

Sensors for Pneumatic Cylinders

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

- 3.1.2 BMF 103
- 3.1.3 Mounting brackets, selection guide and installation for BMF 103
- 3.1.4 BMF 273
- 3.1.6 BMF 303
- 3.1.7 Mounting brackets, selection guide and installation for BMF 303
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Reed switches
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Compact directly in T-slot

Sensors for Pneumatic Cylinders

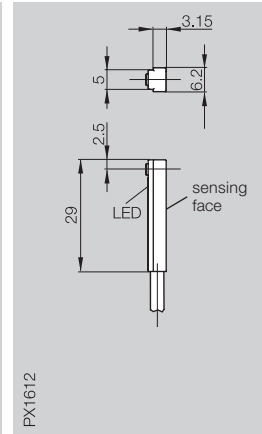
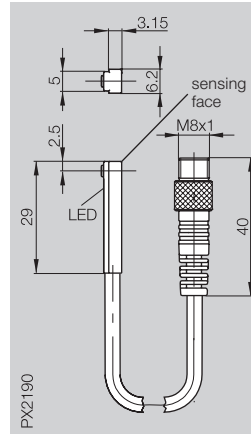
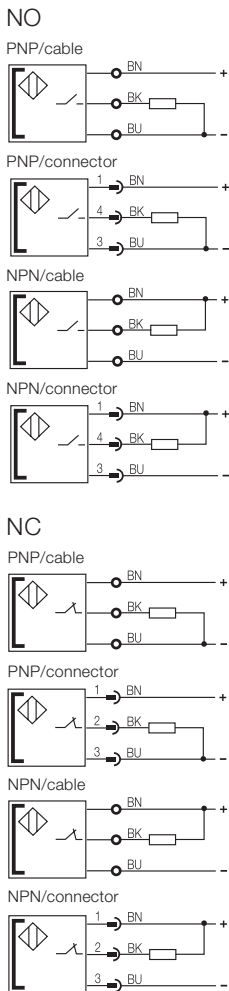
BMF 307

Series	BMF 307	BMF 307
Type	Connector M8x1 with rotatable union nut	

Advantages

- Non-contact, wear-free sensing of the piston position
- Desensitized to contamination
- Senses piston position through the cylinder wall
- Can be installed in T-slot cylinder without mounting bracket
e.g. Festo: ADVU, ADN, DRQ, DGP; SMC; Bosch.

Wiring diagrams



PNP	NO	BMF 307K-PS-C-2-SA2-S49-00,3	BMF 307K-PS-C-2-PU-02
	NC	BMF 307K-PO-C-2-SA2-S49-00,3	BMF 307K-PO-C-2-PU-02
NPN	NO	BMF 307K-NS-C-2-SA2-S49-00,3	BMF 307K-NS-C-2-PU-02
	NC	BMF 307K-NO-C-2-SA2-S49-00,3	BMF 307K-NO-C-2-PU-02

Rated operating field strength I_{H_n}	1.2 kA/m	1.2 kA/m
Assured operating field strength I_{H_a}	≥ 2 kA/m	≥ 2 kA/m
Hysteresis of I_{H_n}	≤ 45 %	≤ 45 %
Temperature drift of turn-on point of I_{H_n}	≤ 0.3 %/°C	≤ 0.3 %/°C
Turn-on delay	≤ 0.05 ms	≤ 0.05 ms
Turn-off delay	≤ 0.05 ms	≤ 0.05 ms
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_b	200 mA*	200 mA*
No-load supply current I_0 max.	≤ 30 mA	≤ 30 mA
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient temperature range T_a	-25...+85 °C	-25...+85 °C
Utilization category	DC 13	DC 13
Degree of protection per IEC 60529	IP 67	IP 67
Housing material	LCP	LCP
Connection	0.3 m cable (PUR) with connector	2 m Cable PUR

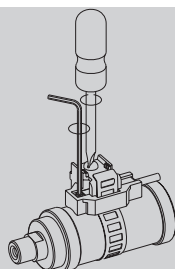
No. of wires x cross-section		3x0.14 mm ²
Approval	cULus	cULus

Recommended connector BKS-...48
*Temperature load curve see page 3.0.6

Other cable lengths on request.



