

UFS

Fork sensor

SICK
Sensor Intelligence.



Described product

UFS

Manufacturer

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Original document

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1 About this document

1.1 Information on the operating instructions

These operating instructions provide important information on how to use devices from SICK AG.

Prerequisites for safe work are:

- Compliance with all safety notes and handling instructions supplied
- Compliance with local work safety regulations and general safety regulations for device applications

The operating instructions are intended to be used by qualified personnel and electrical specialists.



NOTE

Read these operating instructions carefully before starting any work on the device, in order to familiarize yourself with the device and its functions.

The instructions constitute an integral part of the product and are to be stored in the immediate vicinity of the device so they remain accessible to staff at all times. Should the device be passed on to a third party, these operating instructions should be handed over with it.

These operating instructions do not provide information on operating the machine in which the device is integrated. For information about this, refer to the operating instructions of the specific machine.

1.2 Scope

These operating instructions serve to incorporate the device into a customer system. Step-by-step instructions are given for all required actions.

These instructions apply to all listed device variants of the product.

Available device variants are listed on the online product page.

► <http://www.sick.com/UFS>

Commissioning is described using one particular device variant as an example.

Simplified device designation in the document

In the following, the sensor is referred to in simplified form as “UFS” or “device”.

1.3 Explanation of symbols

Warnings and important information in this document are labeled with symbols. The warnings are introduced by signal words that indicate the extent of the danger. These warnings must be observed at all times and care must be taken to avoid accidents, personal injury, and material damage.



DANGER

... indicates a situation of imminent danger, which will lead to a fatality or serious injuries if not prevented.

**WARNING**

... indicates a potentially dangerous situation, which may lead to a fatality or serious injuries if not prevented.

**CAUTION**

... indicates a potentially dangerous situation, which may lead to minor/slight injuries if not prevented.

**NOTICE**

... indicates a potentially harmful situation, which may lead to material damage if not prevented.

**NOTE**

... highlights useful tips and recommendations as well as information for efficient and trouble-free operation.

1.4 Further information

**NOTE**

All the documentation available for the device can be found on the online product page at:

► <http://www.sick.com/UFS>

The following information is available for download from this page:

- Type-specific online data sheets for device variants, containing technical data and dimensional drawings
 - EU declaration of conformity for the product family
 - Dimensional drawings and 3D CAD dimension models in various electronic formats
 - These operating instructions, available in English and German, and in other languages if necessary
 - Other publications related to the devices described here
 - Publications dealing with accessories
-

1.5 Customer service

If you require any technical information, our customer service department will be happy to help. To find your agency, see the final page of this document.

**NOTE**

Before calling, make a note of all type label data such as type code, serial number, etc., to ensure faster processing.

2 Safety information

2.1 Intended use

The UFS fork sensor is an ultrasonic sensor with a transmitter and a receiver that functions according to the through-beam principle.

It is used for non-contact detection of:

- Labels on carrier material
- Tears in films/web material
- Double layers
- Adhesive areas (splice)

2.2 Improper use

- The device does not constitute a safety-relevant device according to the EC Machinery Directive (2006/42/EC).
- The device must not be used in explosion-hazardous areas.
- Any other use that is not described as intended use is prohibited.
- Any use of accessories not specifically approved by SICK AG is at your own risk.

The device is not suitable for the following applications (this list is not exhaustive):

- As a safety device to protect persons, their hands, or other body parts
- Underwater
- In explosion-hazardous areas
- Outdoors, without additional protection



NOTICE

Danger due to improper use!

Any improper use can result in dangerous situations.

Therefore, observe the following information:

- The device should be used only in line with intended use specifications.
- All information in these operating instructions must be strictly complied with.

2.3 Limitation of liability

Applicable standards and regulations, the latest state of technological development, and our many years of knowledge and experience have all been taken into account when assembling the data and information contained in these operating instructions. The manufacturer accepts no liability for damage caused by:

- Failure to observe the operating instructions
- Improper use
- Use by untrained personnel
- Unauthorized conversions
- Technical modifications
- Use of unauthorized spare parts, wear and tear parts, and accessories

With special variants, where optional extras have been ordered, or owing to the latest technical changes, the actual scope of delivery may vary from the features and illustrations shown here.

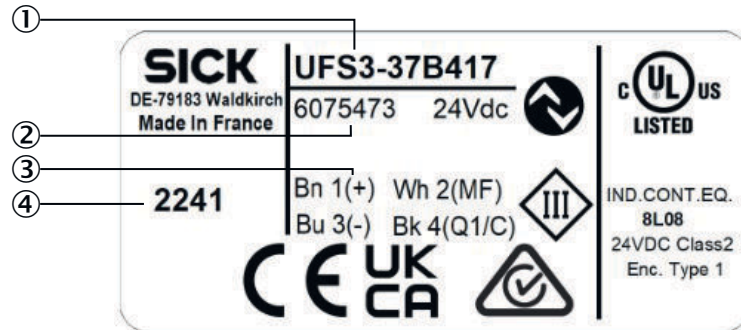
2.4 Repair

The product is a replacement device. The device is not intended to be repaired. Interference with or modifications to the device on the part of the customer will invalidate any warranty claims against SICK AG.

3 Product description

3.1 Product ID

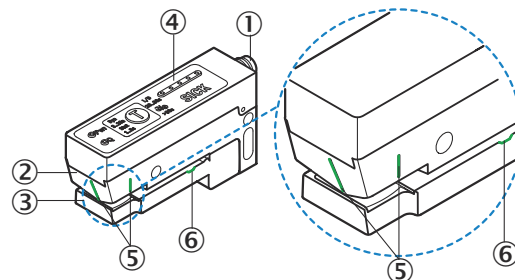
3.1.1 Type label



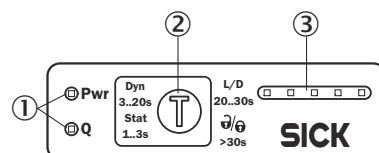
- ① Device type number
- ② Part number
- ③ Pin assignment
- ④ Date of manufacture

