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NIVOCONT K

KRK–622
CONDUCTIVE LEVEL SWITCH

USER'S MANUAL

PDF

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CE

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☐☐ type probes selected according to the task. Probes are to be connected to the NIVOCONT KS☐– ☐0☐ 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× ⅜" (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)

2. TECHNICAL DATA

2.1 GENERAL DATA

2.1.1 Switch

	KRK–622–1, –2	KRK–622–4
Probe voltage	max. 3.5 V AC	
Probe current	< 1 mA AC	
Sensitivity	Adjustable: 5…100 kΩ	
Max. cable capacitance	800 nF (sensitivity 5 kΩ) 100 nF (sensitivity 100 kΩ)	
Response time	max. 400 ms	
Mechanical accuracy	±5%	
Delay	Adjustable: 0.5…10 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_n	230 V or 110 V AC	24 V AC/DC
	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 mm² (AWG14)	
Overvoltage category	II	
Pollution degree	2	
Electrical protection	Class II	Class III
Ingress protection	IP20	
Mechanical connection	DIN EN 60715 rail	
Weight	248 g (0.55 lb)	147 g (0.32 lb)

2.1.2 Probe sockets

	KSK–201	KSP–201	KSS–201	KSN–201	KSH–202	KSH–203	KSH–204	KSH–301	KSH–302	KSH–303	KSH–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[1]	M4 nut, protected by a rubber cap			M20x1.5 cable diameter Ø6…12 mm (Ø0.25...0.5 inch)							–	–	
Process conn.	–	⅜" 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. +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				–		
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

[1] cable: Ø4…7 mm

2.2 ORDER CODES (NOT ALL CODE VARIATION AVAILABLE)

KRK–622–☐

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

KLN–2☐☐

Code	Probe length		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)		

NIVOCONT KS☐ – ☐0☐

Type	Code
Cable probe	K
SINGLE PROBE	
PP socket	P
Carbon steel socket	S
Stainless steel socket	N
MULTIPLE PROBES	
Stainless steel socket	H

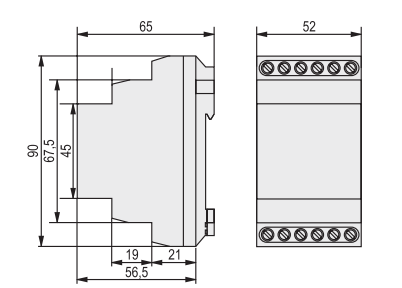
Housing mat.	Code
Aluminum	2
Plastic	3

Probe number	Code
1 + reference probe*	1*
2 + reference probe	2
3 + reference probe	3
4 + reference probe	4

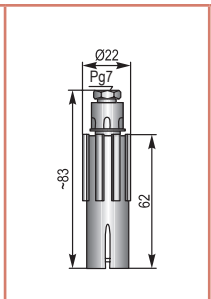
*only plastic version

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

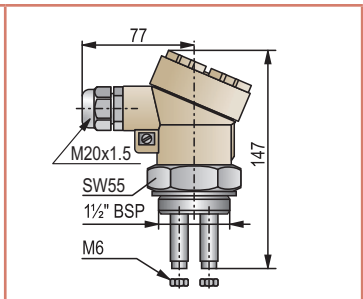
2.4 DIMENSIONS



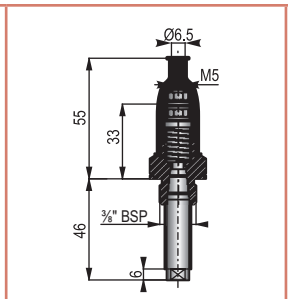
Switch KRK–622–☐



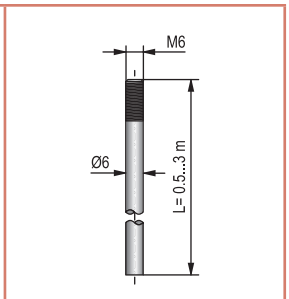
Cable Probe KSK–201



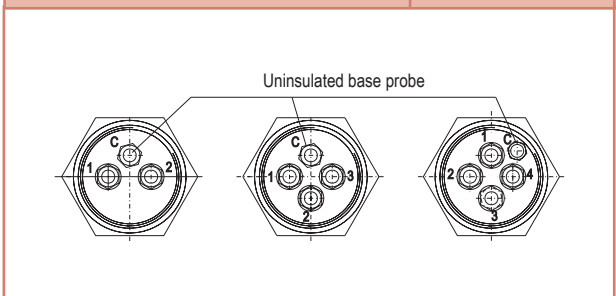
Probe Socket KSH–20☐



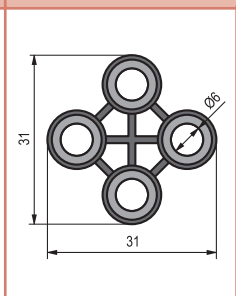
Probe Socket KSP–201 / KSS–201 / KSN–201



