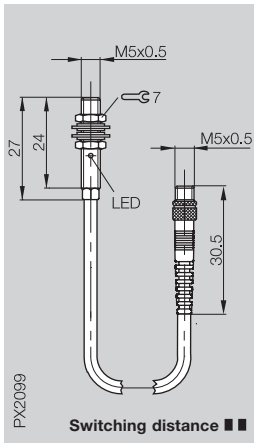
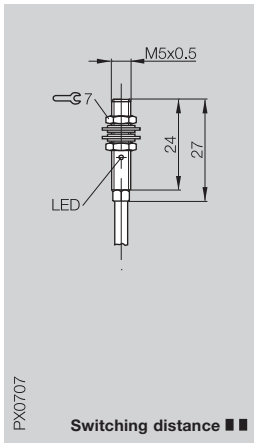
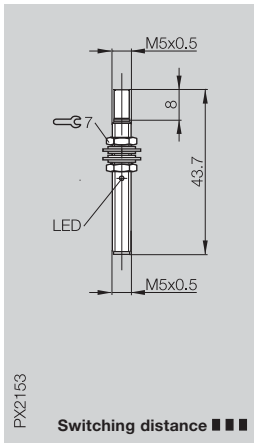
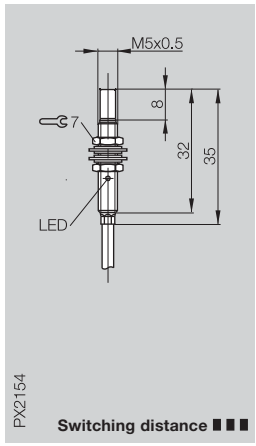
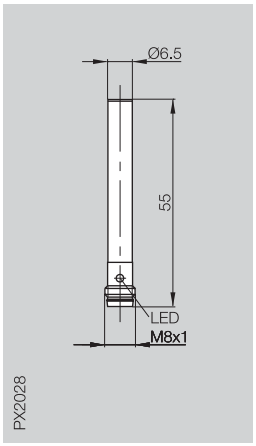
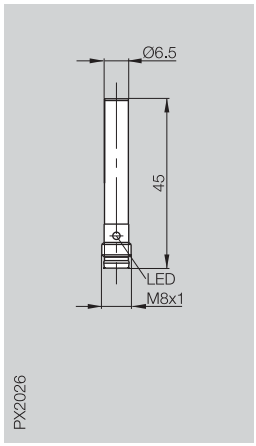
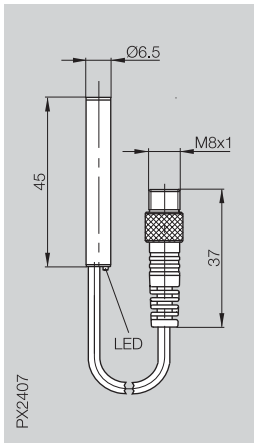
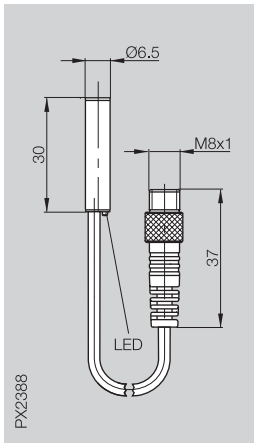
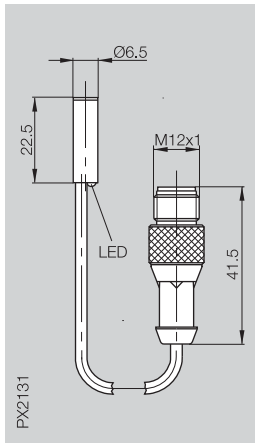
Housing size		**M5×0.5**	**M5×0.5**	**M5×0.5**	**M5×0.5**
Mounting (see notes starting p. **1.0.**11)		flush	flush	non-flush	non-flush
Rated operating distance s_n		**1.5 mm**	**1.5 mm**	**5 mm**	**5 mm**
Assured operating distance s_a		0...1.2 mm	0...1.2 mm	0...4.1 mm	0...4.1 mm
					
PNP	NO ①	BES 516-3005-G-E4-C-S26-00,3	BES 516-3005-G-E4-C-PU-02	BES M05ED-PSC50F-S26G	BES M05ED-PSC50F-EP02
	NC ②		BES 516-3022-G-E4-C-PU-02		
NPN	NO ④		BES 516-3006-G-E4-C-PU-02		
	NC ⑤		BES 516-3023-G-E4-C-PU-02		
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e		≤ 3 V	≤ 3 V	≤ 2.5 V	≤ 2.5 V
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	75 V DC
Rated operational current I_e		100 mA	100 mA	100 mA	100 mA
No-load supply current I_0 max.		≤ 12 mA	≤ 12 mA	≤ 10 mA	≤ 10 mA
Polarity reversal protected		yes	yes	yes	yes
Short circuit protected		yes	yes	yes	yes
Repeat accuracy R		≤ 5 %	≤ 5 %	≤ 10 %	≤ 10 %
Ambient temperature range T_a		–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
Switching frequency f		3000 Hz	3000 Hz	3000 Hz	3000 Hz
Utilization category		DC 13	DC 13	DC 13	DC 13
Function indicator		yes	yes	yes	yes
Degree of protection per IEC 60529		IP 67	IP 67	IP 67	IP 67
Insulation class					
Housing material		Stainless steel	Stainless steel	Stainless steel	Stainless steel
Material of sensing face		POM	POM	POM	POM
Connection		0.3 m PUR cable with connector	2 m cable PUR	Connector	2 m cable PUR
No. of wires × cross-section			3×0.14 mm²		3×0.14 mm²
Approval		cULus	cULus	cULus	cULus
Recommended connector		BKS-B 25		BKS-B 25/BKS-B 26	

① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

Other cable lengths on request.

	∅ 6.5 mm	**∅ 6.5 mm**	**∅ 6.5 mm**	**∅ 6.5 mm**	**∅ 6.5 mm**
	flush	flush	flush	flush	flush
	1.5 mm	**1.5 mm**	**1.5 mm**	**1.5 mm**	**1.5 mm**
	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm
					
	BES 516-371-S49-C	BES 516-371-E5-C-S49	BES 516-371-E0-C-S49-00,5	BES 516-371-E4-C-S49-00,3	BES 516-371-SA10-S4-00,3
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
	75 V DC	75 V DC	250 V AC	250 V AC	75 V DC
	200 mA	200 mA	200 mA	200 mA	200 mA
	≤ 9 mA	≤ 9 mA	≤ 9 mA	≤ 9 mA	≤ 10 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	3000 Hz	3000 Hz	3000 Hz	3000 Hz	4000 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 67	IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67
			⧈	⧈	
	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
	PA 12	PA 12	PA 12	PA 12	PBT
	Connector	Connector	0.5 m PUR cable with connector	0.3 m PUR cable with connector	0.3 m PUR cable with connector
	cULus	cULus	cULus	cULus	
	BKS-_ 48/BKS-_ 49	BKS-_ 48/BKS-_ 49	BKS-_ 48	BKS-_ 48	BKS-_ 19

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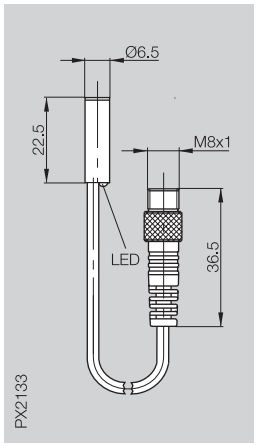
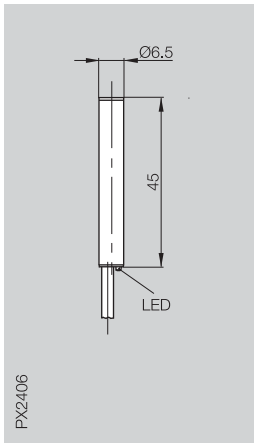
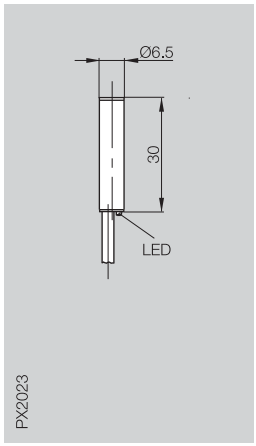
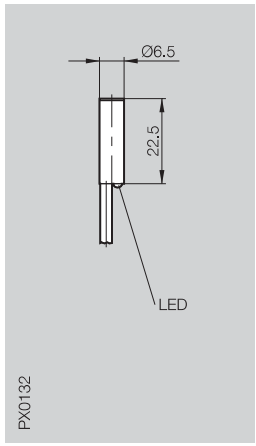
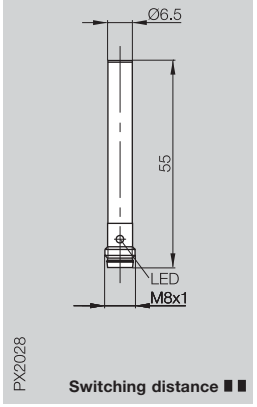
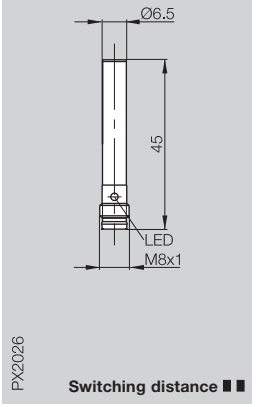
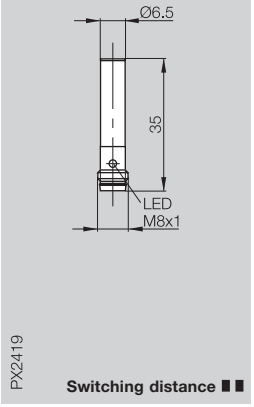
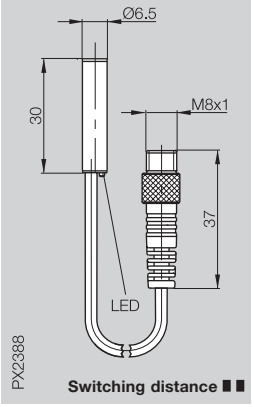
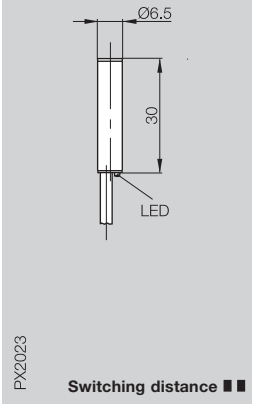
Connectors, Holders ... Page 5.2 ...

Housing size			Ø **6.5 mm**	Ø **6.5 mm**	Ø **6.5 mm**	Ø **6.5 mm**
Mounting (see notes starting p. **1.0.**11)			flush	flush	flush	flush
Rated operating distance s_n			**1.5 mm**	**1.5 mm**	**1.5 mm**	**1.5 mm**
Assured operating distance s_a			0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm
						
PNP	NO	①	BES 516-371-SA10-S49-00,3	BES 516-371-E0-C-02	BES 516-371-E4-C-02	BES 516-371-SA10-02
	NC	②				
NPN	NO	④			BES 516-372-E4-C-02	BES 516-372-SA1-02
	NC	⑤				
Supply voltage U_B			10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e			≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
Rated insulation voltage U_i			75 V DC	250 V AC	250 V AC	75 V DC
Rated operational current I_e			200 mA	200 mA	200 mA	200 mA
No-load supply current I_0 max.			≤ 10 mA	≤ 9 mA	≤ 9 mA	≤ 25 mA
Polarity reversal protected			yes	yes	yes	yes
Short circuit protected			yes	yes	yes	yes
Repeat accuracy R			≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a			–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
Switching frequency f			4000 Hz	3000 Hz	3000 Hz	1500 Hz
Utilization category			DC 13	DC 13	DC 13	DC 13
Function indicator			yes	yes	yes	yes
Degree of protection per IEC 60529			IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67
Insulation class				⧈	⧈	
Housing material			CuZn coated	Stainless steel	Stainless steel	CuZn coated
Material of sensing face			PBT	PA 12	PA 12	PBT
Connection			0.3 m PUR cable with connector	2 m PVC cable	2 m PVC cable	2 m PVC cable
No. of wires × cross-section				3×0.14 mm²	3×0.14 mm²	3×0.14 mm²
Approval				cULus	cULus	
Recommended connector			BKS-_ 48			

① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

For sensors with cable, other lengths and PUR quality are available on request.

For sensors with cable and connector, other lengths are available on request.

	∅ 6.5 mm	**∅ 6.5 mm**	**∅ 6.5 mm**	**∅ 6.5 mm**	**∅ 6.5 mm**
	flush	flush	flush	flush	flush
	2 mm	**2 mm**	**2 mm**	**2 mm**	**2 mm**
	0...1.6 mm	0...1.6 mm	0...1.6 mm	0...1.6 mm	0...1.6 mm
					
	BES 516-371-G-S49-C	BES 516-371-G-E5-C-S49 BES 516-3021-G-E5-C-S49	BES 516-371-SA15-C-S49	BES 516-371-G-E4-C-S49-00,3	BES 516-371-G-E4-C-02 BES 516-3021-G-E4-C-02
		BES 516-372-G-E5-C-S49 BES 516-3025-G-E5-C-S49			BES 516-372-G-E4-C-02
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
	75 V DC	75 V DC	75 V DC	250 V AC	250 V AC
	200 mA	200 mA	200 mA	200 mA	200 mA
	≤ 9 mA	≤ 18 mA	≤ 9 mA	≤ 9 mA	≤ 18 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	1500 Hz	1500 Hz	1500 Hz	1500 Hz	1500 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 67	IP 67	IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
				⧈	⧈
	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
	PA 12	PA 12	PA 12	PA 12	PA 12
	Connector	Connector	Connector	0.3 m PUR cable with connector	2 m PVC cable
					3×0.14 mm²
	cULus	cULus	cULus	cULus	cULus
	BKS-_ 48/BKS-_ 49	BKS-_ 48/BKS-_ 49	BKS-_ 48/BKS-_ 49	BKS-_ 48	

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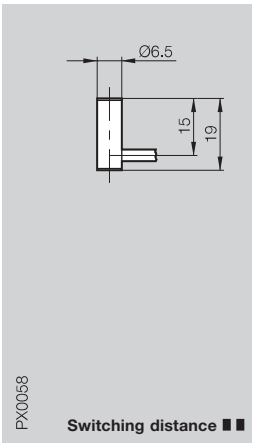
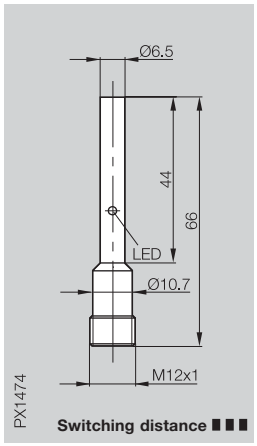
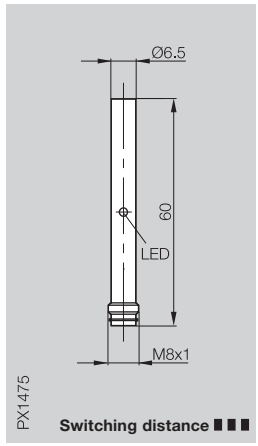
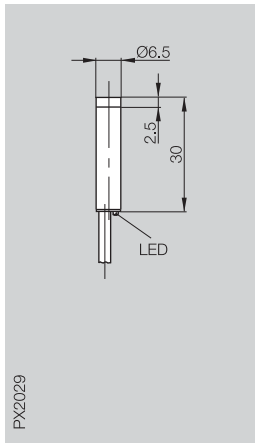
Connectors, Holders ...
Page 5.2 ...

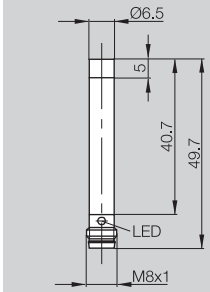
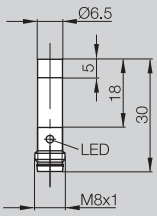
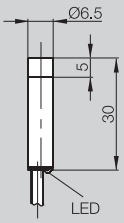
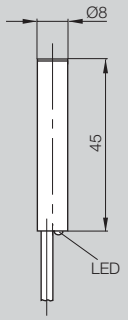
DC 3-wire
Ø 6.5 mm
s_n 2 mm, 2.5 mm, 3 mm

Ø6.5 mm

Housing size			**Ø 6.5 mm**	**Ø 6.5 mm**	**Ø 6.5 mm**	**Ø 6.5 mm**
Mounting (see notes starting p. **1.0.**11)			flush	quasi flush	quasi flush	non-flush
Rated operating distance s_n			**2 mm**	**3 mm**	**3 mm**	**2.5 mm**
Assured operating distance s_a			0...1.6 mm	0...2.4 mm	0...2.4 mm	0...2 mm
						
PNP	NO	①	BES 516-371-SA13-PU-02	BES G06MH1-PSC30B-S04G	BES G06MI-PSC30B-S49G	BES 516-349-E4-C-02
	NC	②			BES G06MI-POC30B-S49G	
NPN	NO	④		BES G06MH1-NSC30B-S04G	BES G06MI-NSC30B-S49G	BES 516-350-E4-C-02
	NC	⑤			BES G06MI-NOC30B-S49G	
Supply voltage U_B			10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e			≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
Rated insulation voltage U_i			75 V DC	75 V DC	75 V DC	250 V AC
Rated operational current I_e			200 mA	200 mA	200 mA	200 mA
No-load supply current I_0 max.			≤ 10 mA	≤ 12 mA	≤ 12 mA	≤ 18 mA
Polarity reversal protected			yes	yes	yes	yes
Short circuit protected			yes	yes	yes	yes
Repeat accuracy R			≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a			–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
Switching frequency f			2000 Hz	1000 Hz	1000 Hz	2000 Hz
Utilization category			DC 13	DC 13	DC 13	DC 13
Function indicator			no	yes	yes	yes
Degree of protection per IEC 60529			IP 65	IP 67	IP 67	IP 68 per BWN Pr. 20
Insulation class						⧈
Housing material			Stainless steel	CuZn coated	CuZn coated	Stainless steel
Material of sensing face			PBT	PBT	PBT	PA 12
Connection			2 m cable PUR	Connector	Connector	2 m PVC cable
No. of wires × cross-section			3×0.14 mm²			3×0.14 mm²
Approval						cULus
Recommended connector				BKS-_ 19/BKS-_ 20	BKS-_ 48/BKS-_ 49	

① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

Other cable lengths on request.

	Ø 6.5 mm	**Ø 6.5 mm**	**Ø 6.5 mm**		**Ø 8 mm**
	non-flush	non-flush	non-flush		flush
	4 mm	**4 mm**	**4 mm**		**1.5 mm**
	0...3.2 mm	0...3.2 mm	0...3.2 mm		0...1.2 mm
	 PX1613 **Switching distance ■■**	 PX2416 **Switching distance ■■**	 PX2415 **Switching distance ■■**		 PX2162
	BES G06EF-PSC40F-S49G	BES G06EB-PSC40F-S49G BES G06EB-POC40F-S49G	BES G06ED-PSC40F-BV02 BES G06ED-POC40F-BV02		BES G08EG-PSC15B-BV02
		BES G06EB-NSC40F-S49G BES G06EB-NOC40F-S49G	BES G06ED-NSC40F-BV02 BES G06ED-NOC40F-BV02		
	10...30 V DC	10...30 V DC	10...30 V DC		10...30 V DC
	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V		≤ 2.5 V
	75 V DC	75 V DC	250 V AC		250 V AC
	200 mA	200 mA	200 mA		200 mA
	≤ 12 mA	≤ 18 mA	≤ 18 mA		≤ 9 mA
	yes	yes	yes		yes
	yes	yes	yes		yes
	≤ 5 %	≤ 5 %	≤ 5 %		≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C		–25...+70 °C
	5000 Hz	1500 Hz	1500 Hz		3000 Hz
	DC 13	DC 13	DC 13		DC 13
	yes	yes	yes		yes
	IP 67	IP 67	IP 68 per BWN Pr. 20		IP 68 per BWN Pr. 20
			⧈		⧈
	Stainless steel	Stainless steel	Stainless steel		Stainless steel
	PBT	PA 12	PA 12		PBT
	Connector	Connector	2 m PVC cable		2 m PVC cable
			3×0.14 mm²		3×0.14 mm²
	cULus	cULus	cULus		cULus
	BKS-_ 48/BKS-_ 49	BKS-_ 48/BKS-_ 49			

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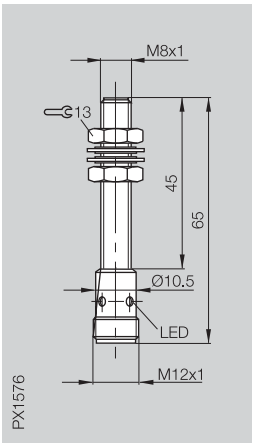
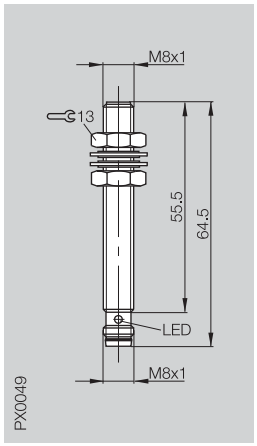
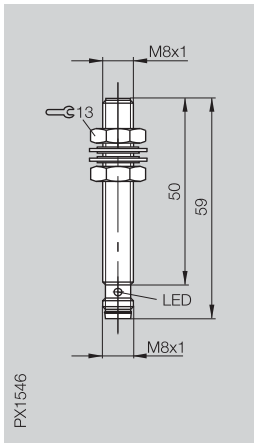
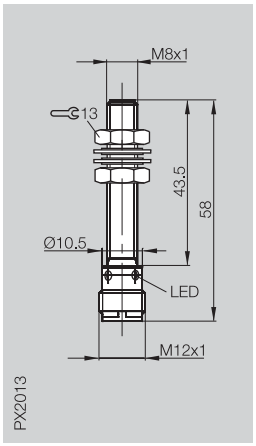
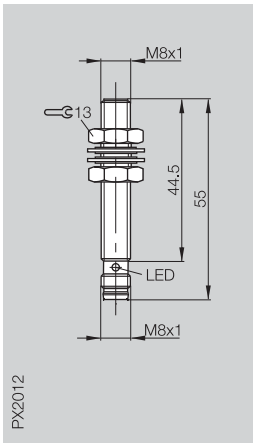
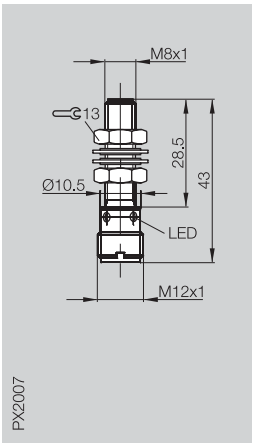
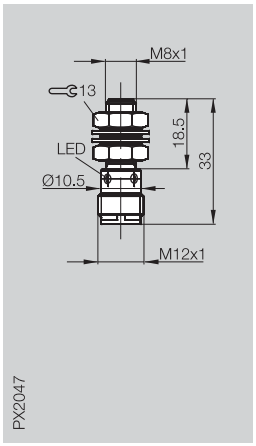
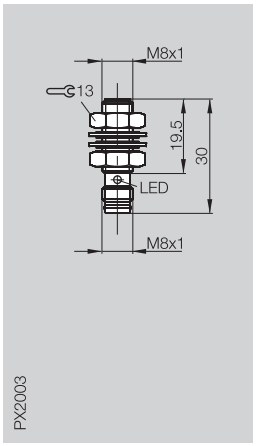
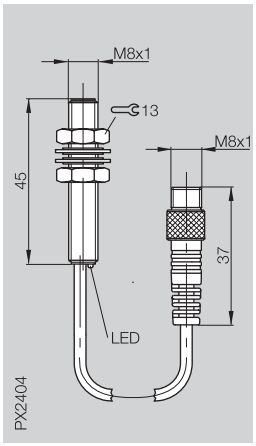
Connectors, Holders ...
Page 5.2 ...

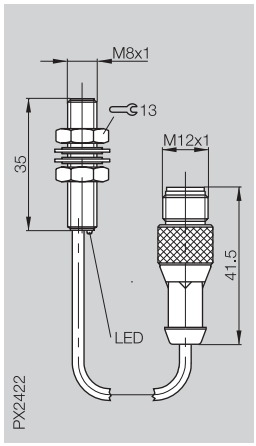
Housing size			**M8×1**	**M8×1**	**M8×1**	**M8×1**
Mounting (see notes starting p. **1.0.**11)			flush	flush	flush	flush
Rated operating distance s_n			**1.5 mm**	**1.5 mm**	**1.5 mm**	**1.5 mm**
Assured operating distance s_a			0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm
						
PNP	NO	①	BES M08MH1-PSC15B-S04G	BES 516-324-SA33	BES M08MI-PSC15B-S49G	BES M08EH-PSC15B-S04G
	NC	②	BES M08MH1-POC15B-S04G			BES M08EH-POC15B-S04G
NPN	NO	④	BES M08MH1-NSC15B-S04G		BES M08MI-NSC15B-S49G	BES M08EH-NSC15B-S04G
	NC	⑤	BES M08MH1-NOC15B-S04G			BES M08EH-NOC15B-S04G
Supply voltage U_B			12...30 V DC	10...30 V DC	12...30 V DC	10...30 V DC
Voltage drop U_d at I_e			≤ 3 V	≤ 2.5 V	≤ 3 V	≤ 2.5 V
Rated insulation voltage U_i			75 V DC	75 V DC	75 V DC	250 V AC
Rated operational current I_e			100 mA	200 mA	100 mA	200 mA
No-load supply current I_0 max.			PNP ≤ 12 mA, NPN ≤ 18 mA	≤ 25 mA	PNP ≤ 12 mA, NPN ≤ 18 mA	PNP ≤ 9 mA, NPN ≤ 18 mA
Polarity reversal protected			yes	yes	yes	yes
Short circuit protected			yes	yes	yes	yes
Repeat accuracy R			≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a			–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
Switching frequency f			1000 Hz	1000 Hz	1000 Hz	3000 Hz
Utilization category			DC 13	DC 13	DC 13	DC 13
Function indicator			yes	yes	yes	yes
Degree of protection per IEC 60529			IP 67	IP 67	IP 67	IP 68 per BWN Pr. 20
Insulation class						⧈
Housing material			CuZn coated	Stainless steel	CuZn coated	Stainless steel
Material of sensing face			PA 12	PBT	PA 12	PBT
Connection			Connector	Connector	Connector	Connector
Approval			cULus		cULus	cULus
Recommended connector			BKS-_ 19/BKS-_ 20	BKS-_ 48/BKS-_ 49	BKS-_ 48/BKS-_ 49	BKS-_ 19/BKS-_ 20

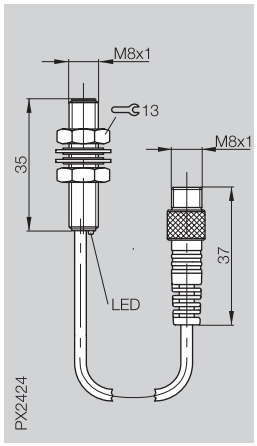
① Wiring diagrams see page **1.0.**6

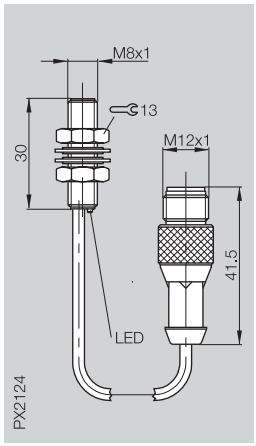
Other cable lengths on request.

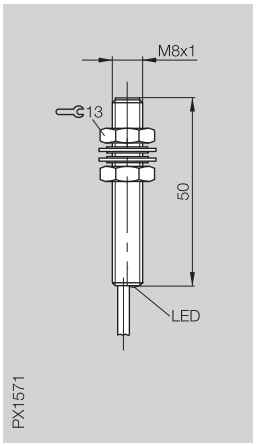
	M8×1	**M8×1**	**M8×1**	**M8×1**	**M8×1**
	flush	flush	flush	flush	flush
	1.5 mm	**1.5 mm**	**1.5 mm**	**1.5 mm**	**1.5 mm**
	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm
					
	BES 516-324-S49-C BES 516-377-S49-C	BES M08EE-PSC15B-S04G BES M08EE-POC15B-S04G	BES M08EC-PSC15B-S04G	BES M08EC-PSC15B-S49G BES M08EC-POC15B-S49G	BES 516-324-E0-C-S49-00,2 BES 516-377-E0-C-S49-00,2
	BES 516-343-S49-C BES 516-378-S49-C	BES M08EE-NSC15B-S04G		BES M08EC-NSC15B-S49G	
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC
	200 mA	200 mA	200 mA	200 mA	200 mA
	PNP ≤ 9 mA, NPN ≤ 18 mA	PNP ≤ 9 mA, NPN ≤ 18 mA	≤ 9 mA	PNP ≤ 9 mA, NPN ≤ 18 mA	≤ 9 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70°C	–25...+70 °C
	3000 Hz	3000 Hz	3000 Hz	3000 Hz	3000 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
	⧈	⧈	⧈	⧈	⧈
	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
	PA 12	PBT	PBT	PBT	PA 12
	Connector	Connector	Connector	Connector	0.2 m PUR cable with connector
	cULus	cULus	cULus	cULus	cULus
	BKS-_ 48/BKS-_ 49	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 48/BKS-_ 49	BKS-_ 48

Housing size	**M8×1**	**M8×1**	**M8×1**	**M8×1**	
Mounting (see notes starting p. **1.0.**11)	flush	flush	flush	flush	
Rated operating distance s_n	**1.5 mm**	**1.5 mm**	**1.5 mm**	**1.5 mm**	
Assured operating distance s_a	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm	





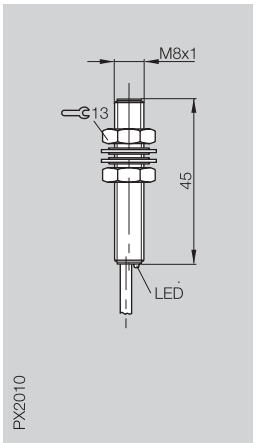
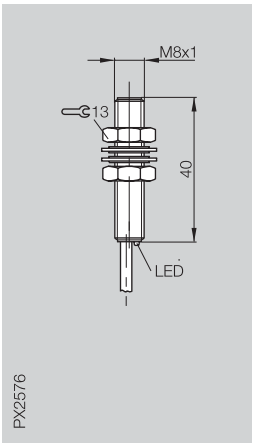
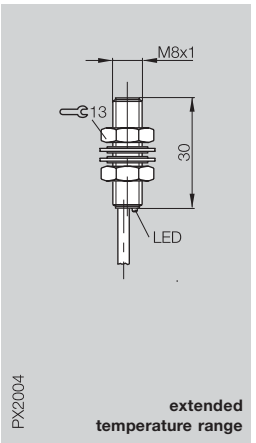
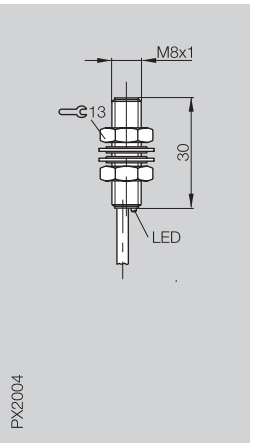
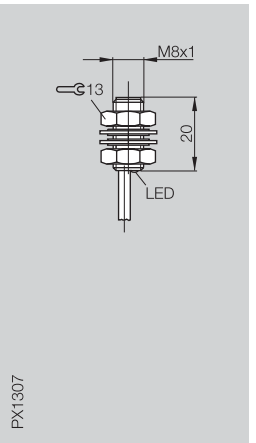




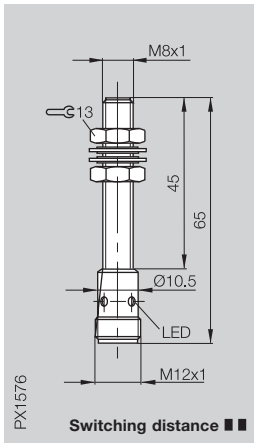
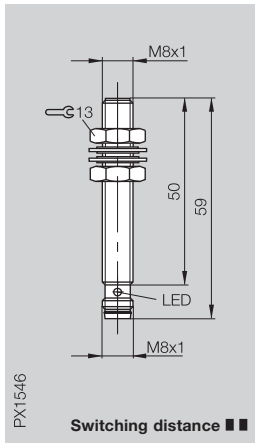
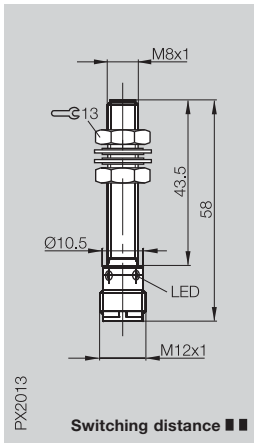
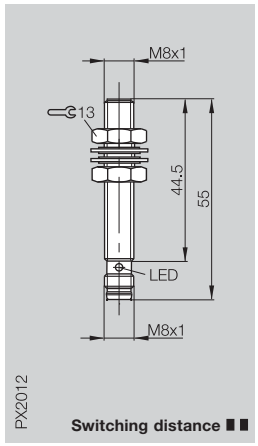
PNP	NO	①	BES 516-324-E3-C-S4-00,3	BES 516-324-E3-C-S49-00,3	BES 516-324-E4-C-S4-00,3	BES M08MI-PSC15B-BV02
	NC	②	BES 516-377-E3-C-S4-PU-00,3			BES M08MI-POC15B-BV02
NPN	NO	④				BES M08MI-NSC15B-BV02
	NC	⑤				
Supply voltage U_B			10...30 V DC	10...30 V DC	10...30 V DC	12...30 V DC
Voltage drop U_d at I_e			≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
Rated insulation voltage U_i			250 V AC	250 V AC	250 V AC	75 V DC
Rated operational current I_e			200 mA	200 mA	200 mA	100 mA
No-load supply current I_0 max.			≤ 9 mA	≤ 9 mA	≤ 9 mA	PNP ≤ 10 mA, NPN ≤ 18 mA
Polarity reversal protected			yes	yes	yes	yes
Short circuit protected			yes	yes	yes	yes
Repeat accuracy R			≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a			–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
Switching frequency f			3000 Hz	3000 Hz	3000 Hz	1000 Hz
Utilization category			DC 13	DC 13	DC 13	DC 13
Function indicator			yes	yes	yes	yes
Degree of protection per IEC 60529			IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67
Insulation class			⧈	⧈	⧈	
Housing material			Stainless steel	Stainless steel	Stainless steel	CuZn coated
Material of sensing face			PA 12	PA 12	PA 12	PA 12
Connection			0.3 m PUR cable with connector	0.3 m PUR cable with connector	0.3 m PUR cable with connector	2 m PVC cable
No. of wires × cross-section						3×0.14 mm²
Approval			cULus	cULus	cULus	cULus
Recommended connector			BKS-_ 19	BKS-_ 48	BKS-_ 19	

① Wiring diagrams see page **1.0.**6

Other cable lengths on request.

	M8×1	**M8×1**	**M8×1**	**M8×1**	**M8×1**
	flush	flush	flush	flush	flush
	1.5 mm	**1.5 mm**	**1.5 mm**	**1.5 mm**	**1.5 mm**
	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm
					
	BES 516-324-E0-C-02 BES 516-377-E0-C-02	BES M08EF-PSC15B-BP02 BES M08EF-POC15B-BP02	BES 516-324-SA45-E4-C-PU-03	BES 516-324-E4-C-02 BES 516-377-E4-C-02	BES 516-324-SA44-C-02
	BES 516-343-E0-C-02 BES 516-378-E0-C-02			BES 516-343-E4-C-02 BES 516-378-E4-C-02	
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
	250 V AC	250 V AC	250 V AC	250 V AC	75 V DC
	200 mA	200 mA	200 mA	200 mA	200 mA
	PNP ≤ 9 mA, NPN ≤ 11 mA	≤ 9 mA	≤ 9 mA	PNP ≤ 9 mA, NPN ≤ 11 mA	≤ 25 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–40...+85 °C	–25...+70 °C	–25...+70 °C
	3000 Hz	3000 Hz	3000 Hz	3000 Hz	1500 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67
	⧈	⧈	⧈	⧈	
	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
	PA 12	PBT	PA 12	PA 12	PBT
	2 m PVC cable	2 m cable PUR	3 m cable PUR	2 m PVC cable	3 m PVC cable
	3×0.14 mm²	3×0.14 mm²	3×0.14 mm²	3×0.14 mm²	3×0.14 mm²
	cULus	cULus	cULus	cULus	cULus

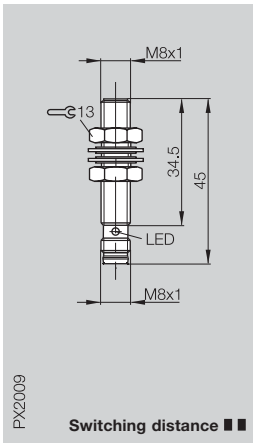
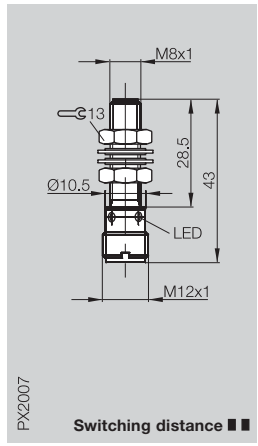
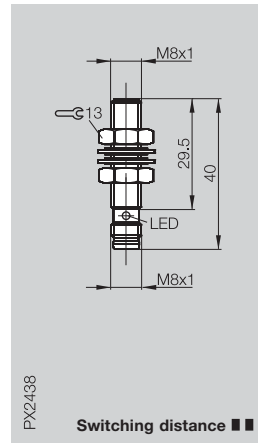
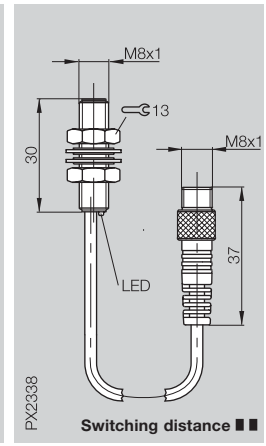
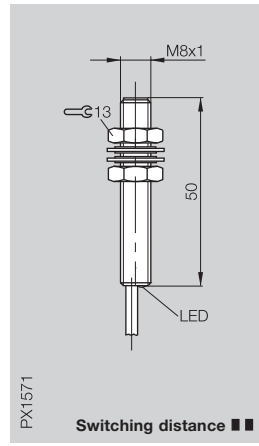
5
Connectors, Holders ...
Page 5.2 ...

Housing size		**M8×1**	**M8×1**	**M8×1**	**M8×1**	
Mounting (see notes starting p. **1.0.**11)		flush	flush	flush	flush	
Rated operating distance s_n		**2 mm**	**2 mm**	**2 mm**	**2 mm**	
Assured operating distance s_a		0...1.6 mm	0...1.6 mm	0...1.6 mm	0...1.6 mm	
						
PNP	NO ①	BES M08MH1-PSC20B-S04G	BES M08MI-PSC20B-S49G	BES M08EH-PSC20B-S04G	BES 516-324-G-S49-C	
	NC ②		BES M08MI-POC20B-S49G		BES 516-377-G-S49-C	
NPN	NO ④	BES M08MH1-NSC20B-S04G	BES M08MI-NSC20B-S49G			
	NC ⑤					
Supply voltage U_B		12...30 V DC	12...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e		≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	
Rated insulation voltage U_i		75 V DC	75 V DC	250 V AC	250 V AC	
Rated operational current I_e		200 mA	200 mA	200 mA	200 mA	
No-load supply current I_0 max.		PNP ≤ 10 mA, NPN ≤ 18 mA	PNP ≤ 10 mA, NPN ≤ 18 mA	≤ 9 mA	≤ 9 mA	
Polarity reversal protected		yes	yes	yes	yes	
Short circuit protected		yes	yes	yes	yes	
Repeat accuracy R		≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	
Ambient temperature range T_a		–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	
Switching frequency f		700 Hz	700 Hz	1500 Hz	1500 Hz	
Utilization category		DC 13	DC 13	DC 13	DC 13	
Function indicator		yes	yes	yes	yes	
Degree of protection per IEC 60529		IP 67	IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	
Insulation class				⧈	⧈	
Housing material		CuZn coated	CuZn coated	Stainless steel	Stainless steel	
Material of sensing face		PA 12	PA 12	PBT	PBT	
Connection		Connector	Connector	Connector	Connector	
No. of wires × cross-section						
Approval		cULus	cULus	cULus	cULus	
Recommended connector		BKS-_ 19/BKS-_ 20	BKS-_ 48/BKS-_ 49	BKS-_ 19/BKS-_ 20	BKS-_ 48/BKS-_ 49	

① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

For sensors with cable, other lengths and PUR quality are available on request.

For sensors with cable and connector, other lengths are available on request.

	M8×1	**M8×1**	**M8×1**	**M8×1**	**M8×1**
	flush	flush	flush	flush	flush
	2 mm	**2 mm**	**2 mm**	**2 mm**	**2 mm**
	0...1.6 mm	0...1.6 mm	0...1.6 mm	0...1.6 mm	0...1.6 mm
					
	BES 516-324-G-E5-C-S49 BES 516-377-G-E5-C-S49	BES M08EE-PSC20B-S04G	BES M08EE-PSC20B-S49G BES M08EE-POC20B-S49G	BES 516-324-G-E4-C-S49-00,2 BES 516-377-G-E4-C-S49-00,3	BES M08MI-PSC20B-BV02
	BES 516-343-G-E5-C-S49 BES 516-378-G-E5-C-S49		BES M08EE-NSC20B-S49G BES M08EE-NOC20B-S49G		BES M08MI-NSC20B-BV02
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	12...30 V DC
	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
	250 V AC	250 V AC	250 V AC	250 V AC	75 V DC
	200 mA	200 mA	200 mA	200 mA	200 mA
	PNP ≤ 9 mA, NPN ≤ 11 mA	≤ 9 mA	PNP ≤ 9 mA, NPN ≤ 11 mA	≤ 9 mA	PNP ≤ 10 mA, NPN ≤ 18 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	1500 Hz	1500 Hz	1500 Hz	1500 Hz	700 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67
	Stainless steel	Stainless steel	Stainless steel	Stainless steel	CuZn coated
	PA 12	PBT	PBT	PA 12	PBT
	Connector	Connector	Connector	0.2 m/0.3 m PUR cable with connector	2 m PVC cable
					3×0.14 mm²
	cULus	cULus	cULus	cULus	cULus
	BKS-_ 48/BKS-_ 49	BKS-_ 19/BKS-_ 20	BKS-_ 48/BKS-_ 49	BKS-_ 48	

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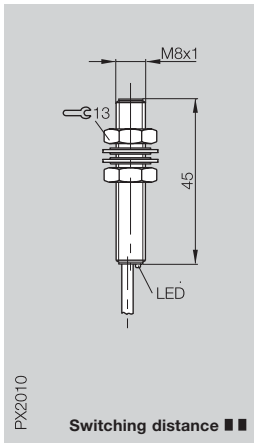
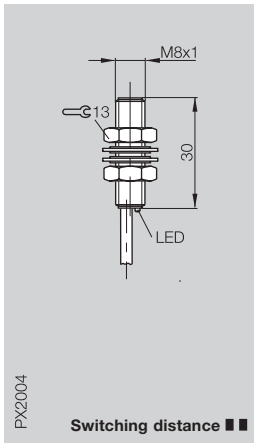
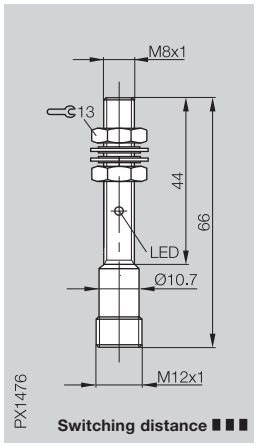
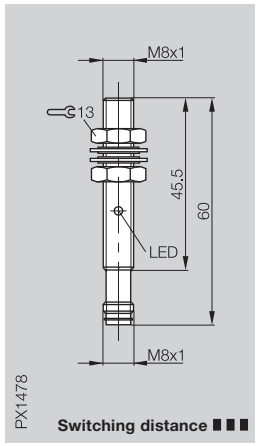
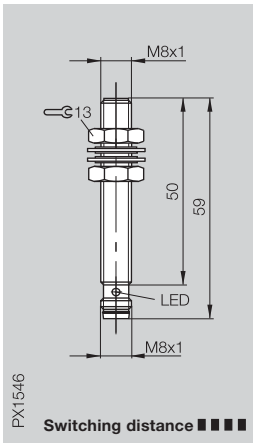
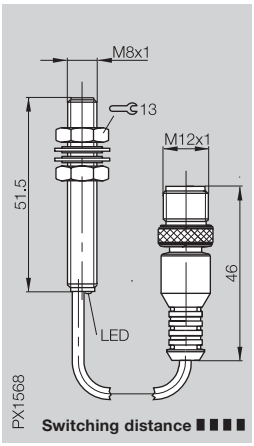
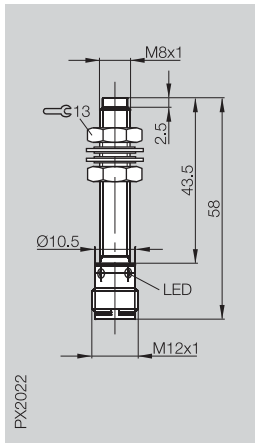
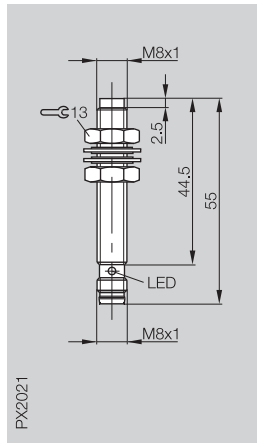
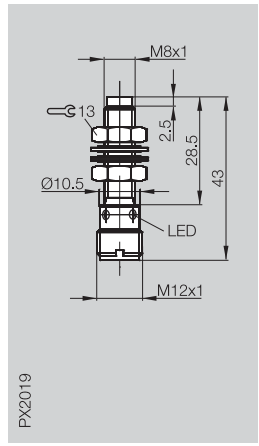
Connectors, Holders ...
Page 5.2 ...

