

# Magnetic switch

## For bypass level indicators

### Model BGU for nuclear power plants

KSR data sheet BGU for NPP



#### 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



#### Magnetic switch

Fig. left: Reed switch, model BGU

Fig. right: High-temperature reed switch, model BGU-AHT

#### 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.

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	IEEE 323, 344	AC 230 V, 60 VA, 1 A	DC 230 V, 30 VA, 0.5 A	DC 30 V, 0.1 A			
<b>BGU</b>	Reed, aluminium case, cable outlet	x	x	x	x	x	*	x	x				-50 ... +180 °C
<b>BGU-A</b>	Reed, aluminium connection housing, cable gland	x	x		x	x	*	x	x				-50 ... +180 °C
<b>BGU-M12</b>	Reed, aluminium case, connector M12	x	x				*	x	x				-40 ... +80 °C
<b>BGU-V</b>	Reed, stainless steel case, cable outlet	x	x	x			x	x	x				-50 ... +180 °C
<b>BGU-AIH</b>	Proximity switch, high alarm, aluminium case, cable gland	x					*				x		-40 ... +80 °C
<b>BGU-AIL</b>	Proximity switch, low alarm, aluminium case, cable gland	x					*				x		-40 ... +80 °C

\* IEEE on request.

## 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 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
IEEE 323, 344	BGU-V	-
GOST-R	all	0959333

Further approvals on request

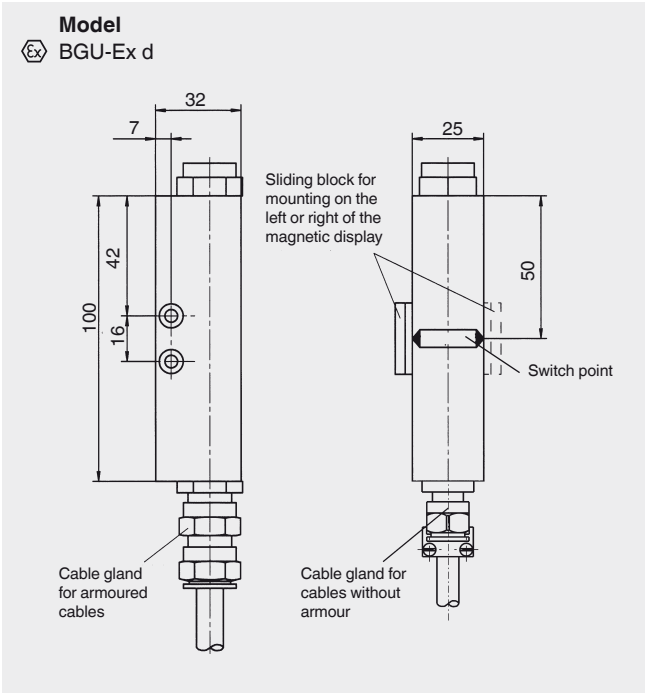
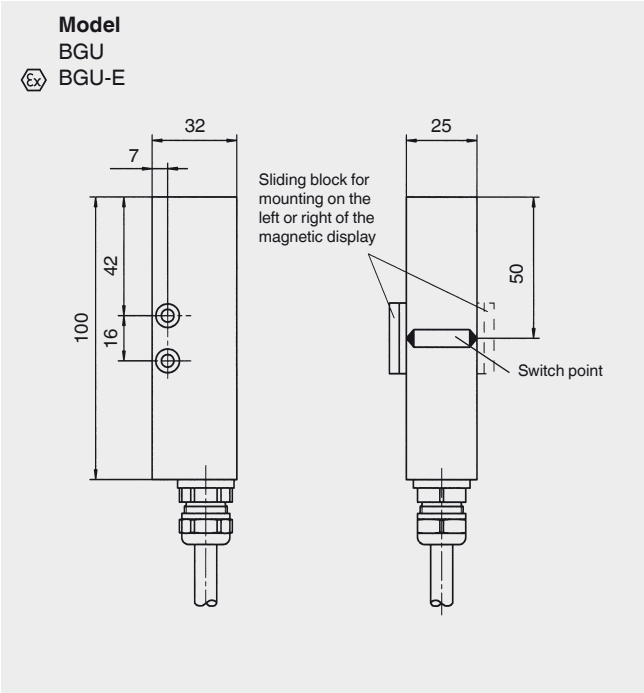
## Manufacturer's declaration

