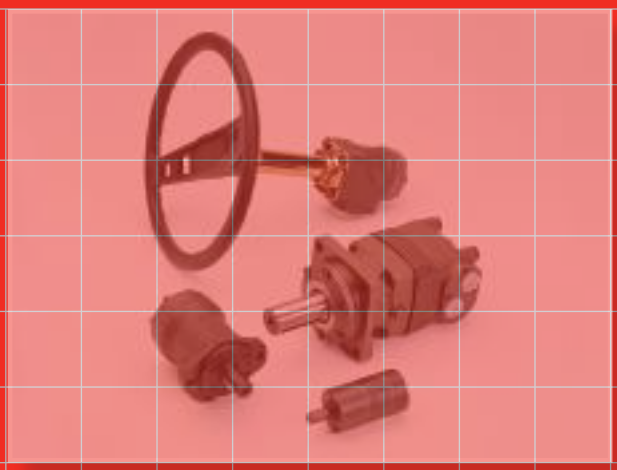
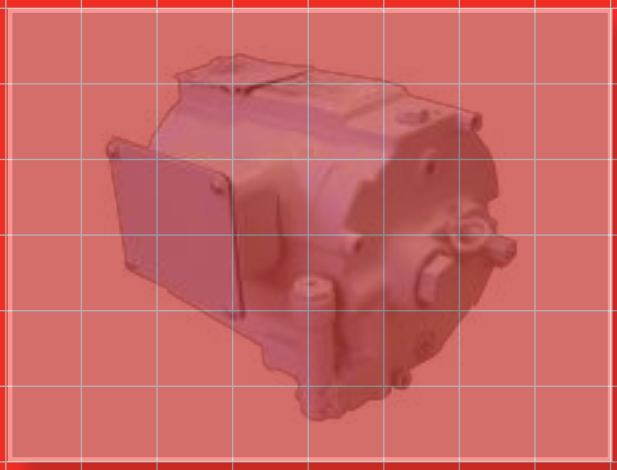
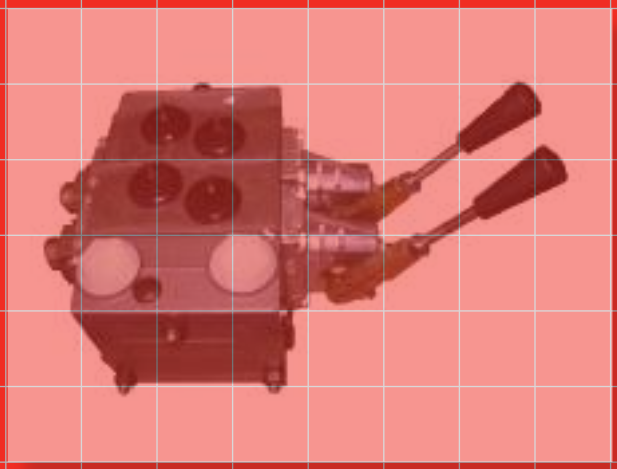






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CATALOGO TECNICO

TECHNICAL CATALOGUE

Menu

SAUER DANFOSS

OMP, OMR, OMH and OMEW Orbital motors

Technical Information

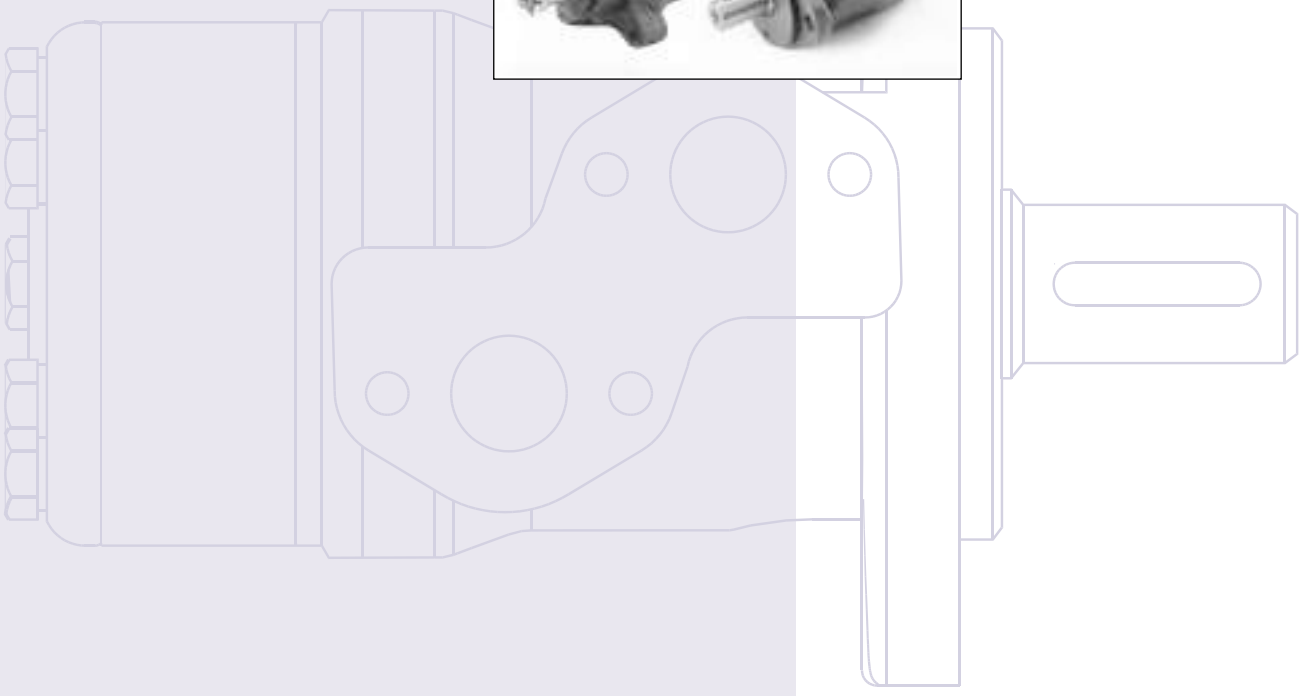












OMP, OMR, OMH and OMEW
Technical Information
A wide range of hydraulic motors



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A WIDE RANGE OF HYDRAULIC MOTORS

Sauer-Danfoss is a world leader within production of low speed hydraulic motors with high torque. 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 cm^3 [0.50 in^3] to 800 cm^3 [48.9 in^3] 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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A wide range of hydraulic motors

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 LSHT 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 HYDRAULIC 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 hydraulic 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: TMT

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

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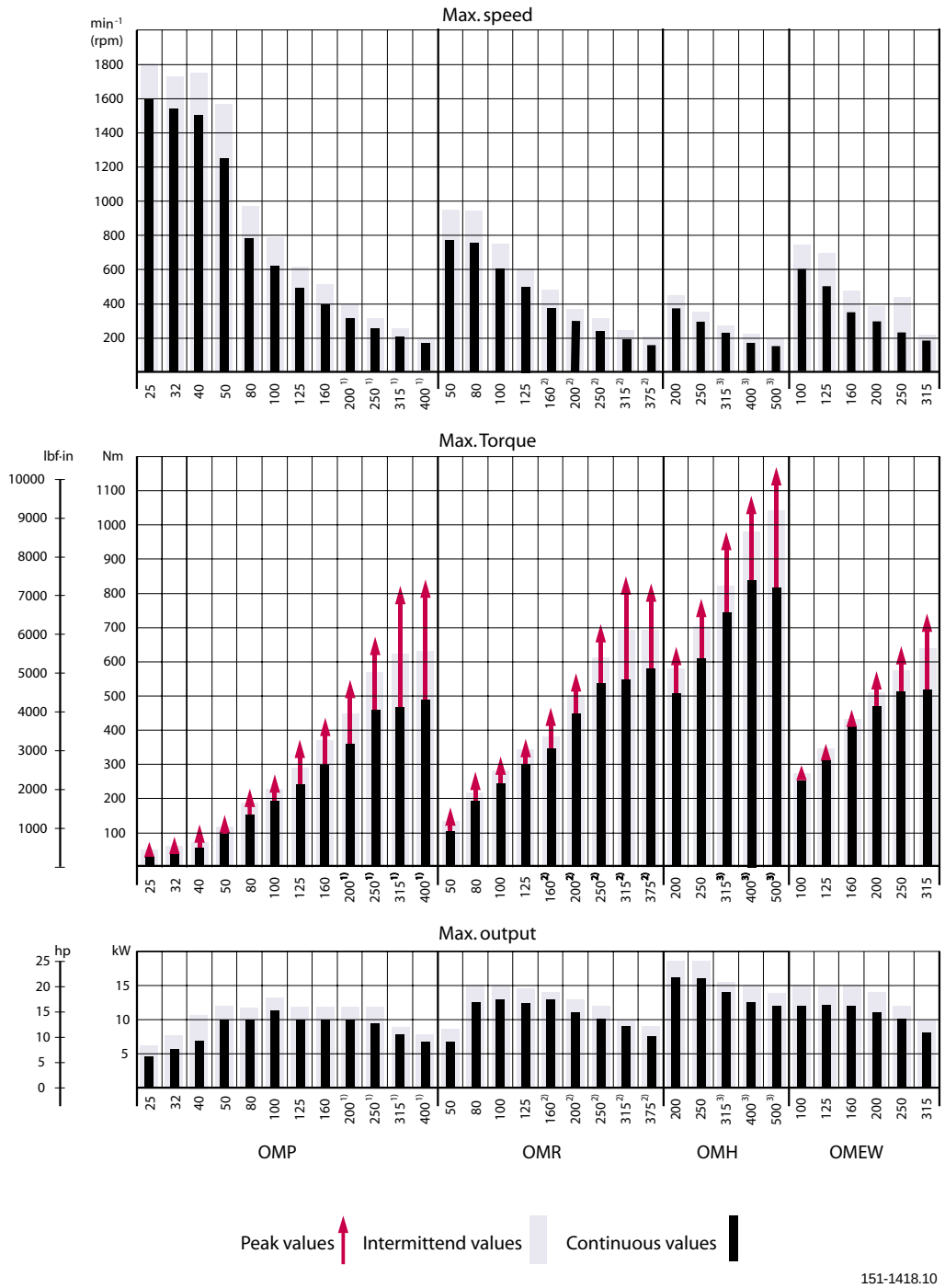
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SPEED, TORQUE AND OUTPUT



151-1418.10

1) Ø1 1/4 in shaft
2) Ø1 1/4 in or 1 1/4 in tapered shaft
3) 1 1/4 in splined shaft

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.

- OMP and OMPW can be found on pages 18 - 23
- OMR and OMRW can be found on pages 45 - 49
- OMH can be found on pages 74 - 76
- OMEW can be found on pages 90 - 92

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" DHMH.PK.100.G2.02 520L0232.

VERSIONS

Mounting flange	Shaft	Port size	European version	US version	Side port version	End port version	Flange port version	Standard shaft seal	High pressure shaft seal	Drain connection	Check valve	Specials	Main type designation
2 hole oval flange (A2-flange)	Cyl. 25 mm	G 1/2	X		X				X	No	No		OMP
		G 1/2	X		X				X	Yes	No		OMP
		G 1/2	X		X			X		Yes	Yes	A	OMP C
		G 1/2	X			X		X		Yes	Yes		OMP
	Cyl. 1 in	G 1/2	X		X				X	No	No		OMP
		G 1/2	X		X				X	Yes	No		OMP
		7/8 - 14 UNF		X	X			X		Yes	Yes		OMP
	Splined 1 in	G 1/2	X		X				X	No	No		OMP
		G 1/2	X		X				X	Yes	No		OMP
4 hole oval flange (A4 flange)	Cyl. 32 mm	G 1/2	X		X			X		Yes	Yes		OMP
Square flange (C-flange)	Cyl. 25 mm	G 1/2	X			X		X		Yes	Yes		OMP
	Cyl. 1 in	7/8 - 14 UNF		X	X			X		Yes	Yes		OMP
		1/2 - 14 NPTF		X	X			X		Yes	Yes		OMP
Wheel	Cyl. 25 mm	G 1/2	X				X	X		Yes	Yes		OMPW
	Tap. 28.5 mm	G 1/2	X				X	X		Yes	Yes	B	OMPW N

Function diagram – see page : →

Specials:
A : Corrosion resistant parts
B : With needle bearings

Features available (options) :
Free running gearset
Low leakage (low speed valve)
Speed sensor
Viton shaft seal
Reverse rotation
Drain
Corrosion protected
Painted
With needle bearings

CODE NUMBERS

CODE NUMBERS	DISPLACEMENT [cm³]												Technical data – Page	Dimensions – Page
	25	32	40	50	80	100	125	160	200	250	315	400		
151-	0340	0341	0342	0310	0311	0312	0313	0314	0315	0316	0317	0318	10	27
151-	0640	0641	0642	0610	0611	0612	0613	0614	0615	0616	0617	0618	10	28
151-	-	-	-	1208	1209	1210	1217	1211	1212	1213	1214	1215	10	29
151-	-	-	-	5191	5192	5193	5194	5195	5196	5197	5198	5199	10	30
151-	-	-	-	0300	0301	0302	0303	0304	0305	0306	0307	0308	10	27
151-	-	-	-	0600	0601	0602	0603	0604	0605	0606	0607	0608	10	28
151-	7080	7081	7082	7041	7042	7043	7044[1)]	7045	7046	7047	7048	7049	10	31
151-	-	-	-	0330	0331	0332	0333	0334	0335	0336	0337	0338	11	27
151-	-	-	-	0630	0631	0632	0633	0634	0635	0636	0637	0638	11	28
151-	-	-	-	5001	5002	5003	5004	5005	5006	5007	5008	5009	12	32
151-	-	-	-	5211	5212	5213	5214	5215	5216	5217	5218	5219	10	33
151-	-	-	-	7061	7062	7063	5174	7065	7066	7067	7068	7069	10	34
151-	-	-	-	7021	7022	7023	7024	7025	7026	7027	7028	7029	10	34
151-	-	-	-	7101	7102	7103	7104	7105	7106	7107	7108	7109	10	35
151-	-	-	-	5301	5302	5303	5304	5305	5306	5307	5308	5309	11	35
→	18	18	19	19	20	20	21	21	22	22	23	23		

1) Motor is painted black

Ordering
Add the four digit prefix "151-" to the four digit numbers from the chart for complete code number.

Example:
151-0305 for an OMP 200 with A2 flange, cyl. 1 in shaft, port size G 1/2 and high pressure shaft seal.

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

TECHNICAL DATA FOR OMP/OMPW WITH 25 MM AND 1 IN CYLINDRICAL SHAFT

Type			OMP	OMP	OMP	OMP	OMP	OMP	OMP	OMP	OMP	OMP	OMP	OMP
Motor size			**25**	**32**	**40**	**50**	**80**	**100**	**125**	**160**	**200**	**250**	**315**	**400**
Geometric displacement	cm^3		25.0	32.0	40.0	48.6	77.8	97.3	125.0	155.7	194.6	242.3	306.1	389.2
	$[in^3]$		[1.53]	[1.96]	[2.45]	[2.97]	[4.76]	[5.95]	[7.65]	[9.53]	[11.91]	[14.83]	[18.73]	[23.82]
Max. speed	min^{-1}	cont.	1600	1560	1500	1230	770	615	480	385	310	250	195	155
	[rpm]	int.[1]	1800	1720	1750	1540	960	770	600	480	385	310	245	190
Max. torque	Nm	cont.	33	43	52	93	150	190	240	300	300	300	300	300
	[lbf·in]		[290]	[380]	[460]	[820]	[1330]	[1680]	[2120]	[2660]	[2660]	[2660]	[2660]	[2660]
		int.[1]	47	61	74	120	190	230	290	370	380	410	390	420
			[420]	[540]	[660]	[1060]	[1680]	[2040]	[2570]	[3280]	[3360]	[3630]	[3450]	[3720]
		peak[2]	67	86	107	140	220	270	370	430	540	550	600	600
			[590]	[760]	[950]	[1240]	[1950]	[2390]	[3280]	[3810]	[4780]	[4870]	[5310]	[5310]
Max. output	kW	cont.	4.5	5.8	7.0	10.0	10.0	11.0	10.0	10.0	8.0	6.0	5.0	4.0
	[hp]		[6.0]	[7.8]	[9.4]	[13.4]	[13.4]	[14.8]	[13.4]	[13.4]	[10.7]	[8.1]	[6.7]	[5.4]
		int.[1]	6.1	7.8	10.6	12.0	12.0	13.0	12.0	12.0	11.0	9.0	7.0	6.0
			[8.2]	[10.5]	[14.2]	[16.1]	[16.1]	[17.4]	[16.1]	[16.1]	[14.8]	[12.1]	[9.4]	[8.1]
Max. pressure drop	bar	cont.	100	100	100	140	140	140	140	140	115	90	75	60
	[psi]		[1450]	[1450]	[1450]	[2030]	[2030]	[2030]	[2030]	[2030]	[1670]	[1310]	[1090]	[870]
		int.[1]	140	140	140	175	175	175	175	175	150	125	100	80
			[2030]	[2030]	[2030]	[2540]	[2540]	[2540]	[2540]	[2540]	[2180]	[1810]	[1450]	[1160]
		peak[2]	225	225	225	225	225	225	225	225	225	180	160	130
			[3260]	[3260]	[3260]	[3260]	[3260]	[3260]	[3260]	[3260]	[3260]	[2610]	[2320]	[1890]
Max. oil flow	l/min	cont.	40	50	60	60	60	60	60	60	60	60	60	60
	[USgal/min]		[10.6]	[13.2]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]
		int.[1]	45	55	70	75	75	75	75	75	75	75	75	75
			[11.9]	[14.5]	[18.5]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]
Max. starting pressure with unloaded shaft	bar		10	10	10	10	10	10	9	7	5	5	5	5
	[psi]		[145]	[145]	[145]	[145]	[145]	[145]	[130]	[100]	[75]	[75]	[75]	[75]
Min. starting torque	at max. press. drop cont. Nm [lbf·in]		30	40	45	80	135	170	210	280	270	280	280	280
			[270]	[350]	[400]	[710]	[1200]	[1510]	[1860]	[2480]	[2390]	[2480]	[2480]	[2480]
	at max. press. drop int.[1] Nm [lbf·in]		40	55	63	100	170	210	270	350	360	390	370	400
			[350]	[490]	[560]	[890]	[1510]	[1860]	[2390]	[3100]	[3190]	[3450]	[3280]	[3540]
Min. speed[3]	min^{-1}		20	15	10	10	10	9	9	8	7	5	5	5
	[rpm]													

[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.

TECHNICAL DATA FOR OMP/OMPW WITH 1 IN SPLINED AND 28,5 MM TAPERED SHAFT

Type			OMP	OMP	OMP	OMP	OMP	OMP	OMP	OMP	OMP
Motor size			**50**	**80**	**100**	**125**	**160**	**200**	**250**	**315**	**400**
Geometric displacement	cm^3		48.6	77.8	97.3	125.0	155.7	194.6	242.3	306.1	389.2
	$[in^3]$		[2.97]	[4.76]	[5.95]	[7.65]	[9.53]	[11.91]	[14.83]	[18.73]	[23.82]
Max. speed	min^{-1}	cont.	1230	770	615	480	385	310	250	195	155
	[rpm]	int[1]	1540	960	770	600	480	385	310	245	190
Max. torque	Nm	cont.	93	150	190	240	300	360	360	360	360
	[lbf·in]		[820]	[1330]	[1680]	[2120]	[2660]	[3190]	[3190]	[3190]	[3190]
	Nm	int.[1]	120	190	230	290	370	450	460	470	460
	[lbf·in]		[1060]	[1680]	[2040]	[2570]	[3280]	[3980]	[4070]	[4160]	[4070]
	Nm	peak[2]	140	220	270	370	430	540	550	540	560
	[lbf·in]		[1240]	[1950]	[2390]	[3280]	[3810]	[4780]	[4870]	[4780]	[4960]
Max. output	kW	cont.	10.0	10.0	11.0	10.0	10.0	10.0	8.0	6.0	5.0
	[hp]		[13.4]	[13.4]	[14.8]	[13.4]	[13.4]	[13.4]	[10.7]	[8.0]	[6.7]
	kW	int.[1]	12.0	12.0	13.0	12.0	12.0	12.0	10.5	7.5	6.0
	[hp]		[16.1]	[16.1]	[17.4]	[16.1]	[16.1]	[16.1]	[14.1]	[10.1]	[8.0]
Max. pressure drop	bar	cont.	140	140	140	140	140	140	105	90	70
	[psi]		[2030]	[2030]	[2030]	[2030]	[2030]	[2030]	[1520]	[1310]	[1020]
	bar	int.[1]	175	175	175	175	175	175	140	120	90
	[psi]		[2540]	[2540]	[2540]	[2540]	[2540]	[2540]	[2030]	[1740]	[1310]
	bar	peak[2]	225	225	225	225	225	225	180	160	130
	[psi]		[3260]	[3260]	[3260]	[3260]	[3260]	[3260]	[2610]	[2320]	[1890]
Max. oil flow	l/min	cont.	60	60	60	60	60	60	60	60	60
	[USgal/min]		[15.9]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]
	l/min	int.[1]	75	75	75	75	75	75	75	75	75
	[USgal/min]		[19.8]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]
Max. starting pressure with unloaded shaft	bar		10	10	10	9	7	5	5	5	5
	[psi]		[145]	[145]	[145]	[130]	[100]	[75]	[75]	[75]	[75]
Min. starting torque	at max. press. drop cont. Nm [lbf·in]		80	135	170	210	280	340	330	340	345
			[710]	[1200]	[1510]	[1860]	[2480]	[3010]	[2920]	[3010]	[3050]
	at max. press. drop int.[1] Nm [lbf·in]		100	170	210	270	350	420	440	450	425
			[890]	[1510]	[1860]	[2390]	[3100]	[3720]	[3890]	[3980]	[3760]
Min. speed[3]	min^{-1}		10	10	9	9	8	7	5	5	5
	[rpm]										

[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.

TECHNICAL DATA FOR OMP/OMPW WITH 32 MM CYLINDRICAL SHAFT

Type			OMP	OMP	OMP	OMP	OMP	OMP	OMP	OMP	OMP
Motor size			**50**	**80**	**100**	**125**	**160**	**200**	**250**	**315**	**400**
Geometric displacement	cm^3 [in^3]		48.6 [2.97]	77.8 [4.76]	97.3 [5.95]	125.0 [7.65]	155.7 [9.53]	194.6 [11.91]	242.3 [14.83]	306.1 [18.73]	389.2 [23.82]
Max. speed	min^{-1} [rpm]	cont.	1230	770	615	480	385	310	250	195	155
		int.[1]	1540	960	770	600	480	385	310	245	190
Max. torque	Nm [lbf·in]	cont.	93 [820]	150 [1330]	190 [1680]	240 [2120]	300 [2660]	360 [3190]	460 [4070]	470 [4160]	490 [4340]
		int.[1]	120 [1060]	190 [1680]	230 [2040]	290 [2570]	370 [3280]	450 [3980]	570 [5050]	620 [5490]	630 [5580]
		peak[2]	140 [1240]	220 [1950]	270 [2390]	370 [3280]	430 [3810]	540 [4780]	670 [5930]	820 [7260]	840 [7440]
Max. output	kW [hp]	cont.	10.0 [13.4]	10.0 [13.4]	11.0 [14.8]	10.0 [13.4]	10.0 [13.4]	10.0 [13.4]	9.5 [12.7]	7.5 [10.1]	6.5 [8.7]
		int.[1]	12.0 [16.1]	12.0 [16.1]	13.0 [17.4]	12.0 [16.1]	12.0 [16.1]	12.0 [16.1]	12.0 [16.1]	9.0 [12.1]	7.5 [10.1]
Max. pressure drop	bar [psi]	cont.	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]	120 [1741]	95 [1380]
		int.[1]	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]	160 [2320]	125 [1810]
		peak[2]	225 [3260]	225 [3260]	225 [3260]	225 [3260]	225 [3260]	225 [3260]	225 [3260]	225 [3260]	180 [2610]
Max. oil flow	l/min [USgal/min]	cont.	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]
		int.[1]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]
Max. starting pressure with unloaded shaft	bar [psi]		10 [145]	10 [145]	10 [145]	9 [130]	7 [100]	5 [75]	5 [75]	5 [75]	5 [75]
Min. starting torque	at max. press. drop cont. Nm [lbf·in]		80 [710]	135 [1200]	170 [1510]	210 [1860]	280 [2480]	340 [3010]	420 [3720]	460 [4070]	460 [4070]
	at max. press. drop int.[1] Nm [lbf·in]		100 [890]	170 [1510]	210 [1860]	270 [2390]	350 [3100]	420 [3720]	530 [4690]	600 [5310]	600 [5310]
Min. speed[3]	min^{-1} [rpm]		10	10	9	9	8	7	5	5	5

Type			Max. inlet pressure	Max. return pressure with drain line
OMP 25 - 400	bar [psi]	cont.	175 [2540]	175 [2540]
	bar [psi]	int.[1]	200 [2900]	200 [2900]
	bar [psi]	peak[2]	225 [3260]	225 [3260]

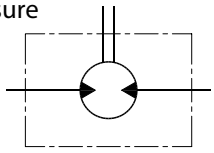
[1] Intermittent operation: the permissible values may occur for max. 10% of every minute.
[2] Peak load: the permissible values may occur for max. 1% of every minute.
[3] Operation at lower speeds may be slightly less smooth.

Technical data – max. permissible shaft seal pressure

OMP WITH HIGH PRESSURE SHAFT SEAL (HPS)

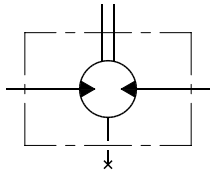
OMP with HPS and without drain connection:
The shaft seal pressure equals the average of input pressure and return pressure.

$$P_{seal} = \frac{P_{in} + P_{return}}{2}$$



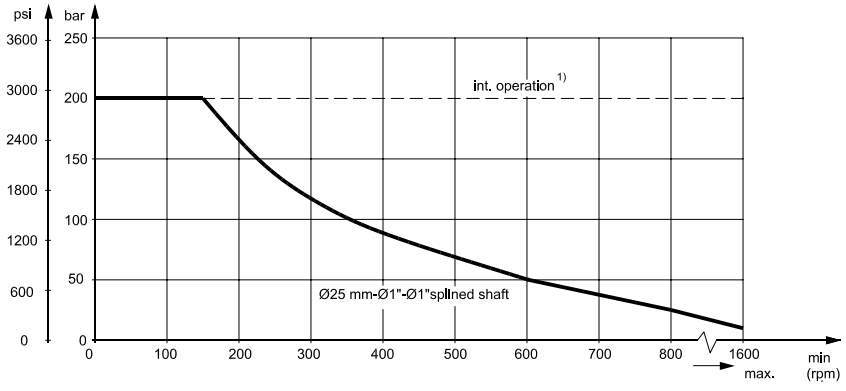
151-1743.10

OMP with HPS and drain connection:
The shaft seal pressure equals the pressure in the drain line.



151-1855.10

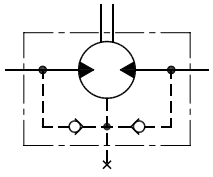
Max. permissible shaft seal pressure



151-1745.10

OMP WITH STANDARD SHAFT SEAL

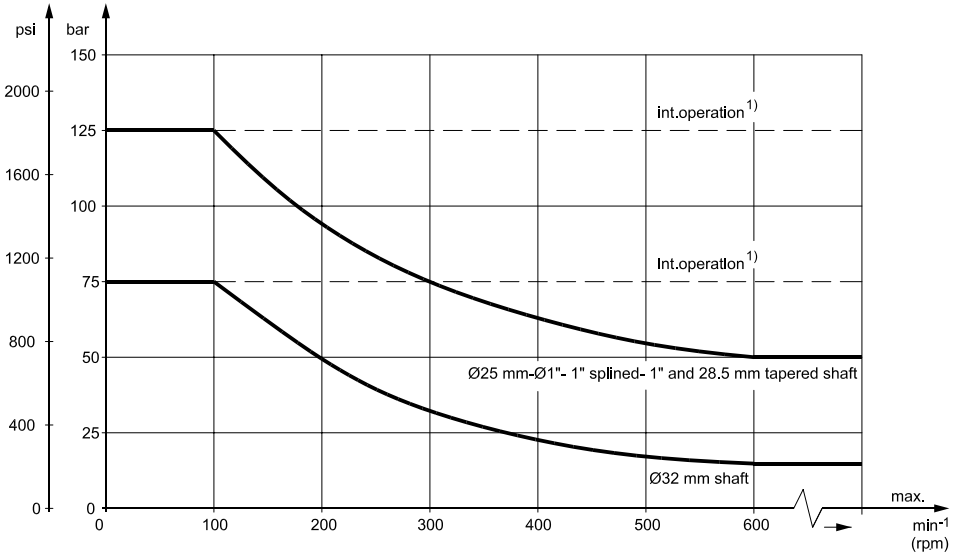
OMP with standard shaft seal, check valves and <u>without</u> use of drain connection:
The pressure on the shaft seal never exceeds the pressure in the return line



151-320.10

OMP with standard shaft seal, check valves and <u>with</u> drain connection:
The shaft seal pressure equals the pressure on the drain line.

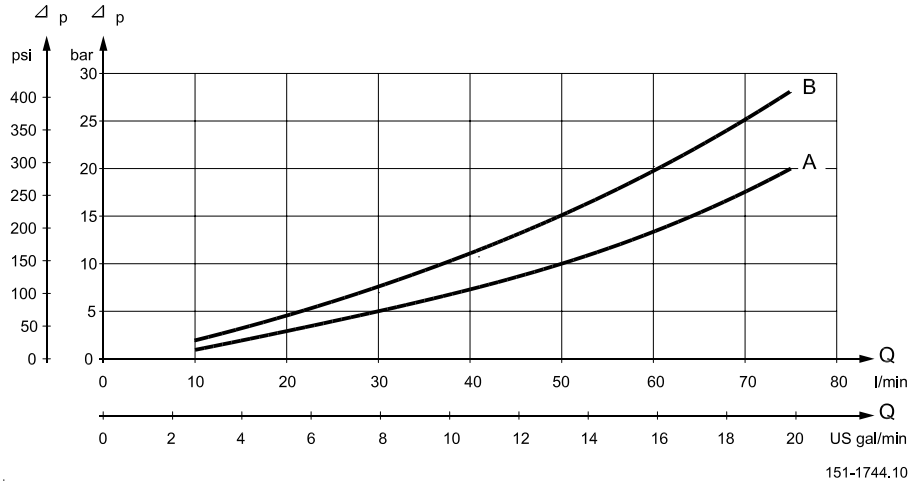
Max. return pressure without drain line or max. pressure in the drain line



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

151-1563.10

PRESSURE DROP IN MOTOR



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

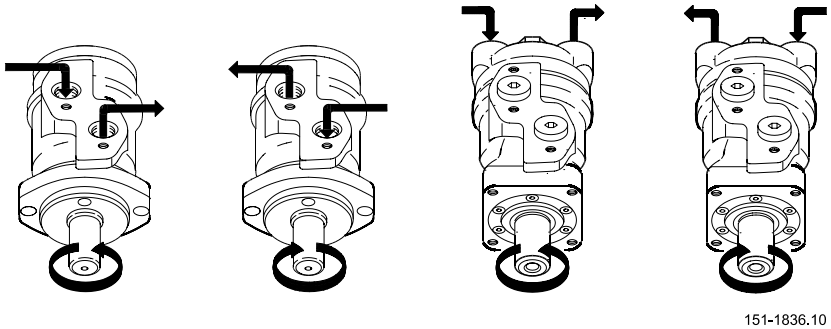
A: OMP 50 - 400
B: OMP 25 - 40 / OMPW

OIL FLOW IN DRAIN LINE

The table 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 mm²/s [SUS]	Oil flow in drain line 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]

DIRECTION OF SHAFT ROTATION

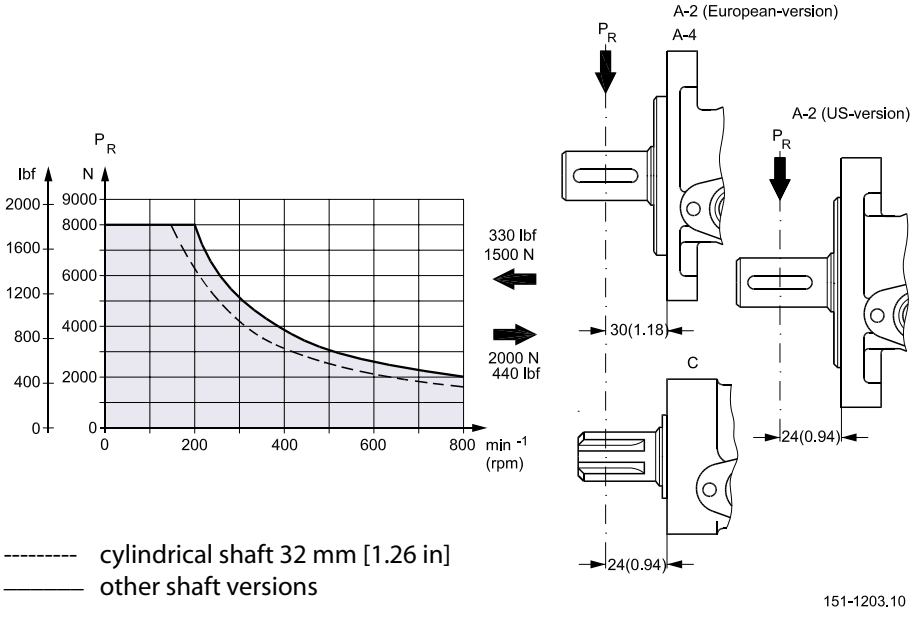


PERMISSIBLE SHAFT LOADS FOR OMP

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	4-hole oval flange** 2-hole oval flange (European version)	4-hole oval flange	Square flange** 2-hole oval flange (US version)
Shaft version	25 mm cylindrical shaft 1 in cylindrical shaft 1 in splined shaft	32 mm cylindrical shaft	25 mm cylindrical shaft
Permissible shaft load (P_R) l in mm	$\frac{800}{n} \times \frac{250000}{95+l}$ N*	$\frac{800}{n} \times \frac{187500}{95+l}$ N*	$\frac{800}{n} \times \frac{250000}{101+l}$ N*
Permissible shaft load (P_R) l in inch	$\frac{800}{n} \times \frac{2215}{3.74+l}$ lbf*	$\frac{800}{n} \times \frac{1660}{3.74+l}$ lbf*	$\frac{800}{n} \times \frac{2215}{3.98+l}$ lbf*

* $n \geq 200$ min^{-1} (rpm); $l \leq 55$ mm [2.2 in]
$n < 200$ min^{-1} (rpm); => $P_{Rmax} = 8000$ N [1800 lbf]
** For both European and US version



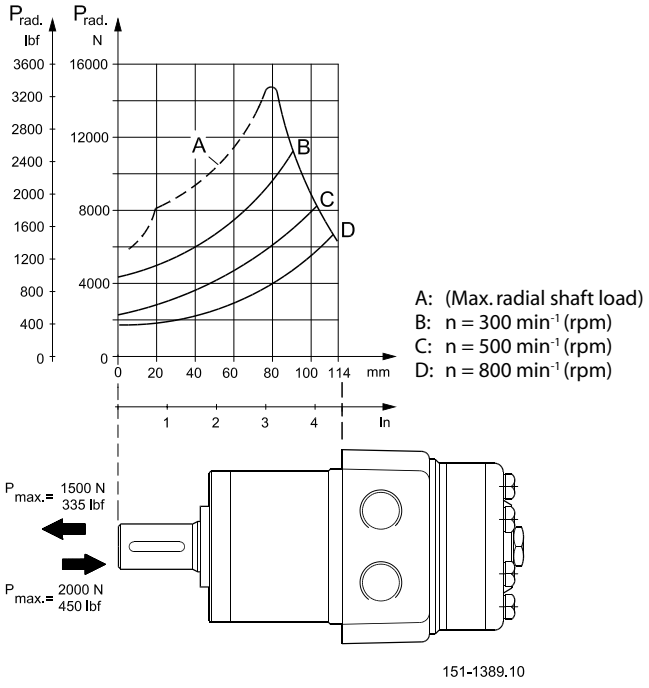
--------- cylindrical shaft 32 mm [1.26 in]
———— other shaft versions

151-1203.10

The curve shows the relation between P_R and n
- when l = 30 mm [1.18 in] for motors with A2 (European version) and A4 oval mounting flange
- 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 with the output shaft running in needle bearings.

PERMISSIBLE SHAFT LOAD FOR OMPW WITH SLIDE BEARINGS



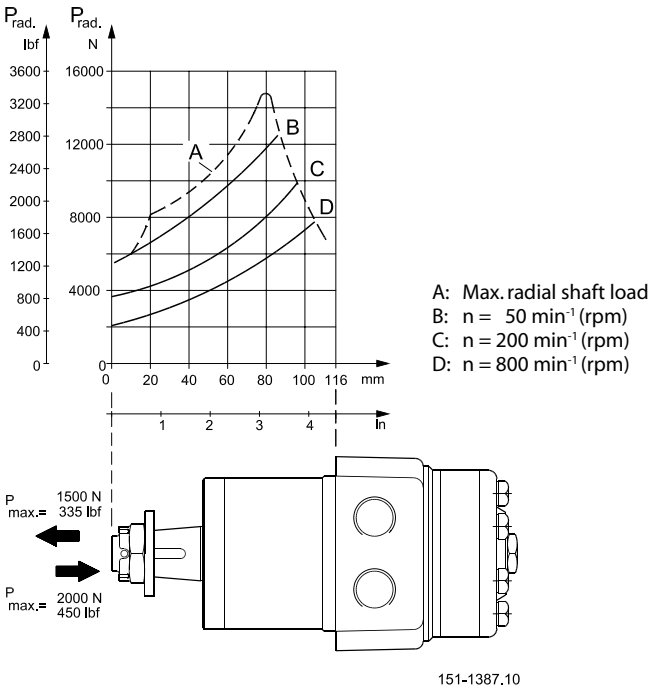
The output shaft on OMPW can be offered in slide bearings similar to the other OMP-motors. The permissible higher radial load is therefore due to the recessed mounting flange moving the point of load closer to the motor bearings.

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.

The curves are not based on calculations of B10 bearing life. They represent absolute limits that must not be exceeded.

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

PERMISSIBLE SHAFT LOAD FOR OMPW N WITH NEEDLE BEARING



The output shaft on OMPW N can be offered in needle bearings. These bearings and the recessed mounting flange allow a higher permissible radial load in comparison to OMP motors.

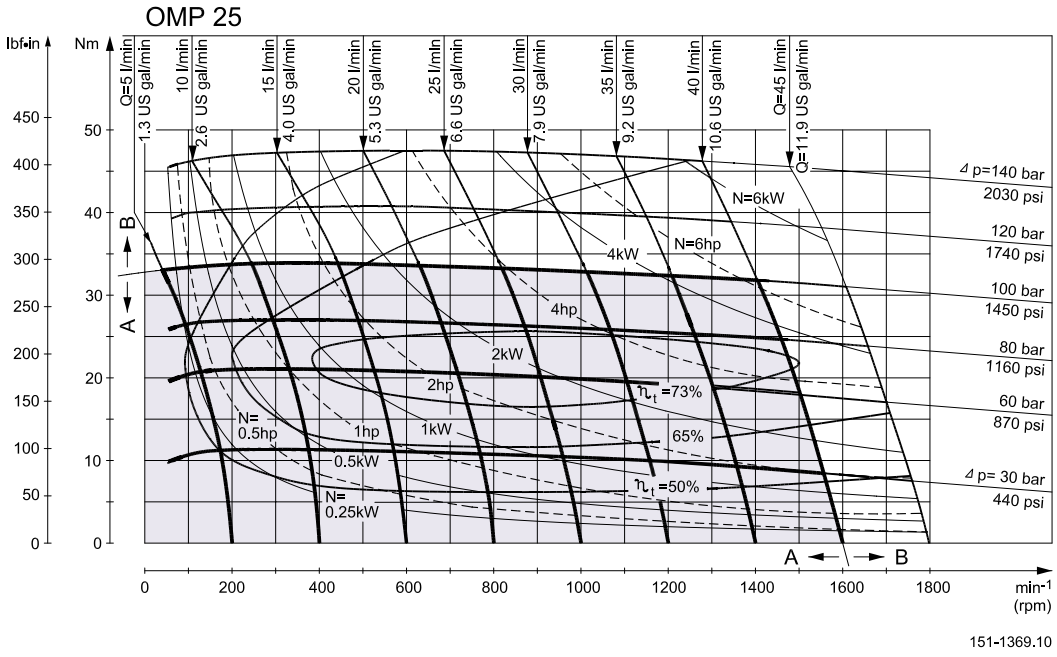
The permissible radial load on the shaft is shown for different speeds as a function of the distance from the mounting flange to the point of load application.

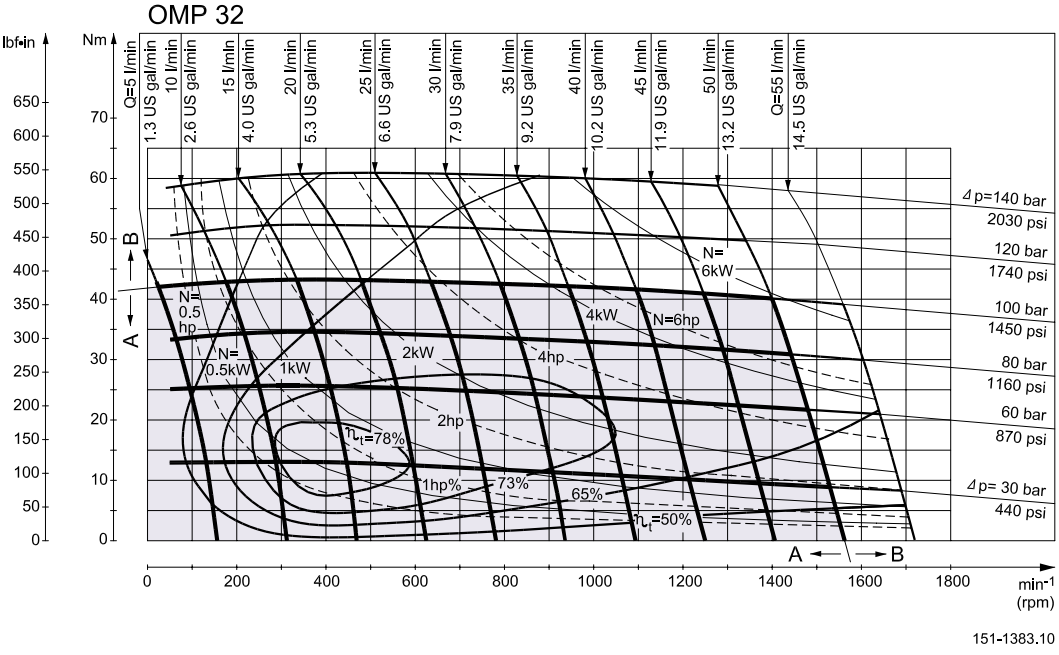
Curve A indicates the max. radial shaft load. Any shaft load exceeding the values quoted in curve A will involve risk of breakage.

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 "General" DHMH.PK.100.G2.02 520L0232.

FUNCTION DIAGRAMS





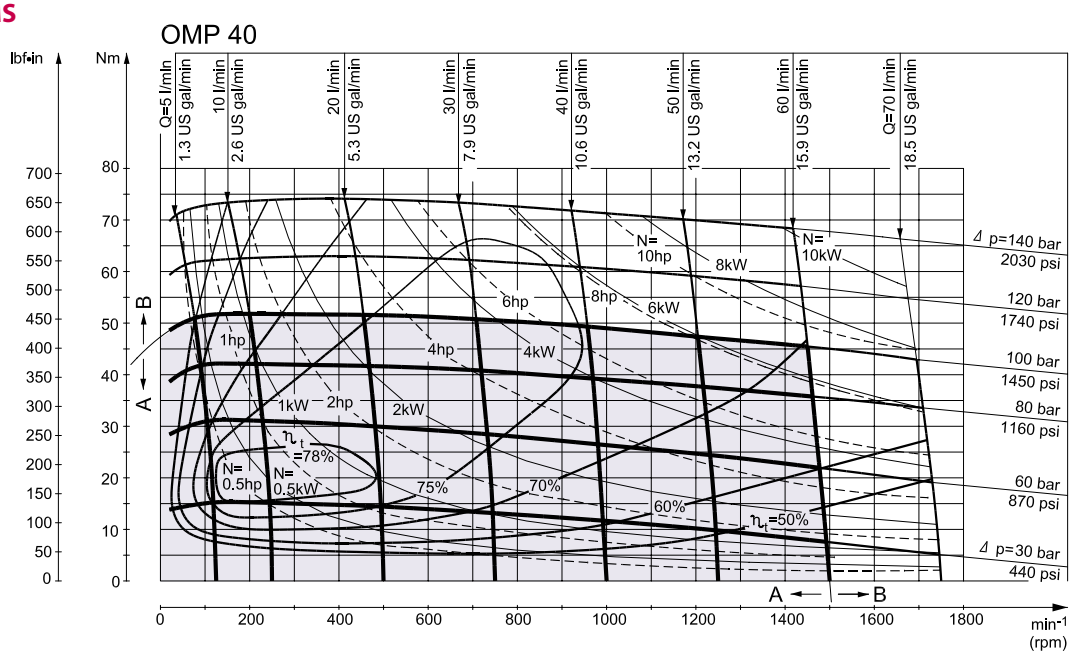
Explanation of function diagram use, basis and conditions can be found on page 7.

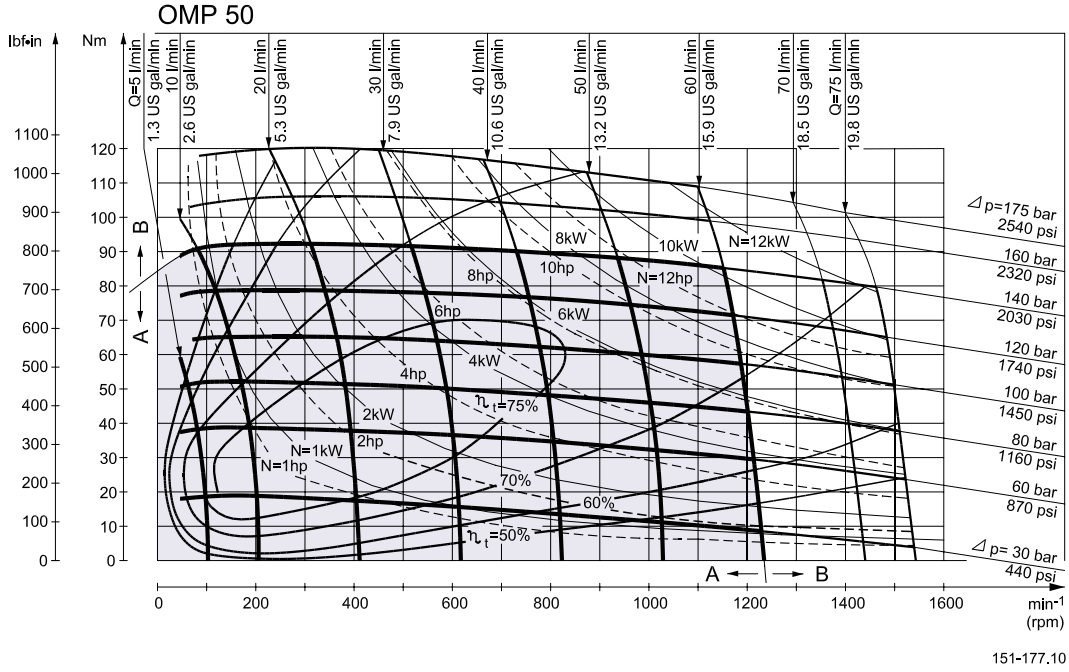
- A: Continuous range
- B: Intermittent range (max. 10% operation every minute)

Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 10-12.

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

FUNCTION DIAGRAMS





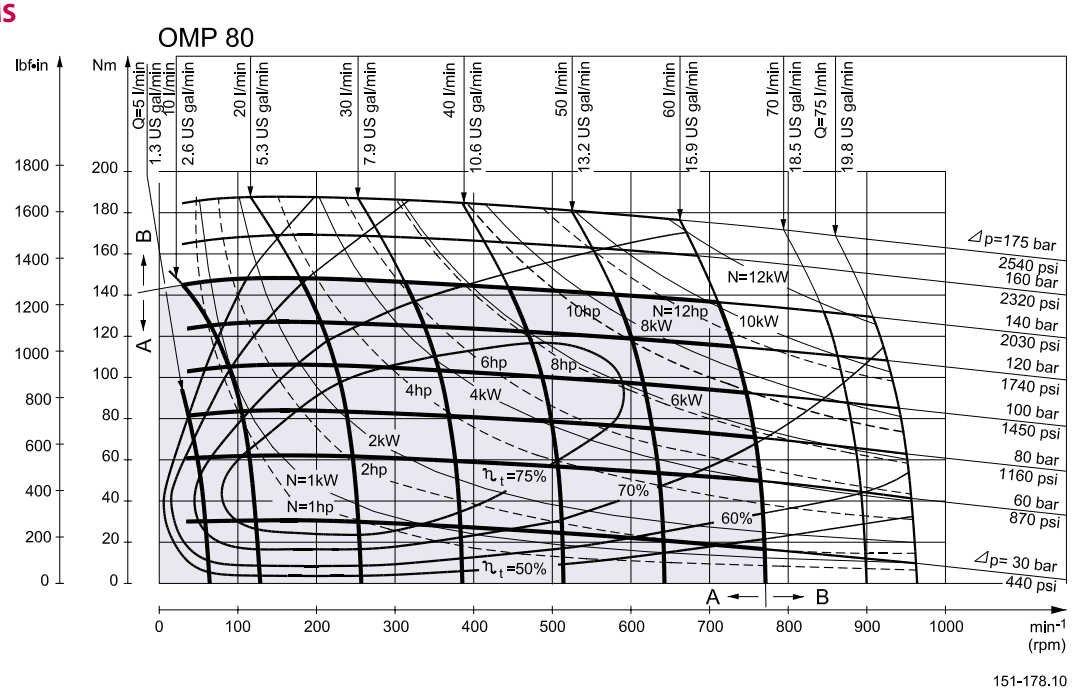
Explanation of function diagram use, basis and conditions can be found on page 7.

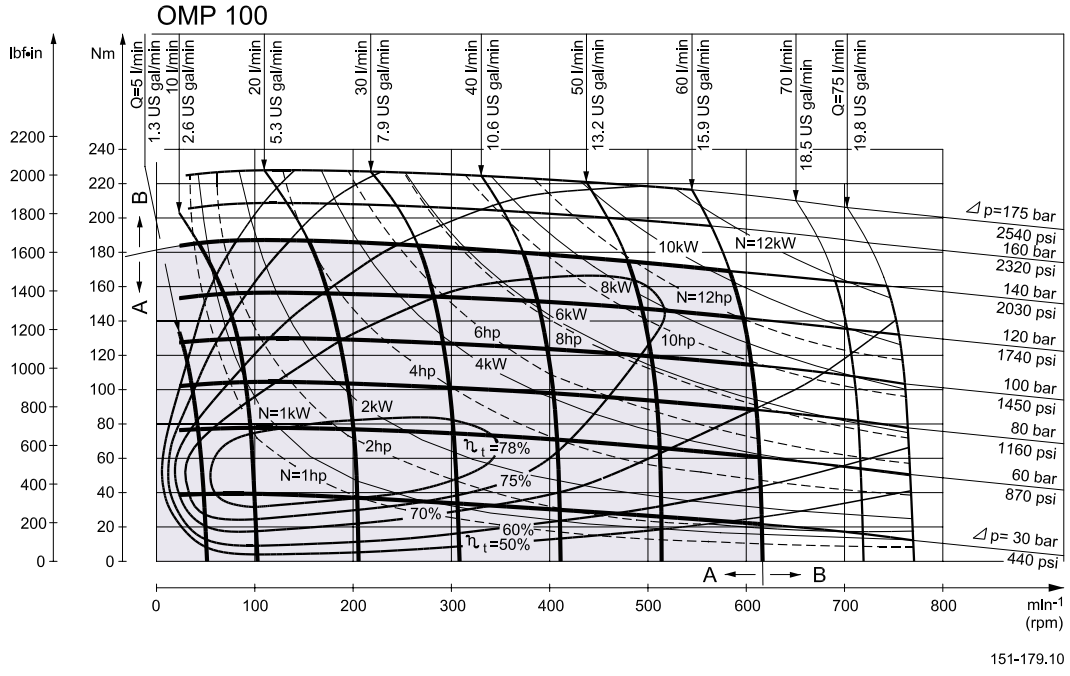
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FUNCTION DIAGRAMS





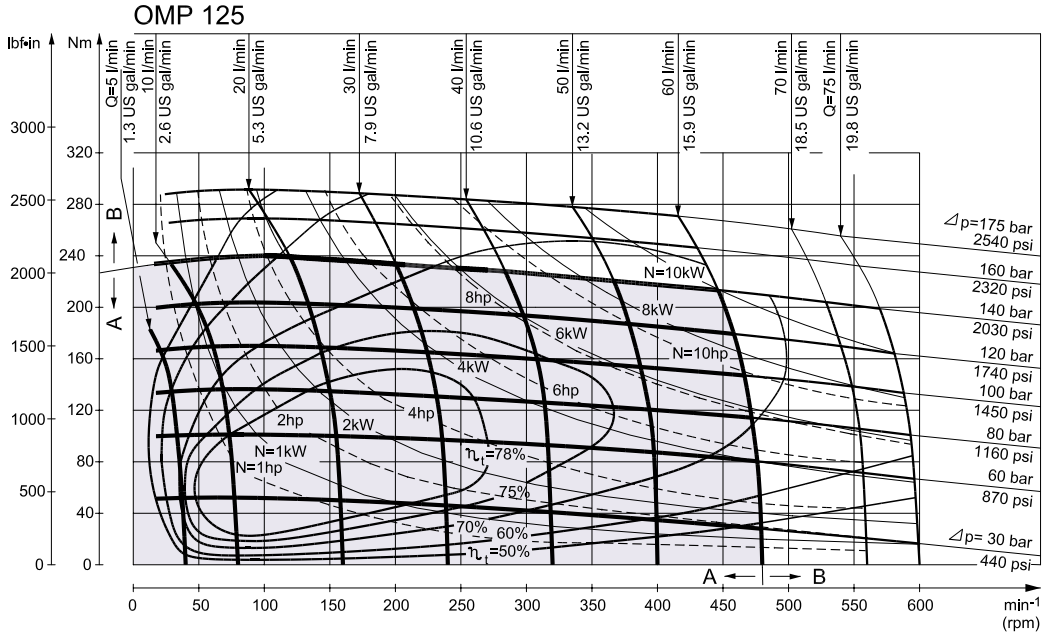
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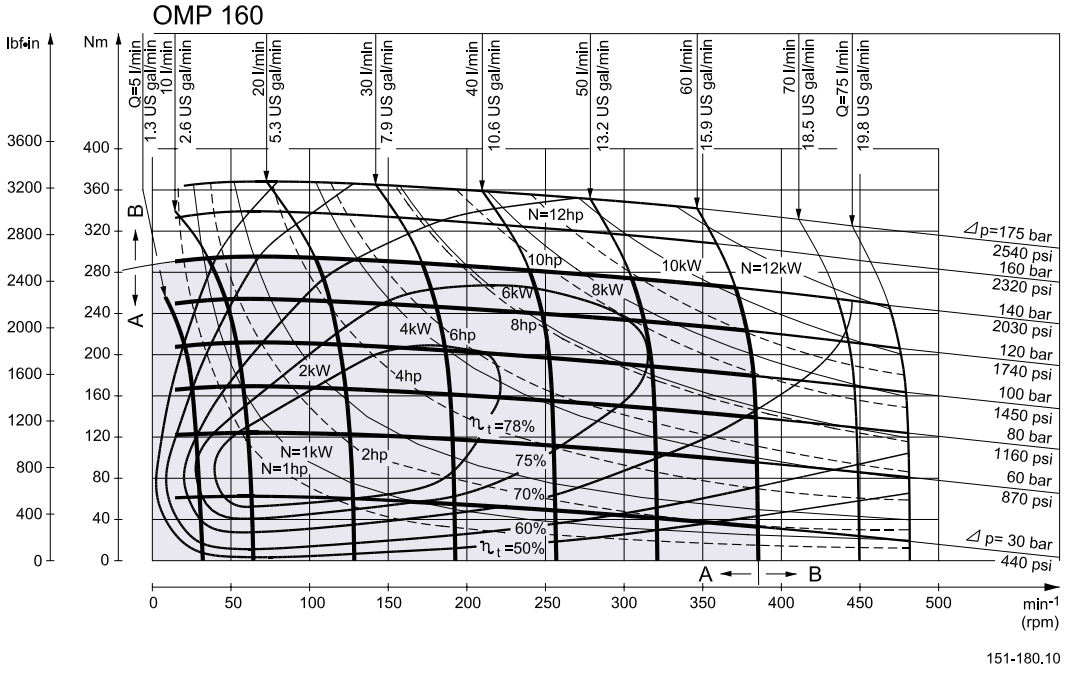
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Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 10-12.

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FUNCTION DIAGRAMS





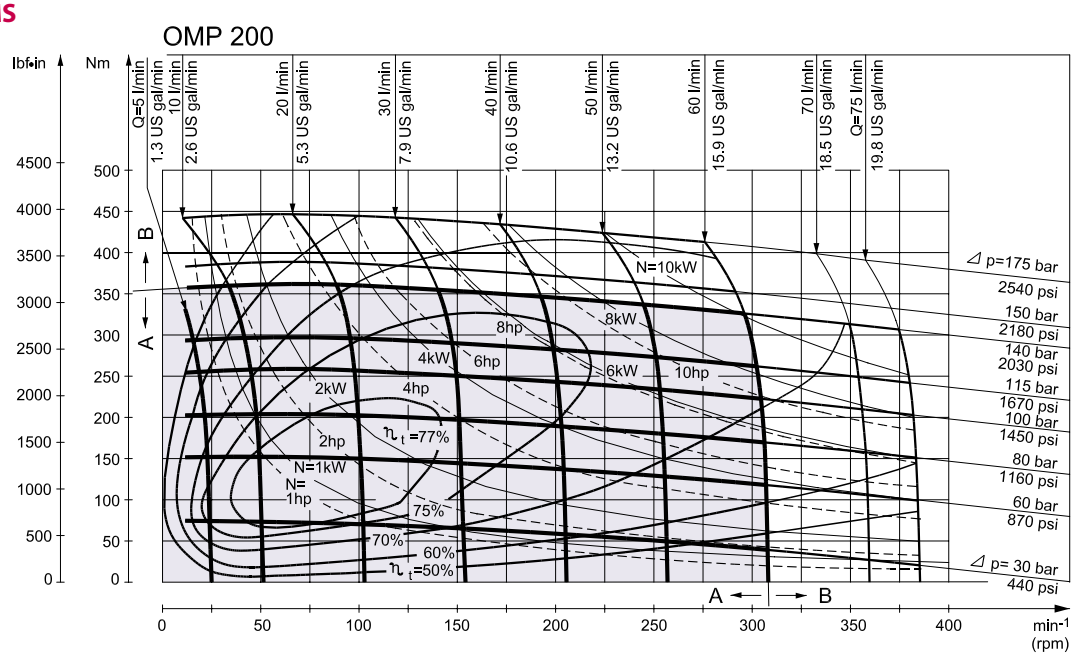
Explanation of function diagram use, basis and conditions can be found on page 7.

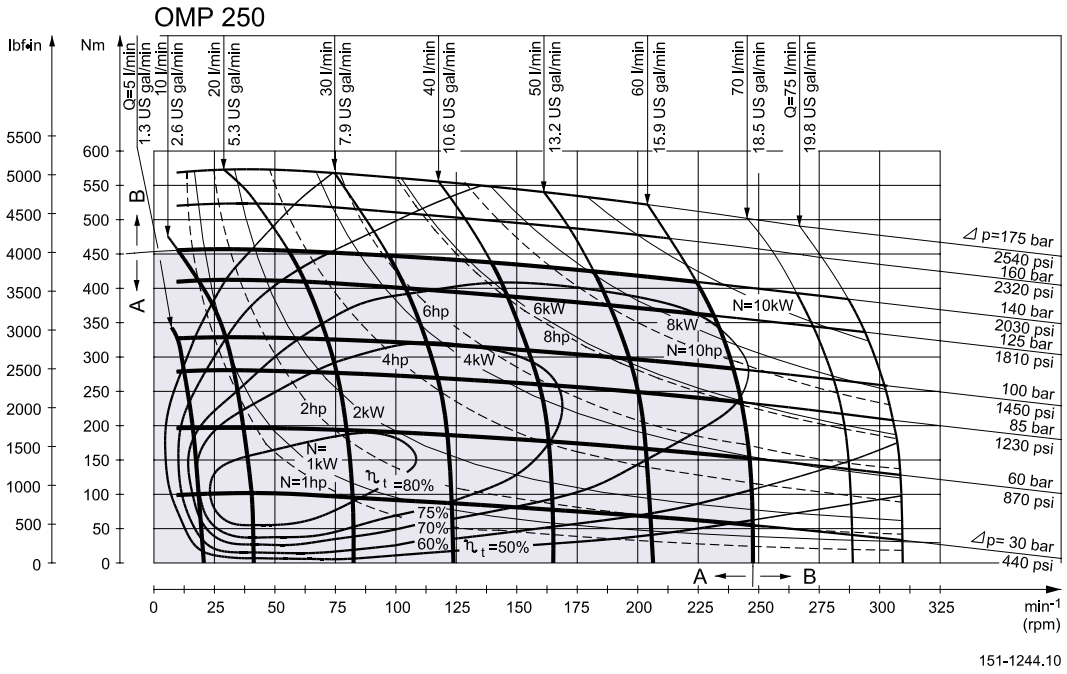
- A: Continuous range
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Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 10-12.

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

FUNCTION DIAGRAMS





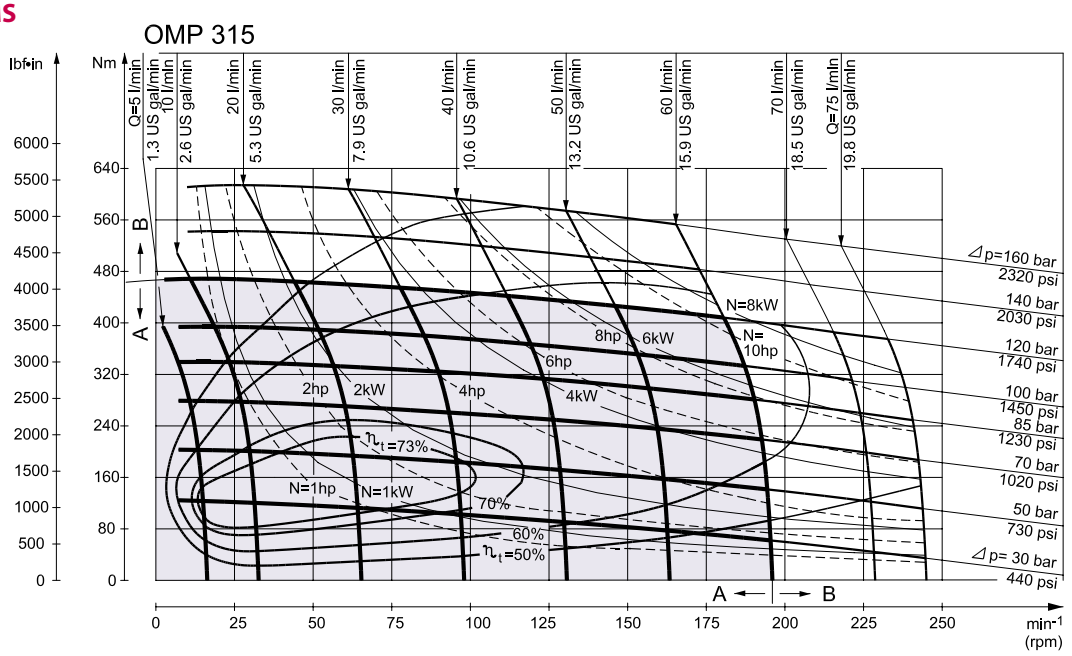
Explanation of function diagram use, basis and conditions can be found on page 7.

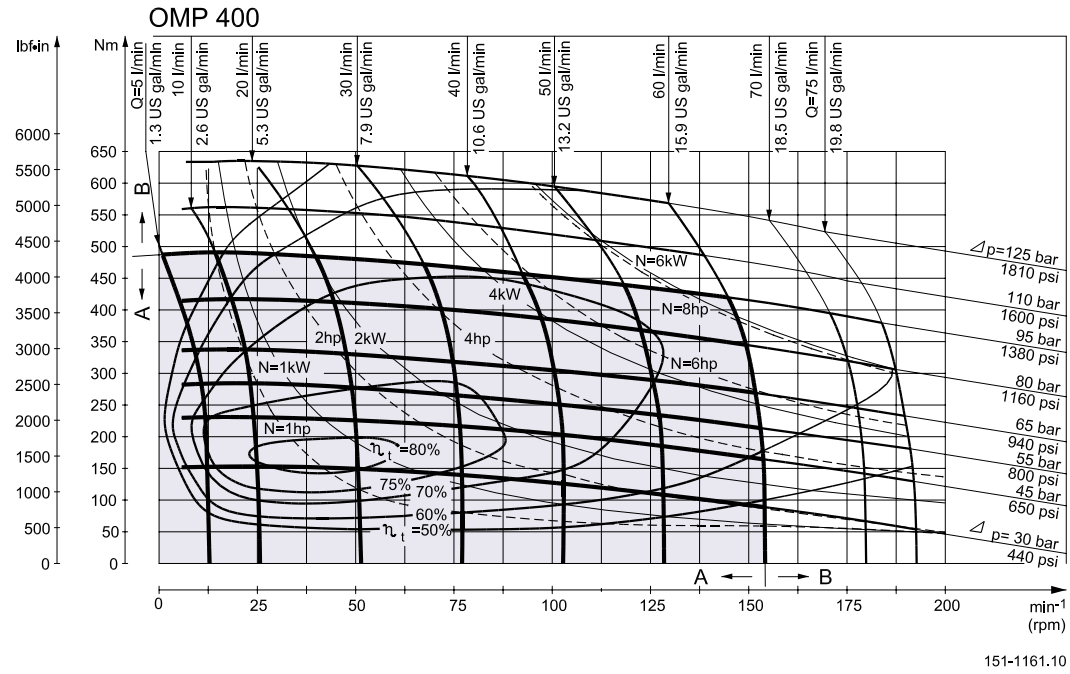
- A: Continuous range
- B: Intermittent range (max. 10% operation every minute)

Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 10-12.

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

FUNCTION DIAGRAMS





Explanation of function diagram use, basis and conditions can be found on page 7.

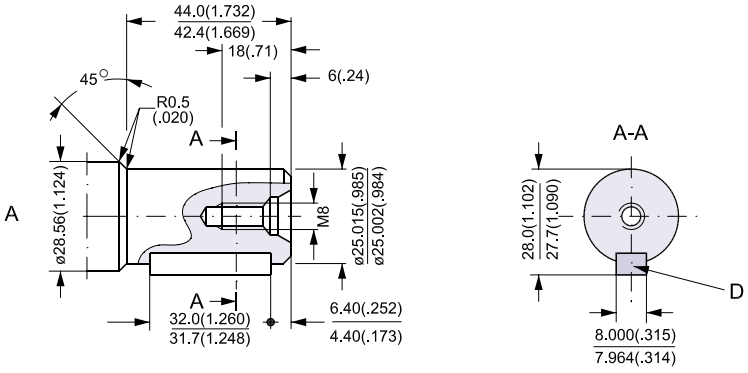
- A: Continuous range
- B: Intermittent range (max. 10% operation every minute)

Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 10-12.

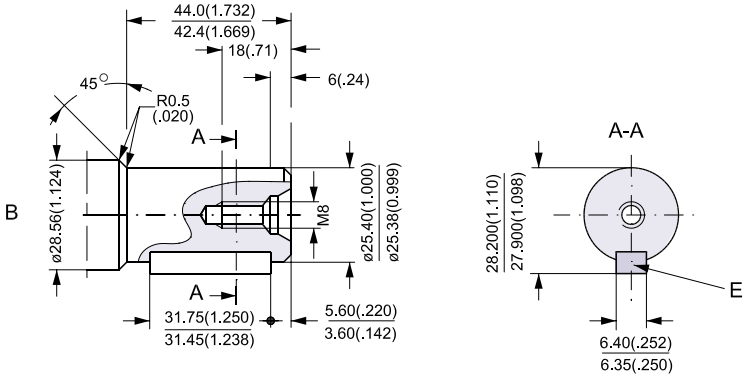
Note: Intermittent pressure drop and oil flow must not occur simultaneously.

SHAFT VERSION

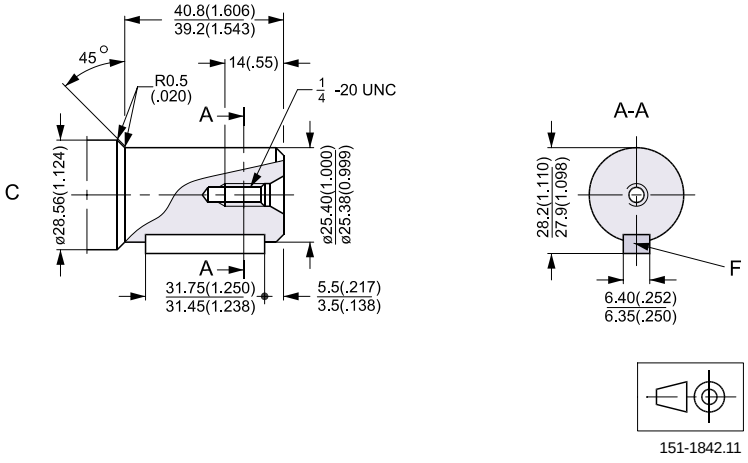
A: Cylindrical shaft
25 mm
D: Parallel key
A8 × 7 × 32
DIN 6885



B: Cylindrical shaft
1 in
E: Parallel key
$^1/_4 \times ^1/_4 \times 1^1/_4$ in
B.S. 46



US version
C: Cylindrical shaft
1 in
F: Parallel key
$^1/_4 \times ^1/_4 \times 1^1/_4$ in
B.S. 46

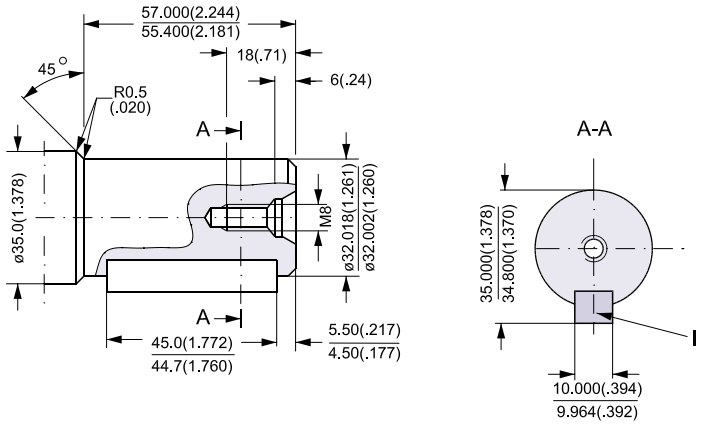


151-1842.11

SHAFT VERSION

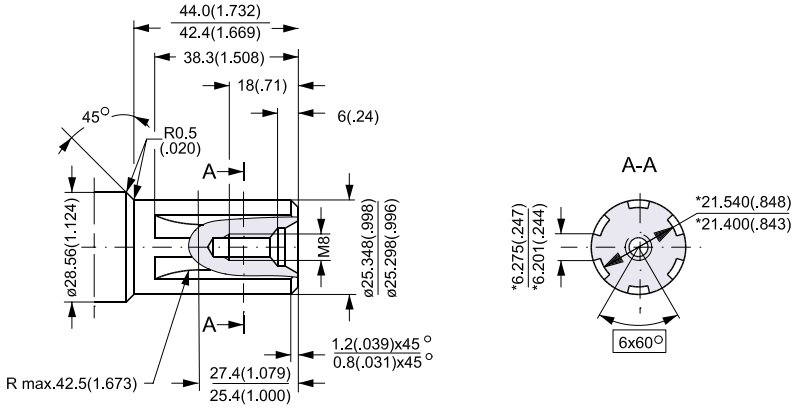
D: Cylindrical shaft
32 mm
I: Parallel key
A10 × 8 × 45
DIN 6885

D



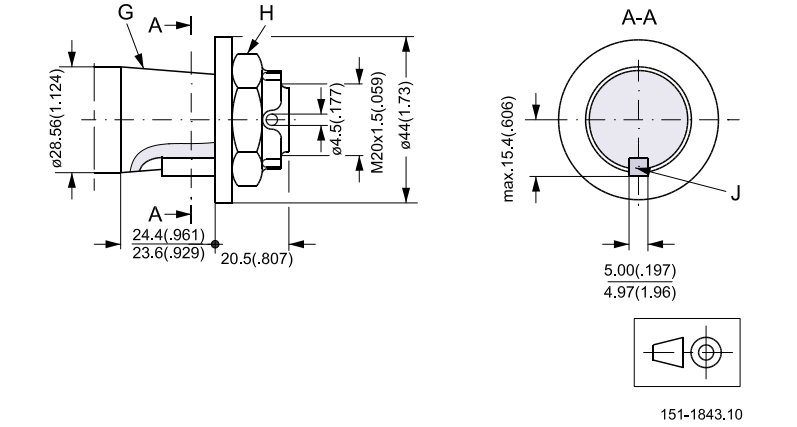
E: Splined shaft
B.S. 2059 (SAE 6 B)
Straight-sided,
bottom fitting, dep.
Fit 2
Nom. size 1 in
* Deviates from
BS 2059 (SAE 6B)

E



F: Tapered shaft
(ISO/R775) →
H: DIN 937
NV 30
Tightening torque:
100 ± 10 Nm
G: Taper 1:10
J: Parallel key
B5 × 5 × 14
DIN 6885

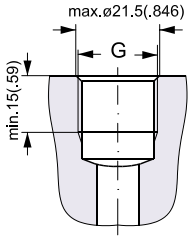
F



151-1843.10

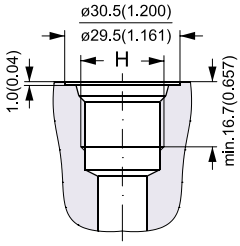
PORT THREAD VERSIONS

A



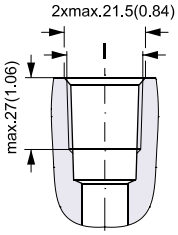
A: G main ports
G: ISO 228/1 - G1/2

B



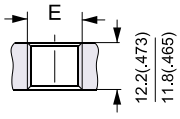
B: UNF main ports
H: 7/8 - 14 UNF
O-ring boss port

C



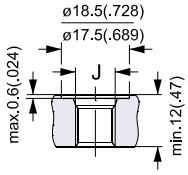
C: NPTF main ports
I: 1/2 - 14 NPTF

D



D: G drain port
E: ISO 228/1 - G1/4

F



151-1844.10

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

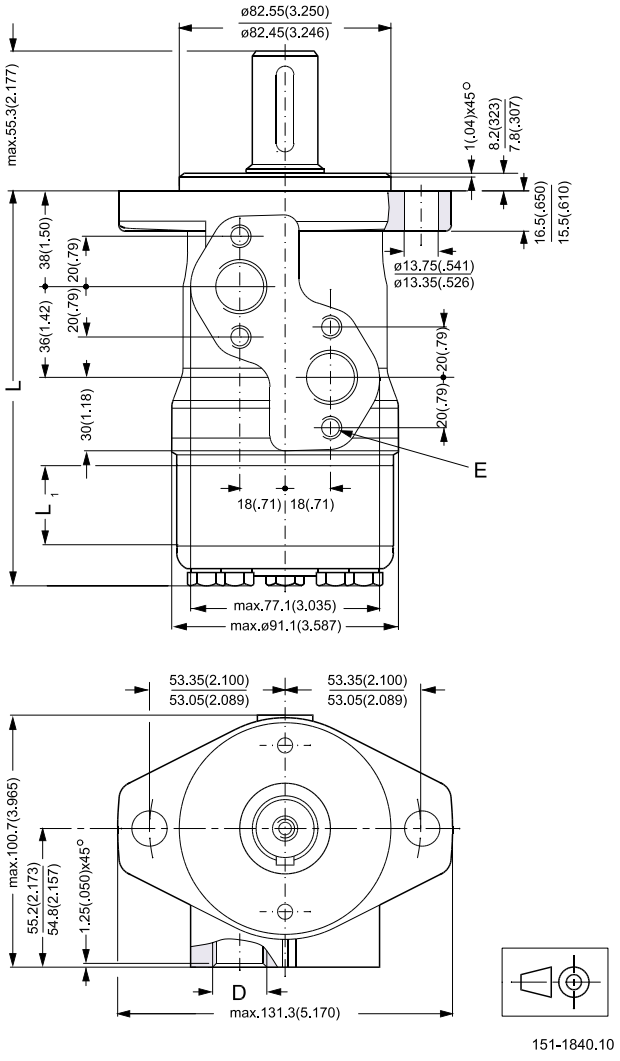
Dimensions – European version

DIMENSIONS

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

Type	L mm [in]	L_1 mm [in]
OMP 25	129.0 [5.08]	4.1 [0.16]
OMP 32	130.0 [5.12]	5.2 [0.20]
OMP 40	131.0 [5.16]	6.5 [0.26]
OMP 50	131.0 [5.16]	6.5 [0.26]
OMP 80	135.0 [5.31]	10.4 [0.41]
OMP 100	137.5 [5.41]	13.0 [0.51]
OMP 125	141.0 [5.55]	16.7 [0.66]
OMP 160	145.5 [5.73]	20.8 [0.82]
OMP 200	150.5 [5.93]	26.0 [1.02]
OMP 250	157.0 [6.18]	32.5 [1.28]
OMP 315	165.5 [6.52]	40.9 [1.61]
OMP 400	176.6 [6.95]	52.0 [2.05]

D: G 1/2; 15 mm [0.59 in] deep
E: M8; 13 mm [0.51 in] deep (4 pcs.)



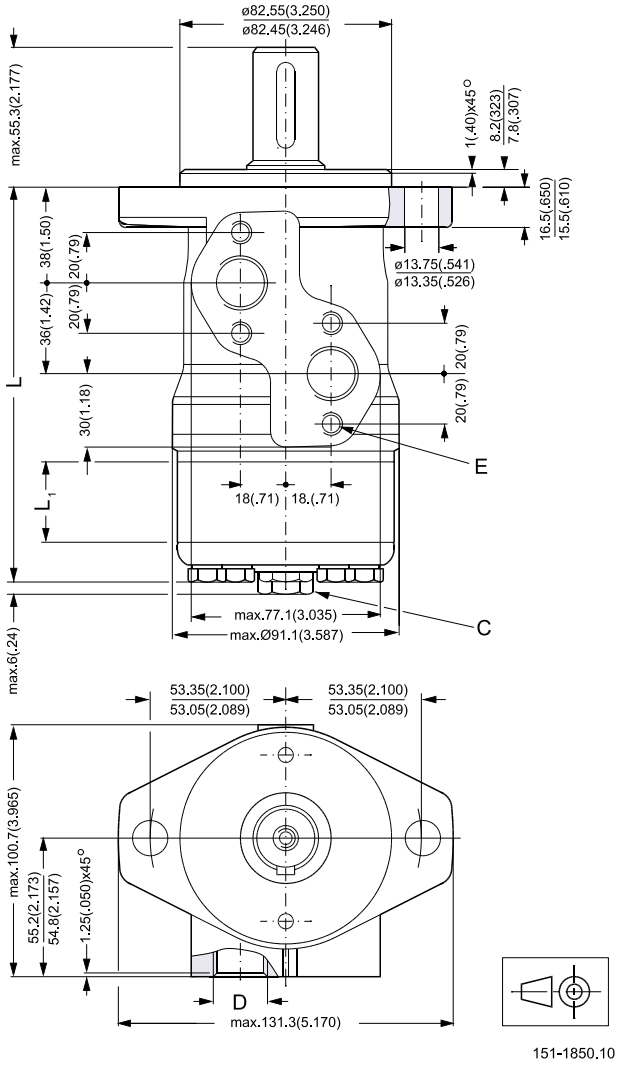
Dimensions – European version

DIMENSIONS

Side port version with 2 hole oval mounting flange (A2-flange).
With drain connection.

Type	L mm [in]	L_1 mm [in]
OMP 25	129.0 [5.08]	4.1 [0.16]
OMP 32	130.0 [5.12]	5.2 [0.20]
OMP 40	131.0 [5.16]	6.5 [0.26]
OMP 50	131.0 [5.16]	6.5 [0.26]
OMP 80	135.0 [5.31]	10.4 [0.41]
OMP 100	137.5 [5.41]	13.0 [0.51]
OMP 125	141.0 [5.55]	16.7 [0.66]
OMP 160	145.5 [5.73]	20.8 [0.82]
OMP 200	150.5 [5.93]	26.0 [1.02]
OMP 250	157.0 [6.18]	32.5 [1.28]
OMP 315	165.5 [6.52]	40.9 [1.61]
OMP 400	176.6 [6.95]	52.0 [2.05]

C: Drain connection
G 1/4; 12 mm [0.47 in] deep
D: G 1/2; 15 mm [0.59 in] deep
E: M8; 13 mm [0.51 in] deep
(4 pcs.)



151-1850.10

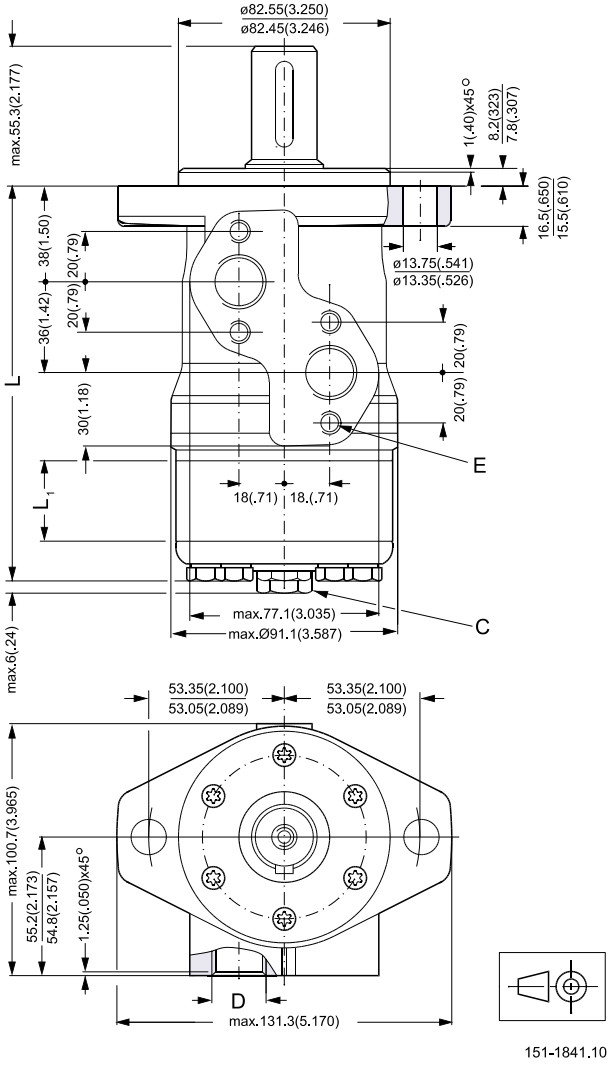
Dimensions – European version

DIMENSIONS

OMP C
Side port version with 2 hole oval mounting flange (A2-flange).

Type	L mm [in]	L_1 mm [in]
OMP 50	131.0 [5.16]	6.5 [0.26]
OMP 80	135.0 [5.31]	10.4 [0.41]
OMP 100	137.5 [5.41]	13.0 [0.51]
OMP 125	141.0 [5.55]	16.7 [0.66]
OMP 160	145.5 [5.73]	20.8 [0.82]
OMP 200	150.5 [5.93]	26.0 [1.02]
OMP 250	157.0 [6.18]	32.5 [1.28]
OMP 315	165.5 [6.52]	40.9 [1.61]
OMP 400	176.6 [6.95]	52.0 [2.05]

C: Drain connection
G 1/4; 12 mm [0.47 in] deep
D: G 1/2; 15 mm [0.59 in] deep
E: M8; 13 mm [0.51 in] deep
(4 pcs.)



151-1841.10

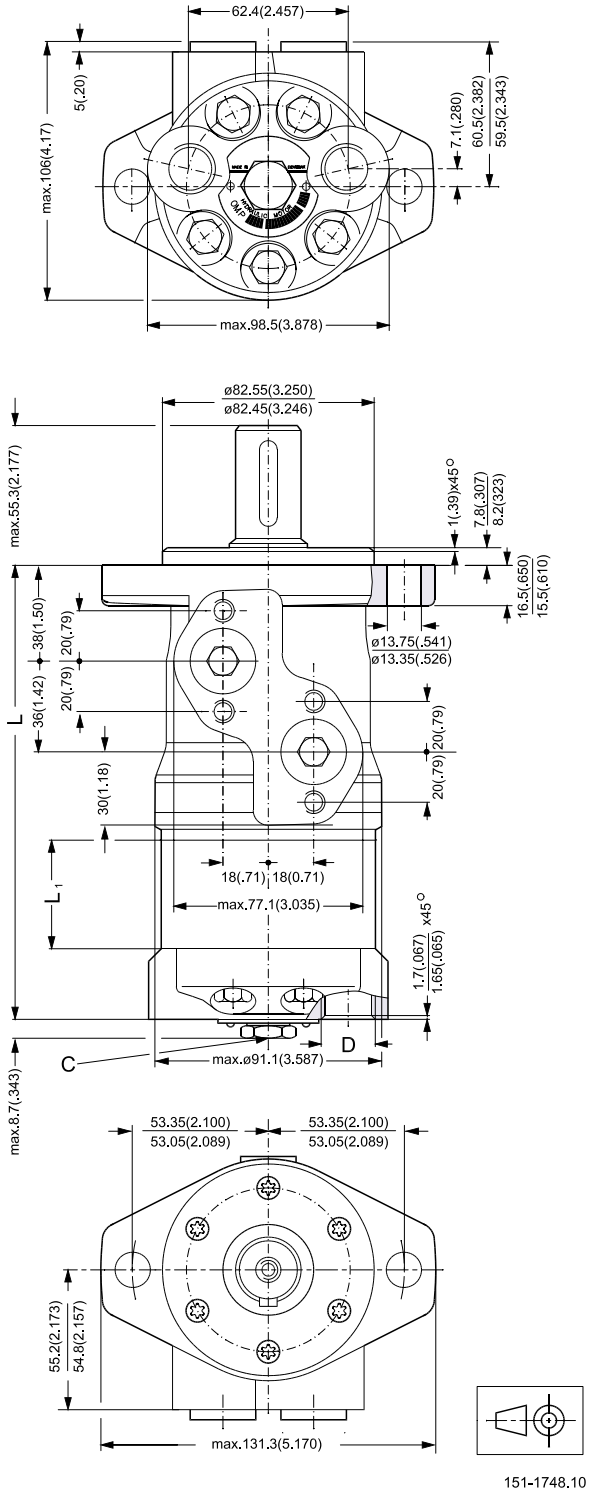
Dimensions – European version

DIMENSIONS

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

Type	L mm [in]	L_1 mm [in]
OMP 50	145.1 [5.71]	6.5 [0.26]
OMP 80	149.0 [5.87]	10.4 [0.41]
OMP 100	151.7 [5.97]	13.0 [0.51]
OMP 125	155.2 [6.11]	16.3 [0.66]
OMP 160	159.4 [6.28]	20.8 [0.82]
OMP 200	164.6 [6.48]	26.0 [1.02]
OMP 250	171.1 [6.74]	32.5 [1.28]
OMP 315	179.5 [7.07]	40.9 [1.61]
OMP 400	190.6 [7.50]	52.0 [2.05]

C: Drain connection
G 1/4; 12 mm [0.47 in] deep
D: G 1/2; 15 mm [0.59 in] deep



151-1748.10

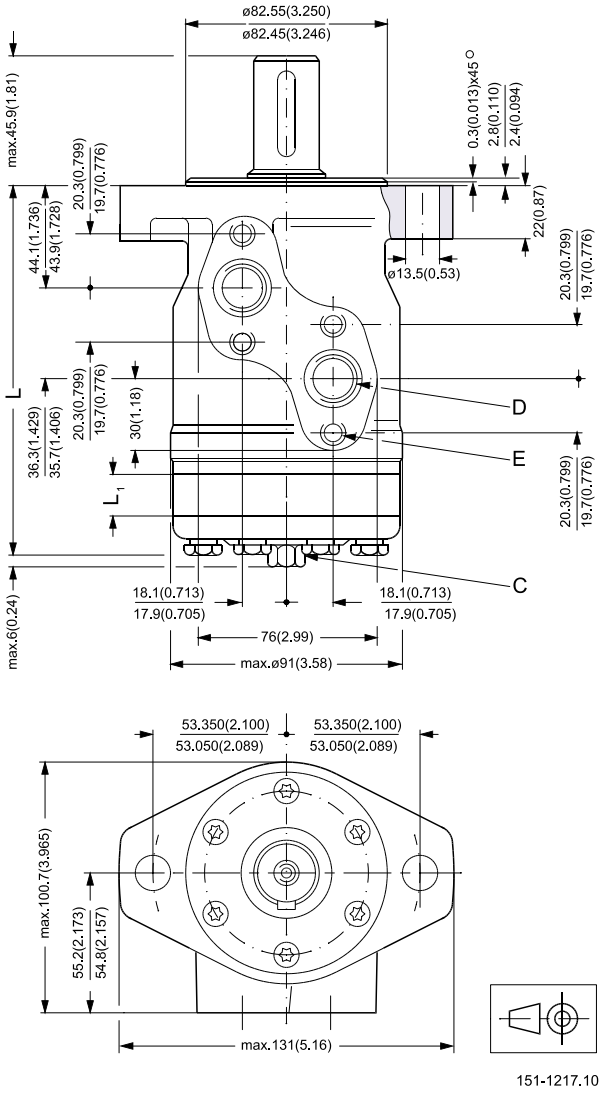
Dimensions – US version

DIMENSIONS

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

Type	L mm [in]	L_1 mm [in]
OMP 25	135.0 [5.31]	4.1 [0.16]
OMP 32	136.0 [5.35]	5.2 [0.20]
OMP 40	137.0 [5.39]	6.5 [0.26]
OMP 50	137.0 [5.39]	6.5 [0.26]
OMP 80	141.0 [5.55]	10.4 [0.41]
OMP 100	143.5 [5.65]	13.0 [0.51]
OMP 125	147.0 [5.79]	16.7 [0.66]
OMP 160	151.5 [5.96]	20.8 [0.82]
OMP 200	156.5 [6.16]	26.0 [1.02]
OMP 250	163.0 [6.42]	32.5 [1.28]
OMP 315	171.5 [6.75]	40.9 [1.61]
OMP 400	182.6 [7.19]	52.0 [2.05]

C: Drain connection
$^{7}/_{16}$ - 20 UNF;
12 mm [0.47 in] deep
D: $^{7}/_{8}$ - 14 UNF;
16.7 mm [0.66 in] deep
or $^{1}/_{2}$ - 14 NPTF
E: M8; 13 mm [0.51 in] deep
(4-off)



151-1217.10

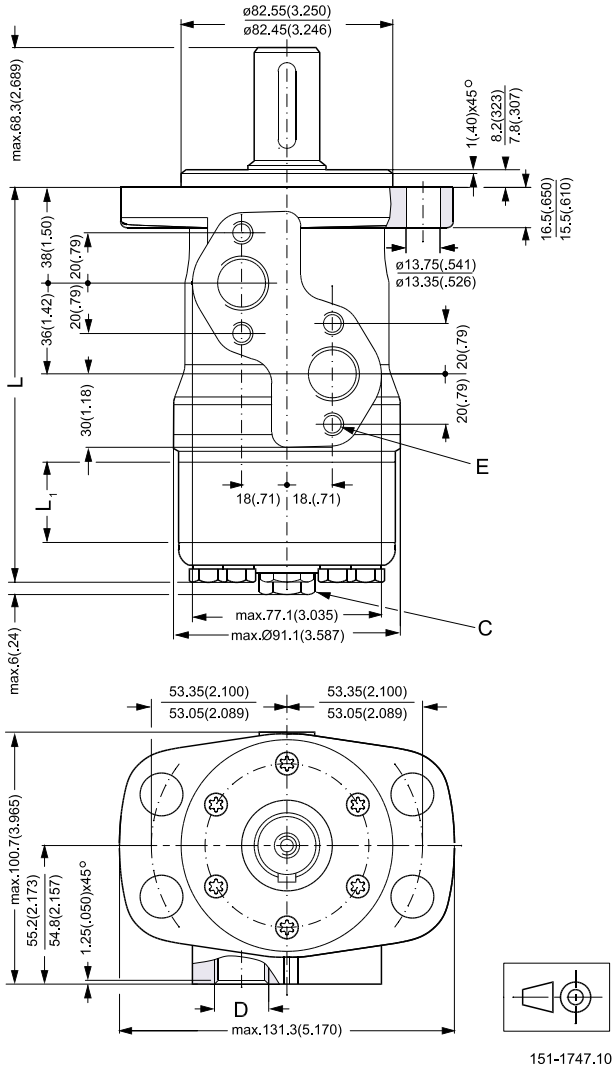
Dimensions – European version

DIMENSIONS

Side port version with 4 hole oval mounting flange (A4-flange).

Type	L mm [in]	L_1 mm [in]
OMP 50	131.0 [5.16]	6.5 [0.26]
OMP 80	135.0 [5.31]	10.4 [0.41]
OMP 100	137.5 [5.41]	13.0 [0.51]
OMP 125	141.0 [5.55]	16.7 [0.66]
OMP 160	145.5 [5.73]	20.8 [0.82]
OMP 200	150.5 [5.93]	26.0 [1.02]
OMP 250	157.0 [6.18]	32.5 [1.28]
OMP 315	165.5 [6.52]	40.9 [1.61]
OMP 400	176.6 [6.95]	52.0 [2.05]

C: Drain connection
G 1/4; 12 mm [0.47 in] deep
D: G 1/2; 15 mm [0.59 in] deep
E: M8; 13 mm [0.51 in] deep
(4 pcs.)



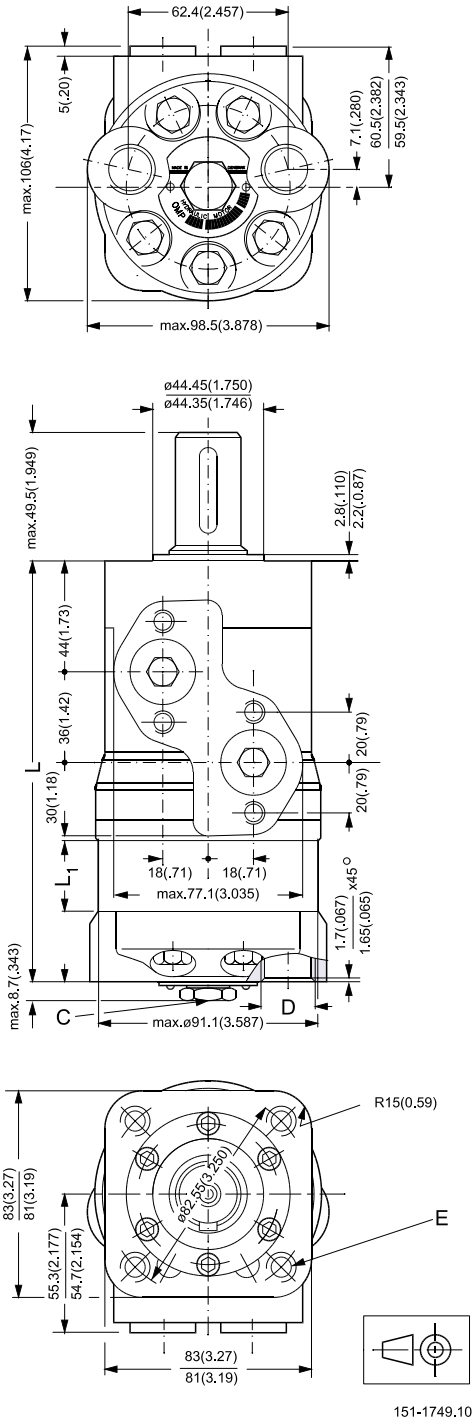
Dimensions – European version

DIMENSIONS

End port version with square mounting flange (C-flange).

Type	L mm [in]	L_1 mm [in]
OMP 50	151.1 [5.94]	6.5 [0.26]
OMP 80	155.0 [6.10]	10.4 [0.41]
OMP 100	157.6 [6.20]	13.0 [0.51]
OMP 125	161.1 [6.34]	16.7 [0.66]
OMP 160	165.4 [6.51]	20.8 [0.82]
OMP 200	170.6 [6.72]	26.0 [1.02]
OMP 250	177.1 [6.97]	32.5 [1.28]
OMP 315	185.5 [7.30]	40.9 [1.61]
OMP 400	196.6 [7.74]	52.0 [2.05]

C: Drain connection
G 1/4; 12 mm [0.47 in] deep
D: G 1/2; 15 mm [0.59 in] deep
E: M10; 15 mm [0.59 in] deep
(4 pcs.)



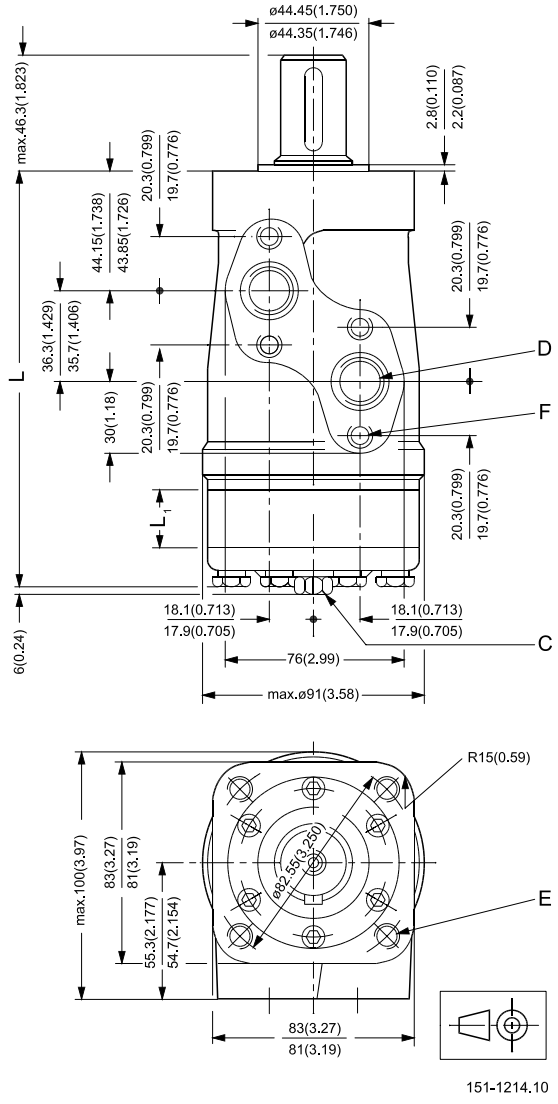
Dimensions – US version

DIMENSIONS

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

Type	L mm [in]	L_1 mm [in]
OMP 50	131.0 [5.16]	6.5 [0.26]
OMP 80	135.0 [5.31]	10.4 [0.41]
OMP 100	137.5 [5.41]	13.0 [0.51]
OMP 125	141.0 [5.55]	16.7 [0.66]
OMP 160	145.5 [5.73]	20.8 [0.82]
OMP 200	150.5 [5.93]	26.0 [1.02]
OMP 250	157.0 [6.18]	32.5 [1.28]
OMP 315	165.5 [6.52]	40.9 [1.61]
OMP 400	176.6 [6.95]	52.0 [2.05]

C: Drain connection
$^{7}/_{16}$ - 20 UNF;
11.94 mm [0.47 in] deep
D: $^{7}/_{8}$ - 14 UNF;
16.76 mm [0.66 in] deep
or $^{1}/_{2}$ - 14 NPTF
E: $^{3}/_{8}$ - 16 UNC;
14.97 mm [0.59 in] deep
(4-off)
F: M8; 12.95 mm [0.51 in] deep
(4-off)

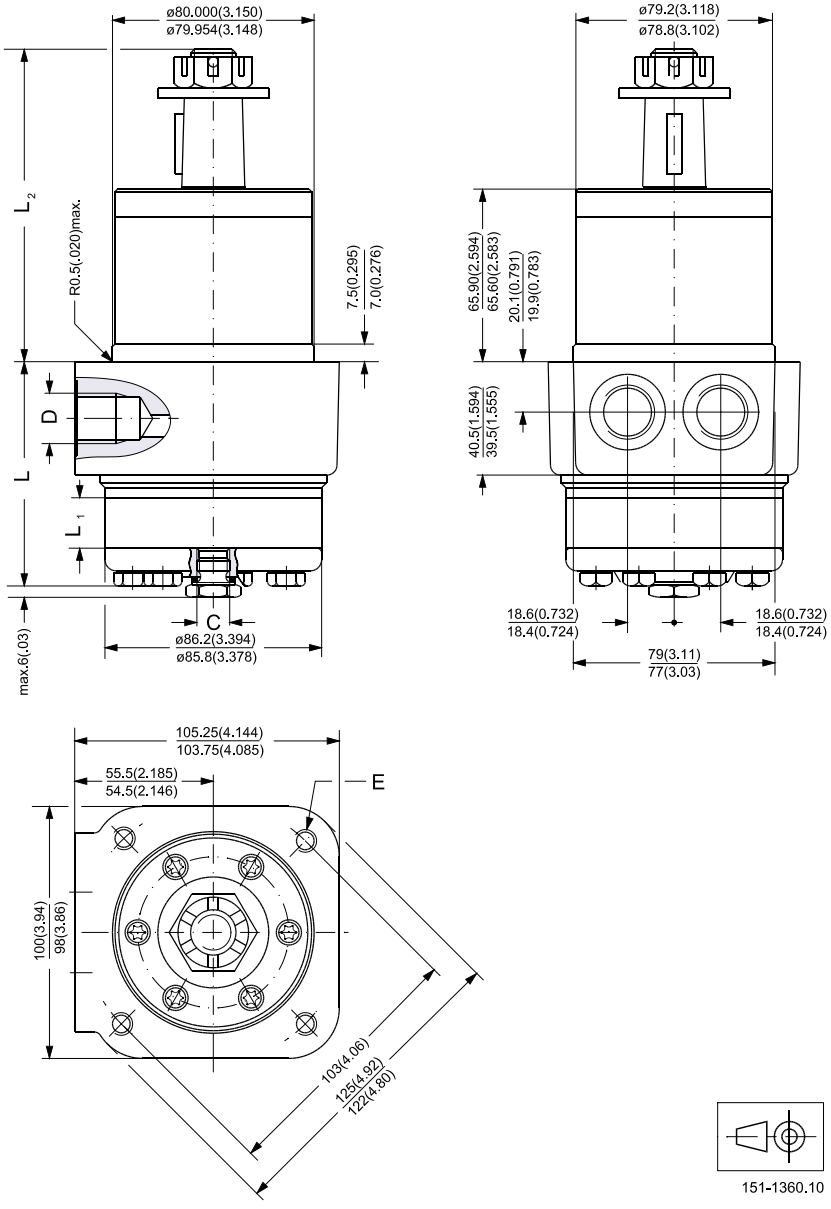


DIMENSIONS
OMPW
OMPW N

Type	L_2 mm [in]
OMPW with ∅25 mm shaft	115.0 [4.53]
OMPW N with tapered shaft	116.0 [4.57]

Type	L mm [in]	L_1 mm [in]
OMP 50	70.8 [2.78]	6.5 [0.26]
OMP 80	74.7 [2.97]	10.4 [0.41]
OMP 100	77.3 [3.04]	13.0 [0.51]
OMP 125	80.6 [3.17]	16.7 [0.66]
OMP 160	85.1 [3.35]	20.8 [0.82]
OMP 200	90.3 [3.56]	26.0 [1.02]
OMP 250	96.8 [3.81]	32.5 [1.28]
OMP 315	105.2 [4.14]	40.9 [1.61]
OMP 400	116.3 [4.58]	52.0 [2.05]

C: Drain connection
G 1/4; 12 mm [0.47 in] deep
D: G 1/2; 15 mm [0.59 in] deep
E: M10; 20 mm [0.79 in] deep
(4 pcs.)



VERSIONS

Mounting flange	Shaft	Port size	European version	US version	Side port version	End port version	Flange port version	Standard shaft seal	High pressure shaft seal	Drain connection	Check valve	Specials	Main type designation
2 hole oval flange (A2-flange)	Cyl. 25 mm	G 1/2	X		X				X	No	No		OMR
		G 1/2	X		X				X	Yes	Yes		OMR
		G 1/2	X		X			X		Yes	Yes	A	OMR C
		G 1/2	X			X		X		Yes	Yes		OMR
	Cyl 1 in	G 1/2	X		X				X	No	No		OMR
		G 1/2	X		X				X	Yes	Yes		OMR
		7/8 - 14 UNF		X	X			X		Yes	Yes		OMR
	Splined 1 in	G 1/2	X		X				X	No	No		OMR
		G 1/2	X		X				X	Yes	Yes		OMR
		7/8 - 14 UNF		X	X			X		Yes	Yes		OMR
	Cyl. 32 mm	G 1/2	X		X			X		Yes	Yes		OMR
	Tap. 28.5 mm	G 1/2	X		X			X		Yes	Yes		OMR
4 hole oval flange (A4-flange)	Cyl. 25 mm	G 1/2	X		X			X		Yes	Yes		OMR
	Cyl. 32 mm	G 1/2	X		X			X		Yes	Yes		OMR
	Cyl. 1 1/4 in	7/8 - 14 UNF		X	X			X		Yes	Yes		OMR
Square flange (C-flange)	Cyl. 25 mm	G 1/2	X			X		X		Yes	Yes		OMR
	Cyl. 1 in	7/8 - 14 UNF		X	X			X		Yes	Yes		OMR
Wheel	Tap. 35 mm	G 1/2	X				X	X		Yes	Yes	B	OMRW N
	Tap. 1 1/4 in	7/8 - 14 UNF		X			X	X		Yes	Yes	B	OMRW N

Function diagram – see page : →

Specials:
A : Corrosion resistant parts
B : With needle bearings

Features available (options) :
Free running gerotor
Low leakage (low speed valve)
Speed sensor
Viton shaft seal
Reverse rotation
Drain
Corrosion protected
Painted
With needle bearings
With brake

CODE NUMBERS

CODE NUMBERS	DISPLACEMENT [cm³]									Technical data – Page	Dimensions – Page
	50	80	100	125	160	200	250	315	375		
151-	0410	0411	0412	0413	0414	0415	0416	0417	0418	38	55
151-	0710	0711	0712	0713	0714	0715	0716	0717	0718	38	56
151-	1231	1232	1233	1238	1234	1235	1236	1237	1243	38	57
151-	6190	6191	6192	6193	6194	6195	6196	6197	6198	38	58
151-	0400	0401	0402	0403	0404	0405	0406	0407	0408	38	55
151-	0700	0701	0702	0703	0704	0705	0706	0707	0708	38	56
151-	7240	7241	7242	7243	7244	7245	7246	7247	7248	38	59
151-	0420	0421	0422	0423	0424	0425	0426	0427	0428	39	55
151-	0720	0721	0722	0723	0724	0725	0726	0727	0728	39	56
151-	7250	7251	7252	7253	7254	7255	7256	7257	7258	39	59
151-	0248	0242	0243	0208	0244	0245	0247	0246	6294	40	57
151-	0265	0266	0267	6295	0268	0269	0271	0270	6296	39	57
151-	6010	6011	6012	6013	6014	6015	6016	6017	6018	38	60
151-	6000	6001	6002	6003	6004	6005	6006	6007	6008	40	60
151-	6110	6111	6112	6113	6114	6115	6116	6117	6118	40	61
151-	6210	6211	6212	6213	6214	6215	6216	6217	6218	38	62
151-	7260	7261	7262	7263	7264	7265	7266	7267	7269	38	63
151-	6300	6301	6302	6303	6304	6305	6306	6307	6308	40	64
151-	6430	6431	6432	6433	6434	6435	6436	6437	6438	40	65
→	45	45	46	46	47	47	48	48	49		

Ordering
Add the four digit prefix "151-" to the four digit numbers from the chart for complete code number.

Example:
151-6004 for an OMR 160 with A4 flange, cyl. 32 mm shaft, port size G 1/2 and side port version.

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

TECHNICAL DATA FOR OMR WITH 25 MM AND 1 IN CYLINDRICAL SHAFT

Type			OMR	OMR	OMR	OMR	OMR	OMR	OMR	OMR	OMR
Motor size			**50**	**80**	**100**	**125**	**160**	**200**	**250**	**315**	**375**
Geometric displacement	cm^3 [in^3]		51.6 [3.16]	80.3 [4.91]	99.8 [6.11]	125.7 [7.69]	159.6 [9.77]	199.8 [12.23]	249.3 [15.26]	315.7 [19.32]	372.6 [22.80]
Max. speed	min^{-1} [rpm]	cont.	775	750	600	475	375	300	240	190	160
		int.[1]	970	940	750	600	470	375	300	240	200
Max. torque	Nm [lbf·in]	cont.	100 [890]	195 [1730]	240 [2120]	300 [2660]	300 [2660]	300 [2660]	300 [2660]	300 [2660]	300 [2660]
		int.[1]	130 [1150]	220 [1957]	280 [2480]	340 [3010]	390 [3450]	390 [3450]	380 [3360]	420 [3720]	430 [3810]
		peak[2]	170 [1510]	270 [2390]	320 [2830]	370 [3280]	460 [4070]	560 [4960]	600 [5310]	610 [5400]	600 [5310]
Max. output	kW [hp]	cont.	7.0 [9.4]	12.5 [16.8]	13.0 [17.4]	12.5 [16.8]	10.0 [13.4]	8.0 [10.7]	6.0 [8.1]	5.0 [6.7]	4.0 [5.4]
		int.[1]	8.5 [11.4]	15.0 [20.1]	15.0 [20.1]	14.5 [19.4]	12.5 [16.8]	10.0 [13.4]	8.0 [10.7]	6.5 [8.7]	6.0 [8.1]
Max. pressure drop	bar [psi]	cont.	140 [2030]	175 [2540]	175 [2540]	175 [2540]	130 [1890]	110 [1600]	80 [1160]	70 [1020]	55 [800]
		int.[1]	175 [2540]	200 [2900]	200 [2900]	200 [2900]	175 [2540]	140 [2030]	110 [1600]	100 [1450]	85 [1230]
		peak[2]	225 [3260]	225 [3260]	225 [3260]	225 [3260]	225 [3260]	225 [3260]	200 [2900]	150 [2180]	130 [1890]
Max. oil flow	l/min [US gal/min]	cont.	40 [10.6]	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]
		int.[1]	50 [13.2]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]
Max. starting pressure with unloaded shaft	bar [psi]		10 [145]	10 [145]	10 [145]	9 [130]	7 [100]	5 [75]	5 [75]	5 [75]	5 [75]
Min. starting torque	at max. press. drop cont. Nm [lbf·in]		80 [710]	150 [1330]	200 [1770]	250 [2210]	240 [2120]	260 [2300]	240 [2120]	260 [2300]	240 [2120]
	at max. press. drop int.[1] Nm [lbf·in]		100 [890]	170 [1500]	230 [2040]	280 [2480]	320 [2830]	330 [2920]	310 [2740]	350 [3100]	380 [3360]
Min. speed[3]	min^{-1} [rpm]		10	10	10	9	7	5	5	5	5

[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.

TECHNICAL DATA FOR OMR WITH 1 IN SPLINED AND 28.5 MM TAPERED SHAFT

Type			OMR	OMR	OMR	OMR	OMR	OMR	OMR	OMR	OMR
Motor size			**50**	**80**	**100**	**125**	**160**	**200**	**250**	**315**	**375**
Geometric displacement	cm^3		51.6	80.3	99.8	125.7	159.6	199.8	249.3	315.7	372.6
	$[in^3]$		[3.16]	[4.91]	[6.11]	[7.69]	[9.77]	[12.23]	[15.26]	[19.32]	[22.80]
Max. speed	min^{-1}	cont.	775	750	600	475	375	300	240	190	160
	[rpm]	int.[1]	970	940	750	600	470	375	300	240	200
Max. torque	Nm	cont.	100	195	240	300	360	360	360	360	360
	[lbf·in]		[890]	[1730]	[2120]	[2660]	[3190]	[3190]	[3190]	[3190]	[3190]
	Nm	int.[1]	130	220	280	340	430	440	470	470	460
	[lbf·in]		[1150]	[1950]	[2480]	[3010]	[3810]	[3890]	[4160]	[4160]	[4070]
	Nm	peak[2]	170	270	320	370	460	560	600	610	600
	[lbf·in]		[1500]	[2390]	[2830]	[3280]	[4070]	[4960]	[5310]	[5400]	[5310]
Max. output	kW	cont.	7.0	12.5	13.0	12.5	12.5	10.0	7.0	5.0	5.0
	[hp]		[9.4]	[16.8]	[17.4]	[16.8]	[16.8]	[13.4]	[9.4]	[6.7]	[6.7]
	kW	int.[1]	8.5	15.0	15.0	14.5	14.0	13.0	9.5	8.0	7.0
	[hp]		[11.4]	[20.1]	[20.1]	[19.4]	[18.8]	[17.4]	[12.7]	[10.7]	[9.4]
Max. pressure drop	bar	cont.	140	175	175	175	165	130	100	85	70
	[psi]		[2030]	[2540]	[2540]	[2540]	[2390]	[1890]	[1450]	[1230]	[1020]
	bar	int.[1]	175	200	200	200	200	175	140	115	90
	[psi]		[2540]	[2900]	[2900]	[2900]	[2900]	[2540]	[2030]	[1670]	[1310]
	bar	peak[2]	225	225	225	225	225	225	200	150	130
	[psi]		[3260]	[3260]	[3260]	[3260]	[3260]	[3260]	[2900]	[2180]	[1890]
Max. oil flow	l/min	cont.	40	60	60	60	60	60	60	60	60
	[US gal/min]		[10.6]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]
	l/min	int.[1]	50	75	75	75	75	75	75	75	75
	[US gal/min]		[13.2]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]
Max. starting pressure with unloaded shaft	bar		10	10	10	9	7	5	7	5	5
	[psi]		[145]	[145]	[145]	[131]	[102]	[73]	[102]	[73]	[73]
Min. starting torque	at max. press. drop cont.		80	150	200	250	300	300	290	315	300
	Nm [lbf·in]		[710]	[1330]	[1770]	[2210]	[2660]	[2660]	[2570]	[2790]	[2660]
	at max. press. drop int.[1]		100	170	230	280	350	400	400	400	380
	Nm [lbf·in]		[890]	[1500]	[2040]	[2480]	[3100]	[3540]	[3540]	[3540]	[3360]
Min. speed[3]	min^{-1}		10	10	10	9	7	5	5	5	5
	[rpm]										

[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.

TECHNICAL DATA FOR OMR/OMRW WITH 32 MM , 1 1/4 IN CYLINDRICAL SHAFT AND 35 MM, 1 1/4 IN TAPERED SHAFT

Type			OMR	OMR	OMR	OMR	OMR	OMR	OMR	OMR	OMR
Motor size			**50**	**80**	**100**	**125**	**160**	**200**	**250**	**315**	**375**
Geometric displacement	cm^3 [in^3]		51.6 [3.16]	80.3 [4.91]	99.8 [6.11]	125.7 [7.69]	159.6 [9.77]	199.8 [12.23]	249.3 [15.26]	315.7 [19.32]	372.6 [22.80]
Max. Speed	min^{-1} [rpm]	cont.	775	750	600	475	375	300	240	190	160
		int.[1]	970	940	750	600	470	375	300	240	200
Max. Torque	Nm [lbf·in]	cont.	100 [890]	195 [1730]	240 [2120]	300 [2660]	380 [3360]	450 [3980]	540 [4780]	550 [4870]	580 [5130]
		int.[1]	130 [1150]	220 [1950]	280 [2480]	340 [3010]	430 [3810]	500 [4430]	610 [5400]	690 [6110]	690 [6110]
		peak[2]	170 [1510]	270 [2390]	320 [2830]	370 [3280]	460 [4070]	560 [4960]	710 [6280]	840 [7440]	830 [7350]
Max. output	kW [hp]	cont.	7.0 [9.4]	12.5 [16.8]	13.0 [17.4]	12.5 [16.8]	12.5 [16.8]	11.0 [14.8]	10.0 [13.4]	9.0 [12.1]	7.5 [10.1]
		int.[1]	8.5 [11.4]	15.0 [20.1]	15.0 [20.1]	14.5 [19.4]	14.0 [18.8]	13.0 [17.4]	12.0 [16.1]	10.0 [13.4]	9.0 [12.1]
Max. pressure drop	bar [psi]	cont.	140 [2030]	175 [2540]	175 [2540]	175 [2540	175 [2540]	175 [2540]	175 [2540]	135 [1960]	115 [1670]
		int.[1]	175 [2540]	200 [2900]	200 [2900]	200 [2900]	200 [2900]	200 [2900]	200 [2900]	175 [2540]	150 [2180]
		peak[2]	225 [3260]	225 [3260]	225 [3260]	225 [3260]	225 [3260]	225 [3260]	225 [3260]	210 [3050]	175 [2540]
Max. oil flow	l/min [USgal/min]	cont.	40 [10.6]	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]
		int.[1]	50 [13.2]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]
Max. starting pressure with unloaded shaft	bar [psi]		10 [145]	10 [145]	10 [145]	9 [130]	7 [100]	5 [75]	5 [75]	5 [75]	5 [75]
Min. starting torque	at max. press.drop cont. Nm [lbf·in]		80 [710]	150 [1330]	200 [1770]	250 [2210]	320 [2830]	410 [3630]	500 [4430]	500 [4430]	470 [4170]
	at max. press.drop int.[1] Nm [lbf·in]		100 [890]	170 [1500]	230 [2040]	280 [2480]	370 [3280]	460 [4070]	550 [4870]	660 [5840]	570 [5050]
Min. speed[3]	min^{-1} [rpm]		10	10	10	9	7	5	5	5	5

Type			Max. inlet pressure	Max. return pressure with drain line
OMR 50 - 375	bar [psi]	cont.	175 [2540]	175 [2540]
	bar [psi]	int.[1]	200 [2900]	200 [2900]
	bar [psi]	peak[2]	225 [3260]	225 [3260]

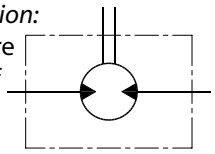
[1] Intermittent operation: the permissible values may occur for max. 10% of every minute.
[2] Peak load: the permissible values may occur for max. 1% of every minute.
[3] Operation at lower speeds may be slightly less smooth.

Technical data – max. permissible shaft seal pressure

OMR WITH HIGH PRESSURE SHAFT SEAL (HPS)

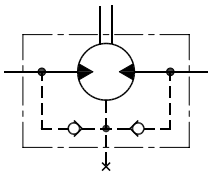
OMR with HPS, without check valves and without drain connection:
The shaft seal pressure equals the average of input pressure and return pressure

$$P_{seal} = \frac{P_{in} + P_{return}}{2}$$

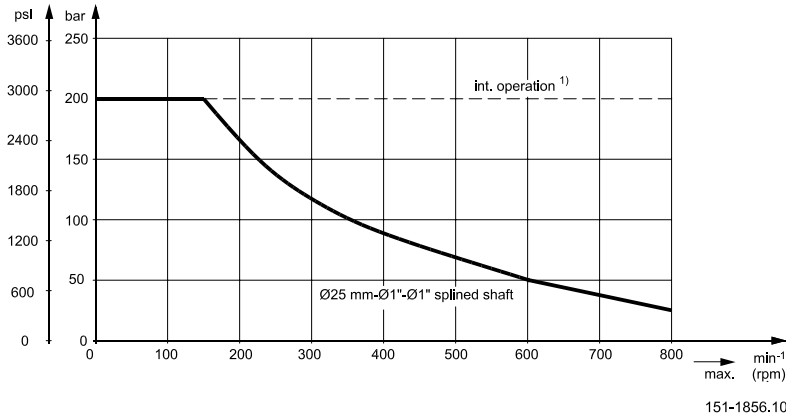

151-1743.10

OMR with HPS, check valves and with drain connection:
The shaft seal pressure equals the pressure in the drain line.

OMR 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

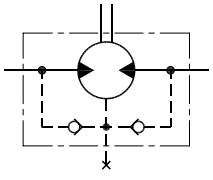
Max. permissible shaft seal pressure



151-1856.10

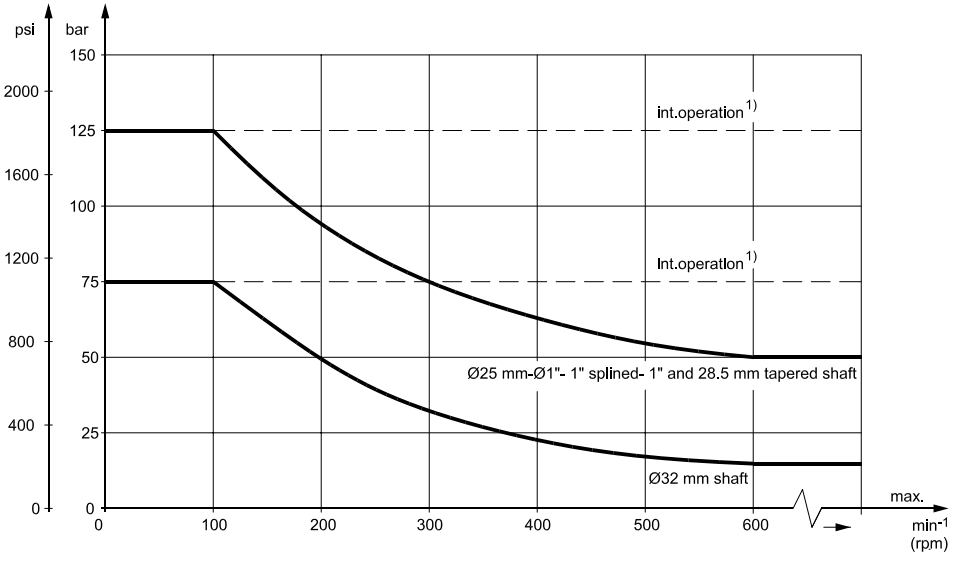
OMR WITH STANDARD SHAFT SEAL

OMR with standard shaft seal, 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

OMR with standard shaft seal, check valves and with drain connection:
The shaft seal pressure equals the pressure on the drain line.

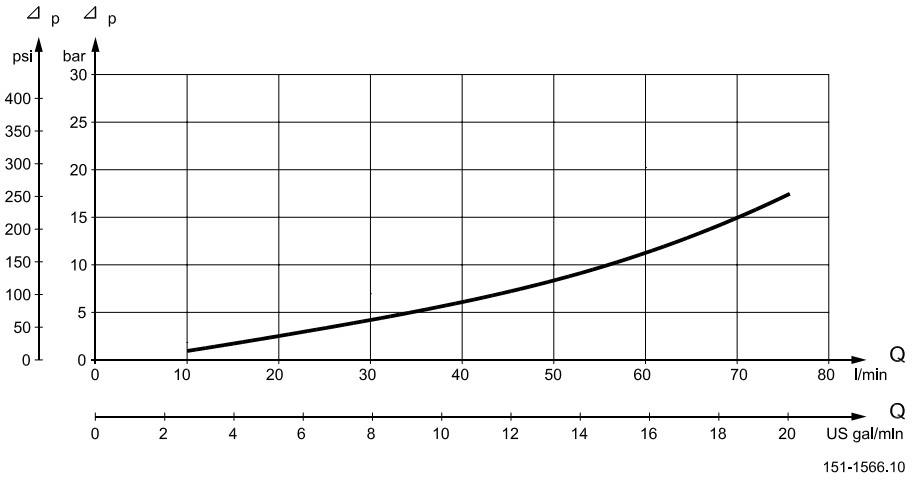
Max. return pressure without drain line or max. pressure in the drain line



151-1563.10

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

PRESSURE DROP IN MOTOR



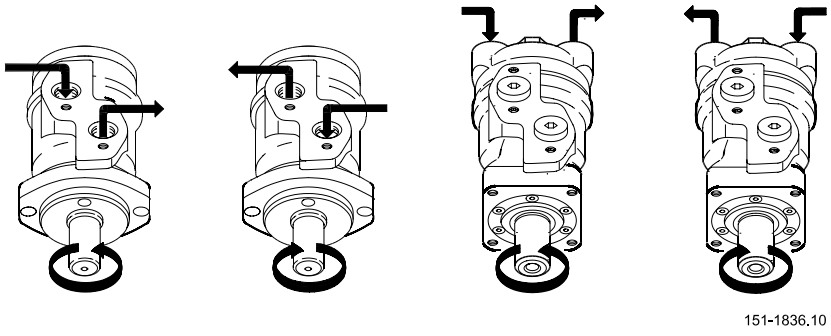
The curve applies to an unloaded motor shaft and an oil viscosity of 35 mm²/s [165 SUS]

OIL FLOW IN DRAIN LINE

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

Pressure drop bar [psi]	Viscosity mm²/s [SUS]	Oil flow in drain line 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]

DIRECTION OF SHAFT ROTATION



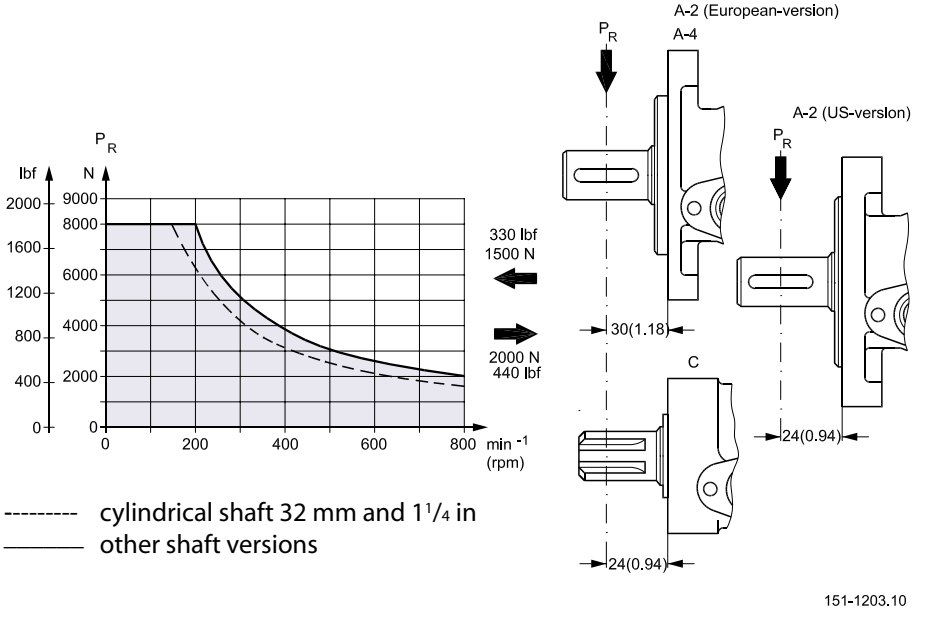
PERMISSIBLE SHAFT LOAD FOR OMR

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	4-hole oval flange** 2-hole oval flange (European version)	4-hole oval flange 2-hole oval flange	Square flange** 2-hole oval flange (US version)
Shaft version	25 mm cylindrical shaft 1 in cylindrical shaft 1 in splined shaft 28.5 mm tapered shaft	32 mm cylindrical shaft $1^1/_4$ in cylindrical shaft	25 mm cylindrical shaft 1 in cylindrical shaft
Permissible shaft load (P_R) l in mm	$\frac{800}{n} \times \frac{250000}{95+l}$ N*	$\frac{800}{n} \times \frac{187500}{95+l}$ N*	$\frac{800}{n} \times \frac{250000}{101+l}$ N*
Permissible shaft load (P_R) l in inch	$\frac{800}{n} \times \frac{2215}{3.74+l}$ lbf*	$\frac{800}{n} \times \frac{1660}{3.74+l}$ lbf*	$\frac{800}{n} \times \frac{2215}{3.98+l}$ lbf*

* $n \geq 200$ min^{-1} (rpm); $l \leq 55$ mm [2.2 in]
$n < 200$ min^{-1} (rpm); => $P_{Rmax} = 8000$ N [1800 lbf]
** For both European and US version



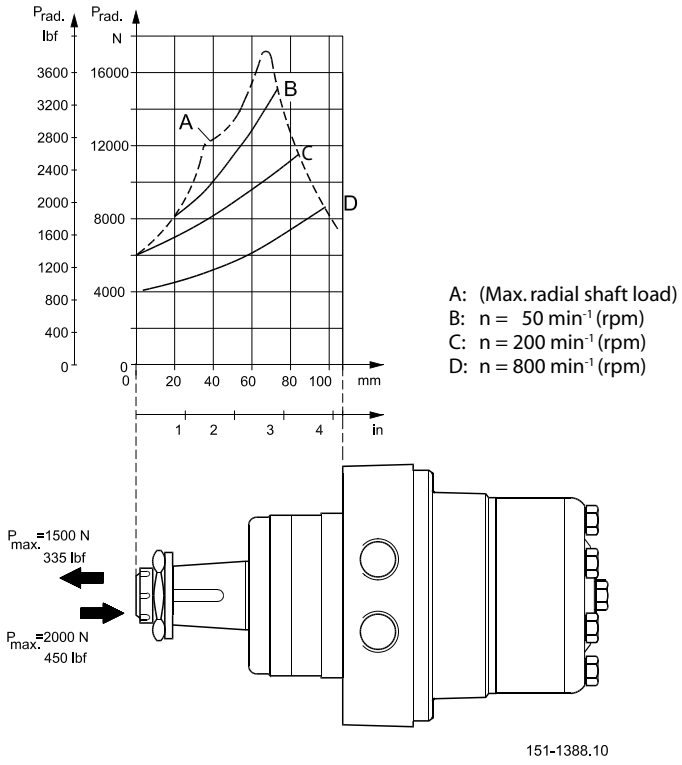
--------- cylindrical shaft 32 mm and $1^1/_4$ in
——— other shaft versions

The curve shows the relation between P_R and n

- when l = 30 mm [1.18 in] for motors with A2 (European version) and A4 oval mounting flange
- 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 OMR with the output shaft running in needle bearings.

PERMISSIBLE SHAFT LOAD FOR OMRW N WITH NEEDLE BEARINGS



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

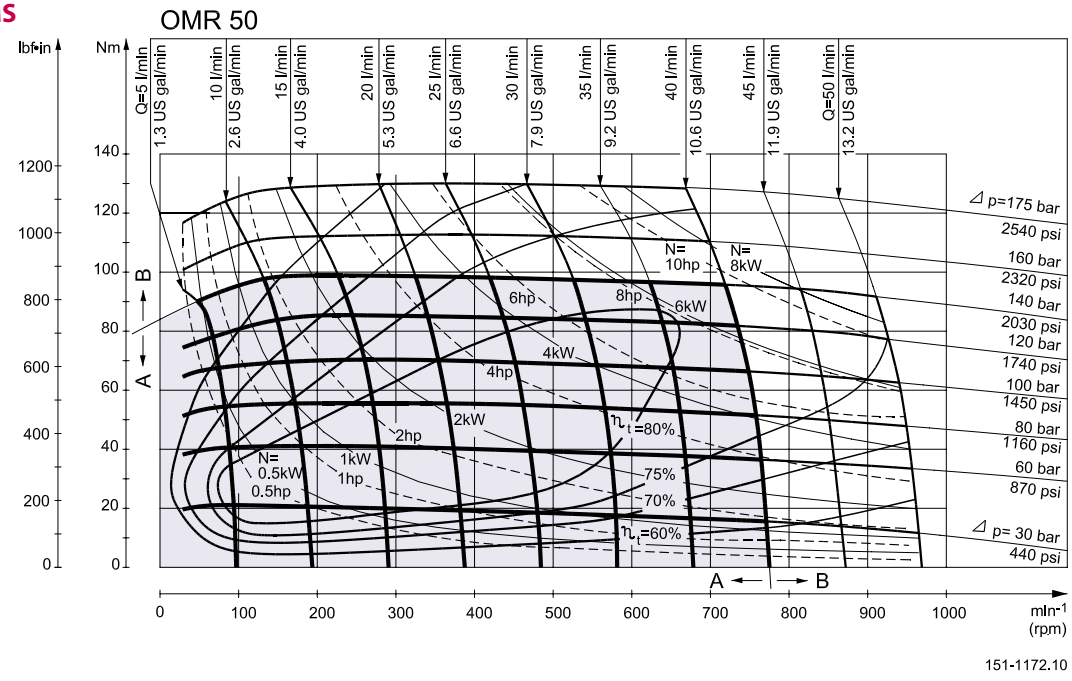
The permissible radial load on the shaft is shown for different speeds as a function of the distance from the mounting flange to the point of load application.

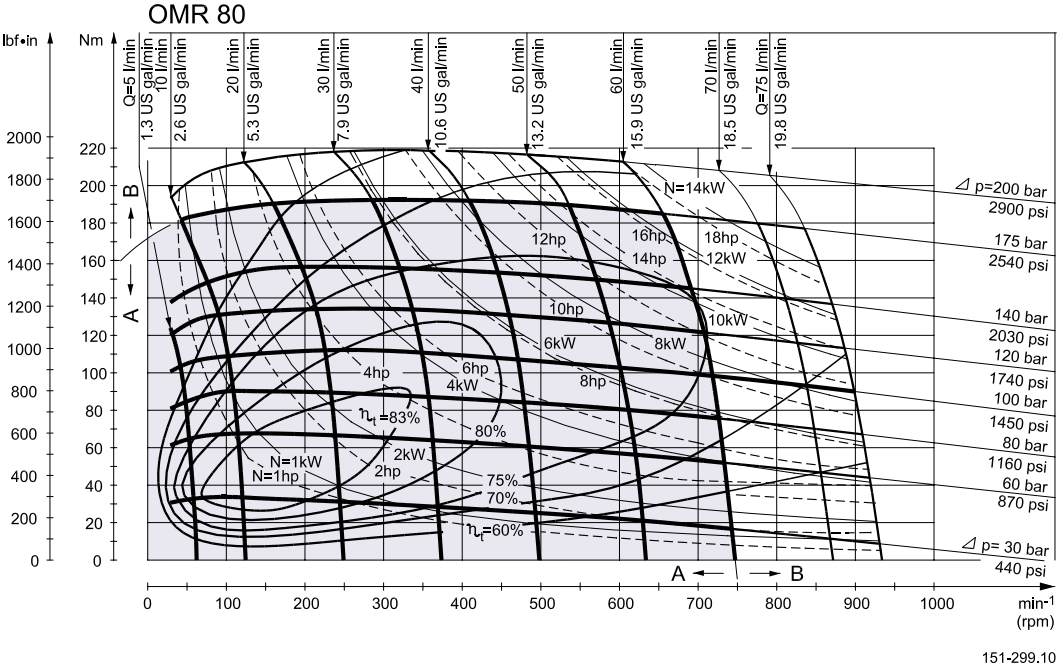
Curve A shows max. radial shaft load. Any shaft load exceeding the values quoted in the curve will involve a risk of breakage.

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 "General" DHMH.PK.100.G2.02 520L0232.

FUNCTION DIAGRAMS





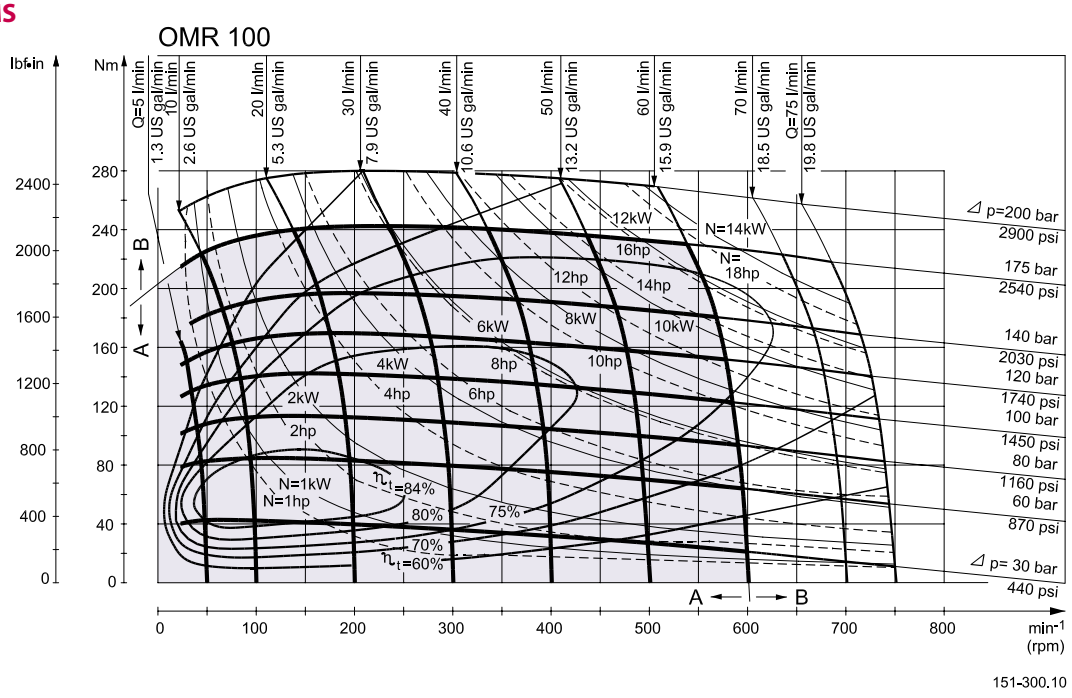
Explanation of function diagram use, basis and conditions can be found on page 7.

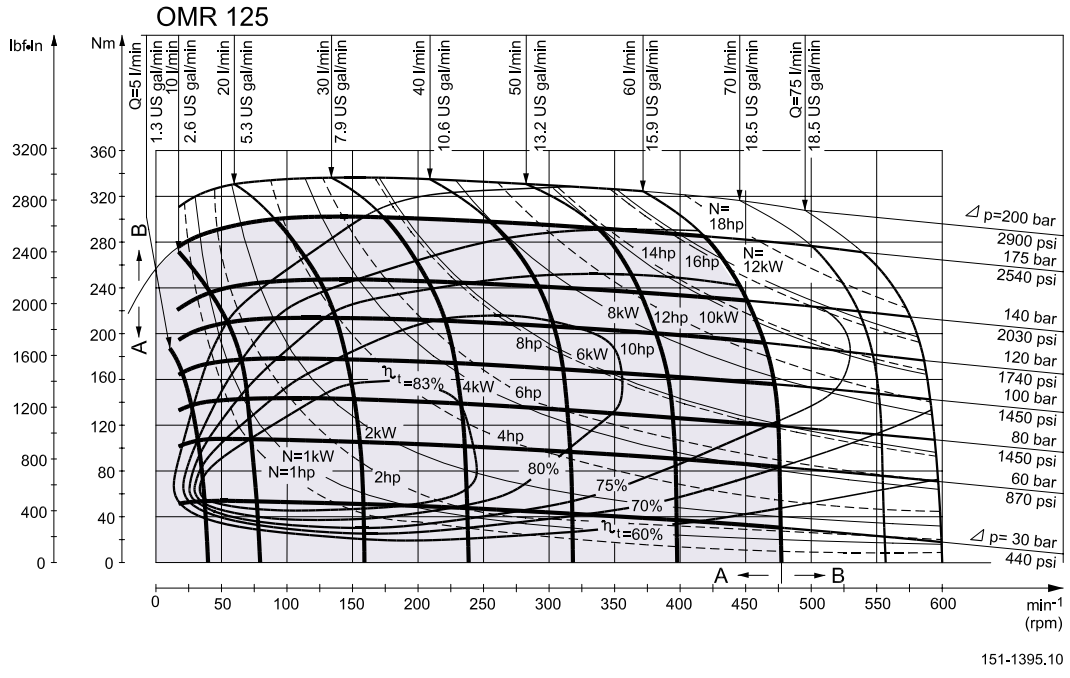
- A: Continuous range
- B: Intermittent range (max. 10% operation every minute)

Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 38-40.

