Ultrasonic fork for splice detection
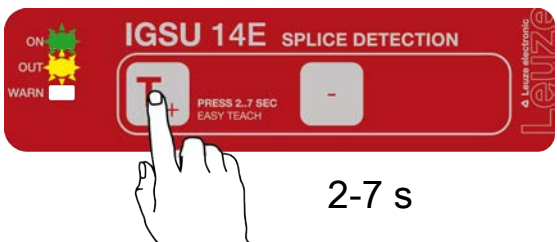
IGSU 14E SD

1

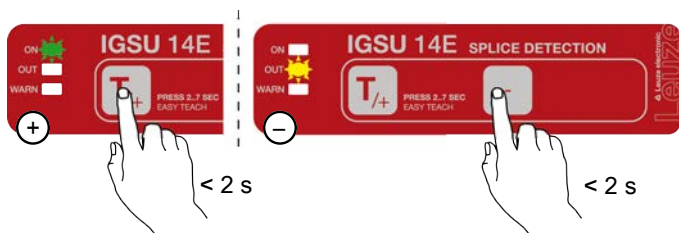**2**

2-7 s

3

7-12 s

Leuze

4

IGSU 14E SPLICE DETECTION

ON
OUT
WARN

PRESS 2..7 SEC
EASY TEACH

> 12 s

5

IGSU 14E

ON
OUT
WARN

PRESS 2..7 SEC
EASY TEACH

+

< 2 s

IGSU 14E SPLICE DETECTION

ON
OUT
WARN

PRESS 2..7 SEC
EASY TEACH

−

< 2 s

6

IGSU 14E SPLICE DETECTION

ON
OUT
WARN

PRESS 2..7 SEC
EASY TEACH

+   > 7 s

Leuze

7

8

4

Leuze
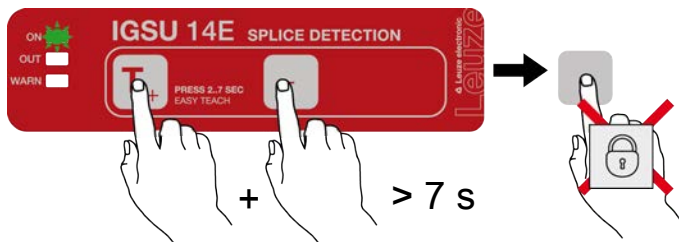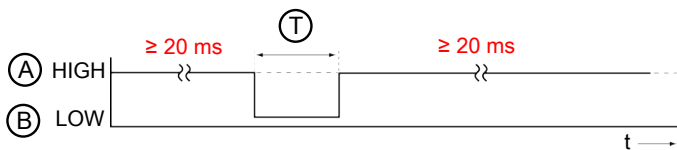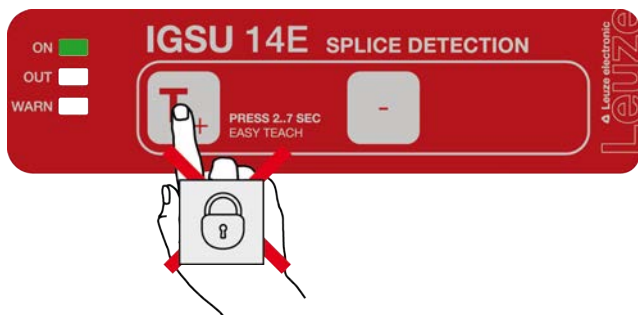
Intended use

The ultrasonic forks for splice inspection are ultrasonic sensors for the contactless detection of splices on paper, film or plastic webs.

NOTICE
Observe intended use!
This product is not a safety sensor and is not intended as personnel protection.
✎ Only allow competent persons to put the product into operation.
✎ Only use the product in accordance with its intended use.

Function and device operation

For reliable detection of the splices, the web must be slightly tensioned on the lower fork.

– Light switching: signal on the splice.
– Dark switching: signal on the web.

Overview of the operating structure via the teach and minus buttons

Function	Configuration via buttons
Standard function	Normal operation after switch-on
easy Teach (with or without web transport)	Press the teach (+) button: 2 … 7 s
Setting the pulse stretching	Press the teach (+) button: 7 … 12 s
Set switching behavior (light/dark switching)	Press the teach (+) button: >12 s
easyTune function – Manual fine tuning of the switching threshold Increase sensitivity Reduce sensitivity	Press the teach (+) button: <2 s Press the minus (-) button: <2 s
Manual locking/unlocking of the buttons on the device	Simultaneously press the teach button (+) and the minus button (-): > 7 s

Leuze

IGSU 14E SD standard functions (splice detection)

During operation the sensor is always in this function.
The sensor detects splices with high precision and speed.
This is indicated by the yellow OUT LED and the switching output.

1

ON LED green	Constantly ON when operating voltage is applied.
OUT LED yellow	Indicates the switching signal. LED is ON if the sensor detects the splice. The display is independent of the output setting.
WARN LED continuous red light	OFF: error-free operation. ON: teaching error – web material outside of the sensor's working range (too thin or too thick). ON: paper tear of the web being advanced through the sensor.

Leuze

easy Teach with or without web transport

Preparation: place paper, film or plastic web in the sensor.

