

## Inductive Sensors series ISS/ISN/ISD-NS-15A/AI-B(-GD)

**ISN-NS-15A/AI-B-GD**
**Housing M30**
**ISD-NS-15A/AI-B-GD**

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

- Type IS\*-NS-15A-B-GD: Analog voltage output 0 - 10VDC
- Type IS\*-NS-15AI-B-GD: Current loop output 4mA - 20mA
- Type ISD-NS-15A/AI-B-GD: Only for use in Ex-zones 1, 2, 21, 22
- Type ISN-NS-15A/AI-B-GD: Only for use in Ex-zones 2, 22
- For embeddable installation method


**0158**

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

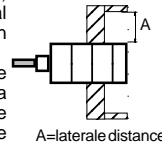
Technical data	Types	ISS-NS-15A/AI-B	ISN-NS-15A/AI-B-GD	ISD-NS-15A/AI-B-GD
Type of Ex protection Gas, according to 2014/34/EU		NONE	II 3G Ex nA IIB T4	II 2G Ex d IIC T5
Type of Ex protection Dust, according to 2014/34/EU		NONE	II 3D Ex tD A22 IP67 T135°C	II 2D Ex tD A21 IP67 T100°C
For use in Ex zones		None	2, 22	1, 2, 21, 22
Performance Level (PL), according to EN 13849-1			PL c	
Category, according to EN 13849-1			1	
Safety integrity level, according to EN 61508			SIL 1	
Safety-related reliability PFHd [1/h]			$2.33 \times 10^{-6}$	
Installation method			embeddable	
Rated operating distance sn, EN60947-2-5		0mm to 15mm, (on steel 37, (sn x 3) <sup>2</sup> x 1mm), at embedded mounting 0VDC to 10VDC or 4mA to 20mA		
Safe 0V or 4mA at the output			45mm (sn x 3)	
Temperature drift			-5mV/K	
Nominal supply voltage Ue		24VDC +-10% (at power supply type PELV at EN 60204, item 6.4.2)		
Isolation voltage Ui			75VDC	
Nominal current consumption Ie			30mA	
Maximum power dissipation			0.83W	
Response time			5ms	
Power-up delay time			70ms	
Voltage output, type ISx-15A-B		0V to 10VDC, PNP, output impedance appr. 25Ω, RLoad: 2kΩ to 1MΩ		
Current output, type ISx-15AI-B		4mA to 20mA, PNP, output impedance appr. 100Ω, RLoad: 0Ω to 100Ω		
Application rating, according to EN 60947-6-1			DC31	
Device designation, according to EN 60947-5-2		M1A30SS2	M1A30SS2	M1A30SS1
Housing		M30, Ms. brass nickel plated / sensing area: Synthetic PEEK mod.		
Enclosure rating, according to EN 60529		IP67		
Vibration and shock resistance		300m/s <sup>2</sup> , 10Hz to 55Hz, in all directions, at EN 60947-5-2		
Pollution degree, according to EN 60664-1:2007		3		
Working temperature range Tamb		-20°C < Tamb < +80°C	-10°C < Tamb < +60°C	-10°C < Tamb < +60°C
Storage temperature range		-40°C ... +90°C		
Cable connection, type ISD-NS-15A/AI-B-GD		Cable: TPU, 3+PE x 0.5mm <sup>2</sup> , shielded, leads numbering marked, halogen free, Length: 6m		
Socket, type ISS/ISN-NS-15A/AI-B(-GD)		Socket M12, Lumberg type: RSF 5, 5-pins		
Accessories included, all types		- 2x nuts M30. (Optional 1x clamp)		
Accessories, types ISN/ISD-NS-15A/AI-B-GD		- 1x Spare safety screw with packing ring for potentiometer sealing		
Accessories, only ISN-NS-15A/AI-B-GD		- Safety lock device, mount at the cable connection, for locking the connection - 1x Dust protection cap for the sensor connector - 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		
Accessories, not included		- Single ended cordset, Lumberg M12/5P straight type: RKTS 5-298/.M or right angle type: RKWTH 5-298/.M		
Options		- Cable length: Up to 100m on request		
Other safety devices		- Safety inductive sensors PDF-M, Ple, SIL3, according to EN 60947-5-3, with switching OSSD - ISD-10-B-GD: Ex type: II 2G Ex d IIC T5, II 1/2D Ex tD A20/A21 IP67 T100°C - ISN-10-B-GD: Ex type: II 3G Ex nA IIB T4, II 3D Ex tD A22 IP67 T135°C - ISS-10-B: Without Ex protection		
LED indication		<p>Object detected, LED shows red, equal to the output voltage level</p>		<p>No object detected, LED goes off</p>
Output function		<p>IS*-15AI-B(-GD): Current loop output</p>		<p>IS*-15A-B(-GD): Voltage output</p>