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

FUNCTION DIAGRAMS





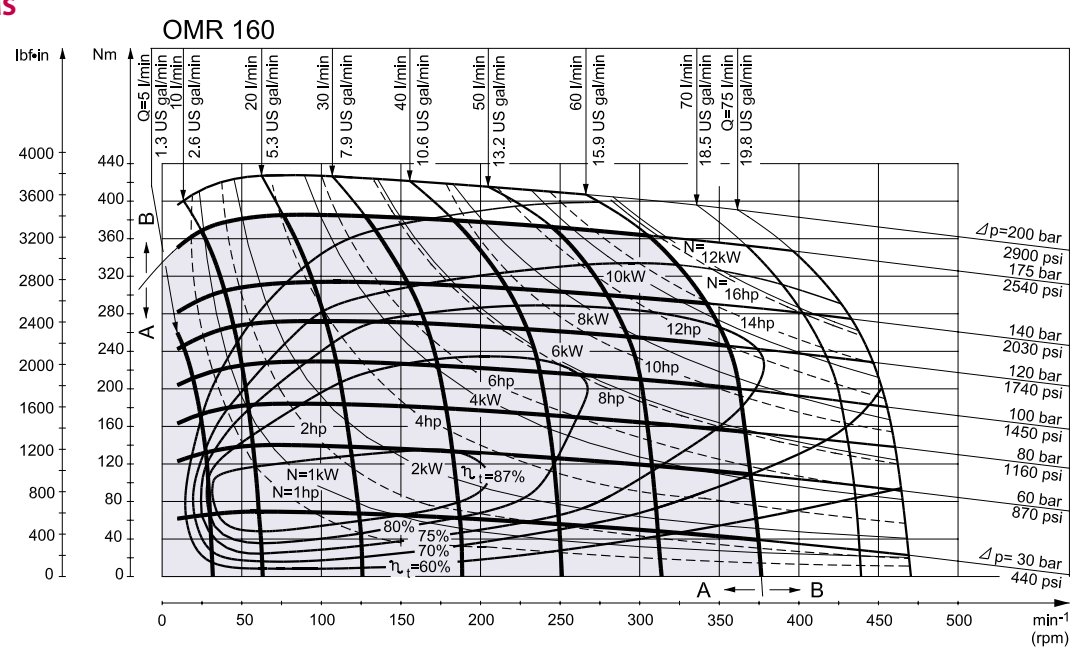
Explanation of function diagram use, basis and conditions can be found on page 7.

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

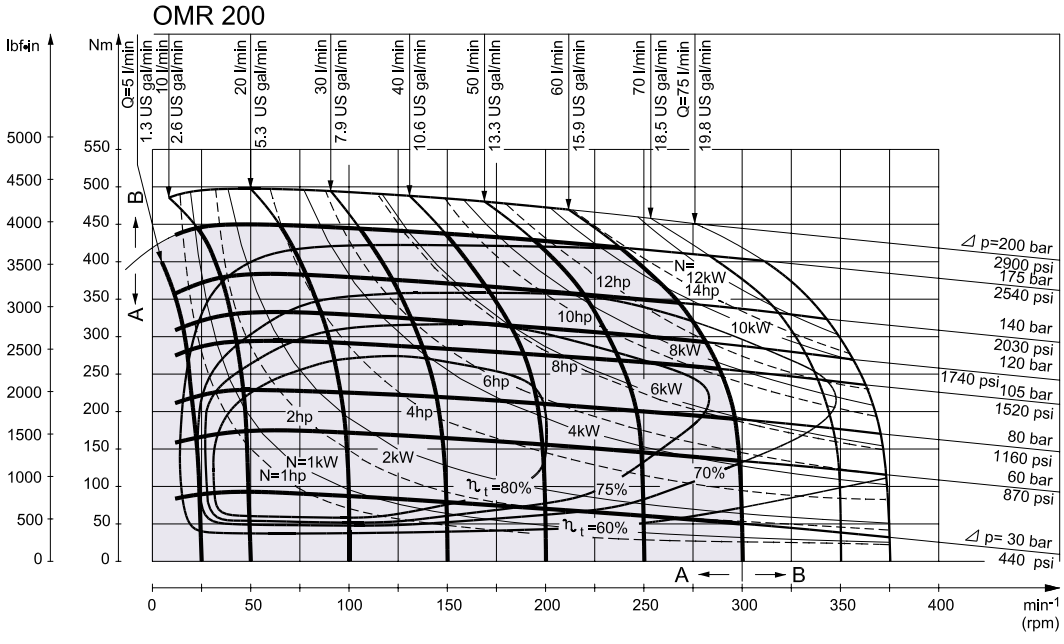
Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 38-40.

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

FUNCTION DIAGRAMS



151-1044.10



151-1396.10

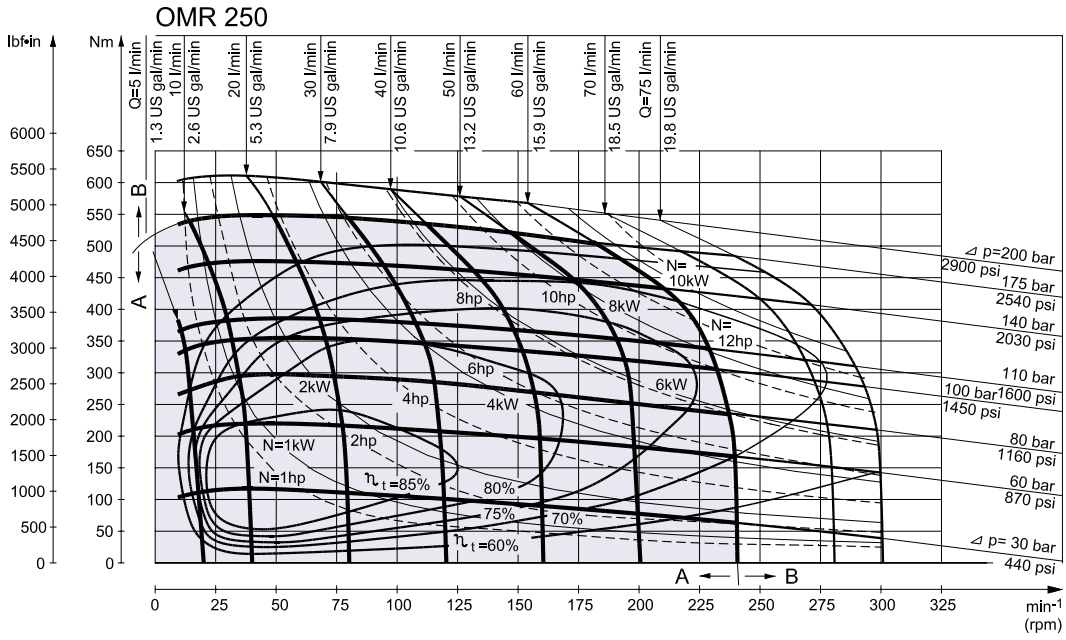
Explanation of function diagram use, basis and conditions can be found on page 7.

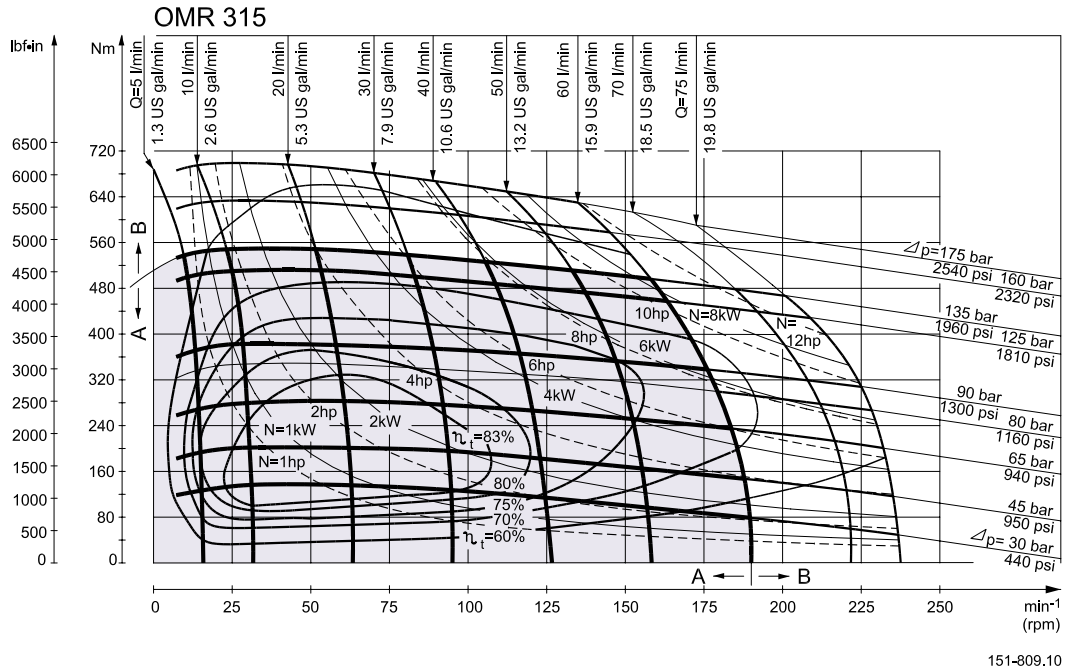
- A: Continuous range
- B: Intermittent range (max. 10% operation every minute)

Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 38-40.

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

FUNCTION DIAGRAMS





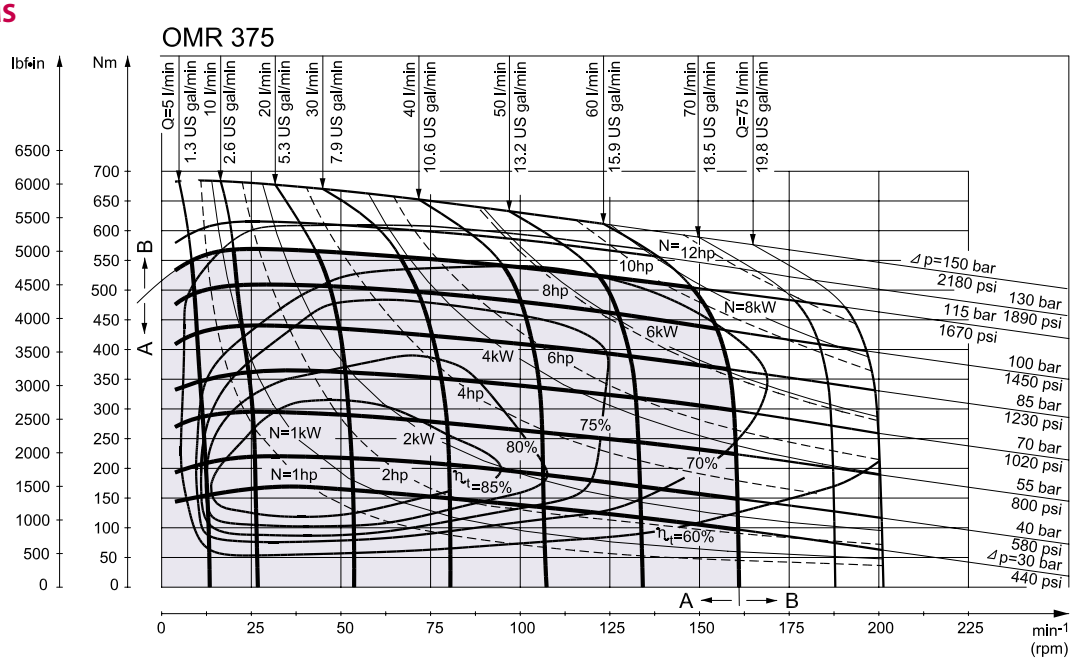
Explanation of function diagram use, basis and conditions can be found on page 7.

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

Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 38-40.

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

FUNCTION DIAGRAMS



Explanation of function diagram use, basis and conditions can be found on page 7.

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

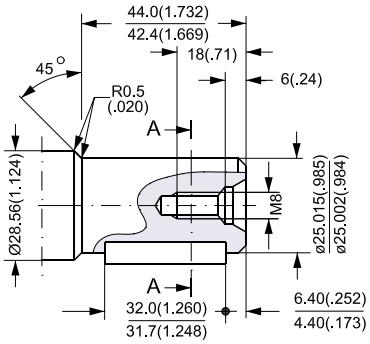
Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 38-40.

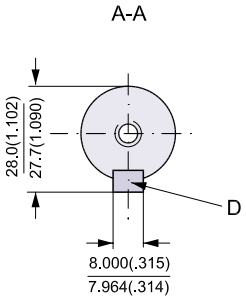
Note: Intermittent pressure drop and oil flow must not occur simultaneously.

SHAFT VERSION

A: Cylindrical shaft
25 mm
D: Parallel key
A8 × 7 × 32
DIN 6885

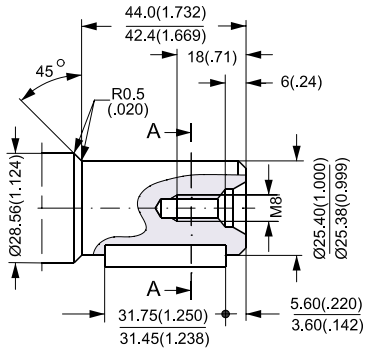
A

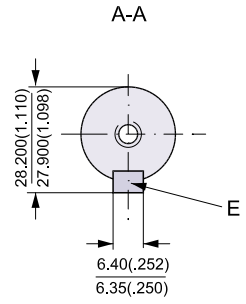




B: Cylindrical shaft
1 in
E: Parallel key
¼ × ¼ × 1 ¼ in
B.S. 46

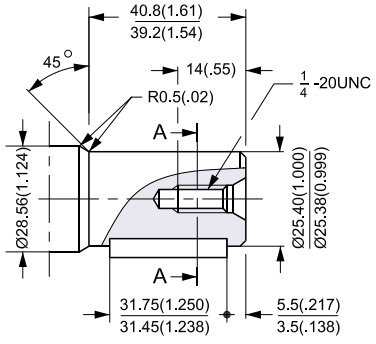
B

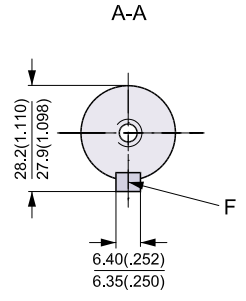


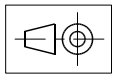


US version
C: Cylindrical shaft
1 in
F: Parallel key
¼ × ¼ × 1 ¼ in
B.S. 46

C



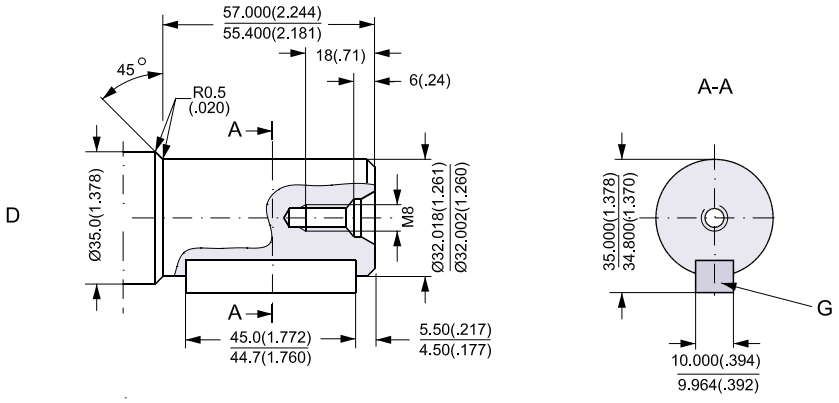




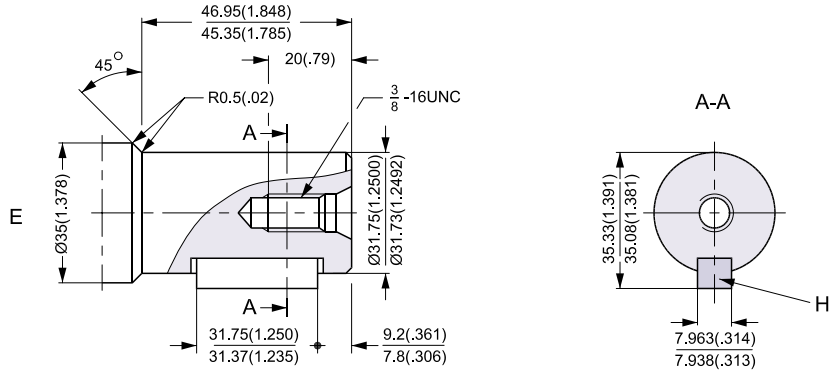
151-1846.11

SHAFT VERSION

D: Cylindrical shaft
32 mm
G: Parallel key
A10 × 8 × 45
DIN 6885



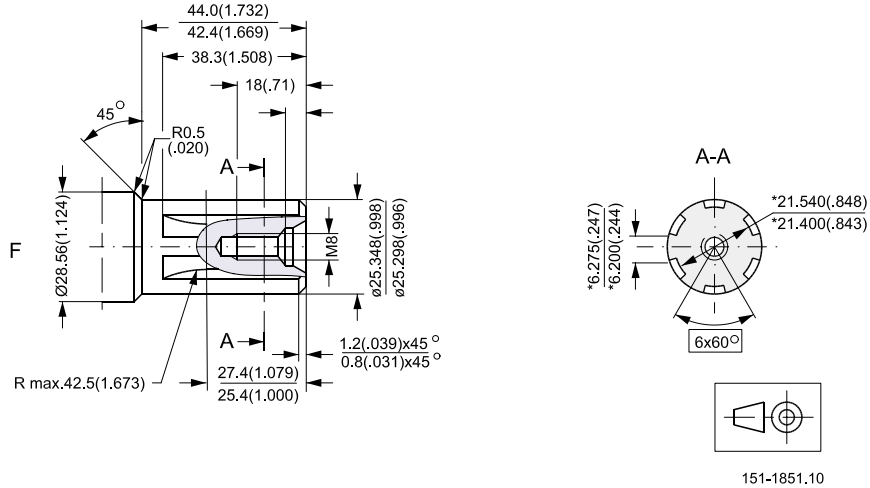
US version
E: Cylindrical shaft
1 1/4 in
H: Parallel key
5/16 × 5/16 × 1 1/4 in
B.S. 46



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)

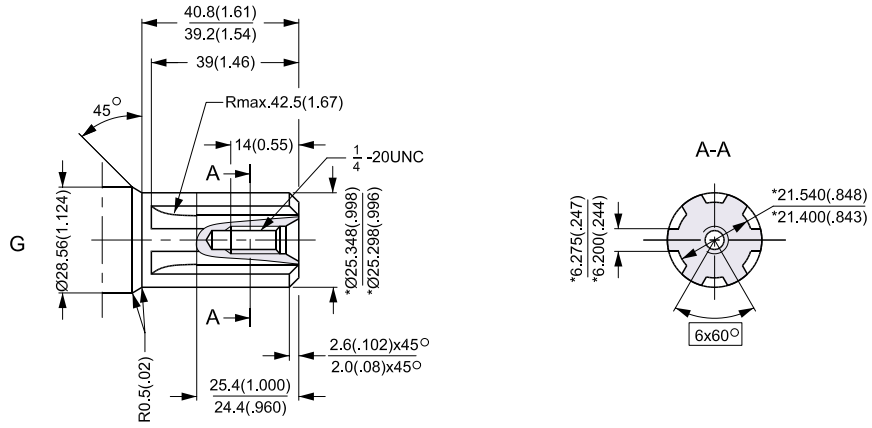


SHAFT VERSION

US version

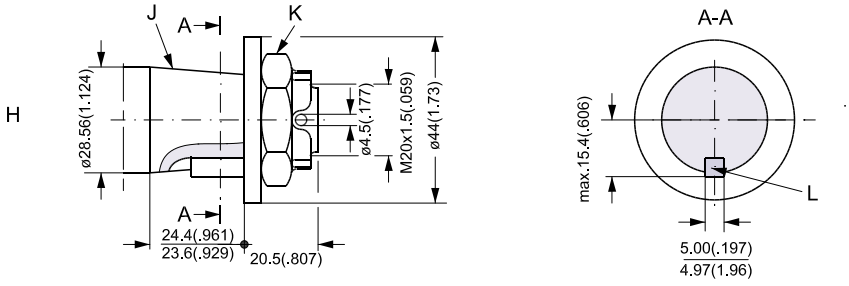
G: Splined shaft
SAE 6 B (B.S. 2059)
Straight-sided,
bottom fitting, deep.
Fit 2
Nom. size 1 in
* Deviates from
SAE 6 B (B.S. 2059)

G



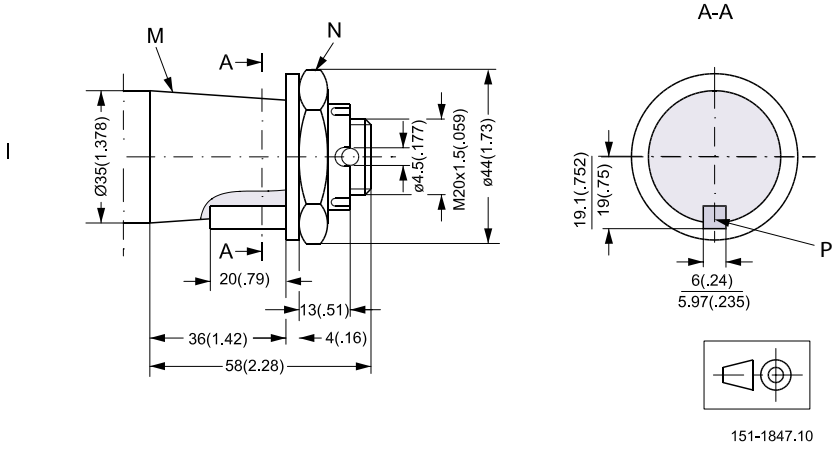
H: Tapered shaft 28.5 mm
(ISO/R775)
K: DIN 937
NV 30
Tightening torque:
100 ± 10 Nm [885 ±85 lbf·in]
J: Taper 1:10
L: Parallel key
B5 × 5 × 14
DIN 6885

H



I: Tapered shaft 35 mm
(ISO/R775)
N: DIN 937
NV 41
Tightening torque:
200 ± 10 Nm [1770 ±85 lbf·in]
M: Taper 1:10
P: Parallel key
B6 × 6 × 20
DIN 6885

I

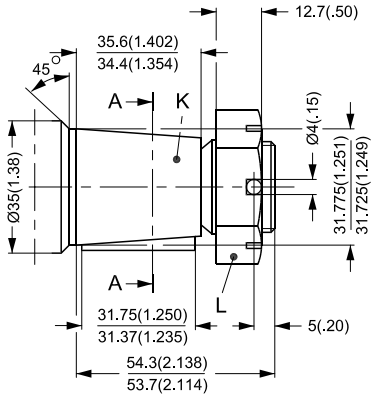


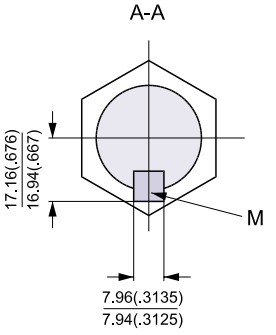
151-1847.10

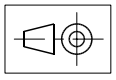
SHAFT VERSION

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 Nm [1770 ±85 lbf·in]
M: Parallel key
5/16 × 5/16 × 1 1/4
SAE J501

J



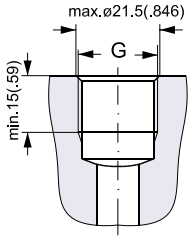




151-1848.10

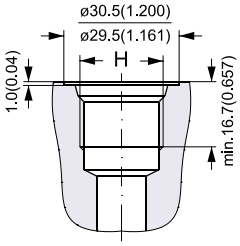
PORT THREAD VERSIONS

A



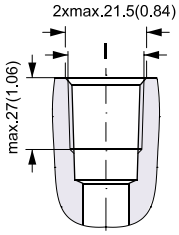
A: G main ports
G: ISO 228/1 - G1/2

B



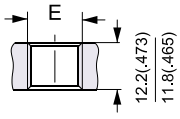
B: UNF main ports
H: 7/8 - 14 UNF
O-ring boss port

C



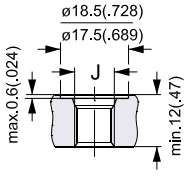
C: NPTF main ports
I: 1/2 - 14 NPTF

D



D: G drain port
E: ISO 228/1 - G1/4

F



151-1844.10

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

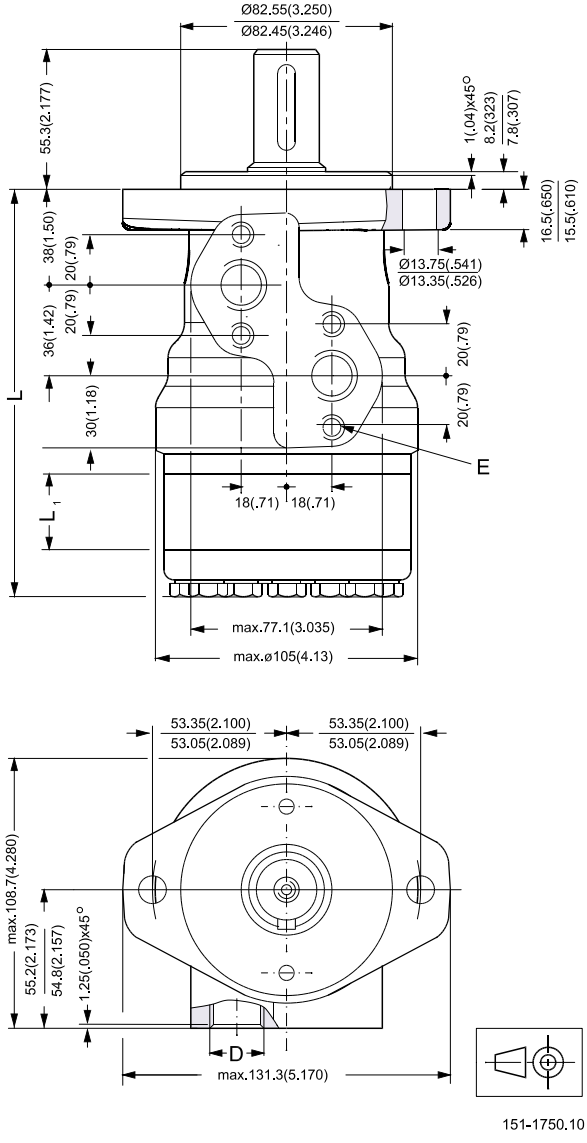
Dimensions – European version

DIMENSIONS

Side port version with 2-hole oval mounting flange (A2 flange).
With high pressure shaft seal.

Type	L mm [in]	L_1 mm [in]
OMR 50	135.5 [5.33]	9.0 [0.35]
OMR 80	140.5 [5.53]	14.0 [0.55]
OMR 100	144.0 [5.67]	17.4 [0.69]
OMR 125	148.5 [5.85]	21.8 [0.86]
OMR 160	154.5 [6.08]	27.8 [1.09]
OMR 200	161.5 [6.36]	34.8 [1.37]
OMR 250	170.5 [6.71]	43.5 [1.71]
OMR 315	181.5 [7.15]	54.8 [2.16]
OMR 375	191.7 [7.55]	65.0 [2.56]

D: G 1/2; 15 mm [0.59 in] deep
E: M8; 13 mm [0.51 in] deep (4 pcs.)



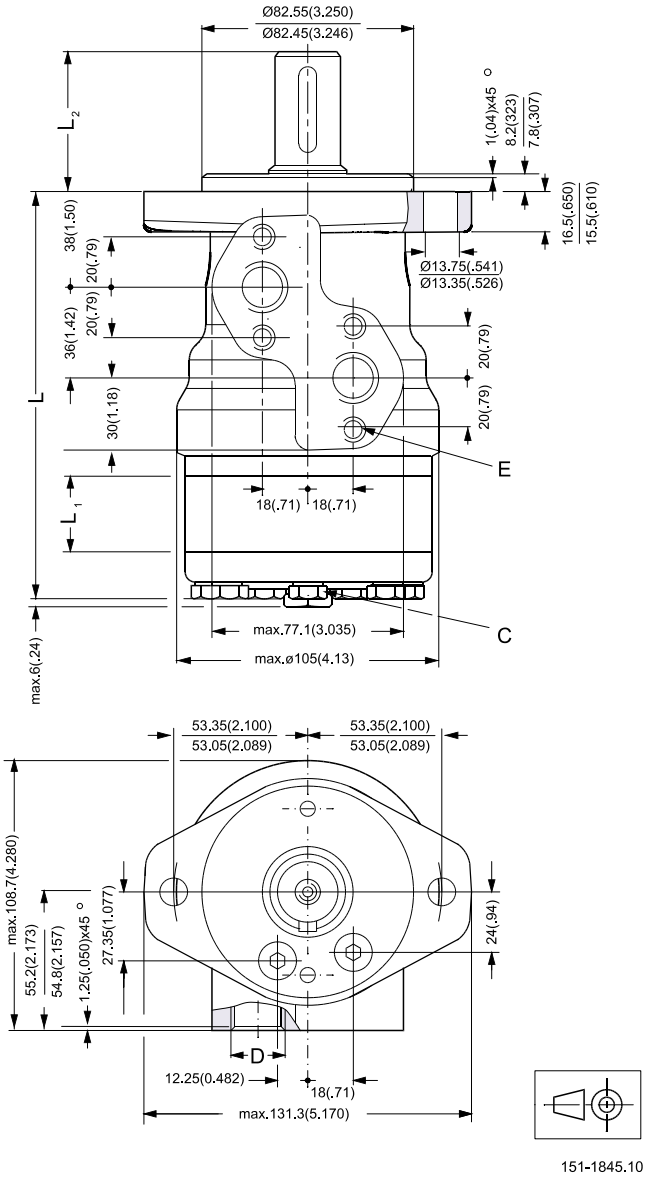
Dimensions – European version

DIMENSIONS

Side port version with 2-hole oval mounting flange (A2 flange).
With check valves and drain connection.
With high pressure shaft seal.

Type	L mm [in]	L_1 mm [in]
OMR 50	135.5 [5.33]	9.0 [0.35]
OMR 80	140.5 [5.53]	14.0 [0.55]
OMR 100	144.0 [5.67]	17.4 [0.69]
OMR 125	148.5 [5.85]	21.8 [0.86]
OMR 160	154.5 [6.08]	27.8 [1.09]
OMR 200	161.5 [6.36]	34.8 [1.37]
OMR 250	170.5 [6.71]	43.5 [1.71]
OMR 315	181.5 [7.15]	54.8 [2.16]
OMR 375	191.7 [7.55]	65.0 [2.56]

C: Drain connection
G 1/4; 12 mm [0.47 in] deep
D: G 1/2; 15 mm [0.59 in] deep
E: M8; 13 mm [0.51 in] deep
(4 pcs.)



Dimensions – European version

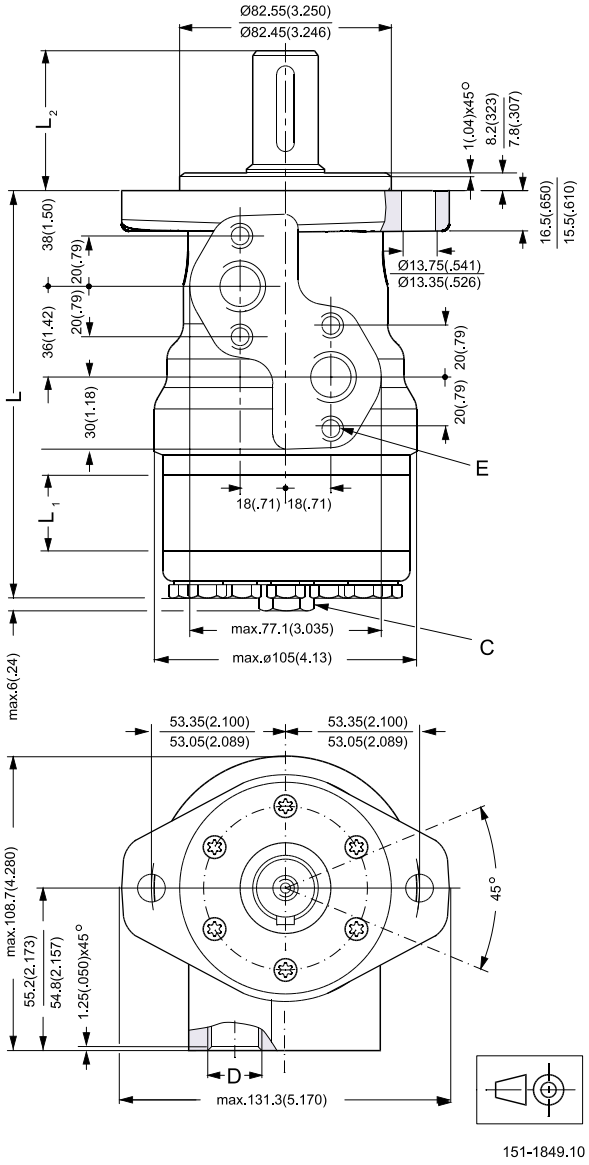
DIMENSIONS

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

Output shaft. max.	L_2 mm [in]
Cylindrical shaft 32 mm [1.26 in]	68.3 [2.69]
Cylindrical shaft 25 mm	55.3 [2.16]
Tapered shaft 28.56 mm [1.12 in]	56.3 [2.19]

Type	L mm [in]	L_1 mm [in]
OMR 50	135.5 [5.33]	9.0 [0.35]
OMR 80	140.5 [5.53]	14.0 [0.55]
OMR 100	144.0 [5.67]	17.4 [0.69]
OMR 125	148.5 [5.85]	21.8 [0.86]
OMR 160	154.5 [6.08]	27.8 [1.09]
OMR 200	161.5 [6.36]	34.8 [1.37]
OMR 250	170.5 [6.71]	43.5 [1.71]
OMR 315	181.5 [7.15]	54.8 [2.16]
OMR 375	191.7 [7.55]	65.0 [2.56]

C: Drain connection
G 1/4; 12 mm [0.47 in] deep
D: G 1/2; 15 mm [0.59 in] deep
E: M8; 13 mm [0.51 in] deep
(4 pcs.)

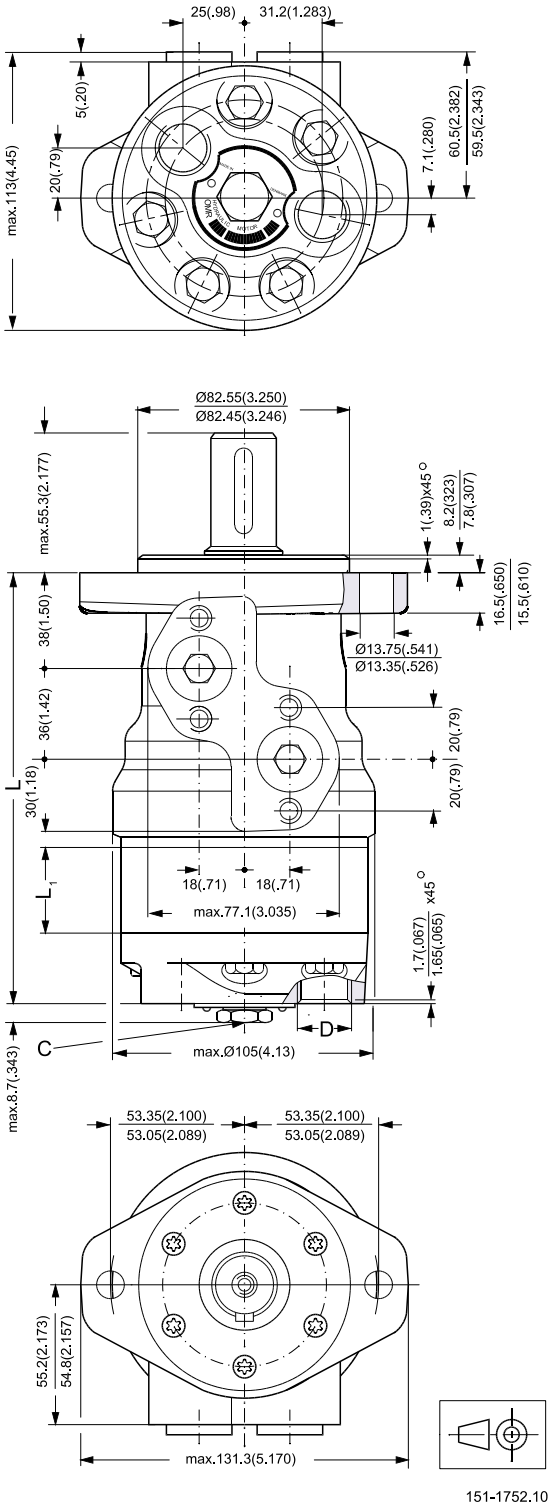


DIMENSIONS

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

Type	L mm [in]	L_1 mm [in]
OMR 50	150.6 [5.92]	9.0 [0.35]
OMR 80	155.6 [6.13]	14.0 [0.55]
OMR 100	159.0 [6.26]	17.4 [0.69]
OMR 125	163.4 [6.43]	21.8 [0.86]
OMR 160	169.4 [6.67]	27.8 [1.09]
OMR 200	176.4 [6.94]	34.8 [1.37]
OMR 250	185.1 [7.29]	43.5 [1.71]
OMR 315	196.4 [7.73]	54.8 [2.16]
OMR 400	206.6 [8.13]	65.0 [2.56]

C: Drain connection
G 1/4; 12 mm [0.47 in] deep
D: G 1/2; 15 mm [0.59 in] deep



151-1752.10

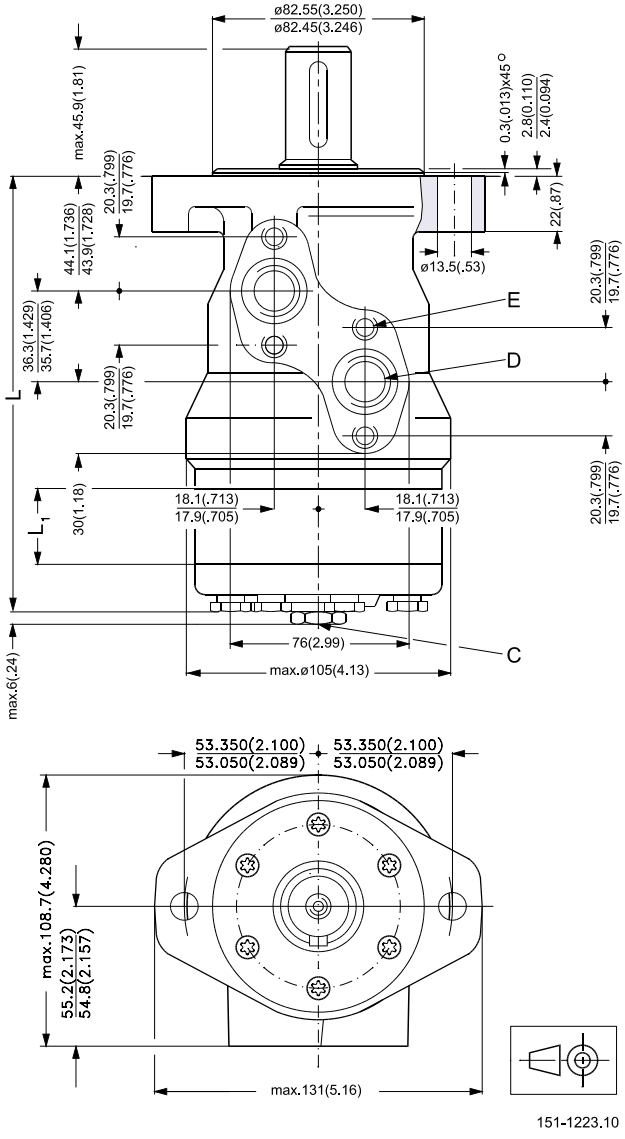
Dimensions – US version

DIMENSIONS

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

Type	L mm [in]	L_1 mm [in]
OMR 50	141.5 [5.57]	9.0 [0.35]
OMR 80	146.5 [5.77]	14.0 [0.55]
OMR 100	150.0 [5.91]	17.4 [0.69]
OMR 125	154.4 [6.08]	21.8 [0.86]
OMR 160	160.5 [6.32]	27.8 [1.09]
OMR 200	167.5 [6.59]	34.8 [1.37]
OMR 250	176.5 [6.95]	43.5 [1.71]
OMR 315	187.5 [7.38]	54.8 [2.16]
OMR 400	197.5 [7.78]	64.8 [2.55]

C: Drain connection
$^{7}/_{16}$ - 20 UNF;
12 mm [0.47 in] deep
D: $^{7}/_{8}$ - 14 UNF;
16.76 mm [0.66 in] deep
E: M8; 13 mm [0.51 in] deep
(4-off)



Dimensions – European version

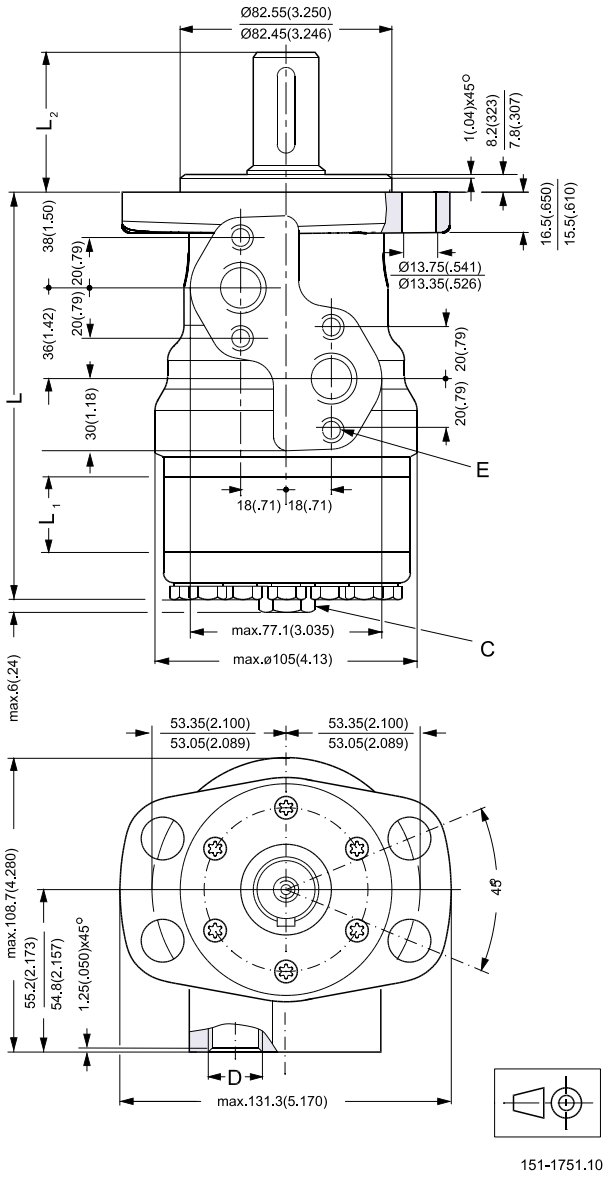
DIMENSIONS

Side port version with 4-hole oval mounting flange (A4 flange).

Output shaft. max.	L_2 mm [in]
Cylindrical shaft 32 mm [1.26 in]	68.3 [2.69]
Cylindrical shaft 25 mm [0.98 in]	55.3 [2.18]

Type	L mm [in]	L_1 mm [in]
OMR 50	135.5 [5.33]	9.0 [0.35]
OMR 80	140.5 [5.53]	14.0 [0.55]
OMR 100	144.0 [5.67]	17.4 [0.69]
OMR 125	148.5 [5.85]	21.8 [0.86]
OMR 160	154.5 [6.08]	27.8 [1.09]
OMR 200	161.5 [6.36]	34.8 [1.37]
OMR 250	170.5 [6.71]	43.5 [1.71]
OMR 315	181.5 [7.15]	54.8 [2.16]
OMR 375	191.7 [7.55]	65.0 [2.56]

C: Drain connection G 1/4; 12 mm [0.47 in] deep
D: G 1/2; 15 mm [0.59 in] deep
E: M8; 13 mm [0.51 in] deep (4 pcs.)



151-1751.10

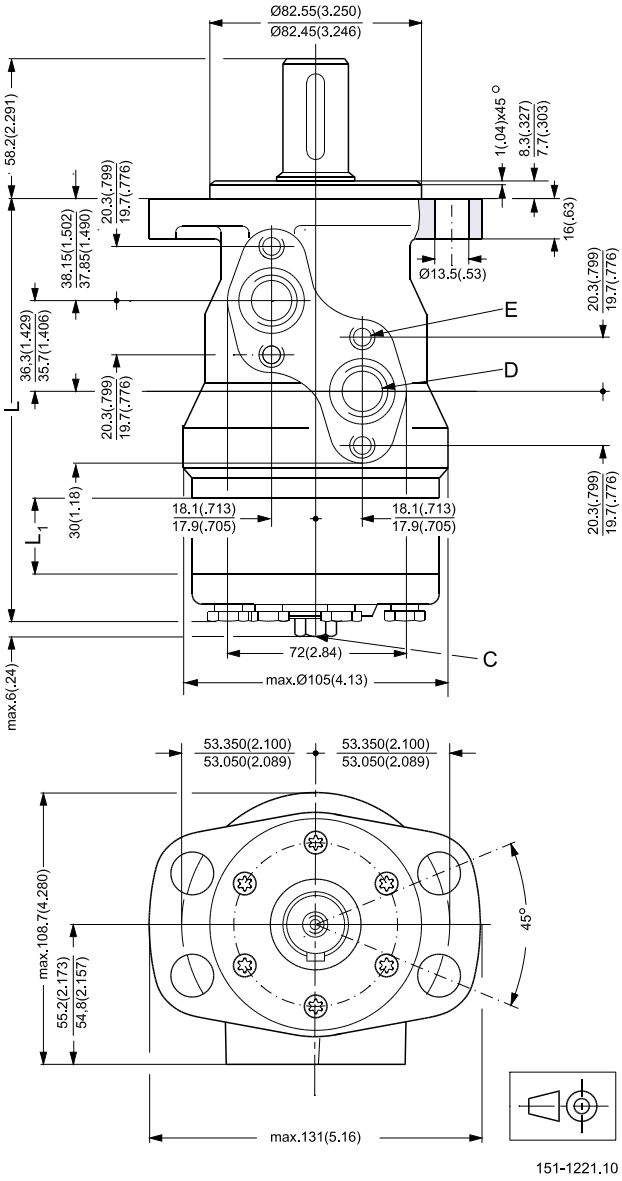
Dimensions – US version

DIMENSIONS

Side port version with 4-hole oval mounting flange (A4-flange).

Type	L mm [in]	L_1 mm [in]
OMR 50	135.5 [5.33]	9.0 [0.35]
OMR 80	140.5 [5.53]	14.0 [0.55]
OMR 100	144.0 [5.67]	17.4 [0.69]
OMR 125	148.4 [5.84]	21.8 [0.86]
OMR 160	154.5 [6.08]	27.8 [1.09]
OMR 200	161.5 [6.36]	34.8 [1.37]
OMR 250	170.5 [6.71]	43.5 [1.71]
OMR 315	181.5 [7.15]	54.8 [2.16]
OMR 400	191.5 [7.55]	64.8 [2.55]

C: Drain connection
$^{7}/_{16}$ - 20 UNF;
12 mm [0.47 in] deep
D: $^{7}/_{8}$ - 14 UNF;
16.76 mm [0.66 in] deep
E: M8; 13 mm [0.51 in] deep
(4-off)

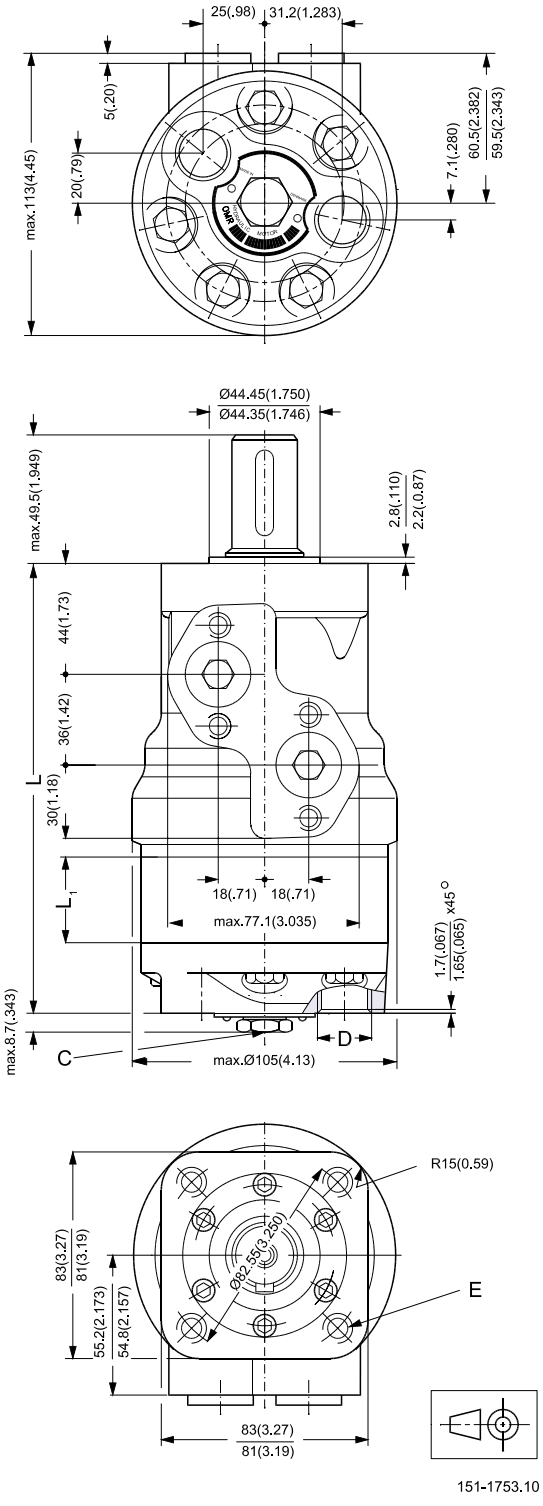


DIMENSIONS

End port version with square mounting flange (C-flange).

Type	L mm [in]	L_1 mm [in]
OMR 50	156.6 [6.17]	9.0 [0.35]
OMR 80	161.6 [6.36]	14.0 [0.55]
OMR 100	165.0 [6.50]	17.4 [0.69]
OMR 125	169.4 [6.67]	21.8 [0.86]
OMR 160	175.4 [6.91]	27.8 [1.09]
OMR 200	182.4 [7.18]	34.8 [1.37]
OMR 250	191.1 [7.52]	43.5 [1.71]
OMR 315	202.4 [7.98]	54.8 [2.16]
OMR 375	212.5 [8.37]	65.0 [2.56]

C: Drain connection
G 1/4; 12 mm [0.47 in] deep
D: G 1/2; 15 mm [0.59 in] deep
E: M10; 15 mm [0.59 in] deep
(4 pcs.)



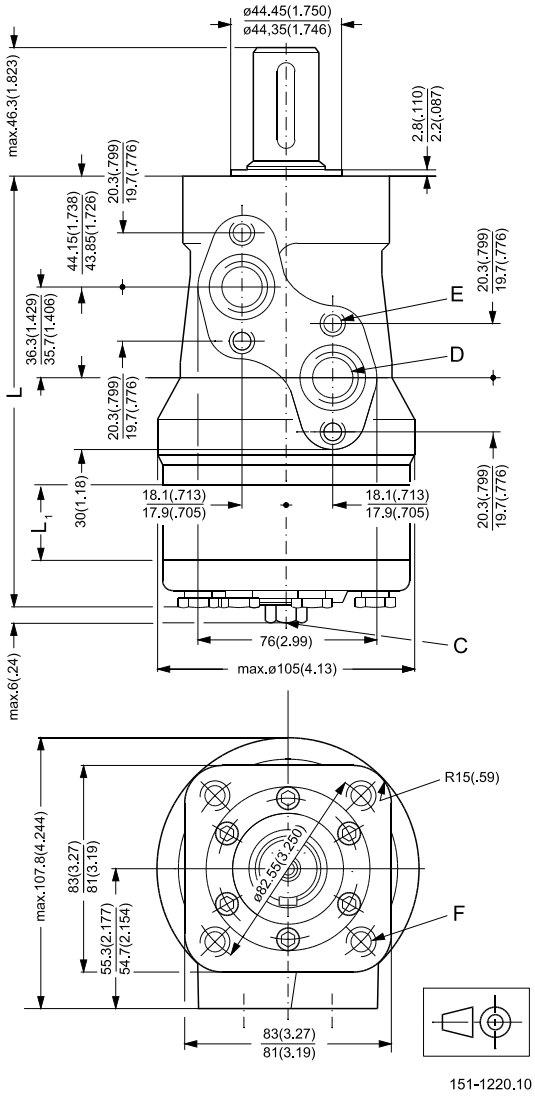
Dimensions – US version

DIMENSIONS

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

Type	L mm [in]	L_1 mm [in]
OMR 50	141.5 [5.57]	9.0 [0.35]
OMR 80	146.5 [5.77]	14.0 [0.55]
OMR 100	150.0 [5.91]	17.4 [0.69]
OMR 125	154.4 [6.08]	21.8 [0.86]
OMR 160	160.5 [6.32]	27.8 [1.09]
OMR 200	167.5 [6.59]	34.8 [1.37]
OMR 250	176.5 [6.95]	43.5 [1.71]
OMR 315	187.5 [7.38]	54.8 [2.16]
OMR 375	197.7 [7.78]	64.8 [2.55]

C: Drain connection
$^{7}/_{16}$ - 20 UNF;
12 mm [0.47 in] deep
D: $^{7}/_{8}$ - 14 UNF;
17 mm [0.66 in] deep
E: M8; 13 mm [0.51 in] deep
(4-off)
F: $^{3}/_{8}$ - 16 UNC;
15 mm [0.59 in] deep
(4-off)



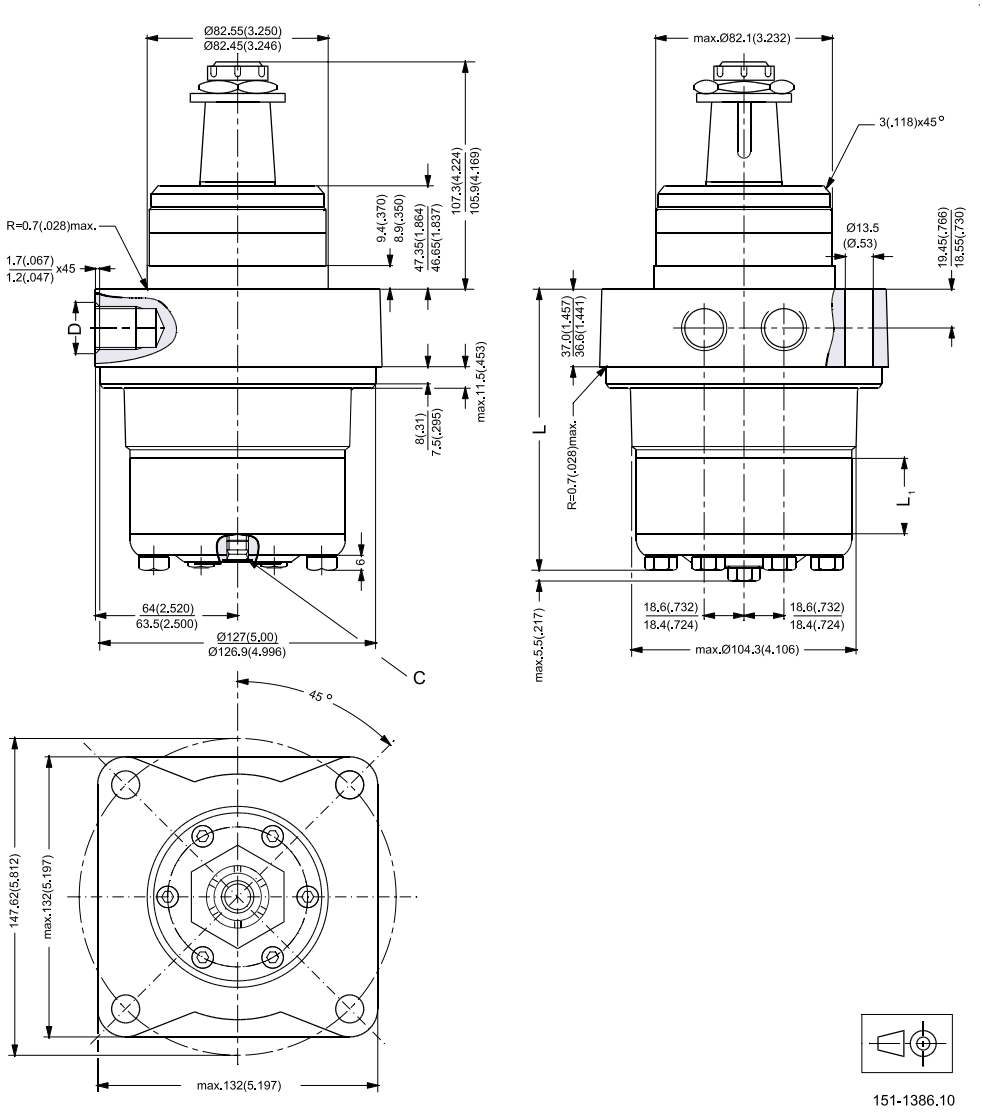
151-1220.10

DIMENSIONS

OMRW N wheel motor.

Type	L mm [in]	L_1 mm [in]
OMRW 50N	106.0 [4.17]	9.0 [0.35]
OMRW 80N	111.0 [4.37]	14.0 [0.55]
OMRW 100N	114.4 [4.50]	17.4 [0.69]
OMRW 125N	118.8 [4.68]	21.8 [0.86]
OMRW 160N	124.8 [4.91]	27.8 [1.09]
OMRW 200N	131.8 [5.19]	34.8 [1.37]
OMRW 250N	140.5 [5.53]	43.5 [1.71]
OMRW 315N	152.0 [5.98]	54.8 [2.16]
OMRW 375N	162.0 [6.38]	65.0 [2.56]

C: Drain connection
G 1/4; 12 mm [0.47 in] deep
D: G 1/2; 15 mm [0.59 in] deep



151-1386.10

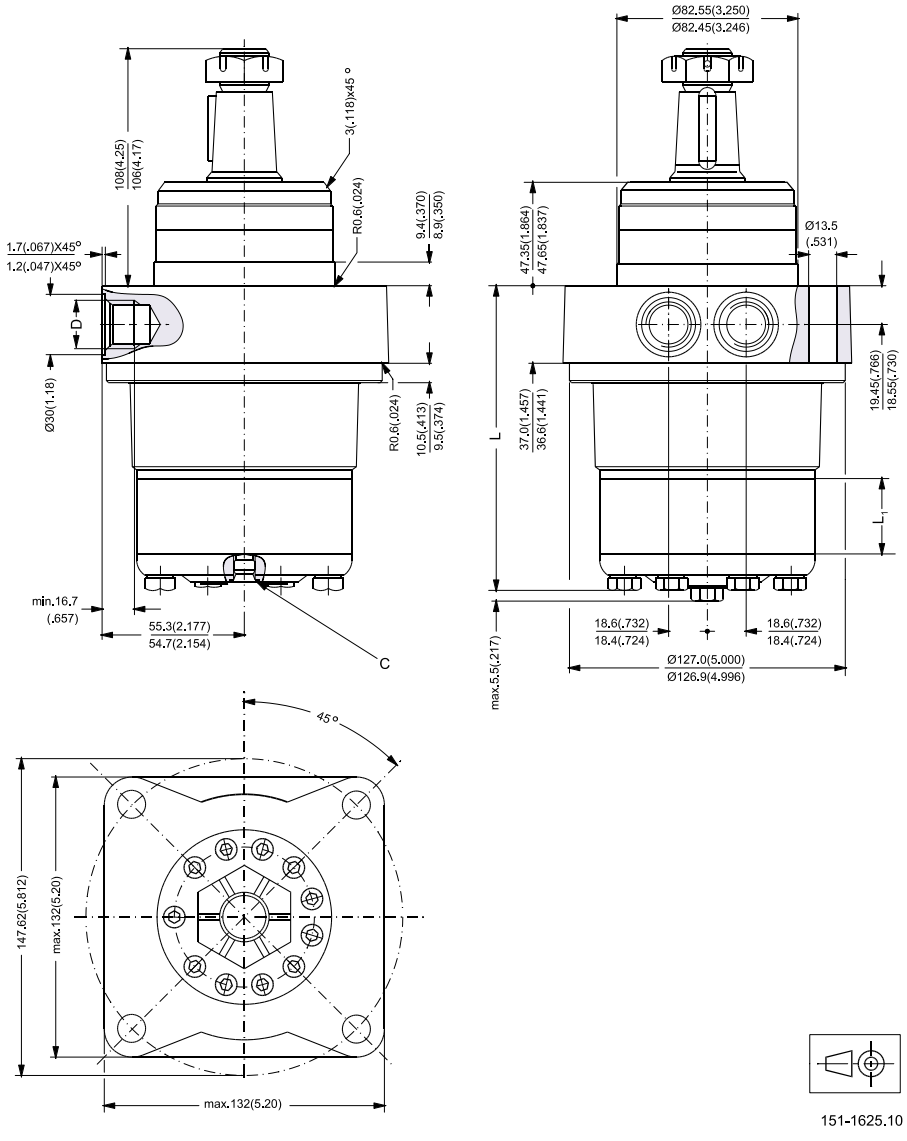
Dimensions – US version

DIMENSIONS

OMRW N wheel motor.

Type	L mm [in]	L_1 mm [in]
OMRW 50N	106.0 [4.17]	9.0 [0.35]
OMRW 80N	111.0 [4.37]	14.0 [0.55]
OMRW 100N	114.4 [4.50]	17.4 [0.69]
OMRW 125N	118.8 [4.68]	21.8 [0.86]
OMRW 160N	124.8 [4.91]	27.8 [1.09]
OMRW 200N	131.8 [5.19]	34.8 [1.37]
OMRW 250N	140.5 [5.53]	43.5 [1.71]
OMRW 315N	152.0 [5.98]	54.8 [2.16]
OMRW 375N	162.0 [6.38]	65.0 [2.56]

C: Drain connection
$^{7}/_{16}$ - 20 UNF
12 mm [0.47 in] deep
D: $^{7}/_{8}$ - 14 UNF
17 mm [0.66 in] deep



151-1625.10

VERSIONS

Mounting flange	Shaft	Port size	European version	US version	Side port version	End port version	Flange port version	Standard shaft seal	High pressure shaft seal	Drain connection	Check valve	Specials	Main type designation
4 hole oval flange (A4-flange)	Cyl. 32 mm	G 1/2	X		X			X		Yes	Yes		OMH
	Cyl. 35 mm	G 1/2	X		X			X		Yes	Yes		OMH
	Cyl. 1 1/4 in	7/8 - 14 UNF		X	X			X		Yes	Yes		OMH
	Splined 1 in SAE 6B	7/8 - 14 UNF		X	X			X		Yes	Yes		OMH
	Splined 1 1/4 in	G 1/2	X		X			X		Yes	Yes		OMH
	Splined 1 1/4 in	7/8 - 14 UNF		X	X			X		Yes	Yes		OMH
	Tapered 35 mm	G 1/2	X		X			X		Yes	Yes		OMH

Function diagram – see page : →

Features available (options) :
Painted

CODE NUMBERS

CODE NUMBERS	DISPLACEMENT [cm³]					Technical data – Page	Dimensions – Page
	200	250	315	400	500		
151H	1002	1003	1004	1005	1006	69	81
151H	1012	1013	1014	1015	1016	70	81
151H	1042	1043	1044	1045	1046	69	82
151H	1080	1082	1083	1084	1081	68	82
151H	1022	1023	1024	1025	1026	70	81
151H	1052	1053	1054	1055	1056	70	82
151H	-	-	1034	1035	1036	70	81
→	74	74	75	75	76		

Ordering
Add the four digit prefix "151H" to the four digit numbers from the chart for complete code number.

Example:
151H1044 for an OMH 315 with A4 flange, cyl. 1 1/4 in shaft, port size 7/8 - 14 UNF.

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

TECHNICAL DATA FOR OMH WITH 1 IN SAE 6 B SPLINED SHAFT

Type			OMH	OMH	OMH	OMH	OMH
Motor size			**200**	**250**	**315**	**400**	**500**
Geometric displacement	cm^3 [in^3]		201.3 [12.32]	252.0 [15.42]	314.9 [19.27]	396.8 [24.28]	470.6 [28.80]
Max. speed	min^{-1} [rpm]	cont.	370	295	235	185	155
		int.[1]	445	350	285	225	190
Max. torque	Nm [lbf·in]	cont.	340 [3000]	340 [3000]	340 [3000]	340 [3000]	340 [3000]
		int.[1]	510 [4500]	510 [4500]	540 [4800]	540 [4800]	520 [4600]
		peak[2]	610 [5400]	610 [5400]	610 [5400]	610 [5400]	610 [5400]
Max. output	kW [hp]	cont.	11.2 [15.0]	7.5 [10.0]	5.2 [7.0]	4.8 [6.5]	3.7 [5.0]
		int.[1]	17.2 [23.0]	11.9 [16.0]	9.7 [13.0]	8.2 [11.0]	6.0 [8.0]
Max. pressure drop	bar [psi]	cont.	115 [1650]	90 [1300]	75 [1100]	60 [900]	50 [725]
		int.[1]	170 [2500]	145 [2100]	120 [1750]	95 [1400]	75 [1100]
		peak[2]	215 [3120]	175 [2540]	145 [2100]	110 [1600]	90 [1300]
Max. oil flow	l/min [US gal/min]	cont.	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]
Max. starting pressure with unloaded shaft	bar [psi]		7 [100]	7 [100]	7 [100]	7 [100]	7 [100]
Min. starting torque	at max. press. drop cont. Nm [lbf·in]		255 [2250]	270 [2400]	280 [2500]	290 [2550]	300 [2650]
	at max. press. drop int.[1] Nm [lbf·in]		390 [3450]	435 [3850]	450 [4000]	450 [4000]	450 [4000]
Min. speed[3]	min^{-1} [rpm]		10	10	8	5	5

[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.

TECHNICAL DATA FOR OMH WITH 32 MM AND 1 1/4 IN CYLINDRICAL SHAFT

Type			OMH	OMH	OMH	OMH	OMH
Motor size			**200**	**250**	**315**	**400**	**500**
Geometric displacement	cm^3 [in^3]		201.3 [12.32]	252.0 [15.42]	314.9 [19.27]	396.8 [24.28]	470.6 [28.80]
Max. speed	min^{-1} [rpm]	cont.	370	295	235	185	155
		int.[1]	445	350	285	225	190
Max. torque	Nm [lbf·in]	cont.	510 [4510]	610 [5400]	590 [5220]	590 [5220]	580 [5130]
		int.[1]	580 [5130]	700 [6200]	670 [5930]	700 [6200]	680 [6020]
		peak[2]	640 [5660]	790 [6990]	840 [7440]	840 [7440]	840 [7440]
Max. output	kW [hp]	cont.	16.0 [21.5]	16.0 [21.5]	12.5 [16.8]	10.0 [13.4]	8.5 [11.4]
		int.[1]	18.5 [24.8]	18.5 [24.8]	14.0 [18.8]	12.0 [16.1]	10.0 [13.4]
Max. pressure drop	bar [psi]	cont.	175 [2540]	175 [2540]	135 [1960]	105 [1520]	85 [1230]
		int.[1]	200 [2900]	200 [2900]	155 [2250]	125 [1810]	100 [1450]
		peak[2]	225 [3260]	225 [3260]	190 [2760]	155 [2250]	130 [1890]
Max. oil flow	l/min [US gal/min]	cont.	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]
Max. starting pressure with unloaded shaft	bar [psi]		5 [75]	5 [75]	5 [75]	5 [75]	5 [75]
Min. starting torque	at max. press. drop cont. Nm [lbf·in]		390 [3450]	520 [4600]	510 [4510]	490 [4340]	490 [4340]
	at max. press. drop int.[1] Nm [lbf·in]		450 [3980]	590 [5220]	590 [5220]	600 [5310]	600 [5310]
Min. speed[3]	min^{-1} [rpm]		10	10	8	5	5

[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.

TECHNICAL DATA FOR OMH WITH 35 MM CYLINDRICAL, 1 1/4 IN SPLINED AND 35 MM TAPERED SHAFT

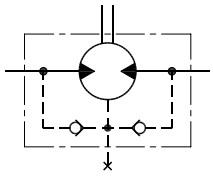
Type			OMH	OMH	OMH	OMH	OMH
Motor size			**200**	**250**	**315**	**400**	**500**
Geometric displacement	cm^3 [in^3]		201.3 [12.32]	252.0 [15.42]	314.9 [19.27]	396.8 [24.28]	470.6 [28.80]
Max. speed	min^{-1} [rpm]	cont.	370	295	235	185	155
		int.[1]	445	350	285	225	190
Max. torque	Nm [lbf·in]	cont.	510 [4510]	610 [5400]	740 [6550]	840 [7440]	820 [7260]
		int.[1]	580 [5130]	700 [6200]	820 [7260]	980 [8670]	1040 [9210]
		peak[2]	640 [5660]	790 [6990]	980 [8670]	1090 [9650]	1170 [10360]
Max. output	kW [hp]	cont.	16.0 [21.5]	16.0 [21.5]	14.0 [18.8]	12.5 [16.8]	11.0 [14.8]
		int.[1]	18.5 [24.8]	18.5 [24.8]	15.5 [20.8]	15.0 [20.1]	14.0 [18.8]
Max. pressure drop	bar [psi]	cont.	175 [2540]	175 [2540]	175 [2540]	155 [2250]	125 [1810]
		int.[1]	200 [2900]	200 [2900]	200 [2900]	190 [2760]	160 [2320]
		peak[2]	225 [3260]	225 [3260]	225 [3260]	210 [3050]	180 2610]
Max. oil flow	l/min [US gal/min]	cont.	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]
Max. starting pressure with unloaded shaft	bar [psi]		5 [75]	5 [75]	5 [75]	5 [75]	5 [75]
Min. starting torque	at max. press. drop cont. Nm [lbf·in]		390 [3450]	520 [4600]	660 [5840	720 [6370]	720 [6370]
	at max. press. drop int.[1] Nm [lbf·in]		450 [3980]	590 [5220]	730 [6460]	880 [7790]	880 [7790]
Min. speed[3]	min^{-1} [rpm]		10	10	8	5	5

Type			Max. inlet pressure	Max. return pressure with drain line
OMH 200 - 500	bar [psi]	cont.	200 [2900]	175 [2540]
	bar [psi]	int.[1]	225 [3260]	200 [2900]
	bar [psi]	peak[2]	250 [3630]	225 [3260]

[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

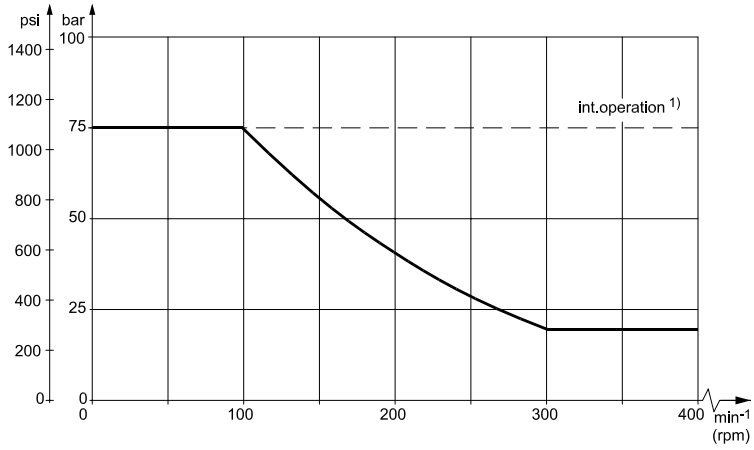
OMH with standard shaft seal, check valves and <u>without</u> use of drain connection:
The pressure on the shaft seal never exceeds the pressure in the return line



151-320.10

OMH with standard shaft seal, check valves and <u>with</u> drain connection:
The shaft seal pressure equals the pressure on the drain line.

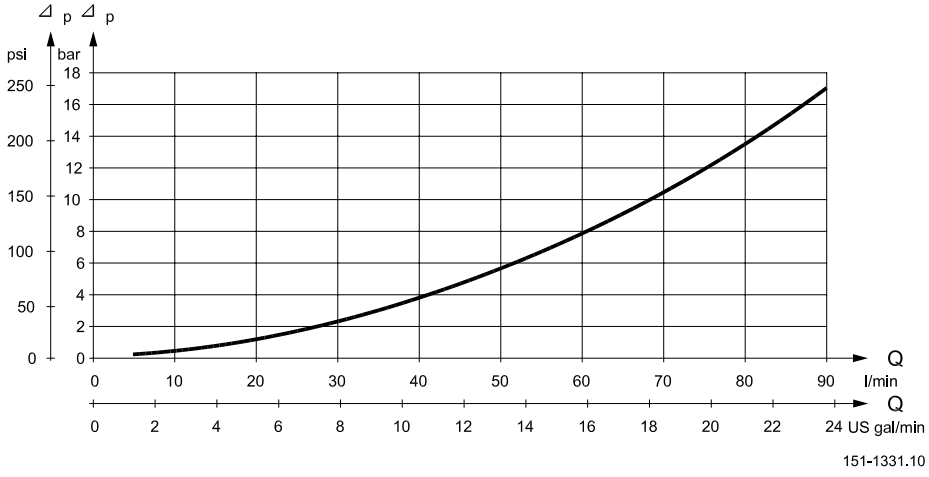
Max. return pressure without drain line or max. pressure in the drain line



151-1565.10

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

PRESSURE DROP IN MOTOR



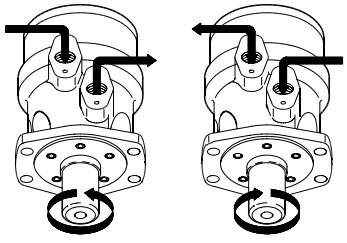
The curve applies to an unloaded motor shaft and an oil viscosity of 35 mm²/s [165 SUS]

OIL FLOW IN DRAIN LINE

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

Pressure drop bar [psi]	Viscosity mm²/s [SUS]	Oil flow in drain line 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]

DIRECTION OF SHAFT ROTATION



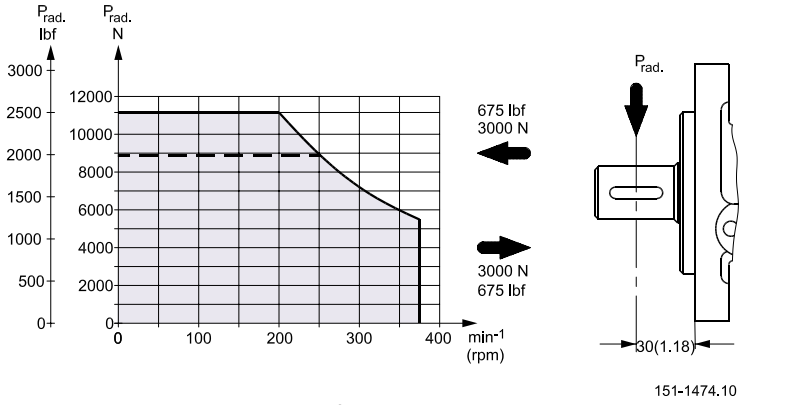
PERMISSIBLE SHAFT LOADS FOR OMH

The permissible shaft load (P_{rad}) is calculated from the speed (n) and the distance (l) between the point of load application and the mounting flange.

$$P_{rad} = \frac{1100}{n} \times \frac{250000}{103.5 + l} \quad N^*;\ l \text{ in mm}$$

$$P_{rad} = \frac{1100}{n} \times \frac{2215}{4.07 + l} \quad lbf^*;\ l \text{ in inch}$$

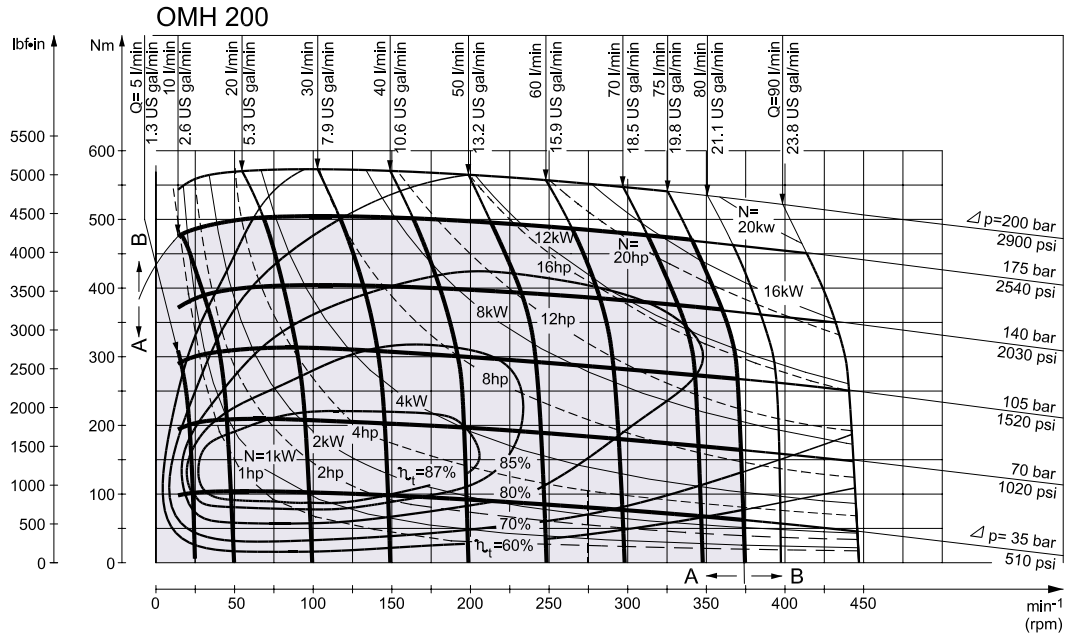
* $n \geq 200\ min^{-1}$ (rpm); $l \leq 60$ mm [2.36 in]
$n < 200\ min^{-1}$ (rpm); => P_{Rmax} = 11000 N [2475 lbf]

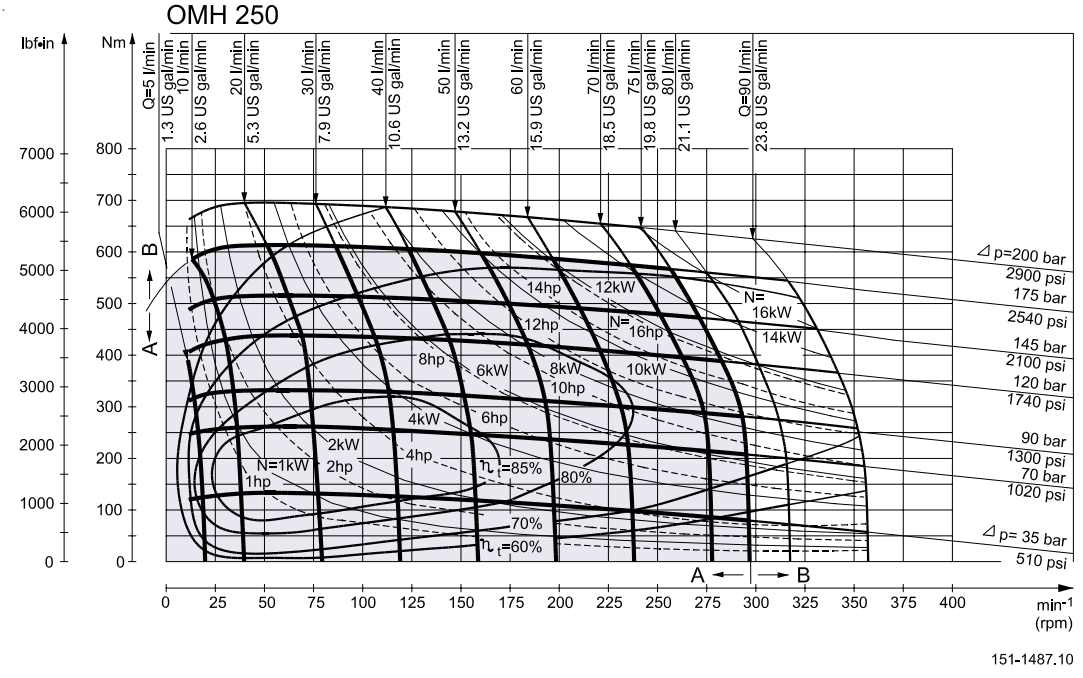


--------- 1 in SAE 6B splined shaft

The drawing shows the permissible radial load when l = 30 mm [1.18 in].

FUNCTION DIAGRAMS





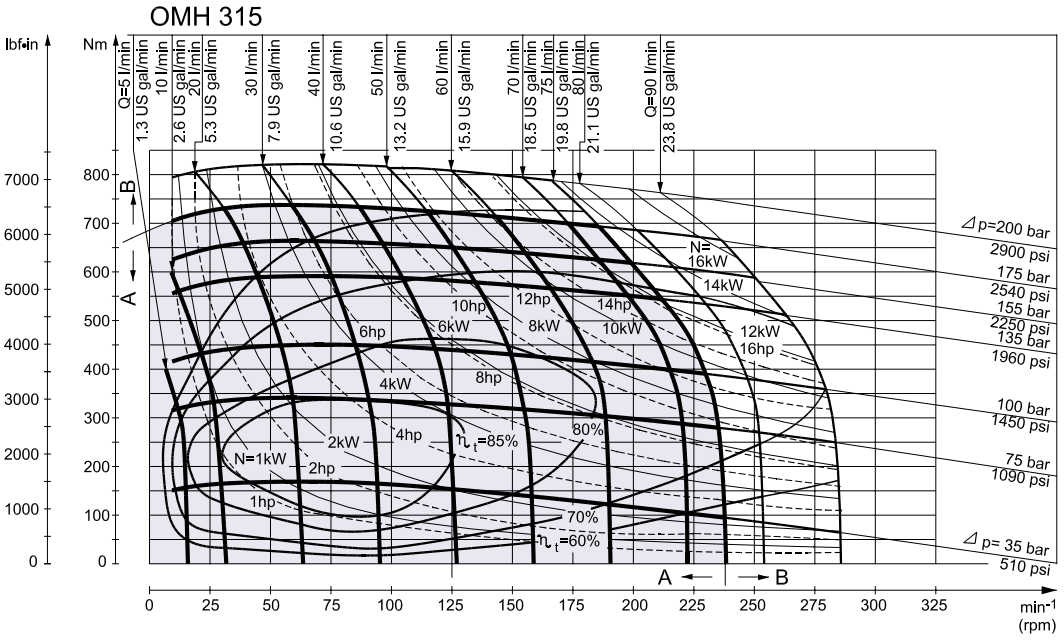
Explanation of function diagram use, basis and conditions can be found on page 7.

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

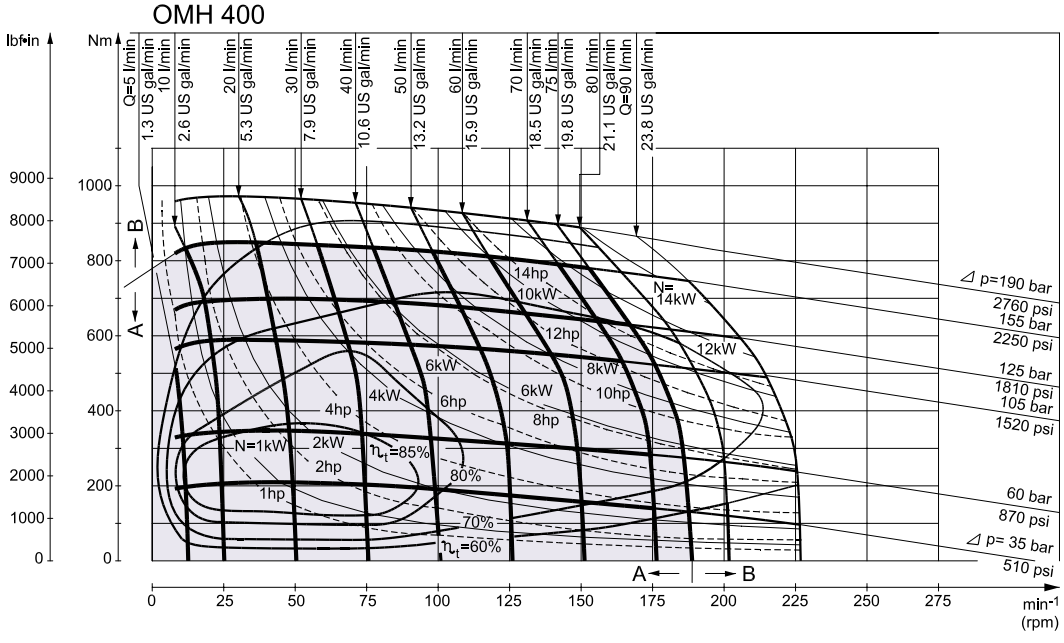
Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 68-70.

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

FUNCTION DIAGRAMS



151-1488.10



151-1489.10

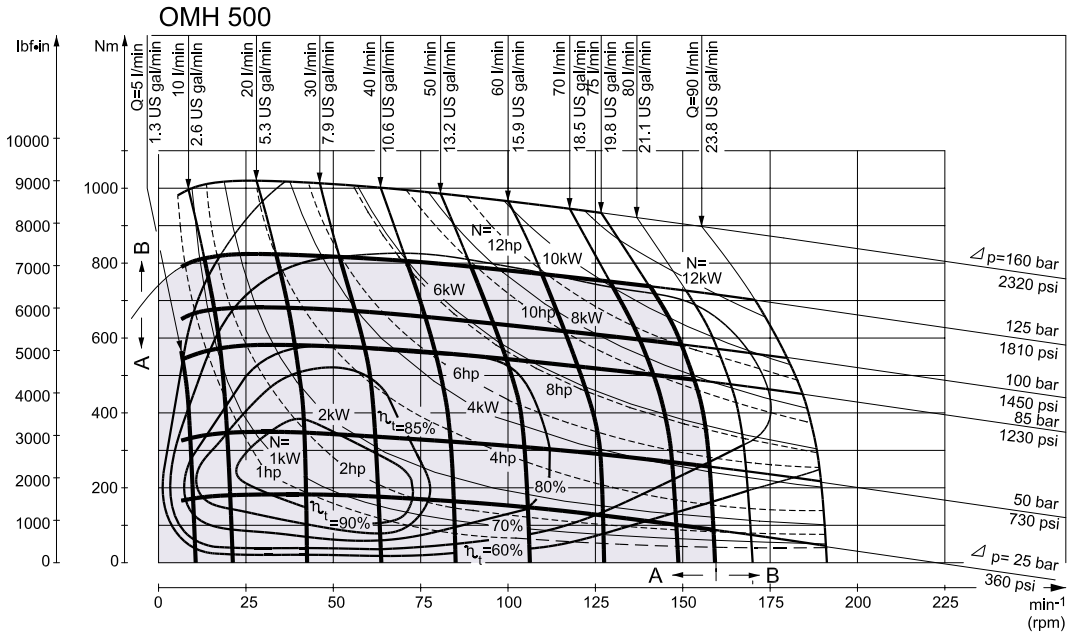
Explanation of function diagram use, basis and conditions can be found on page 7.

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

Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 68-70.

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

FUNCTION DIAGRAMS



Explanation of function diagram use, basis and conditions can be found on page 7.

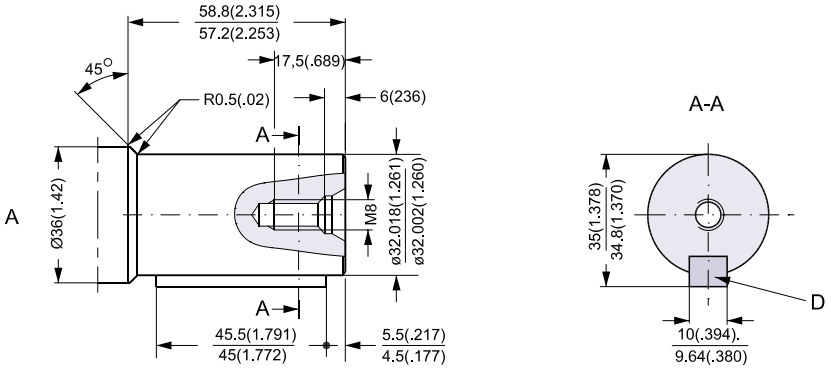
- A: Continuous range
- B: Intermittent range (max. 10% operation every minute)

Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 68-70.

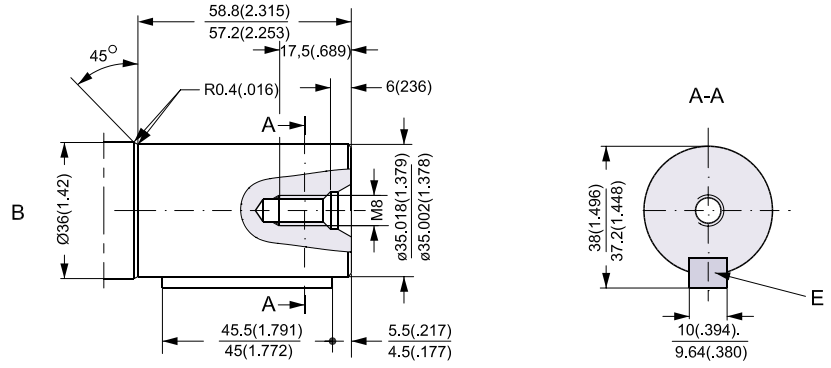
Note: Intermittent pressure drop and oil flow must not occur simultaneously.

SHAFT VERSION

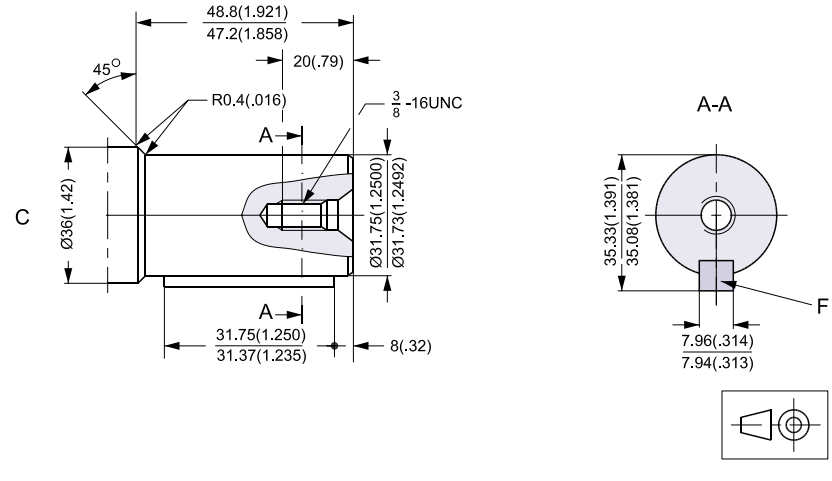
A: Cylindrical shaft
32 mm
D: Parallel key
A10 × 8 × 45
DIN 6885



B: Cylindrical shaft
35 mm
E: Parallel key
A10 × 8 × 45
DIN 6885



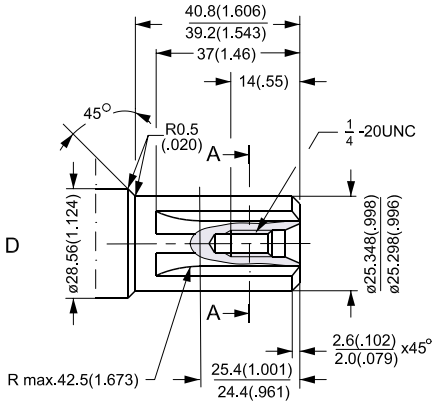
US version
C: Cylindrical shaft
1 1/4 in
F: Parallel key
5/16 × 5/16 × 1 1/4 in
SAE J 744

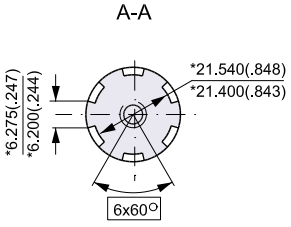


SHAFT VERSION

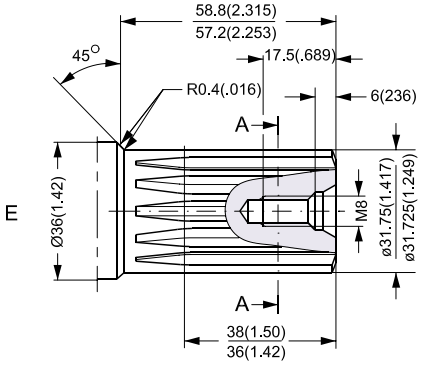
D: Splined shaft
SAE 6 B (B.S. 2059)
Straight-sided,
bottom fitting, deep.
Fit 2
Nom. size 1 in

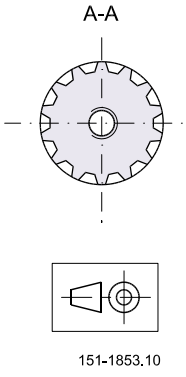
*Deviates from
SAE 6 B (B.S. 2059)





E. Involute splined shaft
ANS B92.1 - 1980 standard
Flat root side fit
Pitch 12/24
Teeth 14
Major dia. 1.25 in
Pressure angle 30°



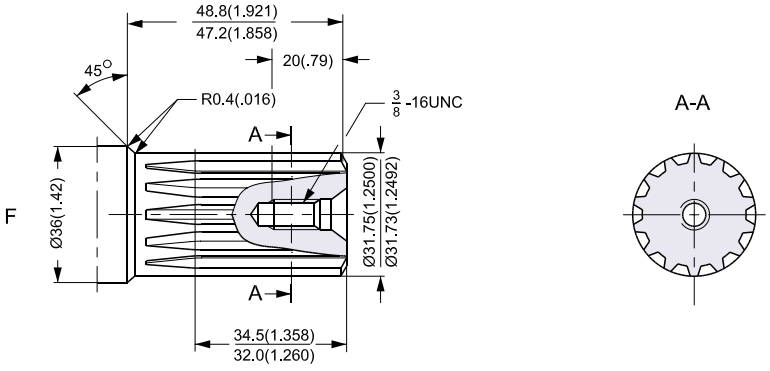


151-1853.10

SHAFT VERSION

US version

F. Involute splined shaft
ANS B92.1 - 1970 standard
Flat root side fit
Pitch 12/24
Teeth 14
Major dia. 1.25 in
Pressure angle 30°

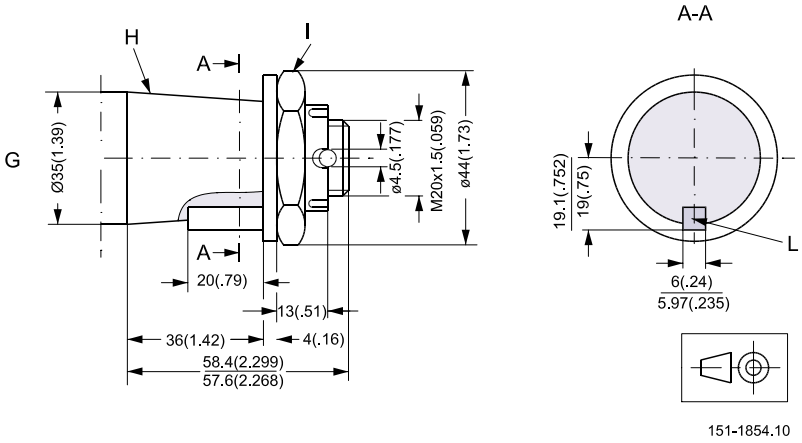


G: Tapered shaft 35 mm
(ISO/R775)

I: DIN 937
NV 410
Tightening torque:
200 ± 10 Nm [1770 ±85 lbf·in]

H: Taper 1:10

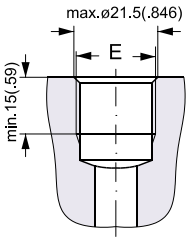
L: Parallel key
B6 × 6 × 20
DIN 6885



151-1854.10

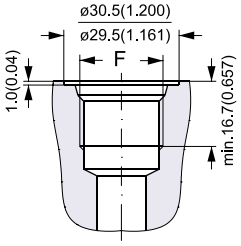
PORT THREAD VERSIONS

A



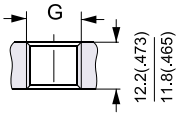
A: G main ports
E: ISO 228/1 - G1/2

B



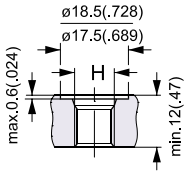
B: UNF main ports
F: 7/8 - 14 UNF
O-ring boss port

C



C: G drain port
G: ISO 228/1 - G1/4

D



151-1858.10

D: UNF drain port
H: 7/16 - 20 UNF
O-ring boss port

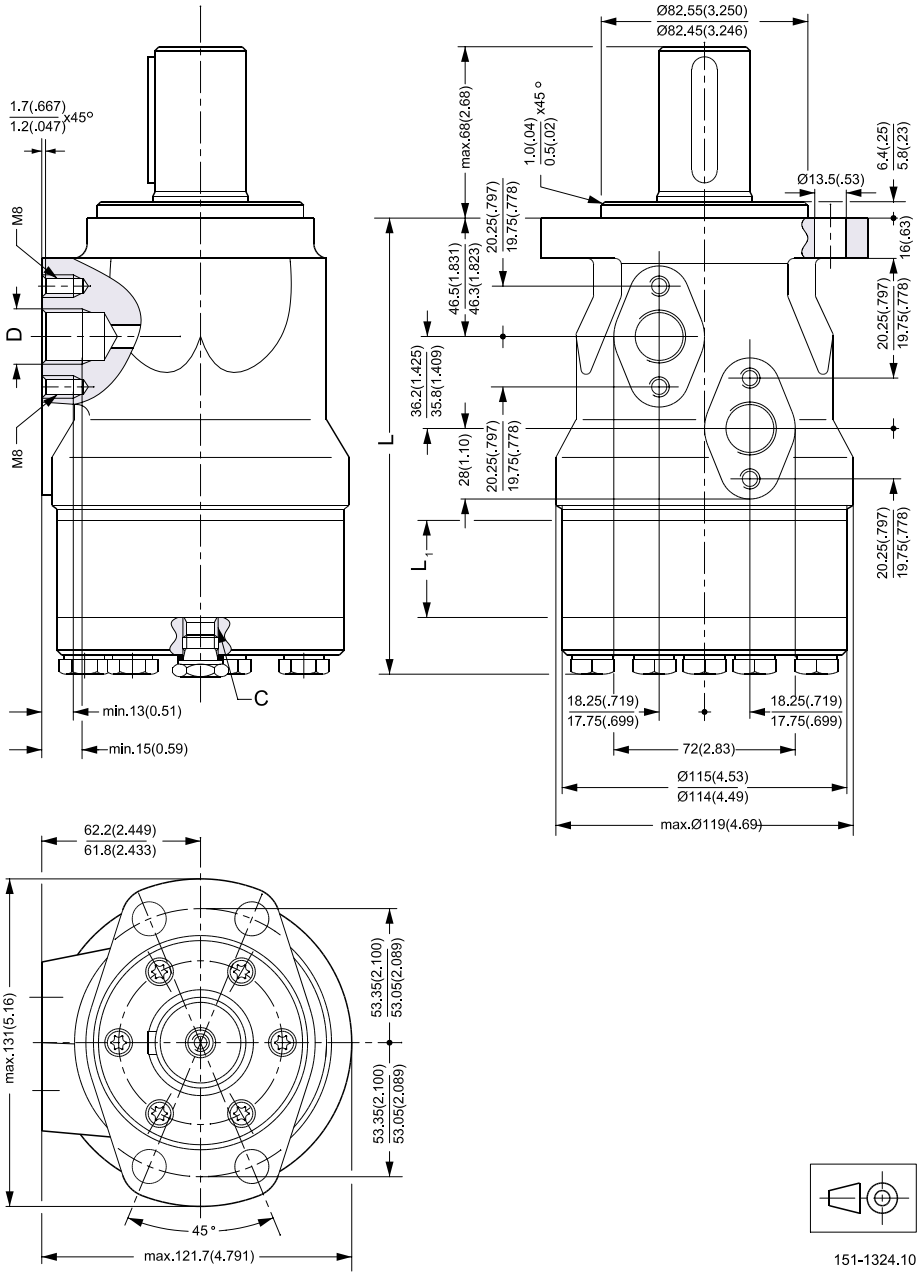
Dimensions – European version

DIMENSIONS

Side port version with 4 hole oval mounting flange (A4-flange).

Type	L mm [in]	L_1 mm [in]
OMH 200	170.1 [6.70]	27.8 [1.09]
OMH 250	177.1 [6.97]	34.8 [1.37]
OMH 315	185.8 [7.31]	43.5 [1.71]
OMH 400	197.1 [7.76]	54.8 [2.16]
OMH 500	207.3 [8.16]	65.0 [2.56]

C: Drain connection
G ¼; 12 mm [0.47 in] deep
D: G ½; 15 mm [0.59 in] deep



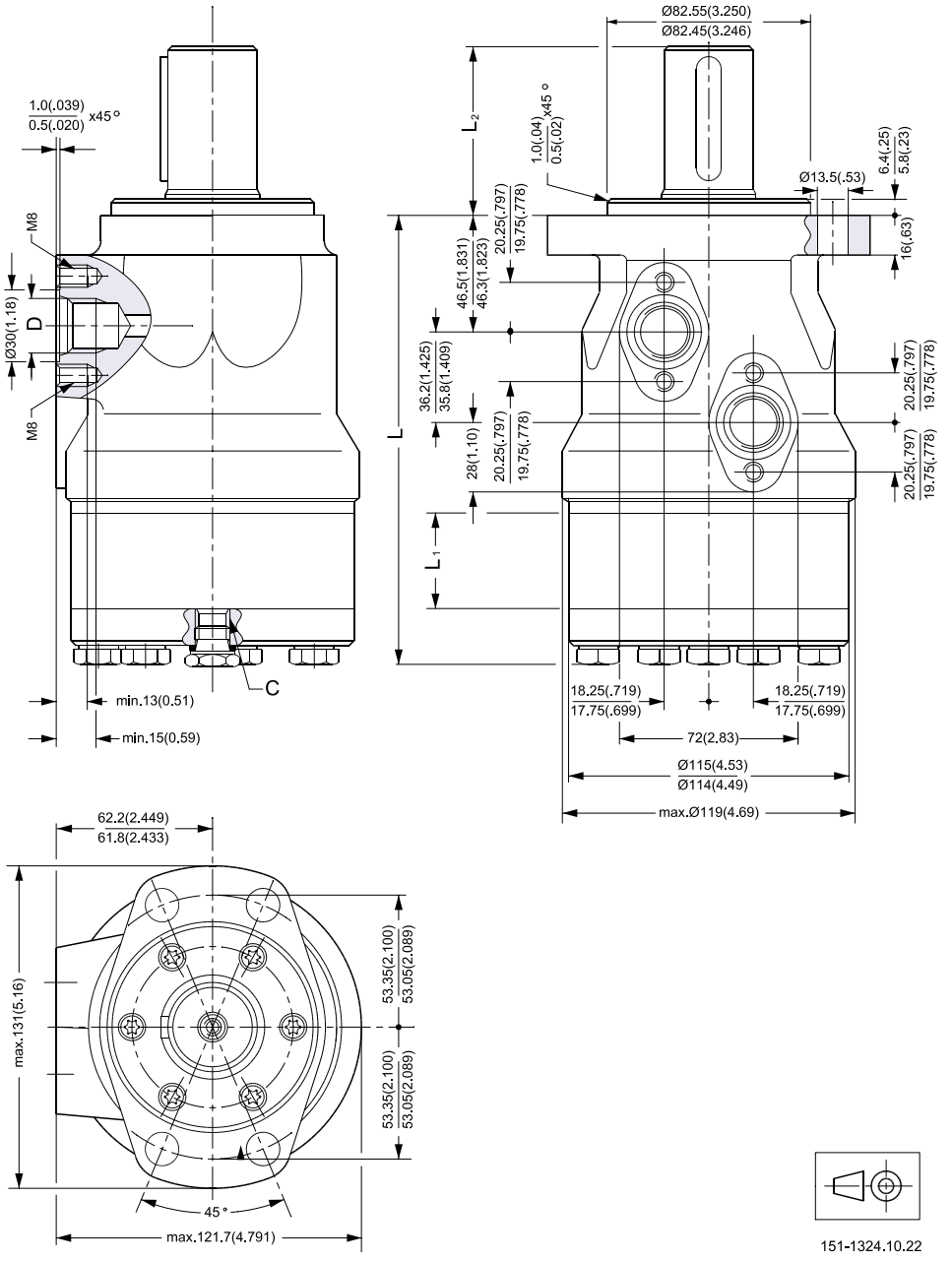
DIMENSIONS

Side port version with 4 hole oval mounting flange (A4 flange).

Output shaft max.	L_2 mm [in]
Splined shaft 1 in	50.5 [1.99]
Other shaft versions	58.0 [2.28]

Type	L mm [in]	L_1 mm [in]
OMH 200	170.1 [6.70]	27.8 [1.09]
OMH 250	177.1 [6.97]	34.8 [1.37]
OMH 315	185.8 [7.31]	43.5 [1.71]
OMH 400	197.1 [7.76]	54.8 [2.16]
OMH 500	207.3 [8.16]	65.0 [2.56]

C: Drain connection
$^{7}/_{16}$ - 20 UNF;
12 mm [0.47 in] deep
D: $^{7}/_{8}$ - 14 UNF;
15 mm [0.59 in] deep



NOTES

VERSIONS

Mounting flange	Shaft	Port size	European version	US version	Clockwise shaft rotation (CW version)[1]	Counter clockwise shaft rotation (CCW version)[1]	Flange port version	Standard shaft seal	High pressure shaft seal	Drain connection	Check valve	Specials	Main type designation
Wheel	Tapered 35 mm	G 1/2	X		X		X		X	No	No		OMEW
	Tapered 35 mm	G 1/2	X			X	X		X	No	No		OMEW
	Tapered 1 1/4 in	7/8 - 14 UNF		X	X		X		X	No	No		OMEW
	Tapered 1 1/4 in	7/8 - 14 UNF		X		X	X		X	No	No		OMEW

Function diagram – see page : →

1) *Direction of rotation*
In the application mainly involves operation in one direction, we therefore recommend a corresponding motor with either CW- or CCW-rotation.
High pressure seals
Since all OMEW motors are fited with a high-pressure shaft seal, there is no need for a drain line.

Features available (options) :
Painted

CODE NUMBERS

CODE NUMBERS	DISPLACEMENT [cm³]						Technical data – Page	Dimensions – Page
	100	125	160	200	250	315		
151H	2002	2003	2004	2005	2006	2007	86	95
151H	2011	2012	2013	2014	2015	2016	86	95
151H	3002	3003	3004	3005	3006	3007	86	96
151H	3011	3012	3013	3014	3015	3016	86	96
→	90	90	91	91	92	92		

Ordering
Add the four digit prefix "151H" to the four digit numbers from the chart for complete code number.

Example:
151H2015 for an OMEW 250 with 35 mm tapered shaft, port size G 1/2 and counter clockwise rotation (CCW).

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

TECHNICAL DATA FOR OMEW WITH 35 MM AND 1 1/4 IN TAPERED SHAFT

Type			OMEW	OMEW	OMEW	OMEW	OMEW	OMEW
Motor size			**100**	**125**	**160**	**200**	**250**	**315**
Geometric displacement	cm^3 [in^3]		99.8 [6.11]	124.1 [7.60]	155.4 [9.51]	198.2 [12.13]	248.1 [15.18]	310.1 [18.98]
Max. speed	min^{-1} [rpm]	cont.	600	475	375	300	240	190
		int.[1]	750	695	470	375	300	240
Max. torque	Nm [lbf·in]	cont.	250 [2210]	320 [2830]	410 [3630]	470 [4160]	510 [4510]	520 [4600]
		int.[1]	270 [2390]	340 [3010]	430 [3810]	510 [4510]	570 [5040]	640 [5660]
		peak[2]	290 [2570]	360 [3190]	460 [4070]	570 [5040]	640 [5660]	740 [6550]
Max. output	kW [hp]	cont.	12.0 [16.1]	12.0 [16.1]	12.0 [16.1]	11.0 [14.8]	10.0 [13.4]	8.0 [10.7]
		int.[1]	15.0 [20.1]	15.0 [20.1]	15.0 [20.1]	14.0 [18.8]	12.0 [16.1]	10.0 [13.4]
Max. pressure drop	bar [psi]	cont.	200 [2900]	200 [2900]	200 [2900]	185 [2680]	160 [2320]	130 [1890]
		int.[1]	210 [3050]	210 [3050]	210 [3050]	200 [2900]	180 [2610]	160 [2320]
		peak[2]	225 [3260]	225 [3260]	225 [3260]	225 [3260]	200 [2900]	185 [2680]
Max. oil flow	l/min [US gal/min]	cont.	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]	60 [15.9]
		int.[1]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]
Max. starting pressure with unloaded shaft	bar [psi]		10 [145]	7 [100]	7 [100]	7 [100]	7 [100]	7 [100]
Min. starting torque	at max. press. drop cont. Nm [lbf·in]		230 [2040]	290 [2570]	360 [3190]	420 [3720]	460 [4070]	470 [4160]
	at max. press. drop int.[1] Nm [lbf·in]		240 [2120]	300 [2660]	380 [3360]	460 [4070]	520 [4600]	570 [5040]
Min. speed[3]	min^{-1} [rpm]		10	9	7	5	5	5

Type			Max. inlet pressure	Max. return pressure
OMEW 100 - 315	bar [psi]	cont.	200 [2900]	200 [2900]
	bar [psi]	int.[1]	210 [3050]	210 [3050]
	bar [psi]	peak[2]	225 [3260]	225 [3260]

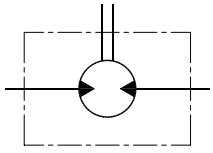
[1] Intermittent operation: the permissible values may occur for max. 10% of every minute.
[2] Peak load: the permissible values may occur for max. 1% of every minute.
[3] Operation at lower speeds may be slightly less smooth.

MAX. PERMISSIBLE SHAFT SEAL PRESSURE

OMEW with high pressure shaft seal

CW version (clockwise rotation)

1) By clockwise rotation:
   The shaft seal pressure equals the return pressure.
2) By counter clockwise rotation:
   The shaft seal pressure equals the input pressure

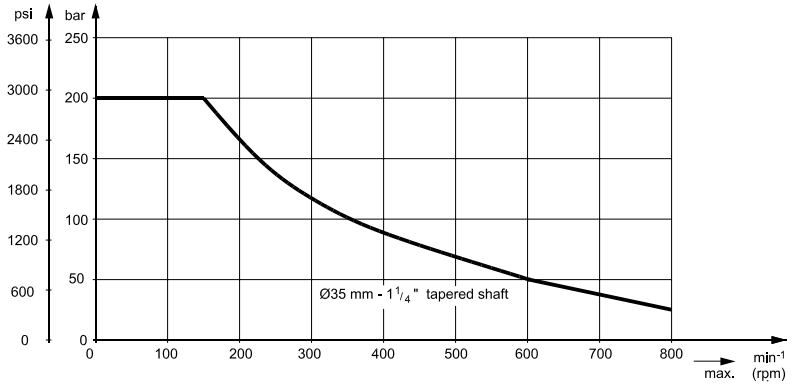


151-1743.10

CCW version (counter clockwise rotation)

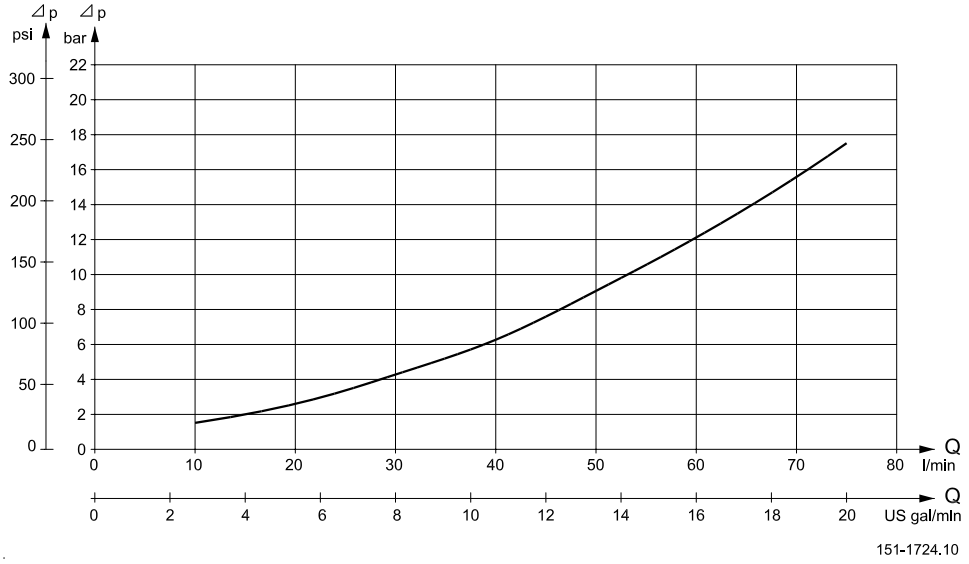
1) By counter clockwise rotation:
   The shaft seal pressure equals the return pressure.
2) By clockwise rotation:
   The shaft seal prressure equals the input pressure

Max. permissible shaft seal pressure



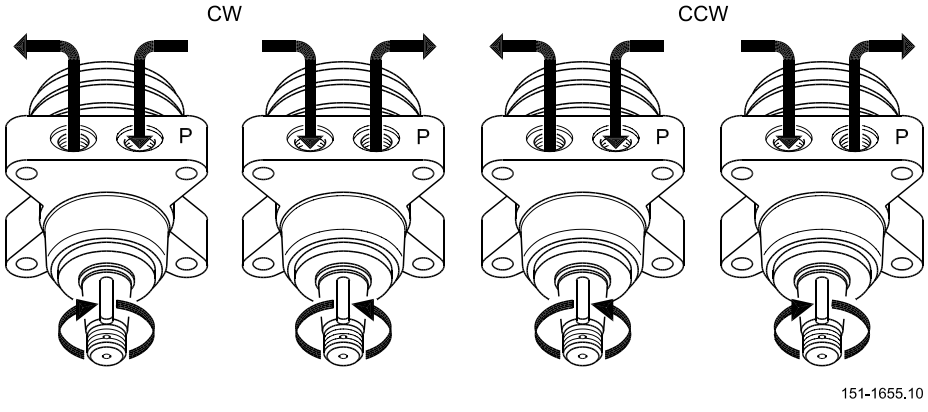
151-1861.10

PRESSURE DROP IN MOTOR



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

DIRECTION OF SHAFT ROTATION



PERMISSIBLE SHAFT LOADS FOR OMEW

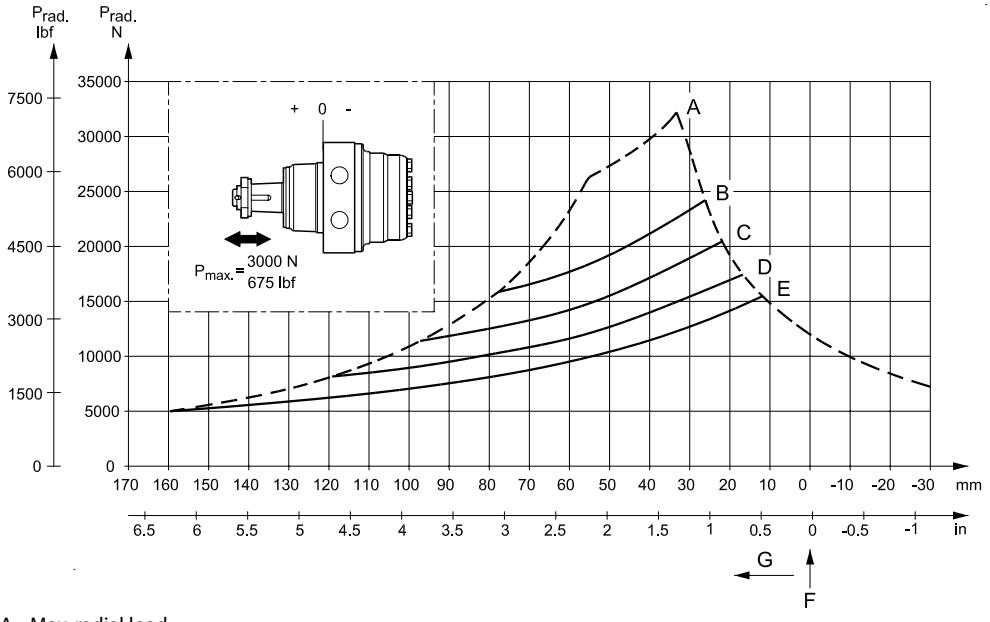
As the OMEW output shaft is embedded in needle bearings and the mounting flange is recessed it is possible to fit a wheel hub direct onto the shaft so that the radial load acts midway between the needle bearings.

Based upon the requested max. speed and the point of action of the radial load the permissible shaft load can be read from the curved shown below.

Curve A shows the max. radial load. If the radial load exceeds these values there is a potential risk of breaksown.

The other curves apply to a B10 bearing life of 2000 hours at the indicated speed when applying a hydraulic mineral oil with an adequate content of anti-wear additives.

The longevity can also be calculated by means of the "Bearing dimensions" instructions in the technical information »General« DKMH.PK.100.G2.02 520L0232.

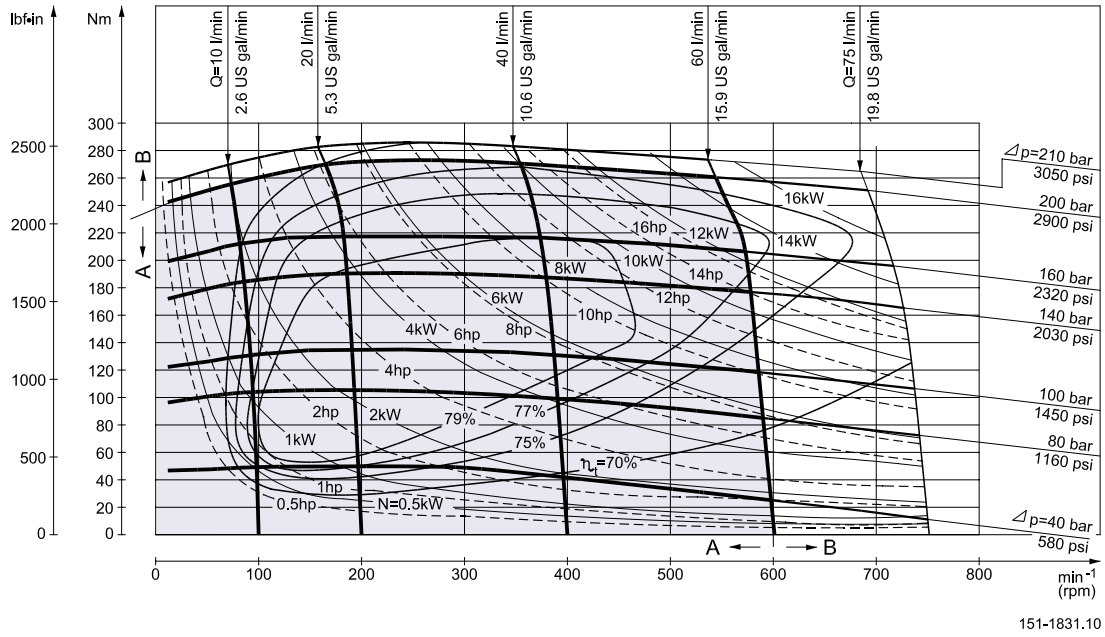


151-1725.10

A: Max. radial load
B: n = 50 min^{-1} (rpm)
C: n = 100 min^{-1} (rpm)
D: n = 200 min^{-1} (rpm)
E: n = 400 min^{-1} (rpm)
F: Front flange
G: Direction toward shaft

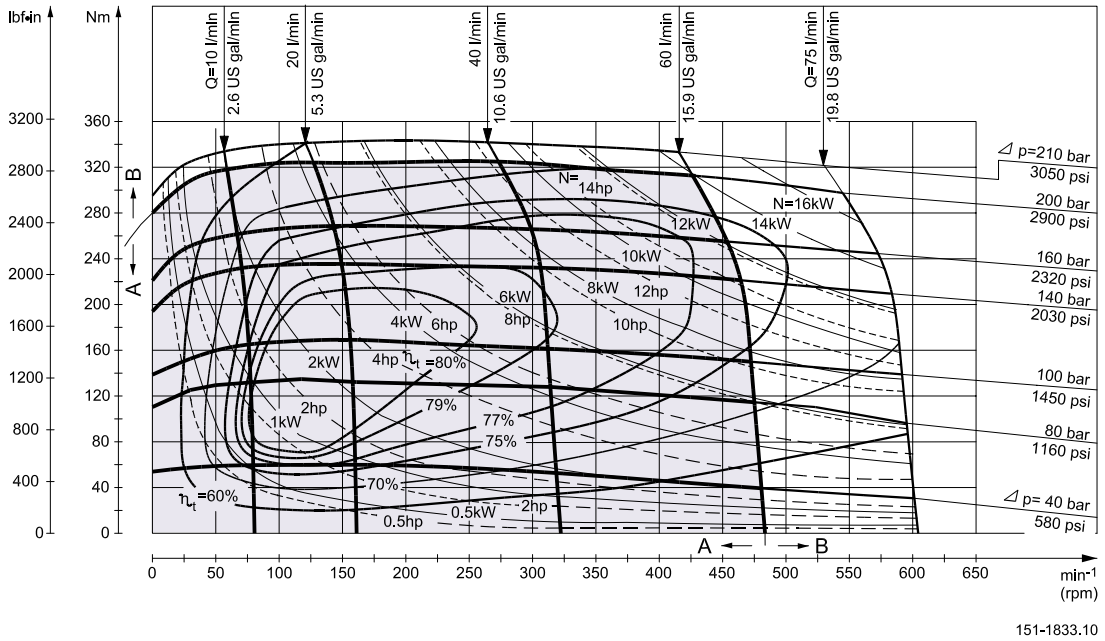
FUNCTION DIAGRAMS

OMEW 100



151-1831.10

OMEW 125



151-1833.10

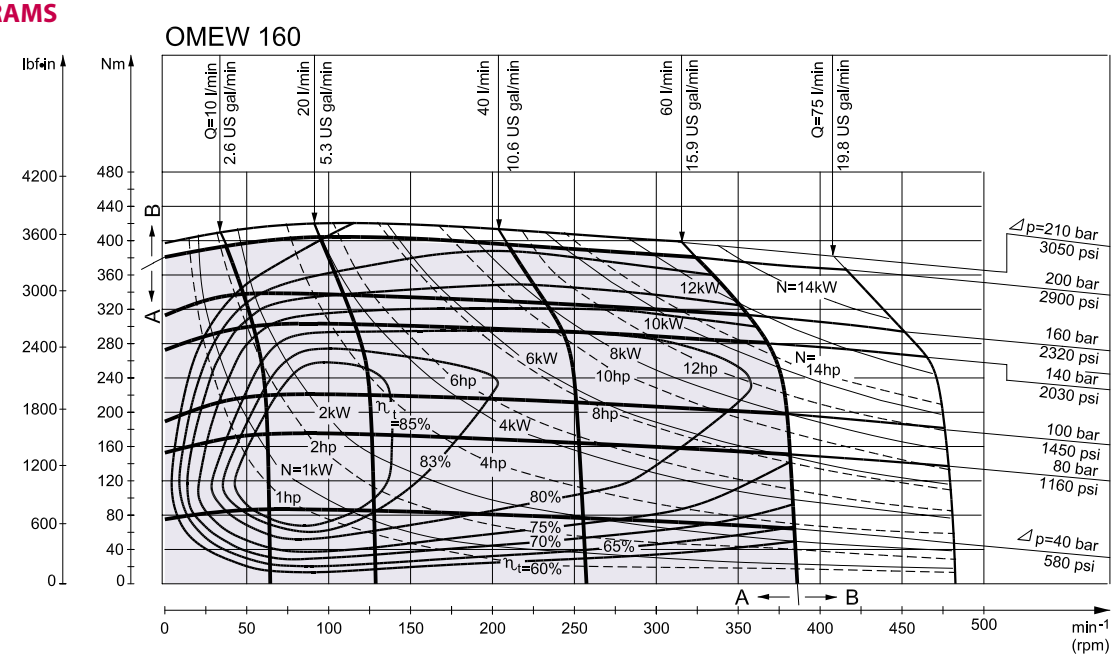
Explanation of function diagram use, basis and conditions can be found on page 7.

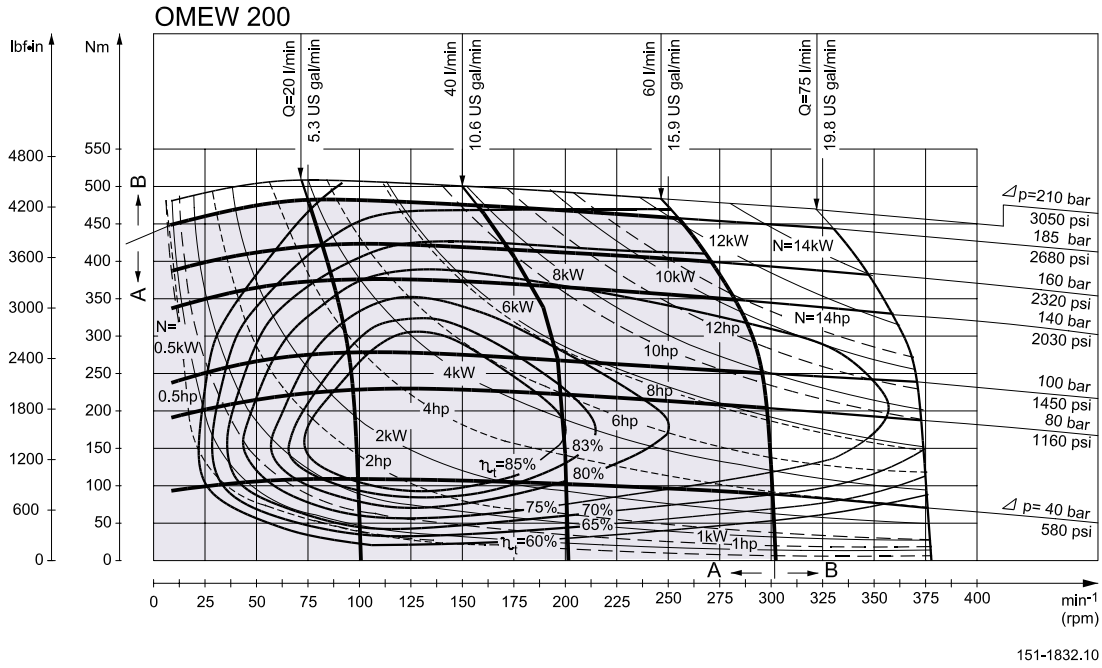
- A: Continuous range
- B: Intermittent range (max. 10% operation every minute)

Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 86.

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

FUNCTION DIAGRAMS





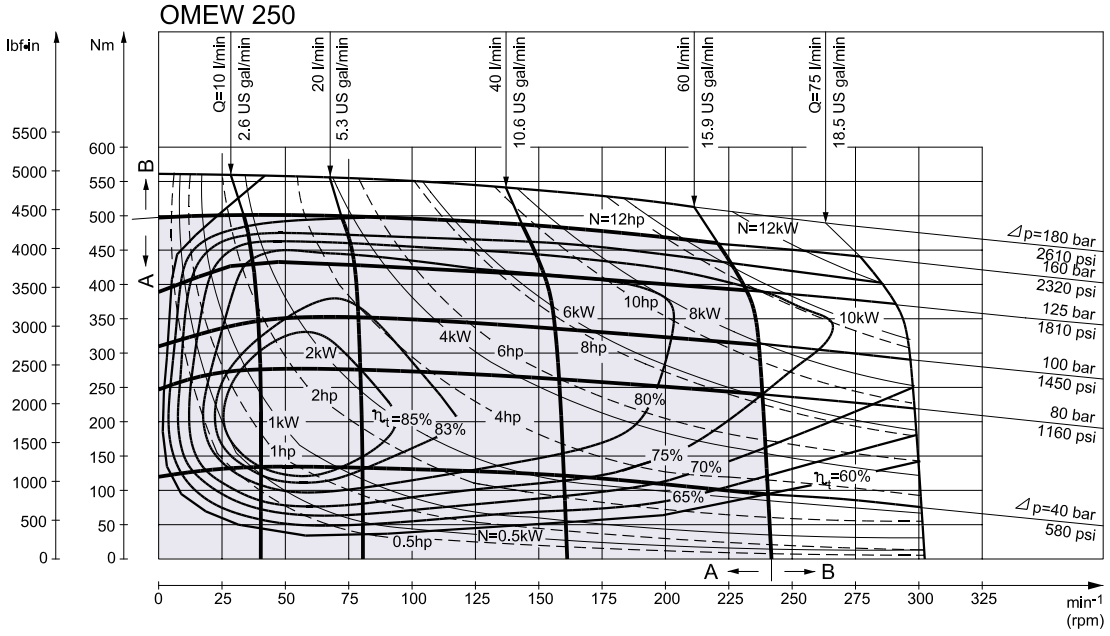
Explanation of function diagram use, basis and conditions can be found on page 7.

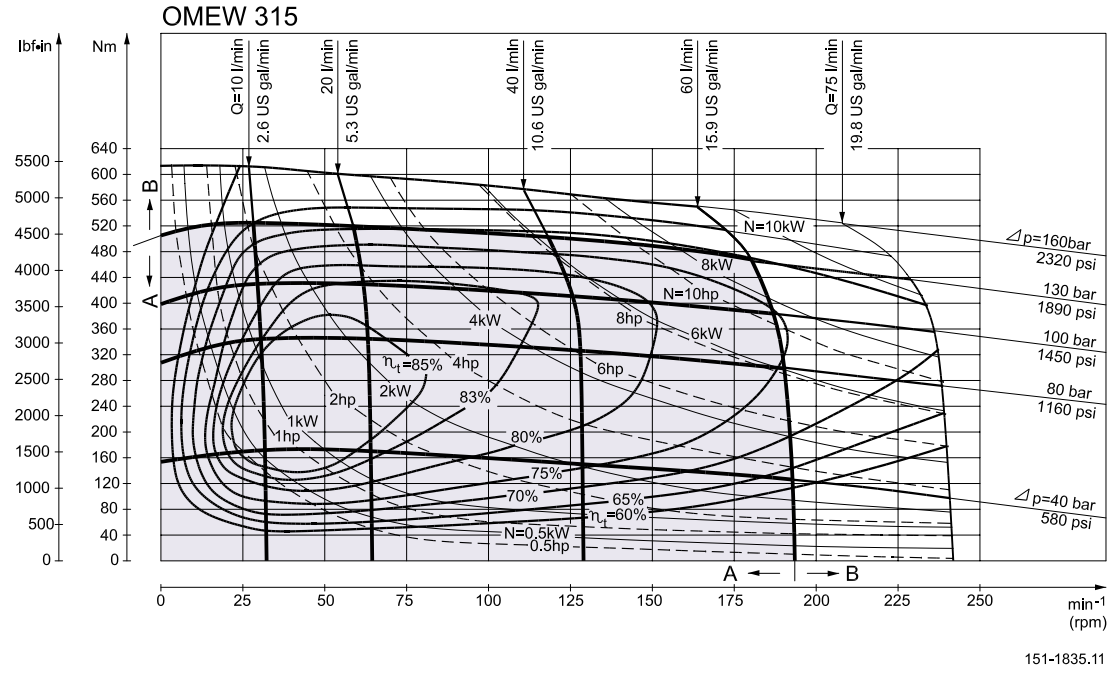
- A: Continuous range
- B: Intermittent range (max. 10% operation every minute)

Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 86.

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

FUNCTION DIAGRAMS





Explanation of function diagram use, basis and conditions can be found on page 7.

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

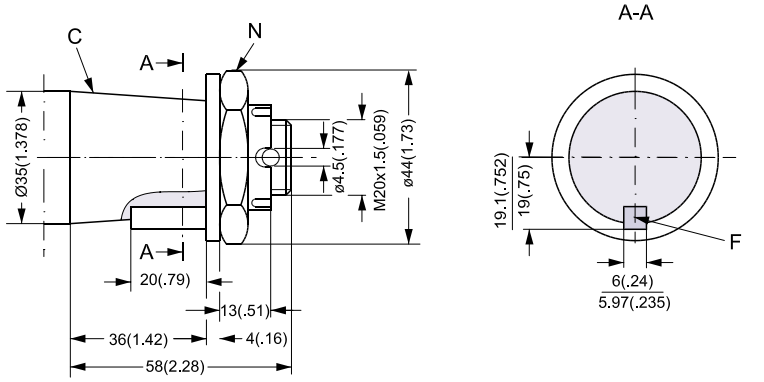
Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 86.