3.2 Product features and functions

3.2.1 Device view



- ① Connection
- ② Sender
- ③ Receiver
- ④ Control panel
- ⑤ Material positioning mark
- ⑥ Cleaning opening for compressed air



- ① LEDs (status indicators)
- ② Teach-in button
- ③ Bar graph

Table 1: Bar graph of values

Bar graph of values	Quality of Teach/Quality of Run
	
	
	

Table 2: Status indicator LEDs

Flashing Q-LED	Description
1 Hz	Static teach-in
3 Hz	Dynamic teach-in
6 Hz	Faulty teach-in
2 x 1 Hz	Successful fine adjustment/L/D switching
3 x 1 Hz	Key lock activated/deactivated
2 s x 6 Hz	Successful 1-point teach-in

Table 3: Teach-in button functions

Function	Teach-in button	Description
2P teach-in	1-3 s	Teach-in of two reference points: carrier material and label
1P teach-in	1-3 s	Teach-in of single reference point: tape material
Dynamic teach-in	3-20 s	Teach-in of multiple reference points through dynamic movement of the material
L/D switching	20-30 s	Adjustment of the switching logic (switch at label (dark) / carrier (light))
Key lock	> 30 s	Activate/deactivate the key lock

3.2.2 Product characteristics

The UFS has the following features and fields of application:

Features

Fork sensors operate according to the through-beam principle. Transmitter and receiver are combined in one housing by means of the fork design. Fork sensors for label detection have a narrow fork width that is especially suitable for web material.

Fields of application

Fork sensors for label detection are used in particular for:

- Detection of labels on carrier material for synchronizing the labeling process as well as triggering cutting, punching and folding processes
- Detection of film tears
- Distinguishes between single- and double-layer material
- Detection of adhesive areas (splice)

Example industries: food and beverage, printing, packaging.

4 Mounting

4.1 Scope of delivery

- Device in the version ordered
- Quickstart

4.2 Mounting requirements

- For the typical space requirements for the device, see the type-specific dimensional drawing, [see "Technical data", page 29](#).
- Comply with technical data, such as the permitted ambient conditions for operation of the device (e.g., temperature range, EMC interference emissions, ground potential),
- To prevent condensation, avoid exposing the device to rapid changes in temperature.
- Protect the device from direct sunlight.
- Shock and vibration resistant mounting.

4.3 Mounting the device

Alignment

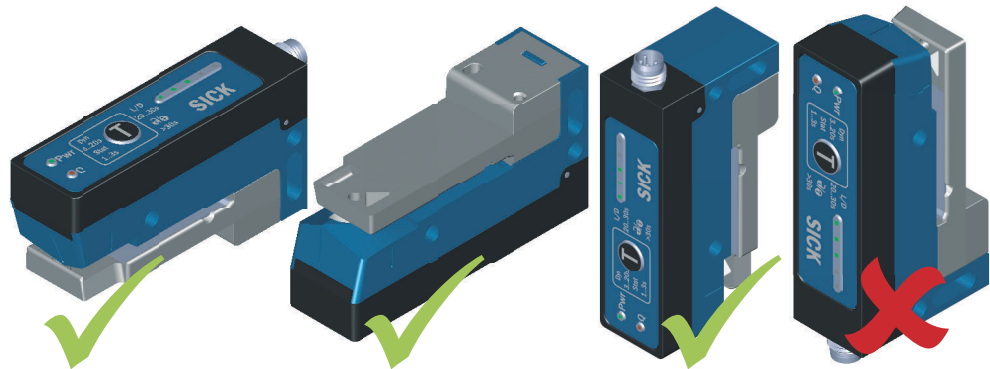
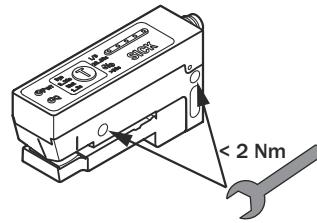


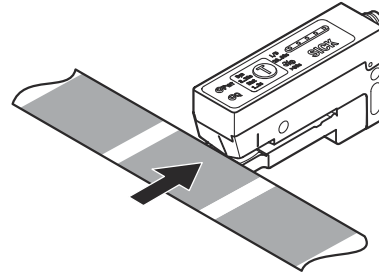
Figure 1: UFS alignment

Mounting

1. Mount the sensor on a flat surface via the fixing holes using 2x M4 screws.



2. Connect the voltage supply.
3. Guide tensioned material through the fork opening.



5 Electrical installation

5.1 Notes on electrical installation



NOTICE

Radio interference when used in residential areas

The device complies with the Radio Safety Requirements (EMC) for the industrial sector (Radio Safety Class A). It may cause radio interference if used in a residential area.



NOTICE

Equipment damage due to incorrect supply voltage!

An incorrect supply voltage may result in damage to the equipment.

- Only operate the device with safety/protective extra-low voltage (SELV/PELV).
- The sensor is a device of protection class III.



NOTICE

Equipment damage due to incorrect supply voltage!

An incorrect supply voltage may result in damage to the equipment.

- Only operate the device with an LPS (limited power source) in accordance with IEC 62368-1 or an NEC Class 2 power supply unit.



NOTICE

Equipment damage or unpredictable operation due to working with live parts!

Working with live parts may result in unpredictable operation.

- Only carry out wiring work when the power is off.
- Only connect and disconnect electrical connections when the power is off.

- **The electrical installation must only be performed by electrically qualified personnel.**
- **Standard safety requirements must be observed when working on electrical systems!**
- Only switch on the supply voltage for the device when the connection tasks have been completed and the wiring has been thoroughly checked.
- When using extension cables with open ends, ensure that bare wire ends do not come into contact with each other (risk of short-circuit when supply voltage is switched on!). Wires must be appropriately insulated from each other.
- Wire cross-sections in the supply cable from the user's power system must be selected in accordance with the applicable standards.
- Only operate the device with an LPS (limited power source) in accordance with IEC 62368-1 or an NEC Class 2 power supply unit.
- All circuits connected to the device must be designed as SELV/PELV circuits.
- Operation in short-circuit protected network at max. 8 A.



