Butterfly Valve

ISORIA 10/16

DN 40 - 1000
PS 10 bar: ISORIA 10
PS 16 bar: ISORIA 16

Type Series Booklet
Legal information/Copyright

Type Series Booklet ISORIA 10/16

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Butterfly Valves
Centred-disc Butterfly Valves

ISORIA 10/16

Main applications
▪ Water extraction
▪ Chemical industry
▪ Cooling circuits
▪ Seawater desalination/reverse osmosis
▪ Flue gas desulphurisation
▪ Food industry / beverage industry
▪ Paper industry / pulp industry
▪ Spray irrigation systems
▪ Deselecting units
▪ General irrigation systems
▪ Washing plants
▪ Paint shops
▪ Shipbuilding
▪ Mixing
▪ Mining
▪ Pipelines and tank farms
▪ Swimming pools
▪ Process engineering
▪ Sugar industry
▪ Pressure boosting
▪ Industrial recirculation systems
▪ Water treatment
▪ Fire-fighting systems

Fluids handled
▪ Condensate
▪ Cleaning agents
▪ Distillate
▪ Wash water
▪ Seawater
▪ Service water
▪ Cooling water
▪ Fire-fighting water
▪ Drinking water
▪ Brackish water
▪ Grey water
▪ River water, lake water and groundwater
▪ Abrasive fluids
▪ Aggressive fluids
▪ Fluids containing mineral oils
▪ Solids-laden fluids
▪ Fluids containing gas
▪ Corrosive fluids
▪ Explosive fluids
▪ Inorganic fluids
▪ Organic fluids
▪ Polymerising/crystallising fluids
▪ Radioactive fluids
▪ Toxic fluids
▪ Volatile fluids
▪ Gas
▪ Oil
▪ Brine
▪ Solvents
▪ Condensate
▪ Cleaning agents
▪ Distillate
## Operating data

### Operating properties

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pressure class</strong></td>
<td></td>
</tr>
<tr>
<td>ISORIA 10</td>
<td>PN 10</td>
</tr>
<tr>
<td>ISORIA 16</td>
<td>PN 16</td>
</tr>
<tr>
<td><strong>Nominal size</strong></td>
<td></td>
</tr>
<tr>
<td>ISORIA 10</td>
<td>DN 40 - 1000</td>
</tr>
<tr>
<td>ISORIA 16</td>
<td>DN 40 - 1000</td>
</tr>
<tr>
<td><strong>Max. permissible pressure [bar]</strong></td>
<td>10</td>
</tr>
<tr>
<td>ISORIA 10</td>
<td>16</td>
</tr>
<tr>
<td>ISORIA 16</td>
<td></td>
</tr>
<tr>
<td><strong>Min. permissible temperature [°C]</strong></td>
<td>≥ -10</td>
</tr>
<tr>
<td>ISORIA 10</td>
<td>≥ -10</td>
</tr>
<tr>
<td>ISORIA 16</td>
<td></td>
</tr>
<tr>
<td><strong>Max. permissible temperature [°C]</strong></td>
<td>≤ +200</td>
</tr>
<tr>
<td>ISORIA 10</td>
<td>≤ +200</td>
</tr>
<tr>
<td>ISORIA 16</td>
<td></td>
</tr>
<tr>
<td><strong>Actuation at ΔP [bar]</strong></td>
<td>10 max.</td>
</tr>
<tr>
<td>ISORIA 10</td>
<td>16 max.</td>
</tr>
<tr>
<td>ISORIA 16</td>
<td></td>
</tr>
<tr>
<td><strong>Vacuum operation down to</strong></td>
<td>0.3 bar absolute</td>
</tr>
<tr>
<td>ISORIA 10</td>
<td></td>
</tr>
<tr>
<td>ISORIA 16</td>
<td></td>
</tr>
<tr>
<td><strong>Max. permissible flow velocity at operating pressure</strong></td>
<td>1.5 to 3 m/s (max.) for water</td>
</tr>
</tbody>
</table>

