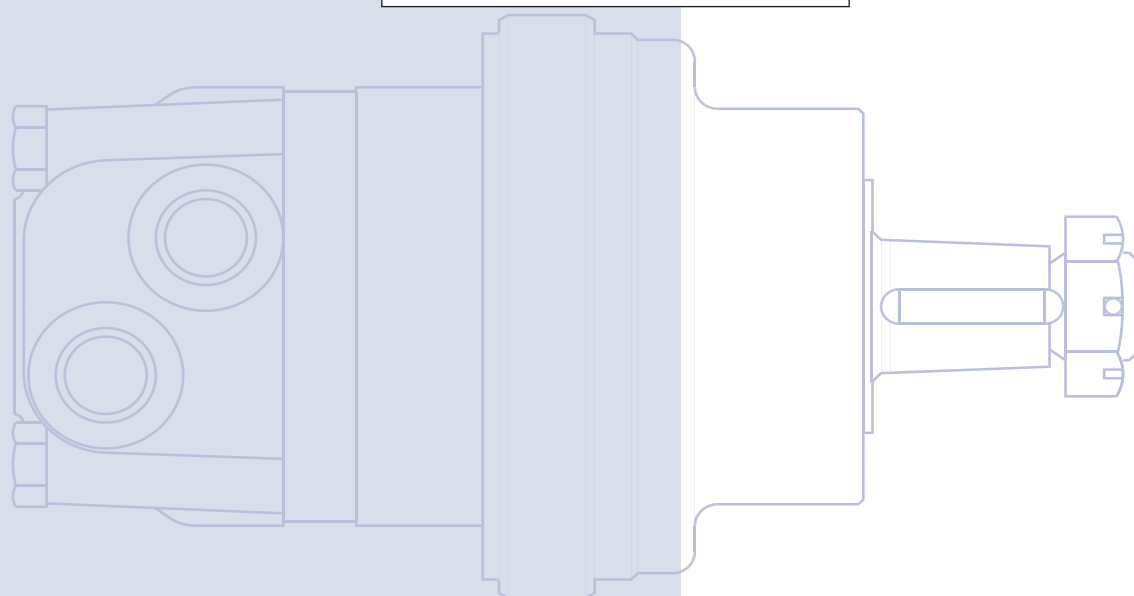




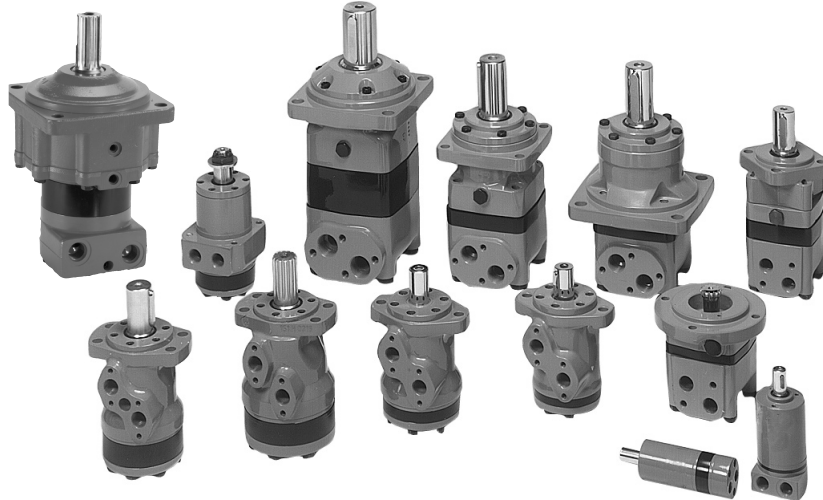
OMSW
with brake nose

Orbital Motors

Technical
Information



**A WIDE RANGE OF
 ORBITAL MOTORS**



F300030.tif

Sauer-Danfoss is a world leader within production of low speed orbital motors with high torque. We can offer more than 1600 different orbital motors, categorised in types, variants and sizes (incl. different shaft versions).

The motors vary in size (rated displacement) from 8 cm³ [0.50 in³] to 800 cm³ [48.9 in³] per revolution.

Speeds range up to approx. 2500 min⁻¹ (rpm) for the smallest type and up to approx. 600 min⁻¹ (rpm) for the largest type.

Maximum operating torques vary from 13 Nm [115 lbf·in] to 2700 Nm [24.000 lbf·in] (peak) and maximum outputs are from 2,0 kW [2,7 hp] to 70 kW [95 hp].

Characteristic features:

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

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Front cover illustrations: P300587.tif, P300588.tif, P330589.tif
 drawing: 151-2012

A WIDE RANGE OF ORBITAL MOTORS (continued)

The programme is characterised by technical features appealing to a large number of applications and a part of the programme is characterised by motors that can be adapted to a given application. Adaptions comprise the following variants among others:

- Motors with corrosion resistant parts
- Wheel motors with recessed mounting flange
- OMP, OMR- motors with needle bearing
- OMR motor in low leakage version
- OMR motors in a super low leakage version
- Short motors without bearings
- Ultra short motors
- Motors with integrated positive holding brake
- Motors with integrated negative holding brake
- Motors with integrated flushing valve
- Motors with speed sensor
- Motors with tacho connection
- All motors are available with black finish paint

Planetary gears

Sauer-Danfoss complements the motor range with a complete programme of planetary gears adapted to suit. The combination of motors and gears makes it possible to obtain smooth running at fractional speeds and with torques up to 650 000 Nm [5 800 000 lbf·in].

The Sauer-Danfoss orbital motors are used in the following application areas:

- Construction equipment
- Agricultural equipment
- Material handling & Lifting equipment
- Forestry equipment
- Lawn and turf equipment
- Special purpose
- Machine tools and stationary equipment
- Marine equipment

SURVEY OF LITERATURE WITH TECHNICAL DATA ON SAUER-DANFOSS ORBITAL MOTORS

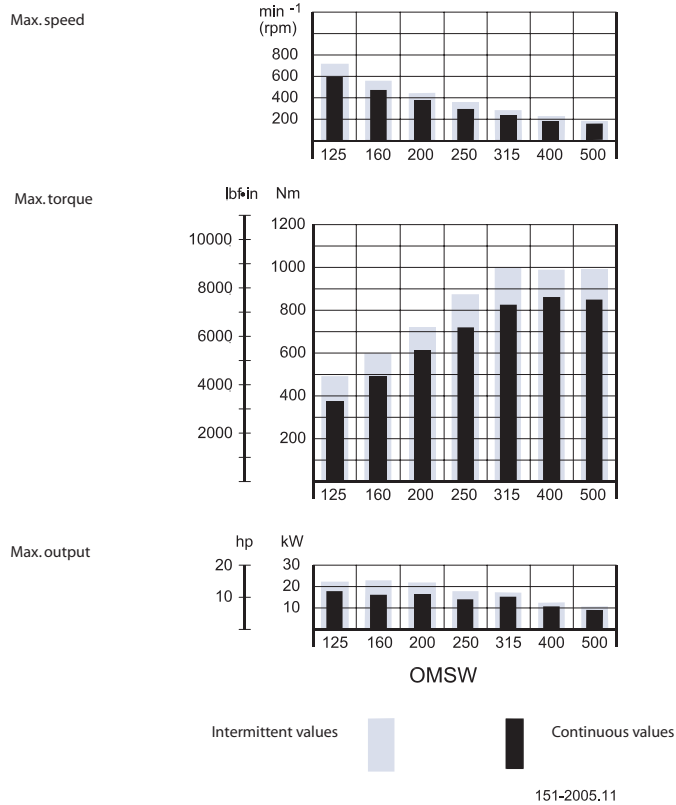
Detailed data on all Sauer-Danfoss motors can be found in our motor catalogue, which is divided into 5 individual subcatalogues:

- General information on Sauer-Danfoss orbital motors: function, use, selection of hydraulic motor, hydraulic systems, etc.
- Technical data on small motors: OML and OMM
- Technical data on medium sized motors: OMP, OMR, OMH and OMEW
- Technical data on medium sized motors: DH and DS
- Technical data on large motors: OMS, OMT and OMV
- Technical data on large motors: TMK
- Technical data on large motors: TMT

A general survey brochure on Sauer-Danfoss orbital motors gives a quick motor reference based on power, torque, speed and capabilities.

