

# ULTRASONIC SENSORS OVERVIEW



# ULTRASONIC SENSORS – PHYSICS AND TECHNOLOGY

Ultrasonic sensors from Pepperl+Fuchs use a ceramic piezo element as acoustic transmitter and receiver. A patented coupling layer made of a special material is used to couple the ultrasound to the acoustically thinner medium of air.

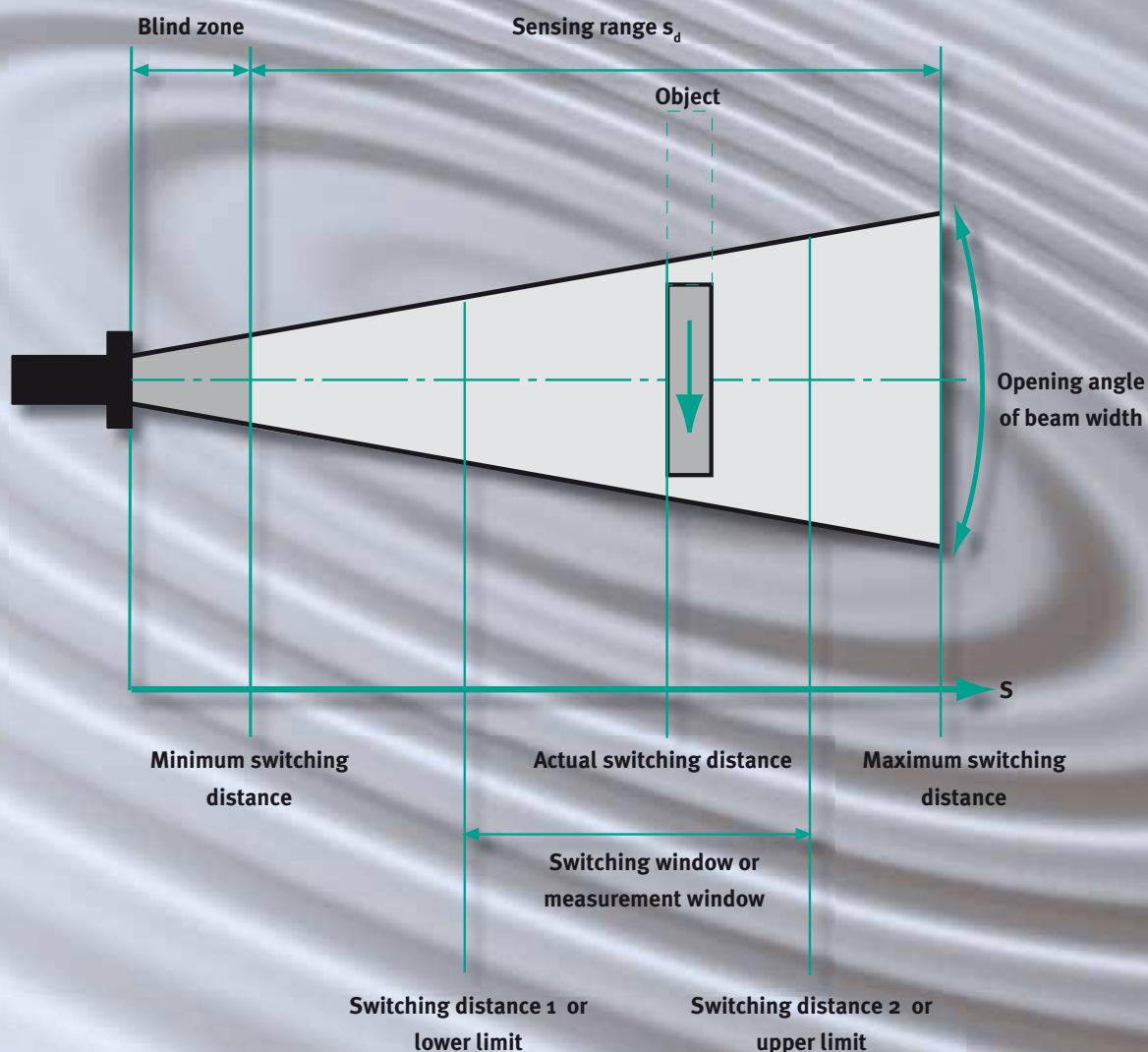
Polyurethane foam is used to make the housing waterproof. The transducer sends a sound pulse packet out and converts the echo pulse back into a voltage. The integrated controller calculates the distance using echo time and speed of sound. The transmitted pulse duration,  $\Delta t$ , and the decay time of the sonic transducer create a blind zone (unusable area) within which the ultrasonic sensor cannot detect an object.

The ultrasonic frequency lies between 65 and 400 kHz, depending on sensor type; the pulse repetition frequency between 14 and 140 Hz.

The active range of the ultrasonic sensor is designated as the sensing range,  $s_d$ , and is limited by the smallest and largest sensing distances, whose values are dependent on the size of the transducer. The largest switching distance is indicated in the type code.

The beam width detects objects that are moving axially towards it or laterally into the beam from the sides.

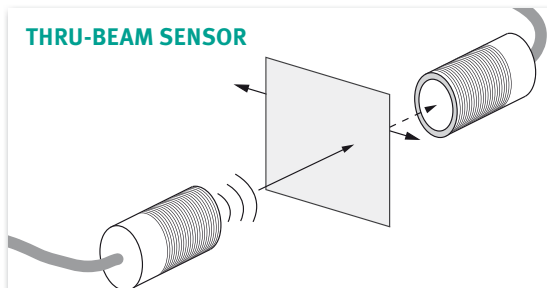
Ultrasonic sensors, depending on type, are available with switch outputs, analog outputs and/or an RS232 interface, with various output functions available.



The ultrasonic sensor principle of measurement is based on the calculation of time elapsed between sound wave transmission and receipt (probe mode) or whether the transmitted signal is received or not (barrier mode).

## BARRIER MODE

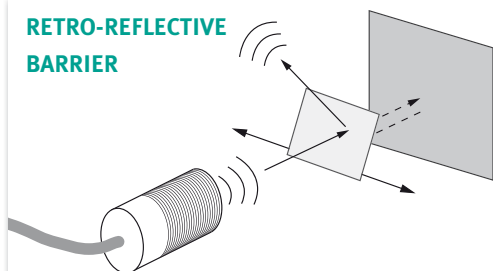
### THRU-BEAM SENSOR



Sender and receiver are installed facing one another. If the ultrasound path is interrupted by an object, the switch output is activated.

Advantage: Long range.

### RETRO-REFLECTIVE BARRIER

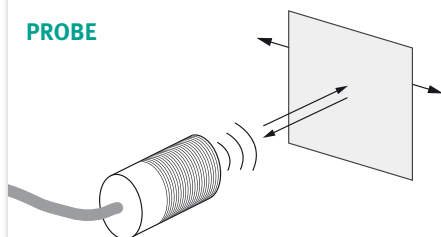


Transmitter and receiver are located in the same housing. The ultrasound is reflected from a previously defined reflector back to the receiver.

Advantage: Non-reflective or weakly reflective objects can still be reliably detected.

## PROBE MODE

### PROBE



Transmitter and receiver are located in the same housing. The ultrasound is reflected directly back to the receiver from the object to be detected.

Advantage: Simple, compact sensor, most commonly used principle.

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# CYLINDRICAL DESIGNS

## 12GM series with analog output or switch output, temperature-compensated



Characteristics			
Sensing range	15 mm ... 120 mm	15 mm ... 200 mm	30 mm ... 400 mm
Usable area	0 mm ... 15 mm	0 mm ... 50 mm	0 mm ... 30 mm
Response delay	approx. 9 ms (analog 27 ms)	approx. 30 ms	approx. 50 ms
Switching frequency (Sensors with switch output)	approx. 52 Hz	approx. 13 Hz	approx. 10 Hz
Resolution max. (Sensors with analog output)	0.17 mm (at max. sensing range)	0.17 mm (at max. sensing range)	0.17 mm (at max. sensing range)
Setting of switching points and evaluation limits	Teach-In with programming unit UB-PROG or apply +UB or -UB on Teach-In input		
Electrical data			
Operating voltage	10 V DC ... 30 V DC 15 V DC ... 30 V DC (Sensors with analog voltage output)		
Mechanical data			
Operating temperature	248 Kelvin ... 343 Kelvin (–25 °C ... +70 °C)		
Protection class	IP65		
Connection type	V1 quick-disconnect (M12 x 1), 4-pin		
Dimensions	L 70 mm, Ø 12 mm		
Outputs (order codes):			
Analog output (4 mA ... 20 mA)	UB120-12GM-I-V1	UB200-12GM-I-V1	UB400-12GM-I-V1
Analog outputs (0 V ... 10 V)	UB120-12GM-U-V1	UB200-12GM-U-V1	UB400-12GM-U-V1
1 switch output, PNP, NO/NC	UB120-12GM-E5-V1	UB200-12GM-E5-V1	UB400-12GM-E5-V1
1 switch output, NPN, NO/NC	UB120-12GM-E4-V1	UB200-12GM-E4-V1	UB400-12GM-E4-V1

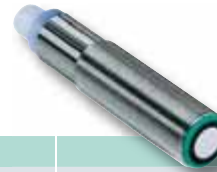
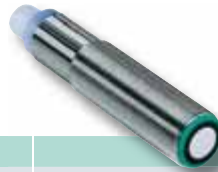
## 18GM series with analog output or switch output, temperature-compensated



Characteristics		
Sensing range	30 mm ... 300 mm	50 mm ... 800 mm
Usable area	0 mm ... 30 mm	0 mm ... 50 mm
Response delay	approx. 30 ms	approx. 100 ms
Switching frequency (Sensors with switching output)	≤ 13 Hz	≤ 4 Hz
Resolution max. (Sensors with analog output)	0.17 mm (at max. sensing range)	0.17 mm (at max. sensing range)
Setting of switching points and evaluation limits	Teach-In with programming unit UB-PROG or apply +UB or -UB on Teach-In input	
Electrical data		
Operating voltage	10 V DC ... 30 V DC 15 V DC ... 30 V DC (Sensors with analog voltage output)	
Mechanical data		
Operating temperature	248 Kelvin ... 343 Kelvin (–25 °C ... +70 °C)	
Protection class	IP65	
Connection type	V1 quick-disconnect (M12 x 1), 4-pin	
Dimensions	L 40 mm, Ø 18 mm	
Outputs (order codes):		
1 switch output, PNP NO/NC	UB300-18GM40-E5-V1 straight	UB800-18GM40-E5-V1 straight
1 analog output 4 mA ... 20 mA	UB300-18GM40-I-V1 straight	UB800-18GM40-I-V1 straight
1 analog output 0 V ... 10 V	UB300-18GM40-U-V1 straight	UB800-18GM40-U-V1 straight
1 switch output, PNP NO/NC	UB300-18GM40A-E5-V1 angled	UB800-18GM40A-E5-V1 angled
1 analog output 4 mA ... 20 mA	UB300-18GM40A-I-V1 angled	UB800-18GM40A-I-V1 angled
1 analog output 0 V ... 10 V	UB300-18GM40A-U-V1 angled	UB800-18GM40A-U-V1 angled



