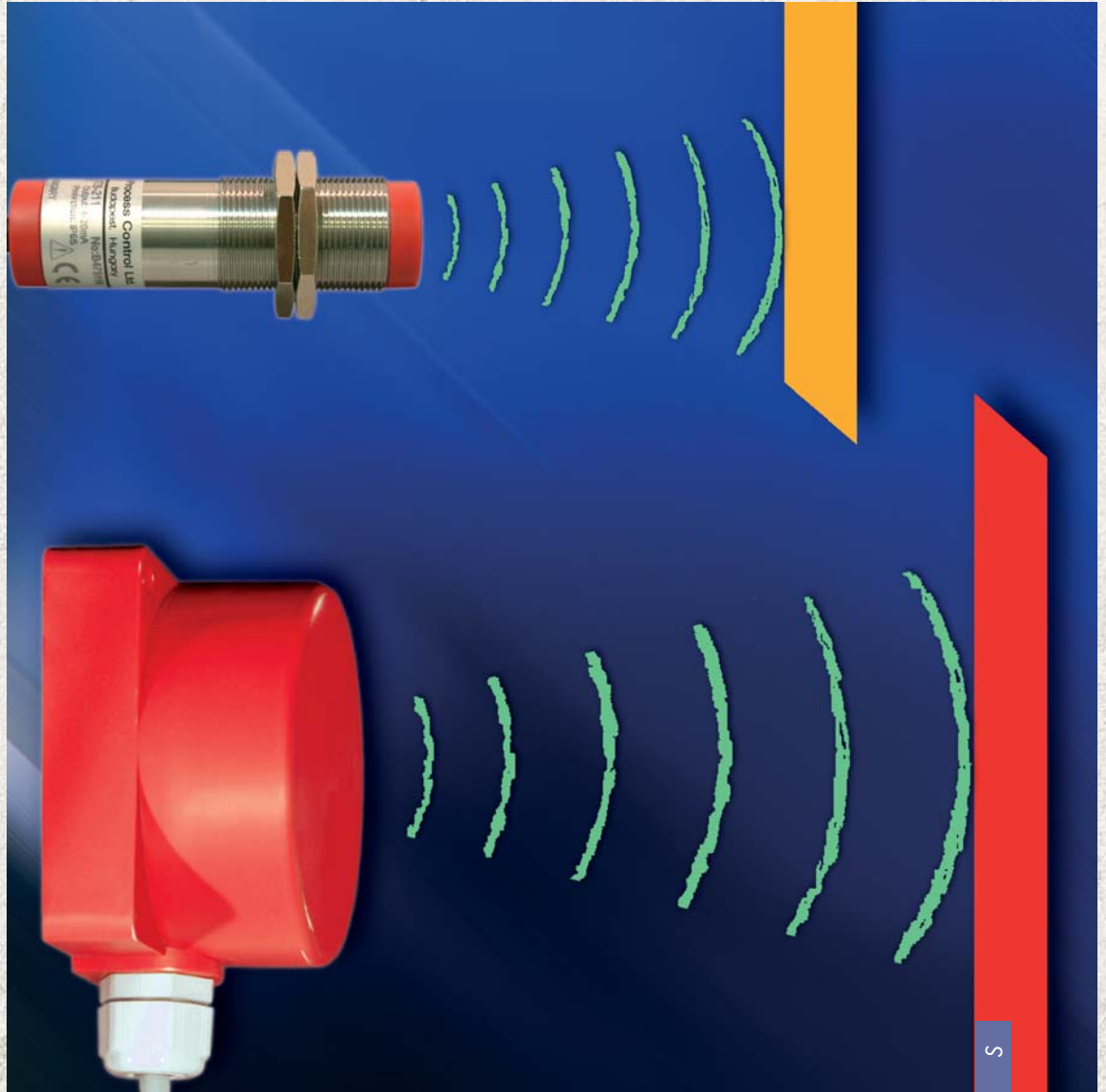# *MICROSONAR*

ULTRASONIC PROXIMITY TRANSMITTER

SENSORS

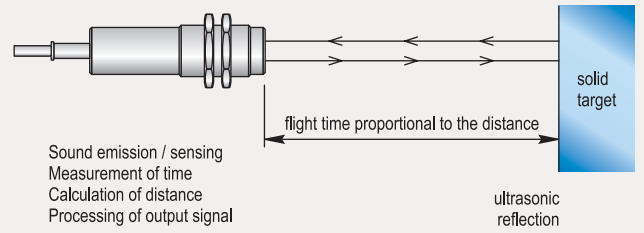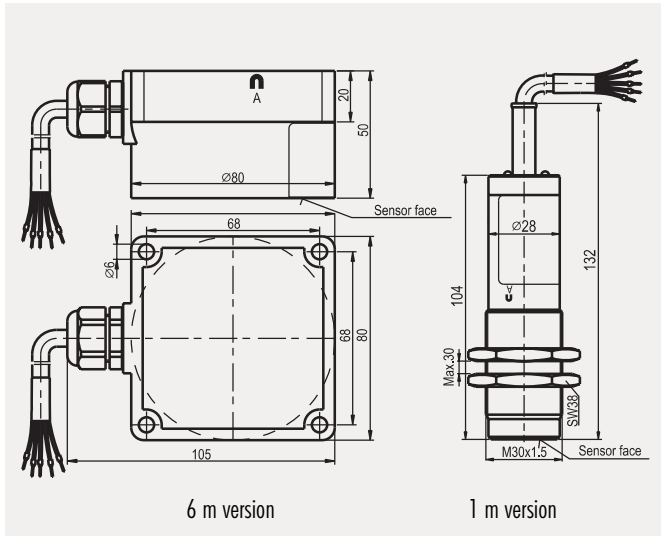OUR PROFESSION IS YOUR LEVEL

GENERAL

MICROSONAR sensors use non-contact ultrasonic principles to detect and measure the position of an object. They act as proximity switches, or transmit the measurement of the distance from sensor face to the target. For transmitter models the output signal is either 4—20 mA or 0—10 V, which can be assigned to any part of the nominal range. Switching points of the proximity switch option can be set to any point within the range.

ULTRASONIC PRINCIPLE

Sound emission / sensing
Measurement of time
Calculation of distance
Processing of output signal

flight time proportional to the distance

solid target