Housing size			**M8×1**	**M8×1**	**M8×1**	**M8×1**
Mounting (see notes starting p. **1.0.**11)			flush	flush	quasi flush	quasi flush
Rated operating distance s_n			**2 mm**	**2 mm**	**3 mm**	**3 mm**
Assured operating distance s_a			0...1.6 mm	0...1.6 mm	0...2.4 mm	0...2.4 mm
						
PNP	NO	①	BES 516-324-G-E0-C-02	BES 516-324-G-E4-C-02	BES M08MH1-PSC30B-S04G	BES M08MH1-PSC30B-S49G
	NC	②		BES 516-377-G-E4-C-02		
NPN	NO	④		BES 516-343-G-E4-C-02	BES M08MH1-NSC30B-S04G	BES M08MH1-NSC30B-S49G
	NC	⑤		BES 516-378-G-E4-C-02		
Supply voltage U_B			10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e			≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
Rated insulation voltage U_i			250 V AC	250 V AC	75 V DC	75 V DC
Rated operational current I_e			200 mA	200 mA	200 mA	200 mA
No-load supply current I_0 max.			≤ 9 mA	PNP ≤ 9 mA, NPN ≤ 11 mA	≤ 12 mA	≤ 12 mA
Polarity reversal protected			yes	yes	yes	yes
Short circuit protected			yes	yes	yes	yes
Repeat accuracy R			≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a			–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
Switching frequency f			1500 Hz	1500 Hz	1000 Hz	1000 Hz
Utilization category			DC 13	DC 13	DC 13	DC 13
Function indicator			yes	yes	yes	yes
Degree of protection per IEC 60529			IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67	IP 67
Insulation class			⧈	⧈		
Housing material			Stainless steel	Stainless steel	CuZn coated	CuZn coated
Material of sensing face			PA 12	PA 12	PBT	PBT
Connection			2 m PVC cable	2 m PVC cable	Connector	Connector
No. of wires × cross-section			3×0.14 mm²	3×0.14 mm²		
Approval			cULus	cULus		
Recommended connector					BKS-_ 19/BKS-_ 20	BKS-_ 48/BKS-_ 49

① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

For sensors with cable, other lengths and PUR quality are available on request.

For sensors with cable and connector, other lengths are available on request.

	M8×1	**M8×1**	**M8×1**	**M8×1**	**M8×1**
	quasi flush	quasi flush	non-flush	non-flush	non-flush
	4 mm	**4 mm**	**2.5 mm**	**2.5 mm**	**2.5 mm**
	0...2.9 mm	0...2.9 mm	0...2 mm	0...2 mm	0...2 mm
					
	BES M08MI-PSC40B-S49G	BES M08MI-PSC40B-BP00,2-GS04	BES M08EG-PSC25F-S04G BES M08EG-POC25F-S04G	BES 516-383-S49-C	BES M08ED-PSC25F-S04G
	BES M08MI-NSC40B-S49G	BES M08MI-NSC40B-BP00,2-GS04	BES M08EG-NSC25F-S04G		BES M08ED-NSC25F-S04G
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 2.8 V	≤ 2.8 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
	75 V DC	75 V DC	250 V AC	250 V AC	250 V AC
	200 mA	200 mA	200 mA	200 mA	200 mA
	≤ 10 mA	≤ 10 mA	PNP ≤ 9 mA, NPN ≤ 18 mA	≤ 9 mA	≤ 11 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	0...+60 °C	0...+60 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	800 Hz	800 Hz	2000 Hz	2000 Hz	2000 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 67	IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
			⧈	⧈	⧈
	CuZn coated	CuZn coated	Stainless steel	Stainless steel	Stainless steel
	PBT	PBT	PBT	PA 12	PBT
	Connector	0.2 m PUR cable with connector	Connector	Connector	Connector
	cULus	cULus	cULus	cULus	cULus
	BKS-_ 48/BKS-_ 49	BKS-_ 19	BKS-_ 19/BKS-_ 20	BKS-_ 48/BKS-_ 49	BKS-_ 19/BKS-_ 20

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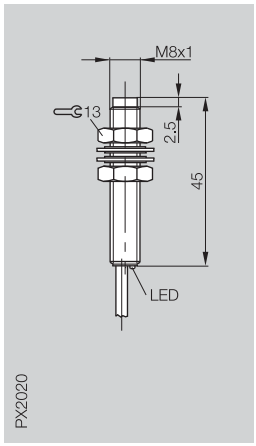
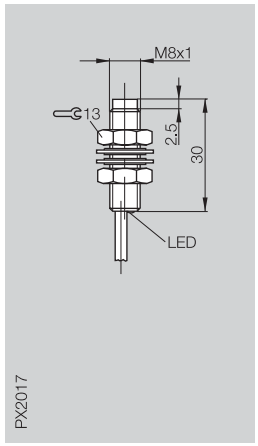
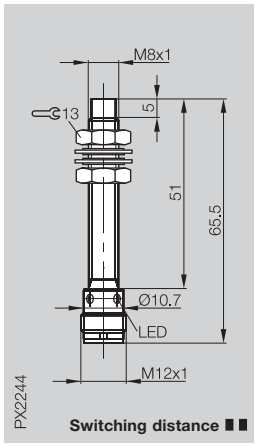
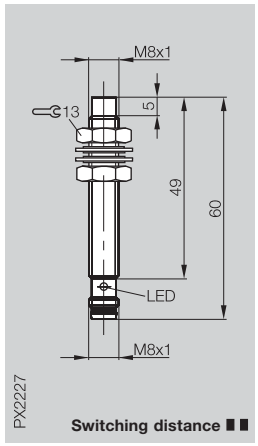
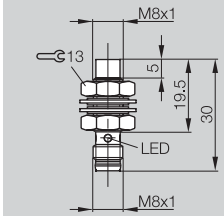
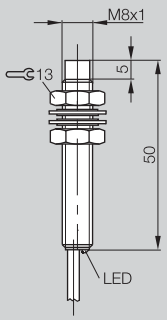
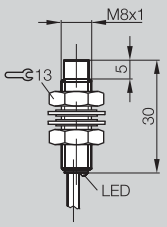
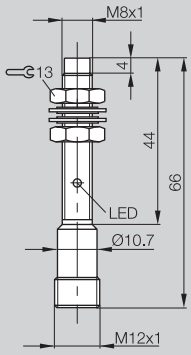
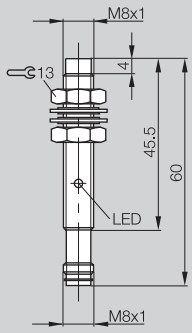
Connectors, Holders ...
Page 5.2 ...

Housing size		**M8×1**	**M8×1**	**M8×1**	**M8×1**
Mounting (see notes starting p. **1.0.**11)		non-flush	non-flush	non-flush	non-flush
Rated operating distance s_n		**2.5 mm**	**2.5 mm**	**4 mm**	**4 mm**
Assured operating distance s_a		0...2 mm	0...2 mm	0...3.2 mm	0...3.2 mm
					
PNP	NO ①	BES 516-383-E0-C-02	BES 516-383-E4-C-02	BES M08EH-PSC40F-S04G	BES M08EH-PSC40F-S49G
	NC ②			BES M08EH-POC40F-S04G	BES M08EH-POC40F-S49G
NPN	NO ④	BES 516-384-E0-C-02	BES 516-384-E4-C-02	BES M08EH-NSC40F-S04G	BES M08EH-NSC40F-S49G
	NC ⑤			BES M08EH-NOC40F-S04G	BES M08EH-NOC40F-S49G
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e		≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
Rated insulation voltage U_i		250 V AC	250 V AC	250 V AC	250 V AC
Rated operational current I_e		200 mA	200 mA	200 mA	200 mA
No-load supply current I_0 max.		PNP ≤ 9 mA, NPN ≤ 18 mA	PNP ≤ 9 mA, NPN ≤ 18 mA	≤ 14 mA	≤ 14 mA
Polarity reversal protected		yes	yes	yes	yes
Short circuit protected		yes	yes	yes	yes
Repeat accuracy R		≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a		–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
Switching frequency f		2000 Hz	2000 Hz	1500 Hz	1500 Hz
Utilization category		DC 13	DC 13	DC 13	DC 13
Function indicator		yes	yes	yes	yes
Degree of protection per IEC 60529		IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67	IP 68 per BWN Pr. 20
Insulation class		⧈	⧈	⧈	⧈
Housing material		Stainless steel	Stainless steel	Stainless steel	Stainless steel
Material of sensing face		PA 12	PA 12	PBT	PBT
Connection		2 m PVC cable	2 m PVC cable	Connector	Connector
No. of wires × cross-section		3×0.14 mm²	3×0.14 mm²		
Approval		cULus	cULus	cULus	cULus
Recommended connector				BKS-_ 19/BKS-_ 20	BKS-_ 48/BKS-_ 49

① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

For sensors with cable, other lengths and PUR quality are available on request.

	M8×1	**M8x1**	**M8x1**	**M8×1**	**M8×1**
	non-flush	non-flush	non-flush	non-flush	non-flush
	4 mm	**4 mm**	**4 mm**	**6 mm**	**6 mm**
	0...3.2 mm	0...3.2 mm	0...3.2 mm	0...4.9 mm	0...4.9 mm
	 PX2403 **Switching distance ■■**	 PX2228 **Switching distance ■■**	 PX2402 **Switching distance ■■**	 PX1479 **Switching distance ■■■**	 PX1481 **Switching distance ■■■**
	BES M08EB-PSC40F-S49G BES M08EB-POC40F-S49G	BES M08EG-PSC40F-BV02 BES M08EG-POC40F-BV02	BES M08ED-PSC40F-BV02 BES M08ED-POC40F-BV02	BES M08MG1-PSC60F-S04G	BES M08MG1-PSC60F-S49G BES M08MG1-POC60F-S49G
	BES M08EB-NSC40F-S49G BES M08EB-NOC40F-S49G	BES M08EG-NSC40F-BV02 BES M08EG-NOC40F-BV02	BES M08ED-NSC40F-BV02 BES M08ED-NOC40F-BV02	BES M08MG1-NSC60F-S04G	BES M08MG1-NSC60F-S49G BES M08MG1-NOC60F-S49G
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
	250 V AC	250 V AC	250 V AC	75 V DC	75 V DC
	200 mA	200 mA	200 mA	200 mA	200 mA
	≤ 18 mA	≤ 14 mA	≤ 18 mA	≤ 12 mA	≤ 12 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	1500 Hz	1500 Hz	1500 Hz	500 Hz	500 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67	IP 67
	⧈	⧈	⧈		
	Stainless steel	Stainless steel	Stainless steel	CuZn coated	CuZn coated
	PBT	PBT	PA 12	PBT	PBT
	Connector	2 m PVC cable	2 m PVC cable	Connector	Connector
		3x0.14 mm²	3x0.14 mm²		
	cULus	cULus	cULus		
	BKS-_ 48/BKS-_ 49			BKS-_ 19/BKS-_ 20	BKS-_ 48/BKS-_ 49

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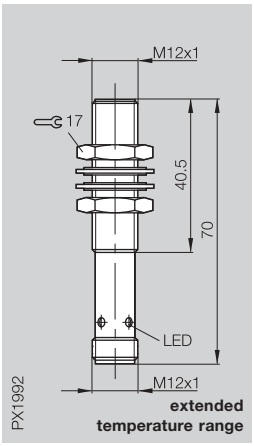
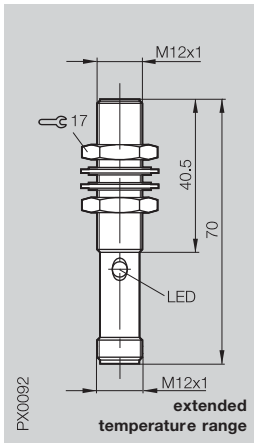
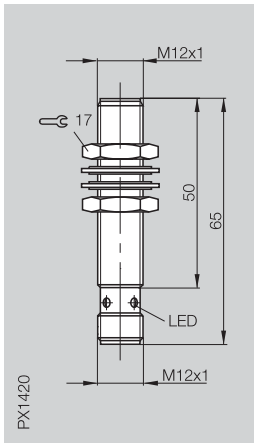
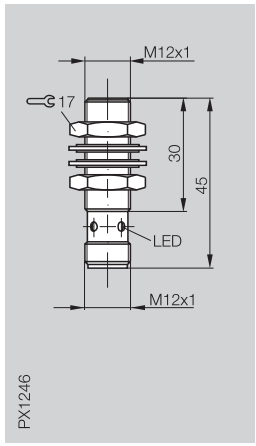
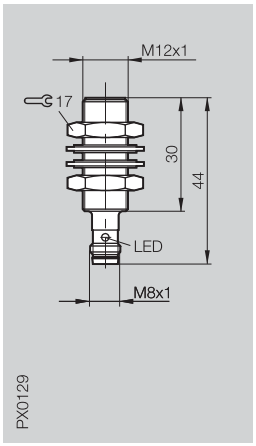
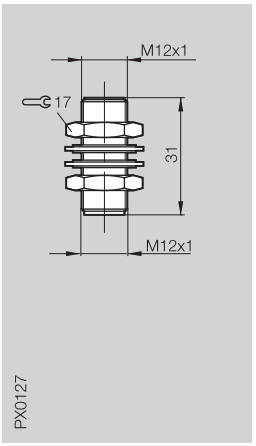
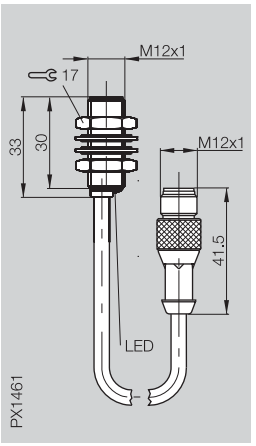
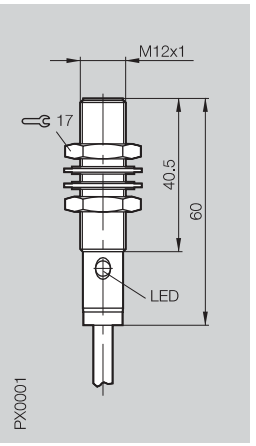
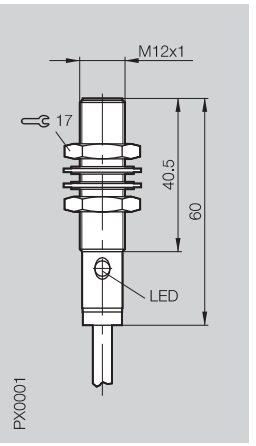
Connectors, Holders ...
Page 5.2 ...

Housing size		**M12×1**	**M12×1**	**M12×1**	**M12×1**	
Mounting (see notes starting p. **1.0.**11)		flush	flush	flush	flush	
Rated operating distance s_n		**2 mm**	**2 mm**	**2 mm**	**2 mm**	
Assured operating distance s_a		0...1.6 mm	0...1.6 mm	0...1.6 mm	0...1.6 mm	
						
PNP	NO ①	BES 516-325-S4-C		BES M12MI-PSC20B-S04G	BES 516-325-E5-C-S4	
	NC ②		BES 516-370-S4-C	BES M12MI-POC20B-S04G	BES 516-370-E5-C-S4	
	complementary ③	BES 516-113-S4-C				
NPN	NO ④		BES 516-329-S4-C	BES M12MI-NSC20B-S04G	BES 516-329-E5-C-S4	
	NC ⑤		BES 516-375-S4-C	BES M12MI-NOC20B-S04G	BES 516-375-E5-C-S4	
	complementary ⑥	BES 516-118-S4-C				
Supply voltage U_B		10...30 V DC	10...30 V DC	12...30 V DC	10...30 V DC	
Voltage drop U_d at I_e		≤ 1.5 V	≤ 1.5 V	≤ 2.5 V	≤ 2 V	
Rated insulation voltage U_i		250 V AC	250 V AC	250 V AC	250 V AC	
Rated operational current I_e		200 mA	200 mA	200 mA	200 mA	
No-load supply current I_0 max.		≤ 8 mA	≤ 8 mA	≤ 15 mA	≤ 10 mA	
Polarity reversal protected		yes	yes	yes	yes	
Short circuit protected		yes	yes	yes	yes	
Repeat accuracy R		≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	
Ambient temperature range T_a		–40...+85 °C	–40...+85 °C	–25...+70 °C	–25...+70 °C	
Switching frequency f		3000 Hz	3000 Hz	1200 Hz	5000 Hz	
Utilization category		DC 13	DC 13	DC 13	DC 13	
Function indicator		yes	yes	yes	yes	
Degree of protection per IEC 60529		IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	
Insulation class		⧈	⧈	⧈	⧈	
Housing material		Stainless steel	Stainless steel	CuZn coated	CuZn coated	
Material of sensing face		PA 12	PA 12	PA 12	PBT	
Connection		Connector	Connector	Connector	Connector	
No. of wires × cross-section						
Approval		cULus	cULus	cULus	cULus	
Recommended connector		BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	

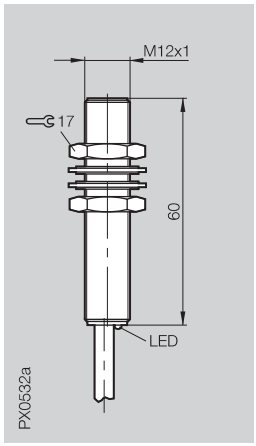
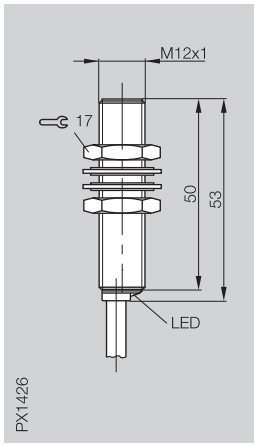
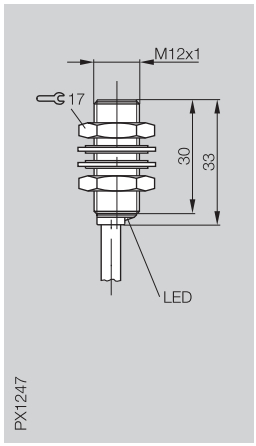
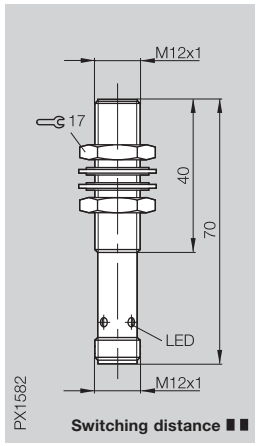
① Wiring diagrams see page **1.0.**6

For sensors with cable, other lengths and PUR quality are available on request.

For sensors with cable and connector, other lengths are available on request.

	M12×1	**M12×1**	**M12×1**	**M12×1**	**M12×1**
	flush	flush	flush	flush	flush
	2 mm	**2 mm**	**2 mm**	**2 mm**	**2 mm**
	0...1.6 mm	0...1.6 mm	0...1.6 mm	0...1.6 mm	0...1.6 mm
					
	BES 516-325-E5-Y-S49	BES 516-325-SA45	BES 516-325-E4-C-S4-00,5	BES 516-325-B0-C-02 BES 516-370-B0-C-02	BES 516-113-B0-C-03
				BES 516-329-B0-C-02 BES 516-375-B0-C-02	BES 516-118-B0-C-03
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 3.5 V	≤ 2.5 V	≤ 2 V	≤ 1.5 V	≤ 2.5 V
	75 V DC	75 V DC	250 V AC	250 V AC	250 V AC
	130 mA	200 mA	200 mA	200 mA	200 mA
	≤ 25 mA	≤ 20 mA	≤ 10 mA	≤ 8 mA	≤ 32 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	1000 Hz	1000 Hz	5000 Hz	3000 Hz	800 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	no	yes	yes	yes
	IP 67	IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
			⧈	⧈	⧈
	CuZn coated	CuZn coated	CuZn coated	Stainless steel	Stainless steel
	PA 12	PA 12	PBT	PA 12	PA 12
	Connector	Connector	0.5 m PUR cable with connector	2 m PVC cable	3 m PVC cable
				3×0.34 mm²	4×0.25 mm²
	cULus		cULus	cULus	cULus
	BKS-_ 48/BKS-_ 49	BKS-_ 19/BKS-_ 20	BKS-_ 19		

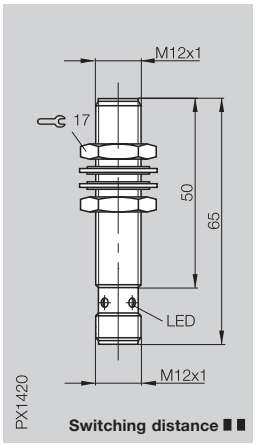
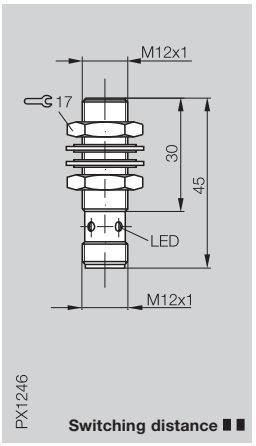
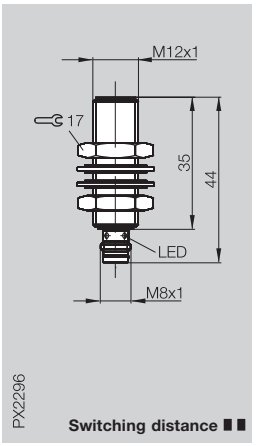
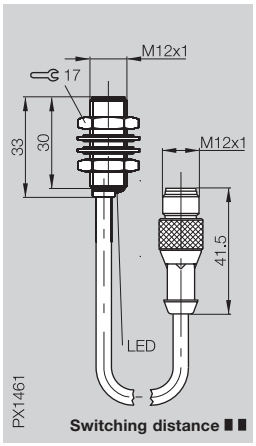
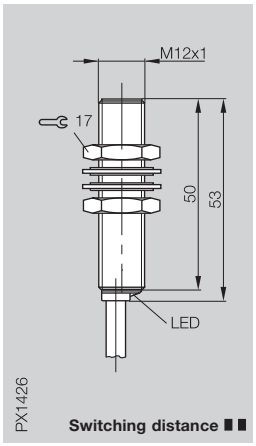
1.1
5
Connectors, Holders ...
Page 5.2 ...

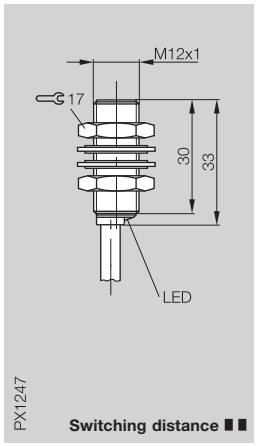
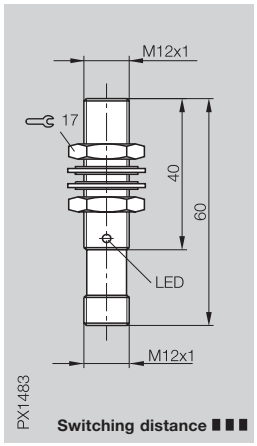
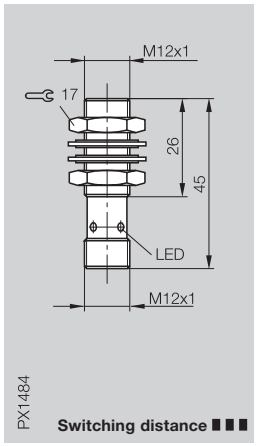
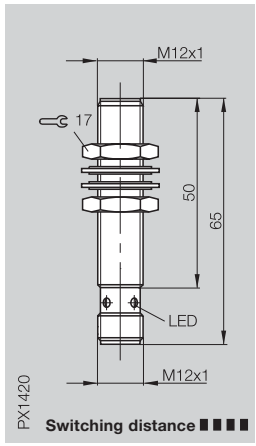
Housing size		**M12×1**	**M12×1**	**M12×1**	**M12×1**	
Mounting (see notes starting p. **1.0.**11)		flush	flush	flush	flush	
Rated operating distance s_n		**2 mm**	**2 mm**	**2 mm**	**4 mm**	
Assured operating distance s_a		0...1.6 mm	0...1.6 mm	0...1.6 mm	0...3.2 mm	
						
PNP	NO ①	BES 516-325-SA56-03	BES M12MI-PSC20B-BV02	BES 516-325-E4-C-02	BES 516-325-G-S4-C	
	NC ②		BES M12MI-POC20B-BV02	BES 516-370-E4-C-02		
NPN	NO ④		BES M12MI-NSC20B-BV02	BES 516-329-E4-C-02		
	NC ⑤			BES 516-375-E4-C-02		
Supply voltage U_B		10...30 V DC	12...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e		≤ 1.7 V	≤ 2.5 V	≤ 2 V	≤ 2.5 V	
Rated insulation voltage U_i		75 V DC	250 V AC	250 V AC	75 V DC	
Rated operational current I_e		200 mA	200 mA	200 mA	200 mA	
No-load supply current I_0 max.		≤ 25 mA	≤ 15 mA	≤ 12 mA	≤ 25 mA	
Polarity reversal protected		yes	yes	yes	yes	
Short circuit protected		yes	yes	yes	yes	
Repeat accuracy R		≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	
Ambient temperature range T_a		–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	
Switching frequency f		800 Hz	1200 Hz	5000 Hz	1000 Hz	
Utilization category		DC 13	DC 13	DC 13	DC 13	
Function indicator		yes	yes	yes	yes	
Degree of protection per IEC 60529		IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67	
Insulation class			⧈	⧈		
Housing material		Stainless steel	CuZn coated	CuZn coated	CuZn coated	
Material of sensing face		PA 12	PA 12	PBT	LCP	
Connection		3 m PVC cable	2 m PVC cable	2 m PVC cable	Connector	
No. of wires × cross-section		3×0.34 mm²	3×0.34 mm²	3×0.34 mm²		
Approval			cULus	cULus	cULus	
Recommended connector					BKS-_ 19/BKS-_ 20	

① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

For sensors with cable, other lengths and PUR quality are available on request.

For sensors with cable and connector, other lengths are available on request.

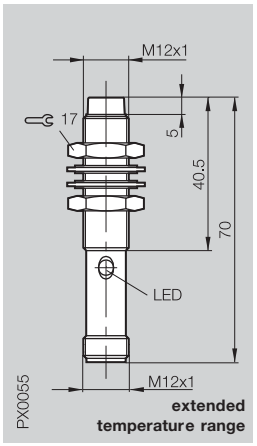
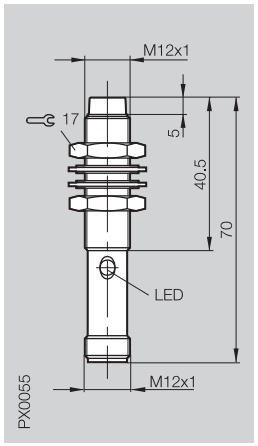
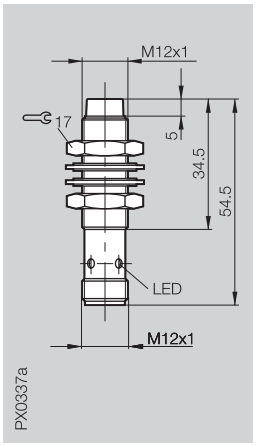
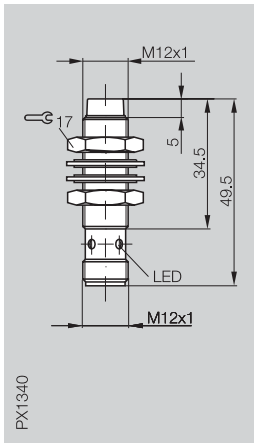
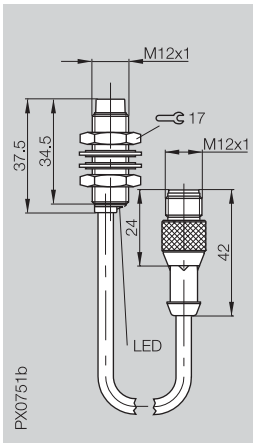
	M12×1	**M12×1**	**M12×1**	**M12×1**	**M12×1**
	flush	flush	flush	flush	flush
	4 mm	**4 mm**	**4 mm**	**4 mm**	**4 mm**
	0...3.2 mm	0...3.2 mm	0...3.2 mm	0...3.2 mm	0...3.2 mm
					
	BES M12MI-PSC40B-S04G BES M12MI-POC40B-S04G	BES 516-325-G-E5-C-S4 BES 516-370-G-E5-C-S4	BES 516-325-G-E5-C-S49 BES 516-370-G-E5-C-S49	BES 516-325-G-E4-C-S4-00,5	BES M12MI-PSC40B-BV02 BES M12MI-POC40B-BV02
	BES M12MI-NSC40B-S04G BES M12MI-NOC40B-S04G	BES 516-329-G-E5-C-S4 BES 516-375-G-E5-C-S4	BES 516-329-G-E5-C-S49 BES 516-375-G-E5-C-S49		BES M12MI-NSC40B-BV02
	12...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	12...30 V DC
	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
	250 V AC	250 V AC	75 V DC	250 V AC	250 V AC
	200 mA	200 mA	200 mA	200 mA	200 mA
	≤ 15 mA	≤ 14 mA	≤ 14 mA	≤ 10 mA	≤ 15 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	300 Hz	1000 Hz	1000 Hz	2500 Hz	300 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
	⧈	⧈		⧈	⧈
	CuZn coated	CuZn coated	CuZn coated	CuZn coated	CuZn coated
	LCP	LCP	LCP	LCP	LCP
	Connector	Connector	Connector	0.5 m PUR cable with connector	2 m PVC cable
					3×0.34 mm²
	cULus	cULus	cULus	cULus	cULus
	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 48/BKS-_ 49	BKS-_ 19	

Housing size		**M12×1**	**M12×1**	**M12×1**	**M12×1**
Mounting (see notes starting p. **1.0.**11)		flush	quasi flush	quasi flush	quasi flush
Rated operating distance s_n		**4 mm**	**6 mm**	**6 mm**	**8 mm**
Assured operating distance s_a		0...3.2 mm	0...4.9 mm	0...4.9 mm	0...5.8 mm
					
PNP	NO ①	BES 516-325-G-E4-C-02	BES M12MG1-PSC60B-S04G	BES M12MD1-PSC60B-S04G	BES M12MI-PSH80B-S04G
	NC ②	BES 516-370-G-E4-C-02	BES M12MG1-POC60B-S04G		
	complementary ③				
NPN	NO ④	BES 516-329-G-E4-C-02	BES M12MG1-NSC60B-S04G	BES M12MD1-NSC60B-S04G	BES M12MI-NSH80B-S04G
	NC ⑤	BES 516-375-G-E4-C-02	BES M12MG1-NOC60B-S04G		
	complementary ⑥				
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	10...55 V DC
Voltage drop U_d at I_e		≤ 2.5 V	≤ 2 V	≤ 2 V	≤ 2.5 V
Rated insulation voltage U_i		250 V AC	75 V DC	75 V DC	250 V AC
Rated operational current I_e		200 mA	200 mA	200 mA	200 mA
No-load supply current I_0 max.		≤ 14 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
Polarity reversal protected		yes	yes	yes	yes
Short circuit protected		yes	yes	yes	yes
Repeat accuracy R		≤ 5 %	≤ 5 %	≤ 5 %	≤ 10 %
Ambient temperature range T_a		–25...+70 °C	–25...+70 °C	–25...+70 °C	0...+60 °C
Switching frequency f		1000 Hz	800 Hz	800 Hz	300 Hz
Utilization category		DC 13	DC 13	DC 13	DC 13
Function indicator		yes	yes	yes	yes
Degree of protection per IEC 60529		IP 68 per BWN Pr. 20	IP 67	IP 67	IP 67
Insulation class		⧈			⧈
Housing material		CuZn coated	CuZn coated	CuZn coated	CuZn coated
Material of sensing face		LCP	PBT	PBT	LCP
Connection		2 m PVC cable	Connector	Connector	Connector
No. of wires × cross-section		3×0.34 mm²			
Approval		cULus			
Recommended connector			BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20

① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

For sensors with cable, other lengths and PUR quality are available on request.

For sensors with cable and connector, other lengths are available on request.

	M12×1	M12×1	M12×1	M12×1	M12×1
	non-flush	non-flush	non-flush	non-flush	non-flush
	4 mm	**4 mm**	**4 mm**	**4 mm**	**4 mm**
	0...3.2 mm	0...3.2 mm	0...3.2 mm	0...3.2 mm	0...3.2 mm
					
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	BES 516-357-S4-C BES 516-3030-S4-C	BES 516-122-S4-C	BES 516-357-E5-Y-S4		
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 1.5 V	≤ 2.5 V	≤ 3.5 V	≤ 2 V	≤ 2 V
	250 V AC	250 V AC	75 V DC	250 V AC	250 V AC
	200 mA	200 mA	130 mA	200 mA	200 mA
	≤ 8 mA	≤ 32 mA	≤ 25 mA	≤ 10 mA	≤ 10 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–40...+85 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	1500 Hz	400 Hz	400 Hz	2000 Hz	2000 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
	⧈	⧈		⧈	⧈
	Stainless steel	Stainless steel	CuZn coated	CuZn coated	CuZn coated
	PA 12	PA 12	PA 12	PBT	PBT
	Connector	Connector	Connector	Connector	0.3 m PUR cable with connector
	cULus	cULus	cULus	cULus	cULus
	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19

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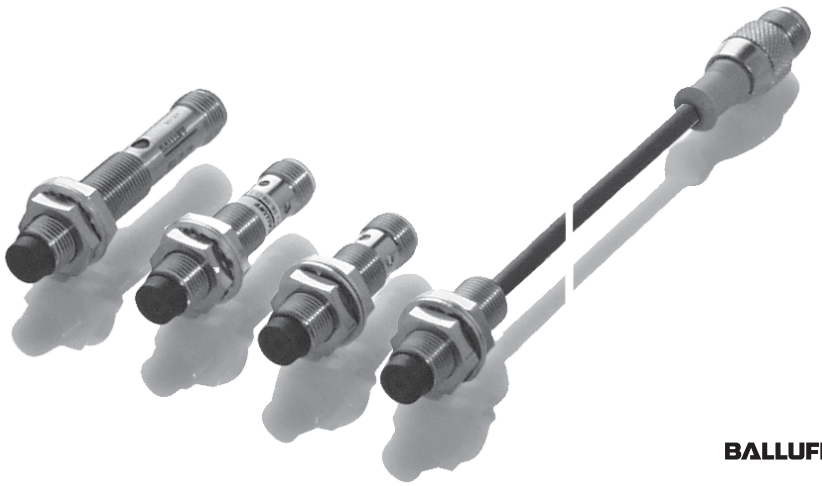
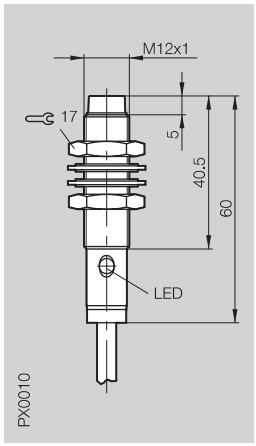
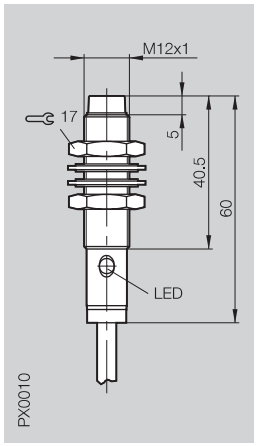
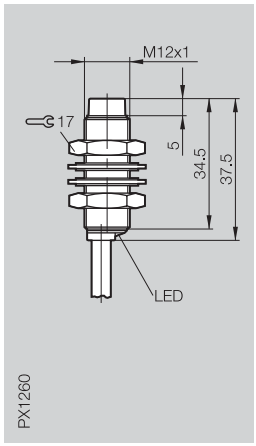
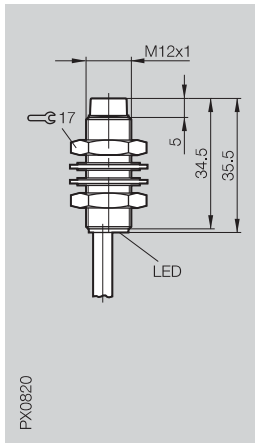
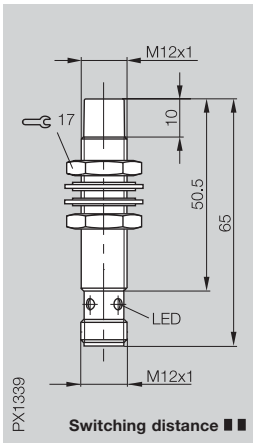
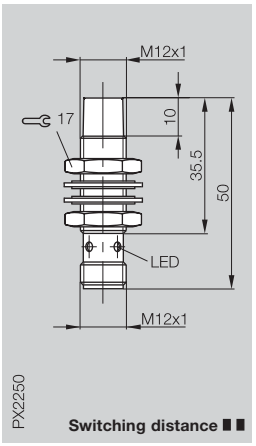
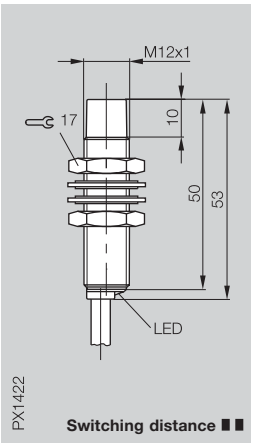
Connectors, Holders ...
Page 5.2 ...



Housing size			**M12×1**	**M12×1**	**M12×1**	**M12×1**
Mounting (see notes starting p. **1.0.**11)			non-flush	non-flush	non-flush	non-flush
Rated operating distance s_n			**4 mm**	**4 mm**	**4 mm**	**4 mm**
Assured operating distance s_a			0...3.2 mm	0...3.2 mm	0...3.2 mm	0...3.2 mm
						
PNP	NO	①	BES 516-356-B0-C-02		BES 516-356-E4-C-02	
	NC	②	BES 516-3019-B0-C-02		BES 516-3019-E4-C-02	
	complementary	③		BES 516-131-B0-C-03		
NPN	NO	④	BES 516-357-B0-C-02			BES 516-357-E4-Y-02
	NC	⑤	BES 516-3030-B0-C-02		BES 516-3030-E4-C-02	
	complementary	⑥		BES 516-122-B0-C-03		
Supply voltage U_B			10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e			≤ 1.5 V	≤ 2.5 V	≤ 2 V	≤ 3.5 V
Rated insulation voltage U_i			250 V AC	250 V AC	250 V AC	75 V DC
Rated operational current I_e			200 mA	200 mA	200 mA	130 mA
No-load supply current I_0 max.			≤ 8 mA	≤ 32 mA	≤ 10 mA	≤ 25 mA
Polarity reversal protected			yes	yes	yes	yes
Short circuit protected			yes	yes	yes	yes
Repeat accuracy R			≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a			–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
Switching frequency f			1500 Hz	400 Hz	2000 Hz	400 Hz
Utilization category			DC 13	DC 13	DC 13	DC 13
Function indicator			yes	yes	yes	yes
Degree of protection per IEC 60529			IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
Insulation class			⧈	⧈	⧈	
Housing material			Stainless steel	Stainless steel	CuZn coated	CuZn coated
Material of sensing face			PA 12	PA 12	PBT	PA 12
Connection			2 m PVC cable	3 m PVC cable	2 m PVC cable	2 m PVC cable
No. of wires × cross-section			3×0.34 mm²	4×0.25 mm²	3×0.34 mm²	3×0.34 mm²
Approval			cULus	cULus	cULus	cULus
Recommended connector						

① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

For sensors with cable, other lengths
quality are available on request.

	M12×1 non-flush **8 mm** 0...6.5 mm	**M12×1** non-flush **8 mm** 0...6.5 mm	**M12×1** non-flush **8 mm** 0...6.5 mm		
					
	BES M12MG-PSC80F-S04G BES M12MG-POC80F-S04G	BES M12MD-PSC80F-S04G BES M12MD-POC80F-S04G	BES M12MG-PSC80F-BV02 BES M12MG-POC80F-BV02		
	BES M12MG-NSC80F-S04G BES M12MG-NOC80F-S04G	BES M12MD-NSC80F-S04G BES M12MD-NOC80F-S04G	BES M12MG-NSC80F-BV02 BES M12MG-NOC80F-BV02		
	10...30 V DC	10...30 V DC	10...30 V DC		
	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V		
	250 V AC	250 V AC	250 V AC		
	200 mA	200 mA	200 mA		
	≤ 14 mA	≤ 14 mA	≤ 14 mA		
	yes	yes	yes		
	yes	yes	yes		
	≤ 5 %	≤ 5 %	≤ 5 %		
	–25...+70 °C	–25...+70 °C	–25...+70 °C		
	800 Hz	800 Hz	800 Hz		
	DC 13	DC 13	DC 13		
	yes	yes	yes		
	IP 67	IP 67	IP 67		
	⧈	⧈	⧈		
	CuZn coated	CuZn coated	CuZn coated		
	PBT	PBT	PBT		
	Connector	Connector	2 m PVC cable		
			3×0.34 mm²		
	cULus	cULus	cULus		
	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20			

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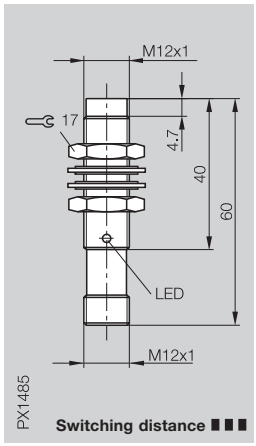
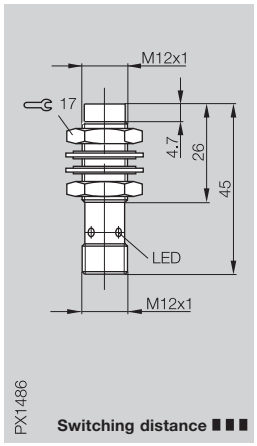
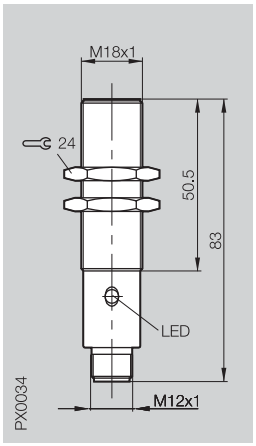
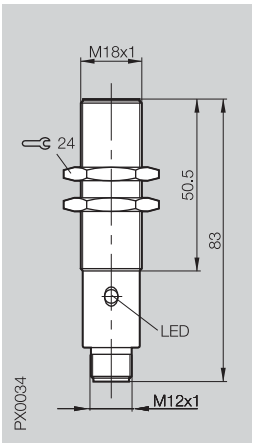
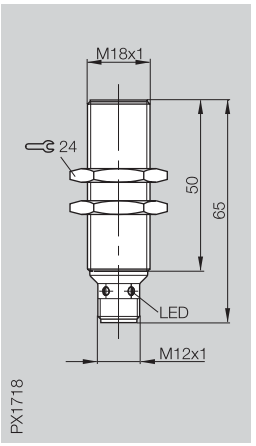
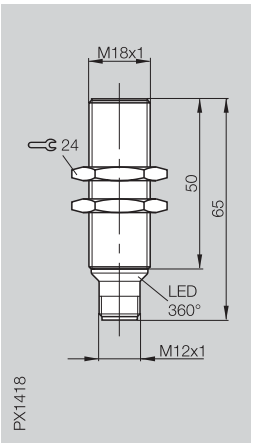
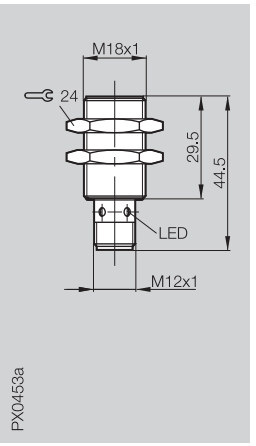
Connectors, Holders ...
Page 5.2 ...

