1. APPLICATION

The conductive measuring principle can be applied to liquids with specific conductivity over 10 µS/cm. The switching unit can sense the resistance between probes. Conductivity measurement is suitable only for detecting the presence of liquid at a given level of the tank. This level is represented by the length of the probe.

The level switch consists of a NIVOCONT KRK-622-□ type switching unit and the KLN-2 $\square\square$ type probes selected according to the task. Probes are to be connected to the NIVOCONT KSD - DOD type probe socket head that can be screwed into the tank.

If the material of the tank or its internal insulation is not conductive then a reference probe should be used in addition to the one, two, three or four probe(s), if the material of the tank is conductive, the tank can be used as a reference probe.

The conductive switch is suitable for filling-emptying control with 2 relay outputs working simultaneously or for level detection of 2 independent levels (in 1 or 2 tanks) with 2 independent relay outputs. More level switches can also be used with one common reference probe 'C' using any combination of multiple-probe and single-probe socket.

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× 1½" (KSH-20□)
- M6 nut (standard SW): 3× (KSH-202)
- 4× (KSH-203, KSH-204)
- M6 nut (non-st. SW) 1× (KSH-204)

NIVOCONT K

CONDUCTIVE LEVEL SWITCH

USER'S MANUAL





Manufacturer: NIVELCO Process Control Co. H-1043 Budapest, Dugonics v. 11.

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2.1 GENERAL DATA 2.1.1 Switch

2. TECHNICAL DATA

	KRK-622-1, -2	KRK-622-4			
Probe voltage	max. 3.5 V AC				
Probe current	< 1 mA AC				
Sensitivity	Adjustable: 5100 kΩ				
Max. cable capacitance	800 nF (sensiti 100 nF (sensitiv				
Response time	max. 40	0 ms			
Mechanical accuracy	±5%	b			
Delay	Adjustable: 0).510 s			
Relay output	2× SPDT				
Switching voltage	250 V AC1,	24 V DC			
Switching current	16 A AC1				
Switching power	4000 VA AC1, 384 W DC				
Min. output power DC	4 kV (power – output)				
Mechanical life-span	3 × 10 ⁷ switches				
Electrical life-span	0.7 × 10 ⁵ switches				
Power supply U	230 V or 110 V AC 24 V AC/DC				
rower supply o _n	Galvanically separated (AC 50/60 Hz)				
Voltage range allowed	Nominal voltage –15%+10%				
Power consumption	2.5 W / 5 VA (230 V AC, 110 V AC), 1.4 W / 2 VA (24 V AC/DC)				
Ambient temperature	-20+55 °C (-4+131 °F)				
Electrical connection	max. 2.5 mm ² (AWG14)				
Overvoltage category	II II				
Pollution degree	2				
Electrical protection	Class II Class III				
Ingress protection	IP20				
Mechanical connection	DIN EN 60	715 rail			
Weight	248 g (0.55 lb)	147 g (0.32 lb)			

2.1.2 Probe sockets

	KSK-	KSP- KSS- KSN-			KSH-						KLN-	KLP- KLP-		
	201	201	201	201	202	203	204	301	302	303	304	200	201	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 ⁽¹⁾	protect	M4 nut, ed by a rub	ber cap	M20x1.5 cable diameter Ø612 mm (Ø0.250.5 inch)					-		-		
Process conn.	-		%" BSP	BSP 1½" 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(+17	-80 °C 6 °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			-				
Mass	50 g (0.11 lb)		100 g (0.22 lt	b)	40			00 g (0.88 lb)			220 g/m (0.13 lb/ft)			
														~

r = reference probe

(1) cable: Ø4...7 mm

2.2 ORDER CODES (NOT ALL CODE VARIATION AVAILABLE)

Power supply	Code
230 V AC	1
110 V AC	2
24 V AC/DC	4

Code	Prob	Code	
0	0 m	0 m	0
1	1 m (3.3 ft)	0.5 m (1.64 ft)	5
2	2 m (6.6 ft)		
3	3 m (10 ft)		

