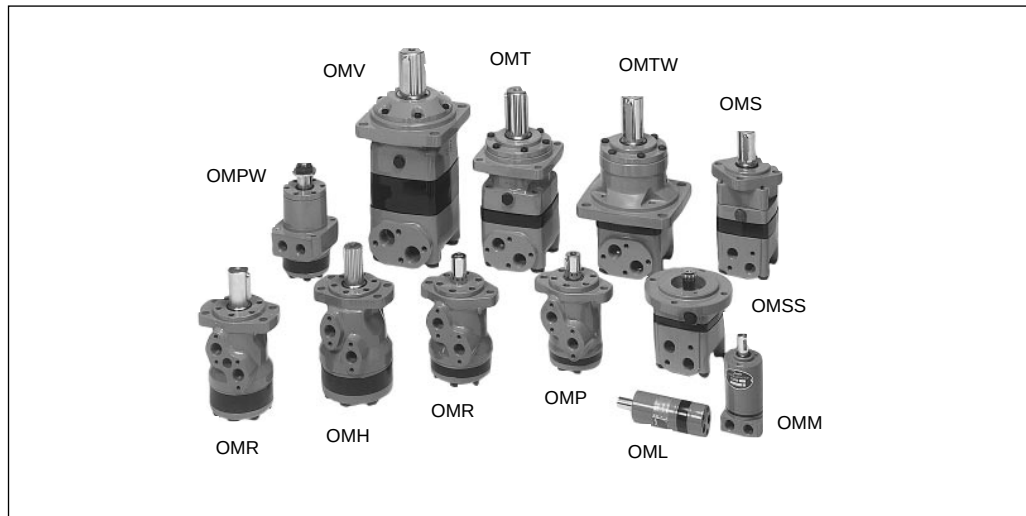


Hydraulic motors OMS, OMT and OMV

Low speed high torque motors



A wide range of hydraulic motors



Danfoss is Europe's largest producer of low speed high torque hydraulic motors. We can offer more than 1600 different hydraulic motors, categorised in types, variants and sizes (incl. different shaft versions).

The motors vary in size (rated displacement) from 8 cm³ to 800 cm³ per revolution.

Speeds range up to approx. 2500 rpm for the smallest type and up to approx 600 rpm for the largest type.

Maximum operating torques vary across the ranges from 1.3 daNm to 250 daNm (peak) and maximum power-outputs from 2.0 kW to 64 kW.

Characteristic features:

- Smooth running over the entire speed range
- Constant operating torque over a wide speed range
- High starting torque
- High return pressure without use of drain line
- 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

Variants

Standard/Extended Programme

The Danfoss metric motor programme has been divided into standard ranges and extended ranges.

The standard ranges are characterised by technical features appealing to a large number of applications.

The extended ranges are characterised by motors adapted to specific applications and comprising the following variants among others:

- Motors with corrosion resistant parts
- Wheel motors with recessed mounting flange
- OMP, OMR motors with needle bearing
- Short motors without bearings
- Ultra short motors
- Motors with integrated drum brake
- Motors with integrated negative holding brake
- Motors with integrated flushing valve
- Actuator motors
- Compact motors; type OMN
- Motors with speed sensor
- Motors with tachometer connection

Planetary gears

Danfoss represents a complete range of planetary gears with flanges and couplings designed for Danfoss hydraulic motors. The combination of motors and gears makes it possible to obtain completely smooth running at fractional speeds and torques up to 65.000 daNm.

Examples of Danfoss hydraulic motor applications

- Machines for agriculture and forestry
- Mining machinery
- Construction plant equipment and access platforms
- Grass cutting machinery
- Special vehicles
- Ship's equipment and winches on fishing vessels
- Machine tools
- Woodworking and sawmill machinery
- Plastic and rubber machinery etc.

Survey of literature with technical data on Danfoss hydraulic motors

Detailed data on all Danfoss motors can be found in our motor catalogue, which is divided into 4 individual subcatalogues:

- General information on Danfoss hydraulic motors: function, use, selection of hydraulic motor, hydraulic systems, etc.
- OML and OMM technical data on small motors.

- Technical data on medium sized motors: OMP, OMR and OMH
- Technical data on large motors: OMS, OMT and OMV

A general survey brochure on Danfoss hydraulic motors giving a quick motor reference based on power, torque, speed and capabilities.

Contents and data survey

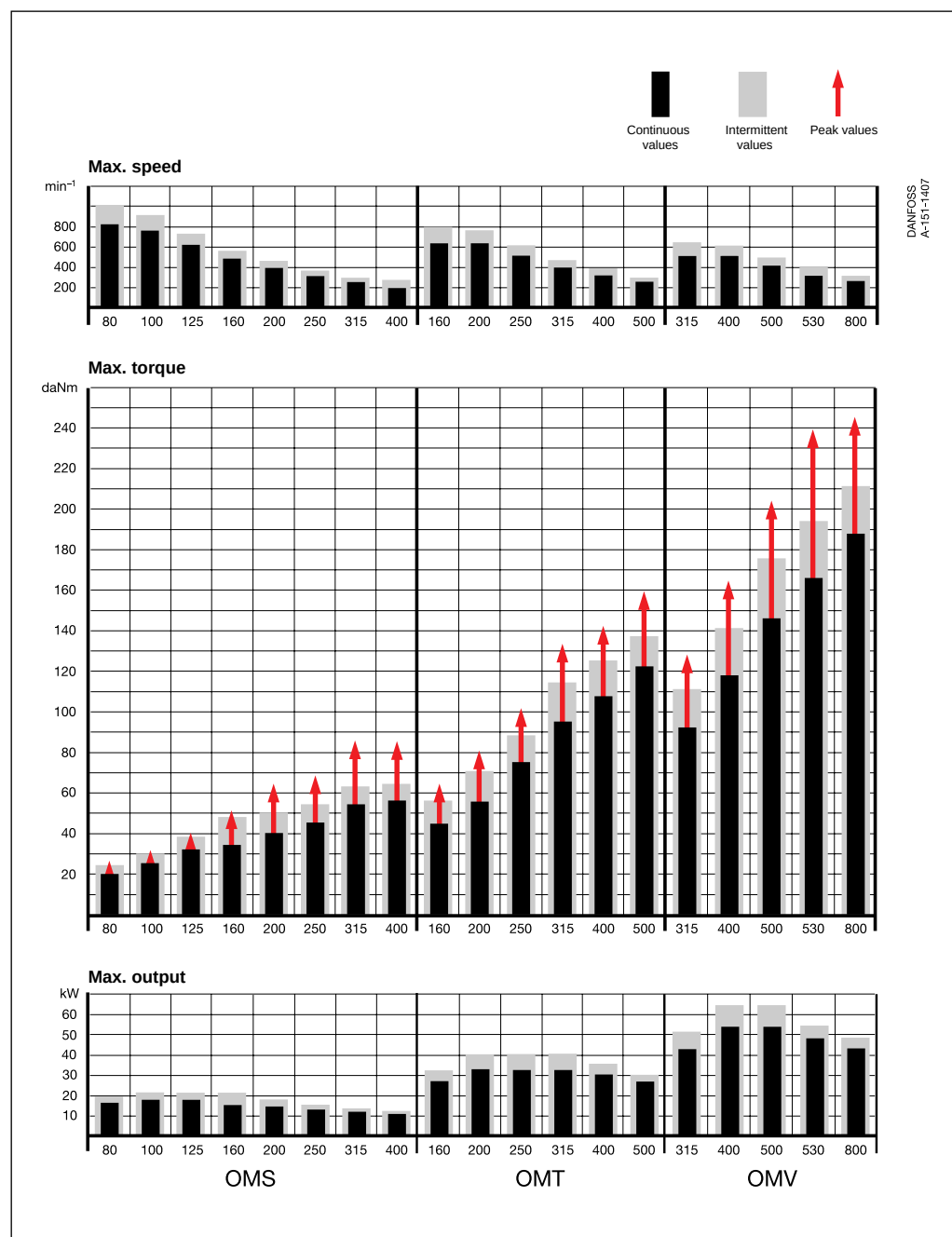
Contents

Type OMS, OMSW, OMSS, OMS B
Type OMT, OMTW, OMTS
Type OMV, OMVW, OMVS
Conversion factors

max. 1000 min⁻¹, 63 daNm, 21 kW
max 780 min⁻¹, 137 daNm, 40 kW
max. 630 min⁻¹, 211 daNm, 64 kW

Page
4
20
36
48

Speed, torque and output



The bar diagram above is used for a quick selection of relevant motor sizes for the application. The final motor size can be determined by using the function diagram for each motor size.