Mounting brackets
BMF 307-HW-73-115/
BMF 307-HW-73 -255
page 3.1.16



3.1
Connectors selection guide page 3.0.7 ...

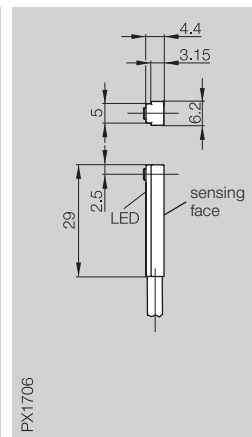
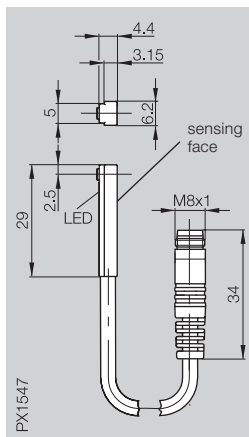
5
Connectors ... page 5.2 ...



The **reed switches BMF 307K-R-...** have an LED for function indication and as a setup aid. The recovery diode for switching an inductive load is already integrated. For sensing the piston position in pneumatic cylinders you can choose between electronic and mechanical cylinder switches. Select whichever one fits your application. We'll be glad to help you.

Can be installed in T-slot cylinder without mounting bracket e.g. Festo: ADVU, ADN, DRQ, DGP; SMC; Bosch. When using reed switches you should verify functionality on the pneumatic cylinder by means of pre-testing.

Series	BMF 307	BMF 307

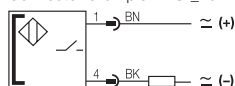


AC NO / DC NO polarized	BMF 307K-R-AS-L-3-S49-00,2	BMF 307K-R-AS-L-3-03
Sensed medium	Magnetic field	Magnetic field
Turn-on delay	≤ 0.7 ms	≤ 0.7 ms
Turn-off delay	≤ 0.2 ms	≤ 0.2 ms
Supply voltage U_B	4...30 V AC/DC	4...30 V AC/DC
Switching capacity max. reed contact	10 W	10 W
Rated operational current I_B	128 mA at 24 V AC/DC	128 mA at 24 V AC/DC
Minimum operating current I_m	3 mA	3 mA
Polarity reversal protected	no	no
Short circuit protected	no	no
Ambient temperature range T_a	-20...+70 °C	-20...+70 °C
Utilization category	AC 12/DC 12	AC 12/DC 12
Degree of protection per IEC 60529	IP 65	IP 65
Housing material	LCP	LCP
Connection	0.2 m cable (PUR) with connector	3 m cable, PVC
No. of wires × cross-section		2×0.14 mm ²
Recommended connector	BKS- 48	

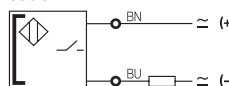


Wiring diagrams

Connector example BKS-48-1- _ _



Cable



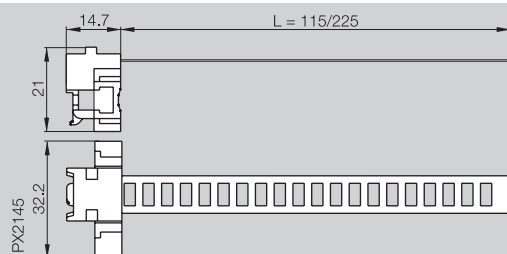
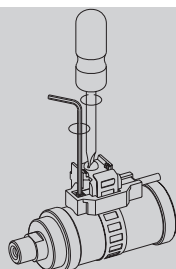
Connect to ground on controller side!

BMF 307-HW-73 -115

BMF 307-HW-73 -255

"Well saddled!
BMT T-slot sensors on round cylinders!"
Mounting brackets suitable for BMF 307 and BMF 315

Piston Ø	Mounting bracket
8...25	BMF 307-HW-73-115
25...63	BMF 307-HW-73-255



Compact from above directly in T-slot

Sensors for Pneumatic Cylinders

BMF 315K

Series	BMF 315K	BMF 315K
Type	Connector M8x1 with rotatable union nut	

BMF 315K – the first choice for pneumatic cylinders with T-slot

The T-slot has established itself over the past years as the standard for pneumatic cylinders.

