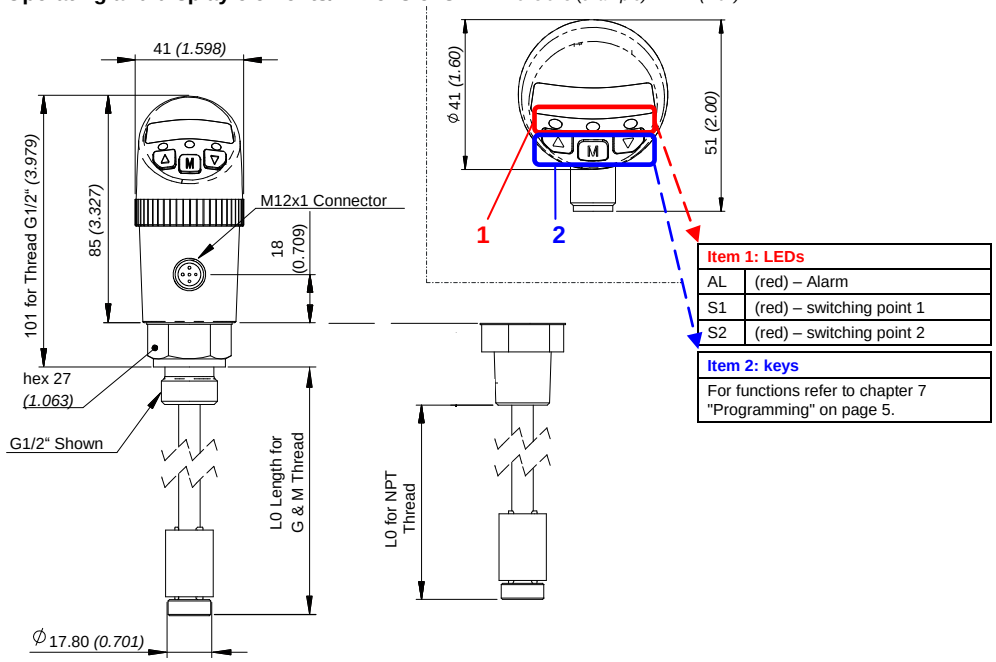
10 Technical Data

	BLS3000
Measuring element	Reed switch
Measuring ranges	L0 = max. 1000 mm, LM: see name plate
Display	4-digit 14-segment LED display, red, digit height 9 mm
Transistor switching outputs PNP	1 or 2 x NO/NC function (programmable), adjustable switching time delay 0 ... 50 s
Resolution	5 mm
Ambient temperature range	-20 ... +70 °C / -4 ... +158 °F
Media temperature range	-25 ... +80 °C / -13 ... +176 °F
Storage temperature range	-30 ... +80 °C / -22 ... +176 °F
Process connection	G ½" M, G ¾" M, G 1" M, M20x1,5 M, ½" NPT M, ¾" NPT M, 1" NPT M, 1¼" NPT M
Protection system[2] / class	IP65, IP67; UL-Type 1,4X,6 / III
Electrical connection	Plug M12x1 mm, 4/5/8-pin (depending on output code),
Power supply	15... 32 V DC /relay-output: 20-32 V DC
Approvals	cULus[1]
For further technical data and options please refer to the data sheets	

1) Conditions of use: 60°C max. ambient, power supply max. 28 V DC
2) The stated ingress protection only applies when plugged in using mating connectors that have the appropriate ingress protection

Operating and display elements/Dimensions

Dimensions (*example*) in mm *(inch)*



Item 1: LEDs	
AL	(red) – Alarm
S1	(red) – switching point 1
S2	(red) – switching point 2

Item 2: keys

For functions refer to chapter 7 "Programming" on page 5.

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Operating Instructions

Dual Level Switch BLS3000

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Art. no. 923-2159
Index A, 23.03.2020
Software-Version: 1.4 and higher

Specifications are subject to changes without notice!

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1 Intended Applications

The dual level switch monitors the level of the medium into which the probe is immersed. The dual level switch features up to two switching outputs and one analog output.

