



SPOOL VALVE HYDRAULIC MOTORS

**TYPE MLHM
MLHP
MLHR
MLHH**



SAE version

SPOOL VALVE HYDRAULIC MOTORS

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SPOOL VALVE HYDRAULIC MOTORS

GENERAL INFORMATION:

Orbit motors convert hydraulic energy (pressure, oil flow) into mechanical energy (torque, speed). Hydraulic orbit motors operate on the principle of an internal gear (rotor) rotating within a fixed external gear (stator). The internal gear transmits the torque generated by the application of pressure from hydraulic oil fed into motor which is then delivered via the motor's output shaft. Orbit motors have high starting torque and constant output torque at wide speed range.

DISTRIBUTOR VALVE

MLHM, MLHP, MLHR, MLHH series motors have spool valve: the distributor valve has been integrated with the output shaft. The cardan shaft rotates distributor valve and transfers mechanical energy from gerotor set to output shaft. The valve has hydrodynamic bearings and has infinite life when load ratings are not exceeded.

GEARWHEEL SET

There are two forms of gearwheel set:

- Gerotor set have plain teeth. These types motors are suitable for long operating periods at moderate pressures or short operating periods at high pressures. MLHM and MLHP series motors have gerotor set.
- Roll-gerotor set have teeth fitted with rollers. The rollers reduce local stress and the tangential reaction forces on the rotor reducing friction to a minimum. This gives long operating life and better efficiency even at continuous high pressures. Roll-gerotor sets are recommended for operation with thin oil and for applications with continually reversing loads. MLHR and MLHH series motors have roll-gerotor set.

FEATURES:

Standard Motor The standard motor mounting flange is located as close to the output shaft as possible. This type of mounting supports the motor close to the shaft load. This mounting flange is also compatible with many standard gear boxes.

Wheel Motor W mounting flange makes the motor MLHPW possible to fit a wheel hub or a winch drum so that the radial load acts closer to motor bearings. This gives the best utilization of the bearing capacity and is a very compact solution.

Needle Bearing MLHPN and MLHRN have an output shaft supported in needle bearing. These types motors are suitable for operating conditions such as frequent start and stops, vibration on the shaft, high static and dynamic radial loads in short operating terms.

Low Leakage LL Series hydraulic motors are designed to operate at the whole standard range of working conditions (pressure drop and frequency of rotation), but with considerable decreased volumetric losses in the drain ports. This motors are suitable for hydraulic systems with series-connected motors with demands for low leakage.

Low Speed Valve LSV feature optimizes the motor for low-speed performance. Motors with this valving provide very low speed while maintaining high torque. They are designed to run continuously at low speed (up to 200 RPM) at normal pressure drop and reduced flow. Optimal run is guaranteed at frequency of rotation from 20 to 50 RPM. Motors with this valving have an increased starting pressure and are not recommended for using at pressure drop less than 580 PSI [40 bar].

Free Running FR motors are with increased clearance at all friction parts, allowing the shaft to rotate more freely with less mechanical drag. The increased clearance also improves lubrication of the wear surfaces of gear set and friction parts. Additional advantages of "FR" version are prolonging of the life of the hydraulic motors at high speeds, as well as the possibility to use them in systems with wide variation of the loading. FR Series motors are designed to operate with high speed /over than 300 RPM/ and low pressure drop. Volumetric efficiency may be reduced slightly.

High Pressure Shaft Seal The high pressure shaft seals allow the motors to withstand high case pressures at high speeds without external drain line.

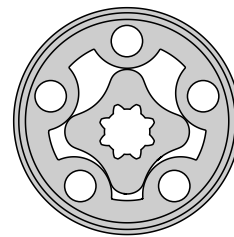
Motors with Speed Sensor Motors are available with integrated inductive sensor who registered the speed of the motor. The sensor is a Hall effect device and produced electric output signal with a standard voltage that can be used for regulating the speed of a motor. The torque and radial load of the motor are not affected by the installation of speed sensor. used for regulating the speed of a motor. The torque and radial load of the motor are not affected by the installation of speed sensor.

HYDRAULIC MOTORS MLHM



APPLICATION

- » Conveyors
- » Textile machines
- » Mining machinery
- » Machine tools
- » Ventilators
- » Construction plant equipment and access platforms etc.



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OPTIONS

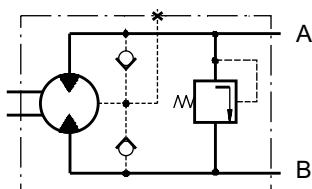
- » Model- Spool valve, gerotor
- » With or without flange
- » Side and rear ports
- » Series with pressure valve(s)
- » Shafts- straight and splined
- » SAE, Metric and BSPP ports
- » Speed sensing
- » Other special features

GENERAL

Displacement,	in ³ /rev [cm ³ /rev.]	.5÷3.05 [8,2÷50]
Max. Speed,	[RPM]	400÷1950
Max. Torque,	in-lb [daNm]	106÷398 [1,2÷4,5]
Max. Output,	HP [kW]	2.4÷3.3 [1,8÷2,4]
Max. Pressure Drop,	PSI [bar]	1015÷1500 [70÷105]
Max. Oil Flow,	GPM [lpm]	4.2÷5.5 [16÷20]
Min. Speed,	[RPM]	20÷50
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)	
Temperature range,	°F [°C]	-22÷194 [-30÷90]
Optimal Viscosity range,	SUS [mm ² /s]	98÷347 [20÷75]
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 micron)	

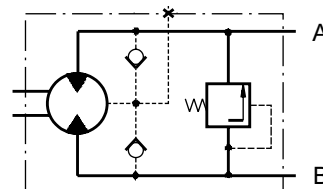
MLHM...P Series with Integrated Internal Crossover Relief Valve

A → B, Δp=1450 or 725 PSI [100 or 50 bar]

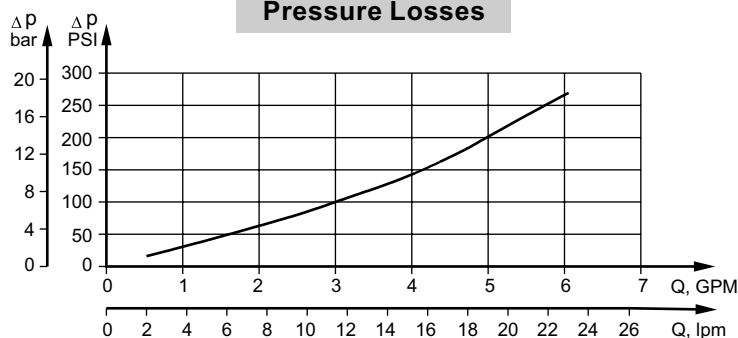


MLHM...P Series with Integrated Internal Crossover Relief Valve

B → A, Δp=1450 or 725 PSI [100 or 50 bar]

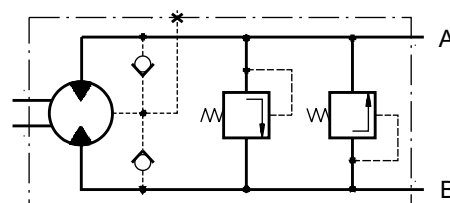


Pressure Losses



MLHM...D Series with Integrated Internal Crossover Relief Valves

A ↔ B, Δp=1450 or 725 PSI [100 or 50 bar]



SPECIFICATION DATA

Type		MLHM 8	MLHM 12.5	MLHM 20	MLHM 32	MLHM 40	MLHM 50
Displacement, in. ³ /rev. [cm. ³ /rev.]		.5 [8,2]	.79 [12,9]	1.22 [20]	1.93 [31,8]	2.44 [40]	3.05 [50]
Max. Speed, [RPM]	Cont.	1950	1550	1000	630	500	400
	Int.*	2440	1940	1250	790	625	500
Max. Torque in-lb [daNm]	Cont.	106 [1,2]	150 [1,7]	230 [2,6]	375 [4,2]	375 [4,2]	398 [4,5]
	Int.*	133 [1,5]	205 [2,3]	311 [3,5]	506 [5,7]	506 [5,7]	513 [5,8]
	Peak**	187 [2,1]	293 [3,3]	453 [5,1]	568 [6,4]	584 [6,6]	708 [8]
Max. Output HP [kW]	Cont.	2.4 [1,8]	3.3 [2,4]	3.3 [2,4]	3.3 [2,4]	2.5 [1,8]	2.48 [1,7]
	Int.*	3.6 [2,6]	4.3 [3,2]	4.3 [3,2]	4.3 [3,2]	4 [3,0]	2.8 [2,1]
Max. Pressure Drop PSI [bar]	Cont.	1500 [105]	1500 [105]	1500 [105]	1500 [105]	1200 [82,5]	1015 [70]
	Int.*	2030 [140]	2030 [140]	2030 [140]	2030 [140]	1600 [110]	1300 [90]
	Peak**	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2000 [140]	1815 [125]
Max. Oil Flow GPM [lpm]	Cont.	4.2 [16]	5.5 [20]	5.5 [20]	5.5 [20]	5.5 [20]	5.5 [20]
	Int.*	5.5 [20]	6.6 [25]	6.6 [25]	6.6 [25]	6.6 [25]	6.6 [25]
Max. Inlet Pressure PSI [bar]	Cont.	2030 [140]	2030 [140]	2030 [140]	2030 [140]	2030 [140]	2030 [140]
	Int.*	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]
Max. Return Pressure without Drain Line or Max. Pressure in Drain Line, PSI [bar]	Cont. 0-100 RPM	2030 [140]	2030 [140]	2030 [140]	2030 [140]	2030 [140]	2030 [140]
	Cont. 100-400 RPM	1500 [105]	1500 [105]	1500 [105]	1500 [105]	1500 [105]	1500 [105]
	Cont. 400-800 RPM	725 [50]	725 [50]	725 [50]	725 [50]	725 [50]	725 [50]
	Cont. >800 RPM	290 [20]	290 [20]	290 [20]	-	-	-
Max. Return Pressure with Drain Line PSI [bar]	Int.* 0-max. RPM	2030 [140]	2030 [140]	2030 [140]	2030 [140]	2030 [140]	2030 [140]
	Cont.	2030 [140]	2030 [140]	2030 [140]	2030 [140]	2030 [140]	2030 [140]
	Int.*	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]
Max. Starting Pressure with Unloaded Shaft, PSI [bar]	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]
Min. Starting Torque in-lb [daNm]	At max. press. drop Cont.	65 [0,7]	105 [1,2]	190 [2,1]	300 [3,4]	295 [3,3]	330 [3,7]
	At max. press. drop Int.*	90 [1,0]	150 [1,7]	260 [2,9]	425 [4,8]	400 [4,6]	425 [4,8]
Min. Speed***, [RPM]		50	40	30	30	25	20
Weight, lb [kg] For "F" flange: + .441 [0,200]	MLHM(M) rear ports	4.2 [1,9]	4.41 [2]	4.63 [2,1]	4.85 [2,2]	5.07 [2,3]	5.51 [2,5]
	MLHM(M)	4.41 [2,0]	4.63 [2,1]	4.85 [2,2]	5.07 [2,3]	5.29 [2,4]	5.73 [2,6]
	MLHM(M)...P	4.85 [2,2]	5.07 [2,3]	5.29 [2,4]	5.51 [2,5]	5.73 [2,6]	6.17 [2,8]
	MLHM(M)...D	5.73 [2,6]	5.95 [2,7]	6.17 [2,8]	6.39 [2,9]	6.61 [3,0]	7.05 [3,2]

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

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

*** For speeds of 30 RPM or lower, consult factory or your regional manager.

1. Intermittent speed and intermittent pressure drop must not occur simultaneously.

2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.

3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP (DIN51524) or HM (ISO 6743/4).
If using synthetic fluids consult the factory for alternative seal materials.

4. Recommended minimum oil viscosity 70 SUS [13 mm²/s] at 122°F [50°C].

5. Recommended maximum system operating temperature is 180°F [82°C].

6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 15-30 minutes.

Performance Data MLHM 8

		Pressure (Δ PSI)				Max. Cont.	Max. Int.	Speed (theor.)
		500	700	1000	1500	1740	2000	
Flow [GPM]	0.5	30.5 217	45.7 207	65.5 196	94.8 148	109 105	122 55	230
	1	30 450	44.5 447	64.5 440	98.8 405	114 371	132 314	461
	2	27 905	43.1 899	62.6 880	97.1 840	113 812	133 775	923
	3	13.9 1372	40.1 1355	60.7 1332	95.4 1292	111 1258	130 1224	1384
	Max. Cont. 4.25		31.3 1924	56.7 1912	91.1 1873	106 1844	126 1791	1961
Max. Int. 5.25			0 2420	52.7 2383	88.2 2338	101 2316	122 2270	2423
Torque (theor.) in-lb. [daNm]		40.7 [0,46]	57.5 [0,65]	80.5 [0,91]	119 [1,35]	138 [1,56]	157 [1,78]	

.50 in³./rev. [8,2 cm³./rev.]