NOTE

Layout of data cables

- Use shielded data cables with twisted-pair wires.
- Implement the shielding design correctly and completely.
- To avoid interference, e.g., from switching power supplies, motors, clocked drives, and contactors, always use cables and layouts that are suitable for EMC.
- Do not lay cables over long distances in parallel with voltage supply cables and motor cables in cable channels.

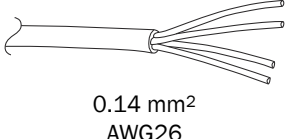
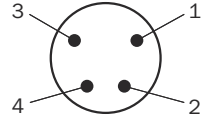
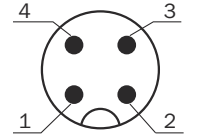
The IP enclosure rating for the device is only achieved under the following conditions:

- The cables plugged into the connections are screwed tight.

If these instructions are not complied with, the IP enclosure rating for the device is not guaranteed!

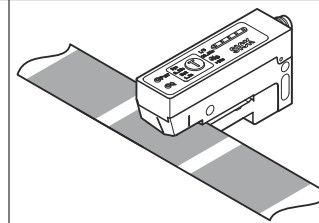
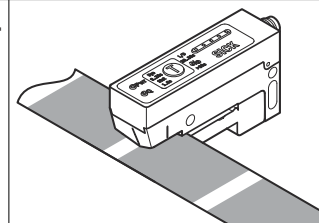
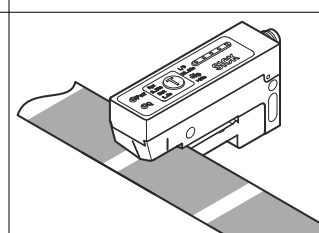
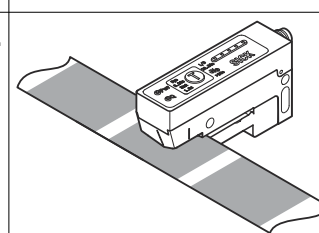
5.2 Pin assignment of the connections

5.2.1 Pin assignment

UFS	xxxx1xxx	xxxx4xxx	xxxx5xxx
1 = BN		+(L+)	
2 = WH		MF	
3 = BU		-(M)	
4 = BK		Q ₁ /C	
	 0.14 mm ² AWG26		

5.2.2 Switching logic

Table 4: Switching logic

Dark switching D = Dark (factory setting)	 Pwr Q	 Pwr Q
Light switching L = Light	 Pwr Q	 Pwr Q

5.3 Connecting the supply voltage



NOTICE

Risk of damage to the device!

The device can become damaged if it is connected to a voltage supply that is already switched on.

- Only connect the device when the supply cable is de-energized.

The device must be connected to a power supply unit with the following properties:

- Supply voltage DC 10.8 V – 26.4 V (SELV/PELV as per currently valid standards)
- Electricity source with at least 3 W power

To ensure protection against short-circuits/overload in the customer's supply cables, the wire cross-sections used must be appropriately selected and protected.

5.4 Process data structure of UFS

Process data structure data length 2 bytes

No.	Description	Data type
Bit 0	QL1	Boolean
Bit 1	QL2	Boolean
Bit 2	Q _{int} 1	Boolean
Bit 3	Q _{int} 2	Boolean
Bit 4	QoR alarm	Boolean
Bit 5	Teach busy	Boolean
Bit 6 - 15	Measurement value	UInt10

6 Commissioning

6.1 Commissioning using the example of dynamic teach-in

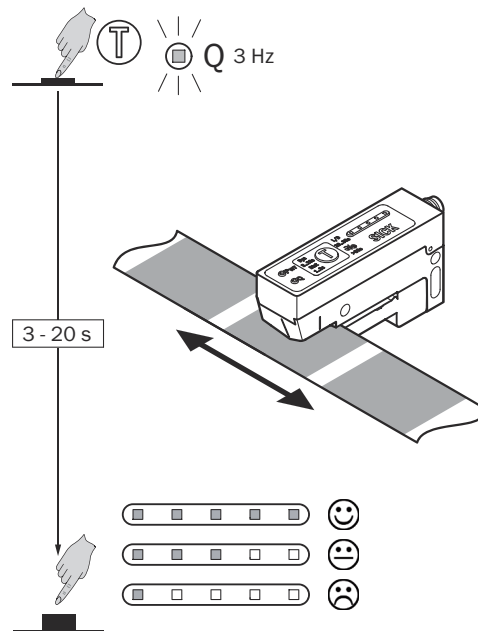


Figure 2: Dynamic teach-in sequence

1. Press the teach-in button for 3-20 s, the Q-LED flashes at 3 Hz. Meanwhile pass the material through the fork opening.



NOTE

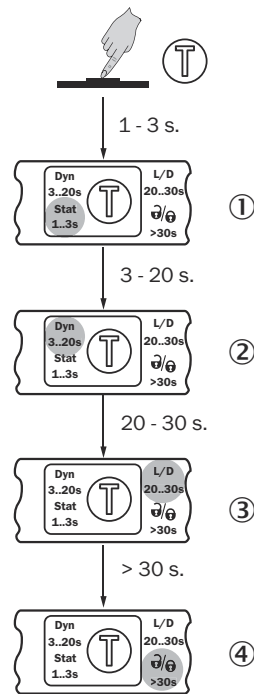
For label materials, at least 3 labels and 3 label gaps should be passed through the fork opening.

2. Release the teach-in button. If the teach-in was successful, the bar graph displays the teach-in quality (Quality of Teach). The Q LED indicates the output state.
3. After 3 s, the bar graph disappears briefly and displays the process quality (Quality of Run).

The switching threshold between the carrier and label is now optimally set. For demanding materials, e.g., very thin labels, it is possible to finely adjust the device (see ["Fine adjustment of the switching threshold", page 21](#)).

