



**Product Description**  
 The ucs sensor offers a non-contact measurement of the distance to an object which must be positioned within the sensor's detection zone. The switching output is set conditional upon the adjusted switching distance. Via the Teach-in procedure, the distance and operating mode can be adjusted. One duo-LED indicates the state of the switching output F2. Switching output F1 is factory set antivalent to F2 and switches in the opposite direction.

**Operating manual**

**Ultrasonic proximity switch with two switching outputs and IO-Link**

ucs-15/CF  
 ucs-24/CF

**IO-Link**  
 The ucs sensor is IO-Link-capable in accordance with IO-Link specification V1.1 and supports Smart Sensor Profile like Digital Measuring Sensor. The sensor can be monitored and parameterized via IO-Link.

**Safety Notes**

- Read the operating manual prior to start-up.
- Connection, installation and adjustments may only be carried out by qualified staff.
- No safety component in accordance with the EU Machine Directive, use in the area of personal and machine protection not permitted.

**Proper Use**

ucs 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, see Fig. 1.
- If necessary, use the alignment assistance (see »Using the Alignment Assistance«).

Pin	microsonic notation	IO-Link notation	IO-Link Smart Sensor Profile	colour
1	+U <sub>B</sub>	L+		brown
2	F1	Q	SSC2	white
3	-U <sub>B</sub>	L-		blue
4	F2	C/Q	SSC1	black
5	Com	NC		grey

Fig. 1: Pin assignment with view onto sensor plug, IO-Link notation and colour coding of the microsonic connection cables.

**Start-up**

- Connect the power supply.
- Set the parameters of the sensor, see Diagram 1.

**Factory Setting**

- The ucs sensor is delivered factory made with the following settings:
- Switching point operation
- Switching output F2 on NOC at operating range
- Switching output F1 works antivalent to switching output F2

- Input Com set to »Teach-in + sync« enabled
- Filter at F01
- Filter strength at P00

**Operating Modes**

Three operating modes are available for the switching output:  
 ■ **Operation with one switching point**  
 The switching output is set when the object falls below the set switching point.

■ **Window mode**

The switching output is set when the object is within the window limits.

■ **Two-way reflective barrier**

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

**Synchronisation**

If the assembly distance of multiple sensors falls below the values shown in Fig. 2, the internal synchronisation should be used (»Teach-in + sync« must be switched on, see Diagram 1). For this purpose set the switching outputs of all sensors in accordance with Diagram 1. Finally interconnect each pin 5 of the sensors to be synchronised.

