Safety. Detection. Control.

Magnus RFID

Next generation RFID safety sensor

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Next generation sensors for machine safety

RFID safety sensors PL e, SIL 3

- The application of Magnus RFID sensors can be extremely wide thanks to the compact and versatile design
- The different design and technology options and the complete mechanical compatibility with Magnus MG series make this product extremely valuable for users
- The RFID technology enables Magnus RFID sensors to be individually coded in three different ways to allow the appropriate tampering protection in all applications. The highest configurations allow each sensor to be paired with one only assigned actuator
- The RFID technology used allows to reach safety levels up to PL e / SIL 3 also when connecting the sensors in series
- As a result, Magnus RFID sensors can be simply integrated in existing safety scenarios, offering a cost-effective solution for modifying and upgrading machines

Main features

- 22 or 78 mm interaxis available
- M12 connector with pigtail or 5 m cable
- Anti-tampering caps
- IP67 and IP6K9K approval (cable models only)
- Next generation RFID technology
- 3 different coding levels
- Smallest in the market
- Fastest response time
- 2 x 400 mA current output (allow to directly control contactors)

A unique range

Standards

- IEC 61508 SIL 3
- IEC 62061 SILCL 3
- EN ISO 13849-1 PL e

Approvals

- TÜV
- UL/CSA
- Ecolab (SGL)

Cost-effectiveness

- Wear-free technology allows for longer product life time.
- Status LED and diagnostic output
- Smallest design of RFID safety sensors
- Full mechanical compatibility with Magnus MG S and MG B
- Can be used as stand-alone

Safety

- Tampering protection in accordance with DIN EN 14119, the highest in its class
- Screw covers prevent easy removal
- Series connection up to PL e / SIL 3
- IP67 and IP6K9K protection grade for use in harsh environments
- Complies with the strict hygiene and cleaning requirements of the food and packaging industry

Versatility

- Dual mounting options
- M12 connector or cable
- 3 different coding levels
- Extension cables for series connection

Magnus RFID

Typical applications

The ideal choice for many industrial applications

Injection moulding

Food & Beverage

Pharmaceutical

Packaging

Logistics

Renewable technologies

Multiple options of actuation technology

Individual coding

HIGH CODING LEVEL

- The actuator is programmed via teach-in and permanently assigned to the sensor during set-up (the process can be repeated if necessary)

Unique coding

HIGH CODING LEVEL

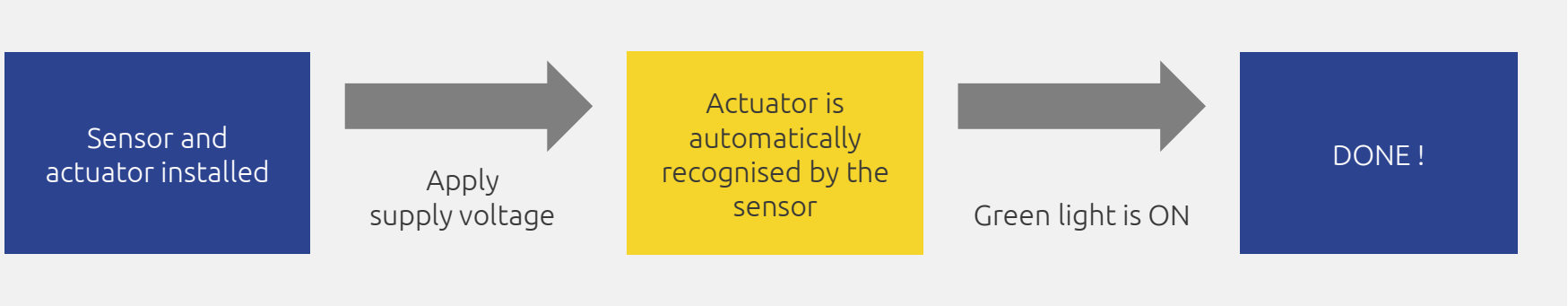
- The actuator is permanently assigned to the sensor during manufacturing (it cannot be replaced with another actuator)

Actuator coded

LOW CODING LEVEL

- The actuator is free and not specifically assigned to the sensor (one actuator can work with multiple sensors)