7 Operation

7.1 Menu structure



- ① Static teach-in (2P teach-in, 1P teach-in)
- ② Dynamic teach-in
- ③ L/D switching
- ④ Key lock

Table 5: Teach-in button functions

Function	Teach-in button	Description
2P teach-in	1-3 s	Teach-in of two reference points: carrier material and label
1P teach-in	1-3 s	Teach-in of single reference point: tape material
Dynamic teach-in	3-20 s	Teach-in of multiple reference points through dynamic movement of the material
L/D switching	20-30 s	Adjustment of the switching logic (switch at label (dark) / carrier (light))
Key lock	> 30 s	Activate/deactivate the key lock

7.2 Teach-in

The UFS supports three teach-in modes

- Dynamic teach-in (recommended mode)
- Static 2-point teach-in
- Static 1-point teach-in (recommended for the detection of adhesive areas only)

The teach-in process can be carried out via

- Manual operation (all three modes)
- Externally via the MF connection (dynamic teach-in only)
- SOPAS (all three modes)

7.2.1 Teach-in via the control panel

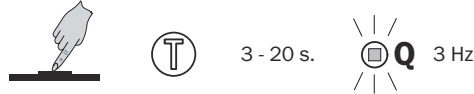
7.2.1.1 Dynamic teach-in



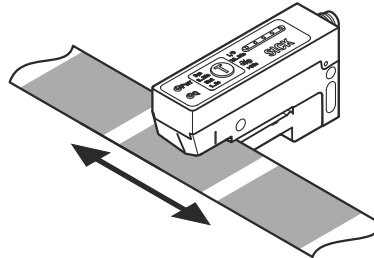
NOTE

For label materials, at least 3 labels and 3 label gaps should be passed through the fork opening.

1. Press and hold the teach-in button for 3-20 s, the Q-LED flashes at 3 Hz.



2. Meanwhile pass the material through the fork opening.



3. Release the teach-in button.
If the teach-in was successful, the bar graph displays the teach-in quality (Quality of Teach).
The Q LED indicates the output state.
4. After 3 s, the bar graph disappears briefly and displays the process quality (Quality of Run).

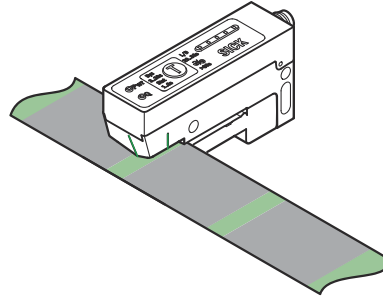
Table 6: Bar graph of values

Bar graph of values	Quality of Teach/Quality of Run

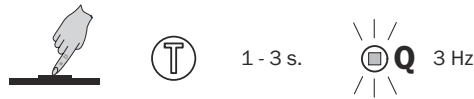
The switching threshold between the carrier and label is now optimally set. For demanding materials, e.g., very thin labels, it is possible to finely adjust the device (see ["Fine adjustment of the switching threshold"](#), page 21).

7.2.1.2 Static 2-point teach-in

1. Guide the material to be taught in (e.g., carrier) into the fork opening and position it so that it is in the area of the mark.



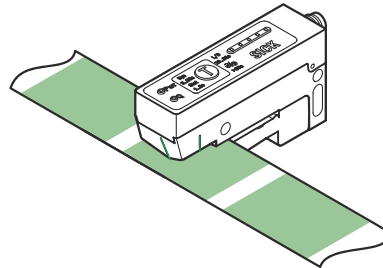
2. Press and hold the teach-in button for 1... 3 s.
The Q-LED flashes at 3 Hz to indicate that the sensor is in teach-in mode.



3. Release the teach-in button.
The Q-LED flashes at 1 Hz, the second reference point can be taught-in.



4. Place the material that has not yet been taught in (e.g., carrier with label) in the fork opening.



5. Briefly press the teach-in button again.



6. If the teach-in was successful, the bar graph displays the teach-in quality (Quality of Teach). The Q LED indicates the output state.
7. After 3 s, the bar graph disappears briefly and displays the process quality (Quality of Run).

Table 7: Bar graph of values

Bar graph of values	Quality of Teach/Quality of Run

For demanding materials, e.g., very thin labels, it is possible to finely adjust the device (see ["Fine adjustment of the switching threshold"](#), page 21).

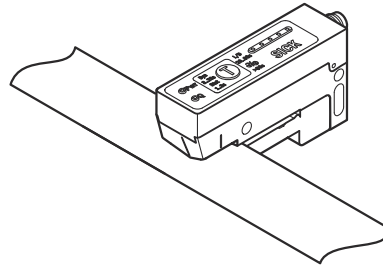
7.2.1.3 Static 1-point teach-in

**NOTE**

The static 1-point teach-in is only recommended for detecting adhesive areas.

A 1P teach-in can be used to detect inaccessible adhesive areas (splice) or when the application does not allow the material being taught in to be moved. This teach-in has the lowest signal reserve, which is why a dynamic teach-in is preferable. A dynamic teach-in, or alternatively a 2P teach-in, is also recommended for accessible adhesive areas.

1. Guide the material to be taught in (continuous material/carrier material without labels) into the fork opening.



2. Press and hold the teach-in button for 1... 3 s.
The Q-LED flashes at 3 Hz to indicate that the sensor is in teach-in mode.



3. Release the teach-in button.
4. As soon as the flashing frequency of the Q-LED drops to 1 Hz, briefly press the teach-in button again to complete the teach-in process.



The switching threshold is set slightly greater than the continuous/carrier material so thicker material is detected as an adhesive area or label.

5. If the teach-in is successful, the Q-LED flashes for 2 s at 6 Hz.
6. The bar graph shows the teach quality (Quality of Teach).
7. After 3 s, the bar graph disappears briefly and displays the process quality (Quality of Run).

Table 8: Bar graph of values

Bar graph of values	Quality of Teach/Quality of Run

For demanding materials, e.g., very thin labels, it is possible to finely adjust the device (see "Fine adjustment of the switching threshold", page 21).

7.2.2 External teach-in

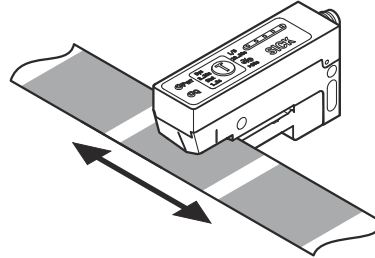
The MF connection can be used to set the switching threshold during the running process via an external signal or for an external teach-in. The external teach-in is always a dynamic teach-in.



