



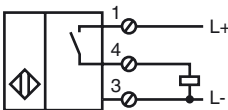
**Model Number**

NBB20-U1K-E2-3G-3D

**Features**

- 20 mm flush
- 3-wire DC
- 4 LEDs indicator for 360° visibility

**Connection**

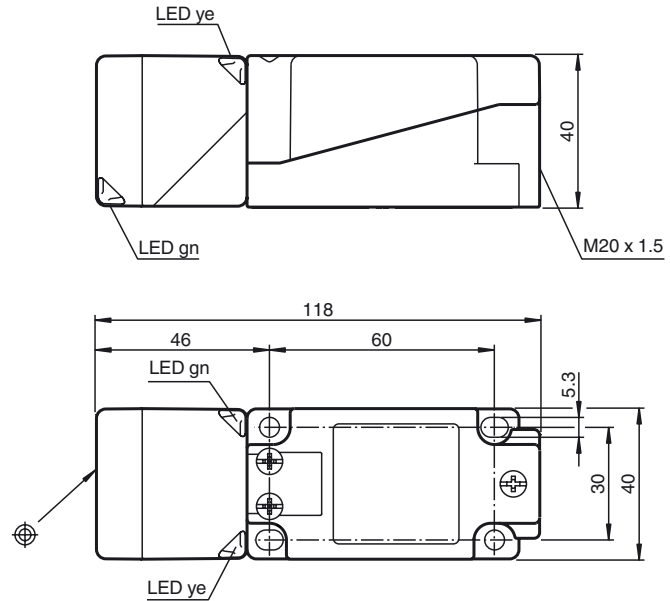


**Accessories**

**MHW 01**

Modular mounting bracket

**Dimensions**



**Technical Data**

**General specifications**

Switching element function	PNP	NO
Rated operating distance	$s_n$	20 mm
Installation		flush
Output polarity		DC
Assured operating distance	$s_a$	0 ... 16.2 mm
Reduction factor $r_{Al}$		0.33
Reduction factor $r_{Cu}$		0.31
Reduction factor $r_{304}$		0.74
Reduction factor $r_{Brass}$		0.41

**Nominal ratings**

Operating voltage	$U_B$	10 ... 30 V DC
Switching frequency	$f$	0 ... 150 Hz
Hysteresis	$H$	typ. 5 %
Reverse polarity protected		reverse polarity protected
Short-circuit protection		pulsing
Voltage drop	$U_d$	$\leq 2$ V
Operating current	$I_L$	0 ... 200 mA
Off-state current	$I_r$	0 ... 0.5 mA typ. 0.01 mA
No-load supply current	$I_0$	$\leq 20$ mA
Operating voltage display		LED, green
Indication of the switching state		LED, yellow

**Functional safety related parameters**

MTTF <sub>d</sub>	1510 a
Mission Time (T <sub>M</sub> )	20 a
Diagnostic Coverage (DC)	0 %

**Ambient conditions**

Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
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**Mechanical specifications**

Connection type	screw terminals
Core cross-section	up to 2.5 mm <sup>2</sup>
Housing material	PA/metal
Sensing face	PA
Protection degree	IP68 / IP69K
Mass	225 g
Note	Tightening torque: 1.8 Nm (housing) Tightening torque: 1.0 Nm (Screw terminal)

**General information**

Use in the hazardous area	see instruction manuals
Category	3G; 3D

**Compliance with standards and directives**

Standard conformity	
Standards	EN 60947-5-2:2007 IEC 60947-5-2:2007

**Approvals and certificates**

FM approval	hazardous (classified) location Non-incendive
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose
CCC approval	Products with a maximum operating voltage of $\leq 36$ V do not bear a CCC marking because they do not require approval.

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## ATEX 3G (nA)

## Instruction

## Manual electrical apparatus for hazardous areas

## Device category 3G (nA)

Directive conformity

Standard conformity

for use in hazardous areas with gas, vapour and mist

94/9/EG

EN 60079-0:2006, EN 60079-15:2005

Ignition protection category "n"

Use is restricted to the following stated conditions

CE symbol

CE

Ex-identification

II 3G Ex nA IIC T6 X

General

The apparatus has to be operated according to the appropriate data in the data sheet and in this instruction manual. The data stated in the data sheet are restricted by this operating instruction! The special conditions must be observed!

Installation, Commissioning

Laws and/or regulations and standards governing the use or intended usage goal must be observed.

Maintenance

No changes can be made to apparatus, which are operated in hazardous areas.

Repairs to these apparatus are not possible.

## Special conditions

Maximum operating current  $I_L$ 

The maximum permissible load current must be restricted to the values given in the following list. High load currents and load short-circuits are not permitted.