A WIDE RANGE OF ORBITAL MOTORS	A wide range of orbital motors	2
CONTENTS	Contents	4
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**SPEED, TORQUE AND
 OUTPUT**



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.

- OMSW can be found on pages 12 - 15.

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 mm²/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" DHMH.PK.100.G2.02 520L0232.

VERSIONS

Mounting flange	Spigot diameter (front / rear end)	Bolt circle diameter (BC)	Shaft	Port size	European version	US version	Side port version	End port version	Standard shaft seal	Drain connection	Check valve	Main type designation
Wheel	ø5.0 in / ø5.0 in	ø 5.8 in	Tap. 1 1/4"	7/8 - 14 UNF		<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	No	Yes	OMSW
						<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	Yes	No	OMSW
						<input type="radio"/>		<input type="radio"/>	No	Yes	OMSW	
						<input type="radio"/>		<input type="radio"/>	Yes	No	OMSW	

Function diagram – see page : →

Note: Motors are painted black

Features available (options)

Shaft options: 1 3/8" shaft
 Side port G 1/2
 End port G 1/2

High pressure shaft seal

CODE NUMBERS

→	CODE NUMBERS	DISPLACEMENT (cm ³)						Technical data – Page	Dimensions – Page	
		125	160	200	250	315	400			500
	151F	2502	2503	2504	2505	2506	2507	2508	8	17
	151F	2512	2513	2514	2515	2516	2517	2518	8	18
	151F	2522	2523	2524	2525	2526	2527	2528	8	19
	151F	2532	2533	2534	2535	2536	2537	2538	8	20
	→	12	12	13	13	14	14	15		

Ordering

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

Example:

151F2514 for an OMSW 200 as sideport version and with drain connection

Note: Orders will not be accepted without the four digit prefix.

TECHNICAL DATA

Type		OMSW	OMSW	OMSW	OMSW	OMSW	OMSW	OMSW	
Motor size		125	160	200	250	315	400	500	
Geometric displacement	cm ³ [in ³]	125.7 [7.67]	159.7 [9.75]	200.0 [12.20]	250.0 [15.26]	314.9 [19.22]	393.0 [23.98]	488.0 [29.78]	
Max. speed	min ⁻¹	cont.	600	470	375	300	240	190	155
	rpm	int. ¹⁾	720	560	450	360	285	230	185
Max. torque	Nm [lbf-in]	cont.	375 [3320]	490 [4340]	610 [5400]	720 [6370]	825 [7300]	865 [7660]	850 [7520]
		int. ¹⁾	490 [4340]	600 [5310]	720 [6370]	870 [7700]	1000 [8850]	990 [8760]	990 [8760]
Max. output	kW [hp]	cont.	18.0 [24.1]	16.5 [22.1]	16.5 [22.1]	14.5 [19.4]	15.0 [20.1]	11.0 [14.8]	9.0 [12.1]
		int. ¹⁾	22.5 [30.2]	22.5 [30.2]	23.0 [30.8]	18.0 [24.1]	17.0 [22.8]	12.5 [16.8]	10.5 [14.1]
Max. pressure drop ²⁾	bar [psi]	cont.	210 [3050]	210 [3050]	210 [3050]	200 [2900]	200 [2900]	160 [2320]	120 [1740]
		int. ¹⁾	275 [3990]	260 [3770]	250 [3630]	250 [3630]	240 [3480]	190 [2760]	140 [2030]
		peak ²⁾	295 [4280]	280 [4060]	270 [3920]	270 [3920]	260 [3770]	210 [3050]	160 [2320]
Max. oil flow	l/min [USgal/min]	cont.	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]
		int. ¹⁾	90 [23.8]	90 [23.8]	90 [23.8]	90 [23.8]	90 [23.8]	90 [23.8]	90 [23.8]
Max. starting pressure with unloaded shaft	bar [psi]	cont.	10 [145]	8 [115]	8 [115]	8 [115]	8 [115]	8 [115]	8 [115]
Min. starting torque	at max. press. drop cont.		290	370	470	560	710	710	660
	Nm [lbf-in]		[2570]	[3270]	[4160]	[4960]	[6280]	[6280]	[5840]
	at max. press. drop int.		380	460	560	700	850	840	770
	Nm [lbf-in] ¹⁾		[3360]	[4070]	[4960]	[6200]	[7520]	[7430]	[6820]

Type		Max. inlet pressure	Max. return pressure with drain line	
OMSW	bar psi	cont.	230 [3340]	140 [2030]
	bar psi	int. ¹⁾	295 [4280]	175 [2540]
	bar psi	peak ²⁾	300 [4350]	210 [3050]

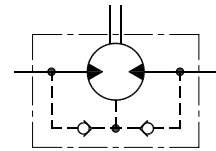
¹⁾ Intermittent operation: the permissible values may occur for max. 10% of every minute

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

For max. permissible combination of flow and pressure, see function diagram for actual motor.

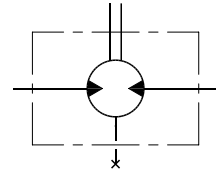
**MAX. PERMISSIBLE
 SHAFT SEAL PRESSURE**

OMSW with check valves
 The pressure on the shaft seal never exceeds pressure in the return line



151-1316.10

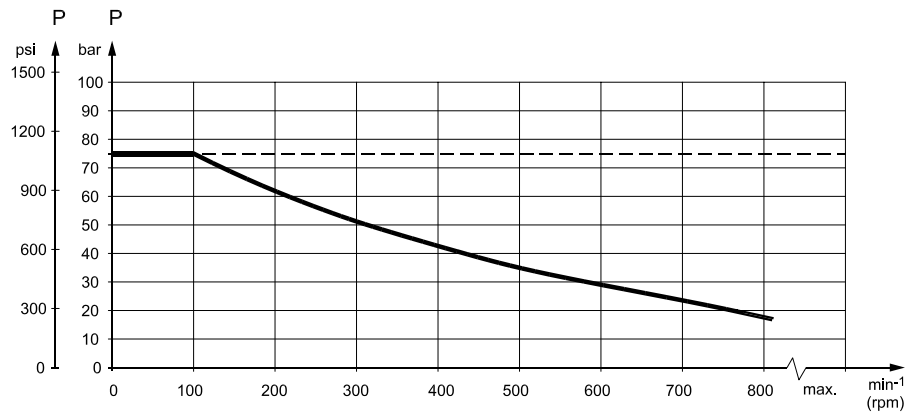
OMSW with drain connection
 Use of the drain connection:
 The shaft seal pressure equals the pressure in the drain line.



151-1855.10

Without use of the drain connection:
 The shaft seal pressure equals the average of input pressure and return pressure.

