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1. APPLICATION

The UNICONT PKK-312-□ series are 4-20 mA current controlled limit switches. The relay output of the units switch at the current limit values (taught to the unit), depending on the limits, switching difference or window comparator modes selected by programming. Error status indication can be programmed so that the relay gets energised or de-energised when detecting any failure. Failure may be represented by discontinuity of cable / lower value fault current or short circuit / upper value error current.

The unit is suitable for powering all NIVELCO manufactured 2-wire (4-20 mA) transmitters. Some models of this series meet the requirements of intrinsically safe operation.

UNICONT PKK-312-8 Ex unit is able without any further programming to monitor the DC powered, 2-wire NIVOSWITCH Ex type vibrating fork's output current changes between the freely vibrating and the immersed states.

2. TECHNICAL DATA

2.1 GENERAL DATA

TYPE	PKK-312-□	
Nominal input current range	1 ... 22 mA	
Accuracy of switching level/threshold level	± 0.1 mA	
Discontinuity threshold/Lower value fault current	3.7 mA	
Short circuit threshold/Upper value fault current	22 mA	
Input impedance	10 Ω	
Input overload capability	maximum 100 mA (permanent)	
Damping	0.1 s; 1 s; 2 s; 5 s selectable	
Relay	- Output	1 piece SPDT
	- Rating	250 V AC, 8 A, AC1
	- Insulation strength	4000 V 50 Hz
	- Electrical / Mechanical life time	10 ⁵ / 2 x 10 ⁶ switching
Electrical connection	max. 2.5 mm ² twisted or maximum 4 mm ² single cable	
Mechanical connection	EN 60715 rail mounted	
Ingress protection	IP 20	
Mass	≈ 0.21 kg	

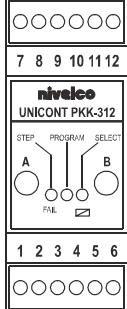
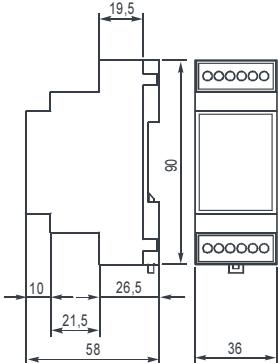
2.2 SPECIAL DATA

TYPE	EX APPROVED MODELS				ORDINARY MODELS			
	PKK-312-5 Ex	PKK-312-6 Ex	PKK-312-7 Ex	PKK-312-8 Ex	PKK-312-1	PKK-312-2	PKK-312-3	PKK-312-4
Power supply range	230 V AC $\pm 10\%$ 50...60 Hz	110 V AC $\pm 10\%$ 50...60 Hz	24 V AC $\pm 10\%$, 50...60 Hz, 24 V DC $\pm 15\%$	230 V AC $\pm 10\%$ 50...60 Hz	110 V AC $\pm 10\%$ 50...60 Hz	24 V AC $\pm 10\%$ 50...60 Hz	24 V AC $\pm 10\%$, 50...60 Hz, 24 V DC $\pm 15\%$	24 V AC $\pm 10\%$, 50...60 Hz, 24 V DC $\pm 15\%$
Power consumption	< 2.5 VA	< 2.5 VA	< 2.5 W		< 2.7 VA			< 2.5 W
Safety maximum voltage	Um=253 V AC				-			
Switching levels	2 values in the range of 1 ... 22 mA		10.5 mA; 12.5 mA		2 values in the range of 1 ... 22 mA			
Ex protection mark	II (1) G [Ex ia Ga] IIB II (1) D[Ex ia Da] IIIC		II (1) G [Ex ia Ga] IIIC II (1) D[Ex ia Da] IIIC		-			
Intrinsically safe maximum values	U ₀ < 28.4 V; I ₀ < 140 mA; P ₀ < 1.1 W; L ₀ < 6 mH; C ₀ < 50 nF		U ₀ < 28.4 V; I ₀ < 80 mA; P ₀ < 0.6 W L ₀ < 4 mH; C ₀ < 50 nF		-			
Output load capability	I _t = 22 mA when U _{out} \approx 12 V		I _t =22 mA when U _{out} \approx 15 V		U ₀ = 30 V I _{MAX} = 70 mA U _{OUT min} = 16 V			
Protection class	Class II		Class III		Class II			
Ambient temp.	-25 °C ... +55 °C				-25 °C ... +55 °C			