**Installation:** Lateral protection plates must not rise above the sensor.

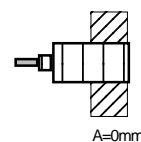
Sensors for not embeddable mounting arrangement have the highest operating distance, but a part of the parasitic lateral electromagnetic field can disturb the safe function. Lateral protection plates or other metallic objects must not influence the Sensor. For safe function a lateral free space around the sensor must be guaranteed.

The series IS\*-NS-15A/AI-B(-GD), sensors for embeddable 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 embeddable 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.



▨ = Metal

**IS\*-NS-15A/AI-B: For embeddable installation method**


A=0mm

**ATEX related designations:**

CE 0158

Type ISD-NS-15A/AI-B-GD:



Manufacturer with address

II 2G Ex d IIC T5, II 2D Ex tD A21 IP67 T100°C

Type ISN-NS-15A/AI-B-GD:

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

Electrical data according to the chart

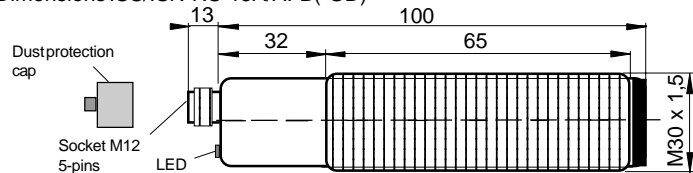
EC-Certification No. BVS 07 ATEX E 044 X

Declaration by manufacturer, directive 2014/34/EU

Tamb: -10°C &lt; Tamb &lt; +60°C

Date of production: Numerals 5 to 8 of the serial number (Year/Calendar week)

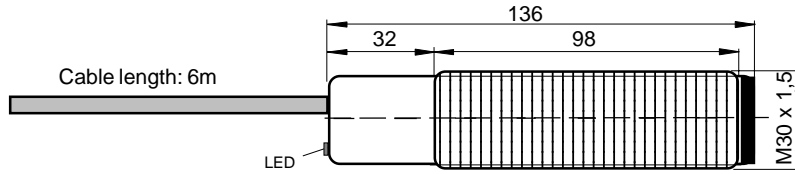
Dimensions ISS/ISN-NS-15A/AI-B-(GD)



Wiring:

1/brown	ISS-NS-15A/AI-B	ISN-NS-15A/A1-B-GD
2/white	+24VDC	+24VDC
3/blue	NC	NC
4/black	0V	0V
5/grey	Output	Output
	PA	PA

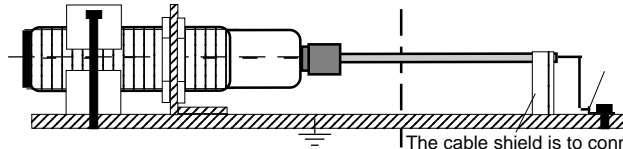
Dimensions ISD-NS-15A/AI-B-GD



Wiring:

Lead-No.	ISD-NS-15A/AI-B-GD
1	+24VDC
2	0V
3	Output
	yellow-green PA/PE

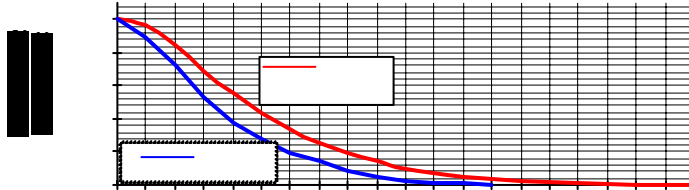
Equipotential bonding grounding prescription:



The end of the cable must be connected outside the hazardous location. Check the reliable, noncorrosive holding of the protection earth connection. The cable shield is to connect to PE in a wide area.