Housing size			**M12×1**	**M12×1**		
Mounting (see notes starting p. **1.0.**11)			non-flush	non-flush		
Rated operating distance s_n			**10 mm**	**10 mm**		
Assured operating distance s_a			0...8.1 mm	0...8.1 mm		
						
PNP	NO	①	BES M12MF1-PSC10F-S04G	BES M12MC1-PSC10F-S04G		
	NC	②	BES M12MF1-POC10F-S04G			
	complementary	③				
NPN	NO	④	BES M12MF1-NSC10F-S04G	BES M12MC1-NSC10F-S04G		
	NC	⑤				
	complementary	⑥				
Supply voltage U_B			10...30 V DC	10...30 V DC		
Voltage drop U_d at I_e			≤ 2 V	≤ 2 V		
Rated insulation voltage U_i			75 V DC	75 V DC		
Rated operational current I_e			200 mA	200 mA		
No-load supply current I_0 max.			≤ 10 mA	≤ 10 mA		
Polarity reversal protected			yes	yes		
Short circuit protected			yes	yes		
Repeat accuracy R			≤ 5 %	≤ 5 %		
Ambient temperature range T_a			–25...+70 °C	–25...+70 °C		
Switching frequency f			400 Hz	400 Hz		
Utilization category			DC 13	DC 13		
Function indicator			yes	yes		
Degree of protection per IEC 60529			IP 67	IP 67		
Insulation class						
Housing material			CuZn coated	CuZn coated		
Material of sensing face			PBT	PBT		
Connection			Connector	Connector		
Approval						
Recommended connector			BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20		

① Wiring diagrams see page **1.0.**6
Switching distance ■■■ see page **1.0.**10

	M18×1	**M18×1**	**M18×1**	**M18×1**	**M18×1**
	flush	flush	flush	flush	flush
	5 mm	**5 mm**	**5 mm**	**5 mm**	**5 mm**
	0...4.1 mm	0...4.1 mm	0...4.1 mm	0...4.1 mm	0...4.1 mm
					
	BES 516-326-S4-C BES 516-367-S4-C	BES 516-105-S4-C	BES M18MI-PSC50B-S04G	BES M18MI-PSC50B-S04K BES M18MI-POC50B-S04K	BES 516-367-E5-Y-S4
	BES 516-355-S4-C BES 516-366-S4-C	BES 516-111-S4-C		BES M18MI-NSC50B-S04K BES M18MI-NOC50B-S04K	BES 516-355-E5-Y-S4
	10...30 V DC	10...30 V DC	12...30 V DC	12...30 V DC	10...30 V DC
	≤ 1.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 3.5 V
	250 V AC	250 V AC	250 V AC	250 V AC	75 V DC
	200 mA	200 mA	200 mA	200 mA	130 mA
	≤ 8 mA	≤ 30 mA	≤ 15 mA	≤ 15 mA	≤ 25 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	900 Hz	500 Hz	700 Hz	700 Hz	500 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67
	⧈	⧈	⧈	⧈	
	CuZn coated	CuZn coated	CuZn coated	CuZn coated/ PA 6 transparent	CuZn coated
	PA 12	PA 12	PA 12	PA 12	PA 12
	Connector	Connector	Connector	Connector	Connector
	cULus	cULus	cULus	cULus	cULus
	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20

All-round LED

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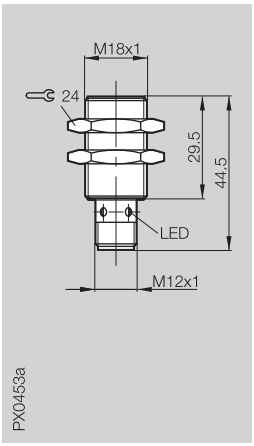
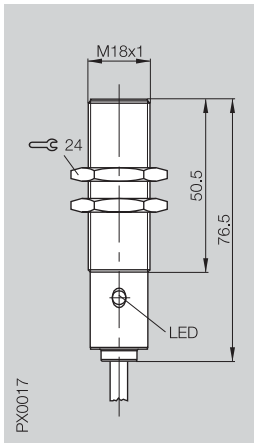
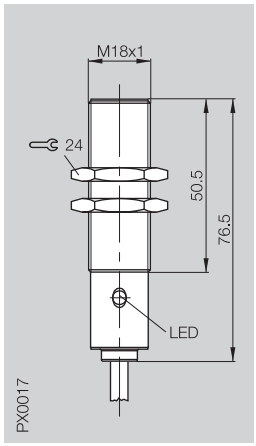
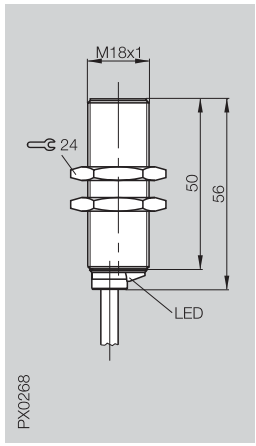
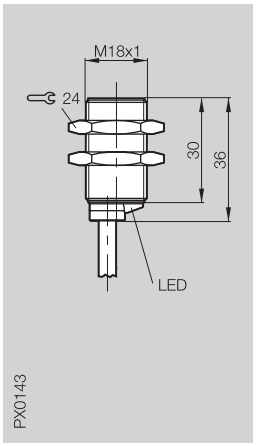
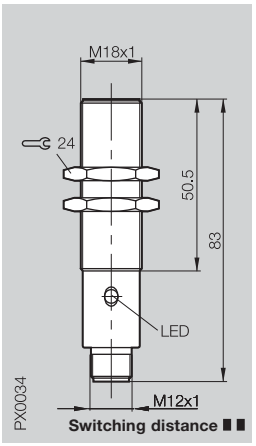
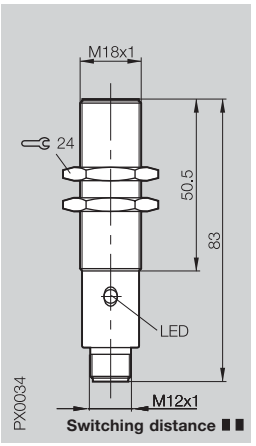
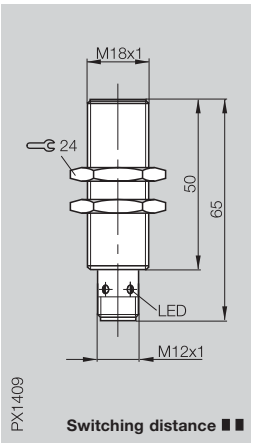
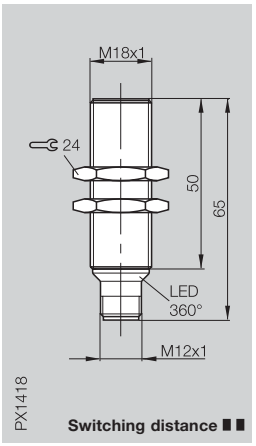
Connectors, Holders ...
Page 5.2 ...

Housing size		**M18×1**	**M18×1**	**M18×1**	**M18×1**
Mounting (see notes starting p. **1.0.**11)		flush	flush	flush	flush
Rated operating distance s_n		**5 mm**	**5 mm**	**5 mm**	**5 mm**
Assured operating distance s_a		0...4.1 mm	0...4.1 mm	0...4.1 mm	0...4.1 mm
					
PNP	NO ①	BES 516-326-E5-C-S4	BES 516-326-B0-C-02		BES M18MI-PSC50B-BV02
	NC ②				BES M18MI-POC50B-BV02
	complementary ③			BES 516-105-B0-C-03	
NPN	NO ④		BES 516-355-B0-C-02		BES M18MI-NSC50B-BV02
	complementary ⑥			BES 516-111-B0-C-03	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	12...30 V DC
Voltage drop U_d at I_e		≤ 2 V	≤ 1.5 V (PNP)/≤ 2.5 V (NPN)	≤ 2.5 V	≤ 2.5 V
Rated insulation voltage U_i		75 V DC	250 V AC	250 V AC	250 V AC
Rated operational current I_e		200 mA	200 mA	200 mA	200 mA
No-load supply current I_0 max.		≤ 10 mA	≤ 25 mA	≤ 30 mA	≤ 15 mA
Polarity reversal protected		yes	yes	yes	yes
Short circuit protected		yes	yes	yes	yes
Repeat accuracy R		≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a		–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
Switching frequency f		1000 Hz	900 Hz (PNP)/500 Hz (NPN)	500 Hz	700 Hz
Utilization category		DC 13	DC 13	DC 13	DC 13
Function indicator		yes	yes	yes	yes
Degree of protection per IEC 60529		IP 67	IP 68 per BWN Pr. 20	IP 67	IP 68 per BWN Pr. 20
Insulation class			⧈	⧈	⧈
Housing material		CuZn coated	CuZn coated	CuZn coated	CuZn coated
Material of sensing face		PBT	PA 12	PA 12	PA 12
Connection		Connector	2 m PVC cable	3 m PVC cable	2 m PVC cable
No. of wires × cross-section			3×0.34 mm²	4×0.25 mm²	3×0.34 mm²
Approval		cULus	cULus	cULus	cULus
Recommended connector		BKS-_ 19/BKS-_ 20			

① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

For sensors with cable, other lengths and PUR quality are available on request.

	M18×1	**M18×1**	**M18×1**	**M18×1**	**M18×1**
	flush	flush	flush	flush	flush
	5 mm	**8 mm**	**8 mm**	**8 mm**	**8 mm**
	0...4.1 mm	0...6.5 mm	0...6.5 mm	0...6.5 mm	0...6.5 mm
					
	BES 516-326-E4-C-02	BES 516-326-G-S4-C	BES 516-326-G-S4-H BES 516-105-G-S4-H	BES M18MI-PSC80B-S04G	BES M18MI-PSC80B-S04K BES M18MI-POC80B-S04K BES M18MI-NSC80B-S04K
	10...30 V DC	10...30 V DC	10...55 V DC	10...30 V DC	12...30 V DC
	≤ 2 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
	75 V DC	75 V DC	75 V DC	250 V AC	250 V AC
	200 mA	200 mA	200 mA	200 mA	200 mA
	≤ 10 mA	≤ 12 mA	≤ 15 mA	≤ 18 mA	≤ 15 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	0...+70 °C	0...+70 °C	–25...+70 °C	–25...+70 °C
	1000 Hz	80 Hz	80 Hz	1000 Hz	150 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 67	IP 67	IP 67	IP 67	IP 68 per BWN Pr. 20
				⧈	⧈
	CuZn coated	CuZn coated	CuZn coated	CuZn coated	CuZn coated/ PA 6 transparent
	PBT	PBT	PBT	PBT	PA 12
	2 m PVC cable	Connector	Connector	Connector	Connector
	3×0.34 mm²				
	cULus	cULus		cULus	cULus
		BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20

All-round LED

1.1

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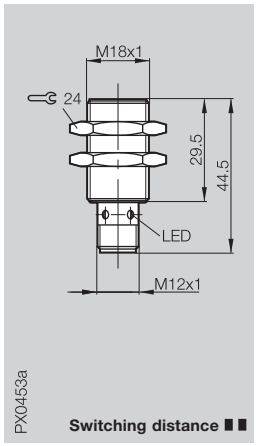
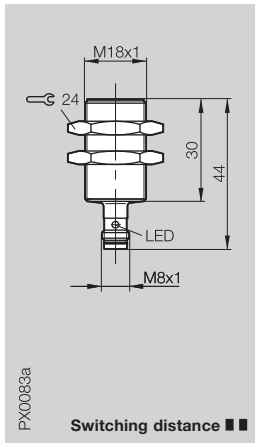
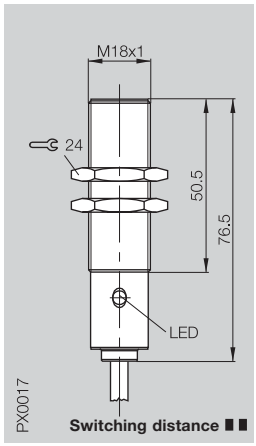
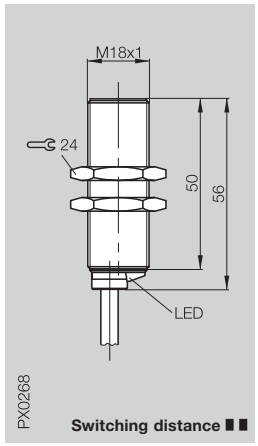
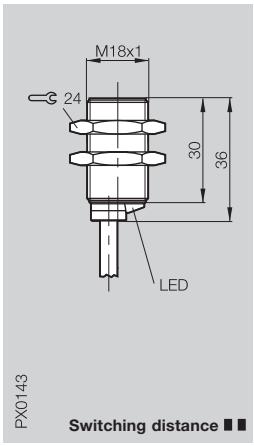
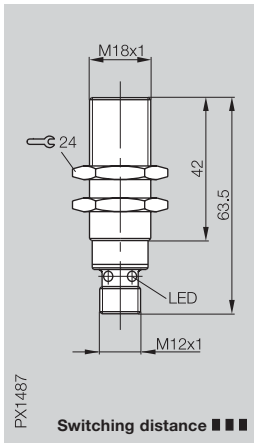
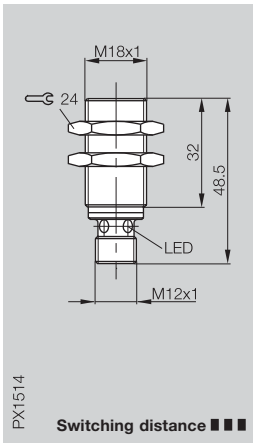
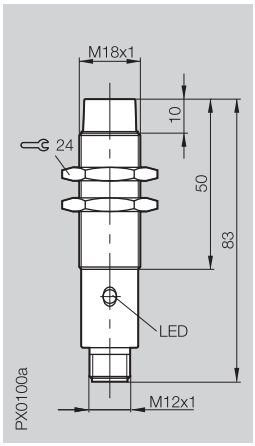
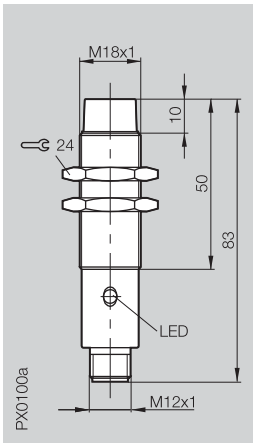
Connectors, Holders ...
Page 5.2 ...

Housing size			**M18×1**	**M18×1**	**M18×1**	**M18×1**
Mounting (see notes starting p. **1.0.**11)			flush	flush	flush	flush
Rated operating distance s_n			**8 mm**	**8 mm**	**8 mm**	**8 mm**
Assured operating distance s_a			0...6.5 mm	0...6.5 mm	0...6.5 mm	0...6.5 mm
						
PNP	NO	①	BES 516-326-G-E5-Y-S4	BES 516-326-G-E5-Y-S49	BES 516-326-G-B0-C-PU-02	BES M18MI-PSC80B-BV02
	NC	②	BES 516-367-G-E5-Y-S4	BES 516-367-G-E5-Y-S49		
	complementary	③				
NPN	NO	④	BES 516-355-G-E5-Y-S4	BES 516-355-G-E5-Y-S49		BES M18MI-NSC80B-BV02
	NC	⑤		BES 516-366-G-E5-Y-S49		
	complementary	⑥				
Supply voltage U_B			10...30 V DC	10...30 V DC	10...30 V DC	12...30 V DC
Voltage drop U_d at I_e			≤ 3.5 V	≤ 3.5 V	≤ 2.5 V	≤ 2.5 V
Rated insulation voltage U_i			75 V DC	75 V DC	250 V AC	250 V AC
Rated operational current I_e			130 mA	130 mA	200 mA	200 mA
No-load supply current I_0 max.			≤ 25 mA	≤ 25 mA	≤ 12 mA	≤ 15 mA
Polarity reversal protected			yes	yes	yes	yes
Short circuit protected			yes	yes	yes	yes
Repeat accuracy R			≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a			–25...+70 °C	–25...+70 °C	0...+70 °C	–25...+70 °C
Switching frequency f			200 Hz	200 Hz	80 Hz	150 Hz
Utilization category			DC 13	DC 13	DC 13	DC 13
Function indicator			yes	yes	yes	yes
Degree of protection per IEC 60529			IP 67	IP 67	IP 67	IP 68 per BWN Pr. 20
Insulation class					⧈	⧈
Housing material			CuZn coated	CuZn coated	CuZn coated	CuZn coated
Material of sensing face			PBT	PBT	PBT	PA 12
Connection			Connector	Connector	2 m cable PUR	2 m PVC cable
No. of wires × cross-section					3×0.34 mm²	3×0.34 mm²
Approval			cULus	cULus	cULus	cULus
Recommended connector			BKS-_ 19/BKS-_ 20	BKS-_ 48/BKS-_ 49		

① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

Other cable lengths on request.

	M18×1	**M18×1**	**M18×1**	**M18×1**	**M18×1**
	flush	quasi flush	quasi flush	non-flush	non-flush
	8 mm	**12 mm**	**12 mm**	**8 mm**	**8 mm**
	0...6.5 mm	0...9.7 mm	0...9.7 mm	0...6.5 mm	0...6.5 mm
					
	BES 516-326-G-E4-Y-02 BES 516-367-G-E4-Y-02	BES M18MG1-PSC12B-S04G	BES M18MD1-PSC12B-S04G	BES 516-360-S4-C BES 516-3026-S4-C	BES 516-123-S4-C
	BES 516-355-G-E4-Y-02 BES 516-366-G-E4-Y-02	BES M18MG1-NSC12B-S04G	BES M18MD1-NSC12B-S04G	BES 516-361-S4-C	BES 516-124-S4-C
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 3.5 V	≤ 2 V	≤ 2 V	≤ 1.5 V	≤ 2.5 V
	75 V DC	75 V DC	75 V DC	250 V AC	250 V AC
	130 mA	200 mA	200 mA	200 mA	200 mA
	≤ 25 mA	≤ 10 mA	≤ 10 mA	≤ 8 mA	≤ 30 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	200 Hz	500 Hz	500 Hz	600 Hz	200 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 68 per BWN Pr. 20	IP 67	IP 67	IP 68 per BWN Pr. 20 ⧈	IP 67 ⧈
	CuZn coated	CuZn coated	CuZn coated	CuZn coated	CuZn coated
	PBT	PBT	PBT	PA 12	PA 12
	2 m PVC cable	Connector	Connector	Connector	Connector
	3×0.34 mm²				
	cULus			cULus	cULus
		BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20

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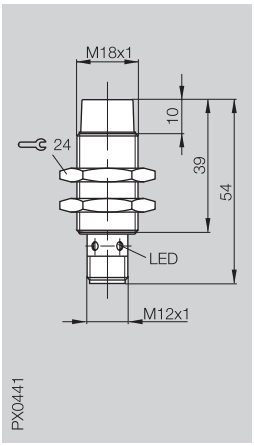
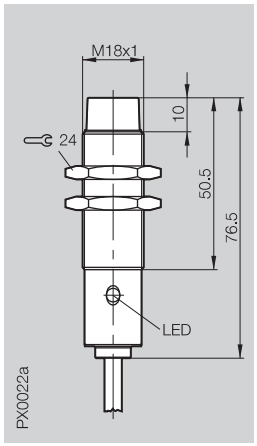
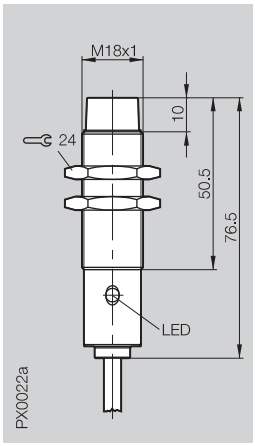
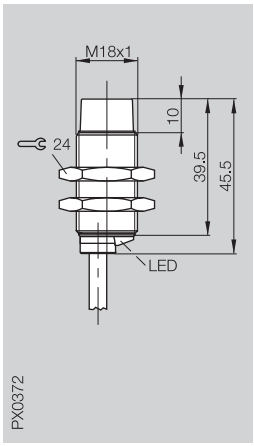
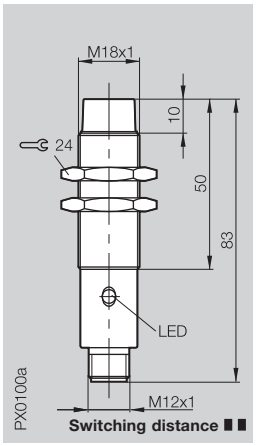
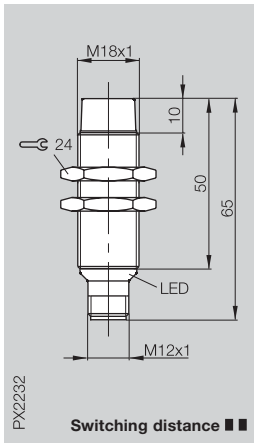
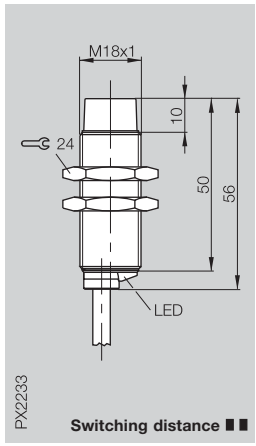
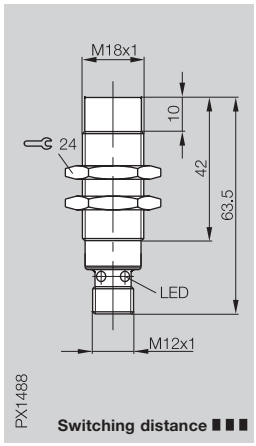
Connectors, Holders ...
Page 5.2 ...

Housing size			**M18×1**	**M18×1**	**M18×1**	**M18×1**
Mounting (see notes starting p. **1.0.**11)			non-flush	non-flush	non-flush	non-flush
Rated operating distance s_n			**8 mm**	**8 mm**	**8 mm**	**8 mm**
Assured operating distance s_a			0...6.5 mm	0...6.5 mm	0...6.5 mm	0...6.5 mm
						
PNP	NO	①	BES 516-360-E5-Y-S4	BES 516-360-B0-C-02		BES 516-360-E4-Y-02
	NC	②	BES 516-3026-E5-Y-S4	BES 516-3026-B0-C-02		BES 516-3026-E4-Y-02
	complementary	③			BES 516-123-B0-C-03	
NPN	NO	④	BES 516-361-E5-Y-S4	BES 516-361-B0-C-02		BES 516-361-E4-Y-02
	NC	⑤		BES 516-3031-B0-C-02		
	complementary	⑥			BES 516-124-B0-C-03	
Supply voltage U_B			10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e			≤ 3.5 V	≤ 1.5 V	≤ 2.5 V	≤ 3.5 V
Rated insulation voltage U_i			75 V DC	250 V AC	250 V AC	75 V DC
Rated operational current I_e			130 mA	200 mA	200 mA	130 mA
No-load supply current I_0 max.			≤ 25 mA	≤ 25 mA	≤ 30 mA	≤ 25 mA
Polarity reversal protected			yes	yes	yes	yes
Short circuit protected			yes	yes	yes	yes
Repeat accuracy R			≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a			–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
Switching frequency f			200 Hz	600 Hz (PNP)/200 Hz (NPN)	200 Hz	200 Hz
Utilization category			DC 13	DC 13	DC 13	DC 13
Function indicator			yes	yes	yes	yes
Degree of protection per IEC 60529			IP 67	IP 68 per BWN Pr. 20 (PNP)/ IP 67 (NPN)	IP 67	IP 68 per BWN Pr. 20
Insulation class				⧈	⧈	
Housing material			CuZn coated	CuZn coated	CuZn coated	CuZn coated
Material of sensing face			PA 12	PA 12	PA 12	PA 12
Connection			Connector	2 m PVC cable	3 m PVC cable	2 m PVC cable
No. of wires × cross-section				3×0.34 mm²	4×0.25 mm²	3×0.34 mm²
Approval			cULus	cULus	cULus	cULus
Recommended connector			BKS-_ 19/BKS-_ 20			

① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

For sensors with cable, other lengths and PUR quality are available on request.

	M18×1 non-flush **16 mm** 0...13 mm	**M18×1** non-flush **16 mm** 0...12.8 mm	**M18×1** non-flush **16 mm** 0...12.8 mm	**M18×1** non-flush **20 mm** 0...16.2 mm	
					
	BES 516-360-G-S4-H BES 516-123-G-S4-H	BES M18MG-PSC16F-S04K BES M18MG-POC16F-S04K	BES M18MG-PSC16F-BV02 BES M18MG-POC16F-BV02	BES M18ME1-PSC20F-S04G	
		BES M18MG-NSC16F-S04K BES M18MG-NOC16F-S04K	BES M18MG-NSC16F-BV02 BES M18MG-NOC16F-BV02	BES M18ME1-NSC20F-S04G	
	10...55 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2 V	
	250 V AC	250 V AC	250 V AC	75 V DC	
	200 mA	200 mA	200 mA	200 mA	
	≤ 15 mA	≤ 14 mA	≤ 14 mA	≤ 10 mA	
	yes	yes	yes	yes	
	yes	yes	yes	yes	
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	
	80 Hz	800 Hz	800 Hz	200 Hz	
	DC 13	DC 13	DC 13	DC 13	
	yes	yes	yes	yes	
	IP 68 per BWN Pr. 20	IP 67	IP 67	IP 54	
	⧈	⧈	⧈		
	CuZn coated	CuZn coated	CuZn coated	CuZn coated	
	PA 12	PBT	PBT	PBT	
	Connector	Connector	2 m PVC cable 3×0.34 mm²	Connector	
			cULus		
	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20		BKS-_ 19/BKS-_ 20	

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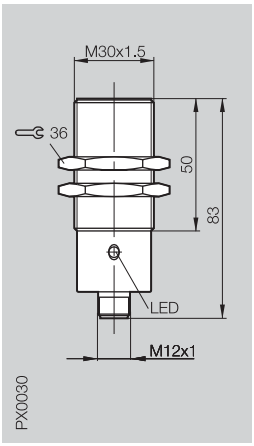
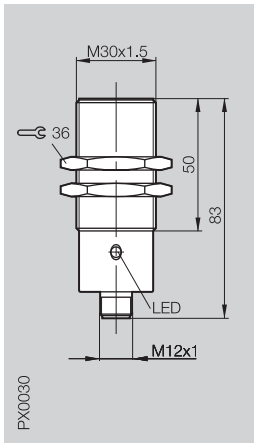
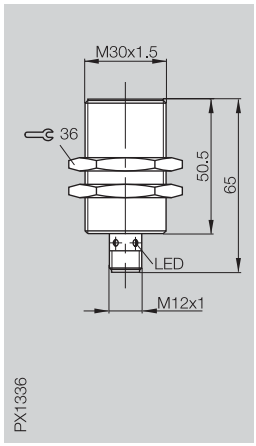
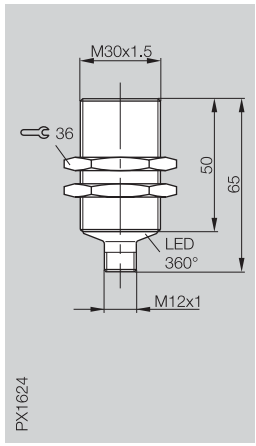
Connectors, Holders ...
Page 5.2 ...

Housing size			**M30×1.5**	**M30×1.5**	**M30×1.5**	**M30×1.5**
Mounting (see notes starting p. **1.0.**11)			flush	flush	flush	flush
Rated operating distance s_n			**10 mm**	**10 mm**	**10 mm**	**10 mm**
Assured operating distance s_a			0...8.1 mm	0...8.1 mm	0...8.1 mm	0...8.1 mm
						
PNP	NO	①	BES 516-327-S4-C		BES M30MI-PSC10B-S04G	BES M30MI-PSC10B-S04K
	NC	②	BES 516-3028-S4-C			BES M30MI-POC10B-S04K
	complementary	③		BES 516-114-S4-C		
NPN	NO	④	BES 516-359-S4-C			BES M30MI-NSC10B-S04K
	NC	⑤				BES M30MI-NOC10B-S04K
	complementary	⑥		BES 516-120-S4-C		
Supply voltage U_B			10...30 V DC	10...30 V DC	12...30 V DC	12...30 V DC
Voltage drop U_d at I_e			≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
Rated insulation voltage U_i			250 V AC	250 V AC	75 V DC	250 V AC
Rated operational current I_e			200 mA	200 mA	200 mA	200 mA
No-load supply current I_0 max.			≤ 25 mA	≤ 30 mA	≤ 10 mA	≤ 10 mA
Polarity reversal protected			yes	yes	yes	yes
Short circuit protected			yes	yes	yes	yes
Repeat accuracy R			≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a			–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
Switching frequency f			300 Hz	300 Hz	400 Hz	400 Hz
Utilization category			DC 13	DC 13	DC 13	DC 13
Function indicator			yes	yes	yes	yes
Degree of protection per IEC 60529			IP 68 per BWN Pr. 20	IP 67	IP 67	IP 68 per BWN Pr. 20
Insulation class			⧈	⧈		⧈
Housing material			CuZn coated	CuZn coated	CuZn coated	CuZn coated/ PA 6 transparent
Material of sensing face			PA 12	PA 12	PA 12	PA 12
Connection			Connector	Connector	Connector	Connector
No. of wires × cross-section						
Approval			cULus	cULus	cULus	cULus
Recommended connector			BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20

① Wiring diagrams see page **1.0.**6

For sensors with cable, other lengths and PUR quality are available on request.

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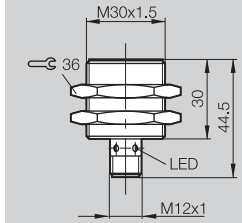
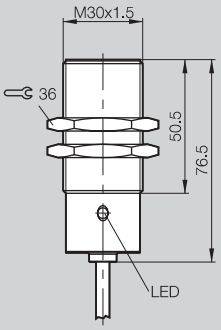
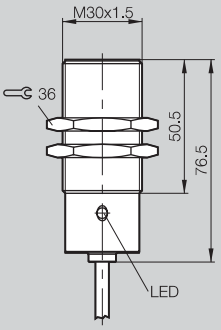
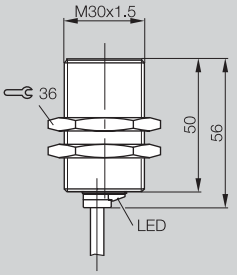
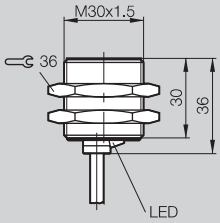
	M30×1.5	M30×1.5	M30×1.5	M30×1.5	M30×1.5
	flush	flush	flush	flush	flush
	10 mm	**10 mm**	**10 mm**	**10 mm**	**10 mm**
	0...8.1 mm	0...8.1 mm	0...8.1 mm	0...8.1 mm	0...8.1 mm
	 PX0326a	 PX0023	 PX0023	 PX0499	 PX0146a
	BES 516-327-E5-Y-S4 BES 516-3028-E5-Y-S4	BES 516-327-B0-C-02	BES 516-114-B0-C-03	BES M30MI-PSC10B-BV02 BES M30MI-POC10B-BV02	BES 516-327-E4-Y-02
	BES 516-359-E5-Y-S4	BES 516-359-B0-C-02	BES 516-120-B0-C-03	BES M30MI-NSC10B-BV02 BES M30MI-NOC10B-BV02	BES 516-359-E4-Y-02
	10...30 V DC	10...30 V DC	10...30 V DC	12...30 V DC	10...30 V DC
	≤ 3.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 3.5 V
	75 V DC	250 V AC	250 V AC	250 V AC	75 V DC
	130 mA	200 mA	200 mA	200 mA	130 mA
	≤ 25 mA	≤ 25 mA	≤ 30 mA	≤ 10 mA	≤ 25 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	500 Hz	300 Hz	300 Hz	400 Hz	200 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 67	IP 68 per BWN Pr. 20	IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
		⧈	⧈	⧈	
	CuZn coated	CuZn coated	CuZn coated	CuZn coated	CuZn coated
	PA 12	PA 12	PA 12	PA 12	PA 12
	Connector	2 m PVC cable	3 m PVC cable	2 m PVC cable	2 m PVC cable
		3×0.34 mm²	4×0.25 mm²	3×0.34 mm²	3×0.34 mm²
	cULus	cULus	cULus	cULus	cULus
	BKS-_ 19/BKS-_ 20				

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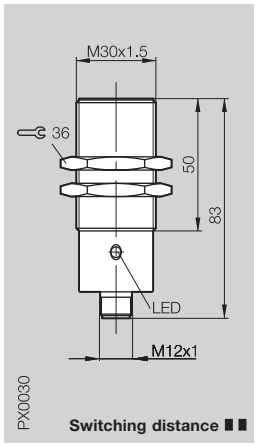
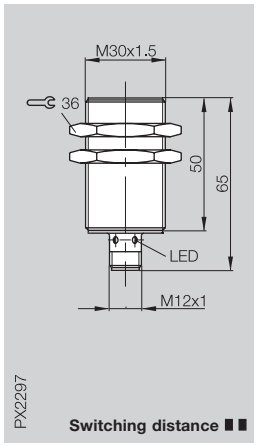
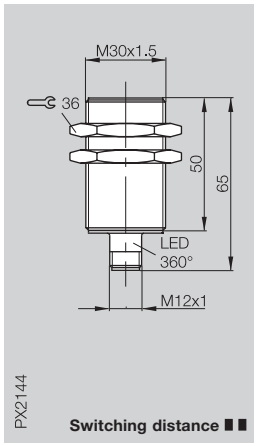
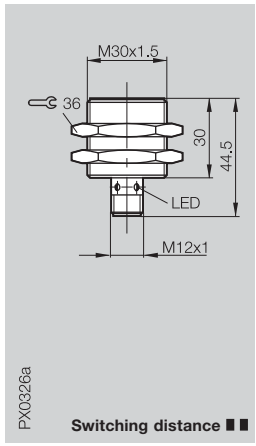
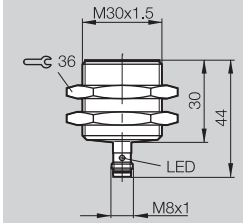
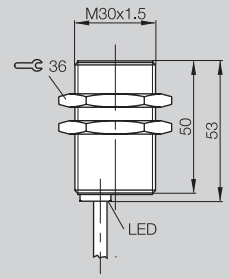
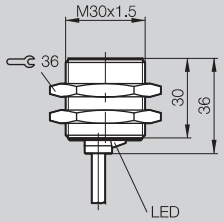
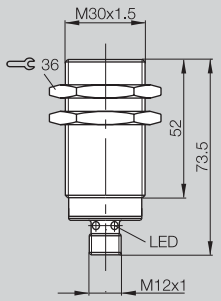
Connectors, Holders ...
Page 5.2 ...

Housing size		**M30×1.5**	**M30x1.5**	**M30×1.5**	**M30×1.5**	
Mounting (see notes starting p. **1.0.**11)		flush	flush	flush	flush	
Rated operating distance s_n		**15 mm**	**15 mm**	**15 mm**	**15 mm**	
Assured operating distance s_a		0...12.2 mm	0...12.2 mm	0...12.2 mm	0...12.2 mm	
						
PNP	NO ①		BES M30MI-PSC15B-S04G	BES M30MI-PSC15B-S04K	BES 516-327-G-E5-Y-S4	
	NC ②			BES M30MI-POC15B-S04K	BES 516-3028-G-E5-Y-S4	
	complementary ③	BES 516-114-G-S4-H				
NPN	NO ④			BES M30MI-NSC15B-S04K		
	NC ⑤			BES M30MI-NOC15B-S04K		
Supply voltage U_B		10...55 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e		≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 3.5 V	
Rated insulation voltage U_i		250 V AC	250 V AC	250 V AC	75 V DC	
Rated operational current I_e		200 mA	200 mA	200 mA	130 mA	
No-load supply current I_0 max.		≤ 15 mA	≤ 10 mA	≤ 10 mA	≤ 25 mA	
Polarity reversal protected		yes	yes	yes	yes	
Short circuit protected		yes	yes	yes	yes	
Repeat accuracy R		≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	
Ambient temperature range T_a		–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	
Switching frequency f		150 Hz	100 Hz	100 Hz	100 Hz	
Utilization category		DC 13	DC 13	DC 13	DC 13	
Function indicator		yes	yes	yes	yes	
Degree of protection per IEC 60529		IP 68 per BWN Pr. 20	IP 67	IP 67	IP 67	
Insulation class		⧈	⧈	⧈		
Housing material		CuZn coated	CuZn coated	CuZn coated	CuZn coated	
Material of sensing face		PA 12	PA 12	PA 12	PA 12	
Connection		Connector	Connector	Connector	Connector	
No. of wires × cross-section						
Approval			cULus	cULus	cULus	
Recommended connector		BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	

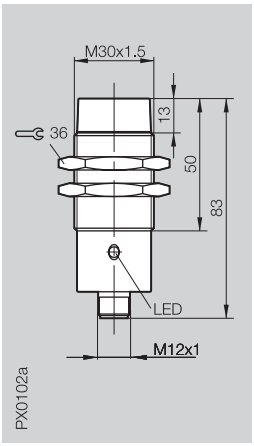
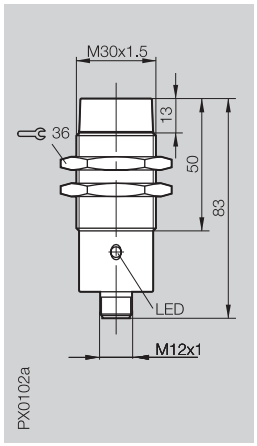
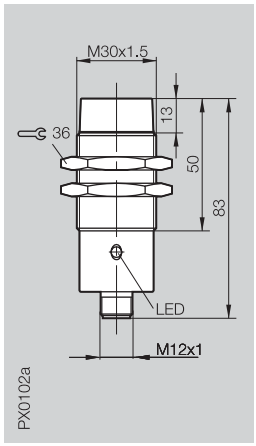
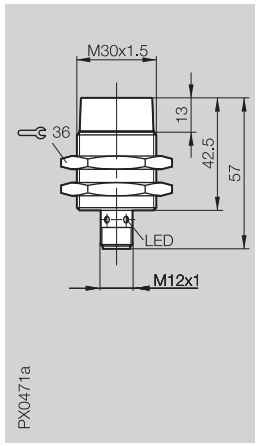
① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

For sensors with cable, other lengths and PUR quality are available on request.

All-round LED

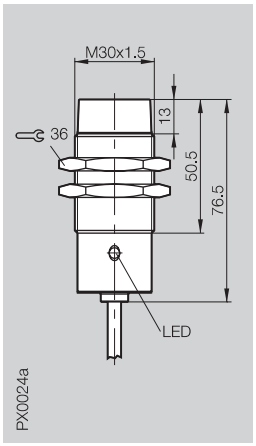
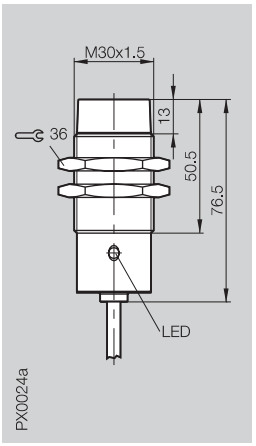
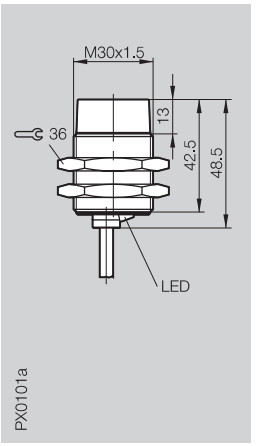
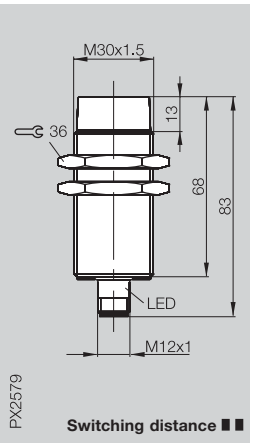
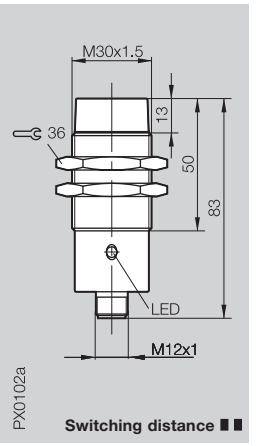
	M30×1.5	**M30x1.5**	**M30×1.5**	**M30×1.5**	
	flush	flush	flush	quasi flush	
	15 mm	**15 mm**	**15 mm**	**22 mm**	
	0...12.2 mm	0...12.2 mm	0...12.2 mm	0...17.8 mm	
	 PX0054a **Switching distance ■■**	 PX2160 **Switching distance ■■**	 PX0146a **Switching distance ■■**	 PX1489 **Switching distance ■■■**	
	BES 516-327-G-E5-Y-S49	BES M30MI-PSC15B-BV02 BES M30MI-POC15B-BV02	BES 516-327-G-E4-Y-02 BES 516-3028-G-E4-Y-02	BES M30MI1-PSC22B-S04G BES M30MI1-POC22B-S04G	
	BES 516-359-G-E5-Y-S49		BES 516-359-G-E4-Y-02	BES M30MI1-NSC22B-S04G	
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
	≤ 3.5 V	≤ 2.5 V	≤ 3.5 V	≤ 2 V	
	75 V DC	250 V AC	75 V DC	75 V DC	
	130 mA	200 mA	130 mA	200 mA	
	≤ 25 mA	≤ 10 mA	≤ 25 mA	≤ 10 mA	
	yes	yes	yes	yes	
	yes	yes	yes	yes	
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	
	100 Hz	100 Hz	100 Hz	200 Hz	
	DC 13	DC 13	DC 13	DC 13	
	yes	yes	yes	yes	
	IP 67	IP 67	IP 68 per BWN Pr. 20	IP 67	
		⧈			
	CuZn coated	CuZn coated	CuZn coated	CuZn coated	
	PA 12	PA 12	PA 12	PBT	
	Connector	2 m PVC cable	2 m PVC cable	Connector	
		3×0.34 mm²	3×0.34 mm²		
	cULus	cULus	cULus		
	BKS-_ 48/BKS-_ 49			BKS-_ 19/BKS-_ 20	

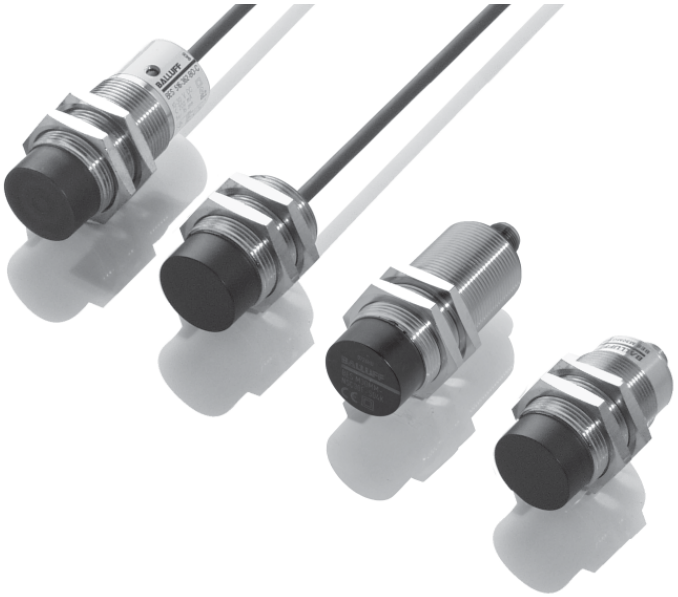
1.1
5
Connectors, Holders ... Page 5.2 ...

