

ULTRASONIC

Ultrasonic Distance- and Proximity Sensors



UFA-1500 Series

Key features:

- Measurement range 120 to 1500 mm
- Distance sensor or 1-point proximity switch
- Teachable measurement range
- Linearity <1% of full scale
- Resolution approx. 0.5 mm
- Working temperature 0 to +60 °C
- Measurement regardless of material, surface, colour and transparency of the target
- Protection class IP67
- Waterproof, oil-resistant
- Configurable size of sound cone
- Configurable as scanner or reflection barrier
- Chemical-resistant version available

Content:

| | |
|-------------------------------------|--------------|
| Technical Data |2 |
| Adjustments |3 |
| Chemical-resistant Version |4 |
| Connection & Teach-In |5 |
| Order Code & Accessories |6 |

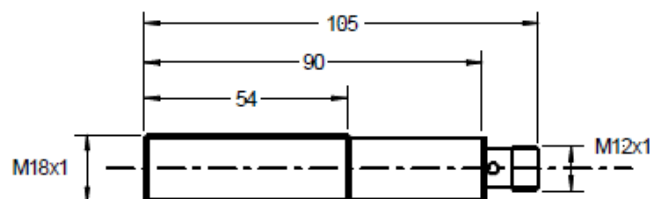
TECHNICAL DATA

| Distance sensor | | UFA-1500-M18-A / AR | UFA-1500-M18-1P / 1PR |
|--|--------|-----------------------------|-----------------------|
| Measurement range MR | [mm] | 120...1500 | 120...1500 |
| Switching point hysteresis, axial | [mm] | - | 2 |
| Linearity | [% MR] | <1 | - |
| Resolution | [mm] | | approx. 0.5 |
| Linearity over full temperature range * | [% MR] | | <2 |
| Operating frequency | [Hz] | | approx. 180 |
| Status indicator | | | LED yellow / red |
| Switching output, short circuit proof, max. load 0.1 A | | - | PNP closer / opener |
| Switching speed, max. | [Hz] | | approx. 5 |
| Analog output speed | [Hz] | approx. 30 | - |
| Analog output | [V] | 0...10 (R_{min} 10 kOhm) | - |
| | [mA] | 4...20 (R_{max} 400 Ohm) | - |
| Voltage supply (reverse polarity protection) | [VDC] | | 11...30 |
| Ripple of supply voltage | [%] | | 10 |
| Mean current consumption | [mA] | approx. 45...65 | approx. 45 |
| Temperature range | [°C] | | 0...+60 |
| Pressure area | [mbar] | | 900...1100 |
| Protection class | | | IP67 |
| Weight | [g] | | approx. 65 |
| Housing material | | | Nickel-plated brass |
| Electrical connection | | | M12 connector, 4-pole |

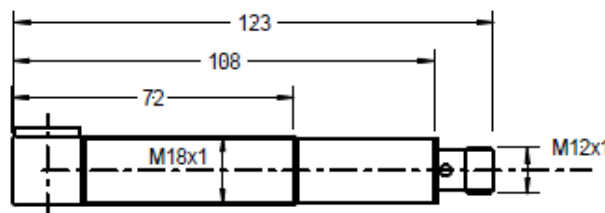
* linearity can be further improved by only teaching the sensor in a heat-resisting state (e.g. 30 minutes after switching on).

TECHNICAL DRAWING

UFA-1500-M18-A / UFA-1500-M18-1P: axial measuring direction



UFA-1500-M18-AR / UFA-1500-M18-1PR: radial measuring direction



!! WARNING - PERSONAL INJURY !!

Never use these products as safety- or emergency shut-off devices, nor in other applications where a malfunction of this product may result in personal injury. Failure to follow this notice may result in serious or fatal injury.

SETTING THE SWITCHING POINTS IN SCANNING MODE

In scanning mode the target reflects a portion of the ultrasound, which in turn is detected by the sensor. The switching points are set by attaching the voltage supply $-U_B$ (0 V) or $+U_B$ (+24 VDC) during 1...5 s to the Teach input.

During the learn-in process a flashing LED indicates whether the sensor detects the target.

- Yellow flashing LED: detected
- Red flashing LED: not detected

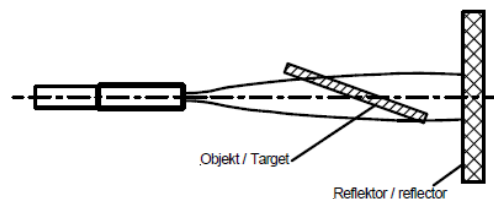
| | |
|---|---|
| <p>Window operation closer NO:</p> <ul style="list-style-type: none"> • Set target to near switching point • Teach switching point 1...5 s with $-U_B$ • Set target to far switching point • Teach switching point 1...5 s with $+U_B$ | <p>Window operation opener NC:</p> <ul style="list-style-type: none"> • Set target to near switching point • Teach switching target at 1...5 s with $+U_B$ • Set target to far switching point • Teach switching point 1...5 s with $-U_B$ |
| <p>Switching point closer NO:</p> <ul style="list-style-type: none"> • Set target to switching point • Teach switching point 1...5 s with $+U_B$ • Point sensor at space (>1.5 m) • Teach 1...5 s with $-U_B$ | <p>Switching point opener NC:</p> <ul style="list-style-type: none"> • Set target to switching point • Teach switching point 1...5 s with $-U_B$ • Point sensor at space (>1.5 m) • Teach 1...5 s with $+U_B$ |

