Installation and Maintenance Instruction Manual

Level Switch Model LS

ASHCROFT®

Table of Contents:

1 General remarks

The level switch described in these operating instructions is designed using the latest standards, guidelines and findings. During the manufacturing processes, all components are subject to our high quality and environmental criteria. For this purpose, we maintain certified management systems according to ISO 9001 and ISO 14001. For the special requirements of devices for intended use in potentially explosive atmospheres, we maintain a management system according to ISO 80079-34.

1.1 Purpose of this manual

These operating instructions contain basic instructions that must be followed for the installation, operation and maintenance of the device. It must be read by the installer, the operator and the specialist personnel responsible for the device before the device is installed and commissioned. These operating instructions must always be available at the place of use.

The following sections on general safety instructions 2 as well as the following special instructions on intended use 2.2 to disposal 11.2 contain important safety instructions, the non-observance of which may cause health and safety hazards to people, in particular to workers, and possibly to domestic and farm animals, as well as property.

1.2 Symbols

Warning.

...indicates a potentially hazardous situation, the non-observance of which may cause hazards to the health and safety of people, especially workers, and possibly to domestic and farm animals, as well as property.

Information.
... highlights important information for efficient and trouble-free operation.

1.3 Limitation of liability

Improper use of the equipment, failure to observe the operating instructions, use of unqualified personnel for installation and maintenance work, or unauthorized modifications to this equipment will inevitably result in the loss of liability claims against the equipment manufacturer.

1.4 Copyright

1.5 Warranty

For the product described here we grant warranty according to § 6 warranty for defects, in our General Terms and conditions of delivery and payment.

1.6 Manufacturer address, customer service

Ashcroft Instruments GmbH
Max Planck Street 1
D-52499 Baesweiler

Tel.: +49 (0) 2401/808-888
Fax.: +49 (0) 2401/808-999
Mail: customer.service@ashcroft.com
Web: www.ashcroft.eu

2 Safety

2.1 General sources of danger

Level switches can be part of oleo dynamic equipment or fluid reservoirs, in case of damage or leakage of the fluid tank it can result in hazardous situations. The selection of switches should be made in accordance with the applicable standards, regulations and engineering practice.

The devices are only to be used for the intended purpose as described by the manufacturer.

2.2 Intended use

The devices may only be used for the purpose intended by the manufacturer.
The intended use of the devices, determined by the manufacturer, is to control the presence of liquid contained in a tank, supplying electrical signal to a control panel when its level changes. The fluid storage can be low pressurized.

According to the Pressure Equipment Directive 2014/68/EU, the device is classified as pressure-maintaining equipment without a safety function in accordance with Article 4(3) of the Directive.

When operating the device, care must be taken to ensure that the medium used is harmless to the selected device material. Process media that exhibit changes in the state of aggregation within a range of application can influence the functionality. Negative influences must be avoided for this reason. The process condition of these media must be within the technical limits of the device.

Further technical data on the intended use are summarized in the product data sheet, see section 12.1 these instructions.

2.3 Operator’s responsibility

Instructions for the proper operation of the device must be observed. They are to be provided by the operator, the respective qualified personnel for installation, maintenance and operation. Risks from electrical energy and from the released energy of the medium, from escaping media and from improper connection of the device must be eliminated. The details for this are to be found in the corresponding applicable set of regulations, such as DIN EN, UVV (accident prevention regulations) and in sector-specific instances of use (DVWG, Ex-. GL, etc.), the VDE guidelines and the regulations supplied by local utilities companies. The device must be included in the equipotential grounding within the system.

The device must be taken out of operation and secured against unintentional operation if it must be assumed that safe operation is no longer possible (see chapter 10, Faults).

Opening the device when energized and performing technical modifications by the customer may lead to hazards to the health and safety of people, especially workers, damage and malfunction.

The operational safety of the device and the manufacturer's warranty are only guaranteed if the device is used as intended. The device design must be adapted to the medium used in the plant. The limit values specified in the technical data must not be exceeded.

The safety instructions listed in this operating manual, existing national regulations for accident prevention and internal work, operating and safety regulations must be observed by the operator. Furthermore, he is responsible for ensuring that all prescribed maintenance, inspection and assembly work is carried out by authorized and qualified personnel.

The device may be regarded as a pressure-maintaining part of a plant.

2.4 Personnel qualification

The device may only be installed and commissioned by trained specialist personnel.

Specialized personnel are persons who are able to perform the work assigned to them due to their specialized training, experience and knowledge of the country-specific regulations, applicable standards and guidelines.

