

LEVEL

Level Switches



switch



measure



control

Barksdale
Control Products GmbH

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Introduction

Application

Where fluids must be stored or handled the Barksdale level switches with their large variety from a simple switch to multi level stations are a logic choice.

When temperature and level measurement are required at the same time in tanks or reservoirs it is practical and economical to combine these in the level switches UNS-1000 with temperature sensor and UNS-2000 with additional temperature switch.

Application

Level

All level switches are equipped with hermetically sealed reed switches. The contact is switched by an annular rod bar magnet which is positioned within the float.

The reed switch is available as normally closed, normally open or SPDT-contact. The only moving part of the level switch is the float sliding along the stem.

Contact modes (NO or NC) are defined on the basis of an empty tank and for installation through the top or through the bottom (when specified as "-U").

NO: Normally open,

- Closing contact by rising level
- Opening contact by falling level

NC: Normally closed,

- Opening contact by rising level
- Closing contact by falling level

The density (specific gravity) of the medium will influence the floating position of the float. In very light oils or solvents the float might change (lower) it's position up to 15 - 20 mm or more. If this is critical in your application consult us for details.

When not specified we will position the switch point for density 1 (water) and the switch action to be on moving upward.

Due to the hysteresis (dead band) of the reed contacts the action on rising level (reactuation point) will be several millimetres lower than the specified switch point.

Temperature Measuring (optional)

For temperature measurement we offer a PT 100 temperature sensor in our UNS-1000 and UNS-2000.

In the series UNS-2000 we also offer temperature switch functions.

The bi-metal element (TP type) is hermetically sealed, has fixed setpoints in steps of 5 °C and is installed in the bottom of the stem.

The TP type has gold plated contacts, is very good for low voltage and mA applications, and can still handle large contact loads up to 3 amp at 24 VDC or 12 V AC. Setpoints between -30...130 °C, the hysteresis is only 2 °C to 4 °C at mid range.

The coding of the temperature switch is simple, just specify TP then the setpoint in °C and 1 or 2 for the contact mode.

I.e. TP 60/1 for setpoint 60 °C contact NO and closes on increasing temperature at 60 ±5 °C. The TP 60/2 is then NC and opens on increasing temperature.

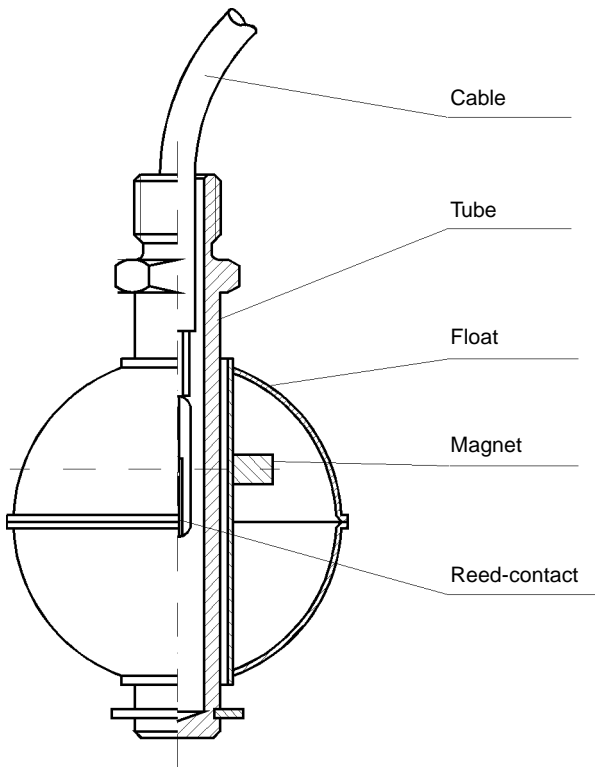
Consult factory for availability of your required version.

T typical Applications for Level Switches with integrated Temperature Sensor

- switching on heaters to avoid freezing of the medium, or
- high or low temperature alarm in hydraulic tanks (TP type)

Type UNS-2100 Ex is also available with temperature switch and EEx-approval.