SETTING SWITCHING POINT IN RETROFLECTIVE MODE

Retroflective mode uses a reflector in the background (max. 1.5 m from the sensor). Unlike optical sensors the reflector can be any material which is somewhat sound-reflecting. Retroflective mode is used in place of scanning mode if the target is at a very sharp angle to the sensor beam (see drawing), or is extremely sound-absorbing (no evaluable signal would be reflected from the target to the sensor). In this mode the sensor permanently checks whether it sees the reflector or if it is covered by the target. Likewise, the sensor has no blind range in this operating mode.

In reflection barrier mode the reflector is taught as follows:

| |
|---|
| <p>Closer NO:</p> <p>Teach 5...10 s with $+U_B$ (Rapid flashing yellow LED)</p> |
| <p>Opener NC:</p> <p>Teach 10...15 s with $+U_B$ (Rapid flashing red LED)</p> |



SETTING THE ANALOG OUTPUT MEASURING LIMITS

The two measuring limits are set by attaching the voltage supply $-U_B$ (0 V), or $+U_B$ (+24 VDC) to the Teach input for 1...5 s. During the teaching process the flashing LED indicates if the sensor detected the target.

- Yellow flashing LED: detected
- Red flashing LED: not detected

$-U_B$ teaches the lower evaluation limit (0 V or 4 mA) and the upper evaluation limit with $+U_B$ (10 V or 20 mA). It can be used to program a rising or falling ramp

- Position the target at the lower measuring limit (i.e. where 0 V or 4 mA is desired)
- Teach lower limit 1...5 s with $-U_B$
- Position the target at the upper measuring limit (i.e. where 10 V or 20 mA is desired)
- Teach upper limit 1...5 s with $+U_B$

Upper and lower measuring limits can also later be programmed individually.

Attention:

The Teach wire/input must be disconnected after the Teaching process is completed. The sensor can therefore also be operated with a 3-wire cable after teaching.

CHEMICAL-RESISTANT VERSION UFA-1500-M30-A-CH / -1P-CH

- Based on the UFA-1500-M18 series
- Resistant to most chemicals, e.g. acids and alkalis
- Front of housing made from PVDF
- Membrane protected with PTFE foil
- For level measurement or -monitoring aggressive mediums

Description:

UFA-CH sensors are designed specifically for use in chemically harsh environments. The high resistance corresponds to that of PVDF, or of PTFE. One possible application is level metering acids and alkalis in small containers. The front exposed to the medium consists of PVDF. What makes these chemical-resistant sensors special is that the ultrasonic converter is fully encased in a special PTFE film which allows ultrasound waves to pass through.

Technical data correspond to those of UFA-1500-M18 sensors. (See page 2)



INSTALLATION

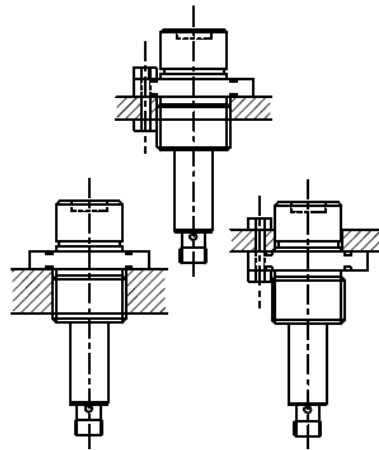
Mount to the flange with 6 M4 screws, or

Mount to the G1 thread. Sealing with the included Viton O-rings.

Ultrasonic sensors should be „mounted“ as flexibly as possible to keep acoustic interference away from the installation site. The included rubber rings for a Ø 21 mm installation hole should be used at any rate.

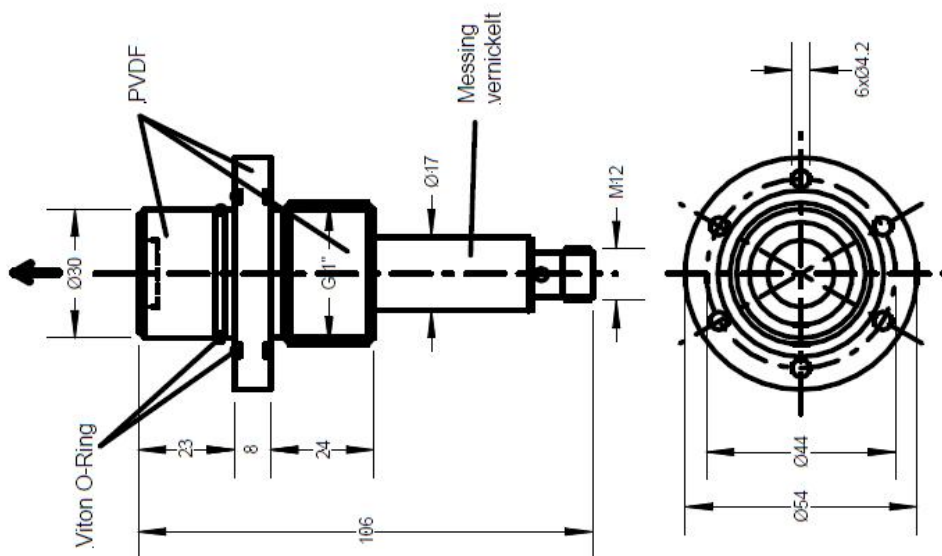
Inclination Angle:

Smooth surfaces can be detected up to an inclination angle of approx. 10 degrees. Rough and heavily textured surfaces can be detected at significantly higher angles. In retroreflective mode the angle does not matter at all.



