Danfoss OMT EM 315 151B3703 orbital hydraulic motor

Manufacturer: Danfoss

Manufacturer part number / published order designation: 151B3703

Published model: 151B3703

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 315 applicable original technical data, execution, conditions or interface
13-15	7-9	OMT EM 315 applicable original technical data, execution, conditions or interface
17	10	OMT EM 315 applicable original technical data, execution, conditions or interface
19-20	11-12	OMT EM 315 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 315 applicable original technical data, execution, conditions or interface
12-13	14-15	OMT EM 315 applicable original technical data, execution, conditions or interface
16	16	OMT EM 315 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 Motor size			OMT EM 160	OMT EM 200	OMT EM 250	OMT EM 315	OMT EM 400	OMT EM 500
Geometric displacements	cm^3 [in^3]		161.1 [9.83]	201.4 [12.29]	251.8 [15.37]	326.3 [19.91]	410.9 [25.07]	523.6 [31.95]
Max. speed	min^{-1} rpm	cont.	625	625	500	380	305	240
		int.	780	750	600	460	365	285
Max torque	Nm [lbf•in]	cont.	470 [4160]	590 [5220]	730 [6460]	950 [8410]	1080 [9560]	1220 [10800]
		int.	560 [4960]	710 [6280]	880 [7790]	1140 [10090]	1260 [11150]	1370 [12130]
Max. output	kW [hp]	cont.	26.5 [35.5]	33.5 [44.9]	33.5 [44.9]	33.5 [44.9]	30.0 [40.2]	26.5 [35.5]
		int.[1]	32.0 [42.9]	40.0 [53.6]	40.0 [53.6]	40.0 [53.6]	35.0 [46.9]	30.0 [40.2
Max. pressure drop	bar [psi]	cont.	200 [2900]	200 [2900]	200 [2900]	200 [2900]	180 [2610]	160 [2320]
		int.[1]	240 [3480]	240 [3480]	240 [3480]	240 [3480]	210 [3050]	180 [2610]
		peak[2]	280 [4060]	280 [4060]	280 [4060]	280 [4060]	240 [3480]	210 [3050]
Max. oil flow	l/min [US gal/min]	cont.	100 [26.4]	125 [33.0]	125 [33.0]	125 [33.0]	125 [33.0]	125 [33.0]
		int.[1]	125 [33.0]	150 [39.6]	150 [39.6]	150 [39.6]	150 [39.6]	150 [39.6]
Max. starting pressure with unloaded shaft	bar [psi]		10 [145]	10 [145]	10 [145]	10 [145]	10 [145]	10 [145]
Min starting torque	Nm [lbf•in]	at max. press. drop cont.	340 [3010]	430 [3810]	530 [4690]	740 [6550]	840 [7430]	950 [8410]
		at max. press. drop int.[1]	410 [3630]	520 [4600]	630 [5580]	890 7880]	970 [8590]	1060 [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] cont.	210 [3050]	140 [2030]
	bar [psi] int.[1]	250 [3630]	175 [2540]
	bar [psi] peak [2]	300 [4350]	210 [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.

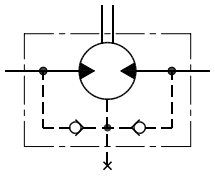
For further technical specifications please see technical information for OMT and OMV (BC152886483862)

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.