The function diagrams are drawn on the basis of actual tests on a representative number of motors from our production. The diagrams apply to a return pressure between 5 and 10 bar when using mineral based hydraulic oil with a viscosity of 35 mm²/s and a temperature of 50°C. For further explanation concerning how to read and use the function diagrams, please consult the paragraph "Selection of motor size" in our catalogue "General Information".

Thread designation

The designation G for pipe thread replaces the previous designation BSP.F, cf BS/ISO 228/1.

The function diagrams for

- OMS can be found on pages 7 - 10
- OMT can be found on pages 25 - 27
- OMV can be found on pages 40 - 42.

Hydraulic motor OMT

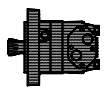
Code numbers and weight

	Motor type	OMT 160	OMT 200	OMT 250	OMT 315	OMT 400	OMT 500
	Cylindrical shaft	151B3000	151B3001	151B3002	151B3003	151B3004	151B3005
	Splined shaft	151B3006	151B3007	151B3008	151B3009	151B3010	151B3011
	Tapered shaft	151B3012	151B3013	151B3014	151B3015	151B3016	151B3017
	P.t.o. shaft	151B3018	151B3019	151B3020	151B3021	151B3022	151B3023
	Weight (kg)	20	20.5	21	22	23	24

Wheel motor

	Motor type	OMTW 160	OMTW 200	OMTW 250	OMTW 315	OMTW 400	OMTW 500
	Cylindrical shaft	151B3024	151B3025	151B3026	151B3027	151B3028	151B3029
	Tapered shaft	151B3030	151B3031	151B3032	151B3033	151B3034	151B3035
	Weight (kg)	22	22.5	23	24	25	26

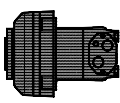
Short motor

	Motor type	OMTS 160	OMTS 200	OMTS 250	OMTS 315	OMTS 400	OMTS 500
	Without output shaft	151B3036	151B3037	151B3038	151B3039	151B3040	151B3041
	Weight (kg)	20	20.5	21	22	23	24

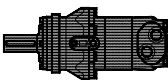
Motors with tacho connection

For code numbers of motors with tacho connection, please contact Danfoss Sales Organization for Hydraulics.

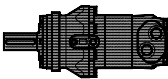
Brake motor OMT FX

	Motor type	OMT FX	OMT FX	OMT FX	OMT FX	OMT FX	OMT FX
	Motor size	160	200	250	315	400	500
	Wheel bolt flange	151B3207	151B3208	151B3209	151B3210	151B3211	151B3212
	Thread hole flange	151B3200	151B3201	151B3202	151B3203	151B3204	151B3205
	Weight (kg)	31.0	31.5	32.0	33.0	34.0	35.0

Brake motor OMT FL

	Motor type	OMT FL	OMT FL	OMT FL	OMT FL	OMT FL	OMT FL
	Motor size	160	200	250	315	400	500
	Cylindrical shaft	151B4000	151B4001	151B4002	151B4003	151B4004	151B4005
	Splined shaft	151B4007	151B4008	151B4009	151B4010	151B4011	151B4012
	Weight (kg)	24.5	25.0	25.5	26.5	27.5	28.5

Brake motor OMT FH

	Motor type	OMT FH	OMT FH	OMT FH	OMT FH	OMT FH	OMT FH
	Motor size	160	200	250	315	400	500
	Cylindrical shaft	151B4021	151B4022	151B4023	151B4024	151B4025	151B4026
	Splined shaft	151B4028	151B4029	151B4030	151B4031	151B4032	151B4033
	Weight (kg)	24.5	25.0	25.5	26.5	27.5	28.5

Technical data

Motor type		OMT OMTW OMTS OMT FX OMT FL OMT FH	OMT OMTW OMTS OMT FX OMT FL OMT FH	OMT OMTW OMTS OMT FX OMT FL OMT FH	OMT OMTW OMTS OMT FX OMT FL OMT FH	OMT OMTW OMTS OMT FX OMT FL OMT FH	OMT OMTW OMTS OMT FX OMT FL OMT FH
Motor size		160	200	250	315	400	500
Geometric displacement	(cm ³ /rev)	161.1	201.4	251.8	326.3	410.9	523.6
Max. speed	(min ⁻¹)	cont.	625	625	500	380	240
		int. ¹⁾	780	750	600	460	285
Max. torque	(daNm)	cont.	47	59	73	95	122
		int. ¹⁾	56	71	88	114	137
		peak ²⁾	66	82	102	133	160
Max. output	(kW)	cont.	26.5	33.5	33.5	33.5	30
		int. ¹⁾	32	40	40	40	35
Max. pressure drop	(bar)	cont.	200	200	200	200	180
		int. ¹⁾	240	240	240	240	210
		peak ²⁾	280	280	280	280	240
Max. oil flow	(l/min)	cont.	100	125	125	125	125
		int. ¹⁾	125	150	150	150	150
Max. starting pressure with unloaded shaft	(bar)	10	10	10	10	10	10
Min. starting torque	(daNm)	at max. press. drop cont.	34	43	53	74	84
		at max. press. drop int. ¹⁾	41	52	63	89	106
Min. speed ³⁾	(min ⁻¹)	10	9	8	7	6	5

Type		Max. inlet pressure	Max. return pressure with drain line ⁴⁾
OMT, OMTW, OMTS OMT FX, OMT FL, OMT FH	cont.	210	140
	int. ¹⁾	250	175
	peak ²⁾	300	210

Brake motors

Type	Max. pressure in drain line ⁴⁾ (bar)	Holding torque ⁵⁾ (daNm)	Brake-release pressure ⁴⁾ (bar)	Max. pressure in brake line (bar)
OMT FX, OMT FL	5	120	12	30
OMT FH	5	120	30	280

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

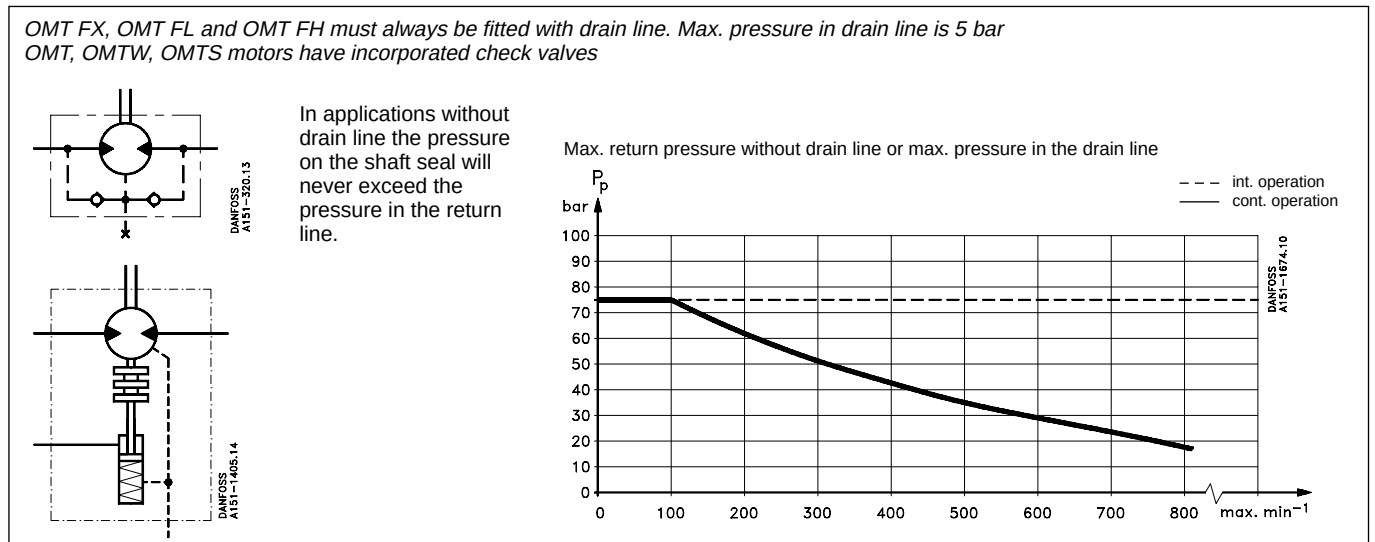
²⁾ Peak load: The permissible values may occur for max. 1% of every minute.

