



Model Number

NCN3-F31K-N4-K

Features

- Direct mounting on standard actuators
- Fixed setting
- EC-Type Examination Certificate TÜV99 ATEX 1479X
- Usable up to SIL 2 acc. to IEC 61508
- 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.
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		≥ 3 mA
Measuring plate detected		≤ 1 mA
Time delay before availability	t_v	≤ 1.1 ms
Switching state indicator		LED, yellow
Valve status indicator		LED, yellow

Functional safety related parameters

Safety Integrity Level (SIL)	SIL 2
MTTF _d	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 ² flexible/rigid
Connection (valve side)	Cage tension spring terminals
Core cross-section (valve side)	1.5/2.5 mm ² flexible/rigid
Housing material	PBT
Sensing face	PBT
Degree of protection	IP66 / IP67
Tightening torque, housing screws	1 Nm
Tightening torque, cable gland	M20 x 1.5 ; ≤ 7 Nm M12 x 1.5 ; ≤ 3 Nm
Note	LED switch-off

General information

Note	Inductive sensors for position feedback of standard drives with terminal identification / terminal assignment in accordance with the former DIN 45140 T1 available on request. Ask your contact person at Pepperl+Fuchs.
Use in the hazardous area	see instruction manuals

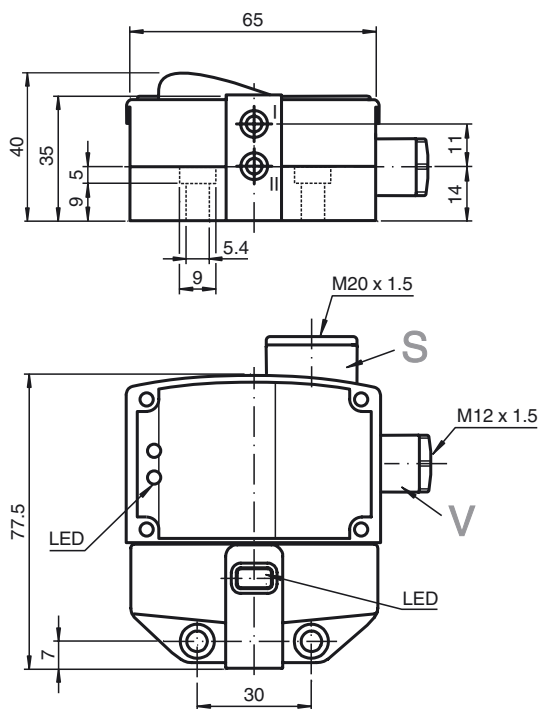
Compliance with standards and directives

Standard conformity	
NAMUR	EN 60947-5-6:2000 IEC 60947-5-6:1999
Electromagnetic compatibility 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

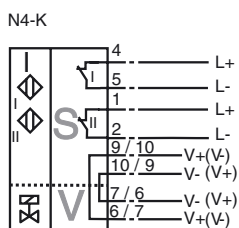
Approvals and certificates

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 ≤ 36 V

Dimensions



Electrical Connection



Interruption of LED:

In the case of a polarity reversal of the valve circuit connection/s, the valve status display does not function, i.e. such that low power valves can (also) be connected.

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-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 capacitance	C_i	≤ 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	≤ 100 μ 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 : 65 °C (149 °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 : 65 °C (149 °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 : 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)
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for IECEX	at $U_i = 15$ 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 $U_i = 15$ 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 $U_i = 15$ 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	≤ 32 V
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Current	I_i	≤ 240 mA
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Internal capacitance	C_i	≤ 10 nF
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Internal inductance	L_i	≤ 20 μ H
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Equipment protection level Gb

Type of protection	intrinsic safety	
CE marking	CE 0102	
Certificates		
Appropriate type	NCN3-F31K-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 capacitance	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 : 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	$\leq 20 \text{ }\mu\text{H}$

Equipment protection level Gc (ic)

Type of protection	intrinsic safety	
CE marking	CE	
Certificates		
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	≤ 100 nF The value is applicable for one sensor circuit. A cable length of 10 m is considered.
Effective internal inductance	L_i	≤ 100 μ 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	≤ 32 V
Current	I_i	≤ 240 mA
Internal capacitance	C_i	≤ 10 nF
Internal inductance	L_i	≤ 20 μ H

Equipment protection level Mb

Type of protection	intrinsic safety	
CE marking	CE 0102	
Certificates		
Appropriate type	NCN3-F31K-N4...	
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	≤ 100 nF The value is applicable for one sensor circuit. A cable length of 10 m is considered.
Effective internal inductance	L_i	≤ 100 μ 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	≤ 32 V
Current	I_i	≤ 240 mA
Internal capacitance	C_i	≤ 10 nF
Internal inductance	L_i	≤ 20 μ H

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