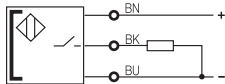
Advantages

- Can be installed in the T-slot from above
- Proven electronics from the BMF line of sensors
- Rugged, compact, low-profile housing
- Extremely reliable switching response
- High function reserve

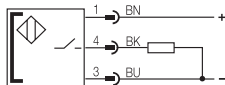
Wiring diagrams

NO

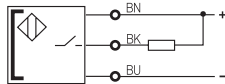
PNP/cable



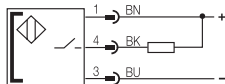
PNP/connector



NPN/cable

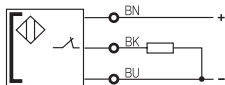


NPN/connector

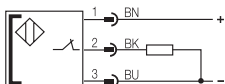


NC

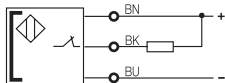
PNP/cable



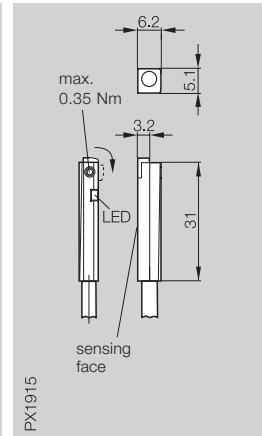
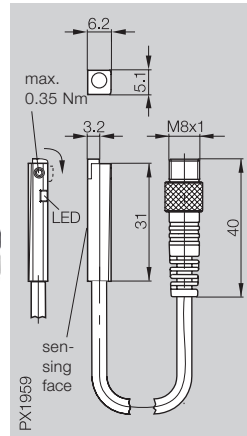
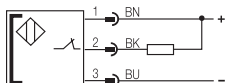
PNP/connector



NPN/cable



NPN/connector



PNP	NO	BMF 315K-PS-C-2-SA2-S49-00,2	BMF 315K-PS-C-2-PU-02
	NC	BMF 315K-PO-C-2-SA2-S49-00,2	BMF 315K-PO-C-2-PU-02
NPN	NO	BMF 315K-NS-C-2-SA2-S49-00,2	BMF 315K-NS-C-2-PU-02
	NC	BMF 315K-NO-C-2-SA2-S49-00,2	BMF 315K-NO-C-2-PU-02

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
Turn-on delay	≤ 0.05 ms	≤ 0.05 ms
Turn-off delay	≤ 0.05 ms	≤ 0.05 ms
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 _b	200 mA*	200 mA*
No-load supply current I ₀ max.	≤ 15 mA	≤ 15 mA
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient temperature range T _a	-25...+85 °C	-25...+85 °C
Utilization category	DC 13	DC 13
Degree of protection per IEC 60529	IP 67	IP 67
Housing material	PA 66	PA 66
Connection	0.2 m cable (PUR) with connector	2 m Cable PUR

No. of wires x cross-section		3x0.14 mm ²
Approval	cULus	cULus
Recommended connector	BKS-__48	

*Temperature load curve see page 3.0.6

Other cable lengths on request.



BMF 307-HW-73 -115
BMF 307-HW-73 -255
Mounting brackets suitable for BMF 307 and BMF 315



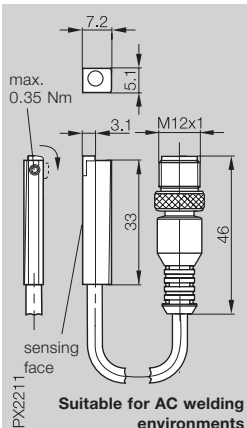
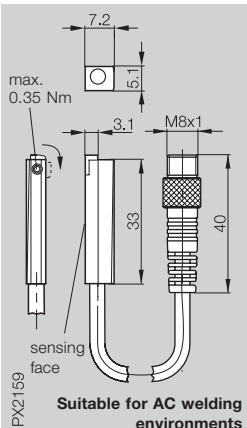
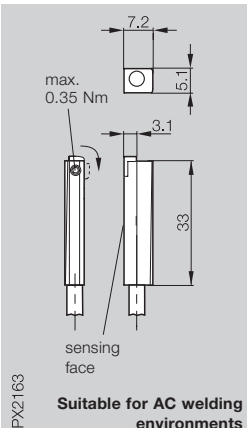
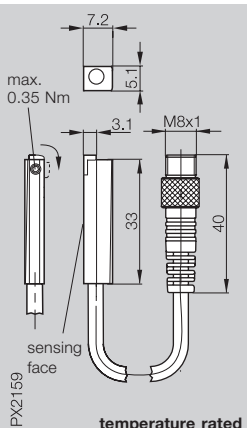
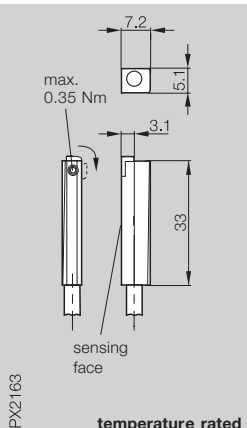
3.1
Connectors selection guide page 3.0.7 ...