³⁾ Operation at lower speeds may be slightly less smooth.

⁴⁾ Brake motors must always have a drain line. The brake-release pressure is the difference between the pressure in the brake line and the pressure in the drain line.

⁵⁾ For the supply of motors with holding torques higher than those stated, please contact the Sales Organization for Danfoss Hydraulics.

Max. permissible shaft seal pressure

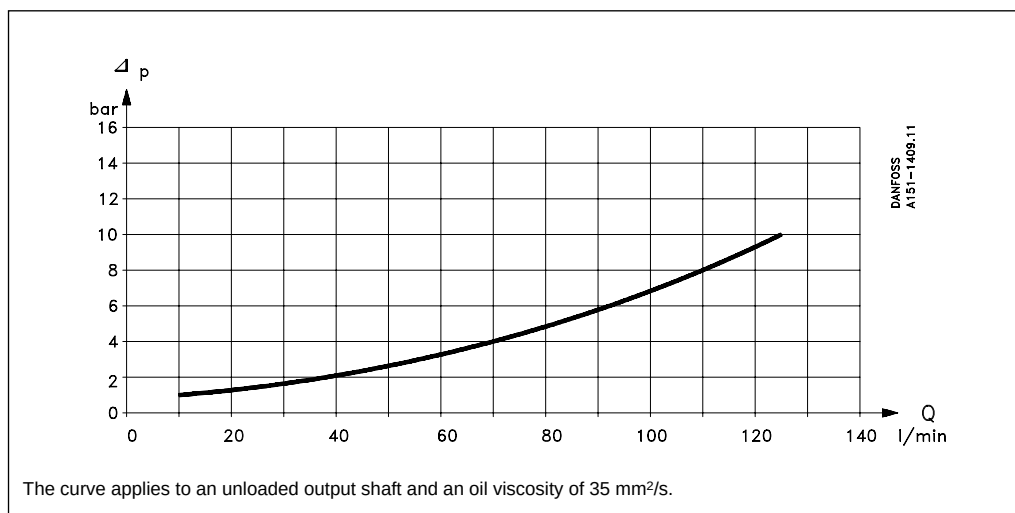


Oil flow in drain line

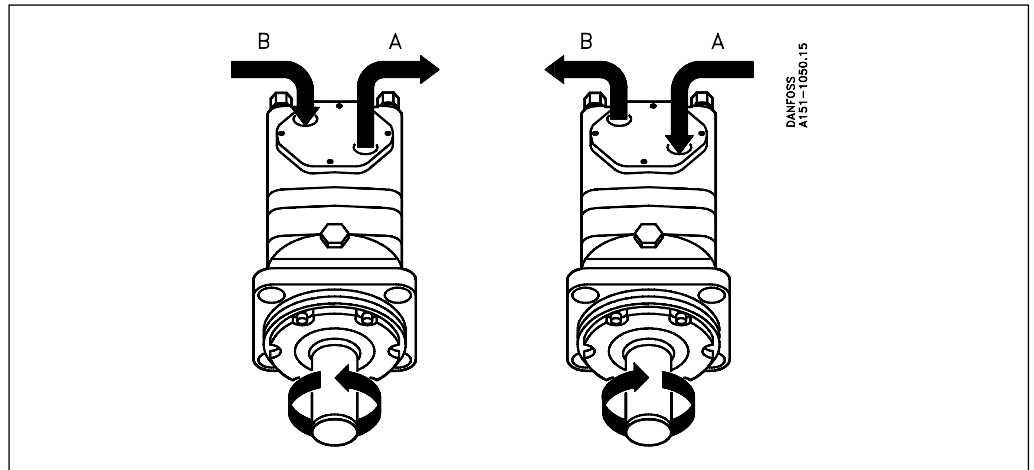
The table shows the max. oil flow in the drain line for all OMT motors. The values are measured at a return pressure less than 5-10 bar.

Pressure drop (bar)	Viscosity (mm ² /s)	Oil flow in drain line (l/min)
140	20	2.5
	35	1.5
210	20	5
	35	3

Pressure loss in the motor



Direction of shaft rotation



Permissible shaft load for OMT and OMTW

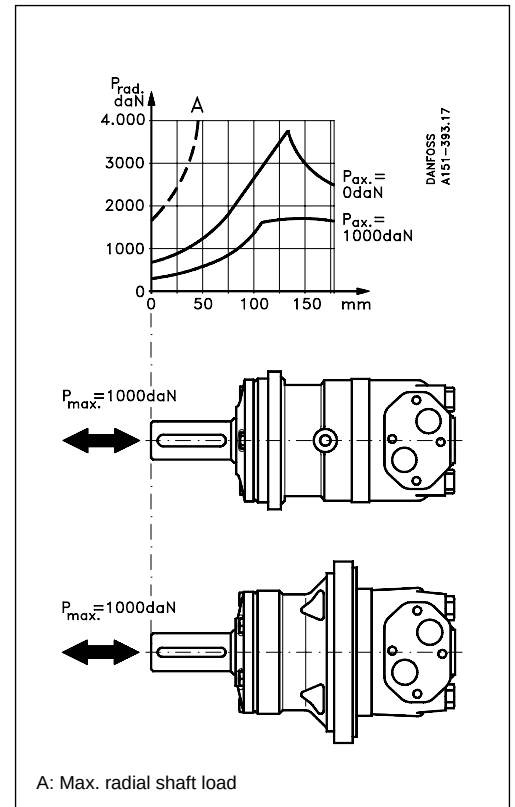
The output shaft runs in tapered roller bearings that permit high axial and radial forces.

The permissible radial load on the shaft is shown for an axial load of 0 and 1000 daN 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 3000 hours at 200 min^{-1} when mineral based hydraulic oil with a sufficient content of anti-wear additives is used.

Bearing life calculations can be made using the explanation and formula provided in the chapter "Bearing dimensioning" in the subcatalogue "General information".

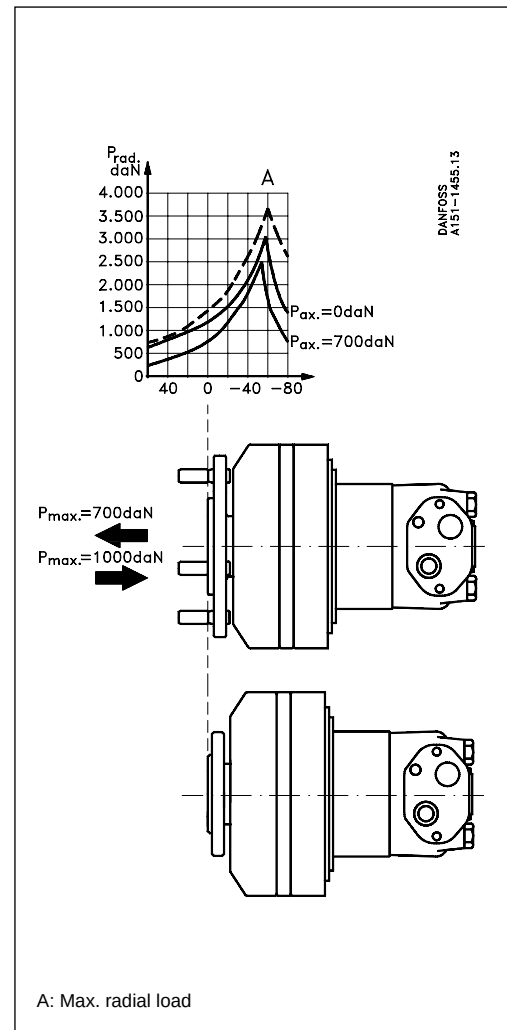


Permissible radial and axial loads for OMT FX

OMT FX shafts run in ball race bearings. This means that OMT FX can be used for heavy vehicles and for winches with relatively high tractive effort without the necessity for further bearings on wheel or winch drum.

The drawing shows the permissible axial and radial forces. Curve A shows the maximum radial load. Any radial load exceeding the values quoted in the curve will involve a risk of breakage.

The other curves apply to a B 10 bearing life of 3000 hours at 50 min⁻¹ when mineral-based hydraulic oil with a sufficient content of antiwear additives is used.