Individual coding teach in process

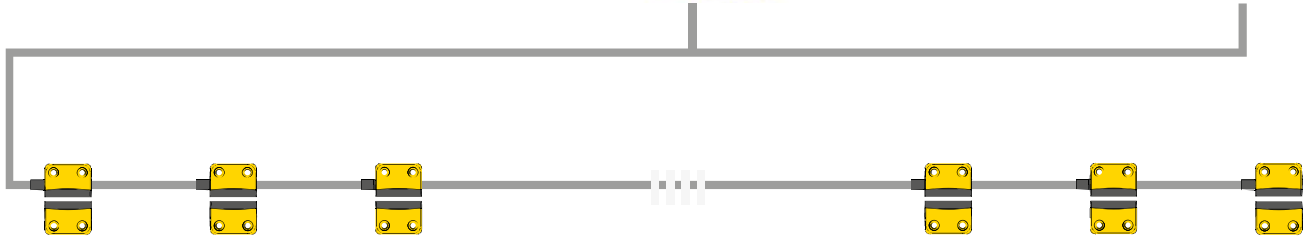


Series connection with maximum safety

Up to
PL e
Performance Level
according to
EN ISO 13849-1

Reliable evaluation,
e.g. with the modular
safety controller Mosaic ...

... or with the
AD SR1
configurable
safety control unit



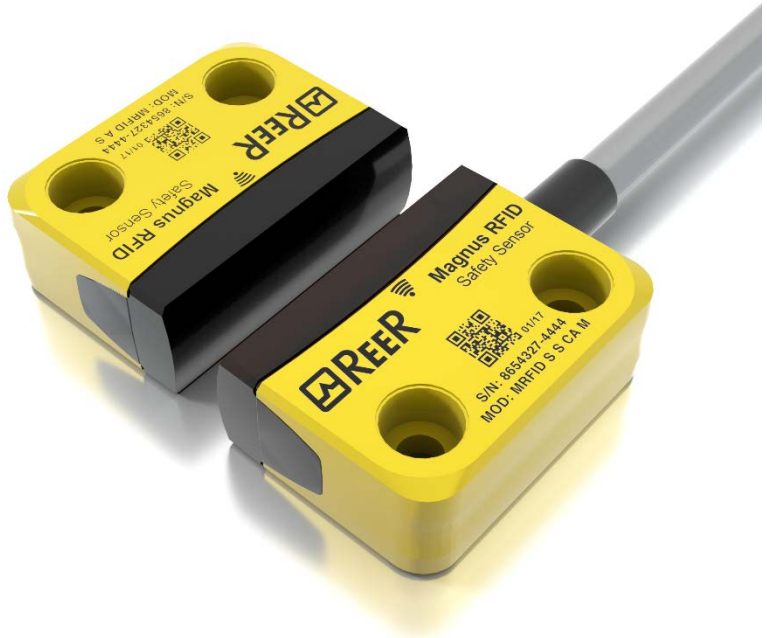
- **Excellent reaction time** of only **75 ms** (optimal especially when used in series)
- **Best-in-class** transition time: **3 ms**
- Allows multiple sensors connected in series without loss of performance
- Series connection created using logical circuits (no safety limitation or voltage drops)

Ideal also in the most demanding applications

- Unique mechanical characteristics allow protection against cleaning agents and wash-down processes, a typical requirement of the food industry
- Resistant to aggressive elements, e.g. cleaning agents used in the food industry
- Waterproof housing in compliance with IP67 and IP6K9K requirements

