



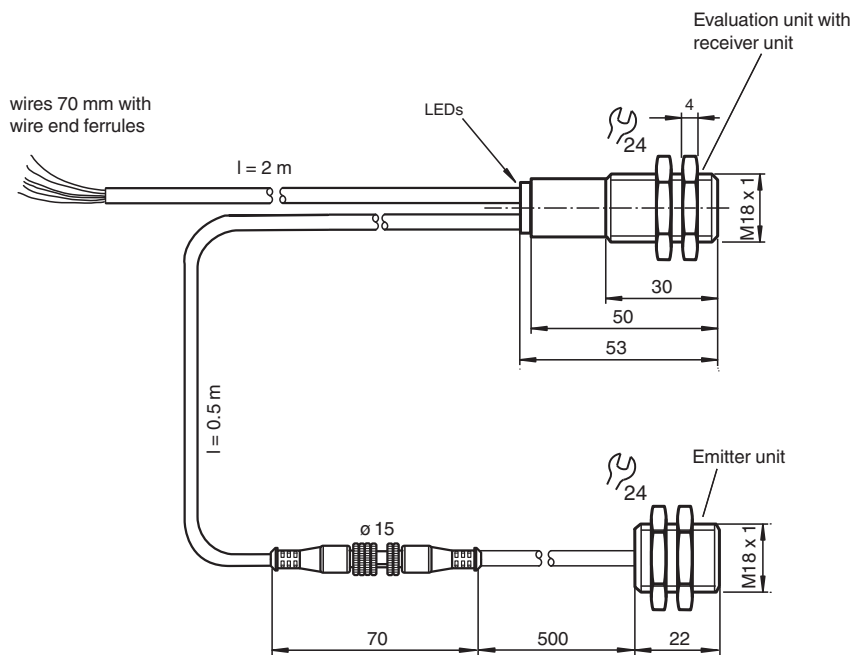
Label sensor

ULB-18GM50-255-2E3

- Ultrasonic system for detection of labels and carrier materials.
- Short version
- Insensitive to printing, colors, and shining surfaces
- Automatic compensation of the operating point with slowly changing ambient condition
- Very high processing speeds are possible.



Dimensions



Technical Data

General specifications

Sensing range	20 ... 60 mm , optimal distance: 45 mm
Transducer frequency	255 kHz

Indicators/operating means

LED green	Display: readiness
LED yellow	indication: label detected
LED red	Display: error

Electrical specifications

Operating voltage	U_B	18 ... 30 V DC , ripple 10 % _{SS}
No-load supply current	I_0	< 60 mA

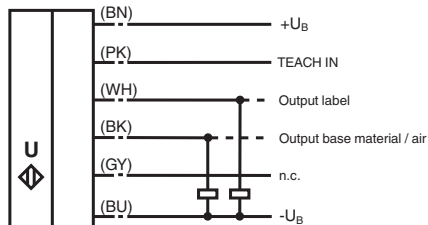
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Technical Data

Time delay before availability	t_v	< 500 ms
Input		
Input type		Teach-In input 0-level: $-U_B \dots -U_B + 1V$ 1-level: $+U_B - 1V \dots +U_B$
Pulse length		≥ 500 ms
Impedance		≥ 10 k Ω
Output		
Output type		2 switch outputs PNP, NC
Rated operating current	I_e	2 x 100 mA , short-circuit/overload protected
Voltage drop	U_d	≤ 3 V
Switch-on delay	t_{on}	≤ 600 μ s
Switch-off delay	t_{off}	≤ 600 μ s
Compliance with standards and directives		
Standard conformity		
Standards		EN IEC 60947-5-2:2020 IEC 60947-5-2:2019
Approvals and certificates		
UL approval		C-UL listed: 57M3, IND CONT. EQ., "Powered by 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		-40 ... 70 °C (-40 ... 158 °F)
Mechanical specifications		
Connection type		cable PVC , 2 m
Core cross section		0.14 mm ²
Degree of protection		IP67
Material		
Housing		nickel plated brass; plastic components: PBT
Transducer		epoxy resin/hollow glass sphere mixture; polyurethane foam
Mass		150 g
Dimensions		
Length		53 mm
Diameter		18 mm

