



## Model Number

NCN3-F31-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

## 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<br>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   |

### Functional safety related parameters

|                                |  |        |
|--------------------------------|--|--------|
| Safety Integrity Level (SIL)   |  | SIL 2  |
| MTTF <sub>d</sub>              |  | 1470 a |
| Mission Time (T <sub>M</sub> ) |  | 20 a   |
| Diagnostic Coverage (DC)       |  | 0 %    |

### Ambient conditions

|                     |  |                                 |
|---------------------|--|---------------------------------|
| Ambient temperature |  | -25 ... 100 °C (-13 ... 212 °F) |
|---------------------|--|---------------------------------|

#### 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) |
|---------------------|--|---------------------------------|

### Mechanical specifications

|                                  |  |                       |
|----------------------------------|--|-----------------------|
| Connection (system side)         |  | PVC cable, 5 m        |
| Core cross-section (system side) |  | 0.75 mm <sup>2</sup>  |
| Housing material                 |  | PBT                   |
| Sensing face                     |  | PBT                   |
| Degree of protection             |  | IP66 / IP67           |
| Cable                            |  |                       |
| Bending radius                   |  | > 10 x cable diameter |

### General information

|                           |  |                         |
|---------------------------|--|-------------------------|
| Use in the hazardous area |  | see instruction manuals |
|---------------------------|--|-------------------------|

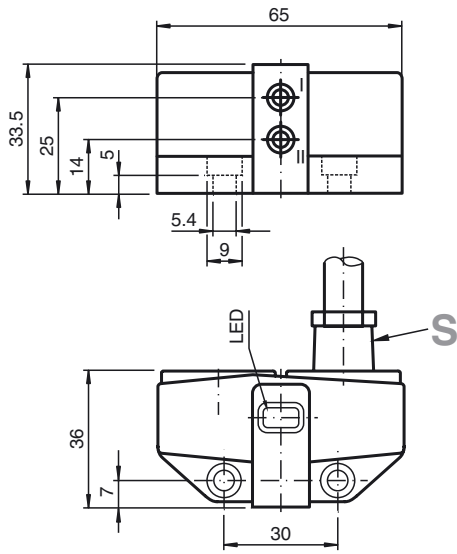
### Compliance with standards and directives

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

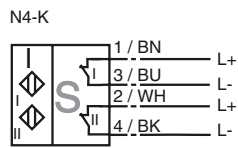
### Approvals and certificates

|                |  |  |
|----------------|--|--|
| 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 capacitance | $C_i$ | $\leq 100$ nF<br>The value is applicable for one sensor circuit.<br>A cable length of 10 m is considered. |
|--------------------------------|-------|---|

|                               |       |  |
|-------------------------------|-------|--|
| Effective internal inductance | $L_i$ | $\leq 100$ $\mu$ H<br>The value is applicable for one sensor circuit.<br>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.<br>Keep to the lower of the two values. |
|---|--|

|          |  |
|----------|--|
| for ATEX | <p>at <math>U_i = 15</math> V , <math>I_i = 25</math> mA , <math>P_i = 34</math> mW ,<br/> T6 : 55 °C (131 °F)<br/> T5 : 70 °C (158 °F)<br/> T4 : 95 °C (203 °F)<br/> T3 : 95 °C (203 °F)<br/> T2 : 95 °C (203 °F)<br/> T1 : 95 °C (203 °F)</p> <p>at <math>U_i = 15</math> V , <math>I_i = 25</math> mA , <math>P_i = 64</math> mW ,<br/> T6 : 55 °C (131 °F)<br/> T5 : 70 °C (158 °F)<br/> T4 : 95 °C (203 °F)<br/> T3 : 95 °C (203 °F)<br/> T2 : 95 °C (203 °F)<br/> T1 : 95 °C (203 °F)</p> <p>at <math>U_i = 15</math> V , <math>I_i = 52</math> mA , <math>P_i = 169</math> mW ,<br/> T6 : 50 °C (122 °F)<br/> T5 : 60 °C (140 °F)<br/> T4 : 90 °C (194 °F)<br/> T3 : 90 °C (194 °F)<br/> T2 : 90 °C (194 °F)<br/> T1 : 90 °C (194 °F)</p> |
|----------|--|

|           |  |
|-----------|--|
| for IECEX | <p>at <math>U_i = 15</math> V , <math>I_i = 25</math> mA , <math>P_i = 34</math> mW ,<br/> T6 : 75 °C (167 °F)<br/> T5 : 90 °C (194 °F)<br/> T4 : 100 °C (212 °F)<br/> T3 : 100 °C (212 °F)<br/> T2 : 100 °C (212 °F)<br/> 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 ,<br/> T6 : 75 °C (167 °F)<br/> T5 : 90 °C (194 °F)<br/> T4 : 100 °C (212 °F)<br/> T3 : 100 °C (212 °F)<br/> T2 : 100 °C (212 °F)<br/> 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 ,<br/> T6 : 65 °C (149 °F)<br/> T5 : 80 °C (176 °F)<br/> T4 : 90 °C (194 °F)<br/> T3 : 90 °C (194 °F)<br/> T2 : 90 °C (194 °F)<br/> T1 : 90 °C (194 °F)</p> |
|-----------|--|