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

SHAFT VERSION

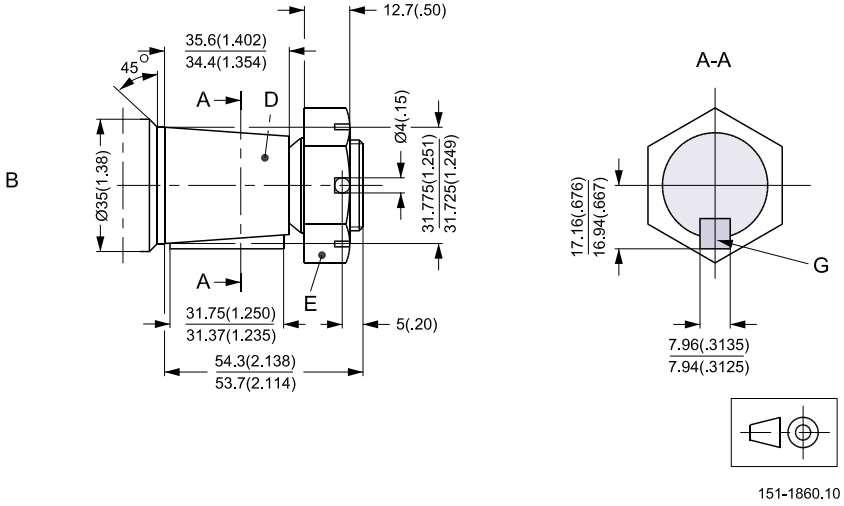
A: Tapered shaft 35 mm
(ISO/R775)
N: DIN 937
NV 41
Tightening torque:
200 ± 10 Nm [1770 ±85 lbf·in]
C: Taper 1:10
F: Parallel key
B6 × 6 × 20
DIN 6885

A



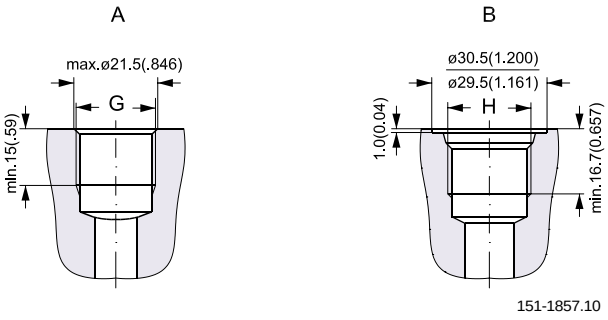
B: Tapered shaft 1 1/4 in
D: Cone 1:8
SAE J501
E: 1 - 20 UNEF
Across flats 1 7/16
Tightening torque:
200 ± 10 Nm [1770 ±85 lbf·in]
G: Parallel key
5/16 × 5/16 × 1 1/4
SAE J501

B



151-1860.10

PORT THREAD VERSIONS



A: G main ports
G: ISO 228/1 - G1/2

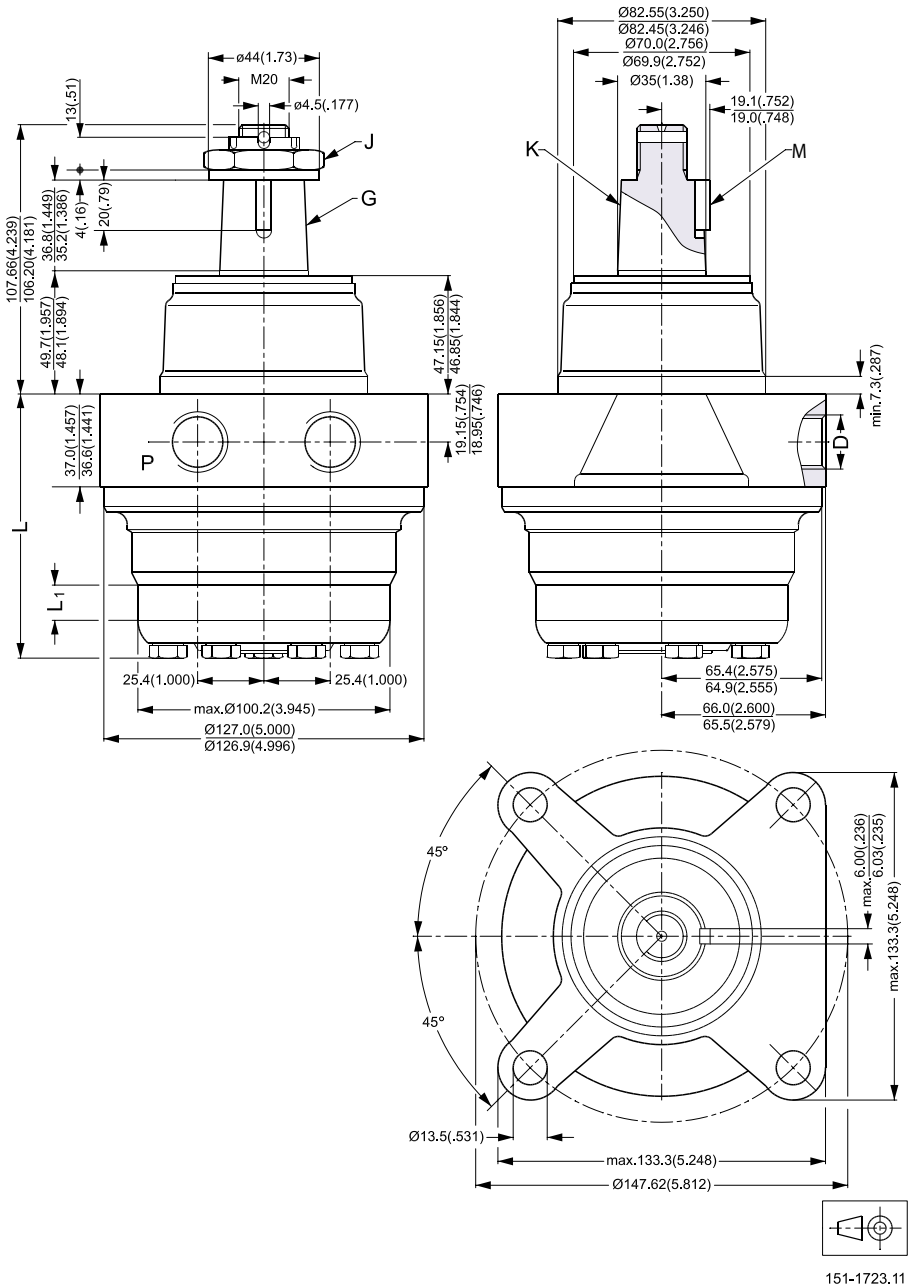
B: UNF main ports
H: 7/8 - 14 UNF
O-ring boss port

Dimensions – European version

DIMENSIONS

Type	L mm [in]	L_1 mm [in]
OMEW 100	107.9 [4.25]	14.0 [0.55]
OMEW 125	111.3 [4.38]	17.4 [0.69]
OMEW 160	115.7 [4.56]	21.8 [0.86]
OMEW 200	121.7 [4.79]	27.8 [1.09]
OMEW 250	128.7 [5.07]	34.8 [1.37]
OMEW 315	137.4 [5.41]	43.5 [1.71]

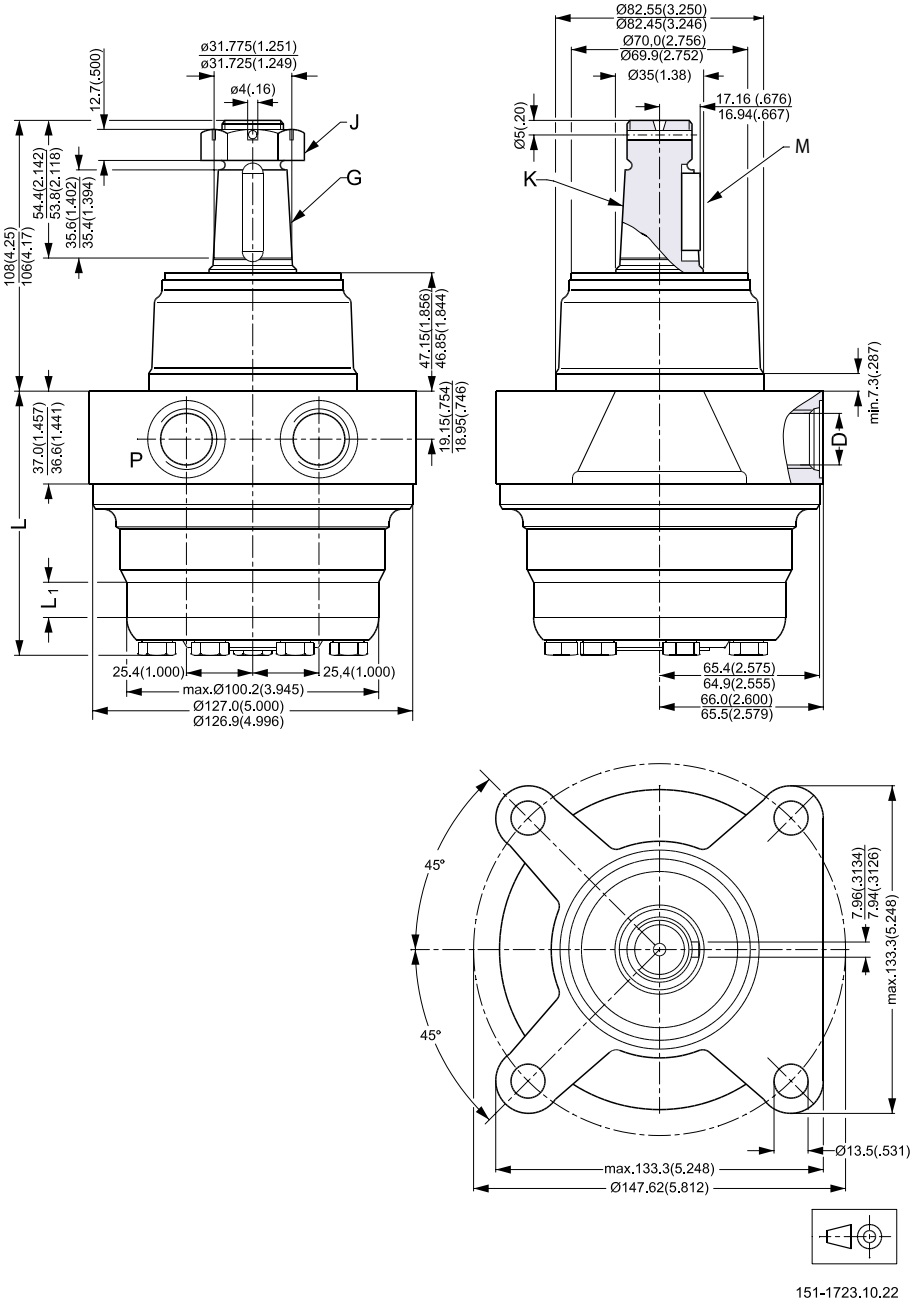
D: G 1/2, 15 mm [0.59 in] deep
G: Tapered shaft 35 mm (ISO/R775)
J: DIN 937
NV 410
Tightening torque:
200 ± 10 Nm [1770 ±85 lbf·in]
K: Taper 1:10
M: Parallel key
B6 × 6 × 20
DIN 6885



DIMENSIONS

Type	L mm [in]	L_1 mm [in]
OMEW 100	107.9 [4.25]	14.0 [0.55]
OMEW 125	111.3 [4.38]	17.4 [0.69]
OMEW 160	115.7 [4.56]	21.8 [0.86]
OMEW 200	121.7 [4.79]	27.8 [1.09]
OMEW 250	128.7 [5.07]	34.8 [1.37]
OMEW 315	137.4 [5.41]	43.5 [1.71]

D: $^{7}/_{8}$ - 14 UNF;
16.7 mm [0.66 in] deep
G: Tapered shaft 1 $^{1}/_{4}$ in
(ISO/R775)
J: Nut 1 - 20 UNEF
Across flats 1 $^{7}/_{16}$
Tightening torque:
200 ± 10 Nm [1770 ±85 lbf·in]
K: Taper 1:8
M: Parallel key
$^{5}/_{16} \times {}^{5}/_{16} \times 1\ {}^{1}/_{4}$
SAEJ 501



151-1723.10.22

Weight of motors

WEIGHT OF MOTORS

Code no	Weight	
	kg	[lb]
151-0208	7.2	15.9
151-0242	6.9	15.2
151-0243	7.0	15.4
151-0244	7.5	16.5
151-0245	8.0	17.6
151-0246	9.0	19.8
151-0247	8.5	18.7
151-0248	6.7	14.8
151-0265	6.7	14.8
151-0266	6.9	15.2
151-0267	7.0	15.4
151-0268	7.5	16.5
151-0269	8.0	17.6
151-0270	9.0	19.8
151-0271	8.5	18.7
151-0300	5.6	12.3
151-0301	5.7	12.6
151-0302	5.9	13.0
151-0303	6.0	13.2
151-0304	6.2	13.7
151-0305	6.4	14.1
151-0306	6.6	14.6
151-0307	6.9	15.2
151-0308	7.4	16.3
151-0310	5.6	12.3
151-0311	5.7	12.6
151-0312	5.9	13.0
151-0313	6.0	13.2
151-0314	6.2	13.7
151-0315	6.4	14.1
151-0316	6.6	14.6
151-0317	6.9	15.2
151-0318	7.4	16.3
151-0330	5.6	12.3
151-0331	5.7	12.6
151-0332	5.9	13.0
151-0333	6.0	13.2
151-0334	6.2	13.7
151-0335	6.4	14.1
151-0336	6.6	14.6
151-0337	6.9	15.2
151-0338	7.4	16.3
151-0340	5.5	12.1
151-0341	5.5	12.1
151-0342	5.6	12.3
151-0400	6.7	14.8
151-0401	6.9	15.2
151-0402	7.0	15.4
151-0403	7.2	15.9

Code no	Weight	
	kg	[lb]
151-0404	7.5	16.5
151-0405	8.0	17.6
151-0406	8.5	18.7
151-0407	9.0	19.8
151-0408	9.5	20.9
151-0410	6.7	14.8
151-0411	6.9	15.2
151-0412	7.0	15.4
151-0413	7.2	15.9
151-0414	7.5	16.5
151-0415	8.0	17.6
151-0416	8.5	18.7
151-0417	9.0	19.8
151-0418	9.5	20.9
151-0420	6.7	14.8
151-0421	6.9	15.2
151-0422	7.0	15.4
151-0423	7.2	15.9
151-0424	7.5	16.5
151-0425	8.0	17.6
151-0426	8.5	18.7
151-0427	9.0	19.8
151-0428	9.5	20.9
151-0600	5.6	12.3
151-0601	5.7	12.6
151-0602	5.9	13.0
151-0603	6.0	13.2
151-0604	6.2	13.7
151-0605	6.4	14.1
151-0606	6.6	14.6
151-0607	6.9	15.2
151-0608	7.4	16.3
151-0610	5.6	12.3
151-0611	5.7	12.6
151-0612	5.9	13.0
151-0613	6.0	13.2
151-0614	6.2	13.7
151-0615	6.4	14.1
151-0616	6.6	14.6
151-0617	6.9	15.2
151-0618	7.4	16.3
151-0630	5.6	12.3
151-0631	5.7	12.6
151-0632	5.9	13.0
151-0633	6.0	13.2
151-0634	6.2	13.7
151-0635	6.4	14.1
151-0636	6.6	14.6
151-0637	6.9	15.2

Code no	Weight	
	kg	[lb]
151-0638	7.4	16.3
151-0640	5.5	12.1
151-0641	5.5	12.1
151-0642	5.6	12.3
151-0700	6.7	14.8
151-0701	6.9	15.2
151-0702	7.0	15.4
151-0703	7.2	15.9
151-0704	7.5	16.5
151-0705	8.0	17.6
151-0706	8.5	18.7
151-0707	9.0	19.8
151-0708	9.5	20.9
151-0710	6.7	14.8
151-0711	6.9	15.2
151-0712	7.0	15.4
151-0713	7.2	15.9
151-0714	7.5	16.5
151-0715	8.0	17.6
151-0716	8.5	18.7
151-0717	9.0	19.8
151-0718	9.5	20.9
151-0720	6.7	14.8
151-0721	6.9	15.2
151-0722	7.0	15.4
151-0723	7.2	15.9
151-0724	7.5	16.5
151-0725	8.0	17.6
151-0726	8.5	18.7
151-0727	9.0	19.8
151-0728	9.5	20.9
151-1208	5.6	12.3
151-1209	5.7	12.6
151-1210	5.9	13.0
151-1211	6.2	13.7
151-1212	6.4	14.1
151-1213	6.6	14.6
151-1214	6.9	15.2
151-1215	7.4	16.3
151-1217	6.0	13.2
151-1231	6.7	14.8
151-1232	6.9	15.2
151-1233	7.0	15.4
151-1234	7.5	16.5
151-1235	8.0	17.6
151-1236	8.5	18.7
151-1237	9.0	19.8
151-1238	7.2	15.9
151-1243	9.5	20.9

WEIGHT OF MOTORS

Code no	Weight	
	kg	[lb]
151-5001	5.6	12.3
151-5002	5.7	12.6
151-5003	5.9	13.0
151-5004	6.0	13.2
151-5005	6.2	13.7
151-5006	6.4	14.1
151-5007	6.6	14.6
151-5008	6.9	15.2
151-5009	7.4	16.3
151-5174	5.4	11.9
151-5191	6.1	13.4
151-5192	6.2	13.7
151-5193	6.4	14.1
151-5194	6.5	14.3
151-5195	6.7	14.8
151-5196	6.9	15.2
151-5197	7.1	15.7
151-5198	7.4	16.3
151-5199	7.9	17.4
151-5211	5.5	12.1
151-5212	5.6	12.3
151-5213	5.8	12.8
151-5214	5.9	13.0
151-5215	6.1	13.4
151-5216	6.3	13.9
151-5217	6.5	14.3
151-5218	6.8	15.0
151-5219	7.3	16.1
151-5301	5.5	12.1
151-5302	5.6	12.3
151-5303	5.8	12.8
151-5304	5.9	13.0
151-5305	6.1	13.4
151-5306	6.3	13.9
151-5307	6.5	14.3
151-5308	6.8	15.0
151-5309	7.3	16.1
151-6000	6.7	14.8
151-6001	6.9	15.2
151-6002	7.0	15.4
151-6003	7.2	15.9
151-6004	7.5	16.5
151-6005	8.0	17.6
151-6006	8.5	18.7
151-6007	9.0	19.8
151-6008	9.5	20.9
151-6010	6.7	14.8
151-6011	6.9	15.2
151-6012	7.0	15.4

Code no	Weight	
	kg	[lb]
151-6013	7.2	15.9
151-6014	7.5	16.5
151-6015	8.0	17.6
151-6016	8.5	18.7
151-6017	9.0	19.8
151-6018	9.5	20.9
151-6110	6.7	14.8
151-6111	6.9	15.2
151-6112	7.0	15.4
151-6113	7.2	15.9
151-6114	7.5	16.5
151-6115	8.0	17.6
151-6116	8.5	18.7
151-6117	9.0	19.8
151-6118	9.5	20.9
151-6190	7.3	16.1
151-6191	7.5	16.5
151-6192	7.6	16.8
151-6193	7.8	17.2
151-6194	8.1	17.9
151-6195	8.6	19.0
151-6196	9.1	20.1
151-6197	9.6	21.2
151-6198	10.1	22.3
151-6210	6.7	14.8
151-6211	6.9	15.2
151-6212	7.0	15.4
151-6213	7.2	15.9
151-6214	7.5	16.5
151-6215	8.0	17.6
151-6216	8.5	18.7
151-6217	9.0	19.8
151-6218	9.5	20.9
151-6294	9.5	20.9
151-6295	7.2	15.9
151-6296	9.5	20.9
151-6300	9.0	19.8
151-6301	9.4	20.7
151-6302	9.5	20.9
151-6303	9.7	21.4
151-6304	10.0	22.1
151-6305	10.5	23.1
151-6306	11.0	24.3
151-6307	11.5	25.4
151-6308	12.0	26.5
151-6430	9.0	19.8
151-6431	9.4	20.7
151-6432	9.5	20.9
151-6433	9.7	21.4

Code no	Weight	
	kg	[lb]
151-6434	10.0	22.1
151-6435	10.5	23.1
151-6436	11.0	24.3
151-6437	11.5	25.4
151-6438	12.0	26.5
151-7021	5.0	11.0
151-7022	5.1	11.2
151-7023	5.3	11.7
151-7024	5.4	11.9
151-7025	5.6	12.3
151-7026	5.8	12.8
151-7027	6.0	13.2
151-7028	6.3	13.9
151-7029	6.8	15.0
151-7041	5.6	12.3
151-7042	5.7	12.6
151-7043	5.9	13.0
151-7044	5.4	11.9
151-7045	6.2	13.7
151-7046	6.4	14.1
151-7047	6.6	14.6
151-7048	6.9	15.2
151-7049	7.4	16.3
151-7061	5.0	11.0
151-7062	5.1	11.2
151-7063	5.3	11.7
151-7065	5.6	12.3
151-7066	5.8	12.8
151-7067	6.0	13.2
151-7068	6.3	13.9
151-7069	6.8	15.0
151-7080	5.4	12.0
151-7081	5.4	12.0
151-7082	5.6	12.3
151-7101	5.5	12.1
151-7102	5.6	12.3
151-7103	5.8	12.8
151-7104	5.9	13.0
151-7105	6.1	13.4
151-7106	6.3	13.9
151-7107	6.5	14.3
151-7108	6.8	15.0
151-7109	7.3	16.1
151-7240	6.7	14.8
151-7241	6.9	15.2
151-7242	7.0	15.4
151-7243	7.2	15.9
151-7244	7.5	16.5
151-7245	8.0	17.6

WEIGHT OF MOTORS

Code no	Weight	
	kg	[lb]
151-7246	8.5	18.7
151-7247	9.0	19.8
151-7248	9.5	20.9
151-7250	6.7	14.8
151-7251	6.9	15.2
151-7252	7.0	15.4
151-7253	7.2	15.9
151-7254	7.5	16.5
151-7255	8.0	17.6
151-7256	8.5	18.7
151-7257	9.0	19.8
151-7258	9.5	20.9
151-7260	6.1	13.4
151-7261	6.3	13.9
151-7262	6.4	14.1
151-7263	6.6	14.6
151-7264	6.9	15.2
151-7265	7.4	16.3
151-7266	7.9	17.4
151-7267	8.4	18.5
151-7269	8.9	19.6
151H1002	10.5	23.1
151H1003	11.0	24.3
151H1004	11.5	25.4
151H1005	12.3	27.1
151H1006	13.0	28.7
151H1012	10.5	23.1
151H1013	11.0	24.3
151H1014	11.5	25.4
151H1015	12.3	27.1
151H1016	13.0	28.7
151H1022	10.5	23.1
151H1023	11.0	24.3
151H1024	11.5	25.4
151H1025	12.3	27.1
151H1026	13.0	28.7
151H1034	11.5	25.4
151H1035	12.3	27.1
151H1036	13.0	28.7
151H1042	10.5	23.1
151H1043	11.0	24.3
151H1044	11.5	25.4
151H1045	12.3	27.1
151H1046	13.0	28.7
151H1052	10.5	23.1
151H1053	11.0	24.3
151H1054	11.5	25.4
151H1055	12.3	27.1
151H1056	13.0	28.7

Code no	Weight	
	kg	[lb]
151H1080	10.5	23.1
151H1081	13.0	28.7
151H1082	11.0	24.3
151H1083	11.5	25.4
151H1084	12.3	27.1
151H2002	9.3	20.5
151H2003	9.5	20.9
151H2004	9.8	21.6
151H2005	10.3	22.7
151H2006	10.8	23.8
151H2007	11.3	24.9
151H2011	9.3	20.5
151H2012	9.5	20.9
151H2013	9.8	21.6
151H2014	10.3	22.7
151H2015	10.8	23.8
151H2016	11.3	24.9
151H3002	9.3	20.5
151H3003	9.5	20.9
151H3004	9.8	21.6
151H3005	10.3	22.7
151H3006	10.8	23.8
151H3007	11.3	24.9
151H3011	9.3	20.5
151H3012	9.5	20.9
151H3013	9.8	21.6
151H3014	10.3	22.7
151H3015	10.8	23.8
151H3016	11.3	24.9

SAUER DANFOSS

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

Radial piston 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

Digital electronics and software

Battery powered inverter

Sensors

DKMH.PK.110.B5.02 **520L0262** Rev. A-03/2002

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.

Sauer-Danfoss (US) Company
2800 East 13th Street
Ames, IA 50010, USA
Phone: +1 515 239-6000, Fax: +1 515 239-6618

Sauer-Danfoss (Neumünster) GmbH & Co. OHG
Postfach 2460, D-24531 Neumünster
Krokamp 35, D-24539 Neumünster, Germany
Phone: +49 4321 871-0, Fax: +49 4321 871-122

Sauer-Danfoss (Nordborg) A/S
DK-6430 Nordborg, Denmark
Phone: +45 7488 4444, Fax: +45 7488 4400

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SAUER DANFOSS

OML and OMM
Orbital motors

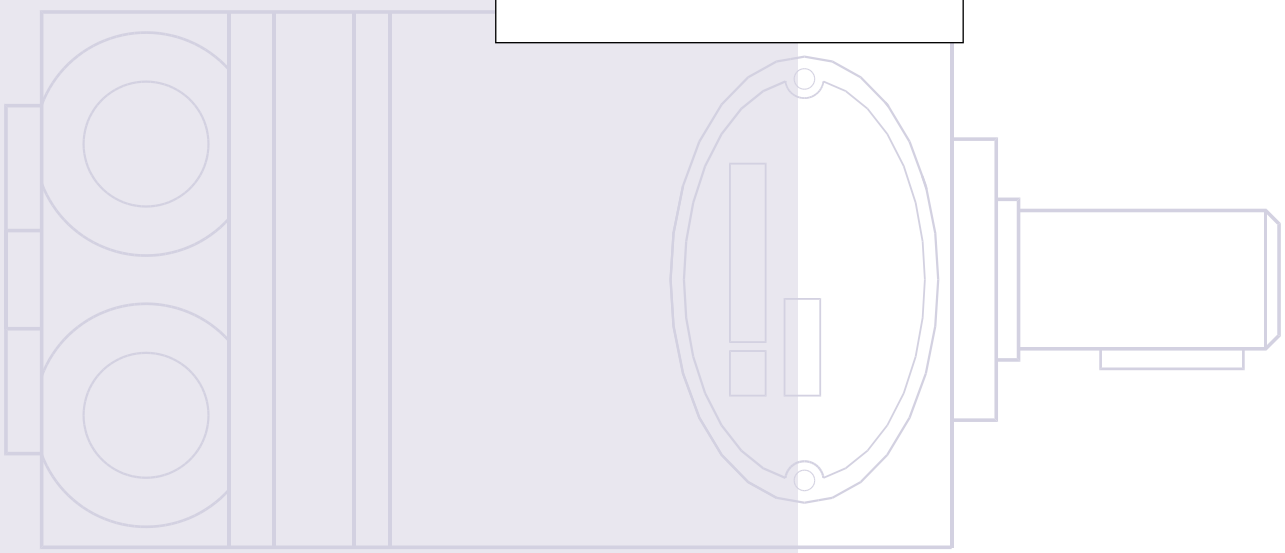
Technical Information











OML and OMM
Technical Information
A wide range of orbital motors



F300030.TIF

A WIDE RANGE OF ORBITAL MOTORS

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 cm^3 (0.50 in^3] to 800 cm^3 (48.9 in^3] 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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Frontpage: F300029.TIF, F300044.TIF, F300028.TIF, F300045.TIF, Drawing 151-1864

OML and OMM
Technical Information
A wide range of orbital motors

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 LSHT 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 orbital 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 orbital 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: TMT

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

OML and OMM
Technical Information
Contents and Data survey

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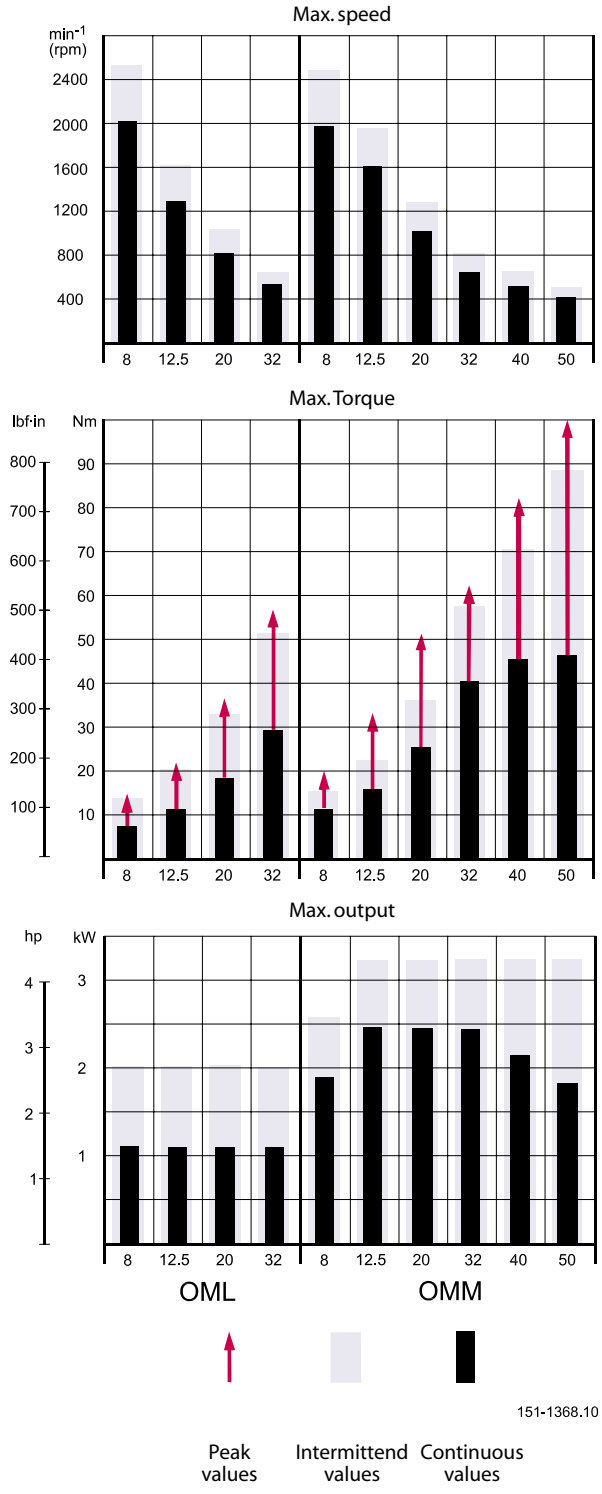
SPEED, TORQUE AND OUTPUT

The bar diagrams, see page 5, 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.

- OML can be found on pages 11 - 12
- OMM can be found on pages 23 - 25

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" DKMH.PK.100.G2.02 520L0232.

SPEED, TORQUE AND OUTPUT



VERSIONS

Mounting	Shaft	Port size	European version	US version	Side port version	End port version	Flange port version	Standard shaft seal	High pressure shaft seal	Drain connection	Check valve	Specials	Main type designation
Front, 4 × M5	Cyl. 16 mm	G 1/4	X			X		X		No	Yes		OML
Front, 4 × 10-32 UNF	Cyl. 5/8 in	7/16 - 20 UNF		X		X		X		No	Yes		OML

Function diagram - see page : →

Features available (options) :
Painted

CODE NUMBERS

CODE NUMBERS	DISPLACEMENT [cm³]				Technical data – Page	Dimensions – Page
	8	12.5	20	32		
151G	2001	2002	2003	2004	8	15
151G	2021	2022	2023	2024	8	16
→	11	11	12	12		

Ordering

Add the four digit prefix "151G" to the four digit numbers from the chart for complete code number.

Example:
151G2001 for an OML 8 with front mounting (4 × M5), cyl. 16 mm shaft and port size G $^{1}/_{4}$.

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

TECHNICAL DATA FOR OML WITH 16 MM AND 5/8 IN CYLINDRICAL SHAFT

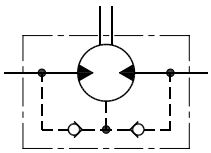
Type			OML	OML	OML	OML
Motor size			**8**	**12.5**	**20**	**32**
Geometric displacement	cm^3 [in^3]		8.0 [0.49]	12.5 [0.77]	20.0 [1.22]	32.0 [1.96]
Max. speed	min^{-1} [rpm]	cont.	2000	1280	800	500
		int.[1]	2500	1600	1000	625
Max. torque	Nm [lbf·in]	cont.	7 [60]	11 [100]	18 [160]	29 [260]
		int.[1]	13 [120]	20 [180]	32 [280]	51 [450]
		peak[2]	14 [125]	22 [200]	36 [320]	57 [500]
Max. output	kW [hp]	cont.	1.1 [1.5]	1.1 [1.5]	1.1 [1.5]	1.1 [1.5]
		int.[1]	2.0 [2.7]	2.0 [2.7]	2.0 [2.7]	2.0 [2.7]
Max. pressure drop	bar [psi]	cont.	70 [1020]	70 [1020]	70 [1020]	70 [55][3] [1020] [800][3]
		int.[1]	125 [1810]	125 [1810]	125 [85][3] [1810] [1230][3]	125 [55][3] [1810] [800][3]
		peak[2]	140 [2030]	140 [2030]	140 [85][3] [2030] [1230][3]	140 [55][3] [2030] [800][3]
Max. oil flow	l/min [USgal/min]	cont.	16 [4.2]	16 [4.2]	16 [4.2]	16 [4.2]
		int.[1]	20 [5.3]	20 [5.3]	20 [5.3]	20 [5.3]
Max. starting pressure with unloaded shaft	bar [psi]		4 [60]	4 [60]	4 [60]	4 [60]
Min. starting torque	at max. press. drop cont. Nm [lbf·in]		5 [45]	9 [80]	15 [135]	24 [210]
	at max. press. drop int.[1] Nm [lbf·in]		10 [90]	16 [140]	27 [240]	42 [370]
Min. speed[4]	min^{-1} [rpm]		50	50	50	50

Type			Max. inlet pressure
OML 8 - 32	bar [psi]	cont.	125 [1810]
	bar [psi]	int.[1]	140 [2030]
	bar [psi]	peak[2]	140 [2030]

[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] Max. pressure drop in applications with a large moment of inertia and frequent stops or reversings.
[4] Operation at lower speed may be slightly less smooth.

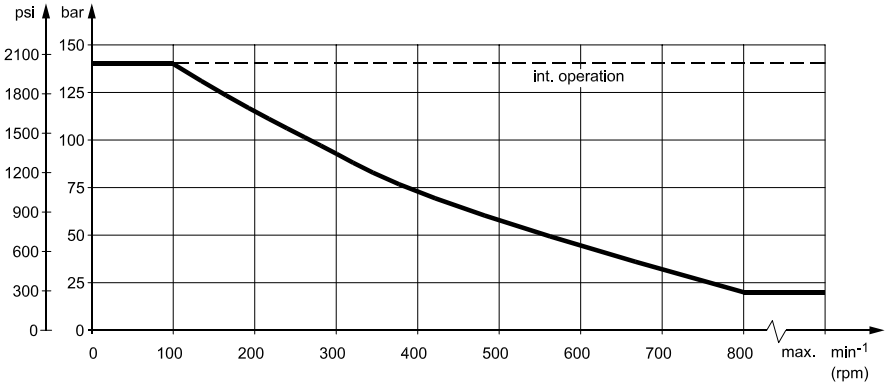
MAX. PERMISSIBLE SHAFT SEAL PRESSURE

OML has incorporated check valves which ensure that the pressure on the shaft seal never exceeds the pressure in the returnline



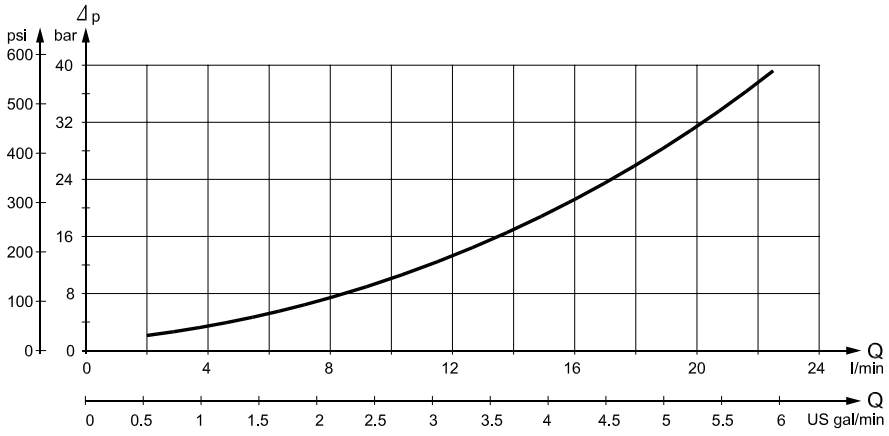
151-1316.10

Max. return pressure (max. pressure on shaft seal)



151-1671.10

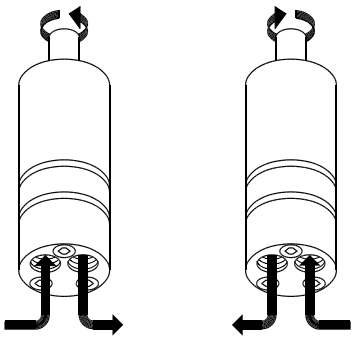
PRESSURE DROP IN MOTOR



151-1415.10

The curve applies to an unloaded motor shaft and an oil viscosity of 35 mm^2/s [165 SUS]

DIRECTION OF SHAFT ROTATION



PERMISSIBLE SHAFT LOADS FOR OML

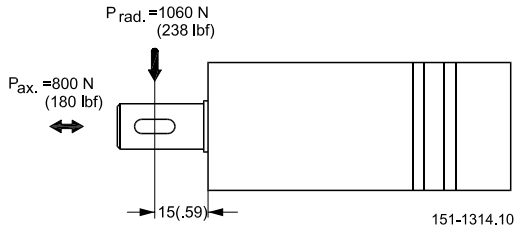
The permissible radial shaft load ($P_{rad.}$) is calculated from the distance (l) between the point of load and the mounting surface:

$$P_{rad.} = \frac{84500}{64.5 + l} \text{ N (l in mm; } l \leq 80)$$

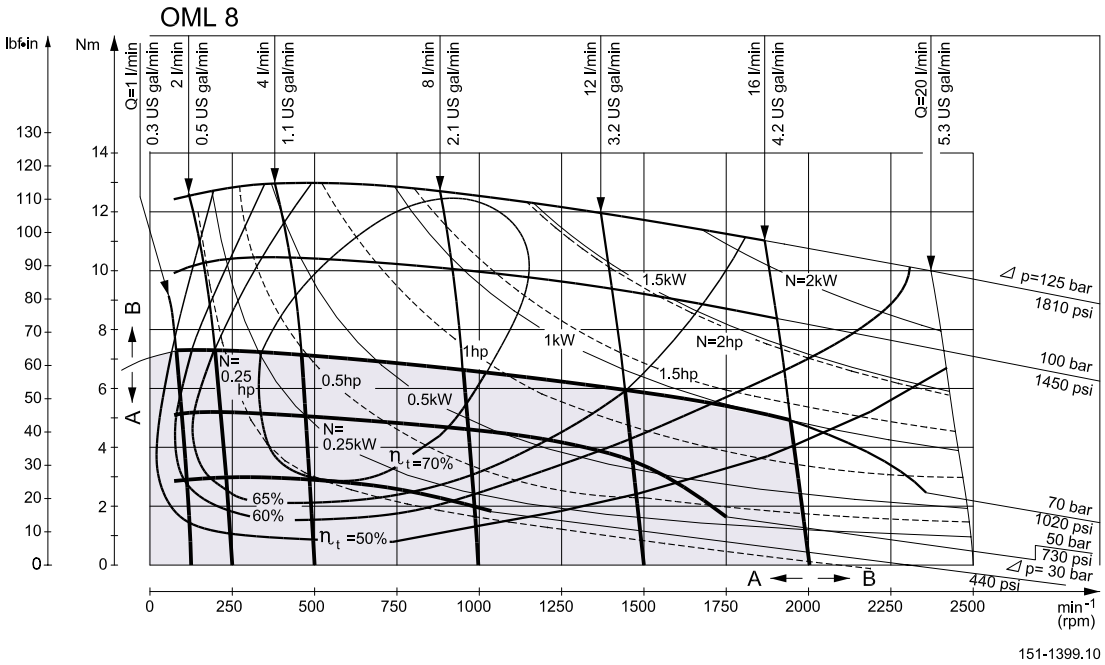
$$P_{rad.} = \frac{748}{254 + l} \text{ lbf (l in inch; } l \leq 3.15)$$

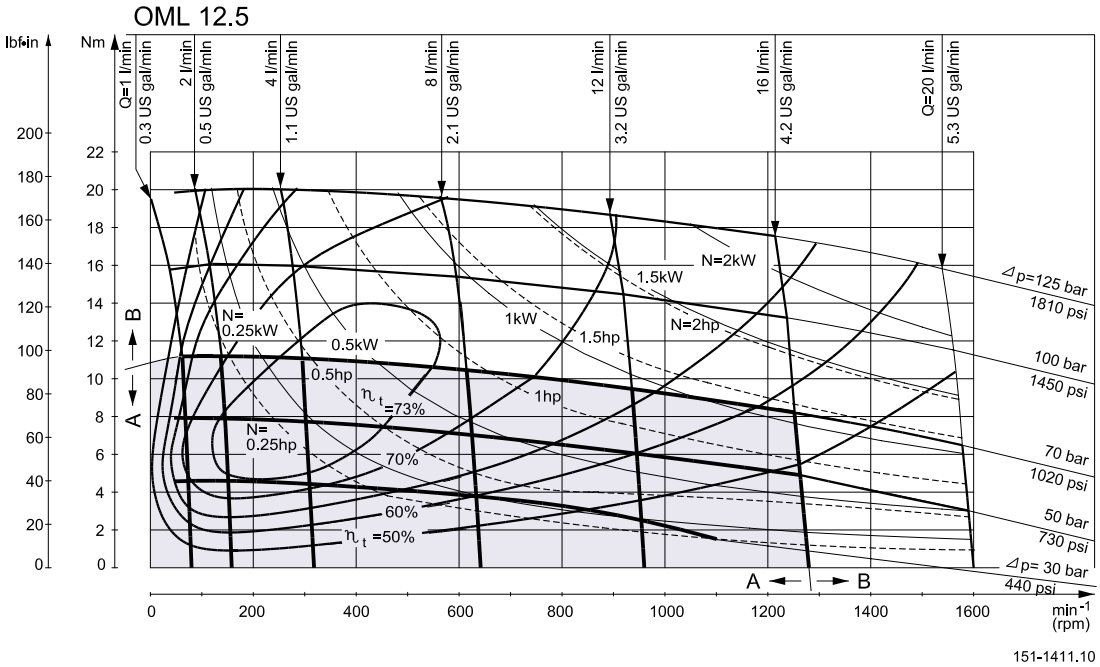
The drawing shows the permissible radial load when l = 15 mm [0.59 in].

The calculated shaft load should never exceed the permissible value.



FUNCTION DIAGRAMS





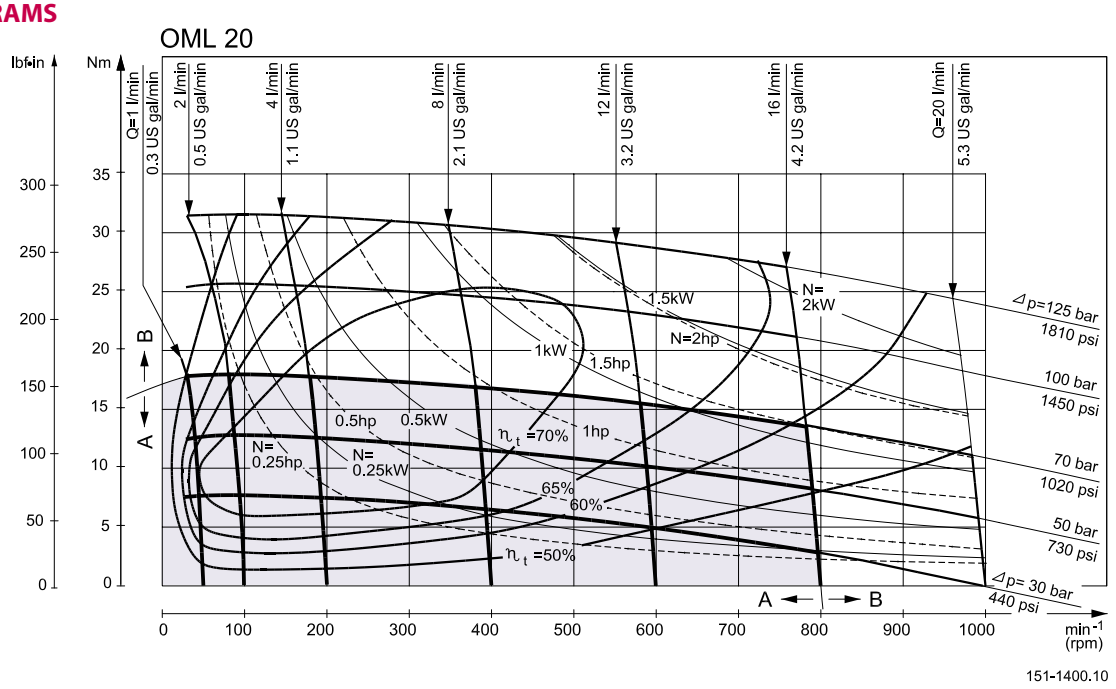
Explanation of function diagram use, basis and conditions can be found on page 4.

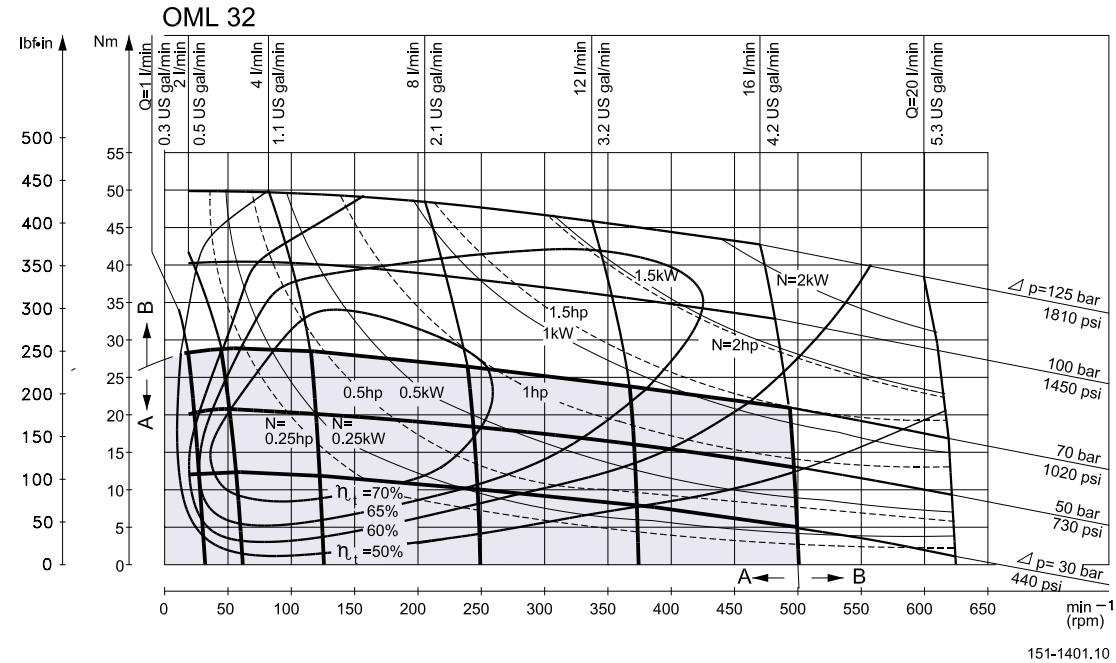
- A: Continuous range
- B: Intermittent range (max. 10% operation every minute)

Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 8.

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

FUNCTION DIAGRAMS





Explanation of function diagram use, basis and conditions can be found on page 4.

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

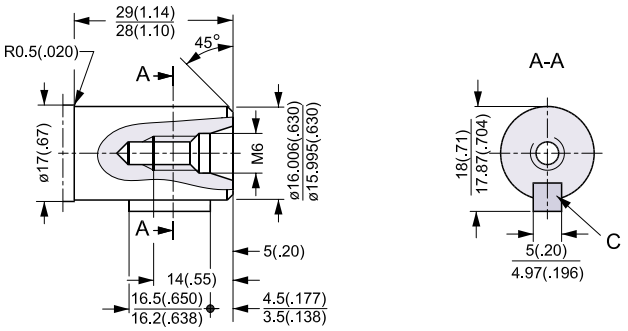
Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 8.

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

SHAFT VERSION

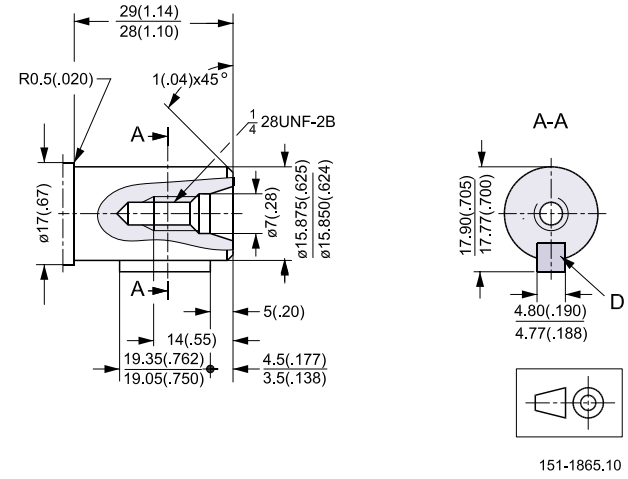
A: Cylindrical shaft
16 mm
C: Parallel key
A5 × 5 × 16
DIN 6885

A



US version
B: Cylindrical shaft
$^{5}/_{8}$″
D: Parallel key
$^{3}/_{16} \times {}^{3}/_{16} \times {}^{3}/_{4}$ in
B.S. 46

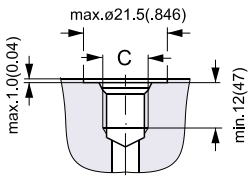
B



151-1865.10

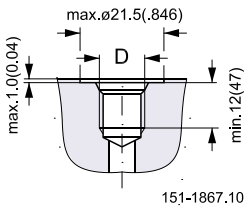
PORT THREAD VERSIONS

A



A: G main ports
C: ISO 228/1 - G1/4

B



B: UNF main ports
D: 7/16 - 20 UNF
O-ring boss port

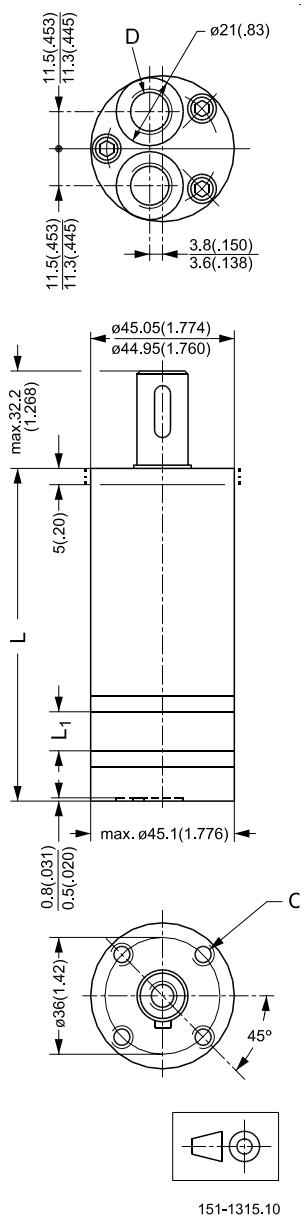
Dimensions – European version

DIMENSIONS

OML.
End port version.

Type	$L_{max.}$	L_1 mm (in)
OML 8	102.5 [4.04]	4.1 [0.16]
OML 12.5	104.8 [4.13]	6.4 [0.25]
OML 20	108.6 [4.28]	10.2 [0.40]
OML 32	114.7 [4.53]	16.3 [0.64]

C: M5; 15 mm [0.59 in] deep
D: G 1/4; 12 mm [0.47 in] deep

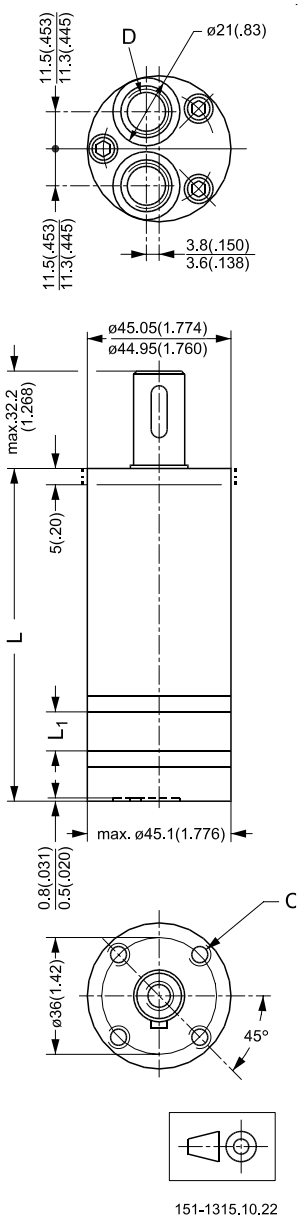


DIMENSIONS

OML.
End port version.

Type	$L_{max.}$	L_1 mm [in]
OML 8	102.5 [4.04]	4.1 [0.16]
OML 12.5	104.8 [4.13]	6.4 [0.25]
OML 20	108.6 [4.28]	10.2 [0.40]
OML 32	114.7 [4.53]	16.3 [0.64]

C: 10 - 32 UNF;
15 mm [0.59 in] deep
D: $^{7}/_{16}$ - UNF;
12 mm [0.47 in] deep
O-ring boss port



NOTES

VERSIONS

Mounting	Shaft	Port size	European version	US version	Side port version	End port version	Flange port version	Standard shaft seal	High pressure shaft seal	Drain connection	Check valve	Specials	Main type designation
Front; 3 × M6	Cyl. 16 mm	G 3/8	X			X		X		Yes	Yes		OMM
		G 3/8	X		X			X		Yes	Yes		OMM
Front; 3 × 1/4 - 28 UNF	Cyl. 5/8 in	9/16-18 UNF		X		X		X		Yes	Yes		OMM
		9/16-18 UNF		X	X			X		Yes	Yes		OMM
Front; 3 × M6	Splined B17×14	G 3/8	X			X		X		Yes	Yes		OMM
		G 3/8	X		X			X		Yes	Yes		OMM

Function diagram - see page : →

Features available (options) :
Speed sensor
Reverse rotation
Drain
Corrosion protected
Painted

CODE NUMBERS

CODE NUMBERS	DISPLACEMENT [cm³]							Technical data – Page	Dimensions – Page
	8	12.5	20	32	40	50	Mounting flange [1]		
151G	0040	0001	0002	0003	0277	0037	0211	20	28 (29)[2]
151G	0041	0004	0005	0006	0279	0013	0211	20	31 (32)[2]
151G	0048	0031	0032	0033	-	-	-	20	30
151G	0049	0034	0035	0036	-	0094	-	20	33
151G	0046	0024	0025	0026	-	-	0211	20	28 (29)[2]
151G	0047	0027	0028	0029	-	-	0211	20	31 (32)[2]
→	23	23	24	24	25	25			

1) To be ordered separately. Mounting screws included.
2) Dimension with extra mounting flange.

Ordering

Add the four digit prefix "151G" to the four digit numbers from the chart for complete code number.

Example:
151G0035 for an OMM 20 with front mounting (3 × 1/4 - 28 UNF), cyl. 5/8 in shaft and port size 9/16 - 18 UNF.

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

TECHNICAL DATA FOR OMM WITH 16 MM AND 5/8 IN CYLINDRICAL SHAFT

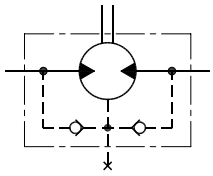
Type			OMM	OMM	OMM	OMM	OMM	OMM
Motor size			**8**	**12.5**	**20**	**32**	**40**	**50**
Geometric displacement	cm^3 [in^3]		8.2 [0.50]	12.9 [0.79]	19.9 [1.22]	31.6 [1.93]	39.8 [2.43]	50.3 [3.08]
Max. speed	min^{-1} [rpm]	cont.	1950	1550	1000	630	500	400
		int.[1]	2450	1940	1250	800	630	500
Max. torque	Nm [lbf-in]	cont.	11 [95]	16 [140]	25 [220]	40 [350]	45 [400]	46 [410]
		int.[1]	15 [135]	23 [200]	35 [310]	57 [500]	70 [620]	88 [780]
		peak[2]	21 [185]	33 [290]	51 [450]	64 [570]	82 [725]	100 [890]
Max. output	kW [hp]	cont.	1.8 [2.4]	2.4 [3.2]	2.4 [3.2]	2.4 [3.2]	2.2 [3.0]	1.8 [2.4]
		int.[1]	2.6 [3.5]	3.2 [4.3]	3.2 [4.3]	3.2 [4.3]	3.2 [4.3]	3.2 [4.3]
Max. pressure drop	bar [psi]	cont.	100 [1450]	100 [1450]	100 [1450]	100 [1450]	90 [1310]	70 [1020]
		int.[1]	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]
		peak[2]	200 [2900]	200 [2900]	200 [2900]	160 [2320]	160 [2320]	160 [2320]
Max. oil flow	l/min [gpm]	cont.	16 [4.2]	20 [5.3]	20 [5.3]	20 [5.3]	20 [5.3]	20 [5.3]
		int.[1]	20 [5.3]	25 [6.6]	25 [6.6]	25 [6.6]	25 [6.6]	25 [6.6]
Max. starting pressure with unloaded shaft	bar [psi]		4 [60]	4 [60]	4 [60]	4 [60]	4 [60]	4 [60]
Min. starting torque	at max. press. drop cont. Nm [lbf·in]		7 [60]	12 [105]	21 [185]	34 [300]	38 [335]	41 [365]
	at max. press. drop int.[1] Nm [lbf·in]		10 [90]	17 [150]	29 [255]	48 [425]	62 [550]	79 [700]
Min. speed[3]	min^{-1} [rpm]		50	40	30	30	30	30

Type			Max. inlet pressure
OMM 8 - 50	bar [psi]	cont.	140 [20309
	bar [psi]	int.[1]	175 [25409
	bar [psi]	peak[2]	225 [3260]

[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 by lower speeds may be slightly less smooth.

MAX. PERMISSIBLE SHAFT SEAL PRESSURE

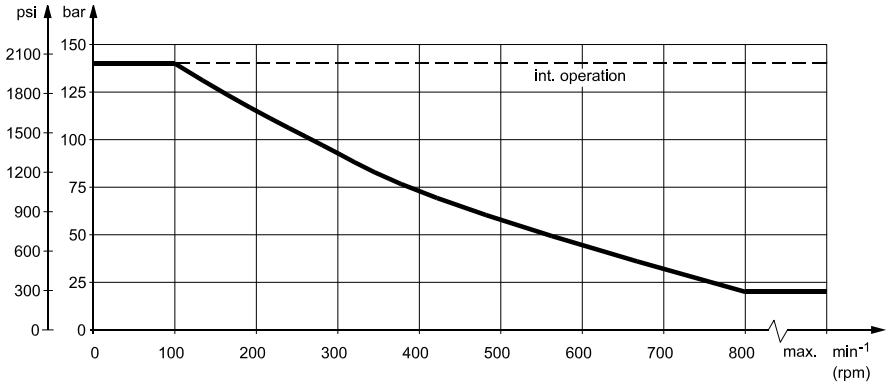
OMM with check valves and without use of drain connection:
The pressure on the shaft seal never exceeds the pressure in the return line.



151-320.10

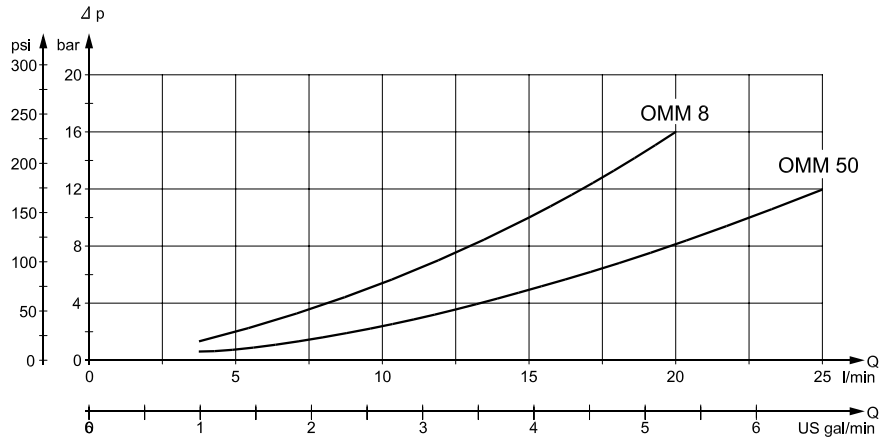
OMM with check valves and drain connection:
The shaft seal pressure equals the pressure on the drain line.

Max. return pressure without drain line or max. pressure in drain line



151-1671.10

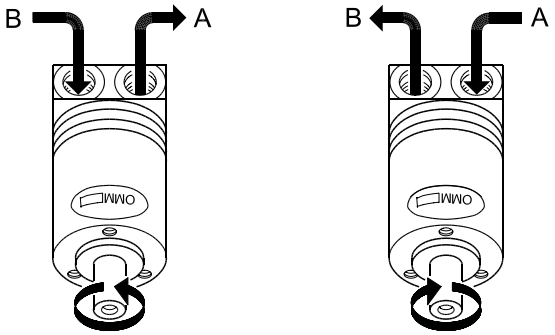
PRESSURE DROP IN MOTOR



151-1367.10

The curve applies to an unloaded motor shaft and an oil viscosity of 35 mm^2/s [165 SUS]

DIRECTION OF SHAFT ROTATION



151-1051.10

PERMISSIBLE SHAFT LOADS FOR OMM

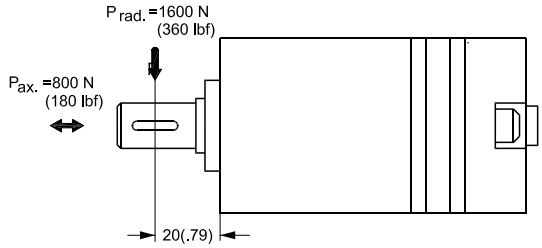
The permissible radial shaft load ($P_{rad.}$) is calculated from the distance (l) between the point of load and the mounting surface:

$$P_{rad.} = \frac{130400}{61.5 + l} \text{ N (l in mm; } l \leq 80 \text{ mm)}$$

$$P_{rad.} = \frac{748}{2.54 + l} \text{ lbf (l in inch; } l \leq 3.15 \text{ in)}$$

The drawing shows the permissible radial load when l = 15 mm [0.59 in].

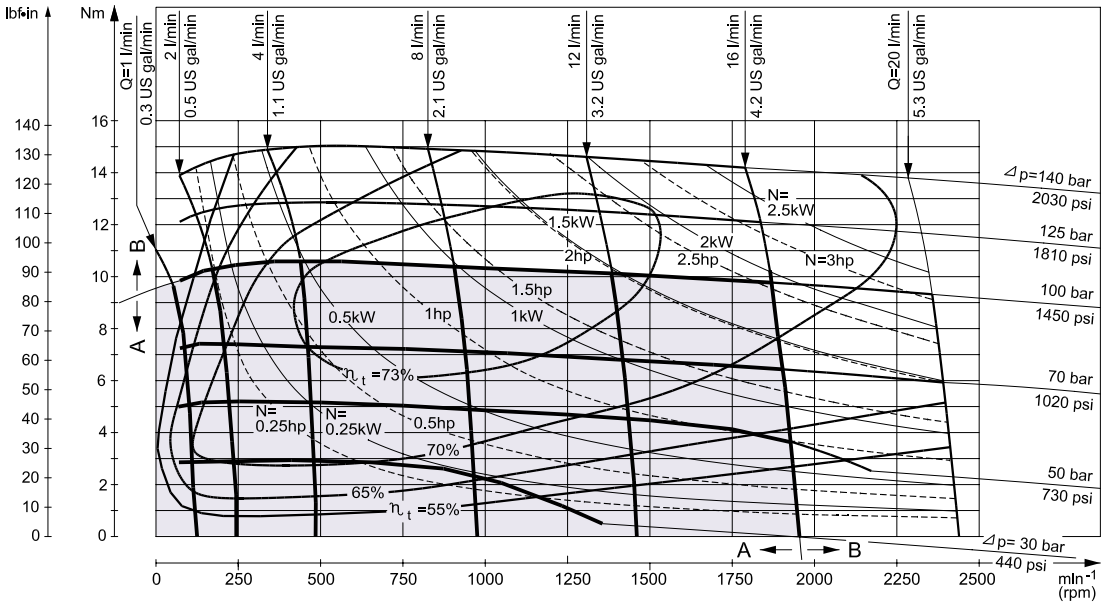
The calculated shaft load should never exceed the permissible value.



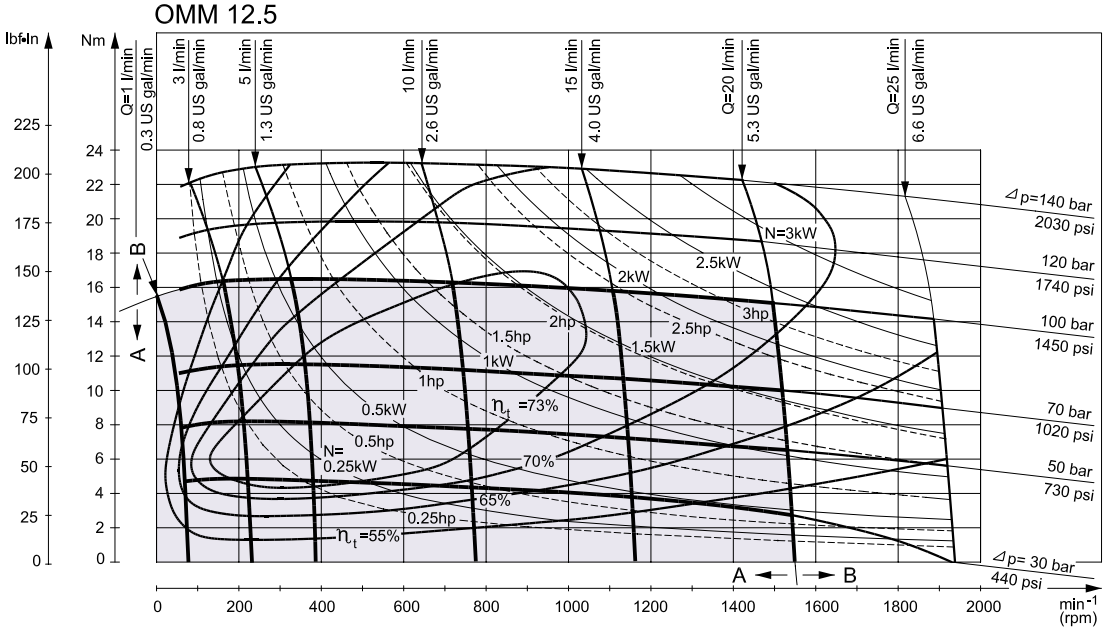
151-980.11

FUNCTION DIAGRAMS

OMM 8



OMM 12.5



Explanation of function diagram use, basis and conditions can be found on page 4.

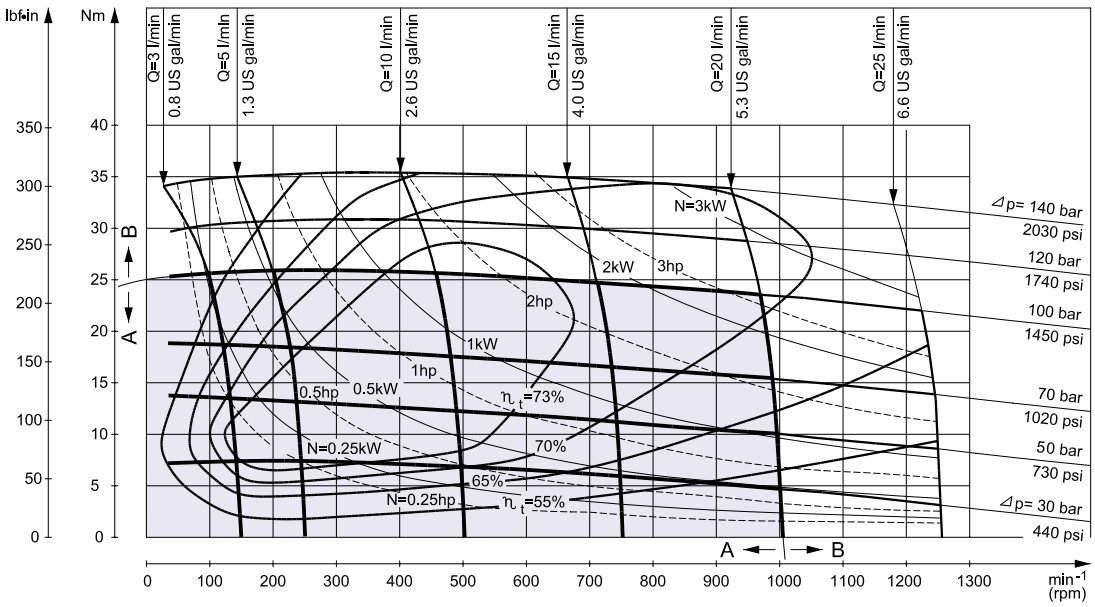
- A: Continuous range
- B: Intermittent range (max. 10% operation every minute)

Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 20.

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

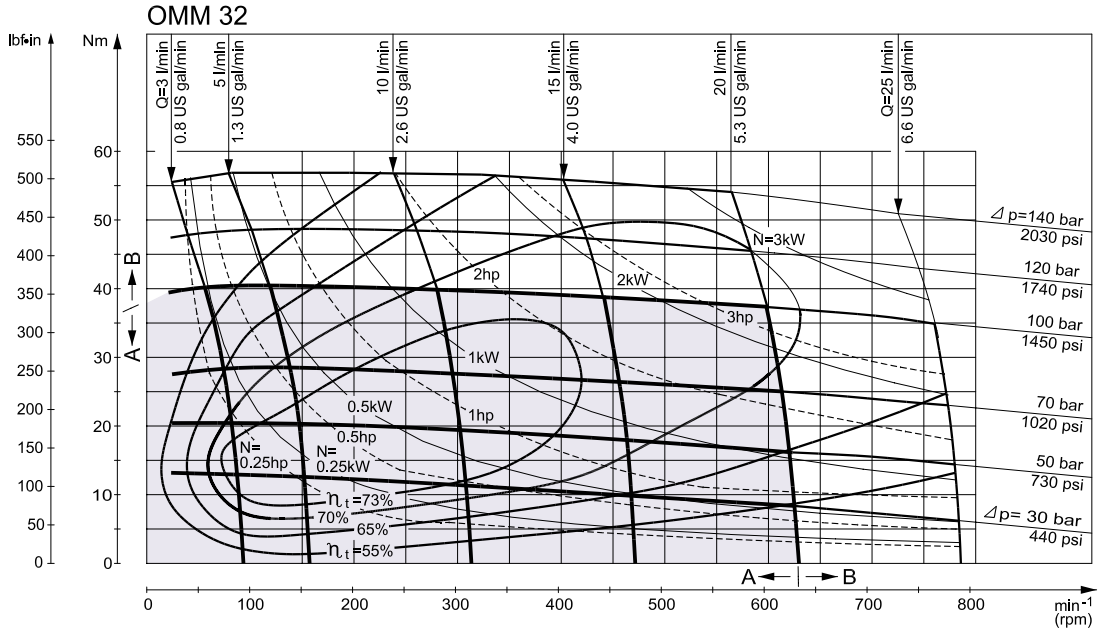
FUNCTION DIAGRAMS

OMM 20



151-995.10

OMM 32



151-996.10

Explanation of function diagram use, basis and conditions can be found on page 4.

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

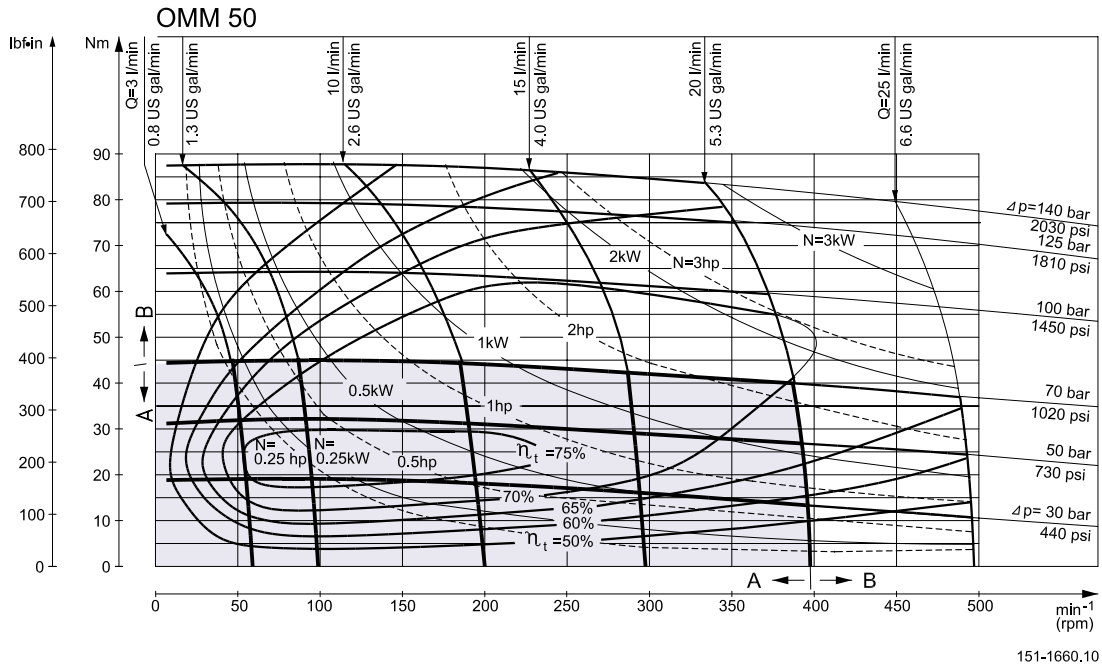
Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 20.

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

FUNCTION DIAGRAMS

OMM 40

No function diagram available for OMM 40.



Explanation of function diagram use, basis and conditions can be found on page 4.

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

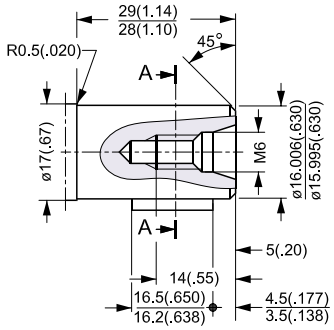
Max. permissible continuous/intermittent pressure drop for the actual shaft version can be found on page 20.

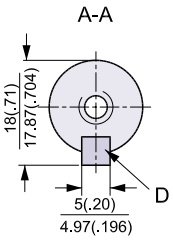
Note: Intermittent pressure drop and oil flow must not occur simultaneously.

SHAFT VERSION

A: Cylindrical shaft
16 mm (xx in)
D: Parallel key
A5 × 5 × 16
DIN 6885

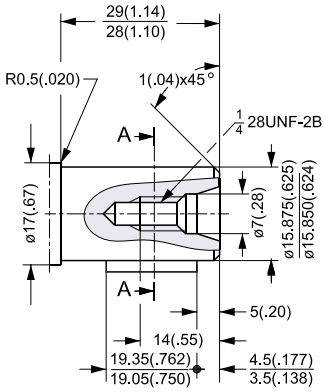
A

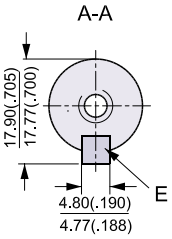




US version
B: Cylindrical shaft
$^{5}/_{8}$ in
E: Parallel key
$^{3}/_{16} \times {}^{3}/_{16} \times {}^{3}/_{4}$ in
B.S. 46

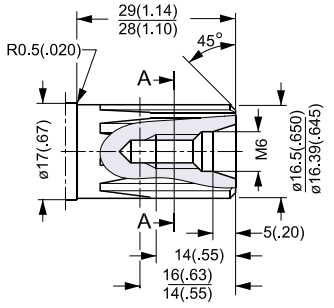
B

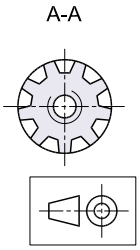




C: Involute splined shaft
B17 × 14, DIN 5482

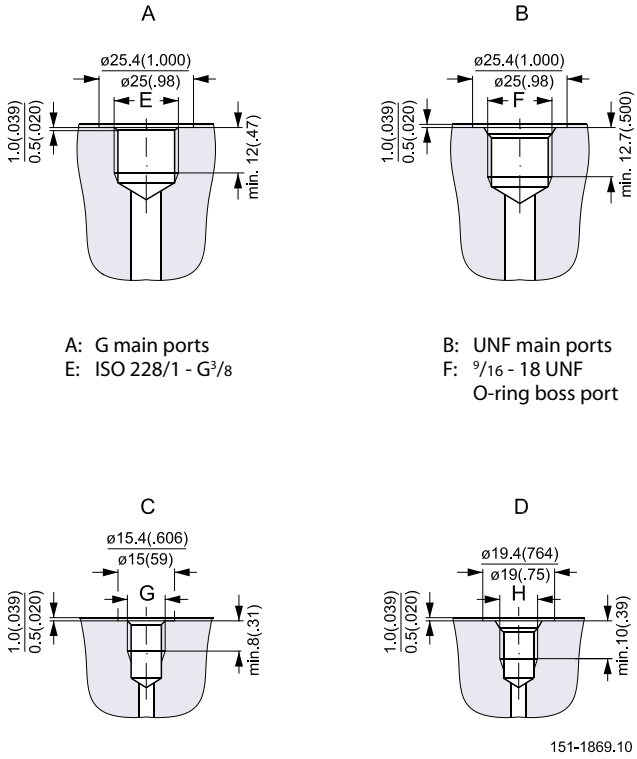
C





151-1866.10

PORT THREAD VERSIONS



A: G main ports
E: ISO 228/1 - G3/8

B: UNF main ports
F: 9/16 - 18 UNF
O-ring boss port

C: G drain ports
G: ISO 228/1 - G1/8

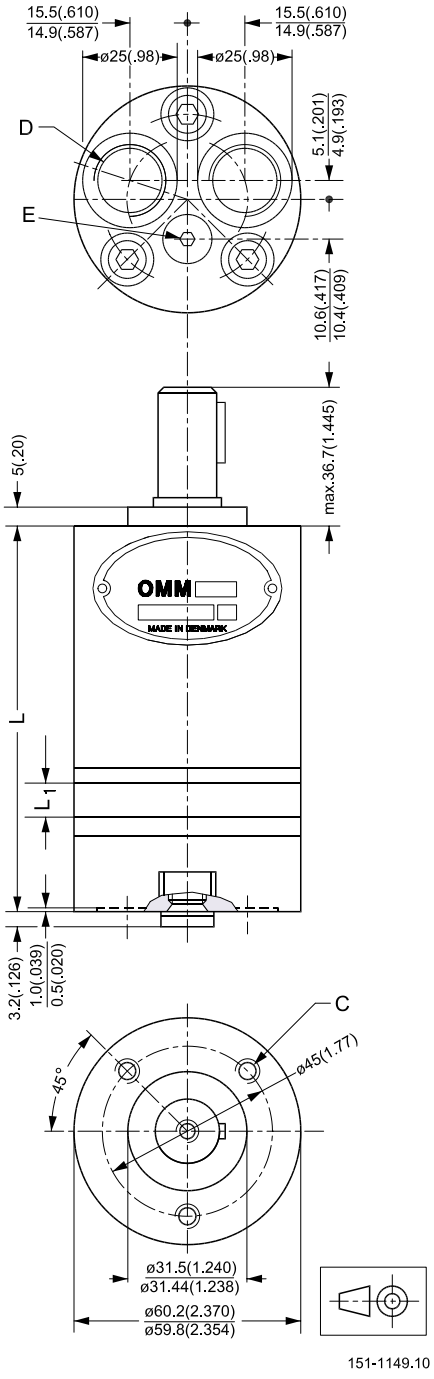
D: UNF drain ports
H: 3/8 - 24 UNF
O-ring port

DIMENSIONS

OMM.
End port version.

Type	$L_{max.}$	L_1 mm [in]
OMM 8	104.0 [4.09]	3.5 [0.14]
OMM 12.5	106.0 [4.17]	5.5 [0.22]
OMM 20	109.0 [4.29]	8.5 [0.33]
OMM 32	114.0 [4.49]	13.5 [0.53]
OMM 40	118.0 [4.65]	17.0 [0.67]
OMM 50	122.0 [4.80]	21.5 [0.85]

C: M6; 10 mm [0.39 in] deep
D: G 3/8; 12 mm [0.47 in] deep
E: Drain connection G 1/8;
8 mm [0.39 in] deep



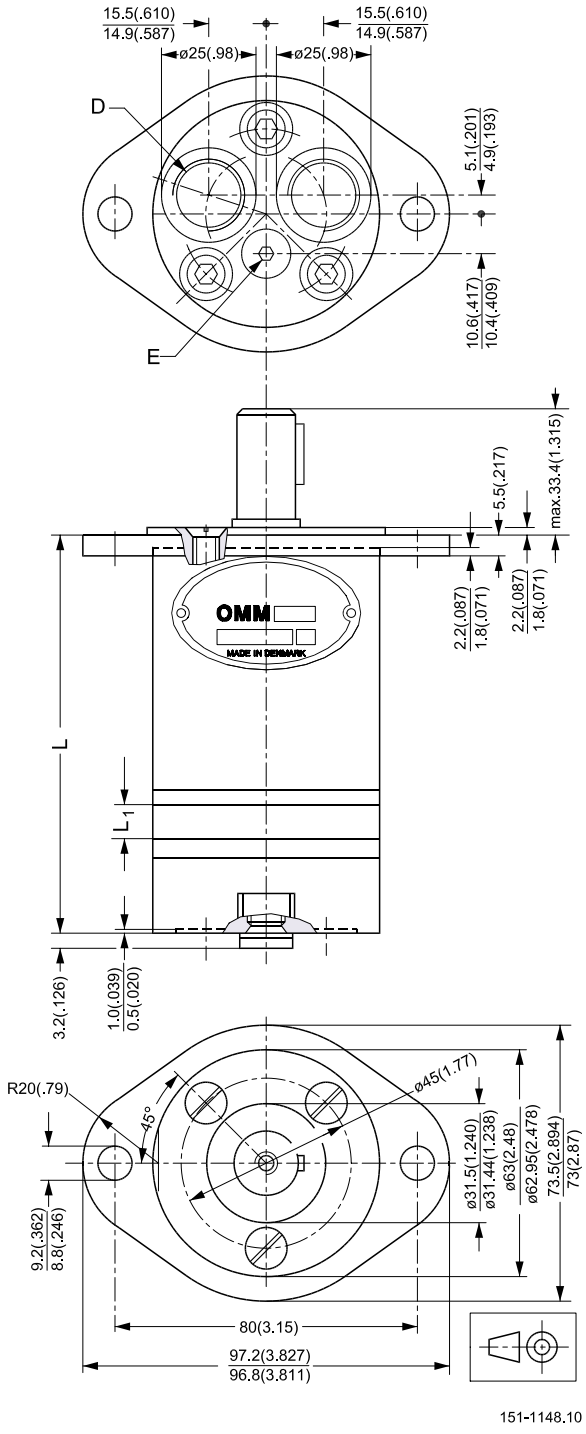
151-1149.10

DIMENSIONS

OMM.
End port version with extra mounting flange.

Type	$L_{max.}$	L_1 mm [in]
OMM 8	107.5 [4.23]	3.5 [0.14]
OMM 12.5	109.5 [4.31]	5.5 [0.22]
OMM 20	112.5 [4.43]	8.5 [0.33]
OMM 32	117.5 [4.63]	13.5 [0.53]
OMM 40	118.0 [4.65]	17.0 [0.67]
OMM 50	125.5 [4.94]	21.5 [0.85]

D: G 3/8; 12 mm [0.47 in] deep
E: Drain connection G 1/8; 8 mm [0.39 in] deep



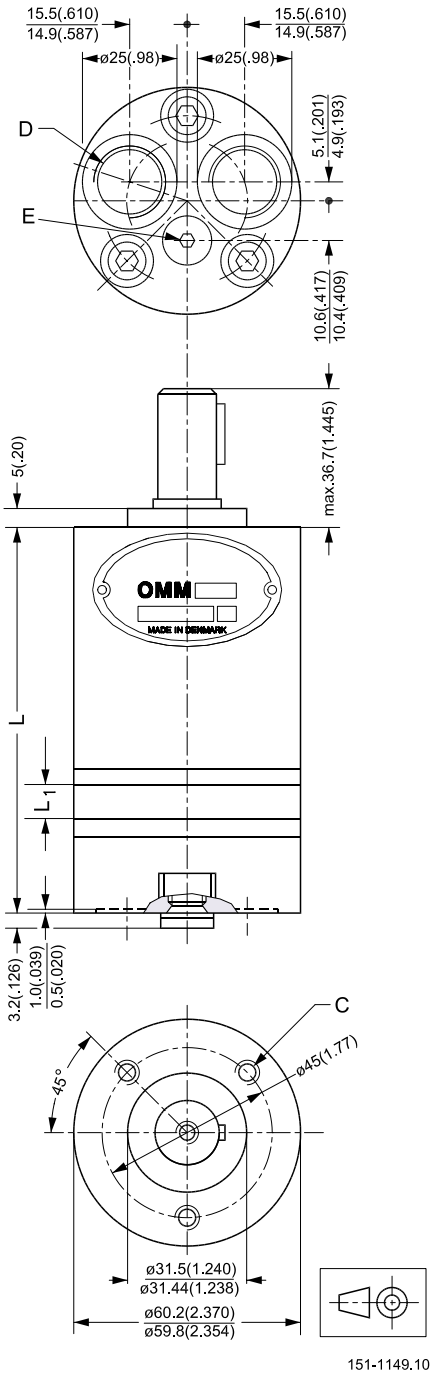
151-1148.10

DIMENSIONS

OMM.
End port version.

Type	$L_{max.}$	L_1 mm [in]
OMM 8	104.0 [4.09]	3.5 [0.14]
OMM 12.5	106.0 [4.17]	5.5 [0.22]
OMM 20	109.0 [4.29]	8.5 [0.33]
OMM 32	114.0 [4.49]	13.5 [0.53]
OMM 50	122.0 [4.80]	21.5 [0.85]

C: 1/4 - 28 UNF - 2B;
min. 10 mm [0.39 in] deep
D: 9/16 - 18 UNF;
12 mm [0.47 in] deep
O-ring boss port
E: 3/8 - 24 UNF;
8 mm [0.39 in] deep
O-ring port



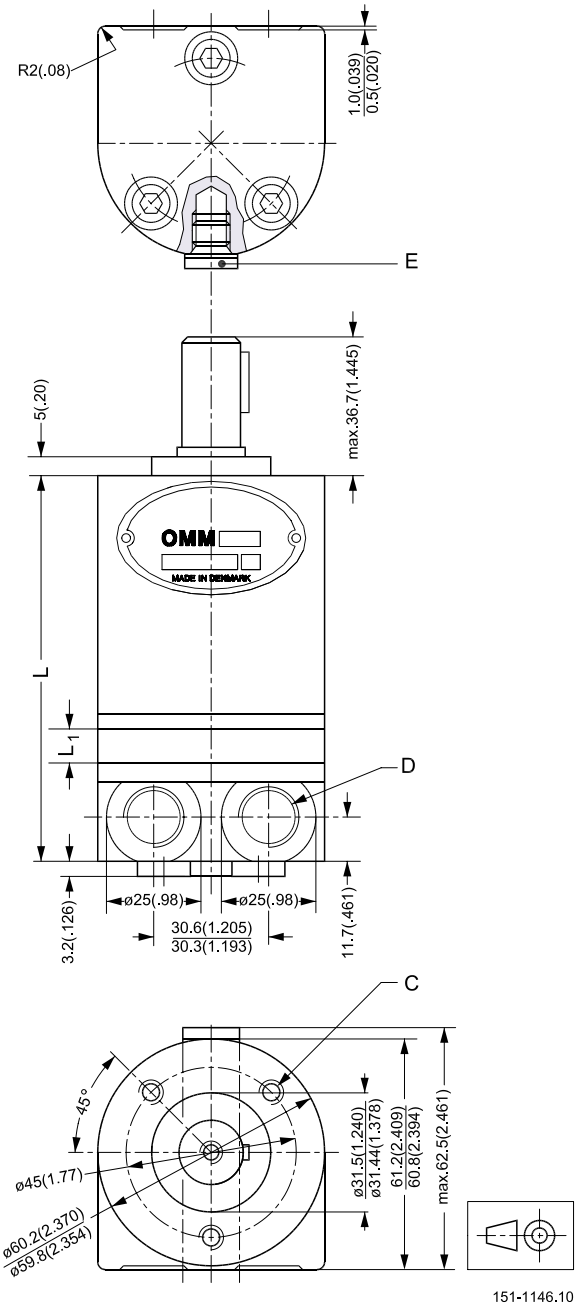
Dimensions – European version

DIMENSIONS

OMM.
Side port version.

Type	$L_{max.}$	L_1 mm [in]
OMM 8	105.8 [4.17]	3.5 [0.14]
OMM 12.5	107.8 [4.24]	5.5 [0.22]
OMM 20	110.8 [4.36]	8.5 [0.33]
OMM 32	115.8 [4.56]	13.5 [0.53]
OMM 40	118.0 [4.65]	17.0 [0.67]
OMM 50	123.8 [4.87]	21.5 [0.85]

C: M6; 10 mm [0.39 in] deep
D: G $^3/_8$; 12 mm [0.47 in] deep
E: Drain connection G $^1/_8$;
8 mm [0.39 in] deep

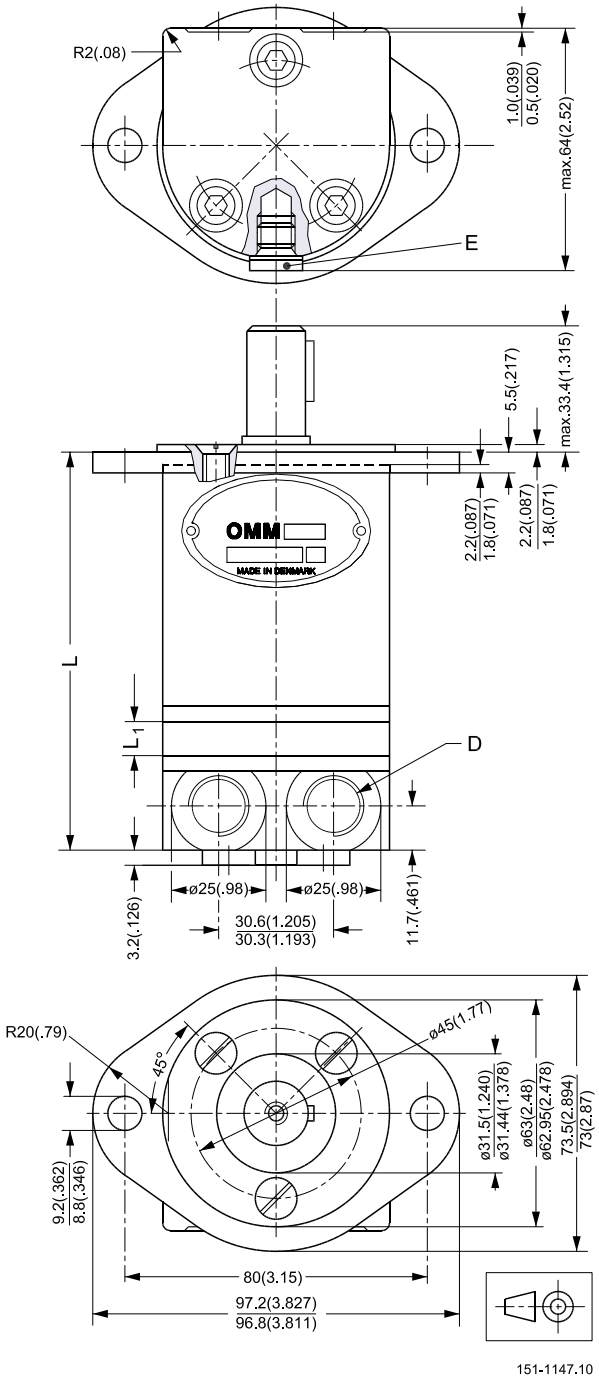


DIMENSIONS

OMM.
Side port version with extra mounting flange.

Type	$L_{max.}$	L_1 mm [in]
OMM 8	109.3 [4.30]	3.5 [0.14]
OMM 12.5	111.3 [4.38]	5.5 [0.22]
OMM 20	114.3 [4.50]	8.5 [0.33]
OMM 32	119.3 [4.70]	13.5 [0.53]
OMM 40	118.0 [4.65]	17.0 [0.67]
OMM 50	127.3 [5.01]	21.5 [0.85]

D: G 3/8; 12 mm [0.47 in] deep
E: Drain connection G 1/8; 8 mm [0.39 in] deep

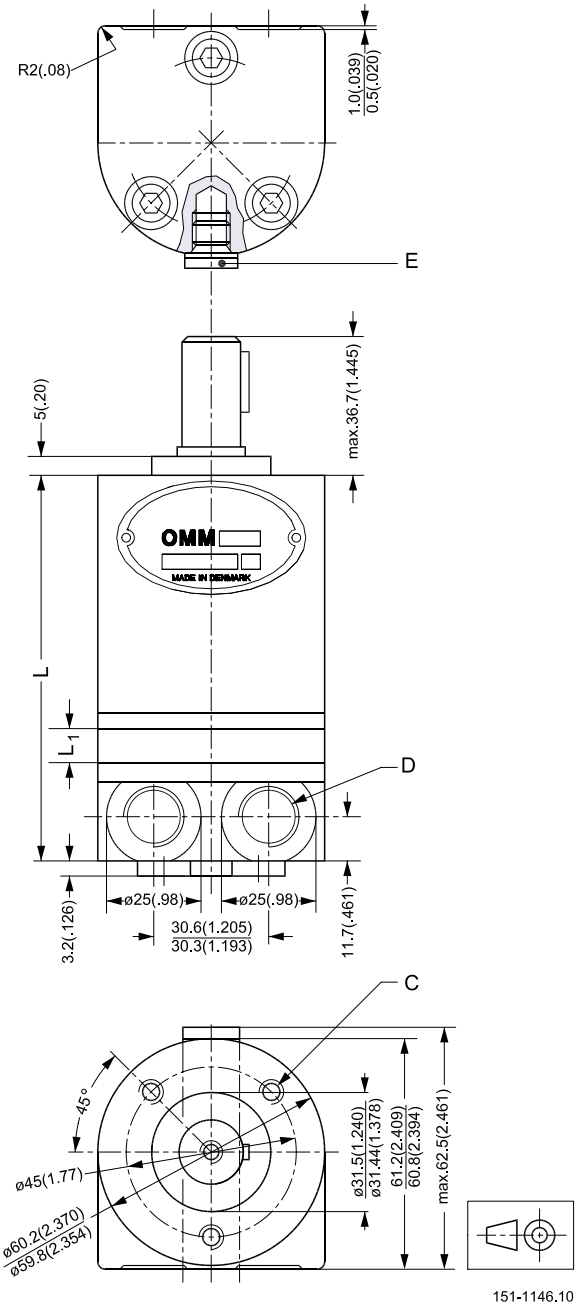


DIMENSIONS

OMM.
Side port version.

Type	$L_{max.}$	L_1 mm [in]
OMM 8	105.8 [4.17]	3.5 [0.14]
OMM 12.5	107.8 [4.24]	5.5 [0.22]
OMM 20	110.8 [4.36]	8.5 [0.33]
OMM 32	115.8 [4.56]	13.5 [0.53]
OMM 50	121.8 [4.80]	21.5 [0.85]

C: 1/4 - 28 UNF - 2B;
min. 10 mm [0.39 in] deep
D: 9/16 - 18 UNF;
12 mm [0.47 in] deep
E: 3/8 - 24 UNF;
8 mm [0.39 in] deep



WEIGHT OF MOTORS

Code no.	Weight	
	kg	lb
151G0001	2.0	4.4
151G0002	2.1	4.6
151G0003	2.2	4.8
151G0004	2.0	4.4
151G0005	2.1	4.6
151G0006	2.2	4.8
151G0013	2.4	5.3
151G0024	2.0	4.4
151G0025	2.1	4.6
151G0026	2.2	4.8
151G0027	2.0	4.4
151G0028	2.1	4.6
151G0029	2.2	4.8

Code no.	Weight	
	kg	lb
151G0031	2.0	4.4
151G0032	2.2	4.8
151G0033	2.2	4.8
151G0034	2.0	4.4
151G0035	2.2	4.8
151G0036	2.2	4.8
151G0037	2.4	5.3
151G0040	1.9	4.2
151G0041	1.9	4.2
151G0046	1.9	4.2
151G0047	1.9	4.2
151G0048	1.9	4.2

Code no.	Weight	
	kg	lb
151G0049	1.9	4.2
151G0094	2.4	5.3
151G0277	2.3	5.1
151G0279	2.3	5.1
151G2001	1.0	2.2
151G2002	1.0	2.2
151G2003	1.1	2.4
151G2004	1.2	2.6
151G2021	1.0	2.2
151G2022	1.0	2.2
151G2023	1.1	2.4
151G2024	1.2	2.6

INSTALLATION OF THE SAUER-DANFOSS ORBITAL MOTORS

About the design

- To ensure efficient operation all hydraulic components must be installed according to their individual instructions.
- The pump line must include a manometer connection.
- To ensure designed contact and minimise the tension all mounting flanges must be flate.
  Hydraulic lines must be fitted correctly to prevent air entrappment.

About the assembly

- Follow the mounting instructions printed on the inside of the cardboard box.
- To prevent contamination, do not dismantle the plastic plugs from the connection ports untill the fittings are ready to be assempled.
- Check that there is full face contact between the motor mounting flange and the mating part.
- Do not force the motor into place when tightening the mounting screws.
- Avoid unsuitable sealing material on fittings such as pack twine, teflon and others. Use only bonded seals, O-rings, steel washers and the like.
- When tightening the fittings never use a torque higher than the max. tightening torque stated in the instructions.
- Make sure that the cleanliness of the oil used is better than 20/16 (ISO 4406). Always use a filter for oil refilling.

STARTING UP AND RUNNING IN THE HYDRAULIC SYSTEM

- Through a small-meshed filter fill up the tank with oil to the upper oil level mark .
- Start the drive engine, and if possible, let it work at its lowest speed. If the motor is provided with bleed screws, keep these open until the emerging oil is non-foaming.
- Check that all components are correctly connected (pump following the right direction of rotation etc.).
- In load-sensing systems, also make sure that the signal lines are bled.
- Indications of air in the hydraulic system:
  - oam in the tank
  - jerky movements of motor and cylinder
  - noise
- If so required, refill with oil.
- Connect the system to a separate tank that includes a filter (fineness max. 10 µm) with twice the capacity of the max. oil flow. Let the entire system run without load (no pressure) for about 30 minutes.
- Do not load the system until it is all bled and clean.
- Check the tightness of the system and make sure that its performance is satisfactory.
- Change the oil filter, and if so required, refill with oil.

OPERATION

- Do not expose the motor to pressures, pressure drops and speeds above the max. values stated in the catalogue.
- Filter the oil to ensure that the contamination level 20/16 (ISO 4406) or better.

MAINTENANCE

- When working with hydraulic systems, the main criteria of operating safety and endurance is careful maintenance
- Always renew and replace oil, oil filters and air filters according to the instructions given by the respective manufacturers
- Regularly check the condition of the oil
- Frequently check system tightness and oil level

SAUER DANFOSS

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

Radial piston 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

Digital electronics and software

Battery powered inverter

Sensors

DKMH.PK.170.C4.02 **520L0346** 02/2002

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.

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Sauer-Danfoss (US) Company
2800 East 13th Street
Ames, IA 50010, USA
Phone: +1 515 239-6000, Fax: +1 515 239-6618

Sauer-Danfoss (Neumünster) GmbH & Co. OHG
Postfach 2460, D-24531 Neumünster
Krokamp 35, D-24539 Neumünster, Germany
Phone: +49 4321 871-0, Fax: +49 4321 871-122

Sauer-Danfoss (Nordborg) A/S
DK-6430 Nordborg, Denmark
Phone: +45 7488 4444, Fax: +45 7488 4400

www.sauer-danfoss.com

Menu

SAUER DANFOSS

OMS, OMT and OMV Orbital Motors

Technical Information









OMS, OMT and OMV
Technical Information
A wide range of orbital motors



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A WIDE RANGE OF ORBITAL MOTORS

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 cm^3 [0.50 in^3] to 800 cm^3 [48.9 in^3] 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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A wide range of orbital motors

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 orbital 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: TMT

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

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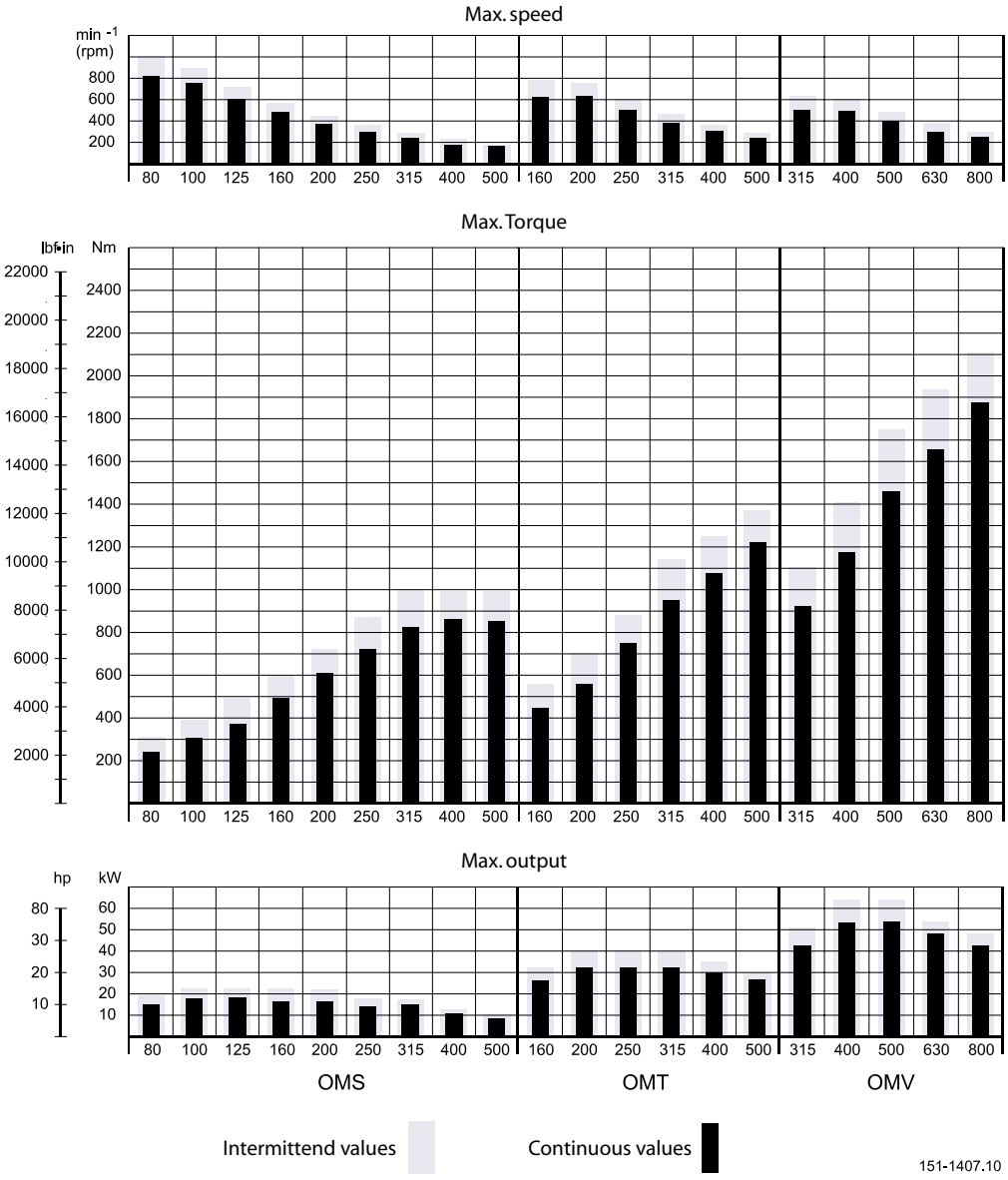
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SPEED, TORQUE AND OUTPUT



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.

- OMS can be found on pages 14-18
- OMT can be found on pages 42-44
- OMV can be found on pages 65-67

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" DHMH.PK.100.G2.02 520L0232.

VERSIONS

Mounting flange	Shaft	Port size	European version	US version	Drain connection	Check valve	Main type designation
Standard flange	Cyl. 32 mm	G 1/2	❍		Yes	Yes	OMS
	Cyl. 1.25 in	7/8-14 UNF		❍	Yes	Yes	OMS
	Splined 1.25 in	G 1/2	❍		Yes	Yes	OMS
		7/8-14 UNF		❍	Yes	Yes	OMS
	Tapered 35 mm	G 1/2	❍		Yes	Yes	OMS
	Tapered 1.25 in	7/8-14 UNF		❍	Yes	Yes	OMS
	P.t.o.	G 1/2	❍		Yes	Yes	OMS
Special flange	Splined 1.25 in	G 1/2	❍		Yes	Yes	OMS
A-2 flange	Cyl. 1 in	7/8-14 UNF		❍	Yes	Yes	OMS
	Cyl. 1.25 in	7/8-14 UNF		❍	Yes	Yes	OMS
	Splined 1 in	7/8-14 UNF		❍	Yes	Yes	OMS
	Splined 1.25 in	7/8-14 UNF		❍	Yes	Yes	OMS
	Tapered 1.25 in	7/8-14 UNF		❍	Yes	Yes	OMS
Magneto flange	Cyl. 1 in	7/8-14 UNF		❍	Yes	Yes	OMS
	Cyl. 1.25 in	7/8-14 UNF		❍	Yes	Yes	OMS
	Splined 1 in	7/8-14 UNF		❍	Yes	Yes	OMS
	Splined 1.25 in	7/8-14 UNF		❍	Yes	Yes	OMS
SAE B flange	Splined 1.25 in	7/8-14 UNF		❍	Yes	Yes	OMS
	Splined 0.875 in	7/8-14 UNF		❍	Yes	Yes	OMS
Wheel	Cyl. 32 mm	G 1/2	❍		Yes	Yes	OMSW
	Cyl. 1.25 in	7/8-14 UNF		❍	Yes	Yes	OMSW
	Tapered 35 mm	G 1/2	❍		Yes	Yes	OMSW
	Tapered 1.25 in	7/8-14 UNF		❍	Yes	Yes	OMSW
Short	No output shaft	G 1/2	❍		Yes	Yes	OMSS

Function diagram - see page : ⟶

Features available (options) :
Speed sensor
Motor with tacho connection
High pressure shaft seal
Viton shaft seal
Painted
Ultra short
Motor with drum brake

CODE NUMBERS

CODE NUMBERS	Displacement [cm³]									Technical data – Page	Shaft loads – Page	Dimensions – Page
	80	100	125	160	200	250	315	400	500			
151F	0500	0501	0502	0503	0504	0505	0506	0605	–	8	11	23
151F	2200	2201	2202	2203	2204	2205	2206	2261	2268	8	11	24
151F	0507	0508	0509	0510	0511	0512	0513	–	–	8	11	23
151F	2207	2208	2209	2210	2211	2212	2213	2262	2269	8	11	24
151F	0514	0515	0516	0517	0518	0519	0520	–	–	8	11	23
151F	2214	2215	2216	2217	2218	2219	2220	2264	2270	8	11	24
151F	0560	0561	0562	0563	0564	0565	0566	–	–	8	11	23
151F	0542	0543	0544	0545	0546	0547	0548	–	–	8	12	25
151F	2300	2301	2302	2303	2304	2305	2306	2307	2345	8	12	26
151F	2316	2317	2318	2319	2320	2321	2322	2323	2347	8	11	26
151F	2308	2309	2310	2311	2312	2313	2314	2315	2346	8	12	26
151F	2324	2325	2326	2327	2328	2329	2330	2331	2348	8	11	26
151F	2332	2333	2334	2335	2336	2337	2338	2339	2349	8	11	26
151F	2377	2378	2379	2380	2381	2382	2383	2384	2385	8	12	27
151F	2368	2369	2370	2371	2372	2373	2374	2375	2376	8	11	27
151F	2359	2360	2361	2362	2363	2364	2365	2366	2367	8	12	27
151F	2350	2351	2352	2353	2354	2355	2356	2357	2358	8	11	27
151F	2395	2396	2397	2398	2399	2400	2401	2402	2403	8	11	28
151F	2413	2414	2415	2416	2417	–	–	–	–	8	13	28
151F	0521	0522	0523	0524	0525	0526	0527	0610	–	8	11	29
151F	2235	2236	2237	2238	2239	2240	2241	2265	2266	8	11	30
151F	0528	0529	0530	0531	0532	0533	0534	0609	–	8	11	29
151F	2242	2243	2244	2245	2246	2247	2248	2263	2267	8	11	30
151F	0535	0536	0537	0538	0539	0540	0541	0608	–	8	–	31
	14	14	15	15	16	16	17	17	18			

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

Example:
151F0504 for an OMS 200 with standard flange, cyl. 32 mm shaft and port size G $^{1}/_{2}$.

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

TECHNICAL DATA FOR OMS

Type			OMS OMSW OMSS	OMS OMSW OMSS	OMS OMSW OMSS	OMS OMSW OMSS	OMS OMSW OMSS	OMS OMSW OMSS	OMS OMSW OMSS	OMS OMSW OMSS	OMS OMSW OMSS
Motor size			**80**	**100**	**125**	**160**	**200**	**250**	**315**	**400**	**500**
Geometric displacement	cm^3 [in^3]		80.5 [4.91]	100.0 [6.10]	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} [rpm]	cont.	810	750	600	470	375	300	240	190	155
		int.[1]	1000	900	720	560	450	360	285	230	185
Max. torque*	Nm [lbf·in]	cont.	240 [2120]	305 [2700]	375 [3320]	490 [4340]	610 [5400]	720 [6370]	825 [7300]	865 [7660]	850 [7520]
		int.[1]	310 [2740]	390 [3450]	490 [4340]	600 [5310]	720 [6370]	870 [7700]	1000 [8850]	990 [8760]	990 [8760]
Max. output	kW [hp]	cont.	15.5 [20.8]	18.0 [24.1]	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]	19.5 [26.2]	22.5 [30.2]	22.5 [30.2]	23.0 [30.8]	22.0 [29.5]	18.0 [24.1]	17.0 [22.8]	12.5 [16.8]	10.5 [14.1]
Max. pressure drop*	bar [psi]	cont.	210 [3050]	210 [3050]	210 [3050]	210 [3050]	210 [3050]	200 [2900]	200 [2900]	160 [2320]	120 [1740]
		int.[1]	275 [3990]	275 [3990]	275 [3990]	260 [3770]	250 [3630]	250 [3630]	240 [3480]	190 [2760]	140 [2030]
		peak[2]	295 [4280]	295 [4280]	295 [4280]	280 [4060]	270 [3920]	270 [3920]	260 [3770]	210 [3050]	160 [2320]
Max. oil flow	l/min [USgal/min]	cont.	65 [17.2]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]
		int.[1]	80 [21.1]	90 [23.8]	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]		12 [175]	10 [145]	10 [145]	8 [115]	8 [115]	8 [115]	8 [115]	8 [115]	8 [115]
Min. starting torque	at max. press. drop cont. Nm [lbf·in]		180 [1590]	230 [2040]	290 [2570]	370 [3270]	470 [4160]	560 [4960]	710 [6280]	710 [6280]	660 [5840]
	at max. press. drop int.[1] Nm [lbf·in]		235 [2080]	300 [2660]	380 [3360]	460 [4070]	560 [4960]	700 [6200]	850 [7520]	840 [7430]	770 [6820]

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

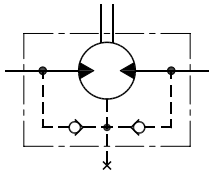
			Splined 1 in	Cyl. 1 in	Splined 0.875 in
*Max torque for shaft type	Nm [lbf·in]	cont.	360 [3190]	300 [2660]	200 [1770]
		int.[1]	450 [3980]	410 [3630]	200 [1770]

[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

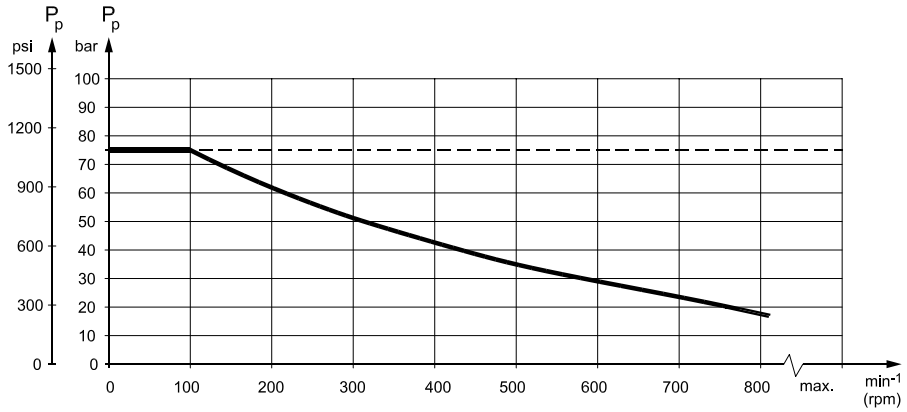
OMS with standard shaft seal, check valves and without use of drain connection:
The pressure on the shaft seal never exceeds the pressure in the return line



151-320.10

OMS with standard shaft seal, 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 the drain line

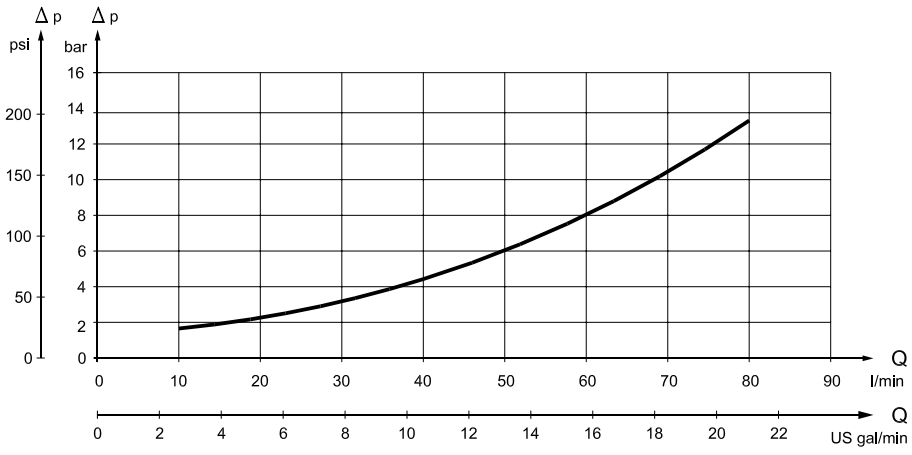


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– – – – Intermittent operation: the permissible values may occur for max. 10% of every minute.

——— Continuous operation

PRESSURE DROP IN MOTOR



151-1408.10

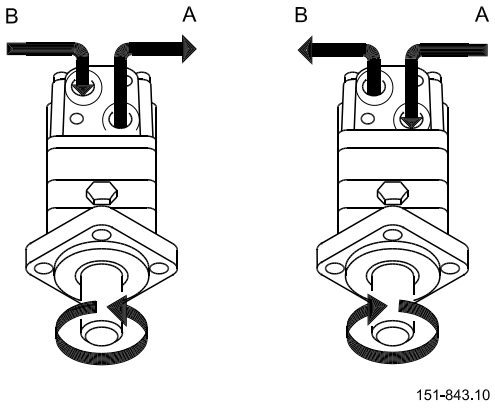
The curve applies to an unloaded motor shaft and an oil viscosity of 35 mm^2/s [165 SUS]

OIL FLOW IN DRAIN LINE

The table 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 mm²/s [SUS]	Oil flow in drain line l/min [US gal/min]
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]

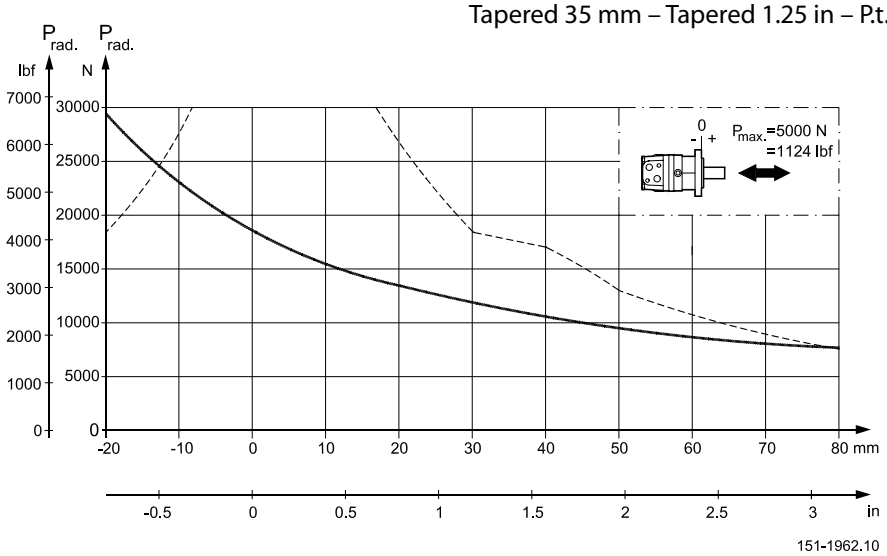
DIRECTION OF SHAFT ROTATION



PERMISSIBLE SHAFT LOADS FOR OMS

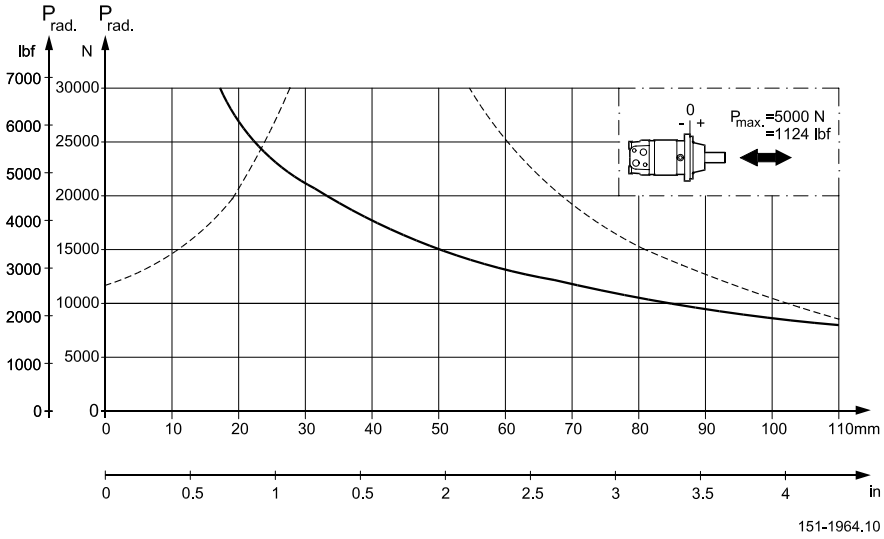
Mounting flange:
Standard – A-2 – Magneto – SAE B

Shaft:
Cyl. 32 mm – Cyl. 1.25 in – Splined 1.25 in.
Tapered 35 mm – Tapered 1.25 in – P.t.o.



Mounting flange:
Wheel

Shaft:
All shaft types

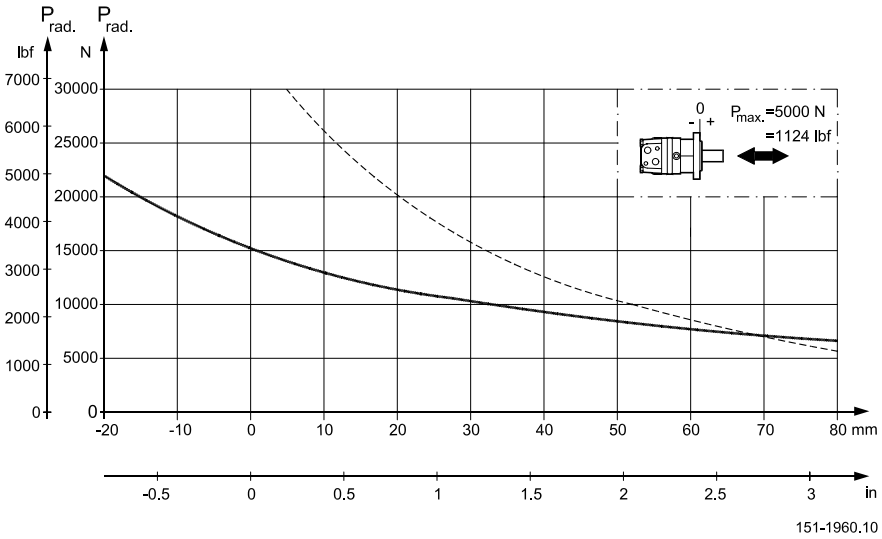


The output shaft runs in tapered roller bearings that permit high axial and radial forces. The permissible radial load on the shaft is shown for an axial load of 0 N as a function of the distance from the mounting flange to the point of load application.
The curve is based on B10 bearing life (2000 hours 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" DHMH.PK.100.G2.02 520L0232.

PERMISSIBLE SHAFT LOADS FOR OMS

Mounting flange:
Special

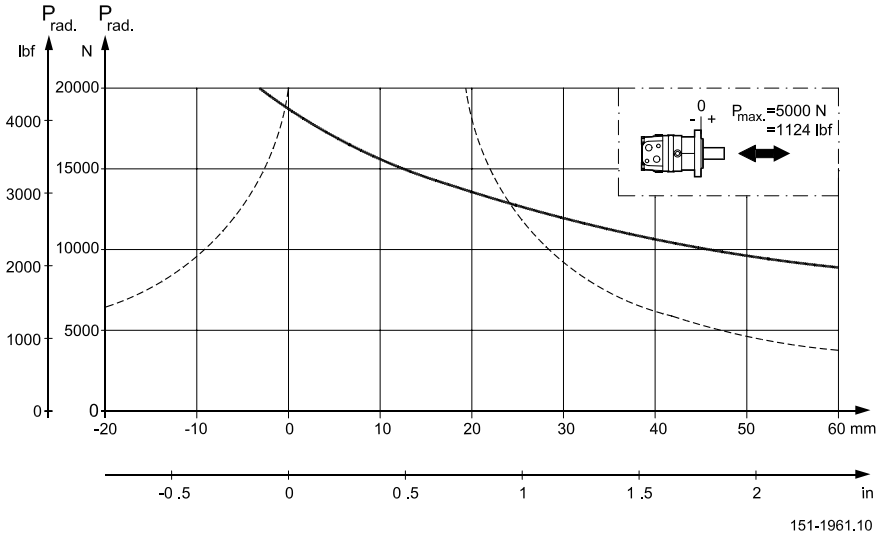
Shaft:
Splined 1.25 in



151-1960.10

Mounting flange:
A-2 – Magneto

Shaft:
Cyl. 1 in – Splined 1 in



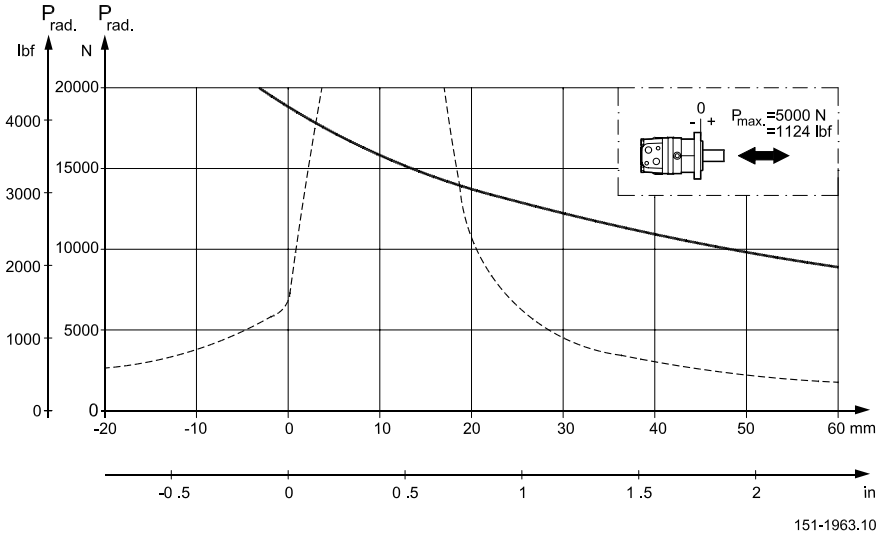
151-1961.10

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 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" DHMH.PK.100.G2.02 520L0232.

PERMISSIBLE SHAFT LOADS FOR OMS

Mounting flange:
SAE B

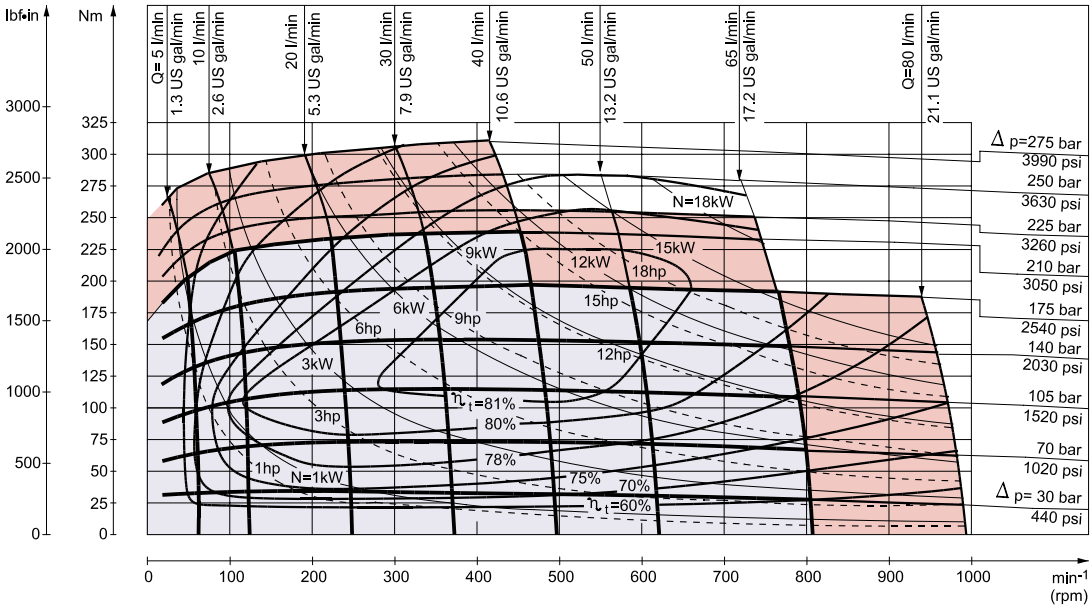
Shaft:
Splined 0.875 in



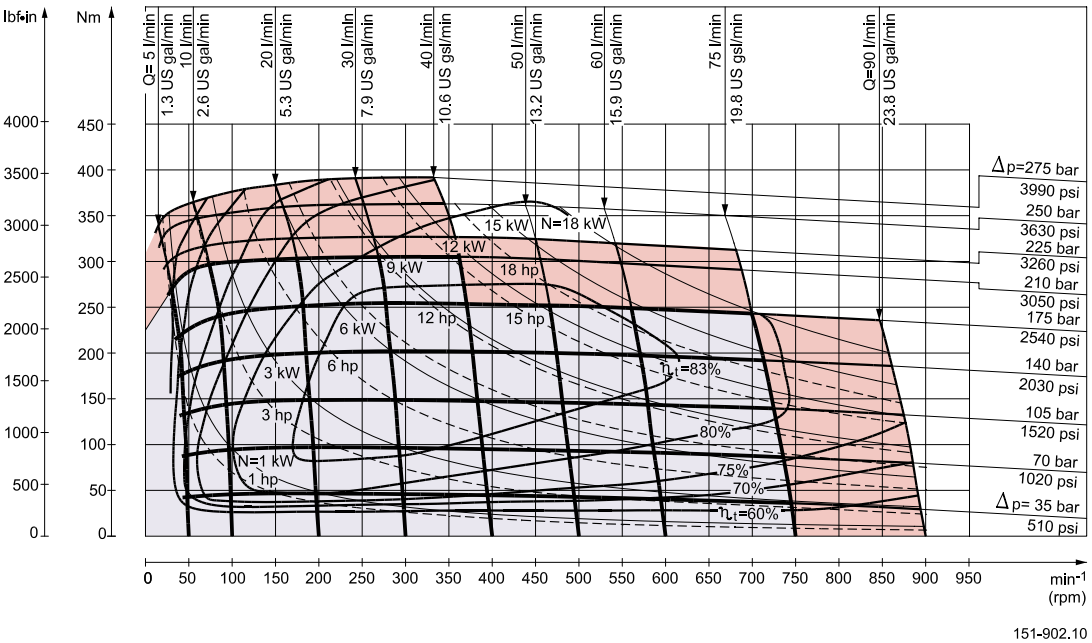
The output shaft runs in tapered roller bearings that permit high axial and radial forces. The permissible radial load on the shaft is shown for an axial load of 0 N as a function of the distance from the mounting flange to the point of load application.
The curve is based on B10 bearing life (2000 hours 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" DHMH.PK.100.G2.02 520L0232.

FUNCTION DIAGRAMS

OMS 80



OMS 100



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

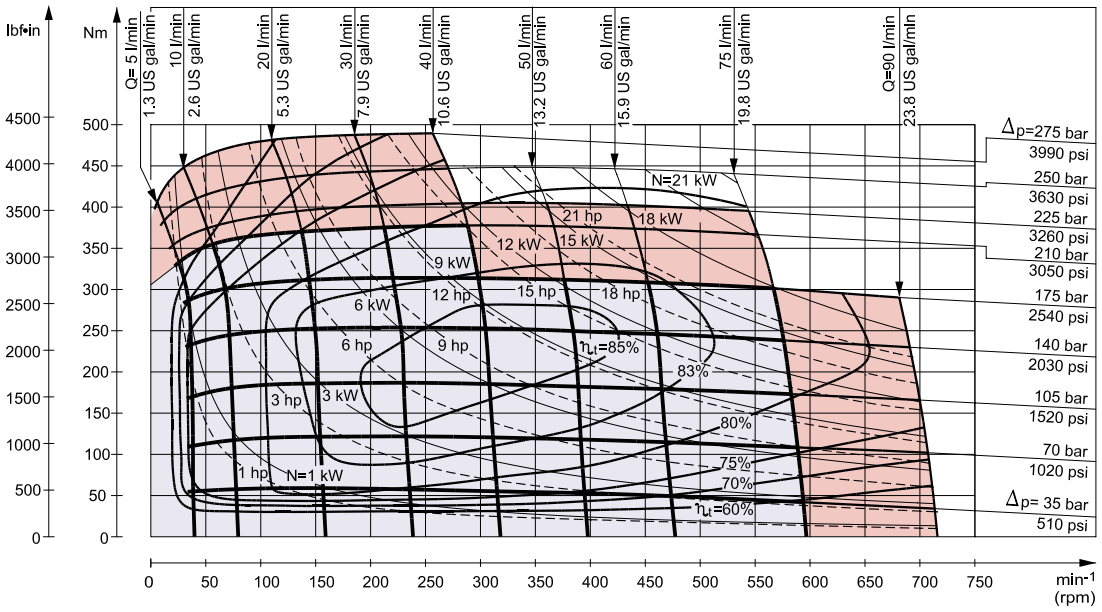
- Continuous range
- Intermittent range (max. 10% operation every minute)

Max. permissible continuous/intermittent torque for the actual shaft version can be found on page 8.

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

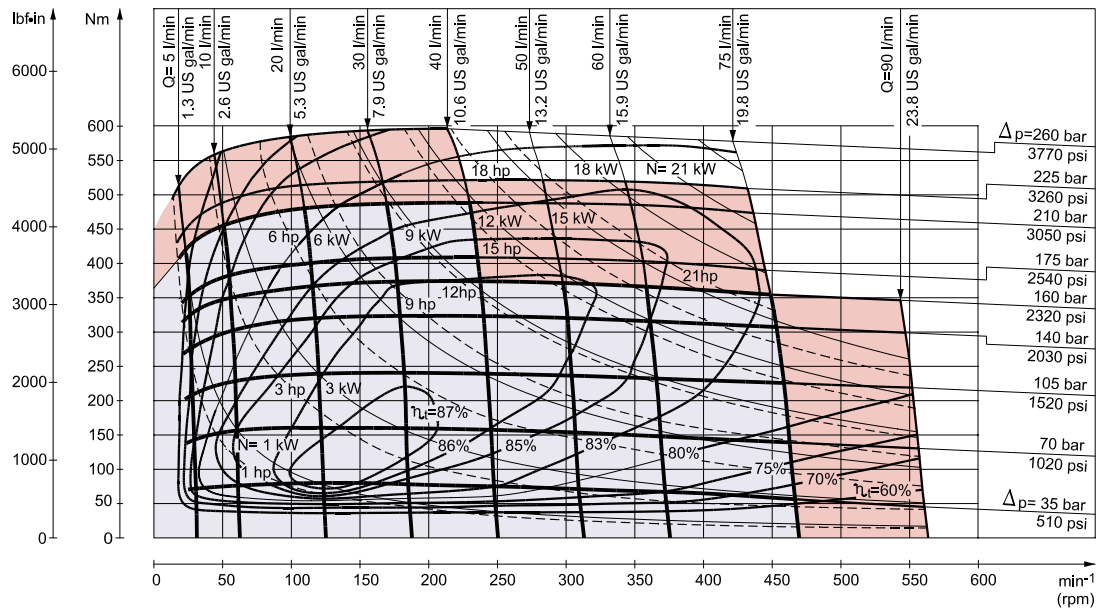
FUNCTION DIAGRAMS

OMS 125



151-903.10

OMS 160



151-904.10

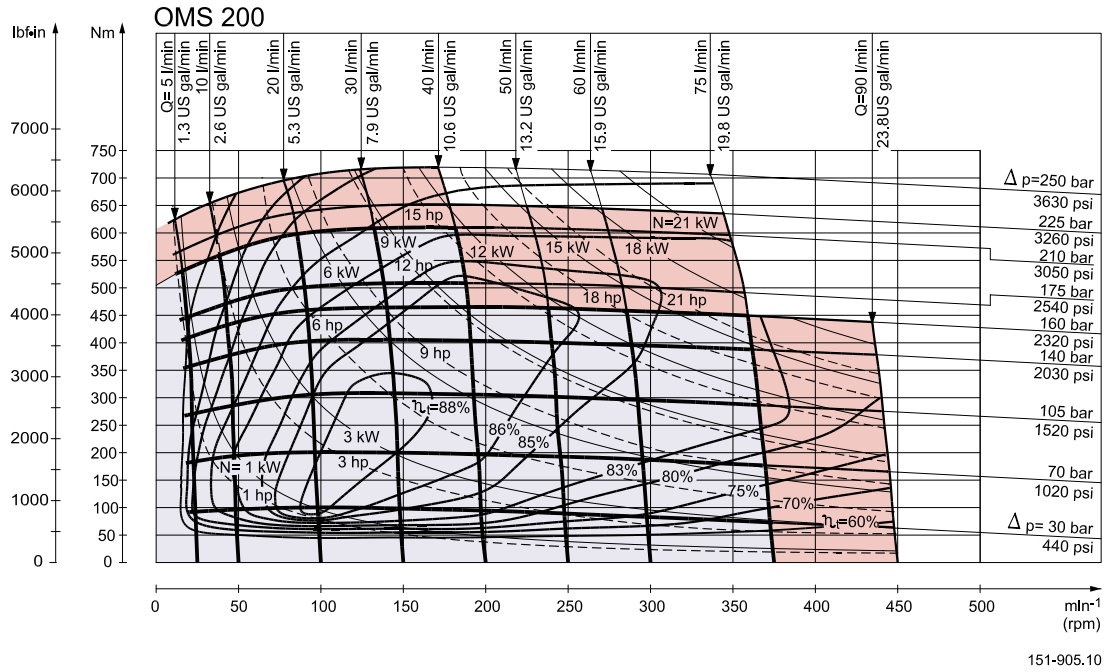
Explanation of function diagram use, basis and conditions can be found on page 5.

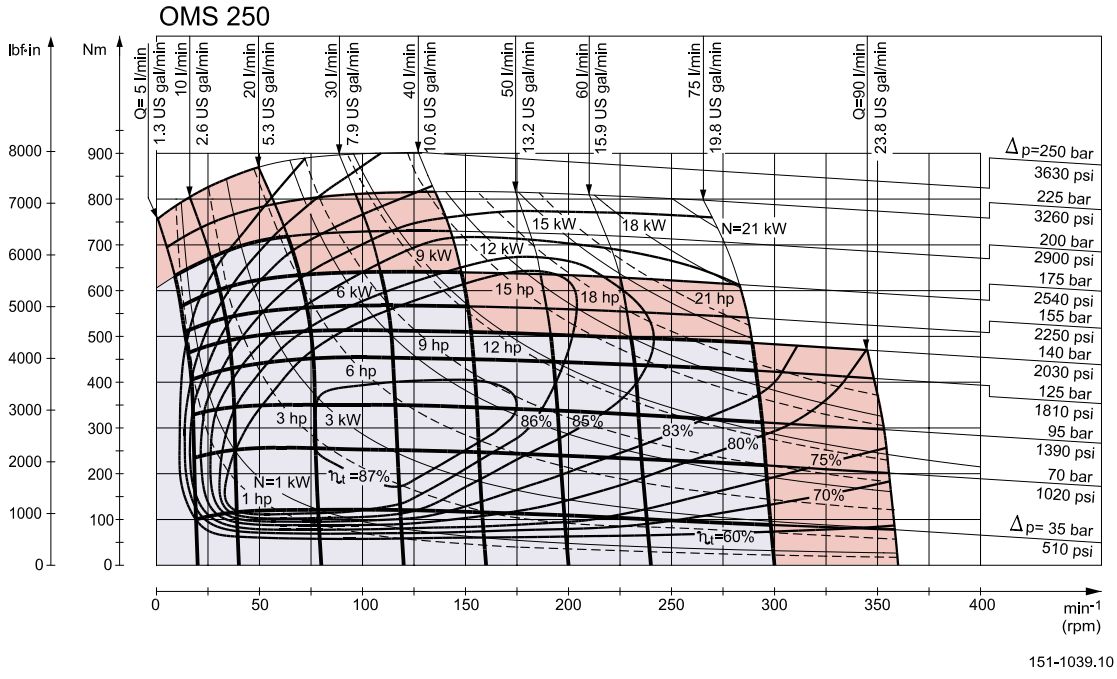
- Continuous range
- Intermittent range (max. 10% operation every minute)

Max. permissible continuous/intermittent torque for the actual shaft version can be found on page 8.

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

FUNCTION DIAGRAMS





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

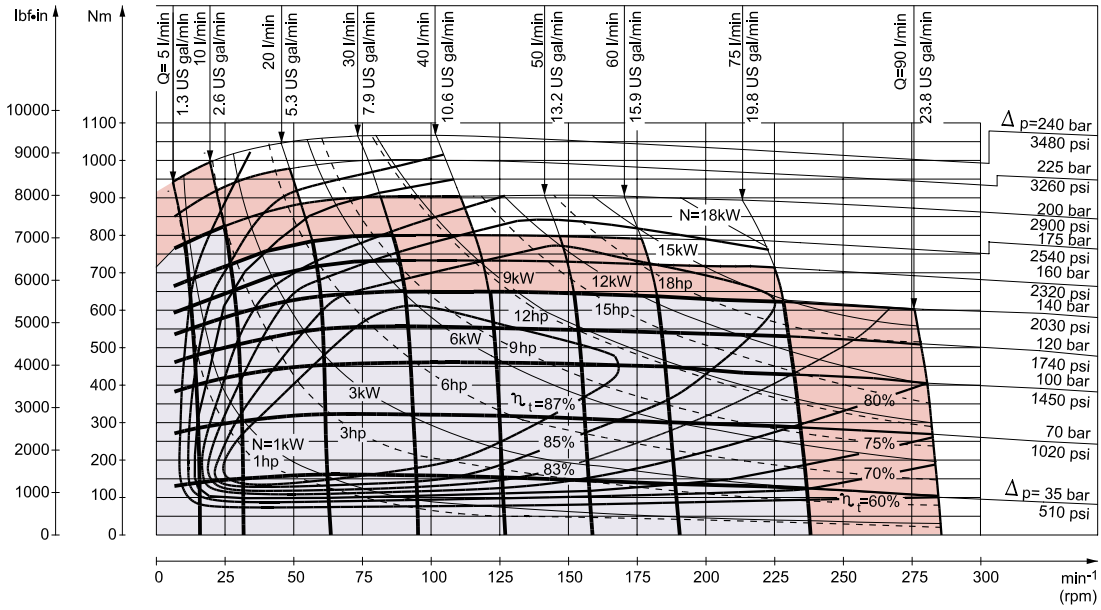
- Continuous range
- Intermittent range (max. 10% operation every minute)

Max. permissible continuous/intermittent torque for the actual shaft version can be found on page 8.

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

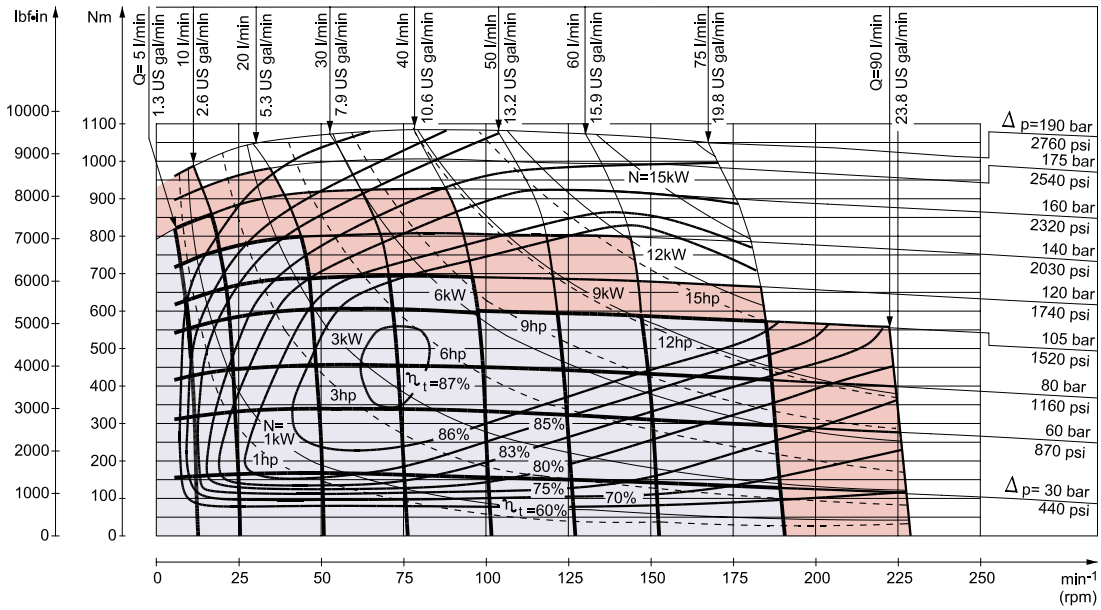
FUNCTION DIAGRAMS

OMS 315



151-906.10

OMS 400



151-1491.10

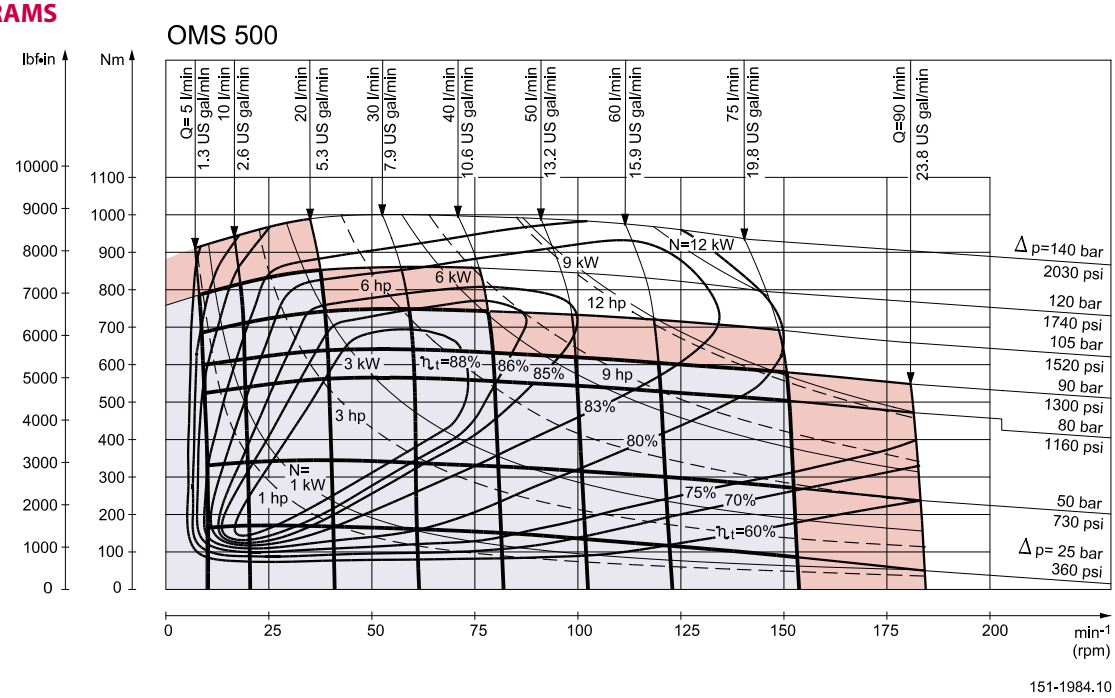
Explanation of function diagram use, basis and conditions can be found on page 5.

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

Max. permissible continuous/intermittent torque for the actual shaft version can be found on page 8.

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

FUNCTION DIAGRAMS



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

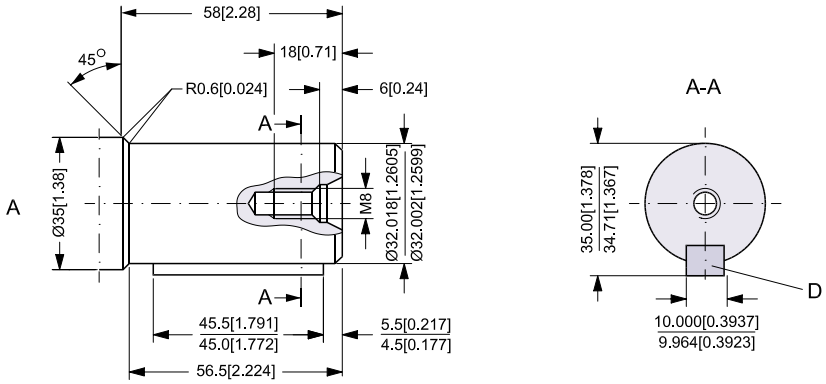
- Continuous range
- Intermittent range (max. 10% operation every minute)

Max. permissible continuous/intermittent torque for the actual shaft version can be found on page 8.

