ENGINEERING
TOMORROW

Technical Information

Orbital Motors
Type OMP X and OMR X

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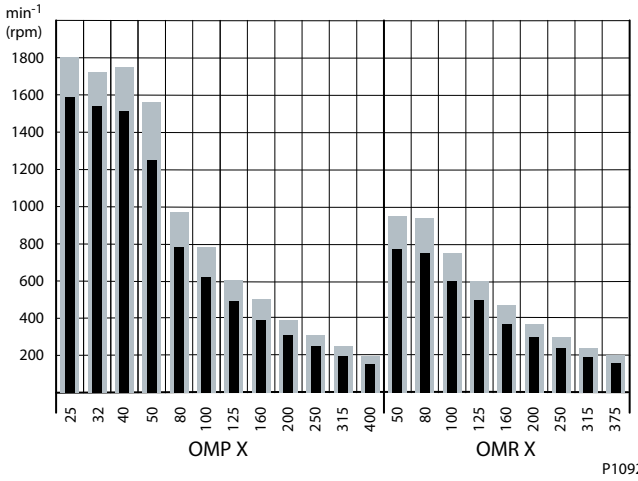
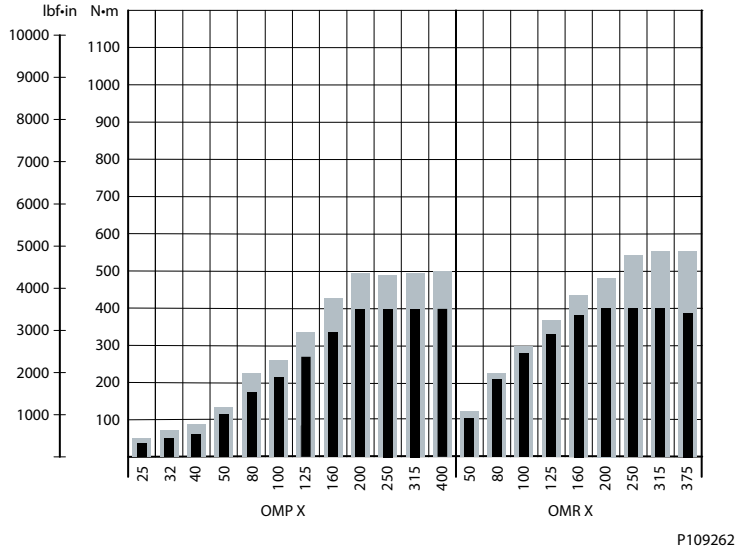
A wide range of Orbital Motors

Speed, torque and output

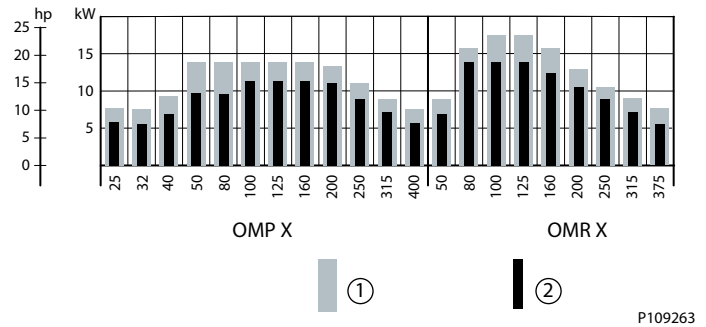
Maximum speed



Maximum torque



Maximum output



A wide range of Orbital Motors

1. Intermitten 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.

- OMP X and OMPW X: see *OMP function diagrams*
- OMR X: see *OMR 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 mm^2/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 Orbital Motors* **520L0232**.

OMR X technical data

OMR X with 1 inch splined 6B and 28.5 mm tapered shaft

OMR 50 cm³ - 160 cm³

Type			OMR X				
Motor size			**50**	**80**	**100**	**125**	**160**
Geometric displacement	cm^3 [in^3]		51.6 [3.16]	80.3 [4.91]	99.8 [6.11]	124.1 [7.57]	155.4 [9.48]
Max. speed	min^{-1} [rpm]	cont.	775	750	600	475	385
		int.*	970	940	750	600	480
Max. torque	Nm [lbf·in]	cont.	100 [890]	215 [1900]	275 [2435]	330 [2920]	380 [3365]
		int.	120 [1060]	235 [2080]	300 [2655]	360 [3185]	435 [3580]
Max. output	KW [hp]	cont.	7.0 [9.4]	14.0 [18.8]	14.0 [18.8]	14.0 [18.8]	12.6 [16.9]
		int.	8.8 [11.7]	15.8 [21.1]	17.5 [23.5]	17.5 [23.5]	15.8 [21.1]
Max. pressure drop	bar [psi]	cont.	150 [2175]	200 [2900]	200 [2900]	200 [2900]	180 [2610]
		int.	175 [2540]	225 [3260]	225 [3260]	225 [3260]	215 [3120]
Max. oil flow	l/min [US gal/min]	cont.	40 [10.6]	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]
		int.	50 [13.2]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]
Max. starting pressure with unloades shaft	bar [psi]		10 [145]	10 [145]	10 [145]	10 [145]	10 [145]
Min. starting torque at max. pressure drop	Nm [lbf·in]	cont.	85 [750]	190 [1680]	230 [2035]	295 [2610]	335 [2965]
		int.	100 [890]	215 [1900]	255 [2255]	335 [2965]	400 [3540]

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

OMR 200 cm³ - 400 cm³

Type			OMR X			
Motor size			**200**	**250**	**315**	**375**
Geometric displacement	cm^3 [in^3]		198.2 [12.09]	248.1 [15.14]	310.1 [18.92]	363.5 [22.18]
Max. speed	min^{-1} [rpm]	cont.	305	240	195	165
		int.	380	300	245	205
Max. torque	Nm [lbf·in]	cont.	400 [3540]	400 [3540]	400 [3540]	390 [3450]
		int.	480 [4250]	540 [4780]	550 [4870]	550 [4865]
Max. output	kW [hp]	cont.	10.5 [14]	8.8 [11.7]	7.0 [9.4]	5.6 [7.5]
		int.	13.1 [17.5]	10.5 [14.1]	8.9 [11.9]	7.8 [10.5]

OMR X technical data

OMR 200 cm³ - 400 cm³ (continued)

Type			OMR X			
Motor size			**200**	**250**	**315**	**375**
Max. pressure drop	bar [psi]	cont.	150 [2175]	125 [1815]	100 [1450]	80 [1160]
		int.	195 [2830]	170 [2465]	140 [2030]	115 [1670]
Max. oil flow	l/min [US gal/min]	cont.	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]
		int.	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]
Max. starting pressure with unloades shaft	bar [psi]		10 [145]	7 [100]	7 [100]	7 [100]
Min. starting torque at max. pressure drop	Nm [lbf·in]	cont.	350 [3100]	370 [3275]	370 [3275]	335 [2965]
		int.	460 [4070]	500 [4425]	515 [4560]	480 [4250]

Type		Max inlet pressure drop N•m [lbf•in]	Max return pressure with drain line N•m [lbf•in]
OMR X 50 cm³ -4 00 cm³	cont.	200 [2900]	200 [2900]
	int.	225 [3260]	225 [3260]

Maximum permissible shaft seal pressure

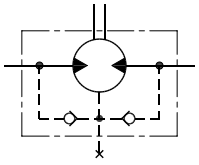
OMR X with High Pressure Shaft seal (HPS)

OMR X with HPS, check valves and with drain connection:

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

OMR X with HPS, check valves and without drain connection:

