# Danfoss OMT EM 160 151B3700 orbital hydraulic motor

Manufacturer: Danfoss

Manufacturer part number / published order designation: 151B3700

Published model: 151B3700

## About this compilation

Prepared by Hydmaster from selected manufacturer documentation. Original technical pages follow without cropped drawings, rewritten data or altered units. This cover and index are Hydmaster editorial material, not a manufacturer-issued exact-execution datasheet.

Coverage: selected pages relevant to the identified size and configuration. Other options or neighbouring models retained on an original page apply only where explicitly identified.

## Execution notes and conditions

Factory article identity is verified on the current manufacturer page; the original technical-document editions are retained.

Representative series photograph; sensor and rear-interface arrangement may differ.

Separate catalogue limits; verify shaft loading, drain pressure and the size-specific operating point.

The US drain thread is 9/16-18 UNF as explicitly stated on the EM dimension drawing; the conflicting port-summary page is not used.

## Source-page index

Source page numbers below are physical pages of each complete original PDF. The original printed page labels and technical content remain unchanged. Compiled page numbers count this cover/index.

## Source A: Danfoss Orbital Motors with Speed Sensor - June 2021

| Original pages | Compiled pages | Relevant content |
|---|---|---|
| 5-9 | 2-6 | OMT EM 160 applicable original technical data, execution, conditions or interface |
| 13-15 | 7-9 | OMT EM 160 applicable original technical data, execution, conditions or interface |
| 17 | 10 | OMT EM 160 applicable original technical data, execution, conditions or interface |
| 19-20 | 11-12 | OMT EM 160 applicable original technical data, execution, conditions or interface |

## Source B: Danfoss OMT and OMV - October 2024

Supplemental stage/component reference; not a complete assembly drawing.

| Original pages | Compiled pages | Relevant content |
|---|---|---|
| 7 | 13 | OMT EM 160 applicable original technical data, execution, conditions or interface |
| 12-13 | 14-15 | OMT EM 160 applicable original technical data, execution, conditions or interface |
| 15 | 16 | OMT EM 160 applicable original technical data, execution, conditions or interface |

## Data survey

### Introduction

Danfoss has developed a speed sensor specially designed for LSHT motors.

The electric output signal is a standard voltage signal that can be used for regulating the speed motor.

### Principle

The speed is measured by a sensor in accordance with the Hall principle. Signal processing and amplification are performed in the sensor housing. A connection is provided in the housing for a Binder Series 713 plug or a plug with 5 metres of cable (available from Danfoss). The sensor can also be supplied with 2 metres molded in cable.

### Advantages

- Robust design
- CE-marked
- Fulfils EMC requirements of EN50081 and EN50082
- Large frequency range, precise regulation
- No limit on motor performance when compared to corresponding motors without speed sensor
- IEC 529 degree of protection: IP 67
- Replacable transducer
- Standard speed signal
- Easy installation
- Electronic signal processing and amplification integrated in the sensor's housing and requiring no maintenance.

### Typical Applications

- Speed indication
- Setting tightening speed in machine tools
- Extend/retract positioning of work platforms
- Granulate metering on injection moulding machines
- Conveyor speed regulation
- Metering on salt spreaders

## Versions OMT EM and OMV EM

### Versions

| Mounting flange | Spigot diameter | Bolt circle diameter (BC) | Shaft | Port size | European version - delivered with sensor for plug connector (PNP version) | US version - delivered with sensor with 2 m moduled in cable (PNP version) | Side port version | Standard shaft seal | Drain connection | Check valve | Main type designation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **OMT EM Motors** | | | | | | | | | | | |
| Standard flange | Ø125 mm | Ø160 mm | Cyl. 40 mm | G 3/4 | X | | X | X | Yes | Yes | OMT EM |
| | Ø5 in | Ø6.38 | Cyl. 1.5 in | 11/16 - 12 UN | | ☒ | X | X | Yes | Yes | OMT EM |
| **OMV EM Motors** | | | | | | | | | | | |
| Standard flange | Ø160 mm | Ø200 mm | Cyl. 50 mm | G 1 | X | | X | X | Yes | Yes | OMV EM |

**Features available:**

Motors in european version: Speed sensor with 2 metres of molded in cable.

Motors in US versions: Speed sensor for plug connection.

Speed sensor for plug connector in NPN version.