### Design details

#### Design

- Wafer-type body with flat faces - T1: DN 40 - 1000
- Semi-lug body - T2: DN 40 - 600
- Full-lug body with flat faces - T3: DN 40 - 600
- Full-lug body with raised faces - T4: DN 40 - 600
- Flanged body with flat faces - T5: DN 650 to 1000 (DN 150 to 600 on request)
- Downstream dismantling possible with body types T2, T3, T4 and T5
- Dead-end service with counterflange possible with all body types
- Body with polyurethane coating, thickness 80 µm, colour: RAL 5002, blue
- Valve disc made of nodular cast iron, epoxy-coated, thickness 80 µm, colour: RAL 8012, brown
- Design to EN 593 and ISO 10631
- Top flange to ISO 5211
- Marking in accordance with EN 19
- Absolutely tight shut-off (no leakage visible to the naked eye) in either direction of flow in accordance with EN 12266-1, leakage rate A, and ISO 5208, category A.
- EN, ASME, JIS, AWWA connections possible.
- Face-to-face length to ISO 5752-20 and EN 558-1-20

#### Variants

- Butterfly valve cleaned and packaged, free from paint wetting impairment substances
- S / SR / SP / CR / CM quarter-turn levers
- MR manual gearbox
- Electric quarter-turn actuators
- ACTAIR NG / DYNACTAIR NG pneumatic actuators
- HQ hydraulic actuators
- AMTROBOX for open/closed position signalling
- AMTRONIC position signalling and control air supply
- SMARTRONIC positioner and process controller

### Valve body materials

#### Overview of available materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Material number</th>
<th>Type</th>
<th>DN</th>
<th>KSB code</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN-GJL-250</td>
<td>JL 1040</td>
<td>T1</td>
<td>DN 40-600</td>
<td>3t</td>
</tr>
<tr>
<td>EN-JS1030</td>
<td>JS 1030</td>
<td>T1</td>
<td>DN 650-1000</td>
<td>3g</td>
</tr>
<tr>
<td>ASTM A 536 gr. 60.40.18</td>
<td>JS 1030</td>
<td>T2</td>
<td>DN 650-1000</td>
<td>3g</td>
</tr>
<tr>
<td>ASTM A 216 gr. CCC</td>
<td>JS 1030</td>
<td>T3</td>
<td>DN 650-1000</td>
<td>1</td>
</tr>
<tr>
<td>EN-JS1030</td>
<td>JS 1030</td>
<td>T4</td>
<td>DN 650-1000</td>
<td>3g</td>
</tr>
<tr>
<td>EN-JS1030</td>
<td>JS 1030</td>
<td>T5</td>
<td>DN 650-1000</td>
<td>3g</td>
</tr>
<tr>
<td>EN-JS1030</td>
<td>JS 1030</td>
<td>T5</td>
<td>DN 650-1000</td>
<td>3g</td>
</tr>
</tbody>
</table>

#### Product benefits

- Spherically machined disc with rounded sealing contour
  - ensures durable and permanently tight shut-off
- Splined or keyed connection without play between shaft and valve disc
  - Dry shaft, no contact with fluid handled
- Sealing to atmosphere is ensured,
  - even when the actuator has been removed
Butterfly Valves

Centred-disc Butterfly Valves

- Marking indicates position of valve disc
- Shaft and actuating shaft in anti-blowout design with screw or circlip
  – Shaft and actuating shaft are retained in the body.
- Valve equipped with stainless steel bearing bushes with reinforced PTFE coating
- The elastomer liner provides tight sealing at the flanged line connections, eliminating the need for an extra gasket.
- Valve actuation options
  – Manual
  – Electric
  – Pneumatic
  – Hydraulic

Product information

PED 2014/68/EU Fluids in Groups 1 and 2
The valves satisfy the safety requirements of Annex I of the European Pressure Equipment Directive 2014/68/EU (PED) for fluids in Groups 1 and 2.

EC Machinery Directive 2006/42/EC
Valves with actuators can meet the requirements of the 2006/42/EC Machinery Directive for partly completed machinery.

