Our policy is one of continued research and development. We therefore reserve the right to amend, without notice, the specifications given in this document.
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Valve function
- Substitute
  - 1 out of 2 normally closed
  - 2 out of 2 normally closed
  - 2 out of 3 normally closed

Flow
- Substitute
  - Standard (24011 and 24010 solenoid valves)
  - High (98015 solenoid valves)

Port sizes
- Substitute
  - G 1/4 (standard flow system)
  - 1/4 NPT (standard flow system)
  - G 1/2 (high flow system)
  - 1/2 NPT (high flow system)

Valve type
- Substitute
  - Temperature
    - 24011 series
    - 98015 series
    - 24010 series

Manifold material
- Substitute
  - Aluminium (plugs: zinc plated steel)
  - Stainless steel
  - Aluminium (plugs: stainless steel)

Solenoids
- Temperature
  - 24011 series
  - 98015 series
  - 24010 series

Silencers
- Temperature
  - Exhaust guard (standard)
  - Plastic silencers to replace exhaust guards
  - Brass silencers to replace exhaust guards
  - Stainless steel silencers to replace exhaust guards

Flow rates and valve combinations

<table>
<thead>
<tr>
<th>Flow direction (port to port)</th>
<th>Standard flow systems</th>
<th>High flow system</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 2</td>
<td>2 x 24011</td>
<td>2 x 24010</td>
</tr>
<tr>
<td></td>
<td>2 x 24010</td>
<td>2 x 24015</td>
</tr>
<tr>
<td>1 = 2 *1) [l/min]</td>
<td>170</td>
<td>170</td>
</tr>
<tr>
<td>2 = 3 *2) [l/min]</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>2 to 3</td>
<td>2 x 24011</td>
<td>2 x 24010</td>
</tr>
<tr>
<td></td>
<td>2 x 24010</td>
<td>2 x 24015</td>
</tr>
<tr>
<td>1 = 2 *1) [l/min]</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>2 = 3 *2) [l/min]</td>
<td>710</td>
<td>710</td>
</tr>
<tr>
<td>3</td>
<td>4 x 24011</td>
<td>4 x 24010</td>
</tr>
<tr>
<td></td>
<td>4 x 24010</td>
<td>4 x 24015</td>
</tr>
<tr>
<td>1 = 2 *1) [l/min]</td>
<td>190</td>
<td>190</td>
</tr>
<tr>
<td>2 = 3 *2) [l/min]</td>
<td>710</td>
<td>710</td>
</tr>
</tbody>
</table>

*1) Flow characteristics conforms to ISO6358 from port 1 to port 2 (6 » 5 bar), see page 1
*2) Flow characteristics conforms to ISO6358 from port 2 to port 3 (10 » 0 bar), see page 1

*3) Temperature range depend on classification T4, T5 or T6, see pages 10, 11, 14 and 17
Standard and optional accessories

Accessories - Standard (included in the scope of supply)

Exhaust guard *2)

Accessories - Optional Other silencers

Silencer (stainless steel) *1)

Silencer (brass) *1)

Silencer (plastic) *1)

Accessories - Cable glands (ordered separately)

Cable gland
Protection class Ex e, Ex d (ATEX), Nickel plated brass/stainless steel

Accessories - Connectors (for valve position sensor ordered separately)

Connector M12 x 1 (straight)

Connector M12 x 1 (90°)

Accessories - Optional For use with valves fitted with position sensors

Bracket, (stainless steel)

Alternative valves with position sensors

Note: Valve position sensors are supplied complete with the valve. See pages 10, 14 & 16 for valve part numbers

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1002 (standard flow)
Weight: 1,0 kg aluminium (2,8 kg stainless steel) sub-base only, valves and accessories see refer page

Dimensions shown in mm
Projection/First angle

- Valve 24011 and 24010 series
- Outlet port G 1/4 or 1/4 NPT
- Exhaust guard, ports G 1/2 or 1/2 NPT
- Dependent on solenoid models (see solenoid drawing)
- Inlet port G 1/4 or 1/4 NPT
- Mounting holes
- Mounting threads as standard or alternative to fix the bracket