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Connectors ... page 5.2 ...

from above directly in T-slot

Sensors for Pneumatic Cylinders

BMF 315M
for welding applications or
use up to 105 °C

BMF 315M	BMF 315M	BMF 315M	BMF 315M	BMF 315M
Connector M12x1 with rotatable union nut	Connector M8x1 with rotatable union nut		Connector M8x1 with rotatable union nut	
				

BMF 315M-PS-W-2-S04-00,3 BMF 315M-PS-W-2-S49-00,3 BMF 315M-PS-W-2-PU-02 BMF 315M-PS-D-2-SA3-S49-00,3 BMF 315M-PS-D-2-SA3-PU-02

1.2 kA/m	1.2 kA/m	1.2 kA/m	1.2 kA/m	1.2 kA/m
≥ 2 kA/m	≥ 2 kA/m	≥ 2 kA/m	≥ 2 kA/m	≥ 2 kA/m
200 kA/m	200 kA/m	200 kA/m		
50...60 Hz	50...60 Hz	50...60 Hz		
≤ 45 %	≤ 45 %	≤ 45 %	≤ 45 %	≤ 45 %
≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C
≤ 50 ms	≤ 50 ms	≤ 50 ms	≤ 0.05 ms	≤ 0.05 ms
≤ 50 ms	≤ 50 ms	≤ 50 ms	≤ 0.05 ms	≤ 0.05 ms
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
≤ 4 V	≤ 4 V	≤ 4 V	≤ 3.1 V	≤ 3.1 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*
≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 15 mA	≤ 15 mA
yes	yes	yes	yes	yes
yes	yes	yes	yes	yes
-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+105 °C	-25...+105 °C
DC 13	DC 13	DC 13	DC 13	DC 13
IP 67	IP 67	IP 67	IP 67	IP 67
Al	Al	Al	Al	Al
0.3 m cable (PUR) with connector	0.3 m cable (PUR) with connector	2 m Cable PUR	0.3 m cable (PUR) with connector	2 m Cable PUR
		3x0.1 mm ²		3x0.1 mm ²
cULus	cULus	cULus	cULus	cULus
BKS- 19	BKS- 48		BKS- 48	



3.1

Connectors
selection
guide
page 3.0.7 ...

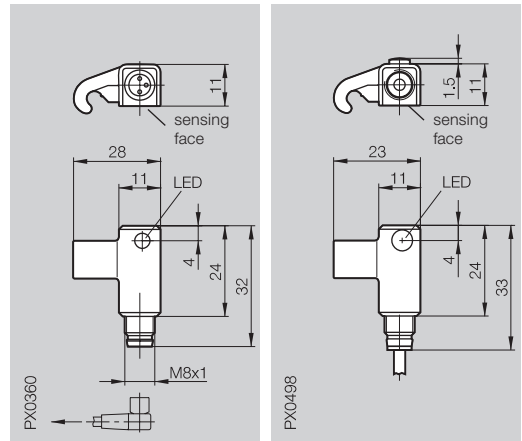
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Connectors ...
page 5.2 ...

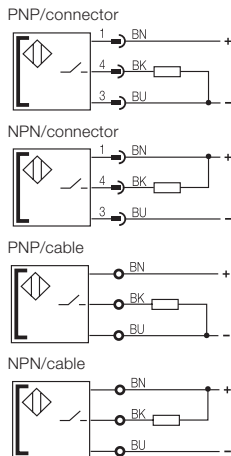


BMF 21 are the classics for cylinders with tie rod, DUO rail, round cylinders and profile cylinders.

Reliable,
tough,
universal..



