

Ultrasonic sensor

UB2000-F54-U-V15

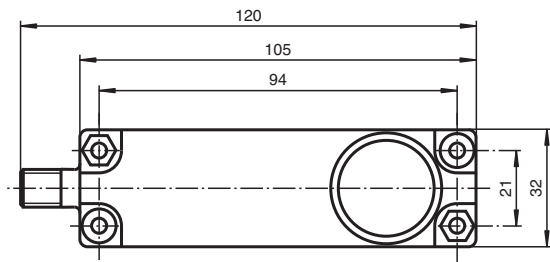


- Analog output 0 ... 10 V
- Measuring window adjustable
- Program input
- Synchronization options
- Deactivation option
- Temperature compensation

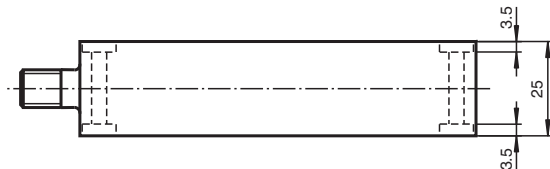
Single head system



Dimensions



Bore hole and countersinking for screws/hexagon M4



Technical Data

General specifications		
Sensing range		80 ... 2000 mm
Adjustment range		100 ... 2000 mm
Dead band		0 ... 80 mm
Standard target plate		100 mm x 100 mm
Transducer frequency		approx. 175 kHz
Response delay		≤ 150 ms
Indicators/operating means		
LED green		solid green: monitoring system green flashing: program function
LED yellow		solid yellow: object in the evaluation range yellow, flashing: program function, object detected
LED red		flashing: normal mode: error Program function: no object detected permanently: Program mode, object uncertain
Electrical specifications		
Operating voltage	U _B	15 ... 30 V DC , ripple 10 % _{SS}

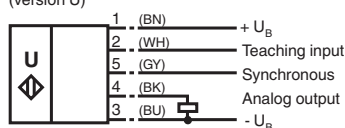
Release date: 2025-05-16 Date of issue: 2025-05-16 Filename: 108163_eng.pdf

Technical Data

No-load supply current	I_0	$\leq 55 \text{ mA}$
Input/Output		
Synchronization		1 synchronous input 0-level: $-U_B \dots +1 \text{ V}$ 1-level: $+4 \text{ V} \dots +U_B$ input impedance: $> 12 \text{ k}\Omega$ synchronization pulse: 0,1 ... 28 ms
Synchronization frequency		
Common mode operation		max. 33 Hz
Multiplex operation		$\leq 33 / n \text{ Hz}$, n = number of sensors
Input		
Input type		1 program input lower evaluation limit A1: $-U_B \dots +1 \text{ V}$, upper evaluation limit A2: $+4 \text{ V} \dots +U_B$ input impedance: $> 4.7 \text{ k}\Omega$, pulse duration: $\geq 1 \text{ s}$
Output		
Output type		1 analog output 0 ... 10 V
Default setting		evaluation limit A1: 100 mm evaluation limit A2: 2000 mm
Resolution		0.47 mm
Deviation of the characteristic curve		$\pm 1 \%$ of full-scale value
Repeat accuracy		$\pm 0.1 \%$ of full-scale value
Load impedance		$\geq 1 \text{ k}\Omega$
Temperature influence		$\pm 1.5 \%$ of full-scale value
Compliance with standards and directives		
Standard conformity		
Standards		EN IEC 60947-5-2:2020 IEC 60947-5-2:2019 EN 60947-5-7:2003 IEC 60947-5-7:2003
Approvals and certificates		
UL approval		cULus Listed, General Purpose
CCC approval		CCC approval / marking not required for products rated $\leq 36 \text{ V}$
Ambient conditions		
Ambient temperature		$-25 \dots 70 \text{ }^\circ\text{C}$ ($-13 \dots 158 \text{ }^\circ\text{F}$)
Storage temperature		$-40 \dots 85 \text{ }^\circ\text{C}$ ($-40 \dots 185 \text{ }^\circ\text{F}$)
Mechanical specifications		
Connection type		Connector plug M12 x 1 , 5-pin
Degree of protection		IP65
Material		
Housing		ABS
Transducer		epoxy resin/hollow glass sphere mixture; polyurethane foam
Mass		100 g
Dimensions		
Height		31 mm
Width		105 mm
Length		25 mm

Connection Assignment

Standard symbol/Connections:
(version U)



Core colours in accordance with EN 60947-5-2.

Release date: 2025-05-16 Date of issue: 2025-05-16 Filename: 108163_eng.pdf

Connection Assignment

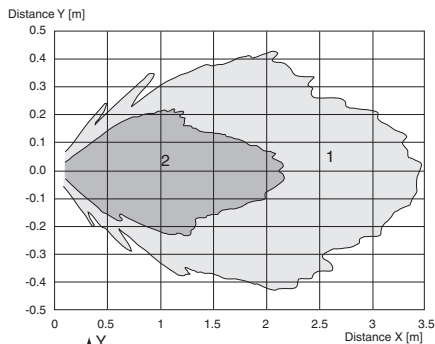


Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

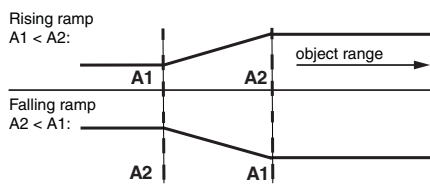
Characteristic Curve

Characteristic response curve



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

Programming the analog output mode



Release date: 2025-05-16 Date of issue: 2025-05-16 Filename: 108163_eng.pdf

Additional Information

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 synchronised.
2. The synchronisation pulses are sent cyclically 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.

Synchronisation cannot be performed during TEACH-IN and vice versa. The sensors must be operated in an unsynchronised manner to teach the evaluation limits.

Note:

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

Adjusting the evaluation range (analogue output)

The ultrasonic sensor has an analogue output with programmable evaluation limits. These are set by applying the supply voltage $-U_B$ or $+U_B$ to the TEACH-IN input. The supply voltage must be applied to the TEACH-IN input for at least 1 s. LEDs indicate whether the sensor has recognised the target during the TEACH-IN procedure. The lower evaluation limit A1 is taught with $-U_B$, A2 with $+U_B$.

Two different output functions can be set:

1. Analogue value increases with rising distance to object (rising ramp)
2. Analogue value falls with rising distance to object (falling rampe)

TEACH-IN rising ramp (A1 > A2)

- Position object at lower evaluation limit
- TEACH-IN lower limit A1 with $-U_B$
- Position object at upper evaluation limit
- TEACH-IN upper limit A2 with $+U_B$

TEACH-IN falling ramp (A1 > A):

- Position object at lower evaluation limit
- TEACH-IN lower limit A2 with $+U_B$
- Position object at upper evaluation limit
- TEACH-IN upper limit A1 with $-U_B$

LED Displays

Displays in dependence on operating mode	Red LED	Yellow LED	Green LED
TEACH-IN evaluation limit			
Object detected	off	flashes	flashes
No object detected	flashes	off	flashes
Object uncertain (TEACH-IN invalid)	on	off	flashes
Normal mode (evaluation range)	off	on	on
Fault	flashes	previous state	off

Release date: 2025-05-16 Date of issue: 2025-05-16 Filename: 108163_eng.pdf