



## Model Number

NCN3-F31-N4-K-K

## Features

- Direct mounting on standard actuators
- Compact and stable housing
- Fixed setting
- EC-Type Examination Certificate TÜV99 ATEX 1479X
- Usable up to SIL 2 acc. to IEC 61508

## Accessories

### BT65A

Activator for F31 series

### BT65X

Activator for F31 series

### BT115A

Activator for F31 series

### BT115X

Activator for F31 series

### BT65B

Activator for F31 series

### BT115B

Activator for F31 series

## Technical Data

### General specifications

Switching function		2 x normally closed (NC)
Output type		NAMUR
Rated operating distance	$s_n$	3 mm
Installation		flush mountable
Assured operating distance	$s_a$	0 ... 2.4 mm
Actual operating distance	$s_r$	2.7 ... 3.3 mm typ.
Actuating element		Stainless steel 1.4305 / AISI 303 8.5 mm x 8.5 mm x 0.5 mm
Reduction factor $r_{Al}$		0.5
Reduction factor $r_{Cu}$		0.4
Reduction factor $r_{304}$		1
Reduction factor $r_{St37}$		1.3
Reduction factor $r_{Brass}$		0.6
Output type		2-wire

### Nominal ratings

Nominal voltage	$U_o$	8 V
Switching frequency	$f$	0 ... 3 kHz
Hysteresis	$H$	typ. 5 %
Reverse polarity protection		reverse polarity protected
Short-circuit protection		yes
Suitable for 2:1 technology		yes, Reverse polarity protection diode not required
Current consumption		
Measuring plate not detected		$\geq 3$ mA
Measuring plate detected		$\leq 1$ mA
Time delay before availability	$t_v$	$\leq 1.1$ ms
Switching state indicator		LED, yellow
Valve status indicator		LED, yellow

### Functional safety related parameters

Safety Integrity Level (SIL)		SIL 2
MTTF <sub>d</sub>		1470 a
Mission Time ( $T_M$ )		20 a
Diagnostic Coverage (DC)		0 %

### Valve circuit

Voltage		max. 32 V DC
Current		max. 240 mA
Short-circuit protection		no
Reverse polarity protection		yes, with reversed output LED is out of function, therefore more power for solenoid valve

### Ambient conditions

Ambient temperature		-25 ... 100 °C (-13 ... 212 °F)
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#### Note:

Under the same product name but with a different part no., this product has a predecessor with a restricted temperature range (up to +70 °C).

The temperature range specified here (up to +100 °C) only applies to sensors with part no. 2239\*\*.

Storage temperature		-40 ... 100 °C (-40 ... 212 °F)
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### Mechanical specifications

Connection (system side)		PVC cable, 5 m
Core cross-section (system side)		0.75 mm <sup>2</sup>
Connection (valve side)		PVC cable, 0.5 m
Core cross-section (valve side)		0.75 mm <sup>2</sup>
Housing material		PBT
Sensing face		PBT
Degree of protection		IP67
Cable		
Bending radius		> 10 x cable diameter

### General information

Use in the hazardous area		see instruction manuals
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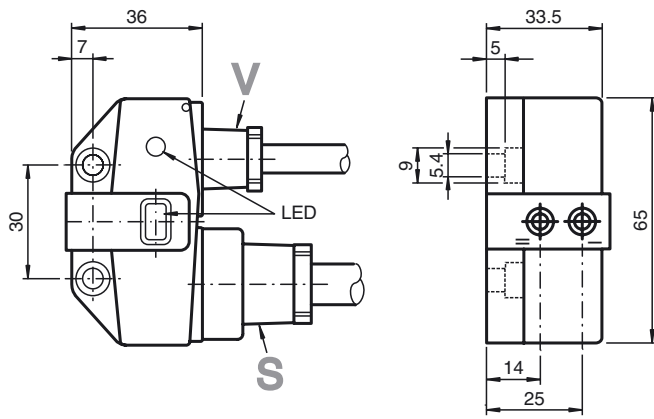
### Compliance with standards and directives

