



**Model Number**

**UB2000-F54-E3-Y124738**

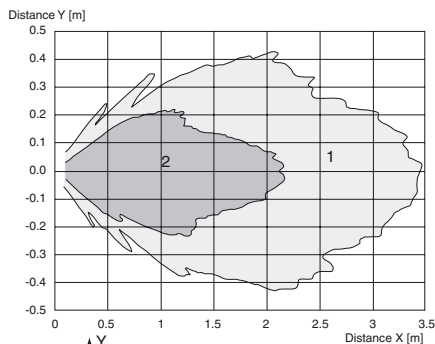
Single head system

**Features**

- **Switch output**
- **Program input**
- **Synchronization options**
- **Deactivation option**
- **Temperature compensation**

**Diagrams**

**Characteristic response curve**



Curve 1: flat surface 100 mm x 100 mm  
Curve 2: round bar, Ø 25 mm

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**Technical data**

**General specifications**

Sensing range	80 ... 2000 mm
Adjustment range	100 ... 620 mm
Unusable area	0 ... 80 mm
Standard target plate	100 mm x 100 mm
Transducer frequency	approx. 175 kHz
Response delay	≤ 50 ms

**Indicators/operating means**

LED green	solid green: monitoring system green off: program function or fault
LED yellow	indication of the switching state 3x flashing: program function object detected
LED red	solid red: Error red, flashing: program function, object not detected

**Electrical specifications**

Operating voltage $U_B$	10 ... 30 V DC, ripple 10 % <sub>SS</sub>
No-load supply current $I_0$	≤ 55 mA

**Input/Output**

Synchronization	1 synchronous input 0-level: $-U_B \dots +1$ V 1-level: $+4$ V $\dots +U_B$ input impedance: > 12 KOhm synchronization pulse: 0,1 ... 28 ms
Synchronization frequency	≤ 40 Hz
Common mode operation	≤ 33 / n Hz, n = number of sensors

**Input**

Input type	1 program input, switching point A1 + 30mm: +5 V ... $+U_B$ input impedance: > 4.7 kΩ, program pulse: ≥ 1 s
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**Output**

Output type	1 switch output PNP
Rated operating current $I_e$	200 mA, short-circuit/overload protected
Voltage drop $U_d$	≤ 3 V
Temperature influence	± 1.5 % of full-scale value

**Measurement accuracy**

Start-up drift	≤ 5 %
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**Ambient conditions**

Ambient temperature	0 ... 70 °C (32 ... 158 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)

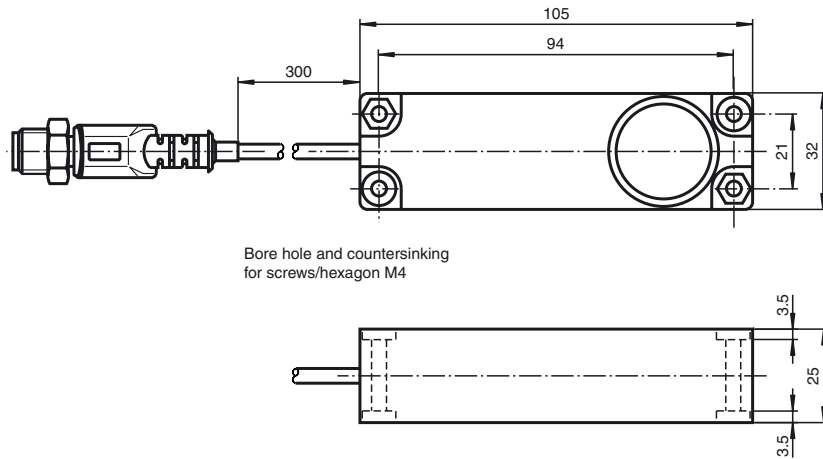
**Mechanical specifications**

Protection degree	IP65
Connection	fixed cable 300 mm with V15 male connector (M12 x 1), 5 pin
Material	
Housing	ABS
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Mass	135 g

**Compliance with standards and directives**

Standard conformity	
Standards	EN 60947-5-2:2007 IEC 60947-5-2:2007

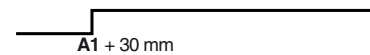
**Dimensions**



**Additional Information**

**Programmed switching output function**

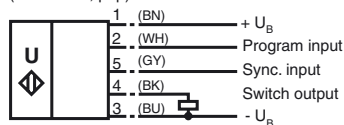
Switch point, normally closed function



Object detected: Switch output open  
No object detected: Switch output closed

**Electrical Connection**

Standard symbol/Connections:  
(version E5, pnp)



Wire colors in accordance with EN 60947-5-2.