Product information as per Regulation No. 1907/2006 (REACH)

ATEX-compliant version in accordance with Directive 2014/34/EU

<table>
<thead>
<tr>
<th>Label</th>
<th>Effective in:</th>
<th>Comment</th>
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<tbody>
<tr>
<td>Worldwide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>Approved in accordance with the German drinking water regulation</td>
<td></td>
</tr>
<tr>
<td>Switzerland</td>
<td>Approved in accordance with Swiss drinking water regulation</td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>Approved in accordance with the Belgian drinking water regulation</td>
<td></td>
</tr>
<tr>
<td>United Kingdom</td>
<td>Approved in accordance with the UK drinking water regulation</td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>Approved in accordance with the French drinking water regulation</td>
<td></td>
</tr>
<tr>
<td>FDA</td>
<td>Worldwide</td>
<td>Elastomeric parts meet FDA standards.</td>
</tr>
<tr>
<td>WRAS</td>
<td>Worldwide</td>
<td>Approved for marine applications</td>
</tr>
<tr>
<td>DNV-GL</td>
<td>Worldwide</td>
<td>Approved for marine applications</td>
</tr>
<tr>
<td>ABS</td>
<td>Worldwide</td>
<td>Approved for marine applications</td>
</tr>
<tr>
<td>NF Rob Gaz</td>
<td>France</td>
<td>Approved for gas applications</td>
</tr>
<tr>
<td>DVGW</td>
<td>Germany</td>
<td>Approved for gas applications</td>
</tr>
<tr>
<td></td>
<td>Worldwide</td>
<td>Certificate regarding food contact materials as per European Regulation (EC) No. 1935/2004</td>
</tr>
</tbody>
</table>

Related documents

<table>
<thead>
<tr>
<th>Document</th>
<th>Reference number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating manual</td>
<td>8449.8</td>
</tr>
</tbody>
</table>

Purchase order specifications

1. Type
2. Nominal pressure
3. Nominal size
4. Fluid handled
5. Flow rate / flow velocity
6. Operating temperature
7. Materials (body, valve disc, seat)
8. Line connection, flange facing and flange surface quality
9. Actuator / automation
10. Reference number
**Technical data**

**Permissible pressures for liners**

Table: ISORIA 10

<table>
<thead>
<tr>
<th>DN [inch]</th>
<th>NPS</th>
<th>Max. permissible pressure PS [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>40-500</td>
<td>1½-20</td>
<td>10</td>
</tr>
<tr>
<td>550</td>
<td>22</td>
<td>10</td>
</tr>
<tr>
<td>600</td>
<td>24</td>
<td>10</td>
</tr>
<tr>
<td>650</td>
<td>26</td>
<td>10</td>
</tr>
<tr>
<td>700</td>
<td>28</td>
<td>6</td>
</tr>
<tr>
<td>750</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>800-1000</td>
<td>32-40</td>
<td>10</td>
</tr>
</tbody>
</table>

Table: ISORIA 16

<table>
<thead>
<tr>
<th>DN [inch]</th>
<th>NPS</th>
<th>Max. permissible pressure PS [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>40-600</td>
<td>1½-24</td>
<td>16</td>
</tr>
<tr>
<td>650-1000</td>
<td>26-40</td>
<td>16</td>
</tr>
</tbody>
</table>

**Vacuum resistance**

Table: vacuum resistance data

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>40-300</td>
<td>1½-12</td>
<td>Non-glued (standard)</td>
<td>1,33 . 10^-2 (10^-2torr)</td>
<td>130 °C</td>
<td>80 °C</td>
</tr>
<tr>
<td>350-1000</td>
<td>14-40</td>
<td>Non-glued (standard)</td>
<td>0,3</td>
<td>130 °C</td>
<td>80 °C</td>
</tr>
<tr>
<td>350-1000</td>
<td>14-40</td>
<td>Glued (optional)</td>
<td>1,33 . 10^-2 (10^-2torr)</td>
<td>80 °C</td>
<td>80 °C</td>
</tr>
</tbody>
</table>

**Hydraulic characteristics of butterfly valves**

Table: Kv0 and Cv0 [mm]

