MOTORS

Technical Information

DH and DS Orbital Motors

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White is a leading global provider of motor and steering solutions that power the evolution of mobile and industrial applications around the world.

Contents

Chapter 1
Product overview

Topics:

- *Data survey*
- *DH versions*
- *DS versions*

Data survey

Maximum speed

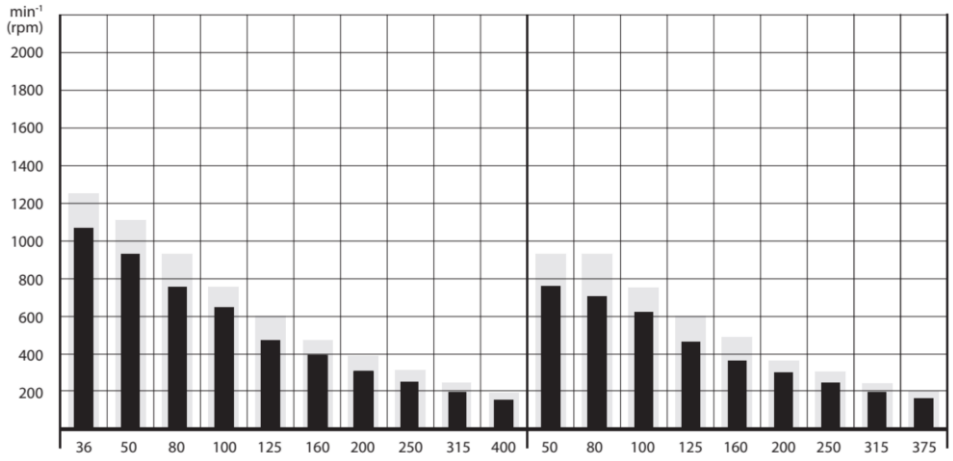


Figure 1 Maximum speed

Maximum Torque

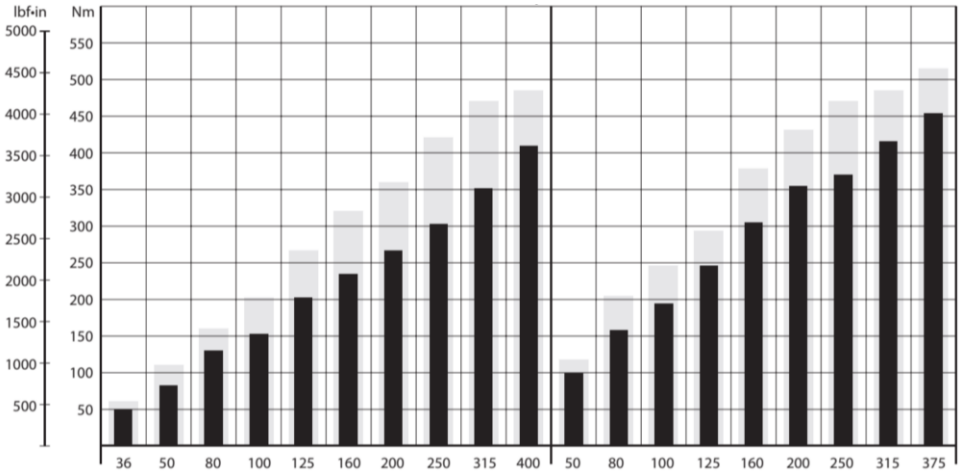


Figure 2 Maximum torque

Output

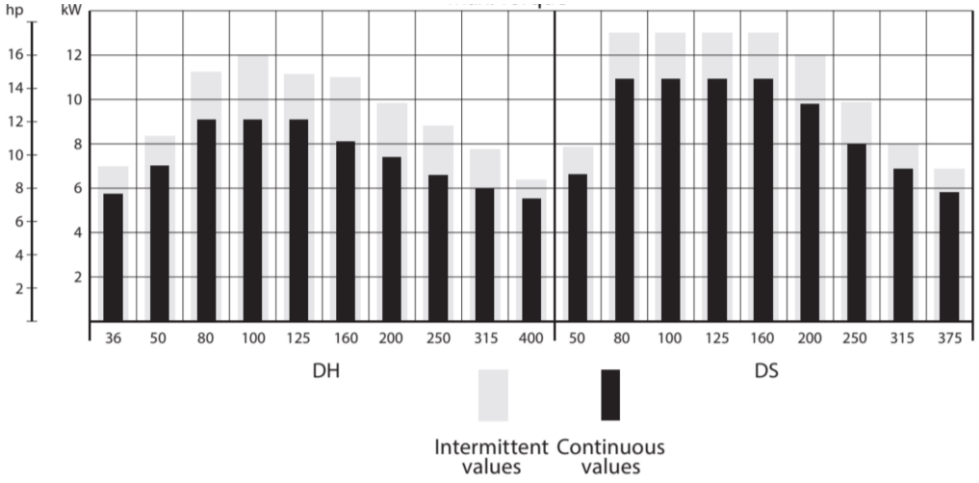


Figure 3 Output

DH versions

Mounting flange	Shaft	Port size	Version		Port version			Shaft seal		Drain connection	Check valve	Main type designation
			EU	US	Side	End	Flange	Standard	High pressure			
2 hole oval flange (A2-flange)	Cyl. 1 in	7/8-14 UNF		X	X				X	No	No	DH
										Yes		
		1/2-14 NPTF								No		
	1 in – 6B spl.	7/8-14 UNF								No		
Square flange (C-flange)	Cyl. 1									No		
		1/2-14 NPTF								No		

Table 1 DH versions

Features available (options)

- Reverse
- Rotation Drain
- Port painted

Code numbers

Code num.	Displacement									
	36	50	80	100	125	160	200	250	315	400
151-	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
	-	3401	3402	3403	-	-	-	3407	3408	3409
	2080	2081	2082	2083	-	2085	2086	2087	2088	2089
	2010	2011	2012	2013	-	2015	2016	2017	2018	2019
	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129

Table 2 DH code numbers

Ordering

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

Example:
151-2000 for an DH 36 with A2-flange, cyl. 1 in shaft, port size 7/8 - 14 UNF and without drain connection.

Orders will not be accepted without the four character prefix.

DS versions

Mounting flange	Shaft	Port size	Version		Port version			Shaft seal		Drain connection	Check valve	Main type designation
			EU	US	Side	End	Flange	Standard	High pressure			
2 hole oval flange (A2-flange)	Cyl. 1 in	7/8-14 UNF		X	X				X	No	No	DS
										Yes		
		1/2-14 NPTF								No		
	1 in – 6B spl.	7/8-14 UNF								No		
Square flange (C-flange)	Cyl. 1									No		
		1/2-14 NPTF								No		

Table 3 DS versions

Features available (options)

- Reverse
- Rotation Drain
- Port painted

Code numbers

Code num.	Displacement								
	50	80	100	125	160	200	250	315	375
151-	2301	2302	2303	2304	2305	2306	2307	2308	-
	-	3702	3703	3704	-	3706	3707	3708	-
	-	2382	2383	-	2385	2386	2387	-	2389
	-	2312	2313	2314	-	2316	-	2318	2319
	2341	2342	2343	2344	2345	2346	2347	2348	2349
	2421	-	2423	-	2425	2426	2427	-	2429

Table 4 DS code version

Ordering

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

Example:
151-2305 for an DS 160 with A2-flange, cyl. 1 in shaft, port size 7/8 - 14 UNF and without drain connection.

Orders will not be accepted without the four character prefix.

Chapter 2
DH Technical data

Topics:

- *Technical data*
- *Maximum pressures*
- *Maximum Permissible Shaft Seal Pressure*
- *Pressure drop in motor*
- *Oil Flow in Drain Line*
- *Direction of shaft rotation*
- *Permissible Shaft Loads for DH*
- *Function diagrams*
- *Shaft version*
- *Port thread versions*

Technical data

DH with 1in cylindrical and 1in-6B splined shaft

Type			DH									
Motor size			36	50	80	100	125	160	200	250	315	400
Geometric displacement	cm^3		36.0	48.6	77.8	97.3	125.0	155.7	194.6	242.3	306.1	389.2
	[in^3]		[2.20]	[2.97]	[4.76]	[5.95]	[7.65]	[9.53]	[11.91]	[14.83]	[18.73]	[23.82]
Maximum speed	min^{-1}	cont.	1050	930	780	620	485	390	310	250	200	155
	[rpm]	int.[1)]	1270	1090	975	780	605	485	390	315	245	195
Maximum torque	N•m	cont.	59	79	125	158	203	235	267	305	355	410
	[lbf•in]		[520]	[700]	[1110]	[1400]	[1800]	[2080]	[2360]	[2700]	[3140]	[3630]
		int. [1)]	76	106	163	214	270	320	360	415	470	485
			[670]	[940]	[1440]	[1890]	[2390]	[2830]	[3190]	[3670]	[4160]	[4290]
Maximum output	kW	cont.	5.8	6.8	8.8	8.8	8.8	8.1	7.4	6.6	6.0	5.5
	[hp]		[7.9]	[9.3]	[12.0]	[12.0]	[12.0]	[10.9]	[9.0]	[8.9]	[8.0]	[7.4]
		int.[1)]	7.0	8.2	11.4	11.8	11.0	11.1	9.8	8.8	7.8	6.4
			[9.5]	[11.2]	[15.5]	[16.0]	[15.0]	[14.1]	[13.1]	[11.8]	[10.5]	[8.6]
Maximum pressure drop.	bar	cont.	124	124	124	124	124	117	103	97	90	83
	[psi]		[1800]	[1800]	[1800]	[1800]	[1800]	[1700]	[1500]	[1400]	[1300]	[1200]
		int.[1)]	166	166	166	166	166	159	141	131	121	97
			[2400]	[2400]	[2400]	[2400]	[2400]	[2300]	[2050]	[1900]	[1750]	[1400]
Maximum oil flow	l/min [US gal/ min]	cont.	38	45	60	60	60	60	60	60	60	60
			[10.0]	[11.9]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]
		int.[1)]	45	55	75	75	75	75	75	75	75	75
			[11.9]	[14.5]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]
Maximum starting pressure with unloaded shaft	bar [psi]		10	10	10	10	10	10	7	7	7	7
			[145]	[145]	[145]	[145]	[145]	[145]	[100]	[100]	[100]	[100]
Minimum starting torque	at max. press. drop cont. N•m [lbf•in]		53	72	115	144	185	217	240	279	330	385
			[470]	[635]	[1020]	[1275]	[1640]	[1920]	[2125]	[2470]	[2920]	[3405]
	at max. press. drop int.[1)] N•m [lbf•in]		66	96	154	192	247	295	327	379	444	451
			[585]	[850]	[1360]	[1700]	[2185]	[2610]	[2895]	[3355]	[3930]	[3990]

Table 5 DH with 1in cylindrical and 1in-6B splined shaft technical data

Maximum pressures

Type			Maximum inlet pressure	Maximum return pressure with drain line
DH 36-400	bar [psi]	cont	138 [2000]	
		int.[1)]	172 [2500]	

Table 6 DH Maximum pressures

1) 6B splined shaft is recommended for operating torque of 280 Nm [2500 lbf·in] or more.

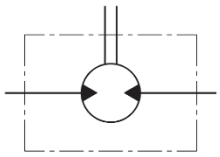
2) Intermittent operation: the permissible values may occur for max. 10% of every minute.

Maximum Permissible Shaft Seal Pressure

DH with HPS and without drain connection:

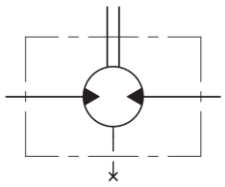
The shaft seal pressure equals the pressure in the drain line. average of input pressure and return pressure.

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



DH with HPS and drain connection:

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



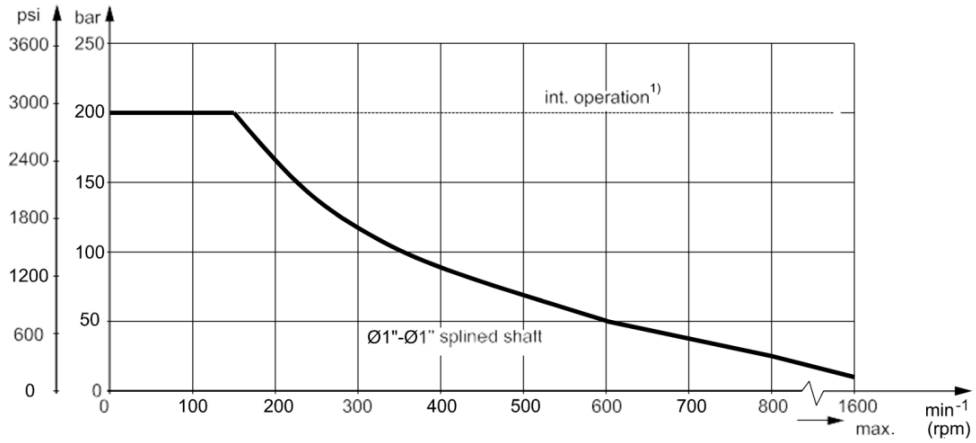
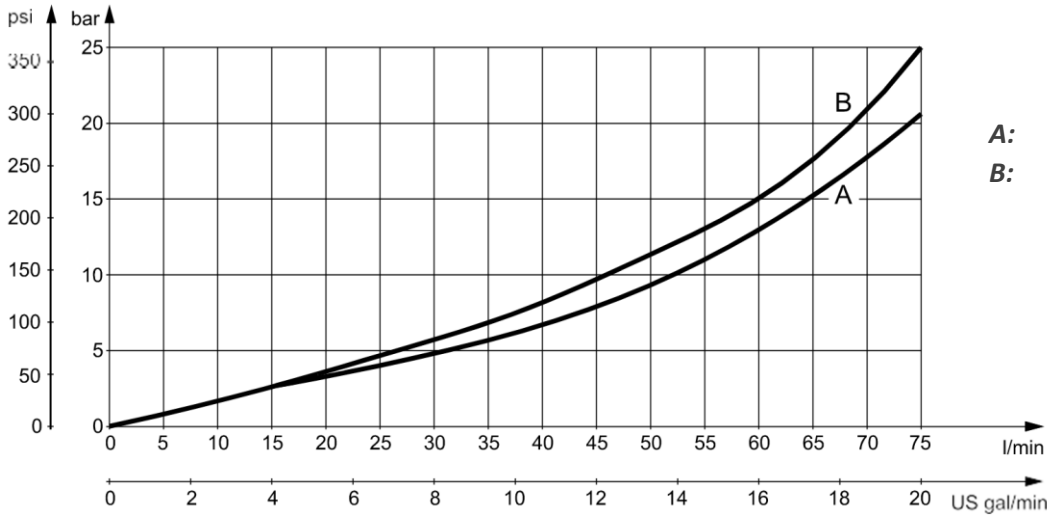


Figure 4 DH Maximum Permissible Shaft Seal Pressure

Pressure drop in motor

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



A: *DH 80-400*
B: *DH 36-50*

Figure 5 DH Pressure drop in motor

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** mm^2/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]

Table 7 DH Oil flow in drain line

Direction of shaft rotation

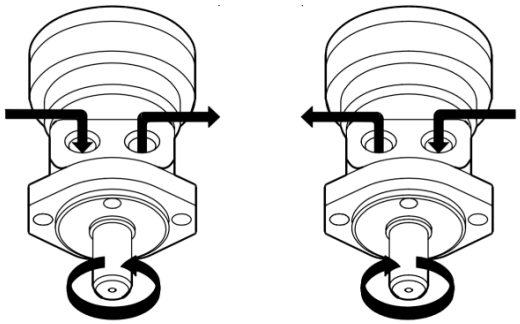


Figure 6 DH Direction of shaft rotation

Permissible Shaft Loads for DH

The permissible 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	Square flange 2-hole oval flange (US version)
Shaft version	1 in cylindrical shaft 1 in-6B splined shaft
Permissible shaft load (P_R) l in mm	$\frac{650}{n} \times \frac{22800}{87+l} N^*$
Permissible shaft load (P_R) l in inch	$\frac{1460}{n} \times \frac{898}{3.425+l} lbf^*$

Table 8 DH Permissible Shaft Loads

* $n \geq 200^{-1}\ (rpm); l \leq 55mm\ [2.2in]$
$n \leq\ 200^{-1}\ (rpm);\ \rightarrow P_{Rmax} = 6500N\ [1460\ lbf], when\ using\ \ above\ formulas\ n\ has\ to\ be\ 200^{-1}\ (rpm)$

The curve shows the relation between P_R an n, when l= 27mm [1.06] for motors with oval and square mounting.

