



## Model Number

NCN3-F31K-N5-K

## Features

- Direct mounting on standard actuators
- Fixed setting
- EC-Type Examination Certificate TÜV99 ATEX 1479X
- 2:1 transfer method
- LEDs for switching state of sensor and solenoid valve
- Valve LEDs disconnectable

## Application

### Note

The connections to this sensor are sealed with stopping plugs to protect against dirt and moisture. If not all of the connections are used in your application, then seal the remaining stopping plugs on the sensor permanently or check during initial installation and when performing regular maintenance work that the stopping plugs are secure and impermeable. If necessary, tighten the stopping plugs to a torque of 1 Nm.

## Accessories

### BT65A

Activator for F31 series

### BT65X

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.
Reduction factor $r_{AI}$		0.35
Reduction factor $r_{CU}$		0.3
Reduction factor $r_{304}$		0.75
Reduction factor $r_{Si37}$		1
Reduction factor $r_{Brass}$		0.45
Output type		2-wire

### Nominal ratings

Nominal voltage	$U_o$	8 V
Switching frequency	$f$	0 ... 3 kHz
Hysteresis	$H$	typ. 5 %
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

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

### Mechanical specifications

Connection (system side)	Cage tension spring terminals
Core cross-section (system side)	1.5/2.5 mm <sup>2</sup> flexible/rigid
Connection (valve side)	Cage tension spring terminals
Core cross-section (valve side)	1.5/2.5 mm <sup>2</sup> flexible/rigid
Housing material	PBT
Sensing face	PBT
Degree of protection	IP67
Tightening torque, housing screws	1 Nm
Tightening torque, cable gland	M20 x 1.5 ; $\leq 7$ Nm M12 x 1.5 ; $\leq 1.5$ Nm

### Note

LED switch-off

### General information

Use in the hazardous area see instruction manuals

### Compliance with standards and directives

Standard conformity	
NAMUR	EN 60947-5-6:2000 IEC 60947-5-6:1999
Electromagnetic compatibility	NE 21:2007
Standards	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

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



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

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

Type of protection	intrinsic safety
CE marking	CE 0102

**Certificates**

Appropriate type	NCN3-F31K-N5...
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 capacitance	$C_i$	$\leq 200$ nF The value is applicable for one sensor circuit. A cable length of 10 m is considered.
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Effective internal inductance	$L_i$	$\leq 200$ $\mu$ 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	<p>at <math>U_i = 15</math> V , <math>I_i = 25</math> mA , <math>P_i = 34</math> mW ,  T6 : 55 °C (131 °F)  T5 : 65 °C (149 °F)  T4 : 95 °C (203 °F)  T3 : 95 °C (203 °F)  T2 : 95 °C (203 °F)  T1 : 95 °C (203 °F)</p> <p>at <math>U_i = 16</math> V , <math>I_i = 25</math> mA , <math>P_i = 64</math> mW ,  T6 : 55 °C (131 °F)  T5 : 65 °C (149 °F)  T4 : 95 °C (203 °F)  T3 : 95 °C (203 °F)  T2 : 95 °C (203 °F)  T1 : 95 °C (203 °F)</p> <p>at <math>U_i = 16</math> V , <math>I_i = 52</math> mA , <math>P_i = 169</math> mW ,  T6 : 45 °C (113 °F)  T5 : 60 °C (140 °F)  T4 : 85 °C (185 °F)  T3 : 85 °C (185 °F)  T2 : 85 °C (185 °F)  T1 : 85 °C (185 °F)</p>
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for IECEX	<p>at <math>U_i = 15</math> V , <math>I_i = 25</math> mA , <math>P_i = 34</math> mW ,  T6 : 70 °C (158 °F)  T5 : 85 °C (185 °F)  T4 : 100 °C (212 °F)  T3 : 100 °C (212 °F)  T2 : 100 °C (212 °F)  T1 : 100 °C (212 °F)</p> <p>at <math>U_i = 15</math> V , <math>I_i = 25</math> mA , <math>P_i = 64</math> mW ,  T6 : 70 °C (158 °F)  T5 : 85 °C (185 °F)  T4 : 100 °C (212 °F)  T3 : 100 °C (212 °F)  T2 : 100 °C (212 °F)  T1 : 100 °C (212 °F)</p> <p>at <math>U_i = 15</math> V , <math>I_i = 52</math> mA , <math>P_i = 169</math> 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)</p>
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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
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Current	$I_i$	$\leq 240$ mA
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Internal capacitance	$C_i$	$\leq 10$ nF
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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-F31K-N5...	
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 capacitance	$C_i$	$\leq 200 \text{ nF}$ The value is applicable for one sensor circuit. A cable length of 10 m is considered.
Effective internal inductance	$L_i$	$\leq 200 \mu\text{H}$ 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 : 70 °C (158 °F) T5 : 85 °C (185 °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 : 70 °C (158 °F) T5 : 85 °C (185 °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	$L_i$	$\leq 20 \mu\text{H}$

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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	Ex II 3G Ex ic IIC T6...T1 Gc	
Standards	EN 60079-0:2012+A11:2013 , EN 60079-11:2012	
Effective internal capacitance	$C_i$	$\leq 200$ nF The value is applicable for one sensor circuit. A cable length of 10 m is considered.
Effective internal inductance	$L_i$	$\leq 200$ $\mu$ 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 $U_i = 20$ V , $I_i = 25$ mA , $P_i = 34$ mW , T6 : 70 °C (158 °F) T5 : 85 °C (185 °F) T4 : 100 °C (212 °F) T3 : 100 °C (212 °F) T2 : 100 °C (212 °F) T1 : 100 °C (212 °F) at $U_i = 20$ V , $I_i = 25$ mA , $P_i = 64$ mW , T6 : 70 °C (158 °F) T5 : 85 °C (185 °F) T4 : 100 °C (212 °F) T3 : 100 °C (212 °F) T2 : 100 °C (212 °F) T1 : 100 °C (212 °F) at $U_i = 20$ 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)	
Maximum values of the valve circuit	The value applies to each valve circuit. A cable length of 10 m is considered.	
Voltage	$U_i$	$\leq 32$ V
Current	$I_i$	$\leq 240$ mA
Internal capacitance	$C_i$	$\leq 10$ nF
Internal inductance	$L_i$	$\leq 20$ $\mu$ H

**Equipment protection level Mb**

Type of protection	intrinsic safety	
CE marking	CE 0102	
<b>Certificates</b>		
Appropriate type	NCN3-F31K-N5...	
IECEX certificate	IECEX TUN 17.0021X	
IECEX marking	Ex ia I Mb	
Standards	IEC 60079-0:2011 , IEC 60079-11:2011	
Effective internal capacitance	$C_i$	$\leq 200$ nF The value is applicable for one sensor circuit. A cable length of 10 m is considered.
Effective internal inductance	$L_i$	$\leq 200$ $\mu$ 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 $U_i = 15$ V , $I_i = 25$ mA , $P_i = 34$ mW : 100 °C (212 °F) at $U_i = 15$ V , $I_i = 25$ mA , $P_i = 64$ mW : 100 °C (212 °F) at $U_i = 15$ V , $I_i = 52$ mA , $P_i = 169$ 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	$U_i$	$\leq 32$ 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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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".