

Bypass Level Indicators

Catalogue

Bypass Level Indicators



Overview

Control
every move

Barksdale®
CONTROL PRODUCTS
CRANE Barksdale, Inc./Barksdale GmbH
A Subsidiary of Crane Co.

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Introduction

Principle of Operation

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 any where 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 320 °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.

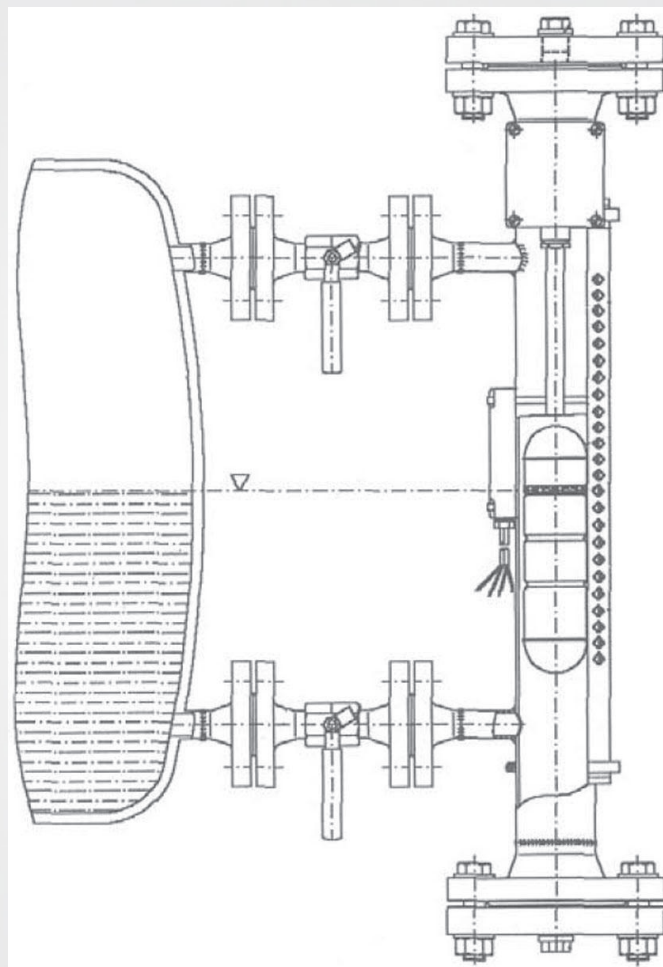
Bypass level tubes with total length > 3 meters can cause higher packing, transport and installation costs than short sections. We therefore offer split versions which can be flanged together on site during installation. Please contact us for details.

Note:

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



Introduction

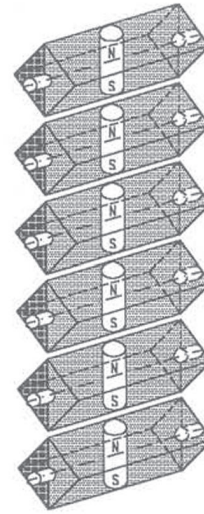
Indication Flags

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.

Indication Rail Assembly

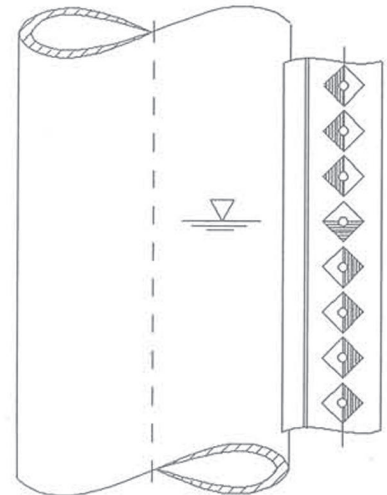
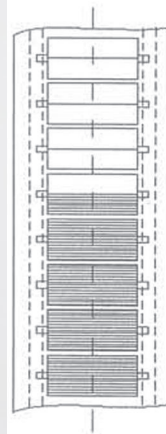
Indication rail assemblies are available in polycarbonate (Makrolon) and anodised aluminium for high Temperatures. The polycarbonate assemblies are 26 mm wide, clear, virtually resistant against UV, chemically polluted atmospheres and im-pacts and offer 180° visibility. The extruded aluminum indication rails are anodised, 30 mm wide and have glass panes to protect the flags. They can be subjected to 320 °C ambient or 320 °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.



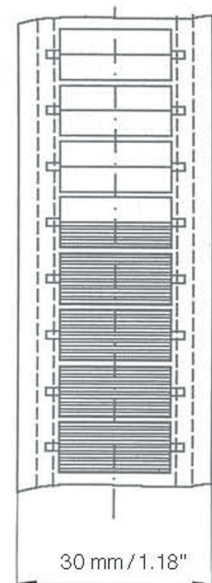
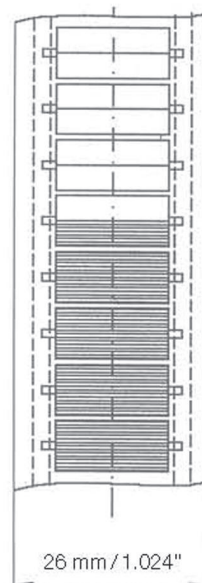
Front view

Side view



Makrolon

Aluminium



Introduction

Float

The float equipped with special magnets can freely rotate in the bypass tube and move up and down. The stainless steel versions in 1.4571 VA can be used up to 150 °C, the titanium versions up to 320 °C. The type VA50/15 and TT50/15 floats provide the opportunity of adjusting the weight of the float precisely to the density (g) of the medium and in this way adjusting the indication exactly to the filling level or interfacial level.

For pressures above 40 bar the float (TT50/20) is equipped with a pressure compensation facility so that the pressure in the float is always equal to the pressure in the bypass chamber.

When the temperature of the fluid in the bypass chamber drops below that of the steam or gas, the condensate formed will be collected by a small tube of $\varnothing 6$ mm in the float and automatically discharged again to the bypass chamber with the next small pressure drop (100 mbar).

Mounting brackets

In the standard version we supply all bypass level indicators with top and bottom process connections and with one or several mounting brackets; for the versions with lateral connections these mounting brackets must be ordered explicitly.

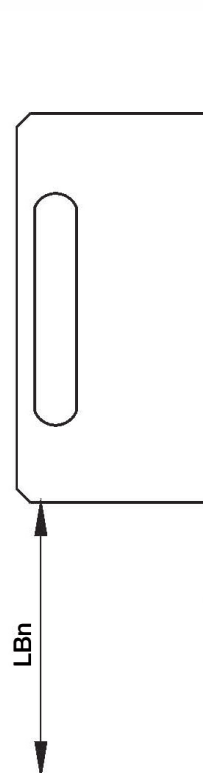
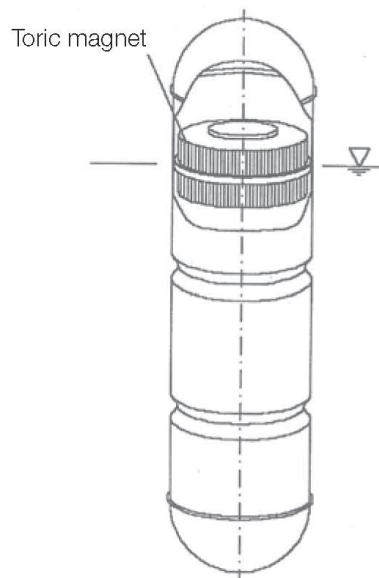
In case of the BNA-S2... series these brackets are attached to the tube with stainless steel clamps and can be adjusted during assembly; all other versions are provided with welded brackets.

When not specified otherwise the dimension LB1 is 300 mm for all bypass level indicators $L0 < 1000$ mm. For total lengths of up to 2000 mm $LB1 = 300$ mm and $LB2 = L0 - 420$ mm. For total lengths < 2000 mm there is a third bracket in the middle between LB1 and LB2. $LB \text{ middle} = (L0 - 20) / 2 - 50$.

When the bypass tube is a split version, there will be a bracket 200 mm below and another one 100 mm above the "split".

All dimensions are measured from the bottom edge of the mounting bracket.

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



Introduction

Protective tubing (Option "PO")

For outdoor applications and applications involving dirt and dust formation we recommend to order a protective tubing for the indication rail.

This transparent shrink tubing from polyolefine features also good resistance to 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; no solvents are required.

Temperature range: -55 °C...+115 °C.

Limit switches

Two different versions of limit switches are available:

GK03, optional in Ex ia

GKHT1 (high-temperature version)

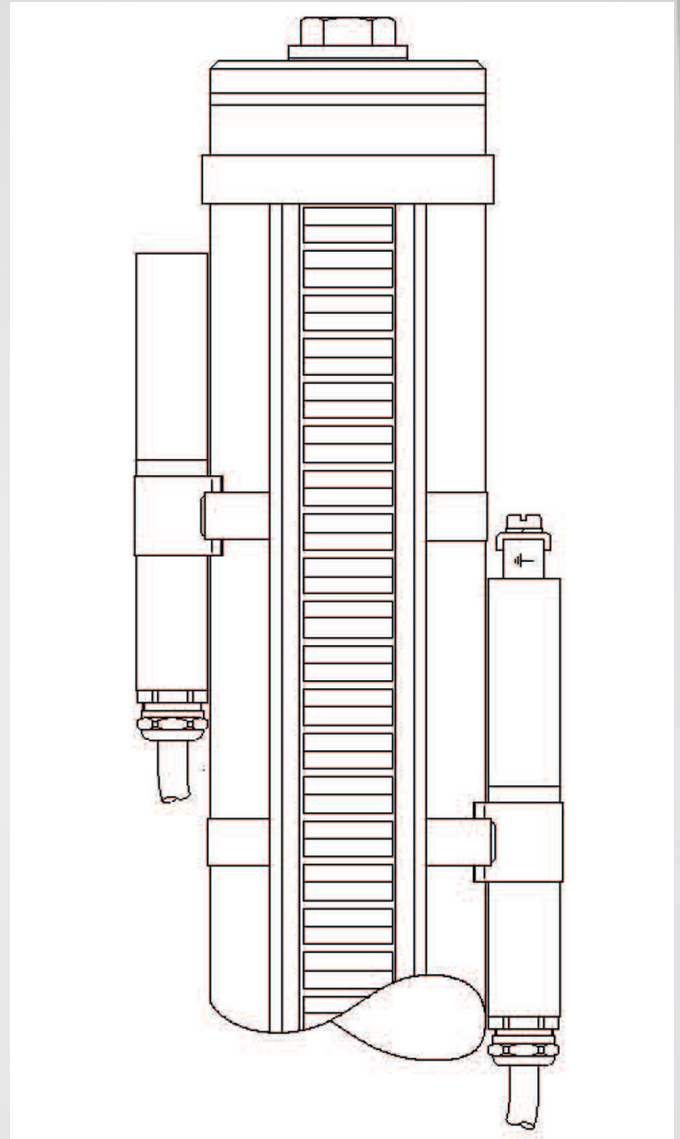
Apart from the HT1 version which is equipped with a micro switch, all other limit switches have bistable reed contacts and can be attached to the tube in any freely selectable position with stainless steel clamps.

