

# Magnetic switch

## For bypass level indicators

### Model BGU



#### Applications

- Magnetic switches for detecting the limits of filling levels in bypass level indicators
- Chemical and petrochemical industries, oil and natural gas extraction (on- and offshore)
- Shipbuilding, machine building
- Power generating equipment, power plants
- Pharmaceutical, food, water treatment, environmental engineering industries

#### Special features

- Proper functioning, even under extreme environmental influences, e.g. dirt, humidity, gases, dust, chips
- Compact and operationally safe design
- Mounting of the switches with tightening strap or via T-slot at the magnetic display
- Medium temperatures from -196 ... +380 °C
- Versions with reed contact, proximity switch, micro switch or rotation magnet

#### Description

The model BGU magnetic switches serve to detect the limits of filling levels in bypass level indicators. They generate a binary signal which can be fed to down-stream signalling or control equipment. Bistable versions enable the storage of signals.

The magnetic switches are mounted directly to the bypass level indicator with a tightening strap or to the magnetic display with sliding blocks.

The magnetic switches are available with different approvals and with SIL 1.



**Magnetic switch**  
**Fig. left: Reed switch, model BGU**  
**Fig. right: High-temperature reed switch, model BGU-AHT**

For selecting the optimum switch (switch model, approval, switching option, cable length, cable material) we offer application-related technical advice.

## Model overview

Switch model	Description	Approval					Switching power			Proximity switch	Temperature range
		with-out	Ex i	Ex d	GL	Ex i + GL	AC 230 V, 60 VA, 1 A	AC 250 V, 100 VA, 2 A	AC 250 V, 5 A (micro switch)		
BGU	Reed, aluminium case, cable outlet	x	x	x	x	x	x				-50 ... +180 °C
BGU-A	Reed, aluminium connection housing, cable gland	x	x		x	x	x				-50 ... +180 °C
BGU-M12	Reed, aluminium case, connector M12	x	x				x				-40 ... +80 °C
BGU-V	Reed, stainless steel case, cable outlet	x	x	x			x				-50 ... +180 °C
BGU-AD	Reed, aluminium case ATX, cable entry	x		x			x				-40 ... +55 °C
BGU-AM	Micro switch, aluminium case ATX, cable entry	x		x					x		-40 ... +55 °C
BGU-AIH	Proximity switch, high alarm, aluminium case, cable gland	x								x	-40 ... +80 °C
BGU-AIL	Proximity switch, low alarm, aluminium case, cable gland	x								x	-40 ... +80 °C
BGU-AR	Rotational switch, aluminium case, cable gland	x						x			-60 ... +380 °C
BGU-AHT	Reed, high temperature, aluminium case, cable gland	x					x				-196 ... +380 °C
BGU-VHT	Reed, high temperature, stainless steel case, cable gland	x					x				-196 ... +380 °C

## Ex approvals

Explosion protection	Ignition protection type	Model	Zone	Approval number
ATEX	Ex i	BGU, BGU-A, BGU-M12, BGU-V	Zone 0, gas	LCIE 01 ATEX 6047 X / II 1 G Ex ia IIC T6-T3
	Ex d	BGU, BGU-V	Zone 1, gas	LCIE 01 ATEX 6047 X / II 2 G Ex d IIC T6-T3
	Ex d	BGU-AM, BGU-AD	Zone 1, gas/dust	LCIE 02 ATEX 6056 / II 2 G/D Ex d IIC T6-T5
	Ex i + GL	BGU, BGU-A	Zone 0, gas	LCIE 01 ATEX 6047 X / II 1 G Ex ia IIC T6-T3 + GL - 99 355 - 97 HH

## Type approval

Approval	Model	Approval number
GL	BGU, BGU-A	GL - 99 355 - 97 HH
GOST-R	all	0959333

