INSTALLATION GUIDE

Inductive Sensors ISZL

For further information please see the data sheet at
LINK

INTRODUCTION

WayCon Positionsmesstechnik GmbH would like to thank you for the trust you have placed in us and our products. This manual will make you familiar with the installation and operation of our inductive sensors. Please read this manual carefully before initial operation!

Unpacking and checking:
Carefully lift the device out of the box by grabbing the housing. After unpacking the device, check it for any visible damage as a result of rough handling during the shipment. Check the delivery for completeness.
If necessary consult the transportation company, or contact WayCon directly for further assistance.

GENERAL SAFETY INSTRUCTIONS

Intended use
This product is a precision device and is used for object detection and the preparation and/or provision of measuring values as electrical quantities for a subsequent system. Unless this product is specially labelled, it must not be used for operation in hazardous environments.

Installation

- For mounting, use only the mechanical mountings and mechanical mounting accessories intended for this product.
- Always comply with admissible cable bending radii.
- Prior to electrical connection of the product, the system must be disconnected from the power supply.
- In areas where shielded cables are mandatory, they must be used as protection against electromagnetic interferences.
- If a connector is added by the customer to a shielded cable, an EMC version of the connectors should be used, and the shield must be connected to the connector housing across a large area.

MAINTENANCE

Inductive sensors do not require any special maintenance or cleaning.

INSTALLATION

Mounting

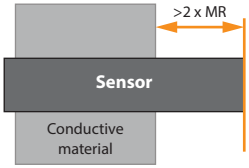
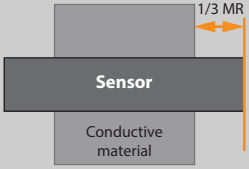
The sensors have a threaded housing and can be fixed using the nuts which are part of the delivery. The maximal mounting torque depends on the housing material as well as the thread size and is specified in the table below:

Sensor	ISZL-6	ISZL-8	ISZL-24
Tightening torque max.	15 Nm / A[1)]: 10 Nm	40 Nm	100 Nm

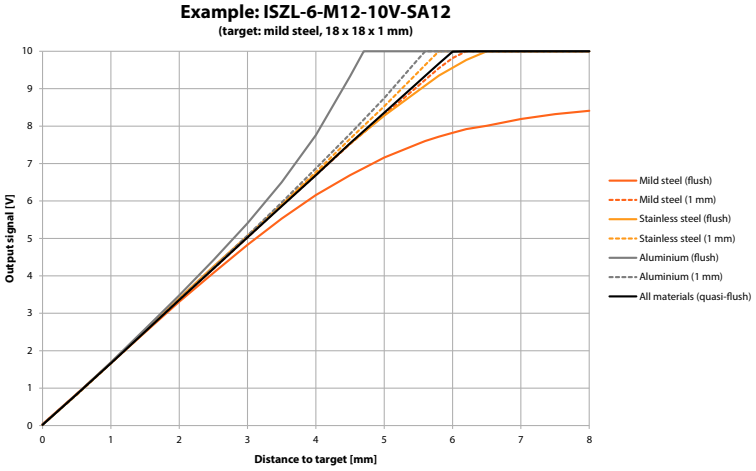
[1)] within the first 5 mm (seen from the active side)

Influence of mounting situation

The largest influence on the output of an inductive sensor is conductive material close to the sensing face. Depending on the material of the sensor housing and the conductivity of the material which is close to the sensor, the output curve is changed more or less. The following mounting situations can be distinguished:

Mounting situation	**Drawing of mounting situation**	**Optimal for...**
Non-flush: There is no conductive material in the vicinity (>2 x max. measurement range) of the sensing face.		ISZL-24
Quasi-flush: There is no conductive material directly surrounding the sensing face, but at a small distance behind (1/3 MR).		ISZL-6 ISZL-8

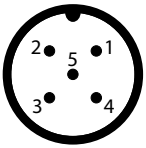
The following diagram illustrates the influence of the carrier material and the mounting method:

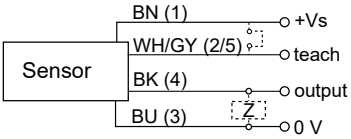


ELECTRICAL CONNECTION

Connector M12, male, 5 pins

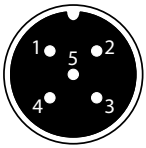
Pin	Signal
1	+V
2	Teach
3	GND
4	Signal
5	Teach





ACCESSORY CABLE

Cable with mating connector M12 (female), 5 poles	
K5PXM-S-M12	X m, straight connector, shielded
K5PXM-SW-M12	X m, angular connector, shielded



Pin	Cable colour
1	BN
2	WH
3	BU
4	BK
5	GY

TEACH FUNCTION

Inductive sensors with teach function can be optimally adapted for the following situations:

- **Compensate tolerances (mechanical tolerances at installation, variation in target geometry and material, deviations from sensor to sensor):** typically a 1-point teach of the start or end position is useful in these cases.
- **Quick setup of sensors:** the distance between the sensor and the target does not need to be set very accurately as variations in distance can be easily compensated using the 1-point teach.
- **Measuring symmetrical displacements (vibrations):** The 1-point teach can be used to set the centre position of the target and thus measure the amplitude relative to the stationary position.
- **Get maximal system accuracy:** The 2-point teach is most useful as the minimal and maximal distance can be set individually. This allows adjusting the measuring range of a sensor to the distance relevant in a given application and thus defining the slope of the sensor output.
- **Set a digital alarm or indicate a valid/invalid position:** sensors with an additional digital output can be set to deliver a high output value only if the target is within a defined measuring range.
- **Set sensor to a defined state:** factory reset

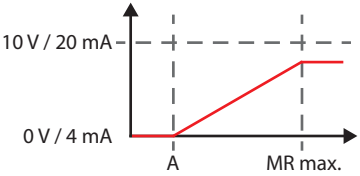
TEACH FUNCTION

General procedure:
To teach the sensor, the teach wire must be connected to the positive supply voltage of the sensor (+V). Depending on the duration of the contact, different teach levels can be selected. A flashing LED indicates that the teach procedure has started.

