

ULTRASONIC

Distance and Proximity Sensors



Series UFA-150, UFA-200

Key-Features:

- Very small blind range, narrow detection beam
- Measuring range 0 to 150 mm and 20 to 200 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 +75 °C
- Measurement is independent of the targets material, surface, colour or transparency
- Protection class IP67
- Special sensors with very small sound cone, radial beam and chemically resistant

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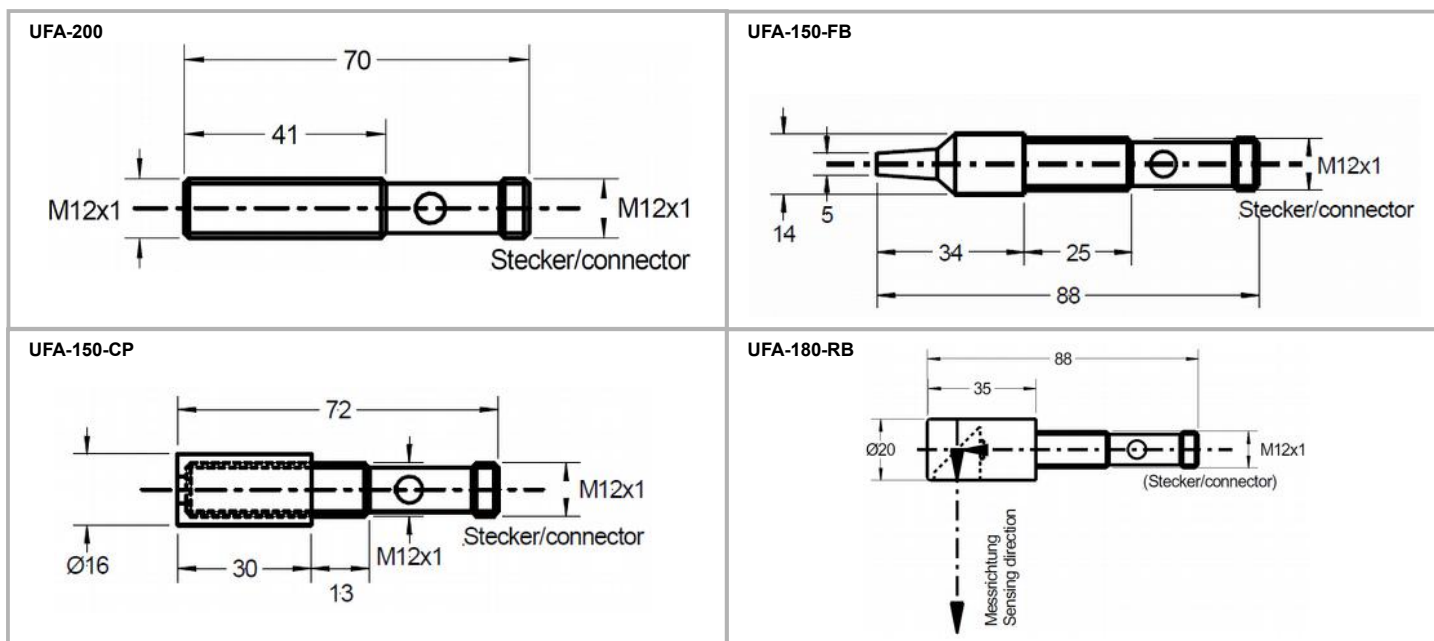
MODEL NAMES

| | Analog Output | | Proximity switch |
|---------------------------------------------------|--------------------------|-------------------------|----------------------|
| | Current output 4...20 mA | Voltage output 0...10 V | |
| Standard | UFA-200-TOR-24-CI | UFA-200-TOR-24-CU | UFA-200-TVPA-24C |
| With focusing device for narrow sound cone | UFA-150-FB-TOR-24-CI | UFA-150-FB-TOR-24-CU | UFA-150-FB-TVPA-24C |
| Chemically resistant version (PVDF) | UFA-150-CP-TOR-24-CI | UFA-150-CP-TOR-24-CU | UFA-150-CP-TVPA-24C |
| Radial sensing direction | UFA-180-RB-TOR-24-CI | UFA-180-RB-TOR-24-CU | UFA-180-RB-TVPA-24-C |

