



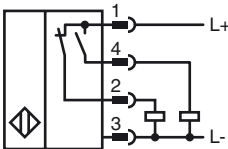
**Model Number**

NBB20-L2-A2-V1-3G-3D

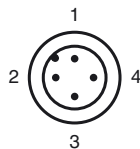
**Features**

- 20 mm flush
- 4-wire DC
- Quick mounting bracket
- 4-way LED indicator

**Connection**



**Pinout**



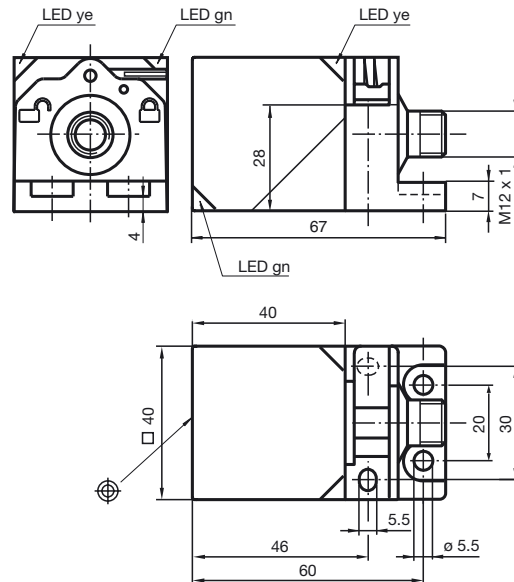
Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

**Accessories**

- V1-G**  
4-pin, M12 female field-attachable connector
- V1-W**  
4-pin, M12 female field-attachable connector
- V1-G-2M-PUR**  
Cable socket, M12, 4-pin, PUR cable
- V1-W-2M-PUR**  
Cable socket, M12, 4-pin, PUR cable
- MHW 01**  
Modular mounting bracket
- MH 02-L**  
Mounting aid

**Dimensions**



**Technical Data**

**General specifications**

Switching element function	PNP	NO/NC
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 protection		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
No-load supply current	$I_0$	$\leq 20$ mA
Time delay before availability	$t_v$	80 ms
Operating voltage display		LED, green
Indication of the switching state		LED, yellow

**Functional safety related parameters**

MTTF <sub>d</sub>	1239 a
Mission Time (T <sub>M</sub> )	20 a
Diagnostic Coverage (DC)	0 %

**Ambient conditions**

Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)

**Mechanical specifications**

Connection type	Device connector M12 x 1, 4-pin
Housing material	PA
Sensing face	PA
Protection degree	IP69K
Mass	130 g

**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**

Protection class	II
Rated insulation voltage	$U_i$ 253 V
Design-impulse-voltage withstand	$U_{imp}$ 4000 V
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

The Ex-significant identification is on the enclosed adhesive label

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.

The adhesive label provided must be affixed in the immediate vicinity of the sensor! The surface to which the label is applied must be clean, flat and free from grease!

The affixed adhesive label must be readable and durable, taking account of the possibility of chemical corrosion!

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

48 °C (118.4 °F)

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

50 °C (122 °F)

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

51 °C (123.8 °F)

at  $U_{Bmax}=30\text{ V}$ ,  $I_L=25\text{ mA}$ 

52 °C (125.6 °F)

Plug connector

The plug connector must not be disconnected under voltage. The proximity switch is marked as follows: "DO NOT DISCONNECT UNDER VOLTAGE!" When the plug connector is disconnected the ingress of dirt into the inner areas (i.e. the areas, which are not accessible in the plugged-in condition) must be prevented.

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

Electrostatic charges must be avoided on the mechanical housing components. Dangerous electrostatic charges on the mechanical housing components can be avoided by incorporating these in the equipotential bonding.

**ATEX 3D**

Note

**This instruction is only valid for products according to EN 50281-1-1, valid until 30-September-2008**  
 Note the ex-marking on the sensor or on the enclosed adhesive label

Instruction

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

for use in hazardous areas with non-conducting combustible dust

Directive conformity

94/9/EG

Standard conformity

EN 50281-1-1


Protection via housing

Use is restricted to the following stated conditions

CE symbol



Ex-identification

 II 3D IP69K T 107 °C (224.6 °F) X

The Ex-significant identification is on the enclosed adhesive label

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 adhered to!

Installation, Commissioning

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

The adhesive label provided must be affixed in the immediate vicinity of the sensor! The surface to which the label is applied must be clean, flat and free from grease!

The affixed adhesive label must be readable and durable, taking account of the possibility of chemical corrosion!

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 heating (Temperature rise)

dependant of the load current  $I_L$  and the max. operating voltage  $U_{Bmax}$ . Information can be taken from the following list. The maximum surface temperature at maximum ambient temperature is given in the Ex identification of the apparatus.at  $U_{Bmax}=30$  V,  $I_L=200$  mA

22 K

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

19 K

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

18 K

at  $U_{Bmax}=30$  V,  $I_L=25$  mA

17 K

Plug connector

The plug connector must not be disconnected under voltage. The proximity switch is marked as follows: "DO NOT DISCONNECT UNDER VOLTAGE!" When the plug connector is disconnected the ingress of dirt into the inner areas (i.e. the areas, which are not accessible in the plugged-in condition) must be prevented.

The plug connection can only be separated using a tool. This is achieved by using the locking protection V1-Clip (Mounting accessory from Pepperl + Fuchs).



Protection from mechanical danger

The sensor must not be mechanically damaged.

Electrostatic charging

Electrostatic charges on the metal housing components must be avoided. Dangerous electrostatic charges on the metal housing components can be avoided by incorporating these components in the equipotential bonding. Sliding contact discharges must be avoided.

## ATEX 3D (tD)

Note	<b>This instruction is only valid for products according to EN 61241-0:2006 and EN 61241-1:2004</b> Note the ex-marking on the sensor or on the enclosed adhesive label
<b>Instruction</b>	<b>Manual electrical apparatus for hazardous areas</b>
<b>Device category 3D</b>	for use in hazardous areas with combustible dust
Directive conformity	94/9/EG
Standard conformity	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 The Ex-relevant identification may also be printed on the accompanying adhesive label.
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	The statutory requirements, directives and standards applicable to the intended use and application must be observed. The adhesive label provided must be affixed in the immediate vicinity of the sensor! The surface to which the label is applied must be clean, flat and free from grease! The affixed adhesive label must be readable and durable, taking account of the possibility of chemical corrosion!
Maintenance	No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible.
<b>Special conditions</b>	
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 $U_{Bmax}=30\text{ V}$ , $I_L=200\text{ mA}$	48 °C (118.4 °F)
at $U_{Bmax}=30\text{ V}$ , $I_L=100\text{ mA}$	50 °C (122 °F)
at $U_{Bmax}=30\text{ V}$ , $I_L=50\text{ mA}$	51 °C (123.8 °F)
at $U_{Bmax}=30\text{ V}$ , $I_L=25\text{ mA}$	52 °C (125.6 °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) The plug connection can only be separated using a tool. This is achieved by using the locking protection V1-Clip (Mounting accessory from Pepperl + Fuchs).
Protection from mechanical danger	The sensor must not be exposed to <b>ANY FORM</b> 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	Electrostatic charges on the metal housing components must be avoided. Dangerous electrostatic charges on the metal housing components can be avoided by incorporating these components in the equipotential bonding. Sliding contact discharges must be avoided.