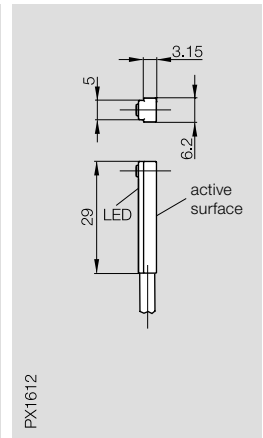
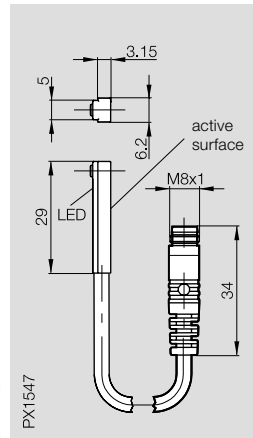
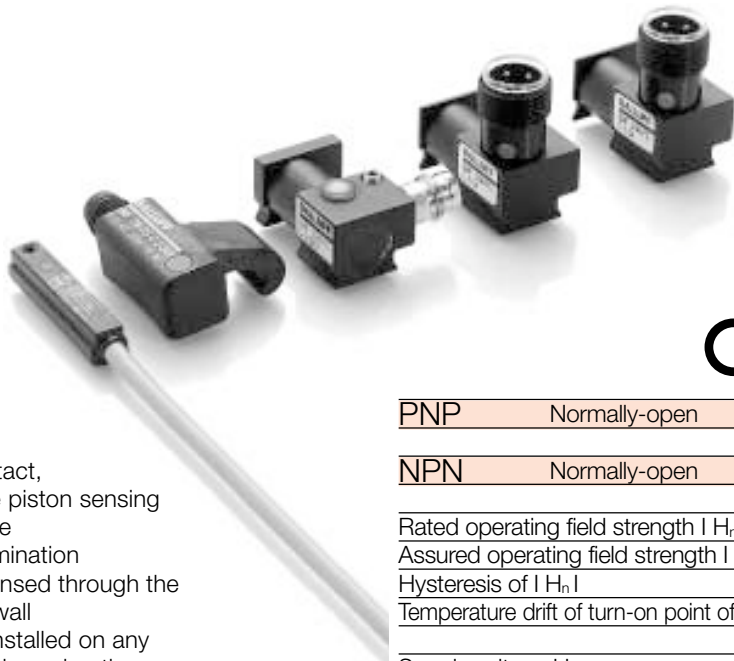


- Non-contact
- Wear-free
- Non-interfering
- Bounceless output signal
- Function indicator
- Switching independent of the polarization of the magnetic field
- No multiple switchpoints
- Compact housings
- Can be attached to any cylinder type

Magnetic field sensors respond to an external magnetic field. Their main area of application is sensing piston positions in pneumatic cylinders.

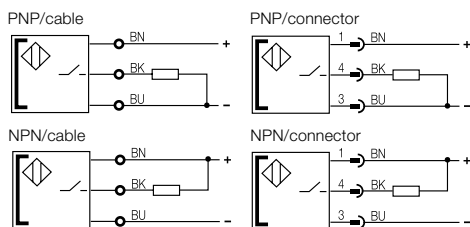
- 3.2** Applications
- 3.3** General description, principles of operation
- 3.4** BMF 303, BMF 305
- 3.5** BMF 305
- 3.6** BMF 305 Reed switches
- 3.7** Brackets selection guide and assembly for BMF 303
- 3.8** Brackets selection guide and assembly for BMF 305
- 3.12** BMF 307
- 3.13** BMF 21, BMF 32
- 3.14** Brackets for BMF 21
- 3.15** Brackets for BMF 32
- 3.16** Cylindrical housing \varnothing 6.5 mm
- 3.17** Cylindrical housings \varnothing 6.5 mm, \varnothing 10 mm, M8, M12
- 3.18** Installation notes
- 3.20** Selection guide connectors and cables





- Non-contact, wear-free piston sensing
- Insensitive to contamination
- Piston sensed through the cylinder wall
- Can be installed on any cylinder size using the corresponding bracket

Wiring diagrams



Please add the cable length to the ordering code for sensors with **cable!**
PU-03, PU-05 = PUR, length 3 m or 5 m

Please add the cable length to the ordering code for sensors with **cable and connector!**
00,2, 00,5 = PUR, length 0.2 m or 0.5 m



Series		BMF 307	BMF 307
PNP	Normally-open	BMF 307K-PS-C-2-S49-	BMF 307K-PS-C-2-
NPN	Normally-open		
Rated operating field strength H _n		1.2 kA/m	1.2 kA/m
Assured operating field strength H _a		≥ 2 kA/m	≥ 2 kA/m
Hysteresis of H _n		≤ 45 %	≤ 45 %
Temperature drift of turn-on point of H _n		≤ 0.3 %/°C	≤ 0.3 %/°C
Supply voltage U _B		10...30 V DC	10...30 V DC
Voltage drop U _d		≤ 3.1 V	≤ 3.1 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.		≤ 30 mA	≤ 30 mA
Off-state current I _r		≤ 80 µA	≤ 80 µA
Protected against polarity reversal		yes	yes
Short circuit protected		yes	yes
Load capacity		≤ 1 µF	≤ 1 µF
Ambient temperature range T _a		-25...+70 °C	-25...+70 °C
Utilization category		DC 13	DC 13
Degree of protection per IEC 60529		IP 67	IP 67
Housing material		LCP	LCP
Connection		cable with connector	cable
No. of wires × conductor cross section			3 × 0.14 mm ²
Approval		cULus	cULus
Recommended connector		BKS-B 48	

Brackets for

	Cylinder with tie rod		
	Cylinder with DUO rail		
	Cylinder without tie rod/rail		
	Profile cylinder		
	Cylinder with trapezoidal rail		

Without brackets

	Cylinder with T-slot/trapezoidal slot	useable without bracket in cylinder with T-slot e. g. Festo ADVU, DRQ, DGP	
--	---------------------------------------	--	--