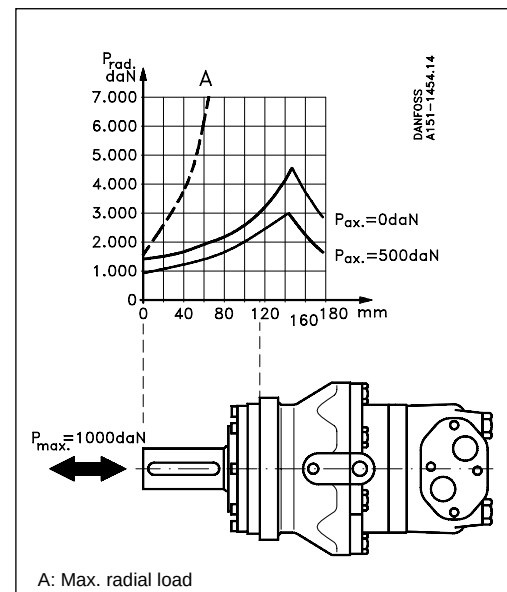
Permissible radial and axial loads for OMT FL and OMT FH

OMT FL shafts run in taper roller bearings. This means that OMT FL and OMT FH can be used for very heavy vehicles and for winches with great tractive efforts without the necessity for further bearings on wheel or winch drum.

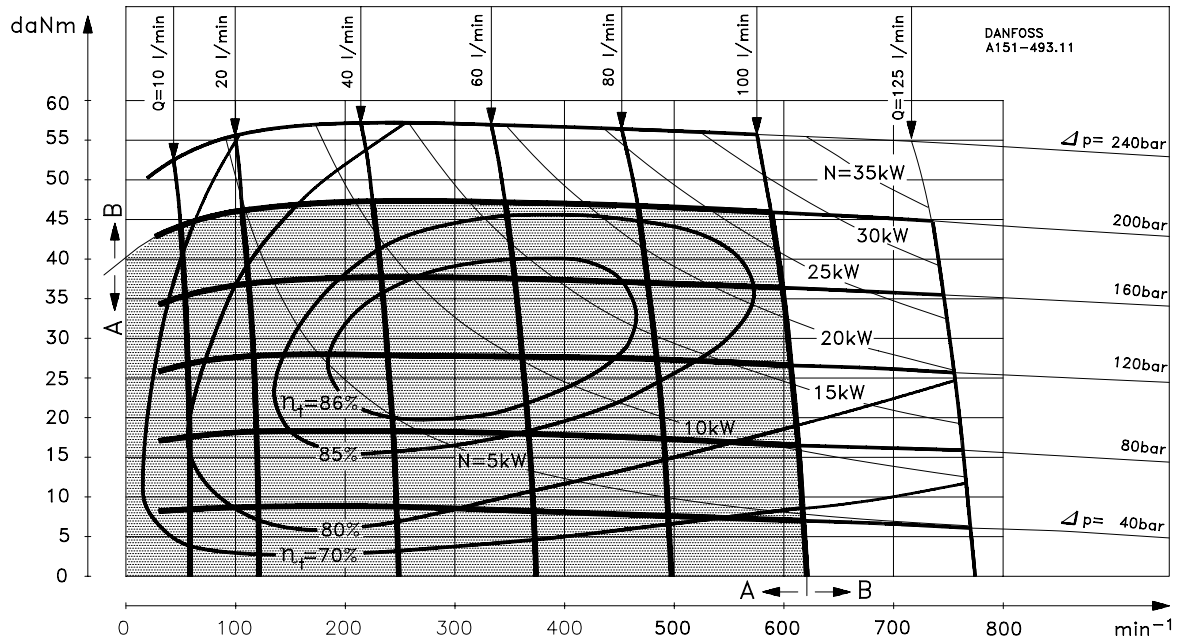
The drawing shows the permissible axial and radial forces.

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

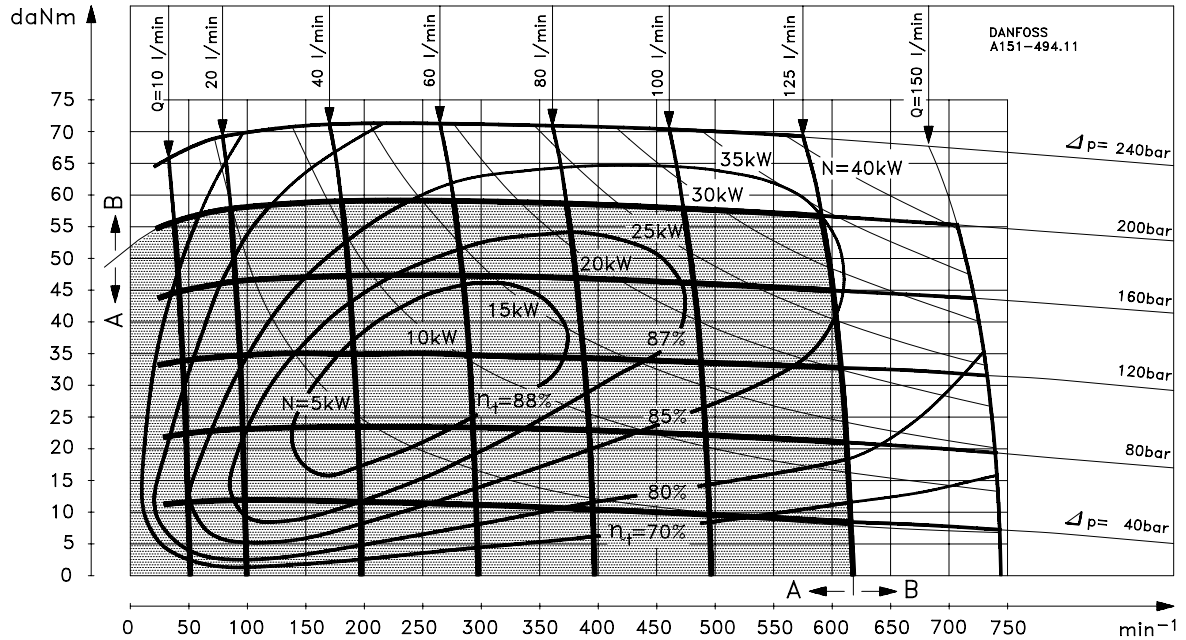
The other curves apply to a B10 bearing life of 3000 hours at 200 min⁻¹ when mineral-based hydraulic oil with a sufficient content of anti-wear additives is used.



