## CONTENTS

**50Hz**

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**- TECNICAL DATA**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
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<tbody>
<tr>
<td>MOTOR DATA</td>
<td>500</td>
</tr>
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<td>NOISE DATA</td>
<td>500</td>
</tr>
</tbody>
</table>

1. click INDEX to jump CORRESPONDING SECTION
2. click to go back to INDEX
# CENTRIFUGAL PUMPS

## DWO SPECIFICATIONS

### Rev. L

<table>
<thead>
<tr>
<th>PUMP</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Liquid Handled</strong></td>
<td><strong>Type of liquid</strong> Clean water</td>
</tr>
<tr>
<td></td>
<td><strong>Temperature [°C]</strong> min. -5 (Standard and Special mechanical seal) max. +90 max. +110 (Optional mechanical seal)</td>
</tr>
<tr>
<td><strong>Maximum working pressure [MPa]</strong></td>
<td>0.8</td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td><strong>Impeller</strong> Open centrifugal type</td>
</tr>
<tr>
<td></td>
<td><strong>Shaft seal type</strong> Mechanical seal</td>
</tr>
<tr>
<td></td>
<td><strong>Bearing</strong> Sealed ball bearing</td>
</tr>
<tr>
<td><strong>Pipe Connection</strong></td>
<td><strong>Suction</strong> G 2</td>
</tr>
<tr>
<td></td>
<td><strong>Discharge</strong> G 2</td>
</tr>
<tr>
<td></td>
<td><strong>G 2½ (DWO 300-400)</strong></td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td><strong>Casing</strong> AISI 304</td>
</tr>
<tr>
<td></td>
<td><strong>Impeller</strong> AISI 304</td>
</tr>
<tr>
<td></td>
<td><strong>Casing cover</strong> AISI 304</td>
</tr>
<tr>
<td></td>
<td><strong>Shaft seal</strong> Ceramic/Carbon/NBR</td>
</tr>
<tr>
<td></td>
<td><strong>Casing cover</strong> AISI 304</td>
</tr>
<tr>
<td></td>
<td><strong>Shaft</strong> AISI 304 (Wet extension)</td>
</tr>
<tr>
<td></td>
<td><strong>Bracket</strong> Aluminium</td>
</tr>
<tr>
<td><strong>Applicable standard of test</strong></td>
<td>ISO 9906:2012 - Grade 3B</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>MOTOR</th>
<th>Electric - TEFC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td><strong>Efficiency level (Reg. 640/2009)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>No. of Poles</strong> 2</td>
</tr>
<tr>
<td></td>
<td><strong>Rotation speed [min⁻¹]</strong> 2800</td>
</tr>
<tr>
<td></td>
<td><strong>Insulation Class</strong> F</td>
</tr>
<tr>
<td></td>
<td><strong>Protection degree (CEI EN 60034-5)</strong> IP 55</td>
</tr>
<tr>
<td></td>
<td><strong>Power rating [kW]</strong> 1.1 ± 1.5</td>
</tr>
<tr>
<td></td>
<td><strong>Frequency [Hz]</strong> 50</td>
</tr>
<tr>
<td></td>
<td><strong>Voltage [V]</strong> 230 ±10%</td>
</tr>
<tr>
<td></td>
<td><strong>Over load protection</strong> Built in</td>
</tr>
<tr>
<td></td>
<td><strong>Casing material</strong> Aluminium</td>
</tr>
<tr>
<td></td>
<td><strong>Base material/motor support</strong> Aluminium</td>
</tr>
<tr>
<td></td>
<td><strong>Dimensions of cable entry</strong> PG11 - PG13.5 – M20x1.5 (See DIMENSIONS TABLE page 400)</td>
</tr>
</tbody>
</table>
## PERFORMANCE RANGE and SELECTION CHART

