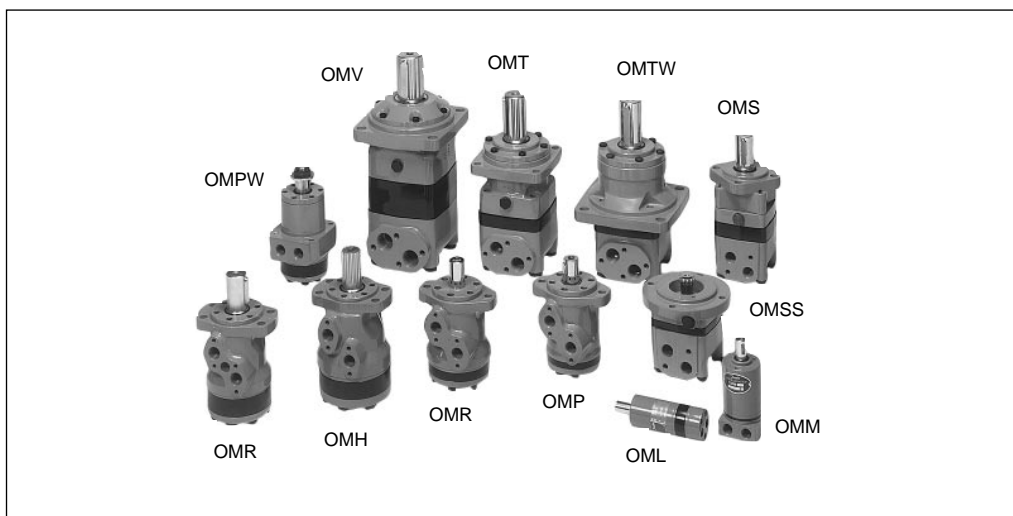


Hydraulic motors OMV

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 applicatons.

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 censor
- Motors with tacho 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

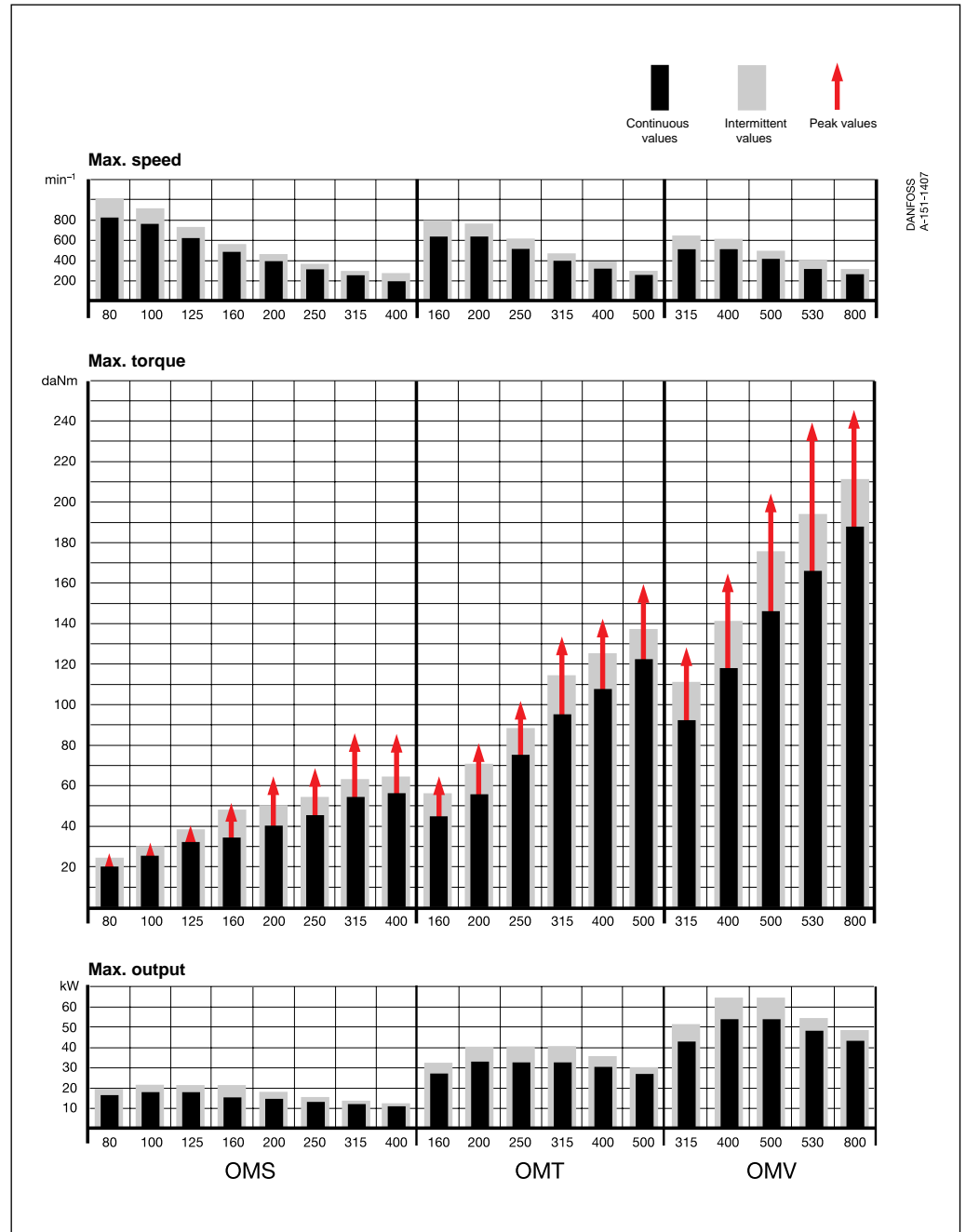
A general survey brochure on Danfoss hydraulic motors giving a quick motor reference based on power, torque, speed and capabilities.

Contents and data survey

Contents

Type OMS, OMSW, OMSS, OMS B	max.	1000 min ⁻¹ ,	63 daNm,	21 kW	Page 4
Type OMT, OMTW, OMTS	max	780 min ⁻¹ ,	137 daNm,	40 kW	20
Type OMV, OMVW, OMVS	max.	630 min ⁻¹ ,	211 daNm,	64 kW	36
Conversion factors					48

Speed, torque and output



DANFOSS A-151-1407

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.

