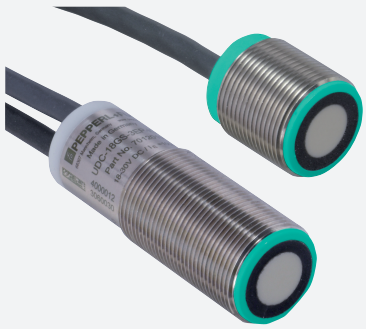


# Double sheet sensor

## UDC-18GS-3EP1-IO-0,2M-V19

- Ultrasonic system for reliable detection of no, one, or two overlapping sheet materials
- Insensitive to printing, colors, and shining surfaces
- Very wide material spectrum, finest papers up to thin sheet metals as well as plastic- and metal foils
- Perpendicular or inclined sensor mounting relative to the sheet plane possible
- Integrated alignment aid
- IO-Link Interface for process data, parameterization and diagnosis
- Synchronization options
- No TEACH-IN required
- Short version

## Function

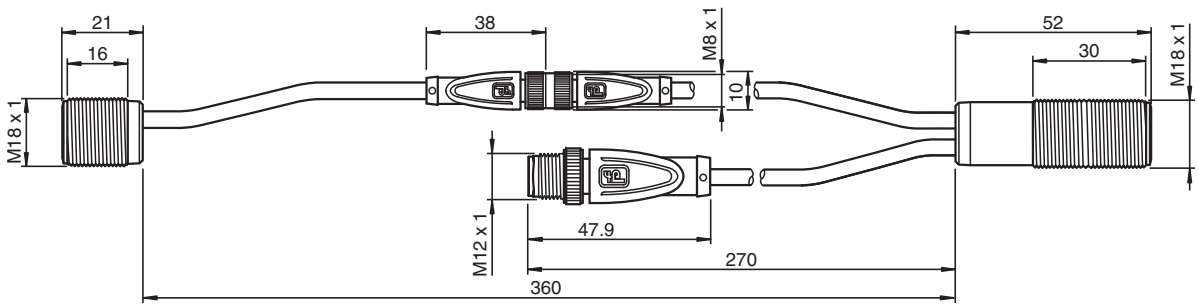
The ultrasonic double-sheet detector is used wherever automatic differentiation between single and double sheets is necessary to protect machines or prevent rejects. The double sheet detection is based on the ultrasonic thru-beam principle.

The following situations can be detected:

- No sheet, i. e. air
- Single sheet
- Double sheet or multiple sheets (a statement on the number of sheets is not possible here)

The signals are evaluated by a microprocessor system. As a result of the evaluation, corresponding switching outputs are set and the result of the evaluation is communicated via the IO-Link interface.

## Dimensions




## Technical Data

| | | |
|---|---|---|
| **General specifications** | | |
| Sensing range | | 20 ... 60 mm , optimal distance: 45 mm |
| Transducer frequency | | approx. 255 kHz |
| **Memory** | | |
| Non-volatile memory | | EEPROM |
| Write cycles | | 300000 |
| **Indicators/operating means** | | |