**18GM series with analog output,  
1 or 2 switch outputs, synchronization  
input, beam width selection**



Characteristics		
Sensing range	30 mm ... 500 mm	70 mm ... 1000 mm
Usable area	0 mm ... 30 mm	0 mm ... 70 mm
Response delay	approx. 50 ms	approx. 100 ms
Switching frequency (Sensors with switch output)	approx. 8 Hz	approx. 3 Hz
Resolution max. (Sensors with analog output)	0.13 mm (at max. sensing range)	0.35 mm (at max. sensing range)
Setting of switching points and evaluation limits	Teach-In with programming unit UB-PROG or apply +UB or –UB on Teach-In input	
Electrical data		
Operating voltage	10 V DC ... 30 V DC 15 V DC ... 30 V DC (Sensors with analog voltage output)	
Mechanical data		
Operating temperature	248 Kelvin ... 343 Kelvin (–25 °C ... +70 °C)	
Protection class	IP65	
Connection type	V1 quick-disconnect (M12 x 1), 4-pin	
Dimensions	L 40 mm, ø 18 mm	
Outputs (order codes):		
Analog output (4 mA ... 20 mA)	UB500-18GM75-I-V15	UB1000-18GM75-I-V15
Analog output (0 V ... 10 V)	UB500-18GM75-U-V15	UB1000-18GM75-U-V15
1 switch output, PNP, NO/NC	UB500-18GM75-E5-V15	UB1000-18GM75-E5-V15
1 switch output, NPN, NO/NC	UB500-18GM75-E4-V15	UB1000-18GM75-E4-V15
2 switch outputs, PNP, NO/NC	UB500-18GM75-E6-V15	UB1000-18GM75-E6-V15
2 switch outputs, NPN, NO/NC	UB500-18GM75-E7-V15	UB1000-18GM75-E7-V15
2 switch outputs, PNP, NO/NC	UB500-18GM75-E23-V15	UB1000-18GM75-E23-V15
2 switch outputs, NPN, NO/NC	UB500-18GM75-E01-V15	UB1000-18GM75-E01-V15
Frequency output/serial digital output/PWM output	UB500-18GM75-F/BIT/PWM-V15	UB1000-18GM75-F/BIT/PWM-V15



# CYLINDRICAL DESIGNS

## 30GM series with one switch output



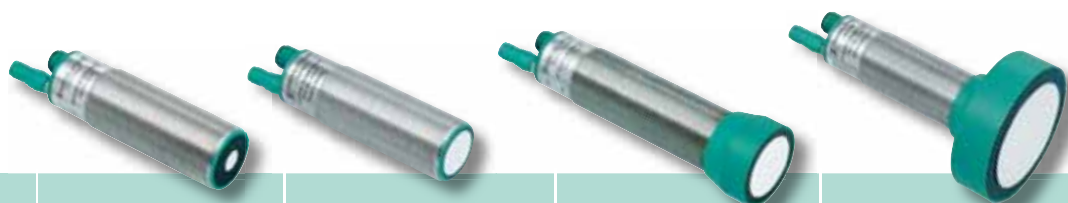
Characteristics				
Sensing range	30 mm ... 500 mm	80 mm ... 2000 mm	200 mm ... 4000 mm	350 mm ... 6000 mm
Usable area	0 mm ... 30 mm	0 mm ... 80 mm	0 mm ... 200 mm	0 mm ... 350 mm
Response delay	approx. 50 ms	approx. 150 ms	approx. 325 ms	approx. 650 ms
Switching frequency	max. 10 Hz	max. 3.3 Hz	max. 1.5 Hz	max. 0.8 Hz
Setting of switching points and Output functions (NO/NC)	Teach-In with programming unit UB-PROG or apply +UB or -UB on Teach-In input			
Electrical data				
Operating voltage	10 V DC ... 30 V DC			
Mechanical data				
Operating temperature	248 Kelvin ... 343 Kelvin (-25 °C ... +70 °C)			
Protection class	IP65			
Connection type	V15 quick-disconnect (M12 x 1), 5-pin			
Dimensions	L 94 mm, ø 30 mm	L 94 mm, ø 30 mm	L 108 mm, ø 40 mm	L 112 mm, ø 73 mm
Outputs (order codes):				
Switch output, PNP, NO/NC	UB500-30GM-E5-V15	UB2000-30GM-E5-V15	UB4000-30GM-E5-V15	UB6000-30GM-E5-V15
Switch output, NPN, NO/NC	UB500-30GM-E4-V15	UB2000-30GM-E4-V15	UB4000-30GM-E4-V15	UB6000-30GM-E4-V15

## 30GM series with analog output, synchronized input, beam width selection



Characteristics					
Sensing range	15 mm ... 300 mm	30 mm ... 500 mm	80 mm ... 2000 mm	200 mm ... 4000 mm	350 mm ... 6000 mm
Usable area	0 mm ... 15 mm	0 mm ... 30 mm	0 mm ... 80 mm	0 mm ... 200 mm	0 mm ... 350 mm
Response delay	approx. 35 ms	approx. 63 ms	approx. 195 ms	approx. 440 ms	approx. 850 ms
Resolution max.	0.172 mm	0.35 mm	0.35 mm	0.35 mm	0.35 mm
Temperature/ Teaching plug	Teach-in of evaluation limits and output functions (falling, rising slope) by temperature/teaching plug During normal mode, the teaching plug must remain in the T position to provide temperature compensation!				
Serial interface	RS232 (parameterization using Ultra 3000 Windows software)				
Electrical data					
Operating voltage	10 V DC ... 30 V DC				
Mechanical data					
Operating temperature	273 Kelvin ... 323 Kelvin (0 °C ... +70 °C)	248 Kelvin ... 343 Kelvin (–25 °C ... +70 °C)			
Protection class	IP65				
Connection type	V1 quick-disconnect (M12 x 1), 4-pin	V15 quick-disconnect (M12 x 1), 5-pin			
Dimensions	L 114 mm, ø 30 mm	L 114 mm, ø 30 mm	L 114 mm, ø 30 mm	L 128 mm, ø 40 mm	L 132 mm, ø 73 mm
Outputs (order codes):					
Analog output (4 mA ... 20 mA) and (0 V ... 10 V)	UC300-30GM-IUR2-V15	UC500-30GM-IUR2-V15	UC2000-30GM-IUR2-V15	UC4000-30GM-IUR2-V15	UC6000-30GM-IUR2-V15

**30GM series with 2 switch outputs, synchronization input, beam width selection**



Characteristics				
Sensing range	30 mm ... 500 mm	80 mm ... 2000 mm	200 mm ... 4000 mm	350 mm ... 6000 mm
Usable area	0 mm ... 30 mm	0 mm ... 80 mm	0 mm ... 200 mm	0 mm ... 350 mm
Response delay	≤ 63 ms	≤ 195 ms	≤ 300 ms	≤ 850 ms
Switching frequency	≤ 7 Hz	≤ 2.5 Hz	≤ 1 Hz	≤ 0.5 Hz
Temperature/ Teaching plug	Teach-in switch points and output function (NC/NO) with temperature/teaching plug In normal mode, the teaching plug must remain in the T position to provide temperature compensation!			
Electrical data				
Operating voltage	10 V DC ... 30 V DC			
Mechanical data				
Operating temperature	248 Kelvin ... 343 Kelvin (–25 °C ... +70 °C)			
Protection class	IP65			
Connection type	V15 quick-disconnect (M12 x 1), 5-pin			
Dimensions	L 94 mm, ø 30 mm	L 94 mm, ø 30 mm	L 108 mm, ø 40 mm	L 112 mm, ø 73 mm
Outputs (order codes):				
Switch output, PNP, NO/NC	<b>UC500-30GM-E6R2-V15</b>	<b>UC2000-30GM-E6R2-V15</b>	<b>UC4000-30GM-E6R2-V15</b>	<b>UC6000-30GM-E6R2-V15</b>
Switch output, NPN, NO/NC	<b>UC500-30GM-E7R2-V15</b>	<b>UC2000-30GM-E7R2-V15</b>	<b>UC4000-30GM-E7R2-V15</b>	<b>UC6000-30GM-E7R2-V15</b>

**30GM series with 2 switch outputs or analog output, miniature remote transducer for narrow installation conditions, beam width selection**



Characteristics		
Sensing range	30 mm ... 300 mm	30 mm ... 300 mm
Usable area	0 mm ... 30 mm	0 mm ... 30 mm
Response delay	≤ 63 ms	≤ 63 ms
Switching frequency	–	≤ 7 Hz
Resolution max.	≥ 0.35 mm	–
Temperature/teaching plug	Teach-in of evaluation limits and output functions (falling/rising slope) using temperature/teaching plug. In normal mode the teaching plug must remain in the T position to provide temperature compensation.	Teach-in of switching point and output functions (NO/NC) using temperature/teaching plug. In normal mode the teaching plug must remain in the T position to provide temperature compensation!
Serial interface	RS232 (parameterization using Ultra 3000 Windows software)	
Electrical data		
Operating voltage	10 V DC ... 30 V DC 15 V DC ... 30 V DC (Sensors with analog voltage output)	
Mechanical data		
Operating temperature	248 Kelvin ... 343 Kelvin (–25 °C ... +70 °C)	
Protection class	IP65	
Connection type	V15 quick-disconnect (M12 x 1), 5-pin	
Dimensions	L 25 mm, ø 18 mm	L 25 mm, ø 18 mm
Outputs (order codes):		
Analog output (4 mA ... 20 mA) and (0 V ... 10 V)	<b>UC300-30GM-IUR2-K-V15</b>	
2 switch outputs, PNP, NO/NC		<b>UC300-30GM-E6R2-K-V15</b>

# CYLINDRICAL DESIGNS

**30GM series with 2 switch outputs, or analog output, temperature-compensated, miniature remote transducer for narrow installation conditions**



Characteristics		
Sensing range	80 mm ... 1000 mm	80 mm ... 1000 mm
Usable area	0 mm ... 80 mm	0 mm ... 80 mm
Response delay	≤ 195 ms	≤ 195 ms
Switching frequency	–	≤ 2.5 Hz
Resolution max.	≥ 0.35 mm	–
Temperature/teaching plug	Teach-in of evaluation limits and output functions (falling/rising slope) through temperature/teaching plug. In normal mode the teaching plug must remain in the T position to provide temperature compensation.	Teach-in of switching point and output functions (NO/NC) through temperature/teaching plug. In normal mode the teaching plug must remain in the T position to provide temperature compensation!
Serial interface	RS232 (parameterization using Ultra 3000 Windows software)	
Electrical data		
Operating voltage	10 V DC ... 30 V DC 15 V DC ... 30 V DC (Sensors with analog voltage output)	
Mechanical data		
Operating temperature	248 Kelvin ... 343 Kelvin (–25 °C ... +70 °C)	
Protection class	IP65	
Connection type	V15 quick-disconnect (M12 x 1), 5-pin	
Dimensions	L 27 mm, ø 30 mm	L 27 mm, ø 18 mm
Outputs (order codes):		
Analog output (4 mA ... 20 mA) and (0 V ... 10 V)	UC1000-30GM-IUR2-K-V15	
2 switch outputs, PNP, NO/NC		UC1000-30GM-E6R2-K-V15