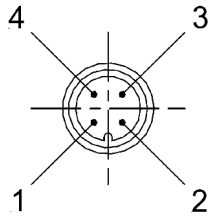
TECHNICAL DRAWING

UFA-1500-M30-A-CH / UFA-1500-M30-1P-CH



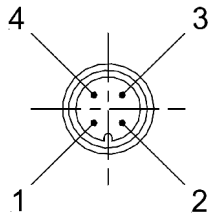
ELECTRICAL CONNECTION

PIN assignment: UFA-1500-M18-A / AR



- 1 +24 VDC (braun/brown)
- 2 Teach (weiß/white)
- 3 0V (blau/blue)
- 4 OUT 0...10 V (schwarz/black)

PIN assignment: UFA-1500-M18-1P / 1PR



- 1 +24 VDC (braun/brown)
- 2 Teach (weiß/white)
- 3 0V (blau/blue)
- 4 OUT PNP (schwarz/black)

The sensors feature a 4-pole M12 connector. The cables should never be mounted parallel or close to high current cables. Please order the necessary cables separately (see accessories).

TEACH TABLE

| TIME | Connect Teach input to | LED flashes | Switching output version | Analog output version |
|------------|--------------------------------|--------------|--|-----------------------|
| 1 to 5 s | +U _B (typ. +24 VDC) | slow yellow | Closer NO: far window point, or switching point Opener NC: close window point | 10 V or 20 mA |
| 1 to 5 s | -U _B (0 VDC) | slow yellow | Closer NO: near window point Opener NC: far window point, or switching point | 0 V, or 4 mA |
| 5 to 10 s | +U _B (typ. +24 VDC) | fast yellow | Retroreflective barrier closer NO | - |
| 10 to 15 s | +U _B (typ. +24 VDC) | fast red | Retroreflective barrier opener NC | - |
| 5 to 10 s | -U _B (0 VDC) | yellow | small detection cone | small detection cone |
| 10 to 15 s | -U _B (0 VDC) | yellow / red | medium detection cone | medium detection cone |
| 15 to 20 s | -U _B (0 VDC) | red | large detection cone | large detection cone |
| >20 s | -U _B (0 VDC) | No LED | Factory reset | Factory reset |

ORDER CODE ULTRASONIC UFA-1500-M18-...

UFA-1500-M18 —



| | |
|------------------------|---|
| A A-R 1P 1P-R | Output Analog output 0...10 V and 4...20 mA, axial measuring direction Analog output 0...10 V and 4...20 mA, radial measuring direction Switching output, 1 x PNP, axial measuring direction Switching output, 1 x PNP, radial measuring direction |
|------------------------|---|

Switching output 1x NPN upon request

ORDER CODE ULTRASONIC UFA-1500-M30-...-CH

UFA-1500-M30 — CH



| | |
|---------|--|
| A 1P | Output Analog output 0...10 V and 4...20 mA, axial measuring direction Switching output, 1 x PNP, axial measuring direction |
|---------|--|

Switching output 1x NPN upon request

OVERVIEW

UFA-1500-M18-A

UFA-1500-M18-A-R

UFA-1500-M18-1P

UFA-1500-M18-1P-R

UFA-1500-M30-A-CH

UFA-1500-M30-1P-CH

ACCESSORIES

Cable with mating connector M12, 4-pole

| | |
|---------------|-------------------------|
| K4P2M-S-M12 | 2m, straight connector |
| K4P5M-S-M12 | 5m, straight connector |
| K4P10M-S-M12 | 10m, straight connector |
| K4P2M-SW-M12 | 2m, angle connector |
| K4P5M-SW-M12 | 5m, angle connector |
| K4P10M-SW-M12 | 10m, angle connector |

Mating connector M12, 4-pole (for customising)

| | |
|------------|-------------------------------|
| D4-G-M12-S | mating connector M12 straight |
| D4-W-M12-S | mating connector M12 angled |



Subject to change without further notice.

WayCon Positionsmesstechnik GmbH

E-Mail: info@waycon.de

Internet: www.waycon.de

Head Office

Mehlbeerenstr. 4

82024 Taufkirchen

Tel. +49 (0)89 67 97 13-0

Fax +49 (0)89 67 97 13-250

Cologne Office

Auf der Pehle 1

50321 Brühl

Tel. +49 (0)2232 56 79 44

Fax +49 (0)2232 56 79 45