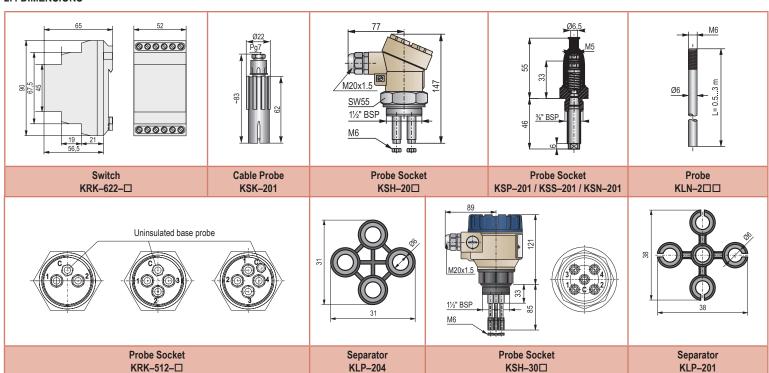
Туре	Code		
Cable probe	K		
SINGLE PROBE			
PP socket	Р		
Carbon steel socket	S		
Stainless steel socket	N		
MULTIPLE PROBES			
Stainless steel socket	Н		

NIVOCONT KS - 0						
Туре	Code	Housing mat.	Code			
Cable probe	K	Aluminum	2			
SINGLE PROBE		Plastic	3			
PP socket	Р					
Carbon steel socket	S					

Probe number	Code
1 + reference probe*	1*
2 + reference probe	2
3 + reference probe	3
4 + reference probe	4
only plastic version	

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

2.4 DIMENSIONS



3. INSTALLATION

A KRK-622-□ switching unit can be mounted on DIN EN 60715 rail.

It is recommended the **KLN-2** \square type probes to be cut to the length required for level detection on site. The probes should be screwed into the **KS** \square - \square 0 \square type sockets.

ALWAYS REMEMBER TO TIGHTEN THE PROBE WITH AN M6 NUT!

When using **KSH–204** type probe sockets the reference probes should be tightened with special SW hexagonal M6 nuts!

It is suggested **KLP–201** or **KLP–204** type PVDF separators (suitable up to +130 °C) to be used at every 0.5 m for multiple probe devices to keep the probes apart.

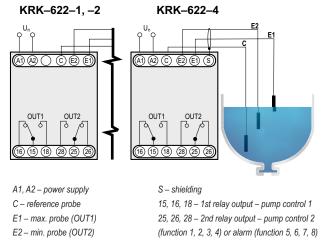
A **KSK–201** single probe, attached to an insulated cable, can be lowered into pits and wells without running the risk of a short circuit. When a detection is needed in a well or in a plastic pipe 2 of them have to be used. For additional levels additional probes should be used.

4. WIRING

If the wall of the tank is conductive no reference probe is needed. In this case terminal 'C' has to be connected to the tank.

On multiple probe units 'E1' and 'E2' are marked with 1–4, the reference probe is marked with 'C'. Admissible length of cable between switching unit and probes depends on cable capacitance and conductivity.

The terminal block assignment of KRK-622-1 and KRK-622-2 is not the same, the KRK-622-4 is different. There is no 'S' terminal at the KRK-622-1 and KRK-622-2. Referring to the illustration below for the terminal block assignments of the devices.



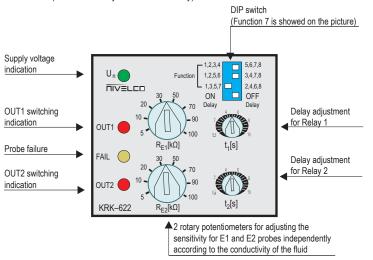
To eliminate signal interferences it is recommended to use shielded cables to the probes.