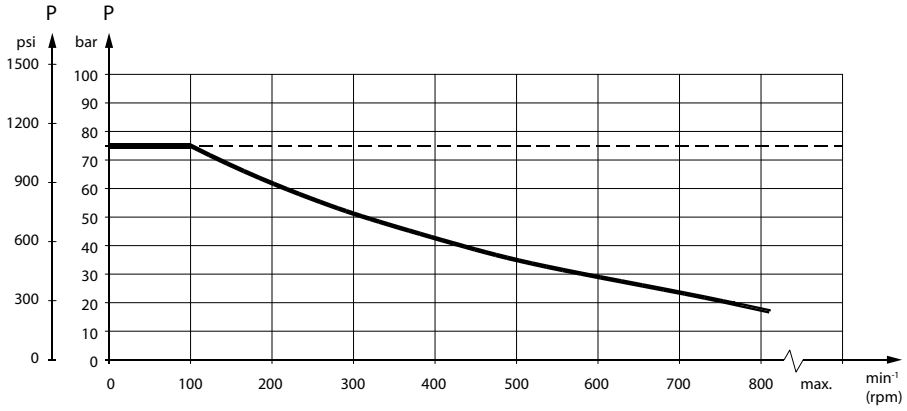


151-320.10

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

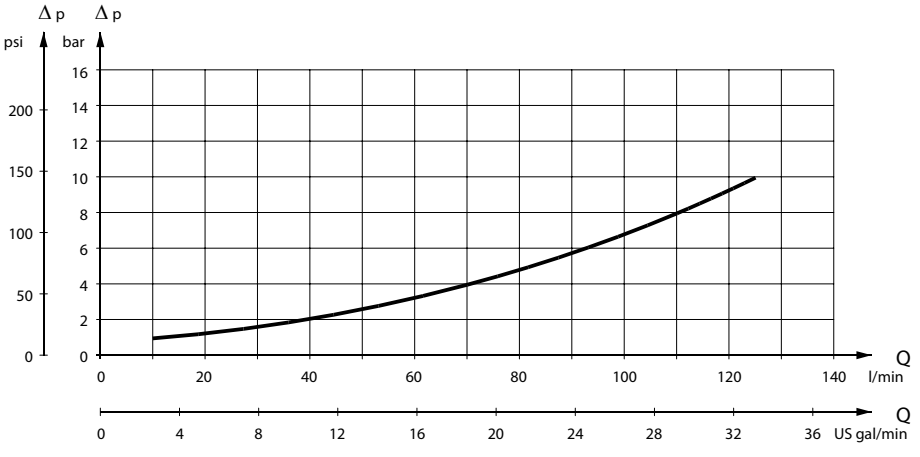


151-1674.10

--- 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

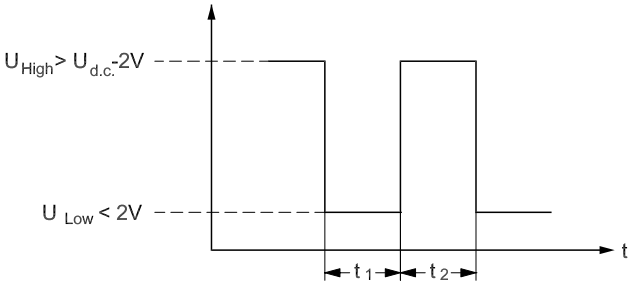
Principle: Hall

Supply voltage: 11 - 30V

Load max.: Lhigh = Llow ± 50 mA

No load current, max.: 20 mA

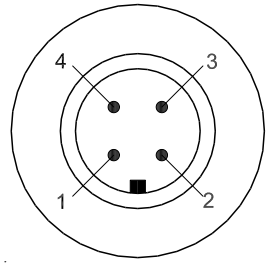
Output signal:



$t_1 = t_2 \pm 10\%$

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:

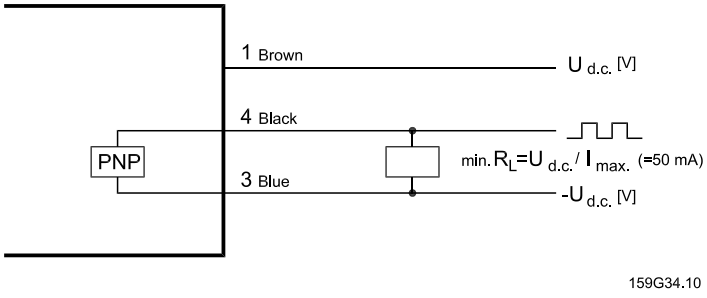
Pulses per revolution (PPR)	OMT EM	OMV EM
	84	102

