Product description

The UF ultrasonic sensors reliably detects labels and materials, regardless of printed design, transparency or surface characteristics. Unlike optical sensors, the UF relies on damping – a process where the thickness of a material determines the degree to which the sensor absorbs sound waves. A high level of positioning accuracy and stable response times make the fork sensor suitable for nearly any environment. Due to its small, compact metal housing, the UF can be used in harsh conditions and where space is limited. As a result, the UF can distinguish between labels located just 2 mm apart from one another on an adhesive tape. Applications include detecting transparent labels on transparent substrates, detecting labels with different printed designs or differentiating between single- and two-ply materials.

At a glance

- Detection of transparent, opaque or printed labels
- Unaffected by metallic foils and labels
  Fast response time of 250 μs
- Rugged, IP 65 aluminum housing
- Reliable label detection, regardless if labels are transparent, opaque or have a printed design, ensuring greater flexibility with one sensor
- Fast response times enable precise detection – even at high web speeds
- The aluminum housing meets all requirements for use in harsh industrial conditions
- Setting the switching threshold using the +/- push buttons or teach-in
- Ultrasonic technology prevents false detection, which may be caused by ambient light or shiny surfaces

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→ www.mysick.com/en/UF

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.
Detailed technical data

Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional principle</td>
<td>Ultrasonic detection principle</td>
</tr>
<tr>
<td>MDO</td>
<td>Gap between labels: 2 mm&lt;br&gt;Size of labels: 2 mm</td>
</tr>
<tr>
<td>Label detection</td>
<td>✔</td>
</tr>
<tr>
<td>Switching function</td>
<td>Light/dark switching, selectable via button</td>
</tr>
</tbody>
</table>

Mechanics/electronics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage $V_s$</td>
<td>DC 10 V ... 30 V</td>
</tr>
<tr>
<td>Ripple</td>
<td>$&lt; 1$ V</td>
</tr>
<tr>
<td>Power consumption</td>
<td>$40$ mA</td>
</tr>
<tr>
<td>Switching output voltage</td>
<td>PNP: HIGH = $V_s$ - 2 V / LOW approx. 0 V&lt;br&gt;NPN: HIGH = approx. $V_s$ / LOW $\leq 2$ V</td>
</tr>
<tr>
<td>Output current $I_{\text{max}}$</td>
<td>$100$ mA</td>
</tr>
<tr>
<td>Initialization time</td>
<td>$100$ ms</td>
</tr>
<tr>
<td>Protection class</td>
<td>III</td>
</tr>
<tr>
<td>Circuit protection</td>
<td>Output Q short-circuit protected&lt;br&gt;Interference suppression</td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>IP 65</td>
</tr>
<tr>
<td>EMV</td>
<td>EN60947-5-2</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 95 g</td>
</tr>
<tr>
<td>Housing material</td>
<td>Aluminum</td>
</tr>
</tbody>
</table>

Ambient data

| Shock load | According to IEC 60068 |

Specific data

<table>
<thead>
<tr>
<th>Switching frequency 1)</th>
<th>Response time 2)</th>
<th>Repeat accuracy</th>
<th>Ambient temperature 3)</th>
<th>Model name</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2 kHz</td>
<td>300 µs</td>
<td>± 0.4 mm</td>
<td>Operation: $+5 \degree C$...$+30 \degree C$&lt;br&gt;Storage: $-30 \degree C$...$+70 \degree C$</td>
<td>UF3</td>
<td>8</td>
</tr>
<tr>
<td>1.5 kHz</td>
<td>250 µs</td>
<td>± 0.25mm</td>
<td>Operation: $+5 \degree C$...$+55 \degree C$&lt;br&gt;Storage: $-20 \degree C$...$+70 \degree C$</td>
<td>UFN3</td>
<td>8</td>
</tr>
</tbody>
</table>

1) Limit values, reverse-polarity protected. Operation in short-circuit protected network max. 8 A.
2) May not exceed or fall short of $V_s$ tolerances.
3) Without load.
4) Output current minimal 0.03 mA.
5) Reference voltage 50 V DC.
6) The UFN complies with the Radio Safety Requirements (FMC) for the industrial sector (Radio Safety Class A).
7) It may cause radio interference if used in residential areas.

1) With light/dark ratio 1:1, typical, dependent on material and speed.
2) Signal transit time with resistive load.
3) Do not bend below 0 °C.
Ordering information

**UF3**
- Switching frequency: 1.2 kHz
- Response time: 300 μs
- Repeat accuracy: ± 0.4 mm
- Ambient temperature:
  - Operation: +5°C...+30°C
  - Storage: -30°C...+70°C

<table>
<thead>
<tr>
<th>Fork width</th>
<th>Fork depth</th>
<th>Adjustments</th>
<th>Input, teach-in (ET)</th>
<th>Switching output</th>
<th>Model name</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 mm</td>
<td>69 mm</td>
<td>Manual (+/<em>/-</em> button)</td>
<td>-</td>
<td>PNP/NPN</td>
<td>UF3-70B410</td>
<td>6034888</td>
</tr>
</tbody>
</table>