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Valve 24011 and 24010 series
Outlet port G 1/4 or 1/4 NPT
Exhaust guard, ports G 1/2 or 1/2 NPT
Dependent on solenoid models (see solenoid drawing)
Inlet port G 1/4 or 1/4 NPT
Mounting holes
Mounting threads as standard or alternative to fix the bracket
2002 (standard flow)
Weight: 1,00 kg aluminium (2,8 kg stainless steel) sub-base only, valves and accessories see refer page

Dimensions shown in mm
Projection/First angle

Valve 24011 and 24010 series
Outlet port G 1/4 or 1/4 NPT
Exhaust guard, ports G 1/2 or 1/2 NPT
Dependent on solenoid models (see solenoid drawing)
Inlet port G 1/4 or 1/4 NPT
Mounting holes
Mounting threads as standard or alternative to fix the bracket
2oo3 (standard flow)
Weight: 2.8 kg aluminium (8 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, ports G 1/2 or 1/2 NPT
Dependent on solenoid models (see solenoid drawing)
Inlet port G 1/4 or 1/4 NPT
Mounting holes
Mounting threads as standard or alternative to fix the bracket

Dimensions shown in mm
Projection/First angle
1002 (high flow)
Weight: 1.4 kg aluminium (4 kg stainless steel) sub-base only, valves and accessories see refer page

Valve 98015 series
Outlet port G 1/2 or 1/2 NPT
Exhaust guard, ports G 1/2 or 1/2 NPT
Dependent on solenoid models (see solenoid drawing)
Inlet port G 1/2 or 1/2 NPT
Mounting holes
Mounting threads as standard or alternative to fix the bracket

Dimensions shown in mm
Projection/First angle
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V82

2oo2 (high flow)
Weight: 1,4 kg aluminium (4 kg stainless steel) sub-base only, valves and accessories see refer page

Dimensions shown in mm
Projection/First angle

Valve 98015 series
Outlet port G 1/2 or 1/2 NPT
Exhaust guard, ports G 1/2 or 1/2 NPT
Dependent on solenoid models (see solenoid drawing)
Inlet port G 1/2 or 1/2 NPT
Mounting holes
Mounting threads as standard or alternative to fix the bracket
**2oo3 (high flow)**

Weight: 3,3 kg aluminium (9,3 kg stainless steel) sub-base only, valves and accessories see refer page
24011 standard flow valves

Standard flow range (340 l/min)
Direct acting 3/2 valve switches at power failure into starting position (mechanical spring return)

Optional valve position sensor
Suitable for outdoor installation in extreme environmental conditions
Solenoide valves suitable for use in area classification category: 2 and 3 GD/zone 1 & 2 (gas), 21 & 22 (dust)

Coil protection concepts: Ex e mb, Ex d mb, Ex tb

International approvals: IECEx, others on request

Technical features
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

Port size:
Flanged

Orifice:
5 mm

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

Fluid/Ambient Temperature:
-25°C ... +80°C [-13 ... +176°F] (NBR),
-40°C ... +60°C [-40 ... +140°F] (VMQ)
Depending on solenoid system
Air supply must be dry enough to avoid ice formation at temperatures +2°C (+35°F).

Technical data

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Temperature (°C)</th>
<th>Material</th>
<th>Valve, Seal, Housing</th>
<th>Position Sensor</th>
<th>Weight (kg)</th>
<th>Test Certificate</th>
<th>Dimension No.</th>
<th>Model No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25 ... 80</td>
<td>NBR</td>
<td>without</td>
<td>X</td>
<td>1</td>
<td>1</td>
<td>2401109</td>
<td></td>
</tr>
<tr>
<td></td>
<td>25 ... 80</td>
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<td>without</td>
<td>X</td>
<td>1</td>
<td>1</td>
<td>1025212</td>
<td></td>
</tr>
<tr>
<td></td>
<td>25 ... 70</td>
<td>NBR</td>
<td>without</td>
<td>X</td>
<td>1</td>
<td>1</td>
<td>1025352</td>
<td></td>
</tr>
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<td>25 ... 70</td>
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<td>without</td>
<td>X</td>
<td>1</td>
<td>1</td>
<td>1160006</td>
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</tr>
<tr>
<td></td>
<td>40 ... 60</td>
<td>VMQ</td>
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<td>X</td>
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<td>1</td>
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<td></td>
<td>40 ... 60</td>
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<td>X</td>
<td>1</td>
<td>1</td>
<td>1160007</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 the operating and maintenance instructions document 7503444.

