Technical Information

Orbital Motors

OMEW Standard and with Low Speed Option
## Revision history

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<table>
<thead>
<tr>
<th>Date</th>
<th>Changed</th>
<th>Rev</th>
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<tr>
<td>October 2014</td>
<td>Changed to Danfoss layout</td>
<td>CA</td>
</tr>
<tr>
<td>September 2010</td>
<td>New back cover</td>
<td>BC</td>
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<tr>
<td>March 2010</td>
<td>Japan location</td>
<td>BB</td>
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<td>January 2009</td>
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Technical Information  
OMEW Standard and with Low Speed Option Orbital Motors

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A wide range of Orbital Motors

Characteristic, features and application areas of Orbital Motors

Danfoss is a world leader within production of low speed orbital motors with high torque. We can offer more than 3,000 different orbital motors, categorised in types, variants and sizes (including different shaft versions).

The motors vary in size (rated displacement) from 8 cm³ [0.50 in³] to 800 cm³ [48.9 in³] per revolution.

Speeds range up to approximate \(2,500 \text{ min}^{-1}\) (rpm) for the smallest type and up to approximate \(600 \text{ min}^{-1}\) (rpm) for the largest type.

Maximum operating torques vary from 13 N•m [115 lbf•in] to 2,700 N•m [24,000 lbf•in] (peak) and maximum outputs are from 2.0 kW [2.7 hp] to 70 kW [95 hp].

Characteristic features of Danfoss Orbital Motors

- Smooth running over the entire speed range
- Constant operating torque over a wide speed range
- High starting torque
- High return pressure without the use of drain line (High pressure shaft seal)
- High efficiency
- Long life under extreme operating conditions
- Robust and compact design
- High radial and axial bearing capacity
- For applications in both open and closed loop hydraulic systems
- Suitable for a wide variety of hydraulics fluids

Technical features of Danfoss Orbital Motor

The programme is characterised by technical features appealing to a large number of applications and a part of the programme is characterised by motors that can be adapted to a given application. Adaptions comprise the following variants among others:
A wide range of Orbital Motors

- Motors with corrosion resistant parts
- Wheel motors with recessed mounting flange
- OMP, OMR- motors with needle bearing
- OMR motor in low leakage version
- OMR motors in a super low leakage version
- Short motors without bearings
- Ultra short motors
- Motors with integrated positive holding brake
- Motors with integrated negative holding brake
- Motors with integrated flushing valve
- Motors with speed sensor
- Motors with tacho connection
- All motors are available with black finish paint

Survey of literature with technical data on Danfoss Orbital Motors

Detailed data on all Danfoss Orbital Motors can be found in our motor catalogue, which is divided into more individual subcatalogues:

- General information on Danfoss Orbital Motors: function, use, selection of orbital motor, hydraulic systems, etc.
- Technical data on small motors: OML and OMM
- Technical data on medium sized motors: OMP, OMR, OMH
- Technical data on medium sized motors: DH and DS
- Technical data on medium sized motors: OMEW
- Technical data on medium sized motors: VMP
- Technical data on medium sized motors: VMR
- Technical data on large motors: OMS, OMT and OMV
- Technical data on large motors: TMT
- Technical data on large motors: TMV

A general survey brochure on Danfoss Orbital Motors gives a quick motor reference based on power, torque, speed and capabilities.
Danfoss is offering the OMEW motor in two different versions. Both versions are designed mainly for propel applications, but they are optimize for different conditions.

A. OMEW standard version.

The advantage by this motor lies in the high speed area. When the flow exceeds 40 l/min this motor is to prefer due to a lower pressure drop.

B. OMEW with low speed option.

The advantage by this motor lies in the Low speed area. This motor has higher efficiency at low speed / medium pressure. When the flow is below 40 l/min this motor is to prefer.

This motor also has the Brake nose which makes it possible to add a drum brake to the motor.

Although the OMEW transmission motor was mainly designed for vehicles such as
- Walk-behind mowers
- Ride on mowers
- Scissor lifts
- Sweepers
- Road rollers

It is also suitable for a wide range of other applications that require a motor that is both compact and gives high efficiency.

