ICS08 IO-Link 3-wire DC



Miniaturized proximity inductive sensors with IO-Link communication



Description

ICS08 series represents the optimal solution for industrial automation equipment in applications where space is limited, but long switching distance is needed, including tool-selection and textile machines. The advanced electronics is encapsulated in a robust stainless steel housing. The availability of the M8-plug and 2m-PVC cable connection in short or long housing construction allows flexible mounting.

On-board IO-Link communication opens up many possibilities, such as easy configuration and setup of the devices and advanced parameter setting.

Benefits

- A complete family. Available in M8 male thread robust stainless steel housings with an operating distance of 2 to 4 mm.
- Easy to install. Both flush and non-flush construction are available. The user can choose between short and long body housings in 2 m PVC cable or M8-disconnect plug versions.
- High precision. The onboard advanced microcontroller ensures better stability with respect to environmental influences, with highly repeatable measurements between -25 and +80°C.
- Easy customization to specific OEM requests: different cable lengths and materials, special labelling, customized pig-tail solutions with special cables and connectors are possible on request.
- The output can be operated either as a switching output or in IO-Link mode.
- Fully configurable via IO-Link v1.1. Electrical outputs can be configured as PNP/NPN/Push-pull, normally open or normally closed.
- Timer functions can be set, such as switch-on and switch-off delay
- Adjustable sensing distance and hysteresis: sensing distance can be set to 50% or 100% of the maximum sensing distance
- Temperature monitoring: over or under-run temperature alarms can be set





Applications

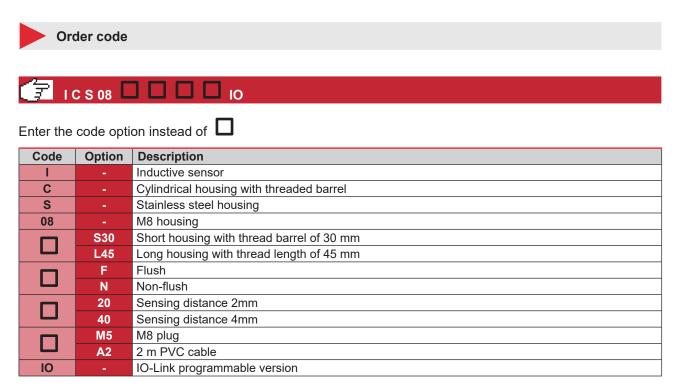
- · Non contact detection of metal objects in general position-sensing and presence-sensing in industrial applications
- · Particularly suitable for rotational speed monitoring thanks to the high operating frequency



Main functions

- · Integrated diagnostic function with flashing LED in the event of a short circuit or overload
- The devices can be operated in IO-Link mode once connected to an IO-Link master, or in standard I/O mode.
- In IO-Link mode the switching signals of the sensor are made available in the process data via the IO-Link interface.
- Several sensor functions can be set via the IO-Link interface:
 - ▶ Adjustable switching distance: 50% or 100% of the maximum switching distance.
 - ► Adjustable hysteresis: standard or increased value.
 - ▶ Divider function: the sensor gives a signal after a specified number of actuation pulses has been reached.
 - ▶ Switch-on delay: the switching pulse is generated after the sensor actuation.
 - Switch-off delay: the generation of the switch signal is delayed by the set time after sensor actuation.
 - ► Temperature error: temperature is out of specifications.
 - Temperature over-run and under-run: temperature is out of the limits defined by the user.

References



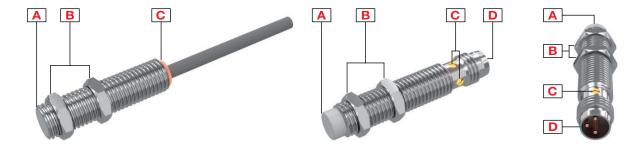
Additional characters can be used for customized versions.



Selection guide

Con- nec- tion	Body style	Detec- tion princi- ple	Rated operating distance Sn	Output type	Ordering no.
Cable		Flush	Configurable: 1 or 2mm		ICS08S30F20A2IO
Plug	Short	Flusii	Factory setting: 2mm		ICS08S30F20M5IO
Cable	SHOIL	Non-	Configurable: 2 or 4mm	Configurable: NPN/PNP/	ICS08S30N40A2IO
Plug	flush			push-pull	ICS08S30N40M5IO
Cable		Flush	Configurable: 1 or 2mm	NO/NC	ICS08L45F20A2IO
Plug		Factory setting: 2mr	Factory setting: 2mm	Factory setting: PNP, NO	ICS08L45F20M5IO
Cable	Long	Non-	Configurable: 2 or 4mm		ICS08L45N40A2IO
Plug		flush	Factory setting: 4mm		ICS08L45N40M5IO

Structure



Element	Component	Function
Α	Sensing face	Flush or non-flush
В	2 nuts	For sensor mounting
С	LED	Yellow LED: Output flashing: short circuit or overload indication
D	M8, 3 pin, male connector	For plug versions only