Solenoid operators

<table>
<thead>
<tr>
<th>Power consumption</th>
<th>Rated current</th>
<th>ATEX Category</th>
<th>Protection class</th>
<th>Temperature Ambient/Fluid</th>
<th>Electrical connection</th>
<th>Weight (kg)</th>
<th>Dimension No.</th>
<th>Circuit diagram</th>
<th>Model No.</th>
</tr>
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<tbody>
<tr>
<td>24 V d.c.</td>
<td>230 V a.c.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10268 *8)</td>
</tr>
<tr>
<td>3,9</td>
<td>162</td>
<td>I2G</td>
<td>Ex e mb IEC T4/T6</td>
<td>-40 ... +85 T4</td>
<td></td>
<td>0,6</td>
<td>6</td>
<td>4</td>
<td>4260 *8)</td>
</tr>
<tr>
<td>—</td>
<td>21</td>
<td>I2D</td>
<td>Ex tb IEC T 130°C</td>
<td>-40 ... +85 T4</td>
<td>M20 x 1,5 (e)</td>
<td>0,6</td>
<td>6</td>
<td>4</td>
<td>4260 *8)</td>
</tr>
<tr>
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<td>381</td>
<td>I2G</td>
<td>Ex e mb IEC T4/T5</td>
<td>-40 ... +85 T5</td>
<td></td>
<td>0,5</td>
<td>6</td>
<td>7</td>
<td>4270 *8)</td>
</tr>
<tr>
<td>—</td>
<td>43</td>
<td>I2G</td>
<td>Ex e mb IEC T4/T5</td>
<td>-40 ... +85 T5</td>
<td></td>
<td>0,5</td>
<td>6</td>
<td>7</td>
<td>4271 *8)</td>
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N/en/en 5.4.925.10 Our policy is one of continued research and development. We therefore reserve the right to amend, without notice, the specifications given in this document.
**24011 standard flow valves**

<table>
<thead>
<tr>
<th>Power consumption</th>
<th>Rated current</th>
<th>ATEX-Category</th>
<th>Protection class (*7)</th>
<th>Temperature Ambient/ Fluid (°C)</th>
<th>Electrical connection</th>
<th>Weight (kg)</th>
<th>Dimension No.</th>
<th>Circuit diagram</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 V d.c. (W)</td>
<td>230 V a.c. (VA)</td>
<td>24 V d.c. (m A)</td>
<td>230 V a.c. (m A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3,9</td>
<td>—</td>
<td>162</td>
<td>—</td>
<td>IIG2</td>
<td>Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b</td>
<td>-49...+80 T4</td>
<td>1/2 NPT *a)</td>
<td>0,8</td>
<td>7</td>
</tr>
<tr>
<td>5,3</td>
<td>—</td>
<td>23</td>
<td>IIG2</td>
<td>Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b</td>
<td>-49...+80 T4</td>
<td>1/2 NPT *a)</td>
<td>0,8</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>3,9</td>
<td>—</td>
<td>162</td>
<td>—</td>
<td>IIG2</td>
<td>Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b</td>
<td>-49...+80 T4</td>
<td>1/2 NPT *a)</td>
<td>0,8</td>
<td>7</td>
</tr>
<tr>
<td>5,3</td>
<td>—</td>
<td>23</td>
<td>IIG2</td>
<td>Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b</td>
<td>-49...+80 T4</td>
<td>M20x1,5 *a)</td>
<td>0,8</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>8,9</td>
<td>—</td>
<td>369</td>
<td>—</td>
<td>IIG2</td>
<td>Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b</td>
<td>-49...+80 T4</td>
<td>1/2 - 14 NPT *a)</td>
<td>0,8</td>
<td>7</td>
</tr>
<tr>
<td>8,9</td>
<td>—</td>
<td>369</td>
<td>—</td>
<td>IIG2</td>
<td>Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b</td>
<td>-49...+80 T4</td>
<td>1/2 - 14 NPT *a)</td>
<td>0,8</td>
<td>7</td>
</tr>
<tr>
<td>10,0</td>
<td>—</td>
<td>43</td>
<td>IIG2</td>
<td>Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b Ex emb nbb 74/46/6b</td>
<td>-49...+80 T4</td>
<td>1/2 - 14 NPT *a)</td>
<td>0,8</td>
<td>7</td>
<td>21</td>
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</tbody>
</table>

