02/2012

Technical Documentation

about
limit switch boxes
for
rotary- and **linear atuators**
acc. to
guidline 94/9/EC, IBExU 07 ATEX 1155

II 2G Ex e d IIC T6 II 2D Ex tD A21 IP65 T80°C

Rauter Sensor-Boxes
Inh. Dipl.-Ing. Peter Rauter
Düsseldorfer Straße 186
D-41460 Neuss (Germany)
Tel +49 (0) 2131 / 38 47 008
Fax +49 (0) 2131 / 38 47 009
info@sensor-boxes.de
www.sensor-boxes.de

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1. Objectives and pratical use

The positions of industrial valves represent an important piece of information for the course of action of a production. These valves are e.g. actuated with pneumatic rotary and linear drives at which the end position of the valve like “open” or “closed” is reported back to a control system. This is done via a mounted limit switch box which is placed above the actuator

Use of the above mentioned limit switch boxes can be found in endangered explosive areas as in the chemicals and petrochemicals industry, equipment group II, category 2G, zones 1 and 2 as well as the zones 21 and 22, see image 1-3 and image 5-10 page 8+9.

Another possibility also can be found the low temperature limit switch box, see image 2+3 and image 8-10, page 9, in explosive areas as the extremely cold zones in Sibirian, equipment group II, category 2G, zones 1 and 2 as well as the zones 21 and 22.

Image 1-3: Polyester and aluminium limit switch boxesfor rotary actuators, - 20°C $\leq T_a \leq$ + 70°C, 160x75x55mm/175x80x57mm, IP 65**,** low temperature limit switch boxes for rotary and linear actuators, - 55°C $\leq T_a \leq$ + 70°C, 175x80x57mm, IP 65

2. Technical specification

2.1 Technical specification of the limit switch boxes, - 20°C £ T_a £ + 70°C and - 55°C £ T_a £ + 70°C

Table 1: Technical specifikation of the limit switch boxes with Bartec limit switches

Term / Identifier:	Technical specifications:
Material and dimensions of the housings	Polyester housing black 160x75x55mm 122x120x90mm 160x160x90mm 220x120x90mm Aluminium housing grey[1)] 175x80x57mm 122x120x90mm 160x160x90mm 220x120x90mm
Bracket connection	F05 slot
Connection to rotary actuator	acc. to VDI/VDE 3845, hole spacing 80x30mm or 130x30mm
Connection to linear actuator	acc. to Namur IEC 534
Protection class	IP 65
ATEX identification	Ex II 2G Ex e d IIC T6 Ex II 2D Ex tD A21 IP65 T80°C
Temperature class	T6
Temperature range	- 20°C ≤ T_a ≤ + 70°C - 55°C ≤ T_a ≤ + 70°C [1)]
Limit switch data[2)] bei AC:	rated voltage U_n = 400 V, rated current I_n = 3 A (ohmic load)
bei AC:	rated voltage U_n = 400 V, rated current I_n = 2 A (inductive load)
bei AC:	rated voltage U_n = 250 V, rated current I_n = 5 A (ohmic load)
bei AC	rated voltage U_n = 250 V, rated current I_n = 3 A (inductive load)
bei DC:	rated voltage U_n = 250 V, rated current I_n = 0,4 A (ohmic load)
bei DC:	rated voltage U_n = 250 V, rated current I_n = 0,03 A (inductive load)
bei AC/DC:	rated voltage U_n = 30 V, rated current I_n = 7 A (ohmic load)
bei AC/DC:	rated voltage U_n = 30 V, rated current I_n = 5 A (inductive load)
Cable glands	M16x1,5mm/M20x1,5 mm, ∅ 10-4,5mm/∅ 13-7mm
Clamps	max. 2,5 mm²
Weight without bracket or mounting set	Polyester box 160x75x55mm = 660g Polyester box 122x120x90mm = 1100g Polyester box 160x160x90mm = 1650g Polyester box 220x120x90mm = 1650g Aluminium box 175x80x57mm = 815g Aluminium box 122x120x90mm = 1055g Aluminium box 160x160x90mm = 2100g Aluminium box 220x120x90mm = 2100g
Switching range	0 up to 90°, 0° up to 180° and free adjustable

[1)] only for low temperature limit switch boxes
[2)] more limit switch data see in appendix page 10-13

3. Connection of the limit switches and adjusting the switching cams

During the cable glands, limit switches will be connected acc. to operating instructions 1-3, page 14-16.

Acc. image 4, limit switches will be connected. The wiring diagram is always fixed in the housing.

Both aluminium switching cams are adjustable. With the hexagon socket screw M4, SW 2mm in the switching cams tighten.

Metal parts (included the bracket) have to be grounded on the metal housing has to be connected to the equipotential bonding.