Torque [in-lb] 122
Speed [RPM] 2270

Performance Data MLHM 20

		Pressure (Δ PSI)				Max. Cont.	Max. Int.	Speed (theor.)
		250	500	700	1000	1500	1740	2000
Flow [GPM]	0.5	28.5 96	79 91	123 85	169 70	238 40	262 20	94,5
	1	33 187	79.5 181	120 173	167 169	242 127	273 106	189
	2	35 378	78.5 375	115 371	163 358	244 323	278 303	379
	3	31 566	74 564	108 559	155 550	240 518	275 497	567
	4	25 750	67 746	101 743	148 733	233 700	269 689	757
Max. Cont. 5.5		13 1038	53 1035	90 1031	163 1024	218 1000	255 1993	1040
Max. Int. 6.6			38 1247	77 1245	125 1242	206 1189	245 1180	1250
Torque (theor.) in-lb. [daNm]		47.8 [0,54]	98 [1,11]	140 [1,59]	197 [2,23]	291 [3,29]	338 [3,82]	385 [4,36]

1.22 in³./rev. [20 cm³./rev.]

Performance Data MLHM 12.5

		Pressure (Δ PSI)				Max. Cont.	Max. Int.	Speed (theor.)
		500	700	1000	1500	1740	2000	
Flow [GPM]	0.5	48.3 133	70.8 129	100 113	147.4 65	164 33		146
	1	49.2 281	71.2 275	101.6 260	153 218	172 190	200 138	293
	2	46.8 575	69.1 566	100.4 554	154 516	175 488	206 446	586
	3	43.8 866	66.3 860	97.1 850	150 816	173 792	205 745	880
	4	39.8 1160	63.1 1152	94.1 1144	147 1109	170 1085	203 1043	1170
Max. Cont. 5.5		30 1604	55.6 1593	87 1582	139 1560	164 1541	195 1494	1612
Max. Int. 6.6		14.8 1910	50 1891	80 1878	132 1848	157 1828	191 1788	1937
Torque (theor.) in-lb. [daNm]		62.8 [0,71]	91.1 [1,03]	127.4 [1,44]	187.6 [2,12]	217.7 [2,46]	248.7 [2,81]	

.79 in³./rev. [12,9 cm³./rev.]

Performance Data MLHM 32

		Pressure (Δ PSI)				Max. Cont.	Max. Int.	Speed (theor.)
		250	500	700	1000	1500	1740	2000
Flow [GPM]	0.5	65 58	130 54	181 49	246 44	366 15		59
	1	66 119	132 114	182 108	251 100	375 77	430 63	119
	2	62 236	128 230	177 226	252 218	377 195	433 183	238
	3	52 357	115 353	169 348	245 342	373 319	431 304	357
	4	40 476	108 472	159 468	234 462	363 441	422 429	476
Max. Cont. 5.5		24 654	88 651	144 648	220 640	345 621	406 605	654
Max. Int. 6.6		7 786	74 784	127 782	204 778	327 761	385 748	786
Torque (theor.) in-lb. [daNm]		248.7 [2,81]	248.7 [2,81]	248.7 [2,81]	248.7 [2,81]	248.7 [2,81]	248.7 [2,81]	

1.93 in³./rev. [31,8 cm³./rev.]

The Performance data was collected at back pressure 72.5÷145 PSI [5÷10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50° C].

Performance Data MLHM 40

	Pressure (Δ PSI)				Max. Cont.	Max. Int.	Speed (theor.)	Torque [in-lb] 540 Speed [RPM] 49
	400	700	1000	1200		1500	1700	
Flow [GPM]	0.5	130 43	230 38	318 32	380 27	468 16	- -	46
	1	129 91	230 88	320 81	382 75	475 62	540 49	92
	2	122 187	225 185	318 173	380 167	472 158	544 146	183
	3	116 278	214 273	308 268	372 263	466 255	538 244	273
	4	102 373	202 367	296 362	360 357	462 349	532 340	365
Max. Cont.	5.5	78 517	182 512	272 506	338 499	436 491	508 482	501
Max. Int.	6.6	57 622	165 617	254 612	320 607	400 600	484 591	603
Torque (theor.) in-lb. [daNm]		161 [1,82]	292 [3,3]	408 [4,62]	487 [5,5]	604 [6,82]	685 [7,74]	

2.53 in³./rev. [41,5 cm³./rev.]

Performance Data MLHM 50

	Pressure (Δ PSI)				Max. Cont.	Max. Int.	Speed (theor.)	Torque [in-lb] 550 Speed [RPM] 52
	200	400	700	1000		1285		
Flow [GPM]	0.5	90 35	185 31	308 26	434 21	- -	-	37
	1	92 72	182 69	308 65	438 60	550 52		74
	2	90 149	172 146	298 142	432 138	558 130		148
	3	88 225	160 222	285 219	428 215	555 207		221
	4	80 301	145 299	274 296	410 290	540 284		294
Max. Cont.	5.5	62 415	114 414	250 411	385 406	505 396		404
Max. Int.	6.6	36 499	85 498	212 494	352 490	466 484		486
Torque (theor.) in-lb. [daNm]		101 [1,14]	200 [2,26]	363 [4,1]	508 [5,74]	644 [7,27]		

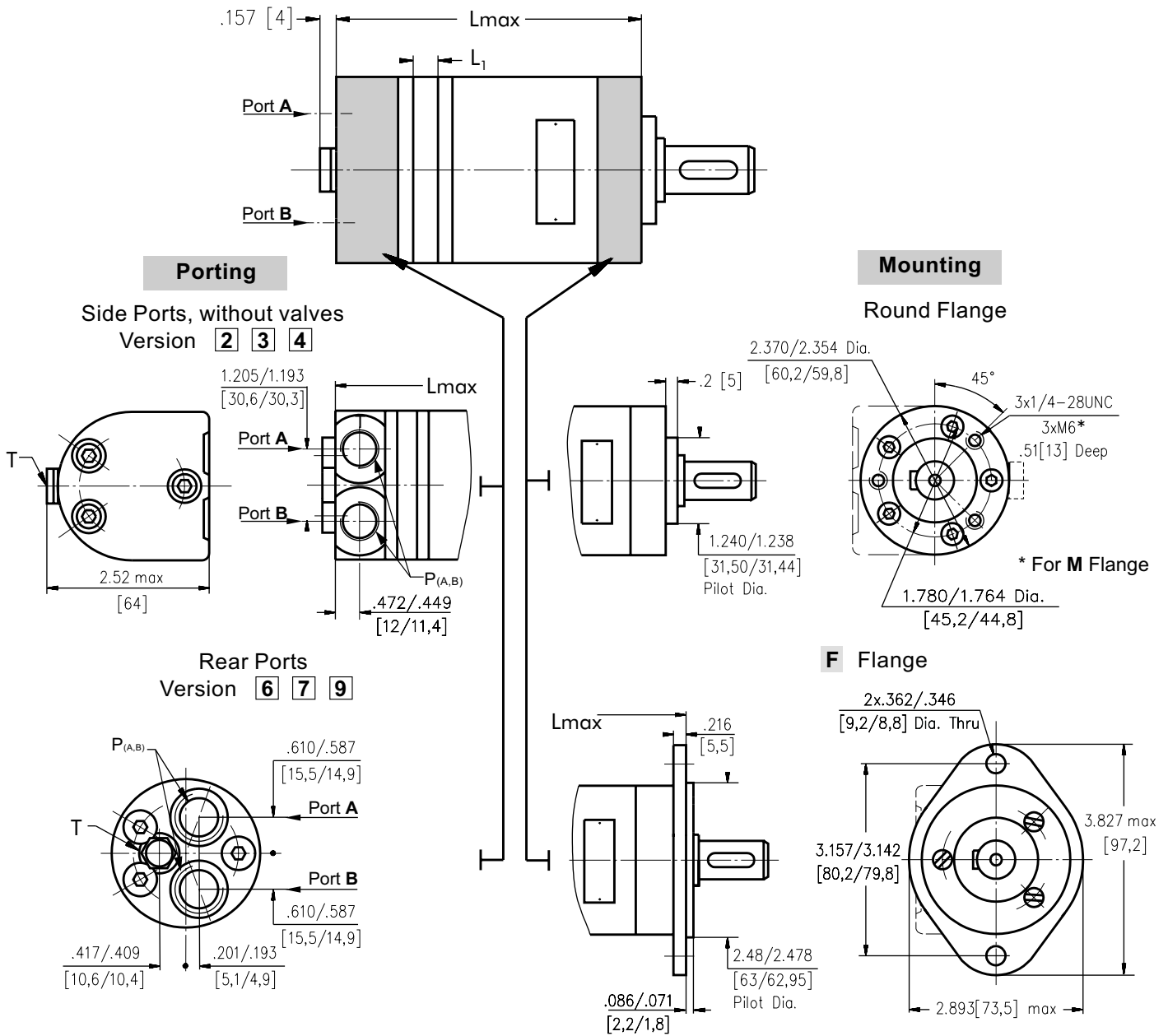
3.14 in³./rev. [51,5 cm³./rev.]

Metric Conversions

Flow 1 lpm = .2642 GPM
Pressure 1 bar = 14.51 PSI
Torque 1 Nm = 8.85 in-lb

The Performance data was collected at back pressure 72.5÷145 PSI [5÷10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50° C].

DIMENSIONS AND MOUNTING DATA



Versions			
	2 6	3 9	4 7
P_(A,B)	2xG $\frac{3}{8}$	2xM18x1,5	2x $\frac{9}{16}$ -18UNF
T	G $\frac{1}{8}$	M10x1	$\frac{3}{8}$ -24UNF

Standard Rotation

Viewed from Shaft End

Port A Pressurized - **CW**

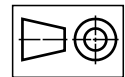
Port B Pressurized - **CCW**

Reverse Rotation

Viewed from Shaft End

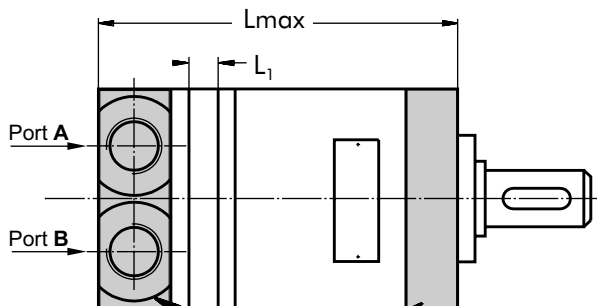
Port A Pressurized - **CCW**

Port B Pressurized - **CW**



Type	Side Ports L_{max}^1 in.[mm]	Rear Ports L_{max}^1 in.[mm]	Type	Side Ports L_{max}^1 in.[mm]	Rear Ports L_{max}^1 in.[mm]	L_1 in.[mm]
MLHM(M) 8	4.134 [105,0]	4.094 [104,0]	MLHMF 8	4.272 [108,5]	4.232 [107,5]	.138 [3,5]
MLHM(M)12.5	4.213 [107,0]	4.173 [106,0]	MLHMF 12.5	4.350 [110,5]	4.311 [109,5]	.217 [5,5]
MLHM(M) 20	4.331 [110,0]	4.291 [109,0]	MLHMF 20	4.587 [116,5]	4.547 [115,5]	.335 [8,5]
MLHM(M) 32	4.528 [115,0]	4.488 [114,0]	MLHMF 32	4.665 [118,5]	4.626 [117,5]	.531 [13,5]
MLHM(M) 40	4.665 [118,5]	4.626 [117,5]	MLHMF 40	4.803 [122,0]	4.764 [121,0]	.669 [17]
MLHM(M) 50	4.823 [122,5]	4.783 [121,5]	MLHMF 50	4.961 [126,0]	4.921 [125,0]	.827 [21]

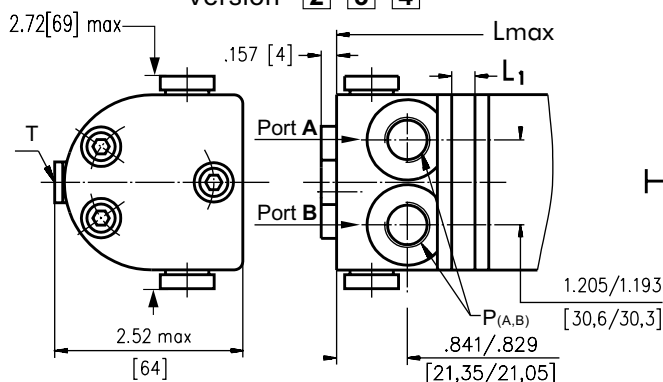
DIMENSIONS AND MOUNTING DATA



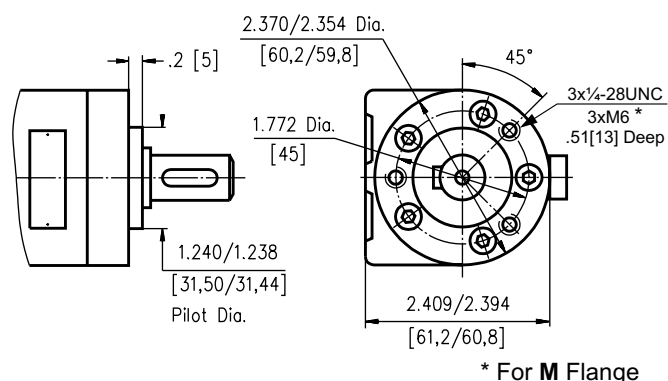
Porting

Mounting

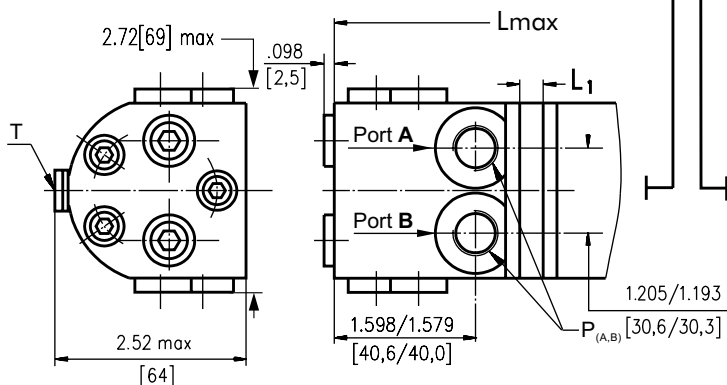
P - Side Ports with Single Crossover Relief Valve Version 2 3 4