The standard speed sensor is a PNP version

## Code Numbers OMT EM and OMV EM

### Code number

| Code numbers | Displacements | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 80 | 100 | 125 | 160 | 200 | 250 | 315 | 400 | 500 | 630 | 800 |
| **OMT EM Motors** | | | | | | | | | | | |
| 151B | - | - | - | 3260 | 3261 | 3262 | 3263 | 3264 | 3265 | - | - |
| 151B | - | - | - | 3700 | 3701 | 3702 | 3703 | 3704 | 3705 | - | - |
| **OMV EM Motors** | | | | | | | | | | | |
| 151B | - | - | - | - | - | - | 3266 | 3267 | 3268 | 3269 | 3270 |

### Ordering

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

Orders will not be accepted without the four digit prefix.

## Technical Data OMT EM

### Technical data for OMT EM

| Type<br>Motor size | | | OMT EM 160 | OMT EM 200 | OMT EM 250 | OMT EM 315 | OMT EM 400 | OMT EM 500 |
|---|---|---|---|---|---|---|---|---|
| Geometric displacements | $cm^3$<br>[$in^3$] | | 161.1<br>[9.83] | 201.4<br>[12.29] | 251.8<br>[15.37] | 326.3<br>[19.91] | 410.9<br>[25.07] | 523.6<br>[31.95] |
| Max. speed | $min^{-1}$<br>rpm | cont. | 625 | 625 | 500 | 380 | 305 | 240 |
| | | int. | 780 | 750 | 600 | 460 | 365 | 285 |
| Max torque | Nm<br>[lbf•in] | cont. | 470<br>[4160] | 590<br>[5220] | 730<br>[6460] | 950<br>[8410] | 1080<br>[9560] | 1220<br>[10800] |
| | | int. | 560<br>[4960] | 710<br>[6280] | 880<br>[7790] | 1140<br>[10090] | 1260<br>[11150] | 1370<br>[12130] |
| Max. output | kW<br>[hp] | cont. | 26.5<br>[35.5] | 33.5<br>[44.9] | 33.5<br>[44.9] | 33.5<br>[44.9] | 30.0<br>[40.2] | 26.5<br>[35.5] |
| | | int.[1] | 32.0<br>[42.9] | 40.0<br>[53.6] | 40.0<br>[53.6] | 40.0<br>[53.6] | 35.0<br>[46.9] | 30.0<br>[40.2 |
| Max. pressure drop | bar<br>[psi] | cont. | 200<br>[2900] | 200<br>[2900] | 200<br>[2900] | 200<br>[2900] | 180<br>[2610] | 160<br>[2320] |
| | | int.[1] | 240<br>[3480] | 240<br>[3480] | 240<br>[3480] | 240<br>[3480] | 210<br>[3050] | 180<br>[2610] |
| | | peak[2] | 280<br>[4060] | 280<br>[4060] | 280<br>[4060] | 280<br>[4060] | 240<br>[3480] | 210<br>[3050] |
| Max. oil flow | l/min<br>[US gal/min] | cont. | 100<br>[26.4] | 125<br>[33.0] | 125<br>[33.0] | 125<br>[33.0] | 125<br>[33.0] | 125<br>[33.0] |
| | | int.[1] | 125<br>[33.0] | 150<br>[39.6] | 150<br>[39.6] | 150<br>[39.6] | 150<br>[39.6] | 150<br>[39.6] |
| Max. starting pressure with unloaded shaft | bar<br>[psi] | | 10<br>[145] | 10<br>[145] | 10<br>[145] | 10<br>[145] | 10<br>[145] | 10<br>[145] |
| Min starting torque | Nm<br>[lbf•in] | at max. press. drop cont. | 340<br>[3010] | 430<br>[3810] | 530<br>[4690] | 740<br>[6550] | 840<br>[7430] | 950<br>[8410] |
| | | at max. press. drop int.[1] | 410<br>[3630] | 520<br>[4600] | 630<br>[5580] | 890<br>7880] | 970<br>[8590] | 1060<br>[9380] |
| Frequency | [Hz] | max. | 1014 | 975 | 780 | 598 | 475 | 371 |

[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.

| Type | | Max. inlet pressure | Max. return pressure with drain line |
|---|---|---|---|
| OMT EM | bar [psi]<br>cont. | 210<br>[3050] | 140<br>[2030] |
| | bar [psi]<br>int.[1] | 250<br>[3630] | 175<br>[2540] |
| | bar [psi]<br>peak [2] | 300<br>[4350] | 210<br>[3050] |

[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.