2 series ideal for all applications

S series
22 mm interaxis



Dimensions compatible
with Magnus MG S series

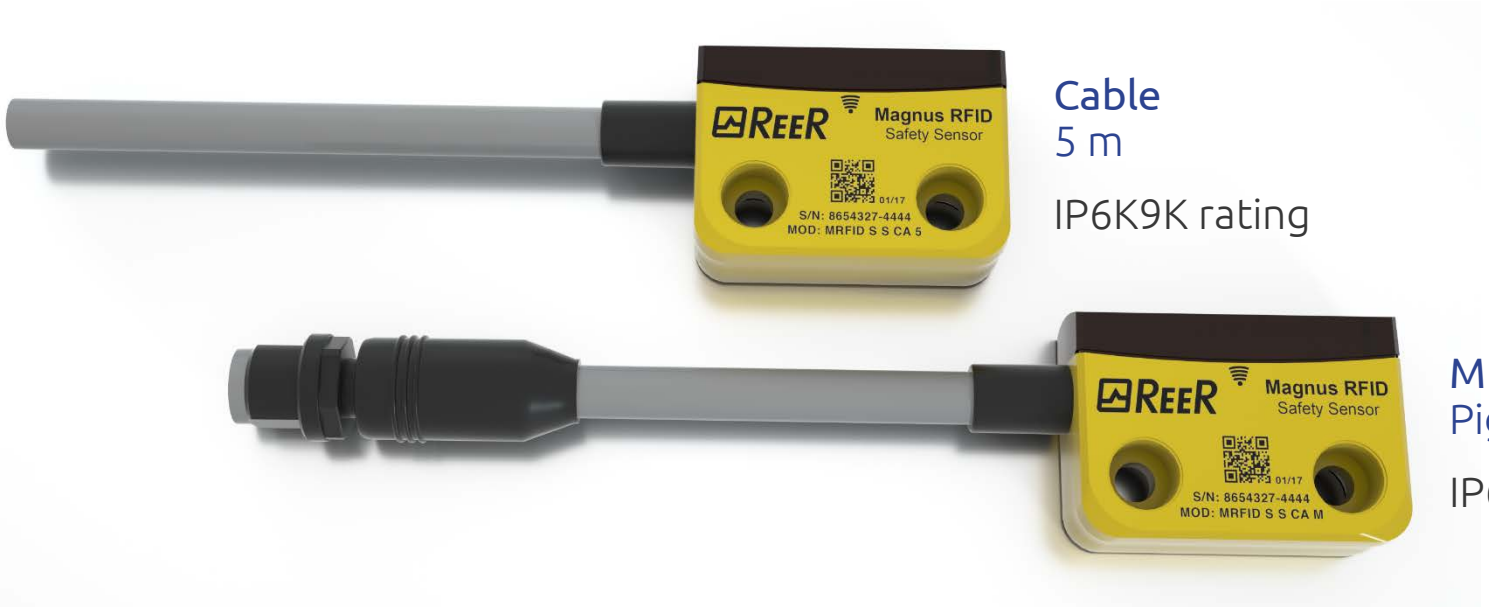
B series
78 mm interaxis

Dimensions compatible
with Magnus MG B series

Connectivity

Choose between Cable or Connector

- Magnus RFID satisfies all requirements with regards to connectivity
- Cables and connectors approved for the food industry complete the range of sensors



Cable
5 m

IP6K9K rating

M12 Connector
Pigtail 15 cm

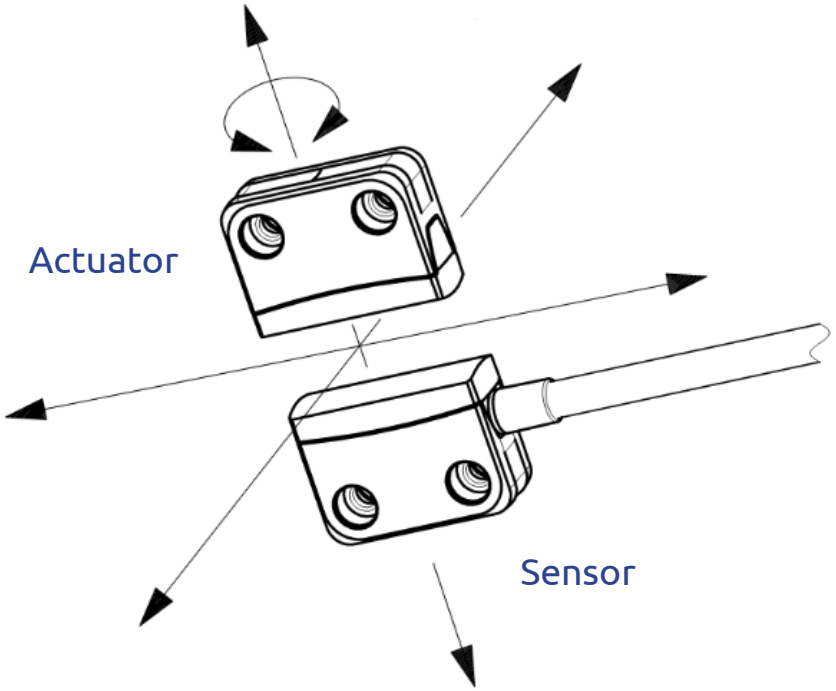
IP67 rating

Anti-tampering caps

- Included with each sensor and actuator (extra caps provided)
- Improves sensor/actuator resistance to tampering actions
- Makes tampering attempts visible
- Complies with EN ISO 14119
- Maintains a flat surface (easy to clean)