**30GM series with 2 switch outputs, or analog output, temperature-compensated, resistant to chemicals**

- Teflon-coated transducer face provides chemical resistance



Characteristics		
Sensing range	200 mm ... 1000 mm	200 mm ... 1000 mm
Usable area	0 mm ... 200 mm	0 mm ... 200 mm
Response delay	≤ 100 ms	≤ 100 ms
Switching frequency	–	≤ 5 Hz
Resolution max.	0.35 mm (at max. sensing range)	–
Temperature/teaching plug	Teach-in of evaluation limits and output functions (falling/rising slope) using temperature/teaching plug. In normal mode the teaching plug must must remain in the T position to provide temperature compensation.	Teach-in of switching point and output functions (NO/NC) using temperature/teaching plug. In normal mode the teaching plug must remain in the T position to provide temperature compensation!
Electrical data		
Operating voltage	10 V DC ... 30 V DC 15 V DC ... 30 V DC (Sensors with analog voltage output)	
Mechanical data		
Operating temperature	248 Kelvin ... 343 Kelvin (–25 °C ... +70 °C)	
Protection class	IP65	
Connection type	V1 quick-disconnect (M12 x 1), 4-pin	
Dimensions	L 115 mm, ø 32 mm	L 96 mm, ø 32 mm
Outputs (order codes):		
Analog output (4 mA ... 20 mA) and (0 V ... 10 V)	UCC1000-30GM-IUR2-V15	
2 switch outputs, PNP, NC/NO		UCC1000-30GM-E6R2-V15



# ULTRASONIC POINT LEVEL SENSORS



**Ultrasonic point level sensor LUC with analog output and active display of movable targets, temperature-compensated**



Characteristics	
Sensing range	0 mm ... 4000 mm, for liquids
Deviation from characteristic	0.5 % of sensing range top limit
Resolution	2 mm
Electrical data	
Operating voltage	20 V DC ... 30 V DC
Analog output	4 mA ... 20 mA and 0 V ... 20 V
Mechanical data	
Operating temperature	248 Kelvin ... 343 Kelvin (–25 °C ... +70 °C)
Protection class	IP65
Connection type	V15 quick-disconnect (M12 x 1), 5-pin
Dimensions	
L 126 mm, ø 44 mm	
Process connection (order designation):	
Screw connector G11/2"A, stainless steel 1.4571	<b>LUC4T-G5S-IU-V15</b>
Screw connector G11/2"A, polypropylene	<b>LUC4T-G5P-IU-V15</b>
Screw connector G11/2"NPT, stainless steel 1.4571	<b>LUC4T-N5S-IU-V15</b>
Screw connector G11/2"NPT, polypropylene	<b>LUC4T-N5P-IU-V15</b>

**Ultrasonic point level sensor D1 with 3 relay outputs, temperature-compensated**



Characteristics	
Sensing range	60 mm ... 550 mm
Usable area	0 mm ... 60 mm
Response delay	10 s
Electrical data	
Operating voltage	10 V DC ... 252 V DC 20 V AC ... 252 V AC, 47 Hz ... 63 Hz
Mechanical data	
Operating temperature	253 Kelvin ... 333 Kelvin (–20 °C ... +60 °C)
Protection class	IP65
Connection type	V15 quick-disconnect, 7-pin
Dimensions	
L 107 mm, ø 75 mm	
Process connection (order designation):	
3 relay outputs, NC/NO	<b>UC500-D1-3K-V7</b>

# VARIKONT SERIES • FP SERIES

## VariKont series/FP series with serial interface and 8 bit output



Characteristics		
Sensing range	300 mm ... 3000 mm	800 mm ... 6000 mm
Usable area	0 mm ... 300 mm	0 mm ... 800 mm
Dynamic Response delay	≤ 100 ms	≤ 270 ms
Resolution	11 mm $\triangle$ LSB <sup>1</sup>	21 mm $\triangle$ LSB <sup>2</sup>
Electrical data		
Operating voltage	20 V DC ... 30 V DC	
Mechanical data		
Operating temperature	263 Kelvin ... 323 Kelvin (−10 °C ... +50 °C)	
Protection class	IP65	
Connection type	2 m cable, 14 x 0.14 mm <sup>2</sup>	
Dimensions L x W x H	128 mm x 40 mm x 40 mm	61 mm x 80 mm x 80 mm
Serial interface	RS232 (parameterization using Ultra 3000 Windows software)	
Outputs (order codes):		
8-bit output, error output, fault output, test input	<b>UJ3000+U1+8B+RS</b>	<b>UJ6000-FP-8B+RS</b>

## VariKont/FP series with serial interface and two switch outputs, temperature-compensated, synchronization input



Characteristics			
Sensing range	60 mm ... 500 mm	300 mm ... 3000 mm	800 mm ... 6000 mm
Usable area	0 mm ... 60 mm	0 mm ... 300 mm	0 mm ... 800 mm
Dynamic Response delay	≤ 30 ms	≤ 120 ms	≤ 120 ms / ≤ 270 ms / ≤ 360 ms
Setting the switching point and Output function (NO)	with DIP switch or RS232		
Electrical data			
Operating voltage	10 V DC ... 30 V DC		
Mechanical data			
Operating temperature	248 Kelvin ... 358 Kelvin (−25 °C ... +70 °C)		
Protection class	IP65		
Connection type	Terminal housing, M20, strand cross-section ≤ 2.5 mm <sup>2</sup>		
Dimensions L x W x H	128 mm x 40 mm x 40 mm	128 mm x 40 mm x 40 mm	61 mm x 80 mm x 80 mm
Serial interface	RS232 (parameterization using Ultra 3000 Windows software)		
Modes	Switch point mode		
	Window mode		
	Latching mode		
	Retro-reflexive mode		
	Area monitoring		
Outputs (order codes):			
Switching output 1 and 2, PNP, NC/NO	<b>UC500+U9+E6+R2</b>	<b>UC3000+U9+E6+R2</b>	<b>UC6000-FP-E6-R2-P5</b>
Switching output 1 and 2, NPN, NC/NO		<b>UC3000+U9+E7+R2</b>	<b>UC6000-FP-E7-R2-P5</b>

**VariKont/FP series**  
with serial interface,  
one switch output and one analog output,  
temperature-compensated,  
synchronization input



Series  
VariKont



Series  
VariKont



Series  
FP

Characteristics			
Sensing range	60 mm ... 500 mm	300 mm ... 3000 mm	800 mm ... 6000 mm
Usable area	0 mm ... 60 mm	0 mm ... 300 mm	0 mm ... 800 mm
Dynamic Response delay	≤ 30 ms	≤ 120 ms	≤ 270 ms
Resolution max.	0.172 mm	0.172 mm	0.172 mm
Setting the evaluation limits and output functions (falling, rising slope and NO/NC)	with DIP switch or RS232		
Electrical data			
Operating voltage	10 V DC ... 30 V DC		
Mechanical data			
Operating temperature	248 Kelvin ... 358 Kelvin (–25 °C ... +70 °C)		
Protection class	IP65		
Connection type	Terminal housing, M20, strand cross-section ≤ 2.5 mm <sup>2</sup>		
Dimensions L x W x H	128 mm x 40 mm x 40 mm	128 mm x 40 mm x 40 mm	61 mm x 80 mm x 80 mm
Serial interface	RS232 (parameterization using Ultra 3000 Windows software)		
Modes	Switch point mode		
	Window mode		
	Latching mode		
	Retro-relexive mode		
	Area monitoring		
Outputs (order codes):			
Analog output 4 mA ... 20 mA / 2 V ... 10 V	The analog output is switched independently of the load between current and voltage output to.		
Switching output, PNP, NC	UC500+U9+IUE2+R2	UC3000+U9+IUE2+R2	UC6000-FP-IUE2-R2-P5
Switching output, NPN, NC		UC3000+U9+IUE0+R2	UC6000-FP-IUE0-R2-P5

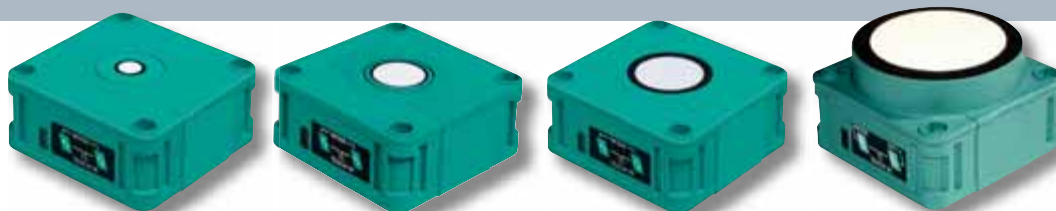
## FP series



Characteristics		
Sensing range	200 mm ... 1000 mm	0 mm ... 4000 mm
Usable area	0 mm ... 200 mm	(barrier mode)
Dynamic Response delay	≤ 100 ms	≤ 150 ms
Switching frequency	≤ 5 Hz	≤ 3 Hz
Setting the switch points and output function (NO/NC and operating mode)	with DIP switch	with Teach-In
Electrical data		
Operating voltage	20 V DC ... 30 V DC	
Mechanical data		
Operating temperature	263 Kelvin ... 323 Kelvin (–10 °C ... +50 °C)	
Protection class	IP65	
Connection type	Terminal housing, M20, strand cross-section ≤ 2.5 mm <sup>2</sup>	
Dimensions L x W x H	61 mm x 80 mm x 80 mm	61 mm x 80 mm x 80 mm
Modes	Thru-beam mode/window mode or independent switching points	Thru-beam mode, works on reflector, allowed distance 1000 mm ... 4000 mm
Outputs (order codes):		
Switch output 1 and 2, PNP, NO/NC	UB1000+FP1+E6	
Switch output, PNP, NO	UJ4000-FP-E2-P1	

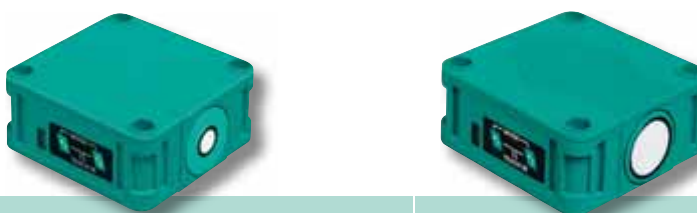
# SERIES F42

F42 series with one or two switch outputs, beam width selection, synchronization input



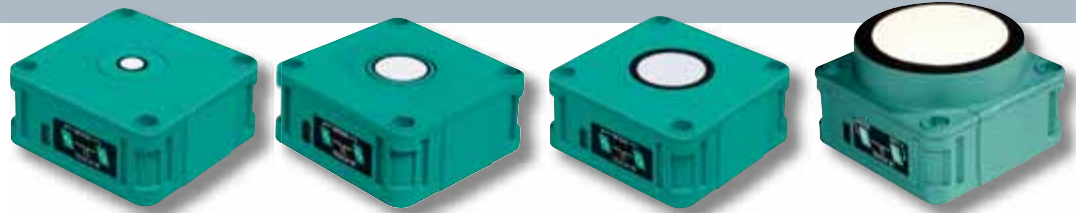
Characteristics				
Sensing range	30 mm ... 500 mm	60 mm ... 2000 mm	200 mm ... 4000 mm	350 mm ... 6000 mm
Usable area	0 mm ... 30 mm	0 mm ... 60 mm	0 mm ... 200 mm	0 mm ... 350 mm
Response delay	approx. 50 ms	approx. 150 ms	approx. 325 ms	approx. 650 ms
Switching frequency	≤ 8 Hz	≤ 3 Hz	≤ 1.5 Hz	≤ 0,6 Hz
Setting the switching points and evaluation limits	Keypad with 2 buttons			
Electrical data				
Operating voltage	10 V DC ... 30 V DC			
Mechanical data				
Operating temperature	248 Kelvin ... 358 Kelvin (–25 °C ... +70 °C)			
Protection class	IP54			
Connection type	V15 quick-disconnect (M12 x 1), 5-pin			
Dimensions L x W x H	34 mm x 80 mm x 80 mm			50 mm x 80 mm x 80 mm
Modes	Switch point mode · Window mode · Latching mode Area monitoring			
Outputs (order codes):				
1 switch output, PNP, NO/NC selectable	UB500-F42-E5-V15	UB2000-F42-E5-V15	UB4000-F42-E5-V15	UB6000-F42-E5-V15
2 switch outputs, PNP, NO/NC selectable	UB500-F42-E6-V15	UB2000-F42-E6-V15	UB4000-F42-E6-V15	UB6000-F42-E6-V15
1 switch output, NPN, NO/NC selectable	UB500-F42-E4-V15	UB2000-F42-E4-V15	UB4000-F42-E4-V15	UB6000-F42-E4-V15
2 switch outputs, NPN, NO/NC selectable	UB500-F42-E7-V15	UB2000-F42-E7-V15	UB4000-F42-E7-V15	UB6000-F42-E7-V15