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

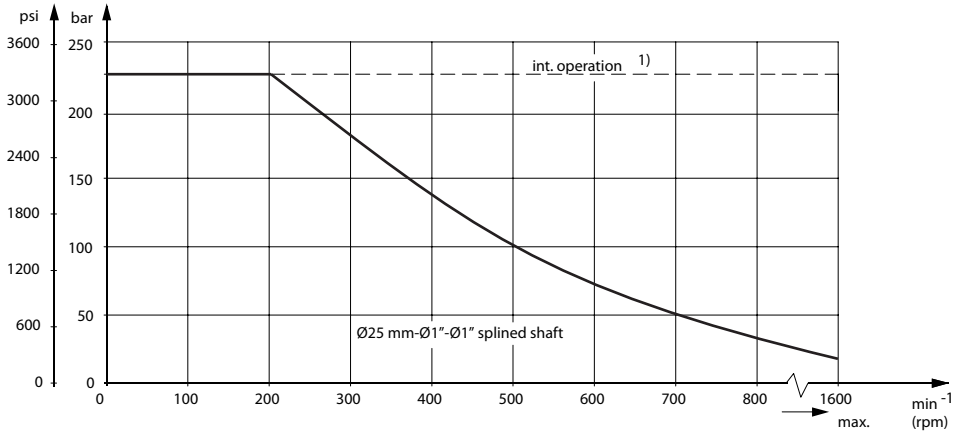


151-320.10

OMR X technical data

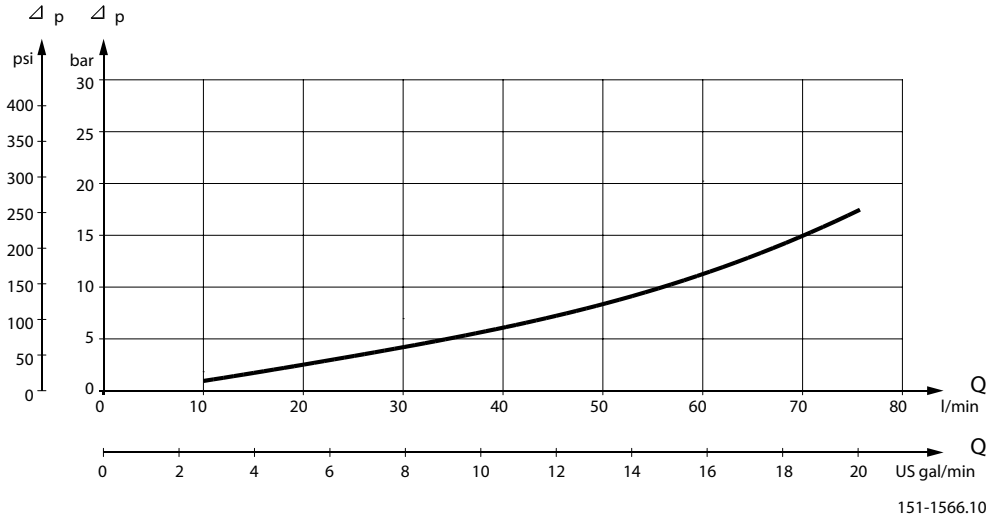
Max. permissible shaft seal pressure

Maximum permissible shaft seal pressure



Pressure drop in OMR X motor

The curve applies to an unloaded motor shaft and an oil viscosity of 35 mm²/s [165 SUS]



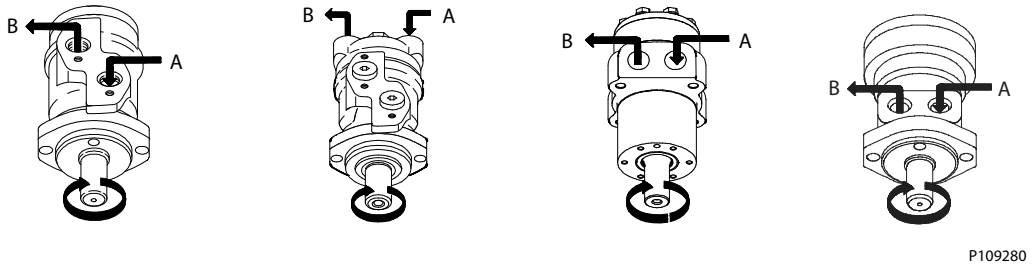
Oil flow in drain line

The table shows the 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]**	**mm²/s**	**[SUS]**	**l/min**	**[US gal/min]**
100	[1450]	20	[100]	2.5	[0.66]
		35	[165]	1.8	[0.78]
140	[2030]	20	[100]	3.5	[0.93]
		35	[165]	2.8	[0.74]

OMR X technical data

Direction of shaft rotation: clockwise



Permissible shaft loads

OMP X and OMR X

The permissible radial shaft load (P_R) depends on:

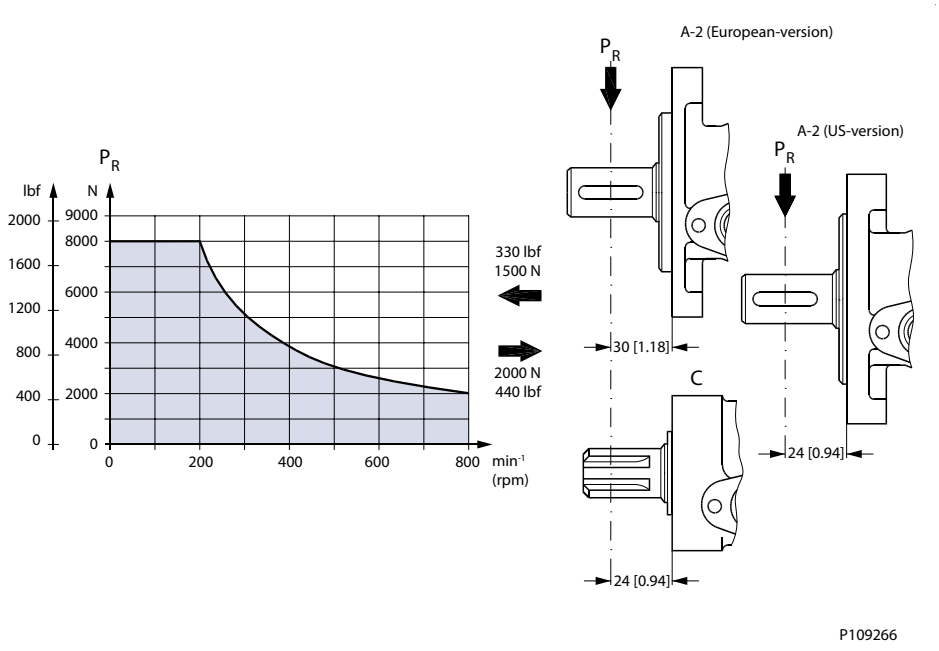
- Speed (n)
- Distance (L) from the point of load to the mounting flange
- Mounting flange version
- Shaft version

Mounting flange	**2-hole oval flange (European version)**	**Square flange**** **2-hole oval flange (US-version)**
Shaft version	**25 mm cylindrical shaft 28.5 mm tapered shaft 1 in cylindrical shaft 1 in splined shaft**	**25 mm cylindrical shaft 1 in splined shaft**
Permissible shaft load (P_R) - l in mm	$\frac{800}{n} \cdot \frac{250000\ N^*}{95 + L}$	$\frac{800}{n} \cdot \frac{250000\ N^*}{101 + L}$
Permissible shaft load (P_R) - l in inch	$\frac{800}{n} \cdot \frac{2215\ lbf^*}{3.74 + L}$	$\frac{800}{n} \cdot \frac{2215\ lbf^*}{3.98 + L}$

** For both European and US-version

* $n \geq 200\ min^{-1}$ [rpm]; ≤ 55 mm [2.2 in]. $n < 200\ min^{-1}$ [rpm]; = > P_{Rmax} = 8000 N [1800 lbf]

OMR X technical data



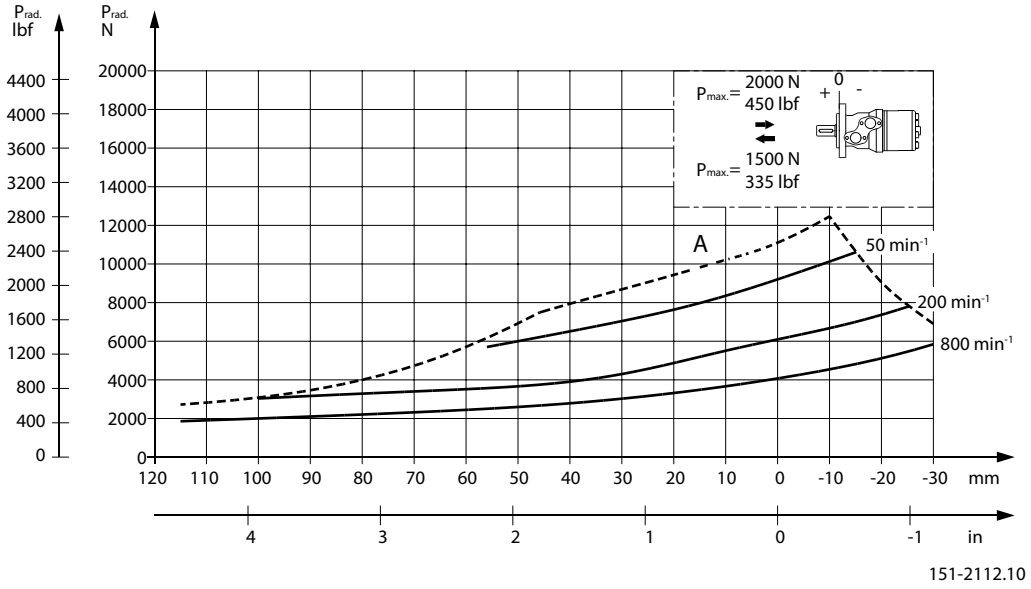
The curve shows the relation between P_R and n

- when l = 30 mm [1.18 in] for motors with A2 (European version)
- when l = 24 mm [0.94 in] for motors with square mounting flange and A2 (US version)

For applications with special performance requirements we recommend OMP and OMR with the output shaft running in needle bearings.

