Medium: Filtered, non-lubricated or dry compressed air, instrument air nitrogen and other non-flammable neutral dry fluids

Operation: 3/2 Direct solenoid operated poppet valves

Operating pressure: 1 ... 10 bar
2 ... 8 bar (with 98025 Valves)

Flow:
Standard valves 165 ... 240 l/min
High flow valves 600 ... 720 l/min

Details see page 2

Additional filter:
Installation of an in-line filter is recommended (in the direction of flow from the actuator to the RVM).

Ambient/Media temperature:
Up to -40 ... +80°C, see option selector page 2
Depending on solenoid system
Air supply must be dry enough to avoid ice formation at temperatures below +2°C (35°F).
For outdoor installations must be protected against the penetration of moisture and a solenoid with IP66 protection must be used!

Materials:
Manifold and valve body: Anodized aluminium or stainless steel
Seal: NBR, VMQ
Internal parts: stainless steel, brass

Flow conversion:
Cv US Gallon/min (water) = l/min (air) x 0,001
Kv m³/h (water) = l/min (air) x 0,000906

Technical features

- Modular design - Herion valves
- Bypass function enables valve removal online
- Stainless steel visual status indicators and exhaust guards as standard
- Optional electrical position indicators for valves
- Cable terminations inside coil housing
- SIL certified components and system
- International approvals
- Available in aluminium and stainless steel construction
- Utilizing industry proven technology

1oo2 with bypass valve exhaust guards and indicators

2oo2 with bypass valve exhaust guards and indicators

2oo3 with bypass valve *1) exhaust guards and indicators

B Bypass valve
I Indicators
V Solenoid actuated valves
W Shuttle valves (‘OR’ function)
Option selector

<table>
<thead>
<tr>
<th>Valve function</th>
<th>Substitute</th>
</tr>
</thead>
<tbody>
<tr>
<td>1oo2 normally closed</td>
<td>1</td>
</tr>
<tr>
<td>2oo2 normally closed</td>
<td>3</td>
</tr>
<tr>
<td>2oo3 normally closed</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Port sizes</th>
<th>Substitute</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1/4 (Standard flow, 24011/24010)</td>
<td>11</td>
</tr>
<tr>
<td>1/4 NPT (Standard flow, 24011/24010)</td>
<td>12</td>
</tr>
<tr>
<td>G1/2 (High flow, 98015/98025)</td>
<td>23</td>
</tr>
<tr>
<td>1/2 NPT (High flow, 98015/98025)</td>
<td>24</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Valve type</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>24011 series</td>
<td>Aluminum -40°C ... +60°C 011</td>
</tr>
<tr>
<td></td>
<td>Stainless steel -40°C ... +60°C 022</td>
</tr>
<tr>
<td></td>
<td>Aluminum with proximity sensor -25°C ... +70°C 033</td>
</tr>
<tr>
<td></td>
<td>Stainless steel with proximity sensor -25°C ... +70°C 044</td>
</tr>
<tr>
<td></td>
<td>Aluminum -25°C ... +80°C 053</td>
</tr>
<tr>
<td></td>
<td>Stainless steel -25°C ... +80°C 064</td>
</tr>
<tr>
<td>98015 series</td>
<td>Aluminum -25°C ... +60°C 073</td>
</tr>
<tr>
<td></td>
<td>Stainless steel -25°C ... +60°C 084</td>
</tr>
<tr>
<td></td>
<td>Aluminum with proximity sensor -25°C ... +60°C 093</td>
</tr>
<tr>
<td></td>
<td>Stainless steel with proximity sensor -25°C ... +60°C 104</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Valve type</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>24010 series</td>
<td>Aluminum -25°C ... +60°C 213</td>
</tr>
<tr>
<td></td>
<td>Stainless steel -25°C ... +60°C 224</td>
</tr>
<tr>
<td></td>
<td>Aluminum with proximity sensor -25°C ... +60°C 233</td>
</tr>
<tr>
<td></td>
<td>Stainless steel with proximity sensor -25°C ... +60°C 244</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manifold material</th>
<th>Substitute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>2</td>
</tr>
<tr>
<td>Aluminum</td>
<td>4</td>
</tr>
</tbody>
</table>

*1) please note solenoid temperature
*2) Other indicators or plugs can be ordered separately, see page 3
*3) Other silencers can be ordered separately, see page 3
*4) Temperature depending on classification T4, T5 or T6, see pages 9, 10, 14 and 17
*5) Other performance categories and currents see page 9, 10, 14 and 17
*6) Other versions see page 20

Flow rates and valve combinations

<table>
<thead>
<tr>
<th>Flow direction (port to port)</th>
<th>Standard flow systems (24011/24010)</th>
<th>High flow systems (98015/98025)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1oo2</td>
<td>Bypass mode 2x24011</td>
<td>Bypass mode 2x98015</td>
</tr>
<tr>
<td>1 + 2 *7) [l/min]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 + 3 *8) [l/min]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2oo2</td>
<td>97100</td>
<td>97109</td>
</tr>
<tr>
<td>1 + 2 *7) [l/min]</td>
<td>950</td>
<td>170</td>
</tr>
<tr>
<td>2 + 3 *8) [l/min]</td>
<td>950</td>
<td>170</td>
</tr>
<tr>
<td>2oo3</td>
<td>97109</td>
<td>97109</td>
</tr>
<tr>
<td>1 + 2 *7) [l/min]</td>
<td>950</td>
<td>1450</td>
</tr>
<tr>
<td>2 + 3 *8) [l/min]</td>
<td>950</td>
<td>1450</td>
</tr>
<tr>
<td>2oo3</td>
<td>97109</td>
<td>97109</td>
</tr>
<tr>
<td>1 + 2 *7) [l/min]</td>
<td>950</td>
<td>2500</td>
</tr>
<tr>
<td>2 + 3 *8) [l/min]</td>
<td>950</td>
<td>2500</td>
</tr>
</tbody>
</table>

*7) Flow characteristics conforms to ISO6358 from port 1 (bypass valve) to port 2 (sub-base) [6 ... 5 bar], see page 1
*8) Flow characteristics conforms to ISO6358 from port 2 (sub-base) to port 3 (sub-base or bypass valve) [10 ... 0 bar], see page 1

** Solenoid code

Country of manufacture
Norgren internal use

Indicators*2) Temperature / Pressure range
Visual valve status indicators in stainless steel - included in the scope of supply
-40°C ... +80°C 2,5 ... 10 bar

Silencers*3) Temperature
Exhaust guard - included in the scope of supply
-55°C ... +80°C

Solenoids coil Temperature *4) Standard (~C)
EX-certificate Substitute
24011 series + 98015 *5) 3824.024.00 -20 ... +60 FM/CSA 02
3825.120.60 -20 ... +60 FM/CSA 03
3826.024.00 -20 ... +60 FM/CSA 04
3827.120.60 -20 ... +60 FM/CSA 05
4270.024.00 -40 ... +65/55 ATEX/IECEX 08
4271.230.50 -40 ... +65/55 ATEX/IECEX 09
4870.024.00 -40 ... +70/40 ATEX/IECEX 14
4871.230.50 -40 ... +70/40 ATEX/IECEX 15
4872.024.00 -40 ... +70/40 ATEX/IECEX 16
4873.230.50 -40 ... +70/40 ATEX/IECEX 17
4872.024.00 -40 ... +50/40 ATEX/IECEX 18
4873.230.50 -40 ... +50/40 ATEX/IECEX 19

Instrinsically safe versions Series 24010
2003 -40...+70/55 55
Series 98025*6) 2050 -40...+60 40