Technical Data Speed Sensor

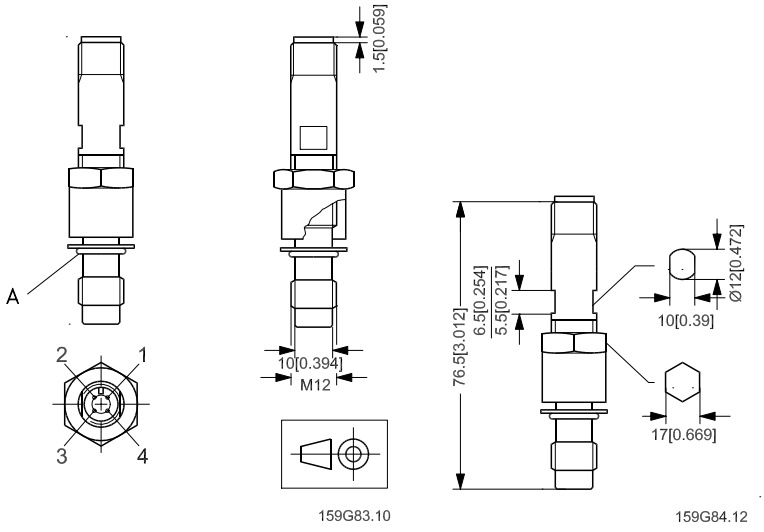
Calculation of frequency:

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

Wiring Diagram

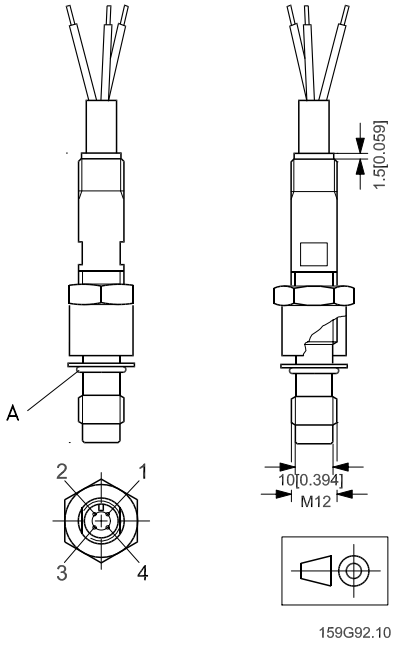


Speed Sensor with Plug Connection Dimensions



Technical Data Speed Sensor

Speed Sensor with Molded in Cable Dimensions



Spare Parts

Speed sensor

Code numbers

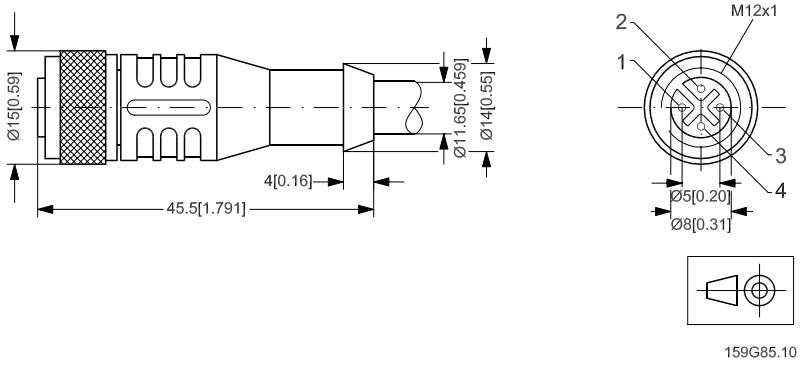
Type	Code no.
Sensor with plug (PNP output)	151-5662
Sensor with 2 m [6.56 ft] molded in cable (PNP output)	151-5663
Sensor with 5.5 m [18.04 ft] moulded in cable (PNP output)	151-5667
Sensor with plug (NPN output)	151-5833