Standard conformity		
NAMUR		EN 60947-5-6:2000 IEC 60947-5-6:1999
Electromagnetic compatibility Standards		NE 21:2007 EN 60947-5-2:2007 EN 60947-5-2/A1:2012 IEC 60947-5-2:2007 IEC 60947-5-2 AMD 1:2012

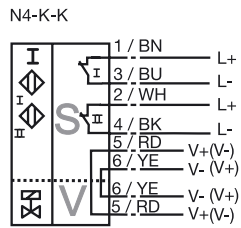
### Approvals and certificates

EAC conformity		TR CU 012/2011
UL approval		cULus Listed, General Purpose
CSA approval		cCSAus Listed, General Purpose
CCC approval		CCC approval / marking not required for products rated $\leq 36$ V

Dimensions



Electrical Connection



**Data for application in connection with hazardous areas**

Equipment protection level Ga , Gb , Gc (ic) , Da , Mb

**Equipment protection level Ga**Type of protection intrinsic safety  
CE marking **CE**0102**Certificates**

Appropriate type	NCN3-F31-N4...
ATEX certificate	TÜV 99 ATEX 1479 X
ATEX marking	Ⓔ II 1G Ex ia IIC T6...T1 Ga
Standards	EN 60079-0:2012+A11:2013 , EN 60079-11:2012
IECEX certificate	IECEX TUN 17.0021X
IECEX marking	Ex ia IIC T6...T1 Ga
Standards	IEC 60079-0:2011 , IEC 60079-11:2011

Effective internal inductivity	$C_i$	$\leq 100$ nF The value is applicable for one sensor circuit. A cable length of 10 m is considered.
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Effective internal inductance	$L_i$	$\leq 100$ $\mu$ H The value is applicable for one sensor circuit. A cable length of 10 m is considered.
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Maximum permissible ambient temperature $T_{amb}$	Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values.
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for ATEX	at $U_i = 15$ V , $I_i = 25$ mA , $P_i = 34$ mW , T6 : 55 °C (131 °F) T5 : 70 °C (158 °F) T4 : 95 °C (203 °F) T3 : 95 °C (203 °F) T2 : 95 °C (203 °F) T1 : 95 °C (203 °F) at $U_i = 15$ V , $I_i = 25$ mA , $P_i = 64$ mW , T6 : 55 °C (131 °F) T5 : 70 °C (158 °F) T4 : 95 °C (203 °F) T3 : 95 °C (203 °F) T2 : 95 °C (203 °F) T1 : 95 °C (203 °F) at $U_i = 15$ V , $I_i = 52$ mA , $P_i = 169$ mW , T6 : 50 °C (122 °F) T5 : 60 °C (140 °F) T4 : 90 °C (194 °F) T3 : 90 °C (194 °F) T2 : 90 °C (194 °F) T1 : 90 °C (194 °F)
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for IECEX	at $U_i = 15$ V , $I_i = 25$ mA , $P_i = 34$ mW , T6 : 75 °C (167 °F) T5 : 90 °C (194 °F) T4 : 100 °C (212 °F) T3 : 100 °C (212 °F) T2 : 100 °C (212 °F) T1 : 100 °C (212 °F) at $U_i = 15$ V , $I_i = 25$ mA , $P_i = 64$ mW , T6 : 75 °C (167 °F) T5 : 90 °C (194 °F) T4 : 100 °C (212 °F) T3 : 100 °C (212 °F) T2 : 100 °C (212 °F) T1 : 100 °C (212 °F) at $U_i = 15$ V , $I_i = 52$ mA , $P_i = 169$ mW , T6 : 65 °C (149 °F) T5 : 80 °C (176 °F) T4 : 90 °C (194 °F) T3 : 90 °C (194 °F) T2 : 90 °C (194 °F) T1 : 90 °C (194 °F)
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Maximum values of the valve circuit	The value applies to each valve circuit. A cable length of 10 m is considered.
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Voltage	$U_i$	$\leq 32$ V
Current	$I_i$	$\leq 240$ mA
Internal capacitance	$C_i$	$\leq 10$ nF
Internal inductance	$L_i$	$\leq 20$ $\mu$ H