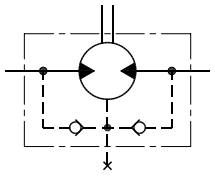
For further technical specifications please see technical information for OMT and OMV (BC152886483862)

## Technical Data OMT EM

### Max. Permissible Shaft Seal Pressure

**OMT EM with check valves and without use of drain connection:**

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

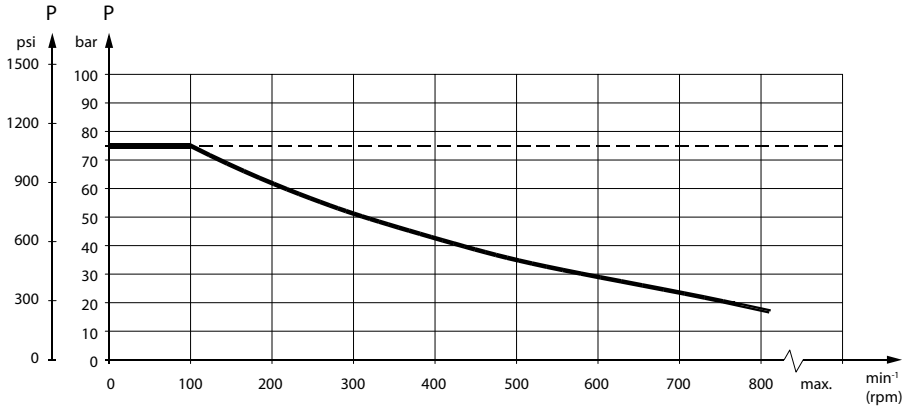


151-320.10

**OMT EM with check valves and with drain connection:**

The shaft seal pressure equals the pressure on the drain line

*Max. return pressure without drain line or max. pressure in drain line*

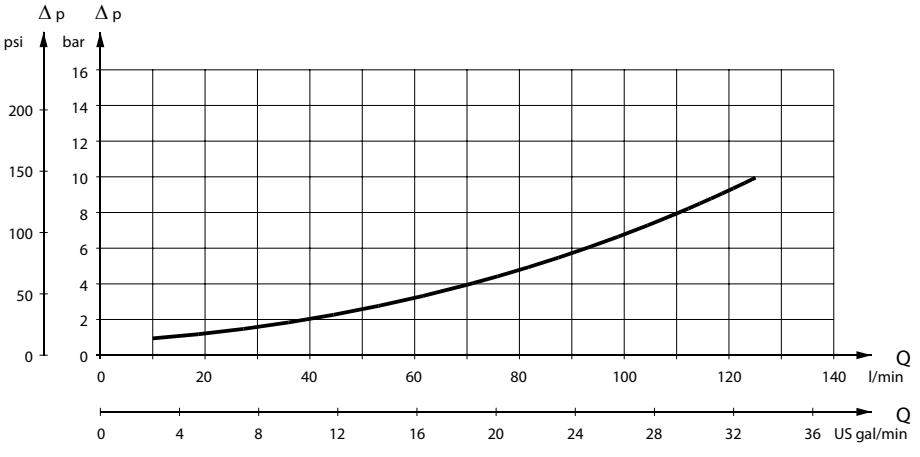



151-1674.10

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

____ Continuous operation

### Pressure drop in motor




151-1409.10

## Technical Data Speed Sensor

### Technical Data Speed Sensor

**Mechanical data:**

Temperatur range: -30°C to +90°C

Enclosure acc. to IEC 529: IP 67

**Electrical data**

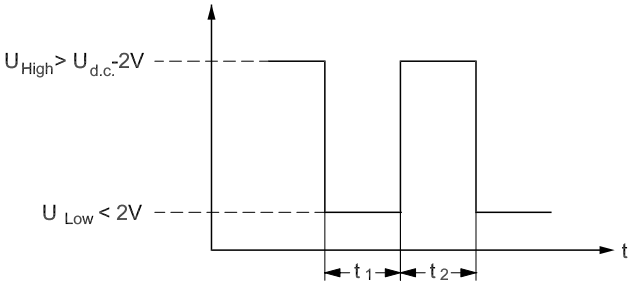
Principle: Hall

Supply voltage: 11 - 30V

Load max.: Lhigh = Llow ± 50 mA

No load current, max.: 20 mA

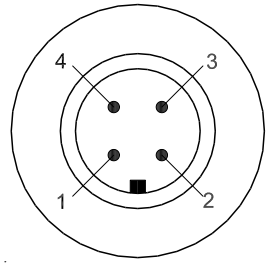
*Output signal:*




$t_1 = t_2 \pm 10\%$

159G33.11

| Connection type | | | |
|---|---|---|---|
| | Binder Series 713 | Molded in cable | Connection |
| Terminal no.: | 1 | brown | UDC (+supply) |
| | 2 | White | No connection |
| | 3 | Blue | UDC (-supply) |
| | 4 | Black | Output signal |
| Protection: Protected against short circuit and incorrect polarization. | | | |




