## Ultrasonic proximity sensors point by point

UC12


**After 2 seconds/shortest time to operation**

Position object, press Teach-in button, ready. There is no faster way to commission an ultrasonic sensor.
This flexibility is further enhanced by the ObSB and window modes.

### Typical applications

- Checking presence of very dark objects
- Level control in the food and drinks industry
- Detecting transparent packaging
- Detecting printed/coloured paper during the printing process

**Easy to learn – Teach-in**

Setting a sensor's parameters can sometimes be time consuming – unless you just show it what to do. We call that "Teach-in". This makes the UM30 quick and easy to handle. And when changes have to be made, it can be re-taught in a jiffy to cope with the new situation.

**Well balanced and reliable – temperature compensation**

Ultrasonic time measurements depend on the state of the medium transmitting the sound, i.e. the air. UM30 sensors balance temperature fluctuations out automatically, thereby ensuring precision and reliability.

**Current or voltage – the appropriate signal automatically**

The analogue output of the UM30 sensor switches automatically between current and voltage. With its 4 to 20 mA or 0 to 10 V DC, it fits perfectly into any measuring environment.

**Q or $\bar{Q}$, no problem here**

What signal does the application require, Q or $\bar{Q}$?
The UM30 has an invertible switching output and can cope with both.

**ObSB mode – Object between sensor and background**

Perfect for detecting round and tilted surfaces, UM18 and UC12.

# Mode of operation: detecting, measuring and switching with ultrasonic proximity sensors.

**The detection of objects with ultrasonic sensors opens up a new dimension. Objects are positioned, detected and controlled virtually irrespective of material and environment.**

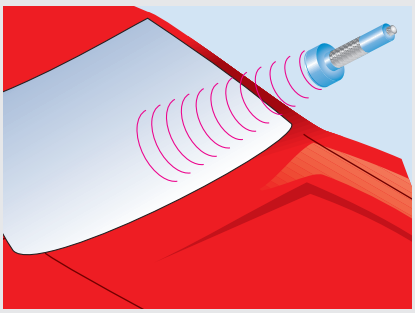
### Sensors with a profile – defining the detection area

SICK Ultrasonic Sensors generate an ultrasonic wave by means of a piezo element in the front part of the housing. The wave spreads in the atmosphere in accordance with the laws of physics. The same piezo element can detect and measure the sound reflected by an object. Therefore it functions alternately as sender and receiver (transceiver).

The measurement principle of ultrasonic sensors is based on the time taken for ultrasonic to travel through the medium air. The signals are transmitted in defined “packages”. With the help of its processing electronics, the transceiver evaluates the time taken between the transmission of a sound “package” and the arrival of the reflection from an object. As a result, either a signal proportionate to the distance is sent via an analogue interface, or a switching signal depending on a previously set distance parameter is sent through a binary output. The accuracy of the measurement and the maximum scanning range lie within a tolerance range which depends mainly on the state of the carrier medium air and the roughness of the object in question.