2.3 ACCESSORIES

- User's Manual
- Warranty Card
- Declaration of Conformity

2.4 DIMENSIONS



2.5 ORDER CODE

P K K - 3 1 2 - □ Ex*

POWERING / Ex	CODE
230 V AC	1
110 V AC	2
24 V AC	3
24 V AC / DC	4
230 V AC Ex	5
110 V AC Ex	6
24 V AC / DC Ex	7
24 V AC / DC Ex	8**

* The order code of an Ex version should end in 'Ex'

** For DC powered, 2-wire NIVOSWITCH Ex vibrating fork of
NIVELCO

3. INSTALLATION

UNICONT PKK-312-□ should be mounted on EN 60715 rail.

NOTE!

Prior to the installation make sure that the input current values can be provided by the loop of the application. If not, teaching of the current values has to be carried out before installation and wiring. (See Point 5 "Teaching current value of tripping point")

4. WIRING

4.1 EX MODELS

PKK-312-8 Ex with NIVOSWITCH Ex vibrating fork	PKK-312-7 Ex with 2-wire Ex transmitter (e.g. EchoTREK SEA-380-6 Ex)	PKK-312-5 Ex... PKK-312-7 Ex for monitoring of Ex passive switch and cable

4.2 ORDINARY MODELS

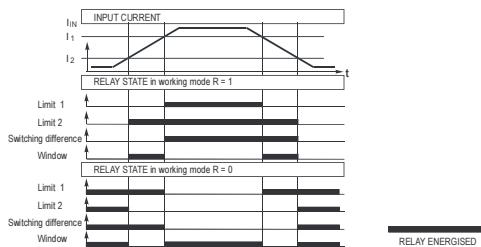
PKK-312-1 ... PKK-312-4 with 4-wire active transmitter (e.g. EchoTREK STA-460)	PKK-312-1 ... PKK-312-4 with 4-wire active transmitter (e.g. MICROSONAR UTS-211)	PKK-312-1 ... PKK-312-4 for monitoring of passive switch

5. INSTALLATION AND SETTING UP

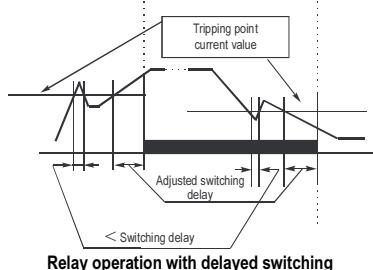
After 3 s from power up the unit begins to work with the signals as per table of WORKING STATUS.

WORKING STATUS		
LED	Indication	Interpretation
(SELECT)	GREEN	Relay energised R=1
	RED	Relay de-energised R=0
FAIL (STEP)	SIMULTANOUS RED BLINKING OF BOTH LED	Memory failure, Relay state sustained
	GREEN	No cable fault/No fault current. No cable monitoring
RED	Cable fault, or. fault current	

The state of the relay in accordance with the operation mode and depending on the input current will be as shown on the first diagram. Operation with delayed switching is demonstrated on the second diagram below.



State of the relay depending on the input current



Relay operation with delayed switching

CAUTION!

If on power up of a unit, set for switching differential, the value of the current will be between the two tripping points, the relay would always remain de-energised irrespectively of the relay operation mode (R = 1 or R = 0) programmed before.

Depending on the actual task, programming of the unit may be needed which involves setting of the Operating Mode with the possibilities as below

PKK-312-Ex unit can be used without any programming for the powering and remote switching function of the Nivelco made DC powered, 2-wire NIVOSWITCH Ex vibrating fork. **Tripping point current values of 10,5 and 12,5 mA and switching differential operating mode can not be changed!**

Setting possibilities:

- Relay operating mode (Default: R = 1)
- Monitoring of cable discontinuity (Default: NONE)
- Monitoring of cable short circuit (Default: NONE)
- Damping (Default: 0.1 s)
- Return to default

A PKK-312-1...PKK-312-7 Ex

Setting possibilities:

- Selection of comparison type (Default: Switching difference)
- Teaching current value (Default: 10,5 mA and 12,5 mA)
- Relay operating mode (Default: R=1)
- Monitoring of cable discontinuity (Default: NONE)
- Monitoring of cable short circuit (Default: NONE)
- Damping (Default: 0,1 s)
- Return to default

PROGRAMMING

Programming involves setting of operating mode and teaching of the input current.