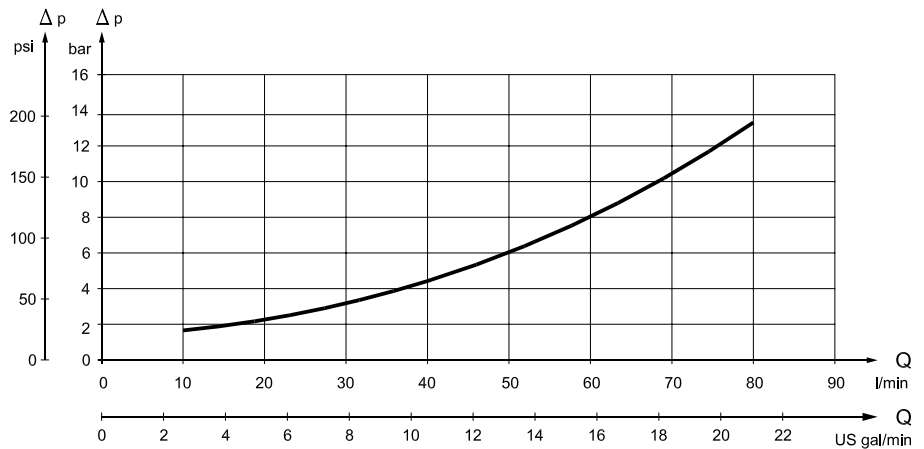
Max. pressure on shaft seal



151-1674.10

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

**PRESSURE DROP IN
 MOTOR**



151-1408.10

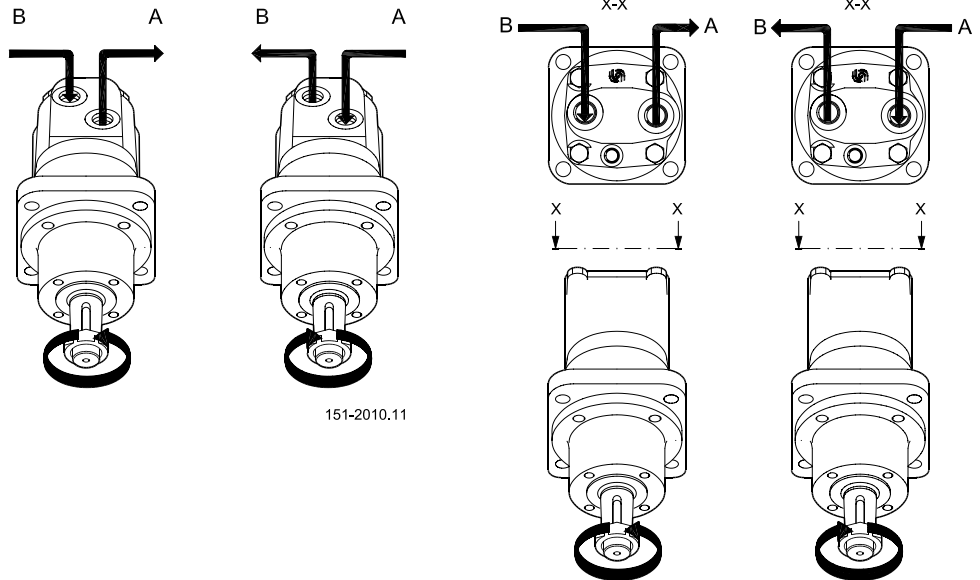
The curve applies to an unloaded motor shaft and an oil viscosity of 35 mm²/s [165 SUS]

OIL FLOW IN DRAIN LINE

The table below shows the max. oil flow in the drain line at a return pressure less than 5-10 bar [75-150 psi].

Pressure drop bar [psi]	Viscosity	Oil flow in drain line l/min [US gal/min]
	mm ² /s [SUS]	
140 [2030]	20 [100]	1.5 [0.40]
	35 [165]	1.0 [0.26]
210 [3050]	20 [100]	3.0 [0.79]
	35 [165]	2.0 [0.53]

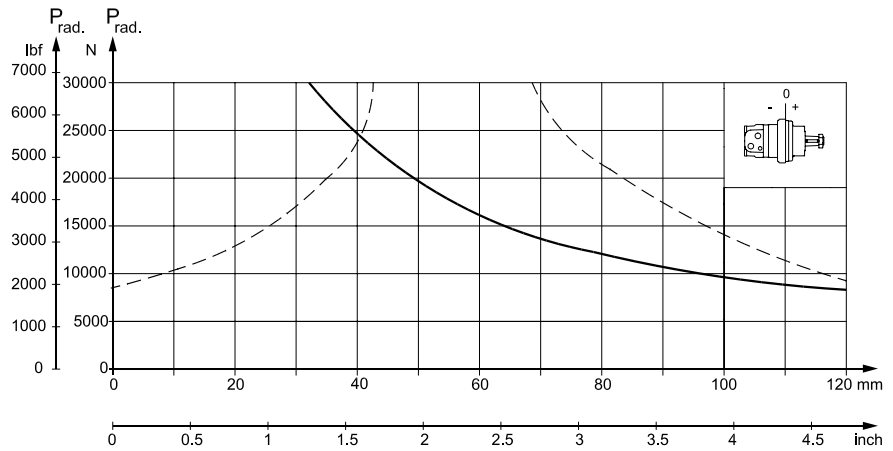
DIRECTION OF SHAFT ROTATION



**PERMISSIBLE SHAFT
 LOAD FOR OMSW**

Mounting flange:
 Wheel

Shaft:
 All shaft types



151-1954.10

Permissible radial shaft load

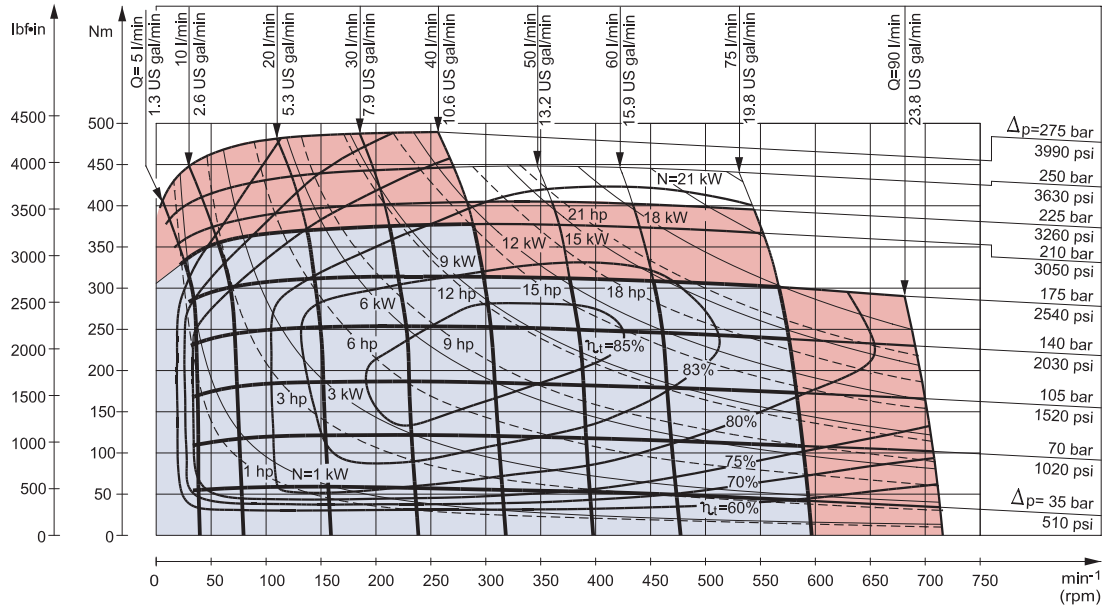
The output shaft runs in tapered roller bearings that permit high axial and radial forces.