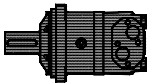
The function diagrams are drawn on the basis of actual tests on a representative number of motors from our production. The diagrams apply to a return pressure between 5 and 10 bar when using mineral based hydraulic oil with a viscosity of 35 mm²/s and a temperature of 50°C. For further explanation concerning 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 OMV


Code numbers and weight

	Motor type	OMV 315	OMV 400	OMV 500	OMV 630	OMV 800
	Cylindrical shaft	151B3100	151B3101	151B3102	151B3103	151B3104
	Splined shaft	151B3105	151B3106	151B3107	151B3108	151B3109
	Tapered shaft	151B3110	151B3111	151B3112	151B3113	151B3114
	Weight (kg)	31.8	32.6	33.5	34.9	36.5

Wheel motor

	Motor type	OMVW 315	OMVW 400	OMVW 500	OMVW 630	OMVW 800
	Cylindrical shaft	151B3115	151B3116	151B3117	151B3118	151B3119
	Tapered shaft	151B3120	151B3121	151B3122	151B3123	151B3124
	Weight (kg)	32.4	33.2	34.1	35.5	37.1

Short motor

	Motor type	OMVS 315	OMVS 400	OMVS 500	OMVS 630	OMVS 800
	Without output shaft	151B3125	151B3126	151B3127	151B3128	151B3129
	Weight (kg)	22.7	23.5	24.4	25.6	27.7

Motors with tacho connection

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

Technical data

Motor type		OMV OMVW OMVS	OMV OMVW OMVS	OMV OMVW OMVS	OMV OMVW OMVS	OMV OMVW OMVS	
Motor size		315	400	500	630	800	
Geometric displacement	(cm ³ /rev)	314.5	400.9	499.6	629.1	801.8	
Max. speed	(min ⁻¹)	cont.	510	500	400	315	250
		int. ¹⁾	630	600	480	380	300
Max. torque	(daNm)	cont.	92	118	146	166	188
		int. ¹⁾	111	141	176	194	211
		peak ²⁾	129	164	205	221	247
Max. output	(kW)	cont.	42.5	53.5	53.5	48	42.5
		int. ¹⁾	51	64	64	56	48
Max. pressure drop	(bar)	cont.	200	200	200	180	160
		int. ¹⁾	240	240	240	210	180
		peak ²⁾	280	280	280	240	210
Max. oil flow	(l/min)	cont.	160	200	200	200	200
		int. ¹⁾	200	240	240	240	240
Max. starting pressure with unloaded shaft	(bar)	8	8	8	8	8	
Min. starting torque	(daNm)	at max. press. drop cont.	71	91	113	133	151
		at max. press. drop int. ¹⁾	85	109	136	155	170
Min. speed ³⁾	(min ⁻¹)	10	9	8	6	5	

Type		Max. inlet pressure	Max. return pressure with drain line
OMV	(bar)	cont.	140
OMVW		int. ¹⁾	175
OMVS		peak ²⁾	210

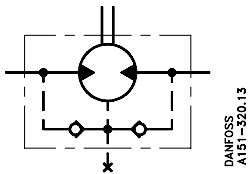
¹⁾ Intermittent operation: the permissible values may occur for max. 10% of every minute.

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

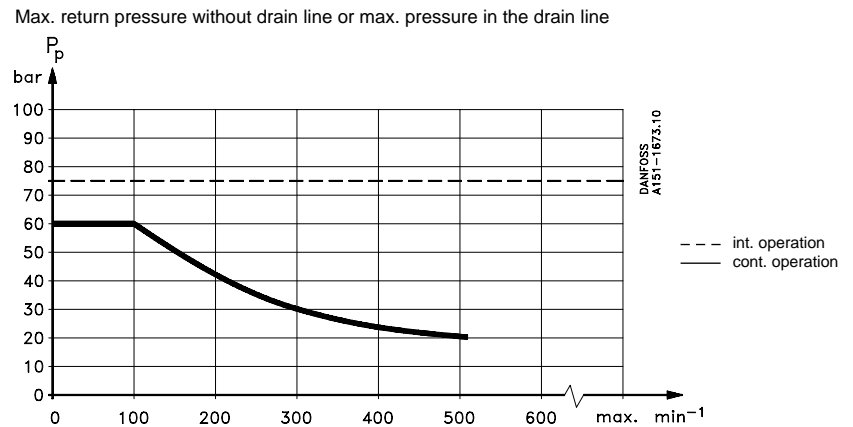
³⁾ Operation at lower speeds may be slightly less smooth.

Max. permissible shaft seal pressure

OMV motors have incorporated check valves



In applications without drain line the pressure on the shaft seal will never exceed the pressure in the return line.