⚠	**DANGER**
The switch may only be used in the specified fields of application. The temperatures must be within the specified ranges, the pressure values and the electrical rating must not exceed the values specified. Observe also the applicable national safety instructions for assembly, commissioning and operation of the switch. The switch is not designed to be used as the only safety relevant element in pressurized systems according to PED/DGR 97/23/EC.	

2 Safety Instructions

The safety instructions are intended to protect the user from dangerous situations and/or material damage.

In the operating instructions the seriousness of the potential risk is designated by the following signal words:

⚠	**DANGER**
Refers to imminent danger to men. Nonobservance may result in fatal injuries.	

⚠	**WARNING**
Refers to a recognizable danger. Nonobservance may result in fatal injuries, and destroy the equipment or plant parts.	

⚠	**CAUTION**
Refers to a danger. Nonobservance may result in light injuries and material damage to the switch and/or to the plant.	

☞	**IMPORTANT**
Refers to important information essential to the user.	

Disposal

The switch must be disposed of correctly in accordance with the local regulations for electric/electronic equipment.

The switch must not be disposed of with the household trash!

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3 Standards

The standards applied during development, manufacture and configuration are listed in the CE conformity and manufacturer's declaration.

4 Warranty/Guarantee

Our scope of delivery and services is governed by the legal warranties and warranty periods.

Terms of guarantee

We guaranty for function and material of the dual level switch under normal operating and maintenance conditions in accordance with the statutory provisions.

Loss of guarantee

The agreed guarantee period will expire in case of:

- incorrect use,
- incorrect installation or
- incorrect handling or operation contrary to the provisions of these operating instructions.

No liability is assumed for any damage resulting therefrom, or any consequential damage.

Refer to Barksdale "Standard Terms and Conditions".

5 Installation

⚠	**CAUTION**
Avoid impact and severe vibration during transport. Even if the switch housing remains undamaged internal parts may be damaged and cause malfunctions.	

The level switch may only be installed and electrically connected by trained and instructed staff according to state-of-the-art standards.

⚠	**DANGER**
The switch may only be installed in systems in which the maximum temperature T_{max} and the maximum pressure D_{max} (3 bar) are not exceeded. Only install the switch when deenergized (electrically and hydraulically/pneumatically).	

Mount the level switch from the bottom to the fitting using a wrench size 27 mm (1.063 inch), and tighten it to a maximum torque of 22 Nm (190 in/lb).

The housing temperature of the level switch measured on the hexagon head of the process connection must not exceed 70 °C (158 °F) when operated continuously at the maximum ambient temperature. This must be ensured by special provisions.

Adjustment of the orientation of the display and/or the process connection must be done by hand. Do not use tools!

The mounting situation (immersion depth, probe length, operating conditions) largely determines the measuring accuracy of the level switch to be achieved.

CAUTION

The following notes must absolutely be observed:

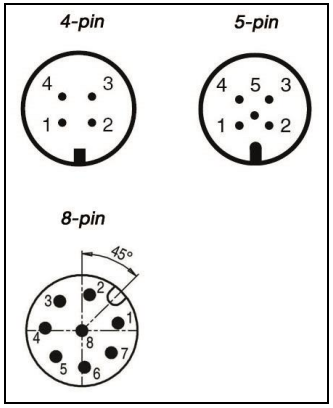
- The permissible data (see type label) must be kept.
- The level switch must be protected against magnetic fields.
- The sliding tube of the level switch must not be bent and severe shocks must be avoided, to avoid damage to internal reed contact.
- Existing adjusting rings, gripping rings or clamping brackets must not be displaced since otherwise the SPST or SPDT function is no longer guaranteed.

Electrical connection is to be carried out dependent on the type of switch (see type label) according to the chart below. Wrong assignment of the connections may cause malfunctions or incorrect switch outputs.

Electrical connection

Plug M 12x1 4/5/8-pin	Model with 2 switch point	Model with 1 switch point and 1 analog output	Model with 2 switch point and 1 analog output	Model with 2 switch point (relay-contacts)	
1	+Ub	+Ub	+Ub	+Ub	
2	SP2	Signal	Signal	SP1a	NC
3	OV	0V	0V	SP1b	
4	SP1	SP1	SP1	0V	
5	-	-	SP2	SP2a	NO
6	-	-	-	SP2b	
7	-	-	-	-	
8	-	-	-	Housing	

Plug



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6 Commissioning/Operation

The level switch may only be commissioned and operated by authorized staff.

