



### Model Number

NCN3-F31K2-N5-B33-S

### Features

- Direct mounting on standard actuators
- ATEX & IECEX certifications
- Usable up to SIL 2 acc. to IEC 61508
- Weatherproof housing for outdoor applications
- LEDs for switching state of sensor and solenoid valve
- Plug-in terminals
- 2:1 transfer method
- Temperature range -40 ... 100 °C (-40 ... 212 °F)
- 2 solenoid valves can be connected

### Accessories

#### BT65-F31K2-RG-EN

Activator for F31K2 series

#### 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
		For assured operating distance $s_{ar}$ see Manual Functional Safety.
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 $r_{Al}$		0.4
Reduction factor $r_{Cu}$		0.4
Reduction factor $r_{304}$		0.7
Reduction factor $r_{Si37}$		1
Reduction factor $r_{Brass}$		0.5
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

Safety Integrity Level (SIL)		SIL 2
MTTF <sub>d</sub>		1730 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		-40 ... 100 °C (-40 ... 212 °F)
Storage temperature		-40 ... 100 °C (-40 ... 212 °F)

### Mechanical specifications

Connection (system side)		Screw terminals, tightening torque min. 0.5 Nm Stripped length 7 mm, M20 x 1.5
Core cross-section (system side)		rigid: 0.14 ... 2.5 mm <sup>2</sup> flexible: 0.14 ... 1.5 mm <sup>2</sup> flexible with core-end sleeve: 0.25 ... 1.5 mm <sup>2</sup>
Connection (valve side)		4-pin, M12 x 1 socket
Core cross-section (valve side)		like core cross section (system side)
Housing material		rugged, translucent polycarbonate (PC) optimised for outdoor use
Housing base		PC
Degree of protection		IP66 / IP67 / IP69
Tightening torque, housing screws		$\leq 2$ Nm
Tightening torque, cable gland		M20 x 1.5 ; $\leq 4$ Nm
Tightening torque, stopping plug		1 Nm
Note		LED switch-off

### General information

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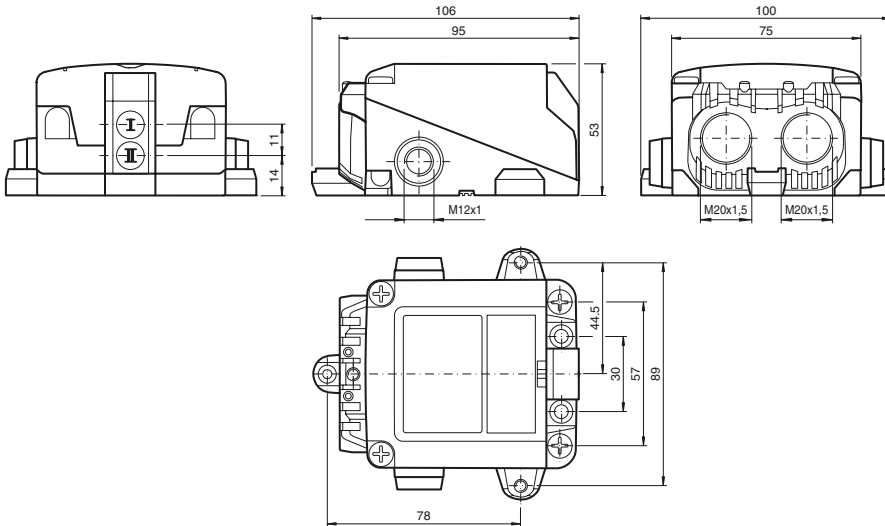
### Compliance with standards and directives

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

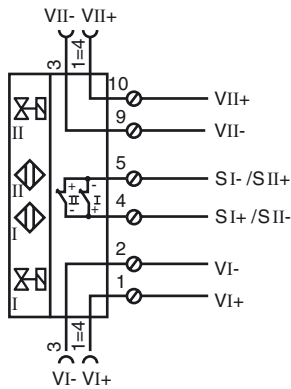
### Approvals and certificates

UL approval		cULus Listed, General Purpose, Class 2 Power Source
CCC approval		CCC approval / marking not required for products rated $\leq 36$ 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	
<b>Equipment protection level Ga</b>		
Type of protection	intrinsic safety	
CE marking	CE 0102	
<b>Certificates</b>		
Appropriate type	NCN3-F31K2...-N5...	
ATEX certificate	TÜV 17 ATEX 8125 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 TUR 17.0055X	
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.
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.	
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 : 50 °C (122 °F) T5 : 65 °C (149 °F) T4 : 90 °C (194 °F) T3 : 90 °C (194 °F) T2 : 90 °C (194 °F) T1 : 90 °C (194 °F) at $U_i = 15$ V , $I_i = 52$ mA , $P_i = 169$ mW , T6 : 45 °C (113 °F) T5 : 55 °C (131 °F) T4 : 75 °C (167 °F) T3 : 75 °C (167 °F) T2 : 75 °C (167 °F) T1 : 75 °C (167 °F)	
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 : 60 °C (140 °F) T5 : 75 °C (167 °F) T4 : 75 °C (167 °F) T3 : 75 °C (167 °F) T2 : 75 °C (167 °F) T1 : 75 °C (167 °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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**Equipment protection level Gb**

Type of protection	intrinsic safety	
CE marking	CE 0102	
<b>Certificates</b>		
Appropriate type	NCN3-F31K2...-N5...	
ATEX certificate	TÜV 17 ATEX 8125 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 TUR 17.0055X	
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	$L_i$	$\leq 200 \text{ }\mu\text{H}$ 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 : 60 °C (140 °F) T5 : 75 °C (167 °F) T4 : 75 °C (167 °F) T3 : 75 °C (167 °F) T2 : 75 °C (167 °F) T1 : 75 °C (167 °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	PF 13 CERT 2895 X	
ATEX marking	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 : 60 °C (140 °F) T5 : 75 °C (167 °F) T4 : 75 °C (167 °F) T3 : 75 °C (167 °F) T2 : 75 °C (167 °F) T1 : 75 °C (167 °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-F31K2...-N5...	
IECEx certificate	IECEx TUR 17.0055X	
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. negligibly small
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 : 75 °C (167 °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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