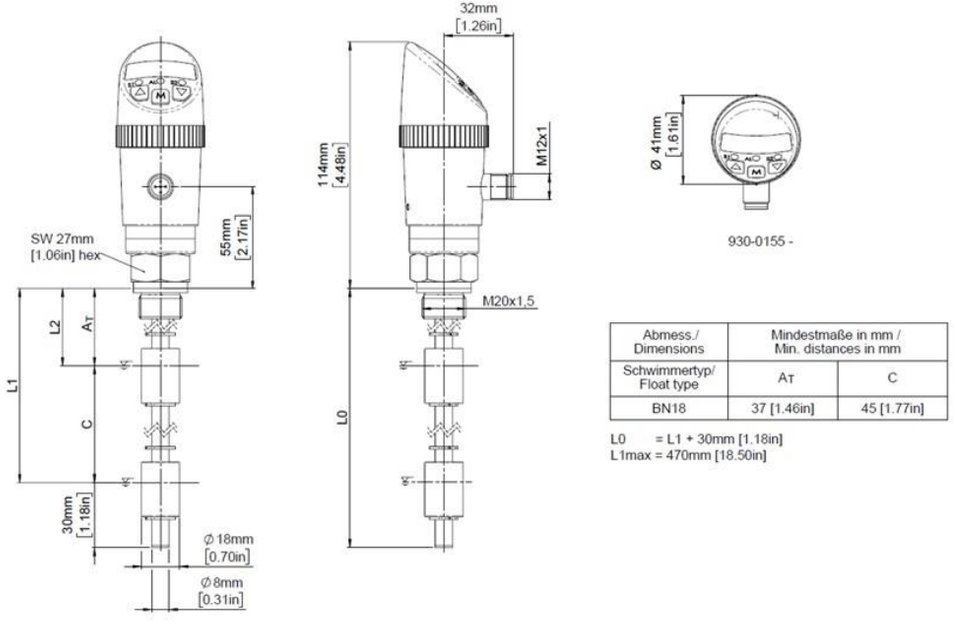
10 Technical Data

	BTLS2000
Measuring range temperature	0 … 100°C; -30 … 140°C (32 … 210°F; -22 … 280°F)
Measuring ranges level	1 or 2 set points. Fixed set points depending on configuration. L1 max. 470 mm.
Display	4-digit 14-segment LED display, red, digit height 9 mm
Outputs	Max. 4 outputs for resistive loads until 500mA
Operating temperature range	-10 ... +60 °C / +14 ... +140 °F
Process connection	M20x1.5
Protection system[1)] /class	IP65, IP67; UL-Type 4X,6 / III
Electrical connection	Plug 5-pin, 8-pin, M12x1
Power supply	15... 28 V DC
For further technical data and options please refer to the data sheets	

1) 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)*



Abmess./ Dimensions	Mindestmaße in mm / Min. distances in mm	
Schwimmertyp/ Float type	AT	C
BN18	37 [1.46in]	45 [1.77in]

L0 = L1 + 30mm [1.18in]
L1max = 470mm [18.50in]

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Operating Instructions

Dual Temperature Switch & Level Switch BTLS2000

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2 **Safety Instructions** 2
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Art. no.: 923-2741
Index ---, 26.03.2020
Software version: 1.2 or higher
Specifications are subject to changes without notice!

Barksdale Inc.

Barksdale GmbH

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1 Intended Applications

The dual temperature switch + level switch has max. 4 switching outputs. After mounting the probe immerses in the medium. The medium temperature will be indicated in the display and two set points can be adjusted over the menu. The level set points are fixed.

DANGER

The dual temperature switch + level switch may only be used in the specified fields of application.

The temperature ranges must be within the permissible limits. The stated temperatures and electrical load values must not be exceeded.

Observe also the applicable national and local safety instructions for assembly, commissioning and operation of the dual temperature switch + level switch.

The switch is not designed to be used as the only safety relevant element in temperature 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 prevent 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 users.

Non-observance may result in fatal injuries.

WARNING

Refers to a recognizable danger.

Non-observance may result in fatal injuries, and destroy the equipment or plant parts.

