

# LEVEL

## Bypass Level Indicators



switch



measure



control

**Barksdale**  
Control Products GmbH

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Barksdale Bypass Level Indicators

Specifications are subject to changes without notice.

# Introduction

## Function Principle

The **Barksdale** Bypass Level Indication System combines the convenience of a sight glass and the strength of a Stainless Steel tube, with the only difference; there is no glass to break or seals to leak. Colourless clean, or even dirt contaminated liquids are indicated by a row of red / white coloured rotating flags and can be seen from great distances.

The bypass tube is connected by side / side, or top and bottom connections with the tank. A magnetic float inside the bypass tube rides on the same level as in the tank and operates the coloured flags, the limit switches and / or the optional level transmitter on the outside of the tube.

The special permanent magnet design provides a 360 degree magnetic flux field. This allows the indication rail, the limit switches and continuous level sensor to be located anywhere around the bypass tube.

The Bypass Level Indication System is available in a variety of metals and plastics.

Except for the tank top version, we can serve many applications up to standard 64 bar and 350 °C.

Depending on process requirements we offer many options such as: special floats, calibrated scales, trace heating, isolations, drain valves, various international construction standards, special tests and approvals.

Bypass level tubes with total length > 3 meters can cause higher packing, transport and installation costs than short sections. We therefore offer split versions which can be flanged together on site during installation.

Please contact us for details.

**Attention:** The indication rail will be interrupted for 30 to 50 mm at the split. In this gap neither indication nor limit switches are possible.

## Materials

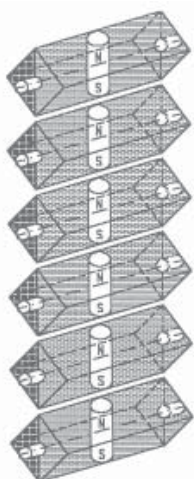
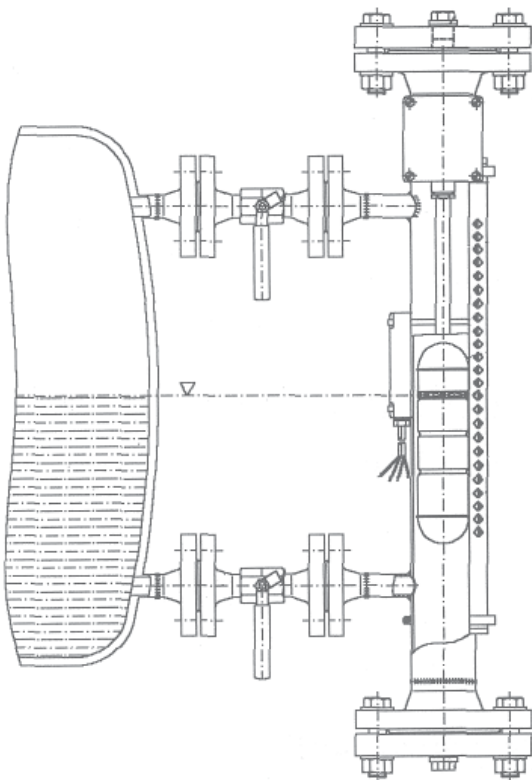
Bypass tube, flanges and floats are as standard available in: Stainless Steel 316 Ti / 1.4571, Titanium, PVC, PVDF, or Polypropylene.

Optional metals and cladding, Teflon lining, chemical metalising, and coatings are available on demand.

## Indication Flags

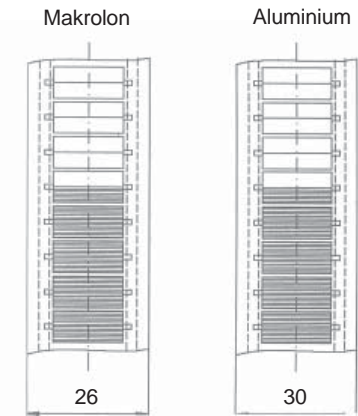
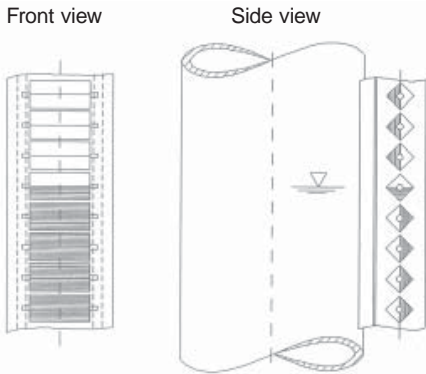
The rotary flags are large in size and brilliant in colour. These square section rotary flags are magnetically interlocked, designed to maintain their relative position even when subject to significant vibration. They rotate from white to red when the magnet quipped float rises with the liquid level in the bypass tube and clearly indicate the level which can be seen from over thirty meters away.