CAUTION

Do not put the switch into operation when the switch itself or the connection cable is damaged.

WARNING

Be aware of the fact that in case of operation with higher temperatures the casing surface may become very warm!

A self-test is performed on first switch on. If the software recognizes an error during the self-test or during operation, this is signalled in the display by "Err" and the corresponding message, refer to Error list on page 7. The red LEDs S1 and S2 signal the activity of the two switching points.

Operation of the level switch is menu-driven via three membrane keys ▲, ▼ and M.

CAUTION

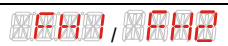
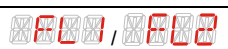
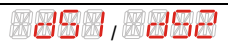
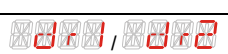
The keys may be damaged by pointed, hard objects. Do not use any pointed, hard objects for making entries.

For information about the factory settings for the parameters and how to change them please refer to the next chapter 7 "Programming".

7 Programming

Navigation function	Symbol (membrane key)
Menu descending	▼
Menu ascending	▲
Horizontal movement in menu, select menu item	M
Parameter change ascending	▲
Parameter change descending	▼
Accept parameter change and return to current menu item	M
Return to measured value display	Press ▲ + ▼ simultaneously

7.1 Parameters

Parameter	14-segment display	Description
SP1/SP2*		Hysteresis function: switching point of solid state contact
FH1/FH2*		Window function: window High solid state contact
rP1/rP2*		Hysteresis function: hysteresis of solid state contact
FL1/FL2*		Window function: window Low solid state contact
EF		Extended programming functions
rES		Reset parameters to factory settings
dS1/dS2*		Switching time delay – the set contact rating must be permanently exceeded to trigger a switching function
dr1/dr2*		Switching time delay – the contact rating must be permanently lower than the set contact rating to trigger a switching function
Ou1/Ou2*		Switching function of solid state contact HNO = hysteresis function, NO contact HNC = hysteresis function, NC contact FNO = window function, NO contact FNC = window function, NC contact diA = diagnostic function, NO contact (only Ou2)
uni***		Select unit: %, mm, cm, m, in, ft, l, Ga, m³ If the measuring range is outside the display range, unit selection is not allowed. The parameter "uni" is not displayed.
dEcP***		Decimal point display: 0.000; 00,00; 000,0 oder 0000
dLFS***		Display, bottom float stopper: 0… 9999
duFS***		Display, top float stopper: 0… 9999
OuA**		Analog output I = 4... 20 mA U = 0... 10 V I.INV = 20... 4 mA U.INV = 10... V

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Parameter	14-segment display	Description
ASP**		Analog start value
AEP**		Analog end value
dPA**		Damping of analog output
ErS.A**		Error signal of analog output values: < 3.6 or > 22 or Off
Hi		Saved value of highest level measured
Lo		Saved value of lowest level measured
COF		Offset correction (max. 10 % of measuring range)
ddis		Damping display
Fdis		Rotate display through 180°
udiS		Unit indication
Firm		Firmware version
LocK		Software lock