CAUTION

Refers to a danger.

Non-observance 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 dual temperature switch + level switch must be disposed of correctly in accordance with the national or 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 temperature switch + 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.

See also Barksdale “Standard Terms and Conditions”.

5 Installation

CAUTION

Jolts and heavy vibrations must be avoided during transport. Even if the switch casing remains undamaged, internal parts may be damaged and cause malfunctions.

CAUTION

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.

The dual temperature switch + level switch may only be installed and electrically connected by trained and instructed staff according to all current standards.

DANGER

The dual temperature switch + level switch may only be installed in systems where the maximum temperature T_{max} and the maximum pressure P_{max} is not exceeded (see type label).

Only install/remove the switch when deenergized (electrically hydraulically/pneumatically) and at ambient temperature.

Mount the temperature switch from the bottom to the fitting using e.g. a wrench SW 27mm (M20) and tighten it to a maximum torque of 22 Nm (190 in/lb).

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

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At high medium or ambient temperatures, ensure by suitable measures that the devices case temperature does not exceed 70°C (60° F) in continuous operation (the temperature is measured at the hexagon of the process connection).

At medium temperatures above 70°C (60° F) the thread must not be immersed into the medium.

The actually achievable accuracy is significantly determined by the mounting situation (immersion depth, sensor length, operating conditions). This is especially the case for large temperature gradients between the environment and the medium.

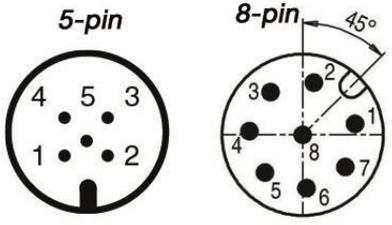
The dual temperature switch + level switch is installed through the tank top or bottom side. Sufficient distance must be kept to the tank wall and any installations. The float must move freely. The Barksdale dual temperature switch + level switch should be installed vertically, if possible. Proper functioning is, however, guaranteed up to an inclination of 30°.

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

Pin	5-pin	8-pin
1	V_{cc}	V_{cc}
2	SP1 Level	Analog Temperature
3	GND	GND
4	SP1 Temperature	SP1 Temperature
5	SP2 Temperature	SP2 Temperature
6	-	SP1 Level
7	-	SP2 Level
8	-	-

Plug



6 Commissioning/Operation

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

⚠	CAUTION
Do not place the dual temperature switch + level switch into operation when the switch 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 hot!	

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 is menu-driven via three 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 for Temperature measuring

(Note: The level set point is fixed, any adjustment can‘t be made)

Navigation function	Symbol (keys)
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

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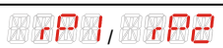
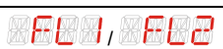
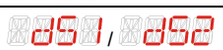
7.1 Parameters

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 output (Ou2)
uni		Select unit: °C, °F, °K If the measuring range is outside the display range, unit selection is not allowed. The parameter "uni" is not displayed.

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Parameter	14-segment display	Description
Hi		Saved value of highest temperature measured
Lo		Saved value of lowest temperature measured
COF		Offset correction (max. 10 % of measuring range)
ddis		Damping display
Fdis		Rotate display through 180°
udiS		Unit indication
Firm		Firmware version
LocK		Locking feature

* only models with 2nd switching contact

Error list

Parameter	14-segment display	Description
sens		Sensor defect
SC1		Short circuit, solid state contact 1
SC2		Short circuit, solid state contact 2
OL		Upper sensor range exceeded
UL		Lower sensor limit exceeded
KEY		Internal defect