Characteristic features that distinguish the OMEW motor are
- Compact design
- Low weight
- High total efficiency
- High starting torque
- Smooth low speed performance
- Larger bearing capacity
- High pressure shaft seal
- No drain line
Versions

<table>
<thead>
<tr>
<th></th>
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<td>Tapered 1 1/4 in 7/8 - 14 UNF</td>
<td>3.25 in</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Yes</td>
<td>OMEW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7/8 - 14 UNF</td>
<td>3.25 in</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Yes</td>
<td>OMEW</td>
<td></td>
<td></td>
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<td></td>
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<td>82.5 mm</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>No</td>
<td>OMEW</td>
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<tr>
<td></td>
<td>G 1/2</td>
<td>82.5 mm</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>No</td>
<td>OMEW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheel, Low Speed</td>
<td>Tapered 1 1/4 in 7/8 - 14 UNF</td>
<td>3.50 in</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Yes</td>
<td>OMEW</td>
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<tr>
<td></td>
<td>7/8 - 14 UNF</td>
<td>3.50 in</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Yes</td>
<td>OMEW</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Direction of rotation

In applications that mainly involves operation in one direction, we recommend a corresponding motor with either CW- or CCW-rotation.

**High pressure seals**

Since all OMEW motors are fitted with a high-pressure shaft seal, there is no need for a drain line.
## Code numbers

### OMEW code numbers

<table>
<thead>
<tr>
<th>Code Numbers</th>
<th>Displacement</th>
<th>100</th>
<th>125</th>
<th>160</th>
<th>200</th>
<th>250</th>
<th>315</th>
<th>345</th>
<th>400</th>
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<td></td>
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<td>151H</td>
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<td>3086</td>
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<td>151H</td>
<td>3090</td>
<td>3091</td>
<td>3092</td>
<td>3093</td>
<td>3094</td>
<td>3095</td>
<td>3096</td>
<td>3097</td>
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</tr>
</tbody>
</table>

### Ordering

Add the four digit prefix “151H” to the four digit numbers from the chart for complete code number.

Example:

151H3084 for an OMEW 250 with 1 1/4 in tapered shaft, port size 7/8 - 14 UNF and clockwise rotation (CW).

Orders will not be accepted without the four digit prefix.
Technical data

Technical data for OMEW

Technical Data for OMEW with 35 mm and 1 1/4 in Tapered Shaft

<table>
<thead>
<tr>
<th>Type</th>
<th>OMEW</th>
<th>OMEW</th>
<th>OMEW</th>
<th>OMEW</th>
<th>OMEW</th>
<th>OMEW</th>
<th>OMEW</th>
<th>OMEW</th>
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<tbody>
<tr>
<td>Motor Size</td>
<td>100</td>
<td>125</td>
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<td>200</td>
<td>250</td>
<td>315</td>
<td>345</td>
<td>400</td>
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<tr>
<td>Max speed min⁻¹ [rpm]</td>
<td>cont.</td>
<td>600</td>
<td>475</td>
<td>375</td>
<td>300</td>
<td>240</td>
<td>190</td>
<td>175</td>
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<tr>
<td></td>
<td>int.¹)</td>
<td>750</td>
<td>695</td>
<td>470</td>
<td>375</td>
<td>300</td>
<td>240</td>
<td>220</td>
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<td>Max starting pressure with unloaded shaft bar [psi]</td>
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<td>10 [145]</td>
<td>7 [100]</td>
<td>7 [100]</td>
<td>7 [100]</td>
<td>7 [100]</td>
<td>7 [100]</td>
<td>7 [100]</td>
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</table>

¹) Intermittent operation: the permissible values may occur for max. 10% of every minute.

Technical Information
OMEW Standard and with Low Speed Option Orbital Motors

Type

Technical data for OMEW with 35 mm and 1 1/4 in Tapered Shaft

<table>
<thead>
<tr>
<th>Type</th>
<th>Max Inlet Pressure</th>
<th>Max Return Pressure</th>
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<tbody>
<tr>
<td>OMEW 100 - 400</td>
<td>bar [psi]</td>
<td>200 [2900]</td>
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<td></td>
<td>cont.</td>
<td>200</td>
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<tr>
<td></td>
<td></td>
<td>10 [145]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 [100]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>bar [psi]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>210 [3045]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>int.¹)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>225 [3260]</td>
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</tbody>
</table>

¹) Intermittent operation: the permissible values may occur for max. 10% of every minute.

²) Peak load: the permissible values may occur for max. 1% of every minute.
Technical data

Maximum permissible shaft seal pressure

OMEW with high pressure shaft seal

**CW version (clockwise rotation)**
1. By clockwise rotation: The shaft seal pressure equals the return pressure.
2. By counter clockwise rotation: The shaft seal pressure equals the input pressure

**CCW version (counter clockwise rotation)**
1. By counter clockwise rotation: The shaft seal pressure equals the return pressure.
2. By clockwise rotation: The shaft seal pressure equals the input pressure

---

**Max permissible shaft seal pressure**

---

Pressure drop in motor

**Standard**
A: OMEW 100 - 400

**Low Speed**
A: OMEW 100 - 160
B: OMEW 200 - 400
The curve applies to an unloaded motor shaft and an oil viscosity of 35 mm²/s [165 SUS]

Direction of shaft rotation

CW - motor / CCW - motor

Permissible shaft loads for OMEW

As the OMEW output shaft is embedded in needle bearings and the mounting flange is recessed it is possible to fit a wheel hub direct onto the shaft so that the radial load acts midway between the needle bearings.