The magnet system in the float will switch over the contact whenever the switch is passed. This permits an arbitrary arrangement of many switches on the tube surface without the switches influencing each other.

When the switching power requirement is higher than permitted by the reed contact, suitable protective relays must be used.

When frequently changing process requirements make a permanent contact position difficult to handle we recommend to order our transmitters (XT) with 4...20 mA output and separate signal conditioner

UAS 3-V3 with its four, easily changeable limit values and many additional features.



Introduction

Transmitter

All bypass level indicators are available with a transmitter either as a potentiometer or a two-wire transmitter with 4...20 mA output.

A float with integrated magnet system moves reliably up and down with the fluid. A board equipped with resistors and reed switches is located in the tube of the transmitter. The resistors are connected to form a measuring chain. The reed switches magnetically activated by the float measure a variable d.c. voltage on the measuring chain dependent on the filling level.

XM and XM_i are designed as simple voltage dividers (potentiometers); XM_i is the intrinsically safe version. The XT and XT_i versions are the two-wire versions with 4...20 mA output; XT_i is the intrinsically safe version. For e.g. interface level measurements the output signal may be inverted (20...4 mA).

Safety switching function

The magnetic field of the moving float switches the reed contacts in a 2-3-2 sequence.

When two adjacent reed contacts are closed, the effective electrical switch point is halfway between the two. When the float moves by another 6.4 mm and the third reed contact is closed, the electric indication in the potentiometer moves to the central contact, i.e. by 6.4 mm. The sequence described shows a redundancy integrated in the system - if e.g. one of the reed contacts fails, the indication will not break down, but the level will be properly indicated via the remaining reed contacts.

Accuracy of the measuring sensor

(without transducer)

Depending on requirements and model different screen sizes are available:

R12 - (1/4" = 6.4 mm),

Accuracy approx. 0.3% at 3000 mm - standard

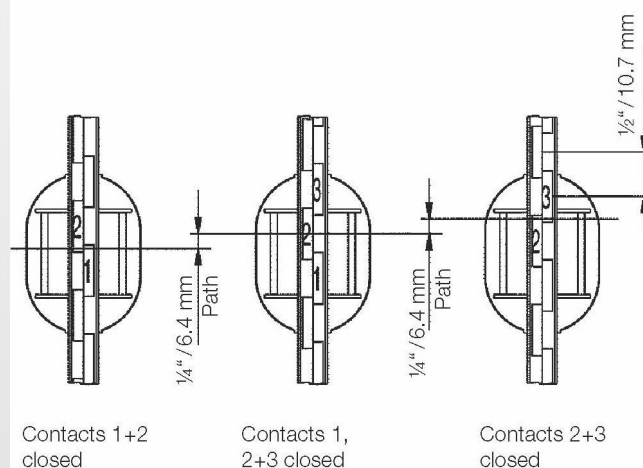
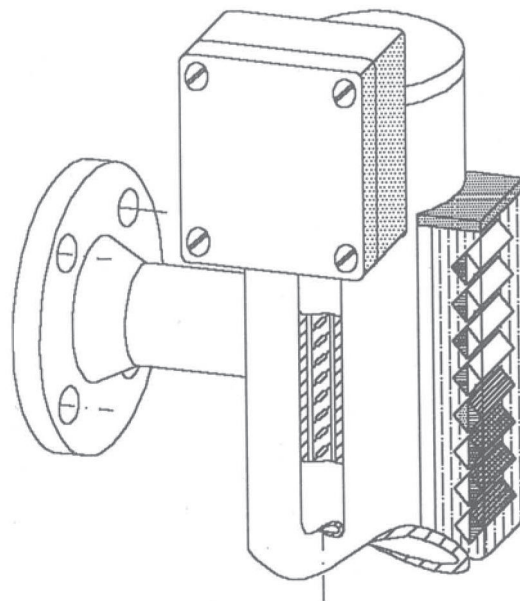
The accuracy of the sensors can be determined by using the following formula according to the measuring length:

$$\pm \frac{\text{Raster : 2}}{\text{Messlänge Lm}} \times 100\%$$

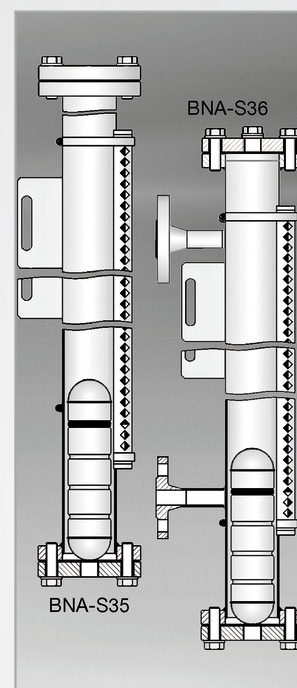
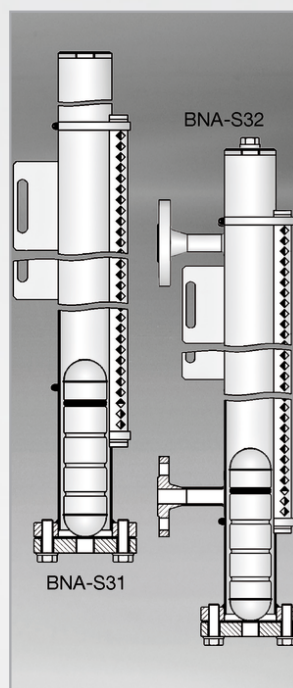
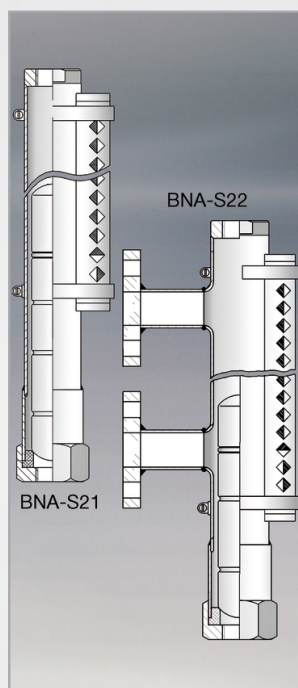
$$\text{e.g. } \pm \frac{(6,4 \text{ mm : 2})}{1000 \text{ mm}} \times 100\% = 0,32\%$$

Special designs

This catalog contains only our standard products and standard options. There are many more versions available. Please contact us - we are happy to assist you!

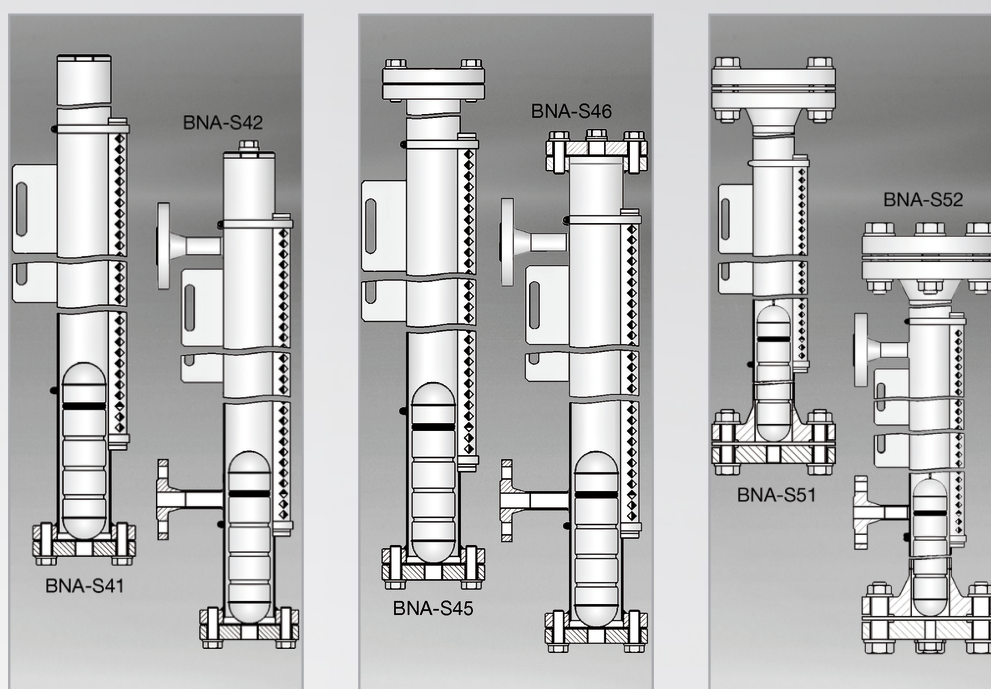


Overview



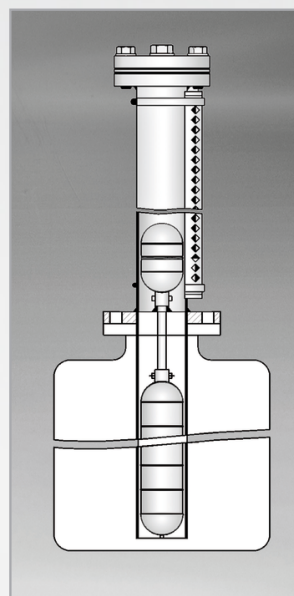
Model	BNA-21 / BNA-22	BNA-31 / BNA-32	BNA-35 / BNA-36
Measuring ranges	LM max. 3000 mm in one piece, max. LM in split sections on request	LM max. 6000 mm in one piece, max. LM in split sections on request	LM max. 6000 mm in one piece, max. LM in split sections on request
Indication rail	Makrolon (polycarbonate) clear, with white/red indication flags	Makrolon (polycarbonate) clear, with white/red indication flags	Makrolon (polycarbonate) clear, with white/red indication flags
Process connection (without adaptor)	BNA-S21: top and bottom G $\frac{1}{2}$ " BNA-S22: side connections	BNA-S31: top and bottom G $\frac{1}{2}$ " BNA-S32: side connections	BNA-S35: top and bottom G $\frac{1}{2}$ " BNA-S36: side connections Service flange: top and bottom
Bypass tube	Stainless steel 1.4571 (SS 316 Ti) PN25, \varnothing 40 x 1 mm	Stainless steel 1.4571 (SS 316 Ti) PN16, \varnothing 60.3 x 2 mm	Stainless steel 1.4571 (SS 316 Ti) PN16, \varnothing 60.3 x 2 mm
Float Standard: min density: max. temperature:	PN16: VA30/02, (SS 316Ti) 1.4571 0.85 g/cm ³ (BN32/100: 0.62 g/cm ³) 150 °C (90°C at max. 10 bar)	PN25: VA50/10 in 1.4571 0.62 g/cm ³ 150 °C	PN25: VA50/10 in 1.4571 0.62 g/cm ³ 150 °C
Max. permissible pressure	16 bar (BN32/100: 10 bar)	16 bar	16 bar
Max. permissible temperature	150 °C media dependent	150 °C media dependent	150 °C media dependent
Options	Titanium/Buna-N float	Aluminium indication rail, titanium float, special connections	Aluminium indication rail, titanium float, special connections
Approvals	Shipbuilding approval	Shipbuilding approval	Shipbuilding approval