Flow rates and valve combinations
Standard and optional accessories

Accessories - Standard (Included in the scope of supply)

<table>
<thead>
<tr>
<th>Exhaust guard *2)</th>
<th>Visual indicators (stainless steel)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page 24</td>
<td>Page 24</td>
</tr>
<tr>
<td>0613422 (G 1/4, 1/4 NPT)</td>
<td>74749-61 (G 1/4)</td>
</tr>
<tr>
<td>0613423 (G 1/2, 1/2 NPT)</td>
<td>74749-60 (1/4 NPT)</td>
</tr>
</tbody>
</table>
*1) For indoors use  
*2) For outdoors use, opening pressure ~ 0.2 bar

Accessories - can be ordered separately

Other silencers, plastic indicator and plugs

<table>
<thead>
<tr>
<th>Silencer (stainless steel) *1)</th>
<th>Silencer (brass) *1)</th>
<th>Silencer (plastic) *1)</th>
<th>Visual indicators (plastic) Adaptor</th>
<th>Plug plus Sealing washer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page 24</td>
<td>Page 24</td>
<td>Page 24</td>
<td>Page 24</td>
<td>Page 24</td>
</tr>
<tr>
<td>0014613 (G 1/4)</td>
<td>T40C2800 (G 1/4)</td>
<td>M5/2 (G 1/4)</td>
<td>FLS-212-000 (1/8 NPT)</td>
<td>0663943 (G 1/4, stainless steel)</td>
</tr>
<tr>
<td>0613678 (1/4 NPT)</td>
<td>T40C4800 (G 1/2)</td>
<td>M5/4 (G 1/2)</td>
<td>0613658 (zinc plated steel)</td>
<td>0663942 (1/4 NPT, stainless steel)</td>
</tr>
<tr>
<td>0613679 (1/2 NPT)</td>
<td>M5004A (1/2 NPT)</td>
<td>C6/4 (1/2 NPT)</td>
<td>0613659 (stainless steel)</td>
<td>0660835 (plastic)</td>
</tr>
</tbody>
</table>
*1) Must be ordered separately; *2) Must be ordered separately for G thread only

Accessories - Cable glands (ordered separately)

<table>
<thead>
<tr>
<th>Cable gland</th>
<th>Protection class Ex e, Ex d (ATEX), Nickel plated brass/stainless steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page 25</td>
<td>Thread</td>
</tr>
<tr>
<td>42x, 46xx</td>
<td>M 20x1,5</td>
</tr>
<tr>
<td>46xx</td>
<td>M 20x1,5</td>
</tr>
<tr>
<td>46xx</td>
<td>1/2-1/4 NPT</td>
</tr>
<tr>
<td>48xx</td>
<td>M 20x1,5</td>
</tr>
<tr>
<td>49xx</td>
<td>M 20x1,5</td>
</tr>
<tr>
<td>48xx</td>
<td>M 20x1,5</td>
</tr>
</tbody>
</table>

Accessories - Connectors (for valve position sensor ordered separately)

<table>
<thead>
<tr>
<th>Connector</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12 x 1 (straight)</td>
<td>05223055 (without cable)</td>
</tr>
<tr>
<td>M12 x 1 (90°)</td>
<td>05223036 (90°, without cable)</td>
</tr>
</tbody>
</table>

Alternative valves with position sensors

Note: Valve position sensors are supplied complete with the valve. See pages 8 & 13 for valve part numbers

Our policy is one of continued research and development. We therefore reserve the right to amend, without notice, the specifications given in this document. (2012 - 5175c) © 2015 Norgren GmbH
1oo2 and 2oo2 with bypass (standard flow)

Weight: 6.8 kg aluminium (18.4 kg stainless steel) sub-base only, valves and accessories

see refer page

Valve 24011 and 24010 series
Outlet port G 1/4 or 1/4 NPT
Exhaust guard (sub-base), ports G 1/2 or 1/2 NPT
Bypass valve 97109 series
Exhaust guard (bypass valve), ports G 1/4 or 1/4 NPT
Dependent on solenoid models (see solenoid drawing)
Inlet port G 1/4 or 1/4 NPT
Visual indicator, stainless steel as standard
Through mounting holes Ø 8.5 with M10 x 20 threads for transport lug (see page 25)
Mounting threads
2003 with bypass (standard flow)

Weight: 10.3 kg aluminium (27.5 kg stainless steel) sub-base only, valves and accessories see refer page

Dimensions in mm

Projection/First angle

[Diagram of valve manifold system]

- Valve 24011 and 24010 series
- Outlet port G 1/4 or 1/4 NPT
- Exhaust guard (sub-base), ports G 1/2 or 1/2 NPT
- Bypass valve 97109 series
- Exhaust guard (bypass valve), ports G 1/4 or 1/4 NPT
- Dependent on solenoid models (see solenoid drawing)
- Inlet port G 1/4 or 1/4 NPT
- Visual indicator, stainless steel as standard
- Through mounting holes Ø 8.5 with M10 x 20 threads for transport lug (see page 25)
- Mounting threads
1002 and 2002 with bypass (high flow)
Weight: 6.8 kg aluminium (18.5 kg stainless steel) sub-base only, valves and accessories
see refer page

[Diagram of valve manifold system]

1. Valve 98015 series
2. Outlet port G 1/2 or 1/2 NPT
3. Exhaust guard (sub-base), ports G 1/2 or 1/2 NPT
4. Bypass valve 97109 series
5. Exhaust guard (bypass valve), ports G 1/2 or 1/2 NPT
6. Dependent on solenoid models (see solenoid drawing)
7. Inlet port G 1/2 or 1/2 NPT
8. Visual indicator, stainless steel as standard
9. Through mounting holes Ø 8.5 with M10 x 20 threads for transport lug (see page 25)
10. Mounting threads
2oo3 with bypass (high flow)

Weight: 9.9 kg aluminium (26.6 kg stainless steel) sub-base only, valves and accessories

see refer page
24011 standard flow valve, 3/2
Direct solenoid actuated poppet valve

> Standard flow range (340 l/min)
> Main application: Single and double acting actuators
> TÜV-approval based on type examination DGRL 97/23/EC and IEC 61508, multichannel up to SIL 3 (12 years)
> Optional valve position sensors
> Suited for outdoor use under critical environment conditions.
> Variable valve solenoid combination

Technical features
Medium: Compressed air, filtered, non-lubricated and dry. Other gases and liquid fluids on request. (Viscosity for gaseous or liquid fluids up to 40 mm²/s)
Operation: Direct solenoid operated poppet valve
Operating pressure: 0 ... 10 bar (0 ... 145 psi)
Orifice: 5 mm

Flow:
Gaseous fluids: 340 l/min

Port size:
Flanged
NAMUR Interface

Flow direction: Optional

Ambient/Media temperature:
NBR:
-25 ... +80°C (-13 ... +176°F)
VMQ:
-40 ... +60°C (-40 ... +140°F)
Depending on solenoid system
Air supply must be dry enough to avoid ice formation at temperatures below +2°C (35°F).
For outdoor installations must be protected all connections against the penetration of moisture and a solenoid with IP66 protection must be used!