### PERFORMANCE RANGE

<table>
<thead>
<tr>
<th>Q (l/min)</th>
<th>0</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>550</th>
<th>750</th>
<th>950</th>
<th>1100</th>
</tr>
</thead>
<tbody>
<tr>
<td>[kW]</td>
<td>0</td>
<td>6</td>
<td>12</td>
<td>18</td>
<td>24</td>
<td>33</td>
<td>42</td>
<td>57</td>
<td>66</td>
</tr>
<tr>
<td>[hp]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>m³/h</td>
<td>0</td>
<td>6</td>
<td>12</td>
<td>18</td>
<td>24</td>
<td>33</td>
<td>42</td>
<td>57</td>
<td>66</td>
</tr>
<tr>
<td>ft</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
<td>100</td>
<td>120</td>
<td>140</td>
<td>160</td>
</tr>
</tbody>
</table>

### SELECTION CHART

<table>
<thead>
<tr>
<th>Pump type</th>
<th>Single Phase</th>
<th>Three Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>DWO 150 M</td>
<td>1,1 kW</td>
<td>1.5 HP</td>
</tr>
<tr>
<td>DWO 150</td>
<td>2.2 kW</td>
<td>3 HP</td>
</tr>
<tr>
<td>DWO 200 M</td>
<td>1.5 kW</td>
<td>2 HP</td>
</tr>
<tr>
<td>DWO 200</td>
<td>2 kW</td>
<td>3 HP</td>
</tr>
<tr>
<td>DWO 300</td>
<td>2.2 kW</td>
<td>2.5 HP</td>
</tr>
<tr>
<td>DWO 400</td>
<td>3 kW</td>
<td>3.5 HP</td>
</tr>
</tbody>
</table>

- H = Total manometric head in meters

---

EBARA Pumps Europe S.p.A.
CURVES SPECIFICATIONS

The specifications below qualify the curves shown on the following pages.

Tolerances according to ISO 9906:2012 - Grade 3B
The curves refer to effective speed of asynchronous motors at 50 Hz, 2 poles.
Measurements were carried out with clean water at 20°C of temperature and with a kinematic viscosity of \( \nu = 1 \text{ mm}^2/\text{s} \ (1 \text{ cSt}) \)
The NPSH curve is an average curve obtained in the same conditions of performance curves.
The continuous curves indicate the recommended working range. The dotted curve is only a guide.
In order to avoid the risk of over-heating, the pumps should not be used at a flow rate below 10% of best efficiency point.

Symbols explanation:

\[
\begin{align*}
Q & = \text{volume flow rate} \\
H & = \text{total head} \\
P_2 & = \text{pump power input (shaft power)} \\
\eta & = \text{pump efficiency} \\
\text{NPSH} & = \text{net positive suction head required by the pump}
\end{align*}
\]
DWO 150 (1.1 kW) - Impeller diameter = 88 mm

Rotation speed = 2800 min\(^{-1}\)
Test standard: ISO 9906:2012 - Grade 3B
DWO 200 (1.5 kW) - Impeller diameter = 103 mm

Rotation speed = 2800 min⁻¹
Test standard: ISO 9906:2012 - Grade 3B
DWO 300 (2.2 kW) - Impeller diameter = 107 mm

Rotation speed ≈ 2800 min⁻¹
Test standard: ISO 9906:2012 - Grade 3B
DWO 400 (3 kW) - Impeller diameter: 118 mm

Rotation speed = 2800 min⁻¹
Test standard: ISO 9906:2012 - Grade 3B
SECTIONAL VIEW