Housing size			**M30×1.5**	**M30×1.5**	**M30×1.5**	**M30×1.5**
Mounting (see notes starting p. **1.0.**11)			non-flush	non-flush	non-flush	non-flush
Rated operating distance s_n			**15 mm**	**15 mm**	**15 mm**	**15 mm**
Assured operating distance s_a			0...12.2 mm	0...12.2 mm	0...12.2 mm	0...12.2 mm
						
PNP	NO	①	BES 516-362-S4-C		BES 516-362-S4-H	BES 516-362-E5-Y-S4
	NC	②	BES 516-3029-S4-C			BES 516-3029-E5-Y-S4
	complementary	③		BES 516-125-S4-C		
NPN	NO	④	BES 516-363-S4-C			BES 516-363-E5-Y-S4
	NC	⑤	BES 516-3033-S4-C			
	complementary	⑥				
Supply voltage U_B			10...30 V DC	10...30 V DC	10...55 V DC	10...30 V DC
Voltage drop U_d at I_e			≤ 2.5 V	≤ 2.5 V	≤ 1.5 V	≤ 3.5 V
Rated insulation voltage U_i			250 V AC	250 V AC	250 V AC	75 V DC
Rated operational current I_e			200 mA	200 mA	200 mA	130 mA
No-load supply current I_0 max.			≤ 25 mA	≤ 30 mA	≤ 12 mA	≤ 25 mA
Polarity reversal protected			yes	yes	yes	yes
Short circuit protected			yes	yes	yes	yes
Repeat accuracy R			≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a			–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
Switching frequency f			100 Hz	100 Hz	400 Hz	100 Hz
Utilization category			DC 13	DC 13	DC 13	DC 13
Function indicator			yes	yes	yes	yes
Degree of protection per IEC 60529			IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67
Insulation class			⧈	⧈	⧈	
Housing material			CuZn coated	CuZn coated	CuZn coated	CuZn coated
Material of sensing face			PA 12	PA 12	PA 12	PA 12
Connection			Connector	Connector	Connector	Connector
No. of wires × cross-section						
Approval			cULus	cULus		cULus
Recommended connector			BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20

① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

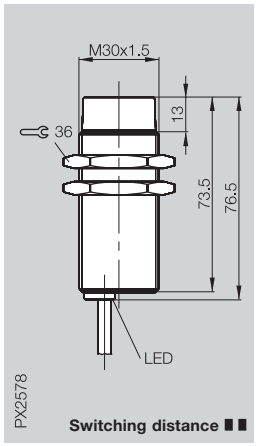
For sensors with cable, other lengths and PUR quality are available on request.

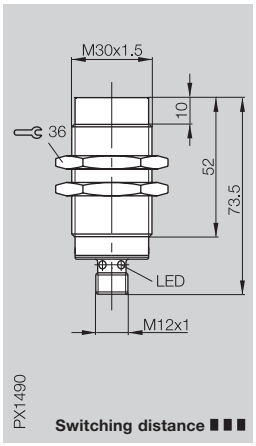
	M30×1.5 non-flush 15 mm 0...12.2 mm	M30×1.5 non-flush 15 mm 0...12.2 mm	M30×1.5 non-flush 15 mm 0...12.2 mm	M30×1.5 non-flush 30 mm 0...24.3 mm	M30×1.5 non-flush 30 mm 0...24.3 mm
					
	BES 516-362-B0-C-02 BES 516-3029-B0-C-02	BES 516-125-B0-C-03	BES 516-362-E4-Y-02 BES 516-3029-E4-Y-02	BES M30MM-PSC30F-S04K BES M30MM-POC30F-S04K	BES 516-362-G-S4-H
	BES 516-363-B0-C-02 BES 516-3033-B0-C-02	BES 516-126-B0-C-03	BES 516-363-E4-Y-02	BES M30MM-NSC30F-S04K BES M30MM-NOC30F-S04K	
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...55 V DC
	≤ 2.5 V	≤ 2.5 V	≤ 3.5 V	≤ 2.5 V	≤ 2.5 V
	250 V AC	250 V AC	75 V DC	250 V AC	250 V AC
	200 mA	200 mA	130 mA	200 mA	200 mA
	≤ 25 mA	≤ 30 mA	≤ 25 mA	≤ 10 mA	≤ 15 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	100 Hz	100 Hz	100 Hz	300 Hz	70 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 68 per BWN Pr. 20	IP 67	IP 68 per BWN Pr. 20	IP 67	IP 68 per BWN Pr. 20
	⧈	⧈			⧈
	CuZn coated	CuZn coated	CuZn coated	CuZn coated	CuZn coated
	PA 12	PA 12	PA 12	PBT	PA 12
	2 m PVC cable	3 m PVC cable	2 m PVC cable	Connector	Connector
	3×0.34 mm²	4×0.25 mm²	3×0.34 mm²		
	cULus	cULus	cULus	cULus	
				BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20



5
Connectors, Holders ...
Page 5.2 ...

Housing size			**M30×1.5**	**M30×1.5**		
Mounting (see notes starting p. **1.0.**11)			non-flush	non-flush		
Rated operating distance s_n			**30 mm**	**40 mm**		
Assured operating distance s_a			0...24.3 mm	0...32.4 mm		



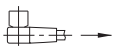


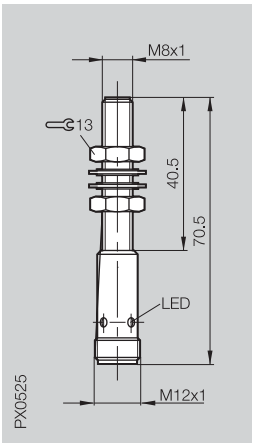
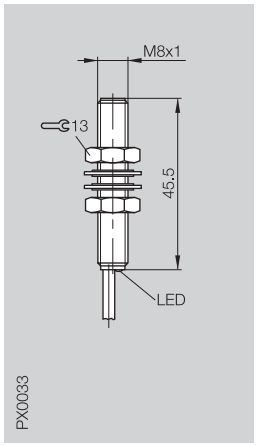
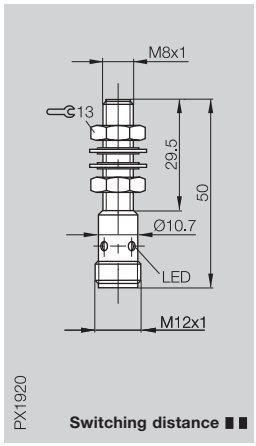
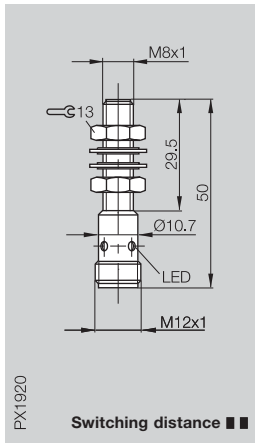
PNP	NO	①	BES M30MM-PSC30F-BV02	BES M30MG1-PSC40F-S04G
	NC	②	BES M30MM-POC30F-BV02	
NPN	NO	④	BES M30MM-NSC30F-BV02	
	NC	⑤	BES M30MM-NOC30F-BV02	

Supply voltage U_B	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e	≤ 2.5 V	≤ 2 V
Rated insulation voltage U_i	250 V AC	75 V DC
Rated operational current I_e	200 mA	200 mA
No-load supply current I_0 max.	≤ 10 mA	≤ 10 mA
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Repeat accuracy R	≤ 5 %	≤ 5 %
Ambient temperature range T_a	–25...+70 °C	–25...+70 °C
Switching frequency f	300 Hz	100 Hz
Utilization category	DC 13	DC 13
Function indicator	yes	yes
Degree of protection per IEC 60529	IP 67	IP 54
Housing material	CuZn coated	CuZn coated
Material of sensing face	PBT	PBT
Connection	2 m PVC cable	Connector
No. of wires × cross-section	3×0.34 mm²	
Approval	cULus	
Recommended connector		BKS-_ 19/BKS-_ 20

① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

Other cable lengths on request.

 Connector orientation

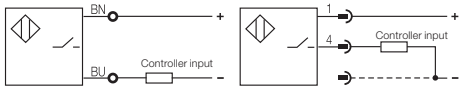
Housing size	**M8×1**	**M8×1**	**M8×1**	**M8×1**
Mounting (see notes starting p. **1.0.**11)	flush	flush	flush	flush
Rated operating distance s_n	**1.5 mm**	**1.5 mm**	**2 mm**	**2 mm**
Assured operating distance s_a	0...1.2 mm	0...1.2 mm	0...1.6 mm	0...1.6 mm
				
NO ⑨ non-polarized ⑦ polarized			BES M08ME1-USC20B-S04G	BES M08ME1-GSC20B-S04G
NC ⑩ non-polarized	BES 516-527-S4-H	BES 516-527-E0-H-03		
Supply voltage U_B	10...55 V DC non-polarized	10...55 V DC non-polarized	10...30 V DC non-polarized	10...30 V DC polarized
Voltage drop U_d at I_e	≤ 5 V	≤ 5 V	≤ 5 V	≤ 5 V
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC	75 V DC
Rated operational current I_e	130 mA	130 mA	100 mA	100 mA
Minimum operating current I_m	5 mA	5 mA	5 mA	5 mA
Off-state current I_r	≤ 500 µA	≤ 500 µA	≤ 600 µA	≤ 600 µA
Polarity reversal protected	yes	yes	yes	yes
Short circuit protected	yes	yes	yes	yes
Permissible load capacitance	≤ 1 µF	≤ 1 µF	≤ 1 µF	≤ 1 µF
Repeat accuracy R	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
Switching frequency f	3000 Hz	3000 Hz	max. 1500 Hz	max. 1500 Hz
Utilization category	DC 13	DC 13	DC 13	DC 13
Function indicator	yes	yes	yes	yes
Degree of protection per IEC 60529	IP 67	IP 67	IP 67	IP 67
Housing material	Stainless steel	Stainless steel	CuZn coated	CuZn coated
Material of sensing face	PBT	PBT	PBT	PBT
Connection	Connector	3 m PVC cable	Connector	Connector
No. of wires × cross-section		2×0.14 mm²		
Approval	cULus	cULus	cULus	cULus
Recommended connector	BKS-S 19-12/-S 20-12		BKS-S 19-11/-S 20-11	BKS-S 19-13/-S 20-13

⑨ For wiring diagrams for 2-wire controllers, see page **1.0.**6
Switching distance ■■ see page **1.0.**10

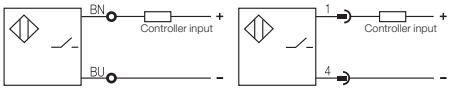
Other cable lengths and PUR cable jacket material on request.

Recommendation for wiring polarized sensors to 3-wire controllers

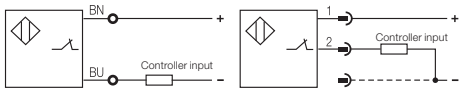
PNP/N.O.



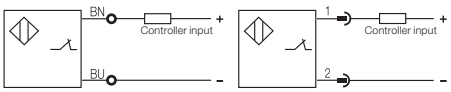
NPN/N.O.



PNP/N.C.



NPN/N.C.

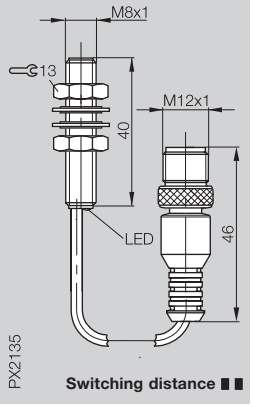
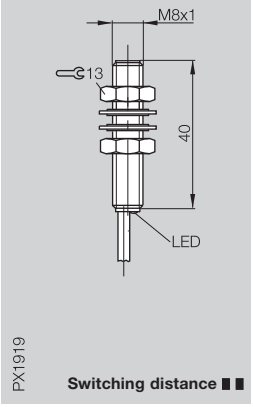
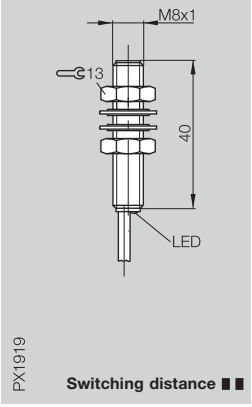


DC 2-wire sensors – for universal use

DC 2-wire sensors can also be used together with most PNP or NPN controllers.

Use of these sensors enables a reduction in the number of inventoried part numbers.

Suitability of the 2-wire sensors for the respective PNP or NPN controller should be tested in advance.

	M8×1 flush **2 mm** 0...1.6 mm	**M8×1** flush **2 mm** 0...1.6 mm	**M8×1** flush **2 mm** 0...1.6 mm		
					
	BES M08MG-GSC20B-BP00,3-GS04	BES M08MG-USC20B-BV02	BES M08MG-GSC20B-BV02		
	10...30 V DC polarized	10...30 V DC non-polarized	10...30 V DC polarized		
	≤ 5 V	≤ 5 V	≤ 5 V		
	75 V DC	75 V DC	75 V DC		
	100 mA	100 mA	100 mA		
	5 mA	5 mA	5 mA		
	≤ 600 µA	≤ 600 µA	≤ 600 µA		
	yes	yes	yes		
	yes	yes	yes		
	≤ 1 µF	≤ 1 µF	≤ 1 µF		
	≤ 5 %	≤ 5 %	≤ 5 %		
	–25...+70 °C	–25...+70 °C	–25...+70 °C		
	max. 1500 Hz	max. 1500 Hz	max. 1500 Hz		
	DC 13	DC 13	DC 13		
	yes	yes	yes		
	IP 67	IP 67	IP 67		
	CuZn coated	CuZn coated	CuZn coated		
	PBT	PBT	PBT		
	0.3 m PUR cable with connector	2 m PVC cable	2 m PVC cable		
		2×0.14 mm²	2×0.14 mm²		
	cULus	cULus	cULus		
	BKS-S 19-13				

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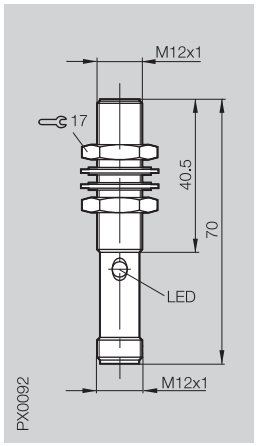
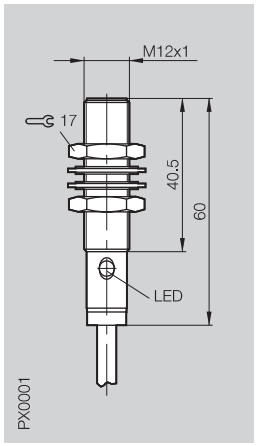
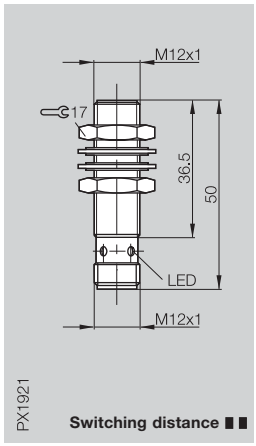
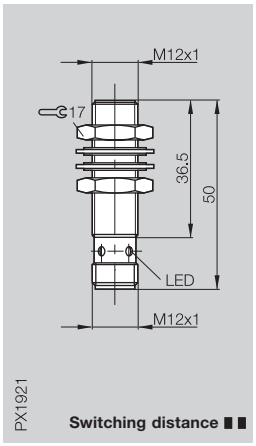
5
Connectors, Holders ...
Page 5.2 ...

Housing size	**M12×1**	**M12×1**	**M12×1**	**M12×1**
Mounting (see notes starting p. **1.0.**11)	flush	flush	flush	flush
Rated operating distance s_n	**2 mm**	**2 mm**	**3 mm**	**3 mm**
Assured operating distance s_a	0...1.6 mm	0...1.6 mm	0...2.4 mm	0...2.4 mm





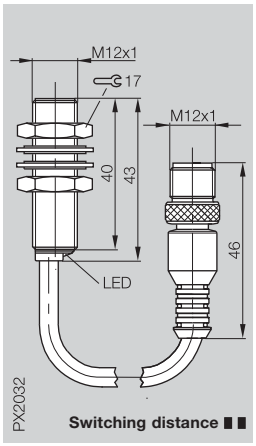
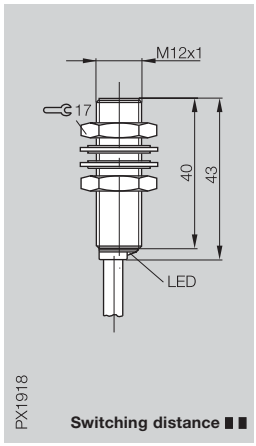
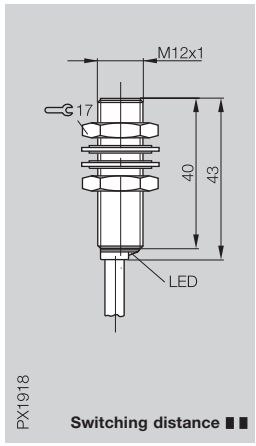
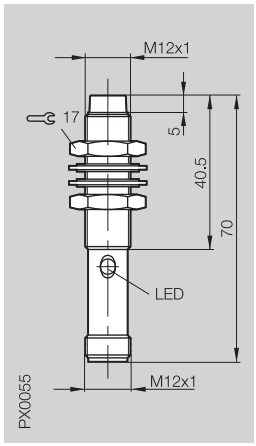
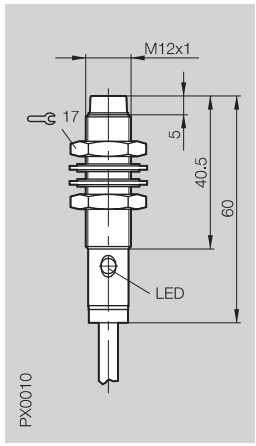




NO ⑨ non-polarized ⑦ polarized			BES M12MF-USC30B-S04G	BES M12MF-GSC30B-S04G
NC ⑩ non-polarized	BES 516-543-S4-H	BES 516-543-B0-H-03		
Supply voltage U_B	10...55 V DC non-polarized	10...55 V DC non-polarized	10...30 V DC non-polarized	10...30 V DC polarized
Voltage drop U_d at I_e	≤ 5 V	≤ 5 V	≤ 5 V	≤ 4 V
Rated insulation voltage U_i	250 V AC	250 V AC	75 V DC	75 V DC
Rated operational current I_e	200 mA	200 mA	100 mA	100 mA
Minimum operating current I_m	5 mA	5 mA	5 mA	5 mA
Off-state current I_r	≤ 500 µA	≤ 500 µA	≤ 600 µA	≤ 600 µA
Polarity reversal protected	yes	yes	yes	yes
Short circuit protected	yes	yes	yes	yes
Permissible load capacitance	≤ 1 µF	≤ 1 µF	≤ 1 µF	≤ 1 µF
Repeat accuracy R	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
Switching frequency f	2500 Hz	2500 Hz	max. 1300 Hz	max. 1300 Hz
Utilization category	DC 13	DC 13	DC 13	DC 13
Function indicator	yes	yes	yes	yes
Degree of protection per IEC 60529	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67	IP 67
Insulation class	⧈	⧈		
Housing material	Stainless steel	Stainless steel	CuZn coated	CuZn coated
Material of sensing face	PA 12	PA 12	PA 12	PA 12
Connection	Connector	3 m PVC cable	Connector	Connector
No. of wires × cross-section		2×0.34 mm²		
Approval	cULus	cULus	cULus	cULus
Recommended connector	BKS-S 19-12/-S 20-12		BKS-S 19-11/-S 20-11	BKS-S 19-13/-S 20-13

⑨ Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

Other cable lengths and
PUR cable jacket material on request.

	M12×1	M12×1	M12×1	M12×1	M12×1
	flush	flush	flush	non-flush	non-flush
	3 mm	**3 mm**	**3 mm**	**4 mm**	**4 mm**
	0...2.4 mm	0...2.4 mm	0...2.4 mm	0...3.2 mm	0...3.2 mm
					
	BES M12MG-GSC30B-BP00,3-GS04	BES M12MG-USC30B-BV02	BES M12MG-GSC30B-BV02	BES 516-545-S4-H	BES 516-545-B0-H-03
	10...30 V DC polarized	10...30 V DC non-polarized	10...30 V DC polarized	10...55 V DC non-polarized	10...55 V DC non-polarized
	≤ 4 V	≤ 5 V	≤ 4 V	≤ 5 V	≤ 5 V
	75 V DC	75 V DC	75 V DC	250 V AC	250 V AC
	100 mA	100 mA	100 mA	200 mA	200 mA
	5 mA	5 mA	5 mA	5 mA	5 mA
	≤ 600 µA	≤ 600 µA	≤ 600 µA	≤ 500 µA	≤ 500 µA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 1 µF	≤ 1 µF	≤ 1 µF	≤ 1 µF	≤ 1 µF
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	max. 1300 Hz	max. 1300 Hz	max. 1300 Hz	1000 Hz	1000 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 67	IP 67	IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
				⧈	⧈
	CuZn coated	CuZn coated	CuZn coated	Stainless steel	Stainless steel
	PBT	PA 12	PA 12	PA 12	PA 12
	0.3 m PUR cable with connector	2 m PVC cable	2 m PVC cable	Connector	3 m PVC cable
		2×0.34 mm²	2×0.34 mm²		2×0.34 mm²
	cULus	cULus	cULus	cULus	cULus
	BKS-S 19-13			BKS-S 19-12/-S 20-12	

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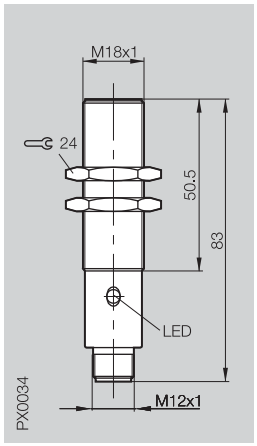
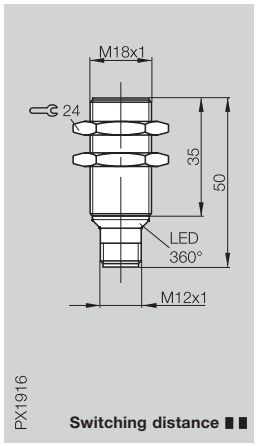
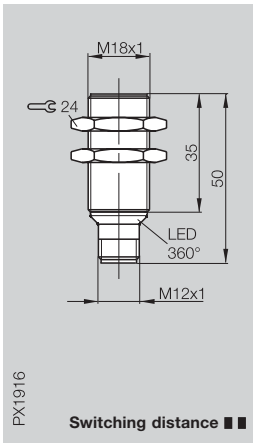
Connectors, Holders ...
Page 5.2 ...

Housing size	**M18×1**	**M18×1**	**M18×1**
Mounting (see notes starting p. **1.0.**11)	flush	flush	flush
Rated operating distance s_n	**5 mm**	**7 mm**	**7 mm**
Assured operating distance s_a	0...4.1 mm	0...5.7 mm	0...5.7 mm





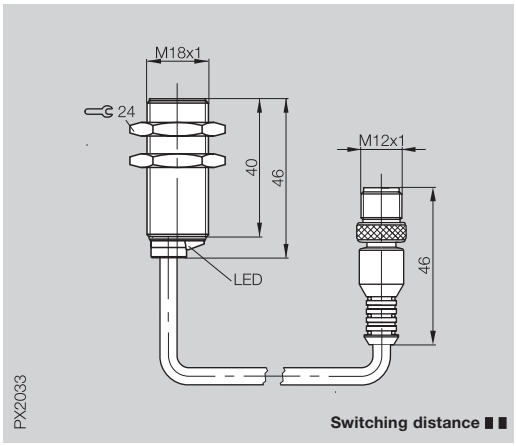
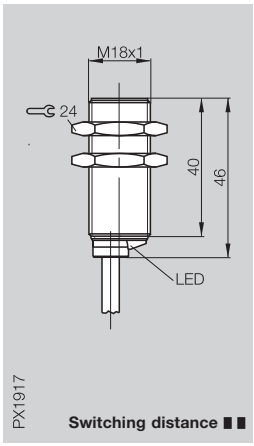
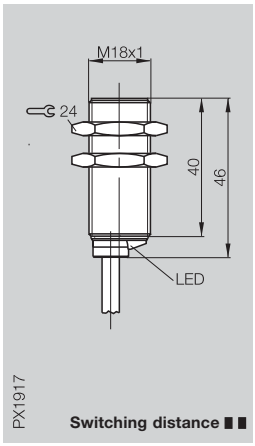
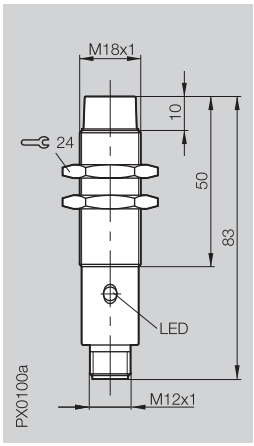


NO ⑨ non-polarized ⑦ polarized		BES M18MF-USC70B-S04K	BES M18MF-GSC70B-S04K
NC ⑩ non-polarized	BES 516-539-S4-H		
Supply voltage U_B	10...55 V DC non-polarized	10...30 V DC non-polarized	10...30 V DC polarized
Voltage drop U_d at I_e	≤ 5 V	≤ 5 V	≤ 4 V
Rated insulation voltage U_i	250 V AC	75 V DC	75 V DC
Rated operational current I_e	200 mA	100 mA	100 mA
Minimum operating current I_m	5 mA	5 mA	5 mA
Off-state current I_r	≤ 500 µA	≤ 600 µA	≤ 600 µA
Polarity reversal protected	yes	yes	yes
Short circuit protected	yes	yes	yes
Permissible load capacitance	≤ 1 µF	≤ 1 µF	≤ 1 µF
Repeat accuracy R	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a	–25...+70 °C	–25...+70 °C	–25...+70 °C
Switching frequency f	250 Hz	max. 600 Hz	max. 600 Hz
Utilization category	DC 13	DC 13	DC 13
Function indicator	yes	yes	yes
Degree of protection per IEC 60529	IP 68 per BWN Pr. 20	IP 67	IP 67
Insulation class	⧈		
Housing material	CuZn coated	CuZn coated	CuZn coated
Material of sensing face	PA 12	PBT	PBT
Connection	Connector	Connector	Connector
No. of wires × cross-section			
Approval	cULus	cULus	cULus
Recommended connector	BKS-S 19-12/-S 20-12	BKS-S 19-11/-S 20-11	BKS-S 19-13/-S 20-13

⑨ Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

Other cable lengths and
PUR cable jacket material on request.

All-round LED

	M18×1	**M18×1**	**M18×1**	**M18×1**
	flush	flush	flush	non-flush
	7 mm	**7 mm**	**7 mm**	**8 mm**
	0...5.7 mm	0...5.7 mm	0...5.7 mm	0...6.5 mm
				
	BES M18MG-GSC70B-BP00,3-GS04	BES M18MG-USC70B-BV02	BES M18MG-GSC70B-BV02	BES 516-547-S4-H
	10...30 V DC polarized	10...30 V DC non-polarized	10...30 V DC polarized	10...55 V DC non-polarized
	≤ 4 V	≤ 5 V	≤ 4 V	≤ 5 V
	75 V DC	75 V DC	75 V DC	250 V AC
	100 mA	100 mA	100 mA	200 mA
	5 mA	5 mA	5 mA	5 mA
	≤ 600 µA	≤ 600 µA	≤ 600 µA	≤500 µA
	yes	yes	yes	yes
	yes	yes	yes	yes
	≤ 1 µF	≤ 1 µF	≤ 1 µF	≤ 1 µF
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	max. 600 Hz	max. 600 Hz	max. 600 Hz	200 Hz
	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes
	IP 67	IP 67	IP 67	IP 67
	CuZn coated	CuZn coated	CuZn coated	CuZn coated
	PBT	PBT	PBT	PA 12
	0.3 m PUR cable with connector	2 m PVC cable	2 m PVC cable	Connector
		2×0.34 mm²	2×0.34 mm²	
	cULus	cULus	cULus	cULus
	BKS-S 19-13			BKS-S 19-12/-S 20-12

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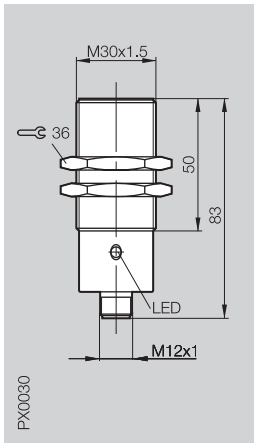
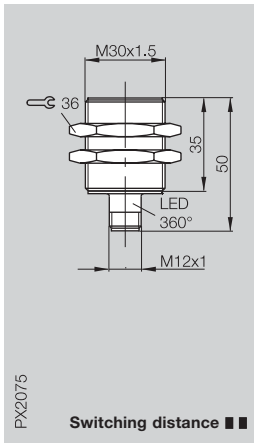
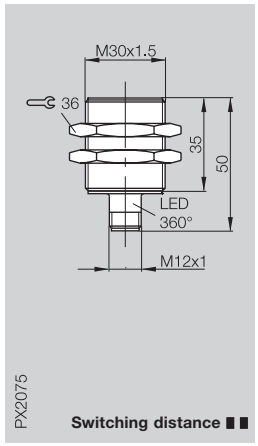
Connectors, Holders ...
Page 5.2 ...

Housing size	**M30×1.5**	**M30×1.5**	**M30×1.5**
Mounting (see notes starting p. **1.0.**11)	flush	flush	flush
Rated operating distance s_n	**10 mm**	**15 mm**	**15 mm**
Assured operating distance s_a	0...8.1 mm	0...12.2 mm	0...12.2 mm





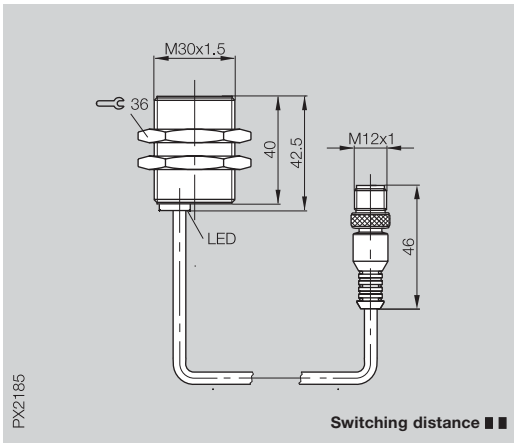
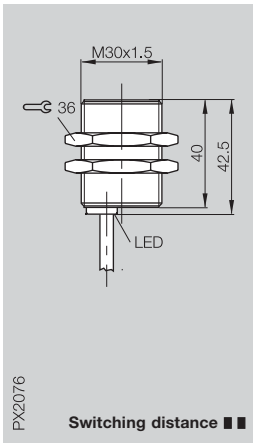
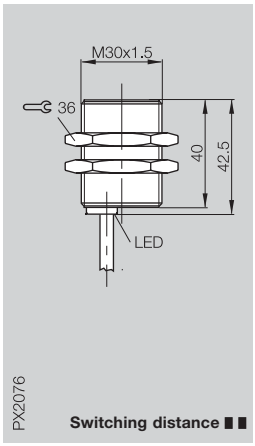
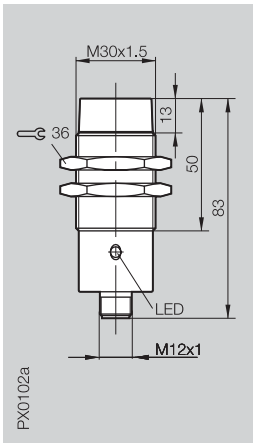


NO ⑨ non-polarized ⑦ polarized		BES M30MF-USC15B-S04K	BES M30MF-GSC15B-S04K
NC ⑩ non-polarized	BES 516-541-S4-H		
Supply voltage U_B	10...55 V DC non-polarized	10...30 V DC non-polarized	10...30 V DC polarized
Voltage drop U_d at I_e	≤ 5 V	≤ 5 V	≤ 4 V
Rated insulation voltage U_i	250 V AC	75 V DC	75 V DC
Rated operational current I_e	200 mA	100 mA	100 mA
Minimum operating current I_m	5 mA	5 mA	5 mA
Off-state current I_r	≤ 500 µA	≤ 600 µA	≤ 600 µA
Polarity reversal protected	yes	yes	yes
Short circuit protected	yes	yes	yes
Permissible load capacitance	≤ 1 µF	≤ 1 µF	≤ 1 µF
Repeat accuracy R	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a	–25...+70 °C	–25...+70 °C	–25...+70 °C
Switching frequency f	150 Hz	max. 400 Hz	max. 400 Hz
Utilization category	DC 13	DC 13	DC 13
Function indicator	yes	yes	yes
Degree of protection per IEC 60529	IP 68 per BWN Pr. 20	IP 67	IP 67
Insulation class	⧈		
Housing material	CuZn coated	CuZn coated	CuZn coated
Material of sensing face	PA 12	PA 12	PA 12
Connection	Connector	Connector	Connector
No. of wires × cross-section			
Approval	cULus	cULus	cULus
Recommended connector	BKS-S 19-12/-S 20-12	BKS-S 19-11/-S 20-11	BKS-S 19-13/-S 20-13

⑨ Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

Other cable lengths and
PUR cable jacket material on request.

All-round LED

	M30×1.5	**M30×1.5**	**M30×1.5**	**M30×1.5**
	flush	flush	flush	non-flush
	15 mm	**15 mm**	**15 mm**	**15 mm**
	0...12.2 mm	0...12.2 mm	0...12.2 mm	0...12.2 mm
				
	BES M30MF-GSC15B-BP00,3-GS04	BES M30MF-USC15B-BV02	BES M30MF-GSC15B-BV02	BES 516-549-S4-H
	10...30 V DC polarized	10...30 V DC non-polarized	10...30 V DC polarized	10...55 V DC non-polarized
	≤ 4 V	≤ 5 V	≤ 4 V	≤ 5 V
	75 V DC	75 V DC	75 V DC	250 V AC
	100 mA	100 mA	100 mA	200 mA
	5 mA	5 mA	5 mA	5 mA
	≤ 600 µA	≤ 600 µA	≤ 600 µA	≤ 500 µA
	yes	yes	yes	yes
	yes	yes	yes	yes
	≤ 1 µF	≤ 1 µF	≤ 1 µF	≤ 1 µF
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	max. 400 Hz	max. 400 Hz	max. 400 Hz	100 Hz
	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes
	IP 67	IP 67	IP 67	IP 68 per BWN Pr. 20
				⧈
	CuZn coated	CuZn coated	CuZn coated	CuZn coated
	PA 12	PA 12	PA 12	PA 12
	0.3 m PUR cable with connector	2 m PVC cable	2 m PVC cable	Connector
		2×0.34 mm²	2×0.34 mm²	
	cULus	cULus	cULus	cULus
	BKS-S 19-13			BKS-S 19-12/-S 20-12

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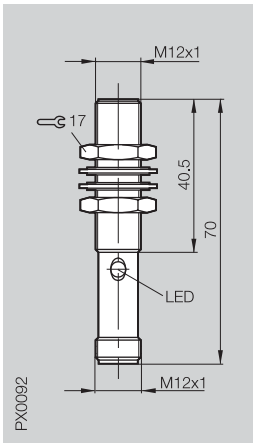
Connectors, Holders ...
Page 5.2 ...

Housing size	**M12×1**
Mounting (see notes starting p. **1.0.**11)	flush
Rated operating distance s_n	**2 mm**
Assured operating distance s_a	0...1.6 mm



NO	⑯	BES 516-207-S27-E
NC	⑰	BES 516-208-S27-E

Rated operational voltage U_e	110 V AC
Supply voltage U_B	20...250 V AC/DC
Voltage drop U_d at I_e	≤ 11 V; ≤ 7.5 V dyn.
Rated insulation voltage U_i	250 V AC
Rated operational current I_e	130 mA
Minimum operating current I_m	5 mA
Off-state current I_r	≤ 1.7 mA at 110 V AC
Inrush current I_k t ≤ 20 ms	≤ 0.7 A/≤ 0.5 Hz
Polarity reversal protected	yes
Short circuit/overload protected	yes/yes

Repeat accuracy R	≤ 5 %
Ambient temperature range T_a	–25...+70 °C
Switching frequency f	≤ 1000 Hz
Utilization category	AC 140/DC 13
Function indicator	yes

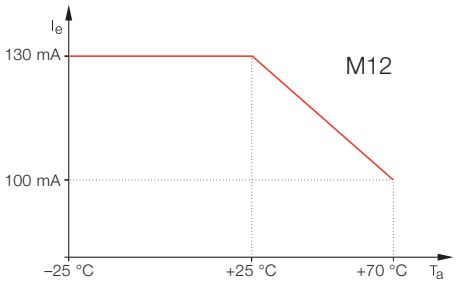
Degree of protection per IEC 60529	IP 67
Insulation class	with protection ground
Housing material	Stainless steel
Material of sensing face	PA 12
Connection	Connector

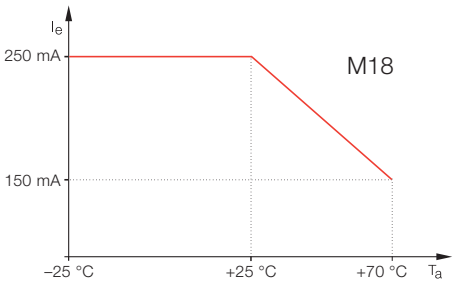
Approval	cULus
Recommended connector	BKS-S 27/BKS-S 28

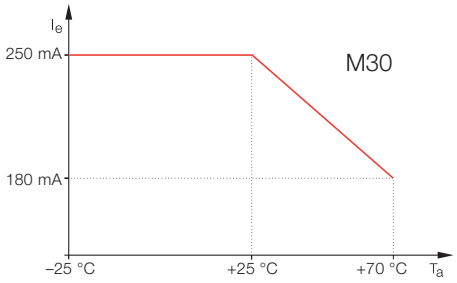
⑯ Wiring diagrams see page **1.0.**6

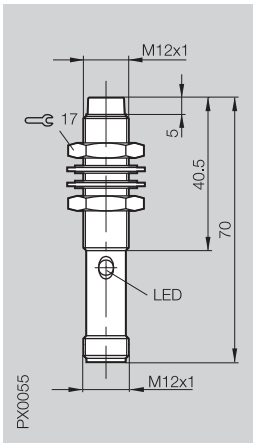
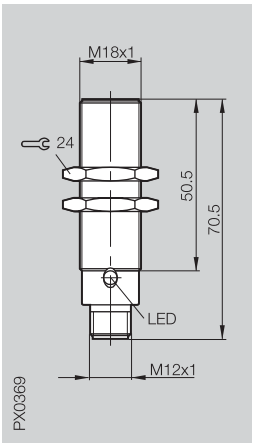
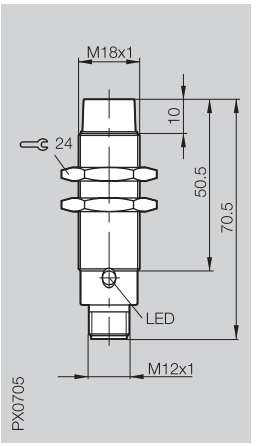
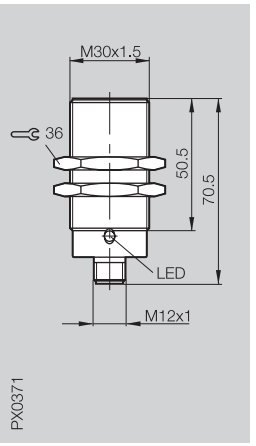
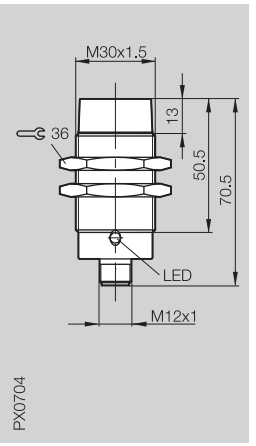
Cable versions (Insulation class 2) on request.

Current reduction as a function of ambient temperature range







	M12×1	M18×1	M18×1	M30×1.5	M30×1.5
	non-flush	flush	non-flush	flush	non-flush
	4 mm	**5 mm**	**8 mm**	**10 mm**	**15 mm**
	0...3.2 mm	0...4.1 mm	0...6.5 mm	0...8.1 mm	0...12.2 mm
					
	BES 516-209-S27-E BES 516-210-S27-E	BES 516-211-E5-E-S27 BES 516-212-E5-E-S27	BES 516-213-E5-E-S27 BES 516-214-E5-E-S27	BES 516-215-E5-E-S27 BES 516-216-E5-E-S27	BES 516-217-E5-E-S27 BES 516-218-E5-E-S27
	110 V AC	110 V AC	110 V AC	110 V AC	110 V AC
	20...250 V AC/DC	20...250 V AC/DC	20...250 V AC/DC	20...250 V AC/DC	20...250 V AC/DC
	≤ 11 V; ≤ 7.5 V dyn.	≤ 11 V; ≤ 7.5 V dyn.	≤ 11 V; ≤ 7.5 V dyn.	≤ 11 V; ≤ 7.5 V dyn.	≤ 11 V; ≤ 7.5 V dyn.
	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC
	130 mA	250 mA	250 mA	250 mA	250 mA
	5 mA	5 mA	5 mA	5 mA	5 mA
	≤ 1.7 mA at 110 V AC	≤ 1.7 mA at 110 V AC	≤ 1.7 mA at 110 V AC	≤ 1.7 mA at 110 V AC	≤ 1.7 mA at 110 V AC
	≤ 0.7 A/≤ 0.5 Hz	≤ 1.5 A/≤ 1 Hz	≤ 1.5 A/≤ 1 Hz	≤ 3 A/≤ 1 Hz	≤ 3 A/≤ 1 Hz
	yes	yes	yes	yes	yes
	yes/yes	yes/yes	yes/yes	yes/yes	yes/yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 10 %	≤ 10 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	≤ 600 Hz	≤ 400 Hz	≤ 250 Hz	≤ 150 Hz	≤ 100 Hz
	AC 140/DC 13	AC 140/DC 13	AC 140/DC 13	AC 140/DC 13	AC 140/DC 13
	yes	yes	yes	yes	yes
	IP 67	IP 67	IP 67	IP 67	IP 67
	with protection ground	with protection ground	with protection ground	with protection ground	with protection ground
	Stainless steel	CuZn coated	CuZn coated	CuZn coated	CuZn coated
	PA 12	PA 12	PA 12	PA 12	PA 12
	Connector	Connector	Connector	Connector	Connector
	cULus	cULus	cULus	cULus	cULus
	BKS-S 27/BKS-S 28	BKS-S 27/BKS-S 28	BKS-S 27/BKS-S 28	BKS-S 27/BKS-S 28	BKS-S 27/BKS-S 28

1.3
5
Connectors, Holders ... Page 5.2 ...

AC sensors are optimized for processors and controllers having an AC voltage input.

These sensors are used mainly in Asia and America.