In one meter indication there are 80 flags, corresponding to an accuracy of 1,25% for one meter, or 0,6% for two meter indication length. Aluminum flags are painted red and aluminum and can be subjected to 320 °C, the polycarbonate flags can be exposed to 150 °C medium, equals 120 °C ambient temperature.



# Introduction

## Indication Rail Assembly



Indication rail assemblies are available in polycarbonate (Makrolon) and anodised aluminium for high Temperatures. The polycarbonate assemblies are 26 mm wide, clear, virtually resistant against UV, chemically polluted atmospheres and impacts and offer 180° visibility.

The extruded aluminum indication rails are anodised, 30 mm wide and have glass panes to protect the flags. They can be subjected to 320 °C ambient or 350 °C medium temperatures.

The indication rail assemblies are attached to the outside of the bypass tube with stainless steel clamps and therefore can easily be positioned in the direction needed for optimal reading (not possible with the double wall / tube design).

The end caps on the rails protect the flags against dirt or dust, however when rain or freezing conditions can be expected we recommend an additional shrink tubing. Please see also page 6.

Flags which are in the wrong position due to external magnetic influences will automatically return to the right position by the flux field of the float on the next passing by.

## Floats

The floats are fabricated in various standard versions: stainless steel, Titanium, PVC, PP, or PVDF (Kynar). Please see page 23. The stainless steel versions in 1.4571 (316Ti) can be used up to 150 °C medium temperatures, the Titanium up to 320 °C.

In the metal floats the top extends 50 mm above the magnet. Depending on the specific gravity  $\rho$  (equals density) of the fluid the float raises or lowers its floating position and therefore influences the indication accuracy.

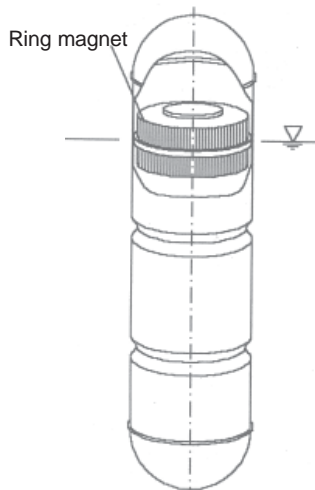
The type VA50/15 and TT50/15 floats are designed to simply match the indication with the liquid level in the bypass tube by adding weight in the float for fluids with higher densities.

These floats are also used for interface measurement between two liquids; for example oil and water; the float will sink through the oil and floats on the water.

Interface application require a minimum specific gravity difference of 0,2.

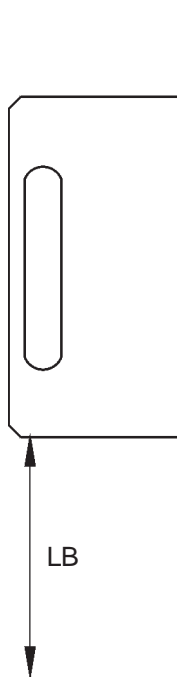
For pressures over 40 bar we have vented floats VA50/20 and TT50/20 which have a vent tube for equalising the inside and outside pressure of the float. This vent tube automatically removes with each small pressure drop condensate from the inside of the float back into the bypass tube.

These vented floats should not be exposed to pressure shocks; it is important that the system will be brought up to pressure slowly.



# Introduction

## Mounting Brackets



In the standard version we supply all bypass indication systems with top and bottom process connections with mounting brackets; the 60 mm  $\varnothing$  metal versions with welded-on bracket(s), the others in engineered plastics (K) and the S21/ S22 version have clamped-on bracket(s).

When not specified otherwise the dimension LB1 is 300 mm for all units with a total length (L0) > 1000 mm.

For L0 up to 2000 mm LB1 is 300 mm and LB2 = L0 – 400 mm.

For L0 over 3000 mm there is a bracket in the middle (LBm) between LB1 and LB2. LBm = LB1 – LB2 .

When the bypass tube is a split version there will be a bracket 200 mm under the “split” flange facing and another bracket 100 mm above.

All LB dimensions are measured from the bottom of the bracket.

When other dimensions are required they must be listed explicitly in the order.

## Heat Tracing

To prevent the cooling or freezing of liquids in the bypass tube we offer an electric heat trace system or a double tube design to be used with steam or water. This double tube design can be used with chilled water when cooling is needed.

It is recommended to order this option with an isolation or plan to have these isolated together with the rest of the installation.

## Isolation

For personal protection we offer a woven glass isolation (–40 °C...400 °C) around the tube, a rubber foam type isolation (–40 °C...105 °C) for low temperatures, and a calcium silicate and aluminium isolation to save energy with high temperatures up to 400 °C.

## Weather Protection

For outdoor or applications where moisture or dust can be expected we recommend the use of our protective shrink tubing for the indication rail.