Further approvals on request

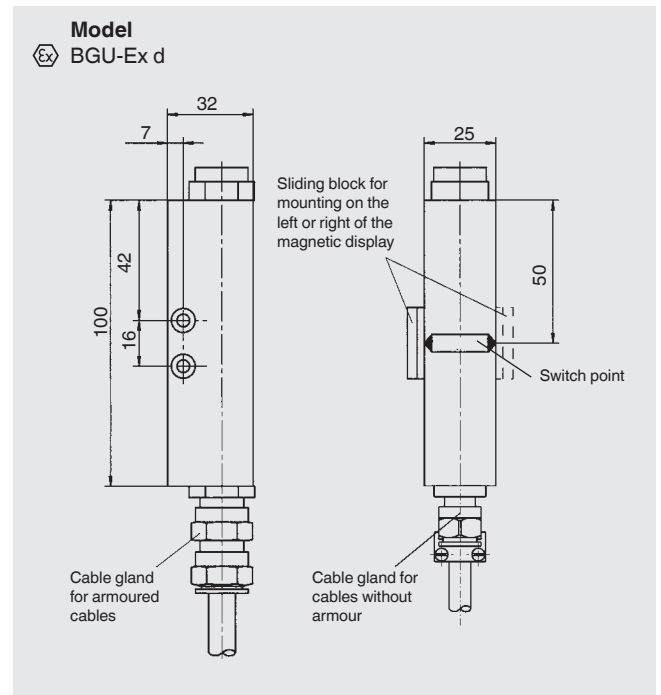
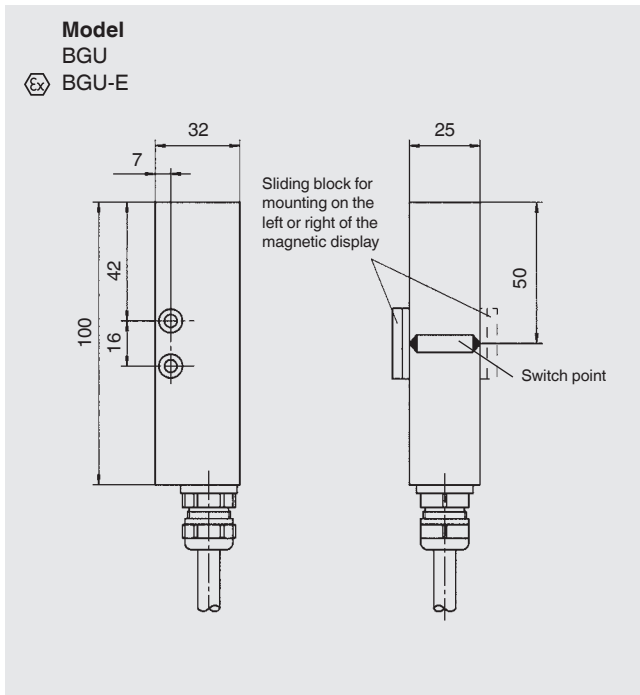
## Manufacturer's declaration

Switching insert	Model	Zone
Proximity switch	BGU-AIL, BGU-AIH	Zone 1

## Options

- Switching option (series resistance R22 for PLC, wiring in accordance with NAMUR per DIN EN 60497-5-6)
- Cable length (1, 2 or 3 m, others on request)
- Cable material (PVC cable, intrinsically safe PVC cable, silicone cable, armoured silicone cable, LMGSG cable for GL approval)

## Magnetic switch, reed, aluminium case, cable outlet, model BGU



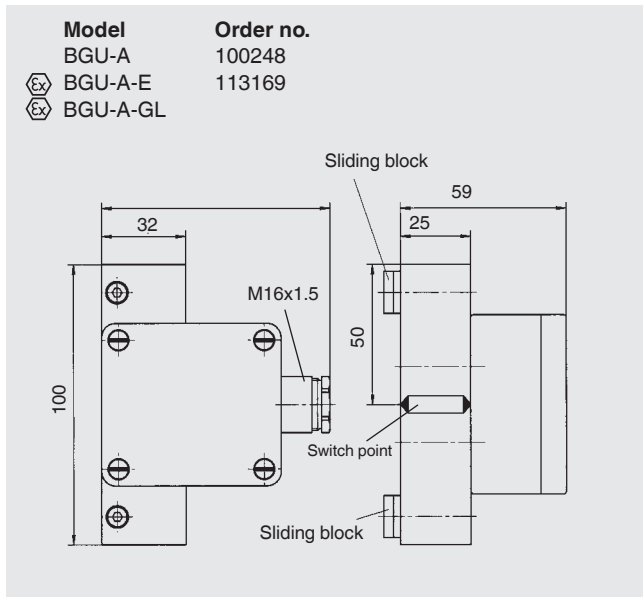
### Specifications

Contact	Reed contact
Contact type	1 change-over contact
Switch behaviour	Bistable
Switching power	
■ Model BGU	AC 230 V, 60 VA, 1 A DC 230 V, 30 W, 0.5 A
■ Model BGU-E	Only for connection to a certified intrinsically safe circuit with max. 100 mA and max. 30 V
Ambient temperature	-50 ... +180 °C
Max. ambient temperature	
■ Switch with connection cable from PVC	90 °C
■ Switch with connection cable from LMGSG	150 °C
■ Switch with connection cable from silicone	180 °C
■ Switch model BGU-E with connection cable from PVC, blue	T6 to 85 °C
Case	Aluminium
Ingress protection	IP 65
Approvals	Ex i