OMR X technical data

OMR X N with Needle Bearings



The output shaft on OMR X N runs in needle bearings. These bearings and the recessed mounting flange allow a higher permissible radial load in comparison to OMR X motors with slide bearings.

The permissible radial load on the shaft is shown for different speeds as a function of the distance from the mounting flange to the point of load application.

Curve A shows max. radial shaft load. Any shaft load exceeding the values quoted in the curve will involve a risk of breakage.

The other curves apply to a B10 bearing life of 2000 hours at the number of revolutions indicated by the curve letter. Mineral based hydraulic oil with a sufficient content of anti-wear additives must be used.

Bearing life calculations can be made using the explanation and formula provided in the chapter *Bearing dimensioning* in the technical information *Orbital Motors General* 520L0232.

OMR X function diagrams

Explanation of function diagram use, basis and conditions can be found in *Speed, torque and output* on page 7.

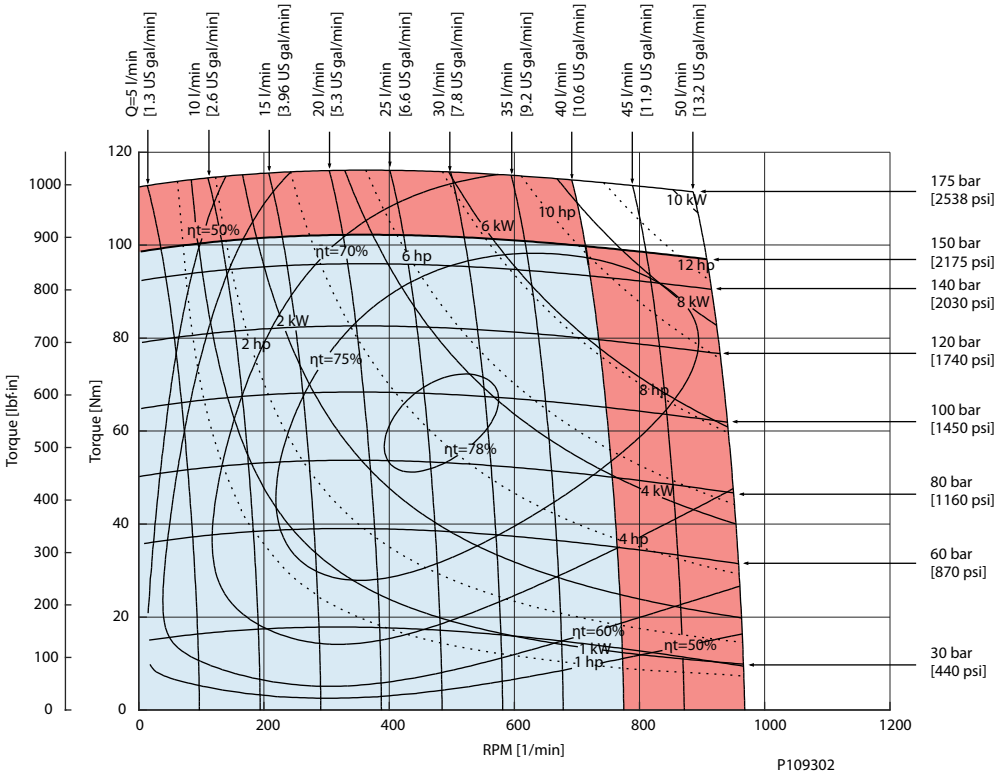
- Continuous range
- Intermittent range (max. 10% operation every minute)

Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found in *OMR X technical data* on page 42.

Intermittent pressure drop and oil flow must not occur simultaneously.

