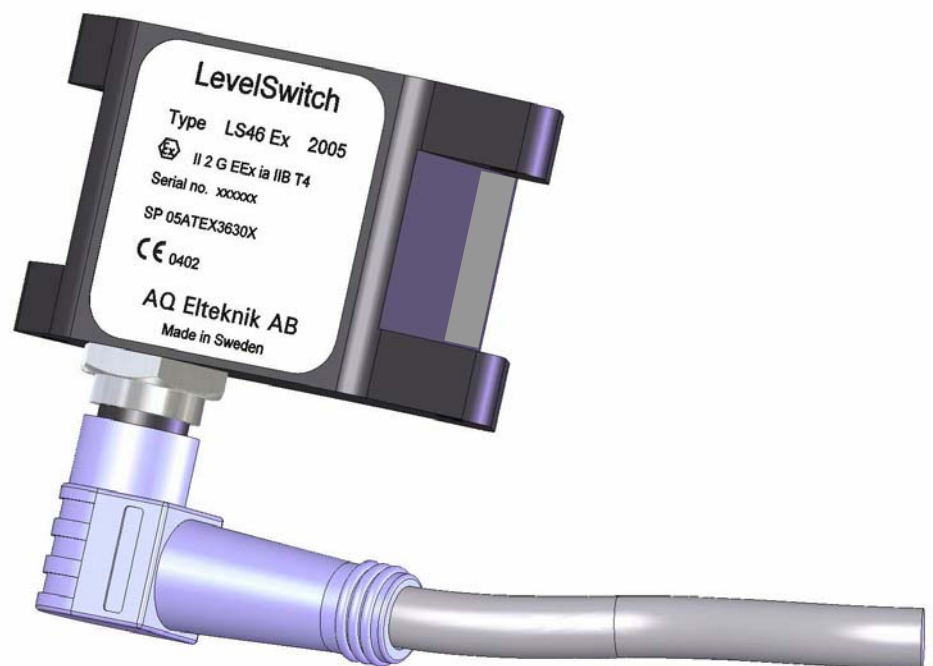


Level Switch Ex

Ex-Manual version 1.4



AQ Elteknik AB

Level Switch Ex

Manual version 1.4

November 2006

AQ Elteknik AB

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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 Ex 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 Ex 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 Ex 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 Ex 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 Ex 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 Ex is connected to any other equipment.

2. Introduction

The Level Switch Ex is a small sensor which is attached to the outside of a container. It uses ultrasound to sense the level of the liquid inside the container without making hole in the container. The Level Switch Ex is intended to be connected to the Ultrasound Controller D72. The D72 is not ex-certified and therefore intrinsically safe barriers must be used.

Measurement technique

The Level Switch Ex sends ultrasound into the container and listens to the echo coming back. When it is attached to the container wall it can sense the presence of liquid or air behind the wall. When it is attached to the bottom of the container it can sense the liquid level. The setting and program version of the Ultrasound Controller D72 determines the measurements that can be made with the Level Switch Ex. More information is available in the Ultrasound Controller D72 users guide.

3. Installing the Level Switch Ex

The Level Switch Ex is attached to the outside of the container and the gap should be as small as possible. If the container is cylindrical choose a Level Switch Ex with a diameter close to the diameter of the container.

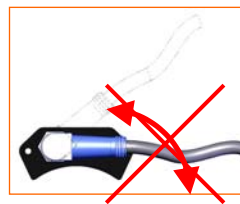
The ultrasound can pass into the container only if there is an air-tight ultrasound-connection between the Level Switch Ex and the container. To make such a connection the Level Switch Ex can be glued with Silicone or with Plastic Welding Glue (a Methylmetacrylate glue) or Electrolube HTC compound can be used.

Gluing the Level Switch Ex with Plastic Welding: Put a mix of the two parts of Plastic Welding on the inner (container-facing) side of the Level Switch Ex and press it on to the container and hold it there until glue has cured (minimum 10 minutes). The Plastic Welding should cover the gap. Plastic Welding is it is very fast and easy to use.

Gluing the Level Switch Ex with silicone: Put silicone on the inner (container-facing) side of the Level Switch Ex and press it on to the container and hold it there until glue has cured (minimum 48 hours). The silicone should cover the gap. Silicone cures very slowly.

Temporary installing the Level Switch Ex with Electrolube HTC: Put Electrolube HTC on the inner (container-facing) side of the Level Switch Ex and press it on to the container. Use a clamp or cable ties to hold the Level Switch Ex in place. The Electrolube HTC compound does not get stiff. If the Level Switch Ex is removed it is recommended to wipe off the old compound and use new next time.