ultrasonic reflection

DIMENSIONS

6 m version   1 m version

INSTALLATION

1 m range units: Use the two nuts provided to secure the body of the sensor in a 31 mm Ø hole.

6 m range units: Use four mounting bolts M4 in the holes (Ø 6) provided to secure to a solid panel or wall.

It is important that the unit is securely fixed to a vibration free structure, for smooth operation.
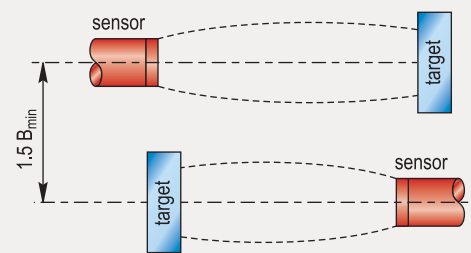Reliable operation can be affected by another target object within or near the ultrasonic beam, or even by an adjacent MICROSONAR unit (see next section for recommendations)

ARRANGEMENT OF MULTIPLE UNITS
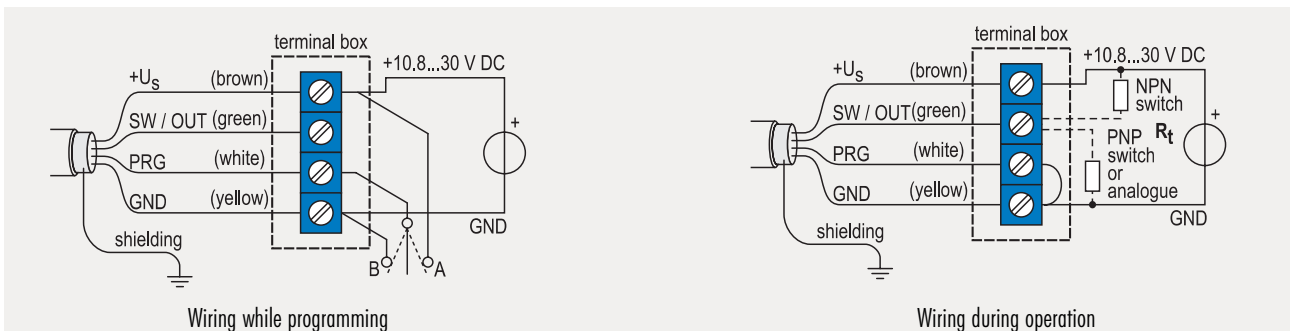
Minimum distances between units
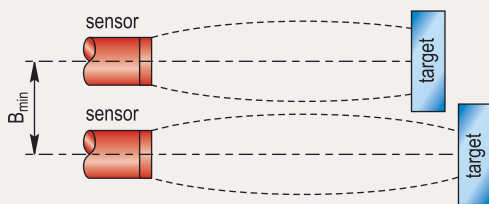
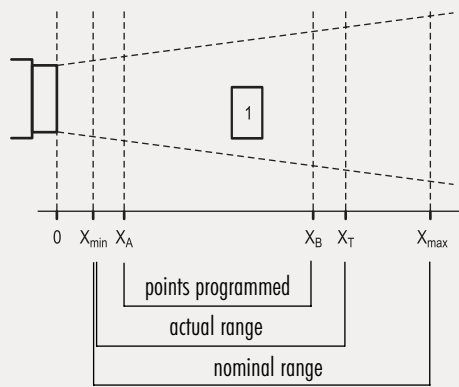| Type	B_{min} (m)
U _ _–21_	0.25
U _ _–26_	0.75