Wiring diagrams

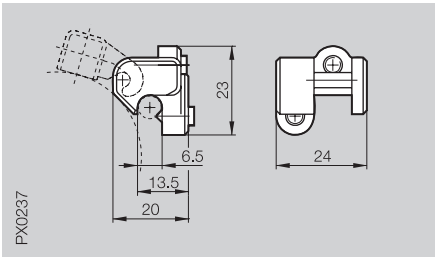


Series		BMF 21	BMF 21
PNP	NO	BMF 21K-PS-C-2-S49	BMF 21K-PS-C-2-PU-02
NPN	NO	BMF 21K-NS-C-2-S49	BMF 21K-NS-C-2-PU-02
Rated operating field strength H _n		1.2 kA/m	1.2 kA/m
Assured operating field strength H _a		≥ 2 kA/m	≥ 2 kA/m
Hysteresis of H _n		≤ 45 %	≤ 45 %
Temperature drift of turn-on point of H _n		≤ 0.3 %/°C	≤ 0.3 %/°C
Turn-on delay		≤ 0.05 ms	≤ 0.05 ms
Turn-off delay		≤ 0.05 ms	≤ 0.05 ms
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 _o		200 mA*	200 mA*
No-load supply current I _o max.		≤ 30 mA	≤ 30 mA
Polarity reversal protected		yes	yes
Short circuit protected		yes	yes
Ambient temperature range T _a		-25...+85 °C	-25...+85 °C
Utilization category		DC 13	DC 13
Degree of protection per IEC 60529		IP 67	IP 67
Housing material		PBT (fiberglass reinforced)	PBT (fiberglass reinforced)
Connection		Connector	2 m Cable PUR
No. of wires × cross-section			3×0.14 mm ²
Approval		cULus	
Recommended connector		BKS- 48/BKS- 49	

*Temperature load curve see page 3.0.6

Other cable lengths on request.

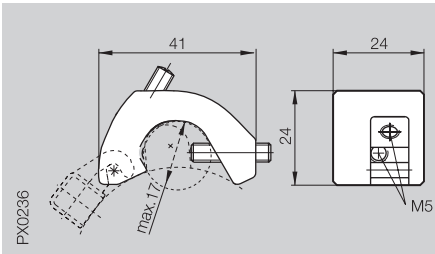
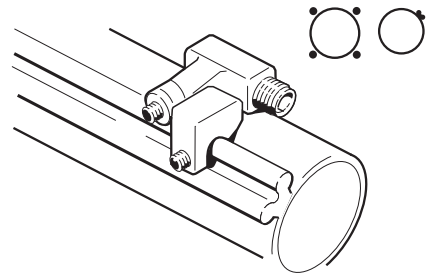




BMF 21-HW-8

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

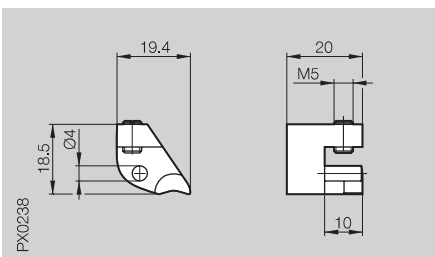
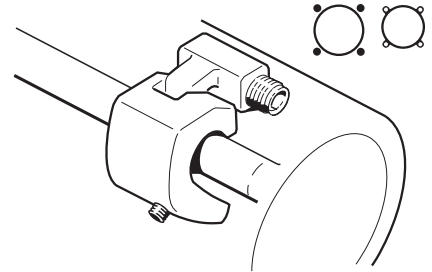
Pneumatic cylinders with DUO rail
(Festo), piston diameter any



BMF 21-HW-10/BMF 21-HW-10-E

for pneumatic cylinders with tie rod;
piston diameter any Tie rod diameter
to 17 mm for pneumatic cylinders
with integrated tie rod (Profile)

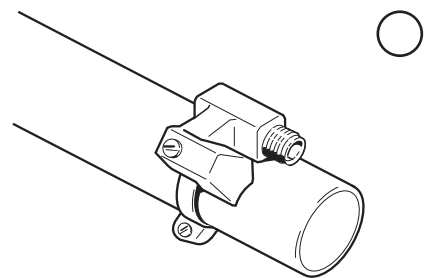
Any piston diameter
Profile width up to 17 mm
BMF 21-HW-10-E:
Stainless steel 1.4305



BMF 21-HW-11

for pneumatic cylinders without
tie rod/rail

Piston diameter 8...80 mm
Mounting bracket only usable with
tube cuffs.



For hose clamp matrix
see page 3.0.10.



