

# Inductive Sensors series ISS/ISN/ISD-SIL1-10-B-GD

ISN-SIL1-10-B-GD

Housing M30

ISD-SIL1-10-B-GD



- Type: ISD-SIL1-10-B-GD: Applicable in Ex zones 1, 2, 20/21, 22.
- Type: ISN-SIL1-10-B-GD: Applicable in Ex zones 2, 22
- For embeddable installation method
- Safety Integrity Level SIL 1
- Performance Level PL c

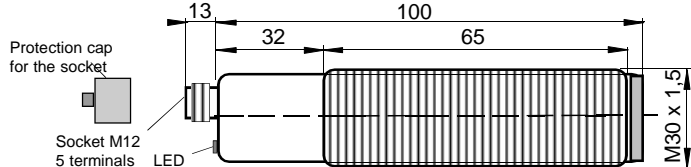

**II 3G Ex nA IIB T4**  
**II 3D Ex tD A22 IP67 T135°C**

**II 2G Ex d IIC T5**  
**II 1/2D Ex tD A20/A21 IP67 T100°C**

Technical Data	Types	ISS-SIL1-10-B	ISN-SIL1-10-B-GD	ISD-SIL1-10-B-GD
Type		SRP/CS - SREC, fail-safe inductive sensor PDF-D, I1A30AP1		
Performance Level (PL), at EN 13849-1		PL c		
Safety integrity level, at EN 62061		SIL 1		
Safety-related reliability PFHd, at EN 62061		1.5 x 10 <sup>-6</sup>		
MTTFd		High		
Type of Ex protection Gas, at 94/9/EG		None	II 3G Ex nA IIB T4	II 2G Ex d IIC T5
Type of Ex protection Dust, at 94/9/EG		None	II 3D Ex tD A22 IP67 T135°C	II 1/2D Ex tD A20/A21 IP67 T100°C
Applicable in Ex zones		None	2, 22	1, 2, 20/21, 22
Housing		M30, brass, nickel plated / Sensing area: Synthetic, PEEK mod.		
Installation method		embeddable (flush) mountable		
Rated operating distance sn,		10mm, (on steel 37, (sn x 3) <sup>2</sup> x 1mm), at non flush mounting, at EN 60947-2-5		
Enable zone		0mm ... 8mm, +-1mm, (on steel 37, (sn x 3) <sup>2</sup> x 1mm)		
Hysteresis		0.5-1.5mm		
Safe switching off distance s(ar)		30mm		
Enclosure rating		IP67 at EN 60529		
Supply voltage		24VDC (20VDC to 28VDC)		
Absolute maximum supply voltage Um		30VDC		
Current consumption		20mA		
Maximum power dissipation		0.6W		
Response time to safety request		10ms		
Power up delay time		200ms		
Output function		2 x OSSD (A1 and A2)		
Output voltage at 24 V		compatible with EN 61131-2 inputs type 1, 2, 3		
Voltage drop		< 2V, (70mA)		
Current rating		70mA		
Short-circuit protection		yes		
Working temperature range Tamb		-10°C < Tamb < +60°C	-10°C < Tamb < +50°C	-10°C < Tamb < +50°C
Storage temperature range		-45°C ... +60°C		
Connection, type ISD-SIL1-10-B-GD		Cable: TPU, AWM 20236, 4+PE x 0.5mm <sup>2</sup> , shielded, Length: 6m		
Connection, types ISS/ISN-SIL1-10-B-GD		Socket M12, Lumberg type: RSF 5, 5 terminals		
Accessories		2x nuts M30. (Optional 1x clamp)		
Accessories, included, only ISN-SIL1-10-B-GD		- 1x Safety lock device, mount at the cable connection, for locking the connection. (black synthetic device) - 1x Warning plate "WARNING - Explosion Hazard - Do Not Disconnect While Circuit Is Live Unless Area Is Known To Be Non-Hazardous", self-sealing, for gluing on the cable connector - 1x Protection cap for the sensor connector.		
Accessories, not included ISS/ISN-SIL1-10-B(-GD)		- Cord Set Lumberg RKT5 5-298/xx (straight type), or RKTW/RKWT5 5-298/xx (right angle type)		
Options		- Other cable length: Up to 100m on request - ISD-SIL1-10-B-G S166: Working temperature range: -30°C to +55°C, only Gas Ex: II 2G Ex d IIB T5		
Function and LED indication		 Object detected, LED green		 No object detected, LED red
Output with dynamic test function Object detected, Outputs switched ON	 + VDC 0V 200µs (Test pulse) 10ms Outputs inactive no object detected	2 x PNP-Outputs, Transistors conducted.  +24VDC OSSD A1 OSSD A2 0V		2 x PNP-Outputs, Transistors open.  +24VDC OSSD A1 OSSD A2 0V Safe state
Installation: Lateral protection plates must not rise above the sensor. Sensors for not embeddable mounting arrangement have the highest operating distance, but a part of the parasitic lateral electromagnetic field can disturb the safe function. Lateral protection plates or other metallic objects must not influence the Sensor. For safe function a lateral free space around the sensor must be guaranteed. The series ISx-SIL1-10-B-GD, sensors for <b>embeddable</b> mounting, no lateral free space is required (A=0). It's possible to realize a better mechanical protection and they have a higher immunity against spurious releasing. In a not embedded mounting arrangement the sensors reach a lower level of operating distance (sa) then sensors for not embeddable mounting.		Other sensors for not embeddable installation method.  A=laterale distance	ISx-SIL1-10-B-.. For embeddable installation method  A=0mm	
<b>ATEX RELATED MARKINGS ON THE SENSOR:</b> CE 0158      Manufacturer with address      Production date: Numbers 4 to 7 of the serial number Device type: ISD-SIL1-10-B-GD:      II 2G Ex d IIC T5, II 1/2D Ex tD A20/A21 IP67 T100°C      Certification number: BVS 07 ATEX E 044 X Device type: ISD-SIL1-10-B-G S166:      II 2G Ex d IIB T5      Certification number: BVS 07 ATEX E 044 X Device type: ISN-SIL1-10-B-GD:      II 3G Ex nA IIB T4, II 3D Ex tD A22 IP67 T135°C Tamb: -10°C < Tamb < +50°C      ISD-SIL1-10-B-G S166: Tamb: -30°C < Tamb < +55°C      Electrical data according to the chart				