F42 series with one or two switch outputs, beam width selection, synchronized input



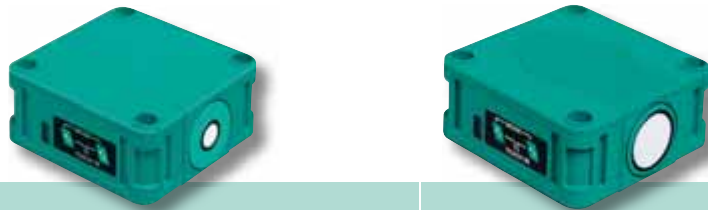
Characteristics		
Measuring range	30 mm ... 500 mm	60 mm ... 2000 mm
Usable area	0 mm ... 30 mm	0 mm ... 60 mm
Response delay	approx. 50 ms	approx. 150 ms
Switching frequency	≤ 8 Hz	≤ 3 Hz
Adjustment of switching points and evaluation boundaries	Keypad with 2 buttons	
Electrical data		
Operating voltage	10 V DC ... 30 V DC	
Mechanical data		
Operating temperature	248 Kelvin ... 343 Kelvin (–25 °C ... +70 °C)	
Protection class	IP54	
Connection type	V15 quick-disconnect (M12 x 1), 5-pin	
Dimensions L x W x H	80 mm x 34 mm x 80 mm	
Operating types	Switch point mode · Latching mode · Window mode · Detection of object presence	
Outputs (order codes):		
1 switch output, PNP, NO/NC selectable	UB500-F42S-E5-V15	UB2000-F42S-E5-V15
2 switch outputs, PNP, NO/NC selectable	UB500-F42S-E6-V15	UB2000-F42S-E6-V15
1 switch output, NPN, NO/NC selectable	UB500-F42S-E4-V15	UB2000-F42S-E4-V15
2 switch outputs, NPN, NO/NC selectable	UB500-F42S-E7-V15	UB2000-F42S-E7-V15

**F42 series with  
analog output,  
beam width selection,  
synchronization input**



Characteristics				
Sensing range	30 mm ... 500 mm	60 mm ... 2000 mm	200 mm ... 4000 mm	350 mm ... 6000 mm
Usable area	0 mm ... 30 mm	0 mm ... 60 mm	0 mm ... 200 mm	0 mm ... 350 mm
Response delay	approx. 50 ms	approx. 150 ms	approx. 325 ms	approx. 650 ms
Resolution max.	0.2 mm (at max. sensing range)	0.35 mm (at max. Sensing range)		0.35 mm (at max. sensing range)
Setting the switching points a and evaluation limits	Keypad with 2 buttons			
Electrical data				
Operating voltage	10 V DC ... 30 V DC 15 V DC ... 30 V DC (Sensors with voltage output)			10 V DC ... 30 V DC 17 V DC ... 30 V DC (Sensors with voltage output)
Mechanical data				
Operating temperature	248 Kelvin ... 358 Kelvin (–25 °C ... +70 °C)			
Protection class	IP54			
Connection type	V15 quick-disconnect (M12 x 1), 5-pin			
Dimensions L x W x H	34 mm x 80 mm x 80 mm			
Outputs (order codes):				
Analog output 4 mA ... 20 mA (falling/ rising slope selectable)	UB500-F42-I-V15	UB2000-F42-I-V15	UB4000-F42-I-V15	UB6000-F42-I-V15
Analog output 0 V ... 10 V (falling/rising slope selectable)	UB500-F42-U-V15	UB2000-F42-U-V15	UB4000-F42-U-V15	UB6000-F42-U-V15

**F42 series with  
analog output, beam width  
selection, synchronized input**



Characteristics		
Sensing range	30 mm ... 500 mm	60 mm ... 2000 mm
Usable area	0 mm ... 30 mm	0 mm ... 60 mm
Response delay	approx. 50 ms	approx. 150 ms
Resolution	0.2 mm (at max. sensing range)	0.7 mm (at max. sensing range)
Adjustment of switching points and evaluation boundaries	Keypad with 2 buttons	
Electrical data		
Operating voltage	10 V DC ... 30 V DC 15 V DC ... 30 V DC (Sensors with voltage output)	
Mechanical data		
Operating temperature	248 Kelvin ... 343 Kelvin (–25 °C ... +70 °C)	
Protection class	IP54	
Connection type	V15 quick-disconnect (M12 x 1), 5-pin	
Dimensions L x W x H	80 mm x 34 mm x 80 mm	
Outputs (order codes):		
Analog output 4 mA ... 20 mA (falling/rising slope selectable)	UB500-F42-I-V15	UB2000-F42-I-V15
Analog output 0 V ... 10 V (falling/rising slope selectable)	UB500-F42S-U-V15	UB2000-F42S-U-V15

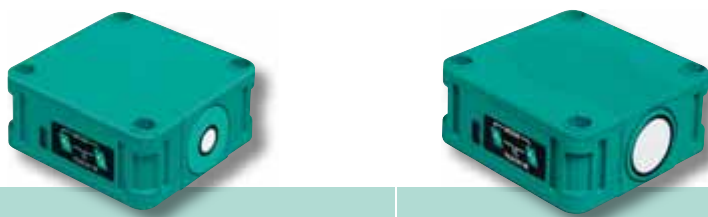


F42 series with relay output, beam width selection



Characteristics				
Sensing range	30 mm ... 400 mm	80 mm ... 1500 mm	200 mm ... 3000 mm	300 mm ... 5000 mm
Usable area	0 mm ... 30 mm	0 mm ... 80 mm	0 mm ... 200 mm	0 mm ... 350 mm
Response delay	approx. 50 ms	approx. 150 ms	approx. 325 ms	approx. 650 ms
Switching frequency	≤ 8 Hz	≤ 3 Hz	≤ 1.5 Hz	≤ 0.6 Hz
Setting the switching points and evaluation limits	Keypad with 2 buttons			
Electrical data				
Working voltage	20 V DC ... 230 V AC			
Mechanical data				
Operating temperature	248 Kelvin ... 343 Kelvin (–25 °C ... +70 °C)			
Protection class	IP54			
Connection type	V95 quick-disconnect (7/8"-16 UNF), 5-pin			
Dimensions L x W x H	34 mm x 80 mm x 80 mm			50 mm x 80 mm x 80 mm
Outputs (order codes):				
Universal, relay output	UB400-F42-UK-V95	UB1500-F42-UK-V95	UB3000-F42-UK-V95	UB5000-F42-UK-V95

F42 series with analog output, beam width selection, synchronized input

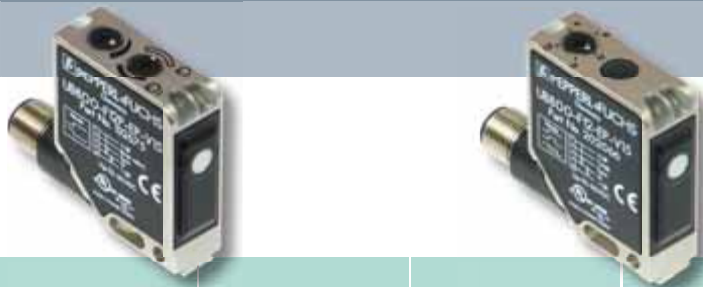


Characteristics		
Sensing range	30 mm ... 500 mm	60 mm ... 2000 mm
Usable area	0 mm ... 30 mm	0 mm ... 60 mm
Response delay	approx. 50 ms	approx. 150 ms
Switching frequency	≤ 8 Hz	≤ 3 Hz
Adjustment of switching points and evaluation boundaries	Keypad with 2 buttons	
Electrical data		
Working voltage	20 V DC ... 230 V AC	
Mechanical data		
Operating temperature	248 Kelvin ... 343 Kelvin (–25 °C ... +70 °C)	
Protection class	IP54	
Connection type	V15 quick-disconnect (M12 x 1), 5-pin	
Dimensions L x W x H	80 mm x 34 mm x 80 mm	
Outputs (order codes):		
Universal; Relay output	UB400-F42S-UK-V95	UB1500-F42S-UK-V95



# F12 SERIES · F43 SERIES

## F12 Series with push-pull output, temperature-compensated



Characteristics					
Sensing range	15 mm ... 150 mm	20 mm ... 250 mm	30 mm ... 800 mm	20 mm ... 250 mm	30 mm ... 800 mm
Usable area	0 mm ... 15 mm	0 mm ... 20 mm	0 mm ... 30 mm	0 mm ... 20 mm	0 mm ... 30 mm
Response delay	approx. 10 ms	approx. 20 ms	approx. 100 ms	approx. 20 ms	approx. 100 ms
Switching frequency	≤ 50 Hz	≤ 20 Hz	≤ 4 Hz	≤ 20 Hz	≤ 4 Hz
Setting of switching points and output functions	Switch point adjustment via potentiometer			Teach-In with programming unit UB-PROG or apply +U <sub>B</sub> or –U <sub>B</sub> on Teach-In input	
Electrical data					
Operating voltage	10 V DC ... 30 V DC			10 V (12 V) DC ... 30 V DC	
Mechanical data					
Operating temperature	258 Kelvin ... 343 Kelvin (–15 °C ... +70 °C)				
Connection type	V15 quick-disconnect (M12 x 1), 5-pin				
Dimensions L x W x H	15 mm x 49 mm x 41,5 mm				
Outputs (order codes):					
Push-pull output, short-circuit resistant, polarity resistant	UB120-F12P-EP-V15	UB250-F12P-EP-V15	UB800-F12P-EP-V15	UB250-F12-EP-V15	UB800-F12-EP-V15
1 analog output 4 mA ... 20 mA				UB250-F12-I-V15	UB800-F12-I-V15
1 analog output 0 V ... 10 V				UB250-F12-U-V15	UB800-F12-U-V15

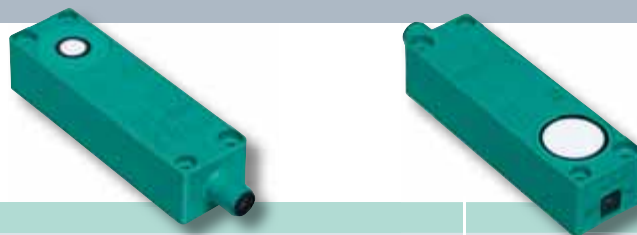
## F43 series with serial interface, 2 relay outputs and analog output, temperature-compensated