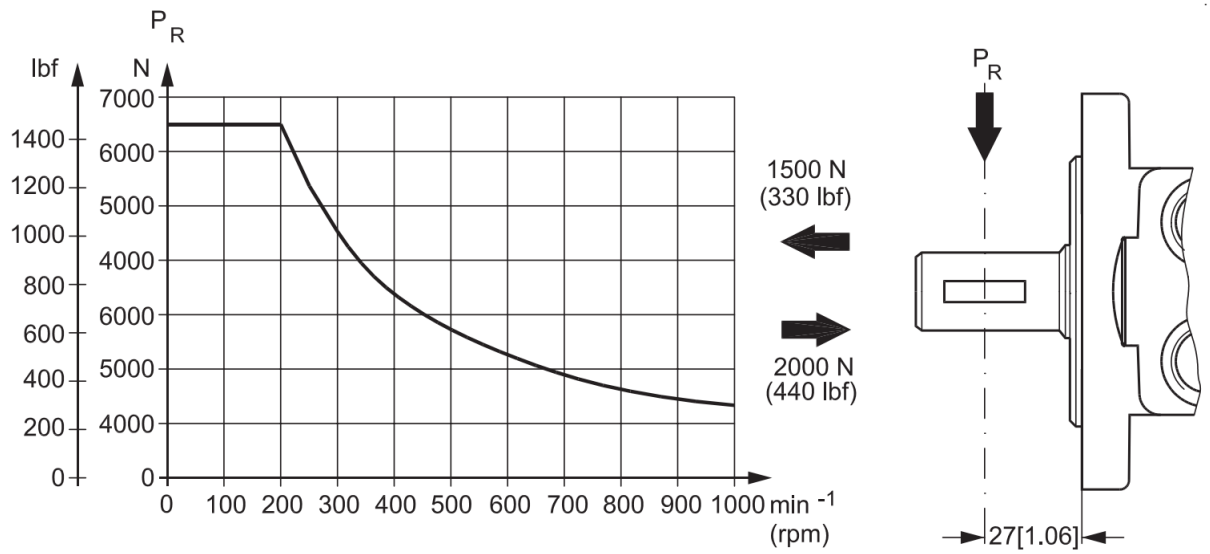


Figure 7 DH permissible shaft loads

Function diagrams

DH 36

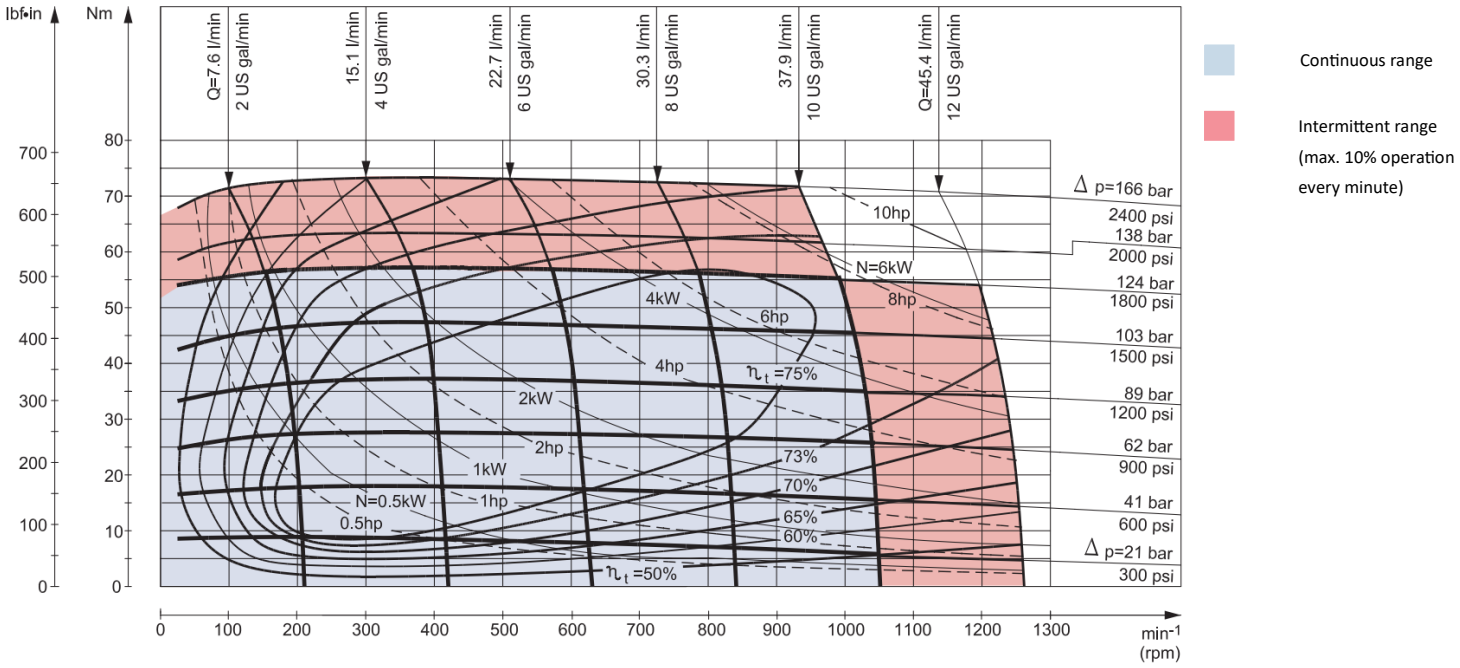
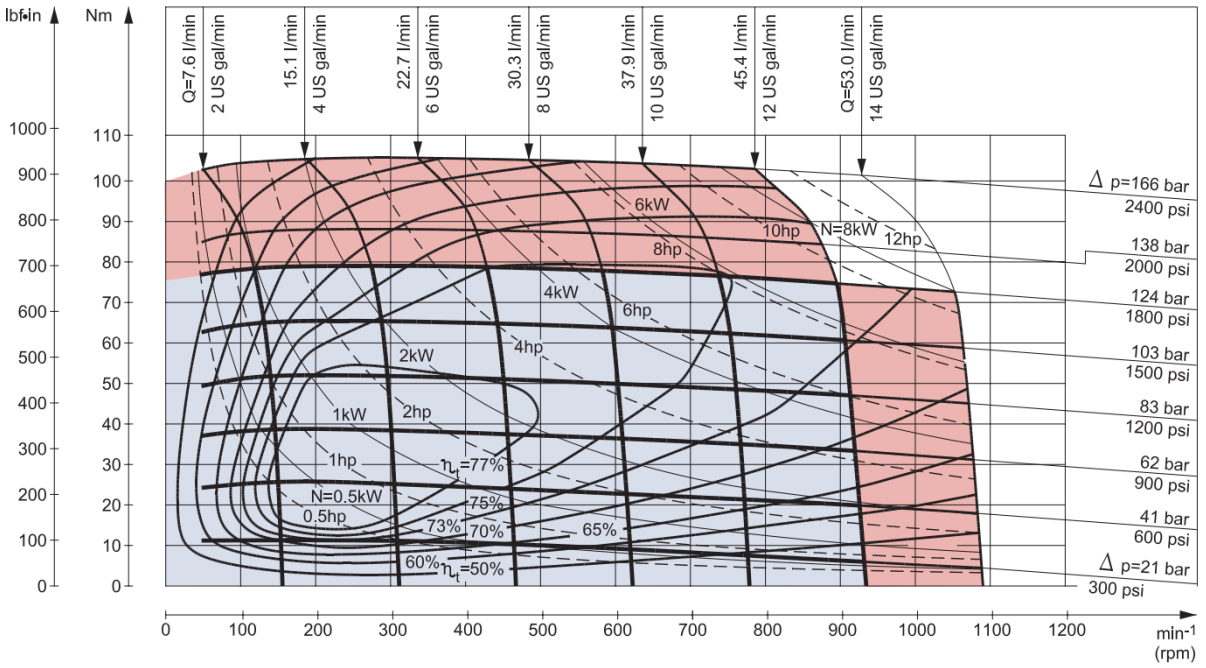


Figure 8 DH 36 function diagram

DH 50

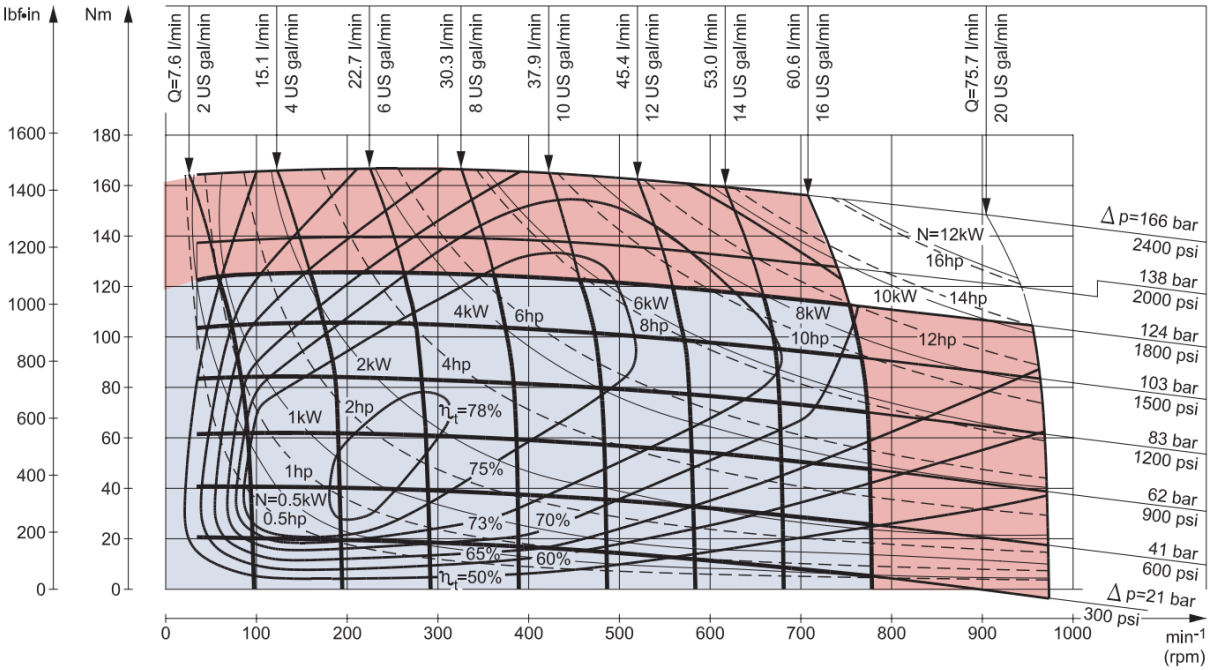


Continuous range

Intermittent range (max. 10% operation every minute)

Figure 9 DH 50 function diagram

DH 80

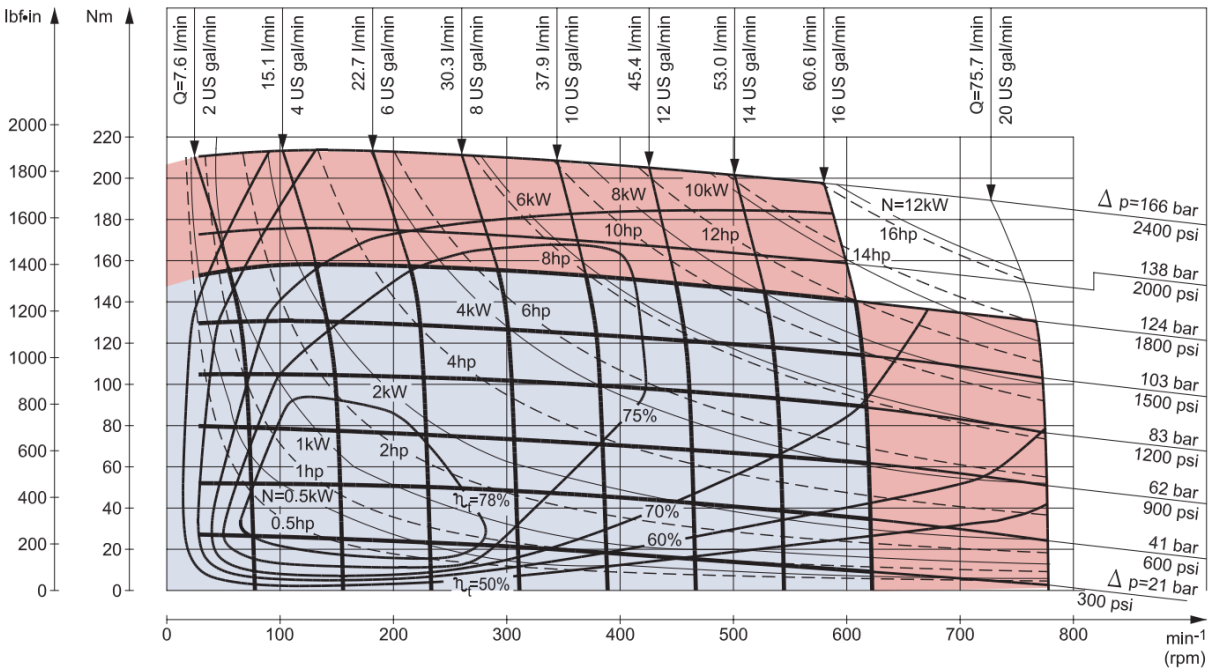


Continuous range

Intermittent range (max. 10% operation every minute)

