Level Switch

Manual

AQ Elteknik AB

Level Switch KS

Level Switch RS

Level Switch LS

AQ Elteknik AB

Manual version 3.1

October 2014

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1. Manufacturer information

AQ Elteknik AB operates a policy of on-going development and reserves the right to make changes and improvements to any of the products described in this manual without prior notice.

Under no circumstances shall AQ Elteknik be held responsible for any loss or indirect damage howsoever caused. The contents of this document are provided as it is. AQ Elteknik AB reserves the right to revise this document or withdraw it at any time without prior notice.

CE Declaration of Conformity

Manufacturer: AQ Elteknik AB Sweden declares, that the product:

Level Switch marked with CE-label conforms with the following standards: EN 61000-6-2:2001, EN 61000-6-4:2001, EN55011 (Group 1, Class B).

Limited Warranty

AQ Elteknik AB warrants to the original end user that the Level Switch is free from any defects in materials or workmanship for a period of one year from the date of purchase. During the warranty period, should the Level Switch have indications of failure due to faulty workmanship or materials, AQ Elteknik AB will replace it with no charge. This warranty shall not apply if the Level Switch is modified, misused or subjected to abnormal working conditions.

Replacement as provided under this warranty is the only remedy of the purchaser. The purchaser pays freight to AQ Elteknik AB. AQ Elteknik AB shall in no event be held liable for indirect or consequential damages of any kind or character to the purchaser.

Warning

The Level Switch is intended to be connected to the Ultrasound Controller, manufactured by AQ Elteknik AB. AQ Elteknik AB takes no responsibility for any possible damage that could happen if the Level Switch is connected to any other equipment.

Certificate of Quality and Function

AQ Elteknik AB guaranties that the Level Switch has passed function and quality tests.

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2. Introduction

When the Level Switch is attached to the outside of a container or pipe it can sense liquid level inside. The Level Switch senses trough the wall without any need for a hole in the container. The Level Switch is made to be used together with the Ultrasound Controller. Level Switch LS is also available ATEX certified, see Level Switch EX manual. Level Switch KS is a new Level Switch with improved specifications that can be used instead of Level Switch LS.

3. Mode

The sensor Mode setting of the Ultrasound Controller determines in which way the Level Switch measures the level.

In Level Switch mode the Level Switch measures a single level from the side.

In Level Sensor mode the Level Switch measures a continuous level from the bottom.

In Gel Sensor mode the Level Switch measures a single gel-level from the side.

4. Level Switch Mode

In Level Switch Mode each Level Switch measures a single level. It measures the presence or no presence of liquid behind the container wall (or pipe wall).

All types of Level Switches can be used in Level Switch Mode but use different measuring techniques. There are two measuring techniques Echo and WR (see Ultrasound Controller manual).

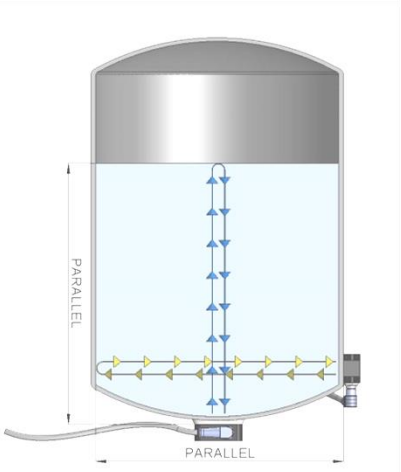
Level Switch KS and Level Switch LS should be used with the Echo technique and Level Switch RS must be used only with the WR technique.

The Level Switch is attached on the wall of the container or pipe. For a cylindrical wall, a Level Switch with a diameter close to the diameter of the container should be chosen. The ultrasound must pass easy into the container or pipe; therefore there must be a tight ultrasound-connection without any air-gap between the Level Switch and the wall.

5. Level Sensor Mode

In Level Sensor mode the Level Switch measures the continuous liquid level. The Level Switch is attached under the container and measures trough the bottom.

Level Switch KS or Level Switch LS should be used (Level Switch RS can not be used).



A Level Switch that fits the shape of the bottom should be chosen. The Level Switch measures the echo that bounces at the liquid surface. It is important the echo goes straight back to the Level Switch. If the Level Switch and the bottom are not horizontal then the echo may bounce in another direction.

If the bottom is not horizontal, silicone can be used to glue the Level Switch at an angle. In this case the Level Switch should be connected to Ultrasound Controller and be active measuring while being glued so that it can be adjusted for maximum echo.

Sound has to be able to pass trough the bottom. Most plastics let sound trough well except polypropylene and fiber reinforced plastics. For stainless steel, a bottom thickness of 5,8mm is the maximum recommended. Stainless steel 5,8mm 2,9mm and 1,45mm works

well at 2MHz which is the optimal frequency for the Level Switch. For other thicknesses other frequencies will be chosen by Ultrasound Controller.

Sound velocity varies with liquids and temperatures. A Level Switch placed low on the container wall can be used to measure and compensate for sound velocity changes.

More information: Ultrasound Controller manual.

6. Gel Sensor Mode

In Gel Sensor Mode each Level Switch measures a single gel-level. It measures the presence or no presence of gel or air behind the column wall.

Level Switch KS can be used in Gel Sensor Mode. The ultrasound must pass easy into the container or pipe; therefore there must be a tight ultrasound-connection without any air-gap between the Level Switch and the wall.

