



**REER**

*Your future's safe!*



# SENSORS

safety contactless sensors and devices



*product catalogue*

## PI-Safe



Fail-safe inductive sensors. See page 4



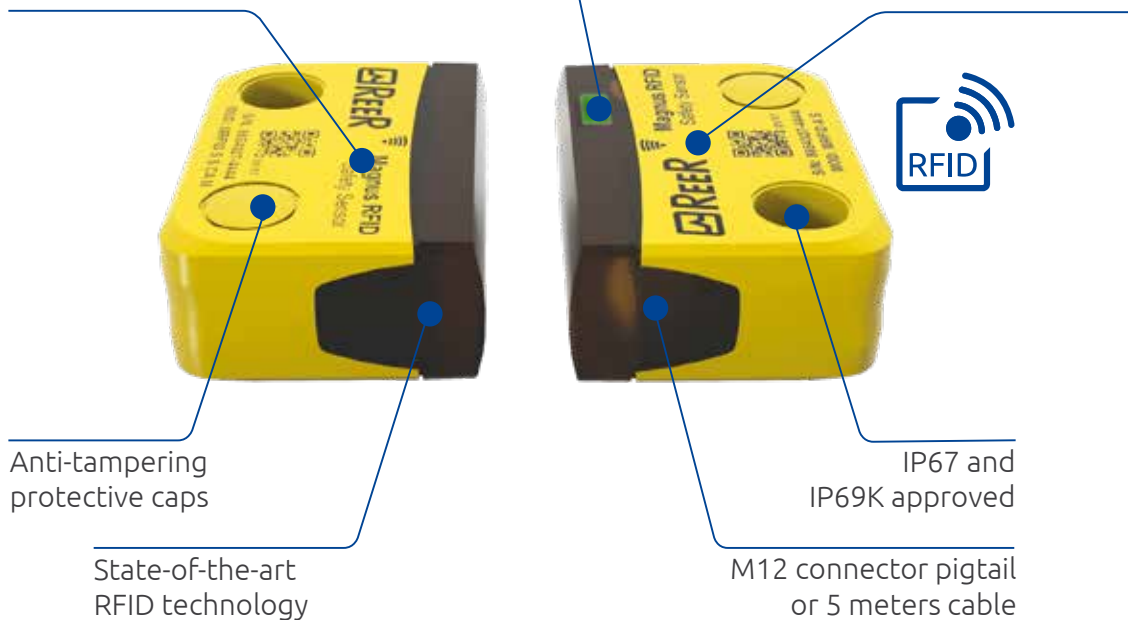
## Magnus RFID

Next generation sensors for machine safety. See page 11

Available with  
22 or 78 mm interaxis

Status LED

3 different  
coding levels



## Magnus MG

Magnetic safety switches. See page 18



## Ilion

Type 2 safety photocells. See page 22



## Ulisse

Type 2 safety photocells. See page 24



## SAFECODER

Safety Sin/Cos incremental encoder. See page 26



## SAFELOCK

Safety switch with guard locking. See page 28





### Fail-safe inductive sensors

#### A complete range of sensors for position detection

- Certification to EN 60947-5-3 for electromechanical control gear
- Ensuring operator and machine safety
- No special actuator for electronic fail-safe sensors required
- Connection to safety interface, safety controller or safety PLC (i.e. AD SR1, Mosaic)

### APPLICATIONS

- Door or flaps detection at closed position
- Cylinder shaft detection
- Treads up detection
- Bolster detection at a truck crane
- Robot cell working limitation of the working area
- Door detection
- Wind turbine lock / endpostion of the blade

### APPROVALS

- 2006/42/EC "Machine Directive"
- 2014/30/EC "Electromagnetic Compatibility Directive"
- 2014/35/EC "Low Voltage Directive"
- EN 60947-5-3 "Low-voltage switchgear and controlgear - Part 5-3: Control circuit devices and switching elements - Requirements for proximity devices with defined behaviour under fault conditions (PDDB)"
- IEC 61508 "Functional safety of electrical / electronic / programmable electronic safety related systems"
- ISO 13849 "Safety of machinery - Safety-related parts of control systems"



### OVERVIEW

The operating principle and thus the advantages of inductive sensors can be used for safety applications.

Inductive safety applications are special applications which require a non-contact and safe detection of a metal object.

A wear-free function due to the non-contact principle together with a high protection rating, guarantee a high uptime of machines and installations.

The PI-Safe sensor increases the uptime and safety of installations and can be connected to approved evaluation units without cross-fault monitoring.

Faults such as coil break or coil short circuit are diagnosed and the sensor passes into the defined safe state. Even a cross fault between the supply voltage and one of the two outputs does not affect the safety function of the sensor.

Applications include reliable positioning on rotary indexing tables and machine tools, safe triggering of slow travel or switching off in end positions for presses, gantry robots and actuators or safe area monitoring for robots.

### MAIN FEATURES

Operating voltage (VDC)	19,2 ... 30
Switching current (mA)	Max. 100
Safety output	2 OSSD
Electrical design	DC PNP
Connection	M12 4-pole connector
Signalling	LED yellow (signal), LED green (power)
Protection class	III

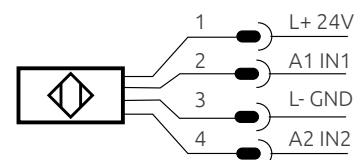
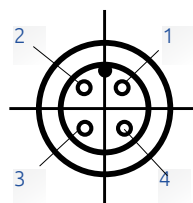


Operating temperature: -25 ... +70 °C



IP65 and IP67 protection rating  
IP69K (PI M30 NF K model only)

### CONNECTOR





## PI M12 NF

METAL THREAD M12 x 1 / L = 70 mm

### TECHNICAL FEATURES

Mounting	Non-flush mountable
Enable zone (mm)	0,5 ... 4
Operating voltage (VDC)	19,2 ... 30
Current consumption (mA)	< 20
Max. capacitive load (nF)	20
Short-circuit protection	yes
Housing material	Body: stainless steel; Head: PBT
Response time (ms)	≤ 1
Safety level	PL d / SIL 2
Ordering code	1293000

### ACCESSORIES

- M12 angle bracket. See [page 10](#)
- M12 mounting clamp. See [page 10](#)
- M12 5-pole straight connectors. See [page 33](#)

## PI M18 NF

METAL THREAD M18 x 1 / L = 70,5 mm

### TECHNICAL FEATURES

Mounting	Non-flush mountable
Enable zone (mm)	1 ... 8
Operating voltage (VDC)	19,2 ... 30
Current consumption (mA)	< 30
Max. capacitive load (nF)	20
Short-circuit protection	yes
Housing material	Body: stainless steel; Head: PBT
Response time (ms)	≤ 1
Safety level	PL d / SIL 2
Ordering code	1293001

### ACCESSORIES

- M18 angle bracket. See [page 10](#)
- M18 mounting clamp. See [page 10](#)
- M12 5-pole straight connectors. See [page 33](#)



SAFETY LEVEL

**SIL 2**

PL d



SAFETY LEVEL

**SIL 2**

PL d



## PI M18 F

METAL THREAD M18 x 1 / L = 70 mm

### TECHNICAL FEATURES

Mounting	Flush mountable
Enable zone (mm)	1 ... 5
Operating voltage (VDC)	19,2 ... 30
Current rating (mA)	100
Current consumption (mA)	< 30
Max. capacitive load (nF)	20
Short-circuit protection	yes
Housing material	Body: Brass white bronze coated; Head: PBT
Response time (ms)	≤ 1
Safety level	PL d / SIL 2
Ordering code	1293002

### ACCESSORIES

- M18 angle bracket. See [page 10](#)
- M18 mounting clamp. See [page 10](#)
- M12 5-pole straight connectors. See [page 33](#)

## PI M18 FR

METAL THREAD M18 x 1 / L = 86,5 mm

### TECHNICAL FEATURES

Mounting	Flush mountable
Enable zone (mm)	> 10
Operating voltage (VDC)	10 ... 30
Current rating (mA)	50
Current consumption (mA)	< 30
Max. capacitive load (nF)	20
Short-circuit protection	yes
Housing material	Body: Brass white bronze coated; Head: PBT
Response time (ms)	≤ 5
Safety level	PL d / SIL 2
Ordering code	1293003

### ACCESSORIES

- M18 angle bracket. See [page 10](#)
- M18 mounting clamp. See [page 10](#)
- M12 5-pole straight connectors. See [page 33](#)





SAFETY LEVEL

**SIL 2**

PL d

## PI M30 NF

METAL THREAD M30 x 1,5 / L = 70 mm

### TECHNICAL FEATURES

Mounting	Non-flush mountable
Enable zone (mm)	1 ... 15
Operating voltage (VDC)	19,2 ... 30
Current rating (mA)	100
Current consumption (mA)	< 30
Max. capacitive load (nF)	20
Short-circuit protection	yes
Housing material	Body: stainless steel; Head: PBT
Response time (ms)	≤ 10
Safety level	PL d / SIL 2
Ordering code	1293004

### ACCESSORIES

- M30 angle bracket. See [page 10](#)
- M30 mounting clamp. See [page 10](#)
- M12 5-pole straight connectors. See [page 33](#)

## PI M30 F

METAL THREAD M30 x 1,5 / L = 70 mm



SAFETY LEVEL

**SIL 2**

PL d

### TECHNICAL FEATURES

Mounting	Flush mountable
Enable zone (mm)	1 ... 10
Operating voltage (VDC)	19,2 ... 30
Current rating (mA)	100
Current consumption (mA)	< 30
Max. capacitive load (nF)	20
Short-circuit protection	yes
Housing material	Body: Brass white bronze coated; Head: PBT
Response time (ms)	≤ 10
Safety level	PL d / SIL 2
Ordering code	1293005

### ACCESSORIES

- M30 angle bracket. See [page 10](#)
- M30 mounting clamp. See [page 10](#)
- M12 5-pole straight connectors. See [page 33](#)



IP69K

SAFETY LEVEL

**SIL 3**

PL e

## PI M30 NF K

METAL THREAD M30 x 1,5 / L = 80 mm

### TECHNICAL FEATURES

Mounting	Non-flush mountable
Enable zone (mm)	6 ... 12
Operating voltage (VDC)	19,2 ... 30
Current rating (mA)	100
Current consumption (mA)	< 30
Max. capacitive load (nF)	20
Short-circuit protection	yes
Housing material	Body: stainless steel; Head: PBT
Response time (ms)	≤ 10
Safety level	PL e / SIL 3
Ordering code	1293006



High protection class IP69K for use in harsh environments.