Accessories

Cable with plug

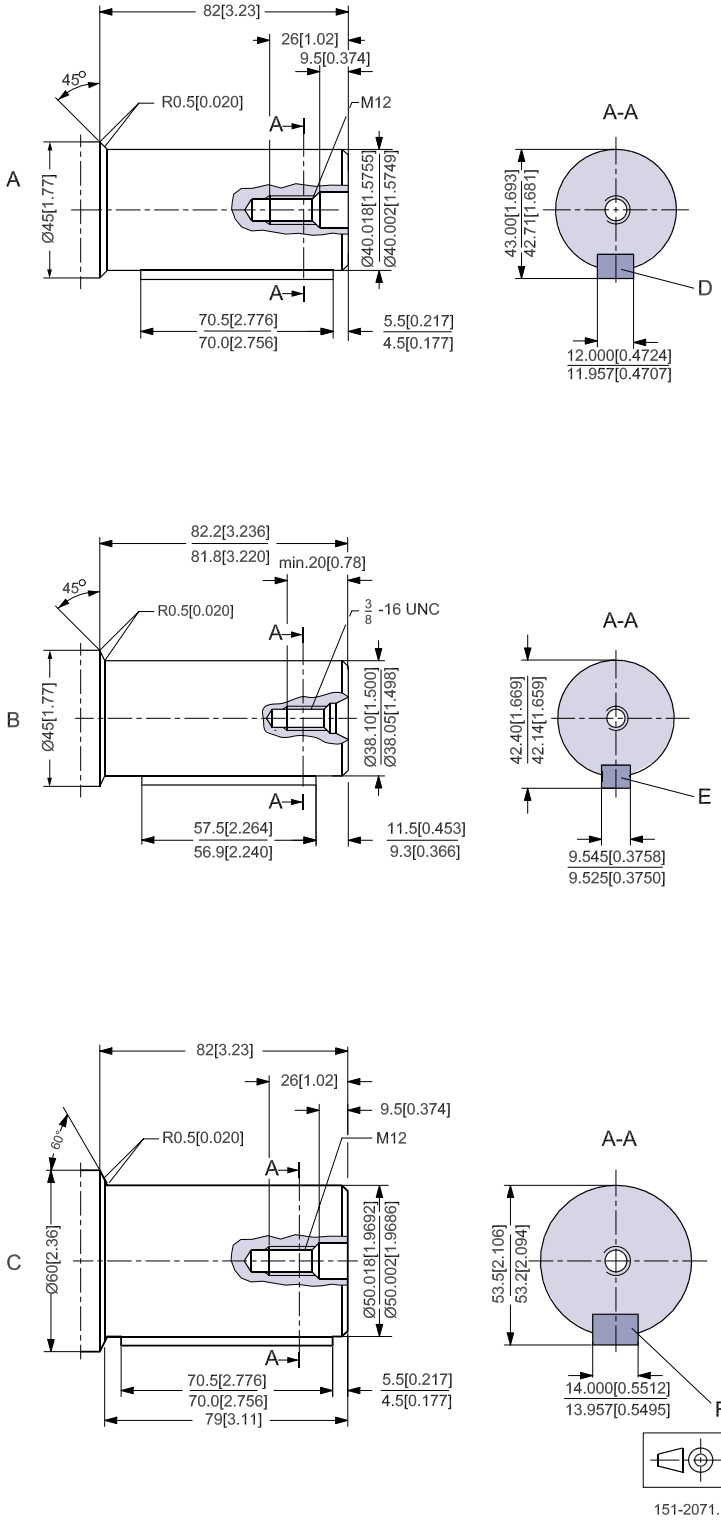
Code numbers

Cable length 5 m [16.4 ft]	984F0101



Shaft Versions

Shaft Versions



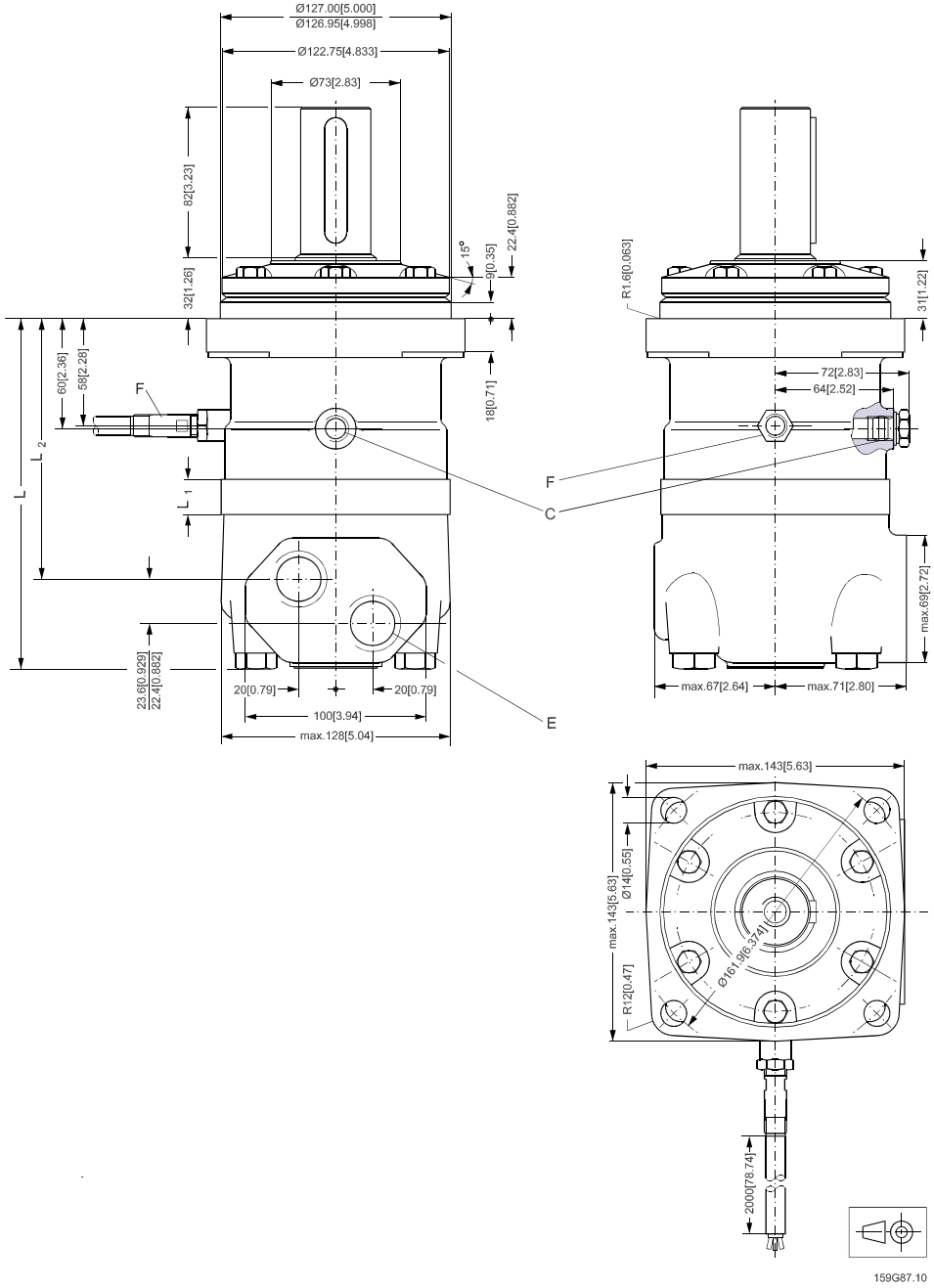
OMT
A: Cylindrical shaft; 40 mm
C: Parallel key
A12 •8 • 70; DIN 6885

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 mm [in]	L1 mm [in]	L2 mm [in]
OMT 160 EM	190 [7.48]	16.5 [0.650]	140 [5.51]
OMT 200 EM	195 [7.68]	21.5 [0.846]	145 [5.71]

Dimensions - US Version

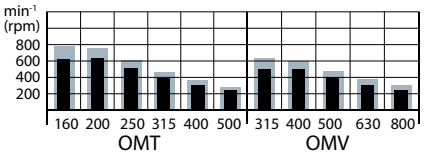
Type	Lmax mm [in]	L1 mm [in]	L2 mm [in]
OMT 250 EM	201 [7.91]	27.8 [1.094]	151 [5.94]
OMT 315 EM	211 [8.31]	37.0 [1.457]	161 [6.34]
OMT 400 EM	221 [8.70]	47.5 [1.870]	171 [6.73]
OMT 500 EM	235 [9.25]	61.5 [2.421]	185 [7.28]