Materials:
Body: Aluminium anodized or stainless steel 1.4404 (316 L)
Seal: NBR, VMQ
Inner parts: stainless steel, brass

Technical data

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Temperature (°C)</th>
<th>Material</th>
<th>Seat</th>
<th>Seal</th>
<th>Housing</th>
<th>Position</th>
<th>Sensor</th>
<th>Weight (kg)</th>
<th>Test certificate IEC 61508</th>
<th>Dimension No.</th>
<th>Model</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>-40 ... +60</td>
<td>VMQ</td>
<td></td>
<td></td>
<td>aluminium</td>
<td>without</td>
<td>0,55</td>
<td>X</td>
<td>1160007</td>
<td>1160006</td>
<td>064</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>-40 ... +60</td>
<td>VMQ</td>
<td></td>
<td></td>
<td>stainless steel</td>
<td>without</td>
<td>1</td>
<td>X</td>
<td>1160007</td>
<td>1160006</td>
<td>064</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>-25 ... +70</td>
<td>NBR</td>
<td></td>
<td></td>
<td>aluminium</td>
<td>integrated</td>
<td>0,62</td>
<td>X</td>
<td>1160006</td>
<td>1160006</td>
<td>064</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>-25 ... +70</td>
<td>NBR</td>
<td></td>
<td></td>
<td>stainless steel</td>
<td>integrated</td>
<td>1,07</td>
<td>X</td>
<td>1160006</td>
<td>1160006</td>
<td>064</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>-25 ... +80</td>
<td>NBR</td>
<td></td>
<td></td>
<td>aluminium</td>
<td>without</td>
<td>0,55</td>
<td>X</td>
<td>2401109</td>
<td>2401109</td>
<td>053</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>-25 ... +80</td>
<td>NBR</td>
<td></td>
<td></td>
<td>stainless steel</td>
<td>without</td>
<td>1</td>
<td>X</td>
<td>1025212</td>
<td>1025212</td>
<td>064</td>
<td></td>
</tr>
</tbody>
</table>

*1) When ordering please indicate solenoid, voltage and current type (frequency).
*2) Particularly for valves with TÜV approval and attachment in plants based on safety standards IEC 61508, taking into account to the operating and maintenance instructions document 7503444.
Solenoids operator, standard voltages

<table>
<thead>
<tr>
<th>Power consumption 24 V d.c. (W)</th>
<th>Rated current 24 V d.c. (m A)</th>
<th>Protection class IP/NEMA</th>
<th>Ex-Protection (ATEX-Category)</th>
<th>Temperature Ambient/ Media (°C)</th>
<th>Electrical connection</th>
<th>Weight (kg)</th>
<th>Drawing No.</th>
<th>Circuit diagram No.</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>8,9</td>
<td>369</td>
<td>NEMA 4, 4X, 6, 6P, 7, 9</td>
<td>XP/DIP, Div. 1 &amp; 2 Cl I, Gr. A-D Cl II, Gr. E-G T3 (160°C)</td>
<td>-20 ... +60</td>
<td>Flying leads 450 mm</td>
<td>0,5</td>
<td>8</td>
<td>1</td>
<td>3824</td>
</tr>
<tr>
<td>9,5</td>
<td>41</td>
<td>NEMA 4, 4X, 6, 6P, 7, 9</td>
<td>XP/DIP, Div. 1 &amp; 2 Cl I, Gr. A-D Cl II, Gr. E-G T3 (160°C)</td>
<td>-20 ... +60</td>
<td>Flying leads 450 mm</td>
<td>0,5</td>
<td>8</td>
<td>5</td>
<td>3825</td>
</tr>
<tr>
<td>13,6</td>
<td>567</td>
<td>NEMA 4, 4X, 6, 6P, 7, 9</td>
<td>XP/DIP, Div. 1 &amp; 2 Cl I, Gr. A-D Cl II, Gr. E-G T3 (160°C)</td>
<td>-20 ... +60</td>
<td>Flying leads 450 mm</td>
<td>0,5</td>
<td>8</td>
<td>1</td>
<td>3826</td>
</tr>
<tr>
<td>15,7</td>
<td>68</td>
<td>NEMA 4, 4X, 6, 6P, 7, 9</td>
<td>XP/DIP, Div. 1 &amp; 2 Cl I, Gr. A-D Cl II, Gr. E-G T3 (160°C)</td>
<td>-20 ... +60</td>
<td>Flying leads 450 mm</td>
<td>0,5</td>
<td>8</td>
<td>5</td>
<td>3827</td>
</tr>
<tr>
<td>3,9</td>
<td>162</td>
<td>IP66 (with cable gland)</td>
<td>II 2 G Ex e mb IC T4/T6 Gb II 2 G Ex e mb IC T130°C Db IP66</td>
<td>T4: -40 ...+80 T6: -40 ... +55 -40 ... +80</td>
<td>M20 x 1,5 *(1)</td>
<td>0,6</td>
<td>6</td>
<td>4</td>
<td>4260</td>
</tr>
<tr>
<td>5,3</td>
<td>23</td>
<td>IP66 (with cable gland)</td>
<td>II 2 G Ex e mb IC T4/T6 Gb II 2 G Ex e mb IC T130°C Db IP66</td>
<td>T4: -40 ...+80 T6: -40 ... +55 -40 ... +80</td>
<td>M20 x 1,5 *(1)</td>
<td>0,6</td>
<td>6</td>
<td>7</td>
<td>4261</td>
</tr>
<tr>
<td>8,9</td>
<td>369</td>
<td>IP66 (with cable gland)</td>
<td>II 2 G Ex e mb IC T4/T6 Gb II 2 G Ex e mb IC T130°C Db IP66</td>
<td>T4: -40 ...+65 T5: -40 ... +55 -40 ... +65</td>
<td>M20 x 1,5 *(1)</td>
<td>0,5</td>
<td>6</td>
<td>4</td>
<td>4270</td>
</tr>
<tr>
<td>10,0</td>
<td>43</td>
<td>IP66 (with cable gland)</td>
<td>II 2 G Ex e mb IC T4/T6 Gb II 2 G Ex e mb IC T130°C Db IP66</td>
<td>T4: -40 ...+65 T5: -40 ... +55 -40 ... +65</td>
<td>M20 x 1,5 *(1)</td>
<td>0,5</td>
<td>6</td>
<td>7</td>
<td>4271</td>
</tr>
<tr>
<td>3,9</td>
<td>162</td>
<td>IP66 (with cable gland)</td>
<td>II 2 G Ex e mb IC T4/T6 Gb II 2 G Ex e mb IC T130°C Db IP66</td>
<td>T4: -40 ...+80 T6: -40 ... +55 -40 ... +80</td>
<td>1/2 NPT *(1)</td>
<td>0,8</td>
<td>7</td>
<td>20</td>
<td>4660</td>
</tr>
<tr>
<td>5,3</td>
<td>23</td>
<td>IP66 (with cable gland)</td>
<td>II 2 G Ex e mb IC T4/T6 Gb II 2 G Ex e mb IC T130°C Db IP66</td>
<td>T4: -40 ...+80 T6: -40 ... +55 -40 ... +80</td>
<td>1/2 NPT *(1)</td>
<td>0,8</td>
<td>7</td>
<td>21</td>
<td>4661</td>
</tr>
<tr>
<td>3,9</td>
<td>162</td>
<td>IP66 (with cable gland)</td>
<td>II 2 G Ex e mb IC T4/T6 Gb II 2 G Ex e mb IC T130°C Db IP66</td>
<td>T4: -40 ...+80 T6: -40 ... +55 -40 ... +80</td>
<td>1/2 NPT *(1)</td>
<td>0,8</td>
<td>7</td>
<td>20</td>
<td>4662</td>
</tr>
<tr>
<td>5,3</td>
<td>23</td>
<td>IP66 (with cable gland)</td>
<td>II 2 G Ex e mb IC T4/T6 Gb II 2 G Ex e mb IC T130°C Db IP66</td>
<td>T4: -40 ...+80 T6: -40 ... +55 -40 ... +80</td>
<td>1/2 NPT *(1)</td>
<td>0,8</td>
<td>7</td>
<td>21</td>
<td>4663</td>
</tr>
</tbody>
</table>

Standard voltages (+10%) 24 V d.c., 230 V a.c., other voltages on request. Design according to VDE 0580, EN 50014/50028. 100% duty cycle.