OMT 160



OMT 200

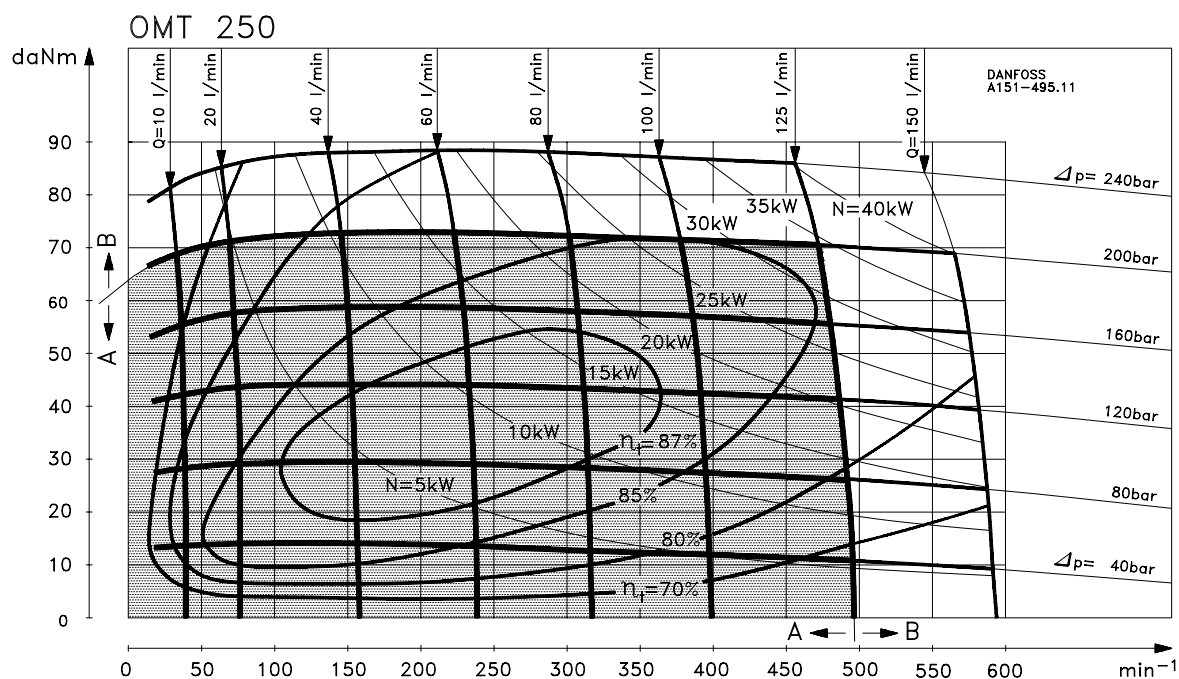
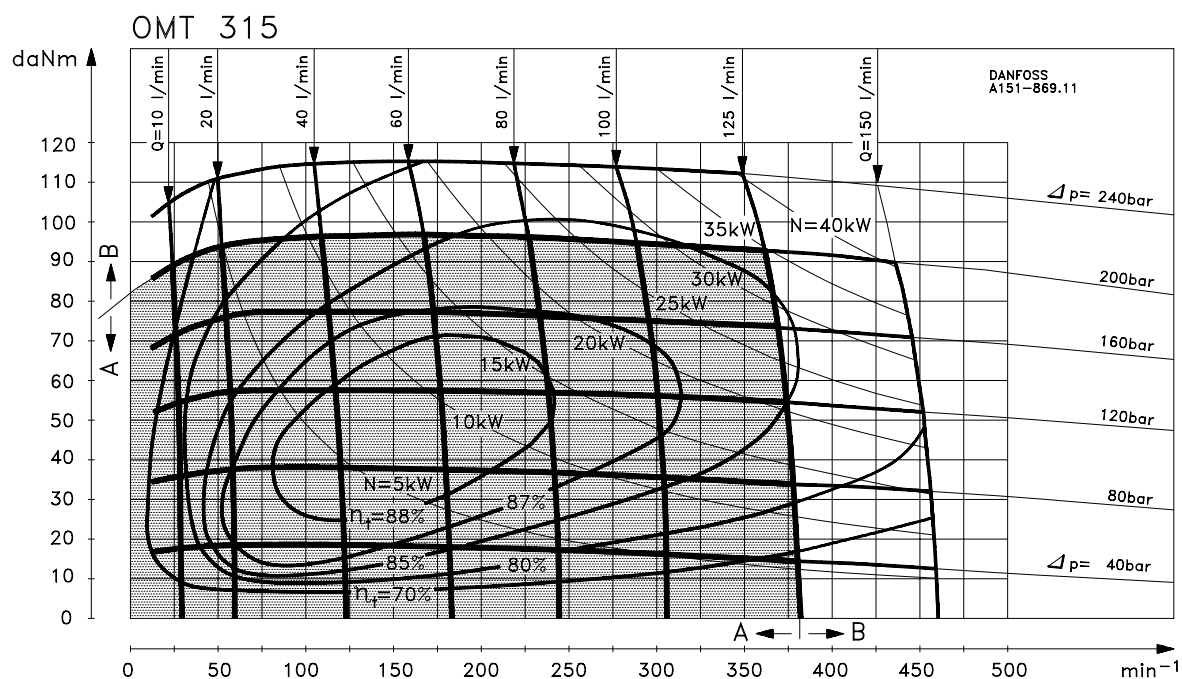


Explanation of function diagram use, basis and conditions can be found on page 3.

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

Note:

Intermittent pressure drop and oil flow must not occur simultaneously.

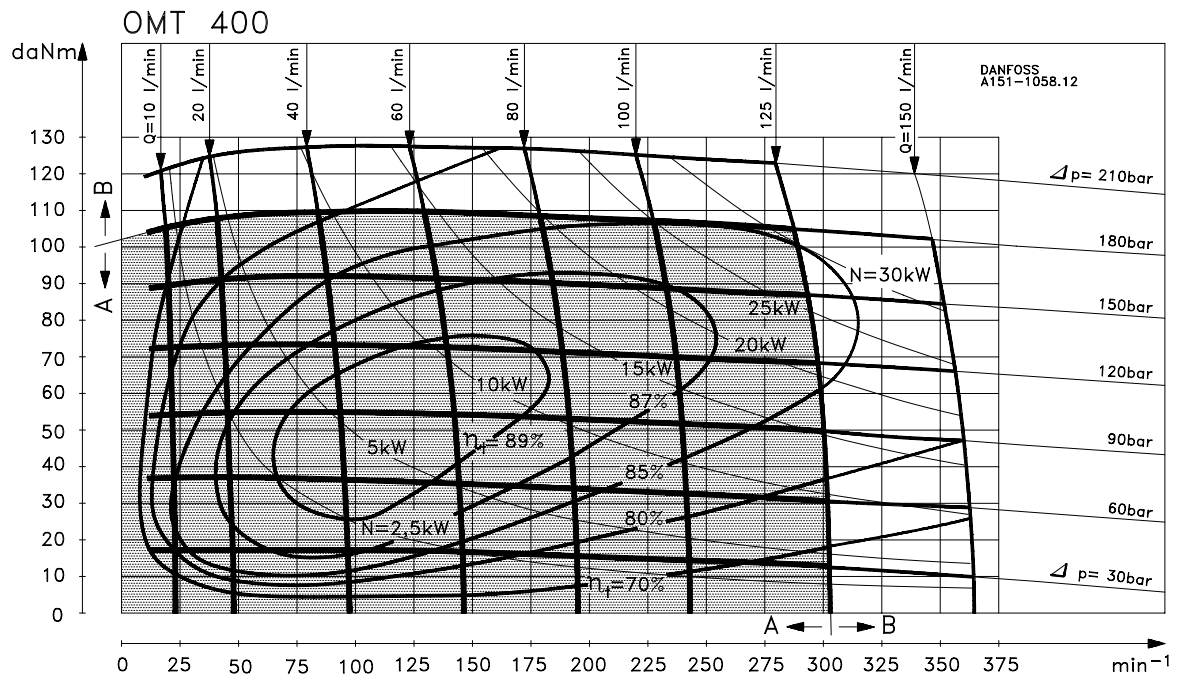
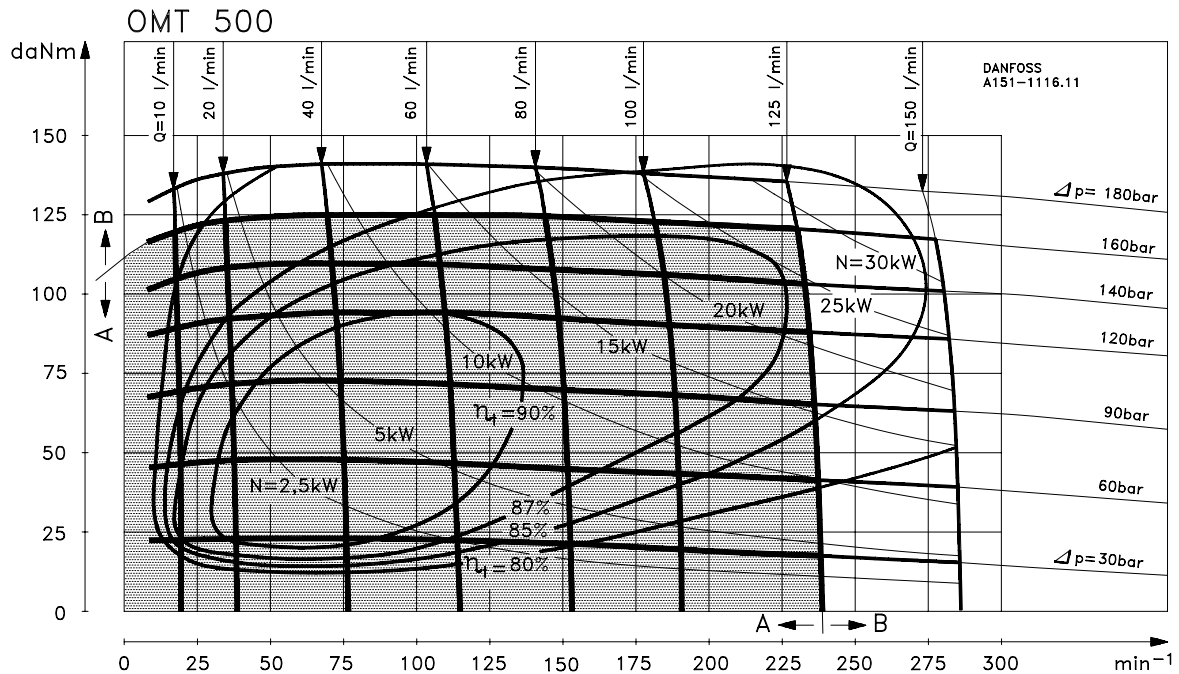


Explanation of function diagram use, basis and conditions can be found on page 3.