Overview



Model	BNA-41 / BNA-42	BNA-45 / BNA-46	BNA-51 / BNA-52
Measuring ranges	LM max. 6000 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 in one piece, max. LM in split sections on request
Indication rail	Makrolon (polycarbonate) clear, with white/red indication flags	Makrolon (polycarbonate) clear, with white/red indication flags	Makrolon (polycarbonate) clear, with white/red indication flags
Process connetion (without adaptor)	BNA-S41: top and bottom G½" BNA-S42: side connections	BNA-S45: top and bottom G½" BNA-S46: side connections Service flange: top and bottom	BNA-S51: top and bottom G½" BNA-S52: side connections
Bypass tube	Stainless steel 1.4571 (SS 316 Ti) PN40, ø 60.3 x 2 mm	Stainless steel 1.4571 (SS 316 Ti) PN40, ø 60.3 x 2 mm	Stainless steel 1.4571 (SS 316 Ti) PN64, ø 60.3 x 2 mm
Float Standard: min density: max. temperature:	PN40: VA50/10 in titanium 0.56 g/cm³ 320 °C	PN40: VA50/10 in titanium 0.56 g/cm³ 320 °C	PN64: TT50/20-VAE (vented) in 1.4571 0.65 g/cm³ 150 °C
Max.permissible pressure	40 bar	40 bar	64 bar
Max. pmissible temperature	320 °C media dependent	320 °C media dependent	150 °C media dependent
Options	Aluminium indication rail, titanium float, special connections	Aluminium indication rail, titanium float, special connections	Aluminium indication rail, titanium float, special connections
Approvals	Shipbuilding approval	Shipbuilding approval	Shipbuilding approval

Overview



Model	BNA-U102
Measuring ranges	LM depends on the buoyancy of the float which in turn depends on the density of the medium (g), max. LM on request
Indication rail	Makrolon (polycarbonate) clear, with white/red indication flags
Process connection (without adaptor)	VA flange DIN 2527 DN65 / PN16 LM max. 4500 mm
Bypass tube	Stainless steel 1.4571 (SS 316 Ti) \varnothing 60.3 x 2 mm
Float	TT50/300 with ABS tube, min. density: 0.6 g/cm ³
Max. permissible pressure	16 bar
Max. permissible temperature	150 °C media dependent
Options	float, connections
Approvals	---

Mini Bypass Level Indicator

BNA-S21/22

The Mini Bypass Level Indicator is the "light" version in the family available with lengths up to 3000 mm, medium temperatures up to 150 °C and pressures up to 16 bar max.

Features

This "light version" is easy to handle, ideal to replace sight glasses and low in cost due to the many OEM applications.

Measuring ranges

LM max. 3000 mm in one piece,
max. LM in split sections on request

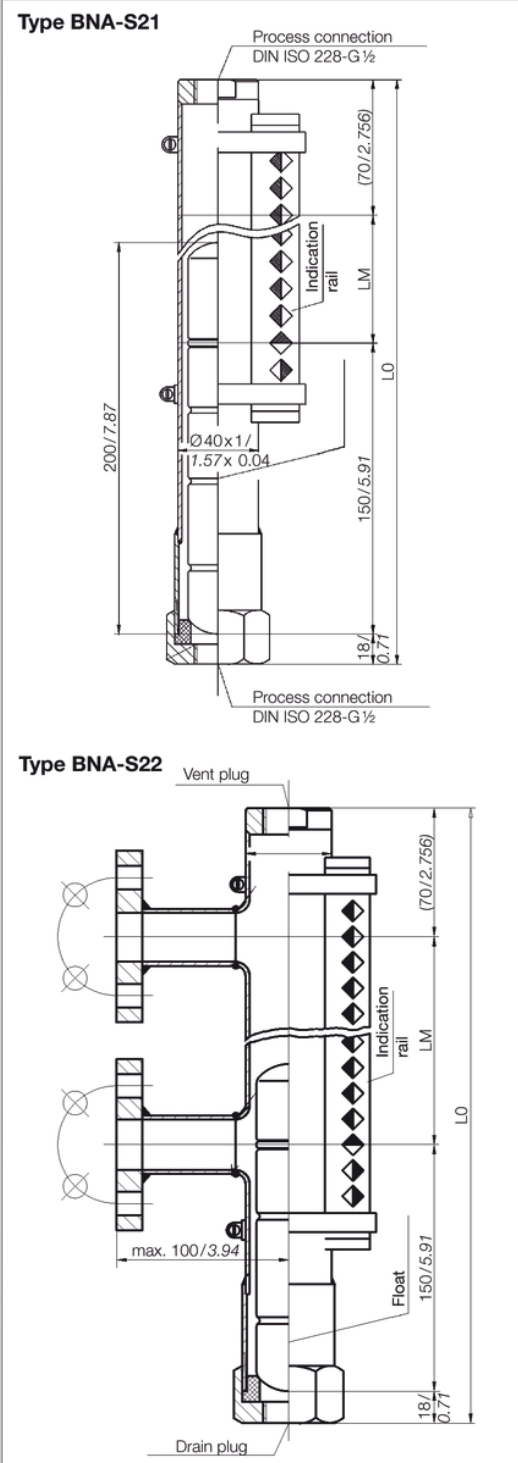
Applications

Tanks in which due to their construction internal measurement is impossible, e.g. ship building, sewage works.

Technical Data

Bypass tube:	Stainless steel 1.4571 (SS 316 Ti) PN 16, Ø = 40 x 1 mm
Float:	
Standard:	VA 30/02: 1.4571 (SS 316Ti), max. 16 bar and 150 °C, min. density: 0.85 g/cm ³
Option:	TT 30/02: in Titanium, PN 25, min. density: 0.85 g/cm ³ max. temperature: 150 °C
	Buna N: BN 32/100, PN 10, min. density: 0.62 g/cm ³ max. temperature: 90 °C
Proof pressure:	1.5 x operating pressure
Process connection:	BNA-S21 top and bottom connections: R 1 1/4" with hex. nut for service, G 1/2 top and bottom with plug
	BNA-S22 side connections: thread R 1/2" or flanges in: DIN DN 15, 20, 25 or ANSI 1/2", 3/4", 1", NPT: 1/2"
Indication rail:	Makrolon (polycarbonate) clear, with white/red indication flags, up to 150 °C media dependent
Accessories:	Limit switches, Transmitters, Scale, Tests / certificates

Dimensions (mm / inch)



Mini Bypass Level Indicator

BNA-S21/22

Order Code

Type:	Version:							
BNA-S21	PN 16, G½ female connections top and bottom, Makrolon indication rail							
BNA-S22	PN 16, side connections, Makrolon indication rail							
Side connections:								
R ½"	Side process connection							
R ½" NPT	Side process connection							
R ¾"	Side process connection							
DN 15	Flange according to DIN 2633 (flange face form C)							
DN 20	Flange according to DIN 2527 (flange face form C)							
DN 25	Flange according to DIN 2527 (identical in construction to DN 20), however tube OD remains 21.3 mm							
½"	Flange according to ANSI B 16,5 150 lbs							
¾"	Flange according to ANSI B 16,5 150 lbs							
1"	Flange according to ANSI B 16,5 150 lbs, however tube OD remains 21.3 mm							
Indicator length [mm] (example):								
2000/1	LM = 2000 mm/in one piece							
3600/2	LM = 3600 mm/in two pieces							
Float:								
VA 30/02	material 1.4571, max. 16 bar/+150 °C, min. density: 0.85 g/cm³							
TT 30/02	material titanium, max. 25 bar/+150 °C, min. density: 0.85 g/cm³							
BN 32/100	material Buna N, max. 10 bar/+90 °C, min. density: 0.62 g/cm³							
Indication rail:								
MA	Makrolon = standard, max. temperature: +150 °C							
Isolation:								
PO	Polyolefine shrink tubing, weather and dust protection for indication rail							
Limit switches:								
Note:	The digit preceding the first letter indicates the desired quantity.							
1GK03	1 limit switch GK03, temperature: -55 °C...+140 °C							
Remote indication:								
XM	Remote indicator, potentiometer							
XMi	As above, Ex i version							
XT	with 4...20 mA							
XTi	with 4...20 mA Ex i							
BNA-S22	- DN 15	- 2600/1	- VA 30/02	- MA	- PO	- 1GK03	- XTi	(Example)

Notes

Bypass Level Indicators

BNA-S31/S32

The Bypass Level Indicator is available with lengths up to 5700 mm, in one piece, medium temperature up to 150 °C max. and pressures up to 16 bar max.

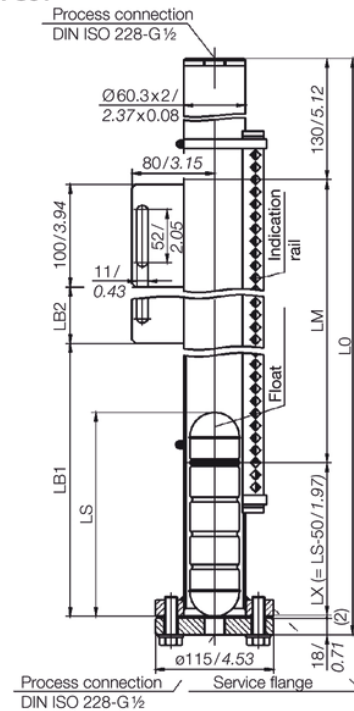
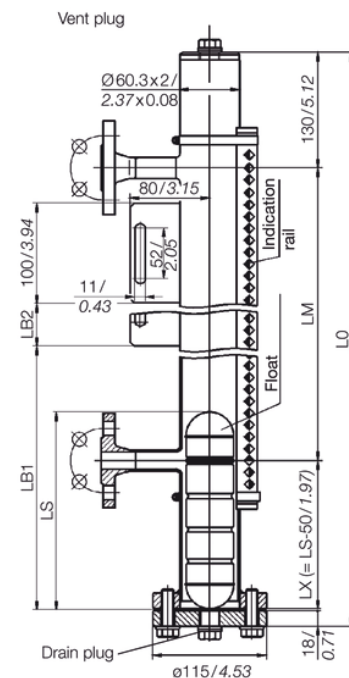
Applications

Tanks in which due to their construction internal measurement is impossible, e.g. ship building, sewage works.

