

# MOUNTING AND OPERATING INSTRUCTIONS



## EB 3701 EN

Translation of original instructions



## Type 3701 Solenoid Valve

Edition January 2020



## Note on these mounting and operating instructions

These mounting and operating instructions assist you in mounting and operating the device safely. The instructions are binding for handling SAMSON devices.

- For the safe and proper use of these instructions, read them carefully and keep them for later reference.
- If you have any questions about these instructions, contact SAMSON's After-sales Service Department (aftersaleservice@samson.de).



The mounting and operating instructions for the devices are included in the scope of delivery. The latest documentation is available on our website at [www.samson.de](http://www.samson.de) > **Service & Support** > **Downloads** > **Documentation**.

## Definition of signal words

### **DANGER**

*Hazardous situations which, if not avoided, will result in death or serious injury*

### **WARNING**

*Hazardous situations which, if not avoided, could result in death or serious injury*

### **NOTICE**

*Property damage message or malfunction*

### **Note**

*Additional information*

### **Tip**

*Recommended action*

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### 1 General safety instructions

- The device is to be mounted, started up or operated only by trained and experienced personnel familiar with the product.  
According to these mounting and operating instructions, trained personnel refers to individuals who are able to judge the work they are assigned to and recognize possible dangers due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.
- Explosion-protected versions of this device are to be operated only by personnel who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.
- Any hazards that could be caused in the control valve by the process medium, the signal pressure or by moving parts are to be prevented by taking appropriate precautions.
- The pilot supply must not exceed the maximum permissible supply pressure and must be limited by pressure reducing valve, if necessary.
- If inadmissible motions or forces are produced in the pneumatic actuator as a result of the supply pressure level, it must be restricted using a suitable supply pressure reducing station.
- Proper shipping and storage are assumed.


#### 1.1 Legal information

The Type 3701 Solenoid Valve bears a CE marking. The declaration of conformity includes information about the applied conformity assessment procedure. The declarations of conformity are included at the end of these instructions.




## 2 Markings on the device

### 2.1 Nameplate

#### Version without explosion protection

<b>SAMSON 3701</b>			
Magnetventil	Solenoid valve		
Electrovanne			
3701-	1	GI 14/TÜV	
Serial no.	2	Var.ID:	3
U	4	V	U <sub>max.</sub> 8 V
I	5	mA	I <sub>max.</sub> 9 mA
DC	6	AC	7
Made in France			

#### Version with explosion protection

<b>SAMSON 3701-1</b>			
Solenoid valve	U <sub>N</sub>	4	V DC
	10	PTB 01 ATEX 2178	
*U <sub>i</sub> ≤ 11 V; *I <sub>i</sub> ≤ 12 mA; *P <sub>i</sub> ≤ 13 mW			
C <sub>1</sub> ≈ 0 nF; L <sub>1</sub> ≈ 0 μH			
* See technical data and explosion-protection certificate			
	for permissible ambient temperature and maximum values for connection to certified intrinsically safe circuits.		
Model	3701-	1	GI 14/SIL
Var.ID:	3	Serial no.	2
SAMSON AG D-60314 Frankfurt		Made in Germany	

- |   |                  |    |                    |
|---|------------------|----|--------------------|
| 1 | Article code     | 8  | Maximum voltage    |
| 2 | Serial number    | 9  | Maximum current    |
| 3 | Configuration ID | 10 | Type of protection |
| 4 | Nominal voltage  | 11 | Output voltage     |
| 5 | Nominal current  | 12 | Output current     |
| 6 | DC marking       | 13 | Power dissipation  |
| 7 | AC marking       |    |                    |

## 2.2 Article code

Solenoid valve	Type 3701-	x	x	x	x	x	x	x	x	x	x	x	x	x
<b>Explosion protection</b>														
Without	0													
II 2G Ex ia IIC T6; II 2D Ex tb IIIC T80°C IP65, ATEX	1													
Ex ia CSA/FM	3													
II 3G Ex nA II T6; II 3G Ex ic IIC T6; II 3D Ex tc IIIC T80°C IP65, ATEX	8													
<b>Nominal signal</b>														
12 V DC	2													
24 V DC	3													
230 V AC (without explosion protection)	5													
115 V AC (without explosion protection)	6													
<b>Switching function</b>														
3/2-way, NC, $K_{VS} = 0.25$ , circuit 1	0													
3/2-way, NO, $K_{VS} = 0.25$ , circuit 2	1													
5/2-way, $K_{VS} = 0.25$	2													
<b>Attachment</b>														
NAMUR interface for rotary actuators including adapter plate (1400-5235)	0													
NAMUR rib for linear actuators	1													
<b>Threaded connection</b>														
G ¼	0													
¼ NPT	1													
<b>Electrical connection</b>														
Without cable gland, fitted with blanking plug	0	0												
Black cable gland M20x1.5	0	1												
Blue cable gland M20x1.5	1	1												
Adapter M20x1.5 to ½ NPT	1	2												
Black CEAG cable gland M20x1.5	1	3												
Cable gland M20x1.5, brass	1	4												
<b>Degree of protection</b>														
IP 54									0					
IP 65, with filter check valve made of polyamide									1					
IP 65, with filter check valve made of stainless steel									2					
<b>Ambient temperature</b>														
-20 to +80 °C									0					
-45 to +80 °C									2					

<b>Solenoid valve</b>	<b>Type 3701-</b>	x	x	x	x	x	x	x	x	x	x	x	x	x
<b>Safety approval</b>														
Without									0					
SIL (only with 3/2-way function)									1					
TÜV (only with 3/2-way function)									2					
<b>Special version</b>														
On request											x	x	x	

### 3 Design and principle of operation

The Type 3701 Solenoid Valve is suitable for controlling pneumatic linear actuators with NAMUR rib according to IEC 60534 or pneumatic rotary actuators with NAMUR interface according to VDI/VDE 3845.

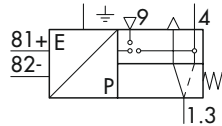
Its operating principle is based on a flap-per/nozzle assembly and a booster valve with diaphragm actuator.

Intrinsically safe, low-power binary signals issued by automation equipment or fieldbus systems can be used for controlling purposes.

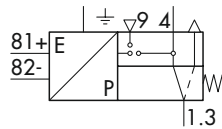
The Type 3701 Solenoid Valve implements 3/2-way or 5/2-way functions with  $K_{VS}$  0.25 (see Fig. 1) depending on the version.

→ Fig. 2 shows the solenoid valve with the enclosure cover removed.

