



# SE-02

## Ultrasonic Level Sensors in 2-wire Technology



## Features

- / Fluids and bulk solids
- / Non-contacting
- / 4...20 mA output
- / HART<sup>®</sup> communication
- / Low energy consumption
- / Cable lengths up to 1000 m
- / PLC connection
- / IP68
- / ATEX approval optional

## Description:

The operating principle of SE-02 level sensors is based on ultrasonic technology. Piezoelectric crystals are electrically incited to emit ultrasonic pulses, which run from the sensor to the surface of the fluid or bulk solid and back again. The SE-02 measures the time, the pulse needs for this distance and evaluates herefrom the distance between sensor and surface. The integrated transmitter generates a 4...20 mA output signal, that is proportional to distance, level, space or volume, whatever has been programmed while setting up the SE-02 via any HART modem and the PC software, which is part of the shipment. The unit provides also a 'fault condition' alarm of either 3.8 mA or 22 mA. The low blank distance of 0.125 meter demonstrates the high performance of SE-02 series. Not only the intelligent electronic of the sensors, but the extremely narrow sound beam, and the insensibility against clutter due to inbuilt components of the container predestine the sensors for a wide range of industrial applications. The SE-02 units are available with a cable-sided 1" male thread, with front threads or front flanges, thus allowing convenient assembly.

## Application:

Wherever non-contacting measurement is required, the Profimess' ultrasonic level sensors of the SE-02 series may be used. The units are able to output a signal, that is proportional to level, distance, free space or volume, thus the user can teach in the relation between the shape of the container and the distance between sensor and surface via 16 pair of values. Due to its protection class of IP68 the SE-02 is particularly demanded for water and wastewater applications.



## Technical Specifications:

<b>Functions /</b>	level, distance, empty space, volume and linearisation using 16 breakpoints
<b>Material housing /</b>	Valox 357 PBT Optional: PVDF
<b>max. Ambient pressure /</b>	5 bar
<b>Operating temp. /</b>	-40...+80°C
<b>Connection /</b>	1" NPT / BSP male thread on cable device side (front thread or flange optional)
<b>Operating range /</b>	Typ A = 0.125...3 m Typ B = 0.3...6 m Typ C = 0.3...10 m Typ D = 0.5...15 m <b>Higher ranges on request</b>
<b>Frequency /</b>	Typ A = 125 kHz Typ B = 75 kHz Typ C = 50 kHz Typ D = 41 kHz
<b>Sound exiting cone /</b>	< 10°
<b>Measurement uncertainty /</b>	0.25 % of measuring range
<b>Resolution /</b>	Typ A = 2.0 mm Typ B = 2.0 mm Typ C = 2.0 mm Typ D = 2.0 mm
<b>Options /</b>	- sensor face soft foam coating for - type B, C and D or PTFE for unting flange - 1.5" NPT front male thread - 2" NPT front male thread - flood protection head - flange version: DN 50 / DN80 / DN 100 / DN 150 DN 200 ANSI 2" / 3" / 4" / 6" / 8" - ATEX version

## Ordering Codes:

<b>Order no.</b>	<b>SE-02.</b>	<b>1.</b>	<b>1.</b>	<b>0.</b>	<b>000.</b>	<b>0.</b>	<b>0.</b>	<b>0</b>
<b>SE-02 Ultrasonic Level Sensor</b>								
<b>Sensor type/Op. range /</b>								
1 = type A / 0.125 m to 3 m								
2 = type B / 0.3 m to 6 m								
3 = type C / 0.3 m to 10 m								
4 = type D / 0.5 m to 15 m								
<b>Cable length /</b>								
1 = 5 m cable								
2 = 10 m cable								
3 = 20 m cable								
4 = 30 m cable								
5 = 50 m cable								
6 = 100 m cable								
9 = special cable lengths								
<b>Housing material /</b>								
0 = Valox 357 PBT (standard)								
1 = PVDF (for sensor type B, C, D and without flange)								
<b>Frontal process connection /</b>								
<b>Front thread:</b>								
000 = without front thread								
015 = 1.5" NPT front thread (for sensor type A and B only)								
020 = 2" NPT front thread (for sensor type C only)								
<b>Flange (incl. 0.25 mm PTFE coating):</b>								
000 = without flange								
002 = 2" ANSI								
003 = 3" ANSI								
004 = 4" ANSI								
006 = 6" ANSI								
008 = 8" ANSI								
050 = DN50								
080 = DN80								
100 = DN100								
150 = DN150								
200 = DN200								
<b>Sensor face coating /</b>								
0 = standard								
1 = PTFE (for flange version only)								
2 = foam-rubber (for sensor type B, C and D only)								
<b>EX approval /</b>								
0 = none								
1 = II 2 GD Ex m IIC T4								
2 = II 1 GD Ex ia IIC T4								
<b>Options /</b>								
0 = none								
1 = flood protection head (all sensors without front thread, none coated only)								