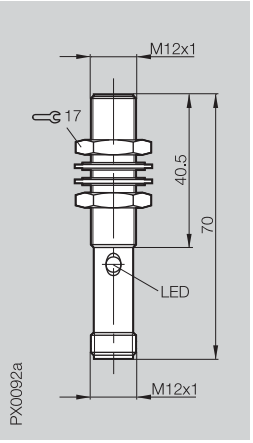
As long as the rated operating current is maintained, these sensors can be used for directly driving contactors and relays.

Recommendation

Short circuit protection: Miniature fuse per IEC 60127-2 Sheet 1, ≤ 2 A (fast acting). See wiring diagrams.

After a short circuit check the unit for reliable function.

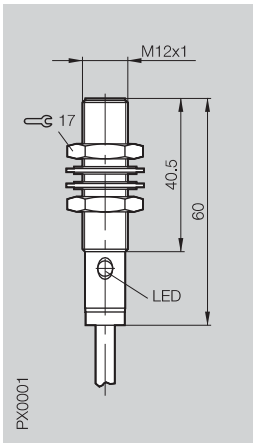
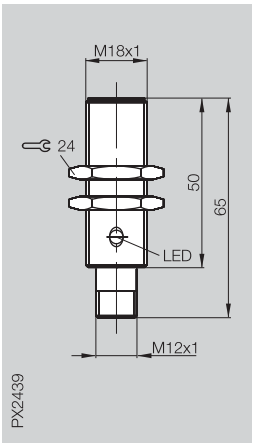
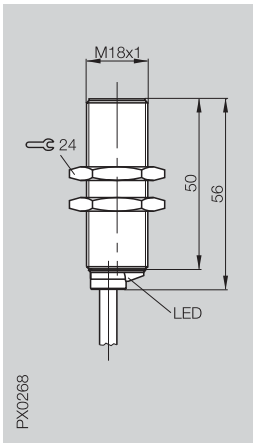
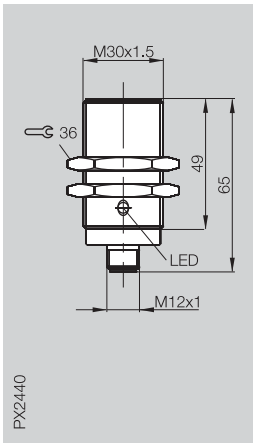
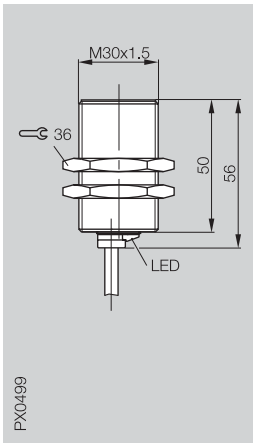
Housing size	**M12×1**
Mounting (see notes starting p. **1.0.**11)	flush
Rated operating distance s_n	**2 mm**
Assured operating distance s_a	0...1.6 mm



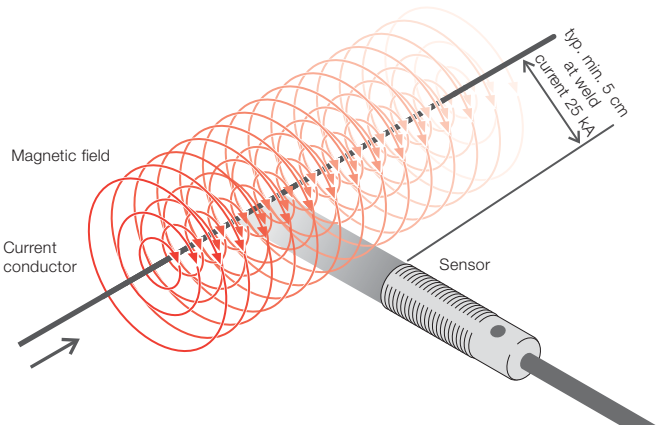
NO ⑪	BES 516-449-S27-L
Supply voltage U_B	20...250 V AC
Voltage drop U_d at I_e	≤ 4 V
Rated insulation voltage U_i	250 V AC
Rated operational current I_e	500 mA
Polarity reversal protected	yes
Short circuit protected	no
Repeat accuracy R	≤ 5 %
Ambient temperature range T_a	–25...+70 °C
Switching frequency f	25 Hz
Utilization category	AC 140
Function indicator	yes
Degree of protection per IEC 60529	IP 67
Insulation class	with protection ground
Housing material	CuZn coated
Material of sensing face	PA 12
Connection	Connector
No. of wires × cross-section	
Approval	cULus
Recommended connector	BKS-S 27/BKS-S 28

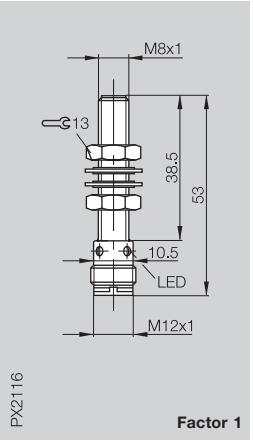
⑪ Wiring diagrams see page **1.0.**6

Other cable lengths on request.

	M12×1	**M18×1**	**M18×1**	**M30×1.5**	**M30×1.5**
	flush	flush	flush	flush	flush
	2 mm	**5 mm**	**5 mm**	**10 mm**	**10 mm**
	0...1.6 mm	0...4.1 mm	0...4.1 mm	0...8.1 mm	0...8.1 mm
					
	BES 516-449-BO-L-02	BES 516-420-E5-L-S27	BES 516-420-E4-L-02	BES 516-418-E5-L-S27	BES 516-418-E4-L-02
	20...250 V AC	20...250 V AC	20...250 V AC	20...250 V AC	20...250 V AC
	≤ 4 V	≤ 4 V	≤ 4 V	≤ 4 V	≤ 4 V
	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC
	500 mA	500 mA	500 mA	500 mA	500 mA
	yes	yes	yes	yes	yes
	no	no	no	no	no
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	25 Hz	25 Hz	25 Hz	25 Hz	10 Hz
	AC 140	AC 140	AC 140	AC 140	AC 140
	yes	yes	yes	yes	yes
	IP 67	IP 67	IP 67	IP 67	IP 67
	⧈	with protection ground	⧈	with protection ground	⧈
	CuZn coated	CuZn coated	CuZn coated	CuZn coated	CuZn coated
	PA 12	PA 12	PA 12	PA 12	PA 12
	2 m PVC cable	Connector	2 m PVC cable	Connector	2 m PVC cable
	2×0.34 mm²		2×0.34 mm²		2×0.34 mm²
	cULus	cULus	cULus	cULus	cULus
		BKS-S 27/BKS-S 28		BKS-S 27/BKS-S 28	

Housing size	**M8×1**
Mounting (see notes starting p. **1.0.**11)	flush
Rated operating distance s_n	**1.5 mm**
Assured operating distance s_a	0...1.2 mm





Weld immune Factor 1 Sensors

... the all-rounder for harsh industrial applications.

Magnetic field immune

Insensitive to magnetic fields which can be created with electrical currents of up to 25 kA (at a distance from energetic conductors of approx. 5 cm).

Weld splatter resistant

Resistant to metal splatter and combustion remains caused by welding.

Factor 1

Identical switching distance for steel, stainless, aluminum or brass.

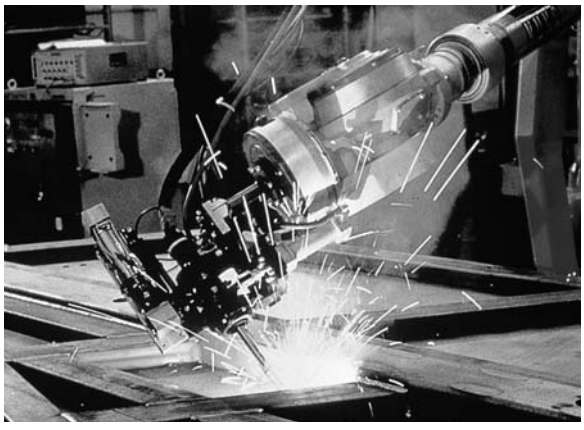
Note about part number

BES ...**-W** Teflon-coated active surface and housing to protect against weld splatter.

PNP NO ①	BES M08EG1-PSC15A-S04G-W
Supply voltage U_B	10...30 V DC
Voltage drop U_d at I_e	≤ 2.5 V
Rated insulation voltage U_i	250 V AC
Rated operational current I_e	150 mA
No-load supply current I_0 max.	≤ 15 mA
Polarity reversal protected	yes
Short circuit protected	yes
Repeat accuracy R	≤ 5 %
Ambient temperature range T_a	–25...+70 °C
Switching frequency f	2000 Hz
Utilization category	DC 13
Function indicator	yes
Degree of protection per IEC 60529	IP 67
Insulation class	⧈
Housing material	Stainless steel, PTFE coated
Material of sensing face	PBT and PTFE
Connection	Connector
Approval	
Recommended connector	BKS-_ 19/BKS-_ 20

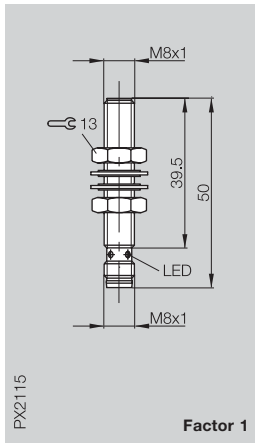
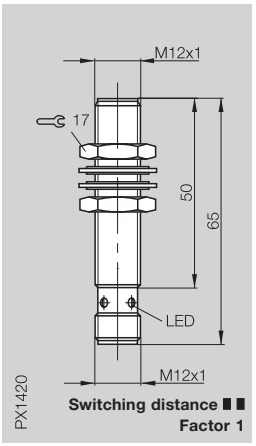
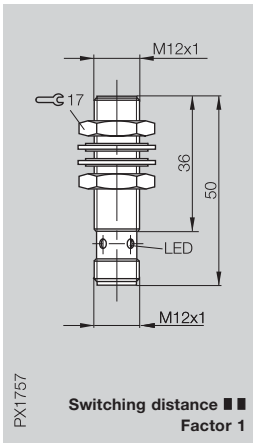
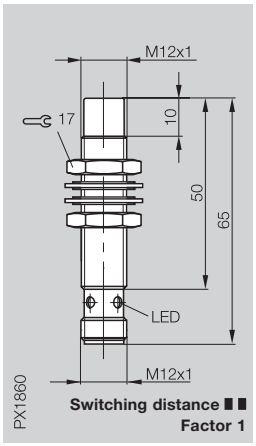
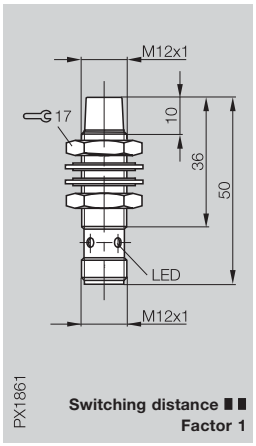
① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

On request:
For applications in direct weld area we recommend the connectors with irradiated cable as an accessory.

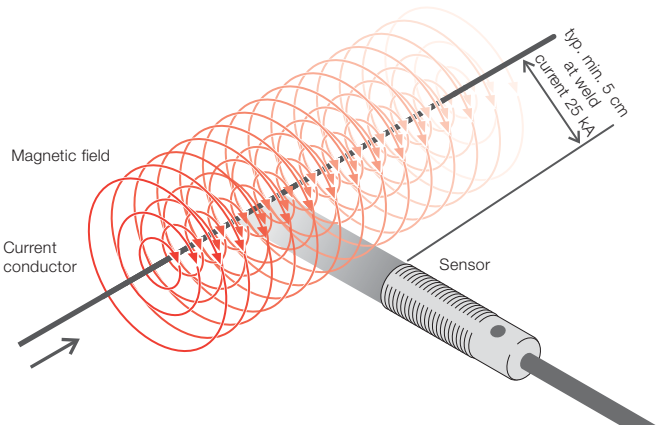


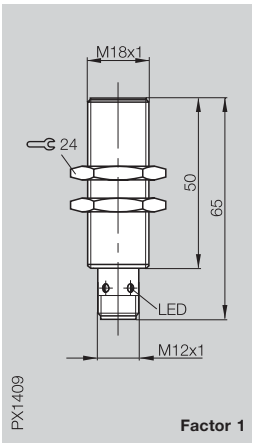
magnetic field ***immune***
+ weld splatter ***resistant***
= weld ***immune***

+ **Factor 1**

	M8×1	**M12×1**	**M12×1**	**M12×1**	**M12×1**
	flush	flush	flush	non-flush	non-flush
	1.5 mm	**3 mm**	**3 mm**	**8 mm**	**8 mm**
	0...1.2 mm	0...2.4 mm	0...2.4 mm	0...6.5 mm	0...6.5 mm
					
	BES M08EG-PSC15A-S49G-W	BES M12ML-PSC30A-S04G-W	BES M12MF1-PSC30A-S04G-W	BES M12ML-PSC80E-S04G-W	BES M12MD1-PSC80E-S04G-W
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC
	150 mA	200 mA	200 mA	200 mA	200 mA
	≤ 15 mA	≤ 15 mA	≤ 15 mA	≤ 15 mA	≤ 15 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	2000 Hz	2000 Hz	2000 Hz	2000 Hz	2000 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 67	IP 67	IP 67	IP 67	IP 67
	⧈	⧈	⧈	⧈	⧈
	Stainless steel, PTFE coated	Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated
	LCP and PTFE	LCP and PTFE	LCP and PTFE	LCP and PTFE	LCP and PTFE
	Connector	Connector	Connector	Connector	Connector
		cULus	cULus	cULus	cULus
	BKS-_ 48/BKS-_ 49	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20

Housing size	**M18×1**
Mounting (see notes starting p. **1.0.**11)	flush
Rated operating distance s_n	**5 mm**
Assured operating distance s_a	0...4.1 mm





Weld immune Factor 1 Sensors

... the all-rounder for harsh industrial applications.

Magnetic field immune

Insensitive to magnetic fields which can be created with electrical currents of up to 25 kA (at a distance from energetic conductors of approx. 5 cm).

Weld splatter resistant

Resistant to metal splatter and combustion remains caused by welding.

Factor 1

Identical switching distance for steel, stainless, aluminum or brass.

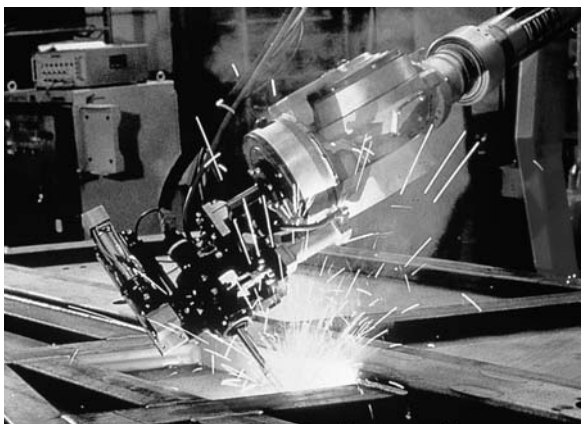
Note about part number

BES ...**-W** Teflon coated active surface and housing to protect against weld splatter.

PNP NO ①	BES M18ML-PSC50A-S04G-W
Supply voltage U_B	10...30 V DC
Voltage drop U_d at I_e	≤ 2.5 V
Rated insulation voltage U_i	250 V AC
Rated operational current I_e	200 mA
No-load supply current I_0 max.	≤ 15 mA
Polarity reversal protected	yes
Short circuit protected	yes
Repeat accuracy R	≤ 5 %
Ambient temperature range T_a	–25...+70 °C
Switching frequency f	2500 Hz
Utilization category	DC 13
Function indicator	yes
Degree of protection per IEC 60529	IP 67
Insulation class	⧈
Housing material	Brass, PTFE coated
Material of sensing face	LCP and PTFE
Connection	Connector
Approval	
Recommended connector	BKS-_ 19/BKS-_ 20

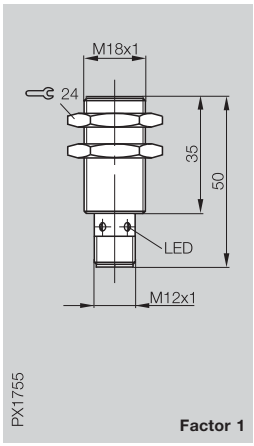
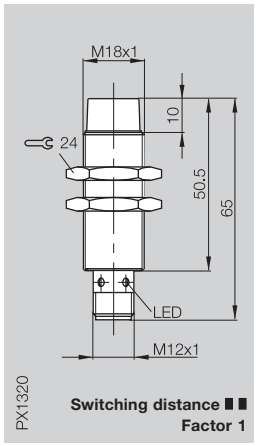
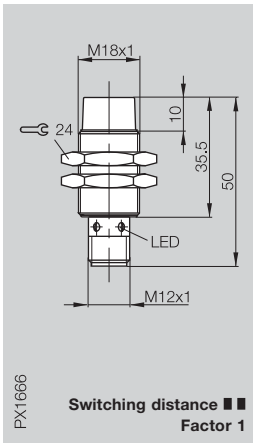
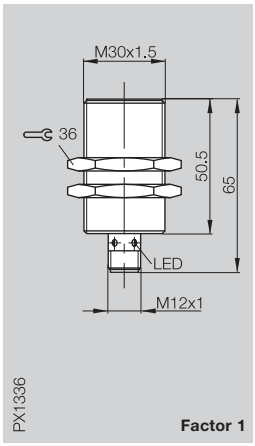
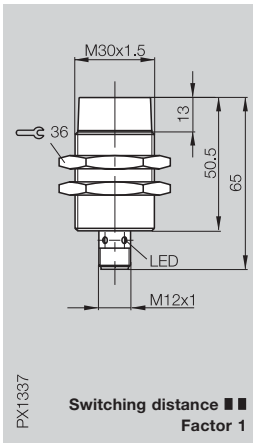
① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

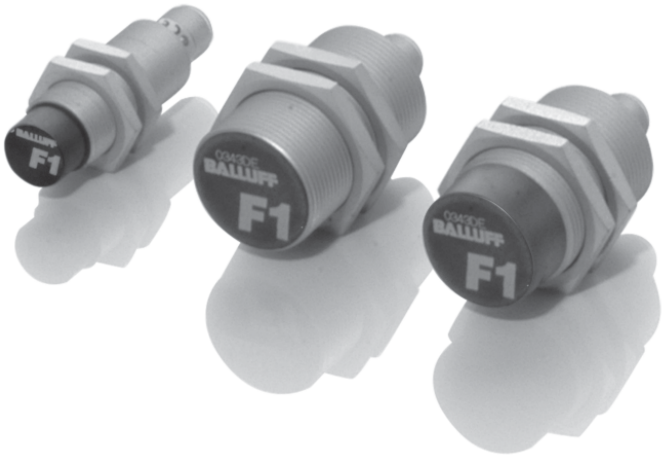
On request:
For applications in direct weld area we recommend the connectors with irradiated cable as an accessory.



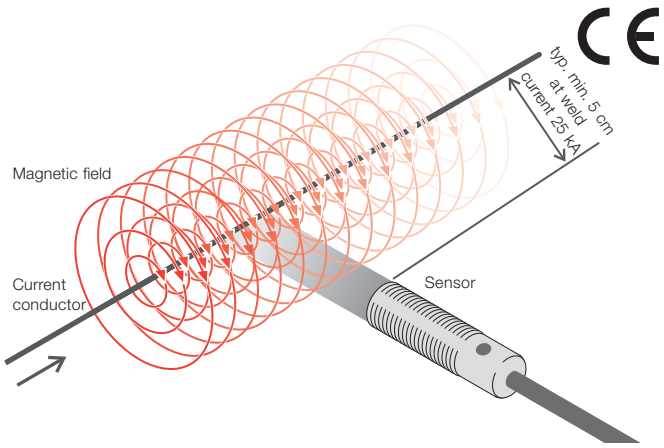
magnetic field ***immune***
+ weld splatter ***resistant***
= weld ***immune***

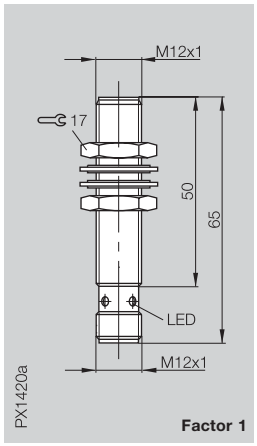
+ **Factor 1**

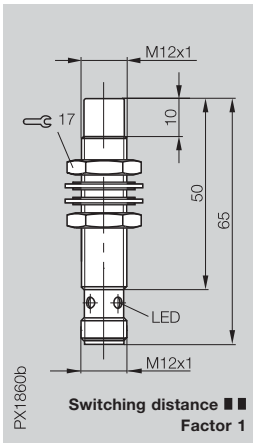
	M18×1	M18×1	M18×1	M30×1.5	M30×1.5
	flush	non-flush	non-flush	flush	non-flush
	5 mm	**12 mm**	**12 mm**	**10 mm**	**20 mm**
	0...4.1 mm	0...9.7 mm	0...9.7 mm	0...8.1 mm	0...16.2 mm
					
	BES M18MF1-PSC50A-S04G-W	BES M18ML-PSC12E-S04G-W	BES M18MD-PSC12E-S04G-W	BES M30ML-PSC10A-S04G-W	BES M30ML-PSC20E-S04G-W
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC
	200 mA	200 mA	200 mA	200 mA	200 mA
	≤ 15 mA	≤ 15 mA	≤ 15 mA	≤ 17 mA	≤ 17 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	2500 Hz	2500 Hz	2500 Hz	600 Hz	1000 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 67	IP 67	IP 67	IP 67	IP 67
	⧈	⧈	⧈	⧈	⧈
	Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated
	LCP and PTFE	LCP and PTFE	LCP and PTFE	LCP and PTFE	LCP and PTFE
	Connector	Connector	Connector	Connector	Connector
	cULus	cULus	cULus	cULus	cULus
	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20

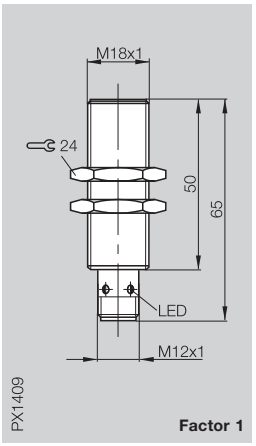


Housing size	**M12×1**	**M12×1**	**M18×1**
Mounting (see notes starting p. **1.0.**11)	flush	non-flush	flush
Rated operating distance s_n	**3 mm**	**8 mm**	**5 mm**
Assured operating distance s_a	0...2.2 mm	0...6.3 mm	0...3.9 mm









Weld immune Factor 1 Sensors

... the all-rounder for harsh industrial applications.

Magnetic field immune

Insensitive to magnetic fields which can be created with electrical currents of up to 25 kA (at a distance from energetic conductors of approx. 5 cm).

Weld splatter resistant

Resistant to metal splatter and combustion remains caused by welding.

Factor 1

Identical switching distance for steel, stainless, aluminum or brass.

Note about part number

BES ...**-W01**
Ceramic coating.
Rugged ceramic coating, thick for the most extreme welding environments.

PNP	NO ① / complementary ③	BES M12ML-PSC30A-S04G-W01	BES M12ML-PSC80E-S04G-W01	BES M18ML-PSC50A-S04G-W01
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e		≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
Rated insulation voltage U_i		250 V AC	250 V AC	250 V AC
Rated operational current I_e		200 mA	200 mA	200 mA
No-load supply current I_0 max.		≤ 15 mA	≤ 15 mA	≤ 15 mA
Polarity reversal protected		yes	yes	yes
Short circuit protected		yes	yes	yes
Repeat accuracy R		≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a		–25...+70 °C	–25...+70 °C	–25...+70 °C
Switching frequency f		2000 Hz	2000 Hz	2500 Hz
Utilization category		DC 13	DC 13	DC 13
Function/Supply voltage indicator		yes/no	yes/no	yes/no
Degree of protection per IEC 60529		IP 67	IP 67	IP 67
Insulation class		⧈	⧈	⧈
Housing material		Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated
Material of sensing face		Ceramic coating	Ceramic coating	Ceramic coating
Connection		Connector	Connector	Connector
Approval		cULus	cULus	cULus
Recommended connector		BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20

① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

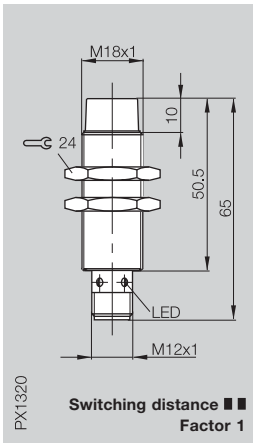
On request:
For applications in direct weld area we recommend the connectors with irradiated cable as an accessory.

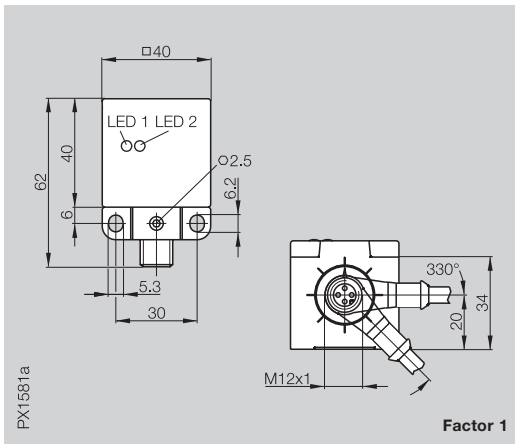
magnetic field ***immune***
+ weld splatter ***resistant***
= weld ***immune***

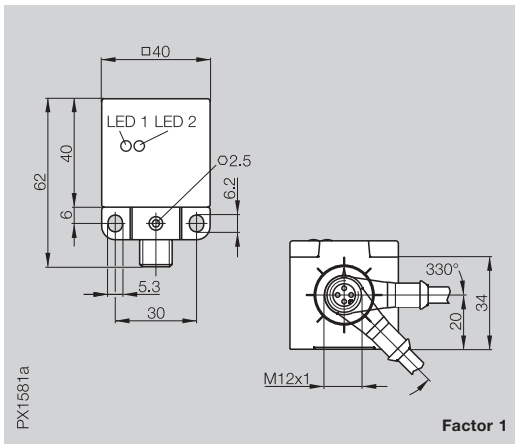
+ **Factor 1**

+ ceramic ***coated***

	M18×1	**40×40×62 mm** Unicompact	**40×40×62 mm** Unicompact
	non-flush	flush	non-flush
	12 mm	**15 mm**	**35 mm**
	0...9.5 mm	0...11.9 mm	0...28.1 mm

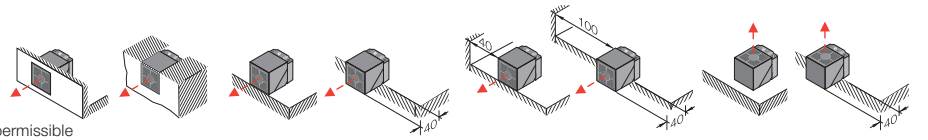






	BES M18ML-PSC12E-S04G-W01	BES Q40KFU-PSC15A-S04G-W01 BES Q40KFU-PAC15A-S04G-W01	BES Q40KFU-PSC35E-S04G-W01 BES Q40KFU-PAC35E-S04G-W01
	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
	250 V AC	250 V AC	250 V AC
	200 mA	200 mA	200 mA
	≤ 15 mA	≤ 20 mA	≤ 20 mA
	yes	yes	yes
	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–10...+70 °C
	2500 Hz	400 Hz	250 Hz
	DC 13	DC 13	DC 13
	yes/no	yes/yes	yes/yes
	IP 67	IP 67	IP 67
	⧈	⧈	⧈
	Brass, PTFE coated	PBT (part coated)	PBT (part coated)
	Ceramic coating	Ceramic coating	Ceramic coating
	Connector	Connector	Connector
	cULus	cULus	cULus
	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20

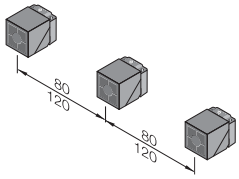
Permissible mounting options Unicompact



Rated operating distance s_n	Attached using	permissible							
15 mm	Original mounting socket (plastic)	yes	yes	yes	yes	yes	yes	yes	yes
	Mounting socket BES Q40-HW-2 (metal)	yes	yes	yes	yes	yes	yes	yes	yes
35 mm	Original mounting socket (plastic)	no	no	no	yes	no	yes	yes	yes
	Mounting socket BES Q40-HW-2 (metal)	no	no	no	yes	no	yes	no	no

Row mounting

flush 80 mm
non-flush 120 mm



Mounting bracket BES Q40-HW-1
Material: Metal

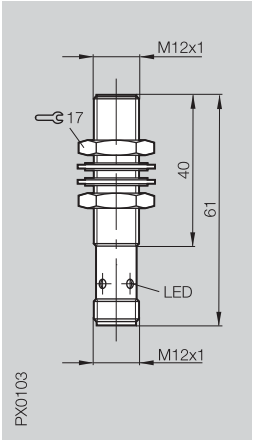
Mounting socket BES Q40-HW-2
Material: Metal.
Can be used in place of original mounting socket.
Please note mounting options!

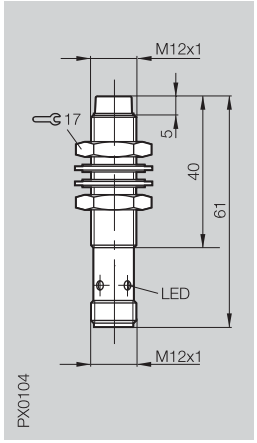
Please order accessories separately!

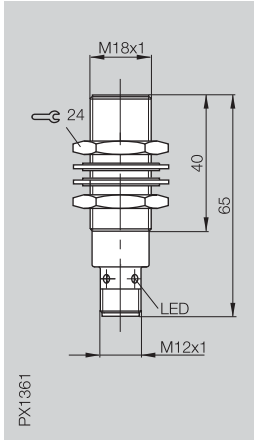
1.5
Factor 1
Weld immune
Magnetic field immune
Diagnostic
Steelface
Pressure rated
Pressure rated Ex
Namur Ex
Temperature rated
PROXINOX®
Ring Sensors
Extended switching distance

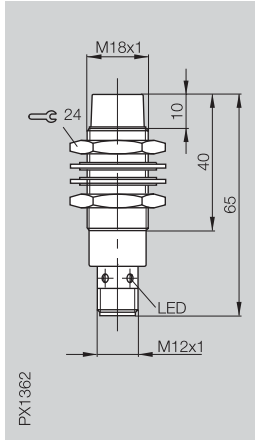
5
Connectors, Holders ...
Page 5.2 ...

Housing size	**M12×1**	**M12×1**	**M18×1**	**M18×1**
Mounting (see notes starting p. **1.0.**11)	flush	non-flush	flush	non-flush
Rated operating distance s_n	**2 mm**	**4 mm**	**5 mm**	**8 mm**
Assured operating distance s_a	0...1.6 mm	0...3.2 mm	0...4.1 mm	0...6.5 mm









PNP NO ①	BES 516-325-S4-W	BES 516-356-S4-W	BES 516-326-S4-W	BES 516-360-S4-W
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e	≤ 2.5 V	≤ 2.5 V	≤ 1.5 V	≤ 2.5 V
Rated insulation voltage U_i	250 V AC	250 V AC	250 V AC	75 V DC
Rated operational current I_e	200 mA	200 mA	200 mA	200 mA
No-load supply current I_0 max.	≤ 20 mA	≤ 20 mA	≤ 10 mA	≤ 20 mA
Polarity reversal protected	yes	yes	yes	yes
Short circuit protected	yes	yes	yes	yes
Repeat accuracy R	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
Switching frequency f	1000 Hz	1000 Hz	500 Hz	200 Hz
Utilization category	DC 13	DC 13	DC 13	DC 13
Function/Supply voltage indicator	yes/no	yes/no	yes/no	yes/no
Degree of protection per IEC 60529	IP 67	IP 67	IP 67	IP 67
Insulation class	⧈	⧈	⧈	
Housing material	Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated
Material of sensing face	LCP	PTFE	PTFE	PTFE
Connection	Connector	Connector	Connector	Connector
No. of wires × cross-section				
Approval	cULus	cULus	cULus	cULus
Recommended connector	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20

① Wiring diagrams see page **1.0.**6

On request:
For applications directly in the welding area we recommend the connectors with irradiated cable as an accessory.

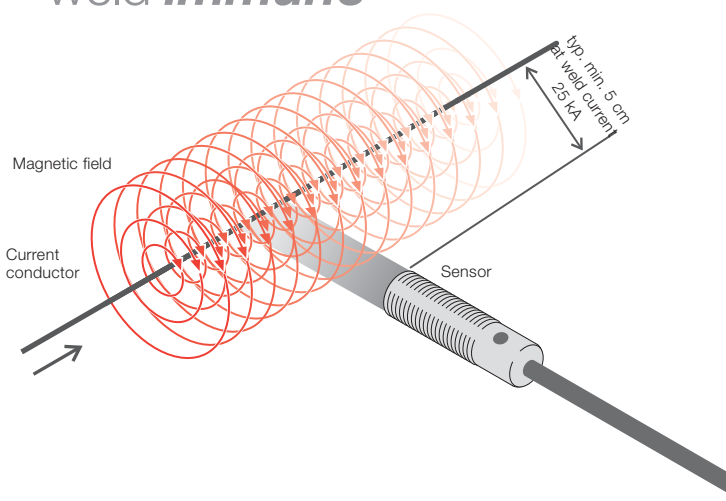
Magnetic field immune

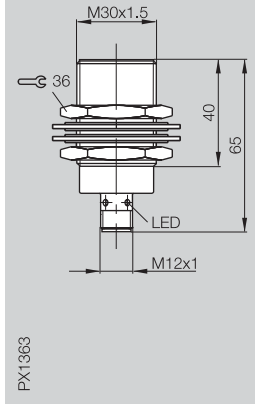
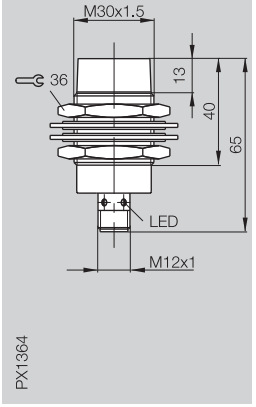
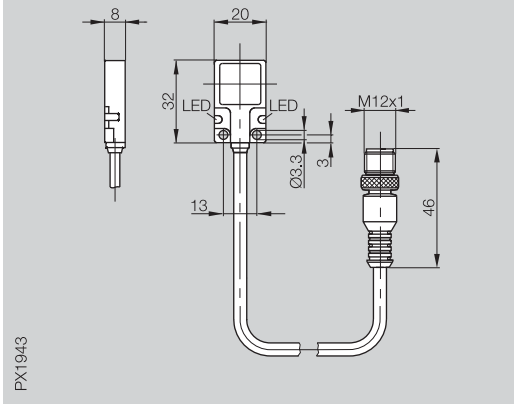
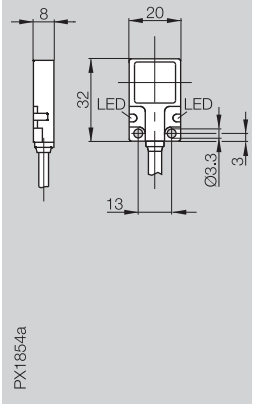
Insensitive to magnetic fields which can be created with electrical currents of up to 25 kA (at a distance from energetic conductors of approx. 5 cm).

Weld splatter resistant

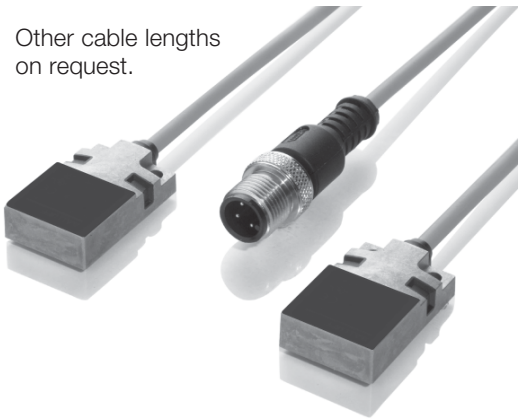
Resistant to metal splatter and combustion remains caused by welding.

magnetic field ***immune***
+ weld splatter ***resistant***
= weld ***immune***



	M30×1.5	**M30×1.5**	**20×32×8 mm** R01	**20×32×8 mm** R01
	flush	non-flush	flush	flush
	10 mm	**15 mm**	**5 mm**	**5 mm**
	0...8.1 mm	0...12.2 mm	0...4.1 mm	0...4.1 mm
				
	BES 516-327-S4-W	BES 516-362-S4-W	BES R01ZC-PSC50B-BX00.2-GS04-W01	BES R01ZC-PSC50B-BX05-W01
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 1.5 V	≤ 1.5 V	≤ 2.5 V	≤ 2.5 V
	250 V AC	75 V DC	75 V DC	75 V DC
	200 mA	200 mA	200 mA	200 mA
	≤ 8 mA	≤ 8 mA	≤ 15 mA	≤ 15 mA
	yes	yes	yes	yes
	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	100 Hz	100 Hz	100 Hz	100 Hz
	DC 13	DC 13	DC 13	DC 13
	yes/no	yes/no	yes/yes	yes/yes
	IP 67	IP 67	IP 67	IP 67
	⧈			
	Brass, PTFE coated	Brass, PTFE coated	GD-Zn	GD-Zn
	PTFE	PTFE	Ceramic coating	Ceramic coating
	Connector	Connector	0.2 m weld splatter resistant cable with connector, PUR irradiated	5 m weld splatter resistant cable, PUR irradiated
				3×0.25 mm²
	cULus	cULus	cULus	cULus
	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19	

Other cable lengths on request.



Part numbering

BES ...**-W** Teflon-coated active surface and housing to protect against weld splatter.

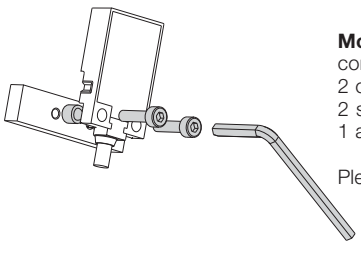
BES ...**-W01**
Ceramic coating.
Rugged ceramic coating, thick for the most extreme welding environments.

Main applications

Position monitoring on welding equipment and robots.

Special features of BES-R01ZC...W01

- Low profile in detection direction
- LED for function and power indication
- Cable weld splatter resistant and irradiated
- Sensing face with ceramic coating



Mounting set BES R01-FK-1
consisting of:
2 cheese-head screws DIN 912 M3×12
2 spacers Ø5×Ø3.3×3.7
1 angled screwdriver DIN 911, 2.5 mm

Please order separately!

5
Connectors, Holders ...
Page 5.2 ...

Desina sensors with diagnostic output

These inductive sensors have been specially designed to the Desina specification for demanding use on machine tools.

The additional diagnostic output monitors the switch and cable function. As long as the sensor is functional, a "High" signal is emitted.

Balluff sensors with Desina specification meet the requirements of ISO 23570-Part 1:
"Industrial automation systems and integration – Distributed installation in industrial applications – Part 1:
Sensors and actuators".

Note!

To ensure reliable function monitoring, connectors without LED must be used (see recommended connectors).

Additional features:

Factor 1 Sensors
detect objects such as steel, aluminum or brass at the same switching distance (no reduction factor).

This property offers advantages in applications where the material of the target object can vary.

In addition, all Factor 1 sensors are **magnetic field immune.**
Their function is not impaired by strong electromagnetic fields (such as from induction hardening or welding equipment).
Factor 1 sensors remain unaffected in their switching behavior by weld currents up to 25 kA.

Part numbering

BES ...**-M01**
Diagnostic function monitors sensor and cable function. Emits a high signal on the monitor output as long as the sensor is functional.

BES ...**-WM01**
Diagnostic function and Teflon-coating
(weld splatter resistant)

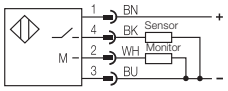
DESINA

www.desina.de

Housing size	
Mounting (see notes starting p. **1.0.**11)	
Rated operating distance s_n	
Assured operating distance s_a	
PNP	**NO**
Supply voltage U_B	
Voltage drop U_d at I_e	
Rated insulation voltage U_i	
Rated operational current I_e	
Monitor output load capacity	
No-load supply current I_0 max.	
Polarity reversal protected	
Short circuit protected	
Repeat accuracy R	
Ambient temperature range T_a	
Switching frequency f	
Utilization category	
Function/Supply voltage indicator	
Degree of protection per IEC 60529	
Insulation class	
Housing material	
Material of sensing face	
Connection	
Approval	
Recommended connector	
possible mounting options	

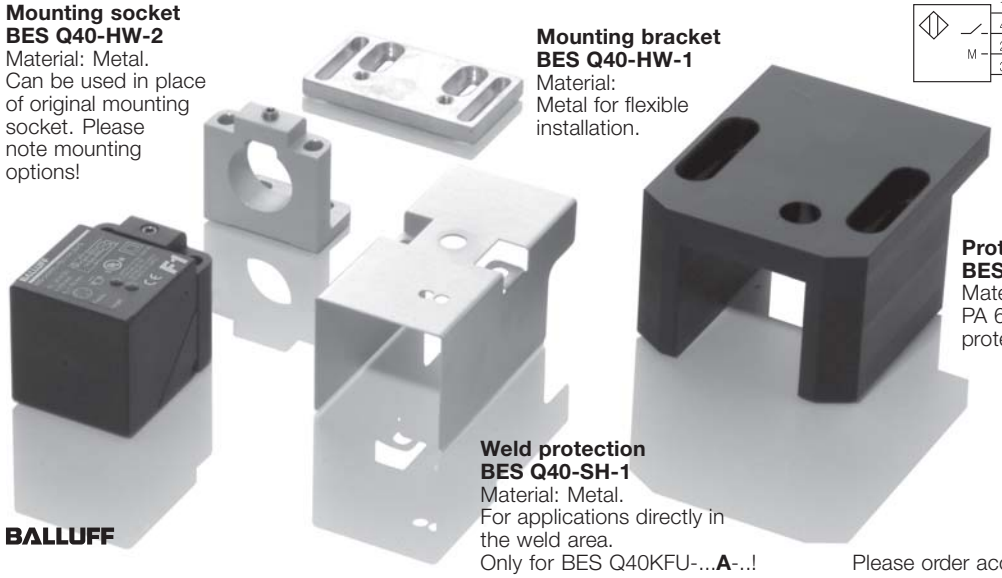
Switching distance ■■ see page **1.0.**10

Wiring diagram



Mounting socket
BES Q40-HW-2
Material: Metal.
Can be used in place of original mounting socket. Please note mounting options!

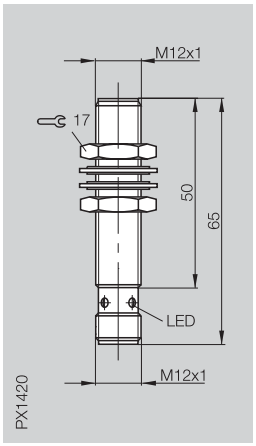
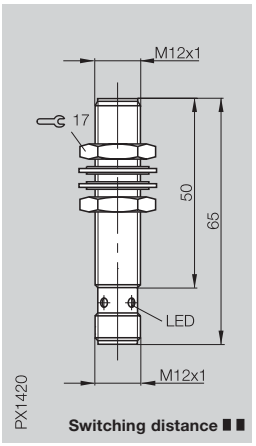
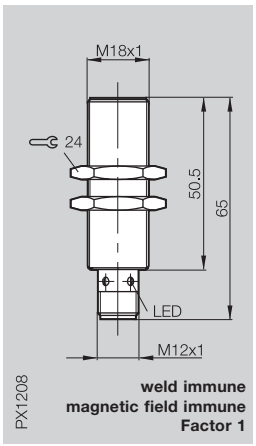
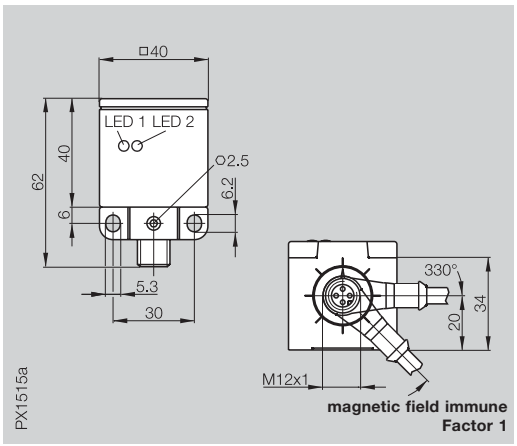
Mounting bracket
BES Q40-HW-1
Material:
Metal for flexible installation.