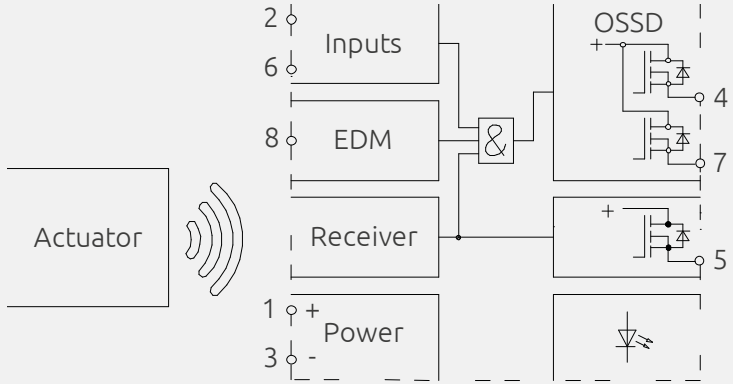
Anti-tampering caps

- All approach directions allowed
- Guaranteed operating distance: 8 … 18mm
  - This range has been specifically chosen to avoid the possibility of opening the door (and introducing a hand or an object) without being detected, whilst allowing typical installation misalignments



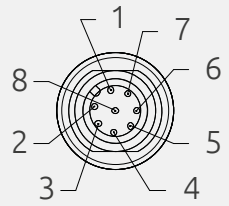
Circuit diagram and pin-out

Circuit diagram



Pin-out

Pin	Color	Function
1	BN	VDC
2	WH	Safety input 1
3	BU	GND
4	BK	Safety output 1
5	GY	Diagnostic output
6	PK	Safety input 2
7	VT	Safety output 2
8	OG	EDM input



- 2 OSSD safety outputs (short-circuit safe) commuting with a maximum load of 400 mA per channel
- Series connection managed connecting the OSSD outputs of the previous sensor to the inputs of the next one

- When using Magnus RFID as stand-alone, safety inputs must be connected to +24 VDC

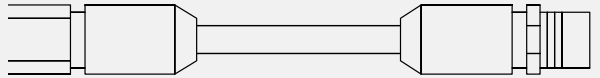
Accessories

Cables

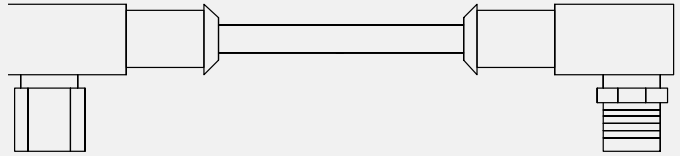
Range

- Type S
  - Male – Female
  - M12 connector (straight)
  - Length: 1, 3, 5, 10 m
  - Poles: 4 or 8
- Type L
  - Male – Female
  - M12 connector (90°)
  - Length: 1, 3, 5, 10 m
  - Poles: 4
- Type C
  - Female M12 connector
  - Length: 1, 3, 5, 10 m
  - Poles/wires: 4 or 8