Programming / viewing operating mode

PROGRAMMING / VIEWING OPERATING MODE				
Enter programming mode: press key A (for about 5 s) till the LED PROGRAM lights up				
Adjustment columns with corresponding LED STEP states, accessed by short pressing of key A				Adjustment raw with relevant state of the LED SELECT, selected by short pressing of key B
GREEN	GREEN BLINKING	RED	RED BLINKING	OFF
Relay operation mode	Comparat or operation mode	Cable short circuit */ monitoring lower current	Cable discontinuity */ monitoring upper current	Switching delay
R = 1	Limit value 1.	ON, relay should be activated	ON, relay should be activated	0,1 s
R = 0	Limit value 2.	ON, relay should be released	ON, relay should be released	1 s
--	Switch. diff	NO	NO	2 s
--	Window	--	--	5 s
Quit programming mode: press key A (for about 5 s) till the LED PROGRAM goes off.				

Cable monitoring can only be applied with Ex certified 2-wire units.

AUTOMATIC QUITTING PROGRAMMING MODE

The unit will operate during programming in accordance with the previous parameters entered in the last completed programming. The new modified parameters will only be effective after quitting programming mode.

Having left the transmitter in programming mode, it would after 30 s automatically quit programming mode. Since this represents uncompleted programming, the performed modification would not be effective.

RELAY TEST

Proper operation of the relay can be tested by pressing key B for about 5 s as a consequence of which the state of the relay and colour of the LED (e.g. from green to red) would be changed. Releasing the key the relay and LED would return to the previous position.

RETURN TO DEFAULT

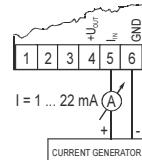
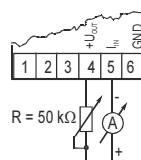
Programming would be returned to default if keys A and B are pressed before/during power up.

TEACHING CURRENT VALUE OF TRIPPING POINT

Teaching input currents represents saving of I_{in} current values for switching point 1 and switching point 2 prevailing between terminals (as per right hand drawing) at the moment of the teaching.

Necessary current values can be provided by one of the arrangements or by the circuit of the actual application on site.

If the input current will be provided by the circuit of the actual application its value have not to be known.



Arrangements for teaching input currents

To perform teaching, keys A and B should be pressed simultaneously for about 5 s until teaching mode has been entered, indicated by the blinking of LED PROGRAM. Releasing key B, or A (**only one of them**) the momentary current value will be assigned to switching point 1 or 2. Also releasing the other key, teaching will be completed, indicated by the going off of LED PROGRAM. Having taught the first current value, the other one can also be taught without quitting teaching mode, whereas the key already released should be pressed again (for about 5 s) and the other key released.

TEACHING					
	Position of key A	Position of key B	STEP LED	PROGR. LED	SELECT LED
Entering teaching mode	KEEP PRESSED > 5 s		OFF	blinking	OFF
Teaching current value for point 1	KEEP PRESSED	RELEASE	OFF		GREEN if SUCCESSFUL RED blinking if FAILED
Quitting teaching mode	RELEASE	-	According to WORKING STATUS	OFF	According to WORKING STATUS
Entering teaching mode	KEEP PRESSED > 5 s		OFF	blinking	OFF
Teaching current value for point 2	RELEASE	KEEP PRESSED	GREEN if SUCCESSFUL RED blinking if FAILED		OFF
Quitting teaching mode	-	RELEASE	According to WORKING STATUS	OFF	According to WORKING STATUS

6. MAINTENANCE AND REPAIR

The unit does not require regular maintenance. All repairs will be carried out at the manufacturer's premises.

7. STORAGE

Temperature: -30 °C ... +60 °C

Humidity: maximum 98%

8. WARRANTY

NIVELCO provides warranty of 3 (three) years in compliance with details described in the Warranty Card.