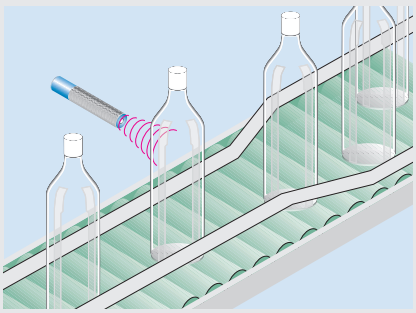
**Positioning**

Object detection and distance measurement independent of material



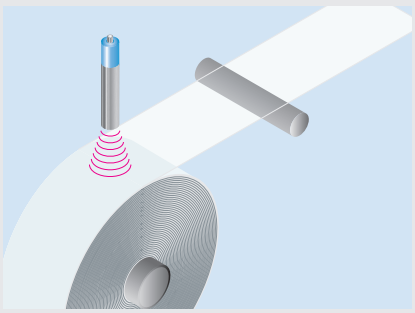
**Detection**

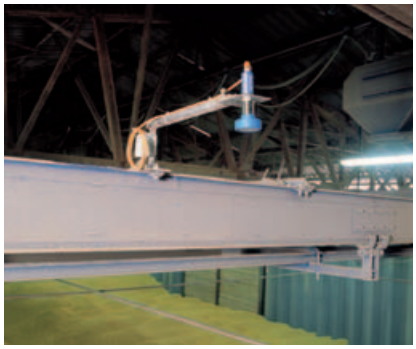
Recognise transparent objects

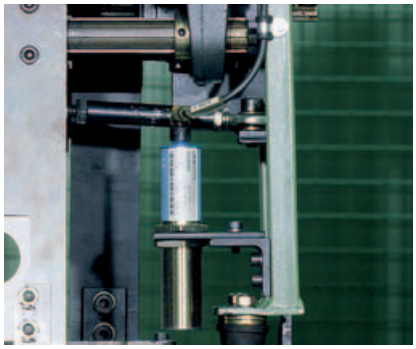


**Unwind**

Distance measurement for diameter check







## Sensors in action – scanning and measuring reflections

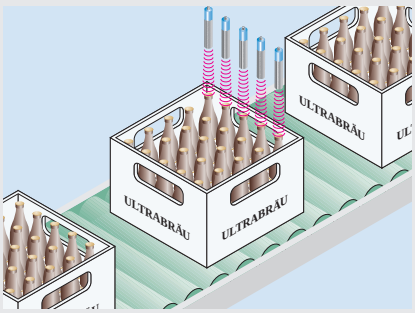
Ultrasonic sensors UM30 are used as non-contact proximity switches which process reflected signals, e.g. from objects on a conveyor belt. An essential benefit of the working principle of ultrasonic sensors is the almost complete blanking of the background, a prerequisite for accurate detection.

## Scanning round corners – thanks to the right accessories

Ultrasonic sensors UM30 are small and easily installed even in confined spaces. And if things get really tight, the right accessories can help out. Suitable reflectors allow sound to be deflected almost without loss.

