Magnetic field sensors

Magnetic field sensors for pneumatic cylinders

Magnetic field sensors are activated by magnetic fields and are especially suited for the detection of pistons in pneumatic cylinders. Based on the fact that magnetic fields can permeate non-magnetizable metals, sensors of this type detect a permanent magnet mounted on a piston through the aluminium wall of a cylinder.

Magnetic-inductive sensors from TURCK operate on a patented functional principle. The sensing range is adjusted to a core width to rule out multiple switchpoints. Permanent magnets of different field strengths are thus reliably detected in all common cylinder types. The sensors operate wear-free, are rugged and short-circuit protected and feature protection class IP67.

The product range offers many solutions for standard applications, welding facilities as well as Ex-areas. TURCK also offers magnetic field sensors for analog detection tasks. They are easy to operate and even fulfill higher demands equally reliable.

To monitor the piston position on all standard pneumatic cylinders, you only need one sensors series, BIM-UNT, BIM-UNTK and BIM-UNR. NAMUR sensors for explosion hazardous areas are also available. Measuring only 18 mm (UNR), 19.7 mm (UNTK) and 28 mm (UNT), the sensors are very small and can be mounted on C-groove and T-groove cylinders. Matching accessories are also available for mounting on tie-rod and dovetail cylinders. Special versions with fine adjustment or external adjustment of switchpoint are no longer needed.

The series of universal magnetic field sensors for pneumatic cylinders is completed by the WIM45-UNTL with analog current and voltage output. Solutions using indirect analog detection can be easily retrofitted with this new type.

Magnetic-inductive sensors are typically applied in pig trap systems or used for gate monitoring. Even the very small versions achieve large switching distances. In combination with the actuation magnet DMR31-15-5, the M12 sensors attain a nominal switching distance of 90 mm.

Our strengths – Your advantages

Universal magnetic field sensors

Monitoring the piston position on standard pneumatic cylinders is easy with the universal magnetic field sensors. But what's more, with the new magnetic field sensors from TURCK automation processes can be optimized and standardized, from construction over purchase and production, up to system support for operators and service personnel. Use the unique performance spectrum of these sensors to reduce your cost effectively!

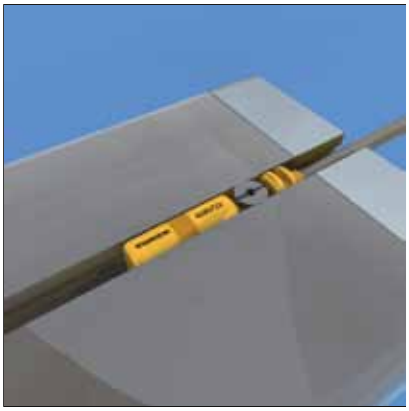
High system availability

The universally applicable magnetic field sensors operate extremely reliable, even in rough production environments. This is guaranteed through excellent EMC properties, protection class IP67 as well as the safe method of installation of the devices. We placed great emphasis on practical functionality of the housings and solid mounting accessories. Magnetic field sensors thus withstand the rough ambient conditions of machine building without any problems. Use these benefits to optimize your production processes.

Maximum planning freedom

Numerous connection possibilities, simple mounting and flexible accessories guarantee maximum freedom in planning with minimal mounting effort. From single switchpoint monitoring, over twin-sets, analog position detection up to combined binary/analog monitoring: Profit from the extensive standard product range of TURCK magnetic field sensors bringing more flexibility to your application.

Your advantages

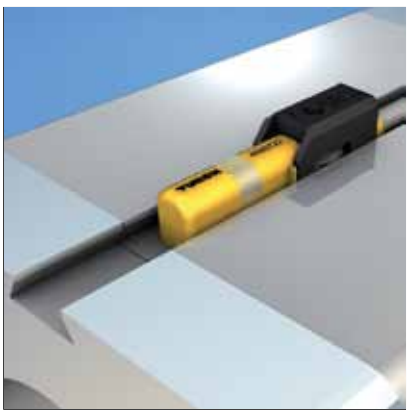


Safe installation

A pre-fixation lip enables one-handed mounting in the groove. Once inserted in the groove, the sensor is moved in its final position and then screwed tight near the cable exit. This prevents an uplift of the sensor when pulling the cable. The screw is a new type of wing screw designed for T-grooves mounting. The wing screw is made of tool steel alloy and is extremely stable. For vibration-resistant mounting it is simply enough to tighten the screw with a quarter revolution, using a standard screw driver or a 1.5 mm Allen key.