Characteristics	■ no usable area	
Sensing range	0 mm ... 300 mm	100 mm ... 2000 mm
Usable area	0 mm ...	100 mm
Dynamic Response delay	≤ 30 ms	≤ 75 ms
Resolution max.	0.17 mm	0.35 mm
Setting the switching points/evaluation limits and output function (falling, rising slope, operating modes)	with RS232	
Electrical data		
Operating voltage	10 V DC ... 30 V DC without current output active 15 V DC ... 30 V DC with current output active	
Mechanical data		
Operating temperature	273 Kelvin ... 323 Kelvin (0 °C ... +50 °C)	
Protection class	IP65	
Connection type	V17 quick-disconnect (M12 x 1), 8-pin	
Dimensions L x W x H	30 mm x 134 mm x 52 mm	
Serial interface	RS232 (parameterization using Ultra 3000 Windows software)	
Outputs (order designation)		
Relay output 1, 2	1 A at 24 V DC	
Analog output	4 mA ... 20 mA	
	UC300-F43-2KIR2-V17	UC2000-F43-2KIR2-V17

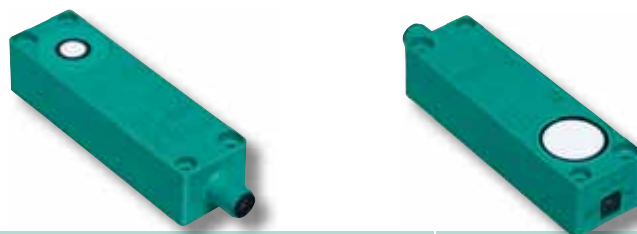
# SERIES F54

## F54 series with one switch output, temperature-compensated



Characteristics		
Measuring range	30 mm ... 500 mm	80 mm ... 2000 mm
Usable area	0 mm ... 30 mm	0 mm ... 80 mm
Response delay	≤ 50 ms	≤ 150 ms
Switching frequency	≤ 10 Hz	≤ 3 Hz
Setting of switching points and output functions	Teach-In with programming unit UB-PROG or apply +U <sub>B</sub> or –U <sub>B</sub> on teach-in input	
Electrical data		
Operating voltage	10 V DC ... 30 V DC	
Mechanical data		
Operating temperature	248 Kelvin ... 343 Kelvin (–25 °C ... +70 °C)	
Connection type	V15 quick-disconnect (M12 x 1)	
Dimensions L x W x H	25 mm x 105 mm x 31 mm	
Outputs (order codes):		
Switching output, NPN, NC/NO	UB500-F54-E4-V15	UB2000-F54-E4-V15
Switching output, PNP, NC/NO	UB500-F54-E5-V15	UB2000-F54-E5-V15

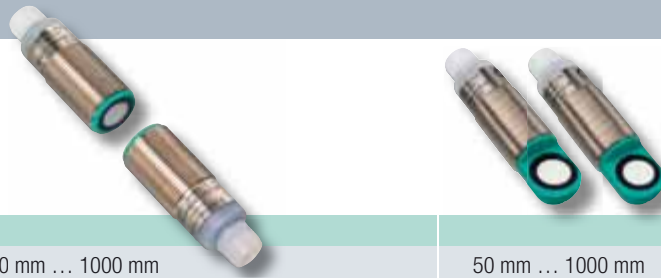
## F54 series with analog output, temperature-compensated



Characteristics		
Measuring range	30 mm ... 500 mm	80 mm ... 2000 mm
Usable area	0 mm ... 30 mm	0 mm ... 80 mm
Dynamic Response delay	≤ 50 ms	≤ 150 ms
Resolution max.	0.13 mm	0.35 mm
Setting the switching points/evaluation limits and output function (falling, rising slope, operating modes)	Teach-In with programming unit UB-PROG or apply +U <sub>b</sub> or –U <sub>b</sub> teach-in input	
Electrical data		
Operating voltage	10 V DC ... 30 V DC 15 V DC ... 30 V DC (Sensor with voltage output)	
Mechanical data		
Operating temperature	248 Kelvin ... 343 Kelvin (–25 °C ... +70 °C)	
Protection class	IP65	
Connection type	V15 quick-disconnect (M12 x 1), 5-pin	
Dimensions L x W x H	25 mm x 105 mm x 31 mm	
Outputs (order designation)		
Analog output (4 mA ... 20 mA)	UB500-F54-I-V15	UB2000-F54-I-V15
Analog output (0 V ... 10 V)	UB500-F54-U-V15	UB2000-F54-U-V15

# ULTRASONIC THRU-BEAM BARRIERS

## 18GM series with one switch output

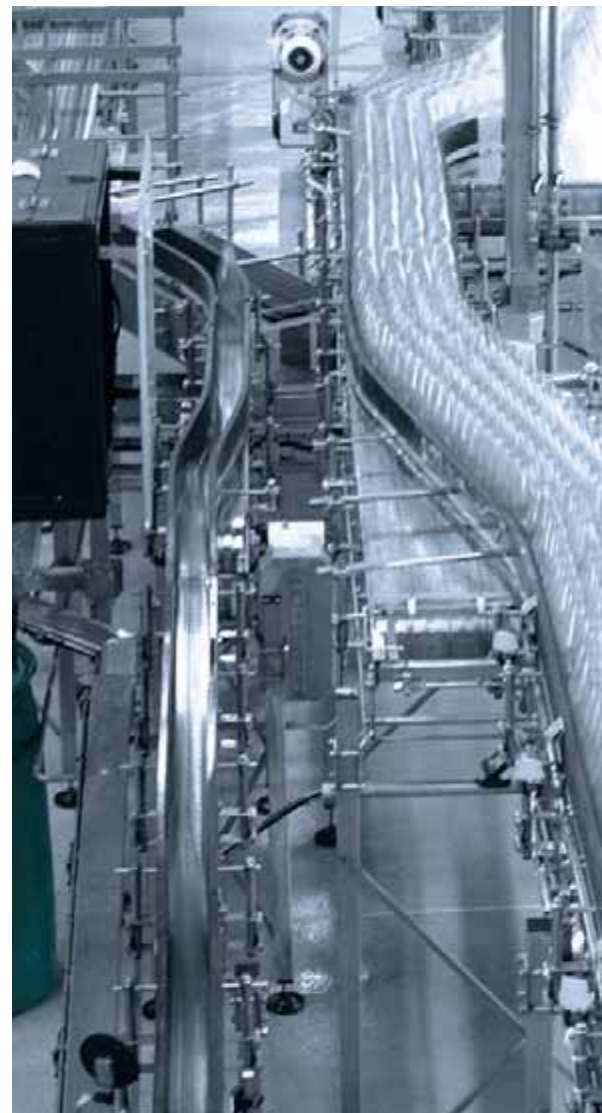


Characteristics	
Sensing range	50 mm ... 1000 mm
Response delay	< 5 ms
Switching frequency	≤ 100 Hz
Setting of switching points and output functions	Teach-In with programming unit UB-PROG or apply +U <sub>B</sub> or –U <sub>B</sub> on teach-in input
Electrical data	
Operating voltage	0 V DC ... 30 V DC
Mechanical data	
Operating temperature	248 Kelvin ... 343 Kelvin (–25 °C ... +70 °C)
Protection class	IP65
Connection type	V1 quick-disconnect (M12 x 1), 4-pin
Dimensions L x W x H	
L 40 mm, ø 18 mm	
Outputs (Order designation, transmitter and receiver in scope of delivery):	
1 switch output, PNP NO/NC	UBE1000-18GM40-SE2-V1 straight
1 switch output, PNP NO/NC	UBE1000-18GM40A-SE2-V1 angled

## 30GM series with two switching outputs, antivalent

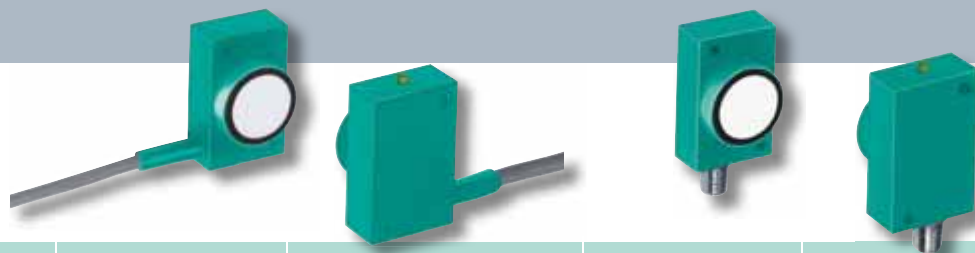


Characteristics	
Sensing range	0 mm ... 4000 mm
Mounting distance, transmitter – receiver	500 mm ... 4000 mm
Response delay	30 ms -3000 ms, adjustable
Electrical data	
Operating voltage	18 V DC ... 30 V DC
Mechanical data	
Operating temperature	273 Kelvin ... 333 Kelvin (0 °C ... + 60 °C)
Protection class	IP65
Connection type	V1 quick-disconnect (M12 x 1), 4-pin
Dimensions	
	L 92 mm, ø 40 mm
Outputs (Order designation, transmitter and receiver in scope of delivery):	
2 switching outputs, PNP, antivalent	UBE4000-30GM-SA2-V15

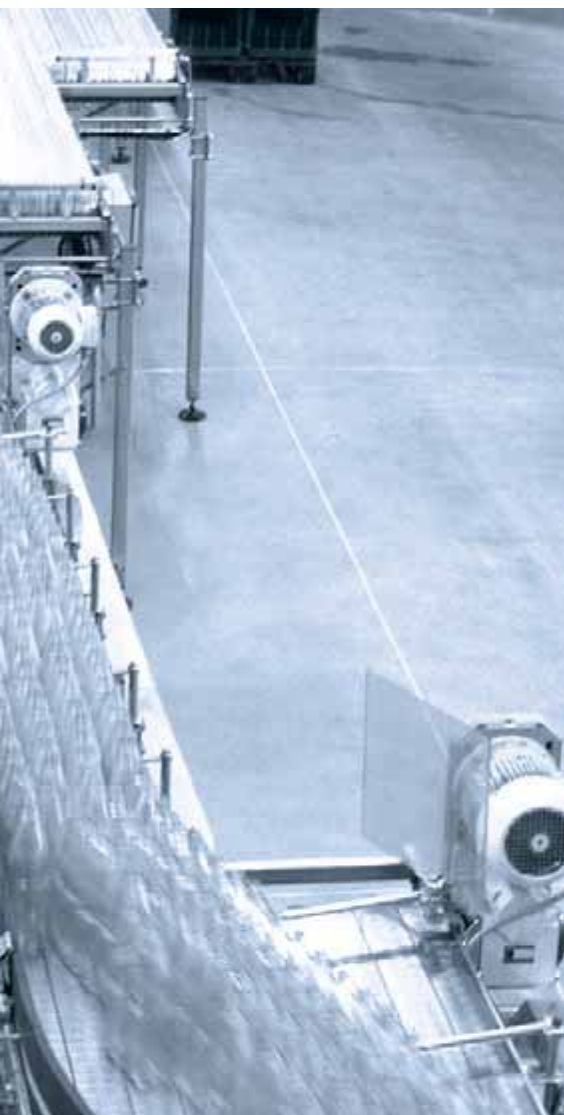




### F64 series with one switch output



Characteristics				
Sensing range	0 mm ... 500 mm	0 mm ... 1500 mm	0 mm ... 500 mm	0 mm ... 1500 mm
Mounting distance, transmitter – receiver	15 mm ... 500 mm	20 mm ... 1500 mm	15 mm ... 500 mm	20 mm ... 1500 mm
Switching frequency	100 Hz	120 kHz	100 Hz	120 kHz
Response delay	≤ 5 ms	approx. 4 ms	≤ 5 ms	approx. 4 ms
Electrical data				
Working voltage	18 V DC ... 30 V DC		18 V DC ... 30 V DC	
Mechanical data				
Operating temperature	273 Kelvin ... 333 Kelvin (0 °C ... + 60 °C)		273 Kelvin ... 333 Kelvin (0 °C ... + 60 °C)	
Protection class	IP54		IP54	
Connection type	2 m PVC cable Transmitter: 2 x 0.34 mm² Receiver: 3 x 0.34 mm²		V3 quick-disconnect (M8 x 1), 3-pin	
Dimensions	18 mm x 25 mm x 40 mm		18 mm x 25 mm x 40 mm	
Outputs (Order designation, transmitter and receiver in scope of delivery):				
1 switch output, PNP, NO	UBE500-F64-SE2	UBE1500-F64-SE2	UBE500-F64-SE2-V3	UBE1500-F64-SE2-V3
1 switch output, NPN, NO	UBE500-F64-SE0	UBE1500-F64-SE0	UBE500-F64-SE0-V3	UBE1500-F64-SE0-V3