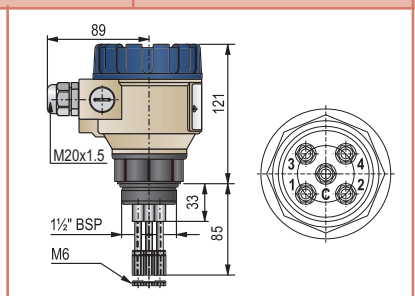
Probe KLN–2☐☐



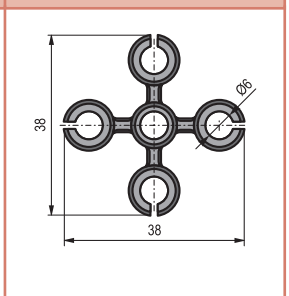
Probe Socket KRK–512–☐



Separator KLP–204



Probe Socket KSH–30☐



Separator KLP–201

3. INSTALLATION

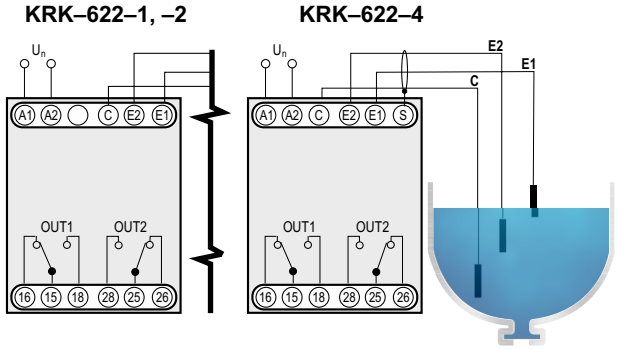
A **KRK–622–□** switching unit can be mounted on DIN EN 60715 rail.
It is recommended the **KLN–2□□** type probes to be cut to the length required for level detection on site. The probes should be screwed into the **KS□–□0□** type sockets.

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.



A1, A2 – power supply
C – reference probe
E1 – max. probe (OUT1)
E2 – min. probe (OUT2)
S – shielding
15, 16, 18 – 1st relay output – pump control 1
25, 26, 28 – 2nd relay output – pump control 2
(function 1, 2, 3, 4) or alarm (function 5, 6, 7, 8)

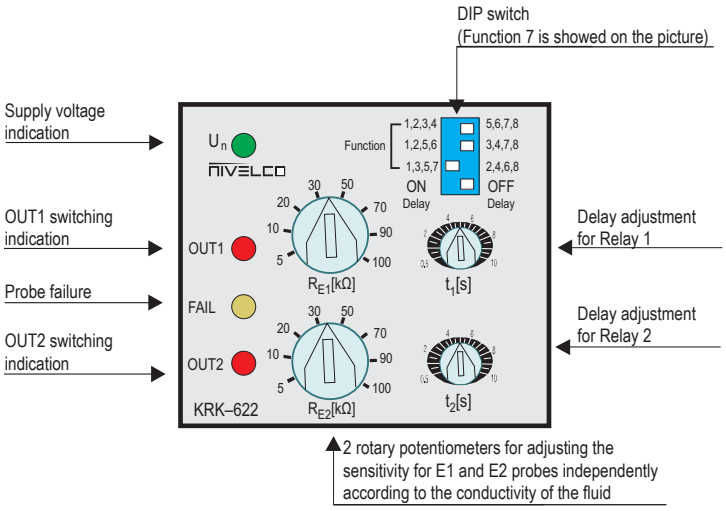
To eliminate signal interferences it is recommended to use shielded cables to the probes.