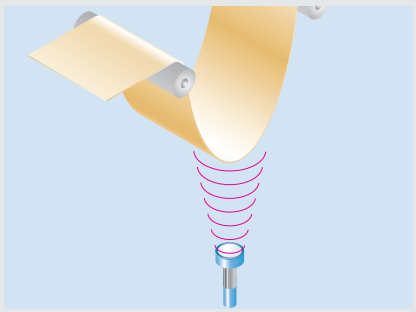
### Package

“Engaged” check on package content



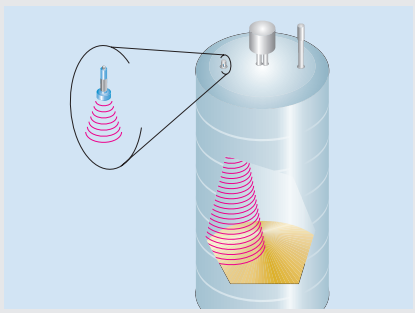

### Adjust

Control material looping



### Monitoring

Level control in silos and containers

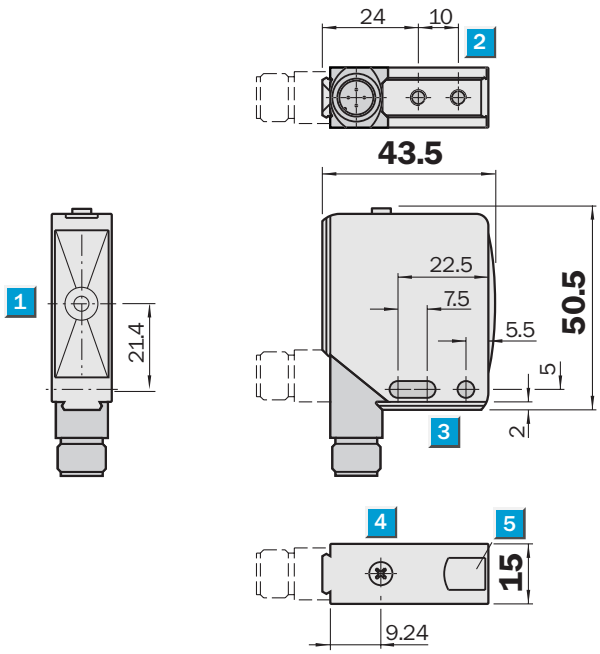


**Operating scanning distance**
**20 ... 150 mm**
**55 ... 250 mm**

**Ultrasonic sensor**

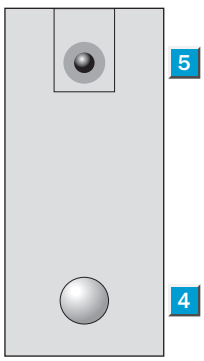
- Independent of material shape (including films, glass and bottles)
- Teach-in
- Insensitive to dirt, dust and fog
- 1 switching output PNP/NPN
- Very good background suppression (BGS)


## Dimensional drawing




## Adjustments possible

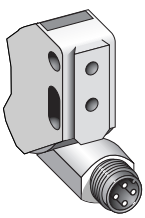
All types



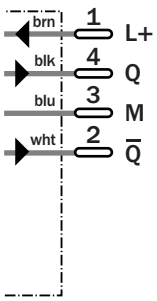

1 Centre of sender and receiver axis
2 M4 threated mounting hole – 4 mm deep
3 Mounting hole Ø 4,2 mm
4 Control element(s)
5 Signal strength indicator

## Connection type

All types



4-pin, M12




## Accessories

Mounting systems

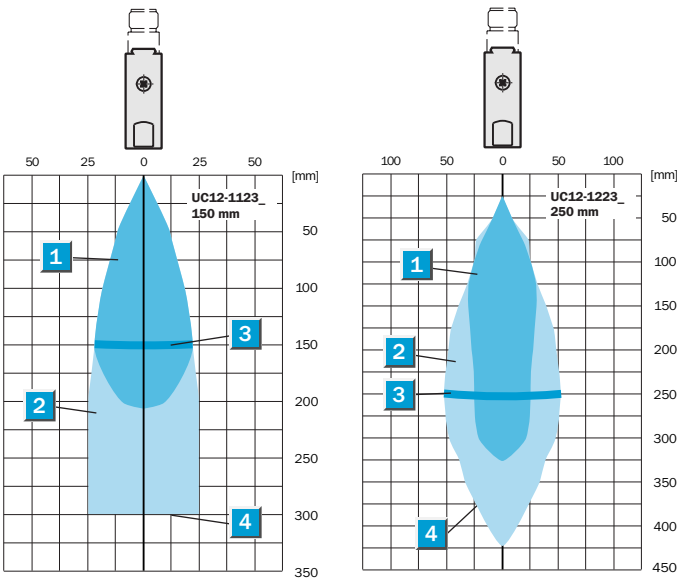
| Technical data | UC12- | 11231 | 12231 | 12235 | 12235 |
|---|---|---|---|---|---|
| **Operating scanning distance** | 20 ... 150 mm (250 mm) | ■ | | ■ | |
| **(limiting scanning distance)** | 55 ... 250 mm (350 mm) | | ■ | | ■ |
| Ultrasonic frequency | Approx. 380 kHz | ■ | | ■ | |
| | Approx. 500 kHz | | ■ | | ■ |
| Resolution | 0.18 mm | ■ | ■ | ■ | ■ |
| Reproducibility | typ. ±0.15 % of final value | ■ | ■ | ■ | ■ |
| Accuracy | ≤ 2 % of final value | ■ | ■ | ■ | ■ |
| **Supply voltage $V_S$** | 10 ... 30 V DC | ■ | ■ | ■ | ■ |
| Residual ripple | 10 % | ■ | ■ | ■ | ■ |
| Current consumption | ≤ 40 mA | ■ | ■ | ■ | ■ |
| **Switching output** [2] | Q: PNP | ■ | ■ | | |
| | Q: NPN | | | ■ | ■ |
| Response time | 27 ms | ■ | ■ | ■ | ■ |
| Switching frequency | < 25/s | ■ | ■ | ■ | ■ |
| Switching hysteresis | 2.0 mm | ■ | ■ | ■ | ■ |
| Standby delay | < 300 ms | ■ | ■ | ■ | ■ |
| Indicator | Double-LED green/yellow | ■ | ■ | ■ | ■ |
| Control element(s) | Teach-in button | ■ | ■ | ■ | ■ |
| **Connection type** | Plug M12, 4-pin | ■ | ■ | ■ | ■ |
| **VDE protection class** | III | ■ | ■ | ■ | ■ |
| **Temperature compensation** | Yes | ■ | ■ | ■ | ■ |
| **Enclosure rating** | IP 67 | ■ | ■ | ■ | ■ |
| **Ambient temperature** | Operation –20 °C ... +70 °C | ■ | ■ | ■ | ■ |
| | Storage –40 °C ... +85 °C | ■ | ■ | ■ | ■ |
| **Weight** | Approx. 75 g | ■ | ■ | ■ | ■ |
| **Housing material** [3] | Nickel-plated brass | ■ | ■ | ■ | ■ |