* only models with 2nd switching contact

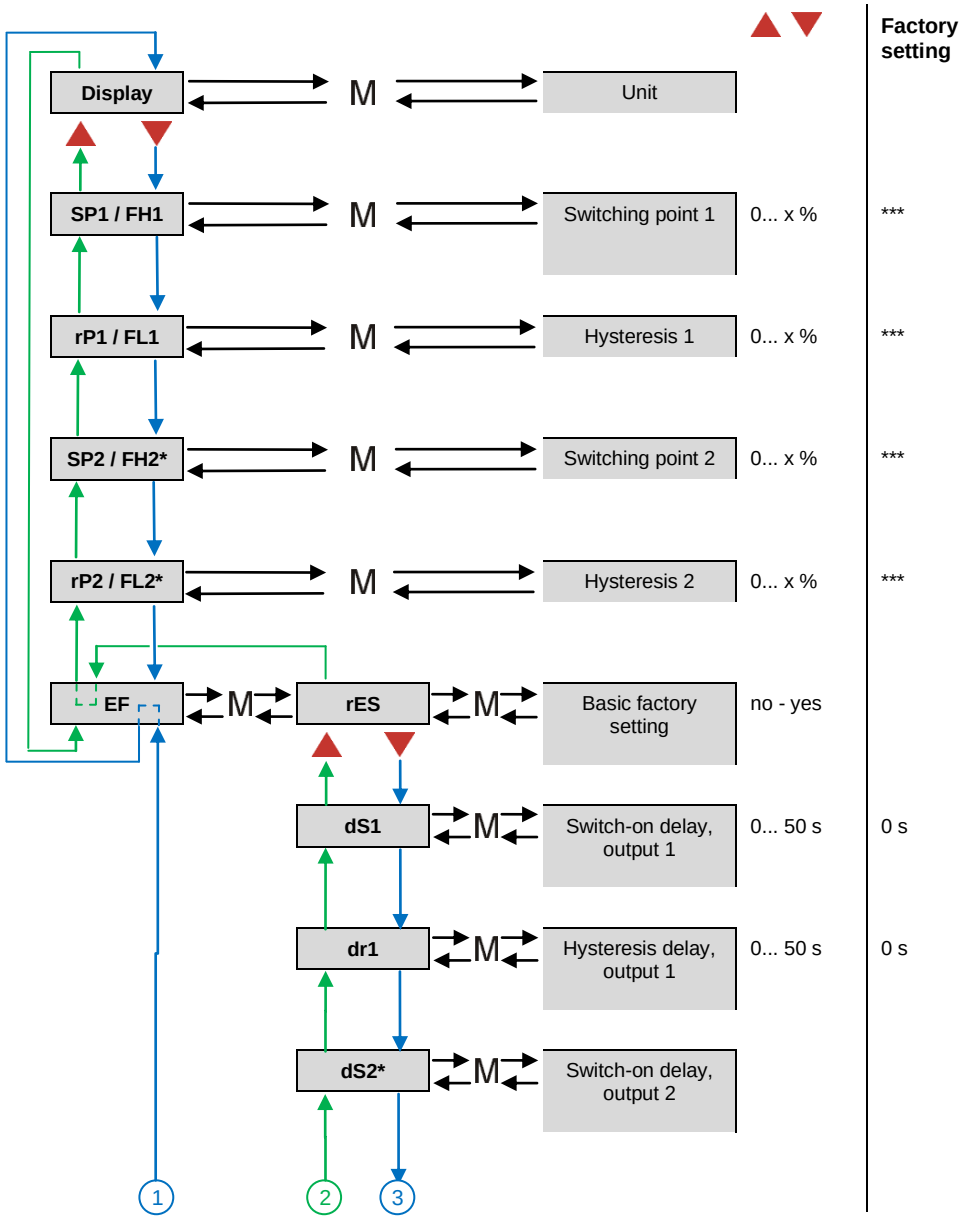
** only models with analog output

*** no automatic conversion
If the unit and/or the display of the measured values are changed all parameters for switching points or analog output must be checked and adjusted as required.

Error list

Parameter	14-segment display	Description
sens		Sensor defect
SC1		Short circuit, solid state contact 1
SC2		Short circuit, solid state contact 2
AOut		Open output, short circuit
OL		Sensor limit positive
UL		Sensor limit negative
KEY		Internal defect

