

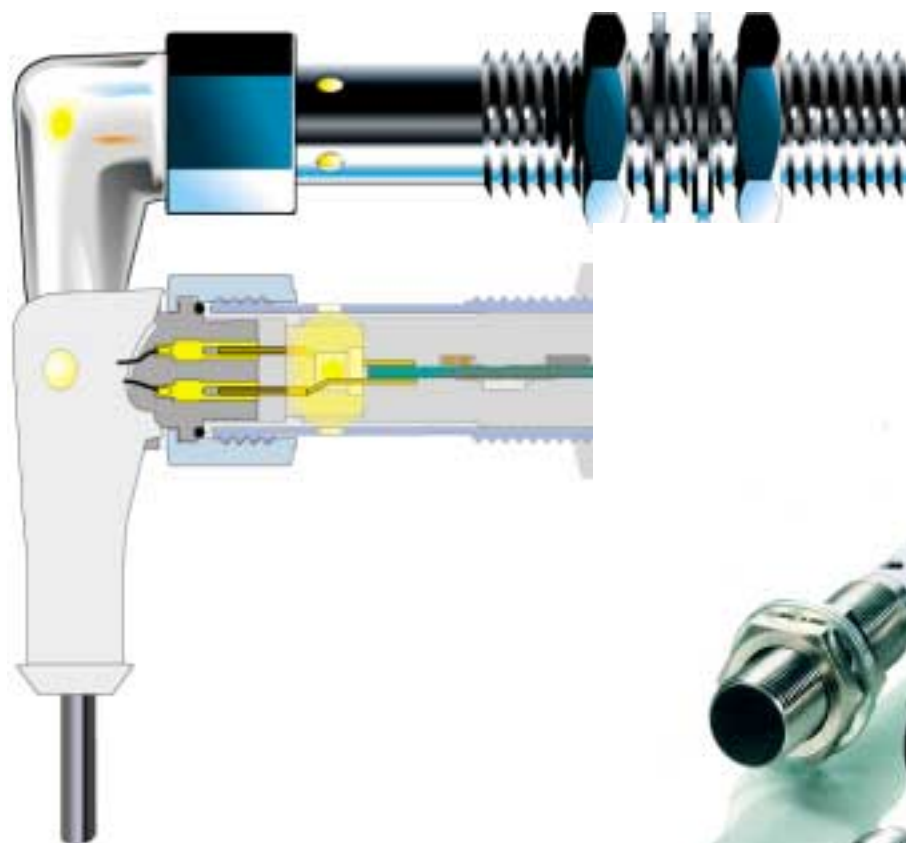


**BALLUFF**

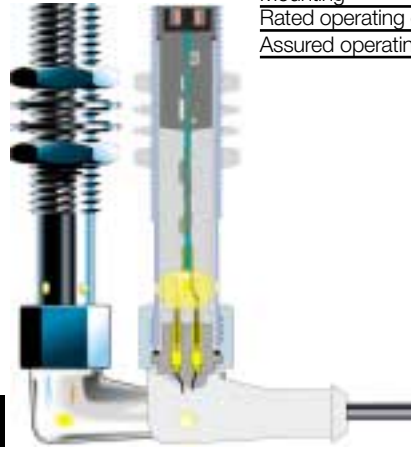
*extremely rugged  
in all kinds  
of environment*

**PROXIMAX®**

The Extra Rugged Sensor  
with Extended Range



# PROXIMAX® – A new sensor concept for the machine tool



Sensors are subjected to extreme stresses on a machine tool. According to studies by the German Machine Tool Builders Association, nearly 30 % of all downtime for machine tools can be attributed to failures of one sensor type or another.

This has led to the design of the "Proximax" concept for inductive proximity switches. Mechanical resistance was given special attention in this design. As opposed to traditional approaches, the front section of the switch is molded with Duroplast. All the important components are housed in this section, the sensor oscillator circuit and the bonded IC. The cavity-free material surrounds the electronic parts and makes the switch insensitive to shock and vibration.

The mineral-filled and fiber-glass reinforced epoxy potting is also extremely resistant to chemicals, abrasion resistant, and can withstand continuous temperatures up to 195 °C. Such a molded proximity switch can even withstand the flame of a blowtorch for a short time.