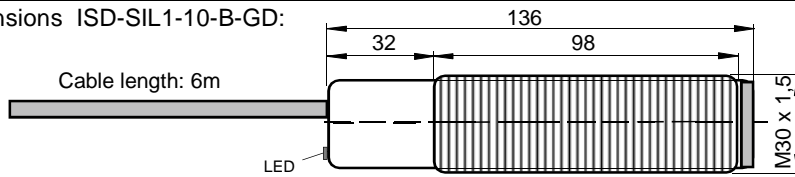
ISX-SIL1-10B\_GD\_e1/2012-06-06/HB

Dimensions ISS/SIL1-10-B-GD S99:



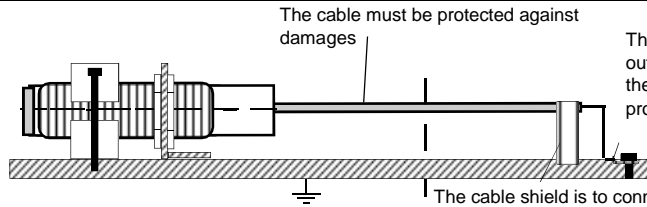
	ISS-SIL1-10-B	ISN-SIL1-10-B-GD
1/brown	+24VDC	+24VDC
2/white	OSSD A2	OSSD A2
3/blue	0V	0V
4/black	OSSD A1	OSSD A1
5/grey	PE/PA	PE/PA

Dimensions ISD-SIL1-10-B-GD:



Wire No:	ISD-SIL1-10-B-GD
1	+24VDC
2	0V
3	OSSD A1
4	OSSD A2
yel.-green	PA/PE
white	Cable shield

Equipotential bonding prescription:



The end of the cable must be connected outside the hazardous location. Check the reliable, noncorrosive holding of the protection earth connection.