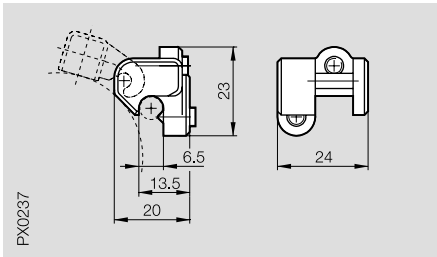
BMF 21	BMF 21	BMF 32	BMF 32	BMF 32
BMF 21K-PS-C-2-S49	BMF 21K-PS-C-2-	BMF 32M-PS-C-2-S49	BMF 32M-PS-C-2-S 4	BMF 32M-PS-W-2-S 4
BMF 21K-NS-C-2-S49	BMF 21K-NS-C-2-	BMF 32M-NS-C-2-S49	BMF 32M-NS-C-2-S 4	
1.2 kA/m ≥ 2 kA/m ≤ 45 % ≤ 0.3 %/°C	1.2 kA/m ≥ 2 kA/m ≤ 45 % ≤ 0.3 %/°C	1.2 kA/m ≥ 2 kA/m ≤ 45 % ≤ 0.3 %/°C	1.2 kA/m ≥ 2 kA/m ≤ 45 % ≤ 0.3 %/°C	1.2 kA/m ≥ 2 kA/m ≤ 45 % ≤ 0.3 %/°C
10...30 V DC ≤ 3.1 V 75 V DC 200 mA ≤ 30 mA ≤ 80 µA yes yes ≤ 1 µF -25...+70 °C DC 13 IP 67	10...30 V DC ≤ 3.1 V 75 V DC 200 mA ≤ 30 mA ≤ 80 µA yes yes ≤ 1 µF -25...+70 °C DC 13 IP 67	10...30 V DC ≤ 3.1 V 75 V DC 200 mA ≤ 30 mA ≤ 80 µA yes yes ≤ 1 µF -25...+70 °C DC 13 IP 67	10...30 V DC ≤ 3.1 V 75 V DC 200 mA ≤ 30 mA ≤ 80 µA yes yes ≤ 1 µF -25...+70 °C DC 13 IP 67	10...30 V DC ≤ 4 V 75 V DC 200 mA ≤ 30 mA ≤ 80 µA yes yes ≤ 0.15 µF -25...+70 °C DC 13 IP 67
PBT (fiberglass reinforced) connector	PBT (fiberglass reinforced) cable 3 × 0.14 mm ²	Al connector	Al connector	Al connector
cULus BKS-B 48/BKS-B 49	cULus BKS-B 48/BKS-B 49	cULus BKS-B 48/BKS-B 49	cULus BKS-B 19/BKS-B 20	cULus BKS-B 19/BKS-B 20
BMF 21-HW-8 BMF 21-HW-10	BMF 21-HW-8 BMF 21-HW-10	BMF 32-HW-13 BMF 32-HW-15	BMF 32-HW-13 BMF 32-HW-15	BMF 32-HW-13 BMF 32-HW-15
BMF 21-HW-8	BMF 21-HW-8	BMF 32-HW-16 BMF tube cuff	BMF 32-HW-16 BMF tube cuff	BMF 32-HW-16 BMF tube cuff
BMF 21-HW-11 BMF tube cuff	BMF 21-HW-11 BMF tube cuff	BMF tube cuff	BMF tube cuff	BMF tube cuff
BMF 21-HW-10	BMF 21-HW-10	BMF 32-HW-15	BMF 32-HW-15	BMF 32-HW-15
		BMF 32-HW-12 (Mecman) BMF 32-HW-14 (Bosch)	BMF 32-HW-12 (Mecman) BMF 32-HW-14 (Bosch)	BMF 32-HW-12 (Mecman) BMF 32-HW-14 (Bosch)
		useable without bracket on cylinders with 60°- or 90°-trapezoidal slot e. g. Festo, Bosch, Martonair		

3

Brackets
page 3.14 ...
Connectors
selection guide
page 3.20 ...

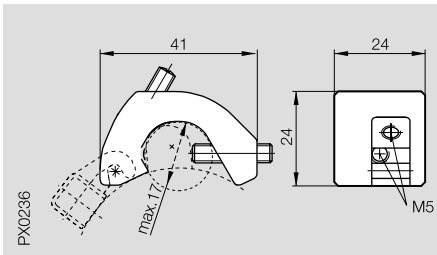
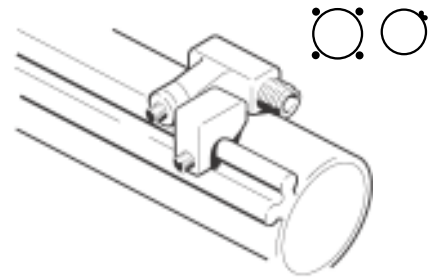
6

Connectors ...
page 6.2 ...

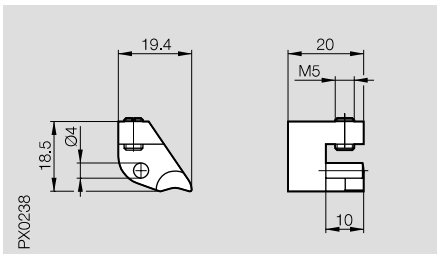
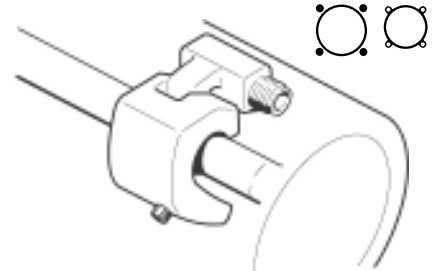


BMF 21-HW-8
for pneumatic cylinder with tie rod
any piston diameter
tie rod diameter up to 6.5 mm