Introduction



Features and Benefits:

- Only moving part: The wearlessly working float.
- NO linkage, bellows or dynamic seals to wear, no service or spare parts needed.
- Easy to install, no calibration needed.
- Welded hollow floats in Stainless Steel and foamed floats in Buna-N (BN) are mostly used. The BN float is a closed cell Buna rubber, very light and very good in most hydrocarbons and water.
- Many special floats are available, consult us for details.
- The position of the float on the stem determines the contact status, open or close. By rotating the float the switch function will be reversed.
- Hysteresis of switch action only a few mm depending on type of contact and float.
- Reed contacts are designed to operate under vibration and are ideal for industrial applications.
- The UNS-1000 and UNS-2000 offer “custom made” specials at standard pricing.
- Approved designs for Zone 0 installations with UNS-2100-EX, according to CENELEC EEx.ib IIC T6 intrinsically safe.
- DNV-, GL-, ABS-, BV-, LR- and RINA-shipboard approvals with the series UNS-1000 S, UNS-2000 S and UNS-VA SB (excluding temperature versions).
- Option for high temperature up to 150 °C, specify -HT.
- Option for splash or protection tube, specify: -DR.
- Option for additional temperature switch(es) specify: -TP.
- Mounting normally vertical downwards through the top, specify -U when mounting will be through the bottom vertical upwards.
- For pressures over 50 bar and/or very low density fluids we have special solutions, consult us for details.
- Many years of experience in level switches and many specials since, include many “exotics” in Hastelloy, Titanium, Teflon etc., will help us to design the special version you might need.

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Barksdale Level Switches

Specifications are subject to changes without notice.

Introduction

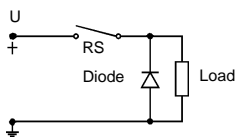


Fig. 1
Protection at AC and inductive load with free-wheeling diode.

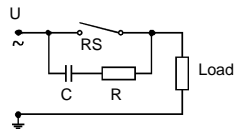


Fig. 2
Protection at DC and inductive load with free-wheeling diode.

Fig. 3

Nomogram for the determination of contact arc-dimming for inductive loads

Example 1: $I = 0,1 \text{ A}$
 $U = 220\text{V}$
 $C = 0,001\text{mF}$
 $R = 340 \text{ Ohm}$

Example 2:
If inrush current is critical, min. resistance should be determined by following nomogram, e.g.
Exp.: Inrush current 0,5A
 $R_{\text{min}} = 400 \text{ Ohm}$

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Barksdale Level Switches

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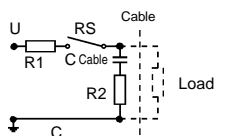
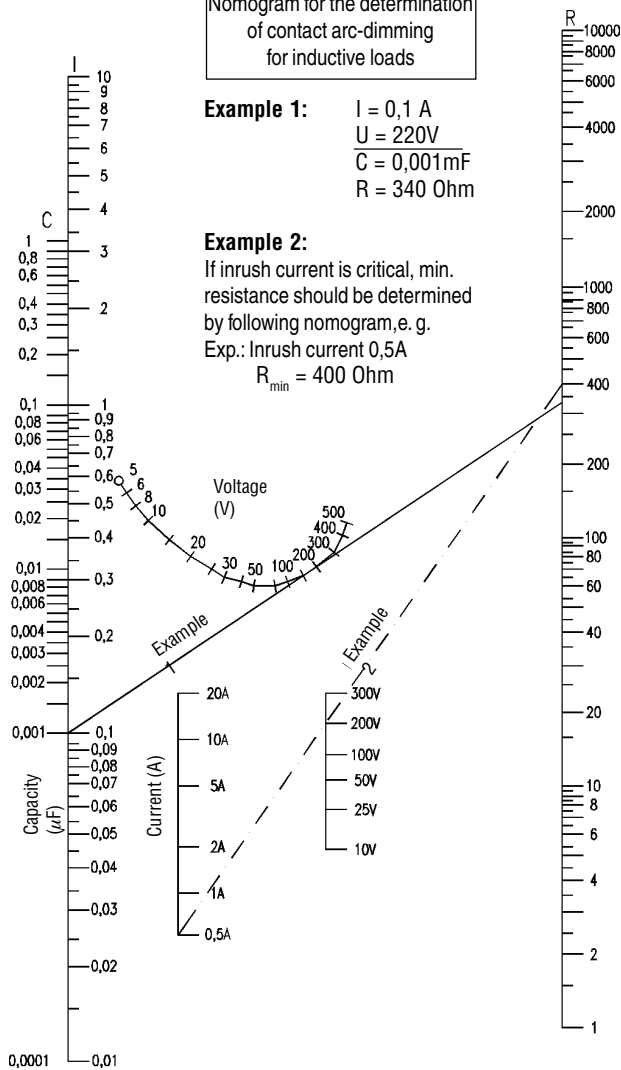


Fig. 4
Protection against high discharge current of condensers. Depends upon circuit R1 or R2 or both should be used.

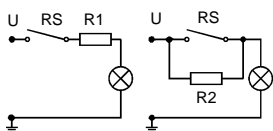


Fig. 5
Lamp loads with parallel or serial resistor to switch.

