Multichannel ultrasonic distance alarm system
UPA 2000 6PS 12/24 C

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- Ultrasound system for preventing collisions, such as of AGVs (Automated Guided Vehicles)
- Measuring distance up to 2m
- 4 ultrasonic sensors for self-installation
- 1 electronic box 10...30VDC
- 6 short-circuit proof PNP switching outputs
- Measurement independent of material, surface and color of the target
- Works under dust, dirt, fog
- Not sensitive to light!
- Detects transparent and bright objects
- Robust electronics IP54

Technical data		**UPA 2000 6PS 12/24 C**	**UPA 2000 6PS 12/24 C, 5m**
Detection range nominal	m	0...2	
Accuracy	cm	~ ±5	
Sensor cable length	m	2.5	5.0
Detection reliability	-	depending on target	
Ultrasonic frequency	kHz	~40	
Switching status indicator	-	6 yellow LED	
Power indicator	-	1 green LED	
Binary output, short circuit proof, max. 0.1A	-	PNP N/O	
Response speed of binary outputs			
t_{on}	s	~0.2	
t_{off} as long as any target is detected	s	~0.2	
t_{off} if no target at all is detected	s	~2	
Power supply voltage (reversal polarity protection)	VDC	10...30	
Ripple of supply voltage	%	<10	
Mean current consumption	mA	~30mA @ 12VDC ~20mA @ 24VDC	
Operating temperature	°C	-10...+60°C	
Size of electronics box (wxhxd)	mm	~109x50x111	
Connection for power and binary outputs	-	8-pin screw mount connector M16, DIN45326	
Sensor connection	-	4 plastic click connectors	

SNT Sensortechnik AG, Hammerstrasse 6, CH-8180 Bülach, Switzerland, Phone +41 44 817 29 22, Fax +41 44 817 10 83, info@sntag.ch

Description

UPA 2000 6PS 12/24 C is a 4-channel system for detecting objects by means of ultrasonic sensors. Compared to conventional industrial ultrasonic sensors, it is cost-effective and tailored precisely to the task, to detect larger objects in the range up to max. 2m in a relatively wide angle. For this purpose low-frequency ultrasonic sensors from the automotive industry are used in conjunction with a robust industrial-grade electronics.

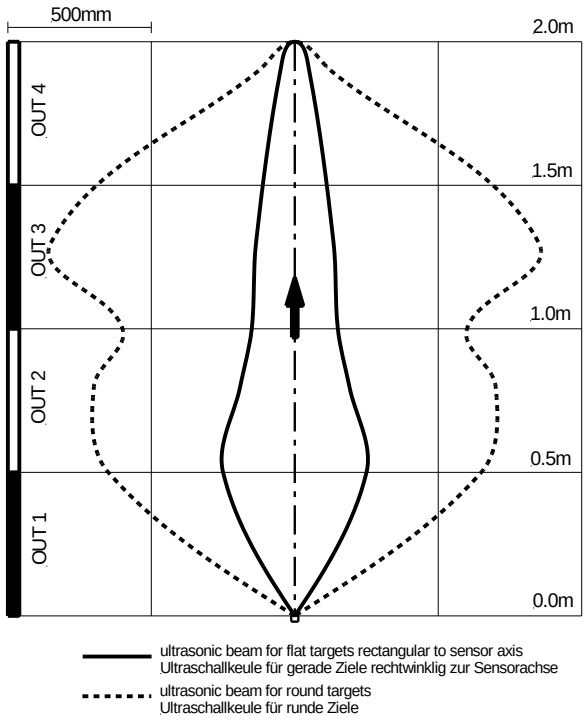
The system includes four sensors (A, B, C, D) with an integrated cable 2.5m (option 5m) which can be individually connected to the electronics box. The sensors are clipped into a hole Ø22mm.

Ultrasonic sensor

Electronics box

Sonic beam

The detection range of the ultrasonic sensors is called sonic cone or beam. It depends strongly on the size, shape and texture of the target. Below typical forms are recorded.



Typical detection beams

Function

The system works from at least one sensor connected. Once a sensor has detected an object in its domain, an output turns on. A distinction is made between the distance at which the object is:

- Output 1: object at a distance 0…0.5m
- Output 2: object at a distance 0.5...1.0m
- Output 3: object at a distance 1.0...1.5m
- Output 4: object at a distance 1.5…2.0m

If several objects are in the detection area, the nearest is relevant for the output. In addition, in the nearer distance it is indicated whether it is one of the sensors A and B or C and D, which sees the object:

- Output 5: A or B
- Output 6: C or D

Of course, both can display simultaneously. So one can differentiate, for example, between right and left or front and back.

