

# GARDIX Fail-safe Inductive Sensor ISD-10-B-GD S166

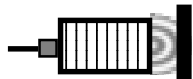

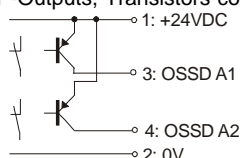
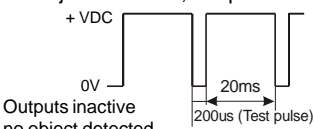
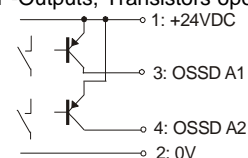
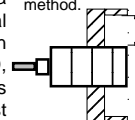
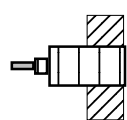
## Short form

When installing and operating the sensor, it is necessary to take into consideration the complete operating manual.

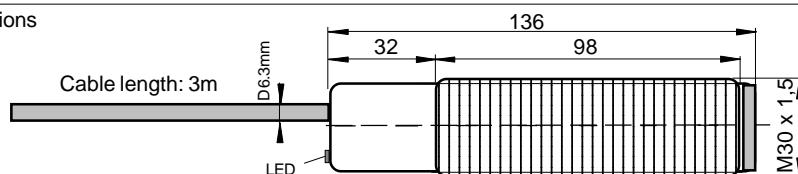


II 2 G Ex d IIC T5  
II 2 D Ex tD A21 IP67 T100°C

- Housing M30, embeddable mounting method (flush mountable)
- PDF-M at EN 60947-5-3
- Performance Level PL e
- ATEX: Applicable in Ex zones 1, 2, 21, 22

Technical Data	Type	ISD-10-B-GD S166
Type		SRP/CS - SREC, fail-safe inductive sensor PDF-M, I1A30AP1
Performance Level (PL), at EN 13849-1		PL e
Safety category, at EN 13849-1		4
Safety integrity level, at EN 62061		SILcl 3
Safety-related reliability PFHd [1/h]		2.47 x 10-8
MTTFd [Years]		100
DC/CCF/Cat.		99% / 92 / 4
Type of Ex protection Gas, at 94/9/EC		II 2 G Ex d IIC T5
Type of Ex protection Dust, at 94/9/EC		II 2 D Ex tD A21 IP67 T100°C
Applicable in Ex zones		1, 2, 21, 22
Installation method		embaddable (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		>=3mm ... <=8mm, (on steel 37, (sn x 3) <sup>2</sup> x 1mm)
Hysteresis		0.5-1.5mm
Safe switching off distance s(ar)		30mm
Supply voltage Ue		24VDC
Absolute maximum supply voltage Ui		30VDC
Rated insulation voltage		75VDC/50VAC
Current consumption		35mA
Maximum power dissipation		0.98W
Response time to safety request		20ms
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
Display		LED green (OSSD=ON), LED red (OSSD=OFF)
Housing		M30, brass, nickel plated / Sensing area: Synthetic, PEEK mod.
Enclosure rating, at EN 60529		IP67
Ambient working temperature range T <sub>amb</sub>		-30°C < T <sub>amb</sub> < +55°C
Storage temperature range		-45°C ... +60°C
EMC, shock and vibration resistance		at EN 60947-5-2
Connection cable		4+PE x 0,5mm <sup>2</sup> , shielded, TPU, leads numbering marked
Cable, length		3m
Cable, jacket diameter		6.3mm
Cable, minimum bending radius		70mm
Cable, approvals		AWM 20236 80°C 30V E63216
Accessories		2x nuts M30. (Optional 1x clamp)
Options		- Other cable lengths on request
Function and LED indication	<div><div></div><div>Object detected, LED green</div></div> <div><div></div><div>No object detected, LED red</div></div>	
Output with dynamic test function Object detected, Outputs switched ON	<div>2 x PNP-Outputs, Transistors conducted.</div> <div></div>	
<div><div></div><div>Outputs inactive no object detected</div></div>	<div>2 x PNP-Outputs, Transistors open.</div> <div></div> <div>Safe state</div>	
<div>Installation: Lateral protection plates must not rise above the sensor. Sensors for non flush 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 ISD-10-B-GD, sensors for <b>flush (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.</div> <div><div><div>Other sensors for not embeddable installation method.</div><div></div><div>A=laterale distance</div></div><div><div>ISD-10-B: For embeddable installation method</div><div></div><div>A=0mm</div></div><div>▨ = Metal</div></div>		
<div>ATEX RELATED MARKINGS ON THE SENSOR:</div> <div><div>CE 0158 Device type Certification number:</div><div>Manufacturer with address ISD-10-B-GD S166 BVS 07 ATEX E 044 X</div></div> <div>Electrical data according to the chart Date of production: Numbers 5 to 8 of the serial number (Year/Week) II 2G Ex d IIC T5, II 2D Ex tD A21 IP67 T100°C T<sub>amb</sub>: -30° &lt; T<sub>amb</sub> &lt; +55°C</div>		

