

## Operation manual for valve solenoids – Type 42xx

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English/German

Please keep for later reference and forward to the end customer together with the product.



Typ 42xx

This operation manual applies to valve solenoids type **42xx**. Refer to table 1 **type overview for model names and the most important technical data**.

### 1 Authorized range of application

#### Explosion protection according to directive 2014/34/EU (ATEX)

The valve solenoids are suitable for use

- in hazardous areas containing flammable gas, zones 1 and 2. They are classed as category II 2G (ATEX) and have Ex eb mb IIC T4/T5/T6 Gb type of protection
- in hazardous areas containing combustible dust, zones 21 and 22. They are classed as category II 2D (ATEX) and have Ex tb IIC T130 °C Db type of protection.

Table 3 shows the electrical and thermal data for each model.

→ **NOTE** Explosion protection applies to operation.

The basic health and safety requirements according to ATEX directive 2014/34/EU are fulfilled by conformity with standards:

EN 60079-0:2018,  
EN 60079-7:2015/A1:2018,  
EN 60079-18:2015+A1:2017,  
EN 60079-31:2014

EU Type Examination Certificate:  
KEMA 98 ATEX 4452 X

#### Explosion protection according to IECEx

The basic health and safety requirements according to IECEx Scheme are fulfilled by conformity with standards:

IEC 60079-0:2017, IEC 60079-7:2017,  
IEC 60079-18:2017, IEC 60079-31:2013

IECEx Certificate of Conformity:  
IECEx KEM 09.0068 X

### 2 General safety instructions

→ During installation, maintenance and repair, the relevant Ex regulations must be followed, in particular IEC / EN 60079-14 and IEC / EN 60079-17.

- Electrical installation must be performed or supervised by a competent person in compliance with relevant domestic regulations.
- Prior to installation, the information on the equipment label must be compared with the expected operating conditions in order to ensure operation in accordance with the intended use.

### 3 Special conditions

→ For higher ambient temperatures it is important to observe the requested heat-resistance of the connecting cable - see table 2.

### 4 Markings

Information about the device's year of manufacture are specified by a five-character date code on the name plate, the first two characters specify the decade and the year, B is representing the years 2010 through 2019.

Example: **B6035** = year 2016

### 5 Assembly

→ **NOTE** Valve actuating solenoids are electrical components. They are inoperable without an accompanying valve.

Valve actuating solenoids are electrical components. They are inoperable without an accompanying valve. Valve-solenoid combinations are normally supplied fully assembled and tested. When replacing or changing solenoids it is important to ensure that the combination is approved for the valve, and that the solenoid is fitted properly with the valve.

Depending on the valve model, the solenoid is fitted to the valve either through a vented cap nut with integrated sealing a), a cap nut with integrated sealing b) or a standard screw nut c). The solenoid must be mounted as shown in figure a). The bushings are used to adjust to the diameter of the stem tube armature. The assignment of the necessary parts is shown in table 1.

The solenoid can be fitted in any position, although the preferred orientation is with the cable entry pointing down

For the relevant torque, refer to the valve documentation.

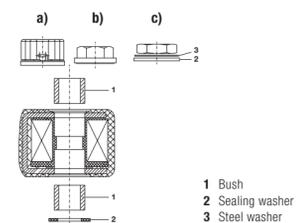


Figure a)

Stem tube Ø	Bush 1	Sealing washer 2	Steel washer 3
13 mm	0587911	0588717	0588905
16 mm	0587912	0588716	0588818

Table 1

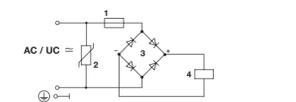
→ **NOTE** The solenoids must not be used as a lever. If the solenoids are subject to external loads of any type, additional protective measures may be necessary.

#### Fitting the cover

After the electrical connection the cover, see section 6, must be fitted carefully. It is important to ensure a proper placement of the sealing. Only the supplied gasket must be used.

→ **NOTE** In order to ensure at least IP 66 degree of protection, the original seal must be used (same holds for the cable gland).

### 6 Electrical connection



- Fuse
- Varistor
- Bridge rectifier
- Coil

#### Connecting terminals

The electrical connection is made via internal terminals. The earth terminal is marked with the symbol ⊕. The earth must always be connected.

The terminals are designed for conductor cross sections up to 4mm<sup>2</sup> and are suitable for solid conductors and fine-stranded conductors with ferrules. The stripping length is 9mm. The required tightening torque is 1.2 Nm.