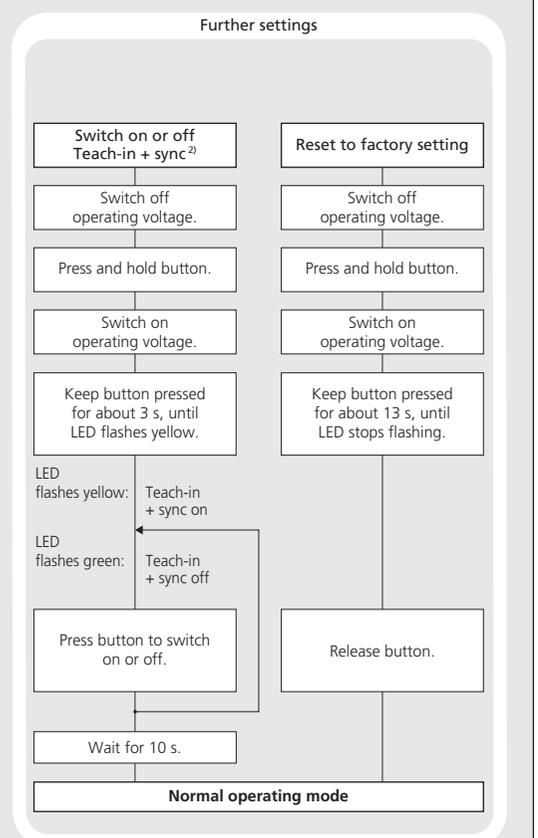
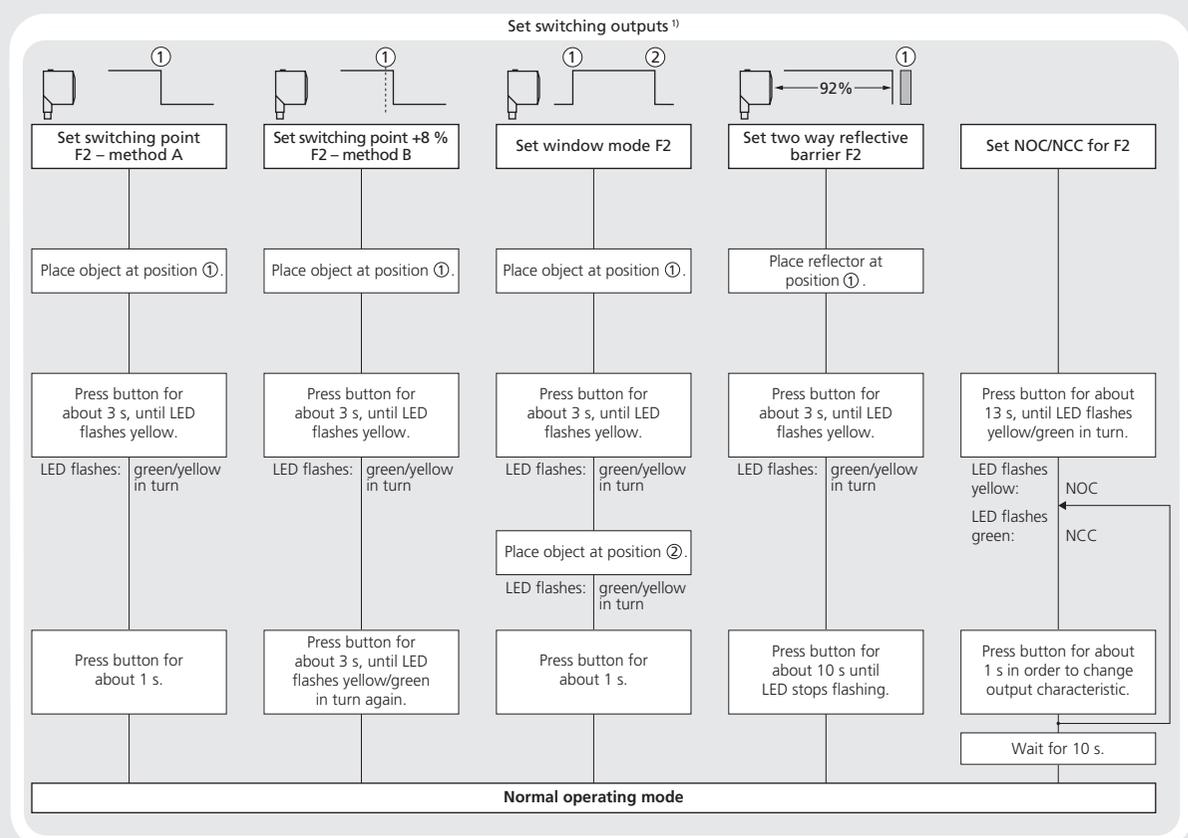
	↕	↔
ucs-15...	≥0.25 m	≥1.30 m
ucs-24...	≥0.35 m	≥2.50 m

Fig. 2: Minimal assembly distances without synchronisation

**Maintenance**

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

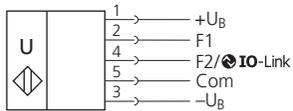
**Diagram 1: Set sensor parameters via Teach-in procedure**



<sup>1)</sup> By default, switching output F1 works antivalent to switching output F2. Using LinkControl or IO-Link, the antivalence of switching output F1 can be canceled and switching output F2 can be set independently of switching output F1.

<sup>2)</sup> Teach-in and sync can be switched on and off separately via LinkControl and IO-Link.