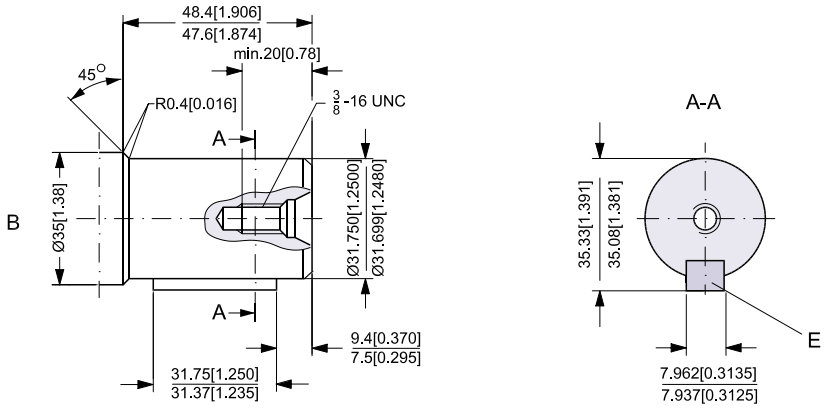
Note: Intermittent pressure drop and oil flow must not occur simultaneously.

SHAFT VERSION

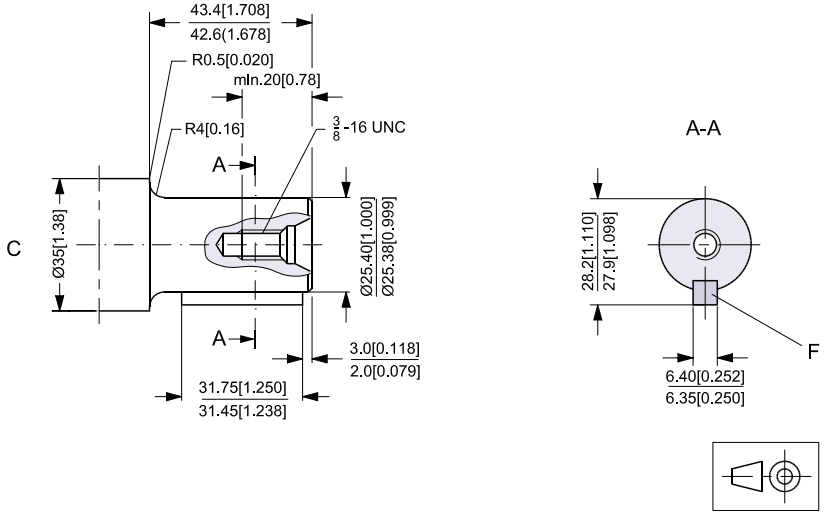
A: Cylindrical 32 mm shaft
D: Parallel key
A10 × 8 × 45
DIN 6885



B: Cylindrical 1.25 in shaft
E: Parallel key
$^{5}/_{16} \times {}^{5}/_{16} \times 1\,{}^{1}/_{4}$ in
SAE J744



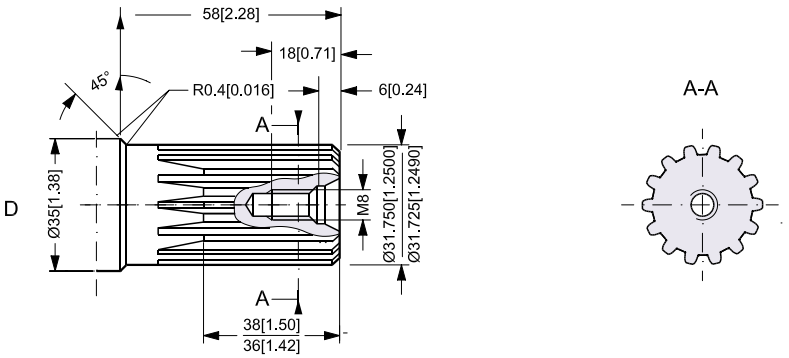
C: Cylindrical 1 in shaft
F: Parallel key
$^{1}/_{4} \times {}^{1}/_{4} \times 1\,{}^{1}/_{4}$ in
B.S. 46



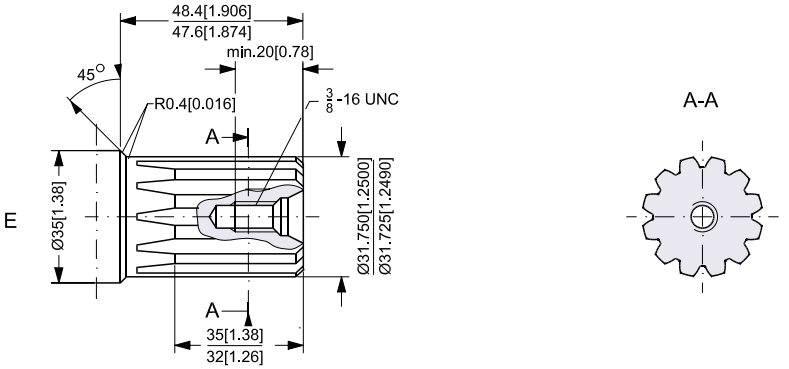
151-876.10

SHAFT VERSION

D. Involute splined shaft
ANS B92.1 - 1970 standard
Flat root side fit
Pitch 12/24
Teeth 14
Major dia. 1.25 in
Pressure angle 30°

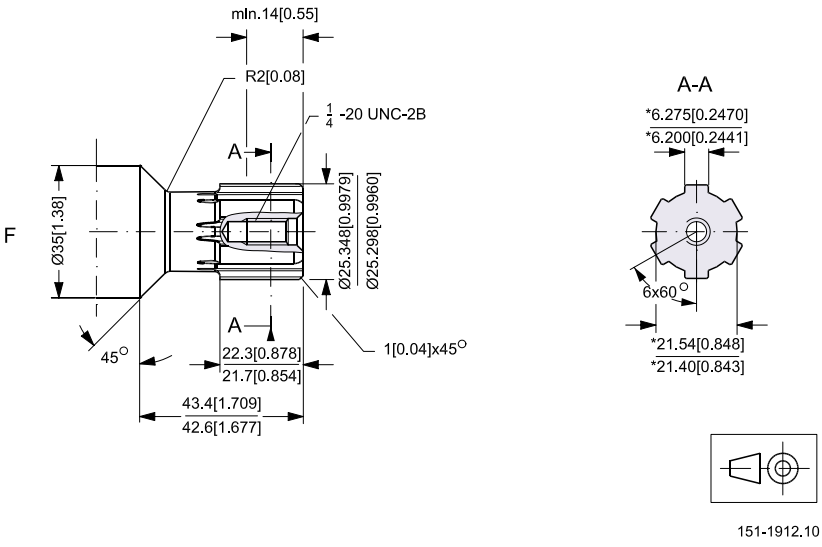


US version
E: Involute splined shaft
ANS B92.1 - 1970 standard
Flat root side fit
Pitch 12/24
Teeth 14
Major dia. 1.25 in
Pressure angle 30°



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

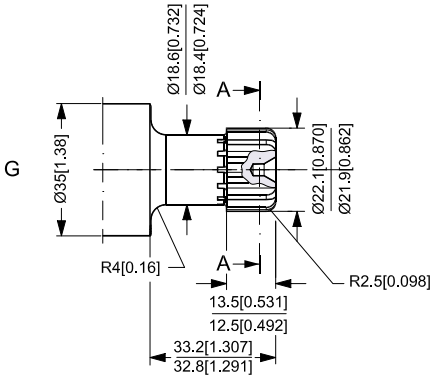
*Deviates from
SAE 6 B (B.S. 2059)

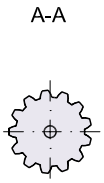


151-1912.10

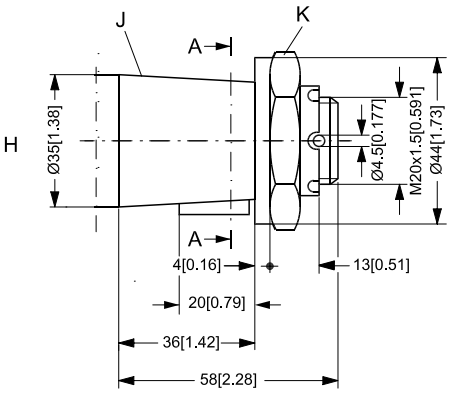
SHAFT VERSION

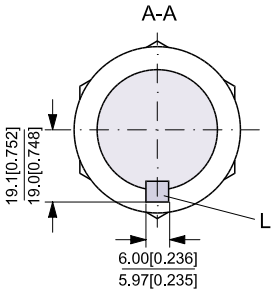
G. Involute splined shaft
ANS B92.1 - 1970 standard
Flat root side fit
Pitch 16/32
Teeth 13
Major dia. 0.875 in
Pressure angle 30°



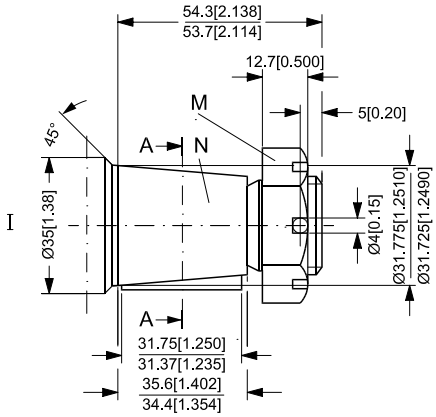


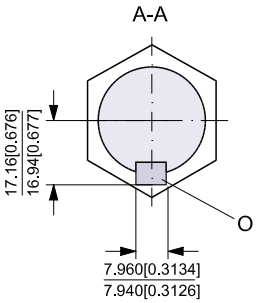
H: Tapered 35 mm shaft
(ISO/R775)
K: DIN 937
Across flats: 41 mm
Tightening torque:
200 ± 10 Nm [1770 ±85 lbf·in]
J: Taper 1:10
L: Parallel key
B6 × 6 × 20
DIN 6885

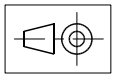




I: Tapered 1 1/4 in shaft
N: Cone 1:8
SAE J501
M: 1 - 20 UNEF
Across flats 1 7/16 in
Tightening torque:
200 ± 10 Nm (1770 ±85 lbf·in)
O: Parallel key
5/16 × 5/16 × 1 1/4
SAE J501





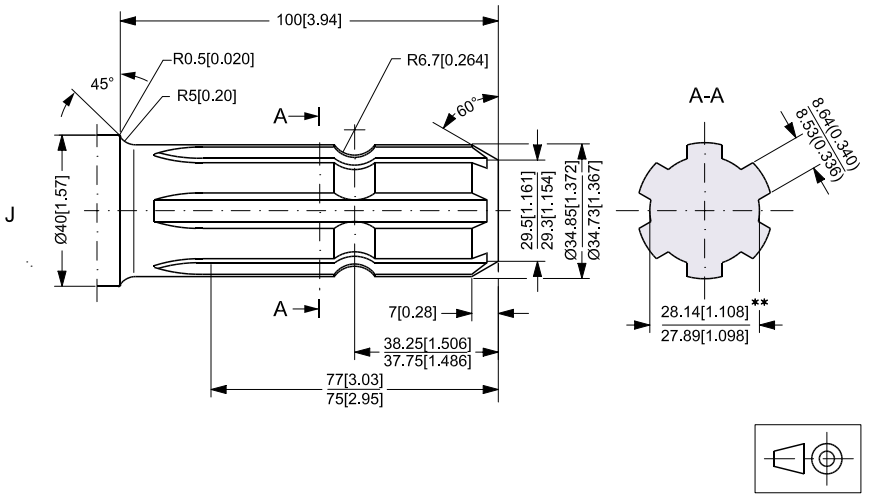


151-1915.10

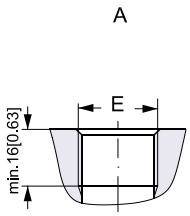
SHAFT VERSION

J. P.t.o. shaft
DIN 9611 Form 1
(ISO/R500 without pin hole)

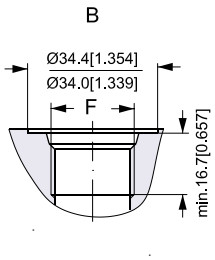
** Deviates from DIN 9611



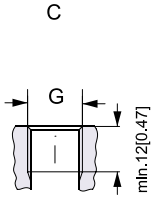
PORT THREAD VERSIONS



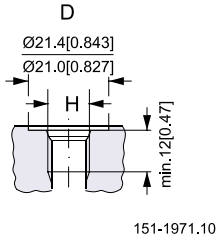
A: G main ports
E: ISO 228/1 - G1/2



B: UNF main ports
F: 7/8 - 14 UNF
O-ring boss port



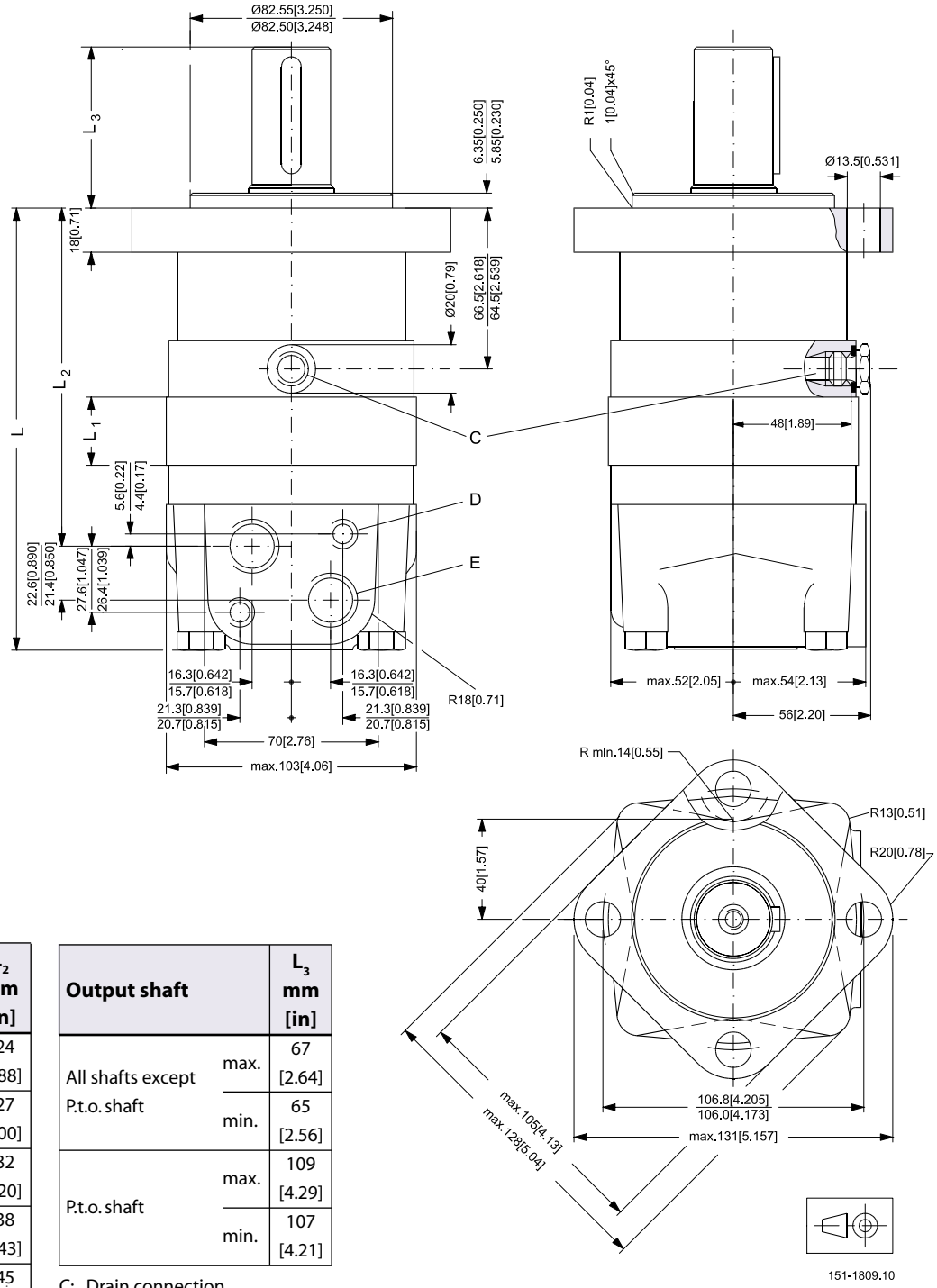
C: G drain port
G: ISO 228/1 - G1/4



D: UNF drain port
H: 7/16 - 20 UNF
O-ring boss port

Dimensions – European version

STANDARD FLANGE



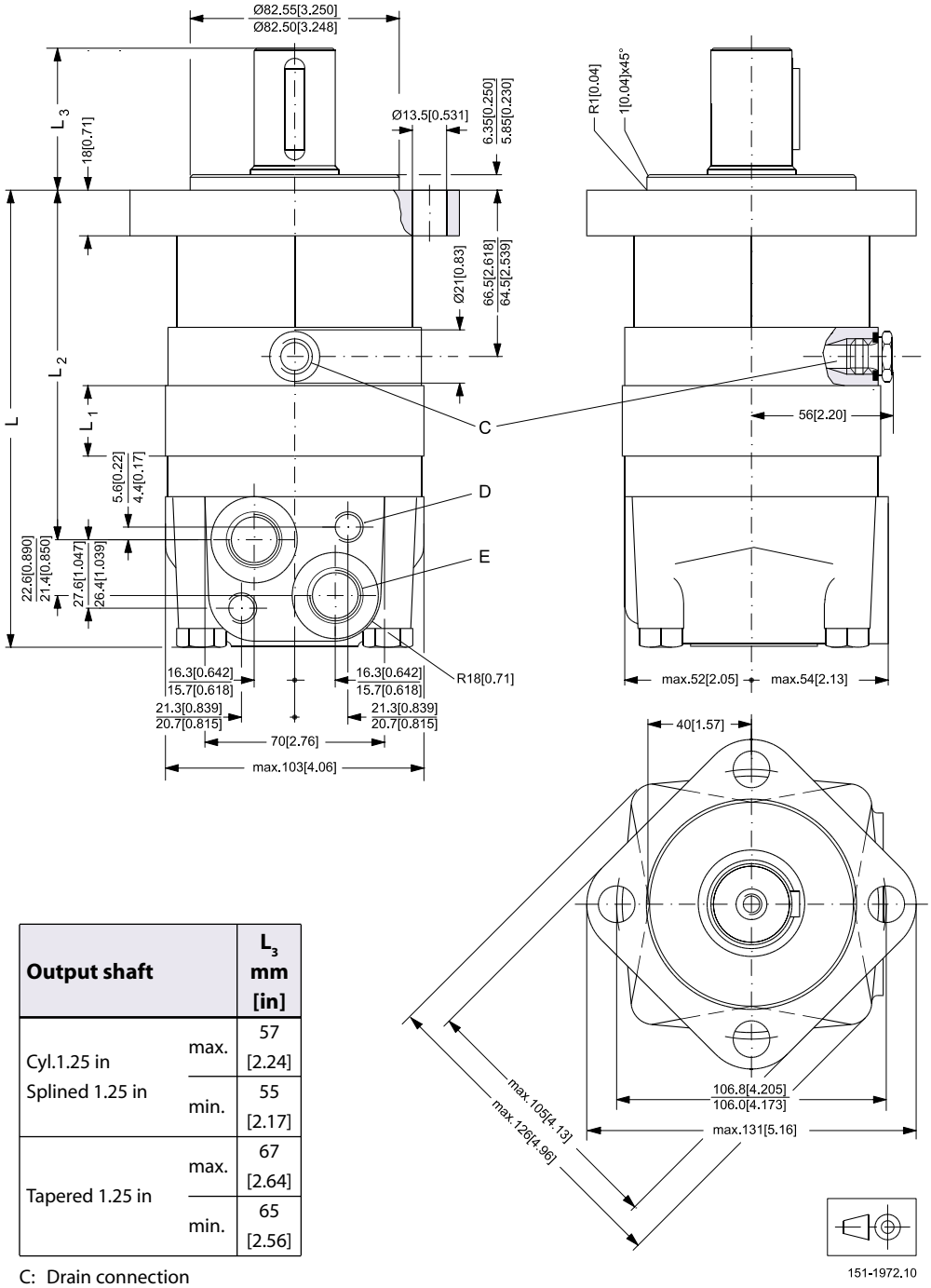
Type	$L_{max.}$ mm [in]	L_1 mm [in]	L_2 mm [in]
OMS 80	167 [6.57]	14.0 [0.551]	124 [4.88]
OMS 100	170 [6.69]	17.4 [0.685]	127 [5.00]
OMS 125	175 [6.89]	21.8 [0.858]	132 [5.20]
OMS 160	181 [7.13]	27.8 [1.094]	138 [5.43]
OMS 200	188 [7.40]	34.8 [1.370]	145 [5.71]
OMS 250	196 [7.72]	43.5 [1.713]	153 [6.02]
OMS 315	208 [8.19]	54.8 [2.157]	165 [6.50]
OMS 400	221 [8.70]	68.4 [2.693]	178 [7.01]

Output shaft		L_3 mm [in]
All shafts except P.t.o. shaft	max.	67 [2.64]
	min.	65 [2.56]
P.t.o. shaft	max.	109 [4.29]
	min.	107 [4.21]

C: Drain connection
G 1/4; 12 mm [0.47 in] deep
D: M10; 13 mm [0.51 in] deep
E: G 1/2; 15 mm [0.59 in] deep

Dimensions – US version

STANDARD FLANGE



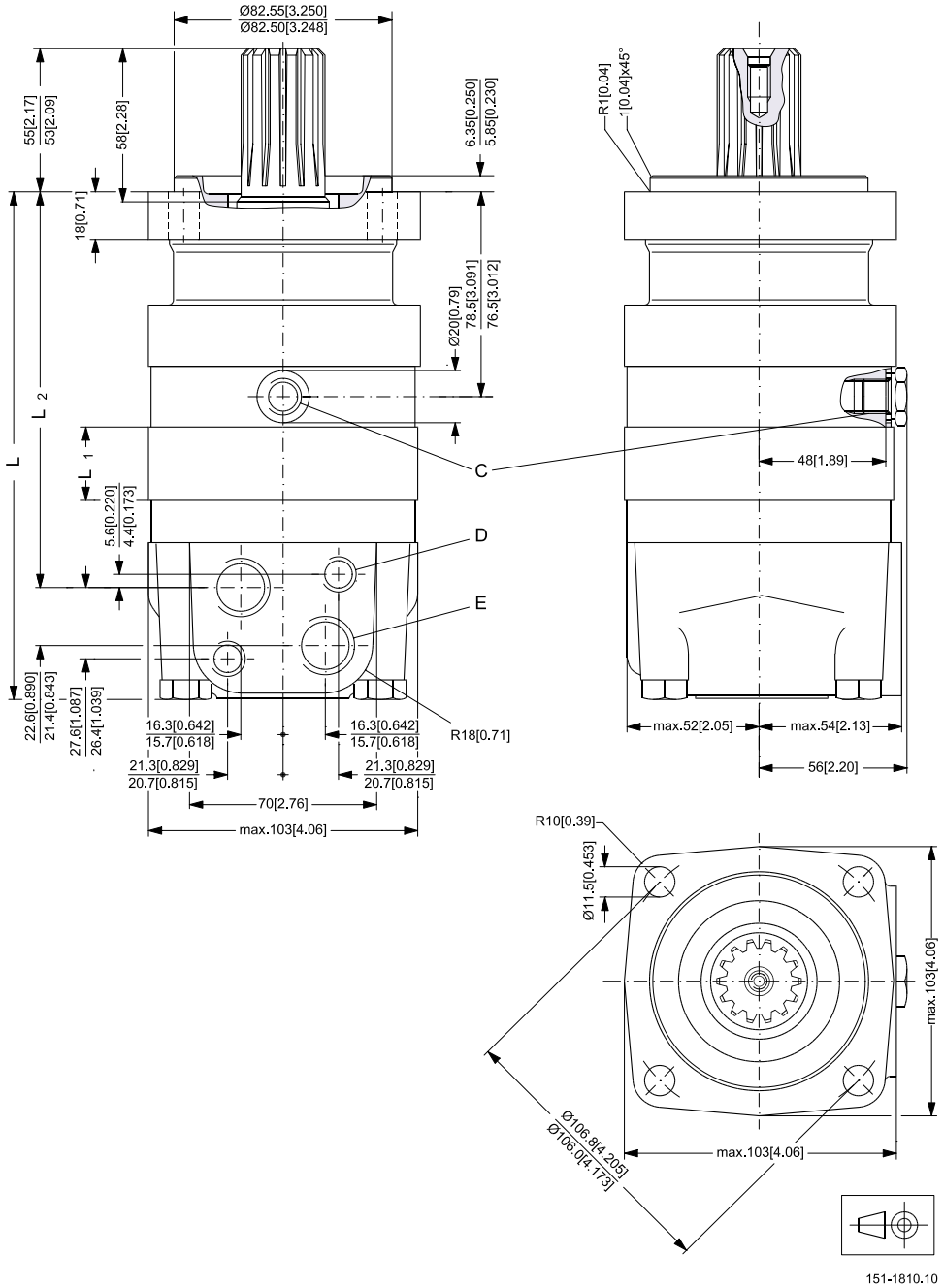
Type	$L_{max.}$ mm [in]	L_1 mm [in]	L_2 mm [in]
OMS 80	167 [6.57]	14.0 [0.551]	124 [4.88]
OMS 100	170 [6.69]	17.4 [0.685]	127 [5.00]
OMS 125	175 [6.89]	21.8 [0.858]	132 [5.20]
OMS 160	181 [7.13]	27.8 [1.094]	138 [5.43]
OMS 200	188 [7.40]	34.8 [1.370]	145 [5.71]
OMS 250	196 [7.72]	43.5 [1.713]	153 [6.02]
OMS 315	208 [8.19]	54.8 [2.157]	165 [6.50]
OMS 400	221 [8.70]	68.4 [2.693]	178 [7.01]
OMS 500	221 [8.70]	68.4 [2.693]	178 [7.01]

Output shaft		L_3 mm [in]
Cyl.1.25 in Splined 1.25 in	max.	57 [2.24]
	min.	55 [2.17]
Tapered 1.25 in	max.	67 [2.64]
	min.	65 [2.56]

C: Drain connection
$^{7}/_{16}$ - 20 UNF;
12 mm [0.47 in] deep
O-ring boss port
D: M10; 13 mm [0.51 in] deep
E: $^{7}/_{8}$ - 14 UNF;
16.7 mm [0.657 in] deep
O-ring boss port

Dimensions – European version

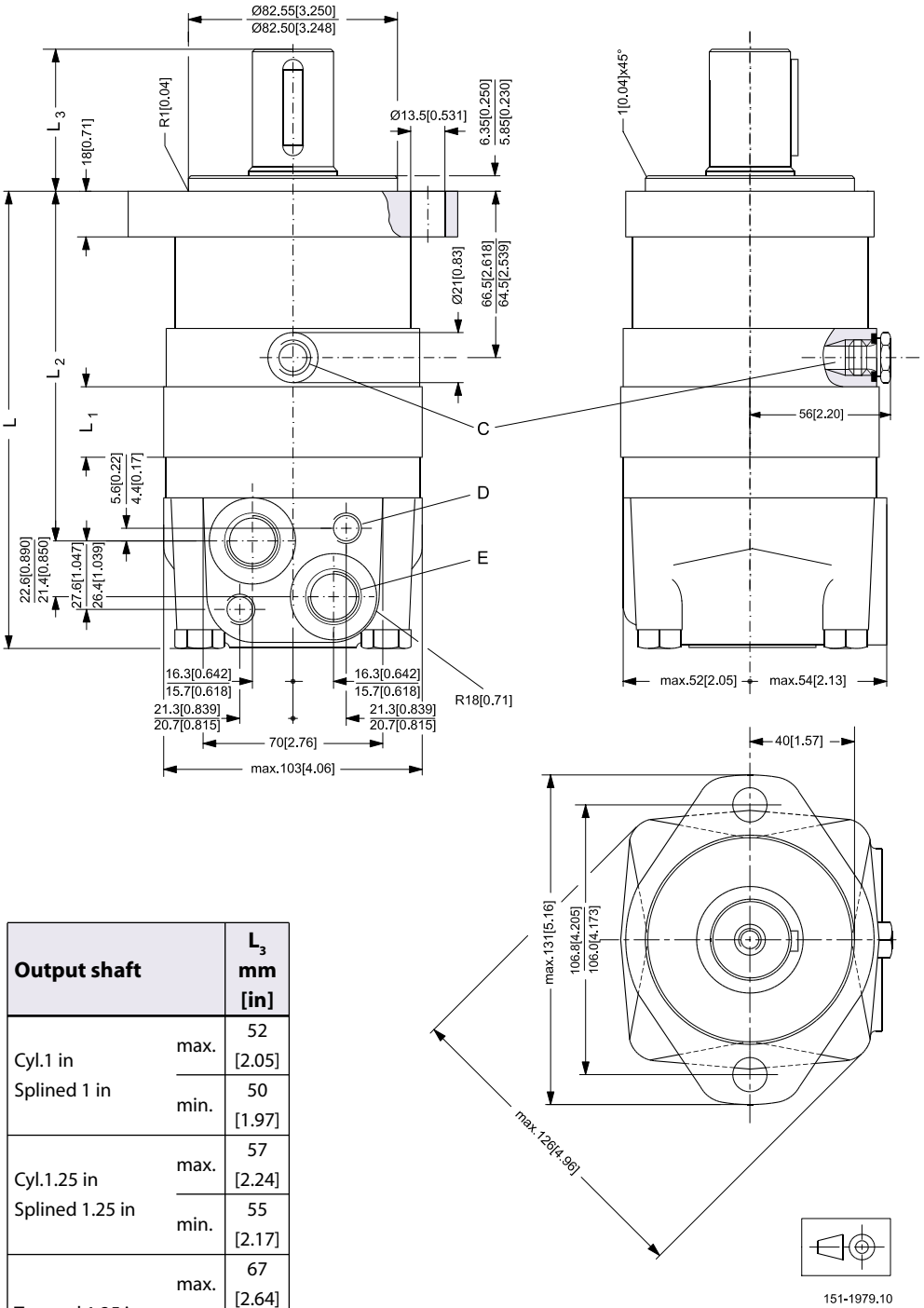
SPECIAL FLANGE



Type	$L_{max.}$ mm [in]	L_1 mm [in]	L_2 mm [in]
OMS 80	178 [7.01]	14.0 [0.551]	136 [5.35]
OMS 100	182 [7.17]	17.4 [0.685]	140 [5.51]
OMS 125	186 [7.32]	21.8 [0.858]	144 [5.67]
OMS 160	192 [7.56]	27.8 [1.094]	150 [5.91]
OMS 200	199 [7.83]	34.8 [1.370]	157 [6.18]
OMS 250	208 [8.19]	43.5 [1.713]	166 [6.54]
OMS 315	219 [8.62]	54.8 [2.157]	177 [6.97]
OMS 400	232 [9.13]	68.4 [2.693]	190 [7.48]

C: Drain connection
G 1/4; 12 mm [0.47 in] deep
D: M10; 13 mm [0.51 in] deep
E: G 1/2; 15 mm [0.59 in] deep

A-2 FLANGE



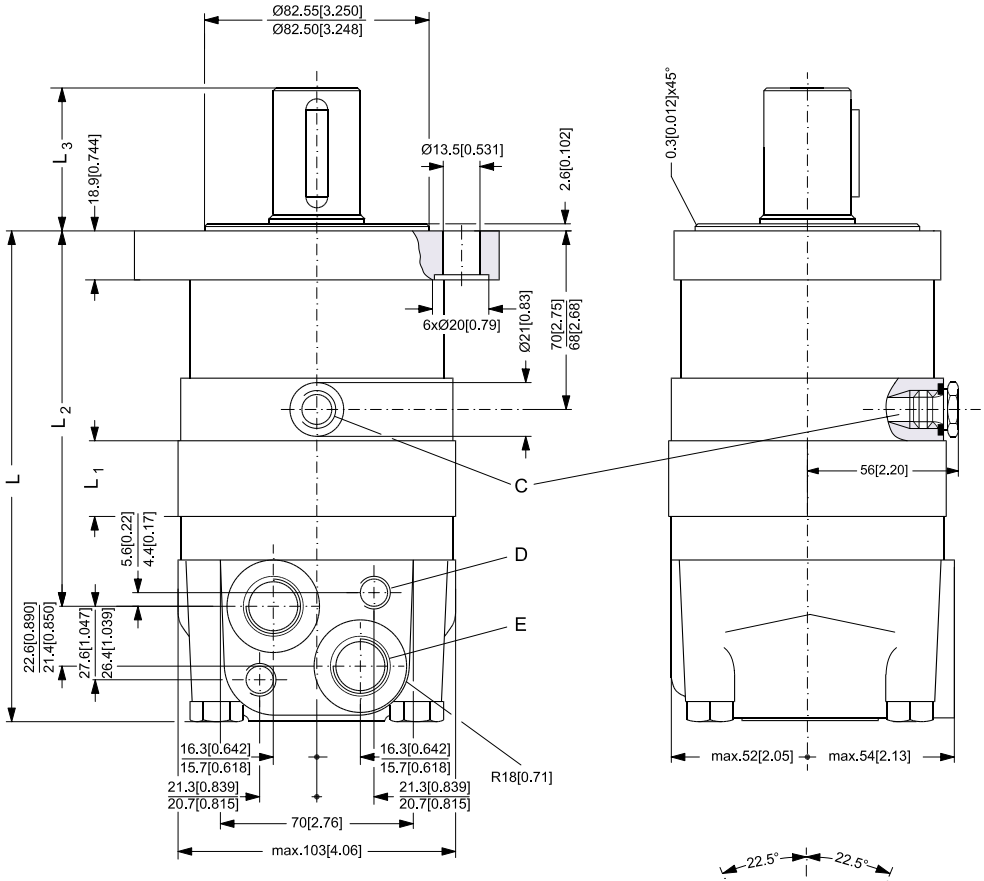
Type	$L_{max.}$ mm [in]	L_1 mm [in]	L_2 mm [in]
OMS 80	167 [6.57]	14.0 [0.551]	124 [4.88]
OMS 100	170 [6.69]	17.4 [0.685]	127 [5.00]
OMS 125	175 [6.89]	21.8 [0.858]	132 [5.20]
OMS 160	181 [7.13]	27.8 [1.094]	138 [5.43]
OMS 200	188 [7.40]	34.8 [1.370]	145 [5.71]
OMS 250	196 [7.72]	43.5 [1.713]	153 [6.02]
OMS 315	208 [8.19]	54.8 [2.157]	165 [6.50]
OMS 400	221 [8.70]	68.4 [2.693]	178 [7.01]
OMS 500	221 [8.70]	68.4 [2.693]	178 [7.01]

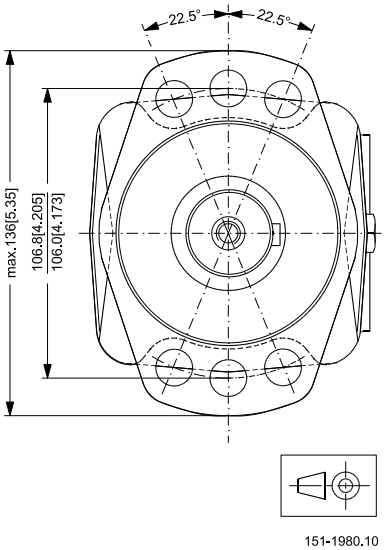
Output shaft		L_3 mm [in]
Cyl.1 in Splined 1 in	max.	52 [2.05]
	min.	50 [1.97]
Cyl.1.25 in Splined 1.25 in	max.	57 [2.24]
	min.	55 [2.17]
Tapered 1.25 in	max.	67 [2.64]
	min.	65 [2.56]

C: Drain connection
$^{7}/_{16}$ - 20 UNF;
12 mm [0.47 in] deep
O-ring boss port
D: M10; 13 mm [0.51 in] deep
E: $^{7}/_{8}$ - 14 UNF;
16.7 mm [0.657 in] deep
O-ring boss port

Dimensions – US version

MAGNETO FLANGE



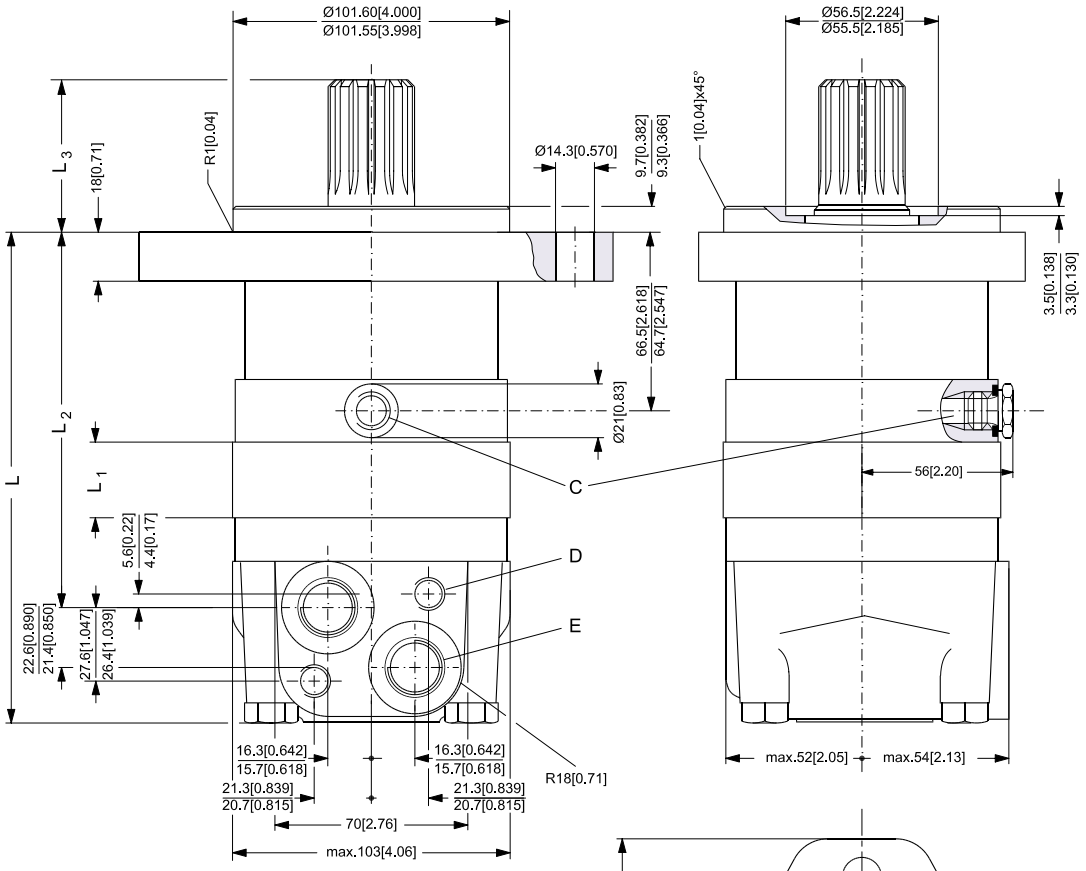


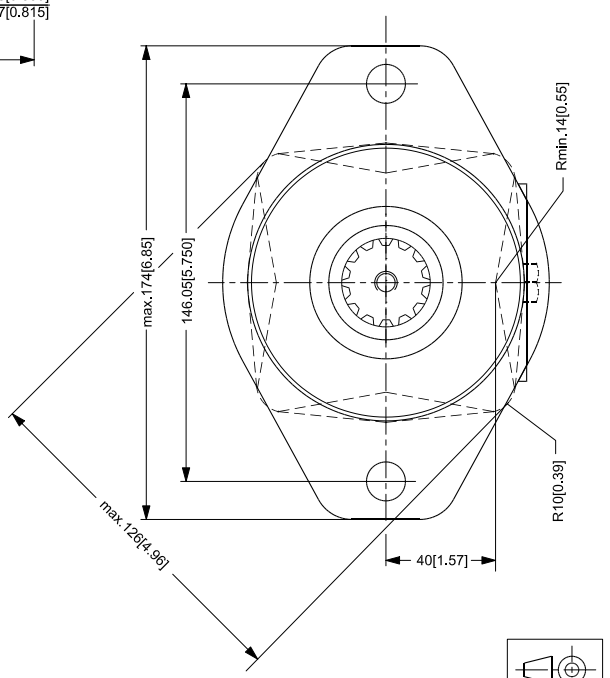
Type	$L_{max.}$ mm [in]	L_1 mm [in]	L_2 mm [in]
OMS 80	171 [6.73]	14.0 [0.551]	128 [5.04]
OMS 100	174 [6.85]	17.4 [0.685]	131 [5.16]
OMS 125	179 [7.05]	21.8 [0.858]	136 [5.35]
OMS 160	185 [7.28]	27.8 [1.094]	142 [5.59]
OMS 200	192 [7.56]	34.8 [1.370]	149 [5.87]
OMS 250	200 [7.87]	43.5 [1.713]	157 [6.18]
OMS 315	212 [8.35]	54.8 [2.157]	169 [6.65]
OMS 400	225 [8.86]	68.4 [2.693]	182 [7.17]
OMS 500	225 [8.86]	68.4 [2.693]	182 [7.17]

Output shaft		L_3 mm [in]
Cyl.1 in Splined 1 in	max.	49 [1.93]
	min.	47 [1.85]
Cyl.1.25 in Splined 1.25 in	max.	54 [2.13]
	min.	52 [2.05]

C: Drain connection
$^{7}/_{16}$ - 20 UNF;
12 mm [0.47 in] deep
O-ring boss port
D: M10; 13 mm [0.51 in] deep
E: $^{7}/_{8}$ - 14 UNF;
16.7 mm [0.657 in] deep
O-ring boss port

SAE-B FLANGE





Type	$L_{max.}$ mm [in]	L_1 mm [in]	L_2 mm [in]
OMS 80	167 [6.57]	14.0 [0.551]	124 [4.88]
OMS 100	170 [6.69]	17.4 [0.685]	127 [5.00]
OMS 125	175 [6.89]	21.8 [0.858]	132 [5.20]
OMS 160	181 [7.13]	27.8 [1.094]	138 [5.43]
OMS 200	188 [7.40]	34.8 [1.370]	145 [5.71]
OMS 250	196 [7.72]	43.5 [1.713]	153 [6.02]
OMS 315	208 [8.19]	54.8 [2.157]	165 [6.50]
OMS 400	221 [8.70]	68.4 [2.693]	178 [7.01]
OMS 500	221 [8.70]	68.4 [2.693]	178 [7.01]

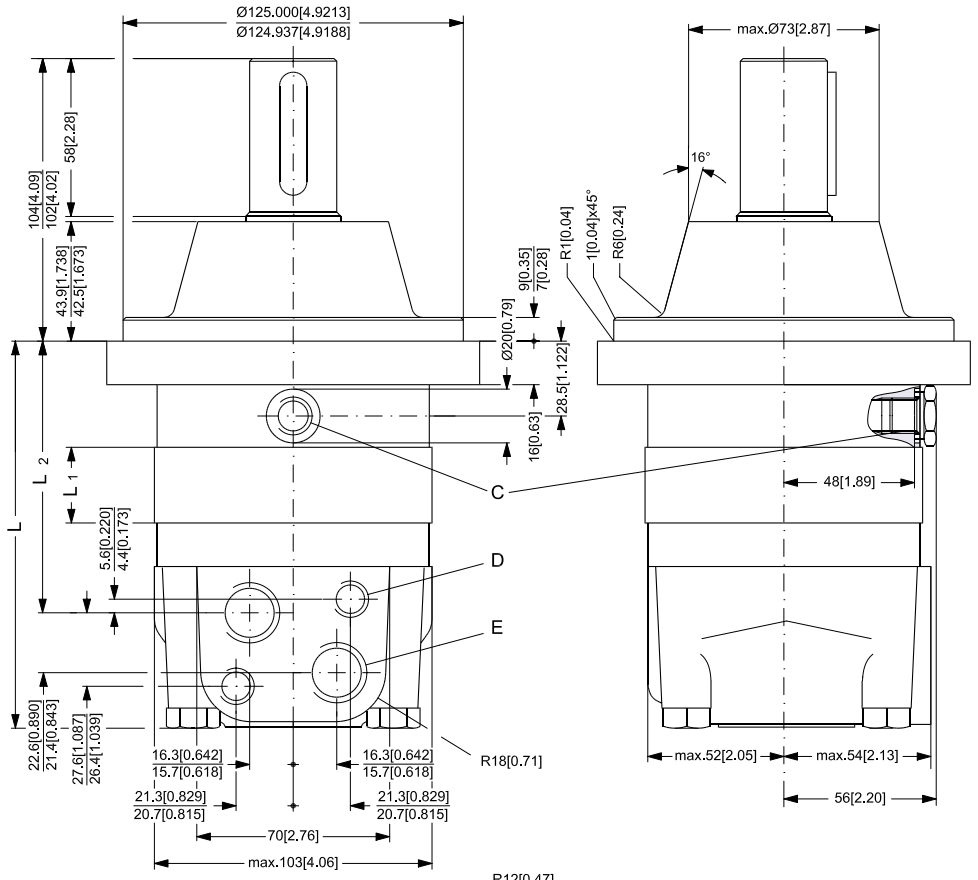
Output shaft		L_3 mm [in]
Splined 1.25 in	max.	57 [2.24]
	min.	55 [2.17]
Splined 0.875 in	max.	42 [1.65]
	min.	40 [1.57]

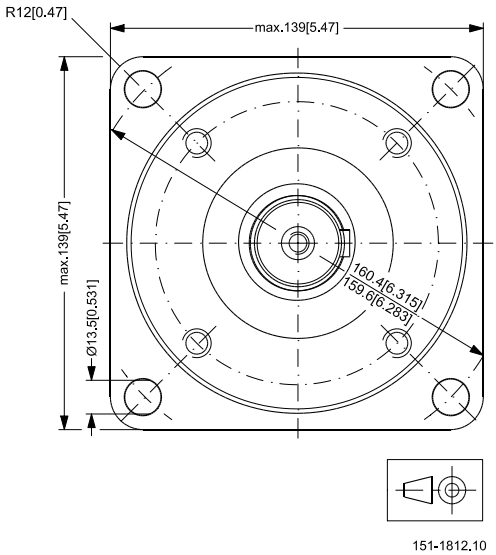
C: Drain connection
$^{7}/_{16}$ - 20 UNF;
12 mm [0.47 in] deep
O-ring boss port
D: M10; 13 mm [0.51 in] deep
E: $^{7}/_{8}$ - 14 UNF;
16.7 mm [0.657 in] deep
O-ring boss port

151-1981.10

Dimensions – European version

WHEEL



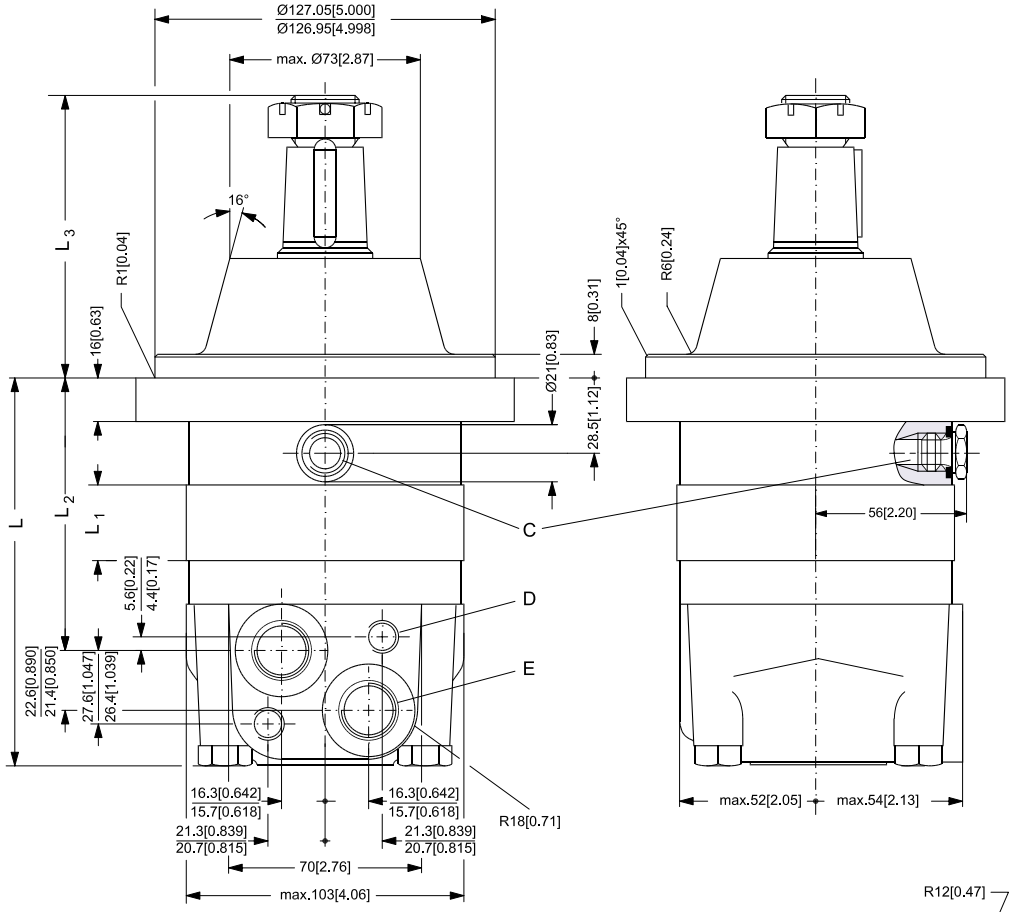


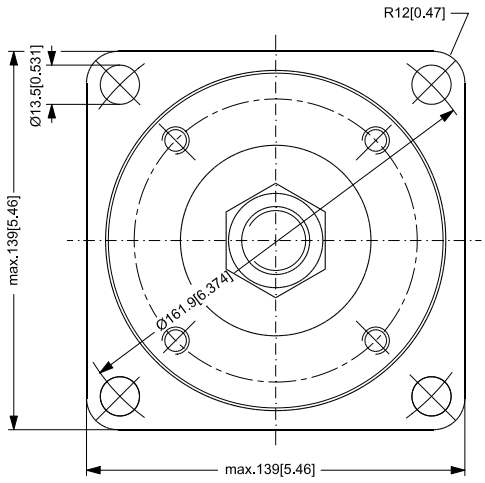
151-1812.10

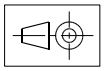
Type	$L_{max.}$ mm [in]	L_1 mm [in]	L_2 mm [in]
OMSW 80	129 [5.08]	14.0 [0.551]	87 [3.43]
OMSW 100	132 [5.20]	17.4 [0.685]	90 [3.54]
OMSW 125	137 [5.39]	21.8 [0.858]	95 [3.74]
OMSW 160	143 [5.63]	27.8 [1.094]	101 [3.98]
OMSW 200	150 [5.91]	34.8 [1.370]	108 [4.25]
OMSW 250	158 [6.22]	43.5 [1.713]	116 [4.57]
OMSW 315	170 [6.69]	54.8 [2.157]	128 [5.04]
OMSW 400	183 [7.20]	68.4 [2.693]	142 [5.59]

C: Drain connection
G 1/4; 12 mm [0.47 in] deep
D: M10; 13 mm [0.51 in] deep
E: G 1/2; 15 mm [0.59 in] deep

WHEEL







151-1982.10

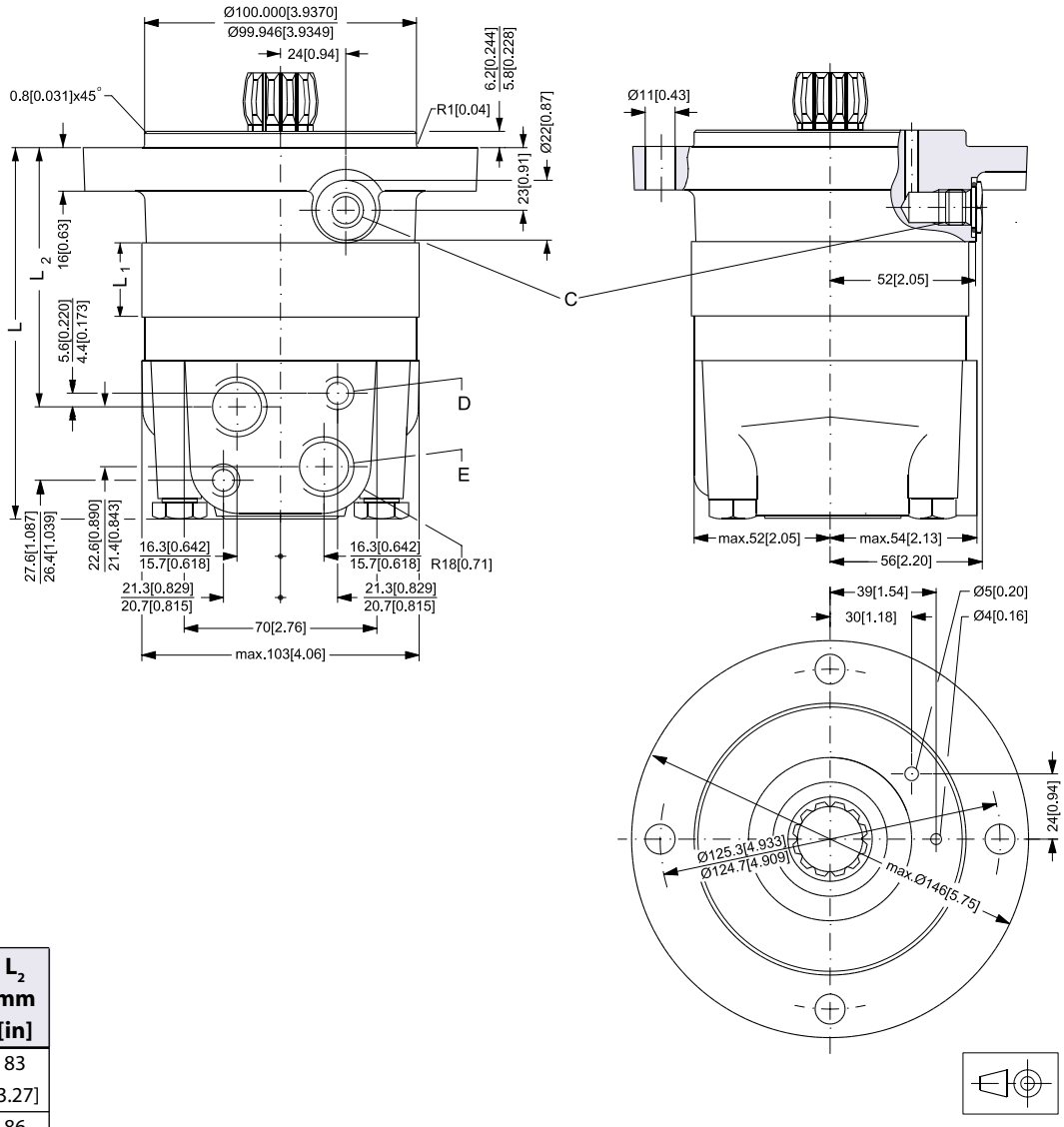
Type	$L_{max.}$ mm [in]	L_1 mm [in]	L_2 mm [in]
OMSW 80	130 [5.12]	14.0 [0.551]	88 [3.46]
OMSW 100	133 [5.24]	17.4 [0.685]	91 [3.58]
OMSW 125	138 [5.43]	21.8 [0.858]	96 [3.78]
OMSW 160	144 [5.67]	27.8 [1.094]	102 [4.02]
OMSW 200	151 [5.94]	34.8 [1.370]	109 [4.29]
OMSW 250	159 [6.26]	43.5 [1.713]	117 [4.61]
OMSW 315	171 [6.73]	54.8 [2.157]	129 [5.08]
OMSW 400	184 [7.24]	68.4 [2.693]	142 [5.59]
OMSW 500	184 [7.24]	68.4 [2.693]	142 [5.59]

Output shaft		L_3 mm [in]
Cyl.1.25 in	max.	94 [3.70]
	min.	92 [3.62]
Tapered 1.25 in	max.	104 [4.09]
	min.	102 [4.02]

C: Drain connection
$^{7}/_{16}$ - 20 UNF;
12 mm [0.47 in] deep
O-ring boss port
D: M10; 13 mm [0.51 in] deep
E: $^{7}/_{8}$ - 14 UNF;
16.7 mm [0.657 in] deep
O-ring boss port

Dimensions – European version

SHORT



151-1814.10

Type	$L_{max.}$ mm [in]	L_1 mm [in]	L_2 mm [in]
OMSS 80	124 [4.88]	14.0 [0.551]	83 [3.27]
OMSS 100	128 [5.04]	17.4 [0.685]	86 [3.39]
OMSS 125	132 [5.20]	21.8 [0.858]	90 [3.54]
OMSS 160	138 [5.43]	27.8 [1.094]	96 [3.78]
OMSS 200	145 [5.71]	34.8 [1.370]	103 [4.06]
OMSS 250	154 [6.06]	43.5 [1.713]	112 [4.41]
OMSS 315	165 [6.50]	54.8 [2.157]	123 [4.84]
OMSS 400	179 [7.05]	68.4 [2.693]	137 [5.39]

C: Drain connection
G 1/4; 12 mm [0.47 in] deep
D: M10; 13 mm [0.51 in] deep
E: G 1/2; 15 mm [0.59 in] deep

INSTALLING THE OMSS

The cardan shaft of the OMSS 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.

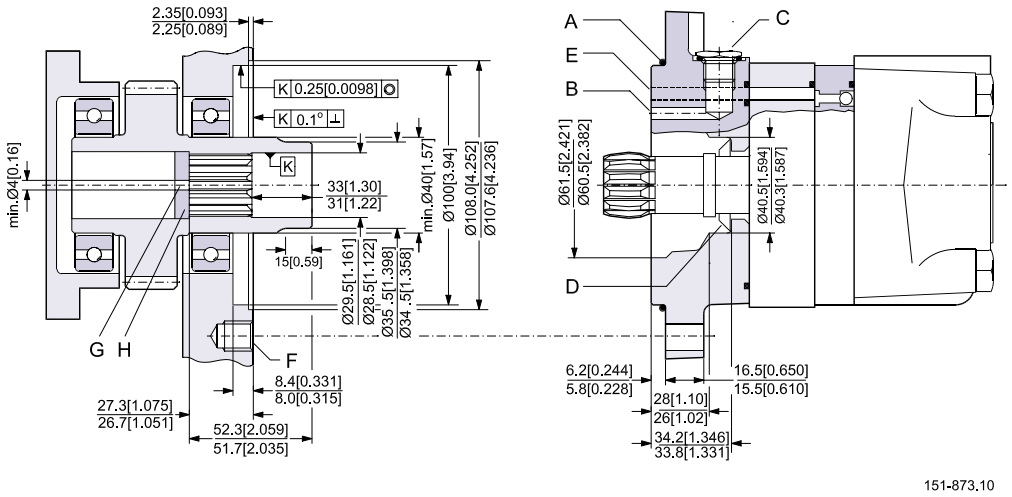
During start and operation it is important that the spline connection and the bearings in the attached component receive oil and are adequately lubricated. To ensure that the spline connection receives sufficient oil, a conical sealing ring between the shaft of the attached component and the motor intermediate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

The conical sealing ring (code. no. 633B9023) 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. below).

We recommend an O-ring between motor and attached component. The O-ring (code no. 151F1033) 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.

OMSS DIMENSIONS OF THE ATTACHED COMPONENT



A: O-ring: 100 × 3 mm
B: External drain channel
C: Drain connection
G ¼; 12 mm [0.47 in] deep
D: Conical seal ring
E: Internal drain channel
F: M10; min. 15 mm [0.59 in] 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).

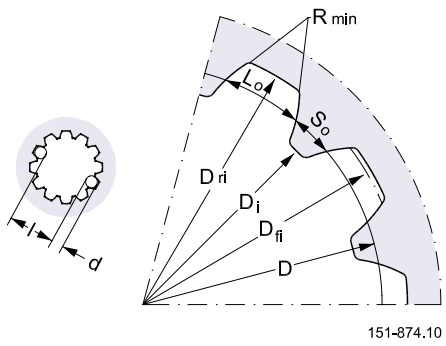
Material:
Case hardening steel with a tensile strength corresponding at least to 20 MoCr4 (900 N/mm²) or SAE 8620.

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 · X = 0.8; m = 2.1166)

Fillet root side fit		mm	in
Number of teeth	z	12	12
Pitch	DP	12/24	12/24
Pressure angle		30°	30°
Pitch dia.	D	25.4	1.0
Major dia.	D_{ri}	$28.0\ ^{0}_{-0.1}$	$1.10\ ^{0}_{-0.004}$
Form dia. (min.)	D_{fi}	27.6	1.09
Minor dia.	D_i	$23.0\ ^{+0.033}_{0}$	$0.9055\ ^{+0.0013}_{0}$
Space width (circular)	L_o	$4.308\ ^{\pm 0.020}$	$0.1696\ ^{\pm 0.0008}$
Tooth thickness (circular)	S_o	2.341	0.09217
Fillet radius	$R_{min.}$	0.2	0.008
Max. measurement between pins*	l	$17.62\ ^{+0.15}_{0}$	$0.700\ ^{0}_{-0.006}$
Pin dia.	d	$4.835\ ^{\pm 0.001}$	$0.1903\ ^{\pm 0.00004}$

* Finished dimensions (when hardened)



DRAIN CONNECTION ON OMSS 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.

VERSIONS

Mounting flange	Shaft	Port size	European version	US version	Drain connection	Check valve	Low pressure release	High pressure release	Main type designation
Standard flange	Cyl. 40 mm	G 3/4	❍		Yes	Yes			OMT
	Cyl. 1.5 in	1 1/16-12 UN		❍	Yes	Yes			OMT
	Splined 1.5 in	G 3/4	❍		Yes	Yes			OMT
		1 1/16-12 UN		❍	Yes	Yes			OMT
	Tapered 45 mm	G 3/4	❍		Yes	Yes			OMT
	Tapered 1.75 in	1 1/16-12 UN		❍	Yes	Yes			OMT
	P.t.o.	G 3/4	❍		Yes	Yes			OMT
Wheel	Cyl. 40 mm	G 3/4	❍		Yes	Yes			OMTW
	Tapered 45 mm	G 3/4	❍		Yes	Yes			OMTW
	Tapered 1.75 in	1 1/16-12 UN		❍	Yes	Yes			OMTW
Brake-wheel	Wheel bolt flange	G 3/4	❍		Yes	No	❍		OMT FX
	Thread hole flange	G 3/4	❍		Yes	No	❍		OMT FX
Brake-standard	Cyl. 40 mm	G 3/4	❍		Yes	No	❍		OMT FL
	Splined 1.5 in	G 3/4	❍		Yes	No	❍		OMT FL
	Cyl. 40 mm	G 3/4	❍		Yes	No		❍	OMT FH
	Splined 1.5 in	G 3/4	❍		Yes	No		❍	OMT FH
Short	No output shaft	G 3/4	❍		Yes	Yes			OMTS

Function diagram - see page : ⟶

Features available (options) :
Speed sensor
Motor with tacho connection
Viton shaft seal
Painted
Ultra short

CODE NUMBERS

CODE NUMBERS	Displacement [cm³]						Technical data – Page	Shaft loads – Page	Dimensions – Page
	160	200	250	315	400	500			
151B	3000	3001	3002	3003	3004	3005	36	40	49
151B	2050	2051	2052	2053	2054	2055	36	40	50
151B	3006	3007	3008	3009	3010	3011	36	40	49
151B	2056	2057	2058	2059	2060	2061	36	40	50
151B	3012	3013	3014	3015	3016	3017	36	40	49
151B	2062	2063	2064	2065	2066	2067	36	40	50
151B	3018	3019	3020	3021	3022	3023	36	40	49
151B	3024	3025	3026	3027	3028	3029	36	40	51
151B	3030	3031	3032	3033	3034	3035	36	40	51
151B	2080	2081	2082	2083	2084	2085	36	40	52
151B	3207	3208	3209	3210	3211	3212	36	41	53
151B	3200	3201	3202	3203	3204	3205	36	41	53
151B	4000	4001	4002	4003	4004	4005	36	41	54
151B	4007	4008	4009	4010	4011	4012	36	41	54
151B	4021	4022	4023	4024	4025	4026	36	41	54
151B	4028	4029	4030	4031	4032	4033	36	41	54
151B	3036	3037	3038	3039	3040	3041	36	–	55
	42	42	43	43	44	44			

Ordering
Add the four digit prefix "151B" to the four digit numbers from the chart for complete code number.

Example:
151B3002 for an OMT 250 with standard flange, cyl. 40 mm shaft and port size G $^{3}/_{4}$.

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

TECHNICAL DATA FOR OMT, OMTW, OMTS, OMT FX OMT FL AND OMT FH

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 [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[1]	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.[1]	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 [USgal/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	at max. press. drop cont. Nm [lbf·in]		340 [3010]	430 [3810]	530 [4690]	740 [6550]	840 [7430]	950 [8410]
	at max. press. drop int.[1] Nm [lbf·in]		410 [3630]	520 [4600]	630 [5580]	890 [7880]	970 [8590]	1060 [9380]

[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.

TECHNICAL DATA FOR OMT, OMTW, OMTS, OMT FX OMT FL AND OMT FH

Type			Max. inlet pressure	Max. return pressure with drain line
OMT, OMTW, OMTS, OMT FX, OMT FL, OMT FH	bar [psi]	cont.	210 [3050]	140 [2030]
	bar [psi]	int.[1]	250 [3630]	175 [2540]
	bar [psi]	peak[2]	300 [4350]	210 [3050]

Brake motors

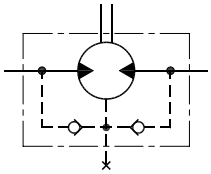
Type	Max. presssure in drain line[3]	Holding torque[4]	Brake-release pressure[3]	Max pressure in brake line
OMT FX, OMT FL	5 bar [70 psi]	1200 Nm [10620 lbf·in]	12 bar [170 psi]	30 bar [440 psi]
OMT FH	5 bar [70 psi]	1200 Nm [10620 lbf·in]	30 bar [440 psi]	280 bar [4060 psi]

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) 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.
4) For the supply of motors with holding torques higher than those stated, please contact the Sauer-Danfoss Sales Organization.

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

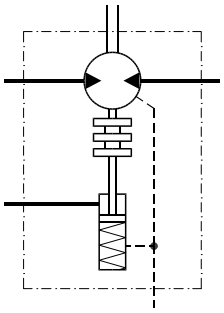
MAX. PERMISSIBLE SHAFT SEAL PRESSURE

OMT with check valves and without use of drain connection:
The pressure on the shaft seal never exceeds the pressure in the return line

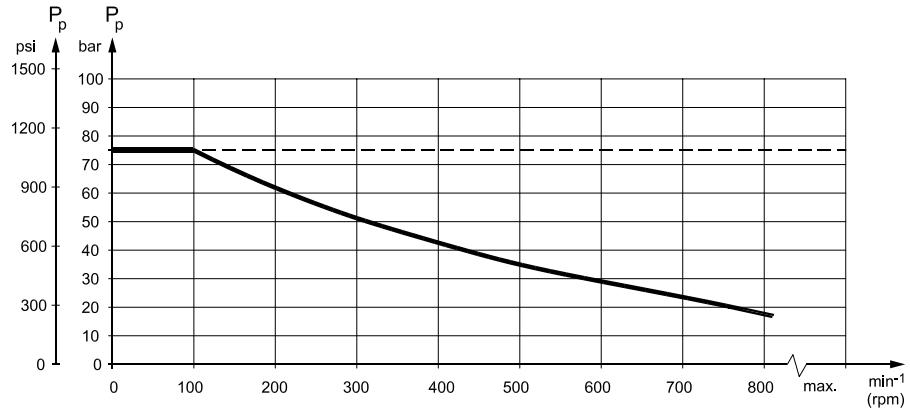

151-320.10

OMT with check valves and with drain connection:
The shaft seal pressure equals the pressure on the drain line.

OMT FX, OMT FL and OMT FH must always be fitted with drain line.
Max. pressure in drain line is 5 bar [75 psi]


151-1405.10

Max. return pressure without drain line or max. pressure in the drain line

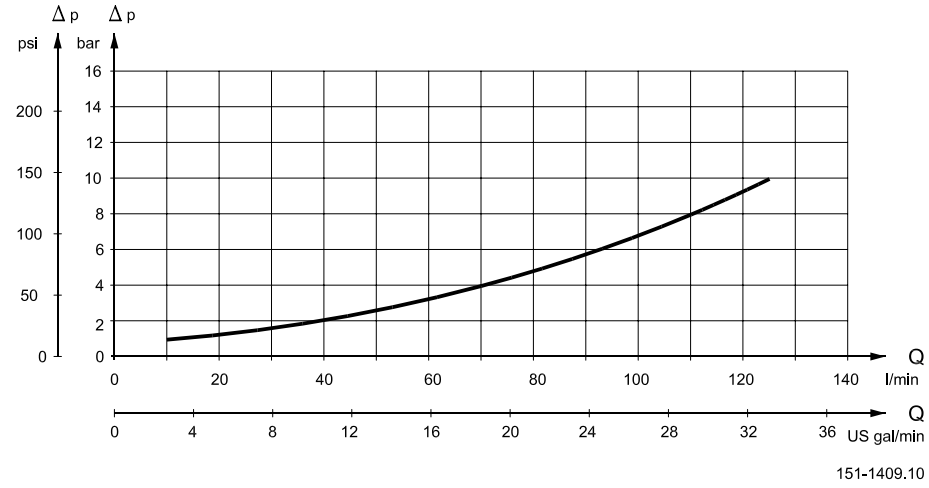


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– – – – Intermittent operation: the permissible values may occur for max. 10% of every minute.

——— Continuous operation

PRESSURE DROP IN MOTOR



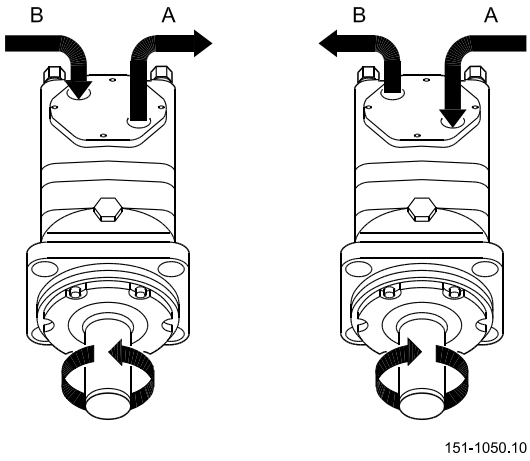
The curve applies to an unloaded motor shaft and an oil viscosity of 35 mm²/s [165 SUS]

OIL FLOW IN DRAIN LINE

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

Pressure drop bar [psi]	Viscosity mm²/s [SUS]	Oil flow in drain line 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]

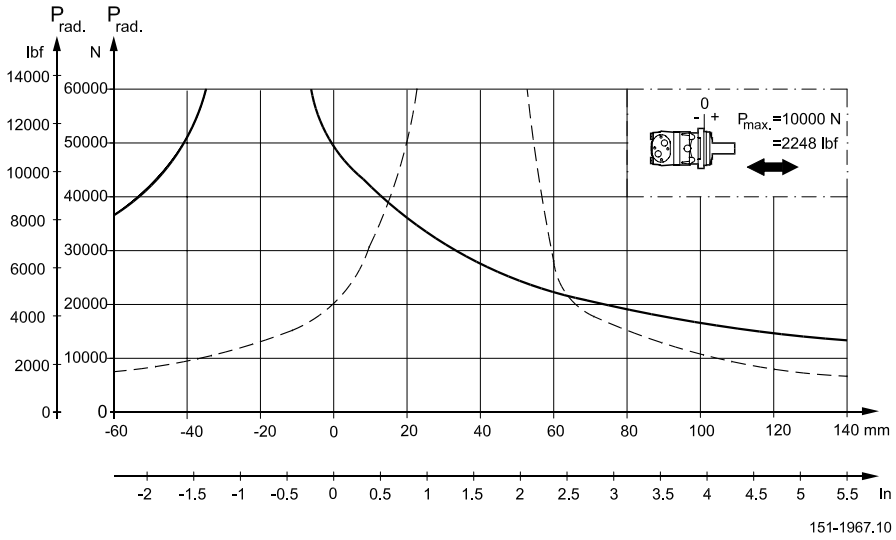
DIRECTION OF SHAFT ROTATION



PERMISSIBLE SHAFT LOADS FOR OMT

Mounting flange:
Standard

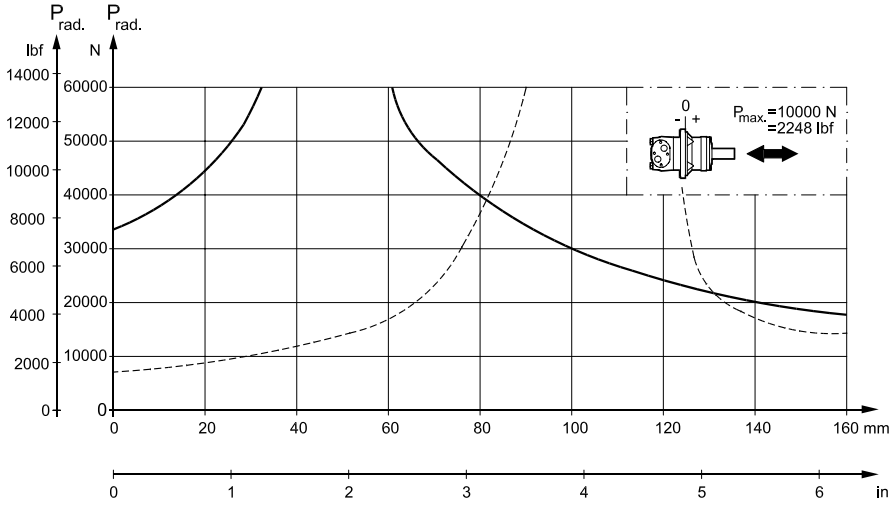
Shaft:
All shaft types



151-1967.10

Mounting flange:
Wheel

Shaft:
All shaft types



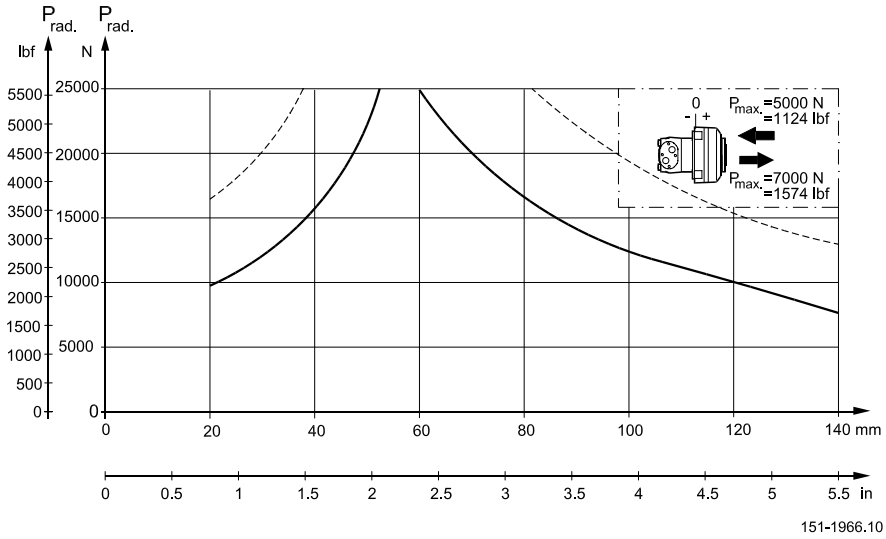
151-1970.10

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 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" DHMH.PK.100.G2.02 520L0232.

PERMISSIBLE SHAFT LOADS FOR OMT

Mounting flange:
Brake-wheel

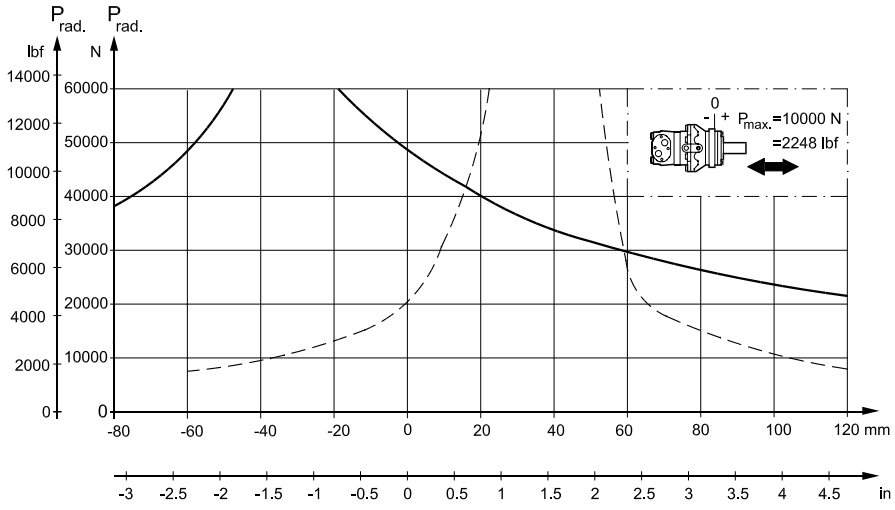
Shaft:
All shaft types



151-1966.10

Mounting flange:
Brake-standard

Shaft:
All shaft types

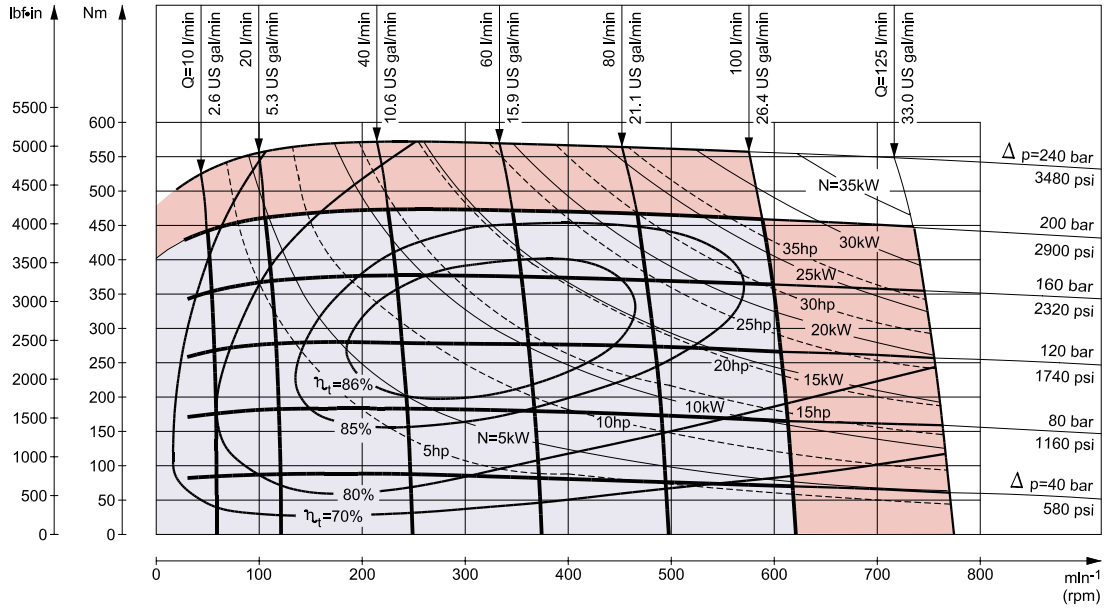


151-1968.10

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 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" DHMH.PK.100.G2.02 520L0232.

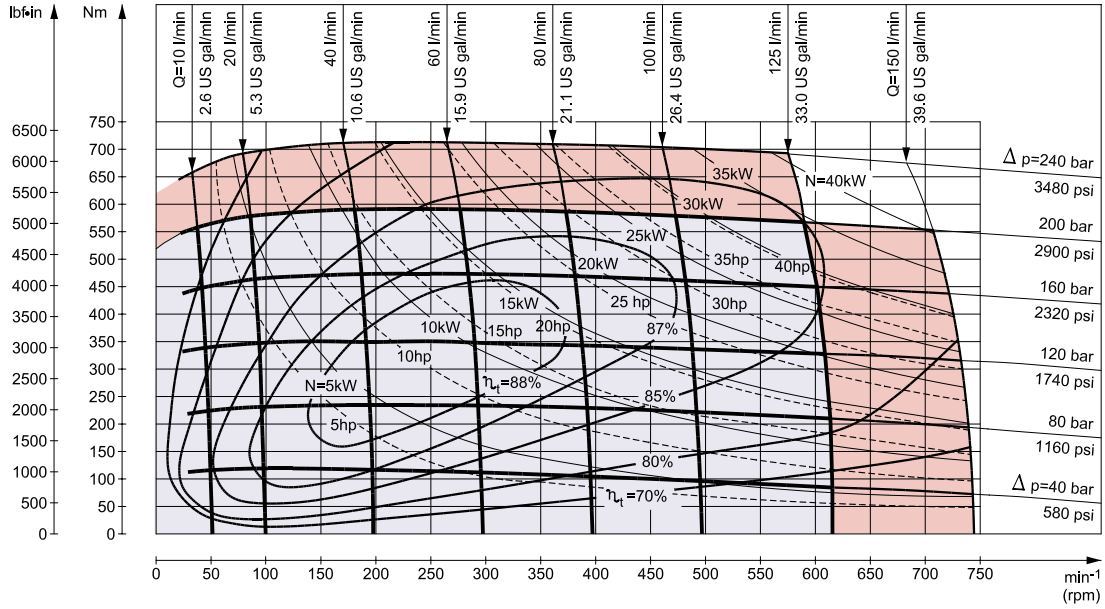
FUNCTION DIAGRAMS

OMT 160



151-493.10

OMT 200



151-494.10

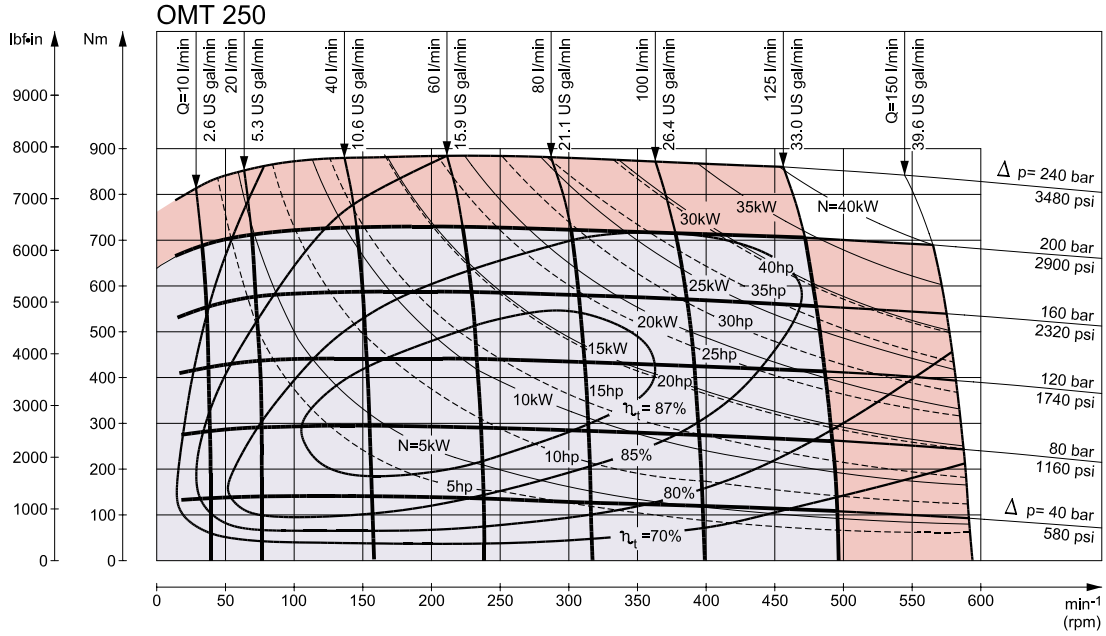
Explanation of function diagram use, basis and conditions can be found on page 5.

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

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

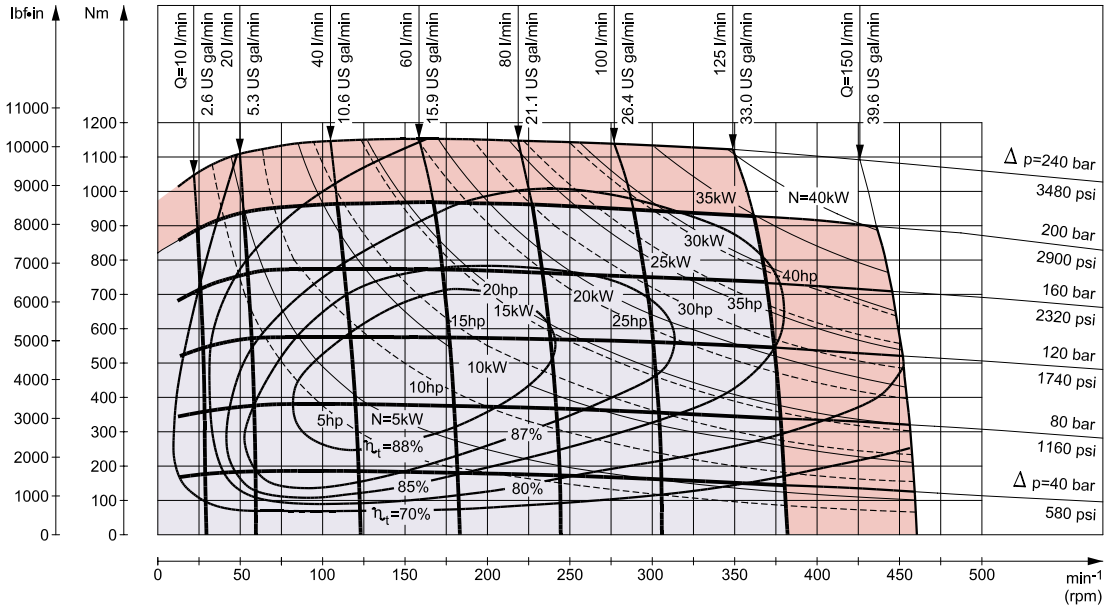
FUNCTION DIAGRAMS

OMT 250



151-495.10

OMT 315



151-869.10

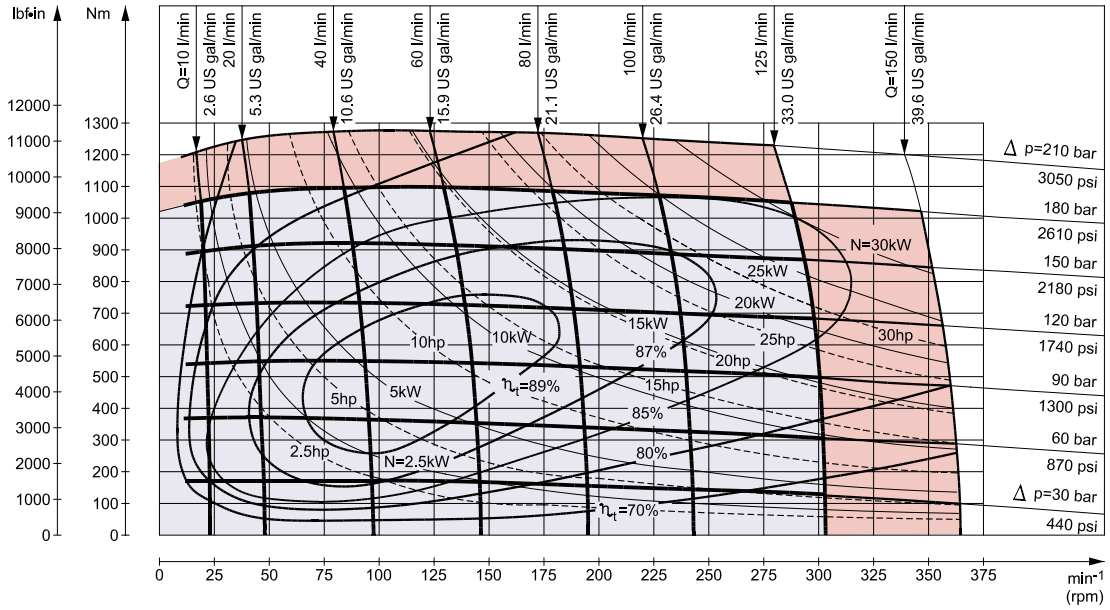
Explanation of function diagram use, basis and conditions can be found on page 5.

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

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

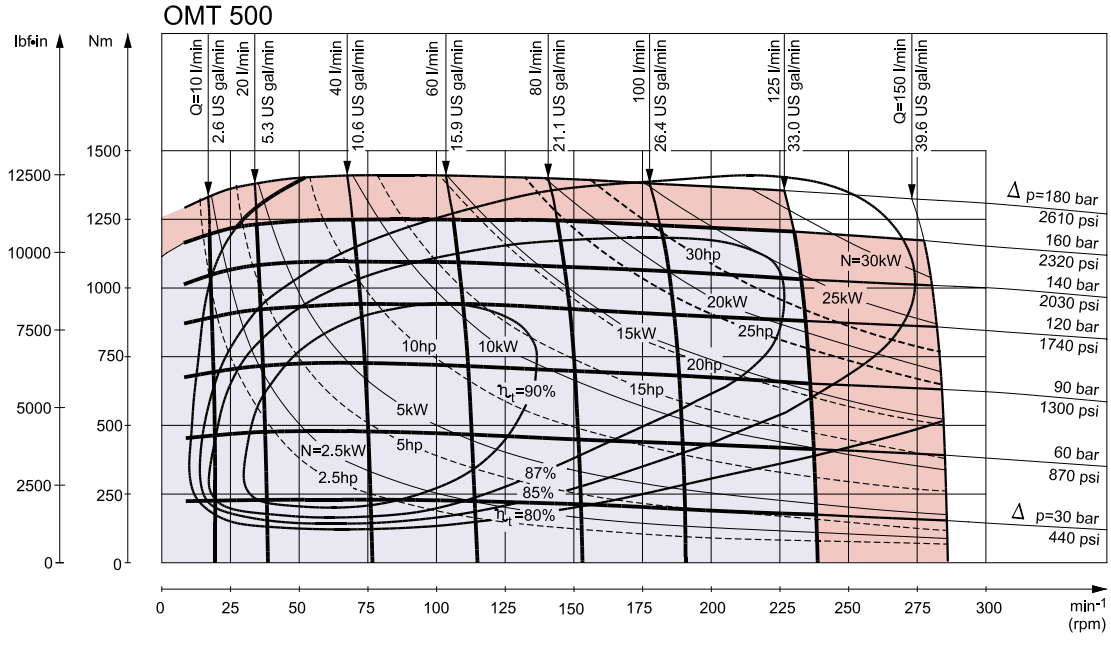
FUNCTION DIAGRAMS

OMT 400



151-1058.10

OMT 500



151-1116.10

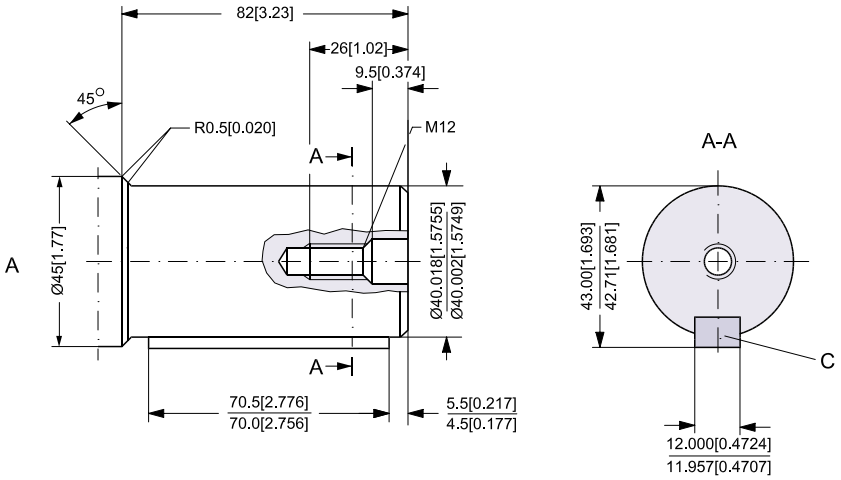
Explanation of function diagram use, basis and conditions can be found on page 5.

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

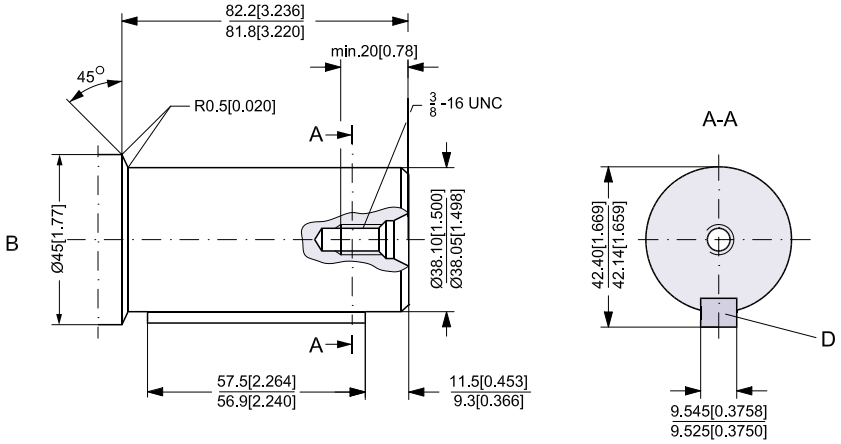
Note: Intermittent pressure drop and oil flow must not occur simultaneously.

SHAFT VERSION

A: Cylindrical 40 mm shaft
C: Parallel key
A12 × 8 × 70
DIN 6885



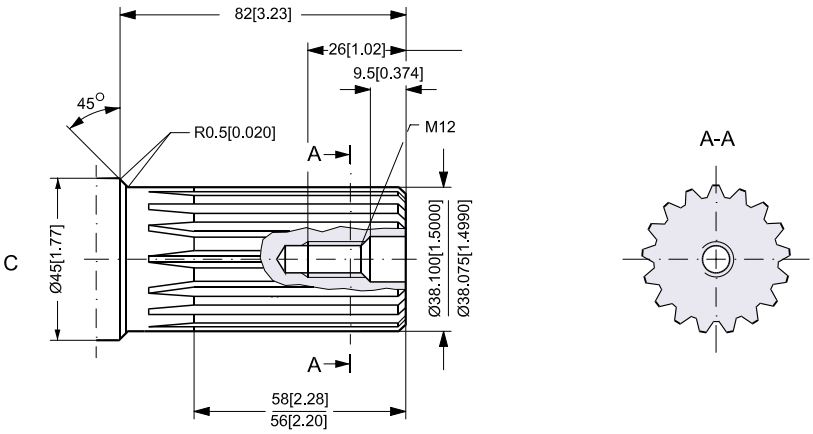
B: Cylindrical 1.5 in shaft
D: Parallel key
$^{3}/_{8} \times {}^{3}/_{8} \times 2^{1}/_{4}$ in
B.S. 46



151-1032.10

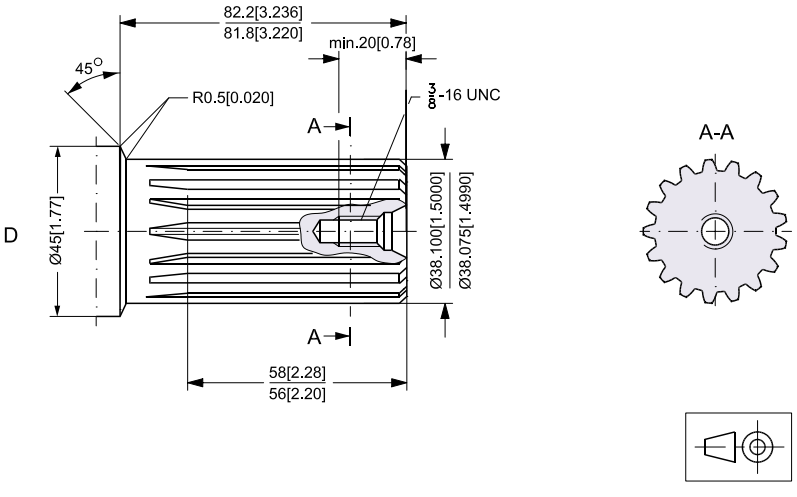
SHAFT VERSION

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



US version

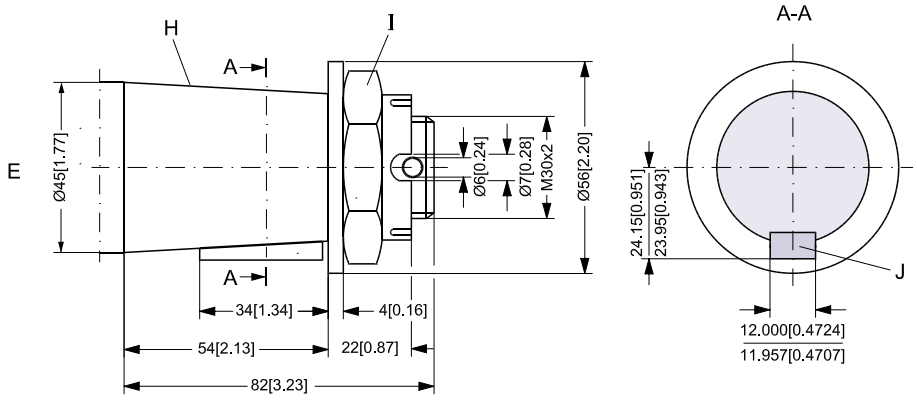
D. Involute splined shaft
ANS B92.1 - 1970 standard
Flat root side fit
Pitch 12/24
Teeth 17
Major dia. 1.50 in
Pressure angle 30°



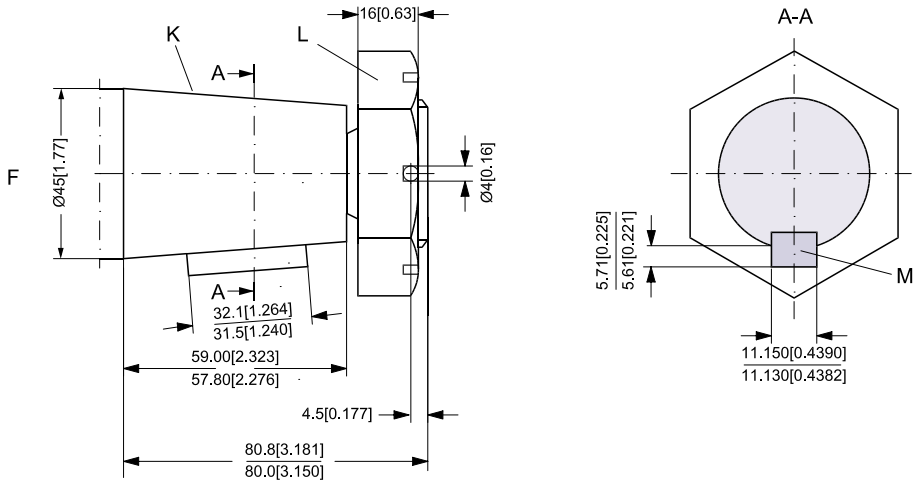
151-1916.10

SHAFT VERSION

E: Tapered 45 mm shaft
(ISO/R775)
I: DIN 937
Across flats: 46 mm
Tightening torque:
500 ± 30 Nm [4430 ±270 lbf·in]
H: Taper 1:10
J: Parallel key
B12 × 8 × 28
DIN 6885

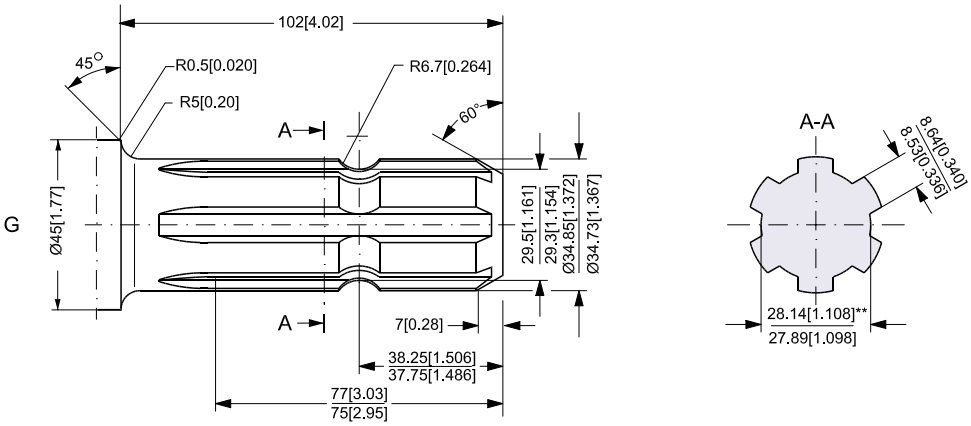


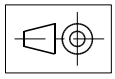
F: Tapered 1.75 in shaft
K: Cone 1:8
SAE J501
L: 1 1/4 - 18 UNEF
Across flats 2 3/16 in
Tightening torque:
500 ±10 Nm (4425 ±90 lbf·in)
M: Parallel key
7/16 × 7/16 × 1 1/4
B.S. 46



G. P.t.o. shaft
DIN 9611 Form 1
(ISO/R500 without pin hole)

** Deviates from DIN 9611

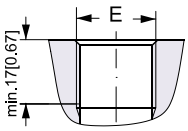




151-1917.10

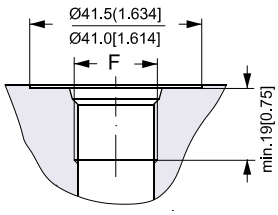
PORT THREAD VERSIONS

A



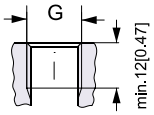
A: G main ports
E: ISO 228/1 - G 3/4

B



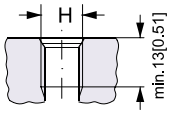
B: UN main ports
F: 1 1/16 - 12 UN
O-ring boss port

C



C: G drain port
G: ISO 228/1 - G 1/4

D

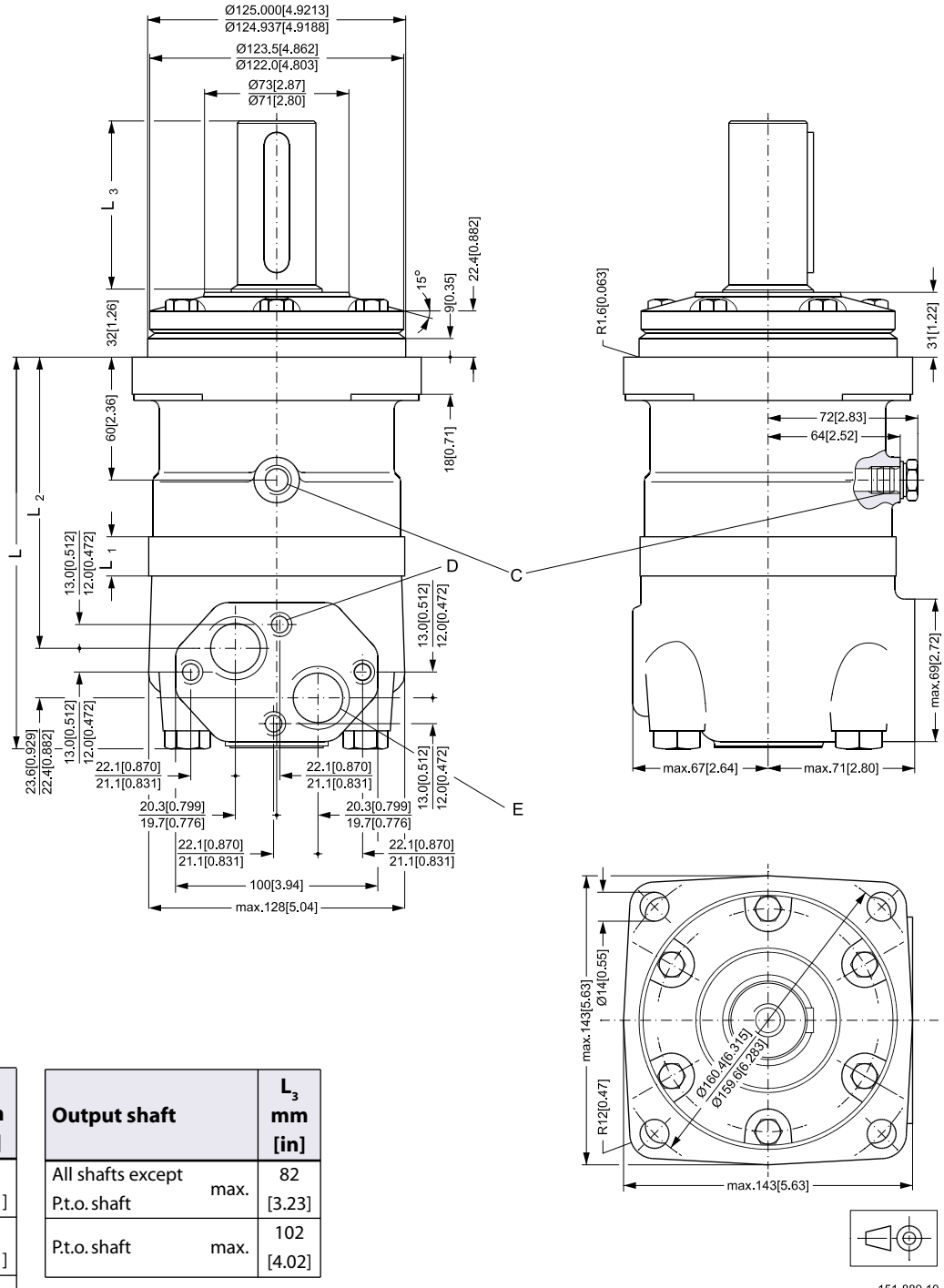


151-1977.10

D: UNF drain port
H: 9/16 - 18 UNF
O-ring boss port

Dimensions – European version

STANDARD FLANGE



Type	$L_{max.}$ mm [in]	L_{1*} mm [in]	L_2 mm [in]
OMT 160	190 [7.48]	16.5 [0.650]	140 [5.51]
OMT 200	195 [7.68]	21.5 [0.846]	145 [5.71]
OMT 250	201 [7.91]	27.8 [1.094]	151 [5.94]
OMT 315	211 [8.31]	37.0 [1.457]	161 [6.34]
OMT 400	221 [8.70]	47.5 [1.870]	171 [6.73]
OMT 500	235 [9.25]	61.5 [2.421]	185 [7.28]

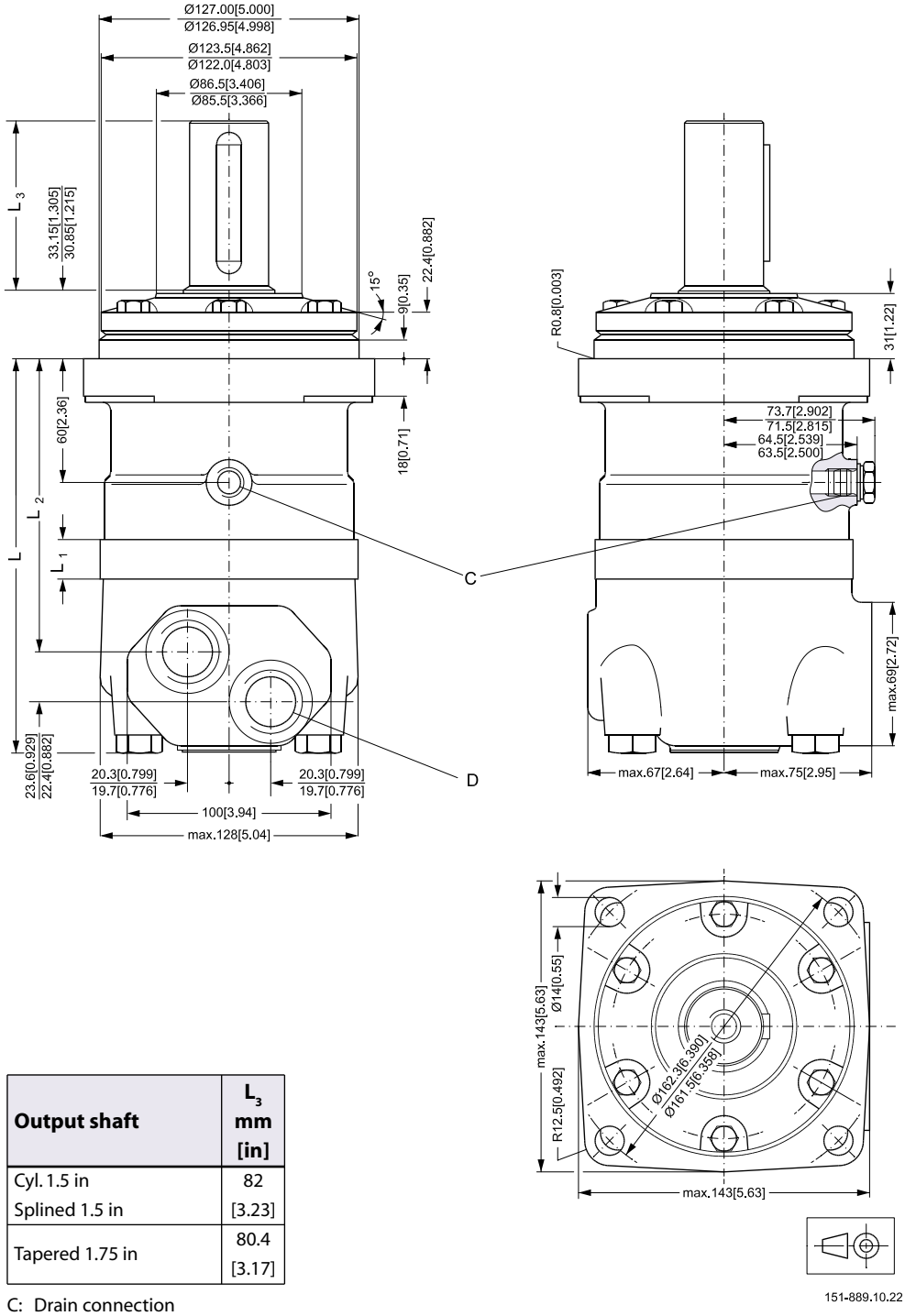
Output shaft		L_3 mm [in]
All shafts except P.t.o. shaft	max.	82 [3.23]
P.t.o. shaft	max.	102 [4.02]

C: Drain connection G 1/4; 12 mm [0.47 in] deep
D: M10; 10 mm [0.39 in] deep
E: G 3/4; 17 mm [0.67 in] deep

*) The gearwheel set is 3.5 mm [0.138 in] wider across the rollers than the L_1 dimensions

151-889.10

STANDARD FLANGE



Type	$L_{max.}$ mm [in]	L_{1*} mm [in]	L_2 mm [in]
OMT 160	190 [7.48]	16.5 [0.650]	140 [5.51]
OMT 200	195 [7.68]	21.5 [0.846]	145 [5.71]
OMT 250	201 [7.91]	27.8 [1.094]	151 [5.94]
OMT 315	211 [8.31]	37.0 [1.457]	161 [6.34]
OMT 400	221 [8.70]	47.5 [1.870]	171 [6.73]
OMT 500	235 [9.25]	61.5 [2.421]	185 [7.28]

Output shaft	L_3 mm [in]
Cyl. 1.5 in Splined 1.5 in	82 [3.23]
Tapered 1.75 in	80.4 [3.17]

C: Drain connection
$^{9}/_{16}$ - 18 UNF;
13 mm [0.51 in] deep
O-ring boss port

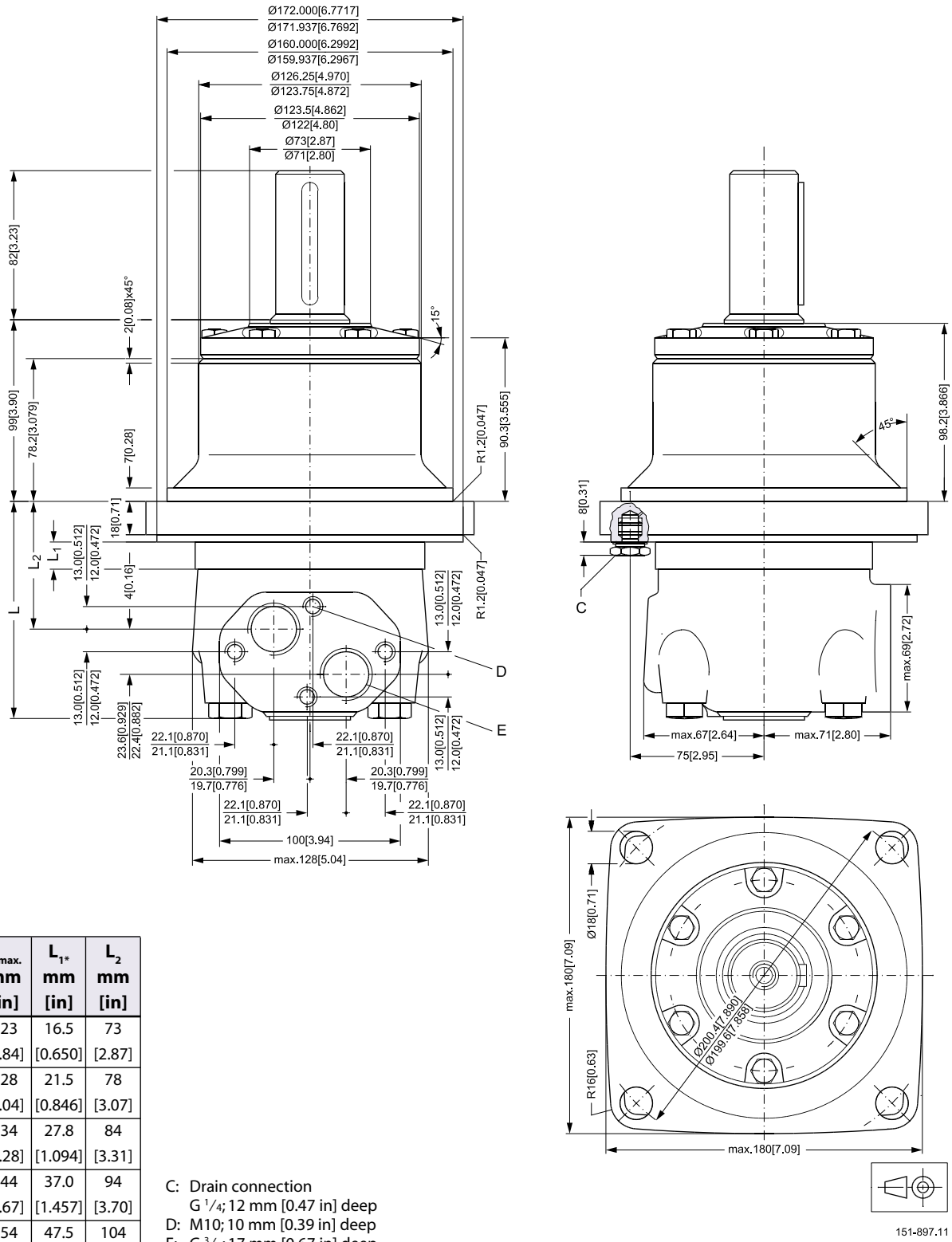
D: $1\,^{1}/_{16}$ - 12 UN;
19 mm [0.75 in] deep
O-ring boss port

*) The gearwheel set is 3.5 mm [0.138 in] wider across the rollers than the L_1 dimensions

DKMH.PK.130.B2.02 **520L0407**

Dimensions – European version

WHEEL

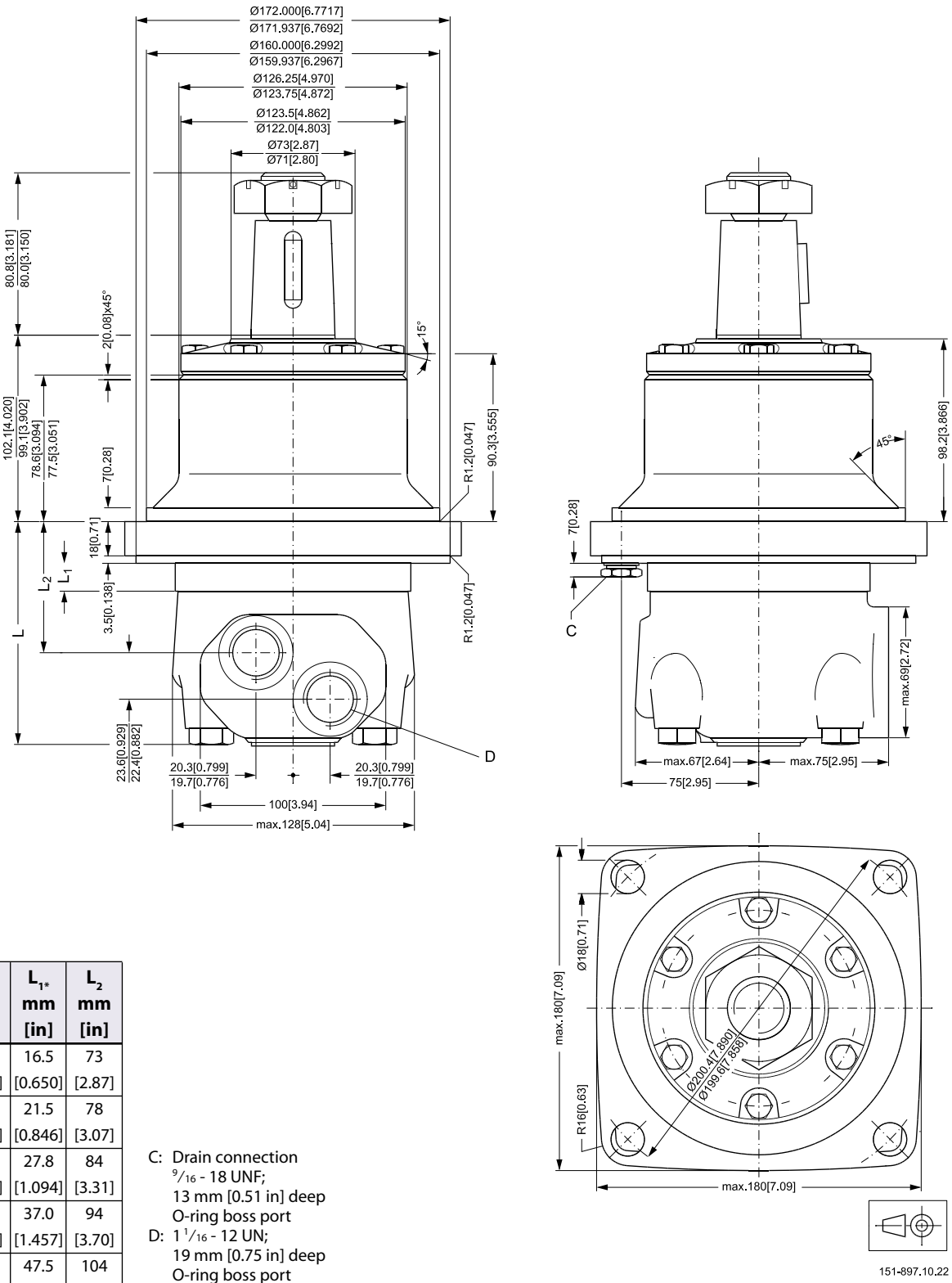


Type	$L_{max.}$ mm [in]	L_{1*} mm [in]	L_2 mm [in]
OMTW 160	123 [4.84]	16.5 [0.650]	73 [2.87]
OMTW 200	128 [5.04]	21.5 [0.846]	78 [3.07]
OMTW 250	134 [5.28]	27.8 [1.094]	84 [3.31]
OMTW 315	144 [5.67]	37.0 [1.457]	94 [3.70]
OMTW 400	154 [6.06]	47.5 [1.870]	104 [4.09]
OMTW 500	168 [6.61]	61.5 [2.421]	118 [4.65]

C: Drain connection G 1/4; 12 mm [0.47 in] deep
D: M10; 10 mm [0.39 in] deep
E: G 3/4; 17 mm [0.67 in] deep

*) The gearwheel set is 3.5 mm [0.138 in] wider across the rollers than the L_1 dimensions

WHEEL



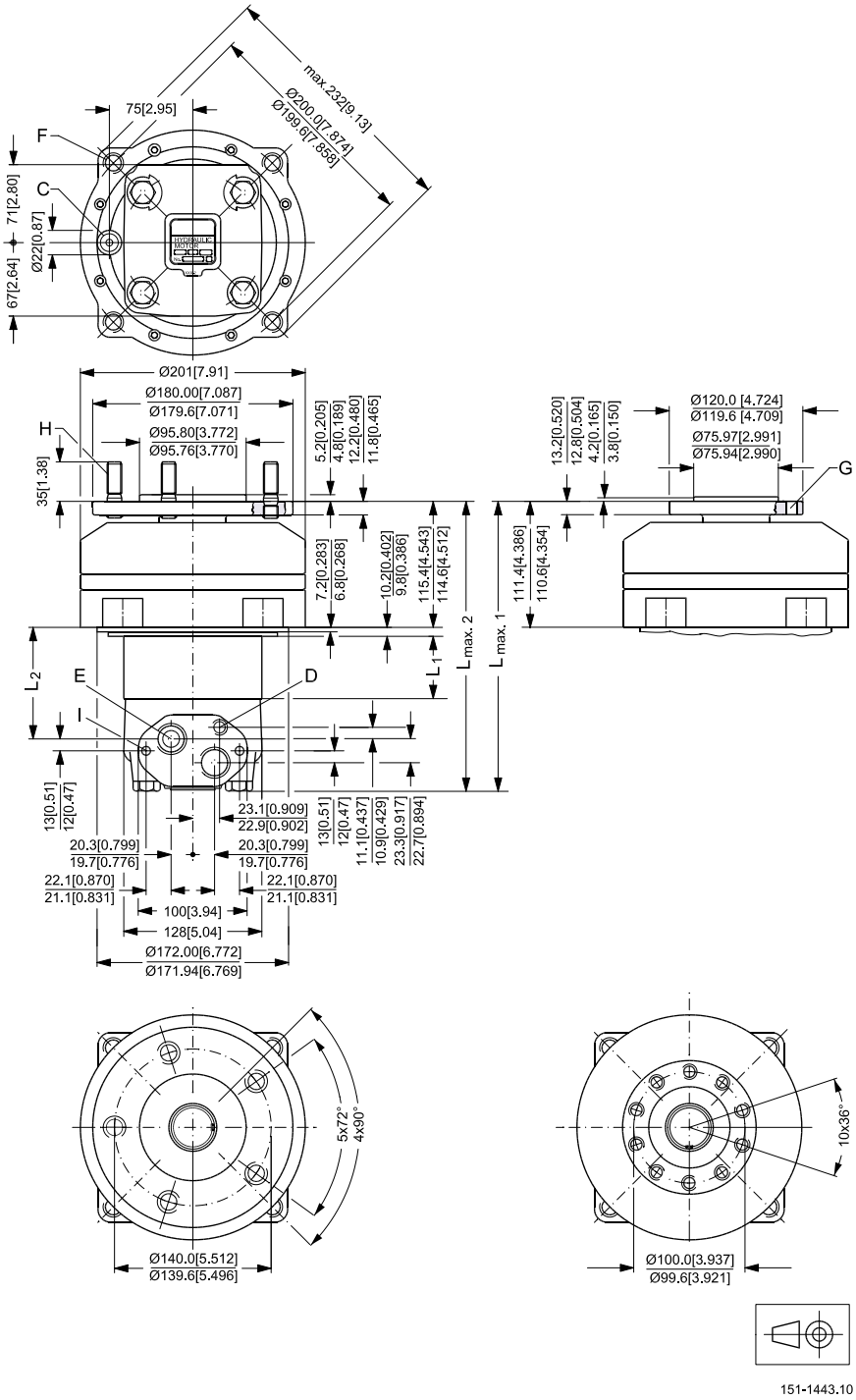
Type	$L_{max.}$ mm [in]	L_{1*} mm [in]	L_2 mm [in]
OMTW 160	123 [4.84]	16.5 [0.650]	73 [2.87]
OMTW 200	128 [5.04]	21.5 [0.846]	78 [3.07]
OMTW 250	134 [5.28]	27.8 [1.094]	84 [3.31]
OMTW 315	144 [5.67]	37.0 [1.457]	94 [3.70]
OMTW 400	154 [6.06]	47.5 [1.870]	104 [4.09]
OMTW 500	168 [6.61]	61.5 [2.421]	118 [4.65]

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

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

BRAKE-WHEEL



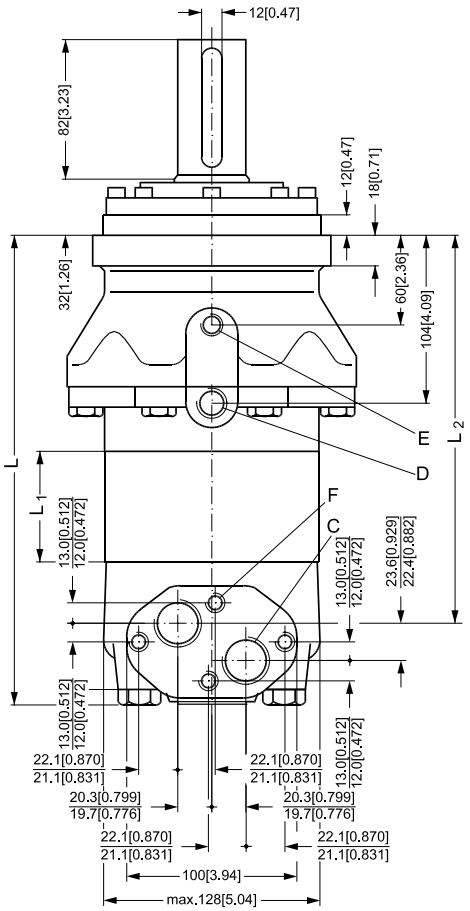
Type	$L_{max.1}$ mm [in]	$L_{max.2}$ mm [in]	L_{1*} mm [in]	L_2 mm [in]
OMT 160 FX	223 [8.78]	227 [8.94]	16,5 [0.650]	62 [2.45]
OMT 200 FX	228 [8.98]	232 [9.13]	21.5 [0.846]	67 [2.65]
OMT 250 FX	234 [9.21]	238 [9.37]	27.8 [1.094]	74 [2.89]
OMT 315 FX	243 [9.57]	247 [9.72]	37.0 [1.457]	83 [3.26]
OMT 400 FX	254 [10.00]	258 [10.16]	47.5 [1.870]	93 [3.67]
OMT 500 FX	268 [10.55]	272 [10.71]	61.5 [2.421]	107 [4.22]

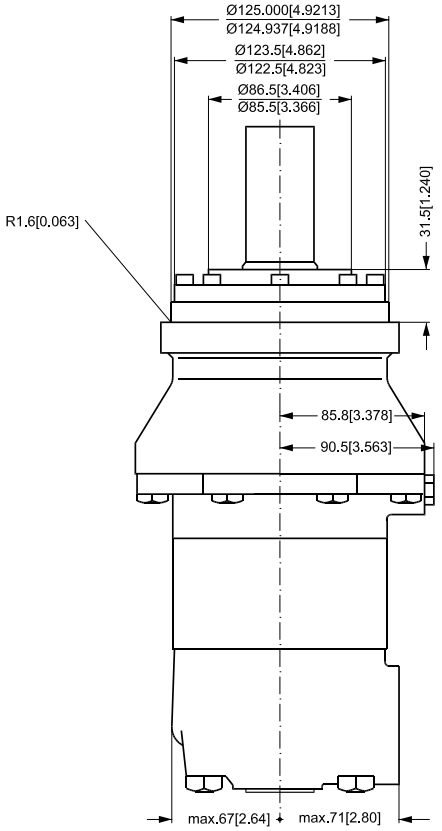
C: Brake-release port G 1/4; 12 mm [0.47 in] deep (BS/ISO 228/1)
D: Drain connection G 1/4; 12 mm [0.47 in] deep
E: G 3/4; 17 mm [0.67 in] deep
F: 4 × M12; 27 mm [1.06 in] deep
G: 10 × M12
H: Wheel bolts 5 × M14 × 1.5
I: M10; 10 mm [0.39 in] deep

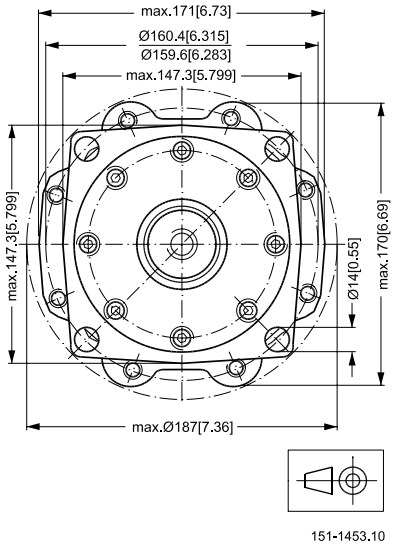
*) The gearwheel set is 3.5 mm [0.138 in] wider across the rollers than the L_1 dimensions

Dimensions – European version

BRAKE-STANDARD







151-1453.10

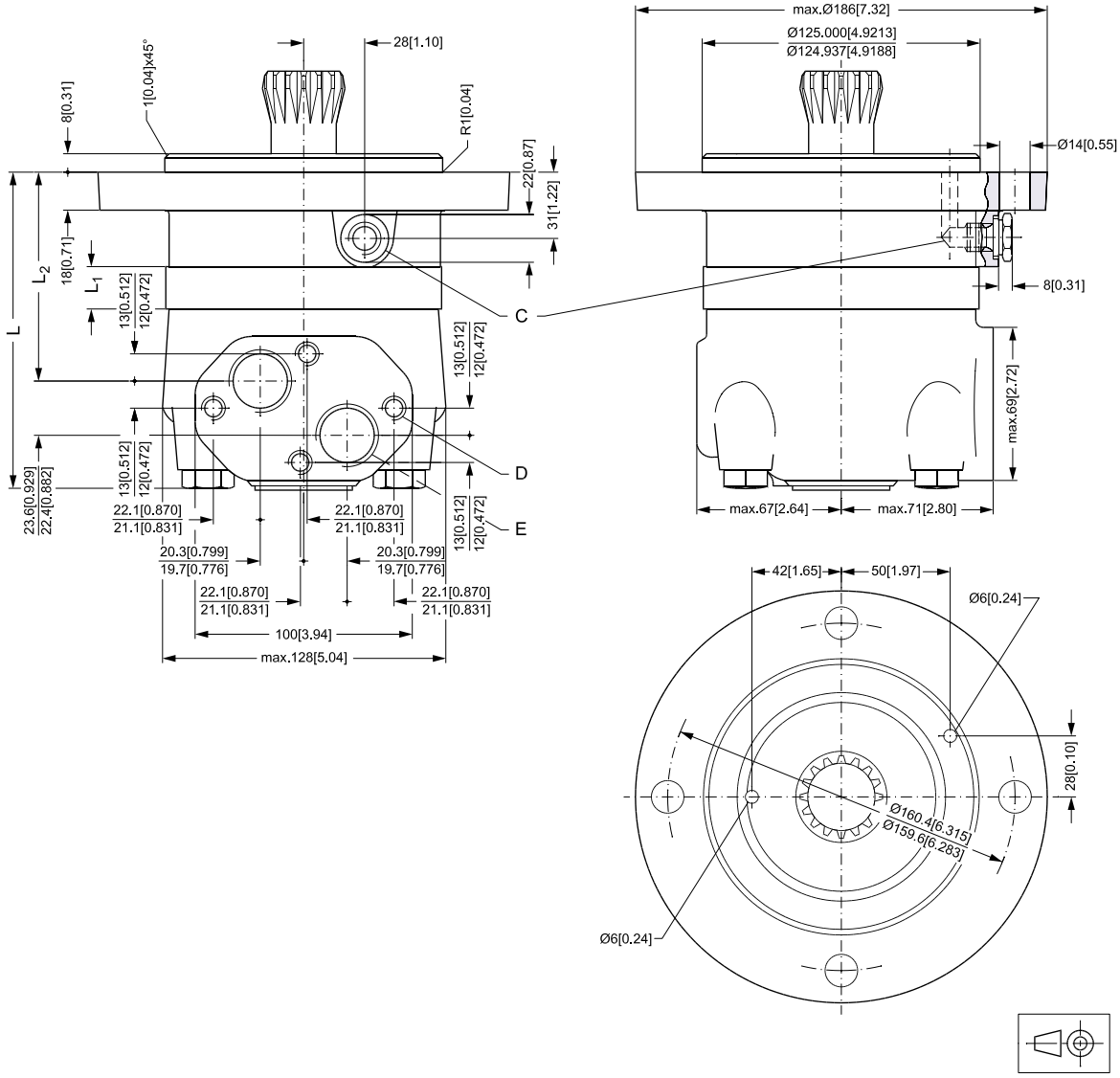
Type	$L_{max.}$ mm [in]	L_{1*} mm [in]	L_2 mm [in]
OMT 160 FL/FH	228 [8.98]	16.5 [0.650]	178 [7.01]
OMT 200 FL/FH	233 [9.17]	21.5 [0.846]	183 [7.20]
OMT 250 FL/FH	239 [9.41]	27,8 [1.094]	189 [7.44]
OMT 315 FL/FH	248 [9.76]	37.0 [1.457]	199 [7.83]
OMT 400 FL/FH	259 [10.20]	47.5 [1.870]	209 [8.23]
OMT 500 FL/FH	273 [10.75]	61.5 [2.421]	223 [8.78]

C: G 3/4; 17 mm [0.67 in] deep (BS/ISO 228/1)
D: Drain connection G 3/8; 14 mm [0.55 in] deep
E: Brake-release port G 1/4; 12 mm [0.47 in] deep
F: M10; 10 mm [0.39 in] deep

*) The gearwheel set is 3.5 mm [0.138 in] wider across the rollers than the L_1 dimensions

Dimensions – European version

SHORT



151-898.10

Type	$L_{max.}$ mm [in]	L_{1*} mm [in]	L_2 mm [in]
OMTS 160	146 [5.75]	16.5 [0.650]	96 [3.78]
OMTS 200	151 5.94]	21.5 [0.846]	101 [3.98]
OMTS 250	157 [6.18]	27.8 [1.094]	107 [4.21]
OMTS 315	166 [6.54]	37.0 [1.457]	116 [4.57]
OMTS 400	177 [6.97]	47.5 [1.870]	127 [5.00]
OMTS 500	191 [7.52]	61.5 [2.421]	142 [5.59]

C: Drain connection G 1/4; 12 mm [0.47 in] deep
D: M10; 10 mm [0.39 in] deep
E: G 3/4; 17 mm [0.67 in] deep

*) The gearwheel set is 3.5 mm [0.138 in] wider across the rollers than the L_1 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.

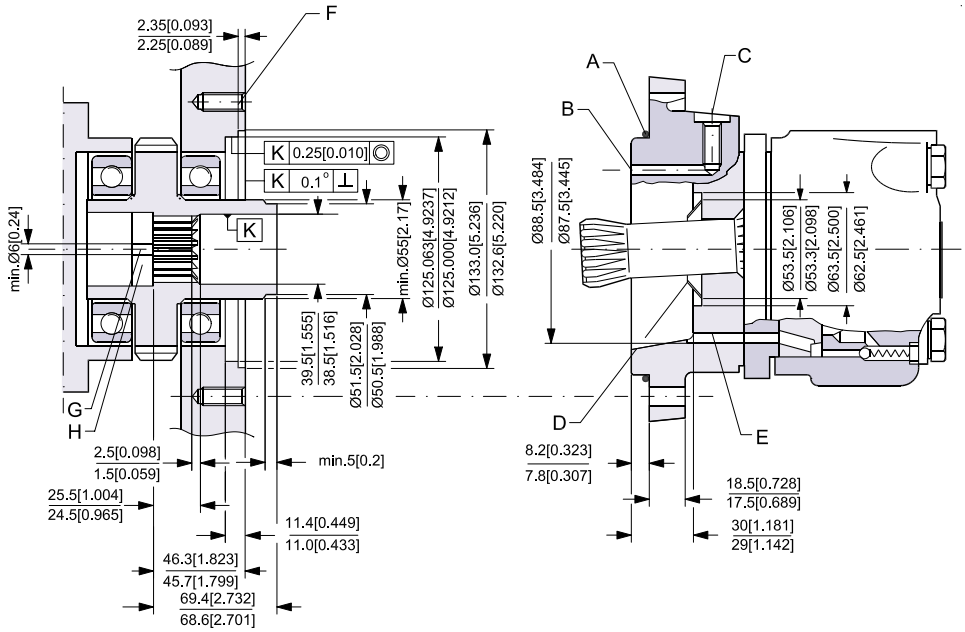
During start and operation it is important that the spline connection and the bearings in the attached component receive oil and are adequately lubricated. To ensure that the spline connection receives sufficient oil, a conical sealing ring between the shaft of the attached component and the motor intermediate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

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.

OMTS DIMENSIONS OF THE ATTACHED COMPONENT



151-452.10

A: O-ring: 125 × 3 mm
B: External drain channel
C: Drain connection
G 1/4; 12 mm [0.47 in] deep
D: Conical seal ring
E: Internal drain channel
F: M12; min. 18 mm [0.71 in] 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).

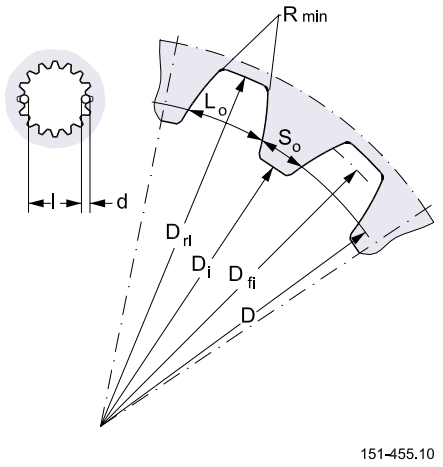
Material:
Case hardening steel with a tensile strength corresponding at least to 20 MoCr4 (900 N/mm²) or SAE 8620.

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 · X = 1; m = 2.1166)

Fillet root side fit		mm	in
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	$32.150\ ^{+0.04}_{0}$	$1.2657\ ^{+0.00157}_{0}$
Space width (circular)	L_o	$4.516\ ^{\pm0.037}$	$0.1777\ ^{\pm0.0014}$
Tooth thickness (circular)	S_o	2.170	0.0854
Fillet radius	$R_{min.}$	0.5	0.02
Max. measurement between pins*	l	$26.9\ ^{+0.1}_{0}$	$1.059\ ^{+0.004}_{0}$
Pin dia.	d	$4.834\ ^{\pm0.001}$	$0.1903\ ^{\pm0.00004}$

* Finished dimensions (when hardened)



151-455.10

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.

VERSIONS

Mounting flange	Shaft	Port size	European version	US version	Drain connection	Check valve	Main type designation
Standard flange	Cyl. 50 mm	G1	❍		Yes	Yes	OMV
	Cyl. 2.25 in	1 5/16-12 UN		❍	Yes	Yes	OMV
	Splined 2.125 in	G1	❍		Yes	Yes	OMV
		1 5/16-12 UN		❍	Yes	Yes	OMV
	Tapered 60 mm	G1	❍		Yes	Yes	OMV
	Tapered 2.25 in	1 5/16-12 UN		❍	Yes	Yes	OMV
SAE-C flange	Cyl. 2.25 in	1 5/16-12 UN		❍	Yes	Yes	OMV
	Splined 2.125 in	1 5/16-12 UN		❍	Yes	Yes	OMV
Wheel	Cyl. 50 mm	G1	❍		Yes	Yes	OMVW
	Tapered 60 mm	G1	❍		Yes	Yes	OMVW
	Tapered 2.25 in	1 5/16-12 UN		❍	Yes	Yes	OMVW
Short	No output shaft	G1	❍		Yes	Yes	OMVS

Function diagram - see page : ⟶

Features available (options) :
Speed sensor
Motor with tacho connection
Viton shaft seal
Painted
Ultra short

CODE NUMBERS

CODE NUMBERS	Displacement [cm³]					Technical data – Page	Shaft loads – Page	Dimensions – Page
	315	400	500	630	800			
151B	3100	3101	3102	3103	3104	60	63	72
151B	2150	2151	2152	2153	2154	60	63	73
151B	3105	3106	3107	3108	3109	60	63	72
151B	2155	2156	2157	2158	2159	60	63	73
151B	3110	3111	3112	3113	3114	60	63	72
151B	2160	2161	2162	2163	2164	60	63	73
151B	2183	2184	2185	2186	2187	60	64	74
151B	2188	2189	2190	2191	2192	60	64	74
151B	3115	3116	3117	3118	3119	60	63	75
151B	3120	3121	3122	3123	3124	60	63	75
151B	2170	2171	2172	2173	2174	60	63	76
151B	3125	3126	3127	3128	3129	60	–	77
	65	65	66	66	67			

Ordering
Add the four digit prefix "151B" to the four digit numbers from the chart for complete code number.

