Explosion-proof single stroke solenoid
Operating instructions

SCHIENLE
MAGNETTECHNIK

Typ: EX18 046

EPS14ATEX1744 X		IECEx EPS14.0064 X
Ⓔx I M2 Ex mb I Mb	**AC**	Ex mb I Mb
Ⓔx II 2G Ex mb IIC T4, T5, T6 Gb		Ex mb IIC T4, T5, T6 Gb
Ⓔx II 2D Ex mb IIIC T135°C, T100°C, T85°C Db		Ex mb IIIC T135°C, T100°C, T85°C Db
Ⓔx I M2 Ex e mb I Mb	**DC**	Ex e mb I Mb
Ⓔx II 2G Ex e mb IIC T4, T5, T6 Gb		Ex e mb IIC T4, T5, T6 Gb
Ⓔx II 2D Ex tb IIIC T135°C, T100°C, T85°C Db		Ex tb IIIC T135°C, T100°C, T85°C Db

Registry-No. of above authority: 2004
Declaration of conformity: K 19 / 2014

CE **2004**

Producer:

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Document : B 32 / 2014
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1 Introduction

The solenoid was designed, manufactured and tested in compliance with the standards and regulations generally applicable within the European Union. On leaving the factory the solenoids safety-related conditions were proven to be faultless.
The operator must only read and observe the notes and warnings provided with this operating instruction in order to maintain this status and to ensure safe operation.

The solenoid must only be installed and wire-connected by a qualified technician, who is familiar with and works according to the generally accepted engineering standards and the latest legal regulations and standards of explosion protection.

2 Usage

This solenoid is assigned to the group II, category 2 of the ATEX directive and to the group I, category M2 for mining applications.
This device can be used in areas where explosion hazard occurs through:
- Gas/air mixtures, vapours or mists of flammable materials according to classes IIA, IIB and IIC acc. ATEX and IECEx.
- Flammable dust/air mixtures according to classes IIIA, IIIB and IIIC.

This device is applicable in following explosion hazardous areas outside mining:
Zone 1, zone 2, zone 21 and zone 22.

The maximum ambient temperatures as followed:

Temperature class	T6 or rather T80°C	Tamb= -40°C up to +45°C and coil power P_N=10W
	T5 or rather T95°C	Tamb= -40°C up to +55°C and coil power P_N=10W
	T4 or rather T130°C	Tamb= -40°C up to +70°C and coil power P_N=10W
	T4 or rather T130°C	Tamb= -40°C up to +60°C and coil power P_N=18W

2.1 Minimum volume of the valve

	1 solenoid per valve	2 solenoids per valve (allways only 1 ON)	>more than 3 solenoids per valve (Manifold) (optionally all solenoids on)
CETOP:	**152,2 cm³**	**152,2 cm³**	**892,5 cm³**
CATRIDGE:	**225,4 cm³**	**/**	**892,5 cm³**

3 Type coding

elektrische Leistung: 10W
electrical power

Schienle Magnettechnik und Elektronik GmbH
In Oberwiesen 3, D-88682 Salem, www.schienle.de
EX18 046 X X X X
U_N=__V R_{20}=__Ω I_G=__A P_{20}=__W IP66/68
EPS 14 ATEX 1 744 X / IECEx EPS 14.0064X
I M2 Ex e mb I Mb
II 2G Ex e mb IIC T4, T5, T6 Gb
II 2D Ex tb IIIC T135°C, T100°C, T85°C Db
T4 (T135°C) -40°C ≤ T_{amb} ≤ +70°C
T5 (T100°C) -40°C ≤ T_{amb} ≤ +60°C
T6 (T85°C) -40°C ≤ T_{amb} ≤ +45°C
CE 2004
external fuse I_N ≤ 3xI_G 1234/001
327555000 **marking DC-version:** 08/19