### Specifications

Contact	Reed contact
Contact type	1 change-over contact
Switch behaviour	Bistable
Switching power	AC 230 V, 60 VA, 1 A DC 230 V, 30 W, 0.5 A
Ambient temperature	-40 ... +150 °C
Max. ambient temperature	
■ Switch with connection cable from PVC, grey	T6 to 85 °C
■ Switch with connection cable from silicone or armoured silicone	T6 to 85 °C T5 to 100 °C T4 to 135 °C T3 to 150 °C
Case	Aluminium
Ingress protection	IP 68
Approvals	Ex d

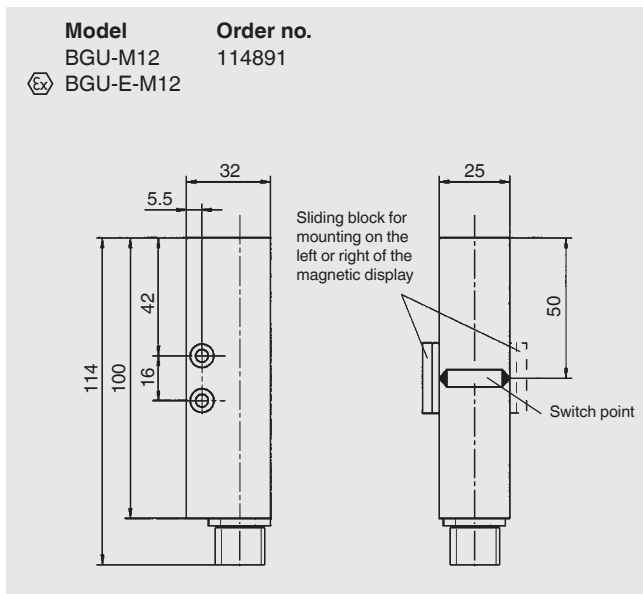
## Magnetic switch, reed, aluminium connection housing, cable gland, model BGU-A



### Specifications

Contact	Reed contact
Contact type	1 change-over contact
Switch behaviour	Bistable
Switching power	
■ Models BGU-A, BGU-A-GL	AC 230 V, 60 VA, 1 A DC 230 V, 30 W, 0.5 A
■ Model BGU-A-E	Only for connection to a certified intrinsically safe circuit with max. 100 mA and max. 30 V
Ambient temperature	-50 ... +180 °C
Max. ambient temperature	
■ Model BGU-A	180 °C
■ Model BGU-A-GL	150 °C
■ Model BGU-A-E	T6 to 85 °C T5 to 100 °C T4 to 135 °C T3 to 150 °C
Case	Aluminium, cable connection M16 x 1.5
Ingress protection	IP 65
Approvals	Ex i

## Magnetic switch, reed, aluminium case, connector M12, model BGU-M12

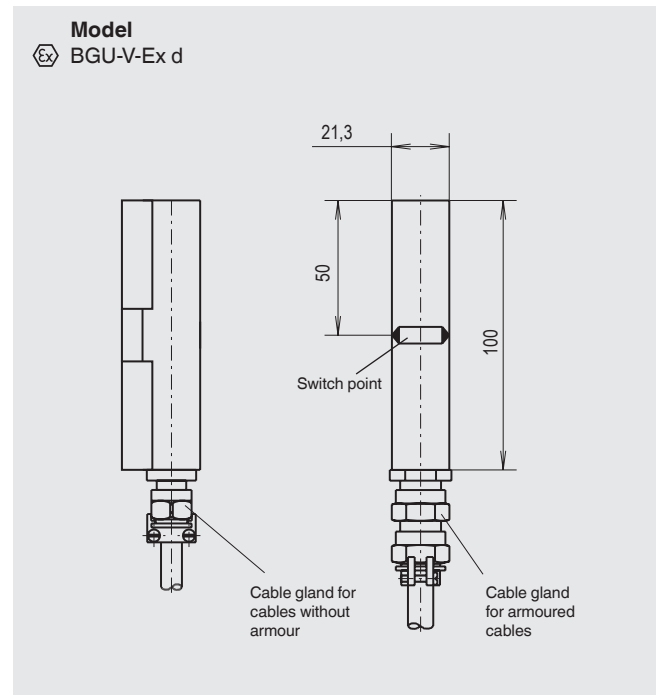
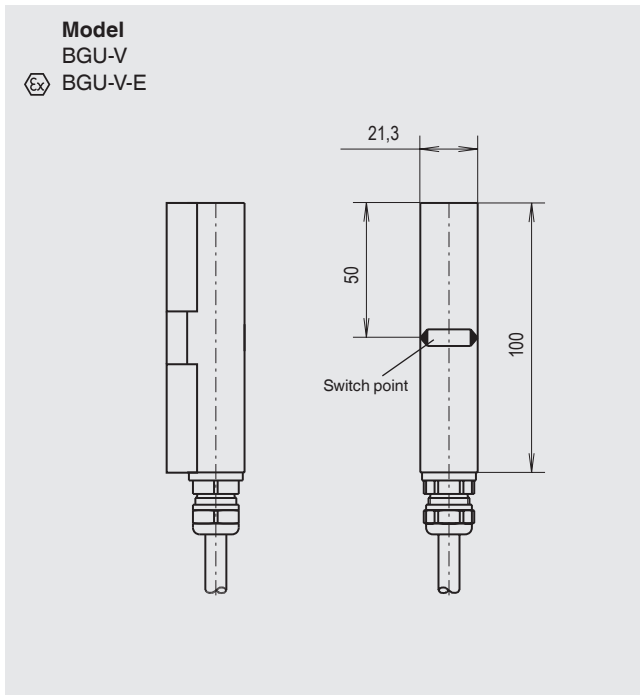