*1) Connector/cable gland is not scope of delivery, see table «Accessories»

Attention: The protection class for coil series 46xx and 48xx is determined by the choice of cable gland. Example: if an ATEX-certified cable gland is used that has Ex d type of protection, the solenoid will have the protection class Ex d mb; if a cable gland with Ex e type of protection is used, the solenoid will have protection class Ex e mb.

Approvals

<table>
<thead>
<tr>
<th>Model</th>
<th>Approvals</th>
<th>IECEx</th>
<th>FM</th>
<th>Datasheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>372x, 382x</td>
<td>—</td>
<td>—</td>
<td>CSA-UR 57643-6</td>
<td>N/en 7.1.575</td>
</tr>
<tr>
<td>42xx</td>
<td>NEMA 98 ATEX 4452 X</td>
<td>IECEx KEM 09.0068X</td>
<td>—</td>
<td>N/en 7.1.580</td>
</tr>
<tr>
<td>46xx</td>
<td>PTB 02 ATEX 2085 X</td>
<td>IECEx PTB 11.0094X</td>
<td>—</td>
<td>N/en 7.1.585</td>
</tr>
</tbody>
</table>
Solenoids operator, standard voltages

<table>
<thead>
<tr>
<th>Model</th>
<th>Power consumption</th>
<th>Rated current</th>
<th>Protection class</th>
<th>Ex-Protection (ATEX-Category)</th>
<th>Temperature Ambient/ Media (°C)</th>
<th>Electrical connection</th>
<th>Weight (kg)</th>
<th>Drawing No.</th>
<th>Circuit diagram No.</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.9</td>
<td>— 369 —</td>
<td>—</td>
<td>IP66 (with cable gland)</td>
<td>II 2 G Ex d mb IIC T4/ T6 Gb</td>
<td>T4: -40 ... +70 T6: -40 ... +40</td>
<td>1/2 NPT *1)</td>
<td>0.8</td>
<td>7</td>
<td>20</td>
<td>4670</td>
</tr>
<tr>
<td></td>
<td>10.0 —</td>
<td>— 43</td>
<td>IP66 (with cable gland)</td>
<td>II 2 G Ex d mb IIC T4/ T6 Gb</td>
<td>T4: -40 ... +70 T6: -40 ... +40</td>
<td>1/2 NPT *1)</td>
<td>0.8</td>
<td>7</td>
<td>21</td>
<td>4671</td>
</tr>
<tr>
<td>8.9</td>
<td>— 369 —</td>
<td>—</td>
<td>IP66 (with cable gland)</td>
<td>II 2 G Ex d mb IIC T4/ T6 Gb</td>
<td>T4: -40 ... +70 T6: -40 ... +40</td>
<td>M20 x 1,5 *1)</td>
<td>0.8</td>
<td>7</td>
<td>20</td>
<td>4672</td>
</tr>
<tr>
<td></td>
<td>10.0 —</td>
<td>— 43</td>
<td>IP66 (with cable gland)</td>
<td>II 2 G Ex d mb IIC T4/ T6 Gb</td>
<td>T4: -40 ... +70 T6: -40 ... +40</td>
<td>M20 x 1,5 *1)</td>
<td>0.8</td>
<td>7</td>
<td>21</td>
<td>4673</td>
</tr>
<tr>
<td>8.9</td>
<td>— 369 —</td>
<td>—</td>
<td>IP66 (with cable gland)</td>
<td>II 2 G Ex d mb IIC T4/ T6 Gb</td>
<td>T4: -40 ... +70 T6: -40 ... +40</td>
<td>M20 x 1,5 *1)</td>
<td>1.2</td>
<td>10</td>
<td>4</td>
<td>4872</td>
</tr>
<tr>
<td></td>
<td>10 —</td>
<td>— 43</td>
<td>IP66 (with cable gland)</td>
<td>II 2 G Ex d mb IIC T4/ T6 Gb</td>
<td>T4: -40 ... +70 T6: -40 ... +40</td>
<td>M20 x 1,5 *1)</td>
<td>1.2</td>
<td>10</td>
<td>7</td>
<td>4873</td>
</tr>
</tbody>
</table>

Standard voltages (±10%) 24 V d.c., 230 V a.c., other voltages on request. Design according to VDE 0580, EN 50014/50028. 100% duty cycle.

*1) Connector/cable gland is not scope of delivery, see table »Accessories«

Attention: The protection class for coil series 46xx and 48xx is determined by the choice of cable gland.

Example: if an ATEX-certified cable gland is used that has Ex d type of protection, the solenoid will have the protection class Ex d mb; if a cable gland with Ex e type of protection is used, the solenoid will have protection class Ex e mb.

Approvals

<table>
<thead>
<tr>
<th>Model</th>
<th>Approvals ATEX</th>
<th>IECEx</th>
<th>Datassheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>46xx</td>
<td>PTB 02 ATEX 2085 X</td>
<td>IECEx PTB 11.0039X</td>
<td>N/en.7.1.585</td>
</tr>
<tr>
<td>48xx</td>
<td>PTB 06 ATEX 2054 X</td>
<td>IECEx PTB 07.0039X</td>
<td>N/en.7.1.590</td>
</tr>
</tbody>
</table>
Position sensor

Supply voltage (Ub): 7.7 ... 9 V d.c.
Ripple: 15%
Frequency of operating cycles: 1000 Hz

Protection class: IP68
Pressure-resistant: 500 bar
Ambient temperature: -25 ... +70°C
24011 standard flow valve, 3/2
Direct solenoid actuated poppet valve

Solenoids

Connector can be indexed by 4x90°
Ø 16 or 13 (with spacer tube)
M20 x 1.5 or 1/2 NPT
Flying leads AWG 18 (450 mm long)
With cable gland, Pg 13.5

Dimensions in mm
Projection/First angle

Circuit diagrams

1
4
7
10

1
4
7
20
21
> **Standard flow range** (340 l/min)
> **Main application:** Single acting actuators in intrinsically safe circuits
> **TÜV-approval based on** type examination IEC 61508, multichannel up to SIL 3
> **Solenoid valve also suitable for use in low power non hazardous areas**

### Technical features

**Medium:** Compressed air, filtered, non-lubricated and dry. Other gase and liquid fluids on request. (Viscosity for gaseous or liquid fluids up to 40 mm²/s)

**Operation:** Direct solenoid operated poppet valve

**Operating pressure:** 0 ... 10 bar (0 ... 145 psi)

**Orifice:** 5 mm

**Flow:**
- Gaseous fluids: 340 l/min

**Port size:**
- Flanged
- NAMUR Interface

**Flow direction:** Optional

**Ambient/Media temperature:**
- -25 ... +80°C (-13 ... +176°F)

Depending on solenoid system

Air supply must be dry enough to avoid ice formation at temperatures below +2°C (35°F).

For outdoor installations must be protected all connections against the penetration of moisture and a solenoid with IP66 protection must be used!