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EX18 046 X X X X
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T5 (T100°C) -40°C ≤ T_{amb} ≤ +60°C
T6 (T85°C) -40°C ≤ T_{amb} ≤ +45°C
CE 2004
external fuse I_N ≤ 3xI_G 1234/001
327555000 **marking AC-version:** 08/19

elektrische Leistung: 18W
electrical power

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In Oberwiesen 3, D-88682 Salem, www.schienle.de
EX18 046 X X X X
U_N=__V R_{20}=__Ω I_G=__A P_{20}=__W IP66/68
EPS 14 ATEX 1 744 X / IECEx EPS 14.0064X
I M2 Ex e mb I Mb
II 2G Ex e mb IIC T4 Gb
II 2D Ex tb IIIC T135°C Db
CE 2004
-40°C ≤ T_{amb} ≤ +60°C
external fuse I_N ≤ 3xI_G 1234/001
327555000 **marking DC-version:** 08/19

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In Oberwiesen 3, D-88682 Salem, www.schienle.de
EX18 046 X X X X
U_N=__V R_{20}=__Ω I_G=__A P_{20}=__W IP66/68
EPS 14 ATEX 1 744 X / IECEx EPS 14.0064X
I M2 Ex mb I Mb
II 2G Ex mb IIC T4 Gb
II 2D Ex tb IIIC T135°C Db
CE 2004
-40°C ≤ T_{amb} ≤ +60°C
external fuse I_N ≤ 3xI_G 1234/001
327555000 **marking AC-version:** 08/19

Table 1 Type coding

type coding
EX18 046 X_1 X_2 X_3 X_4

Kabellänge: *lenght of cable:*	X_4	*3M = 3 Meter / metres* *8M = 8 Meter / metres* *- = no installed cable (DC)*
Spannungsart: *voltage type:*	X_3	AC, DC
Spannung 1.Spule: *voltage 1.coil:*	X_2	12V, 24V, 48V, 110V, 230V, ...
Leistung: *power:*	X_1	10W, 18W
Baugröße des Magnetgehäuses *housing size*	046	keine Auswahl möglich *no selection possible*
Kennung des Gerätetypen *model type*	EX18	keine Auswahl möglich *no selection possible*

4 Electrical data

- Rated voltage: U_N [VDC] ± 10% max.
- Supply voltage: U_N [VDC or VAC] (for electronics)
- Ripple voltage: ± 15% [VDC]
- Resistance: R_{20} [Ω] ±5% bei 20 [°C]
- Working duty
  in mounted state with valve: S1 (100%ED)
- Test procedure: Pressure: 1m under water
  Test duration: 24h

4.1 Versions

Table 2 Voltage versions

Type	Spannung	Widerstand	Nennstrom	Grenzstrom	Schutzschaltung	Leistung
	U_N	R_{20}	I_N	I_G		P_N
DC	[VDC]	[Ohm]	[A]	[A]		[W]
EX18 046 10W 12V DC -	12	16,1	0,75	0,65	Diode (36V)	8,9
EX18 046 10W 24V DC -	24	61,8	0,39	0,34	Diode (36V)	9,3
EX18 046 10W 48V DC -	48	252,4	0,19	0,16	Diode (75V)	9,1
EX18 046 10W 110V DC -	110	1171,5	0,094	0,08	Diode (180V)	10,3
EX18 046 18W 12V DC -	12	7,7	1,56	1,37	Diode (36V)	18,8
EX18 046 18W 24V DC -	24	32,3	0,74	0,65	Diode (36V)	17,8
EX18 046 18W 48V DC -	48	125,7	0,38	0,33	Diode (75V)	18,3
EX18 046 18W 110V DC -	110	655,6	0,17	0,15	Diode (180V)	18,5
AC	[VAC] 50/60Hz					
EX18 046 10W 110V AC 3M	110	894,1	0,112	0,095	Gleichrichter	11,2
EX18 046 10W 110V AC 8M	110	894,1	0,112	0,095	Gleichrichter	11,2
EX18 046 10W 230V AC 3M	230	3987	0,052	0,044	Gleichrichter	10,7
EX18 046 10W 230V AC 8M	230	3987	0,052	0,044	Gleichrichter	10,7
EX18 046 18W 110V AC 3M	110	524,4	0,19	0,167	Gleichrichter	19,1
EX18 046 18W 110V AC 8M	110	524,4	0,19	0,167	Gleichrichter	19,1
EX18 046 18W 230V AC 3M	230	2251,4	0,092	0,08	Gleichrichter	19
EX18 046 18W 230V AC 8M	230	2251,4	0,092	0,08	Gleichrichter	19