General Technical Information

The indicated values for power, voltage and capacity are valid for purely resistive loads. Quite frequently though, the loads are surrounded by inductive and capacitive components. Very often lamp loads must be switched. In this case, protection of the reed switch against voltage and power peaks must be considered. Of course, each case must be evaluated separately. But we would like to give some guidelines concerning the wiring of reeds for different loads to avoid premature failure.

1. Inductive loads

Contact protection is relatively simple for direct current (DC). A free-wheel diode is wired parallel to the load. Polarity must be established in such a way that the diode will inhibit at normal operational voltage (current) and short-circuit the power peaks which occur in the opposite direction when the switch opens. (see fig. 1).

It is not possible to use a diode for AC. Here an arc-dimming unit has to be used. Generally this unit is a RC-unit wired parallel to the switch and hence in series with the load. Sizing of such an arc-dimming unit can be performed according to the nomogram shown in fig. 2 and 3.

2. Capacitive loads and lamp loads

Contrarily to the inductive loads, there are inrush currents for capacitive loads and lamp loads which can lead to disturbance - even to the point of fusing of the contacts. During the wiring of loaded condensators (e.g. cable capacities) a sudden discharge will occur, with an intensity depending on the capacity and length of supply cable to the switch (can be regarded as series resistor). The discharge peak of the current is largely reduced by a series resistor to the condensator. Its size is determined by the possibilities offered by the respective power circuit. It should be as high as possible in order to limit the discharge current to a permitted value. These criteria are valid analogously for the charging of condensors (see fig. 4).

Finally we want to give some details regarding the wiring of lamp loads. Cold incandescent filaments (switched off) have ten times smaller resistance than switched on filaments. That means during switch-on - even for a short period of time only - the current flow is ten times higher than in glowing, static condition of the lamp. This tenfold inrush current can be reduced to an acceptable level by a continuously wired limiting resistor. Another possibility is the parallel wiring of a resistance to the switch. This will permanently heat up the switches of the lamp filament only so much as to just prevent it from glowing. Both protective modes result in the loss of capacity (see. fig 5).

General View

Level Switches with one Switchpoint

Material: Metal



Type UNS-	MS 1/8 - BN25 VA 1/8 - VA27	MS 1/4 - BN30 VA 1/4 - VA52	MS 3/8 - BN30 VA 3/8 - VA52	90 - MS 3/8 - BN30 90 - VA 3/8 - VA52	VA / SB4 VA / SB5
Mounting Position	Through top Through bottom	Through top Through bottom	Through top Through bottom	Side mounted	Through top
Stem Material	Brass Stainless Steel 1.4571	Brass Stainless Steel 1.4571	Brass Stainless Steel 1.4571	Brass Stainless Steel 1.4571	Stainless Steel 1.4571
Mounting Element	G 1/8 Mounting thread	G 1/4 Mounting thread	G 3/8 Mounting thread	G 3/8 Mounting thread	Mounting bracket
Float	BN25, Ø = 25 mm VA27, Ø = 27 mm	BN30, Ø = 30 mm VA52, Ø = 52 mm	BN30, Ø = 30 mm VA52, Ø = 52 mm	BN30, Ø = 30 mm VA52, Ø = 52 mm	PE33, Ø = 33 mm
Float Material	Buna N - BN Stainl. Steel 1.4571-VA	Buna N - BN Stainl. Steel 1.4571-VA	Buna N - BN Stainl. Steel 1.4571-VA	Buna N - BN Stainl. Steel 1.4571-VA	Polyethylene PE
Min. Fluid Specific Gravity (g/cm³)	BN25: 0,57 VA27: 0,71	BN30: 0,60 VA52: 0,78	BN30: 0,60 VA52: 0,78	BN30: 0,60 VA52: 0,78	0,80
Max. Pressure (bar)	15 15	15 40	15 40	15 40	3
Max. Temperature	80/100 °C - Buna N 105/150 °C - Stainl. Steel	80/100 °C - Buna N 105/150 °C - Stainl. Steel	80/100 °C - Buna N 105/150 °C - Stainl. Steel	80/100 °C - Buna N 105/150 °C - Stainl. Steel	70 °C
Contact Mode	NO / NC SPDT	NO / NC SPDT	NO / NC SPDT	NO / NC SPDT	NO / NC
Contact Rating	40 VA/W NO / NC 3 VA/W / SPDT	100 VA/W NO / NC 60 VA/W / SPDT	100 VA/W NO / NC 60 VA/W / SPDT	100 VA/W NO / NC 60 VA/W / SPDT	40 VA/W NO / NC
Option	High temperature version	High temperature version	High temperature version	High temperature version	Test equipment
Approval	Shipbuilding approval	Shipbuilding approval	Shipbuilding approval	Shipbuilding approval	Shipbuilding approval
Catalogue Page No.	10-11	12-13	14-15	16-17	18-19