TECHNICAL DATA

| | | Analog Output | Proximity switch |
|-----------------------------------------------------------------|--------|-------------------------------------------|------------------|
| Measurement range UFA-200 | [mm] | 20 to 200 | 20 to 200 |
| Measurement range UFA-150-FB | [mm] | 0 to 150 | 0 to 150 |
| Measurement range UFA-150-CP | [mm] | 20 to 150 | 20 to 150 |
| Measurement range UFA-150-RB | [mm] | 0 to 180 | 0 to 180 |
| Hysteresis switching point, axial | [%] | - | ≤1 |
| Hysteresis switching point, radial | [%] | - | ≤1 |
| Linearity | [% FS] | <1 | - |
| Repeatability | [% FS] | approx. 0.5 | |
| Temperature error | [% FS] | ≤1.5 | |
| Operating frequency | [Hz] | approx. 400 | |
| Status indicator | | LED yellow / red | |
| Switching output, reversal polarity protection, load max. 0.1 A | | - | PNP NO / NC |
| Switching speed, max. | [Hz] | - | 13 |
| t switching output | [ms] | - | ca. 30 |
| Analog output UFA...CU | [V] | 0...10 (R _{min} 1 kOhm) | - |
| Analog output UFA...CI | [mA] | 4...20 (R _{max} 300 Ohm) | - |
| Voltage supply (reverse polarity protection) | [VDC] | 10...30, except UFA-150/200...CU: 15...30 | |
| Ripple of supply voltage | [%] | 10 | |
| Mean current consumption | [mA] | approx. 30 | |
| Temperature range | [°C] | 0...+70 | |
| Protection class | | IP67 | |
| Weight | [g] | approx. 25 | |
| Housing material | | Nickel-plated brass | |
| Electrical connection | | M12 connector, 4-pole | |

TECHNICAL DRAWING



!! WARNING – SAFETY INFORMATION !!

These products are neither allowed to be used 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 OF THE SWITCHING POINTS (UFA...-TVPA-24C)

The switching points are set by connecting the teach wire with either the power supply $-U_B$ (0 V) or $+U_B$ (+24 VDC). The voltage must be active for at least 1 s on the teach wire. During teaching the LED shows if the sensor has detected the object.

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Window operation (closer):</p> <ul style="list-style-type: none"> • Place the object to the near switching point • Teach switching point with $-U_B$ • Place the object to the far switching point • Teach switching point with $+U_B$ | <p>Window operation (opener):</p> <ul style="list-style-type: none"> • Place the object to the near switching point • Teach switching point with $+U_B$ • Place the object to the far switching point • Teach switching point with $-U_B$ |
| <p>Switching point (closer):</p> <ul style="list-style-type: none"> • Place the object to the switching point • Teach switching point with $+U_B$ • Cover the sensor diaphragm by hand or let the sensor look into the void • Teach with $-U_B$ | <p>Switching point (opener):</p> <ul style="list-style-type: none"> • Place the object to the switching point • Teach switching point with $-U_B$ • Cover the sensor diaphragm by hand or let the sensor look into the void • Teach with $+U_B$ |

SETTING THE MEASURING LIMITS (ANALOGUE OUTPUT)

The two measuring limits are set by connecting the teach wire with either the power supply $-U_B$ (0 V) or $+U_B$ (+24 VDC). The voltage must be active for at least 1 s on the teach wire. During teaching the LED shows if the sensor has detected the object. With $-U_B$ the lower measuring limit (0 V or 4 mA) and with $+U_B$ the upper measuring limit (10 V or 20 mA) is taught. Thus it is possible to teach a rising or a falling ramp.

- Place the object to the lower measuring limit (where 0 V or 4 mA is expected)
- Teach lower measuring limit with $-U_B$
- Place the object to the upper measuring limit (where 10 v or 20 mA is expected)
- Teach upper measuring limit with $+U_B$

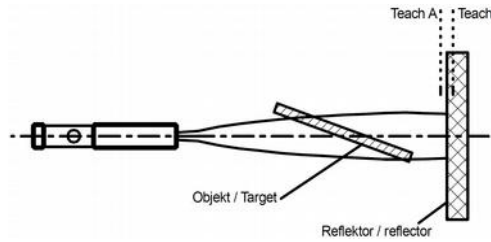
Lower and upper measuring limits can also be programmed individually later.