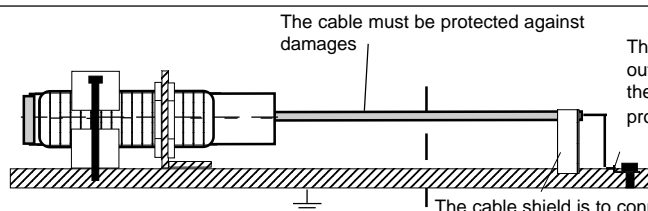
## Dimensions



Wire number ISD-10-B-GD S166

1	+24VDC
2	0V
3	OSSD A1
4	OSSD A2
yellow-green	PE/PA
white	Cable shield

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.

## Operating manual, short form / CE-Declaration of Conformity:

### Accident prevention:

Definite Application:

The PDF-M ISD-10-B-GD S166 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 humans and 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, leaking 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. The fail-safe inductive sensor ISD-10-B-GD S162 is only applicable in Ex zones 1, 2, 21, 22.

### 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:

It must be ensured that all requirements of the respective application correspond to the requirements stated in these and the complete operating manual instructions. The sensor can only be flush mounted. Because the sensor reacts to metal objects, it must be ensured, that other metal objects not can enable the sensor, either intentionally or unintentionally (EN 1088). A horizontal mounting is to prefer. 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. All post-switched circuits must also be certificated for the required safety level. The electrical connections must be exactly as shown in the connection diagram. The cable shield must be connected short. The cable shield should be connected to the protection earth, large-surfaced. Connection cables must not be installed parallel to high voltage cables. The maximum allowed capacitance at the outputs must be  $\leq 470\text{nF}$ .

### Function:

When a metallic object is entering the detection field, both dynamic tested outputs (OSSD) becomes active (switching ON). Is no object detected both outputs becomes inactive (safe state, OFF). If metallic or other permeable objects are positioned near or direct ( $\leq 3\text{mm}$ ) on the sensitive area of the sensor, both outputs

are also switching OFF. The fail-safe inductive sensors of the series ISD-10-B-GD S166 are built in a 2-channel different redundancy. Failures and disturbances results to outputs are switching OFF and the LED is blinking red. The safe-state is the same as no object is detected. (Output is switching OFF). The emergency OFF state is only resetable by separating the supply voltage.

### 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
Steel37	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 not to the near range switching-off. 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/EG

Standards met:

Machine directive: 2006/42/EC, ATEX directive: 94/9/EC, 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, IEC 60241-0:2006, EN 61241-1:2004; EN 60529:2000, EN 61326-3-1:2008, 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, short-form

Approvals:

Fail-safe: PDF-M at EN 60947-5-3, certification number: ET 11069, Berufsgenossenschaft Energie Textil Elektro Medienerzeugnisse, Fachausschuss Elektrotechnik, Prüf- und Zertifizierungsstelle im DGUV Test, Gustav-Heinemann-Ufer 130, D-50968 Köln, CE 0340. ATEX: II 2 G Ex d IIC T5, II 2 D Ex tD 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 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:

*H. Bracher*

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