Figure 10 DH 80 function diagram

DH 100

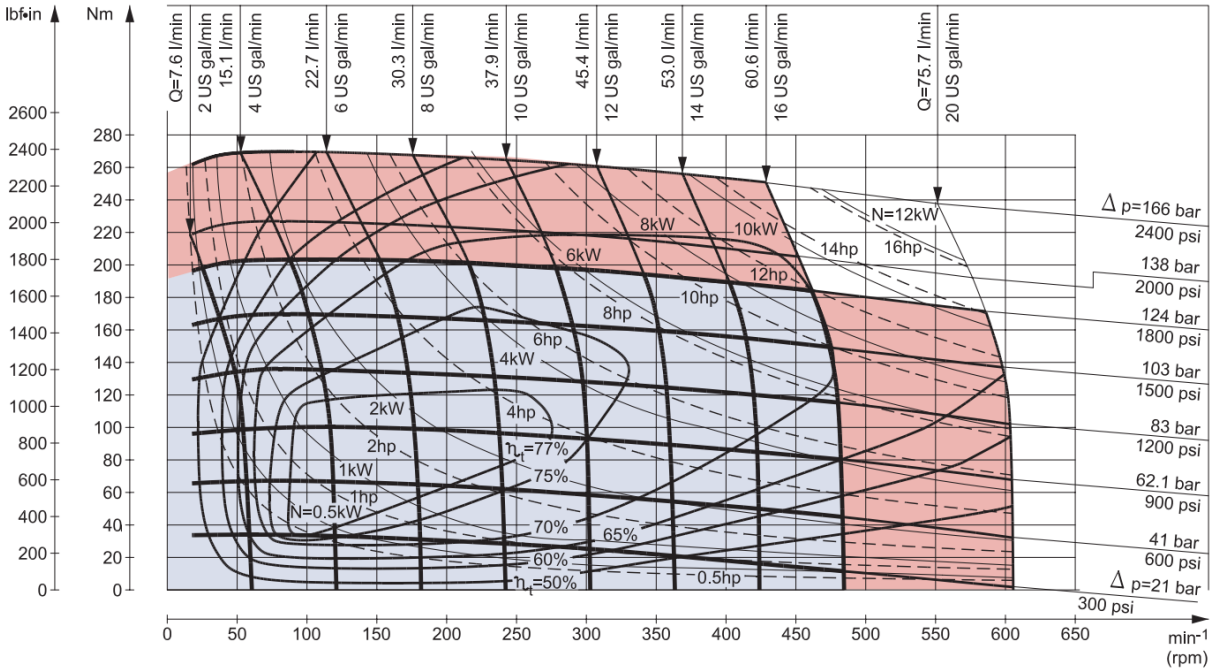


Continuous range

Intermittent range (max. 10% operation every minute)

Figure 11 DH 100 function diagram

DH 125

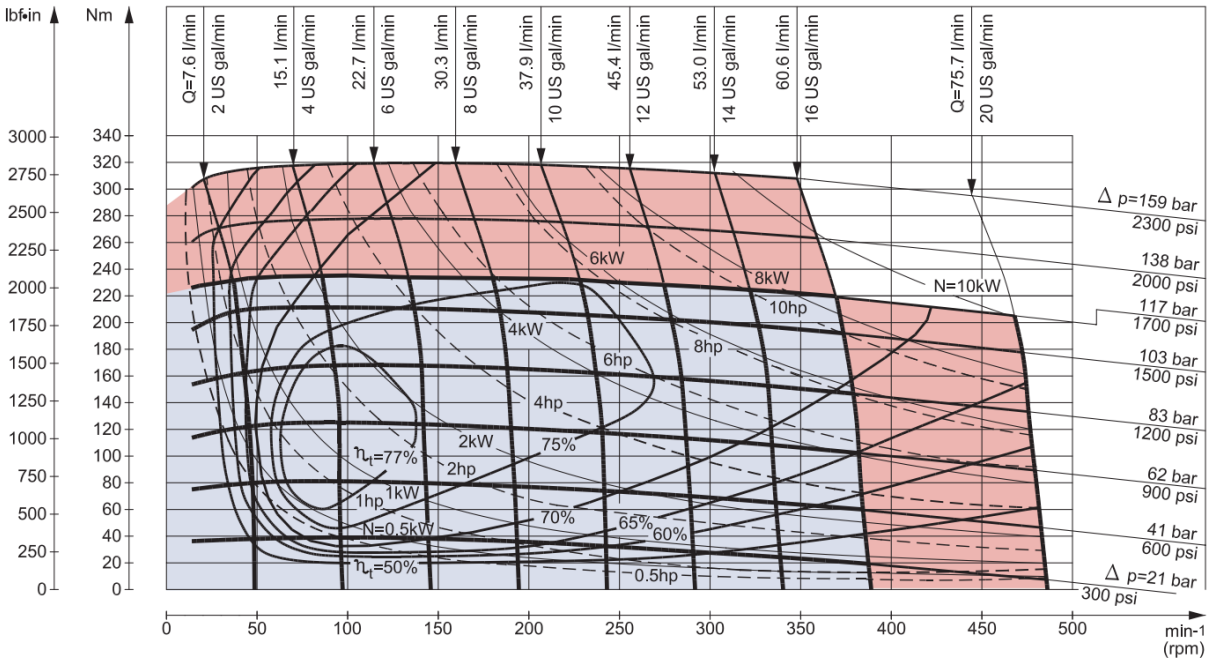


Continuous range

Intermittent range (max. 10% operation every minute)

Figure 12 DH 125 function diagram

DH 160

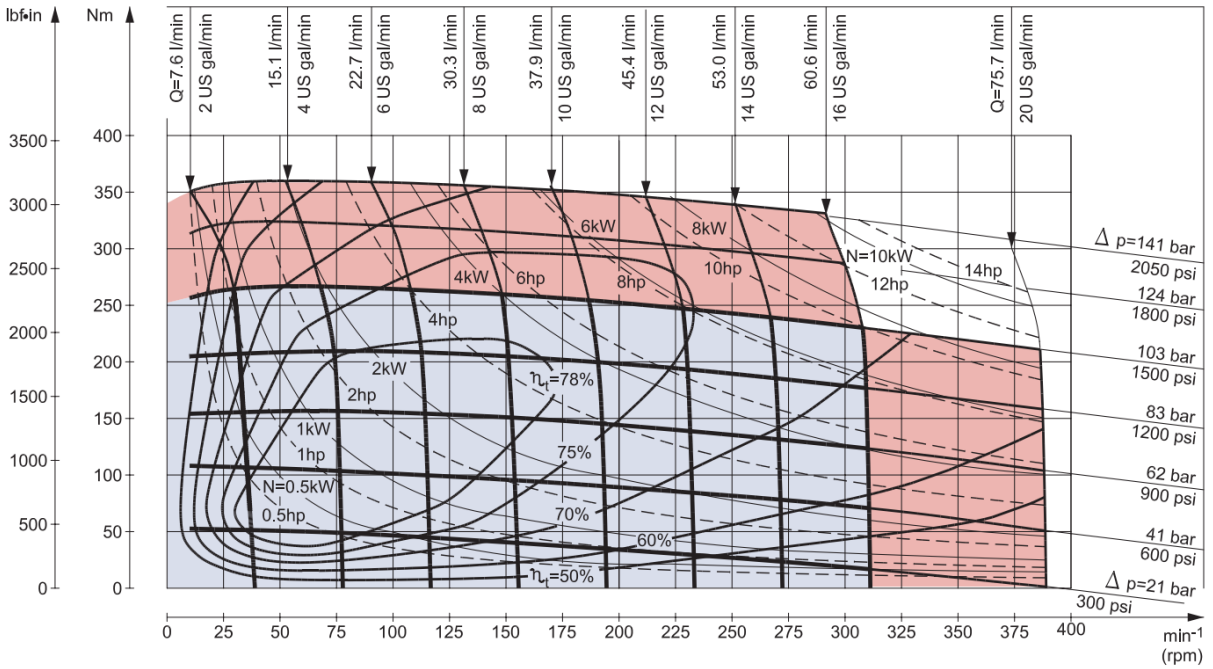


Continuous range

Intermittent range (max. 10% operation every minute)

Figure 13 DH 160 function diagram

DH 200

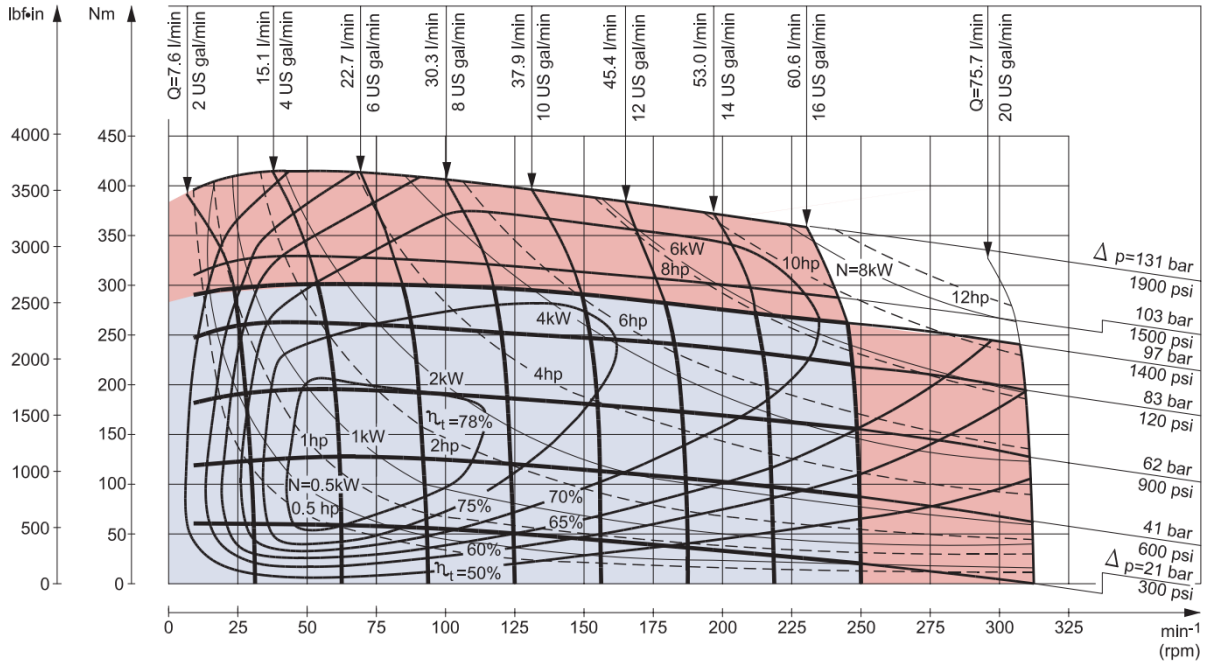


Continuous range

Intermittent range (max. 10% operation every minute)

Figure 14 DH 200 function diagram

DH 250

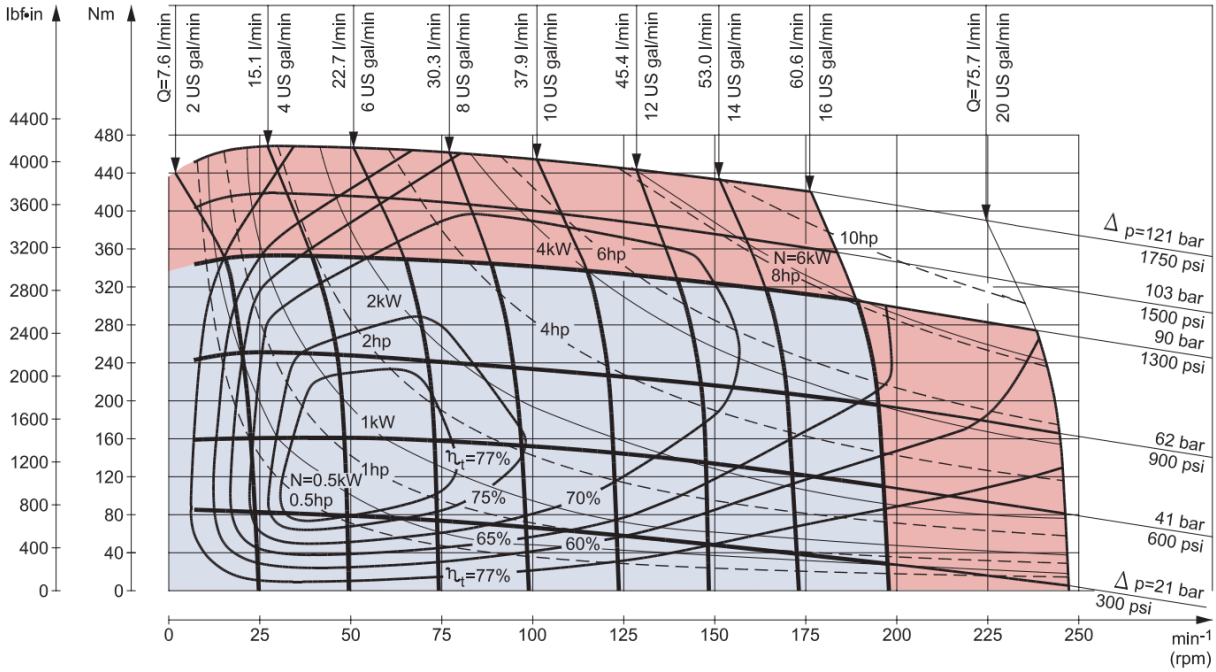


Continuous range

Intermittent range (max. 10% operation every minute)

Figure 15 DH 250 function diagram

DH 315



Continuous range

Intermittent range (max. 10% operation every minute)