5 Initial installation

- The ambient temperature range shall not overstep the temperatures given in capture 2. The maximum temperature of the medium (generally hydraulic fluid) shall not exceed 70°C
- It is the users duty to ensure free and unhindered heat emission during operation. This means that the solenoid shall neither be covered nor stored immediately adjacent to heat sources (e.g. fan heaters) during operation.
- Care is to be given that the solenoid is not subjected to direct sunlight during operation.

6 Installation notice - installation, mounting, demounting

- Installing the type VDC for temperature class T4 a cable with an ambient operating temperature of at least +105°C is to be used (e.g. LAPP FD Robust). For T5 and T6 a cable with an ambient operating temperature of at least +90°C is sufficient. The fastening torque on the cable gland depends of the used cable and is to be determined by installing user.
- When installing the VDC solenoid type, please note the fastening torque of the screws (4Nm) and of the BARTEC Connection box (0,4Nm)
- When installing the VDC solenoid type, an appropriate cable shoe M3, 0,75mm^2 with an ambient operating temperature of at least +105°C is to be used
- The user has to safeguard each solenoid with a fuse: $I_N \leq 3xI_G$, with trigger characteristic “slow blow”. The breaking capacity of the fuse link has to be stronger than the max short circuit current at the users operating area.
- EX-secured components must be used during mounting in case the fuse and/or the interface are within the EX-range.
- In addition, the solenoid may be connected to ground via the purpose-built ground clamp an the connector casing.
- The EX-Solenoid presented herewith shall only be operated with a valve body according to the instructions in point 12
- The coil must not be activated allone – a connection to the valve body is required!
- The for the assembling needed single parts are listed in chapter 13

7 Specification

- Coils and plug cavity to be molded watertight. Insulation class “F“(155C°)
- Protection type IAW DIN VDE 0470, EN 60529 and/or IEC 529 Device: IP 66/68,
- Surface protection (casing) acc DIN 50979 Fe//Zn8-12//Cn//T0
- Max. temperature of operating medium (generally hydraulic fluid): 70°C
- Max. ambient temperature: see capture 2!

8 Suppressor

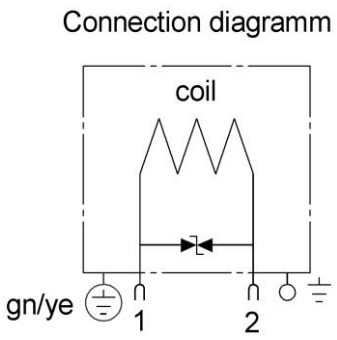

Figure 1 — Bidirectional voltage limiter – diodes:
U_Z = 36V, bipolar for U_N = 12 und 24VDC
U_Z = 75V, bipolar for U_N = 48VDC
U_Z = 180V, bipolar for U_N = 110VDC

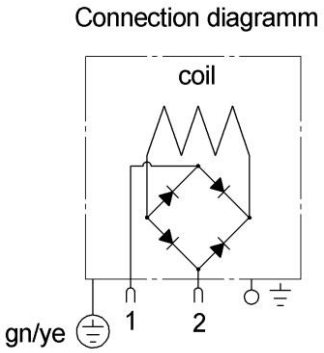

Figure 2 — Bridge rectifier for AC version

9 Maintenance, service, troubleshooting

- The solenoid generally requires almost no maintenance. All electrical connections shall be checked regularly for possible damages (visual check)
- The surface of the device shall be checked regularly for dust deposits, which should be cleaned off.
- Do not try to open or to repair the device. If any troubles occur, please contact the manufacturer.