### ACCESSORIES

- M30 angle bracket. See [page 10](#)
- M30 mounting clamp. See [page 10](#)
- M12 5-pole straight connectors. See [page 33](#)





SAFETY LEVEL

**SIL 3**

PL e



SAFETY LEVEL

**SIL 3**

PL e

## PI SQ F-NF

RECTANGULAR 40x40x66 mm

### TECHNICAL FEATURES

Mounting	Non-flush or flush mountable
Enable zone (mm)	10 ... 15
Operating voltage (VDC)	19,2 ... 30
Current consumption (mA)	< 15
Max. capacitive load (nF)	20
Short-circuit protection	yes
Housing material	Body: diecast zinc; Head: PPE;
Response time (ms)	≤ 50
Safety level	PL e / SIL 3
Ordering code	1293007

### ACCESSORIES

- M12 5-pole straight connectors. See [page 33](#)

## PI SQ NF

RECTANGULAR 40x40x66 mm

### TECHNICAL FEATURES

Mounting	Non-flush mountable
Enable zone (mm)	4 ... 20
Operating voltage (VDC)	19,2 ... 30
Current consumption (mA)	< 30
Max. capacitive load (nF)	20
Short-circuit protection	yes
Housing material	Body: diecast zinc; Head: PPE;
Response time (ms)	≤ 50
Safety level	PL e / SIL 3
Ordering code	1293008

### ACCESSORIES

- M12 5-pole straight connectors. See [page 33](#)

## ACCESSORIES

### ANGLE BRACKET

- For mounting cylindrical sensors
- Easy, quick and inexpensive fixing
- Robust stainless steel design for use in harsh industrial environments
- Reliable mounting on a surface by means of two screws

	Ordering code	Model
	1293100	M12 bracket
	1293101	M18 bracket
	1293102	M30 bracket

### CLAMPS WITH END STOP

- End stop for defined installation position
- Safe fixing of the sensor with click-fit mounting
- Easy, quick and inexpensive fixing
- Reliable mounting on a surface by means of two screws

	Ordering code	Model
	1293103	M12 mounting clamp
	1293104	M18 mounting clamp
	1293105	M30 mounting clamp



## The best in cost-effectiveness

- Wear-free technology allows for longer 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 a stand-alone

## The best in 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

## The best in versatility

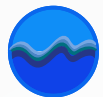
- Dual mounting options
- M12 connector or cable
- IP67 and IP6K9K protection grade for use in harsh environments
- Complies with the strict hygiene and cleaning requirements of the food and packaging industry
- 3 different coding levels
- Extension cables for series connection



Operating temperature:  
-25 ... +70 °C



High protection classes IP67 and IP6K9K for use in harsh environments



Resistant to aggressive media, e.g. cleaning agents used in the food industry



Vibration resistance:  
10...55 Hz, amplitude 1 mm

## OVERVIEW

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.



## Multiple options of actuation technology

- **Individual coding**  
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**  
The actuator is permanently assigned to the sensor during manufacturing (it cannot be replaced with another actuator)
- **Actuator coded**  
The actuator is free and not specifically assigned to the sensor (one actuator can work with multiple sensors)

## Ideal also in the most demanding applications

Unique mechanical characteristics allow protection against cleaning agents and washdown processes, a typical requirement of the food industry.



S series



B series



## TECHNICAL FEATURES

### Electrical specifications

	S series / B series
Supply voltage (VDC)	24 ± 10%
Max. switching voltage (V)	Supply voltage ± 0,2 V
Switching current safety output (mA)	Max. 400
Switching current control output (mA)	Max. 50
Response time (ms)	Input-Output: 3 Sensor-Actuator: 75
Contact form	OSSD
Switching frequency (Hz)	3
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 (mm)	8
Safe distance for switching off (mm)	18
Minimum air-gap (mm)	0,5
Misalignment actuator max. (mm)	Max. 8
Reverse polarity protection	Yes
Short-circuit proof outputs	Yes
Current consumption per input (mA)	2,75
Indication LED	Three-colour
Operating direction	Any direction
Switching principle	Electronic
Repeating accuracy R (mm)	< 0,5
Hysteresis (mm)	2
Series connection	Max. 30 sensors
Technology	RFID

### Mechanical data

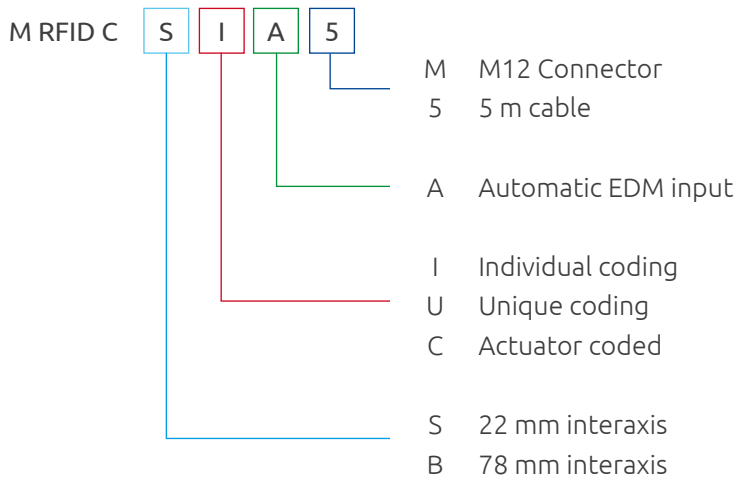
	S series	B series
Housing material	PBT / PC	
Housing	Rectangular	
Connector type	Pigtail M12 / 8-pole / 150mm	
Cable	5 m PVC / 8 wires	
Cross-section of wire (mm <sup>2</sup> )	0,25	
Dimensions h w d (mm)	26 x 36 x 13	26 x 88 x 13
Fastening	M4 screws (countersunk)	

### Environmental features

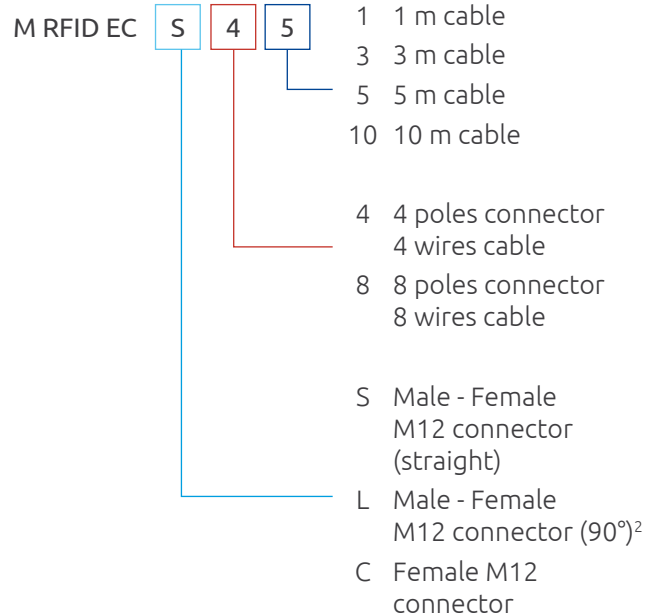
	S series / B series
Protection class	IP67 (all versions) IP6K9K (cable versions only)
Operating temperature	- 25 ... +70 °C
Shock resistance	30 g / 11 ms
Vibration resistance (Hz)	10 ... 55, amplitude 1 mm

## CODE LEGEND (ORDERING INFORMATION)

### Combo (Sensor + Actuator)<sup>1</sup>



### Extension cable (for series connection)



### T Connectors (for series connection)



### 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)

- Each Combo set is provided with a Sensor and the corresponding Actuator. Sensors and Actuators can be also ordered separately, please enquire within
- 4-pole version available only

## APPROVALS

- 2006/42/EC "Machine Directive"
- 2014/30/EC "Electromagnetic Compatibility Directive"
- 2014/35/EC "Low Voltage Directive"
- IEC 61508-1 (ed. 2) (SIL3) "Functional safety of electrical/electronic programmable electronic safety related systems - General requirements"
- IEC 61508-2 (ed. 2) (SIL3) "Functional safety of electrical/electronic/programmable electronic safety related systems - Requirements for electrical/electronic/programmable electronic safety-related systems"
- IEC 61508-3 (ed. 2) (SIL3) "Functional safety of electrical/electronic programmable electronic safety related systems: Software requirements"
- IEC 62061: "Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems"
- ISO 13849-1:2015 "Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design"

SAFETY LEVEL

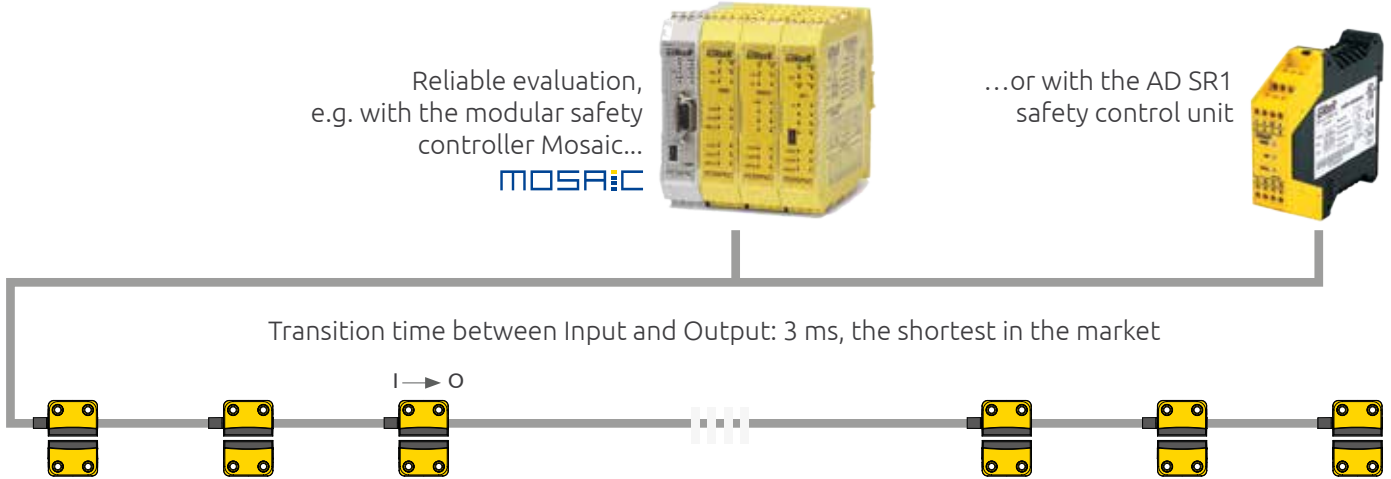
Cat. 4

SIL 3 - SILCL 3  
PL e



## SERIES CONNECTION WITH MAXIMUM SAFETY

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



## MAGNUS RFID RANGE

**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

**Cable or M12 Connector**  
Magnus RFID satisfies all requirements with regard to connectivity.



## PART NUMBERS

### Combo (Sensor + Actuator) 22 mm interaxis

Ordering code	Model	Connection	Description
1292000	MRFID C S CA M	M12 connector	Actuator coded
1292003	MRFID C S CA 5	5 m cable	
1292010	MRFID C S IA M	M12 connector	Individual coding
1292013	MRFID C S IA 5	5 m cable	
1292020	MRFID C S UA M	M12 connector	Unique coding
1292023	MRFID C S UA 5	5 m cable	

### Combo (Sensor + Actuator) 78 mm interaxis

Ordering code	Model	Connection	Description
1292100	MRFID C B CA M	M12 connector	Actuator coded
1292103	MRFID C B CA 5	5 m cable	
1292110	MRFID C B IA M	M12 connector	Individual coding
1292113	MRFID C B IA 5	5 m cable	
1292120	MRFID C B UA M	M12 connector	Unique coding
1292123	MRFID C B UA 5	5 m cable	

