

Model Number

SJ3,5-S1N

Features

- 3.5 mm slot width
- Usable up to SIL 3 acc. to IEC 61508
- Nonferrous targets

Application



Danger!

In safety-related applications the sensor must be operated with a qualified fail safe interface from Pepperl+Fuchs, such as KFD2-SH-EX1. Consider the "exida Functional Safety Assessment" document which is available on www.pepperl-fuchs.com as an integral part of this product's documentation.

Technical Data

General specifications

Switching element function	NAMUR, NO
Slot width	3.5 mm
Depth of immersion (lateral)	5 ... 7 typ. 6 mm
Installation	
Output polarity	Safety Function

Nominal ratings

Nominal voltage	U_o	8 V
Switching frequency	f	0 ... 2500 Hz
Hysteresis	H	with NAMUR switch amplifier: 0.09 mm (e. g. Pepperl+Fuchs KCD2-SR-Ex1.LB) with safety switch amplifier 0.05 mm (e. g. Pepperl+Fuchs KFD2-SH-Ex1)
Suitable for 2:1 technology		yes, with reverse polarity protection diode
Rate of current rise		2.1 mA / mm

Current consumption

Measuring plate not detected	≤ 1 mA
Measuring plate detected	≥ 3 mA

Functional safety related parameters

MTTF _d	7974 a
Mission Time (T _M)	20 a
Diagnostic Coverage (DC)	0 %

Ambient conditions

Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
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Mechanical specifications

Connection type	flexible leads LiY, 500 mm
Core cross-section	0.14 mm ²
Housing material	PBT
Degree of protection	IP67
Note	only for non-ferrous metal Adjustable stop

General information

Use in the hazardous area	see instruction manuals
Category	1G; 2G; 3G; 1D

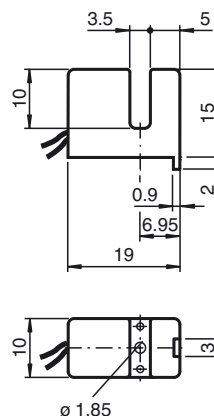
Compliance with standards and directives

Standard conformity	
Standards	EN 60947-5-2:2007 IEC 60947-5-2:2007

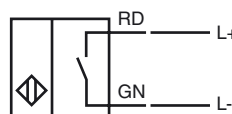
Approvals and certificates

FM approval	
Control drawing	116-0165F
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose
CCC approval	CCC approval / marking not required for products rated ≤ 36 V

Dimensions



Electrical Connection



ATEX 1G

Instruction

Device category 1G

EC-Type Examination Certificate

CE marking

ATEX marking

Directive conformity

Standards

Appropriate type

Effective internal capacitance C_i Effective internal inductance L_i

Cable length

Explosion group IIC

General

Ambient temperature

Installation, Commissioning

Maintenance

Specific conditions

Protection from mechanical danger

Manual electrical apparatus for hazardous areas

for use in hazardous areas with gas, vapour and mist

PTB 00 ATEX 2049 X

CE 0102

Ex II 1G Ex ia IIC T6 Ga

94/9/EG

EN 60079-0:2009, EN 60079-11:2012, EN 60079-26:2007

Ignition protection "Intrinsic safety"

Use is restricted to the following stated conditions

SJ3,5-S1N...

 ≤ 30 nF ; a cable length of 10 m is considered. ≤ 100 μ H ; a cable length of 10 m is considered.

Dangerous electrostatic charges on the fixed connection cable must be taken into account for lengths equal to and exceeding the following values:

30 cm

The apparatus has to be operated according to the appropriate data in the data sheet and in this instruction manual. The EC-Type Examination Certificate has to be observed. The special conditions must be adhered to!

The temperature ranges, according to temperature class, are given in the EC-Type Examination Certificate. Note: Use the temperature table for category 1 !!! The 20 % reduction in accordance with EN 1127-1:2007 has already been accounted for in the temperature table for category 1.

Laws and/or regulations and standards governing the use or intended usage goal must be observed.

The intrinsic safety is only assured in connection with an appropriate related apparatus and according to the proof of intrinsic safety.

The associated apparatus must satisfy the requirements of category ia.

Due to the possible danger of ignition, which can arise due to faults and/or transient currents in the equipotential bonding system, galvanic isolation of the power supply and signal circuit is preferable. Associated apparatus without electrical isolation must only be used if the appropriate requirements of IEC 60079-14 are met.

No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible.

When used in the temperature range below -20 °C the sensor should be protected from knocks by the provision of an additional housing.