Two MICROSONAR units working in close proximity may interfere with one another if their beams overlap: for units with parallel axes, observe the minimum separations quoted above.

WIRING

Wiring while programming

Wiring during operation

OPERATION/PROGRAMMING OPTIONS

The Smart signal processing techniques used with MICROSONAR, with a few selected programmable features to suit the application, enable the unit to satisfy most measurement and process control applications. The programming is not complex, and is achieved using the magnetic screwdriver supplied, or by use of the programming connection wire in the sensor cable.

The programming functions set the parameters defined in the diagram below. Distance parameters X_A and X_B define the output transfer characteristic of the unit, and can be set to any position within the nominal range. The minimum distance between X_A and X_B is not recommended to be smaller than 20 mm.

Speed of response: The sensor speed of response is a compromise between being able to reject any occasional false echo returns or echo failures, and tracking the changing distance of the target. To reject false echoes, MICROSONAR averages a programmable number of valid distance measurements. This averaging number, "a", is selected by considering the display stability, velocity of the target and site noise conditions, including the possibility of lost echoes. There is also a further ability to reject "k" number of successive invalid echoes, useful where the target gives a poor quality reflected signal.

Switch output (UR_–2_3-4 and UR_–2_4-4 types) Proximity switches compare the measured distance with the programmed points X_A and X_B and switch in accordance with the figure on the right. Reverse operation can be achieved by programming X_B smaller than X_A.
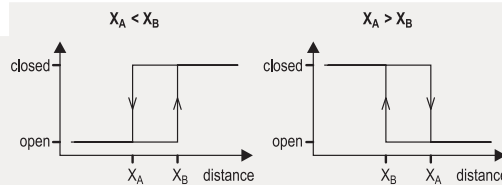
Current output (UT_–2_1-4 type) These measurement transmitters provide a 4-20 mA output signal proportional to the position within the range X_A to X_B, according to the figure at the right. Note the over- and under-range output indications. Decreasing current output for increasing target distance is achieved by setting X_B smaller than X_A.
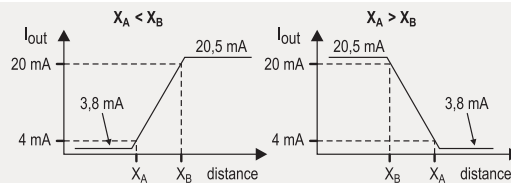

Voltage output (UT_–2_2-4 type) These measurement transmitters provide a 0-10 V DC output signal proportional to the position within the range X_A to X_B, according to the figure at the right. Note the over-range output indication. Decreasing current output for increasing target distance is achieved by setting X_B smaller than X_A.
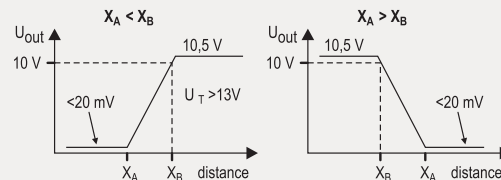

APPLICATIONS

MICROSONAR is primarily for industrial process automation. The MICROSONAR proximity switches and distance transmitters are suitable for detecting the presence or absence of objects, or for measuring the distance between sensor and target object with high accuracy. To enable a good quality reflection, the target should have a plain flat surface, and the MICROSONAR sensor surface should be parallel to the target surface, and pointing directly at the target. If the reflecting surface is not plain and flat, it will not necessarily prevent measurement, but may cause performance limitations.