Technical Data

Bypass tube:	Stainless steel 1.4571 (SS 316 Ti) PN 16, Ø = 60.3 x 2 mm
Float:	
Standard:	VA 50/10 in 1.4571, min. density: 0.62 g/cm ³ max. temperature: 150 °C media dependent
Option:	VA 50/15 in 1.4571, with M4 plug min. density: 0.63 g/cm ³ max. temperature: 150 °C media dependent TT 50/10 in Titanium, min. density: 0.56 g/cm ³ max. temperature: 320 °C media dependent TT 50/15 in Titanium, with M4 plug min. density: 0.57 g/cm ³ max. temperature: 320 °C media dependent
Proof pressure:	1.5 x operating pressure
Process connections:	BNA-S31 top and bottom connections: top G½, bottom service flange ½" BNA-S32 side connections: threaded R ½", R ¾", 1", or flanges in: DIN DN 15, 20, 25, 32, 40, 50 or ANSI ½", ¾", 1", 1 ½", 2", NPT: ½", ¾", 1"
Indication rail:	
Standard:	Makrolon (polycarbonate) clear, with white/red indication flags , up to 150 °C media dependent
Option:	Aluminium, black anodized, flags painted silver/red, up to max. 350 °C - AL
Accessories:	Limit switches, Transmitters, Scale, Tests / certificates

Dimensions (mm / inch)

Type BNA-S31

Type BNA-S32


Order Code

Type:	Version:
BNA-S31	PN 16, top and bottom G½ connections, Makrolon indication rail, bottom service flange only
BNA-S32	PN 16, G½ side connection, Makrolon indication rail, bottom service flange only
BNA-S35	PN 16, top and bottom G½ connections, Makrolon indication rail, top and bottom service flange
BNA-S36	PN 16, G½ side connection, Makrolon indication rail, top and bottom service flange
BNA-S41	PN 40, top and bottom G½ connections, Makrolon indication rail, bottom service flange only
BNA-S42	PN 40, G½ side connection, Makrolon indication rail, bottom service flange only
BNA-S45	PN 40, top and bottom G½ connections, Makrolon indication rail, top and bottom service flange
BNA-S46	PN 40, G½ side connection, Makrolon indication rail, top and bottom service flange

Side connections:

R ½" or R ½" NPT	Process connection
R ¾" or R ¾" NPT	Process connection
R 1" or R 1" NPT	Process connection
DN 15	Flange PN16/DIN 2633 or PN 40/DIN 2635
DN 20	Flange PN16/DIN 2633 or PN 40/DIN 2635
DN 25	Flange PN16/DIN 2633 or PN 40/DIN 2635
DN 32	Flange PN16/DIN 2633 or PN 40/DIN 2635
DN 40	Flange, as above, however with conical reducer, extended from DN 32 to DN 40
DN 50	Flange, as above, however with conical reducer, extended from DN 32 to DN 50
½"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5
¾"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5
1"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5
1 ¼"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5
1 ½"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5, however with conical reducer, extended from DN 32 to 1 ½"
2"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5, however with conical reducer, extended from DN 32 to 2"

Indicator length [mm] (example):

2000/1	LM = 2000 mm/in one piece
6000/2	LM = 6000 mm/in two pieces

Float:

VA 50/10	material 1.4571, max. 25 bar/+150 °C, min. density: 0.62 g/cm³
VA 50/15	material 1.4571, as above, however with plug M4, density: 0.63 g/cm³
TT 50/10	material titanium, max. 40 bar/+320 °C, min. density: 0.56 g/cm³
TT 50/15	material titanium, as above, however with plug M4, density: 0.57 g/cm³

Indication rail:

MA	Makrolon = standard, max. temperature: +150 °C
AL	Aluminium painted, max. temperature: +350 °C

Isolation:

PO	Poliethylene shrink tubing, weather and dust protection for indication rail
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Limit switches:

Note: The digit preceding the first letter indicates the desired quantity.

1GK03	1 limit switch GK03, temperature: -55 °C...+140 °C
2GKHT1	2 high-temperature limit switches, temperature: -55 °C...+350 °C

Remote indication:

XM	Remote indicator, potentiometer
XM _i	As above, Ex i version
XT	with 4...20 mA
XT _i	with 4...20 mA Ex i

Scale:

SK	Scale*
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BNA-S32 - DN 25 - 2600/1 - VA 50/15 - MA - PO - 2GK03 - XT_i - SK (Example)

*Detailed specification and description required

Bypass Level Indicators

BNA-S35-S36

The Bypass Level Indicator is available with lengths up to 5700 mm, in one piece, medium temperature up to 150 °C max. and pressures up to 16 bar max.

Applications

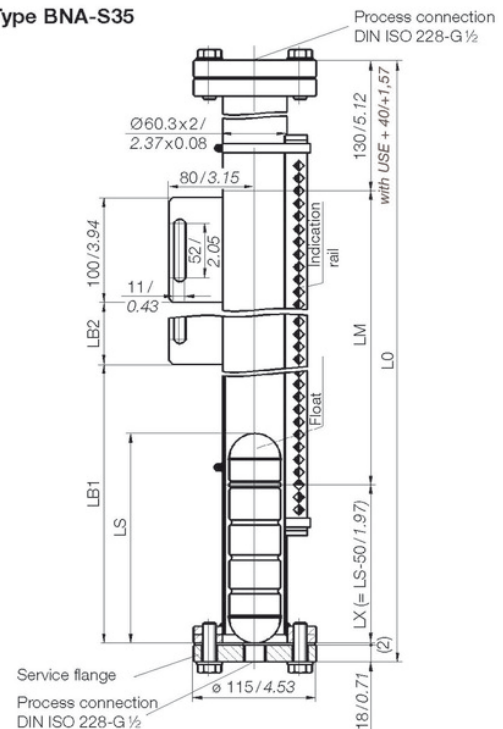
Tanks in which due to their construction internal measurement is impossible, e.g. ship building, sewage works.

Technical Data

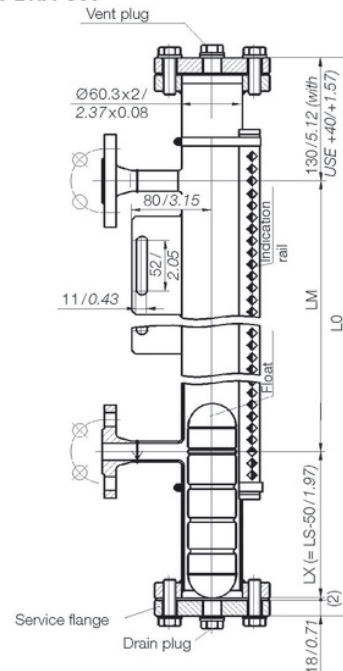
Bypass tube:	Stainless steel 1.4571 (SS 316 Ti) PN 16, Ø = 60.3 x 2 mm
Float:	
Standard:	VA 50/10 in 1.4571, min. density: 0.62 g/cm ³ max. temperature: 150 °C media dependent
Option:	VA 50/15 in 1.4571, with M4 plug min. density: 0.63 g/cm ³ max. temperature: 150 °C media dependent TT 50/10 in Titanium, min. density: 0.56 g/cm ³ max. temperature: 320 °C media dependent TT 50/15 in Titanium, with M4 plug min. density: 0.57 g/cm ³ , max. temperature: 320 °C media dependent
Proof pressure:	1.5 x operating pressure
Process connections:	BNA-S35 top and bottom connections: top G½, bottom service flange ½"
	BNA-S36 side connections: threaded R ½", R ¾", 1", or flanges in: DIN DN 15, 20, 25, 32, 40, 50 or ANSI ½", ¾", 1", 1 ½", 2", NPT: ½", ¾", 1"
Option:	Instead of G½, top and bottom ½" NPT or flange connections with weld neck flanges.
Indication rail:	
Standard:	Makrolon (polycarbonate) clear, with white/red indication flags , up to 150 °C media dependent
Option:	Aluminium, black anodized, flags painted silver/red, up to max. 350 °C - AL
Accessories:	Limit switches, Transmitters, Scale, Tests / certificates

Dimensions (mm / inch)

Type BNA-S35



Type BNA-S36



Order Code

Type:	Version:
BNA-S31	PN 16, top and bottom G½ connections, Makrolon indication rail, bottom service flange only
BNA-S32	PN 16, G½ side connection, Makrolon indication rail, bottom service flange only
BNA-S35	PN 16, top and bottom G½ connections, Makrolon indication rail, top and bottom service flange
BNA-S36	PN 16, G½ side connection, Makrolon indication rail, top and bottom service flange
BNA-S41	PN 40, top and bottom G½ connections, Makrolon indication rail, bottom service flange only
BNA-S42	PN 40, G½ side connection, Makrolon indication rail, bottom service flange only
BNA-S45	PN 40, top and bottom G½ connections, Makrolon indication rail, top and bottom service flange
BNA-S46	PN 40, G½ side connection, Makrolon indication rail, top and bottom service flange

Side connections:

R ½" or R ½" NPT	Process connection
R ¾" or R ¾" NPT	Process connection
R 1" or R 1" NPT	Process connection
DN 15	Flange PN16/DIN 2633 or PN 40/DIN 2635
DN 20	Flange PN16/DIN 2633 or PN 40/DIN 2635
DN 25	Flange PN16/DIN 2633 or PN 40/DIN 2635
DN 32	Flange PN16/DIN 2633 or PN 40/DIN 2635
DN 40	Flange, as above, however with conical reducer, extended from DN 32 to DN 40
DN 50	Flange, as above, however with conical reducer, extended from DN 32 to DN 50
½"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5
¾"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5
1"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5
1 ¼"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5
1 ½"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5, however with conical reducer, extended from DN 32 to 1 ½"
2"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5, however with conical reducer, extended from DN 32 to 2"

Indicator length [mm] (example):

2000/1	LM = 2000 mm/in one piece
6000/2	LM = 6000 mm/in two pieces

Float:

VA 50/10	material 1.4571, max. 25 bar/+150 °C, min. density: 0.62 g/cm³
VA 50/15	material 1.4571, as above, however with plug M4, density: 0.63 g/cm³
TT 50/10	material titanium, max. 40 bar/+320 °C, min. density: 0.56 g/cm³
TT 50/15	material titanium, as above, however with plug M4, density: 0.57 g/cm³

Indication rail:

MA	Makrolon = standard, max. temperature: +150 °C
AL	Aluminium painted, max. temperature: +350 °C

Isolation:

PO	Poliethylene shrink tubing, weather and dust protection for indication rail
----	---

Limit switches:

Note: The digit preceding the first letter indicates the desired quantity.