→ **NOTE** For the earth connection (protective earth connection) the requirements of EN 60079-14, point 6.2 must be followed.

### Cable gland

→ **NOTE** Metallic cable glands are generally not permitted.

The solenoids have a connection thread of M20x1.5. The thread length of the cable gland does not exceed 10 mm.

When selecting the connection cable, the clamping range of the cable gland and the requirements of the IEC/EN 60079-14 for the cable must be noted. Regarding the temperature resistance, table 2 should be noted.

P <sub>N</sub>		t <sub>amb</sub>
0,7 W / 1 VA	AND	>68 °C
4 W / 5 VA	AND	>65 °C
8 W / 9 VA	AND	>62 °C

Table 2: Required temperature stability of the cable gland and the connection cable

→ **NOTE** Depending on the rated power P<sub>N</sub> and the ambient temperature t<sub>amb</sub> a cable gland and a connecting cable with a temperature resistance >88 °C is required under the conditions listed in table 2.

For use in gas hazardous areas only plastic cable glands with ATEX respectively IECEx approval for the type of protection Ex eb II are allowed.

For use in dust hazardous areas only plastic cable glands with ATEX respectively IECEx approval for the type of protection Ex tb are allowed.

#### Fuse

All solenoids have a build in fuse (rated current see table 3). The breaking capacity of the fuses is 35 A.

If the maximum prospective short-circuit current at the point of installation is greater than 35 A, a short-circuit protection with the following characteristics must be connected before it:

- Maximum rated current ≤ 3 x I<sub>N</sub>
- Rated voltage > 1,1 x U<sub>N</sub>
- Breaking capacity ≥ maximum prospective short-circuit current at the point of installation (usually 1 500 A)

The fuse may be housed in the associated power supply unit or must be connected separately on the supply side.

### 7 Operation

#### CAUTION

**Risk of burns at the solenoid**  
The solenoid is heating up during operation. There is a risk of injury if touched.

→ Prevent persons and objects to touch the heated surface of the solenoid.

#### DANGER

##### Risk of electrostatic charge

→ It should be ensured that the plastic surface of the magnet can not become electrostatically charged.  
Avoid  
- unintended rubbing  
- cleaning with dry cloth  
- flow past of particles

The solenoids are designed for a duty cycle of 100 %. During operation it must be ensured that temperatures do not exceed the maximum permitted ambient and fluid temperatures, and that the limit rating is not exceeded (max. 10 % overvoltage). If necessary, the solenoid should be protected against overload.

All solenoids are wired with an internal varistor. To avoid power-off voltage peaks, which may affect sensitive electronic equipment, additional measures may be required.

### 8 Maintenance

The solenoids are maintenance-free

- If the solenoids fail or malfunction without apparent reason, they must be replaced.
- Solenoids showing obvious signs of damage must not be installed and must be replaced.
- Faulty coils or other electrical/electronic components cannot be repaired or replaced.

### 9 Disposal

→ Dispose the valve solenoid (coil of copper wire) as electrical waste.

### 10 Standards and directives

#### CE marking

The CE mark is not a quality mark; it is a symbol intended for use by the relevant authorities.

In order to enable the free movement of goods within the EU, the Council of Europe has issued directives that establish essential health and safety requirements specifically for the European market.

The CE mark is confirmation that products comply with all relevant directives i.e. comply with the relevant standards, in particular the harmonized standards. Solenoids of the 42xx series comply with the following directives:  
2014/34/EU, 2014/35/EU and 2014/30/EU.

#### UKCA marking

The UKCA mark is not a quality mark; it is a symbol intended for use by the relevant authorities.

In order to enable the free movement of goods within the UK, the government of Great Britain has issued directives that establish essential health and safety requirements specifically for the UK market.

The UKCA mark is confirmation that products comply with all relevant directives i.e. comply with the relevant standards, in particular the harmonized standards. Solenoids of the 42xx series comply with the following directive:  
S.I. 2016 / 1107 - Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016.

#### Notes on directive 2014/34/EU (Explosion Protection Directive ATEX)

The solenoids comply with the design specified in the EU-Type-Examination Certificate KEMA 98 ATEX 4452 X and satisfy the relevant requirements of the Directive 2014/34/EU; they are therefore labeled with the CE mark. EU-Declaration of conformity see section 11.

#### Notes on directive 2014/35/EU (Low-voltage Directive)

The solenoids have been designed, constructed, and fabricated in compliance with the DIN VDE 0580 standard "Electromagnetic devices".

This means that they also satisfy the requirements of the Low Voltage Directive, which applies to rated voltages of 50 to 1000 V AC and 75 to 1500 V DC.