**Stainless steel**

<table>
<thead>
<tr>
<th>Power consumption</th>
<th>Rated current</th>
<th>ATEX-Category</th>
<th>Protection class (*7)</th>
<th>Temperature Ambient/ Fluid (°C)</th>
<th>Electrical connection</th>
<th>Weight (kg)</th>
<th>Dimension No.</th>
<th>Circuit diagram</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 V d.c. (W)</td>
<td>120 V a.c. (VA)</td>
<td>24 V d.c. (m A)</td>
<td>120 V a.c. (m A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8,9</td>
<td>—</td>
<td>369</td>
<td>—</td>
<td>IIG2</td>
<td>Ex e mb h 74/46/6b Ex e mb h 74/46/6b Ex e mb h 74/46/6b Ex e mb h 74/46/6b</td>
<td>-49...+50 T4</td>
<td>-49...+50 T6</td>
<td>M20x1,5 *a)</td>
<td>1,2</td>
</tr>
<tr>
<td>10</td>
<td>—</td>
<td>43</td>
<td>IIG2</td>
<td>Ex e mb h 74/46/6b Ex e mb h 74/46/6b Ex e mb h 74/46/6b Ex e mb h 74/46/6b</td>
<td>-49...+50 T4</td>
<td>-49...+50 T6</td>
<td>M20x1,5 *a)</td>
<td>1,2</td>
<td>10</td>
</tr>
</tbody>
</table>

Standard voltages 24 V d.c., 230 V a.c., other voltages on request.

*Design according to VDE 0580, EN 50014/50028. 100% duty cycle.

*1) EG-Type-Examination-Certificate KEMA 02 ATEX 1347 X

*2) EG-Type-Examination-Certificate KEMA 98 ATEX 4402 X, edition no. 3

*3) EG-Type-Examination-Certificate PTB 02 ATEX 2085 X

*4) IEC Ex Certificate of Conformity IEC Ex KEM 09.0068

*5) IEE Type-Examination-Certificate PTB 06 ATEX 2095 X

*6) IEC Ex Certificate of Conformity PTB 07.0039 X

*7) IEC Ex Certificate of Conformity PTB 11.0094 X

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 dmb; if a cable gland with Ex e type of protection is used, the solenoid will have protection class Ex emb.

---

**4/13**

N/en/en 5.4.925.11
24011 standard flow valves

Valves

Position sensor
Supply voltage (Ub): 7.7 ... 9 V DC
Ripple: 15%
Frequency of operating cycles: 1000 Hz
Protection class: IP68
Pressure-resistant: 500 bar
Ambient temperature: -25 ... +70°C
Solenoids

Dimensions shown in mm
Projection/First angle

Circuit diagrams
24010 standard flow valves

Standard flow range (340 l/min)
Direct acting 3/2 valve switches at power failure into starting position (mechanical spring return)

Optional valve position sensor
Suitable for outdoor installation in extreme environmental conditions
Solenoid valves suitable for use in area classification category: 2 and 3 GD / zone 1 & 2 (gas), 21 & 22 (dust)

Coil protection concept: Ex ia (intrinsically safe)
International approvals: IECEx, others on request

