Explosion-proof solenoid coil
EX22 037 - 23W x - DC - -
Operating manual
EU Declaration of Conformity

Manufacturer:
Schienle Magnettechnik GmbH
In Oberwiesen 3
88682 Salem-Neufach
Germany

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Table of contents

1 Introduction ........................................................................................................................................... 3
1.1 Manufacturer .................................................................................................................................. 3
1.2 Safety .............................................................................................................................................. 4
1.2.1 Intended use ................................................................................................................................. 4
1.2.2 Authorised personnel .................................................................................................................. 4
1.2.3 Improper use ............................................................................................................................... 4
1.2.4 About this document .................................................................................................................. 4
1.2.5 Applicable components ............................................................................................................. 4
1.2.6 Symbols ....................................................................................................................................... 4
1.3 Explanation of symbols .................................................................................................................... 5
1.4 Abbreviations and glossary ............................................................................................................... 5
2 General danger warnings .................................................................................................................... 6
3 General view ......................................................................................................................................... 7
4 Type identifier ..................................................................................................................................... 9
4.1 Solenoid coil ...................................................................................................................................... 9
4.2 Actuator .......................................................................................................................................... 9
5 Technical data ..................................................................................................................................... 10
6 Explosion protection .......................................................................................................................... 12
7 Operating conditions .......................................................................................................................... 13
8 Assembly ............................................................................................................................................ 15
8.1 Connection to the valve .................................................................................................................. 15
8.2 Electrical connection ....................................................................................................................... 17
8.3 Disassembly ..................................................................................................................................... 18
8.4 Dimensional drawings .................................................................................................................... 18
1 Introduction

The product was designed, manufactured and tested in compliance with current regulations and standards, and left the factory in working order and safe condition.

To maintain this condition and ensure hazard-free operation, the user must follow the notes and warnings contained in this operating manual.

1.1 Manufacturer

This product was manufactured by us:

Schienle Magnettechnik GmbH
In Oberwiesen 3
88682 Salem-Neufrach, Germany

Tel: +49 7553 8268 60
Fax: +49 7553 8268 61
Email: info@schienle.de
1.2 **Safety**

1.2.1 **Intended use**

The solenoid coil of type EX22 037 - 23W x - DC - - are intended to be used together with Schienle actuator of type: BS 19 XXX1X for actuating valves.

Operation is not permitted without the above-mentioned actuator or with actuators not of the type stated above.

The type of actuator for the valve should be selected with the solenoid coil manufacturer or their representatives. At the valve side, the installation conditions required for the magnetic solenoid coil must be guaranteed.

For details on permitted use in explosive environments, please see chapter 6.

1.2.2 **Authorised personnel**

The solenoid coil must only be assembled and wired by qualified and authorized expert personnel who is familiar with and observe the regulations and standards in force at the installation site.

The specific operating limits must always be adhered to. See sections 5, 6 & 7.

1.2.3 **Improper use**

Any other use is improper use. If the product is used beyond its specified limits, expect loss of its explosion protection.

1.2.4 **About this document**

This document relates to the product Explosion-proof solenoid coil, type EX22 037 - 23W x - DC - - and must always be stored so that it is immediately accessible if needed.

1.2.5 **Applicable components**

Only useable with the component VS M22x1 A1 (stopping plug) and BS 19 XXX1X (actuator).

1.2.6 **Symbols**

Safety-related notes in this document are indicated with the following symbols and signal words:
1.3 Explanation of symbols

The following symbols are applied to the type plate and/or the product. The symbols must always be observed:

![FM US APPROVED]

1.4 Abbreviations and glossary

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>Alternating current</td>
</tr>
<tr>
<td>DC</td>
<td>Direct current</td>
</tr>
</tbody>
</table>

Table 1: abbreviations
2 General danger warnings

WARNING

There is no explosion protection during assembly and connection works. All works must only be carried out if no dangers are present, in particular when no explosive atmosphere is present.

Before beginning connection works and dismantling, ensure that the supply voltage is switched off and has been protected against being switched on again.

To preserve the explosion protection, ensure you observe the assembly instructions and adhere to the assembly requirements.