NOTE

For label materials, at least 3 labels and 3 label gaps should be passed through the fork opening.

1. Voltage > 7 V at pin 2
2. Move the material through the fork opening. The Q LED flashes at 3 Hz.



3. To complete the teach-in process, remove the voltage or reduce it to < 2 V.
4. If the teach-in was successful, the bar graph displays the teach-in quality (Quality of Teach). The Q LED indicates the output state.
5. After 3 s, the bar graph disappears briefly and displays the process quality (Quality of Run).

Table 9: Bar graph of values

Bar graph of values	Quality of Teach/Quality of Run

7.2.3 Faulty teach-in

A faulty teach-in is indicated by:

- Fast flashing of the Q-LED at 6 Hz
- 6 Hz signal via the MF output

To correct the faulty teach-in, a new teach-in must be performed.

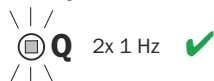
7.3 Fine adjustment of the switching threshold

To achieve a higher signal reserve, a fine adjustment can be made after a successful teach-in regardless of the teach-in method used. In this case the switching threshold is set closer to the taught-in material.

1. Within 10 s after a successful teach-in, briefly press the teach-in button.



2. The Q-LED flashes 2x at 1 Hz, the fine adjustment is confirmed.

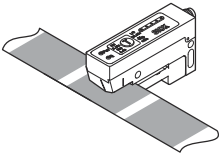
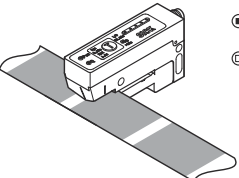
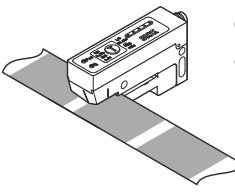
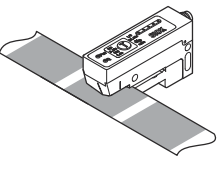


3. After 3 s, the bar graph disappears briefly and displays the process quality (Quality of Run).

7.4 Adjusting the switching logic

Switch at label (dark) or carrier (light)

Table 10: Switching logic

Dark switching D = Dark (factory setting)	Switch at label: The switching output is active when a label is in the area of the material positioning mark.				
Light switching L = Light	Switch at label gap (carrier material): The switching output is active if there is a label gap (carrier material) in the area of the material positioning mark.				

1. Press and hold the teach-in button for 20-30 s.
2. Switching logic changed to carrier or label.

7.5 Key lock

The key lock can be used to prevent unintentional changing of the settings.

1. Hold down the teach-in button > 30 s



7.6 Further setting and diagnostic options via SOPAS



NOTICE

The SOPAS ET software can be downloaded from the following link: <https://www.sick.com/de/en/sopas-engineering-tool-2018/p/p367244>

The driver for this product can be found at <http://www.sick.com/UFS>.

All adjustments offered by the sensor via the display or the external cable have also been mapped in the SOPAS configuration software.

7.6.1 Teach-in via SOPAS

The teach-in mode can be selected and run on the “ENHANCED SENSING” tab, (see [figure 3, page 23](#), number ①).

In addition to the signal strengths and the switching states over time, the monitor also displays the quality of the teach-in (Quality of Teach) and process (Quality of Run) via a bar graph.

7.6.2 Adjusting the switching threshold

After a teach-in has been performed, the switching threshold value can be adjusted in 5% increments in both directions using the “Teach-in level” field (see [figure 3, page 23](#), number ②).

7.6.3 Adjusting the switching logic

The switching logic is set by selecting either the direct or inverted signal (see figure 3, number ③).

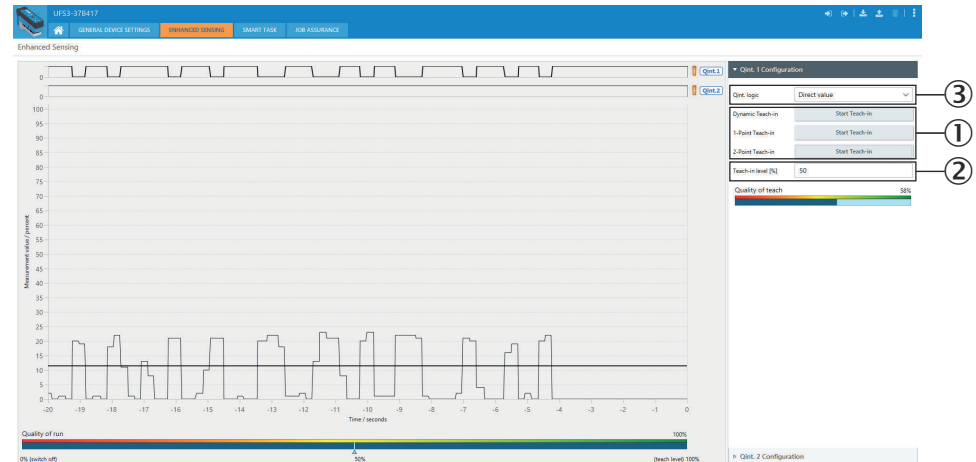


Figure 3: “Enhanced Sensing” tab

7.6.4 Key lock

The key lock can be selected or deselected on the “GENERAL DEVICE SETTINGS” tab, (see figure 4, page 23, number ①).