#### 3/2-way function

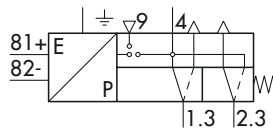


Type 3701-xx0,  
neutral position "Actuator vented"



Type 3701-xx1,  
neutral position "Actuator filled with air"

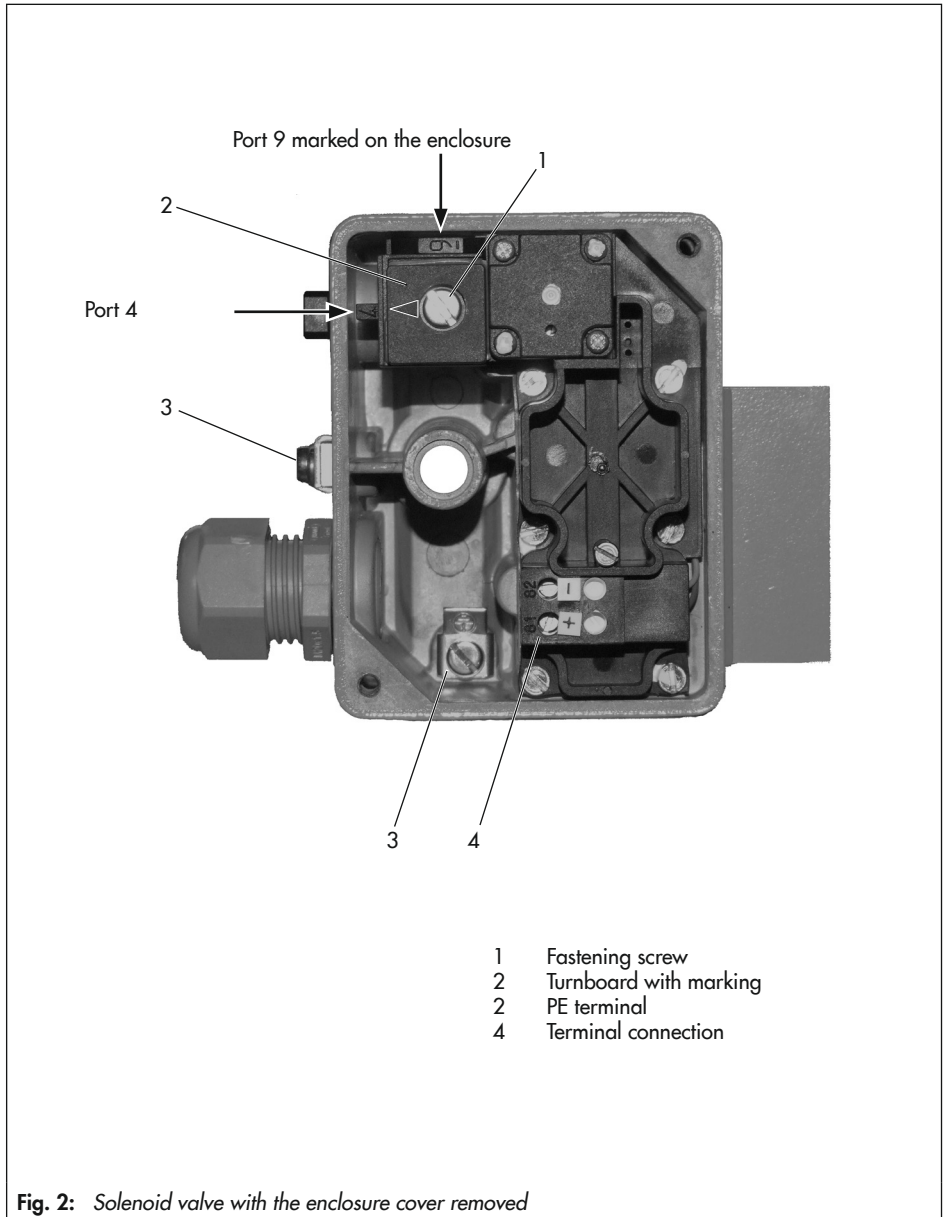
#### 5/2-way function



Type 3701-xx2,  
neutral position "Actuator vented"

Fig. 1: Switching functions





## 3.1 Technical data

General data	
Design	Solenoid with flapper/nozzle assembly and diaphragm switching elements
Degree of protection	IP 54 with filter, IP 65 with filter check valve
Ambient temperature	See Electric data
Mounting position	Any desired position
Compliance	<b>CE · EAC</b>
Material	
Enclosure	AlMg, powder coated, gray beige RAL 1019
NAMUR adapter plate	AlMg, powder coated, gray beige RAL 1019
Screws	1.4571
Springs	1.4310
Seals	Silicone rubber, Perbunan
Diaphragms	Chloroprene rubber 57 Cr 868 (-20 to +80 °C) · Silicone rubber (-45 to +80 °C)
Weight	
Approx.	450 g

Electric data			
Nominal signal	$U_N$	<b>12 V DC</b>	<b>24 V DC</b>
	$U_{max}$	25 V	32 V
Switching point	$U_{80\text{ °C}}$	$\geq 9.6\text{ V}$	$\geq 18\text{ V}$
	On	$I_{20\text{ °C}}$	$\geq 1.52\text{ mA}$
		$P_{20\text{ °C}}$	$\geq 13.05\text{ mW}$
	Off <sub>-25 °C</sub>	$U$	$\leq 2.4\text{ V}$
Input impedance	R	5.5 k $\Omega$	10.7 k $\Omega$
Temperature influence		0.2 %/K	0.1 %/K
Type of protection <sup>1)</sup>		Intrinsic safety: II 2G Ex ia IIC T6, non-sparking: II 3G Ex nA II T6	
Output voltage <sup>2)</sup>	$U_i$ (V)	25/27/28/30/32	
Output current <sup>2)</sup>	$I_i$ (mA)	150/125/115/100/85	
Power dissipation	$P_i$ (mW)	No restrictions	
Outer inductance <sup>2)</sup>	$L_i$	Negligibly small	
Outer capacitance <sup>2)</sup>	$C_i$	Negligibly small	
Ambient temperature <sup>7)</sup>		-45 to +60 °C (temperature class T6) -45 to +70 °C (temperature class T5) -45 to +80 °C (temperature class T4)	
Connection		See article code on page 6	

Electric data			
Nominal signal	$U_N$	115 V AC	230 V AC
		$U_{max}$	130 V
	f	48 to 62 Hz	
Switching point	$U_{+80\text{ °C}}$	≥ 82 to 130 V	≥ 183 to 255 V
	On $I_{+20\text{ °C}}$	≥ 2.2 mA	≥ 2.6 mA
	$P_{+20\text{ °C}}$	≥ 0.17 VA	≥ 0.46 VA
	Off <sub>-25 °C</sub> U	≤ 18 V	≤ 36 V
Input impedance	R	Approx. 40 kΩ	Approx. 80 kΩ
Temperature influence		0.05 %/K	0.03 %/K
Type of protection <sup>1)</sup>		No explosion protection	

<sup>1)</sup> EC type examination certificate PTB 01 ATEX 2178 and statement of conformity PTB 02 ATEX 2014 X

<sup>2)</sup> Permissible maximum values when connected to a certified intrinsically safe circuit.

Pneumatic data		
Type 3701	-xx0 / -xx1	-xx2
Safety function	TÜV <sup>1)</sup> /SIL <sup>1)</sup>	-
Version	3/2-way function	5/2-way function
$K_{VS}$ <sup>2)</sup>	0.25	0.25
Pilot supply	Medium	Instrument air (free from corrosive substances) or nitrogen
	Pressure	1.4 to 6 bar
Operating medium	Instrument air (free from corrosive substances) <sup>3)</sup> Air containing oil, nitrogen, non-corrosive gases <sup>4)</sup>	
Operating pressure	Max. 6 bar	
Output signal	Operating pressure	
Air consumption	≤ 80 l <sub>n</sub> /h at 1.4 bar pilot supply in neutral position ≤ 10 l <sub>n</sub> /h at 1.4 bar pilot supply in operating position	
Switching time <sup>5)</sup>	≤ 65 ms	
Service life	≥ 2 × 10 <sup>7</sup> switching cycles (at -20 to +80 °C)	
	≥ 2 × 10 <sup>6</sup> switching cycles (at -45 to +80 °C)	
Connection	G ¼ (¼ NPT)	

<sup>1)</sup> Report no. S 384 2013 E2 (used on control valves according to DIN 3394 Part 1, DIN EN 161, DIN 32725, DIN EN 264 and DIN 32730); Report no. V 60.09/14 rev. 02 (certification for safety-instrumented systems according to IEC 61508/SIL).