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 curve is based on B_{10} 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.

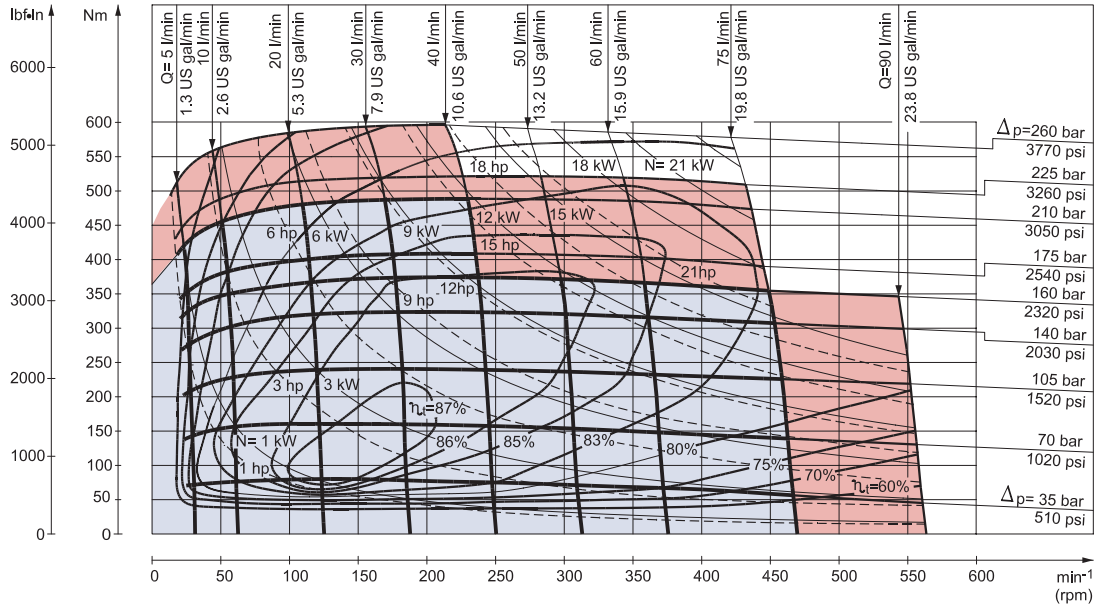
FUNCTION DIAGRAMS

OMS 125



151-903.10

OMS 160



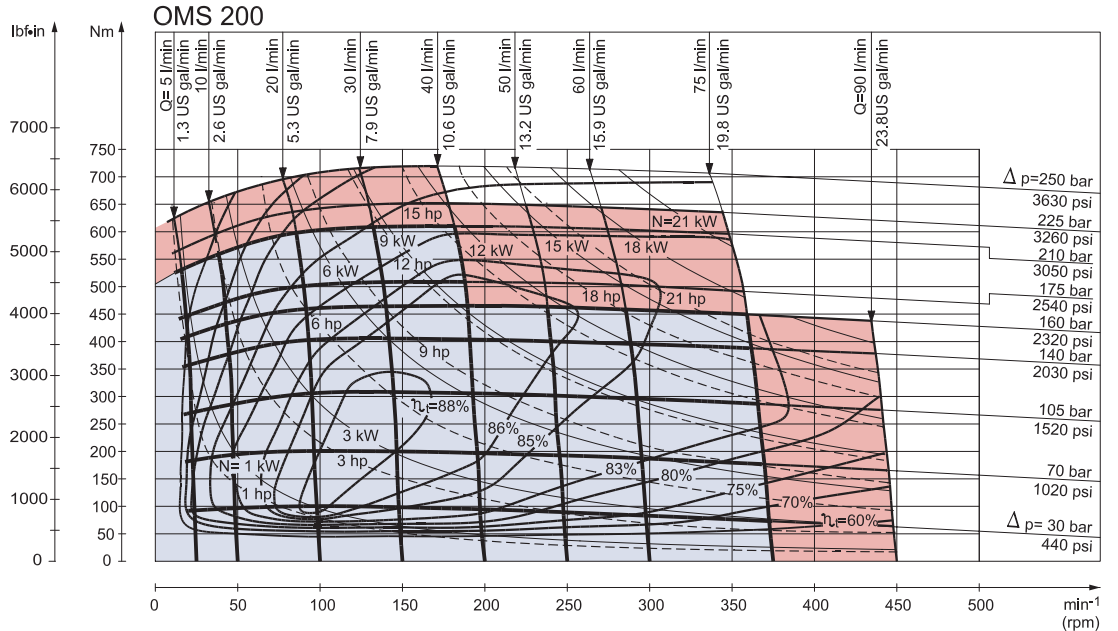
151-904.10

Explanation of function diagram use, basis and conditions can be found on page 5.

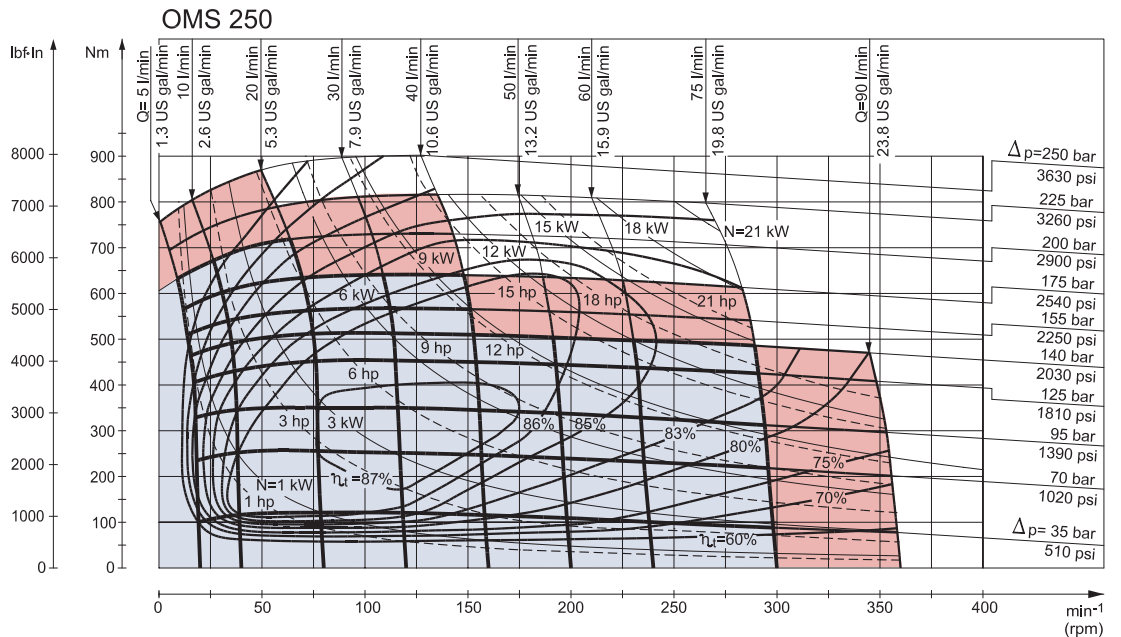
- Continuous range
- Intermittent range (max. 10% operation every minute)

