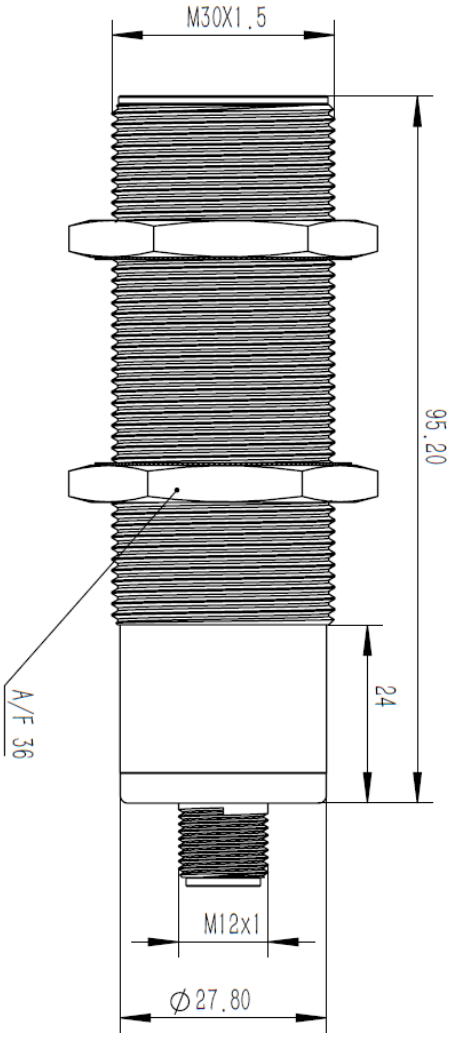
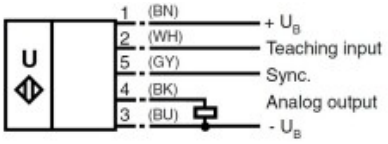
Ultrasonic Sensor

Product manual for Part Numbers: PXUS1500-30IV15

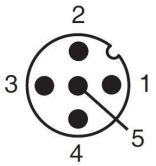
2-meter removable M12 cable included.

Technical Data	
General Specifications	
Sensing distance	80…1500mm
Adjustment range	120…1500mm
Unusable area	0…80mm
Standard target plate	100mm×100mm
Transducer frequency	About 180kHz
Response Delay	About 195ms
Indicators/Operating means	
LED blue	Power on
LED yellow	Indication of the switching state. flashing: program function object detected
LED red	Permanently red: Error Red, flashing: program function, object not detected
Electrical specifications	
Operating voltage U_B	10…30VDC, ripple10%ss
Power consumption P_0	≤ 900 mW
Output	
Output type	1 analogue output 4…20mA
Resolution	Evaluation range [mm]/4000, but ≥ 0.35 mm
Deviation of the characteristic curve	≤ 0.2% of full-scale value
Repeat accuracy	±0.1% of full-scale value
Load impedance	0…500 Ohm
Temperature influence	≤2% from full-scale value
Ambient conditions	
Ambient temperature	-25…70℃
Storage temperature	-40…85℃
Mechanical specifications	
Protection grade	IP67
Connection	5-pin, A-coded M12 with removable 2m cable
Material Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture, polyurethane foam
Weight	130g





M12 Connector



External synchronization

The sensor can be synchronized by the external application of a square wave voltage. A synchronization pulse at the synchronization input starts a measuring cycle. The pulse must have a duration greater than 100 µs. The measuring cycle starts with the falling edge of a synchronization pulse. A low level > 1 s or an open synchronization input will result in the normal operation of the sensor. A high level at the synchronization input disables the sensor. Two operating modes are available:

1. Multiple sensors can be controlled by the same synchronization signal. The sensors are synchronized.
2. The synchronization pulses are sent cyclically to individual sensors. The sensors operate in multiplex mode.

Internal synchronization

The synchronization connections of up to 5 sensors capable of internal synchronization are connected to one another. When power is applied, these sensors will operate in multiplex mode.
The response delay increases according to the number of sensors to be synchronized. Synchronization cannot be performed during TEACH-IN and vice versa. The sensors must be operated in an unsynchronized manner to teach the evaluation limits.

Note:

If the option for synchronization is not used, the synchronization input has to be connected to ground (0V) or the sensor has to be operated via a V1 cable connector (4-pin).