Attention: The teach wire must not be connected during normal operation. The sensor can e. g. be operated after teaching with a 3 wire cable.

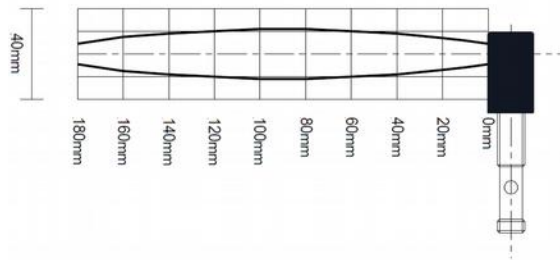
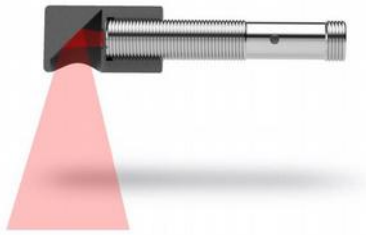
| | LED red | LED yellow |
|--------------------------------|----------|------------------|
| During teach-in: | | |
| - Object detected | off | blinking |
| - No object detected | blinking | off |
| - Object not reliably detected | on | off |
| Normal operation PNP | off | switching status |
| Normal operation analogue | off | on |
| Error | on | last status |

APPLICATION HINT WINDOW OPERATION (UFA...TVPA-24C)

In window operation the sensor detects only targets which are within the window limits. The same function can also be used to simulate a kind of retro-reflective sensor. The reflector is mounted in the small window between Teach A and Teach B (see drawing below). In such setup the sensor detects also targets which pass the sensor beam in a very flat angle. The sensor would not detect such targets in normal scan operation mode.



VERSION WITH RADIAL BEAM UFA-180-RB



VERSION WITH FOCUSING DEVICE UFA-150-FB

Key Features

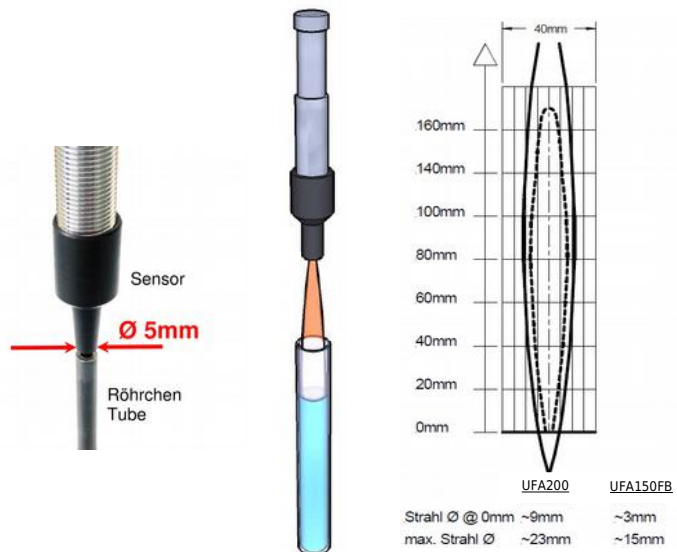
- very narrow detection beam
- particularly for level measurement in narrow cavities
- no blind range
- measuring range up to 150 mm
- Teach-In
- Binary or analogue outputs

Description:

The ultrasonic sensors series UFA-150-FB (FOCUS Beam) are equipped with a focusing device made of glass-fibre reinforced polypropylene, which makes the sound beam particularly narrow. Therefore they are suitable in the near range from 0 mm up to 150 mm to watch into narrow cavities. A typical application is measuring of liquid level in small tubes or containers.

With a little distance between sensor and tube, and depending on the measuring height, levels can be measured in tubes which only have a few mm diameter. In very narrow set ups, only a test can verify the feasibility of measurement.

Technical data see page 2.



