



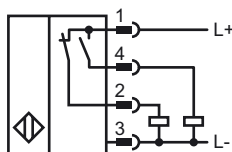
Model Number

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

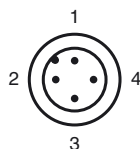
Features

- Basic series
- 20 mm embeddable
- Quick mounting bracket
- 4-way LED indicator

Connection



Pinout



Wire colors in accordance with EN 60947-5-2

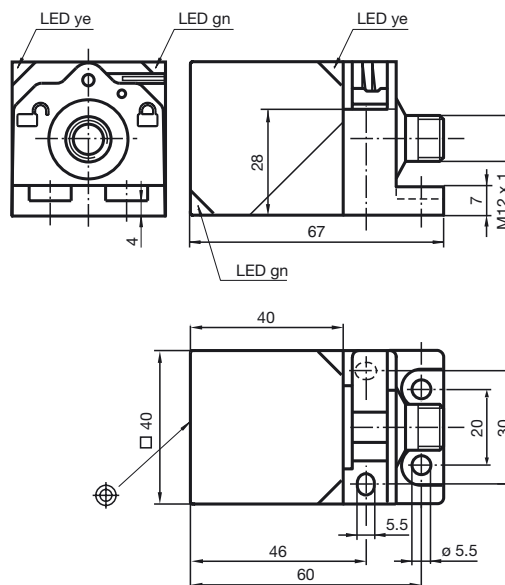
1	BN
2	WH
3	BU
4	BK

Accessories

MHW 01
Mounting aid

MH 02-L
Mounting aid

Dimensions



Technical Data

General specifications

Switching element function	PNP	Antivalent
Rated operating distance	s_n	20 mm
Installation		embeddable
Output polarity		DC
Assured operating distance	s_a	0 ... 16.2 mm
Reduction factor r_{AI}		0.33
Reduction factor r_{Cu}		0.31
Reduction factor r_{V2A}		0.74
Reduction factor r_{Brass}		0.41

Nominal ratings

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

Ambient conditions

Ambient temperature	-25 ... 85 °C (248 ... 358 K)
Storage temperature	-40 ... 85 °C (233 ... 358 K)

Mechanical specifications

Connection type	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

ATEX 3G (nA)

Instruction

Device category 3G (nA)

Directive conformity

Standard conformity

CE symbol

Ex-identification

General

Installation, Commissioning

Maintenance

Special conditions

Maximum operating current I_L

Maximum operating voltage U_{Bmax}

Maximum permissible ambient temperature T_{Umax}

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

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

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

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

Plug connector

Protection from mechanical danger

Protection from UV light

Electrostatic charging

Manual electrical apparatus for hazardous areas

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

II 3G Ex nA IIC T6 X

The Ex-significant identification is on the enclosed adhesive label

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!

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!

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

Repairs to these apparatus are not possible.

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.

The maximum permissible operating voltage U_{Bmax} is restricted to the values in the following list. Tolerances are not permissible.

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

48 °C

50 °C

51 °C

52 °C

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

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 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.

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

22 °C

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

19 °C

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

18 °C

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

17 °C

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	<p>This instruction is only valid for products according to EN 61241-0:2006 and EN 61241-1:2004</p> <p>Note the ex-marking on the sensor or on the enclosed adhesive label</p>
Instruction	Manual electrical apparatus for hazardous areas
Device category 3D	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	<p> II 3D Ex tD A22 IP67 T80°C X</p> <p>The Ex-relevant identification may also be printed on the accompanying adhesive label.</p>
General	<p>The apparatus has to be operated according to the appropriate data in the data sheet and in this instruction manual.</p> <p>The maximum surface temperature has been determined in accordance with method A without a dust layer on the equipment.</p> <p>The data stated in the data sheet are restricted by this operating instruction!</p> <p>The special conditions must be adhered to!</p>
Installation, Commissioning	<p>The statutory requirements, directives and standards applicable to the intended use and application must be observed.</p> <p>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!</p> <p>The affixed adhesive label must be readable and durable, taking account of the possibility of chemical corrosion!</p>
Maintenance	<p>No changes can be made to apparatus, which are operated in hazardous areas.</p> <p>Repairs to these apparatus are not possible.</p>
Special conditions	
Maximum operating current I_L	<p>The maximum permissible load current must be restricted to the values given in the following list.</p> <p>High load currents and load short-circuits are not permitted.</p>
Maximum operating voltage U_{Bmax}	<p>The maximum permissible operating voltage U_{Bmax} must be restricted to the values given in the following list. Tolerances are not permitted.</p>
Maximum permissible ambient temperature	<p>dependant of the load current I_L and the max. operating voltage U_{Bmax}.</p> <p>Information can be taken from the following list.</p>
at $U_{Bmax}=30\text{ V}$, $I_L=200\text{ mA}$	48 °C
at $U_{Bmax}=30\text{ V}$, $I_L=100\text{ mA}$	50 °C
at $U_{Bmax}=30\text{ V}$, $I_L=50\text{ mA}$	51 °C
at $U_{Bmax}=30\text{ V}$, $I_L=25\text{ mA}$	52 °C
Plug connector	<p>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).</p>
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	<p>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.</p> <p>Sliding contact discharges must be avoided.</p>