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

FUNCTION DIAGRAMS



151-905.10



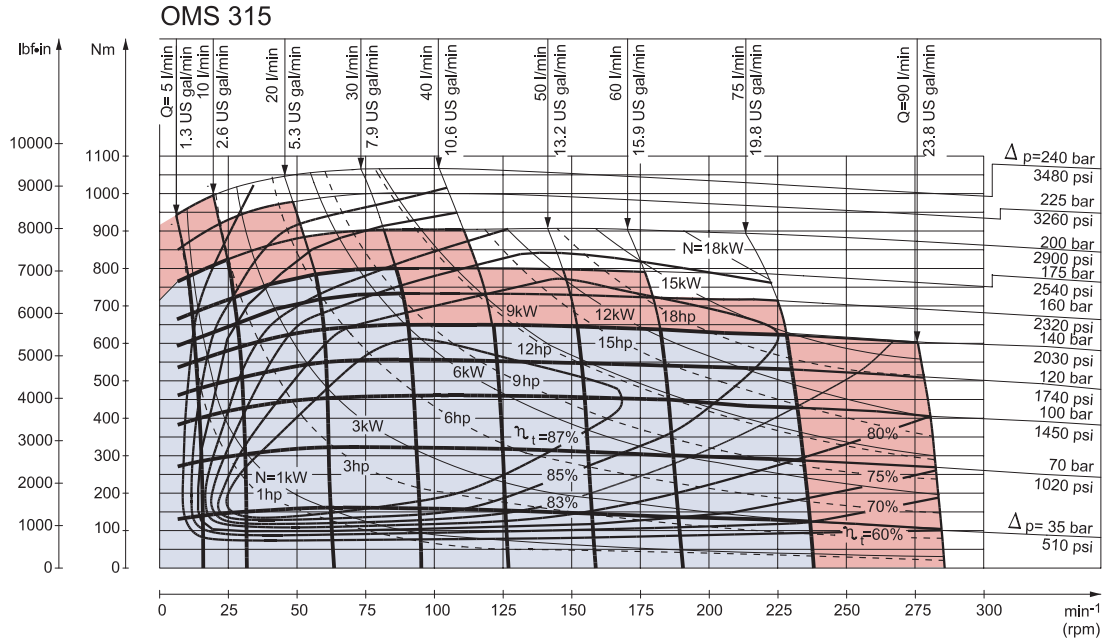
151-1039.10

Explanation of function diagram use, basis and conditions can be found on page 5.

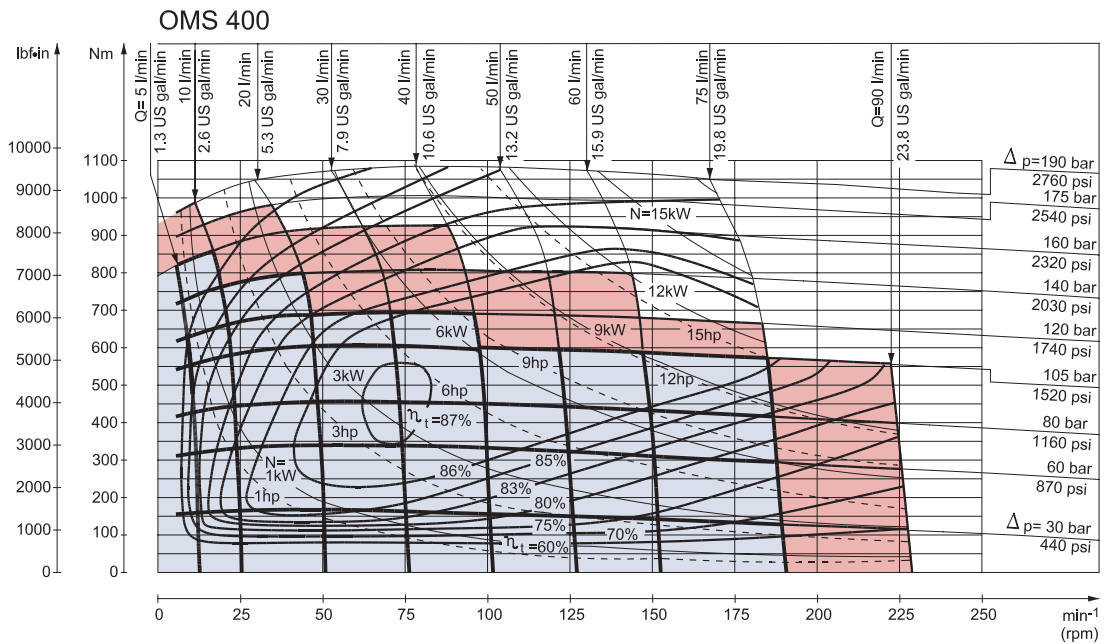
- Continuous range
- Intermittent range (max. 10% operation every minute)

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

FUNCTION DIAGRAMS
 (continued)



151-906.10



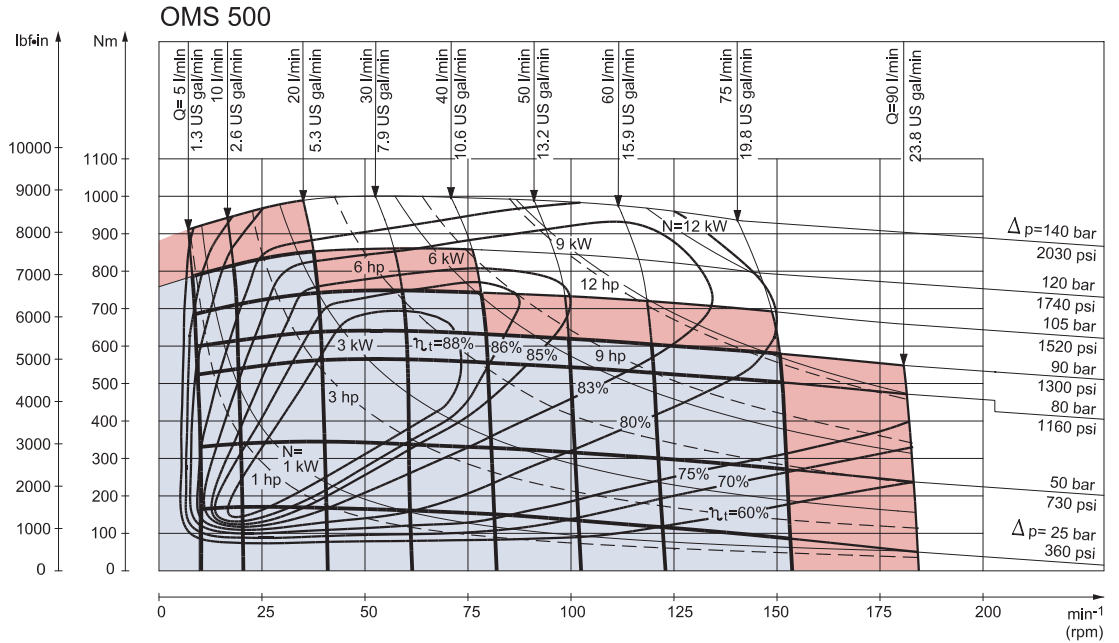
151-1491.10

Explanation of function diagram use, basis and conditions can be found on page 5.

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

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

**FUNCTION DIAGRAMS
 (continued)**



151-1984.10

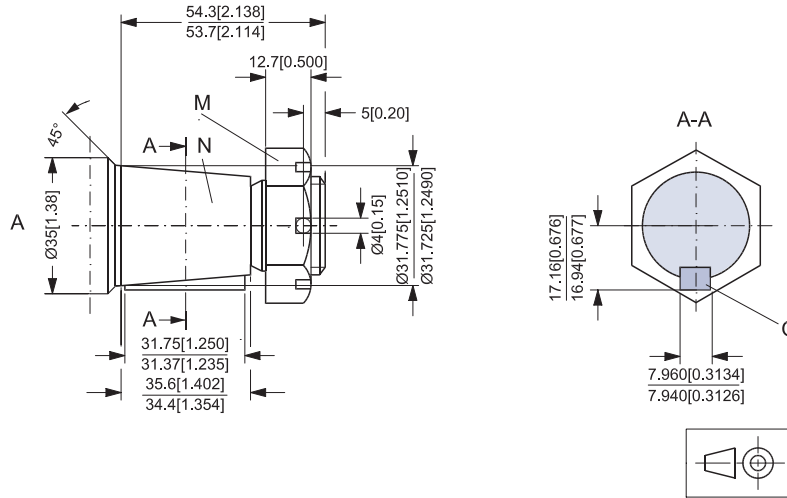
Explanation of function diagram use, basis and conditions can be found on page 5.