Operating manual / EC Declaration of Conformity:

Safety Informations:

Definite Application:

The PDF-D ISx-SIL1-10-B-GD is a fail-safe inductive sensor conform the machine directive 2006/42/EC. The sensor detects non-contact metallic objects and is provided for the protection of machines. The outputs (OSSD) will be only unblocked, when metallic objects are detected in the enable range. The fail-safe inductive sensor must only be operated with fail-safe relay or other fail-safe equipment. When installing and operating the sensor, it is necessary to take into consideration the complete operating manual. The sensor must be installed, connected and put into operation only by qualified electrician trained in safety technology. The outputs (OSSD) must not be connected direct to the machinery circuit. The outputs (OSSD) of the sensor must only be connected at emergency stop relay or other approved electronic safety devices. The installation must be protected against defeating. The sensor reacts to metal objects, e.g. the frame of a safety door. Other metal objects that are intended to enable the sensor must not be allowed to enable the sensor, either intentionally or unintentionally. Use the sensor only in the specified environmental conditions. The sensor must only be repaired by the manufacturer. Tampering with the sensor is not allowed. Disconnect the sensor externally before handling it. Also disconnect any supplied relay load circuits. The applicable standards for the corresponding application must be complied with. For installations the requirements according to EN 60204 must be observed. After power-up a complete function and safety test must be executed. Also without supply voltage, leading currents up to 2mA are possible. All connections and installations must be executed at safety fundamental rules. It must be ensured, that the machinery residuals off after a safe switch-off or a defect of the sensor.

Installation prescriptions for Ex hazardous locations

It is necessary to take into consideration the valid international and national rules and regulations (EN 60079-14). Do not exceed the maximum ratings. The local equipotential bonding have to be done. The protective earth (PE/PA) is solid connected with the housing and the cable shielding. The cable have to be installed and protected against damages. The cable with termination fittings, or in cable tray systems and installed in a manner to avoid tensile stress at the termination fittings. To connect cables inside hazardous locations only use certificated Ex e housings. All cable terminals must be connected outside hazardous locations.

**Type ISD-SIL1-10-B-GD:** Only applicable in Ex zones 1, 2, 20/21, 22. For the zones 20/21 only the front part (sensitive area) can be mounted inside the zone 20. The rear part with the cable must be in the zone 21.

**Type ISN-SIL1-10-B-GD:** Only applicable in Ex zones 2 and 22. The maximum input voltage  $U_m=30VDC$  must not be exceeded. The local equipotential bonding have to be done reliable and noncorrosive over the terminal pin 5 and cable shielding. The protective earth (PE/PA) of the socket is solid connected with the housing. Do not separate the connector when the supply voltage is connected to the cable. When installing the sensor, the safety lock device must be fitted at the cable connector. The additional adhesive warning label must be fixed to the connector housing at the connection cable. Lumberg cordsets RKTS 5-298/xx (Straight type) RKTW/RKWTW 5-298/xx (Right angle type) are allowed ONLY. It is necessary to take into consideration the mounting prescription of the connector manufacturer. In dusty locations, the socket protection cap must be fitted, when the connection cable is NOT connected.

Additional safety information related Ex protection

BVS 07 ATEX E 044 X: X = The plastic part of the housing (sensitive area) must be protected against direct sunlight and UV irradiation.

General mounting prescriptions

Lateral protection plates must not rise above the sensor. Metallic protection plates must not rise above the sensor. Electrolytic fluids, graphitized greases or other magnetizable substances can disturb the correct function. The electrical connections must be exactly as shown in the connection diagram. The cable shield must be connected short. The cable shield must be connected to the protection earth, large-surfaced. Connection cables must not be installed parallel to high voltage cables.