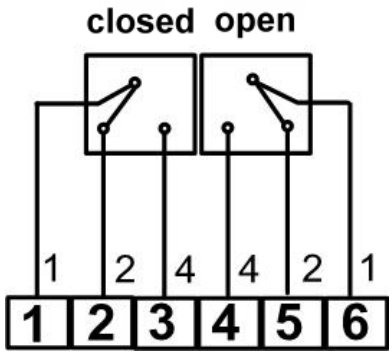


Image 4: Wiring diagram of the limit switches (changer)

3.1 Subblementary connection of solenoid valve

At the polyester housing 122x120x90mm and 220x120x90mm and the aluminium housing 122x120x90mm and 220x120x90mm are the possibilty with subblementary clamps and cable glands to connect a solenoid valve.

The max. rating voltage 400V and the max. rating current 7A (ohmic load) and 5 A (inductive load) at - 20°C ≤ T_a ≤ + 70°C and also at
- 55°C ≤ T_a ≤ + 70°C do not overshoot at the clamps for connection of the solenoid valve.

4. Components and parts lists

4.1 Components and parts lists of the limit switch boxes, - 20°C £ T_a £ + 70°C

Table 2: Components and parts lists of the limit switch boxes with Bartec limit switches

Term / Identifier	Article-No.	Material	Comments
Polyester empty housing with closed cover and 4x screw	PE-160L PE-122L PE-160L1 PE-220L	PE PE PE PE	160x75x55mm, Bartec type: 07-5185-1600/7555 122x120x90mm, Bartec type: 07-5185-1221/2090 160x160x90mm, Bartec type: 07-5185-1601/6012 220x120x90mm, Bartec type: 07-5185-2201/2090
Aluminium empty housing with closed cover and 4x screw	AL-175L AL-122L AL-160L AL-220L	AL-Si 12 AL-Si 12 AL-Si-12 AL-Si-12	175x80x57mm, Bartec type: 07-5180-1750/8057 122x122x90mm, Bartec type: 07-5180-1221/2090 160x160x90mm, Bartec type: 07-1580-1601/6090 220x120x90mm, Bartec type: 07-5180-2201/2090
Cable glands, black	KL	PA CR/NBR	M20x1,5mm/M16x1,5mm, ∅13-7mm/∅10-4,5mm Lapp type: Skintop MS-M and MSR-M-ATEX
Clamps	V	Plastic	2,5mm², grey Bartec type: 07-9702-0220/1 and 07-9702-0320/1
Clamps	DK 3 N	Plastic	2,5mm², grey Phoenix-Contact type: UK 3 N
Ground plates: PE-122L, -160L1, -220L und AL-122L, -160L, -220L	PL-122L,- 220L, -160L	A2 (=1.4301)	106x105x1,5mm and 207x107x1,5mm
Screws, lock washers for ground plate, 4x	B-Sch, B-F	A2	M6x10mm, ∅6mm
Aluminium shaft bearing body: PE-160L and AL-175L	WA-1	AL	∅64x13mm, Z-No 0029
O-Ring	O-1-WA	NBR 70	∅62x3mm
Aluminium shaft bearing body: PE-122L, PE-160L1, PE-220L und AL-122L, AL-160L, AL-220L	WA-2	AL	∅74x9mm, Z.-No 0030
Shafts for housing	WO	A2 (=1.4305)	∅12x64/77mm, Z.-No 005/0016
O-Ring for shaft	O-WE	NBR 70	∅9x1,5mm
Washer for shaft, 2x	U	POM	∅18/∅12x1,2mm
Lock washer for shaft, 2x	S	A2	DIN 6799-9
2x Switching cam with 1x M4	Sch	AL	Z.-No 0017a
Mounting parts with screws for limit switches	B	PA or AL/VA2	25x20x5mm, 2x M3x32mm
Cable binder	K	Neylon	99x2,5mm
Wiring diagram/ limit switch label	Sch-S	PVC	30x30mm and 8x4 mm
Data plate	type	3M7872EC	70x32mm
Bartec limit switches: changer, closing switch and opening switch	EBS	Silver or gold plated	34x25x11mm, single pole switch 46x25x16mm, double pole switch Bartec type: 07-15.1-…/…, see page 10-13
Isolating jacketing for limit switch cable	IS	PVC	Bürklin type: 6,0x0,6-PVC, DIN 40621, ∅6mmx0,6mm, up to 90°C heat resisting
Brackets	MB	A2 (=1.4301)	70x130x45/55mm, for actuators acc. to VDI/VDE 3845
Aluminium plate fort he mounting set for linear actuators acc. to Namur IEC 534	SB-AB	Al	135x80x10mm, Z.-No 061

4.2 Components and parts lists of the low temperature limit switch box, - 55°C £ T_a £ + 70°C

Table 3: Components and parts lists of the low temperature limit switch box with Bartec limit switches