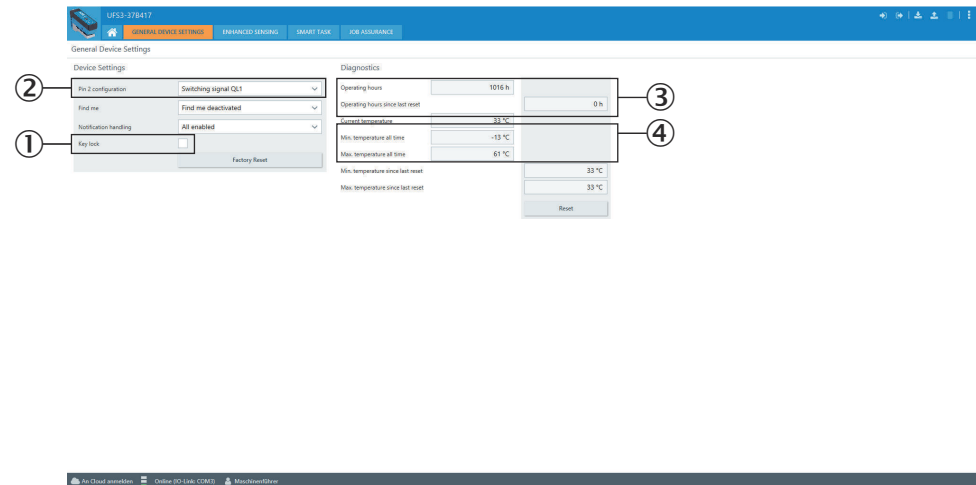


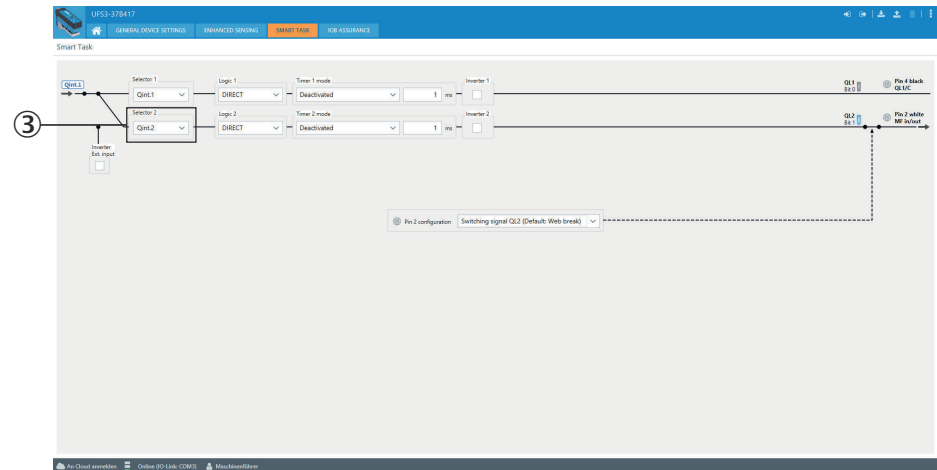
Figure 4: “General Device Settings” tab

7.6.5 Additional settings via SOPAS

SOPAS also offers the following setting and diagnostic options:

- PIN 2 configuration

The multifunction contact can be defined as an input (external trigger or external signal for further logical linking with the measurement signal (smart function)) or as an output for switching status or warning messages (see figure 4, page 23 number ②).



- Warning messages

- Web break

The sensor performs a switching operation as soon as there is no more material in the fork opening. This makes it possible, for example, to detect a web break early. To do this, select the switching signal QL2 as the PIN 2 configuration and select Qint2 on the “Smart Task” tab (see ①) in selector 2 as shown.

- Process quality

A threshold value can be set by moving the mark to generate an alarm when the value falls below it (see figure 4, page 23 number ④) if “quality of run alarm” is selected in the PIN 2 configuration.

- Diagnosis

- Operating hours counter

The total operating time since initial commissioning and the operating time since the last reset are displayed

- Temperature

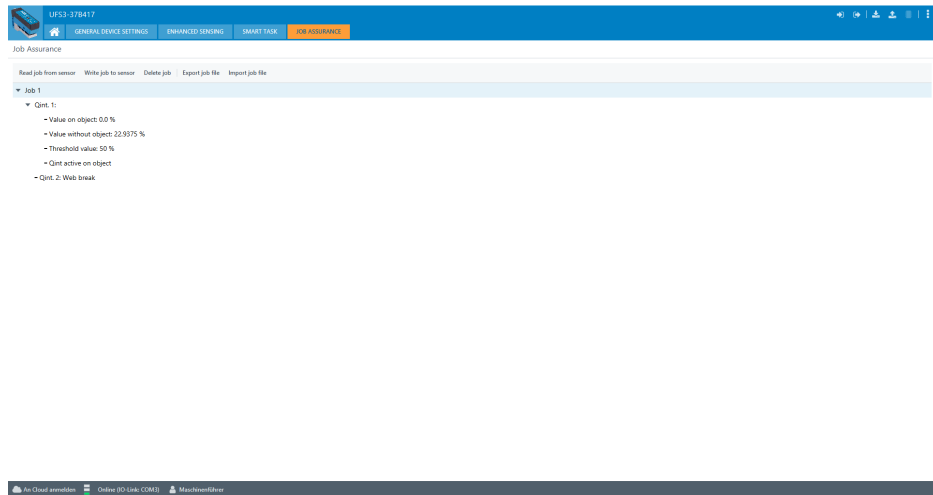
The current device temperature, the maximum and minimum temperature since initial commissioning and since the last reset are displayed

- Smart Tasks

The “Smart Task” tab can be used to define the logic for various switching outputs, for example AND/OR or switching output configurations such as a delay. The switching output logic can, for example, link two internal “Qint” switching events or an external input defined in the “Enhanced sensing” area, and link the resultant switching event with one of the two switching outputs of the sensor: QL1 (pin 4) or QL2 (configurable on pin 2).

- Job assurance

The “Job Assurance” tab can be used to read and save or retransfer to the device the application configuration of the sensor as a “Job”.



8 Troubleshooting

LED/fault pattern	Cause	Measures
Green LED is off	No voltage or voltage below the limit values / Voltage interruptions	Check the power supply, check all electrical connections (cables and plug connections) / Establish a stable voltage supply
Sensor does not respond to commands, such as teach-in	Sensor is locked	Unlock the sensor, hold down the teach-in button for > 30 s
Fast flashing of the Q-LED and the bar graph at 6 Hz	Faulty teach-in	Repeat the teach-in (dynamic teach-in is recommended)
Sensor switches (Q-LED lights up) to label instead of carrier material	Switch at label active (= dark: D)	Press and hold the teach-in button for 20-30 s to change to Switch at carrier.
Sensor switches (Q-LED lights up) to carrier material instead of label	Switch at carrier active (= light: L)	Press and hold the teach-in button for 20-30 s to change to Switch at label.
Sensor does not switch (Q-LED does not light up), neither at a label or at carrier material	Demanding material, e.g., very thin labels	Set the switching threshold close to the taught-in material (= fine adjustment) by briefly pressing the teach-in button within 10 s after a successful teach-in. The fine adjustment is confirmed by the Q-LED flashing 2x at 1 Hz.
6 Hz via the MF output	Faulty external teach-in	Repeat the external teach-in

9 Maintenance

9.1 Maintenance

During operation, the device is maintenance-free.