### Specifications

Contact	Reed contact
Contact type	1 change-over contact
Switch behaviour	Bistable
Switching power	
■ Model BGU-M12	AC 230 V, 60 VA, 1 A DC 230 V, 30 W, 0.5 A
■ Model BGU-E-M12	Only for connection to a certified intrinsically safe circuit with max. 100 mA and max. 30 V
Ambient temperature	-40 ... +80 °C
Max. ambient temperature	
■ Model BGU-M12	80 °C
■ Model BGU-E-M12	T6 to 80 °C
Case	Aluminium
Ingress protection	IP 67
Approvals	Ex i

Model	Order no.
BGU-M12, with mating connector and 2 m PVC cable	114448

## Magnetic switch, reed, stainless steel case, cable outlet, model BGU-V



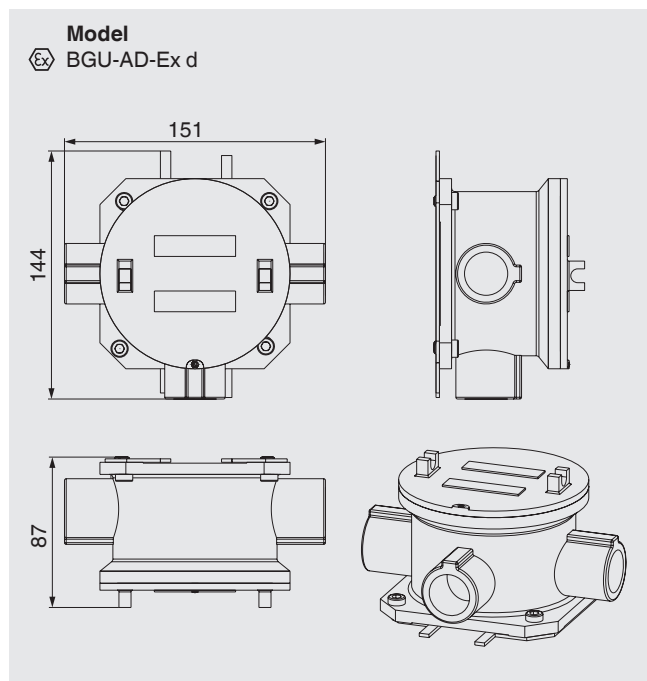
### Specifications

Contact	Reed contact
Contact type	1 change-over contact
Switch behaviour	Bistable
Switching power	
■ Model BGU-V	AC 230 V, 60 VA, 1 A DC 230 V, 30 W, 0.5 A
■ Model BGU-V-E	Only for connection to a certified intrinsically safe circuit with max. 100 mA and max. 30 V
Ambient temperature	-50 ... +180 °C
Max. ambient temperature	
■ Switch with connection cable from PVC	90 °C
■ Switch with connection cable from silicone	180 °C
■ Switch model BGU-V-E with connection cable from PVC, blue	T6 to 85 °C
Case	Stainless steel 1.4571 (316Ti)
Ingress protection	IP 65
Approvals	Ex i