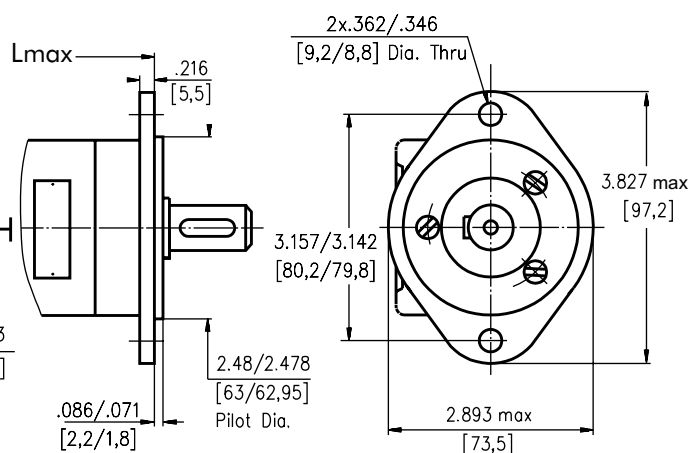
Round Flange



D - Side Ports with Dual Crossover Relief Valve Version 2 3 4



F Flange



	Versions		
	2	3	4
P_(A,B)	2xG $\frac{3}{8}$	2xM18x1,5	2x $\frac{9}{16}$ -18UNF
T	G $\frac{1}{8}$	M10x1	$\frac{3}{8}$ -24UNF

Standard Rotation

Viewed from Shaft End

Port A Pressurized - CW

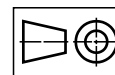
Port B Pressurized - CCW

Reverse Rotation

Viewed from Shaft End

Port A Pressurized - CCW

Port B Pressurized - CW

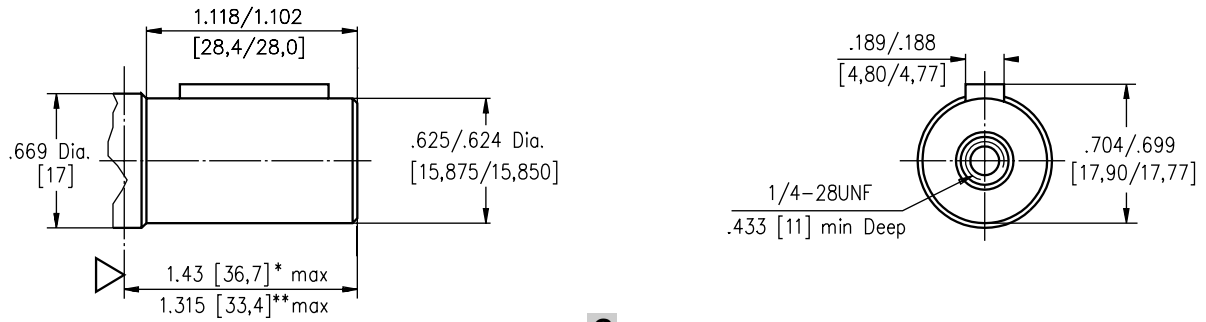


Type	L_{max} , in.[mm]	Type	L_{max} , in.[mm]	Type	L_{max} , in.[mm]	Type	L_{max} , in.[mm]	L_1 , in.[mm]
MLHM(M) 8...P	4.528 [115]	MLHMF 8...P	4.665 [118,5]	MLHM(M) 8...D	5.276 [134,0]	MLHMF 8...D	5.433 [138]	.138 [3,5]
MLHM(M)12,5...P	4.606 [117]	MLHMF12,5...P	4.744 [120,5]	MLHM(M)12,5...D	5.354 [136,0]	MLHMF12,5...D	5.512 [140]	.217 [5,5]
MLHM(M) 20...P	4.724 [120]	MLHMF 20...P	4.862 [123,5]	MLHM(M) 20...D	5.472 [139,0]	MLHMF 20...D	5.748 [146]	.335 [8,5]
MLHM(M) 32...P	4.921 [125]	MLHMF 32...P	5.059 [128,5]	MLHM(M) 32...D	5.669 [144,0]	MLHMF 32...D	5.827 [148]	.531 [13,5]
MLHM(M) 40...P	5.039 [128]	MLHMF 40...P	5.197 [132,0]	MLHM(M) 40...D	5.807 [147,5]	MLHMF 40...D	5.945 [151]	.669 [17]
MLHM(M) 50...P	5.217 [132,5]	MLHMF 50...P	5.354 [136,0]	MLHM(M) 50...D	5.965 [151,5]	MLHMF 50...D	6.102 [155]	.828 [21]

SHAFT EXTENSIONS

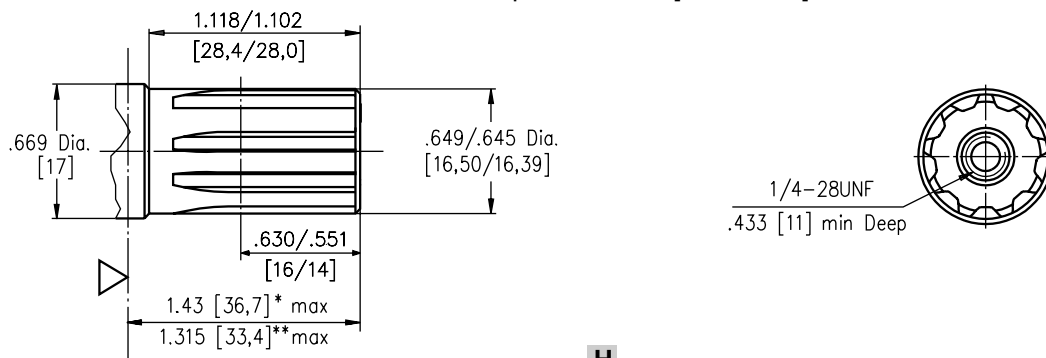
C

$\frac{5}{8}$ " [15,8] straight, Parallel key $\frac{3}{16}$ "x $\frac{3}{16}$ "x $\frac{3}{4}$ " BS 46
Max.Torque 345 in-lb [3,9 daNm]



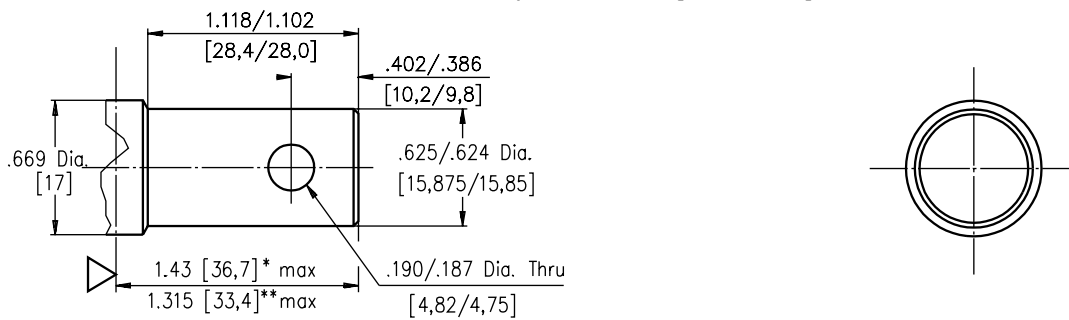
G

Splined - Metric B 17x14 DIN 5482
Max. Torque 390 in-lb [4,4 daNm]



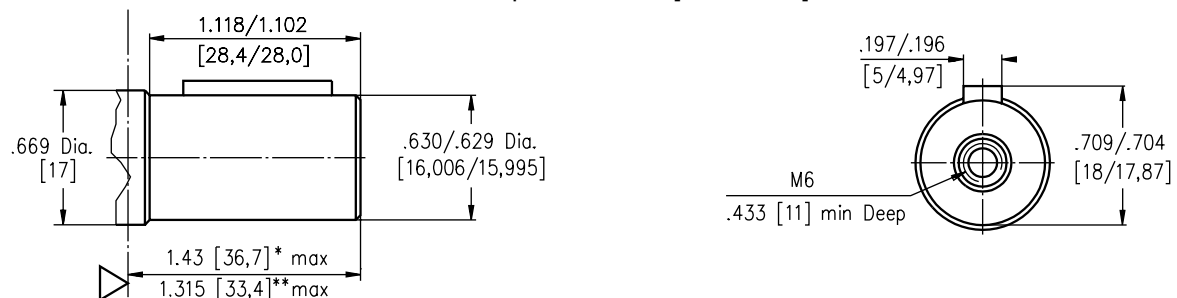
H

$\frac{5}{8}$ " [15,8] straight, w/ .19 [4,82] Crosshole
Max. Torque 345 in-lb [3,9 daNm]



M

ø16 straight, Parallel key A5x5x16 DIN 6885
Max. Torque 345 in-lb [3,9 daNm]

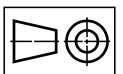


* For Round Flange

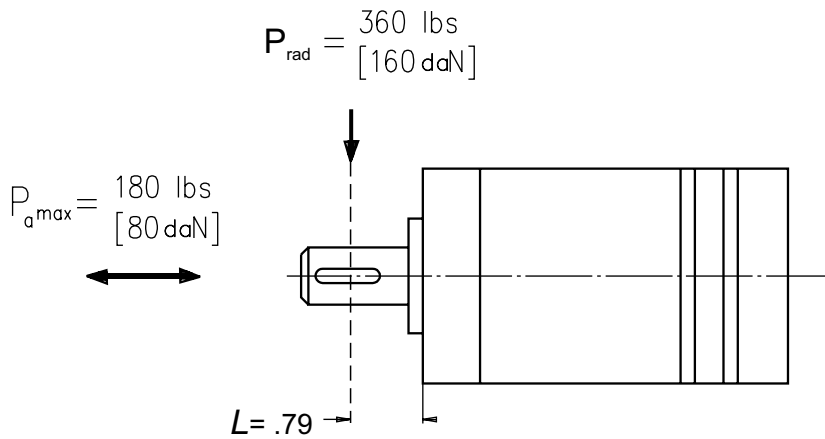
▽ - Motor Mounting Surface

** For Flange F

Requirement max. Torque must be not exceeded.



PERMISSIBLE SHAFT LOAD



The permissible radial shaft load P_{rad} is calculated from the distance L between the point of load application and the mounting surface:

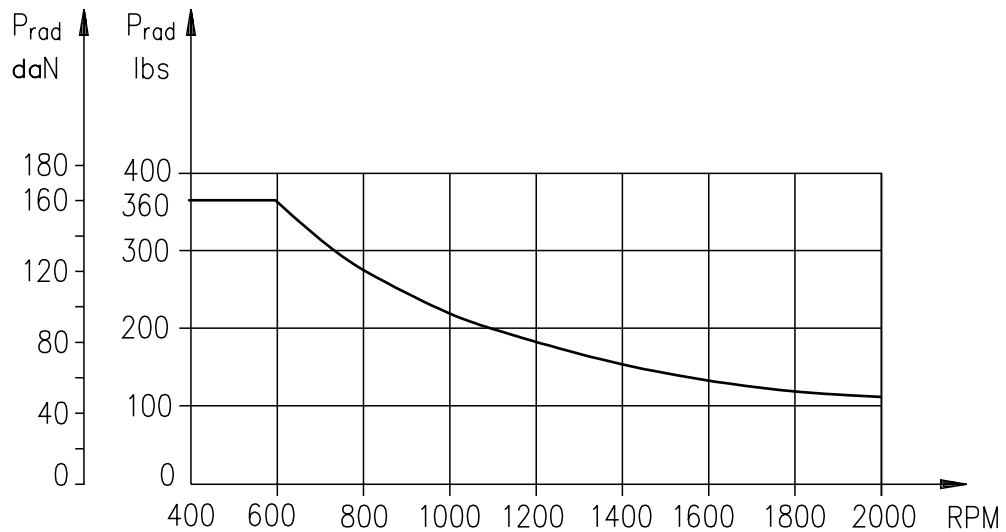
$$* P_{rad} = \frac{600}{n} \times \frac{1155}{2.42 + L}, [\text{lbs}]$$

* 1. L - in inch

2. $L \leq 3.12$

The drawing shows the permissible radial load when $L = .79$.