Compact design

Measuring only 28 mm (UNT), 19.7 mm (UNTK) and 18 mm (UNR), the standard sensors are the most compact devices on the market. The active face is located directly at the sensor end. This enables the piston position to be detected up to the end of compact short-stroke cylinders. Thanks to the bright and all-round visible LED, the current switching state is perfectly visible from any perspective and proves helpful when sensors are mounted and adjusted. The best mounting position is thus obtained.



Optional accessories

An extensive range of accessories round off the performance spectrum of the new, universally applicable magnetic field sensors. We offer mounting aids for all standard cylinders, adjustment and fixation tools, as well as the fixation clips for save cable routing. With the new MR sensor element, all magnets in standard pneumatic cylinders can be detected safely and without multiple switching points. Thus piston positions are precisely detected, allowing you to benefit from the high level of flexibility.

Type code

BIM – UNT . – A P 6 X – H1 1 4 1 / S1160

BIM Functional principle – **UNT** . Housing – **A P 6 X** Electrical version –

Functional principle

BIM	magnetic-inductive/ magnetostrictive
WIM45	analog, position detection, magnetically actuated, 45 mm measuring range

Additional information to housing

E	long

Housing

IKT	for tie-rod and profile cylinders mounted with fixing clamp, active face centered
NST	for groove cylinders, mounted with fixing clamp, incl. accessories adaptable to dovetail and tie-rod cylinders active face centered
UNR	for C-groove cylinders without accessories, adaptable to other cylinder types with accessories
UNT	for T-groove cylinders without accessories, adaptable to other cylinder types with accessories
UNTK	short type, for T-groove cylinders, mounted without accessories, accessories for mountingon other cylinder types
UNTL	long size, with analog output, for T-groove cylinders without accessories, adaptable to other cylinder types with accessories
EG, EM	threaded barrel, stainless steel, Ø in [mm]
M	threaded barrel, metal, Ø in [mm]

Indication

X	1 x LED
X...	number of LEDs or multicolor LED

Voltage range

6	10…30 VDC, Ⓚ
4	10…65 VDC, Ⓚ

Output mode

N	NPN
P	PNP

Output function

A	working current NO
LIU	analog output (voltage and current), U_B = 15…30 VDC
AY1	digital (NAMUR acc. to EN 60947-5-6)
Y1	analog (NAMUR acc. to EN 60947-5-6)

H1	1	4	1	Electrical connection: connector	/	S1160	Special version

Assignment
- **1** standard assigment or customized

Number of contacts
- **...** … contacts

Connector type
- **1** straight
- **3** straight with adapter

Connector type
- **H1** connector M12 x 1
- **V1** connector M8 x 1 / Ø 8 mm

Features
- **3GD** approval ATEX II 3 G and II 3 D
- **S34** magnetic-field resistant
- **S97** extended temperature range: -40 °C
- **S100** extended temperature range: +100 °C
- **S1139** extended travel path
- **S1160** irradiated cable, for welding facilities
- **S1165** PP cabel, chemical and temperature resistant

x.x	PSG	3	M	Electrical connection: Cable connection	/

Assignment
- M rotatable nut
- S fixed thread

Number of contacts
- … … contacts

Connector type
- PSG connector M8 x 1, straight
- RS4 connector M12 x 1, straight

Cable length
- ... [m]

...M	Cable Connection	/

Cable Connection
- **...M** cable length [m]