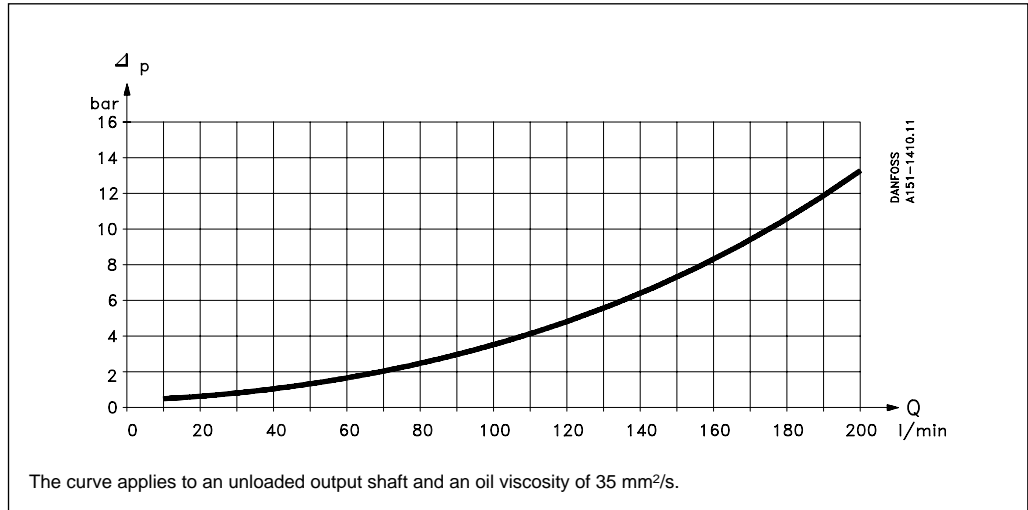


Oil flow in drain line

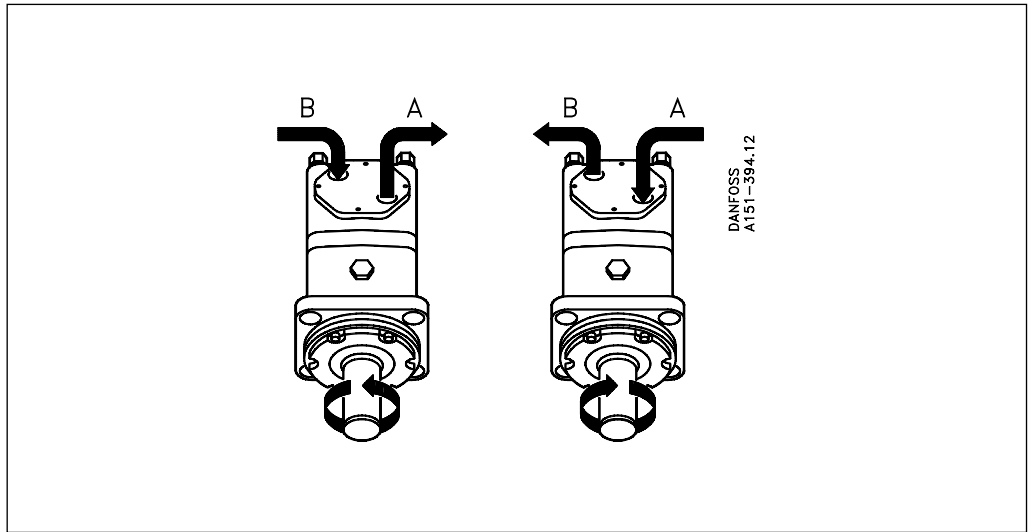
The table shows the max. oil flow in the drain line for all OMV motors. The values are measured at a return pressure less than 5-10 bar.

Pressure drop (bar)	Viscosity (mm ² /s)	Oil flow in drain line (l/min)
140	20	3
	35	2
210	20	6
	35	4

Pressure loss in the motor



Direction of shaft rotation



Permissible shaft load for OMV and OMVW

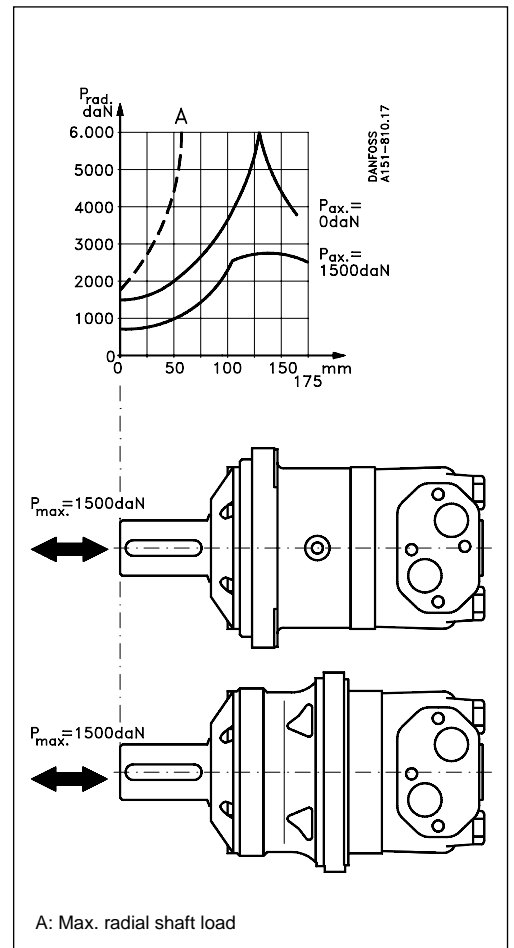
The output shaft runs in tapered roller bearings that permit high axial and radial forces.

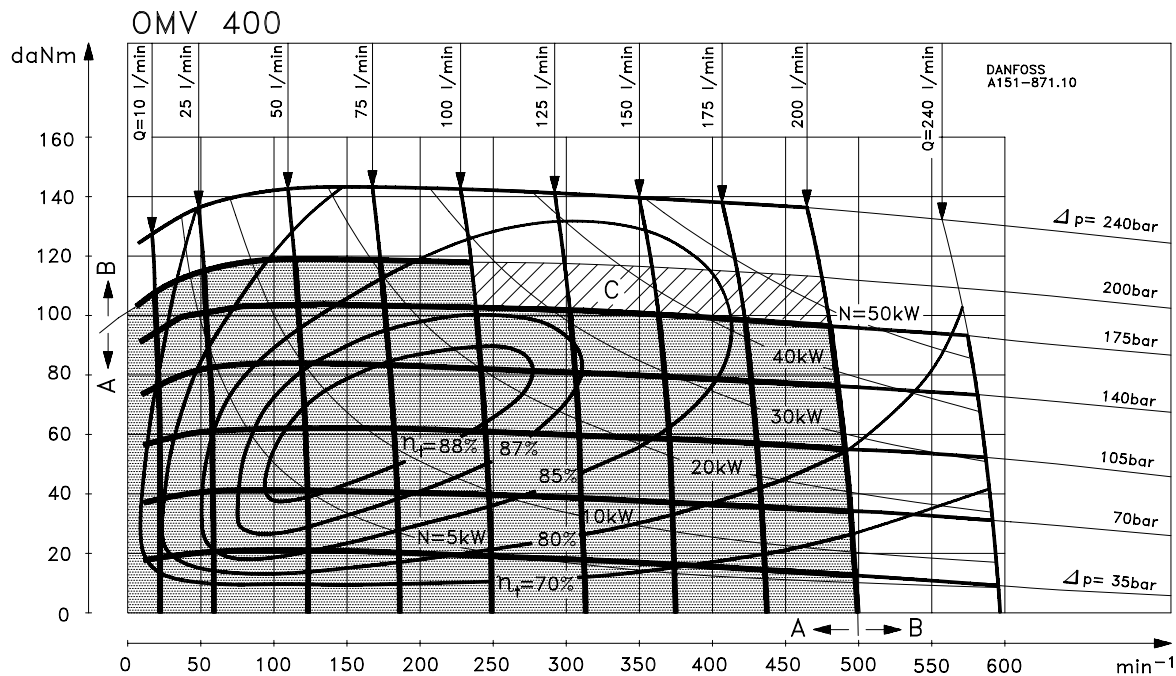
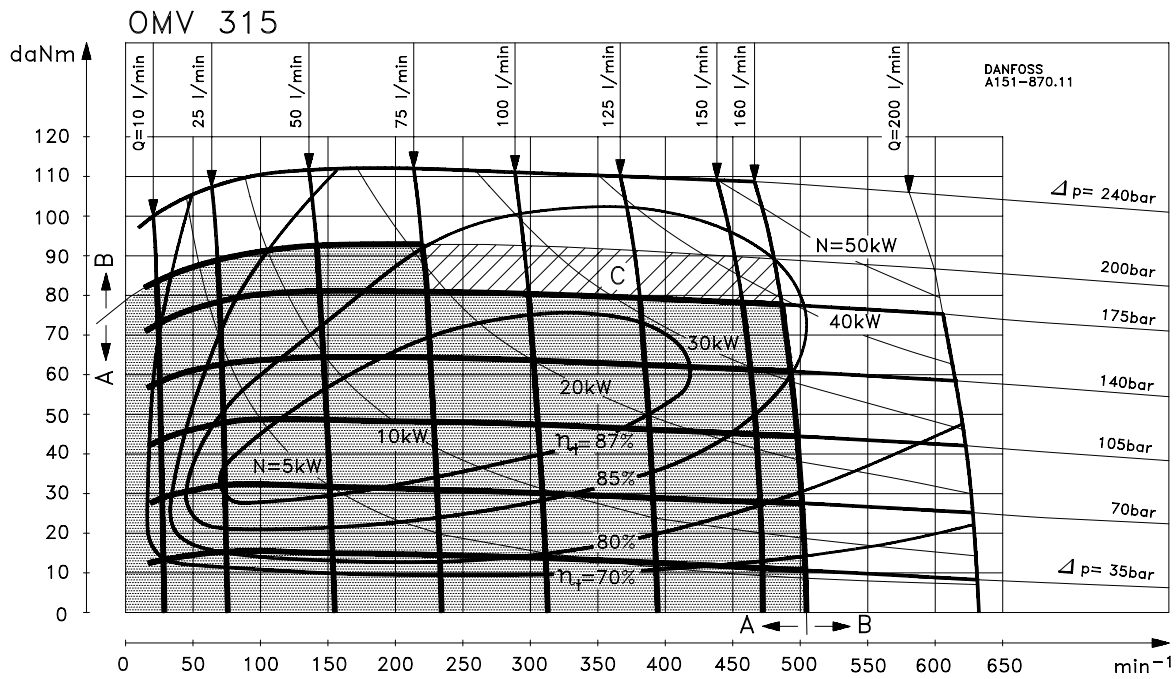
The permissible radial load on the shaft is shown for an axial load of 0 and 1500 daN as a function of the distance from the mounting flange to the point of load application.