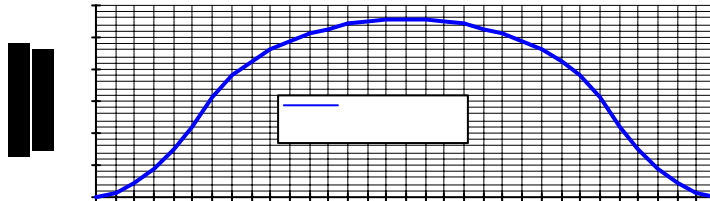
Output characteristic for axial approximation

Measured on plate steel 37 and stainless steel 1.4301 (45mm x 45mm x 1mm). Sensor non-flush mounted.



Output characteristic for lateral approximation

Measured on plate steel 37 (45mm x 45mm x 1mm). Sensor non-flush mounted.



Operating manual / EU - Declaration of Conformity:

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-NS-15A/AI-B-GD:** Only applicable in Ex zones 1, 2, 21, 22.

**Type ISN-NS-15A/AI-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

Equal to the damping of the electromagnetic field, the output varies between 0V and 10V or between 4mA and 20mA. A strong damping generates a higher voltage or current. The output characteristic is determined with a measure plate, steel 37 (45mm x 45mm x 1mm) at non-flush mounting

Chemical resistance

The sensor must not be exposed to the following substances: Chromic acid, CAS-No. 7738-94-5. Hydrochloric acid, CAS-No. 7647-01-0. Sulfuric acid, CAS-No. 7664-93-9 / CAS-No. 7783-05-3. Hydrobromic acid 100% , CAS-No. 10035-10-6. Nitric acid, CAS-No. 7697-37-2. Bromine, CAS-No. 7726-95-6. Chlorine, CAS-No. 7782-50-5. Ferric(III) chloride , CAS-No. 7705-08-0 (anhydrous), CAS-No. 10025-77-1. Fluorine, CAS-No. 7782-41-4. Iodine, CAS-No. 7553-56-2. Sodium (hot), CAS-No. 7440-23-5. Concentrated phenol, CAS-No. 108-95-2.

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 output characteristic is determined with a measure plate, steel 37 (45mm x 45mm x 1mm) at non-flush mounting. 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

Safe 0V or 4mA at the output: 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

The dismounting 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 60204, EN 60079-14, ATEX118a, UVV, BetrSichV, single directive 1999/92/EC  
Machine directive: 2006/42/EG, ATEX directive: 2014/34/EU, EMC directive: 2014/30/EU, RoHS directive: 2011/65/EU, 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 60079-0:2006, EN 60079-1:2004, EN 60079-15:2010, IEC 60241-0:2006, EN 61241-1:2004; EN 60529:2014, EN 61326-3-1:2008.

General Notes, disposal

We reserve the right to modify our equipment. Our equipment is designed such way, that it has the least possible adverse effect on the environment. 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.

EU-Declaration of Conformity

ATEX ISD: II 2G Ex d IIC T5, II 2D Ex tD A21 IP 67 T100°C, EC-certification No. BVS 07 ATEX E 044 X, DEKRA EXAM GmbH, Notified body, Carl-Beyling-Haus, Dinendahlstrasse 9, D-44809 Bochum, ident no. 0158.  
ATEX ISN: II 3 G Ex nA IIB T4, II 3 D Ex tD A22 IP 67 T135°C, declaration by manufacturer according to the ATEX directive 2014/34/EU. ATEX certification of quality type production of Ex devices according to the ATEX directive 2014/34/EU, CE 0158. Certification No: BVS 12 ATEX ZQS / E118. The conformity of the devices with the EC standards and directives and the observation of the Quality Safety System ISO 9001:2008 with the ATEX module "Production", declares:  
Hans Bracher, Matrix Elektronik AG

ISX-NS-15A-AI-B-GD\_e8/2017-01-05/HB

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