Maximum operating voltage  $U_{Bmax}$ 

The maximum permissible operating voltage  $U_B$  max is restricted to the values in the following list. Tolerances are not permissible.

Maximum permissible ambient temperature  $T_{Umax}$ 

dependant of the load current  $I_L$  and the max. operating voltage  $U_{Bmax}$ . Information can be taken from the following list.

at  $U_{Bmax}=30$  V,  $I_L=200$  mA

50 °C (122 °F)

at  $U_{Bmax}=30$  V,  $I_L=100$  mA

53 °C (127.4 °F)

at  $U_{Bmax}=30$  V,  $I_L=50$  mA

54 °C (129.2 °F)

Plug connector

The plug connector must not be withdrawn under voltage. The proximity switch is identified as follows: "WARNING - DO NOT SEPARATE WHEN ENERGIZED". With the plug connector disconnected, soiling of the internal area must be prevented (i.e. the area that is inaccessible when the connector is inserted)

Protection from mechanical danger

The sensor must not be exposed to **ANY FORM** of mechanical danger.

Protection from UV light

The sensor and the connection cable must be protected from damaging UV-radiation. This can be achieved when the sensor is used in internal areas.

Connections for external wire

Terminal connection: Minimum conductor cross-section: 0.5 mm<sup>2</sup>, maximum conductor cross-section: 2.5 mm<sup>2</sup>. The ends of the conductor must be provided with cable sleeves.

Lead insertion

The cable entry must be such, that no tension load or twist is applied to the cable

The protection category must be in accordance with EN 60529 and as stated in the data sheet.

The requirements of EN 60079-0 relating to the cable and lead entries are to be complied with.

**ATEX 3D (tD)**

Note

**This instruction is only valid for products according to EN 61241-0:2006 and EN 61241-1:2004**  
Note the ex-marking on the sensor or on the enclosed adhesive label

Instruction

**Manual electrical apparatus for hazardous areas****Device category 3D**


Directive conformity  
Standard conformity

for use in hazardous areas with combustible dust  
94/9/EG  
EN 61241-0:2006, EN 61241-1:2004  
Protection via housing "tD"  
Use is restricted to the following stated conditions

CE symbol



Ex-identification

 II 3D Ex tD A22 IP67 T80°C X

General

The apparatus has to be operated according to the appropriate data in the data sheet and in this instruction manual.  
The maximum surface temperature has been determined in accordance with method A without a dust layer on the equipment.  
The data stated in the data sheet are restricted by this operating instruction!  
The special conditions must be adhered to!

Installation, Commissioning

Laws and/or regulations and standards governing the use or intended usage goal must be observed.

Maintenance

No changes can be made to apparatus, which are operated in hazardous areas.  
Repairs to these apparatus are not possible.

**Special conditions**Maximum operating current  $I_L$ 

The maximum permissible load current must be restricted to the values given in the following list.  
High load currents and load short-circuits are not permitted.

Maximum operating voltage  $U_{Bmax}$ 

The maximum permissible operating voltage  $U_{Bmax}$  must be restricted to the values given in the following list. Tolerances are not permitted.

Maximum permissible ambient temperature  $T_{Umax}$

dependant of the load current  $I_L$  and the max. operating voltage  $U_{Bmax}$ .  
Information can be taken from the following list.

at  $U_{Bmax}=30$  V,  $I_L=200$  mA

50 °C (122 °F)

at  $U_{Bmax}=30$  V,  $I_L=100$  mA

53 °C (127.4 °F)

at  $U_{Bmax}=30$  V,  $I_L=50$  mA

54 °C (129.2 °F)

Plug connector

The plug connector must not be withdrawn under voltage. The proximity switch is identified as follows: "WARNING - DO NOT SEPARATE WHEN ENERGIZED". With the plug connector disconnected, soiling of the internal area must be prevented. (i.e. the area that is inaccessible when the connector is inserted)

Protection from mechanical danger

The sensor must not be exposed to **ANY FORM** of mechanical danger.

Protection from UV light

The sensor and the connection cable must be protected from damaging UV-radiation. This can be achieved when the sensor is used in internal areas.

Electrostatic charging

Sliding contact discharges must be avoided.

Connections for external wire

Terminal connection: Minimum conductor cross-section: 0.5 mm<sup>2</sup>, maximum conductor cross-section: 2.5 mm<sup>2</sup>. The ends of the conductor must be provided with cable sleeves.

Lead insertion

The cable entry must be such, that no tension load or twist is applied to the cable  
The protection category must be in accordance with EN 60529 and as stated in the data sheet.  
The requirements of EN 61241-0 relating to the cable and lead entries are to be complied with. The special characteristics of the ignition protection class "tD, method A" of the proximity switch must not be disregarded.