Technical Information

Orbital Motor

TMK, TMKW and TMK FL
## Technical Information

### TMK, TMKW and TMK FL Orbital Motors

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## Revision History

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<th>Date</th>
<th>Changed</th>
<th>Rev</th>
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</thead>
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<tr>
<td>Feb 2014</td>
<td>Converted to Danoss layout - DITA CMS</td>
<td>FA</td>
</tr>
<tr>
<td>Apr 2006</td>
<td></td>
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# Technical Information

**TMK, TMKW and TMK FL 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 3000 different orbital motors, categorised in types, variants and sizes (incl. 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 approx. 2500 min⁻¹ (rpm) for the smallest type and up to approx. 600 min⁻¹ (rpm) for the largest type.

Maximum operating torques vary from 13 N·m [115 lbf·in] to 2700 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

The Danfoss Orbital Motors are used in the following application areas:

- Construction equipment
- Agricultural equipment
- Material handling & Lifting equipment
- Forestry equipment
- Lawn and turf equipment
- Special purpose
- Machine tools and stationary equipment
- Marine equipment

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: OM EW
- Technical data on medium sized motors: VMP
- Technical data on medium sized motors: VMR
- Technical data on large motors: OMS, OMT and OM V
- 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.
Data survey

Speed and torque

Max. speed / Max. torque

The bar diagrams above are useful for a quick selection of relevant motor size for the application. The final motor size can be determined by using the function diagram for each motor size.

- TMK can be found under Function diagrams.

The function diagrams are based on actual tests on a representative number of motors from our production. The diagrams apply to a return pressure between 5 and 10 bar [75 and 150 psi] when using mineral based hydraulic oil with a viscosity of 35 mm²/s [165 SUS] and a temperature of 50°C [120°F]. For further explanation concerning how to read and use the function diagrams, please consult the paragraph “Selection of motor size” in the technical information “General” DHMH.PK.100.G2.02 520L0232.
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TMK, TMKW and TMK FL Orbital Motors

Versions

Version

Orbit motors US-versions, standard shaft seals, drain connections and painted black

<table>
<thead>
<tr>
<th>Mount. flange</th>
<th>Spigot diameter front/rear end</th>
<th>Bolt circle diameter (BC)</th>
<th>Shaft</th>
<th>Port size</th>
<th>Side port version</th>
<th>End port version</th>
<th>Check valve</th>
<th>Main type design</th>
<th>Config.- code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magneto</td>
<td>Ø 3.25 in</td>
<td>Ø 4.187 in</td>
<td>Cyl. 1.25 in</td>
<td>1 1/16-12 UN</td>
<td>x</td>
<td>x</td>
<td>TMK</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Spl. 1.25 in</td>
<td>1 1/16-12 UN</td>
<td>x</td>
<td></td>
<td>TMK</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tap. 1.25 in</td>
<td>1 1/16-12 UN</td>
<td>x</td>
<td></td>
<td>TMK</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>SAE-C</td>
<td>Ø 5 in</td>
<td>Ø 6.375 in</td>
<td>Cyl. 1.25 in</td>
<td>1 1/16-12 UN</td>
<td>x</td>
<td>x</td>
<td>TMK</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tap. 1.5 in</td>
<td>1 1/16-12 UN</td>
<td>x</td>
<td></td>
<td>TMK</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tap. 1.625 in</td>
<td>1 1/16-12 UN</td>
<td>x</td>
<td></td>
<td>TMK</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Wheel</td>
<td>Ø 4.25 in Ø 5 in (rear)</td>
<td>Ø 5.8 in</td>
<td>Tap. 1.5 in</td>
<td>1 1/16-12 UN</td>
<td>x</td>
<td></td>
<td>TMKW</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7/8-14 UNF</td>
<td>x</td>
<td></td>
<td>TMKW</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Brake std.</td>
<td>Ø 5.5 in (only rear)</td>
<td>Ø 6.375 in</td>
<td>Tap. 1.5 in</td>
<td>1 1/16-12 UN</td>
<td>x</td>
<td></td>
<td>TMK-FL</td>
<td>11</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7/8-14 UNF</td>
<td>x</td>
<td></td>
<td>TMK-FL</td>
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Configuration code and code numbers