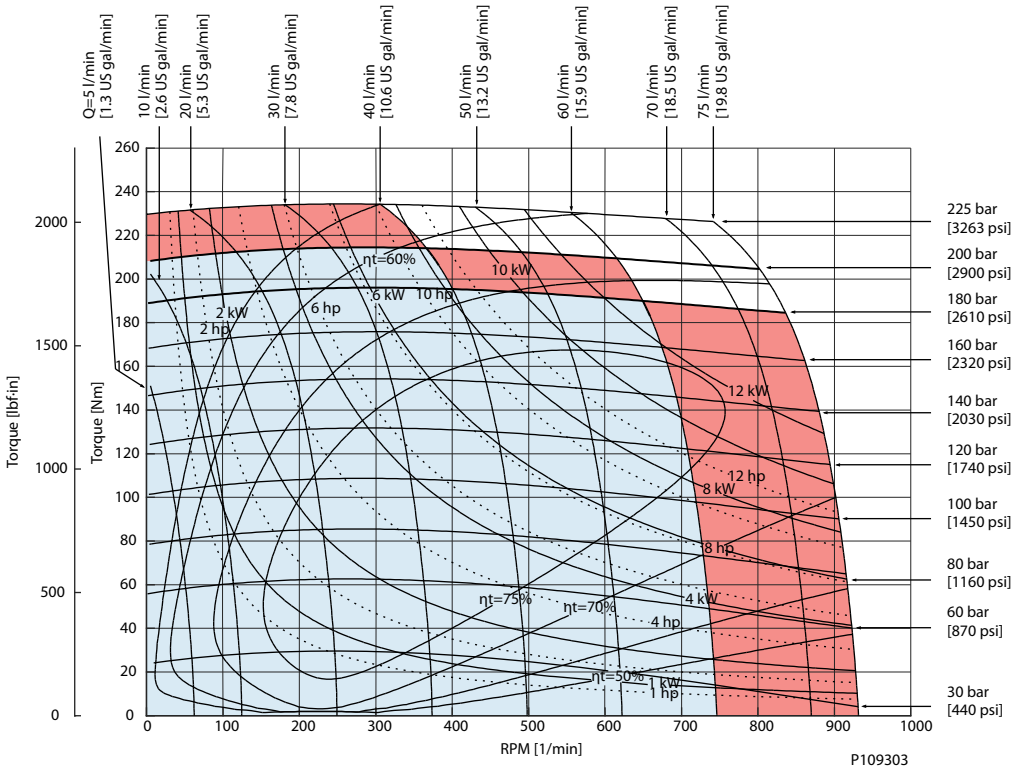
OMR X function diagrams

OMR X 50

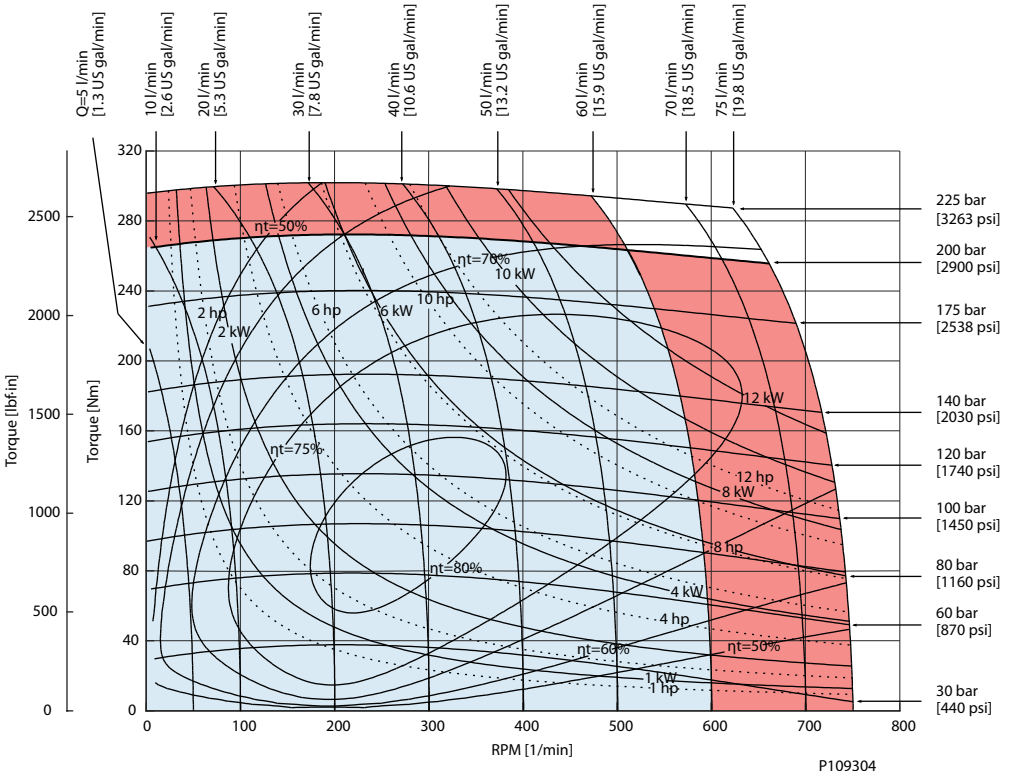


OMR X function diagrams

OMR X 80

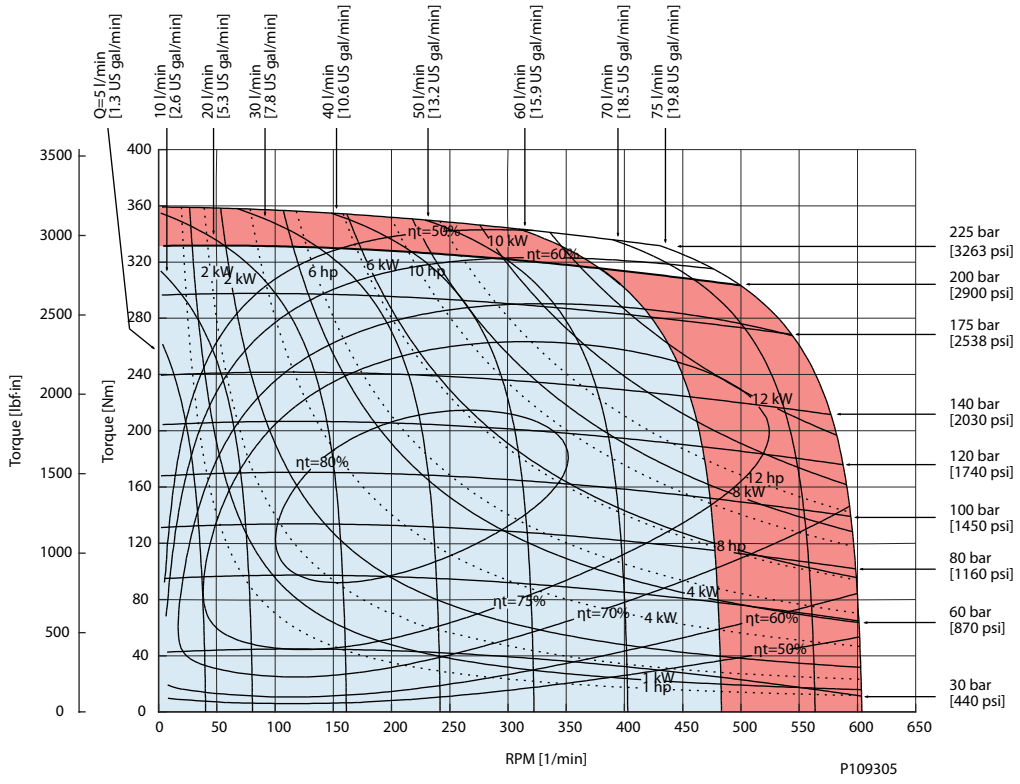


OMR X 100

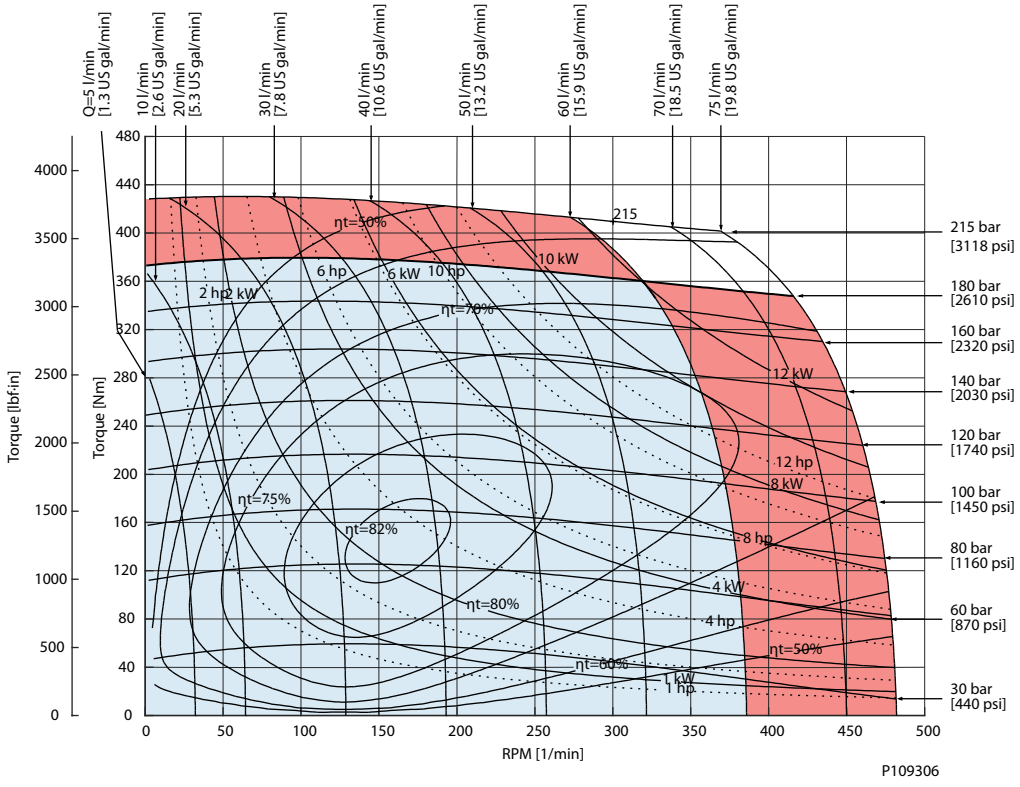


OMR X function diagrams

OMR X 125

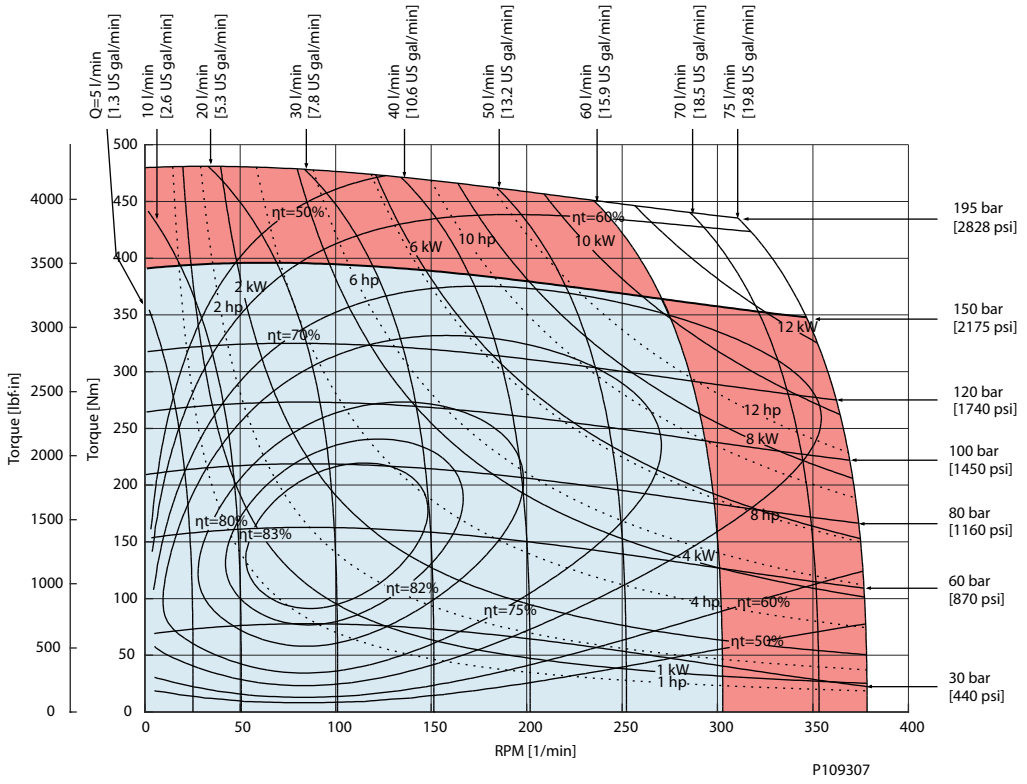


OMR X 160

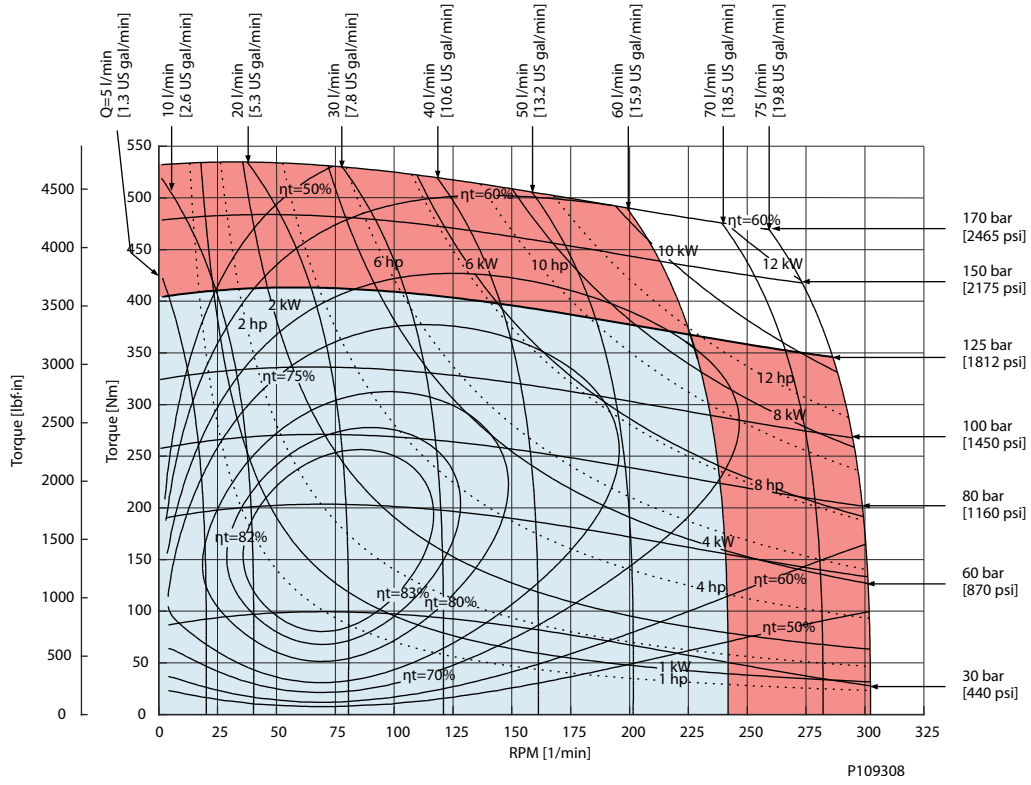


OMR X function diagrams

OMR X 200