This guarantees that it will hold up against any kind of hot chips, even if they stick to the active surface.

The housing is made of chemical-resistant, rust-free

stainless steel 1.4305, so that together with the other properties, the entire switch has a high resistance to most of the coolants and lubricants found on machine tools. The sensors is rated IP 68.

All models come standard with extended sensing range. This means less time spent adjusting at often inaccessible spots on the machine tool, so the machine is up and running just that much sooner.

In some versions an optical adjustment aid tells the assembler when the optimum sensing distance of 80 %  $s_n$  is reached.

### Diagnostic output version

Following a recommendation of the VDW, a version with integrated diagnostic function is now introduced. It contains has all the features already mentioned, but also an output for self-diagnostics. This is intended to provide standardization for installation as well. This version is available in M12, 2-wire configuration with a connector having a third connection.

Machine downtime costs a lot of money. Reducing it is a necessity given today's costs.

Sensors designed with the "Proximax" concept do their

part to save costs with their rugged construction, setup aids, and self-diagnostic function.

### PROXIMAX® – DC 2-wire with setup aid

PROXIMAX® – in 2-wire configuration have an optical setup aid. The uncertain switching range (up to 80 % of  $s_n$ ) is displayed with a flashing LED.

Other advantages:  
Operating current up to 200 mA even for 2-wire sensors.

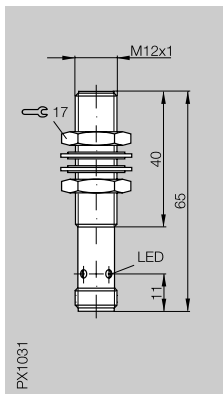
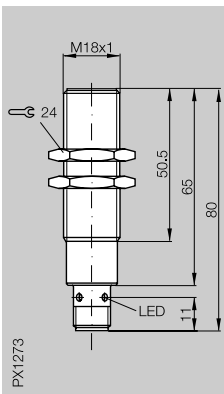
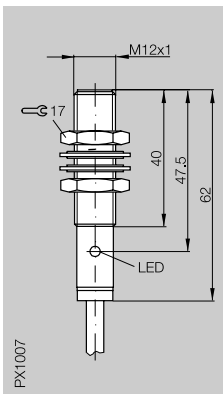
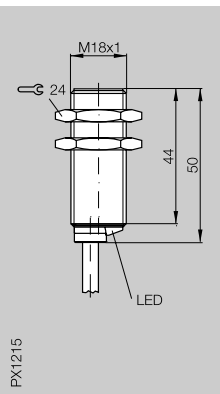
Housing size	
Mounting	
Rated operating distance $s_n$	
Assured operating distance $s_a$	



PNP	Normally-open
Rated operational voltage $U_e$	
Supply voltage $U_B$	
Voltage drop $U_d$ at $I_e$	
Rated insulation voltage $U_i$	
Rated operational current $I_e$	
No-load supply current $I_0$ damped/undamped	
Minimum operational current $I_n$	
Off-state current $I_r$	
Protected against polarity reversal	
Short circuit protected	
Load capacity	
Repeat accuracy R	
Ambient temperature range $T_a$	
Frequency of operating cycles f	
Utilization categories	
Function indication	
Degree of protection per IEC 529	
Insulation Class	
Housing material	
Material of sensing face	
Connection	
No. of wires × conductor cross section	
Recommended connector	
Pressure rated up to	

DC 3-wire

DC 2-wire

DC 3-wire		DC 2-wire	
M12x1	M18x1	M12x1	M18x1
flush	flush	flush	flush
4 mm	8 mm	4 mm	7 mm
0...3.2 mm	0...6.4 mm	0...3.2 mm	0...5.7 mm
			