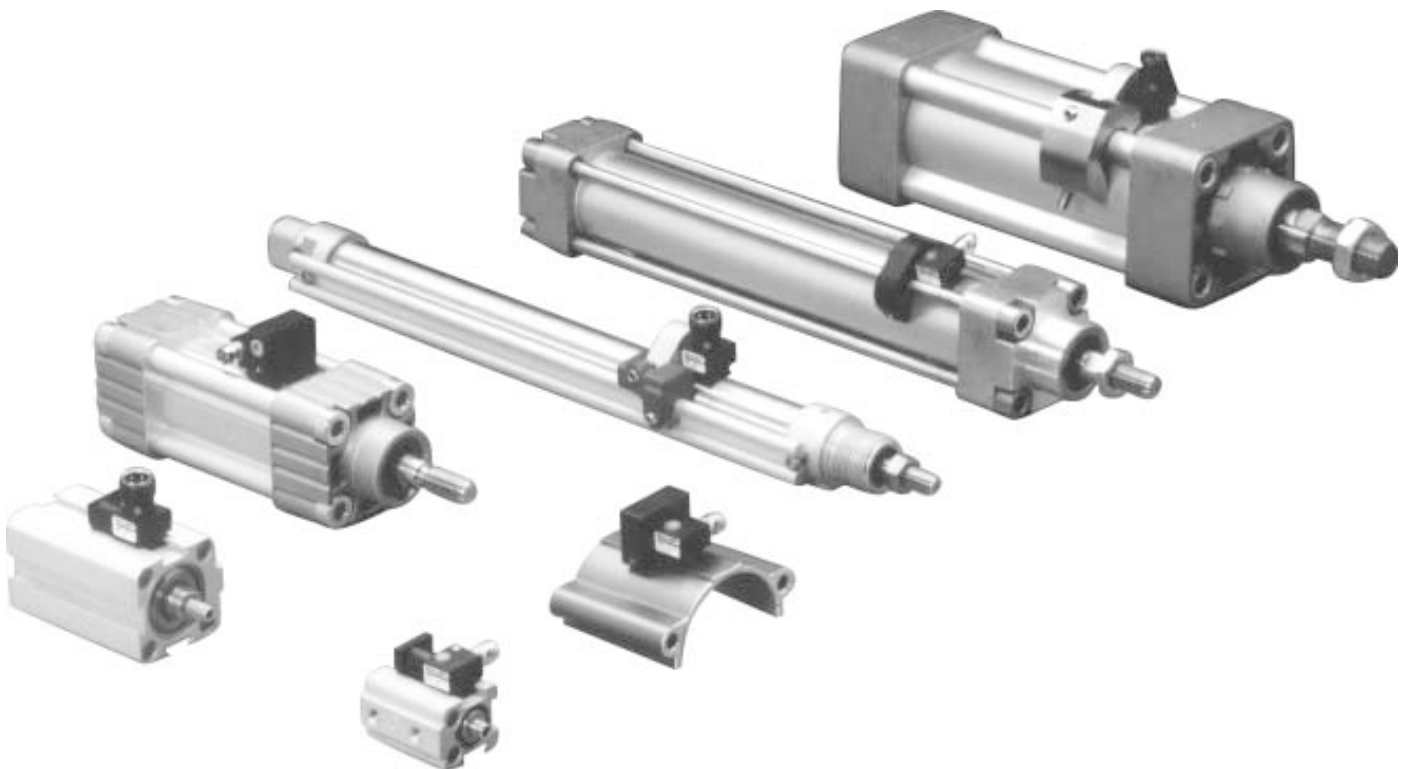
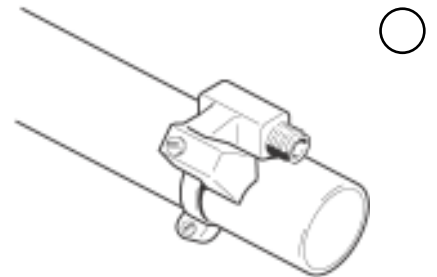
pneumatic cylinder with DUO rail
(Festo), any piston diameter

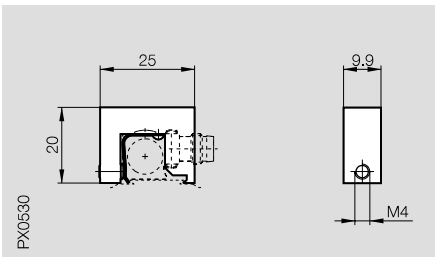


BMF 21-HW-10/BMF 21-HW-10-E
for pneumatic cylinder with tie rod
any piston diameter
tie rod diameter up to 17 mm
for pneumatic cylinder with integral
tie rod (profile)
any piston diameter
profile width up to 17 mm
BMF 21-HW-10-E: stainless steel 1.4305



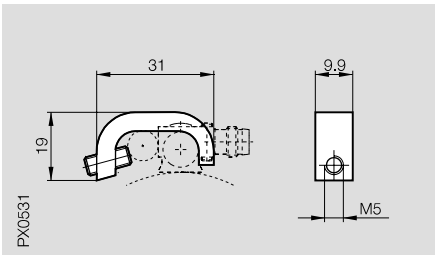
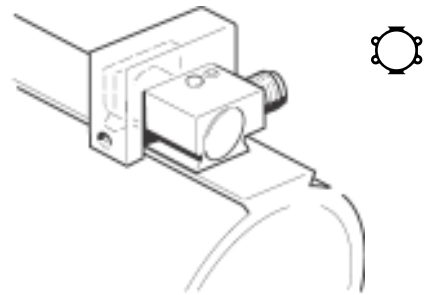
BMF 21-HW-11
for pneumatic cylinder without tie
rod/rail
piston diameter 8...80 mm
bracket for use only with tube cuff
please order tube cuff separately
(see page 3.15).