1GK03	1 limit switch GK03, temperature: -55 °C...+140 °C
2GKHT1	2 high-temperature limit switches, temperature: -55 °C...+350 °C

Remote indication:

XM	Remote indicator, potentiometer
XM _i	As above, Ex i version
XT	with 4...20 mA
XT _i	with 4...20 mA Ex i

Scale:

SK	Scale*
----	--------

BNA-S32 - DN 25 - 2600/1 - VA 50/15 - MA - PO - 2GK03 - XT_i - SK (Example)

*Detailed specification and description required

Bypass Level Indicators

BNA-S41/S42

The Bypass Level Indicator is available with lengths up to 5700 mm, in one piece, medium temperature up to 320 °C max. and pressures up to 40 bar max.

Applications

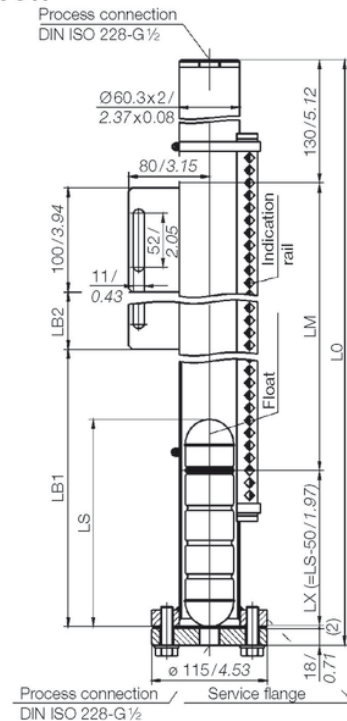
Tanks in which due to their construction internal measurement is impossible, e.g. ship building, sewage works.

Technical Data

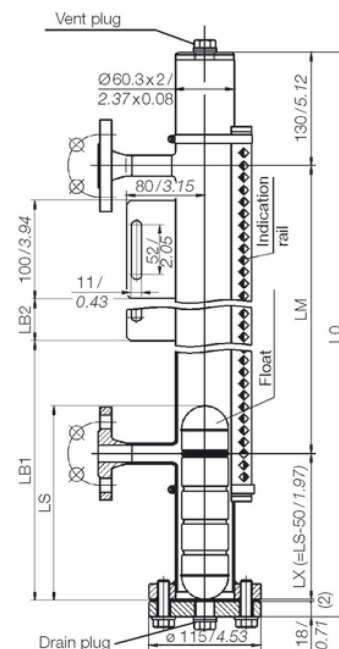
Bypass tube:	Stainless steel 1.4571 (SS 316 Ti) PN 40, Ø = 60.3 x 2 mm
Float:	
Standard:	TT 50/10 in Titanium, min. density: 0.56 g/cm ³ max. temperature: 320 °C media dependent
Option:	TT 50/15 in titanium, with M4 plug min. density: 0.57 g/cm ³ max. temperature: 320 °C media dependent
Proof pressure:	1.5 x operating pressure
Process connections:	BNA-S41 top and bottom connections: top G½, bottom service flange ½"
	BNA-S42 side connections: threaded R ½", R ¾", 1", or flanges in: DIN DN 15, 20, 25, 32, 40, 50 or ANSI ½", ¾", 1", 1 ½", 2", NPT: ½", ¾", 1"
Option:	Instead of G½, top and bottom ½" NPT or flange connections with weld neck flanges.
Indication rail:	
Standard:	Makrolon (polycarbonate) clear, with white/red indication flags , up to 150 °C media dependent
Option:	Aluminium, black anodized, flags painted silver/red, up to max. 350 °C - AL
Accessories:	Limit switches, Transmitters, Scale, Tests / certificates

Dimensions (mm / inch)

Type BNA-S41



Type BNA-S42



Order Code

Type:	Version:
BNA-S31	PN 16, top and bottom G½ connections, Makrolon indication rail, bottom service flange only
BNA-S32	PN 16, G½ side connection, Makrolon indication rail, bottom service flange only
BNA-S35	PN 16, top and bottom G½ connections, Makrolon indication rail, top and bottom service flange
BNA-S36	PN 16, G½ side connection, Makrolon indication rail, top and bottom service flange
BNA-S41	PN 40, top and bottom G½ connections, Makrolon indication rail, bottom service flange only
BNA-S42	PN 40, G½ side connection, Makrolon indication rail, bottom service flange only
BNA-S45	PN 40, top and bottom G½ connections, Makrolon indication rail, top and bottom service flange
BNA-S46	PN 40, G½ side connection, Makrolon indication rail, top and bottom service flange

Side connections:

R ½" or R ½" NPT	Process connection
R ¾" or R ¾" NPT	Process connection
R 1" or R 1" NPT	Process connection
DN 15	Flange PN16/DIN 2633 or PN 40/DIN 2635
DN 20	Flange PN16/DIN 2633 or PN 40/DIN 2635
DN 25	Flange PN16/DIN 2633 or PN 40/DIN 2635
DN 32	Flange PN16/DIN 2633 or PN 40/DIN 2635
DN 40	Flange, as above, however with conical reducer, extended from DN 32 to DN 40
DN 50	Flange, as above, however with conical reducer, extended from DN 32 to DN 50
½"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5
¾"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5
1"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5
1 ¼"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5
1 ½"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5, however with conical reducer, extended from DN 32 to 1 ½"
2"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5, however with conical reducer, extended from DN 32 to 2"

Indicator length [mm] (example):

2000/1	LM = 2000 mm/in one piece
6000/2	LM = 6000 mm/in two pieces

Float:

VA 50/10	material 1.4571, max. 25 bar/+150 °C, min. density: 0.62 g/cm³
VA 50/15	material 1.4571, as above, however with plug M4, density: 0.63 g/cm³
TT 50/10	material titanium, max. 40 bar/+320 °C, min. density: 0.56 g/cm³
TT 50/15	material titanium, as above, however with plug M4, density: 0.57 g/cm³

Indication rail:

MA	Makrolon = standard, max. temperature: +150 °C
AL	Aluminium painted, max. temperature: +350 °C

Isolation:

PO	Poliethylene shrink tubing, weather and dust protection for indication rail
----	---

Limit switches:

Note: The digit preceding the first letter indicates the desired quantity.

1GK03	1 limit switch GK03, temperature: -55 °C...+140 °C
2GKHT1	2 high-temperature limit switches, temperature: -55 °C...+350 °C

Remote indication:

XM	Remote indicator, potentiometer
XM _i	As above, Ex i version
XT	with 4...20 mA
XT _i	with 4...20 mA Ex i

Scale:

SK	Scale*
----	--------

BNA-S32 - DN 25 - 2600/1 - VA 50/15 - MA - PO - 2GK03 - XT_i - SK (Example)

*Detailed specification and description required

Bypass Level Indicators

BNA-S45/S46

The Bypass Level Indicator is available with lengths up to 5700 mm, in one piece, medium temperature up to 320 °C max. and pressures up to 40 bar max.

Applications

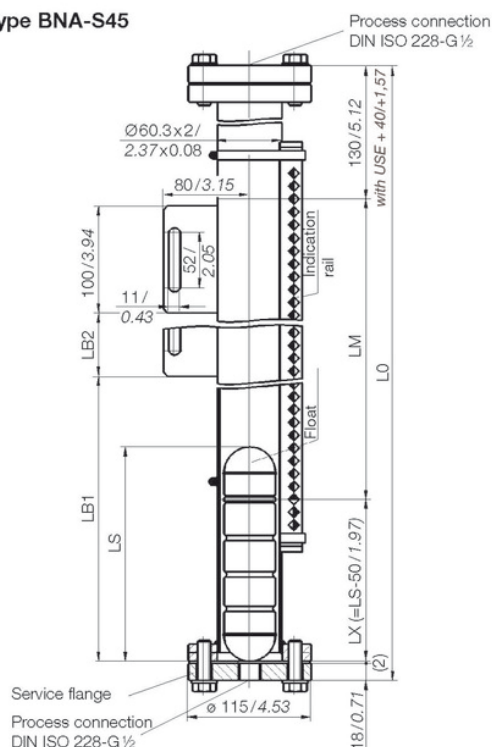
Tanks in which due to their construction internal measurement is impossible, e.g. ship building, sewage works.

Technical Data

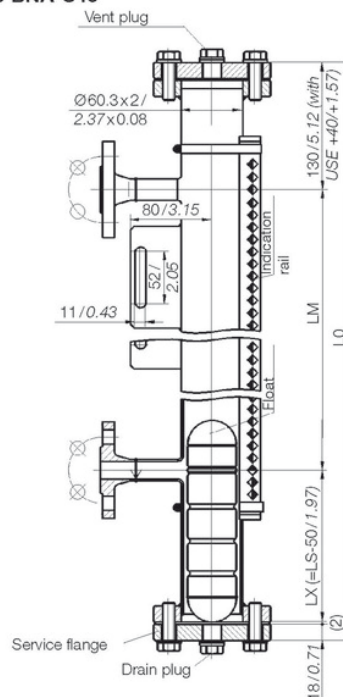
Bypass tube:	Stainless steel 1.4571 (SS 316 Ti) PN 40, Ø = 60.3 x 2 mm
Float:	
Standard:	TT 50/10 in Titanium, min. density: 0.56 g/cm ³ max. temperature: 320 °C media dependent
Option:	TT 50/15 in Titanium, with M4 plugmin. density: 0.57 g/cm ³ , max. temperature: 320 °C media dependent
Proof pressure:	1.5 x operating pressure
Process connections:	BNA-S45 top and bottom connections: top G½, bottom service flange ½"
	BNA-S46 side connections: threaded R ½", R ¾", 1", or flanges in: DIN DN 15, 20, 25, 32, 40, 50 or ANSI ½", ¾", 1", 1 ½", 2", NPT: ½", ¾", 1"
Option:	Instead of G½, top and bottom ½ " NPT or flange connections with weld neck flanges.
Indication rail:	
Standard:	Makrolon (polycarbonate) clear, with white/red indication flags , up to 150 °C media dependent
Option:	Aluminium, black anodized, flags painted silver/red, up to max. 350 °C - AL
Accessories:	Limit switches, Transmitters, Scale, Isolation, Tests / certificates