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

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

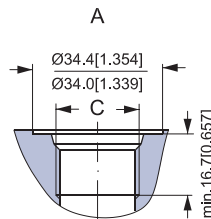
SHAFT VERSION

- A: Tapered 1 1/4 in shaft
- N: Cone 1:8
SAE J501
- M: 1 - 20 UNEF
across flats 1 7/16 in
Tightening torque:
200 ± 10 Nm
[1770 ± 85 lbf-in]
- O: Parallel key
5/16 x 5/16 x 1 1/4
SAE

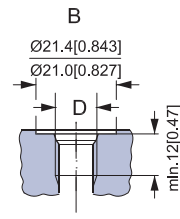


151-2004.10

PORT THREAD VERSIONS



A: UNF main port
 C: 7/8 - 14 UNF
 o-ring boss port



B: UNF drain port
 7/16 - 20 UNF
 o-ring boss port

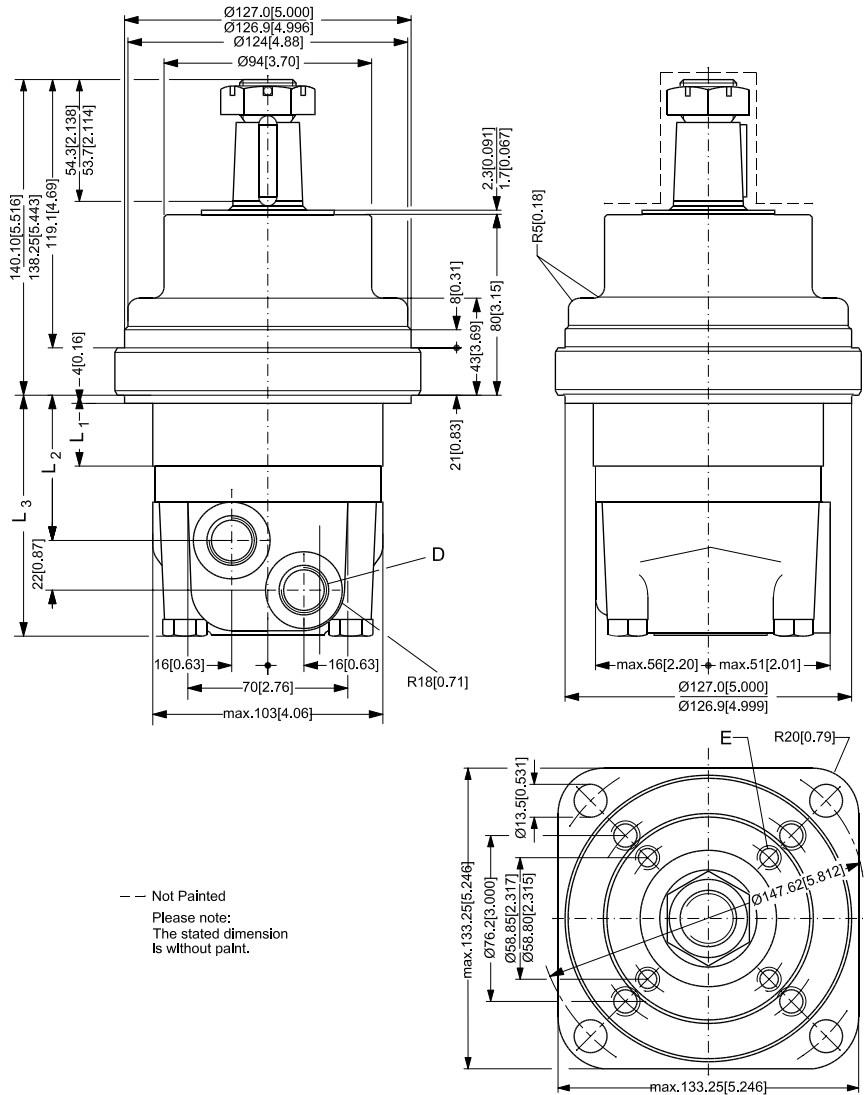
151-2003.10

DIMENSIONS

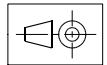
Type	L ₁ mm (in)	L ₂ mm (in)	L ₃ mm (in)
OMSW 125	21.8 [0.86]	58.8 [2.31]	100.2 [3.94]
OMSW 160	27.8 [1.09]	64.8 [2.55]	106.2 [4.18]
OMSW 200	34.8 [1.37]	71.8 [2.83]	113.2 [4.46]
OMSW 250	43.5 [1.71]	80.5 [3.17]	121.9 [4.80]
OMSW 315	54.8 [2.16]	91.8 [3.61]	133.2 [5.24]
OMSW 400	68.4 [2.69]	105.4 [4.15]	146.8 [5.78]
OMSW 500	68.4 [2.69]	105.4 [4.15]	146.8 [5.78]

D: 7/8 - 14 UNF;
 16.76 mm [0.66 in] deep
 E: Thread for external brake
 4 x 5/16 - 18 UNF;
 13 mm [0.51 in] deep

OMSW with side port and check valve



--- Not Painted
 Please note:
 The stated dimension
 is without paint.



