Documentation

about

Ex eb mb … and **Ex eb db … 4 - 250 V AC/DC limit switch boxes**

with

reed limit switches

for

pneumatic rotary- and **linear actuators**

acc. to

directive 2014/34/EU, IBExU 07 ATEX 1155

II 2G Ex eb mb IIC T6 Gb **II 2D Ex tb IIIC T 80°C Db**

and

II 2G Ex eb db IIC T6 Gb **II 2D Ex tb IIIC T 80°C Db**

Rauter Sensor-Boxes
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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 actuated with pneumatic rotary or linear actuators 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 a limit switch box which is placed above/at the actuator, see image 1-3.

Use of the above mentioned limit switch boxes can be found in endangered ex-plosive areas equipment group II, category 2G, zones 1, 2 or 2D zones 21, 22.

Image 1-3: left**:** stainless steel limit switch box, Aisi 304, size: 150x150x80mm, with stainless steel bracket for rotary actuators acc. to VDI/VDE 3845, midle and rigth: stainless steel limit switch box, Aisi 304, size: 300x150x80mm and size: 150x150x80mm with mounting set for linear actuators acc. to NAMUR IEC 534

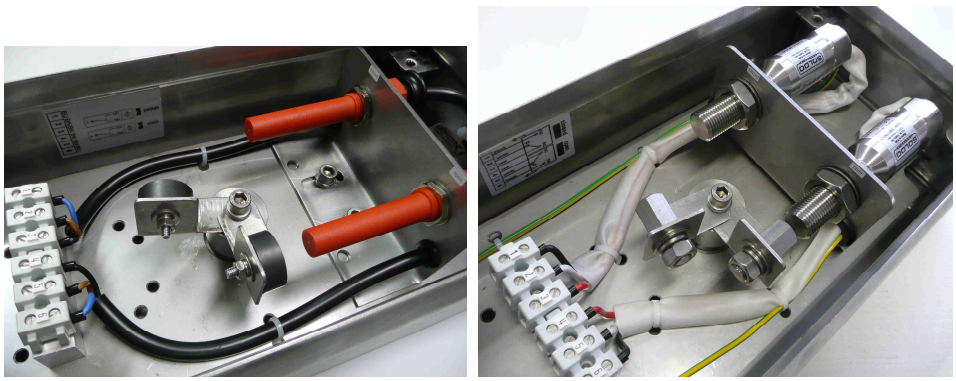

Image 4+5: possible versions of limit switches: Bernstein-Reed limit switches with silver coated contacts or Soldo-Reed limit switches with gold coated contacts, adjustable switching cams with mounted magnets

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2. Technical specifications

Table 1: Technical specifications as well as conditions of use fort the limit switch boxes

Term/Identifier:	**Technical specifications:**
material and sizes:	stainless steel, Aisi 304, size: 300x150x80mm and 150x150x80mm
actuator connection:	for rotary actuators acc. to VDI/VDE 3845 or for linear actuators with mounting set acc. to NAMUR IEC 534
temperature range :	- 20°C ≤ T_a ≤ + 60°C
protection class:	IP 65
ATEX identification:	**II 2G Ex eb mb IIC T6 Gb** **II 2D Ex tb IIIC T 80°C Db** **II 2G Ex eb db IIC T6 Gb** **II 2D Ex tb IIIC T 80°C Db**
temperature class	T6
versions of limit switches: Bernstein limit switches: MAK-1513-LEX-1 Soldo limit switches: BMN311E-E1A23A6 R.Stahl limit switches: 8064/11	details see table 2
1-2x cable glands 1-2x adapter for cable glands 1-2x cable glands for steel wire armoured cable SWA	M20x1,5mm, clamp range ∅9-13mm ½“ NPT M20x1,5mm, clamp range ∅15,5-21,1mm, ∅6,7-14mm
cable glands	max. 2,5mm², 2x 3-pole
weight (without bracket and mounting set)	approx. 4 kg/stainless steel limit switch box size 300x150x80mm approx. 2,5 kg/stainless steel limit switch box size 150x150x80mm
switching range	0° up to 180° or up to 360°

Table 2: electrical data of limit switch boxes

Norminal voltage	**R.Stahl 8064/11**		**Berstein MAK-1513-LEX-1**	**SOLDO BMN311E-E1A23A6**	
	Ohmic load	**Inductive load**		**Ohmic load**	**Inductive load**
400 V AC	3 A	2 A	-	-	-
250 V AC	5 A	3 A	1 A	1 A	0,5 A
250 V DC	0,4 A	0,03 A	1 A	-	-
30 V AC/DC	7 A	5 A	1 A	1 A	0,5 A

3. Connecting limit switches, fixing switching cams/switching contacts and mounting the cover

During the cable glands, limit switches will be connecting acc. to operating instructions, see page 11-14 and acc. to wiring diagrams, see 6-8. The wiring diagrams are always fix in the housing.

Metal parts, brackets for rotary actuators and mounting set kits for linear actuators, are necessary connecting on the ground and metal housing are connecting to the equipotential bonding. Earth terminals, screwed bolt M6, are at the cover and in the housing.

