Solenoid operated spool valve for the temperature range -60 °C

**Flange construction**
- 4/2-way impulse valve
- 4/3-way with spring centred mid position
- 4/2-way with spring reset
- \( Q_{\text{max}} = 50 \text{l/min} \)
- \( p_{\text{max}} = 350 \text{ bar} \)

**NG6**
ISO 4401-03
- \( I I 2 \ G \ Ex \ db \ I I C \ T 6 , \ T 4 \)
- \( I I 2 \ D \ Ex \ tb \ I I I \ C \ T 80 \ ^\circ \text{C} , \ T 130 \ ^\circ \text{C} \)
- \( I M 2 \ Ex \ db \ I \ M b \)

**DESCRIPTION**
Direct operated solenoid spool valve with 4 connections in 5 chamber design. With the solenoids deenergised, the spool is held in the center position by the spring (4/3), or switched back to the offset position (4/2). With the impulse spool (4/2), the spool is held in the switching position by the detent. The pressure tight encapsulated Ex-protection solenoid coil prevents an explosion on the inside penetrating to the outside as well as an ignitable surface temperature.

**APPLICATION**
These valves are suitable for applications in explosion-hazard areas, open cast and also in mines. Spool valves are mainly used for controlling direction of movement and stopping of hydraulic cylinders and motors.

**SYMBOL**

![Symbol Diagram](image-url)
TYPE CODE

Spool valve direct operated

Explosion proof execution Ex d

Flange construction

International standard interface ISO, NG6

Designation of symbols acc. to table

Spool clearance

Nominal voltage $U_n$
- 12 VDC 0.12
- 24 VDC 0.24
Nominal power $P_n$
- 15 W 0.15

Certification ATEX, IECEx, CCC, EAC

Sealing material / -60…+70 °C

Temperature range

Design index (subject to change)

1.3-33

CERTIFICATES

<table>
<thead>
<tr>
<th>Surface</th>
<th>Mining</th>
<th>Z591 -60 °C to…</th>
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</thead>
<tbody>
<tr>
<td>ATEX</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>IECEx</td>
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<td>x</td>
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<tr>
<td>CCC</td>
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<td>x</td>
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<tr>
<td>EAC</td>
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</table>

The certificates can be found on www.wandfluh.com

ACTUATION

Actuation Switching solenoid, wet pin push type, pressure tight

Execution MKY45 / 18x60 (Data sheet 1.1-183)

Connection Cable gland for cable Ø 6.5…14 mm

GENERAL SPECIFICATIONS

Designation 4/2-, 4/3-spool valve

Construction Direct operated

Mounting Flange construction

Nominal size NG6 according to ISO 4401-03

Actuation Ex-protection switching solenoid

Ambient temperature Operation as T4 -60…+70 °C (L15)

Weight 2.8 kg (1 solenoid)
4.6 kg (2 solenoids)

MTTFd 150 years

HYDRAULIC SPECIFICATIONS

Working pressure $p_{max} = 350$ bar

Tank pressure $p_{max} = 100$ bar

Maximum volume flow $Q_{max} = 50$ l/min, see characteristics

Leakage oil On request

Fluid Mineral oil, other fluid on request

Viscosity range 12 mm²/s…320 mm²/s

Temperature range Operation as T4 -60…+70 °C

Contamination efficiency Class 20 / 18 / 14

Filtration Required filtration grade B 10…16 ≥ 75, see data sheet 1.0-50
ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Protection class</th>
<th>IP67</th>
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</thead>
<tbody>
<tr>
<td>Relative duty factor</td>
<td>100 % DF</td>
</tr>
<tr>
<td>Switching frequency</td>
<td>12 000 / h</td>
</tr>
<tr>
<td>Voltage tolerance</td>
<td>± 10 % with regard to nominal voltage</td>
</tr>
<tr>
<td>Standard nominal voltage</td>
<td>12 VDC, 24VDC, 115 VAC, 230 VAC</td>
</tr>
<tr>
<td>AC = 50 to 60 Hz ± 2 %, with built-in two-way rectifier</td>
<td></td>
</tr>
<tr>
<td>Standard nominal power</td>
<td>15 W</td>
</tr>
<tr>
<td>Temperature class</td>
<td>Nominal power 15 W: T1…T4</td>
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</tbody>
</table>