A teach procedure can be aborted by connecting the teach wire to the power supply +V for more than 10 s. This way the sensor keeps its previous settings. This is indicated by fast flashing (8 Hz) of the LED.

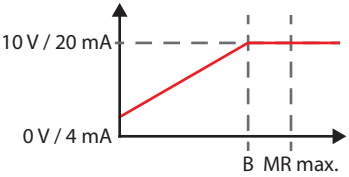
Teach level 1 (1-point-teach)
The 1-point-teach is typically used in applications where a short setup time is desired and the installation tolerances shall be compensated. Two situations can be distinguished:

1) Minimal distance:
During the teach procedure the target is positioned at the minimum distance relative to the sensor (position "A" in the figure). In the application the target moves away from the sensor. In this situation the sensor will be taught to provide an output signal of 0 V (or 4 mA) at position "A".



Procedure:
1. Position target at distance "A".
2. Connect teach wire to +V (2 s). When yellow LED starts flashing with 1 Hz, cut connection.
3. Connect teach wire shortly (>0.2 s) to +V.
4. Wait 4 s (LED keeps flashing).
5. LED flashes shortly. The teaching is finished.

2) Maximum distance:
During the teach procedure the target is positioned at the maximum distance relative to the sensor (position "B" in the figure). In the application the target moves towards the sensor. In this situation the sensor should be set to have an output signal of 10 V (or 20 mA) at position "B".



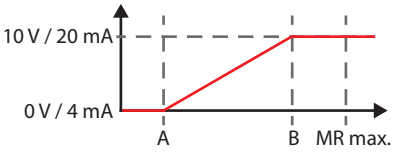
Procedure:
1. Position target at distance "B".
2. Connect teach wire to +V (2 s). When yellow LED starts flashing with 1 Hz, cut connection.
3. Connect teach wire shortly (>0.2 s) to +V.
4. Within 4 s: connect teach wire shortly (>0.2 s) to +V (LED keeps flashing).
5. LED flashes shortly. The teaching is finished.

When using the 1-point-teach the sensor will either never reach the maximum output value (case 1) or the minimum output value (case 2).

TEACH FUNCTION

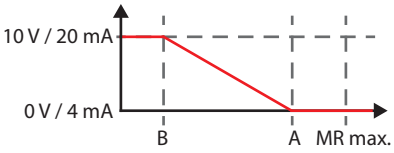
Teach level 2 (2-point-teach)
The 2-point-teach is typically used in applications where two reference positions can be set and where installation tolerances and tolerances of the target shall be compensated. The 2-point-teach allows to change the slope of the sensor output. Depending on the teach order the slope of the sensor's output signal will be either rising or falling:

1) Rising slope:
To teach the first position, the target is placed at the minimum distance relative to the sensor (position "A" in the figure). For the second position, the target is placed at the maximum distance (position "B"). For distances smaller than "A" the output signal will be 0 V (or 4 mA), for distances larger than "B" the output will be 10 V (or 20 mA).



Procedure:
1. Position target at distance "A".
2. Connect teach wire to +V (4 s). When yellow LED starts flashing with 2 Hz, cut connection.
3. Connect teach wire shortly (>0.2 s) to +V.
4. Position target at distance "B".
5. Connect teach wire shortly (>0.2 s) to +V.
6. LED flashes shortly. The teaching is finished.

2) Falling slope:
To teach the first position, the target is placed at the maximum distance relative to the sensor (position "A" in the figure). For the second position, the target is placed at the minimum distance (position "B"). For distances larger than "A" the output signal will be 0 V (or 4 mA), for distances smaller than "B" the output will be 10 V (or 20 mA).



Procedure:
1. Position target at distance "A".
2. Connect teach wire to +V (4 s). When yellow LED starts flashing with 2 Hz, cut connection.
3. Connect teach wire shortly (>0.2 s) to +V.
4. Position target at distance "B".
5. Connect teach wire shortly (>0.2 s) to +V.
6. LED flashes shortly. The teaching is finished.

Teach Level 3 (Factory Reset)
This will restore the default settings the sensor had when leaving the factory:
at minimal measurement range the output signal is minimal, at maximal range the signal is maximal.

Procedure:
1. Connect teach wire to +V (6 s). When yellow LED starts flashing with 4 Hz, cut connection.
2. LED flashes shortly. The teaching is finished.

TROUBLESHOOTING

Problem	Possible solution
Linearity of the output does not meet the expectations.	Change the geometry and material of the target to conform to the standard target as much as possible.
Slope is not steep enough.	Use larger target.
The output is switching at different distances if the target is approaching or leaving.	This is due to the hysteresis of the sensor in order to guarantee stable behaviour.

DECLARATION OF EU-CONFORMITY

WayCon Positionsmesstechnik GmbH
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This is to certify that the products

Classification inductive sensors
Product series ISZL
fulfil the current request of the following EU-directives
EMC-directive 2014/30/EU
2011/65/EU
applied harmonized standards:
EN 60947-5-2:2007+A1:2012, Sec. 8.6, EN 60947-5-7:2003, Sec. 8.6,
EN 55011:2009+A1:2010, EN 55022:2010 (Class B), EN 50581:2012

This declaration of conformity loses its validity if the product is misused or modified with out proper authorisation.

Taufkirchen, 18.02.2019

Andreas Täger
CEO