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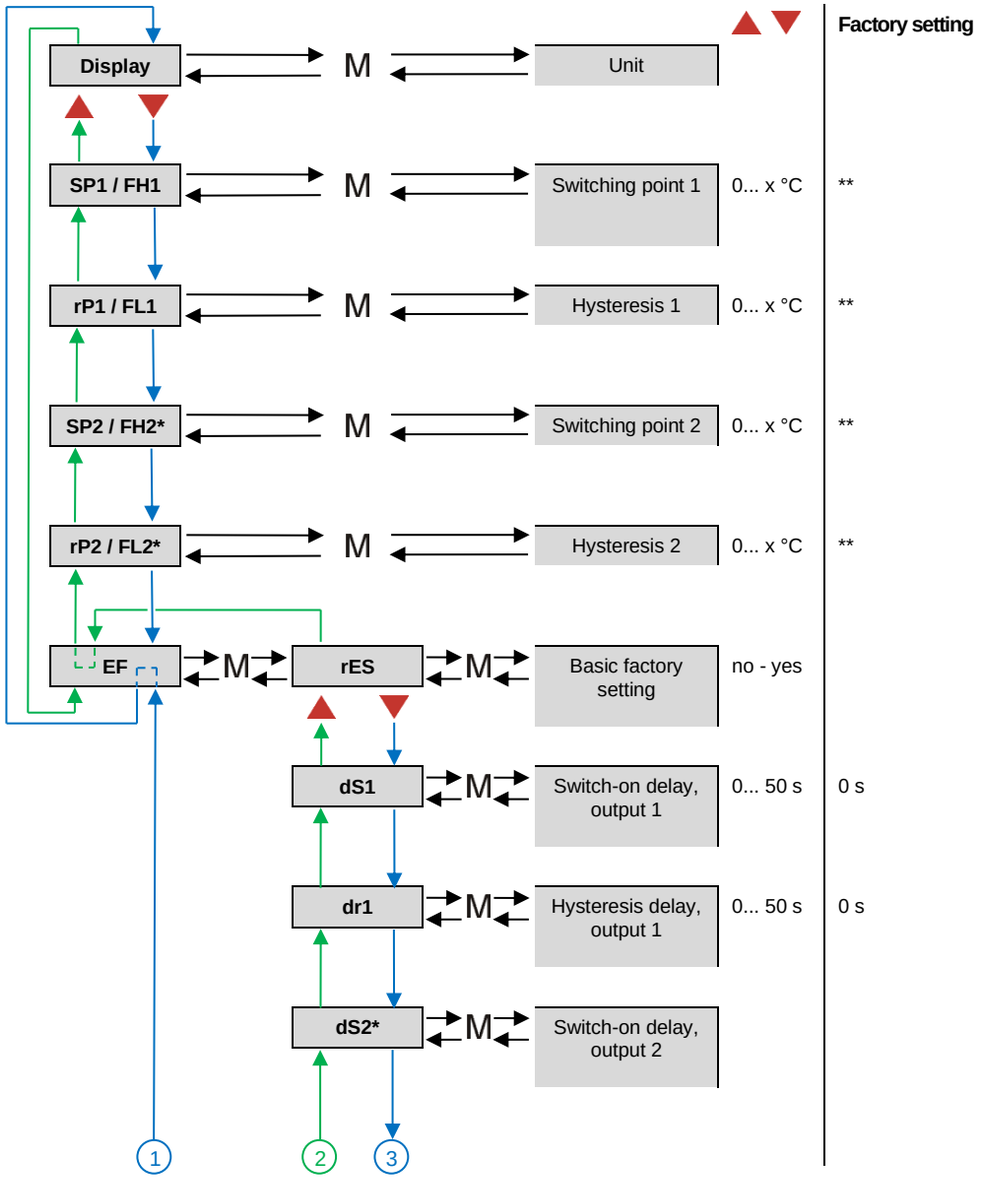
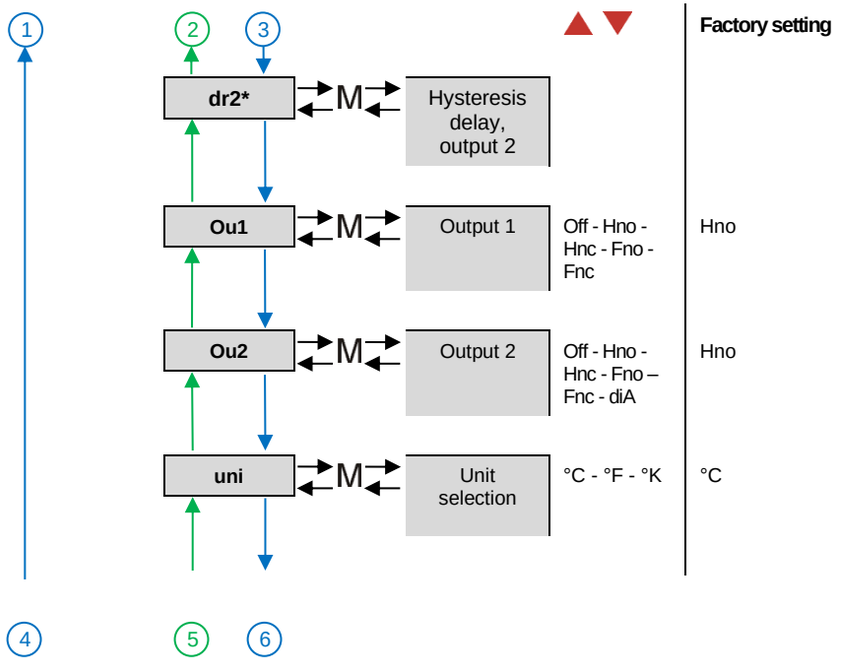
7.2 Menu Structure