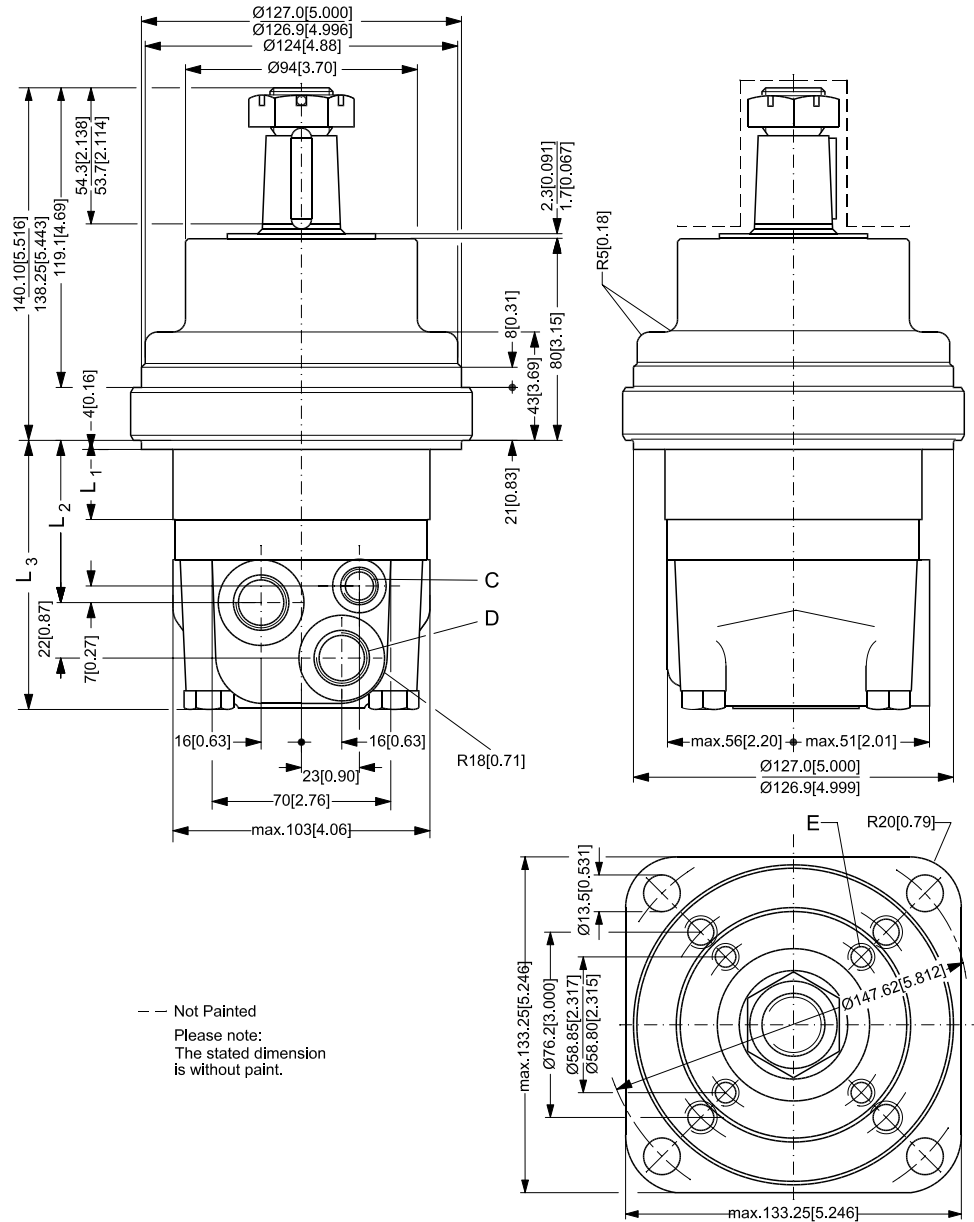
151-1999.10

DIMENSIONS

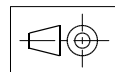
Type	L ₁ mm (in)	L ₂ mm (in)	L ₃ mm (in)
OMSW 125	21.8 [0.86]	58.8 [2.31]	100.2 [3.94]
OMSW 160	27.8 [1.09]	64.8 [2.55]	106.2 [4.18]
OMSW 200	34.8 [1.37]	71.8 [2.83]	113.2 [4.46]
OMSW 250	43.5 [1.71]	80.5 [3.17]	121.9 [4.80]
OMSW 315	54.8 [2.16]	91.8 [3.61]	133.2 [5.24]
OMSW 400	68.4 [2.69]	105.4 [4.15]	146.8 [5.78]
OMSW 500	68.4 [2.69]	105.4 [4.15]	146.8 [5.78]

- C: 7/16 - 20 UNF;
11.43 mm [0.45 in] deep
- D: 7/8 - 14 UNF;
16.76 mm [0.66 in] deep
O-ring boss port
- E: Thread for external brake
4 x 5/16 - 18 UNC;
13 mm [0.51 in] deep

OMSW with side port and drain connection



--- Not Painted
 Please note:
 The stated dimension
 is without paint.



151-2000.10

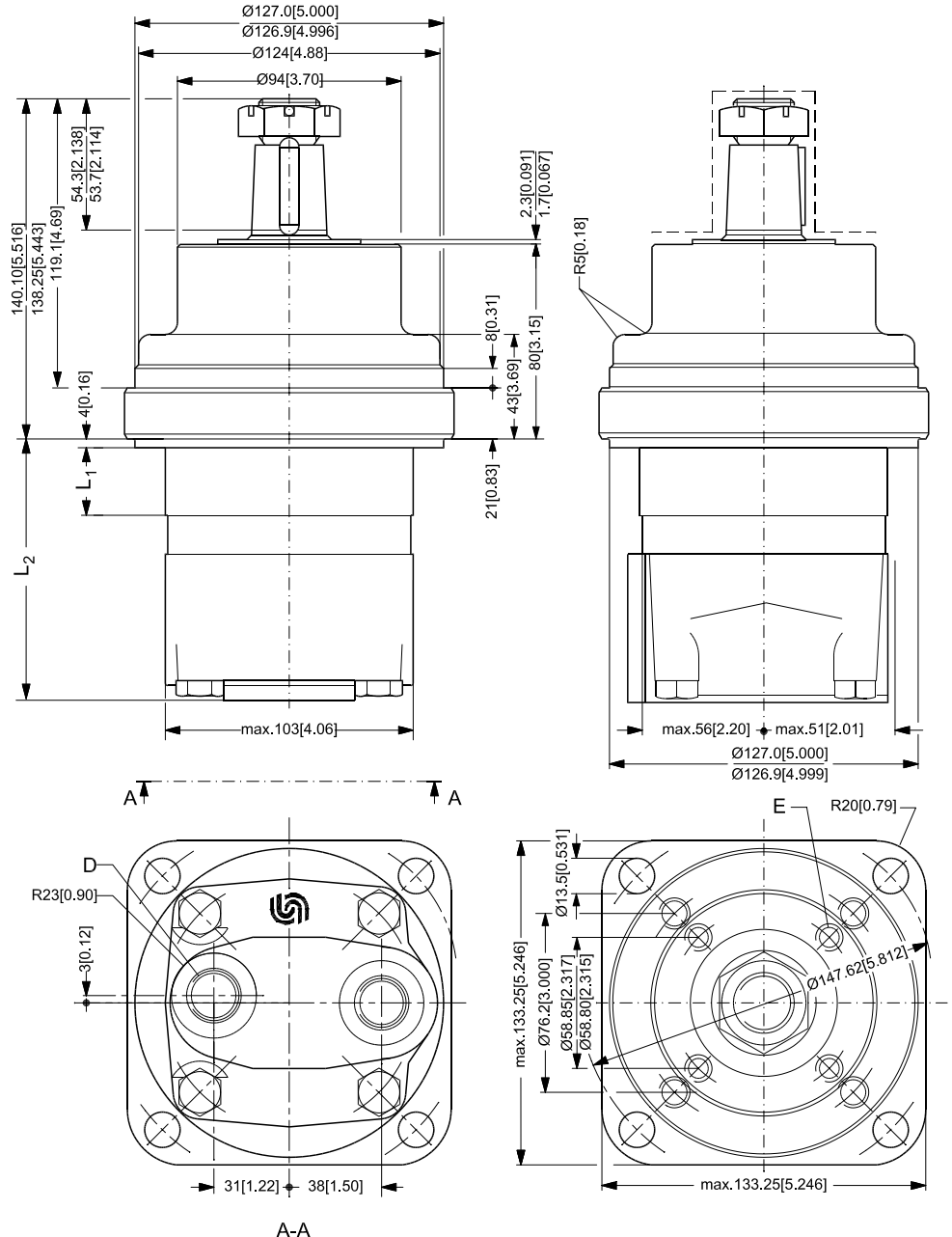
DIMENSIONS

Type	L ₁ mm (in)	L ₂ mm (in)
OMSW 125	21.8 [0.86]	101.8 [4.01]
OMSW 160	27.8 [1.09]	107.8 [4.24]
OMSW 200	34.8 [1.37]	114.8 [4.52]
OMSW 250	43.5 [1.71]	123.5 [4.86]
OMSW 315	54.8 [2.16]	134.8 [5.31]
OMSW 400	68.4 [2.69]	148.4 [5.84]
OMSW 500	68.4 [2.69]	148.4 [5.84]

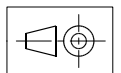
D: 7/8 - 14 UNF;
 16.76 mm [0.66 in] deep
 O-ring boss port

E: Thread for external brake
 4 x 5/16 - 18 UNC;
 13 mm [0.51 in] deep

OMSW with end port and check valve



--- Not Painted
 Please note:
 The stated dimension
 is without paint.