5. COMMISSIONING

5.1. ADJUSTMENT

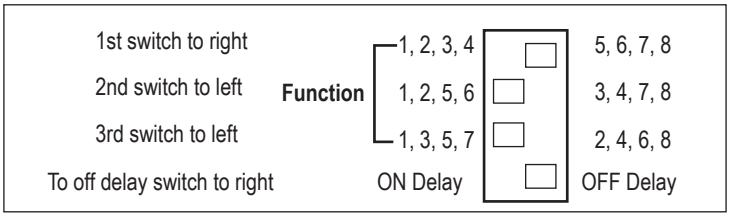
The green LED (U_n) shows that the unit is on, the energised state of the relays are indicated by the OUT1 respectively OUT2 LEDs. If the OUT1, OUT2 (red) LEDs are flashing, they indicate the timer operation. When they light up, it shows that the corresponding relay is switched on. Yellow LED (FAIL) 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_{E1} or R_{E2} 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

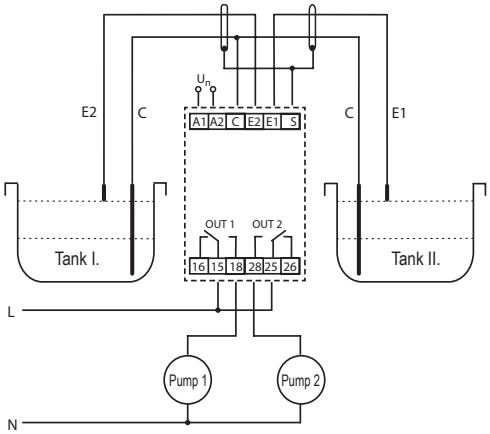
Example of setting DIP switch:
Select the desired function in accordance with the figures. The upper 3 switches are for selecting the number of the function you want to use. If you want to use Function 5 you should set the switches as follows: set the 1st switch to the right, the 2nd to the left and 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:



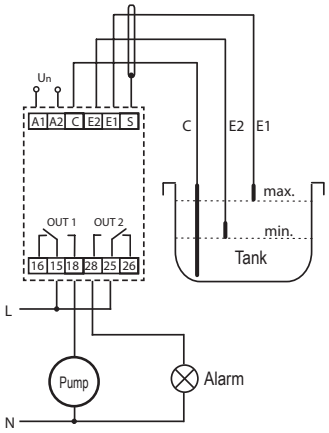
5.2 FUNCTIONS

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

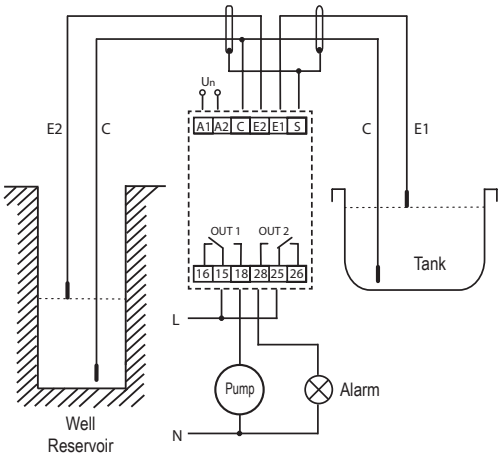
Functions 1 to 4 are for controlling 2 pumps according to the following picture:



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

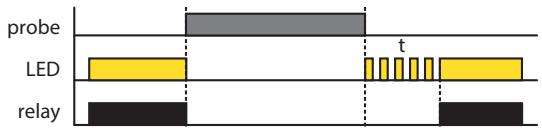
FUNCTION 6
Both probes and reference probe are in one tank. Relay 1 controls the pump, which keeps the tank empty and maintains the level between probes 'E1' and 'E2'. Relay 2 is used to alarm signalling. Relay 2 is on if the level is not between the two probes.
Relay 1 (E1): Pump control 1
Relay 2 (E2): 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

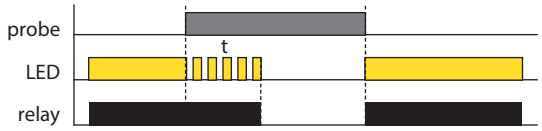
FUNCTION 8
Pumping from reservoir to the tank – probe 'E2' is in the reservoir, probe 'E1' is in the tank. The pump only runs if probe 'E2' is flooded (full reservoir) and the tank is not full (probe 'E1'). The alarm reports the status of full tank and reservoir (both probes are flooded).
Relay 1 (E1): Pump control 1
Relay 2 (E2): Alarm