Designs and variants

	Design	Measuring range	Electrical connection	Output	Accessories for cylindrical design	Page
UNTK – 3-wire DC 	rectangular 5 x 6 x 19.7 mm	–	2 m cable 0.3 m cable with connector, M8 x 1 0.3 m cable with connector, M12 x 1	PNP	KLR1... - KLDT... KLZ...INT	199
UNT – cable connection and cable with male end 	rectangular UNT 5 x 6 x 28 mm	–	2 m cable 0.3 m cable with connector, M12 x 1 7 m cable 0.3 m cable with connector, M8 x 1 0.3 m cable with connector, Ø8 mm 0.3 m cable with connector	NAMUR PNP NPN 2-wire	KLR1... - KLDT... KLZ...INT	199
UNT – M12 x 1 or male M8 x 1 	rectangular UNT 5 x 22 x 30 mm	–	connector, M8 x 1 connector, M12 x 1	PNP NPN	KLR1... - KLDT... KLZ...INT	200
UNT – Twin Set 	rectangular UNT 5 x 22 x 30 mm	–	connector, M8 x 1 connector, M12 x 1	PNP	KLR1... - KLDT... KLZ...INT	200
UNR – 3-wire DC 	rectangular UNR 2.9 x 4.6 x 18 mm	–	2 m cable 7 m cable 0.3 m cable with connector, M8 x 1 0.3 m cable with connector, Ø8 mm 0.3 m cable with connector, M12 x 1	PNP NPN	-	203
UNTL – Current and voltage output 	rectangular UNTL 5 x 14.5 x 73 mm	45 mm	0.3 m cable with connector, M8 x 1 0.3 m cable with connector, M12 x 1	Analog output, 4...20 mA, 0...10 V	- KLDT...	205
UNTL – Twin Set 	rectangular UNTL	45 mm	cable with connector, M12 x 1	PNP/ Analog output, 0...10 V	–	205

	Design	Measuring range	Electrical connection	Output	Accessories for cylindrical design	Page
Design NST 	rectangular NST 17 x 14 x 28 mm	–	2 m cable connector, M12 x 1 connector, M8 x 1	NAMUR ⎯⎺⎯, PNP ⎯⎺⎯, NPN	KLN3 KLN3 KLZ...INT and KLN3 KLN-SMC KLF1 8 KLF2	207
Design IKT 	rectangular IKT 14.6 x 17 x 30 mm 14.6 x 28 x 30 mm	–	2 m cable connector, M12 x 1 connector, M8 x 1	NAMUR ⎯⎺⎯, PNP ⎯⎺⎯, NPN	KLI... KLI... KLI...	207
M8 	threaded barrel M8 x 1 Ø 8 x 41.6 mm Ø 8 x 57 mm Ø 8 x 49 mm	–	2 m cable connector, M12 x 1 connector, M8 x 1	NAMUR ⎯⎺⎯, NPN ⎯⎺⎯, PNP	–	209
M12 	threaded barrel M12 x 1 Ø 12 x 62 mm Ø 12 x 64 mm	–	connector, M12 x 1 2 m cable	NAMUR ⎯⎺⎯, PNP ⎯⎺⎯, NPN	–	209

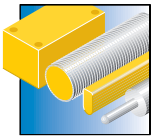
UNT and UNTK design

UNTs and UNTKs are mounted quickly and firmly. The devices of the UNTK series are extremely compact and feature a very small switching distance. A pre-fixation lip enables one-handed mounting, even overhead. With the extended range of accessories, the sensors can be mounted on nearly all standard pneumatic cylinders. All standard connection types are available.