<table>
<thead>
<tr>
<th>DN [inch]</th>
<th>NPS</th>
<th>Flow coefficient with valve disc fully open</th>
<th>Zeta</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 1½</td>
<td>53</td>
<td>62</td>
<td>1,46</td>
</tr>
<tr>
<td>50 2</td>
<td>133</td>
<td>154</td>
<td>0,56</td>
</tr>
<tr>
<td>65 2½</td>
<td>240</td>
<td>280</td>
<td>0,49</td>
</tr>
<tr>
<td>80 3</td>
<td>410</td>
<td>475</td>
<td>0,39</td>
</tr>
<tr>
<td>100 4</td>
<td>655</td>
<td>760</td>
<td>0,37</td>
</tr>
<tr>
<td>125 5</td>
<td>900</td>
<td>1044</td>
<td>0,48</td>
</tr>
<tr>
<td>150 6</td>
<td>1800</td>
<td>2090</td>
<td>0,25</td>
</tr>
<tr>
<td>200 8</td>
<td>3550</td>
<td>4120</td>
<td>0,20</td>
</tr>
<tr>
<td>250 10</td>
<td>7350</td>
<td>8453</td>
<td>0,12</td>
</tr>
<tr>
<td>300 12</td>
<td>9100</td>
<td>10465</td>
<td>0,16</td>
</tr>
<tr>
<td>350 14</td>
<td>11200</td>
<td>12880</td>
<td>0,19</td>
</tr>
<tr>
<td>400 16</td>
<td>14800</td>
<td>17020</td>
<td>0,19</td>
</tr>
<tr>
<td>450 18</td>
<td>19700</td>
<td>22655</td>
<td>0,17</td>
</tr>
<tr>
<td>500 20</td>
<td>25000</td>
<td>28750</td>
<td>0,16</td>
</tr>
<tr>
<td>550 22</td>
<td>31700</td>
<td>36455</td>
<td>0,15</td>
</tr>
<tr>
<td>600 24</td>
<td>36400</td>
<td>41860</td>
<td>0,16</td>
</tr>
<tr>
<td>650 26</td>
<td>37700</td>
<td>43730</td>
<td>0,20</td>
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<tr>
<td>700 28</td>
<td>47500</td>
<td>55100</td>
<td>0,17</td>
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<tr>
<td>750 30</td>
<td>51500</td>
<td>59740</td>
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<td>800 32</td>
<td>63500</td>
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<tr>
<td>900 36</td>
<td>84700</td>
<td>98250</td>
<td>0,15</td>
</tr>
<tr>
<td>1000 40</td>
<td>108500</td>
<td>125860</td>
<td>0,14</td>
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</table>
Actuating torques
A safety coefficient has already been included in the actuating torques for actuator selection.

Table: actuating torques [Nm] for ISORIA 10

<table>
<thead>
<tr>
<th>DN</th>
<th>NPS [inch]</th>
<th>Liners XA, XC, XV, K with lubricating fluid</th>
<th>All liners with non-lubricating fluid and ¹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>1½</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>50</td>
<td>2</td>
<td>16</td>
<td>24</td>
</tr>
<tr>
<td>65</td>
<td>2½</td>
<td>24</td>
<td>32</td>
</tr>
<tr>
<td>80</td>
<td>3</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>100</td>
<td>4</td>
<td>48</td>
<td>56</td>
</tr>
<tr>
<td>125</td>
<td>5</td>
<td>64</td>
<td>80</td>
</tr>
<tr>
<td>150</td>
<td>6</td>
<td>104</td>
<td>112</td>
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<td>200</td>
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<td>136</td>
<td>168</td>
</tr>
<tr>
<td>250</td>
<td>10</td>
<td>198</td>
<td>297</td>
</tr>
<tr>
<td>300</td>
<td>12</td>
<td>342</td>
<td>468</td>
</tr>
<tr>
<td>350</td>
<td>14</td>
<td>450</td>
<td>648</td>
</tr>
<tr>
<td>400</td>
<td>16</td>
<td>585</td>
<td>882</td>
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<tr>
<td>450</td>
<td>18</td>
<td>720</td>
<td>1080</td>
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<td>500</td>
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<td>900</td>
<td>1350</td>
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<td>2300</td>
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<td>800</td>
<td>32</td>
<td>2600</td>
<td>4000</td>
</tr>
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<td>900</td>
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</tr>
<tr>
<td>1000</td>
<td>40</td>
<td>4100</td>
<td>6000</td>
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</table>