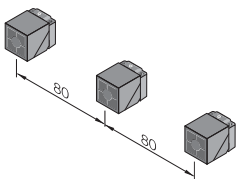
Protective cover
BES Q40-SH-2
Material:
PA 6 as step protection.

Weld protection
BES Q40-SH-1
Material: Metal.
For applications directly in the weld area.
Only for BES Q40KFU-...**A**-..!

Please order accessories separately!

	M12×1	**M12×1**	**M18×1**	**40×40×62 mm** Unicompact
	flush	flush	flush	flush
	2 mm	**4 mm**	**5 mm**	**15 mm**
	0...1.6 mm	0...3.2 mm	0...4.1 mm	0...12.2 mm
				
	BES M12MI-PSC20B-S04G-M01	BES M12MI-PSC40B-S04G-M01	BES M18MI-PSC50A-S04G-WM01	BES Q40KFU-PSC15A-S04G-M01
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 2.5 V	≤ 2.5 V	≤ 3.5 V	≤ 3.5 V
	250 V AC	250 V AC	250 V AC	250 V AC
	200 mA	200 mA	200 mA	200 mA
	max. 50 mA	max. 50 mA	max. 50 mA	max. 50 mA
	≤ 12 mA	≤ 12 mA	≤ 25 mA	≤ 28 mA
	yes	yes	yes	yes
	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	2000 Hz	1000 Hz	15 Hz	13 Hz
	DC 13	DC 13	DC 13	DC 13
	yes/no	yes/no	yes/no	yes/yes
	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67	IP 67
	⧈	⧈	⧈	⧈
	CuZn coated	CuZn coated	Brass, PTFE coated	PBT
	LCP	LCP	LCP and PTFE	PBT
	Connector	Connector	Connector	Connector
	cULus	cULus	cULus	cULus
	BKS-S 19-3-PY/BKS-S 20-3-PY	BKS-S 19-3-PY/BKS-S 20-3-PY	BKS-S 19-3-PY/S 20-3-PY	BKS-S 19-3-PY/S 20-3-PY
				Fig. 1 to 4

Row mounting
flush 80 mm



Mounting options

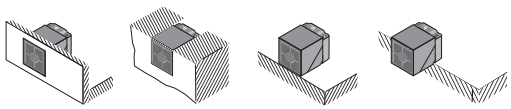
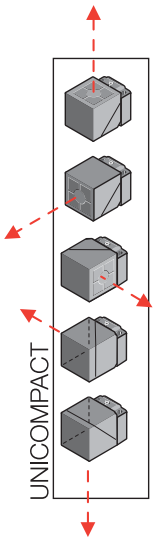


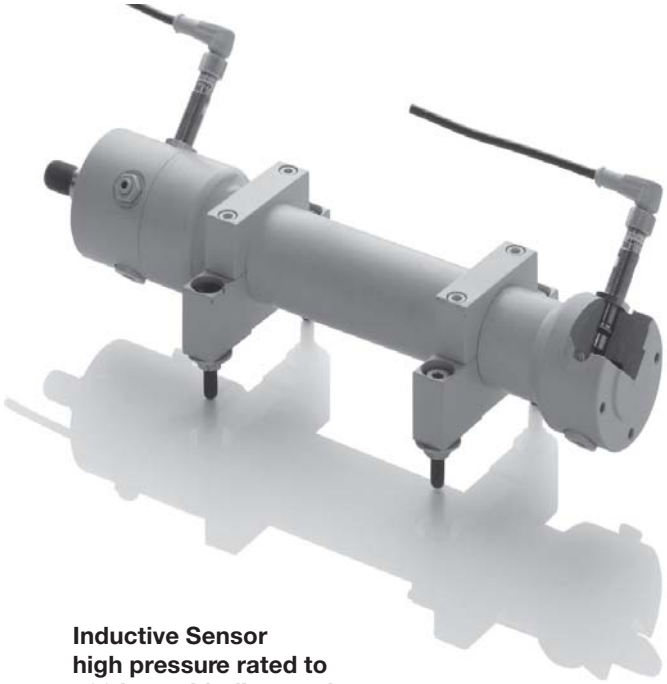
Fig. 1 Fig. 2 Fig. 3 Fig. 4



1.5
Factor 1
Weld immune
Magnetic field immune
Diagnostic
Steelface
Pressure rated
Pressure rated Ex
Namur Ex
Temperature rated
PROXINOX®
Ring Sensors
Extended switching distance

5
Connectors, Holders ... Page 5.2 ...

+ high pressure rated



Inductive Sensor high pressure rated to 500 bar, with diagnostics and setup aid.

This high pressure rated inductive sensor is used for position sensing of the piston position in hydraulic cylinders.

Here the active surface is subjected to high pressure inside the cylinder.

Balluff has developed a special manufacturing technique for making the active surface extremely resistant. The coils are encased in a Duromer. The additional diagnostic output monitors the sensor and cable function. As long as the sensor is functional a “High” signal is emitted.

The optical setup aid indicates when the optimum distance of the sensing face from the piston has been reached. This simplifies installation and helps to prevent damage to the sensor.

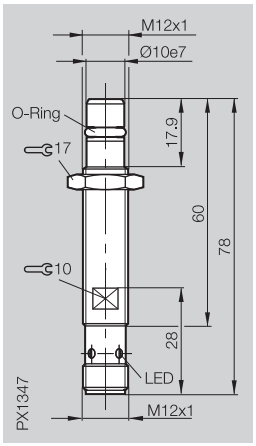
Note!

For reliable function monitoring, connectors without LED must be used (see recommended connectors).

Part numbering

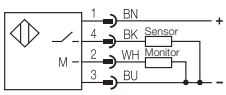
BES ...**-HM01**
Diagnostic function and high pressure rated active surface.

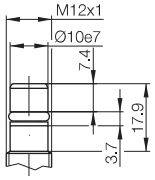
Housing size	**M12×1**
Mounting (see notes starting p. **1.0.**11)	flush
Rated operating distance s_n	**1.5 mm**
Assured operating distance s_a	0...1.2 mm



PNP NO	BES M12EL-PSC15B-S04G-HM01
Supply voltage U_B	10...30 V DC
Voltage drop U_d at I_e	≤ 3.7 V
Rated insulation voltage U_i	75 V DC
Rated operational current I_e	200 mA
Monitor output load capacity	max. 50 mA
No-load supply current I_0 max.	≤ 9 mA
Polarity reversal protected	yes
Short circuit protected	yes
Repeat accuracy R	≤ 5 %
Ambient temperature range T_a	–25...+70 °C
Switching frequency f	300 Hz
Utilization category	DC 13
Function indicator	yes
Degree of protection per IEC 60529	IP 68 per BWN Pr. 20
Housing material	Stainless steel
Material of sensing face	EP
Connection	Connector
Approval	cULus
Recommended connector	BKS-S 19-3-PY/BKS-S 20-3-PY
O-Ring/spare part number	5.3×2.4/631753
Support ring/spare part number	10×5.9×1/705918
High pressure rated to	**500 bar**

Wiring diagram





Function principle

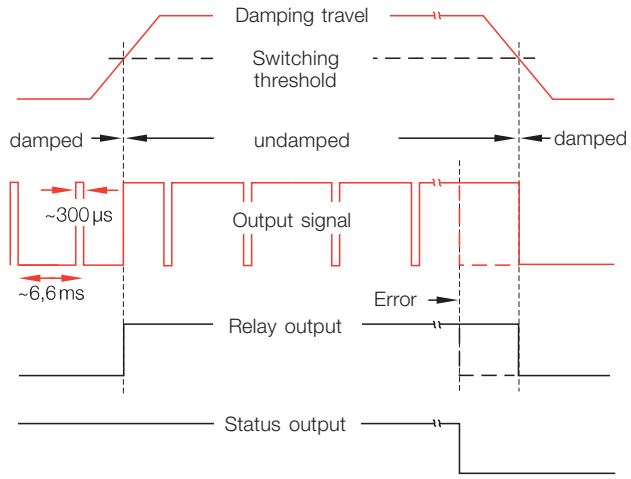
Proximity switches with dynamic diagnostics allow monitoring of the sensor functions including the cable.

To accomplish this, the oscillator state is changed using a pulse generator while the sensor is operating. As soon as the sensor head is damaged or the oscillator becomes electrically defective, the pulse generator is no longer able to change the oscillator state and the test pulses will be missing from the output.

The pulse frequency is f ~ 160 Hz and the pulse duration t ~ 300 µs. The pulse-pause ratio of t ~ 5 % selected is small enough that the test pulses can be filtered out by the input filter of a controller, or for example a relay can be directly driven.
The information “proximity switch damped or undamped” can therefore be processed in the usual fashion.

Function monitoring

The test pulses and thereby the function of the proximity switch are monitored by additional electronics which signal error-free function by means of a High level on the “Status/Output” message output.



Pulse diagram of a proximity switch with function diagnostics (NC).

For this Balluff offers a function diagnostics unit which can be easily installed in a controller:

Function diagnostics unit
see page **1.5.**19
– BES 113-FD-1
(for 1 Sensor)

The unit is compatible with:

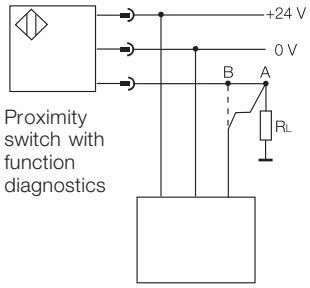
Inductive Sensors
see page **1.5.**18
– BES 113-356-SA6-S4
Normally open
– BES 113-356-SA31-S4
Normally open
– BES 113-3019-SA1-S4
Normally closed

Capacitive sensor
see page **4.**15
– BCS 20MG10-XPA1Y-8B-03
complementary.

Single faults are detected when monitoring for the entire system.

Installation notes

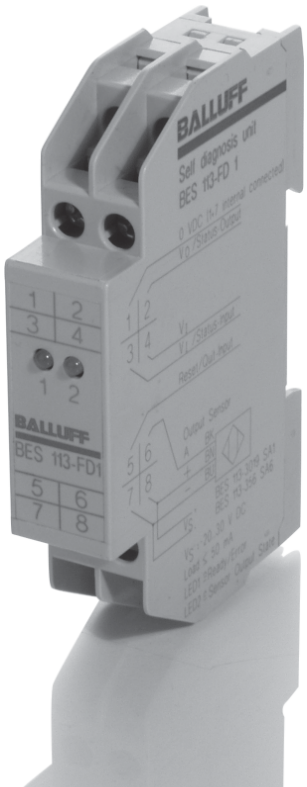
The signal line for the function diagnostics unit should be connected as closely as possible to the load R_L (Point A). When Point B is connected the cable segment between B and load R_L is not monitored.



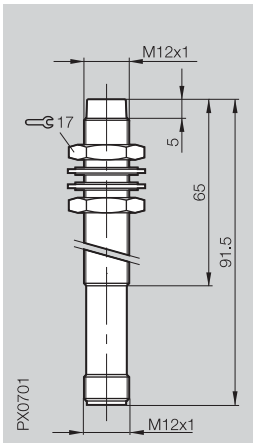
Note!

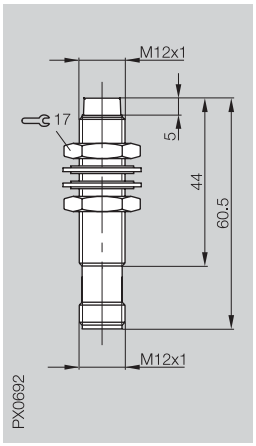
The system described here is not suitable for systems with personal protection.

For additional information please request a device description.



Housing size	**M12×1**	**M12×1**
Mounting (see notes starting p. **1.0.**11)	non-flush	non-flush
Rated operating distance s_n	**3.7 mm**	**4 mm**
Assured operating distance s_a	0...3 mm	0...3 mm





Note!

For function diagnostic switches with connector option, do not use connectors with integrated LED function indicator, since the LED is parallel to the load R_L and cable break monitoring is then no longer assured.

The switch function can however be monitored on the LEDs in the processor.

PNP				
	NO	①	BES 113-356-SA6-S4	BES 113-356-SA31-S4
	NC	②	BES 113-3019-SA1-S4	
Supply voltage U_B			20...30 V DC	20...30 V DC
Voltage drop U_d at I_e			typ. 2.5 V	typ. 3.5 V
Rated insulation voltage U_i			75 V DC	75 V DC
Rated operational current I_e			130 mA	130 mA
Minimum operating current I_m			1 mA	5 mA
No-load supply current I_0 max.			≤ 25 mA	≤ 10 mA
Output resistance R_a			Open collector	Open collector
Polarity reversal protected			yes	yes
Short circuit protected			yes	yes
Repeat accuracy R			≤ 5 %	≤ 5 %
Effective operating distance s_r			3.7 mm +20 %/–10 %	4 mm +20 %/–10 %
Ambient temperature range T_a			–25...+70 °C	0...+70 °C
Switching frequency f			300 Hz	300 Hz
Utilization category			DC 12	DC 13
Function indicator			no	no
Degree of protection per IEC 60529			IP 67	IP 67
Housing material			CuZn coated	CuZn coated
Material of sensing face			PA 12	LCP
Connection			Connector (cable length ≤ 50 m to controller)	Connector (cable length ≤ 50 m to controller)
Recommended connector			BKS-_ 19/20-1 NO BKS-_ 19/20-2 NC	BKS-_ 19/20-1 NO

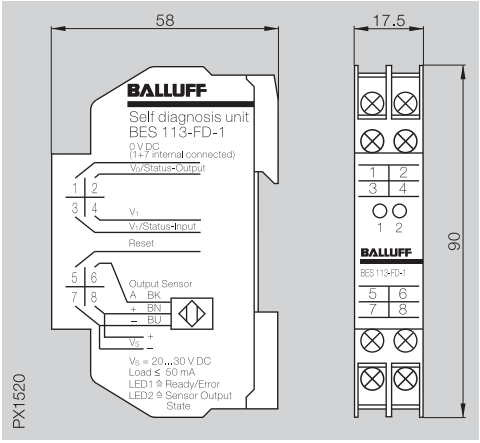
① Wiring diagrams see page **1.0.**6

Description	**Function diagnostics unit** with electronic output
Use	For function diagnostic sensors BES 113-... (see page **1.5.**18) or BCS 20... page **4.**15

The function diagnostics unit BES 113-FD-1 monitors a proximity switch and its cable using dynamic function diagnostics. A logic circuit polls the sensor signals for the presence of test pulses and also monitors for proper function of the processor. For the machine controller it emits a High level signal on the “Status/Output” line when there is no fault and a Low signal when a fault is present. LED’s indicate the switching state of the sensor.

Recurring faults are stored by the device. They must be reset using a reset function (Low signal on 5).

If the BES 113-FD-1 is used as a single unit, terminals V_I (3 and 4) must be jumpered together.



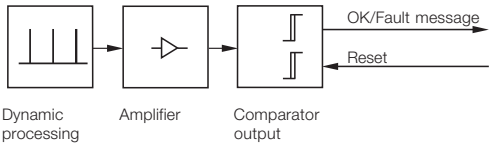
Ordering code		BES 113-FD-1
Supply voltage U_B		20...30 V DC
Ripple		≤ 15 %
No-load current		approx. 20 mA
Output voltage U_0 (referenced to 0 V)	low	0...(0.1×U_B) for defects in sensor or processor (fault)
	high	(0.5×U_B)...U_B for error-free function
Output current max.		50 mA
Ambient temperature range		0...+60 °C
LED 1 green		“Ready/Error” – in error-free state the LED is bright on. For defects (fault) the LED is very dim.
LED 2 yellow		“Sensor Output State” indicates the switching state of the sensor.
Housing attachment		Rail mount per DIN EN 50022-35
max. conductor cross-section		2×2.5 mm²
Degree of protection per IEC 60529		Housing IP 40, terminals IP 20

Cascading

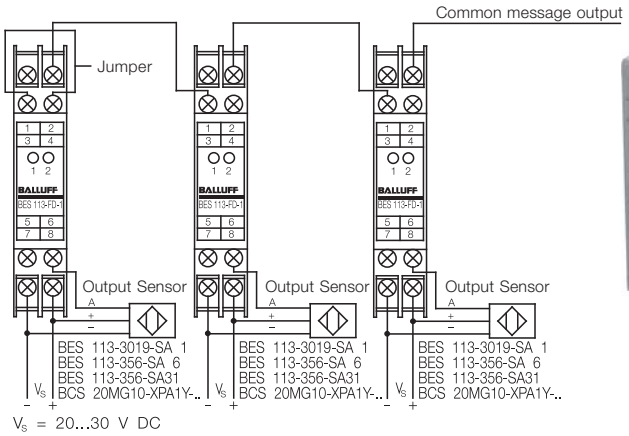
When cascading several BES 113-FD-1 the output (2) must be connected to the input (3) of the following device. The jumper between V_I is not needed except for the first device.

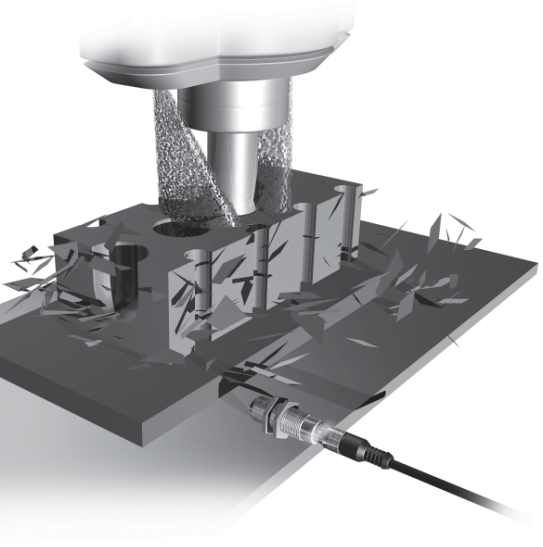
When there is a malfunction, the message appears on the last device. The defective sensor is indicated by the first weakly illuminated LED in the cascade.

Small and space-saving, the BES 113-FD-1 can be attached to a DIN rail per DIN EN 50022-35.

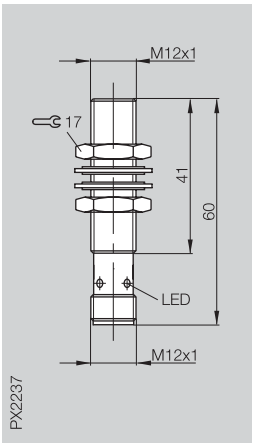


Cascading





Housing size	**M12×1**
Installation type (see installation dimensions below)	quasi flush
Rated operating distance s_n	**6 mm**
Assured operating distance s_a	0...4.9 mm



PNP	NO	①	BES M12EG1-PSC60Z-S04G-S11
NPN	NO	④	BES M12EG1-NSC60Z-S04G-S11

Supply voltage U_B	10...30 V DC
Voltage drop U_d at I_e	≤ 2 V
Rated insulation voltage U_i	75 V DC
Rated operational current I_e	200 mA
No-load supply current I_0 max.	≤ 16 mA
Polarity reversal protected	yes
Short circuit protected	yes
Repeat accuracy R	≤ 5 %
Ambient temperature range T_a	–25...+70 °C
Switching frequency f	400 Hz
Utilization category	DC 13
Function indicator (flashes at between approx.. 70 and 100 % of effective operating distance s_r)	yes
Degree of protection per IEC 60529	IP 67
Housing material	Stainless steel
Material of sensing face	Stainless steel
Connection	Connector
Recommended connector	BKS-_ 19/BKS-_ 20/ BKS-S 20E
Pressure rated to	**80 bar**

① Wiring diagrams see page **1.0.**6

Inductive Steelface sensors with extended switching distance

are used in especially harsh environments and applications which are too extreme for standard sensors.

Here is where they show their strengths:

- Resistance to abrasive media and aggressive cleaners and solvents
- Rugged sensing face
- Long switching distance for more function reserve – applies especially to non-flush mountable sensors

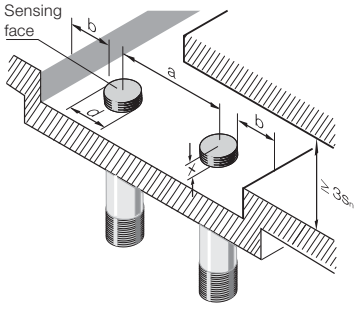
Installation dimensions for quasi flush sensors (please note)

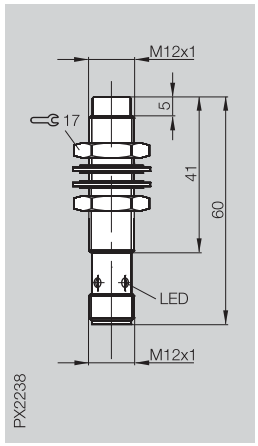
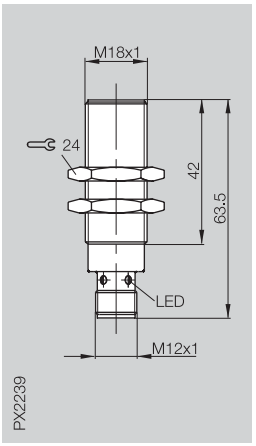
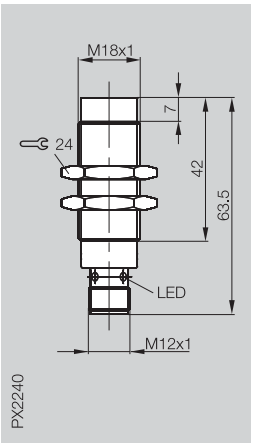
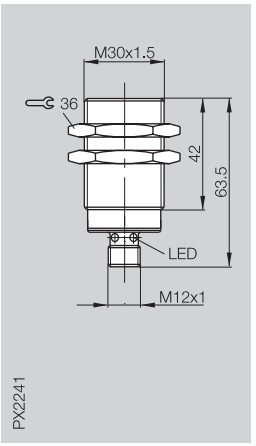
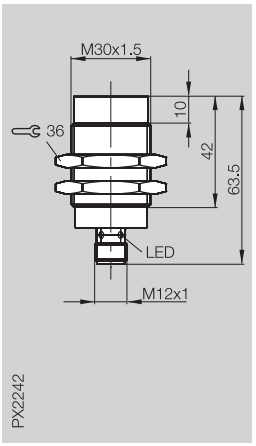
Housing size	Dimension a	Dimension b	Dimension x	For installation in
M12	≥ 50 mm	≥ 6 mm	≥ 7 mm	Steel Fe 360
			≥ 12 mm	Aluminum
			≥ 12 mm	Brass
			≥ 10 mm	Stainless steel
M18	≥ 60 mm	≥ 16 mm	≥ 14 mm	Steel Fe 360
			≥ 12 mm	Aluminum
			≥ 14 mm	Brass
			≥ 16 mm	Stainless steel
M30	≥ 90 mm	≥ 30 mm	≥ 28 mm	Steel Fe 360
			≥ 28 mm	Aluminum
			≥ 28 mm	Brass
			≥ 35 mm	Stainless steel

Failure to observe the mounting dimensions or flush mounting may result in significant reductions in switching distance!

Reduction factor (referenced to detection object)

Housing size	Factor	When mounted in
M12	1	Steel Fe 360
	0.8...1	Aluminum
	0.7...0.85	Copper
	0.85...1.3	Brass
	0.5/0.9	Stainless 1 mm/≥ 2 mm thick
M18	1	Steel Fe 360
	0.8...1	Aluminum
	0.7...0.85	Copper
	0.85...1.3	Brass
	0.5/0.8	Stainless 1 mm/≥ 2 mm thick
M30	1	Steel Fe 360
	0.7...1	Aluminum
	0.7...0.9	Copper
	0.9...1.2	Brass
	0.5/1	Stainless 1 mm/≥ 2 mm thick



	M12×1	M18×1	M18×1	M30×1.5	M30×1.5
	non-flush	quasi flush	non-flush	quasi flush	non-flush
	10 mm	**10 mm**	**20 mm**	**20 mm**	**40 mm**
	0...8.1 mm	0...8.1 mm	0...16.2 mm	0...16.2 mm	0...32.4 mm
					
	BES M12EF1-PSC10F-S04G-S	BES M18EG1-PSC10Z-S04G-S11	BES M18EF1-PSC20F-S04G-S	BES M30EG1-PSC20Z-S04G-S11	BES M30EE1-PSC40F-S04G-S
	BES M12EF1-NSC10F-S04G-S	BES M18EG1-NSC10Z-S04G-S11	BES M18EF1-NSC20F-S04G-S	BES M30EG1-NSC20Z-S04G-S11	BES M30EE1-NSC40F-S04G-S
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 2 V	≤ 2 V	≤ 2 V	≤ 2 V	≤ 2 V
	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
	200 mA	200 mA	200 mA	200 mA	200 mA
	≤ 12 mA	≤ 16 mA	≤ 12 mA	≤ 16 mA	≤ 12 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	350 Hz	200 Hz	150 Hz	200 Hz	100 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 67	IP 67	IP 67	IP 67	IP 67
	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
	Connector	Connector	Connector	Connector	Connector
	BKS-_ 19/BKS-_ 20/ BKS-S 20E	BKS-_ 19/BKS-_ 20/ BKS-S 20E	BKS-_ 19/BKS-_ 20/ BKS-S 20E	BKS-_ 19/BKS-_ 20/ BKS-S 20E	BKS-_ 19/BKS-_ 20/ BKS-S 20E
	80 bar	**60 bar**	**60 bar**	**40 bar**	**40 bar**

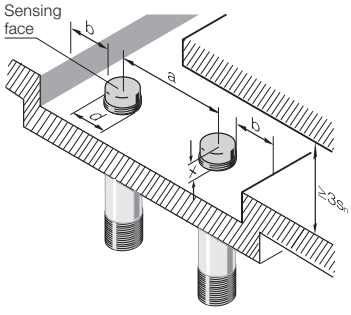
Installation dimensions for non-flush sensors (please note)

Housing size	Dimension a	Dimension b	Dimension x	When mounted in
M12	≥ 105 mm	≥ 30 mm	≥ 25 mm	Steel Fe 360
			≥ 15 mm	Aluminum
			≥ 17 mm	Brass
			≥ 25 mm	Stainless
M18	≥ 200 mm	≥ 50 mm	≥ 45 mm	Steel Fe 360
			≥ 25 mm	Aluminum
			≥ 25 mm	Brass
			≥ 45 mm	Stainless
M30	≥ 370 mm	≥ 90 mm	≥ 70 mm	Steel Fe 360
			≥ 40 mm	Aluminum
			≥ 40 mm	Brass
			≥ 70 mm	stainless steel

Not observing the installation dimensions may result in a significant reduction in switching distance!

Reduction factor (referenced to detection object)

Housing size	Factor	When mounted in
M12	1	Steel Fe 360
	1	Aluminum
	0.8	Copper
	1	Brass
	1	Stainless ≥ 5 mm thick
M18	1	Steel Fe 360
	0.7	Aluminum
	0.7	Copper
	0.7	Brass
	1	Stainless ≥ 5 mm thick
M30	1	Steel Fe 360
	0.7	Aluminum
	0.7	Copper
	1	Brass
	1	Stainless ≥ 5 mm thick



5
Connectors, Holders ...
Page 5.2 ...

pressure rated
high pressure rated

Inductive Sensors – pressure rated up to 100 bar and high pressure rated up to 500 bar.

In the wide range of hydraulic applications, high pressure proximity switches are exposed to many hostile environments.

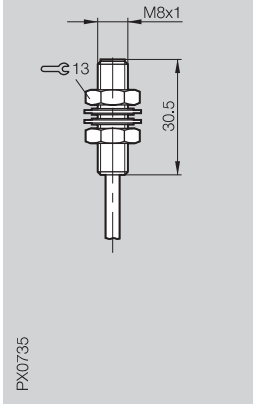
Numerous applications in hydraulic cylinders and valves have resulted in this model-rich sensor line. What are your requirements?

Medium-resistant housing materials and a special sealing process result in pressure ratings from 3 to 500 bar depending on the model.

The various housing diameters and thread sizes are based on application-specific requirements.

The output amplifier is built in so that no accessory devices are necessary and the switch may be connected directly to the coil of a relay. Pressure-tight proximity switches are available with molded-in cable or with plug-in connector.

Housing size	**M8×1**
Mounting (see notes starting p. **1.0.**11)	flush
Rated operating distance s_n	**1.2 mm**
Assured operating distance s_a	0...1 mm



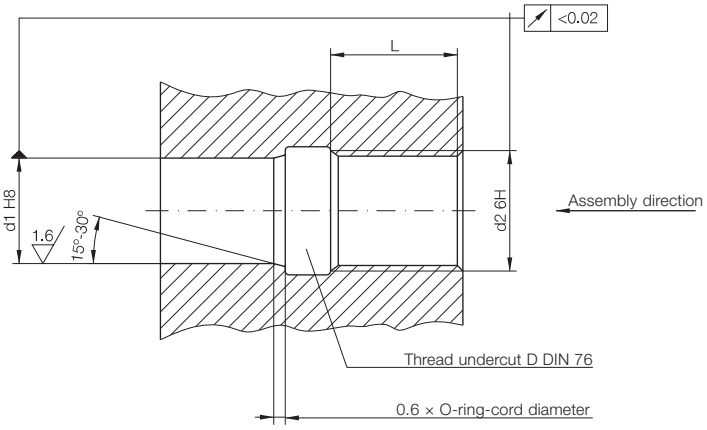
PNP	NO	①	BES 516-324-SA17-05
	NC	②	

Supply voltage U_B	10...30 V DC
Voltage drop U_d at I_e	≤ 1.5 V
Rated insulation voltage U_i	75 V DC
Rated operational current I_e	200 mA
No-load supply current I_0 max.	≤ 20 mA
Polarity reversal protected	yes
Short circuit protected	no
Repeat accuracy R	≤ 5 %
Ambient temperature range T_a	–25...+70 °C
Switching frequency f	1500 Hz
Utilization category	DC 13
Function indicator	no
Degree of protection per IEC 60529	IP 68 per BWN Pr. 20
Housing material	Stainless steel
Material of sensing face	PA 12
Connection	5 m PVC cable
No. of wires × cross-section	3×0.14 mm²
Approval	
Recommended connector	
O-Ring/spare part number	
Support ring/spare part number	
Pressure rated to	**10 bar**

① Wiring diagrams see page **1.0.**6

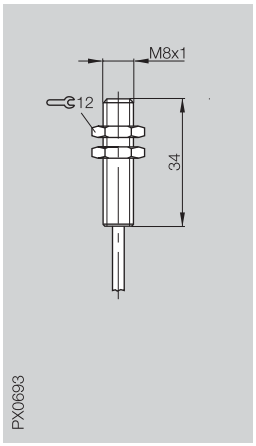
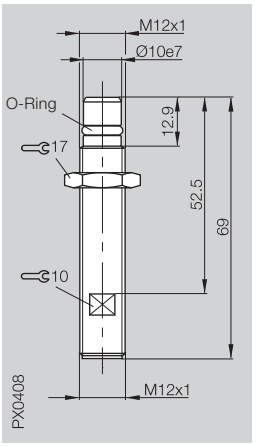
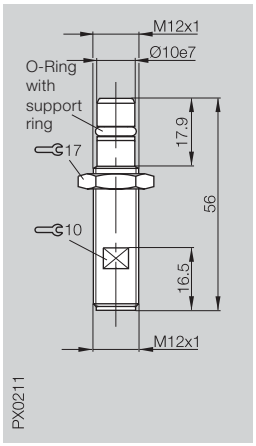
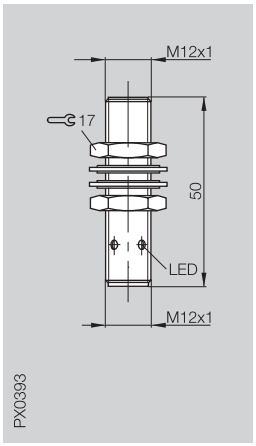
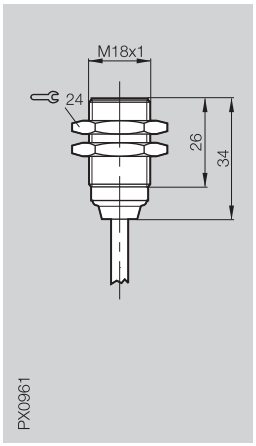
Other cable lengths on request.

Installation note for pressure/high-pressure rated sensors with O-ring

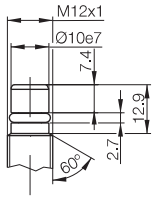


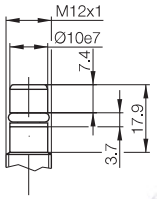
Example using BES 516-300-S270-S4-D:

d1: Ø of bore for switch head
Ø 10^{H8} = Ø $10^{+0.022}$
d2: nominal thread diameter M12×1 6H
L: recommended insertion depth L ≥ 0.8×d_2
0.8×12 = 9.6

	M8×1	M12×1	M12×1	M12×1	M18×1
	flush	flush	flush	flush	flush
	1.5 mm	**1.5 mm**	**1.5 mm**	**2 mm**	**5 mm**
	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.6 mm	0...4.1 mm
					
	BES 516-300-S289-B0-D-PU-05 BES 516-300-S292-B0-D-PU-05	BES 516-300-S270-S4-D	BES 516-300-S291-S4-D	BES 516-370-SA9-E5-C-S4	BES 516-326-SA23-03
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 2.5 V	≤ 2 V	≤ 2 V	≤ 2 V	≤ 3.5 V
	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
	200 mA	200 mA	200 mA	200 mA	130 mA
	≤ 25 mA	≤ 8 mA	≤ 8 mA	≤ 10 mA	≤ 20 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+70 °C	–25...+80 °C	–25...+80 °C	–25...+70 °C	–25...+70 °C
	1000 Hz	2000 Hz	2000 Hz	5000 Hz	500 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	no	no	no	yes	no
	IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
	Stainless steel	Stainless steel	Stainless steel	CuZn coated	CuZn coated
	Ceramic	EP	EP	PEEK	PA 12
	5 m Cable PUR	Connector	Connector	Connector	3 m cable, PVC
	3×0.14 mm²				3×0.34 mm²
	cULus				
		BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	
		5.3×2.4/631753	5.3×2.4/631753		
			10×5.9×1/705918		
	100 bar	**100 bar**	**50 bar**	**10 bar**	**10 bar**

For accessories and installation note for seal nut BES 08-DM-1 see page **5.**73





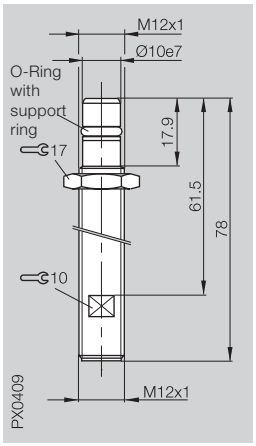
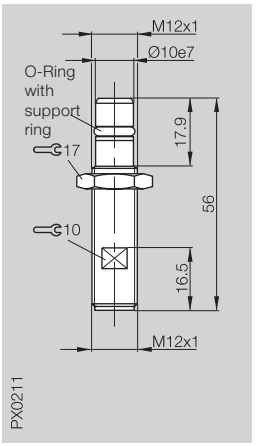
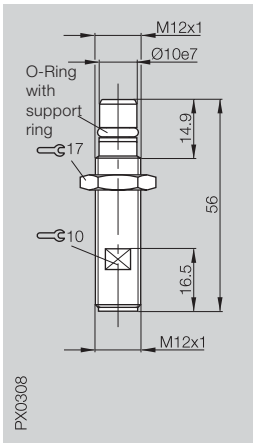
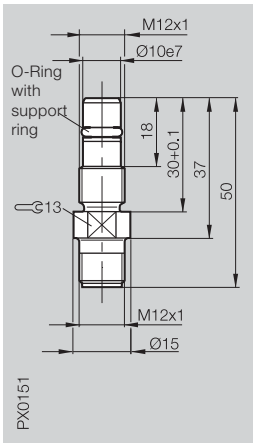
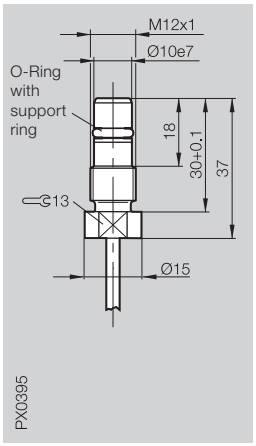
Housing size	
Mounting (see notes starting p. **1.0.**11)	
Rated operating distance s_n	
Assured operating distance s_a	

CE

PNP	NO	①
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 max.		
Polarity reversal protected		
Short circuit protected		
Repeat accuracy R		
Ambient temperature range T_a		
Switching frequency f		
Utilization category		
Function indicator		
Degree of protection per IEC 60529		
Housing material		
Material of sensing face		
Connection		
No. of wires × cross-section		
Recommended connector		
O-Ring/spare part number		
Support ring/spare part number		
High pressure rated to		

① Wiring diagrams see page **1.0.**6

Other cable lengths on request.

	M12×1	**M12×1**	**M12×1**	**M12×1**	**M12×1**
	flush	flush	flush	flush	flush
	1.5 mm	**1.5 mm**	**1.5 mm**	**1.5 mm**	**1.5 mm**
	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm
					
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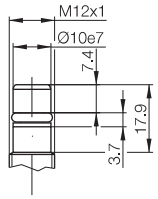
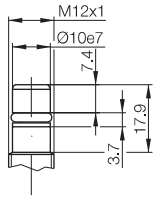
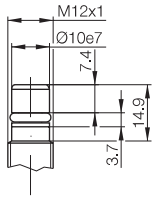
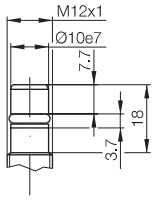
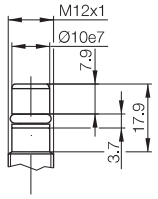
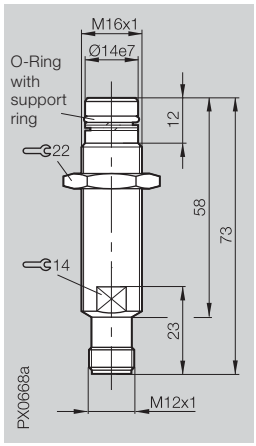
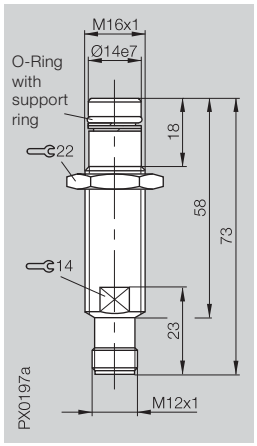
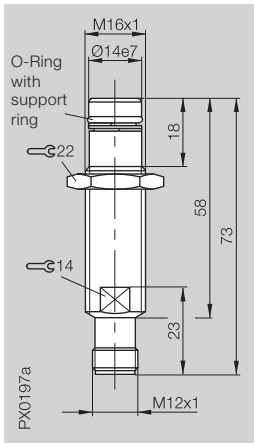
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 2 V	≤ 2 V	≤ 2 V	≤ 2 V	≤ 2 V
	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
	200 mA	200 mA	200 mA	200 mA	200 mA
	≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+80 °C	–25...+80 °C	–25...+80 °C	–25...+80 °C	–25...+80 °C
	1000 Hz	1000 Hz	1000 Hz	1000 Hz	2000 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	no	no	no	no	no
	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
	EP	EP	EP	EP	EP
	Connector	Connector	Connector	Connector	3 m Cable PUR
					3×0.14 mm²
	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	
	5.85×2.4/636594	5.85×2.4/636594	5.85×2.4/636594	5.85×2.4/636594	5.3×2.4/631753
	10×5.9×1/705918	10×5.9×1/705918	10×5.9×1/705918	10×5.9×1/705918	10×5.9×1/705918
	350 bar	**350 bar**	**350 bar**	**350 bar**	**350 bar**
					

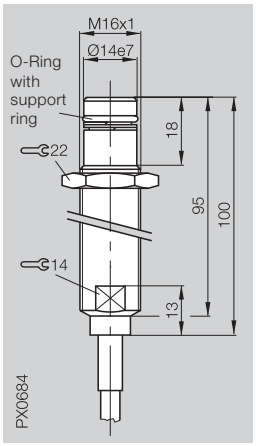
5
Connectors, Holders ...
Page 5.2 ...

Housing size	**M16×1**	**M16×1**	**M16×1**	**M16×1**
Mounting (see notes starting p. **1.0.**11)	flush	flush	flush	flush
Rated operating distance s_n	**1.5 mm**	**1.5 mm**	**1.5 mm**	**1.5 mm**
Assured operating distance s_a	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm





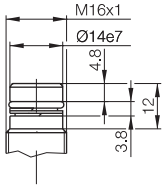


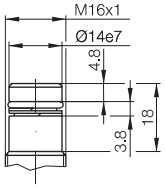


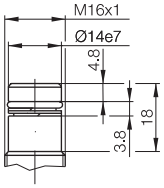
PNP						
	NO	①	BES 516-300-S152-S4-D	BES 516-300-S149-S4-D		
	NC	②			BES 516-300-S156-S4-D	BES 516-300-S237-D-PU-05
Supply voltage U_B			10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e			≤ 1.5 V	≤ 1.5 V	≤ 1.5 V	≤ 1.5 V
Rated insulation voltage U_i			75 V DC	75 V DC	75 V DC	75 V DC
Rated operational current I_e			200 mA	200 mA	200 mA	200 mA
No-load supply current I_0 max.			≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
Polarity reversal protected			yes	yes	yes	yes
Short circuit protected			yes	yes	yes	yes
Repeat accuracy R			≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a			–25...+80 °C	–25...+80 °C	–25...+80 °C	–25...+80 °C
Switching frequency f			1000 Hz	1000 Hz	1000 Hz	1000 Hz
Utilization category			DC 13	DC 13	DC 13	DC 13
Function indicator			no	no	no	no
Degree of protection per IEC 60529			IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
Housing material			Stainless steel	Stainless steel	Stainless steel	Stainless steel
Material of sensing face			EP	EP	EP	EP
Connection			Connector	Connector	Connector	5 m Cable PUR
No. of wires × cross-section						3×0.34 mm²
Approval				cULus		
Recommended connector			BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	
O-Ring/spare part number			11×1.8/703843	11×1.5/709137	11×1.5/709137	11×1.8/703843
Support ring/spare part number			14×11.1×0.7/505953	14×11.6×1.5/709136	14×11.6×1.5/709136	14×11.1×0.7/505953
High pressure rated to			**350 bar**	**350 bar**	**350 bar**	**350 bar**

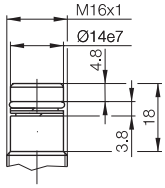
① Wiring diagrams see page **1.0.**6

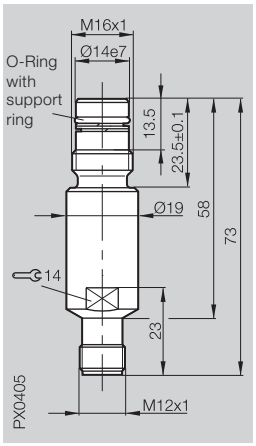
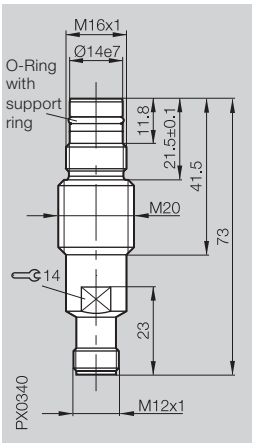
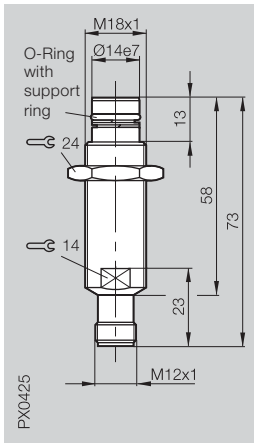
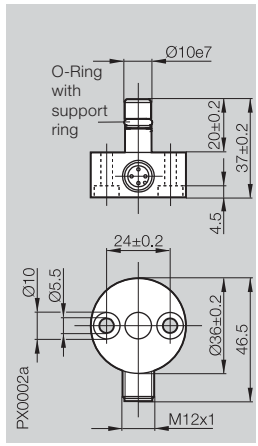
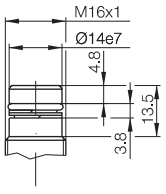
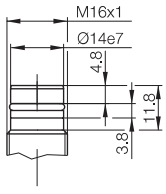
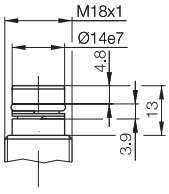
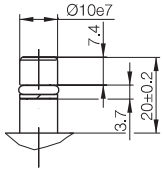
Other cable lengths on request.