<table>
<thead>
<tr>
<th>N°</th>
<th>PART NAME</th>
<th>MATERIAL</th>
<th>Q.TY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Casing</td>
<td>AISI 304</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Motor bracket</td>
<td>Aluminium</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Casing cover</td>
<td>AISI 304</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Shaft with rotor</td>
<td>AISI 304 (Wet extension)</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Impeller</td>
<td>AISI 304</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Mechanical seal protection</td>
<td>AISI 304</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Motor frame with stator</td>
<td>Aluminium</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Motor cover</td>
<td>Aluminium</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Fan</td>
<td>PP</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Fan cover</td>
<td>Fe P04 Zincate</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>Terminal box</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>Terminal box cover</td>
<td>Aluminium</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>Splash ring</td>
<td>NBR</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>Pump side ball bearing</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>Fan side ball bearing</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>Adjusting ring</td>
<td>Steel C70</td>
<td>1</td>
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<tr>
<td>17</td>
<td>Tie rod</td>
<td>Fe 420 Zincate</td>
<td>4</td>
</tr>
<tr>
<td>18</td>
<td>Capacitor</td>
<td>[1]</td>
<td>1</td>
</tr>
<tr>
<td>19</td>
<td>Priming plug</td>
<td>AISI 303</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>N°</th>
<th>PART NAME</th>
<th>MATERIAL</th>
<th>Q.TY</th>
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<td>AISI 303</td>
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<tr>
<td>21</td>
<td>O-ring</td>
<td>[4] NBR/FPM/EPDM</td>
<td>1</td>
</tr>
<tr>
<td>22</td>
<td>Mechanical seal</td>
<td>AISI 304</td>
<td>1</td>
</tr>
<tr>
<td>23</td>
<td>Key</td>
<td>AISI 316</td>
<td>1</td>
</tr>
<tr>
<td>24</td>
<td>Impeller nut</td>
<td>AISI 304</td>
<td>1</td>
</tr>
<tr>
<td>25</td>
<td>Motor support</td>
<td>Aluminium</td>
<td>1</td>
</tr>
<tr>
<td>26</td>
<td>Spacer</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>27</td>
<td>Terminal box</td>
<td>[1] PP</td>
<td>1</td>
</tr>
<tr>
<td>28</td>
<td>Box gasket</td>
<td>NBR</td>
<td>1</td>
</tr>
<tr>
<td>29</td>
<td>Washer</td>
<td>AISI 304</td>
<td>1</td>
</tr>
<tr>
<td>30</td>
<td>Washer</td>
<td>AISI 304</td>
<td>1</td>
</tr>
<tr>
<td>31</td>
<td>O-ring</td>
<td>[4] NBR/FPM/EPDM</td>
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<tr>
<td>32</td>
<td>Terminal box cover gasket</td>
<td>[1] NBR</td>
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</tr>
<tr>
<td>33</td>
<td>Lip seal</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>34</td>
<td>Lip seal</td>
<td>-</td>
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</tr>
<tr>
<td>35</td>
<td>Protector</td>
<td>[1]</td>
<td>1</td>
</tr>
<tr>
<td>36</td>
<td>Screw</td>
<td>Stainless steel A2 UNI7323</td>
<td>6</td>
</tr>
</tbody>
</table>

[1] Only for Single phase
[2] Only for Three phase
[3] See MECHANICAL SEAL pages 301, 302
[4] FPM for H-HS-HHW-Q1AVGG (see pages 301, 302)
EPDM for AQ1EGG-VAEGG-Q1U3EGG-U3BEGG (see pages 301, 302)
NBR only for Standard version (see pages 301, 302)
### Mechanical Seal

**STANDARD**

<table>
<thead>
<tr>
<th>REF</th>
<th>PART NAME</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Rotary seal ring</td>
<td>Ceramic</td>
</tr>
<tr>
<td>B</td>
<td>Stationary seal ring</td>
<td>Carbon graphite</td>
</tr>
<tr>
<td>C</td>
<td>O-ring</td>
<td>NBR</td>
</tr>
<tr>
<td>D</td>
<td>O-ring</td>
<td>NBR</td>
</tr>
<tr>
<td>E</td>
<td>O-ring</td>
<td>NBR</td>
</tr>
<tr>
<td>F</td>
<td>Self driv spring</td>
<td>AISI 316</td>
</tr>
<tr>
<td>G</td>
<td>Frame</td>
<td>AISI 304</td>
</tr>
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</table>