### Individual sensors 22 mm interaxis

Ordering code	Model	Connection	Description
1292200	MRFID S S CA M	M12 connector	Actuator coded
1292203	MRFID S S CA 5	5 m cable	
1292210	MRFID S S IA M	M12 connector	Individual coding
1292213	MRFID S S IA 5	5 m cable	

### Individual sensors 78 mm interaxis

Ordering code	Model	Connection	Description
1292300	MRFID S B CA M	M12 connector	Actuator coded
1292303	MRFID S B CA 5	5 m cable	
1292310	MRFID S B IA M	M12 connector	Individual coding
1292313	MRFID S B IA 5	5 m cable	

### Individual actuators

Ordering code	Model	Description
1292290	MRFID A S	Actuator for sensors 22 mm interaxis
1292390	MRFID A B	Actuator for sensors 78 mm interaxis

### Spacers \*

Ordering code	Model	Description
1292401	MRFID SP S	Spacer for sensors 22 mm interaxis
1292400	MRFID SP B	Spacer for sensors 78 mm interaxis

\* Ordering code includes one spacer only

## AVAILABLE CABLES

- Male - Female M12 4-pole or 8-pole straight connectors. See [page 37](#)
- Male - Female M12 4-pole 90° angled connectors. See [page 37](#)
- Female M12 4-pole or 8-pole connectors. See [page 38](#)
- T connectors (Type A, B, C). See [page 38](#)
- Termination plug. See [page 38](#)

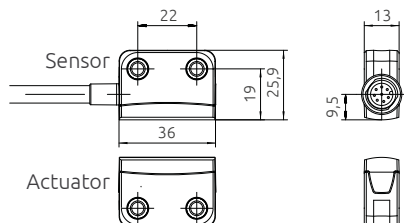


## MECHANICAL DATA

### DIMENSIONS

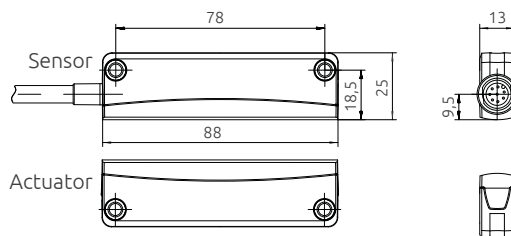
#### S series

Cable version

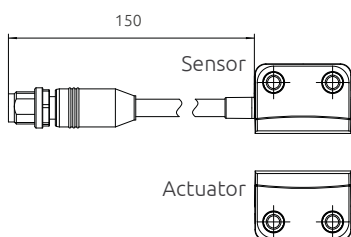


#### B series

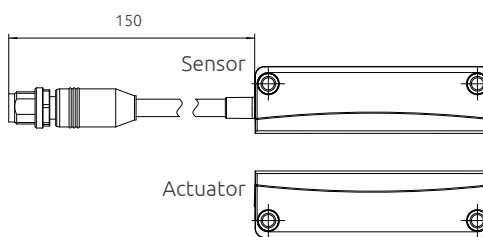
Cable version



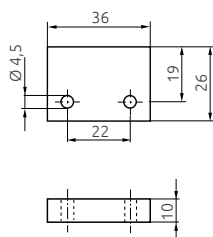
M12 Connector version



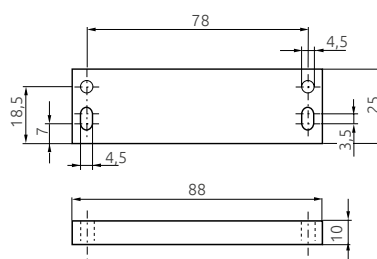
M12 Connector version



Spacer S



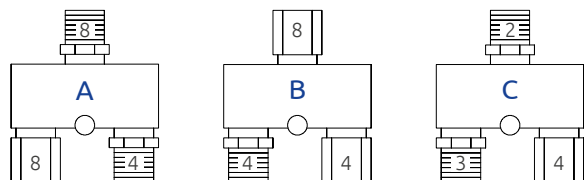
Spacer B



Dimension: mm

### ACCESSORIES

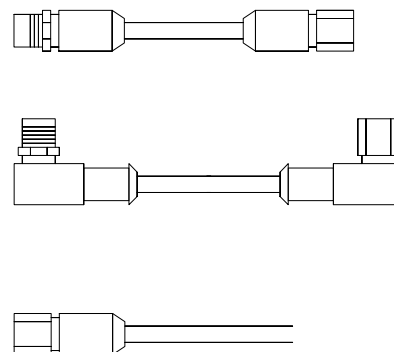
T Connectors



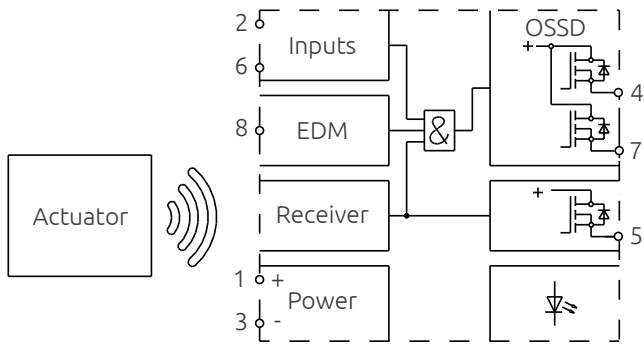
- Type A** To gain status output from the connected sensor
- Type B** For series connections of 2 or more sensors
- Type C** To introduce additional power supplies in long series

Extension cables

- 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

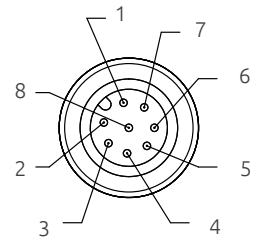


## CIRCUIT DIAGRAM

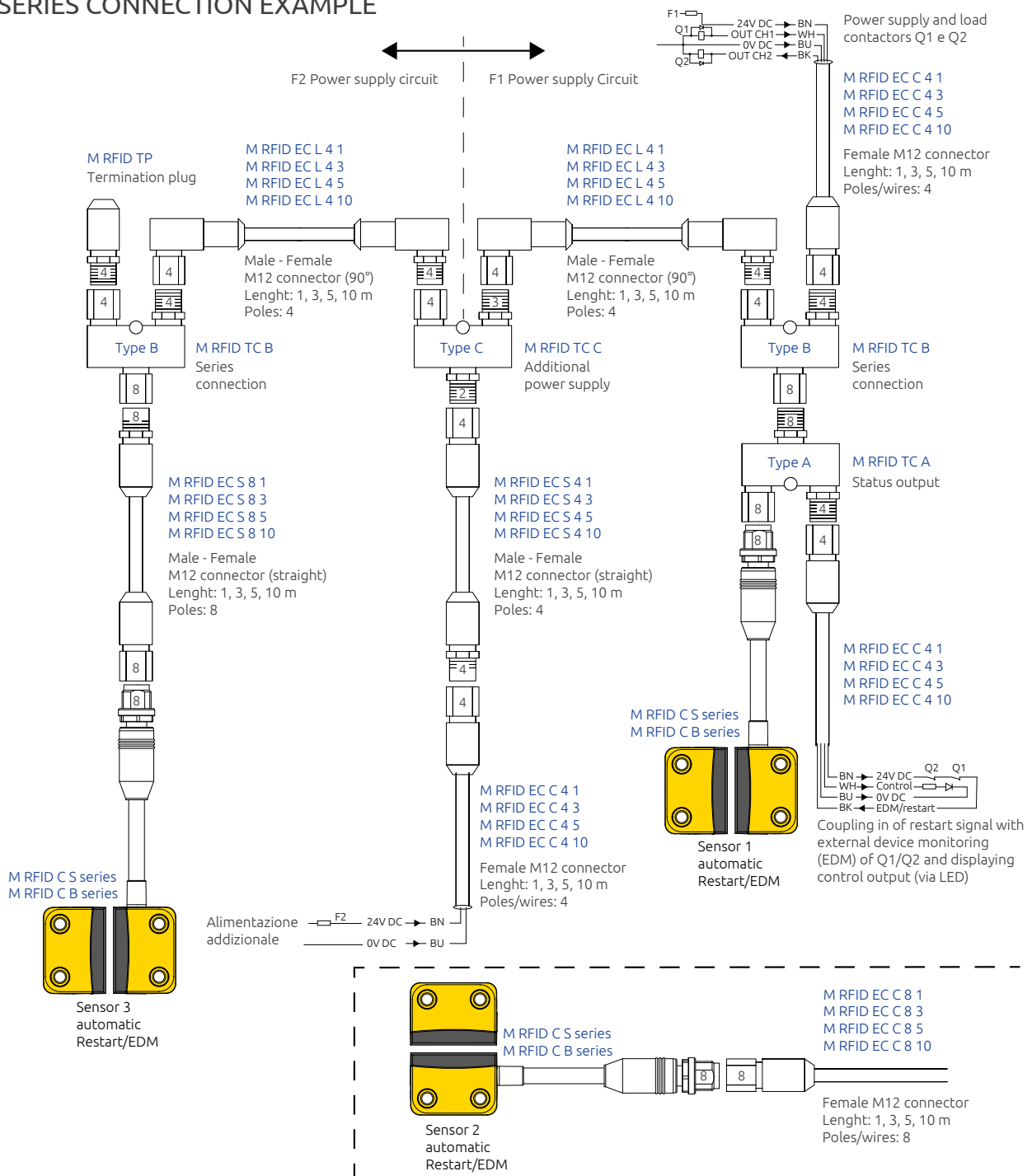


## PIN-OUT

Pin	Function
1	VDC
2	Safety input 1
3	GND
4	Safety output 1
5	Diagnostic output
6	Safety input 2
7	Safety output 2
8	EDM input



## SERIES CONNECTION EXAMPLE



## MG S

### RECTANGULAR COMPACT HOUSING

#### TECHNICAL FEATURES

Operating voltage (VDC)	24
Switching current (mA)	Max. 100
Series resistance (Ohm)	22
Switching power (W)	3
Shock resistance (Hz/g)	10 - 2000/35
Housing material	PBT
Possible actuation magnets	MG S M to be ordered separately

#### PART NUMBERS

MG S 20 ordering code: 1291000

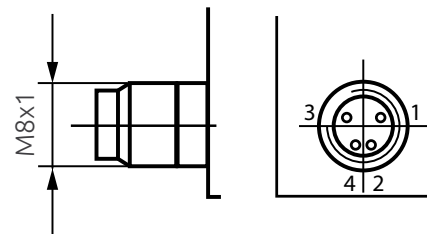
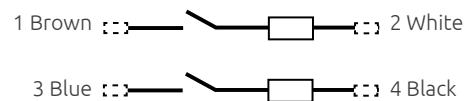
MG S M ordering code: 1291001

#### CABLES NEEDED

M8 4-pole. See [page 34](#) (CGx, CG9x)

#### CONNECTOR

M8 4-pole connector.



Compact and robust thermoplastic enclosure (PBT).

22 mm fixing.

Coded magnetic operation – Tamper resistant.

Can be connected to Mosaic safety configurable controller. MG S switches connected to Mosaic safety controller form a certified PL e safety system.