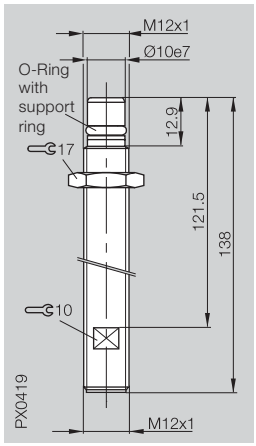
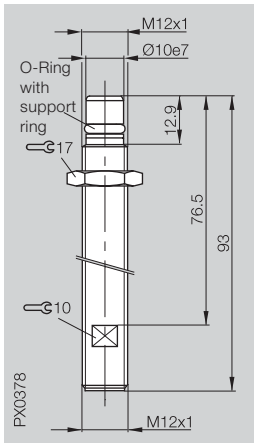
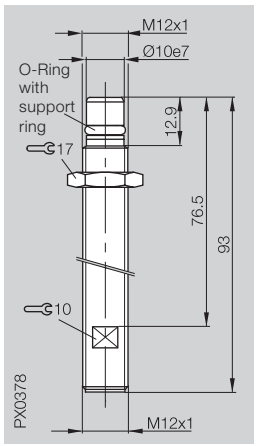
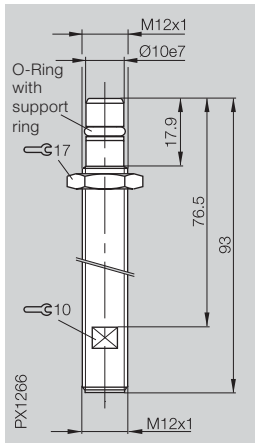
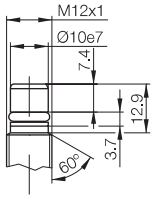
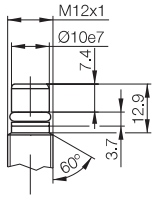
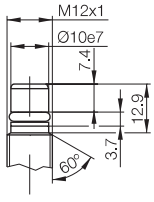
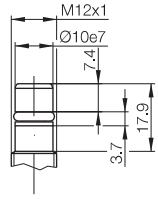




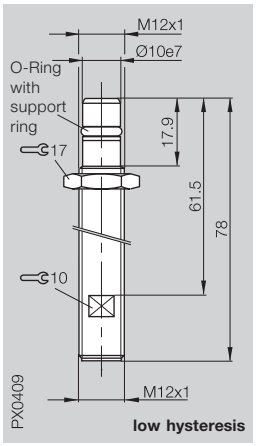
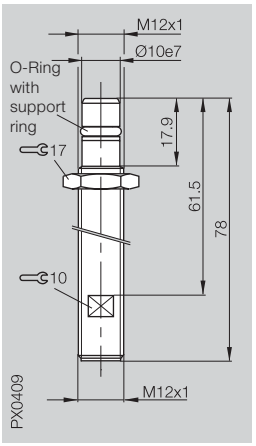
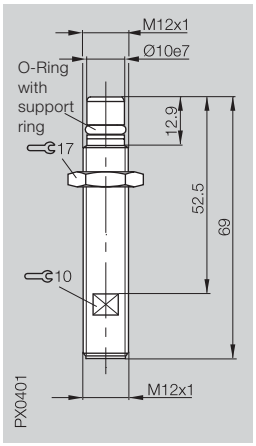
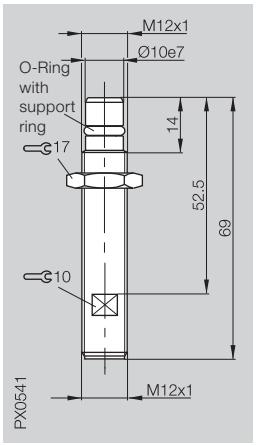
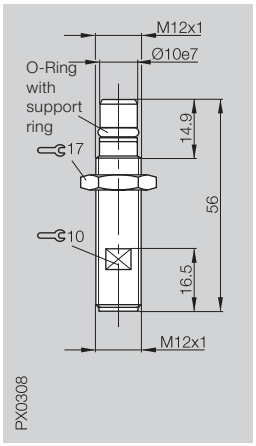
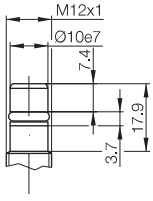
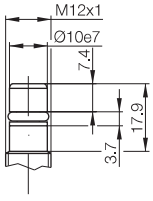
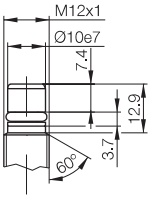
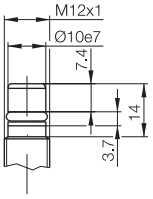
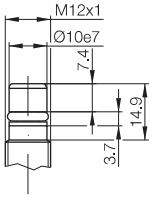


	M16×1/Ø 19 mm	M16×1/M20	M18×1	Ø 10 mm/Ø 36 mm
	flush	flush	flush	flush
	1.5 mm	**1.5 mm**	**1.5 mm**	**1.5 mm**
	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm
				
	BES 516-300-S129-S4-D	BES 516-300-S128-S4-D	BES 516-300-S144-S4-D	BES 516-300-S260-S4-D
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 1.5 V	≤ 1.5 V	≤ 1.5 V	≤ 2 V
	75 V DC	75 V DC	75 V DC	75 V DC
	200 mA	200 mA	200 mA	200 mA
	≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 8 mA
	yes	yes	yes	yes
	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+80 °C	–25...+80 °C	–25...+80 °C	–25...+80 °C
	1000 Hz	1000 Hz	1000 Hz	2000 Hz
	DC 13	DC 13	DC 13	DC 13
	no	no	no	no
	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
	Stainless steel	Stainless steel	Stainless steel	Stainless steel
	EP	EP	EP	EP
	Connector	Connector	Connector	Connector
	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20
	11×1.8/703843	11×1.8/703843	11×1.8/703843	5.85×2.4/636594
	14×11.1×0.7/505953	14×11.1×0.7/505953	14×11.1×0.7/505953	10×5.9×1/705918
	350 bar	**350 bar**	**350 bar**	**350 bar**
				

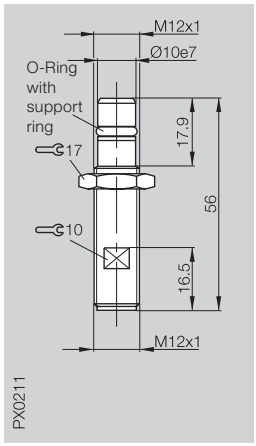
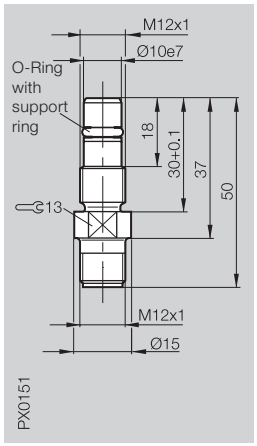
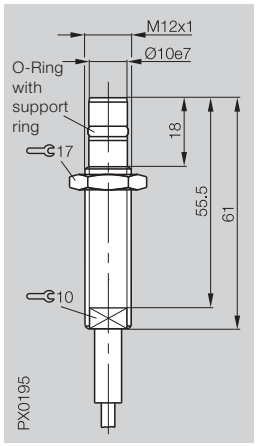
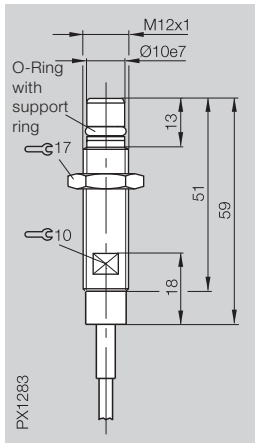
1.5
Factor 1
Weld immune
Magnetic field immune
Diagnostic
Steelface
Pressure rated
Pressure rated Ex
Namur Ex
Temperature rated
PROXINOX®
Ring Sensors
Extended switching distance
5
Connectors, Holders ... Page 5.2 ...

Housing size		**M12×1**	**M12×1**	**M12×1**	**M12×1**
Mounting (see notes starting p. **1.0.**11)		flush	flush	flush	flush
Rated operating distance s_n		**1.5 mm**	**1.5 mm**	**1.5 mm**	**1.5 mm**
Assured operating distance s_a		0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm
					
PNP	NO ①	BES 516-300-S164-S4-D	BES 516-300-S163-S4-D		BES 516-300-S300-S4-D
	complementary ③				
NPN	NO ④			BES 516-300-S242-S4-D	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e		≤ 1.5 V	≤ 1.5 V	≤ 1.5 V	≤ 1.5 V
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	75 V DC
Rated operational current I_e		200 mA	200 mA	200 mA	200 mA
No-load supply current I_0 max.		≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
Polarity reversal protected		yes	yes	yes	yes
Short circuit protected		yes	yes	yes	yes
Repeat accuracy R		≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a		–25...+80 °C	–25...+80 °C	–25...+80 °C	–25...+80 °C
Switching frequency f		1000 Hz	1000 Hz	1000 Hz	1000 Hz
Utilization category		DC 13	DC 13	DC 13	DC 13
Function indicator		no	no	no	no
Degree of protection per IEC 60529		IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
Housing material		Stainless steel	Stainless steel	Stainless steel	Stainless steel
Material of sensing face		EP	EP	EP	EP
Connection		Connector	Connector	Connector	Connector
Approval		cULus	cULus		cULus
Recommended connector		BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20
O-Ring/spare part number		5.3×2.4/631753	5.3×2.4/631753	5.3×2.4/631753	5.3×2.4/631753
Support ring/spare part number		10×5.9×1/705918	10×5.9×1/705918	10×5.9×1/705918	10×5.9×1/705918
High pressure rated to		**500 bar**	**500 bar**	**500 bar**	**500 bar**
					

① Wiring diagrams see page **1.0.**6

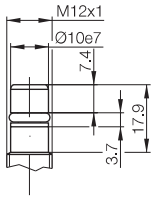
	M12×1	**M12×1**	**M12×1**	**M12×1**	**M12×1**
	flush	flush	flush	flush	flush
	1.5 mm	**1.5 mm**	**1.5 mm**	**1.5 mm**	**1.5 mm**
	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm
					
	BES 516-300-S298-S4-D	BES 516-300-S135-S4-D BES 516-100-S45-S4-D	BES 516-300-S162-S4-D		BES 516-300-S265-S4-D
				BES 516-300-S281-S4-D	
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 1.5 V	≤ 1.5 V	≤ 2 V	≤ 1.5 V	≤ 2 V
	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
	200 mA	200 mA	200 mA	200 mA	200 mA
	≤ 10 mA	≤ 10 mA	≤ 8 mA	≤ 10 mA	≤ 8 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+80 °C	–25...+80 °C	–25...+80 °C	–25...+80 °C	–25...+80 °C
	1000 Hz	1000 Hz	2000 Hz	1000 Hz	2000 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	no	no	no	no	no
	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
	EP	EP	EP	EP	EP
	Connector	Connector	Connector	Connector	Connector
	cULus	cULus	cULus	cULus	cULus
	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20
	5.85×2.4/636594	5.85×2.4/636594	5.3×2.4/631753	5.3×2.4/631753	5.3×2.4/631753
	10×5.9×1/705918	10×5.9×1/705918	10×5.9×1/705918	10×5.9×1/705918	10×5.9×1/705918
	500 bar	**500 bar**	**500 bar**	**500 bar**	**500 bar**
					

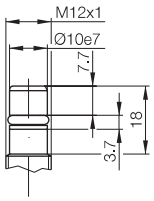
Also available as inductive **diagnostics capable sensor,** see page **1.5**.16

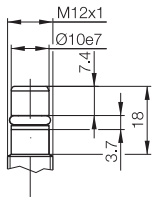
Housing size		**M12×1**	**M12×1**	**M12×1**	**M12×1**
Mounting (see notes starting p. **1.0.**11)		flush	flush	flush	flush
Rated operating distance s_n		**1.5 mm**	**1.5 mm**	**1.5 mm**	**1.5 mm**
Assured operating distance s_a		0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm
					
PNP	NO ①	BES 516-300-S249-S4-D	BES 516-300-S262-S4-D	BES 516-300-S135-D-PU-05	BES 516-300-S162-D-PU-05
	NC ②	BES 516-300-S305-S4-D		BES 516-300-S178-D-PU-05	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e		≤ 2 V	≤ 2 V	≤ 1.5 V	≤ 2 V
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	75 V DC
Rated operational current I_e		200 mA	200 mA	200 mA	200 mA
No-load supply current I_0 max.		≤ 8 mA	≤ 8 mA	≤ 10 mA	≤ 8 mA
Polarity reversal protected		yes	yes	yes	yes
Short circuit protected		yes	yes	yes	yes
Repeat accuracy R		≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a		–25...+80 °C	–25...+90 °C	–25...+80 °C	–25...+80 °C
Switching frequency f		2000 Hz	2000 Hz	1000 Hz	2000 Hz
Utilization category		DC 13	DC 13	DC 13	DC 13
Function indicator		no	no	no	no
Degree of protection per IEC 60529		IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
Housing material		Stainless steel	Stainless steel	Stainless steel	Stainless steel
Material of sensing face		EP	EP	EP	EP
Connection		Connector	Connector	5 m Cable PUR	5 m Cable PUR
No. of wires × cross-section				3×0.14 mm²	3×0.14 mm²
Approval		cULus	cULus	cULus	
Recommended connector		BKS-_ 19/BKS-_ 20	BKS-_ 19/BKS-_ 20		
O-Ring/spare part number		5.3×2.4/631753	5.3×2.4/631753	5.85×2.4/636594	5.3×2.4/631753
Support ring/spare part number		10×5.9×1/705918	10×5.9×1/705918	10×5.9×1/705918	10×5.9×1/705918
High pressure rated to		**500 bar**	**500 bar**	**500 bar**	**500 bar**

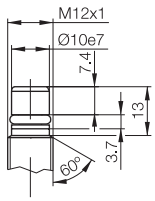
① Wiring diagrams see page **1.0.**6

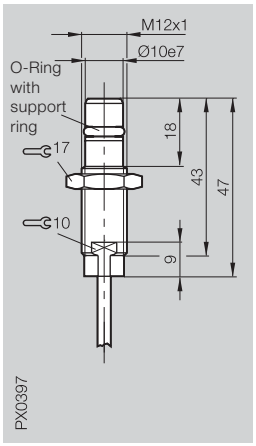
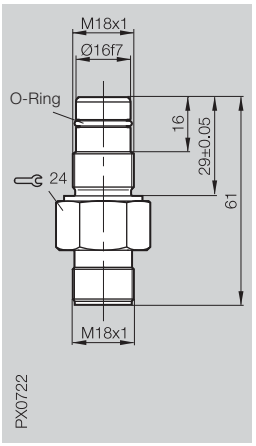
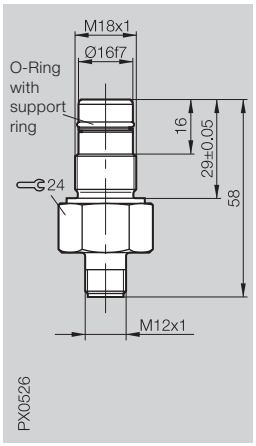
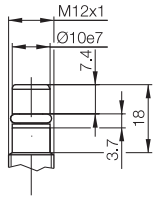
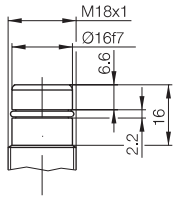
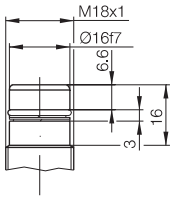
Other cable lengths on request.





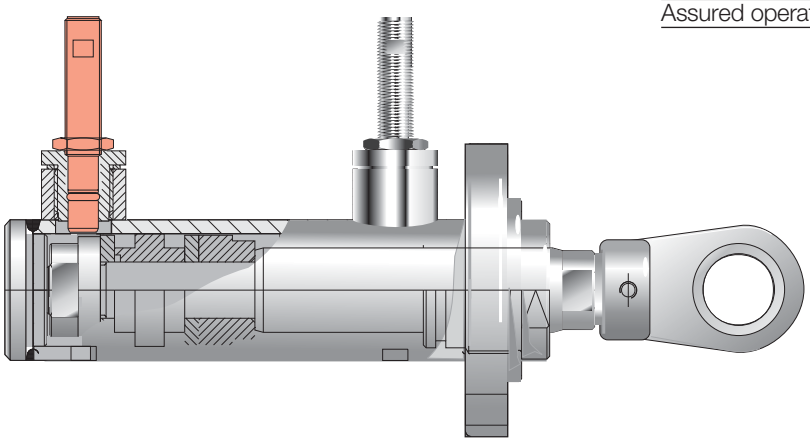




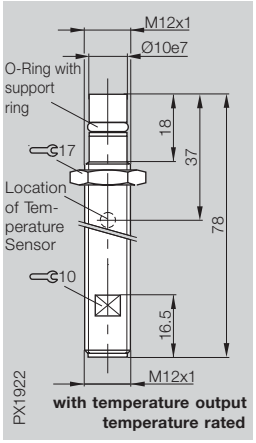
	M12×1	**M18×1**	**M18×1**
	flush	flush	flush
	1.5 mm	**3 mm**	**3 mm**
	0...1.2 mm	0...2.1 mm	0...2.1 mm
			
	BES 516-300-S240-D-PU-03	BES 516-300-S203	BES 516-300-S190-S4
	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 2 V	≤ 3.5 V	≤ 3.5 V
	75 V DC	75 V DC	75 V DC
	200 mA	130 mA	130 mA
	≤ 8 mA	≤ 20 mA	≤ 25 mA
	yes	yes	yes
	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+80 °C	–25...+80 °C	–25...+80 °C
	2000 Hz	1000 Hz	400 Hz
	DC 13	DC 13	DC 13
	no	no	no
	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
	Stainless steel	Stainless steel	Stainless steel
	EP	PEEK	PEEK
	3 m Cable PUR	Connector	Connector
	3×0.14 mm²		
	cULus		
		BKS-S 7-1	BKS-_ 19/BKS-_ 20
	5.85×2.4/636594	13×1.5/619531	13×1.5/619531
	10×5.9×1/705918		16×13.8×0.5/635431
	500 bar	**500 bar**	**500 bar**
			

1.5
Factor 1
Weld immune
Magnetic field immune
Diagnostic
Steelface
Pressure rated
Pressure rated Ex
Namur Ex
Temperature rated
PROXINOX®
Ring Sensors
Extended switching distance

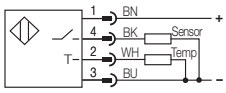
5
Connectors, Holders ...
Page 5.2 ...



Housing size	**M12×1**
Mounting (see notes starting p. **1.0.**11)	flush
Rated operating distance s_n	**1.5 mm**
Assured operating distance s_a	0...1.2 mm



BHS B135V-PSD15-S04-T01
with temperature output



High-End versions of the **high pressure rated sensors** are available in two series:

- Long switching distances to 2.5 mm (max. 90 °C ambient temperature) or
- High temperatures to 120° C (switching distance 1.5 mm)
- Both versions pressure rated to 500 bar just like our traditional high-pressure models

Ambient temperatures to +120 °C

- Especially suited for modern high-performance hydraulic systems
- For newer hydraulic fluids that can become hot
- For hydraulic cylinders on high-temperature injection molds

Temperature output

To measure temperature changes inside the cylinder the BHS ...T01 has an integrated temperature sensor that outputs the measured temperature as a voltage.

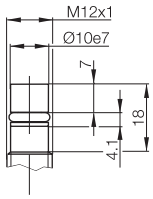
Part numbering

BHS ...-PSD**15**-S04
Rated operating distance **1.5** mm
Ambient temperature range –25...**+120 °C**

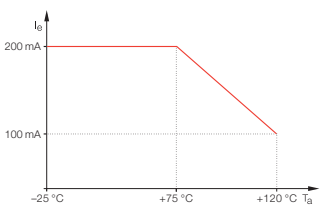
BHS ...-PSD15-S04-**T01**
with additional temperature output

PNP	NO	①	BHS B135V-PSD15-S04-T01
Supply voltage U_B			10...30 V DC
Voltage drop U_d at I_e			≤ 2.5 V
Rated insulation voltage U_i			75 V DC
Rated operational current I_e			200 mA
No-load supply current I_0 max.			≤ 8 mA
Polarity reversal protected			yes
Short circuit protected			yes
Repeat accuracy R			≤ 5 %
Ambient temperature range T_a			**–25...+120 °C**
Switching frequency f			400 Hz
Utilization category			DC 13
Function indicator			no
Degree of protection per IEC 60529			IP 68 per BWN Pr. 20
Housing material			Stainless steel
Material of sensing face			Ceramic
Connection			Connector
Approval			cULus
Recommended connector			BKS-S 19-3-PY/S 20-3-PY
O-Ring/spare part number			6.75×1.78/149621
Support ring/spare part number			10×7×1.8/150229
High pressure rated to			**500 bar**

① Wiring diagrams see page **1.0.**6
Exception:
BHS B135V-PSD15-S04-T01 see above

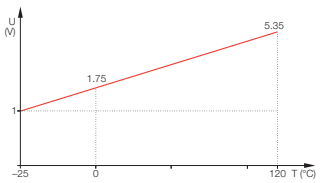


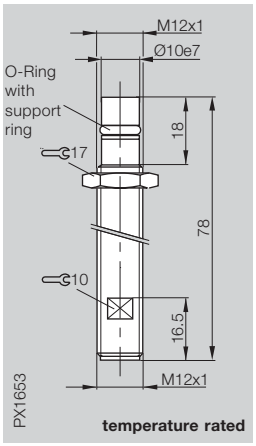
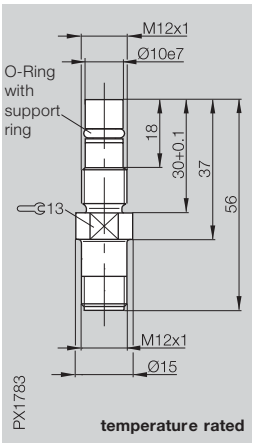
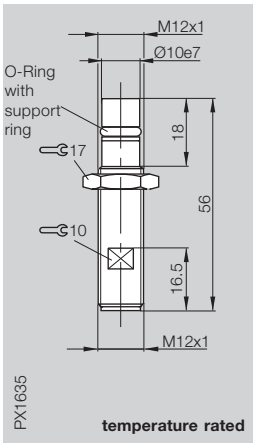
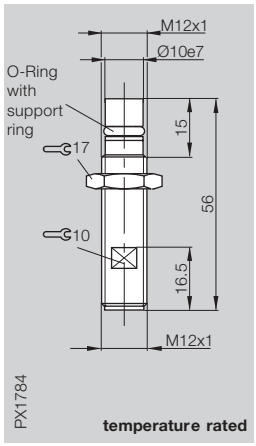
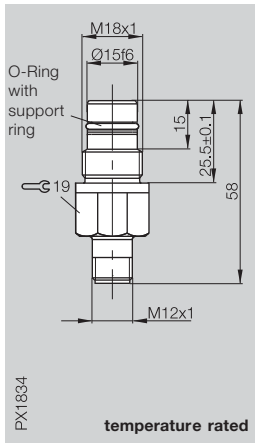
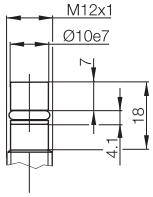
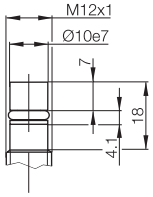
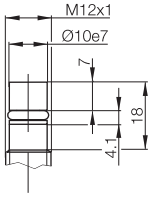
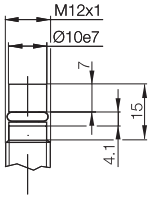
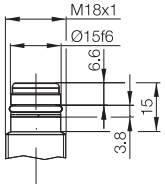
Current reduction as a function of ambient temperature range

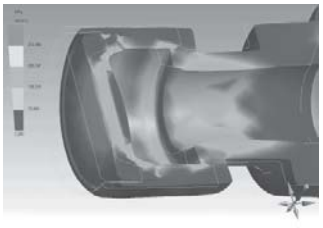


Temperature output

U (V) = 1+0.03×(T +25)



M12×1	**M12×1**	**M12×1**	**M12×1**	**M18×1**	
flush	flush	flush	flush	flush	
1.5 mm	**1.5 mm**	**1.5 mm**	**1.5 mm**	**1.5 mm**	
0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm	
					
BHS B135V-PSD15-S04	BHS B400V-PSD15-S04	BHS B249V-PSD15-S04	BHS B265V-PSD15-S04	BHS E308V-PSD15-S04	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	
75 V DC	75 V DC	75 V DC	75 V DC	75 V DC	
200 mA	200 mA	200 mA	200 mA	200 mA	
≤ 8 mA	≤ 8 mA	≤ 8 mA	≤ 8 mA	≤ 8 mA	
yes	yes	yes	yes	yes	
yes	yes	yes	yes	yes	
≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	
–25...+120 °C	**–25...+120 °C**	**–25...+120 °C**	**–25...+120 °C**	**–25...+120 °C**	
400 Hz	400 Hz	400 Hz	400 Hz	400 Hz	
DC 13	DC 13	DC 13	DC 13	DC 13	
no	no	no	no	no	
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	
Ceramic	Ceramic	Ceramic	Ceramic	Ceramic	
Connector	Connector	Connector	Connector	Connector	
cULus	cULus	cULus	cULus	cULus	
BKS-B 19/B 20-1-PU2	BKS-B 19/B 20-1-PU2	BKS-B 19/B 20-1-PU2	BKS-B 19/B 20-1-PU2	BKS-B 19/B 20-1-PU2	
6.75×1.78/149621	6.75×1.78/149621	6.75×1.78/149621	6.75×1.78/149621	12.42×1.78/130654	
10×7×1.8/150229	10×7×1.8/150229	10×7×1.8/150229	10×7×1.8/150229	15×12.2×0.7/642827	
500 bar	**500 bar**	**500 bar**	**500 bar**	**500 bar**	
					

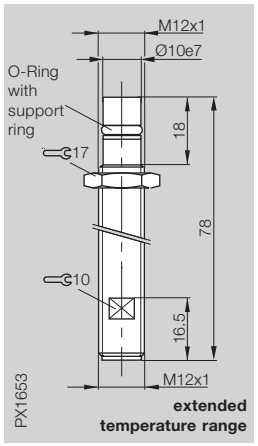


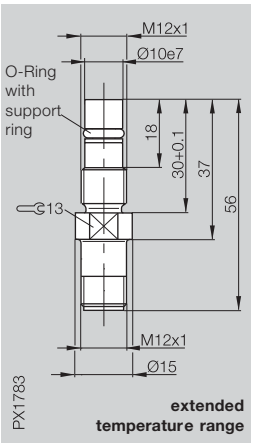
Simulation (FEM method) of the stress distribution under high pressure on housing and ceramic cap

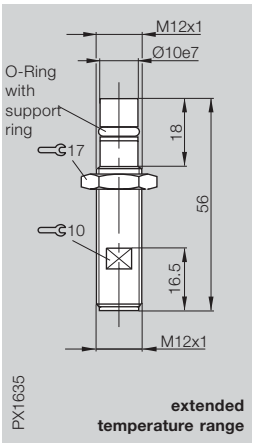
1.5
Factor 1
Weld immune
Magnetic field immune
Diagnostic
Steelface
Pressure rated
Pressure rated Ex
Namur Ex
Temperature rated
PROXINOX®
Ring Sensors
Extended switching distance

5
Connectors, Holders ...
Page 5.2 ...

Housing size	**M12×1**	**M12×1**	**M12×1**
Mounting (see notes starting p. **1.0.**11)	flush	flush	flush
Rated operating distance s_n	**2.5 mm**	**2.5 mm**	**2.5 mm**
Assured operating distance s_a	0...2 mm	0...2 mm	0...2 mm



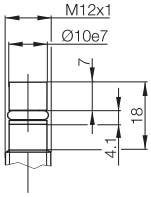


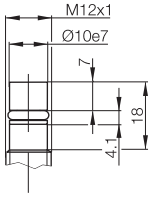


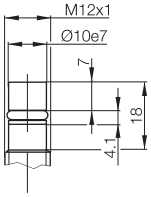
PNP NO ①	BHS B135V-PSD25-S04-003	BHS B400V-PSD25-S04-003	BHS B249V-PSD25-S04-003
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC
Rated operational current I_e	200 mA	200 mA	200 mA
No-load supply current I_0 max.	≤ 8 mA	≤ 8 mA	≤ 8 mA
Polarity reversal protected	yes	yes	yes
Short circuit protected	yes	yes	yes
Repeat accuracy R	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a	**–25...+90 °C**	**–25...+90 °C**	**–25...+90 °C**
Switching frequency f	400 Hz	400 Hz	400 Hz
Utilization category	DC 13	DC 13	DC 13
Function indicator	no	no	no
Degree of protection per IEC 60529	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
Housing material	Stainless steel	Stainless steel	Stainless steel
Material of sensing face	Ceramic	Ceramic	Ceramic
Connection	Connector	Connector	Connector
Approval	cULus	cULus	cULus
Recommended connector	BKS-B 19/B 20-1-PU2	BKS-B 19/B 20-1-PU2	BKS-B 19/B 20-1-PU2
O-Ring/spare part number	6.75×1.78/149621	6.75×1.78/149621	6.75×1.78/149621
Support ring/spare part number	10×7×1.8/150229	10×7×1.8/150229	10×7×1.8/150229
High pressure rated to	**500 bar**	**500 bar**	**500 bar**

① Wiring diagrams see page **1.0.**6

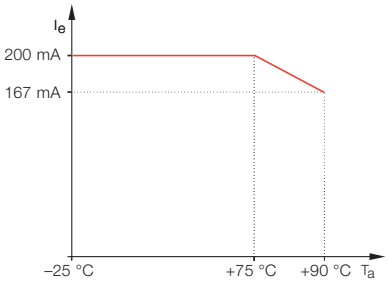
Other cable lengths on request.

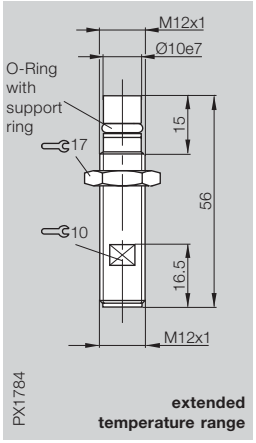
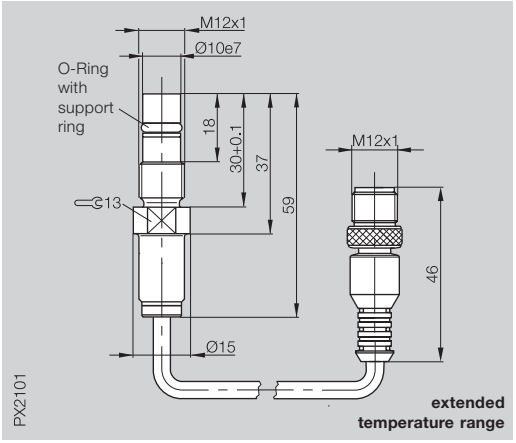
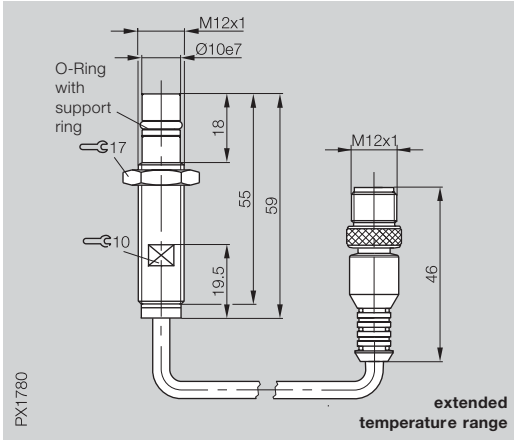
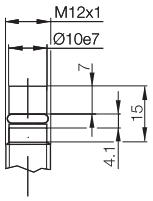
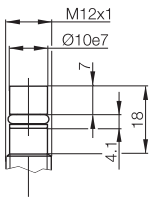
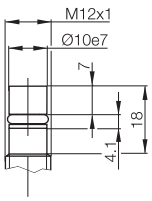


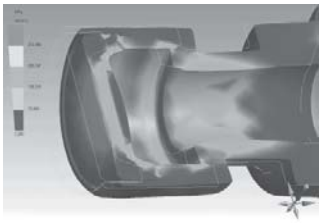




Current reduction as a function of ambient temperature range



M12×1	**M12×1**	**M12×1**
flush	flush	flush
2.5 mm	**2.5 mm**	**2.5 mm**
0...2 mm	0...2 mm	0...2 mm
		
BHS B265V-PSD25-S04-003	BHS B400V-PSD25-BP00,2-S04-003	BHS B249V-PSD25-BP00,2-S04-003
10...30 V DC	10...30 V DC	10...30 V DC
≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
75 V DC	75 V DC	75 V DC
200 mA	200 mA	200 mA
≤ 8 mA	≤ 8 mA	≤ 8 mA
yes	yes	yes
yes	yes	yes
≤ 5 %	≤ 5 %	≤ 5 %
–25...+90 °C	**–25...+90 °C**	**–25...+90 °C**
400 Hz	400 Hz	400 Hz
DC 13	DC 13	DC 13
no	no	no
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67
Stainless steel	Stainless steel	Stainless steel
Ceramic	Ceramic	Ceramic
Connector	0.2 m PUR cable with connector	0.2 m PUR cable with connector
cULus	cULus	cULus
BKS-B 19/B 20-1-PU2	BKS-B 19-1-PU2	BKS-B 19-1-PU2
6.75×1.78/149621	6.75×1.78/149621	6.75×1.78/149621
10×7×1.8/150229	10×7×1.8/150229	10×7×1.8/150229
500 bar	**500 bar**	**500 bar**
		



Simulation (FEM method) of the stress distribution under high pressure on housing and ceramic cap

Sensors with ATEX approval Category 3G

Devices in this category are designed for use in areas where explosive atmospheres occur infrequently.

Note!

Before design, installation and startup, please read the operating manual found at www.balluff.com.

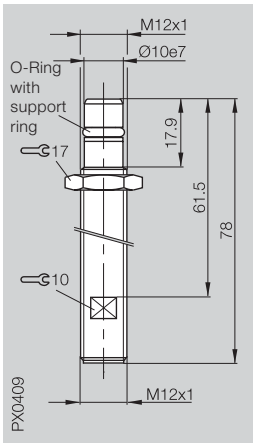
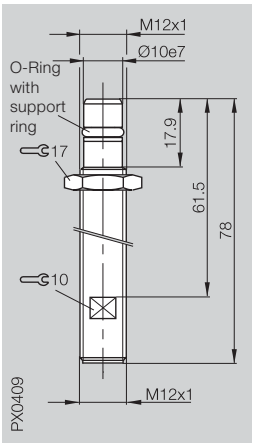
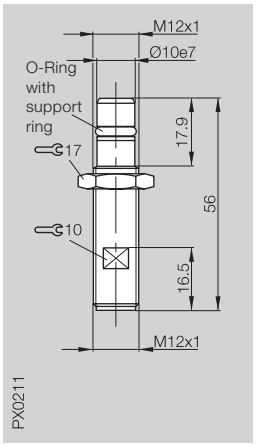
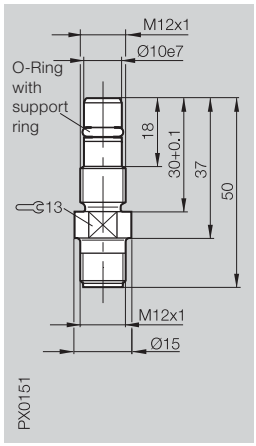
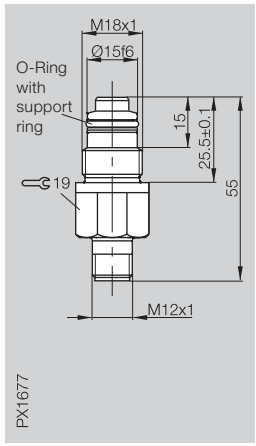
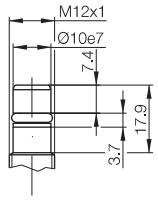
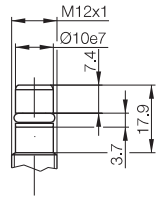
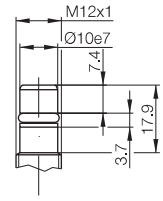
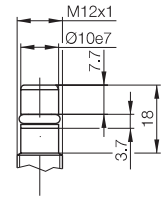
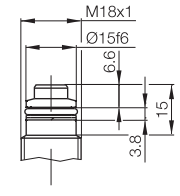
Housing size	
Mounting (see notes starting p. **1.0.**11)	
Rated operating distance s_n	
Assured operating distance s_a	

CE

Ex

PNP	NO	①
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 max.		
Polarity reversal protected		
Short circuit protected		
Repeat accuracy R		
Ambient temperature range T_a		
Switching frequency f		
Utilization category		
Function indicator		
Degree of protection per IEC 60529		
Housing material		
Material of sensing face		
Connection		
Recommended connector		
O-Ring/spare part number		
Support ring/spare part number		
Pressure rated (hydraulic) up to		
Ex-Zone		
Conformity		
Designation		

① Wiring diagrams see page **1.0.**6

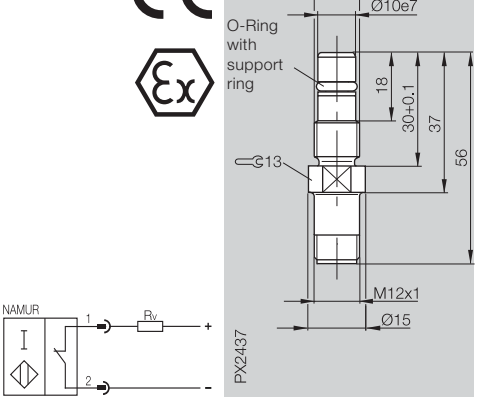
M12×1	**M12×1**	**M12×1**	**M12×1**	**M18×1**	
flush	flush	flush	flush	flush	
1.5 mm	**1.5 mm**	**1.5 mm**	**1.5 mm**	**1.5 mm**	
0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm	
					
BES 516-300-S321-NEX-S4-D	BES 516-300-S135-NEX-S4-D	BES 516-300-S249-NEX-S4-D	BES 516-300-S262-NEX-S4-D	BES 516-300-S308-NEX-S4-D	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
≤ 2 V	≤ 2 V	≤ 2 V	≤ 2 V	≤ 2 V	
75 V DC	75 V DC	75 V DC	75 V DC	75 V DC	
200 mA	200 mA	200 mA	200 mA	200 mA	
≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA	
yes	yes	yes	yes	yes	
yes	yes	yes	yes	yes	
≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	
–25...+80 °C	–25...+80 °C	–25...+80 °C	–25...+90 °C	–25...+80 °C	
1000 Hz	1000 Hz	2000 Hz	2000 Hz	2000 Hz	
DC 13	DC 13	DC 13	DC 13	DC 13	
no	no	no	no	no	
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	
EP	EP	EP	EP	EP	
Connector	Connector	Connector	Connector	Connector	
BKS-S 19-1/BKS-S 20-1	BKS-S 19-1/BKS-S 20-1	BKS-S 19-1/BKS-S 20-1	BKS-S 19-1/BKS-S 20-1	BKS-S 19-1/BKS-S 20-1	
5.85×2.4/636594	5.85×2.4/636594	5.3×2.4/631753	5.3×2.4/631753	12.42×1.78/642828	
10×5.9×1/705918	10×5.9×1/705918	10×5.9×1/705918	10×5.9×1/705918	15×12.2×0.7/642827	
350 bar	**500 bar**	**500 bar**	**500 bar**	**500 bar**	
DIN EN 60079-0: 2004 DIN EN 60079-15: 2003 Ex II 3G Ex nA II T4 X	DIN EN 60079-0: 2004 DIN EN 60079-15: 2003 Ex II 3G Ex nA II T4 X	DIN EN 60079-0: 2004 DIN EN 60079-15: 2003 Ex II 3G Ex nA II T4 X	DIN EN 60079-0: 2004 DIN EN 60079-15: 2003 Ex II 3G Ex nA II T4 X	DIN EN 60079-0: 2004 DIN EN 60079-15: 2003 Ex II 3G Ex nA II T4 X	
					

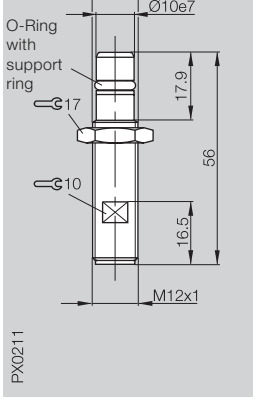
5
Connectors, Holders ...
Page 5.2 ...

high pressure rated NAMUR

Ignition protection type "Intrinsically Safe"

Housing size	**M12×1**	**M12×1**
Mounting (see notes starting p. **1.0.**11)	flush	flush
Rated operating distance s_n	**1.5 mm**	**1.5 mm**
Assured operating distance s_a	0...1.2 mm	0...1.2 mm





Ignition protection type „intrinsically safe“ used with switching amplifier outside the hazardous area

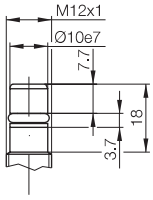
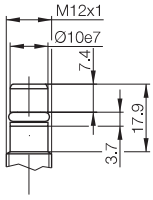
Inductive sensors to NAMUR specification consist essentially of an oscillator with a dampable oscillator coil and a demodulator.

These high pressure sensors are used, for example, in end-of-travel monitoring on hydraulic cylinders or position detection on valves.

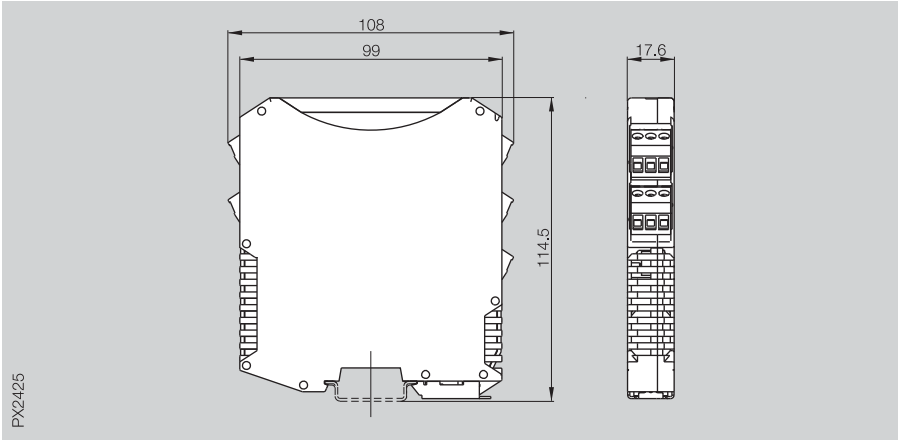
They can be used in conjunction with suitable switching amplifiers such as from Steel (see next page) in explosive systems or Zone 1 and Zone 2 areas. The switch amplifier must be installed outside the explosive area.

Note!

Before design, installation and startup, please read the operating manual found at www.balluff.com.
You must also observe the requirements for the EC Type Examination Certificate of the PTB.