<sup>2)</sup> The air flow rate when  $p_1 = 2.4$  bar and  $p_2 = 1.0$  can be calculated using the following formula:  $Q = K_{VS} \times 36.22$  in m<sup>3</sup>/h.

<sup>3)</sup> With internal pilot supply (delivered status)

<sup>4)</sup> With external pilot supply

<sup>5)</sup> Permissible ambient temperature -45 °C only applicable with diaphragm and seals made of silicone rubber and metal cable gland

### 3.2 Summary of explosion protection approvals

Type	Certification		Type of protection/comments	
3701	SIL	Number	V 60.09/14 rev.01	Certification for safety-instrumented systems according to IEC 61508
		Date	2006-02-22	
3701-1	TÜV	Number	S 284 2013 E2	Mounted on control valves according to DIN 3394-1, DIN EN 161, DIN 32725, DIN EN 264 and DIN 32730
		Date	2014-01-16	
3701-1	 <sup>1)</sup> EAC	Number	PTB 01 ATEX 2178	II 2G Ex ia IIC T6
		Date	2006-02-22	II 2D Ex tb IIIC T80°C IP65
3701-3	CSA	Number	1607252	Ex ia IIC T6: Class I, Zone 0 Class I, Div.1, Groups A,B,C,D Class II, Div.1, Groups E,F,G Class I, Div.2, Groups A,B,C,D Class II, Div.2, Groups E,F,G
		Date	2005-09-16	
3701-3	FM	Number	3020228	Class I, Zone 0 AEx ia IIC Class I, II, III; Div.1, Groups A,B,C,D,E,F,G Class I, Div.2, Groups A,B,C,D; Class II, Div.2 Groups F,G; Class III; Type 3R
		Date	2015-10-12	
3701-8	 <sup>1)</sup>	Number	PTB 02 ATEX 2014 X	II 3G Ex nA II T6
		Date	2006-02-22	II 3G Ex ic IIC T6 II 3D Ex tc IIIC T80°C IP65

<sup>1)</sup> EC type examination certificate

## 4 Accessories

Designation	Ordering number
Adapter plate for rotary actuators with NAMUR interface according to VDI/VDE 3845	1400-5235
Mounting parts for valves with rod-type yokes according to NAMUR	1400-5342
Mounting parts for Series 240 in DN 15 to 80, in case positioner and/or limit switch is to be mounted as well	1400-5905
Polyethylene filter, connection G ¼, degree of protection IP 54 Filter check valve made of polyamide or 1.4571, degree of protection IP 65 or NEMA 4. Refer to Application Notes ► AB 08	8504-0066

### 5 Mounting and start-up

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#### **i** Note

The mounting accessories (M8 fastening screw, washer and O-ring) are included in the scope of delivery.

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#### 5.1 Mounting position

Any mounting position may be used. The following applies concerning the installation:

- Install the solenoid valve in such a way that the filter in the enclosure cover and the cable gland M20x1.5 face downward (in cases where this is not possible, mount it in the horizontal position).
- On mounting, make sure that 300 mm or more clearance is kept above the enclosure cover.

#### 5.2 Ambient temperature

The minimum permissible ambient temperature is

- 20 °C (Types 3701-xxxx xxxx 0),
- 45 °C (Types 3701-xxxx xxxx 2).

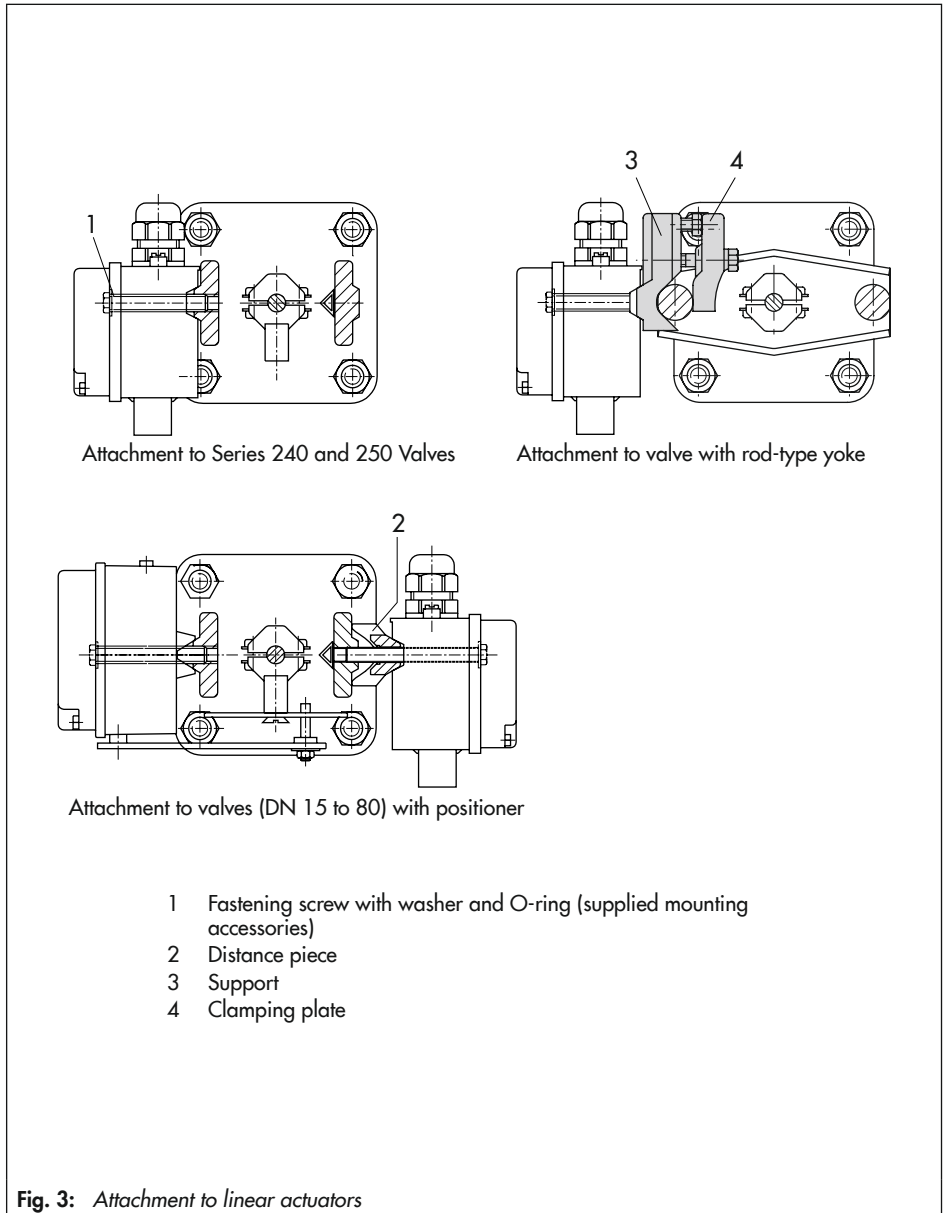
The permissible ambient temperature range is lower for intrinsically safe versions according to EC type examination certificate PTB 01 ATEX 2178 and statement of conformity PTB 02 ATEX 2014 X.