If the calculated shaft load exceeds the permissible, a flexible coupling must be used.



ORDER CODE

1	2	3	4	5	6	7	8	9
M	L	H	M					

Pos.1 - Mounting Flange

omit - round, three bolts

F - flange, two holes

M - round metric, three bolts M6

Pos.2 - Displacement code

8 - .5 [8,2] in.³/rev. [cm.³/rev.]

12.5 - .79 [12,9] in.³/rev. [cm.³/rev.]

20 - 1.22 [20,0] in.³/rev. [cm.³/rev.]

32 - 1.93 [31,8] in.³/rev. [cm.³/rev.]

40 - 2.44 [40,0] in.³/rev. [cm.³/rev.]

50 - 3.05 [50,0] in.³/rev. [cm.³/rev.]

Pos.3 - Shaft Extensions* [for dimensions data see page 10]

C - ⁵/₈" [15,8] straight, Parallel key

VC - ⁵/₈" [15,8] straight, Parallel key w/ corrosion resistant bushing

G - Involute Splined- Metric B17x14 DIN5482

H - ⁵/₈" [15,8] straight, Parallel key w/ .19 [4,82] Crosshole

M - 16 mm straight, Parallel key

VM - 16 mm straight, Parallel key w/ corrosion resistant bushing

Pos.4 - Port Size/Type [standard manifold to each]

2 - side ports, 2xG3/8, G1/8, BSP thread, ISO 228

3 - side ports, 2xM18x1,5; M10x1; metric thread, ISO 262

4 - side ports, 2x9/16-18 UNF, O-ring, 3/8-24 UNF

6 - rear ports, 2xG3/8, G1/8, BSP thread, ISO 228

7 - rear ports, 2x9/16-18 UNF, O-ring, 3/8-24 UNF

9 - rear ports, 2xM18x1,5; M10x1; metric thread, ISO 262

Pos. 5 - Option**

omit - without valves

D - side ports with dual crossover relief valve

P - side ports with single crossover relief valve

Pos. 6 - Directions for Control [for "P" option only]

/L - B → A (left control)

/R - A → B (right control)

Pos. 7 - Valve Rated Pressure [for "P" and "D" option only]

/50 - Δp= 725 PSI [50 bar]

/100 - Δp=1450 PSI [100 bar]

Pos. 8 - Special Features [see page 52]

Pos. 9 - Design Series

omit - Factory specified

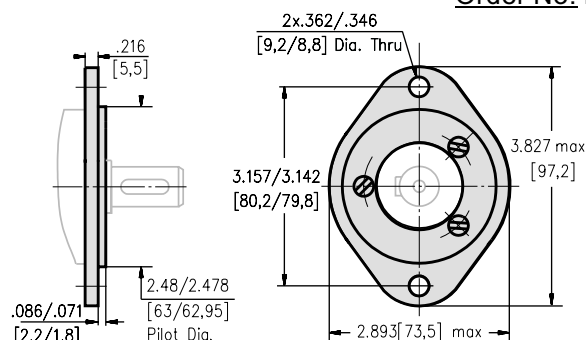
Notes: * The permissible output torque for shafts must not be exceeded!

** Options **P, D**- for side ports (**2, 3, 4**) only.

The hydraulic motors are mangano-phosphatized as standard.

F - Flange Kit (2 Holes)

Order No:48443 029 00



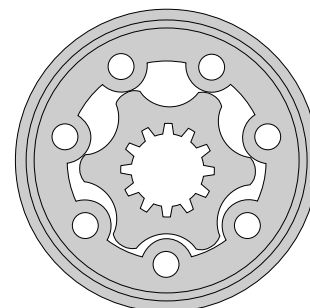
Flange Kit includes 3 screws - 1/4-28 UNF for attaching flange to the motor.

HYDRAULIC MOTORS MLHP



APPLICATION

- » Conveyors
- » Feeding mechanism of robots and manipulators
- » Metal working machines
- » Textile machines
- » Machines for agriculture
- » Food industries
- » Grass cutting machinery etc.



CONTENTS

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Order code	32

OPTIONS

- » Model- Spool valve, gerotor
- » Flange and wheel mount
- » Motor with needle bearing
- » Side and rear ports
- » Shafts- straight, splined and tapered
- » SAE, Metric and BSPP ports
- » Speed sensing
- » Other special features

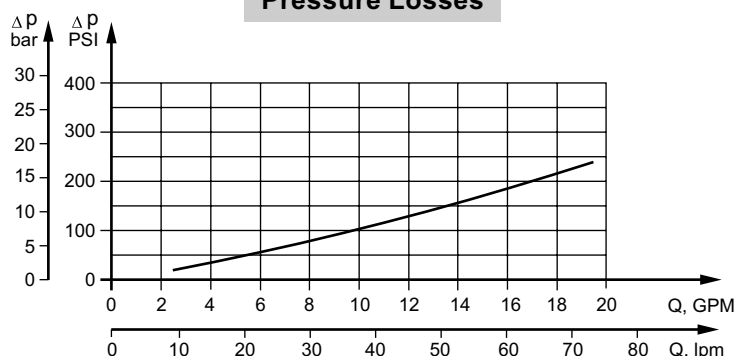
GENERAL

Displacement,	in ³ /rev [cm ³ /rev.]	1.52÷38.05 [25÷623,6]
Max. Speed,	[RPM]	97÷1600
Max. Torque,	in-lb [daNm]	290÷4415 [3,3÷50]
Max. Output,	HP [kW]	4.4÷14.1 [3,3÷10,5]
Max. Pressure Drop,	PSI [bar]	800÷2030 [55÷140]
Max. Oil Flow,	GPM [lpm]	10.5÷16 [40÷60,6]
Min. Speed,	[RPM]	10
Pressure fluid		Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range,	°F [°C]	-22÷194 [-30÷90]
Optimal Viscosity range, SUS [mm²/s]		98÷347 [20÷75]
Filtration		ISO code 20/16 (Min. recommended fluid filtration of 25 micron)

Oil flow in drain line

Pressure drop PSI [bar]	Viscosity SUS [mm ² /s]	Oil flow in drain line GPM [lpm]
1450 [100]	98 [20]	.660 [2,5]
	164 [35]	.476 [1,8]
2030 [140]	98 [20]	.925 [3,5]
	164 [35]	.740 [2,8]

Pressure Losses



SPECIFICATION DATA

Specification Data for MLHP... motors with **C, D, G, H, M, S** and **T** shafts.

(1.124 [28,56] sealing diameter)

Type		MLHP 25	MLHP 32	MLHP 40	MLHP 50	MLHP 80	MLHP 100	MLHP 125
Displacement, in. ³ /rev. [cm. ³ /rev.]		1.52 [25]	1.95 [32]	2.44 [40]	3.02 [49,5]	4.83 [79,2]	6.04 [99]	7.55 [123,8]
Max. Speed, [RPM]	Cont.	1600	1560	1515	1225	765	612	489
	Int.*	1815	1720	1760	1530	956	765	611
Max. Torque in-lb [daNm]	Cont.	290 [3,3]	380 [4,3]	550 [6,2]	835 [9,43]	1340 [15,15]	1710 [19,3]	2100 [23,7]
	Int.*	415 [4,7]	540 [6,1]	730 [8,2]	1050 [11,9]	1725 [19,5]	2100 [23,7]	2640 [29,8]
	Peak**	595 [6,7]	760 [8,6]	950 [10,7]	1285 [14,3]	1985 [22,4]	2435 [27,5]	3235 [36,5]
Max. Output HP [kW]	Cont.	6.0 [4,5]	7.8 [5,8]	11.5 [8,5]	13.5 [10,1]	13.7 [10,2]	14.1 [10,5]	13.7 [10,2]
	Int.*	8.2 [6,1]	10.5 [7,8]	15.5 [11,6]	16.1 [12,2]	16.8 [12,5]	17.1 [12,8]	16.1 [12]
Max. Pressure Drop PSI [bar]	Cont.	1450 [100]	1450 [100]	1750 [120]	2030 [140]	2030 [140]	2030 [140]	2030 [140]
	Int.*	2030 [140]	2030 [140]	2250 [155]	2540 [175]	2540 [175]	2540 [175]	2540 [175]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]
Max. Oil Flow GPM [lpm]	Cont.	10.5 [40]	13.2 [50]	16 [60,6]	16 [60,6]	16 [60,6]	16 [60,6]	16 [60,6]
	Int.*	12 [45,4]	14.5 [55]	18.5 [70]	20 [75,8]	20 [75,8]	20 [75,8]	20 [75,7]
Max. Inlet Pressure PSI [bar]	Cont.	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]
	Int.*	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]
Max. Return Pressure with Drain Line PSI [bar]	Cont.	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]
	Int.*	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]
Max. Starting Pressure with Unloaded Shaft, PSI [bar]		145 [10]	145 [10]	145 [10]	145 [10]	145 [10]	145 [10]	131 [9]
Min. Starting Torque in-lb [daNm]	At max.press. drop Cont.	265 [3,0]	355 [4,0]	480 [5,4]	690 [7,8]	1170 [13,2]	1470 [16,6]	1830 [20,7]
	At max.press. drop Int.*	370 [4,2]	500 [5,6]	600 [6,8]	885 [10]	1490 [16,8]	1860 [21]	2360 [26,6]
Min. Speed***, [RPM]		20	15	10	10	10	10	10
Weight, lb [kg] For rear ports +.992 [0,450]	MLHP(F)(N)	12.3 [5,6]	12.4 [5,6]	12.6 [5,7]	12.8 [5,8]	13.2 [5,9]	13.5 [6,1]	13,7 [6,2]
	MLHPW(N)	11.7 [5,3]	11.7 [5,3]	11.9 [5,4]	12.1 [5,5]	12.4 [5,6]	12.8 [5,8]	13 [5,9]
	MLHPQ(M)(N)	11.1 [5,0]	11.1 [5,0]	11.2 [5,1]	11.5 [5,2]	11.7 [5,3]	12.1 [5,5]	12.3 [5,6]

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

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

*** For speeds of 10 RPM or lower, consult factory or your regional manager.

1. Intermittent speed and intermittent pressure drop must not occur simultaneously.

2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.

3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4).

If using synthetic fluids consult the factory for alternative seal materials.

4. Recommended minimum oil viscosity 70 SUS [13 mm²/s] at 122°F [50°C].

5. Recommended maximum system operating temperature is 180°F [82°C].

6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

SPECIFICATION DATA (continued)

Specification Data for MLHP... motors with **C, D, G, H, M, S** and **T** shafts.
(1.124 [28,56] sealing diameter)

Type		MLHP 160	MLHP 200	MLHP 250	MLHP 315	MLHP 400	MLHP 500	MLHP 630
Displacement, in. ³ /rev. [cm. ³ /rev.]		9.66 [158,4]	12.1 [198]	15.1 [247,5]	19.3 [316,8]	24.16 [396]	30.2 [495]	38.05 [623,6]
Max. Speed, [RPM]	Cont.	382	306	245	191	153	122	97
	Int.*	479	383	306	239	191	153	121
Max. Torque in-lb [daNm]	Cont.	2770 [31,3]	3240 [36,6]	3360 [38]	3360 [38]	3190 [36]	3452 [39]	3895 [44]
	Int.*	3345 [37,8]	4035 [45,6]	5160 [58,3]	4960 [56]	5240 [59]	5045 [57]	5665 [64]
	Peak**	3880 [43,8]	4870 [55]	6060 [68,5]	7505 [85]	7560 [85,4]	6903 [78]	7257 [82]
Max. Output HP [kW]	Cont.	13.5 [10,1]	13.5 [10]	10 [7,5]	7.9 [5,8]	6.2 [4,6]	4.7 [3,5]	4.4 [3,3]
	Int.*	16.2 [12,1]	16.1 [12]	16.1 [12]	12.1 [9]	10.5 [7,8]	9.7 [7,2]	7.5 [5,6]
Max. Pressure Drop PSI [bar]	Cont.	2030 [140]	2030 [140]	1600 [110]	1300 [90]	1015 [70]	870 [60]	800 [55]
	Int.*	2540 [175]	2540 [175]	2540 [175]	2030 [140]	1665 [115]	1305 [90]	1160 [80]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	2610 [180]	1885 [130]	1740 [110]
Max. Oil Flow GPM [lpm]	Cont.	16 [60,6]	16 [60,6]	16 [60,6]	16 [60,6]	16 [60,6]	16 [60,6]	16 [60,6]
	Int.*	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]
Max. Inlet Pressure PSI [bar]	Cont.	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2030 [140]	2030 [140]
	Int.*	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2540 [175]	2540 [175]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]
Max. Return Pres- sure with Drain Line PSI [bar]	Cont.	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2030 [140]	2030 [140]
	Int.*	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2540 [175]	2540 [175]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3262 [225]	3260 [225]	3260 [225]
Max. Starting Pressure with Unloaded Shaft, PSI [bar]		116 [8]	100 [7]	87 [6]	73 [5]	73 [5]	73 [5]	73 [5]
Min. Starting Torque in-lb [daNm]	At max.press. drop Cont.	2500 [28,2]	2950 [33,5]	2970 [33,6]	3045 [34,4]	3050 [34,5]	3180 [36]	3670 [41,5]
	At max.press. drop Int.*	3140 [35,5]	3770 [42,6]	4795 [54,2]	5480 [61,9]	5390 [60,8]	4780 [54]	5480 [62]
Min. Speed***, [RPM]		10	10	10	10	10	10	10
Weight, lb [kg] For rear ports +.992 [0,450]	MLHP(F)(N)	14.1 [6,4]	14.6 [6,6]	15 [6,8]	15.6 [7,1]	16.8 [7,6]	20 [8,9]	21.4 [9,5]
	MLHPW(N)	13.5 [6,1]	13.9 [6,3]	14.3 [6,5]	15 [6,8]	15.9 [7,2]	19.0 [8,6]	20.3 [9,2]
	MLHPQ(M)(N)	12.8 [5,8]	13.2 [6]	13.7 [6,2]	14.3 [6,5]	15 [6,8]	18.3 [8,3]	19.8 [9]

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

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

*** For speeds of 10 RPM or lower, consult factory or your regional manager.

1. Intermittent speed and intermittent pressure drop must not occur simultaneously.

2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.