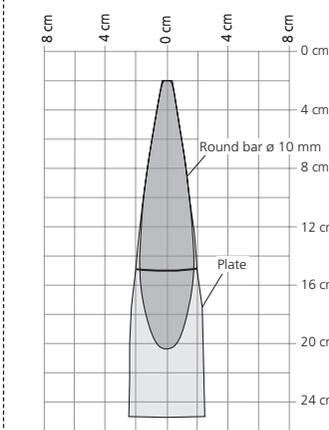
## Technical Data



**blind zone**  
**operating range**  
**maximum range**  
**angle of beam spread**  
**transducer frequency**  
**resolution**  
**reproducibility**  
**detection zones**

for different objects:  
The dark grey areas represent the zone where it is easy to recognise the normal reflector (round bar). This indicates the typical operating range of the sensors. The light grey areas represent the zone where a very large reflector – for instance a plate – can still be recognized. The requirement is an optimal alignment of the sensor and reflector.  
It is not possible to evaluate ultrasonic reflections outside this area.

20 mm  
150 mm  
250 mm  
see detection zone  
380 kHz  
0.1 mm  
±0.15 %



**accuracy**

±1 % (temperature drift internally compensated)

**operating voltage  $U_B$** : 10 to 30 V DC, reverse polarity protection (Class 2)

**voltage ripple**: ±10 %

**no-load current consumption**: <60 mA

**housing**

zinc die-cast, plastic parts: PBT;

ultrasonic transducer: polyurethane foam,

epoxy resin with glass content

**weight**

65 g

**class of protection per EN 60529**

IP 67

**norm conformity**

EN 60947-5-2

**type of connection**

5-pin M12 circular plug

brass nickel-plated

**controls**

Teach-in button

**scope for settings**

Teach-in, LinkControl, IO-Link

**indicators**

1 x duo-LED green/yellow

**synchronisation**

internal synchronisation up to 10 sensors

**operating temperature**

-25 to +70 °C

**storage temperature**

-40 to +85 °C

**switching hysteresis**<sup>3)</sup>

2 mm

**switching frequency**<sup>4)</sup>

25 Hz

**response time**<sup>4)</sup>

32 ms

**time delay before availability**

<300 ms

**switching outputs**

2 x Push-Pull,  $U_B=3 V$ ,  $-U_B=3 V$ ,  $I_{max} = 2 \times 100 mA$

switchable high active/low active, short-circuit-proof

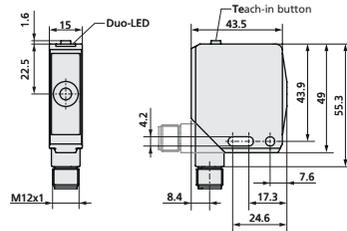
**order no.**

ucs-15/CF

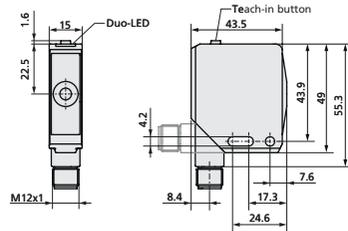
<sup>3)</sup> Can be programmed via LinkControl and IO-Link.

<sup>4)</sup> With LinkControl and IO-Link, the selected filter setting influences the switching frequency and response time.

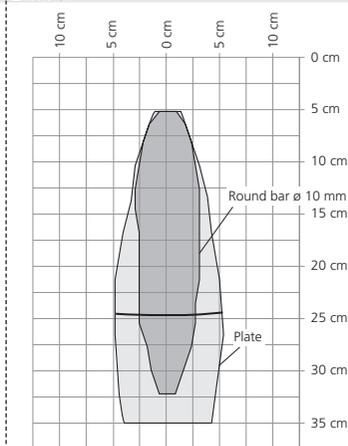
ucs-15...



ucs-24...