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## Technical Data

| | | |
|---|---|---|
| LED green | | indication: single sheet detected<br>flashing (1 Hz) - standby mode<br>flashing wiht short break (1 Hz) - IO-Link mode |
| LED yellow | | indication: no sheet detected (Air) |
| LED red | | indication: double sheet detected<br>flashing: device error |
| **Electrical specifications** | | |
| Operating voltage | $U_B$ | 18 ... 30 V DC , ripple 10 %$_{SS}$ |
| No-load supply current | $I_0$ | ≤ 40 mA |
| Power consumption | $P_0$ | ≤ 550 mW |
| Time delay before availability | $t_v$ | ≤ 300 ms |
| **Interface** | | |
| Interface type | | IO-Link |
| IO-Link revision | | 1.1 |
| Device profile | | Identification and Diagnosis - I&D |
| Process data | | Input: 16 Bit<br>- measurement value 8 Bit<br>- selected threshold set 2 Bit<br>- switching signals 3 Bit<br>Output: 8 Bit<br>- threshold set 2 Bit<br>- disable transducer 1 Bit |
| Vendor ID | | 1 (0x0001) |
| Device ID | | 3148290 (0x300A02) |
| Transfer rate | | COM2 (38.4 kBit/s) |
| Min. cycle time | | 2.8 ms |
| SIO mode support | | yes |
| Compatible master port type | | Class A (use adapter cable listed in accesories)<br>Class B (use 3-pole adapter or 3-wire cable) |
| **Input/Output 1** | | |
| Designation | | SYNC |
| Input/output type | | 1 synchronization connection, bidirectional |
| 0 Level | | 0 ... 1 V |
| 1 Level | | 2.5 V ... $U_B$ |
| Input impedance | | > 22 kΩ |
| Output rated operating current | | current source < 2.5 mA |
| Pulse length | | 0.4 ... 3 ms with external control, low active |
| Synchronization frequency | | |
| Common mode operation | | ≤ 230 Hz |
| Multiplex operation | | ≤ 230 Hz /n, n = number of sensors , n ≤ 10 |
| **Input/Output 2** | | |
| Designation | | IN2/FEEDBACK |
| Input/output type | | input or output programmable via IO-Link :<br>input for selection of a threshold set (factory default)<br>output as feedback output |
| Input type | | digital input |
| Signal | | 0-level: 0 ... + 1V<br>1-level: +$U_B$ - 1 V ... +$U_B$ |
| Input impedance | | ≥ 60 kΩ |
| Pulse length | | ≥ 100 ms |
| Output type | | PNP |
| Rated operating current | $I_e$ | 8 mA |
| Voltage drop | | < 3 V |
| Fusing | | reverse polarity protected , overload and short-circuit protected |
| **Input** | | |
| Designation | | IN1/TEACH |
| Input type | | 0-level: 0 ... + 1V<br>1-level: +$U_B$ - 1 V ... +$U_B$ |

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## Technical Data

| | | |
|---|---|---|
| Pulse length | | ≥ 100 ms |
| Impedance | | ≥ 60 kΩ |
| **Output** | | |
| Designation | | OUT 1 ... 3 |
| Number | | 3 |
| Output function | | OUT 1: single sheet detected<br>OUT 2: double sheet detected<br>OUT 3: no sheet detected (air) |
| Output type | | Push-pull (4 in 1) output , NC contact ( programmable ) |
| Rated operating current | $I_e$ | 100 mA per output |
| Voltage drop | $U_d$ | ≤ 3 V |
| Switch-on delay | $t_{on}$ | 15 ms (programmable) |
| Switch-off delay | $t_{off}$ | 15 ms (programmable) |
| Pulse extension | | can be activated (100 ms or IO-Link cycle time) |
| Fusing | | reverse polarity protected , overload and short-circuit resistant |
| **Compliance with standards and directives** | | |
| Standard conformity | | |
| Standards | | EN IEC 60947-5-2:2020<br>IEC 60947-5-2:2019<br>IEC 61131-9 / IO-Link V1.1.3 |
| **Approvals and certificates** | | |
| UL approval | | cULus Listed, General Purpose, Class 2 Power Source |
| CCC approval | | CCC approval / marking not required for products rated ≤36 V |
| **Ambient conditions** | | |
| Ambient temperature | | 0 ... 60 °C (32 ... 140 °F) |
| Storage temperature | | -25 ... 70 °C (-13 ... 158 °F) |
| **Mechanical specifications** | | |
| Connection type | | fixed cable with plug |
| Housing length | | |
| Ultrasonic transmitter | | 21 mm |
| Ultrasonic receiver | | 52 mm |
| Housing diameter | | |
| Ultrasonic transmitter | | 18 mm |
| Ultrasonic receiver | | 18 mm |
| Degree of protection | | IP65 |
| Material | | |
| Housing | | Stainless steel 1.4305/AISI 303, polyamide plastic parts |
| Transducer | | epoxy resin/hollow glass sphere mixture; polyurethane foam |
| Connector | | |
| Threading | | M12 x 1 |
| Number of pins | | 8 |
| Cable | | |
| Cable diameter | | 4.3 mm |
| Bending radius | | 5 x diameter , fixed |
| Material | | PUR |
| Color | | black |
| Length | L | approx. 200 mm |
| Mass | | 75 g |
| Tightening torque, fastening screws | | max. 20 Nm |