<table>
<thead>
<tr>
<th>Config.- code</th>
<th>Code number - displacement (cm³)</th>
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<tr>
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<td>160</td>
</tr>
<tr>
<td>1</td>
<td>151F6060</td>
</tr>
<tr>
<td>2</td>
<td>151F6050</td>
</tr>
<tr>
<td>3</td>
<td>151F6070</td>
</tr>
<tr>
<td>4</td>
<td>151F6130</td>
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<td>151F6140</td>
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<td>151F6090</td>
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<td>11</td>
<td>11008903</td>
</tr>
<tr>
<td>12</td>
<td>11008909</td>
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Features available (options)

Shaft options:
- Splined 1.5 in shaft
- Cyl. 40 mm shaft (not brake version)

Port option:
- Side port G 3/4
- End port G 1/2

Check valves
- Flushing valves with different flushing flow

Motors are painted black
### Technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>TMK TMK</th>
<th>TMK TMK</th>
<th>TMK TMK</th>
<th>TMK TMK</th>
<th>TMK TMK</th>
<th>TMK TMK</th>
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<tbody>
<tr>
<td>Motor size</td>
<td>160</td>
<td>200</td>
<td>250</td>
<td>315</td>
<td>400</td>
<td>470</td>
</tr>
<tr>
<td>Geometric displacement cm³</td>
<td>158.0</td>
<td>201.5</td>
<td>252.2</td>
<td>315.3</td>
<td>397.2</td>
<td>471.1</td>
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<td></td>
<td>[9.64]</td>
<td>[12.30]</td>
<td>[15.39]</td>
<td>[19.23]</td>
<td>[24.24]</td>
<td>[28.75]</td>
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<tr>
<td>Max. speed min⁻¹ [rpm]</td>
<td>cont.</td>
<td>505</td>
<td>400</td>
<td>320</td>
<td>255</td>
<td>200</td>
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<tr>
<td></td>
<td>int.¹</td>
<td>630</td>
<td>500</td>
<td>400</td>
<td>315</td>
<td>250</td>
</tr>
<tr>
<td>Max. output kW [hp]</td>
<td>cont.</td>
<td>22.0 [29.5]</td>
<td>22.0 [29.5]</td>
<td>21.0 [28]</td>
<td>20.0 [27]</td>
<td>17.5 [23.5]</td>
</tr>
<tr>
<td></td>
<td>int.¹</td>
<td>27.0 [36]</td>
<td>27.0 [36]</td>
<td>25.0 [33.5]</td>
<td>23.5 [31.5]</td>
<td>22.0 [29.5]</td>
</tr>
<tr>
<td>Max. starting pressure with unloaded shaft bar [psi]</td>
<td>8 [100]</td>
<td>8 [100]</td>
<td>7 [100]</td>
<td>7 [100]</td>
<td>7 [100]</td>
<td>7 [100]</td>
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</table>

### Technical Information

<table>
<thead>
<tr>
<th>Type</th>
<th>Max. inlet pressure</th>
<th>Max. return pressure with drain line</th>
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<tr>
<td>TMK 160 - 470 bar [psi]</td>
<td>cont. 250 [3625]</td>
<td>cont. 140 [2030]</td>
</tr>
<tr>
<td>max. 350 [5075] int.¹</td>
<td>175 [2540]</td>
<td></td>
</tr>
<tr>
<td>- - peak ²</td>
<td>210 [3045]</td>
<td></td>
</tr>
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### Notes

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.

For max. permissible combination of flow and pressure, see function diagram for actual motor.
Technical data for parking brake motor TMK FL

<table>
<thead>
<tr>
<th>Technical data for brake motor TMK FL</th>
<th></th>
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<tbody>
<tr>
<td>Holding torque 1)</td>
<td>Nm [lbf•in]</td>
<td>1050 [9295]</td>
</tr>
<tr>
<td>Min. release pressure 2)</td>
<td>bar [psi]</td>
<td>15 [215]</td>
</tr>
<tr>
<td>Max. pressure in drain/brake line</td>
<td>bar [psi]</td>
<td>30 [435]</td>
</tr>
</tbody>
</table>

1) This brake is to be used only as a passive parking brake. It may not be used for dynamic braking. When release pressure 2) is greater than zero, the holding torque depends inversely proportional on the actual release pressure.