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".

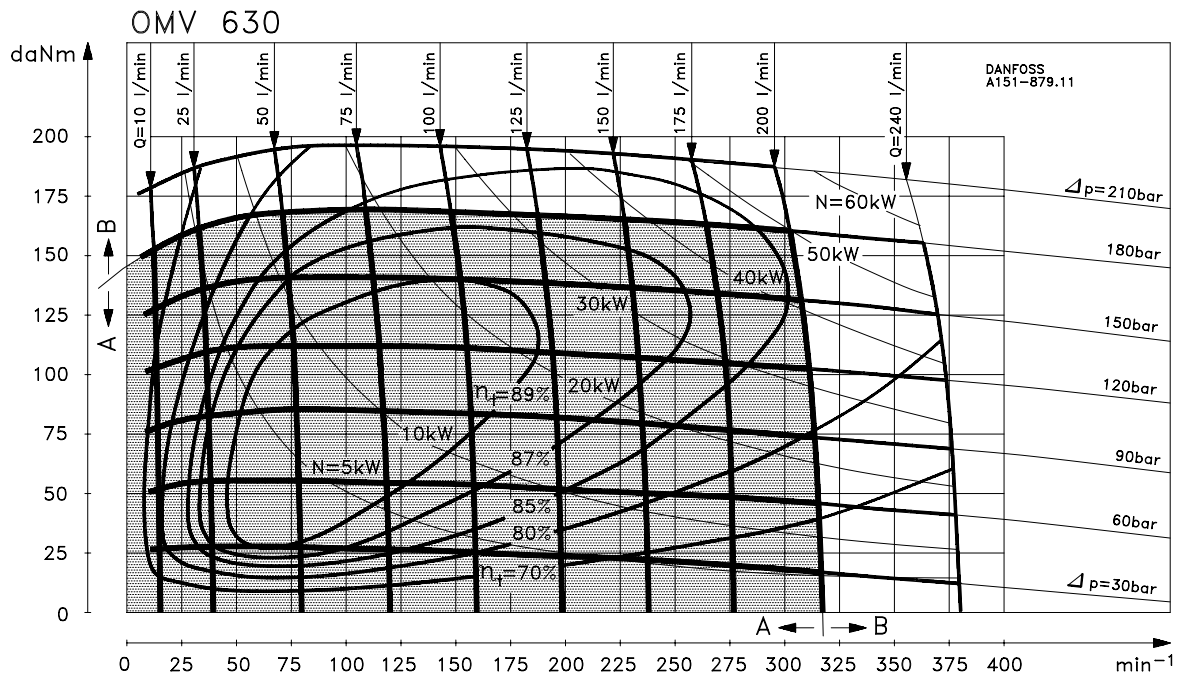
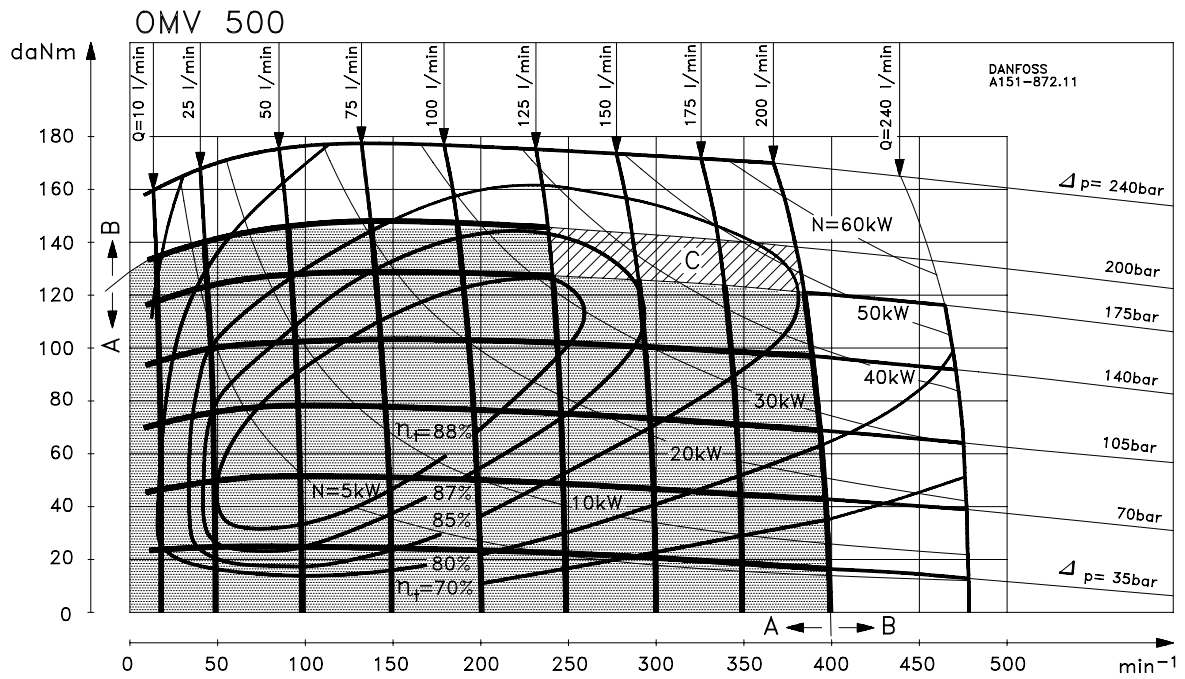