7. Installing the Level Switch

How to install the Ultrasound Controller and connect the cables is described in the Ultrasound Controller manual.

There must be a tight ultrasound-connection without any air-gap between the Level Switch and the container. This is easy achieved by using glue. Alternatives for glue do also exist.

Silicone is recommended. Silicone is heat-resistant and can be used at all temperatures. A Level Switch glued with silicone is easy to remove. The silicone can be Loctite 5366 or another transparent silicone. It takes a few days to cure. Put some silicone on the container-facing side of the Level Switch and press it on to the container. The silicone should cover any gap between the Level Switch and the container. During the first hours the Level Switch must be held properly in place with tape or something else. The Level Switch can be used even though the silicone is not completely cured (which takes a few days).

Transparent 1-component MS-polymer can also be used, but only at temperatures below 80°C. It is flexible like silicone and takes some days to cure.

Hard glues should be avoided since they can come loose by temperature variations.

Sonotech SONO 600 or Electrolube Heat Transfer Compound can be used to create the tight ultrasound-connection when the Level Switch is not glued and during testing. It does not cure so the Level Switch must be held in place by other means. When the Level Switch is removed, the old SONO 600 or Heat Transfer Compound should be wiped off and new used next time the Level Switch is attached. SONO 600 can be used at all temperatures and Heat Transfer Compound at temperatures below 60°C.

The measuring technique WR used in Level Switch mode is sensitive for small movements, which may occur when gluing is not done; therefore a steady support is needed.

8. Technical Data

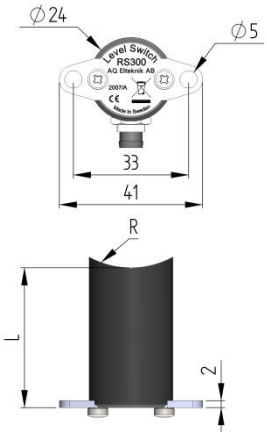
Level Switch RS	Fit container / pipe diameter (mm)
RS27	¾" DN20 26 – 28
RS30	29 – 31
RS34	1" DN25 32 – 35
RS38	36 – 40
RS42	1¼" DN32 40 – 43
RS46	1½" DN40 44 – 49
RS53	50 – 57
RS65	2" DN50 58 – 69
RS75	2½" DN65 70 – 79
RS85	3" DN80 80 – 98
RS115	4" DN100 98 – 135
RS165	6" DN150 135 – 200
RS250	200 – 350
RS600	350 – 1000
RSF	1000 – Flat

Level Switch KS	Fit container diameter (mm)
KS27	26 – 28
KS30	29 – 31
KS34	32 – 35
KS38	36 – 40
KS42	40 – 43
KS46	44 – 49
KS53	50 – 57
KS65	58 – 69
KS75	70 – 79
KS85	80 – 98
KS115	98 – 135
KS165	135 – 200
KS250	201 – 350
KS600	351 – 1000
KSF	1000 – Flat

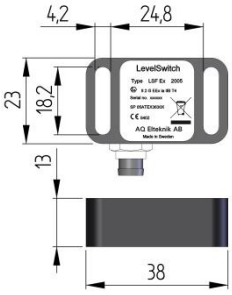
Level Switch LS	Fit container diameter (mm)
LS46	44 – 47
LS49	48 – 50
LS53	51 – 58
LS65	59 – 69
LS75	70 – 79
LS85	80 – 91
LS100	92 – 106
LS115	107 – 124
LS135	125 – 147
LS165	148 – 180
LS200	180 – 240
LS300	240 – 400
LS600	400 – 1000
LSF	1000 – Flat

Level Switch	Level Switch RS Level Switch KS	Level Switch LS
Material	PEI	POM-H
Container / pipe temperature	-20°C to 140°C	-15°C to 60°C
Ambient temperature	-20°C to 60°C	-15°C to 60°C

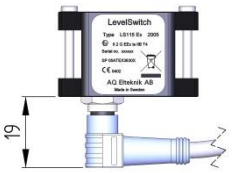
Cable	data	Order number
Cable type	4 x 0,14mm² + screen, PVC, diameter 4,1mm	
Cable Length	7m connector 0° grey	G–Cable–7m
	7m connector 90° grey	WG–Cable–7m
	20m connector 0° grey	G–Cable–20m
	20m connector 90° grey	WG–Cable–20m
	40m connector 90° grey	WG–Cable–40m



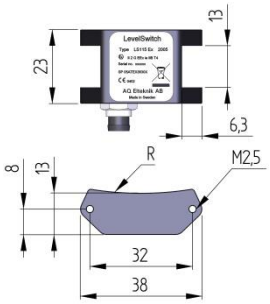
Level Switch RS
Level Switch RSF
Level Switch KS



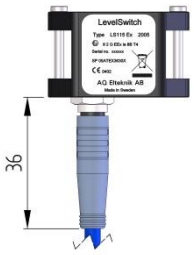
Level Switch



Cable 90°



Level Switch



Cable 0°

Level Switch	Dimensions	comment
Level Switch KS	L = 15mm R = fit container diameter	
Level Switch KSF	L = 20mm R = flat surface	Can fit a depression 8mm deep
Level Switch RS	L = 40mm R = fit container diameter	
Level Switch RSF	L = 40mm R = flat surface	
Level Switch LS	See drawings	Old version, for new design use Level Switch KS