At 0 bar - holding torque = 1050 Nm [9295 lbf•in]
At 15 bar [215 psi] or more - holding torque = 0 Nm

2) The release pressure is the difference between the pressure in the drain/brake release line and the pressure in the vent line. The vent port must always be connected to tank.

The brake will be fully released at 15 bar [215 psi].
The drain/release port on the TMK FL motor must never remain plugged or be connected to the system A or B pressures, since the brake is a low pressure device. A common solution for controlling the brake is to use a two position valve to connect the drain port to hydrostatic charge pressure (brake released), or to reservoir pressure (brake holding).

The vent port must always be connected to tank.

See the above schematic for details.
Shaft seal

Max. permissible shaft seal pressure

**TMK, TMKW and TMK FL with use of drain connection**

The shaft seal pressure equals the pressure in the drain line.

**TMK with check valves and without use of drain connection**

The pressure on the shaft seal never exceeds the pressure in the return line.

**TMKW / TMK FL without check valves and without use of drain connection**

The shaft seal pressure equals the average of input pressure and return pressure.

TMK FL must always have a drain line.

**Max. pressure on shaft seal**
Pressure drop in motor

The curve applies to an unloaded motor shaft and an oil viscosity of 35 mm$^2$/s [165 SUS]
Oil flow

Oil flow in drain line

The table below shows the max. oil flow in the drain line at a return pressure less than 5-10 bar [75-150 psi].

<table>
<thead>
<tr>
<th>Pressure drop bar [psi]</th>
<th>Viscosity mm²/s [SUS]</th>
<th>Oil flow in drain line l/min [US gal/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>160 [2320]</td>
<td>20 [100]</td>
<td>1.7 [0.45]</td>
</tr>
<tr>
<td></td>
<td>35 [165]</td>
<td>1.2 [0.32]</td>
</tr>
<tr>
<td>325 [4713]</td>
<td>20 [100]</td>
<td>3.5 [0.92]</td>
</tr>
<tr>
<td></td>
<td>35 [165]</td>
<td>2.5 [0.66]</td>
</tr>
</tbody>
</table>

Direction of shaft rotation
Shaft load

Permissible shaft load for TMKW

Mounting flange: Magneto, SAE-C

Mounting flange: Wheel

Permissible radial shaft load

The output shaft runs in tapered roller bearings that permit high axial and radial forces.

The permissible radial load on the shaft is shown for an axial load of 0 N as a function of the distance from the mounting flange to the point of load application.

The curve is based on $B_{10}$ Bearing life (2000 hours or 12 000 000 shaft revolutions at 100 min$^{-1}$) at rated output torque, when mineral-based hydraulic oil with a sufficient content of anti-wear additives, is used.
Shaft load

Permissible radial shaft load

The output shaft runs in tapered roller bearings that permit high axial and radial forces.

The permissible radial load on the shaft is shown for an axial load of 0 N as a function of the distance from the mounting flange to the point of load application.

The curve is based on $B_{10}$ Bearing life (2000 hours or 12 000 000 shaft revolutions at 100 min$^{-1}$) at rated output torque, when mineral-based hydraulic oil with a sufficient content of anti-wear additives, is used.
Function diagrams

Explanation of function diagram use, basis and conditions can be found under Speed and torque on page 7 Speed and torque

[blue] Continuous range

[pink] Intermittent range (max. 10% operation every minute)

Intermittent pressure drop and oil flow must not occur simultaneously.