Term / Identifier	Article-No.	Material	Comments
Aluminium empty housing with closed cover and 4x screw	AL-175L-T AL-122L-T AL-160L-T AL-220L-T	AL-Si 12 AL-Si 12 AL-Si-12 AL-Si-12	175x80x57mm, Bartec type: 07-5180-1750/8057 122x122x90mm, Bartec type: 07-5180-1221/2090 160x160x90mm, Bartec type: 07-1580-1601/6090 220x120x90mm, Bartec type: 07-5180-2201/2090 al cover sealings are heat resistant : -55°C up to +100°C
Cable glands	KL-T-Ms-T	Messing plated	M20x1,5mm, M16x1,5mm with LSR packet seal, ∅13-7mm, ∅10-4,5mm Pflitsch type: U 28. UNI Ex e, -60°C up to +180°C
Cable glands	KL-T-VA-T	A2 (=1.4305)	M20x1,5mm, M16x1,5mm with LSR packet seal, ∅13-7mm, ∅10-4,5mm Pflitsch type: U 28. UNI Ex e, -60°C up to +180°C
Clamps	V	Plastic	2,5mm², grey Bartec type: 07-9702-0220/1 und 07-9702-0320/1, heat resistant: -55°C up to +120°C
Ground plates: AL-122L, -160L, -220L	PL-122L,-220L, -160L	A2 (=1.4301)	106x105x1,5mm and 207x107x1,5mm
Screws, lock washers for ground plate, 4x	B-Sch, B-F	A2	M6x10mm, ∅6mm
Aluminium shaft bearing body: AL-175L	WA-1	AL	∅64x13mm, Z-No 0029
O-Ring	O-1-WA-T	Silikon	∅57x2mm and ∅62x3mm, heat resistant: -55°C up to +200°C
Aluminium shaft bearing body: AL-122L, AL-160L, AL-220L	WA-2	AL	∅74x9mm, Z.-No 0030
Shafts for housing	WO	A2 (=1.4305)	∅12x64/77mm, Z.-No 005/0016
O-Ring for shaft	O-WE	NBR 70	∅9x1,5mm, heat resistant: -55°C up to +200°C
Washer for shaft, 2x	U	POM	∅18/∅12x1,2mm
Lock washer for shaft, 2x	S	A2	DIN 6799-9
2x Switching cam with 1x M4	Sch	AL	Z.-No 0017a
Mounting parts with screws for limit switches	B	PA or AL/VA2	25x20x5mm, 2x M3x32mm
Wiring diagram/ limit switch label	Sch-S	PVC	30x30mm and 8x4 mm
Stainless steel data plate, fixed with groove pin	Typ-T	A2 (=1.4301)	65x35x0,5mm, heat resistant: -55°C up to +100°C
Bartec limit switches: changer, closing switch and opening switch	EBS	Silver or gold plated	34x25x11mm, single pole switch 46x25x16mm, double pole switch Bartec type: 07-15.1-…/…, see page 10-13
Isolating jacketing for limit switch cable	IS-T	Silikon	Bürklin type: 6,0x0,6-PVC, DIN 40628, Sil (F163.900), ∅6mmx0,6mm, Temp.-beständigkeit: -60°C bis +200°C
Brackets	MB	A2 (=1.4301)	70x130x45/55mm, for actuator acc. to VDI/VDE 3845
Aluminium plate for the mounting set for linear actuators acc. to Namur IEC 534	SB-AB	Al	135x80x10mm, Z.-No.: 061

5. Appendix

5.1 Images of the limit switch boxes

Image 5: Polyester and aluminium limit switch boxes for rotary actuators, - 20°C ≤ T_a ≤ + 70°C, 160x75x55mm/175x80x57mm, IP 65

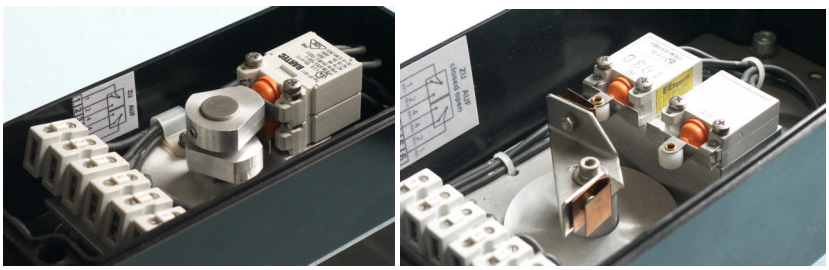


Image 6+7: Inner views of different Polyester limit switch boxes, - 20°C ≤ T_a ≤ + 70°C, IP 65

Image 8+9: Low temperature limit switch box, aluminium housing, 175x80x57mm, for rotary actuators, **- 55°C** £ **T_a** £ **+ 70°C,** 175x80x57mm, IP 65

Image 10: Low temperature limit switch box, aluminium housing, 175x80x57mm, for linear actuators, **- 55°C** £ **T_a** £ **+ 70°C,** 175x80x57mm, IP 65, inner view see image 9

5.2 Data sheets of limit switches and operating instructions of cable glands

5.2.1 Data sheet limit switches

(Attention: left site insert switch will be used only in our limit switch boxes !!!)