Based upon the requested max. speed and the point of action of the radial load the permissible shaft load can be read from the curve shown below.

Curve A shows the max. radial load. If the radial load exceeds these values there is a potential risk of breakdown.

The other curves apply to a B10 bearing life of 2000 hours at the indicated speed when applying a hydraulic mineral oil with an adequate content of anti-wear additives.

The lifetime can also be calculated by means of the “Bearing dimensions” instructions in the technical information »General« 520L0232.
Technical data

A: Max. radial load
B: \( n = 50 \text{ min}^{-1} \) (rpm)
C: \( n = 100 \text{ min}^{-1} \) (rpm)
D: \( n = 200 \text{ min}^{-1} \) (rpm)
E: \( n = 400 \text{ min}^{-1} \) (rpm)
F: Front flange
G: Direction toward shaft
Shaft version

OMEW shaft version

Tapered shaft 35 mm

I: Tapered shaft 35 mm
N: DIN 937, NV 41; Tightening torque: 200 ± 10 N-m [1770 ± 85 lbf-in]
M: Taper 1:10
P: Parallel key B6 • 6 • 20, DIN 6885

Tapered shaft 1 1/4 in

B: Cone 1:8, SAE J501
C: 1 - 20 UNEF, Across flats 1 7/16; Tightening torque: 400 ± 10 N-m [3540 ± 85 lbf-in]
D: Woodruff key 5/16 × 1, SAE J502 1a

OMEW port thread version

A: G main ports
G: ISO 228/1-G1/2
Shaft version

B: UNF main ports
H: 7/8-14 UNF O-ring boss port
Dimensions

OMEW dimensions

European version

D: G 1/2, 15 mm [0.59] deep

<table>
<thead>
<tr>
<th>Type</th>
<th>L_{max}</th>
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<td>[in]</td>
<td>[kg]</td>
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<td>112.0</td>
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<td>115.4</td>
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<td>17.4</td>
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<td>119.8</td>
<td>4.72</td>
<td>21.8</td>
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<td>OMEW 200</td>
<td>125.8</td>
<td>4.95</td>
<td>27.8</td>
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<td>OMEW 250</td>
<td>132.8</td>
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<td>34.8</td>
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<td>OMEW 315</td>
<td>137.4</td>
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Dimensions

D:
7/8 - 14 UNF, 16.7 [0.66] deep

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Not painted

The stated dimension is with paint

OMEW European version

<table>
<thead>
<tr>
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<th>$L_1$</th>
<th>Weight</th>
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<tr>
<td></td>
<td>mm</td>
<td>mm [in]</td>
<td>kg [lb]</td>
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<tr>
<td>OMEW 100</td>
<td>112.0 [4.41]</td>
<td>14.0 [0.55]</td>
<td>9.3 [20.5]</td>
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<tr>
<td>OMEW 125</td>
<td>115.4 [4.54]</td>
<td>17.4 [0.69]</td>
<td>9.5 [20.9]</td>
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<td>OMEW 160</td>
<td>119.8 [4.72]</td>
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<td>9.8 [21.6]</td>
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<td>125.8 [4.95]</td>
<td>27.8 [1.09]</td>
<td>10.3 [22.7]</td>
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<tr>
<td>OMEW 250</td>
<td>132.8 [5.23]</td>
<td>34.8 [1.37]</td>
<td>10.8 [23.8]</td>
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<tr>
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<td>141.5 [5.57]</td>
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<td>11.3 [24.9]</td>
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<td>145.9 [5.74]</td>
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<td>152.8 [6.02]</td>
<td>54.9 [2.16]</td>
<td>12.0 [26.5]</td>
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Dimensions

**US version**

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<tr>
<td></td>
<td>mm</td>
<td>[in]</td>
<td>mm</td>
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<tr>
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<td>OMEW 125</td>
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<td>[5.50]</td>
<td>43.5</td>
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<td>OMEW 345</td>
<td>144.0</td>
<td>[5.67]</td>
<td>47.9</td>
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<td>150.9</td>
<td>[5.94]</td>
<td>54.8</td>
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</table>

D: 7/8 - 14 UNF, 16.7 [0.66] deep

E: Thread for external brake 4 x 5/16-18 UNC, min 20 [0.79] deep

--- Not painted

The stated dimension is with paint
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