**TMK 160 function diagram**

![TMK 160 function diagram](image)
Function diagrams

**TMK 200 function diagram**

**TMK 250 function diagram**
Function diagrams

**TMK 315 function diagram**

**TMK 400 function diagram**
Function diagrams

**TMK 470 function diagram**

![Diagram of TMK 470 function](image_url)
Shaft Versions

**A:** Cylindrical shaft 1.25 in
F: Parallel key
5/16 x 5/16 x 1 1/4 in
SAE J744

**B:** Involute splined shaft
ANS B92.1 - 1970 standard
Flat root side fit
Pitch 12/24
Teeth 14
Major diameter: 1.25 in
Pressure angle 30°

**C:** Tapered shaft 1.25 in
G: Cone 1 : 8
SAE J501
H: 1 - 20 UNEF
Across flats: 1 7/16 in
Tightening torque:
450 ± 10 Nm [3980 ± 85 lbf•in]
I: Parallel key
5/16 x 5/16 x 3/4 in
SAE J501
Shaft

**D:** Tapered shaft 1.5 in  
**J:** Cone 1:8  
SAE J501  
**K:** 1-20 UNEF  
Across flats: 1 7/16 in  
Tightening torque: 450 ± 10 Nm [3980 ± 85 lbf-in]  
**L:** Parallel key 3/8 x 3/8 x 1 in  
B.S. 46

**E:** Tapered shaft 1.625 in  
**M:** Cone 1:8  
SAE J501  
**N:** 1 1/4-18 UNEF  
Across flats: 2 3/16 in  
Tightening torque: 500 ± 10 Nm [4425 ± 85 lbf-in]  
**O:** Parallel key  
7/16 x 7/16 x 1 1/4 in  
B.S. 46
Port

Port thread versions

A: UNF Main port
D: 7/8 - 14 UNF o-ring boss port

B: UN Main port
E: 1 1/16 – 12 UN o-ring boss port

C: UNF Drain/release port
F: 7/16 - 20 UNF o-ring boss port
Dimensions, US version, TMK with Magneto flange

**TMK with Magneto flange**

C: Drain connection 7/16 - 20 UNF

D: 2 x 1 1/16 - 12 UN

----Not Painted
**Technical Information**
**TMK, TMKW and TMK FL Orbital Motors**

Dimensions, US version, TMK with Magneto flange

**Dimensions**

<table>
<thead>
<tr>
<th>Type</th>
<th>$L_1$ mm [in]</th>
<th>$L_2$ mm [in]</th>
<th>$L_3$ mm [in]</th>
<th>$L_4$ mm [in]</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMK 160</td>
<td>204.6 [8.06]</td>
<td>179.6 [7.07]</td>
<td>160.8 [6.33]</td>
<td>151.4 [5.96]</td>
</tr>
<tr>
<td>TMK 250</td>
<td>217.6 [8.57]</td>
<td>192.6 [7.58]</td>
<td>176.8 [6.84]</td>
<td>164.4 [6.47]</td>
</tr>
<tr>
<td>TMK 470</td>
<td>247.8 [9.76]</td>
<td>222.8 [8.77]</td>
<td>204.0 [8.03]</td>
<td>194.6 [7.66]</td>
</tr>
</tbody>
</table>

**Output shaft**

<table>
<thead>
<tr>
<th>Output shaft</th>
<th>$L_5$ mm [in]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyl. 1.25 in</td>
<td>58.8 [2.31]</td>
</tr>
<tr>
<td>Spl. 1.25 in</td>
<td>56.0 [2.20]</td>
</tr>
<tr>
<td>Tap. 1.25 in</td>
<td>62.0 [2.44]</td>
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</table>

The stated dimensions are without paint.
Dimensions, US version, TMK with SAE-C flange

**TMK with SAE-C flange**

C: Drain connection 7/16 - 20 UNF
D: 2 x 1 1/16 - 12 UN
-------Not Painted

**Dimensions**

<table>
<thead>
<tr>
<th>Type</th>
<th>L_1 [mm]</th>
<th>L_2 [mm]</th>
<th>L_3 [mm]</th>
<th>L_4 [mm]</th>
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<tbody>
<tr>
<td>TMK 160</td>
<td>204.6 [8.06]</td>
<td>179.6 [7.07]</td>
<td>160.8 [6.33]</td>
<td>151.4 [5.96]</td>
</tr>
</tbody>
</table>
**Technical Information**  
**TMK, TMKW and TMK FL Orbital Motors**