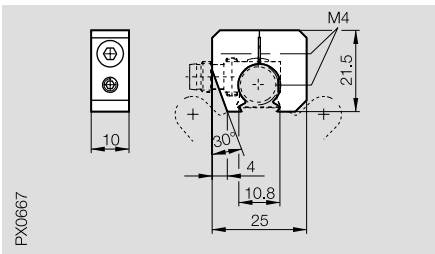
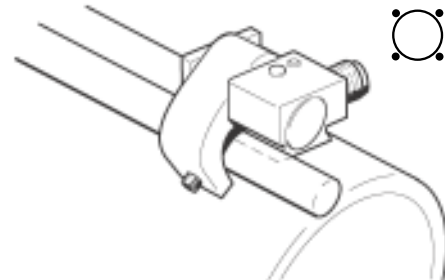
BMF 32-HW-12

for pneumatic cylinder with
trapezoidal rail (Rexroth-Mecman)
any piston diameter



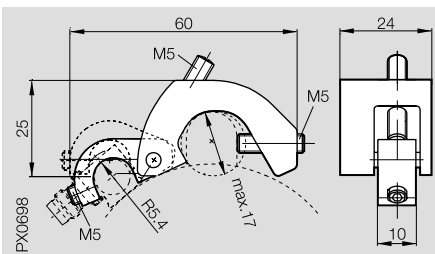
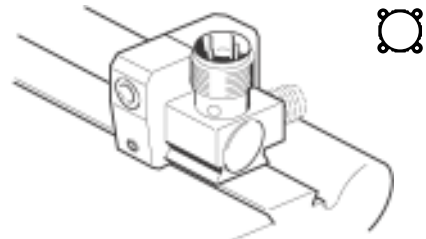
BMF 32-HW-13

for pneumatic cylinder with tie rod
any piston diameter
tie rod diameter max. 11 mm



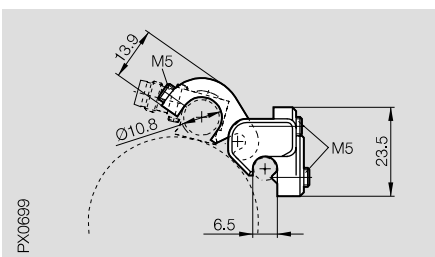
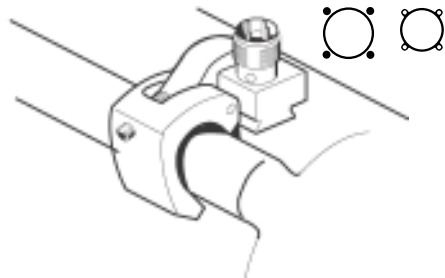
BMF 32-HW-14

for pneumatic cylinder with
trapezoidal rail (Bosch) type:
0 822 350/351/352/353/354/355
any piston diameter



BMF 32-HW-15

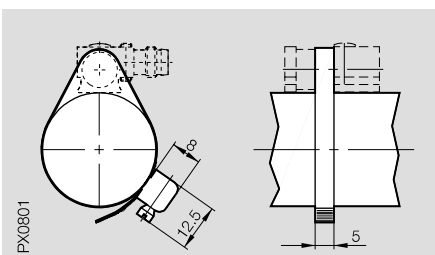
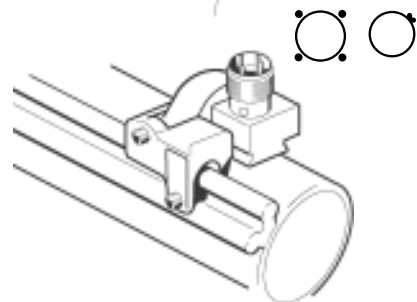
for pneumatic cylinder with tie rod
any piston diameter
tie rod diameter up to 17 mm
for pneumatic cylinder with integral
tie rod (profile)
any piston diameter
profile width up to 17 mm



BMF 32-HW-16

for pneumatic cylinder with tie rod
any piston diameter
tie rod diameter up to 6.5 mm

pneumatic cylinder with DUO rail
(Festo), any piston diameter

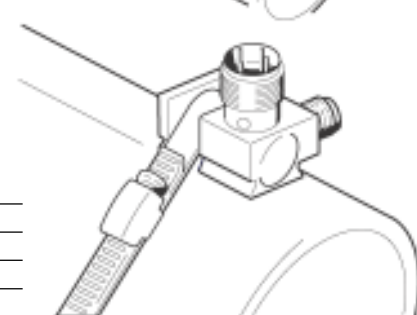


BMF Tube cuff size 1...8

stainless steel for pneumatic cylinder
without tie rod/rail
piston diameter 8...80 mm

Piston Ø	Tube cuff size for BMF 21-HW-11	Tube cuff size for BMF 32
8, 10	1	1
12	1	2
16, 20	2	2
25	2	3
32	3	3
40	4	4
50	5	5
63	6	8
80	7	7

Tube cuff size _ please order separately



Magnetic Field Sensors

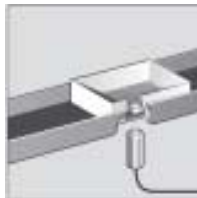
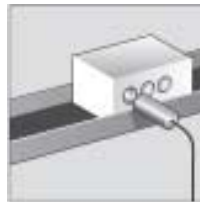
Cylindrical Housings
Ø 6.5 mm



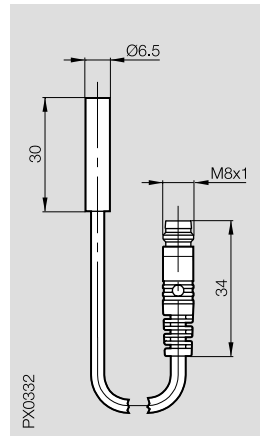
Some advantages of magnetic field sensors in the classic inductive sensors housing.