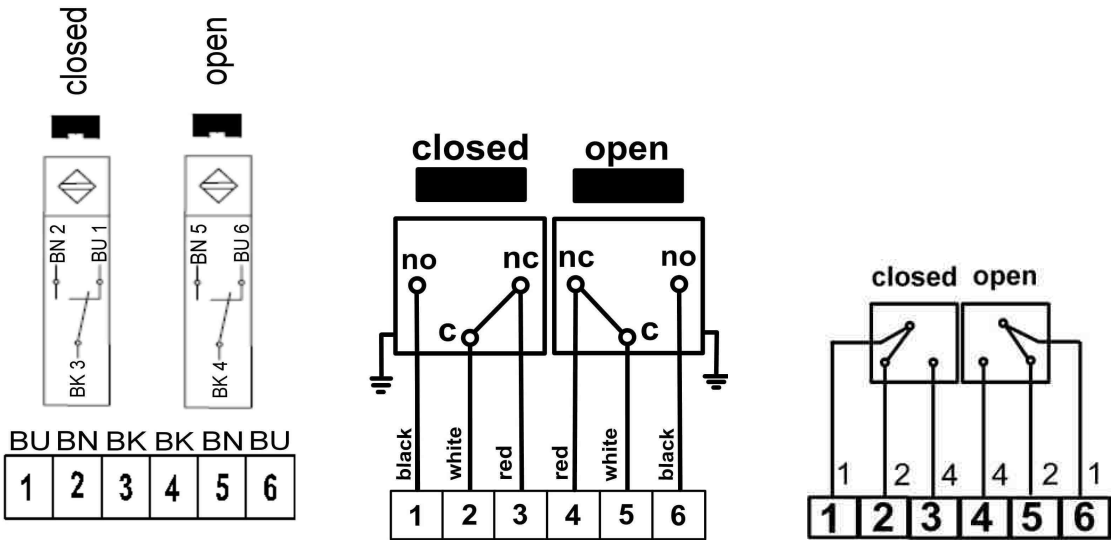


Image 6-8: wiring diagrams for connecting the possible versions of limit switches, see table 1: **left**: Ex m … Bernstein reed limit switches, **middle:** Ex d … Soldo reed limit switches, **right**: Ex d … R.Stahl limit switches, all limit switches are connecting on a 6-pole clamp

Both adjustable stainless steel switching cams with the mounted magnets for the Soldo and Bernstein limit switches can be tighten with a hexagon socket screw M6, SW 5mm.

Both adjustable aluminium switching contacts for the R.Stahl limit switches are can be tighten with a hexagon socket screw M4, SW 2mm.

Necessary turn the cover locking pins correctly into the housing lock !

4. **Components** and **parts list**

Table 3: Components and parts list about the limit switch boxes

Term/Identifier:	**Idend-No.:**	**Material:**	**Technical specifications:**
Rittal housing 1: housing and closed cover with sealing	EB-VA-300	Aisi 304 optional Aisi 316Ti	Ident-No.: KL 1522.010, 300x150x80mm
Rittal housing 2: housing and closed cover with sealing	EB-VA-150	Aisi 304 optional Aisi 316Ti	Ident-No.: KL 1521.010, 150x150x80mm
Cover locking pins sealing: 4x Locking pins 4x Plastic bush 4x O-Ring 4x O-Ring 4x Lock washer for shaft	EB-VA-300/150-D	 Stainless steel Plastic NBR Silikon Stainless steel	 5x36mm, Ident-No.: 315733 Ident-No.: 220267 5x2mm, Ident-No.: 220240 13x3mm, Ident-No.: 220507 Ident-No.: 321759
Shaft for EB-VA-300	EB-W-VA-300	Stainless steel	Drawing-No.: 102
Shaft system for EB-VA-300	EB-WD-VA-300	Stainless steel	Drawing-No.: 101
Pllate for EB-VA-300	EB-PL-VA-300	Aisi 304	Drawing-No.: 100
Holder for limit switches for EB-VA-300	EB-HS-VA-300	Aisi 304	Drawing-No.: 105
Holder for clamps for EB-VA-300	EB-HK-AL-300	Aluminium	Drawing-No.: 107
Shaft for EB-VA-150	EB-W-VA-150-D	Stainless steel	Drawing-No.: 008
Shaft for EB-VA-150	EB-W-VA-150-H	Stainless steel	Drawing-No.: 060
Shaft system for EB-VA-150	EB-WD-VA-150	Aluninium	Drawing-No.: 030
Plate for EB-VA-150	EB-PL-VA-150	Aisi 304	Drawing-No.: 021
Cable entry grommets	EB-DTF	PVC	∅□mm und ∅□□mm
Protective tube	EB-Sch-S	Silikon	∅□mm und ∅□□mm
Bartec clamp 2x 3-pole	EB-K	Polyester/ Polyamide	Ident-No.: 07-9702-0320/1, max. 2,5mm², grey
Bernstein limit switch, 2x	EB-B	Polyamide	MAK-1513-LEX-1
Soldo limit switch, 2x	EB-S	Stainless steel	BMN311E-E1A23A6
R.Stahl limit switch, 2x	EB-ST	Thermoplast	8064/11
Switching cams for Bernstein and Soldo limit switches	EB-Sch-Be-So	Aisi 304 and Magnet	Drawing-No.: 110a +110b
Switching kontacts for Stahl limit switches	EB-Sch-AL	Aluminium	Drawing-No.: 111
1-2x Plitsch cable gland with 2x hexagon nut M20x1,5mm and Silikon O-ring	EB-KL-VA	Aisi 304 optional Aisi 316Ti	Ident-No.: 22052sti8ex, M20x1,5mm, clamp range 8,0-5,0mm
1-2x R.Stahl ½“ NPT connector with 2x hexagon nut M25x1,5mm and Silikon O-ring	EB-A-VA	Stainless steel	Ident-No.: 8295/1A3-M25x1,5
1-2x Hugro cable gland for steel wire armoured cable SWA with 2x hexagon nut M20x1,5mm an fibre washer	EB-V	Aisi 316L	Ident-No.: 115.2020.31.W, M20x1,5mm, ∅15,5-21,1mm, ∅6,7-14mm
O-Ring for shaft EB-VA-150	EB-O-W-150	NBR 70	9x1,5mm
O-Ring for shaft EB-VA-300	EB-O-W-300	NBR 70	10x2mm
O-Ring f. shaft system f. EB-VA-150 + EB-VA-300	EB-O-WD	NBR 70	65x3mm
Washer for shafts for EB-VA-150 + EB-VA-300	EB-D	POM and Stainless steel	∅18/∅12x1,2mm und ∅22/∅16x0,1-0,5mm
Lock washer for shaft for EB-VA-150	EB-S-W-150	Stainless steel	RA 9, DIN 6799-9
Lock washer for shaft for EB-VA-300	EB-S-W-300	Stainless steel	RA 12, DIN 6799-9
Screws with washers and spring rock washers	EB-Schr.	Stainless steel	M3-M6, DIN 84, 912, 963 …
Cable binder	EB-K	Neylon	99x2,5 mm
Wiring diagram and limit switch sign	EB-Sch	PVC	Approx. 40x30mm and 8x4 mm
Plate for mounting set acc. to Namur IEC 534	EB-AB	Aisi 304	135x80x10mm, D.-No.: 061