Hex Key Set



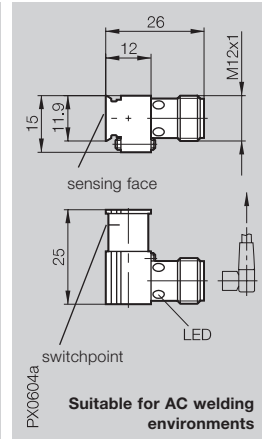
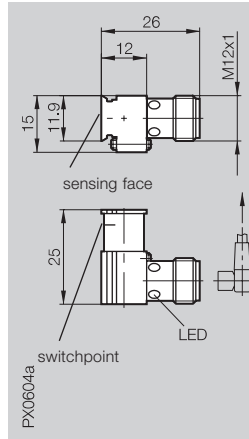
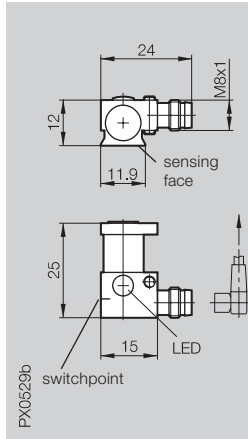
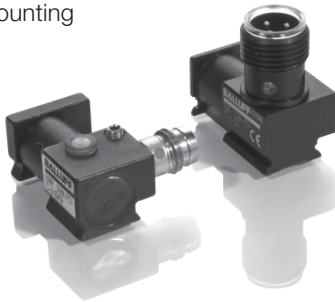
BMF Hex Key

Please order
accessories separately
see page 5.74



Series	BMF 32	BMF 32	BMF 32
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BMF 32 – the specialist for round cylinders as well as cylinders with trapezoidal slot. Also for universal use with many cylinder types using suitable mounting brackets.



PNP	NO	BMF 32M-PS-C-2-S49	BMF 32M-PS-C-2-S4	BMF 32M-PS-W-2-S4
NPN	NO	BMF 32M-NS-C-2-S49	BMF 32M-NS-C-2-S4	
Rated operating field strength I_{H_n}		1.2 kA/m	1.2 kA/m	1.2 kA/m
Assured operating field strength I_{H_a}		≥ 2 kA/m	≥ 2 kA/m	≥ 2 kA/m
Hysteresis of I_{H_n}		$\leq 45\%$	$\leq 45\%$	$\leq 45\%$
Temperature drift of turn-on point of I_{H_n}		$\leq 0.3\%/^{\circ}\text{C}$	$\leq 0.3\%/^{\circ}\text{C}$	$\leq 0.3\%/^{\circ}\text{C}$
Turn-on delay		≤ 0.05 ms	≤ 0.05 ms	≤ 0.05 ms
Turn-off delay		≤ 0.05 ms	≤ 0.05 ms	≤ 0.05 ms
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d		≤ 3.1 V	≤ 3.1 V	≤ 4 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.		≤ 30 mA	≤ 30 mA	≤ 30 mA
Polarity reversal protected		yes	yes	yes
Short circuit protected		yes	yes	yes
Ambient temperature range T_a		-25...+85 °C	-25...+85 °C	-25...+85 °C
Utilization category		DC 13	DC 13	DC 13
Degree of protection per IEC 60529		IP 67	IP 67	IP 67
Housing material		Al	Al	Al
Connection		Connector	Connector	Connector
Approval		cULus	cULus	cULus
Recommended connector		BKS- 48/BKS- 49	BKS- 19/BKS- 20	BKS- 19/BKS- 20

*Temperature load curve see page 3.0.6

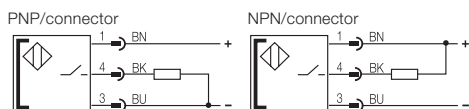
without mounting bracket



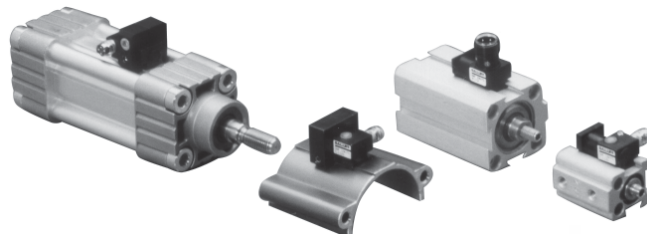
without mounting bracket for installation in cylinders with 60°- or 90°-trapezoidal slot e.g. Festo, Bosch, Martonair



Wiring diagrams



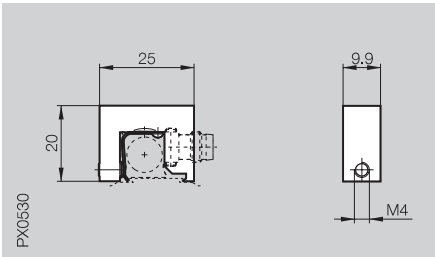
The series BMF 305M/315M/32M-...-W... is suitable for extreme conditions of use. The housings are metal, making them resistant to weld splatter. Conditions including weld currents of over 25 kA do not affect the function ability of the sensor. The output state of the sensor is stored during AC welding.