Explanation of function diagram use, basis and conditions can be found on page 3.

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

Note:
Intermittent pressure drop and oil flow must not occur simultaneously.



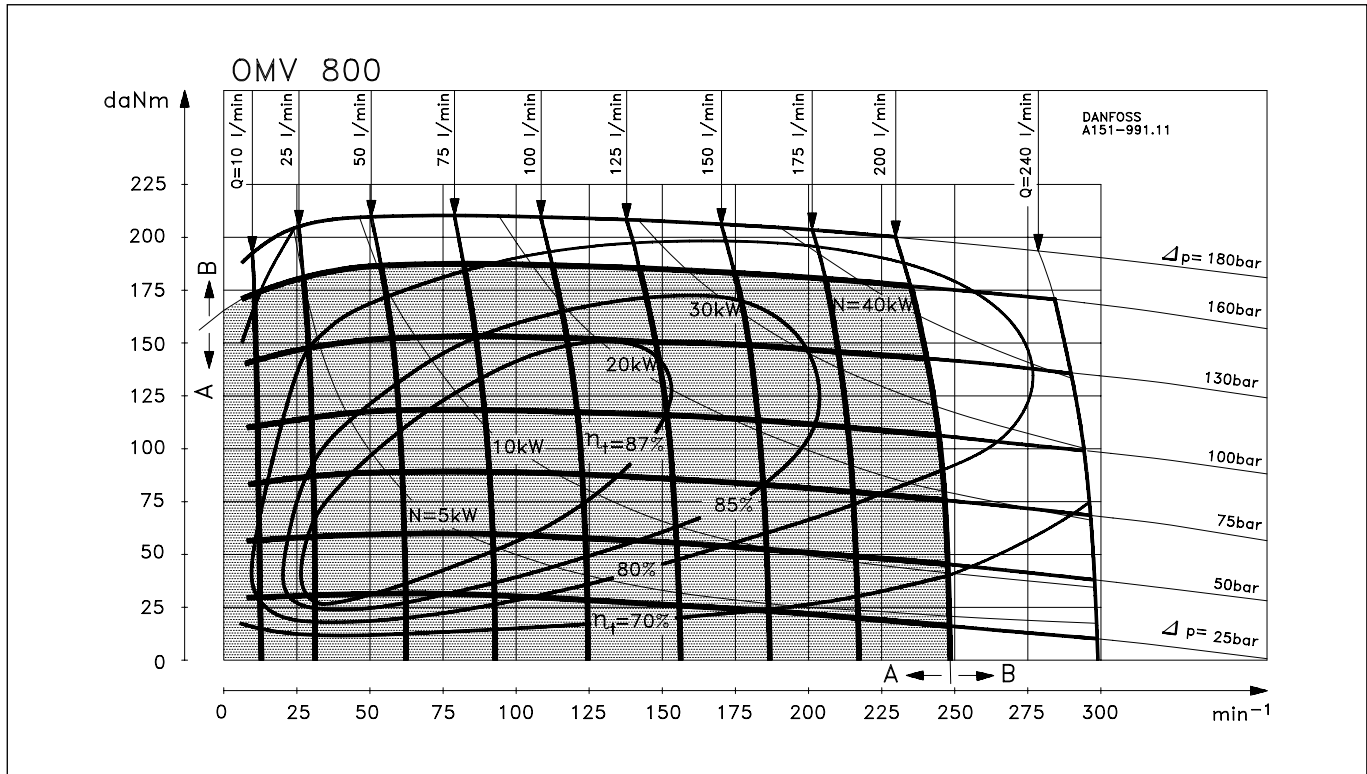
Explanation of function diagram use, basis and conditions can be found on page 3.