**Materials:**
- Body: Aluminium anodized or stainless steel 1.4404 (316 L)
- Inner parts: stainless steel, brass
- Solenoid housing: aluminium, anodized
- Seals: NBR

### Technical data

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Temperature (°C)</th>
<th>Material</th>
<th>Position sensor</th>
<th>Weight (kg)</th>
<th>Test certificate IEC 61508</th>
<th>Dimension No.</th>
<th>Model</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>211</td>
<td>-25 ... +60</td>
<td>NBR</td>
<td>aluminium</td>
<td>0.55</td>
<td>X</td>
<td>1</td>
<td>2401099.2003</td>
<td>213</td>
</tr>
<tr>
<td>32</td>
<td>-25 ... +60</td>
<td>NBR</td>
<td>stainless steel</td>
<td>1.00</td>
<td>X</td>
<td>1</td>
<td>2401097.2003</td>
<td>224</td>
</tr>
<tr>
<td>33</td>
<td>-25 ... +60</td>
<td>NBR</td>
<td>aluminium</td>
<td>0.62</td>
<td>X</td>
<td>2</td>
<td>1023353.2003</td>
<td>233</td>
</tr>
<tr>
<td>34</td>
<td>-25 ... +60</td>
<td>NBR</td>
<td>stainless steel</td>
<td>1.07</td>
<td>X</td>
<td>2</td>
<td>2401098.2003</td>
<td>244</td>
</tr>
</tbody>
</table>

*1) Solenoid to be included in scope of supply

*2) Particularly for valves with TÜV approval and attachment in plants based on safety standards IEC 61508, taking into account to the operating and maintenance instructions document 7503444.

---

Our policy is one of continued research and development. We therefore reserve the right to amend, without notice, the specifications given in this document. (2012 - 5175c) © 2015 Norgren GmbH
Solenoid parameters for use in non hazardous locations (25)

<table>
<thead>
<tr>
<th>Switch-on voltage (V)</th>
<th>Allowed current (mA)</th>
<th>Holding current (mA)</th>
<th>Power consumption (W)</th>
<th>Protection class IP</th>
<th>Ex-Protection (ATEX-Category)</th>
<th>Temperature Ambient/Fluid (°C)</th>
<th>Electrical connection</th>
<th>Weight (kg)</th>
<th>Operating sequence</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 ... 26,4</td>
<td>&lt; 75</td>
<td>&gt; 40</td>
<td>1,8</td>
<td>IP66 (w/ cable gland)</td>
<td>-40 ... +80</td>
<td>M20 x 1,5 *2)</td>
<td>0,85</td>
<td>see below</td>
<td>2003</td>
<td></td>
</tr>
</tbody>
</table>

Standard voltages ±10%, Design according to VDE 0580, EN 50014/50028. 100% duty cycle.
Pick-up delay typical: 0,3 ... 2 s, depending on intrinsical current supply.

*2) Connector cable gland is in scope of delivery.

Solenoid parameters for use in intrinsically safe circuits (25)

| Switch-on voltage (V) | Holding current (mA) | Holding voltage (V) | Pick-up delay typical *3) (s) | Protection class IP | Ex-Protection (ATEX-Cat-
gory) | Temperature Ambient/Fluid (°C) | Weight (kg) | Model |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>22 ... 28</td>
<td>40</td>
<td>approx. 5</td>
<td>0,3 ... 5</td>
<td>IP66 (w/ cable gland)</td>
<td>II 2 G Ex la IIC T5/T6</td>
<td>T5: -40 ... +70 T6: -40 ... +55 T9: -40 ... +70</td>
<td>0,85</td>
<td>2003</td>
</tr>
</tbody>
</table>

*3) depending on intrinsical current supply.

Function of solenoid drive
To switch the direct operated valve, a certain energy is required. This energy is stored in a capacitor. The charging voltage is 22 V. The higher the supply voltage, the shorter the charging time. As soon as the charging voltage has been reached, the valve switches. The small current now flowing through the coil is sufficient to hold the valve in the open position. At least 40 mA are required for this.

Current supply units:
Intrinsically safe power supply units can be chosen in a list of compatibility in www.norgren.com. When selecting an intrinsically safe power supply, it is important to observe the maximum permissible values acc. to the EC-Type-Examination Certificate PTB 04 ATEX 2010 respectively IECEx PTB 05.0020 Ul 28 V, li 110 mA, Pi 1,5 W. The effective internal capacities Ci and inductivities li of the solenoid are negligibly low.
Our policy is one of continued research and development. We therefore reserve the right to amend, without notice, the specifications given in this document. (2012 - 5175c) © 2015 Norgren GmbH

**24010 standard flow valve, 3/2**

Direct solenoid actuated poppet valve

**Drawings**

**Valves**

**Position sensor**

Supply voltage (Ub):
7.7 ... 9 V d.c.

Ripple:
15%

Frequency of operating cycles:
1000 Hz

Protection class:
IP68

Pressure-resistant:
500 bar

Ambient temperature:
-25 ... +70°C

**Circuit diagram**
> High flow range
(950 l/min)
> Main application:
Single acting actuators
>TÜV-approval based
on type examination
DGRL 97/23/EG and
IEC 61 508,
multichannel up to
SIL 3

> Optional valve position
sensors
> Suited for outdoor use
under critical
environment conditions
> Variable valve solenoid
combination

Technical features

Medium:
Filtered, non-lubricated and
dried compressed air, instrument
air, nitrogen and other
non-flammable neutral, dry fluids

Operation:
Direct solenoid operated
poppet valve

Operating pressure:
0 ... 10 bar (0 ... 145 psi)

Orifice:
8 mm

Flow:
Gaseous fluids: 950 l/min

Port size:
Flanged

Flow direction:
Optional

Ambient/Media temperature:
-40 ... +60°C (-40 ... +140°F)
-25 ... +60°C (-13 ... +140°F)
(SIL version)

Depending on solenoid system

Air supply must be dry enough
to avoid ice formation at
temperatures below +2°C (35°F).

For outdoor installations must be
protected all connections against
the penetration of moisture and
a solenoid with IP66 protection
must be used!

Materials:
Body: Aluminium anodized
or stainless steel 1.4404 (316 L)
Seals: NBR

Technical data

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Temperature (°C)</th>
<th>Material seat seal</th>
<th>Housing</th>
<th>Inductive limit sensor</th>
<th>Weight (kg)</th>
<th>Test certificate IEC 61 508 *2</th>
<th>Dimension No.</th>
<th>Model *1)</th>
<th>Substitute</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-40 ... 60</td>
<td>NBR</td>
<td>aluminium</td>
<td>without</td>
<td>0,65</td>
<td>X</td>
<td>1</td>
<td>9801595</td>
<td>073</td>
</tr>
<tr>
<td>2</td>
<td>-40 ... 60</td>
<td>NBR</td>
<td>stainless steel</td>
<td>without</td>
<td>1,50</td>
<td>X</td>
<td>1</td>
<td>9801795</td>
<td>084</td>
</tr>
<tr>
<td>3</td>
<td>-25 ... 60</td>
<td>NBR</td>
<td>aluminium</td>
<td>integrated</td>
<td>0,72</td>
<td>X</td>
<td>2</td>
<td>9801594</td>
<td>093</td>
</tr>
<tr>
<td>4</td>
<td>-25 ... 60</td>
<td>NBR</td>
<td>stainless steel</td>
<td>integrated</td>
<td>1,57</td>
<td>X</td>
<td>2</td>
<td>9801794</td>
<td>104</td>
</tr>
</tbody>
</table>

*1) When ordering please indicate solenoid, voltage and current type (frequency).

