

# Technical data sheet

## Ultrasonic fork sensor

Part no.: 50142877

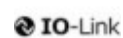
GSU14E/16T.3-M12



For illustration purposes only

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## Technical data

### Basic data

|                      |                                                                        |
|----------------------|------------------------------------------------------------------------|
| Series               | 14                                                                     |
| Principle of physics | Ultrasonics                                                            |
| Application          | Detection of non-transparent labels<br>Detection of transparent labels |
| Label width, min.    | 4 mm                                                                   |
| Label gap, min.      | 2 mm                                                                   |
| Medium               | Transparent and not transparent                                        |

### Special version

|                 |                                                              |
|-----------------|--------------------------------------------------------------|
| Special version | Manual fine tuning of the switching threshold<br>Teach input |
|-----------------|--------------------------------------------------------------|

### Electrical data

|                    |                                                         |
|--------------------|---------------------------------------------------------|
| Protective circuit | Polarity reversal protection<br>Short circuit protected |
|--------------------|---------------------------------------------------------|

### Performance data

|                      |                            |
|----------------------|----------------------------|
| Supply voltage $U_B$ | 18 ... 30 V, DC            |
| Residual ripple      | 0 ... 10 %, From $U_B$     |
| Open-circuit current | 0 ... 60 mA, Typical value |

### Inputs

|                        |            |
|------------------------|------------|
| Number of teach inputs | 1 Piece(s) |
|------------------------|------------|

### Teach inputs

|                   |                                    |
|-------------------|------------------------------------|
| Type              | Teach input                        |
| Voltage type      | DC                                 |
| Switching voltage | high: $\geq 9V$<br>low: $\leq 2 V$ |
| Input resistance  | 15,000 $\Omega$                    |

### Teach input 1

|                        |      |
|------------------------|------|
| Active switching state | High |
|------------------------|------|

### Outputs

|                                     |            |
|-------------------------------------|------------|
| Number of digital switching outputs | 2 Piece(s) |
|-------------------------------------|------------|

### Switching outputs

|                         |                                            |
|-------------------------|--------------------------------------------|
| Type                    | Digital switching output                   |
| Voltage type            | DC                                         |
| Switching current, max. | 100 mA                                     |
| Switching voltage       | high: $\geq (U_B - 2V)$<br>low: $\leq 2 V$ |
| Load capacity           | 0.01 $\mu F$                               |

### Switching output 1

|                     |                                                                                                   |
|---------------------|---------------------------------------------------------------------------------------------------|
| Switching element   | Transistor, Push-pull                                                                             |
| Switching principle | IO-Link / NPN light switching (switching in the gap), PNP dark switching (switching on the label) |

### Switching output 2

|                     |                                                                                         |
|---------------------|-----------------------------------------------------------------------------------------|
| Switching element   | Transistor, Push-pull                                                                   |
| Switching principle | PNP light switching (switching in the gap), NPN dark switching (switching on the label) |

### Time behavior

|                                     |          |
|-------------------------------------|----------|
| Switching frequency                 | 2,000 Hz |
| Response time                       | 0.2 ms   |
| Readiness delay                     | 300 ms   |
| Max. conveyor speed during teach-in | 50 m/min |

### Interface

|      |         |
|------|---------|
| Type | IO-Link |
|------|---------|

### IO-Link

|                  |                      |
|------------------|----------------------|
| COM mode         | COM3                 |
| Profile          | Smart sensor profile |
| Min. cycle time  | COM3 = 0.5 ms        |
| Frame type       | 2.5                  |
| Specification    | V1.1                 |
| Device ID        | 2521                 |
| SIO-mode support | Yes                  |

### Connection

|                       |            |
|-----------------------|------------|
| Number of connections | 1 Piece(s) |
|-----------------------|------------|

### Connection 1

|                    |                                           |
|--------------------|-------------------------------------------|
| Function           | Signal IN<br>Signal OUT<br>Voltage supply |
| Type of connection | Connector                                 |
| Thread size        | M12                                       |
| Type               | Male                                      |
| Material           | Metal                                     |
| No. of pins        | 5 -pin                                    |
| Encoding           | A-coded                                   |
| Plug outlet        | Horizontal (parallel to belt movement)    |