Connection Assignment

Standard symbol/Connection:
Label monitor

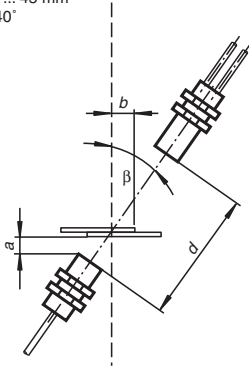


Characteristic Curve

Mounting/Adjustment

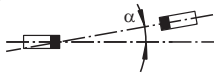
Suggestions:

- a = 5 mm ... 15 mm
- b ≥ 10 mm
- d = 40 mm ... 45 mm
- β = 20° ... 40°



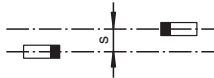
Angular misalignment

$\alpha < +/- 1^\circ$



Sensor offset

$s < +/- 1 \text{ mm}$



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Operation

Operation in applications with increased ESD requirements

Using the included metal screw caps, the sensor can be used in applications with increased ESD requirements up to 30 kV (ESD = electrostatic discharge). The metal coupling nuts are screwed on the front of the transmitter and receiver. The installation of the transmitter and receiver must ensure a large area electrical connection to the machine earth.

Additional Information

Description of sensor functions

The ultrasonic double sheet monitor for label detection can be used in all applications, where an automatic detection of labels is required, to automatise labelling of goods. Even transparent or metalised labels can be detected without problem. The double-sheet monitor is based on the ultrasonic through-beam principle. The following can be detected:

- No base material, i.e. air,
- Labels

A microprocessor system evaluates the signals. The appropriate switch outputs are set as a result of the evaluation. Changes in ambient conditions such as temperature and humidity are compensated for automatically. The interface electronics is integrated into a compact M18 metal housing together with a sensor head.

Electrical connection

The sensor is equipped with 6 connecting wires. The functionality of the connections is described in the following table. The teach input (PK) is used to teach the sensor.

Colour	Switching on	Comments
BN	+U _B	
WH	Switch output for labels	Pulse width corresponds to the event
BK	Switch output for base material / air	Pulse width corresponds to the event
GY	not connected	
PK	-U _B / n.c. / +U _B	Normal operation / TEACH-IN
BU	-UB	

Normal mode

The sensor is working in normal mode if the function input (PK) is applied to -U_B or not connected.

Displays:

LED yellow: Detection of labels

LED green: Power on

LED red: Error

Switch outputs:

The switch outputs are only active in normal operation!

White: WH Label output

Black: BK Base material / air output

TEACH-IN mode

Connecting the teach input (PK) with +U_B for at least 500 ms causes the sensor to change into TEACH-IN mode. The TEACH-IN procedure takes place by the transition from label to base material. We suggest to accomplish the TEACH-IN procedure with activated material feeding and multiple label/base material transitions.

During the TEACH-IN procedure flashes the yellow LED; the green LED is off.

After returning to the normal operation mode (teach input (PK) detached from +U_B) the sensor indicates whether the TEACH-IN procedure was successful or not.

TEACH-IN procedure successful: green LED flashes 3 times

TEACH-IN procedure not successful: red LED flashes 3 times

Notes:

A complete device consists of an ultrasonic emitter and an evaluation unit with an ultrasonic emitter. The sensor heads are optimally adjusted to each other when they leave the factory. Therefore, they must not be used separately or exchanged with other devices of the same type. The plug connector on the emitter/receiver connection cable is only intended to be used for easier mounting, not to replace units.

If two or more double sheet controls are used in the immediate vicinity of each other, there may be mutual interference between them, which can result in improper functionality of the devices. Mutual interference can be prevented by introducing suitable countermeasures when planning systems. Suitable measures can be:

- Mounting of sound absorbers (foam material)
- mounting of sound separators (sheet metal)
- installation of the sensors with different directions of sound transmission.