Table: actuating torques [Nm] for ISORIA 16

<table>
<thead>
<tr>
<th>DN</th>
<th>NPS [inch]</th>
<th>Liners XA, XC, XV, K with lubricating fluid only</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>1½</td>
<td>16</td>
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<tr>
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¹) Other liners (except XA, XC, XV, K) with lubricating fluid
Materials

Sectional drawing

Fig. 1: Sectional drawings of ISORIA 10/16 for DN 40 - 600
1.1) Parts 310.1, 310.2, 310.3 for DN 200 only
Fig. 2: Sectional drawings of ISORIA 10/16 for DN 650 - 1000
<table>
<thead>
<tr>
<th>Part No.</th>
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<td>6i</td>
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2) Shaft spare parts kit
3) Valve disc spare parts kit
4) Liner spare parts kit
5) For ISORIA 10 only
<table>
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<tr>
<th>Part No.</th>
<th>Description</th>
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<td>ASTM A890 Gr. CE3MN, equivalent of NORICLOR</td>
<td>5g[^3]</td>
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<td>Polyethylene</td>
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<td>Steel</td>
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Variants

Electric actuator

ACTAIR NG / DYNACTAIR NG pneumatic actuator

AMTRONIC / SMARTRONIC compressed air supply, positioner

Limit switch box AMTROBOX, AMTROBOX S, AMTROBOX R, AMTROBOX EEx-ed, AMTROBOX EEx-ia

HQ hydraulic actuator

Deck stand

Extension

Chain wheel

Cardan connection
## Dimensions and weights

### Dimensions of ISORIA 10/16

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<th>h1</th>
<th>h2</th>
<th>Top flange to ISO 5211</th>
<th>Shaft end Flat end</th>
<th>Shaft end Square end</th>
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<td>14</td>
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* Flat end s in Ø z or Øs

### Manual override

The selection of actuators given below typically applies to butterfly valves handling lubricating fluids at the maximum flow velocities shown.

For valves handling non-lubricating fluids (gas), a max. flow velocity of 50 m/s applies.

Higher flow velocities and further actuator/valve combinations are possible, depending on the operating conditions and hydraulic characteristics. Please contact us.
Dimensions and weights of ISORIA 10/16 + S / SR lever

Unit comprising ISORIA 10/16 + S / SR lever

S lever: can be locked in end positions
SR lever: can be locked in 9 positions

Actuation via S / SR lever [mm]

<table>
<thead>
<tr>
<th>DN</th>
<th>NPS [inch]</th>
<th>Max. velocity</th>
<th>l2</th>
<th>h2</th>
<th>[kg]</th>
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<td>0,5</td>
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<td>2½</td>
<td>3,0</td>
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<td>191</td>
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<td>3</td>
<td>3,0</td>
<td>180</td>
<td>197</td>
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Dimensions and weights of ISORIA 10/16 + SP lever

Unit comprising ISORIA 10/16 + SP lever

SP lever: can be locked in any position

Actuation via SP lever [mm]

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<tr>
<th>DN</th>
<th>NPS [inch]</th>
<th>Max. velocity</th>
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<th>h2</th>
<th>[kg]</th>
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<td>3,0</td>
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<td>3,0</td>
<td>330</td>
<td>294</td>
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6) The weights given refer to the actuating element.
7) The weights given refer to the actuating element.
Dimensions and weights of ISORIA 10/16 + CR / CM lever

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<th>Max. velocity [m/s]</th>
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<th>d1</th>
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8) The weights given refer to the actuating element.
9) High actuating torque, manual gearbox recommended
## Dimensions and weights of ISORIA 10/16 + MR manual gearbox

![Diagram of ISORIA 10/16 + MR manual gearbox](image-url)

**Unit comprising ISORIA 10/16 + MR manual gearbox**

Actuation via MR manual gearbox for ISORIA 10 (with lubricating fluid, with liners XA, XC, XV and K) [mm]

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<th>Max. velocity [m/s]</th>
<th>Type</th>
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<th>B</th>
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10) The weights given refer to the actuating element.
### Actuation via MR manual gearbox for ISORIA 10 (with lubricating fluid, with liners other than XA, XC, XV and K) and for ISORIA 16 (with lubricating fluid, with liners XA, XC, XV and K) [mm]

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11) The weights given refer to the actuating element.
12) The weights given refer to the actuating element.