Insert switch/limit switch BARTEC

Insert switch

Limit switch

Description

Insert switch with connection cores

This switching element can be universally used for switching, controlling and regulating operations within Ex-areas. The insert switch is audited by the PTB according to the latest EC guideline 94/9/EC. Devices equipped with these insert switches have to be approved by a testing authority, the switch itself needs not be retested.
The cores are cast-in at the back of the switch. Their standard length is 500 mm; other lengths are available on request. To connect the cores we recommend the miniterminals from BARTEC.

Limit switch witch connection cable

The limit switches have been developed for Ex-areas where safe and reliable signalling is required, for example on pumps, petrol pumps, as well as in mechanical and high-tec engineering. The switches must be mounted into the respective devices or systems in such a way as to guarantee mechanical protection. No further tests are required. The connection cable is cast in on the back of the switch. For the connection in Ex-areas BARTEC provides a large variety of terminals and terminal boxes.

Explosion protection

Ex protection type

Insert switch	II 2G Ex d IIC
	I M2 Ex d I
Limit switch	II 2G Ex d IIC T6
	II 2D Ex DA21 IP 66 T 80 °C

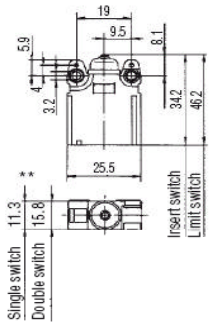
Certifications

Insert switch	PTB 98 ATEX 1032 U
	IECEx PTB 07.0040 U
Limit switch	PTB 00 ATEX 1093 X
	IBExU01ATEX1007 X
	IECEx PTB 07.0045 X

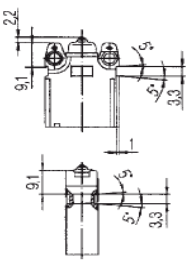
Ambient temperature

-20 °C to +40 °C (-55 °C to +75 °C)
-20 °C to +75 °C for DustEx
-55 °C on request

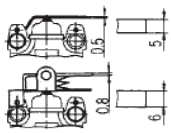
Dimensions in mm



Clip-on pockets



Lever widths



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Insert switch/limit switch

BARTEC

Technical data

Ex d Insert switch/limit switch
EN 60947-5-1
EN 60947-1

Protection class
IEC/EN 60529:IP 66

Electrical data for control switch in accordance with DIN EN 60947-5-1
Rated operating voltage AC 400 V
Utilization category
AC-15 2 A 400 V
DC-13 0.15 A 250 V
Isolation voltage 400 V
(further electrical data on request)

Electrical data for switch
Rated current
AC 2 A 400 V
AC 7 A 250 V
DC 0.5 A 250 V
(further electrical data on request)

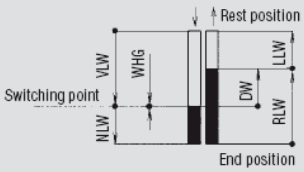
Ambient temperature +40 °C		
AC switching capacity		
	ohmic load	inductive load cos φ = 0,6
400 V	3 A	2 A
250 V	5 A	3 A
30 V	7 A	5 A
DC switching capacity		
	ohmic load	inductive load L/R = 3 µs
250 V	0.4 A	0.03 A
30 V	7 A	5 A

Tightening torque of fixing screws
0.6 Nm

Rating of gold-coated contacts
Voltage: min. 5 V/max. 30 V
Current: min. 4 mA/max. 400 mA

- the product of voltage and current should not exceed 0.12 VA
- for alternating current these values have to be interpreted as peak values

Contact Travels



Contact break distance 2 x ≥ 0.3 mm		
Contact travels (in mm)		
Pretravel	VLW	max. 0.9
Overtravel	NLW	min. 0.5
Differential value	DW	max. 0.45
Release travel	RLW	0.9
Release travel	LLW	0.1 to 0.45
Repeat accuracy WHG (for repetetive actuation)		± 0.02

Service life	
mechanical	> 2 x 10^6
electrical	dependent on load
max. switching rate	1000 operations/h
Switching actuation force	
Single-break switch	max. 2.0 N
Double-break switch	max. 3.6 N
Reset force	
Single-break switch	min. 0.4 N
Double-break switch	min. 0.8 N
Operating rate	≥ 10 µm/sec.