- Significantly greater switching distances compared with the same size inductive sensor
- Sensing through walls made of colored metal and aluminum, without reduced switching distances
- Reacts only to magnetic fields; no faulty switching by metal shavings or other metal parts
- Can be actuated from the front or side

- Magnet can be flush mounted in steel
- Protected against polarity reversal
- Supply voltage 10...30 V
- Responds to north or south poles
- Semiconductor sensor wear-free
- Vibration insensitive
- Output protected against inductive peaks
- Short circuit protected



Series	BMF 07M
Housing size	Ø 6.5 mm

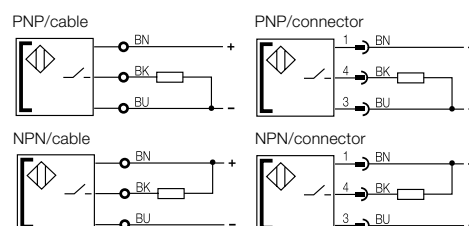


PNP	Normally-open	BMF 07M-PS-D-2-S49-
NPN	Normally-open	BMF 07M-NS-D-2-S49-
Rated operating field strength $I_{H_n I}$		1.2 kA/m
Assured operating field strength $I_{H_a I}$		≥ 2 kA/m
Hysteresis of $I_{H_n I}$		≤ 45 %
Temperature drift of turn-on point of $I_{H_n I}$		≤ 0.3 %/°C
Supply voltage U_B		10...30 V DC
Voltage drop U_d		≤ 2.5 V
Rated insulation voltage U_i		75 V DC
Rated operational current I_o		200 mA
No-load supply current I_o max.		≤ 12 mA
Off-state current I_r		≤ 80 μ A
Protected against polarity reversal		yes
Short circuit protected		yes
Load capacity		≤ 1 μ F
Ambient temperature range T_a		-25...+70 °C
Utilization category		DC 13
Degree of protection per IEC 60529		IP 67
Housing material		CuZn nickel plated
Connection		cable with connector
No. of wires \times conductor cross section		
Approval		cULus
Recommended connector		BKS-B 48

Please add the cable length to the ordering code for sensors with **cable!**
PU-03, PU-05 = PUR, length 3 m or 5 m

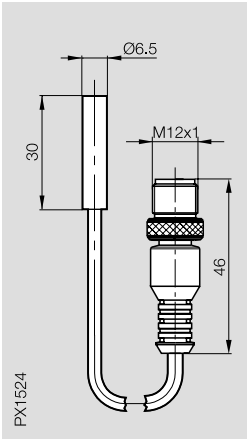
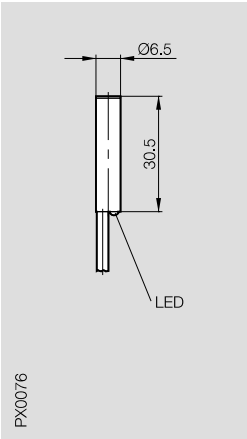
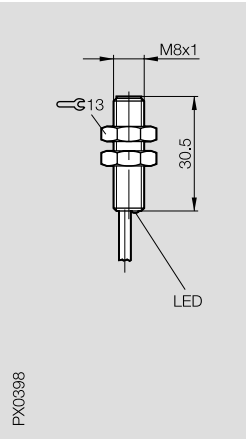
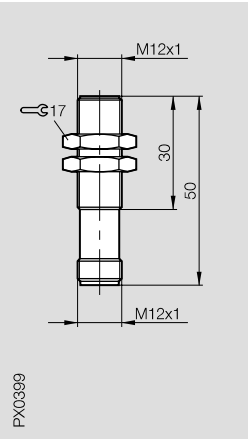
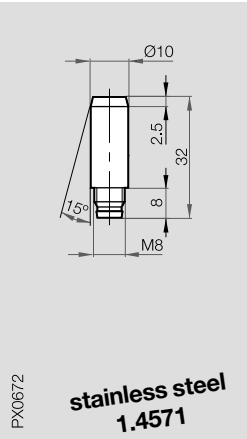
Please add the cable length to the ordering code for sensors with **cable and connector!**
00,2, 00,5 = PUR, length 0.2 m or 0.5 m

Wiring diagrams






Magnetic Field Sensors

Cylindrical Housings
 \varnothing 6.5 mm, \varnothing 10 mm,
 M8, M12

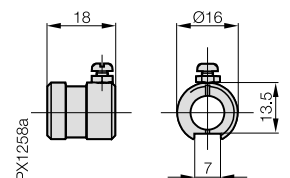
BMF 07M	BMF 07M	BMF 08M	BMF 12M	BMF 10E
\varnothing 6.5 mm	\varnothing 6.5 mm	M8x1	M12x1	for foods industry bracket BMF 10E-HW-19 \varnothing 10 mm
				
BMF 07M-PS-D-2-S 4-	BMF 07M-PS-C-2-KPU-	BMF 08M-PS-C-2-KPU-	BMF 12M-PS-D-2-S 4	BMF 10E-PS-D-2-SA 1-S49
	BMF 07M-NS-C-2-KPU-	BMF 08M-NS-C-2-KPU-	BMF 12M-NS-D-2-S 4	
1.2 kA/m \geq 2 kA/m \leq 45 % \leq 0.3 %/°C	1.2 kA/m \geq 2 kA/m \leq 45 % \leq 0.3 %/°C	1.2 kA/m \geq 2 kA/m \leq 45 % \leq 0.3 %/°C	1.2 kA/m \geq 2 kA/m \leq 45 % \leq 0.3 %/°C	1.2 kA/m \geq 2 kA/m \leq 45 % \leq 0.3 %/°C
10...30 V DC \leq 2.5 V 75 V DC 200 mA \leq 12 mA \leq 80 μ A yes yes \leq 1 μ F -25...+70 °C DC 13 IP 67 CuZn nickel plated cable with connector cULus BKS-B 19	10...30 V DC \leq 2.5 V 75 V DC 200 mA \leq 22 mA \leq 80 μ A yes yes \leq 1 μ F -25...+70 °C DC 13 IP 67 CuZn nickel plated cable 3 x 0.14 mm ² cULus	10...30 V DC \leq 3.1 V 75 V DC 200 mA \leq 22 mA \leq 80 μ A yes yes \leq 1 μ F -25...+70 °C DC 13 IP 67 CuZn nickel plated cable 3 x 0.14 mm ² cULus	10...30 V DC \leq 2.5 V 75 V DC 200 mA \leq 12 mA \leq 80 μ A yes yes \leq 1 μ F -25...+70 °C DC 13 IP 67 CuZn nickel plated connector cULus BKS-B 19/BKS-B 20	10...30 V DC \leq 2.5 V 75 V DC 200 mA \leq 12 mA \leq 80 μ A yes yes \leq 1 μ F -25...+70 °C DC 13 IP 67 stainless steel 1.4571 connector BKS-B 48/BKS-B 49

Operating distance magnet – sensor

Magnet type	Samarium-Cobalt	Hard ferrite	Strontium-Ferrite
			
Ordering code	630 620 260	350 620 961	320 709 084
Housing size	16 x 12 mm	\varnothing 10 mm	\varnothing 4 mm
Height	3 mm	10 mm	5 mm
Assured operating distance S_a	28 mm	15 mm	5 mm
Hysteresis	8 mm	2 mm	2 mm

Within the operating zone scheduled, a secure switch is guaranteed. The operating zones have been determined in measuring series and help to choose a magnet suitable.