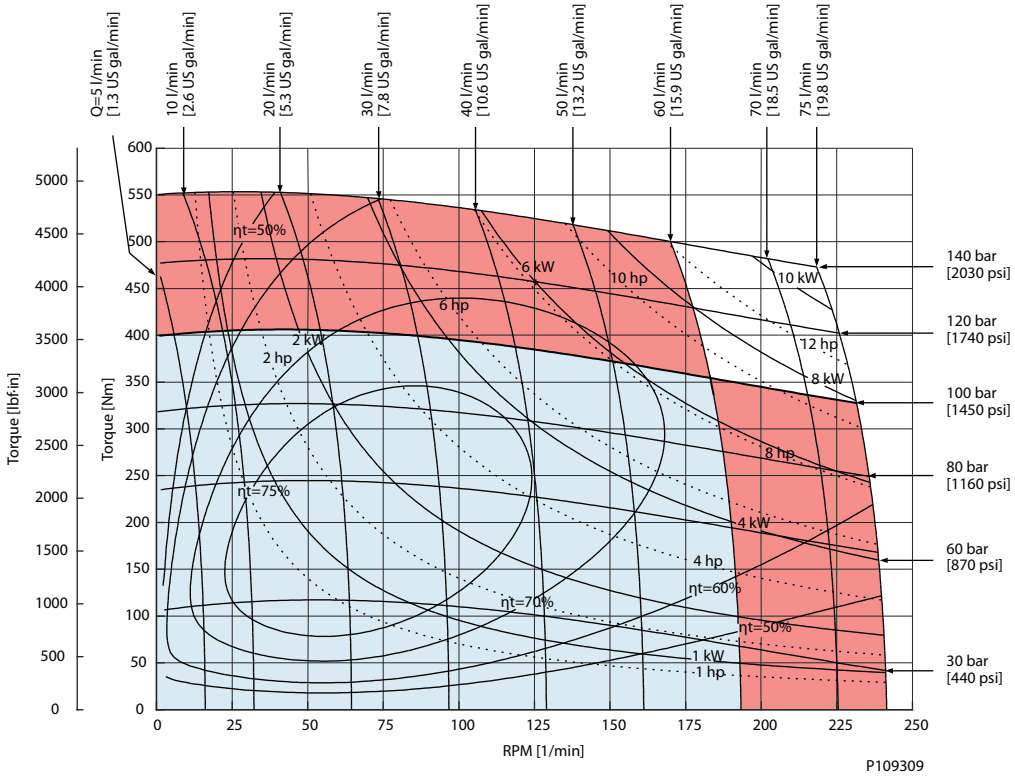


OMR X 250

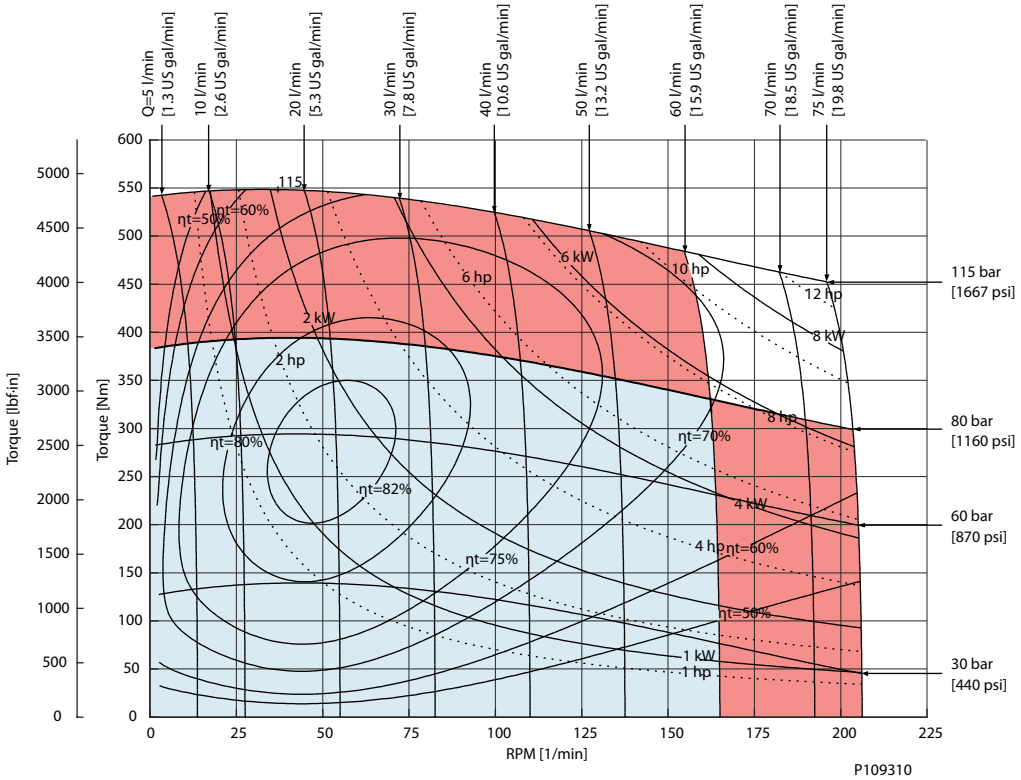


OMR X function diagrams

OMR X 315

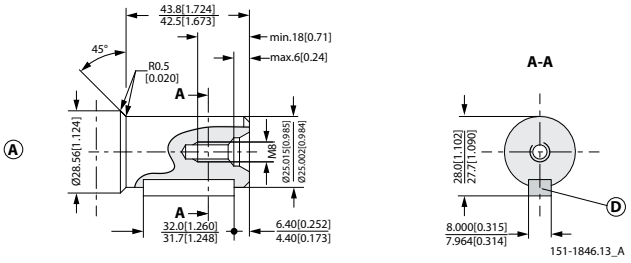


OMR X 375



OMR X Shaft version

OMR X shaft version

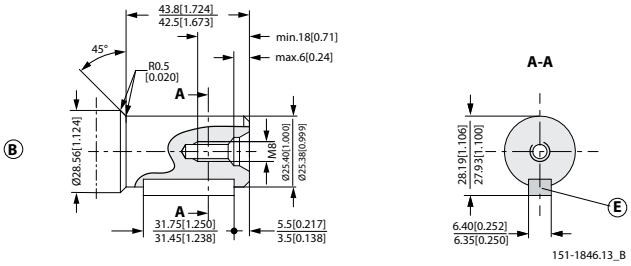


A: Cylindrical shaft 25 mm

D: Parallel key A8 • 7 • 32 DIN 6885

Max cont. torque 340 Nm [3010 lbf·in]

Max int. torque 450 Nm [3983 lbf·in]