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

Note:

Intermittent pressure drop and oil flow must not occur simultaneously.



Explanation of function diagram use, basis and conditions can be found on page 3.

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

Note:

Intermittent pressure drop and oil flow must not occur simultaneously.

A: Cylindrical shaft
 G: Parallel key
 A12 × 8 × 70
 DIN 6885

B: Involute splined shaft
 ANS B92.1 - 1970 standard
 Flat root side fit
 Pitch 12/24
 Teeth 17
 Major dia. 1.50 inch
 Pressure angle 30°

C: Tapered shaft
 (ISO/R775)
 E: DIN 937
 Across flats: 46
 Tightening torque:
 50 ± 3 daNm
 F: Taper 1:10
 H: Parallel key
 B12 × 8 × 28
 DIN 6885

D: P.t.o. shaft
 DIN 9611 Form 1
 (ISO/R500 without pin hole)
 ** Deviates from DIN 9611

Technical drawing of a Danfoss A151-889.14 valve, showing three views: front, side, and top. The drawing includes detailed dimensions in millimeters and degrees.

Front View Dimensions:

- Overall height: 82
- Top flange diameter: $\varnothing 125^{+0.5}_{-1}$
- Top flange thickness: 32
- Main body diameter: $\varnothing 72 \pm 1$
- Main body height: 60
- Bottom flange diameter: 100
- Bottom flange thickness: 23.0 ± 0.6
- Mounting hole diameter: 12.5 ± 0.5
- Mounting hole spacing: 21.6 ± 0.5
- Mounting hole diameter: 20.0 ± 0.3
- Mounting hole spacing: 21.6 ± 0.5
- Overall width: max. 128

Side View Dimensions:

- Top flange thickness: 32
- Main body diameter: 72
- Main body height: 60
- Bottom flange thickness: max. 67
- Bottom flange width: max. 71

Top View Dimensions:

- Flange side length: max. 143
- Flange thickness: max. 143
- Flange fillet radius: R12
- Mounting hole diameter: $\varnothing 14$
- Mounting hole spacing: $\varnothing 160 \pm 0.4$

Other Dimensions:

- Top flange thickness: 18
- Main body diameter: $\varnothing 125^{+0.5}_{-1}$
- Main body diameter: $\varnothing 72 \pm 1$
- Main body height: 60
- Bottom flange thickness: 23.0 ± 0.6
- Mounting hole diameter: 12.5 ± 0.5
- Mounting hole spacing: 21.6 ± 0.5
- Mounting hole diameter: 20.0 ± 0.3
- Mounting hole spacing: 21.6 ± 0.5
- Overall width: max. 128
- Top flange thickness: 32
- Main body diameter: $\varnothing 72 \pm 1$
- Main body height: 60
- Bottom flange thickness: max. 67
- Bottom flange width: max. 71

Notes:

- 15° angle
- R1.6
- R12

Legend:

- A: 151-889.14
- B: 151-889.14
- C: 151-889.14
- D: 151-889.14
- E: 151-889.14

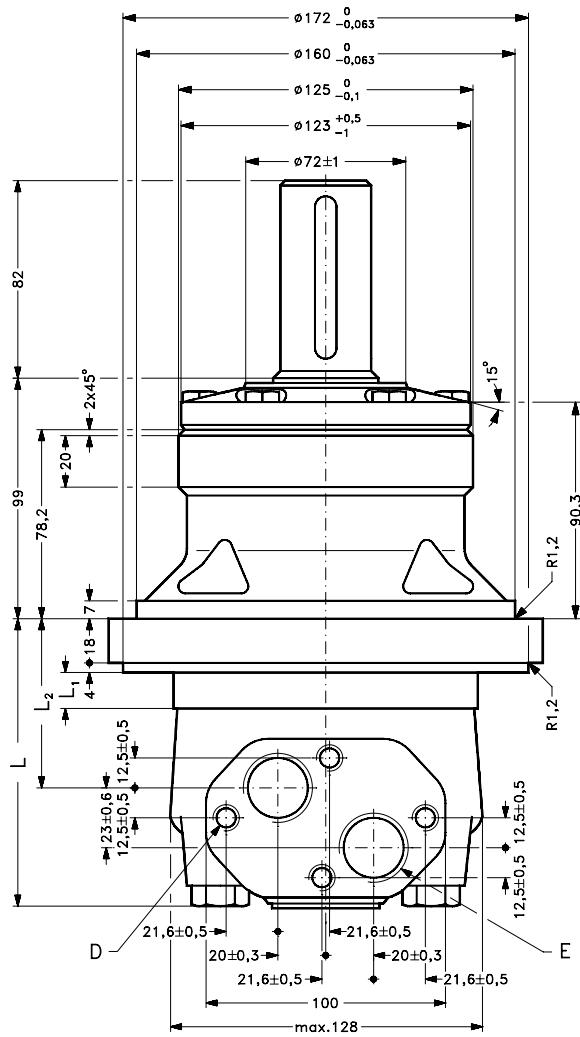
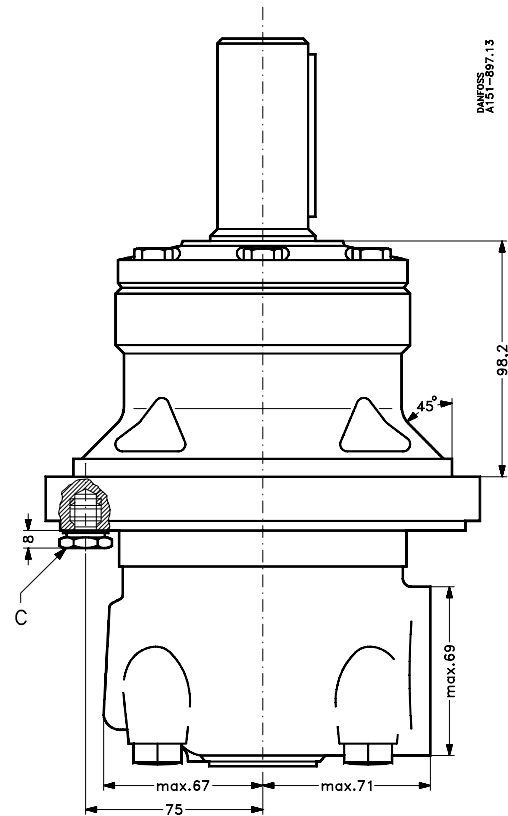
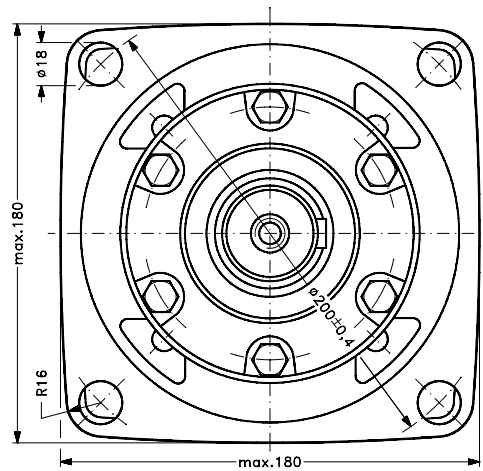
Material: A151-889.14

Type	L _{max}	L ₁ ')	L ₂
OMT 160	190	16.5	140
OMT 200	195	21.5	145
OMT 250	201	27.8	151
OMT 315	211	37.0	161
OMT 400	221	47.5	171
OMT 500	235	61.5	185