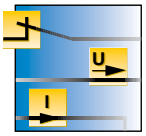
Features

- Compact design
- Quickly and firmly mounted
- Excellent EMC properties
- For T-groove cylinders without accessories
- Mounting accessories for all standard cylinders.
- Clearly visible LED
- Twin set for monitoring of two switchpoints

Properties

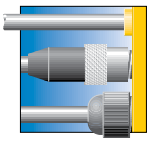


Designs
Universal design (28 mm) and very compact design (19.7 mm)



Electrical version
NAMUR, 2, 3 and 4-wire DC

Measuring ranges
Reliable position detection on all standard pneumatic cylinders



Electrical connections
Cable, male M8 and M12, pigtail

Materials
Rugged PP housing for a wide range of applications

Internet link
Scan the QR code to access our products on the internet

UNTK

General data

Protection class	IP67	**Operating voltage**	10…30 VDC
Output	_⎍_, PNP	**Housing material**	PP
Ambient temperature	-25…+70 °C	**Dimensions**	5 x 6 x 19.7 mm

Types and data – selection table

Type	Connection	w	d
BIM-UNTK-AP7X	2 m cable	w079	d432
BIM-UNTK-AP7X-0,3-PSG3M	0.3 m Cable with connector, M8 x 1	w064	d433
BIM-UNTK-AP7X-0,3-RS4	0.3 m Cable with connector, M12 x 1	w064	d434

UNT – cable connection and cable with male end

General data

Protection class	IP67	**Housing material**	PP
Ambient temperature	-25…+70 °C	**Dimensions**	5 x 6 x 28 mm

S1139: long overtravel range; S1160: irradiated, weld-resistant cable; S1165: highly resistant cable for the food industry

Types and data – selection table

Type	Connection	Operating voltage	Output	w	d
BIM-UNT-AY1X/S1139	2 m cable	8.2 VDC	NAMUR	w080	d435
BIM-UNT-AY1X-0,3-RS4.21/S1139	0.3 m Cable with connector, M12 x 1	8.2 VDC	NAMUR	w081	d436
BIM-UNT-AP6X	2 m cable	10…30 VDC	_⎍_, PNP	w079	d435
BIM-UNT-AP6X 7M	7 m cable	10…30 VDC	_⎍_, PNP	w079	d435
BIM-UNT-AP6X/S1139	2 m cable	10…30 VDC	_⎍_, PNP	w079	d435
BIM-UNT-AP6X/S1160	2 m cable	10…30 VDC	_⎍_, PNP	w079	d435
BIM-UNT-AP6X/3GD	2 m cable	10…30 VDC	_⎍_, PNP	w079	d435
BIM-UNT-AP6X-0,3-PSG3S	0.3 m Cable with connector, M8 x 1	10…30 VDC	_⎍_, PNP	w064	d437
BIM-UNT-AP6X-0,3-PSG3S/S1139	0.3 m Cable with connector, M8 x 1	10…30 VDC	_⎍_, PNP	w064	d437
BIM-UNT-AP6X-0,3-PSG3M	0.3 m Cable with connector, M8 x 1	10…30 VDC	_⎍_, PNP	w064	d438
BIM-UNT-AP6X-0,3-PSG3M/S1139	0.3 m Cable with connector, M8 x 1	10…30 VDC	_⎍_, PNP	w064	d438
BIM-UNT-AP6X-0,3-RS4	0.3 m Cable with connector, M12 x 1	10…30 VDC	_⎍_, PNP	w064	d436
BIM-UNT-AP6X-0,3-RS4/S1139	0.3 m Cable with connector, M12 x 1	10…30 VDC	_⎍_, PNP	w064	d436
BIM-UNT-AP6X-0,3-RS4/S1160	0.3 m Cable with connector, M12 x 1	10…30 VDC	_⎍_, PNP	w064	d436
BIM-UNT-AG41X/S1139/S1160	2 m cable	10…55 VDC	_⎍_, 2-wire	w082	d435

Table continues on the next page…

… Table starts on previous page

Type	Connection	Operating voltage	Output	w	d
BIM-UNT-AG41X-0,3-RS4.23/S1139/S1160	0.3 m Cable with connector	10…55 VDC	⎓, 2-wire	w083	d436

Many different types available, also as NPN version, see type code

UNT – M12 x 1 or male M8 x 1

General data

Protection class	IP67	**Operating voltage**	10…30 VDC
Output	⎓, PNP	**Housing material**	PP
Ambient temperature	-25…+70 °C	**Dimensions**	5 x 22 x 30 mm