#### 5.3 Mounting on linear actuators

The Type 3701-xxx1 Solenoid Valve is designed for attachment according to IEC 60534-6 (NAMUR).

##### Attachment (see Fig. 3)

1. Observe instructions on mounting position (see section 5.1).
  2. Remove enclosure cover.
  3. Push washer and O-ring onto the M8 fastening screw (1).
  4. Use the M8 fastening screw (1) to directly fasten the solenoid valve to the yoke of the control valve.
- For Series 240 Valves (DN 15 to 80) fitted with a positioner or limit switch, additionally mount the distance piece (2) (required accessories: section 4 on page 13).
  - For valves with rod-type yoke, mount the solenoid valve using a support (3) with clamping plate (4) (required accessories: section 4 on page 13).



## 5.4 Mounting on rotary actuators

### Version for adapter plate

This version of the Type 3701-xxx2 Solenoid Valve is fitted with ports for the output signal (1.3 and 2.3) at the back. In this case, an adapter plate (5) according to VDI/VDE 3845 is required for attachment.

➔ Accessories: section 4 on page 13.

The adapter plate (not mounted) is included in the scope of delivery for Type 3701-xxx0.

### Attachment (see Fig. 4)

1. Observe instructions on mounting position (see section 5.1).
2. Use an M5x10 coded grub screw (6) according to DIN 916 to determine the direction of action of the rotary actuator at the connecting flange.
3. Check to make sure the two O-rings are seated correctly.
4. Mount the adapter plate (5) on the NAMUR interface of the actuator using the supplied M5x16 screws (7).
5. Push washer and O-ring onto the M8 fastening screw (1).
6. Mount the solenoid valve on the adapter plate using the M8 fastening screw (1).

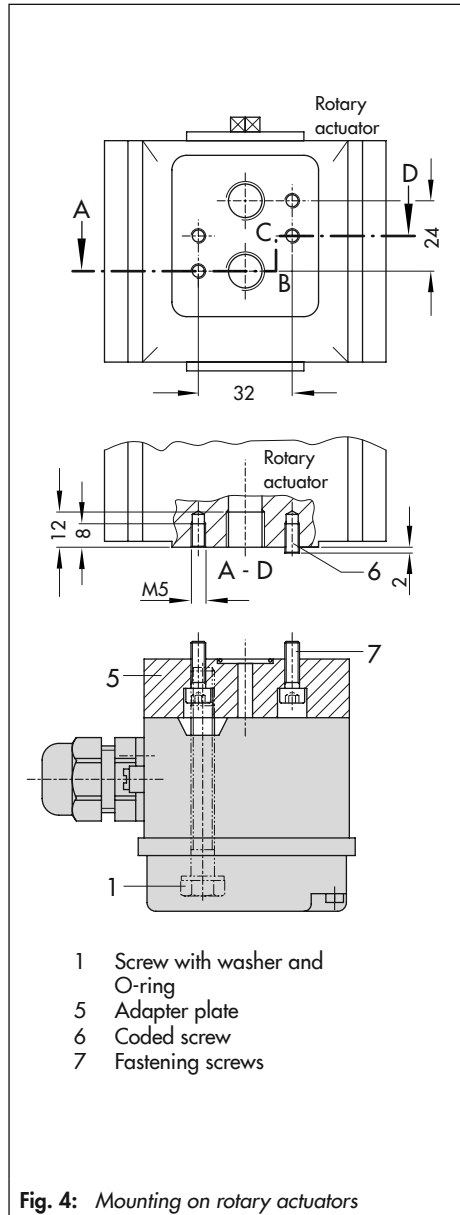


Fig. 4: Mounting on rotary actuators



## 6 Pneumatic connection

### **⚠ WARNING**

*Risk of injury due to high pressure inside device.*

*Prior to performing repair and maintenance work on the device, depressurize the connecting lines.*

The air connections are designed as threaded holes with G 1/4 or 1/4 NPT thread depending on the device version.

- ➔ Run and attach the connecting lines and screw joints according to good professional practice.
- ➔ Check the connecting lines and screw joints for leaks and damage at regular intervals and repair them, if necessary.
- ➔ The  $K_{VS}$  coefficient of an upstream pressure reducing valve must be at least 1.6 times larger than the  $K_{VS}$  coefficient of the device.

### Port labeling

Inscription	Function
4	Supply
9	External pilot supply
1.3/2.3	Output

## 6.1 Sizing of the connecting line

Refer to the table below for the minimum required nominal size of the connecting line at the port **4** of the enclosure.

The specifications apply to a connecting line shorter than 2 m. Use a larger nominal size for lines longer than 2 m.

Connection	9	4	1.3/2.3
Pipe <sup>1)</sup>	6x1 mm	12x1 mm	
Hose <sup>2)</sup>	4x1 mm	9x3 mm	

<sup>1)</sup> Outside diameter x Wall thickness

<sup>2)</sup> Inside diameter x Wall thickness

## 6.2 Compressed air quality

With internal pilot supply over port **4** (delivered status):

- ➔ Instrument air (free from corrosive substances), 1.4 to 6 bar

With external pilot supply over port **9**

- ➔ Instrument air (free from corrosive substances), air containing oil or non-corrosive gases with 0 to 6 bar

Compressed air quality according to ISO 8573-1		
Particle size and quantity	Oil content	Pressure dew point
Class 4	Class 3	Class 3
$\leq 5 \mu\text{m}$ and $1000/\text{m}^3$	$\leq 1 \text{ mg}/\text{m}^3$	$-20 \text{ }^\circ\text{C}/10 \text{ K}$ below the lowest ambient temperature to be expected

## 6.3 Pilot supply

In the delivered state, the pilot supply is fed internally over port **4**.

→ On mounting the solenoid valve to rotary or linear actuators fitted with positioners, the pilot supply must be changed to an external pilot supply over port **9**.

To change to an external pilot supply through port **9**, proceed as follows:

→ See Fig. 2 on page 9.

1. Open the enclosure cover and unscrew the screw on the turnboard.
2. Turn the turnboard by 90° with the arrow pointing to the number 9. Retighten the screw.
3. Remove the blanking plug in port 9 and replace it with a screw joint.

## 7 Electrical connections

---

### **⚠ DANGER**

*For electrical installation, observe the relevant electrotechnical regulations and the accident prevention regulations that apply in the country of use. In Germany, these are the VDE regulations and the accident prevention regulations of the employers' liability insurance.*

*The degree of protection IEC 60529 is only guaranteed when the enclosure cover is mounted, the exhaust air filters are installed and the connections have been properly mounted.*

*The following regulations apply to installation in hazardous areas: EN 60079-14 (VDE 0165, Part 1) Explosive Atmospheres – Electrical Installations Design, Selection and Erection.*

*For intrinsically safe electrical equipment approved in accordance with Directive 2014/34/EU, the data specified in the EC type examination certificate apply to the connection of intrinsically safe circuits.*

---

## Electrical connections

The electrical connection is made using an M20x1.5 cable gland to the terminals in the enclosure or using a connector. Connectors that can be used are listed in the table in section 4.

