



VSU 12

Splice inspection



20 ... 40mm



- Reliable detection of splice on paper web or plastic web
- Web speeds of up to 1000m/min
- Automatic adaptation to the medium
- High acoustic power (guaranteeing reliable functionality even for thick materials)
- Ultrasonic sensor in the M18 round-sleeve housing
- Plug connection
- Short-circuit proof PNP transistor outputs operating-state indication by means of LEDs
- Sensors have a very short construction (can thus also be used in applications with limited available space)
- Paper tear detection (...4.5)

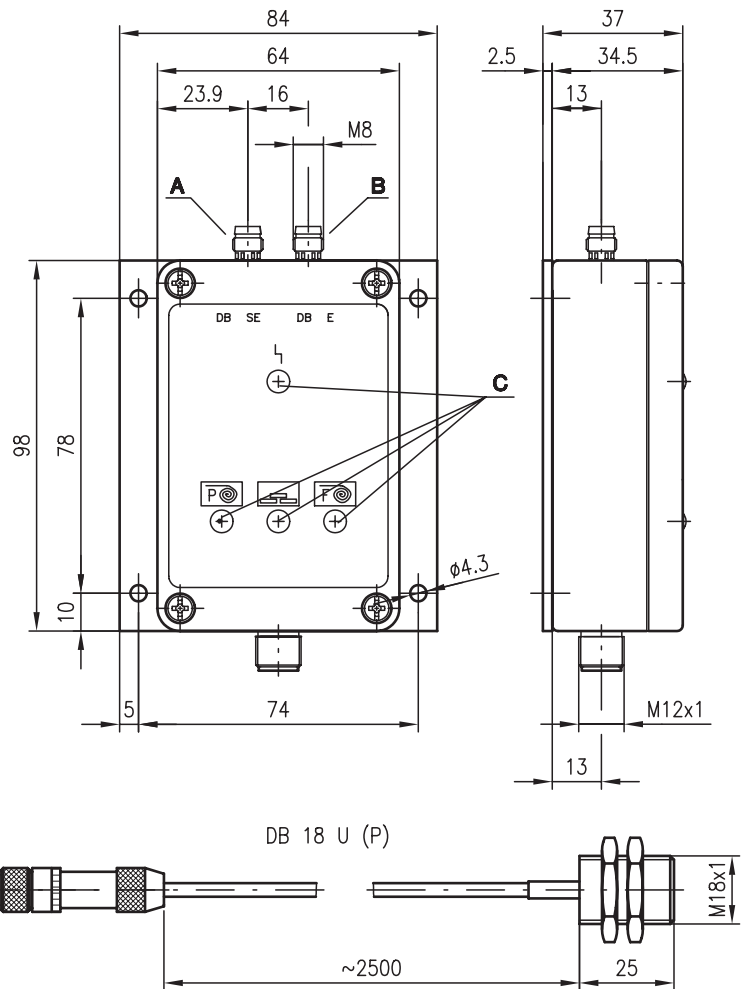


Accessories:

(available separately)

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

Dimensioned drawing



- A** Transmitter DB 18 U (P)
- B** Receiver DB 18 U (P)
- C** Indicator diodes

Electrical connection

VSU 12/4.4

10-30V DC +	1	br/BN
Level under Limit	2	ws/WH
GND	3	bl/BU
Tape	4	sw/BK
Paper/Foil	5	gr/GR

VSU12/4.5

10-30V DC +	1	br/BN
web material	2	ws/WH
GND	3	bl/BU
Tape	4	sw/BK
Paper/Foil	5	gr/GR

We reserve the right to make changes * vsu_12_e.fm



Specifications

Sensor data

Operating range (recommended)
Operating range limit
Converter frequency
Sound cone

DB 18 UP
25mm
20 ... 40mm
200kHz ± 2%
approx. 12°

VSU 12/4.4.../4.5

Timing

Web speed

max. 1000m/min
min. ≥ 6mm/s
(with 30mm splice width)
path clear/
inserted medium < 5s
≤ 100ms
0 ... 200ms, adjustable