Example:
151B3101 for an OMV 400 with standard flange, cyl. 50 mm shaft and port size G 1.

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

TECHNICAL DATA FOR OMV, OMVW AND OMVS

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 [in^3]		314.5 [19.19]	400.9 [24.46]	499.6 [30.49]	629.1 [38.39]	801.8 [48.93]
Max. speed	min^{-1} [rpm]	cont.	510	500	400	315	250
		int.[1]	630	600	480	380	300
Max. torque	Nm [lbf·in]	cont.	920 [8140]	1180 [10440]	1460 [12920]	1660 [14690]	1880 [16640]
		int.[1]	1110 [9820]	1410 [12480]	1760 [15580]	1940 [17170]	2110 [18680]
Max. output	kW [hp]	cont.	42.5 [57.0]	53.5 [71.7]	53.5 [71.7]	48.0 [64.4]	42.5 [57.0]
		int.[1]	51.0 [68.4]	64.0 [85.8]	64.0 [85.8]	56.0 [75.1]	48.0 [64.4]
Max. pressure drop	bar [psi]	cont.	200 [2900]	200 [2900]	200 [2900]	180 [2610]	160 [2320]
		int.[1]	240 [3480]	240 [3480]	240 [3480]	210 [3050]	180 [2610]
		peak[2]	280 [4060]	280 [4060]	280 [4060]	240 [3480]	210 [3050]
Max. oil flow	l/min [USgal/min]	cont.	160 [42.3]	200 [52.8]	200 [52.8]	200 [52.8]	200 [52.8]
		int.[1]	200 [52.8]	240 [63.4]	240 [63.4]	240 [63.4]	240 [63.4]
Max. starting pressure with unloaded shaft	bar [psi]		8 [116]	8 [116]	8 [116]	8 [116]	8 [116]
Min. starting torque	at max. press. drop cont. Nm [lbf·in]		710 [6280]	910 [8050]	1130 [10000]	1330 [11770]	1510 [13360]
	at max. press. drop int.[1] Nm [lbf·in]		850 [7520]	1090 [9650]	1360 [12040]	1550 [13720]	1700 [15050]

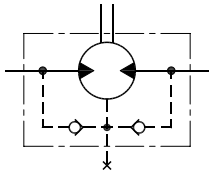
Type			Max. inlet pressure	Max. return pressure with drain line
OMV OMVW OMVS	bar [psi]	cont.	210 [3050]	140 [2030]
	bar [psi]	int.[1]	250 [3630]	175 [2540]
	bar [psi]	peak[2]	300 [4350]	210 [3050]

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

MAX. PERMISSIBLE SHAFT SEAL PRESSURE

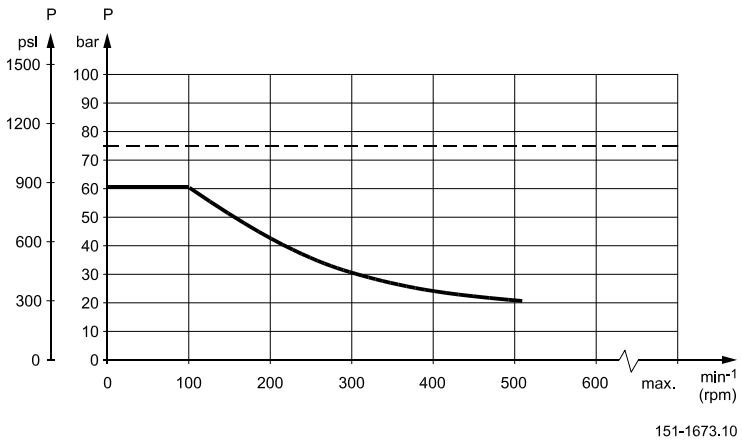
OMV with check valves and without use of drain connection:
The pressure on the shaft seal never exceeds the pressure in the return line



151-320.10

OMV 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 the drain line

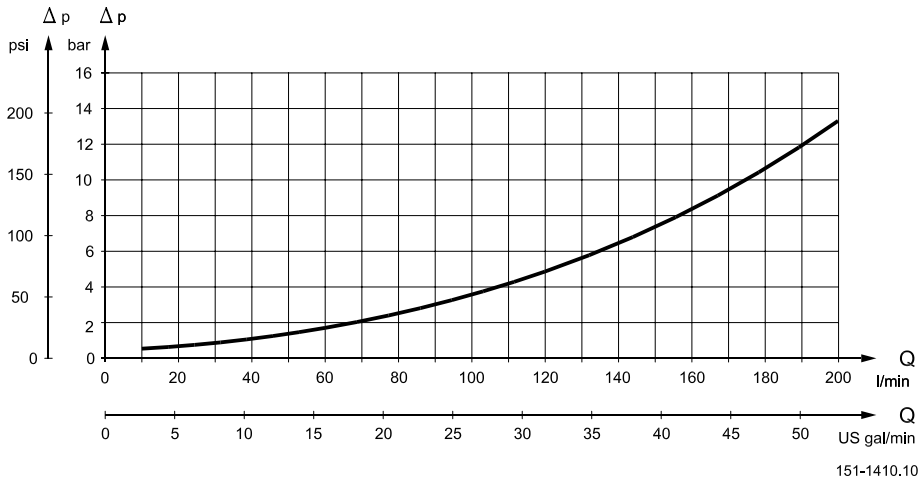


151-1673.10

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

——— Continuous operation

PRESSURE DROP IN MOTOR



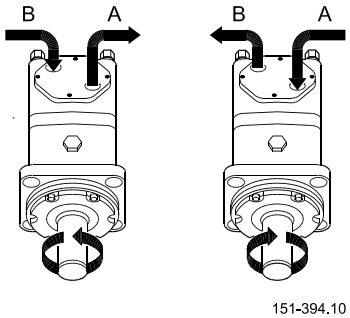
The curve applies to an unloaded motor shaft and an oil viscosity of 35 mm²/s (165 SUS)

OIL FLOW IN DRAIN LINE

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

Pressure drop bar [psi]	Viscosity mm²/s [SUS]	Oil flow in drain line l/min [US gal/min]
140 [2030]	20 [100]	3.0 [0.79]
	35 [165]	2.0 [0.53]
210 [3050]	20 [100]	6.0 [1.59]
	35 [165]	4.0 [1.06]

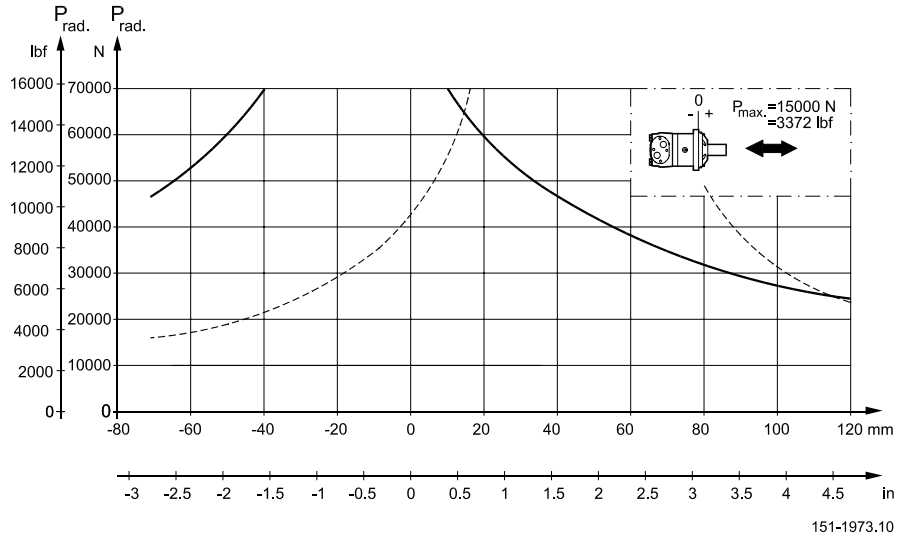
DIRECTION OF SHAFT ROTATION



PERMISSIBLE SHAFT LOADS FOR OMV

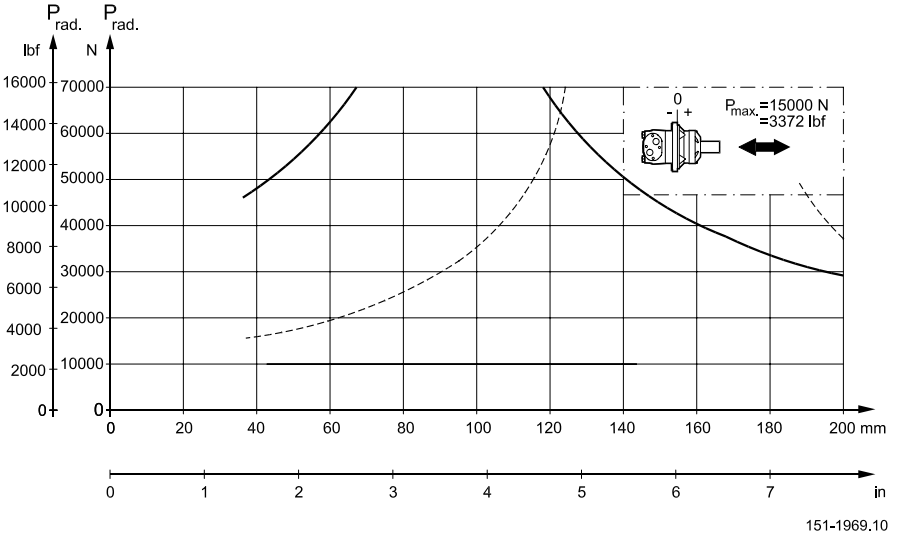
Mounting flange:
Standard

Shaft:
All shaft types



Mounting flange:
Wheel

Shaft:
All shaft types

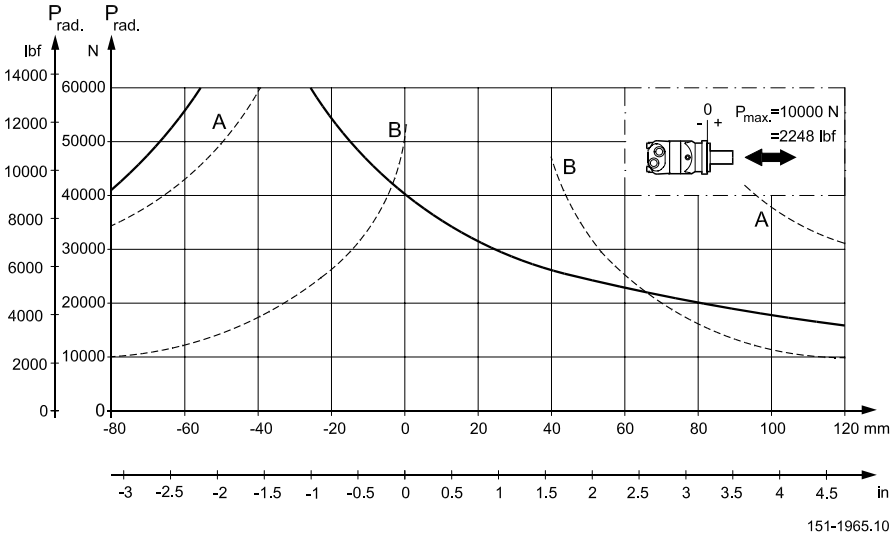


The output shaft runs in tapered roller bearings that permit high axial and radial forces. The permissible radial load on the shaft is shown for an axial load of 0 N as a function of the distance from the mounting flange to the point of load application.
The curve is based on B10 bearing life (2000 hours 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" DHMH.PK.100.G2.02 520L0232.

PERMISSIBLE SHAFT LOADS FOR OMV

Mounting flange:
SAE-C

Shaft:
All shaft types

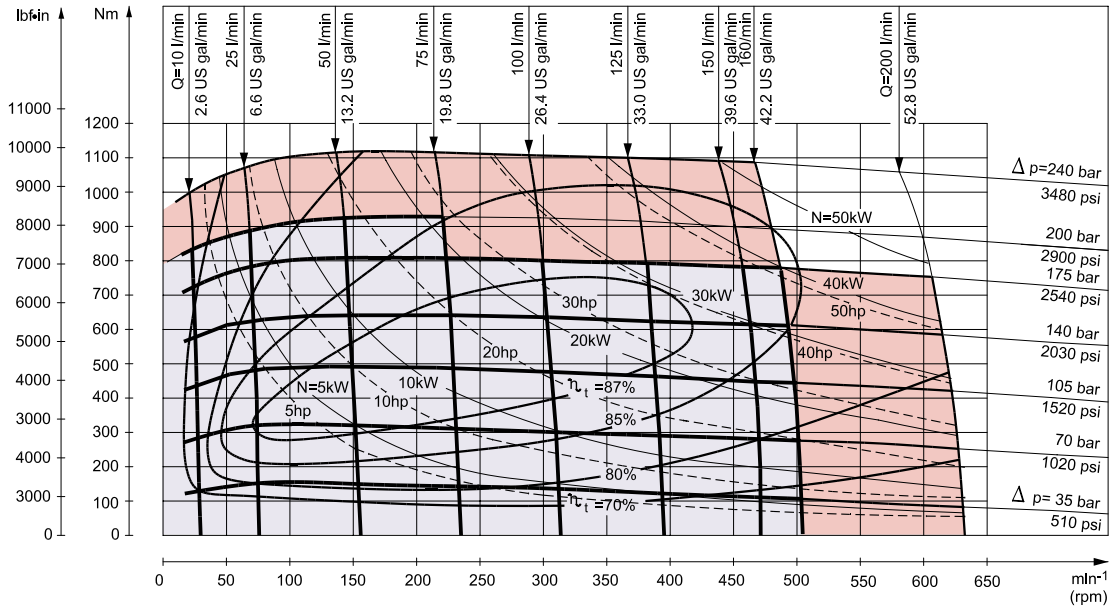


A: Cyl. 2.25 in shaft
B: Splined 2.125 in shaft

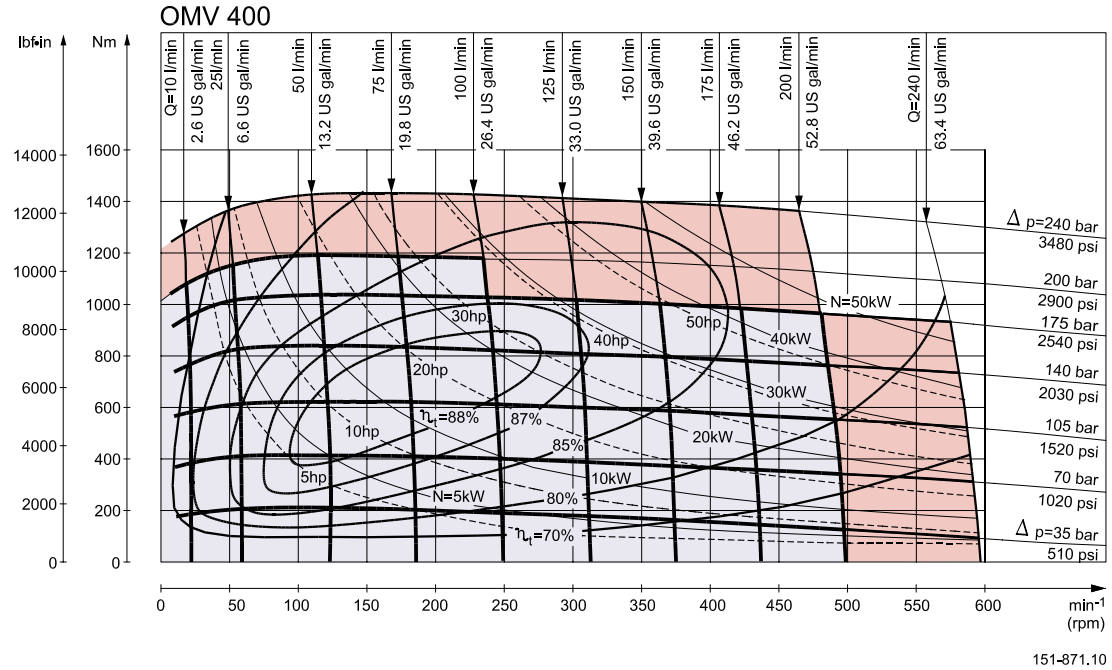
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The curve is based on B10 bearing life (2000 hours or 12,000,000 shaft revolutions at 100 min^{-1}) at rated output torque, when mineral-based hydraulic oil with a sufficient content of anti-wear additives, is used.
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Bearing life calculations can be made using the explanation and formula provided in the chapter "Bearing dimensioning" in the technical information "General Orbital motors" DHMH.PK.100.G2.02 520L0232.

FUNCTION DIAGRAMS

OMV 315



OMV 400

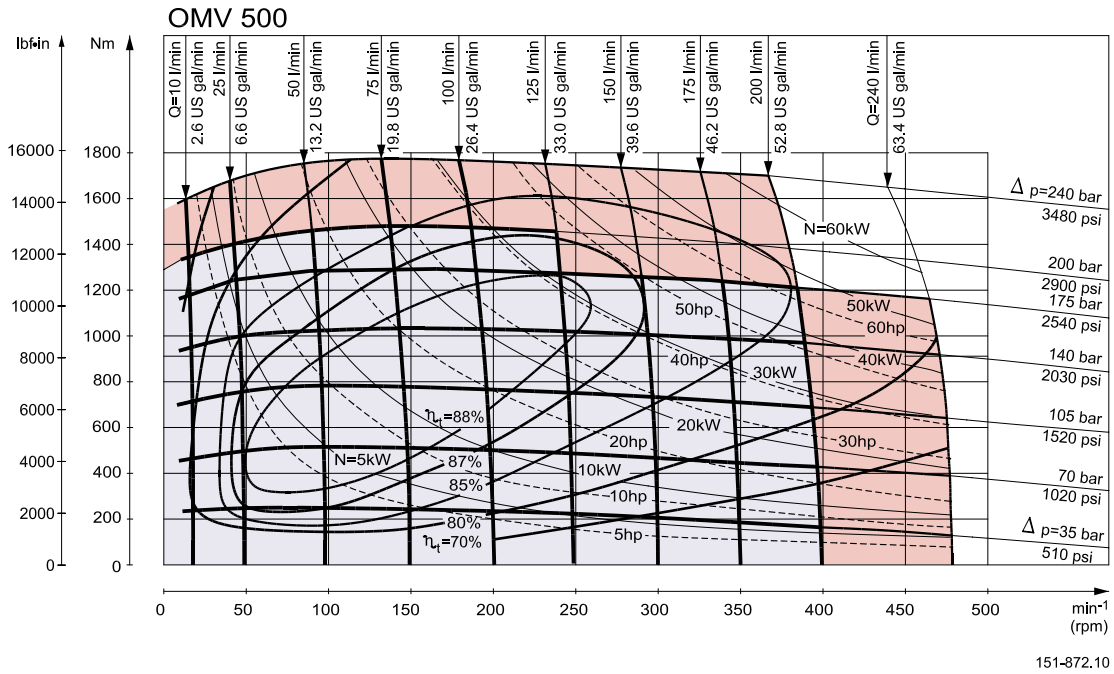


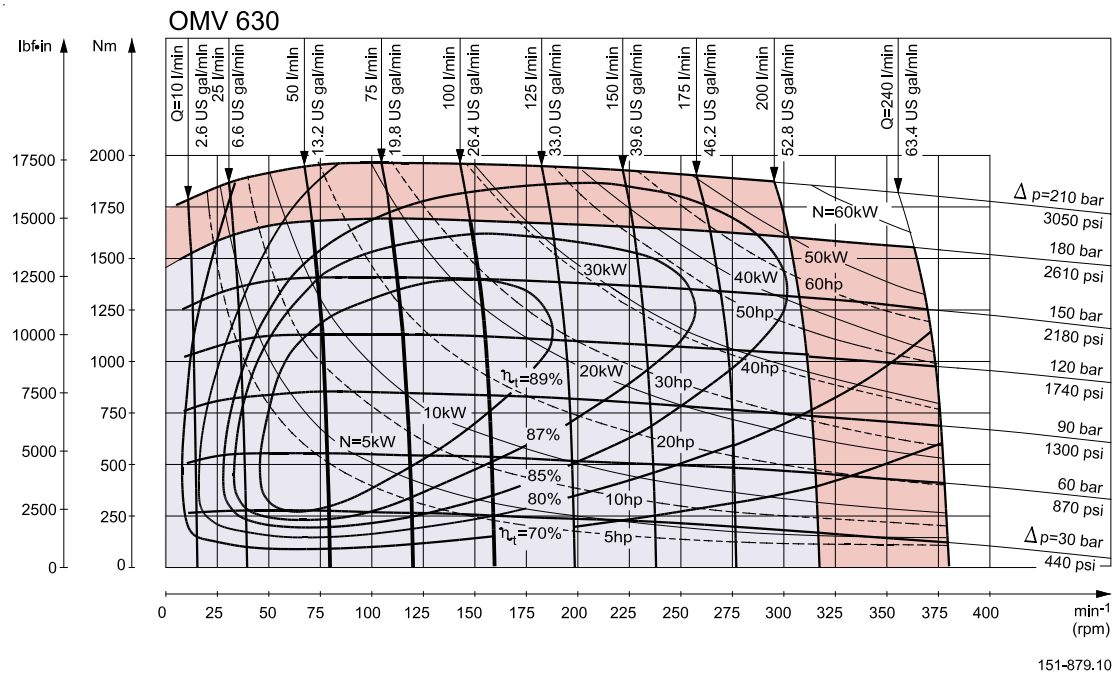
Explanation of function diagram use, basis and conditions can be found on page 5.

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

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

FUNCTION DIAGRAMS



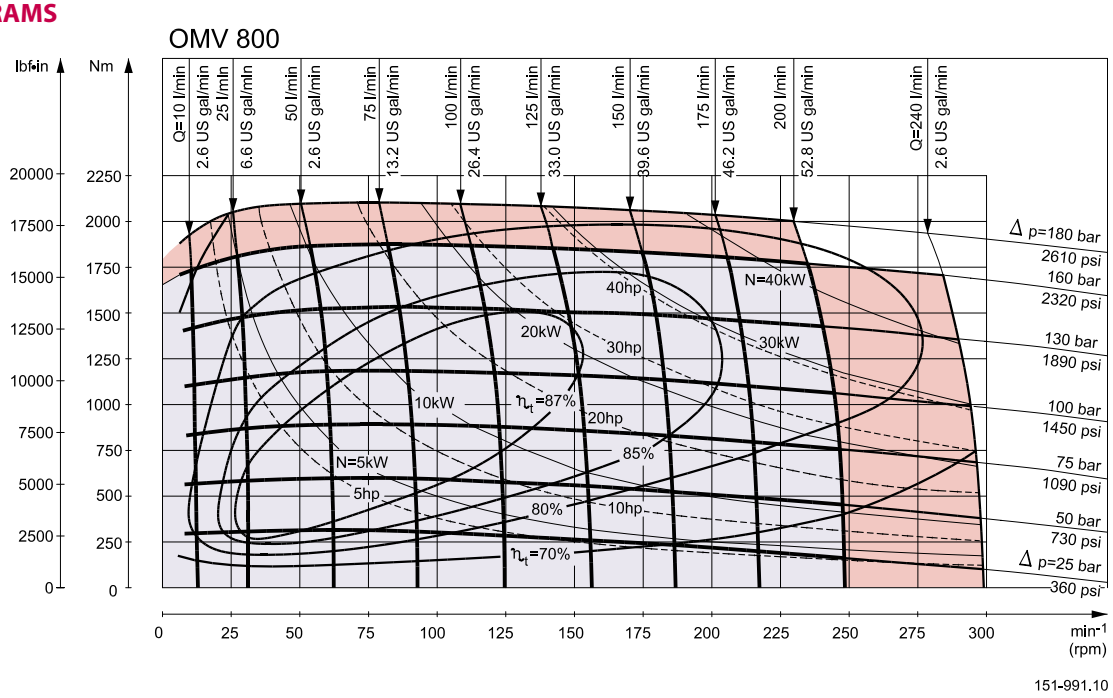


Explanation of function diagram use, basis and conditions can be found on page 5.

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

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

FUNCTION DIAGRAMS



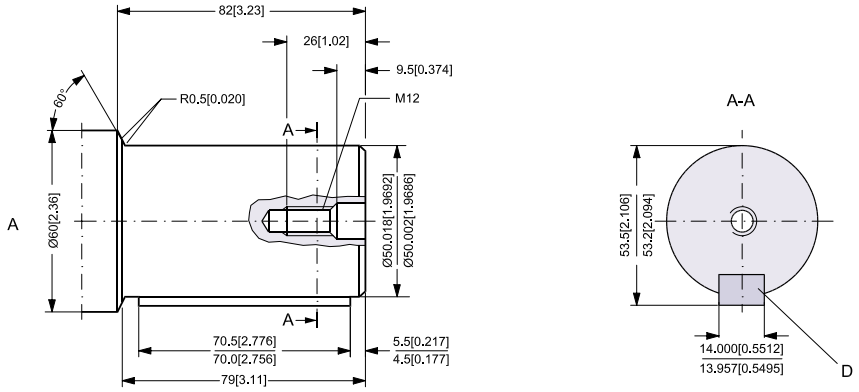
Explanation of function diagram use, basis and conditions can be found on page 5.

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

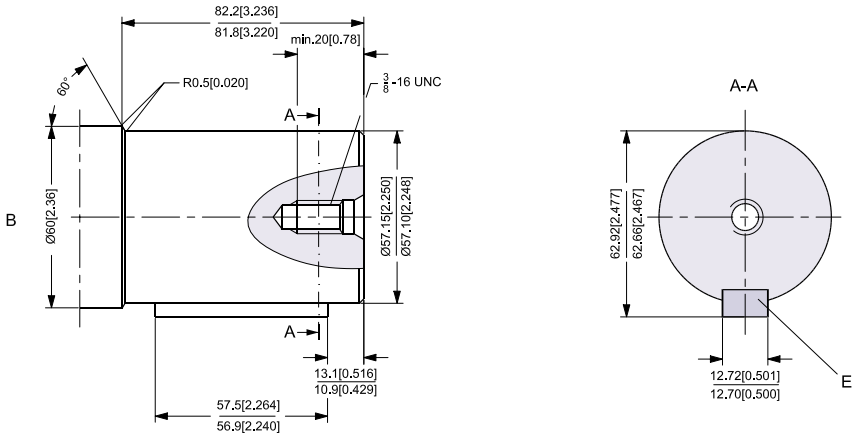
Note: Intermittent pressure drop and oil flow must not occur simultaneously.

SHAFT VERSION

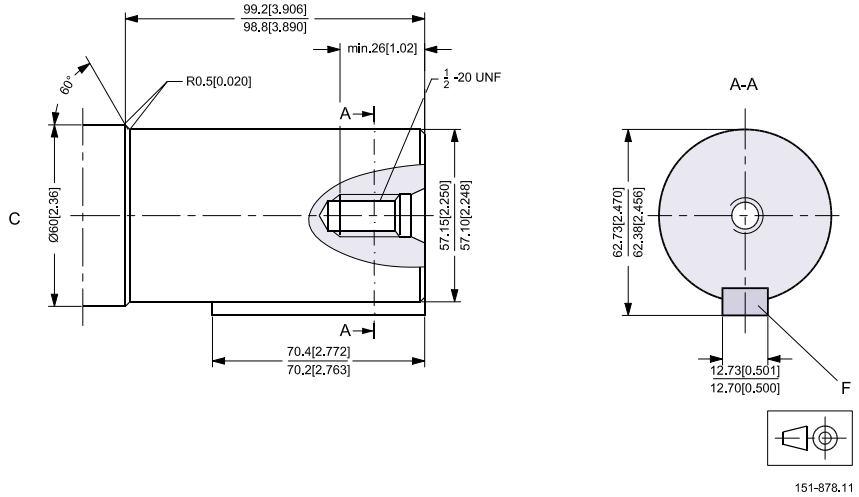
A: Cylindrical 50 mm shaft
D: Parallel key
A14 × 9 × 70
DIN 6885



B: Cylindrical 2.25 in shaft for OMV with standard mounting flange
E: Parallel key
$^1/_2 \times ^1/_2 \times 2^1/_4$ in
B.S. 46

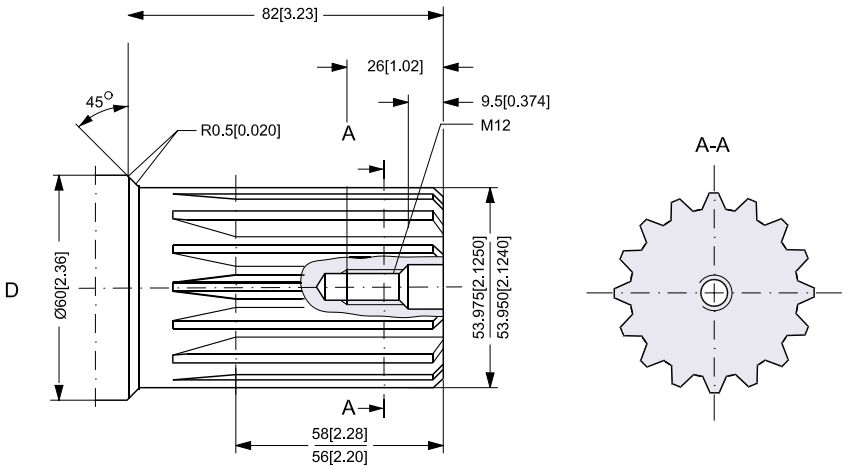


C: Cylindrical 2.25 in shaft for OMV with mounting flange SAE-C
F: Parallel key
$^1/_2 \times ^1/_2 \times 2^1/_4$ in
B.S. 46

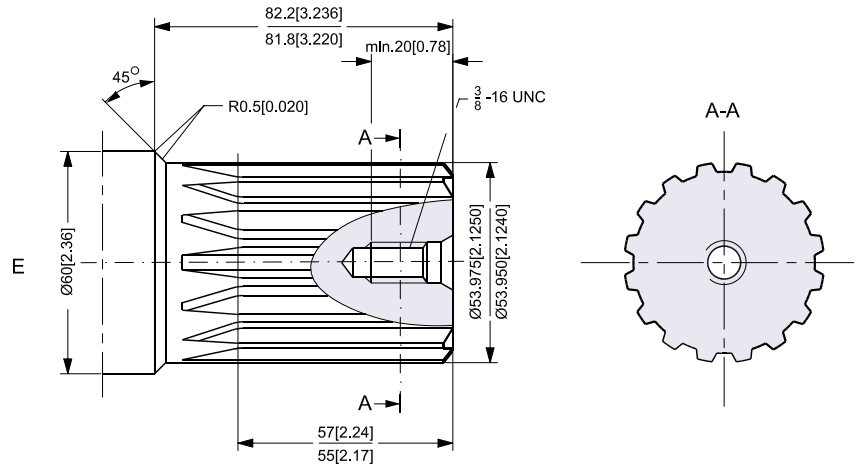


SHAFT VERSION

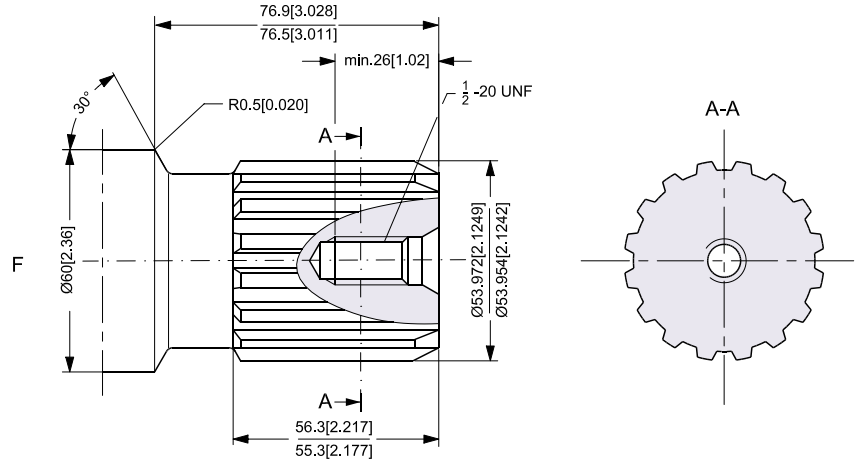
D: Involute splined shaft
ANS B92.1 - 1970 standard
Flat root side fit
Pitch $^{8}/_{16}$
Teeth 16
Major dia. 2.125 in
Pressure angle 30°

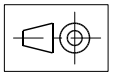


US Version
E: Involute splined shaft
for OMV with standard
mounting flange
ANS B92.1 - 1970 standard
Flat root side fit
Pitch $^{8}/_{16}$
Teeth 16
Major dia. 2.125 in
Pressure angle 30°



US Version
F: Involute splined shaft
for OMV with mounting
flange SAE-C
ANS B92.1 - 1970 standard
Flat root side fit
Pitch $^{8}/_{16}$
Teeth 16
Major dia. 2.125 in
Pressure angle 30°

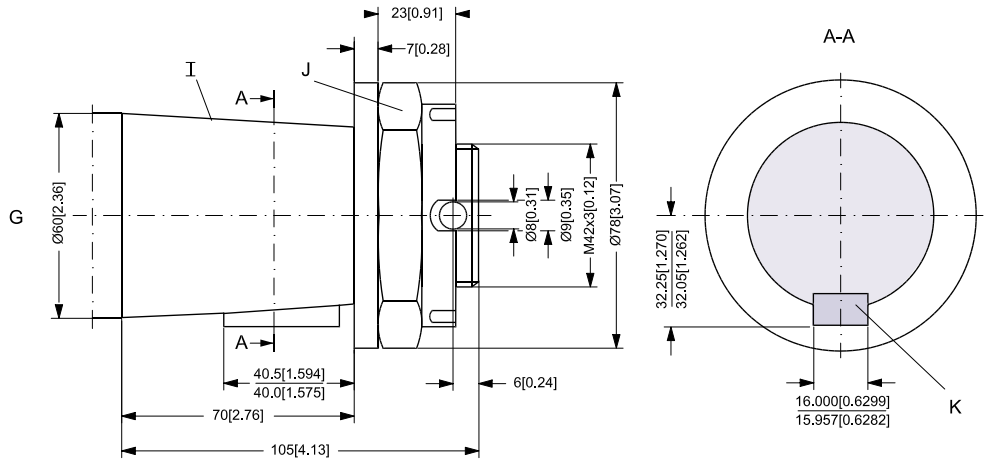




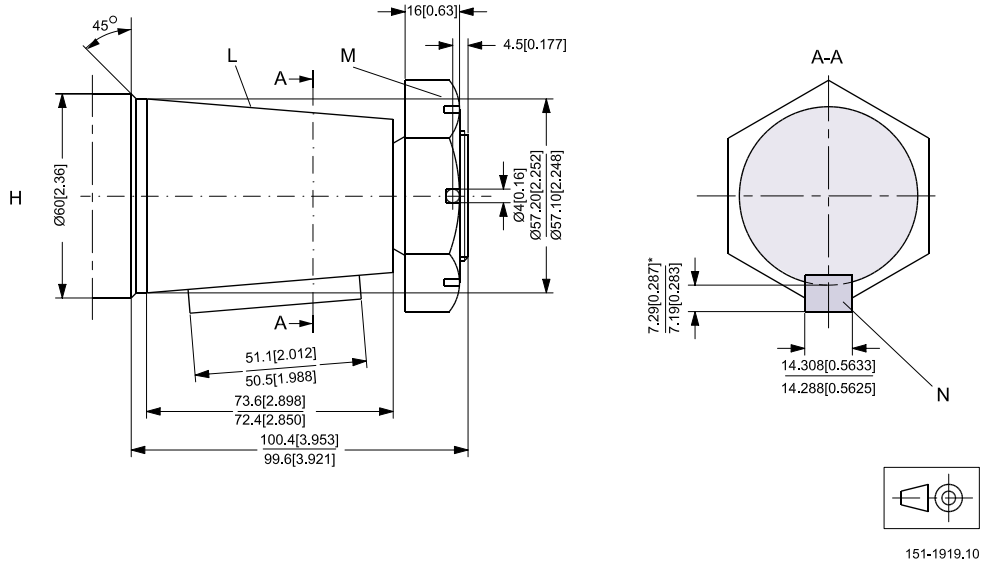
151-1918.10

SHAFT VERSION

G: Tapered 60 mm shaft
(ISO/R775)
J: DIN 937
Across flats: 65 mm
Tightening torque:
750 ±50 Nm [6640 ±440 lbf·in]
I: Taper 1:10
K: Parallel key
B16 × 10 × 32
DIN 6885



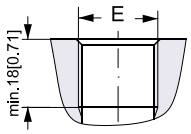
H: Tapered 2.25 in shaft
L: Cone 1:8
SAE J501
M: $1^{1}/_{2}$ - 18 UNEF
Across flats: $2^{3}/_{8}$ in
Tightening torque:
750 ±50 Nm [6640 ±440 lbf·in]
N: Parallel key
$^{9}/_{16} \times {}^{9}/_{16} \times 2$ in
B.S. 46



151-1919.10

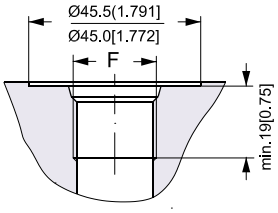
PORT THREAD VERSIONS

A



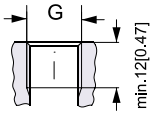
A: G main ports
E: ISO 228/1 - G1

B



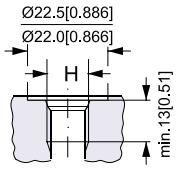
B: UN main ports
F: 1 5/16 - 12 UN
O-ring boss port

C



C: G drain port
G: ISO 228/1 - G1/4

D

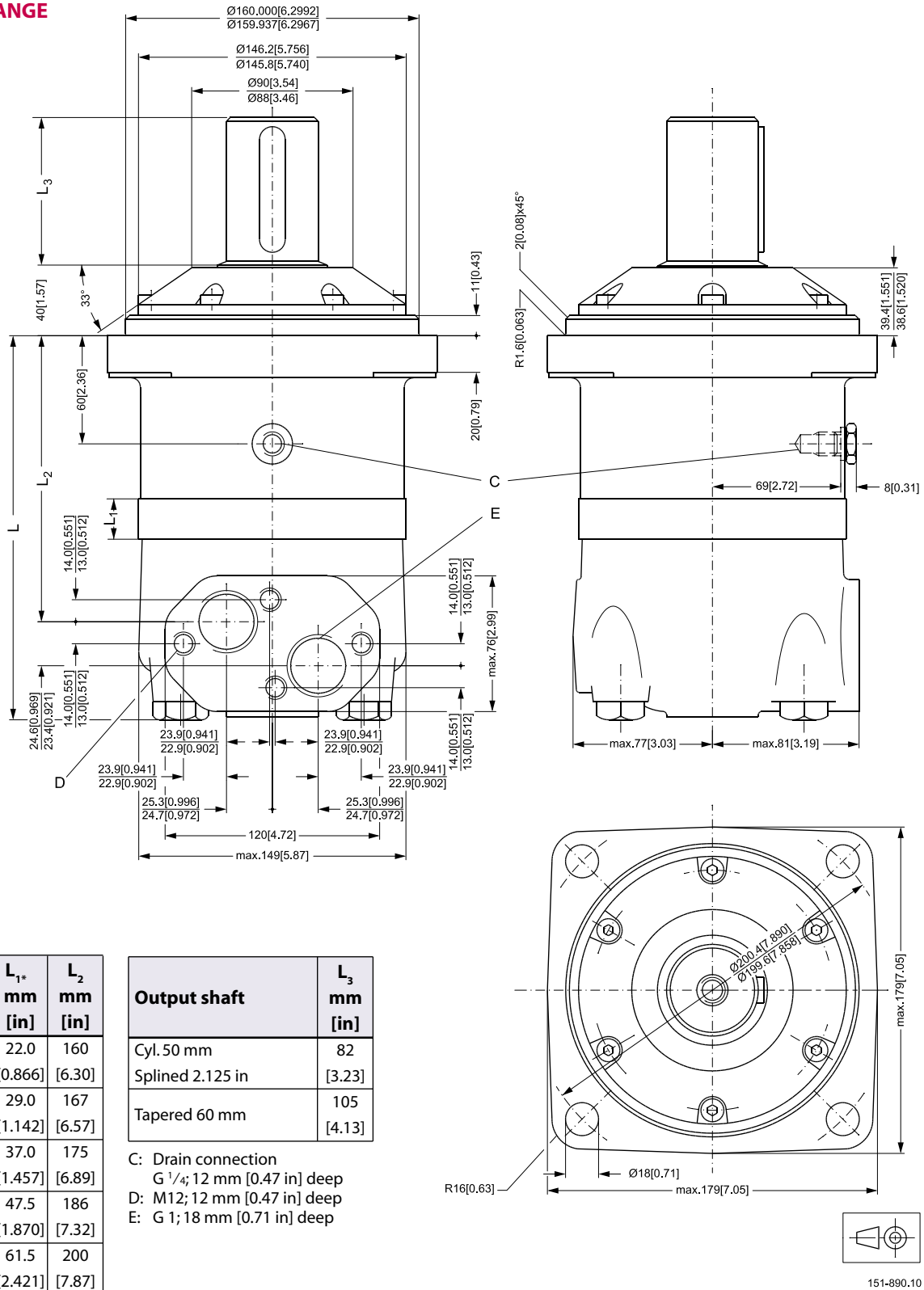


151-1978.10

D: UNF drain port
H: 9/16 - 18 UNF
O-ring boss port

Dimensions – European version

STANDARD FLANGE



Type	$L_{max.}$ mm [in]	L_{1*} mm [in]	L_2 mm [in]
OMV 315	215 [8.46]	22.0 [0.866]	160 [6.30]
OMV 400	222 [8.74]	29.0 [1.142]	167 [6.57]
OMV 500	230 [9.05]	37.0 [1.457]	175 [6.89]
OMV 630	240 [9.45]	47.5 [1.870]	186 [7.32]
OMV 800	254 [10.00]	61.5 [2.421]	200 [7.87]

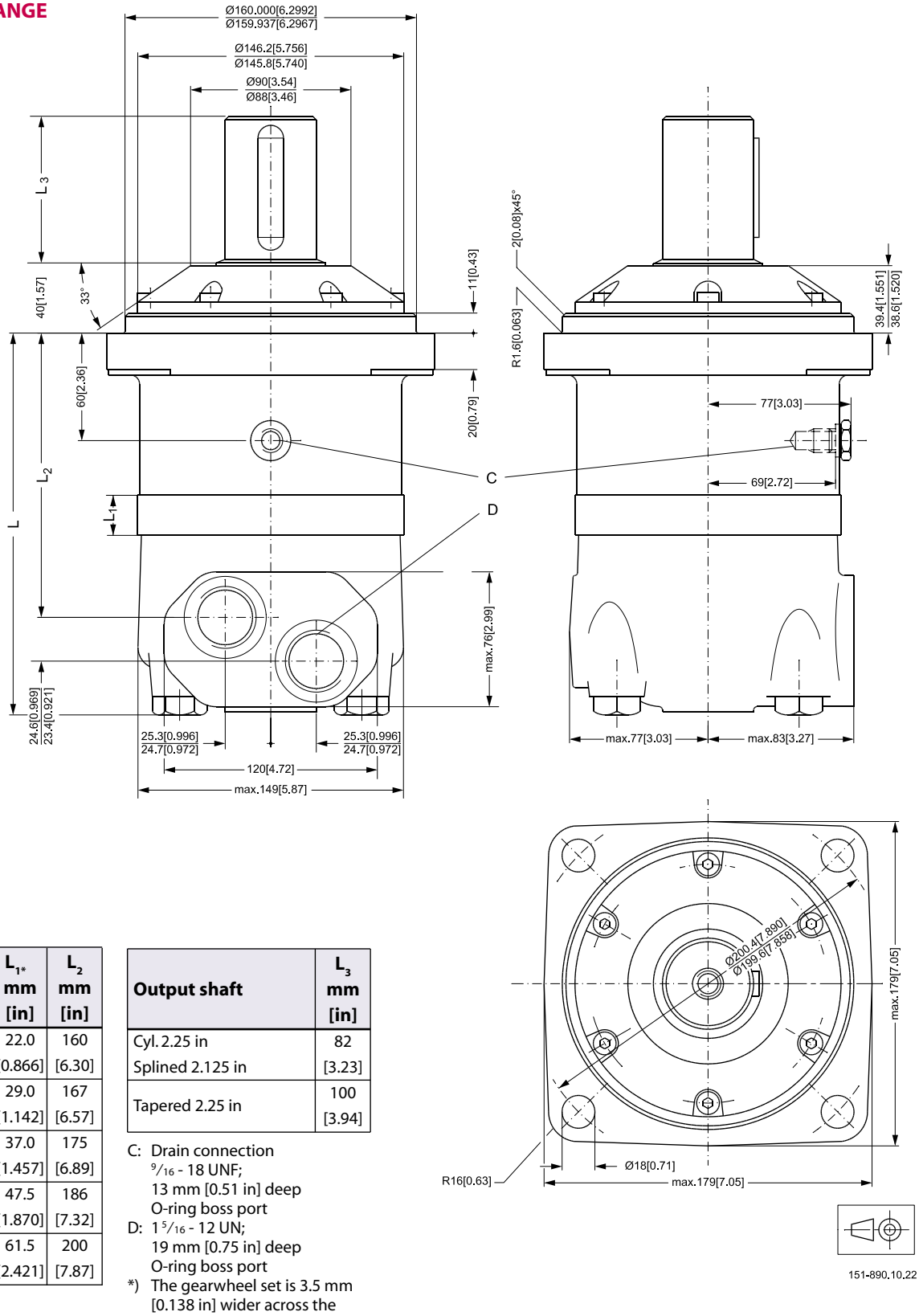
Output shaft	L_3 mm [in]
Cyl. 50 mm Splined 2.125 in	82 [3.23]
Tapered 60 mm	105 [4.13]

C: Drain connection
G 1/4; 12 mm [0.47 in] deep
D: M12; 12 mm [0.47 in] deep
E: G 1; 18 mm [0.71 in] deep

*) The gearwheel set is 3.5 mm [0.138 in] wider across the rollers than the L_1 dimensions

Dimensions – US version

STANDARD FLANGE



Type	$L_{max.}$ mm [in]	L_{1*} mm [in]	L_2 mm [in]
OMV 315	215 [8.46]	22.0 [0.866]	160 [6.30]
OMV 400	222 [8.74]	29.0 [1.142]	167 [6.57]
OMV 500	230 [9.05]	37.0 [1.457]	175 [6.89]
OMV 630	240 [9.45]	47.5 [1.870]	186 [7.32]
OMV 800	254 [10.00]	61.5 [2.421]	200 [7.87]

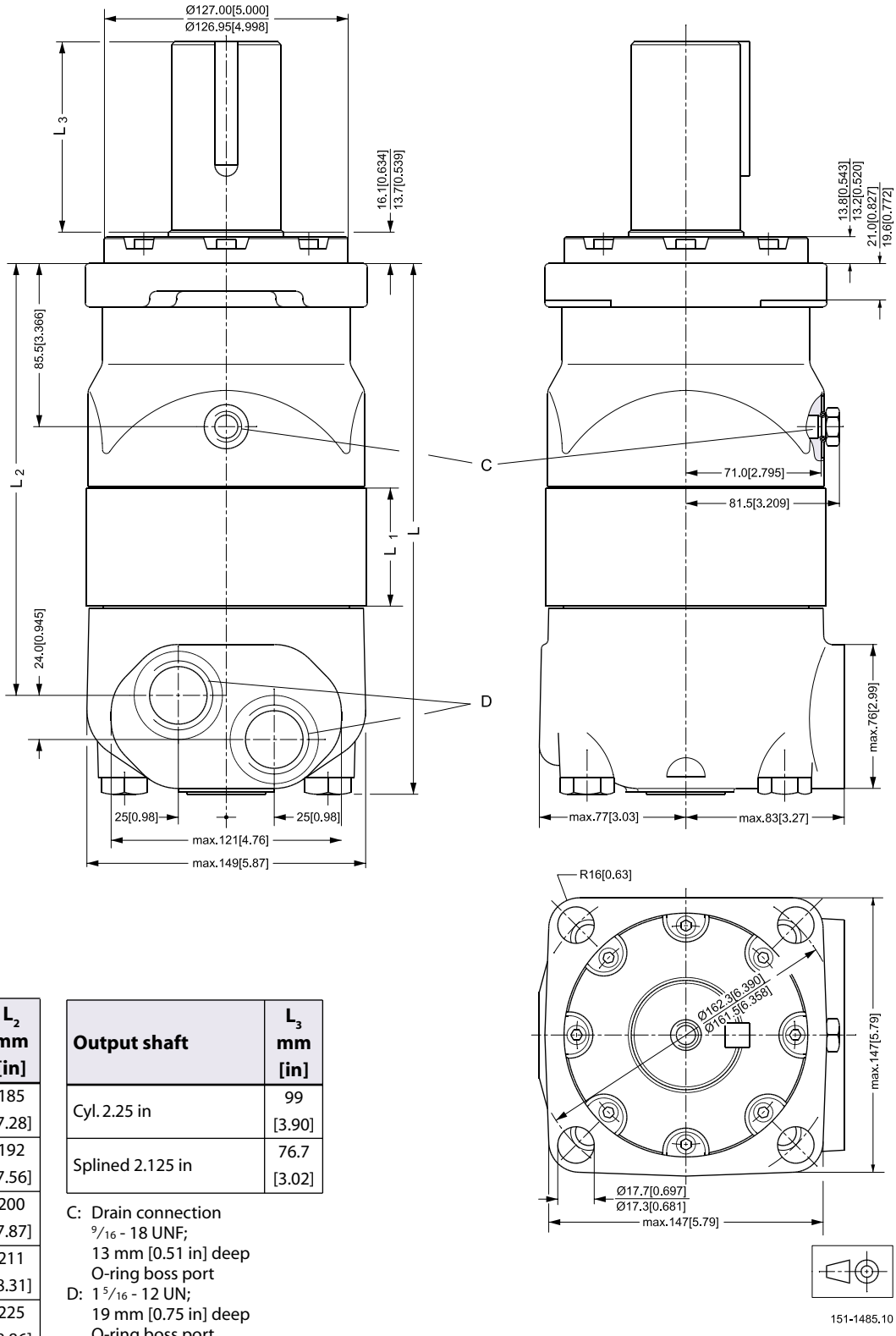
Output shaft	L_3 mm [in]
Cyl. 2.25 in Splined 2.125 in	82 [3.23]
Tapered 2.25 in	100 [3.94]

C: Drain connection
$^9/_{16}$ - 18 UNF;
13 mm [0.51 in] deep
O-ring boss port

D: $1\,^5/_{16}$ - 12 UN;
19 mm [0.75 in] deep
O-ring boss port

*) The gearwheel set is 3.5 mm [0.138 in] wider across the rollers than the L_1 dimensions

SAE-C FLANGE



Type	$L_{max.}$ mm [in]	L_{1*} mm [in]	L_2 mm [in]
OMV 315	239 [9.41]	22.0 [0.866]	185 [7.28]
OMV 400	246 [9.69]	29.0 [1.142]	192 [7.56]
OMV 500	254 [10.00]	37.0 [1.457]	200 [7.87]
OMV 630	265 [10.43]	47.5 [1.870]	211 [8.31]
OMV 800	279 [10.98]	61.5 [2.421]	225 [8.86]

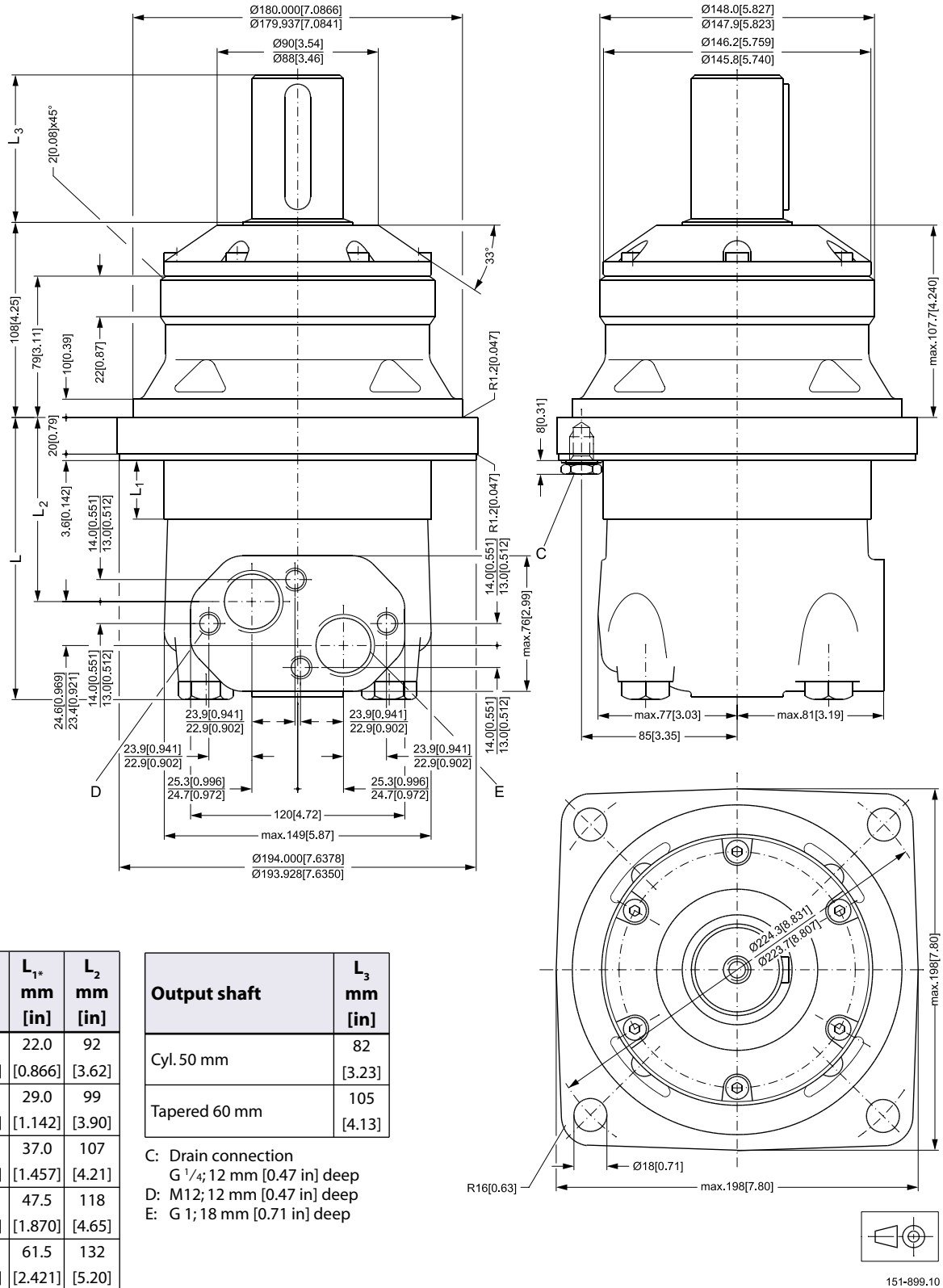
Output shaft	L_3 mm [in]
Cyl. 2.25 in	99 [3.90]
Splined 2.125 in	76.7 [3.02]

C: Drain connection
$^{9}/_{16}$ - 18 UNF;
13 mm [0.51 in] deep
O-ring boss port

D: $1\,^{5}/_{16}$ - 12 UN;
19 mm [0.75 in] deep
O-ring boss port

*) The gearwheel set is 3.5 mm [0.138 in] wider across the rollers than the L_1 dimensions

WHEEL



Type	$L_{max.}$ mm [in]	L_{1*} mm [in]	L_2 mm [in]
OMVW 315	146 [5.75]	22.0 [0.866]	92 [3.62]
OMVW 400	153 [6.02]	29.0 [1.142]	99 [3.90]
OMVW 500	161 [6.34]	37.0 [1.457]	107 [4.21]
OMVW 630	172 [6.77]	47.5 [1.870]	118 [4.65]
OMVW 800	185 [7.28]	61.5 [2.421]	132 [5.20]

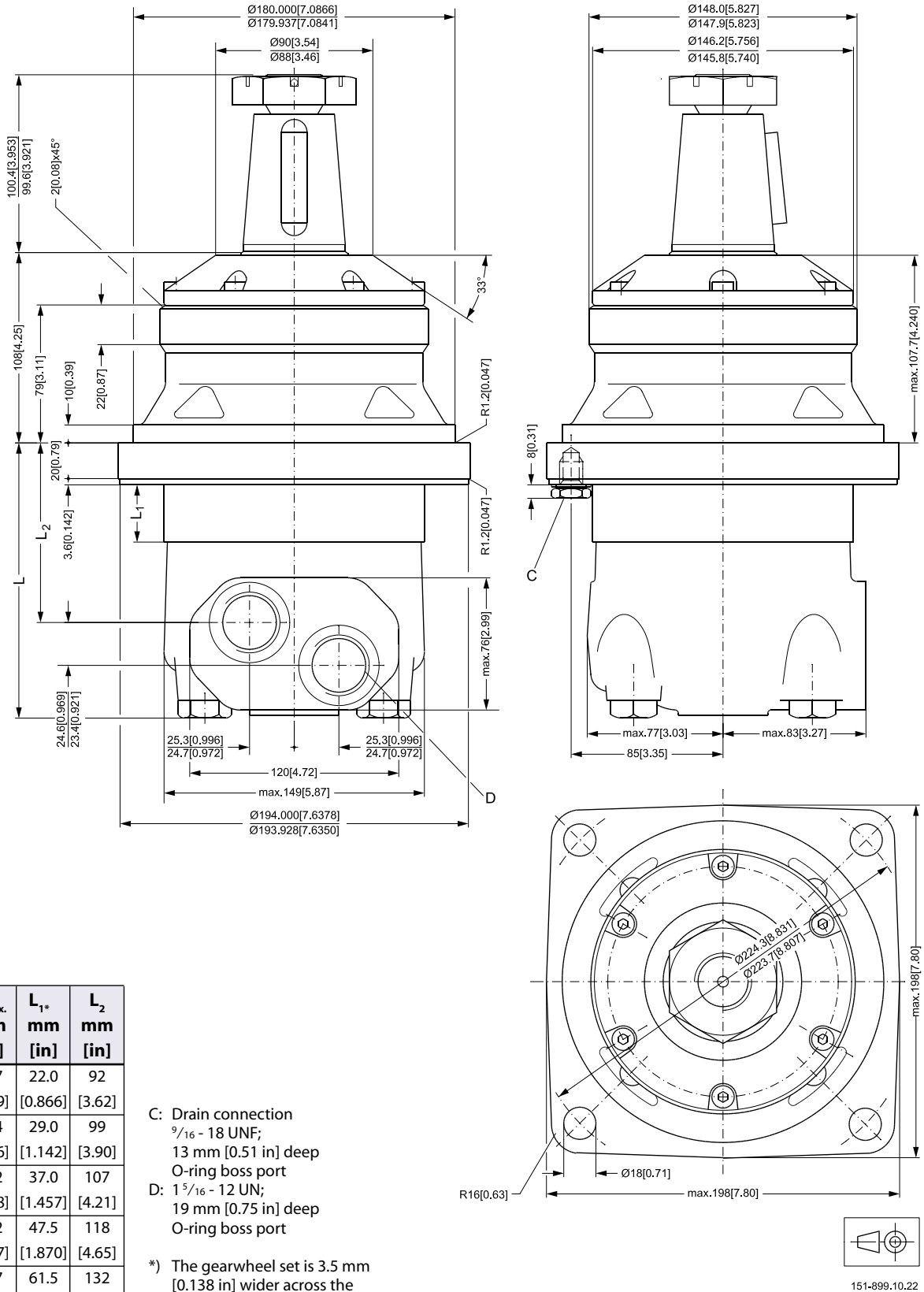
Output shaft	L_3 mm [in]
Cyl. 50 mm	82 [3.23]
Tapered 60 mm	105 [4.13]

C: Drain connection
G 1/4; 12 mm [0.47 in] deep
D: M12; 12 mm [0.47 in] deep
E: G 1; 18 mm [0.71 in] deep

*) The gearwheel set is 3.5 mm [0.138 in] wider across the rollers than the L_1 dimensions

151-899.10

WHEEL



Type	$L_{max.}$ mm [in]	L_{1*} mm [in]	L_2 mm [in]
OMVW 315	147 [5.79]	22.0 [0.866]	92 [3.62]
OMVW 400	154 [6.06]	29.0 [1.142]	99 [3.90]
OMVW 500	162 [6.38]	37.0 [1.457]	107 [4.21]
OMVW 630	172 [6.77]	47.5 [1.870]	118 [4.65]
OMVW 800	187 [7.36]	61.5 [2.421]	132 [5.20]

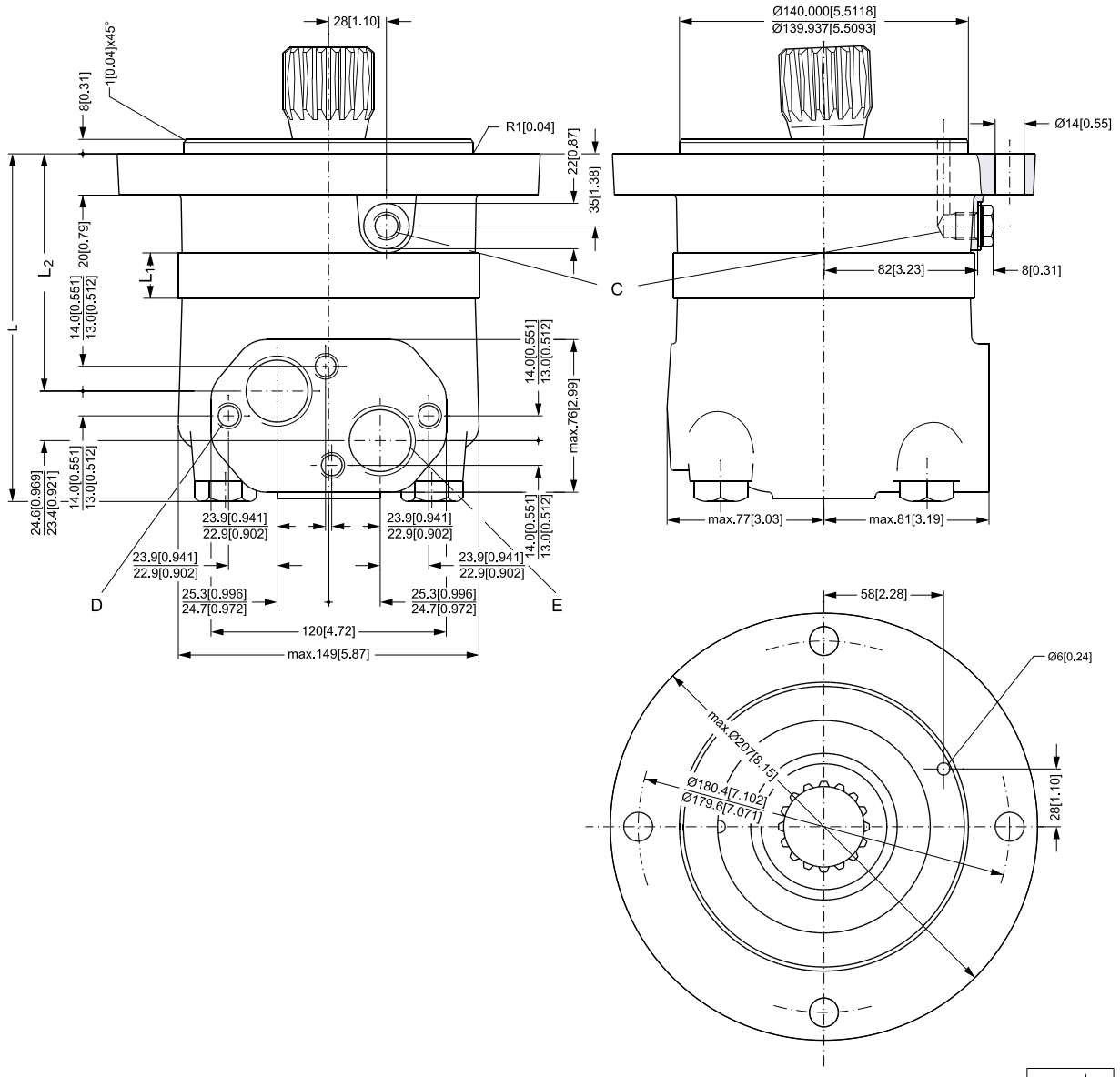
C: Drain connection
$^{9}/_{16}$ - 18 UNF;
13 mm [0.51 in] deep
O-ring boss port

D: $1\,^{5}/_{16}$ - 12 UN;
19 mm [0.75 in] deep
O-ring boss port

*) The gearwheel set is 3.5 mm [0.138 in] wider across the rollers than the L_1 dimensions

Dimensions – European version

SHORT



151-900.10

Type	$L_{max.}$ mm [in]	L_{1*} mm [in]	L_2 mm [in]
OMVS 315	171 [6.73]	22.0 [0.866]	117 [4.61]
OMVS 400	179 [7.05]	29.0 [1.142]	124 [4.88]
OMVS 500	186 [7.32]	37.0 [1.457]	132 [5.20]
OMVS 630	197 [7.76]	47.5 [1.870]	143 [5.63]
OMVS 800	211 [8.31]	61.5 [2.421]	157 [6.18]

C: Drain connection
G 1/4; 12 mm [0.47 in] deep
D: M12; 12 mm [0.47 in] deep
E: G 1; 18 mm [0.71 in] deep

*) The gearwheel set is 3.5 mm [0.138 in] wider across the rollers than the L_1 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.

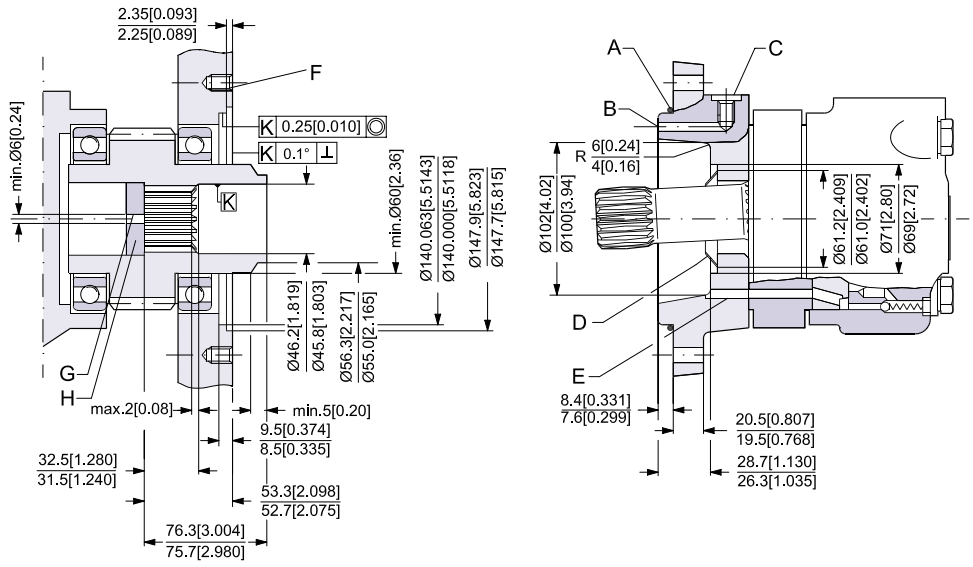
During start and operation it is important that the spline connection and the bearings in the attached component receive oil and are adequately lubricated. To ensure that the spline connection receives sufficient oil, a conical sealing ring between the shaft of the attached component and the motor intermediate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

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.

OMVS DIMENSIONS OF THE ATTACHED COMPONENT



151-815.10

A: O-ring: 140 × 3 mm
B: External drain channel
C: Drain connection
G ¼; 12 mm [0.47 in] deep
D: Conical seal ring
E: Internal drain channel
F: M12; min. 18 mm [0.71 in] 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).

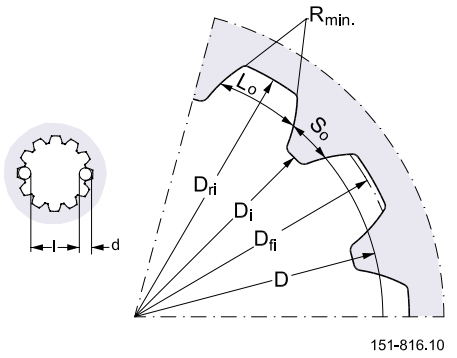
Material:
Case hardening steel with a tensile strength corresponding at least to 20 MoCr4 (900 N/mm²) or SAE 8620.

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 · X = 1; m = 2.54)

Fillet root side fit		**mm**	**in**
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	$5.180\ ^{\pm0.037}$	$0.204\ ^{\pm0.0015}$
Tooth thickness (circular)	S_o	2.835	0.1116
Fillet radius	$R_{min.}$	0.4	0.015
Max. measurement between pins*	l	$32.47\ ^{+0.15}_{0}$	$1.278\ ^{+0.006}_{0}$
Pin dia.	d	$5.6\ ^{\pm0.001}$	$0.22\ ^{\pm0.00004}$

* 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.

WEIGHT OF MOTORS

Code no	Weight kg	Weight [lb]
151B2050	20.0	44.1
151B2051	20.5	45.2
151B2052	21.0	46.3
151B2053	22.0	48.5
151B2054	23.0	50.7
151B2055	24.0	52.9
151B2056	20.0	44.1
151B2057	20.5	45.2
151B2058	21.0	46.3
151B2059	22.0	48.5
151B2060	23.0	50.7
151B2061	24.0	52.9
151B2062	20.0	44.1
151B2063	20.5	45.2
151B2064	21.0	46.3
151B2065	22.0	48.5
151B2066	23.0	50.7
151B2067	24.0	52.9
151B2080	22.0	48.5
151B2081	22.5	49.6
151B2082	23.0	50.7
151B2083	24.0	52.9
151B2084	25.0	55.1
151B2085	26.0	57.3
151B2150	31.8	70.1
151B2151	32.6	71.9
151B2152	33.5	73.9
151B2153	34.9	76.9
151B2154	36.5	80.5
151B2155	31.8	70.1
151B2156	32.6	71.9
151B2157	33.5	73.9
151B2158	34.9	76.9
151B2159	36.5	80.5
151B2160	31.8	70.1
151B2161	32.6	71.9
151B2162	33.5	73.9
151B2163	34.9	76.9
151B2164	36.5	80.5
151B2170	32.4	71.4
151B2171	33.2	73.2
151B2172	34.1	75.2
151B2173	35.5	78.3
151B2174	37.1	81.8
151B2183	30.0	66.2
151B2184	30.8	67.9
151B2185	31.7	69.9
151B2186	33.1	73.0
151B2187	34.7	76.5

Code no	Weight kg	Weight [lb]
151B2188	30.0	66.2
151B2189	30.8	67.9
151B2190	31.7	69.9
151B2191	33.1	73.0
151B2192	34.7	76.5
151B3000	20.0	44.1
151B3001	20.5	45.2
151B3002	21.0	46.3
151B3003	22.0	48.5
151B3004	23.0	50.7
151B3005	24.0	52.9
151B3006	20.0	44.1
151B3007	20.5	45.2
151B3008	21.0	46.3
151B3009	22.0	48.5
151B3010	23.0	50.7
151B3011	24.0	52.9
151B3012	20.0	44.1
151B3013	20.5	45.2
151B3014	21.0	46.3
151B3015	22.0	48.5
151B3016	23.0	50.7
151B3017	24.0	52.9
151B3018	20.0	44.1
151B3019	20.5	45.2
151B3020	21.0	46.3
151B3021	22.0	48.5
151B3022	23.0	50.7
151B3023	24.0	52.9
151B3024	22.0	48.5
151B3025	22.5	49.6
151B3026	23.0	50.7
151B3027	24.0	52.9
151B3028	25.0	55.1
151B3029	26.0	57.3
151B3030	22.0	48.5
151B3031	22.5	49.6
151B3032	23.0	50.7
151B3033	24.0	52.9
151B3034	25.0	55.1
151B3035	26.0	57.3
151B3036	15.0	33.1
151B3037	15.5	34.2
151B3038	16.0	35.3
151B3039	17.0	37.5
151B3040	18.0	39.7
151B3041	19.0	41.9
151B3100	31.8	70.1
151B3101	32.6	71.9

Code no	Weight kg	Weight [lb]
151B3102	33.5	73.9
151B3103	34.9	76.9
151B3104	36.5	80.5
151B3105	31.8	70.1
151B3106	32.6	71.9
151B3107	33.5	73.9
151B3108	34.9	76.9
151B3109	36.5	80.5
151B3110	31.8	70.1
151B3111	32.6	71.9
151B3112	33.5	73.9
151B3113	34.9	76.9
151B3114	36.5	80.5
151B3115	32.4	71.4
151B3116	33.2	73.2
151B3117	34.1	75.2
151B3118	35.5	78.3
151B3119	37.1	81.8
151B3120	32.4	71.4
151B3121	33.2	73.2
151B3122	34.1	75.2
151B3123	35.5	78.3
151B3124	37.1	81.8
151B3125	22.7	50.1
151B3126	23.5	51.8
151B3127	24.4	53.8
151B3128	25.6	56.4
151B3129	27.7	61.1
151B3200	31.0	68.3
151B3201	31.5	69.4
151B3202	32.0	70.5
151B3203	33.0	72.8
151B3204	34.0	75.0
151B3205	35.0	77.2
151B3207	31.0	68.3
151B3208	31.5	69.4
151B3209	32.0	70.5
151B3210	33.0	72.8
151B3211	34.0	75.0
151B3212	35.0	77.2
151B4000	24.5	54.0
151B4001	25.0	55.1
151B4002	25.5	56.2
151B4003	26.5	58.4
151B4004	27.5	60.6
151B4005	28.5	62.8
151B4007	24.5	54.0
151B4008	25.0	55.1
151B4009	25.5	56.2

WEIGHT OF MOTORS

Code no	Weight kg	Weight [lb]
151B4010	26.5	58.4
151B4011	27.5	60.6
151B4012	28.5	62.8
151B4021	24.5	54.0
151B4022	25.0	55.1
151B4023	25.5	56.2
151B4024	26.5	58.4
151B4025	27.5	60.6
151B4026	28.5	62.8
151B4028	24.5	54.0
151B4029	25.0	55.1
151B4030	25.5	56.2
151B4031	26.5	58.4
151B4032	27.5	60.6
151B4033	28.5	62.8
151F0500	9.8	21.6
151F0501	10.0	22.1
151F0502	10.3	22.7
151F0503	10.7	23.6
151F0504	11.1	24.5
151F0505	11.6	25.6
151F0506	12.3	27.1
151F0507	9.8	21.6
151F0508	10.0	22.1
151F0509	10.3	22.7
151F0510	10.7	23.6
151F0511	11.1	24.5
151F0512	11.6	25.6
151F0513	12.3	27.1
151F0514	9.8	21.6
151F0515	10.0	22.1
151F0516	10.3	22.7
151F0517	10.7	23.6
151F0518	11.1	24.5
151F0519	11.6	25.6
151F0520	12.3	27.1
151F0521	10.3	22.7
151F0522	10.5	23.1
151F0523	10.8	23.8
151F0524	11.2	24.7
151F0525	11.6	25.6
151F0526	12.1	26.7
151F0527	12.8	28.2
151F0528	10.3	22.7
151F0529	10.5	23.1
151F0530	10.8	23.8
151F0531	11.2	24.7
151F0532	11.6	25.6
151F0533	12.1	26.7

Code no	Weight kg	Weight [lb]
151F0534	12.8	28.2
151F0535	7.8	17.2
151F0536	8.0	17.6
151F0537	8.3	18.3
151F0538	8.7	19.2
151F0539	9.1	20.1
151F0540	9.6	21.2
151F0541	10.3	22.7
151F0542	10.2	22.5
151F0543	10.4	22.9
151F0544	10.7	23.6
151F0545	11.1	24.5
151F0546	11.5	25.4
151F0547	12.0	26.5
151F0548	12.7	28.0
151F0560	9.8	21.6
151F0561	10.0	22.1
151F0562	10.3	22.7
151F0563	10.7	23.6
151F0564	11.1	24.5
151F0565	11.6	25.6
151F0566	12.3	27.1
151F0605	13.1	28.9
151F0608	11.1	24.5
151F0609	13.6	30.0
151F0610	13.6	30.0
151F2200	9.8	21.6
151F2201	10.0	22.1
151F2202	10.3	22.7
151F2203	10.7	23.6
151F2204	11.1	24.5
151F2205	11.6	25.6
151F2206	12.3	27.1
151F2207	9.8	21.6
151F2208	10.0	22.1
151F2209	10.3	22.7
151F2210	10.7	23.6
151F2211	11.1	24.5
151F2212	11.6	25.6
151F2213	12.3	27.1
151F2214	9.8	21.6
151F2215	10.0	22.1
151F2216	10.3	22.7
151F2217	10.7	23.6
151F2218	11.1	24.5
151F2219	11.6	25.6
151F2220	12.3	27.1
151F2235	10.3	22.7
151F2236	10.5	23.1

Code no	Weight kg	Weight [lb]
151F2237	10.8	23.8
151F2238	11.2	24.7
151F2239	11.6	25.6
151F2240	12.1	26.7
151F2241	12.8	28.2
151F2242	10.3	22.7
151F2243	10.5	23.1
151F2244	10.8	23.8
151F2245	11.2	24.7
151F2246	11.6	25.6
151F2247	12.1	26.7
151F2248	12.8	28.2
151F2261	13.1	28.9
151F2262	13.1	28.9
151F2263	13.6	30.0
151F2264	13.1	28.9
151F2265	13.6	30.0
151F2300	9.8	21.6
151F2301	10.0	22.1
151F2302	10.3	22.7
151F2303	10.7	23.6
151F2304	11.1	24.5
151F2305	11.6	25.6
151F2306	12.3	27.1
151F2307	13.1	28.9
151F2308	9.8	21.6
151F2309	10.0	22.1
151F2310	10.3	22.7
151F2311	10.7	23.6
151F2312	11.1	24.5
151F2313	11.6	25.6
151F2314	12.3	27.1
151F2315	13.1	28.9
151F2316	9.8	21.6
151F2317	10.0	22.1
151F2318	10.3	22.7
151F2319	10.7	23.6
151F2320	11.1	24.5
151F2321	11.6	25.6
151F2322	12.3	27.1
151F2323	13.1	28.9
151F2324	9.8	21.6
151F2325	10.0	22.1
151F2326	10.3	22.7
151F2327	10.7	23.6
151F2328	11.1	24.5
151F2329	11.6	25.6
151F2330	12.3	27.1
151F2331	13.1	28.9

WEIGHT OF MOTORS

Code no	Weight	
	kg	[lb]
151F2332	9.8	21.6
151F2333	10.0	22.1
151F2334	10.3	22.7
151F2335	10.7	23.6
151F2336	11.1	24.5
151F2337	11.6	25.6
151F2338	12.3	27.1
151F2339	13.1	28.9
151F2345	14.0	30.9
151F2346	14.0	30.9
151F2347	14.0	30.9
151F2348	14.0	30.9
151F2349	14.0	30.9
151F2350	9.8	21.6
151F2351	10.0	22.1
151F2352	10.3	22.7
151F2353	10.7	23.6
151F2354	11.1	24.5

Code no	Weight	
	kg	[lb]
151F2355	11.6	25.6
151F2356	12.3	27.1
151F2357	13.1	28.9
151F2358	14.0	30.9
151F2359	9.8	21.6
151F2360	10.0	22.1
151F2361	10.3	22.7
151F2362	10.7	23.6
151F2363	11.1	24.5
151F2364	11.6	25.6
151F2365	12.3	27.1
151F2366	13.1	28.9
151F2367	14.0	30.9
151F2368	9.8	21.6
151F2369	10.0	22.1
151F2370	10.3	22.7
151F2371	10.7	23.6
151F2372	11.1	24.5

Code no	Weight	
	kg	[lb]
151F2373	11.6	25.6
151F2374	12.3	27.1
151F2375	13.1	28.9
151F2376	14.0	30.9
151F2395	9.8	21.6
151F2396	10.0	22.1
151F2397	10.3	22.7
151F2398	10.7	23.6
151F2399	11.1	24.5
151F2400	11.6	25.6
151F2401	12.3	27.1
151F2402	13.1	28.9
151F2403	14.0	30.9
151F2413	9.8	21.6
151F2414	10.0	22.1
151F2415	10.3	22.7
151F2416	10.7	23.6
151F2417	11.1	24.5

NOTES

SAUER DANFOSS

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Hydrostatic transmissions

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Electric power steering

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Sensors

DKMH.PK.130.B2.02 **520L0407 03/2002**

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.

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Sauer-Danfoss (US) Company
2800 East 13th Street
Ames, IA 50010, USA
Phone: +1 515 239-6000, Fax: +1 515 239-6618

Sauer-Danfoss (Neumünster) GmbH & Co. OHG
Postfach 2460, D-24531 Neumünster
Krokamp 35, D-24539 Neumünster, Germany
Phone: +49 4321 871-0, Fax: +49 4321 871-122

Sauer-Danfoss (Nordborg) A/S
DK-6430 Nordborg, Denmark
Phone: +45 7488 4444, Fax: +45 7488 4400

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Menu

SAUER DANFOSS

OSPB, OSPC, OSPF, OSPD,OSPQ, OSPL Load sensing Steering units

OLS Priority valves

OSQ Flow amplifiers

Technical Information











A wide range of steering components

A WIDE RANGE OF STEERING COMPONENTS



F300599

Sauer-Danfoss is the largest producer in the world of steering components for hydrostatic steering systems on off-road vehicles. Sauer-Danfoss offers steering solutions both at component and system levels. Our product range makes it possible to cover applications of all types - ranging from ordinary 2-wheel steering (also known as Ackermann steering) to articulated steering, complicated 4-wheel steering, automatic steering (e.g. by sensor) and remote controlled steering via satellite.
We can offer more than 1000 different steering units, 150 different priority valves and 300 different steering columns categorised in types, variants and sizes.

For hydrostatic steering systems Sauer-Danfoss offers:

- Mini steering units with displacements from 32 to 100 cm^3/rev [1.95 to 6.10 in^3/rev], flow up to 20 l/min [5.28 US gal/min], steering pressure up to 125 bar [1813 psi].
- Steering units with displacements from 40 to 1000 cm^3/rev [2.44 to 61.0 in^3/rev], flow up to 100 l/min [26.4 US gal/min], steering pressure up to 210 bar [3045 psi].
- Priority valves for rated flows at 40, 80, 120 and 160 l/min [10.6, 21.1, 31.7 and 42.3 US gal/min], pressure up to 350 bar [5076 psi].
- Pilot operated flow-amplifiers with amplification factors of 4, 5, 8, 10 or 20 for rated oil flows of 240 and 400 l/min [63.4 and 105.7 US gal/min], steering pressure up to 210 bar [3045 psi].
- Pilot operated steering valve with steering flow up to 100 l/min [26.4 US gal/min], steering pressure up to 250 bar [3625 psi] and with integrated priority valve for pump flow up to 150 l/min [39.6 US gal/min].

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A WIDE RANGE OF STEERING COMPONENTS (CONTINUED)

For electro-hydraulic steering systems Sauer-Danfoss offers:

- Pilot operated steering valve (pilot operated by hydrostatic steering unit or by electrical signal) with steering flow up to 100 l/min [26.4 US gal/min] , steering pressure up to 250 bar [3625 psi] and with integrated priority valve for pump flow up to 150 l/min [39.6 US gal/min]

For hydromechanical steering systems Sauer-Danfoss offers:

- Torque amplifiers for output torques of 80 and 120 Nm [708 and 1062 lbf·in]

For steering units and torque amplifiers Sauer-Danfoss offers:

- Steering columns: fixed, tiltable and/or telescopible with or without horn switch and sensor for start/stop of pump, with length, from 45 to 1200 mm [1.77 to 47.2 in]

Characteristic features of steering units:

- Low steering torque: From 0.5 Nm to 3 Nm [4.42 to 26.6 lbf·in] in normal steering situations
- Low noise level
- Low pressure drop
- Many types available: Open center Non reaction, Open center Reaction, Closed center Non reaction, Load Sensing, Load Sensing Reaction, Power Beyond
- One or more built-in valve functions: relief valve, shock and suction valves in L- and R-line, non return valve in P-line and in LS-line
- Optional port connections (according to ISO, SAE or DIN standards)

Characteristic features of electro-hydraulic steering system:

- High steering pressure requiring smaller cylinders and flow
- Low noise emmission in the cab because of low pilot pressure
- The possibility of emergency steering even on very heavy vehicles
- Minimization of side acceleration with articulated steering
- With microcontroller: No steering wheel drift and the possibility of variable steering ratio
- Analogue and CAN-bus interface
- Electro-hydraulic steering valve EHPS can be combined with Sauer-Danfoss PVG 32 proportional valve
- The system is approved by TÜV and have a controller with safety critical steering software

CONVERSION FACTORS

1 Nm = 8.851 lbf·in
1 N = 0.225 lbf
1 bar = 14.50 psi
1 mm = 0.0394 in

1 cm^3 = 0.061 in^3
1 litre = 0.264 US gal
°F = 1.8 × °C + 32

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Contents and technical literature survey

SURVEY OF LITTERATURE WITH TECHNICAL DATA ON SAUER-DANFOSS STEERING COMPONENETS

Detailed data on all Sauer-Danfoss steering components and accessories can be found in our steering component catalogues, which is divided in 6 individual subcatalogues:

• General information	Steering components DKMH.PK.200.A1.02 **520L0468**
• Technical data on mini steering units and steering columns for mini steering units:	OSPM and OTPM DKMH.PN.210.PC.02 **520L0438**
• Technical data on open center and closed center steering units and on torque amplifiers:	OSPB, OSPC, OSPR, OSPD and TAD DKMH.PK.210.A1.02 **520L0502**
• Technical data on load sensing steering units, priority valves and flow-amplifiers:	OSPB, OSPC, OSPF, OSPD, OSPQ, OSPL, OSPBX, OSPCX, OSPLX, OLS and OSQ DKMH.PN.210.B1.02 **520L0520**
• Technical data on hydraulic and electro-hydraulic pilot operated steering valve, appropriate steering units and electrical actuation module as well as sensors for electro-hydraulic steering systems	EHPS and OSPCX PVE and PVED for EHPS and sensors for steering systems with EHPS DKMH.PN.270.B1.02 **520L0521**
• Technical data on valve blocks and steering columns	OVP, OVPL, OVR and OTPB DKMH.PN.230.A1.02 **520L0522**

The most important data on all Sauer-Danfoss steering components is highlighted in a general survey brochure.
For technical information on individual variants, please contact the Sauer-Danfoss Sales Organization

LS Steering units OSPB, OSPC, OSPF, OSPD, OSPQ, OSPL

VERSIONS

Load sensing
In load sensing steering systems both the steering system and the working hydraulics can be supplied with oil from the same pump, using a load sensing pump, also delivers the potential for energy saving.
Load sensing steering units have an extra connection for load sensing (LS), so that a load pressure signal can be directed via the steering unit to a Sauer-Danfoss priority valve and/or an LS pump. The load sensing signal controls the oil flow from the priority valve (and/or the LS pump) to the steering unit. The LS connection is open to tank when the steering unit is in the neutral position.

Load sensing static
Load sensing static steering units require load sensing static priority valves and/or load sensing static variable displacement pumps. Load sensing static steering systems have no oil flow in the LS connection when the steering unit is in neutral position.

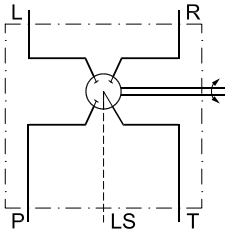
Load sensing dynamic
Load sensing dynamic steering units require load sensing dynamic priority valves and/or load sensing dynamic variable displacement pumps. Load sensing dynamic steering systems have a constant oil flow in the LS connection in the direction of the steering unit even when the steering unit is in neutral position.

Reaction
With reaction steering units any external forces acting on the steered wheels result in a corresponding movement of the steering wheel when the driver is not steering the vehicle.

Non-reaction
With non-reaction steering units there is no corresponding movement of the steering wheel when the driver is not steering the vehicle

OSPB LS: Steering unit with no valve functions

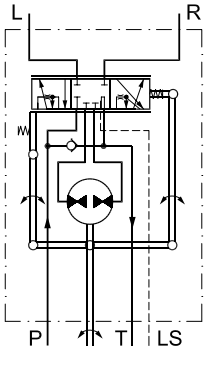
Sauer-Danfoss diagram





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CETOP diagram



OSPB LS (OLS)

Load sensing static non-reaction and load sensing dynamic non-reaction

VERSIONS

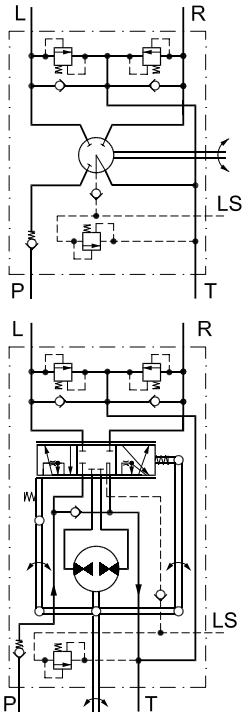


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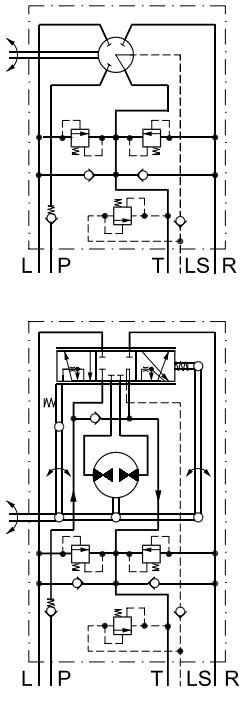
OSPC LS: Steering unit load sensing with integrated valve functions for in line priority valve OLS



150-595.11

OSPC LS (OLS)
Load sensing dynamic non-reaction

OSPC LS: Steering unit load sensing with integrated valve functions for flange on priority valve OLSA



150-596.10

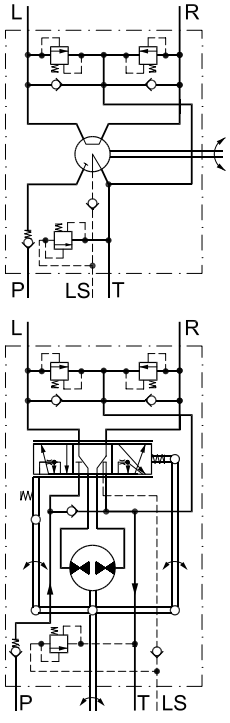
OSPC LS (OLSA)
Load sensing dynamic non-reaction

VERSIONS



F300617

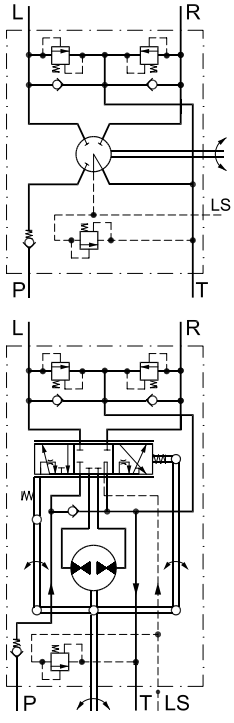
OSPC LSR: Steering unit load sensing dynamic with integrated valve functions



150-598.11

OSPC LSR (OLS)
Load sensing dynamic reaction

OSPF LS : Steering unit full drain load sensing dynamic and with integrated valve functions



150-597.11

OSPF LS (OLS)
Load sensing dynamic non-reaction

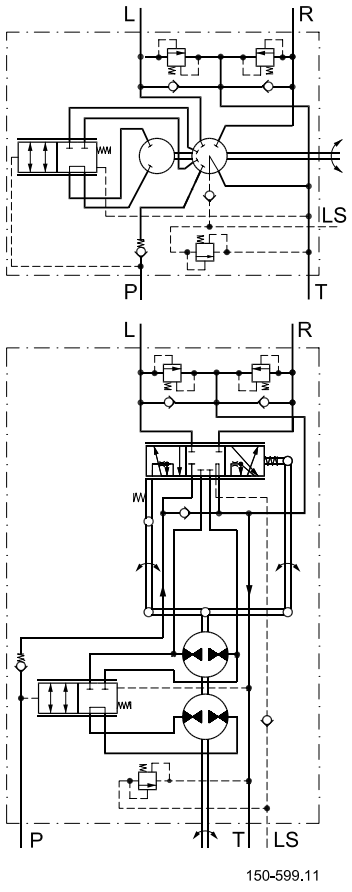
VERSION

OSPD LS: Steering unit load sensing dynamic with 2 rotary meters and with integrated valve functions

The OSPD has 2 rotary meters (gear wheel sets). Should the pump supply be lost, only one rotary meter is active for emergency steering. In normal steering situations both rotary meters are active.



F300612



150-599.11

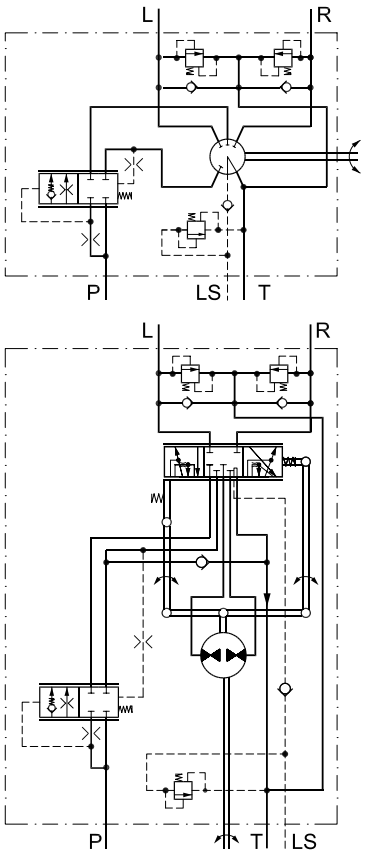
OSPD LS (OLS)
Load sensing dynamic non-reaction

OSPQ LS: Steering unit load sensing dynamic with flow amplification and with integrated valve functions

The OSPQ has incorporated amplification valve. Should pump supply fail or the steering wheel speed be less than approximate 10 rev/min only the rotary meter determines the displacement. In normal steering situations or at higher steering wheel speed, oil is also led to the steering cylinder via the built in amplification valve.



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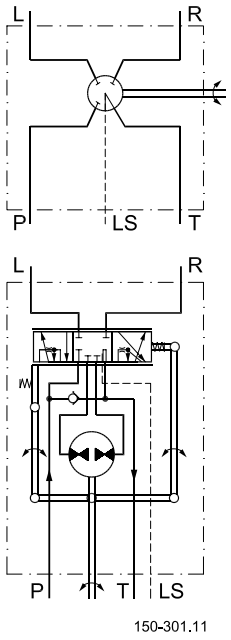
OSPQ LS (OLS)
Load sensing dynamic non-reaction

VERSION

OSPL LS: Steering unit load sensing for high steering flow, displacement larger than 500 cm³/rev [30.5 in³/rev].

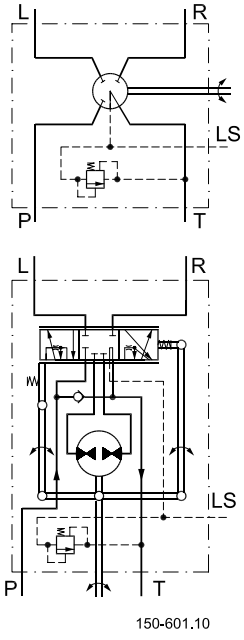


F300611



150-301.11

OSPL LS (OLS)
Load sensing static non-reaction



150-601.10

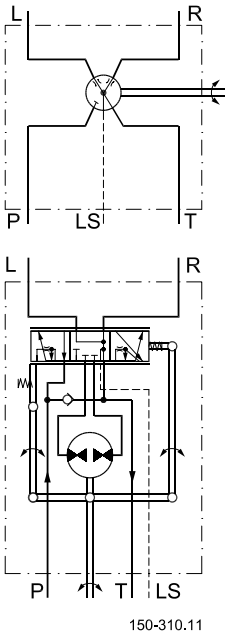
OSPL LS (OLS)
Load sensing dynamic non-reaction

VERSIONS

OSPBX LS, OSPCX LS and OSPLX LS: Steering units load sensing for flow amplifiers.
OSPBX LS, OSPCX LS and OSPX LS are load sensing steering units with the L and the R connections open to tank when in neutral position. OSPBX LS, OSPCX LS and OSPX LS can only be used with Sauer-Danfoss flow-amplifiers OSQA or OSQB. OSPBX LS, OSPCX LS and OSPX LS steering units must not be connected directly to the steering cylinder. OSPCX LS is for OSQ dynamic without pilot pressure relief valve.

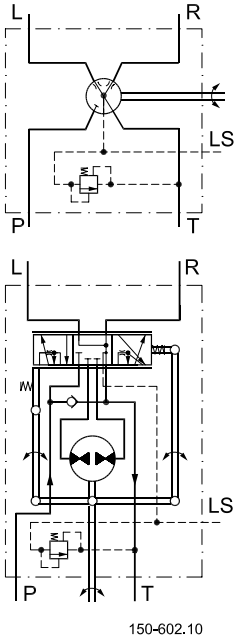


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150-310.11

OSPBX LS, OSPLX LS
Load sensing static



150-602.10

OSPCX LS
Load sensing dynamic

CODE NUMBERS AND WEIGHTS

OSPB load sensing static non-reaction steering units

OSPB LS Static steering units have no valve functions.
OSPB LS in the table below have all standard neutral setting springs, see page 24

Steering unit	Code Numbers Connections European version for OLS G ½ G ¼ - S**	 US version for OLS ¾-16 UNF - O* $^{7}/_{16}$-20 UNF - O* + S**	Weight kg [lb]
OSPB 50 LS	-	150G6085	5.2 [11.46]
OSPB 80 LS	-	150G6086	5.3 [11.68]
OSPB 100 LS	-	150G6087	5.4 [11.90]
OSPB 125 LS	-	150G6088	5.5 [12.13]
OSPB 160 LS	-	150G6089	5.6 [12.35]
OSPB 200 LS	150-0103	150G6090	5.8 [12.79]
OSPC 315 LS	150-0104	150-0116	6.2 [13.67]
OSPB 400 LS	150-0105	150-0117	7.0 [15.43]

O*: O-ring chamfer on port connections
S**: Spot face around port connection
Valve blocks OVP and OVR can be mounted on all of the OSPB steering units from the above table.

CODE NUMBERS AND WEIGHTS

OSPB Load sensing dynamic non-reaction steering units

OSPB LS Dynamic steering units have no valve functions.
OSPB LS in the table below have all standard neutral setting springs, see page 24

Steering unit	Code Numbers Connections US version for OLS ¾-16 UNF - O* $^{7}/_{16}$-20 UNF - O* + S**	Weight kg [lb]
OSPB 50 LS	150-8204	5.2 [11.46]
OSPB 80 LS	150-8205	5.3 [11.68]
OSPB 100 LS	150-8206	5.4 [11.90]
OSPB 125 LS	150-8207	5.5 [12.13]
OSPB 160 LS	150-8208	5.6 [12.35]
OSPB 200 LS	150-8209	5.8 [12.79]
OSPB 315 LS	150-8210	6.2 [13.67]
OSPB 400 LS	150-8211	7.0 [15.43]

O*: O-ring chamfer on port connections
S**: Spot face around port connection
Valve blocks OVP and OVR can be mounted on all of the OSPB steering units from the above table

CODE NUMBERS AND WEIGHTS

OSPC load sensing static non-reaction steering unit

OSPC LS Static steering units in the table below incorporate all the following valve functions:

- check valve in P-port
- pilot pressure relief valve
- shock valves
- suction valves

OSPC LS in the table below have all standard neutral setting springs, see page 24

Steering unit	Code Numbers			Valve settings		Weight
	Connections					
	European for OLS G ½ G ¼ - S**	European and US version for OLSA	US version for OLS ¾-16 UNF - O* $^{7}/_{16}$-20 UNF - O* + S**	Relief valve bar [psi]	Shock valve bar [psi]	kg [lb]
OSPC 80 LS	150-1230	150-1188	150-1222	170 [2465]	225 [3263]	5.3 [11.68]
OSPC 100 LS	150-1231	150-1189	150-1221			5.4 [11.90]
OSPC 125 LS	150-1232	150-1190	150-1220			5.5 [12.13]
OSPC 160 LS	150-1233	150-1191	150-1219			5.6 [12.35]
OSPC 200 LS	150-1234	150-1192	150-1218			5.8 [12.79]
OSPC 315 LS	150-1235	-	150G6091			6.2 [13.67]
OSPC 400 LS	150-1240	-	-			7.0 [15.43]

O*: O-ring chamfer on port connections
S**: Spot face around port connections

If you require other port connections, valve combinations and/or other valve settings or other displacements, please fill in the order form on page 24 and contact the Sauer-Danfoss Sales Organization.

CODE NUMBERS AND WEIGHTS

OSPC load sensing dynamic non-reaction steering units

OSPC LS Dynamic steering units in the table below incorporate all the following valve functions:

- check valve in P-port
- pilot pressure relief valve
- shock valves
- suction valves
- check valve in LS-line for all OSPC LS Dynamic up to and including 200 cm^3/rev

OSPC LS in the table below have all standard neutral setting springs, see page 24

Steering unit	Code Numbers			Valve settings		Weight
	Connections					
	European version for OLS G ½ - S** G ¼ - S**	European and US version for OLSA	US version for OLS ¾-16 UNF - O* $^7/_{16}$-20 UNF - O* + S**	Relief valve bar [psi]	Shock valve bar [psi]	kg [lb]
OSPC 50 LS	150-8233	150-8222	150-8215	140 [2030]	200 [2900]	5.2 [11.46]
OSPC 80 LS	150-8234	150-8223	150-8216	170 [2465]	225 [3263]	5.3 [11.68]
OSPC 100 LS	150-8235	150-8224	150-8217			5.4 [11.90]
OSPC 125 LS	150-8236	150-8225	150-8218			5.5 [12.13]
OSPC 160 LS	150-8237	150-8226	150-8219			5.6 [12.35]
OSPC 200 LS	150-8238	150-8227	150-8220			5.8 [12.79]
OSPC 315 LS	150-8239	-	150-8221			6.2 [13.67]
OSPC 400 LS	150-8240	-	-			7.0 [15.43]

O*: O-ring chamfer on port connections

S**: Spot face around port connections

If you require other port connections, valve combinations and/or other valve settings or other displacements please fill in the order form on page 24 and contact the Sauer-Danfoss Sales Organization.

CODE NUMBERS AND WEIGHTS

OSPC load sensing dynamic reaction steering units

OSPC LSR Dynamic steering units in the table below incorporate all the following valve functions:

- check valve in P-port
- pilot pressure relief valve
- shock valves
- suction valves
- check valve in LS-line

OSPC LSR in the table below have all standard neutral setting springs, see page 24

Steering unit	Code Numbers Connections European version for OLS G ½ - S** G ¼ - S**	Valve settings Relief valve bar [psi]	 Shock valve bar [psi]	Weight kg [lb]
OSPC 80 LSR	150-8241	170 [2465]	225 [3263]	5.3 [11.68]
OSPC 200 LSR	150-8242			5.8 [12.79]

O*: O-ring chamfer on port connections
S**: Spot face around port connections (can not be used in connection with OVR angular block)

If you require other port connections, valve combinations, valve settings and/or other displacements, please fill in the order form on page 24 and contact the Sauer-Danfoss Sales Organization.

CODE NUMBERS AND WEIGHTS

OSPF load sensing dynamic non-reaction steering units

OSPF LS Dynamic steering units in the table below incorporate all the following valve functions:

- check valve in P-port
- pilot pressure relief valve
- shock valves
- suction valves

OSPF LS in the table below have all soft neutral setting springs, see page 24

Steering unit	Code Numbers Connections European version for OLS G ½ - S** G ¼ - S**	Valve settings Relief valve bar [psi]	 Shock valve bar [psi]	Weight kg [lb]
OSPF 80 LS	150G5079	170 [2465]	225 [3263]	5.3 [11.68]
OSPF 100 LS	150G5080			5.4 [11.90]
OSPF 125 LS	150G5081			5.5 [12.13]
OSPF 160 LS	150G5082			5.6 [12.35]
OSPF 200 LS	150G5083			5.8 [12.79]
OSPF 315 LS	150G5084			6.2 [13.67]
OSPF 400 LS	150G5085			7.0 [15.43]

O*: O-ring chamfer on port connections
S**: Spot face around port connections (can not be used in connection with OVR angular block)

If you require other port connections, valve combinations, valve settings and/or other displacements, please fill in the order form on page 24 and contact the Sauer-Danfoss Sales Organization.

CODE NUMBERS AND WEIGHTS

OSPD load sensing non-reaction steering units

OSPD LS Dynamic steering units in the table below incorporate all the following valve functions:

- check valve in P-port
- pilot pressure relief valve
- shock valves
- suction valves
- check valve in LS-line

OSPD LS in the table below have all standard neutral setting springs, see page 24

Steering unit	Code Numbers Connections European version G ½ - S** G ¼ - S**	Valve settings Relief valve bar [psi]	 Shock valve bar [psi]	Weight kg [lb]
OSPD 70/230 LS	150G8112	170 [2465]	225 [3263]	7.7 [17.00]
OSPD 70/270 LS	150G8113			7.9 [17.41]
OSPD 70/385 LS	150G8114			8.4 [18.52]
OSPD 125/325 LS	150G8128			8.1 [12.79]
OSPD 125/440 LS	150G8129			8.6 [18.96]

S**: Spot face around port connections (can not be used in connection with OVR angular block)

If you require other port connections, valve combinations, valve settings and/or other displacements, please fill in the order form on page 24 and contact the Sauer-Danfoss Sales Organization.

CODE NUMBERS AND WEIGHTS

OSPQ load sensing dynamic non-reaction steering units

OSPQ LS Dynamic steering units in the table below incorporate all the following valve functions:

- check valve in amplification valve, act as check valve in P-port
- pilot pressure relief valve
- shock valves
- suction valves
- check valve in LS-line

OSPQ LS in the table below have all standard neutral setting springs, see page 24

Steering unit	Code Numbers Connections European version M 18 x 1.5 - O* + S** M 12 x 1.5 - O* + S**	Valve settings Relief valve bar [psi]	Valve settings Shock valve bar [psi]	Weight kg [lb]
OSPQ 80/125 LS	150G8012	170 [2465]	225 [3263]	5.3 [11.68]
OSPQ 125/250 LS	150G8011			5.5 [12.79]
OSPQ 160/320 LS	150G8030			5.6 [12.35]

O*: O-ring chamfer on port connections
S**: Spot face around port connections (can not be used in connection with OVR angular block)

If you require other valve combinations, valve settings and/or other displacements, please fill in the order form on page 24 and contact the Sauer-Danfoss Sales Organization.

CODE NUMBERS AND WEIGHTS

OSPL load sensing static non-reaction steering units

OSPL LS Static steering units have no valve functions.
OSPL LS in the three tables below have all strong neutral setting springs, see page24

Steering unit	Code Numbers Connections European version for OLS G ½ G ¼ - S**	US version for OLS ¾-16 UNF - O* $^{7}/_{16}$-20 UNF - O* + S**	US version for OLS and OVPL LS - port $^{7}/_{16}$-20 UNF - O* + S**	Weight kg [lb]
OSPL 520 LS	150-7169	150-7167	150-7168	8.1 [17.86]
OSPL 630 LS	150-7107	150-7164	150-7113	8.4 [18.52]
OSPL800 LS	150-7108	150-7165	150-7114	8.8 [19.40]
OSPL 1000 LS	150-7110	150-7166	150-7115	10.0 [22.05]

O*: O-ring chamfer on port connections S**: Spot face around port connection

OSPL load sensing dynamic non-reaction steering units

OSPL LS Dynamic steering units in the table below have no valve functions.

Steering unit	Code Numbers Connections US version for OLS ¾-16 UNF - O* $^{7}/_{16}$-20 UNF - O* +S**	Weight kg [lb]
OSPL 520 LS	150-8243	8.1 [17.86]
OSPL 630 LS	150-8212	8.4 [18.52]
OSPL 800 LS	150-8213	8.8 [19.40]
OSPL 1000 LS	150-8214	10.0 [22.05]

O*: O-ring chamfer on port connections S**: Spot face around port connection

OSPL LS Dynamic steering units in the table below incorporate all the following valve function:
- pilot pressure relief valve

Steering unit	Code Numbers Connections European version for OLS and OVPL LS: G ¼ - S**	Valve settings Relief valve bar [psi]	Weight kg [lb]
OSPL 520 LS	150-8244	170 [2465]	8.1 [17.86]
OSPL 1000 LS	150-8245		10.0 [22.05]

S**: Spot face around port connection

If you require other displacements or other valve setting, please fill in the order form on page 24 and contact the Sauer-Danfoss Sales Organization.

CODE NUMBERS AND WEIGHTS

OSPBX and OSPLX load sensing static steering units for OSQ static

OSPBX LS and OSPLX LS Static steering units in the table below have no valve functions.
OSPBX LS in the table below have all standard neutral setting springs, see page 24
OSPLX LS in the table below have all strong neutral setting springs, see page 24

Steering unit	Code Numbers Connections European version G ½ G ¼ - S**	 US version ¾-16 UNF - O* $^{7}/_{16}$-20 UNF - O* + S**	Weight kg [lb]
OSPBX 160 LS	150-1082	150-1078	5.6 [12.35]
OSPBX 200 LS	150-1083	150-1079	5.8 [12.79]
OSPBX 315 LS	150-1084	150-1080	6.2 [13.67]
OSPBX 400 LS	150-1085	150-1081	7.0 [15.43]
OSPLX 520 LS	150-7170	150-7173	8.1 [17.86]
OSPLX 630 LS	150-7171	150-7174	8.4 [18.52]
OSPLX 800 LS	150-7172	150-7155	8.8 [19.40]

O*: O-ring chamfer on port connections
S**: Spot face around port connection

OSPCX load sensing dynamic steering units for OSQ dynamic

OSPCX LS Dynamic steering unit in the table below incorporates the following valve function:

- pilot pressure relief valve

OSPCX LS in the table below has standard neutral setting springs, see page 24

Steering unit	Code Numbers Connections European version for OLS and OVPL G ½ - S** G ¼ - S**	Valve settings Relief valve bar [psi]	Weight kg [lb]
OSPCX LS 160	150-8188	200 [2900]	5.6 [12.35]

S**: Spot face around port connection

If you require other displacements or other valve setting, please fill in the order form on page 24 and contact the Sauer-Danfoss Sales Organization.

NOTES

SPECIFICATION TABLE FOR NON CATALOGUE NUMBERS OF LS STEERING UNITS

Fill in your company data and place x's in the table where appropriate, then send to your Sauer-Danfoss Sales Organisation.

Your company	Name	Vehicle	Potential pcs/year	Completed by	Date

Steering unit type	OSPC	OSPF	OSPD	OSPQ	OSPL	OSPLX	OSPCX							
Reaction type	LS (Non-reaction)							LSR (Reaction: only OSPC, OSPD, OSPQ)						
Load Sensing type	Static (Only OSPC, OSPL, OSPLX, OSPCX)							Dynamic						
DP, cm³/rev OSPC LS OSPF LS	40	50	60	70	80	100	125	160	185	200	230	250	315	400
DP, cm³/rev OSPC LSR	40	50	60	70	80	100	125	160	185	200				
DP, cm³/rev OSPD LS	60/185	60/220	60/260	70/195	70/230	70/270	70/385	100/200	100/260	100/300	125/285	125/325	125/440	
DP, cm³/rev OSPD LSR	60/185	60/220	70/195	70/230	100/200									
DP, cm³/rev OSPQ LS	80/125	80/140	80/160	100/160	100/180	100/200	125/200	125/250	160/250	160/320				
DP, cm³/rev OSPQ LSR	80/125	80/140	80/160	100/160	100/180	100/200	125/200							
DP, cm³/rev OSPL, OSPLX	520	630	800	1000 (only OSPL)										
DP, cm³/rev OSPCX	160	200	250	315	400									
Port threads OSPC, OSPF	G 1/2	G 1/2- S**	M18 × 1.5 - O* + S**	3/4-16 UNF - O*	for OLSA (only OSPC)									
Port threads OSPD	G 1/2- S**	M18 × 1.5 - O* + S**	3/4-16 UNF - O*											
Port threads OSPL, OSPLX	G 1/2	3/4-16 UNF - O*	For OPVL and without RV (LS = 7/16 - 20 UNF)	For OVPL and with RV (LS = G 1/4)										
Relief valve*** bar	70	80	90	100	110	120	140	170	190	200	210	no relief valve		
Shock valves**** bar	160	180	200	225	240	no shock valves								
Suction**** valves	Yes	No												
Check valve in LS	Yes (Only for OSPC dynamic, OSPD and OSPQ)	No (Only for OSPC, OSPF and OSPL)												
Neutral setting springs	Soft: 0.5 - 1.8 Nm in normal steering situations	Standard: 0.8 - 3 Nm in normal steering situations	Strong: 1.5 - 4 Nm in normal steering situations											
Unit black painted	Yes	No												

SPECIFICATION TABLE FOR NON CATALOGUE NUMBERS OF LS STEERING UNITS (CONTINUED)

DP = Displacement, RV = Pilot pressure relief valve.
O*: O-ring chamfer on port connections
S**: Spot face around port connections (can not be used in connection with OVR angular block)
RV*** see "Technical data" page 29-30 for limitation in maximum pressure depending on displacements
Shock and suction valves****: not available in OSPL
Port and valve combinations possible: see tables page 26 - 28.
Types not mentioned with port connections in the table above, are only available in the version(s) stated in the code number tables.

An alternative way to specify a variant is to state an existing code number and add the modifications, you would like to have implemented in the basic steering unit.

Code number of basic steering unit: _____

Requested modifications: _____

_____

_____

_____

_____

PORT THREAD VERSIONS AND VALVE COMBINATIONS

The following combinations of port threads and valves are available for OSPC LS/LSR:
Housings for low flow: 40 - 200 cm³/rev [2.44 - 12.20 in³/rev] gear wheel set.

Threads			Valves			
Main ports (P, T, L, R)	LS-port	For steering column	Pilot pressure relief valve	Shock valves	Suction valves	Check valve in LS (only for LS Dynamic)
DIN 3852-2 G ½	DIN 3852-2 G ¼ w. spot face	M10 x 1,5	Yes	Yes	Yes	Yes
			Yes	Yes	Yes	No
DIN 3852-2 G ½ w. spot face	DIN 3852-2 G ¼ w. spot face	M10 x 1,5	Yes	Yes	Yes	Yes
			Yes	Yes	Yes	No
ISO 6149-1 M18 x 1,5, w. O-ring chamfer and spot face	ISO 6149-1 M12 x 1,5, w. O-ring chamfer and spot face	M10 x 1,5	Yes	Yes	Yes	Yes
			Yes	Yes	Yes	No
ISO 11926-1 ¾ - 16 UNF, O-ring boss port	ISO 11926-1 $^{7}/_{16}$ - 20 UNF O-ring boss port and spot face	3/8 - 16 UNC	Yes	Yes	Yes	Yes
			Yes	No	No	No
ISO 11926-1 ¾ - 16 UNF, O-ring boss port	ISO 11926-1 $^{7}/_{16}$ - 20 UNF O-ring boss port and spot face	M10 x 1,5	Yes	Yes	Yes	Yes
For OLSA	For OLSA	M10 x 1,5	Yes	Yes	Yes	Yes
			Yes	Yes	Yes	No
			Yes	No	No	No

The following combinations of port threads and valves are available for OSPC LS/LSR:
Housings for high flow: 250 - 400 cm³/rev [15.25 -24.4 in³/rev] gear wheel set.

Threads			Valves			
Main ports (P, T, L, R)	LS-port	For steering column	Pilot pressure relief valve	Shock valves	Suction valves	Check valve in LS (only for LS Dynamic)
DIN 3852-2 G ½	DIN 3852-2 G ¼ w. spot face	M10 x 1,5	Yes	Yes	Yes	No
			No	Yes	Yes	No
DIN 3852-2 G ½ w. spot face	DIN 3852-2 G ¼ w. spot face	M10 x 1,5	Yes	Yes	Yes	No
			Yes	No	No	Yes
ISO 11926-1 ¾ - 16 UNF, O-ring boss port	ISO 11926-1 $^{7}/_{16}$ - 20 UNF O-ring boss port and spot face	$^{3}/_{8}$ - 16 UNC	Yes	Yes	Yes	No
			Yes	No	No	No
			No	Yes	Yes	No
			No	Yes	No	No
ISO 11926-1 ¾ - 16 UNF, O-ring boss port	ISO 11926-1 $^{7}/_{16}$ - 20 UNF O-ring boss port and spot face	M10 x 1,5	Yes	Yes	Yes	No
			Yes	No	No	No
For OLSA	For OLSA	M10 x 1,5	Yes	Yes	Yes	No

Housings with spot face around port connections on main ports cannot be used in connection with OVR angular block.

PORT THREAD VERSIONS AND VALVE COMBINATIONS (CONTINUED)

The following combinations of port threads and valves are available for OSPF LS:

Threads			Valves		
Main ports (P, T, L, R)	LS-port	For steering column	Pilot pressure relief valve	Shock valves	Suction valves
DIN 3852-2 G ½	DIN 3852-2 G ¼ w. spot face	M10 x 1,5	Yes	Yes	Yes
DIN 3852-2 G ½ w. spot face	DIN 3852-2 G ¼ w. spot face	M10 x 1,5	Yes	Yes	Yes
ISO 6149-1 M18 x 1.5, w. O-ring chamfer and spot face	ISO 6149-1 M12 x 1.5, w. O-ring chamfer and spot face	M10 x 1,5	Yes	Yes	Yes
			No	Yes	Yes
ISO 11926-1 ¾ - 16 UNF, O-ring boss port	ISO 11926-1 $^{7}/_{16}$ - 20 UNF O-ring boss port and spot face	$^{3}/_{8}$ - 16 UNC	Yes	Yes	Yes
ISO 11926-1 ¾ - 16 UNF, O-ring boss port	ISO 11926-1 $^{7}/_{16}$ - 20 UNF O-ring boss port and spot face	M10 x 1,5	Yes	Yes	Yes

The following combinations of port threads and valves are available for OSPD LS/LSR:

Threads			Valves			
Main ports (P, T, L, R)	LS-port	For steering column	Pilot pressure relief valve	Shock valves	Suction valves	Check valve in LS (only for LS Dynamic)
DIN 3852-2 G ½ w. spot face	DIN 3852-2 G ¼ w. spot face	M10 x 1,5	Yes	Yes	Yes	Yes
ISO 6149-1 M18 x 1.5, w. O-ring chamfer and spot face	ISO 6149-1 M12 x 1.5, w. O-ring chamfer and spot face	M10 x 1.5	Yes	Yes	Yes	Yes
ISO 11926-1 ¾ - 16 UNF, O-ring boss port	ISO 11926-1 $^{7}/_{16}$ - 20 UNF O-ring boss port and spot face	M10 x 1,5	Yes	Yes	Yes	Yes
			Yes	Yes	Yes	No

PORT THREAD VERSIONS AND VALVE COMBINATIONS (CONTINUED)

The following combinations of port threads and valves are available for OSPQ LS/LSR:

Threads			Valves			
Main ports (P, T, L, R)	LS-port	For steering column	Pilot pressure relief valve	Shock valves	Suction valves	Check valve in LS (only for LS Dynamic)
ISO 6149-1 M18 x 1.5, w. O-ring chamfer and spot face	ISO 6149-1 M12 x 1.5, w. O-ring chamfer and spot face	M10 x 1.5	Yes	Yes	Yes	Yes
			No	Yes	Yes	Yes

Housings with spot face around port connections on main ports cannot be used in connection with OVR angular block.
For OSPL, OSPBX, OSPCX and OSPLX only the versions listed in the tables with code numbers are available.

TECHNICAL DATA

Displacement, flow and pressure: OSPB LS, OSPC LS, OSPC LSR

Common data: Look in sub catalogue: "General Steering Components"

Steering unit	Displacement cm³/rev [in³/rev]	*Rated oil flow l/min [US gal/min]	Max. pressure on connections P bar [psi]	T bar [psi]	L. R bar [psi]
OSPC 40 LS Static	40 [2.44]	4 [1.06]	140 [2030]	40 [580]	280 [4061]
OSPB/OSPC 50 LS Static	50 [3.05]	5 [1.32]			
OSPC 60 LS Static	60 [3.66]	6 [1.58]			
OSPC 70 LS Static	70 [4.27]	7 [1.85]	175 [2538]		
OSPB/OSPC 80 LS Static	80 [4.88]	8 [2.11]			
OSPB/OSPC 100 LS Static	100 [6.10]	10 [2.64]			
OSPB/OSPC 125 LS Static	125 [7.63]	13 [3.43]			
OSPB/OSPC 160 LS Static	160 [9.76]	16 [4.23]	210 [3045]		
OSPC 185 LS Static	185 [11.29]	19 [5.02]			
OSPB/OSPC 200 LS Static	200 [12.20]	20 [5.28]			
OSPC 230 LS Static	230 [14.03]	23 [6.07]			
OSPC 250 LS Static	250 [15.25]	25 [6.60]			
OSPB/OSPC 315 LS Static	315 [19.22]	32 [8.45]			
OSPB/OSPC 400 LS Static	400 [24.41]	40 [10.57]			
OSPC 40 LS Dynamic	40 [2.44]	4 [1.06]	140 [2030]	40 [580]	280 [4061]
OSPB/OSPC 50 LS Dynamic	50 [3.05]	5 [1.32]			
OSPC 60 LS Dynamic	60 [3.66]	6 [1.58]			
OSPC 70 LS Dynamic	70 [4.27]	7 [1.85]	175 [2538]		
OSPB/OSPC 80 LS Dynamic	80 [4.88]	8 [2.11]			
OSPB/OSPC 100 LS Dynamic	100 [6.10]	10 [2.64]			
OSPB/OSPC 125 LS Dynamic	125 [7.63]	13 [3.43]	210 [3045]		
OSPB/OSPC 160 LS Dynamic	160 [9.76]	16 [4.23]			
OSPC 185 LS Dynamic	185 [11.29]	19 [5.02]			
OSPB/OSPC 200 LS Dynamic	200 [12.20]	20 [5.28]			
OSPC 230 LS Dynamic	230 [14.03]	23 [6.07]			
OSPC 250 LS Dynamic	250 [15.25]	25 [6.60]			
OSPB/OSPC 315 LS Dynamic	315 [19.22]	32 [8.45]			
OSPB/OSPC 400 LS Dynamic	400 [24.41]	40 [10.57]			
OSPC 40 LSR Dynamic	40 [2.44]	4 [1.06]	140 [2030]	40 [580]	280 [4061]
OSPC 50 LSR Dynamic	50 [3.05]	5 [1.32]			
OSPC 60 LSR Dynamic	60 [3.66]	6 [1.58]			
OSPC 70 LSR Dynamic	70 [4.27]	7 [1.85]	175 [2538]		
OSPC 80 LSR Dynamic	80 [4.88]	8 [2.11]			
OSPC 100 LSR Dynamic	100 [6.10]	10 [2.64]			
OSPC 125 LSR Dynamic	125 [7.63]	13 [3.43]	210 [3045]		
OSPC 160 LSR Dynamic	160 [9.76]	16 [4.23]			
OSPC 185 LSR Dynamic	185 [11.29]	19 [5.02]			
OSPC 200 LSR Dynamic	200 [12.20]	20 [5.28]			

*Rated flow at 100 rpm

TECHNICAL DATA

Displacement, flow and pressure: OSPF LS

Common data: Look in sub catalogue: "General Steering Components"

Steering unit	Displacement cm^3/rev $[in^3/rev]$	*Rated oil flow l/min [US gal/min]	Max. pressure on connections P bar [psi]	T bar [psi]	L. R bar [psi]
OSPF 50 LS Dynamic	50 [3.05]	5 [1.32]	140 [2030]	40 [580]	280 [4061]
OSPF 60 LS Dynamic	60 [3.66]	6 [1.58]			
OSPF 70 LS Dynamic	70 [4.27]	7 [1.85]			
OSPF 80 LS Dynamic	80 [4.88]	8 [2.11]	175 [2538]		
OSPF 100 LS Dynamic	100 [6.10]	10 [2.64]			
OSPF 125 LS Dynamic	125 [7.63]	13 [3.43]			
OSPF 160 LS Dynamic	160 [9.76]	16 [4.23]	210 [3045]		
OSPF 185 LS Dynamic	185 [11.29]	19 [5.02]			
OSPF 200 LS Dynamic	200 [12.20]	20 [5.28]			
OSPF 230 LS Dynamic	230 [14.03]	23 [6.07]			
OSPF 250 LS Dynamic	250 [15.25]	25 [6.60]			
OSPF 315 LS Dynamic	315 [19.22]	32 [8.45]			
OSPF 400 LS Dynamic	400 [24.41]	40 [10.57]			

*Rated flow at 100 rpm

TECHNICAL DATA

Displacement, flow and pressure: OSPD LS, OSPQ LS

OSPD and OSPQ steering units in the table below are all Load Sensing Dynamic type.
Common data: Look in sub catalogue: "General Steering Components"

Steering unit	Displacement manual steer mode		Displacement *normal steer mode		Rated oil flow**		Max. pressure on connections		
	cm^3/rev	$[in^3/rev]$	cm^3/rev	$[in^3/rev]$	l/min	[US gal/min]	P bar [psi]	T bar [psi]	L. R bar [psi]
OSPD 60/185 LS	60	[3.66]	185	[11.29]	19	[5.02]	210 [3045]	40 [580]	280 [4061]
OSPD 60/220 LS	60	[3.66]	220	[13.42]	22	[5.81]			
OSPD 60/260 LS	60	[3.66]	260	[15.87]	26	[6.87]			
OSPD 70/195 LS	70	[4,27]	195	[11.90]	20	[5.28]			
OSPD 70/230 LS	70	[4,27]	230	[14.03]	23	[6.07]			
OSPD 70/270 LS	70	[4,27]	270	[16.48]	27	[7.139			
OSPD 70/385 LS	70	[4,27]	385	[23.49]	39	[10.30]			
OSPD 100/200 LS	100	[6.10]	200	[12.20]	20	[5.28]			
OSPD 100/260 LS	100	[6.10]	260	[15.87]	26	[6.87]			
OSPD 100/300 LS	100	[6.10]	300	[18.31]	30	[7.93]			
OSPD 125/285 LS	125	[7.63]	285	[17.39]	29	[7.66]			
OSPD 125/325 LS	125	[7.63]	325	[19.83]	33	[8.72]			
OSPD 125/440 LS	125	[7.63]	440	[26.85]	44	[11.62]			
OSPD 60/185 LSR	60	[3.66]	185	[11.29]	19	[5.02]	210 [3045]	40 [580]	280 [4061]
OSPD 60/220 LSR	60	[3.66]	220	[13.42]	22	[5.81]			
OSPD 70/195 LSR	70	[4,27]	195	[11.90]	20	[5.28]			
OSPD 100/200 LSR	100	[6.10]	200	[12.20]	20	[5.28]			
OSPQ 80/125 LS	80	[4,88]	125	[7.63]	13	[3.43]	210 [3045]	40 [580]	280 [4061]
OSPQ 80/140 LS	80	[4,88]	140	[8.54]	14	[3.70]			
OSPQ 80/160 LS	80	[4,88]	160	[9.76]	16	[4.23]			
OSPQ 100/160 LS	100	[6.10]	160	[9.76]	16	[4.23]			
OSPQ 100/180 LS	100	[6.10]	180	[10.98]	18	[4.75]			
OSPQ 100/200 LS	100	[6.10]	200	[12.20]	20	[5.28]			
OSPQ 125/200 LS	125	[7.63]	200	[12.20]	20	[5.28]			
OSPQ 125/250 LS	125	[7.63]	250	[15.25]	25	[6.60]			
OSPQ 160/250 LS	160	[9.76]	250	[15.25]	25	[6.60]			
OSPQ 160/320 LS	160	[9.76]	320	[19.53]	32	[8.45]			
OSPQ 80/125 LSR	80	[4,88]	125	[7.63]	13	[3.43]	210 [3045]	40 [580]	280 [4061]
OSPQ 80/140 LSR	80	[4,88]	140	[8.54]	14	[3.70]			
OSPQ 80/160 LSR	80	[4,88]	160	[9.76]	16	[4.23]			
OSPQ 100/160 LSR	100	[6.10]	160	[9.76]	16	[4.23]			
OSPQ 100/180 LSR	100	[6.10]	180	[10.98]	18	[4.75]			
OSPQ 100/200 LSR	100	[6.10]	200	[12.20]	20	[5.28]			
OSPQ 125/200 LSR	125	[7.63]	200	[12.20]	20	[5.28]			

* normal steer mode: OSPQ: at a steering wheel speed higher than approximately 20 rpm, the amplification is fully active, and the displacements in the table are valid.
** Rated flow at 100 rpm

TECHNICAL DATA

Displacement, flow and pressure: OSPL LS, OSPBX LS, OSPCX LS, OSPLX LS

'Common data: Look in sub catalogue: "General Steering Components"

Steering unit	Displacement cm³/rev [in³/rev]		*Rated oil flow l/min [US gal/min]		Max. pressure on connections P bar [psi]	T bar [psi]	L. R bar [psi]
OSPL 520 LS Static	520	[31.73]	52	[13.74]	210 [3045]	40 [580]	280 [4061]
OSPL 630 LS Static	630	[38.44]	63	[16.64]			
OSPL 800 LS Static	800	[48.82]	70**	[18.49]			
OSPL 1000 LS Static	1000	[61.02]	70**	[18.49]			
OSPL 520 LS Dynamic	520	[31.73]	52	[13.74]	210 [3045]	40 [580]	280 [4061]
OSPL 630 LS Dynamic	630	[38.44]	63	[16.64]			
OSPL 800 LS Dynamic	800	[48.82]	70**	[18.49]			
OSPL 1000 LS Dynamic	1000	[61.02]	70**	[18.49]			
OSPBX 160 LS Static	160	[9.76]	16	[4.23]	210 [3045]	40 [580]	280 [4061]
OSPBX 200 LS Static	200	[12.20]	20	[5.28]			
OSPBX 250 LS Static	250	[15.25]	25	[6.60]			
OSPBX 315 LS Static	315	[19.22]	32	[8.45]			
OSPBX 400 LS Static	400	[24.41]	40	[10.57]			
OSPCX 160 LS Dynamic	160	[9.76]	16	[4.23]	210 [3045]	20 [580]	280 [4061]
OSPCX 200 LS Dynamic	200	[12.20]	20	[5.28]			
OSPCX 250 LS Dynamic	250	[15.25]	25	[6.60]			
OSPCX 315 LS Dynamic	315	[19.22]	32	[8.45]			
OSPCX 400 LS Dynamic	400	[24.41]	40	[10.57]			
OSPLX 520 LS Static	520	[31.73]	52	[13.74]	210 [3045]	40 [580]	280 [4061]
OSPLX 630 LS Static	630	[38.44]	63	[16.64]			
OSPLX 800 LS Static	800	[48.82]	70**	[18.49]			

* Rated flow at 100 rpm

** Please cantact Sauer-Danfoss Sales Organization for flow higher then 70l/min [18.49 US gal/min]. 70l/min [18.49 US gal/min] results in lower max. speed than 100 rpm on steering wheel for OSPL 800 and OSPL 1000 :
OSPL 800 max. speed at 70l/min [18.49 US gal/min] 87 rpm
OSPL 1000 max speed at 70l/min [18.49 US gal/min] 70 rpm

Please contact the Sauer-Danfoss Sales Organization regarding steering units with code numbers not

TECHNICAL DATA

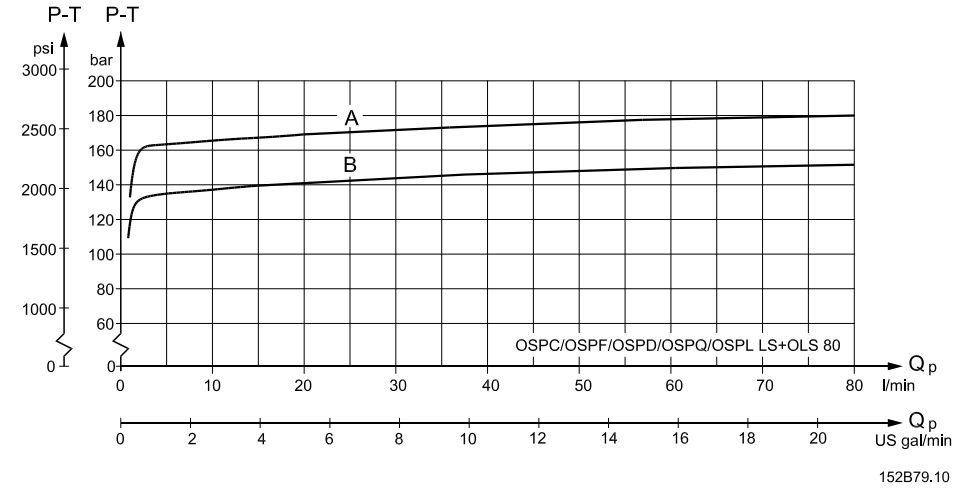
Valve functions in OSPC, OSPF, OSPD, OSPQ and OSPL LS steering units

Pilot pressure relief valve; (P - T, Qp) characteristic

The pilot pressure relief valve protects the steering unit against excessive pressure. The pilot pressure relief valve in the OSPC LS, OSPF LS, OSPD LS, OSPQ LS and OSPL LS steering unit together with the priority valve limit the maximum steering pressure P-T. The pilot pressure relief valve is set at an oil flow to the priority valve of 25 l/min [6.60 US gal/min].
For OSPC, OSPD, OSPQ and OSPL load sensing dynamic steering units, the setting values are valid at a dynamic flow of 0.6 l/min [0.16 US gal/min].
For OSPF load sensing dynamic steering units, the setting values are valid at a dynamic flow of 1 l/min [0.26 US gal/min].
Setting tolerance:
</= 170 bar: rated value +5 bar [72.5 psi].
> 170 bar: rated value +10 bar [145 psi].

A = 170 $^{+5}_{-0}$ bar [2465+ $^{73}_{-0}$ psi]

B = 140 $^{+5}_{-0}$ bar [2030 + $^{73}_{-0}$ psi]



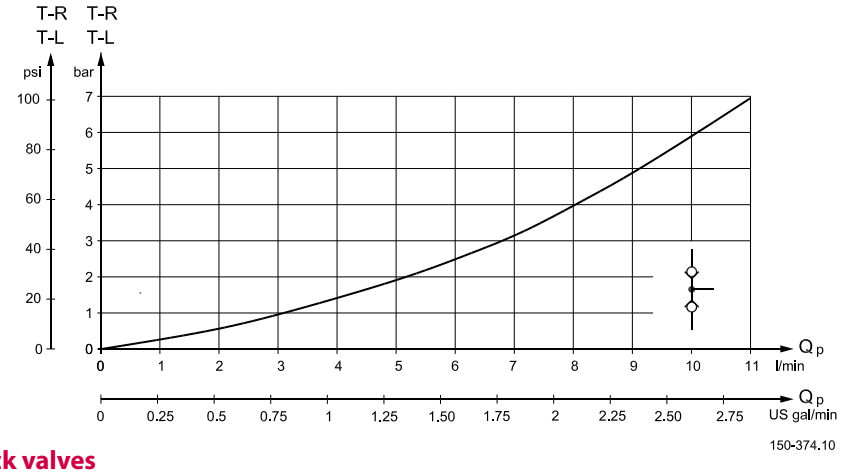
Shock valves

The shock valves protect the steering unit and limit maximum external forces on the steering cylinder. The shock valves in the steering unit limit the maximum pressure drop from L to T and from R to T. The shock valves are set at 1 l/min]0.264 US gal/min]
At higher flow pressure peaks may occour.
The shock valves are of the direct acting type, so they react very quickly.
Setting tolerance: rated value +20 bar [290 psi].

TECHNICAL DATA

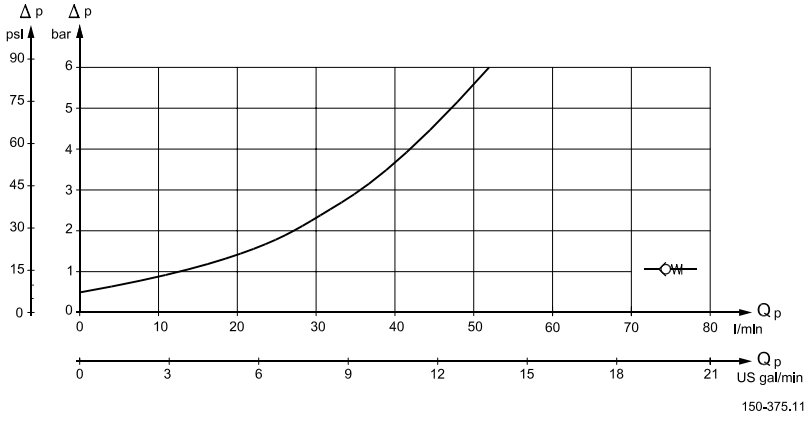
Suction valves

The suction valves allow oil suction to avoid cavitation in the steering cylinder. To provide correct suction, a back pressure valve must be fitted in the tank line from the steering unit. Generally Sauer-Danfoss recommend a back pressure of 2 bar, but on vehicles with strong self straightening tendencies and on articulated steered vehicles, we recommend 5-10 bar [72.5 - 145 psi]. For further advice, please contact the Sauer-Danfoss Sales Organisation.
Note: A connection which incorporates a check valve must be established to allow oil flow to by-pass the back pressure valve (and filter) from the tank to steering unit. See diagramme examples in sub catalogue "General Steering Components" page 37 - 39.



Check valves

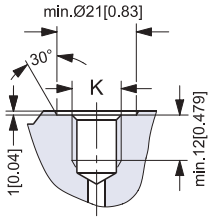
The check valve in the P connection of the steering unit protects the driver against steering wheel jerks. The check valve prevents oil from flowing backwards into the pump line when steering against a high pressure on the cylinder side. The pressure drop across the check valve is indicated on the following graph, which assumes the use of port adaptors with 11 mm [0.43 in] minimum bore.



The check valve in the LS line of OSPC LS, OSPD LS and OSPQ LS dynamic steering units also protects the driver against steering wheel jerks. The check valve prevents oil from flowing backwards into the LS line to the priority valve when steering against a high pressure on the cylinder side.
In OSPF LS oil cannot flow backwards into the LS line, look in sub catalogue: "General Steering Components" page 26.