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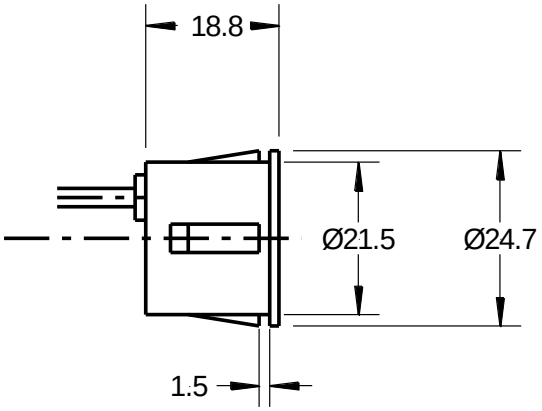
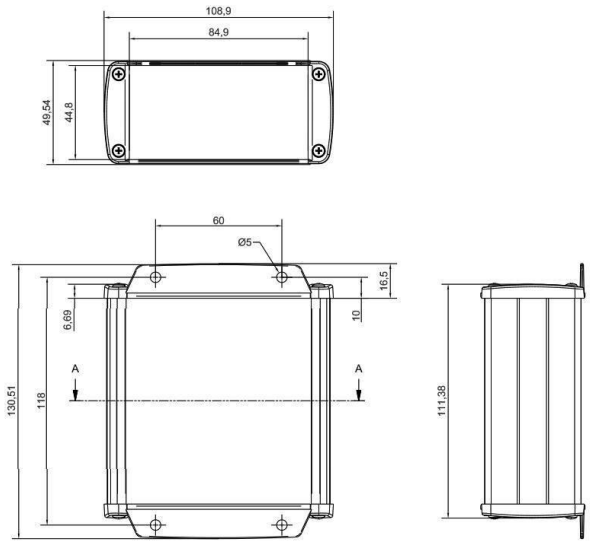
All 6 outputs are PNP normally open (N/O), short-circuit proof and with max. 100mA. They can be connected in parallel as an OR link among themselves or with other similar systems. The switching status of each output is indicated by a yellow LED.

Dimensions



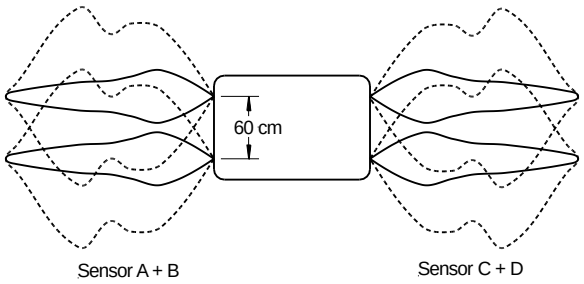
Ultrasonic sensor



Electronics housing

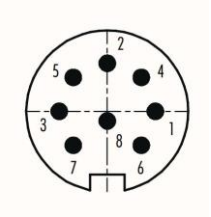
Installation of the sensors

The sensors have a clip mechanism. As a joist, take a plate with 1.5mm thickness and drill Ø22mm holes in it. The sensors can then be carefully pushed in from the front. For acoustic reasons the sensor shall not stick too tight in the hole and it must not be fixed with a hard glue, but at best from the rear with soft silicone (RTV).
The distance between the sensors determines how well the complete covering of the space by the sound beams is. For a good coverage a distance of max. 60cm should be followed. If requirements are lower or the objects large and well detectable, even a much greater distance is sufficient. One should determine the desired distance before final installation experimentally.
The sensor membrane has a certain inclination with respect to the mounting hole. So one can optimize the alignment by turning the sensor.



Installation example

Electrical connection



8-pin M16 connector (DIN45326), view on the electronics box

1	brown/braun	+10...30VDC
2	blue/blau	out 1 (0...0.5m)
3	grey/grau	out 2 (0.5...1.0m)
4	white/weiss	GND
5	pink/rosa	out 3 (1.0...1.5m)
6	green/grün	out 4 (1.5...2.0m)
7	yellow/gelb	out 5 (Sensor A/B)
8	red/rot	out 6 (Sensor C/D)

Scope of delivery

- 4 ultrasonic sensors with 2.5m cable (option 5m)
- 1 electronics box
- 1 8-wire cable l=2m with cable socket 8-pin and a free end for in- and outputs

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