Figure 16 DH 315 function diagram

DH 400

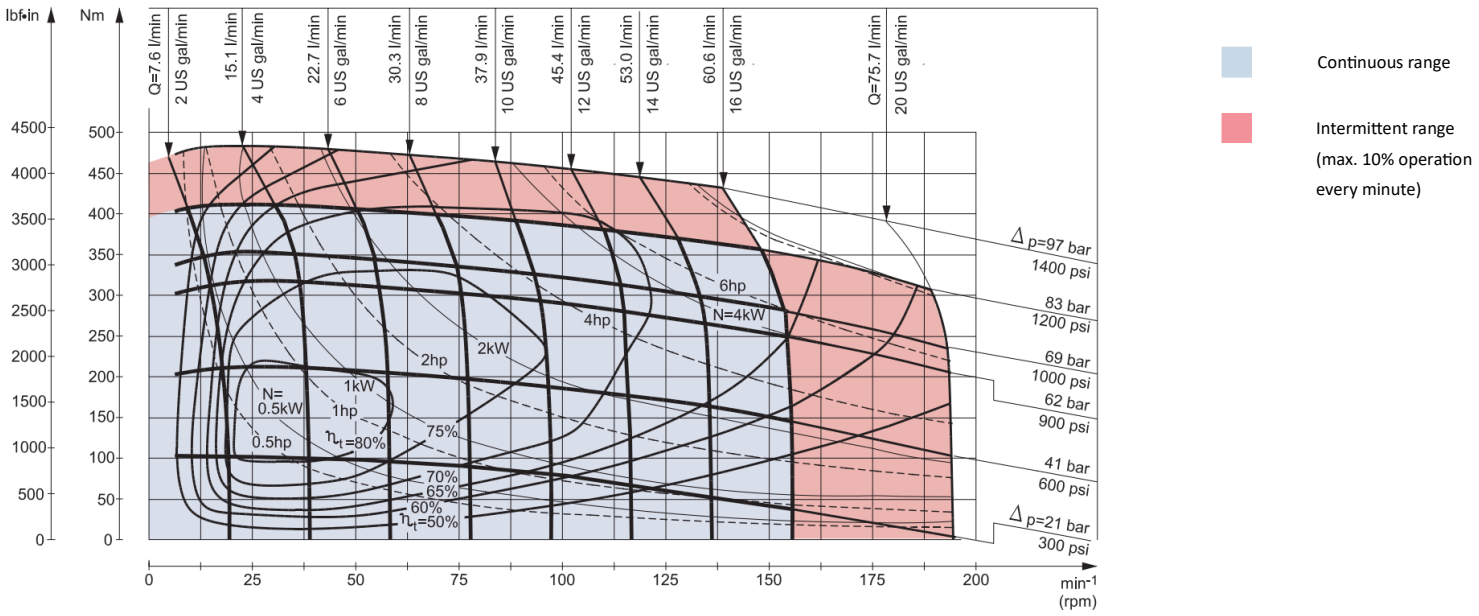


Figure 17 DH 400 function diagram

Shaft version

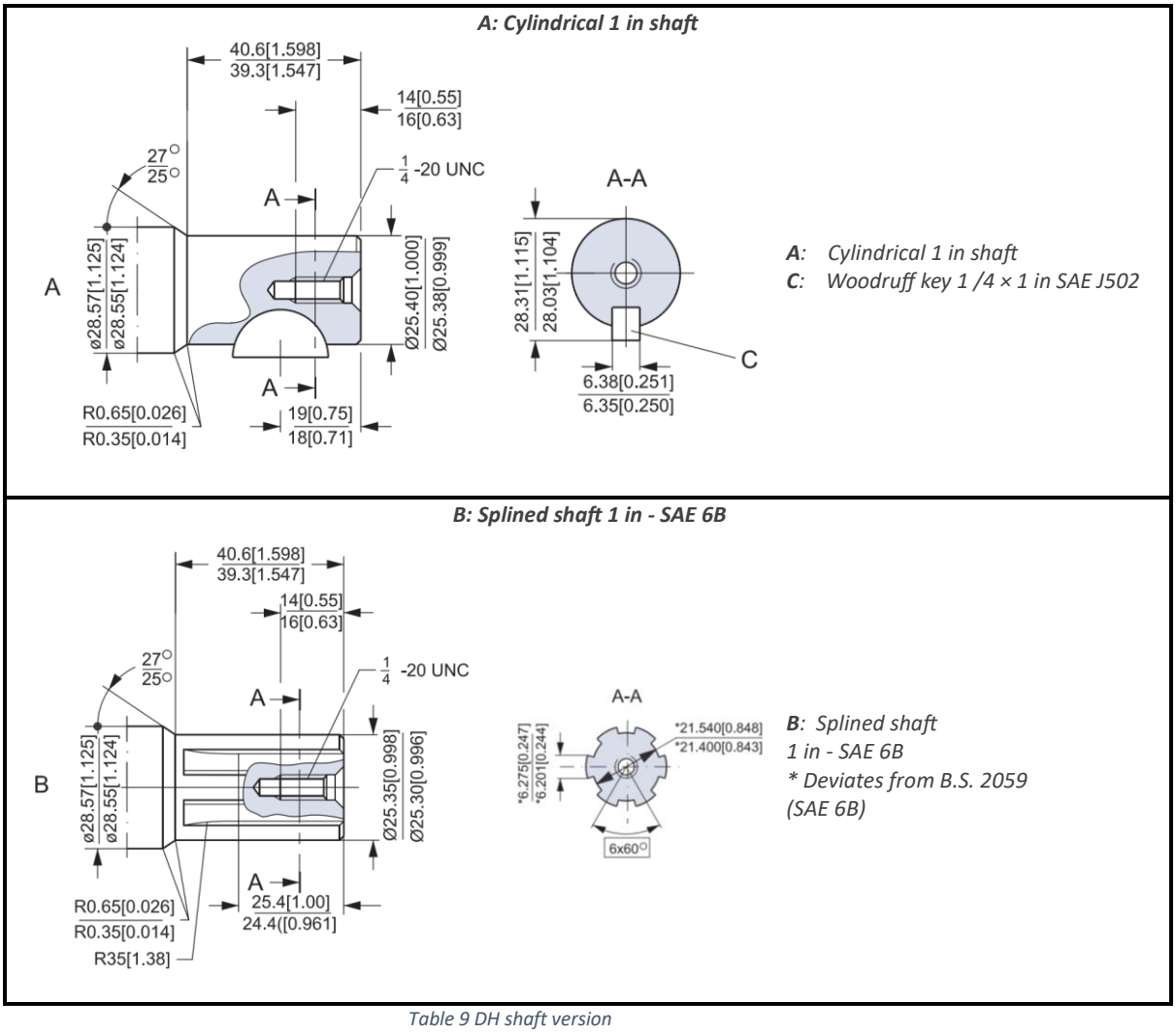


Table 9 DH shaft version

Port thread versions

UNF 7/8–14 UNF O-ring boss	NPTF 1/2–14 NPTF	UNF drain 7/16–20 UNF O-ring boss

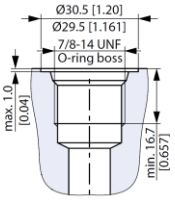
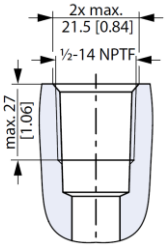
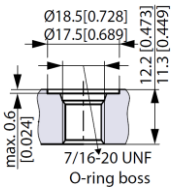

		

Figure 18 DH port thread version: 7/8-14 UNF O-ring boss	*Figure 19 DH port thread version: 1/2–14 NPTF*	*Figure 20 DH port thread version: 7/16-20 UNF O-ring boss*

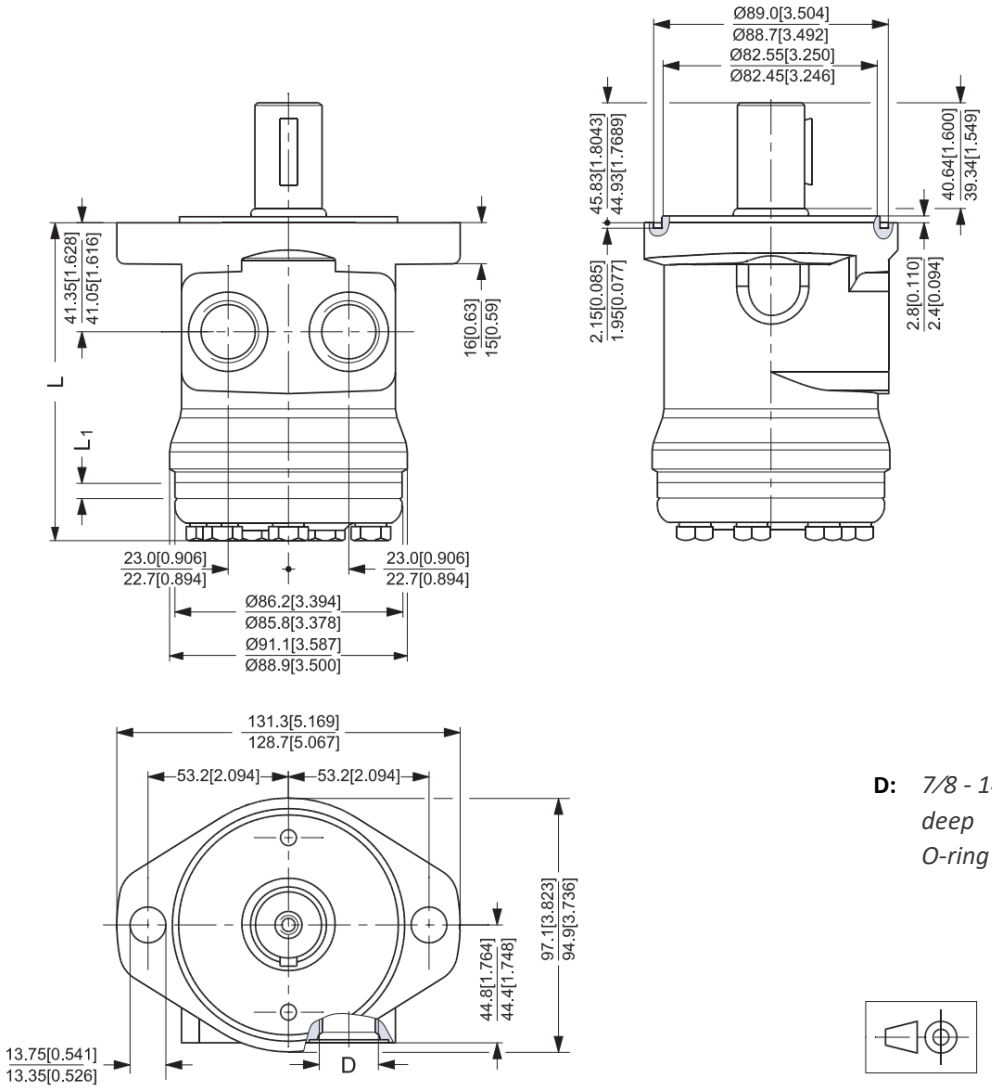
Table 10 DH main ports overview

Chapter 3
DH Dimensions

Topics:

- *DH side port version with 2 hole oval mounting flange (A2-flange)*
- *DH side port version with 2 hole mounting flange (A2-flange). With drain connection.*
- *DH Side port version with square mounting flange (C-flange)*

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



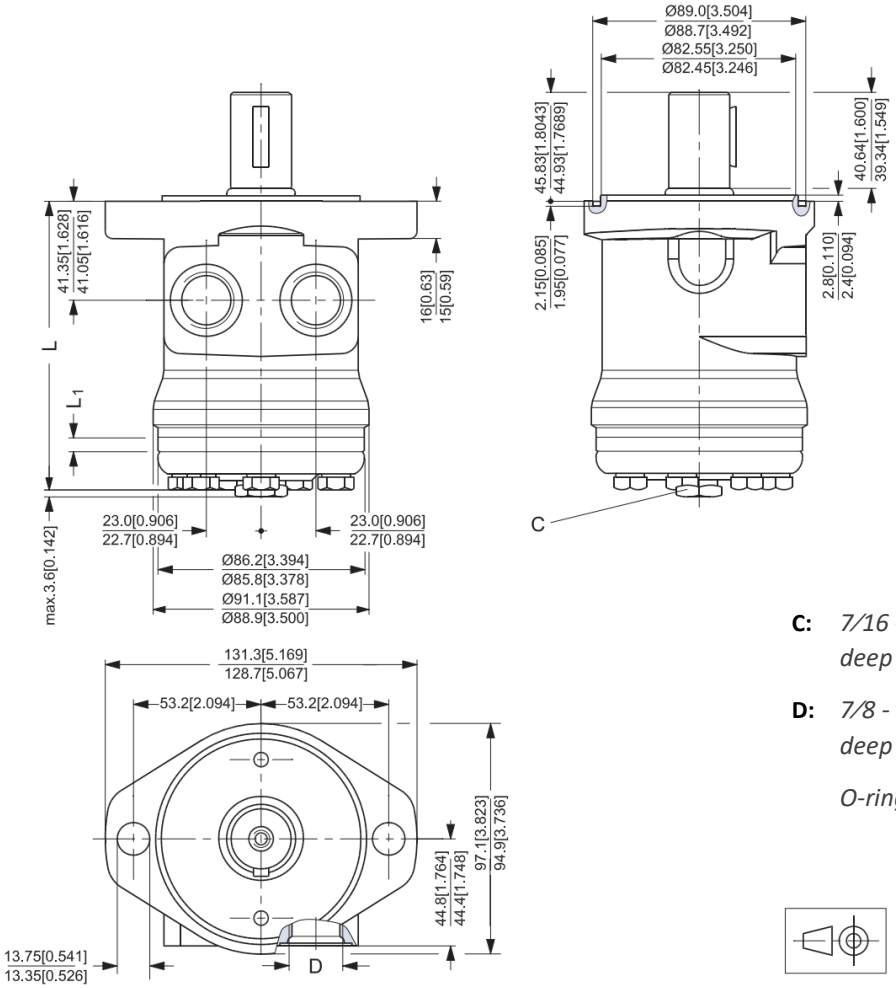
D: *7/8 - 14 UNF, 16.7 mm [0.66 in] deep*
O-ring boss port or 1/2 - 14 NPTF

Figure 21 DH Side port version (A2 flange)

Type		L_{max} mm[in]	L_1 mm[in]
DH	36	119.7 [4.71]	5.9 [0.23]
	50	120.3 [4.74]	6.5 [0.26]
	80	124.2 [4.89]	10.4 [0.41]
	100	126.8 [4.99]	13.0 [0.51]
	125	130.5 [5.14]	16.7 [0.66]
	160	134.6 [5.30]	20.8 [0.82]
	200	139.8 [5.50]	26.0 [1.02]
	250	146.3 [5.76]	32.5 [1.28]
	315	154.7 [6.09]	40.9 [1.61]
	400	165.8 [6.53]	52.0 [2.05]

Table 11 DH Side port version (A2 flange) dimensions

DH side port version with 2 hole mounting flange (A2-flange). With drain connection.