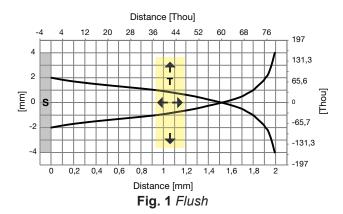
Sensing

Detection

Rated operating distance S	2 mm flush or 4 mm non-flush
Rated operating distance 3 _n	Programmable via IO-Link: 50% or 100% of the maximum S _n
Reference target	The operating distance is measured according to IEC 60947-5-2, using a standard target moving axially. This target is square shape 1 mm thickness, made of steel e.g. type Fe 360 as defined in ISO 630 and it shall be of the rolled finish. The length of the side of the square is equal to – the diameter of the circle inscribed on the active surface of the sensing face, or – three times the rated operating distance S _n whichever is greater
Assured operating sensing distance (S _a)	$0 \le S_a \le 0.81 \text{ x } S_n \text{ (e.g. with } S_n \text{ of 2 mm, } S_a \text{ is } 0 \dots 1.62 \text{ mm)}$
Effective operating distance (S _r)	$0.9 \times S_n \le S_r \le 1.1 \times S_n$
Usable operating distance (S _u)	$0.9 \times S_r \le S_u \le 1.1 \times S_r$
Temperature drift	≤ +/-10%
Hysteresis (H)	Programmable via IO-Link: standard or increased



S: sensor T: target



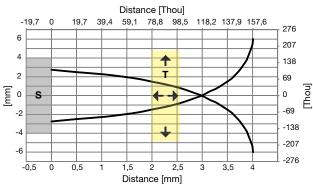


Fig. 2 Non-flush



Correction factors

The specific operating distance S_n refers to defined measuring conditions. The following data have to be considered as general guidelines.

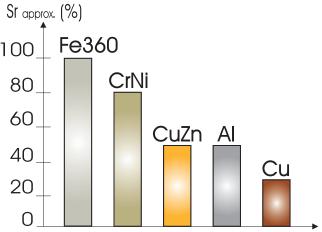


Fig. 3 The rated operating distance is reduced by the use of metals and alloys other than Fe360. The most important reduction factors for inductive proximity sensors are shown in the figure.

Fe360 : Steel

CrNi: Chrome-nickel

CuZn : Brass Al : Aluminium Cu : Copper

Sr: Effective operating distance



Accuracy

Repeat accuracy (R)	≤ 5%

Features



Power Supply

Rated operational voltage (U _b)	10 to 30 VDC (ripple included)
Ripple (U _{rpp})	≤ 10%
No load supply current (I _o)	≤ 17 mA
Power ON delay (t _v)	≤ 50 ms



Outputs

Output functions	Configurable via IO-Link: PNP, NPN or push-pull Factory setting: PNP
Output configuration	Configurable via IO-Link: N.O. or N.C. Factory setting: N.O.
Output current (I _e)	≤ 100 mA
OFF-state current (I _r) (only for PNP or NPN output)	≤ 100 µA
Voltage drop (U _d)	Max. 1.2 VDC @ 100 mA
Protection	Short-circuit, reverse polarity and transients
Voltage transient	1 kV/0.5 J

Response times

Operating frequency (f)	≤ 2 KHz



Indication

Standard IO mode:

Yellow LED	Output	Description
OFF	OFF	N.O. output, target not present N.C. output, target present
ON	ON	N.O. output, target present N.C. output, target not present
Blinking	f: 2Hz	Short-circuit or overload
Billiking	f: 1Hz	Temperature alarm (if enabled)

IO-Link mode:

- LED is ON for 0.75 s and OFF for 0.075 s
- · Possibility to disable the LED



Environmental

Ambient temperature	Operating: -25° to +80°C (-13° to +176°F)	
Ambient temperature	Storage: -30° to +80°C (-22° to +176°F)	
Ambient humidity	Operating: 35% to 95%	
Ambient humidity	Storage: 35% to 95%	
Vibration	10 to 55 Hz, amplitude 1.0 mm; sweep cycle 5 min; in X, Y and Z direction	IEC 60068-2-6
Shock	30 G /11 ms. 10 shocks in X, Y and Z direction	IEC 60068-2-27
Degree of protection	IP67	IEC 60529; EN 60947-1



Compatibility and conformity

	IEC 61000-4-2 Electrostatic discharge	8 kV air discharge 4 kV contact discharge
	IEC 61000-4-3 Radiated radiofrequency	3 V/m
EMC protection	IEC 61000-4-4 Burst immunity	2 kV
	IEC 61000-4-6 Conducted radio fre-	3 V
	quency	3 V
	IEC 61000-4-8 Power frequency magnetic fields	30 A/m
MTTF _d	4513 years @ 50°C (122°F)	
Approvals	CCC is not required for products rated	IO -Link ≤ 36 ∨