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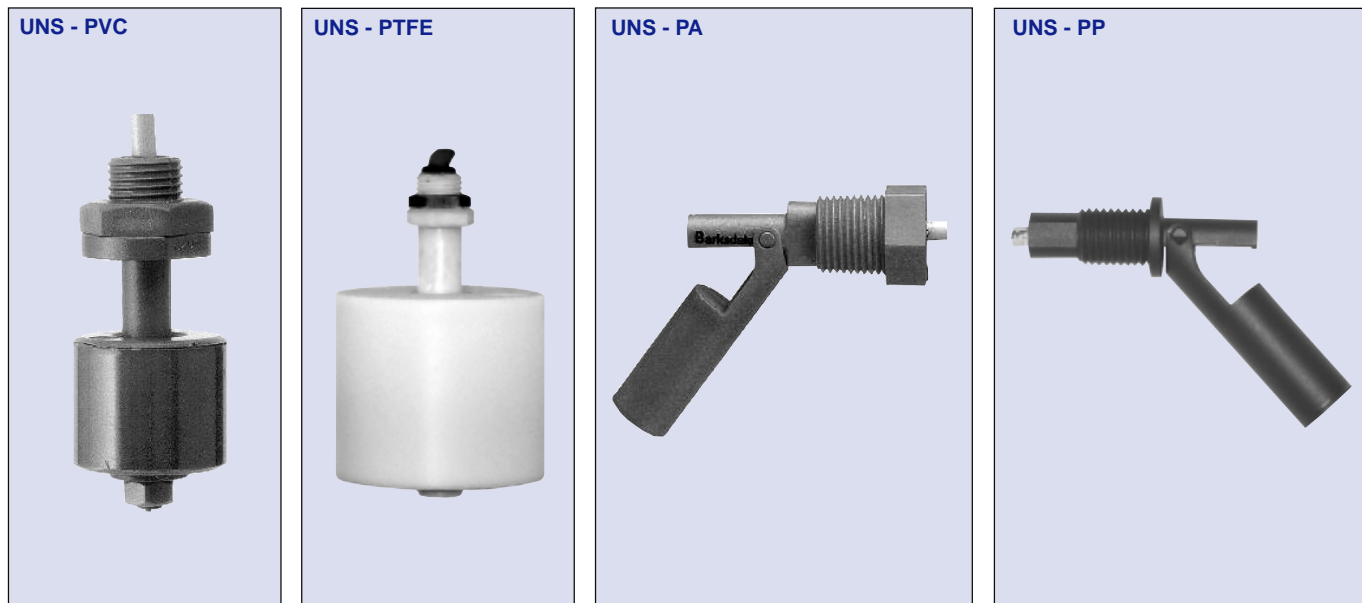
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General View

Level Switches with one Switchpoint

Material: Plastic

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Barksdale Level Switches

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Type UNS-	PVC1/8-PVC25	PVC3/8-PVC25	PTFE1/4-PTFE55	PA16-PA18 PA1/2"NPT-PA18 PA16-PA18-MS-A	PP16-PP18 PP1/2"NPT-PP18
Mounting Position	Through top Through bottom	Through top Through bottom	Through top Through bottom	Side mounted	Side mounted
Stem Material	PVC-hard	PVC-hard	Teflon	Polyamide 6.6	Polypropylene
Mounting Element	G 1/8 Mounting thread	G 3/8 Mounting thread	G 1/4 Mounting thread	M 16 x 2 1/2" NPT, G 1/2	M 16 x 2 1/2" NPT
Float	PVC 25, Ø = 25 mm	PVC 25, Ø = 25 mm	PTFE 55, Ø = 55 mm	18 mm	18 mm
Float Material	PVC-hard	PVC-hard	Teflon	Polyamide 6.6	Polypropylene
Min. Fluid Specific Gravity (g/cm³)	0,70	0,70	1,0	0,70	0,65
Max. Pressure (bar)	3	3	3	5	5
Max. Temperature	65 °C	65 °C	150 °C	60 / 120 °C	60 / 90 °C
Contact Mode	NO / NC SPDT	NO / NC SPDT	NO / NC SPDT	NO / NC	NO / NC
Contact Rating	10 VA/W NO / NC 3 VA/W / SPDT	10 VA/W NO / NC 3 VA/W / SPDT	100 VA/W NO / NC 60 VA/W / SPDT	60 VA/W	60 VA/W
Option	On request	On request	On request	On request	On request
Approval	---	---	---	---	---
Catalogue Page No.	20	20	21	22	23