Switching distance: 3 - 10 mm.

Sensor with 4 wires: 2 NO contacts.



Operating temperature: -25 ... +75 °C



IP67 rating

## MG B RECTANGULAR HOUSING

### TECHNICAL FEATURES

Operating voltage (VDC)	24
Switching current (mA)	Max. 100
Series resistance (Ohm)	22
Switching power (W)	3
Shock resistance (Hz/g)	10 - 2000/35
Housing material	PBT
Possible actuation magnets	MG B M to be ordered separately
Possible actuation reinforced magnets	MG B M+ to be ordered separately (only use reinforced actuation magnets if a gap of more than 4 mm is unavoidable)

### PART NUMBERS

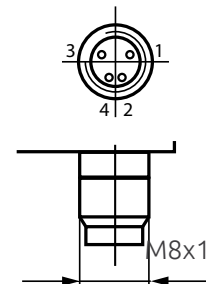
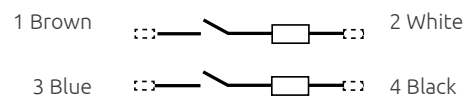
MG B 20 ordering code: **1291010**  
 MG B M ordering code: **1291011**  
 MG B M+ ordering code: **1291012**

### CABLES NEEDED

M8 4-pole. See [page 34](#) (CGx, CG9x)

### CONNECTOR

M8 4-pole connector



Robust thermoplastic enclosure (PBT).

78 mm fixing.

Coded magnetic operation – Tamper resistant.

Can be connected to Mosaic safety configurable controller. MG B switches connected to Mosaic safety controller form a certified PL e safety system.

Switching distance:

- 4 - 16 mm
- 7 - 18 mm with magnet MG B M+

Sensor with 4 wires: 2 NO contacts



Operating temperature: -25 ... +75 °C



IP67 rating

MG M M  
MG M M+



Robust cylindrical thermoplastic enclosure.  
30 mm diameter.

Coded magnetic operation – Tamper resistant.

Can be connected to Mosaic safety configurable controller. MG M switches connected to Mosaic safety controller form a certified PL e safety system.

Switching distance:

- 4 - 16 mm
- 7 - 20 mm with magnet MG M M+

Sensor with 4 wires: 2 NO contacts.



Operating temperature: -25 ... +75 °C



IP67 rating



## MG M 20

### CYLINDRICAL HOUSING

#### TECHNICAL FEATURES

Operating voltage (VDC)	24
Switching current (mA)	max. 100
Series resistance (Ohm)	22
Switching power (W)	3
Shock resistance (Hz/g)	10 - 2000/35
Housing material	PBT
Possible actuation magnets	MG M M to be ordered separately

Possible actuation reinforced magnets  
MG M M+ to be ordered separately (only use reinforced actuation magnets if a gap of more than 4 mm is unavoidable)

#### PART NUMBERS

MG M 20 ordering code: 1291020

MG M M ordering code: 1291021

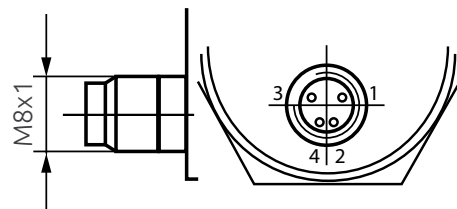
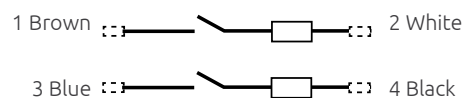
MG M M+ ordering code: 1291022

#### CABLE NEEDED

M8 4-pole. See [page 34](#) (CGx, CG9x)

#### CONNECTOR

M8 4-pole connector



## APPROVALS

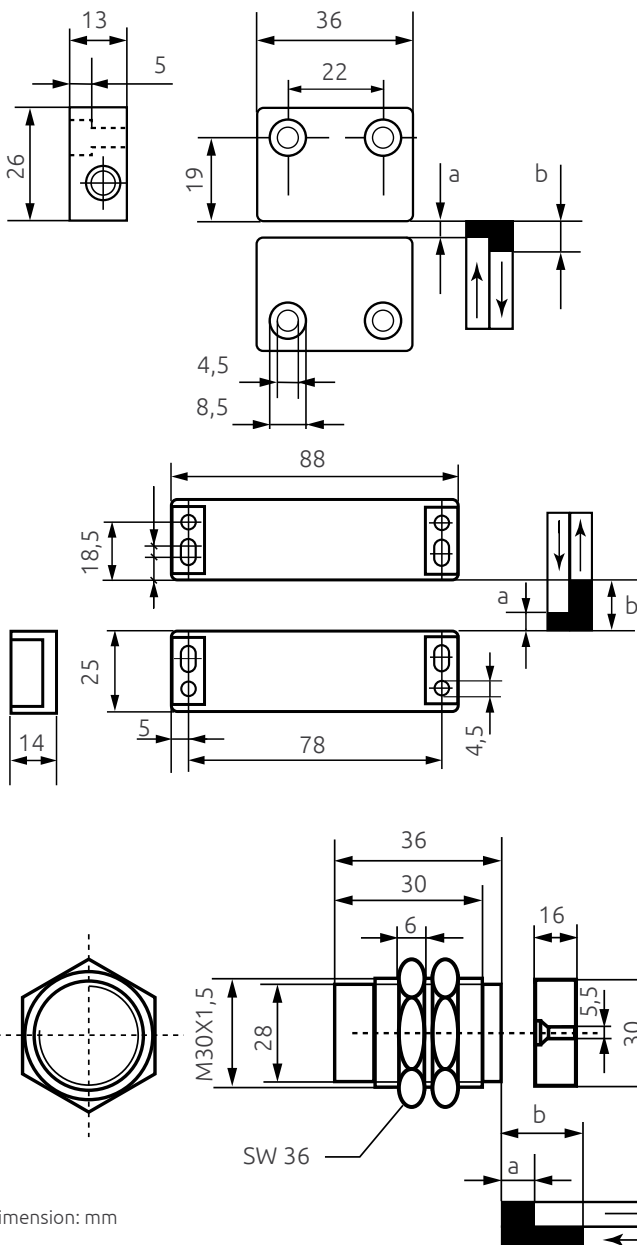
Safety Level **PL e** when connected to Mosaic  
Up to **PL d** when connected to MG d1

- 2006/42/EC: "Machine Directive"
- 2014/30/EU: "Electromagnetic Compatibility Directive"
- 2014/35/EU: "Low Voltage Directive"
- EN 61508-1:1998 "Functional safety of electrical/electronic programmable electronic safety related systems - General requirements"
- EN 61508-2:2000 "Functional safety of electrical/electronic/programmable electronic safety related systems - Requirements for electrical/electronic/programmable electronic safety-related systems"
- EN 61508-3:1998 "Functional safety of electrical/electronic programmable electronic safety related systems: Software requirements"
- ISO 13849-1:2008 "Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design"
- IEC 62061: "Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems"



## MECHANICAL DATA

### DIMENSIONS



Dimension: mm

Gaps (operating distance) for safe switching function in mm:

MINIMUM GAP	0,5	-
ON	3	a
OFF	10	b

Gaps (operating distance) for safe switching function in mm:

MINIMUM GAP	normal	0,5	
	with + magnet	3	
ON	normal	4	a
	with + magnet	7	
OFF	normal	16	b
	with + magnet	18	

+ = reinforced

Gaps (operating distance) for safe switching function in mm:

MINIMUM GAP	normal	0,5	
	with + magnet	3	
ON	normal	4	a
	with + magnet	7	
OFF	normal	16	b
	with + magnet	18	

+ = reinforced



Ilion is a Type 2 safety photocell with M18 cylindrical metal body.

The photocells must be connected to control unit for example: AU SX or AU SXM control unit with Muting to form a protection system that can be composed of 1, 2, 3 or 4 single beam photocells or Mosaic.

In case of connection with Mosaic safety controller, the number of photocells depends to the configuration of the Mosaic system (for details on the interface see AU SX, AU SXM and Mosaic control units).

The compact size of the photocells makes it possible to fit the protection system into very small spaces, while the possibility to use more photocells provides the maximum flexibility in positioning the protective beams.

All connections through M12 5-pole connectors. Unshielded cables up to 50 meter long (between sensor and control unit).



Operating temperature: 0 ... +55 °C



IP67 protection rating

## TECHNICAL FEATURES

Minimum detectable object (mm)	12
Max. range (m)	8 IL 10 20 IL 20
Number of photocells per control unit	1 ... 4 with AU SX and AU SXM control units In case of connection with Mosaic safety controller the number of photocells depends to the number available input of the system.
Response time for each photocell (ms)	7
Output	PNP - 100 mA
Signalling	Status led
Power supply (VDC)	24 ± 20%
Electrical connections	M12 4-pole
Dimensions (mm)	Ø 18 x 85

## PART NUMBERS

Ilion photocell includes multi-language instruction manual and CE declaration of conformity.

IL 10 ordering code: **1200201**

IL 20 ordering code: **1200202**

## CABLES NEEDED

M12 5-pole. Pin 5 not connected  
See [page 34](#) (CDx, CD 9x, CDM 9", CDM 99)

## ACCESSORIES

- Safety interface AU SX. See [page 31](#)
- Safety interface AU SXM. See [page 32](#)
- Adjustable fixing Bracket. See [page 23](#)



## APPROVALS

Safety level (with a control unit AU XS, AU SXM or Mosaic): Type 2 – SIL CL 1 – PL c – Cat. 2

- 2006/42/EC: "Machine Directive"
- 2014/30/EU: "Electromagnetic Compatibility Directive"
- 2014/35/EU: "Low Voltage Directive"
- IEC 61496-1 (ed.3) "Safety of machinery - Electro sensitive protective equipment - General requirements and tests"
- IEC 61496-2 (ed.3) "Safety of machinery - Electro-sensitive protective equipment - Particular requirements for equipment using active opto-electronic protective devices (AOPDs)"
- ISO 13849-1:2006 "Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design"
- IEC 62061 (ed.1) "Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems"
- EN 50178:1997 "Electronic equipment for use in power installations"
- EN 55022:2110 "Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement"

SAFETY LEVEL

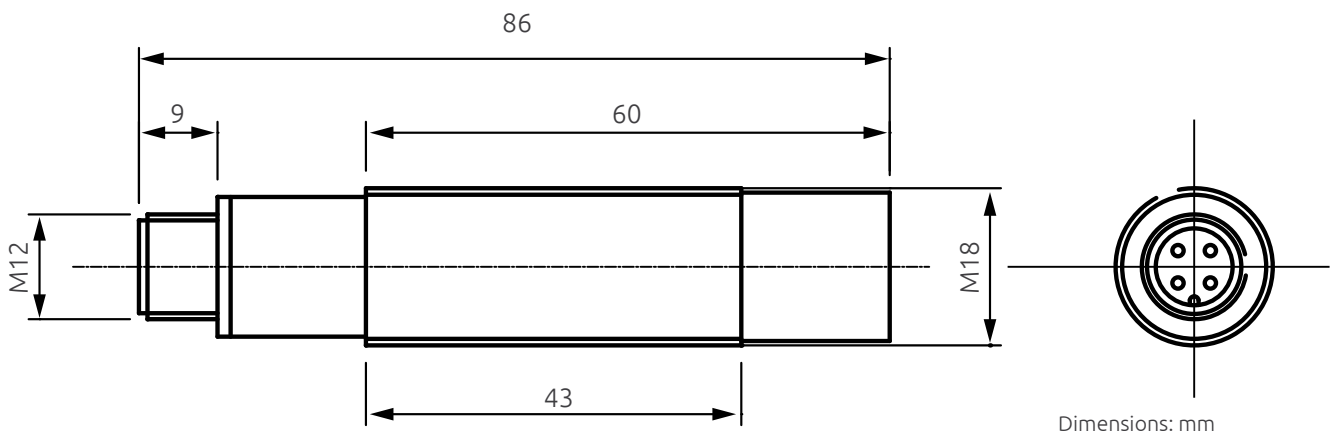
**TYPE 2**

SIL CL 1  
PL c - Cat. 2



## MECHANICAL DATA

### DIMENSIONS



## IL FB

### ADJUSTABLE BRACKETS



### PART NUMBERS

Model	Code	Description
IL FB	1200090	Set of 2 adjustable brackets

The IL FB bracket allows both vertical and horizontal adjustment of the optical axis of the photocell



Ulisse is a Type 2 safety photocell with metal body and M8 3-pole connector.