### Mechanical data

|                       |                                          |
|-----------------------|------------------------------------------|
| Design                | Fork                                     |
| Mouth width           | 4 mm                                     |
| Mouth depth           | 80 mm                                    |
| Dimension (W x H x L) | 22 mm x 46.9 mm x 96 mm                  |
| Housing material      | Metal                                    |
| Metal housing         | Diecast zinc, galvanic nickel coating    |
| Net weight            | 270 g                                    |
| Housing color         | Silver                                   |
| Type of fastening     | Mounting thread<br>Through-hole mounting |

### Operation and display

|                                     |                                          |
|-------------------------------------|------------------------------------------|
| Type of display                     | LED                                      |
| Number of LEDs                      | 3 Piece(s)                               |
| Operational controls                | Control buttons                          |
| Function of the operational control | Dynamic teach on label carrier and label |

### Environmental data

|                                |               |
|--------------------------------|---------------|
| Ambient temperature, operation | 0 ... 60 °C   |
| Ambient temperature, storage   | -40 ... 70 °C |

Technical data

Certifications

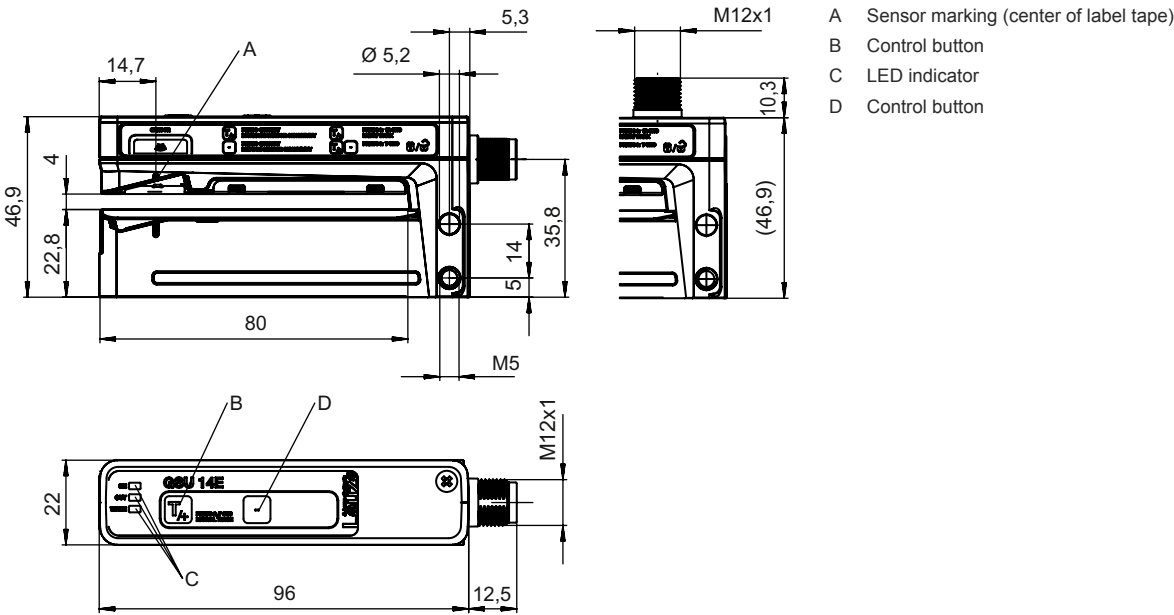
|                      |                           |
|----------------------|---------------------------|
| Degree of protection | IP 65                     |
| Protection class     | III                       |
| Approvals            | c UL US                   |
| Standards applied    | EN 60947-5-2:2007+A1:2012 |
| US patents           | US 6,314,054 B            |