2.5 Signs/safety marking

Not applicable.

2.6 Environmental protection

This device contain electrical components. The provisions of the Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) 2006/1907/EC must be observed, the corresponding safety data sheets of the manufacturers of the chemicals, are available for download on our website. At the end of the product life cycle, we recommend to recycle the devices, as they are mostly made of stainless steel. Instructions for disassembly, material separation and disposal can be found in chapters 11.1 and 11.2

3 Technical data

For detailed technical data, please refer to the documents in the appendix chapter 12

3.1 Reed contacts

Maximum current table for Reed contacts					
Contact code	1	2	3	5	7
Maximum power load	**SPST 40 W [VA]**	**SPST 60 W [VA]**	**SPST 120 W [VA]**	**SPST 60 W [VA]**	**SPST 5 W [VA]**
Max charge in Voltage [V]	**Max current load in Ampere [A]**				
6	2	3	3	1	0,25
12	2	3	3	1	0,25
24	1,5	2,5	3	1	0,2
48	0,8	1,25	2,5	1	0,1
110	0,3	0,5	1	0,5	0,05
230	0,15	0,25	0,5	0,25	-

Note 1: The electric charge to the level switch should not exceed the electric tension and current load values indicated on the table.

Note 2: In case of power charge piloting, it is necessary to use auxiliary relays or snubbers/suppressors.

3.2 Electrical Wiring

The wiring of the ASHCROFT® Level Switches is available in various configurations:

- Two, three or four wires sealed cable
- DIN Connector (Hirschmann DIN EN 175301-803)
- Box with terminal blocks weatherproof “S” version; the housing has two electrical entries located a side.

3.2.1 Head type MS, RS, S, SX, C, P

3.2.1.1 Separate wiring

Information.
Each contact has its own supply

Separate wiring / Single contact (SPST)	
	Cable colour
L5 — 10 / 9	Black / Black
L4 — 8 / 7	White / White
L3 — 6 / 5	Red / Red
L2 — 4 / 3	Blue / Blue
L1 — 2 / 1	Yellow / Yellow

Separate wiring / Double contact(SPDT)	
	Cable colour
L3 — 9 / 8 / 7	White / Orange / Brown
L2 — 6 / 5 / 4	White / Black / Blue
L1 — 3 / 2 / 1	White / Red / Yellow

Warning.
For separate wiring in SPDT form, exceeding one switch point, the white colour wire is always the common wire.

3.2.1.2 Common wiring

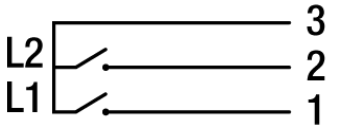
Information.
Each contact is fed by one wire common for all contacts

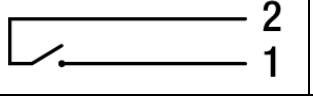
Common wiring / Single contact (SPST)	
	Cable colour
L6 — 7 L5 — 6 L4 — 5 L3 — 4 L2 — 3 L1 — 2 / 1	White (COM) Brown Orange Black Red Blue Yellow

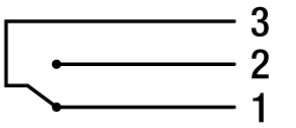
Common wiring / Double Contact(SPDT)	
	Cable colour
L4 — 9 L3 — 8 L2 — 7 L1 — 6 / 5 / 4 / 3 / 2 / 1	White (COM) Grey Green Orange Brown Black Blue Red Yellow

Warning.
For separate wiring in SPDT form, exceeding one switch point, the white colour wire is always the common wire.

3.2.2 Head type N and NX

Separate wiring / Single contact (SPST) with DIN 175301-803/A connector and two switch points	
	Cable colour
	White (COM) Blue Yellow

Separate wiring / Single contact (SPST) with DIN 175301-803/A connector and one switch point	
	Cable colour
	Yellow Yellow

Separate wiring / Double contact (SPDT) with DIN 175301-803/A connector and one switch point	
	Cable colour
	White (COM) Red Yellow

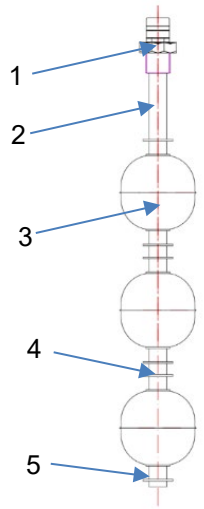
4 Marking of the device

The device is provided with marking on a label or with laser tagging on process connection. The label shows the type designation, serial number, year of manufacture, certificate of approval number, and manufacturer, alternative with limited space type designation, order number and item number.