[1] Outputs short-circuit protected
$I_{max}$ = 200 mA
PNP: High = $V_S$ –(< 2 V)/LOW = 0 V
NPN: High = $V_S$/LOW ≤ 2 V

[2] Temperature compensation at –20 ... +65 °C

[3] Ultrasonic transducer: Polyurethane-foam, glass epoxy resin

## Measurement ranges




| | |
|---|---|
| 1 | Aligned plate 10 x 10 mm² |
| 2 | Pipe diameter 10 mm |
| 3 | Operating scanning distance |
| 4 | Limiting scanning distance |

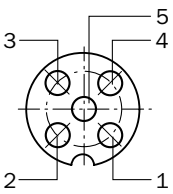
## Order information

| Type | Order no. |
|---|---|
| UC12-11231 | 6029831 |
| UC12-12231 | 6029832 |
| UC12-11235 | 6029833 |
| UC12-12235 | 6029834 |

## SENSICK screw-in system M12, 5-pin, enclosure rating IP 67

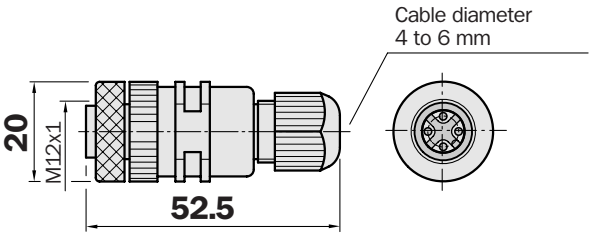
- Contact assignment according to EN 50 044
- DC coding

Pin assignment
Pin 1 = brown
Pin 2 = white
Pin 3 = blue
Pin 4 = black
Pin 5 = grey



