



Operating manual

Ultrasonic proximity switch with one switched output and IO-Link interface

Ics+340/F
Ics+600/F

Product description

The Ics+ sensor offers a non-contact measurement of the distance to an object which must be positioned within the sensor's detection zone. The switched output is set conditional upon the adjusted detect distance.

Via the Teach-in procedure, the detect distance and operating mode can be adjusted. One LED indicates operation and the state of the switched output.

The Ics+ sensors are IO-Link-capable in accordance with IO-Link specification V1.0.

Safety instructions

- Read the operating instructions prior to start-up.
- Connection, installation and ad-

justments may only be carried out by qualified staff.

- No safety component in accordance with the EU Machine Directive.

Use for intended purpose only

Ics+ ultrasonic sensors are used for non-contact detection of objects.

Installation

- Mount the sensor at the place of fitting.
- Connect a connection cable to the M12 device plug.

Start-up

- Connect the power supply.
- Carry out sensor adjustment in accordance with the diagram.

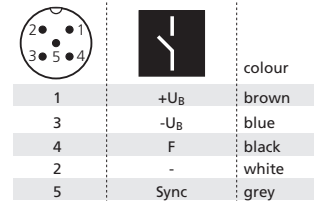


Fig. 1: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cables

Factory setting

- Switched output on NOC.
- Detect distance at operating range.

Operating modes

Three operating modes are available for the switched output:

- Operation with one detect point
The switched output is set when the object falls below the set detect point.

- Window mode

The switched output is set when the object is within the set window.

- Two-way reflective barrier

The switched output is set when the object is between sensor and fixed reflector.

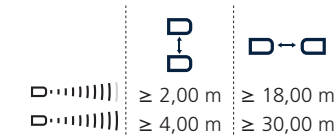


Fig. 2: Assembly distances

Synchronisation

If under multiple sensor operation the assembly distance falls below the values shown in Fig. 2, the internal synchronisation should be used. For this purpose interconnect each pin 5 of max. 10 sensors.

Maintenance

microsonic sensors are maintenance-free. In case of excess caked-on dirt we recommend cleaning the white sensor surface.

Notes

- The sensors of the Ics+ family have a blind zone, within which a distance measurement is not possible.
- The Ics+ sensors are equipped with an internal temperature compensation. Due to the sensors self heating, the temperature compensation reaches its optimum working-point after approx. 30 minutes of operation.
- In the normal operating mode, an illuminated yellow LED signals that the switched output is switched through.
- The Ics+ sensors have a push-pull switched output.
- In the »Two-way reflective barrier« operating mode, the object has to be within the range of 0-85 % of the set distance.
- In the »Set detect point – method A« Teach-in procedure the actual distance to the object is taught to the sensor as the detect point. If the object moves towards the sensor (e.g. with level control) then the taught distance is the level at which the sensor has to switch the output.
- If the object to be scanned moves into the detection area from the side, the »Set detect point +8 % – method B« Teach-in procedure should be used. In this way the switching distance is set 8 % further than the actual measured distance to the object. This ensures a reliable switching distance even if the height of the objects varies slightly.