### Actuation via MR manual gearbox for ISORIA 10 (with lubricating fluid, with any liner) [mm]

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<th>B</th>
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**Line connections**

The valves can be installed between the following line connections (other line connections on request):
- EN 1092 PN 6 (ISORIA 10 only), 10 and 16
- ASME B16.1 Cl. 125 and B16.5 Cl. 150
- ASME B16.47 Cl. 150 Series A
- MSS SP 44 Cl. 150
- AWWA C207 Cl. B, D and E
- AS 2129 Tables D and E
- BS 10 Tables D and E
- JIS B2220, B2238 and B2239 5K, 10K, 16K and 20K (ISORIA 16 only)

**Wafer-type body - T1**

T1 wafer-type bodies can be installed between all the above-mentioned line connections.

**Semi-lug body (T2) for standards EN 1092, MSS SP44 Class 150, JIS B2220, JIS B2238 and JIS B2239**

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<th>PN 16</th>
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**Semi-lug body (T2) for standards ASME, AWWA, BS10 and AS2129**

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13) ISORIA 10-specific
14) ISORIA 16-specific
### Full-lug body with flat faces (T3) for standards EN 1092, MSS SP44 Class 150, JIS B2220, JIS B2238 and JIS B2239

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### Full-lug body with flat faces (T3) for standards ASME, AWWA, BS10 and AS2129

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### Butterfly Valves

#### Centred-disc Butterfly Valves

Full-lug body with raised faces (T4) for standards EN 1092, MSS SP44 Class 150, JIS B2220, JIS B2238 and JIS B2239

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Full-lug body with raised faces (T4) for standards ASME, AWWA, BS10 and AS2129

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### Flanged body with flat faces (T5) for standards EN 1092, MSS SP44 Class 150, JIS B2220, JIS B2238 and JIS B2239

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Symbols key:
- ✔: Installation possible
- ●: Non-standardised connection
- ▲: Downstream dismantling not possible
- ▼: Installation not possible
- ◆: Flanged installation possible
- ◎: Fit washer between nut and body
- ☎: Contact KSB.

### Flanged body with flat faces (T5) for standards ASME, AWWA, BS10 and AS2129

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Symbols key:
- ✔: Flanged installation possible
- ●: Non-standardised connection
- ▲: Downstream dismantling not possible
- ◆: Installation not possible
- ◎: Fit washer between nut and body
- ☎: Contact KSB.
Installation information

Dead-end service and downstream dismantling

For downstream dismantling, successively loosen diagonally opposed tie rods.
Flange dimensions
The valves can be installed between all commercial mating flanges and line connections without requiring any flange gaskets. The elastomer liner alone provides a tight seal at the flange connections.
The drawings below show a valve of body type T1 installed between flanges. Please verify that the connection meets the requirements given below.
The flange dimensions indicated in the table apply to all body types.

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(15) Verify that body is correctly centred between the tie rods.
Coated flange

N.B.: Direct installation between rubber-coated flanges or with expansion bellows is not permitted. Contact us.

Installation between flanges made of polyethylene
- Installation between flanges with flat faces is permitted.
- Installation between flanges with grooved faces is not permitted.
Bolting and weights

Bolting and weights for wafer-type body - T1

The drawings do not indicate the exact product design (number of tapped lugs/clearance holes).