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

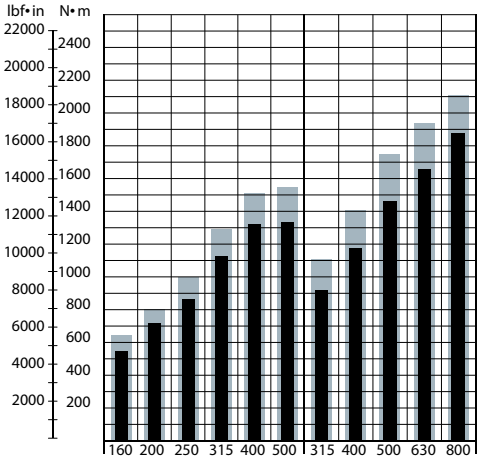
Orbital motors

Speed, torque, and output

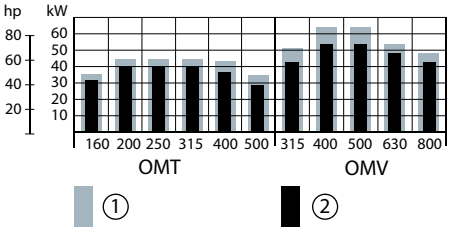
Maximum speed



Maximum torque



Maximum output



1. Intermittend values
2. Continuous values

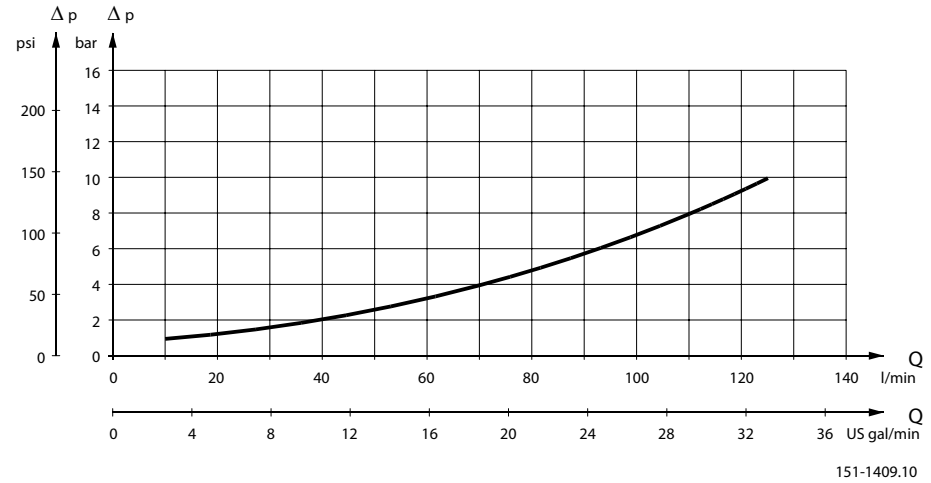
The bar diagrams above are useful for a quick selection of relevant motor size for the application. The final motor size can be determined by using the function diagram for each motor size: see *OMT Function diagrams* on page 15, or *OMV function diagrams* on page 44.

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]

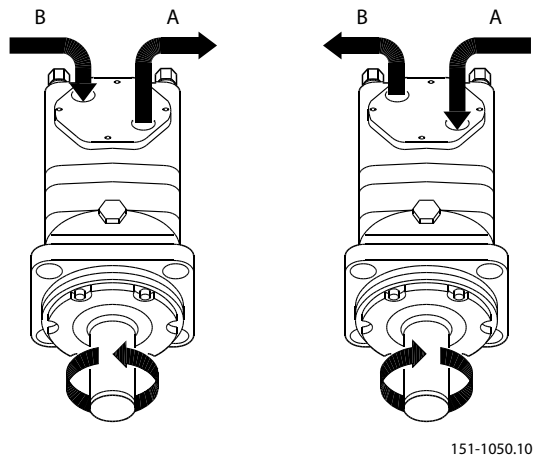
Oil flow in drain line

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.

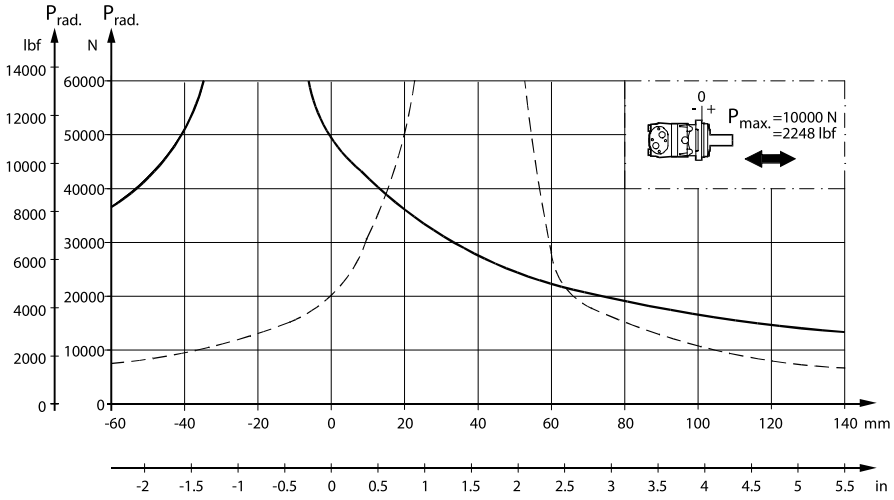
The curves are based on B10 bearing life (2000 hours or 12,000,000 shaft revolutions at 100 min^{-1}) at rated output torque, when mineral-based hydraulic oil with a sufficient content of anti-wear additives, is used.