General View

Multi Level Switches with one ore more Switchpoints

Material: Metal



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Type UNS-	1000	1000-S	1000-G
Mounting Position	Through top Through bottom	Through top Through bottom	Side mounted
Stem Material	Brass Stainless Steel 1.4571	Stainless Steel 1.4571	Stainless Steel 1.4571
Mounting Element	Flange and thread	Flange and thread	G 1/2 side / bottom
Float	BN25, Ø = 25 mm VA27, Ø = 27 mm	BN25, Ø = 25 mm VA27, Ø = 27 mm	VA27, Ø = 27 mm
Float Material	Buna N - BN Stainl. Steel 1.4571-VA	Buna N - BN Stainl. Steel 1.4571-VA	Buna N - BN Stainl. Steel 1.4571-VA
Min. Fluid Specific Gravity (g/cm ³)	BN25: 0,57 VA27: 0,71	BN25: 0,57 VA27: 0,71	0,71
Max. Pressure (bar)	15	15	15
Max. Temperature	80/100 °C - Buna N 105/150 °C - Stainl. Steel	80/100 °C - Buna N 105/150 °C - Stainl. Steel	90 °C - Stainl. Steel
Contact Mode	NO / NC SPDT	NO / NC SPDT	NO / NC SPDT
Contact Rating	40 VA/W NO / NC 3 VA/W / SPDT	40 VA/W NO / NC 3 VA/W / SPDT	40 VA/W NO / NC 3 VA/W / SPDT
Option	High temp. version, temperature sensor	On request	High temperature version
Approval	---	Shipbuilding approval	---
Catalogue Page No.	24-25	26-27	28

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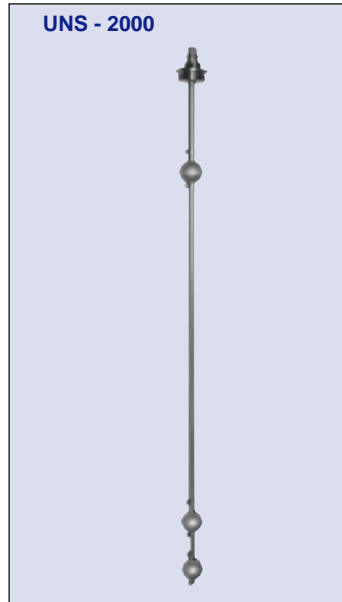
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General View

Multi Level Switches with one ore more Switchpoints and Ex-Approval

Material: Metal

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Barksdale Level Switches

Specifications are subject to changes without notice.

Type UNS-	2000	2000-S	2100-Ex
Mounting Position	Through top Through bottom	Through top Through bottom	Through top Through bottom
Stem Material	Brass Stainless Steel 1.4571	Stainless Steel 1.4571	Stainless Steel 1.4571
Mounting Element	Flange and thread	Flange and thread	Flange and thread
Float	BN30, Ø = 30 mm VA52, Ø = 52 mm	BN30, Ø = 30 mm VA52, Ø = 52 mm VA80, Ø = 80 mm	VX44, Ø = 44 mm VX52, Ø = 52 mm VX80, Ø = 80 mm
Float Material	Buna N - BN Stainl. Steel 1.4571-VA	Stainl. Steel 1.4571 - VA	Stainl. Steel 1.4571-VA
Min. Fluid Specific Gravity (g/cm³)	BN30: 0,60 VA52: 0,78	BN30: 0,60 VA52: 0,78 VA80: 0,54	VX44: 0,84 VX52: 0,78 VX80: 0,54
Max. Pressure (bar)	15 40	BN30: 15, VA52: 40 VA80: 17	15 17
Max. Temperature	80/100 °C - Buna N 105/150 °C - Stainl. Steel	80/100 °C - Buna N 150 °C - Stainl. Steel	T4...T6 +85 °C...+120 °C
Contact Mode	NO / NC SPDT	NO / NC SPDT	NO / NC SPDT
Contact Rating	100 VA/W NO / NC 60 VA/W / SPDT	100 VA/W NO / NC 60 VA/W / SPDT	100 VA/W NO / NC 60 VA/W / SPDT
Option	High temp. version, temp. sensor and switch	On request	On request
Approval	---	Shipbuilding approval	Ex-approval PTB Nr. Ex-95.D.2010
Catalogue Page No.	30-31	32-33	35