### Specifications

Contact	Reed contact
Contact type	1 change-over contact
Switch behaviour	Bistable
Switching power	AC 230 V, 60 VA, 1 A DC 230 V, 30 W, 0.5 A
Ambient temperature	-50 ... +150 °C
Max. ambient temperature	
■ Switch with connection cable from PVC, grey	T6 to 85 °C
■ Switch with connection cable from silicone or armoured silicone	T5 to 100 °C T4 to 135 °C T3 to 150 °C
Case	Stainless steel 1.4571 (316Ti)
Ingress protection	IP 68
Approvals	Ex d

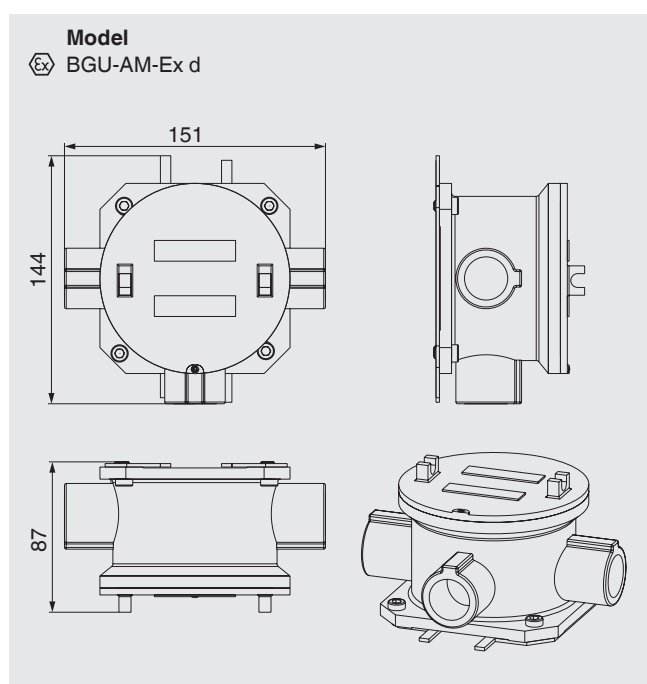
## Magnetic switch, reed, aluminium case ATX, cable entry, model BGU-AD



### Specifications

Contact	Reed contact
Contact type	1 change-over contact
Switch behaviour	Bistable
Switching power	AC 230 V, 60 VA, 1 A DC 230 V, 30 W, 0.5 A
Ambient temperature	-40 ... +55 °C
Max. ambient temperature	T6 to 40 °C T5 to 55 °C tD to 95 °C
Case	Aluminium
Cable entries	1/2" NPT(F) with adapter 3/4" NPT(F) M20 x 1.5 with adapter
Ingress protection	IP 66
Approvals	Ex d

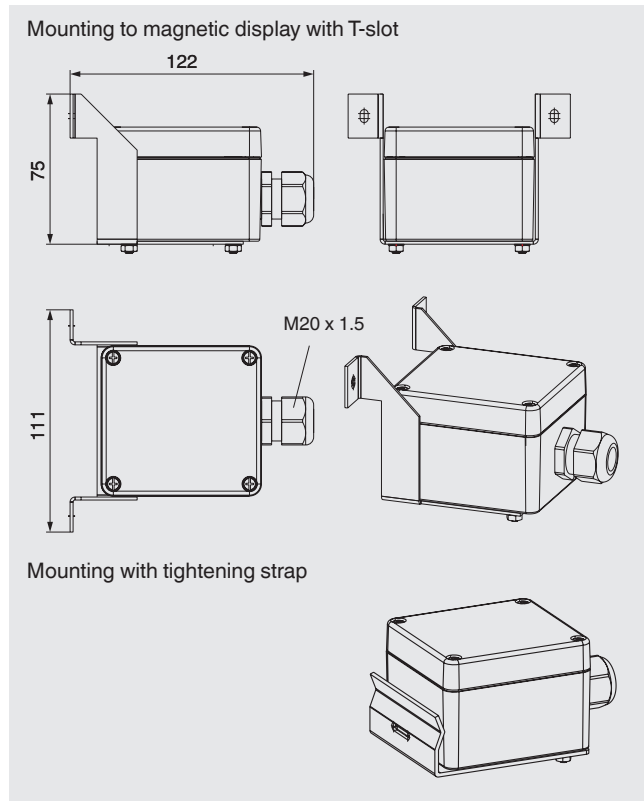
## Magnetic switch, micro switch, aluminium case ATX, cable entry, model BGU-AM



### Specifications

Contact	Micro switch
Contact type	1 change-over contact
Switch behaviour	Bistable
Switching power	AC 250 V, 5 A
Ambient temperature	-40 ... +55 °C
Max. ambient temperature	T6 to 40 °C T5 to 55 °C tD to 95 °C
Case	Aluminium
Cable entries	1/2" NPT(F) with adapter 3/4" NPT(F) M20 x 1.5 with adapter
Ingress protection	IP 66
Approvals	Ex d