Types and data – selection table

Type	Connection	w	d
BIM-UNT-AP6X2-V1131	male, M8 x 1	w064	d439
BIM-UNT-AP6X2-H1141	male, M12 x 1	w064	d440

Many different types available, also as NPN version, see type code

UNT – Twin set

General data

Protection class	IP67	**Operating voltage**	10…30 VDC
Output	⎓, PNP	**Housing material**	PP
Ambient temperature	-25…+70 °C	**Dimensions**	5 x 22 x 30 mm

Types and data – selection table

Type	Connection	w	d
BIM-UNT-0,3-UNT-2AP6X3-V1141	male, M8 x 1	w084	d441
BIM-UNT-0,3-UNT-2AP6X3-H1141	male, M12 x 1	w084	d442

Wiring diagrams on page 658 Dimension drawing on page 670 Accessories on page 560

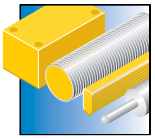
UNR design

Magnetic field sensors for short-stroke cylinders and parallel grippers are very compactly designed. The all-round visible LED allows the switching state to be observed from any position. All standard connection types are available.

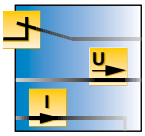
Features

- Compact design
- For C groove cylinders
- Quickly and firmly mounted
- Excellent EMC properties
- Clearly visible LED

Properties

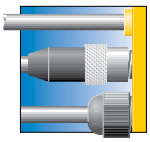


Designs
Small size, length 18 mm



Electrical version
3-wire DC outputs NPN/PNP

Measuring ranges
Reliable position detection on all standard pneumatic cylinders



Electrical connections
Cable, cable with male end M8 x 1 and M12 x 1

Materials
Rugged PP housing for a wide range of applications

Internet link
Scan the QR code to access our products on the internet

UNR

General data

Protection class	IP67	**Operating voltage**	10…30 VDC
Output	⎓, PNP	**Housing material**	PP
Ambient temperature	-25…+70 °C	**Dimensions**	2.9 x 4.6 x 18 mm

Types and data – selection table

Type	Connection	w	d
BIM-UNR-AP6X	2 m cable	w079	d443
BIM-UNR-AP6X 7M	7 m cable	w079	d443
BIM-UNR-AP6X-0,3-PSG3S	0.3 m Cable with connector, M8 x 1	w064	d444
BIM-UNR-AP6X-0,3-PSG3M	0.3 m Cable with connector, M8 x 1	w064	d445
BIM-UNR-AP6X-0,3-RS4	0.3 m Cable with connector, M12 x 1	w064	d446

Many different types available, also as NPN version, see type code

w Wiring diagrams on page 658 d Dimension drawing on page 670 Accessories on page 560

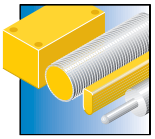
Analog position gauging systems

The universal magnetic field sensors for pneumatic cylinders are now also available with analog current and voltage output. The new analog sensor WIM45-UNTL by TURCK offers clear advantages, especially in situations where additional flexibility and monitoring properties are required.

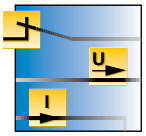
Features

- Compact design
- Quickly and firmly mounted
- Inserted in the groove from the top
- Hardly affected by external magnetic fields
- Status of magnetic field displayed via 2 LEDs
- Measured value memory

Properties

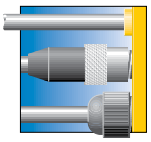


Designs
One type for all standard pneumatic cylinders



Electrical version
Analog outputs 4… 20 mA and 0…10 VDC as well as 3-wire DC switching output

Measuring ranges
Analog position detection up to 45 mm on all standard pneumatic cylinders



Electrical connections
Standard connection modes: Cable with male end M8 or M12

Materials
Rugged PA housing for a wide range of applications

Special features
Also available with combined analog and switching output in one device