Bracket BMF 10E-HW-19 (please order separately)



Piston- \varnothing	Tube cuff size
8, 10, 12	2
16, 20, 25	3
32	4
40	5
50	6
63	8
Tube cuff size _ please order separately	

3

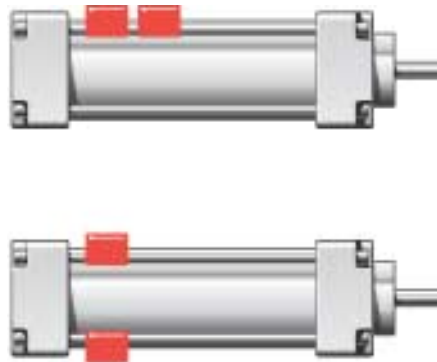
Connectors
 selection guide
 page 3.20 ...

6

Connectors,
 clamps ...
 page 6.2 ...

Mounting distances

The response travel of a magnetic field sensitive sensor is virtually independent of the field strength of typical piston magnets. Still the sensor does not exhibit false switching. When using more than one of the magnetic field switches, the BMF sensors can be mounted directly next to or beside each other.

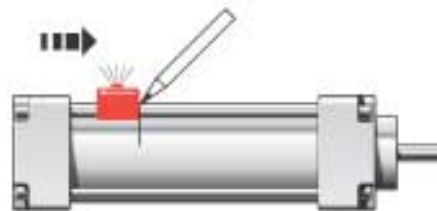


**Adjustment
and installation**

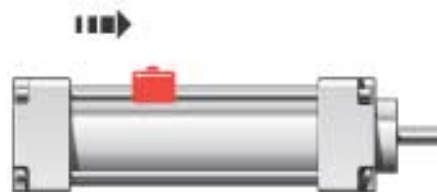
1. Set piston to end of travel.



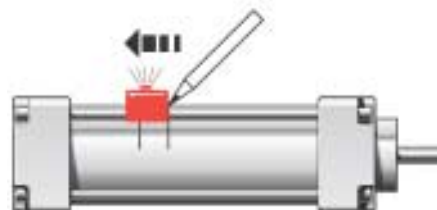
2. Slide sensor (with power on) until the output turns on (LED on). Mark front edge of sensor on cylinder.



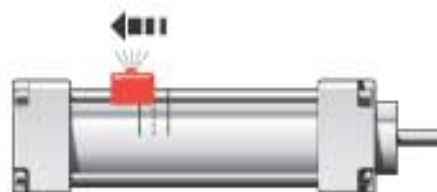
3. Continue to slide the sensor until the output is off (LED off).



4. Slide sensor back to 2nd turn-on point. Mark front edge of sensor on cylinder.



5. Fasten sensor down with front edge is between the two marked points.



Response distances

Ø cylinder	BMF 303	BMF 305/BMF 21/BMF 10E	BMF 307	BMF 32	BMF 32...W...
32 mm	10.0 mm	3.6 mm	9.7 mm	4.2 mm	7.2 mm
40 mm	9.1 mm	4.1 mm	10.1 mm	5.1 mm	5.1 mm
50 mm	13.0 mm	4.8 mm	12.4 mm	5.3 mm	6.5 mm
63 mm	12.4 mm	4.9 mm	11.9 mm	5.4 mm	9.4 mm
80 mm	13.0 mm	5.1 mm	12.6 mm	5.7 mm	8.5 mm
100 mm	13.1 mm	5.9 mm	13.3 mm	5.8 mm	8.8 mm

Hysteresis

	1...2 mm	0.5...1 mm	0.5...1 mm	1...1.5 mm	1.5...2 mm
--	----------	------------	------------	------------	------------

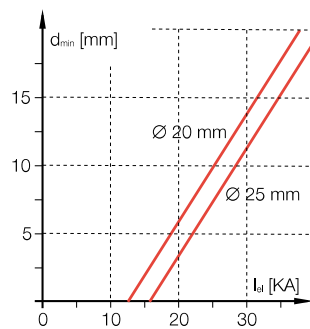
The indicated values represent measured guidelines.

Differences may arise due to different types of pistons and magnets.