2

- Press the teach button until the green ON LED and the yellow OUT LED flash synchronously.
- Release the teach button.
    - ⇨ The teaching time of approx. six seconds begins.
      The sensor indicates this by a more rapid synchronous flashing of the green ON LED and yellow OUT LED.
- If desired, advance the web through the sensor at a maximum speed of 50 m/min.
  If the sheet is not transported, it remains unchanged and slightly under tension in the sensor.
    - ⇨ If a splice is transported through the sensor during teach time, the sensor calculates the switching threshold as a function of both states.
      Advantage: very reliable detection of splices
    - ⇨ If no splices are transported through the sensor during teach time, the sensor calculates the switching threshold as a function of this state.
      Advantage: very simple execution
  – After the teach time is over, the sensor automatically ends the teach event.
  – If the teach event is faulty (e.g., unfavorable material combination, uneven transport, jittering during transport), the red WARN LED illuminates and the warning output (if present for the sensor model) is activated.
    If the fault cannot be rectified, the web material cannot be detected.

NOTICE
When changing to another type of web, a new adjustment must generally be carried out by teaching it.

Leuze

Setting the pulse stretching

If the web speed is high and the splice width is thin, the signal on the switching output is very short when moving over a splice.

– Therefore a fixed pulse stretching of 20 ms is activated in the factory settings.
– If pulse stretching is undesirable, you can switch the function off.

3

✎ Press the teach button until the green ON LED and the yellow OUT LED flash alternately.
✎ Release the teach button.
⇨ The green ON LED flashes for another 2 seconds and the yellow OUT LED indicates the changed status of the pulse stretching for 2 seconds:
OUT LED ON: pulse stretching activated
OUT LED OFF: pulse stretching deactivated

Adjusting the switching behavior of the switching output (light/dark switching)

4

✎ Press the teach button until only the green ON LED flashes.
✎ Release the teach button.
⇨ The green ON LED flashes for another 2 seconds and the yellow OUT LED indicates the changed switching behavior for 2 seconds:
Yellow OUT LED ON: switching output, light switching (signal on the splice)
Yellow OUT LED OFF: switching output, dark switching (signal on the web)

Leuze

easyTune – Manual fine tuning of the switching threshold

With homogeneous web material, the signal on the web is greater than the signal on the splice.

For the taught switching threshold, there is a high function reserve, and the sensor functions reliably.

To achieve a better function reserve, it can be advantageous to change the taught switching threshold, especially for inhomogeneous web material.

The sensitivity of the sensor and, thus, the switching threshold can be adjusted with the *easyTune* function, which is in principle comparable to a potentiometer.

5

The sensitivity of the sensor can be adjusted by pressing the teach button (+) or the minus button (-).

Increase sensitivity:
↳ Briefly press the teach button (+).
⇨ A single flash of the green ON LED confirms button actuation.

Reduce sensitivity:
↳ Briefly press the minus button (-).
⇨ A single flash of the yellow OUT LED confirms button actuation.

Recommended settings

Observation	Measure	Action
After teaching, the yellow LED and the switching output flicker if the splice is moved through the sensor: The function reserve on the splice is too low.	Reduce sensitivity of the sensor (upward shift of the switching threshold)	Repeatedly press the **minus button (-)** briefly until the sensor detects the splice stably and without interruption.
In certain cases, a highly inhomogeneous web material can affect the functional reliability. The yellow LED and the switching output flicker if the blank web is moved through the sensor without splices: The function reserve on the web is too low.	Increase sensitivity of the sensor (downward shift of the switching threshold)	Repeatedly press the **teach button (+)** briefly until the sensor detects the transported web material without splice stably and without flickering.

Leuze

Manual locking/unlocking of the buttons on the device

To protect against erroneous operation, the locking of the buttons is intended to prevent a button on the device from accidentally being pressed. Accidental button actuation could unintentionally trigger the *easyTune* function or the teaching of the device.

6

↳ Press the teach button (+) and the minus button (-) simultaneously until the green ON LED flashes at approx. six times per second.

↳ Release the teach button (+) and the minus button (-).

⇨ The buttons are now locked and can no longer be operated.

⇨ The buttons are unlocked using the same button combination.

NOTICE
Manual locking of the buttons on the device is stored in volatile memory.

Leuze

Sensor adjustment via teach input (pin 5)

Teach-in

To teach, a teach signal is applied to the teach input (pin 5). The duration of the teach signal (low level on the teach input) determines the teach-in function.

NOTICE
Before a low level is applied for teaching-in functions, a high level must be applied for at least 20 ms.

7

A	Buttons locked
B	Buttons can be operated
T	Duration of the teach signal

Duration T [ms]	Function
20 … 80	*easy Teach* with or without web transport
120 … 180	
220 … 280	Configure the switching behavior of the switching output: light switching
320 … 380	Configure the switching behavior of the switching output: dark switching
420 … 480	easyTune (-): reduce sensitivity
520 … 580	easyTune (+): increase sensitivity
620 … 680	Activate pulse stretching
720 … 780	Deactivate pulse stretching

Locking the buttons via the teach input

8

Manual locking of the buttons on the device is only suitable for protecting against tampering to a limited extent since locking can be canceled using the corresponding button combination. For this reason, it is also possible to lock the buttons via the teach input (pin 5).

– A **static high signal** (≥ 20 ms) on the teach input locks the buttons on the device so that no manual operation is possible. The buttons can then no longer be unlocked using the described button combination.

– If the teach input is not connected or if there is a static low signal, the buttons are unlocked and can be operated freely.

NOTICE
The buttons can also be locked/unlocked via IO-Link.