5. Data sheet limit switches

5.1 Data sheet Bernstein limit switches

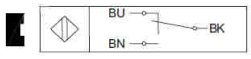
Technical Data BERNSTEIN

Magnetic Switch

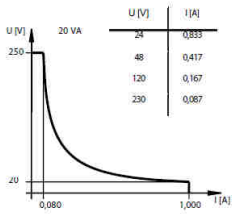
Series MAK-15

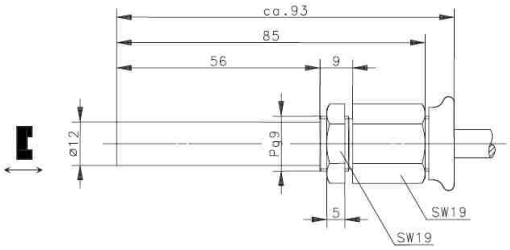
Description **MAK-1513-LEX-1**	Article number **6316315308**

Wiring diagram



Switching diagram





Identifying characteristics in accordance with EN 60947-5-2 and EN 62246-1

Electrical data		
Assured operating distance	S_a	10 mm
Output		changeover function
Max. voltage		250 V AC/DC
Max. switch current		1 A
Max. switching		20 VA
Min. switching		3 VA
Mechanical lifetime		3 x 10^8 switchings, however, according to the load resetability
Repeat accuracy	R	± 0,1mm (under same geometrical conditions at the same temperature)
Differential travel	H	max. 20 mm
Shock		10 g (11 ms, 1/2 sinus-wave)
Vibration		15 g (50-2000 HZ)
Reference magnet		T-62 N/S

Mechanical data	
Enclosure	PA6, red
Ambient air temperature	-5 °C ... +60 °C (moving cable); -20 °C ... +60 °C (cable fixed mounted)
Protection class	IP 67 acc. to EN 60529
Connection	Cable 3 x 0,75 mm² x 1 m
Assembly position	optional
Fixing accessories	hex nut PG9, POM

EU Conformity
CE 0637

Approvals	Ex
KEMA 03ATEX1399 X	II 2 G Ex mb IIC T6 Gb II 2 D Ex tb IIIC T85 °C Db

5.2 Data sheet Soldo limit switches (new type: BMN311E-E1A23A6 = old type: BMT1N3-2)

SOLDO CONTROLS

BM / TB proximity switches

The SOLDO BM and TB Series Proximity Switches, provides a compact design and a cost saving solution for remote valve position feedback in both linear and rotary applications, as well as general purpose feedback in explosive atmosphere or subsea environments.

The rugged design and ease installation system, provide maximum application versatility.

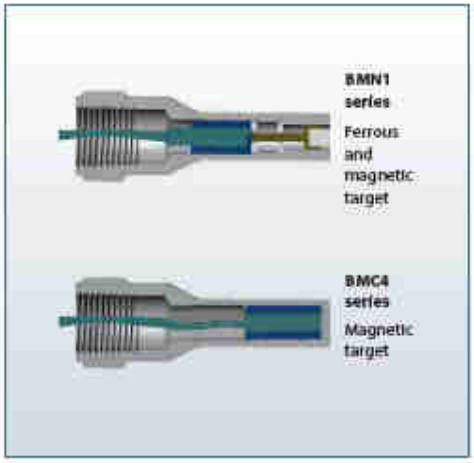
TB series is the conjunction of a BM bolt switch with an aluminum or stainless steel junction box, to allow a direct local wire connection.

BM switch utilize industrial standard 5/8-18 UNF or M16x1.5 threads and each switch is provided with two heavy-duty jam nuts. BM switches can be mounted with standard brackets or customized ones to suit specific applications.

TB series uses the same BM head mounting pattern with the availability of a junction box screw bottom mounting system.