C: *7/16 - 20 UNF, 12 mm [0.47 in] deep*

D: *7/8 - 14 UNF, 16.7 mm [0.66 in] deep*

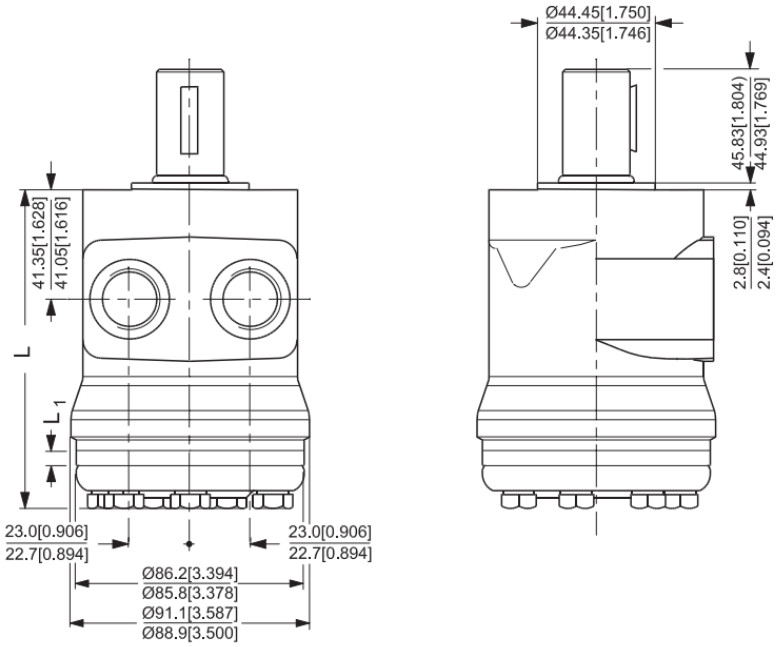
O-ring boss port or 1/2 - 14 NPTF

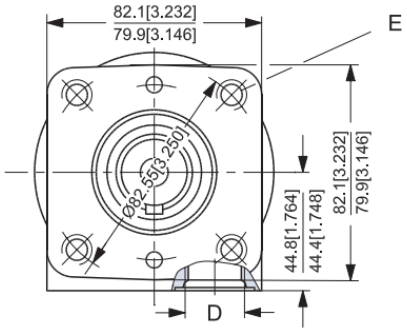
Figure 22 DH side port version A2 flange with drain connection

Type		L_{max} mm[in]	L_1 mm[in]
DH	36	119.7 [4.71]	5.9 [0.23]
	50	120.3 [4.74]	6.5 [0.26]
	80	124.2 [4.89]	10.4 [0.41]
	100	126.8 [4.99]	13.0 [0.51]
	125	130.5 [5.14]	16.7 [0.66]
	160	134.6 [5.30]	20.8 [0.82]
	200	139.8 [5.50]	26.0 [1.02]
	250	146.3 [5.76]	32.5 [1.28]
	315	154.7 [6.09]	40.9 [1.61]
	400	165.8 [6.53]	52.0 [2.05]

Table 12 DH Side port version (A2 flange) with drain connection dimensions

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





D: *7⁄8 - 14 UNF; 16.7 mm [0.66 in] deep or 1⁄2 - 14 NPTF*

E: *3⁄8 - 16 UNC; 15 mm [0.59 in] deep(4-off)*

Figure 23 DH Side port version C-flange

Type		L_{max} mm[in]	L_1 mm[in]
DH	36	119.7 [4.71]	5.9 [0.23]
	50	120.3 [4.74]	6.5 [0.26]
	80	124.2 [4.89]	10.4 [0.41]
	100	126.8 [4.99]	13.0 [0.51]
	125	130.5 [5.14]	16.7 [0.66]
	160	134.6 [5.30]	20.8 [0.82]
	200	139.8 [5.50]	26.0 [1.02]
	315	154.7 [6.09]	40.9 [1.61]

Table 13 DH Side port version (A2 flange) with drain connection dimensions

Chapter 4
DS Technical Data

Topics:

- *Technical versions*
- *Maximum pressures*
- *Maximum Permissible Shaft Seal Pressure*
- *Pressure drop in motor*
- *Oil Flow in Drain Line*
- *Direction of shaft rotation*
- *Permissible Shaft Loads for DS*
- *DS function diagrams*
- *Shaft version*
- *Port thread versions*

Technical versions

DS with 1in cylindrical and 1in-6B splined shaft

Type			DS								
Motor size			50	80	100	125	160	200	250	315	375
Geometric displacement	cm^3		51.6	80.3	99.8	124.1	155.4	198.2	248.1	310.1	390.7
	[in^3]		[3.16]	[4.91]	[6.11]	[7.60]	[9.51]	[12.13]	[15.18]	[18.98]	[23.91]
Maximum speed	min^{-1}	cont.	770	755	605	480	380	305	245	190	155
	[rpm]	int.[1)]	955	945	760	600	475	380	305	240	195
Maximum torque	N•m	cont.	93	159	193	247	314	350	370	415	455
	[lbf•in]		[820]	[1405]	[1710]	[2190]	[2780]	[3100]	[3270]	[3670]	[4030]
		int. [1)]	116	206	237	304	378	429	469	485	515
			[1025]	[1820]	[2100]	[2690]	[3350]	[3800]	[4150]	[4290]	[4560]
Maximum output	kW	cont.	6.6	10.7	10.7	10.7	10.7	9.6	8.0	6.9	5.8
	[hp]		[8.9]	[14.3]	[14.3]	[14.3]	[14.3]	[12.9]	[10.7]	[9.3]	[7.8]
		int.[1)]	7.8	13.0	13.0	13.0	12.6	11.8	9.9	8.0	6.9
			[10.5]	[17.4]	[17.4]	[17.4]	[16.9]	[15.8]	[13.3]	[10.7]	[9.3]
Maximum pressure drop.	bar	cont.	138	138	138	138	138	124	107	97	83
	[psi]		[2000]	[2000]	[2000]	[2000]	[2000]	[1800]	[1550]	[1400]	[1200]
		int.[1)]	172	172	172	172	172	155	138	114	97
			[2500]	[2500]	[2500]	[2500]	[2500]	[2250]	[2000]	[1650]	[1400]
Maximum oil flow	l/min [US gal/ min]	cont.	40	60	60	60	60	60	60	60	60
			[10.6]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]	[15.9]
		int.[1)]	50	75	75	75	75	75	75	75	75
			[13.2]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]	[19.8]
Maximum starting pressure with unloaded shaft	bar [psi]		10	10	10	10	10	10	7	7	7
			[145]	[145]	[145]	[145]	[145]	[145]	[100]	[100]	[100]
Minimum starting torque	at max. press. drop cont. N•m [lbf•in]		76	118	164	204	256	294	318	358	387
			[670]	[1045]	[1455]	[1810]	[2265]	[2600]	[2815]	[3170]	[3425]
	at max. press. drop int.[1)] N•m [lbf•in]		95	148	205	255	320	367	408	423	453
			[840]	[1305]	[1820]	[2260]	[2830]	[3250]	[3615]	[3745]	[4010]

Table 14 DS with 1in cylindrical and 1in-6B splined shaft technical data

Maximum pressures

Type			Maximum inlet pressure	Maximum return pressure with drain line
DS 50-375	bar [psi]	cont	138 [2000]	
		int.[1)]	172 [2500]	

Table 15 DS Maximum pressures

1) 6B splined shaft is recommended for operating torque of 280 Nm [2500 lbf·in] or more.

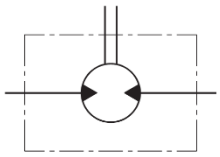
2) Intermittent operation: the permissible values may occur for max. 10% of every minute.

Maximum Permissible Shaft Seal Pressure

DS with HPS and without drain connection:

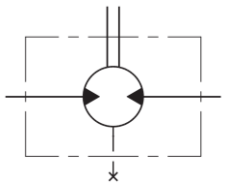
The shaft seal pressure equals the pressure in the drain line. average of input pressure and return pressure.

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



DS with HPS and drain connection:

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



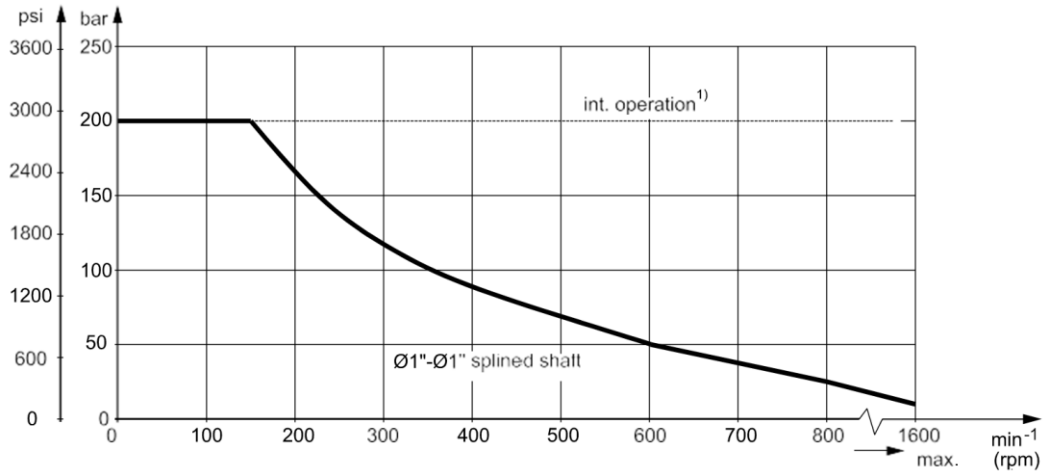


Figure 24 DS Maximum Permissible Shaft Seal Pressure

Pressure drop in motor

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

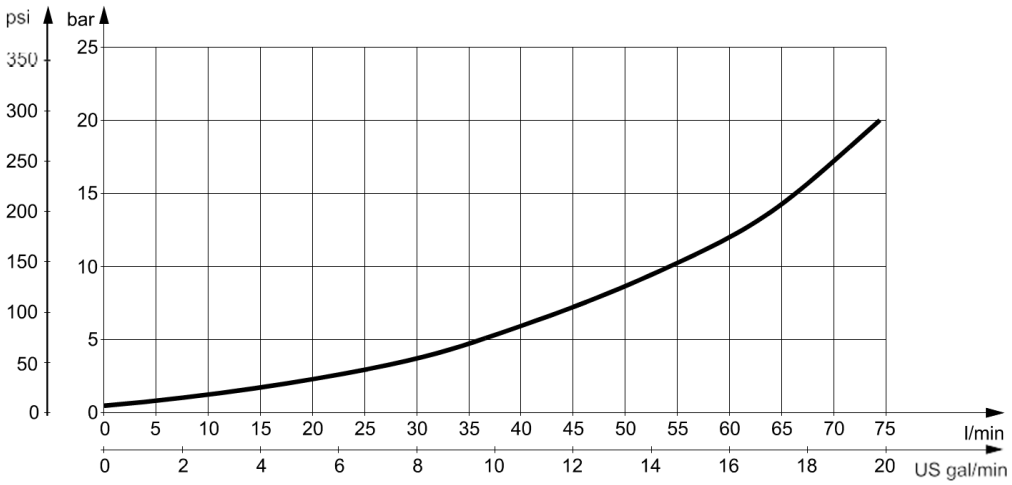


Figure 25 DS Pressure drop in motor

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]

Table 16 DS Oil flow in drain line

Direction of shaft rotation

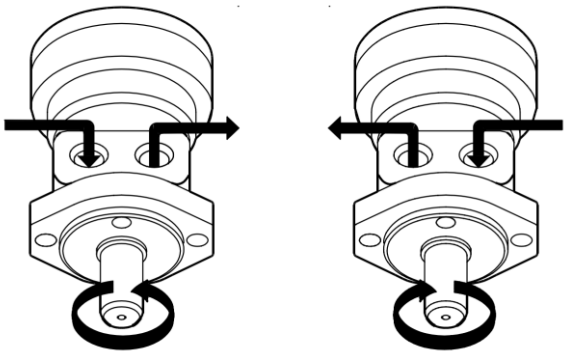


Figure 26 DS Direction of shaft rotation

Permissible Shaft Loads for DS

The permissible 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	Square flange 2-hole oval flange (US version)
Shaft version	1 in cylindrical shaft 1 in-6B splined shaft
Permissible shaft load (P_R) l in mm	$\frac{650}{n} \times \frac{22800}{87+l} N^*$
Permissible shaft load (P_R) l in inch	$\frac{1460}{n} \times \frac{898}{3.425+l} lbf^*$

Table 17 DS Permissible Shaft Loads

* $n \geq 200^{-1}\ (rpm); l \leq 55mm\ [2.2in]$
$n \leq\ 200^{-1}\ (rpm);\ \rightarrow P_{Rmax} = 6500N\ [1460\ lbf], when\ using\ \ above\ formulas\ n\ has\ to\ be\ 200^{-1}\ (rpm)$

The curve shows the relation between P_R an n, when l= 27mm [1.06] for motors with oval and square mounting.