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

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Function diagrams

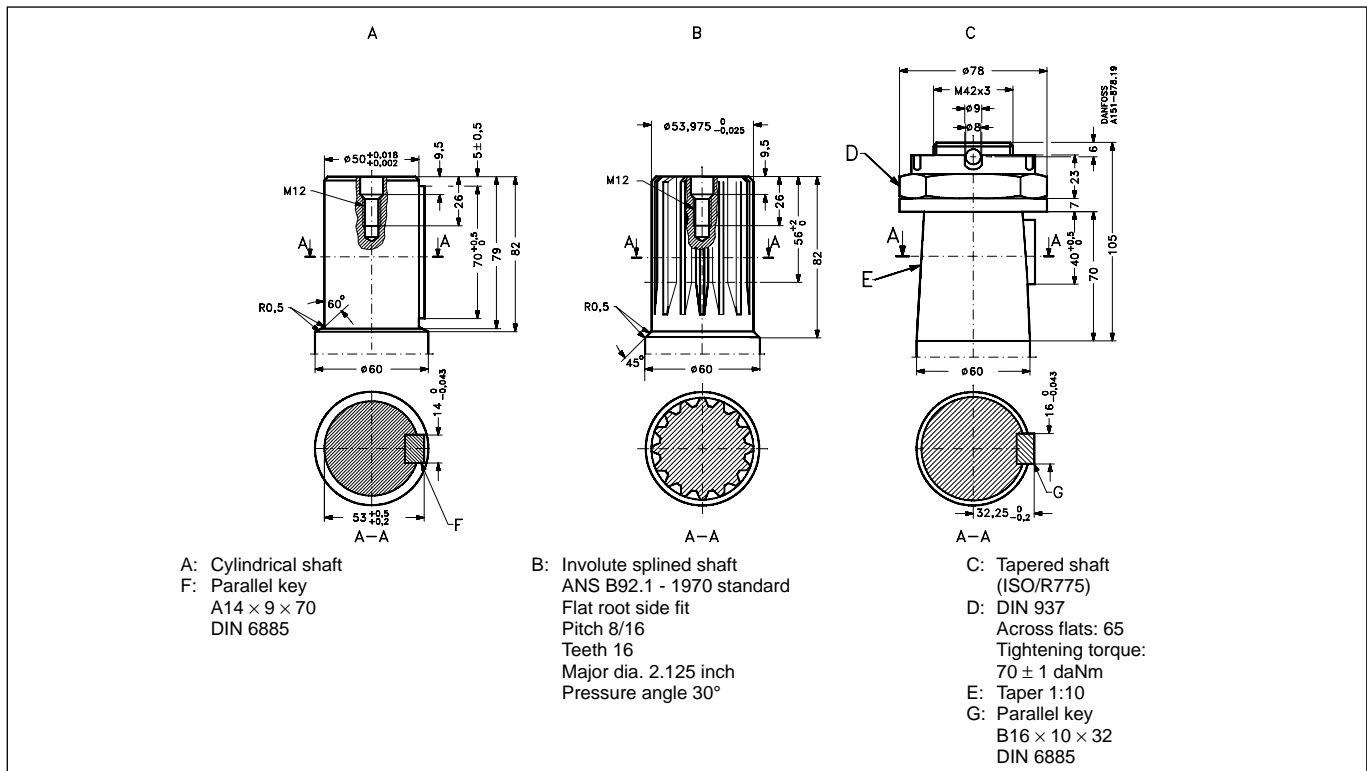


Explanation of function diagram use, basis and conditions can be found on page 3.

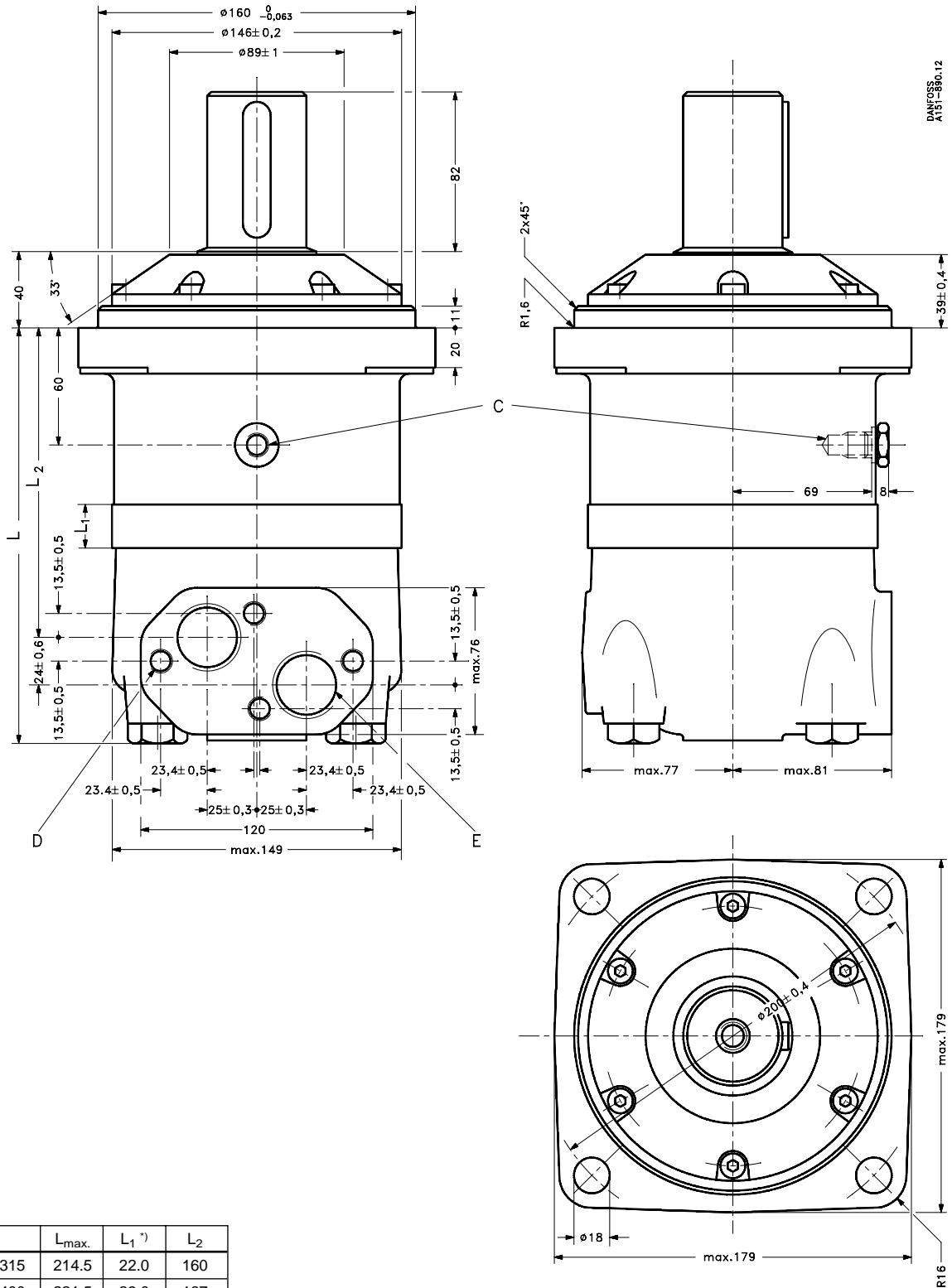
Note: Intermittent pressure drop and oil flow must not occur simultaneously.