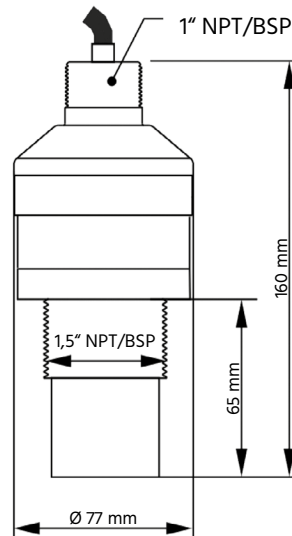


## Electrical Specifications:

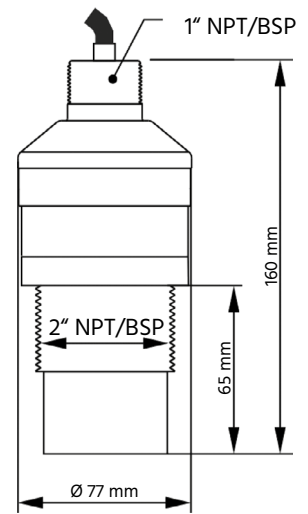
<b>Supply voltage /</b>	10...28 VDC
<b>Output /</b>	4...20 mA (3.8...22 mA) HART® - loop powered (2-wire)
<b>Configuration /</b>	PC software for parameter setting and linearisation via HART® communication (HART® - communicator not included).
<b>Start up time /</b>	4 sec. typical (9 sec. after 12 hours without activity)
<b>Cable length /</b>	5 m, 10 m 20 m, 30 m, 50 m or 100 m (special lengths optional)
<b>Protection class /</b>	IP68
<b>Approvals for</b>	II 2 GD Ex m IIC T4
<b>Ex-versions /</b>	II 1 GD Ex ia IIC T4

## Dim., Mounting Thread, front side:

Sensor Type A and Type B

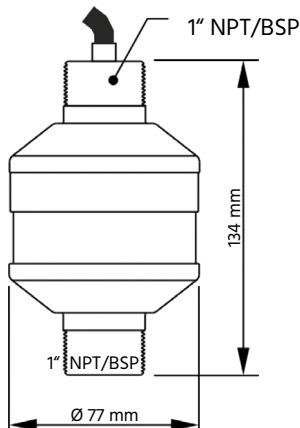


Sensor Type C

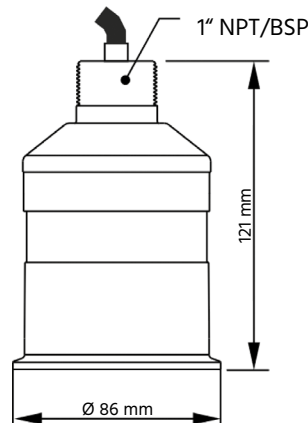


## Dim., Mounting Thread, cable side:

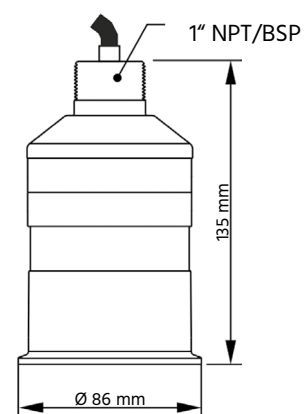
Sensor Type A



Sensor Type B and Type C



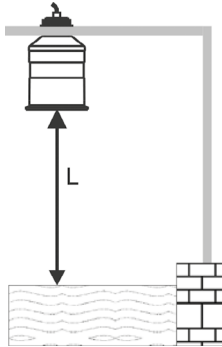
Sensor Type D





# Outdoor and open Vessel installation:

## Mounted via rear 1" NPT thread



The SE-02 ultrasonic sensors can be simply mounted on a bracket, suitable for the application and secured using either the 1" NPT rear or via the 1.5" or 2" front thread, dependant on model. Care should be taken to ensure that the SE-02 sensor is not installed in direct sunlight, in order to avoid errors in the measurement of ambient temperature. Attention should also be taken, when mounting the unit, to ensure that strong windy conditions are avoided, wherever possible, to prevent abnormal operation.

## Mounted via optional front thread

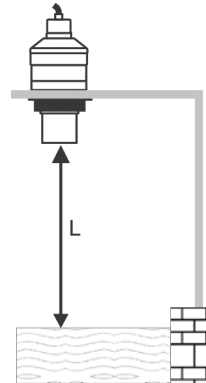
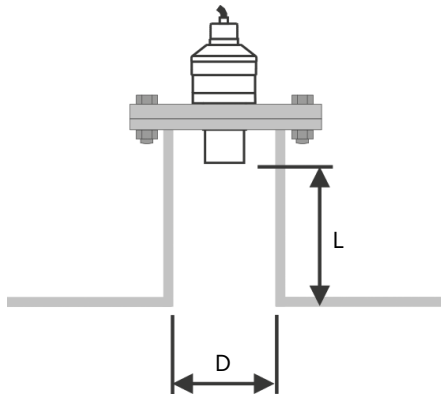


Table 1: Minimum sensor distance

Sensor	Operating range	L = min. Distance
Type A	3 m	125 mm
Type B	6 m	300 mm
Type C	10 m	300 mm
Type D	15 m	500 mm

# Closed Vessel installation:

## Flange mounted via front thread to a stand pipe



When mounting the ultrasonic sensor to a stand pipe care should be taken to ensure that the standpipe is of sufficient diameter with reference to its length, see table 2 for details. When using a standpipe, fixed to the top of a vessel, ensure that the open end of the standpipe is clear of any obstructions such as weld seams, gaskets etc. in order to avoid unwanted signal returns.

## Optional flange mounted to a stand pipe

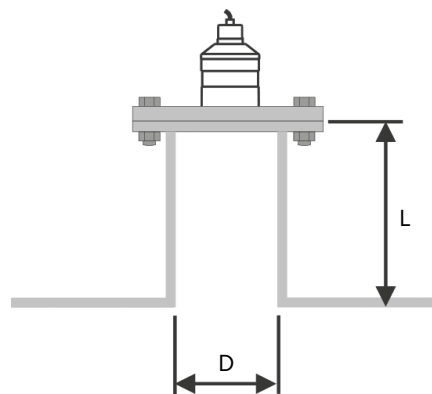


Table 2: Dimensions standing pipe

Diameter (D)	max. Length (L)
80 mm	220 mm
100 mm	300 mm
150 mm	420 mm
200 mm	560 mm