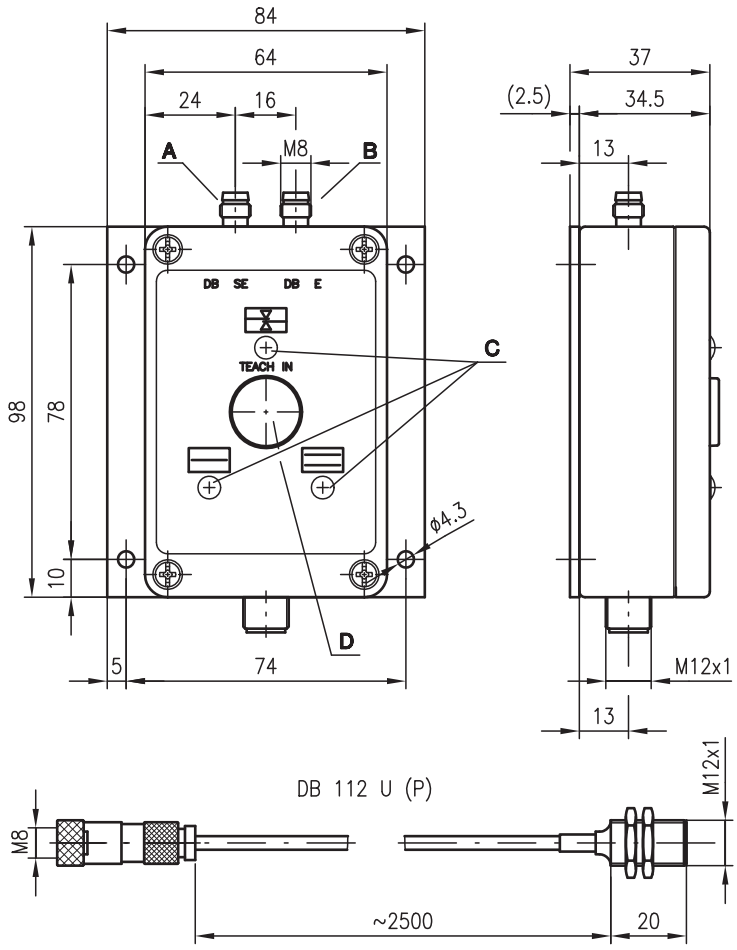
DB 112

Double sheet monitoring

en 2020/10/12 50143738

- Reliable detection of multilayer paper sheets, plastic and metal foils as well as cards (e.g., telephone cards)
- Not affected by printing or metallic coating
- Measurement range from 20 g/m² paper to 1200 g/m² cardboard
- Ultrasonic sensor in M12 cylindrical sensor housing
- Plug connection
- Short-circuit proof transistor outputs
- Operating state indicators via LEDs
- Very small construction (can thus also be used in applications with limited available space)

Dimensioned drawing



A DB 112 U (P) transmitter
B DB 112 U (P) receiver
C Indicator diodes
D "TEACH-IN" push button

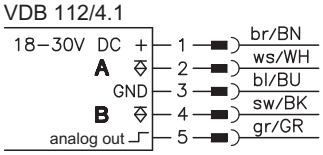
Internal: configuration switch

Accessories:

(available separately)

- M12 connectors (KD …)
- Ready-made cables (KB …)
  5-pin: KB-095-5000-5A

Electrical connection



A Single sheet
B Double sheet

Technical data

	DB 112 UP	VDB 112/4.1
Sensor data		
Operating range	10 … 30 mm	
Converter frequency	300 kHz ± 2%	
Sound cone	Approx. 12°	
Time behavior		
Switching frequency		200 Hz
Readiness delay		≤ 100 ms
Electrical data		
Operating voltage U_B		18 … 30 V DC (incl. residual ripple)
Residual ripple		≤ 15% of U_B
Open-circuit current		≤ 75 mA
Switching output		2 transistor outputs
Function		Single sheet detected or ≥ 1 sheet detected Double sheet detected or ≥ 2 sheets detected
Signal voltage high/low		≥ (U_B-2V)/≤ 2V
Output current		Max. 200 mA per output
Analog output [1]		0 … 5V, R_L ≥ 100 kΩ
Indicators		
Green LED **A**		Double sheet monitoring unit ready
Flashing green LED **A** (VDB 112/4)		TEACH-IN event
Yellow LED **B**		Single sheet detected
Red LED **C**		Double sheet detected
Mechanical data		
Housing	Nickel-plated brass	Aluminum, with powder coating, black
Weight	20 g	400 g
Connection type	M8 connector, 3-pin, with 2.5 m cable	M12 connector, 5-pin
Environmental data		
Ambient temp. (operation/storage)		0 °C … +60 °C/-40 °C … +70 °C
Protective circuit [2]		1,2,3
VDE protection class		III
Degree of protection		IP 65
Standards applied		EN 60947-5-2