Note! Other electrical specifications see data sheet 1.1-183

MANUAL OVERRIDE

HB6-Z591 for „-60…+70 °C“

SURFACE TREATMENT

◆ The valve body is made of stainless steel
◆ The armature tube and the plug screw are zinc-nickel coated

COMMISSIONING

Attention! The solenoid coil must only be put into operation, if the requirements of the operating instructions supplied are observed to their full extent. In case of non-observance, no liability can be assumed.

PERFORMANCE SPECIFICATIONS

Oil viscosity \( \mu = 30 \text{ mm}^2/\text{s} \)

\[ p = f(Q) \]

Performance limits L15

Measured with nominal voltage -10% at 50 °C

\[ \Delta p = f(Q) \]

Pressure drop volume flow characteristics

\[ Q_L = f(Q) \]

Leakage volume flow characteristic

Note! With the L15 execution for ambient temperatures up to 70 °C, the performance specifications have been evaluated with an ambient temperature of 50 °C.

STANDARDS

<table>
<thead>
<tr>
<th>Explosion protection</th>
<th>Directive 2014 / 34 / EU (ATEX)</th>
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</thead>
<tbody>
<tr>
<td>Flameproof enclosure</td>
<td>EN / IEC / UL 60079-1, 31</td>
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<tr>
<td>Cable entry</td>
<td>EN 60079-0, 1, 7, 15, 31</td>
</tr>
<tr>
<td>Mounting interface</td>
<td>ISO 4401-03</td>
</tr>
<tr>
<td>Protection class</td>
<td>EN 60 529</td>
</tr>
<tr>
<td>Contamination efficiency</td>
<td>ISO 4406</td>
</tr>
</tbody>
</table>

ACCESSORIES

| Fixing screws | Data sheet 1.0-60 |
| Threaded subplates | Data sheet 2.9-30 |
| Multi-station subplates | Data sheet 2.9-60 |
| Module type manifold blocks | Data sheet 2.9-100 |
| Technical explanations | Data sheet 1.0-100 |
| Filtration | Data sheet 1.0-50 |
| Relative duty factor | Data sheet 1.1-430 |
**DIMENSIONS**

4/3-way spool valve (spring centring)
4/2-way spool valve (impulse)

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**HYDRAULIC CONNECTION**

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**PARTS LIST**

<table>
<thead>
<tr>
<th>Position</th>
<th>Article</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>10</td>
<td>263.64..</td>
<td>Solenoid coil MK.45 / 18 x 60-… / L15-M238</td>
</tr>
<tr>
<td>12</td>
<td>154.2603</td>
<td>Knurled nut Ex M18 x 1,5 x 18</td>
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<tr>
<td>15</td>
<td>253.8028</td>
<td>HB6-Z591</td>
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<tr>
<td>17</td>
<td>160.2251</td>
<td>O-ring ID 25,07 x 2,62 (NBR)</td>
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<tr>
<td>18</td>
<td>160.0171</td>
<td>O-ring ID 17,17 x 1,78 (polyurethan)</td>
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<tr>
<td>40</td>
<td>239.2210</td>
<td>Socket head screw M20 x 1</td>
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<tr>
<td>70</td>
<td>160.0091</td>
<td>O-ring ID 9,25 x 1,78 (polyurethan)</td>
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<tr>
<td>110</td>
<td>111.1080</td>
<td>Cable gland M20 x 1,5</td>
</tr>
</tbody>
</table>

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**SEALING MATERIAL**

NBR as standard

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**INSTALLATION NOTES**

Mounting type  Flange mounting
4 fixing holes for socket head screws M5 x 45

Mounting position  Any, preferably horizontal

Tightening torque  Fixing screws $M_0 = 5.1 \text{Nm (screw quality A4)}$
 $M_0 = 9 \text{Nm knurled nut}$

**Note!** The length of the fixing screw depends on the base material of the connection element.

**Attention!** For stack assembly please observe the remarks in the operating instructions