Technical features
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

Technical data

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Material</th>
<th>Temperature (°C)</th>
<th>Material seal</th>
<th>Position sensor</th>
<th>Weight (kg)</th>
<th>Test certificate</th>
<th>Dimension No.</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>NBR</td>
<td>-25 ... +60</td>
<td>aluminium</td>
<td>without</td>
<td>0.55</td>
<td>X</td>
<td>1</td>
<td>2401099.2003</td>
</tr>
<tr>
<td>2</td>
<td>NBR</td>
<td>-25 ... +60</td>
<td>stainless steel</td>
<td>without</td>
<td>1.00</td>
<td>X</td>
<td>1</td>
<td>2401099.2003</td>
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<td>2</td>
<td>NBR</td>
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<td>integrated</td>
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<td>integrated</td>
<td>1.07</td>
<td>X</td>
<td>2</td>
<td>2401099.2003</td>
</tr>
</tbody>
</table>

*1) Solenoid to be included in scope of supply; *2) Particulary 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.

Solenoid parameters for use in intrinsically safe circuits

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Switch-on voltage (V)</th>
<th>Holding current (mA)</th>
<th>Holding voltage (V)</th>
<th>Pick-up delay typical *3) (s)</th>
<th>Protection class</th>
<th>Temperature Ambient/Fluid (°C)</th>
<th>Weight (kg)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 ... 28</td>
<td>22</td>
<td>40</td>
<td>approx. 5</td>
<td>0.3 ... 5</td>
<td>II2E Ex ia IIC T6</td>
<td>-40 ... +70</td>
<td>0.85</td>
<td>2003</td>
</tr>
<tr>
<td>22 ... 28</td>
<td>22</td>
<td>40</td>
<td>approx. 5</td>
<td>0.3 ... 5</td>
<td>II2E Ex ia IIC T5</td>
<td>-40 ... +70</td>
<td>0.85</td>
<td>2003</td>
</tr>
<tr>
<td>22 ... 28</td>
<td>22</td>
<td>40</td>
<td>approx. 5</td>
<td>0.3 ... 5</td>
<td>II2D IP66 T95°C</td>
<td>-70</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*3) depending on intrinsical current supply

Operating sequence

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 UI 28 V, Ui 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.

Position sensor
Supply voltage (Ub): 7.7 ... 9 V DC
Ripple: 15%
Frequency of operating cycles: 1000 Hz

Protection class: IP68
Pressure-resistant: 500 bar
Ambient temperature: -25 ... +70°C

Circuit diagram

Dimensions shown in mm
Projection/First angle

Solenoid
Locked with plug and sealing washer
3 mm deep
Position sensor
Cable gland included in scope of supply
High flow range (950 l/min)
Direct acting 3/2 valve switches at power failure into starting position (mechanical spring return)
Optional valve position sensor
Suitable for outdoor installation in extreme environmental conditions
Solenoid valves suitable for use in area classification category: 2 and 3 GD / zone 1 & 2 (gas), 21 & 22 (dust)
Coil protection concepts: Ex e mb, Ex d mb, Ex tb
International approvals: IECEx, others on request

Technical features
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

Port size:
Flanged
Orifice:
8 mm
Operating pressure:
0 ... 10 bar (0 ... 145 psi)

Fluid/Ambient temperature:
-40 ... +60°C (-40 ... +140°F)
-25 ... +60°C (-13 ... +140°F) (SIL approval)
Depending on solenoid system
Air supply must be dry enough to avoid ice formation at temperatures +2°C (+35°F).

Technical data

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Temperature (°C)</th>
<th>Material</th>
<th>Inductive limit sensor</th>
<th>Weight (kg)</th>
<th>Test certificate</th>
<th>Dimension No.</th>
<th>Model *1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-40 ... +60</td>
<td>NBR</td>
<td>aluminium</td>
<td>0,65</td>
<td>X</td>
<td>1</td>
<td>9801595</td>
</tr>
<tr>
<td></td>
<td>-40 ... +60</td>
<td>NBR</td>
<td>stainless steel</td>
<td>1,50</td>
<td>X</td>
<td>1</td>
<td>9801795</td>
</tr>
<tr>
<td></td>
<td>-25 ... +60</td>
<td>NBR</td>
<td>aluminium</td>
<td>0,72</td>
<td>X</td>
<td>2</td>
<td>9801594</td>
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<tr>
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<td>-25 ... +60</td>
<td>NBR</td>
<td>stainless steel</td>
<td>1,57</td>
<td>X</td>
<td>2</td>
<td>9801794</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)
Design according to VDE 0580, EN 50014/50028. 100% duty cycle.