5. COMMISSIONING

5.1. ADJUSTMENT

The green LED ($\mathrm{U_n}$) shows that the unit is on, the energised state of the relays are indicated by the OUT1 respectively OUT2 LEDs. If the OUT1, OUT2 (red) LEDs are flashing, they indicate the timer operation. When they light up, it shows that the corresponding relay is switched on. Yellow LED (FAIL) indicates probe failure (for example at Functions 5 and 6 probe 'E1' is flooded and probe 'E2' is not, which is unreal state so the yellow LED is on.)

Operating modes, delay ON and delay OFF can be set with the DIP switch on the front panel. $t_1[s]$ and $t_2[s]$ potentiometers are for adjusting the delay time. The delay value can change from 0.5 seconds to 10 seconds. You can set the sensitivity of the two probes independently using the R_{E_1} or R_{E_2} potentiometers. The sensitivity setting should comply with the conductivity of the fluid. Do not set sensitivity higher than required because the vapour precipitation may lead to operation disturbance. In heavily humid environment insulated probes can be used. With the ON Delay / OFF Delay switch on the DIP switch, delay type of the relays can be selected (switch-on delay or switch-off delay).

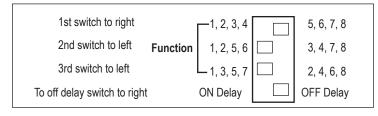


Front panel of NIVOCONT KRK-622

Example of setting DIP switch:

Select the desired function in accordance with the figures. The upper 3 switches are for selecting the number of the function you want to use. If you want to use Function 5 you should set the switches as follows: set the 1st switch to the right, the 2nd to the left and the 3rd to the left. Then select whether you need ON delay or OFF delay with the 4th switch. You can choose the type of delay, but you cannot deactivate the delay. However, the minimum delay time you can set with the potentiometers is 0.5 seconds.

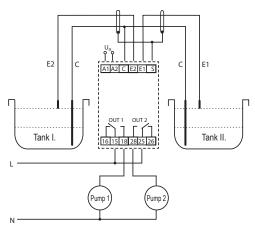
The DIP switch looks like this after setting function 5 with an OFF delay:



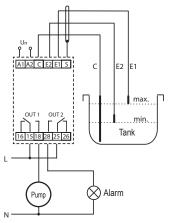
5.2 FUNCTIONS

Attention! The following wiring diagrams show the wiring of the KRK-622-4, 24 V supply voltage device.

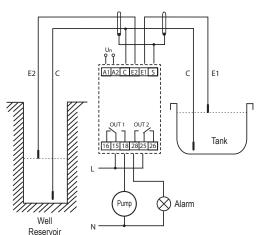
Functions 1 to 4 are for controlling 2 pumps according to the following picture:



Functions 5 and 6 are for controlling one pump (filling or emptying one tank) and for generating alarm signal according to the following picture. If level is not between 'E1' and 'E2' alarm is generated:



Functions 7 and 8 also controls one pump and generates one alarm signal:



FUNCTION 1

Controlling level in 2 separate tanks (each with 1 probe) – filling. The pumps are running and fill the tanks until the levels reach the corresponding probes (E1 or E2).

Relay 1 (E1): Pump control 1

Relay 2 (E2): Pump control 2

FUNCTION 2

Controlling level in 2 separate tanks (each with 1 probe) – emptying. The pumps are running and emptying the tanks until probes are flooded.

Relay 1 (E1): Pump control 1

Relay 2 (E2): Pump control 2

FUNCTION 3

Controlling level in 2 separate tanks (each with 1 probe). Pump 1 is emptying the tank and stops when probe 'E1' is not flooded anymore. Pump 2 is filling the tank and stops if level reaches probe 'E2'.

Relay 1 (E1): Pump control 1

Relay 2 (E2): Pump control 2

FUNCTION 4

Controlling level in 2 separate tanks (each with 1 probe). Pump 2 is emptying the tank and stops when probe 'E2' is not flooded anymore. Pump 1 is filling the tank and stops if level reaches probe 'E1'.