3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4).
If using synthetic fluids consult the factory for alternative seal materials.

4. Recommended minimum oil viscosity 70 SUS [13 mm²/s] at 122°F [50°C].

5. Recommended maximum system operating temperature is 180°F [82°C].

6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

SPECIFICATION DATA (continued)

Specification Data for MLHP... motors with **B, K, R** and **L** shafts.
(1.378 [35] sealing diameter)

Type		MLHP 25	MLHP 32	MLHP 40	MLHP 50	MLHP 80	MLHP 100	MLHP 125
Displacement, in. ³ /rev. [cm. ³ /rev.]		1.52 [25]	1.95 [32]	2.44 [40]	3.02 [49,5]	4.83 [79,2]	6.04 [99]	7.55 [123,8]
Max. Speed, [RPM]	Cont.	1600	1560	1515	1225	765	612	489
	Int.*	1815	1720	1760	1530	956	765	611
Max. Torque in-lb [daNm]	Cont.	290 [3,3]	380 [4,3]	550 [6,2]	835 [9,43]	1340 [15,15]	1710 [19,3]	2100 [23,7]
	Int.*	415 [4,7]	540 [6,1]	730 [8,2]	1050 [11,9]	1725 [19,5]	2100 [23,7]	2640 [29,8]
	Peak**	595 [6,7]	760 [8,6]	950 [10,7]	1285 [14,3]	1985 [22,4]	2435 [27,5]	3235 [36,5]
Max. Output HP [kW]	Cont.	6.0 [4,5]	7.8 [5,8]	11.5 [8,5]	13.5 [10,1]	13.7 [10,2]	14.1 [10,5]	13.7 [10,2]
	Int.*	8.2 [6,1]	10.5 [7,8]	15.5 [11,6]	16.1 [12,2]	16.8 [12,5]	17.1 [12,8]	16.1 [12]
Max. Pressure Drop PSI [bar]	Cont.	1450 [100]	1450 [100]	1750 [120]	2030 [140]	2030 [140]	2030 [140]	2030 [140]
	Int.*	2030 [140]	2030 [140]	2250 [155]	2540 [175]	2540 [175]	2540 [175]	2540 [175]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]
Max. Oil Flow GPM [lpm]	Cont.	10.5 [40]	13.2 [50]	16 [60,6]	16 [60,6]	16 [60,6]	16 [60,6]	16 [60,6]
	Int.*	12 [45,4]	14.5 [55]	18.5 [70]	20 [75,8]	20 [75,8]	20 [75,8]	20 [75,7]
Max. Inlet Pressure PSI [bar]	Cont.	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]
	Int.*	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]
Max. Return Pres- sure with Drain Line PSI [bar]	Cont.	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]
	Int.*	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]
Max. Starting Pressure with Unloaded Shaft, PSI [bar]		145 [10]	145 [10]	145 [10]	145 [10]	145 [10]	145 [10]	131 [9]
Min. Starting Torque in-lb [daNm]	At max.press. drop Cont.	265 [3,0]	355 [4,0]	480 [5,4]	690 [7,8]	1170 [13,2]	1470 [16,6]	1830 [20,7]
	At max.press. drop Int.*	370 [4,2]	500 [5,6]	600 [6,8]	885 [10]	1490 [16,8]	1860 [21]	2360 [26,6]
Min. Speed***, [RPM]		20	15	10	10	10	10	10
Weight, lb [kg] For rear ports: +.992 [0,450]		MLHP(F) 12.3 [5,6]	12.4 [5,6]	12.6 [5,7]	13[5,9]	13.2[6]	13.7[6,2]	13.9[6,3]

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

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

*** For speeds of 10 RPM or lower, consult factory or your regional manager.

1. Intermittent speed and intermittent pressure drop must not occur simultaneously.

2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.

3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4).
If using synthetic fluids consult the factory for alternative seal materials.

4. Recommended minimum oil viscosity 70 SUS [13 mm²/s] at 122°F [50°C].

5. Recommended maximum system operating temperature is 180°F [82°C].

6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

SPECIFICATION DATA (continued)

Specification Data for MLHP... motors with **B, K, R** and **L** shafts.

(1.378 [35] sealing diameter)

Type		MLHP 160	MLHP 200	MLHP 250	MLHP 315	MLHP 400	MLHP 500	MLHP 630
Displacement, in. ³ /rev. [cm. ³ /rev.]		9.66 [158,4]	12.1 [198]	15.1 [247,5]	19.3 [316,8]	24.16 [396]	30.2 [495]	38.05 [623,6]
Max. Speed, [RPM]	Cont.	382	306	245	191	153	122	97
	Int.*	479	383	306	239	191	153	121
Max. Torque in-lb [daNm]	Cont.	2770 [31,3]	3240 [36,6]	4160 [47]	4360 [48]	4415 [50]	3452 [39]	3895 [44]
	Int.*	3345 [37,8]	4035 [45,6]	5160 [58,3]	4960 [56]	5240 [59]	5045 [57]	5665 [64]
	Peak**	3875 [43,8]	4870 [55]	6060 [68,5]	7505 [85]	7560 [85,4]	6903 [78]	7257 [82]
Max. Output HP [kW]	Cont.	13.5 [10,1]	13.5 [10]	12.1 [9]	10.2 [7,6]	8.3 [6,2]	4.7 [3,5]	4.4 [3,3]
	Int.*	16.2 [12,1]	16.1 [12]	16.1 [12]	12.1 [9]	10.5 [7,8]	9,7 [7,2]	7.5 [5,6]
Max. Pressure Drop PSI [bar]	Cont.	2030 [140]	2030 [140]	3030 [140]	1740 [120]	1400 [95]	870 [60]	800 [55]
	Int.*	2540 [175]	2540 [175]	2540 [175]	2030 [140]	1670 [115]	1305 [90]	1160 [80]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	2610 [180]	1885 [130]	1740 [110]
Max. Oil Flow GPM [lpm]	Cont.	16 [60,6]	16 [60,6]	16 [60,6]	16 [60,6]	16 [60,6]	16 [60,6]	16 [60,6]
	Int.*	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]
Max. Inlet Pressure PSI [bar]	Cont.	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2030 [140]	2030 [140]
	Int.*	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2540 [175]	2540 [175]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]
Max. Return Pres- sure with Drain Line PSI [bar]	Cont.	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2030 [140]	2030 [140]
	Int.*	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2540 [175]	2540 [175]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3262 [225]	3260 [225]	3260 [225]
Max. Starting Pressure with Unloaded Shaft, PSI [bar]		116 [8]	100 [7]	87 [6]	73 [5]	73 [5]	73 [5]	73 [5]
Min. Starting Torque in-lb [daNm]	At max.press. drop Cont.	2500 [28,2]	2950 [33,5]	3790 [42,8]	4050 [45,8]	4140 [46,8]	3180 [36]	3670 [41,5]
	At max.press. drop Int.*	3140 [35,5]	3770 [42,6]	4795 [54,2]	5480 [61,9]	5390 [60,8]	4780 [54]	5480 [62]
Min. Speed***, [RPM]		10	10	10	10	10	10	10
Weight, lb [kg] For rear ports: +.992 [0,450]		MLHP(F) 14.3[6,5]	14.8[6,7]	15.2[6,9]	15.9[7,2]	17[7,7]	19.9 [9,0]	21.2 [9,6]

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

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

*** For speeds of 10 RPM or lower, consult factory or your regional manager.

1. Intermittent speed and intermittent pressure drop must not occur simultaneously.

2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.

3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4).
If using synthetic fluids consult the factory for alternative seal materials.

4. Recommended minimum oil viscosity 70 SUS [13 mm²/s] at 122°F [50°C].

5. Recommended maximum system operating temperature is 180°F [82°C].

6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

Performance Data

MLHP 25

		Pressure (Δ PSI)				Max. Int.		Speed (theor.)
		450	900	1160	1450	1740	2030	
Flow [GPM]	1	98 121	181 78	227 46	- -	- -	- -	150
	2	103 272	191 226	237 193	296 144	350 81	398 20	303
	3	102 424	191 376	237 343	298 293	357 224	411 154	454
	5	99 717	188 665	236 630	297 580	360 518	419 451	757
	7	94 1008	182 955	231 921	293 869	357 806	420 736	1060
	9	87 1311	174 1253	225 1214	287 1161	351 1102	415 1033	1364
Max. Cont.	11	76 1546	166 1488	218 1450	282 1400	345 1335	410 1270	1664
Max. Int.	12	70 1764	157 1703	211 1664	275 1615	339 1555	403 1490	1817
Torque (theor.) in-lb. [daNm]		108 [1,23]	218 [2,47]	281 [3,18]	352 [3,98]	422 [4,77]	493 [5,57]	
1.52 in ³ ./rev. [25 cm ³ ./rev.]								

Torque [in-lb] 403
Speed [RPM] 1490

Performance Data

MLHP 32

		Pressure (Δ PSI)				Max. Int.		Speed (theor.)
		450	900	1160	1450	1740	2030	
Flow [GPM]	1	118 90	229 52	291 25	- -	- -	- -	118
	2	118 210	232 171	298 141	373 100	445 51	- -	237
	3	118 331	233 291	302 260	377 219	454 166	520 113	355
	5	113 564	229 527	302 491	379 448	460 390	531 315	592
	7	107 798	224 759	296 726	376 683	457 631	535 558	828
	9	98 1036	216 992	289 958	371 916	452 865	532 800	1066
Max. Cont.	11	90 1268	207 1222	280 1191	362 1149	445 1097	526 1035	1300
	13	81 1510	198 1460	271 1424	353 1380	438 1321	518 1261	1538
Max. Int.	14.5	74 1693	190 1641	261 1607	344 1560	432 1504	510 1437	1715
Torque (theor.) in-lb. [daNm]		140 [1,58]	280 [3,16]	360 [4,07]	450 [5,09]	541 [6,11]	631 [7,13]	
1.95 in ³ ./rev. [32 cm ³ ./rev.]								

Torque [in-lb] 510
Speed [RPM] 1437

The Performance data was collected at back pressure 72.5±145 PSI [5±10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50° C].

Performance Data

MLHP 40

		Pressure (Δ PSI)					Max. Cont.		Max. Int.		Speed (theor.)
		450	900	1160	1450	1740	2030	2250			
Flow [GPM]	1	134 87	278 74	364 61	443 47	533 28	617 8	- -	95		
	2	138 180	289 165	376 152	459 137	552 116	643 92	710 74		189	
	4	135 367	283 353	375 340	460 327	559 308	657 285	724 258			
	6	129 557	274 544	370 533	457 519	558 501	656 478	724 451		568	
	8	121 748	263 735	362 722	450 711	552 696	650 674	719 657			757
	10	109 941	249 929	352 918	441 906	543 889	640 872	708 858		946	
	12	97 1128	236 1114	340 1100	428 1088	532 1073	629 1056	697 1044			1136
	14	84 1313	220 1300	328 1287	416 1274	519 1260	617 1243	685 1231		1325	
Max. Cont.											
	16	68 1500	203 1485	316 1472	402 1460	505 1444	604 1427	673 1414	1514		
Max. Int.	18.5	47 1739	179 1722	297 1703	381 1689	485 1671	586 1653	655 1642		1751	
Torque (theor.) in-lb. [daNm]		174 [1,97]	350 [3,95]	450 [5,09]	563 [6,36]	676 [7,64]	789 [8,91]	874 [9,88]	Torque		

2.44 in³/rev. [40 cm³/rev.]