CHEMICAL-RESISTANT VERSION UFA-150-CP

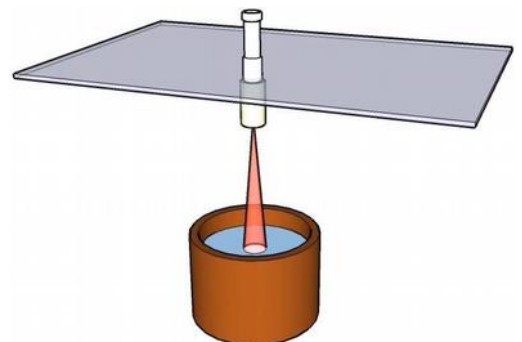
Key Features

- chemically resistant version (PVDF)
- diaphragm PTFE coated
- front resistant against most chemicals
- measuring range up to 150 mm
- Teach-In
- binary or analogue outputs

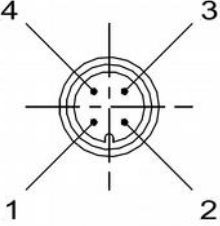
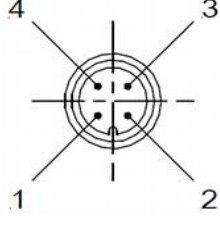
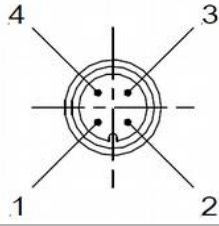
Description:

The diaphragm of the series UFA-150-CP (Chemical Protection) is coated with a thin PTFE foil. The head made of chemically resistant PVDF serves as mechanical fixation for the foil and protection of the sensor's front part. Thus the front part of the ultrasonic sensor becomes resistant to most chemicals.

Technical data see page 2.



ELECTRICAL CONNECTION

| | | |
|-----------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| PIN-assignment UFA-...-TOR-24-CU |  | <ul style="list-style-type: none"> 1 +24 VDC 2 Teach-In 3 0 V 4 OUT 0...10 V |
| PIN-assignment UFA-...-TVPA-24-C |  | <ul style="list-style-type: none"> 1 +24 VDC 2 Teach-In 3 0 V 4 OUT PNP |
| PIN-assignment UFA-...-TOR-24-CI |  | <ul style="list-style-type: none"> 1 +24 VDC 2 Teach-In 3 0 V 4 OUT 4...20 mA |

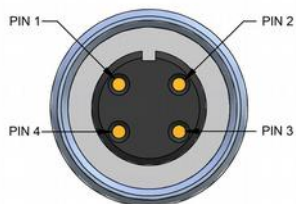
The sensors feature a 4-pole M12 connector. The cables should never be mounted parallel or close to high current cables. Please order the necessary cables separately (see accessories).

ACCESSORIES

Cable with connector M12, 4 poles, shielded

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

| PIN No. | cable colour | PIN No. | cable colour |
|---------|--------------|---------|--------------|
| Pin 1 | brown | Pin 3 | blue |
| Pin 2 | white | Pin 4 | black |

