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Transducer  
SQ-UST-A1 and SQ-UST-G1  
for  
SQ-Eval-Kit-A1  
and  
SQ-Eval-Kit-G1

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## Product Overview

The non-invasive control of liquid levels is essential for many applications assuring proper functionality of components and systems. The ability of ultrasound to propagate through solids and liquids provides an almost ideal technology to implement this task. A preferred implementation for liquid level metering (LLM) attaches an ultrasound transducer to bottom wall of the liquid container. A short ultrasound wave is transmitted from the transducer passing the container wall and travels through the liquid to the liquid air interface. This interface acts as an ideal reflector returning the ultrasound wave back to the transducer, where the time of arrival is registered. or time of flight is estimated via ultrasonic signal processing. An increased delay of the arriving signals indicates a higher level, a reduced time of arrival a lower level. However, level metering requires the speed of sound in the fluid to be known. This knowledge is either obtained by calibrating or by measuring separately this parameter.

Besides propagating through container walls and hereby conveniently accessing the fluid for LLM, another main advantage of ultrasound is detecting foam fluid interfaces.

An appropriate technology here is the use of ultrasonic waves with their ability to pass layers like vessel walls and nontransparent, conductive and non-conductive materials. The usual method here is the echo sonography, where an ultrasound transducer produces a sonic wave which passes the liquid up to the liquid/air interface on top of the liquid where most of the wave will be reflected back. This wave is again received by the transducer. By estimation of the speed of sound inside the liquid and measuring the travel time of the bouncing ultrasound wave, the liquid level may be calculated.

One of the main advantages of the used ultrasound technology beside the non-contact measurement through the containers wall is the detection of foam/liquid boundaries.

Often the ultrasonic altimeter is - even though best applicable - not used because there is a need of certain knowledge about ultrasound signal processing and ultrasonic transducers.

Despite ultrasound is highly suitable for LLV it is often not utilized due to a lack of knowledge of ultrasound transducers and signal processing.

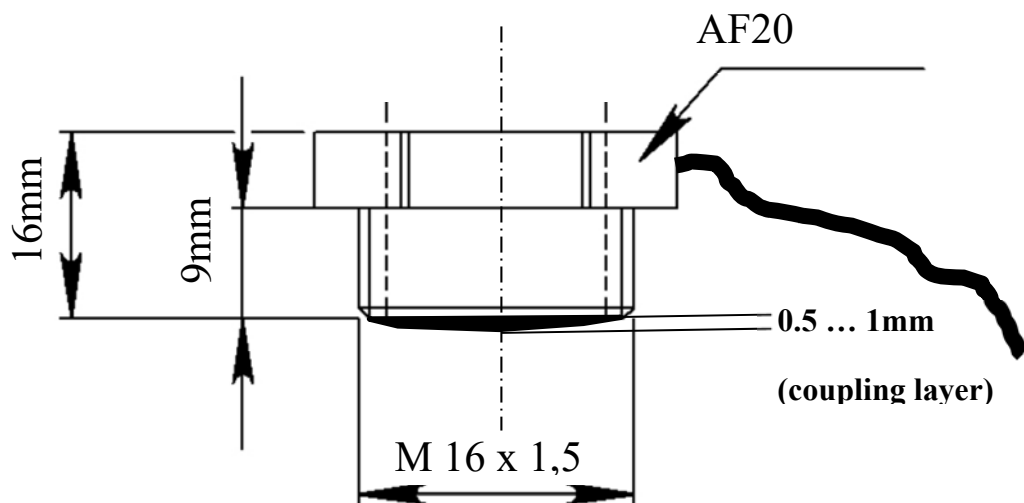
However, SonoQ's easy to integrate level module offers the possibility to add an ultrasonic level measurement into an existing system or to simplify the design of new products.

### Transducer Types and Dimensions

Because the transducer plays an important role to the quality of the level meter, generally application specific designs are possible. In that case, please contact the distributor or manufacturer for further consulting. Type of coupling as immersion (highest performance), dry coupling (easy handling if canisters are changed, but limited detectable level minimum) or glued-on transducers are possible for different opening angles and working frequencies.

For standard application there are two types of transducer available from stock:

- 2 MHz with 10mm aperture and dry coupling (SQ-A1)
- 2 MHz with 10mm aperture and tape fixation (SQ-G1)



## Technical Data:

**SQ-A1**

Nominal Frequency	2 MHz
Aperture	10 mm
Protection Class	IP65
electric connection	Cable, twisted pair, 500mm Jacket: PVC-based Coding: White-Signal/brown-Ground
Type of coupling	dry-coupling with elastomer cushion Minimum coupled surface: 70% / centered
Working Temperature	- 20°C ... 60°C
Housing	Polyamide, M16x1,5 thread, 16 mm height
recommended range	aqueous solutions (20mm... 750mm)
Acoustic radiation	< 100mW/cm <sup>2</sup> in water

**SQ-G1 (to be favored)**

Nominal Frequency	2 MHz
Aperture	10 mm
Protection Class	IP65
electric connection	Cable, twisted pair, 500mm Jacket: PVC-based Coding: White-Signal/brown-Ground
Type of coupling	glue-on with epoxy (e.g. UHU-Endfest – supplied with SQ-Eval-Kit-G1)
Working Temperature	- 20°C ... 100°C
Housing	glass filled Polyamide, M16x1,5 thread, 16 mm height
recommended range	aqueous solutions (20mm... 750mm)
Acoustic radiation	< 100mW/cm <sup>2</sup> in water

## Ordering Information

Part Number	Description
SQ-UST-A1	Transducer 2 MHz with 10mm aperture and dry coupling
SQ-UST-G1	Transducer 2 MHz with 10mm aperture and tape fixation

## Revision History

Version	Date	Changes
	28.05.2014	Initial release
1.1	26.01.2015	Drawing, technical data, ordering information
1.2	29.03.2016	Title
1.3	17.07.2017	Some text corrections
1.4	12.01.2018	Some text corrections

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