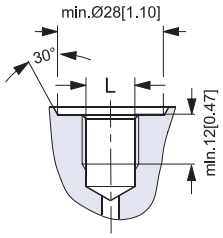
PORT THREAD VERSIONS FOR OSPB LS, OSPC LS/LSR, OSPF LS, OSPD LS/LSR, OSPQ LS/LSR, OSPL LS, OSPBX LS, OSPCX LS, OSPLX LS

A



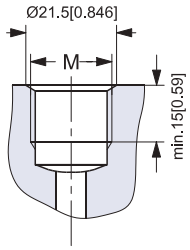
A: G port w. spot face (LS in OSPB and OSPL with no valves)
K: DIN 3852-2 - G ¼

B



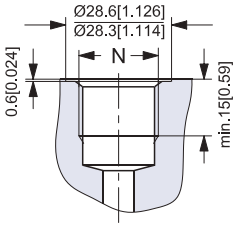
B: G port w. spot face (LS in OSPC/F/D/Q and OSPL with valves)
L: DIN 3852-2 - G ¼

C



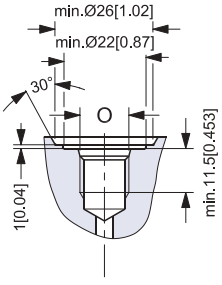
C: G ports (P, T. L, R)
M: DIN 3852-2 - G ½

D



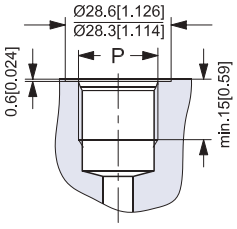
D: G ports w. spot face (P, T, L, R)
N: DIN 3852-2 - G ½

E



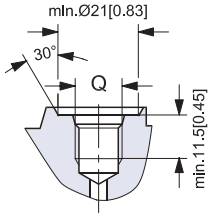
E: Metric port w. spot face and O-ring chamfer (LS)
O: ISO 6149-1 - M12 x 1.5

F



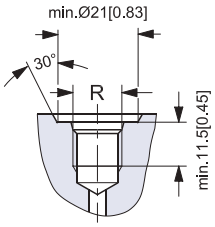
F: Metric ports w. spot face and O-ring chamfer (P, T. L, R)
P: ISO 6149-1 - M18 x 1.5

G



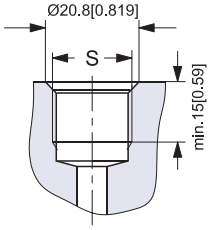
G: UNF port w. O-ring chamfer (LS in OSPB and OSPL with no valves)
Q: ISO 11926-1 - 7/16-20UNF O-ring boss port

H



H: UNF ports w. O-ring chamfer (LS in OSPC/F/D and OSPL with valves)
R: ISO 11926-1 - 7/16-16UNF O-ring boss port

I



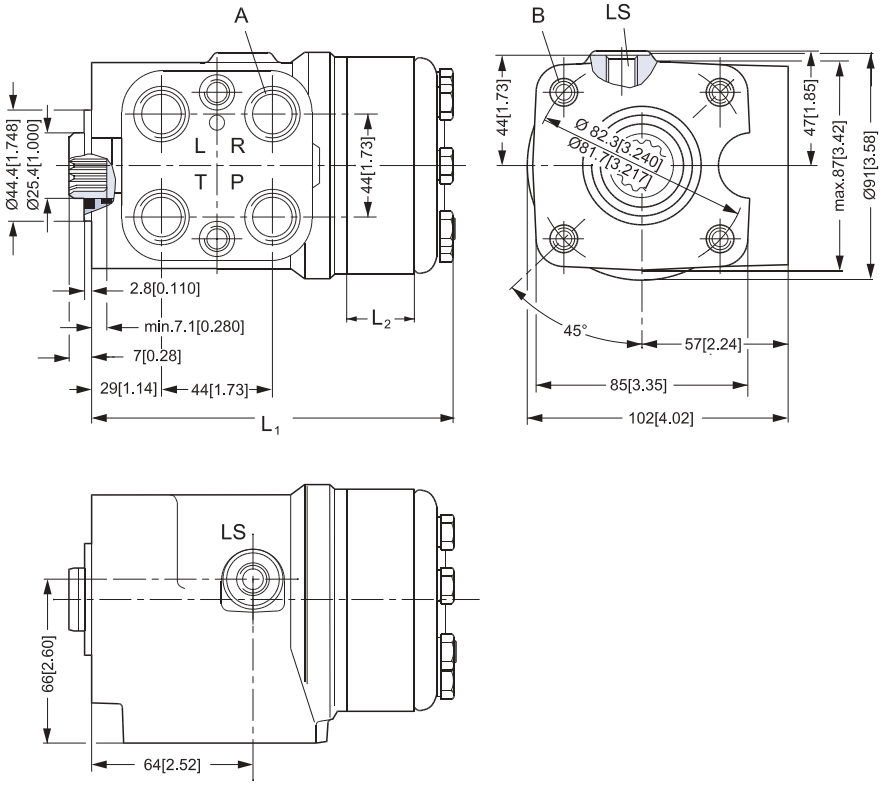
150-603.10

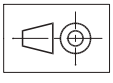
I: UNF ports w. O-ring chamfer (P, T. L, R)
S: ISO 11926-1 - ¾-16UNF O-ring boss port

DIMENSIONS

OSPB LS for OLS, OSPBX LS for OSQ:

Type	L_1 mm [in]	L_2 mm [in]
OSPB 50	126 [4.96]	6.5 [0.26]
OSPB 80	129 [5.08]	10.4 [0.41]
OSPB 100	132 [5.20]	13.0 [0.51]
OSPB 125	135 [5.31]	16.2 [0.64]
OSPB/ OSPBX 160	140 [5.51]	20.8 [0.82]
OSPB/ OSPBX 200	145 [5.71]	26.0 [1.02]
OSPB/ OSPBX 250	151 [5.94]	32.5 [1.28]
OSPB/ OSPBX 315	160 [6.30]	40.9 [1.61]
OSPB/ OSPBX 400	171 [6.73]	52.0 [2.05]





150-590.11

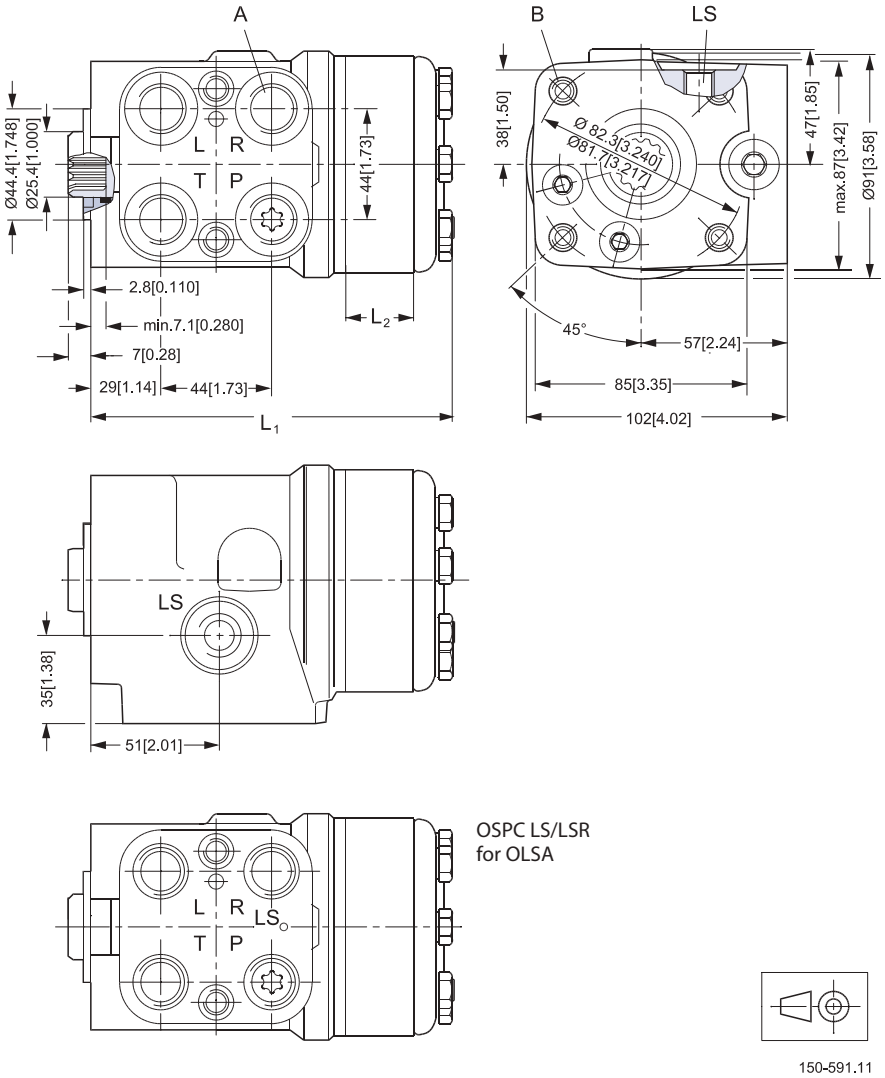
European version:
A: G ½; 15 mm [0.59 in] deep
B: M10 × 1.5, 16 mm [0.63 in] deep
LS: G ¼ with spot face, 11 mm [0.43 in] deep

US version:
A: ¾ - 16 UNF O-ring boss; 15 mm [0.59 in] deep
B: $^3/_8$ - 16 UNC, 16 mm [0.63 in] deep
LS: G $^7/_{16}$ - 20 UNF O-ring boss, 11.5 mm [0.45 in] deep

DIMENSIONS

OSPC LS/LSR and OSPF LS for OLS, OSPCX LS for OSQ:

Type	L_1 mm [in]	L_2 mm [in]
OSPC 40	126 [4.96]	6.5 [0.26]
OSPC/OSPF 50	126 [4.96]	6.5 [0.26]
OSPC/OSPF 60	128 [5.04]	9.1 [0.36]
OSPC/OSPF 70	128 [5.04]	9.1 [0.36]
OSPC/OSPF 80	129 [5.08]	10.4 [0.41]
OSPC/OSPF 100	132 [5.20]	13.0 [0.51]
OSPC/OSPF 125	135 [5.31]	16.2 [0.64]
OSPC/OSPF OSPCX 160	140 [5.51]	20.8 [0.82]
OSPC/OSPF 185	143 [5.63]	24.0 [0.94]
OSPC/OSPF OSPCX 200	145 [5.71]	26.0 [1.02]
OSPC/OSPF 230	149 [5.87]	29.9 [1.18]
OSPC/OSPF OSPCX 250	151 [5.94]	32.5 [1.28]
OSPC/OSPF OSPCX 315	160 [6.30]	40.9 [1.61]
OSPC/OSPF OSPCX 400	171 [6.73]	52.0 [2.05]



European version:
A: G ½ or G ½ w. spot face or M18 x 1.5 ISO 6149, 15 mm [0.59 in] deep
B: M10 x 1.5, 16 mm [0.63 in] deep
LS: G ¼ w. spot face or M12 x 1.5 ISO 6149, 11.5 mm [0.45 in] deep

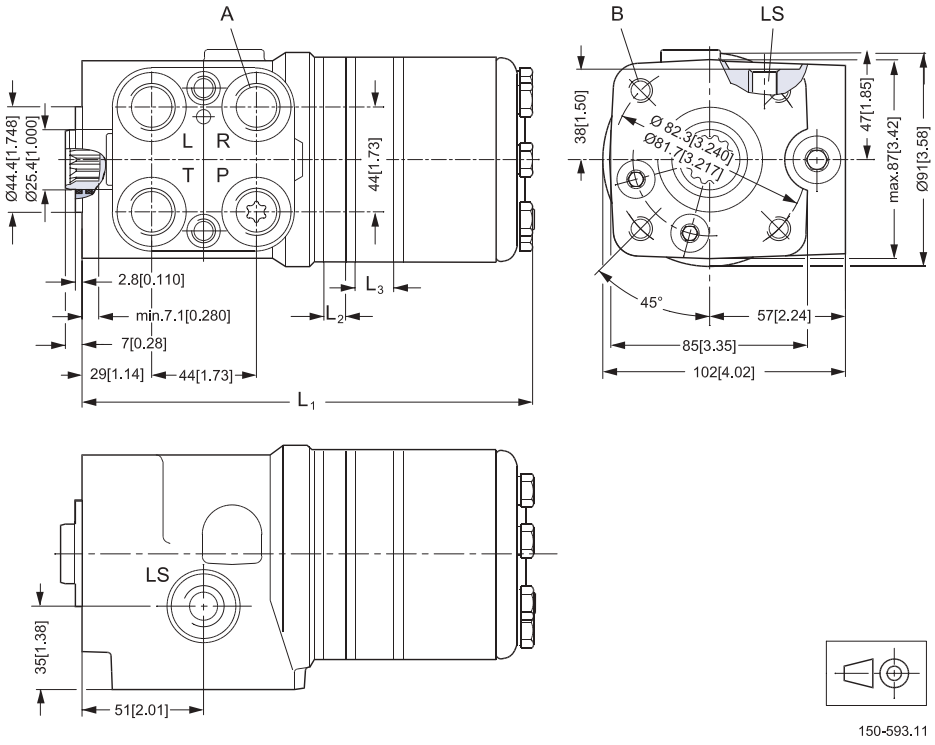
US version:
A: ¾-16 UNF O-ring boss, 15 mm (0.59 in) deep
B: 3/8 - 16 UNC or M10 x 1.5, 16 mm [0.63 in] deep
LS: 7/16 - 20 UNF O-ring boss, 11.5 mm [0.45 in] deep

OSPC LS/LSR for OLSA:
B: M10 x 1,5, 16 mm [0.63 in] deep

DIMENSIONS

OSPD LS/LSR for OLS:

Type	L_1 mm [in]	L_2 mm [in]	L_3 mm [in]
OSPD 60/185	195 [7.70]	9.1 [0.36]	20.8 [0.82]
OSPD 60/220	200 [7.87]	9.1 [0.36]	26.0 [1.02]
OSPD 70/195	190 [7.48]	9.1 [0.36]	16.2 [0.65]
OSPD 70/230	195 [7.70]	9.1 [0.36]	20.8 [0.82]
OSPD 70/270	200 [7.87]	9.1 [0.36]	26.0 [1.02]
OSPD 70/385	215 [8.46]	9.1 [0.36]	40.9 [1.61]
OSPD 100/200	191 [7.52]	13.0 [0.51]	13.0 [0.51]
OSPD 100/260	199 [7.83]	13.0 [0.51]	20.8 [0.82]
OSPD 100/300	204 [8.03]	13.0 [0.51]	26.0 [1.02]
OSPD 125/285	202 [7.95]	16.2 [0.64]	20.8 [0.82]
OSPD 125/325	207 [8.15]	16.2 [0.64]	26.0 [1.02]
OSPD 125/440	222 [8.74]	16.2 [0.64]	40.9 [1.61]



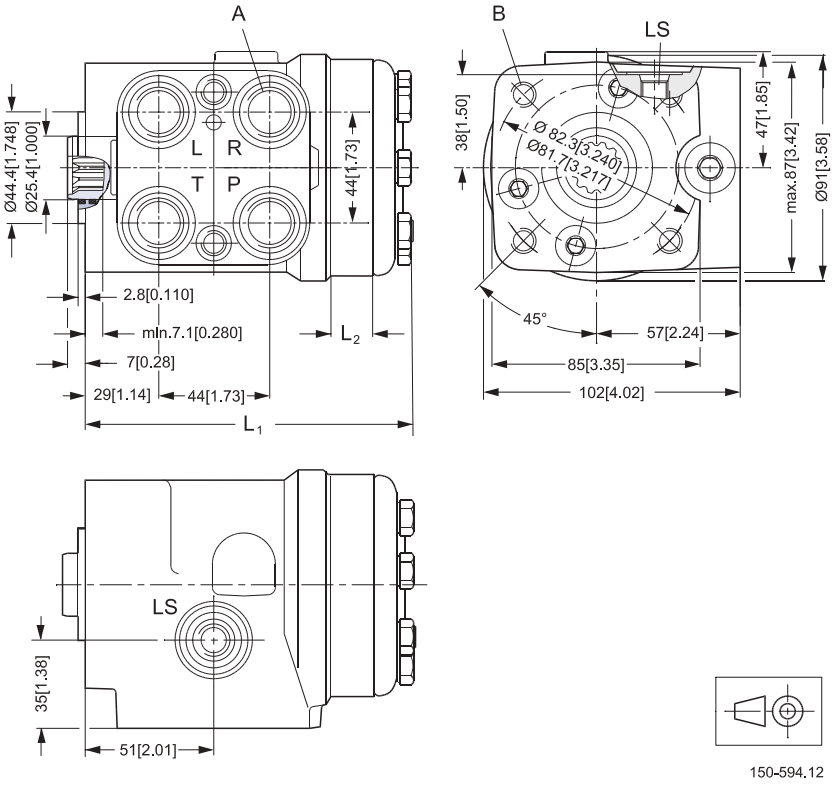
European version:
A: G ½ w. spot-face
or M18 × 1.5 ISO 6149
15 mm [0.59 in] deep
B: M10 × 1.5, 16 mm [0.63 in]
deep
LS: G ¼ w. spot face or
M 12 x 1.5 ISO 6149
11.5 mm [0.45 in] deep

US version:
A: ¾ - 16 UNF O-ring boss;
15 mm [0.59 in] deep
B: M 10 × 1.5, 16 mm
[0.63 in] deep,
LS: 7/16 - 20 UNF o-ring boss,
11.5 mm [0.45 in] deep

DIMENSIONS

OSPQ LS/LSR for OLS:

Type	L_1 mm [in]	L_2 mm [in]
OSPQ 80/125	129 [5.08]	10,4 [0.41]
OSPQ 80/140	129 [5.08]	10,4 [0.41]
OSPQ 80/160	129 [5.08]	10,4 [0.41]
OSPQ 100/160	132 [5.20]	13,0 [0.51]
OSPQ 100/180	132 [5.20]	13,0 [0.51]
OSPQ 100/200	132 [5.20]	13,0 [0.51]
OSPQ 125/200	135 [5.31]	16,2 [0.64]
OSPQ 125/250	135 [5.31]	16,2 [0.64]
OSPQ 160/250	140 [5.51]	20.8 [0.82]
OSPQ 160/320	140 [5.51]	20.8 [0.82]



European version:
A: M18 x 1.5 ISO 6149, 15 mm [0.59 in] deep
B: M10 x 1.5, 16 mm [0.63 in] deep
LS: M12 x 1.5 ISO 6149, 11.5 mm [0.45 in] deep

DIMENSIONS

OSPL LS for OLS and OSPLX LS for OSQ:

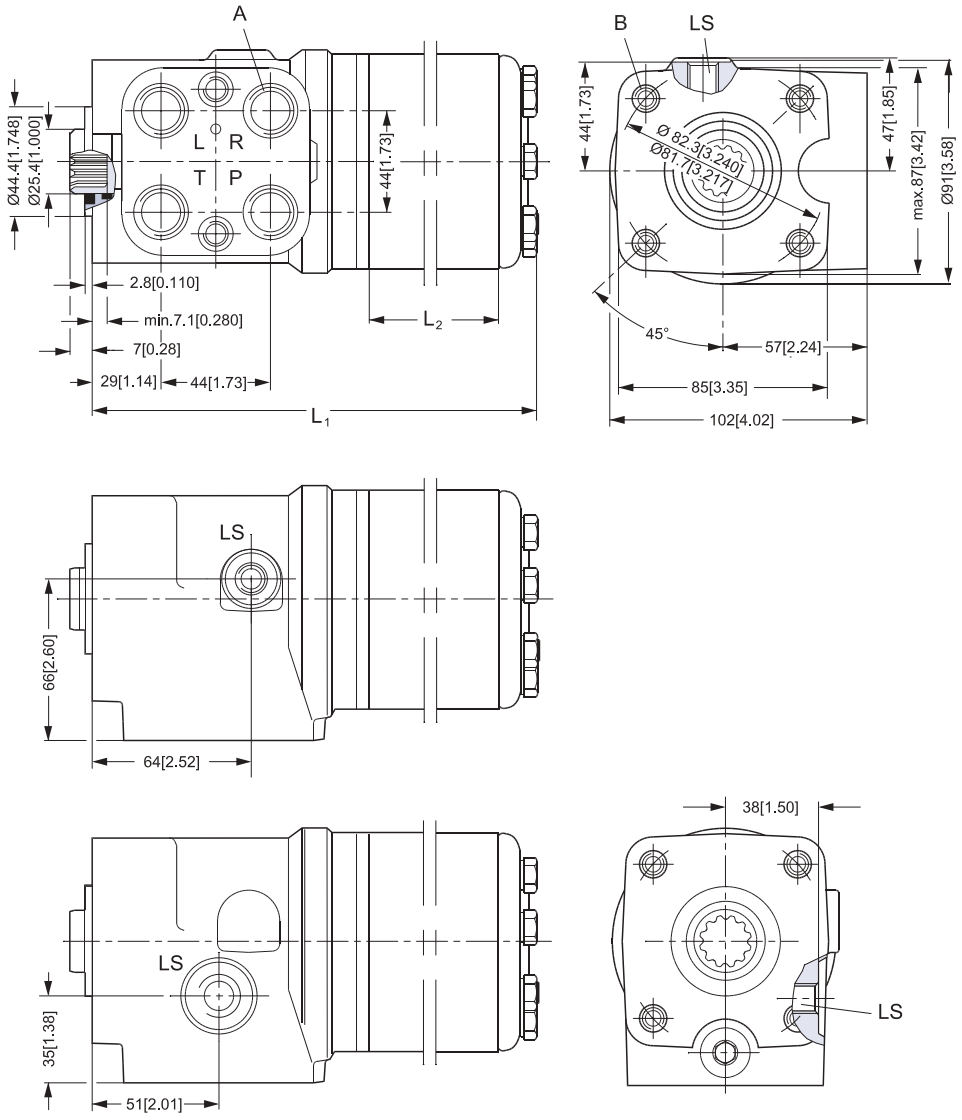
Type	L_1 mm [in]	L_2 mm [in]
OSPL/OSPLX 520	194 [7.64]	65,0 [2.56]
OSPL/OSPLX 630	211 [8.31]	82,0 [3.23]
OSPL/OSPLX 800	233 [9.17]	104,0 [4.09]
OSPL 1000	263 [10.35]	134,0 [5.27]

European version:
A: G ½; 15 mm (0.59 in) deep
B: M10 x 1.5, 16 mm deep
LS: G ¼ w. spot face,
11.5 mm [0.45 in] deep

US version:
A: ¾-16 UNF O-ring boss,
15 mm (0.59 in) deep
or for OVPL
B: M10 x 1.5, 16 mm deep
LS: 7/16-20 UNF O-ring boss,
11.5 mm [0.45 in] deep

OSPL LS with pilot pressure relief valve:

European version:
A: for OVPL
B: M10 x 1.5, 16 mm deep
LS: G ¼ w. spot face,
11.5 mm [0.45 in] deep



OSPL LS with relief valve

150-592.12

Priority valves OLSA and OLS

Sauer-Danfoss priority valves are used in steering systems with load sensing steering units. In such systems steering always has first priority.

VERSIONS

Load sensing static priority valves
Load sensing static steering units require load sensing static priority valves. Load sensing static steering systems have no oil flow in the LS connection when the steering unit is in neutral position.

Load sensing dynamic priority valves
Load sensing dynamic steering units require load sensing dynamic priority valves. Load sensing dynamic steering systems have a constant oil flow in the LS connection from the priority valve to the steering unit even when the steering unit is in neutral position.

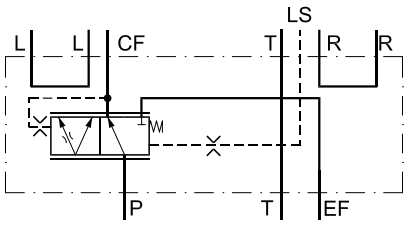
Ports:
P = pump,
CF = controlled flow (priority oil flow),
EF = excess flow,
L = left,
R = right,
T = tank,
LS = load sensing,
PP = pilot pressure

OLSA 40/80
The OLSA 40 and OLSA 80 "flange on" priority valves are used in load sensing steering systems, built onto OSPC LS (OLSA) steering units.



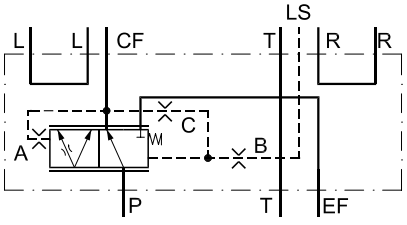
F300625

OLSA static



152B135.11

OLSA dynamic



152B170.11

A: PP-damping orifice
B: LS-orifice
C: Dynamic-orifice

Priority valves OLSA and OLS

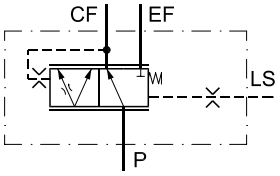
VERSIONS

The OLS 40, OLS 80 and OLS 120 "in line" priority valves are used in load sensing steering systems together with OSPB LS, OSPC LS, OSPF LS, OSPD LS, OSPQ LS and OSPL LS steering units.

OLS 40/80



F300624



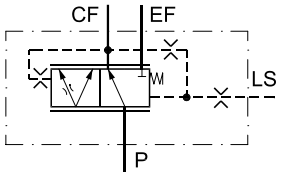
152B134.10

OLS static

OLS 120



F300623



152B171.10

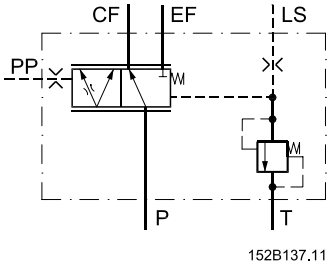
OLS dynamic

The OLS 160 "in line" priority valve is used in load sensing steering systems together with OSPB LS, OSPC LS, OSPF LS, OSPD LS, OSPQ LS and OSPL LS steering units.

OLS 160

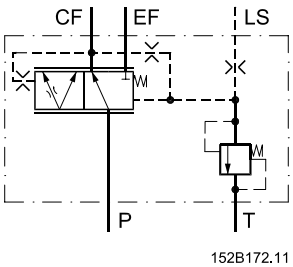


F300622



152B137.11

OLS static



152B172.11

OLS dynamic

OLS 160 is also available without pilot pressure relief valve.

SYSTEM SIZING

The steering system pump is sized so that satisfactory performance is achieved for both steering and working hydraulics - even at idle.
Before selecting a priority valve, consider

- the type of steering unit (LS static, LS dynamic or OSPF LS dynamic)
- the displacement of the steering unit
- the pump flow
- the application's requirement for energy optimization, initial steering response time and stability, as these all govern the selection for control spring pressure
- whether the priority valve should have internal PP (Pilot Pressure) or external PP-connection depends on the pressure drop in the pump line between the priority valve's CF-port (Controlled Flow) and the steering unit's P-port. With normal hose and tube dimensions and less than 5 m distance between priority valve and steering unit, the immediate choice is normally a priority valve with internal PP.

The following survey lists the code numbers of the priority valves that are the most frequently used in connection with the above Sauer-Danfoss steering unit types. All priority valves in the code number tables, except OLS 160 static, have internal PP connection. OLS 160 static in the code number table all have external PP connection.

CODE NUMBERS AND WEIGHTS

OLS/OLSA static priority valves for load sensing static steering units

OLSA 40 static and OLSA 80 static

Priority valve	Code Numbers		Control spring pressure		Weight	
	Connections					
	European version	US version				
	T,R,L: G 3/8 P, EF: G ½	T, R, L: 9/16 - 18 UNF P, EF: 7/8 - 14 UNF	bar	[psi]	kg	[lb]
OLSA 40	152B0001	-	4	[58]	2,1	[4.63]
OLSA 40	152B0002	152B0122	7	[101.5]	2,1	[4.63]
OLSA 40	152B0003	152B0124	10	[145]	2,1	[4.63]
OLSA 80	152B0016	152B0019	4	[58]	2,1	[4.63]
OLSA 80	152B0017	152B0020	7	[101.5]	2,1	[4.63]
OLSA80	152B0015	152B0125	10	[145]	2,1	[4.63]

OLS 40 static and OLS 80 static

Priority valve	Code Numbers		Control spring pressure		Weight	
	Connections					
	European version	US version				
	LS: G ¼ P, EF, CF: G ½	LS: 7/16 -20 UNF CF: ¾ - 16 UNF P, EF: 7/8 - 14 UNF	bar	[psi]	kg	[lb]
OLS 40	152B0231	152B0237	4	[58]	1,0	[2.2]
OLS 40	152B0232	152B0238	7	[101.5]	1,0	[2.2]
OLS 40	152B0233	152B0253	10	[145]	1,0	[2.2]
OLS 80	152B0261	152B0267	4	[58]	1,0	[2.2]
OLS 80	152B0262	152B0268	7	[101.5]	1,0	[2.2]
OLS 80	152B0263	152B0280	10	[145]	1,0	[2.2]

CODE NUMBERS AND WEIGHTS

OLS/OLSA static priority valves for load sensing statics steering units

OLS 120 static

Priority valve	Code Numbers Connections European version LS: G ¼ CF: G ½ P, EF: G ¾	Code Numbers Connections US version LS: 7/16 -20 UNF CF: ¾ - 16 UNF P, EF: 1 1/16 - 12 UNF	Control spring pressure bar	[psi]	Weight kg	[lb]
OLS 120	152B2232	152B2238	7	[101.5]	2.1	[4.63]
OLS 120	152B2233	152B2239	10	[145]	2.1	[4.63]

OLS 160 static

Priority valve	Code Numbers Connections European version LS, PP, T: G ¼ CF: G ½ P, EF: G ¾	Code Numbers Connections US version LS, PP, T: 7/16 -20 UNF CF: ¾ - 16 UNF P, EF: 1 1/16 - 12 UNF	Control spring pressure bar	[psi]	Pilot pressure relief valve bar	[psi]	Weight kg	[lb]
OLS 160	152B1005	152B1085	7	[101.5]	170	[2465]	4.4	[9.7]
OLS 160	152B1006	152B1086	10	[145]	170	[2465]	4.4	[9.7]

OLS/OLSA dynamic priority valves for load sensing dynamic steering units

OLSA 40 dynamic and OLSA 80 dynamic for OSPC LS dynamic

Priority valve	Code Numbers Connections European version T,R,L: G 3/8 P/EF: G ½	Code Numbers Connections US version T,R,L: 9/16 - 18 UNF P/EF: 7/8 - 14 UNF	Control spring pressure bar	[psi]	Weight kg	[lb]
OLSA 40	152B8001	-	4	[58]	2.1	[4.63]
OLSA 40	152B8041	152B8042	7	[101.5]	2.1	[4.63]
OLSA 40	152B8046	152B8043	10	[145]	2.1	[4.63]
OLSA 80	152B8047	-	4	[58]	2,1	[4.63]
OLSA 80	152B8048	152B8044	7	[101.5]	2.1	[4.63]
OLSA 80	152B8049	152B8045	10	[145]	2.1	[4.63]

CODE NUMBERS AND WEIGHTS

OLS/OLSA dynamic priority valves for load sensing dynamic steering units

OLS 40 dynamic and OLS 80 dynamic for OSPB, OSPC, OSPD, OSPQ and OSPL LS dynamic

Priority valve	Code Numbers Connections European version LS: G ¼ P, EF, CF: G ½	Code Numbers Connections US version LS: 7/16 - 20 UNF CF: ¾ - 16 UNF P, EF: 7/8 - 14 UNF	Control spring pressure bar	[psi]	Weight kg	[lb]
OLS 40	152B8231	-	4	[58]	1.0	[2.20]
OLS 40	152B8232	152B8253	7	[101.5]	1.0	[2.20]
OLS 40	152B8233	152B8254	10	[145]	1.0	[2.20]
OLS 80	152B8261	-	4	[58]	1.0	[2.20]
OLS 80	152B8256	152B8268	7	[101.5]	1.0	[2.20]
OLS 80	152B8257	152B8260	10	[145]	1.0	[2.20]

OLS 80 dynamic with low pressure drop (P-EF) spool for OSPB, OSPC, OSPD, OSPQ and OSPL LS dynamic

Priority valve	Code Numbers Connections European version LS: G ¼ P, EF, CF: G ½	Control spring pressure bar	[psi]	Weight kg	[lb]
OLS 80	152B8259	7	[101.5]	1.0	[2.2]

OLS 120 dynamic for OSPB, OSPC, OSPD, OSPQ and OSPL LS dynamic

Priority valve	Code Numbers Connections European version LS: G ¼ CF: G ½ P, EF: G ¾	Code Numbers Connections US version LS: 7/16 -20 UNF CF: ¾ - 16 UNF P, EF: 1 1/16 - 12 UNF	Control spring pressure bar	[psi]	Weight kg	[lb]
OLS 120	152B8132	152B8143	7	[101.5]	2.1	[4.63]
OLS 120	152B8133	152B8144	10	[145]	2.1	[4.63]

OLS 160 dynamic for OSPB, OSPC, OSPD, OSPQ and OSPL LS dynamic

Priority valve	Code Numbers Connections European version LS, T: G ¼ CF: G ½ P, EF: G ¾	Code Numbers Connections US version LS, T: 1/16 -20 UNF CF: ¾ - 16 UNF P, EF: 1 1/16 - 12 UNF	Control spring pressure bar	[psi]	Pilot pressure relief valve bar	[psi]	Weight kg	[lb]
OLS 160	152B8159	152B8154	7	[101.5]	170	[2465]	4.4	[9.7]
OLS 160	152B8160	152B8155	10	[145]	170	[2465]	4.4	[9.7]
OLS 160	152B8105	-	12	[174]	170	[2465]	4.4	[9.7]
OLS 160	152B8161	152B8156	7	[101.5]	210	[3045]	4.4	[9.7]
OLS 160	152B8162	152B8157	10	[145]	210	[3045]	4.4	[9.7]

CODE NUMBERS AND WEIGHTS

OLS dynamic priority valves for OSPF LS dynamic steering units

OLS 40 dynamic and OLS 80 dynamic

Priority valve	Code Numbers Connections European version LS: G ¼ P, EF, CF: G ½	Control spring pressure bar	 [psi]	Weight kg	 [lb]
OLS 40	152B8031	10	[145]	1.0	[2.20]
OLS 80	152B8258	7	[101.5]	1.0	[2.20]

OLS 120 dynamic

Priority valve	Code Numbers Connections European version LS: G ¼, CF: G ½ P, EF, CF: G ¾	Control spring pressure bar	 [psi]	Weight kg	 [lb]
OLS 120	152B8147	7	[101.5]	2.1	[4.63]

OLS 160 dynamic

Priority valve	Code Numbers Connections European version LS: G ¼, CF: G ½ P, EF, CF: G ¾	Control spring pressure bar	 [psi]	Pilot pressure relief valve	Weight kg	 [lb]
OLS 160	152B8158	7	[101.5]	none	4.4	[9.7]
OLS 160	152B8113	10	[145]	none	4.4	[9.7]

If you require other port connections, other control spring pressure and/or other PP connection, go to the survey on page 47, and tick off the desired specifications, then consult the Sauer-Danfoss Sales Organization.

SPECIFICATION TABLE FOR NON CATALOGUE NUMBERS OF SAUER-DANFOSS PRIORITY VALVES

Fill in your company data and place x's in the table where appropriate, then send to your Sauer-Danfoss Sales Organization

Your company	**Name**	**Vehicle**	**Potential pcs/year**	**Completed by**	**Date**

Your application	Pump flow to OLS/OLSA at idle, l/min [US gal/min]	Pump flow to OLS/OLSA at max engine speed, l/min [US gal/min]

Priority valve type	OLSA 40	OLSA 80	OLS 40	OLS 80	OLS 120	OLS 160

Load Sensing type	Static	Dynamic	Dynamic for OSPF steering unit

Spool type	Standard	Low pressure drop, P-EF (only OLS/OLSA 80 dynamic)

Control spring bar	4	5.5 (only OLS/OLSA 40/80)	7	10	12 (only OLS 160)

PP-connection	Internal	External

Ports OLSA	G: P, EF,: G ½ - S** T, L, R: G ³/₈ - S**	Metric 1: P,EF, T, L, R: M 18 x 1.5 - O* +S**	Metric 2: P, EF: M 22 x 1.5 - O* +S** T, L, R: M 18 x 1.5 - O* - S**	UNF: P, EF,: ⁷/₈ - 14 UNF - O* T, L, R: ⁹/₁₆ - 18 UNF - O*

Ports OLS 40/80	G: P, CF, EF: G ½ - S** LS: G ¼ - S**	Metric: P, EF: M 22 x 1,5 - O* +S** CF: M 18 x 1,5 - O* +S** LS: M 12 x 1,5 - O* +S**	UNF: P, EF: ⁷/₈ - 14 UNF - O* CF: ¾ - 16 UNF - O* LS: ⁷/₁₆ - 20 UNF - O*

Ports OLS 120	G: P, CF, EF: G ³/₄ - S** LS: G ¼ - S** LS, PP: G ¼ - S**	Metric: P, EF: M 27 x 2 - O* +S** CF: M 18 x 1,5 - O* +S** LS, PP: M 12 x 1,5 - O* +S**	UNF: P, EF: 1 ¹/₁₆ - 12 UNF - O* CF: ¾ - 16 UNF - O* LS, PP: ⁷/₁₆ - 20 UNF - O*

Ports OLS 160	G 1: P, EF,: G ³/₄ - S** CF: G ½ - S** LS, PP, T: G ¼ - S**	G 2: P, EF: G 1 - S** CF: G ³/₄ - S** LS, PP, T: G ¼ - S**	UNF 1: P, EF: 1 ¹/₁₆ - 12 UN - O* CF: ³/₄ - 16 UNF - O* LS, PP, T: ⁷/₁₆ - 20 UNF - O*	UNF 2: P, EF: 1 ⁵/₁₆ - 12 UF - O* CF: ⁷/₈ - 14 UNF - O* LS, PP, T: ⁷/₁₆ - 20 UNF - O*

R V, OLS 160 bar	70	80	90	100	110	120	140	170	190	200	210	no relief valve

Unit black painted	Yes	No

Ports: PP port only exists when external PP connection is used. Ports OLS 160: T port only exists with integrated pilot pressure relief valve (RV)
O*: O-ring chamfer on port connections
S**: Spot face around port connections

An alternative way to specify a variant is to state an existing code number and add the modifications, you would like to have implemented in the basic priority valve.

Code number of basic priority valve:_____
Requested modifications:
_____

TECHNICAL DATA

Max. pressure on connections

Priority valve valve	Rated flow to P-connection l/min [US gal/min]		Max. pressure on connections P, EF bar	[psi]	CF bar	[psi]	L, R bar	[psi]	LS bar	[psi]	T bar	[psi]	PP bar	[psi]
OLSA 40	40	[10.57]	250	[3625]	210	[3045]	280	[4061]	210	[3045]	20	[290]		
OLSA 80	80	[21.13]	250	[3625]	210	[3045]	280	[4061]	210	[3045]	20	[290]		
OLS 40	40	[10.57]	250	[3025]	210	[3045]			210	[3045]			210	[3045]
OLS 80	80	[21.13]	250	[3025]	210	[3045]			210	[3045			210	[3045]
OLS 120	120	[31.70]	250	[3025]	210	[3045]			210	[3045]			210	[3045]
OLS 160	160	[42.27]	350	[5076]	210	[3045]			210	[3045]	15	[217]	210	[3045]

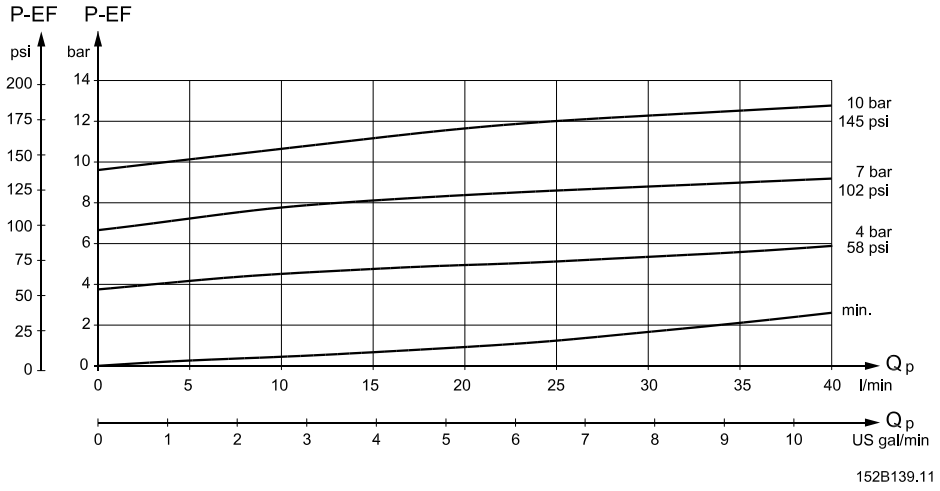
PRESSURE DROP IN PRIORITY VALVES

Pressure drop in priority valves

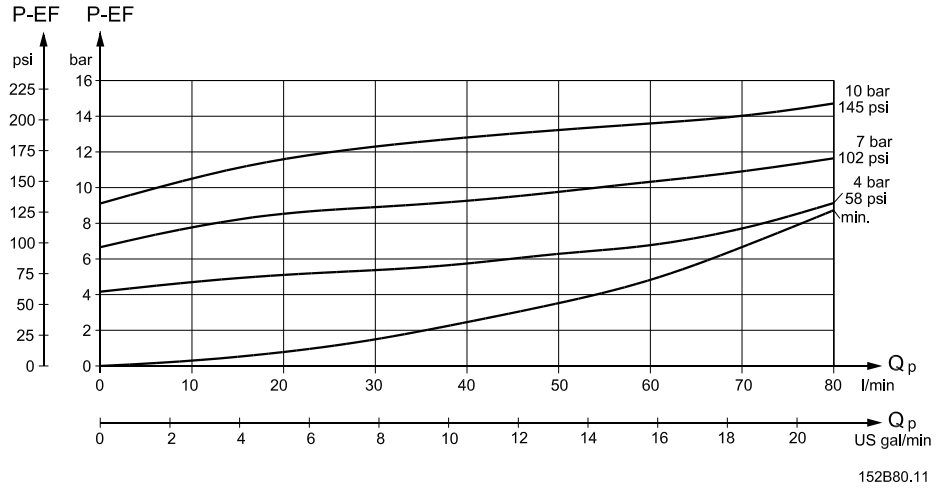
This data comes from measurements on a representative sample of priority valves from production. Oil with viscosity of 21 mm²/s at 50 °C [102 SUS at 122 °F] was used during measuring. Measurement made when pressure on the LS connection is zero (steering unit in neutral position). The minimum curves apply when the pressure on the EF connection is higher than the actual control spring pressure. The curves for control spring pressure of 4 , 7, 10 or 12 bar [58, 101, 145 or 174 psi] apply when pressure on the EF connection is zero.

Pressure drop P-EF for static priority valves

OLSA/OLS 40



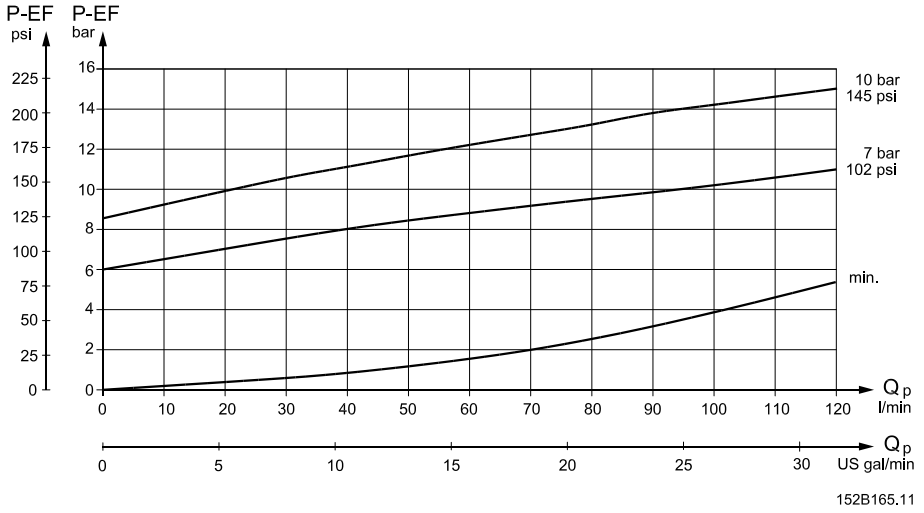
OLSA/OLS 80



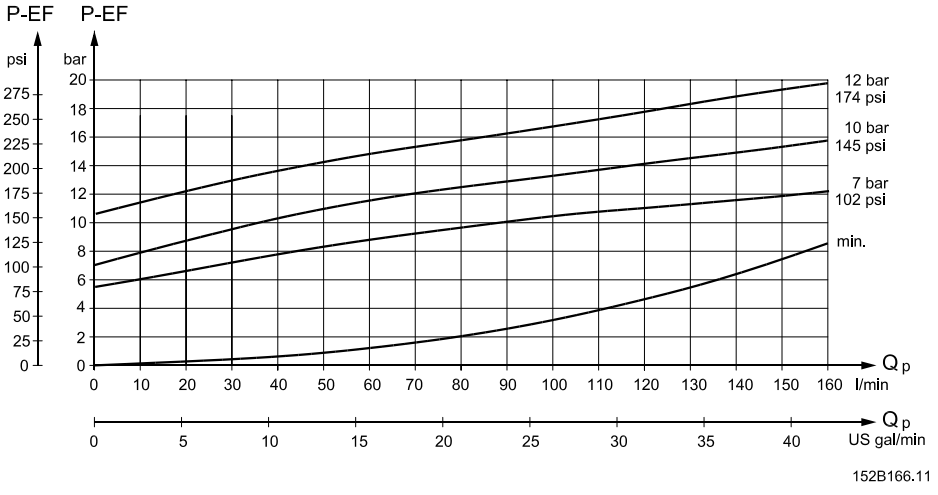
TECHNICAL DATA

Pressure drop P-EF for static priority valves

OLS 120



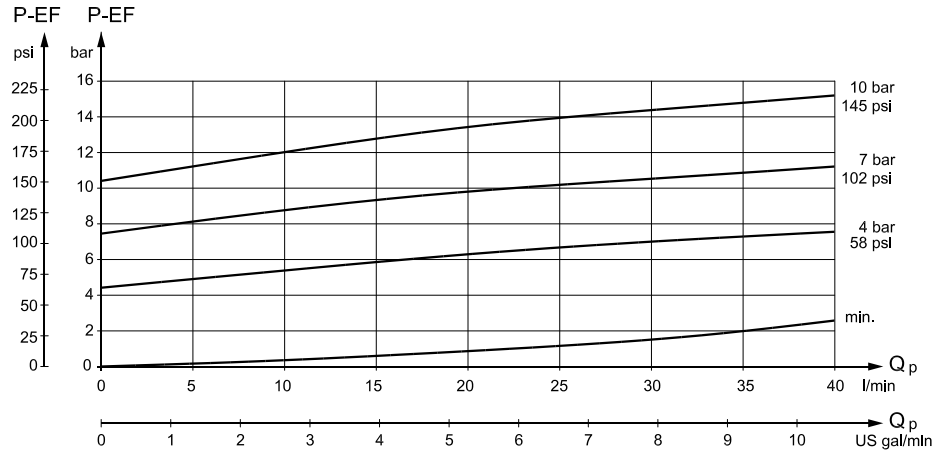
OLS 160



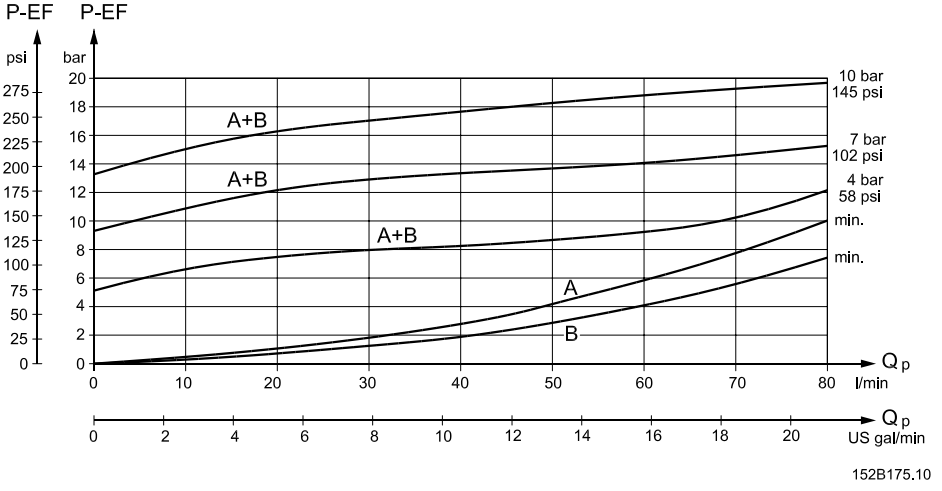
TECHNICAL DATA

Pressure drop P-EF for dynamic priority valves

OLSA/OLS 40



OLSA/OLS 80



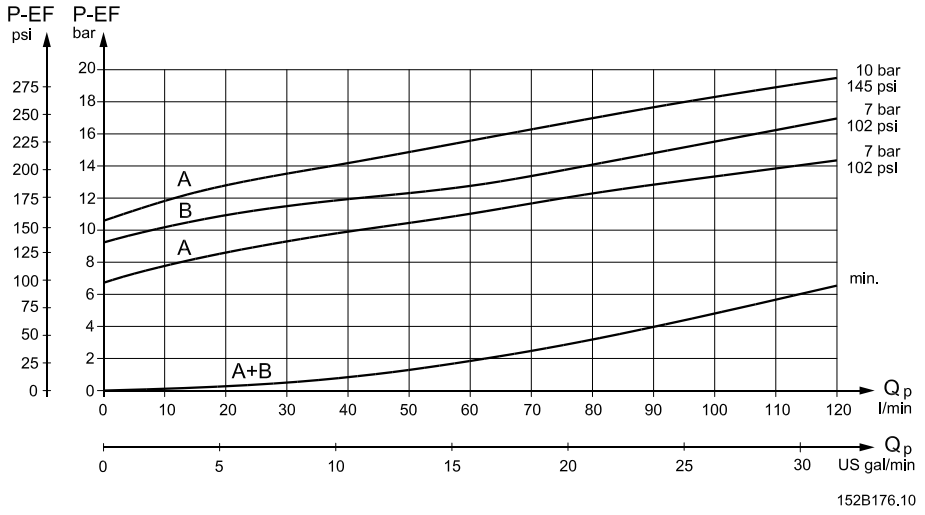
A: OLS/OLSA 80 Dynamic for OSPB, OSPC, OSPF, OSPD, OSPQ, OSPL LS Dynamic

B: OLS/OLSA 80 Dynamic with low pressure drop (P-EF) spool for OSPB, OSPC, OSPD, OSPQ, OSPL LS Dynamic

TECHNICAL DATA

Pressure drop P-EF for dynamic priority valves

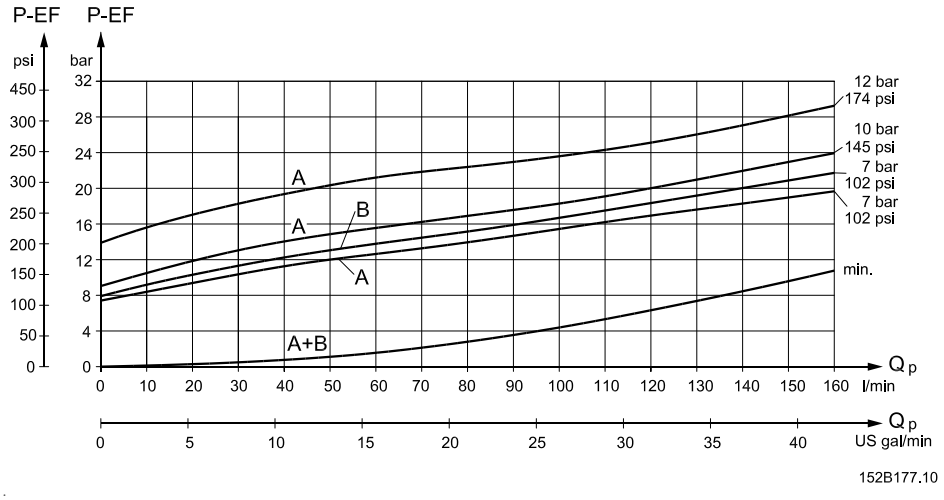
OLS 120



A: OLS 120 Dynamic for OSPB, OSPC, OSPD, OSPQ, OSPL LS Dynamic

B: OLS 120 Dynamic for OSPF LS Dynamic

OLS 160



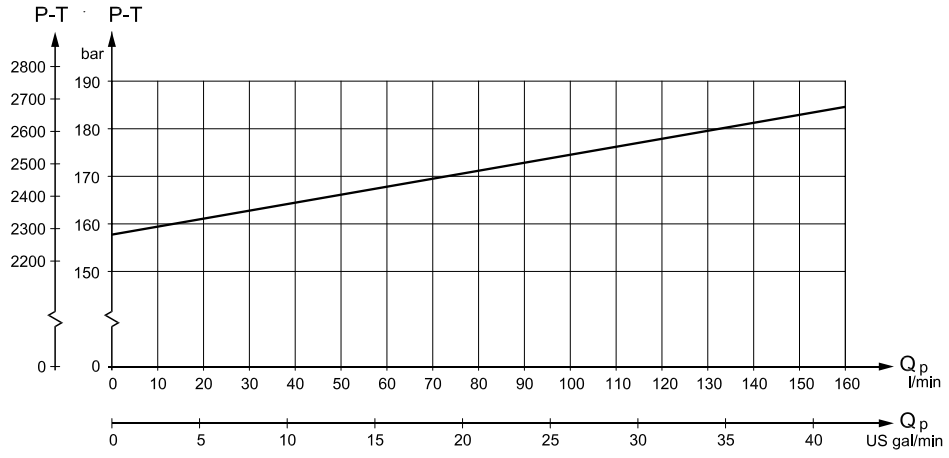
A: OLS 160 Dynamic for OSPB, OSPC, OSPD, OSPQ, OSPL LS Dynamic

B: OLS 160 Dynamic for OSPF LS Dynamic

TECHNICAL DATA

OLS 160, pilot pressure relief valve (P - T, Qp) characteristic

OLS 160 with pilot pressure relief valve is used in connection with Sauer-Danfoss steering units without pilot pressure relief valve, normally steering unit type OSPL.
The pilot pressure relief valve protects the steering unit against excessive pressure. The pilot pressure relief valve in OLS 160 operates with the priority valve spool in the OLS 160 to limit the maximum steering pressure P-T measured across the steering unit ports.
The pilot pressure relief valve is set when an oil flow of 80 l/min[21 US gal/min] is supplied to OLS 160.
Setting tolerance:
</= 170 bar [2466 psi]: rated value +5 bar [72.5 psi]
> 170 bar [2466 psi: rated value +10 bar [145 psi]



Qp = Pump flow

152B141.10

DIMENSIONS

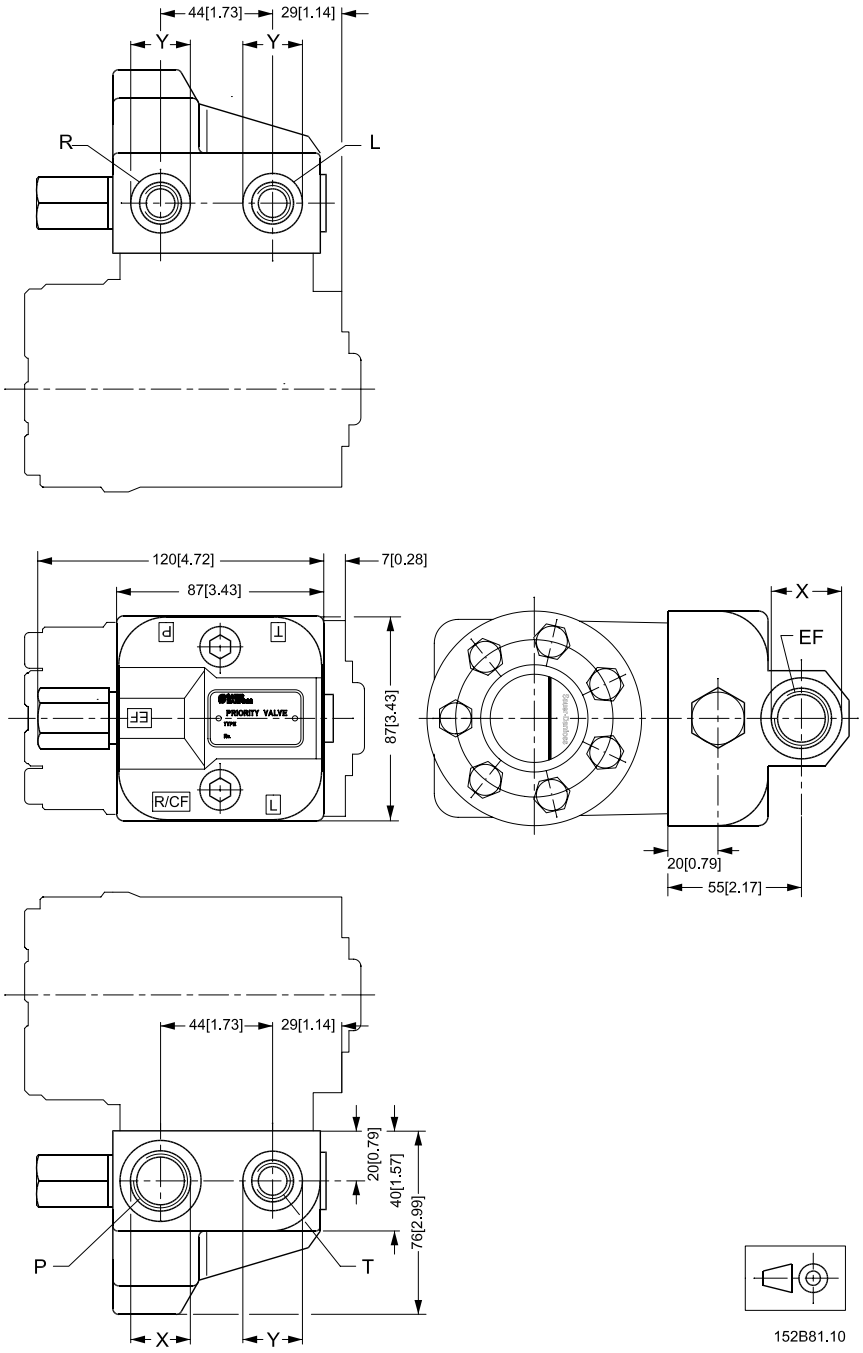
OLSA

European version:
P, EF:
- G ½ w. spot face
  14 mm [0.55 in] deep
  x = 34 mm [1.34 in],
  max. 1,5 mm [0.06 in] deep
  or M18 x 1.5 ISO 6149
  14,5 mm [0.57 in] deep
  x = 29 mm [1.14 in],
  max. 1,5 mm [0.06 in] deep
  or M22 x 1.5 ISO 6149,
  15,5 mm [0.61 in] deep
  x = 34 mm [1.34 in],
  max. 1,5 mm [0.06 in] deep

T, L, R:
- G 3/8 w. spot face
  12 mm [0.47 in] deep
  y = 34 mm [1.34 in],
  max. 1,5 mm [0.06 in] deep
  or M18 x 1.5 ISO 6149,
  15 mm [0.59 in] deep
  y = 29 mm [1.14 in],
  max. 1.5 mm [0.06 in] deep

US version:
P, EF:
- 7/8-14 UNF O-ring boss
  16.7 mm [0.66 in] deep
  x = 34 mm [1.34 in],
  max. 1.5 mm [0.06 in] deep

T, L, R:
- 9/16 - 18 UNF O-ring boss
  12.7 mm [0.50 in] deep
  y = 25 mm [0.98 in],
  max. 1.5 mm [0.06 in] deep



DIMENSIONS

OLS 40, OLS 80

European version:

P, EF:
- G ½ w. spot face
  15 mm [0.59 in] deep
  x = 29 mm [1.14 in],
  max. 1.5 mm [0.06 in] deep
  or M22 x 1.5 ISO 6149
  15 mm [0.59 in] deep,
  x = 34 mm [1.34 in],
  max. 1 mm [0.04 in] deep

CF:
- G ½ w. spot face
  14 mm [0.55 in]deep
  y = 29 mm [1.14 in],
  max. 1.5 mm [0.06 in] deep
  or M18 x 1,5 ISO 6149
  12 mm [0.47 in] deep,
  y = 29 mm [1.14 in],
  max. 1 mm [0.04 in] deep

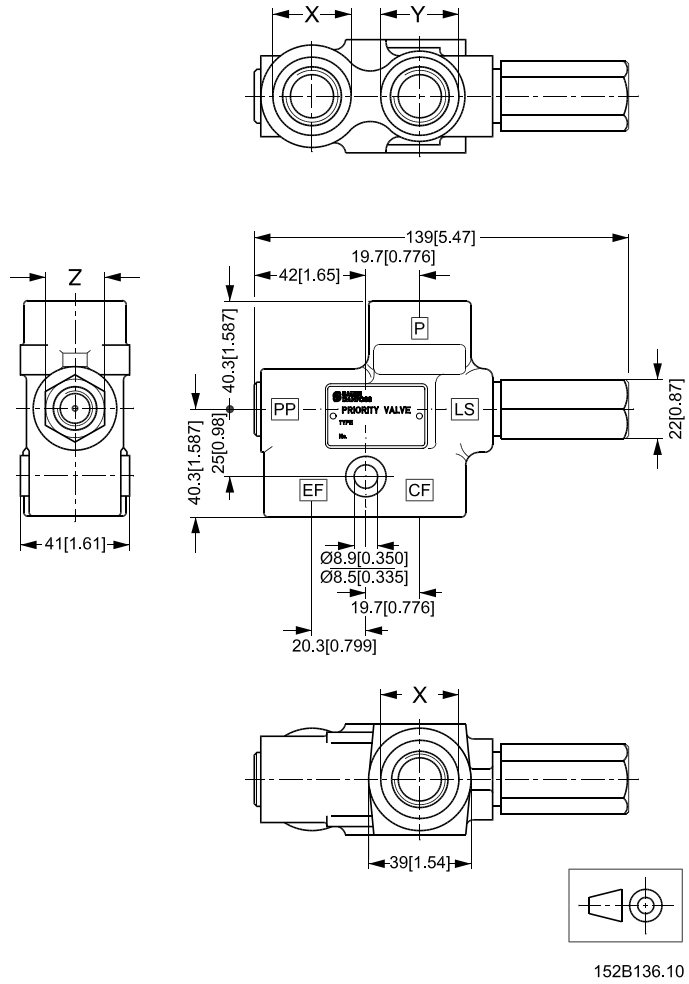
LS:
- G ¼ w. spot face
  12.5 mm [0.49 in] deep
  z = 21mm [0.83 in],
  max. 1 mm [0.04 in] deep
  or M12 x 1,5 ISO 6149
  12,5 mm [0.49 in] deep,
  z = 22 mm [0.86 in]
  0 mm deep

US version:

P, EF:
- 7/8 - 14 UNF O-ring boss
  15 mm [0.59 in] deep
  x = 34 mm [1.14 in],
  max. 1.3 [0.05] deep

CF:
- ¾-16 UNF O-ring boss
  14,3 mm [0.56 in] deep
  y = 30 mm [1.18 in],
  max. 1.3 mm [0.05 in] deep

LS:
- 7/16-20 UNF O-ring boss
  12.5 mm [0.49 in] deep
  z = 21 mm [0.83 in],
  max. 1 mm [0.04 in] deep



152B136.10

DIMENSIONS

OLS 120

European version:

P, EF:
- G ¾ w. spot face
  x = 42 mm [1.65 in],
  max. 2.5 mm [0.10 in] deep
  or M27 x 2 ISO 6149
  x = 40 mm [1.57 in],
  max. 2.5 mm [0.10 in] deep

CF:
- G ½ w. spot face
  y = 34 mm [1.34 in],
  max. 2.5 mm [0.10 in] deep
  or M18 x 1.5 ISO 6149
  y = 29 mm [1.14 in],
  max. 2 mm [0.08 in] deep

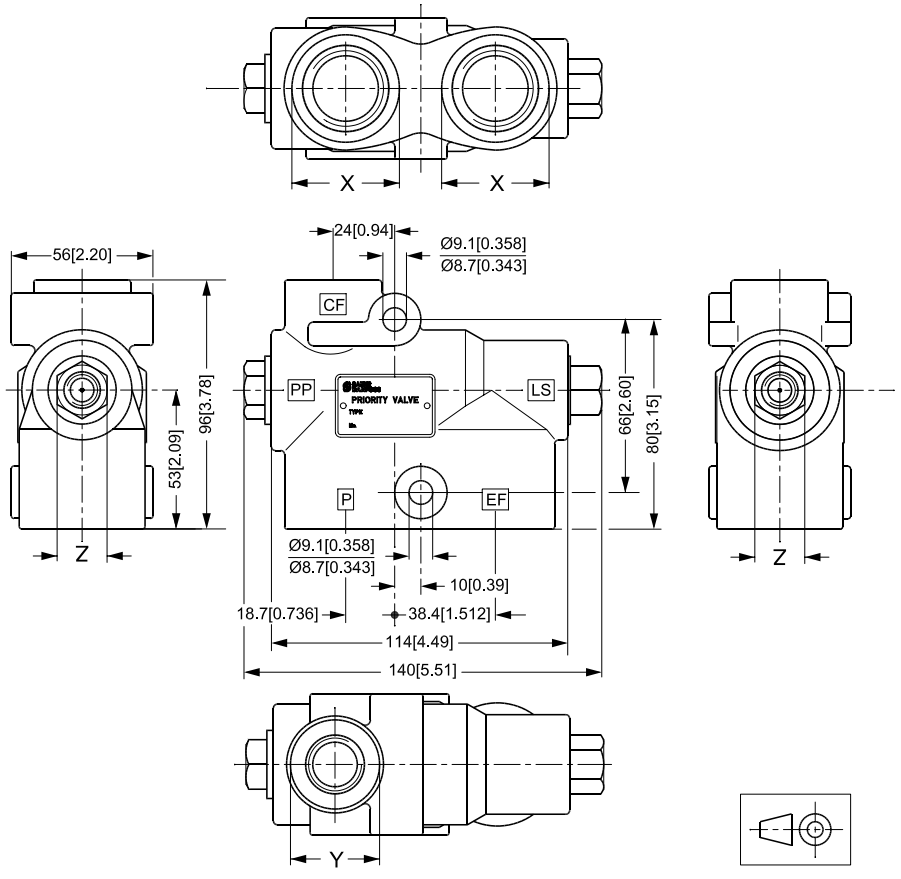
LS, PP:
- G ¼ w. spot face
  12 mm [0.47 in] deep
  z = 19 mm [0.75 in]
  0 mm deep
  or M12 x 1,5 ISO 6149
  11,5 mm [0.45 in] deep,
  z = 19 mm [0.75 in]
  0 mm deep

US version:

P, EF:
- 1 1/16 - 12 UN O-ring boss
  x = 41mm [1.61 in],
  max. 2.4 mm [0.09 in] deep

CF:
- ¾ - 16 UNF O-ring boss
  y = 30 mm [1.18 in],
  max. 2 mm [0.08 in] deep

LS, PP:
- 7/16 - 20 UNF O-ring boss
  11.5 mm [0.45 in] deep
  z = 19 mm [0.75 in] 0 mm
  deep



DIMENSIONS

OLS 160

European version:

P, EF:
- G ¾ w. spot face
  x = 42 mm [1.65 in],
  max. 2.5 mm [0.10 in] deep
  or G 1 w. spot face
  x = 47 mm [1.85 in],
  max 2.5 mm [0.10 in] deep

CF:
- G ½ w. spot face
  y = 34 mm [1.34 in],
  max. 2.5 mm [0.10 in] deep
  or G ¾ w. spot face
  y = 38 mm [1.50 in],
  max. 2.5 mm [0.10 in] deep

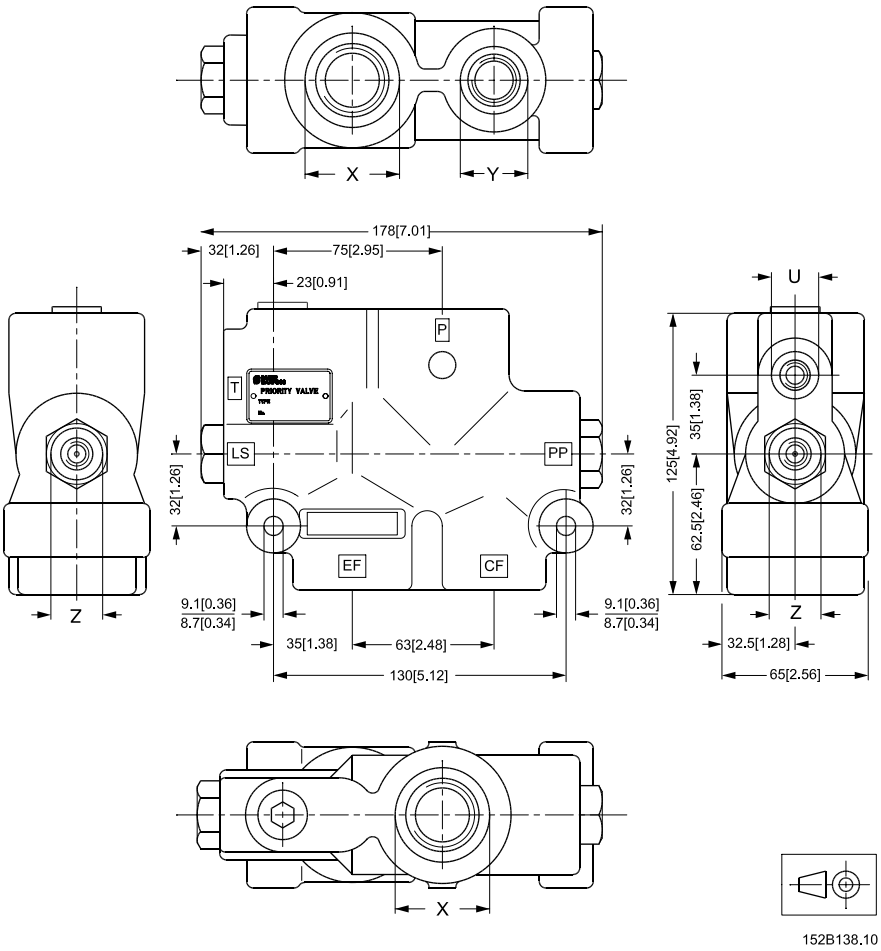
LS, PP, T:
- G ¼ w. spot face
  12 mm [0.47 in] deep
  z = 22.8 mm [0.89 in],
  max. 1 mm [0.04 in]deep
  u = 25 mm [0.98 in]
  max. 1.5 mm [0.06 in] deep

US version:

P, EF:
- 1 1/16-12 UNF O-ring boss
  x = 41 mm [1.61 in],
  max. 2.5 mm [0.10 in] deep
  or 1 5/16 - 12 UNF O-ring boss
  x = 49 mm [1.93 in],
  max. 2.5 mm [0.10 in] deep

CF:
- ¾-16 UNF O-ring boss
  y = 32 mm [1.26 in],
  max. 2.5 mm [0.10 in] deep
  7/8 - 14 UNF O-ring boss
  y = 34 mm [1.34 in],
  max. 2.5 mm [0.10 in] deep

LS, PP, T:
- 7/16 - 20 UNF O-ring boss
  11.5 mm [0.45 in] deep
  z = 22,8 mm [0.89 in],
  max. 1.5 mm [0.06 in] deep
  u = 21 mm [0.83 in],
  max. 1.6 mm [0.06 in] deep



Flow amplifiers OSQA, OSQB and OSQB/OLSQ

VERSIONS

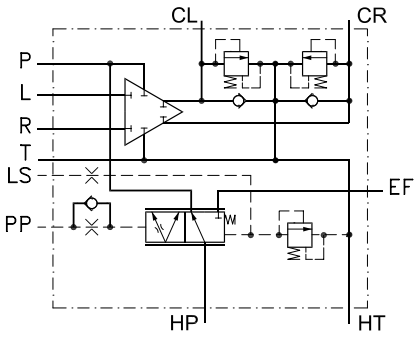
OSQA and OSQB static

Flow amplifier OSQ is used in steering systems of large vehicles and vessels that need high oil flow for their steering. A steering system of this nature consists of a steering unit and a flow amplifier.



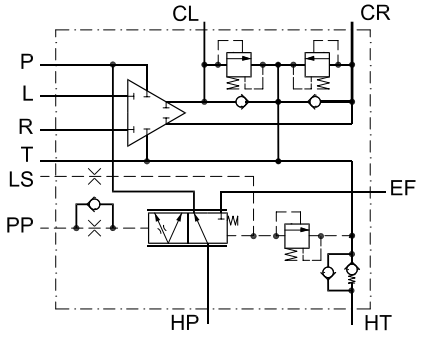
F300630

OSQA static

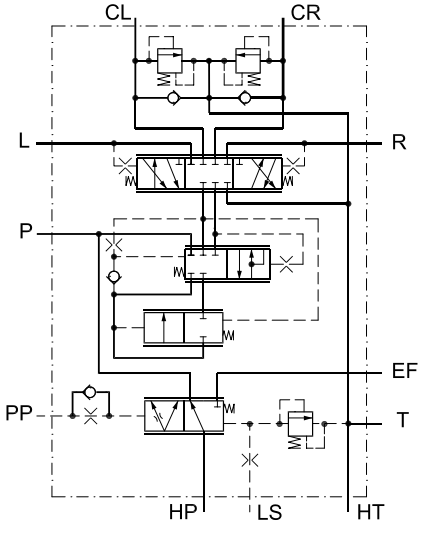


150F56.10

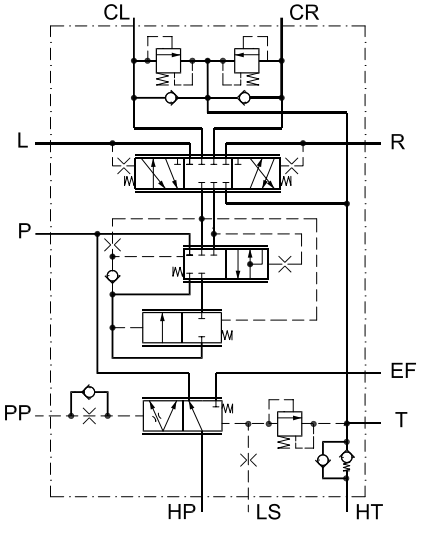
OSQB static



150F55.10



150F69.10



150F54.10

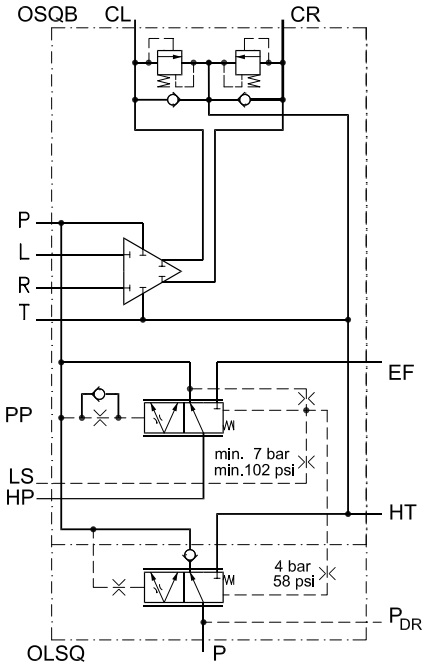
Flow amplifiers OSQA, OSQB and OSQB/OLSQ

VERSIONS

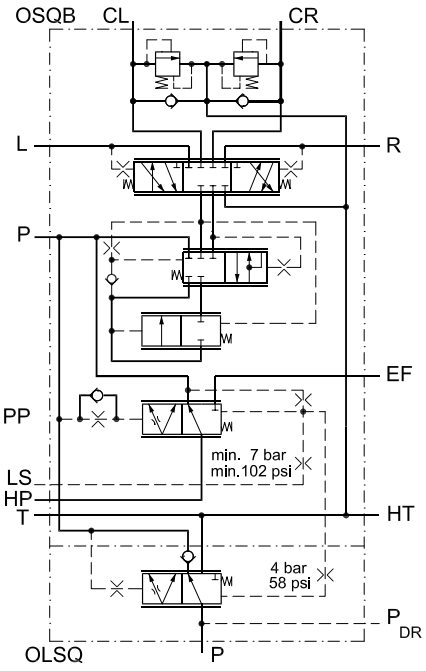
OSQB dynamic with OLSQ priority valve for emergency steering



F300646



150F74.10



150F73.10

Flow amplifiers OSQA, OSQB and OSQB/OLSQ

CODE NUMBERS AND WEIGHTS

OSQA and OSQB static flow amplifiers for load sensing static steering units

These flow amplifiers have to be used in connection with steering units type OSPBX LS or OSPLX LS.

Flow amplifier	Code Numbers Connections: see "dimensions" European version	Code Numbers Connections: see "dimensions" US version	Setting pressures Pilot pressure relief valve bar [psi]	Setting pressures Shock valves bar [psi]	Control spring pressure bar [psi]	Weight kg [lb]
OSQA 4	150F0040	150F0043	170 [2465]	230 [3335]	7 [101]	29 [64]
OSQA 5	150F0041	150F0044	170 [2465]	230 [3335]	7 [101]	29 [64]
OSQA 8	150F0042	150F0045	170 [2465]	230 [3335]	7 [101]	29 [64]
OSQB 4	150F0030	150F0053	170 [2465]	230 [3335]	7 [101]	29 [64]
OSQB 5	150F0031	150F0054	170 [2465]	230 [3335]	7 [101]	29 [64]
OSQB 8	150F0032	150F0055	170 [2465]	230 [3335]	7 [101]	29 [64]
OSQB 10	-	150F0094	170 [2465]	260 [3770]	7 [101]	29 [64]

OSQB/OLSQ dynamic flow amplifier for load sensing dynamics steering units.

OSQB with OLSQ has no pilot pressure relief valve.
This flow amplifier has to be used in connection with steering unit type OSPCX LS, which has incorporated pilot pressure relief valve

Flow amplifier	Code Numbers Connections see "dimensions" European version	Setting pressures Shockvalves bar	Setting pressures Shockvalves [psi]	Control spring pressure bar	Control spring pressure [psi]	Weight kg	Weight [lb]
OSQB 8/OLSQ	150F8010	260	[3770 psi]	7	[101.5]	32	[70.6]

If you require other amplification factors, other valve settings or other control spring pressures, please fill in the order form on page 61 and contact the Sauer-Danfoss Sales Organization.

SPECIFICATION TABLE FOR NON CATALOGUE NUMBERS OF SAUER-DANFOSS FLOW AMPLFIERS

Fill in your company data and place x's in the table where appropriate, then send to your Sauer-Danfoss Sales Organization

Your company	Name	Vehicle	Potential pcs/year	Completed by	Date

Your application	Pump flow to OSQ at idle, l/min [US gal/min]			Pump flow to OSQ at max engine speed, l/min [US gal/min]		
Flow amplifier type	OSQA		OSQB		OSQB/OLSQ	
Amplification factor	4	5	8	9.1	16.5	
Load sensing type	Static			Dynamic		
Control spring bar	7 [101]		10 [145]		16 [232]	
PP-connection	Internal			External		
Ports, OSQA	G: European version HP, EF HT, CL, CL,: G ¾ P, T, L, R: G ½ PP, LS: G ¼			UNF: US version HP, EF HT, CL, CR,: 1 $^{1}/_{16}$ - 12 UN P, T, L, R: ¾ - 16 UNF PP, LS: $^{7}/_{16}$ - 20 UNF		
Ports, OSQB	G: European version HP, EF,: 1 ¼ in SAE flange HT, CL, CR: 1 in SAE flange P, T, L, R: G ½ PP, LS: G ¼			UNF: US version HP, EF,: 1 ¼ in SAE flange HT, CL, CR: 1 in SAE flange P, T, L, R: ¾ - 16 UNF PP, LS: $^{7}/_{16}$ - 20 UNF		
Ports, OSQB/OLSQ	G: (European version) HP, EF: 1 ¼ in SAE flange HT, CL, CR: 1 in SAE flange P_{OSQ}, P_{OLSQ}, T, L, R: G ½ PP, LS: G ¼					
Pilot pressure relief valve bar [psi]	100 [1450]	120 [1740]	140 [2030]	170 [2465]	210 [3045]	No relief valve (only OSQB/OLSQ)
Shock valves, bar [psi]	165 [2393]	200 [2900]	230 [3335]		260 [3770]	270 [3916]
Back pressure valve	Yes (Only OSQB)			No		
Unit black painted	Yes			No		

An alternative way to specify a variant is to state an existing code number and add the modifications, you would like to have implemented in the basic flow amplifier.

Code number of basic flow amplifier: _____
Requested modifications:

TECHNICAL DATA

Flow and pressure

Flow amplifier	Rated flow to HP-connection		Max. pressure on connections							
			HP, EF, CL CR		CF, LS, PP		HT		T	
	l/min	[US gal/min]	bar	[psi]	bar	[psi]	bar	[psi]	bar	[psi]
OSQA	240	[63.4]	280	[4061]	210	[3045]	15	[217.5]	15	[217.5]
OSQB	400	[106]	280	[4061]	210	[3045]	10	[145]	15	[217.5]

Total displacement of stering system

Flow amplifier	Amplification factor	Steering unit						
		OSPBX/OSPCX LS				OSPLX LS		
		160	200	315	400	520	630	800
		cm³/rev [in³/rev]	cm³/rev [in³/rev]	cm³/rev [in³/rev]	cm³/rev [in³/rev]	cm³/rev [in³/rev]	cm³/rev [in³/rev]	cm³/rev [in³/rev]
OSQA 4	4	640 [39]	800 [49]	1260 [77]	1600 [98]	2080 [127]		
OSQA 5	5	800 [49]	1000 [61]	1575 [96]	2000 [122]			
OSQA 8	8	1280 [78]	1600 [98]					
OSQA 10	9.1	1456 [89]						
OSQB 4	4					2080 [127]	2520 [154]	3200 [195]
OSQB 5	5				2000 [122]	2600 [159]	3150 [192]	4000 [244]
OSQB 8	8			2520 [154]	3200 [195]	4160 [254]		
OSQB 10	9.1		1820 [111]	2865 [175]	3640 [222]			
OSQB 20	16.5	2640 [161]	3300 [201]					

Installation

The flow amplifier has to be mounted on a flat surface.

Mounting screw	Tightening torque, Nm [lbf·in]
M 10 x 1.5	30 +/-5 [265 +/- 44]
3/8 - 16 UNC	40 +/- 5 [354 +/- 44]
7/16 - 14 UNC	55 +/- 5 [487 +/- 44]

Tightening torque for fittings: Look in sub catalogue "General Steering Components" page 36.

TECHNICAL DATA

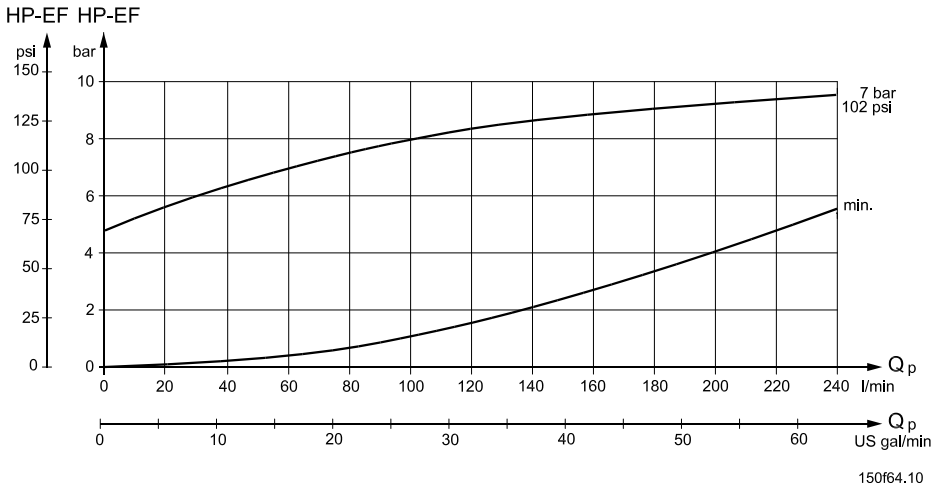
Valve functions in the flow amplifiers

The datas below come from measurements on a representative sample of flow amplifiers from production. Oil with viscosity of 21 mm^2/s [102 SUS] at 50 °C [122 °C] was used during measuring.

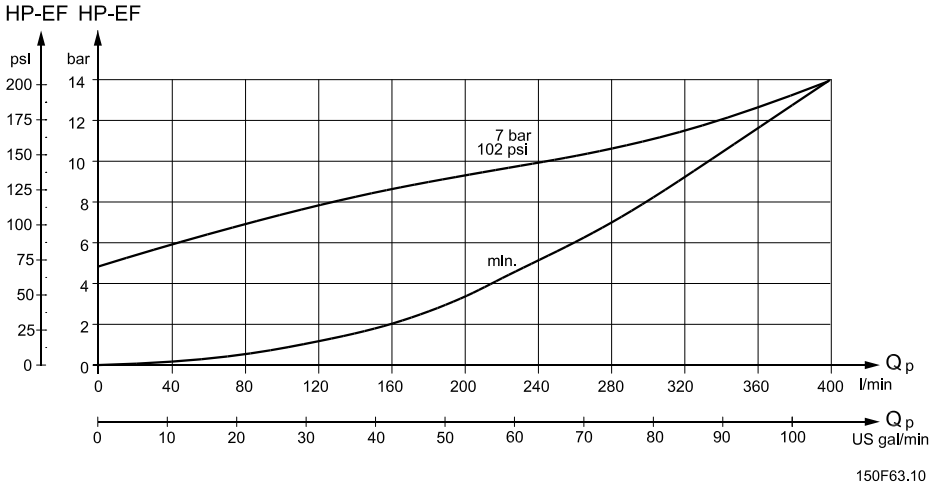
Priority valve

The priority valve is used in load sensing systems where the same pump supplies oil to both the steering system and working hydraulics. The steering system always has first priority. Measurements were made when the pressure on the LS connection is zero. (steering unit is in neutral position). The minimum curves apply when the pressure on the EF connection is higher than the actual control spring pressure. The curves for control spring pressure of 7 bar [101.5 psi] apply when the pressure on the EF connection is zero

OSQA



OSQB

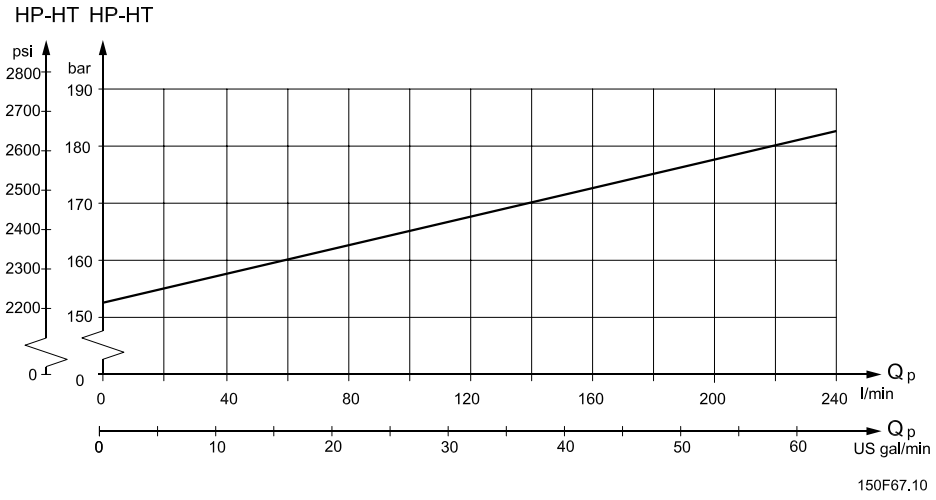


TECHNICAL DATA

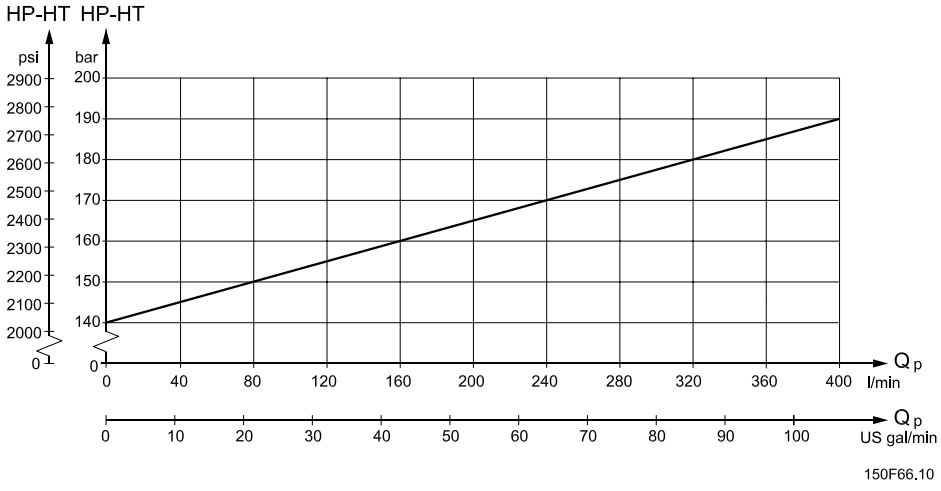
OSQ pilot pressure relief valve (HP - HT, Qp) characteristic

The pilot pressure relief valve protects the steering unit against excessive pressure. The pilot pressure relief valve together with the priority valve limit the maximum steering pressure HP-HT.
The pilot pressure relief valve in OSQA is set with an oil flow of 140 l/min [37 US gal/min] supplied to the HP connection.
The pilot pressure relief valve in OSQB is set with an oil flow of 240 l/min [63.4 US gal/min] supplied to the HP connection.
Setting tolerance: rated value +10 bar [+145 psi]. The curves below are valid for rated settings 170 bar [2466 psi].

OSQA



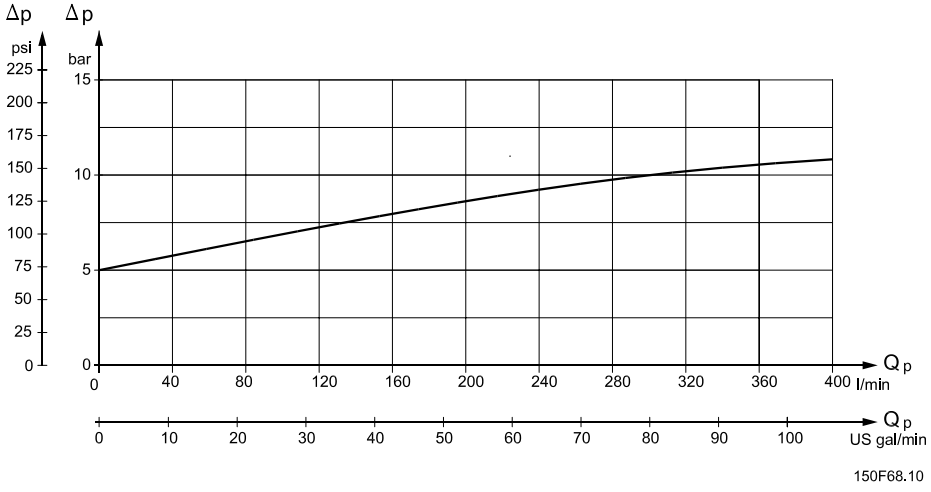
OSQB



TECHNICAL DATA

Back pressure valve

The back pressure valve in (OSQB only) increases the capacity of the suction valves. The pressure drop shown applies to the back pressure valve only.

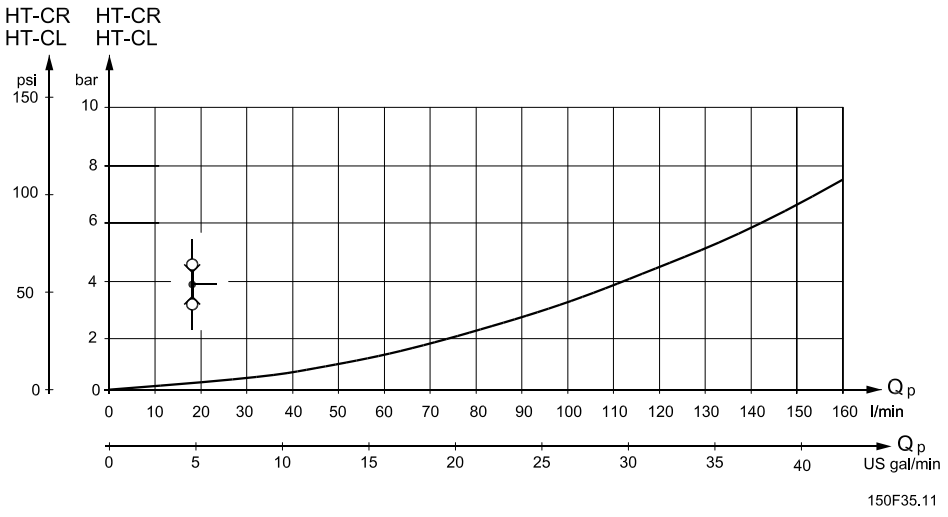


Shock valves

The shock valves protect the flow amplifier against shock from external forces on the steering cylinders. The shock valves in OSQA and OSQB limit the maximum pressure drop from CL to HT and from CR to HT. The shock valves are set at 10 l/min [2.64 US gal/min]. Setting tolerance: rated value +20 bar [290 psi].

Suction valves

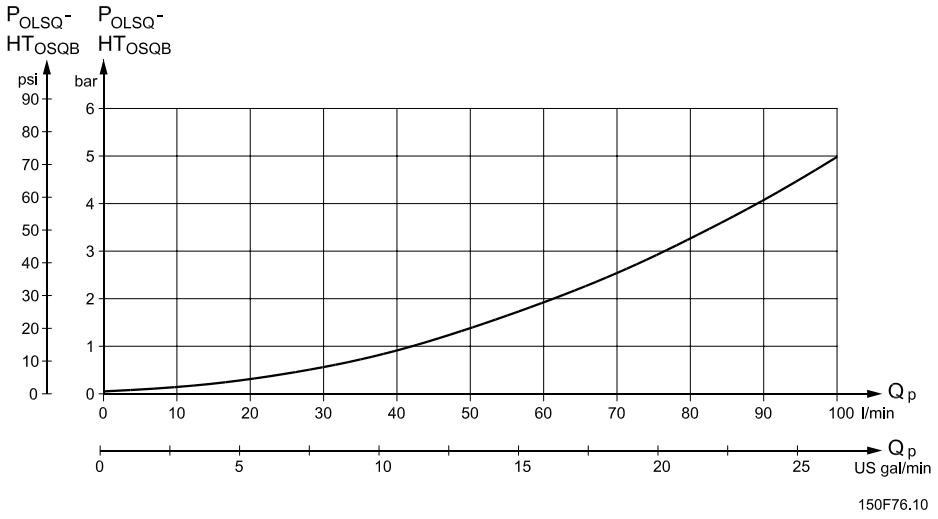
The suction valves ensure oil suction on the side of the steering cylinder pistons where in unfavorable conditions cavitation might occur. The capacity of the suction valves is increased in OSQB by the built-in back pressure valve.



TECHNICAL DATA

Priority valve OLSQ for emergency circuit in OSQB/OLSQ

When under normal steering conditions the stand-by pressure in the main circuit (minimum 7 bar [101.5 psi] priority valve spring in OSQ) overrules the spring pressure in OLSQ (4 bar [58 psi] spring), OLSQ's priority valve will pass oil from the emergency steering pump across OLSQ's P-connection to the flow amplifier's HT tank connection.
If the oil supply from the main pump should fail, the stand-by pressure of OSQ's priority valve in the main pump circuit disappears and relocates the spool in OLSQ to enable the oil from the emergency steering pump to enter the pump circuit in the OSQ.
The curve shows the pressure drop from OLSQ's P-connection to OSQ's HT-connection with an active main pump and neutral positioned steering. The curve solely applies to OSQs without any back pressure valve in the tank line.



Flow amplifiers OSQA, OSQB and OSQB/OLSQ

DIMENSIONS OSQA

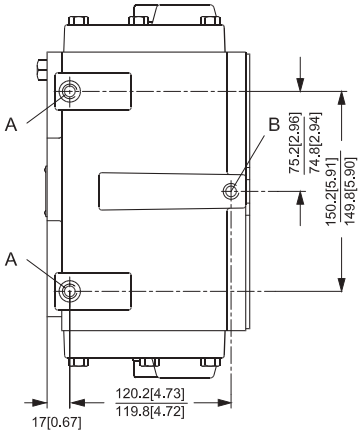
European version:
HP, EF, HT, CL, CR: G ¾
P, T, L, R: G ½
PP, LS: G ¼

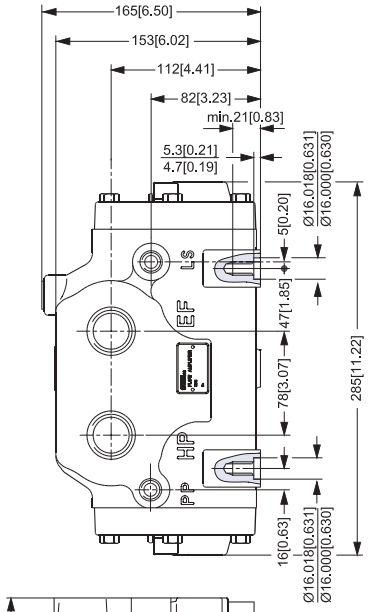
A: M10 x 1.5, 21 mm [0.83in] deep
B: M10 x 1.5, 16 mm [0.63 in] deep

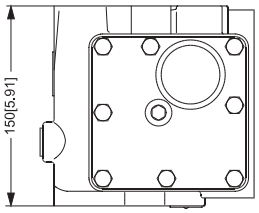
US version:
HP, EF, HT, CL, CR: 1 1/16 - 12 UN
P, T, L, R: ¾ - 16 UNF

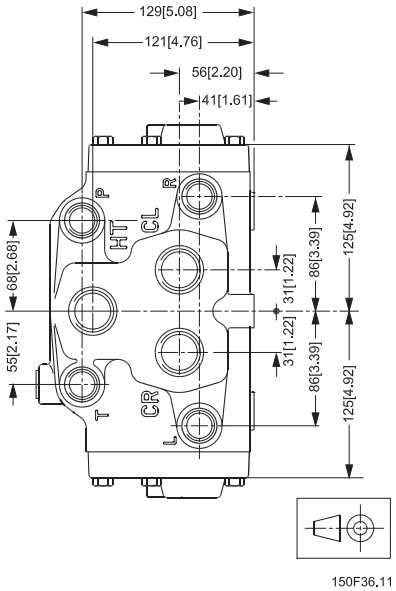
PP, LS: 7/16 - 20 UNF

A:
7/16 - 14 UNC, 21 mm [0.83 in]deep
B:
7/16 - 14 UNC, 16 mm [0.63 in] deep









150F36.11

DIMENSIONS OSQB

European version:
HP, EF:
1 ¼ in SAE flange
7/16-14 UNC
18 mm [0.71 in] deep (8)

HT, CL, CR:
1 in SAE flange
3/8 - 16 UNC
18 mm [0.71 in] deep (12)

P, T, L, R: G ½
PP, LS: G ¼

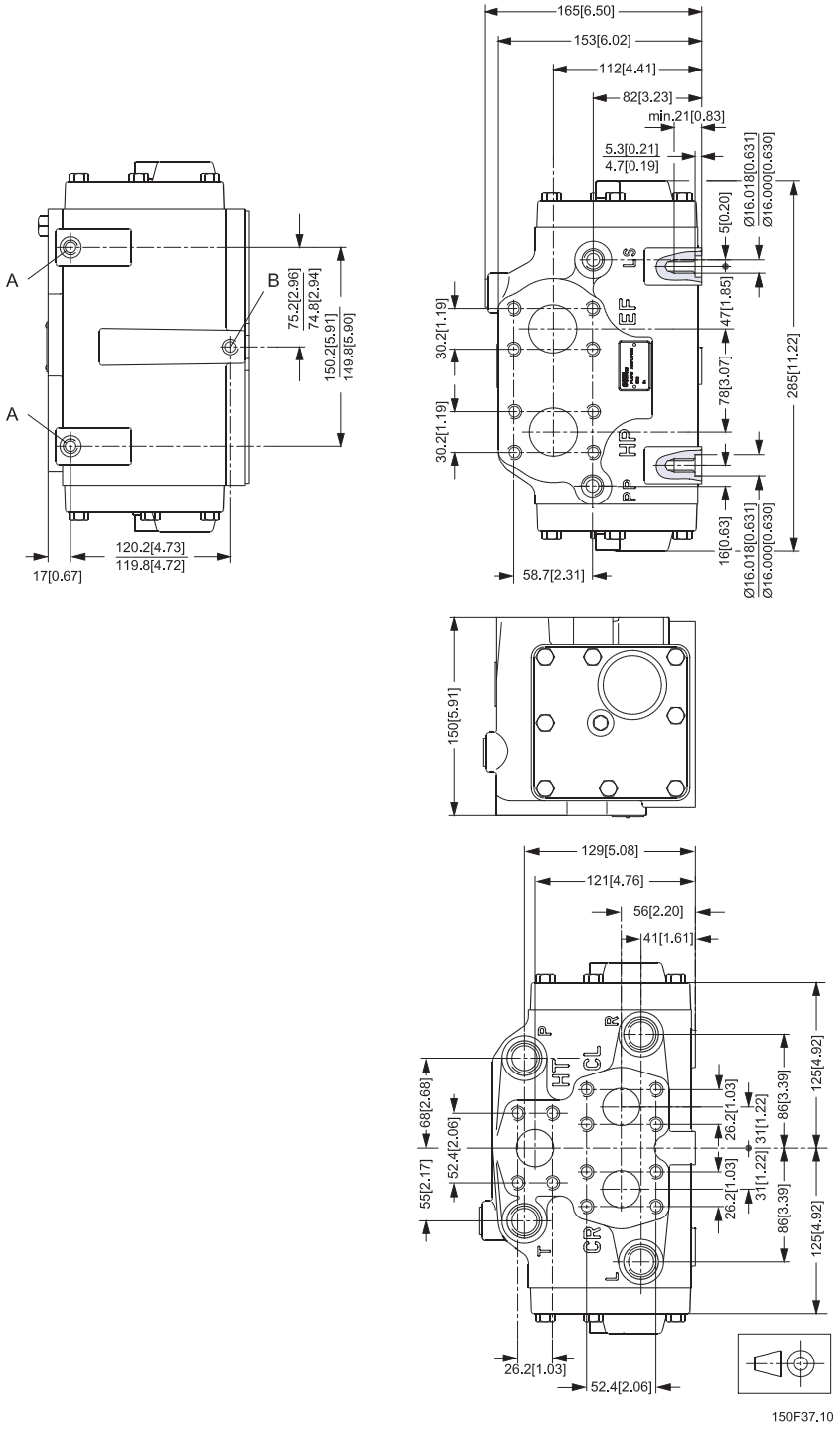
A: M10 x 1,5, 21 mm [0.83 in] deep
B: M10 x 1,5, 16 mm [0.63 in] deep

US version:
HP, EF:
1 ¼ in SAE flange
7/16 - 14 UNC
18 mm [0.71 in] deep (8)

HT, CL, CR:
1 in SAE flange
3/8 - 16 UNC
18 mm [0.71 in] deep (12)

P, T, L, R: ¾ - 16 UNF
PP, LS: 7/16 - 20 UNF

A:
7/16 - 14 UNC, 21 mm [0.83 in] deep
B:
7/16 - 14 UNC, 16 mm [0.63 in] deep



150F37.10

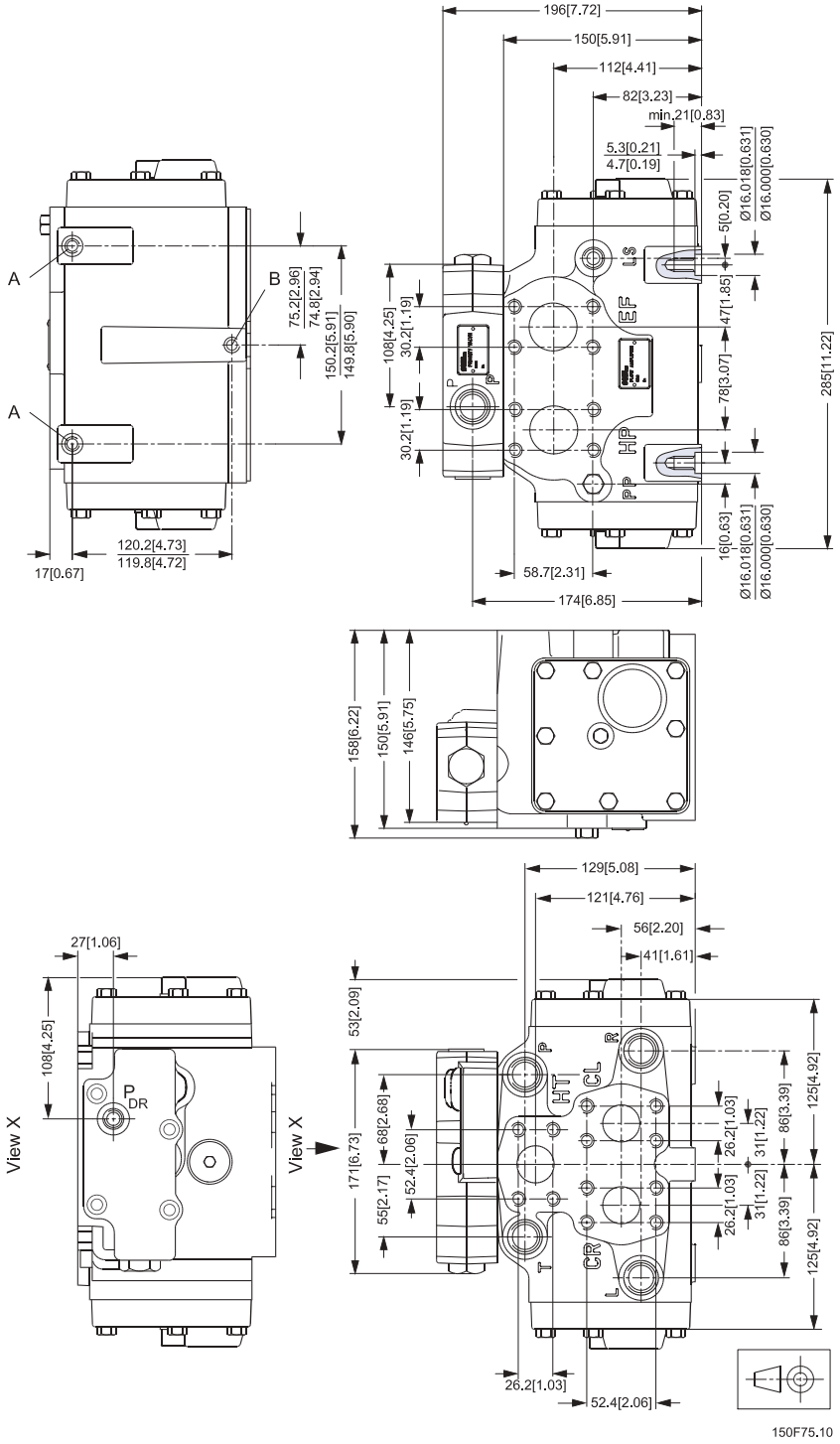
DIMENSIONS
OSQB WITH OLSQ

European version
HP, EF:
1 ¼ in SAE flange
$^{7}/_{16}$ - 14 UNC
18 mm [0.71 in] deep (8)

HT, CL, CR:
1 in SAE flange
$^{3}/_{8}$ - 16 UNC
18 mm [0.71 in] deep (12)

P_{OSQ}, P_{OLSQ}, T, L, R: G ½
PP, LS, P_{DR}: G ¼

A:
M10 x 1.5, 21 mm [0.83 in] deep
B:
M10 x 1.5, 16 mm [0.63 in] deep



NOTES

NOTES

SAUER DANFOSS

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Sauer-Danfoss (US) Company
2800 East 13th Street
Ames, IA 50010, USA
Phone: +1 515 239-6000, Fax: +1 515 239-6618

Sauer-Danfoss (Neumünster) GmbH & Co. OHG
Postfach 2460, D-24531 Neumünster
Krokamp 35, D-24539 Neumünster, Germany
Phone: +49 4321 871-0, Fax: +49 4321 871-122

Sauer-Danfoss (Nordborg) A/S
DK-6430 Nordborg, Denmark
Phone: +45 7488 4444, Fax: +45 7488 4400

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SAUER DANFOSS

OSPB, OSPC, OSPR, OSPD Open Center Steering units

OSPB Closed Center Steering units

TAD Torque amplifiers

Technical Information








Open and Closed Center Steering units, Torque amplifiers
Technical Information
A wide range of steering components

A WIDE RANGE OF STEERING COMPONENTS



F300599

Sauer-Danfoss is the largest producer in the world of steering components for hydrostatic steering systems on off-road vehicles. Sauer-Danfoss offer steering solutions both at component and system levels. Our product range makes it possible to cover applications of all types - ranging from ordinary 2-wheel steering (also known as Ackermann steering) to articulated steering, complicated 4-wheel steering, automatic steering (e.g. by sensor) and remote controlled steering via satellite.
We can offer more than 1000 different steering units, 150 different priority valves and 300 different steering columns categorised in types, variants and sizes.

For hydrostatic steering systems Sauer-Danfoss offers:

- Mini steering units with displacements from 32 to 100 cm^3/rev [1.95 to 6.10 in^3/rev], flow up to 20 l/min [5.28 US gal/min], steering pressure up to 125 bar [1813 psi]
- Steering units with displacements from 40 to 1000 cm^3/rev [2.44 to 61.0 in^3/rev], flow up to 100 l/min [26.4 US gal/min], steering pressure up to 210 bar [3045 psi]
- Priority valves for rated flows at 40, 80, 120 and 160 l/min [10.6, 21.1, 31.7 and 42.3 US gal/min], pressure up to 350 bar [5076 psi]
- Flow-amplifiers with amplification factors of 4, 5, 8, 10 or 20 for rated oil flows of 240 and 400 l/min [63.4 and 105.7 US gal/min], steering pressure up to 210 bar [3045 psi]
- Pilot operated steering valve with steering flow up to 100 l/min [26.4 US gal/min], steering pressure up to 250 bar [3625 psi] and with integrated priority valve for pump flow up to 150 l/min [39.6 US gal/min].

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A WIDE RANGE OF STEERING COMPONENTS (CONTINUED)

For electro-hydraulic steering systems Sauer-Danfoss offers:

- Pilot operated steering valve (pilot operated by hydrostatic steering unit or by electrical signal) with steering flow up to 100 l/min [26.4 US gal/min] , steering pressure up to 250 bar [3625 psi] and with integrated priority valve for pump flow up to 150 l/min [39.6 US gal/min]

For hydromechanical steering systems Sauer-Danfoss offers:

- Torque amplifiers for output torques of 80 and 120 Nm [708 and 1062 lbf·in]

For steering units and torque amplifiers Sauer-Danfoss offers:

- Steering columns: fixed, tiltable and/or telescopible with or without horn switch and sensor for start/stop of pump, with length, from 45 to 1200 mm [1.77 to 47.2 in]

Characteristic features of steering units:

- Low steering torque: From 0.5 Nm to 3 Nm [4.42 to 26.6 lbf·in] in normal steering situations
- Low noise level
- Low pressure drop
- Many types available: Open center Non reaction, Open center Reaction, Closed center Non reaction, Load Sensing, Load Sensing Reaction, Power Beyond
- One or more built-in valve functions: relief valve, shock and suction valves in L- and R-line, none return valve in P-line and in LS-line
- Optional port connections (according to ISO, SAE or DIN standards)

Characteristic features of electro-hydraulic steering system:

- High steering pressure requiring smaller cylinders and flow
- Low noise emmission in the cab because of low pilot pressure
- The possibility of emergency steering even on very heavy vehicles
- Minimization of side acceleration with articulated steering
- With microcontroller: No steering wheel drift and the possibility of variable steering ratio
- Analogue and CAN-bus interface
- Electro-hydraulic steering valve EHPS can be combined with Sauer-Danfoss PVG 32 proportional valve
- The system is approved by TÜV and have a controller with satisfy critical steering software

CONVERSION FACTORS

1 Nm = 8.851 lbf·in	1 cm^3 = 0.061 in^3
1 N = 0.225 lbf	1 litre = 0.264 US gal
1 bar = 14.50 psi	°F = 1.8 × °C + 32
1 mm = 0.0394 in	

Open and Closed Center Steering units, Torque amplifiers
Technical Information
Contents and technical literature survey

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Open and Closed Center Steering units, Torque amplifiers Technical Information

Contents and technical literature survey

SURVEY OF LITTERATURE WITH TECHNICAL DATA ON SAUER-DANFOSS STEERING COMPONENETS

Detailed data on all Sauer-Danfoss steering components and accessories can be found in our steering component catalogues, which is divided in 6 individual subcatalogues:

• General information	Steering components DKMH.PK.200.A1.02 **520L0468**
• Technical data on mini steering units and steering columns for mini steering units:	OSPM and OTPM DKMH.PN.210.PC.02 **520L0438**
• Technical data on open center and closed center steering units and on torque amplifiers:	OSPB, OSPC, OSPR, OSPD and TAD DKMH.PK.210.A1.02 **520L0502**
• Technical data on load sensing steering units, priority valves and flow-amplifiers:	OSPB, OSPC, OSPF, OSPD, OSPQ, OSPL, OSPBX, OSPCX, OSPLX, OLS and OSQ DKMH.PN.210.B1.02 **520L0520**
• Technical data on hydraulic and electro-hydraulic pilot operated steering valve, appropriate steering units and electrical actuation module as well as sensors for electro-hydraulic steering systems	EHPS and OSPCX PVE and PVED for EHPS and sensors for steering systems with EHPS DKMH.PN.270.B1.02 **520L0521**
• Technical data on valve blocks and steering columns	OVP, OVPL, OVR and OTPB DKMH.PN.230.A1.02 **520L0522**

The most important data on all Sauer-Danfoss steering components is highlighted in a general survey brochure.
For technical information on individual variants, please contact the Sauer-Danfoss Sales Organisation

NOTES

VERSIONS

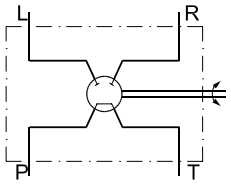
Open center
Open center steering units have open connection between pump and tank in the neutral position. In open center steering systems, pumps with fixed displacement are used.

Reaction
With reaction steering units any external forces acting on the steered wheels result in a corresponding movement of the steering wheel when the driver is not steering the vehicle.

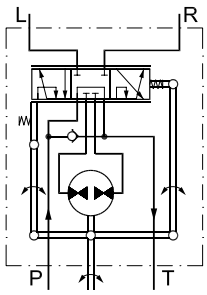
Non-reaction
With non-reaction steering units there is no corresponding movement of the steering wheel when the driver is not steering the vehicle.

OSPB: Steering unit with no valve functions

Sauer-Danfoss diagram



CETOP diagram



150-181.10



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OSPB ON
Open center Non-reaction

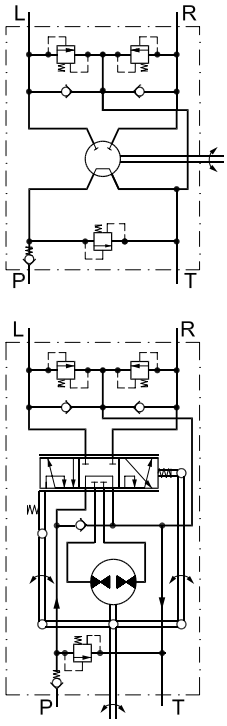
VERSIONS

OSPC: Steering unit with integrated valve functions

OSPC ON

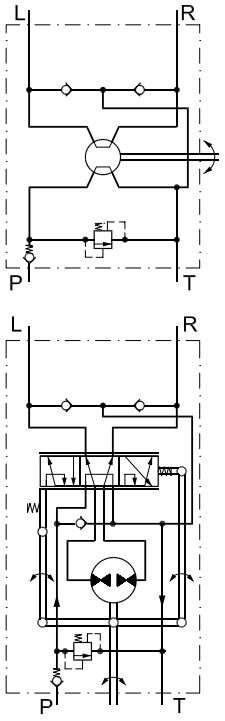


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150-370.10

OSPC ON
Open center Non-reaction



150-434.10

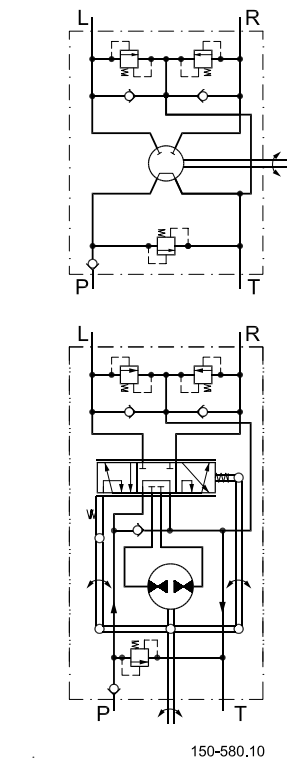
OSPC OR
Open center Reaction

VERSIONS

OSPR: Steering unit with rear ports and with integrated valve functions
The OSPR has end ports with integrated fittings and is designed specially for applications where pipes and/or hoses must run parallel with the steering column, and where space is limited.



F300621



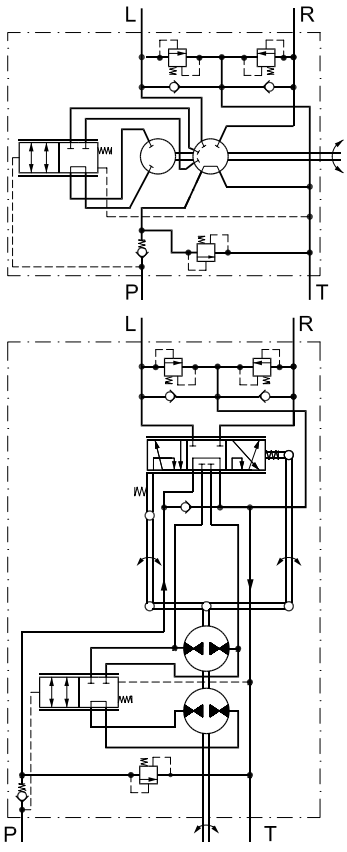
150-580.10

OSPR ON
Open center Non-reaction

OSPD: Steering unit with 2 rotary meters and with integrated valve functions
The OSPD has 2 rotary meters (gear wheel sets). In the case of no pump supply only one rotary meter is active for emergency steering. In normal steering situations both rotary meters are active.



F300613



150-581.10

OSPD ON
Open center Non-reaction

CODE NUMBERS AND WEIGHTS

OSPB OPEN CENTER NON-REACTION STEERING UNITS

OSPB has no valve functions.

Steering unit	Code Numbers		Pump flow range	Weight
	Connections			
	European version	US version		
	G 1/2	3/4-16UNF O*	l/min [US gal/min]	kg [lb]
OSPB 50 ON	150N0039	150N0025	5-18 [1.32-4.76]	5.2 [11.46]
OSPB 80 ON	150N0040	150N0026	10-30 [2.64-7.93]	5.3 [11.68]
OSPB 100 ON	150N0041	150N0027		5.4 [11.90]
OSPB 125 ON	150N0042	150N0024	20-50 [5.28-13.21]	5.5 [12.13]
OSPB 160 ON	150N0043	150N0028		5.6 [12.35]
OSPB 200 ON	150N0044	150N0023		5.8 [12.79]
OSPB 250 ON	150N0052	150N0022		6.0 [13.23]
OSPB 315 ON	150N0045	150N0030	20-70 [5.28-18.49]	6.2 [13.67]
OSPB 400 ON	150N0046	150N0031		7.0 [15.43]
OSPB 500 ON	150N0047	150N0032		7.6 [16.76]

O*: O-ring chamfer on port connections
Valve blocks OVP and OVR can be mounted on the all the OSPB steering units from the above table.

CODE NUMBERS AND WEIGHTS

OSPC OPEN CENTER NON-REACTION STEERING UNITS

OSPC ON in the table below have all the following valve functions incorporated:

- check valve in P-port
- relief valve
- shock valves
- suction valves

Steering unit	Code Numbers		Pump flow range	Valve settings		Weight
	Connections			Relief valve	Shock valve	
	European version	US version				
	G 1/2 S**	3/4-16 UNF O*	l/min [US gal/min]	bar [psi]	bar [psi]	kg [lb]
OSPC 40 ON	150N2148	–	5-18 [1.32-4.76]	140 [2030]	200 [2900]	5.2 [11.46]
OSPC 50 ON	150N2149	150N2136				5.2 [11.46]
OSPC 80 ON	150N2150	150N2137	10-30 [2.64-7.93]	170 [2465]	225 [3263]	5.3 [11.68]
OSPC 100 ON	150N2151	150N2138				5.4 [11.90]
OSPC 125 ON	150N2152	150N2139	20-50 [5.28-13.21]			5.5 [12.13]
OSPC 160 ON	150N2153	150N2140				5.6 [12.35]
OSPC 200 ON	150N2154	150N2141				5.8 [12.79]
OSPC 250 ON	150N2155	150N2168				6.0 [13.23]
OSPC 315 ON	150N2156	150N2142	20-70 [5.28-18.49]			6.2 [13.67]
OSPC 400 ON	150N2157	–				7.0 [15.43]
OSPC 500 ON	150N2158	–				7.6 [16.78]

O*: O-ring chamfer on port connections
S**: Spot-face around port connections (can not be used in connection with OVR angular block).

If you wish other port connection displacements, combination of displacement and pump flow range, valve combinations and/or other valve settings, please fill in the order form on page 14 and contact the Sauer-Danfoss Sales Organisation.

CODE NUMBERS AND WEIGHTS

OSPC OPEN CENTER REACTION STEERING UNITS

OSPC OR in the table below have all the following valve functions incorporated:

- check valve in P-port
- relief valve
- suction valves

Steering unit	Code Numbers Connections European version G 1/2	Pump flow range l/min [US gal/min]	Valve settings Relief valve bar [psi]	Weight kg [lb]
OSPC 80 OR	150N2159	10-30 [2.64-7.93]	170 [2465]	5.3 [11.68]
OSPC 200 OR	150N2160	20-50 [5.28-13.21]		5.8 [12.79]

If you wish other displacements, port connections, pump flow range, valve combinations and/or other valve settings, please fill in the order form on page 14 and contact the Sauer-Danfoss Sales Organisation.

OSPR OPEN CENTER NON-REACTION STEERING UNITS

OSPR ON in the table below has the following valve functions incorporated:

- check valve in P-port
- relief valve
- shock valves
- suction valves

All OSPR steering units are painted black

Steering unit	Code Numbers Connections European version ORFS 11/16-16 UN 9/16-18 UNF	Pump flow range l/min [US gal/min]	Valve settings Relief valve bar [psi]	 Shock valve bar [psi]	Weight kg [lb]
OSPR 125 ON	150N6001	10-30 [2.64-7.93]	170 [2465]	225 [3263]	4.9 [10.80]

If you wish other displacements, reaction type, pump flow range and/or other valve settings, please fill in the order form on page 14 and contact the Sauer-Danfoss Sales Organisation.

CODE NUMBERS AND WEIGHTS

OSPD OPEN CENTER NON-REACTION STEERING UNITS

OSPD ON in the table below has the following valve functions incorporated:

- check valve in P-port
- relief valve
- shock valves
- suction valves

Steering unit	Code Numbers Connections European version G1/2 S**	Pump flow range l/min [US gal/min]	Valve settings Relief valve bar [psi]	 Shock valve bar [psi]	Weight kg [lb]
OSPD 70/195 ON	150G4051	20-50 [5.28-13.21]	170 [2465]	225 [3263]	7.6 [16.76]

S**: Spot-face around port connections (can not be used in connection with OVR angular block)

If you wish other displacements, reaction type, pump flow range and/or other valve settings, please fill in the order form on page 14 and contact the Sauer-Danfoss Sales Organisation.

SPECIFICATION TABLE FOR NON CATALOGUE NUMBERS

Specification table for Sauer-Danfoss open center steering units type OSPC, OSPR and OSPD which are not available in the code number tables.
Fill in your company data and place x's in the table where appropriate then send to your Sauer-Danfoss Sales Organisation.

Your company	Name	Vehicle	Potential pcs/year	Completed by	Date

Steering unit type	OSPC						OSPR						OSPD			
Reaction type	ON (Open center Non-reaction)								OR (Open center Reaction)							
DP, cm³/rev OSPC ON	40	50	60	70	80	100	125	160	185	200	230	250	315	400	500	
DP, cm³/rev OSPC OR	40		50		60		70		80		100		125		160	
DP, cm³/rev OSPR ON/OR	70				80				125				200			
DP, cm³/rev OSPD ON	60/185	60/220	60/260	70/195	70/230	70/270	100/260	100/300	125/285	125/325	125/440					
DP, cm³/rev OSPD OR	60/185			60/220			70/195			70/230						
Pump flow range l/min	5-18			10-30			20-50			20-70						
Port threads OSPC***	G1/2			G1/2 - S**			M18 × 1.5 - O* S**			M22 × 1.5/M18 × 1.5 - S**			3/4-16UNF - O*			
Relief valve**** bar	70	80	90	100	110	120	140	170	190	200	210	no relief valve				
Shock valves bar	150	180	200	225	240	no shock valves										
Suction valves	Yes								No							
Neutral setting springs	Soft: 0.5 - 1.8 Nm in normal steering situations					Standard: 0.8 - 3 Nm in normal steering situations						Strong: 1.5 - 4 Nm in normal steering situations				
Unit black painted	Yes								No							

DP: Displacement
O*: O-ring chamfer on port connections
S**: Spot-face around port connections (can not be used in connection with OVR angular block)
OSPC***: The different port connections are only available for OSPC ON/OR, see also the form on page 13.
Relief valve****: see form on page 16 for limitations in maximum pressure depending on displacement and limitations for OSPR.

All OSPC, OSPR and OSPD steering units specified by code numbers in this catalogue have check valve in P-connection.
All steering units specified by code numbers in this catalogue have standard neutral setting springs.

An alternative way to specify a variant is to state an existing code number and add the modifications, you would like to have implemented in the basic steering unit.
Code number of basic steering unit: _____
Requested modifications: _____
_____

PORT THREAD VERSIONS AND VALVE COMBINATIONS

The following combinations of port threads and valves are available for OSPC ON/OR:

Threads		Valves		
Ports	**For steering column**	**Relief valve**	**Shock valves**	**Suction valves**
DIN 3852-2 G 1/2	M10×1.5	Yes	Yes	Yes
		Yes	Yes	No
		Yes	No	Yes
		Yes	No	No
DIN 3852-2 G 1/2 w. spot-face	M10×1.5	Yes	Yes	Yes
		Yes	Yes	No
		No	Yes	Yes
ISO 6149-1 M18×1.5, w. O-ring chamfer and spot-face	M10×1.5	Yes	Yes	Yes
		Yes	Yes	No
		Yes	No	Yes
		Yes	No	No
DIN 3852-1 P and T: M22×1.5, L and R: M18×1.5 w. spot-face	M10×1.5	Yes	Yes	Yes
		Yes	No	Yes
		Yes	No	No
ISO 11926-1 3/4-16 NF, O-ring boss port	3/8-16 UNC	Yes	Yes	Yes
		Yes	Yes	No
		Yes	No	Yes
		Yes	No	No
		No	Yes	Yes
ISO 11926-1 3/4-16 NF, O-ring boss port	M10×1.5	Yes	Yes	Yes
		Yes	Yes	No
		Yes	No	Yes

Housings with around port connections can not be used in connection with OVR angular block.
Shock valves are not needed for reaction type steering units.
For OSPR ON/OR and OSPD ON/OR only the versions listed in the tables with code numbers are available.

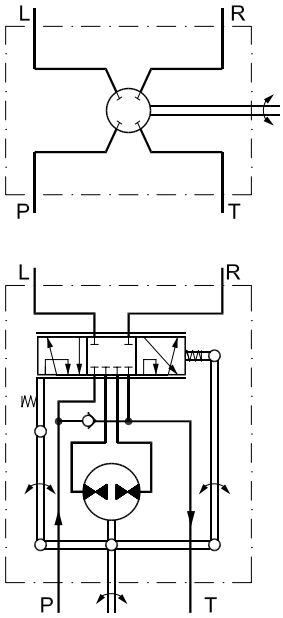
STEERING UNITS, OSPB CLOSED CENTER

VERSION

Closed center
Closed center steering units are blocked on their P port in the neutral position. In closed center steering systems, variable oil flow is required.

Non-reaction
With non-reaction steering units there is no corresponding movement of the steering wheel when the driver is not steering the vehicle





OSPB CN
Closed center Non-reaction

CODE NUMBERS AND WEIGHTS

OSPB CLOSED CENTER NON-REACTION STEERING UNITS

OSPB has no valve functions.

Steering unit	Code Numbers Connections US version ¾-16UNF O*	Weight kg [lb]
OSPB 50 CN	150-0125	5.2 [11.46]
OSPB 80 CN	150-0126	5.3 [11.68]
OSPB 100 CN	150-0127	5.4 [11.90]
OSPB 125 CN	150-0129	5.5 [12.13]
OSPB 160 CN	150-0128	5.6 [12.35]
OSPB 200 CN	150-0146	5.8 [12.79]
OSPB 315 CN	150G4104	6.2 [13.23]
OSPB 400 CN	150G4105	7.0 [15.43]

O*: O-ring chamfer on port connections

Valve blocks OVP and OVR can be mounted on the all the OSPB steering units from the above table

Steering units Open Center and Closed Center

TECHNICAL DATA

Common data:
Look in sub catalogue:"General, steering components "

DISPLACEMENT, FLOW AND PRESSURE

Steering unit	Displacement cm³/rev [in³/rev]	Recommended* oil flow l/min [US gal/min]	Max. pressure on connections P bar [psi]	T bar [psi]	L, R bar [psi]
OSPC 40 ON	40 [2.44]	4-18 [1.05-4.76]	140 [2030]	40 [580]	280 [4061]
OSPB/OSPC 50 ON	50 [3.05]	5-18 [1.32-4.76]			
OSPC 60 ON	60 [3.66]	6-18 [1.59-4.76]			
OSPC 70 ON	70 [4.27]	7-18 [1.85-4.76]	175 [2538]		
OSPB/OSPC 80 ON	80 [4.88]	8-30 [2.11-7.93]			
OSPB/OSPC 100 ON	100 [6.10]	10-30 [2.64-7.93]			
OSPB/OSPC 125 ON	125 [7.63]	13-50 [3.43-13.21]	210 [3045]		
OSPB/OSPC 160 ON	160 [9.76]	16-50 [4.23-13.21]			
OSPB/OSPC 185 ON	185 [11.29]	19-50 [5.02-13.21]			
OSPB/OSPC 200 ON	200 [12.20]	20-50 [4.23-13.21]			
OSPB/OSPC 230 ON	230 [14.04]	23-50 [6.08-13.21]			
OSPB/OSPC 250 ON	250 [15.26]	25-50 [6.60-13.21]			
OSPB/OSPC 315 ON	315 [19.22]	32-70 [8.45-18.49]			
OSPB/OSPC 400 ON	400 [24.41]	40-70 [10.57-18.49]			
OSPB/OSPC 500 ON	500 [30.51]	50-70 [13.21-18.49]			
OSPC 40 OR	40 [2.44]	4-18 [1.05-4.76]	140 [2030]	40 [580]	280 [4061]
OSPC 50 OR	50 [3.05]	5-18 [1.32-4.76]			
OSPC 60 OR	60 [3.66]	6-18 [1.59-4.76]			
OSPC 70 OR	70 [4.27]	7-18 [1.85-4.76]	175 [2538]		
OSPC 80 OR	80 [4.88]	8-30 [2.11-7.93]			
OSPC 100 OR	100 [6.10]	10-30 [2.64-7.93]			
OSPC 125 OR	125 [7.63]	13-50 [3.43-13.21]	210 [3045]		
OSPC 160 OR	160 [9.76]	16-50 [4.23-13.21]			
OSPC 185 OR	185 [11.29]	19-50 [5.02-13.21]			
OSPC 200 OR	200 [12.20]	20-50 [4.23-13.21]			
OSPR 70 ON	70 [4.27]	7-18 [1.85-4.76]	175 [2538]	20 [5]	240 [3480]
OSPR 80 ON	80 [4.88]	8-30 [2.11-7.93]			
OSPR 125 ON	125 [7.63]	13-30 [3.43-7.93]			
OSPR 200 ON	200 [12.20]	20-30 [4.23-7.93]			
OSPR 70 OR	70 [4.27]	7-18 [1.85-4.76]	175 [2538]	20 [5]	240 [3480]
OSPR 80 OR	80 [4.88]	8-30 [2.11-7.93]			
OSPR 125 OR	125 [7.63]	13-30 [3.43-7.93]			
OSPR 200 OR	200 [12.20]	20-30 [4.23-7.93]			
OSPB 50 CN	50 [3.05]	5 [1.32]	140 [2030]	40 [580]	280 [4061]
OSPB 80 CN	80 [4.88]	8 [2.11]	175 [2538]		
OSPB 100 CN	100 [6.10]	10 [2.64]			
OSPB 125 CN	125 [7.63]	13 [3.43]			
OSPB 160 CN	160 [9.76]	16 [4.23]			
OSPB 200 CN	200 [12.20]	20 [5.28]			
OSPB 315 CN	315 [19.22]	32 [8.45]			
OSPB 400 CN	400 [24.41]	40 [10.57]			

* Criteria for determining the recommended oil flow:
- As a minimum the oil flow it takes to ensure sufficient steering speed at engine idle speed
- Ensures the least possible pressure loss at full speed

TECHNICAL DATA

Common data:
Look in sub catalogue: "General, steering components"

DISPLACEMENT, FLOW AND PRESSURE

Steering unit	Displacement manual steer mode cm³/rev [in³/rev]	Displacement normal steer mode cm³/rev [in³/rev]	Recommended* oil flow l/min [US gal/min]	Max. pressure on connections P bar [psi]	T bar [psi]	L, R bar [psi]
OSPD 60/185 ON	60 [3.66]	185 [11.29]	20-50 [5.28-13.21]			
OSPD 60/220 ON	60 [3.66	220 [13.43]	22-50 [5.81-13.21]			
OSPD 60/260 ON	60 [3.66]	260 [15.87]	26-50 [6.87-13.21]			
OSPD 70/195 ON	70 [4.27]	195 [11.90]	20-50 [5.28-13.21]			
OSPD 70/230 ON	70 [4.27]	230 [14.04]	23-50 [6.08-13.21]	210 [3045]	40 [580]	280 [4060]
OSPD 100/260 ON	100 [6.10]	260 [15.87]	26-50 [6.87-13.21]			
OSPD 100/300 ON	100 [6.10]	300 [18.31]	30-50 [7.93-13.21]			
OSPD 125/285 ON	125 [7.63]	285 [17.39]	30-50 [7.93-13.21]			
OSPD 125/325 ON	125 [7.63]	325 [19.83]	33-70 [8.72-18.49]			
OSPD 125/440 ON	125 [7.63]	440 [26.85]	44-70 [11.62-18.49]			
OSPD 60/185 OR	60 [3.66]	185 [11.29]	20-50 [5.28-13.21]			
OSPD 60/220 OR	60 [3.66]	220 [13.43]	22-50 [5.81-13.21]			
OSPD 70/195 OR	70 [4.27]	195 [11.90]	20-50 [5.28-13.21]	210 [3045]	40 [580]	280 [4060]
OSPD 70/230 ON	70 [4.27]	230 [14.04]	23-50 [6.08-13-21]			

* Criteria for determining the recommended oil flow:
- As a minimum the oil flow it takes to ensure sufficient steering speed at idle engine speed
- Ensures the least possible pressure loss at full speed

Please contact the Sauer-Danfoss Sales Organisation regarding steering units with code numbers not mentioned in this catalogue. They may have different technical data.

TECHNICAL DATA

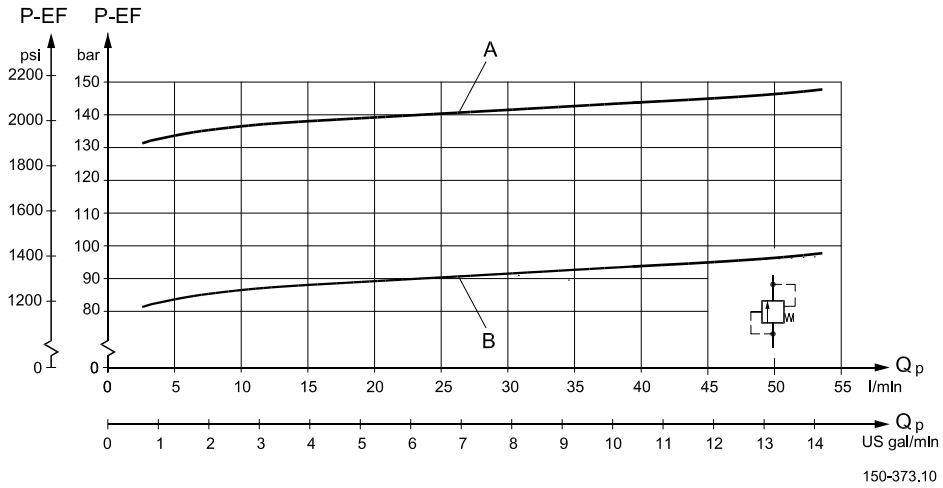
VALVE FUNCTIONS IN OSPC, OSPR AND OSPD STEERING UNITS

The data below comes from measurements on a representative sample of steering units from production. Oil with a viscosity of 21 mm²/s [100 SUS] at 50°C [122°F] was used during measuring.

PRESSURE RELIEF VALVE

The pressure relief valve protects pump and steering unit against excessive pressure and limits the system pressure while steering. The pressure relief valve is set at 25 l/min [6.60 US gal/min] flow.

Setting tolerances:
170 bar [2466 psi]: rated value +5 bar [+73 psi]
> 170 bar [2466 psi]: rated value +10 bar [+145 psi]



A = 140 $^{+5}$ bar [2030 $^{+73}$ psi]
B = 90 $^{+5}$ bar [1305 $^{+73}$ psi]
Q = 25 l/min [6.60 US gal/min]

SHOCK VALVES

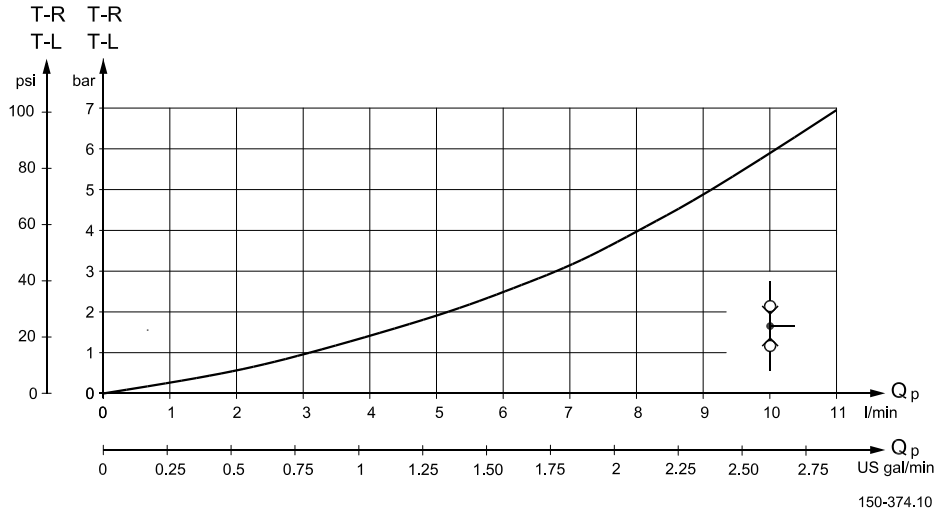
The shock valves protect the steering unit and limit maximum external forces on the steering cylinder. The shock valves in the steering unit limit the maximum pressure drop from L to T and from R to T. The shock valves are set at 1 l/min [0.26 US gal/min].
The shock valves are of the direct acting type, so they react very quickly.
Settings: rated value +20 bar [290 psi], ex: 200 +20 bar [2900 +290 psi].

TECHNICAL DATA

VALVE FUNCTIONS IN OSPC, OSPR AND OSPD STEERING UNITS

SUCTION VALVES

The suction valves ensure oil suction to avoid cavitation in the steering cylinder. To provide correct suction, a back pressure valve must be fitted in the tank line from the steering unit.
Generally we recommended a back pressure of 2 bar [29 psi], but on vehicles with strong selfstraightening tendencies, we recommend 5-10 bar [72-145 psi].
For further advice, please contact the Sauer-Danfoss Sales Organisation.
Note: A connection which incorporates a check valve must be established to allow oil flow to by-pass the back pressure valve (and filter) from the tank to steering unit.



