



### Model Number

**NBB20-U1K-E2-3G-3D**

### Features

- Sensor head bidirectional and rotatable
- 20 mm flush
- 3-wire DC
- 4 LEDs indicator for 360° visibility
- ATEX-approval for zone 2 and zone 22

### Accessories

#### MHW 01

Modular mounting bracket

## Technical Data

### General specifications

Switching function		Normally open (NO)
Output type		PNP
Rated operating distance	$s_n$	20 mm
Installation		flush
Output polarity		DC
Assured operating distance	$s_a$	0 ... 16.2 mm
Actual operating distance	$s_r$	18 ... 22 mm typ. 20 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
Output type		3-wire

### 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
Voltage drop at $I_L$		
Voltage drop $I_L = 1$ mA, switching element on $U_d$		0.5 ... 2.3 V typ. 0.9 V
Voltage drop $I_L = 10$ mA, switching element on $U_d$		0.8 ... 2.2 V typ. 1.4 V
Voltage drop $I_L = 20$ mA, switching element on $U_d$		0.9 ... 2.3 V typ. 1.5 V
Voltage drop $I_L = 50$ mA, switching element on $U_d$		0.9 ... 2.5 V typ. 1.6 V
Voltage drop $I_L = 100$ mA, switching element on $U_d$		1 ... 2.6 V typ. 1.8 V
Voltage drop $I_L = 200$ mA, switching element on $U_d$		1.2 ... 2.8 V typ. 2 V

### Design data

Operating current	$I_L$	0 ... 200 mA
Off-state current	$I_r$	0 ... 0.5 mA typ. 0.01 mA
Off-state current $T_U = 40$ °C, switching element off		$\leq 100$ $\mu$ A
No-load supply current	$I_0$	$\leq 20$ mA
Time delay before availability	$t_v$	80 ms
Operating voltage indicator		LED, green
Switching state indicator		LED, yellow

### Functional safety related parameters

MTTF <sub>d</sub>	1510 a
Mission Time ( $T_M$ )	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
Information for connection	A maximum of two conductors with the same core cross section may be mounted on one terminal connection! tightening torque 1.2 Nm + 10 %
Core cross-section	up to 2.5 mm <sup>2</sup>
Minimum core cross-section	without wire end ferrule 0.5 mm <sup>2</sup> , with connector sleeves 0.34 mm <sup>2</sup>
Maximum core cross-section	without wire end ferrule 2.5 mm <sup>2</sup> , with connector sleeves 1.5 mm <sup>2</sup>
Housing material	PA
Sensing face	PA
Degree of protection	IP68 / IP69K
Mass	225 g
Note	Tightening torque: 1.8 Nm (housing)

### General information

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

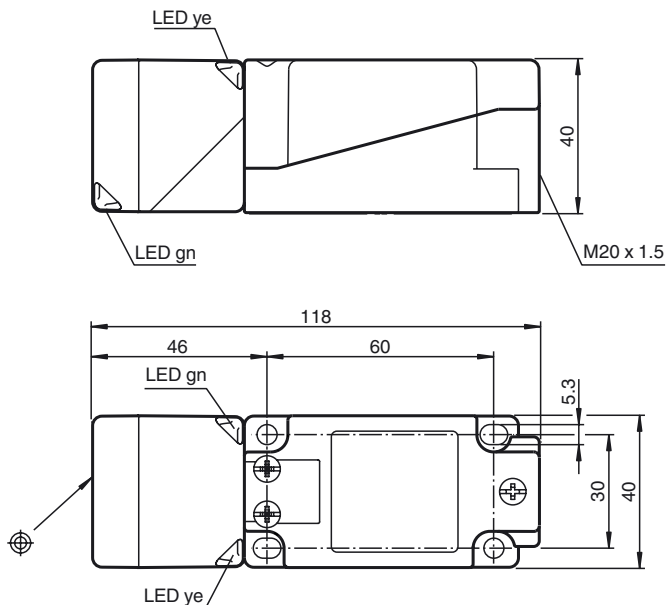
### Compliance with standards and directives

Standard conformity	
Standards	EN 60947-5-2:2007 EN 60947-5-2/A1:2012 IEC 60947-5-2:2007 IEC 60947-5-2 AMD 1:2012

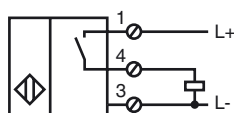
### Approvals and certificates

FM approval	hazardous (classified) location Non-incendive
UL approval	cULus Listed, General Purpose
CCC approval	CCC approval / marking not required for products rated $\leq 36$ V

Dimensions



Electrical Connection



Equipment protection level Gc (nA)

Certificate	PF 15CERT3754 X
CE marking	CE
ATEX marking	Ex II 3G Ex nA IIC T6 Gc The Ex-related marking can also be printed on the enclosed label.
Standards	EN 60079-0:2012+A11:2013, EN 60079-15:2010 Ignition protection category "n" Use is restricted to the following stated conditions

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 $U_{Bmax}=30\text{ V}$ , $I_L=200\text{ mA}$	50 °C (122 °F)
at $U_{Bmax}=30\text{ V}$ , $I_L=100\text{ mA}$	53 °C (127.4 °F)
at $U_{Bmax}=30\text{ V}$ , $I_L=50\text{ mA}$	54 °C (129.2 °F)

Equipment protection level Dc (tc)

CE marking	CE
ATEX marking	Ex II 3D Ex tc IIIC T80°C Dc The Ex-related marking can also be printed on the enclosed label.
Standards	EN 60079-0:2012+A11:2013, EN 60079-31:2014 Protection by enclosure "tc" Some of the information in this instruction manual is more specific than the information provided in the datasheet.
General	The corresponding datasheets, declarations of conformity, EC-type examination certificates, certifications, and control drawings, where applicable (see datasheets), form an integral part of this document. These documents can be found at <a href="http://www.pepperl-fuchs.com">www.pepperl-fuchs.com</a> . The maximum surface temperature of the device was determined without a layer of dust on the apparatus. Some of the information in this instruction manual is more specific than the information provided in the datasheet.

Special conditions

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.
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at $U_{Bmax}=30\text{ V}$ , $I_L=200\text{ mA}$	50 °C (122 °F)
at $U_{Bmax}=30\text{ V}$ , $I_L=100\text{ mA}$	53 °C (127.4 °F)
at $U_{Bmax}=30\text{ V}$ , $I_L=50\text{ mA}$	54 °C (129.2 °F)

**Equipment protection level Dc (tD)****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!

**Special conditions**

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 $U_{Bmax}=30\text{ V}$ , $I_L=200\text{ mA}$	50 °C (122 °F)
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