**Dimensions, US version, TMK with SAE-C flange**

<table>
<thead>
<tr>
<th>Type</th>
<th>$L_1$ mm [in]</th>
<th>$L_2$ mm [in]</th>
<th>$L_3$ mm [in]</th>
<th>$L_4$ mm [in]</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMK 470</td>
<td>247.8 [9.76]</td>
<td>222.8 [8.77]</td>
<td>204.0 [8.03]</td>
<td>194.6 [7.66]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output shaft</th>
<th>$L_5$ mm [in]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyl. 1.25 in</td>
<td>59.0 [2.32]</td>
</tr>
<tr>
<td>Spl. 1.25 in</td>
<td>56.3 [2.22]</td>
</tr>
<tr>
<td>Tap. 1.25 in</td>
<td>62.2 [2.45]</td>
</tr>
<tr>
<td>Tap. 1.5 in</td>
<td>74.8 [2.94]</td>
</tr>
<tr>
<td>Tap. 1.625 in</td>
<td>84.3 [3.32]</td>
</tr>
</tbody>
</table>

The stated dimensions are without paint.
Dimension, US version TMKW with side port

TMKW with side port and drain connection

C: Drain connection 7/16 - 20 UNF
D: 2 x 1 1/16 - 12 UN

--------Not Painted
Dimension, US version TMKW with side port

### Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>$L_1$ mm [in]</th>
<th>$L_2$ mm [in]</th>
<th>$L_3$ mm [in]</th>
<th>$L_4$ mm [in]</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMKW 160</td>
<td>164.7 [6.48]</td>
<td>139.3 [5.48]</td>
<td>120.3 [4.74]</td>
<td>110.8 [4.36]</td>
</tr>
<tr>
<td>TMKW 200</td>
<td>170.7 [6.72]</td>
<td>145.3 [5.72]</td>
<td>126.3 [4.97]</td>
<td>116.8 [4.60]</td>
</tr>
<tr>
<td>TMKW 250</td>
<td>177.7 [7.00]</td>
<td>152.3 [6.00]</td>
<td>133.3 [5.25]</td>
<td>123.8 [4.87]</td>
</tr>
<tr>
<td>TMKW 315</td>
<td>186.4 [7.34]</td>
<td>161.0 [6.34]</td>
<td>142.0 [5.59]</td>
<td>132.5 [5.22]</td>
</tr>
<tr>
<td>TMKW 400</td>
<td>197.7 [7.78]</td>
<td>172.3 [6.78]</td>
<td>153.3 [6.00]</td>
<td>143.8 [5.66]</td>
</tr>
<tr>
<td>TMKW 470</td>
<td>207.9 [8.19]</td>
<td>182.5 [7.19]</td>
<td>163.5 [6.44]</td>
<td>154.0 [6.06]</td>
</tr>
</tbody>
</table>

The stated dimensions are without paint.
Dimension, US version, TMKW with end port

TMKW with end port and drain connection

C: Drain connection
7/16 - 20 UNF
D: 2 x 7/8 - 14 UNF
----- Not Painted
Dimension, US version, TMKW with end port

<table>
<thead>
<tr>
<th>Type</th>
<th>L (mm [in])</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMKW 160</td>
<td>183.5 (7.2)</td>
</tr>
<tr>
<td>TMKW 200</td>
<td>189.5 (7.46)</td>
</tr>
<tr>
<td>TMKW 250</td>
<td>196.5 (7.74)</td>
</tr>
<tr>
<td>TMKW 315</td>
<td>205.2 (8.08)</td>
</tr>
<tr>
<td>TMKW 400</td>
<td>216.5 (8.52)</td>
</tr>
<tr>
<td>TMKW 470</td>
<td>226.7 (8.93)</td>
</tr>
</tbody>
</table>

The stated dimensions are without paint.
Dimension, US version, TMK FL with side port

TMK FL with side port and drain connection

C: Drain connection and brake release port 7/16 - 20 UNF
D: 2 x 1 1/16 - 12 UN
V: Vent port 7/16 - 20 UNF
------Not Painted
Technical Information  TMK, TMKW and TMK FL Orbital Motors