Before use remove all protective covers e.g. label protective film, protective caps.
3 General view

solenoid coil

actuator BS 19 XXX1X:

solenoid:

Fig 1: exploded view of the solenoid
<table>
<thead>
<tr>
<th>Item no</th>
<th>Name</th>
<th>Tightening torque</th>
<th>Spanner size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>screw for grounding</td>
<td>17 lb-in + 3.5 lb-in / 2 Nm + 0.4 Nm</td>
<td>Slotted screw 1.2 x 8.5</td>
</tr>
<tr>
<td>2</td>
<td>stopping plug – VS M22x1 A1</td>
<td>265 lb-in / 30 Nm</td>
<td>internal hex 10</td>
</tr>
<tr>
<td>3</td>
<td>o-ring</td>
<td>26 x 2 (recommended: VMQ)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>grub screw</td>
<td>26 lb-in / 3 Nm</td>
<td>internal hex 1.5</td>
</tr>
<tr>
<td>5</td>
<td>connecting terminal</td>
<td>4.4 lb-in / 0.5 Nm</td>
<td>slotted screw 0.4 x 2.5</td>
</tr>
<tr>
<td>6</td>
<td>thread for cable connection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>coil housing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>connector housing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>type label</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>cylinder screw (4x)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>grub screw (1x)</td>
<td>26 lb-in / 3 Nm</td>
<td>internal hex 2</td>
</tr>
<tr>
<td>12</td>
<td>hexagonal nut</td>
<td>10 Nm</td>
<td>27</td>
</tr>
<tr>
<td>13</td>
<td>o-ring</td>
<td>18,72 x 2,62</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>actuator – BS 19 XXX1X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: parts list for exploded view

⚠️ **WARNING**

It is not allowed to open the four enclosure fastener screws (10).
4 Type identifier

4.1 Solenoid coil

<table>
<thead>
<tr>
<th>Type coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>EX22 037 - 23W x - DC - -</td>
</tr>
</tbody>
</table>

- **Handnotausführung:** \(- = \) Auswahl über Betätigungssystem BS 19 XXX1X
- **emergency manual override:** \(- = \) selection by actuator BS 19 XXX1X
- **Inerne Spulenvorschaltung:** \(- = \) nur eine Spule, daher nicht relevant
- **contacting of ground:** \(- = \) only one coil, not relevant

- **Spannungsort:** DC
- **voltage type:** DC

- **Spannung 2.Spule:** \(- = \) nicht vorhanden
- **voltage 2.coil:** \(- = \) not applicable

- **Spannung 1.Spule:** A=6V; B=12V; C=24V; D=36V; E=48V; ...
- **voltage 1.coil:** A=6V; B=12V; C=24V; D=36V; E=48V; ...

- **Leistung:** 23W
- **power:** 23W

- **Maximaldruck:** \(- = \) Auswahl über Betätigungssystem BS 19 XXX1X
- **max. of pressure:** \(- = \) selection by actuator BS 19 XXX1X

- **Baugröße des Magnetgehäuses**
- **housing size**

- **Kennung des Gerätytypen**
- **model type**

4.2 Actuator

<table>
<thead>
<tr>
<th>Type coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS 19 X X X 1 X</td>
</tr>
</tbody>
</table>

- **Interne Variantenkennung für unterschiedlich konstruktive Ausführungen:** 1; 2; 3; ... usw
- **internal variant identification for different constructive versions:** 1; 2; 3; ... etc.

- **Material:** I- Automatenstahl
- **material:** I- stainless steel

- **Handnot:** O- ohne Handnot; H- mit Handnot
- **emergency manual override:** O- without; H- with emergency manual override
- **Maximaldruck:** A=50bar; B=100bar; C=150bar; D=250bar; E=350bar; F=500bar
- **max. pressure:** A=50bar; B=100bar; C=150bar; D=250bar; E=350bar; F=500bar

- **Kennlinienart:** S= schwarz-weiß; P=proportional
- **characteristic curve:** S= black and white; P= proportional

- **Außendurchmesser:** z.B. 19; ... usw.
- **external diameter:** e.g. 19; ... etc.