The outer packaging is labelled with the type designation, order number, item number and manufacturer's data. The materials used for the wetted parts as well as other device-specific versions are represented by a type coding on the nameplate and can be broken down at any time with the aid of the data sheet.

5 Structure and function

5.1 Overview



1 Process connection
2 Stem / Slide bar
3 Float
4 Top level ring stop (Seeger ring)
5 Low level ring stop (Seeger ring)

5.2 Functional description

ASHCROFT® “ON-OFF“ level switches use reed switches magnetic sensors. This type of contact, hermetically sealed, inert gas filled, are placed inside the slide bar and switched-on when the magnetic float reaches the commutating area.

The stroke of each float is limited to the height of the controlled level by suitable ring stops.

The “reed switch“ contact is made of two low-reluctance magnetic foils, placed inside of a glass bulb in order to be protected by the dust, corrosion and oxidation. The inert gas inside the glass bulb is an additional protection against the oxidation of the contact.

The “reed switch” contacts can be operated up to one million operations at full resistive load, providing its electrical limits are respected. Auxiliary relays would be necessary for power circuits, as well as current snubbers / suppressors, to safeguard the efficiency of the contacts.

The “reed switch” contacts may be, single contact type, “SPST”, or changeover type, “SPDT”.

The “SPST” contact can be selected either as “normally closed (NC)” or “normally open (NO)“ form.

The switches are wired according to the standard specifications, listed in the wiring diagram. In addition, the switches are supplied with a wiring diagram. Special wirings are available on request.

5.3 Description of the components

5.3.1 Reed contact

The Reed contact is hermetically sealed and filled with an inert gas. See table maximum current (see chap.4.1)

5.3.2 Float

The floats are swimming on top of the fluid and contain a magnet which allows to open or closed the Reed contact circuit.

5.3.3 Stem / Slide bar

Inside the slide bar, the reed contacts are wired and secured against slipping by casting the tube with a 2k epoxy resin.

5.3.4 Top/low lever stop ring (Seeger ring)

The top or low lever stop ring are SEEGER® Circular Self-Locking Rings Type ZA. The rings are limiting the heights of the controlled level.

6 Transportation

The device must be protected against impact and bending. The device shall only be transported in a cleaned condition (free of residual media).

6.1 Delivery

The delivery is to be checked for completeness and transport damage. In case of transport damage, the delivery is not to be accepted or only with reservation, the extent of damage is to be noted and, if necessary, a complaint is to be initiated. In these cases, please contact our service department.

6.2 Storage

The storage of the devices should exclude external influences as far as possible to avoid damage to the devices. Vibrations or impact effects must be avoided, and the limit values of the storage temperatures must be taken into account.

Permissible storage temperature: -60 to +80°C

7 Assembly/Installation

The instruments may be installed from the inside or from the outside of the tank, in accordance to the selected process connection. The process connection can be threaded or flanged. The level switches are always supplied complete with gasket to be always placed between the tank wall surface and the instrument connection.

The correct installation of our level switches must be in vertical position, with 30° maximum angle.

Warning.

Use of suitable tools for the assembly and the disassembly of the instrument are recommended. For instruments with threaded connection, the wrench must be used on hexagon of the fitting.

7.1 Preparation

To ensure safe working during installation and maintenance, the system has to be

- Depressurized within the relevant plant for the purpose of repair or inspection,
- Functional checked on site.

During assembly/installation work, the system must be secured against being switched on again.

7.2 Requirements for the installation site

- Check the suitability of the device for the process media to be controlled,
- Protection against any kind of mechanical vibration,
- The level switch must be mounted in a top vertical position,
- The floats must be able to swim freely on the fluid surface.

7.3 Process connection

The process connections comply with the general technical standards for threads or flanges. Thread types and materials of the process connections may vary depending on the application.

- Assembly of the device only by authorized and qualified personnel.
- The device must be integrated into the equipotential grounding of the process installation (e.g. by using an electrically conductive seal).
- When connecting the device, the tank must be depressurized.

Only use the appropriate open-end wrench to tighten the sealant on the intended wrench flat. The tightening torque depends on the sealant used.

7.4 Electrical connection

Take note of the electrical data in the data sheet and the locally-applicable regulations.