BES M12EL-PSC40B-S04G	BES M18EL-PSC80B-S04G	BES M12EL-USH40B-BP00	BESM18EK-USH70B-BP00
24 V DC	24 V DC	24 V DC	24 V DC
10...30 V DC	10...30 V DC	10...55 V DC	10...55 V DC
≤ 1.5 V	≤ 1.5 V	≤ 5 V	≤ 5 V
250 V AC	250 V AC	250 V AC	250 V AC
200 mA	200 mA	200 mA	200 mA
≤ 9 mA/≤ 4 mA	≤ 9 mA/≤ 4 mA		
≤ 10 µA	≤ 10 µA	3 mA	3 mA
yes	yes	≤ 650 µA	≤ 650 µA
yes	yes	yes	yes
≤ 1.0 µF	≤ 1.0 µF	yes	yes
≤ 5 %	≤ 5 %	≤ 0.2 µF	≤ 0.2 µF
-25...+70 °C	-25...+70 °C	≤ 5 %	≤ 5 %
1000 Hz	500 Hz	-25...+70 °C	-25...+70 °C
DC 13	DC 13	1000 Hz	500 Hz
yes	yes	DC 13	DC 13
IP 68 per BWN Pr 20	IP 68 per BWN Pr 20	yes	yes
☐	☐	IP 68 per BWN Pr 20	IP 68 per BWN Pr 20
stainless steel	stainless steel	☐	☐
EP (Duroplast)	EP (Duroplast)	stainless steel	stainless steel
connector	connector	EP (Duroplast)	EP (Duroplast)
		connector	connector
		cable	cable
		2 × 0.34 mm <sup>2</sup>	2 × 0.34 mm <sup>2</sup>
BKS-S 19/BKS-S 20	BKS-S 19/BKS-S 20		
	25 bar		25 bar

PROXIMAX



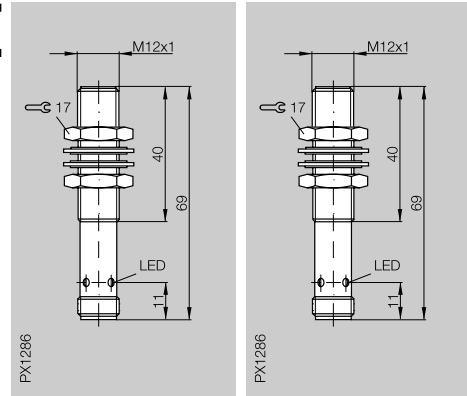
The Duroplast molded front section is extremely temperature resistant to hot chips.



The stainless housing is extremely rugged.



Housing size	<b>M12x1</b>	<b>M12x1</b>
Mounting	flush	flush
Rated operating distance $s_n$	<b>2 mm</b>	<b>4 mm</b>
Assured operating distance $s_a$	0...1.6 mm	0...3.2 mm



## Diagnostic output version

Following a recommendation of the VDW, a version with integrated diagnostic function is now introduced. It contains all the features already mentioned, but also an output for self-diagnostics. This is intended to provide standardization for installation as well. This version is available in M12, 2-wire configuration with a connector having a third connection. In case of operating sensor a current flows in this third wire. Electrical data:  $I_{max}$  50 mA, PNP function, short circuit protected.

PNP	Normally-open	BES M12EL-GSH20B-S04G-M01	BES M12EL-GSH40B-S04G-M01
Rated operational voltage $U_e$		24 V DC	24 V DC
Supply voltage $U_B$		10...55 V DC	10...55 V DC
Voltage drop $U_d$ at $I_e$		$\leq 3.7$ V	$\leq 3.7$ V
Rated insulation voltage $U_i$		250 V AC	250 V AC
Rated operational current $I_e$		200 mA	200 mA
Minimum operational current $I_m$		3 mA	3 mA
Off-state current $I_o$		$\leq 650$ $\mu$ A	$\leq 650$ $\mu$ A
Protected against polarity reversal		yes	yes
Short circuit protected		yes	yes
Load capacity		$\leq 1$ $\mu$ F	$\leq 1$ $\mu$ F
Repeat accuracy R		$\leq 5$ %	$\leq 5$ %
Ambient temperature range $T_a$		-25...+70 °C	-25...+70 °C
Frequency of operating cycles f		1000 Hz	1000 Hz
Utilization categories		DC 13	DC 13
Function indication		yes	yes
Degree of protection per IEC 529		IP 68 per BWN Pr 20	IP 68 per BWN Pr 20
Insulation Class		□	□
Housing material		stainless steel	stainless steel
Material of sensing face		EP (Duroplast)	EP (Duroplast)
Connection		connector	connector