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)

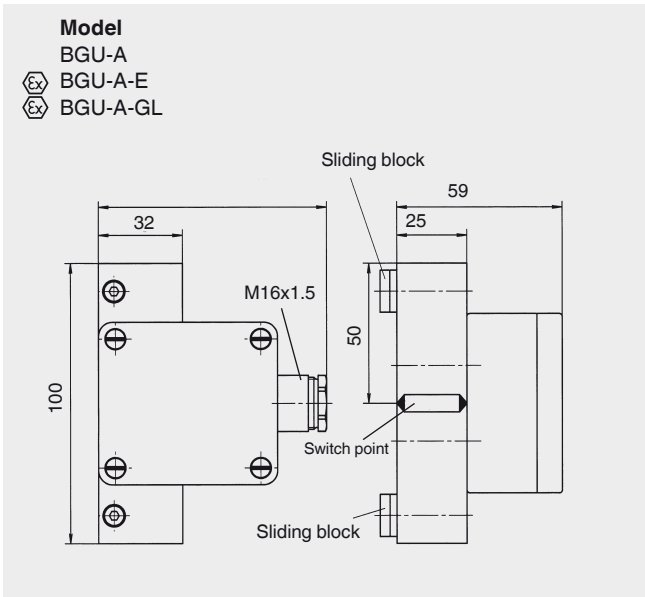
Magnetic switch, reed, aluminium case, cable outlet, model BGU



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

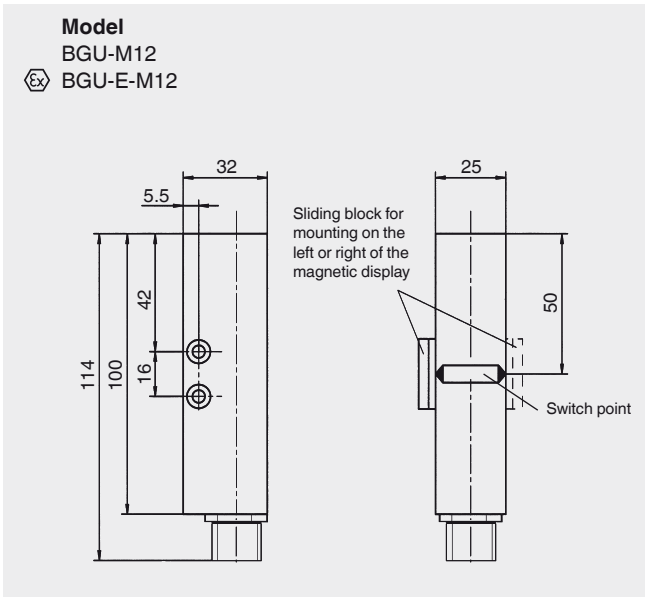
Magnetic switch, reed, aluminium connection housing, cable gland, model BGU-A



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

\* Nuclear qualified plug (Han® 7D) on request.