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**Equipment protection level Gb**

Type of protection	intrinsic safety	
CE marking	CE 0102	
<b>Certificates</b>		
Appropriate type	NCN3-F31-N4...	
ATEX certificate	TÜV 99 ATEX 1479 X	
ATEX marking	Ex II 1G Ex ia IIC T6...T1 Ga	
Standards	EN 60079-0:2012+A11:2013 , EN 60079-11:2012	
IECEx certificate	IECEx TUN 17.0021X	
IECEx marking	Ex ia IIC T6...T1 Ga	
Standards	IEC 60079-0:2011 , IEC 60079-11:2011	
Effective internal inductivity	$C_i$	$\leq 100 \text{ nF}$ The value is applicable for one sensor circuit. A cable length of 10 m is considered.
Effective internal inductance	$L_i$	$\leq 100 \text{ }\mu\text{H}$ The value is applicable for one sensor circuit. A cable length of 10 m is considered.
Maximum permissible ambient temperature $T_{amb}$	Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. at $U_i = 15 \text{ V}$ , $I_i = 25 \text{ mA}$ , $P_i = 34 \text{ mW}$ , T6 : 75 °C (167 °F) T5 : 90 °C (194 °F) T4 : 100 °C (212 °F) T3 : 100 °C (212 °F) T2 : 100 °C (212 °F) T1 : 100 °C (212 °F) at $U_i = 15 \text{ V}$ , $I_i = 25 \text{ mA}$ , $P_i = 64 \text{ mW}$ , T6 : 75 °C (167 °F) T5 : 90 °C (194 °F) T4 : 100 °C (212 °F) T3 : 100 °C (212 °F) T2 : 100 °C (212 °F) T1 : 100 °C (212 °F) at $U_i = 15 \text{ V}$ , $I_i = 52 \text{ mA}$ , $P_i = 169 \text{ mW}$ , T6 : 65 °C (149 °F) T5 : 80 °C (176 °F) T4 : 90 °C (194 °F) T3 : 90 °C (194 °F) T2 : 90 °C (194 °F) T1 : 90 °C (194 °F)	
Maximum values of the valve circuit	The value applies to each valve circuit. A cable length of 10 m is considered.	
Voltage	$U_i$	$\leq 32 \text{ V}$
Current	$I_i$	$\leq 240 \text{ mA}$
Internal capacitance	$C_i$	$\leq 10 \text{ nF}$
Internal inductance	$L_i$	$\leq 20 \text{ }\mu\text{H}$

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**Equipment protection level Gc (ic)**

Type of protection	intrinsic safety	
CE marking	CE	
<b>Certificates</b>		
ATEX certificate	PF13CERT2895 X	
ATEX marking	⊕ II 3G Ex ic IIC T6...T1 Gc	
Standards	EN 60079-0:2012+A11:2013 , EN 60079-11:2012	
Effective internal inductivity	$C_i$	≤ 100 nF The value is applicable for one sensor circuit. A cable length of 10 m is considered.
Effective internal inductance	$L_i$	≤ 100 μH The value is applicable for one sensor circuit. A cable length of 10 m is considered.
Maximum permissible ambient temperature $T_{amb}$	Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. at $U_i = 20\text{ V}$ , $I_i = 25\text{ mA}$ , $P_i = 34\text{ mW}$ , T6 : 75 °C (167 °F) T5 : 90 °C (194 °F) T4 : 100 °C (212 °F) T3 : 100 °C (212 °F) T2 : 100 °C (212 °F) T1 : 100 °C (212 °F) at $U_i = 20\text{ V}$ , $I_i = 25\text{ mA}$ , $P_i = 64\text{ mW}$ , T6 : 75 °C (167 °F) T5 : 90 °C (194 °F) T4 : 100 °C (212 °F) T3 : 100 °C (212 °F) T2 : 100 °C (212 °F) T1 : 100 °C (212 °F) at $U_i = 20\text{ V}$ , $I_i = 52\text{ mA}$ , $P_i = 169\text{ mW}$ , T6 : 65 °C (149 °F) T5 : 80 °C (176 °F) T4 : 90 °C (194 °F) T3 : 90 °C (194 °F) T2 : 90 °C (194 °F) T1 : 90 °C (194 °F)	
Maximum values of the valve circuit	The value applies to each valve circuit. A cable length of 10 m is considered.	
Voltage	$U_i$	≤ 32 V
Current	$I_i$	≤ 240 mA
Internal capacitance	$C_i$	≤ 10 nF
Internal inductance	$L_i$	≤ 20 μH