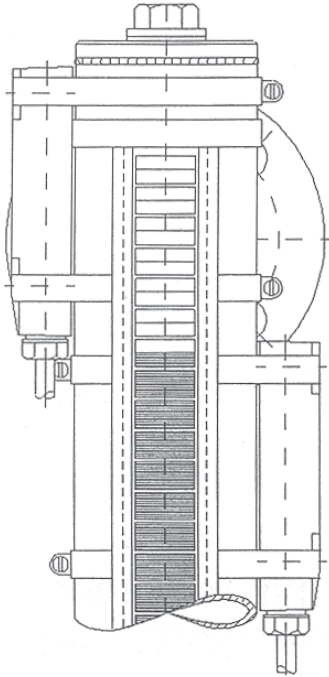
This transparent Polyolefin shrink tubing offers also a good resistance against oil, vapours and gases in the chemical industry and reduces freezing of the surface and ice build-up.

Cleaning with water or steam is easy; the use of solvents is not recommended. Temperature limits: –55 °C...135 °C.

## Introduction

**Limit Switches** Barksdale offers a line of various Limit Switches:

- GK 01 (Standard)
- GK 01L with two LED's indicating switch status
- GK 02 in EEx d
- GK HT1 (high temperature version).



As the float rises with the liquid level the magnet system will switch-over the contact. This contact status will remain until the float passes again and the switch status returns to it's original position.

Besides the GK HT1 which has a micro switch, all other Limit Switches have bi-stable reed contacts.

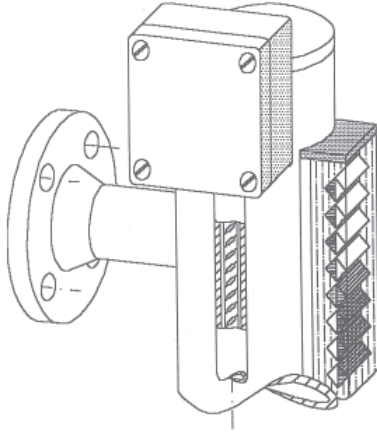
The GK 01L has a red and a green LED which indicate the switch over status of the contact whenever the float passes.

The Limit Switches are designed for quick and easy installation; only a screw driver is needed to tighten the stainless steel clamps. They can be mounted in any position around the bypass tube without influencing each other.

When frequent changing process requirements make a permanent contact position difficult to handle we recommend to order our XT level transmitters and UAS 3 trip amplifiers, which enables set point changes by touching a key pad.

## Introduction

### Continuous Level Indicating Transmitters (TLI)



All Bypass Level Indicators are available with a strap-on transmitter with continuous (resistance) electrical output or as Level Transmitter with integrated signal conditioner and a two-wire 4...20 mA output.

The measuring principle is a static chain of magnetically activated reed switches with resistors arranged inside a vertical SS tube at 12,7 mm intervals.

The flux field transmitted by the float causes reed switches to operate in a „2-3-2 at a time“ sequence, rendering an effective reading of 6,35 mm accuracy regardless of the length of the chain and provide a reed switch and signal redundancy.

Intrinsically safe versions XMi and XTi are available for hazardous areas, when needed, there is also a digital version with Hart protocol configuration.