Electrical connection
- Insert switch: cores 4 GAF 0.75
- Limit switch:
  cable H05VV-F 0.75/A05VV-F 0.75
  (other cables on request)

Conductor diameter
2-wire 6.1 $^{\pm 0.3}$ mm
3-wire 6.6 $^{\pm 0.3}$ mm
4-wire 6.7 $^{\pm 0.3}$ mm
6-wire 8.9 $^{\pm 0.3}$ mm

Contact element
snap-action contact element (double-break) as, normally-open, normally-closed, changeover contact as well as N/0 + N/C contacts for circuits with equal potentials.

Contact material
Silver or gold-coated contacts
(all contact elements have a standard protective gold-coating as standard)

Double-break switch (switch options)
- *simultaneous switch sequence:*
  chamber I and II almost simultaneous
- *defined switch sequence:*
  chamber I switches mechanically safe 0.03 up to 0.3 mm before chamber II

Weight
- Insert switch with 500 mm cores:
  single-break switch 35 g,
  double-break switch 70 g
- Limit switch with 3 m cable:
  single-break switch 210 g,
  double-break switch 415 g

Housing material
plastic (thermoplastics)

Plunger/additional actuator
stainless steel

Technical data subject to change without notice.

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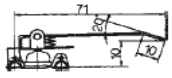
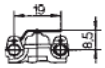
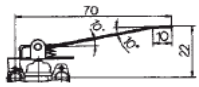
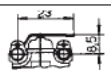
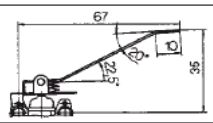
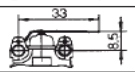
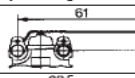
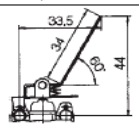
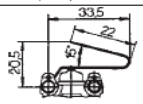
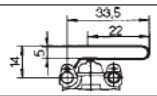
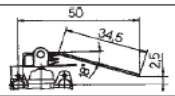
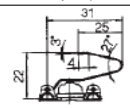
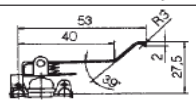
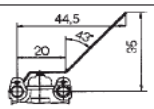
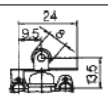
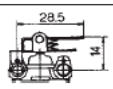
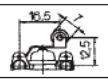
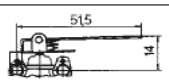
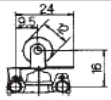
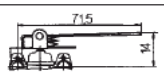
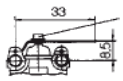
Rauter Sensor-Boxes
Inh. Dipl.-Ing. Peter Rauter
Düsseldorfer Straße 186
D-41460 Neuss (Germany)
Tel +49 (0) 2131 / 38 47 008
Fax +49 (0) 2131 / 38 47 009
info@sensor-boxes.de
www.sensor-boxes.de

Insert switch/limit switch

BARTEC

Selection chart Single-break switch

Type of contact		Additional actuator*			
Switch chamber **1**	Code no.	Options	Code no.	Options	Code no.
2 (BN) 1 (BU)	10	without additional actuator	00		44
			01		45
			02		46
			03		
4 (BN) 3 (BU)	20		04		47
			21		
			22		48
2 (GY) 4 (BN) 1 (BK)	30		23		49
			24		plastic roller 61
					metal roller 62
2 (BN) 4 (GY) 1 (BU) 3 (BK)	40		41		plastic roller 63
					metal roller 64
			42		plastic roller 66
			43		adjusting screw 73

Complete order no. 07- □ 511- □ □ □□ / □□

Please enter code number.

( ) Code for connection cable

* Dimensions for additional actuator are reference values

** When packing several switches, these dimensions are reduced to 11 mm resp. 15.5 mm

Insert switch with connection cores	1
Limit switch with connection cable	2

Length of connection cores in 100 mm
e.g. **5** = 500 mm
Length of connection cable in meters
e.g. **3** = 3 m
Please specify greater lengths in plain text, code no. = **0**

Contact material	
1	Silver
3	Gold-coated contacts

03-0330-0154-08/08-BCS-129306/3

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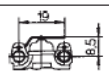
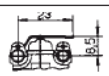
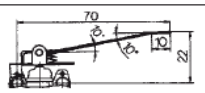
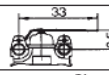
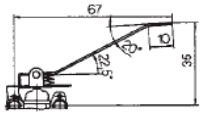
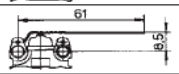
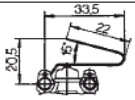
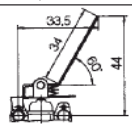
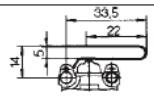
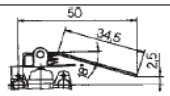
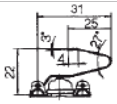
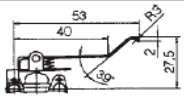
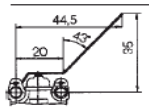
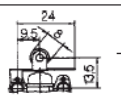
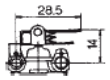
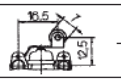
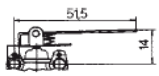
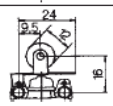
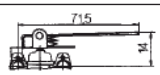
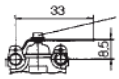
Insert switch/limit switch

