

Ultraducer 1A – High Precision Ultrasonic Proximity Sensor

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Fig.1. UD 1A, sensor front end view, sample housing design,
OD=25mm(1.0”), Tube Length=130mm (5.1”)
(projected design, not the actual housing)

Product summary.

Ultraducer 1A is an ultra high precision non-contact analog through-air ultrasonic proximity sensor designed for a wide range of industrial automation and control applications requiring precise measurement of distance at short range, with temperature and humidity compensation.

Benefits in comparison with existing alternatives

- Well known, well understood and proven ultrasonic technology but with unique “laser”-like precision!
- Non-contact “vernier calliper” replacement!
- Non-contact replacement for moving shaft precision inductive (LVDT) sensors
- Unlike LVDT, provides fully integrated measurement electronics, which come as an expensive optional extra with LVDT.
- Superior replacement for non-contact inductive and capacitive switches: longer range at higher precision!
- Replacement of laser photoelectric gauges in high dust, black or transparent target applications.
- New applications possible due to high resolution: e.g. paper sheet counting, objective lens positioning for power laser cutting devices etc.
- Very narrow beam allows applications through narrow holes, slits or through cluttered partially obstructed pathways.



Particularly suitable application examples

- Positioning in CNC machining
- Production line positioning
- Precision positioning and non-contact distance sensing in robotics,
- Fault detection in turning, milling and drilling production processes, ability to penetrate drill holes (dia >1/4")
- Non-contact measuring of drill hole depth
- Measuring thickness of sheets and foils, at a distance
- Counting number of stacked up thin objects and thin sheets
- Non-contact measuring of thickness of wires and bands.
- Detection of thin wires, threads and bands
- Precise angular sensing (below 1.5deg)
- Precision liquid level gage

Less suitable application examples

Applications with strong CO₂, CFC and hydrocarbon gases and vapors. Temperatures above 60deg C or below -20 degC, and long range sensing beyond 10cm (beyond 30cm for 700kHz version). Airborne applications.

Features.

- High absolute accuracy +/-50um (+/-0.002") at 40mm distance, temperature & humidity compensated
- Very high resolution +/-10um at 15ms response, or 4um at 1s response time (standard deviation)
- Full instantaneous temperature, gas composition and humidity compensation in real time by built-in calibration reference target.
- Selectable response speed: from 15 ms to 1s (hard wired)
- Very narrow beam width: 8mm diameter and 1 degree beam spread angle – allows measuring through narrow openings and through holes.
- Range 20 – 80mm (1.4MHz version)
- Small transducer size: 10mm dia, 7mm thick (radiating surface 8mm dia), allows easy placement in tight locations.
- Electronics circuit board 21 X 120mm double sided SMT. Suggested housing format: steel or aluminum pipe OD=25mm, L=130mm.
- Power Supply 24Vdc (18-31V) / 60mA
- Analog Outputs: distance 0-3V, echo strength 0-3V, resolution 0.3mV