#### Notes on directive 2014/30/EU (Electromagnetic Compatibility)

The solenoids satisfy the requirements of the generic standards for emitted interference (EN 61000-6-4) and for interference immunity (EN 61000-6-2) in industrial environments.

Solenoid as actuating elements for valves do not constitute independently operable devices in the sense of the EMC Directive, and are only handled by specialist firms, or built into a machine.

It is prohibited to put them into operation until it has been established that the whole machine or system complies with the requirements of the EMC Directive.

Type overview		Solenoid order number	Stem tube Ø 13 mm	Solenoid order number	Stem tube Ø 16 mm	Connector thread for cable gland	Nominal power (limit rating) P <sub>N</sub>	Voltage	Nominal current	Device fuse rated current	Power consumption	Type of protection and permissible ambient and fluid temperature for gases	Type of protection and permissible ambient and fluid temperature for dusts																				
4200	4250	0,7 W resp. 1,0 VA	M20 X 1,5	20 V DC	38 mA	80 mA	0,8 W	Ex eb mb IIC T5/T6 Gb	by T5 -40...+80 °C or bei T6 -40...+70 °C	Ex tb IIC T 130 °C Db	24 V DC 33 mA 63 mA 0,8 W 48 V DC 15 mA 40 mA 0,7 W 110 V DC 12 mA 40 mA 1,3 W 120 V DC 8 mA 40 mA 1,0 W																						
				24 V UC	43 mA	80 mA	1,1 VA																										
				48 V AC	17 mA	40 mA	0,8 VA																										
				110 V AC	11 mA	40 mA	1,2 VA																										
				230 V AC	6 mA	40 mA	1,3 VA																										
				4210	4260	4 W resp. 5 VA	M20 X 1,5							20 V DC	193 mA	400 mA	3,9 W	Ex eb mb IIC T4/T6 Gb	by T4 -40...+80 °C or bei T6 -40...+55 °C	Ex tb IIC T 130 °C Db	24 V DC 162 mA 400 mA 3,9 W 48 V DC 101 mA 200 mA 4,8 W 60 V DC 81 mA 160 mA 4,9 W 110 V DC 44 mA 80 mA 4,9 W 120 V DC 38 mA 80 mA 4,6 W												
														24 V UC	217 mA	400 mA	4,9 VA																
														48 V AC	107 mA	250 mA	5,1 VA																
														110 V AC	49 mA	100 mA	5,4 VA																
														120 V AC	43 mA	80 mA	4,8 VA																
														4211	4261	8 W resp. 9 VA	M20 X 1,5							20 V DC	23 mA	40 mA	5,3 W	Ex eb mb IIC T4/T5 Gb	by T4 -40...+65 °C or bei T5 -40...+55 °C	Ex tb IIC T 130 °C Db	24 V DC 369 mA 800 mA 8,9 W 48 V DC 156 mA 315 mA 7,8 W 110 V DC 69 mA 160 mA 7,6 W 120 V DC 75 mA 160 mA 9,0 W		
																								24 V UC	346 mA	630 mA	7,7 VA						
48 V AC	210 mA	400 mA	10,1 VA																														
110 V AC	80 mA	160 mA	8,8 VA																														
120 V AC	67 mA	160 mA	8,0 VA																														
4220	4270	11 W resp. 13 VA	M20 X 1,5					24 V DC	475 mA	1000 mA	11,4 W	Ex eb mb IIC T4/T5 Gb	by T4 -40...+50 °C or bei T5 -40...+40 °C											Ex tb IIC T 130 °C Db	27 V DC 415 mA 1000 mA 11,2 W 48 V DC 240 mA 500 mA 11,5 W 60 V DC 195 mA 400 mA 11,7 W 110 V DC 116 mA 250 mA 12,8 W 120 V DC 98 mA 200 mA 11,8 W								
								24 V UC	557 mA	1000 mA	12,5 VA																						
				48 V AC	328 mA	630 mA	15,8 VA																										
				110 V AC	133 mA	250 mA	14,6 VA																										
				120 V AC	113 mA	250 mA	13,6 VA																										
				4230	4280	11 W resp. 13 VA	M20 X 1,5	24 V DC	475 mA	1000 mA	11,4 W							Ex eb mb IIC T4/T5 Gb	by T4 -40...+50 °C or bei T5 -40...+40 °C	Ex tb IIC T 130 °C Db	27 V DC 415 mA 1000 mA 11,2 W 48 V DC 240 mA 500 mA 11,5 W 60 V DC 195 mA 400 mA 11,7 W 110 V DC 116 mA 250 mA 12,8 W 120 V DC 98 mA 200 mA 11,8 W												
								24 V UC	557 mA	1000 mA	12,5 VA																						
								48 V AC	328 mA	630 mA	15,8 VA																						
								110 V AC	133 mA	250 mA	14,6 VA																						
								120 V AC	113 mA	250 mA	13,6 VA																						
								4231	4281	11 W resp. 13 VA	M20 X 1,5			24 V DC	475 mA	1000 mA	11,4 W											Ex eb mb IIC T4/T5 Gb	by T4 -40...+50 °C or bei T5 -40...+40 °C	Ex tb IIC T 130 °C Db	27 V DC 415 mA 1000 mA 11,2 W 48 V DC 240 mA 500 mA 11,5 W 60 V DC 195 mA 400 mA 11,7 W 110 V DC 116 mA 250 mA 12,8 W 120 V DC 98 mA 200 mA 11,8 W		
														24 V UC	557 mA	1000 mA	12,5 VA																
48 V AC	328 mA	630 mA	15,8 VA																														
110 V AC	133 mA	250 mA	14,6 VA																														
120 V AC	113 mA	250 mA	13,6 VA																														