*2) For operation in plants according to IEC 61511/61508 (-25 ... +60°C)
### Solenoids

<table>
<thead>
<tr>
<th>Power consumption 24 V d.c. (W)</th>
<th>Rated current 24 V d.c. (A)</th>
<th>Protection class IP/NEMA</th>
<th>Ex-Protection (ATEX-Category)</th>
<th>Temperature Ambient Medium (°C)</th>
<th>Electrical connection</th>
<th>Weight (kg)</th>
<th>Drawing No.</th>
<th>Circuit diagram No.</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>8,9</td>
<td>369</td>
<td>NEMA 4, 4X, 6, 6P, 7, 9</td>
<td>XP/DP, Div. 1 &amp; 2 Cl I, Gr. A-D Cl III, Gr. E-G T3 (160°C)</td>
<td>-20 ... +60</td>
<td>Flying leads 450 mm</td>
<td>0,5</td>
<td>8</td>
<td>1</td>
<td>3824</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13,6</td>
<td>367</td>
<td>NEMA 4, 4X, 6, 6P, 7, 9</td>
<td>XP/DP, Div. 1 &amp; 2 Cl I, Gr. A-D Cl III, Gr. E-G T3 (160°C)</td>
<td>-20 ... +60</td>
<td>Flying leads 450 mm</td>
<td>0,5</td>
<td>8</td>
<td>1</td>
<td>3826</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15,7</td>
<td>68</td>
<td>NEMA 4, 4X, 6, 6P, 7, 9</td>
<td>XP/DP, Div. 1 &amp; 2 Cl I, Gr. A-D Cl III, Gr. E-G T3 (160°C)</td>
<td>-20 ... +60</td>
<td>Flying leads 450 mm</td>
<td>0,5</td>
<td>8</td>
<td>5</td>
<td>3827</td>
</tr>
</tbody>
</table>

- Standard voltages (±10%) 24 V d.c., 230 V a.c., other voltages on request. Design according to VDE 0580, EN 50014/50028. 100% duty cycle.
- Connector/cable gland is not scope of delivery, see table «Accessories»
- Attention: The protection class for coil series 46xx and 48xx is determined by the choice of cable gland.
- Example: If an ATEX-certified cable gland is used that has Ex d type of protection, the solenoid will have the protection class Ex d mb; if a cable gland with Ex e type of protection is used, the solenoid will have protection class Ex e mb.

### Approvals

<table>
<thead>
<tr>
<th>Model</th>
<th>Approvals</th>
<th>IECEx</th>
<th>FM</th>
</tr>
</thead>
<tbody>
<tr>
<td>372x, 382x</td>
<td>CSA-LR 57643-6</td>
<td>N/en 7.1.575</td>
<td></td>
</tr>
<tr>
<td>42xx</td>
<td>NEMA 98 ATEX 4452 X</td>
<td>IECEx KEM 09.0068X</td>
<td>N/en 7.1.580</td>
</tr>
<tr>
<td>46xx</td>
<td>PTB 02 ATEX 2085 X</td>
<td>IECEx PTB 11.0094X</td>
<td>N/en 7.1.585</td>
</tr>
<tr>
<td>48xx</td>
<td>PTB 06 ATEX 2054 X</td>
<td>IECEx PTB 07.0039X</td>
<td>N/en 7.1.590</td>
</tr>
</tbody>
</table>

Our policy is one of continued research and development. We therefore reserve the right to amend, without notice, the specifications given in this document. (2012 - 5175c) © 2015 Norgren GmbH
98015 high flow valve, 3/2
Direct solenoid actuated poppet valve

Our policy is one of continued research and development. We therefore reserve the right to amend, without notice, the specifications given in this document. (2012 - 5175c) © 2015 Norgren GmbH

Drawings
Valves

Position sensor

Supply voltage (Ub):
7.7 ... 9 V d.c.
Ripple:
15%
Frequency of operating cycles:
1000 Hz

Protection class:
IP68
Pressure-resistant:
500 bar
Ambient temperature:
-25 ... +70°C
Our policy is one of continued research and development. We therefore reserve the right to amend, without notice, the specifications given in this document. (2012 - 5175c) © 2015 Norgren GmbH

98015 high flow valve, 3/2
Direct solenoid actuated poppet valve

Solenoids

Connector can be indexed by 4x90°
Ø 16 or 13 (with spacer tube)
M20 x 1,5 or 1/2 NPT
Flying leads AWG 18 (450 mm long)
With cable gland, Pg 13,5

Dimensions in mm
Projection/First angle

Circuit diagrams

Connector can be indexed by 4x90°
Ø 16 or 13 (with spacer tube)
M20 x 1,5 or 1/2 NPT
Flying leads AWG 18 (450 mm long)
With cable gland, Pg 13,5
98025 high flow valve, 3/2
Indirect solenoid actuated poppet valve

> High flow range
  (950 l/min)
> Main application:
  Single acting actuators
> TÜV-approval based
  on type examination
  DGRL 97/23/EG and
  IEC 61 508,
  multichannel up to
  SIL 3

> Suited for outdoor use
  under critical
  environment conditions

Technical features

- **Medium:** Filtered, non-lubricated and dried compressed air, instrument air, nitrogen and other non-flammable neutral, dry fluids
- **Operation:** Indirect solenoid operated poppet valve.
- **Operating pressure:** 2 ... 8 bar (29 ... 116 psi) with internal air supply

Flow:
- **Gaseous fluids:** 950 l/min
- **Orifice:** 8 mm
- **Port size:** Flanged
- **Flow direction:** Fixed

Ambient/Media temperature:
- **-40 ... +60°C (-40 ... +140°F)**
  (SIL version)
- **-25 ... +60°C (-13 ... +140°F)**
  Depending on solenoid system
  Air supply must be dry enough to avoid ice formation at temperatures below +2°C (35°F).
  For outdoor installations must be protected all connections against the penetration of moisture and a solenoid with IP66 protection must be used!

Materials:
- **Body:** Aluminium anodized (suitable for high humidity, sulphuric, sodium chloride or ammonia environments), stainless steel 1.4404 (316 L)
- **Seal:** NBR
- **Inner parts:** stainless steel

Technical data

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Temperature (°C)</th>
<th>Material seat seal</th>
<th>Material housing</th>
<th>Inductive limit sensor</th>
<th>Weight (kg)</th>
<th>Test certificate IEC 61 508 *2)</th>
<th>Dimension No.</th>
<th>Model *1)</th>
<th>Substitute</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-40 ... +60</td>
<td>NBR</td>
<td>aluminium</td>
<td>without</td>
<td>0.75</td>
<td>X</td>
<td>1</td>
<td>9802595</td>
<td>313</td>
</tr>
<tr>
<td></td>
<td>-40 ... +60</td>
<td>NBR</td>
<td>stainless steel</td>
<td>without</td>
<td>1.70</td>
<td>X</td>
<td>1</td>
<td>9802795</td>
<td>324</td>
</tr>
</tbody>
</table>

In order to ensure full flow and proper function make sure that sufficient pressure supply with feed pipe diameters according to the port size is available. (Minimum pressure: 3 bar)

*1) When ordering please indicate solenoid, voltage and current type (frequency).
*2) For operation in plants according to IEC 61511/61508 (-25 ... +60°C)