Internet link
Scan the QR code to access our products on the internet

UNTL – Current and voltage output

General data

Measuring range	45 mm	**Protection class**	IP67
Operating voltage	15…30 VDC	**Output**	Analog output, 4…20 mA, 0…10 V
Housing material	PA12-GF30	**Ambient temperature**	-25…+70 °C
Dimensions	5 x 14.5 x 73 mm	**Repeatability**	0.1% of measuring range IA - BI

Types and data – selection table

Type	Connection	w	d
WIM45-UNTL-LIU5X2-0,3-PSG4M	0.3 m Cable with connector, M8 x 1	w085	d447
WIM45-UNTL-LIU5X2-0,3-RS4	0.3 m Cable with connector, M12 x 1	w085	d448

UNTL – Twin set

General data

Measuring range	45 mm	**Protection class**	IP67
Connection	Cable with connector, M12 x 1	**Operating voltage**	15…30 VDC
Output	⎓, PNP/analog output, 0…10 V	**Housing material**	PA
Ambient temperature	-25…+70 °C	**Repeatability**	0.1% of measuring range IA - BI

Types and data – selection table

Type	w	d
WIM45-UNTL-0,3-BIM-UNT-LUAP6X 4-H1141	w086	d449

w Wiring diagrams on page 658 d Dimension drawing on page 670 Accessories on page 560

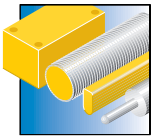
For harsh environments

The rugged magnetic field sensors are particularly suited for harsh environments. With the extended range of accessories the sensors can be mounted on nearly all standard pneumatic cylinders. All standard connection types are available.

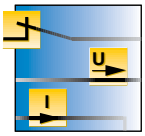
Features

- Rugged designs
- Many different mounting options
- Optional weld field immunity
- Excellent EMC properties

Properties

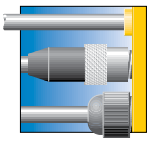


Designs
Standard design, for harsh environments



Electrical versions
NAMUR, 2/3-wire DC

Measuring ranges
Reliable position detection on all standard pneumatic cylinders



Electrical connections
Cable, male M8 x 1 and M12 x 1

Materials
Rugged PA12-GF30 resp. GD-ZN housing for a wide range of applications

Internet link
Scan the QR code to access our products on the internet

NST

General data

Protection class	IP67	**Housing material**	PA12-GF30
Ambient temperature	-25…+70 °C	**Dimensions**	17 x 14 x 28 mm

S34: weld-resistant, for use in 50-Hz welding systems

Types and data – selection table

Type	Connection	Operating voltage	Output	w	d
BIM-NST-Y1X	2 m cable	8.2 VDC	NAMUR	w080	d450
BIM-NST-Y1X-H1141	male, M12 x 1	8.2 VDC	NAMUR	w081	d451
BIM-NST-AP6X	2 m cable	10…30 VDC	_⟋‾⟍_, PNP	w079	d450
BIM-NST-AP6X-V1131	male, M8 x 1	10…30 VDC	_⟋‾⟍_, PNP	w064	d452
BIM-NST-AP6X-H1141	male, M12 x 1	10…30 VDC	_⟋‾⟍_, PNP	w064	d451
BIM-NST-AP6X-H1141/S34	male, M12 x 1	10…30 VDC	_⟋‾⟍_, PNP	w064	d453

Many different types available, also as NPN version, see type code

IKT

General data

Protection class	IP67	**Housing material**	GD-Zn
Ambient temperature	-25…+70 °C		

Types and data – selection table

Type	Connection	Operating voltage	Output	Dimensions	w	d
BIM-IKT-Y1X	2 m cable	8.2 VDC	NAMUR	14.6 x 17 x 30 mm	w080	d454
BIM-IKT-Y1X-H1141	male, M12 x 1	8.2 VDC	NAMUR	14.6 x 28 x 30 mm	w081	d455
BIM-IKT-AP6X	2 m cable	10…30 VDC	_⟋‾⟍_, PNP	14.6 x 17 x 30 mm	w079	d454
BIM-IKT-AP6X-V1131	male, M8 x 1	10…30 VDC	_⟋‾⟍_, PNP	14.6 x 17 x 30 mm	w064	d456
BIM-IKT-AP6X-H1141	male, M12 x 1	10…30 VDC	_⟋‾⟍_, PNP	14.6 x 28 x 30 mm	w064	d455