**OPTIONAL**

- **REF**
- **PART NAME**
- **H**
- **HS**
- **HW**
- **HSW**

<table>
<thead>
<tr>
<th>PART NAME</th>
<th>REF</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotary seal ring</td>
<td>Ceramic</td>
<td>Silicon carbide</td>
</tr>
<tr>
<td>Stationary seal ring</td>
<td>Carbon graphite</td>
<td>Silicon carbide</td>
</tr>
<tr>
<td>O-ring</td>
<td>FPM</td>
<td>FPM</td>
</tr>
<tr>
<td>O-ring</td>
<td>FPM</td>
<td>FPM</td>
</tr>
<tr>
<td>O-ring</td>
<td>FPM</td>
<td>FPM</td>
</tr>
<tr>
<td>Self driv spring</td>
<td>AISI 316</td>
<td>AISI 316</td>
</tr>
<tr>
<td>Frame</td>
<td>AISI 304</td>
<td>AISI 316</td>
</tr>
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</table>

**SPECIAL**

- **REF**
- **PART NAME**
- **Q1AVGG**
- **VAEGG**
- **Q1U3EGG**
- **U3BEGG**

<table>
<thead>
<tr>
<th>PART NAME</th>
<th>REF</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotary seal ring</td>
<td>Silicon carbide</td>
<td>Ceramic</td>
</tr>
<tr>
<td>Stationary seal ring</td>
<td>Metallized carbon</td>
<td>Metallized carbon</td>
</tr>
<tr>
<td>O-ring</td>
<td>FPM</td>
<td>EPDM</td>
</tr>
<tr>
<td>O-ring</td>
<td>FPM</td>
<td>EPDM</td>
</tr>
<tr>
<td>O-ring</td>
<td>FPM</td>
<td>EPDM</td>
</tr>
<tr>
<td>Self driv spring</td>
<td>AISI 316</td>
<td>AISI 316</td>
</tr>
<tr>
<td>Frame</td>
<td>AISI 316</td>
<td>AISI 316</td>
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</table>
**MECHANICAL SEAL**

<table>
<thead>
<tr>
<th>REF</th>
<th>PART NAME</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Rotary seal ring</td>
<td>Metallised carbon</td>
</tr>
<tr>
<td>B</td>
<td>Stationary seal ring</td>
<td>Silicon carbide</td>
</tr>
<tr>
<td>C</td>
<td>O-ring</td>
<td>EPDM</td>
</tr>
<tr>
<td>D</td>
<td>Bellows</td>
<td>EPDM</td>
</tr>
<tr>
<td>E</td>
<td>Frame + spring</td>
<td>AISI 316</td>
</tr>
</tbody>
</table>

**SPECIAL**

<table>
<thead>
<tr>
<th>Pump type</th>
<th>Single Phase</th>
<th>Three Phase</th>
<th>Pump side</th>
<th>Ball Bearing</th>
<th>Fan side</th>
</tr>
</thead>
<tbody>
<tr>
<td>DWO 150 M</td>
<td>DWO 150</td>
<td>6204 2RSH</td>
<td>6204-ZZ C3</td>
<td>6203 2RSH</td>
<td>6203-ZZ C3</td>
</tr>
<tr>
<td>DWO 200 M</td>
<td>DWO 200</td>
<td>6204 2RSH</td>
<td>6204-ZZ C3</td>
<td>6203 2RSH</td>
<td>6203-ZZ C3</td>
</tr>
<tr>
<td>-</td>
<td>DWO 300</td>
<td>6305 2RSH</td>
<td>6305-ZZ C3</td>
<td>6205 2RSH</td>
<td>6205-ZZ C3</td>
</tr>
<tr>
<td>-</td>
<td>DWO 400</td>
<td>6305 2RSH</td>
<td>6305-ZZ C3</td>
<td>6205 2RSH</td>
<td>6205-ZZ C3</td>
</tr>
</tbody>
</table>