Using in AC welding environments

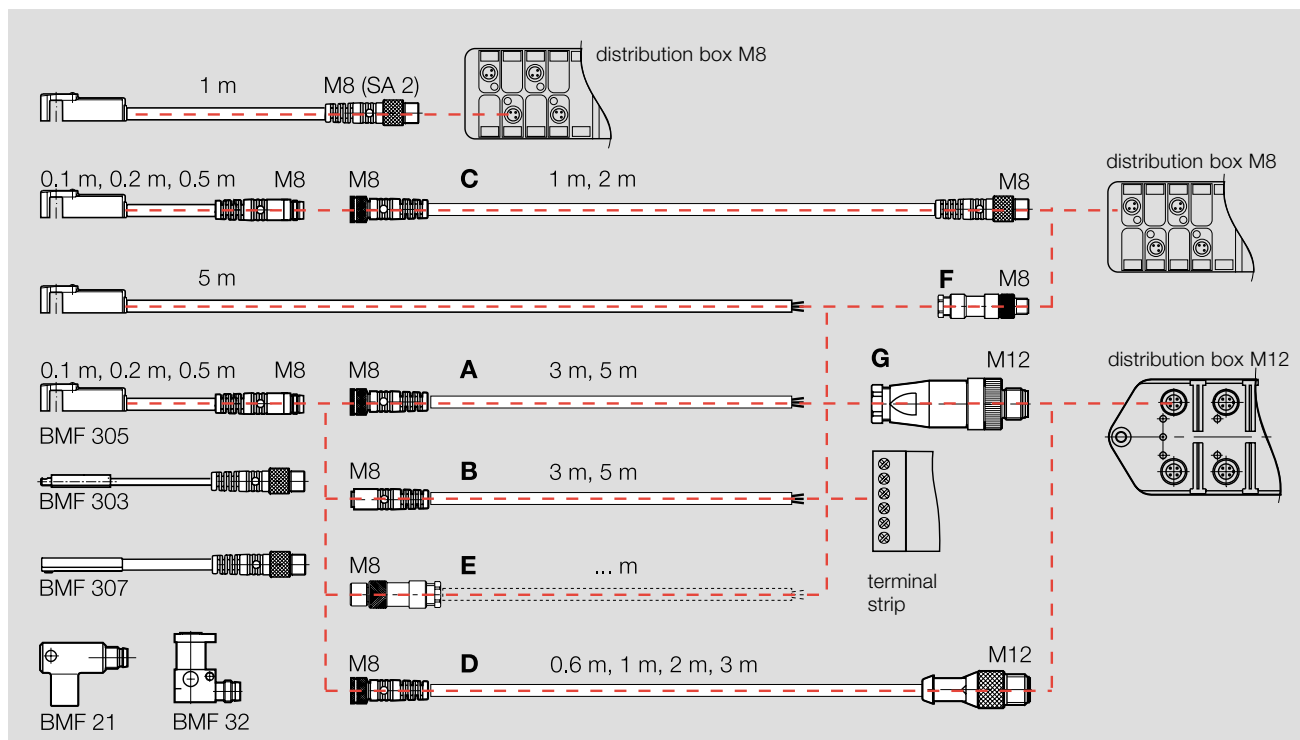
The BMF 305M/32M-...-W... magnetic field sensors can be operated in external fields up to a field strength of $E_{max} = 200$ kA/m. This limit is often exceeded in the direct vicinity of high current lines, e. g. welding equipment. The sensor should therefore be mounted

at a distance d_{min} from such lines, as shown in the diagram below showing the relationship between current and conductor diameter.



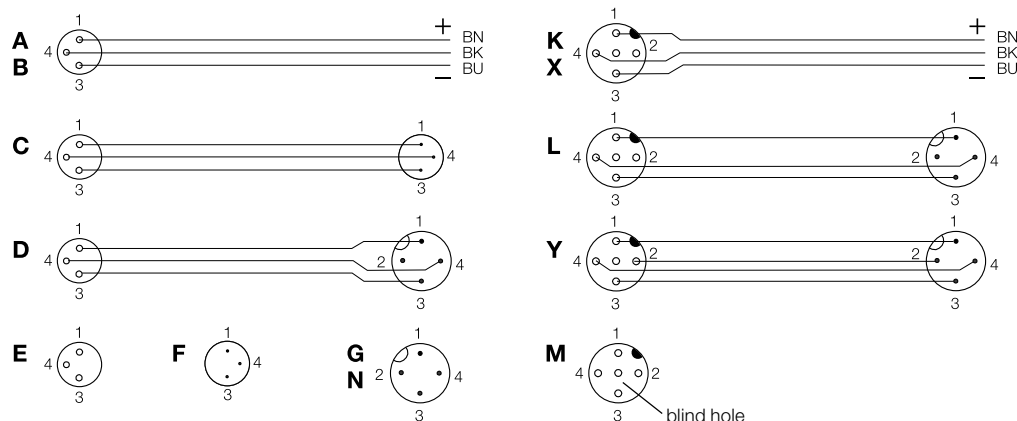
Wiring versions for M8 (BMF-...-S49)

Select the appropriate cable from the magnetic field sensor to your control.



Type/version	Fastening	Material	Length	Ordering code
A straight coupling M8 with molded-in cable	threaded ring M8, self-securing	PVC	3 m	BKS-B 48-1-03
		PVC	5 m	BKS-B 48-1-05
		PUR	3 m	BKS-B 48-1-PU-03
		PUR	5 m	BKS-B 48-1-PU-05
B straight coupling M8 with molded-in cable	ratchet (for M8)	PVC	3 m	BKS-B 41-1-03
		PVC	5 m	BKS-B 41-1-05
		PUR	3 m	BKS-B 41-1-PU-03
		PUR	5 m	BKS-B 41-1-PU-05
C straight coupling M8 with cable and straight connector M8	threaded ring M8, threaded ring M8	PUR	1 m	BKS-B 48-1/GS 49-PU-01
		PUR	2 m	BKS-B 48-1/GS 49-PU-02
D straight coupling M8 with cable and straight connector M12	threaded ring M8, threaded ring M12, self-securing	PUR	0.6 m	BKS-B 48-1/GS 4-PU-00,6
		PUR	1 m	BKS-B 48-1/GS 4-PU-01
		PUR	2 m	BKS-B 48-1/GS 4-PU-02
		PUR	3 m	BKS-B 48-1/GS 4-PU-03
E straight coupling M8, solder contacts 3-pin	threaded ring M8			BKS-S 81-00
F straight connector M8, solder contacts 3-pin	threaded ring M8			BKS-S 82-00
G straight connector M12, screw contacts 4-pin	threaded ring M12			RSC 4/7