7.2 Menu Structure



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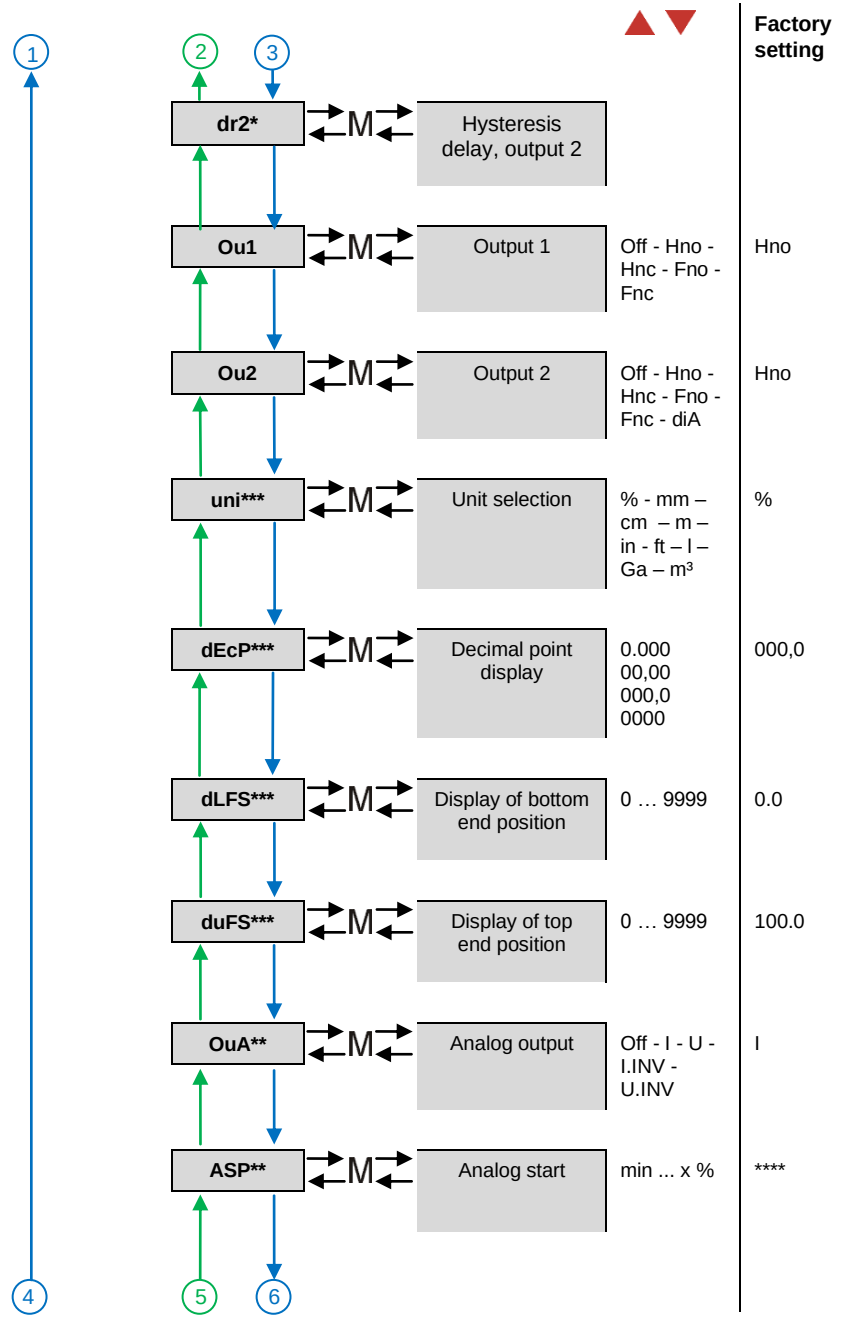