Many different types available, also as NPN version, see type code

w Wiring diagrams on page 658 d Dimension drawing on page 670 Accessories on page 560

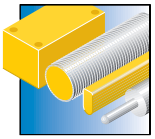
Magnetic-inductive sensors

Typical applications for magnetic-inductive sensors include „pig“ detection and gate monitoring. Since magnetic-inductive sensors are actuated by external magnetic fields, they achieve large switching distances despite their small size. In combination with the actuation magnet DMR31-15-5, the M12 sensors attain a rated switching distance of 90 mm.

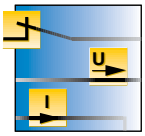
Features

- Achieves very long ranges
- Permeates non-magnetizable materials
- ATEX and SIL approved versions
- Rugged threaded barrels
- Broad selection of actuators

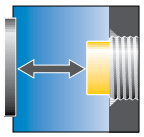
Properties



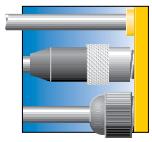
Designs
Threaded barrels M8 x 1 or M12 x 1



Electrical version
NAMUR, 2 or 3-wire DC



Switching distances
M8 sensors up to 78 mm and M12 sensors up to 90 mm, depending on the actuating magnet



Electrical connections
Connection cable, male M8 x 1 and M12 x 1, 2 m

Materials
Rugged threaded barrels, chrome-plated brass or stainless steel

Internet link
Scan the QR code to access our products on the internet

M8

General data

Protection class	IP67	**Switching distance**	78 mm
Housing material	V2A (1.4301)	**Ambient temperature**	-25…+70 °C

For more details on magnetic actuators see chapter „Accessories“
Operating distance 78 mm, in conjunction with magnet DMR31-15-5

Types and data – selection table

Type	Connection	Operating voltage	Output	Dimensions	w	d
BIM-EG08-Y1X	2 m cable	8.2 VDC	NAMUR	Ø 8 x 41.6 mm	w080	d457
BIM-EG08-Y1X-H1341	male, M12 x 1	8.2 VDC	NAMUR	Ø 8 x 57 mm	w081	d458
BIM-EG08-AP6X	2 m cable	10…30 VDC	_⟋‾, PNP	Ø 8 x 41.6 mm	w079	d457
BIM-EG08-AP6X-V1131	male, M8 x 1	10…30 VDC	_⟋‾, PNP	Ø 8 x 49 mm	w064	d459
BIM-EG08-AP6X-H1341	male, M12 x 1	10…30 VDC	_⟋‾, PNP	Ø 8 x 57 mm	w064	d458

Many different types available, also as NPN version, see type code

M12

General data

Protection class	IP67	**Switching distance**	90 mm
Ambient temperature	-25…+70 °C		

For more details on magnetic actuators see chapter „Accessories“
Operating distance 90 mm, in conjunction with magnet DMR31-15-5

Types and data – selection table

Type	Connection	Operating voltage	Output	Housing material	Dimensions	w	d
BIM-M12E-Y1X-H1141	male, M12 x 1	8.2 VDC	NAMUR	CuZn, chrome-plated	Ø 12 x 62 mm	w081	d173
BIM-EM12E-Y1X	2 m cable	8.2 VDC	NAMUR	V2A (1.4301)	Ø 12 x 64 mm	w080	d460
BIM-EM12E-AP4X-H1141	male, M12 x 1	10…65 VDC	_⟋‾, PNP	V2A (1.4301)	Ø 12 x 62 mm	w064	d173
BIM-EM12E-AP4X	2 m cable	10…65 VDC	_⟋‾, PNP	V2A (1.4301)	Ø 12 x 64 mm	w079	d460

Many different types available, also as NPN version, see type code

w Wiring diagrams on page 658 d Dimension drawing on page 670 Accessories on page 560