

Cylindrical Type

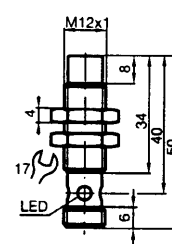
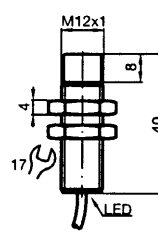
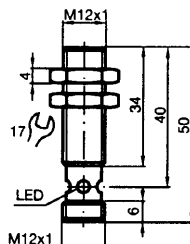
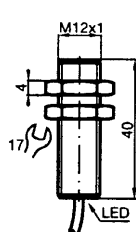
DC

2- wire

Basic series

2 mm embeddable

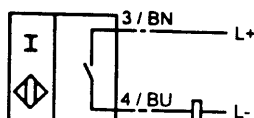
4 mm not embed.



Operating dist. s_a , mounting	2 mm, embeddable	2 mm, embeddable	4 mm, not embedd. *	4 mm, not embedd.
Make function	NBB2-12GM40-Z0	NBB2-12GM40-Z0-V1	NBN4-12GM40-Z0	NBN4-12GM40-Z0-V1
Break function				
Assured operat. dist. s_a [mm]	0 ... 1,62	0 ... 1,62	0 ... 3,24	0 ... 3,24
Reduction factor	r_{V2A} 0,67	0,67	0,74	0,74
	r_{AI} 0,18	0,18	0,37	0,37
	r_{Cu} 0,12	0,12	0,36	0,36
Operating voltage U_B [V]	6 ... 60	6 ... 60	6 ... 60	6 ... 60
Operational current I_L [mA]	4 ... 100	4 ... 100	4 ... 100	4 ... 100
Switching frequency [Hz]	2000	2000	2000	2000
Off-state current I_R [μA]	0,7	0,7	0,7	0,7
Voltage drop [V]	6	6	6	6
Short circuit protection	no	no	no	no
Reverse polarity protection	tolerant	tolerant	tolerant	tolerant
Output indicator	LED, yellow	LED, yellow	LED, yellow	LED, yellow
Operating temperature [$^{\circ}C$]	-25 ... 70	-25 ... 70	-25 ... 70	-25 ... 70
In compliance with	EN60947-5-2	EN60947-5-2		
Protection to DIN 40050	IP 67	IP 67	IP 67	IP 67
Connection	2 m, PVC-cable	V1- connector	2 m, PVC-cable	V1- connector
Conductor cross section	0,14 mm ²	-	0,14 mm ²	-
Housing material	Nickel plated brass	Nickel plated brass	Nickel plated brass	Nickel plated brass
Sensing face	PBT	PBT	PBT	PBT

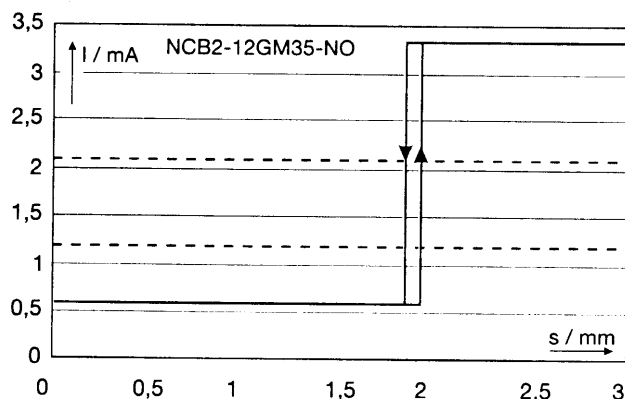
Standard symbol / connection

Z0

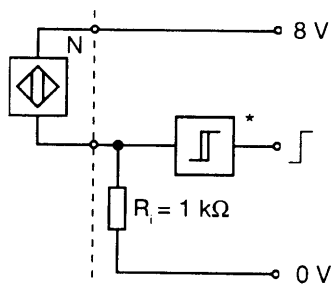


Step 3 Electrical Data and Connections

Due to the extended electronics in the NAMUR sensor, it is possible to obtain a binary switching behaviour in the sensor (defined hysteresis/ differential travel) by maintaining the standardised voltage and current values.