→ The terminal assignment is listed in Fig. 5.

### Using a connector

1. Unscrew the M20x1.5 cable gland out of the enclosure cover.
2. Screw connector into the thread.

## 7.1 Sizing of the connecting line

We recommend the following size of the connecting lines:

- Conductor cross-section  $\geq 0.5 \text{ mm}^2$
- 6 to 12 mm outside diameter (for M20x1.5 cable glands)

## 7.2 Degree of protection

Devices with a rating of IP 54 can be converted to a rating of IP 65 by exchanging the filter in the enclosure cover.

Refer to Application Notes ► AB 08.

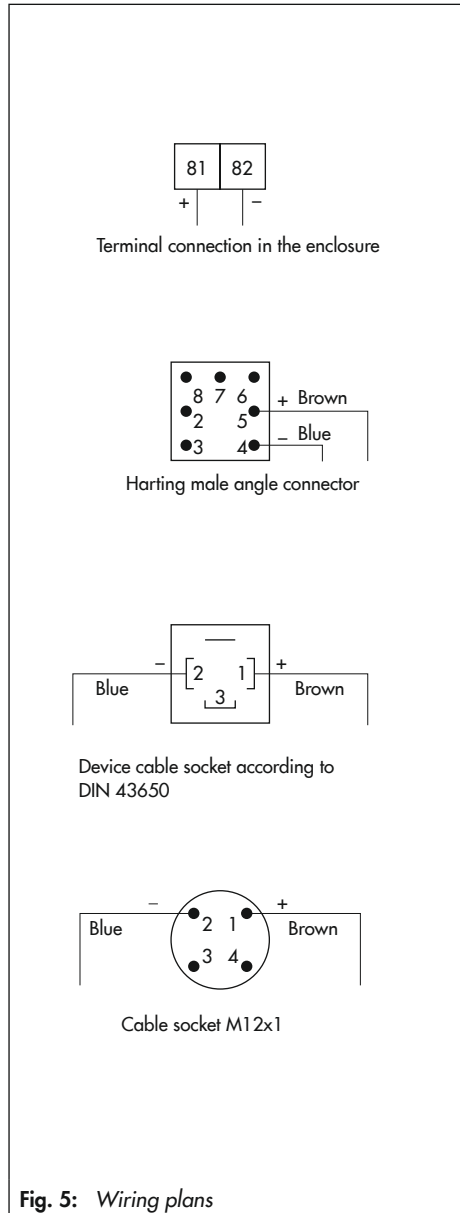


Fig. 5: Wiring plans

## 8 Disposal



SAMSON is a producer registered at the following European institution ► <https://www.ewrn.org/national-registers/national-registers>.  
WEEE reg. no.:  
DE 62194439/FR 025665

- Observe local, national and international refuse regulations.
- Do not dispose of components, lubricants and hazardous substances together with your other household waste.

---

### **i Note**

*We can provide you with a recycling passport according to PAS 1049 on request. Simply e-mail us at [offersaleservice@samsongroup.com](mailto:offersaleservice@samsongroup.com) giving details of your company address.*

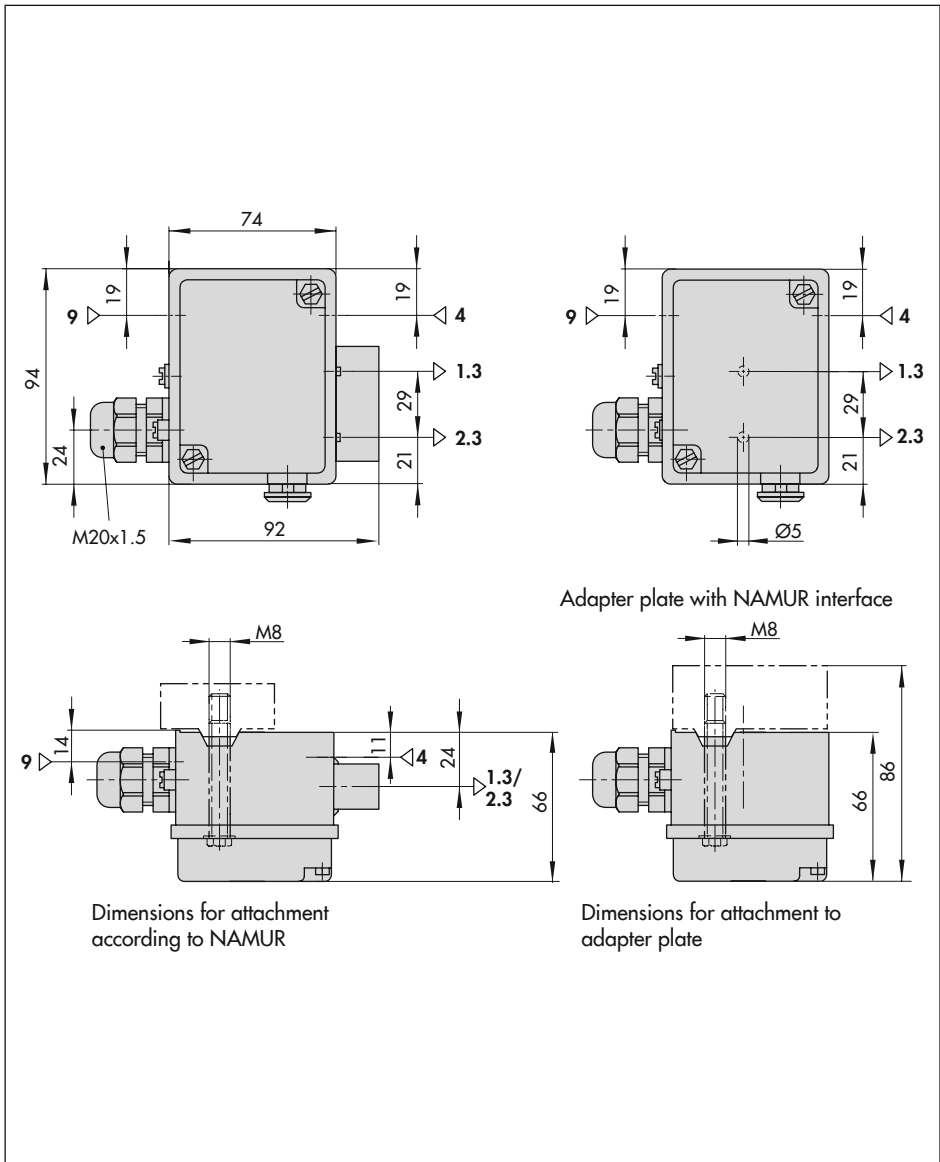
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### **💡 Tip**

*On request, we can appoint a service provider to dismantle and recycle the product.*

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## 9 Dimensions in mm





**TRANSLATION**

**Statement of Conformity**



- (1)
- (2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres – **Directive 94/9/EC**
- (3) EC Type Examination Certificate Number

**PTB 02 ATEX 2014 X**

- (4) Equipment: Model 3701-8.. Solenoid Valve
- (5) Manufacturer: SAMSON AG Mess- und Regeltechnik
- (6) Address: Weismüllerstr. 3, 60314 Frankfurt am Main, Germany
- (7) The equipment and any acceptable variation thereof are specified in the schedule to this certificate and the documents referred to therein.
- (8) The Physikalisch-Technische Bundesanstalt, notified body number 0102 according to Article 9 of the Council Directive 94/9/ of 23 March 1994, certifies that this equipment has been found to comply with the essential health and safety requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres specified in Annex II to the Directive.