### VariKont series with one switch output



Characteristics		
Sensing range	0 mm ... 6000 mm	
Mounting distance, transmitter – receiver	0 mm ... 6000 mm	
Switching frequency	≤ 30 Hz	
Electrical data		
Operating voltage	20 V DC ... 30 V DC	
Mechanical data		
Operating temperature	263 Kelvin ... 323 Kelvin (0 °C ... + 50 °C)	
Protection class	IP65	
Connection type	terminal housing, M 20, strand cross-section ≤ 2.5 mm <sup>2</sup>	
Dimensions		
		L 92 mm, ø 40 mm
Outputs (Order designation, transmitter and receiver in scope of delivery):		
Switching output 1 and 2, PNP, antivalent	UBE6000+U1+SA2	

# ULTRASONIC SENSORS WITH EXTERNAL EVALUATION

## 30GM series for probe or one-way operation



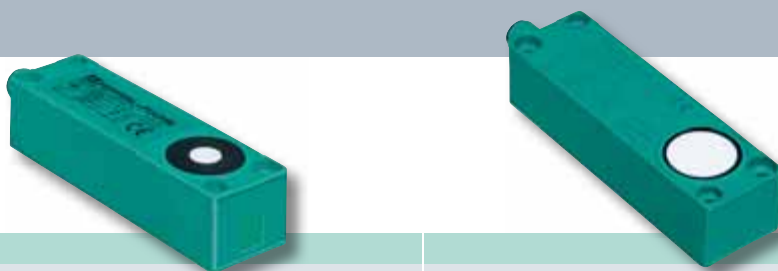
Characteristics				
Sensing range	60 mm ... 500 mm	200 mm ... 2000 mm	500 mm ... 4000 mm	800 mm ... 6000 mm
Usable area	0 mm ... 60 mm	0 mm ... 200 mm	0 mm ... 500 mm	0 mm ... 800 mm
Electrical data				
Operating voltage	10 V DC ... 30 V DC			
Evaluation	Determination of the sensing range is performed in the connected evaluation electronics (e.g. devices UH3-KHD2-4E5 or UH3-KHD2-4I or UH3-T1-KT). The sensing range is calculated from the travel time of the transmitted pulse, in pulse echo mode.			
Mechanical data				
Operating temperature	248 Kelvin ... 343 Kelvin (–25 °C ... +70 °C)			
Protection class	IP65			
Connection type	quick-disconnect V1			
Dimensions	L 93 mm, ø 30 mm	L 93 mm, ø 30 mm	L 106 mm, ø 40 mm	L 115 mm, ø 74 mm
Design (order designation):				
	<b>UB500-30GM-H3-V1</b>	<b>UB2000-30GM-H3-V1</b>	<b>UB4000-30GM-H3-V1</b>	<b>UB6000-30GM-H3-V1</b>

## VariKont/FP series for probe mode

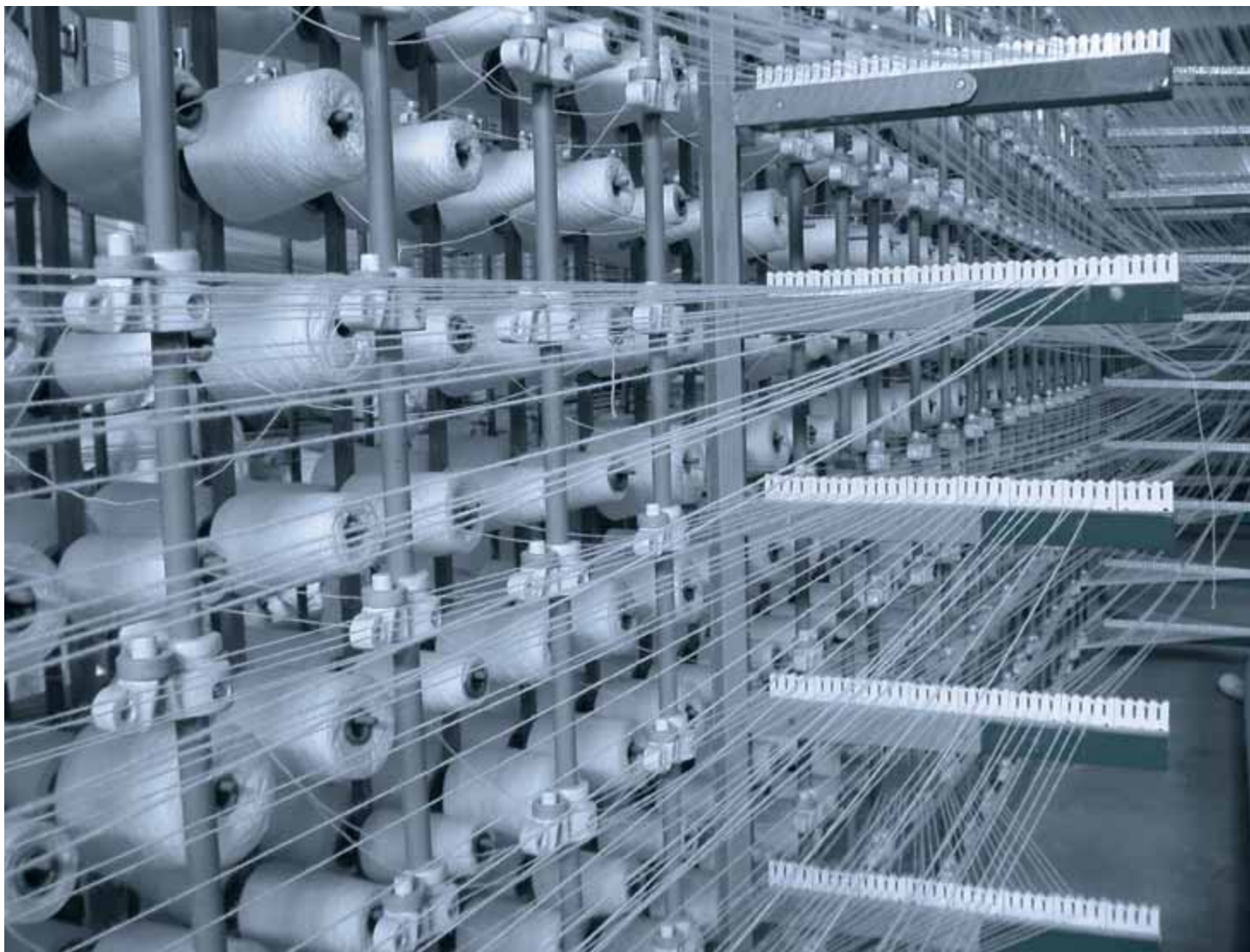


Characteristics			
Sensing range	60 mm ... 500 mm	300 mm ... 3000 mm	800 mm ... 6000 mm
Usable area	0 mm ... 60 mm	0 mm ... 300 mm	0 mm ... 800 mm
Electrical data			
Operating voltage	10 V DC ... 30 V DC		
Temperature compensation	For external temperature compensation, a temperature pulse is available on the temperature output.		
Evaluation	Determination of the sensing range is performed in the connected evaluation electronics (e.g. devices UH3-KHD2-4E5 or UH3-KHD2-4I or UH3-T1-KT). The sensing range is calculated from the travel time of the transmitted pulse, in pulse echo mode.		
Mechanical data			
Operating temperature	248 Kelvin ... 343 Kelvin (–25 °C ... +70 °C)		
Protection class	IP65		
Connection type	Terminal housing, M20, strand cross-section ≤ 2.5 mm²		
Dimensions L x W x H	128 mm x 40 mm x 40 mm	128 mm x 40 mm x 40 mm	61 mm x 80 mm x 80 mm
Design (order designation):			
	<b>UB500-U9-H3</b>	<b>UB3000-U9-H3</b>	<b>UB6000-FP-H3</b>

**F54 series  
for probe mode**



Characteristics		
Sensing range	60 mm ... 500 mm	80 mm ... 2000 mm
Usable area	0 mm ... 60 mm	0 mm ... 80 mm
Converter frequency	approx. 380 kHz	175 KHz
Resolution max.	0.13 mm	0.35 mm
Electrical data		
Operating voltage	10 V DC ... 30 V DC	
Evaluation	Determination of the sensing range is performed in the connected evaluation electronics The sensing range is calculated from the travel time of the transmitted pulse, in pulse echo mode.	
Mechanical data		
Operating temperature	248 Kelvin ... 343 Kelvin (–25 °C ... +70 °C)	248 Kelvin ... 358 Kelvin (–25 °C ... +85 °C)
Protection class	IP65	
Connection type	V1 quick-disconnect (M12 x 1), 4-pin	
Dimensions L x W x H	25 mm x 105 mm x 31 mm	120 mm x 32 mm x 25 mm
Outputs (order designation)		
	UB500-F54-H3-V1	UB2000-F54-H3-V1





## HIGHLIGHTS

- Ultrasonic system to reliably detect zero, one, or two sheets of material, preferably paper
- Teaching material thickness is not required
- Insensitive to print, colors, and glossy surfaces
- Material weights from 10 g/m<sup>2</sup> to over 2000 g/m<sup>2</sup>
- Very broad material spectrum – thin paper through very heavy paper to thin sheet metal and plastic or metal foils
- Sensor installation can be perpendicular or angled relative to the sheet path
- Signal output via 3 short-circuit-resistant, polarity-insensitive PNP switching outputs

## APPLICATION EXAMPLES

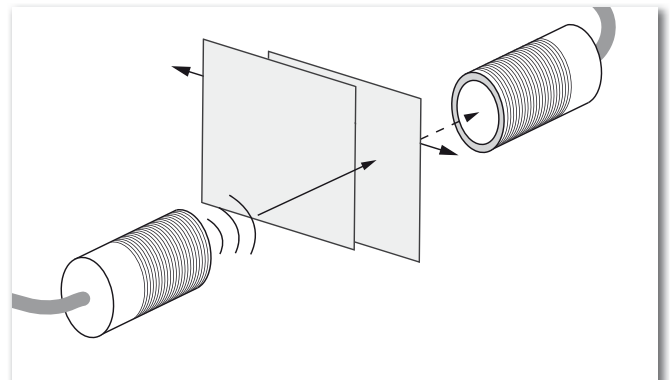
- In printing machines the ultrasonic double-sheet detector prevents the intake of two sheets, which protects the machinery from damage and prevents a second sheet from remaining in the machine.