The photocells must be connected to control unit for example: standard AU SX or AU SXM control unit with Muting or Mosaic to form a protection system that can be composed of 1, 2, 3 or 4 single beam photocells.

In case of connection with Mosaic safety controller, the number of photocells depends to the configuration of the Mosaic system (for details on the interface see AU SX, AU SXM and Mosaic control units).

Thanks to the very small size, the anodised aluminium case and the glass lenses free from electrostatic dust attraction, Ulisse is the ideal solution for the protection of weaving machines as well as of other applications characterised by high levels of mechanical stress or very restricted spaces.



Operating temperature: 0 ... +55 °C



IP67 protection rating

## TECHNICAL FEATURES

Minimum detectable object (mm)	8
Max. range (m)	6
Number of photocells per control unit	1 ... 4 In case of connection with Mosaic safety controller the number of photocells depends to the number available input of the system.
Response time for each photocell (ms)	7
Output	PNP - 100 mA
Signalling	Status led
Power supply (VDC)	24 ± 20%
Electrical connections	M8 3-pole
Max. cable length (m)	50 (between sensor and control unit)
Dimensions h x w x d (mm)	58 x 15 x 25

## PART NUMBERS

Ulisse photocell includes multi-language instruction manual and CE declaration of conformity.

UPC ordering code: 1200300

## CABLES NEEDED

M8 3-pole. See [page 35](#) (C 8x, C 895)

## ACCESSORIES

- Safety interface AU SX. See [page 31](#)
- Safety interface AU SXM. See [page 32](#)

## APPROVALS

Safety level (with a control unit AU XS, AU SXM or Mosaic): Type 2 – SIL CL 1 – PL c – Cat. 2

- 2006/42/EC: "Machine Directive"
- 2014/30/EU: "Electromagnetic Compatibility Directive"
- 2014/35/EU: "Low Voltage Directive"
- IEC 61496-1 (ed.3) "Safety of machinery - Electro sensitive protective equipment - General requirements and tests"
- IEC 61496-2 (ed.3) "Safety of machinery - Electro-sensitive protective equipment - Particular requirements for equipment using active opto-electronic protective devices (AOPDs)"
- ISO 13849-1:2006 "Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design"
- IEC 62061 (ed.1) "Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems"
- EN 50178:1997 "Electronic equipment for use in power installations"
- EN 55022:2110 "Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement"

SAFETY LEVEL

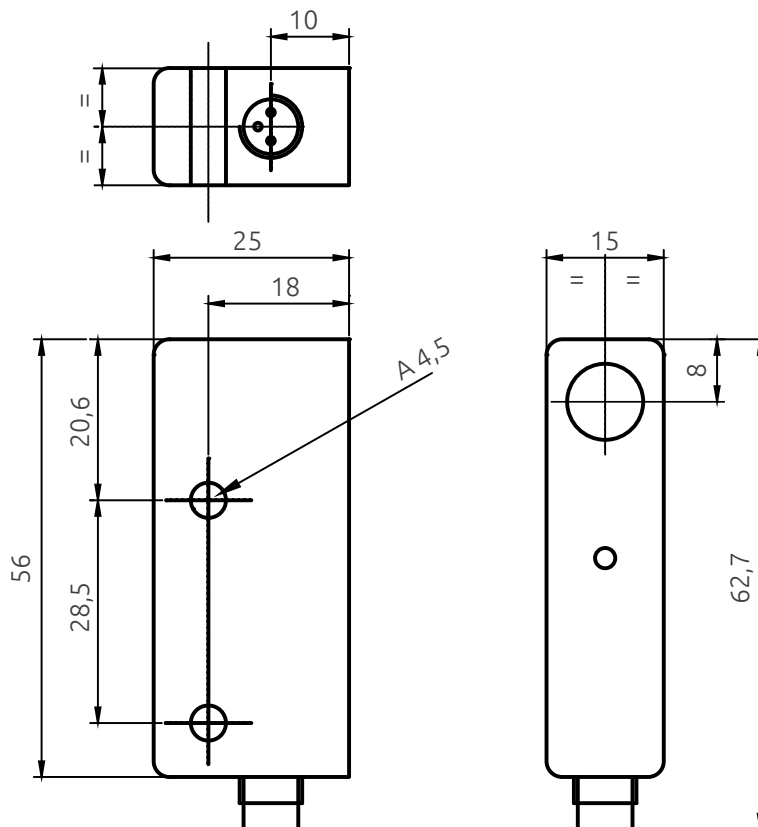
**TYPE 2**

SIL CL 1  
PL c - Cat. 2



## MECHANICAL DATA

### DIMENSIONS



Dimensions: mm



Shaft version



Hollow shaft version

Safety Sin/Cos incremental encoder. Together with Mosaic, it forms a SIL 3 certified safety function for speed monitoring. Available in two models: Shaft or Hollow shaft.

## APPLICATION EXAMPLE

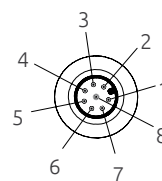
Any applications requiring speed monitoring of a rotating axis.

Features a robust and reliable interface and the ability to handle high mechanical loads.

## TECHNICAL FEATURES

Shaft type	Hollow shaft version Ø 12 mm Shaft version Ø 10 mm with flat surface
Fastening	Safety-Lock™ Allow high rotational speed and high shaft load capacity
Protection rate	Housing and flange side IP67, shaft IP65 (optional IP67)
Immunity to interference	Shock and vibration resistant Insensitive to strong magnetic fields
Resolution	2048 pulse rate
Power supply	SC3 24D2048R - 24 VDC SC3 05D2048R - 5 VDC SC3 24B2048R - 24 VDC SC3 05B2048R - 5 VDC
Connector	Radial M12 8-pole

## CONNECTORS



M12 8-pole

- 1 - GND
- 2 - + V
- 3 - A: Sine output
- 4 -  $\bar{A}$ : Sine output
- 5 - B: Cosine output
- 6 -  $\bar{B}$ : Cosine output
- 7 - N.C.
- 8 - N.C.
- shield - PH

## APPROVALS

- 2006/42/EC "Machinery Directive"
- 2004/108/EC "Electromagnetic Compatibility (EMC)"
- EN ISO 13849-1 "Safety of machinery: Safety-related parts of control systems. Part 1: General principles for design"
- EN ISO 13849-2 "Safety of machinery: Safety-related parts of control systems. Part 2: Validation"
- IEC 61508 "Functional safety of electrical, electronic and programmable electronic safety-related systems"
- EN ISO 61800-5-2 "Adjustable speed electrical power drive systems". Part 5-2 Safety requirements - Functional
- UL (C+US) mark for USA and Canada
- BGIA - Institute for Occupational Safety and Health - Germany



## PART NUMBERS

Ordering code	Description
1100102	SC3 24D2048R - 24 VDC Hollow Shaft version Ø 12 mm
1100103	SC3 05D2048R - 5 VDC Hollow Shaft version Ø 12 mm
1100104	SC3 24B2048R - 24 VDC Shaft version Ø 10 mm with flat surface
1100105	SC3 05B2048R - 5 VDC Shaft version Ø 10 mm with flat surface

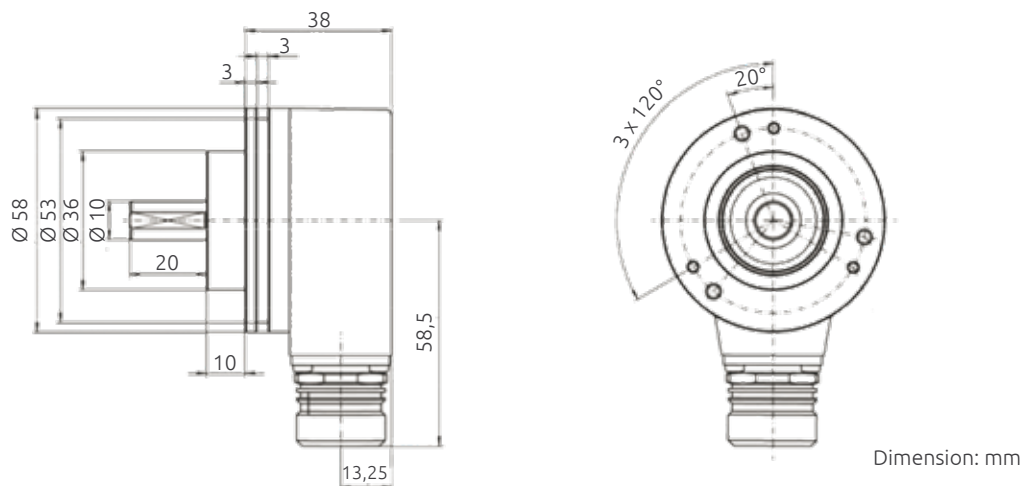
## CABLES NEEDED

M12 8-pole shielded. See page 36

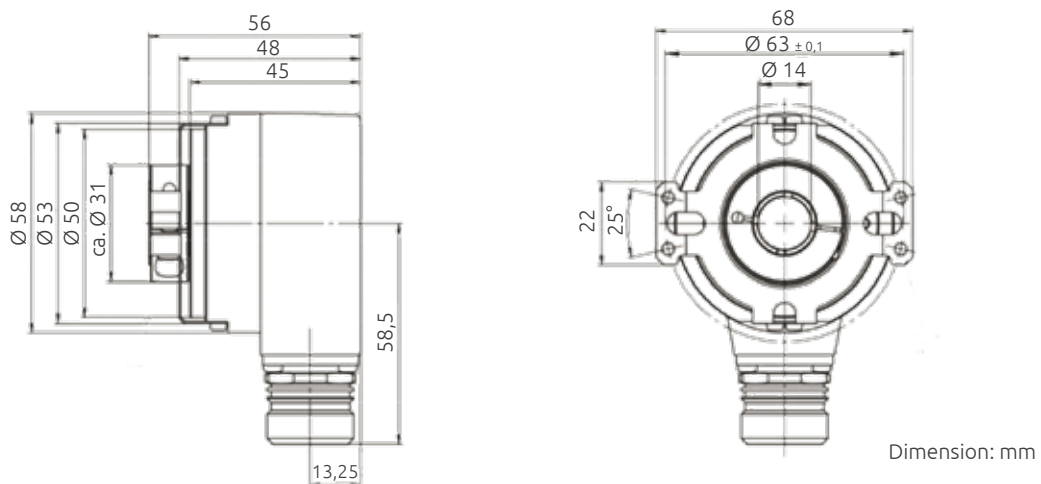
NOTE: cables supplied with M12 8-pole connector at one end only. The other side must be cut off at correct length and crimped with RJ45 connector (not included).