Dimensions (mm / inch)

Type BNA-S45



Type BNA-S46



Order Code

Type:	Version:
BNA-S31	PN 16, top and bottom G½ connections, Makrolon indication rail, bottom service flange only
BNA-S32	PN 16, G½ side connection, Makrolon indication rail, bottom service flange only
BNA-S35	PN 16, top and bottom G½ connections, Makrolon indication rail, top and bottom service flange
BNA-S36	PN 16, G½ side connection, Makrolon indication rail, top and bottom service flange
BNA-S41	PN 40, top and bottom G½ connections, Makrolon indication rail, bottom service flange only
BNA-S42	PN 40, G½ side connection, Makrolon indication rail, bottom service flange only
BNA-S45	PN 40, top and bottom G½ connections, Makrolon indication rail, top and bottom service flange
BNA-S46	PN 40, G½ side connection, Makrolon indication rail, top and bottom service flange

Side connections:

R ½" or R ½" NPT	Process connection
R ¾" or R ¾" NPT	Process connection
R 1" or R 1" NPT	Process connection
DN 15	Flange PN16/DIN 2633 or PN 40/DIN 2635
DN 20	Flange PN16/DIN 2633 or PN 40/DIN 2635
DN 25	Flange PN16/DIN 2633 or PN 40/DIN 2635
DN 32	Flange PN16/DIN 2633 or PN 40/DIN 2635
DN 40	Flange, as above, however with conical reducer, extended from DN 32 to DN 40
DN 50	Flange, as above, however with conical reducer, extended from DN 32 to DN 50
½"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5
¾"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5
1"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5
1 ¼"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5
1 ½"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5, however with conical reducer, extended from DN 32 to 1 ½"
2"	Flange 150 lbs, 300 lbs, 600 lbs ANSI B 16,5, however with conical reducer, extended from DN 32 to 2"

Indicator length [mm] (example):

2000/1	LM = 2000 mm/in one piece
6000/2	LM = 6000 mm/in two pieces

Float:

VA 50/10	material 1.4571, max. 25 bar/+150 °C, min. density: 0.62 g/cm³
VA 50/15	material 1.4571, as above, however with plug M4, density: 0.63 g/cm³
TT 50/10	material titanium, max. 40 bar/+320 °C, min. density: 0.56 g/cm³
TT 50/15	material titanium, as above, however with plug M4, density: 0.57 g/cm³

Indication rail:

MA	Makrolon = standard, max. temperature: +150 °C
AL	Aluminium painted, max. temperature: +350 °C

Isolation:

PO	Poliethylene shrink tubing, weather and dust protection for indication rail
----	---

Limit switches:

Note: The digit preceding the first letter indicates the desired quantity.

1GK03	1 limit switch GK03, temperature: -55 °C...+140 °C
2GKHT1	2 high-temperature limit switches, temperature: -55 °C...+350 °C

Remote indication:

XM	Remote indicator, potentiometer
XM _i	As above, Ex i version
XT	with 4...20 mA
XT _i	with 4...20 mA Ex i

Scale:

SK	Scale*
----	--------

BNA-S32 - DN 25 - 2600/1 - VA 50/15 - MA - PO - 2GK03 - XT_i - SK (Example)

*Detailed specification and description required

Bypass Level Indicators

BNA-S51-S52

The Bypass Level Indicator is available with lengths up to 5700 mm, in one piece, medium temperature up to 150 °C max. and pressures up to 64 bar max.

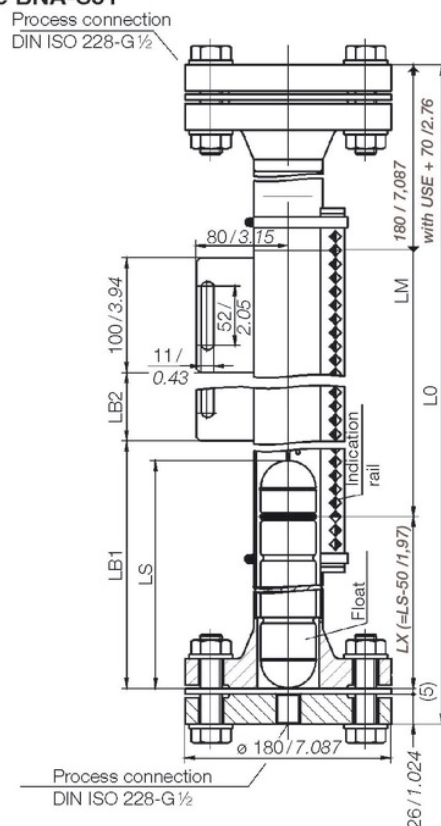
Applications

Tanks in which due to their construction internal measurement is impossible, e.g. ship building, sewage works.

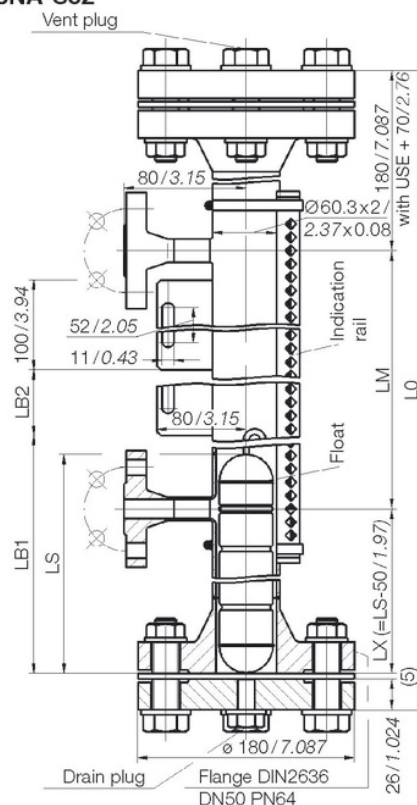
Technical Data

Bypass tube:	Stainless steel 1.4571 (SS 316 Ti) PN 64, Ø = 60.3 x 2 mm
Float: Standard:	TT 50/20-VAE (vented) in 1.4571, min. density: 0.65 g/cm ³ max. temperature: 320 °C media dependent
Proof pressure:	1.5 x operating pressure
Process connections:	<p>BNA-S51 top and bottom connection with weld neck flanges DIN 2636 and blind flanges DN 50 PN 64: G½</p> <p>BNA-S52 side connections: Flanges in: DIN DN 15, 25, 32, 40 or 50, or ANSI ½", ¾", 1", 1 ½", 2", NPT: ½", ¾", 1"</p>
Option:	Instead of G½, top and bottom ½" NPT or flange connections with weld neck flanges
Indication rail: Standard:	Makrolon (polycarbonate) clear, with white/red indication flags, up to 150 °C media dependent
Option:	Aluminium, black anodized, flags painted silver/red, up to max. 350 °C - AL
Accessories:	Limit switches, Transmitters, Scale, Tests / certificates

Type BNA-S51



Type BNA-S52



Order Code

Type:	Version:								
BNA-S51	PN 64, top and bottom G½ connections in DIN252, DN 50 blind flange top and bottom, Makrolon indication rail								
BNA-S52	PN 64, G½ side connections in DIN252, DN 50 blind flange top and bottom, Makrolon indication rail								
Side connections:									
DN 15	Flange DIN 2637 (up to DN 40 PN 64 = PN 100, from DN 50 DIN 2636)								
DN 20	Flange DIN 2637								
DN 25	Flange DIN 2637								
DN 32	Flange DIN 2637								
DN 40	Flange, as above, however with conical reducer, extended from DN 32 to DN 40								
DN 50	Flange, as above, however with conical reducer, extended from DN 32 to DN 50								
½"	Flange 150 lbs, 300 lbs, 600 lbs, 900 lbs ANSI B 16,5								
¾"	Flange 150 lbs, 300 lbs, 600 lbs, 900 lbs ANSI B 16,5								
1"	Flange 150 lbs, 300 lbs, 600 lbs, 900 lbs ANSI B 16,5								
1 ¼"	Flange 150 lbs, 300 lbs, 600 lbs, 900 lbs ANSI B 16,5								
1 ½"	Flange 150 lbs, 300 lbs, 600 lbs, 900 lbs ANSI B 16,5, however with conical reducer, extended from DN 32 to DN 40								
2"	Flange 150 lbs, 300 lbs, 600 lbs, 900 lbs ANSI B 16,5, however with conical reducer, extended from DN 32 to DN 50								
Indicator length [mm] (example):									
2000/1	LM = 2000 mm/in one piece								
6600/2	LM = 6600 mm/in two pieces								
Float:									
VA 50/20	material 1.4571, max. 25 bar/+150 °C, min. density: 0.65 g/cm³								
TT 50/20	material titanium, max. 40 bar/+320 °C, min. density: 0.60 g/cm³								
Indication rail:									
MA	Makrolon = standard, max. temperature: +150 °C								
AL	Aluminium painted, max. temperature: +350 °C								
Isolation:									
PO	Polyolefine shrink tubing, weather and dust protection for indication rail								
Limit switches:									
Note:	The digit preceding the first letter indicates the desired quantity.								
1GK03	1 limit switch GK03, temperature: -55 °C...+140 °C								
2GKHT1	2 high-temperature limit switches, temperature: -55 °C...+350 °C								
Remote indication:									
XM	Remote indicator, potentiometer								
XM _i	As above, Ex i version								
XT	with 4...20 mA								
XT _i	with 4...20 mA Ex i								
Scale:									
SK	Scale*								
BNA-S52	- DN 25	- 2600/1	- VA 50/20	- MA	- PO	- 2GK03	- Xti	- SK	(Example)

*Detailed specification and description required.

*Detailed specification and description required.

Bypass Level Indicators

BNA-U102

The measuring length of the bypass level indicator depends on the buoyancy of the float, which in turn depends on the density of the medium, max. LM on request, two parts, medium temperature up to 150 °C max. and pressures up to 16 bar max.