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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 capacitance                    | $C_i$  | $\leq 100 \text{ nF}$<br>The value is applicable for one sensor circuit.<br>A cable length of 10 m is considered.          |
| Effective internal inductance                     | $L_i$  | $\leq 100 \text{ }\mu\text{H}$<br>The value is applicable for one sensor circuit.<br>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.<br>Keep to the lower of the two values.<br>at $U_i = 15 \text{ V}$ , $I_i = 25 \text{ mA}$ , $P_i = 34 \text{ mW}$ ,<br>T6 : 75 °C (167 °F)<br>T5 : 90 °C (194 °F)<br>T4 : 100 °C (212 °F)<br>T3 : 100 °C (212 °F)<br>T2 : 100 °C (212 °F)<br>T1 : 100 °C (212 °F)<br>at $U_i = 15 \text{ V}$ , $I_i = 25 \text{ mA}$ , $P_i = 64 \text{ mW}$ ,<br>T6 : 75 °C (167 °F)<br>T5 : 90 °C (194 °F)<br>T4 : 100 °C (212 °F)<br>T3 : 100 °C (212 °F)<br>T2 : 100 °C (212 °F)<br>T1 : 100 °C (212 °F)<br>at $U_i = 15 \text{ V}$ , $I_i = 52 \text{ mA}$ , $P_i = 169 \text{ mW}$ ,<br>T6 : 65 °C (149 °F)<br>T5 : 80 °C (176 °F)<br>T4 : 90 °C (194 °F)<br>T3 : 90 °C (194 °F)<br>T2 : 90 °C (194 °F)<br>T1 : 90 °C (194 °F) |  |

**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                    | $C_i$  | $\leq 100 \text{ nF}$<br>The value is applicable for one sensor circuit.<br>A cable length of 10 m is considered.          |
| Effective internal inductance                     | $L_i$  | $\leq 100 \text{ }\mu\text{H}$<br>The value is applicable for one sensor circuit.<br>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.<br>Keep to the lower of the two values.<br>at $U_i = 20 \text{ V}$ , $I_i = 25 \text{ mA}$ , $P_i = 34 \text{ mW}$ ,<br>T6 : 75 °C (167 °F)<br>T5 : 90 °C (194 °F)<br>T4 : 100 °C (212 °F)<br>T3 : 100 °C (212 °F)<br>T2 : 100 °C (212 °F)<br>T1 : 100 °C (212 °F)<br>at $U_i = 20 \text{ V}$ , $I_i = 25 \text{ mA}$ , $P_i = 64 \text{ mW}$ ,<br>T6 : 75 °C (167 °F)<br>T5 : 90 °C (194 °F)<br>T4 : 100 °C (212 °F)<br>T3 : 100 °C (212 °F)<br>T2 : 100 °C (212 °F)<br>T1 : 100 °C (212 °F)<br>at $U_i = 20 \text{ V}$ , $I_i = 52 \text{ mA}$ , $P_i = 169 \text{ mW}$ ,<br>T6 : 65 °C (149 °F)<br>T5 : 80 °C (176 °F)<br>T4 : 90 °C (194 °F)<br>T3 : 90 °C (194 °F)<br>T2 : 90 °C (194 °F)<br>T1 : 90 °C (194 °F) |  |

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**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 capacitance                    | $C_i$   | $\leq 100$ nF<br>A cable length of 10 m is considered.      |
| Effective internal inductance                     | $L_i$   | $\leq 100$ $\mu$ H<br>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.<br>Keep to the lower of the two values.<br>at $U_i = 15$ V , $I_i = 25$ mA , $P_i = 34$ mW : 100 °C (212 °F)<br>at $U_i = 15$ V , $I_i = 25$ mA , $P_i = 64$ mW : 100 °C (212 °F)<br>at $U_i = 15$ V , $I_i = 52$ mA , $P_i = 169$ mW : 90 °C (194 °F) |   |

**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  |  |
| Effective internal capacitance                    | $C_i$   | $\leq 100$ nF<br>The value is applicable for one sensor circuit.<br>A cable length of 10 m is considered.      |
| Effective internal inductance                     | $L_i$   | $\leq 100$ $\mu$ H<br>The value is applicable for one sensor circuit.<br>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.<br>Keep to the lower of the two values.<br>at $U_i = 15$ V , $I_i = 25$ mA , $P_i = 34$ mW : 100 °C (212 °F)<br>at $U_i = 15$ V , $I_i = 25$ mA , $P_i = 64$ mW : 100 °C (212 °F)<br>at $U_i = 15$ V , $I_i = 52$ mA , $P_i = 169$ mW : 90 °C (194 °F) |  |