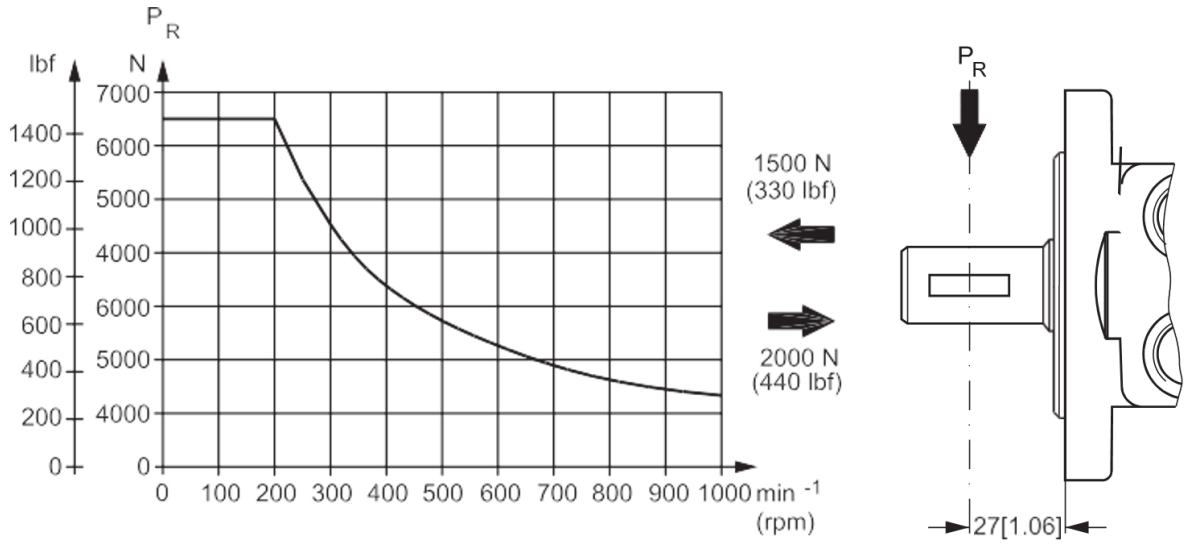


Figure 27 DS Permissible Shaft Loads

DS function diagrams

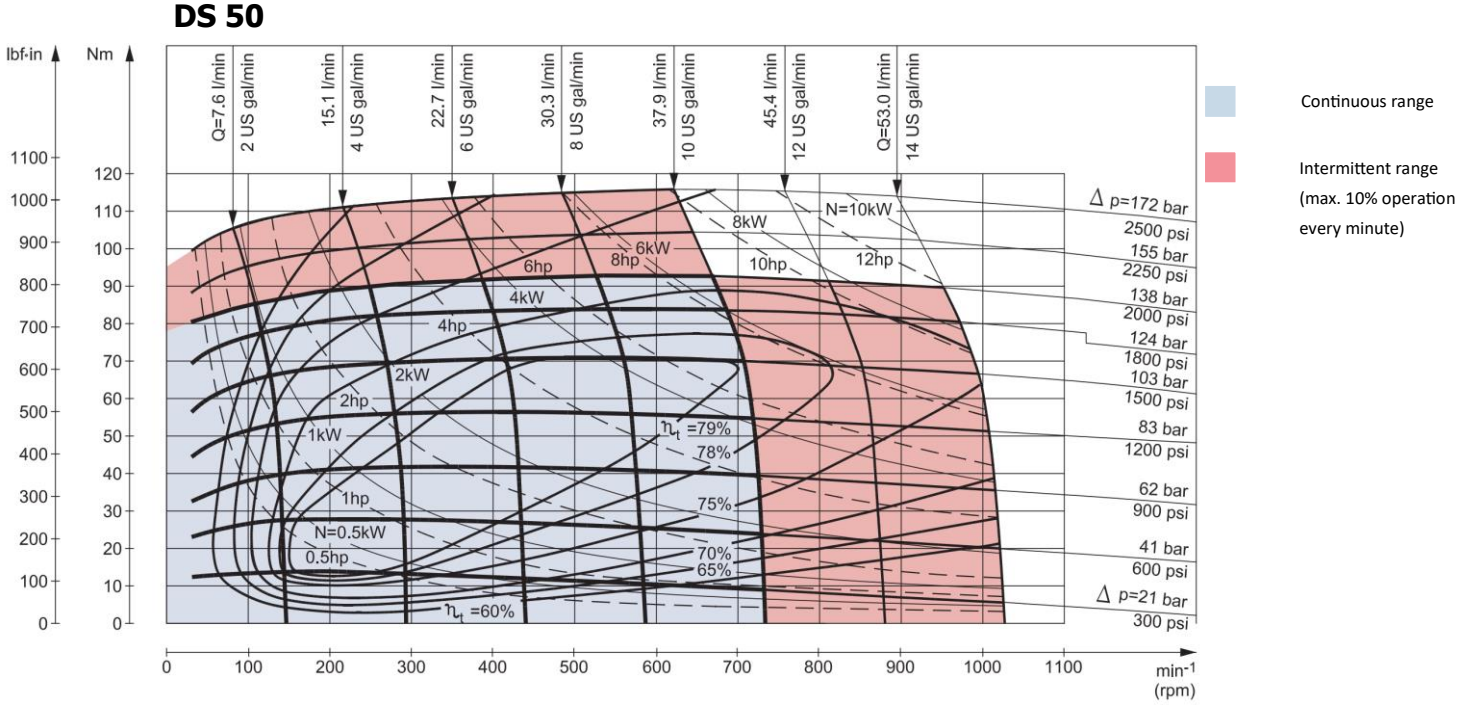
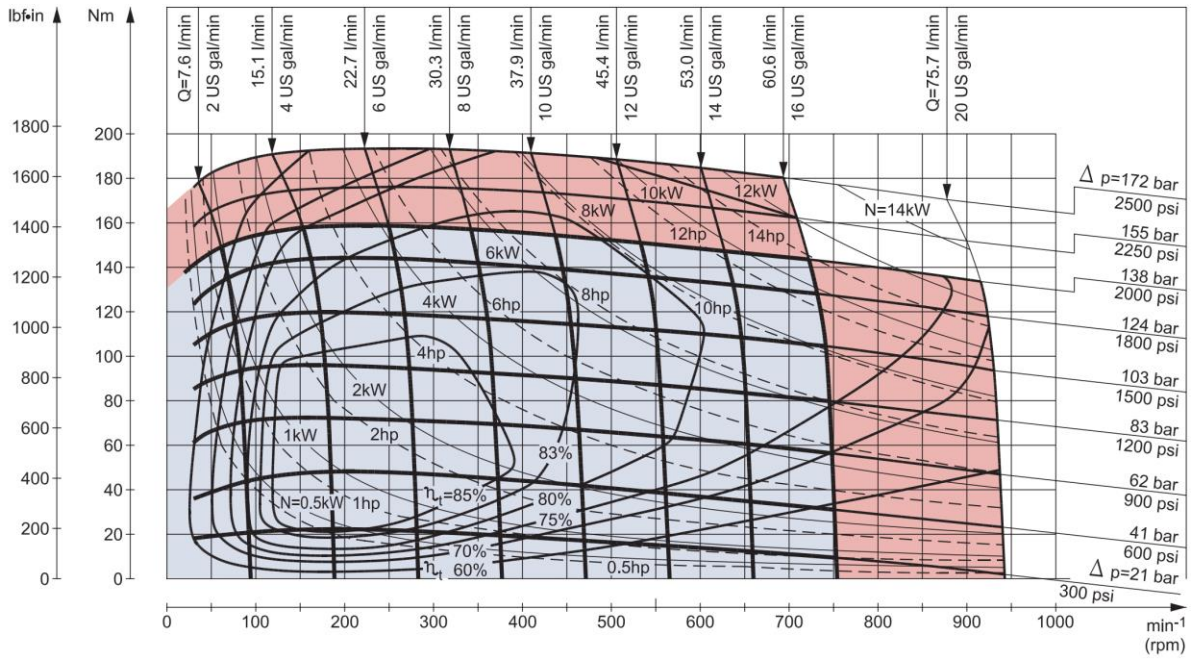


Figure 28 DS 50 function diagram

DS 80

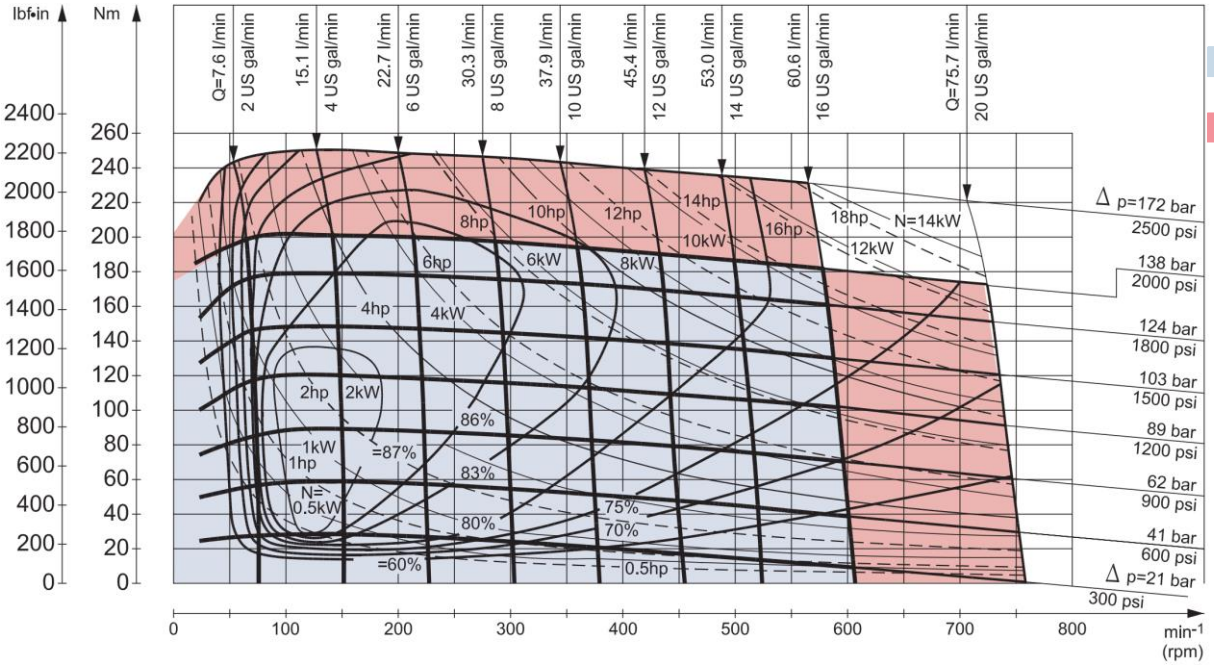


Continuous range

Intermittent range (max. 10% operation every minute)

Figure 29 DS 80 function diagram

DS 100

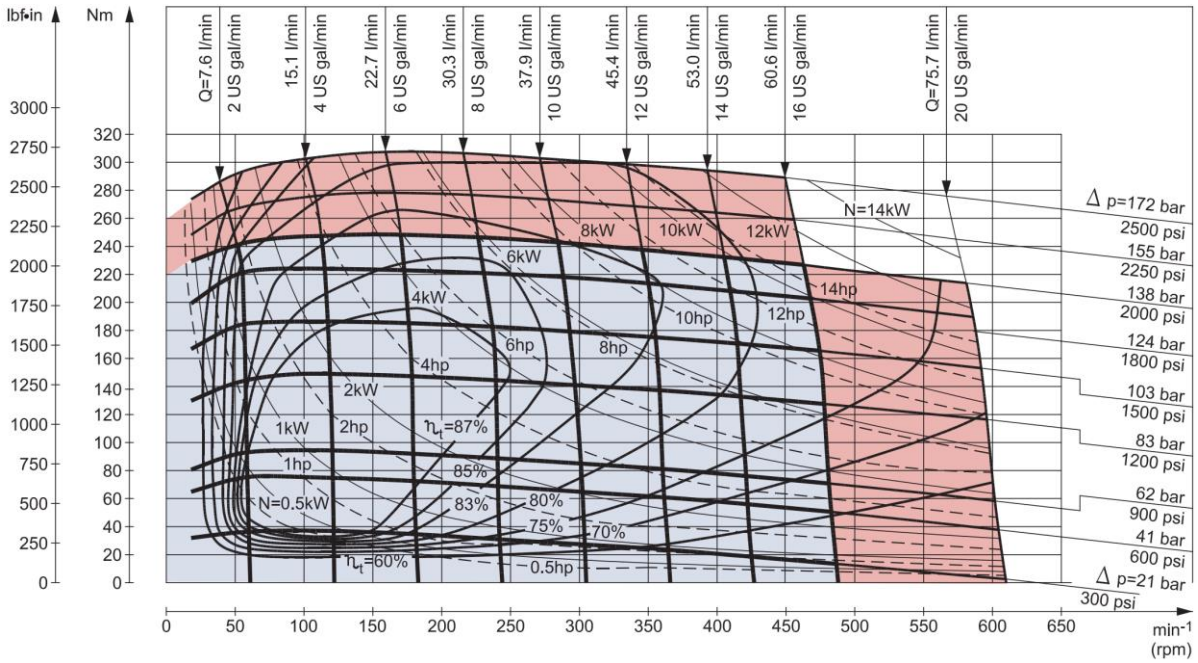


Continuous range

Intermittent range (max. 10% operation every minute)

Figure 30 DS 36 function diagram

DS 125

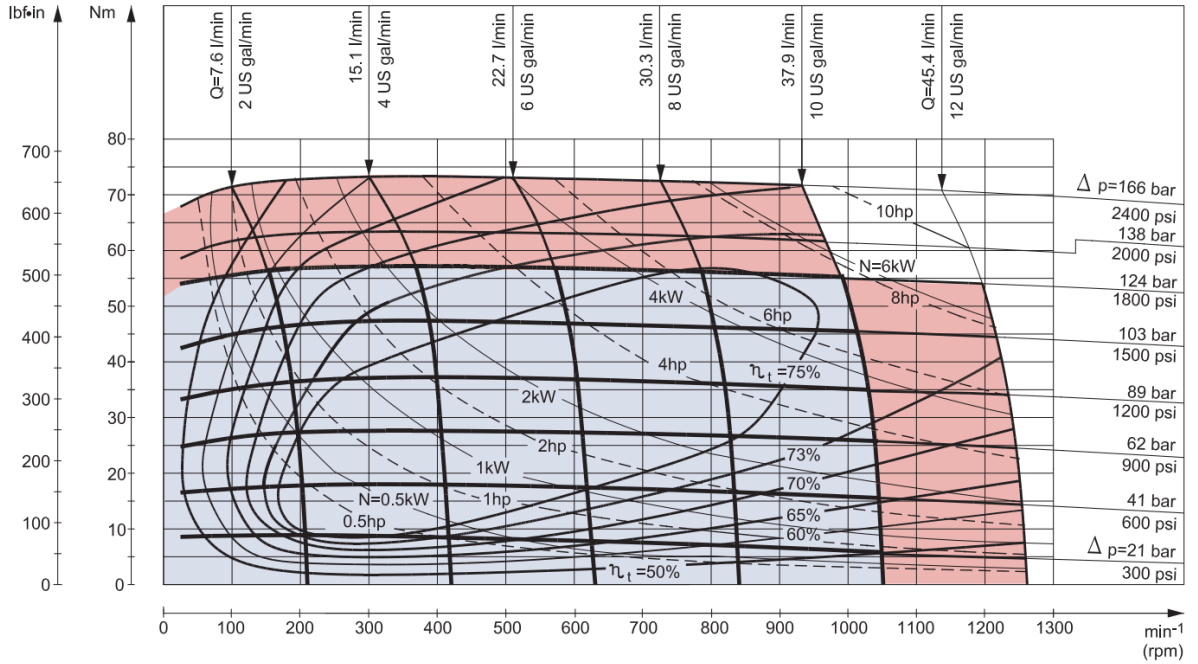


Continuous range

Intermittent range (max. 10% operation every minute)