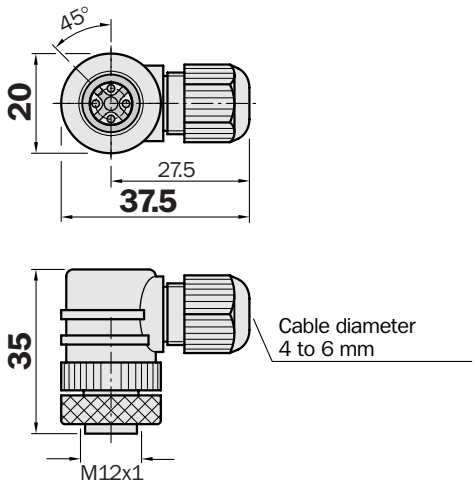

### Female connector M12, 5-pin, straight

| Type | Order no. | Contacts |
|---|---|---|
| DOS-1205-G | 6009719 | 5 |



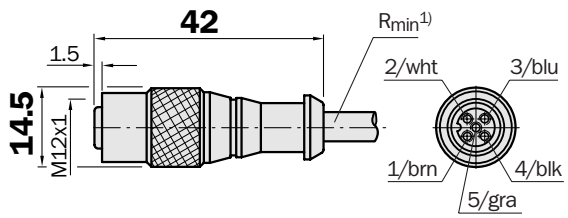

### Female connector M12, 5-pin, right angle

| Type | Order no. | Contacts |
|---|---|---|
| DOS-1205-W | 6009720 | 5 |



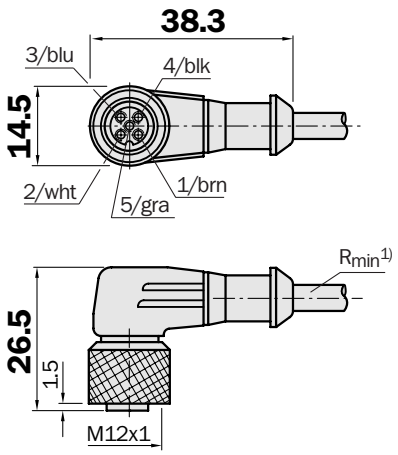

### Female connector M12, 5-pin, straight
### Cable diameter 6 mm, 5 x 0.25 mm², sheath PVC

| Type | Order no. | Contacts | Cable length |
|---|---|---|---|
| DOL-1205-G02M | 6008899 | 5 | 2 m |
| DOL-1205-G05M | 6009868 | 5 | 5 m |
| DOL-1205-G10M | 6010544 | 5 | 10 m |




### Female connector M12, 5-pin, right angle
### Cable diameter 6 mm, 5 x 0.25 mm², sheath PVC

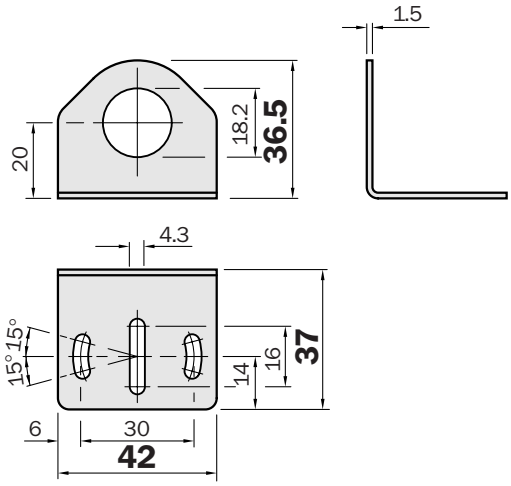
| Type | Order no. | Contacts | Cable length |
|---|---|---|---|
| DOL-1205-W02M | 6008900 | 5 | 2 m |
| DOL-1205-W05M | 6009869 | 5 | 5 m |
| DOL-1205-W10M | 6010542 | 5 | 10 m |



## Dimensional drawings and order informations

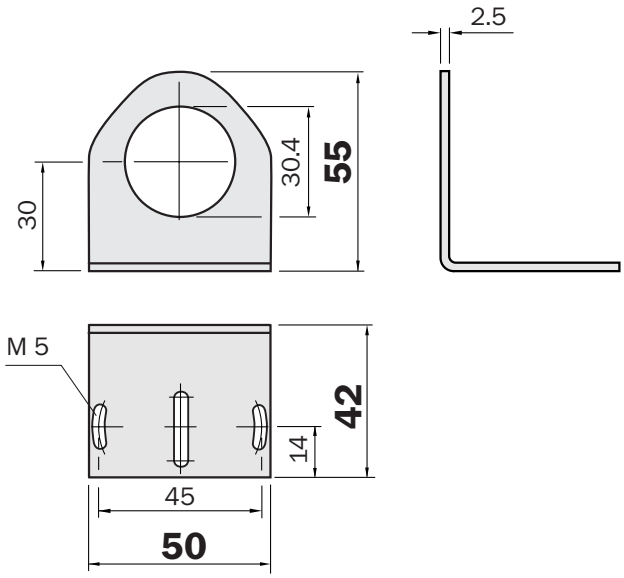
### Mounting bracket for UM18

| Type | Order no. |
|---|---|
| BEF-WN-M18 | 5308446 |




### Mounting bracket for UM30

| Type | Order no. |
|---|---|
| BEF-WN-M30 | 5308445 |




### Diverter plate for UM30 to 1300 mm operating scanning range

| Type | Order no. |
|---|---|
| USP-UM30 | 5312916 |