Standard voltages 24 V d.c., 230 V a.c., other voltages on request.

Stainless steel

<table>
<thead>
<tr>
<th>Power consumption</th>
<th>Rated current</th>
<th>ATEX-Category</th>
<th>Protection class [*7]</th>
<th>Temperature Ambient/Fluid (°C)</th>
<th>Electrical connection</th>
<th>Weight (kg)</th>
<th>Dimension No.</th>
<th>Circuit diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>8,9</td>
<td>—</td>
<td>369</td>
<td>II2G</td>
<td>—</td>
<td>M20 x 1,5 *6)</td>
<td>0,5</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>10,0</td>
<td>—</td>
<td>II2G</td>
<td>—</td>
<td>M20 x 1,5 *6)</td>
<td>0,5</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>10,0</td>
<td>43</td>
<td>II2G</td>
<td>—</td>
<td>M20 x 1,5 *6)</td>
<td>0,8</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>8,9</td>
<td>—</td>
<td>369</td>
<td>II2G</td>
<td>—</td>
<td>M20 x 1,5 *6)</td>
<td>0,8</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>10,0</td>
<td>—</td>
<td>II2G</td>
<td>—</td>
<td>M20 x 1,5 *6)</td>
<td>1,2</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>43</td>
<td>II2G</td>
<td>—</td>
<td>M20 x 1,5 *6)</td>
<td>1,2</td>
<td>10</td>
<td>7</td>
</tr>
</tbody>
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Power consumption

<table>
<thead>
<tr>
<th>24 V d.c. (W)</th>
<th>120 V a.c. (VA)</th>
<th>24 V d.c. (m A)</th>
<th>120 V a.c. (m A)</th>
<th>ATEX-Category</th>
<th>Protection class [*7]</th>
<th>Temperature Ambient/Fluid (°C)</th>
<th>Electrical connection</th>
<th>Weight (kg)</th>
<th>Dimension No.</th>
<th>Circuit diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>8,9</td>
<td>—</td>
<td>369</td>
<td>—</td>
<td>II2G</td>
<td>XP/DIP Div. 1 &amp; 2 Cl. I, Gr. A-D Cl. II (Fl), Gr. E-G Cl. III (Fl), Gr. E-G T3 (160°C) *4 NEMA 4, 4X, 6, 6P, 7, 9</td>
<td>-20 ... +60</td>
<td>Flying leads 450 mm long</td>
<td>0,5</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>9,5</td>
<td>—</td>
<td>41</td>
<td>—</td>
<td>XP/DIP Div. 1 &amp; 2 Cl. I, Gr. A-D Cl. II (Fl), Gr. E-G Cl. III (Fl), Gr. E-G T3 (160°C) *4 NEMA 4, 4X, 6, 6P, 7, 9</td>
<td>-20 ... +60</td>
<td>Flying leads 450 mm long</td>
<td>0,5</td>
<td>5</td>
<td>8</td>
<td>3825</td>
</tr>
<tr>
<td>13,6</td>
<td>567</td>
<td>—</td>
<td>—</td>
<td>XP/DIP Div. 1 &amp; 2 Cl. I, Gr. A-D Cl. II (Fl), Gr. E-G Cl. III (Fl), Gr. E-G T3 (160°C) *4 NEMA 4, 4X, 6, 6P, 7, 9</td>
<td>-20 ... +60</td>
<td>Flying leads 450 mm long</td>
<td>0,5</td>
<td>1</td>
<td>8</td>
<td>3826</td>
</tr>
<tr>
<td>15,7</td>
<td>—</td>
<td>68</td>
<td>—</td>
<td>XP/DIP Div. 1 &amp; 2 Cl. I, Gr. A-D Cl. II (Fl), Gr. E-G Cl. III (Fl), Gr. E-G T3 (160°C) *4 NEMA 4, 4X, 6, 6P, 7, 9</td>
<td>-20 ... +60</td>
<td>Flying leads 450 mm long</td>
<td>0,5</td>
<td>5</td>
<td>5</td>
<td>3827</td>
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</table>