- **Plan Betätigungssystem/Actuator**
## 5 Technical data

<table>
<thead>
<tr>
<th>Description</th>
<th>EX22 037 - 23W x - DC - -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection class according to IEC 60529</td>
<td>IP66/IP67</td>
</tr>
<tr>
<td>Insulation class in accordance with DIN VDE 0580</td>
<td>F (up to 155°C)</td>
</tr>
<tr>
<td>Highest medium temperature</td>
<td>70°C</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-40 &lt;= Ta &lt;= 55°C</td>
</tr>
<tr>
<td>Supply voltage, operating current, resistance at 20°C</td>
<td>See table 4</td>
</tr>
<tr>
<td>Power-on time</td>
<td>100% exception see table 6</td>
</tr>
<tr>
<td>power</td>
<td>P&lt;sub&gt;p0&lt;/sub&gt; ≈ 23 W</td>
</tr>
<tr>
<td>Electrical connection</td>
<td></td>
</tr>
<tr>
<td>Maximum cross-section</td>
<td>1.5mm²</td>
</tr>
<tr>
<td>Minimum cross-section</td>
<td>0.5mm²</td>
</tr>
<tr>
<td>Protective circuit</td>
<td>Voltage suppressor diode</td>
</tr>
</tbody>
</table>

Table 3: technical data

![Label](image_url)
### Table 4: overview of variants

<table>
<thead>
<tr>
<th>Version</th>
<th>Voltage ±10%</th>
<th>Resistance ±5%</th>
<th>limited current</th>
<th>Protective circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$U_N$ [VDC]</td>
<td>$R_{20}$ [Ω]</td>
<td>$I_0$ [A]</td>
<td></td>
</tr>
<tr>
<td>EX22 037 - 23W B - DC - -</td>
<td>12</td>
<td>6,5</td>
<td>1,35</td>
<td>Diode</td>
</tr>
<tr>
<td>EX22 037 - 23W C - DC - -</td>
<td>24</td>
<td>25,6</td>
<td>0,67</td>
<td>Diode</td>
</tr>
<tr>
<td>EX22 037 - 23W D - DC - -</td>
<td>36</td>
<td>59</td>
<td>0,45</td>
<td>Diode</td>
</tr>
<tr>
<td>EX22 037 - 23W E - DC - -</td>
<td>48</td>
<td>105,5</td>
<td>0,34</td>
<td>Diode</td>
</tr>
</tbody>
</table>

### Table 5: types of actuators

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>h8</td>
<td>52</td>
<td>10</td>
<td>10</td>
<td>0</td>
<td>≥ 0,1mm</td>
<td>BS 19 XA1x</td>
</tr>
<tr>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>≥ 0,5mm</td>
<td>BS 19 XB1x</td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>≥ 1,0 mm</td>
<td>BS 19 XC1x</td>
</tr>
<tr>
<td>250</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>≥ 1,5 mm</td>
<td>BS 19 XD1x</td>
</tr>
<tr>
<td>315</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>≥ 1,8 mm</td>
<td>BS 19 XF1x</td>
</tr>
<tr>
<td>500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>≥ 2,5mm</td>
<td>BS 19 XE1x</td>
</tr>
</tbody>
</table>
6  Explosion protection

The solenoid coil may be used in hazardous areas in accordance with the certifications:

Ambient Temperature Range:  \(-40°C \leq T_a \leq 55°C\)

IP Rating:  IP66/67

<table>
<thead>
<tr>
<th>Certification/Approval</th>
<th>Type of Protection</th>
<th>Marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEX</td>
<td>Ex db</td>
<td>II 2 G  Ex db IIB+H2 T4 Gb</td>
</tr>
<tr>
<td>ATEX</td>
<td>Ex tb</td>
<td>II 2 D  Ex tb IIC T135°C Db</td>
</tr>
<tr>
<td>IECEx</td>
<td>Ex db</td>
<td>Ex db IIB+H2 T4 Gb</td>
</tr>
<tr>
<td>IECEx</td>
<td>Ex tb</td>
<td>Ex tb IIC T135°C Db</td>
</tr>
<tr>
<td>NEC500</td>
<td>XP</td>
<td>I/1/BCDT4</td>
</tr>
<tr>
<td>NEC500</td>
<td>DIP</td>
<td>II,III/1/EFG/T4</td>
</tr>
<tr>
<td>NEC505</td>
<td>Aex db</td>
<td>I/1/Aex db IIB+H2/T4</td>
</tr>
<tr>
<td>NEC506</td>
<td>Aex tb</td>
<td>21/Aex tb IIC/ T135°C</td>
</tr>
<tr>
<td>CEC Annex J</td>
<td>XP</td>
<td>I/1/BCD/T4</td>
</tr>
<tr>
<td>CEC Annex J</td>
<td>DIP</td>
<td>II,III/1/EFG/T4</td>
</tr>
<tr>
<td>CEC Section 18</td>
<td>Ex db</td>
<td>I/1/Ex db IIB+H2/T4</td>
</tr>
<tr>
<td>CEC Section 18</td>
<td>Ex tb</td>
<td>21/Ex tb IIC/ T135°C</td>
</tr>
</tbody>
</table>
## 7 Operating conditions