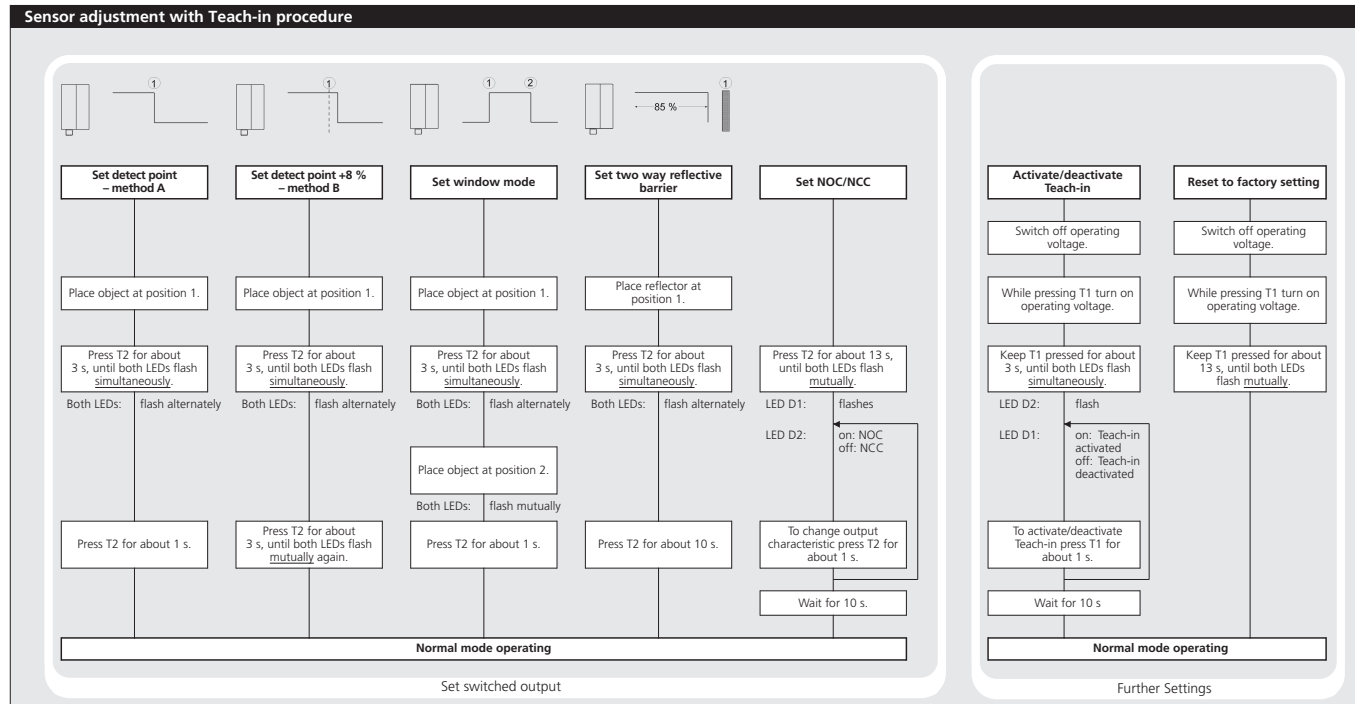
Contact

Sensor Partners BV

James Wattlaan 15
5151 DP Drunen
The Netherlands
+31 (0)416 - 37 82 39
info@sensorpartners.com
sensorpartners.com

Sensor Partners BVBA

Z.1 Researchpark 310
B-1731, Zellik
Belgium
+32 (0)2 - 464 96 90
info@sensorpartners.com
sensorpartners.com



Sensor adjustment in IO-Link mode

The lcs+ sensors are IO-Link-capable in accordance with IO-Link specification V1.0.

Pointer

■ In IO-Link mode LinkControl is not available.

Process data

The lcs+ cyclically transmits the measured distance value with a resolution of 1 mm and the logical state of the switched output.

Service data

The following sensor parameters may be set via IO-Link interface using the IO-Link device description (IODD).

Detect point 1

The switched output is activated

when the distance to an object is smaller than the present detect point.

Return detect point 1

The switched output is reactivated when the distance to an object is greater than the present return detect point (detect point + hysteresis).

Pointer

■ The return detect point 1 must always be greater than the detect point 1.

Detect point 2, return detect point 2

By programming these two detect distances to a value smaller than the actual maximum distance the window mode is activated. The window lies between detect point 1 and detect point 2.

Pointer

■ The return detect point 2 must always be smaller than the detect point 2.

Foreground suppression

Spurious reflections, caused by objects in the foreground of the sensor may be blocked out by the foreground suppression.

Pointer

■ The object in the foreground can cause multiple reflections that lead to invalid measurement.
■ The object in the foreground must not cover the sensor in a way that the detection zone is influenced.

Maximum range

The value specifies the maximum measurement range.

Teach-in via push-buttons T1/T2

The push-buttons can be locked/unlocked for the Teach-in procedures.

Set NOC/NCC

The NCC or NOC output function can be present for the switched output.

Measurement filter

lcs+ ultrasonic sensors provide for a choice of 5 filter settings:

■ F00 (no filter)
Each ultrasonic measurement acts in an unfiltered manner on the output.
■ F01 (standard filter)

On the object continuously approaching the sensor, the ongoing interval is immediately taken on and the output correspondingly activated. The effect of the object abruptly moving away from the sensor is for the existing distance to be saved for a retaining time dependent on the filter strength and for the switched output state to be maintained.

■ F02 (Average value filter)

Forms the arithmetic mean across a number of measurements. The output is activated in keeping with the average value. The number of measurements, from which the average value is formed, depends on the selected filter strength.

■ F03 (foreground filter)

This filter reacts very fast on sensor close measurement values and gives a straightened output on this sensor close level. Disturbances from objects in the background or momentary loss of echoes from the object to be detected are filtered out.

■ F04 (background filter)

This filter reacts very fast on sensor far measurement values and gives a straightened output on this sensor far level. Disturbances from obstacles in front of the object to be detected are filtered out.

Filter strength

A filter strength between 0 – weak filter effect – and 9 – pronounced filter effect – can be selected for each measurement filter.

Temperature compensation

The temperature compensation improves the measurement accuracy at changing ambient temperature and may be deactivated.

Pointer

■ The measurement accuracy amounts to 0,17 %/K change of temperature without compensation.