NOTE! The connector must not be turned



4. Connecting the Level Switch Ex

The cable-connector fits the Level Switch Ex and the other end of the cable connects to the barrier (hazardous side). The maximum cable length is 40m. A similar screened cable connects the safe side of the barrier to the Ultrasound Controller D72. The cable-screen is important because it prevents external noise from entering. Therefore all cables must be screened and the screen must be connected to ground. The screen of the cable connected to the Level Switch Ex can be connected to the ground terminal of the barrier or to a separate ground terminal.

Terminal Connector	Level Switch Cable	Cable Color
11	Level Switch 1	Brown
12	Level Switch 1	White & Screen
13	Level Switch 2	Brown
14	Level Switch 2	White & Screen
15	Not used	
16	Level Switch 3	Brown
17	Level Switch 3	White & Screen
18	Level Switch 4	Brown
19	Level Switch 4	White & Screen
20	Not used	

NOTE! The unscreened part of the cable should be kept very short (< 30mm) and the screen must not be left unconnected.

Choosing a barrier

A zener barrier with safety description according to the intrinsic parameters of the Level Switch Ex should be chosen. The Level Switch also requires the barrier to let trough a minimum of $\pm 8V$ AC with a serial resistance of 110Ω maximum. A double zener-barrier is convenient if more than one Level Switch Ex is used.

Shielding the barriers

To prevent noise from entering via unscreened zener-barriers a screen-plate should be placed outside each group of barriers belonging a D72. More information about the screen-plate is in the D72 manual.

Intrinsically Safe Barrier

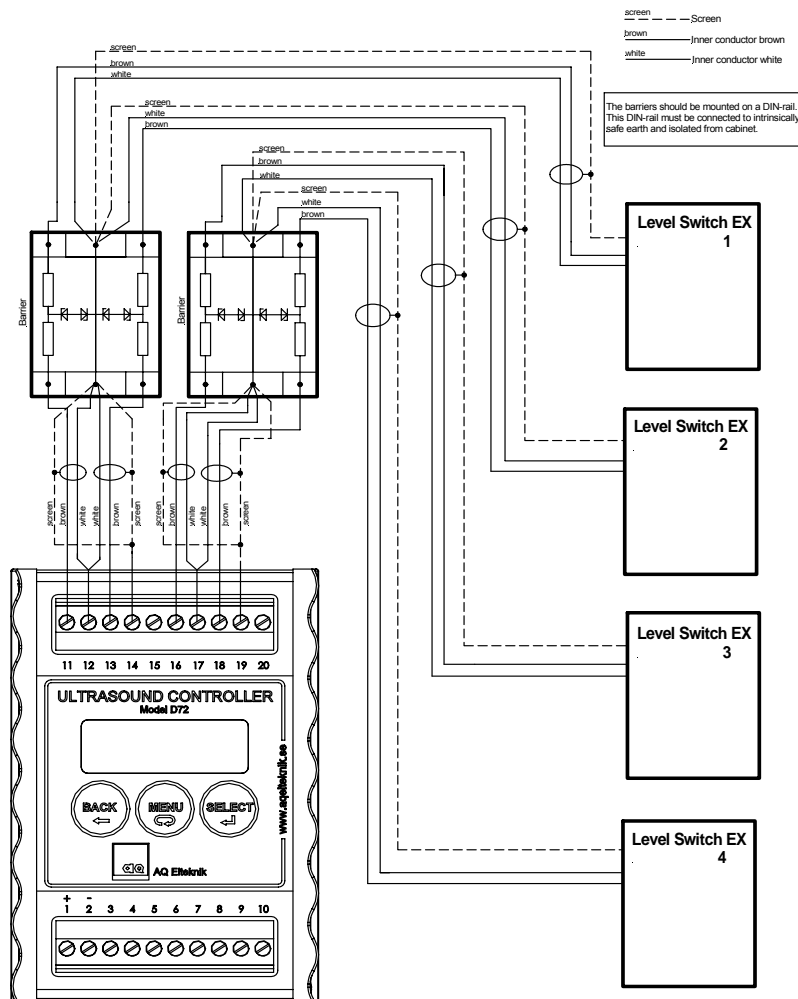
Notice that Ultrasound Controller D72 is not EX certified and ia-classified barriers must be used to connect the Level Switch Ex to The Ultrasound Controller.

Common regulations for installation and maintenance of explosive protected electrical equipment shall be observed. (EN 60079-14 and EN 60079-17 in European countries connected to CENELEC). Special conditions for use according to certificate SP 05ATEX3630X concerning the Level Switch Ex:

1. The cable from the barrier to the Level Switch Ex shall be permanently installed, mechanically protected and protected from other environmental stress in order to ensure explosion protection. A person with the required knowledge should perform installation.
2. The current limitation of the intrinsically safe barriers connected to the Level Switch Ex must be resistive with linear characteristic.