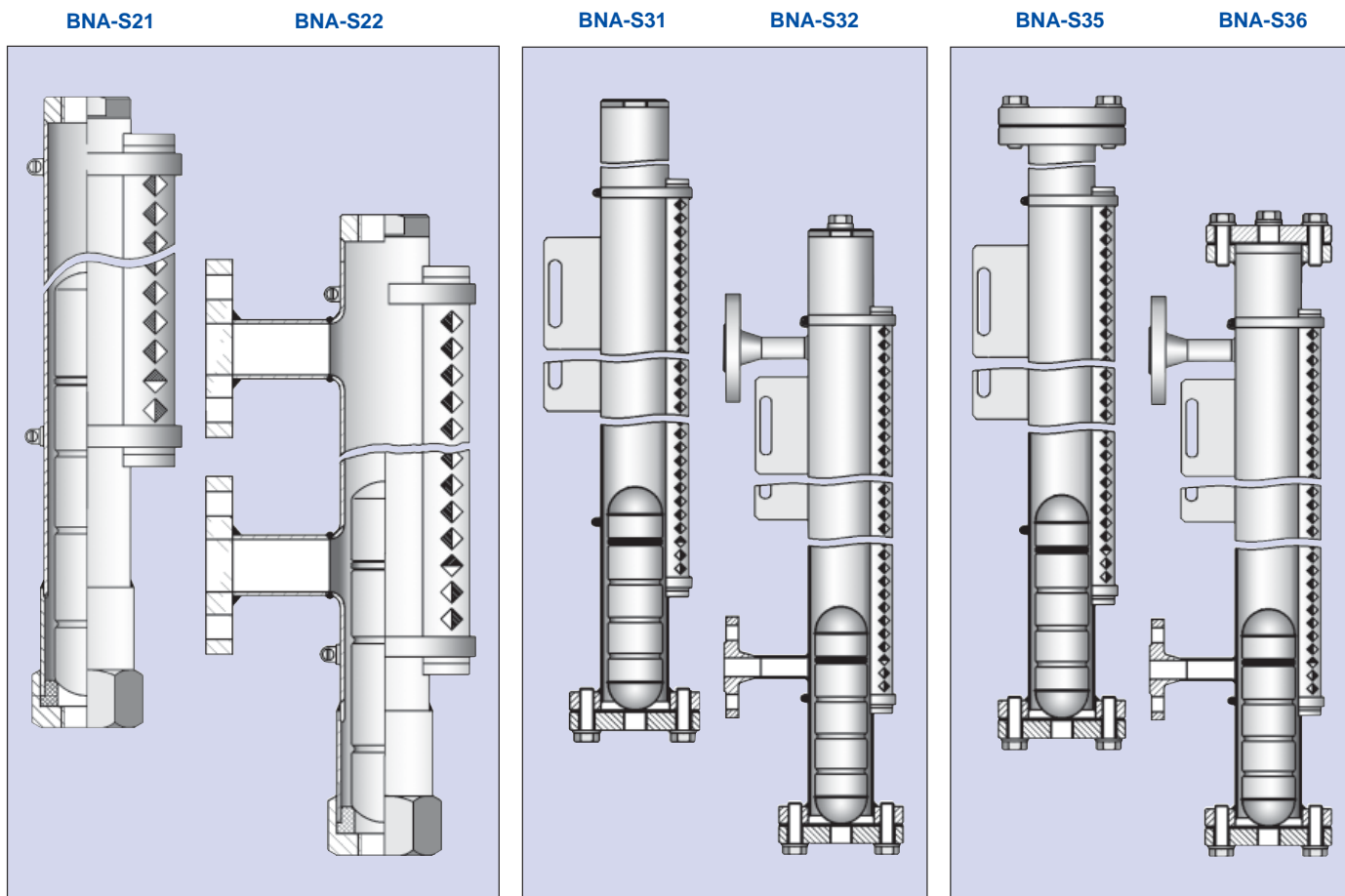
For interface level measurement the output signal can easily be inverted (20...4 mA).

### Special Designs

This catalog contains only our standard program.

**There are many more versions available, please contact us. We are happy to assist you.**

# Overview



Type	BNA-S21 BNA-S22	BNA-S31 BNA-S32	BNA-S35 BNA-S36
<b>Measuring Ranges</b>	LM max. 3000 mm in one piece, max. LM in split sections on request	LM max. 6000 mm in one piece, max. LM in split sections on request	LM max. 6000 mm one piece, max. LM in split sections on request
<b>Indication Rail Assembly</b>	Makrolon (Polycarbonate), with red/white square flags	Makrolon (Polycarbonate), with red/white square flags	Makrolon (Polycarbonate), with red/white square flags
<b>Process Connection (without Adaptor)</b>	BNA-S21: top and bottom G 1/2 BNA-S22: side mounted	BNA-S31: top and bottom G 1/2 BNA-S32: side mounted	BNA-S35: top and bottom G 1/2 BNA-S36: side mounted
<b>Stem</b>	Stainl. St. 1. 4571 (SS 316 Ti) PN 25, Diameter 40 x 1 mm	Stainl. St. 1. 4571 (SS 316 Ti) PN 16, Diameter 60,3 x 2 mm	Stainl. St. 1.4571 (SS 316 Ti) PN 16, Diameter 60, 3 x 2 mm
<b>Float</b>	Standard: VA 30/02, (SS 316Ti) 1.4571, max. 25 bar and 150 °C, min. Density: 0,85 g/cm <sup>3</sup>	Standard PN 25: VA 50/10 in 1.4571, min. Density: 0,62 g/cm <sup>3</sup> , max. Temperature: 150 °C	Standard PN 25: VA 50/10 in 1. 4571min. Density: 0,62 g/cm <sup>3</sup> , max. Temperature: 150 °C
<b>Max. Pressure in bar</b>	25 bar	16 bar	16 bar
<b>Max. Temperature</b>	150 °C	150 °C	150 °C
<b>Options</b>	Titanium- / Buna-N Float	Alu-Indication Rail, Titanium-Float, Special Connections	Alu-Indication Rail, Titanium-Float, Special Connections
<b>Approvals</b>	Shipbuilding Approval	Shipbuilding Approval	Shipbuilding Approval