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

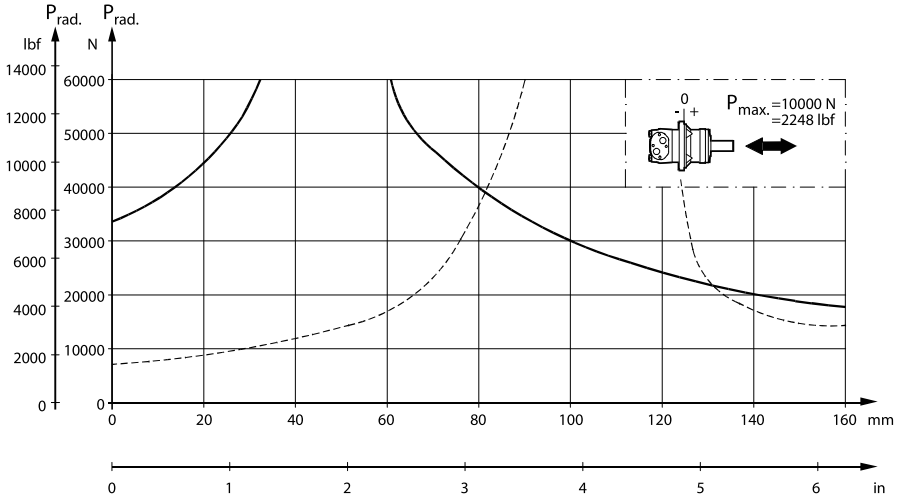
The dash curve shows max. radial shaft load. Any shaft load exceeding the values shown in the curve will involve a risk of breakage.

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**.

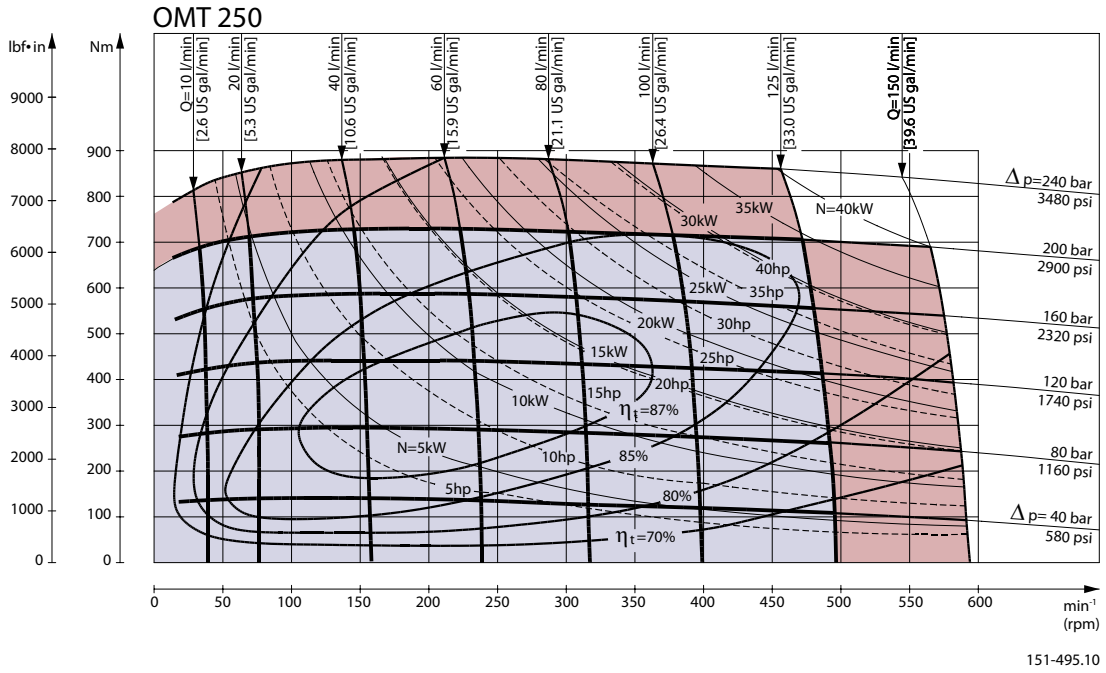
Standard mounting flange with all shaft types