C: Drain connection
G 1/4 ; 12 mm deep
D: M10; 10 mm deep
E: G 3/4; 17 mm deep

*) The gearwheel set is 3.5 mm wider across the rollers than the L_1 dimensions

OMTW wheel motor



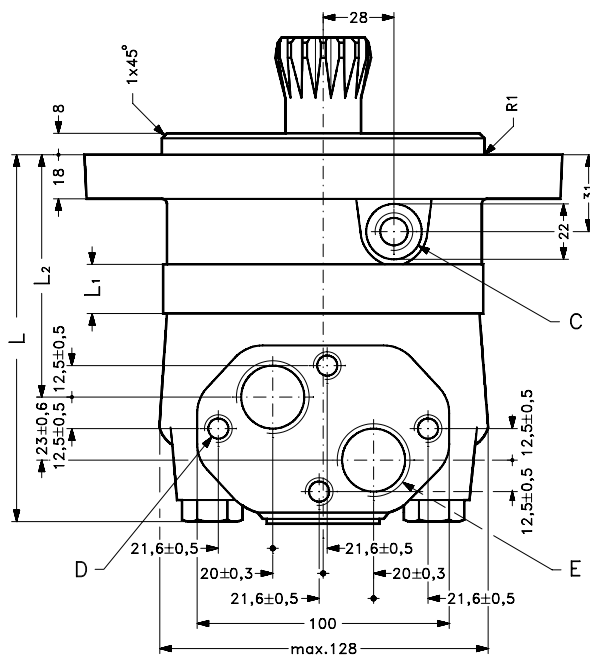
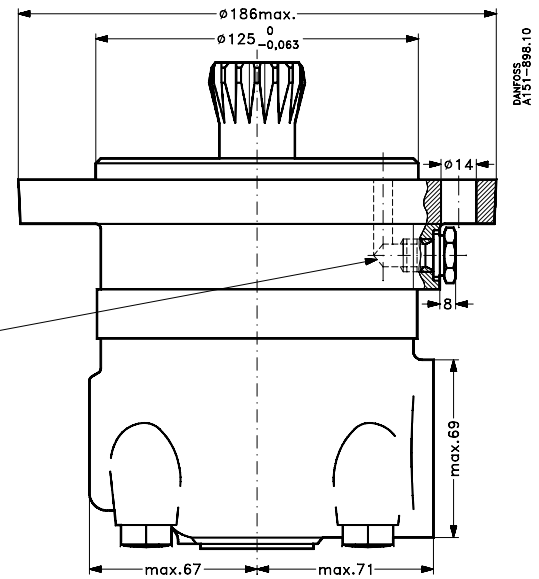
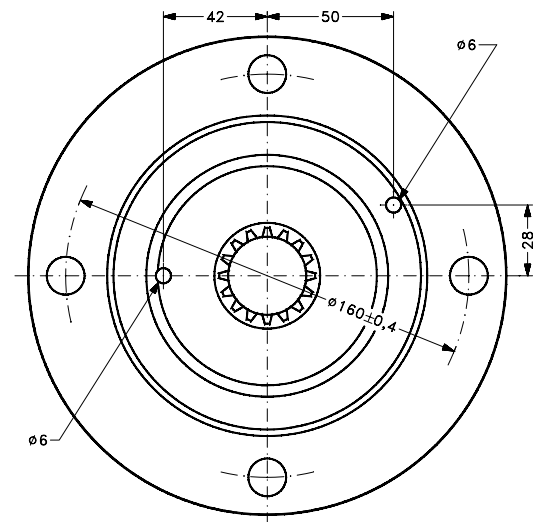
DANFOSS
A131-897.13

Type	L _{max.}	L ₁ *)	L ₂
OMTW 160	123	16.5	73
OMTW 200	128	21.5	78
OMTW 250	134	27.8	84
OMTW 315	144	37.0	94
OMTW 400	154	47.5	104
OMTW 500	168	61.5	118

C: Drain connection
G 1/4; 12 mm deep
D: M10; 10 mm deep
E: G 3/4; 17 mm deep

*) The gearwheel set is 3.5 mm wider across the rollers than the L₁ dimensions

OMTS short motor



Type	L _{max.}	L ₁ *)	L ₂
OMTS 160	146	16.5	96
OMTS 200	151	21.5	101
OMTS 250	157	27.8	107
OMTS 315	166	37.0	116
OMTS 400	177	47.5	127
OMTS 500	191	61.5	142

C: Drain connection
G 1/4 ; 12 mm deep
D: M10; 10 mm deep
E: G 3/4; 17 mm deep

*) The gearwheel set is 3.5 mm wider across the rollers than the L₁ dimensions

Installing the OMTS

The cardan shaft of the OMTS motor acts as an "output shaft". Because of the movement of the shaft, no seal can be fitted at the shaft output. Internal oil leakage from the motor will therefore flow into the attached component.

During start and operation it is important that the spline connection and the bearings in the attached component receive oil and are adequately lubricated. To ensure that the spline connection receives sufficient oil, a conical sealing ring between the shaft of the attached component and the motor intermediate plate is recommended. This method is used in the OMT.

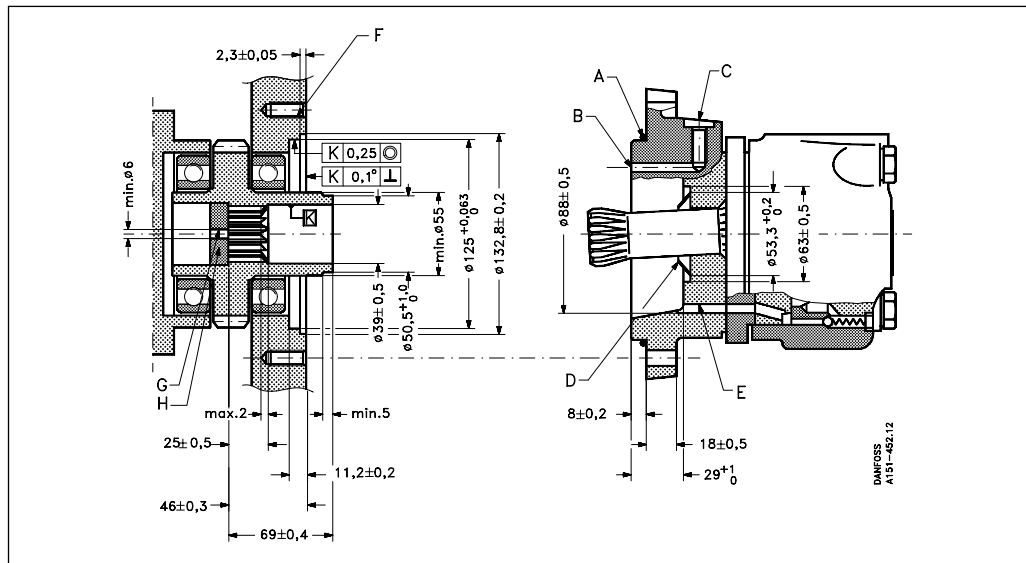
The conical sealing ring (code. no. 633B9022) is supplied with the motor.

To ensure that oil runs to the bearings and other parts of the attached component, the stop plate must have a hole in it (see fig. overleaf).

We recommend an O-ring between motor and attached component. The O-ring (code no. 151B1040) is supplied with the motor. If motor and attached component have been separated, remember to refill before starting up. Fill the oil through the drain connection.

Dimensions of the attached component

- A: O-ring: 125 × 3 mm
- B: External drain channel
- C: Drain connection
G 1/4; 12 mm deep
- D: Conical seal ring
- E: Internal drain channel
- F: M12; min. 18 mm deep
- G: Oil circulation hole
- H: Hardened stop plate



Internal spline data for the component to be attached

The attached component must have internal splines corresponding to the external splines on the motor cardan shaft (see drawing below).

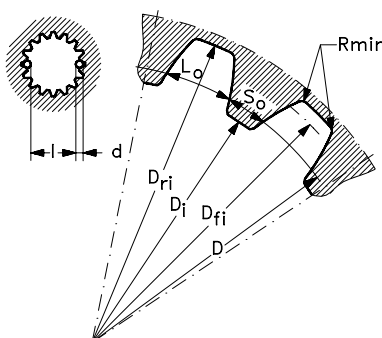
Material:

Case hardening steel with a tensile strength corresponding at least to 20 MoCr4 (90 daN/mm²).

See also SAE 8620 for further information on steel material.