## MECHANICAL DATA

### DIMENSIONS



Encoder, shaft version with flat surface



Hollow shaft version



Safelock is a safety switch utilised for the protection of personnel when opening doors leading to dangerous areas. It acts by monitoring and interrupting the safety circuit during dangerous scenarios.

The solenoid locks and unlocks access to the dangerous area, guaranteeing safety until the danger has stopped. Available models

#### SLK-M

Retention mechanism actuated by a spring and unlocked by ON current. Guard locking by spring force, release by applying voltage to the guard locking solenoid.

#### SLK-E

Retention mechanism actuated by ON current and unlocked by spring. Guard locking by applying voltage to the guard locking solenoid, release by spring force.

- Actuating head made of plastic or metal
- Auxiliary release on the front. Used for releasing the guard locking with the aid of a tool. To protect against tampering, the auxiliary release is sealed with sealing lacquer
- Approach direction: horizontal and vertical. Can be adjusted in 90° steps
- Any installation position



Operating temperature: -20 ... +55 °C



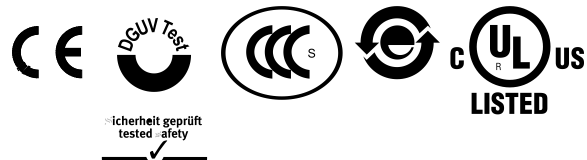
IP67 protection rating

## TECHNICAL FEATURES

Housing material	Reinforced thermoplastic
Contact material	Silver alloy, gold flashed
Switching principle	Slow-action switching contact
Number of door position positively driven contacts	2
Number of guard lock monitoring positively driven contacts	1
Approach speed	Max. 20 m/min
Actuation frequency	1200 1/h
Guard locking principle	Closed-circuit current principle
Force	Locking force (Fmax): ≥1 kN (plastic), ≥2 kN (metal)
	Locking force (FZh): 1,5 kN 0,7 kN (plastic), 1,5 kN (metal)
	Retention force: 20 N
	Extraction force: 30 N Actuating force: 35 N
Solenoid operating voltage	AC/DC 24 V -15% ... +10%
Short circuit protection	4 A
Switching voltage	12 V Min at 10 mA
Switching current	1 mA Min at 24 V
Power consumption	6 W

## APPROVALS

- 2006/42/EC: "Machine Directive"
- EN 60947-5-1:2004/A1:2009 Low-voltage switchgear and controlgear. Control/circuit devices and switching elements. Electromechanical control circuit devices
- EN 60947-5-1:2004/A1:2009 Annex K
- EN ISO 14119:2013 Safety of machinery - Interlocking devices associated with guards - Principles for design and selection

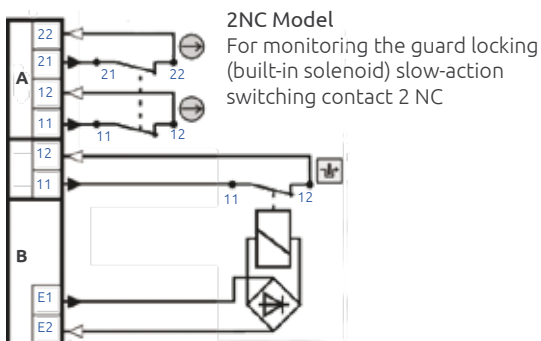


## PART NUMBERS

Ordering code	Model	Guard lock	Description
1290100	SLK-M-P-2NC-24	Mechanical	Safelock with mechanical guard lock and plastic actuating head. Switching element: 2 NC, feedback 1 NC
1290102 *	SLK-M-M-2NC-24		Safelock with mechanical guard lock and metal actuating head. Switching element: 2 NC, feedback 1 NC
1290104	SLK-E-P-2NC-24	Electrical	Safelock with electrical guard lock and plastic actuating head. Switching element: 2 NC, feedback 1 NC
1290106 *	SLK-E-M-2NC-24		Safelock with electrical guard lock and metal actuating head. Switching element: 2 NC, feedback 1 NC

\* Contact ReeR to check availability

## BLOCK DIAGRAM



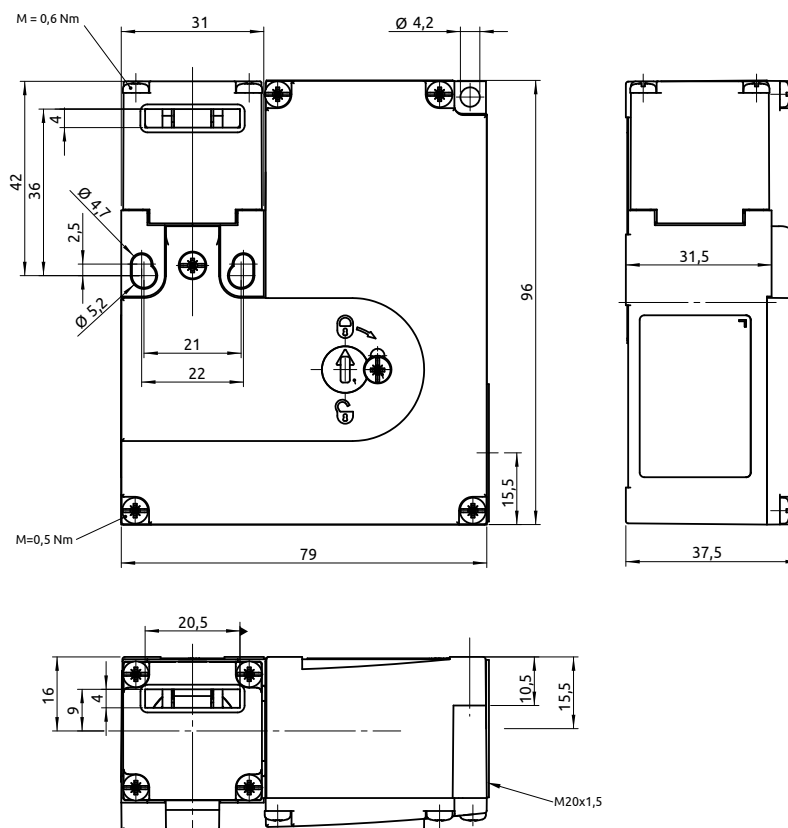
## SAFETY LEVELS

3 different safety levels according to the EN ISO 13489-1 standard

Category / Safety Level	Safety device
Cat. 1 / PL c	1 Safelock + 1 safety relay AD SRE3C or 1 input of the Mosaic safety controller
Cat. 3 / PL d	1 Safelock + 1 safety relay AD SRE3C or 2 inputs of the Mosaic safety controller + fault exclusion according to the standard (EN ISO 13849-2)
Cat. 4 / PL e	2 Safelock + 2 Magnus RFID + safety relay AD SR1 or 2 inputs of the Mosaic safety controller 2 Safelock + 1 safety relay AD SRE3C or 2 inputs of the Mosaic safety controller 2 Safelock + 2 safety relay AD SRE4C or 4 inputs of the Mosaic safety controller

## MECHANICAL DATA

### DIMENSIONS





## ACTUATORS

Model		Ordering code	Description
ACT-S-S-RB		1290302	Actuator standard, straight with rubber bush Two stainless safety screws per actuator Actuators with rubber bushings
ACT-S-A-RB		1290303	Actuator standard, angled with rubber bush Two stainless safety screws per actuator
ACT-S-H-TB		1290304	Actuator standard, hinged, top-bottom Actuators made of stainless steel Two stainless safety screws per actuator For doors hinged at top and bottom
ACT-S-H-LR		1290305	Actuator standard, hinged, left-right Actuators made of stainless steel Two stainless safety screws per actuator For doors hinged on right and left
ACT-F-S-RB		1290306 *	Actuator for insertion funnels, straight with rubber bush Two stainless safety screws per actuator Actuators with rubber bushings
ACT-F-A-RB		1290307 *	Actuator for insertion funnels, angled with rubber bush Two stainless safety screws per actuator Actuators with rubber bushings
ACT-F-H-TB		1290308 *	Actuator for insertion funnels, hinged, top-bottom Actuators made of stainless steel Two stainless safety screws per actuator For doors hinged at top and bottom
ACT-FH-LR		1290309 *	Actuator for insertion funnels, hinged, left-right Actuators made of stainless steel Two stainless safety screws per actuator For doors hinged on right and left
ACT-F-IF		1290311 *	Insertion Funnel

\* Contact ReeR to check availability



Control unit for safety photocells Ilion and Ulisse, which can be combined to form a Type 2 safety system.

Up to 4 photocells may be connected.

With guided-contact safety relays.

Start/Restart interlock.

EDM Feedback input for external contactors monitoring.

Self test every 5 seconds.

## APPROVALS

- 2006/42/EC: "Machine Directive"
- 2014/30/EU: "Electromagnetic Compatibility Directive"
- 2014/35/EU: "Low Voltage Directive"
- EN 61496-1:2013 "Safety of machinery - Electro sensitive protective equipment - General requirements and tests"
- IEC 62061 (ed.1) (SILCL1) "Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems"
- EN ISO 13849-1: 2008 (Cat. 2, PL c) "Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design"
- EN 50178: 1997 "Electronic equipment for use in power installations"
- EN 55022: 2010 "Information Technology Equipment- Radio Disturbance Characteristics- Limits and Methods of Measurement"
- UL (C+US) mark for USA and Canada



SAFETY LEVEL

**TYPE 2**



SILCL 1  
PL c - Cat. 2

## AU SX

### TYPE 2 CONTROL UNIT FOR ILION AND ULISSE PHOTOCELLS

#### TECHNICAL FEATURES

Safety relay outputs	2 NO - 2 A 250 VAC
Status output	PNP - 100 mA at 24 VDC
Response time (ms)	≤ 30
Start/Restart command according to IEC 61496-1	Manual or automatic Start/Restart selectable on terminal block
Signalling	LED indication of input/output status and diagnosis
Power supply (VDC)	24 ± 20%
Electrical connections	On terminal block
Operating temperature (°C)	0 ... 55
Protection rating	IP20 for housing IP2X for terminal block
Fastening	DIN rail fastening according to EN 50022-35 standard
Dimensions h x w x d (mm)	99 x 22,5 x 114

#### PART NUMBERS

AU SX module includes multi-language instruction manual and CE declaration of conformity.

Ordering code: **1201710**



AU SXM control unit, with integrated Muting functions, for safety photocells Ilion and Ulisse, which can be combined to form a Type 2 safety system.