Connector wiring



front view of pins/sockets

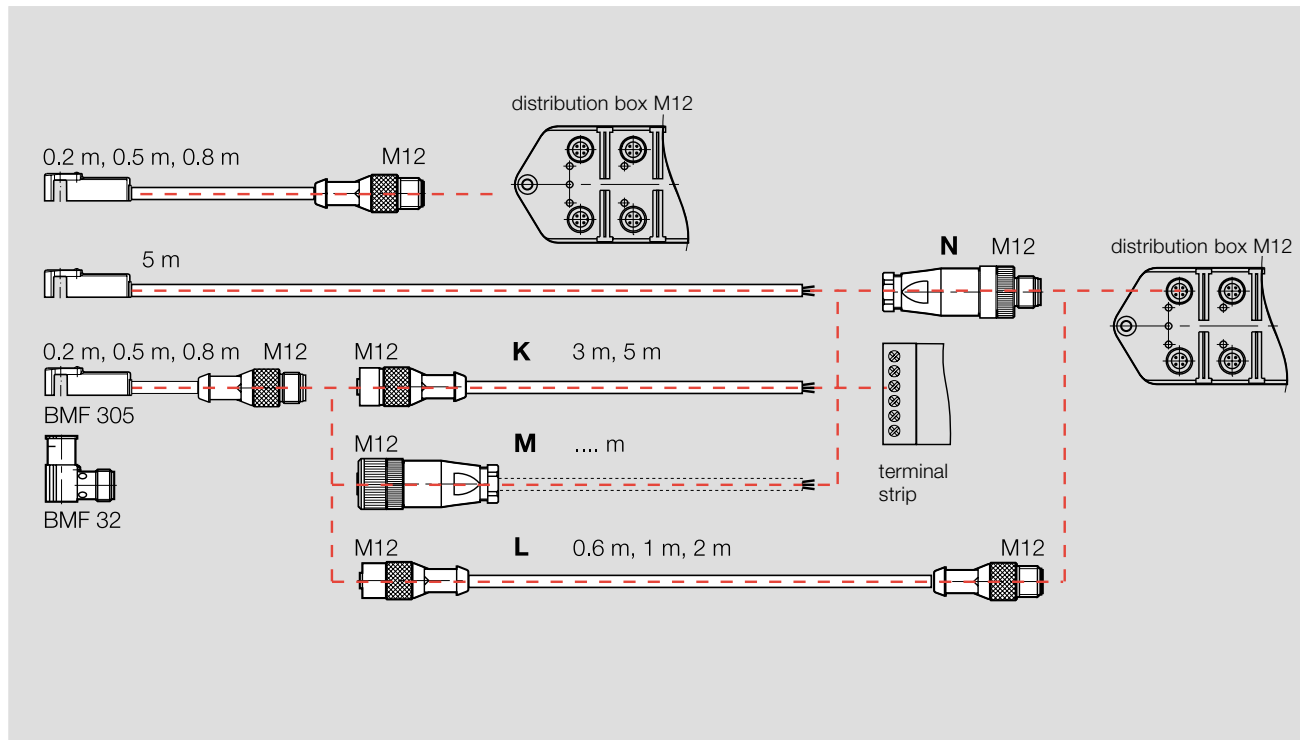
Wire colors

coding as per DIN IEC 60757

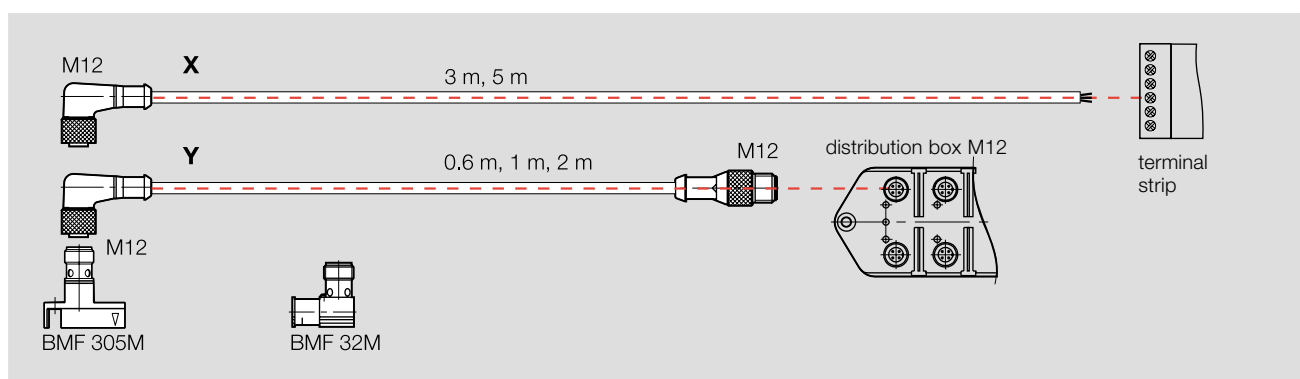
BN	brown
BK	black
BU	blue

Wiring versions for M12 (BMF-...-S 4)

Select the appropriate cable from the magnetic field sensor to your control.



Type/version	Fastening	Material	Length	Ordering code
K straight coupling M12 with molded-in cable	threaded ring M12, self-securing	PVC	3 m	BKS-B 19-1-03
		PVC	5 m	BKS-B 19-1-05
		PUR	3 m	BKS-B 19-1-PU-03
		PUR	5 m	BKS-B 19-1-PU-05
L straight coupling M12 with cable and straight connector M12	threaded ring M12, threaded ring M12, self-securing	PUR	0.6 m	BKS-B 19-1/GS 4-PU-00,6
		PUR	1 m	BKS-B 19-1/GS 4-PU-01
		PUR	2 m	BKS-B 19-1/GS 4-PU-02
M straight coupling M12, screw contacts 4-pin	threaded ring M12			BKS-S 10-3
N straight connector M12, screw contacts 4-pin	threaded ring M12			RSC 4/7



Type/version	Fastening	Material	Length	Ordering code
X right angle coupling M12 with molded-in cable	threaded ring M12, self-securing	PVC	3 m	BKS-B 20-1-03
		PVC	5 m	BKS-B 20-1-05
		PUR	3 m	BKS-B 20-1-PU-03
		PUR	5 m	BKS-B 20-1-PU-05
Y right angle coupling M12 with cable and straight connector M12	threaded ring M12, threaded ring M12, self-securing	PUR	0,6 m	BKS-B 20-3/GS 4-PU-00,6
		PUR	1 m	BKS-B 20-3/GS 4-PU-01
		PUR	2 m	BKS-B 20-3/GS 4-PU-02