(*) Only for IE3 Motors
DIMENSIONS and WEIGHT

PUMP

[1~] Single phase
DWO 150
DWO 200

DWO 150
DWO 200
DWO 300
DWO 400

(*) Only for IE3 Motors

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DWO 150</td>
<td>365</td>
<td>390</td>
<td>197 197 239 239 74 G62.5 PG11 M20x1.5 G 2</td>
<td>14.4</td>
<td>14.5</td>
<td>15.4</td>
<td></td>
</tr>
<tr>
<td>DWO 200</td>
<td>378</td>
<td>390.5</td>
<td>197 197 239 239 74 G62.5 PG11 M20x1.5 G 2</td>
<td>15.7</td>
<td>16.2</td>
<td>17.1</td>
<td></td>
</tr>
<tr>
<td>DWO 300</td>
<td>416</td>
<td>394.5</td>
<td>230/241 197 244 239 78 Ø80 PG13.5 M20x1.5 G 2½</td>
<td>-</td>
<td>19.4</td>
<td>19.4</td>
<td></td>
</tr>
</tbody>
</table>

[1~] Single phase
(*) Only for IE3 Motors
GEOMETRIC TOLERANCES
### CENTRIFUGAL PUMPS

#### DIMENSIONS and WEIGHT

**Packing**

<table>
<thead>
<tr>
<th>Pump type</th>
<th>Weight [kgf]</th>
<th>Single Phase</th>
<th>Three Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>DWO 150 M</td>
<td>15.3</td>
<td>205</td>
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<tr>
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<tr>
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<tr>
<td>DWO 400</td>
<td>23.2</td>
<td>-</td>
<td>280</td>
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</tbody>
</table>

- **[1~]** Single phase
- **[3~]** Three phase
- (*) Only for IE3 Motors
### MOTOR DATA

<table>
<thead>
<tr>
<th>Pump type</th>
<th>Single Phase</th>
<th>Three Phase</th>
<th>Power kW</th>
<th>Efficiency</th>
<th>Capacitor [µF]</th>
<th>Efficiency (% load) 50%</th>
<th>75%</th>
<th>100%</th>
<th>Input [kW]</th>
<th>Full load current [A]</th>
<th>Locked rotor current [A]</th>
</tr>
</thead>
<tbody>
<tr>
<td>DWO 150 M</td>
<td>1.1</td>
<td>1.5</td>
<td>35</td>
<td>450</td>
<td>79.7</td>
<td>82.5</td>
<td>83.0</td>
<td>1.36</td>
<td>1.80</td>
<td>6.8</td>
<td>5.6</td>
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<tr>
<td>- DWO 150</td>
<td>1.1</td>
<td>1.5</td>
<td>-</td>
<td>-</td>
<td>83.5</td>
<td>84.3</td>
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<td>1.77</td>
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<td>40</td>
<td>450</td>
<td>78.6</td>
<td>83.0</td>
<td>84.2</td>
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<td>1.78</td>
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<td>-</td>
<td>-</td>
<td>82.7</td>
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<td>87.0</td>
<td>-</td>
<td>1.72</td>
<td>-</td>
<td>6.6</td>
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<tr>
<td>- DWO 300</td>
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<td>3.0</td>
<td>-</td>
<td>-</td>
<td>83.1</td>
<td>85.7</td>
<td>86.2</td>
<td>-</td>
<td>2.55</td>
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<td>7.8</td>
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<td>- DWO 300</td>
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<td>3.0</td>
<td>-</td>
<td>-</td>
<td>86.2</td>
<td>87.0</td>
<td>86.6</td>
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</tbody>
</table>

* Locked rotor current

### NOISE DATA

<table>
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<tr>
<th>Pump type</th>
<th>Power [kW]</th>
<th>LpA - dB(A) *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Phase</td>
<td>Three Phase</td>
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</tr>
<tr>
<td>DWO 150 M</td>
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<td>DWO 200 M</td>
<td>1.5</td>
<td>2.0</td>
</tr>
<tr>
<td>- DWO 300</td>
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<td>3.0</td>
</tr>
<tr>
<td>- DWO 400</td>
<td>3.0</td>
<td>4.0</td>
</tr>
</tbody>
</table>

* Mean value of several measures at 1m distance around the pump. Tolerance ± 2.5 dB.