Dimension, US version, TMK FL with side port

**Dimensions**

<table>
<thead>
<tr>
<th>Type</th>
<th>( L_1 ) mm [in]</th>
<th>( L_2 ) mm [in]</th>
<th>( L_3 ) mm [in]</th>
<th>( L_4 ) mm [in]</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMK FL 200</td>
<td>131.2 [5.17]</td>
<td>106.2 [4.18]</td>
<td>87.2 [3.43]</td>
<td>77.7 [3.06]</td>
</tr>
<tr>
<td>TMK FL 250</td>
<td>138.2 [5.44]</td>
<td>113.2 [4.46]</td>
<td>94.2 [3.70]</td>
<td>84.7 [3.33]</td>
</tr>
<tr>
<td>TMK FL 315</td>
<td>146.9 [5.78]</td>
<td>121.9 [4.80]</td>
<td>102.9 [4.05]</td>
<td>93.4 [3.68]</td>
</tr>
<tr>
<td>TMK FL 400</td>
<td>158.2 [6.23]</td>
<td>133.2 [5.24]</td>
<td>114.2 [4.50]</td>
<td>104.7 [4.12]</td>
</tr>
<tr>
<td>TMK FL 470</td>
<td>168.4 [6.63]</td>
<td>143.4 [5.65]</td>
<td>124.4 [4.90]</td>
<td>114.9 [4.52]</td>
</tr>
</tbody>
</table>

The stated dimensions are without paint.
Dimension, US version, TMK FL with end port

TMK FL with end port and drain connection

C: Drain connection and brake release port 7/16 - 20 UNF
D: 2 x 7/8 - 14 UNF
V: Vent port 7/16 - 20 UNF

---------Not Painted
### Technical Information

**TMK, TMKW and TMK FL Orbital Motors**

**Dimension, US version, TMK FL with end port**

**Dimensions**

<table>
<thead>
<tr>
<th>Type</th>
<th>L mm [in]</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMK FL 160</td>
<td>144.0 [5.67]</td>
</tr>
<tr>
<td>TMK FL 200</td>
<td>150.0 [5.91]</td>
</tr>
<tr>
<td>TMK FL 250</td>
<td>157.0 [6.18]</td>
</tr>
<tr>
<td>TMK FL 315</td>
<td>165.7 [6.52]</td>
</tr>
<tr>
<td>TMK FL 400</td>
<td>177.0 [6.97]</td>
</tr>
<tr>
<td>TMK FL 470</td>
<td>187.2 [7.37]</td>
</tr>
</tbody>
</table>

The stated dimensions are without paint.
## Weight of Orbital Motors

<table>
<thead>
<tr>
<th>Code no</th>
<th>Weight kg [lb]</th>
<th>Code no</th>
<th>Weight kg [lb]</th>
</tr>
</thead>
<tbody>
<tr>
<td>151F6010</td>
<td>16.0 [35.3]</td>
<td>151F6010</td>
<td>16.9 [37.2]</td>
</tr>
<tr>
<td>151F6011</td>
<td>16.5 [36.4]</td>
<td>151F6011</td>
<td>17.4 [37.5]</td>
</tr>
<tr>
<td>151F6012</td>
<td>17.0 [37.5]</td>
<td>151F6012</td>
<td>17.9 [39.4]</td>
</tr>
<tr>
<td>151F6013</td>
<td>17.5 [38.6]</td>
<td>151F6013</td>
<td>18.4 [40.5]</td>
</tr>
<tr>
<td>151F6014</td>
<td>18.0 [39.7]</td>
<td>151F6014</td>
<td>18.9 [41.6]</td>
</tr>
<tr>
<td>151F6015</td>
<td>18.5 [40.8]</td>
<td>151F6015</td>
<td>19.4 [42.7]</td>
</tr>
<tr>
<td>151F6016</td>
<td>19.0 [41.9]</td>
<td>151F6016</td>
<td>20.0 [44.1]</td>
</tr>
<tr>
<td>151F6017</td>
<td>19.5 [43.0]</td>
<td>151F6017</td>
<td>21.0 [46.3]</td>
</tr>
<tr>
<td>151F6018</td>
<td>20.0 [44.1]</td>
<td>151F6018</td>
<td>22.0 [48.5]</td>
</tr>
</tbody>
</table>
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