N.B.: Bolting is not included in our standard scope of supply.

\[ L = l_1 + 2e + 2f \]

\[ A = e + X \]

- \( L \): minimum length of tie rods
- \( l_1 \): face-to-face length of valve
- \( e \): flange thickness (customer-specific)
- \( f \): thickness of nut + standardised overhang of tie rod
- \( A \): max. bolt length
- \( X \): max. thread engagement depth
- \( e \): flange thickness (customer-specific)
- \( B \): min. thread length > A - e
### Dimensions [mm] and weights [kg] for wafer-type body T1 - connections EN 1092-1 PN 10 and 16

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### Dimensions [mm] and weights [kg] for wafer-type body T1 - connections JIS B2220, B2238, B2239 10K and 16K

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16) Quantity of nuts = quantity of tie rods x 2
17) Quantity of bolts x 2
18) Non-standardised connection
## Butterfly Valves

### Centred-disc Butterfly Valves

Dimensions [mm] and weights [kg] for wafer-type body T1 - connections ASME and MSS SP 44 Class 150

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19) For DNs concerned, see connection standards.
Bolting and weights for semi-lug body - T2

The drawings do not indicate the exact product design (number of tapped lugs/clearance holes).

N.B.: Bolting is not included in our standard scope of supply.

Length of tie rod for semi-lug body - T2

\[ L = l_1 + 2e + 2f \]

- \( L \): minimum length of tie rods
- \( l_1 \): face-to-face length of valve
- \( e \): flange thickness (customer-specific)
- \( f \): thickness of nut + standardised overhang of tie rod

Length of bolt at shaft passage for semi-lug body - T2

\[ A = e + X \]

- \( A \): max. bolt length
- \( X \): max. thread engagement depth
- \( e \): flange thickness (customer-specific)
- \( B \): min. thread length > \( A - e \)
### Dimensions [mm] and weights [kg] for semi-lug body T2 - connections EN 1092-1 PN 10 and PN 16

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20) Quantity of nuts = quantity of tie rods x 2
21) Quantity of bolts x 2
22) Non-standardised connection
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23) For DNs concerned, see connection standards.
Bolting and weights for full-lug body with flat faces - T3

The drawings do not indicate the exact product design (number of lugs).

N.B.: Bolting is not included in our standard scope of supply.

\[ A = e + X \]

- \( A \): max. bolt length
- \( X \): max. thread engagement depth
- \( e \): flange thickness (customer-specific)
- \( B \): min. thread length > \( A-e \)
- \( l_1 \): face-to-face length of valve

Length of bolts for full-lug body with flat faces - T3
### Dimensions [mm] and weights [kg] for full-lug body with flat faces T3 - connections EN 1092-1, PN 10 and PN 16

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### Dimensions [mm] and weights [kg] for full-lug body with flat faces T3 - connections JIS B2220, B2238, B2239 10K and 16K

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24) Quantity of nuts = quantity of tie rods x 2
25) Quantity of bolts x 2
26) Non-standardised connection
## Dimensions [mm] and weights [kg] for full-lug body with flat faces T3 - connections ASME and MSS SP 44 Class 150

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<sup>27</sup> For DNs concerned, see connection standards.
Bolting and weights for full-lug body with raised faces - T4

The drawings do not indicate the exact product design (number of lugs).

N.B.: Bolting is not included in our standard scope of supply.

A = e + X

- A: max. bolt length
- X: max. thread engagement depth
- e: flange thickness (customer-specific)
- B: min. thread length > A - e

Length of bolts for full-lug body with raised faces - T4
### Dimensions (mm) and weights (kg) for full-lug body with raised faces T4 - connections EN 1092-1, PN 10 and PN 16

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### Dimensions (mm) and weights (kg) for full-lug body with raised faces T4 - connections JIS B2220, B2238, B2239 10K and 16K

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28) Quantity of nuts = quantity of tie rods x 2
29) Quantity of bolts x 2
30) Installation between flanges EN 1092 PN 6, ASME B16.5 Cl. 150, JIS B2220, B2238 and B2239-5K, BS 10 Tables D and E and AS 2129 Tables D and E
31) Installation between flanges EN 1092 PN 10, PN 16 and JIS B2220, B2238 and B2239 - 10K and 16K
32) Installation between flanges EN 1092 PN 6 and 10, ASME B16.5 Cl. 150, AWWA C 207 B, D and E, BS 10 Tables D and E, AS 2129 Tables D and E and JIS B2220, B2238 and B2239-5K
33) Installation between flanges EN 1092 PN 16 and JIS B2220, B2238 and B2239-10K
34) JIS B2220, B2238 and B2239-10K
35) Non-standardised connection
36) Installation between flanges JIS B2220, B2238 and B2239-10K
### Butterfly Valves

#### Centred-disc Butterfly Valves

8445.5 /04-EN

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#### Dimensions [mm] and weights [kg] for full-lug body with raised faces T4 - connections ASME and MSS SP 44 Class 150

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For DN concerned, see connection standards.