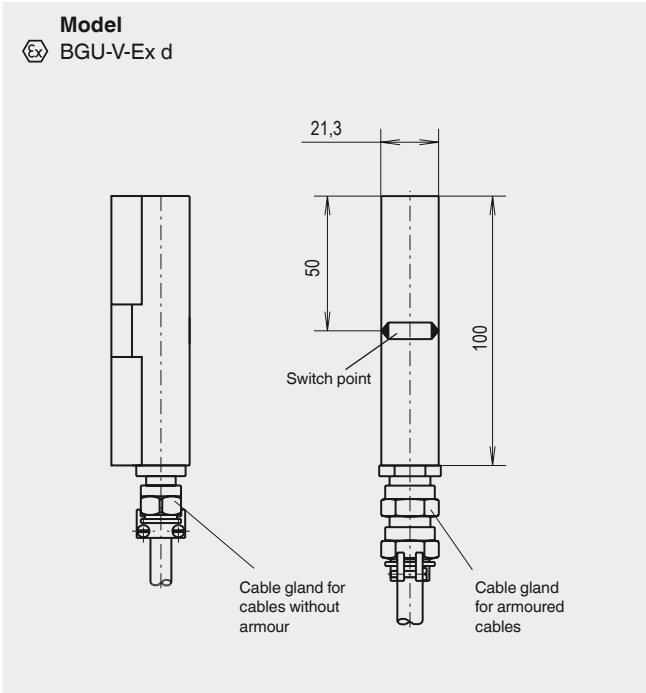
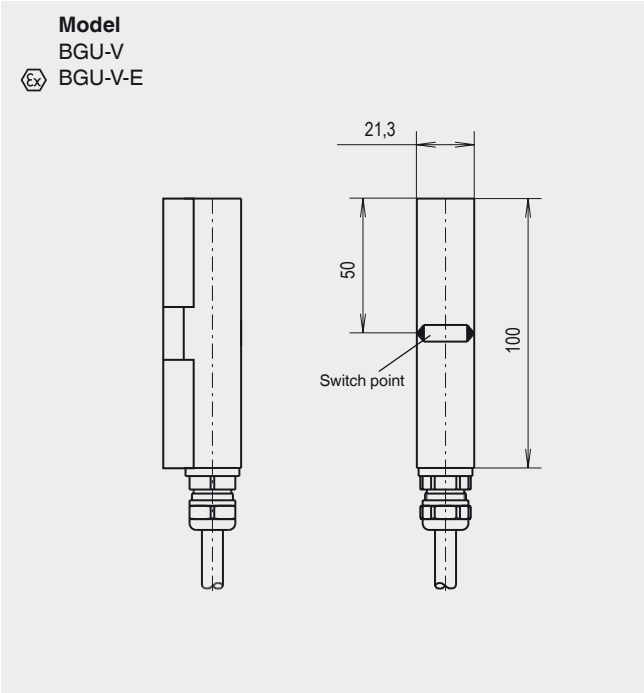
Magnetic switch, reed, aluminium case, connector M12, model BGU-M12



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**  
BGU-M12, with mating connector and 2 m PVC cable

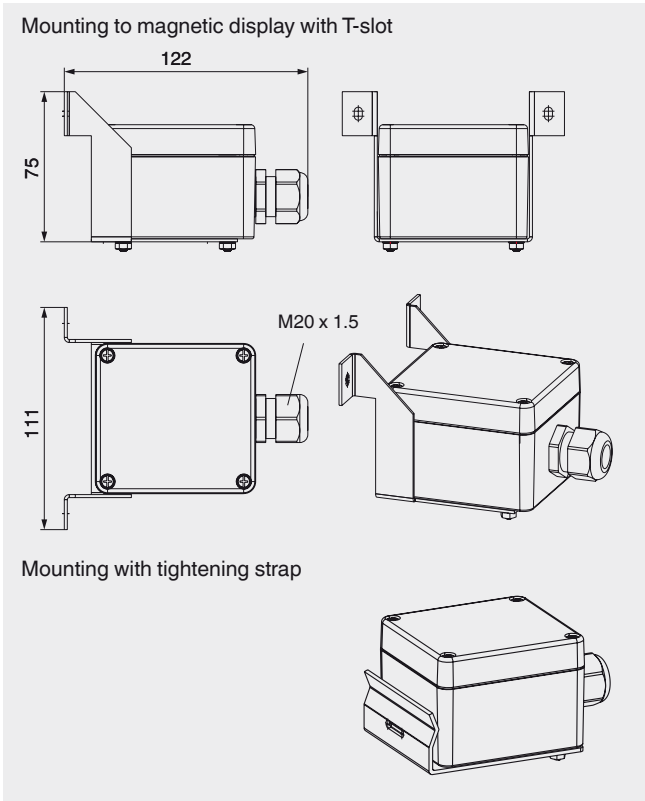
Magnetic switch, reed, stainless steel case, cable outlet, model BGU-V



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	T6 to 85 °C 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, proximity switch, aluminium case, cable gland, model BGU-AIH, high alarm and model BGU-AIL, low alarm