- Connection to be undertaken by authorized and qualified specialist staff only.
- The electrical connection of the device is to be undertaken in accordance with the relevant regulations of the VDE and the regulations supplied by the local utilities company.
- Disconnect the plant from the mains supply before wiring electrical connections.
- Before operating the switch all conduit entries and/or junction boxes need to be closed according to the required safety and electrical codes.
    a. Standard product has two 1/2 NPT conduit holes with one permanent plug. 1/2 NPT conduit holes can be modified or reduced adapters.
- It is recommended that Teflon tape or other sealant be used on conduit, bushing, gland or plug threads to ensure integrity of the enclosure.
- Cable couplers, glands and conduit connectors must have the correct electrical approvals.

- Always follow safety and electrical regulations when connecting these devices.
- The system ground of the device is marked with a green coloured screw and/or by the ground symbol.

7.5 Starting up

A prerequisite for starting up is the proper installation of all measuring and control lines. All connection must be laid in such a way that no mechanical forces can act on the device.

Before starting up, the tightness of the pressure connection must be checked.

7.6 Subsequent relocation of the level switch

Do not disassemble the device from the measuring point in order to mount it at another measuring point without cleaning it first. There is a risk of mixing media with unpredictable chemical reactions.

8 Maintenance

The devices are low maintenance. To ensure reliable operation and a long service life of the device, we nevertheless recommend that the device is checked regularly. When carrying out maintenance work on the device, the tank must be depressurized, unintended starting up must be prevented.

8.1 Cleaning

- Deposits of liquid residues and dirt must be removed from the stem/slide bar
- Check efficient sliding of the floats
- Top/low level ring stop (SEEGER® ring) tightness on the stem/slide bar to prevent incorrect tank levels

Functional tests

The exact test cycles must be adapted to the operating and ambient conditions. When various device components interact, the operating instructions of all other devices must also be observed.

- Check float for free movement
- Check Reed contact function by moving the float up and down
- Check on function, in conjunction with downstream components
- Check of pressure lines for damage and tightness

8.2 Cleaning and maintenance

Cleaning is carried out with a non-aggressive cleaning agent and a damp soft cloth to avoid electrostatic charging. In the same work process, care can be taken to detect possible damage to the device at an early stage. If any damage is detected, the unit should be handed over to the manufacturer's service department immediately.

9 Faults

All defective or faulty equipment must be taken out of service. Defective or faulty devices should be handed over to the manufacturer's service department immediately. Under no circumstances repair attempts should be made on site. Device safety can no longer be guaranteed.

Contact details see chap. 1.6

Fault	Possible causes	Possible measures
Switch function does not work	1) Damaged Reed contact 2) Jammed float 3) Wrong wiring 4) Missing or shifted SEEGER ring	1) Replacement of the level switch unit 2) Clean the slide bar/stem and floats with a soft cloth 3) Check wiring according to the manual 4) Send for repair to ASHCROFT®
Corrosion at slide bar/stem and float	Incompatible process media	Replace level switch with compatible materials
Bended slide bar/stem	Incorrect handling or mounting	Send for repair to ASHCROFT
Damage to housing or wiring	Incorrect handling or mounting	Replace/repair level switch at ASHCROFT

9.1 Behaviour after rectifying the fault

See chapter 8 Assembly/Installation

10 Dismantling & disposal

10.1 Disassembly

- During maintenance work on the unit, the lines must be depressurized and emptied and the system must be secured against being switched on again.
- Unplug or remove electrical wiring
- Dismantle the measuring device using a suitable tool

Residual media in and on dismantled measuring instruments can endanger people, the environment and equipment. Sufficient precautionary measures must be taken. If necessary, the devices must be cleaned thoroughly (see notes in the safety data sheets).

10.2 Disposal

At the end of the product life cycle, do not dispose of this product with normal household waste. Take this product to a collection point or a specialist disposal company for recycling of the components.

With the help of the product coding and our data sheet (see Appendix 12.1 available on our website) you will receive the necessary information to be able to carry out a material separation yourself. Our devices described in this manual are mostly made of stainless steels that can be recycled.

Materials to be recycled:

- Stainless steel (process connection, floats)
- Aluminium (housing)

- Copper (cables)
- Plastic or rubber (floats, plugs)

Please help to protect our environment!

Some of the product materials can be reused if you take the product to a collection point or to a waste management company. By reusing some parts or raw materials from used products, you make an important contribution to protecting the environment.

Our products are delivered in optimized packaging. This essentially means that materials are used which can be recycled as secondary raw materials at the local disposal service. For more information on the disposal of packaging, please contact your local administration.