Switch-on delay

If the switch-on delay is activated, the switched output will not be set before the programmed time once the measurement value falls below the set detect point. If the measurement value increases to the detect point again, the switched output will be reset after 50 % of the programmed on-delay time.

Detection zone sensitivity

The size of the detection zone can be varied in three steps.

Synchronisation and multiplex in IO-Link mode

As in SIO mode up to 10 sensors can be synchronised by interconnecting the sync-channel (Pin 5) of each sensor. Additionally the multiplex mode is available.

Multiplex mode device address

In multiplex mode for every sensor connected via the sync-channel a unique device address has to be set. The sensors then perform their measurement in increasing order of the device addresses. With multiplex address »0« the sensors work synchronous, with address »11« synchronisation/multiplex is disabled.

Pointer

■ In multiplex mode the response time of each sensor extends corresponding to the number of connected sensors.

Multiplex mode highest address

To optimise the multiplex speed the highest assigned device address may be set instead of the default value »10«.

Interference noise suppression

This filter keeps the state of the output for the time a ultrasonic interference noise, e.g. leaking compressed air, makes a measurement impossible.

Pointer

■ The Interference noise suppression filter extends the measurement cycle of the sensor and for this it's response time.

Echo quality

To simplify the adjustment of the sensor towards the measurement object the echo quality can be observed. The value gives back the strength of the reflected echo.

System commands

With 6 system commands the following settings may be carried out:

- Teach-in detect point.
- Teach-in detect point +8 %.
- Teach-in window mode detect point 1.
- Teach-in window mode detect point 2.
- Teach-in two way reflective barrier.
- Reset sensor to factory settings.

IODD file

The latest IODD file you will find on the internet under www.microsonic.de/en/IODD.

For further informations on IO-Link see www.io-link.com.

IO-Link data				lcs+340...				lcs+600...											
physical layer		SIO mode support		yes			yes												
min cycle time		baud rate		43 ms	COM 2 (38.400 Bd)		60,8 ms	COM 2 (38.400 Bd)											
format of process data		content of process data		16 Bit, R, UNI16	Bit 0: logical state of switched output, Bit 1-15: distance value with 1 mm resolution		16 Bit, R, UNI16	Bit 0: logical state of switched output, Bit 1-15: distance value with 1 mm resolution											
service data IO-Link specific				index				access				value							
Vendor name				0x10				:R				microsonic GmbH							
Vendor text				0x11				:R				www.microsonic.de							
Product name				0x12				:R				lcs+							
Product ID				0x13				:R				340/F							
Product text				0x15				:R				Ultraschall-Sensor							
service data sensor specific				index				format				access				range (dez)			
detect point 1				0x40				:UINT16				:R/W				2.038-29.098 (350-4.998 mm)			
return detect point 1				0x41				:UINT16				:R/W				2.044-29.104 (351-4.999 mm)			
detect point 2				0x42				:UINT16				:R/W				2.049-58.214 (352-4.999 mm) ¹⁾			
return detect point 2				0x43				:UINT16				:R/W				2.044-58.214 (351-4.998 mm) ¹⁾			
foreground suppression				0x44				:UINT16				:R/W				0-4.256 (0-1.050 mm)			
maximum range				0x45				:UINT16				:R/W				29.110-58.162 (5.000-9.990 mm)			
Teach-in via push-button T1/T2				0x46				:UINT8				:R/W				0: deactivated, 2: activated			
set NOC/NCC				0x47				:UINT8				:R/W				0: NCC, 2: NOC			
measurement filter				0x48				:UINT8				:R/W				0-4: F00 - F04			
filter strength				0x49				:UINT8				:R/W				0-9: P00 - P09			
temperature compensation				0x4A				:UINT8				:R/W				0: deactivated, 2: activated			
switch-on delay				0x4B				:UINT8				:R/W				0-20: 0-20 s			
detection zone sensitivity				0x4C				:UINT8				:R/W				1: high, 2: standard, 3: low			
multiplex mode device addressing				0x4D				:UINT8				:R/W				0-11: 0: sync, 11: deactivated			
multiplex mode highest address				0x4E				:UINT8				:R/W				1-10			
interference noise suppression				0x4F				:UINT8				:R/W				0: deactivated, 2: activated			
system commands				index				access				value							
Teach-in detect point				0x02				:W				161							
Teach-in detect point + 8 %				0x02				:W				162							
Teach-in window mode detect point 1				0x02				:W				163							
Teach-in window mode detect point 2				0x02				:W				164							
Teach-in two way reflective barrier				0x02				:W				165							
reset to factory settings				0x02				:W				166							
observe distance value				0x51				:UINT16				:R							
echo quality				0x50				:UINT16				:R							

¹⁾ Distance values as e.g. detect points are given as a multiple of the internal measurement resolution = 0,172 mm (example: 2.038 ± 350 mm).