Up to 4 photocells may be connected.

2-sensor Muting logics.

With guided-contact safety relays.

Muting time-out selectable.

Start/Restart interlock.

EDM Feedback input for extra external contactors monitoring.

Self test every 5 seconds.

## APPROVALS

- 2006/42/EC: "Machine Directive"
- 2014/30/EU: "Electromagnetic Compatibility Directive"
- 2014/35/EU: "Low Voltage Directive"
- EN 61496-1:2013 "Safety of machinery - Electro sensitive protective equipment - General requirements and tests"
- IEC 62061 (ed.1) (SILCL1) "Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems"
- EN ISO 13849-1: 2008 (Cat. 2, PL c) "Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design"
- EN 50178: 1997 "Electronic equipment for use in power installations"
- EN 55022: 2010 "Information Technology Equipment- Radio Disturbance Characteristics- Limits and Methods of Measurement"
- UL (C+US) mark for USA and Canada



SAFETY LEVEL

**TYPE 2**

SILCL 1  
PL c - Cat. 2



## AU SXM

### TYPE 2 CONTROL UNIT WITH INTEGRATED MUTING FOR ILION AND ULISSE PHOTOCELLS

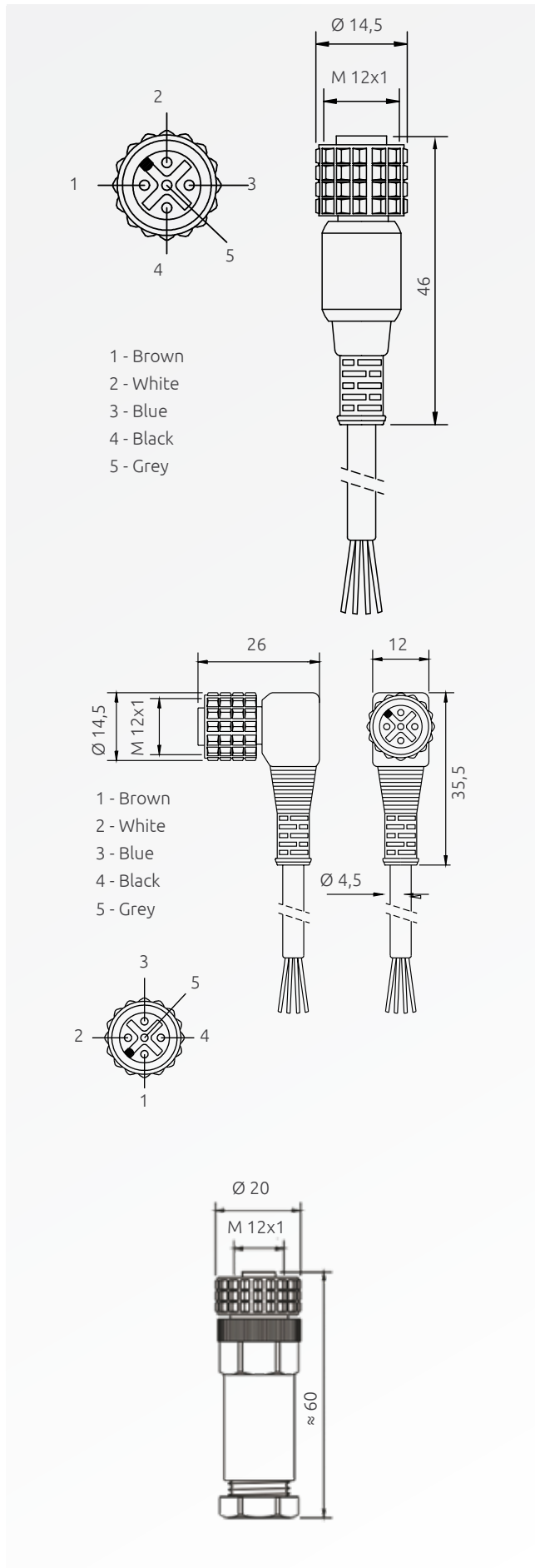
## TECHNICAL FEATURES

Inputs for Muting sensors	2 inputs 0 or 24 VDC – PNP or relay – dark-on
Muting Enable input	0 or 24 VDC – PNP or relay
Safety relay outputs	2 NO - 2A 250 VAC
Status output	PNP - 100 mA at 24 VDC
Muting lamp output	24 VDC; 0,5 - 5 W
Muting time-out	30 sec. or infinite, selectable
Override	2 operating modes selectable: manual action with hold to run or automatic with pulse command
Override time-out (min)	15
Response time (ms)	≤ 30
Start/Restart command according to IEC 61496-1	Manual or automatic Start/Restart selectable on terminal block
Signalling	LED indications of input/output status, Muting sensor inputs, diagnosis
Power supply (VDC)	24 ± 20%
Electrical connections	On terminal blocks
Operating temperature (°C)	0 ... 55
Protection rating	IP20 for housing IP2X for terminal blocks
Fastening	DIN rail fastening according to EN 50022-35 standard
Dimensions h x w x d (mm)	99 x 35 x 114

## PART NUMBERS

AU SXM module includes multi-language instruction manual and CE declaration of conformity.

Ordering code: 1201711



## CD x

### M12 STRAIGHT CONNECTOR 5-POLE

Model	Code	Description
CD 5	1330950	Pre-wired cable 5 m
CD 10	1330956	Pre-wired cable 10 m
CD 15	1330952	Pre-wired cable 15 m
CD 20	1330957	Pre-wired cable 20 m
CD 25	1330949	Pre-wired cable 25 m
CD 40	1330907	Pre-wired cable 40 m
CD 50	1330965	Pre-wired cable 50 m

Note: Pin 5 not connected

Cables for Ilion photocells.

## CD 9x

### M12 90° ANGLE CONNECTOR 5-POLE

Model	Code	Description
CD 95	1330951	Pre-wired cable 5 m
CD 910	1330958	Pre-wired cable 10 m
CD 915	1330953	Pre-wired cable 15 m

Note: Pin 5 not connected

Cables for Ilion photocells.

## CDM 9

### M12 STRAIGHT CONNECTOR 5-POLE SCREW TERMINAL, PG9 CABLE GLAND

Model	Code
CDM 9	1330954

Cables for Ilion photocells.

## CDM 99

### M12 STRAIGHT CONNECTOR 5-POLE SCREW TERMINAL, PG9 CABLE GLAND

Model	Code
CDM 99	1330955

Cables for Ilion photocells.

## C8 Gx

### M8 STRAIGHT CONNECTOR 4-POLE

Model	Code	Description
C8 G3	1291070	Pre-wired cable 3 m
C8 G5	1291072	Pre-wired cable 5 m

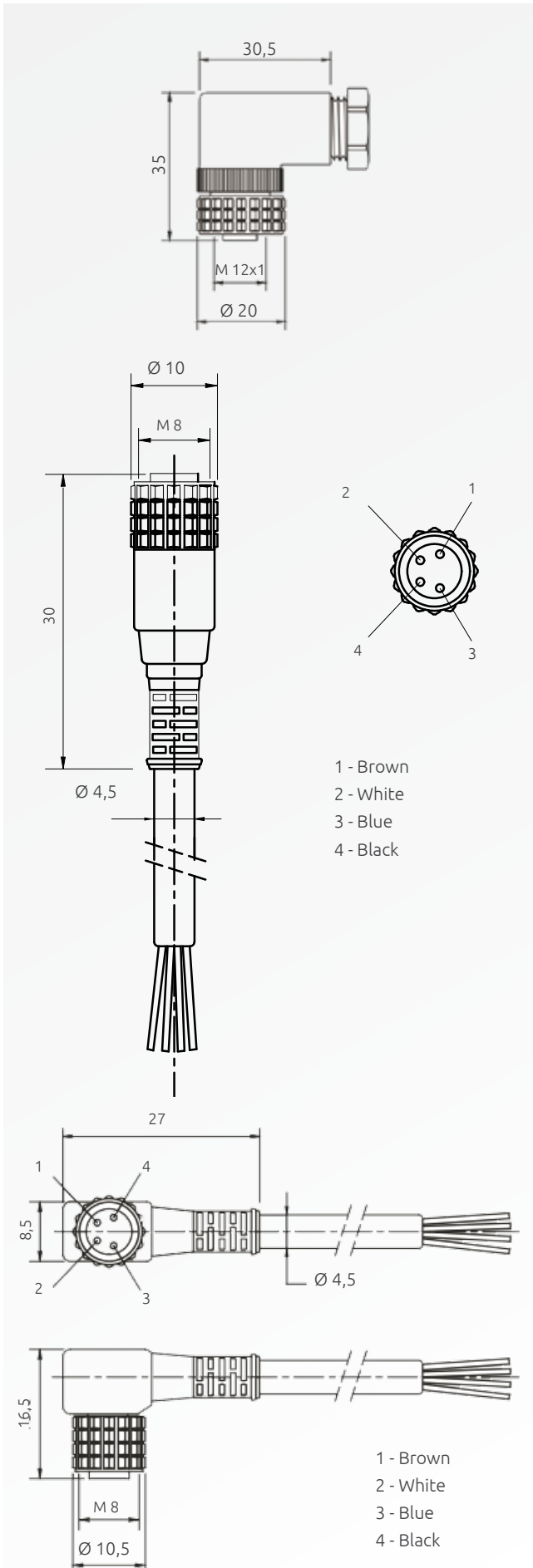
Cables for Magnus MG magnetic sensors.

## C8 G9x

### M8 90° ANGLE CONNECTOR 4-POLE

Model	Code	Description
C8 G93	1291071	Pre-wired cable 3 m
C8 G95	1291073	Pre-wired cable 5 m

Cables for Magnus MG magnetic sensors.



## CABLES C 8X

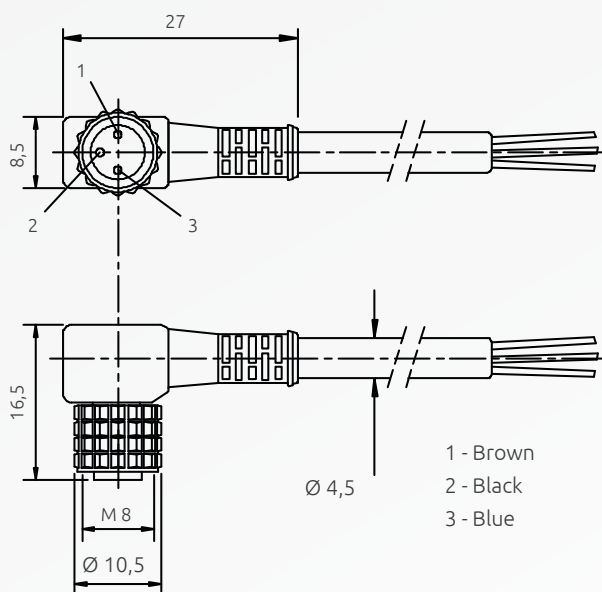
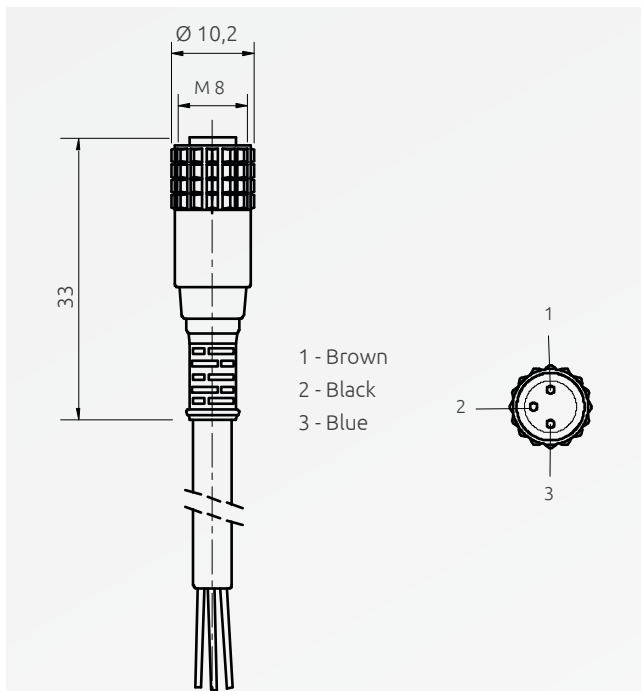
### M8 STRAIGHT CONNECTOR 3-POLE

Model	Code	Description
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C 85	1200217	Pre-wired cable 5 m
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C 815	1200219	Pre-wired cable 15 m
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Cables for Ulisse photocells.