## Magnetic switch, proximity switch, aluminium case, cable gland, model BGU-AIH, high alarm and model BGU-AIL, low alarm



Model	Normally open with	Mounting	Order no.
BGU-AIH	rising level	T-slot	115162
BGU-AIL	falling level	T-slot	115163
BGU-AIH	rising level	Tightening strap	114687
BGU-AIL	falling level	Tightening strap	114688

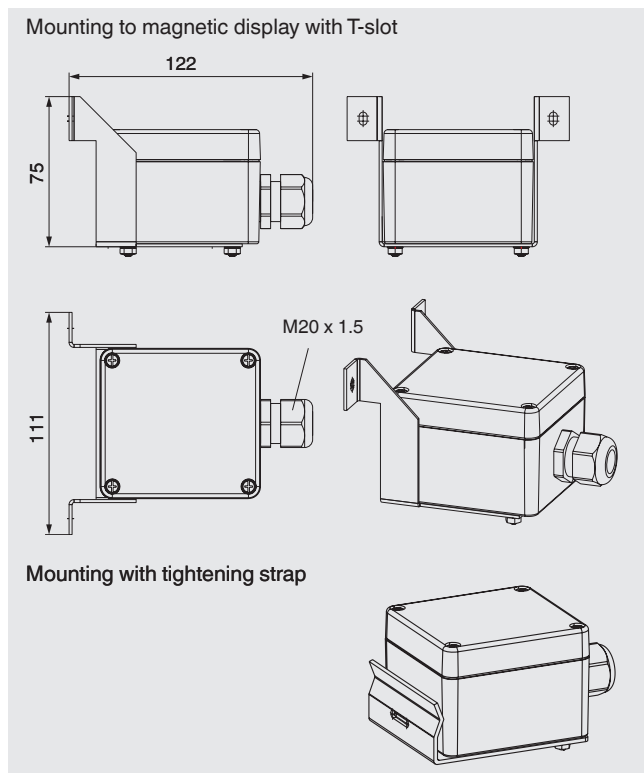
### Specifications

Contact	Inductive proximity sensor SJ 3.5-SN
Contact type	Code AIH: High alarm Code AIL: Low alarm
Switch behaviour	Bistable
Nominal voltage	DC 8 V ( $R_i \sim 1 \text{ k}\Omega$ )
Permissible residual ripple	< 5 %
Operating voltage $U_B$	5 ... 25 V
Current supply	active area free: > 3 mA active area covered: > 1 mA
Permissible resistance of control cable	< 100 $\Omega$
Self-inductance	160 $\mu\text{H}$
Self-capacitance	20 nF
Ambient temperature	-40 ... +80 °C
Case	Aluminium, 80 x 75 x 57 mm Cable connection M20 x 1.5
Ingress protection	IP 65

### Accessories

Tightening strap Standard: OD 50-70 mm  
Option: OD 30-45, 40-60, 60-80, 80-100 mm

## Magnetic switch, rotational switch, aluminium case, cable gland, model BGU-AR



Model	Mounting	Order no.
BGU-AR	T-slot	115636
BGU-AR	Tightening strap	115157
BGU-AR m	Tightening strap (with Microtherm®)	115158

### Specifications

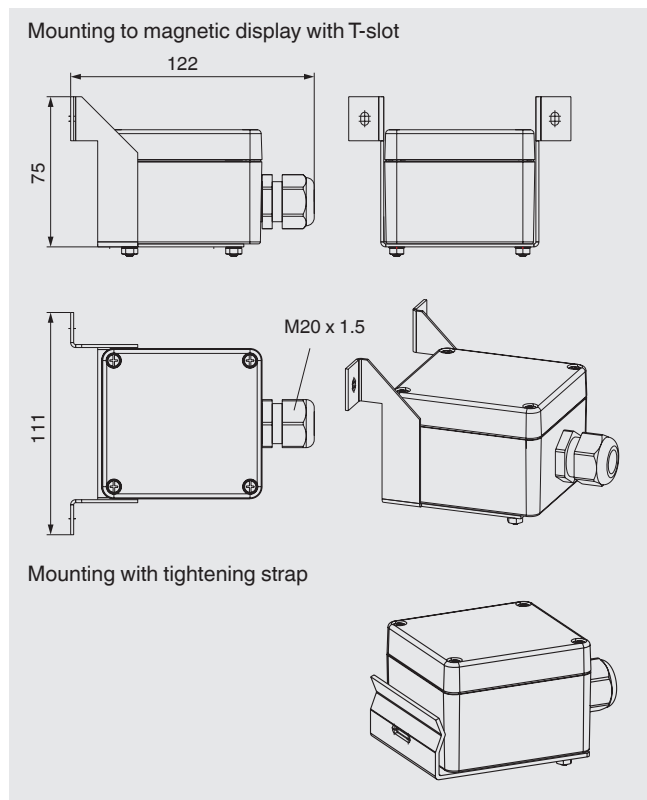
Contact	Rotary magnet with contact rocker switch
Contact type	1 change-over contact
Switch behaviour	Bistable
Switching power	AC 250 V, 100 VA, 2 A DC 200 V, 40 W, 2 A
Ambient temperature <sup>1)</sup>	-60 ... +250 °C -60 ... +380 °C with Microtherm®
Case	Aluminium, 80 x 75 x 57 mm Cable connection M20 x 1.5
Ingress protection	IP 65