Performance Data

MLHP 50

		Pressure (Δ PSI)						Max. Cont.	Max. Int.		Speed (theor.)
		450	900	1150	1450	1740	1810	2030	2320	2540	
Flow [GPM]	1	168 71	345 63	459 45	571 19	- -	- -	- -	- -	- -	77
	2	176 150	357 133	482 113	591 86	727 70	760 51	816 30	- -	- -	153
	4	165 304	355 290	477 274	604 255	730 232	771 213	853 182	971 137	1054 97	306
	6	158 454	346 443	474 432	600 413	729 390	776 378	854 368	988 325	1080 298	459
	8	145 613	339 602	462 587	594 566	725 543	772 532	848 518	986 486	1078 459	612
	10	128 767	329 757	450 743	584 724	712 696	760 687	840 670	972 639	1067 617	765
	12	115 922	312 912	437 902	567 886	701 862	748 851	828 836	959 804	1054 781	918
	14	98 1078	290 1069	420 1058	552 1040	682 1018	726 1004	810 990	943 958	1028 937	1071
Max. Cont.	16	79 1232	272 1217	400 1206	543 1193	660 1173	708 1167	793 1155	918 1131	1001 1110	1224
Max. Int.	18	57 1389	244 1368	374 1355	504 1342	635 1325	685 1314	771 1304	896 1270	975 1240	1377
	20	34 1540	215 1521	347 1510	476 1492	603 1483	648 1474	740 1466	867 1428	941 1402	1530
Torque (theor.) in-lb. [daNm]		216 [2,44]	432 [4,88]	553 [6,25]	697 [7,88]	836 [9,44]	870 [9,83]	975 [11,02]	1115 [12,6]	1221 [13,8]	Torque

3.02 in³/rev. [49,5 cm³/rev.]

The Performance data was collected at back pressure 72.5÷145 PSI [5÷10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50° C].

Performance Data

MLHP 80

		Pressure (Δ PSI)						Max. Cont.	Max. Int.		Speed (theor.)
		450	900	1150	1450	1740	1810	2030	2320	2540	
Flow [GPM]	1	296 43	578 34	716 25	900 17	- -	- -	- -	- -	- -	48
	2	299 90	565 80	749 67	937 51	1115 30	1161 18	- -	- -	- -	96
	4	300 185	590 178	760 168	976 150	1146 133	1202 121	1331 111	1492 75	- -	191
	6	286 282	578 275	749 265	972 255	1137 237	1196 229	1334 218	1529 183	1673 158	287
	8	268 379	566 379	733 362	954 351	1123 333	1180 326	1318 315	1520 280	1668 257	382
	10	247 473	548 468	717 460	930 447	1112 430	1165 425	1298 410	1505 378	1659 354	478
	12	207 568	528 561	696 552	909 543	1087 526	1142 521	1275 504	1482 477	1640 453	574
	14	204 664	501 658	671 650	864 638	1061 623	1120 618	1255 604	1453 577	1618 555	669
Max. Cont.	16	168 759	481 752	642 746	852 736	1038 721	1094 716	1230 703	1430 676	1590 652	765
Max. Int.	18	140 855	446 848	605 839	823 832	1006 818	1063 813	1198 799	1401 777	1560 753	860
	20	103 946	392 940	566 933	782 923	982 910	1036 907	1165 894	1363 866	1526 848	956
Torque (theor.) in-lb. [daNm]		345 [3,9]	690 [7,8]	884 [9,99]	1115 [12,6]	1338 [15,12]	1390 [15,7]	1561 [17,64]	1784 [20,16]	1947 [22]	Torque Speed
4.83 in ³ ./rev. [79.2 cm ³ ./rev.]											

4.83 in³/rev. [79,2 cm³/rev.]

Torque [in-lb] 1526
Speed [RPM] 848

Performance Data

MLHP 100

		Pressure (Δ PSI)						Max. Cont.	Max. Cont.	Max. Int.	Speed (theor.)
		450	900	1150	1450	1740	1810	2030	2320	2540	
Flow [GPM]	1	357 34	693 26	926 18	1138 11	- -	- -	- -	- -	- -	38
	2	365 75	707 69	940 62	1171 52	1395 38	1470 32	1614 21	- -	- -	76
	4	357 152	708 148	950 144	1174 135	1415 121	1490 114	1651 101	1883 70	2038 33	153
	6	335 230	691 227	930 221	1165 212	1412 201	1492 195	1660 185	1901 161	2069 138	230
	8	305 307	674 303	915 299	1150 291	1390 284	1470 280	1634 269	1881 247	2054 220	306
	10	281 393	652 391	890 387	1116 380	1366 372	1450 368	1612 358	1846 338	2033 316	383
	12	265 462	619 460	866 457	1094 452	1352 442	1432 436	1586 426	1821 406	2012 385	459
	14	232 540	586 539	829 535	1061 530	1318 521	1388 517	1558 508	1793 487	1981 465	535
Max. Cont.	16	205 615	552 614	814 612	1034 607	1277 590	1350 594	1525 585	1761 567	1956 547	612
Max. Int.	18	155 695	508 692	756 688	990 684	1238 677	1322 675	1481 665	1724 648	1907 627	688
	20	106 770	458 767	705 765	935 761	1194 757	1273 752	1459 744	1676 727	1867 705	765
Torque (theor.) in-lb. [daNm]		432 [4,88]	865 [9,77]	1105 [12,49]	1394 [15,75]	1673 [18,9]	1740 [19,66]	1952 [22,05]	2230 [25,2]	2442 [27,59]	

6.04 in³/rev. [99,0 cm³/rev.]

Torque [in-lb] 1867
Speed [RPM] 705

The Performance data was collected at back pressure 72.5÷145 PSI [5÷10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50° C].

Performance Data

MLHP 125

		Pressure (Δ PSI)						Max. Cont.	Max. Int.	Speed (theor.)	
		450	900	1150	1450	1740	1810	2030	2320	2540	
Flow [GPM]	1	488 28	922 21	1223 14	- -	- -	- -	- -	- -	- -	31
	2	479 59	924 55	1246 51	1545 41	1837 28	1920 23	2102 12	- -	- -	62
	4	474 120	923 115	1253 111	1554 102	1857 89	1965 83	2155 68	2432 44	2617 24	122
	6	450 180	905 177	1224 172	1534 166	1843 156	1941 152	2136 144	2456 125	2655 110	183
	8	417 240	881 237	1203 233	1498 226	1815 217	1905 213	2117 203	2420 187	2632 176	245
	10	393 300	851 297	1176 294	1462 289	1786 278	1875 275	2084 265	2377 247	2590 236	306
	12	351 361	816 358	1131 354	1429 348	1739 339	1825 336	2045 327	2341 310	2560 295	367
	14	308 424	780 420	1099 417	1383 411	1685 401	1786 398	1995 390	2292 375	2526 359	428
Max. Cont.	16	259 483	732 479	1045 475	1340 470	1637 463	1727 460	1945 450	2242 435	2471 421	489
Max. Int.	18	205 543	672 540	997 536	1291 531	1578 522	1675 518	1888 512	2188 496	2407 484	550
	20	149 602	616 599	932 596	1214 589	1504 585	1616 581	1822 573	2125 557	2331 534	612
Torque (theor.) in-lb. [daNm]		540 [6,1]	1082 [12,22]	1382 [15,62]	1744 [19,7]	2092 [23,64]	2176 [24,59]	2441 [27,58]	2790 [31,52]	3054 [34,51]	
47.55 in ³ ./rev. [123,8 cm ³ ./rev.]											

Torque [in-lb] 2331
Speed [RPM] 534

Performance Data

MLHP 160

		Pressure (Δ PSI)						Max. Cont.	Max. Int.		Speed (theor.)
		450	900	1150	1450	1740	1810	2030	2320	2540	
Flow [GPM]	1	554 24	1100 20	1471 16	1853 13	- -	- -	- -	- -	- -	24
	2	563 48	1102 46	1500 44	1885 39	2252 28	2358 23	2590 13	- -	- -	48
	4	552 95	1111 92	1511 90	1882 86	2270 79	2361 76	2627 67	3026 48	3275 27	96
	6	523 145	1082 142	1477 139	1860 135	2234 130	2329 127	2616 121	3015 103	3295 90	143
	8	496 191	1054 189	1450 188	1824 185	2200 180	2306 177	2572 171	2968 157	3251 143	191
	10	454 238	1017 237	1404 236	1771 233	2151 230	2270 228	2532 223	2917 206	3215 192	239
	12	416 288	952 287	1355 286	1725 285	2114 280	2207 278	2483 271	2878 257	3172 244	287
	14	363 337	914 336	1290 335	1660 333	2053 329	2147 327	2434 321	2812 307	3124 295	335
Max. Cont.	16	296 385	850 384	1235 383	1810 382	2000 378	2092 375	2361 370	2747 358	3052 348	382
Max. Int.	18	236 433	781 432	1162 431	1535 430	1925 426	2034 425	2296 420	2670 406	2980 396	430
	20	167 481	712 480	1108 479	1461 478	1842 475	1948 473	2210 468	2592 457	2896 446	478
Torque (theor.) in-lb. [daNm]		692 [7,82]	1383 [15,63]	1769 [19,99]	2230 [25,2]	2676 [30,24]	2784 [31,46]	3123 [35,28]	3570 [40,33]	3908 [44,15]	Torque (theor.) in-lb. [daNm]
9.66 in ³ ./rev. [158.4 cm ³ ./rev.]											

Torque [lb-in] 2896
Speed [RPM] 446

The Performance data was collected at back pressure 72.5±145 PSI [5±10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50° C].

Performance Data MLHP 200

		Pressure (Δ PSI)									Max. Cont.	Max. Int.	Speed (theor.)
		450	900	1150	1450	1740	1820	2030	2200	2320	2540	2900	
Flow [GPM]	1	577 20	1195 18	1585 16	1980 13	- -	- -	- -	- -	- -	- -	- -	19
	2	572 38	1195 37	1581 36	2011 32	2397 28	2527 26	2795 21	3030 16	3155 13	- -	- -	38
	4	557 77	1200 76	1592 75	2017 73	2410 67	2537 65	2823 61	3060 54	3213 48	3496 37	3936 13	77
	6	535 115	1166 114	1559 112	1997 110	2405 108	2512 106	2807 102	3050 96	3205 91	3504 81	3945 56	115
	8	524 153	1127 151	1528 150	1951 149	2373 146	2470 144	2775 140	3010 134	3170 130	3472 120	3900 94	153
	10	478 192	1087 191	1481 190	1911 188	2330 185	2393 183	2715 180	2940 174	3122 170	3424 159	3855 132	191
	12	430 230	1039 229	1433 228	1864 226	2265 224	2350 222	2668 218	2890 212	3066 208	3370 197	3800 167	229
	14	372 271	981 269	1373 268	1796 267	2210 264	2294 262	2608 259	2830 253	2996 249	3305 237	3710 205	268
	Max. Cont.	310 303	916 301	1326 300	1744 299	2150 297	2240 295	2548 291	2760 286	2940 283	3245 272	3650 237	306
	18	235 342	842 341	1266 340	1660 339	2070 337	2170 335	2475 333	2682 328	2855 325	3146 317	3540 279	344
Max. Int.	20	160 382	766 381	1175 380	1585 379	1977 376	2090 375	2377 372	2576 368	2768 365	3050 356	3423 316	382
	Torque (theor.) in-lb. [daNm]	865 [9,77]	1729 [19,54]	2212 [24,99]	2788 [31,5]	3337 [37,7]	3500 [39,55]	3904 [44,11]	4231 [47,8]	4462 [50,41]	4886 [55,2]	5575 [62,99]	

12.1 in³./rev. [198,0 cm³./rev.]

Torque [lb-in] 3423
Speed [RPM] 316

Performance Data MLHP 250

		Pressure (Δ PSI)						Max. Cont.	Max. Int.	Speed (theor.)
		450	900	1200	1450	1810	2030	2300	2540	
Flow [GPM]	1	908 14	1780 12	2520 10	- -	- -	- -	- -	- -	15
	2	935 28	1800 26	2540 22	2960 19	3680 10	- -	- -	- -	31
	4	910 59	1795 57	2545 53	2970 50	3715 38	4075 29	4680 10	- -	61
	6	841 96	1745 93	2490 85	2940 85	3685 76	4110 70	4730 56	5205 43	92
	8	797 122	1695 120	2440 117	2900 112	3615 104	4060 97	4685 85	5140 75	122
	10	715 153	1650 151	2375 148	2830 143	3545 135	3960 128	4580 117	5060 106	153
	12	660 184	1570 182	2310 179	2732 175	3450 167	3890 160	4485 150	4960 140	184
	14	605 215	1480 213	2227 209	2670 207	3355 199	3771 192	4370 182	4825 173	214
	16	560 245	1402 244	2117 241	2556 237	3260 230	3685 223	4260 213	4700 204	245
	Max. Cont.	412 275	1290 274	2025 272	2465 268	3155 260	3585 252	4150 243	4590 233	275
Max. Int.	20	302 307	1160 306	1870 304	2335 300	3050 292	3465 285	4013 275	4425 266	306
	Torque (theor.) in-lb. [daNm]	1080 [12,21]	2160 [24,4]	2885 [32,6]	3487 [39,4]	4355 [49,2]	4880 [55,13]	5529 [62,47]	6106 [68,99]	

15.1 in³./rev. [247,5 cm³./rev.]