Hardening specification:

- On the surface: HV = 750 ± 50
- 0,7 ± 0,2 mm under the surface: HV = 560

			
Internal involute spline data Standard <i>ANS B92.1-1970, class 5</i> (corrected $m \cdot x = 1$; $m = 2.1166$)			
Fillet root side fit		mm	inch
Number of teeth	z	16	16
Pitch	DP	12/24	12/24
Pressure angle		30°	30°
Pitch dia.	D	33,8656	1.3333
Major dia.	D_{ri}	38,4 ^{+0,4} ₀	1.5118 ^{+0,0157} ₀
Form dia. (min.)	D_{fi}	37,6	1.4803
Minor dia.	D_i	32,15 ^{+0,04} ₀	1.2657 ^{+0,00157} ₀
Space width (circular)	L_o	4,516 ± 0,037	.1777 ± .0014
Tooth thickness (circular)	S_o	2,170	.0854
Fillet radius	$R_{min.}$	0,5	.02
Max. measurement between pins*	l	26,9 ^{+0,1} ₀	1.059 ^{+0,04} ₀
Pin dia.	d	4,834 ± 0,001	.1903 ± .00004

* Finished dimensions (when hardened)

Drain connection on OMTS or attached component

A drain line ought to be used when pressure in the return line can exceed the permissible pressure on the shaft seal of the attached component.

The drain line can be connected at two different points:

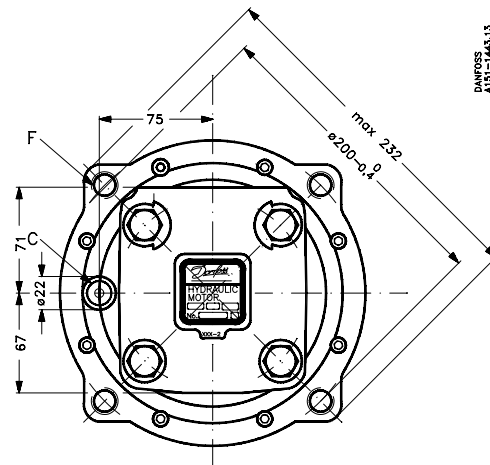
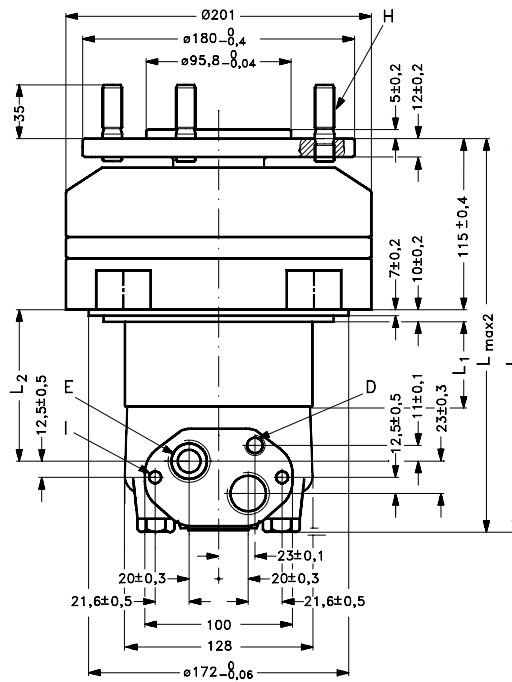
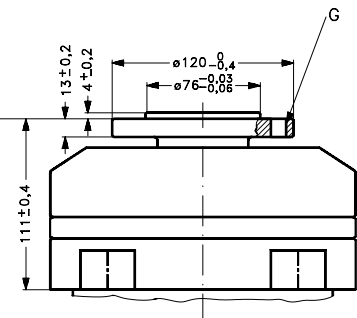
- 1) at the motor drain connection
- 2) at the drain connection of the attached component.

If a drain line is fitted to the attached component, it must be possible for oil to flow freely between motor and attached component.

The drain line must be led to the tank in such a way that there is no risk of the motor and attached component being drained of oil when at rest.

The maximum pressure in the drain line is limited by the attached component and its shaft seal.

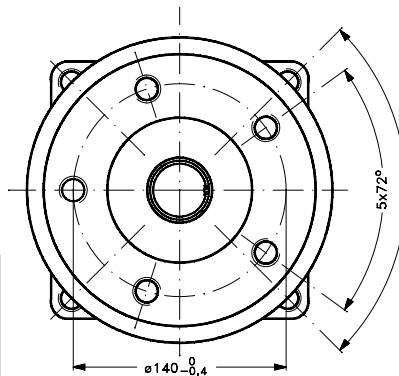
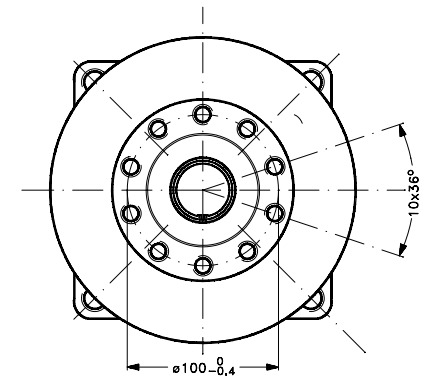
OMT FX



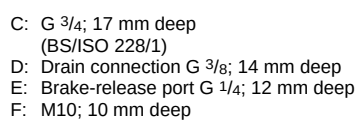
- C: Brake-release port G 1/4; 12 mm deep (BS/ISO 228/1)
 D: Drain connection G 1/4; 12 mm deep
 E: G 3/4; 17 mm deep
 F: 4 × M12; 27 mm deep
 G: 10 × M12
 H: Wheel bolts 5 × M14 × 1.5
 I: M10; 10 mm deep

Type	L _{max. 1}	L _{max. 2}	L ₁ *)	L ₂
OMT 160 FX	223	227	16.5	62.3
OMT 200 FX	228	232	21.5	67.3
OMT 250 FX	234	238	27.8	73.5
OMT 315 FX	243	247	37.0	82.8
OMT 400 FX	254	258	47.5	93.3
OMT 500 FX	268	272	61.5	107.1

*) The gearwheel set is 3.5 mm wider across the rollers than the L₁ dimensions



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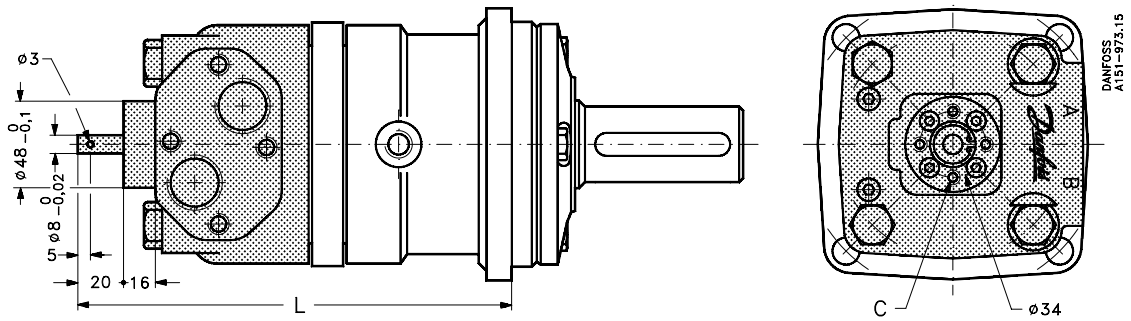


Type	$L_{\max}$	L_1 ')	L_2
OMT 160 FL/FH	228	16.5	178
OMT 200 FL/FH	233	21.5	183
OMT 250 FL/FH	239	27.8	189
OMT 315 FL/FH	248	37.0	199
OMT 400 FL/FH	259	47.5	209
OMT 500 FL/FH	273	61.5	223

HK.13.B-

Motors with tacho connection
OMT T, OMTW T, OMTS T

Dimensions



Dimensions (mm)

Motor size	160	200	250	315	400	500
Type OMT T	223	228	234	244	254	268
Type OMTW T	156	161	167	177	187	201
Type OMTS T	179	184	190	199	210	224

C: M5 (4); 8 mm deep

Weight of tacho connection unit: 0.2 kg

Angular backlash

Tolerances in the connection between the motor output shaft and tacho connection give a certain angular backlash. Backlash can be defined as the angle the output shaft will turn on reversing before the tacho shaft is engaged. On the OMT motors the backlash is min. 7.9° and max. 12.4°.

Permissible load on the tacho drive of motor

- *Torque:*
0.01 Nm cont. and 0.04 Nm int.
- *Radial force in the middle of drive shaft:*
5 daN at 0-800 min⁻¹
- *Axial load:*
5 daN