ATEX 2G

Instruction

Device category 2G

EC-Type Examination Certificate

CE marking

ATEX marking

Directive conformity

Standards

Appropriate type

Effective internal capacitance C_i Effective internal inductance L_i

General

Ambient temperature

Installation, Commissioning

Maintenance

Specific conditions

Protection from mechanical danger

Manual electrical apparatus for hazardous areas

for use in hazardous areas with gas, vapour and mist

PTB 00 ATEX 2049 X

CE 0102

II 1G Ex ia IIC T6 Ga

94/9/EG

EN 60079-0:2009, EN 60079-11:2012

Ignition protection "Intrinsic safety"

Use is restricted to the following stated conditions

SJ3,5-S1N...

 ≤ 30 nF ; a cable length of 10 m is considered. ≤ 100 μ H ; a cable length of 10 m is considered.

The apparatus has to be operated according to the appropriate data in the data sheet and in this instruction manual. The EC-Type Examination Certificate has to be observed. The special conditions must be adhered to!

The temperature ranges, according to temperature class, are given in the EC-Type Examination Certificate.

Laws and/or regulations and standards governing the use or intended usage goal must be observed. The intrinsic safety is only assured in connection with an appropriate related apparatus and according to the proof of intrinsic safety.

No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible.

When used in the temperature range below -20 °C the sensor should be protected from knocks by the provision of an additional housing.

ATEX 3G (nL)

Note	This instruction is only valid for products according to EN 60079-15:2003, valid until 31-May-2008
Instruction	Manual electrical apparatus for hazardous areas
Device category 3G (nL)	for use in hazardous areas with gas, vapour and mist
CE marking	CE 0102
ATEX marking	⊕ II 3G EEx nL IIC T6 X
Directive conformity	94/9/EG
Standard conformity	EN 60079-15:2003 Ignition protection category "n" Use is restricted to the following stated conditions
Effective internal capacitance C_i	$\leq 30 \text{ nF}$; A cable length of 10 m is considered.
Effective internal inductance L_i	$\leq 100 \text{ } \mu\text{H}$; A cable length of 10 m is considered.
General	The apparatus has to be operated according to the appropriate data in the data sheet and in this instruction manual. The data stated in the data sheet are restricted by this operating instruction! The special conditions must be observed!
Installation, Commissioning	Laws and/or regulations and standards governing the use or intended usage goal must be observed. The sensor must only be operated with energy-limited circuits, which satisfy the requirements of IEC 60079-15. The explosion group depends on the connected and energy-limited supply circuit.
Maintenance	No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible.
Specific conditions	
Maximum permissible ambient temperature T_{Umax} at $U_i = 20 \text{ V}$	
for $P_i=34 \text{ mW}$, $I_i=25 \text{ mA}$, T6	70 °C (158 °F)
for $P_i=34 \text{ mW}$, $I_i=25 \text{ mA}$, T5	85 °C (185 °F)
for $P_i=34 \text{ mW}$, $I_i=25 \text{ mA}$, T4-T1	100 °C (212 °F)
for $P_i=64 \text{ mW}$, $I_i=25 \text{ mA}$, T6	66 °C (150.8 °F)
for $P_i=64 \text{ mW}$, $I_i=25 \text{ mA}$, T5	81 °C (177.8 °F)
for $P_i=64 \text{ mW}$, $I_i=25 \text{ mA}$, T4-T1	100 °C (212 °F)
for $P_i=169 \text{ mW}$, $I_i=52 \text{ mA}$, T6	45 °C (113 °F)
for $P_i=169 \text{ mW}$, $I_i=52 \text{ mA}$, T5	60 °C (140 °F)
for $P_i=169 \text{ mW}$, $I_i=52 \text{ mA}$, T4-T1	89 °C (192.2 °F)
for $P_i=242 \text{ mW}$, $I_i=76 \text{ mA}$, T6	30 °C (86 °F)
for $P_i=242 \text{ mW}$, $I_i=76 \text{ mA}$, T5	45 °C (113 °F)
for $P_i=242 \text{ mW}$, $I_i=76 \text{ mA}$, T4-T1	74 °C (165.2 °F)
Protection from mechanical danger	The sensor must not be mechanically damaged. When used in the temperature range below -20 °C the sensor should be protected from knocks by the provision of an additional housing.
Connection parts	The connection parts are to be installed, such that a minimum protection class of IP20 is achieved, in accordance with IEC 60529.