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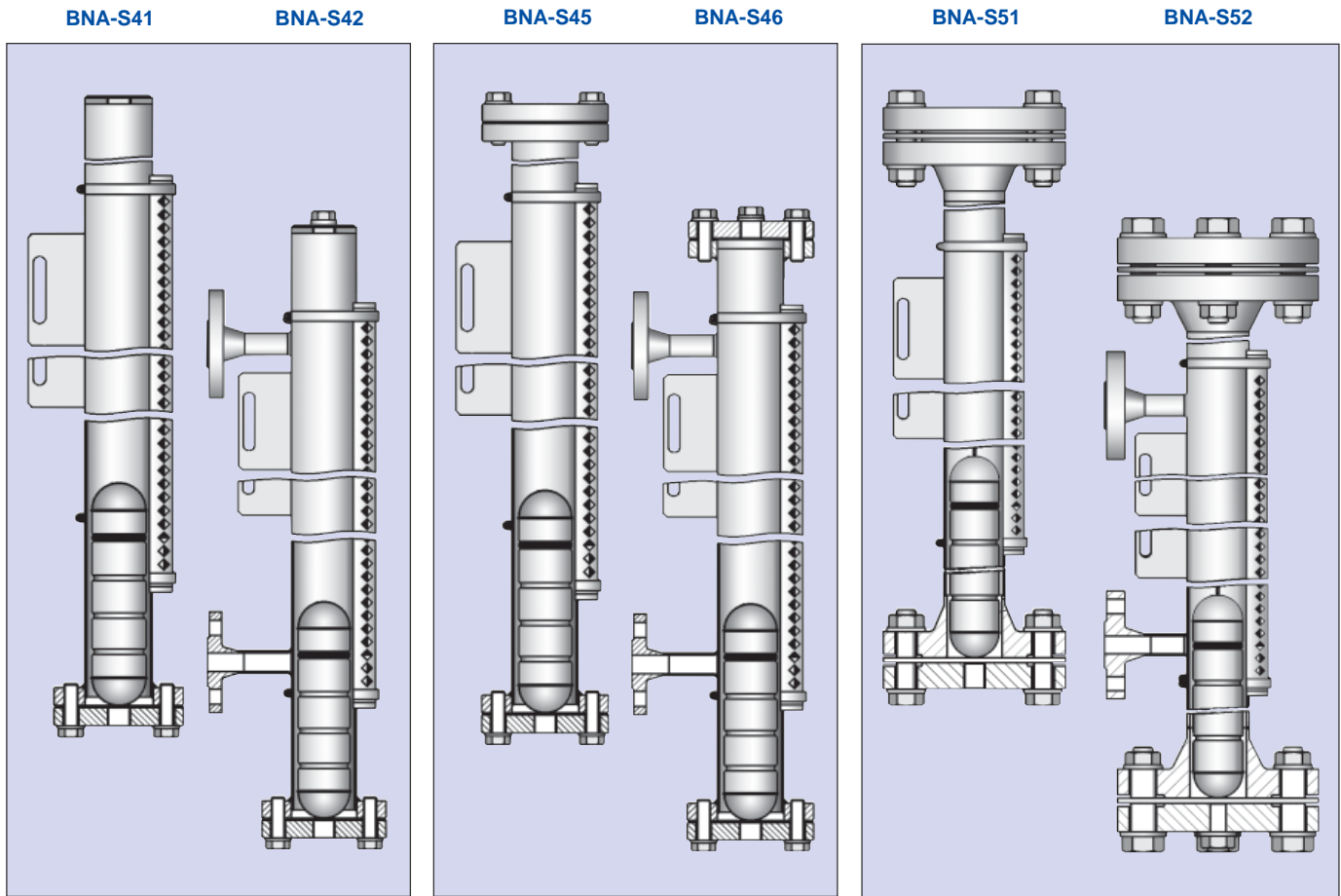


# Overview

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Barksdale Bypass Level Indicators

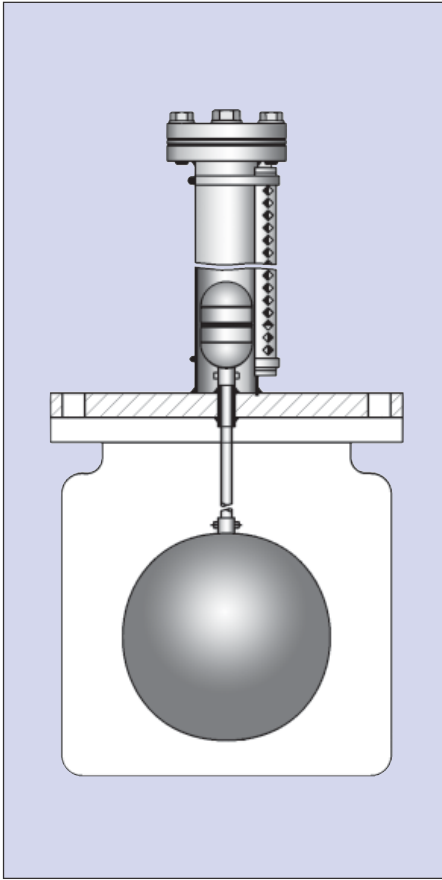
Specifications are subject to changes without notice.



