



Model Number

NBN40-U1K-E2-3G-3D

Features

- Sensor head bidirectional and rotatable
- 40 mm non-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 40 mm
Installation	non-flush
Output polarity	DC
Assured operating distance	s_a 0 ... 32.4 mm
Actual operating distance	s_r 36 ... 44 mm typ. 40 mm
Reduction factor r_{AI}	0.31
Reduction factor r_{CU}	0.3
Reduction factor r_{304}	0.74
Reduction factor r_{Brass}	0.39

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 ≤ 2 V

Voltage drop at I_L

Voltage drop $I_L = 1$ mA, switching element 0.5 ... 2.3 V typ. 0.9 V on U_d

Voltage drop $I_L = 10$ mA, switching element 0.8 ... 2.2 V typ. 1.4 V on U_d

Voltage drop $I_L = 20$ mA, switching element 0.9 ... 2.3 V typ. 1.5 V on U_d

Voltage drop $I_L = 50$ mA, switching element 0.9 ... 2.5 V typ. 1.6 V on U_d

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

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 ≤ 100 µA

No-load supply current I_0 ≤ 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_d 1358 a

Mission Time (T_M) 20 a

Diagnostic Coverage (DC) 0 %

Ambient conditions

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

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 mm²

Minimum core cross-section without wire end ferrule 0.5 mm², with connector sleeves 0.34 mm²

Maximum core cross-section without wire end ferrule 2.5 mm², with connector sleeves 1.5 mm²

Housing material PA/metal

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
IEC 60947-5-2:2007

Approvals and certificates

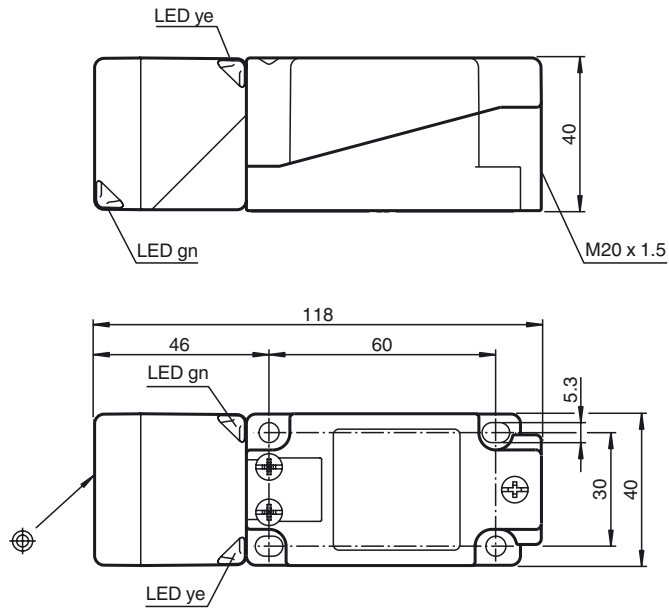
FM approval hazardous (classified) location
Non-incendive

UL approval cULus Listed, General Purpose

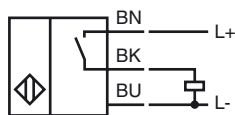
CSA approval cCSAus Listed, General Purpose

CCC approval CCC approval / marking not required for products rated ≤36 V

Dimensions



Electrical Connection



Equipment protection level Gc (nA)

Instruction

Device category 3G (nA)

Certificate of Compliance

CE marking

ATEX marking

Standards

General

Installation, commissioning

Maintenance

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

Protection from mechanical danger

Protection from UV light

Protection against transients

Electrostatic charge

Lead insertion

Material selection accessories

Plug connector

Manual electrical apparatus for hazardous areas

for use in hazardous areas with gas, vapour and mist

PF 15CERT3754 X



II 3G Ex nA IIC T6 Gc

The Ex-related marking can also be printed on the enclosed label.

EN 60079-0:2012+A11:2013, EN 60079-15:2010

Ignition protection category "n"

Use is restricted to the following stated conditions

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. If the Ex-related marking is printed only on the supplied label, then this must be attached in the immediate vicinity of the sensor. The sticking surface for the label must be clean and free from grease. The attached label must be legible and indelible, including in the event of possible chemical corrosion. After opening the housing, you should check that the seal is in the correct position and is clean and intact before closing the housing again.

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

Repairs to these apparatus are not possible. After opening the housing, you should check that the seal is in the correct position and is clean and intact before closing the housing again.

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_B max 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.

50 °C (122 °F)

53 °C (127.4 °F)

54 °C (129.2 °F)

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.

Ensure transient protection is provided and that the maximum value of the transient protection (140% of 85 V) is not exceeded.

When used in group IIC non-permissible electrostatic charges should be avoided on the plastic housing parts. Avoid electrostatic charges that can cause electrostatic discharge when installing or operating the device. Information on electrostatic hazards can be found in the technical specification IEC/TS 60079-32-1.

If cable glands are required for the installation then the following points must be observed:



The cable glands must be certified in accordance with the application.

The temperature range of the cable glands must be selected according to the application. The degree of protection must not be reduced by the cable glands. Seal the housing. Use a seal that meets the requirements of the application.

When selecting accessories, ensure that the material allows the temperature of the enclosure to rise to up to 70 °C.

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)

Equipment protection level Dc (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	for use in hazardous areas with combustible dust
CE marking	 I
ATEX marking	 II 3D Ex tD A22 IP67 T80°C X
Standards	EN 61241-0:2006, EN 61241-1:2004 Protection via housing "tD" Use is restricted to the following stated conditions
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 $U_{Bmax}=30\text{ V}$, $I_L=200\text{ mA}$	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)
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 charge	Sliding contact discharges must be avoided.
Connections for external wire	Terminal connection: Minimum conductor cross-section: 0.5 mm ² , maximum conductor cross-section: 2.5 mm ² . 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.
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)

Equipment protection level Dc (tc)

Instruction

Device category 3D

Certificate of Compliance

CE marking

ATEX marking

Standards

General

Installation, commissioning

Maintenance

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

Protection from mechanical danger

Protection from UV light

Electrostatic charge

Lead insertion

Plug connector

Manual electrical apparatus for hazardous areas

for use in hazardous areas with combustible dust

PF 15CERT3774 X

CE

Ex II 3D Ex tc IIIC T80°C Dc

The Ex-related marking can also be printed on the enclosed label.

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.

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 www.pepperl-fuchs.com. 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.

Laws and/or regulations and standards governing the use or intended usage goal must be observed. If the Ex-relevant identification is printed exclusively on the adhesive label provided, this label must be affixed in the immediate vicinity of the sensor! The background surface to which the adhesive label is to be applied must be clean and free from grease! The applied label must be durable and remain legible, with due consideration of the possibility of chemical corrosion! After opening the housing, you should check that the seal is in the correct position and is clean and intact before closing the housing again.

No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible. After opening the housing, you should check that the seal is in the correct position and is clean and intact before closing the housing again.

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} must be restricted to the values given in the following list. Tolerances are not permitted.

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

50 °C (122 °F)

53 °C (127.4 °F)

54 °C (129.2 °F)

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.

Sliding contact discharges must be avoided. Avoid electrostatic charges that can cause electrostatic discharge when installing or operating the device. Information on electrostatic hazards can be found in the technical specification IEC/TS 60079-32-1. Do not attach the nameplate provided in areas where electrostatic charge can build up.

If cable glands are required for the installation then the following points must be observed: The cable glands must be certified in accordance with the application. The temperature range of the cable glands must be selected according to the application. The degree of protection must not be reduced by the cable glands. Seal the housing. Use a seal that meets the requirements of the application.

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)