159G82.10

*Revolution:*

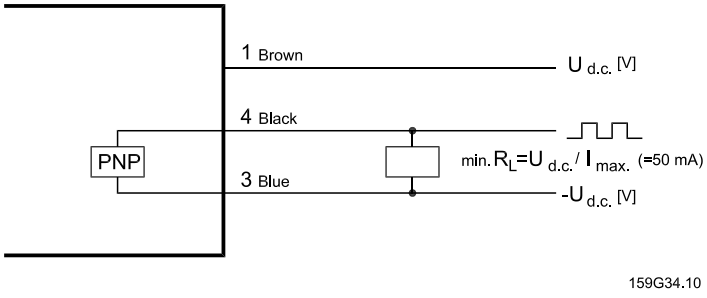
| Pulses per revolution (PPR) | OMT EM | OMV EM |
|---|---|---|
| | 84 | 102 |

## Technical Data Speed Sensor

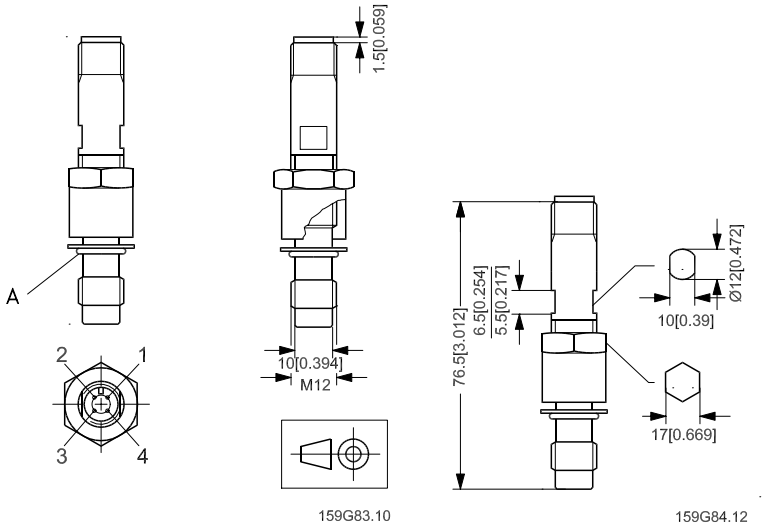
Calculation of frequency:

$$fr = \frac{RPM \cdot PPR}{60} \quad [Hz]$$

## Wiring Diagram

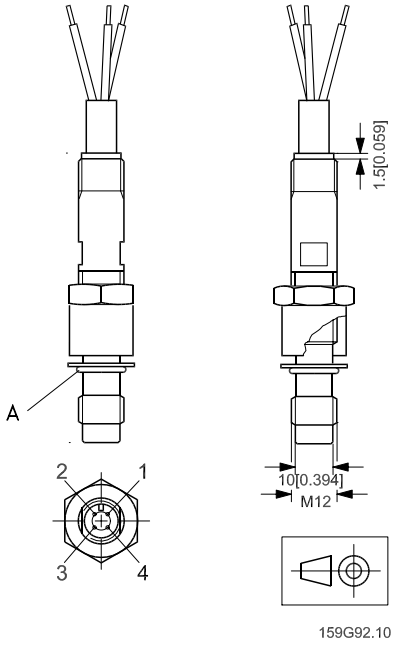



## Speed Sensor with Plug Connection Dimensions



## Technical Data Speed Sensor

### Speed Sensor with Molded in Cable Dimensions




### Spare Parts

#### Speed sensor

*Code numbers*

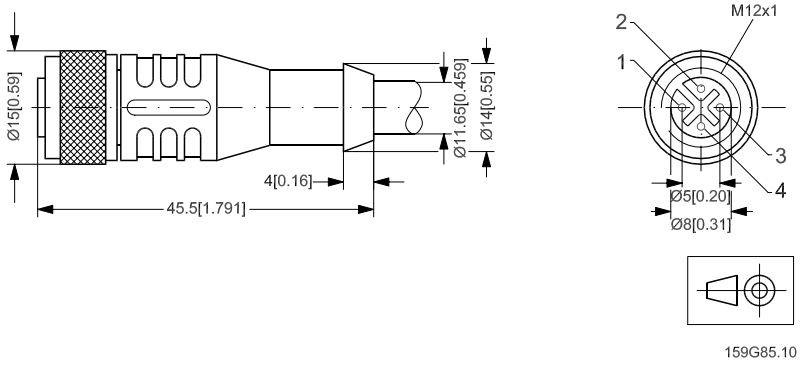
| Type | Code no. |
|---|---|
| Sensor with plug (PNP output) | 151-5662 |
| Sensor with 2 m [6.56 ft] molded in cable (PNP output) | 151-5663 |
| Sensor with 5.5 m [18.04 ft] moulded in cable (PNP output) | 151-5667 |
| Sensor with plug (NPN output) | 151-5833 |