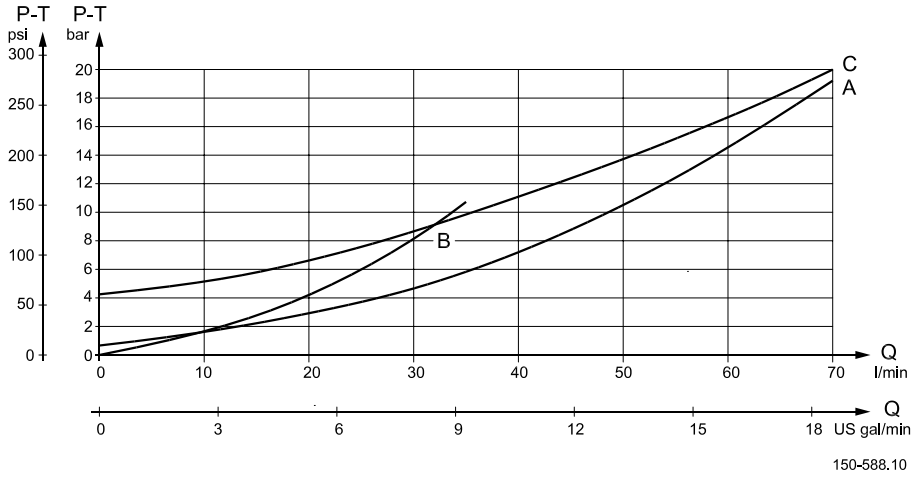
CHECK VALVE

The check valve protects the driver against steering wheel jerks. The check valve prevents oil from flowing backwards into the pump line when steering against a high pressure on the cylinder side. The check valve is built into the steering unit P connection. The pressure drop across the check valve depends on the use of port adoptors with 11 mm [0.43 in] minimum bore and is indicated on the graph.

TECHNICAL DATA

PRESSURE DROP IN NEUTRAL

The pressure drop is measured on Open Center steering units, and with the steering unit in neutral position.
The pressure drop is measured from P to T.
The values are valid at an oil temperature of 50°C (122°F) and a viscosity of 21 mm^2/s (100 SUS).

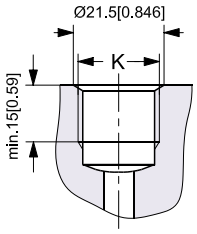


A: OSPB ON and OSPC ON/OR
B: OSPR ON/OR
C: OSPD ON/OR

The pressure drop curves are solely valid for selected spool sets within the recommended flow range.
E.g. OSPC 50 ON with a spool set for 5-18 l/min [1.32-4.76 US gal/min], pressure drop curve A solely applies within the interval from 0-18 l/min [0-4.76 US gal/min]. A higher flow supply to the steering unit (e.g. 30 l/min [7.93 US gal/min]) will make the pressure drop exceed the value, which curve A shows at 30 l/min [7.93 US gal/min].

PORT THREAD VERSIONS

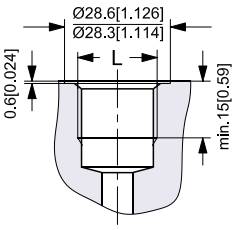
A



A: G main ports

K: DIN 3852-2 - G½

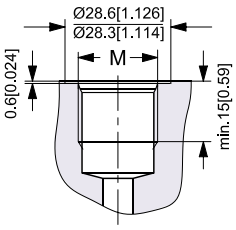
B



B: G main ports w.spot-face

L: DIN 3852-2 - G½

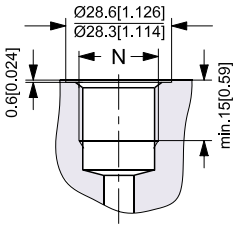
C



C: Metric main ports w.spot-face and O-ring chamfer

M: ISO 6149-1 – M18×1.5

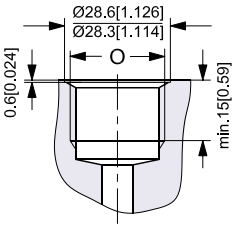
D



D: Metric main ports w. spot-face

N: DIN 3852-1 – M18×1.5

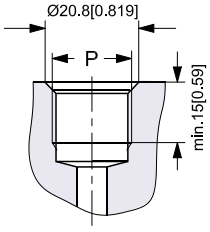
E



E: Metric main ports w. spot-face

O: DIN 3852-1 – M22×1.5

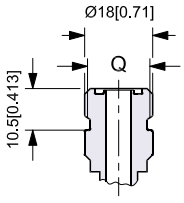
F



F: UNF main ports w. O-ring chamfer

P: ISO 11926-1 – ¾-16UNF O-ring boss port

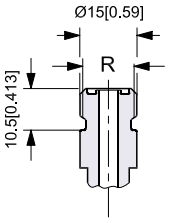
G



G: ORFS main ports: O-ring face seal

Q: ISO 8434-3 - $^{11}/_{16}$-16 UN

H



H: ORFS main ports: O-ring face seal

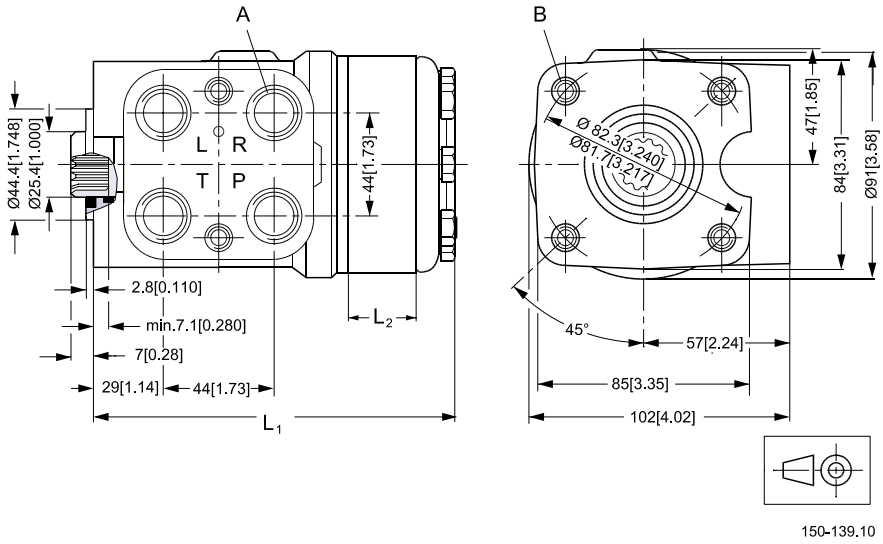
R: ISO 8434-3 – $^{9}/_{16}$-18 UNF

150-582.10

DIMENSIONS

OSPB ON and OSPB CN

Type	L_1 mm [in]	L_2 mm [in]
OSPB 50	126 [4.96]	6.5 [0.26]
OSPB 80	129 [5.08]	10.4 [0.41]
OSPB 100	132 [5.20]	13.0 [0.51]
OSPB 125	135 [5.31]	16.2 [0.64]
OSPB 160	140 [5.51]	20.8 [0.82]
OSPB 200	145 [5.71]	26.0 [1.02]
OSPB 250	151 [5.94]	32.5 [1.28]
OSPB 315	160 [6.30]	40.9 [1.61]
OSPB 400	171 [6.73]	52.0 [2.05]
OSPB 500	184 [7.24]	65.0 [2.56]



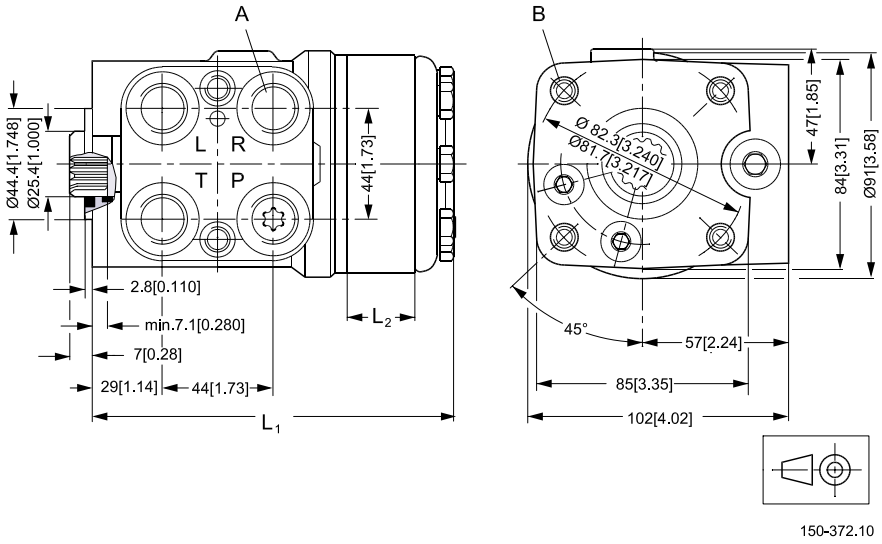
European version:
A: G ½; 15 mm [0.59 in] deep
B: M10 × 1.5,
16 mm [0.63 in] deep

US version:
A: ¾ - 16 UNF O-ring boss;
15 mm [0.59 in] deep
B: ⅜ - 16 UNC,
16 mm [0.63 in] deep

DIMENSIONS

OSPC ON and OSPC OR

Type	L_1 mm [in]	L_2 mm [in]
OSPC 40	126 [4.96]	6.5 [0.26]
OSPC 50	126 [4.96]	6.5 [0.26]
OSPC 60	128 [5.04]	9.1 [0.36]
OSPC 70	128 [5.04]	9.1 [0.36]
OSPC 80	129 [5.08]	10.4 [0.41]
OSPC 100	132 [5.20]	13.0 [0.51]
OSPC 125	135 [5.31]	16.2 [0.64]
OSPC 160	140 [5.51]	20.8 [0.82]
OSPC 185	143 [5.63]	24.0 [0.94]
OSPC 200	145 [5.71]	26.0 [1.02]
OSPC 230	149 [5.87]	29.9 [1.18]
OSPC 250	151 [5.94]	32.5 [1.28]
OSPC 315	160 [6.30]	40.9 [1.61]
OSPC 400	171 [6.73]	52.0 [2.05]
OSPC 500	184 [7.24]	65.0 [2.56]

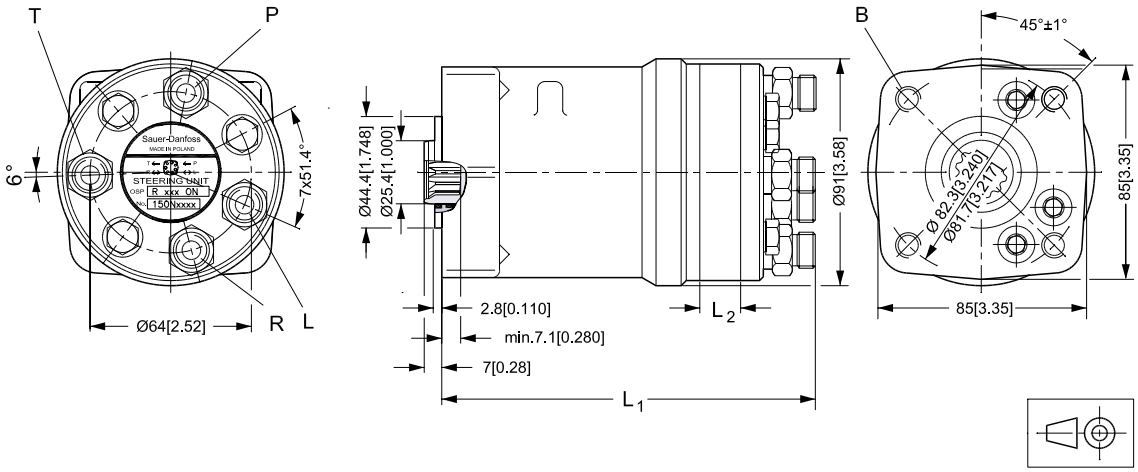


European version:
A: G ½ w. spot-face
or M18 × 1.5 ISO 6149
or M22 × 1.5 (P and T) +
M18 × 1.5 (L and R) DIN 3852;
15 mm [0.59 in] deep
B: M10 × 1.5,
16 mm [0.63 in] deep

US version:
A: ¾ - 16 UNF O-ring boss;
15 mm [0.59 in] deep
B: ⅜ - 16 UNC,
16 mm [0.63 in] deep

DIMENSIONS

OSPR ON and OSPR OR



150-578.10

Type	L_1 mm [in]	L_2 mm [in]
OSPR 70	141 [5.55]	9.1 [0.36]
OSPR 80	142 [5.59]	10.4 [0.41]
OSPR 100	145 [5.71]	13.0 [0.51]
OSPR 125	148 [5.83]	16.2 [0.64]
OSPR 160	153 [6.02]	20.8 [0.82]
OSPR 200	158 [6.22]	26.0 [1.02]

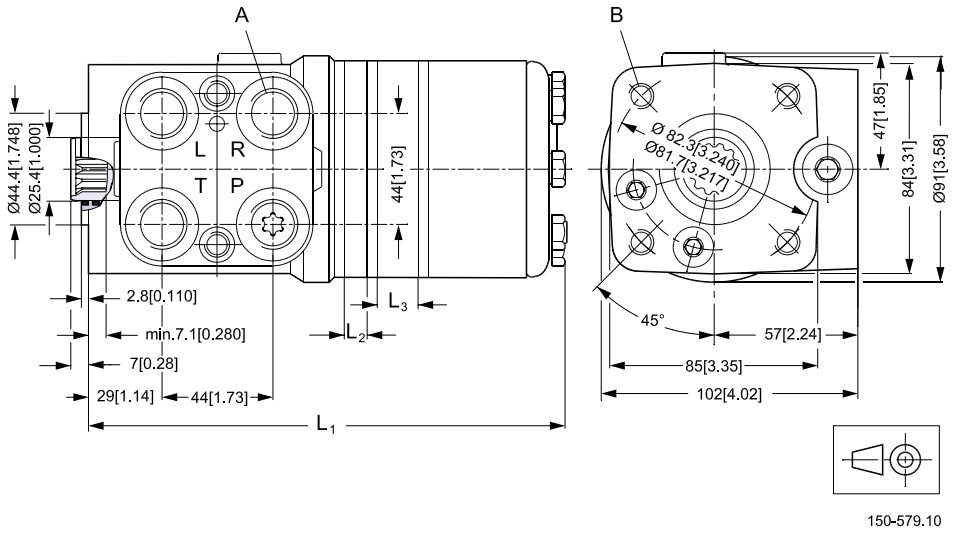
P and T: 11/16-16 UN ORFS
L and R: 9/16-18 UNF ORFS
ISO 8434-3
B: M10 × 1.5,
16 mm [0.63 in] deep

DIMENSIONS

OSPD ON and OSPD OR

Type	L_1 mm [in]	L_2 mm [in]	L_3 mm [in]
OSPD 60/185	195 [7.68]	9.1 [0.36]	20.8 [0.82]
OSPD 60/220	200 [7.87]	9.1 [0.36]	26.0 [1.92]
OSPD 70/195	190 [7.48]	9.1 [0.36]	16.2 [0.64]
OSPD 70/230	195 [7.68]	9.1 [0.36]	20.8 [0.82]
OSPD 100/260	199 [7.83]	13.0 [0.51]	20.8 [0.82]
OSPD 100/300	204 [8.03]	13.0 [0.51]	26.0 [1.02]
OSPD 125/285	202 [7.95]	16.2 [0.64]	20.8 [0.82]
OSPD 125/325	207 [8.15]	16.2 [0.64]	26.0 [1.02]
OSPD 125/440	222 [8.74]	16.2 [0.64]	40.9 [1.61]

European version:
A: G ½; 15 mm [0.59 in] deep
w. spot-face;
B: M10 × 1.5,
16 mm [0.63 in] deep



Torque amplifier, TAD

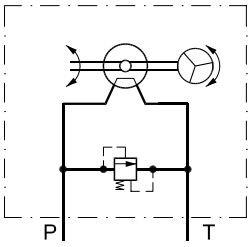
VERSION

Open center

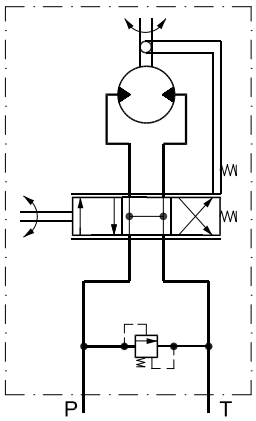
TAD is an open center torque amplifier, which has open connection between pump and tank in the neutral position. In open center steering systems, pumps with fixed displacement are used.



F300616



150B36.10



150B25.10

CODE NUMBERS AND WEIGHTS

Type	Code number		Weight kg [lb]
	European version	US version	
	G ½	¾-16 UNF	
TAD 100	150B0032	150B0012	6.2 [13.67]
TAD 160	150B0034	150B0014	6.5 [14.33]

TECHNICAL DATA

Torque amplifier			TAD 100	TAD 160
Displacement		cm^3/rev	100	160
		in^3/rev	[6.10]	[9.76]
Input torque *		Nm	approx. 3	approx. 3
		lbf·in	[26.55]	[26.55]
Max. input torque	cont.	Nm	20	20
		lbf·in	[177.02]	[177.02]
	peak	Nm	200	200
		lbf·in	[1770.15]	[1770.15]
Hydraulic output torque at 70 bar [1015 psi]		Nm	80	120
		lbf·in	[708.06]	[1062.09]
Max. operating pressure		bar	70	70
		psi	[1015]	[1015]
Max. return pressure		bar	2	2
		psi	[29]	[29]
Recommended oil flow Q		l/min	10	16
		US gal/min	[2.64]	[4.23]
Max. speed at Q		r/min	100	100
Pressure drop in neutral position at Q and viscosity 21 mm^2/s [100 SUS]		bar	0.9	1.4
		psi	[13]	[20]
Pressure relief valve setting		bar	70	70
		psi	[1015]	[1015]

* This torque is of course considerably higher if the oil flow is insufficient or fails completely.

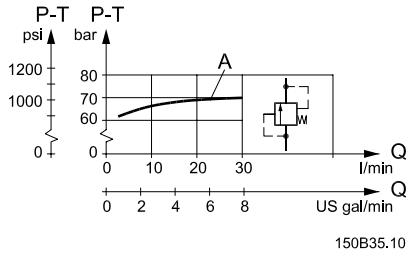
The output shaft must be capable of handling the torque (manual input torque + hydraulic output torque).

VALVE FUNCTION IN TAD TORQUE AMPLIFIERS

The data given here comes from measurements on a representative sample of torque amplifiers from production. Oil with a viscosity of 21 mm^2/s [100 SUS] at 50°C [122°F] was used.

PRESSURE RELIEF VALVE

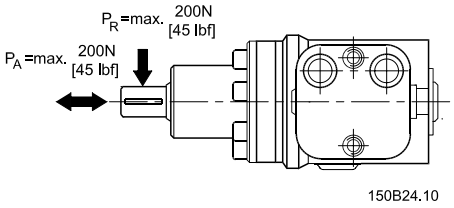
The pressure relief valve protects the pump and the torque amplifier against excessive pressure. The pressure relief valve in the torque amplifier limits the maximum pressure drop from P to T. The pressure relief valve is set at 25 l/min [6.60 US gal/min].
A: 70 $^{+5}$ bar [1015 $^{+73}$ psi].



150B35.10

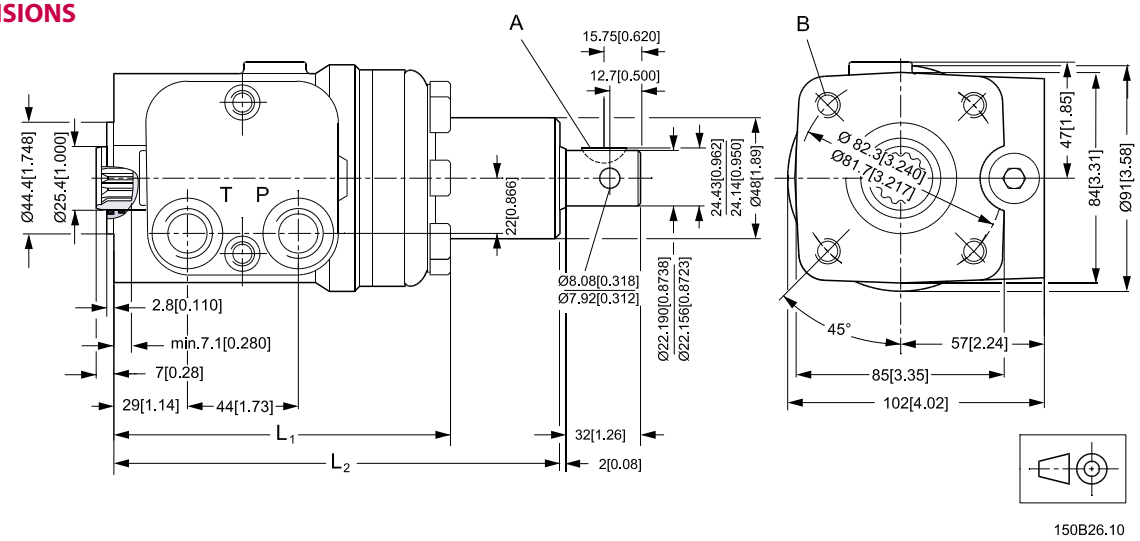
INSTALLATION

The output shaft of the torque amplifier is only meant to absorb small radial and axial forces



150B24.10

DIMENSIONS



150B26.10

Type	L_1 mm [in]	L_2 mm [in]
TAD 100	137 [5.39]	181 [7.13]
TAD 160	145 [5.71]	189 [7.44]

European version:
P,T: G 1/2; 15 mm [0.59 in] deep, w. spot-face
A: 3/16 in × 3/4 in SAE J502
B: M10 × 1.5, 16 mm [0.63 in] deep

US version:
P,T: 3/4 - 16 UNF O-ring boss; 15 mm [0.59 in] deep
A: 3/16 in × 3/4 in SAE J502
B: 3/8 - 16 UNC, 16 mm [0.63 in] deep

NOTES

NOTES

SAUER DANFOSS

OUR PRODUCTS

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Electro-hydraulic power steering

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Gear pumps and motors

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DKMH.PN.210.A1.02 **520L0502** 02/2002

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Sauer-Danfoss (US) Company
2800 East 13th Street
Ames, IA 50010, USA
Phone: +1 515 239-6000, Fax: +1 515 239-6618

Sauer-Danfoss (Neumünster) GmbH & Co. OHG
Postfach 2460, D-24531 Neumünster
Krokamp 35, D-24539 Neumünster, Germany
Phone: +49 4321 871-0, Fax: +49 4321 871-122

Sauer-Danfoss (Nordborg) A/S
DK-6430 Nordborg, Denmark
Phone: +45 7488 4444, Fax: +45 7488 4400

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Menu

SAUER DANFOSS

PVG 32
Proportional Valves

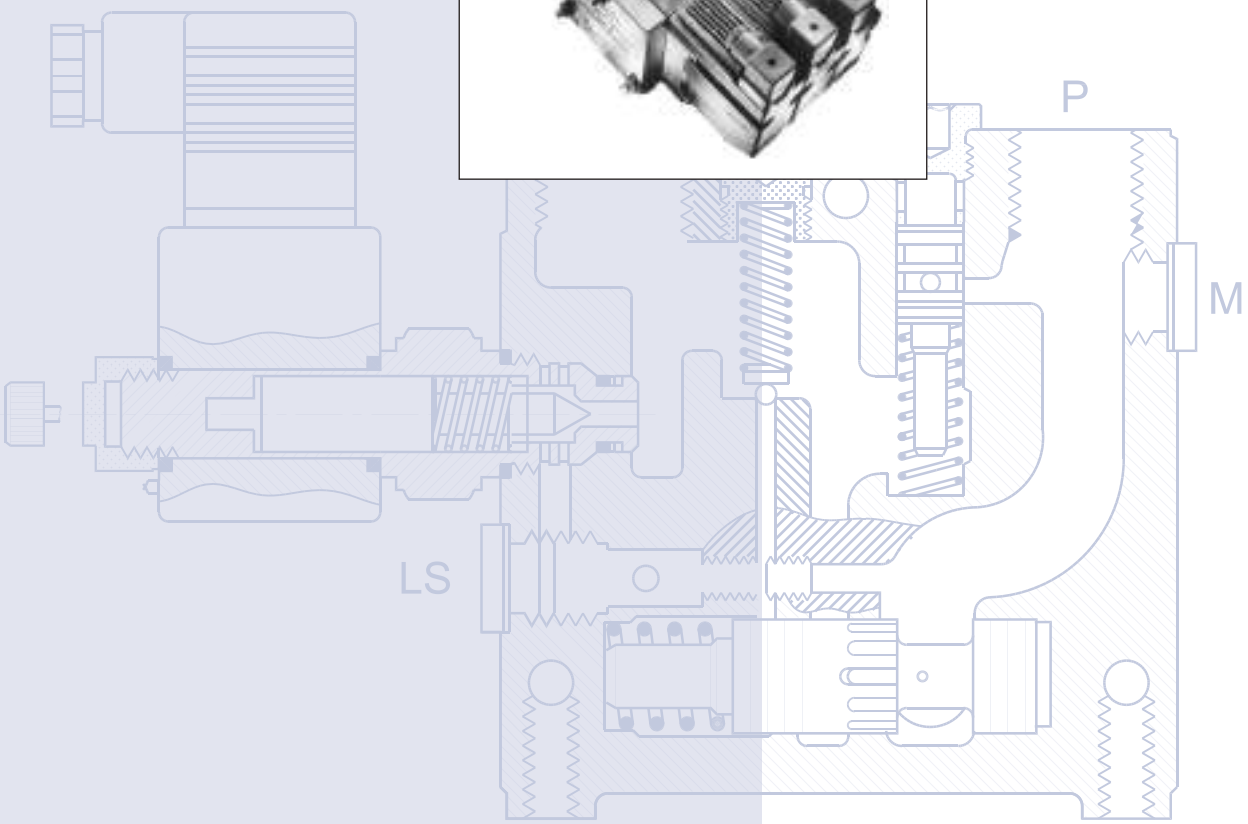
Technical Information











PVG 32 Proportional Valve
Technical Information
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Frontpage: P300004.TIF., P300002.TIF, P3000010.TIF, F72269.TIF, Drawing 157-195.ai

GENERAL

Valve system

PVG 32 is a hydraulic load sensing valve designed to give maximum flexibility. From a simple load sensing directional valve, to an advanced electrically controlled load-independent proportional valve.



The PVG 32 module system makes it possible to build up a valve group to meet requirements precisely.
The compact external dimensions of the valve remain unchanged whatever combination is specified.

General features PVG 32

- Load-independent flow control:
  - Oil flow to an individual function is independent of the load pressure of this function
  - Oil flow to one function is independent of the load pressure of other functions
- Good regulation characteristics
- Energy-saving
- Up to 10 basic modules per valve group
- Several types of connection threads
- Low weight

PVP – pump side module

- Built-in pressure relief valve
- System pressure up to 350 bar [5075 psi]
- Pressure gauge connection
- Versions:
  - Open centre version for systems with fixed displacement pumps
  - Closed centre version for systems with variable displacement pumps
  - Pilot oil supply for electrical actuator built into the pump side module
  - Versions prepared for electrical LS unloading valve PVPX

PVB, basic module

- Interchangeable spools
- Depending on requirements the basic module can be supplied with:
  - Integrated pressure compensator in channel P
  - Check valve in channel P
  - Shock/suction valves
  - LS pressure limiting valves individually adjustable for ports A and B
  - Different spool variants

GENERAL

Actuation modules

The basic module is always fitted with mechanical actuator PVM, which can be combined with the following as required:

- Electrical actuator (12 V ⎓ or 24 V ⎓)
  - PVES – proportional, super
  - PVEH – proportional, high performance
  - PVEM – proportional, medium performance
  - PVEO – ON/OFF
- PVMD, cover for mechanical actuation
- PVMR, cover for mechanical detent
- PVMF, cover for mechanical float
- PVH, cover for hydraulic actuation

ACCESSORIES

Remote control units

- Electrical remote control units
  - PVRE, PVRET
  - PVREL
  - PVRES
  - Prof 1
  - Prof 1 CIP
- Hydraulic remote control unit
  - PVRHH

Electronics

- EHF, flow adjustment unit
- EHR, ramp generator
- EHS, speed control
- EHSC, closed loop speed control
- EHA, alarm logic
- EHC, closed loop position control
- PVG CIP
- CIP Configuration Tool

PVG 32 VALVE GROUP WITH OPEN CENTRE PVP (PVB WITH FLOW CONTROL SPOOL)

When the pump is started and the main spools in the individual basic modules (11) are in the neutral position, oil flows from the pump, through connection P, across the pressure adjustment spool (6) to tank. The oil flow led across the pressure adjustment spool determines the pump pressure (stand-by pressure).

When one or more of the main spools are actuated, the highest load pressure is fed through the shuttle valve circuit (10) to the spring chamber behind the pressure adjustment spool (6), and completely or partially closes the connection to tank.

Pump pressure is applied to the right-hand side of the pressure adjustment spool (6). The pressure relief valve (1) will open should the load pressure exceed the set value, diverting pump flow back to tank.

In a pressure-compensated basic module the compensator (14) maintains a constant pressure drop across the main spool – both when the load changes and when a module with a higher load pressure is actuated.

With a non pressure-compensated basic module incorporating a load drop check valve (18) in channel P, the check valve prevents return oil flow.
The basic module can be supplied without the load drop check valve in channel P for functions with over-centre valves.

The shock valves PVLP (13) with fixed setting and the suction valves PVLA (17) on ports A and B are used for the protection of the individual working function against overload and/or cavitation.

An adjustable LS pressure limiting valve (12) can be built into the A and B ports of pressure-compensated basic modules to limit the pressure from the individual working functions.

The LS pressure limiting valves save energy compared with the shock valves PVLP:
- With PVLP all the oil flow to the working function will be led across the combined shock and suction valves to tank if the pressure exceeds the fixed setting.
- With LS pressure limiting valves an oil flow of about 2 l/min [0.5 US gal/min] will be led across the LS pressure limiting valve to tank if the pressure exceeds the valve setting.

PVG 32 VALVE GROUP WITH CLOSED CENTRE PVP (PVB WITH FLOW CONTROL SPOOL)

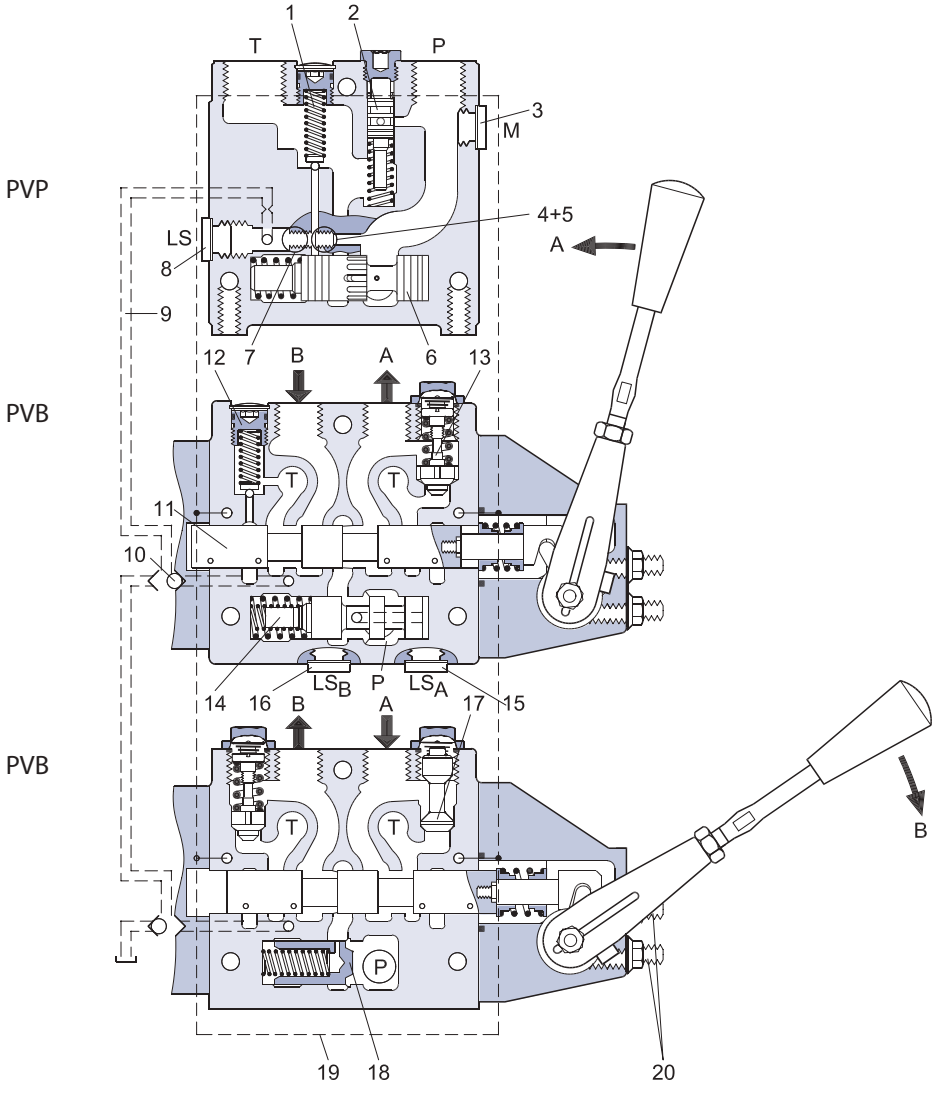
In the closed centre version an orifice (5) and a plug (7) have been fitted instead of the plug (4). This means that the pressure adjustment spool (6) will only open to tank when the pressure in channel P exceeds the set value of the pressure relief valve (1).

In load sensing systems the load pressure is led to the pump regulator via the LS connection (8).

In the neutral position the pump control sets the displacement so that leakage in the system is compensated for, to maintain the set stand-by pressure.
When a main spool is actuated the pump regulator will adjust the displacement so that the set differential pressure between P and LS is maintained.

The pressure relief valve (1) in PVP should be set at a pressure of approx. 30 bar [435 psi] above maximum system pressure (set on the pump or external pressure relief valve).

PVG 32
SECTIONAL DRAWING



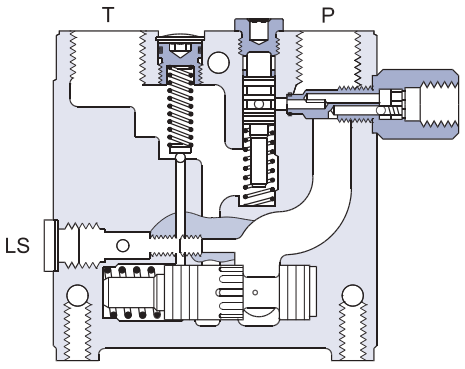
157-104.10

1. Pressure relief valve
2. Pressure reduction valve for pilot oil supply
3. Pressure gauge connection
4. Plug, open centre
5. Orifice, closed centre
6. Pressure adjustment spool
7. Plug, closed centre
8. LS connection
9. LS signal
10. Shuttle valve
11. Main spool
12. LS pressure limiting valve
13. Shock and suction valve, PVLP
14. Pressure compensator
15. LS connection, port A
16. LS connection, port B
17. Suction valve, PVLA
18. Load drop check valve
19. Pilot oil supply for PVE
20. Max. oil flow adjustment screws for ports A and B

PVPC, PLUG FOR EXTERNAL PILOT OIL SUPPLY

PVPC with check valve for open centre PVP

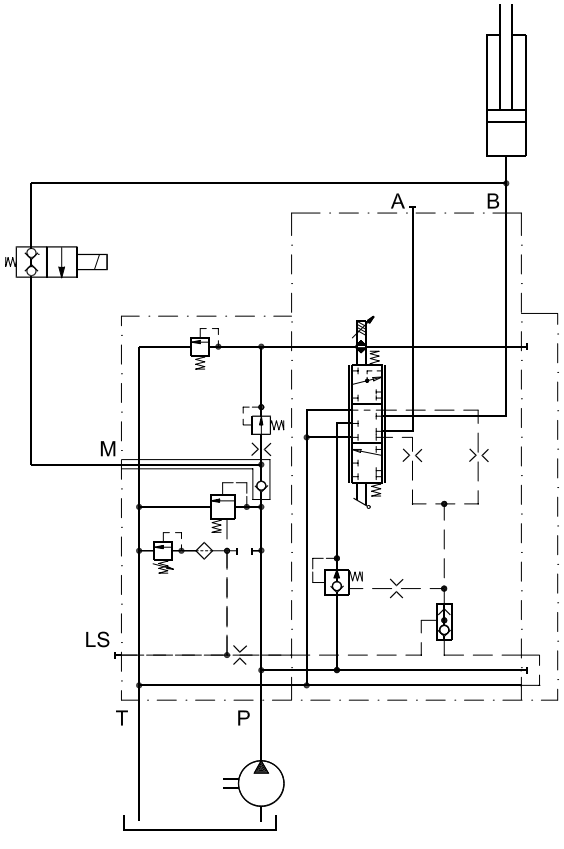
PVPC with check valve is used in systems where it is necessary to operate the PVG 32 valve by means of the electrical remote control without pump flow.



157-114.10

When the external solenoid valve is opened, oil from the pressure side of the cylinder is fed via the PVPC through the pressure reducing valve to act as the pilot supply for the electrical actuators.

This means that a load can be lowered by means of the remote control lever without starting the pump. The built-in check valve prevents the oil from flowing via the pressure adjustment spool to tank. With the pump functioning normally the external solenoid valve is closed to ensure that the load is not lowered due to the pilot supply oil flow requirement of approximately 1 l/min [0.25 US gal/min].



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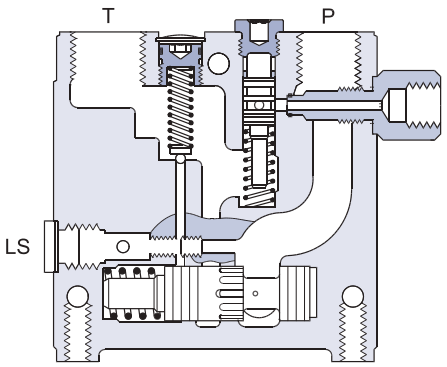
Please note:
With closed centre PVP the external pilot oil supply can be connected to the pressure gauge connection without the use of a PVPC plug.

PVPC, PLUG FOR EXTERNAL PILOT OIL SUPPLY

PVPC without check valve for open or closed centre PVP

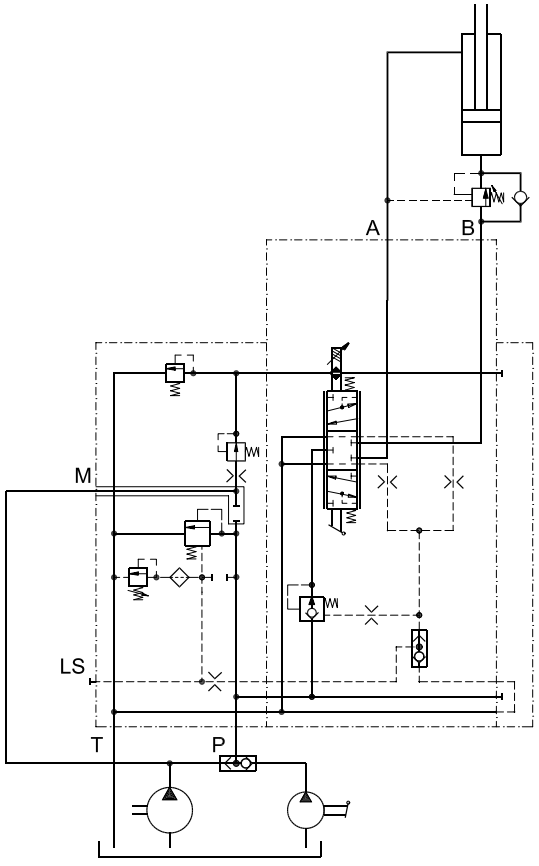
PVPC without check valve is used in systems where it is necessary to supply the PVG 32 valve with oil from a manually operated emergency pump without directing oil flow to the pilot oil supply (oil consumption about 1 l/min) [0.25 US gal/min].

When the main pump is working normally, the oil is directed through the PVPC plug via the pressure reduction valve to the electrical actuators.



157-193.10

When the main pump flow fails, the external shuttle valve ensures that the oil flow from the manually operated emergency pump is used to pilot open the over centre valve and lower the load. The load can only be lowered using the mechanical operating lever of the PVG 32 valve.



157-194.10

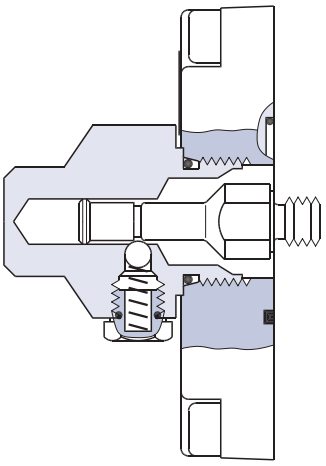
PVMR, FRICTION DETENT

PVMR, Friction Detent

The friction detent PVMR allows the directional spool to be held in any position, resulting in infinitely variable, reversible, pressure compensated flow. This can be sustained indefinitely without having to continue to hold the mechanical lever.

Please note:
PVMR should only be used together with PVB basic modules with pressure compensator.

PVMR



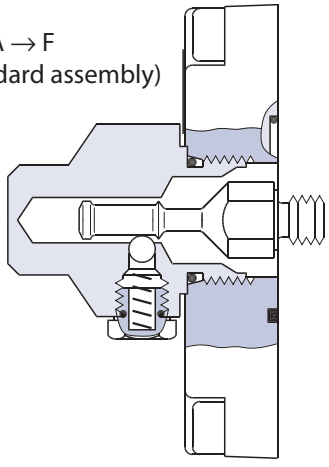
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PVMF, MECHANICAL FLOAT POSITION LOCK

PVMF, Mechanical Float Position Lock

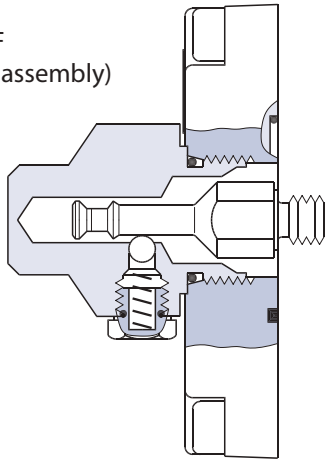
This allows the float spool to be held in the float position after release of the mechanical handle.

PVMF
P → A → F
(Standard assembly)



157-205.10

PVMF
P → B → F
(Standard assembly)



157-206.10

PVBS, MAIN SPOOLS FOR FLOW CONTROL (STANDARD)

When using standard flow control spools, the pump pressure is determined by the highest load pressure. This is done either via the pressure adjustment spool in open centre PVP (fixed displacement pumps) or via the pump regulator (variable displacement pumps).

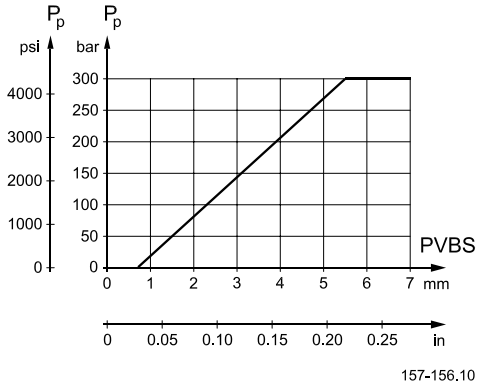
In this way the pump pressure will always correspond to the load pressure plus the stand-by pressure of the pressure adjustment spool or the pump regulator.
This will normally give optimum and stable adjustment of the oil flow.

PVBS, MAIN SPOOLS FOR FLOW CONTROL (WITH LINEAR CHARACTERISTIC)

PVBS main spools with linear characteristic have less dead band than standard spools and a completely proportional ratio between control signal and oil flow in the range beyond the dead band. PVBS with linear characteristic must never be used together with PVEM electrical actuators. The interaction between the small dead band of the spools and the hysteresis of the PVEM actuator of 20% involves a risk of building up a LS pressure in neutral position.

PVBS, MAIN SPOOLS FOR PRESSURE CONTROL

In a few systems load sensing pump pressure may result in unstable adjustment of the oil flow and a tendency towards system hunting. This may be the case with working functions that have a large moment of inertia or over-centre valves. In such systems main spools for pressure control can be advantageous.



The spools are designed in such a way that the pump pressure is controlled by the spool travel. The main spool must be displaced until the pump pressure just exceeds the load pressure before the working function is applied. If the main spool is held in this position, the pump pressure will remain constant – even if the load pressure changes – giving a stable system.

The use of pressure control spools, however, also means that

- the oil flow is load dependent
- the dead band is load dependent
- the pump pressure can exceed the load pressure by more than is usual.

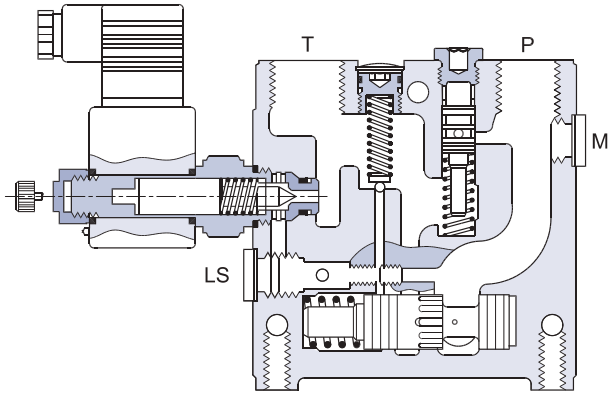
Due to these factors it is recommended that pressure control spools are only used when it is known for certain that problems with stability will arise – or already have arisen.

PVPX, ELECTRICAL LS UNLOADING VALVE

PVPX is a solenoid LS unloading valve. PVPX is fitted into the pump side module enabling a connection to be made between the LS and the tank lines. Thus the LS signal can be relieved to tank by means of an electric signal.

For a PVP pump side module in open centre version the relief to tank of the LS signal means that the pressure in the system is reduced to the sum of the tank port pressure plus the neutral flow pressure for the pump side module.

For a PVP pump side module in closed centre version the relief to tank of the LS signal means that the pressure is reduced to the sum of the tank port pressure for the pump side module plus the stand-by pressure of the pump.



PVG 32 VALVE GROUP

The technical data for PVG 32 and PVPX are typical measured results. For the hydraulic system a mineral based hydraulic oil with a viscosity of 21 mm^2/s [102 SUS] and a temperature of 50°C [122°F] was used.

Max. pressure	Port P continuous	350 bar[1)]	[5075 psi][1)]
	Port A/B	350 bar	[5075 psi]
	Port T, static/dynamic	25 bar/40 bar	[365/580 psi]
Oil flow, rated (See characteristics, page 31 - 36)	Port P	140 l/min[3)]	[37 US gal/min][3)]
	Port A/B, with press. comp.	100 l/min[2)]	[26.4 US gal/min][2)]
	Port A/B , without press. comp.	125 l/min	[33 US gal/min]
Spool travel, standard		± 7 mm	[±0.28 in]
Spool travel, float position spool	Proportional range	± 4.8 mm	[±0.19 in]
	Float position	8 mm	[±0.32 in]
Dead band, flow control spools	Standard	± 1.5 mm	[±0.06 in]
	Linear characteristic	± 0.8 mm	[±0.03 in]
Max. internal leakage at 100 bar [2175 psi] and 21 mm^2/s [102 SUS]	A/B → T, without shock valve	20 cm^3/min	[1.85 in^3/min]
	A/B → T, with shock valve	25 cm^3/min	[2.15 in^3/min]
Oil temperature (inlet temperature)	Recommended temperature	30 → 60°C	[86 → 140°F]
	Min. temperature	-30°C	[–22°F]
	Max. temperature	+90°C	[194°F]
Ambient temperature		-30 → +60°C	[–22 → +140°F]
Oil viscosity	Operating range	12 - 75 mm^2/s	[65 - 347 SUS]
	Min. viscosity	4 mm^2/s	[39 SUS]
	Max. viscosity	460 mm^2/s	[2128 SUS]
Filtration (See page 55)	Max. contamination (ISO 4406)	19/16	19/16
Oil consumption in pilot oil pressure reduction valve		1 l/min	[0.25 us gal/min]

1) With PVSI end plate. With PVS end plate max. 300 bar [4351 psi].
2) For 130 l/min contact technical Sales Organization for Sauer-Danfoss
3) In open circuit systems with short P-hoses/tubes, attention should be paid to pressure peaks at flows >100 l/min. [26.4 US gal/min]

PVH, HYDRAULIC ACTUATION

Regulation range	5-15 bar	[75-220 psi]
Max. pilot pressure	30 bar	[435 psi]
Max. pressure on port T [1)]	10 bar	[145 psi]

1) The PVRHH remote control lever should be connected direct to tank.

PVM, MECHANICAL ACTUATION

Regulation range, control lever			±19.5°	
Regulation range,		Proportional range	±13.4°	
		Float position	22.3°	
Operating force			Neutral position	Max. spool travel
		PVM + PVMD	22 ± 3 Nm [5.0 ±0.7 lbf·in]	28 ± 3 Nm [6.3 ±0.7 lbf·in]
		PVM + PVE [1]	22 ± 3 Nm [5.0 ±0.7 lbf·in]	28 ± 3 Nm [6.3 ±0.7 lbf·in]
		PVM + PVH	27 ± 3 Nm [6.0 ±0.7 lbf·in]	83 ± 3 Nm [18.7 ±0.7 lbf·in]
Operating force	PVM + PVMR	Spool displacement from neutral position		17 Nm [3.8 lbf·in]
		Spool displacement from any other position		0.6 Nm [1.3 lbf·in]
	PVM+PVMF	Spool displacement from neutral position		22 Nm [5.0 lbf·in]
		Spool displacement into float position		60 Nm [13.5 lbf·in]
		Spool displacement away from float position		28 Nm [6.3 lbf·in]
Control lever positions, see page 45		No.	2 × 6	

[1] PVE without voltage

PVE, REACTION TIME

Voltage	Function		PVEO ON/OFF s	PVEM Prop. medium s	PVEH Prop. high s	PVES Prop. super s
Neutral switch	Reaction time from neutral position to max. spool travel	Max.	0.235	0.700	0.230	0.230
		Rated	0.180	0.450	0.150	0.150
		Min.	0.120	0.230	0.120	0.120
Neutral switch	Reaction time from max.pool travel to neutral position	Max.	0.175	0.175	0.175	0.175
		Rated	0.090	0.090	0.090	0.090
		Min.	0.065	0.065	0.065	0.065
Constant voltage	Reaction time from neutral position to max. spool travel	Max.	–	0.700	0.200	0.200
		Rated	–	0.450	0.120	0.120
		Min.	–	0.230	0.050	0.050
Constant voltage	Reaction time from max. spool travel to neutral position	Max.	–	0.700	0.100	0.100
		Rated	–	0.450	0.090	0.090
		Min.	–	0.230	0.065	0.065

PVE, OIL CONSUMPTION AND HYSTERESIS

Voltage	Function		PVEO ON/OFF	PVEM Prop. medium	PVEH Prop. high	PVES Prop. super
Without voltage	Pilot oil flow per PVE	Neutral	0 l/min [0 US gal/min]	0 l/min [0 US gal/min]	0 l/min [0 US gal/min]	0.4 l/min [0.106 US gal/min]
With voltage	Pilot oil flow per PVE	Locked	0.1 l/min [0.026 US gal/min]	0.1 l/min [0.026 US gal/min]	0.1 l/min [0.026 US gal/min]	0.2 l/min [0.053 US gal/min]
		1 actuation	0.002 l [0.053 US gal/min]	0.002 l [0.053 US gal/min]	0.002 l [0.053 US gal/min]	0.002 l [0.053 US gal/min]
		Actuations	0.7 l/min [0.185 US gal/min]	0.5 l/min [0.132 US gal/min]	1.1 l/min [0.290 US gal/min]	1.1 l/min [0.2906 US gal/min]
	Hysteresis [1]	Rated	–	20%	4%	<1%

[1] Hysteresis is indicated at rated voltage and f = 0.02 Hz for one cycle. A cycle incl. N > full A > N > full B > N.

PVE, ELECTRICAL ACTUATION

Actuation			PVEO, PVEM, PVEH and PVES	
Grade of enclosure IEC 529			IP 65	
Rated voltage			12 V ⎓	24 V ⎓
Supply voltage (U_{DC})		Voltage range	11 to 15 V	22 to 30 V
		Max. ripple	5%	
Current consumtion[1)]			0.65 A	0.33 A
Signal voltage (PVEM/PVEH/PVES)		Neutral	$0.5 \times U_{DC}$	
		Regulating	$0.25 \times U_{DC}$ to $0.75 \times U_{DC}$	
Signal current[1)] (PVEM/PVEH/PVES)			0.25 mA	0.5 mA
Input impedance in relation $0,5 \times U_{DC}$			12 kΩ	
Power consumption			8 W	
Fault monitoring (PVEH/PVES)		Max. load	100 mA	60 mA
	Active	Reaction time at fault	500 ms	
	Passiv	Reaction time at fault	250 ms	

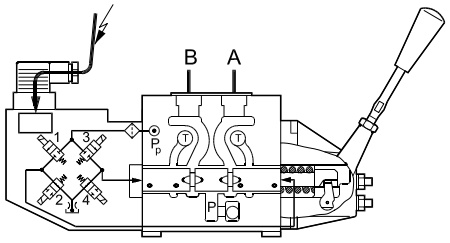
1) At rated voltage

PVPX, ELECTRICAL LS UNLOADING VALVE

Max. operation pressure		350 bar [5075 psi]	
Enclosure to IEC 529		IP 65	
Max. pressure drop at an oil flow of 0.10 l/min. [2.6 US gal/min]		2 bar [30 psi]	
Oil temperature (inlet temperature)	Recommended temperature	30 to 60°C [86 to 140°F]	
	Min. temperature	–30°C [–22°F]	
	Max. temperature	90°C [194°F]	
Max. coil surface temperature		155°C [311°F]	
Ambient temperature		–30 to +60°C [–22 to +140°F]	
Oil viscosity	Operating range	12 to 75 mm^2/s [65 to 347 SUS]	
	Min. viscosity	4 mm^2/s [39 SUS]	
	Max. viscosity	460 mm^2/s [2128 SUS]	
Response time for LS pressure relief		300 ms	
Rated voltage		12 V	24 V
Max.permissible deviation from rated supply voltage		± 10 %	± 10 %
Current consumption at rated voltage	at 22°C [72°F] coil temperature	1.55 A	0.78 A
	at 110°C [230°F] coil temperature	1.00 A	0.50 A
Power consumption	at 22°C [72°F] coil temperature	19 W	19 W
	at 110°C [230°F] coil temperature	12 W	12
Max. permissible deviation from rated supply voltage		±10%	

PVEO, ON-OFF

Main features of PVEO:
- Compact
- Robust operation
- Simple build-up



157-99.10

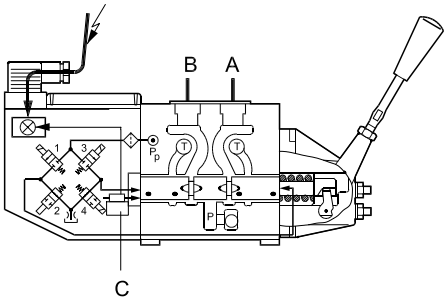
PROPORTIONAL ACTUATION

With electrical proportional actuation the main spool position is adjusted so that it corresponds to an electric signal – from a remote control unit, for example.

The signal (set-point signal) is converted into a hydraulic pressure which moves the main spool. The position of the main spool is converted in the positional transducer (C) to an electric signal (feed-back signal). This signal is registered by the electronics.
The variation between the set-point signal and feed-back signal actuates the solenoid valves. The solenoid valves are actuated so that hydraulic pressure moves the main spool into the correct position.

PVEM, PROPORTIONAL MEDIUM

PVEM versions are recommended where there is a requirement for simple proportional control and where reaction and hysteresis are not critical. Main features of PVEM:
- ON-OFF modulated
- Inductive transducer, see page 17
- Medium hysteresis

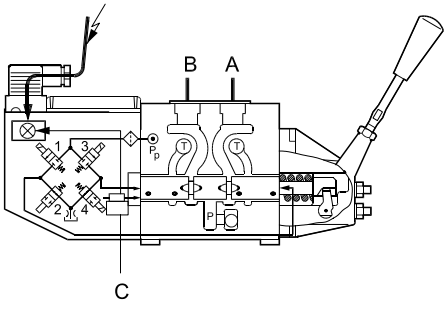


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PVEH, PROPORTIONAL HIGH

PVEH versions are recommended where among the requirements are fault monitoring, fast system reaction, low hysteresis and fine regulation.

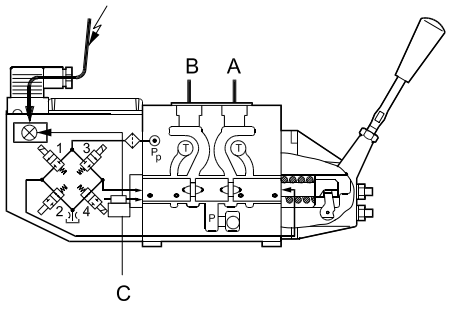
Main features of PVEH:
- Inductive transducer, see page 17
- Integrated pulse width modulation, see page 17
- Short reaction time
- Low hysteresis
- Fault monitoring, see page 17 and 18
  Transistor output for signal source, see page 19



157-48.10

PVES, PROPORTIONAL SUPER

PVES versions are recommended for control systems requiring very low hysteresis to obtain a very fine regulation. For other technical data: see PVEH.



LVDT-TRANSDUCER, PULSE WIDTH MODULATION

Inductive transducer, LVDT

(Linear Variable Differential Transformer). When the main spool is moved, a voltage is induced proportional to the spool position. The use of LVDT gives contact-free (proximity) registration of the main spool position. This means an extra-long working life and no limitation as regards the type of hydraulic fluid used. In addition, LVDT gives a precise position signal of high resolution.

Integrated pulse width modulation

Positioning of the main spool in PVEH is based on the pulse width modulation principle. As soon as the main spool reached the required position, modulation stops and the spool is locked in position.

THE FAULT MONITORING SYSTEM

A fault monitoring system is provided in all PVEH and PVES models. The system is available in two versions: – The active fault monitoring type, which provides a warning signal and deactivates the solenoid valves, and the passive fault monitoring type, which provides a warning signal only. See page 19.
Both active and passive fault monitoring systems are triggered by three main events:

Input signal monitoring

The input signal voltage is continuously monitored. The permissible range is between 15% and 85% of the supply voltage. Outside this range the section will switch into an active error state.

Transducer supervision

If one of the wires to the LVDT sensor is broken or short-circuited, this section will switch into an active error state.

THE FAULT MONITORING SYSTEM (CONTINUED)

Supervision of the closed loop

The actual position must always correspond to the demanded position (input signal). When the distance from neutral to the actual position is longer than the demanded distance, the system detects an error and will switch into an active error state. On the other hand, a situation where the actual position is closer to neutral than that demanded will not cause an error state. This situation is considered "in control".
When an active error state occurs, the fault monitoring logic will be triggered:
Note:
The neutral deadband prevents the output signal from releasing the fault monitoring logic, thus stopping the function until the required pilot oil pressure has been developed.

Active fault monitoring

- A delay of 500 ms before anything happens.
- The solenoid valve bridge will be disabled, - all solenoids will be released.
- An alarm signal is sent out through the connector.
- This state is memorized and continues until the system is actively reset (by turning off the supply voltage).

Passive fault monitoring

- A delay of 250 ms before anything happens.
- An alarm signal is sent out through the connector.
- This state is not memorized. When the erroneous state disappears, the alarm signal will turn to passive again. However, the signal will always be active for a minimum of 100 ms when triggered.

To prevent the electronics from going into an undefined state, a general supervision of the power supply and the internal clock frequency is made. This function applies to PVEH, PVES and PVEM:

High supply voltage

The solenoid valves are disabled when the supply voltage is exceeded by 50% (18 V for a 12 V PVE and 36 V for a 24 V PVE).

Low supply voltage:

The solenoid valves are disabled when the supply voltage falls below 8 V.

Internal clock

The solenoid valves are disabled when the internal clock frequency fails.

All three states are triggered automatically when the fault conditions cease.

Note:
1. Different degrees of safety are described on pages 50 to 53.

2. The fault monitoring does not work if the supply voltage to PVEH/PVES is cut off – for example by a neutral position switch (see page 50).

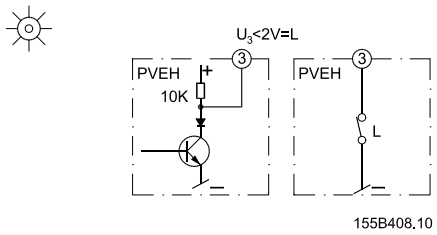
3. When using PVEH/PVES with passive fault monitoring it's up to the customer to decide on the required degree of safety for the system (see page 50).

PVEH/PVES, CONNECTION TO FAULT MONITORING OUTPUT

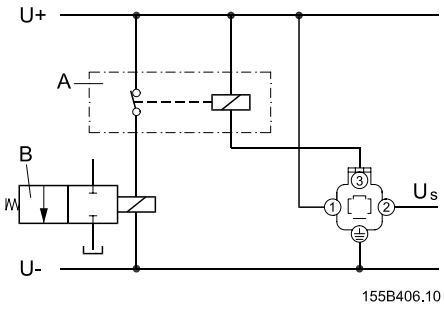
Normal

Green

Transistor output function



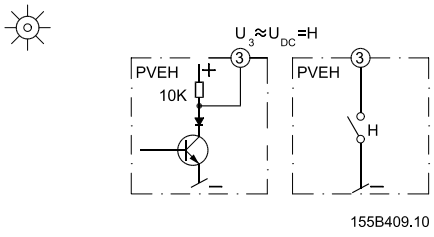
Example of connected components



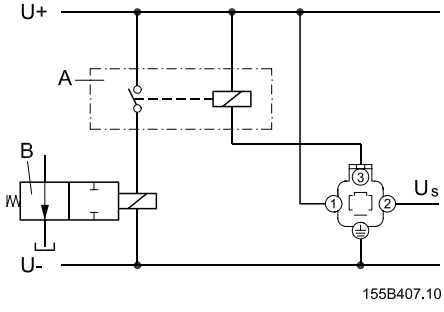
Fault

Red

Transistor output function



Example of connected components



A: External relay
B: Solenoid valve (e.g. PVPX)

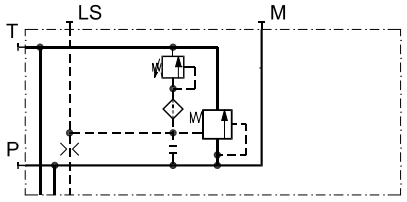
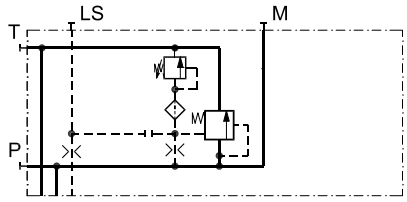
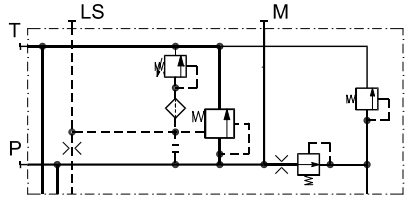
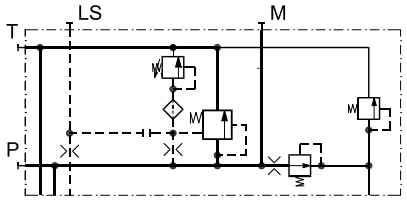
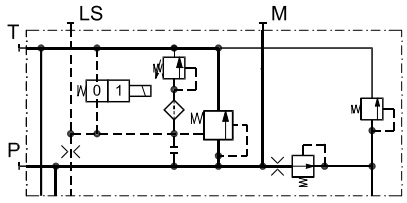
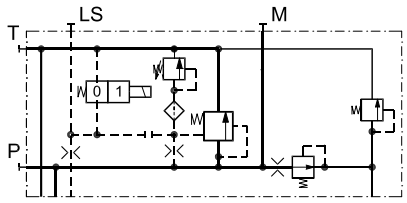
A: External relay
B: Solenoid valve (e.g. PVPX)

Via an external relay the pin pos. 3 can be connected to a solenoid valve which will relieve the LS-signal to tank, e.g. PVPX.

Other connections possible:

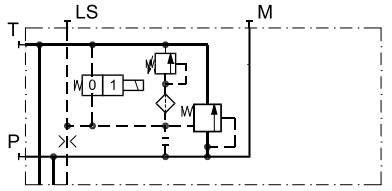
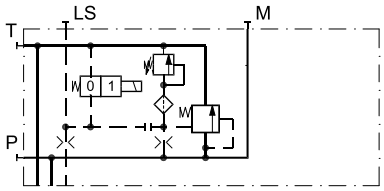
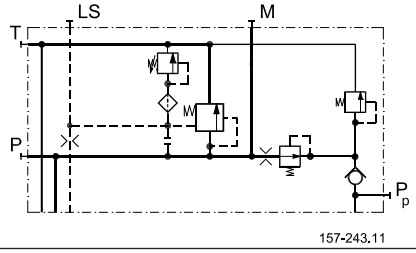
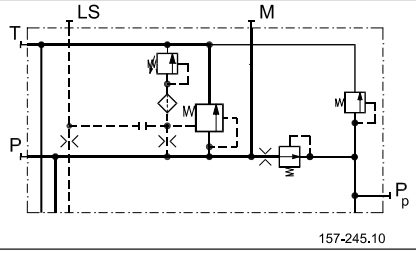
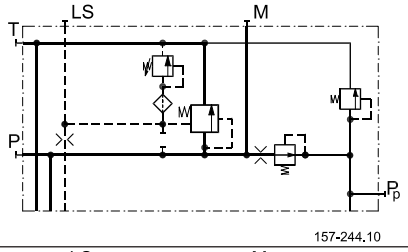
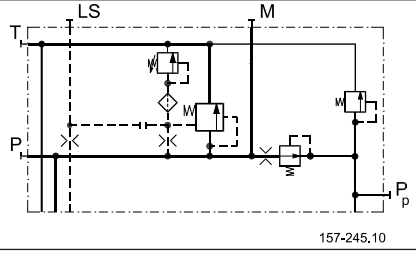
- a solenoid valve to relieve the pump oil flow
- a signal lamp, an alarm horn
- pump cut-out, etc.

PVP, PUMP SIDE MODULES

Symbol	Description		Code number
 157-24.10	Open centre pump side module for pumps with fixed displacement. For purely mechanically actuated valve groups.	P = G 1/2	157B5000
		P = 7/8 in - 14	157B5200
		P = G 3/4	157B5100
		P = 1 1/16 in - 14	157B5300
 157-23.10	Closed centre pump side module for pumps with variable displacement. For purely mechanically actuated valve groups.	P = G 1/2	157B5001
		P = 7/8 in - 14	157B5201
		P = G 3/4	157B5101
		P = 1 1/16 in -14	157B5301
 157-22.10	Open centre pump side module for pumps with fixed displacement. With pilot oil supply for electrically actuated valves.	P = G 1/2	157B5010
		P = 7/8 in - 14	157B5210
		P = G 3/4	157B5110
		P = 1 1/16 in - 14	157B5310
 157-21.10	Closed centre pump side module for pumps with variable displacement. With pilot oil supply. For electrically actuated valves	P = G 1/2	157B5011
		P = 7/8 in - 14	157B5211
		P = G 3/4	157B5111
		P = 1 1/16 in - 14	157B5311
 157-153.11	Open centre pump side module for pumps with fixed displacement. With pilot oil supply for electrically actuated valves. Connection for electrical LS unloading valve, PVPX	P = G 1/2	157B5012
		P = 7/8 in - 14	157B5212
		P = G 3/4	157B5112
		P = 1 1/16 in - 14	157B5312
 157-154.10	Closed centre pump side module for pumps with variable displacement. With pilot oil supply. For electrically actuated valves Connection for electrical LS unloading valve, PVPX.	P = G 1/2	157B5013
		P = 7/8 in - 14	157B5213
		P = G 3/4	157B5113
		P = 1 1/16 in - 14	157B5313

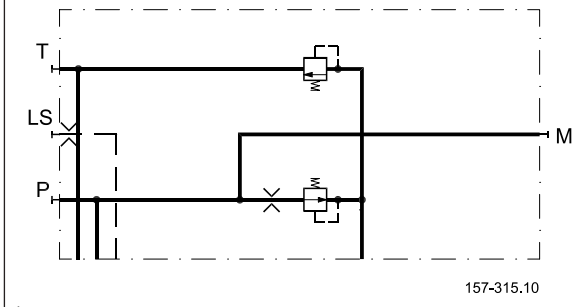
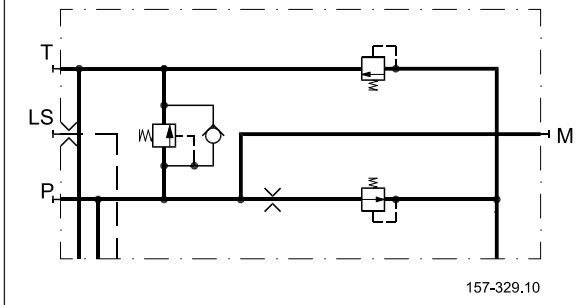
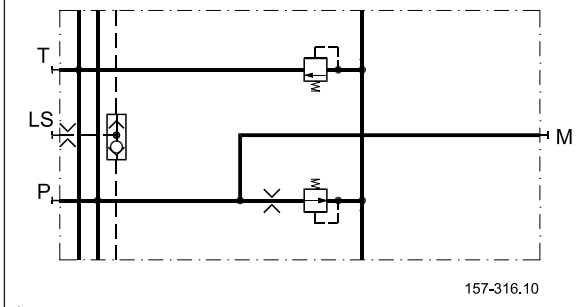
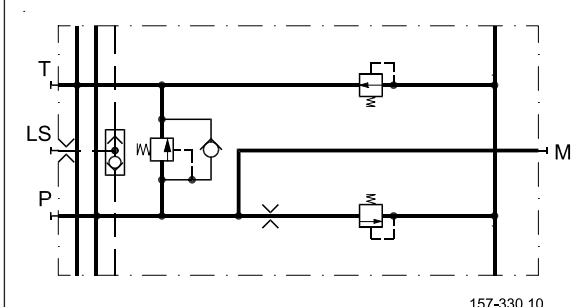
Connection: P = G 1/2; 14 mm deep or G 3/4; 16 mm deep. LS/M = G 1/4; 12 mm deep; T = G 3/4; 16 mm deep.
P = 7/8 in - 14; 0.65 in deep or 1 1/16 in - 12; 0.75 in deep. LS/M = 1/2 in - 20; 0.47 in deep. T = 1 1/16 in - 12; 0.75 in deep.

PVP,
PUMP SIDE MODULES

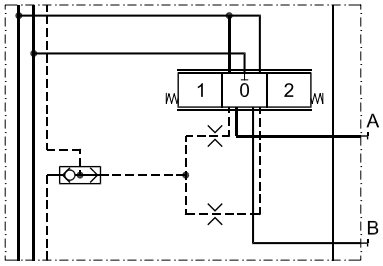
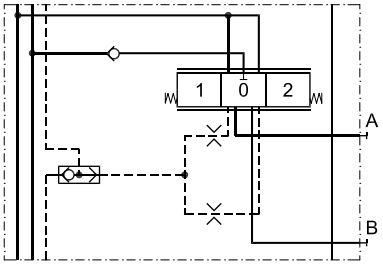
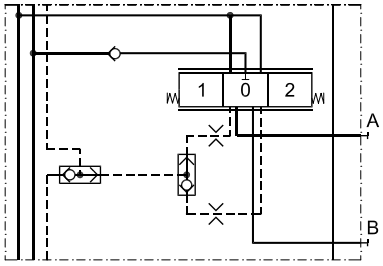
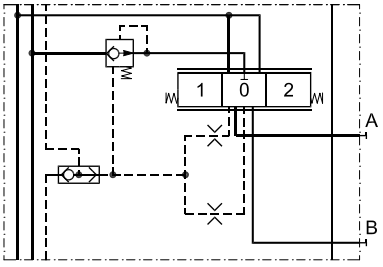
Symbol	Description		Code number
	Open centre pump side module for pumps with fixed displacement. For mechanically actuated valves. Connection for LS unloading valve, PVPX.	P = G 3/4	157B5102
	Closed centre pump side module for pumps with variable displacement. For mechanically actuated valves. Connection for LS unloading valve, PVPX.	P = G 3/4	157B5103
	Open centre pump side module for pumps with fixed displacement. With pilot oil supply for electrical actuation and connection for pilot oil pressure.	P = G 3/4	157B5180
	Closed centre pump side module for pumps with variable displacement. With pilot oil supplyfor electrical actuation and connection for pilot oil pressure.	P = G 3/4	157B5181
	Open centre pump side module for pumps with fixed displacement. With pilot oil supply for hydraulic actuation and connection for pilot oil pressure.	P = G 3/4	157B5190
	Closed centre pump side module for pumps with variable displacement. With pilot oil supply for hydraulic actuation and connection for pilot oil pressure.	P = G 3/4	157B5191

Connection: P = G 1/2; 14 mm deep or G 3/4; 16 mm deep. LS/M = G 1/4; 12 mm deep; T = G 3/4; 16 mm deep.

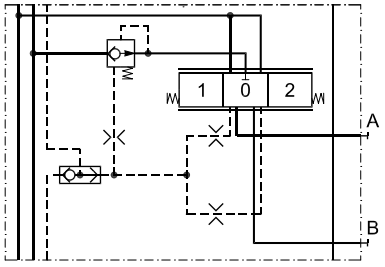
PVPV AND PVPVM, PUMP SIDE MODULES

Symbol	Description		Code number
 157-315.10	PVPV Closed center pump side module for pumps with variable displacement	P and T = G 1	157B5938
	With pilot supply for electrical actuation	P and T = 1 5/16 UN	157B5911
	Max pump pressure = 350 bar [5075 psi] Max. pump flow = 150 l/min [40 US gal/min]		
 157-329.10	PVPV Closed center pump side module for pumps with variable displacement	P and T = G 1	157B5941
	With pilot supply for electrical actuation With shock and suction valve PVLP 63	P and T = 1 5/16 UN	157B5913
	Max pump pressure = 350 bar [5075 psi] Max. pump flow = 150 l/min [40 US gal/min]		
 157-316.10	PVPVM Closed centre pump side module for pumps with variable displacement	P and T = G 1	157B5937
	With pilot supply for electrical actuation	P and T = 1 5/16 UN	157B5912
	Max pump pressure = 350 bar [5075 psi] Max pump flow = 230 l/min [61 US gal/min]		
 157-330.10	PVPVM Closed centre pump side module for pumps with variable displacement	P and T = G 1	57B5940
	With pilot supply for electrical actuation With shock and suction valve PVLP 63	P and T = 1 5/16 UN	157B5914
	Max pump pressure = 350 bar [5075 psi] Max pump flow = 230 l/min [61 US gal/min]		

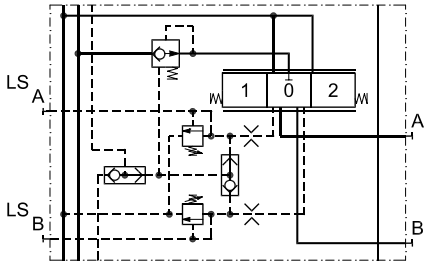
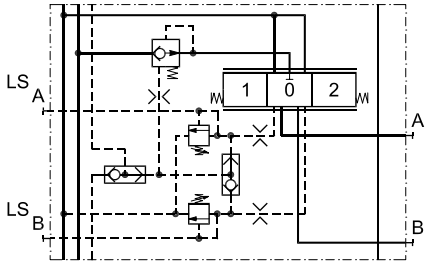
PVB,
BASIC MODULES – WITHOUT ADJUSTABLE $LS_{A/B}$ PRESSURE LIMITING VALVES

Symbol	Description		Code number: No facilities for shock valves A/B	Code number: Facilities for shock valves A/B
 157-19.10	Without load drop check valve and pressure compensator. Can be used where load holding valves prevent oil from flowing back through channel P.	G 1/2 14 mm deep	157B6000	157B6030
		7/8 in - 14 0.65 in deep	157B6400	157B6430
 157-20.10	Load drop check valve.	G 1/2 14 mm deep	157B6100	157B6130
		7/8 in - 14 0.65 in deep	157B6500	157B6530
 157-196.10	Load drop check valve. $LS_{A/B}$ shuttle valve. To be used with float position spools.	G 1/2 14 mm deep	–	157B6136
		7/8 in - 14 0.65 in deep	–	157B6536
 157-197.10	With non-damped compensator valve.	G 1/2 14 mm deep	157B6200	157B6230
		7/8 in - 14 0.65 in deep	157B6600	157B6630

PVB,
BASIC MODULES – WITHOUT ADJUSTABLE $LS_{A/B}$ PRESSURE LIMITING VALVES

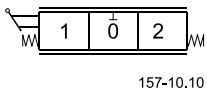
Symbol	Description		Code number	
			No facilities for shock valves A/B	Facilities for shock valves A/B
 157-16.10	With damped compensator valve	G 1/2 14 mm deep	157B6206	157B6236
		7/8 in - 14 0.65 in deep	–	–

PVB,
BASIC MODULES – WITH ADJUSTABLE $LS_{A/B}$ PRESSURE LIMITING VALVES

Symbol	Description		Code number	
			No facilities for shock valves A/B	Facilities for shock valves A/B
 157-198.10	With non-damped. compensator valve. Adjustable $LS_{A/B}$ pressure limiting valves. External LS connection port A/B. Also used for float position spools.	G 1/2 14 mm deep	157B6203	157B6233
		7/8 in - 14 0.65 in deep	157B6603	157B6633
 157-17.10	Damped compensator valve. Adjustable $LS_{A/B}$ pressure limiting valves. External LS connection port A/B.	G 1/2 14 mm deep	157B6208	157B6238
		7/8 in - 14 0.65 in deep	–	–

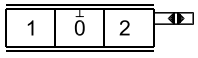
Connection: $LS_{A/B}$: G 1/4 12 mm deep, 1/2 in-20; 0.47 in deep

PVM, MECHANICAL ACTUATION

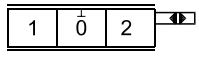
Symbol	Description		Code number	
 157-10.10	PVM, Standard, spring centered . Individual oil flow adjustment to ports A and B.	22.5°	157B3171	157B3191
		37.5°	157B3172	157B3192
	PVM Without actuation lever and base. Shaft for mounting of actuation lever.		157B3173	157B3193
	PVM, As standard, without actuation lever. With base for mounting of actuation lever.	22.5°	157B3175	157B3195
		37.5°	157B3174	157B3194

Note: Code number for the anodiseret version of 157B3171 is 157B3184

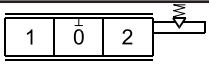
PVMD, COVER FOR MECHANICAL ACTUATION

Symbol	Description	Code number
 157-199.10	PVMD, Cover for purely mechanically operated valve.	157B0001

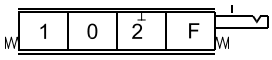
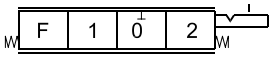
PVH, HYDRAULIC ACTUATION

Symbol	Description		Code number
 157-199.10	PVH, Cover for hydraulic remote control	G $^{1}/_{4}$; 12 mm deep	157B0008
		$^{9}/_{16}$-18 UNF; 0.54 in deep	157B0007

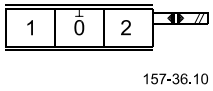
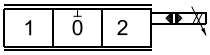
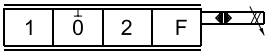
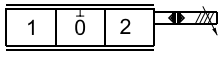
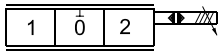
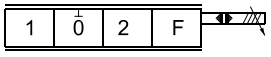
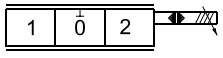
PVMR, FRICTION DETENT

Symbol	Description	Code number
 157-210.10	PVMR, Friction detent	157B0004

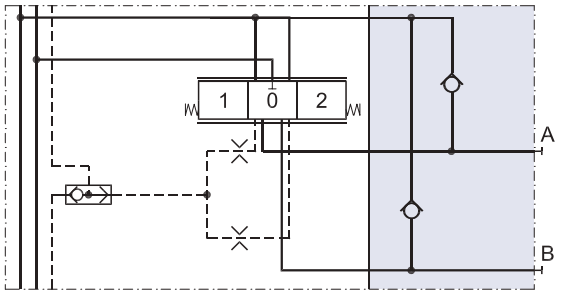
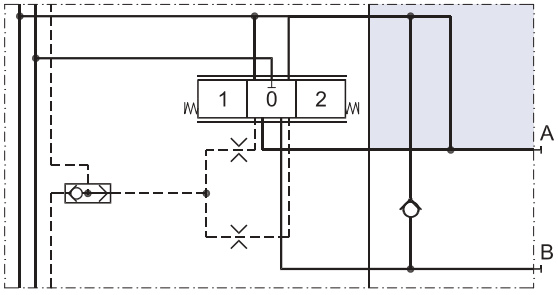
PVMF, MECHANICAL FLOAT POSITION

Symbol	Description	Code number
 157-208.10  157-209.10	PVMF, Mechanical float position lock	157B0005

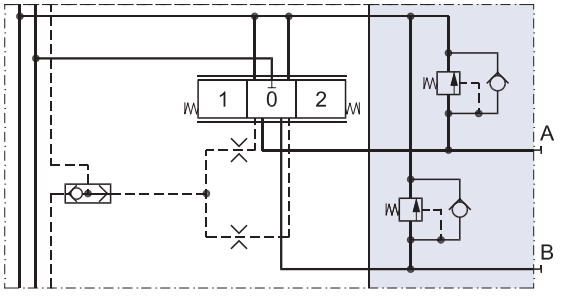
PVE
ELECTRICAL ACTUATION

Symbol	Description		Code number
 157-36.10	PVEO; ON/OFF	12 V	157B4216
		24 V	157B4228
 157-35.10	PVEM, standard. Proportional Medium On/Off-modulated, inductive transducer.	12 V	157B4116
		24 V	157B4128
 157-189.10	PVEM, For float position. Proportional Medium. On/Off-modulated, inductive transducer etc.	12 V	157B4416
		24 V	157B4428
 157-34.10	PVEH, standard. Proportional High. Pulse-width modulation, quick response, low hysteresis, active fault monitoring, inductive transducer.	12 V	157B4016
		24 V	157B4028
 157-34.10	PVEH, Proportional High. Pulse width modulation, quick response, low hysteresis, passive fault monitoring, inductive transducer.	12 V	157B4086
		24 V	157B4088
 157-190.10	PVEH, For float position. Proportional High. Pulse width modulation , quick response low hysteresis, active fault monitoring,inductive transducer etc.	12 V	157B4316
		24 V	157B4328
 157-34.10	PVES, Proportional super. Specifications as PVEH but hysteresis ~ 0%	12 V	157B4816
		24 V	157B4828

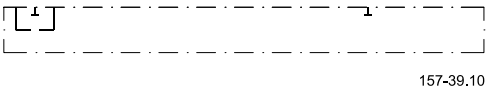
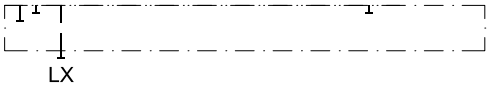
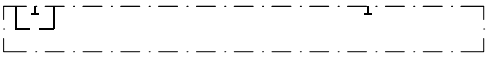
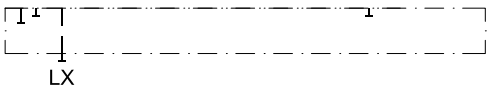
PVLA, SUCTION VALVE (FITTED IN PVB)

Symbol	Description	Code number
 157-15.10	Suction valve for port A and/or B.	157B2001
 157-223.10	Plug for connecting the nonactive port to tank, when using a single acting spool.	157B2002

PVLP, SHOCK AND SUCTION VALVE (FITTED IN PVB)

Symbol	Description	Setting bar	Setting [psi]	Code number
 157-18.10	Shock and suction valve for port A and/or B. (Not adjustable)	32	460	157B2032
		50	725	157B2050
		63	914	157B2063
		80	1160	157B2080
		100	1450	157B2100
		125	1813	157B2125
		140	2031	157B2140
		150	2175	157B2150
		160	2320	157B2160
		175	2538	157B2175
		190	2755	157B2190
		210	3045	157B2210
		230	3335	157B2230
		240	3480	157B2240
		250	3625	157B2250
		265	3843	157B2265
		280	4061	157B2280
		300	4351	157B2300
		320	4641	157B2320
		350	5075	157B2350

PVS, END PLATE

Symbol	Description		Code number
 157-39.10	PVS, without active elements. No connections		157B2000
			157B2020
 LX 157-115.10	PVS, without active elements. Max. intermittent LX pressure: 250 bar [3625 psi]	G $^{1}/_{8}$, 10 mm deep	157B2011
		$^{3}/_{8}$ in - 24; 0.39 in deep	157B2021
 157-39.10	PVSI, without active elements. Without connections		157B2014
			157B2004
 LX 157-115.10	PVSI, without active elements. LX connections. Max. int. LX pressure: 350 bar [5075 psi]	G $^{1}/_{4}$, 12 mm deep	157B2015
		$^{1}/_{2}$ in - 20; 0.47 in deep	157B2005

PVAS, ASSEMBLY KIT

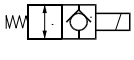
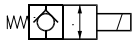
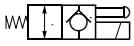
	Code number 157B...									
Description	**0 PVB**	**1 PVB**	**2 PVB**	**3 PVB**	**4 PVB**	**5 PVB**	**6 PVB**	**7 PVB**	**8 PVB**	**9 PVB**	**10 PVB**
Tie bolts and seals	8000*	8001	8002	8003	8004	8005	8006	8007	8008	8009	8010

*) For one PVB on PVGI (combination PVG 120 / 32)

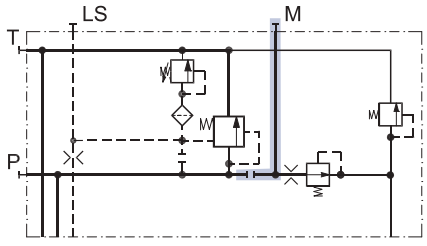
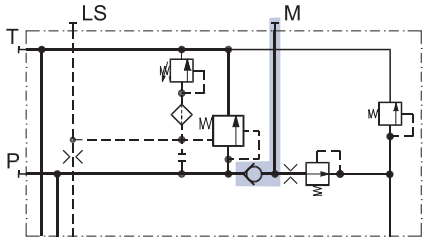
PVAS, ASSEMBLY KIT FOR PVPVM

	Code number 157B...								
Description	**1 PVB**	**2 PVB**	**3 PVB**	**4 PVB**	**5 PVB**	**6 PVB**	**7 PVB**	**8 PVB**	**9 PVB**	**10 PVB**
Tie bolts and seals	8021	8022	8023	8024	8025	8026	8027	8028	8029	8030

PVPX, ELECTRICAL LS UNLOADING VALVE

Symbol	Description		Code number
 157-150.10	PVPX, Normally open: LS pressure relieved with no signal to PVPX.	12 V	157B4236
		24 V	157B4238
 157-151.10	PVPX, Normally closed: LS pressure relieved with signal to PVPX.	12 V	157B4246
		24 V	157B4248
 157-152.10	PVPX, Normally open with manual override: LS pressure relieved with no signal to PVPX. Manual over-ride DE-selects LS-pump	12 V	157B4456
		24 V	157B4458
		26 V	157B4260
–	Plug		157B5601

PVPC, PLUG FOR EXTERNAL PILOT OIL SUPPLY

Symbol	Description		Code number
 157-191.10	PVP, Plug without check valve for open or closed centre	G $^1/_2$, 12 mm deep	157B5400
		$^1/_2$ in-20; 0.47 in deep	–
 157-192.10	PVP, Plug with check valve for open centre	G $^1/_2$, 12 mm deep	157B5600
		$^1/_2$ in-20; 0.47 in deep	157B5700

GENERAL

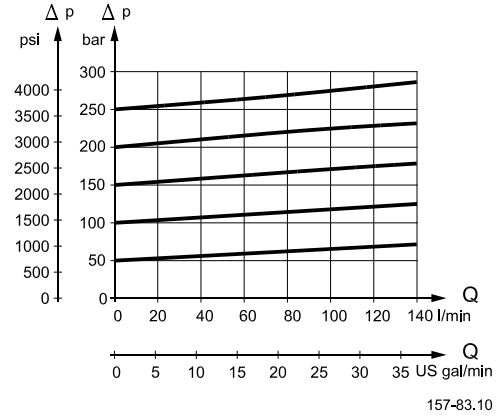
The characteristics in this catalogue are typical measured results.
During measuring a mineral based hydraulic oil with a viscosity of 21 mm^2/s [102 SUS] at a temperature of 50°C [122°F] was used.

PVP, PUMP SIDE MODULE

Pressure relief valve characteristic in PVP

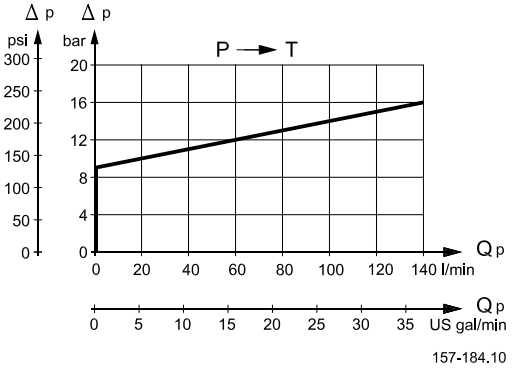
The pressure relief valve is set at an oil flow of 15 l/min [4.0 US gal/min].

Setting range:
30 to 350 bar [435 to 5075 psi]
(with PVSI end plate) and
(300 bar [4351 psi] (with PVS end plate)



157-83.10

Neutral flow pressure in PVP, open centre



157-184.10

PVB, BASIC MODULE

Oil flow characteristics

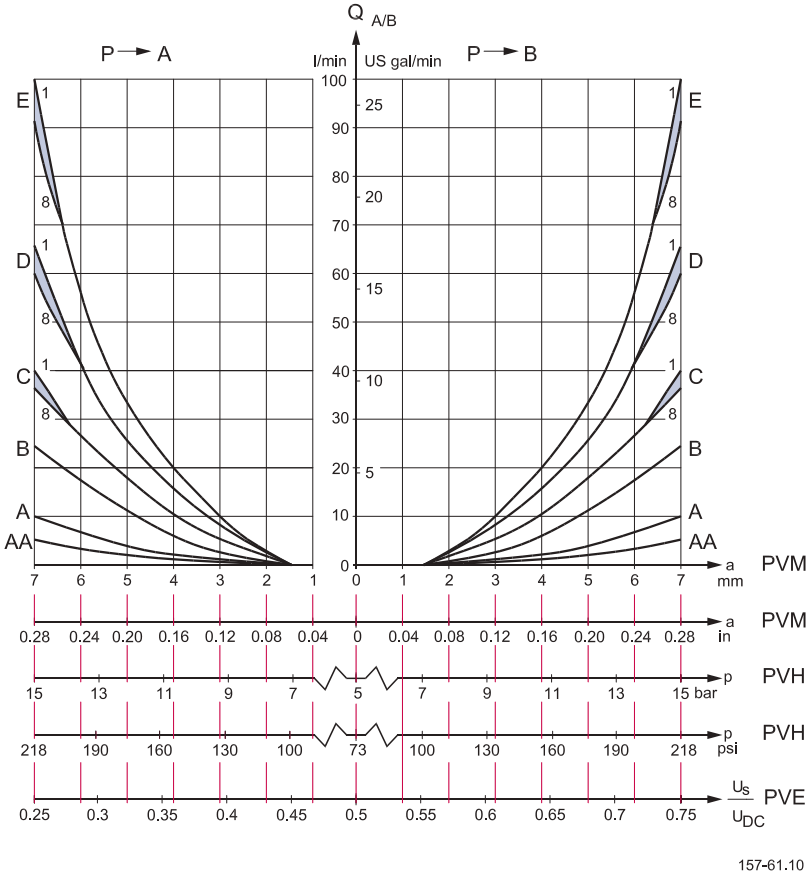
The oil flow for the individual spool depends on

- type of basic module (with/without compensation)
- type of pump (fixed or variable displacement).

Please note:
The letters AA, A, B, etc. denote spool types, see pages 56 to 62. The characteristic below is shown for spool travel in both directions. All other characteristics are shown for spool travel in one direction only.

Pressure-compensated PVB, open or closed centre PVP

The oil flow is dependent on the supplied pump oil flow. The characteristics are plotted for a pump oil flow, Q_P, corresponding to the rated max. spool oil flow, Q_N.
Increasing the pump oil flow to $1{,}4 \times Q_N$ will give the same oil flow on the eighth as on the first basic module.



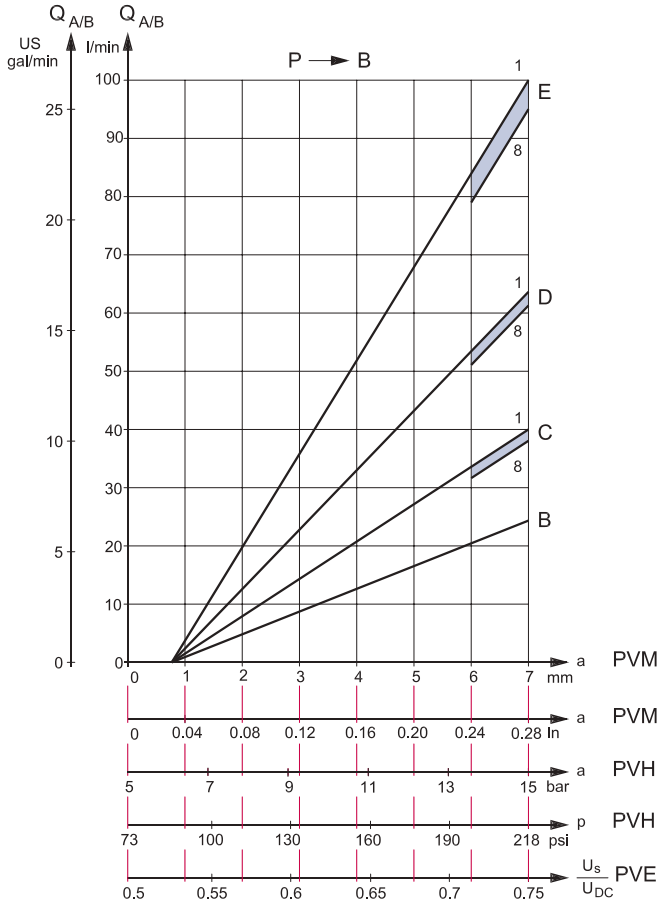
U_S = Signal voltage
U_{DC} = Supply voltage
1 = First PVB after PVP
8 = Eighth PVB after PVP

PVB, BASIC MODULE

Pressure compensated PVB, open or closed centre PVP

Linear characteristic

Please note:
For PVB basic modules without pressure compensator the top ends of the characteristics (max. oil flow) are different so they correspond to those of the standard flow control spools, see characteristics for PVB without pressure compensator.



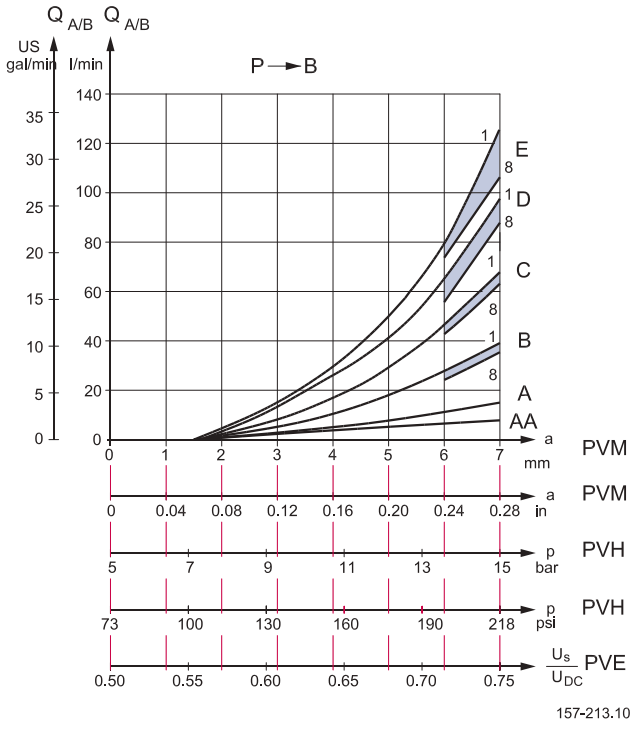
U_S = Signal voltage
U_{DC} = Supply voltage
1 = First PVB after PVP
8 = Eighth PVB after PVP

PVB, BASIC MODULE

PVB without pressure compensation, open centre PVP

Oil flow as a function of spool travel.

The spool flow is dependent on the supplied oil flow, Q_P. The characteristics apply to supply oil flow of 130 l/min [34.3 US gal/min] with the actuation of one basic module. If several basic modules are activated at the same time, the characteristic depends on the load pressure of the actuated basic modules.

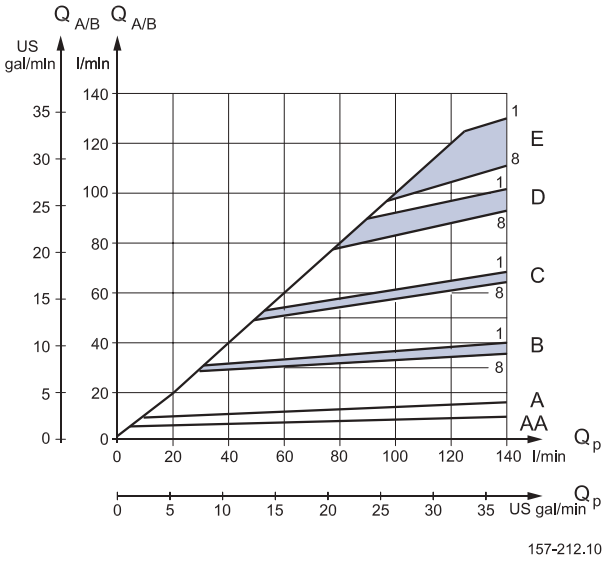


PVB, BASIC MODULE

PVB without pressure compensation, open centre PVP

Oil flow $Q_{A/B}$ as a function of supplied pump oil flow (Q_P) – curves for fully displaced flow control spools.

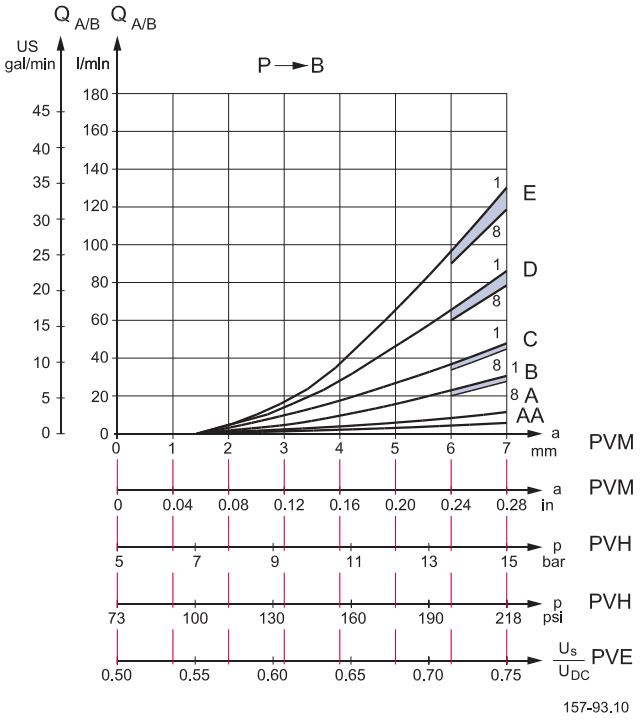
The pressure drop of any oil flowing back to tank (Q_P - $Q_{A/B}$) is read on the curve for neutral flow pressure in PVP, page 30.



PVB, BASIC MODULE

PVB without pressure compensation, closed centre PVP

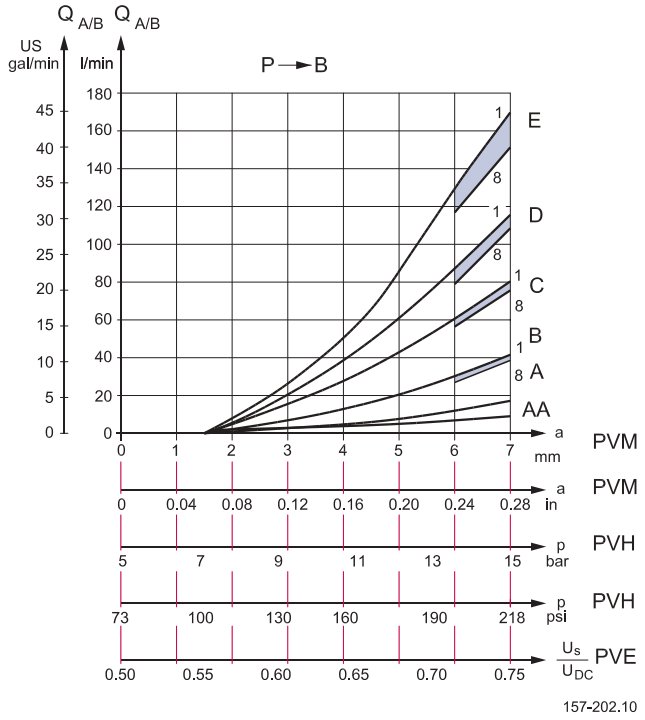
Set pressure difference between pump pressure and LS signal = 10 bar [145 psi].



**PVB,
BASIC MODULE**

PVB without pressure compensation, closed centre PVP

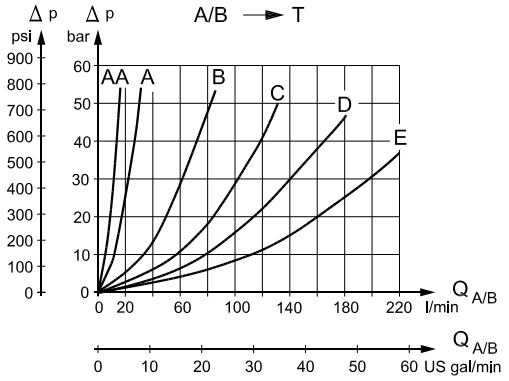
Set pressure difference between pump pressure and LS signal = 20 bar [290 psi].



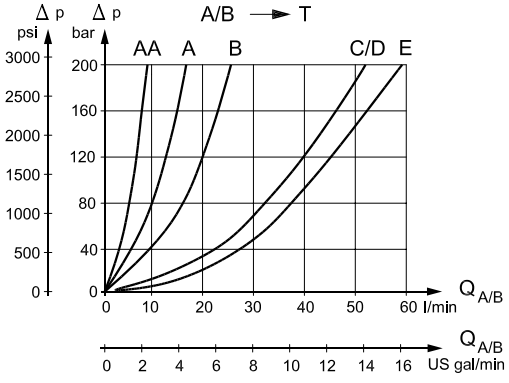
The oil flow is dependent on the pressure difference between the pump pressure and the LS signal. Normally the pressure difference is set at the LS pump regulator.

PVB, BASIC MODULE

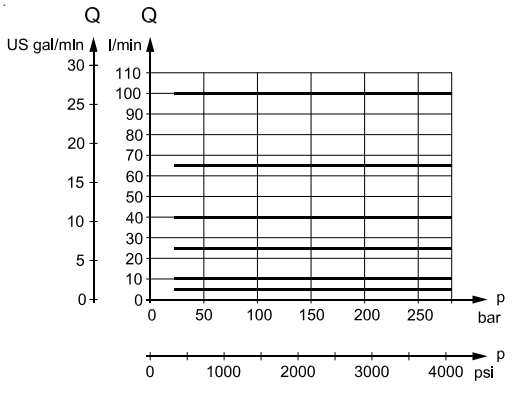
Pressure drop PVB at max. main spool travel



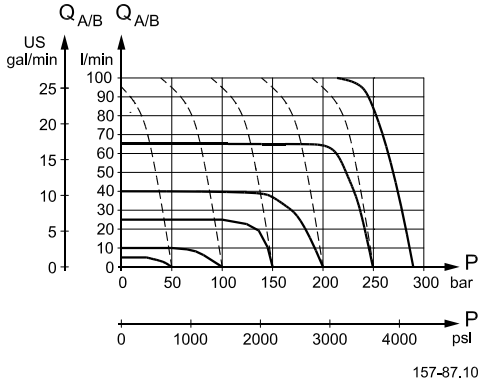
Pressure drop PVB for open spool in neutral position



Load-independent oil flow, pressure-compensated PVB



Oil flow at LS pressure limiting, pressure-, compensated PVB



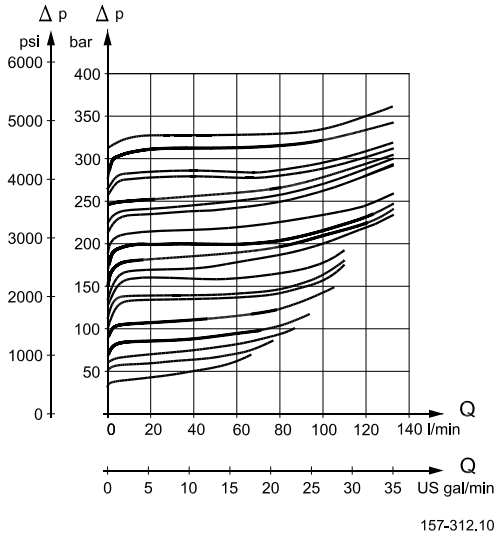
PVLP, SHOCK AND SUCTION VALVE

PVLP, shock valve

PVLP is set at an oil flow of 10 l/min [2.6 US gal/min].

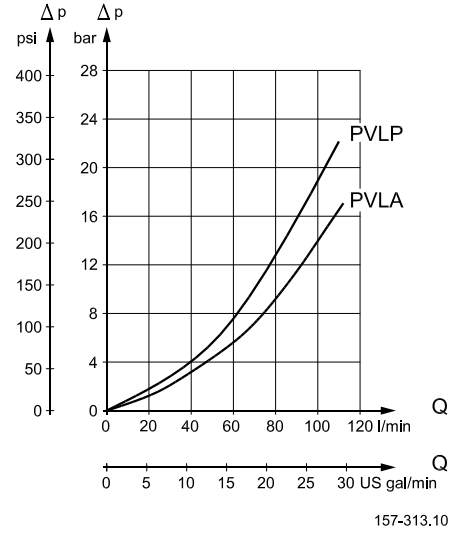
The shock valve PVLP is designed to absorb shock effects. Consequently, it should not be used as a pressure relief valve.

If the working function requires the use of a pressure relief valve, a PVB basic module with built-in $LS_{A/B}$ pressure limiting valve should be used.



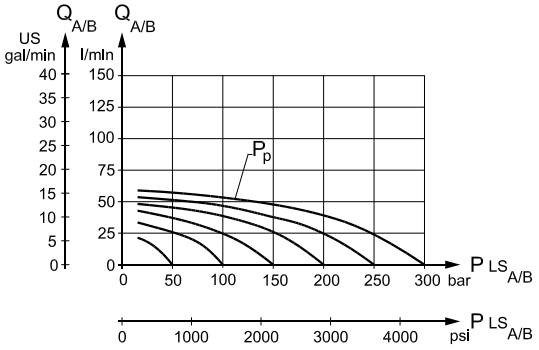
PVLA, SUCTION VALVE

PVLP/PVLA, suction valve



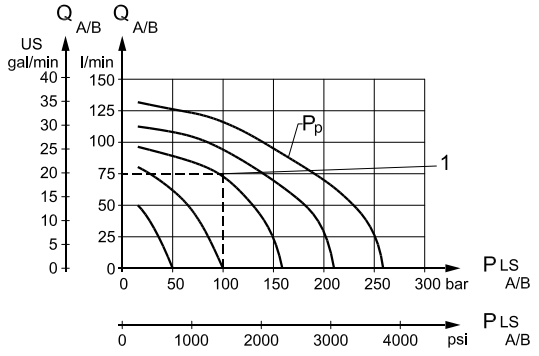
PRESSURE CONTROL SPOOLS, CHARACTERISTICS IN EXTREME POSITIONS

Size A:

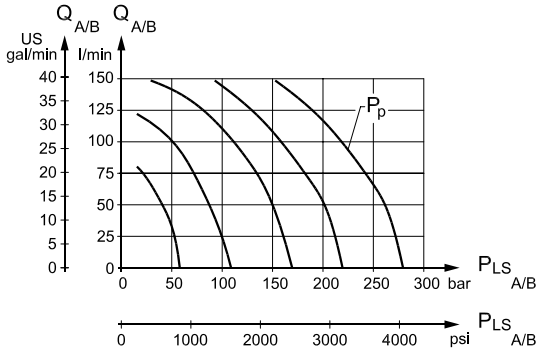


Size B:

1: See example page 40

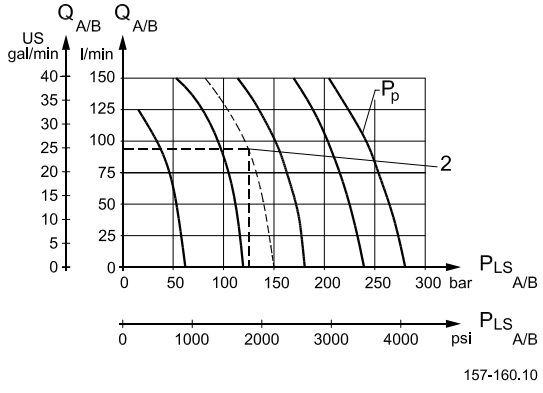


Size C:



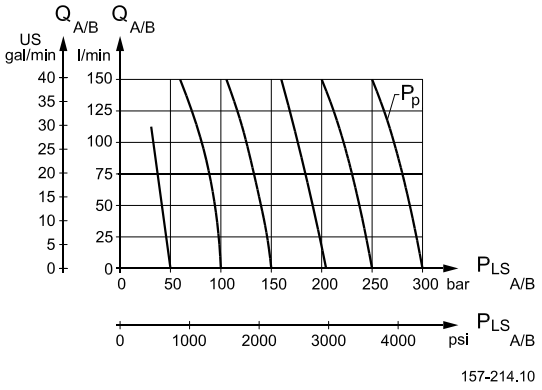
Size D:

2: See example page 40



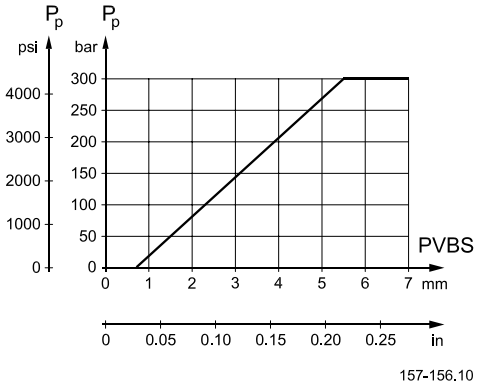
PRESSURE CONTROL SPOOLS, CHARACTERISTICS IN EXTREME POSITIONS

Size E:



Pressure build-up

Max. oil flow can be reduced by about 50% without limitation of maximum pressure by limiting the main spool travel from 7 mm [0.28 in] to 5.5 mm [0.22 in]



EXAMPLES OF HOW TO USE THE CHARACTERISTICS FOR PRESSURE CONTROL SPOOLS

Example of determining the oil flow

- Given:
  - Spool type B
  - Pressure setting $P_{P:}$ 160 bar [2320 psi]
  - Load pressure, $LS_{A/B:}$ 100 bar [1450 psi]
- Result:
  - Oil flow = 75 l/min [19.8 US gal/min] (see page 39, size B).

Example of determining spool size

- Given:
  - Max. oil flow, $Q_{A/B}$: 90 l/min [23.8 US gal/min]
  - Pressure setting P_P: 150 bar [2175 psi]
  - Load pressure, P_{LS_A}: 125 bar [1810 psi]
- Result:
  - D spool (see page 39, size D)

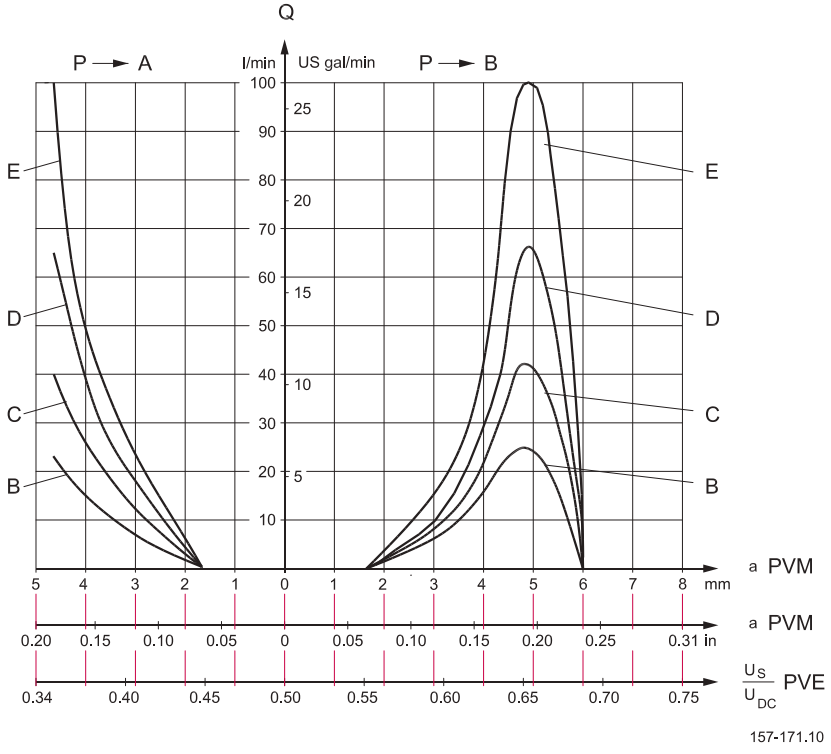
Please note:
Normally a smaller spool can be chosen with pressure control. It is our experience that the spool can be one size smaller than with normal flow control.

CHARACTERISTICS FOR FLOAT POSITION MAIN SPOOLS

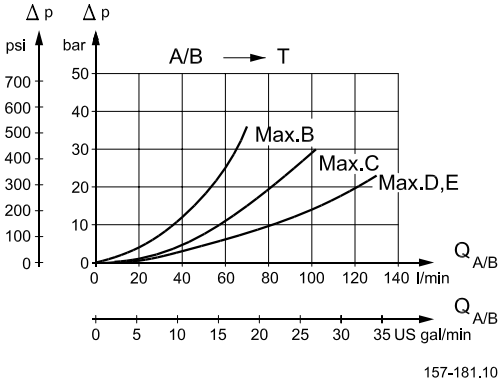
Characteristics; oil flow, spool travel and voltage

The spools have 4,8 mm spool travel in direction A and 8 mm travel in direction B:

- 4.8 mm [0.19 in] spool displacement in direction A gives max. oil flow to port A
- 4.8 mm [0.19 in] spool displacement in direction B gives max. oil flow to port B
- 8 mm [0.32 in] spool displacement in direction B gives completely open float position A/B → T.



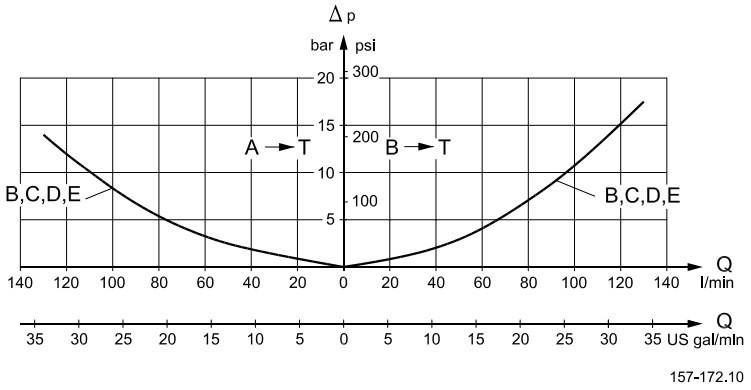
Pressure drop A/B → T at max. spool travel within the proportional range (4.8 mm) [0.19 in).



Spools D and E have the same opening area for forward flow and return flow.
Spool E can give 100 l/min [26.4 US gal/min] pressure compensated oil flow due to a higher pressure drop across spool E. This occurs during spool actuation only.

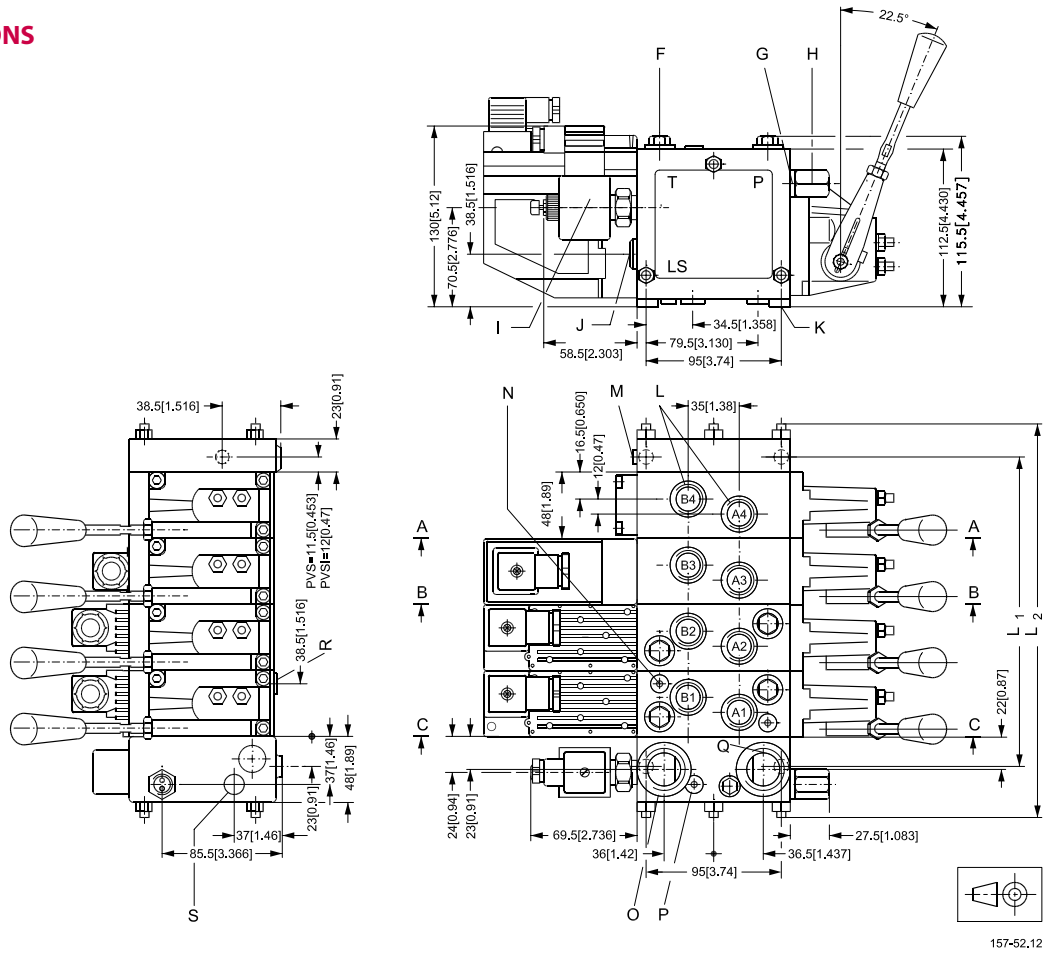
CHARACTERISTICS FOR FLOAT POSITION MAIN SPOOLS

Pressure drop A/B → T in float position



157-172.10

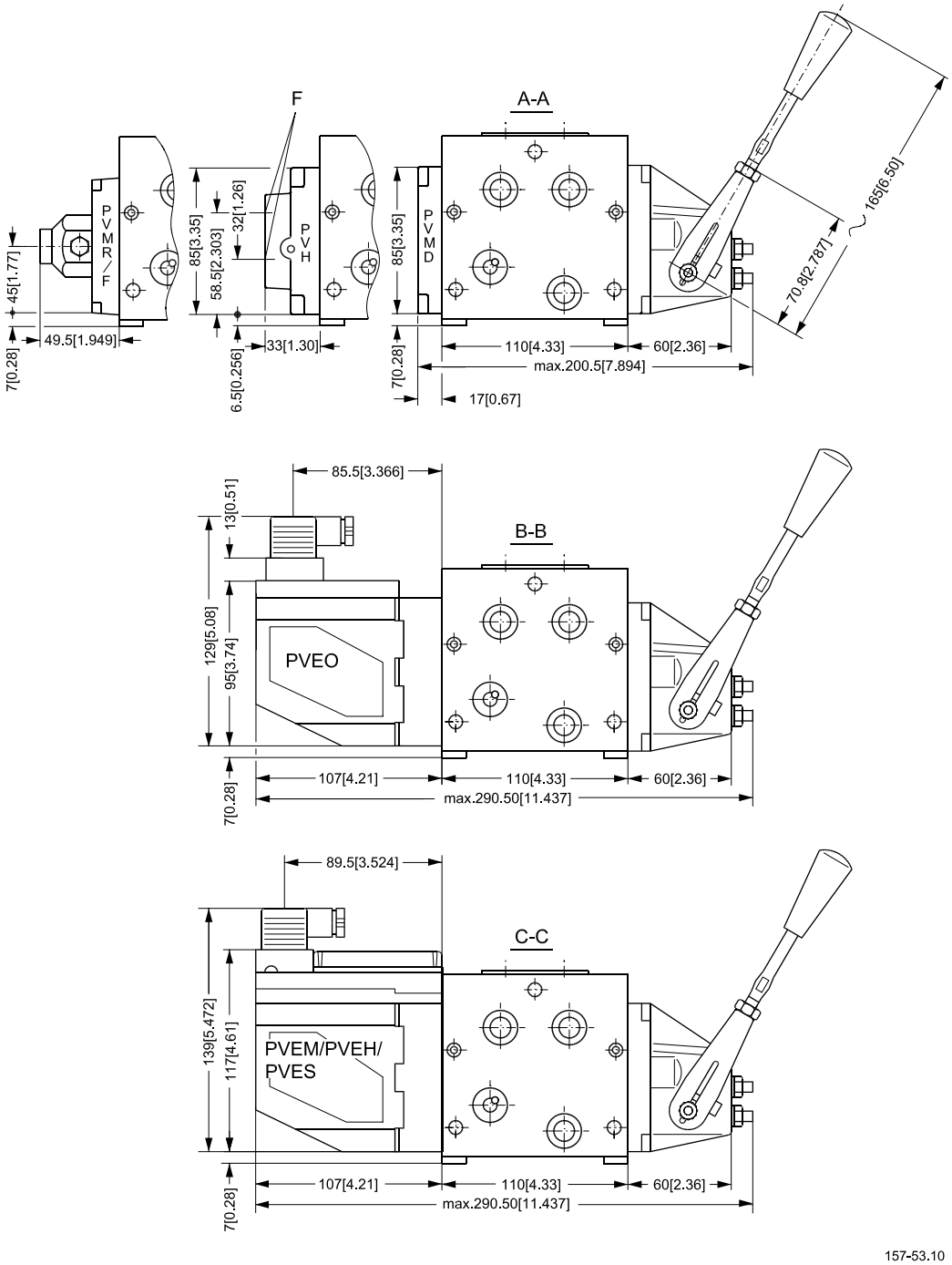
VALVE DIMENSIONS



F : Shock and suction valve, PVLP
G : Pressure gauge connection; G 1/4, 12 mm deep – [1/2 in-20, 0.47 in deep]
H : Plug for external pilot oil supply, PVPC; G 1/2, 12 mm deep – [1/2 in-20, 0.47 in deep]
I : Electrical LS unloading valve, PVPX
J : LS connection; G 1/4, 12 mm deep – [1/2 in-20, 0.47 in deep]
K : Fixing holes; M8 × min. 15 – [5/16 in-18, 0.47 in deep]
L : Port A and B; G 1/2, 14 mm deep – [7/8 in-14, 0.65 in deep]
M : LX connection: PVS; G 1/8, 10 mm deep – [3/8 in-24, 0.39 in deep]
PVSI; G 1/4, 12 mm [0.47 in] deep – [1/2 in-20, 0.47 in deep]
N : LS pressure limiting valve
O : Tank connection; G 3/4, 16 mm deep – [1 1/16 in-12, 0.75 in deep]
P : Pressure relief valve
Q : Pump connection; G 1/2, 14 mm deep or G 3/4, 16 mm deep – [7/8 in-14, 0.65 in deep or 1 1/16 in-12, 0.75 in deep]
R : LS_A and LS_B connections; G 1/4, 12 mm [0.47 in] deep – [1/2 in-20, 0.47 in deep]
S : Pp, pilot pressure connection G ¼

PVB		1	2	3	4	5	6	7	8	9	10
L1	mm	82	130	178	226	274	322	370	418	466	514
	[in]	3.23	5.12	7.01	8.90	10.79	12.68	14.57	16.46	18.35	20.24
L2	mm	140	189	238	287	336	385	434	483	532	581
	[in]	5.51	7.44	9.37	11.30	13.23	15.16	17.09	19.02	20.95	22.87

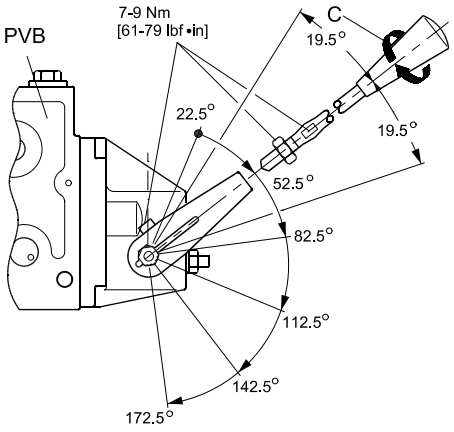
GENERAL DIMENSIONS



F : G 1/4, 12 mm deep [1/2 in - 20, 0.47 in deep]

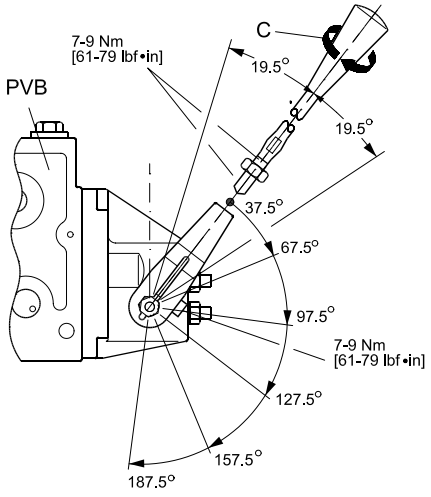
CONTROL LEVER POSITIONS

Base with an angle of 22.5°



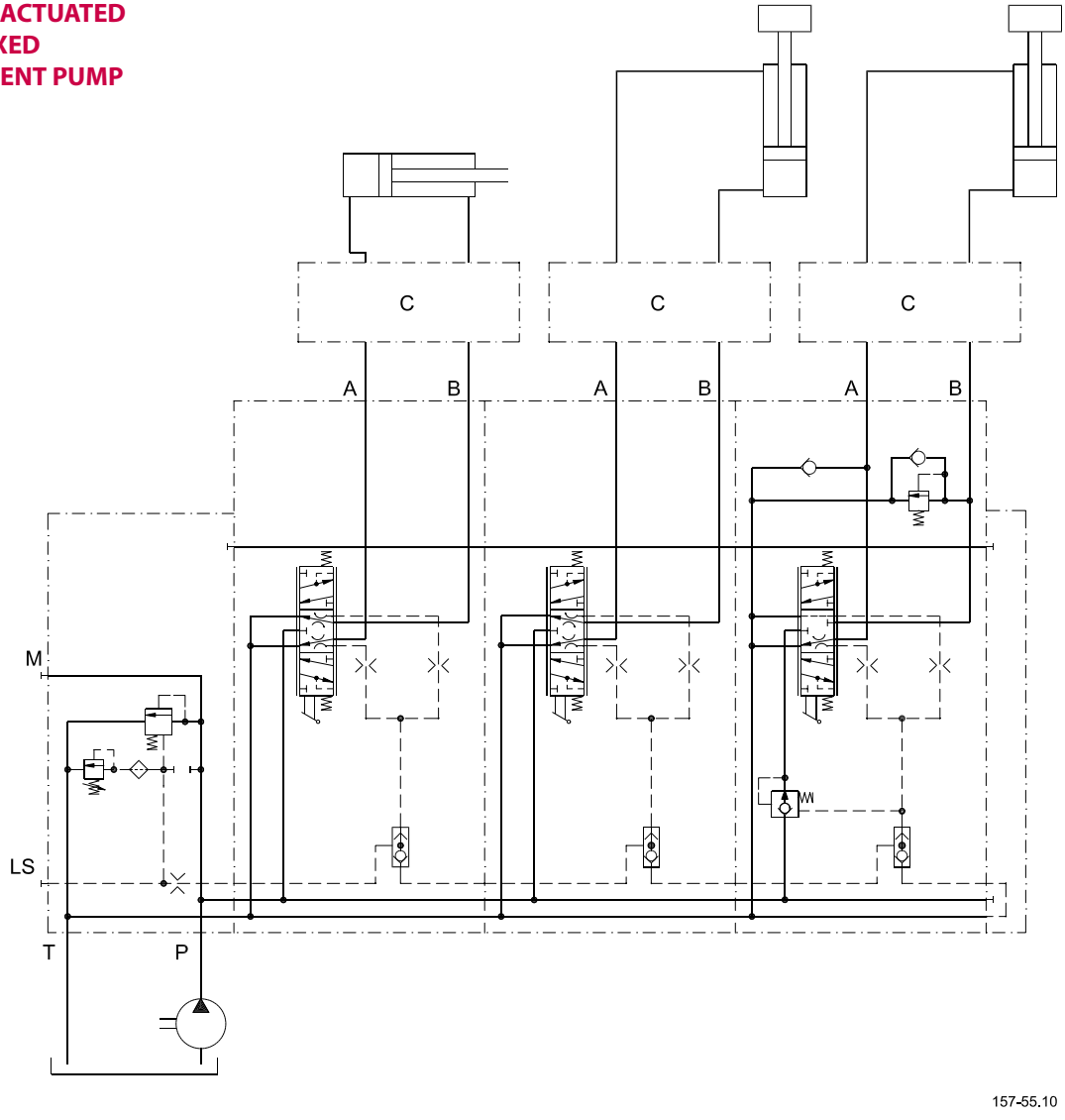
157-75.10

Base with an angle of 37.5°



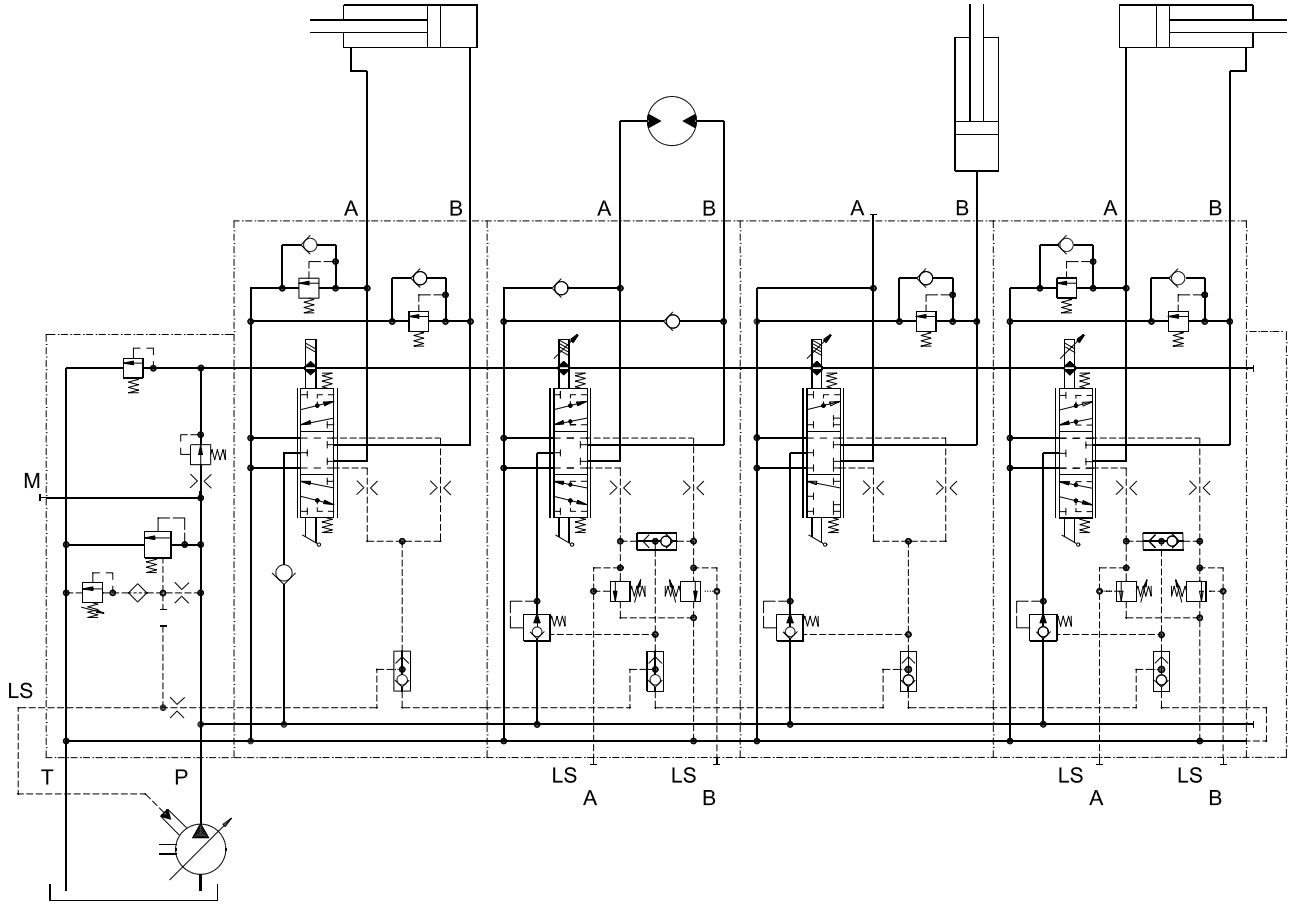
157-64.10

MANUALLY ACTUATED PVG 32 – FIXED DISPLACEMENT PUMP



C: Over-centre valve

ELECTRICALLY ACTUATED PVG 32 – VARIABLE DISPLACEMENT PUMP (ELECTRICAL ACTUATOR, SHOCK VALVES, ETC.)



157-56.10

ELECTRICAL CONNECTIONS, GENERAL

The electrical connections to remote control levers, PVE actuators and voltage supply are made using an ordinary terminal strip.

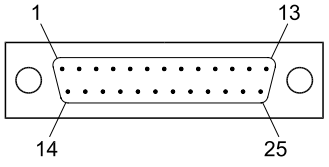
The wiring diagrams below and on page 50 to 53 show only the basic outlines for the electrical connection.

Voltage supply
For a main transformer with stabilised output voltage, the ripple must not exceed 5% of rated voltage.

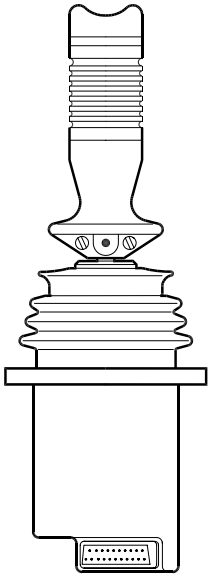
ELECTRICAL CONNECTION EXAMPLE

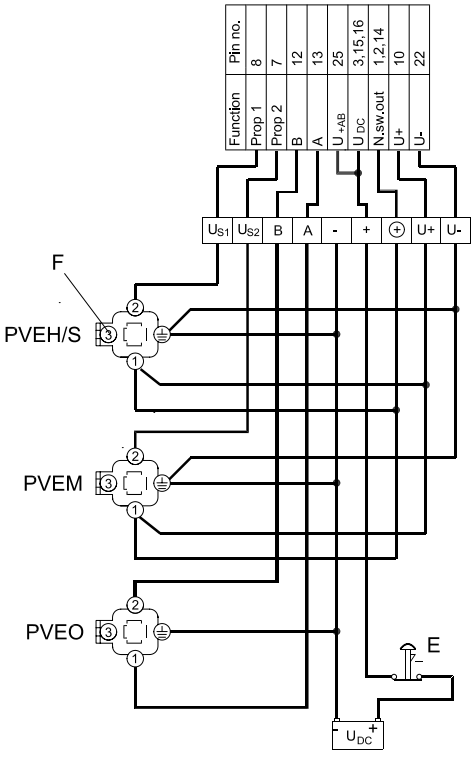
Signal leads must not act as supply leads at the same time unless the distance between the actuator module PVE and terminal board is less than 3 m [3.3 yards] and the lead cross-section is min. 0.75 mm^2 [AWG 18].

25 Pin SUB-D connector
with M3 screws (MIL-DTL-24308)



162B78.10





155B539.10

F: Signal output, fault monitoring
E: Emergency stop

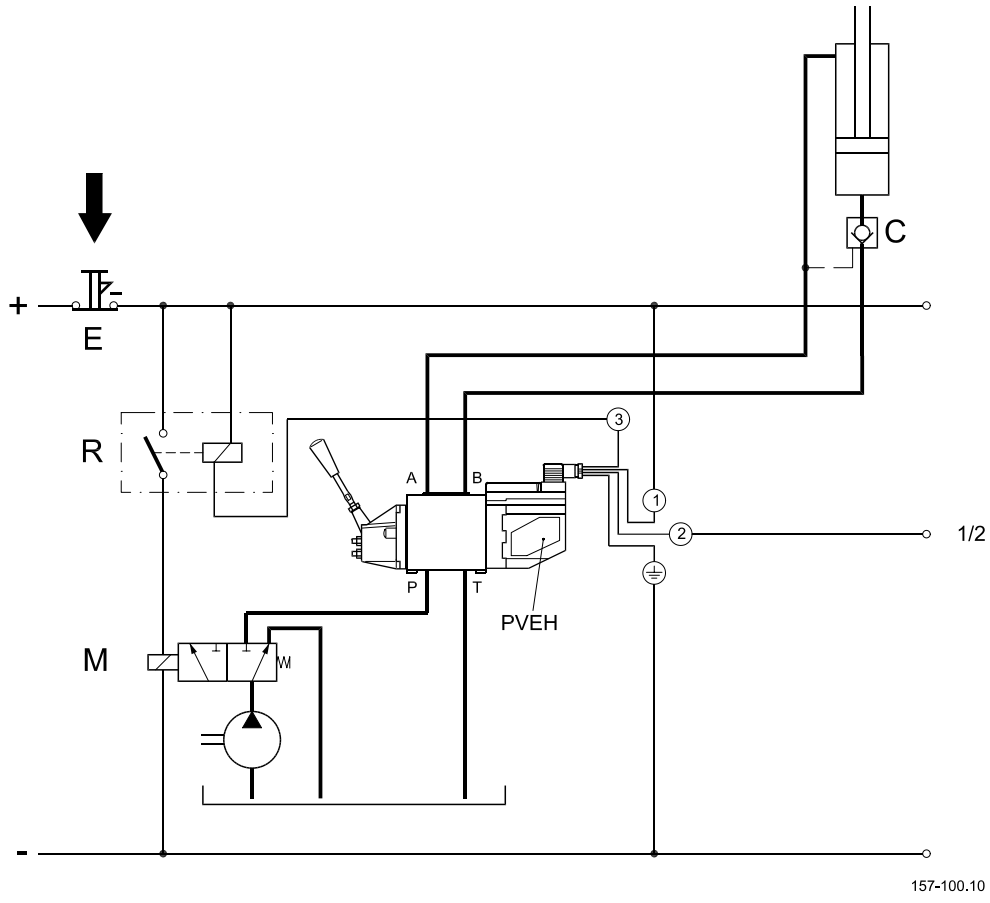
BUILDING IN SAFETY

All makes and all types of directional control valves (incl. proportional valves) can fail. Thus the necessary protection against the serious consequences of function failure should always be built in.

For each application an assessment should be made of the consequences of pressure failure and uncontrolled or blocked movements.
To determine the degree of protection that ought to be built into the system, Sauer-Danfoss makes the following distinctions.