Figure 31 DS 125 function diagram

DS 160

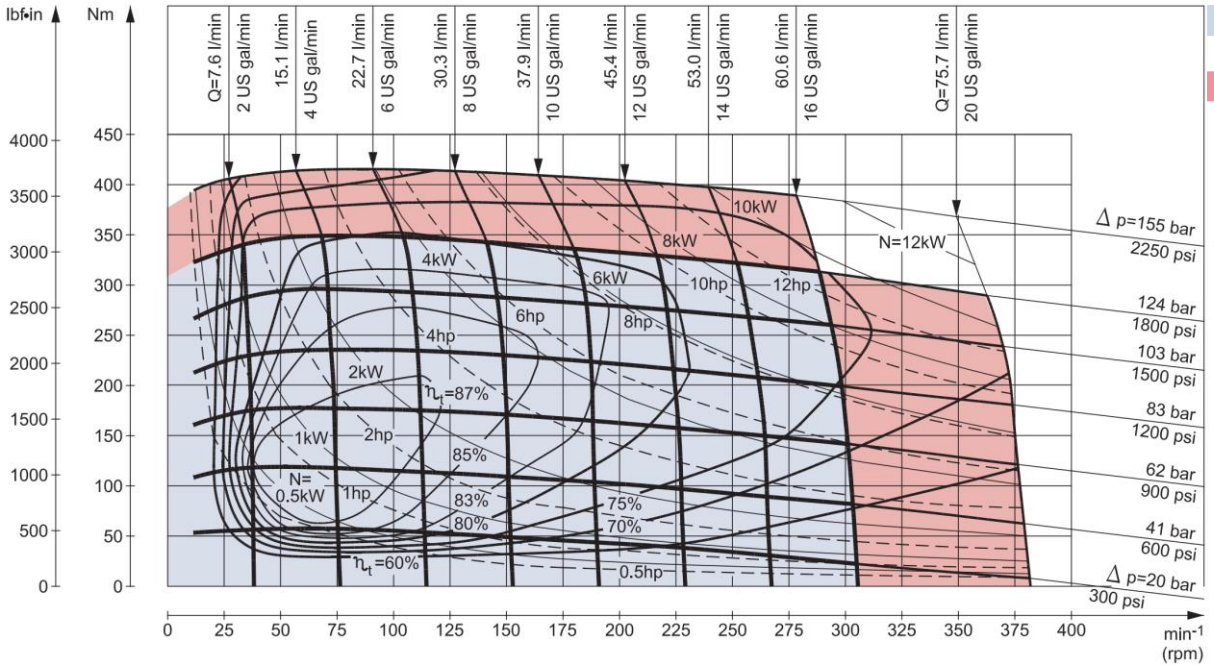


Continuous range

Intermittent range (max. 10% operation every minute)

Figure 32 DS 160 function diagram

DS 200

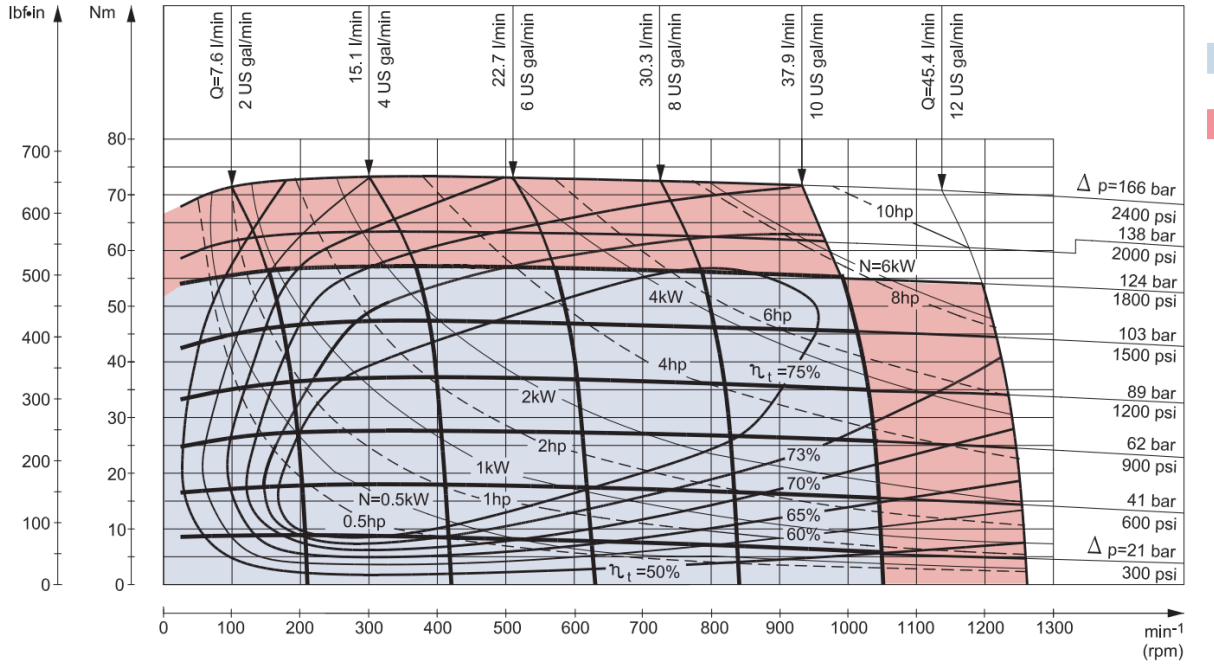


Continuous range

Intermittent range (max. 10% operation every minute)

Figure 33 DS 200 function diagram

DS 250

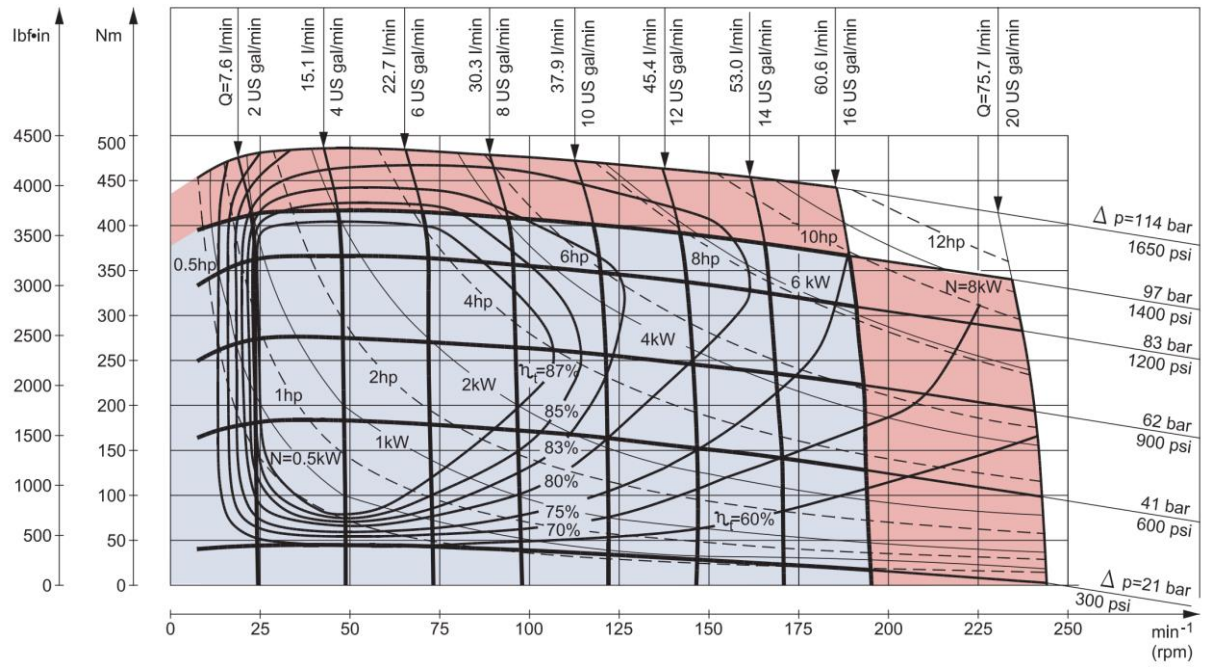


Continuous range

Intermittent range (max. 10% operation every minute)

Figure 34 DS 250 function diagram

DS 315

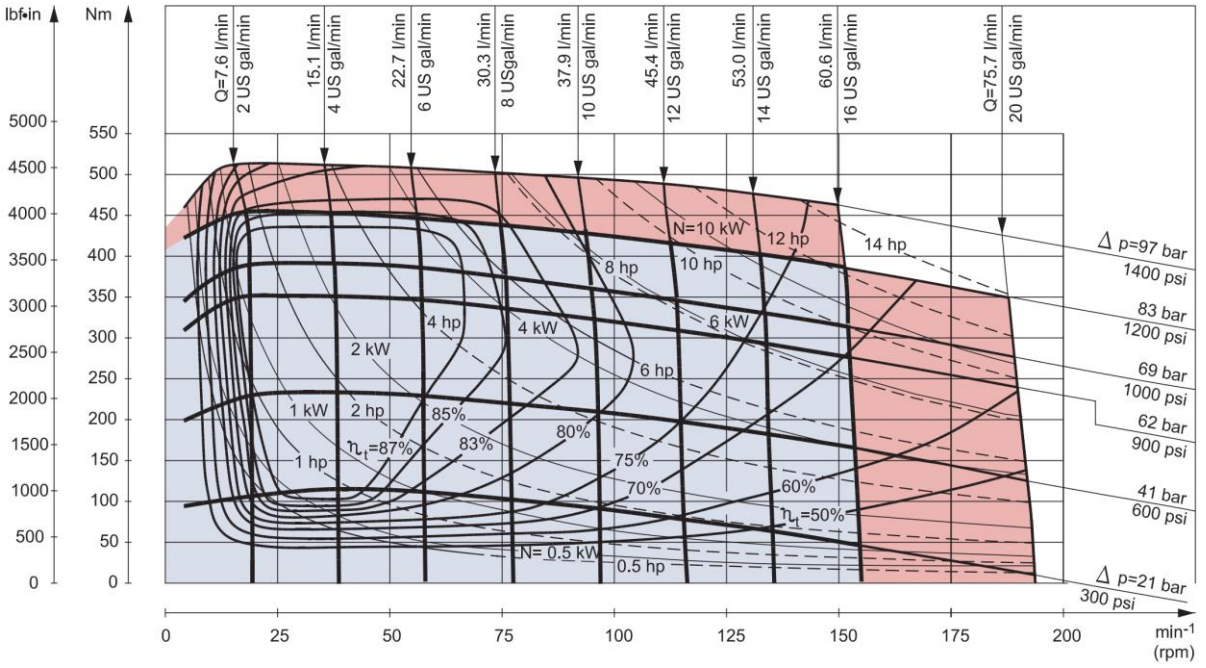


Continuous range

Intermittent range (max. 10% operation every minute)

Figure 35 DS 315 function diagram

DS 375



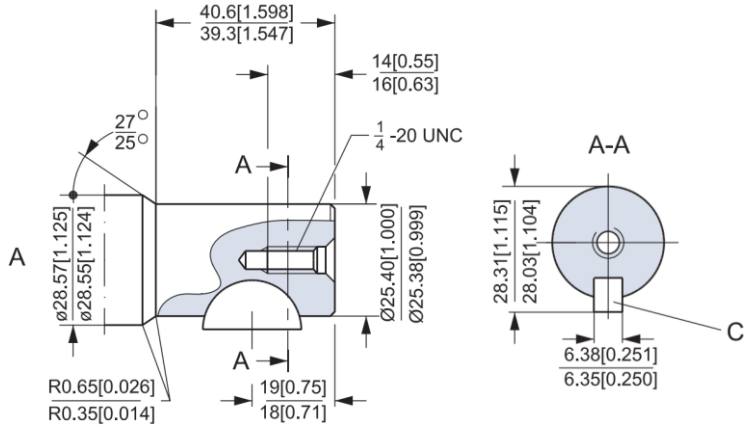
Continuous range

Intermittent range (max. 10% operation every minute)

Figure 36 DS 375 function diagram

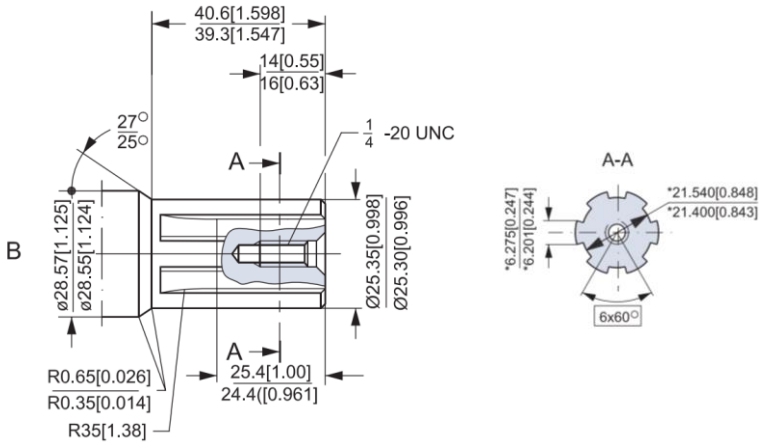
Shaft version

A: Cylindrical 1 in shaft



A: *Cylindrical 1 in shaft*
C: *Woodruff key 1 /4 × 1 in SAE J502*

B: Splined shaft 1 in - SAE 6B



B: *Splined shaft 1 in - SAE 6B*
** Deviates from B.S. 2059 (SAE 6B)*

Table 18 DS Shaft version

Port thread versions

UNF **7/8–14 UNF O-ring boss**	**NPTF** **1/2–14 NPTF**	**UNF drain** **7/16–20 UNF O-ring boss**

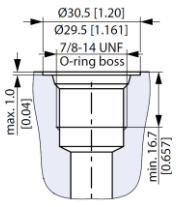
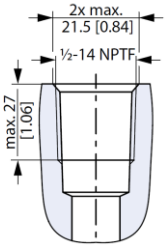
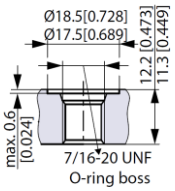