### Accessories

#### Cable with plug

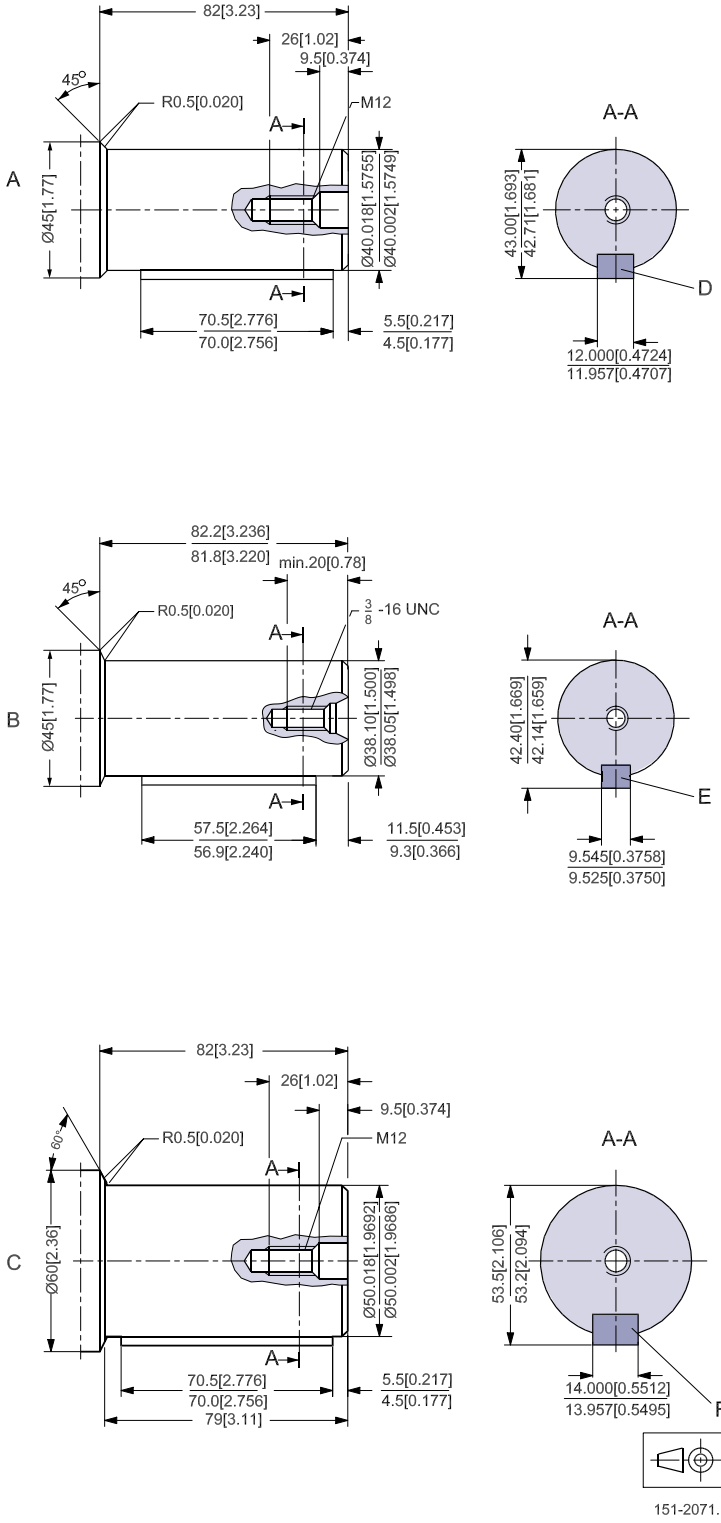
*Code numbers*

| | |
|---|---|
| Cable length 5 m [16.4 ft] | 984F0101 |



## Shaft Versions

### Shaft Versions



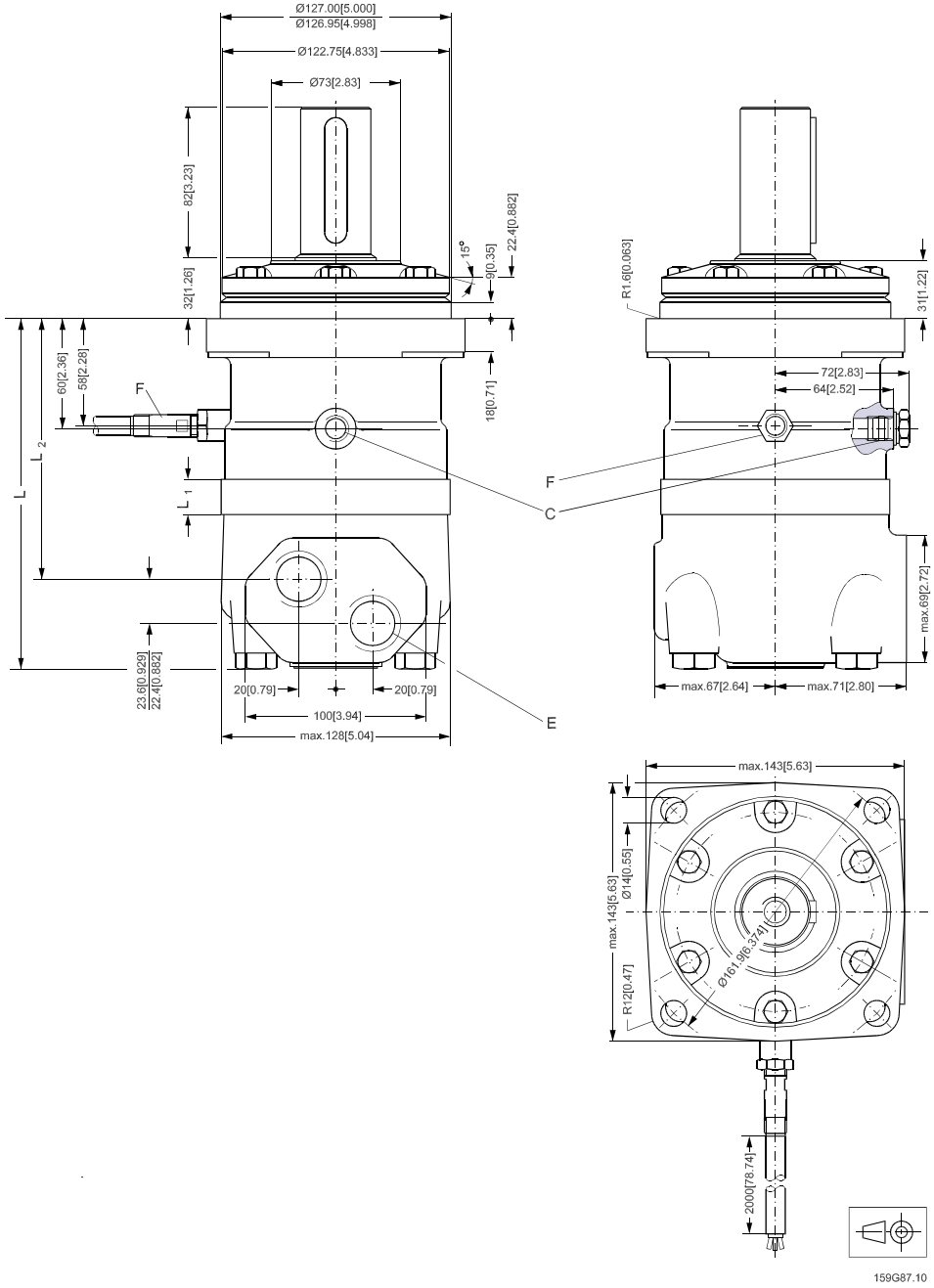

**OMT**
A: Cylindrical shaft; 40 mm
C: Parallel key
A12 •8 • 70; DIN 6885

**OMT US Version**
B: Cylindrical 1.5 in shaft
D: Parallel key
3/8 × 3/8 × 21/4 in; B.S.46

**OMV**
A: Cylindrical shaft; 50 mm
C: Parallel key
A14 • 9 • 70; DIN 6885

## Dimensions - US Version

### OMT EM




C: Drain connection 9⁄16 - 18 UNF; 13 mm [0.51 in] deep O-ring boss port

D: 1 1⁄16 - 12 UN; 19 mm [0.75 in] deep O-ring boss port

F : Plug connection: 2 m [6.56 ft] molded in cable

| Type | Lmax<br>mm [in] | L1<br>mm [in] | L2<br>mm [in] |
|---|---|---|---|
| OMT 160 EM | 190<br>[7.48] | 16.5<br>[0.650] | 140<br>[5.51] |
| OMT 200 EM | 195<br>[7.68] | 21.5<br>[0.846] | 145<br>[5.71] |