Classification

|                       |          |
|-----------------------|----------|
| Customs tariff number | 85365019 |
| ECLASS 5.1.4          | 27272801 |
| ECLASS 8.0            | 27272801 |
| ECLASS 9.0            | 27272801 |
| ECLASS 10.0           | 27272801 |
| ECLASS 11.0           | 27272801 |
| ECLASS 12.0           | 27272801 |
| ECLASS 13.0           | 27272801 |
| ECLASS 14.0           | 27272801 |
| ECLASS 15.0           | 27272801 |
| ETIM 5.0              | EC001847 |
| ETIM 6.0              | EC001847 |
| ETIM 7.0              | EC001847 |
| ETIM 8.0              | EC001847 |
| ETIM 9.0              | EC001847 |
| ETIM 10.0             | EC001847 |

Dimensioned drawings

All dimensions in millimeters

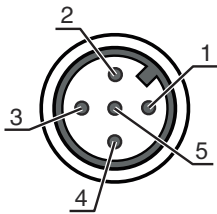


Electrical connection

Connection 1

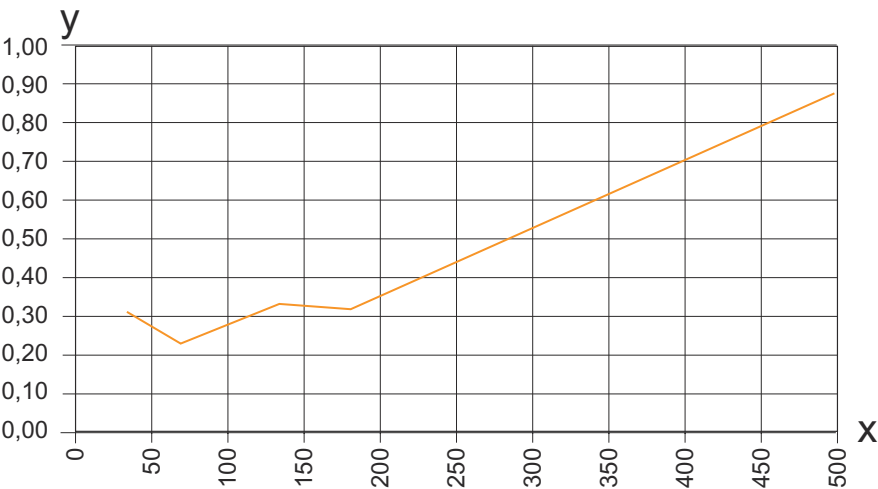
|                    |                                        |
|--------------------|----------------------------------------|
| Function           | Signal IN                              |
|                    | Signal OUT                             |
|                    | Voltage supply                         |
| Type of connection | Connector                              |
| Thread size        | M12                                    |
| Type               | Male                                   |
| Material           | Metal                                  |
| No. of pins        | 5 -pin                                 |
| Encoding           | A-coded                                |
| Plug outlet        | Horizontal (parallel to belt movement) |

| Pin | Pin assignment  |
|-----|-----------------|
| 1   | V+              |
| 2   | OUT 2           |
| 3   | GND             |
| 4   | IO-Link / OUT 1 |
| 5   | Teach-in        |



Diagrams

Repeatability as a function of the conveyor speed



x Conveyor speed [m/min]  
y Repeatability [mm]  
NOTE Example process of a paper-label-on-paper-carrier combination (label length = 89.7 mm, label gap = 2 mm)

Operation and display

| LED    | Display                  | Meaning                           |
|--------|--------------------------|-----------------------------------|
| 1 ON   | Green, continuous light  | Operational readiness             |
| 2 OUT  | Yellow, continuous light | Switching signal in the label gap |
| 3 WARN | Red, continuous light    | Teach error                       |