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

Shaft versions



OMV



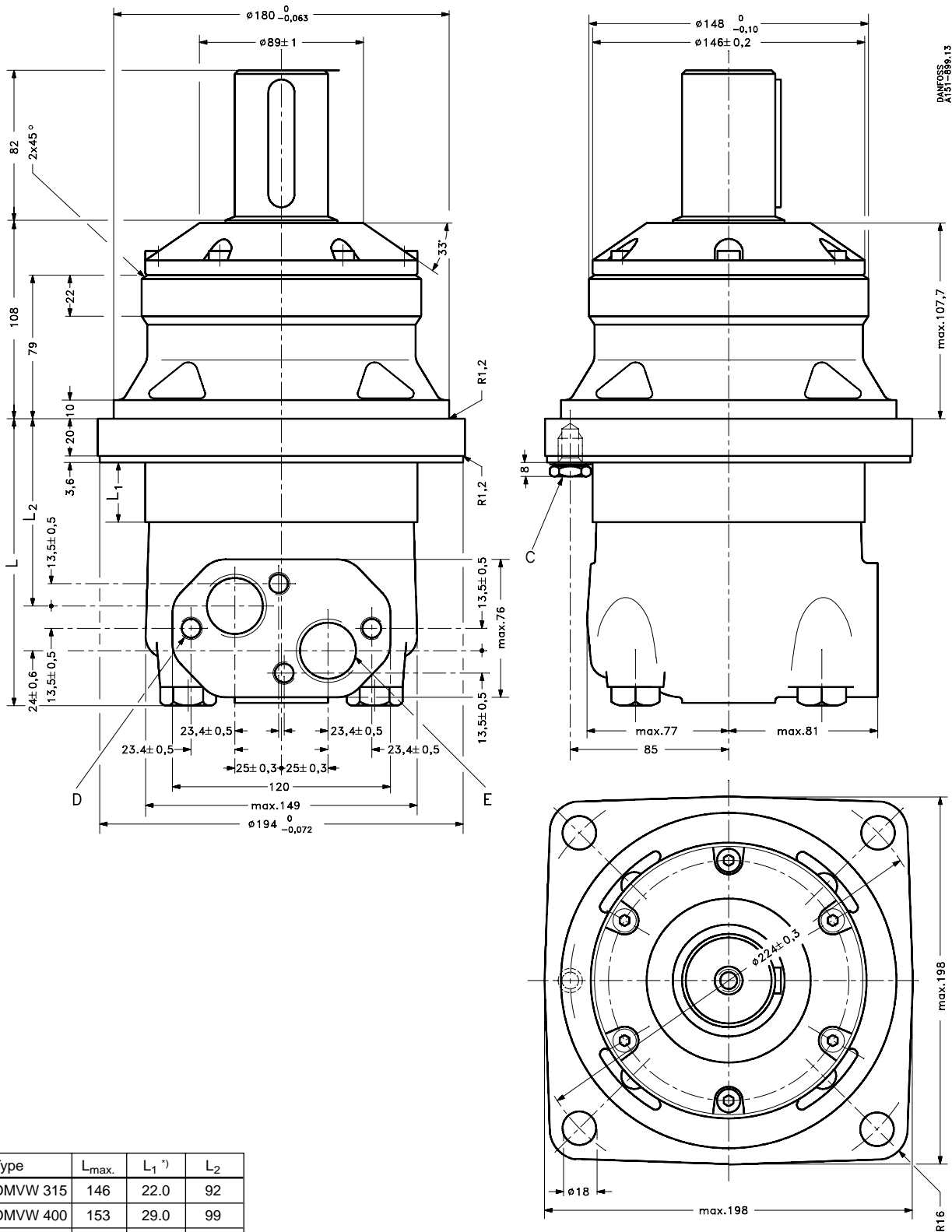
DANFOSS
A151-880.12

Type	L _{max.}	L ₁ *)	L ₂
OMV 315	214.5	22.0	160
OMV 400	221.5	29.0	167
OMV 500	229.5	37.0	175
OMV 630	240.0	47.5	186
OMV 800	254.0	61.5	200