## Dimensions - US Version

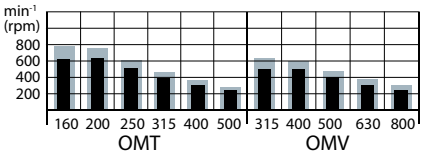
| Type | Lmax<br>mm [in] | L1<br>mm [in] | L2<br>mm [in] |
|---|---|---|---|
| OMT 250 EM | 201<br>[7.91] | 27.8<br>[1.094] | 151<br>[5.94] |
| OMT 315 EM | 211<br>[8.31] | 37.0<br>[1.457] | 161<br>[6.34] |
| OMT 400 EM | 221<br>[8.70] | 47.5<br>[1.870] | 171<br>[6.73] |
| OMT 500 EM | 235<br>[9.25] | 61.5<br>[2.421] | 185<br>[7.28] |

*) The gearwheel set is 3.5 mm [0.138 in] wider across the rollers than the L1 dimensions

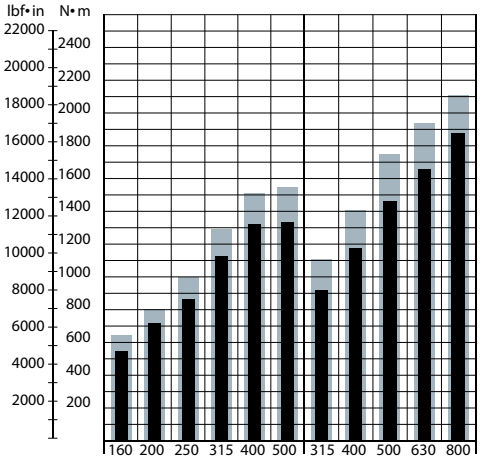
## Orbital motors

### Speed, torque, and output

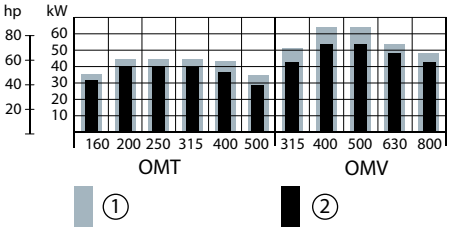
*Maximum speed*




*Maximum torque*




*Maximum output*




1. Intermittend values
2. Continuous values

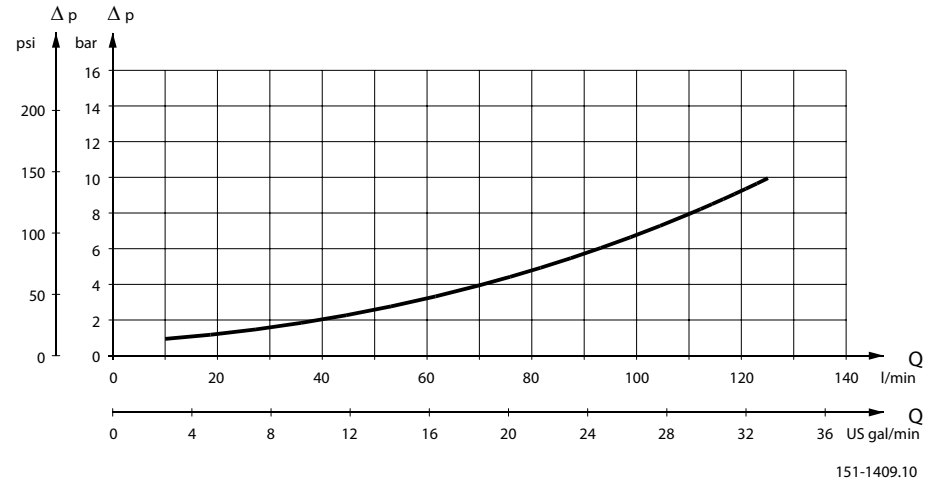
The bar diagrams above are useful for a quick selection of relevant motor size for the application. The final motor size can be determined by using the function diagram for each motor size: see *OMT Function diagrams* on page 15, or *OMV function diagrams* on page 44.

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 $mm^2/s$ [165 SUS] and a temperature of 50°C [120°F].

## OMT

### Pressure drop in motor

*OMT 160, 200, 250, 315, 400, 500 pressure drop*




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

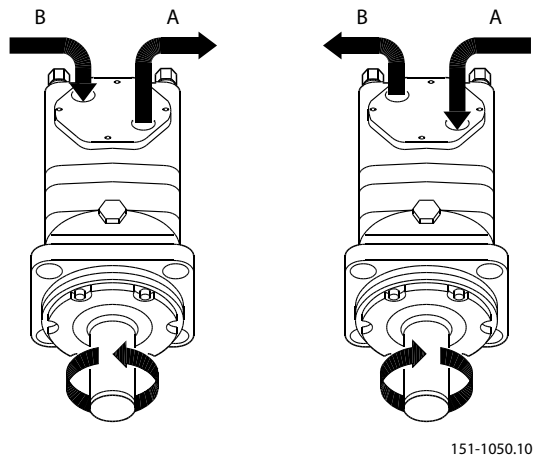
### Oil flow in drain line

*Maximum oil flow in the drain line at a return pressure less than 5-10 bar [75-150 psi]*