Mechanical data

Weight (including 2 nuts and the packaging) max.	Cable version: short, flush: 44.8g; short, non-flush: 44.9g; long, flush: 47g; long, non-flush: 47.1g; Plug version: short, flush: 16g; short, non-flush: 16.1g; long, flush: 18.4g; long, non-flush: 18.5g.
Mounting	Flush mountable or non-flush mountable
Material	Housing: stainless steel AISI304 Front cap: Grey thermoplastic polyester
Max tightening torque	7 Nm

Electrical connection

Cable	2m, 3 x 0.14 mm ² , Ø3.2 mm, PVC, grey, oil proof
Plug	M8 x 1 quick disconnect, 3 pin, male connector

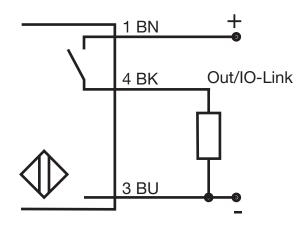


Communication

Communication	Via IO-Link V1.1 or via standard I/O



Connection Diagrams



Colour code		
BN: brown	BK: black	BU: blue



Dimensions [mm]

ICS08 [mm]

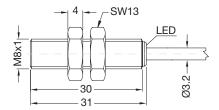


Fig. 4 Short body, flush version, cable

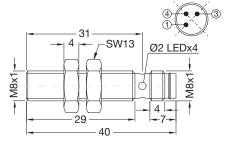


Fig. 6 Short body, flush version, plug

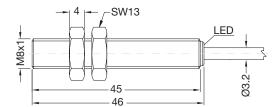


Fig. 8 Long body, flush version, cable

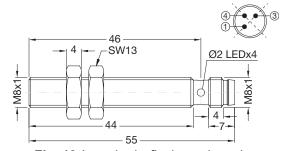


Fig. 10 Long body, flush version, plug

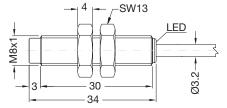


Fig. 5 Short body, non-flush version, cable

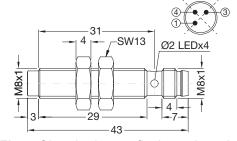


Fig. 7 Short body, non-flush version, plug

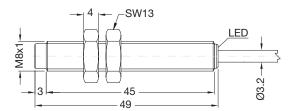


Fig. 9 Long body, non-flush version, cable

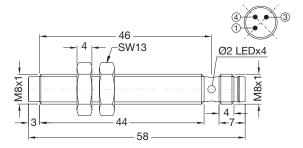


Fig. 11 Long body, non-flush version, plug



Installation

M8 flush

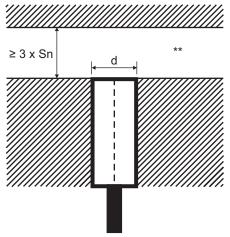


Fig. 12 Flush sensor, when installed in damping material

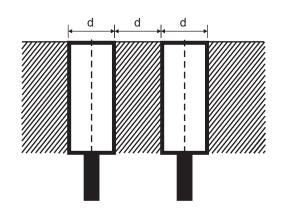


Fig. 13 Flush sensors, when installed together in damping material

M8 non-flush

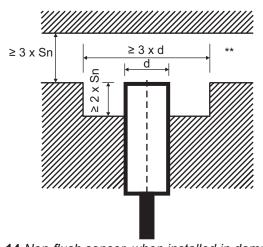


Fig. 14 Non-flush sensor, when installed in damping material

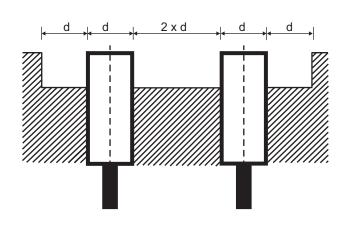


Fig. 15 Non-flush sensors, when installed together in damping material



Sensors installed opposite each other

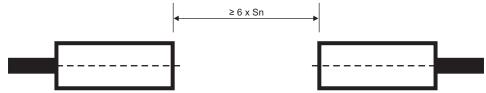


Fig. 16 For sensors installed opposite each other, a minimum space of 6 x Sn (the nominal sensing distance) must be observed

S_n: nominal sensing distance d: sensor diameter: 8 mm

^{**} Free zone or non-damping material



Delivery contents and compatible components



Delivery contents

- · Inductive proximity switch
- 2 fixing nuts
- · 2 lock washers
- Packaging: plastic bag



CARLO GAVAZZI compatible components

- Mounting bracket AMB8... to be purchased separately
- · Connector type: CONB53... series to be purchased separately



Further reading

Information	Where to find it	QR
IO-Link manual	http://www.productselection.net/MANUALS/UK/IOL_IM.pdf	
Mounting brackets	http://www.productselection.net/Pdf/UK/AMB8_30.pdf	
Connectors	http://www.productselection.net/Pdf/UK/CONB5.pdf	



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