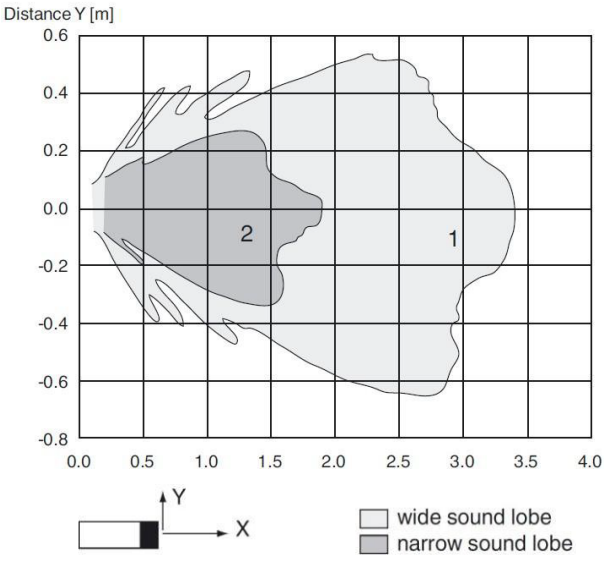
Adjusting the evaluation limits

The ultrasonic sensor features an analogue output with two teachable evaluation limits. These are set by applying the supply voltage - U_B or + U_B to the TEACH-IN input. The supply voltage must be applied to the TEACH-IN input for at least 1 s. LEDs indicate whether the sensor has recognized the target during the TEACH-IN procedure. The lower evaluation limit A1 is taught with - U_B, A2 with + U_B.

Two different output functions can be set:

1. Analogue value increases with rising distance to object (rising ramp)
2. Analogue value falls with rising distance to object (falling ramp) Evaluation limits may only be specified within the first 5 minutes after Power on. To modify the evaluation limits later, the user may specify the desired values only after a new Power On.

Characteristic response curve



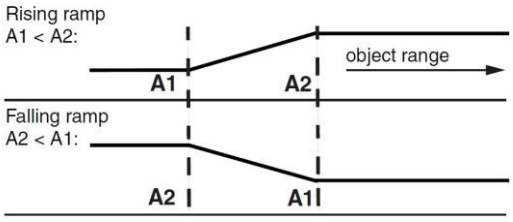
TEACH-IN rising ramp (A2 > A1)

- Position object at lower evaluation limit
- TEACH-IN lower limit A1 with - U_B
- Position object at upper evaluation limit
- TEACH-IN upper limit A2 with + U_B

TEACH-IN falling ramp (A1 > A2):

- Position object at lower evaluation limit
- TEACH-IN lower limit A2 with + U_B
- Position object at upper evaluation limit
- TEACH-IN upper limit A1 with - U_B

Programmed analogue output function



Default setting A1: unusable area
A2: nominal sensing range Mode of operation: rising ramp

LED Displays

Displays in dependence on operating mode	Red LED	Yellow LED
TEACH-IN evaluation limit		
Object detected	off	flashes
No object detected	flashes	off
Object uncertain (TEACH-IN invalid)	on	off
Normal mode (evaluation range)	off	on
Fault	on	previous state

Adjusting the sound cone characteristics:

The ultrasonic sensor enables two different shapes of the sound cone, a wide angle sound cone and a small angle sound cone.

1. Small angle sound cone

- switch off the power supply
- connect the Teach-input wire to -U_B
- switch on the power supply

- the red LED flashes once with a pause before the next.
- yellow LED: permanently on: indicates the presence of an object or disturbing object within the sensing range
- disconnect the Teach-input wire from -UB and the changing is saved

2. Wide angle sound cone

- switch off the power supply
- connect the Teach-input wire with + U_B
- switch on the power supply

- the red LED double-flashes with a long pause before the next.
- yellow LED: permanently on: indicates an object or disturbing object within the sensing range
- disconnect the Teach-input wire from + U_B and the changing is saved.

Notes:

1) Although not required, securing the sensor at the middle of the sensor housing is recommended.
2) The shape, material, and positioning of objects will influence the sensors detection range.
3) Objects with a flat surface will allow for the greatest range of detection. Rounded objects, or those with rough surfaces will likely result in a reduced range of detection, as well as diminished analog output voltage level.
4) Extreme temperature variations can impact measurement repeatability.