Unique Design Features

- Compact position indication on linear valve
- Adaptable solution to multiple applications
- 316 stainless steel rugged BM enclosure
- 450 mm of flying leads on the BM series for wiring purposes
- Junction box feature on the TB series
- 316 stainless steel or aluminum junction box on the TB series
- Magnetic or ferrous sensing target capabilities (see the switch options for more info)



Linking the Process with the Control Room

Product Ordering Matrix

Nomenclature

BM	N1	1	1	E	-	E	1	A	2	3	A	6

Series
- BM Proximity bolt switch
- TB Proximity bolt switch with integrated junction box

Switch Type
- C4 Magnetic SPDT hermetically sealed switch, max. 1A@24VDC (usable in Exia loops)
- N1 Magnetic proximity SPDT hermetically sealed switch, silver plated snap acting contacts

Switch Quantity
- 1 Nr. 1 switch or sensor
- 2 N° 2 switches (only for TB series)

Terminals
- A Circuit board with extra pass-through terminals (standard)
- 1 Flying leads (for BM series)

Coating
- 0 Black polyester powder coating (for aluminium TB series)
- E Electropolished finishing (for stainless steel TB series)

Cable Entries
- 1 N° 2 1/2" NPT cable entries (only for TB series with 2 switches)
- 2 N° 2 M20x1.5 cable entries (only for TB series with 2 switches)
- E N° 1 M20x1.5 cable entry
- D N° 1 1/2" npt cable entry

Visual Position Indicator
- 1 No visual position indicator

Approval*
- W Weather proof limit switch box
- A ATEX certified box
- G EAC certified box for Russian market, with RTN permit
- U UL certified box (available on BMC4 option)

Marking
- 0 Ordinary location
- 2 Certification marking: Ex II 2GD Exd IIC
- 7 CULUS class1/2 Div1 (available on BMC4 option)
- 8 CULUS class1/2 Div2 (available on BMC4 option)

IP Protection rating
- 2 Weather Proof 67 (available on TB series)
- 3 Weather Proof IP66/68 (available on BM series)
- 6 Subsea application up to -40 meters (available on BM series) **
- 7 Nema 4 4X (available on BMC4 option)

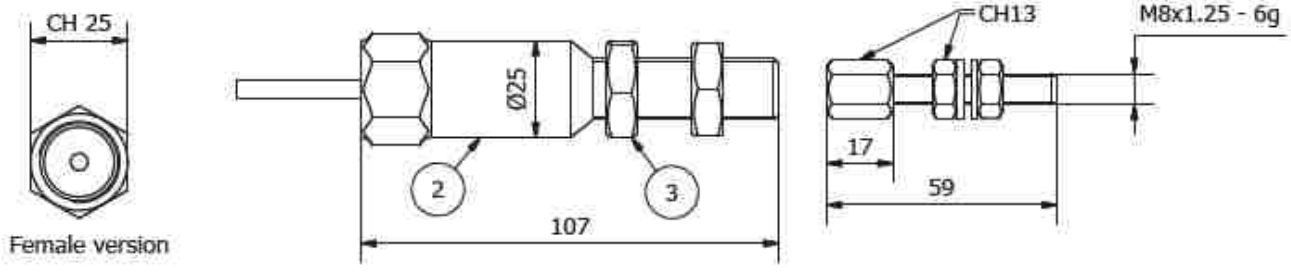
Temperature
- A Ambient temperature range: -20 +80
- L Ambient temperature range: -40 +80

Material
- 6 316 stainless steel heavy duty enclosure
- 8 316 stainless steel with aluminum junction box (only for TB series)

* SIL2 and SIL3 available on request

** SubSea cable with fast connector with standard length as follow: 5, 20, 40 mt

Type BMN311E-E1A23A6 with gold plated snap acting contacts
Ratings: 1 A @ 250 V AC, 1 A @ 30 V DC, Resistive Load
CE 0359, Ex II 2GD, Ex d IIC T6/T5/T4 Gb, Ex tb IIIC T80/T95/T115°C Db, IP66/68



5.3 Data sheet R.Stahl limit switches

Typ / Type 8064/11 (ATEX)
Typ / Type 8064/15 (ATEX)

Kleingrenztaster mit Einzeladern
Micro limit switches with single-core cables
Interrupteurs de position petit modèle avec conducteurs intégrés

Electrical data

Switching capacity to EN 60 947-5-1							
AC-15	2 A / 400 V						
DC-13	0,15 A / 250 V						
Voltage		resistive load	inductive load cos φ = 0,6	Voltage		resistive load	inductive load L/R = 0,3 µs
AC	400 V	3 A	2 A	DC	250 V	0,4 A	0,03 A
	250 V	5 A	3 A		30 V	7 A	5 A
	30 V	7 A	5 A				

Tabelle 5-2: Switching capacity to EN 60947-5-1

	8064/11-...	8064/15-...
Rated operating voltage	5 V DC ... 30 V DC	
Switching capacity	4 mA ... 400 mA	10 mA ... 400 mA

Table 5-3: Switching capacity of gold-plated contacts for DC (for AC, the values must be taken as peak values)

- Rated insulation voltage — max. 400 V
- Connection cores — 4GAF, 2 to 8 x 0.75 mm^2
- Max. switching frequency per hour 8064/11-.../ 8064/15-... — 1000 switching cycles
- Service life (electrical) — dependet on load

6. Operating instructions cable glands

6.1 Operating instructions Pflitsch cable gland

Betriebsanleitung · *Operating instructions*

PFLITSCH

PTB 01 ATEX 3104X

U 28. UNI Ex-e

Edelstahl

Anwendung:
Die Kabelverschraubungen (KLE) U 28. UNI Ex-e, dienen zur Einführung von fest verlegten Kabeln und Leitungen in einen Anschlussraum oder in ein Gehäuse eines explosionsgeschützten elektrischen Betriebsmittels der Gerätegruppe II und der Kategorien 2 G/D und 3 G/D. Der Anschlussraum oder das Gehäuse müssen der Zündschutzart „Erhöhte Sicherheit – Ex-e" nach den Normen EN 60079-0:2006, EN 60079-7:2007, EN 61241-0:2006 und EN 60241-1:2004 entsprechen. Die KLE ist für Betriebsmittel mit dem Grad der mechanischen Gefahr „ hoch" nach EN 60079-0 geeignet. Bei der Werkstoffauswahl des Dichteinsatzes ist die Umgebungs-, die Oberflächen- und die Betriebstemperatur an der Einbaustelle zu beachten.
Bei ordnungsgemäßer Montage der KLE kann die Schutzart IP 68 nach IEC 529 oder EN 60529 erreicht werden.