Relay 1 (E1): Pump control 1

Relay 2 (E2): Pump control 2

FUNCTION 5

Both probes and reference probe are in one tank. Relay 1 controls the pump, which keeps the tank filled and maintains the level between probes 'E1' and 'E2'. Relay 2 is used to alarm signalling. Relay 2 is on if the level is not between the two probes.

Relay 1 (E1): Pump control 1

Relay 2 (E2): Alarm

FUNCTION 6

Both probes and reference probe are in one tank. Relay 1 controls the pump, which keeps the tank empty and maintains the level between probes 'E1' and 'E2'. Relay 2 is used to alarm signalling. Relay 2 is on if the level is not between the two probes.

Relay 1 (E1): Pump control 1

Relay 2 (E2): Alarm

FUNCTION 7

Pumping from well to the tank – probe 'E2' is in the well, probe 'E1' is in the tank. The pump only runs if probe 'E2' is flooded (enough water in the well) and the tank is not full meaning the level does not reach probe 'E1'. The alarm reports a lack of water in the well (probe 'E2' is not flooded).

Relay 1 (E1): Pump control 1

Relay 2 (E2): Alarm

FUNCTION 8

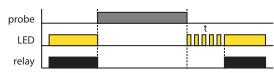
Pumping from reservoir to the tank – probe 'E2' is in the reservoir, probe 'E1' is in the tank. The pump only runs if probe 'E2' is flooded (full reservoir) and the tank is not full (probe 'E1'). The alarm reports the status of full tank and reservoir (both probes are flooded).

Relay 1 (E1): Pump control 1

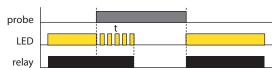
Relay 2 (E2): Alarm

5.3 TIME DIAGRAMS

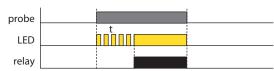
FUNCTION 1, 3, 4 - PUMP UP (FILLING), ON DELAY:



FUNCTION 1, 3, 4 - PUMP UP (FILLING), OFF DELAY:



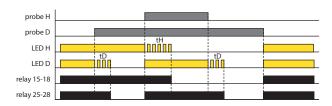
FUNCTION 2, 3, 4 – PUMP DOWN (EMPTYING), ON DELAY:



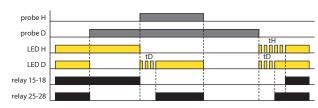
FUNCTION 2, 3, 4 - PUMP DOWN (EMPTYING), OFF DELAY:



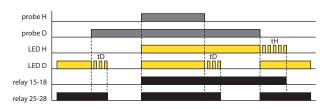
FUNCTION 5 - PUMP UP (FILLING), ON DELAY:



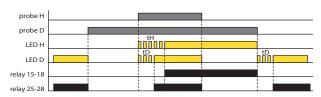
FUNCTION 5 - PUMP UP (FILLING), OFF DELAY:



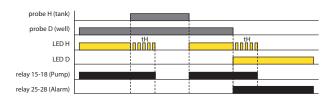
FUNCTION 6 - PUMP DOWN (EMPTYING THE TANK), ON DELAY:



FUNCTION 6 - PUMP DOWN (EMPTYING THE TANK), OFF DELAY:



FUNCTION 7 - PUMP FROM WELL TO TANK, ON DELAY:



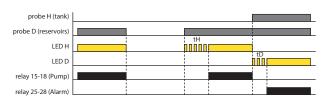
FUNCTION 7 – PUMP FROM WELL TO TANK, OFF DELAY:



FUNCTION 8 - PUMP FROM RESERVOIRS TO TANK, ON DELAY:



FUNCTION 8 – PUMP FROM RESERVOIRS TO TANK, OFF DELAY:



6. MAINTENANCE AND 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.

7. STORAGE CONDITIONS

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

krk622en1905h
December 2019
NIVELCO reserves the right to change technical data without notice.