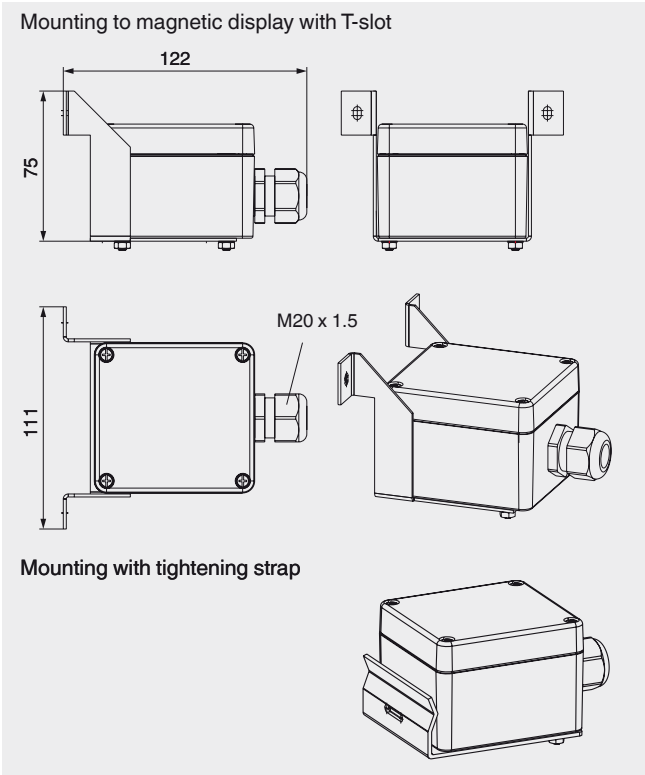


Model	Normally open with	Mounting
BGU-AIH	rising level	T-slot
BGU-AIL	falling level	T-slot
BGU-AIH	rising level	Tightening strap
BGU-AIL	falling level	Tightening strap

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
BGU-AR	T-slot
BGU-AR	Tightening strap
BGU-AR m	Tightening strap (with Microtherm®)

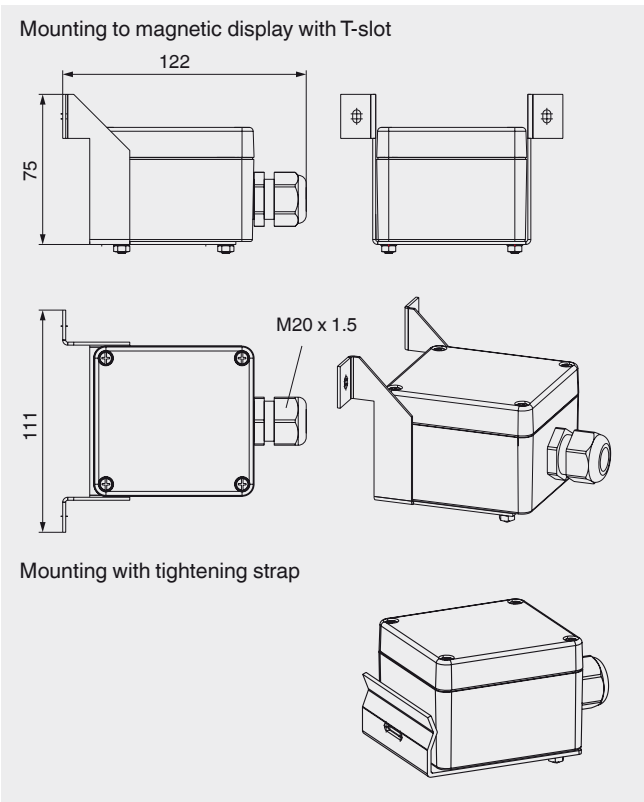
Specifications	
Contact	Rotary magnet with contact rocker switch
Contact type	1 change-over contact
Switch behaviour	Bistable
Switching power	AC 250 V, 100 VA, 2 A DC 200 V, 40 W, 2 A
Ambient temperature <sup>1)</sup>	-60 ... +250 °C -60 ... +380 °C with Microtherm®
Case	Aluminium, 80 x 75 x 57 mm Cable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

\* Nuclear qualified plug (Han® 7D) on request.

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



Model	Mounting
BGU-AHT	T-slot
BGU-AHT	Tightening strap

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®

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)

Nuclear qualified plug (Han® 7D) on request.

**Proximity switch**  
(for models BGU-AIH and BGU-AIL)

SJ 3.5 SN

Further plugs on request.

## 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
- **IEEE 323**, standard for qualifying class 1E equipment for nuclear power generating stations
- **IEEE 344**, standard for seismic qualification of equipment for nuclear power generating stations