Kennzeichnung:
Die KLE U 28. UNI Ex-e entspricht den Normen EN 60079-0:2006, EN 60079-7:2007, EN 61241-0:2006 und EN 61241-1:2004.
Sie sind von der Physikalisch-Technischen Bundesanstalt (PTB) einer EG-Baumusterprüfung nach EG-Richtlinie 94/9/EG unterzogen worden.
Sie sind deshalb wie folgt gekennzeichnet:

Kombiniert für Gas und Staub:
II 2 G/D Ex e II Ex tD A21 IP 68
PTB 01 ATEX 3104X xx CE 0102
(xx = Anschlussgewindeart und -größe, z. B. M25, Pg 21, NPT 3/4" oder G 1/2")

Kennzeichnung Gas:
II 2G Ex e II

Kennzeichnung Staub:
II 2D Ex tD A21 IP 68

Kennzeichnung extrem kleiner Bauteile:*
II 2G/II 2D CE 0102

Weitere Zertifikate:
IECEx – IECEx PTB 10.0006X
EAC – RU C-DE.МЦ06.B.00119

*Kennzeichnung auf Kabelverschraubung

PTB 01 ATEX 3104X

U 28. UNI Ex-e

stainless steel

Application:
The cable glands (CG/CES) U 28. UNI Ex-e are used to insert permanently laid, screened 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 60079-0:2006, EN 60079-7:2007, EN 61241-0:2006, and EN 61241-1:2004. The CG/CES is suitable for operating material with the degree of mechanical risk "high" as per EN 60079-0.
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 CG/CES, the protective class IP 68 according to IEC 529 or EN 60529 can be attained.

Designation:
The CG/CES U 28. UNI Ex-e conforms with the standards EN 60079-0:2006, EN 60079-7:2007, EN 61241-0:2006 and EN 61241-1:2004.
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:

Combinated for gas and dust:
II 2 G/D Ex e II Ex tD A21 IP 68
PTB 01 ATEX 3104X xx CE 0102
(xx = connection thread type and size, e. g. M25, Pg 21, NPT 3/4" or G 1/2")

Designation gas:
II 2G Ex e II

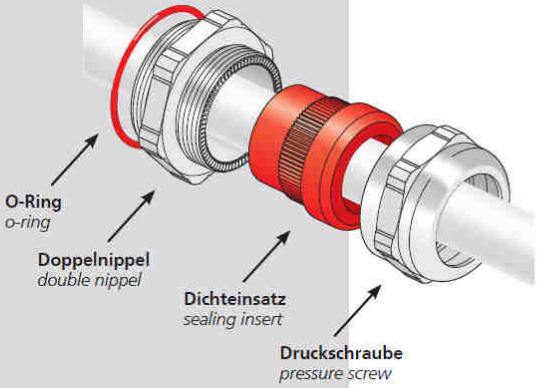
Designation dust:
II 2D Ex tD A21 IP 68

Designation of extremely small components:*
II 2G/II 2D CE 0102

Further certificates:
IECEx – IECEx PTB 10.0006X
EAC – RU C-DE.МЦ06.B.00119

**Designation on cable gland*

PFLITSCH



Montage
Als Montagewerkzeug kann der PFLITSCH-Steckschlüssel M28 verwendet werden.

Einsatztemperaturbereich:

Material:	TPE- V	Temperaturbereich: -40 °C bis +135 °C
	TPE	Temperaturbereich: -40 °C bis +115 °C
	LSR	Temperaturbereich: -60 °C bis +180 °C

Mindestwandstärken
- Beim Einbau in Geräten mit Gewindebohrungen: s = 5,0 mm (Kunststoff); 3,0 mm (Metall)
- Beim Einbau in Geräten mit Durchgangsbohrungen: s = 2,0 mm (Kunststoff); 1,0 mm (Metall)

Hinweis zur Zugentlastung der Kabelverschraubung:
Die KLE mit der Standard-Druckschraube ist nur für fest verlegte Leitungen und Kabel geeignet. Der Betreiber muss in diesem Fall für geeignete Maßnahmen sorgen, um eine Zugentlastung zu gewähren.

Wichtig:
Dichtringe dürfen nicht mit dem Messer ausgeschnitten werden! Nicht benutzte Gehäusebohrungen sind mit einem Ex–Verschlussstopfen zu verschließen. KLE mit entsprechenden Gewindegrößen sind mit einem geschlossenen Dichteinsatz oder mit einem UNI Ex e Blind-Dichteinsatz zu verschließen. Nicht benutzte Bohrungen von Mehrfach-Dichteinsätzen sind mit einem Bolzen zu verschließen.

Demontage:
Die Demontage erfolgt in umgekehrter Reihenfolge.

Instandhaltung:
Die KLE sind in die Kontrollen bei der Inspektion und Wartung der elektrischen Betriebsmittel einzubeziehen.