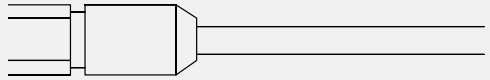
Type S



Type L



Type C



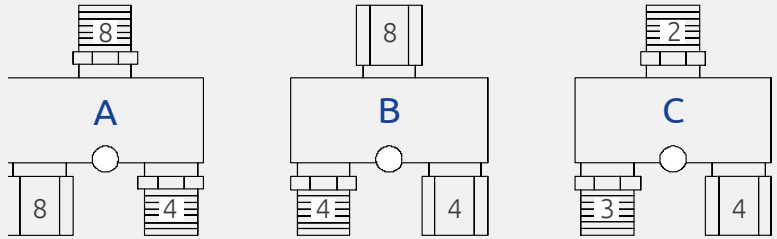
Accessories

T Connectors

Range

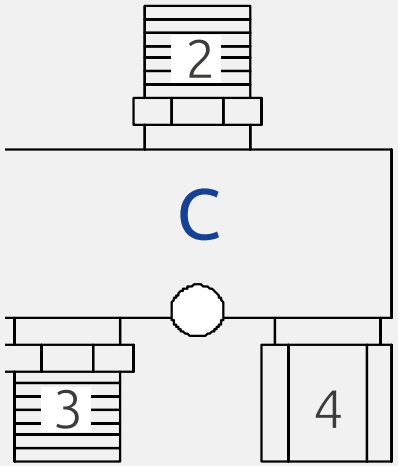
- Type A
  - To gain status output from the connected sensor
- Type B
  - For series connections of 2 or more sensors
- Type C
  - To introduce additional power supplies in long series

T Connectors



Accessories

Why to use the Type C Connector?



- Power to one (or more) sensors is granted using a fuse (I_{fuse} = max. 1000 mA)
- If this value is exceeded (due to the series connection of multiple sensors + load of contactor, relay coil, Mosaic input …), an additional fuse must be used to connect additional sensors
- Additional fuses can be added using Type C Connectors

Calculation example

Contactor current, I_{cont} = *170 mA per coil*

Total current of sensors, $I_{tot\ sens}$ = current of fuse, I_{fuse} - current of contactor, I_{cont}

$I_{tot\ sens} = I_{fuse} - (2 \times I_{cont}) = 1000\ mA - (2 \times 170\ mA) = 660\ mA$

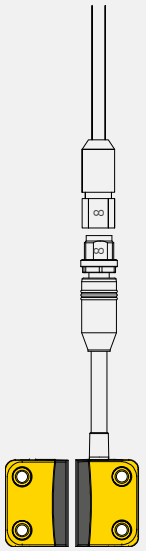
Current of sensor = 50 mA (approx. value)

$N_{sens} = I_{tot\ sens} / I_{sens} = 660\ mA / 50\ mA = 13,2$ ➔ **13 sensors**

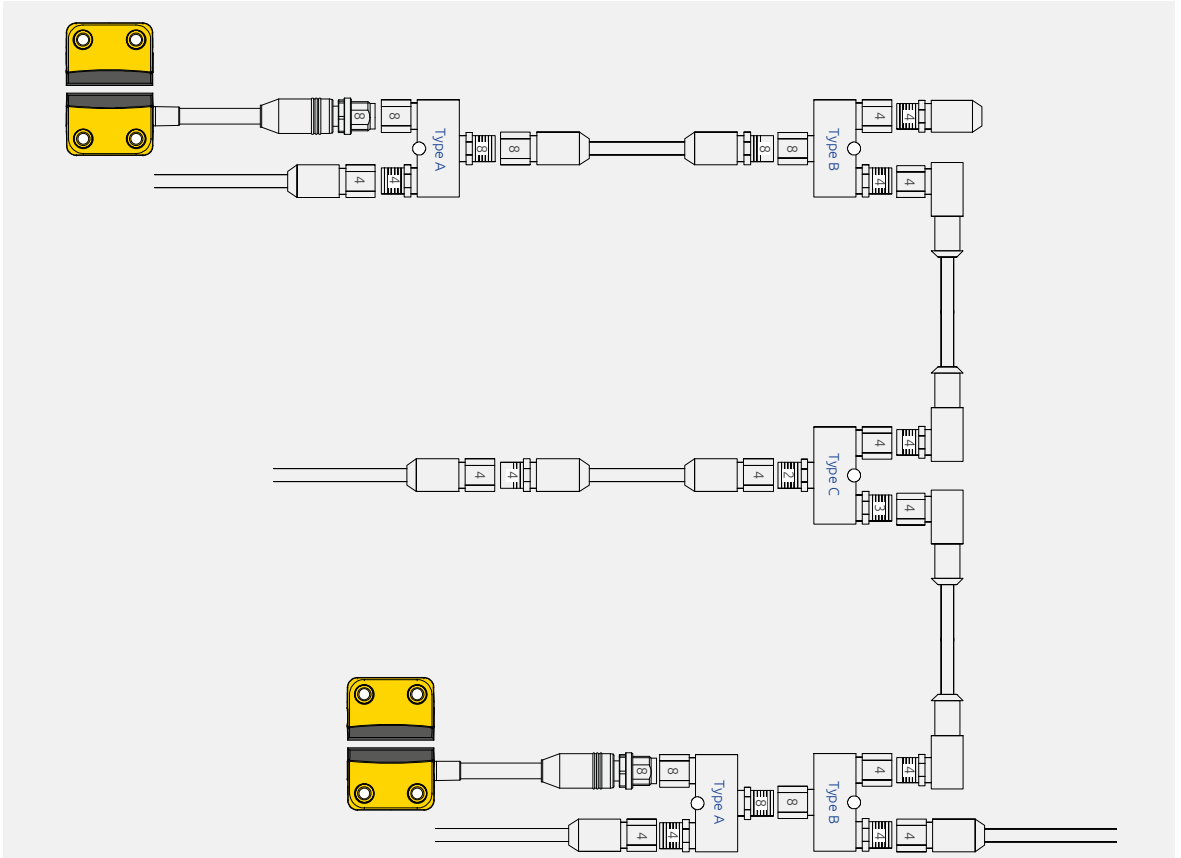
In this case 13 sensors can be connected to one safety circuit using contactors with each 170 mA