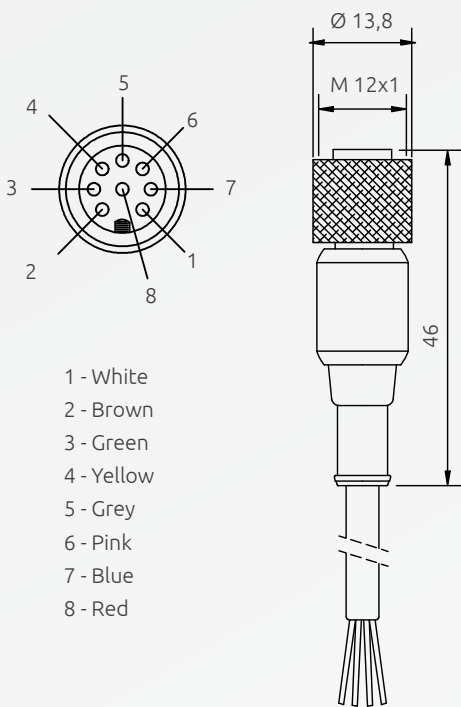
## C 895

### M8 90° ANGLE CONNECTOR 3-POLE

Model	Code	Description
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C 895	1200217	Pre-wired cable 5 m
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Cable for Ulisse photocells.

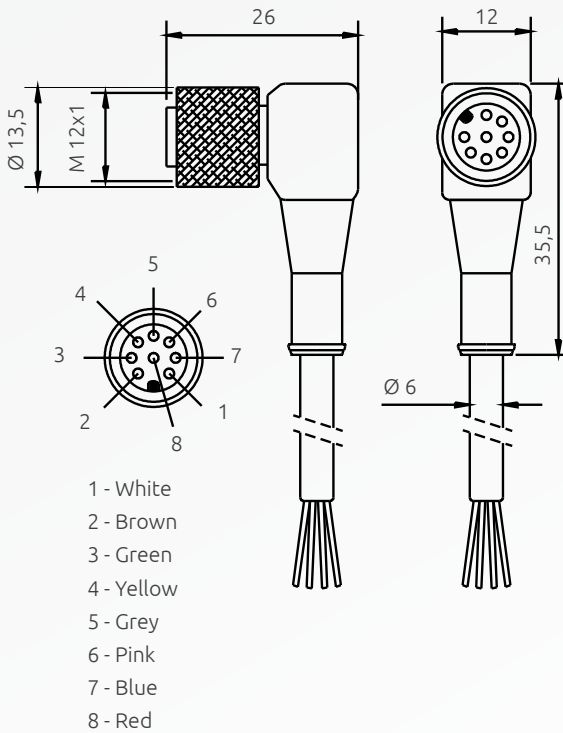


## C8D x SH

### M12 STRAIGHT CONNECTOR, 8 POLES, SHIELDED

Model	Code	Description
C8D 5 SH	1330930	Pre-wired shielded cable 5 m
C8D 10 SH	1330931	Pre-wired shielded cable 10 m
C8D 15 SH	1330932	Pre-wired shielded cable 15 m

Cables for Safecoder.



## C8D9x SH

### M12 90° ANGLE CONNECTOR, 8 POLES, SHIELDED

Model	Code	Description
C8D95 SH	1330933	Pre-wired shielded cable 5 m
C8D910 SX	1330934	Pre-wired shielded cable 10 m
C8D915 SH	1330935	Pre-wired shielded cable 15 m

Cables for Safecoder.



## EC S4 x

### MALE-FEMALE M12 STRAIGHT CONNECTOR 4-POLE

Model	Code	Description
MRFID EC S4 1	1292414	Pre-wired cable 1 m
MRFID EC S4 3	1292415	Pre-wired cable 3 m
MRFID EC S4 5	1292416	Pre-wired cable 5 m
MRFID EC S4 10	1292417	Pre-wired cable 10 m

Cables for Magnus RFID sensors.

## EC S8 x

### MALE-FEMALE M12 STRAIGHT CONNECTOR 8-POLE

Model	Code	Description
MRFID EC S8 1	1292422	Pre-wired cable 1 m
MRFID EC S8 3	1292423	Pre-wired cable 3 m
MRFID EC S8 5	1292424	Pre-wired cable 5 m
MRFID EC S8 10	1292425	Pre-wired cable 10 m

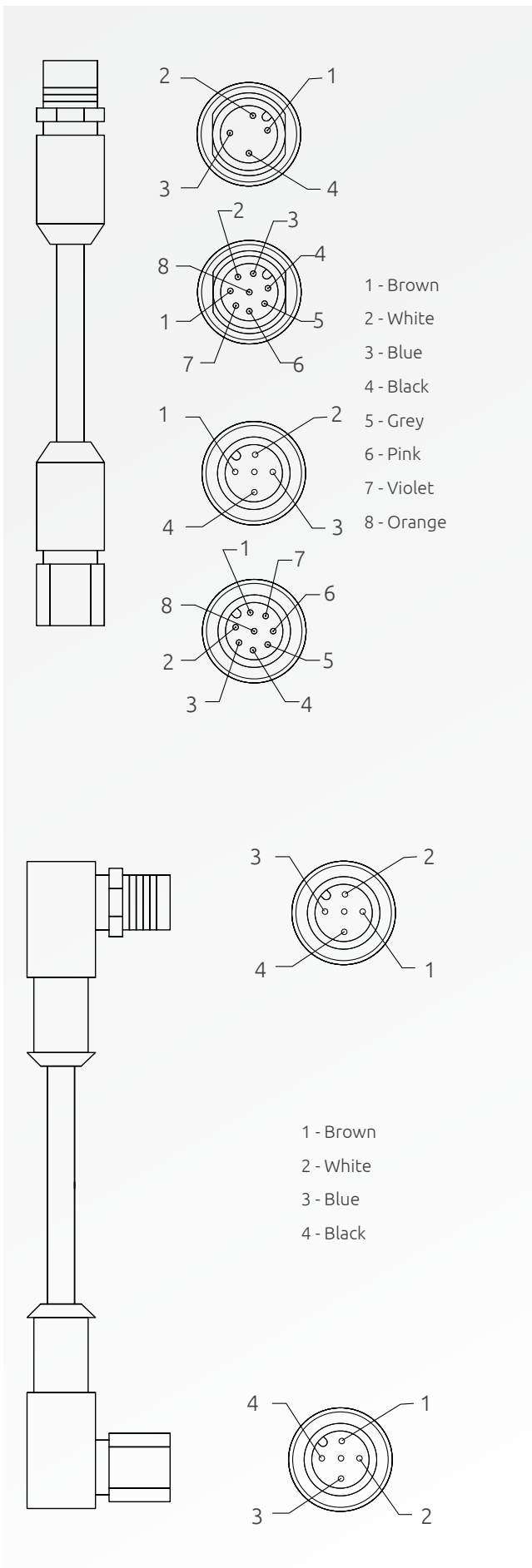
Cables for Magnus RFID sensors.

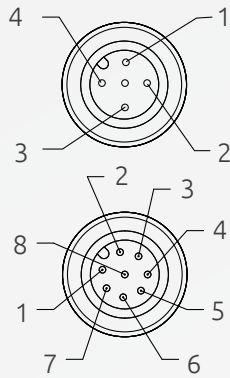
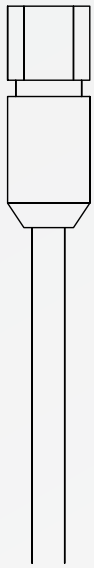
## EC L4 x

### MALE-FEMALE M12 90° ANGLE CONNECTOR 4-POLE

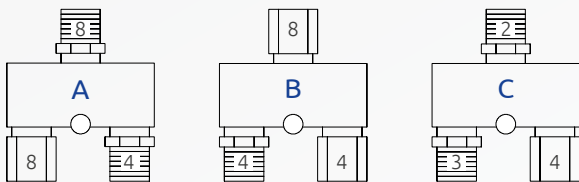
Model	Code	Description
MRFID EC L4 1	1292418	Pre-wired cable 1 m
MRFID EC L4 3	1292419	Pre-wired cable 3 m
MRFID EC L4 5	1292420	Pre-wired cable 5 m
MRFID EC L4 10	1292421	Pre-wired cable 10 m

Cables for Magnus RFID sensors.

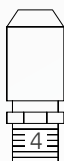




- 1 - Brown
- 2 - White
- 3 - Blue
- 4 - Black
- 5 - Grey
- 6 - Pink
- 7 - Violet
- 8 - Orange



- 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



## EC C4 x FEMALE M12 STRAIGHT CONNECTOR 4-POLE

Model	Code	Description
MRFID EC C4 1	1292406	Pre-wired cable 1 m
MRFID EC C4 3	1292407	Pre-wired cable 3 m
MRFID EC C4 5	1292408	Pre-wired cable 5 m
MRFID EC C4 10	1292409	Pre-wired cable 10 m

Cables for Magnus RFID sensors.

## EC C8 x FEMALE M12 STRAIGHT CONNECTOR 8-POLE

Model	Code	Description
MRFID EC C8 1	1292410	Pre-wired cable 1 m
MRFID EC C8 3	1292411	Pre-wired cable 3 m
MRFID EC C8 5	1292412	Pre-wired cable 5 m
MRFID EC C8 10	1292413	Pre-wired cable 10 m

Cables for Magnus RFID sensors.

## T CONNECTOR M12 T ADAPTER

Model	Code	Description
MRFID TC A	1292404	M12 T type A connector
MRFID TC B	1292403	M12 T type B connector
MRFID TC C	1292405	M12 T type C connector

Connectors for Magnus RFID sensors.

## TP TERMINATION PLUG

Model	Code	Description
MRFID TP	1292402	Termination plug

For Magnus RFID sensors.



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