NAMUR	BES 516-300-S318-S4-N	BES 516-300-S315-S4-N
Rated operational voltage U_e	8.2 V DC	8.2 V DC
Supply voltage U_B	7.7...9 V DC	7.7...9 V DC
Rated insulation voltage U_i	75 V DC	75 V DC
Current draw at $s_r = 0$	≤ 1 mA	≤ 1 mA
$s_r = \infty$	≥ 4 mA	≥ 4 mA
Rated series resistance R_V	1000 Ω	1000 Ω
Permissible series resistance R_V	550...1100 Ω	550...1100 Ω
Output signal:	Current change (no trigger response)	Current change (no trigger response)
Fully undamped	≥ 4 mA	≥ 4 mA
Fully damped	≤ 1 mA	≤ 1 mA
Polarity reversal protected < 9 V	yes	yes
Repeat accuracy R	≤ 5 %	≤ 5 %
Ambient temperature range T_a	**–25...+70 °C**	**–25...+70 °C**
Switching frequency f	1000 Hz	1000 Hz
Function indicator	no	no
Degree of protection per IEC 60529	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
Housing material	Stainless steel	Stainless steel
Material of sensing face	POM	POM
Connection	Connector	Connector
Recommended connector	BKS-S 10-3/BKS-S 8-3/ BKS-S220-12-PB/ BKS-S221-12-PB	BKS-S 10-3/BKS-S 8-3/ BKS-S220-12-PB/ BKS-S221-12-PB
O-Ring/spare part number	5.85×2.4/636594	5.85×2.4/636594
Support ring/spare part number	10×5.9×1/705918	10×5.9×1/705918
Pressure rated (hydraulic) up to	**500 bar**	**500 bar**
Ex-Zone		
Conformity	EN 60079-0:2004 EN 50020:2002	EN 60079-0:2004 EN 50020:2002
EC Type Examination Certificate	PTB 01 ATEX 2207 X	PTB 01 ATEX 2207 X
Designation	Ex II 2 G Ex ia IIC T6	Ex II 2 G EEx ia IIC T6
Effective internal capacitance	≤ 30 nF	≤ 30 nF
Effective internal inductance	0.5 mH	0.5 mH
Maximum input power P_i	200 mW	200 mW
For additional data see EC Type Examination Certificate.		

Housing size	**99×17.6×114.5 mm**



Ordering code	STAHL 9170/20-12-11S	STAHL 9170/20-12-21S
Input	NAMUR specification	
Output relay	2-channel, 1 change-over Switching voltage 250 V AC Switching current 4 A AC Switching capacity 50 W/1000 VA	
Function change	via switch	
Supply voltage U_B	24 V DC	120...230 V AC
Ambient temperature range T_a	–20...+60 °C	
relative humidity	≤ 95 %, non-condensing	
Ex-Zone		
Designation	Ex II (1) GD [EEx ia] IIC/IIB and Ex II 3 G EEx nAC II T4	
EC Type Examination Certificate	DMT 02 ATEX E 195 X	

For safety and other data see EC Type Examination Certificate.

The switching amplifier with relay output serves as the interface between electrical signals from the hazardous area (Ex zone) and the non-hazardous area (safe zone).

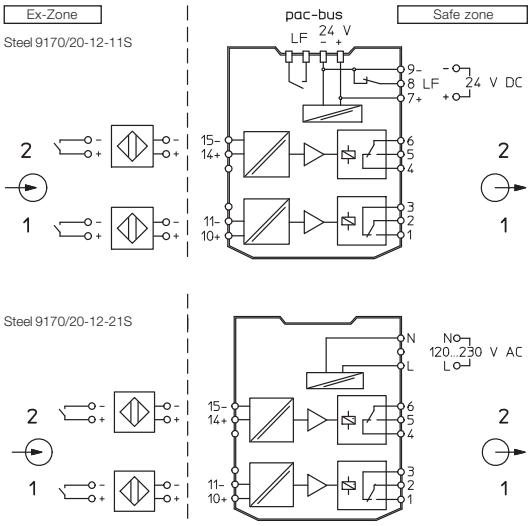
The input signals from NAMUR sensors are converted using relay switching contacts on the outputs. Input, output and auxiliary power circuits are galvanically isolated.

Note!

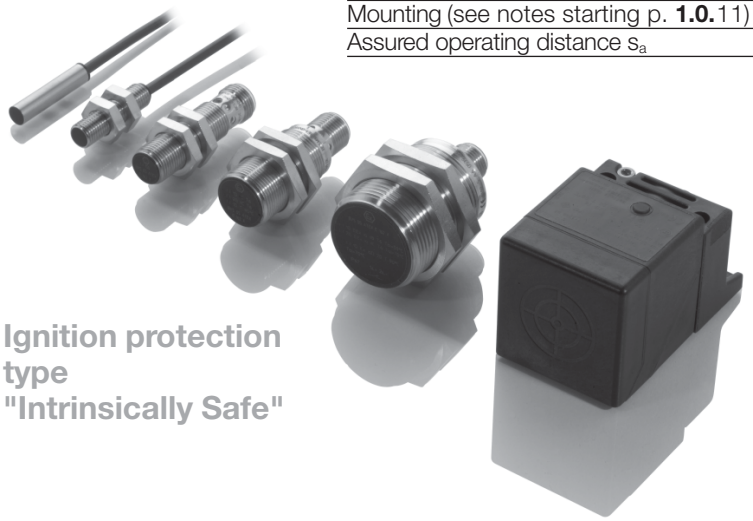
Before design, installation and startup, please read the operating manual found at www.stahl.de.

You must also observe the requirements for the EC Type Examination Certificate.

Wiring diagrams

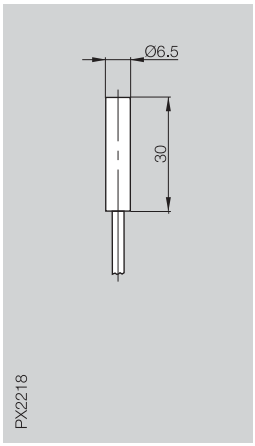


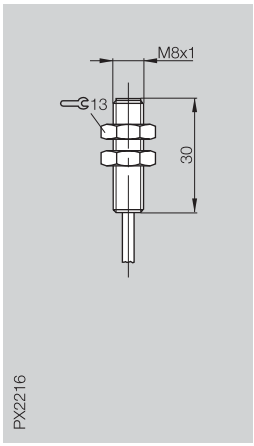
DC 2-wire
∅ 6.5 mm, M8
s_n 1 mm



Ignition protection type "Intrinsically Safe"

Housing size	**∅ 6.5 mm**	**M8×1**
Mounting	flush	flush
Mounting (see notes starting p. **1.0.**11)	**1 mm**	**1 mm**
Assured operating distance s_a	0.8 mm	0...0.8 mm





Ignition protection type „intrinsically safe“ used with switching amplifier outside the hazardous area

Inductive sensors to NAMUR specification consist essentially of an oscillator with a dampable oscillator coil and a demodulator.

These sensors can be used in conjunction with suitable switching amplifiers such as from Steel (see page **1.5.**39) in explosive systems or zones (see ATEX marking). The switching amplifier must be installed only outside the explosive area.

Note!

Before design, installation and startup, please read the operating manual found at www.balluff.com.
You must also observe the requirements for the EC Type Examination Certificate of the BVS and PTB.

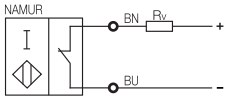
NAMUR	BES G06MD-GNX10B-EV02-EEX	BES M08MD-GNX10B-EV02-EEX
Rated operational voltage U_e	8.2 V DC	8.2 V DC
Supply voltage U_B	7.7...9 V DC	7.7...9 V DC
Rated insulation voltage U_i	75 V DC	75 V DC
Current draw:	Current change (no trigger response)	Current change (no trigger response)
Open (undamped)	≤ 1 mA	≤ 1 mA
Conducting (damped)	≥ 2.1 mA	≥ 2.1 mA
Rated series resistance R_V	1000 Ω	1000 Ω
Polarity reversal protected	no*	no*
Ambient temperature range T_a	–20...+70 °C	–20...+70 °C
Switching frequency f	2000 Hz	2000 Hz
Function indicator	no	no
Degree of protection per IEC 60529	IP 67	IP 67
Housing material	CuZn coated	CuZn coated
Material of sensing face	PBT	PBT
Connection	2 m PVC cable	2 m PVC cable
No. of wires × cross-section	2×0.14 mm²	2×0.14 mm²
Recommended connector		
Ex-Zone		
Conformity	EN 50014:1997+A1+A2 EN 50020	EN 50014:1997+A1+A2 EN 50020
EC Type Examination Certificate	BVS 05 ATEX E 163 PTB 05 ATEX 2075	BVS 05 ATEX E 163 PTB 05 ATEX 2075
Designation	Ex II 2G EEx ia IIC T6 Ex II 1D Ex iaD 20 T90°C	Ex II 2G EEx ia IIC T6 Ex II 1D Ex iaD 20 T90°C
Maximum internal capacitance	≤ 80 nF	≤ 80 nF
Maximum internal inductance	0.07 mH	0.07 mH
Connected to approved intrinsically safe circuits with the highest values	U = 15 V I = 50 mA P = 120 mW	U = 15 V I = 50 mA P = 120 mW

*Power restriction when using an approved intrinsically safe switching amplifier

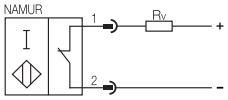
Switching distance ■■ see page **1.0.**10

Wiring diagrams

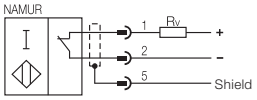
BES G06.../M08...



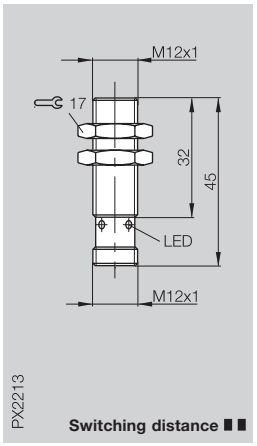
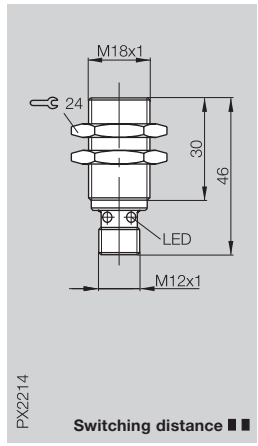
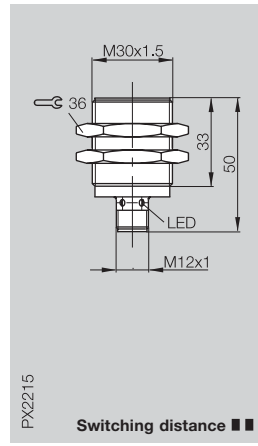
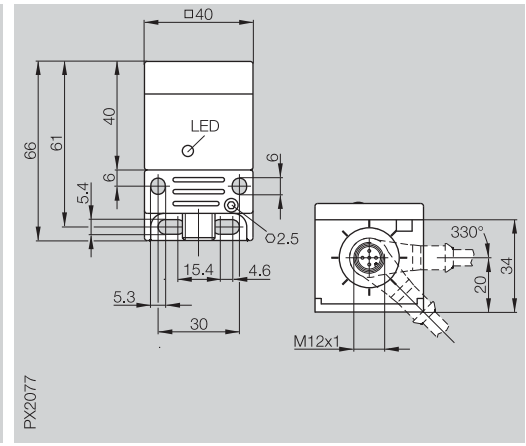
BES M12.../M18.../M30...



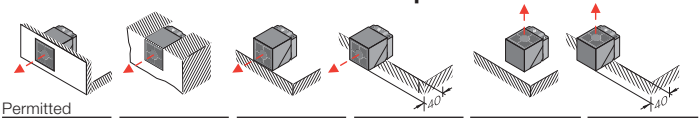
Unicompact



1 Connected to NAMUR switching amplifier
2 Connected to NAMUR switching amplifier
5 Connector body potential compensation

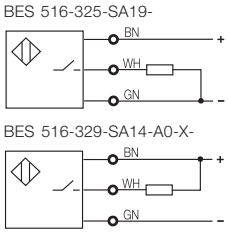
	M12×1	**M18×1**	**M30×1.5**	**40×40×66 mm** Unicompact	**40×40×66 mm** Unicompact
	flush	flush	flush	flush	non-flush
	4 mm	**8 mm**	**15 mm**	**20 mm**	**35 mm**
	0...3.2 mm	0...6.5 mm	0...12.2 mm	0...16.2 mm	0...28.4 mm
					
	BES M12ME-GNX40B-S04G-EEX	BES M18ME1-GNX80B-S04G-EEX	BES M30ME1-GNX15B-S04G-EEX	BES Q40KFU-GNX20B-S92G-EEX	BES Q40KFU-GNX35F-S92G-EEX
	8.2 V DC	8.2 V DC	8.2 V DC	8.2 V DC	8.2 V DC
	7.7...9 V DC	7.7...9 V DC	7.7...9 V DC	7.7...9 V DC	7.7...9 V DC
	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
	Current change (no trigger response)	Current change (no trigger response)	Current change (no trigger response)	Current change (no trigger response)	Current change (no trigger response)
	≤ 1 mA	≤ 1 mA	≤ 1 mA	≤ 1 mA	≤ 1 mA
	≥ 2.1 mA	≥ 2.1 mA	≥ 2.1 mA	≥ 2.1 mA	≥ 2.1 mA
	1000 Ω	1000 Ω	1000 Ω	1000 Ω	1000 Ω
	no*	no*	no*	no*	no*
	–20...+70 °C	–20...+70 °C	–20...+70 °C	–20...+70 °C	–20...+70 °C
	700 Hz	400 Hz	100 Hz	200 Hz	100 Hz
	yes	yes	yes	no	no
	IP 67	IP 67	IP 67	IP 67	IP 67
	CuZn coated	CuZn coated	CuZn coated	PPE/PPS	PPE/PPS
	PBT	PBT	PBT	PPE	PPE
	Connector	Connector	Connector	Connector	Connector
	BKS-S 10-3/BKS-S 8-3/ BKS-S220-12-PB/ BKS-S221-12-PB	BKS-S 10-3/BKS-S 8-3/ BKS-S220-12-PB/ BKS-S221-12-PB	BKS-S 10-3/BKS-S 8-3/ BKS-S220-12-PB/ BKS-S221-12-PB	BKS-S 92-00	BKS-S 92-00
	EN 50014:1997+A1+A2 EN 50020	EN 50014:1997+A1+A2 EN 50020	EN 50014:1997+A1+A2 EN 50020	EN 50014:1997+A1+A2 EN 50020	EN 50014:1997+A1+A2 EN 50020
	BVS 05 ATEX E 162 X	BVS 05 ATEX E 162 X	BVS 05 ATEX E 162 X	BVS 05 ATEX E 162 X	BVS 05 ATEX E 162 X
	Ex II 2G EEx ia IIC T6 Ex II 1D Ex iaD 20 T90°C	Ex II 2G EEx ia IIC T6 Ex II 1D Ex iaD 20 T90°C	Ex II 2G EEx ia IIC T6 Ex II 1D Ex iaD 20 T90°C	Ex II 2G EEx ia IIB T6 Ex II 1D Ex iaD 20 T90°C	Ex II 2G EEx ia IIB T6 Ex II 1D Ex iaD 20 T90°C
	≤ 210 nF	≤ 200 nF	≤ 230 nF	≤ 250 nF	≤ 220 nF
	0.115 mH	0.19 mH	0.21 mH	0.45 mH	0.71 mH
	U = 15 V I = 50 mA P = 120 mW	U = 15 V I = 50 mA P = 120 mW	U = 15 V I = 50 mA P = 120 mW	U = 15 V I = 50 mA P = 120 mW	U = 15 V I = 50 mA P = 120 mW

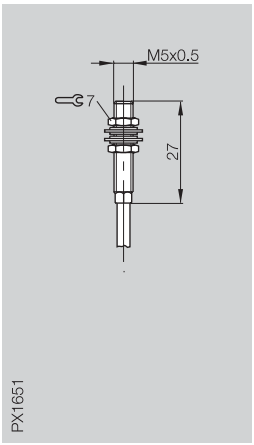
Permissible installation variations for Unicompact

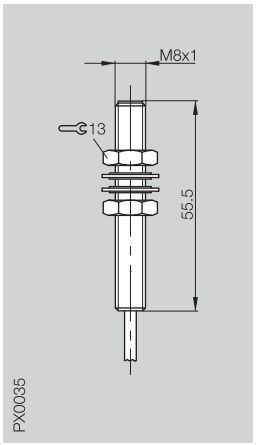


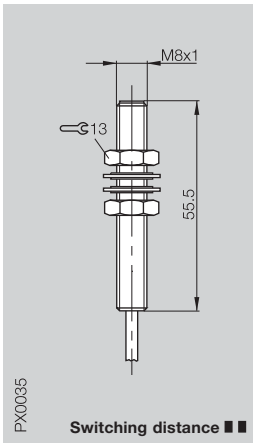
Rated operating distance s_n	Permitted					
20 mm	yes	yes	yes	yes	yes	yes
35 mm	no	no	no	yes	no	yes

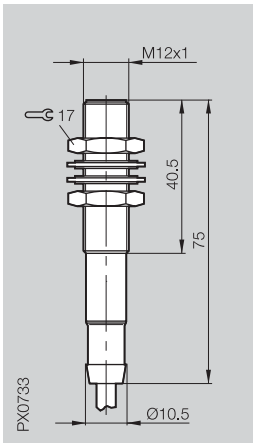
Housing size		**M5×0.5**	**M8×1**	**M8×1**	**M12×1**
Mounting (see notes starting p. **1.0.**11)		flush	flush	flush	flush
Rated operating distance s_n		**0.5 mm**	**1 mm**	**2 mm**	**2 mm**
Assured operating distance s_a		0...0.4 mm	0...0.8 mm	0...1.6 mm	0...1.6 mm
PNP	NO ①	BES M05ED-PSD05B-ES02-T01	BES 516-324-SA8-02	BES 516-324-SA26-02	BES 516-325-SA19-03
	complementary ③				
NPN	NO ④				BES 516-329-SA14-A0-X-03
	complementary ⑥				
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e		≤ 1 V	≤ 1.5 V	≤ 1.5 V	PNP ≤ 1.8 V, NPN ≤ 1.5 V
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	75 V DC
Rated operational current I_e		≤ 150 mA (see Fig. 1)	≤ 200 mA (see Fig. 2)	≤ 200 mA (see Fig. 3)	≤ 200 mA (see Fig. 3)
No-load supply current I_0 max.		≤ 10 mA	≤ 20 mA	≤ 20 mA	≤ 25 mA
Polarity reversal protected		yes	yes	yes	yes
Short circuit protected		yes	no	no	no
Repeat accuracy R		≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a		**–25...+120 °C**	**–25...+100 °C**	**–25...+120 °C**	**–25...+120 °C**
Switching frequency f		1000 Hz	2000 Hz	1500 Hz	1000 Hz
Utilization category		DC 13	DC 13	DC 13	DC 13
Function indicator		no	no	no	no
Degree of protection per IEC 60529		IP 67	IP 67	IP 67, IP 60 cable exit	IP 68 per BWN Pr. 20, IP 60 cable exit
Housing material		Stainless steel	Stainless steel	Stainless steel	CuZn coated
Material of sensing face		PA 6	PBT	PBT	PEEK
Connection		2 m silicon cable	2 m PVC/105 °C cable	2 m Teflon cable	3 m silicon cable
No. of wires × cross-section		3×0.15 mm²	3×0.14 mm²	3×0.14 mm²	3×0.5 mm²
Recommended connector					
Pressure rated to					**3 bar**









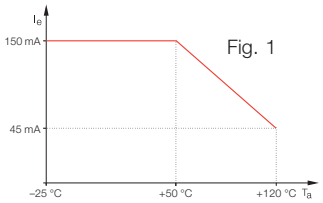


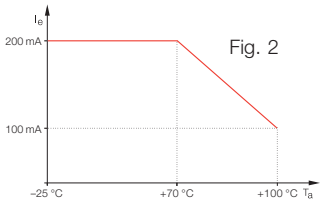
① Wiring diagrams see page **1.0.**6
Exception: BES 516-325-SA19- and BES 516-329-SA14-A0-X- see above

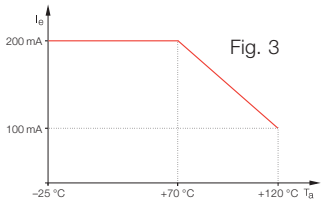
Switching distance ■■ see page **1.0.**10

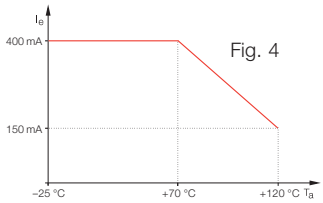
Other cable lengths on request.

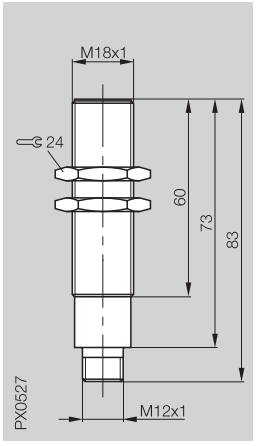
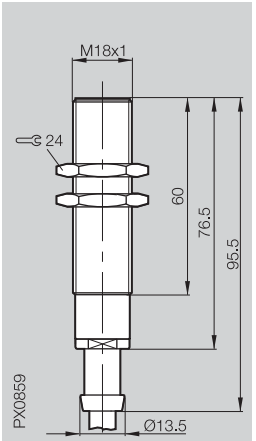
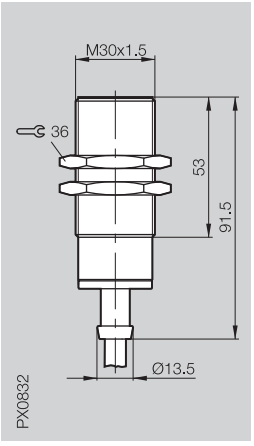
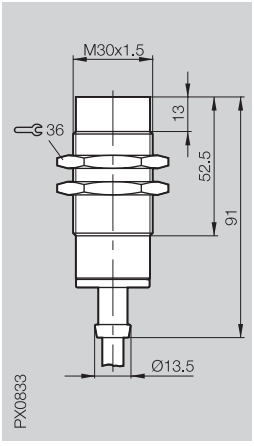
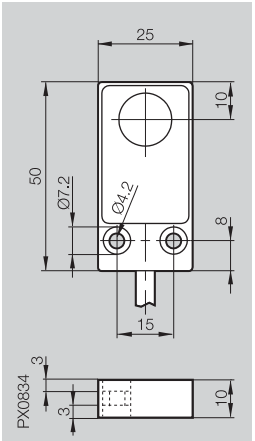
Current reduction as a function of ambient temperature range









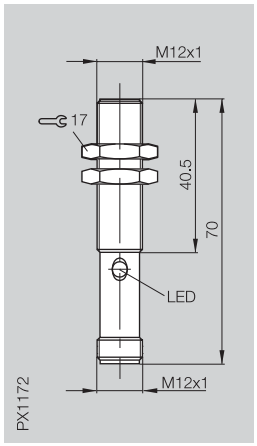
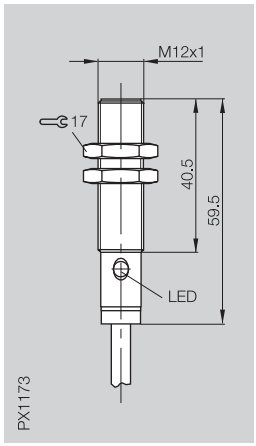
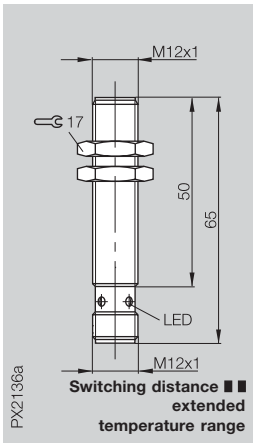
	M18×1	M18×1	M30×1.5	M30×1.5	25×50×10 mm
	flush	flush	flush	non-flush	flush
	5 mm	**5 mm**	**10 mm**	**15 mm**	**5 mm**
	0...4.1 mm	0...4.1 mm	0...8.1 mm	0...12.2 mm	0...4.1 mm
					
	BES 516-105-SA5	BES 516-105-SA2-05	BES 516-114-SA1-05	BES 516-125-SA1-05	BES 516-347-SA2-03
			BES 516-120-SA2		
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	24 V DC ±10 %
	≤ 1.5 V	≤ 1.5 V	≤ 1.5 V	≤ 1.5 V	≤ 2.5 V
	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
	≤ 400 mA (see Fig. 4)	≤ 400 mA (see Fig. 4)	≤ 400 mA (see Fig. 4)	≤ 400 mA (see Fig. 4)	≤ 25 mA
	≤ 20 mA	≤ 20 mA	≤ 15 mA	≤ 15 mA	≤ 25 mA
	yes	yes	yes	yes	yes
	no	no	no	no	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–25...+120 °C	**–25...+120 °C**	**–25...+120 °C**	**–25...+120 °C**	**–25...+100 °C**
	500 Hz	500 Hz	300 Hz	100 Hz	500 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	no	no	no	no	no
	IP 67	IP 67, IP 60 cable exit	IP 67, IP 60 cable exit	IP 67, IP 60 cable exit	IP 65, IP 60 cable exit
	CuZn coated	CuZn coated	CuZn coated	CuZn coated	GD-Al
	PBT	PBT	PBT	PA 12	PBT
	Connector	5 m silicon cable	Silicon cable 5 m for BES 516-114-SA1-05 9 m for BES 516-120-SA2	5 m silicon cable	3 m silicon cable
		4×0.75 mm²	4×0.75 mm²	4×0.75 mm²	3×0.75 mm²
	BKS-S 23-3/BKS-S 24-3/BKS-S144				

Temperature rated sensors to +120 °C

More and more industrial processes are running at higher temperatures. This increases the demands on the sensor. With high temperature rated sensors from Balluff you are on the safe side even under high temperatures.

Applications

- Television picture tube and display manufacturing
- Motor function monitoring
- Glass manufacturing

Housing size			**M12×1**	**M12×1**	**M12×1**
Mounting (see notes starting p. **1.0.**11)			flush	flush	flush
Rated operating distance s_n			**2 mm**	**2 mm**	**4 mm**
Assured operating distance s_a			0...1.6 mm	0...1.6 mm	0...3.2 mm
					
			stainless steel		
PNP	NO	①	BES 515-325-S4-C	BES 515-325-B0-C-PU-03	BES M12EI-PSC40B-S04G
	NC	②			BES M12EI-POC40B-S04G
NPN	NO	④			BES M12EI-NSC40B-S04G
Supply voltage U_B			10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e			≤ 1.5 V	≤ 1.5 V	≤ 2.5 V
Rated insulation voltage U_i			250 V AC	250 V AC	250 V AC
Rated operational current I_e			200 mA	200 mA	200 mA
No-load supply current I_0 max.			≤ 8 mA	≤ 8 mA	≤ 14 mA
Polarity reversal protected			yes	yes	yes
Short circuit protected			yes	yes	yes
Repeat accuracy R			≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a			–25...+70 °C	–25...+70 °C	–25...+85 °C
Switching frequency f			≤ 3000 Hz	≤ 3000 Hz	≤ 1000 Hz
Utilization category			DC 13	DC 13	DC 13
Function indicator			yes	yes	yes
Degree of protection per IEC 60529			IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
Insulation class			⧈	⧈	⧈
Housing material			Stainless steel	Stainless steel	Stainless steel
Material of sensing face			PA 12	PA 12	LCP
Connection			Connector	3 m PUR cable	Connector
No. of wires × cross-section				3×0.34 mm²	
Approval			cULus	cULus	cULus
Recommended connector			BKS-S 20E		BKS-S 20E

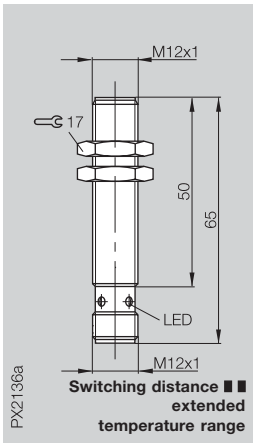
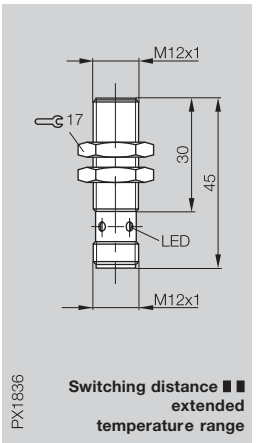
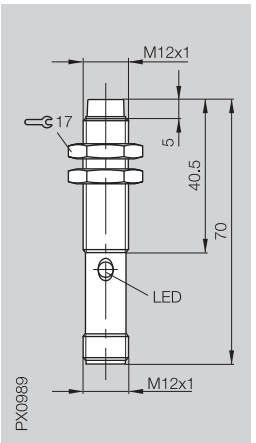
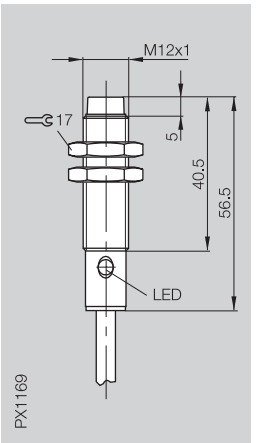
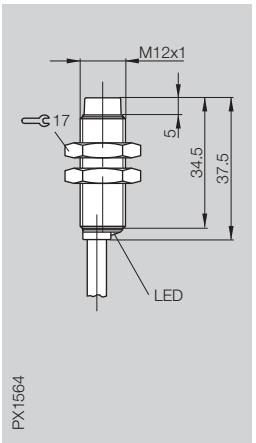
① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

Other cable lengths on request.

A tough player – Stainless steel housing stops aggressive media in its tracks.

Inductive proximity switches are being increasingly used in aggressive environments. This applies especially to the working zone of machine tools or in the chemical industry, on packaging machines and in the food industry. The main elements at work are aggressive cleaning agents combined with high-pressure cleaning equipment.

The solution = PROXINOX®

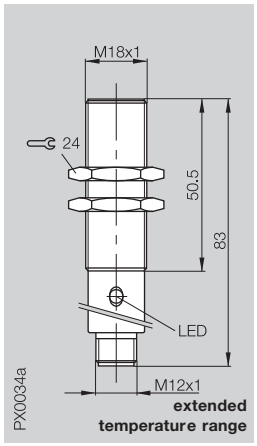
	M12×1	M12×1	M12×1	M12×1	M12×1
	flush	flush	non-flush	non-flush	non-flush
	4 mm	**4 mm**	**4 mm**	**4 mm**	**4 mm**
	0...3.2 mm	0...3.2 mm	0...3.2 mm	0...3.2 mm	0...3.2 mm
					
	BES M12EI-PSC40B-S04G-009	BES M12EE-PSC40B-S04G BES M12EE-POC40B-S04G	BES 515-356-S4-C	BES 515-356-B0-C-03	BES 515-356-E4-C-03
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 2.5 V	≤ 2 V	≤ 1.5 V	≤ 1.5 V	≤ 2 V
	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC
	200 mA	200 mA	200 mA	200 mA	200 mA
	≤ 10 mA	≤ 10 mA	≤ 8 mA	≤ 8 mA	≤ 10 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–40...+85 °C	–25...+85 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	≤ 2000 Hz	≤ 2000 Hz	≤ 1500 Hz	≤ 1500 Hz	≤ 2000 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
	⊡	⊡	⊡	⊡	⊡
	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
	LCP	LCP	PA 12	PA 12	PBT
	Connector	Connector	Connector	3 m PVC cable	3 m PVC cable
				3×0.34 mm²	3×0.34 mm²
	cULus	cULus	cULus	cULus	cULus
	BKS-S 20E	BKS-S 20E	BKS-S 20E		

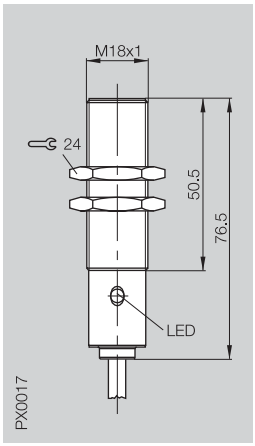
1.5
Factor 1
Weld immune
Magnetic field immune
Diagnostic
Steelface
Pressure rated
Pressure rated Ex
Namur Ex
Temperature rated
PROXINOX®
Ring Sensors
Extended switching distance

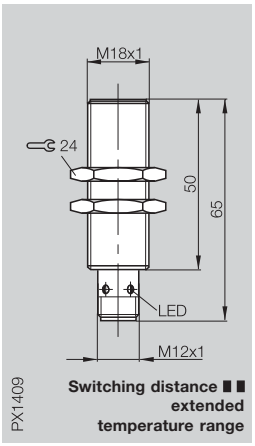
5
Connectors, Holders ...
Page 5.2 ...

Housing size	**M18×1**	**M18×1**	**M18×1**	
Mounting (see notes starting p. **1.0.**11)	flush	flush	flush	
Rated operating distance s_n	**5 mm**	**5 mm**	**8 mm**	
Assured operating distance s_a	0...4.1 mm	0...4.1 mm	0...6.5 mm	

stainless steel





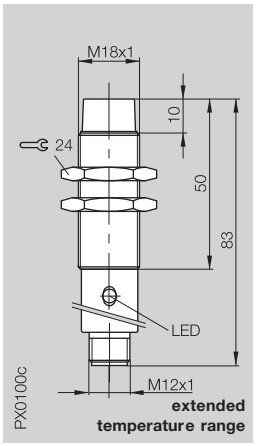
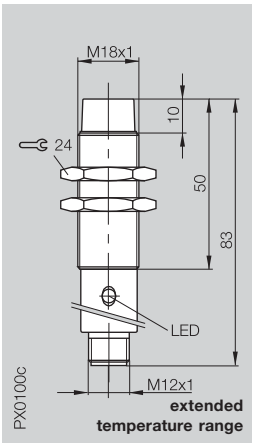
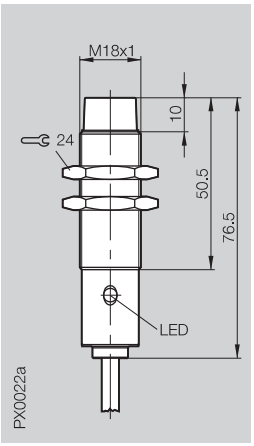
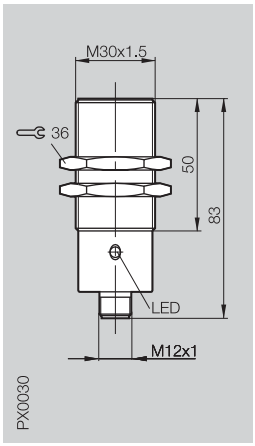
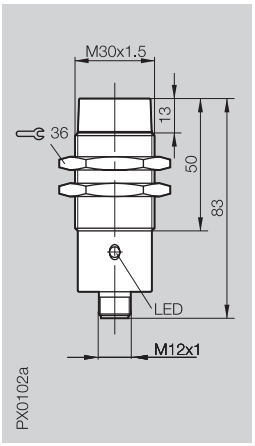


PNP					
	NO	①	BES 515-326-S4-C	BES 515-326-B0-C-PU-03	BES M18EI-PSC80B-S04G
	NC	②			BES M18EI-POC80B-S04G
	complementary	③			

Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e	≤ 1.5 V	≤ 1.5 V	≤ 2.5 V
Rated insulation voltage U_i	250 V AC	250 V AC	250 V AC
Rated operational current I_e	200 mA	200 mA	200 mA
No-load supply current I_0 max.	≤ 12 mA	≤ 12 mA	≤ 10 mA
Polarity reversal protected	yes	yes	yes
Short circuit protected	yes	yes	yes
Repeat accuracy R	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T_a	–40...+85 °C	–25...+70 °C	–40...+85 °C
Switching frequency f	900 Hz	900 Hz	700 Hz
Utilization category	DC 13	DC 13	DC 13
Function indicator	yes	yes	yes
Degree of protection per IEC 60529	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
Insulation class	⧈	⧈	⧈
Housing material	Stainless steel	Stainless steel	Stainless steel
Material of sensing face	PA 12	PA 12	PBT
Connection	Connector	3 m Cable PUR	Connector
No. of wires × cross-section		3×0.34 mm²	
Approval	cULus	cULus	cULus
Recommended connector	BKS-S 20E		BKS-S 20E

① Wiring diagrams see page **1.0.**6
Switching distance ■■ see page **1.0.**10

Other cable lengths on request.

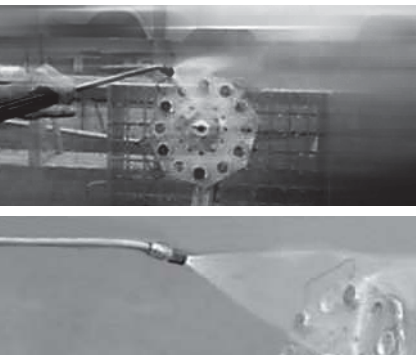
	M18×1	M18×1	M18×1	M30×1.5	M30×1.5
	non-flush	non-flush	non-flush	flush	non-flush
	8 mm	**8 mm**	**8 mm**	**10 mm**	**15 mm**
	0...6.5 mm	0...6.5 mm	0...6.5 mm	0...8.1 mm	0...12.2 mm
					
	BES 515-360-S4-C	BES 515-123-S4-C	BES 515-360-B0-C-PU-03	BES 515-327-S4-C	BES 515-362-S4-C
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 1.5 V	≤ 2.5 V	≤ 1.5 V	≤ 2.5 V	≤ 2.5 V
	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC
	200 mA	200 mA	200 mA	200 mA	200 mA
	≤ 12 mA	≤ 30 mA	≤ 12 mA	≤ 25 mA	≤ 25 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–40...+85 °C	–40...+85 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	600 Hz	200 Hz	600 Hz	≤ 300 Hz	≤ 100 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	yes	yes	yes	yes	yes
	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
	⊡	⊡	⊡	⊡	⊡
	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
	PA 12	PA 12	PA 12	PA 12	PA 12
	Connector	Connector	3 m Cable PUR	Connector	Connector
			3×0.34 mm²		
	cULus	cULus	cULus	cULus	cULus
	BKS-S 20E	BKS-S 20E		BKS-S 20E	BKS-S 20E

1.5
Factor 1
Weld immune
Magnetic field immune
Diagnostic
Steelface
Pressure rated
Pressure rated Ex
Namur Ex
Temperature rated
PROXINOX®
Ring Sensors
Extended switching distance

5
Connectors, Holders ...
Page 5.2 ...

PROXINOX® Sensors – withstands the harshest cleaning processes

In the food and beverage industry, the chemical industry, and even conveying operations, inductive proximity sensors are routinely cleaned with more and more aggressive agents. Whether it's acids, bases, steam, foam or high pressure cleaning equipment – the technology in the new PROXINOX ®-stainless steel sensors is especially designed for these harsh conditions.



+ Steam blast tested

Features

- No function display directly on sensor: the hole for the LED is a potential source of danger when cleaning, as well as a possible entry for bacteria. The function display is completely wrapped in the transparent plastic of the connector.
- Housing of stainless steel (type 1.4571): type 1.4571 stainless steel is what the food and beverage industry demands. The connector plug must also be capable of withstanding cleaning and disinfecting agents.
- Gold contacts: harsh conditions demand gold plated contacts in order to avoid connector corrosion.
- Laser etched part number: cleaning agents and disinfectants can remove a label. Etched part numbers are there to stay.
- Additional O-ring seals: temperature shock, caused by cleaning and disinfection, lead to strongly different expansions of a steel housing and the internal epoxy.

Housing size	
Mounting (see notes starting p. **1.0.**11)	
Rated operating distance s_n	
Assured operating distance s_a	

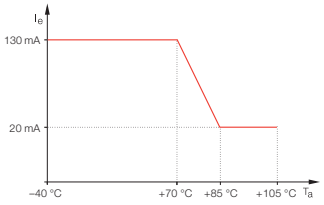
CE

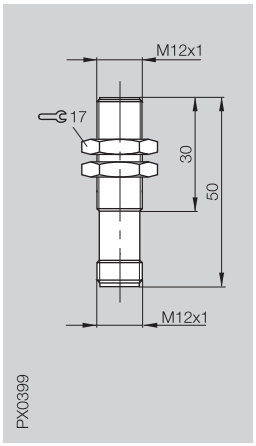
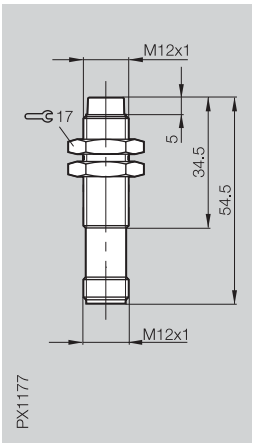
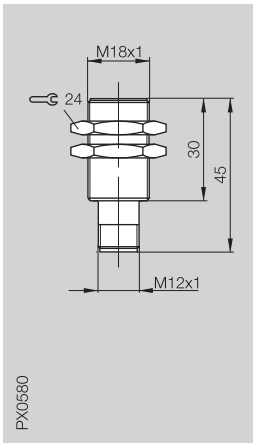
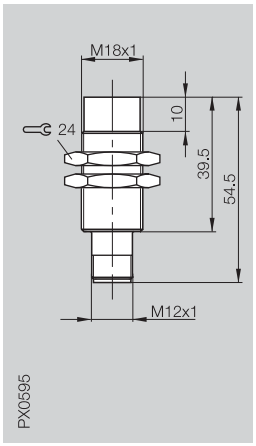
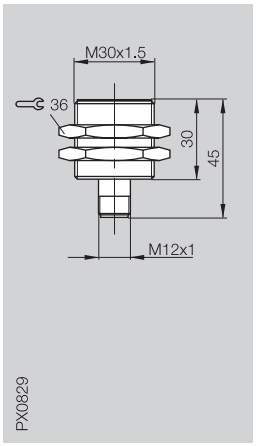
stainless steel

PNP	NO	①
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 max.		
Polarity reversal protected		
Short circuit protected		
Repeat accuracy R		
Ambient temperature range T_a		
Ambient temperature T_a at load current ≤ 20 mA		
Ambient temperature range T_a short-time 30 min		
Switching frequency f		
Utilization category		
Function indicator		
Degree of protection per IEC 60529		
Housing material		
Material of sensing face		
Connection		
Approval		
Recommended connector		

① Wiring diagrams see page **1.0.**6

Current reduction as a function of ambient temperature range



	M12×1	M12×1	M18×1	M18×1	M30×1.5
	flush	non-flush	flush	non-flush	flush
	2 mm	**4 mm**	**5 mm**	**8 mm**	**10 mm**
	0...1.6 mm	0...3.2 mm	0...4.1 mm	0...6.5 mm	0...8.1 mm
					
	BES 515-325-E5-T-S4	BES 515-356-E5-T-S4	BES 515-326-E5-T-S4	BES 515-360-E5-T-S4	BES 515-327-E5-T-S4
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 3.5 V	≤ 3.5 V	≤ 3.5 V	≤ 3.5 V	≤ 3.5 V
	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
	130 mA	130 mA	130 mA	130 mA	130 mA
	≤ 25 mA	≤ 25 mA	≤ 25 mA	≤ 25 mA	≤ 20 mA
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
	–40...+70 °C	–40...+70 °C	–40...+70 °C	–40...+70 °C	–40...+70 °C
	–40...+85 °C	–40...+85 °C	–40...+85 °C	–40...+85 °C	–40...+85 °C
	+105 °C	+105 °C	+105 °C	+105 °C	+105 °C
	≤ 800 Hz	400 Hz	500 Hz	200 Hz	200 Hz
	DC 13	DC 13	DC 13	DC 13	DC 13
	no	no	no	no	no
	IP 69K and IP 68 per BWN Pr. 27	IP 69K and IP 68 per BWN Pr. 27	IP 69K and IP 68 per BWN Pr. 27	IP 69K and IP 68 per BWN Pr. 27	IP 69K and IP 68 per BWN Pr. 27
	Stainless steel 1.4571	**Stainless steel 1.4571**	**Stainless steel 1.4571**	**Stainless steel 1.4571**	**Stainless steel 1.4571**
	PEEK	PEEK	PA 12	PA 12	PA 12
	Connector	Connector	Connector	Connector	Connector
	cULus	cULus	cULus	cULus	cULus
	BKS-S260-3	BKS-S260-3	BKS-S260-3	BKS-S260-3	BKS-S260-3