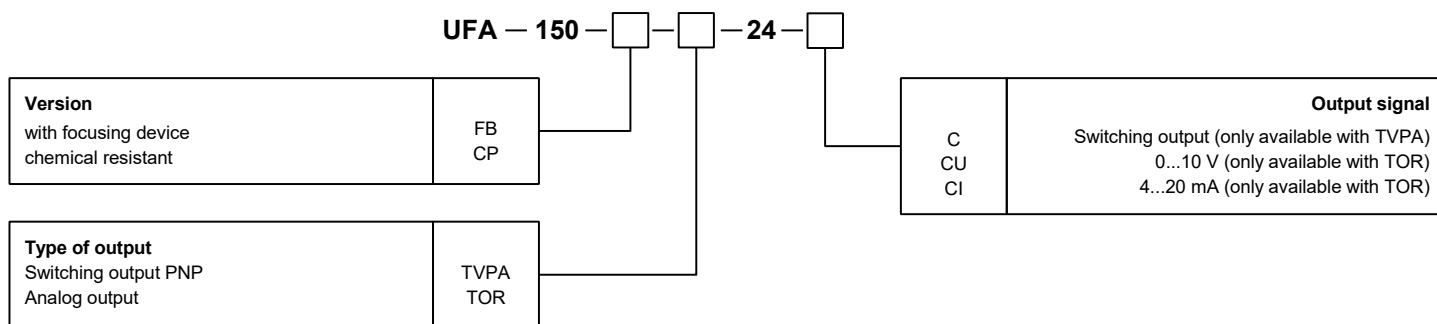


Mating connector M12, 4-pole (for self assembly), shielded

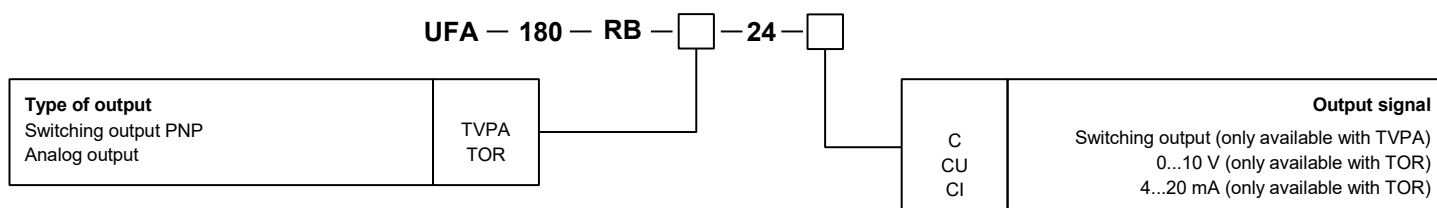
| | |
|------------------------|----------------------------------------------|
| Connector M12 straight | D4-G-M12-S |
| Connector M12 angular | D4-W-M12-S |
| Protection class | IP67 |
| Cable passage | ø 4...8 mm |
| Temperature range | -25...+90 °C |
| Wire cross section | 0.14...0.34 mm ² |
| Mode of connection | Spring cage |
| Special feature | excellent resistance against chemicals and o |



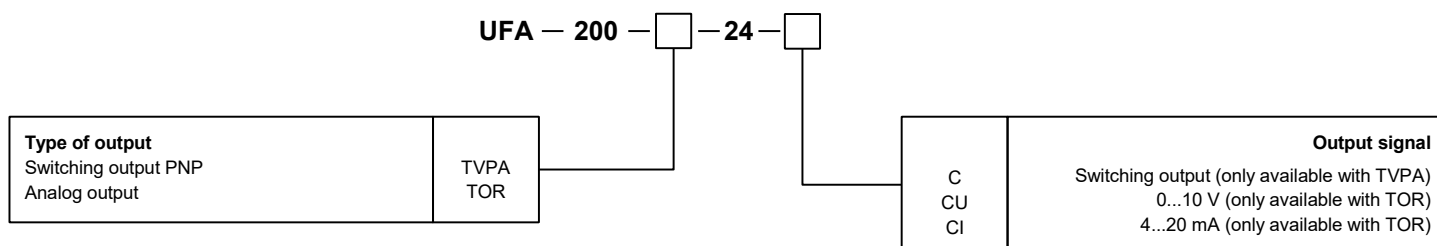
ORDER CODE UFA-150



ORDER CODE UFA-180



ORDER CODE UFA-200



OVERVIEW

UFA-150-FB-TOR-24-CI

UFA-150-FB-TOR-24-CU

UFA-150-FB-TVPA-24C

UFA-150-CP-TOR-24-CI

UFA-150-CP-TOR-24-CU

UFA-150-CP-TVPA-24C

UFA-200-TOR-24-CI

UFA-200-TOR-24-CU

UFA-200-TVPA-24C

UFA-180-RB-TOR-24-CI

UFA-180-RB-TOR-24-CU

UFA-180-RB-TVPA-24-C

ACCESSORIES

Cable with mating connector M12, 4-pole, shielded

K4P2M-S-M12 2 m, straight connector

K4P5M-S-M12 5 m, straight connector

K4P10M-S-M12 10 m, straight connector

K4P2M-SW-M12 2 m, angular connector

K4P5M-SW-M12 5 m, angular connector

K4P10M-SW-M12 10 m, angular connector

Mating connector M12, 4-pole, shielded (for self assembly)

D4-G-M12-S Mating connector M12 straight

D4-W-M12-S Mating connector M12 angular

Subject to change without prior notice..

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