## Part number code

Part designation: **AAA14E/BCD.EEE-FFF**

|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>AAA14E</b> | <b>Operating principle / construction</b><br>GSU14E: Ultrasonic fork sensor<br>IGSU14E: Ultrasonic fork sensor with integrated easyTeach function<br>GSX14E: Fork sensor, ultrasonic/optical combination                                                                                                                                                                                                                                                                                                               |
| <b>B</b>      | <b>Switching output / function OUT 1/IN: Pin 4</b><br>6: push-pull switching output, PNP light switching (switching in the gap), NPN dark switching (switching on the label)<br>G: Push-pull switching output, PNP dark switching (switching on the label), NPN light switching (switching in the gap)<br>1: IO-Link / NPN light switching (switching in the gap), PNP dark switching (switching on the label)<br>L: IO-Link / PNP light switching (switching in the gap), NPN dark switching (switching on the label) |
| <b>C</b>      | <b>Switching output / function OUT 2/IN: pin 2</b><br>6: push-pull switching output, PNP light switching (switching in the gap), NPN dark switching (switching on the label)<br>G: Push-pull switching output, PNP dark switching (switching on the label), NPN light switching (switching in the gap)<br>W: warning output                                                                                                                                                                                            |
| <b>D</b>      | <b>Switching output / function OUT 3/IN: Pin 5</b><br>T: teach-in                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>EEE</b>    | <b>Equipment</b><br>3: teach-in via button<br>SD: Splice inspection                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>FFF</b>    | <b>Electrical connection</b><br>M12: M12 connector, 5-pin (horizontal plug outlet)<br>M12V: M12 connector, 5-pin (vertical plug outlet)                                                                                                                                                                                                                                                                                                                                                                                |

### Note



A list with all available device types can be found on the Leuze website at [www.leuze.com](http://www.leuze.com).

## Notes



### Observe intended use!



- This product is not a safety sensor and is not intended as personnel protection.
- The product may only be put into operation by competent persons.
- Only use the product in accordance with its intended use.



### For UL applications:



- For UL applications, use is only permitted in Class 2 circuits in accordance with the NEC (National Electric Code).

## Further information

- The push-pull switching outputs must not be connected in parallel.
- The label material used determines the achievable precision and the reliability of gap detection between labels.
- To achieve high repeatability, the label tape must be slightly under tension on the lower fork.

## Accessories

### Connection technology - Connection unit

|                                                                                  | Part no. | Designation           | Article        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------|----------|-----------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 50144900 | MD 798i-11-82/L5-2222 | IO-Link master | Type: IO-Link master<br>Current consumption, max.: 11,000 mA<br>Switching outputs for each sensor connection: 1 Piece(s)<br>Switching output: Transistor, PNP<br>Interface: IO-Link, Automatic protocol detection, EtherNet IP, Modbus TCP, PROFINET<br>Connections: 12 Piece(s)<br>Sensor connections: 8 Piece(s)<br>Connections for voltage supply: 2 Piece(s)<br>Interface connections: 2 Piece(s)<br>Degree of protection: IP 67, IP 65, IP 69K |
|                                                                                  |          |                       |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

### Connection technology - Connection cables

|                                                                                   | Part no. | Designation        | Article          | Description                                                                                                                                                                       |
|-----------------------------------------------------------------------------------|----------|--------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 50132079 | KD U-M12-5A-V1-050 | Connection cable | Connection 1: Connector, M12, Axial, Female, A-coded, 5 -pin<br>Connector, LED: No<br>Connection 2: Open end<br>Shielded: No<br>Cable length: 5.000 mm<br>Sheathing material: PVC |
|                                                                                   |          |                    |                  |                                                                                                                                                                                   |

### General

|                                                                                    | Part no. | Designation | Article  | Description                                                                  |
|------------------------------------------------------------------------------------|----------|-------------|----------|------------------------------------------------------------------------------|
|  | 50144288 | FS 14EML.5  | Carriage | Dimensions: 21 mm x 21 mm x 170 mm<br>Housing material: Stainless steel, V2A |
|                                                                                    | 50144289 | FS 14EML1.5 | Carriage | Dimensions: 21 mm x 21 mm x 120 mm<br>Housing material: Stainless steel, V2A |

#### Note



A list with all available accessories can be found on the Leuze website in the Download tab of the article detailed page.