NAMUR sensors can be connected to external switching amplifiers to convert the current variations in a binary output signal. Pepperl+Fuchs offers a range of switching amplifiers for Ex and non-Ex applications.



* e. g. Pepperl+Fuchs KCD2-EL
KFD2-SR-Ex1
EG2-R

Safety Sensors, Two-Wire, SN

These sensors correspond to the N-types, but with an additional function, however: If a fault develops in the sensor, or the interface unit, or the connecting wiring, the output is automatically switched to the safe "OFF" state. The circuit combination of the proximity switch and the interface unit is approved by the TÜV on the basis of DIN VDE 0660 Part 209 to provide a contact-free actuating position switch for safety functions. Both components are constructed in accordance with the Fail-Safe switching principle. The following types are available:

- Normally closed (SN) and
- Normally open (S1N).

Parallel and Series Connection

Proximity switches can be connected in parallel or in series, in order to achieve simple logic functions (AND, OR, NAND, NOR).

Combinations with mechanical switches are also possible. In accordance with the Ex-Regulation, NAMUR sensors may not be connected either in parallel or in series.

	Parallel	Serial
Two-Wire	Note off-state current, Note time delay not NAMUR sensors	Note voltage drop not NAMUR sensors
Three-Wire	De-coupling diodes recommended	Note voltage drop Note time delay

Step 4 General Specification

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The **No-Load Supply Current** I_0 is the self current requirement of the sensor. It is measured with load.

The **Operating Current** I_L is the maximum load current for continuous operation.

The **Short Time Current** I_k is the current which can occur for a short period on switch on, without damaging the sensor.

The **Off-State Current** I_R is the current that flows across the load when the sensor is switched off.

The **Operating voltage** U_B is given as a maximum value of the supply voltage. Safe operation of the sensor is assured within this range. In the case of NAMUR sensors the nominal voltage is stated.

The **Voltage Drop** U_d is measured across the driven sensor or output.

The **Ripple Voltage** is the alternating voltage which is superimposed on the operating voltage (peak-peak) and is stated as a percentage of the arithmetic mean value. Pepperl+Fuchs sensors correspond with the standard DIN EN 50 008 in having a maximum of 10 % ripple.

The **Switching Frequency** (frequency of operating cycles) is the maximum number of

reversals from damped to non-damped state, measured in Hertz (Hz) - see IEC 947-5-2, Appendix 1.

Permissible Interference Voltage

Short term voltage peaks on the supply leads can destroy unprotected sensors. All Pepperl+Fuchs sensors have a transients protection which suppresses interface pulses up to 1 kV over 10 ms duration.

The **Time Delay** t_v is the period of time that passes between connecting the supply voltage to a proximity switch and the switch being ready for operation.

Suppression of Switch On Pulses

All Pepperl+Fuchs sensors are equipped with a device which suppresses a fault signal at the output over a period of time t_v when the operating voltage is first applied.

Short Circuit Protection

With a pulsing short circuit protection, with which all Pepperl+Fuchs sensors are equipped, the output is periodically blocked and released again if the limiting current is exceeded, until the short circuit has been eliminated.

The permissible **Ambient Temperature** is the temperature range within which the sensor normally functions. The temperature range applicable to the Pepperl+Fuchs Standard Series is:

-25 °C ... +70 °C or 248 K ... 343 K.

The following ranges apply to special types:

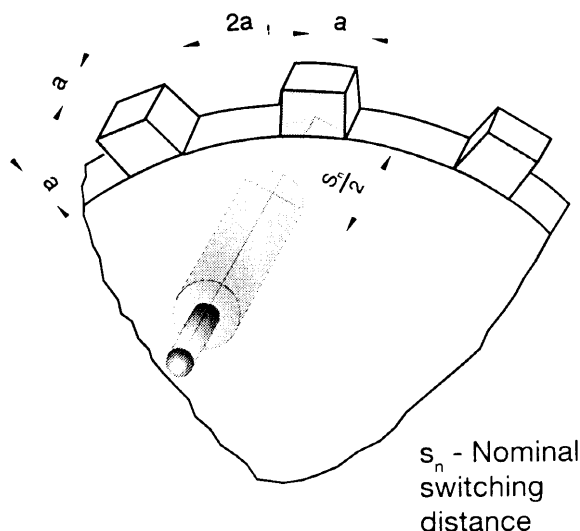
-25 °C ... +100 °C or 248 K ... 373 K

-40 °C ... +150 °C or 233 K ... 423 K

0 °C ... +200 °C or 273 K ... 473 K.