[Image of technical features]
Solenoid actuators for intrinsically-safe circuits

<table>
<thead>
<tr>
<th>Model</th>
<th>Nominal resistance RN coil (Ω)</th>
<th>Min. required switching current (mA)</th>
<th>Resistance Rw 60 coil (Ω)</th>
<th>Required voltage at terminal Rw 60 (V)</th>
<th>IP Protection class</th>
<th>Ex-Protection (ATEX-Category)</th>
<th>Temperature Ambient/Media (°C)</th>
<th>Weight (kg)</th>
<th>Circuit diagram No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>33</td>
<td>240</td>
<td>8</td>
<td>IP66 (with cable gland)</td>
<td>II 2 G Ex ia IIC T4/TE Db</td>
<td>T4: -40 ... +80</td>
<td>0,85</td>
<td>10</td>
<td>2050</td>
</tr>
<tr>
<td>391</td>
<td>24</td>
<td>460</td>
<td>11</td>
<td>IP66 (with cable gland)</td>
<td>II 2 G Ex ia IIC T4/TE Db</td>
<td>T4: -40 ... +80</td>
<td>0,85</td>
<td>10</td>
<td>2051</td>
</tr>
<tr>
<td>736</td>
<td>17</td>
<td>880</td>
<td>15</td>
<td>IP66 (with cable gland)</td>
<td>II 2 G Ex ia IIC T4/TE Db</td>
<td>T4: -40 ... +80</td>
<td>0,85</td>
<td>10</td>
<td>2052</td>
</tr>
<tr>
<td>1220</td>
<td>13</td>
<td>1460</td>
<td>19</td>
<td>IP66 (with cable gland)</td>
<td>II 2 G Ex ia IIC T4/TE Db</td>
<td>T4: -40 ... +80</td>
<td>0,85</td>
<td>10</td>
<td>2053</td>
</tr>
</tbody>
</table>

Cable gland (cable Ø 5 ... 10 mm) is in scope of delivery

When selecting an intrinsically safe power supply, the permissible maximum values according to the Certificate of Conformity should be taken into account.

$U_i = 45 \text{ V, } I_i = 500 \text{ mA according to Tab. A. 1, EN 60079-11}$

$P_i = 2,0 \text{ W, } L_i \text{ and } C_i \text{ can be ignored.}$

Approvals

<table>
<thead>
<tr>
<th>Model</th>
<th>Approvals ATEX</th>
<th>IECEx</th>
<th>Datasheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>205x</td>
<td>PTB 07 ATEX 2019</td>
<td>IECEx PTB 07.0017</td>
<td>N/en 7.1.535</td>
</tr>
</tbody>
</table>

Drawing Valves

Dimensions in mm

[Drawing with dimensions]
97109 standard and high flow valve, 5/2
Manual actuated bypass spool valve

- Port size: 1/4 & 1/2
  (ISO G or NPT)
- NAMUR Interface
- Crossover-free switching
- Reliable operation even with minimal air flow
- Lockable manual operator with detent in switching and normal position
- Simple design of soft seal spool system
- U-lock with two keys

Technical features

Medium:
Filtered, non-lubricated and dried compressed air, instrument air, nitrogen and other non-flammable neutral, dry fluids

Operation:
Manual actuated spool valve

Operating pressure:
0 ... 10 bar (0 ... 145 psi)

Orifice:
6 mm (1/4”), 8 mm (1/2”)

Port size:
G1/4, 1/4 NPT, G1/2, 1/2 NPT
NAMUR Interface with integrated recirculation from the exhaust air to the actuator spring chamber

Flow direction:
Fixed

Ambient/Media temperature:
-40 ... +65°C (NBR) (-40 ... +149°F)
-25 ... +80°C (HNBR) (-13 ... +176°F)

Air supply must be dry enough to avoid ice formation at temperatures below +2°C (35°F).
For outdoor installation please protect all connections against the penetration of moisture.

Materials:
Aluminium anodized or stainless steel 1.4404 (316 L)
Seals: NBR or HNBR

Technical data

Seals: NBR -40 ... +65°C (-40 ... +149°F)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Port size</th>
<th>Materials</th>
<th>Actuation/return</th>
<th>Flow (l/min)</th>
<th>Operating pressure (bar)</th>
<th>Weight (kg)</th>
<th>Drawing No.</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G1/4</td>
<td>Aluminium</td>
<td>Lever/spring</td>
<td>0 ... 10</td>
<td>0 ... 145</td>
<td>0.60</td>
<td>1</td>
<td>9710906</td>
</tr>
<tr>
<td></td>
<td>1/4 NPT</td>
<td>Aluminium</td>
<td>Lever/spring</td>
<td>0 ... 10</td>
<td>0 ... 145</td>
<td>0.60</td>
<td>1</td>
<td>9710911</td>
</tr>
<tr>
<td></td>
<td>G1/2</td>
<td>Aluminium</td>
<td>Lever/spring</td>
<td>0 ... 10</td>
<td>0 ... 145</td>
<td>1.30</td>
<td>2</td>
<td>9710908</td>
</tr>
<tr>
<td></td>
<td>1/2 NPT</td>
<td>Aluminium</td>
<td>Lever/spring</td>
<td>0 ... 10</td>
<td>0 ... 145</td>
<td>1.30</td>
<td>2</td>
<td>9710913</td>
</tr>
<tr>
<td></td>
<td>G1/4</td>
<td>Stainless steel</td>
<td>Lever/spring</td>
<td>0 ... 10</td>
<td>0 ... 145</td>
<td>1.40</td>
<td>2</td>
<td>9710917</td>
</tr>
<tr>
<td></td>
<td>1/4 NPT</td>
<td>Stainless steel</td>
<td>Lever/spring</td>
<td>0 ... 10</td>
<td>0 ... 145</td>
<td>1.40</td>
<td>2</td>
<td>9710918</td>
</tr>
<tr>
<td></td>
<td>G1/2</td>
<td>Stainless steel</td>
<td>Lever/spring</td>
<td>0 ... 10</td>
<td>0 ... 145</td>
<td>3.20</td>
<td>2</td>
<td>9710919</td>
</tr>
<tr>
<td></td>
<td>1/2 NPT</td>
<td>Stainless steel</td>
<td>Lever/spring</td>
<td>0 ... 10</td>
<td>0 ... 145</td>
<td>3.20</td>
<td>2</td>
<td>9710920</td>
</tr>
</tbody>
</table>

Seals: HNBR -25 ... +80°C (-13 ... +176°F)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Port size</th>
<th>Materials</th>
<th>Actuation/return</th>
<th>Flow (l/min)</th>
<th>Operating pressure (bar)</th>
<th>Weight (kg)</th>
<th>Drawing No.</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G1/4</td>
<td>Aluminium</td>
<td>Lever/spring</td>
<td>1300</td>
<td>0 ... 10</td>
<td>0.60</td>
<td>1</td>
<td>9710915</td>
</tr>
<tr>
<td></td>
<td>1/4 NPT</td>
<td>Aluminium</td>
<td>Lever/spring</td>
<td>1300</td>
<td>0 ... 10</td>
<td>0.60</td>
<td>1</td>
<td>9710919</td>
</tr>
<tr>
<td></td>
<td>G1/2</td>
<td>Aluminium</td>
<td>Lever/spring</td>
<td>2600</td>
<td>0 ... 10</td>
<td>1.30</td>
<td>2</td>
<td>9710917</td>
</tr>
<tr>
<td></td>
<td>1/2 NPT</td>
<td>Aluminium</td>
<td>Lever/spring</td>
<td>2600</td>
<td>0 ... 10</td>
<td>1.30</td>
<td>2</td>
<td>9710921</td>
</tr>
<tr>
<td></td>
<td>G1/4</td>
<td>Stainless steel</td>
<td>Lever/spring</td>
<td>1300</td>
<td>0 ... 10</td>
<td>1.40</td>
<td>1</td>
<td>9710916</td>
</tr>
<tr>
<td></td>
<td>1/4 NPT</td>
<td>Stainless steel</td>
<td>Lever/spring</td>
<td>1300</td>
<td>0 ... 10</td>
<td>1.40</td>
<td>1</td>
<td>9710920</td>
</tr>
<tr>
<td></td>
<td>G1/2</td>
<td>Stainless steel</td>
<td>Lever/spring</td>
<td>2600</td>
<td>0 ... 10</td>
<td>3.20</td>
<td>1</td>
<td>9710918</td>
</tr>
<tr>
<td></td>
<td>1/2 NPT</td>
<td>Stainless steel</td>
<td>Lever/spring</td>
<td>2600</td>
<td>0 ... 10</td>
<td>3.20</td>
<td>1</td>
<td>9710922</td>
</tr>
</tbody>
</table>

