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

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 interfaces 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.

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.

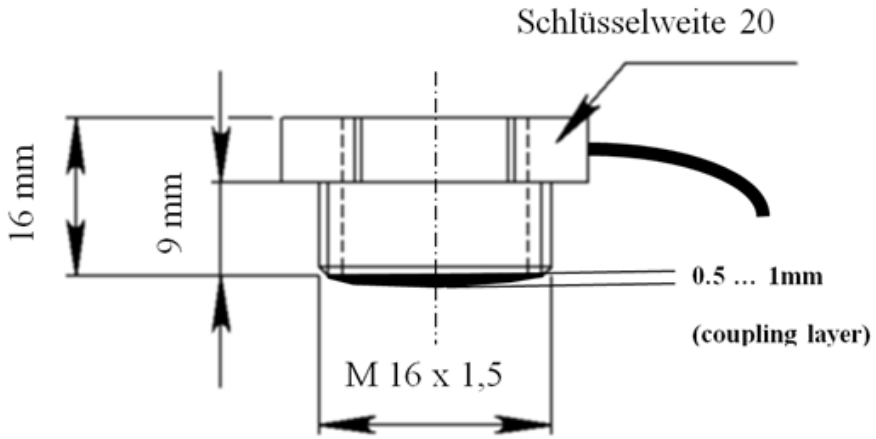
However, SonoQ´s easy to integrate level module offers the possibility to add an ultrasonic level measurement into an existing system or to simplify the design of new products.

Transducer Types and Dimensions

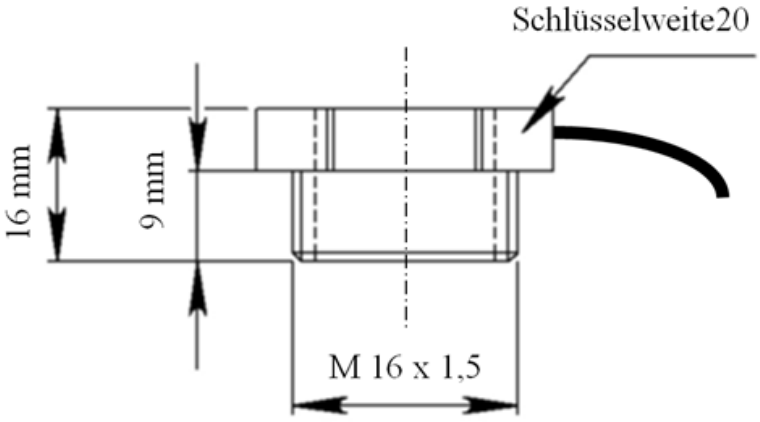
Because the transducer plays an important role to the quality of the level meter, generally application specific designs are possible. In that case, please contact the distributor or manufacturer for further consulting. Type of coupling as immersion (highest performance), dry coupling (easy handling 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)



Dimensions SQ-A1



Dimensions SQ-G1

Technical Data:

SQ-A1

Nominal Frequency	2 MHz
Aperture	10 mm
Protection Class	IP65
electric connection	Cable, twisted pair, 500mm, optional shield Jacket: PVC-based Coding: white-signal/brown-ground, optional: shield
Type of coupling	dry-coupling with elastomer cushion Minimum coupled surface: 70% / centered
Working Temperature	- 20°C … 60°C
Housing	Glass filled polyamide, M16x1,5 thread, 16 mm height
recommended range	Aqueous solutions (20mm… 750mm)
Acoustic radiation	< 100mW/cm^2 in water

SQ-G1 (to be favored)

Nominal Frequency	2 MHz
Aperture	10 mm
Protection Class	IP65
electric connection	Cable, twisted pair, 500mm, optional shield Jacket: PVC-based Coding: white-signal/brown-ground, optional: shield
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^2 in water

Note:
A stable force-fit connection is needed to propagate the acoustic wave through the wall into the liquid. First of all the glue need to be selected according the boundaries metal (surface of transducer) and wall material. Often an epoxy like UHU Endfest is a good choice. For long term stability the support of the glue layer by additional constructive pressure from behind the transducer is very helpful.

- The connection area should be flat, without corrosion and clean.
- Area at wall is to be degreased by solvents like isopropanol or acetone
- Surface of transducer is to be degreased by solvents like isopropanol or acetone
- Preparation of the glue according to manufacturer instruction
- Application of a pea sized amount of mixed glue on transducers metallic surface
- Spreading of the glue by help of a clean spatula

- Pressing and fixation of transducer to the designated area of the tank. It may be helpful to locate the transducer by help of a tape or by a special tool. For most glues, the thickness of the glue layer should be around 0.1 mm
- Hardening of glue as given in manufacturer instruction. In most cases hardening at higher temperatures gives better results.

Ordering Information

Part Number	Description
SQ-A1	Transducer 2 MHz with 10mm aperture and dry coupling
SQ-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 changes
1.4	16.04.2018	PEWATRON-Logo added und IS-LINE Logo removed
1.5	18.04.2018	Cable: optional shield Overview: small changes
1.6	20.07.2018	tech. note glue
1.7	17.08.2018	Drawing G1

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