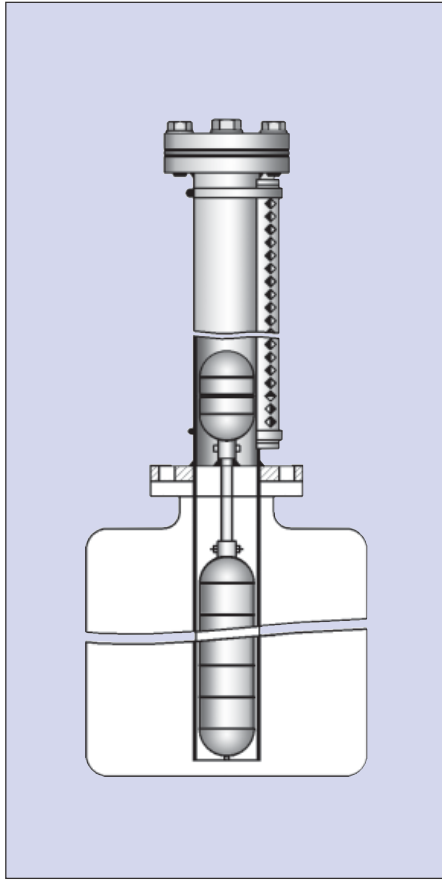
Type	BNA-S41 BNA-S42	BNA-S45 BNA-S46	BNA-S51 BNA-S52
<b>Measuring Ranges</b>	LM max. 6000 mm one piece, split sections also longer, max. LM on request	LM max. 6000 mm one piece, split sections also longer, max. LM on request	LM max. 6000 mm one piece, split sections also longer, max. LM on request
<b>Indication Rail Assembly</b>	Makrolon (Polycarbonate), with red/white square flags	Makrolon (Polycarbonate), with red/white square flags	Makrolon (Polycarbonate), with red/white square flags
<b>Process Connection (without Adaptor)</b>	BNA-S41: top and bottom G 1/2 BNA-S42: side mounted	BNA-S45: top and bottom G 1/2 BNA-S46: side mounted	BNA-S51: top and bottom G 1/2 BNA-S52: side mounted
<b>Stem</b>	Stainl. St. 1.4571 (SS 316 Ti) PN 40, Diameter 60,3 x 2 mm	Stainl. St. 1.4571 (SS 316 Ti) PN 40, Diameter 60,3 x 2 mm	Stainl. St. 1.4571 (SS 316 Ti) PN 64, Diameter 60,3 x 2 mm
<b>Float</b>	Standard PN 40: TT 50/10 in Titan, min. Density: 0,56 g/cm <sup>3</sup> , max. Temperature: 320 °C	Standard PN 40: TT 50/10 in Titan, min. Density: 0,56 g/cm <sup>3</sup> , max. Temperature: 320 °C	Standard: VA 50/20-VAE (vented) in 1.4571, min. Density: 0,65 g/cm <sup>3</sup> , max. Temperature: 150 °C
<b>Max. Pressure in bar</b>	40 bar	40 bar	64 bar
<b>Max. Temperature</b>	320 °C	320 °C	150 °C
<b>Options</b>	Alu-Indication Rail, Titanium-Float, Special Connections	Alu-Indication Rail, Titanium-Float, Special Connections	Alu-Indication Rail, Titanium-Float, Special Connections
<b>Approvals</b>	Shipbuilding Approval	Shipbuilding Approval	Shipbuilding Approval