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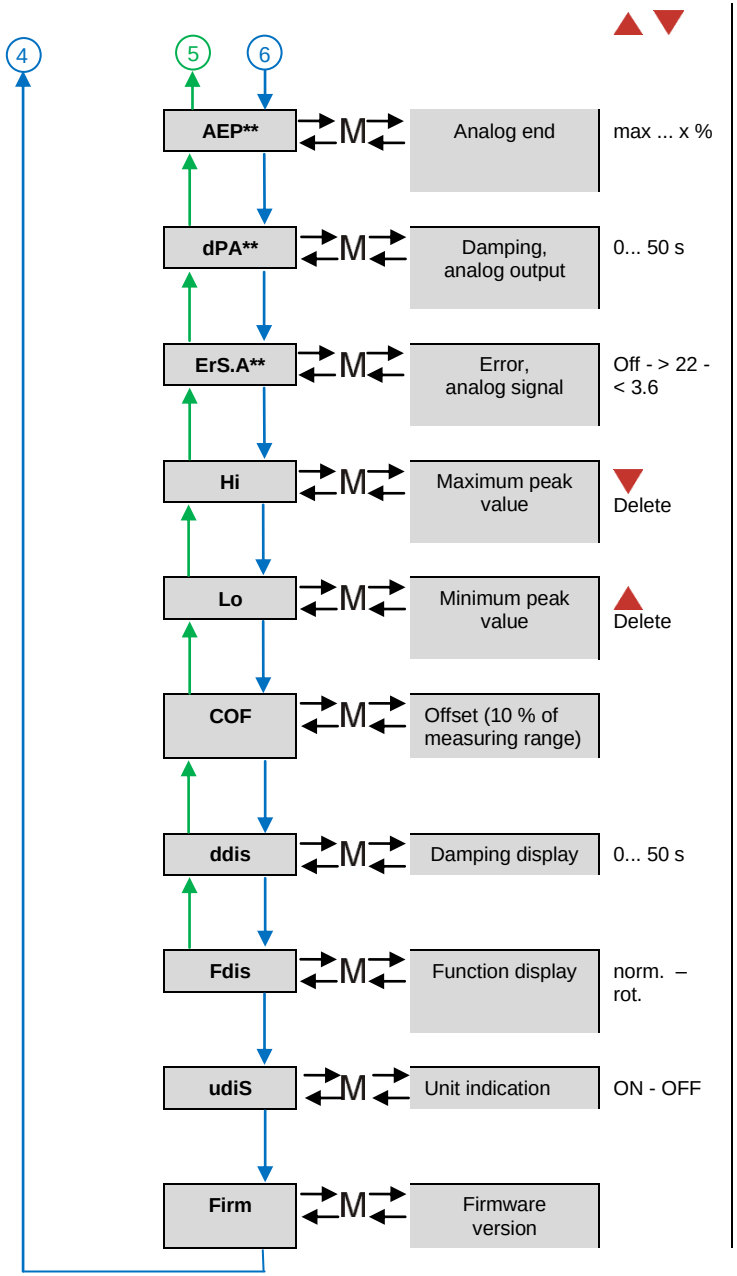

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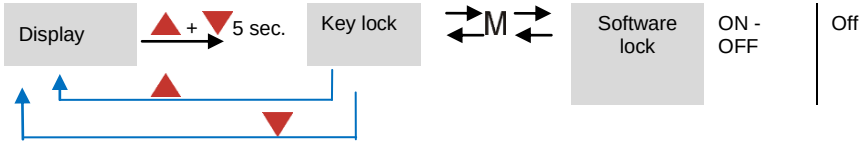
* only models with 2nd switching contact

** only models with analog output

*** no automatic conversion
If the unit and/or the display of the measured values are changed all parameters for switching points or analog output must be checked and adjusted as required.

**** setting according to measuring range

Software lock



8 Maintenance/Cleaning

Maintenance

The level switch requires no maintenance.

WARNING

Check the switch for functioning at regular intervals. If the switch does not work properly, stop operation immediately.

Cleaning

CAUTION

The switch may be damaged by the use of unsuitable cleaning agents.

The following cleaning agents may be used to clean polycarbonates:
- Mild soap or detergents
- Isopropyl alcohol

After cleaning, immediately rinse with water. Do not leave cleaners on surfaces of products.
Do not clean products at elevated temperatures or under direct sunlight.

The following cleaning agents are known to affect the integrity of polycarbonate components and should not be used:
- ZEP Fast 505, Pinesol, Formula 409
- Brake Cleaner
- Halogenated solvents (benzene, gasoline, acetone or carbon tetrachloride)
- Strong alkaline
- MEK (methyl ethyl ketone)
- Abrasive substances

9 Decommissioning

DANGER

Only remove the switch when deenergized (electrically and hydraulically/pneumatically).

Disconnection of the switch from pressure and power supply must be carried out by trained or instructed personnel according to state-of-the-art standards.

WARNING

Be aware of the fact that in case of operation with higher temperatures the casing surface may become very warm!

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