Protection Class

Pepperl+Fuchs sensors are protected, as appropriate, in accordance with IP 65, IP 67 or IP 68 (DIN 40050 and IEC 529) (see chapter Additional Information).



Additional Information

Protection provided by housings
(DIN VDE 0470 Teil 1, EN 60 529)

IP 6 7

Protection against contact and foreign bodies	Protection against water
0 - Not protected	0 - Not protected
1 - Prevention of hand contact with dangerous components - Protection from solid foreign bodies of 50 mm diameter and above	1 - Protection* from dripping water
2 - Prevention of finger contact with dangerous components - Protection from solid foreign bodies of 12.5 mm diameter and above	2 - Protection from dripping water, with the housing tilted up to 15°
3 - Prevention of access by tools to dangerous components - Protection from solid foreign bodies of 2,5 mm diameter and above	3 - Protection from sprayed water
4 - Prevention of access by wires to dangerous components - Protection from solid foreign bodies of 1 mm diameter and above	4 - Protection from water splashing
5 - Prevention of access by wires to dangerous components - Protection from dust	5 - Protection from water hosing
6 - Prevention of access by wires to dangerous components - Dust tight	6 - Protection from water jetting
	7 - Protection from prolonged submersion in water
	8 - Protection from permanent submersion in water

Notes:

When an identifying number does not need to be given, the letter "X" is to be substituted.

Devices which are identified by the second digit 7 or 8, need not satisfy the requirements stipulated by the second digit 5 or 6. Such devices are then given a twin designation (e.g. IPX6 / IPX7).

The conditions stipulated by Pepperl+Fuchs GmbH for IPX8 are:

- 1 m head of water over the test sample
- 24h operation under water with cyclic attenuation/equalisation under nominal load
- A cycle time of 2 hours
- Water temperature = roomtemperature $\pm 5^{\circ}\text{C}$

Type Index

1st Position / 1st Symbol	2nd Position / 1st Symbol	3rd Position / 3rd Symbol	4th Position / 1st Symbol	5th Position / 1st Symbol	6th Position / 1st Position	8th Position / 1st Symbol
Detection Method Section 3.1	Installation Conditions Section 3.2	Construction Type and Size Section 3.3	Switching Function (Output) Section 3.4	Type of Output Section 3.5	Connection Type Section 3.6	NAMUR Function Section 4.7
I Inductive C Capacitive U Ultrasonic D Diffusive R Reflected Optical Beam T Direct Optical Beam	1 Flush Mountable 2 Non Flush Mountable 3 Not stipulated	FORM (1 Capital letter) A Cyl. Threaded Sleeve B Smooth Cyl. Sleeve C Rectangular, with Square Cross Section D Rectangular with Rect. Cross Section SIZE (2 Digits) for Diameter or Length of Side	A Normally Open B Normally Closed C Changeover Type P Programmable by User S Other	P PNP Output 3 or 4 Connections DC N NPN Output 3 or 4 Connections DC D 2 Connections DC F 2 Connections AC U 2 Connections AC or DC	1 Integrated Connection Lead 2 Plug Connec- tion 3 Screwed Connection 9 Other	N NAMUR Function

Example: NBN 4-12GM50-E2-V1

I
Inductive

2
Non-Flush
Mountable

A12
Cylindrical
M12 Thread

A
Normally
Open

P
PNP Output
3 or 4 Connections DC

1
Integrated
Connection Lead

Sections 3.1 - 3.6 relate to IEC Standard 947-5-2.