BARTEC

Selection chart Double-break switch

Type of contact				Additional actuator*			
	Switch chamber 1	Switch chamber 2	Code no.	Variante	Code no.	Variante	Code no.
simultaneous switch sequence	12 (GY) / 11 (BK)	22 (BN) / 21 (BU)	11	without additional actuator	00		
					01		44
	14 (GY) / 13 (BK)	22 (BN) / 21 (BU)	21		02		45
	14 (GY) / 13 (BK)	24 (BN) / 23 (BU)	22		03		46
					04		
	12 14 (2) (3) / 11 (1)	22 24 (5) (6) / 21 (4)	33		21		47
	12 14 / 11 13	22 24 / 21 23	44		22		48
defined switch sequence	12 (GY) / 11 (BK)	22 (BN) / 21 (BU)	1A		23		49
	14 (GY) / 13 (BK)	22 (BN) / 21 (BU)	2A		24		plastic roller 61
							metal roller 62
	14 (GY) / 13 (BK)	24 (BN) / 23 (BU)	2B		41		plastic roller 63
							metal roller 64
	12 14 (2) (3) / 11 (1)	22 24 (5) (6) / 21 (4)	3C		42		plastic roller 66
	12 14 / 11 13	22 24 / 21 23	4D		43		adjusting screw 73

Complete order no. 07- ☐ 511- ☐ ☐ ☐☐ / ☐☐

Please enter code number.

( ) Code for connection cable

* Dimensions for additional actuator are reference values

** When packing several switches, these dimensions are reduced to 11 mm resp. 15.5 mm

Insert switch with connection cores	1
Limit switch with connection cable	2

Length of connection cores
5 = 500 mm
Length of connection cable
3 = 3 m
Please specify other lengths in plain text, code no. = **0**

Contact material	
1	Silver
3	Gold-coated contacts

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03-0330-0154/A-07/10-BCS-129306/4

5.2.2 Operating instruction 1, cable gland in plastic housing, limit switch box, - 20°C £ T_a £ + 70°C

U.I. LAPP GmbH
Schulze-Delitzsch-Straße 25
D- 70565 Stuttgart
Tel. 07 11/78 38-01
Fax 07 11/78 38-2 64
Internet www.lappkabel.de

Niederlassungen:
Hannover
Oberhausen

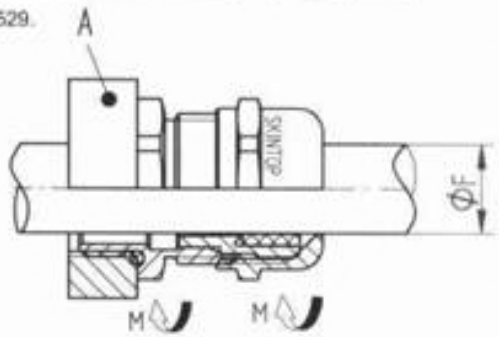
LAPP KABEL

Betriebsanleitung / Instruction sheet
SKINTOP® MS-M-ATEX / MSR-M-ATEX

II2G EExeII / II1D IP6X IBExU 01 ATEX 1041 X

Artikel Part	Klemm- und Dichtbereich ØF Clamping and Sealing range ØF mm	Drehmoment M Torque M Nm	Farbe Dichtring Gland color
SKINTOP® MS-M12 ATEX	3-7	7	schwarz / black
SKINTOP® MS-M16 ATEX	4,5-10	7	schwarz / black
SKINTOP® MS-M20 ATEX	7-13	12	schwarz / black
SKINTOP® MS-M25 ATEX	9-17	12	schwarz / black
SKINTOP® MS-M32 ATEX	11-21	17	schwarz / black
SKINTOP® MS-M40 ATEX	19-28	17	schwarz / black
SKINTOP® MS-M50 ATEX	26-35	20	schwarz / black
SKINTOP® MS-M63 ATEX	34-45	20	schwarz / black
SKINTOP® MS-M63 PLUS ATEX	44-55	30	schwarz / black
SKINTOP® MSR-M12 ATEX	2-5	7	grau / grey
SKINTOP® MSR-M16 ATEX	4-7	7	grau / grey
SKINTOP® MSR-M20 ATEX	5-10	12	grau / grey
SKINTOP® MSR-M25 ATEX	6-13	12	grau / grey
SKINTOP® MSR-M32 ATEX	7-15	17	grau / grey
SKINTOP® MSR-M40 ATEX	16-23	17	grau / grey
SKINTOP® MSR-M50 ATEX	19-29	20	grau / grey
SKINTOP® MSR-M63 ATEX	32-39	20	grau / grey

Schutzart / IP-Protection: IP66 / IP68 , EN 60529.
Für SKINTOP® MS-M63 PLUS ATEX IP66
Temperaturbereich / Temperature range: -30°C bis +90°C.