Connection examples

Direct connection



Series connection



Technical data

Electrical specifications	S series	B series
Supply voltage	24 VDC ± 10%	
Max. switching voltage	Supply voltage ± 0,2 V	
Switching current safety output	Max. 400 mA	
Switching current control output	Max. 50 mA	
Contact form	OSSD	
Switching frequency	3 Hz	
Transition time	Input-Output: 3 ms / Sensor-Actuator: 75 ms	
No. of safety outputs electronic	2	
No. of diagnostic outputs electronic	1	
Number of safety inputs	2	
EDM input	Yes	
Start button	Yes	
Functional category	DC-12 / DC-13	
Assured switching distance	8 mm	
Safe distance for switching off	18 mm	
Minimum air-gap	0,5 mm	
Misalignment actuator	Max. 8 mm	
Reverse polarity protection	Yes	
Short-circuit proof outputs	Yes	
Current consumption per input	2,75 mA	
Indication LED	Three-colour	
Operating direction	Any direction	
Switching principle	Electronic	
Repeating accuracy (R)	< 0,5 mm	
Hysteresis	2 mm	
Series connection	Max. 30 sensors	
Technology	RFID	
Possible actuators	M RFID A S	M RFID A B

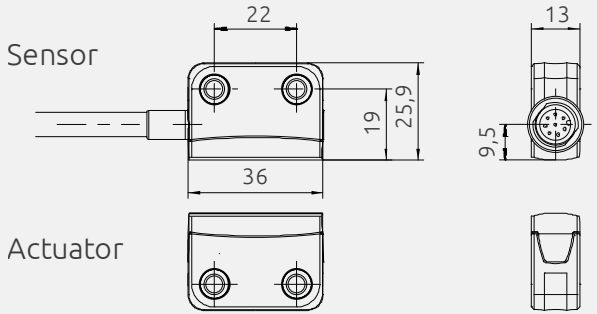
Environmental features	
Protection class	IP67 (all models) / IP6K9K (only models with cable)
Operating temperature	- 25 ... 70° C
Shock resistance	30 g / 11 ms
Vibration resistance	10 ... 55 Hz, amplitude 1 mm

Mechanical data		
Housing material	PBT / PC	
Housing	Rectangular	
Connector type	Pigtail M12 / 8-pole / 150 mm	
Cable	5 m PVC / 8 wires	
Cross-section of wire	0,25 mm²	
Temp. range cable	- 25 ... 80° C	
Dimensions (height x width x depth)	26 x 36 x 13 mm	26 x 88 x 13 mm
Mounting type	M4 screws (countersunk)	

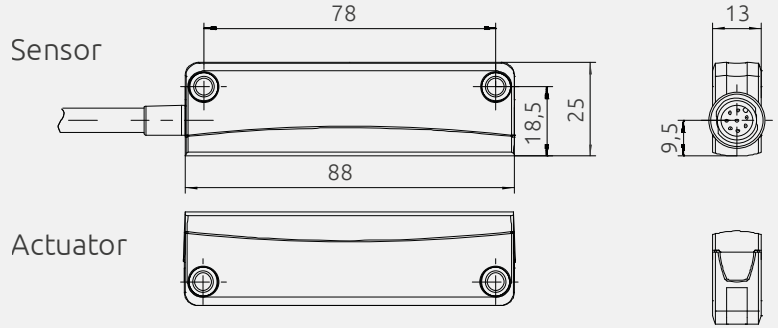
Approvals	
CE	Yes
UL	Yes
SGL (Ecolab)	Yes
PL	e
SIL	3
SIL CL	3
Category	4