Fluid

<table>
<thead>
<tr>
<th>Ambient/Fluid Temperature (°C)</th>
<th>Fluid</th>
<th>Electrical connection</th>
<th>Weight (kg)</th>
<th>Dimension No.</th>
<th>Circuit diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>-20 ... +60 Flying leads 450 mm long</td>
<td>NEMA 4, 4X, 6, 6P, 7, 9</td>
<td>0,5</td>
<td>8</td>
<td>1</td>
<td>3824</td>
</tr>
</tbody>
</table>

Weight

<table>
<thead>
<tr>
<th>No.</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>3824</td>
<td>8</td>
</tr>
</tbody>
</table>

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 dmb; if a cable gland with Ex e type of protection is used, the solenoid will have protection class Ex emb.

Our policy is one of continued research and development. We therefore reserve the right to amend, without notice, the specifications given in this document.

*8) Suitable for outdoor installation
*10) IEC Ex Certificate of Conformity IEC Ex KEM 09.0068
*11) IEC Ex Certificate of Conformity IEC Ex KEM 09.0068
*12) IEC Ex Certificate of Conformity IEC Ex KEM 09.0068
Position sensor

Supply voltage (Ub):
7.7 ... 9 V DC

Ripple:
15%

Frequency of operating cycles:
1000 Hz

Protection class:
IP68

Pressure-resistant:
500 bar

Ambient temperature:
-25 ... +60°C
98015 high flow valves

Solenoids

Dimensions shown in mm
Projection/First angle

Circuit diagrams
Our policy is one of continued research and development. We therefore reserve the right to amend, without notice, the specifications given in this document.

### Exhaust guard (plastic) - standard option

![Exhaust guard (plastic) - standard option 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>G 1/2, 1/2 NPT</td>
<td>12</td>
<td>33,5</td>
<td>29</td>
<td>11</td>
<td>0613423</td>
</tr>
</tbody>
</table>

### Silencer (plastic)

![Silencer (plastic) 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>30,5</td>
<td>15,5</td>
<td>2,9</td>
<td>M/S2</td>
</tr>
<tr>
<td>1/4 NPT</td>
<td>7</td>
<td>30,5</td>
<td>15,5</td>
<td>2,9</td>
<td>C/S2</td>
</tr>
<tr>
<td>G 1/2</td>
<td>12</td>
<td>67</td>
<td>23</td>
<td>11,5</td>
<td>M/S4</td>
</tr>
<tr>
<td>1/2 NPT</td>
<td>12</td>
<td>67</td>
<td>23</td>
<td>11,5</td>
<td>C/S4</td>
</tr>
</tbody>
</table>

### Silencer (brass or stainless steel)

![Silencer (brass or stainless steel) 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>6</td>
<td>17</td>
<td>18</td>
<td>140C2800</td>
</tr>
<tr>
<td>1/4 NPT</td>
<td>35</td>
<td>9</td>
<td>16</td>
<td>18</td>
<td>MS002A</td>
</tr>
<tr>
<td>G 1/4</td>
<td>36</td>
<td>14</td>
<td>23</td>
<td>63</td>
<td>140C2800</td>
</tr>
<tr>
<td>1/4 NPT</td>
<td>36</td>
<td>14</td>
<td>23</td>
<td>63</td>
<td>MS002A</td>
</tr>
<tr>
<td>G 1/2</td>
<td>56</td>
<td>12</td>
<td>27</td>
<td>63</td>
<td>140C4800</td>
</tr>
<tr>
<td>1/2 NPT</td>
<td>48</td>
<td>12</td>
<td>27</td>
<td>63</td>
<td>MS004A</td>
</tr>
<tr>
<td>G 1/2</td>
<td>49</td>
<td>12</td>
<td>24</td>
<td>235</td>
<td>061379 *1)</td>
</tr>
<tr>
<td>1/2 NPT</td>
<td>49</td>
<td>12</td>
<td>24</td>
<td>235</td>
<td>061379 *1)</td>
</tr>
</tbody>
</table>