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37) For DN concerned, see connection standards.
Bolting and weights for flanged body with flat faces - T5 DN 150 - 600

The drawings do not indicate the exact product design (number of tapped holes/plain holes)

N.B.: Bolting is not included in our standard scope of supply.

Length of tie rod for flanged body with flat faces - T5

\[ L = l_1 + 2e + 2f \]

- \( L \): minimum length of tie rods
- \( l_1 \): face-to-face length of valve
- \( e \): flange thickness (customer-specific)
- \( f \): thickness of nut + standardised overhang of tie rod

Length of bolt at shaft passage for flanged body with flat faces - T5

\[ A = e + X \]

- \( A \): max. bolt length
- \( X \): max. thread engagement depth
- \( e \): flange thickness (customer-specific)
- \( B \): min. thread length > \( A - e \)
### Dimensions [mm] and weights [kg] for flanged body with flat faces T5 - connections EN 1092-1, PN 10 and PN 16

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### Dimensions [mm] and weights [kg] for flanged body with flat faces T5 - connections JIS B2220, B2238, B2239 10K and 16K

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### Dimensions [mm] and weights [kg] for flanged body with flat faces T5 - connections ASME and MSS SP 44 Class 150

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38) Quantity of nuts = quantity of tie rods x 2
39) Quantity of bolts x 2
40) Non-standardised connection
41) For DNs concerned, see connection standards.
Butterfly Valves

Centred-disc Butterfly Valves

40

ISORIA 10/16

Bolting and weights for flanged body with flat faces - T5 DN 650 - 600

Flanged installation is permitted up to a max. differential pressure of 10 bar

The drawings do not indicate the exact product design (number of tapped holes/clearance holes).

N.B.: Bolting is not included in our standard scope of supply.

Installation between flanges

Length of tie rod for flanged body with flat faces - T5

\[ L = l_1 + 2e + 2f \]

- \( L \): minimum length of tie rods
- \( l_1 \): face-to-face length of valve
- \( e \): flange thickness (customer-specific)
- \( f \): thickness of nut + standardised overhang of tie rod

Length of bolt at shaft passage for flanged body with flat faces - T5

\[ A = e + X \]

- \( A \): max. bolt length
- \( X \): max. thread engagement depth
- \( e \): flange thickness (customer-specific)

Flanged installation

Length of bolts for flanged body with flat faces - T5

Length of bolt at shaft passage for flanged body with flat faces - T5

Information on fasteners available on request
### Dimensions [mm] and weights [kg] for flanged body with flat faces T5 - connections EN 1092-1, PN 10 and PN 16

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### Dimensions [mm] and weights [kg] for flanged body with flat faces T5 - connections JIS B2220, B2238, B2239 10K and 16K

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42) Quantity of nuts = quantity of tie rods x 2 Quantity of nuts = quantity of tie rods x 2
43) Quantity of bolts x 2
44) Installation between flanges EN 1092 PN 6, 10, JIS B2220, B2238 and B2239-5K and 10K
45) Non-standardised connection
46) Installation between flanges EN 1092 PN 16, MSS SP 44 Cl. 150, ASME B16.1 Cl. 125
47) Installation between flanges EN 1092 PN 16, MSS SP 44 Cl. 150, ASME B16.1 Cl. 125, AS 2129 Cl. D and E
Dimensions [mm] and weights [kg] for flanged body with flat faces T5 - connections ASME and MSS SP 44 Class 150

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For DNs concerned, see connection standards.

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\(^{48}\) For DNs concerned, see connection standards.