| Pressure drop | | Viscosity | | Oil flow in drain line | |
|---|---|---|---|---|---|
| **bar** | **[psi]** | **$mm^2/s$** | **[SUS]** | **l/min** | **[US gal/min]** |
| 140 | [2030] | 20 | [100] | 2.5 | [0.66] |
| | | 35 | [165] | 1.5 | [0.40] |
| 210 | [3050] | 20 | [100] | 5.0 | [1.32] |
| | | 35 | [165] | 3.0 | [0.79] |

### OMT direction of shaft rotation

*Standard rotation*



## OMT

### Permissible shaft loads for OMT

#### *Shaft load and bearing life time*

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.

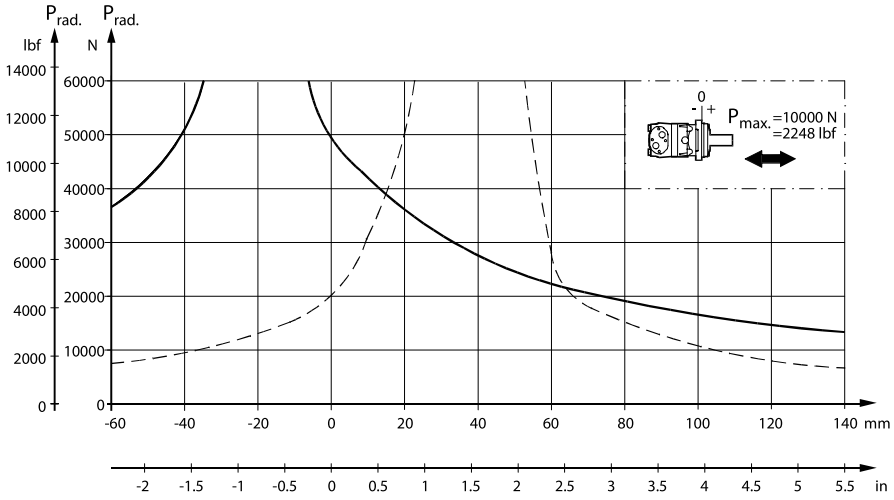
The curves are based on B10 bearing life (2000 hours or 12,000,000 shaft revolutions at 100 $min^{-1}$) at rated output torque, when mineral-based hydraulic oil with a sufficient content of anti-wear additives, is used.

For 3,000,000 shaft revolutions or 500 hours – increase these shaft loads with 52%.

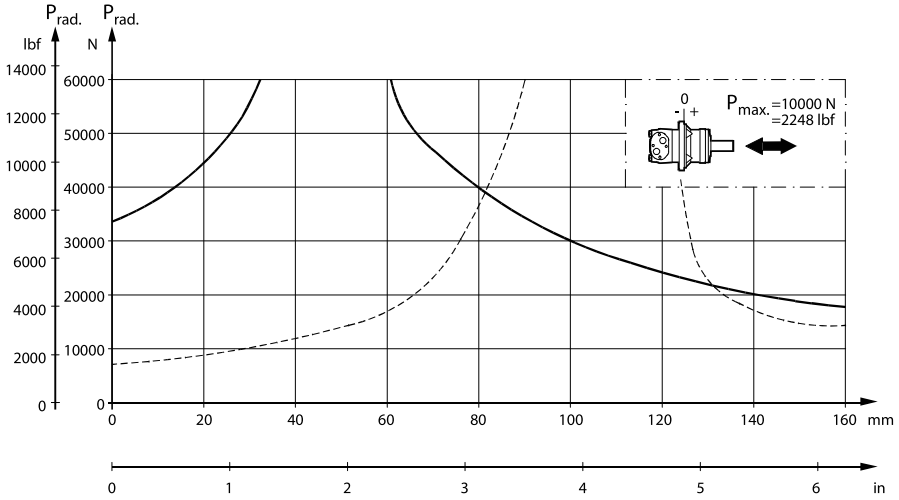
The dash curve shows max. radial shaft load. Any shaft load exceeding the values shown in the curve will involve a risk of breakage.

Bearing life calculations can be made using the explanation and formula provided in the chapter *Bearing dimensioning* in the technical information *General Orbital Motors*, **BC152886483554**.

#### *Standard mounting flange with all shaft types*




#### *Wheel mounting flange with all shaft types*



## OMT

### OMT Function diagrams

**Continuous range**

**Intermittent range (maximum 10% operation every minute)**