Torque [in-lb] 4425
Speed [RPM] 266

The Performance data was collected at back pressure 72.5÷145 PSI [5÷10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50° C].

Performance Data MLHP 315

		Pressure (Δ PSI)					Max. Cont.	Max. Int.	Speed (theor.)
		450	700	1000	1230	1450	1740	2030	
Flow [GPM]	1	1140 12	1850 10	- -	- -	- -	- -	- -	10
	2	1122 24	1875 22	2555 20	3105 16	3600 11	- -	- -	24
	4	1075 48	1800 46	2515 44	3095 40	3595 35	4285 28	4960 20	48
	6	1015 71	1750 70	2462 68	3035 64	3540 59	4220 52	4942 44	72
	8	940 96	1686 95	2400 93	2970 89	3462 85	4150 77	4882 69	97
	10	878 121	1612 120	2310 118	2885 114	3390 111	4075 103	4782 95	120
	12	782 146	1522 145	2210 143	2800 140	3285 137	3955 129	4655 121	143
	14	686 170	1410 169	2110 167	2696 165	3170 162	3835 155	4550 147	167
	16	560 195	1302 194	2015 192	2535 190	3050 187	3700 181	4420 174	191
	Max. Cont.	18	448 220	1155 219	1865 217	2418 216	2865 213	3560 207	4240 200
Max. Int.	20	330 244	980 243	1720 242	2270 240	2722 238	3415 233	4090 226	239

Torque (theor.) in-lb. [daNm]	1383 [15,63]	2153 [24,33]	2184 [24,68]	3785 [42,76]	4462 [50,41]	5354 [60,49]	6246 [70,57]
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19.3 in³./rev. [316,8 cm³./rev.]

Torque [in-lb] 4090
Speed [RPM] 226

Performance Data MLHP 400

		Pressure (PSI)					Max. Cont.	Max. Int.	Speed (theor.)
		400	650	800	945	1160	1400	1670	
Flow [GPM]	1	1382 10	- -	- -	- -	- -	- -	- -	10
	2	1380 19	2090 18	2570 17	3065 15	3760 11	- -	- -	19
	4	1375 38	2065 37	2545 36	3020 34	3780 31	4365 27	5075 21	38
	6	1340 56	2030 55	2500 55	2960 54	3725 51	4330 46	5015 39	57
	8	1272 77	1965 76	2420 76	2875 75	3620 72	4240 67	4945 60	77
	10	1195 96	1885 95	2300 94	2795 93	3540 90	4175 85	4835 80	96
	12	1095 116	1765 115	2210 114	2700 113	3430 110	4025 105	4705 98	115
	14	955 136	1645 135	2090 134	2578 133	3270 131	3895 126	4540 119	134
Max. Cont.	16	820 155	1495 154	1940 153	2435 153	3100 151	3780 146	4360 140	153
Max. Int.	18	645 174	1330 173	1790 172	2270 172	2940 170	3610 164	4220 158	172
	20	425 198	1105 198	1600 196	2050 195	2685 194	3345 190	3930 186	191

Torque (theor.) in-lb. [daNm]	1538 [17,38]	2500 [28,25]	3077 [34,76]	3635 [41,07]	4462 [50,41]	5385 [60,84]	6423 [72,57]
-------------------------------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------

24.16 in³./rev. [396,0 cm³./rev.]

Torque [in-lb] 3930
Speed [RPM] 186

The Performance data was collected at back pressure 72.5÷145 PSI [5÷10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50° C].

Performance Data MLHP 500

		Pressure (Δ PSI)				Max. Cont.	Max. Int.			Speed (theor.)
		200	400	600	870		1000	1200	1305	
Flow [GPM]	1	810 7	1625 6	2398 4	- -		- -	- -	- -	8
	2	812 15	1698 15	2636 14.5	3450 14		4058 11.5	4812 8	5210 7	15
	4	816 30	1607 30	2362 29.5	3428 28		3570 26	4804 23	5195 22	31
	6	784 46	1590 46	2309 45	3380 43		3908 41	4750 38	5150 36	46
	8	768 61	1554 61	2246 60	3285 58		3818 56	4662 53	5045 51	61
	10	710 76	1394 76	2132 75	3110 74		3658 73	4484 70	4920 67	76
	12	670 91	1328 91	1998 90	2975 89		3508 87	4350 84	4785 81	92
	14	588 107	1198 107	1820 106	2805 105		3330 103	4112 101	4590 98	107
Max. Cont.	16	490 122	1065 121	1650 120	2612 119		3170 117	3950 114	4440 111	122
Max. Int.	18	368 137	844 137	1537 137	2320 136		2904 133	3755 129	4245 126	138
	20	252 153	622 152	1252 151	2045 150		2628 149	3508 147	3995 144	153
Torque (theor.) in-lb. [daNm]		961 [10,86]	1923 [21,73]	2884 [32,59]	4184 [47,27]		4805 [54,32]	5769 [65,18]	6275 [70,9]	

30.20 in³./rev. [495,0 cm³./rev.]

Performance Data MLHP 630

		Pressure (Δ PSI)				Max. Cont.	Max. Int.		Speed (theor.)
		200	400	600	800		1000	1160	
Flow [GPM]	2	976 12	2015 11.5	3320 11	3995 9		5070 6	- -	12
	4	990 24	2025 24	3312 23	3990 22		5115 20	5435 16	24
	6	976 36	1990 36	3260 35	3915 34		5025 32	5815 29	36
	8	950 48	1900 48	3152 47	3818 46		4885 45	5648 42	49
	10	888 61	1812 61	2975 60	3640 59		4662 58	5370 56	61
	12	835 72	1722 72	2825 71	3508 70		4485 68	5195 65	73
	14	745 85	1555 85	2585 84	3285 83		4262 81	4920 79	85
Max. Cont.	16	620 97	1376 97	2380 96	3062 95		3995 94	4645 91	97
Max. Int.	18	488 109	1172 109	2150 108	2815 107		3730 106	4395 104	109
	20	372 121	940 121	1925 120	2530 119		3455 117	4100 114	121
Torque (theor.) in-lb. [daNm]		1212 [13,69]	2422 [27,37]	3634 [41,06]	4846 [54,75]		6057 [68,43]	7026 [79,38]	

38.5 in³./rev. [623,6 cm³./rev.]

Torque [in-lb] 3995
Speed [RPM] 144

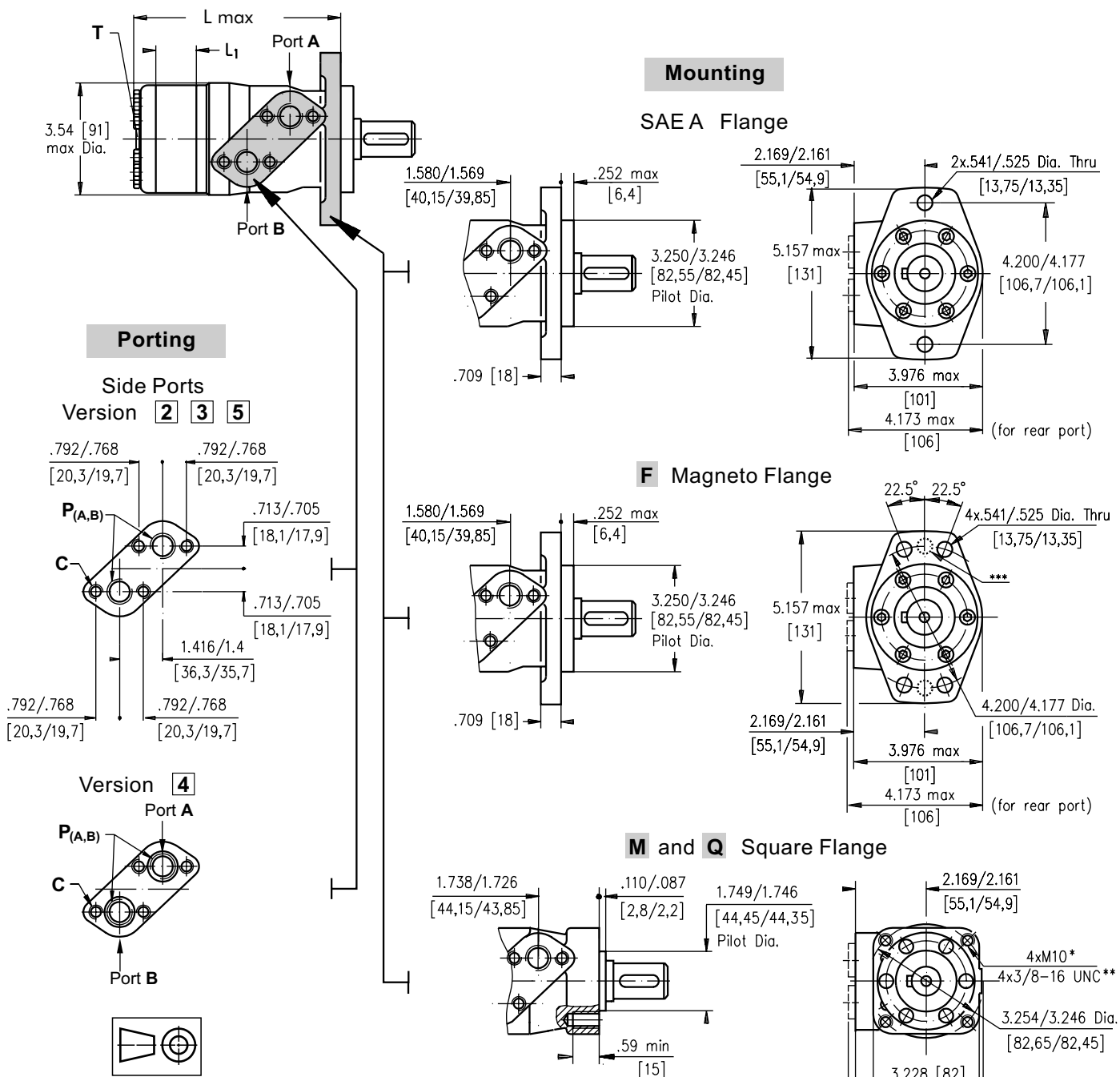
Metric Conversions

Flow 1 lpm = .2642 GPM
Pressure 1 bar = 14.51 PSI
Torque 1 Nm = 8.85 in-lb

Torque [in-lb] 4100
Speed [RPM] 114

The Performance data was collected at back pressure 72.5÷145 PSI [5÷10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50° C].

DIMENSIONS AND MOUNTING DATA



Type	Lmax, in.[mm]	Type	Lmax, in.[mm]	L ₁ , in.[mm]
MLHP(F) 25	5.35[136,0]	MLHPQ(M) 25	5.53[140,5]	.21[5,20]
MLHP(F) 32	5.39[137,0]	MLHPQ(M) 32	5.57[141,5]	.25[6,30]
MLHP(F) 40	5.45[138,5]	MLHPQ(M) 40	5.61[142,5]	.29[7,40]
MLHP(F) 50	5.41[137,5]	MLHPQ(M) 50	5.59[142,0]	.26[6,67]
MLHP(F) 80	5.57[141,5]	MLHPQ(M) 80	5.75[146,0]	.42[10,67]
MLHP(F) 100	5.67[144,0]	MLHPQ(M) 100	5.85[148,5]	.52[13,33]
MLHP(F) 125	5.81[147,5]	MLHPQ(M) 125	5.98[152,0]	.66[16,67]
MLHP(F) 160	5.98[152,0]	MLHPQ(M) 160	6.16[156,5]	.84[21,33]
MLHP(F) 200	6.20[157,5]	MLHPQ(M) 200	6.38[162,0]	1.05[26,67]
MLHP(F) 250	6.46[164,0]	MLHPQ(M) 250	6.63[168,5]	1.31[33,33]
MLHP(F) 315	6.83[173,5]	MLHPQ(M) 315	7.01[178,0]	1.68[42,67]
MLHP(F) 400	7.24[184,0]	MLHPQ(M) 400	7.42[188,5]	2.10[53,33]
MLHP(F) 500	7.78[197,5]	MLHPQ(M) 500	7.95[202,0]	2.62[66,63]
MLHP(F) 630	8.47[215,0]	MLHPQ(M) 630	8.62[219,0]	3.31[84,00]