Two solenoid coils may be used on one valve. The minimum volume of valve housing per energized solenoid coil see table 6.

As protection against short-circuiting, each solenoid coil must have a fuse fitted upstream. The fuse must be appropriate to the coil’s rated voltage (3 x Inom, recommended 2 x Inom in accordance with IEC 60127-2). Alternatively, fit a thermal overcurrent release with short-circuit and thermal high-speed release (set to the rated current).

However, the fuse’s rated voltage must not be greater than the power supply’s short circuit current.

For thermal reasons, the solenoid coil must only be operated with a Schienle actuator of type BS 19 XXX1X and a suitable valve fitted to it.

---

**WARNING**

Risk of injury from explosion!

Not observing the following instructions can lead to the solenoid coil no longer being explosion-proof!

However, simultaneous energy supply to both coils results in malfunction or possible overheating, and is therefore not permitted.

---

No deposits that could affect heat dissipation must be allowed to build up on the solenoid coils surface.

Coating is permitted if the layer thickness does not exceed following limits:
Group IIB max. 2 mm
Group IIB+H2 max. 0.2 mm
Coating must not be used in areas affected by charge-producing processes, mechanical friction and separation processes, electron emission (e.g. in the vicinity of electrostatic coating equipment), and pneumatically conveyed dust.
Solenoid coil must be completed and fitted to the valve during the coating process.
In case of varnished surfaces: Potential electrostatic charging hazard, clean only with damp cloth.

Flame path repair is not possible. Contact manufacturer.

Before carrying out any type of works, the solenoid coil must be disconnected from the power supply.

Any type of modifications that could affect explosion-protection are strictly forbidden!
The solenoid coil must only be dismantled in non-explosive areas.
For the electrical connection, a suitable connection cable plus ½" cable gland (Ex d, at least IP66/67) or conduit system is required, which must be suitable for the intended use in accordance with 60079-14 and 60079-1. The cable and cable gland temperature range must be within the values shown in table 6.

The operator is obliged to guarantee free, unimpeded heat dissipation during operation.

During operation, the solenoid coil must neither be covered nor positioned near external heat sources. Ensure that, during operation, the solenoid coil is not exposed to direct sunlight.

<table>
<thead>
<tr>
<th>ambient temperature</th>
<th>valve layout</th>
<th>min. distance of neighboring coil housings</th>
<th>volume of valve</th>
<th>cyclic duration factor</th>
<th>maximum cable and cable gland temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 40°C</td>
<td>series</td>
<td>≥ 6 mm</td>
<td>&gt; 152 cm³</td>
<td>100%</td>
<td>125°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>75%</td>
<td>105°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50%</td>
<td>90°C</td>
</tr>
<tr>
<td></td>
<td>single</td>
<td></td>
<td>&gt; 60 cm³</td>
<td>100%</td>
<td>105°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>75%</td>
<td>90°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50%</td>
<td>90°C</td>
</tr>
<tr>
<td>≤ 55°C</td>
<td>series</td>
<td>≥ 6 mm</td>
<td>&gt; 152 cm³</td>
<td>100%</td>
<td>125°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>75%</td>
<td>125°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50%</td>
<td>105°C</td>
</tr>
<tr>
<td></td>
<td>single</td>
<td></td>
<td>&gt; 60 cm³</td>
<td>100%</td>
<td>125°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>75%</td>
<td>105°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50%</td>
<td>90°C</td>
</tr>
</tbody>
</table>

Table 6: special temperature conditions

The list is only for using between directly connected actuators and steel valves. On request other different versions, connection between actuator and valves or linking width.