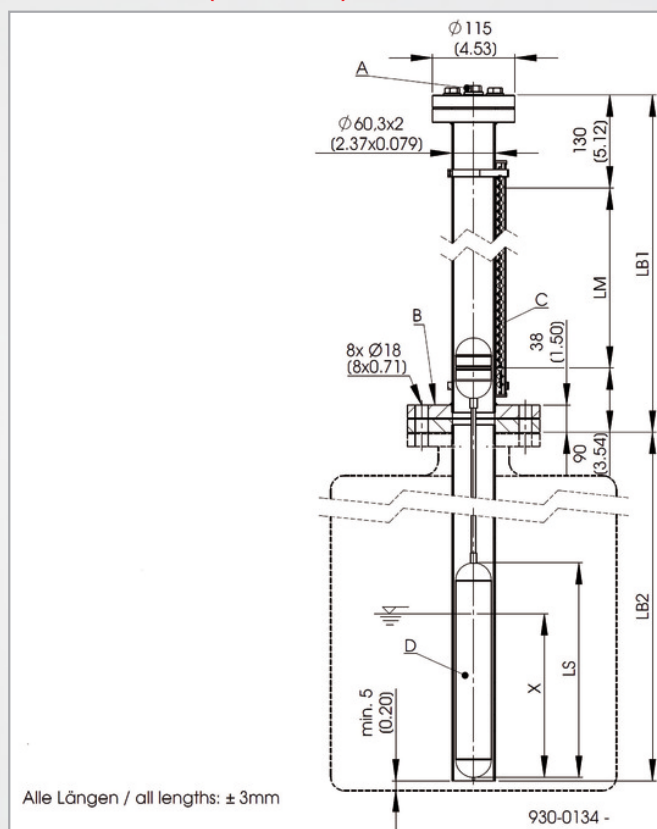
Applications

Tanks in which due to their construction internal measurement is impossible, e.g. ship building, sewage works.
For top tank mounting

Technical Data

Bypass tube:	Stainless steel 1.4571 (SS 316 Ti) PN 16, Ø = 60.3 x 2 mm
Float:	
Standard:	TT 50-300, LM max. 4500 / 1.0 g/cm ³
Option:	Further floats on request
Proof pressure:	1.5 x operating pressure
Process connections:	
Standard:	With VA flange DIN 2527 DN 65 PN 16
Option:	Special (larger) flange connections available
Indication rail:	Makrolon (polycarbonate) clear, with white/red indication flags, up to 150 °C media dependent
Accessories:	Limit switches, Transmitters, Electronic transmitters, Tests / certificates
Order data:	
Type:	BNA-U102
Medium:	Density of medium [g/cm ³]
Measuring length:	LM [mm]
Installation data:	Distance from tube end to bottom of flange (LB2). Further details or drawings with planned installation geometry are helpful.
Options and accessories:	Shipyards version BNA-S-U102

Dimensions (mm / inch)



Description

A	vent plug G1/2"
B	blind flange EN 1092-1 Typ05 DN65 / PN16 form A including flange gasket (1 pcs)
C	indication rail
D	float
X	immersion depth depends on the density of the medium
LM	measuring length
LS	float length (300 mm [11.81 inch] standard)
LB1	length above tank
LB2	length inside tank

Notes

Transmitters for bypass level indicators

Features / Description

The measuring chain is installed in a tube and attached to the float chamber with stainless steel clamps. This design enables retrofitting to existing systems.

An electrical connection box made of aluminium with series terminals permits direct cable connection.

The maximum deviation is ± 1 mm and due to the screen of 6.4 mm (R12) there are two switching cycles per indication flag.

Two versions are available:

XM - Standard version

XMi - Ex i for intrinsically safe applications

XM with a measuring chain, total resistance 100 kOhm max.

XMi like XM, but with external ground screws and blue cable gland.

Technical Data

Tubing:	1.4571, $\varnothing 13$ mm
Connection box:	KX4, KLS, aluminium, 75x80x50 mm, system of protection IP65, with screw terminals
Measuring length (LM):	Normally the same length as the indication rail. Please state LM in spare part orders.
Total length (L0):	
XM:	Measuring length (LM) + 158 mm, however LM + 175 mm for the high-temperature version up to 150 °C medium temperature
XMi:	is measuring length (LM) + 158 mm
Temperature range:	
XM:	-10 °C...+90 °C, -50 °C...+150 °C for high-temperature version
XMi:	T1...T4 up to 100 °C, T5 up to 65 °C, T6 up to 50 °C
Note concerning XMi:	Intrinsically safe is only applicable with an approved current circuit with a maximum open circuit voltage (Ui) of 24 V. Total length (L0) 6000 mm max. according to approval.

Order Code

Order number example for XM:

XM - HT - R12 - LM2500

Measuring length LM in mm

Screen R12

HT high-temperature version (option)

Type: XM = KX4

Order number example for XMi :

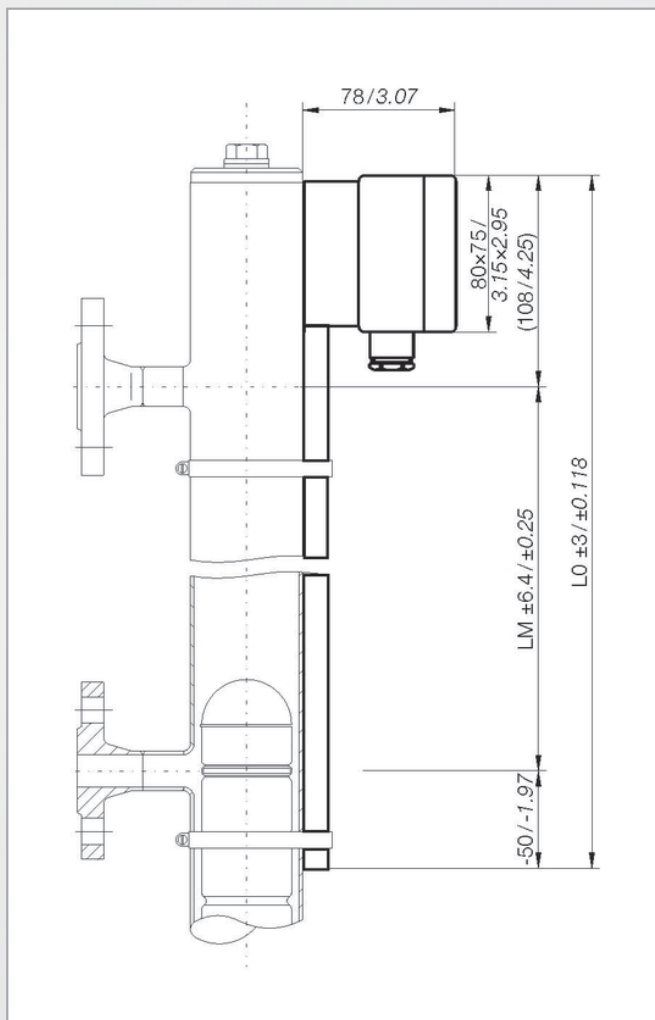
XMi - R12 - LM2500

Measuring length LM in mm

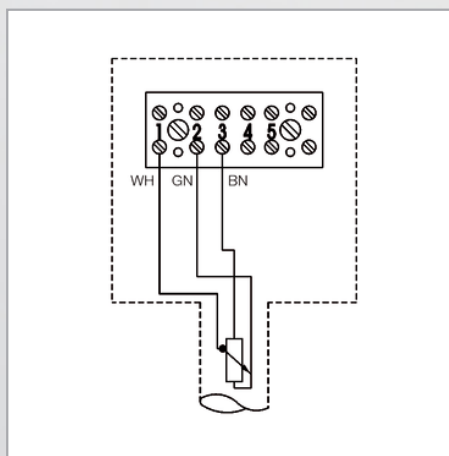
Screen R12

Type: XMi = KX4

Dimensions (mm / inch)



Electronic connections KX4



Notes

Transmitters for bypass level indicators

Features / Description

The measuring principle and construction of this series are identical to those of the XM series, however the XT series is equipped with a 2-wire transmitter module (instead of simple terminals in the KLS terminal box). This transmitter module (transducer) converts the resistance into a 4...20 mA output signal. For e.g. interface measurement the output signal can also be inverted (20...4 mA). A version with linearisation of the tank content graph is available as an option.

Two versions are available:

XT - Standard version

XTi - Ex i for intrinsically safe applications

Transmitter XT with type MU3L, circuit monitoring with selective fault recognition and selective output control (Namur NE43) 3.5 mA or 23 mA, reversed polarity protection.

Transmitter XTi with type MUEX, intrinsically safe transmitter module with ATEX approval Ex ia IIC T1...T6, reversed polarity protection and fault recognition with selective output control (Namur NE 43) 3.5 mA or 23 mA.

Technical Data

Power supply:	
XT:	8...35 VDC, max. 10% residual ripple
Xti:	8...24 VDC, max. 10% residual ripple
Output:	4...20 mA, reversed polarity protected
Load:	max. 700 Ohm at 24 V
Delay:	0.33 sec
Accuracy:	max. $\pm 0.2\%$ f. s.
Temperature range:	
XT:	-40 °C... +85 °C -50 °C...+150 °C for high-temperature version
XTi:	T1...T4: -40 °C...+85 °C T5 and T6: -40 °C...+60 °C
Note	The configuration of the selective output control for fault recognition is ≤ 3.5 mA unless expressly specified otherwise in the order.

Order Code

Order number example for XT:

XT	-	HT	-	R12	-	LM2500
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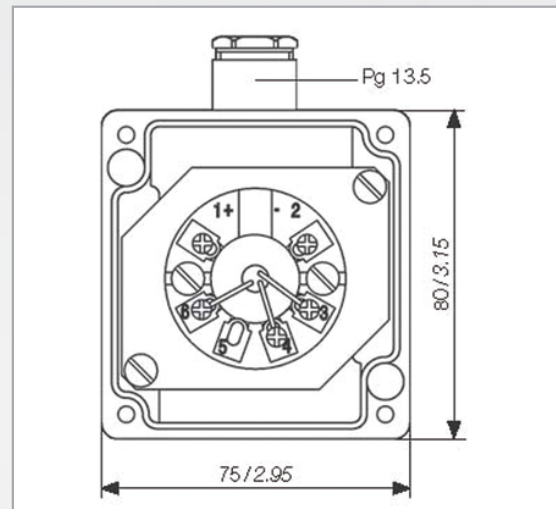
Measuring length LM in mm
Screen R12
HT high-temperature version (option)
Type: XT = KLS (incl. Transducer)

Order number example for XTi :

XTi	-	R12	-	LM2500
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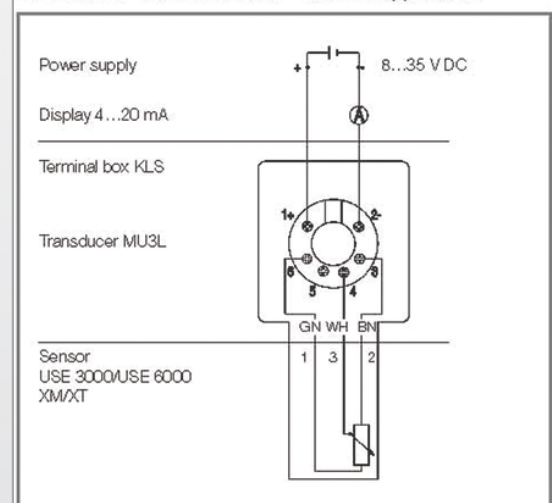
Measuring length LM in mm
Screen R12
Type: XTi = KLS (incl. Transducer)