10 Standards and regulations

- Directive 2014/34/EU of European Parliament and European Council
- DIN VDE 0580
- EN 60529
- EN 60079-0:2012+A11:2013, EN 60079-7:2007, EN 60079-18:2015, EN 60079-31:2014
- IEC 60079-0:2011, IEC 60079-7:2006, IEC 60079-18:2009, IEC 60079-31:2008

11 Safety notice – <u>Please read carefully</u>

- In case the solenoid shows any signs of a defect, malfunctioning or external damage (including corrosion), the device must immediately be taken out of operation.
- Any deposits on the surface of the device shall not obstruct heat emission
- To maintain legibility of the data plate, the solenoid must not be coated.

Caution:

- Always disconnect the solenoid from the power supply before any maintenance or other work on it.
- Always exchange the complete solenoid. Do not try to repair the solenoid.
- In no case shall any changes be made to the solenoid or the connecting cable.
- Never operate the solenoid when disconnected from the valve body. (See also item 11)
- Demount the solenoid only in secure areas (not in EX-areas). If this is not possible, the solenoid must cool off for 10 minutes minimum.

<u>Any warranty claims are denied in case the regulations in this operating manual are not observed!</u>

12 Grouping of single solenoid and valve

12.1 General

The current single solenoid must only be operated with a valve body with a **<u>minimum volume described in chapter 2</u>**

12.2 Indications – <u>Please read carefully!</u>

Principally attend following indications:

- The minimum dimensions of each valve body shall not fall below defined volume. Valve bodies with major dimensions can be used.
- In case single valve body is used, it is the users duty to ensure free and unhindered heat emission during operation.
- If 2 solenoids per valve body are installed (CETOP), they have to be mounted on opposite sides.
  Furthermore to follow:

The user has to take care that during working only one solenoid per valve body is actuated. A simultaneous activation of solenoids at one and the same valve body is forbidden. The user has to fulfil this by a proper electrical connection.

- Having an installation of more than two solenoids per valve (Manifold) it is the users duty to ensure free and unhindered heat emission during operation.