Connecting Level Switch Ex to D72 trough a zener-barrier

Connections for Level Switch EX and Ultrasound Controller model D72



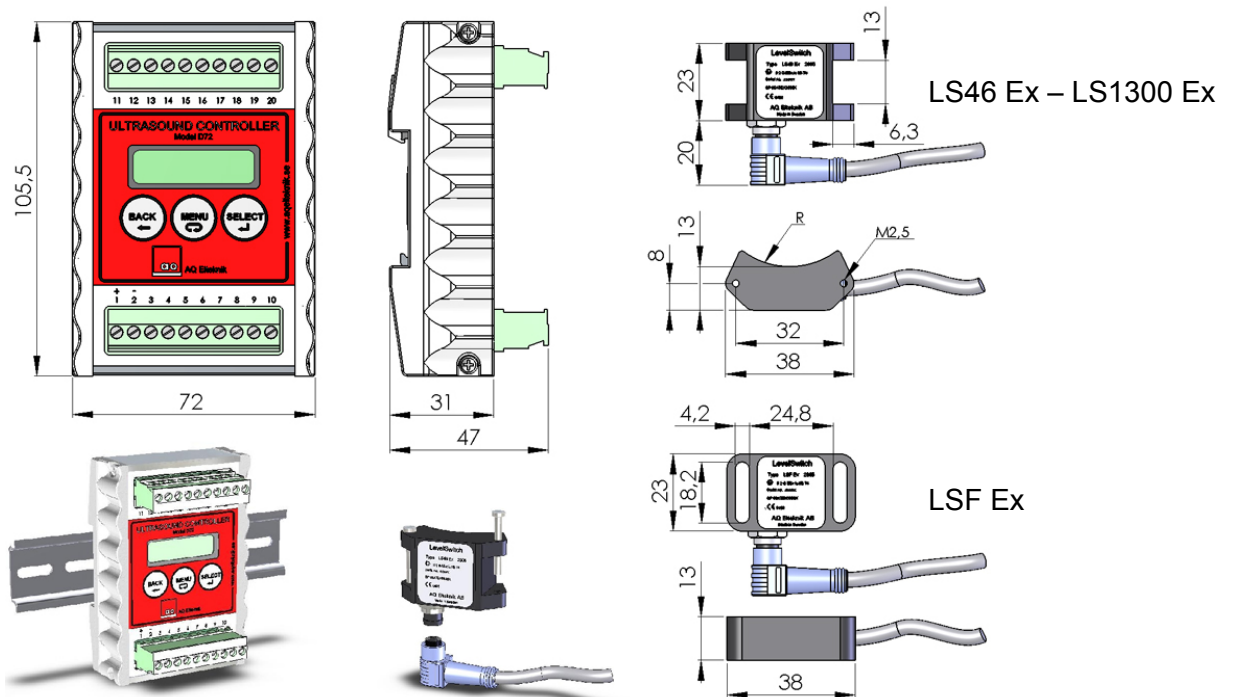
5. Technical data

Type	Fit container with inner diameter
LS46 Ex	44 – 48mm
LS49 Ex	47 – 52mm
LS53 Ex	50 – 56mm
LS65 Ex	60 – 71mm
LS75 Ex	69 – 80mm
LS85 Ex	79 – 93mm
LS100 Ex	91 – 108mm
LS115 Ex	106 – 126mm
LS135 Ex	123 – 150mm
LS165 Ex	146 – 183mm
LS200 Ex	179 – 245mm
LS300 Ex	235 – 380mm
LS500 Ex	370 – 750mm
LS1300 Ex	700 – 2000mm
LSF EX	Flat container wall

Mounting screws for LS__Ex:	M2,5x20mm
Material:	plastic and stainless steel
Operating temperature range:	-15°C to 60°C
Maximum temperature:	60°C
Transport temperature range:	-15 to + 60 °C
Cable with connector	C7Ex 7m blue, 4x0,14mm ² + screen C20Ex 20m blue, 4x0,14mm ² + screen
Maximum cable length	40m

Dimensions

Ultrasound Controller D72



6. Manufacturer information

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e-mail: info@aqelteknik.se

Label information

Level Switch Made in Sweden
Type see "Technical data"
Ex Class CE Ⓢ II 2 G EEx ia IIB T4
SP No. SP 05ATEX3630X

Intrinsic parameters

Max input voltage	Ui:	10,0V
Max current input	Ii:	250mA
Max power input	Pi:	1,1W
Inner capacitance	Ci:	200nF
Inner inductance	Li:	0,05mH

EX description

The Level Switch Ex is made to be used in Apparatus-group IIB and Equipment-group 2G. The Level Switch Ex is classified for zone 1. Notice that Ultrasound Controller model D72 is not EX certified and ia-classified barriers must be used to connect the Level Switch Ex to The Ultrasound Controller.