# Overview

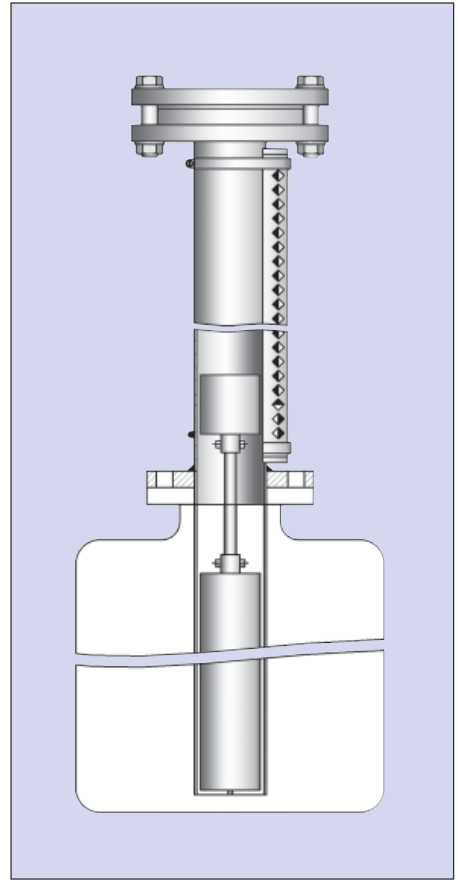
**BNA-U101**



**BNA-U102**



**BNA-U301 BNA-U401 BNA-U701**



Type	BNA-U101	BNA-U102	BNA-U301 BNA-U401 BNA-U701
<b>Measuring Ranges</b>	Depends on the buoyancy of the float (which again depends on the density of the medium (g)), max. LM on request	Depends on the buoyancy of the float (which again depends on the density of the medium (g)), max. LM on request	Depends on the buoyancy of the float (which again depends on the density of the medium (g))
<b>Indication Rail Assembly</b>	Makrolon (Polycarbonate), with red/white square flags	Makrolon (Polycarbonate), with red/white square flags	Makrolon (Polycarbonate), with red/white square flags
<b>Process Connection (without Adaptor)</b>	VA Flange DIN 2527 DN 200 / PN 16 LM max. 6000 mm, 5300 mm /	VA Flange DIN 2527 DN 65 / PN 16 LM max. 4500 mm /	Flange DN 65
<b>Stem</b>	Stainl. St. 1. 4571 (SS 316 Ti) PN 64, Diameter 60, 3 x 2 mm	Stainl. St. 1. 4571 (SS 316 Ti) PN 64, Diameter 60, 3 x 2 mm	Diameter 63, 3 x 2 mm
<b>Float</b>	VA 200 with VA tube 12 x 1 min. density = 0,6 g/cm <sup>3</sup>	VA 50-400 mit ABS Rohr min. density = 0,6 g/cm <sup>3</sup>	PVC 300, LM 1000 mm, min. dens. 0,7 g/cm <sup>3</sup> PVC 300, LM 2000 mm, min. dens. 0,8 g/cm <sup>3</sup> PVC 400, LM 2000 mm, min. dens. 0,67 g/cm <sup>3</sup> PP 300, LM 4000 mm, min. dens. 0,8 g/cm <sup>3</sup> PP 400, LM 4000 mm, min. dens. 0,67 g/cm <sup>3</sup>
<b>Max. Pressure in bar</b>	16	16	BNA-U301: 2,5 / BNA-U401: 6 BNA-U701: 2,5
<b>Max. Temperature</b>	150 °C	150 °C	BNA-U301: 60 °C / BNA-U401: 140 °C BNA-U701: 80 °C
<b>Options</b>	Alu-Indication Rail, Titanium-Float	Float, Connections	Float, Connections
<b>Approvals</b>	---	---	---

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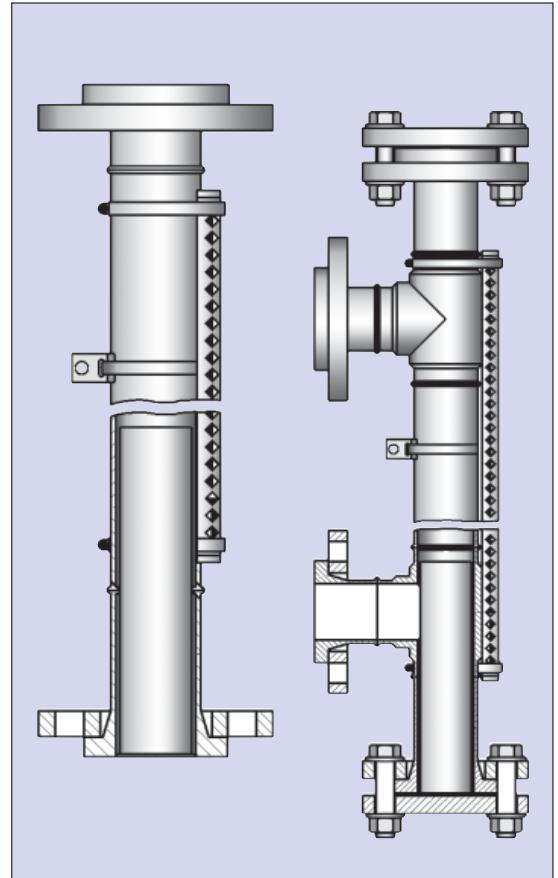
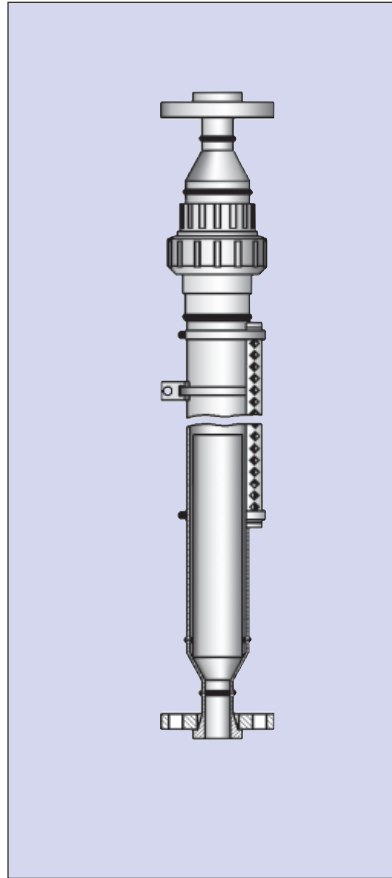
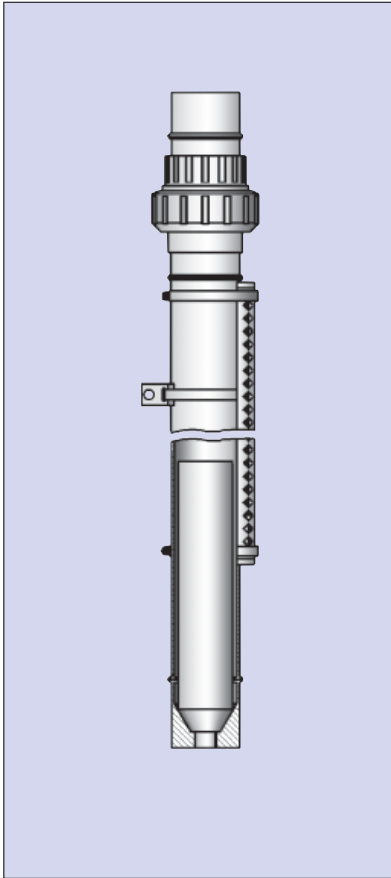
# Overview