Depending on the assignment location, the following preventive maintenance tasks may be required for the device at regular intervals:

Table 11: Maintenance schedule

Maintenance work	Interval	Procedure
Clean the fork opening using compressed air	Cleaning interval depends on the ambient conditions	Specialist
Check screw connections and plug connectors	Every 6 months	Specialist

9.2 Cleaning the device

Check the device for contamination at regular intervals (e.g., weekly). This is especially important in harsh operating environments (dust, abrasion, moisture, etc.).



NOTICE

Device damage due to improper cleaning!

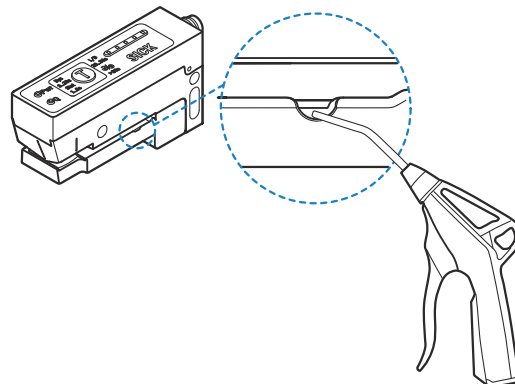
Improper cleaning may result in device damage.

- Only use suitable cleaning agents.
- Never use sharp objects for cleaning.

Cleaning the housing

In order to ensure that the heat produced by the internal power loss is adequately dissipated, the housing surface must be kept clean.

Aim the compressed air into the cleaning opening to clean the fork opening.



10 Decommissioning

10.1 Disassembly and disposal

Disassembling the device

1. Switch off the supply voltage to the device.
2. Detach all connecting cables from the device.
3. If the device is being replaced, mark its position and alignment on the bracket or surroundings.
4. Detach the device from the bracket.

Disposing of the device

Any device which can no longer be used must be disposed of in an environmentally friendly manner in accordance with the applicable country-specific waste disposal regulations.



NOTE

Disposal of batteries, electric and electronic devices

- According to international directives, batteries, accumulators and electrical or electronic devices must not be disposed of in general waste.
- The owner is obliged by law to return this devices at the end of their life to the respective public collection points.



 This symbol on the product, its package or in this document, indicates that a product is subject to these regulations.

10.2 Returning devices

- ▶ Do not dispatch devices to the SICK Service department without consultation.



NOTE

To enable efficient processing and allow us to determine the cause quickly, please include the following when making a return:

- Details of the contact person
 - Description of the application
 - Description of the fault that occurred
-

11 Technical data

11.1 General data

Features

Table 12: Technical data

Attribute	Value
Principle of operation	Ultrasonic detection principle
Dimensions (W x H x D)	20 mm x 38 mm x 70 mm
Housing design	Forked
Fork width	2.6 mm
Fork depth	43 mm
Smallest detectable object (MDO)	Label size: 2 mm ¹⁾ Label gap: 1 mm ¹⁾
label detection applications	✓
Settings	Teach-in button (teach-in, sensitivity, switch at label/carrier, key lock) Cable (dynamic teach-in)
Teach-in method	1-point teach-in 2-point teach-in Dynamic teach-in

¹⁾ Depends on label thickness.

Communication interface

Table 13: Technical data

Attribute	Value
IO-Link	✓

Mechanics/Electronics

Table 14: Technical data

Attribute	Value
Supply voltage V_S	10 V DC ... 30 V DC ¹⁾
Residual ripple	< 10% ²⁾
Current consumption	50 mA ³⁾
Switching frequency	1.1 kHz ⁴⁾
Response time	440 μ s ⁵⁾
Switching output	Push-pull: PNP/NPN; PNP; NPN
Switching output (voltage)	Push-Pull: High = UV - < 2 V/Low: $\leq$ 2 V PNP: High = UV - 3 V/Low = 0 V NPN: High = UV/Low $\leq$ 3 V
Output current	I_{max} 100 mA ⁶⁾
Initialization time	100 ms
Connection type	Connector M8, 4-pin Cable with connector M12, 4-pin Cable open end, 4-wire
Protection class	III ⁷⁾

Attribute	Value
Circuit protection	UV connections reverse polarity protected Output Q short-circuit protected Interference-pulse suppression
Enclosure rating	IP65
Weight	Approx. 100 g
Housing material	Metal, Zamak plastic, glass fiber reinforced plastic
Display	LEDs (status indicator) Bar graph display (Quality of Teach/Run)

- 1) Limit values, reverse-polarity protected. Operation in short-circuit protected network, max. 8 A
- 2) Must not exceed or fall below U_V tolerances.
- 3) Without load.
- 4) Depending on material and speed.
- 5) Signal transit time with resistive load.
- 6) Minimum output current 0.3 mA.
- 7) Rated voltage DC 50 V.