To keep the temperature class the explosion-proof solenoid coil shall only be operated in combination with a valve block with minimum volume according to the operating instructions. The maximum oil temperature of 70°C shall not be exceeded.
8 Assembly

8.1 Connection to the valve

Before beginning, ‘Operating conditions’ and ‘General danger warnings’ must have been read and understood.
There is no explosion protection during assembly and connection works. All works must only be carried out if no dangers are present, in particular when no explosive atmosphere is present.

⚠️ WARNING

After installation, do not open the equipment or remove components if an explosive atmosphere exists. «ATTENTION – NE PAS OUVRIR SI UNE ATMOSPHÈRE EXPLOSIVE GAZEUSE PEUT ÊTRE PRÉSENTE»

See fig 2 for the order of the works when fitting the solenoid coil (3) to the actuator (2). Ensure you observe the tightening torques given in table 2.

Push the solenoid coil (3) over the actuator (2) in the order shown in fig 2 and fit the o-ring (4) and hexagon nut (6). Firmly tighten the hexagon nut (6) until it is no longer possible for the actuator to twist as a result of the expected vibrations. Secure the hexagon nut against working loose using the supplied grub screws (5). Please see table 2 for tightening torques.
**WARNING**

Solenoid coils must not be allowed to touch one another under operating conditions. However the solenoid coils are arranged, the maximum permitted surface temperature must be guaranteed.

Connect the solenoid coil using cable entries or conduit systems that comply with the requirements of EN 60079-1 and EN 60079-14 and which have their own test certificate.

**Do not use cable entries without an Ex-d test certificate!**

**NOTICE**

The IP protection must be created by appropriate seals on the cable entries or installation pipe. Maximum IP protection class is 66/67.

**WARNING**

Conduit runs must have a sealing fitting connected within 18 inches of this coil. 

*UN SELLEMENT DOIT ÊTRE INSTALLÉ À MOINS DE 457 mm DU BOÎTIER*
8.2 Electrical connection

☞ To open the solenoid coil (fig. 2 assembly), loosen the grub screw (7) and stopping plug (9) using the tools specified in table 2. Ensure that the surrounding surfaces are dry.

☞ Remove the stopping plug (9). When doing so, ensure that neither the thread nor the seal become damaged or soiled.

☞ Connect the electrical supply to the terminal that is now accessible, in accordance with the circuit diagram (fig 3). See table 3 for permitted wire gauge and required tightening torque (tab. 2). Depending on installation conditions, the grounding screw (10) can also be used.

☞ After successful electrical connection, the terminal compartment must be closed again by means of the stopping plug (9). When doing so, ensure that neither the thread nor the seal become damaged or soiled and that you observe the specified torques for the stopping plug (9) and grub screw (7) (see table 2). Tighten the grub screw and then inspect it visually to ensure it secures the stopping plug.

☞ Use ½” NPT cable glands or conduit system with an Ex-d test certificate for closing the housing.

Fig 3: electrical connection
8.3 Disassembly

⚠️ WARNING
Risk of injury from explosion!
When disassembled, the solenoid coil is no longer explosion-proof. Disassembly must therefore only take place in non-ignitable atmospheres!

⚠️ CAUTION
Risk of injury!
During operation, the solenoid coil can become so hot that it can cause skin lesions!

- Before dismantling, allow the solenoid coil to cool down for 10 minutes.

8.4 Dimensional drawings

Fig 4: The coil external dimensions
EU-Declaration of Conformity

The manufacturer,

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

herewith declares that the product

Description: Explosion-proof solenoid coil
Type: EX22 037 - 23W x - DC - -
EU-certificate: FM18ATEX0019X
Marking: Ex II 2G Ex db IIB+H2 T4 Gb
        Ex II 2D Ex tb IIIIC T135°C Db

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

DIN EN 60079-0:2014-06: Explosive atmospheres - Part 0: Equipment - General requirements (IEC 60079-0:2011, modified + Cor.:2012 + Cor.:2013)
EN 60079-31:2014: Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t" (IEC 60079-31:2013);

Salem-Neufrach 19.06.2018
Place Date Ex-Responsible Person