Assembly
The PFLITSCH socket spanner M28 can be used as a tool

Application temperature range:

Material:	*TPE- V*	*Temperature range: -40 °C up to +135 °C*
	TPE	*Temperature range: -40 °C up to +115 °C*
	LSR	*Temperature range: -60 °C up to +180 °C*

Minimum wall thicknesses
- *For installation in devices with threaded holes: s = 5.0 mm (plastic); 3.0 mm (metal)*
- *For installation in devices with throughholes: s = 2.0 mm (plastic); 1.0 mm (metal)*

Pointer for strain relief of the cable gland:
The CG/CES are only suitable for permanently laid lines and cables. In this case, the operator must adopt appropriate measures to ensure strain relief.

Important:
Sealing rings must not be cut out with a knife! Housing holes that are not used must be sealed with an Ex closure plug. CG/CES 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 CG/CES are to be included in the inspection and maintenance of the electrical operating material.

Anschlussmaße für Durchgangsbohrungen: / ***Connection dimensions for throughholes:***

Metrisch/*metric*	M10	M12	M16	M20	M25	M32	M40	M50	M63	M72	M75	M80
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	75,0	80,0
Pg	7	9	11	13,5	16	21	29	36	42	48	–	–
d [mm] 0/+ 0,3	12,5	15,5	19,0	20,5	22,5	28,5	37,0	47,0	54,0	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	–	–	–	–	–

Anzugsmomente: / ***Tightening torques:***

Metrisch/*metric*	M10	M12	M16	M20	M25	M32	M40	M50	M63	M72	M75	M80
Nm	6	6	8	10	10	15	20	20	20	30	40	40
Pg	7	–	9	11/13,5	16	21	29	36/42	48	–	–	–
Nm	6,25	–	3,75	3,75	6,25	7,5	7,5	7,5/10	10	–	–	–

6.2 Operating instructions Hugro cable gland

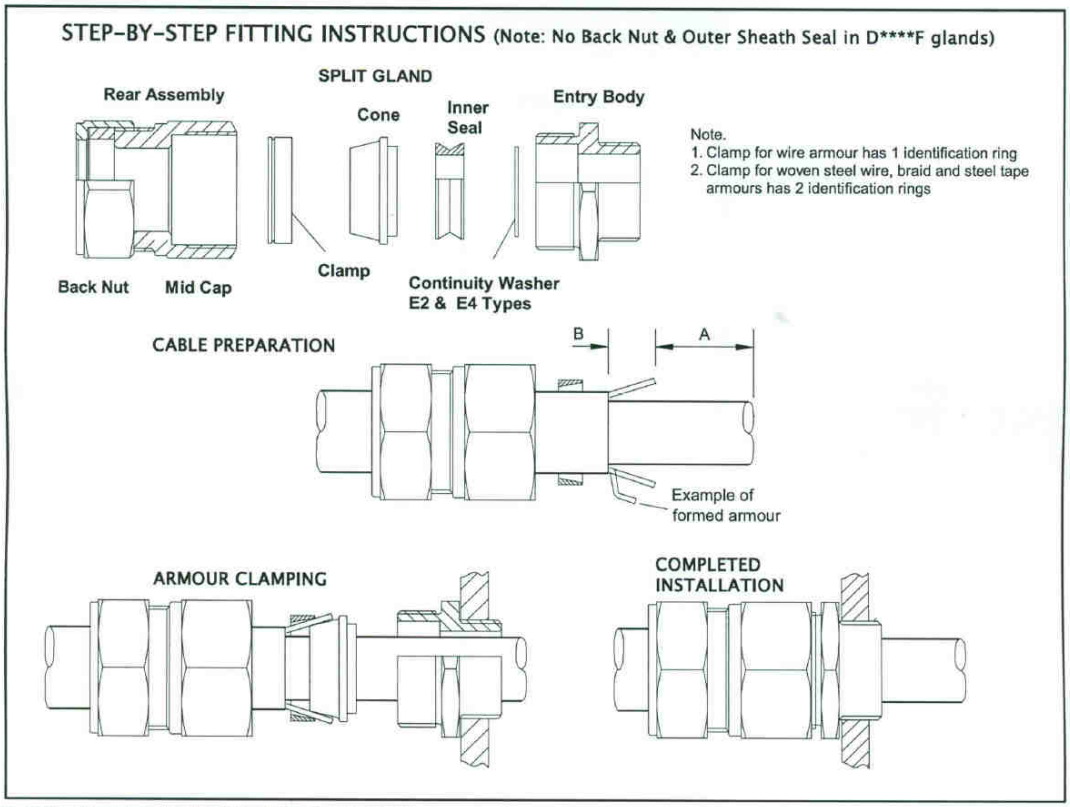
E****F* / D****F Cable Glands for armoured cable – ASSEMBLY INSTRUCTIONS

Brief Description

The E****F* type cable gland is for outdoor use in the appropriate Hazardous Areas with armoured cable. They give environmental protection to IP66/67/68 (50 metres for 7 days). The type IE option has an earth stud on the entry body. D****F type glands are for indoor use and offer the same level of environmental protection. A termination suitable for EMC protection can be made using armoured cables with these glands. Clamp options allow wire armour, woven steel wire, braid and steel tape armours. A variant giving electrical continuity to a lead sheath cable is available.

Warning

Please read these instructions carefully. These products should not be used in applications except as detailed here or in our datasheets, unless confirmed in writing by Peppers. Peppers take no responsibility for any damage, injury or other consequential loss caused where products are not installed or used according to these instructions. This leaflet is not intended to advise on the selection of product. Further guidance can be found in the standards listed overleaf or the prevailing code of practice.