MICROSONAR is applicable to the detection of engine parts; piece work; vehicles; fork-lifts; tippers; cranes. In the same way it can be used with packages and packing cases, cardboard, sheet materials, belts, buildings and raw materials, provided the targets have a surface with the proper reflection capabilities, and their speed of movement is not excessive.

sensing of height

sensing of objects

sensing of distance

sensing of continuity

NIVELCO
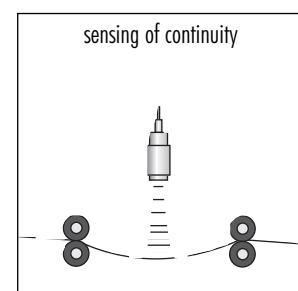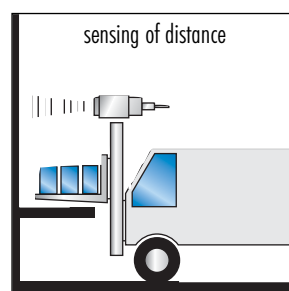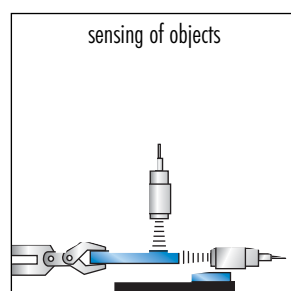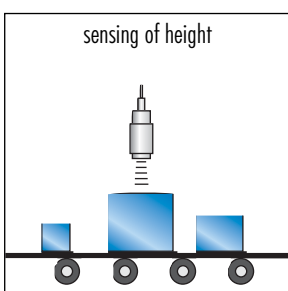
GENERAL DATA

Type		UT☐-211	UT☐-212	UR☐-213 UR☐-214	UTP-261	UTP-262	URP-263 URP-264
Nominal Range	Xmin (m)	0.2			0.4		
	Xmax (m)	1.0			6.0		
Ultrasonic frequency		160 kHz			60 kHz		
Total Beam angle		5°					
Measure sequence time (Tp)		25 ms			80 ms		
Resolution		0.25 mm	0.25 mm	0.1 mm	1.5 mm	1.5 mm	0.1 mm
Output		4 ... 20 mA	0 ... 10 V	switch	4 ... 20 mA	0 ... 10 V	switch
Programming		With contacting a PRG cable or with magnet					
Ambient temperature		–20 ... +70 °C					
Power supply		10.8 ... 30 V					
Consumption Us = 12 V		< 55 mA	< 41 mA	< 31 mA *	< 54 mA	< 40 mA	< 30 mA *
Consumption Us = 24 V		< 63 mA	< 49 mA	< 39 mA *	< 61 mA	< 47 mA	< 37 mA *
Input protection		Reverse polarity, Surge, ESD					
Integrated cable		Shielded cable with PVC coating L = 3 m					
Cable core		4 x 0.5 mm2					
Electric protection		Class III.					
Ingress protection		U☐S – 2☐☐: IP 67, U☐P – 2☐☐: IP 68			IP 68		
Enclosure		U☐S: Stainless Steel with PP covers U☐P: PP housing			PP (moulded with resin)		
Mass		400 g			530 g		

* unloaded

Type	UT☐-2☐1-4	UT☐-2☐2-4	UR☐-2☐3-4	UR☐-2☐4-4
Type of Output				
Voltage rating	–	–	Max. 30 V DC	
Current rating	–	–	Max. 200 mA	
Residual voltage	–	–	< 2,5 V	
Switching delay or Settling time (Tb*)	U☐☐-21☐-4: 25 ms (a=1), 100 ms (a=4), 200 ms (a=8), 400 ms (a=16) ** U☐☐-26☐-4: 80 ms (a=1), 320 ms (a=4), 640 ms (a=8), 1280 ms (a=16) **			
Temperature error	± 0.02% / °C			
Linearity error	± 0.35 %		–	–
Repeatability	1.5 mm		1 mm	
Output signal	4 ... 20 mA	0 ... 10 V (Us > 13 V)	–	–
Load resistance	≤ 500 ohm (Us>14 V)	≥ 1 kohm	–	–
Output protection	Overvoltage	Short Circuit, Overvoltage	Short Circuit, Overload, Overvoltage	

* under good reflection conditions   ** value of „a" can be programmed

ORDER CODE (NOT ALL COMBINATIONS AVAILABLE)

MICROSONAR U☐☐-2☐☐

Model	Code
Switch	R
Transmitter	T

Enclosure	Code
Plastic	P
Stainless Steel	S

Range	Code
0.2 ... 1.0 m	1
0.4 ... 6.0 m	6

Output	Code
4 ... 20 mA	1
0 ... 10 V	2
PNP switch	3
NPN switch	4