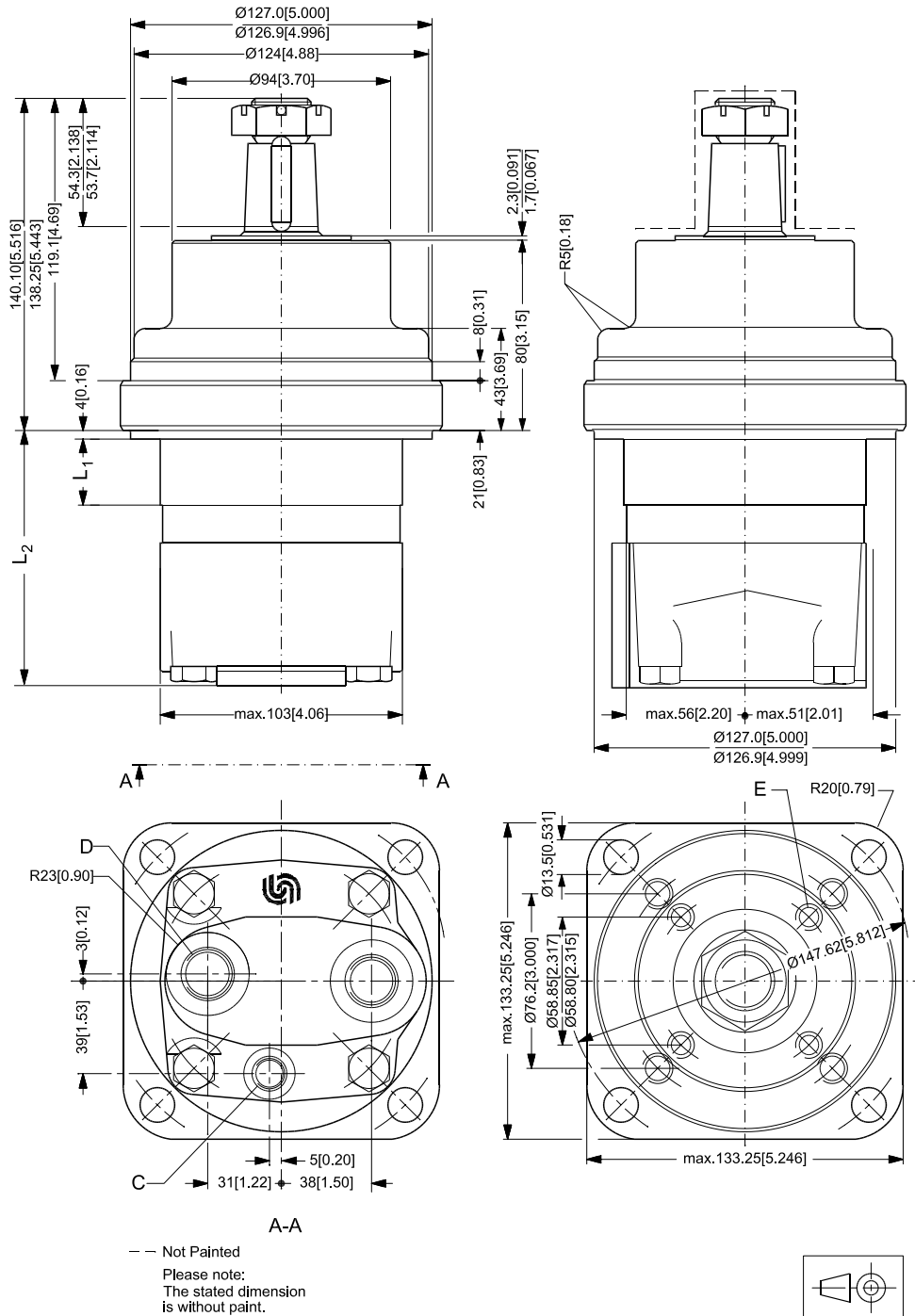
151-2002.10

DIMENSIONS

OMSW with end port and drain connection

Type	mm L ₁ (in)	mm L ₂ (in)
OMSW 125	21.8 [0.86]	101.8 [4.01]
OMSW 160	27.8 [1.09]	107.8 [4.24]
OMSW 200	34.8 [1.37]	114.8 [4.52]
OMSW 250	43.5 [1.71]	123.5 [4.86]
OMSW 315	54.8 [2.16]	134.8 [5.31]
OMSW 400	68.4 [2.69]	148.4 [5.84]
OMSW 500	68.4 [2.69]	148.4 [5.84]

- C: 7/16 - 20 UNF;
11.43 mm [0.45 in] deep
- D: 7/8 - 14 UNF;
16.76 mm [0.66 in] deep
O-ring boss port
- E: Thread for external brake
4 x 5/16 - 18 UNC;
13 mm [0.51 in] deep



WEIGHT OF MOTORS

Code no	Weight	
	kg	[lb]
151F2502	10.8	[23.8]
151F2503	11.2	[24.7]
151F2504	11.6	[25.6]
151F2505	12.1	[26.7]
151F2506	12.8	[28.2]
151F2507	13.6	[30.0]
151F2508	13.6	[30.0]
151F2512	10.8	[23.8]
151F2513	11.2	[24.7]
151F2514	11.6	[25.6]
151F2515	12.1	[26.7]
151F2516	12.8	[28.2]
151F2517	13.6	[30.0]
151F2518	13.6	[30.0]
151F2522	10.8	[23.8]
151F2523	11.2	[24.7]
151F2524	11.6	[25.6]
151F2525	12.1	[26.7]
151F2526	12.8	[28.2]
151F2527	13.6	[30.0]
151F2528	13.6	[30.0]
151F2532	10.8	[23.8]
151F2533	11.2	[24.7]
151F2534	11.6	[25.6]
151F2535	12.1	[26.7]
151F2536	12.8	[28.2]
151F2537	13.6	[30.0]
151F2538	13.6	[30.0]



OMSW with brake nose
Technical Information
Notes

NOTES



OMSW with brake nose
Technical Information
Notes

NOTES



OUR PRODUCTS

Hydrostatic transmissions
Hydraulic power steering
Electro-hydraulic power steering
Electric power steering
Closed and open circuit axial piston pumps and motors
Gear pumps and motors
Bent axis motors
Orbital motors
Transit mixer drives
Planetary compact gears
Proportional valves
Directional spool valves
Cartridge valves
Hydraulic integrated circuits
Hydrostatic transaxles
Integrated systems
Fan drive systems
Electrohydraulic controls
Micro-controllers and software
Electric motors and inverters
Displays
Sensors

Sauer-Danfoss Hydraulic Power Systems – Market Leaders Worldwide

Sauer-Danfoss is a comprehensive supplier providing complete systems to the global mobile market.

Sauer-Danfoss serves markets such as agriculture, construction, road building, material handling, municipal, forestry, turf care, and many others.

We offer our customers optimum solutions for their needs and develop new products and systems in close cooperation and partnership with them.

Sauer-Danfoss specializes in integrating a full range of system components to provide vehicle designers with the most advanced total system design.

Sauer-Danfoss provides comprehensive worldwide service for its products through an extensive network of Authorized Service Centers strategically located in all parts of the world.

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