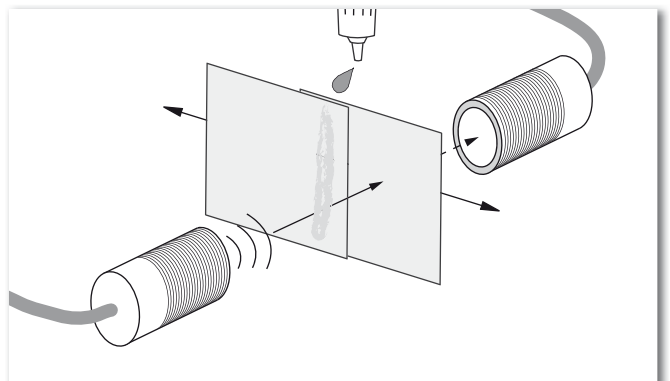
#### MORE AREAS OF APPLICATION FOR THE 18GM SERIES:

- For detecting and counting adhesive labels in labeling machines.
- In letter opening machines, checking that opened letters are completely emptied.
- In slip counters, the ultrasonic double-sheet detection ensures that banking receipts are not counted incorrectly.
- In packaging machines, splices at the beginning and end of rolls of aluminum packaging foil are detected
- In paper processing machinery to detect no sheet (air), single and double sheets, or splices.
- In paper sorting applications for calendar manufacturing, the double sheet detector ensures that individual months are not missing or duplicated.

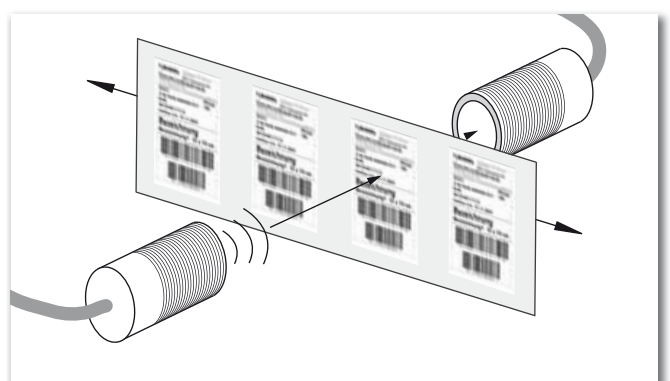
#### ULTRASONIC DOUBLE SHEET DETECTION



#### ULTRASONIC SPLICE DETECTION



#### ULTRASONIC LABEL DETECTION





# DOUBLE SHEET, DOUBLE MATERIAL, LABEL AND SPLICE

## 18GM series for double-sheet detection, splice, and label detection



Characteristics			
Detectable paper thicknesses	10 g/m <sup>2</sup> ... 2000 g/m <sup>2</sup>	10 g/m <sup>2</sup> ... 2000 g/m <sup>2</sup>	10 g/m <sup>2</sup> ... 2000 g/m <sup>2</sup>
Response delay	≤ 15 ms	≤ 0.6 ms	≤ 0.6 ms
Electrical data			
Working measurement voltage	18 V DC ... 30 V DC		
Mechanical data			
Operating temperature	0 °C ... +60 °C		
Protection class	IP67		
Connection type	2 m cable		
Switching outputs	3 x PNP NC	2 x PNP NC	2 x PNP NC
Dimensions	L 50 mm/22 mm, ø 18 mm	L 50 mm/22 mm, ø 18 mm	L 50 mm/22 mm, ø 18 mm
Design (order designation):			
	Double-sheet detection <b>UDC-18GM50-400-3E3</b>	Label detection <b>ULB-18GM50-255-2E3</b>	Splice detection <b>UGB-18GM50-255-2E3</b>

## 18GMA series for double-sheet detection



Characteristics	
Detectable paper thicknesses	10 g/m <sup>2</sup> ... 2000 g/m <sup>2</sup>
Response delay	about 15 ms
Working measurement voltage	18 V DC ... 30 V DC
Operating temperature	0 °C ... +50 °C
Protection class	IP67
Connection type	2 m, PVC cable 0.14 mm <sup>2</sup>
Switching outputs	3 x PNP NC
Dimensions	ø 18 mm
Design (order designation):	
	Double-sheet detection <b>UDC-18GMA-400-3E3</b>

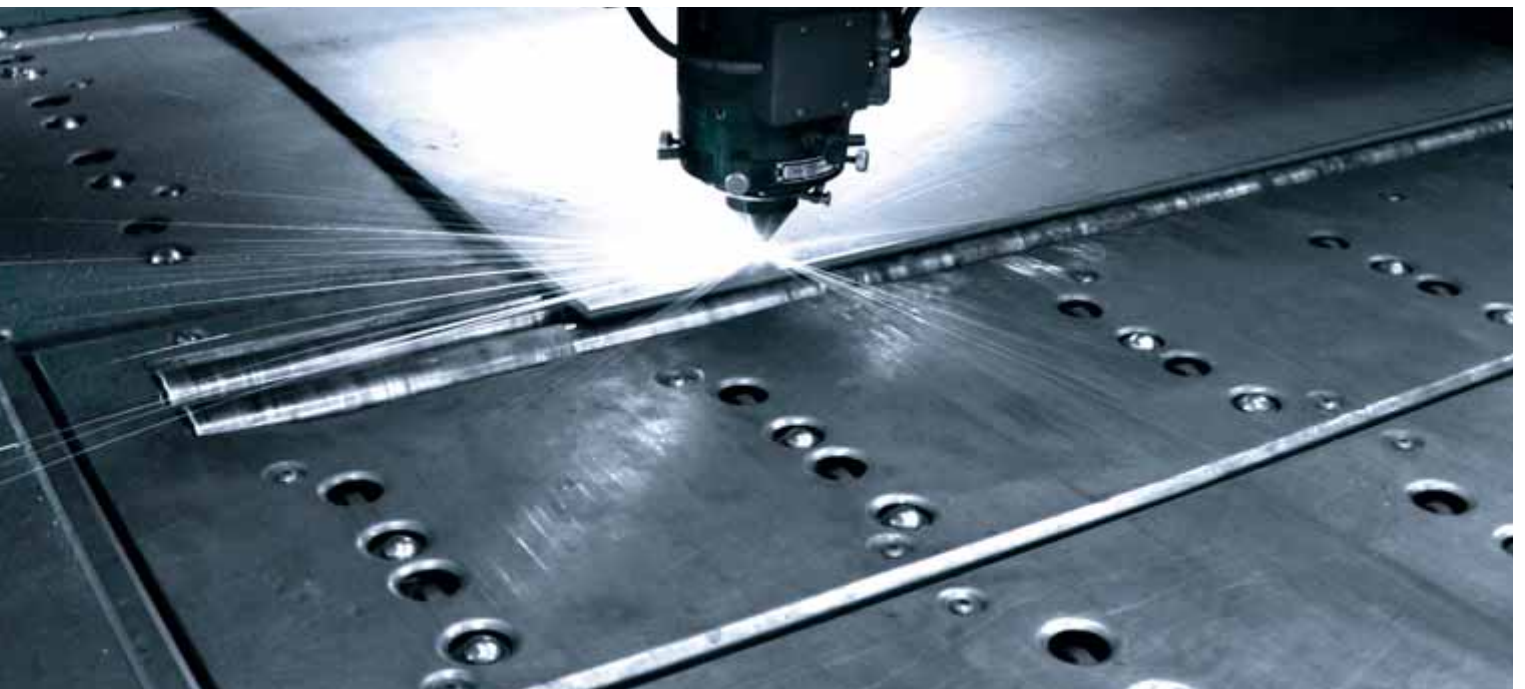
## 30GM series for double-material detection



Characteristics	
Detectable material	plastic, wood, glass, etc.
Response delay	about 30 ms
Electrical data	
Working measurement voltage	18 V DC ... 30 V DC
Mechanical data	
Operating temperature	0 °C ... +50 °C
Protection class	IP67
Connection type	2 m, PVC cable 0.14 mm <sup>2</sup>
Switching outputs	3 x PNP NC
Dimensions	ø 30 mm
Design (order designation):	
	Double-material detection <b>UDC-30GM-085-3E3</b>



# DETECTION



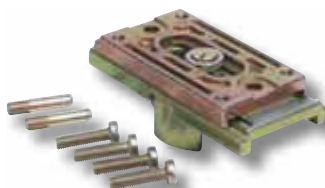
## MHo4-3505 MOUNTING ACCESSORY for FP series

The MHo4-3505 mounting accessories make it possible to turn the sensor around the horizontal and vertical axes max.  $\pm 30^\circ$ . Brackets are adjustable using the fastening screws.



## MHo4-2681F MOUNTING ACCESSORY for VariKont series

Adjustable along the x and y axes and  $360^\circ$  allows for simple mounting and adjustment.



## MHW11 MOUNTING ACCESSORY

Mounting brackets for F42, FP, VariKont L, VariKont, BF18 series sensors



## MH-UDBo1 MOUNTING ACCESSORY

Mounting brackets for ultrasonic double sheet detector

## OMH-4 MOUNTING ACCESSORY for $\varnothing 18$ mm sensors

For mounting on  $\varnothing 12$  mm round rod or on sheet metal (thickness 1.5 mm ... 3 mm).



## M105 MOUNTING ACCESSORY for all 30GM series cylindrical sensors

- secure fastening
- simple mounting
- robust design
- resistant to chemicals

## BF 5-30 MOUNTING ACCESSORY Universal mounting bracket for all cylindrical $\varnothing 5$ mm to $\varnothing 30$ mm sensors.

- secure fastening
- simple mounting
- provides  $360^\circ$  rotation in two axes
- robust design



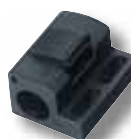
## BF30 MOUNTING FLANGE for $\varnothing 30$ mm sensors



## BF18 MOUNTING FLANGE for $\varnothing 18$ mm sensors



## BF12 MOUNTING FLANGE for $\varnothing 12$ mm sensors



## BF12-F MOUNTING FLANGE for $\varnothing 12$ mm sensors



## BF18-F MOUNTING FLANGE for $\varnothing 18$ mm sensors



## BF30 MOUNTING FLANGE for $\varnothing 30$ mm sensors

## RIGHT ANGLE DEFLECTOR BRACKET UVW90-M12/UVW90-M30 for 12GM or 30GM series

deflects beams  $90^\circ$  to enable mounting on tanks, conveyors, etc.

- universal mounting option
- deflects beams  $90^\circ$  to enable mounting on tanks, conveyors, etc.
- universal installation orientation
- ultrasound focusing effect (UVW90-M30 $^\circ$ )



## RIGHT ANGLE DEFLECTOR BRACKET UVW90-K18/UVW90-K30 for 18GM or 30GM series



The BF5-30 mounting accessory comes with 2 mounting heads ( $\varnothing 18$  mm,  $\varnothing 30$  mm) and 4 adapter sockets ( $\varnothing 5$  mm,  $\varnothing 8$  mm,  $\varnothing 12$  mm,  $\varnothing 14$  mm).