1. Maximum safety demands
2. High safety demands
3. Average safety demands
4. Limited safety demands.

1. MAXIMUM SAFETY DEMANDS



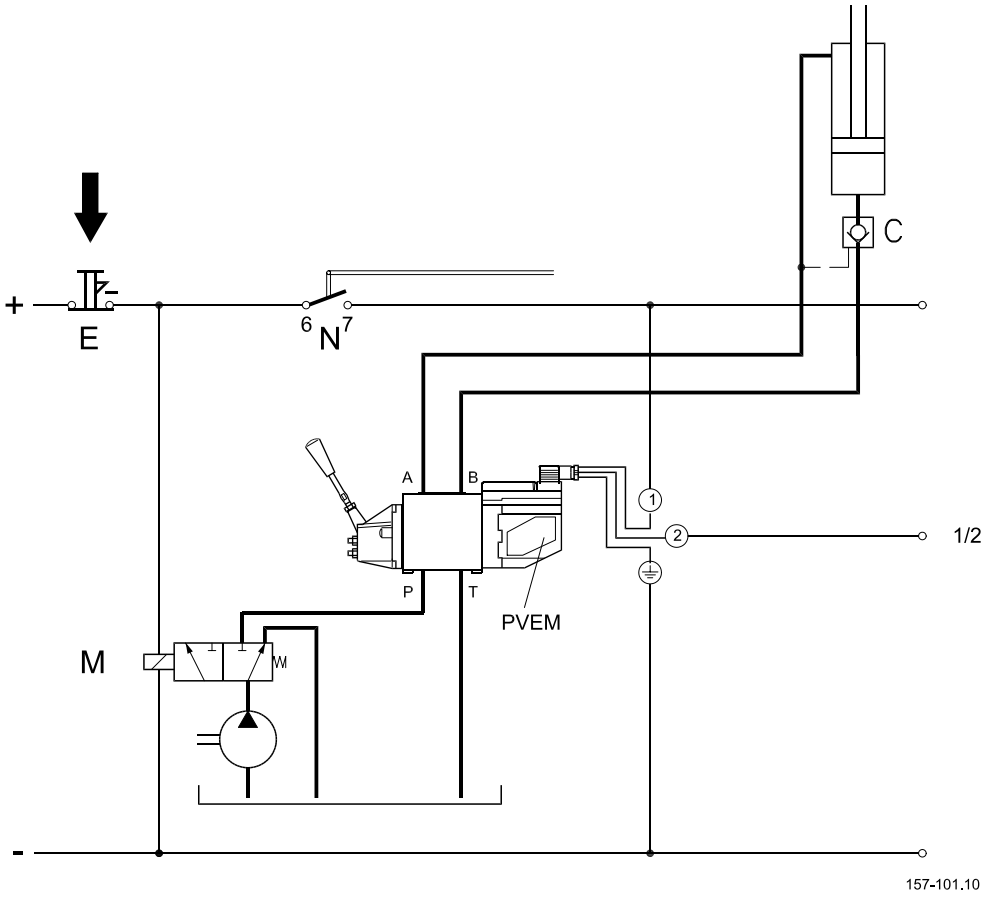
When the fault monitoring system in PVEH is connected, the reaction to electrical and mechanical faults (e.g. a spool seizure) is fast and operator-independent. See page 17 “fault monitoring”.

A system can be protected against many electrical, hydraulic and mechanical faults by building in components as shown in the diagram:
R: Alarm logic EHA (or relay) connected to the fault monitoring system in PVEH
E: Electrical emergency stop
M: Solenoid valve
C: Pilot-operated check valve

The alarm logic EHA cuts off current to the solenoid valve (M) when PVEH monitoring registers a fault. The solenoid valve then leads the oil flow direct from pump to tank. Thus all functions are without operating pressure, i.e. locked in position, because there is no pilot pressure on the pilot operated check valve (C).
Actuation of the emergency switch (E) cuts off current to the proportional valve and the solenoid valve (M). Actuation in this case is manual, but the result is the same as above. Stopping or disconnecting the pump drive motor is another safety measure, if the system reaction time can be accepted.

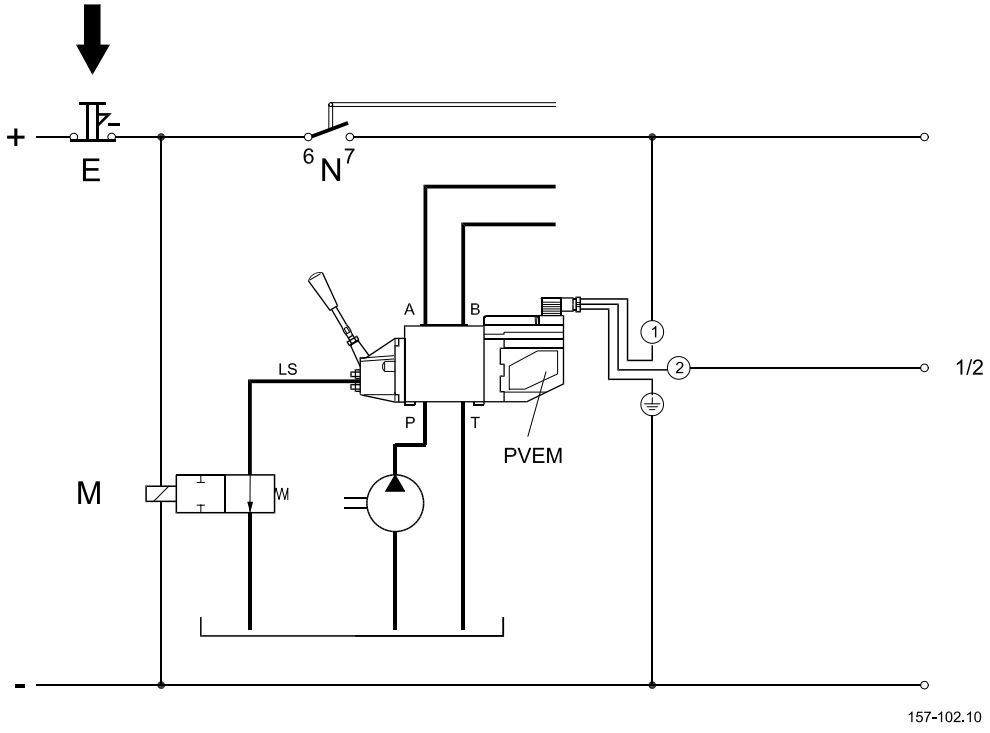
Note:
The neutral position switch in the remote control units should not be used.
PVEH with fault monitoring must have a constant voltage supply.

2.
HIGH SAFETY DEMANDS



The difference between this safety method and the one previously described (1) is that here there is no built-in automatic fault monitoring and a neutral position switch (N) is connected.
The method still gives a high degree of protection, but requires operator intervention. It is recommended that the neutral position switch be always connected to the electrical system. This then automatically cuts off current to the proportional valve when the remote control unit is in neutral position.

3. AVERAGE SAFETY DEMANDS

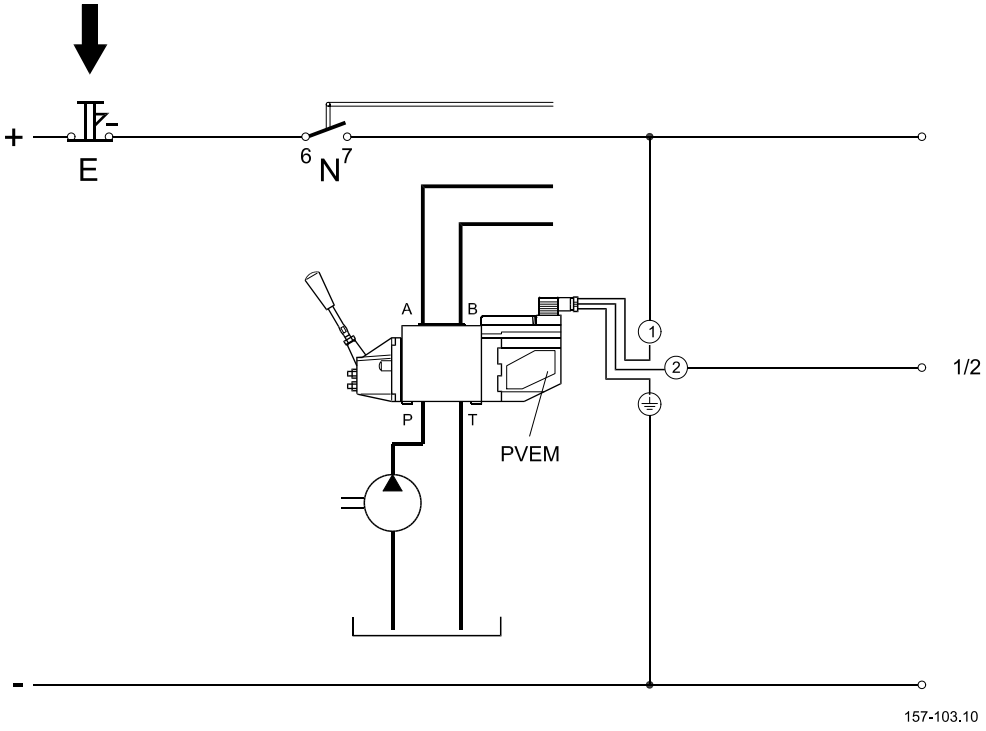


The difference from the previous method is that the LS- signal from the proportional valve is led direct to tank when the emergency switch (E) is actuated. This can be achieved by using the Sauer-Danfoss LS unloading valve PVPX, integrated in the pump side module.

In a system with open centre PVP and a fixed displacement pump, the effect of the PVPX is an almost pressureless system, 8-14 bar [120-200 psi] i.e. all functions requiring a higher operating pressure will not operate, see page 11.

The method can also be used in LS systems with a variable displacement pump and closed centre version proportional valve.
The pressure after LS relief then depends on the pump stand-by pressure.

4. LIMITED SAFETY DEMANDS



The safety system can consist of an emergency switch (E) and a neutral position switch (N) if protection against electrical failure is the only requirement. Here, there is no protection against hydraulic and mechanical faults (spool seizured in an extreme position).

OIL

The main duty of the oil in a hydraulic system is to transfer energy; but it must also lubricate the moving parts in hydraulic components, protect them against corrosion, and transport dirt particles and heat out of the system. It is therefore important to choose the correct oil with the correct additives. This gives normal operation and long working life.

Mineral oil
For systems with PVG 32 valves Sauer-Danfoss recommends the use of mineral-based hydraulic oil containing additives: Type HLP (DIN 51524) or HM (ISO 6743/4).

Non-flammable fluids
Phosphate-esters (HFDR fluids) can be used without special precautions. However, dynamic seals must be replaced with FPM (Viton) seals.
So please contact the Sauer-Danfoss Sales Organization if the PVG 32 valve is to be used with phosphate-esters.
The following fluids should only be used according to agreement with the Sales Organization for Sauer-Danfoss:

- Water-glycol mixtures (HFC fluids)
- Water-oil emulsions (HFB fluids)
- Oil-water emulsions (HFAE fluids)

Biodegradable oils
PVG 32 valves can be used in systems with rapeseed oil. The use of rapeseed oil is conditioned by

- complying with the demands on viscosity, water content, temperature and filtering etc. (see chapters below and technical data page 12).
- adapting the operating conditions to the directions of the oil supplier.

Before using other biodegradable fluids, please consult the Sauer-Danfoss Organization.

PARTICLE CONTENT, DEGREE OF CONTAMINATION

Oil filtration must prevent particle content from exceeding an acceptable level, i.e. an acceptable degree of contamination.

Maximum contamination for PVG 32 is 19/16 (see ISO 4406. Calibration in accordance with the ACFTD method).

In our experience a degree of contamination of 19/16 can be maintained by using a filter fineness as described in the next section.

FILTRATION

Effective filtration is the most important precondition in ensuring that a hydraulic system performs reliably and has a long working life. Filter manufacturers issue instructions and recommendations. It is advisable to follow them.

System filters
Where demands on safety and reliability are very high a pressure filter with bypass and indicator is recommended. Experience shows that a 10 µm nominal filter (or finer) or a 20 µm absolute filter (or finer) is suitable.
It is our experience that a return filter is adequate in a purely mechanically operated valve system.

The fineness of a pressure filter must be selected as described by the filter manufacturer so that a particle level of 19/16 is not exceeded.

The filter must be fitted with pressure gauge or dirt indicator to make it possible to check the condition of the filter.

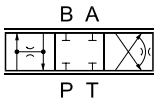
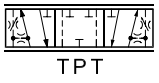
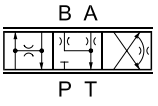
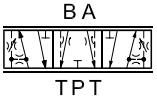
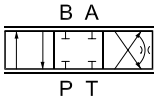
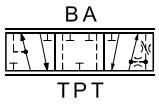
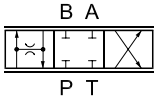
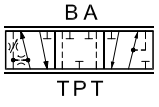
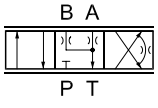
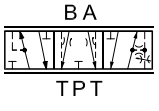
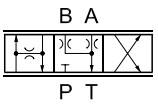
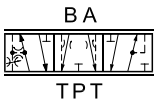
In systems with differential cylinders or accumulators the return filter must be sized to suit the max. return oil flow. Pressure filters must be fitted to suit max. pump oil flow.

Internal filters
The filters built into PVG 32 are not intended to filter the system but to protect important components against large particles. Such particles can appear in the system as a result of pump damage, hose fracture, use of quick-couplings, filter damage, starting up, contamination, etc.

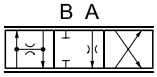
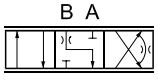
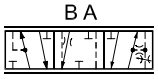
The filter in the electrical actuator PVE protecting the solenoid valves has a mesh of 150 µm.

Bursting pressure drop for internal filters is 25 bar [360 psi].

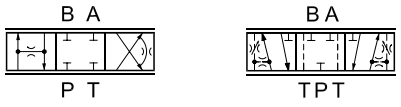
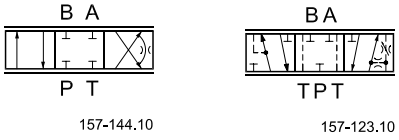
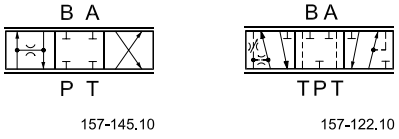
STANDARD PC SPOOLS

To be used when PVB is with $LS_{A/B}$ shuttle valve						Code number 157B...		To be used when PVB is without $LS_{A/B}$ shuttle valve					
Size						ISO symbol	Symbol	Size					
Press. compensated flow l/min [US gal/min]								Press. compensated flow l/min [US gal/min]					
E 100 [26.4]	D 65 [17.2]	C 40 [10.6]	B 25 [6.6]	A 10 [2.6]	AA 5 [1.3]			AA 5 [1.3]	A 10 [2.6]	B 25 [6.6]	C 40 [10.6]	D 65 [17.2]	E 100 [26.4]
–	7033	7032	7031	7030	7035	 157-143.10	 157-121.10	7015	7010	7011	7012	7013	–
						4-way, 3-position Closed neutral position, PC → A and B							
7134	7133	7132	7131	7130	7135	 157-146.10	 157-128.10	7115	7110	7111	7112	7113	–
						4-way, 3-position Closed neutral position, PC → A and B							
7064	7063	7062	7061	–	–	 157-144.10	 157-123.10	–	7040	7041	7042	7043	7044
						4-way, 3-position Closed neutral position, PC → A							
7074	7073	7072	7071	–	–	 157-145.10	 157-122.10	–	7050	7051	7052	7053	7054
						4-way, 3-position Closed neutral position, PC → B							
7164	7163	7162	7161	–	–	 157-147.10	 157-130.10	–	–	7141	7142	7143	7144
						4-way, 3-position Throttled, open neutral position, PC → A							
7174	7173	7172	7171	–	–	 157-148.10	 157-132.10	–	7150	7151	7152	7153	7154
						4-way, 3-position Throttled, open neutral position, PC → B							

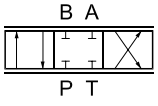
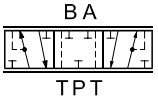
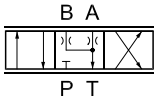
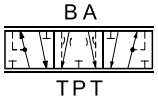
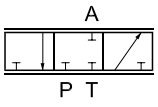
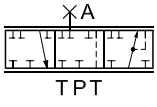
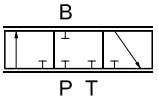
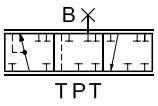
STANDARD PC SPOOLS

To be used when PVB is with $LS_{A/B}$ shuttle valve						Code number 157B...		To be used when PVB is without $LS_{A/B}$ shuttle valve					
Size						ISO symbol	Symbol	Size					
Press. compensated flow l/min [US gal/min]								Press. compensated flow l/min [US gal/min]					
E 100 [26.4]	D 65 [17.2]	C 40 [10.6]	B 25 [6.6]	A 10 [2.6]	AA 5 [1.3]			AA 5 [1.3]	A 10 [2.6]	B 25 [6.6]	C 40 [10.6]	D 65 [17.2]	E 100 [26.4]
–	7473	7472	7471	7470	–	 157-149.10	 157-142.10	–	–	–	7452	7453	–
						4-way, 3-position Throttled, A → T neutral position, PC → B							
–	7563	7562	–	–	–	 157-167.10	 157-188.10	–	–	7541	7542	7543	–
						4-way, 3-position Throttled, B→ T neutral position , PC → A							

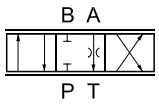
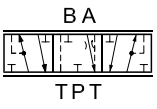
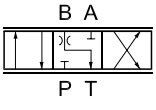
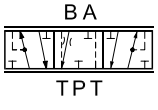
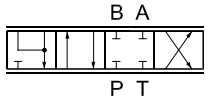
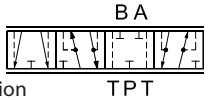
STANDARD PC SPOOLS, HYDRAULIC ACTUATION

To be used when PVB is with $LS_{A/B}$ shuttle valve						Code number 157B...		To be used when PVB is without $LS_{A/B}$ shuttle valve					
Size						ISO symbol	Symbol	Size					
Press. compensated flow l/min [US gal/min]								Press. compensated flow l/min [US gal/min]					
E 100 [26.4]	D 65 [17.2]	C 40 [10.6]	B 25 [6.6]	A 10 [2.6]	AA 5 [1.3]			AA 5 [1.3]	A 10 [2.6]	B 25 [6.6]	C 40 [10.6]	D 65 [17.2]	E 100 [26.4]
–	–	–	–	–	–	 4-way, 3-position Closed neutral position, PC → A and B		9015	9010	9011	9012	–	–
–	–	–	–	–	–	 4-way, 3-position Closed neutral position, PC → A		–	–	–	9042	9043	9044
–	–	–	–	–	–	 4-way, 3-position Closed neutral position, PC → B		–	–	–	9052	9053	9054

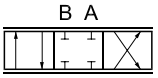
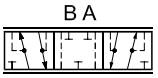
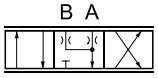
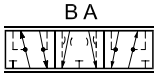
STANDARD FC SPOOLS

To be used when PVB is with $LS_{A/B}$ shuttle valve							Code number 157B...		To be used when PVB is without $LS_{A/B}$ shuttle valve						
Size							ISO symbol	Symbol	Size						
Press. compensated flow l/min [US gal/min]									Press. compensated flow l/min [US gal/min]						
F 130 [34.3]	E 100 [26.4]	D 65 [17.2]	C 40 [10.6]	B 25 [6.6]	A 10 [2.6]	AA 5 [1.3]			AA 5 [1.3]	A 10 [2.6]	B 25 [6.6]	C 40 [10.6]	D 65 [17.2]	E 100 [26.4]	F 130 [34.3]
7026	7024	7023	7022	7021	7020	7025	 157-02.10  157-26.10 4-way, 3-position Closed neutral position		7005	7000	7001	7002	7003	7004	7006
7126	7124	7123	7122	7121	7120	7125	 157-03.10  157-27.10 4-way, 3-position Throttled, open neutral position		7105	7100	7101	7102	7103	7104	7106
–	–	–	–	–	–	–	 157-04.10  157-28.10 4-way, 3-position Closed neutral position, P → A		–	7200	7201	7202	7203	7204	–
–	–	–	–	–	–	–	 157-05.10  157-29.10 3-way, 3-position Closed neutral position, P → B		–	–	7301	7302	7303	7304	–

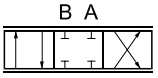
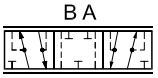
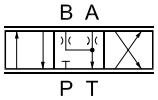
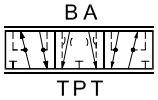
STANDARD FC SPOOLS

To be used when PVB is with $LS_{A/B}$ shuttle valve							Code number 157B…		To be used when PVB is without $LS_{A/B}$ shuttle valve						
Size							ISO symbol	Symbol	Size						
Press. compensated flow l/min [US gal/min]									Press. compensated flow l/min [US gal/min]						
F 130 [34.3]	E 100 [26.4]	D 65 [17.2]	C 40 [10.6]	B 25 [6.6]	A 10 [2.6]	AA 5 [1.3]			AA 5 [1.3]	A 10 [2.6]	B 25 [6.6]	C 40 [10.6]	D 65 [17.2]	E 100 [26.4]	F 130 [34.3]
–	7424	7423	7422	7421	–	–	 157-06.10	 157-30.10	–	–	7401	7402	7403	7404	7406
							4-way, 3-position Throttled, A → T in neutral position								
–	7524	7523	7522	7521	–	–	 157-07.10	 157-31.10	–	–	7501	7502	7503	7504	–
							4-way, 3-position Throttled, B → T in neutral position								
–	7624	7623	7622	7621	7620	–	 157-139.10	 157-140.10	–	–	–	–	–	–	–
							4-way, 4-position Closed neutral position Float P → B → F								

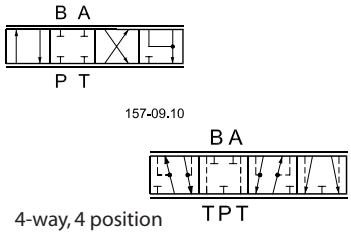
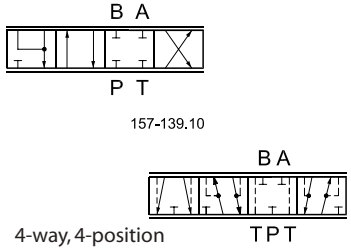
STANDARD FC SPOOLS, HYDRAULIC ACTUATION

To be used when PVB is with $LS_{A/B}$ shuttle valve						Code number 157B...		To be used when PVB is without $LS_{A/B}$ shuttle valve					
Size						ISO symbol	Symbol	Size					
Press. compensated flow l/min [US gal/min]								Press. compensated flow l/min [US gal/min]					
E 100 [26.4]	D 65 [17.2]	C 40 [10.6]	B 25 [6.6]	A 10 [2.6]	AA 5 [1.3]			AA 5 [1.3]	A 10 [2.6]	B 25 [6.6]	C 40 [10.6]	D 65 [17.2]	E 100 [26.4]
9024	9023	9022	9021	9020	9025	 157-02.10 4-way, 3-position closed neutral position	 157-117.10	9005	9000	9001	9002	9003	9004
9124	9123	9122	9121	9120	9125	 157-03.10 4-way, 3-position Throttled closed neutral position	 157-118.10	9105	9100	9101	9102	9103	9104

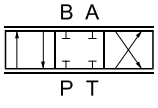
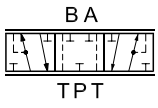
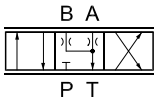
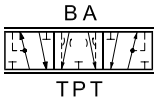
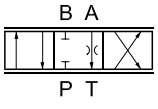
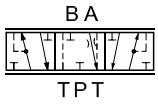
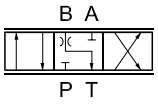
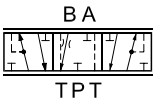
PVMR, FC SPOOLS FOR FRICTION DETENT

To be used when PVB is with $LS_{A/B}$ shuttle valve						Code number 157B...		To be used when PVB is without $LS_{A/B}$ shuttle valve					
Size						ISO symbol	Symbol	Size					
Press. compensated flow l/min [US gal/min]								Press. compensated flow l/min [US gal/min]					
E 100 [26.4]	D 65 [17.2]	C 40 [10.6]	B 25 [6.6]	A 10 [2.6]	AA 5 [1.3]			AA 5 [1.3]	A 10 [2.6]	B 25 [6.6]	C 40 [10.6]	D 65 [17.2]	E 100 [26.4]
9724	9723	9722	9721	9720	–	 157-02.10 4-way, 3-position closed neutral position	 157-117.10	–	9700	9701	9702	9703	9704
9734	9733	9732	9731	9730	–	 157-03.10 4-way, 3-position Throttled open neutral position	 157-118.10	–	9710	9711	9712	9713	9714

FC SPOOLS FOR MECHANICAL FLOAT POSITION PVMF

To be used when PVB is with $LS_{A/B}$ shuttle valve							Code number 157B...	To be used when PVB is without $LS_{A/B}$ shuttle valve						
Size							ISO symbol Symbol	Size						
Press. compensated flow l/min [US gal/min]								Press. compensated flow l/min [US gal/min]						
F 130 [34.3]	E 100 [26.4]	D 65 [17.2]	C 40 [10.6]	B 25 [6.6]	A 10 [2.6]	AA 5 [1.3]		AA 5 [1.3]	A 10 [2.6]	B 25 [6.6]	C 40 [10.6]	D 65 [17.2]	E 100 [26.4]	F 130 [34.3]
–	9824	9823	9822	9821	9820	9825	 4-way, 4 position Closed neutral position P → A → F	–	–	–	–	–	–	–
–	9624	9623	9622	9621	–	–	 4-way, 4-position Closed neutral position Float P → B → F	–	–	–	–	–	–	–

FC SPOOLS WITH LINEAR FLOW CHARACTERISTIC

To be used when PVB is with $LS_{A/B}$ shuttle valve							Code number 157B...		To be used when PVB is without $LS_{A/B}$ shuttle valve						
Size							ISO symbol	Symbol	Size						
Press. compensated flow l/min [US gal/min]									Press. compensated flow l/min [US gal/min]						
F 130 [34.3]	E 100 [26.4]	D 65 [17.2]	C 40 [10.6]	B 25 [6.6]	A 10 [2.6]	AA 5 [1.3]			AA 5 [1.3]	A 10 [2.6]	B 25 [6.6]	C 40 [10.6]	D 65 [17.2]	E 100 [26.4]	F 130 [34.3]
–	9774	9773	9772	9771	–	–	 157-02.10  157-26.10 4-way, 3-position Closed neutral position		–	9750	9751	9752	9753	9754	–
–	9784	9783	9782	9781	–	–	 157-03.10  157-27.10 4-way, 3-position Throttled, open neutral position		–	9760	9761	9762	9763	9764	–
–	–	–	–	–	–	–	 157-06.10  157-30.10 4-way, 3-position Throttled, A → T in neutral position		–	–	–	–	–	9794	–
–	–	–	–	–	–	–	 157-07.10  157-31.10 4-way, 3-position B → T in closed neutral position		–	–	–	–	–	9804	–

PVB, basic valves

Code no. 157B…	No facilities for shock valves A and B		Facilities for shock valves A and B	
	G 1/2	7/8 in-14	G 1/2	7/8 in-14
Without compensator /check valve	6000	6400	6030	6430
With check valve	6100	6500	6130	6530
With check valve and $LS_{A/B}$ shuttle valve	–	–	6136	6536
With compensator valve	6200	6600	6230	6630
With damped compensator valve	6206	–	6236	–
With compensator valve, $LS_{A/B}$ relief valve and $LS_{A/B}$ shuttle valve	6203	6603	6233	6633
With compensator valve, $LS_{A/B}$ relief valve and $LS_{A/B}$ shuttle valve	6208	–	6238	–
Weight kg [lb]	3.1 [6.8]		3.0 [6.6]	

PVPV/M, pump side module closed center

Code no. 157B….	With pilot supply for PVE and without PVLP 63		and with PVLP 63	
	G1	1 5/16 UN	G1	1 5/16 UN
PVPV	5938	5911	5941	5913
PVPVM	5937	5912	5940	5914

PVPC, plugs

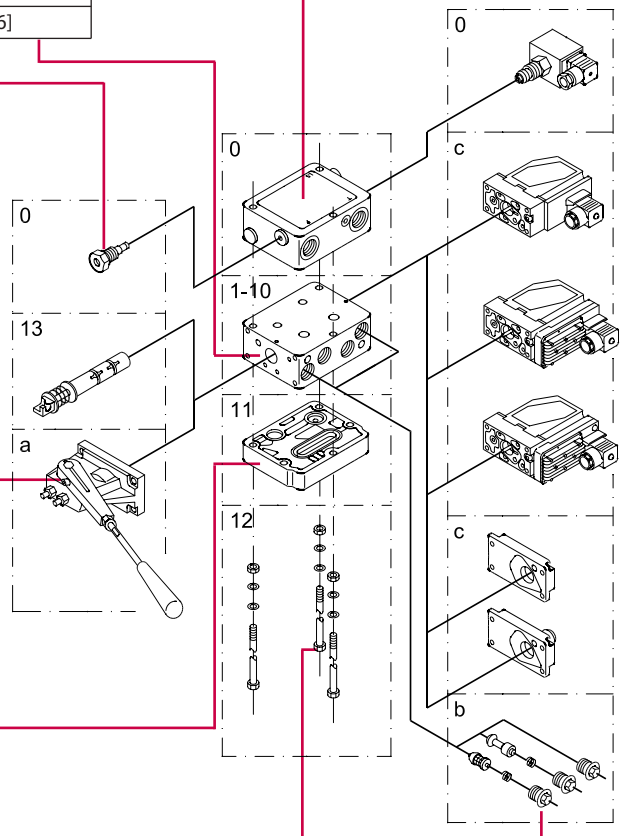
Code no. 157B…	G 1/4	1/2 in - 20	Weight kg	[lb]
External pilot supply	5400	–	0.05	0.1
External pilot supply incl. check valve	5600	5700	0.05	0.1

PVM, mechanical actuation

Standard	157B…	3171 3172	3191 3192	22.5° 37.5°
Standard, with base, without arm and button	157B…	3174 3175	3194 3195	37.5° 22.5°
Standard, without base, arm and button	157B…	3173	3193	–
Weight	kg [lb]	0.4 0.9		

End plate, PVS, PVSI

Code no. 157B…	G 1/4	1/2 in - 20	Weight kg	[lb]
PVS, without connections	2000	2020	0.5	1.1
PVS, with LX connection	2011	2021	0.5	1.1
PVSI, without connections	2014	2004	1.7	3.6
PVSI, with LX connections	2015	2005	1.7	3.6



PVAS, assembly kit

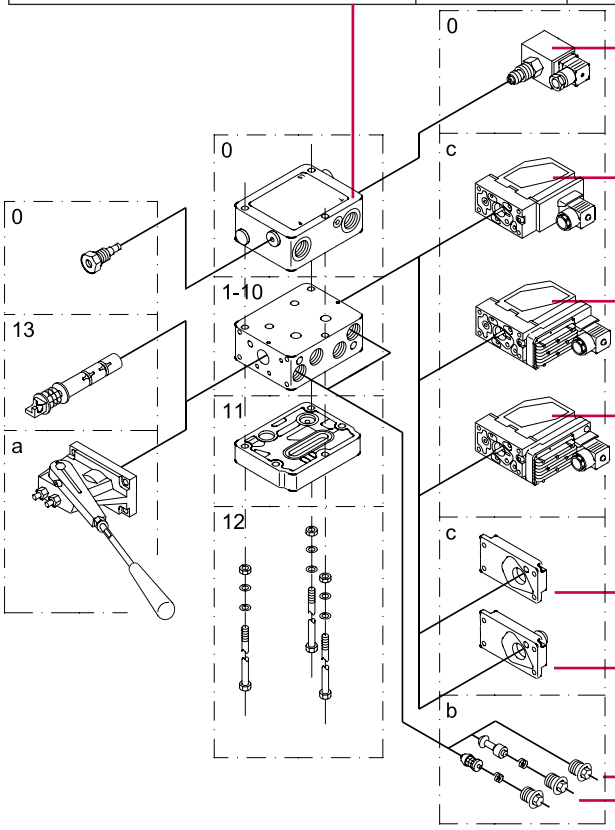
Code no. 157B…	0	1	2	3	4	5	6	7	8	9	10
PVB's	8000	8001	8002	8003	8004	8005	8006	8007	8008	8009	8010
PVB + PVPVM	–	8021	8022	8023	8024	8025	8026	8027	8028	8029	8030
Weight kg [lb]	0.1 [0.2]	0.15 [0.3]	0.25 [0.6]	0.30 [0.7]	0.40 [0.9]	0.45 [1.0]	0.50 [1.1]	0.60 [1.3]	0.65 [1.4]	0.70 [1.6]	0.80 [1.7]

PVLP, shock/and anti-cavitation valves

Code no. 157B…		2032	2050	2063	2080	2100	2125	2140	2150	2160	2175	2190	2210	2230	2240	2250	2265	2280	2300	2320	2350
Settings	bar	32	50	63	80	100	125	140	150	160	175	190	210	230	240	250	265	280	300	320	350
	[psi]	460	725	914	1160	1450	1813	2031	2175	2320	2538	2755	3045	3335	3480	3625	3845	4061	4351	4641	5075
Weight		0.05 kg [0.17 lb]																			

PVP, pump side module

Code no. 157B…		Without pilot supply for PVE	Without pilot supply for PVE with facilit. for PVPX	With pilot supply for PVE	With pilot supply for PVE and facilit. for PVPX	With pilot supply for PVE and pilot oil pressure take-off	With pilot supply for PVH and pilot oil pressure take-off
Open centre	T = G 3/4, P = G 1/2	5000	–	5010	5012	–	–
	P = 7/8 in - 14	5200	–	5210	5212	–	–
	T = G 3/4, P = G 3/4	5100	5102	5110	5112	5180	5190
	P = 1 1/16 in - 12	5300	–	5310	5312	–	–
Closed centre	T = G 3/4, P = G 1/2	5001	–	5011	5013	–	–
	P = 7/8 in - 14	5201	–	5211	5213	–	–
	T = G 3/4, P = G 3/4	5101	5103	5111	5113	5181	5191
	P = 1 1/16 in - 12	5301	–	5311	5313	–	–
Weight	kg	3.0	3.0	3.0	3.0	3.0	3.0
	[lb]	[6.6]	[6.6]	[6.6]	[6.6]	[6.6]	[6.6]



157-240.11

PVPX, electrical LS pressure relief valves

Code no. 157B…		Code No.	Weight kg	Weight [lb]
Normally open	12 V	4236	0.3	0.7
	24 V	4238	0.3	0.7
Normally closed	12 V	4246	0.3	0.7
	24 V	4248	0.3	0.7
Normally open with manual override	12 V	4256	0.3	0.7
	24 V	4258	0.3	0.7
Plug		5601	0.06	0.13

PVE, electrical actuation

Code no. 157B…		Code No.	Weight kg	Weight [lb]
PVEO, on-off	12 V	4216	0.6	1.3
	24 V	4228	0.6	1.3
PVEM prop. medium – Standard	12 V	4116	0.9	2.0
	24 V	4128	0.9	2.0
PVEM prop. medium – Float	12 V	4416	1.0	2.2
	24 V	4428	1.0	2.2
PVEH prop. high – active fault mon.	12 V	4016	1.0	2.2
	24 V	4028	1.0	2.2
PVEH prop. high – passive fault mon.	12 V	4086	1.0	2.2
	24 V	4088	1.0	2.2
PVEH prop. high – float pos. act. fault	12 V	4316	1.0	2.2
	24 V	4328	1.0	2.2
PVES – 0% hys. act. fault.	12 V	4816	1.0	2.2
	24 V	4828	1.0	2.2

PVMD, PVH, PVMR, PVMF covers

Code no. 157B…	Code No.	Weight kg	Weight [lb]
Cover for PVM	0001	0.1	0.2
Hydraulic actuation PVH G 1/4	0008	0.2	0.4
Hydraulic actuation PVH 9/16 - 18 UNF	0007	0.9	2.0
PVMR (frict. detent)	0004	0.3	0.6
PVMF (mech. float position)	0005	0.3	0.6

PVLA, anti-cavitation valve

Code no. 157B…	Code No.	Weight kg	Weight [lb]
Plug A or B	2002	0.04	0.09
Valve A or B	2001	0.05	0.1

ORDER SPECIFICATION

An order form for Danfoss PVG 32 hydraulic valve is shown on the next page. The form can be obtained from the Sauer-Danfoss Sales Organization.

Both the module selection chart on the previous pages and the order form are divided into fields 0, 1-10, 11, 12, 13, a, b, and c.

Each module has its own field:

0: - Pump side module PVP
- Plug for external pilot oil supply PVPC
- Electrical LS unloading valve PVPX

1-10: Basic valves PVB

13: Main spool PVBS

a: Mechanical actuator PVM (or PVE when option mounted)

c: - Cover for mechanical actuation PVMD
- Cover for hydraulic actuation PVH
- Electrical actuators PVE (or PVE when option mounted)

b: - Shock and suction valve PVLP
- Suction valve PVLA

11: End plate PVS

12: Assembly kit PVAS

Please state

- Code numbers of all modules required
- Required setting (P) for pump side module
- Required setting of $LS_{A/B}$ pressure limiting valves, see pressure setting guidance below.

Standard and option assembly

The PVG 32 valve group is assembled the way the module selection chart shows if the code number for PVM is written in field a, and the code number for PVMD, PVE or PVH in field c.
The valve group is assembled so that the mechanical actuator is mounted on the opposite end of the basic module, if the code number for PVM is written in field c of the order form and the code numbers for PVMD, PVE or PVH in field a.

Reordering

The space at the top right-hand corner of the form is for Danfoss to fill in.
The code number for the whole of the specified valve group (PVG No.) is entered here.
In the event of a repeat order all you have to do is enter the number Danfoss has given on the initial confirmation of order.

ORDER SPECIFICATION

Pressure setting limits

The maximum setting pressure for the pressure limiting valves LS_A or LS_B depends on the chosen pressure setting for shock valve PVLP. The maximum values recommended to avoid interaction can be read in the following table.
The figures in the table have been calculated according to the following expressions:

- PVLP ≤150 bar: $LS_{A/B} \leq 0.8 \times P_{PVLP}$
- PVLP >150 bar: $P_{PVLP} - LS_{A/B} \geq 30$ bar.

Max. pressure setting of LS_A and LS_B valves relative to PVLP shock valve

Setting pressure for PVL	bar	32	50	63	80	100	125	140	150	160	175	190	210	230	240	250	265	280	300	320	350
	[psi]	460	725	914	1160	1450	1813	2031	2175	2320	2538	2755	3045	3335	3480	3625	3843	4061	4351	4641	5075
Max. setting pressure for $LA_{A/B}$	bar	–	40	50	64	80	100	112	120	130	145	160	180	200	210	220	235	250	270	290	320
	[psi]	–	580	720	930	1160	1450	1625	1740	1885	2100	2320	2610	2900	3045	3190	3408	3625	3915	4205	4641
Min. setting pressure for $LA_{A/B}$	bar	30																			
	[psi]	435																			

PVG 32
Specification Sheet

Subsidiary/Dealer		**PVG No.**	
Customer		**Customer No.**	
Application		**Revision No.**	

Function	A-Port							B-Port	
		0 157B		157B					
			p =	bar	157B				
	a 157B	**1** 157B		157B		**13**		157B	**c**
	b 157B		LS_A	bar	LS_B	bar		157B	**b**
	a 157B	**2** 157B		157B		**13**		157B	**c**
	b 157B		LS_A	bar	LS_B	bar		157B	**b**
	a 157B	**3** 157B		157B		**13**		157B	**c**
	b 157B		LS_A	bar	LS_B	bar		157B	**b**
	a 157B	**4** 157B		157B		**13**		157B	**c**
	b 157B		LS_A	bar	LS_B	bar		157B	**b**
	a 157B	**5** 157B		157B		**13**		157B	**c**
	b 157B		LS_A	bar	LS_B	bar		157B	**b**
	a 157B	**6** 157B		157B		**13**		157B	**c**
	b 157B		LS_A	bar	LS_B	bar		157B	**b**
	a 157B	**7** 157B		157B		**13**		157B	**c**
	b 157B		LS_A	bar	LS_B	bar		157B	**b**
	a 157B	**8** 157B		157B		**13**		157B	**c**
	b 157B		LS_A	bar	LS_B	bar		157B	**b**
	a 157B	**9** 157B		157B		**13**		157B	**c**
	b 157B		LS_A	bar	LS_B	bar		157B	**b**
	a 157B	**10** 157B		157B		**13**		157B	**c**
	b 157B		LS_A	bar	LS_B	bar		157B	**b**
Remarks		**11** 157B							
		12 157B							

Filled in by	Date

PHYD-PVG32-3

Note:
Separate specification pads with 50 sheets are available under the literature no. DKMH.PZ.570.D8.02 **520L0515**.

PVG 32
SAE Specification Sheet

Subsidiary/Dealer		**PVG No.**	
Customer		**Customer No.**	
Application		**Revision No.**	

Function	A-Port				B-Port
		0 157B p = psi 157B			
	a 157B **b** 157B	**1** 157B LS_A psi	157B LS_B psi	**13**	157B **c** 157B **b**
	a 157B **b** 157B	**2** 157B LS_A psi	157B LS_B psi	**13**	157B **c** 157B **b**
	a 157B **b** 157B	**3** 157B LS_A psi	157B LS_B psi	**13**	157B **c** 157B **b**
	a 157B **b** 157B	**4** 157B LS_A psi	157B LS_B psi	**13**	157B **c** 157B **b**
	a 157B **b** 157B	**5** 157B LS_A psi	157B LS_B psi	**13**	157B **c** 157B **b**
	a 157B **b** 157B	**6** 157B LS_A psi	157B LS_B psi	**13**	157B **c** 157B **b**
	a 157B **b** 157B	**7** 157B LS_A psi	157B LS_B psi	**13**	157B **c** 157B **b**
	a 157B **b** 157B	**8** 157B LS_A psi	157B LS_B psi	**13**	157B **c** 157B **b**
	a 157B **b** 157B	**9** 157B LS_A psi	157B LS_B psi	**13**	157B **c** 157B **b**
	a 157B **b** 157B	**10** 157B LS_A psi	157B LS_B psi	**13**	157B **c** 157B **b**
Remarks		**11** 157B **12** 157B			

Filled in by	Date

PHYD-PVG32-3

NOTES

NOTES

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Sauer-Danfoss (US) Company
2800 East 13th Street
Ames, IA 50010, USA
Phone: +1 515 239-6000, Fax: +1 515 239-6618

Sauer-Danfoss (Neumünster) GmbH & Co. OHG
Postfach 2460, D-24531 Neumünster
Krokamp 35, D-24539 Neumünster, Germany
Phone: +49 4321 871-0, Fax: +49 4321 871-122

Sauer-Danfoss (Nordborg) A/S
DK-6430 Nordborg, Denmark
Phone: +45 7488 4444, Fax: +45 7488 4400

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Menu

SAUER DANFOSS

PVG 120
Proportional Valves

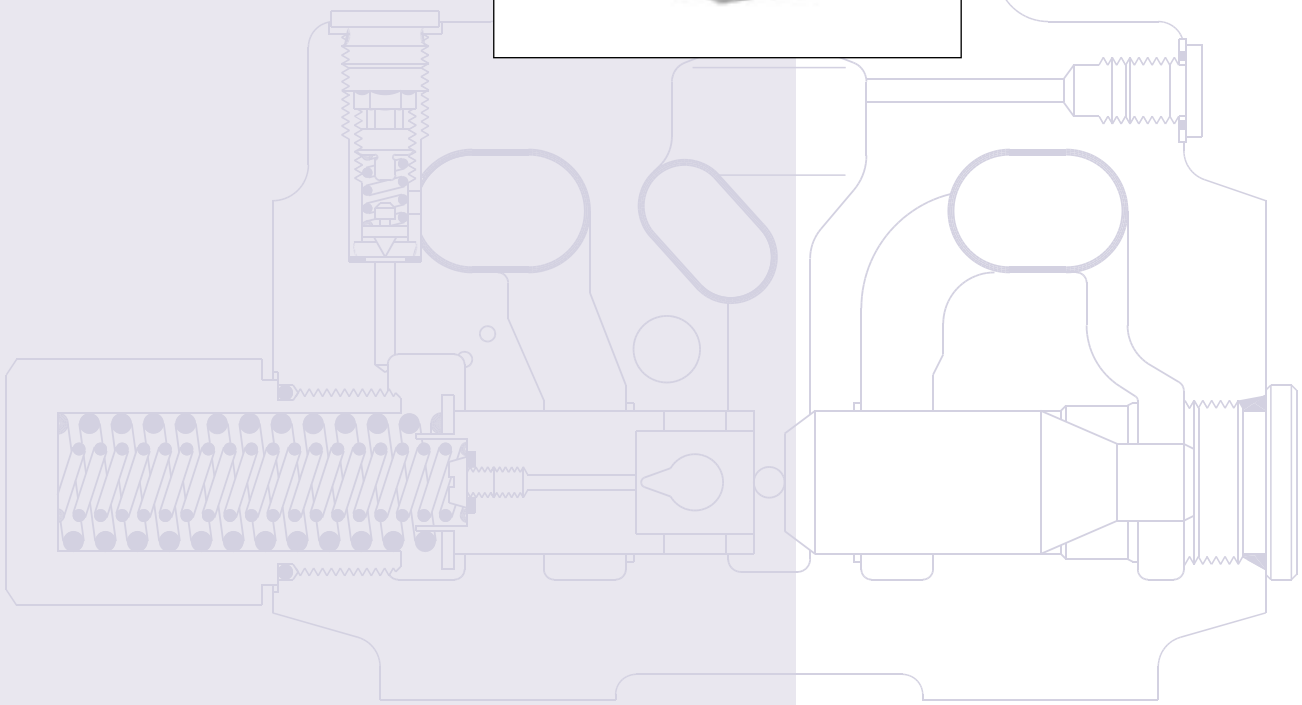
Technical Information











PVG 120 Proportional Valve
Technical Information
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GENERAL

Valve system
Load sensing proportional valve type PVG 120 is a combined directional and flow control valve which is supplied as a valve group consisting of modules specified to match particular customer needs. The flexible nature of this valve will allow an existing valve bank to be easily adapted to suit changes in requirements.



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General characteristics
- Load-independent flow control:
  - Oil flow to an individual function is independent of the load of this function
  - Oil flow to one function is independent of the load pressure of other functions
- Good regulation characteristics
- Central pilot supply built in when the valves are actuated electrohydraulically
- Energy-saving
- Up to eight basic modules per valve group

Pump side module – PVP
- Built-in pressure relief valve
- System pressure up to 400 bar [5800 psi]
- Pressure gauge connection
- Versions:
  - Open centre version for systems with fixed displacement pumps
  - Open centre version prepared for an extra relief module
  - Closed centre version for systems with variable displacement pumps
  - Closed centre version without system pressure relief valve for variable displace ment pumps with built-in pressure relief valve.

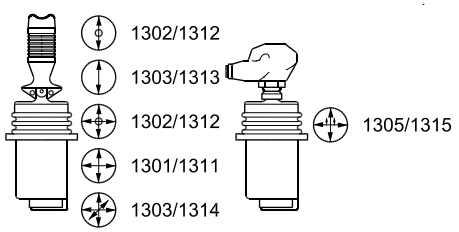
Basic module – PVB
- Integrated pressure compensator in channel P
- Interchangeable spools
- Depending on requirements the basic module can be supplied with:
  - Shock/suction valves
  - Adjustable LS pressure limiting valve for ports A and B
  - LS connection
  - Module for oil flows exceeding 180 l/min [47.6 gpm]
  - Different spool variants

Actuation modules
The basic module is always fitted with mechanical actuation PVM, which can be combined with the following as required:
- Electrical actuation (12 V ⎓ or 24 V ⎓)
  - PVEH- proportional, high performance
  - PVEO - On/off
- Cover for hydraulic remote control, PVH
- Cover for mechanically actuated valve group, PVMD

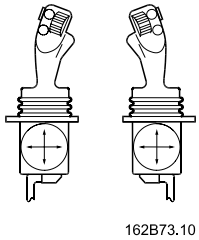
GENERAL

Remote controls units

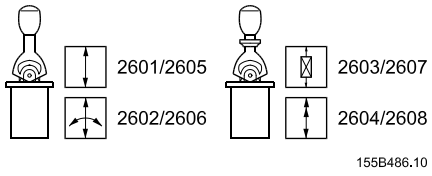
- PVRE, electrical control unit, 162F…



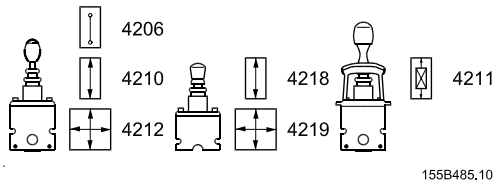
- Prof 1, 162F…



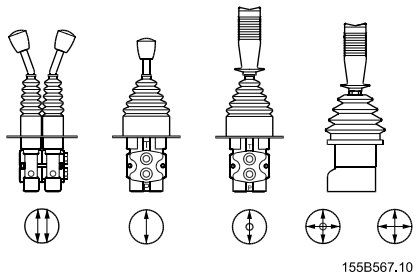
- PVREL, electrical control unit, 155U…



- PVRES, electrical control unit, 155B…



- PVRH, hydraulic control unit, 155N…



Electronic accessories

- EHF, low adjustment unit
- EHR, ramp generator
- EHS, speed control
- EHSC, closed loop speed control
- EHA, alarm logic
- EHC, closed loop position control

PVG 120 WITH OPEN CENTRE PVP

When the pump is started and the main spools (1) in the individual basic modules are in neutral position, oil flows from the pump, through connection P, across the pressure adjustment spool (2) to tank.
The oil flow led across the pressure adjustment spool determines the pump pressure (stand-by pressure). If a reduced stand-by pressure is required, an extra relief valve PVPH or PVPE can be used in PVP (see characteristics for neutral flow pressure, page 25).

When the main spools are actuated the highest load pressure is distributed across the shuttle valve circuit (3) to the spring chamber behind the pressure adjustment spool (2) and completely or partly closes the connection to tank.

The pump pressure is applied to the right-hand side of the pressure adjustment spool (2). The pressure relief valve (4) opens when the load pressure exceeds the set value, allowing pump flow to be diverted back to tank.

In the basic module the compensator (5) maintains a constant pressure drop across the main spool – both when the load changes and when a module with a higher load pressure is activated.

Shock and suction valves with a fixed setting (7) and the suction valves (8) on ports A and B are used to protect individual working functions against overload.

In the basic module it is possible to build in an adjustable LS pressure relief valve (6) to limit the pressure from each working function.
The LS pressure limiting valve saves energy:

- Without LS pressure limiting valve all the oil flow to the working function will be led across the combined shock and suction valves to tank if the pressure exceeds the fixed setting of the valves.
- With LS pressure limiting valve an oil flow of only about 2 l/min [0.5 US gal/min] will be led across the LS pressure limiting valve to tank if the pressure exceeds the valve setting.

PVG 120 WITH CLOSED CENTRE PVP

In the closed centre version an orifice (9) has been fitted instead of the plug. This means that the pressure adjustment spool (2) will only open to tank when the pressure in channel P exceeds the pressure relief valve setting (4).

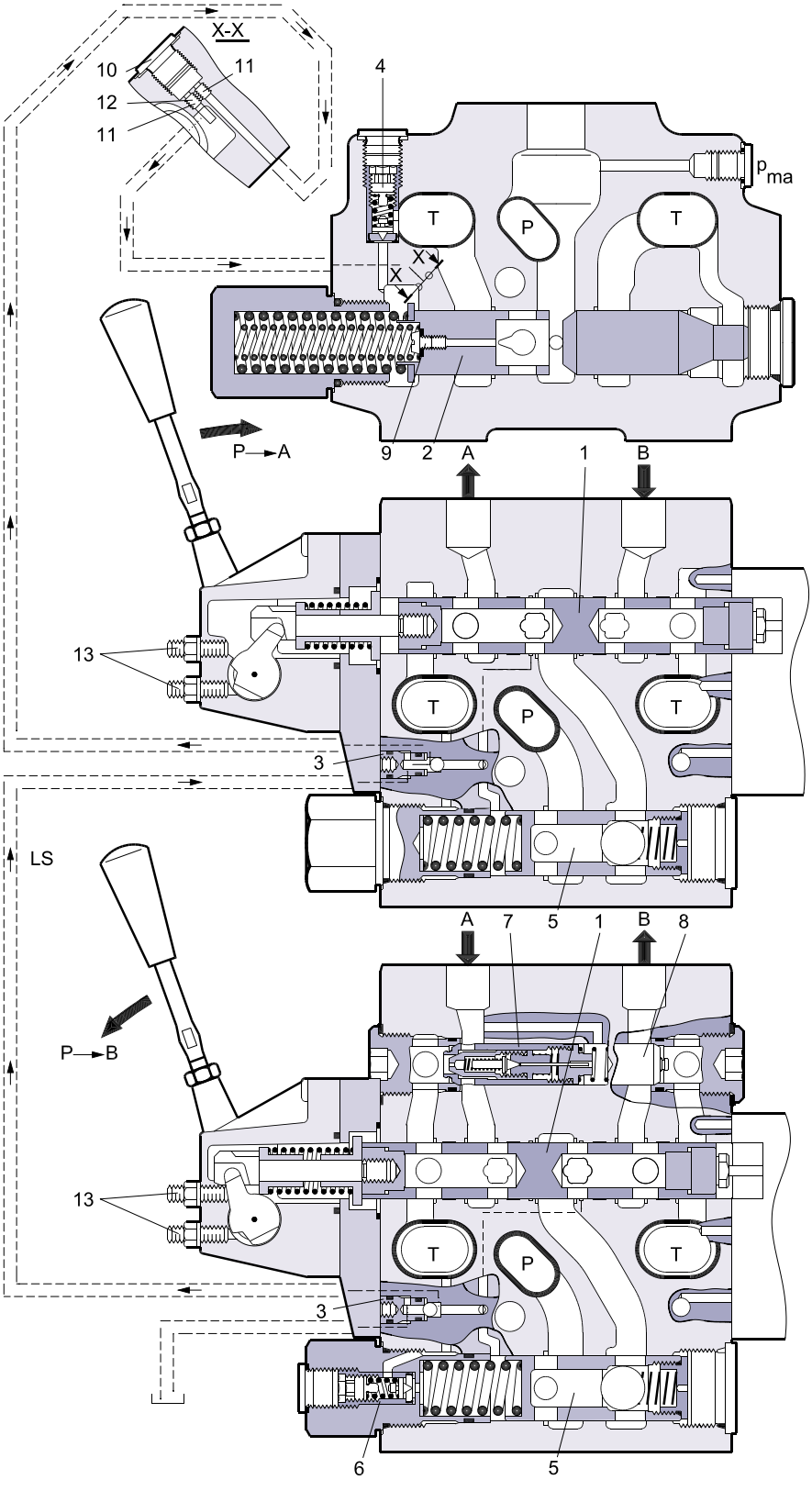
In load sensing systems the load pressure is led to the pump regulator via the LS connection (10). So the orifices (11) have been removed, and a plug (12) has been fitted instead of one of the orifices.

In neutral position the pump regulator will set the displacement so that leakage in the system is just compensated for.

When a main spool is activated, the pump regulator will adjust the displacement so that the set differential pressure between P and LS is maintained.

The pressure relief valve (4) in PVP is set for a pressure of about 30 bar [435 psi] above maximum system pressure (set at the pump or an external pressure relief valve).
If the system or the pump regulation has a pressure relief valve, it is possible to use a PVPV pump side module, without integrated pressure adjustment spool and pressure relief valve.

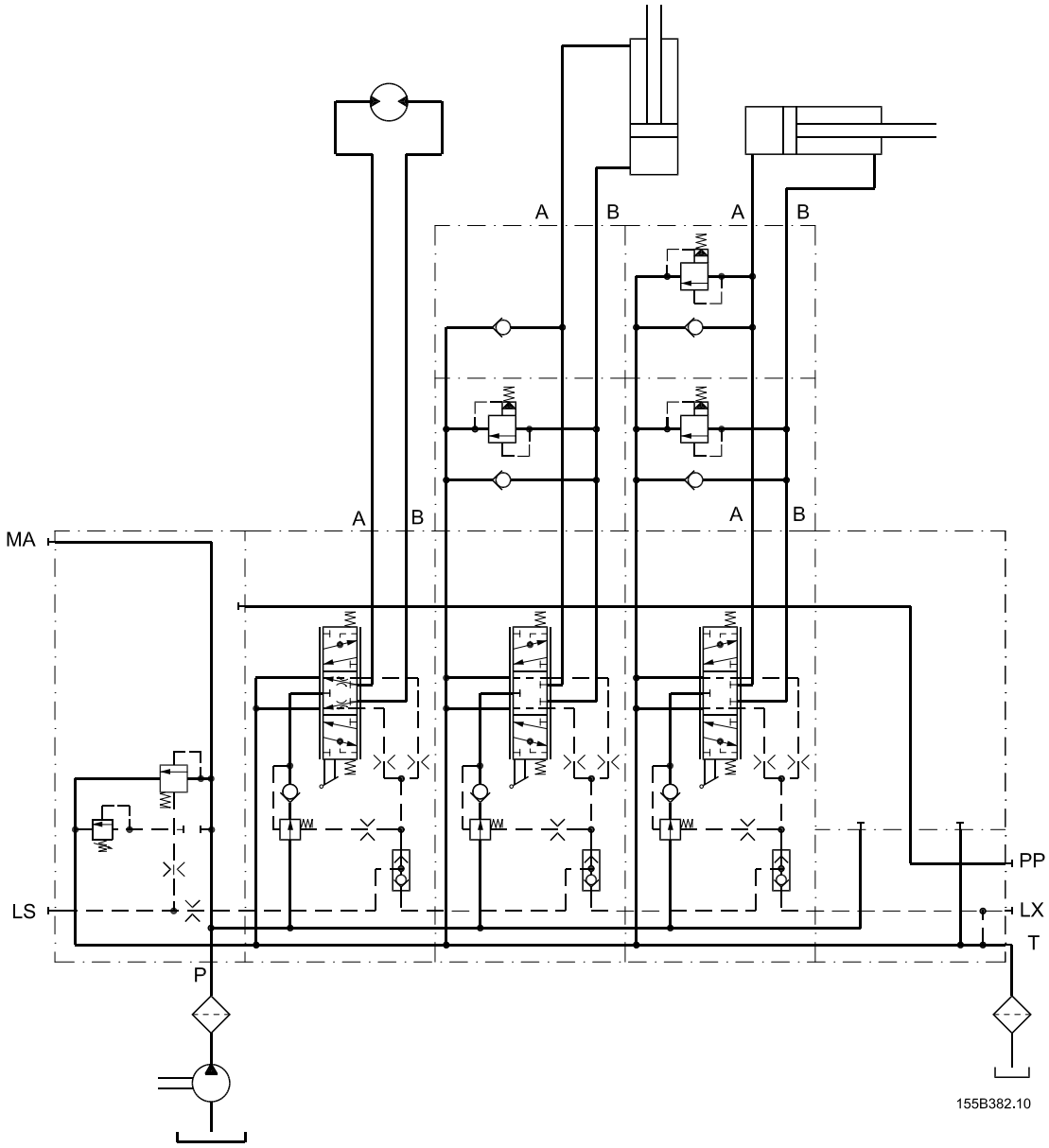
PVG 120
SECTIONAL DRAWING



1. Main spool
2. Pressure adjustment spool in PVP
3. Shuttle valve
4. Pressure relief valve in PVP
5. Pressure compensator in PVB
6. LS pressure relief valve in PVB
7. Shock and suction valve PVLP
8. Suction valve PVLA
9. Orifice, closed centre PVP
   Plug, open centre PVP
10. LS connection

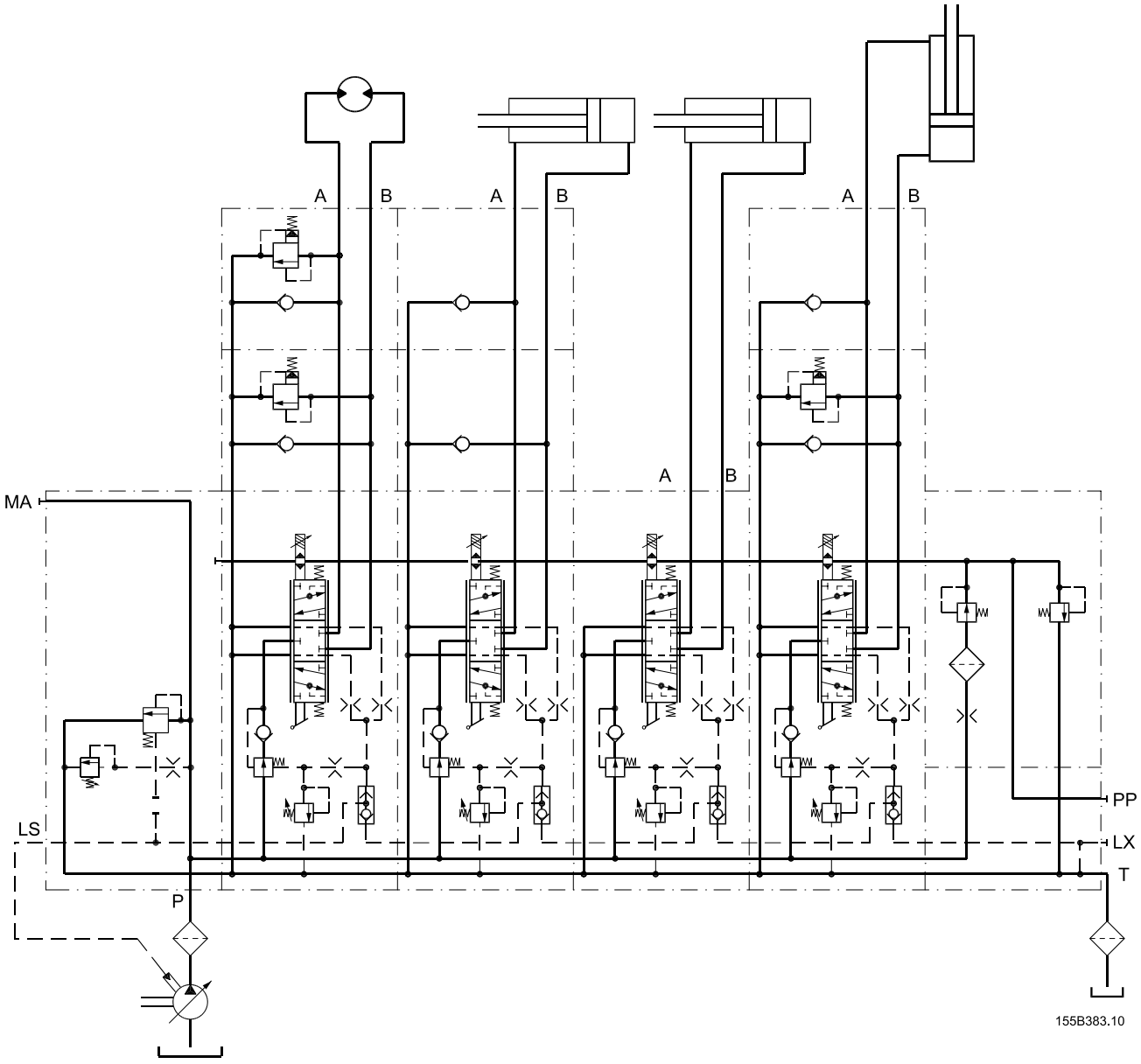
EXAMPLES

PVG 120 with fixed displacement pump



EXAMPLES

PVG 120 with variable displacement pump



PVG 120 VALVE GROUP

	Port P	continuous	350 bar	[5075 psi]
		intermittent[1]	400 bar	[5800 psi]
Max. pressure	Port A/B		400 bar	[5800 psi]
	Port T, static/dynamic		25 bar/40 bar	[365/580 psi]
Oil flow, (see characteristics 15)	Port P, rated max.		240/300 l/min	[63.4/79.3 gpm]
	Port A/B		65/95/130/180/ 210/240 l/min [2]	[17.2/25.1/34.3/47.6/ 55.5/63.4 gpm [2]]
Spool travel			± 8 mm	[± 0.32 in]
Dead band (± 25%)			± 2 mm	[± 0.08 in]
Max. internal leakage at 100 bar, 21 mm^2/s	A/B→T, without shockvalve		90 cm^3/min	[5.5 in^3/min]
	A/B→ T, with shockvalve		95 cm^3/min	[5.6 in^3/min]
Oil temperature (inlet temperature)	Recommended temperature		30 to 60°C	[86 to 140°F]
	Min. temperature		–30°C	[–22°F]
	Max. temperature		+90°C	[+194°F]
Ambient temperature			–30 to +60°C	[–22 to +140°F]
Oil viscosity	Operating range		12 to 75 mm^2/s	[65 SUS to 347 SUS]
	Min. viscosity		4 mm^2/s	[39 SUS]
	Max. viscosity		460 mm^2/s	[2128 SUS]
Filtering (See page 38)	Max. contamination (ISO 4406)		19/16	[19/16]
Oil consumption in pressure reduction valve for PVT at PVE pilot-oil supply			0.4 l/min	[0.1 gpm]

1) Intermittent operation: the permissible values may occur for max. 10% of every minute.
2) See page 24 regarding the ordering or conversion of valve groups for oil flows exceeding 180 l/min [47.6 gpm].

MECHANICAL ACTUATION PVM

Regulation range, control lever		±19,5°	
Operating force		Neutral position	Max. spool travel
	PVM + PVMD	1.8 ± 3.0 N [4.0 ± 0.7 lbf]	2.5 ± 3.0 N [5.6 ± 0.7 lbf]
	PVM + PVE 1)	1.8 ± 3.0 N [4.0 ± 0.7 lbf]	2.5 ± 3.0 N [5.6 ± 0.7 lbf]
	PVM + PVH	2.4 ± 3.0 N [5.40 ± 0.7 lbf]	8.5 ± 3.0 N [19.1 ± 0.7 lbf]
Possible control lever positions (see page 18)	Number	2 × 5	

1) without voltage PVE

HYDRAULIC ACTUATION PVH

Control range	5 to 15 bar	[75 to 220 psi]
Max. pilot pressure, static	35 bar	[510 psi]
Max. pressure on port T 1)	3 bar	[45 psi]

1) It is recommended that the tank connection from the hydraulic remote control unit PVRH is taken direct to tank.

PVE
ELECTRICAL ACTUATION

Actuation		PVEO ON/OFF	PVEH Proportional High
Hysteresis (applies to the electrical actuation only) [1]	Typical	-	4%
Reaction time from neutral position to max. spool travel	Typical	250 ms	250 ms
	Max.	350 ms	280 ms
Reaction time from max. spool travel to neutral position[2]	Typical	240 ms	150 ms
	Max.	330 ms	200 ms
Pilot oil flow pr. PVE	Neutral position without voltage	0 l/min / [US/gal min]	
	Locked with voltage [3]	0 l/min / [US/gal min]	
Enclosure to IEC 529		IP 65	

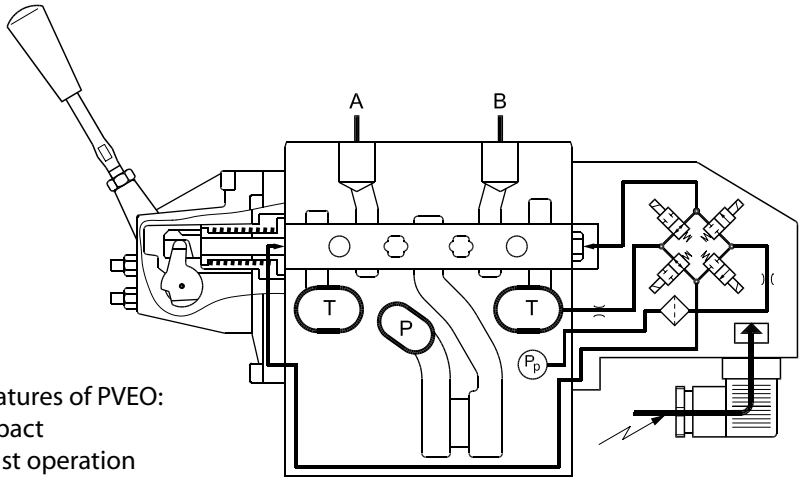
1) The hysteresis is stated at rated and f = 0,02 Hz for a cycle. One cycle includes the movement from neutral position to max. spool travel direction A, via neutral position to max. spool travel in direction B, and back to neutral position. Further information can be obtained by contacting the Sales Organization for Sauer-Danfoss.
2) Reaction times for PVEH is reduced by 20 by 30 ms if the voltage is not interrupted during the neutral positioning (remote control lever without neutral position switch).
3) Total oil consumtion for a spool movement from N to full A or B: 0.0035 l [0.0009 US gal]

Actuation		PVEO, ON/OFF PVEH, Proportional High	
Rated voltage		12 V ⎓	24 V ⎓
Supply voltage (U_{DC})	Range	11 to 15 V	22 to 30 V
	Max. ripple (PVEH)	5%	
Current consumtion at rated voltage		0.65 A	0.33 A
Signal voltage (PVEH)	Neutral	$0.5 \times U_{DC}$	
	Regulating	$0.25 \times U_{DC}$ to $0.75 \times U_{DC}$	
Signal current at rated voltage (PVEH)		0.25 mA	0.5 mA
Input impedance at $0,5 \times U_{DC}$ (PVEH)		12 kW	
Power consumption		8 W	
Fault monitoring (PVEH aktiv)	Max. load	–100 mA	–60 mA
	Reaction time at fault	500 ms	
Fault monitoring (PVEH passiv)	Reaction time at fault	250 ms	

PVPE, ELECTRICAL RELIEF VALVE, NORMALLY OPEN

Max. operation pressure		350 bar [5085 psi]	
Max. pressure drop a an flow of 0.20 l/min. [0.053 US gal/min]		1.2 bar [17 psi]	
Oil temperature (inlet temperature)	Recommended temperature	30 to 60°C [86 to 140°F]	
	Min. temperature	–30°C [–22°F]	
	Max. temperature	+90°C [+194°F]	
Max. coil surface temperature		155°C [311°F]	
Ambient temperature		–30 to +60°C [–22 to +140°F]	
Oil viscosity	Operating range	12 to 75 mm^2/s [65 to 347 SUS]	
	Min. viscosity	4 mm^2/s [39 SUS]	
	Max. viscosity	460 mm^2/s [2128 SUS]	
Response time for pressure relief to tank		600 ms	
Enclosure to. IEC 529		IP 65	
Rated voltage		12 V	24 V
Max.permissible deviation from rated supply voltage		± 10 %	± 10 %
Current consumption at rated voltage	at 22°C [72°F] coil temperature	1.55 A	0.78 A
	at 85°C [230°F] coil temperature	1.00 A	0.50 A
Power consumption	at 22°C [72°F] coil temperature	19 W	19 W
	at 85°C [230°F] coil temperature	12 W	12 W

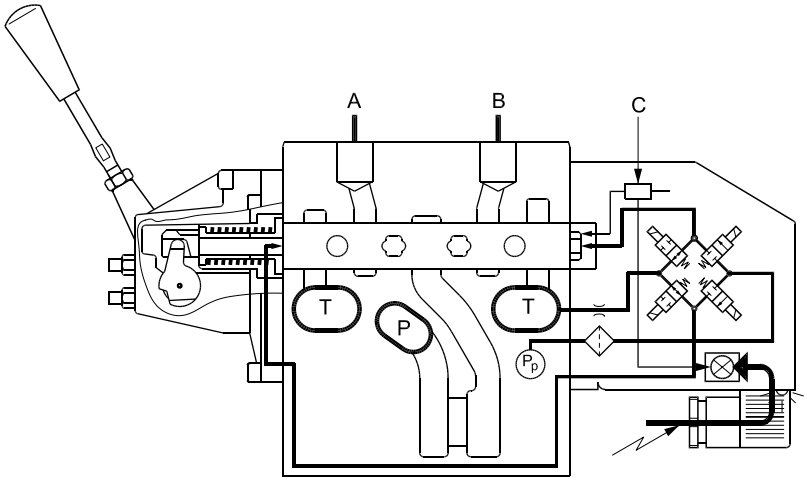
PVEO, ON-OFF



155B432.10

Main features of PVEO:
- Compact
- Robust operation

PVEH, PROPORTIONAL HIGH



155B428.10

PVEH adjusts the main spool position so that it corresponds to an electrical control signal – for example from a remote control unit.

The control signal (set-point signal) is converted into a hydraulic pressure which moves the main spool. The position of the main spool is converted in the positional transducer (C) to an electric signal (feed-back signal). This signal is registered by the electronics.

The variation between the set-point signal and feed-back signal actuates the solenoid valves. Thus the hydraulic pressure moves the main spool into the correct position.

Special features of PVEH:
- Inductive transducer, see page 13
- Integrated pulse width modulation, see page 13
- Short reaction time
- Low hysteresis
- Fault monitoring, see page 13 and 14
- Transistor output for signal source, see page 13 and 14

PVEH, LVDT-TRANSDUCER

LVDT, Inductive transducer
(Linear Variable Differential Transformer).
When the main spool is moved a voltage is induced proportional to the spool position. The use of LVDT gives contact-free (proximity) registration of the main spool position. This means an extra-long working life and no limitation as regards the type of hydraulic fluid used. In addition, LVDT gives a precise position signal of high resolution.

PVEH, PULSE WIDTH MODULATION

Integrated pulse width modulation
Positioning of the main spool in PVEH is based on the pulse width modulation principle. As soon as the main spool reaches the required position, modulation stops and the spool is locked in position.

PVEH, FAULT MONITORING

The fault monitoring system
A fault monitoring system is provided in all PVEH models. The system is available in two versions:

- The active fault monitoring type, which provides a warning signal and deactivates the solenoid valves, and:
- the passive fault monitoring type, which provides a warning signal only. See figure below.

Both active and passive fault monitoring systems are triggered by 3 main events:

Input signal monitoring:
The input signal voltage is continuously monitored. The legal range is between 15% and 85% of the supply voltage. Outside the range and this section will switch into an active error state.

Transducer supervision:
If one of the wires to the LVDT sensor is broken or shorted, this section will switch into an active error state.

Supervision of the closed loop:
The actual position must always correspond to the demanded position (input signal). When the distance from neutral to the actual position is longer than the demanded distance, the system detects an error and will switch into an active error state. On the other hand, a situation where the actual position is closer to neutral than that demanded will not cause an error state. This situation is considered as "in control".
When an active error state occurs, the fault monitoring logic will be triggered:

Note:
The neutral deadband prevents the output signal from releasing the fault monitoring logic, thus stopping the function until the required pilot oil pressure has been developed.

Active fault monitoring:

- A delay of 500 ms before anything happens.
- The solenoid valve bridge will be disabled – all solenoids will be released.
- An alarm signal is sent out through the connector.
- This state is memorized and continues until the system is actively reset (by turning off the supply voltage).

PVEH, FAULT MONITORING (CONTINUED)

Passive fault monitoring:

- A delay of 250 ms before anything happens.
- An alarm signal is sent out through the connector.
- This state is not memorized. When the erroneous state disappears, the alarm signal will turn to passive again. However, the signal will always be active for a minimum of 100 ms when triggered.

To prevent the electronics from going into an undefined state, a general supervision of the power supply and the internal clock frequency is made:

High supply voltage:
The solenoid valves are disabled when the supply voltage is exceeded by 50% (18 V for a 12 V PVE and 36 V for a 24 V PVE).

Low supply voltage:
The solenoid valves are disabled when the supply voltage falls below 8 V.

Internal clock:
The solenoid valves are disabled when the internal clock frequency fails.

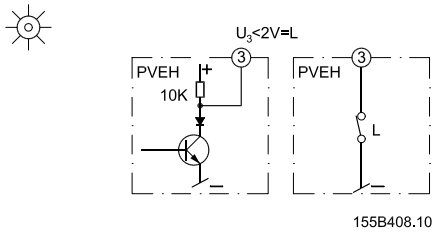
All three states are triggered automatically when the fault conditions cease.

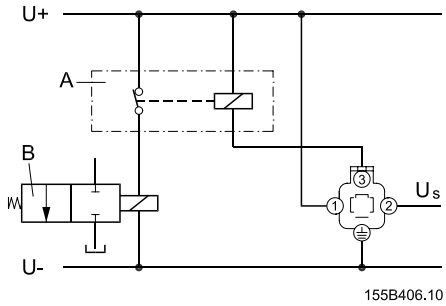
Note:
Different degrees of safety are described on pages 33 to 36.
The fault monitoring does not work if the supply voltage to PVEH is cut off - for example by a neutral position switch (see page 33).
When using PVEH with passive fault monitoring it is up to the customer to decide on the degree of safety required for the system (see page 33).

PVEH, CONNECTION TO FAULT MONITORING OUTPUT

Normal

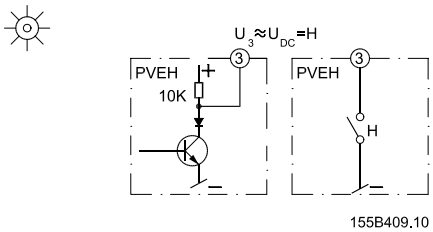
Green

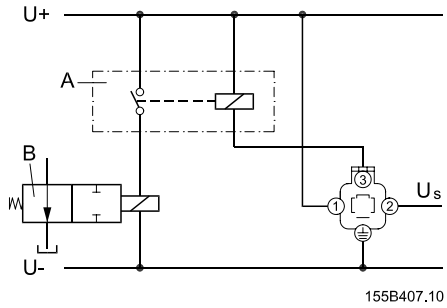




Fault

Red





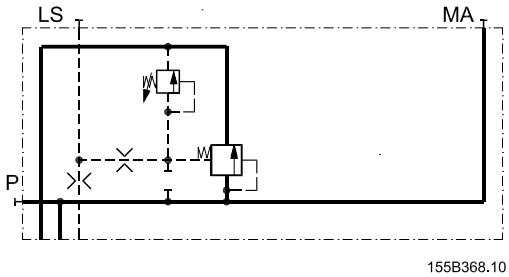
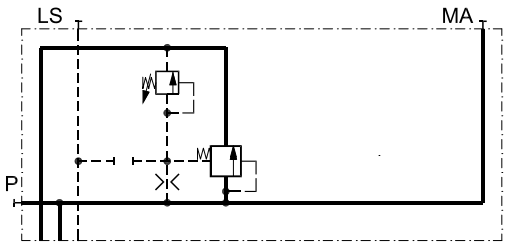
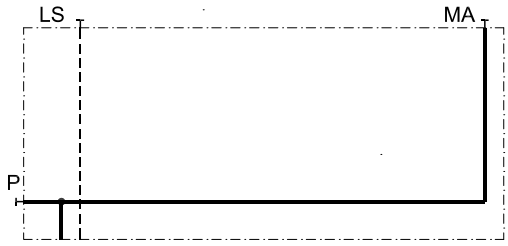
A: External relay
B: Solenoid valve (e.g. PVPE)

A: External relay
B: Solenoid valve (e.g. PVPE)

Via an external relay pin 3 can be connected to an electrically actuated valve which will relieve pump oil flow to tank, e.g. PVPE.

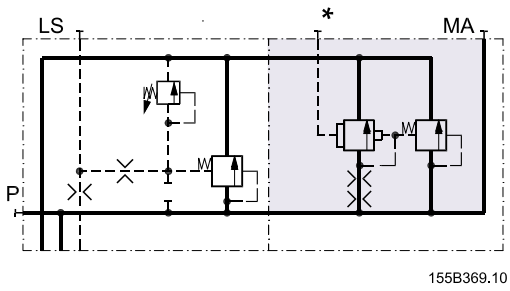
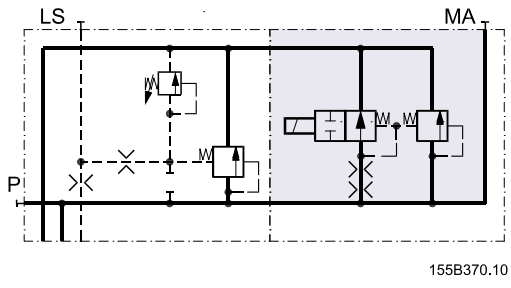
Other connections possible:
- a valve to relieve the LS signal
- a signal lamp, an alarm horn
- pump cut-out, etc.

PVP AND PVPV, PUMP SIDE MODULES

Symbol	Description		Code number
 155B368.10	Open centre PVP for pumps with fixed displacement. Pressure gauge connection.	Metric flange	155G5021
		SAE flange	155G5037
		O-ring boss	155G5023
	Open centre PVP for oil flow exceeding 180 l/min. [47.55 US gallon/min] For pumps with fixed displacement. Pressure gauge connection.	Metric flange	155G5027
		SAE flange	155G5029
		O-ring boss	155G5028
 155B371.10	Closed centre PVP for pumps with variable displacement. Pressure gauge connection.	Metric flange	155G5020
		SAE flange	155G5022
		O-ring boss	155G5038
 155B372.10	Closed centre PVPV without pressure relief valve. For pumps with variable displacement. Pressure gauge connection	Metric flange	155G5030
		SAE flange	155G5031
		O-ring boss	155G5032

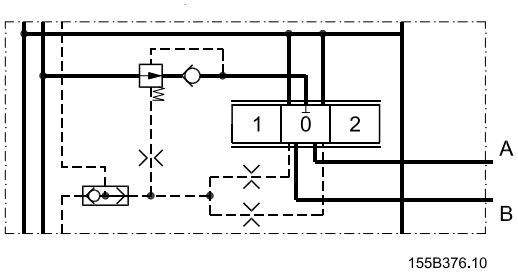
Port connections: P = 1 in SAE flange (415 bar [6020 psi]); MA = G $^{1}/_{4}$; LS = G $^{3}/_{8}$
P = $1^{1}/_{16}$ - 12 UN O-ring Boss 6020 psi; MA = $^{1}/_{2}$ - 20 UNF O-ring Boss; LS = $^{3}/_{4}$ - 16 UNF O-ring Boss

PVP,
ACCESSORIES FOR OPEN CENTRE PUMP SIDE MODULES

Symbol	Description	Code number
	Prop, PVPD	155G5041
	PVEH, hydraulically actuated relief valve	155G5061*
	PVPE, electrically actuated relief valve. Normally open solenoid valve (12 V ⎓) (24 V ⎓)	155G5052 155G5054

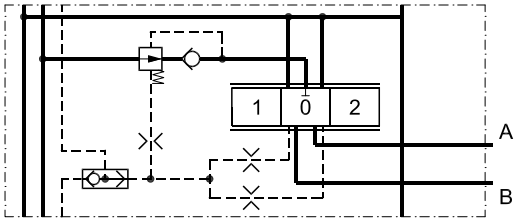
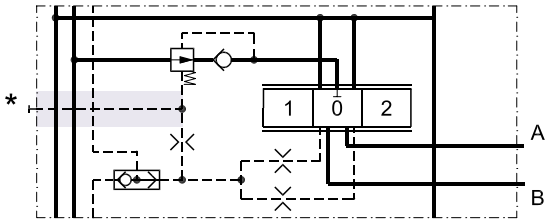
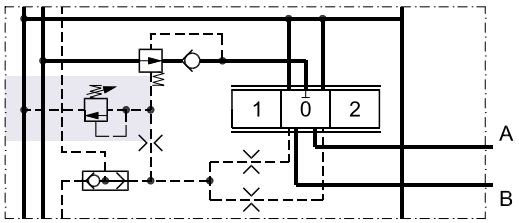
* Connection for external pilot pressure: only available with G $^{1}/_{4}$ thread

PVB,
BASIC MODULES

Symbol	Description		Code number	
			No facilities for shock valves A/B (low modules)	Facilities for shock valves A/B (high modules)
	Pressure compensated basic module	Metric flange	155G6014	155G6005
		SAE flange	155B6016	155B6007
		O-ring boss	155G6015	155B6006

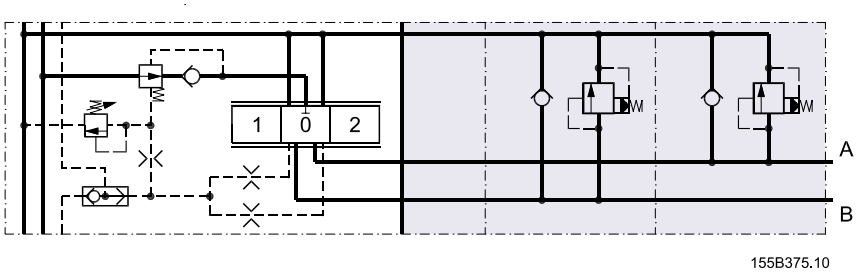
Port connections: A/B: $^{3}/_{4}$ in SAE flange 415 bar (6020 psi);
A/B: 1 $^{1}/_{16}$ - 12 UN O-ring Boss 415 bar (6020 psi)

PVB,
ACCESSORIES FOR BASIC MODULES

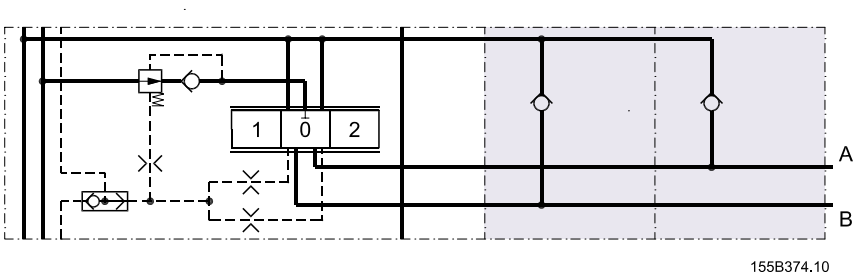
Symbol	Description	Code number
 155B376.10	PVBP, plug	155G6081
 155B436.10	PVBU, module for oil flow exceeding 180 l/min [47.6 US gallon/min]. Connection for external LS pressure relief. PVBC, connection for external LS pressure relief.	155G6035 155G6082
 155B377.10	PVBR, LS-pressure relief valve for ports A/B-port	155G6080

Port connections: G 1/4: only available with G 1/4 thread

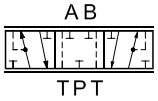
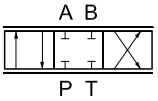
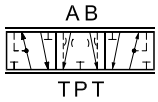
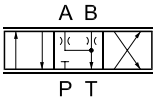
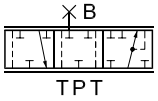
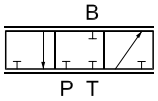
PVLP,
SHOCK AND SUCTION VALVES FOR A AND B PORT CONNECTIONS

Symbol	Fixed setting bar	[psi]	Code number
	50	[725]	155G0050
	75	[1100]	155G0075
	100	[1450]	155G0100
	125	[1800]	155G0125
	150	[2200]	155G0150
	175	[2550]	155G0175
	200	[2900]	55G0200
	225	[3240]	155G0225
	250	[3650]	155G0250
	275	[4000]	155G0275
	300	[4350]	155G0300
	325	[4700]	155G0325
	350	[5100]	155G0350
	375	[5450]	155G0375
	400	[5800]	155G0400

PVLA,
SUCTION VALVE

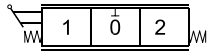
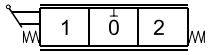
Symbol	Code number
	155G1065

PVBS, MAIN SPOOLS

Symbol	ISO Symbol	Description	Code number Size			
			A 65 l/min [17.2 US gal/min]	B 95 l/min [25.1 US gal/min]	C 130 l/min [34.3 US gal/min]	D[1] 180 l/min [47.6 US gal/min]
 155B235.10	 155B384.10	4-way, 3-position. Closed neutral position	155G6452	155G6454	155G6456	155G6458
 155B236.10	 155B385.10	4-way, 3-position. Throttled, open neutral position		155G6464	155G6466	155G6468
 155B226.10	 155B386.10	3-way, 3-position P → B			155G6476	155G6478

1) Main spool D is used for oil flow exceeding 180 l/min [47.6 US gal/min]

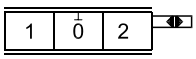
PVM, MECHANICAL ACTUATION

Symbol	Description		Code number
 155B387.10	PVM, standard, spring centered mechanical actuation. Individual oil flow adjustment to ports A and B.	22.5°	155G3040
		37,5°	155G3041
 155B387.10	PVM, mechanical actuation for hydraulically operated valves. Individual oil flow adjustment to ports A and B.	22,5°	155G3050
		37,5°	155G3051

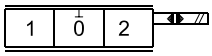
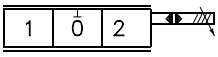
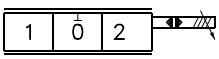
PVMD, COVER FOR MECHANICAL ACTUATION

Symbol	Description	Code number
	PVMD, cover for purely mechanically operated valve.	155G4061

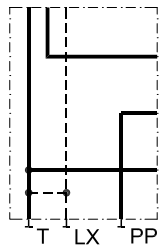
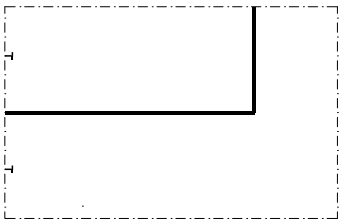
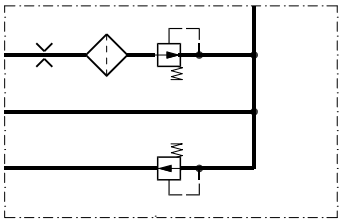
PVH, HYDRAULIC ACTUATION

Symbol	Description		Code number
 155B339.10	PVH, cover for hydraulically operated valve.	G 1/4	155G4022
		1/2 in-20 UNF	155G4021

PVE, ELECTRICAL ACTUATION

Symbol	Description		Code number
 155B388.10	PVEO; ON/OFF	12 V	155G4272
		24 V	155G4274
 155B389.10	PVEH, proportional high. Pulse width modulation, short reaction time, low hysteresis, **active** fault monitoring, inductive transducer.	12 V	155G4072
		24 V	155G4074
 155B389.10	PVEH, proportional high. Pulse width modulation, short reaction time, low hysteresis, **passive** fault monitoring, inductive transducer.	12 V	155G4172
		24 V	155G4174

PVT, TANK SIDE MODUL

Symbol	Description		Code number
Upper part  155B380.10	Upper part: Without active elements	Metric flange	155G7020
		SAE flange	155G7022
		O-ring boss	155G7021
	Upper part: With LX connection	Metric flange	155G7023
		SAE flange	155G7025
		O-ring boss	155G7024
Lower part  155B435.10	Lower part: Without active elements	Mounting thread metric	155G7060
		Mounting thread UNF	155G7062
Lower part  155B381.10	Lower part: PVE, pilot oil supply for electrical actuations. Filter mesh: 125µm	Mounting thread metric	155G7040[1)]
		Mounting thread UNF	155G7042[1)]

1) Tank module 155G7040/155G7042 can easily be rebuilt to be used for pilot oil supply to hydraulically actuated valve. Rebuilding kit 155G7041 contains the necessary springs, spring stops, and O-rings. The remote control unit P port is connected to the PP connection in the tank module.

Port connections: T = 1 in SAE flange flange 210 bar [3045 psi]; PP = G $^{3}/_{8}$ [$^{3}/_{8}$ in SAE]; LX = G $^{3}/_{8}$ [$^{3}/_{8}$ in SAE].
T = $^{15}/_{16}$ - 12 UN O-ring Boss 3045 psi; PP = $^{3}/_{4}$ - 16 UNF O-ring Boss; LX = $^{3}/_{4}$ - 16 UNF O-ring Boss

PVAS, ASSEMBLY KIT

Description	Description							
	1 PVB	2 PVB	3 PVB	4 PVB	5 PVB	6 PVB	7 PVB	8 PVB
Tie bolts and seals	155G8031	155G8032	155G8033	155G8034	155G8035	155G8036	155G8037	155G8038

MODULES FOR OIL FLOW EXCEEDING 180 L/MIN [47.6 US GAL/MIN]

Pump with fixed displacement

I. Ordering:
Order accessory module 155G6035, main spool D, and pump side modules 155G5027/155G5028/155G5029.

2. Conversion:
In open centre systems a max. oil flow exceeding 180 l/min [47.6 US gal/min] is achieved by changing the following parts in the pump side and basic modules:
– Open centre pump side module
a) Pressure adjustment spool
b) The springs behind the pressure adjustment spool
c) The plug behind the pressure adjustment spool
Parts from kit 155G5035 may be used.
– Closed centre pump side module
A closed centre pump side module can be changed into an upgraded open centre pump side module by means of kit 155G5035.
– Basic module
a) Spring behind pressure compensator
b) The plug behind the pressure compensator
Spring and plug with code number 155G6035 (PVBU, accessory module).

Pump with variable displacement

1. Ordering:
Order accessory module 155G6035 and main spool D.
2. Conversion:
In closed centre systems a max. oil flow exceeding 180 l/min [47.6 US gal/min] can be achieved by changing the following basic module parts:
a) Spring behind pressure compensator
b) The plug behind the pressure compensator
The code number of the spring and plug is 155G6035 (PVBU, accessory module).

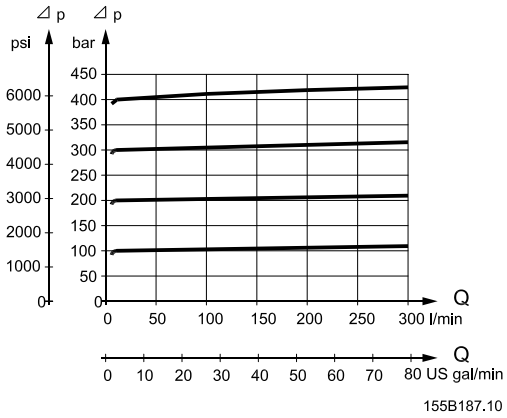
GENERAL

All characteristics and values in this Technical Information are typical measured results. For the hydraulic system a mineral based hydraulic oil with a viscosity of 21mm^2/s [102 SUS] and a temperature of 50°C [122°F] was used.

PVP, PUMP SIDE MODULE

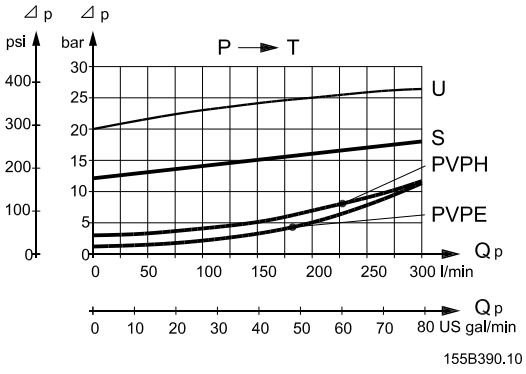
PVP, pressure relief valve characteristic

The pressure relief valve is adjustable within the 50-400 bar [725-6225 psi] range by means of a screw.



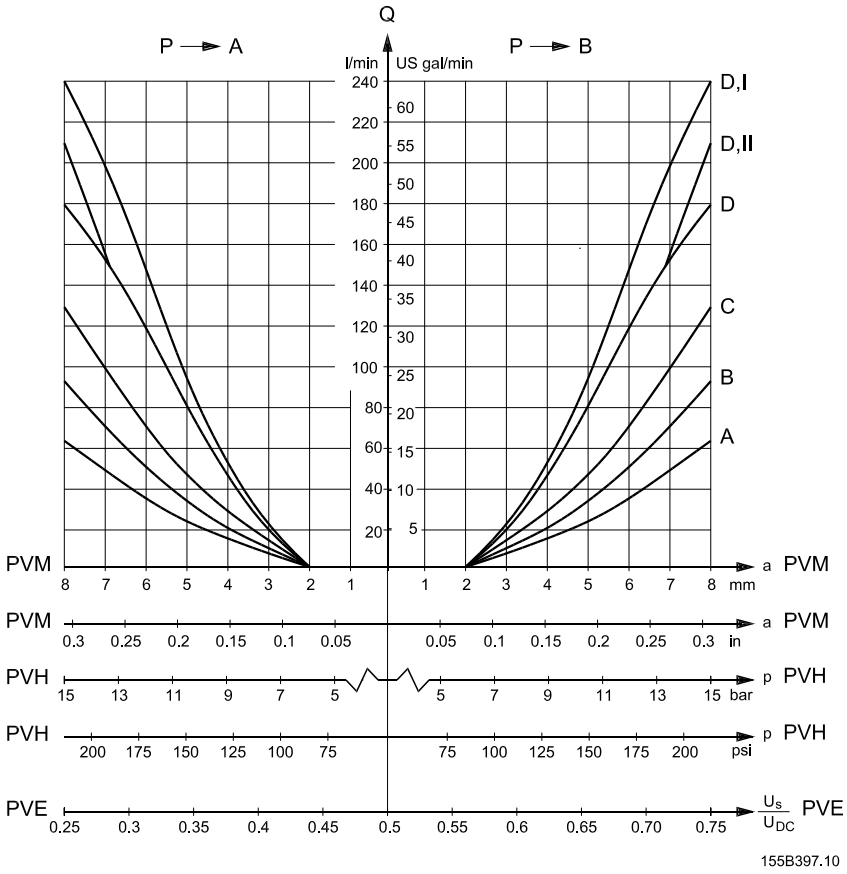
PVP, neutral flow pressure in PVP, open centre

U = PVP for PVB oil flow > 180 l/min [47.6 US gal/min]
S = PVP, standard



PVB, BASIC MODULE

Oil flow characteristics

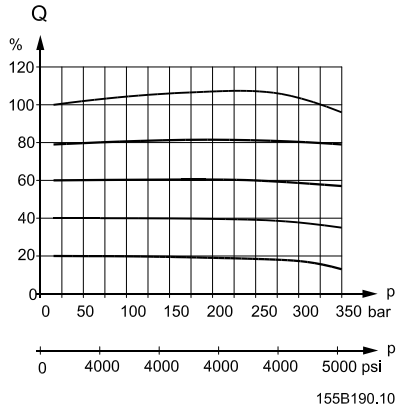


A : 65 l/min [17.2 US gal/min] rated oil flow
B : 95 l/min [25.1 US gal/min] rated oil flow
C : 130 l/min [34.3 US gal/min] rated oil flow
D : 180 l/min [47.6 US gal/min] rated oil flow
D.I : 240 l/min [63.4 US gal/min] rated oil flow
(Closed centre system with basic module for oil flow > 180 l/min [47.6 US gal/min])
D.II : 210 l/min [55.5 US gal/min] rated oil flow
(Open centre system with basic module for oil flow > 180 l/min [47.6 US gal/min] and pump side module 155G5027/155G5028/155G5029).
U_S = Signal voltage
U_{DC} = Supply voltage

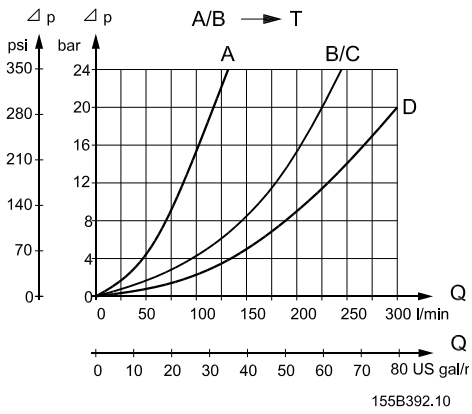
PVB,
BASIC MODULE

Load independent oil flow
Pressure drop (Q) T in neutral position (spools with open neutral position) (p)

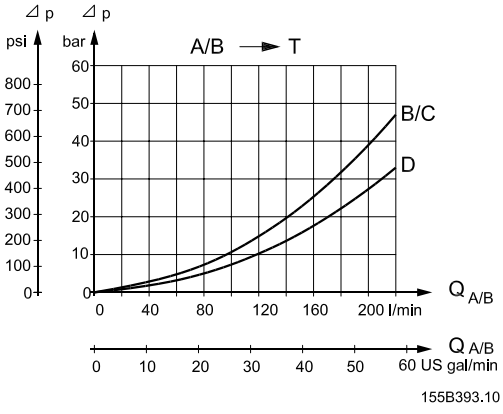
The oil flow (Q) is shown as a function of the load (p).



Pressure drop A/B → T at full spool travel

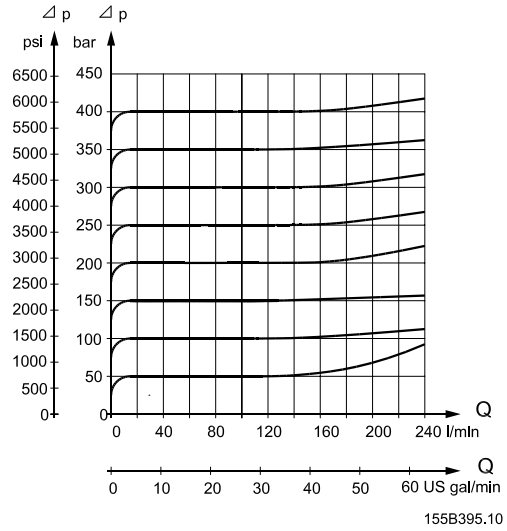


Pressure drop A/B → T in neutral position (spools with open neutral position)



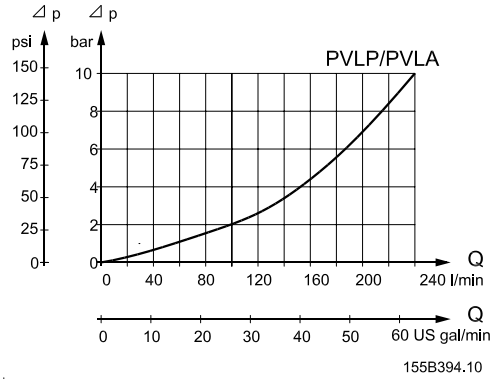
PVLP, SHOCK VALVE (PRESSURE RELIEF VALVE IN PVLP)

PVLP,
shock valve characteristics



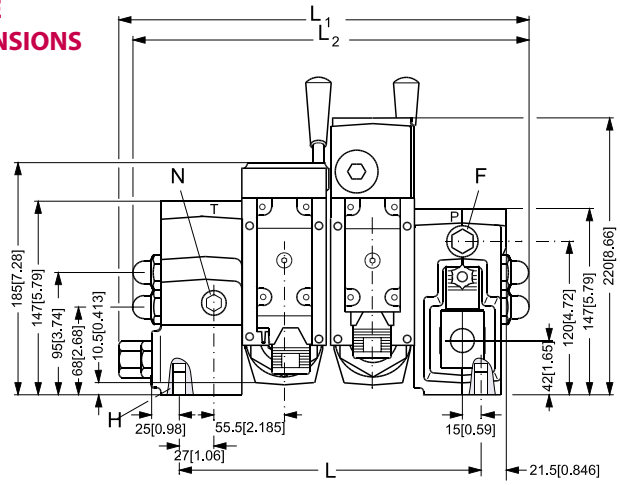
PVLP/PVLA, SUCTION FUNCTION

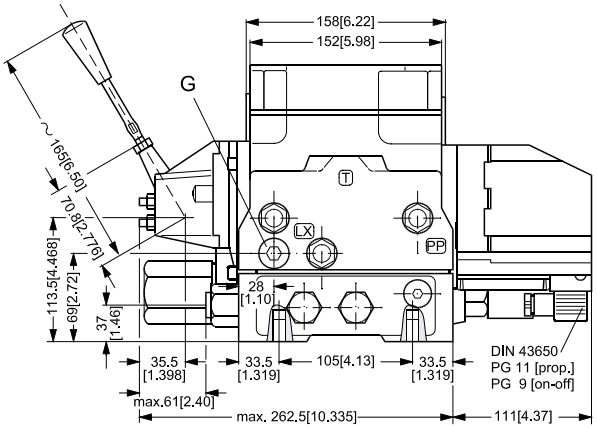
PVLP/PVLA,
suction function characteristics

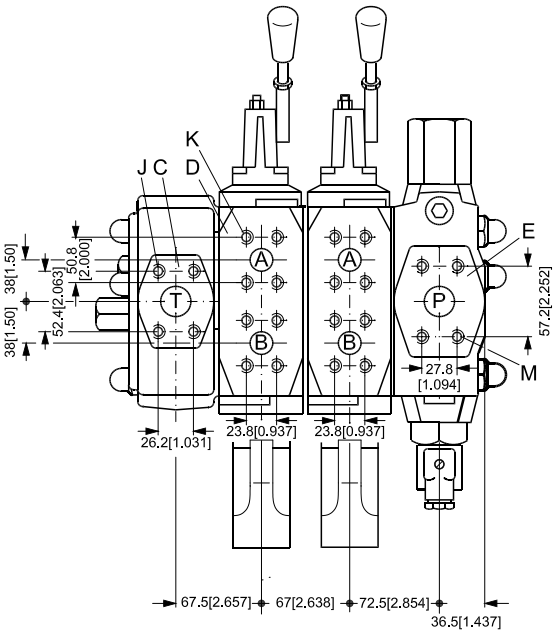


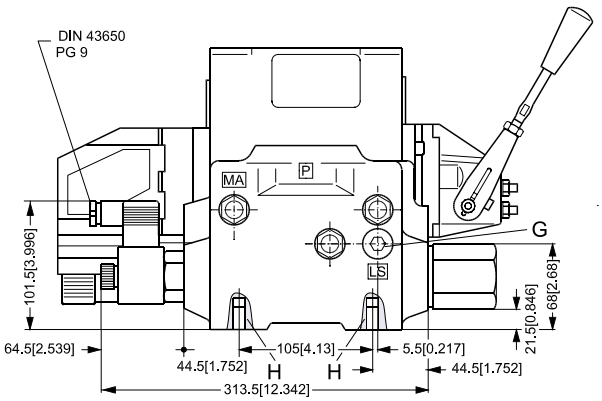
Dimensions

VALVE DIMENSIONS

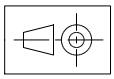








155B418.10

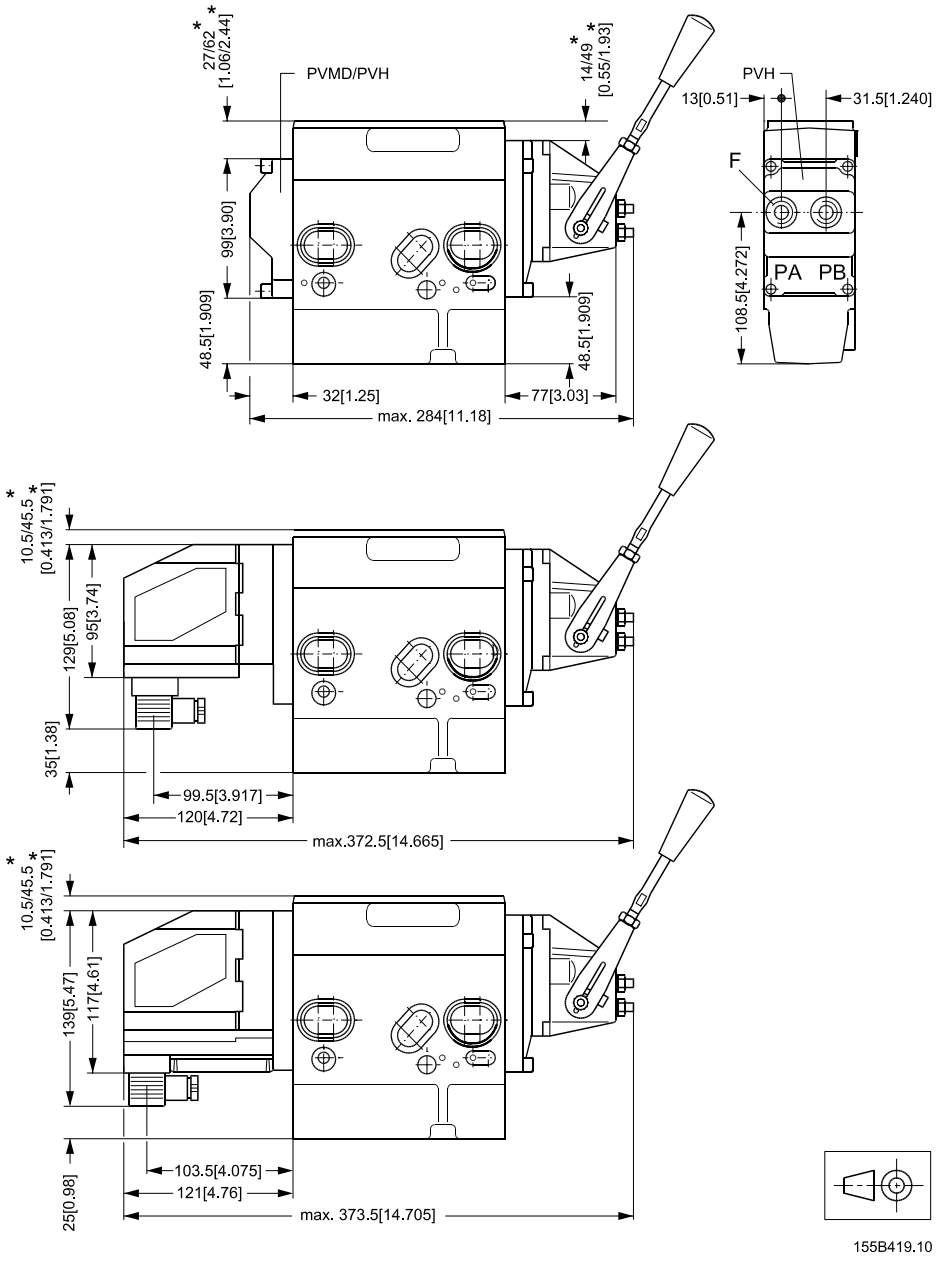


155B417.10

C : 1 in SAE flange (210 bar) – [1 in SAE flange/1 $^{5}/_{16}$ - 12 UN O-ring Boss (3045 psi)]
D : $^{3}/_{4}$ in SAE flange (415 bar) – [$^{3}/_{4}$ in SAE flange/1 $^{1}/_{16}$ - 12 UN O-ring Boss (6020 psi)]
E : 1 in SAE flange (415 bar) – [1 in SAE flange/1 $^{5}/_{16}$ - 12 UN O-ring Boss (6020 psi)]
F : G $^{1}/_{4}$ – [$^{1}/_{2}$ in - 20 UNF]
G : G $^{3}/_{8}$ – [$^{3}/_{4}$ in - 16 UNF]
H : M12; 18 mm deep – [$^{7}/_{16}$ - 14 UNC; 0.7 in deep]
J : M10; 17 mm deep – [$^{3}/_{8}$ - 16 UNC; 0.7 in deep]
K : M10; 17 mm deep – [$^{3}/_{8}$ - 16 UNC; 0.7 in deep]
M : M12; 18 mm deep – [$^{7}/_{16}$ - 14 UNC; 0.7 in deep]
N : G $^{3}/_{8}$ – [$^{3}/_{4}$ in - 16 UNF]

PVB		1	2	3	4	5	6	7	8
L	mm	168	235	302	369	436	503	570	637
	in	[6.62]	[9.26]	[11.90]	[14.54]	[17.18]	[19.82]	[22.46]	[25.10]
L1	mm	263.5	330.5	397.5	464.5	531.5	598.5	665.5	732.5
	in	[10.38]	[13.02]	[15.66]	[18.30]	[20.94]	[23.58]	[26.22]	[28.86]
L2	mm	255	322	389	456	523	590	657	724
	in	[10.05]	[12.69]	[15.33]	[17.97]	[20.61]	[23.25]	[25.89]	[28.53]

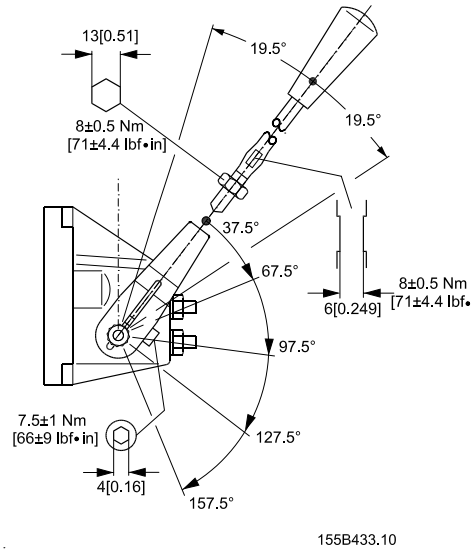
GENERAL DIMENSIONS



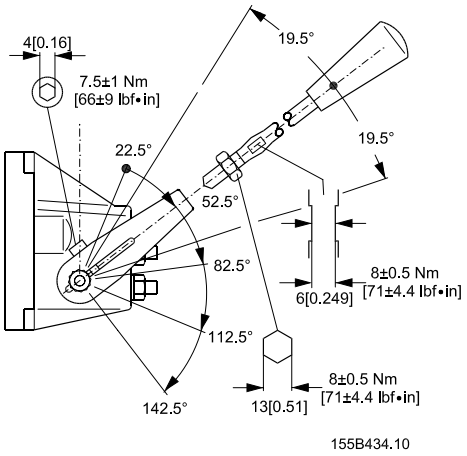
F : G $^1/_4$ [$^1/_2$ in - 20 UNF]
* Dimensions in parenthesis apply to high basic modules

PVM, LEVER POSITIONS

Base with an angle of 37.5°



Base with an angle of 22.5°



BUILDING IN SAFETY

All makes and all types of directional control valves (incl. proportional valves) can fail. So for each application the necessary protection against the consequences of function failure should be built in.

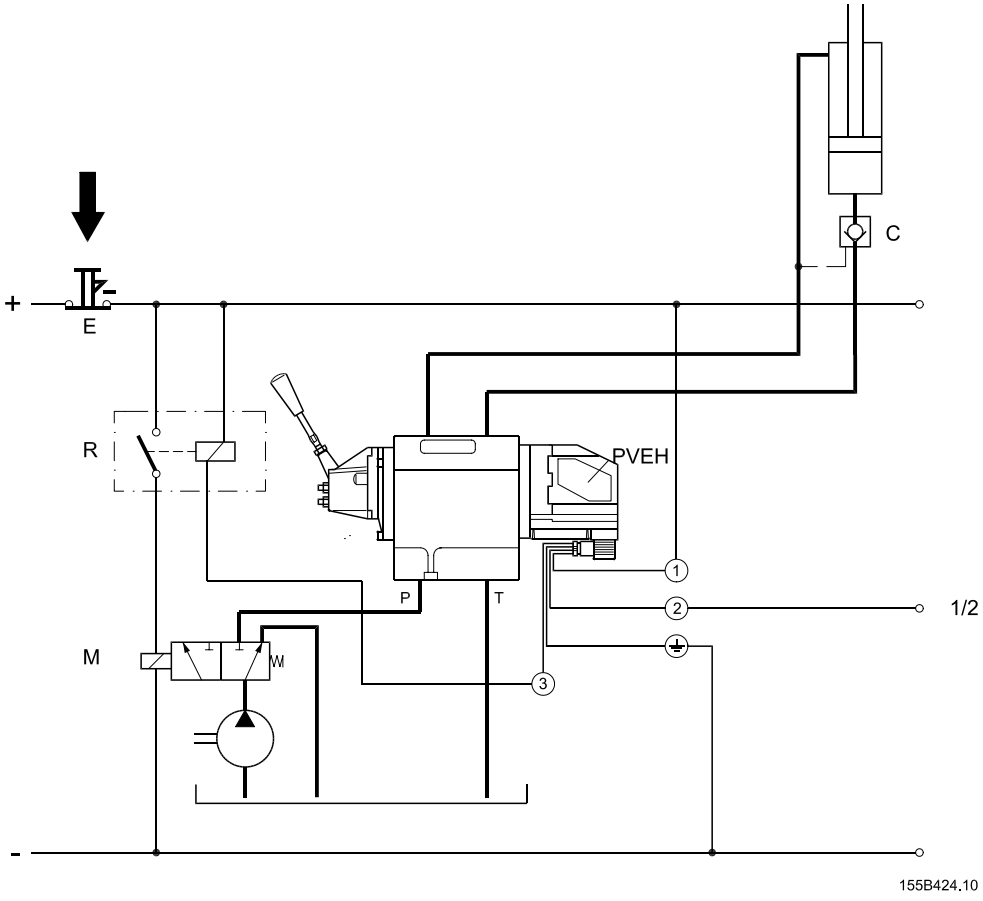
For each application an assessment should be made of the consequences of pressure failure and uncontrolled or blocked movements.

To determine the degree of protection that ought to be built into the system, Sauer-Danfoss makes the following distinctions:

1. Maximum safety demands
2. High safety demands
3. Average safety demands
4. Limited safety demands

See examples on pages 33, 34 , 35 and 36.

1. MAXIMUM SAFETY DEMANDS

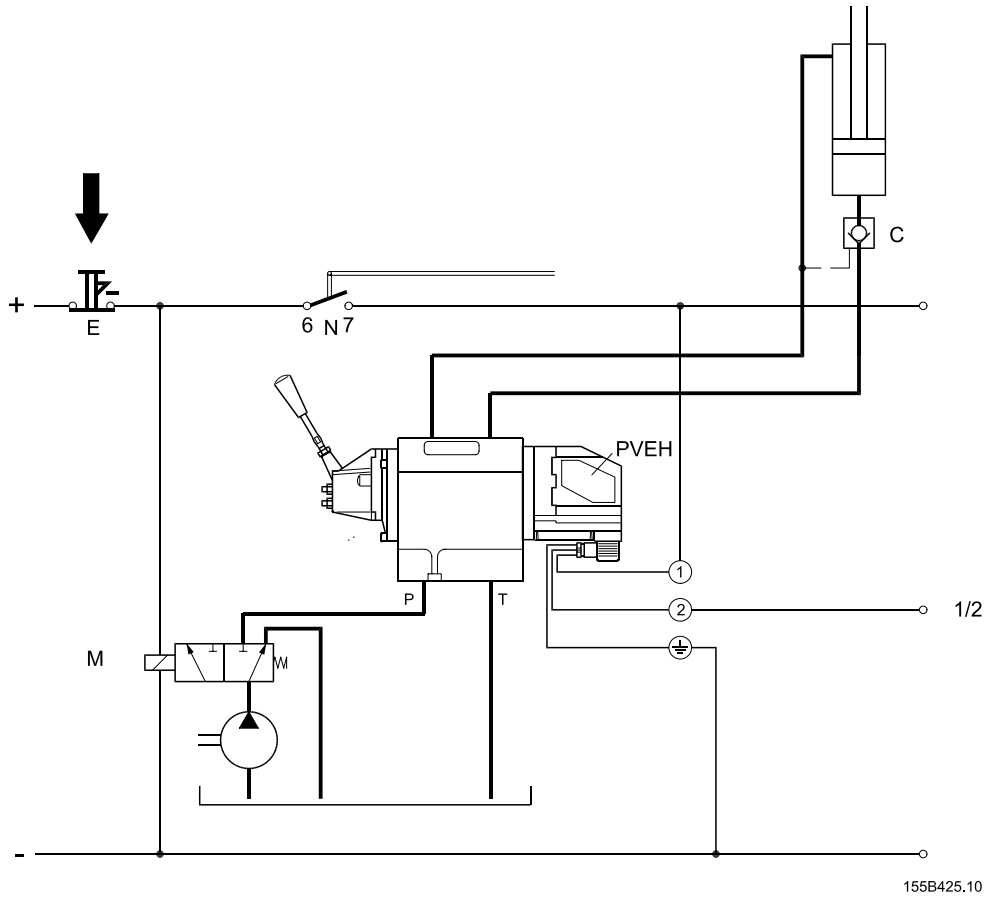


When the fault monitoring system in PVEH is connected, the reaction to electrical and mechanical faults (e.g. a spool seizure) is fast and operator-independent. See page 13 "fault monitoring".
A system can be protected against many electrical, hydraulic and mechanical faults by building in components as shown in the diagram:
R: Alarm logic EHA (or relay) connected to the fault monitoring system in PVEH
E: Electrical emergency stop
M: Solenoid valve
C: Pilot-operated check valve

The alarm logic EHA (or relay) cuts off current to the solenoid valve (M) when PVEH monitoring registers a fault.
The solenoid valve then leads the oil flow direct from pump to tank. Thus all functions are without operating pressure, i.e. locked in position, because there is no pilot pressure on the pilot operated check valve (C).
Activation of the emergency switch (E) cuts off current to the proportional valve and the solenoid valve (M).
Activation in this case is manual, but the result is the same as just described.
Stopping or disconnecting the pump drive motor is another safety measure, if the system reaction time can be accepted.

Note:
The neutral position switch in the remote control units should not be used.
PVEH with fault monitoring must have a constant voltage supply.

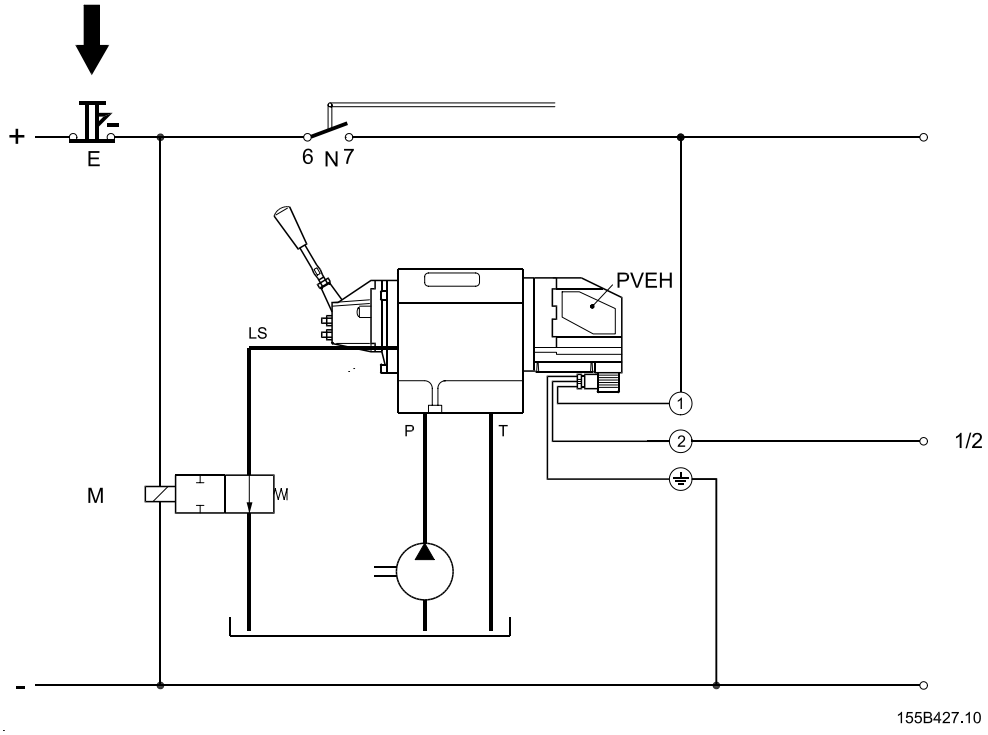
2.
HIGH SAFETY DEMANDS



Compared with the safety method previously described (1) this is operator-dependent and includes a neutral position switch (N).

The neutral position switch cuts off current to the proportional valve automatically when the remote control lever is in neutral position. At the same time the neutral position switch cuts off fault monitoring in PVEH. So PVEH does not give a fault signal when for example the neutral positioning of the main spool fails.

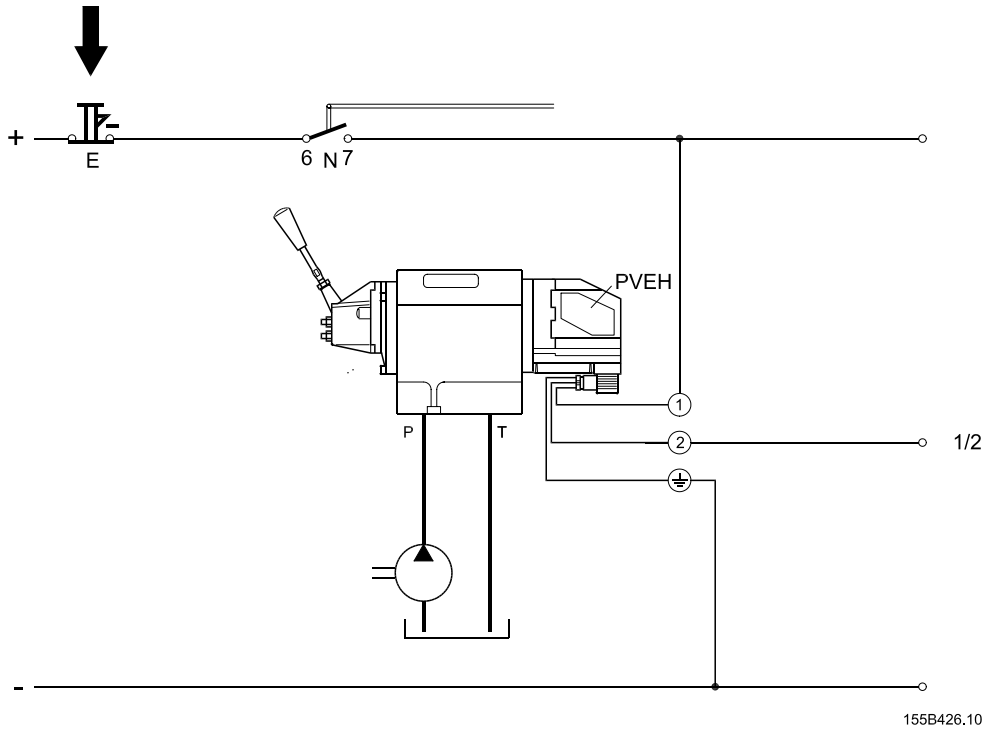
3. AVERAGE SAFETY DEMANDS



The difference in method now is that the LS signal from the proportional valve is led direct to tank when the emergency switch (E) is activated. The diagram shows the method used in a system with a fixed displacement pump, i.e. with open centre version proportional valve.

Activation of the emergency switch makes the system pressure drop to 12-18 bar [175-260 psi].
For valve groups with oil flows > 180 l/min [47.6 US gal/min]) the system pressure drop to (20-26 bar [290-380 psi]
All functions requiring a higher operating pressure will stop. In LS systems with a variable displacement pump and closed centre proportional valve, the pressure after the LS relief depends on the pump stand-by pressure.

4. LIMITED SAFETY DEMANDS



This safety system can consist of an emergency switch (E) and a neutral position switch (N) if protection against electrical failure is the only requirement. Here, there is no protection against hydraulic and mechanical faults (e.g. spool seizure in extreme position).

OIL

The main duty of the oil in a hydraulic system is to transfer energy; but it must also lubricate the moving parts in hydraulic components, protect them against corrosion, and transport dirt particles and heat out of the system. It is therefore important to choose the correct oil with the correct additives. This gives problem-free operation and long working life.

Mineral oil
For systems with PVG 120 valves Sauer-Danfoss recommends the use of mineral-based hydraulic oil containing additives: Type H-LP (DIN 51524) or HM (ISO 6743/4).

Non-flammable fluids
Phosphate-esters (HFDR fluids) can be used without special precautions. However, dynamic seals must be replaced with FPM (Viton) seals. Please contact the Sauer-Danfoss Sales Organisation if the PVG 120 valve is to be used with phosphate-esters.
The following fluids should only be used according to agreement with the Sales Organisation for Sauer-Danfoss:

- Water-glycol mixtures (HFC fluids)
- Water-oil emulsions (HFB fluids)
- Oil-water emulsions (HFAE fluids)

Biodegradable oils
PVG 120 valves can be used in systems using rape-seed oil. The use of rape-seed oil is conditional on

- it complying with the demands on viscosity, temperature and filtration etc. (see chapters below and technical data page 9).
- the operating conditions being adapted to the recommendations of the oil supplier.

Before using other biodegradable fluids, please consult the Sauer-Danfoss Sales Organisation.

PARTICLE CONTENT, DEGREE OF CONTAMINATION

Oil filtration must prevent the particle content from exceeding an acceptable level, i.e. an acceptable degree of contamination.
Maximum contamination for PVG 120 is 19/16 (see ISO 4406).
Calibration in accordance with the ACFTD method.

In our experience a degree of contamination of 19/16 can be maintained by using a filter fineness as described in the next section.

FILTERING

Effective filtration is the most important precondition in ensuring that a hydraulic system performs reliably and has a long working life. Filter manufacturers issue instructions and recommendations. It is advisable to follow them.

System filters
Where demands for safety and reliability are very high a pressure filter with bypass and indicator is recommended. Experience shows that a 10 µm nominal filter (or finer) or a 20 µm absolute filter (or finer) is suitable.
It is our experience that a return filter is adequate in a purely mechanically operated valve system.

The fineness of a pressure filter must be selected as described by the filter manufacturer so that a particle level of 19/16 is not exceeded. See "Particle content, degree of contamination".
The filter must be fitted with pressure gauge or dirt indicator to make it possible to check the condition of the filter.

In systems with differential cylinders or accumulators the return filter must be sized to suit the max. return oil flow. Pressure filters must be fitted to suit max. pump oil flow.

Internal filters
The filters built into PVG 120 are not intended to filter the system but to protect important components against large particles.
Such particles can appear in the system as a result of pump damage, hose fracture, use of quick-couplings, filter damage, starting up, contamination, etc.

The filter that protects the pilot supply in the tank side module has a mesh of 125 µm. It is obtainable as a spare part and is easy to replace.

The filter protecting the essential PVE parts has a mesh of 125 µm.

CONVERSION FACTORS

1 Nm	=	885.1 lbf·in
1 N	=	22.48 lbf·in
1 bar	=	14.50 psi
1 mm	=	0.0394 in
1 cm^3	=	0.061 in^3
1 l	=	0.22 gallon, UK
1 l	=	0.264 gallon, US
°F	=	1.8 × °C + 32

ORDER FORM

An order form for Sauer-Danfoss PVG 120 hydraulic valve is shown on next page.
The form can be obtained from the Sauer-Danfoss Sales Organisation.
The module selection chart on the next page and the order form are divided into fields.

Each module has its own field:

0: PVP, pump side modules
d: PVPD, PVPH and PVPE, accessory modules
1-8: PVB, basic modules
e: PVBS, main spools
f: PVBP, PVBR, PVBU and PVBC, accessory modules
a: PVM, mechanical actuation
c: PVMD, cover for mechanical operation
PVH, cover for hydraulic operation
PVEO and PVEH, electrical actuations
b: PVLP, shock and suction valve
PVLA, suction valve
9: PVT, tank side module
10: PVAS, assembly kit

Please state:

- Code numbers of all modules required
- Required setting (p) for pump side module
- Required setting of $LS_{A/B}$ pressure relief valves, if accessory module PVBR is ordered.

ORDER FORM

SAUER DANFOSS

PVG 120
Specification Sheet

Subsidiary / Dealer	PVG No.
Customer	Customer No.
Application	Revision No.

Function	A-Port					B-Port	
		0 155G		155G			
			p =		bar		
	a 155G	**1** 155G		155G	**e**	155G	**c**
	b 155G	**f** 155G		LS_{AB}	bar	155G	**b**
	a 155G	**2** 155G		155G	**e**	155G	**c**
	b 155G	**f** 155G		LS_{AB}	bar	155G	**b**
	a 155G	**3** 155G		155G	**e**	155G	**c**
	b 155G	**f** 155G		LS_{AB}	bar	155G	**b**
	a 155G	**4** 155G		155G	**e**	155G	**c**
	b 155G	**f** 155G		LS_{AB}	bar	155G	**b**
	a 155G	**5** 155G		155G	**e**	155G	**c**
	b 155G	**f** 155G		LS_{AB}	bar	155G	**b**
	a 155G	**6** 155G		155G	**e**	155G	**c**
	b 155G	**f** 155G		LS_{AB}	bar	155G	**b**
	a 155G	**7** 155G		155G	**e**	155G	**c**
	b 155G	**f** 155G		LS_{AB}	bar	155G	**b**
	a 155G	**8** 155G		155G	**e**	155G	**c**
	b 155G	**f** 155G		LS_{AB}	bar	155G	**b**
Remarks		**9** 155G					
		10 155G					
		11 155G					

Filled in by	Date

991L1868 ver. 03.2002

Reordering
The space at the top right-hand corner of the form is for Sauer-Danfoss to fill in. The code number for the whole of the specified valve group (PVG No.) is entered here. In the event of a repeat order all you have to do is enter the number Sauer-Danfoss has given on the initial confirmation of order.

Note:
If PVG 120 is to be used with phosphate-esters this must be stated on the order form (see also page 37, “Non-flammable fluids”).

NOTES

PVB, high basic module

	SAE flange	O-ring Boss	Metric flange	Weight kg	[lb]
Facilities for shock valves AB	155G6007	155G6006	155G6005	10.2	[22.5]

PVB, low basic module

	SAE flange	O-ring Boss	Metric flange	Weight kg	[lb]
No facilities for shock valves AB	155G6016	155G6015	155G6014	8.9	[19.6]

Accessory modules for PVB

		Weight kg	[lb]
Plug, PVBP	155G6081	0.4	[0.9]
$LS_{A/B}$ press. relief valve, PVBR	155G6080	0.4	[0.9]
External LS connection, PVBC	155G6082	0.4	[0.9]
Module for oil flow > 180 l/min [47.6 US gal/min], PVBU	155G6035	0.4	[0.9]

PVBS, mechanical actuation

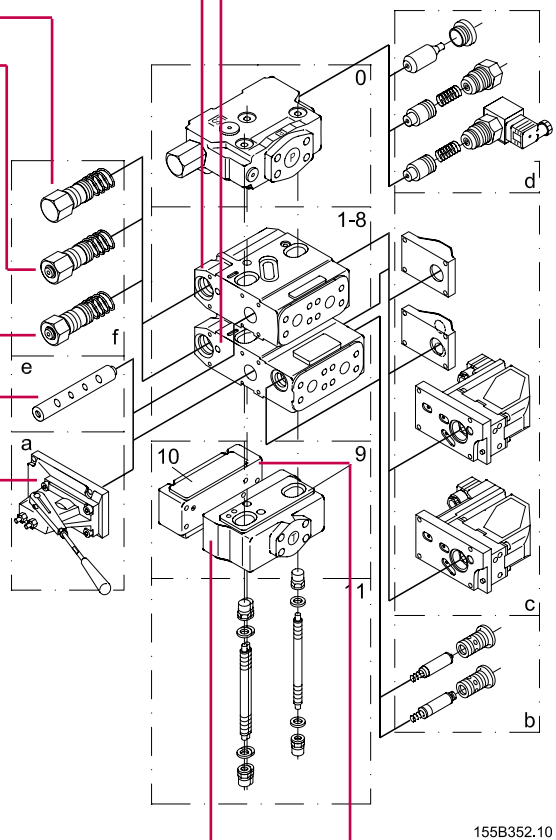
Oil flow l/min / US gal / Symbol	A 65 [17.2]	B 95 [25.1]	C 130 [34.3]	D 180 [47.6]
A B P T 155B384.10	155G6452	155G6454	155G6456	155G6458
A B P T 155B385.10		155G6464	155G6466	155G6468
B P T 155B386.10			155G6476	155G6478
Weight (kg)	0.35	0.35	0.35	0.35
Weight [lb]	[0.8]	[0.8]	[0.8]	[0.8]

PVM, mechanical actuation

PVM + PVMD or PVM + PVE	155G3040 155G3041	22.5° 37.5°
PVM + PVH	155G3050 155G3051	22.5° 37.5°
Weight kg [lb]	0.5 [1.1]	

PVT, tank side module

	SAE flange	O-ring Boss	Metric flange	Weight kg	[lb]
Upper part excl. LX connection	155G7022	155G7021	155G7020	4.6	[10.1]
Upper part incl. LX connection	155G7025	155G7024	155G7023	4.6	[10.1]
Lower part incl. pilot oil supply PVE for	155G7042		155G7040	4.4	[9.7]
Lower part excl. pilot oil supply for PVE	155G7062		155G7060	4.4	[9.7]



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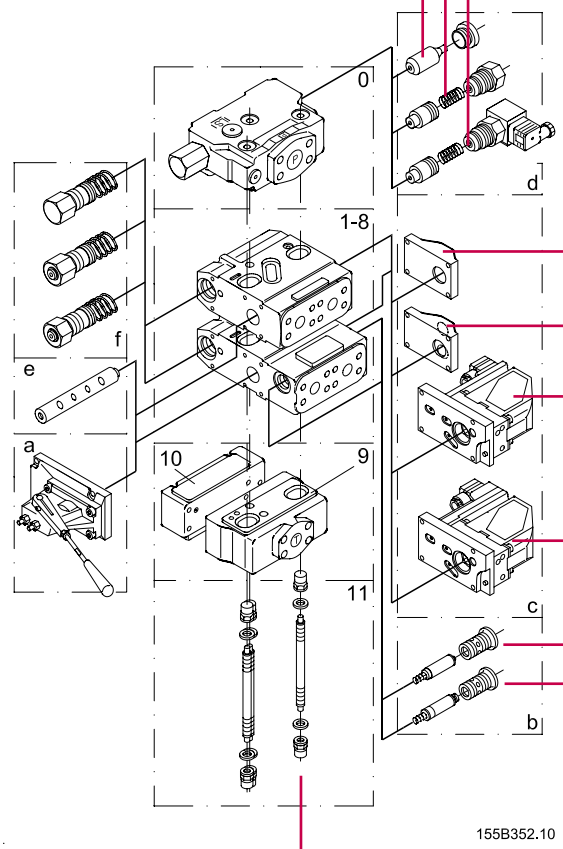
Module selection chart

PVP, pump side module

		O-ring Boss	SAE flange	Metric flange	Weight kg	[lb]
Open centre	Excl. PVPD, PVPH, PVPE	155G5023	155G5037	155G5021	10.0	[22.1]
	For PVB-oil flow > 180 l/min [47.6 US gal/min] Excl. PVPD, PVPH, PVPE	155G5028	155G5029	155G5027	10.0	[22.1]
Closed centre	Incl. pressure relief valve and plug PVPD	155G5022	155G5038	155G5020	10.2	[22.5]
	Excl. pressure relief valve	155G5031	155G5032	155G5030	11.0	[24.3]

Accessory modules for open centre PVP

			Weight kg	[lb]
Plug, PVPD		155G5041	0.4	[0.9]
Hydraulic relief valve, PVPH		155G5061	0.5	[1.1]
Electrical relief valve, PVPE	12 V	155G5052	0.7	[1.5]
	24 V	155G5054	0.7	[1.5]



155B352.10

PVMD, cover for PVM

	Weight kg	[lb]
155G4061	0.3	[0.7]

PVH, cover for PVRH

	Weight kg	[lb]
155G4021	0.4	[0.9]
155G4022	0.4	[0.9]

Electrical actuation PVE

	PVEH	PVEH	PVEO
	Fault monitoring		
	Active	Passive	
12 V	155G4072	155G4172	155G4272
24 V	155G4074	155G4174	155G4274
Weight (kg)	1.25	1.25	1.0
[lb]	[2.76]	[2.76]	[2.2]

PVLP, shock and suction valve A/B

Pressure setting (bar)	[psi]	
50	725	155G0050
75	1100	155G0075
100	1450	155G0100
125	1800	155G0125
150	2200	155G0150
175	2550	155G0175
200	2900	155G0200
225	3250	155G0225
250	3650	155G0250
275	4000	155G0275
300	4350	155G0300
325	4700	155G0325
350	5100	155G0350
375	5400	155G0375
400	5800	155G0400
Weight (kg)		0.175
[lb]		[0.386]

PVLA suction valve A/B

	155G1065
Weight (kg)	0.2
[lb]	[0.4]

PVAS, assembly kit

PVB's	1	2	3	4	5	6	7	8
	155G8031	155G8032	155G8033	155G8034	155G8035	155G8036	155G8037	155G8038
Weight (kg)	0.8	1.0	1.1	1.2	1.4	1.7	1.9	2.1
[lb]	[1.8]	[2.2]	[2.4]	[2.6]	[3.1]	[3.7]	[4.2]	[4.6]

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Sauer-Danfoss (US) Company
2800 East 13th Street
Ames, IA 50010, USA
Phone: +1 515 239-6000, Fax: +1 515 239-6618

Sauer-Danfoss (Neumünster) GmbH & Co. OHG
Postfach 2460, D-24531 Neumünster
Krokamp 35, D-24539 Neumünster, Germany
Phone: +49 4321 871-0, Fax: +49 4321 871-122

Sauer-Danfoss (Nordborg) A/S
DK-6430 Nordborg, Denmark
Phone: +45 7488 4444, Fax: +45 7488 4400

www.sauer-danfoss.com

Oleodinamica Pneumatica

Via C. Fenzi, 4 25135 BRESCIA(ITALY)
Tel.+39 0303760255
Fax.+39 0303365657
www.cope-italy.com
info@cope-italy.it

P.I.V. E C.F.: 00600150171 REG.IMPERSE: BS029-11834 – CAP.SOC.€ 78.000,000I.V.



COMPONENTI
OLEODINAMICA PNEUMATICA ELETTRONICA

Via C. Fenzi, 4 - 25135 Brescia
Tel. ++39.030.3760255
Fax ++39.030.3365657
www.cope-italy.com
www.cope-italy.it
info@cope-italy.it