The examination and test results are recorded in confidential report: **PTB Ex 02-21476**

- (9) The essential health and safety requirements are satisfied by compliance with

**EN 50021: 1999**

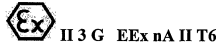
- (10) If the sign “X” is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use as specified in the schedule to this certificate.
- (11) In compliance with the Directive 94/9/EC this Statement of Conformity relates only to the design and construction of the equipment specified. Further requirements of this Directive apply to manufacture and marketing of this equipment.

Statements of conformity without signature and seal are invalid.  
This Statement of conformity may be reproduced only in its entirety and without any changes, schedule.  
Extracts or changes shall require the prior approval of the Physikalisch-Technische Bundesanstalt.

Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig

Ptb13-Ex n.doc

- 12) The marking of the equipment shall include the following:



Zertifizierungsstelle Explosionsschutz  
By order

Braunschweig, 07 March 2002

(Signature)

(Seal)

Dr. Ing. U. Johannsmeyer  
Regierungsdirektor

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Ptb13-Ex n.doc



(13)

## Schedule

(14)

### Statement of Conformity PTB 02 ATEX 2014 X

(15) Description of Equipment

The Model 3701-8.. Solenoid Valve converts electrical binary signals in the input circuit into pneumatic output signals. The Main component of the solenoid valve is the Model 1079-27... e/p-Binary Converter Coil which is suitable for nominal voltages of 6V, 12V and 24V.

The device is intended for use inside and outside of hazardous areas.

The correlation between version and temperature classification is shown in the table below:

Version U <sub>N</sub>	6V	12 V	24 V
Temperatur3 class T6		60°C	
T5		-45°C . . . 70°C	
T4		80°C	

(16) Test report PTB Ex 02-21476

(17) Special conditions for safe use

1. The Model 3701-8.. Solenoid valve shall be installed in an enclosure providing at least Degree of Protection IP 54 according to IEC Publication 60529:1989.
2. The wiring shall be connected in such a manner that the connection facilities are not subjected to tensile and/or torsional stress.

(18) Basic health and safety requirements

In compliance with the standard specified above.

Zertifizierungsstelle Explosionsschutz  
By order

Braunschweig, 07 March 2002

(Signature) (seal)

Dr. Ing. U. Johannsmeyer  
Regierungsdirektor

Statements of conformity without signature and seal are invalid.  
This Statement of conformity may be reproduced only in its entirety and without any changes, schedule.  
Extracts or changes shall require the prior approval of the Physikalisch-Technische Bundesanstalt.

Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig

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## **T R A N S L A T I O N**

(1) **EC TYPE EXAMINATION CERTIFICATE**

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres – **Directive 94/9/EC**

(3) EC Type Examination Certificate Number

**PTB 01 ATEX 2178**

(4) Equipment: Model 3701-1.. Solenoid Valve

(5) Manufacturer: SAMSON AG Mess- und Regeltechnik

(6) Address: Weismüllerstr. 3, 60314 Frankfurt am Main, Germany

(7) The equipment and any acceptable variation thereof are specified in the schedule to this certificate and the documents referred to therein.

(8) The Physikalisch-Technische Bundesanstalt, notified body number 0102 according to Article 9 of the Council Directive 94/9/ of 23 March 1994, certifies that this equipment has been found to comply with the essential health and safety requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres specified in Annex II to the Directive.

The examination and test results are recorded in confidential report.

**PTB Ex 01-21377**

(9) The essential health and safety requirements are satisfied by compliance with

**EN 50014: 1997+A1+A2 EN 50020:1994**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use as specified in the schedule to this certificate.

(11) According to the Directive 94/9/EC this EC Type Examination Certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the Manufacture and supply of this equipment.



(12) The marking of the equipment shall include the following:



Zertifizierungsstelle Explosionsschutz  
By order

Braunschweig, 29 November 2001

(Signature)

(Seal)

Dr. Ing. U. Johannsmeyer  
Regierungsdirketor

(13) **Schedule**

(14) **EC Type Examination Certificate No. PTB 01 ATEX 2178**

(15) **Description of Equipment**

The model 3701-1.. Solenoid Valve converts electrical binary signals in the input circuit into pneumatic output signals. It is intended for installation in equipment used inside and outside of a hazardous area.

The main component of the solenoid valve is the Model 1079-27 . . e/p Binary Converter coil, which is a passive two-terminal network that may be connected to certified intrinsically safe circuits, provided the permissible maximum values of  $U_i$ ,  $I_i$ , and  $P_i$  are not exceeded.

With suitable dropping resistors the Model 1079-27 . . e/p Binary Converter Coil can accommodate nominal voltages of 6V, 12V and 24V.

**Electrical data**

The correlation between version, temperature classification, permissible ambient temperatures ranges and maximum power dissipation is shown in the table below:

Version $U_N$		6V	12 V	24 V
Temperatur class	T6	60°C		
	T5	-45°C . . .70°C		
	T4	80°C		
Characteristic linear or regular	$P_i$	#	##	

# The permissible power dissipation  $P_i$  in the version is 250mW.

## The maximum values for connection to a certified intrinsically safe circuit is shown in the table below:

$U_i$	25V	27V	28V	30V	32V
$I_i$	150mA	125mA	115mA	100mA	85mA
$P_i$	no limitation				

$C_i$  negligible,  $L_i$  negligible

(16) Test report: **PTB Ex 01-21377**

(17) **Special conditions for safe use**

Nons

(18) **Special health and safety requirements**

In compliance with the standard specified above.

Zertifizierungsstelle Explosionsschutz  
By order

Braunschweig, 29 November 2001

(Signature)                      (seal)

Dr. Ing. U. Johannsmeyer  
Regierungsdirektor

**Installation Manual for apparatus certified by CSA for use in hazardous locations.**

Electrical rating of intrinsically safe apparatus and apparatus for installation in hazardous locations.

**Table 1: Maximum values of solenoid valve circuit**

	<b>U<sub>i</sub> or V<sub>max</sub></b>	<b>I<sub>i</sub> or I<sub>max</sub></b>	<b>P<sub>i</sub> or P<sub>max</sub></b>	<b>C<sub>i</sub></b>	<b>L<sub>i</sub></b>
12V/24 V version	28V	115mA	no limited	0 nF	0 µH
6 V version	28V	115 mA	250mW	0 nF	0 µH

**U<sub>0</sub> or V<sub>0c</sub> ≤ U<sub>i</sub> or V<sub>max</sub> / I<sub>0</sub> or I<sub>0c</sub> ≤ I<sub>i</sub> or I<sub>max</sub> / P<sub>0</sub> ≤ P<sub>i</sub> or P<sub>max</sub>; C<sub>a</sub> ≥ C<sub>i</sub> and L<sub>a</sub> ≥ L<sub>i</sub>**

**Table 2: CSA - certified barrier parameters of solenoid valve circuit**

<b>Barrier</b>	<b>Supply barrier</b>		<b>Evaluation barrier</b>	
	<b>V<sub>max</sub></b>	<b>R<sub>min</sub></b>	<b>V<sub>max</sub></b>	
12V/24 V version	≤ 28V	≥ 240Ω	≤ 28V	Diode Return
6 V version	≤ 28V	≥ 784Ω	28V	Diode Return