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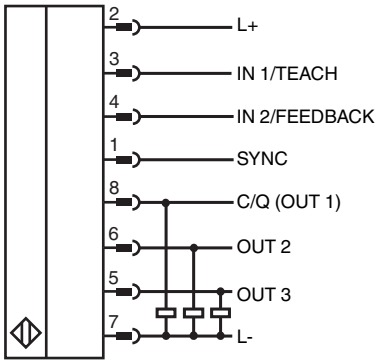
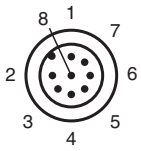
## Connection




## Connection Assignment



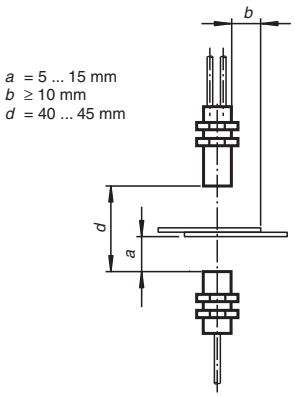

## Installation

**Hinweis**
Only use the cables specified by Pepperl+Fuchs for this purpose to extend the connecting cable between the transmitter and receiver of the ultrasonic double sheet detectors. The use of other cables will result in impairment of the sensor function or even loss of function.

## Mounting

### Mounting/Adjustment

Recommended distances

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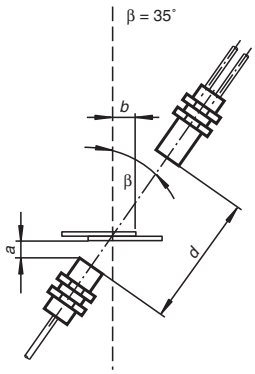
## Mounting

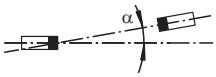
### Mounting/Adjustment

(for very thick papers)



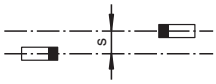

**Angular misalignment**

α < +/- 1°




**Sensor offset**

s < +/- 1 mm




## Commissioning

**Operating Modes**

The measured object is a material inserted between the emitter and receiver. The sensor measures the damping of the emitted ultrasonic signal caused by the material.
The residual amplitude of the ultrasonic signal arriving at the receiver is evaluated in relation to the set threshold values and assigned to the corresponding state (="air", "single sheet" or "double sheet"). The detected state is reported back via the switching outputs of the sensor and via the IO-Link process data. In the IO-Link process data, the measured amplitude is also made available as an analog value.
Depending on the application, the sensor can be operated in the following ways:

1. By selecting one of the 3 implemented threshold sets, each covering a very wide range of materials. The respective thresholds are preset but adjustable.
2. By teaching in a specific material or a specific material constellation for multi-layer materials.
3. In permanent IO-Link operation, a completely separate evaluation of the amplitude values measured by the sensor can be performed in the downstream, user-side controller in addition or as an alternative to the two aforementioned options.

**Further Documentation**

For detailed information on mounting, alignment and commissioning you may refer to the commissioning instruction of the sensor.

The sensor manual is also available as detailed overall documentation.
You can access the documents mentioned via the product detail page at www.pepperl-fuchs.com.

## Accessories

| | | |
|---|---|---|
| | **V19-G-BK2M-PUR-U** | Female cordset single-ended M12 straight A-coded, 8-pin, PUR cable black, UL approved |
| | **IO-Link-Master02-USB** | IO-Link master, supply via USB port or separate power supply, LED indicators, M12 plug for sensor connection |
| | **V19-G-BK0,6M-PUR-U-V1-G-YIOL** | Cordset for IO-Link M12 socket straight A-coded 8-pin to M12 plug straight A-coded 4-pin, PUR cable black, UL approved, drag chain suitable |
| | **MH-UDB01** | Mounting bracket for double sheet monitor |
| | **AA-UDB-18GM-01** | alignment aid for double sheet sensor |
| | **V31-GM-1M-PUR-V31-GM-UDB/UDC** | 1 m cable for extension between emitter and receiver for UDB-18GS-..., UDC-18GS-... und UDC(M)-30GS-... |

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## Accessories

| | | |
|---|---|---|
| | **V31-GM-2M-PUR-V31-GM-UDB/UDC** | 2 m cable for extensionn between emitter and receiver for UDB-18GS-..., UDC-18GS-... and UDC(M)-30GS-... |

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