<sup>1)</sup> With additional insulation the temperature ranges can change

### Accessories

Tightening strap Standard: OD 50-70 mm  
Option: OD 30-45, 40-60, 60-80, 80-100 mm

## Magnetic switch, reed, high temperature, aluminium case, cable gland, model BGU-AHT



Model	Mounting	Order no.
BGU-AHT	T-slot	115159
BGU-AHT	Tightening strap	110486

### Specifications

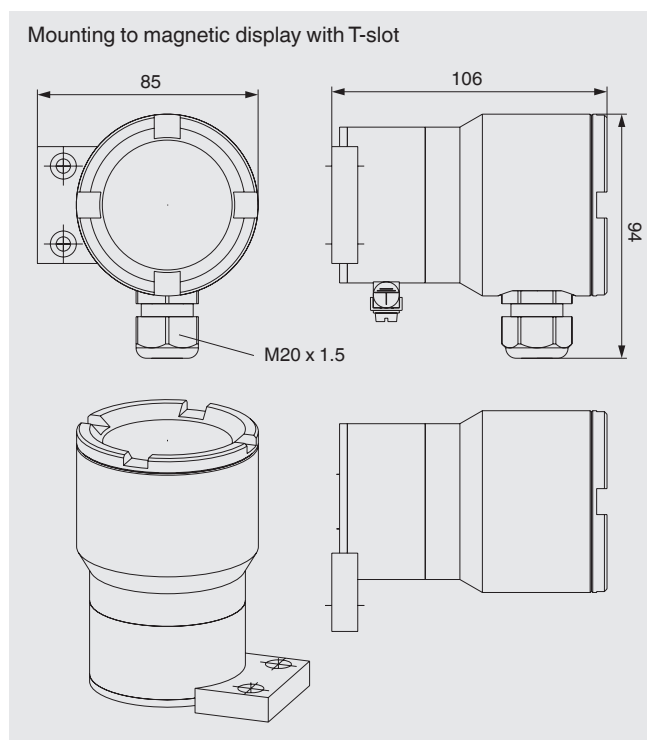
Contact	Reed contact
Contact type	1 change-over contact
Switch behaviour	Bistable
Switching power	AC 230 V, 60 VA, 1 A DC 230 V, 30 W, 0.5 A
Ambient temperature <sup>1)</sup>	-196 ... +380 °C
Case	Aluminium, 80 x 75 x 57 mm Cable connection M20 x 1.5
Ingress protection	IP 65

1) With additional insulation the temperature ranges can change

### Accessories

Mounting with tightening strap, including Mikroterm®

## Magnetic switch, reed, high temperature, stainless steel case, cable gland, model BGU-VHT



Model	Mounting	Order no.
BGU-VHT	Pipe Ø 42,3 mm	115038
BGU-VHT	Pipe Ø 60.3 mm	111342

### Specifications

Contact	Reed contact
Contact type	1 change-over contact
Switch behaviour	Bistable
Switching power	AC 230 V, 60 VA, 1 A DC 230 V, 30 W, 0.5 A
Ambient temperature <sup>1)</sup>	-196 ... +380 °C
Case	Stainless steel
Ingress protection	IP 67

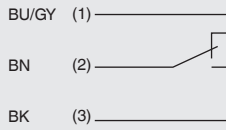
1) With additional insulation the temperature ranges can change