STEP-BY-STEP FITTING INSTRUCTIONS

1 Split gland as shown.
2 Remove the Inner Seal. This must be removed to effectively clamp armour. E2 & E4 types: - remove Continuity Washer.
3 Fit Entry Body to enclosure including sealing washer if required. Hand-tighten, then suitably secure with a wrench.
4 Slide Rear Assembly (and shroud if required) onto cable as shown.
5 Prepare cable as shown in diagram.
  A Strip the outer sheath and armour to suit the installation. For lead sheathed cable the lead sheath must pass through the Continuity Washer when installation is complete.
  B Expose armour approx. 20mm long and slide the Clamp over the exposed armour. Slide cone on to inner sheath and spread armour over the cone. Where sheath sizes are near minimum, form armour to facilitate clamping as shown. Ensure the Clamp is in the correct orientation. The clamp should be positioned so that the identification ring(s) are away from the cone.
6 Insert cable through Entry Body. Do not re-fit seal or continuity washer. Push cable forward to maintain armour contact.
7 Support the cable to prevent it from twisting. Hand tighten Mid Cap to Entry Body to lock onto armour. When tight, further tighten Mid Cap 1 full turn with wrench. Cable with maximum diameter wire armour may require an additional ½ to 1 turn.
8 Loosen off Mid Cap to visually check armour is securely locked. If armour has not clamped repeat the clamping process.
9 Pull out cable from Entry Body. Re-fit the inner seal (and continuity washer on E2 & E4 Types). Re-insert cable through the seal, (and continuity washer if fitted) and Entry Body. For lead sheath cable the Continuity Washer must be in contact with the lead sheath & must be in front of the seal.
10 Re-tighten Mid Cap to the entry body. Ensure the seal makes full contact with cable inner sheath and then tighten the Mid Cap by the additional turns detailed in Table 1
11 Hold Mid Cap with wrench and tighten Back Nut onto cable. Ensure the seal makes full contact with cable outer sheath and then tighten the back nut by the additional turns detailed in Table 1. If fitted, pull shroud over gland assembly.
12 (E***IEF* / D***IEF options) For Integral Earth cable glands, connect the earth cable to the earth stud.

E****F* / D****F Cable Glands for armoured cable – ASSEMBLY INSTRUCTIONS

Table 1 - Installation Data, Cable Sizes and Armour Acceptance (mm)

Cable Sizes (mm), Armour Acceptance (mm) & Assembly Data NOTE:- * Type 3 & 4 (silicone) seals only to 9.3 mm diameter										
Gland Size	Mid Cap Turns – Step 10	Back Nut Turns – Step 11	Inner Sheath		Outer Sheath		Reduced Bore		Armour Acceptance Ranges	
			Min	Max	Min	Max	Min	Max	Wire	Tape/ Woven Wire/Braid
16	1	1	3.5	8.4	8.4	13.5	4.9	10.3	0.9	0.15 – 0.35
20S	1	1	8.0	11.7	11.5	16.0	9.4	12.5	0.9 – 1.25	0.15 – 0.35
20	1	1	6.7*	14.0	15.5	21.1	12.0	17.6	0.9 – 1.25	0.15 – 0.50
25	1	1	13.0	20.0	20.3	27.4	16.8	23.9	1.25 – 1.6	0.15 – 0.50
32	1	2	19.0	26.3	26.7	34.0	23.2	30.5	1.6 – 2.0	0.15 – 0.55
40	1	1	25.0	32.2	33.0	40.6	28.6	36.2	1.6 – 2.0	0.2 – 0.6
50S	1	1	31.5	38.2	39.4	46.7	34.8	42.4	2.0 – 2.5	0.2 – 0.6
50H	1	2	31.5	38.2	39.4	46.7	34.8	42.4	2.0 – 2.5	0.2 – 0.6
50	1	2	36.5	44.1	45.7	53.2	41.1	48.5	2.0 – 2.5	0.5 – 0.8
63S	1	1	42.5	50.1	52.1	59.5	47.5	54.8	2.5	0.5 – 0.8
63H	1	1	42.5	50.1	52.1	59.5	47.5	54.8	2.5	0.5 – 0.8
63	1	1	49.5	56.0	58.4	65.8	53.8	61.2	2.5	0.5 – 0.8
75S	1 ¾	1	54.5	62.0	64.8	72.2	60.2	68.0	2.5	0.5 – 1.0
75H	1 ¾	1	54.5	62.0	71.1	78.0	66.5	73.4	2.5	0.5 – 1.0
75	1 ¾	1	60.5	68.0	71.1	78.0	66.5	73.4	2.5	0.5 – 1.0
80	1 ¼	1	62.2	72.0	77.0	84.0	71.9	79.4	3.15	0.5 – 1.0
80H	1 ¼	1	62.2	72.0	79.6	90.0	75.0	85.4	3.15	0.5 – 1.0
85	1 ¼	1	69.0	78.0	79.6	90.0	75.0	85.4	3.15	0.5 – 1.0
90	1	3	74.0	84.0	88.0	96.0	82.0	91.4	3.15	0.5 – 1.0
90H	1	1	74.0	84.0	92.0	102.0	87.4	97.4	3.15	0.5 – 1.0
100	1	1	82.0	90.0	92.0	102.0	87.4	97.4	3.15	0.5 – 1.0