**Pinout**

**Connector V15**



**Accessories**

**V15-G-2M-PVC**

Cable socket, M12, 5-pin, PVC cable

**V15-W-2M-PUR**

Cable socket, M12, 5-pin, PUR cable

**Synchronisation**

The sensor features a synchronisation input for the suppression of mutual interference. If this input is not used, the sensor will operate using an internally generated clock rate. The synchronisation of multiple sensors can be realised as follows:

**External synchronisation**

The sensor can be synchronised by the external application of a square wave voltage. A synchronisation pulse at the synchronisation input starts a measuring cycle. The pulse must have a duration greater than 100 µs. The measuring cycle starts with the falling edge of a synchronisation pulse. A low level > 1 s or an open synchronisation input will result in the normal operation of the sensor. A high level at the synchronisation input disables the sensor.

Two operating modes are available

1. Multiple sensors can be controlled by the same synchronisation signal. The sensors are synchro-

nised.

2. The synchronisation pulses are sent cyclicly to individual sensors. The sensors operate in multiplex mode.

**Internal synchronisation**

The synchronisation connections of up to 5 sensors capable of internal synchronisation are connected to one another. When power is applied, these sensors will operate in multiplex mode. The response delay increases according to the number of sensors to be synchronised.

**Note:**

If the option for synchronization is not used, the synchronization input has to be connected to ground (0V) or the sensor has to be operated via a V1 cable connector (4-pin).

**Adjustment of the switch output**

For TEACH-IN of the switch output, a voltage > 5 V must be applied to the TEACH-input. After approx. 1 s the sensor goes into TEACH mode. Now the sensor evaluates the current object distance. In case of an object distance <620 mm, the sensor saves a value, which is 30 mm greater than the evaluated into the internal RAM after another half second. A successful TEACH-IN is indicated by triple flashing of the yellow LED. The switch output is now off, in case of constant object distance, because of the stored switching distance increased by 30 mm.

If the TEACH-IN was not successful (no object inside a range of 100 mm ... 620 mm) the red LED flashes. The switch output is switched off and gets locked. The output lock remains until another successful TEACH-IN is performed.

**Switch on conditions for the output**

For switching on the output, 2 conditions must be fulfilled:

- The object distance must exceed the taught object distance by more than 30 mm and
- at the TEACH-input a voltage > 5 V must be applied.

**Switch off condition for the output**

An activated switch output remains in this state, until it is reset by applying -U<sub>B</sub> voltage (0 V) to the TEACH-input or a floating TEACH-input.

**LED Display**

LED-timing ultrasonic-muting sensor for protection of the delivery tray						
LED red						
LED yellow						
LED green						
<b>Sensor state</b>	+U <sub>b</sub> = 0 V	Power ON reset, probe active, wait for Teach IN	Teach input = +U <sub>b</sub> , wait 1 sec, storing the current distance + 30 mm in EEPROM, storing successful	Sensor active, detects unchanged stack position, U <sub>out</sub> = 0 V	Output active, U <sub>out</sub> = U <sub>b</sub> Sensor waiting for Power ON, Reset or new Teach IN	Teach input = +U <sub>b</sub> , storing the current distance + 30 mm in EEPROM <b>not possible</b> , storing not successful
<b>Phase</b>	0	1	2 a	3	4	2 b
<b>Machine state</b>	OFF	Paper is being stacked	Paper stack has arrived down below	Paper stack remains unchanged in the delivery tray	Operator lifts up stack and pulls it > 30 mm out of its position	Paper stack cannot be detected, no paper stack present, too many interfering echoes, measuring not possible within valid range of values
*) red LED: lights up sporadically in these time periods when signal-to-noise ratio diminishes. No effect on measuring results						

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