C: Drain connection
G 1/4; 12 mm deep
D: M12; 12 mm deep
E: G 1; 18 mm deep

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

OMVW wheel motor



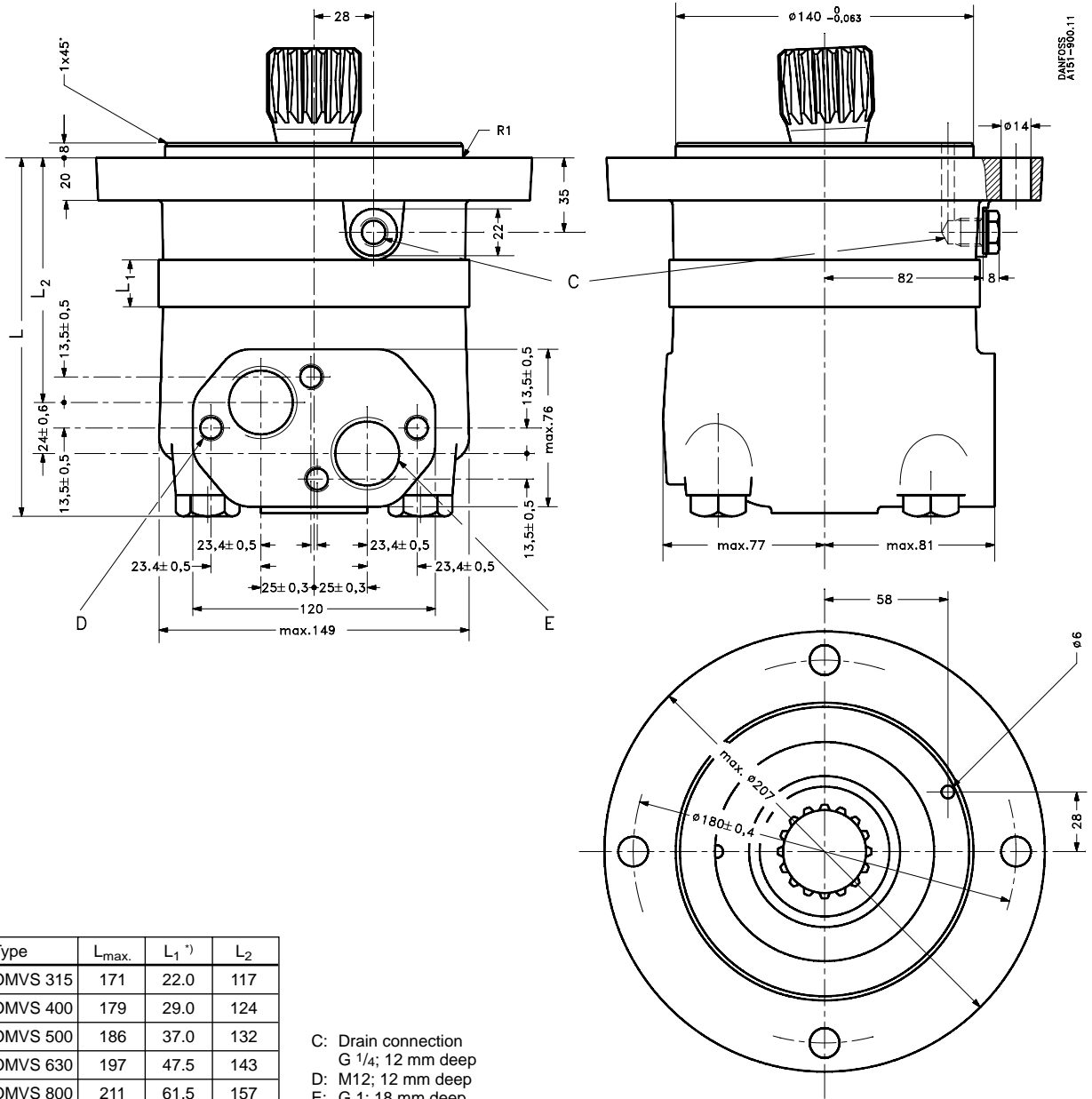
DANFOSS
A151-889.13

Type	L _{max.}	L ₁ ^{*)}	L ₂
OMVW 315	146	22.0	92
OMVW 400	153	29.0	99
OMVW 500	161	37.0	107
OMVW 630	172	47.5	118
OMVW 800	185	61.5	132

- C: Drain connection
G 1/4; 12 mm deep
- D: M12; 12 mm deep
- E: G 1; 18 mm deep

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

OMVS short motor



Type	L _{max.}	L ₁ *)	L ₂
OMVS 315	171	22.0	117
OMVS 400	179	29.0	124
OMVS 500	186	37.0	132
OMVS 630	197	47.5	143
OMVS 800	211	61.5	157

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

Installing the OMVS

The cardan shaft of the OMVS 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.

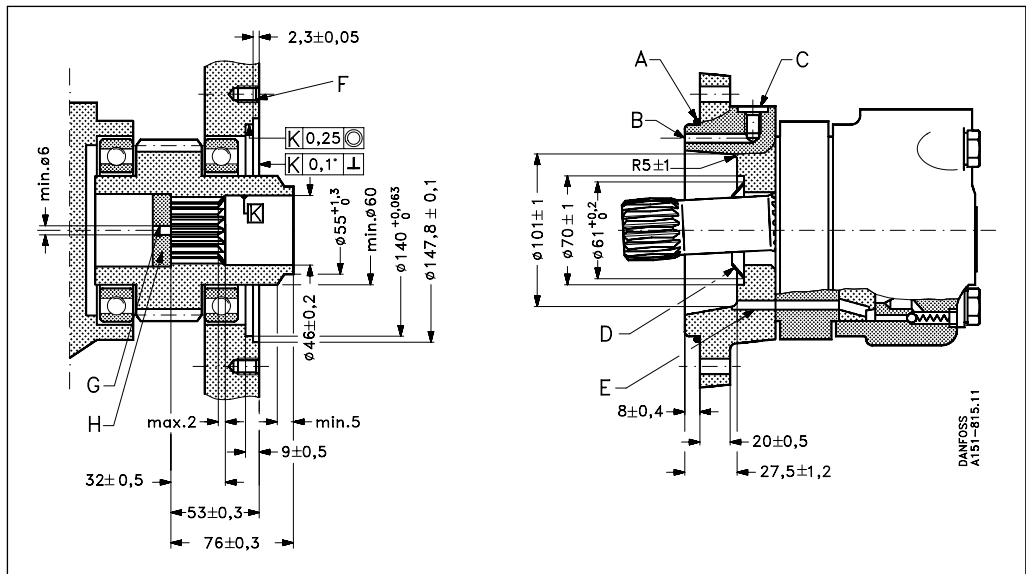
During start and operation it is important that the spline connection and the bearings in the attached component receive oil and are adequately lubricated. To ensure that the spline connection receives sufficient oil, a conical sealing ring between the shaft of the attached component and the motor intermediate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

The conical sealing ring (code. no. 633B9021) 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. 151B1041) 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: 140 × 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 to at least 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 ANS B92.1-1970, class 5
(corrected $m \cdot x = 1$; $m = 2,54$)

Feature	mm	inch
Fillet root side fit		
Number of teeth z	16	16
Pitch DP	10/20	10/20
Pressure angle	30°	30°
Pitch dia. D	40,640	1.6
Major dia. D _{ri}	45,2 ^{+0.4} ₀	1.780 ^{+0.016} ₀
Form dia. (min.) D _{fi}	44,6	1.756
Minor dia. D _i	38,5 ^{+0.039} ₀	1.516 ^{+0.0015} ₀
Space width (circular) L _o	5,180 ± 0,037	.204 ± 0.0015
Tooth thickness (circular) S _o	2,835	.1116
Fillet radius R _{min.}	0,4	.015
Max. measurement between pins*	32,47 ^{+0.15} ₀	1.278 ^{+0.006} ₀
Pin dia. d	5,6 ± 0,001	.22 ± 0.00004

* Finished dimensions (when hardened)

Drain connection on OMVS 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.

Motors with tacho connection
OMV T, OMVW T, OMVS T

Dimensions

Dimensions (mm)

Motor size	315	400	500	630	800
Type OMV T	246.5	253.5	261.5	272	286
Type OMVW T	178.5	185.5	193.5	204	218.5
Type OMVS T	203.5	210.5	218.5	229	243

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 OMV motors the backlash is min. 8.0° and max. 12.1°.

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

Danfoss quality and hydraulic range

ISO 9001

INTERNATIONAL STANDARD



INTERNATIONAL ORGANIZATION FOR STANDARDIZATION
ORGANISATION INTERNATIONALE DE NORMALISATION
МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Quality management and quality assurance standards



Danfoss Mobile Hydraulics have been manufactured to meet the quality demands specified by ISO 9001.

Conversion factors

1 daNm = 88.51 lbf in
1 daN = 2.248 lbf
1 bar = 14.50 lbf/in²
1 mm = 0.0394 in

1 cm³ = 0.061 in³
1 litre = 0.22 gallon, UK
1 litre = 0.264 gallon, US
°F = 1.8 × °C + 32

Catalogues and leaflets are available for detailed information on the following hydraulic components:

- Low-speed high-torque hydraulic motors
- Planetary gears
- Hydrostatic steering units
- Steering columns
- Valve blocks
- Flow-amplifiers
- Priority valves
- Torque amplifiers
- Variable displacement hydraulic pumps
- Pump controls
- Proportional valves
- Remote control units
- Electronics for hydr. components
- Rotary actuators
- Gear wheel motors
- Gear wheel pumps
- Cartridge valves
- Directional control valves



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