Dimensions (mm / inch)

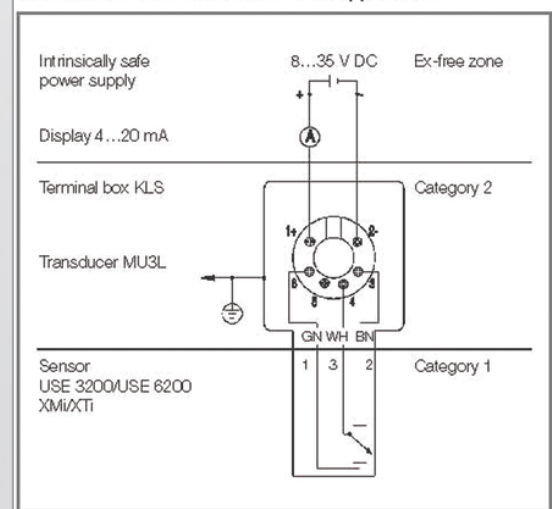


Circuit diagram

Level sensor with transmitter - Non-Ex application



Level sensor with transmitter - Ex application



Notes

Limit Switches

GK03

Limit Switch for Bypass Level Indicator

Features / Description

All GK switches have bi-stable reed contacts. They can be mounted in any position around the tube of a magnet-controlled level indicator with stainless steel clamps, however the cable direction should preferably be downward. The magnet system in the float will switch over the contact whenever the switch is passed. This permits an arbitrary arrangement of many switches on the tube surface without the switches disturbing each other. The switch position must be checked before installation; it can be set with a ring magnet or the float. The switch hysteresis depends on the distance to the magnet system in the float and is smallest when the switches are installed closely along the indication rail.

Applications

Limit value measuring on magnetically controlled level indicators

Technical Data

Housing: GK03/GK03L/GK03-EXI:	1,4305 and M16 x1,5 cable gland	
Cable: GK03:	Silicone 3x0,5 mm ² or	
GK03-EXI:	PVC 3x0,34 mm ² , length 1, 3 or 5 m	
GK03L:	PVC 3x0,34 mm ² , length 1, 3 or 5 m	
	PVC 4x0,55 mm ² , length 2 mother lengths or versions on request	
Protection class:	IP 65	
Switching power: GK03:	230 V AC/DC/ 1,0 A / 60 VA/W	
GK03-EXI:	U _i = 28 V	
	I _i = 50 mA	
	C _i = 40 pF	
	L _i = 4 µH	
GK03L:	24 V DC/1,0 A/40 W	
Temperature range: GK03:	for Si cable:	for PVC cable:
GK03-EXI:	-55 °C...+140 °C	-10 °C...+80 °C
GK03L:	-40 °C...+75 °C	-10 °C...+75 °C
Option: GK03:	Grounding clip (incl. in case of GK03-EXI)	
Approvals: GK03-EXI:	• ISSEP08ATEX016X II G Ex ia IIC T6 • II1GD Ex iaD 2D T100	

When larger contact ratings are needed than the reed contacts allow, suitable relays must be used.

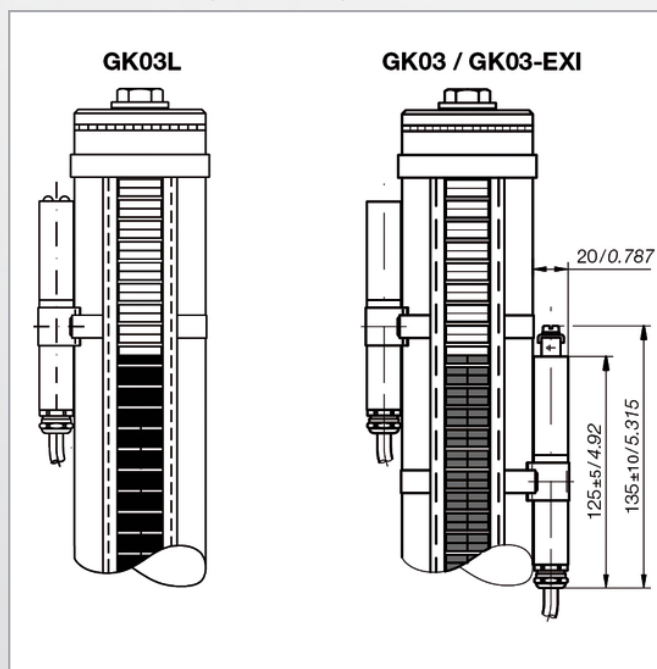
When frequently changing process requirements make a permanent contact position difficult to handle we recommend to order our transmitters with 4 ...20 mA output and separate trip amplifier UAS 3, which enables set point changes by touching a keypad and many additional features.

Order Numbers

Order No.	Limit Switch
0303-031	GK03 1m PVC cable
0303-028	GK03 1m Si cable
0303-032	GK03 3 m PVC cable
0303-029	GK03 3m Si cable
0303-033	GK03 5 m PVC cable
0303-030	GK03 5m Si cable
0303-035	GK03-EXI 1m PVC cable
0303-027	GK03-EXI 3 m Si cable
0303-036	GK03-EXI 5 m PVC cable
0303-038	GK03L 2 m PVC cable



Dimensions (mm / inch)



Circuit diagram

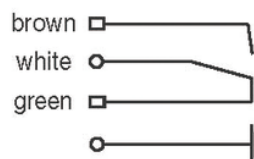
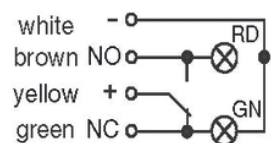


Figure 1: Schematic diagram
GK03/GK03-EXI



RD (red LED) = full
GN (green LED) = empty

Figure 2: Schematic
diagram GK03L

Notes

Limit Switches

Floats: VA.../TT.../BN

The standard floats listed below have less weight, are shorter and versatile; they replace all versions built so far.

In case of the ..15 version (with M3 plug) the optimum immersion depth of 150 mm can be trimmed exactly to the density of the medium by filling them with silica sand or lead shot.

The required total weight of the float is calculated by means of the following formula:

$283 \times \mu$ (density) of the medium = weight in g

The ..20 versions are vented floats with automatic condensate discharge (VAE) for pressures above 40 bar.

Floats

Type	Material	LS [mm]	P max [bar]	T max [°C]	Weight [g]	Volume [cm³]	g min ** [g/cm³]	Extras
VA 50/10	1.4571	200	25	150	205	360	0.62	---
VA 50/15	1.4571	200	25	150	207	360	0.63	With M4 plug
TT 50/10	Titanium	200	40	320	202	360	0.56	---
TT 50/15	Titanium	200	40	320	202	360	0.57	With M4 plug
TT 50/20	Titanium	200	VAE	320	210	360	0.6	With VAE tube
VA 30/02	1.4571	200	16	150	104	141	0.85	Only BNA-S21/S22
TT 30/02	Titanium	200	25	150	102	141	0.85	Only BNA-S21/S22
TT 30/03	Titanium	200	25	320	103	141	0.86	Only BNA-S21/S22
BN 32/100	Buna N	100	10	90	51	78.4	0.75	Oil up to 110 °C (only BNA-S21/S22)

* The plastic floats with the new magnet system are relatively light.

To enable adjustment of the float weight to the medium, the medium density (g) must be stated in the order.

** The min. density relates to a float immersion depth of 175 mm (or 87.5%). The ideal immersion depth of the 200-floats is 150 mm, but an immersion depth of 175 mm is absolutely sufficient for most applications. Only in very viscous or dirty media a "residual buoyance" of 25 mm only is not recommended.

For media with very low density, such as some hydrocarbons, special floats are available.

Maximum permissible pressures

Higher temperatures may impair the pressure resistance of the bypass tube.

The maximum permissible pressures for stainless steel pipes, material number 1.4571, are specified in DIN 2413. Including the strength values, the permissible 1% technical elastic limit and a safety value of 1.5 the following table is drawn up:

Outer ø [mm]	Wall thickness [mm]	20 °C [bar]	100 °C [bar]	150 °C [bar]	200 °C [bar]	250 °C [bar]	300 °C [bar]	350 °C [bar]	400 °C [bar]
60.3	2	83	70	64	58	54	52	49	46
60.3	2.77	115	87	90	81	76	71	68	65
60.3	2.9	121	101	94	85	79	75	71	68

Scale

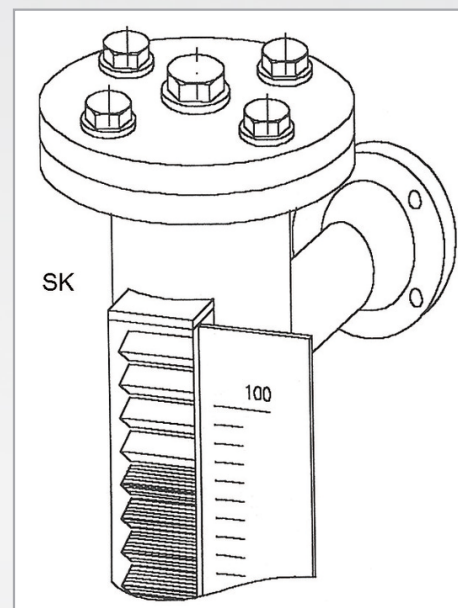
All bypass level indicators can be supplied with a scale attached directly beside the indication rail. This scale will be manufactured according to the customer's requirements. So any graduation or measuring unit is possible.

The base material is aluminium.

For applications up to 150 °C the scales are affixed, for applications above 150 °C the scales are engraved

We need the following data to submit an offer:

- ▶ Unit of measurement
- ▶ Scale start and end values
- ▶ LM (indication length)
- ▶ Graduation: centimeter, decimeter or inch
- ▶ Any special requests, e.g. non-linear scale marking, engraved scale markings, colour marking, Resopal, plastic version, additional text etc.



Isolation and protection for indication rail ("MA" and "AL")

PO:

For outdoor applications or applications in which the bypass level indicator is exposed to cold, splash water or dust we recommend the use of our protective polyolefine tubing for the indication rail. Temperature range: -55...115 °C.

Test and certificates

- ▶ X-radiographic inspection of the weld seams
- ▶ Pressure test with certificates
- ▶ Factory certificates according to DIN EN 10204-2.1, DIN EN 10204-2.2, DIN EN 10204-3.1

Notes

Notes

Experts

Specialists for monitoring
and control of

- ▶ Pressure
- ▶ Temperature
- ▶ Level
- ▶ Flow

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