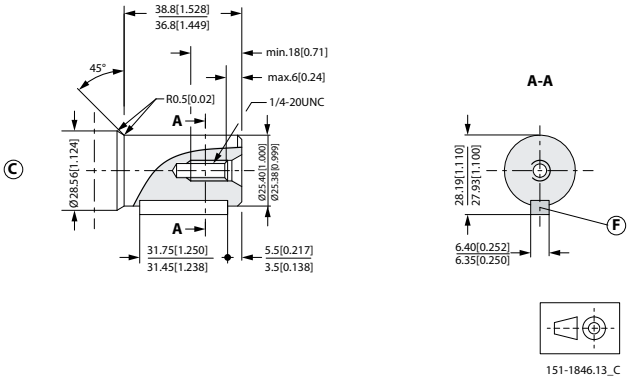
B: Cylindrical shaft 1 in

E: Parallel key ¼ • ¼ • 1 ¼ in B.S. 46

Max cont. torque 340 Nm [3010 lbf·in]

Max int. torque 450 Nm [3983 lbf·in]

US version



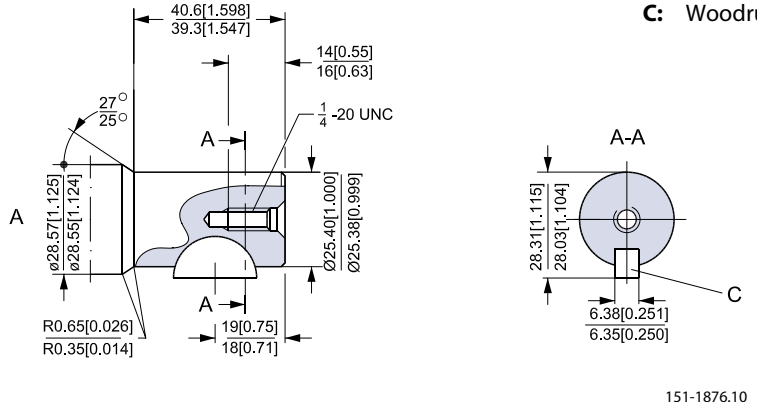
C: Cylindrical shaft 1 in

F: Parallel key ¼ • ¼ • 1 ¼ in B.S. 46

Max cont. torque 340 Nm [3010 lbf·in]

Max int. torque 450 Nm [3983 lbf·in]

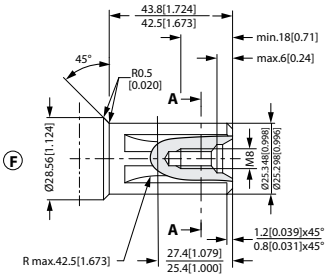
US version

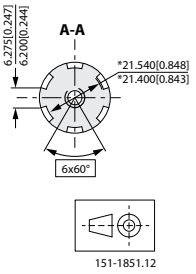


A: Cylindrical shaft 1 in

C: Woodruff key 1/4 x 1 in SAE J502

OMR X Shaft version

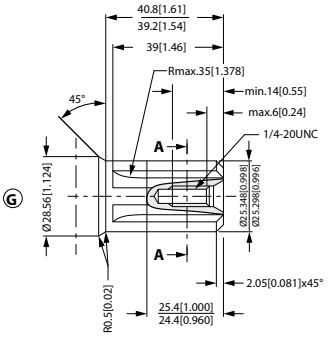


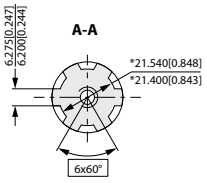


F: Involute splined shaft B.S. 2059 (SAE 6 B) Straight-sided, bottom fitting, deep. Fit 2 Nom. size 1 in *Deviates from B.S. 2059 (SAE 6 B)

Max cont. torque 400 Nm [3540 lbf·in]

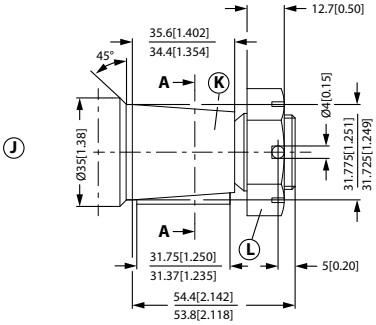
US version

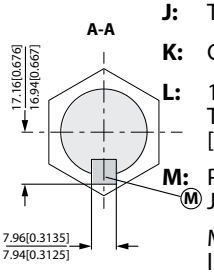




G: Splined shaft SAE 6 B (B.S. 2059) Straight-sided, bottom fitting, deep. Fit 2; Nom. size 1 in * Deviates from SAE 6 B (B.S. 2059)

Max cont. torque 400 Nm [3540 lbf·in]





J: Tapered shaft 1 1/4 in

K: Cone 1:8 SAE J501

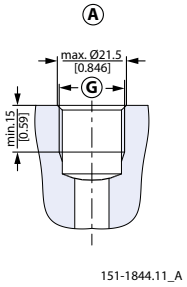
L: 1 - 20 UNEF Across flats 1 7/16 Tightening torque: 200 ± 10 N•m [1770 ± 85 lbf•in]

M: Parallel key 5/16 • 5/16 • 1 1/4 SAE J501

Max cont. torque 400 Nm [3540 lbf·in]

OMR X port thread versions

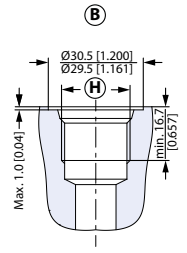
Port thread versions



151-1844.11_A

A: G main ports

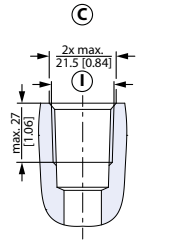
G: ISO 228/1 - G1/2



151-1844.11_B

B: UNF main ports

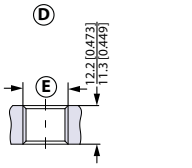
H: 7/8 - 14 UNF O-ring boss port



151-1844.11_C

C: NPTF main ports

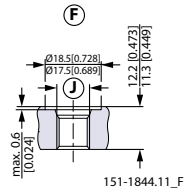
I: 1/2 - 14 NPTF



151-1844.11_D

D: G drain port

E: ISO 228/1 - G1/4



151-1844.11_F

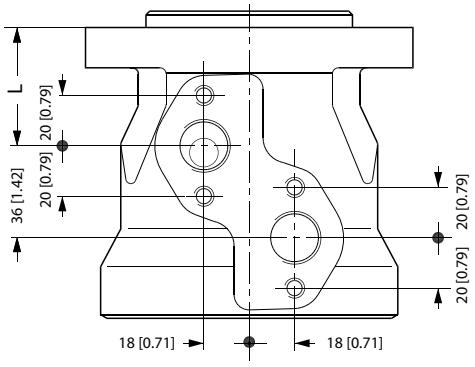
F: UNF drain port

J: 7/16 - 20 UNF O-ring boss port

OMR X port thread versions

OMR X manifold mount

European version



L: see dimensional drawing for given OMR X motor:

- *OMR X dimensions - European version* on page 57
- *OMR X dimensions - US version* on page 61

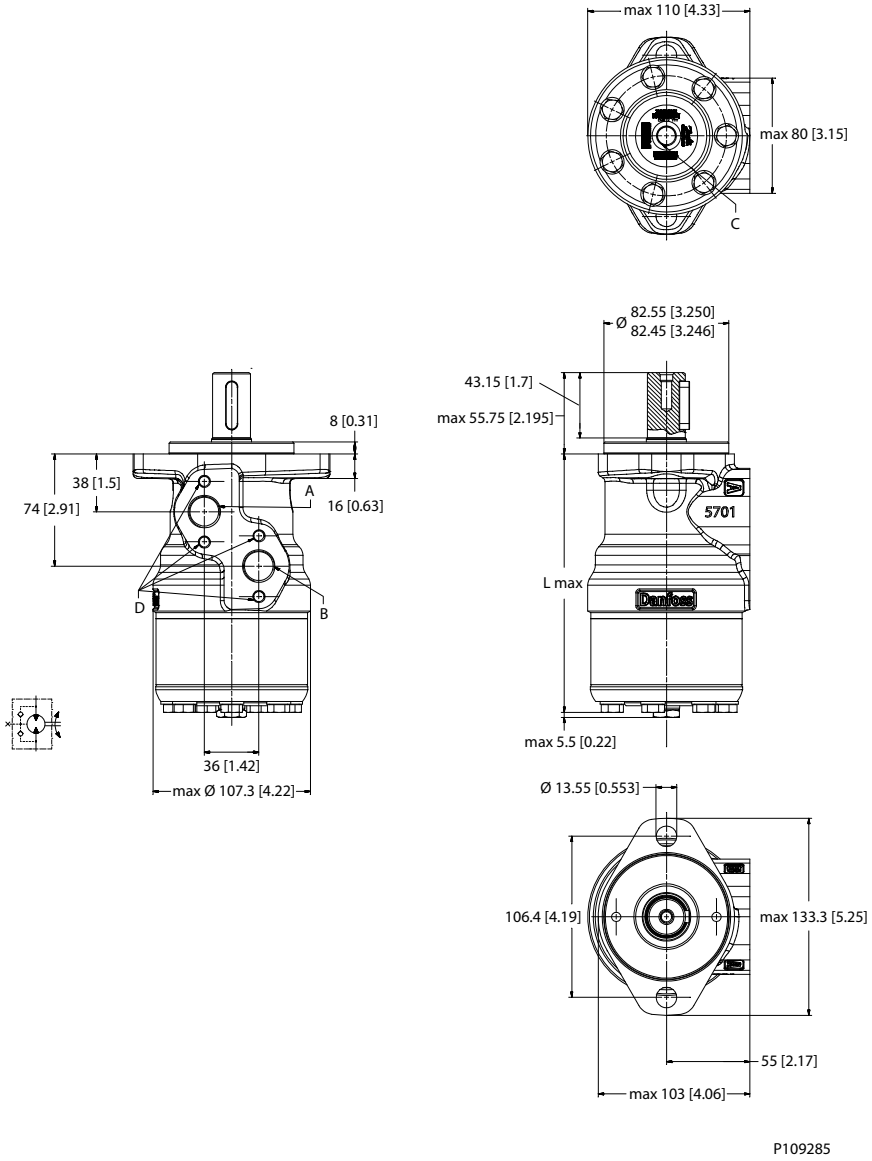
L: see dimensional drawing for given OMP X motor:

- *OMP X dimensions - European version* on page 30
- *OMP X dimensions - US version* on page 35

OMR X dimensions

OMR X dimensions - European version

Side port offset version with 2-hole oval mounting flange (A2 flange)



P109285

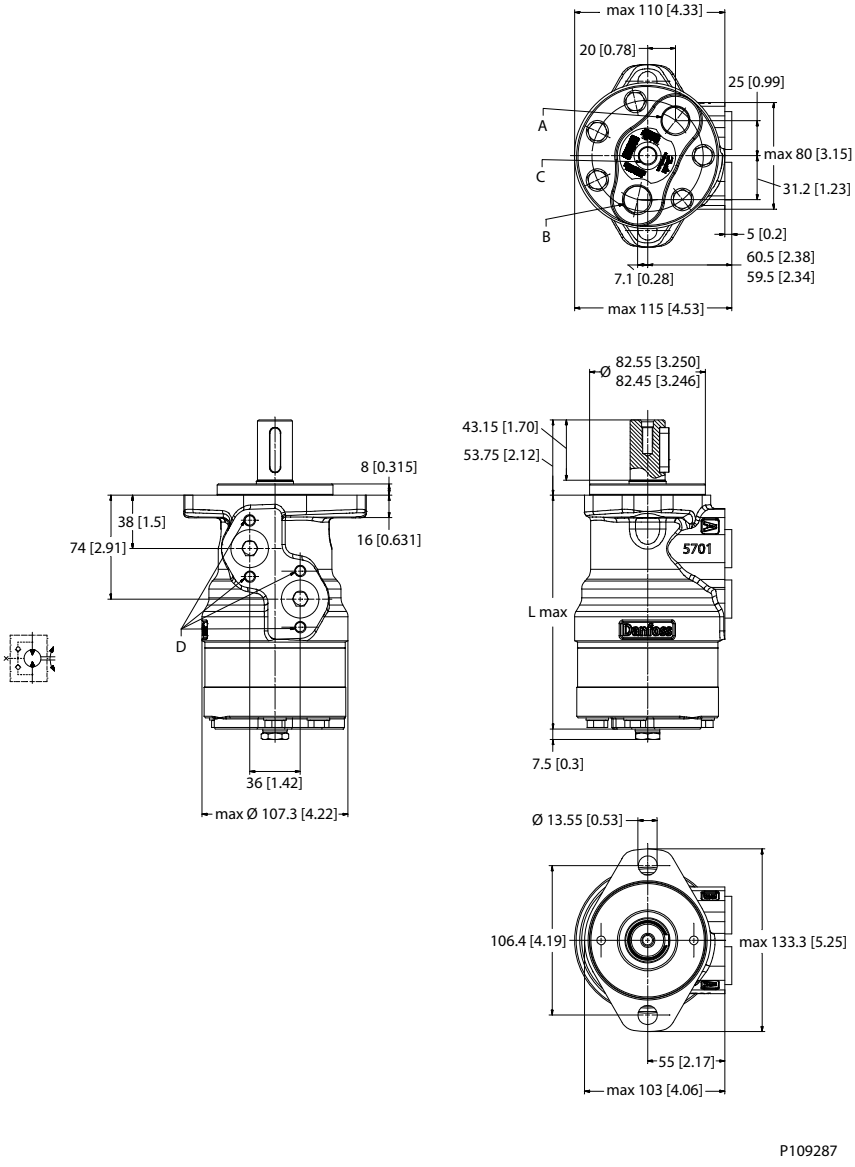
Port connections: A, B	G 1/2; min 15 [0.59] deep
Drain connection: C	G 1/4; 12 [0.47] deep

OMR X dimensions

Type	Displacement	L max: mm [in]
OMR X	50	137.8 [5.43]
	80	142.8 [5.63]
	100	142.8 [5.63]
	125	146.2 [5.76]
	160	150.6 [5.93]
	200	156.6 [6.17]
	250	163.6 [6.45]
	315	172.3 [6.79]
	375	179.8 [7.08]
	400	183.6 [7.23]

OMR X dimensions

End port version with 2-hole oval mounting flange (A2-flange)



P109287

Port connections: A, B	G 1/2; min 15 [0.59] deep
Drain connection: C	G 1/4; 12 [0.47] deep
Threaded connection holes: D	M8 13 [0.51] deep

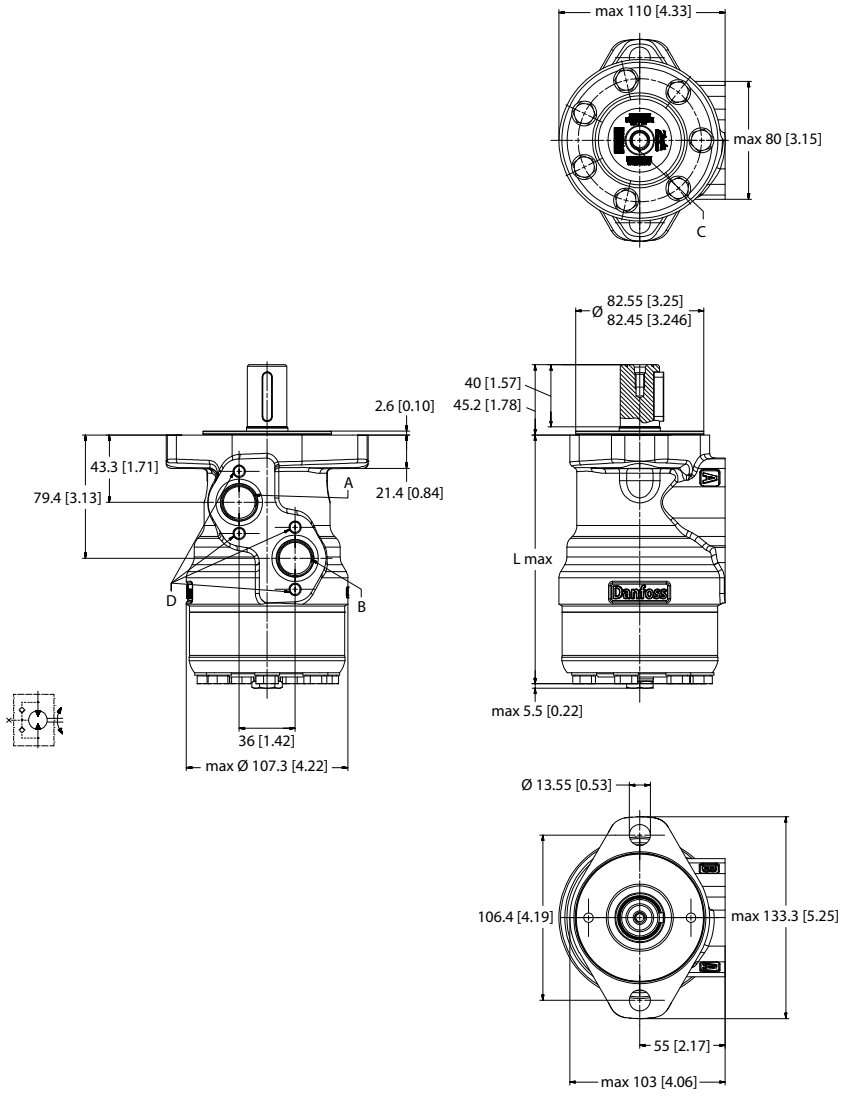
OMR X dimensions

Type	Displacement	L max: mm [in]
OMR X	50	150.3 [5.82]
	80	155.3 [6.12]
	100	155.3 [6.12]
	125	158.7 [6.25]
	160	163.1 [6.43]
	200	169.1 [6.66]
	250	176.1 [6.94]
	315	184.6 [7.28]
	375	192.3 [7.58]