**Table 3:** The correlation between temperature classification and permissible ambient temperature ranges is shown in the table below:

<b>Temperature class</b>	<b>Permissible ambient temperature range</b>
T6	- 45°C ... 60°C
T5	- 45°C ... 70°C
T4	- 45°C ... 80°C

**Intrinsically safe if installed as specified in manufacturer’s installation manual.**

**CSA- certified for hazardous locations**

**Ex ia IIC T6; Class I, Zone 0**

**Class I; Groups A, B, C, D**

**Class II; Groups E, F + G; Class III**

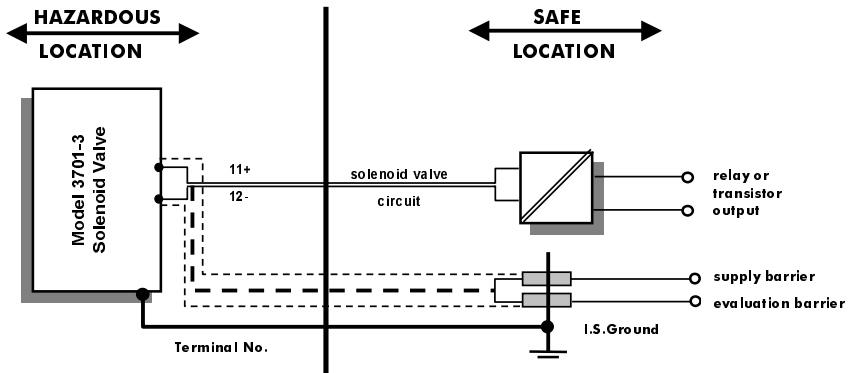
**Type 3 Enclosure**

**Notes:**

- 1.) The apparatus may be installed in intrinsically safe circuit only when used in conjunction with the CSA certified apparatus. For maximum values of U<sub>i</sub> or V<sub>max</sub>; I<sub>i</sub> or I<sub>max</sub>; P<sub>i</sub> or P<sub>max</sub>; C<sub>i</sub> and L<sub>i</sub> of the various apparatus see Table 1.
- 2.) The apparatus may be installed in intrinsically safe circuit only when used in conjunction with the CSA certified intrinsically safe barrier. For barrier selection see Table 2.
- 3.) Installation shall be in accordance with the Canadian Electrical Code Part. 1. Use only supply wires suitable for 5°C above surrounding temperature.

**Revisions Control Number: 1 May 05**

**Addendum to EB 8375 EN**



**Version:** Model 3701-3 solenoid valve.

Supply and evaluation barrier CSA- certified.

For the permissible maximum values for the intrinsically safe circuit see Table 1

For the permissible barrier parameters for the circuit see Table 2

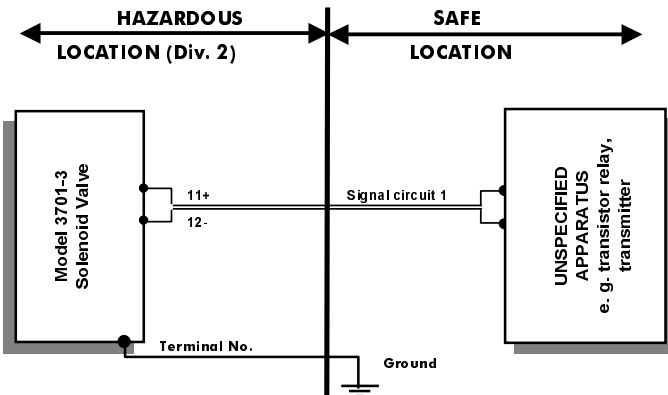
Cable entry M 20 x 1.5 or metal conduit according to drawing No. 1050 – 0539 T or 1050 – 0540 T

**CSA- certified for hazardous locations**

**Class I; Div. 2, Groups A, B, C, D,**

**Class II; Div. 2 Groups E, F + G; Class III.**

**Type 3 Enclosure**



**Notes:**

- 1.) For the maximum values for the circuit see Table 1 and 2.
- 2.) Cable entry only rigid metal conduit according to drawing No. 1050-0539 T and 1050-0540 T

**Revisions Control Number: 1 May 05**

**Addendum to EB 8375 EN**

**Installation Manual for apparatus approved by FM for use in hazardous locations.**

Electrical rating of intrinsically safe apparatus and apparatus for installation in hazardous locations.

**Table 1: Maximum values**

	$U_i$ or $V_{max}$	$I_i$ or $I_{max}$	$P_i$ or $P_{max}$	$C_i$	$L_i$
<b>Solenoid valve 12V/24 V version</b>	28V	115mA	not limited	0nF	0 $\mu$ H
<b>Solenoid valve 6 V version</b>	28V	115 mA	250mW	0nF	0 $\mu$ H

**Notes:**  $U_0$  or  $V_{oc}$  or  $V_i \leq U_i$  or  $V_{max}$  /  $I_0$  or  $I_{sc}$  or  $I_i \leq I_i$  or  $I_{max}$   $P_0$  or  $P_{max} \leq P_i$  or  $P_{max}$

**Table 2: FM - approved barrier parameters of solenoid valve circuit**

Barrier	Supply barrier			Evaluation barrier		
	$V_{oc}$	$R_{min}$	$I_{sc}$	$V_{oc}$	$R_{min}$	$I_{sc}$
<b>Solenoid valve 12V/24 V version</b>	$\leq 28V$	$\geq 240\Omega$	$\leq 115mA$	$\leq 28V$	#	0mA
<b>Solenoid valve 6 V version</b>	$\leq 28V$	$\geq 784\Omega$	$\leq 115mA$	28V	#	0mA

**Table 3:** The correlation between temperature classification and permissible ambient temperature ranges is shown in the table below:

Temperature class	Permissible ambient temperature range
<b>T6</b>	<b>60°C</b>
<b>T5</b>	<b>- 45°C ... 70°C</b>
<b>T4</b>	<b>80°C</b>



**Intrinsically safe if installed as specified in manufacturer’s installation manual.**

**FM- approved for hazardous locations**

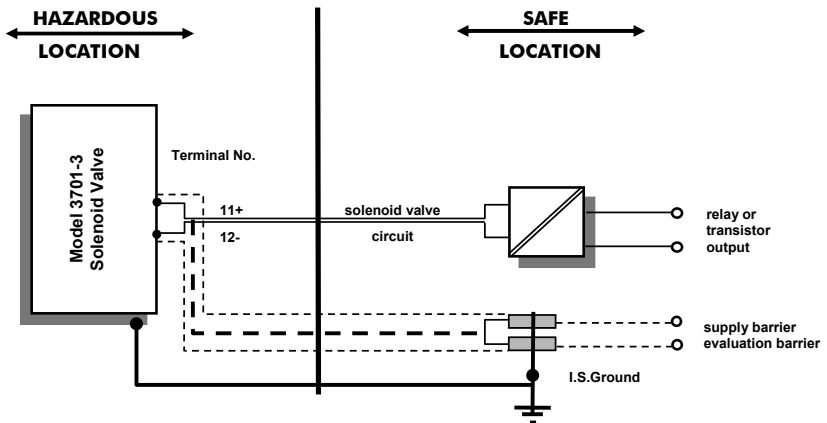
**Class I, Zone 0 A Ex ia IIC T6**

**Class I, II, III Division 1, Groups A, B, C, D; E, F + G**

**NEMA 3R**

**Notes:**

- 1.) The apparatus may be installed in intrinsically safe circuits only when used in conjunction with the FM approved apparatus. For maximum values of  $U_i$  or  $V_{max}$ ;  $I_i$  or  $I_{max}$ ;  $P_i$  or  $P_{max}$ ;  $C_i$  and  $L_i$  of the various apparatus see Table 1.
- 2.) The apparatus may be installed in intrinsically safe circuit only when used in conjunction with the FM approved intrinsically safe barrier. For barrier selection see Table 2.
- 3.) Installation shall be in accordance with the National Electrical Code ANSI/NFPA 70 and ANSI/ISA RP 12.06.01
- 4.) Use only supply wires suitable for 5°C above surrounding temperature.