Accessories

- U-lock with two keys (brass)
- U-lock with two keys (stainless steel)

0613633 0613836
Inlet and exhaust ports G1/4 or 1/4 NPT
Namur flange plate
Inlet and exhaust ports G1/2 or 1/2 NPT
### V81 series - Redundant valve manifold systems - Modular with bypass
1oo2 “Safety”, 2oo2 “Availability” and 2oo3 “Safety and Availability”

#### Accessories

**Exhaust guard (plastic) - standard option**

![Exhaust guard diagram]

<table>
<thead>
<tr>
<th>B</th>
<th>Suitable for</th>
<th>G</th>
<th>C</th>
<th>Ø D</th>
<th>Weight (g)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4”</td>
<td>G 1/4, 1/4 NPT</td>
<td>10</td>
<td>26,5</td>
<td>21</td>
<td>5</td>
<td>0613422</td>
</tr>
<tr>
<td>1/2”</td>
<td>G1/2, 1/2 NPT</td>
<td>12</td>
<td>33,5</td>
<td>29</td>
<td>11</td>
<td>0613423</td>
</tr>
</tbody>
</table>

**Silencer**

![Silencer diagram]

<table>
<thead>
<tr>
<th>B</th>
<th>G</th>
<th>C</th>
<th>Ø D</th>
<th>Weight (g)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 1/4</td>
<td>7</td>
<td>35,5</td>
<td>15,5</td>
<td>2,9</td>
<td>M52</td>
</tr>
<tr>
<td>1/4 NPT</td>
<td>7</td>
<td>35,5</td>
<td>15,5</td>
<td>2,9</td>
<td>C52</td>
</tr>
<tr>
<td>G1/2</td>
<td>12</td>
<td>67</td>
<td>23</td>
<td>11,5</td>
<td>M54</td>
</tr>
<tr>
<td>1/2 NPT</td>
<td>12</td>
<td>67</td>
<td>23</td>
<td>11,5</td>
<td>C54</td>
</tr>
</tbody>
</table>

**Plug (nickel plated brass or stainless steel)**

![Plug diagram]

<table>
<thead>
<tr>
<th>B</th>
<th>C</th>
<th>G</th>
<th>Ø D</th>
<th>Ø D1</th>
<th>Weight (g)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4”</td>
<td>G 1/4, 1/4 NPTF</td>
<td>46</td>
<td>20</td>
<td>21</td>
<td>14</td>
<td>25</td>
</tr>
<tr>
<td>G1/4</td>
<td>21</td>
<td>12</td>
<td>13</td>
<td>24</td>
<td>0683943</td>
<td>*1)</td>
</tr>
<tr>
<td>1/4 NPT</td>
<td>10</td>
<td>—</td>
<td>7</td>
<td>8</td>
<td>0682082</td>
<td>*1)</td>
</tr>
</tbody>
</table>

*1) stainless steel

**Sealing washer (plastic)**

![Sealing washer diagram]

For plug | Ø D | Ø D1 | E | Weight (g) | Model |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4”</td>
<td>13,5</td>
<td>17</td>
<td>1,5</td>
<td>2</td>
<td>0680835</td>
</tr>
</tbody>
</table>

**Visual indicator (stainless steel) - standard option**

![Visual indicator diagram]

<table>
<thead>
<tr>
<th>B</th>
<th>C</th>
<th>Ø D</th>
<th>Ø D1</th>
<th>G</th>
<th>Weight (g)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 1/4</td>
<td>42</td>
<td>18</td>
<td>14</td>
<td>11,5</td>
<td>14</td>
<td>35</td>
</tr>
<tr>
<td>1/4 NPT</td>
<td>42</td>
<td>18</td>
<td>14</td>
<td>16</td>
<td>14</td>
<td>35</td>
</tr>
</tbody>
</table>

**Silencer (brass or stainless steel)**

![Silencer brass diagram]

<table>
<thead>
<tr>
<th>B</th>
<th>C</th>
<th>G</th>
<th>Ø D</th>
<th>Weight (g)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 1/4</td>
<td>33</td>
<td>8</td>
<td>17</td>
<td>18</td>
<td>T40C2800</td>
</tr>
<tr>
<td>1/4 NPT</td>
<td>35</td>
<td>8</td>
<td>16</td>
<td>18</td>
<td>M0032A</td>
</tr>
<tr>
<td>G 1/4</td>
<td>36</td>
<td>8</td>
<td>18</td>
<td>23</td>
<td>0148613</td>
</tr>
<tr>
<td>1/4 NPT</td>
<td>36</td>
<td>8</td>
<td>16</td>
<td>67</td>
<td>0613678</td>
</tr>
<tr>
<td>G1/2</td>
<td>56</td>
<td>12</td>
<td>27</td>
<td>63</td>
<td>T40C4800</td>
</tr>
<tr>
<td>1/2 NPT</td>
<td>48</td>
<td>12</td>
<td>24</td>
<td>81</td>
<td>M004A</td>
</tr>
<tr>
<td>G1/2</td>
<td>49</td>
<td>12</td>
<td>24</td>
<td>235</td>
<td>0613679</td>
</tr>
</tbody>
</table>

*1) stainless steel

**Visual indicator (plastic)**

![Visual indicator plastic diagram]

<table>
<thead>
<tr>
<th>B</th>
<th>C</th>
<th>Ø D</th>
<th>Ø D1</th>
<th>Weight (g)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8 NPTF</td>
<td>46</td>
<td>20</td>
<td>21</td>
<td>14</td>
<td>25</td>
</tr>
</tbody>
</table>

*1) stainless steel

**Adapter (zinc plated steel or stainless steel)**

![Adapter diagram]

For plug | Ø D | Ø D1 | E | Weight (g) | Model |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4”</td>
<td>13,5</td>
<td>17</td>
<td>1,5</td>
<td>2</td>
<td>0680835</td>
</tr>
<tr>
<td>1/4 NPT</td>
<td>1/8 NPTF</td>
<td>21,5</td>
<td>14</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>1/4 NPT</td>
<td>1/8 NPTF</td>
<td>21,5</td>
<td>14</td>
<td>16</td>
<td>14</td>
</tr>
</tbody>
</table>

*1) stainless steel

---

Our policy is one of continued research and development. We therefore reserve the right to amend, without notice, the specifications given in this document. (2012 - 5175c) © 2015 Norgren GmbH

en 5.4.920.24
V81 series - Redundant valve manifold systems - Modular with bypass

1002 “Safety”, 2002 “Availability” and 2003 “Safety and Availability”

Cable gland

Connector - valve position sensor
90°, 4 pin, with cable

90°, 4 pin, without cable

straight, 4 pin, with cable

straight, 4 pin, without cable

Transport lug (zinc plated steel)
Model: 0613909
Weight: 0.2 kg
Warning

These products are intended for use in industrial compressed air and fluid systems only. Do not use these products where pressures and temperatures can exceed those listed under »Technical features/data«. Before using these products with fluids other than those specified, for non-industrial applications, life-support systems, or other applications not within published specifications, consult IMI NORGREN.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes. The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure.

System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided.

System designers and end users are cautioned to review specific warnings found in instruction sheets packed and shipped with these products.

Functional safety (SIL):
Suitable for certain applications can only be evaluated through examination of each safety-related overall system with regard to the requirements of IEC 61508/61511.