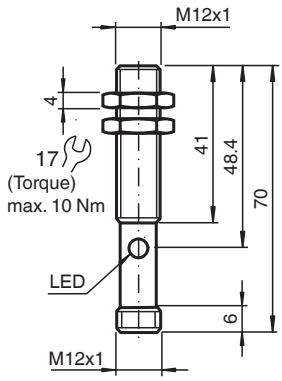
Ultrasonic sensor

UBH60/30-12GM-U-V1

- Thickness measurement with analog output 0 ... 10 V
- Automatic compensation of the reference distance, deactivateable
- Extremely narrow projection cone
- Short response time

Single head system

Dimensions



Technical Data

General specifications		
Measurement range		object thickness (d) : 0 ... 30 mm
Dead band		0 ... 15 mm
Reference distance	h	50 ... 60 mm
Standard target plate		10 mm x 10 mm
Transducer frequency		approx. 850 kHz
Response delay		approx. 12 ms
Indicators/operating means		
LED yellow		solid: object in evaluation range

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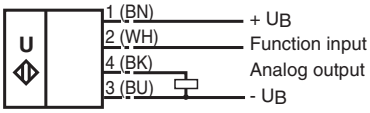
Technical Data

LED red		solid red: Error red, flashing: program function, object not detected
Electrical specifications		
Operating voltage	U_B	15 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	I_0	≤ 30 mA
Time delay before availability	t_v	≤ 200 ms
Input		
Input type		1 funtion input 0-level: -$U_B$or unwired 1-level: +4 V ... +U_B input impedance: > 4.7 kΩ
Output		
Output type		1 analog output 0 ... 10 V
Resolution		0.17 mm
Deviation of the characteristic curve		± 1 % of full-scale value
Repeat accuracy		± 0.5 % of full-scale value
Load impedance		> 1 kOhm
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, Class 2 Power Source
CCC approval		CCC approval / marking not required for products rated ≤36 V
Ambient conditions		
Ambient temperature		-25 ... 70 °C (-13 ... 158 °F)
Storage temperature		-40 ... 85 °C (-40 ... 185 °F)
Mechanical specifications		
Connection type		Connector plug M12 x 1 , 4-pin
Housing diameter		12 mm
Degree of protection		IP67
Material		
Housing		brass, nickel-plated
Transducer		epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Mass		25 g

Connection

Standard symbol/Connections:



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

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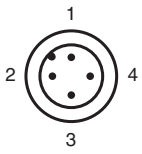
Connection Assignment

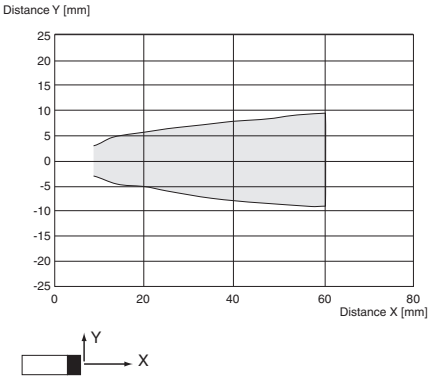


Wire colors in accordance with EN 60947-5-2

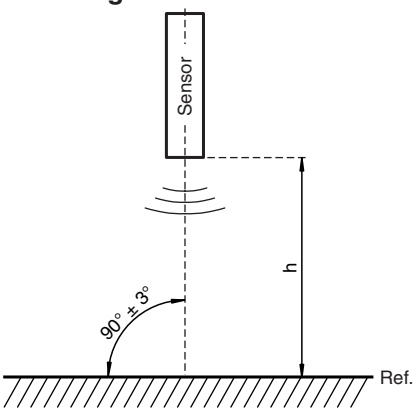
1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Characteristic Curve

Characteristic response curve



Mounting



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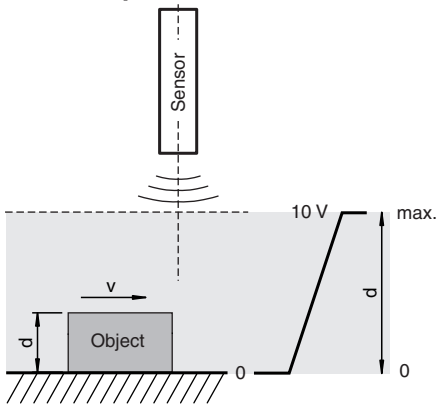
Characteristic Curve

Normal operation



Accessories

	**BF 5-30**	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
	**BF 12**	Mounting flange, 12 mm
	**BF 12-F**	Plastic mounting adapter, 12 mm
	**V1-G-2M-PVC**	Female cordset single-ended M12 straight A-coded, 4-pin, PVC cable grey
	**V1-W-2M-PUR**	Female cordset single-ended M12 angled A-coded, 4-pin, PUR cable grey
	**UVW90-M12**	Ultrasonic -deflector
	**M12K-VE**	Plastic nuts with centering ring for the vibration-free mounting of cylindrical sensors

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Additional Information

Functional description

This sensor is used to measure the thickness of objects. It teaches itself by independently switching to a reference object. The distance h to this object serves as a reference distance and defines the object thickness 0 mm. This reference distance can be dynamically tracked in order to compensate for external influences. This guarantees a high measurement accuracy of the sensor over the entire temperature range.

Automatic teach-in process

Immediately after the supply voltage is connected, the sensor automatically references itself to the reference object and teaches in the distance as the reference distance. The distance h between the sensor surface and the reference object must lie within the valid range for the reference distance (see Technical Data). The sensor then immediately reverts to normal operation.
If no reference object is detected, the red LED flashes (Fault).

Normal operation

In normal operation, the sensor outputs a value at the analog output, which is proportional to the thickness of the object. The object thickness 0 mm (measurement to the reference object) is represented in this by the minimum analog value and the largest measurable object thickness (see Technical Data) is represented by the maximum analog value.

Dynamic tracking of the reference distance

The dynamic tracking of the reference distance can be activated and deactivated by means of the function input circuitry (see Function Input).
Dynamic tracking activated:
(Function input open or connected with $-U_B$)
When measuring an object, the sensor must detect the reference point again within no longer than four seconds in order to be re-referenced to it. Otherwise the object is interpreted as the reference. Then, in accordance with a PTI characteristic with a time constant of 14 s, this distance value becomes the new reference distance.
If the object is incorrectly taught-in as the reference and then moves outside the sensor's detection field so that the greater distance to the actual reference object is measured, the sensor immediately reacts. The new, greater distance is taught-in as the reference without delay.
Dynamic tracking deactivated:
(Function input connected with $+U_B$)
The reference distance automatically taught-in when the sensor is switched on is retained during the entire operation.

Function input

The function input is used to activate/deactivate the dynamic tracking of the reference distance (see above).

LED indicator

Indication as a function of operating status	Red LED	Yellow LED
Teach-in control limit: No reference object detected or reference object at an incorrect distance	Flashes	Off
Normal operation Measurement on object Measurement on reference	 Off Off	 On Off
Fault	On	Last valid status

Additional Information

If the sensor is installed at places, where the environment temperature can fall below 0 °C, for the sensors fixation, one of the mounting flanges BF 12, BF 12-F or BF 5-30 must be used. In case of direct mounting of the sensor in a through hole, it has to be fixed at the middle of the housing thread.

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