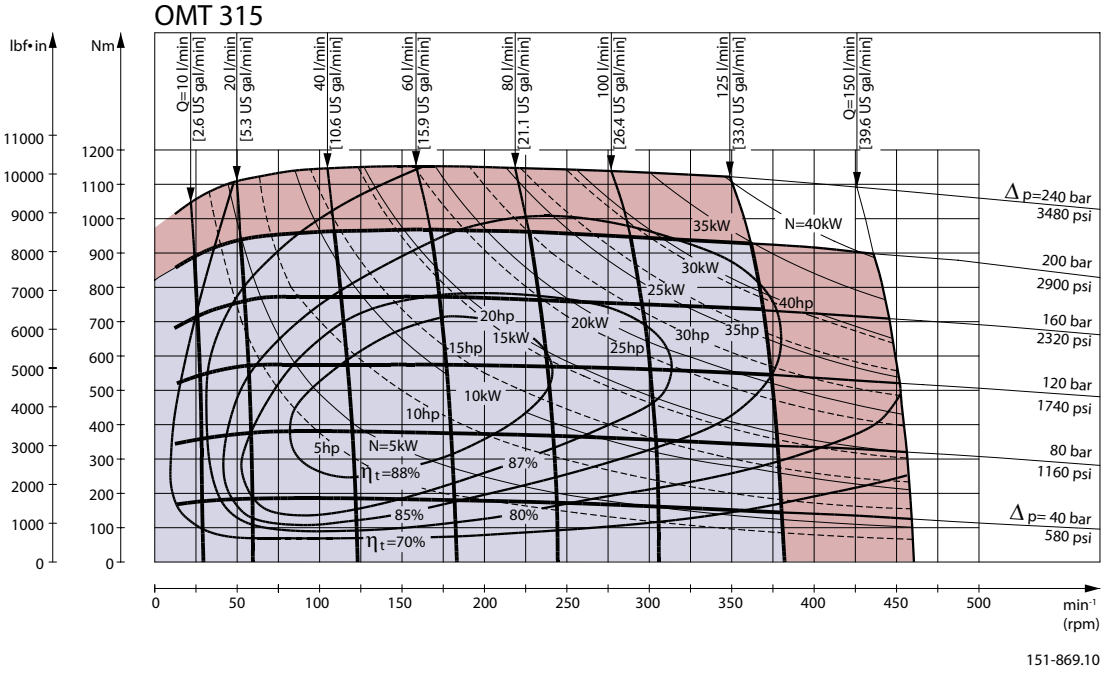


Wheel mounting flange with all shaft types



OMT


OMT 250
lbf•in
Nm
Q=10 l/min [2.6 US gal/min]
20 l/min [5.3 US gal/min]
40 l/min [10.6 US gal/min]
60 l/min [15.9 US gal/min]
80 l/min [21.1 US gal/min]
100 l/min [26.4 US gal/min]
125 l/min [33.0 US gal/min]
Q=150 l/min [39.6 US gal/min]
Δp=240 bar 3480 psi
200 bar 2900 psi
160 bar 2320 psi
120 bar 1740 psi
80 bar 1160 psi
Δp= 40 bar 580 psi
N=40kW
35kW
30kW
40hp
25kW
35hp
20kW
30hp
15kW
25hp
20hp
15hp
10kW
ηt=87%
N=5kW
10hp
85%
5hp
80%
ηt=70%
min-1 (rpm)
151-495.10


OMT 315
lbf•in
Nm
Q=10 l/min [2.6 US gal/min]
20 l/min [5.3 US gal/min]
40 l/min [10.6 US gal/min]
60 l/min [15.9 US gal/min]
80 l/min [21.1 US gal/min]
100 l/min [26.4 US gal/min]
125 l/min [33.0 US gal/min]
Q=150 l/min [39.6 US gal/min]
Δp=240 bar 3480 psi
200 bar 2900 psi
160 bar 2320 psi
120 bar 1740 psi
80 bar 1160 psi
Δp= 40 bar 580 psi
N=40kW
35kW
30kW
25kW
40hp
20hp
20kW
30hp
35hp
15hp
15kW
25hp
10kW
10hp
5hp
N=5kW
ηt=88%
87%
85%
80%
ηt=70%
min-1 (rpm)
151-869.10