ATEX 3G (ic)

Instruction

Device category 3G (ic)

Certificate of Compliance

CE marking

ATEX marking

Directive conformity

Standards

Effective internal capacitance C_i Effective internal inductance L_i

General

Installation, Commissioning

Maintenance

Specific conditionsMaximum permissible ambient temperature T_{Umax} at $U_i = 20\text{ V}$ for $P_i=34\text{ mW}$, $I_i=25\text{ mA}$, T6for $P_i=34\text{ mW}$, $I_i=25\text{ mA}$, T5for $P_i=34\text{ mW}$, $I_i=25\text{ mA}$, T4-T1for $P_i=64\text{ mW}$, $I_i=25\text{ mA}$, T6for $P_i=64\text{ mW}$, $I_i=25\text{ mA}$, T5for $P_i=64\text{ mW}$, $I_i=25\text{ mA}$, T4-T1for $P_i=169\text{ mW}$, $I_i=52\text{ mA}$, T6for $P_i=169\text{ mW}$, $I_i=52\text{ mA}$, T5for $P_i=169\text{ mW}$, $I_i=52\text{ mA}$, T4-T1for $P_i=242\text{ mW}$, $I_i=76\text{ mA}$, T6for $P_i=242\text{ mW}$, $I_i=76\text{ mA}$, T5for $P_i=242\text{ mW}$, $I_i=76\text{ mA}$, T4-T1

Protection from mechanical danger

Connection parts

Manual electrical apparatus for hazardous areas

for use in hazardous areas with gas, vapour and mist

PF 13 CERT 2895 X

CE 0102

II 3G Ex ic IIC T6 Gc

94/9/EG

EN 60079-0:2009, EN 60079-11:2012 Ignition protection category "ic"

Use is restricted to the following stated conditions

 $\leq 30\text{ nF}$; A cable length of 10 m is considered. $\leq 100\text{ }\mu\text{H}$; A cable length of 10 m is considered.

The apparatus has to be operated according to the appropriate data in the data sheet and in this instruction manual. The data stated in the data sheet are restricted by this operating instruction!

The special conditions must be observed!

Laws and/or regulations and standards governing the use or intended usage goal must be observed. The sensor must only be operated with energy-limited circuits, which satisfy the requirements of IEC 60079-11. The explosion group depends on the connected and energy-limited supply circuit.

No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible.

70 °C (158 °F)

85 °C (185 °F)

100 °C (212 °F)

66 °C (150.8 °F)

81 °C (177.8 °F)

100 °C (212 °F)

45 °C (113 °F)

60 °C (140 °F)

89 °C (192.2 °F)

30 °C (86 °F)

45 °C (113 °F)

74 °C (165.2 °F)

The sensor must not be mechanically damaged.

When used in the temperature range below $-20\text{ }^\circ\text{C}$ the sensor should be protected from knocks by the provision of an additional housing.

The connection parts are to be installed, such that a minimum protection class of IP20 is achieved, in accordance with IEC 60529.

ATEX 1D

Instruction

Device category 1D

EC-Type Examination Certificate

CE marking

ATEX marking

Directive conformity

Standards

Appropriate type

Effective internal capacitance C_i Effective internal inductance L_i

General

Maximum housing surface temperature

Installation, Commissioning

Maintenance

Specific conditions

Electrostatic charging

Manual electrical apparatus for hazardous areas

for use in hazardous areas with combustible dust

ZELM 03 ATEX 0128 X

CE 0102

II 1D Ex iaD 20 T 108 °C (226.4 °F)

94/9/EG

IEC 61241-11:2002: draft; prEN61241-0:2002

type of protection intrinsic safety "iD"

Use is restricted to the following stated conditions

SJ3,5-S1N...

≤ 30 nF ; a cable length of 10 m is considered.

≤ 100 μH ; a cable length of 10 m is considered.

The apparatus has to be operated according to the appropriate data in the data sheet and in this instruction manual.

The EC-Type Examination Certificate has to be observed.

The special conditions must be adhered to!

The maximum surface temperature of the housing is given in the EC-Type Examination Certificate.

Laws and/or regulations and standards governing the use or intended usage goal must be observed.

The intrinsic safety is only assured in connection with an appropriate related apparatus and according to the proof of intrinsic safety.

The associated apparatus must satisfy at least the requirements of category ia IIB or iaD. Because of the possibility of the danger of ignition, which can arise due to faults and/or transient currents in the equipotential bonding system, galvanic isolation in the power supply and signal circuits is preferable. Associated apparatus without electrical isolation must only be used if the appropriate requirements of IEC 60079-14 are met.

The intrinsically safe circuit has to be protected against influences due to lightning. When used in the isolating wall between Zone 20 and Zone 21 or Zone 21 und Zone 22 the sensor must not be exposed to any mechanical danger and must be sealed in such a way, that the protective function of the isolating wall is not impaired. The applicable directives and standards must be observed.

No changes can be made to apparatus, which are operated in hazardous areas.

Repairs to these apparatus are not possible.

The connection cables are to be laid in accordance with EN 50281-1-2 and must not normally be subjected to chaffing during use.