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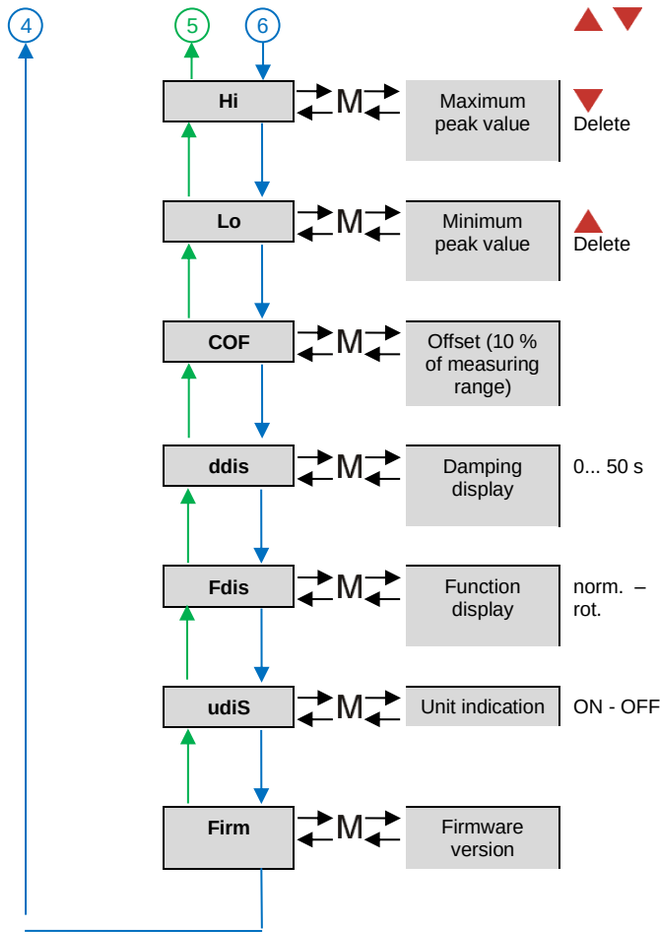
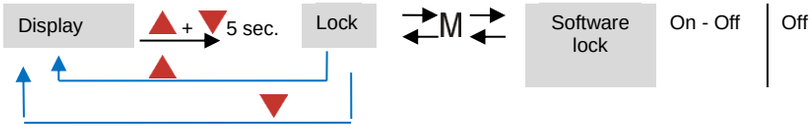


* only models with 2nd switching contact

** setting according to measuring range

Lock



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8 Maintenance/Cleaning

Maintenance

The dual temperature switch + level switch requires no maintenance.

WARNING

Check the switch for functioning at regular intervals.

If the dual temperature switch + level switch does not work properly, stop operation immediately.

CAUTION

Do not bend or hit the stem when cleaning the guide tube!

Proceed **carefully** to remove medium residues from the guide tube, if necessary.

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 dual temperature switch + level switch when deenergized (electrically hydraulically/pneumatically) and at ambient temperature.

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 hot!

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