**Equipment protection level Da**

Type of protection	intrinsic safety	
CE marking	CE 0102	
<b>Certificates</b>		
Appropriate type	NCN3-F31-N4-K...	
ATEX certificate	TÜV 99 ATEX 1479 X	
ATEX marking	⊕ II 1D Ex ia IIIC T135°C Da	
Standards	EN 60079-0:2012+A11:2013 , EN 60079-11:2012	
IECEX certificate	IECEX TUN 17.0021X	
IECEX marking	Ex ia IIIC T135°C Da	
Standards	IEC 60079-0:2011 , IEC 60079-11:2011	
Effective internal inductivity	$C_i$	≤ 100 nF A cable length of 10 m is considered.
Effective internal inductance	$L_i$	≤ 100 μH A cable length of 10 m is considered.
Maximum permissible ambient temperature $T_{amb}$	Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. at $U_i = 15\text{ V}$ , $I_i = 25\text{ mA}$ , $P_i = 34\text{ mW}$ : 100 °C (212 °F) at $U_i = 15\text{ V}$ , $I_i = 25\text{ mA}$ , $P_i = 64\text{ mW}$ : 100 °C (212 °F) at $U_i = 15\text{ V}$ , $I_i = 52\text{ mA}$ , $P_i = 169\text{ mW}$ : 90 °C (194 °F)	
Maximum values of the valve circuit	The value applies to each valve circuit. A cable length of 10 m is considered.	
Voltage	$U_i$	≤ 32 V
Current	$I_i$	≤ 240 mA
Internal capacitance	$C_i$	≤ 10 nF
Internal inductance	$L_i$	≤ 20 μH

**Equipment protection level Mb**

Type of protection	intrinsic safety	
CE marking	CE 0102	
<b>Certificates</b>		
Appropriate type	NCN3-F31-N4...	
IECEX certificate	IECEX TUN 17.0021X	
IECEX marking	Ex ia I Mb	
Standards	IEC 60079-0:2011 , IEC 60079-11:2011	

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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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Effective internal inductivity	$C_i$	$\leq 100 \text{ nF}$ The value is applicable for one sensor circuit. A cable length of 10 m is considered.
Effective internal inductance	$L_i$	$\leq 100 \text{ }\mu\text{H}$ The value is applicable for one sensor circuit. A cable length of 10 m is considered.
Maximum permissible ambient temperature $T_{\text{amb}}$		Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. at $U_i = 15 \text{ V}$ , $I_i = 25 \text{ mA}$ , $P_i = 34 \text{ mW}$ : $100 \text{ }^\circ\text{C}$ ( $212 \text{ }^\circ\text{F}$ ) at $U_i = 15 \text{ V}$ , $I_i = 25 \text{ mA}$ , $P_i = 64 \text{ mW}$ : $100 \text{ }^\circ\text{C}$ ( $212 \text{ }^\circ\text{F}$ ) at $U_i = 15 \text{ V}$ , $I_i = 52 \text{ mA}$ , $P_i = 169 \text{ mW}$ : $90 \text{ }^\circ\text{C}$ ( $194 \text{ }^\circ\text{F}$ )
Maximum values of the valve circuit		The value applies to each valve circuit. A cable length of 10 m is considered.
Voltage	$U_i$	$\leq 32 \text{ V}$
Current	$I_i$	$\leq 240 \text{ mA}$
Internal capacitance	$C_i$	$\leq 10 \text{ nF}$
Internal inductance	$L_i$	$\leq 20 \text{ }\mu\text{H}$