5.3 TIME DIAGRAMS

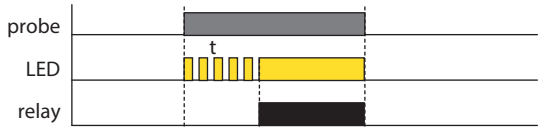
FUNCTION 1, 3, 4 – PUMP UP (FILLING), ON DELAY:



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

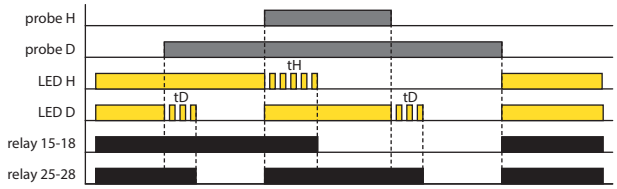


FUNCTION 2, 3, 4 – PUMP DOWN (EMPTYING), ON DELAY:

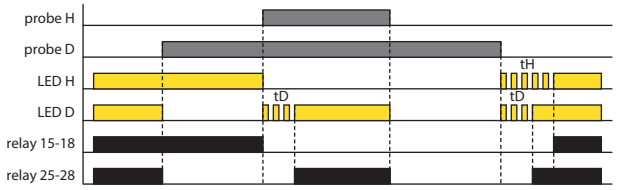


FUNCTION 2, 3, 4 – PUMP DOWN (EMPTYING), OFF DELAY:

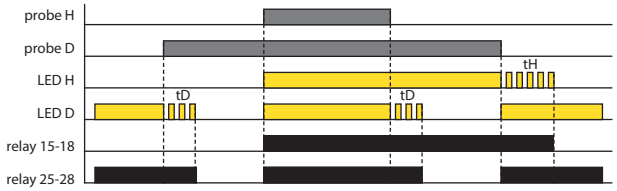
FUNCTION 5 – PUMP UP (FILLING), ON DELAY:



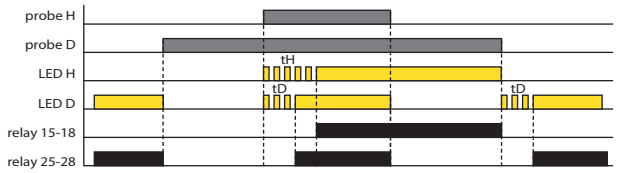
FUNCTION 5 – PUMP UP (FILLING), OFF DELAY:



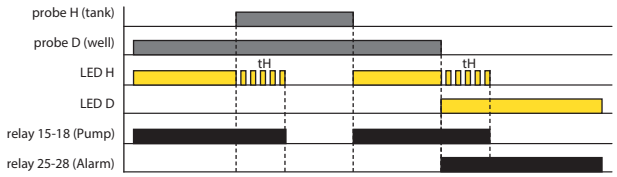
FUNCTION 6 – PUMP DOWN (EMPTYING THE TANK), ON DELAY:



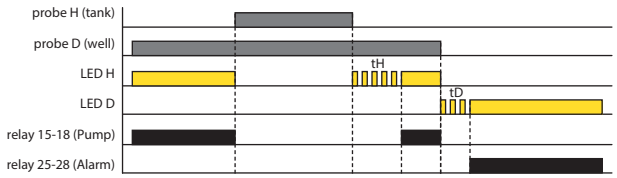
FUNCTION 6 – PUMP DOWN (EMPTYING THE TANK), OFF DELAY:



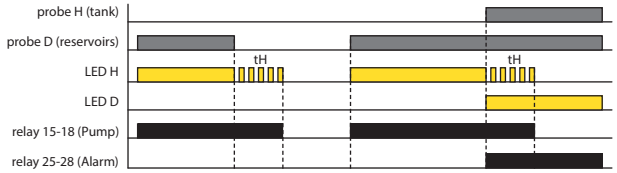
FUNCTION 7 – PUMP FROM WELL TO TANK, ON DELAY:



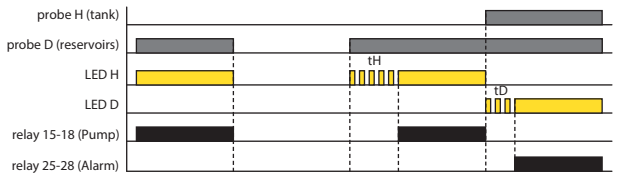
FUNCTION 7 – PUMP FROM WELL TO TANK, OFF DELAY:



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.