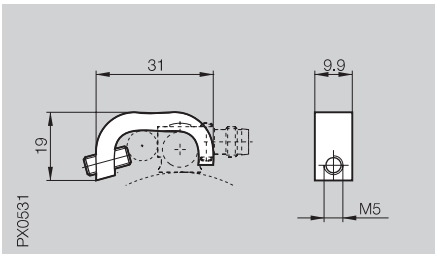
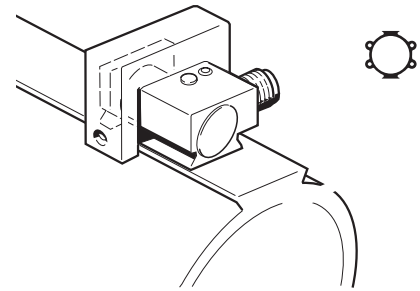
Please order accessories separately see page 5.74

Sensors for Pneumatic Cylinders

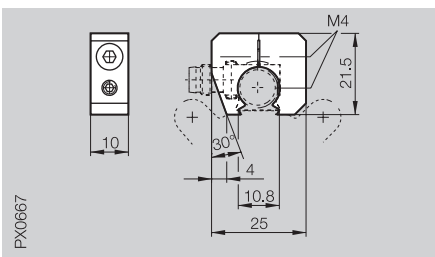
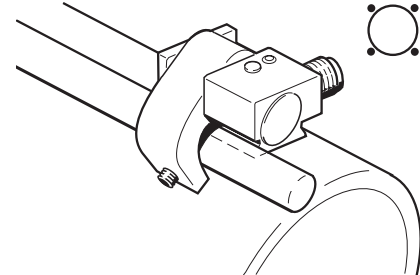
Mounting brackets
for BMF 32



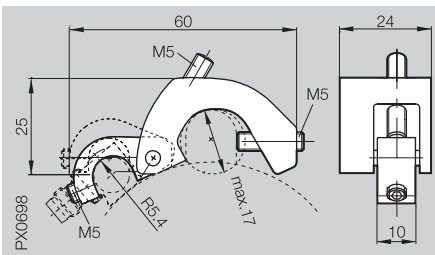
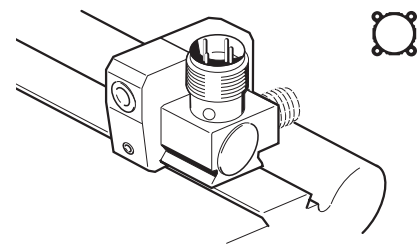
BMF 32-HW-12
for pneumatic cylinders with
trapezoidal rail (Bosch Rexroth)
any piston diameter



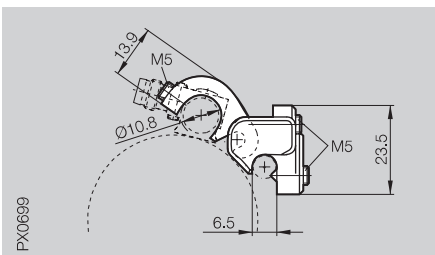
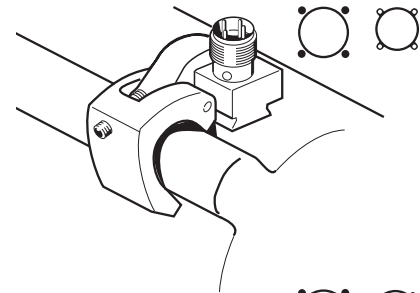
BMF 32-HW-13
for pneumatic cylinders with tie rod,
any piston diameter
tie rod diameter max. 11 mm



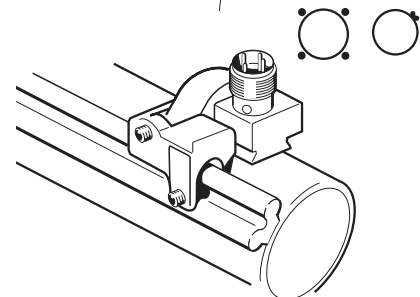
BMF 32-HW-14
for pneumatic cylinders with
trapezoidal rail (Bosch) Typ:
0 822 350/351/352/353/354/355
any piston diameter