**UFN3**
- Switching frequency: 1.5 kHz
- Response time: 250 μs
- Repeat accuracy: ± 0.25 mm
- Ambient temperature:
  - Operation: +5°C...+55°C
  - Storage: -20°C...+70°C

<table>
<thead>
<tr>
<th>Fork width</th>
<th>Fork depth</th>
<th>Adjustments</th>
<th>Input, teach-in (ET)</th>
<th>Switching output</th>
<th>Model name</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 mm</td>
<td>69 mm</td>
<td>Teach-in dynamic Teach-in static</td>
<td>Teach: U &gt; 7 V &lt; Uv</td>
<td>PNP</td>
<td>UFN3-70P415</td>
<td>6049679</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Run: U &lt; 2v</td>
<td>NPN</td>
<td>UFN3-70N415</td>
<td>6049680</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>PNP/NPN</td>
<td>UFN3-70B413</td>
<td>6049678</td>
</tr>
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</table>

Dimensional drawing

Dimensions in mm

**UF3**

1. Screw for removing the cover for cleaning purposes
2. Fork opening: fork width 3 mm, fork depth 69 mm
3. Mounting hole, Ø 4.2 mm
4. Detection axis

**UFN3**

1. Fork opening: fork width 3 mm, fork depth 69 mm
2. Mounting hole, Ø 4.2 mm
3. Detection axis
**Adjustments**

**UF3**

1. Function signal indicator (yellow), switching output
2. Function indicator (red)
3. "+"/"-" buttons and function button

**UFN3**

1. 
2. 
3. 

**Connection type and diagram**

**UF3-70Bxxx**

- **Connector**
  - M8, 4-pin

**UFN3-70Pxxx**

- **Connector**
  - M8, 4-pin

**UFN3-70Nxxx**

- **Connector**
  - M8, 4-pin
Recommended accessories

Plug connectors and cables

Connector M8, 4-pin

<table>
<thead>
<tr>
<th>Connector type</th>
<th>Enclosure rating</th>
<th>Flying leads</th>
<th>Sheath material</th>
<th>Cable length</th>
<th>Model name</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female connector</td>
<td>IP 67</td>
<td>Straight</td>
<td>PVC</td>
<td>2 m</td>
<td>DOL-0804-G02M</td>
<td>6009870</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 m</td>
<td>DOL-0804-G05M</td>
<td>6009872</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 m</td>
<td>DOL-0804-G10M</td>
<td>6010754</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Angled</td>
<td>PVC</td>
<td>2 m</td>
<td>DOL-0804-W02M</td>
<td>6009871</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 m</td>
<td>DOL-0804-W05M</td>
<td>6009873</td>
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<td></td>
<td></td>
<td>10 m</td>
<td>DOL-0804-W10M</td>
<td>6010755</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Straight</td>
<td>–</td>
<td>–</td>
<td>DOS-0804-G</td>
<td>6009974</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Angled</td>
<td>–</td>
<td>–</td>
<td>DOS-0804-W</td>
<td>6009975</td>
</tr>
</tbody>
</table>

For dimensional drawings, please see page 39.
For additional accessories, please see www.mysick.com/en/UF3

Setting the switching threshold via “+”/“−” buttons: UF3

As an example “Q = light switching” = switching signal on label gap.

1. No object in the active area of the fork sensor
2. Position label in the active area of the fork sensor
3. Position substrate in the active area of the fork sensor

Yellow LED illuminates. If the yellow LED does not illuminate, press both the “+” and “−” buttons together and hold for 6 seconds (see notes 1). Yellow LED illuminates. If the yellow LED does not illuminate, press the “+” button to increase sensitivity.

Press the “−” button and hold until yellow LED goes out.

Notes

- Once teach-in process is complete, the switching threshold can be adjusted at any time using the “+” or “−” button. To make minor adjustments, press the “+” or “−” button once. To configure settings quickly, keep the “+” or “−” button pressed for longer.

- Press both the “+” and “−” buttons together (3 seconds) to lock the device and prevent unintentional actuation.

- Press both the “+” and “−” buttons together (6 seconds) to define the switching function (light/dark switching). Standard setting: Q = light switching.
Setting the switching threshold via “+”/“−” buttons: UFN3

1. Position label or substrate in the active area of the fork sensor

2. Move multiple labels through the fork sensor

Press both the “+” and “−” buttons together, hold > 1 s and then release the teach-in buttons. The red LED flashes.

Press “−” button, teach-in process is finished.

Notes

Switching threshold adaptation:
Only, the first teach-in procedure after switching on is permanently stored. Teach-in can be repeated cyclically, Switching output also during teach-in active.

- Once teach-in process is complete, the switching threshold can be adjusted at any time using the “+” or “−” button. To make minor adjustments, press the “+” or “−” button once.
  To configure settings quickly, keep the “+” or “−” button pressed for longer.

- Press both the “+” and “−” buttons together (3 seconds) to lock the device and prevent unintentional actuation.

- Press both the “+” and “−” buttons together (6 seconds) to define the switching function (light/dark switching). Standard setting: Q = light switching.

Teach-in (static): Setting the switching threshold without movements of label, cf. operating instruction.