Recovery-time constant
(LED A flashes briefly)
Delay before start-up
Pulse stretching

Electrical data

Operating voltage U_B

10 ... 30VDC
(incl. residual ripple)
≤ 15% of U_B
≤ 75 mA

Residual ripple
Bias current

Outputs

Tape
Function

PNP transistor output
Forced tripping of transistor
when splice detected
PNP transistor output
Forced tripping of transistor
when material not detectable

Level under limit
Function

VSU 12/4.5

Web material (paper tear)
Function

PNP transistor output
Forced tripping of transistor
when material present between
the sensors
≥ ($U_B - 2V$) ≤ 2V
max. 200mA per output

Signal voltage high/low
Output current

Indicators

VSU 12/4.4

LED **B** green
LED **D** green
LED **C** yellow
LED **A** red flashing

foil selected
paper selected
splice detected
material not detectable

VSU 12/4.5

LED **A** red flashing
LED **A** yellow

material not detectable
paper tear

Mechanical data

Housing
Weight
Connection type

nickel-faced brass
30g
M8 connector, 3-pin, with
2m cable

aluminium, black powder-coated
400g
M12 connector,
5-pin

Environmental data

Ambient temp. (operation/storage)
Protective circuit ¹⁾
VDE safety class
Protection class
Electromagnetic compatibility

0°C ... +60°C/-40°C ... +70°C
1,2,3
III
IP 65
severity level 3 acc. to
(IEC 801-4 and IEC 17 B
(CO) 180-I and II)

Options

Commutation input Paper/Foil ²⁾

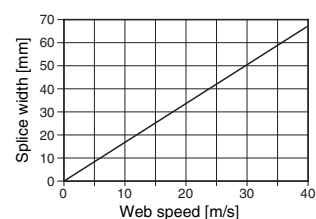
Paper mode 0V or not connected
Foil mode ≥8 V

1) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection
2) Switch **S1** must be in position **0** "Paper"

Tables

Diagrams

Splice width in dependence of web speed



Remarks

Order guide

	Designation	Part No.
Sensor pair	DB 18 UP-25, 2500	500 33752
Amplifier	VSU 12/4.4	501 04022
	VSU 12/4.5	501 04139



VSU 12

Technical description

General Information

The ultrasonic system for splice detection consists of a VSU 12/4... evaluation amplifier and a DB 18 UP ultrasonic sensor pair. It mainly detects splices on paper, plastic or metal web used on roll machines.

Mounting

Transmitter and receiver (DB 18 UP) have the same construction and are to be mounted at an angle of $65^\circ (\pm 2^\circ)$ relative to the sheet.

The distance between transmitter and receiver should be 25mm (± 5 mm).

Exact alignment ($\pm 1^\circ$) must be ensured. Alignment which is not in line with the axis results in a reduction of the working range. The material to be scanned must be located approx. 8 ... 10mm above the transmitter.

The pitch of the sensors should be parallel to the tape or, as the case may be, splices.

Function

The evaluation unit can be operated in two different modes.

a) Parameter switch S1 in position "0" (paper)

The sheet is either paper or cardboard.

b) Parameter switch S1 in position "1" (foil)

The sheet is either plastic or metalised foil.
The amplifier has a higher sensitivity.

The changeover from "paper" to "foil" can also be performed via PIN 5 "Paper/Foil". Low-level on connection 5 means "paper", high-level (≥ 8 V) on connection 5 means "foil". The parameter switch **S1** must be in position **0** "paper" in order to use this feature (state on delivery).

Adjusting the sensitivity (P2)

Inhomogeneities in the web material may lead to erroneous switching in the detection of glued seams. These faults may generate signals even if there is no glued seam. By lowering the sensitivity via the potentiometer **P2** (turn left), this erroneous switching may be alleviated. Full right turn position on **P2** corresponds to maximum sensitivity (factory setting).