		

Figure 37 DS port thread version: 7/8-14 UNF O-ring boss	*Figure 38 DS port thread version: 1/2–14 NPTF*	*Figure 39 DS port thread version: 7/16-20 UNF O-ring boss*

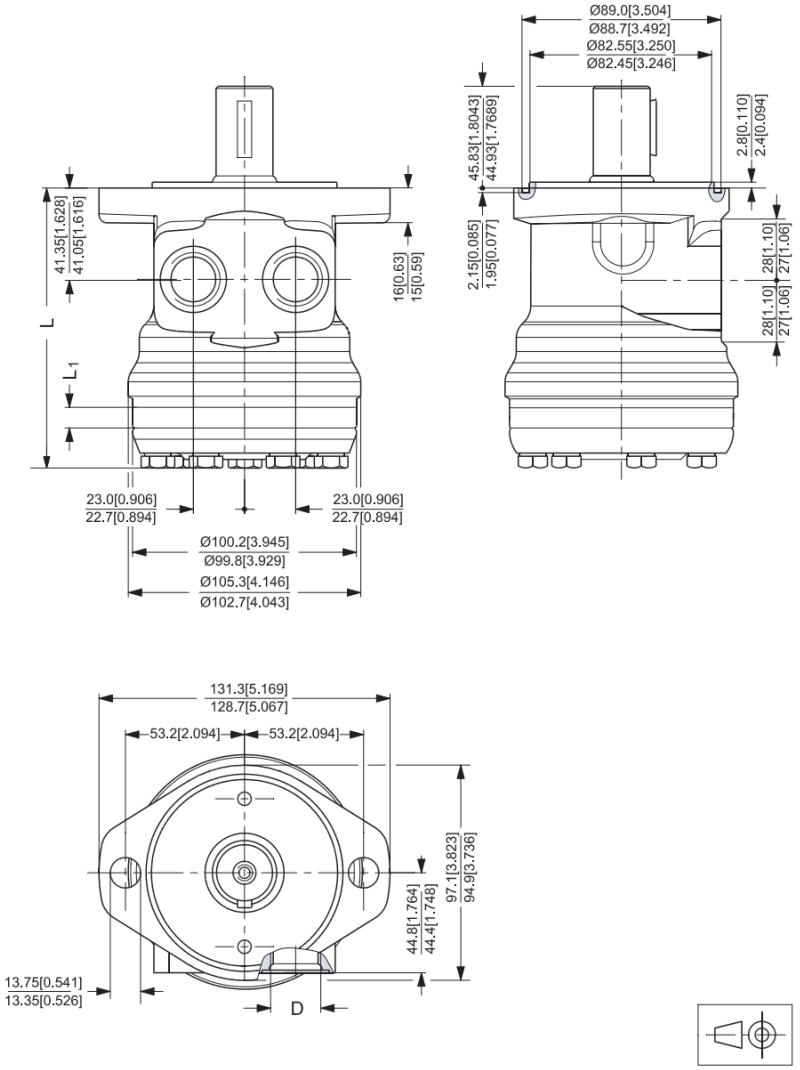
Table 19 DS main ports overview

Chapter 5
DS dimensions

Topics:

- *DS Side port version with 2 hole oval mounting flange (A2-flange)*
- *DS side port version with 2 hole mounting flange (A2-flange). With drain connection.*
- *DS Side port version with square mounting flange (C-flange)*

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



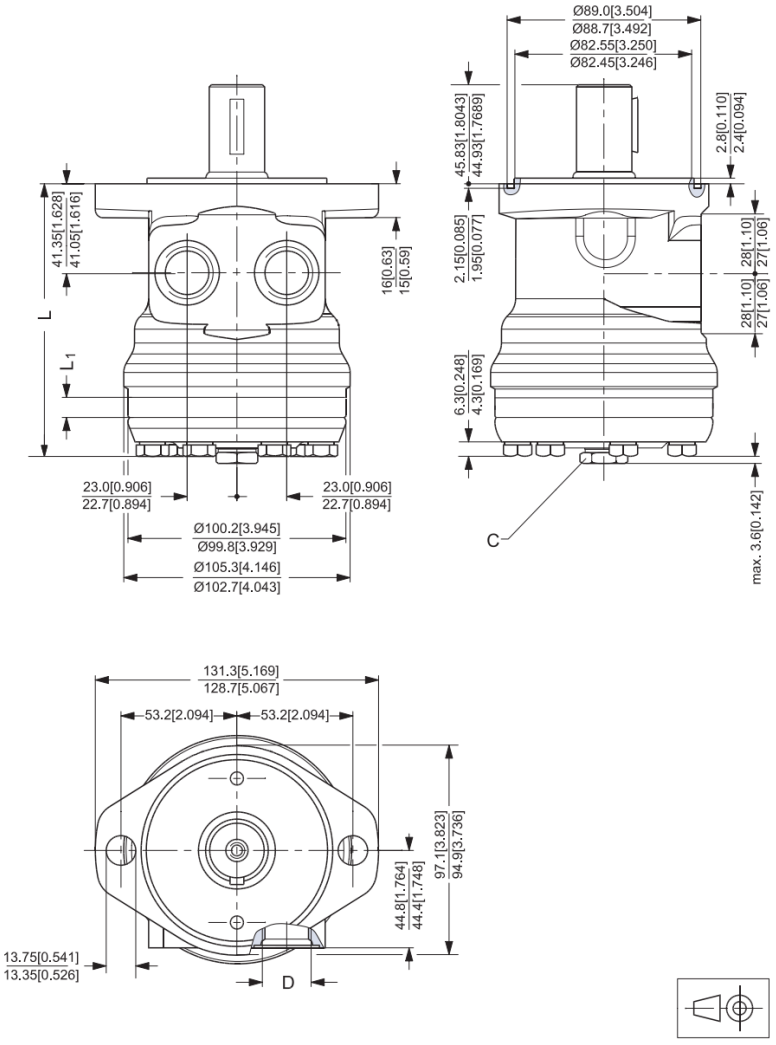
D: *7/8 - 14 UNF, 16.7 mm [0.66 in] deep*
O-ring boss port or 1/2 - 14 NPTF

Figure 40 DS side port version A2 flange

Type		L_{max} mm[in]	L_1 mm[in]
DS	50	125.6 [4.94]	9.0 [0.35]
	80	130.6 [5.14]	14.0 [0.55]
	100	130.6 [5.14]	14.0 [0.55]
	125	134.0 [5.28]	17.4 [0.69]
	160	138.4 [5.45]	21.8 [0.86]
	200	144.4 [5.69]	27.8 [1.09]
	250	151.4 [5.96]	34.8 [1.37]
	315	160.1 [6.30]	43.5 [1.71]
	375	171.4 [6.75]	54.8 [2.16]

Table 20 DS Side port version (A2 flange) dimensions

DS side port version with 2 hole mounting flange (A2-flange). With drain connection.



C: *7/16 - 20 UNF, 12 mm [0.47 in] deep*

D: *7/8 - 14 UNF, 16.7 mm [0.66 in] deep*

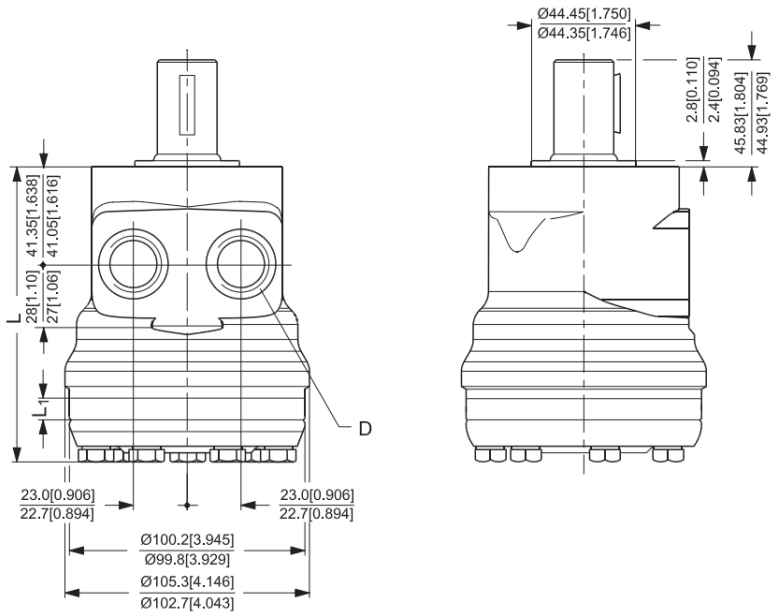
O-ring boss port or 1/2 - 14 NPTF

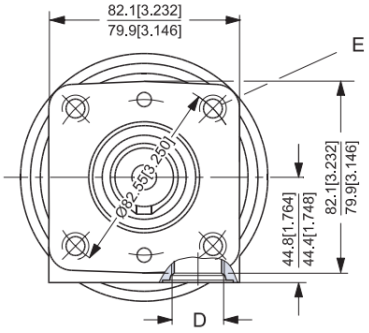
Figure 41 DS side port version A2 flange with drain connection

Type		L_{max} mm[in]	L_1 mm[in]
DH	50	125.6 [4.94]	9.0 [0.35]
	80	130.6 [5.14]	14.0 [0.55]
	100	130.6 [5.14]	14.0 [0.55]
	125	134.0 [5.28]	17.4 [0.69]
	160	138.4 [5.45]	21.8 [0.86]
	200	144.4 [5.69]	27.8 [1.09]
	250	151.4 [5.96]	34.8 [1.37]
	315	160.1 [6.30]	43.5 [1.71]
	375	171.4 [6.75]	54.8 [2.16]

Table 21 DS Side port version (A2 flange) with drain connection dimensions

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





F: *7⁄8 - 14 UNF; 16.7 mm [0.66 in] deep or 1⁄2 - 14 NPTF*

G: *3⁄8 - 16 UNC; 15 mm [0.59 in] deep(4-off)*

Figure 42 DS Side port version (C-flange)

Type		L_{max} mm[in]	L_1 mm[in]
DS	50	125.6 [4.94]	9.0 [0.35]
	80	130.6 [5.14]	14.0 [0.55]
	100	130.6 [5.14]	14.0 [0.55]
	125	134.0 [5.28]	17.4 [0.69]
	160	138.4 [5.45]	21.8 [0.86]
	200	144.4 [5.69]	27.8 [1.09]
	250	151.4 [5.96]	34.8 [1.37]
	315	160.1 [6.30]	43.5 [1.71]
	375	171.4 [6.75]	54.8 [2.16]

Table 22 DS Side port version (C flange) dimensions

Chapter 6
Installation, maintenance and weight of motors

Topics:

- *Installation of the Orbital Motors*
- *Operation*
- *Maintenance*
- *Weight of motors*

Installation of the 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 gage connection.
- To ensure designed contact and minimize the stress all mounting flanges must be flat.
- Hydraulic lines must be fitted correctly to prevent air entrapment

About the assembly :

- Follow the mounting instructions printed on the inside of the cardboard box.
- To prevent contamination, do not remove the plastic plugs from the connection ports until the fittings are ready to be assembled.
- 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 free of entraped air.
- Indications of air in the hydraulic system:
  - foam in the tank
  - jerky movements of motor and cylinder
  - noise
- If 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 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

Weight of motors

	Weight	Code no	Weight	Code no	Weight

Code no	kg	[lb]
151-2000	5.1	11.2
151-2001	5.1	11.2
151-2002	5.2	11.5
151-2003	5.4	11.9
151-2004	5.5	12.1
151-2005	5.7	12.6
151-2006	5.9	13.0
151-2007	6.1	13.4
151-2008	6.4	14.1
151-2009	6.9	15.2
151-2010	5.1	11.2
151-2011	5.1	11.2
151-2012	5.2	11.5
151-2013	5.4	11.9
151-2015	5.7	12.6
151-2016	5.9	13.0
151-2017	6.1	13.4
151-2018	6.4	14.1
151-2019	6.9	15.2
151-2040	4.8	10.6
151-2041	4.8	10.6
151-2042	4.9	10.8
151-2043	5.1	11.2
151-2044	5.2	11.5
151-2045	5.4	11.9
151-2046	5.6	12.3
151-2047	5.8	12.8
151-2048	6.1	13.4
151-2049	6.6	14.6
151-2080	5.1	11.2
151-2081	5.1	11.2
151-2082	5.2	11.5
151-2083	5.4	11.9
151-2085	5.7	12.6
151-2086	5.9	13.0
151-2087	6.1	13.4
151-2088	6.4	14.1
151-2089	6.9	15.2
151-2120	4.8	10.6
151-2121	4.8	10.6
151-2122	4.9	10.8
151-2123	5.1	11.2
151-2124	5.2	11.5
151-2125	5.4	11.9
151-2126	5.6	12.3
151-2127	5.8	12.8
151-2128	6.1	13.4
151-2129	6.6	14.6
151-2301	5.9	13.0
151-2302	6.1	13.4
151-2303	6.1	13.4
151-2304	6.2	13.7
151-2305	6.4	14.1
151-2306	6.7	14.8
151-2307	7.2	15.9
151-2308	7.7	17.0
151-2309	8.2	18.1
151-2312	6.1	13.4
151-2313	6.1	13.4
151-2314	6.2	13.7
151-2316	6.7	14.8
151-2318	7.7	11.2
151-2319	8.2	11.7
151-2341	5.6	12.3
151-2342	5.8	12.8
151-2343	5.8	12.8
151-2344	5.9	13.0
151-2345	6.1	13.4
151-2346	6.4	14.1
151-2347	6.9	15.2
151-2348	7.4	16.3
151-2349	7.9	17.4
151-2382	6.1	13.4
151-2383	6.1	13.4
151-2385	6.4	14.1
151-2386	6.7	14.8
151-2387	7.2	15.9
151-2389	8.2	18.1
151-2421	5.6	12.3
151-2423	5.8	12.8
151-2425	6.1	13.4
151-2426	6.4	14.1
151-2427	6.9	15.2
151-2429	7.9	17.4
151-3401	5.1	11.2
151-3402	5.2	11.5
151-3403	5.4	11.9
151-3407	6.1	13.4
151-3408	6.4	14.1
151-3409	6.9	15.2
151-3702	6.1	13.4
151-3703	6.1	13.4
151-3704	6.2	13.7
151-3706	6.7	14.8
151-3707	7.2	15.9
151-3708	7.7	17.0

Table 23 Weight of motors

Figures

Tables

WHITE

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