1) The analog output has no protective circuit, therefore the correct selection of the load resistance RL, as well as a correct protective circuit must be provided by the customer.
2) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection

Order guide

	Designation	Part no.
Sensor pair	DB 112 UP.1-20, 2500	50109000
Amplifier (PNP switching outputs, analog output)	VDB 112/4.1	50137139

Tables

Diagrams

Notes

DB 112

Technical description

General

The ultrasonic double sheet monitoring system consists of a VDB 112/… analysis amplifier and a DB 112 UP ultrasonic sensor pair. It monitors primarily paper, plastic and metal films, which are fed in by feeders. Each sheet is compared with the stored reference value and, in the event of a double sheet, indicated appropriately.

Mounting

Transmitter and receiver (DB 112 UP) are identical in construction and are to be mounted according to the table under "Mounting and notes" at an angle which varies depending on the sheet material. A larger angle of inclination increases the flutter range; e.g., with a 40° pitch, flutter is permissible within 60% of the measurement field. The distance between transmitter and receiver must be at least 10 mm and can be max. 30 mm.

Take care to ensure exact alignment (± 1°). If the alignment does not run along the axis, the working range is reduced.

Function

Referencing possibilities (calibrate or teach)

- For the reliable detection of double sheets for all media that are to be processed, it is recommended that the single medium always be used as a reference. Switch S1 in position "1" (Teach).
- With inhomogeneous materials, e.g., materials with trapped air or high bulk paper, referencing can fluctuate significantly depending on the scanning location during calibration. These materials can be checked using a constant reference value (Ref. constant). Switch S1 in position "0" (Ref. constant)

The evaluation unit can be operated in two different reference modes.

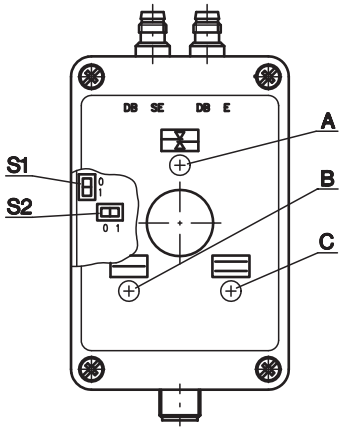
- a) Switch S2 in position "1" (man.)
  Calibration on the material to be detected is performed by pressing the "TEACH IN" button on the top of the device. The reference value remains stored until the next calibration process.
- b) Switch S2 in position "0" (Auto)
  For calibration see "a)", as well as automatic "TEACH IN" during sheet intake and when applying the supply voltage if a sheet is located between the sensors at this time. An automatic calibration process is performed during sheet movement if no sheet is present in the measurement field for ≥ 2s.

Operation

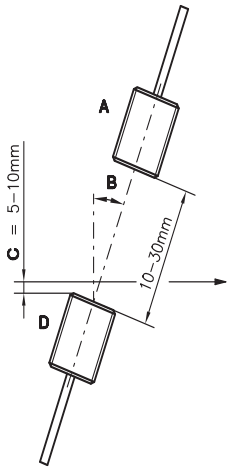
The VDB 112/... evaluation unit constantly signals the situation between the sensors at two outputs.
The "single sheet detected" output is activated as long as one or more sheets are located in the measurement field.
The "double sheet detected" output is activated as long as two or more sheets are located in the measurement field.
The reference value remains stored even after a voltage interruption. The analog output signals the received signal level.

Controls and indicators

A Green LED
B Yellow LED
C Red LED
D Test point 0 … 4VDC
E GND
S1 Switch: Teach/Ref. constant
S2 Switch: Teach man./Auto



Mounting and notes



A Receiver
B Angle of inclination
C Sheet material
D Transmitter

Notes

- When aligning the transmitter and receiver, take care to ensure the most exact alignment possible. To ensure proper function, the sensors must be inclined by the angle "B" towards the vertical.

Sheet material	Recommended angle of inclination B		
	0°	15° ... 25°	25° ... 35°
Standard papers to 150 g/m²	X	X	X
Carton		X	X
Plastics			X