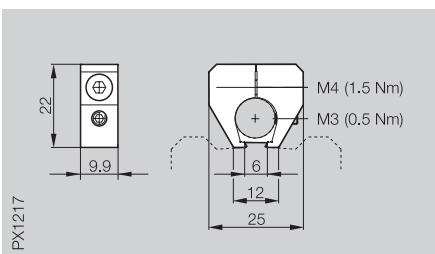
BMF 32-HW-15
for pneumatic cylinders with tie rod,
any piston diameter
tie rod diameter up to 17 mm
for pneumatic cylinders
with tie rod integrated in housing
any piston diameter
profile width up to 17 mm



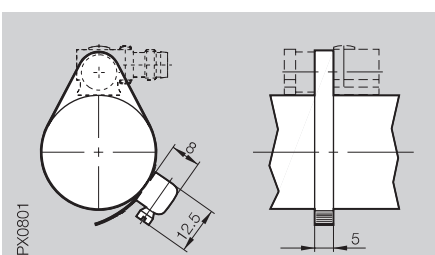
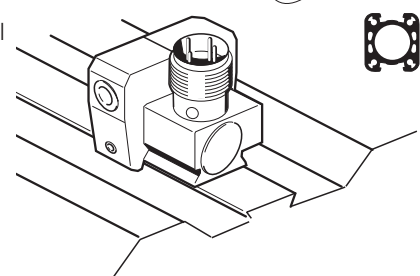
BMF 32-HW-16
for pneumatic cylinders with tie rod,
any piston diameter
tie rod diameter up to 6.5 mm



Pneumatic cylinders with DUO rail
(Festo), piston diameter any



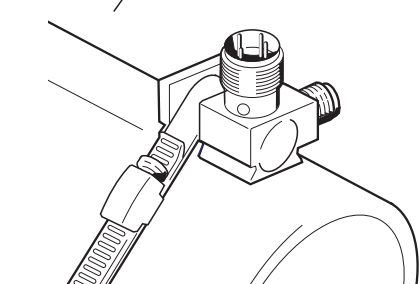
BMF 32-HW-18
for pneumatic cylinders with trapezoidal
rail Bosch Rexroth Series 2700



BMF hose clamp size 0...8
stainless steel for pneumatic cylinders
without tie rod/rail piston diameter up
to 80 mm



For hose clamp matrix
see page 3.0.10.



3.1

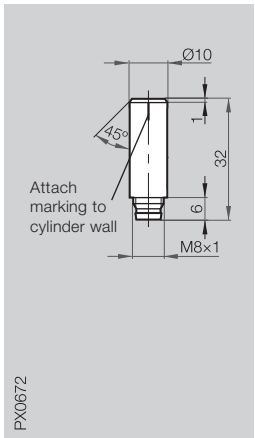
Connectors
selection
guide
page 3.0.7 ...

5

Connectors ...
page 5.2 ...

BMF 10E – developed for the stricter demands of the foods industry. Extremely tough thanks to single-part stainless steel housing.

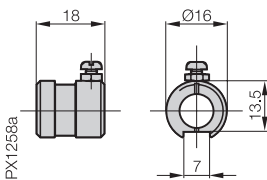
Series	BMF 10E
Housing size	Ø 10 mm



**stainless
steel**

PX0672

**Mounting bracket
BMF 10E-HW-19
Stainless steel 1.4571**
(please order separately)



Usable only with hose clamp
(please order separately)

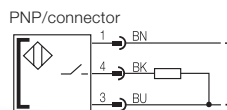


For hose clamp matrix
see page 3.0.10.

PNP	NO	BMF 10E-PS-D-2-SA1-S49
Rated operating field strength H _n		1.2 kA/m
Assured operating field strength H _a		≥ 2 kA/m
Hysteresis of H _n		≤ 45 %
Temperature drift of turn-on point of H _n		≤ 0.3 %/°C
Turn-on delay		≤ 0.05 ms
Turn-off delay		≤ 0.05 ms
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 ₀		200 mA*
No-load supply current I ₀ max.		≤ 12 mA
Polarity reversal protected		yes
Short circuit protected		yes
Ambient temperature range T _a		-40...+85 °C
Utilization category		DC 13
Degree of protection per IEC 60529		IP 67
Housing material		Stainless steel 1.4571
Connection		Connector
Recommended connector		BKS- 48/BKS- 49

*Temperature load curve see page 3.0.6

Wiring diagram



Hex Key Set



BMF Hex Key

Please order
accessories separately
see page 5.74