OMR X dimensions

OMR X dimensions - US version

Side port offset version with 2-hole oval mounting flange (A2-flange)



P109288

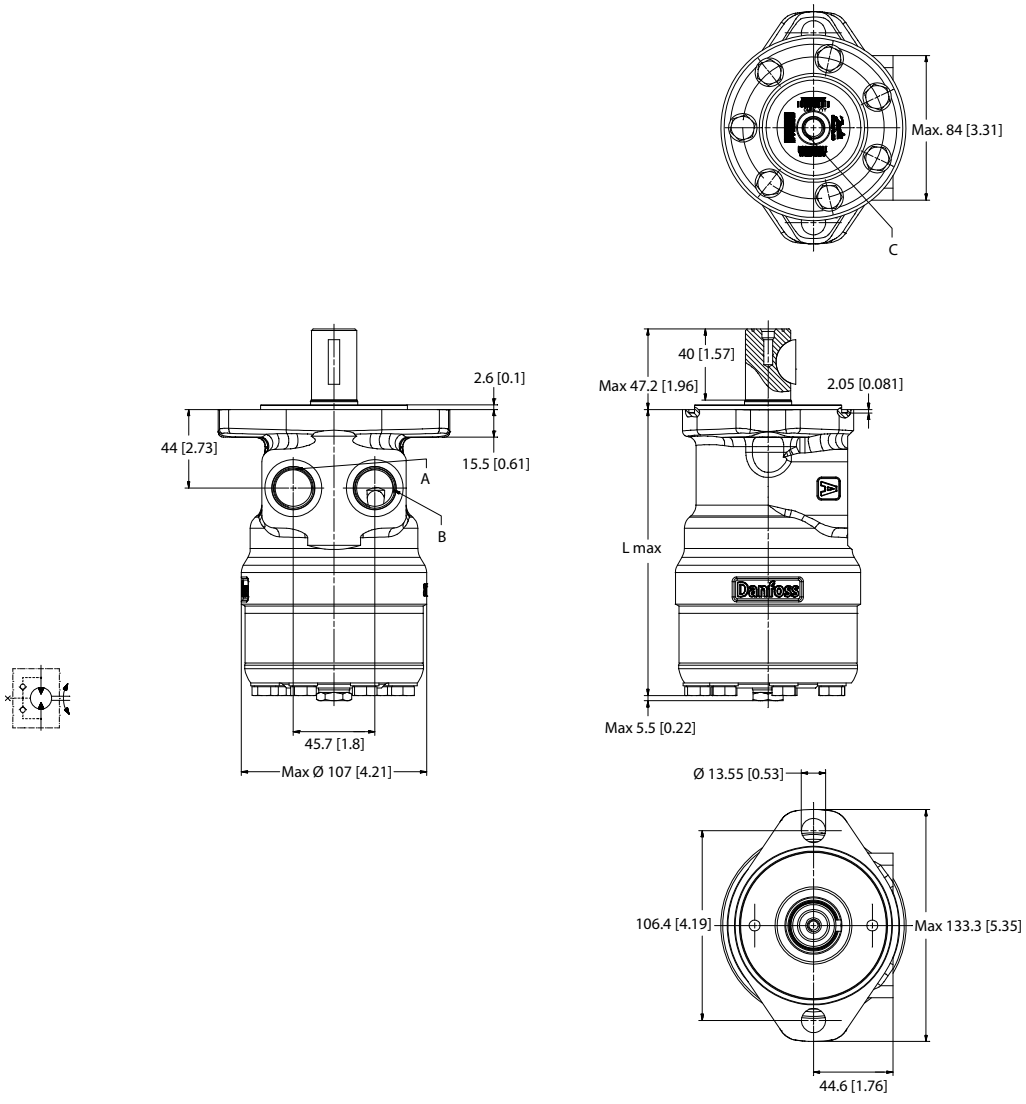
Port connections: A,B	7/8 - 14 UNF; min 16.7 [0.66] deep
Drain connection C	7/16 - 20 UNF; 12 [0.47] deep
Threaded connection holes D	M8; 13 [0.51] deep

OMR X dimensions

Type	Displacement	L max: mm [in]
OMR X	50	143.2 [5.64]
	80	148.2 [5.84]
	100	148.2 [5.84]
	125	151.6 [5.97]
	160	156.0 [6.15]
	200	162.0 [6.38]
	250	169.0 [6.66]
	315	177.7 [7.00]
	375	185.2 [7.30]

OMR X dimensions

Side port aligned version with 2 hole oval mounting flange (A2)



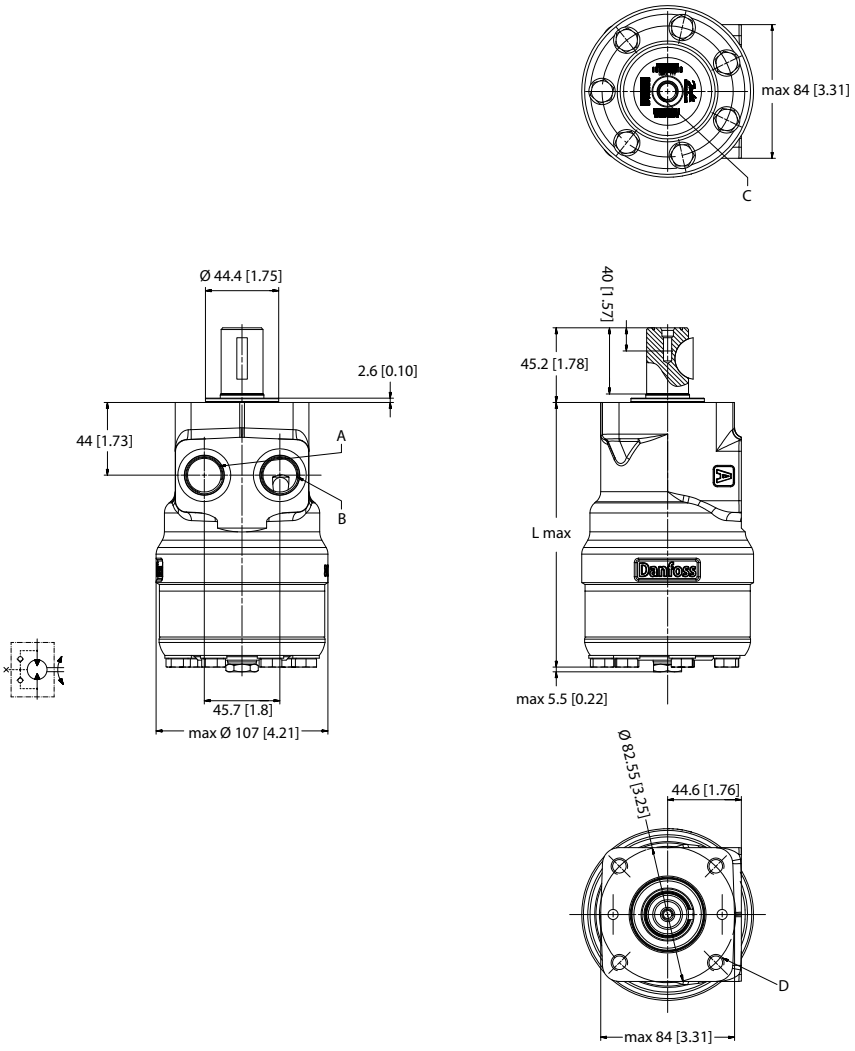
Port connections: A, B	7/8 - 14 UNF; min 16.7 [0.66] deep
Drain connection: C	7/16 - 20 UNF; 12 [0.47] deep

OMR X dimensions

Type	Displacement	L max: mm [in]
OMR X	50	137.8 [5.43]
	80	142.8 [5.63]
	100	142.8 [5.63]
	125	146.2 [5.76]
	160	150.6 [5.93]
	200	156.6 [6.17]
	250	163.6 [6.45]
	315	172.3 [6.79]
	375	179.8 [7.08]
	400	183.6 [7.23]

OMR X dimensions

Side port aligned version with square mounting flange (C-flange)



P109289

Port connections: A, B 7/8 - 14 UNF; min 16.7 [0.66] deep

Drain connection: C 7/16 - 20 UNF; 12 [0.47] deep

Threaded connection holes: D 3/8 - 16 UNC; 15 [0.59]

Type	Displacement	L max: mm [in]
OMR X	80	148.2 [5.84]
	100	148.2 [5.84]
	125	151.6 [5.97]
	160	156 [6.15]
	200	162 [6.38]
	250	169 [6.66]
	315	177.7 [7]
	375	189 [7.45]