**EXTERNAL TEMPERATURE PROBE**  
**LUC4-Z30-G2V/LUC4-Z30-N2V**  
 for type LUC4T-... and UC...-30GM-...  
 ultrasonic point level sensors



**EXTERNAL TEMPERATURE PROBE UC-30GM-TEMP**  
 for type UC...-30GM- ...  
 and series LUC4T-...  
 ultrasonic point level sensors



**RS232 INTERFACE**  
**UC-F43-R2**  
**UC-30GM-R2**  
**UC-FP/U9-R2**

- for programming sensors with RS232 interface using Ultra 3000
- simple insertion into the sensor line and connection of the Sub-D plug to the PC serial interface (Adapter for USB connection: USB-o.3M-PVC ABG-SUBD9)



**EXTENSION CABLES**  
**UC-30GM-PROG**

The extension cable allows programming of types UC...-30GM-... and LUC... ultrasonic sensors even in hard-to-reach mounting locations. The sensor end of the extension cable is connected to the temperature plug socket on the sensor. At the other end of the cable, the sensor can be programmed using the temperature plug.



**PROGRAMMING UNIT**  
**UB-PROG2 + UB-PROG3**

- simple programming of switch points A1/A2 or a measurement window
- simple selection of output function:
  - window mode: NO/NC function
  - switching point mode: NO/NC function
  - monitoring of sensing range



**DIGITAL DISPLAYS**



DA5-IU-C

**DA5-IU-2K-V**  
**DA5-IU-2K-C**

- programmable characteristic curve
- 2 adjustable limit values
- current/voltage input
- 2 relay outputs



Technical data		DA5-IU-2K-V	DA5-IU-2K-C
Operating voltage	10 V DC ... 30 V DC	90 V AC ... 260 V AC	90 V AC ... 260 V AC
Display	6-digit display, red 7 segment LED, 8 mm	5-digit display, red 7-segment-LED, 14.2 mm, 2 LED for relays	
Operating sensor voltage	—	24 V DC, 100 mA	—
2 relay outputs	—	2 x 250 V AC/300 V DC, 3 A	
Housing	48 x 24 x 65 mm (W x H x D)	96 x 48 x 75 mm (W x H x D)	
Connection type	7-pin plug with screw terminals max. 0.4 mm <sup>2</sup> ... 1.5 mm <sup>2</sup> strand cross-section	8-pin and 11-pin plugs with screw terminals max. 0.25 mm <sup>2</sup> ... 2.5 mm <sup>2</sup> strand cross-section or max. 0.14 mm <sup>2</sup> ... 1.5 mm <sup>2</sup> strand cross-section	
Protection class	IP65, on front side	IP65, on front side	

**TYPE G**  
straight design



**TYPE W**  
angled design

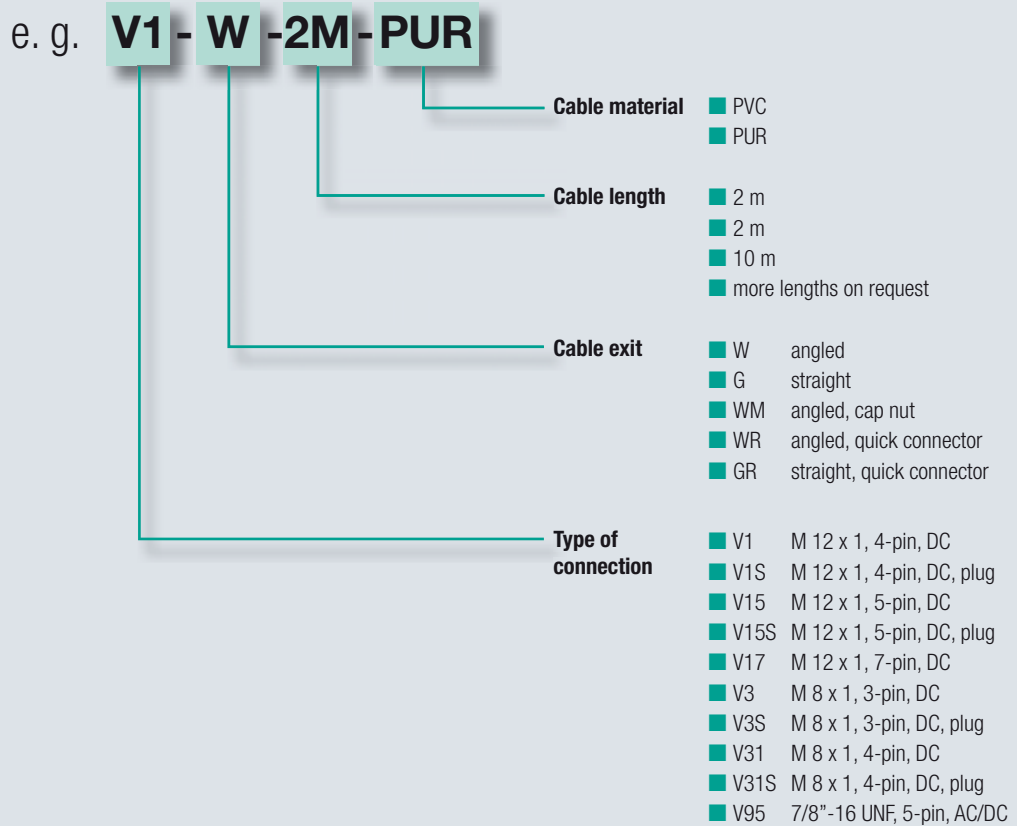


## CABLE SOCKETS

Model number				
V1-G-2M-PVC	V15-W-PG9	V17-G-2M-PUR	V3-GM-5M-PUR	V95-G-YE2M-ST00W
V1-G-5M-PVC	V15-G-PG9	V17-G-5M-PUR	V3-WM-2M-PUR	V95-G-YE2M
V1-W-2M-PVC	V15-G-2M-PVC			V95-G
V1-W-5M-PVC	V15-W-2M-PUR			V95-W
V1-W-E2-2M-PUR	V15-W-5M-PUR			
V1-W-E2-5M-PUR	V15-W-15M-PUR			
V1-W-A2-5M-PUR				
V1-W-A0-5M-PUR				
V1-G				
V1-W				

For additional cable sockets and connection cables flyer  
“Connectors from Pepperl+Fuchs”.

**TYPE CODE**  
CABLE SOCKETS





# ULTRA 3000 CALIBRATION SOFTWARE



Using the ULTRA 3000 calibration software, ultrasonic sensors with RS232 interfaces can be perfectly programmed to operate even with the most difficult requirements.

## SYSTEM REQUIREMENTS

The ULTRA 3000 software can run on any personal computer or laptop. Requirements are Windows 95/98/ME/NT/2000 or XP, an EGA or VGA graphics card and a free RS232 interface or a free USB-Interface if the converter USB-o,8M-PVC ABG-SUBD9 is used.

The following sensors can communicate with the software:

Series:	Sensor types:
-30GM	UC...-30GM-...R2-V15
VariKont	UC...+U9+E6/E7+R2
	UC...+U9+IUE0/E2+R2
	UJ3000+U1+...+RS
-FP	UC6000-FP-...R2-P5
	UJ6000-FP-...+RS
-F43	UC...-F43-2KIR2-V17

## SHOW IT

The Ultra 3000 software provides a graphical view of the distance measured. The switch points are marked. LED simulations model the switching states of the outputs.



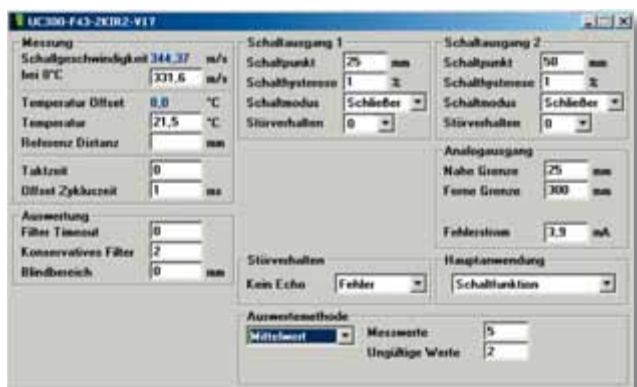
## DISTANCE

It displays the current measured distance in mm.



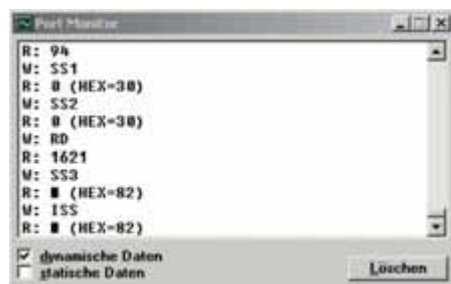
## PARAMETERS

All parameters can be modified here. Display and input fields allow the quick configuration of commands or parameters with the click of a mouse without the need to know the details of commands and their syntax.



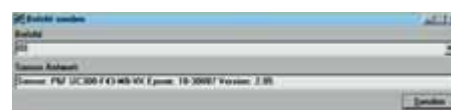
## PORT MONITOR

It displays the commands sent to and received by the sensor.



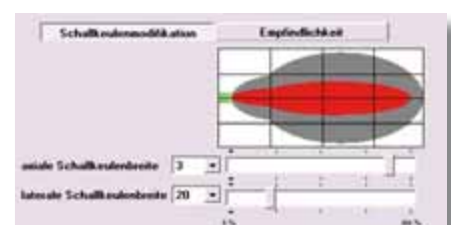
## SEND COMMAND

Just as with a terminal program, the sensor parameters are set and queried by command here (alternative to the parameters window).



## BEAM WIDTH SETTINGS

- Adjustable beam width (without loss of coverage)
- Adjustable sensitivity or maximum coverage



# FACTORY AUTOMATION – SENSING YOUR NEEDS



Pepperl+Fuchs sets the standard in quality and innovative technology for the world of automation. Our expertise, dedication, and heritage of innovation have driven us to develop the largest and most versatile line of industrial sensor technologies and interface components in the world. With our global presence, reliable service, and flexible production facilities, Pepperl+Fuchs delivers complete solutions for your automation requirements – wherever you need us.



## Contact

Pepperl+Fuchs GmbH  
Lilienthalstraße 200  
68307 Mannheim · Germany  
Tel. +49 621 776-4411 · Fax +49 621 776-27-4411  
E-mail: [fa-info@pepperl-fuchs.com](mailto:fa-info@pepperl-fuchs.com)

## Worldwide Headquarters

Pepperl+Fuchs GmbH · Mannheim · Germany  
E-mail: [fa-info@pepperl-fuchs.com](mailto:fa-info@pepperl-fuchs.com)

## USA Headquarters

Pepperl+Fuchs Inc. · Twinsburg · USA  
E-mail: [fa-info@us.pepperl-fuchs.com](mailto:fa-info@us.pepperl-fuchs.com)

## Asia Pacific Headquarters

Pepperl+Fuchs Pte Ltd · Singapore  
Company Registration No. 1999003130E  
E-mail: [fa-info@sg.pepperl-fuchs.com](mailto:fa-info@sg.pepperl-fuchs.com)

[www.pepperl-fuchs.com](http://www.pepperl-fuchs.com)

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