Technical drawings

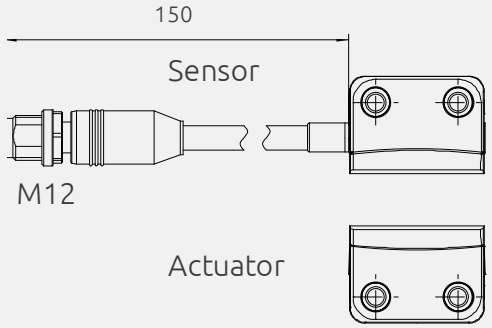
S series
Cable



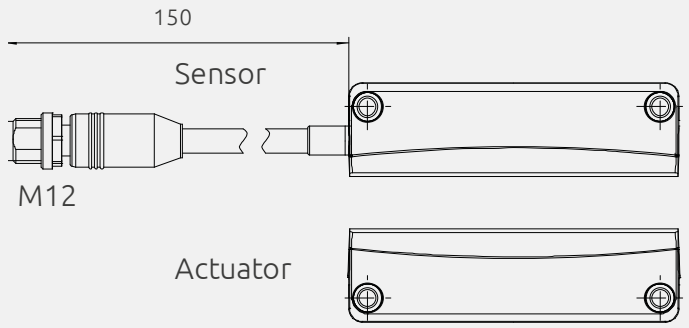
B series
Cable



S series
M12 Connector



B series
M12 Connector



Magnus MG vs Magnus RFID

Magnus MG	Magnus RFID
Reed technology	RFID technology
No supply voltage	Supply voltage necessary
Large switching distance	Larger switching distance
Offset of approx. 5mm	Offset of typically 8mm
No safety inputs	2 safety inputs
2 potential-free contact	2 safety outputs (OSSD) 1 diagnostic output
Can‘t be used as Stand-Alone device	Can be used as Stand-Alone device because of integrated evaluation system by either choosing - EDM-input - Start-input (start button)
One coding level - low	3 different coding versions - low (coded actuator) - high (individual/unique actuator)

Magnus MG vs Magnus RFID

Magnus MG	Magnus RFID
Series connection (with reduced PL) possible (limited by series resistor)	Series connection with **up to 30 sensors and PL e** possible
Cable (4 wires)	Cable (8 wires) Pigtail M12 (8 pins)
Specification of PFH_D value only in combination with safety control unit possible	Specification of PFH_D value possible
No led available	Displaying different switching states and diagnosis (blinking codes LED red) with a 3 colour LED
Covered installation behind non-ferrous materials possible, e.g. stainless steel	**No covered installation behind electrically conductive materials possible, e.g. stainless steel, brass, aluminum, …**
No direct or flush mounting on ferrous conductive materials	**No direct or flush mounting on electrically conductive materials. The use of Spacers is recommended.**
	Because of the above mentioned points no housing in stainless steel possible

Ordering information

Combo
Sensor + Actuator

M RFID C [S][I][A][5]

5 — M 5 m cable; 5 M12 Connector
A — A Automatic EDM input
I — I Individual coding; U Unique coding; C Actuator coded
S — S 22 mm interaxis; B 78 mm interaxis

Extension cables
(for series connection)

M RFID EC [S][4][3]

3 — 1 1 m cable; 3 3 m cable; 5 5 m cable; 10 10 m cable
4 — 4 4 poles connector / 4 wires cable; 8 8 poles connector / 8 wires cable
S — S Male - Female M12 connector (straight); L Male - Female M12 connector (90°)[2]; C Female M12 connector cable

T Connectors
(for series connection)

M RFID TC [A]

A — A M12 Type A; B M12 Type B; C M12 Type C

Accessories

M RFID SP	Spacers available for S or B series (recommended for mounting on metal surfaces)
M RFID TP	Termination plug (to close the last Type B connector in series connections of 2 or more sensors)

Safety. Detection. Control.

Thank you.