11 Appendix

11.1 Data Sheet Level Switch

Detailed data sheets are available directly from the manufacturer (see 1.6 Manufacturer address, customer service).

Model	Designation	Document
LS	Level Switch Model LS	DS LS

11.2 Declaration of conformity for Level Switch without Transmitter

ASHCROFT®
Trust the shield.®

EU-Konformitätserklärung
EU-Declaration of Conformity
DIN EN ISO IEC 17050-1:2010

TÜVRheinland ZERTIFIZIERT — Management System ISO 9001:2015 — www.tuv.com ID 9105011538

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erklärt in alleiniger Verantwortung, dass die mit CE gekennzeichneten Produkte
declares in sole responsibility that the products marked with CE

Gerät: Niveauschalter „Serie LS“
Equipment: Level Switch “LS Series“

Kennzeichnung:
Marking:

CE

Herstellungsdatum: ab 01.02.2021
Date of manufacture: from 01.02.2021

die grundlegenden Sicherheits- und Schutzanforderungen erfüllen, in Übereinstimmung mit den unten genannten Richtlinien und harmonisierten Normen. Die Konformitätsaussage bezieht sich auf die Konzeption und Fertigung der oben genannten Produkte.
the fundamental safety and protection requirements passed in accordance with the guidelines and harmonized *standards listed below. This declaration of conformity refers to the design and manufacture of the above products.*

Richtlinie *Directive*	2014/35/EU „Niederspannungsrichtlinie“ *“Electrical equipment designed for use within certain voltage limits”*
Angewendete harmonisierte Normen *Used harmonized Standards*	EN 61010-1:2010+Cor:2011, EN 60947-1:2007+A1:2010+A2:2014, EN 60947-5-1:2016
Richtlinie *Directive*	2011/65/EU „Richtlinie zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten“ *“Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment”* 2015/863/EU „Änderung von Anhang II der Richtlinie 2011/65/EU“ *“Amending Annex II to Directive 2011/65/EU”*
Einstufung *Classification*	Einstufung des Produktes nach Anhang II Punkt 9 der Richtlinie „Überwachungs- und Kontrollinstrumente einschließlich Überwachungs- und Kontrollinstrumente in der Industrie“ *Classification of the product according to Annex II, point 9 of the Directive "Monitoring and control instruments, including industrial monitoring and control instruments".*
Stoffbeschränkungen *Substance restrictions*	Beschränkungen und Höchstkonzentrationen in homogenen Werkstoffen in Gewichtsprozent: *Limitations and maximum concentrations in homogeneous materials in percent by weight:* Blei (0,1 %) *Lead (0,1 %)* Quecksilber (0,1 %) *Mercury (0,1 %)* Cadmium (0,01 %) *Cadmium (0,01 %)* Sechswertiges Chrom (0,1 %) *Hexavalent chromium (0,1 %)* Polybromierte Biphenyle (PBB) (0,1 %) *Polybrominated biphenyls (PBB) (0,1 %)*

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EU-Konformitätserklärung
EU-Declaration of Conformity
DIN EN ISO IEC 17050-1:2010

TÜVRheinland ZERTIFIZIERT
Management System ISO 9001:2015
www.tuv.com ID 9105011538

	Polybromierte Diphenylether (PBDE) (0,1 %) *Polybrominated diphenyl ethers (PBDE) (0,1 %)* Di(2-ethylhexyl)phthalat (DEHP) (0,1 %) *Bis(2-ethylhexyl) phthalate (DEHP) (0,1 %)* Butylbenzylphthalat (BBP) (0,1 %) *Butyl benzyl phthalate (BBP) (0,1 %)* Dibutylphthalat (DBP) (0,1 %) *Dibutyl phthalate (DBP) (0,1 %)* Diisobutylphthalat (DIBP) (0,1 %) *Diisobutyl phthalate (DIBP) (0,1 %)*

Das oben benannte Produkt erfüllt die derzeit gültigen Vorschriften der Richtlinie 2011/65/EU des Europäischen Parlaments und des Rates vom 8. Juni 2011 sowie der Delegierten Richtlinie 2015/863/EU der Kommission vom 31.03.2015.
The above-mentioned product comply with the currently valid provisions of Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 and the Commission Delegate Directive 2015/863/EU of 31 March 2015

Baesweiler, den 01.02.2021
Ort und Datum
Place and date

Werksleiter
Operations Manager

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