55 mm  
240 mm  
350 mm  
see detection zone  
500 kHz  
0.1 mm  
±0.15 %



**accuracy**

±1 % (temperature drift internally compensated)

**operating voltage  $U_B$** : 10 to 30 V DC, reverse polarity protection (Class 2)

**voltage ripple**: ±10 %

**no-load current consumption**: <60 mA

**housing**

zinc die-cast, plastic parts: PBT;

ultrasonic transducer: polyurethane foam,

epoxy resin with glass content

**weight**

65 g

**class of protection per EN 60529**

IP 67

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**type of connection**

5-pin M12 circular plug

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Teach-in, LinkControl, IO-Link

**indicators**

1 x duo-LED green/yellow

**synchronisation**

internal synchronisation up to 10 sensors

**operating temperature**

-25 to +70 °C

**storage temperature**

-40 to +85 °C

**switching hysteresis**<sup>3)</sup>

2 mm

**switching frequency**<sup>4)</sup>

20 Hz

**response time**<sup>4)</sup>

40 ms

**time delay before availability**

<300 ms

**switching outputs**

2 x Push-Pull,  $U_B=3 V$ ,  $-U_B=3 V$ ,  $I_{max} = 2 \times 100 mA$

switchable high active/low active, short-circuit-proof

**order no.**

ucs-24/CF

## Using the Alignment Assistance

With the internal alignment assistance the sensor can be optimally aligned to the object during installation. To do this, proceed as follows (see Fig. 3):

→ Mount the sensor loosely at the place of mounting so that it can still be moved.

→ Press the button shortly. The green LED flashes. The faster the LED flashes, the stronger the received signal.

→ Point the sensor at different angles to the object for about 10 seconds so that the sensor can determine the maximum signal level. Align the sensor until the green LED shines constantly.

→ Screw the sensor in this position.

→ Press the button shortly (or wait approx. 120 s) to exit the Alignment Assistance. The yellow LED flashes 2x and the sensor returns to normal operating mode.

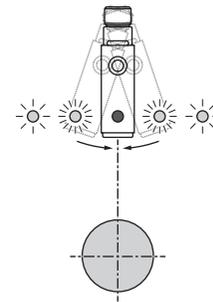


Fig. 3: Align the sensor optimally

## Notes

■ The ucs sensor has a blind zone, within which a distance measurement is not possible.

■ The ucs sensor is equipped with an internal temperature compensation. Due to the sensors self heating, the temperature compensation reaches its optimal working point after approx. 120 seconds of operation.

■ The ucs sensor has two push-pull switching outputs. By default, switching output F1 works antivalent to switching output F2. Using LinkControl or IO-Link, the antivalence of switching output F1 can be canceled and switching output F2 can be set independently of switching output F1.

■ In the normal operating mode the illuminated yellow LED signals that the switching output F2 is set.

■ The green flashing LED indicates that the sensor is in IO-Link mode.

■ If a Teach-in process is not completed, all changes are deleted after approx. 30 seconds.

■ In the »Two-way reflective barrier« operating mode, the object has to be within the range of 0 to 92 % of the set distance.

■ In the »Set switching point – method A« Teach-in procedure the actual distance to the object is taught to the sensor as the switching 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 switching 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, see Fig. 4.

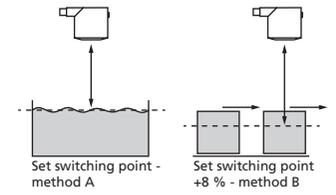


Fig. 4: Setting the switching point for different directions of movement of the object

■ The sensor can be reset to its factory setting (see »Further settings«, Diagram 1).

■ The ucs sensor can be blocked against changes in the sensor via function »Switch on or off Teach-in + sync«, see Diagram 1.

■ Using the LinkControl adapter (optional accessory) and the LinkControl software for Windows®, all Teach-in and additional sensor parameter settings can be optionally adjusted.

■ The latest IODD file and informations about start-up and configuration of ucs sensors via IO-Link, you will find online at: [www.microsonic.de/en/ucs](http://www.microsonic.de/en/ucs)