Operation VSU 12/4.4

The VSU 12/4.4 evaluation unit automatically adapts to the acoustic transmissivity of the medium. As soon as a splice is detected, the "splice detected" output (tape) is triggered. The duration of the output signal can be set via the potentiometer (pulse stretching) **P1**. The maximum time which can be set is 200ms. A detected splice is indicated on LED **C**.

If the level is not sufficient for reliable detection, the "Material not detectable" output (Level under Limit) is triggered. This is also signalled via the red flashing LED **A**.

Operation VSU 12/4.5

The VSU 12/4.5 evaluation unit automatically adapts to the acoustic transmissivity of the medium. As soon as a splice is detected, the "splice detected" output (tape) is triggered. The duration of the output signal can be set via the potentiometer (pulse stretching) **P1**. The maximum time which can be set is 200ms. A detected splice is indicated on LED **C**.

If the level is not adequate for reliable detection, this is indicated by the red, flashing LED **A**. As soon as the system detects a paper tear or if no material is present between the sensors, this is indicated at PIN 2 via the PNP output.

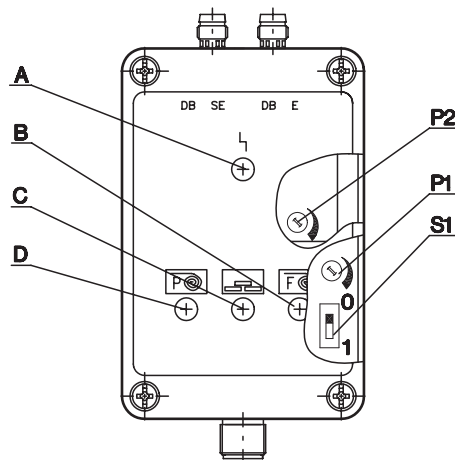
Controls and indicators

Display

(see Specifications)

Adjustment

(see Specifications)

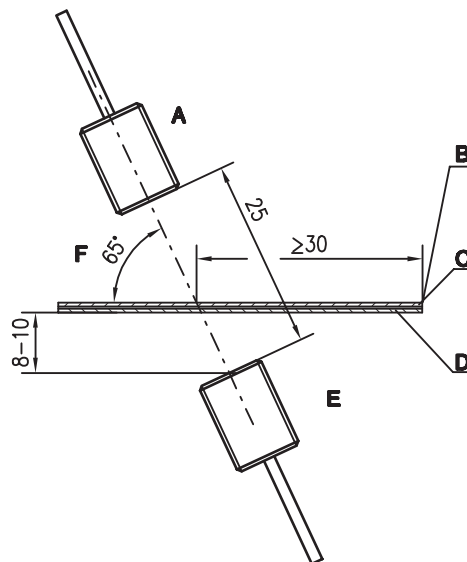


- A LED red
- B LED green
- C LED yellow
- D LED green
- P1 Potentiometer
0 ... 200ms pulse stretching
- P2 Potentiometer
sensitivity adjustment
- S1 Foil/Paper switch
0 = paper
1 = foil

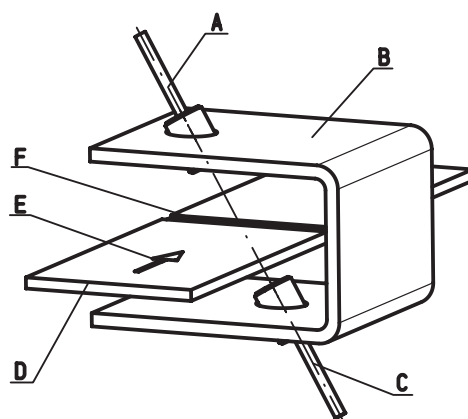
Installation and Remarks

Remarks

- When aligning the sender and receiver, the best possible alignment must be ensured.
- For proper function, the sensors must be positioned at an angle of $F = 65^\circ (\pm 2^\circ)$ relative to the web.



- A Receiver
- B Outer edge
- C Tape min. 15mm wide
- D Paper or foil web
- E Transmitter
- F Pitch relative to the direction of travel



- A Receiver
- B Holder
- C Transmitter
- D Paper or foil web
- E Direction of travel
- F Splice