BNA-K301 BNA-K401 BNA-K701

BNA-K302.0 BNA-K402.0 BNA-K702.0

BNA-K302.1 /  
-K402.1 / -K702.1

BNA-K303 /  
-K403 / BNA-K703



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Barksdale Bypass Level Indicators

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Type	BNA-K301 BNA-K401 BNA-K701	BNA-K302.0 BNA-K402.0 BNA-K702.0	BNA-K302.1 BNA-K402.1 BNA-K702.1	BNA-K303* BNA-K403* BNA-K703*
Measuring Ranges	LM max. 3000 mm one piece, split sections on request	LM max. 3000 mm one piece, split sections on request	LM max. 3000 mm one piece, split sections on request	LM max. 3000 mm one piece, split sections on request
Indication Rail Assembly	Makrolon (Polycarbonate), with red/white square flags	Makrolon (Polycarbonate), with red/white square flags	Makrolon (Polycarbonate), with red/white square flags	Makrolon (Polycarbonate), with red/white square flags
Process Connection (without Adaptor)	with Thread	with Flanges DN 15 to DN 32	Lap joint flanges with stub ends at top DIN 8063/PN10, top + bottom DN 50 * side mounted DN 15 to DN 50	Lap joint flanges with stub ends at top DIN 8063/PN10, top + bottom DN 50 * side mounted DN 15 to DN 50
Stem	Diameter 63,3 x 3 mm	Diameter 63,3 x 3 mm	Diameter 63 x 3 mm	Diameter 63 x 3 mm
Float	PVC 50/10, min. density 0,54 g/cm <sup>3</sup> PVDF 50/10, min. density 0,66 g/cm <sup>3</sup> PP 50/10, min. density 0,45 g/cm <sup>3</sup>	PVC 50/10, min. density 0,54 g/cm <sup>3</sup> PVDF 50/10, min. density 0,66 g/cm <sup>3</sup> PP 50/10, min. density 0,45 g/cm <sup>3</sup>	PVC 50/10, min. density 0,54 g/cm <sup>3</sup> PVDF 50/10, min. density 0,66 g/cm <sup>3</sup> PP 50/10, min. density 0,45 g/cm <sup>3</sup>	PVC 50/10, min. density 0,54 g/cm <sup>3</sup> PVDF 50/10, min. density 0,66 g/cm <sup>3</sup> PP 50/10, min. density 0,45 g/cm <sup>3</sup>
Max. Pressure in bar	BNA-K301: 2,5 / BNA-K401: 6 BNA-K701: 2,5	BNA-K302.0: 2,5 / BNA-K402.0: 6 BNA-K702.0: 2,5	BNA-K302.1: 2,5 / BNA-K402.1: 6 BNA-K702.1: 2,5	BNA-K303: 2,5 / BNA-K403: 6 BNA-K703: 2,5
Max. Temperature	BNA-K301: 60 °C / BNA-K401: 140 °C BNA-K701: 80 °C	BNA-K302.0: 60 °C / BNA-K402.0: 140 °C BNA-K702.0: 80 °C	BNA-K302.1: 60 °C / BNA-K402.1: 140 °C BNA-K702.1: 80 °C	BNA-K303: 60 °C / BNA-K403: 140 °C BNA-K703: 80 °C
Options	Special Connections	Special Connections	Special Connections	Special Connections
Approvals	---	---	---	---