**Version:** Model 3701-3 solenoid valve.

Supply and evaluation barrier FM/CSA- approved.

For the permissible maximum values for the intrinsically safe circuit see Table 1

For the permissible barrier parameters for the circuit see Table 2

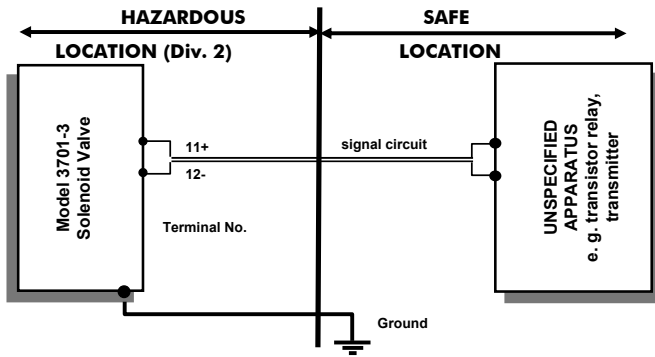
Cable entry M 20 x 1.5 or metal conduit according to drawing No. 1050 – 0539 T or 1050 – 0540 T

**FM- approved for hazardous locations**

**Class I, Division 2, Groups A, B, C, D**

**Class I, Class II Division 2, Groups F + G; Class III**

**NEMA 3R**



**Notes:**

- 1.) For the maximum values for the individual circuit see Table 1 and 2.
- 2.) Cable entry only rigid metal conduit according to drawing No. 1050-0539 T and 1050-0540 T
- 3.) The installation shall be in accordance with the National Electrical Code ANSI/NFPA 70



**SAMSON**

## **EU Konformitätserklärung / EU Declaration of Conformity / Déclaration UE de conformité**

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller/  
This declaration of conformity is issued under the sole responsibility of the manufacturer/  
La présente déclaration de conformité est établie sous la seule responsabilité du fabricant.  
Für das folgende Produkt / For the following product / Nous certifions que le produit

### **Magnetventil / Solenoid Valve / Electrovanne Typ/Type/Type 3701**

wird die Konformität mit den einschlägigen Harmonisierungsrechtsvorschriften der Union bestätigt /  
the conformity with the relevant Union harmonisation legislation is declared with/  
est conforme à la législation d'harmonisation de l'Union applicable selon les normes:

EMC 2014/30/EU	EN 61000-6-2:2005, EN 61000-6-3:2007 +A1:2011, EN 61326-1:2013
LVD 2014/35/EU	EN 60730-1:2016, EN 61010-1:2010
RoHS 2011/65/EU	EN 50581:2012

Hersteller / Manufacturer / Fabricant:

**SAMSON AKTIENGESELLSCHAFT**  
Weismüllerstraße 3  
D-60314 Frankfurt am Main  
Deutschland/Germany/Allemagne

Frankfurt / Francfort, 2017-07-29

Im Namen des Herstellers/ On behalf of the Manufacturer/ Au nom du fabricant.

Hanno Zager  
Leiter Qualitätssicherung/Head of Quality Management/  
Responsable de l'assurance de la qualité

Dirk Hoffmann  
Zentralabteilungsleiter/Head of Department/Chef de département  
Entwicklungsorganisation/Development Organization



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Für das folgende Produkt / For the following product / Nous certifions que le produit

### Magnetventil / Solenoid Valve / Electrovanne Typ/Type/Type 3701-1...

entsprechend der EU-Baumusterprüfbescheinigung PTB 01 ATEX 2178 ausgestellt von der/  
according to the EU Type Examination PTB 01 ATEX 2178 issued by/  
établi selon le certificat CE d'essais sur échantillons PTB 01 ATEX 2178 émis par:

Physikalisch Technische Bundesanstalt  
Bundesallee 100  
D-38116 Braunschweig  
Benannte Stelle/Notified Body/Organisme notifié 0102

wird die Konformität mit den einschlägigen Harmonisierungsrechtsvorschriften der Union bestätigt /  
the conformity with the relevant Union harmonisation legislation is declared with/  
est conforme à la législation d'harmonisation de l'Union applicable selon les normes:

EMC 2014/30/EU	EN 61000-6-2:2005, EN 61000-6-3:2007 +A1:2011, EN 61326-1:2013
Explosion Protection 94/9/EC (to 2016-04-19) Explosion Protection 2014/34/EU (from 2016-04-20)	EN 60079-0:2009, EN 60079-11:2012
RoHS 2011/65/EU	EN 50581:2012

Hersteller / Manufacturer / Fabricant:

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Frankfurt / Francfort, 2017-07-29

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Leiter Qualitätssicherung/Head of Quality Management/  
Responsable de l'assurance de la qualité

Dirk Hoffmann  
Zentralabteilungsleiter/Head of Department/Chef de département  
Entwicklungsorganisation/Development Organization



**SAMSON**

## **EU Konformitätserklärung / EU Declaration of Conformity / Déclaration UE de conformité**

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This declaration of conformity is issued under the sole responsibility of the manufacturer/  
La présente déclaration de conformité est établie sous la seule responsabilité du fabricant.  
Für das folgende Produkt / For the following product / Nous certifions que le produit

### **Magnetventil / Solenoid Valve / Electrovanne Typ/Type/Type 3701-8...**

entsprechend der EU-Baumusterprüfbescheinigung PTB 02 ATEX 2014 X ausgestellt von der/  
according to the EU Type Examination PTB 02 ATEX 2014 X issued by/  
établi selon le certificat CE d'essais sur échantillons PTB 02 ATEX 2014 X émis par:

Physikalisch Technische Bundesanstalt  
Bundesallee 100

D-38116 Braunschweig

Benannte Stelle/Notified Body/Organisme notifié 0102

wird die Konformität mit den einschlägigen Harmonisierungsrechtsvorschriften der Union bestätigt /  
the conformity with the relevant Union harmonisation legislation is declared with/  
est conforme à la législation d'harmonisation de l'Union applicable selon les normes:

EMC 2014/30/EU

EN 61000-6-2:2005, EN 61000-6-3:2007  
+A1:2011, EN 61326-1:2013

Explosion Protection 94/9/EC (bis/to 2016-04-19)

Explosion Protection 2014/34/EU (ab/from 2016-04-20)

EN 60079-15:2010, EN 60079-31:2009

RoHS 2011/65/EU

EN 50581:2012

Hersteller / Manufacturer / Fabricant:

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Dirk Hoffmann  
Zentralabteilungsleiter/Head of Department/Chef du département  
Entwicklungsorganisation/Development Organization





**EB 3701 EN**



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