Table 3

Additional types on request

### 11 Declaration of conformity

-ORIGINAL-

IMI International s.r.o.  
Central Trade Park, Evropská 852  
664 42 Modřice, Czech Republic  
Tel: +420 532 278 111  
Fax: +420 532 278 113  
www.imi-precision.com  
ICO: 25992089 DIC: C229692089



#### EU – Declaration of Conformity in accordance with Directive: 2014/34/EU

Equipment: Valve Solenoid

Model series: 42xx

Herewith the manufacturer declares that the named products are in conformity with all relevant provisions of the above-mentioned directive to use in potentially explosive atmospheres.

#### Referenced normative standards:

EN 60079-0:2018 General requirements  
EN 60079-7:2015/A1:2018 Increased safety "e"  
EN 60079-18:2015 + A1:2017 Encapsulation "m"  
EN 60079-31:2014 Protection by enclosure "r"

#### Equipment group, Categories, Types of protection:

Ex II 2G Ex eb mb IIC T6...T4 Gb  
II 2D Ex tb IIC T 130°C Db

#### EU-Type Examination Certificate:

KEMA 98ATEX4452 X Issue Number.: 5  
Issued by DEKRA Certification B.V.  
NL-6825 MJ Arnhem (Notified Body No.: 0344)

EU-Certificate for quality system:  
Issued by TÜV SÜD Product Service GmbH,  
D-80339 München (Notified Body No.: 0123)

In Modřice, November 2022

Jiří Tošovský  
Motion Control R&D Manager

Roman Kameník  
Authorized Representative



-ORIGINAL-

IMI International s.r.o.  
Central Trade Park, Evropská 852  
664 42 Modřice, Czech Republic  
Tel: +420 532 278 111  
Fax: +420 532 278 113  
www.imi-precision.com  
ICO: 25992089 DIC: C229692089



#### UK – Declaration of Conformity in accordance with Directive: S.I. 2016 / 110 - Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016

Equipment: Valve Solenoid

Model series: 42xx

Herewith the manufacturer declares that the named products are in conformity with all relevant provisions of the above-mentioned directive to use in potentially explosive atmospheres.

#### Referenced normative standards:

EN 60079-0:2018 General requirements  
EN 60079-7:2015/A1:2018 Increased safety "e"  
EN 60079-18:2015 + A1:2017 Encapsulation "m"  
EN 60079-31:2014 Protection by enclosure "r"

#### Equipment group, Categories, Types of protection:

Ex II 2G Ex eb mb IIC T6...T4 Gb  
II 2D Ex tb IIC T 130°C Db

#### EU-Type Examination Certificate:

KEMA 98ATEX4452 X Issue Number.: 5  
Issued by DEKRA Certification B.V.  
NL-6825 MJ Arnhem (Notified Body No.: 0344)

EU-Certificate for quality system:  
Issued by TÜV SÜD Product Service GmbH,  
D-80339 München (Notified Body No.: 0123)

In Modřice, November 2022

Jiří Tošovský  
Motion Control R&D Manager

Roman Kameník  
Authorized Representative



IMI International s.r.o.  
CTPark, Evropská 852 664 42  
Modřice  
Czech republic  
Telefon +420 532 278 111  
www.imi