*1) stainless steel

### Cable gland - solenoid

![Cable gland - solenoid diagram]

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>Ø D</th>
<th>Weight (g)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCB x 1,5</td>
<td>9</td>
<td>34</td>
<td>5 ... 8</td>
<td>22</td>
<td>29</td>
</tr>
<tr>
<td>MCB x 1,5</td>
<td>14</td>
<td>29</td>
<td>10 ... 14</td>
<td>24</td>
<td>29</td>
</tr>
<tr>
<td>1/2-14 NPT</td>
<td>15</td>
<td>38</td>
<td>7 ... 11,9</td>
<td>24</td>
<td>50</td>
</tr>
<tr>
<td>MCB x 1,5</td>
<td>14</td>
<td>39</td>
<td>7 ... 12</td>
<td>24</td>
<td>40</td>
</tr>
<tr>
<td>MCB x 1,5</td>
<td>10</td>
<td>34</td>
<td>10 ... 14</td>
<td>24</td>
<td>35</td>
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</tbody>
</table>
**Connector - valve position sensor**

90°, 4 pin, with cable

<table>
<thead>
<tr>
<th>B</th>
<th>C</th>
<th>ø D</th>
<th>ø D1</th>
<th>ø D2</th>
<th>Cable Material</th>
<th>Cable Length (m)</th>
<th>Weight (g)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12 x 1,5</td>
<td>32,5</td>
<td>15</td>
<td>11</td>
<td>27</td>
<td>PUR</td>
<td>4 x 0,34 mm²</td>
<td>90</td>
<td>0523058</td>
</tr>
<tr>
<td>M12 x 1,5</td>
<td>32,5</td>
<td>15</td>
<td>11</td>
<td>27</td>
<td>PUR</td>
<td>2</td>
<td>180</td>
<td>0523053</td>
</tr>
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</table>

90°, 4 pin, without cable

<table>
<thead>
<tr>
<th>B</th>
<th>C</th>
<th>ø D</th>
<th>ø D1</th>
<th>ø D2</th>
<th>Cable Material</th>
<th>Cable Length (m)</th>
<th>Weight (g)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12 x 1,5</td>
<td>40,5</td>
<td>20</td>
<td>Pg 7</td>
<td>35</td>
<td>PUR</td>
<td>2</td>
<td>200</td>
<td>0523055</td>
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</table>

straight, 4 pin, with cable

<table>
<thead>
<tr>
<th>B</th>
<th>C</th>
<th>ø D</th>
<th>ø D1</th>
<th>ø D2</th>
<th>Cable Material</th>
<th>Cable Length (m)</th>
<th>Weight (g)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12 x 1,5</td>
<td>40</td>
<td>15</td>
<td>11</td>
<td>4 x 0,34 mm²</td>
<td>PUR</td>
<td>2</td>
<td>80</td>
<td>0523057</td>
</tr>
<tr>
<td>M12 x 1,5</td>
<td>40</td>
<td>15</td>
<td>11</td>
<td>4 x 0,34 mm²</td>
<td>PUR</td>
<td>5</td>
<td>200</td>
<td>0523052</td>
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</table>

straight, 4 pin, without cable

<table>
<thead>
<tr>
<th>B</th>
<th>C</th>
<th>ø D</th>
<th>ø D1</th>
<th>ø D2</th>
<th>Cable Material</th>
<th>Cable Length (m)</th>
<th>Weight (g)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12 x 1,5</td>
<td>40,5</td>
<td>20</td>
<td>Pg 7</td>
<td>25</td>
<td>PUR</td>
<td>2</td>
<td>100</td>
<td>0523056</td>
</tr>
</tbody>
</table>

**Bracket**

Model: A165-95

Weight: 0,61 kg

**Warning**

These products are intended for use in industrial compressed air systems only. Do not use these products where pressures and temperatures can exceed those listed under »Technical features«. 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 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 pneumatic 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.