Montage / Assembly

1. SKINTOP® in Gehäuse einschrauben (A) (Drehmoment M).
   Screw SKINTOP® into housing (A) (Torque M).
2. Leitung einführen.
   Put cable through.
3. Hutmutter festziehen, (Drehmoment M).
   Tighten nutcap, (Torque M).

Hinweis / Note:

1. Die Verschraubungen dürfen ausschliesslich für Kabel ohne Bewehrung oder Umspinnung sowie nur für feste Installation verwendet werden.
   The cabel entries may be used only for non-armouring cables and only for solid installation.
2. Bei mehrmaliger Verwendung ist auf Unversehrtheit des Kunststoffeinsatzes zu achten.
   The plastic insert must be undamaged at multiple use.
3. Sollte der Inhalt dieser Verpackung auf neue Verpackungen verteilt werden, so muß jeder neuen Verpackung eine Kopie dieser Bedienungsanleitung beigelegt werden.
   If the content of this bag will be split on two ore more units, a copy of this instruction sheet must be placed in every packing units.

Art.Nr. 99996620

5.2.3 Operating instruction 2, cable gland in messing housing, limit switch box, - 55°C £ T_a £ + 70°C

CE 0102

PFLITSCH
Kompetenz im Kabelmanagement
Stand: 22.06.2006

Operating and assembly instructions for cable glands (KV/CG)
of the ignition protective class Ex "e"
Type: U 2. UNI Ex e, brass nickel-plated

Application
The cables glands (KVs/CGs) U 2. UNI Ex e are used to insert permanently laid lines and cables into a connection space or housing of an explosion-protected electrical operating material of the appliance group II and categories 2 G/D and 3 G/D. The connection space or housing must conform to the ignition protective class "Increased safety – Ex e" in accordance with the standards EN 60079-0:2004, EN 60079-7:2003 and EN 50281-1-1:1999.
The KLE is suitable for operating material with the degree of mechanical risk "high" as per EN 60079.
In selecting the material for the sealing insert, the ambient, surface and operating temperature at the installation point is to be observed.
With proper assembly of the KLE, the protective class IP 68 according to IEC 529 or EN 60529 can be attained.

Designation
The KLE U 2. UNI Ex e conforms with the standards EN 60079-0:2004, EN 60079-7:2003 and EN 50281-1-1:1999. They were subjected to an EC design test in accordance with EC directive 94/9/EC by the Physical-Technical Federal Institute (PTB).
They are therefore designated as follows:

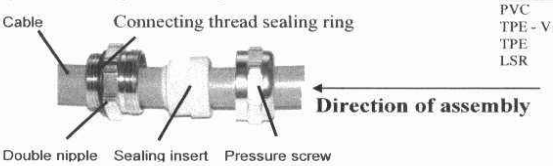
II 2 G/D Ex e II PTB 98 ATEX 3109 IP 68 XX CE0102

and with the connecting thread type and size, e.g. M 16 or Pg 21.

Application temperature range:

Material	Temperature range
PVC	- 20° C - + 85° C
TPE - V	- 40° C - + 135° C
TPE	- 40° C - + 115° C
LSR	- 60° C - + 180° C

Assembly



The Pflitsch socket spanner M28 can be used as a tool.

Minimum wall thicknesses for installation in appliances with threaded holes: 5.0 mm (plastic); 3.0 mm (metal)
Minimum wall thicknesses for installation in appliances with throughholes: 2.0 mm (plastic); 1.0 mm (metal)

Pointer for strain relief of the cable gland:
The KLE with the standard pressure screw is only suitable for permanently laid lines and cables. In this case, the operator must adopt appropriate measures to ensure strain relief.

Sealing rings must not be cut out with a knife
Housing holes that are not used must be sealed with an Ex closure plug. KLEs with corresponding thread sizes are to be sealed with a closed sealing insert or with a UNI Ex e blind sealing insert. Non-used holes of multi-sealing inserts are to be sealed with a bolt.

Disassembly:
Disassembly is carried out in the reverse order.
Maintenance:
The KLEs are to be included in the inspection and maintenance of the electrical operating material.