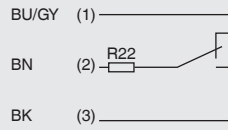
## Electrical connections

### Reed contact, micro switch, rotation magnet

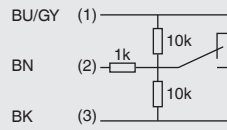
1 switch point



1 switch point  
Wiring for operation  
with a PLC

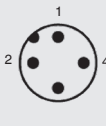


1 switch point  
NAMUR circuit per  
DIN EN 60947-5-6



### Connector M12, pin assignment (for model BGU-M12)

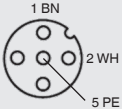
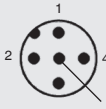
Instrument



Mating connector with cable



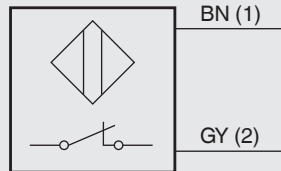
5-pin  
(only with Ex)



### Proximity switch

(for models BGU-AIH  
and BGU-AIL)

SJ 3.5 SN



### Connection cable

(for models BGU and BGU-V)

Connection cable	Cross-section
PVC	4 x 0.5 mm <sup>2</sup>
Silicone	4 x 0.75 mm <sup>2</sup>
Armoured silicone	4 x 0.75 mm <sup>2</sup>
LMGSG	3 x 1.5 mm <sup>2</sup>

### Colour coding per IEC 60757

Colour	Short symbol
Black	BK
Brown	BN
Red	RD
Orange	OG
Yellow	YE
Green	GN
Blue	BU
Violet	VT
Grey	GY
White	WH
Pink	PK
Turquoise	TQ
Green-Yellow	GNYE

### CE conformity

#### Electromagnetic compatibility (EMC)

2004/108/EC

#### ATEX directive (option)

94/9/EC, ignition protection type Ex i, zone 0, gas

94/9/EC, ignition protection type Ex d, zone 1, gas, dust

### Approvals

- **GL**, ships, shipbuilding, offshore, Germany
- **GOST**, national standard for Russia, Kazakhstan and Belarus

## Contact protection measures

The reed contacts should be protected against any voltage or current spikes that might occur.

Depending on the different load types different protective circuits are used.



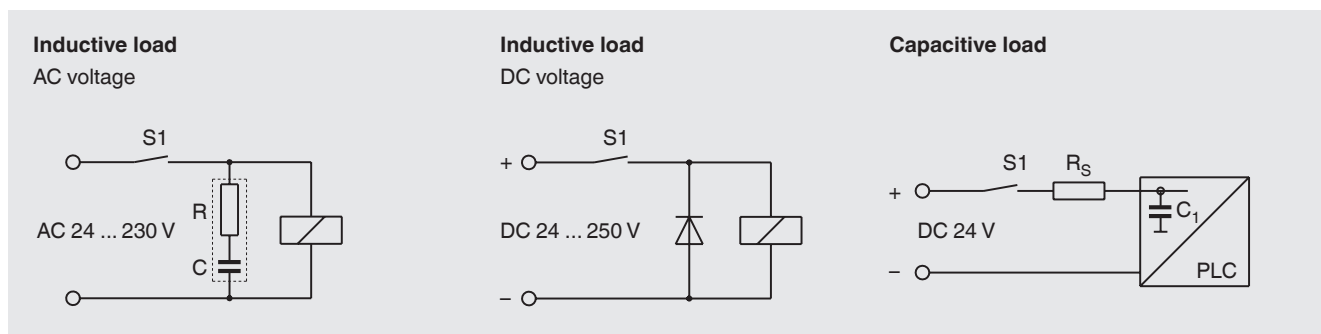
Model KR 24



RC module

Contact protection relays	Contacts	Input	Power supply	Approval marking	Order no.
KR 24	1 x change-over AC 250 V, 2 A	2 x contacts	DC 20 ... 30 V		112941
KR 24-EX	2 x change-over AC 253 V, 2 A	2 x contacts	DC 20 ... 30 V	PTB 02 ATEX 2072 / II(1) GD [Ex ia] IIC	112944
KR 230	1 x change-over AC 250 V, 2 A	2 x contacts	AC 230 V		112942
KR 230-EX	2 x change-over AC 253 V, 2 A	2 x contacts	AC 230 V	II 1 GD EEx ia IIC, PTB 02 ATEX 2073 / II(1) GD [Ex ia] IIC	112943

RC module	Capacity	Resistance	Voltage	Order no.
B3/115	0.33 $\mu$ F	470 $\Omega$	AC 115 V	110446
B3/230	0.33 $\mu$ F	1000 $\Omega$	AC 230 V	110460



## Ordering information

To order the described product the order number (if available) is sufficient.

Alternatively:

Model / Approval / Switching option / Cable length / Cable material