Installation Guidance

Point	Advice			
1	EN/IEC 60079-10	EN/IEC 60079-14	National Electrical Code (NEC 500 – 505)	Canadian Electrical Code (CSA C22.1)
2	Installation should only be carried out by a competent electrician, skilled in cable gland installation.			
3	NO INSTALLATION SHOULD BE CARRIED OUT UNDER LIVE CONDITIONS.			
4	Threaded entries: the product can be installed directly into threaded entries. Threaded entries should comply with clause 5.3 of IEC/EN 60079-1 and have a lead-in chamfer to allow for full engagement of the threads. For Ex d applications a minimum of 5 fully engaged parallel threads is required. Metric threads are supplied with an o-ring and will maintain IP66 and IP68. Parallel entry threads will maintain an IP rating of IP64. A sealing washer should be used to maintain all IP ratings greater than IP64. Any thread sealant used should be non-hardening.			
5	Clearance holes: these may be 0.1 to 0.7mm larger than the major diameter of the male thread. The product should be secured with a lock nut and the threads tightened to ensure the cable gland is secure. A sealing washer should be used to maintain IP ratings. A serrated washer should be used for additional installation protection.			
6	To maintain the Ingress Protection rating of the product, the entry hole must be perpendicular to the surface of the enclosure. The surface should be sufficiently flat and rigid to make the IP joint. The surface must be clean and dry. It is the users/installers responsibility to ensure that the interface between the enclosure and cable gland is suitably sealed for the required application.			
7	Whilst Peppers products with tapered threads, when installed into a threaded entry, have been tested to maintain IP66 without any additional sealant, due to the differing gauging tolerances associated with the use of tapered threads it is recommended to use a non-hardening thread sealant if an IP rating higher than IP64 is required.			
8	Once installed do not dismantle except for routine inspection. An inspection should be conducted as per IEC/EN 60079-17. After inspection the gland should be re-assembled as instructed, ensuring the compression nut, mid cap and back nut are correctly tightened to ensure the cable is secure.			
9	For Ex d applications, these glands should only be used with substantially round and compact cables with extruded bedding (i.e. effectively filled cables) that are compliant with EN/IEC 60079-14.			
10	On aluminium variants it is recommended to use an anti-seize lubricant to aid assembly and routine inspection. Care should be taken to ensure no lubricant comes into contact with the cable gland seals as this may impair performance.			

Approvals and Certification

Approval	Certificate Number	Protection Concept / Type
ATEX	Sira 01ATEX1271X	Ⓔx II 1D 2G Ex d IIC Gb / Ex e IIC Gb / Ex ta IIIC Da
	Sira 09ATEX1221X	Ⓔx II 3G Ex nR IIC Gc
IECEx	IECEx SIR 07.0097X	Ex d IIC Gb / Ex e IIC Gb / Ex ta IIIC Da
CSA - Canada	1356011	Ex d IIC / Ex e II / CL I Div 2 Gr ABCD / CL II Gr EFG / CL III Type 4X
CSA - US	2627370	Class I, Division 2, Groups ABCD / Class II, Division 1, Groups EFG / Class III; Type 4X Class I Zone 1 AEx e IIC Gb / Class II, Zone 20 AEx ta IIIC Da IP66 IP68
GOST-R	РОСС GB.ГБ06.B01316	Ex d IICU / Ex e IIU / Ex nR IIU
EAC	RU C-GB. ГБ06.B.00098	Ex d IICU / Ex e IIU / Ex nR IIU
UKRAINE	UA.TR.047.C.0408-13	Ex d IIC X / Ex e II X
INMETRO	NCC 13.2186 X	Ex d IIC Gb / Ex e IIC Gb / Ex ta IIIC Da
NEPSI	GYJ111308X	Ex d IIC / Ex e II

Interpretation of Markings. Markings on the gland carry the following meanings:
Cable Gland Type & Size E-a-b-c-IE-F-R-ddd-eee-nn

a =	Seal Type 1 = Neoprene (black) 2 = Neoprene with Continuity washer 3 = Silicone (white) 4 = Silicone with Continuity Washer	R =	Optional reduced bore outer seal (red silicone)
b =	Armour clamping **W** = single wire armour **X** = woven steel wire/tape/braid	ddd =	Gland size
c =	Main component material **A** = Aluminium **B** = brass **S** = stainless steel	eee =	Entry thread type and size
IE =	Integral Earth stud option	nn =	Year of manufacture

Special Conditions for Safe Use

1. These glands must not be used with enclosures where the temperature at the point of contact exceeds -35°C to +90°C using neoprene seals, or –60° to +180°C using silicone seals.
2. These glands, when installed in accordance with the manufacturers instructions and with an appropriate enclosure on which they are fixed, are capable of providing an ingress protection of IP66 and IP68 (50 metres 7 days)
3. If these cable glands only grip the cable sheath of the cable and do not clamp the cable armour or if they are used to terminate unarmoured, braided or screened cables, then they shall only be used for fixed installations, hence the cables shall be effectively clamped to prevent pulling or twisting.
4. Where glands without sealing rings are installed in protection by enclosure (Ex t) equipment for use in explosive dust atmospheres, they shall only be fitted into enclosures offering a minimum of 5 full threads, in accordance with EN 60079-31:2009 clause 5.1.1.

7. Aplicable standards

EN 60079-0: 2018 Explosive atmospheres - Part 0: Equipment - General requirements

EN 60079-1: 2014 Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures „d“

EN 60079-7: 2015 Explosive atmospheres - Part 7: Equipment protection by increased safety „e“

EN 60079-31: 2014 Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure „t“

EN 60079-18: 2015 Explosive atmospheres - Part 18: Equipment protection by encapsulation „m“

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