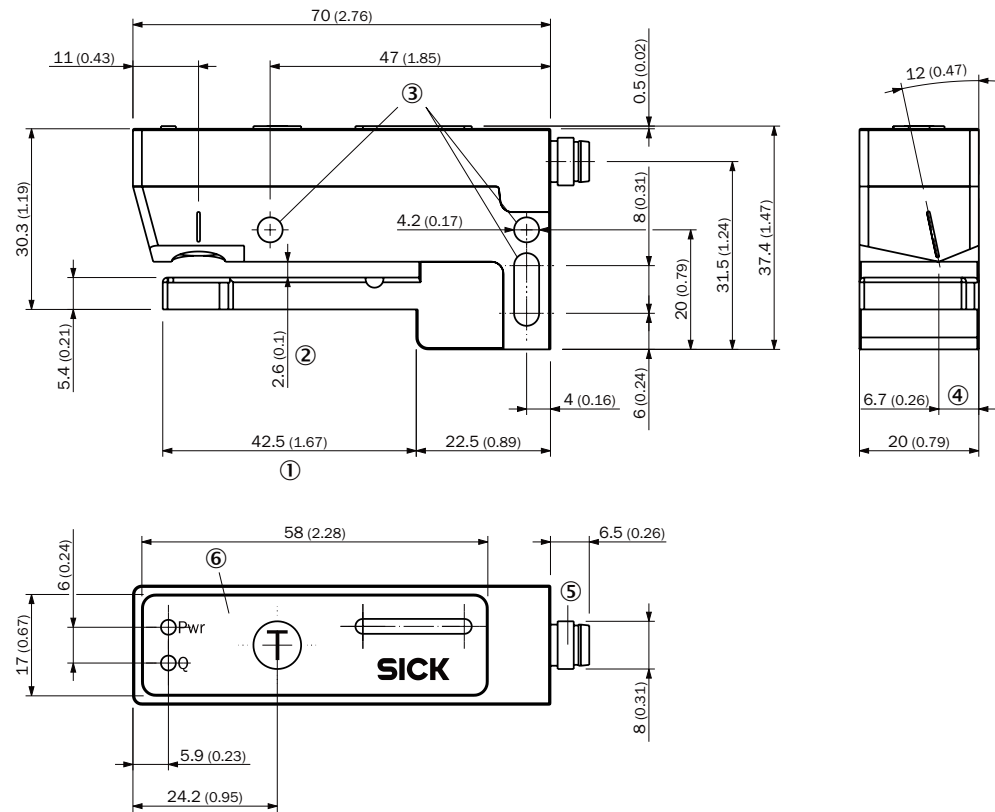
Ambient data

Table 15: Technical data

Attribute	Value
Ambient temperature, operation	+5 °C ... +55 °C ¹⁾
Ambient temperature, storage	-20 °C ... +70 °C
Impact load	According to EN 60068-2-27
EMC	EN 60947-5-2 ²⁾
UL file no	NRKH.E191603

- 1) Do not bend cables below 0 °C.
- 2) The UFS complies with the Radio Safety Requirements (EMC) for the industrial sector (Radio Safety Class A). It may cause radio interference if used in a residential area.

11.2 Dimensional drawings



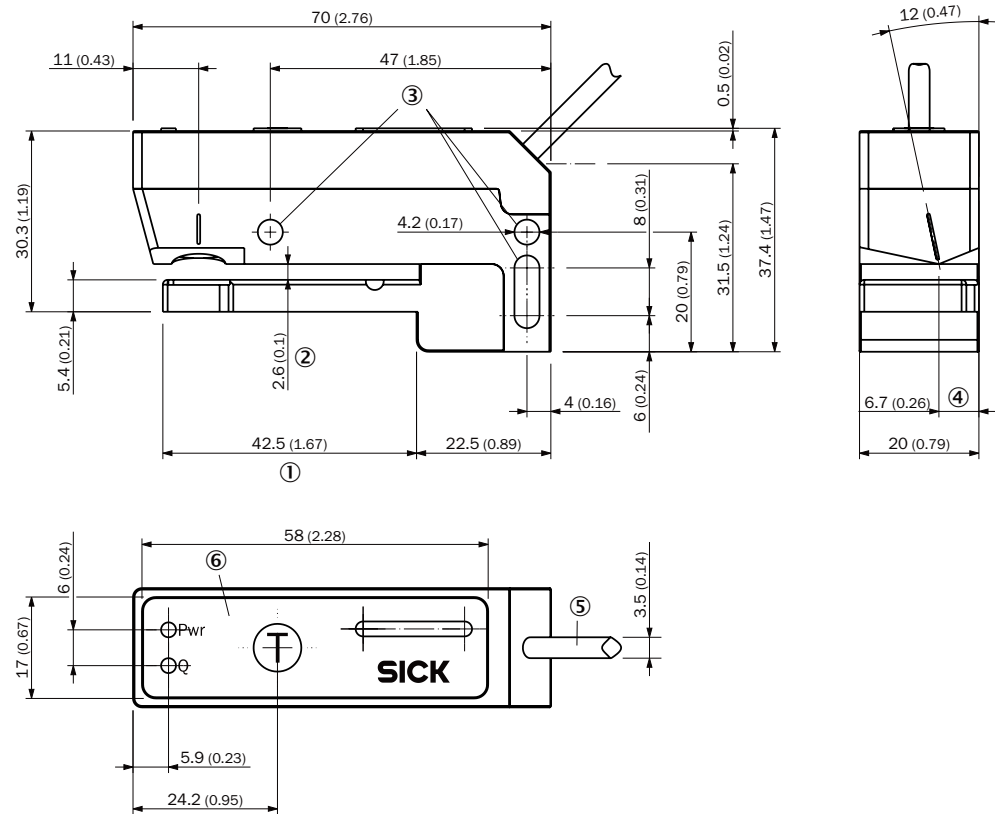


Figure 6: Dimensioned drawing for UFS-xxx1xx, UFS-xxx5xx

- ① Fork depth
- ② Fork width
- ③ Fixing hole
- ④ Detection axis
- ⑤ Connection
- ⑥ Display and setting elements

12 Accessories



NOTE

Accessories can be found on the online product page at:

► <http://www.sick.com/UFS>

13 Annex

13.1 EU declaration of conformity and certificates

The EU declaration of conformity and other certificates can be downloaded from the Internet at:

► <http://www.sick.com/UFS>

13.2 Certification according to UL60947-5-2



The UFS is certified in accordance with UL60947-5-2 if it is supplied with power by LPS or Class 2 power supply units.

The certification is only valid with corresponding device identification on the type label of the respective device.

13.3 Licenses

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License texts can be read out from the device using a web browser via the following URL: `<device ip>/license/COPYING`

Printed copies of the license texts are also available on request.

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