Connection dimensions for throughholes

metr.	M 10	M 12	M 16	M 20	M 25	M 32	M 40	M 50	M 63	M 72
d [mm] 0/+ 0,3	10,0	12,0	16,0	20,0	25,0	32,0	40,0	50,0	63,0	72,0
Pg	7	9	11	13,5	16	21	29	36	42	48
d [mm] 0/+0,3	12,5	15,5	19	20,5	22,5	28,5	37	47	54	59,5
NPT	3/8"	½"	¾"	1"	1 ¼"	1 ½"	2"			
d [mm] 0/+0,3	17,1	21,3	26,6	33,3	42,0	48,1	60,1			

Tightening torque

thread	M10	M12	M16	M20	M25	M32	M40	M50	M63	
Nm	6	6	8	10	10	15	20	20	20	
thread	Pg 7	Pg 9	Pg 11	Pg 13,5	Pg 16	Pg 21	Pg 29	Pg 36	Pg 42	Pg 48
Nm	6,25	6,25	6,25	6,25	7,5	10	10	10	10	10

Seite 3 von 4

5.2.4 Operating instruction 3, cable gland in stainless steel housing, limit switch box, - 55°C £ T_a £ + 70°C

CE 0102

PFLITSCH
Kompetenz im Kabelmanagement
Stand: 22.06.2006

Operating and assembly instructions for cable glands (KV/CG)
of the ignition protective class Ex "e"
Type: U 28. UNI Ex e, stainless steel:

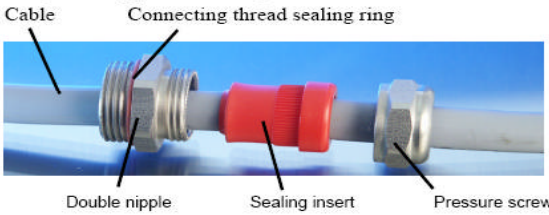
Application
The cables glands (KVs/CGs) U 28. UNI Ex e are used to insert permanently laid lines and cables into a connection space or housing of an explosion-protected electrical operating material of the appliance group II and categories 2 G/D and 3 G/D.
The connection space or housing must conform to the ignition protective class "Increased safety – Ex e" in accordance with the standards EN 60079-0:2004, EN 60079-7:2003 and EN 50281-1-1:1999.
The KLE is suitable for operating material with the degree of mechanical risk "high" as per EN 60079.
In selecting the material for the sealing insert, the ambient, surface and operating temperature at the installation point is to be observed.
With proper assembly of the KLE, the protective class IP 68 according to IEC 529 or EN 60529 can be attained.

Designation
The KLE U 28. UNI Ex e conforms with the standards EN 60079-0:2004, EN 60079-7:2003 and EN 50281-1-1:1999. They were subjected to an EC design test in accordance with EC directive 94/9/EC by the Physical-Technical Federal Institute (PTB).
They are therefore designated as follows:

II 2 G/D Ex e II PTB 01 ATEX 3104X IP 68 XX CE 0102

and with the connecting thread type and size, e.g. M 16.

Assembly



Application temperature range:

Material	Temperature range
PVC	- 20° C - + 85° C
TPE - V	- 40° C - + 135° C
TPE	- 40° C - + 115° C
LSR	- 60° C - + 180° C

The Pflitsch socket spanner M28 can be used as a tool.

Minimum wall thicknesses for installation in appliances with threaded holes: 5.0 mm (plastic); 3.0 mm (metal)
Minimum wall thicknesses for installation in appliances with throughholes: 2.0 mm (plastic); 1.0 mm (metal)

Pointer for strain relief of the cable gland:
The KLE with the standard pressure screw is only suitable for permanently laid lines and cables. In this case, the operator must adopt appropriate measures to ensure strain relief.

Sealing rings must not be cut out with a knife
Housing holes that are not used must be sealed with an Ex closure plug. KLEs with corresponding thread sizes are to be sealed with a closed sealing insert or with a UNI Ex e blind sealing insert. Non-used holes of multi-sealing inserts are to be sealed with a bolt.

Disassembly:
Disassembly is carried out in the reverse order.

Maintenance:
The KLEs are to be included in the inspection and maintenance of the electrical operating material.

Connection dimensions for throughholes										
metr.	M 10	M 12	M 16	M 20	M 25	M 32	M 40	M 50	M 63	M 72
d [mm] 0/+ 0,3	10,0	12,0	16,0	20,0	25,0	32,0	40,0	50,0	63,0	72,0
Pg	7	9	11	13,5	16	21	29	36	42	48
d [mm] 0/+0,3	12,5	15,5	19	20,5	22,5	28,5	37	47	54	59,5
NPT	3/8"	½"	¾"	1"	1 ¼"	1 ½"	2"			
d [mm] 0/+0,3	17,1	21,3	26,6	33,3	42,0	48,1	60,1			

Tightening torque

thread	M10	M12	M16	M20	M25	M32	M40	M50	M63	
Nm	6	6	8	10	10	15	20	20	20	
thread	Pg 7	Pg 9	Pg 11	Pg 13,5	Pg 16	Pg 21	Pg 29	Pg 36	Pg 42	Pg 48
Nm	6,25	6,25	6,25	6,25	7,5	10	10	10	10	10