13 Dimensions

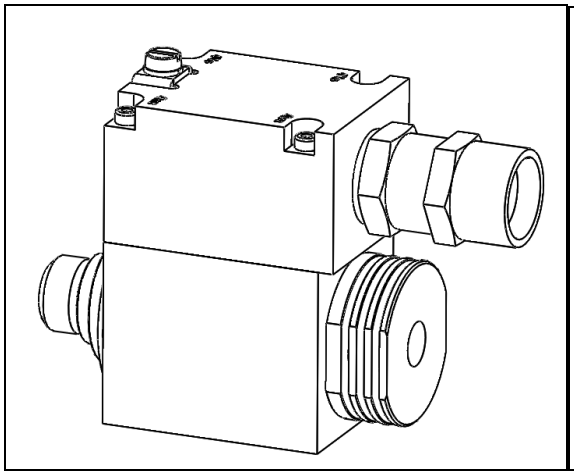

Abb.: EX18 046

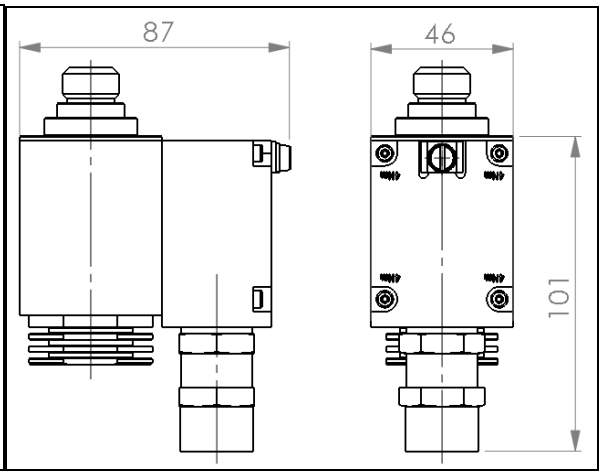

Abb.: Abmessungen

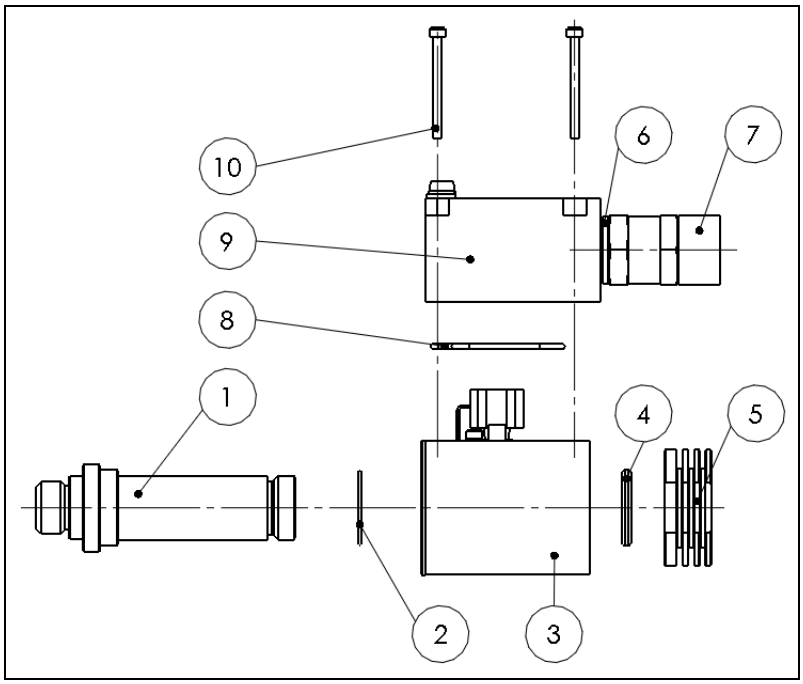

Abb.: Explosionsansicht

E-Stückliste EX18 046x yzyz		
Pos.No.:	Quantity:	Description:
1	1	actuating system
2	1	O-Ring ø22mmx1,5mm **(IP protection relevant)**
3	1	Solenoid
4	1	O-Ring ø21,89mmx2,62mm **(IP protection relevant)**
5	1	Fixing nut (key-wide 36)
6	1	Connection thread sealing M20 **(IP protection relevant)**
7	1	Cable gland
8	1	O-Ring ø45mmx2mm **(IP protection relevant)**
9	1	Plug housing
10	1	Cylinder head screw M4x35mm

14 EU-Declaration of Conformity

SCHIENLE MAGNETTECHNIK

The manufacturer,

Schienle Magnettechnik und Elektronik GmbH
In Oberwiesen 3
88682 Salem – Neufrach

herewith declares that the product

Description:	**Explosion-proof coil**
Type:	**EX18 046**
Certificate:	**EPS14ATEX1744 X; IECEx EPS14.0064 X**

Is been designed, assembled and proved in accordance with the EU regulation 2014/34/EU and following harmonized norms:

EN 60079-0:2012+A11:2013: Explosive atmospheres - Part 0: Equipment - General requirements (IEC 60079-0:2011, modified + Cor.:2012 + Cor.:2013);
EN 60079-7:2007: Explosive atmospheres - Part 7: Equipment protection by increased safety "e" (IEC 60079-7:2006);
EN 60079-18:2015: Explosive atmospheres - Part 18: Equipment protection by encapsulation "m" (IEC 60079-18:2014)
EN 60079-31:2014: Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t" (IEC 60079-31:2013);

Salem-Neufrach	12.2019	
Place	Date	Ex-Responsible Person