Function:

When a metallic object is entering the detection field, both outputs (OSSD)

becomes active (switching ON). Is no object detected both outputs becomes inactive (safe state, OFF). Do not posing metallic or other permeable objects near or direct on the sensitive area of the sensor.

Chemical resistance

The sensor must not be exposed to the following substances: Formic Acid, Chlorosulfonic Acid, Chronic Acid conc., Hydrochloric Acid, Hydrobromic Acid (100%), Oluem, Azotic Acid, Sulphuric Acid, Bromine, Chlorine, Ferric(III)-chlorid, Fluorine, Iodine, Sodium (hot), concentrated Phenol.

Maintenance:

The sensor does not require any special maintenance. Magnetic precipitations must be cleared. Equipment must only be repaired or serviced by the manufacturer.

General notes to the operating distance

The nominal operating distance  $s_n$  (EN60947-2-5) does not take into account production tolerances and influences of temperature or voltage. The safe operating distance  $s_a$  is the minimal reachable operating distance on steel 37 (30mmx30mmx1mm) on all mounting arrangements. On other materials or smaller objects a reduction factor must be taken into account.

Material	Reduction factor
Steel 37	1
Stainless steel	0,8
Aluminum	0,4

Safety distance  $s_d$ : An inductive sensor is safe switched OFF, when the distance between sensor and actuator plate is greater then 3 x nominal distance  $s_n$ .

General safety instructions:

Small or bad magnetizable parts, placed direct on or near the sensitive area results to switching-on. When installing and operating with the sensor, it is necessary to take into consideration the relevant international and other national regulations: EN 60204, EN 60079-14, ATEX118a, UUV, BetrSichV, single directive 1999/92/EG

The dismantling of the connector safety lock device while the supply voltage is connected is hazardous! The mounting of the sensor in dusty locations without fixed cordset or protection cap results in a high ignition risk. The sensors must not be used for Accident-Prevention! In worst case the output can change to any state! When installing and operating with the sensor, it is necessary to take into consideration the relevant international and other national regulations: EN 60079-14, ATEX118a, UUV, BetrSichV, Directive 1999/92/EC

Standards met:

EN 60947-5-1:2007, EN 60947-5-2:2007, EN 60947-5-3:2005-11, EN 13849-1:2008, EN 62061:10/2005; EN 60079-0:2004, EN 60079-1:2004, EN 60079-15:2005, EN 60241-0:2004, EN 61241-1:2004; EN 60529:2000, EN 61326-3-1:2008; Ex protection: 94/9/EC, Machine directive: 2006/42/EC, EMC: 2004/108/EC, RoHS: 2002/95/EC.

General notes, Disposal

We reserve the right to modify our equipment. Our equipment is designed in accordance with the RoHS directive. It neither emit or contain any damaging or siliconized substances and use a minimum of energy and resources. No longer usable or irreparable units must be disposed of in accordance with local waste disposal regulations.

EC Declaration of Conformity

ATEX ISD-SIL1-10-B-GD: II 2 G Ex d IIC T5, II 2 D Ex tD A20/A21 IP 67 T100°C, certification number: BVS 07 ATEX E 044 X, DEKRA EXAM GmbH, Zertifizierungsstelle, Carl-Beyling-Haus, Dinendahlstrasse 9, D-44809 Bochum, CE 0158.

ATEX ISN-SIL1-10-B-GD: Declaration of conformity by manufacturer at 94/9/EC. ATEX certification of quality type production of Ex devices at the directive 94/9/EC, CE 0158. Certification No: BVS 03 ATEX ZQS / E118. The conformity of the devices with the EC standards and directives and the EC-type examination certificate and the observation of the Quality Safety System ISO 9001:2008 with the ATEX module "Production", declares:

Hans Bracher, Matrix Elektronik AG:

ISX-SIL1-10B\_GD\_e1/2012-06-06/HB

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