* For M Flange

** For Q Flange

*** Perform at customer's request

Standard Rotation

Viewed from Shaft End

Port A Pressurized - CW

Port B Pressurized - CCW

Reverse Rotation

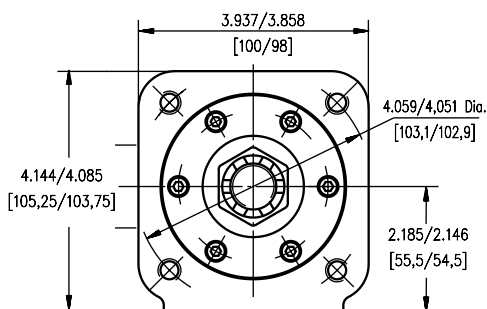
Viewed from Shaft End

Port A Pressurized - CCW

Port B Pressurized - CW

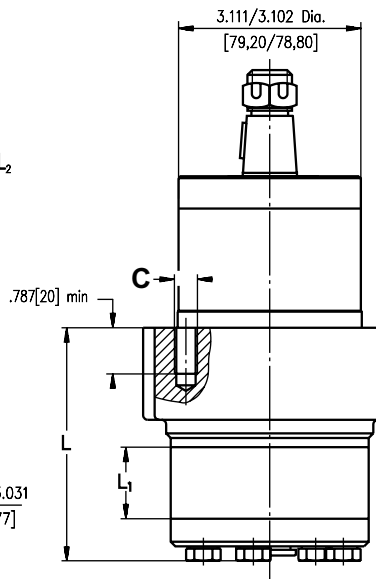
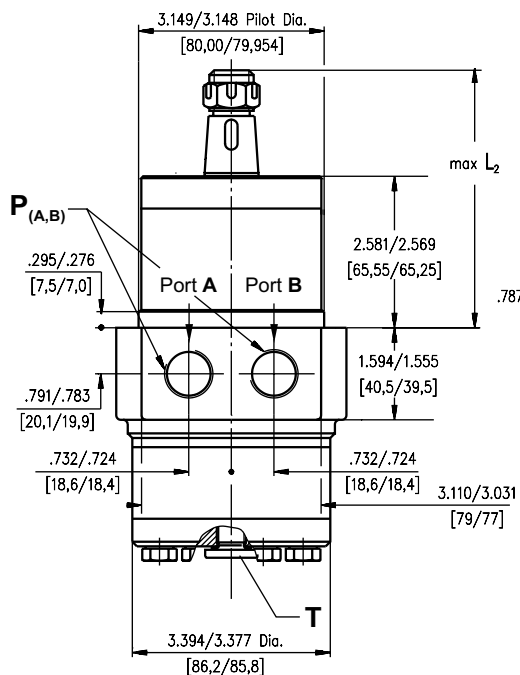
	Versions			
	2	3	4	5
C	4xM8	4xM8	4x $\frac{3}{16}$ -18 UNC	4x $\frac{3}{16}$ -18 UNC
P(A,B)	2xG $\frac{1}{2}$	2xM22x1,5	2x $\frac{1}{4}$ -14 UNF	2x $\frac{1}{2}$ -14 NPTF
T	G $\frac{1}{4}$	M14x1,5	$\frac{1}{16}$ -20 UNF	$\frac{1}{16}$ -20 UNF

DIMENSIONS AND MOUNTING DATA - MLHPW (WHEEL MOTOR)



	Versions			
	2	3	4	5
C	4xM10	4xM10	3/8-16 UNC	3/8-16 UNC
P _(A,B)	2xG1/2	2xM22x1,5	2x 7/8-14 UNF	2x 7/8-14 NPTF
T	G1/4	M14x1,5	7/16-20 UNF	7/16-20 UNF

Shaft version	L ₂ , in.[mm]
C, G, H	4.17[106]
S, D	3.99[101,4]
M	4.32[109,6]
T	4.78[121,5]



Type	L, in.[mm]	L1, in.[mm]
MLHPW(N) 25	3.01 [76,5]	.21 [5,20]
MLHPW(N) 32	3.07 [78,0]	.25 [6,30]
MLHPW(N) 40	3.13 [79,5]	.29 [7,40]
MLHPW(N) 50	3.07 [78,0]	.26 [6,67]
MLHPW(N) 80	3.23 [82,0]	.42 [10,67]
MLHPW(N) 100	3.35 [85,0]	.52 [13,33]
MLHPW(N) 125	3.47 [88,0]	.66 [16,67]
MLHPW(N) 160	3.66 [93,0]	.84 [21,33]
MLHPW(N) 200	3.86 [98,0]	1.05 [26,67]
MLHPW(N) 250	4.13[105,0]	1.31 [33,33]
MLHPW(N) 315	4.49[144,0]	1.68 [42,67]
MLHPW(N) 400	4.92[125,0]	2.10 [53,33]

Standard Rotation

Viewed from Shaft End

Port A Pressurized - CW

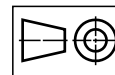
Port B Pressurized - CCW

Reverse Rotation

Viewed from Shaft End

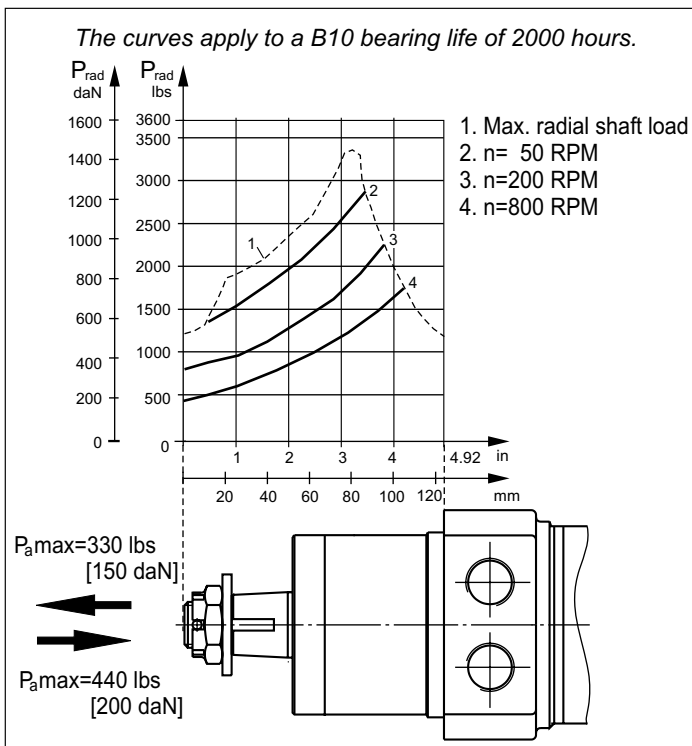
Port A Pressurized - CCW

Port B Pressurized - CW

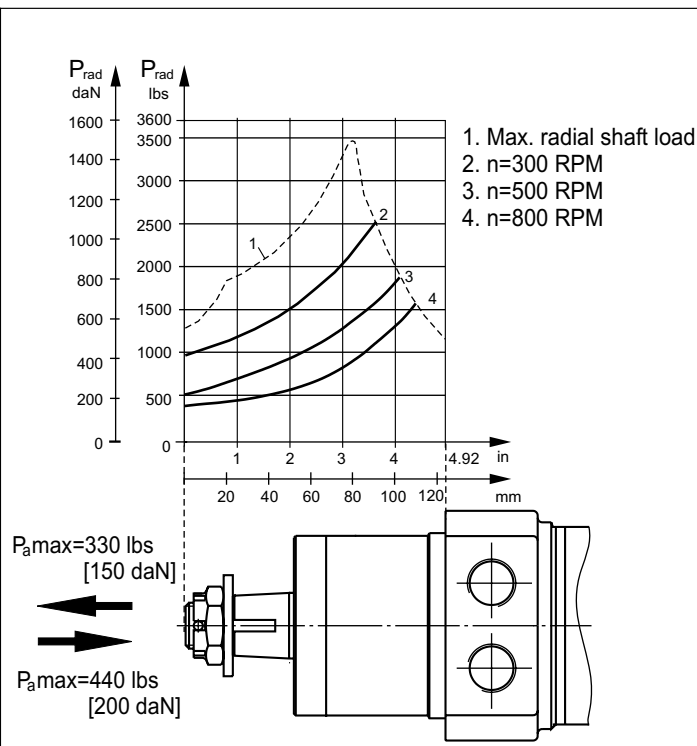


PERMISSIBLE SHAFT LOADS

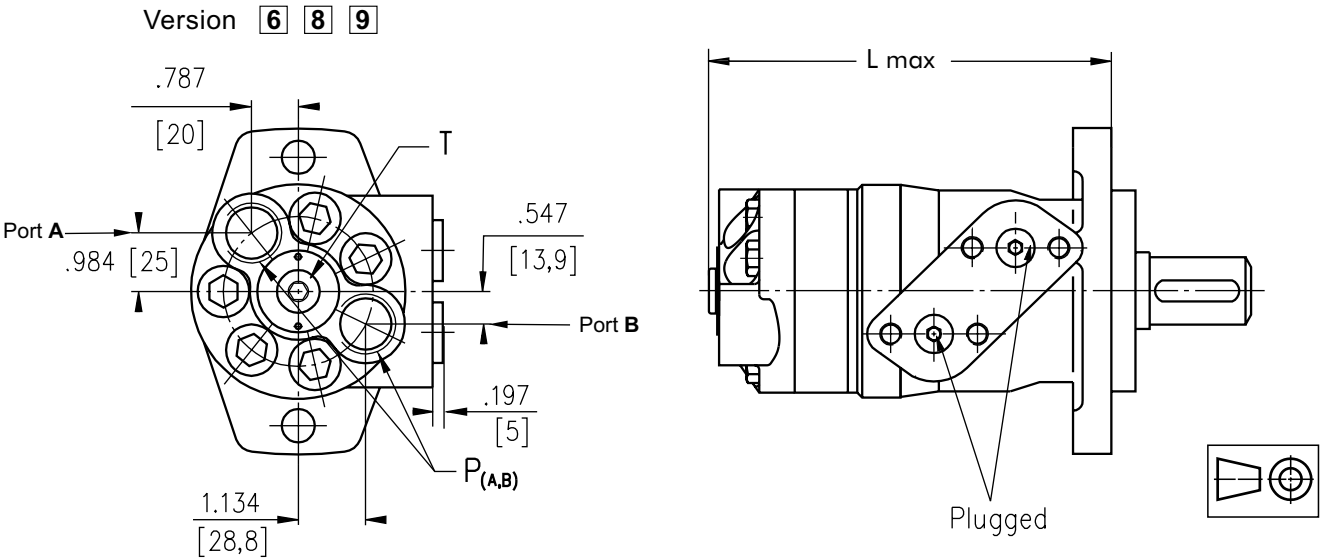
MLHPWN



MLHPW



MLHP - REAR PORTS



Type	Lmax, in.[mm]	Type	Lmax, in.[mm]
MLHP(F) 25	6.06[154,0]	MLHPQ(M) 25	6.22[158,0]
MLHP(F) 32	6.01[155,0]	MLHPQ(M) 32	6.26[159,0]
MLHP(F) 40	6.14[156,0]	MLHPQ(M) 40	6.32[160,5]
MLHP(F) 50	6.12[155,5]	MLHPQ(M) 50	6.30[160,0]
MLHP(F) 80	6.28[159,5]	MLHPQ(M) 80	6.44[163,0]
MLHP(F) 100	6.38[162,0]	MLHPQ(M) 100	6.54[166,0]
MLHP(F) 125	6.52[165,5]	MLHPQ(M) 125	6.69[170,0]
MLHP(F) 160	6.69[170,0]	MLHPQ(M) 160	6.85[174,0]
MLHP(F) 200	6.91[175,5]	MLHPQ(M) 200	7.07[179,5]
MLHP(F) 250	7.17[182,0]	MLHPQ(M) 250	7.32[186,0]
MLHP(F) 315	7.54[191,5]	MLHPQ(M) 315	7.70[195,5]
MLHP(F) 400	7.95[202,0]	MLHPQ(M) 400	8.11[206,0]
MLHP(F) 500	8.48[215,5]	MLHPQ(M) 500	8.64[219,5]
MLHP(F) 630	9.17[233,0]	MLHPQ(M) 630	9.37[238,0]

	Versions			
	6	7	8	9
P _(A,B)	2xG ¹ / ₂	2x ⁷ / ₈ -14 UNF	2x ¹ / ₂ -14 NPTF	2xM22x1,5
T	G ¹ / ₄	⁷ / ₁₆ -20 UNF	⁷ / ₁₆ -20 UNF	M14x1,5

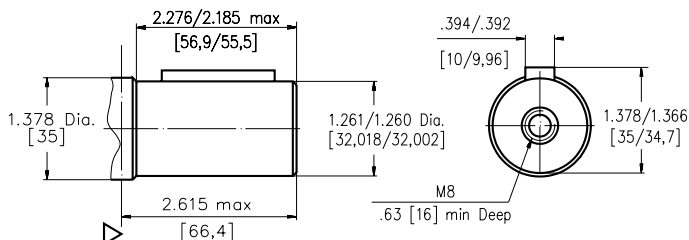
Standard Rotation
Viewed from Shaft End
Port A Pressurized - **CW**
Port B Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port A Pressurized - **CCW**
Port B Pressurized - **CW**

SHAFT EXTENSIONS FOR MLHP AND MLHR MOTORS

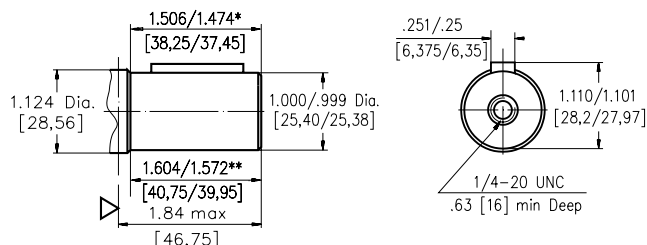
B

ø32 straight, Parallel key A10x8x45 DIN 6885
Max. Torque 6815 in-lb [77 daNm]



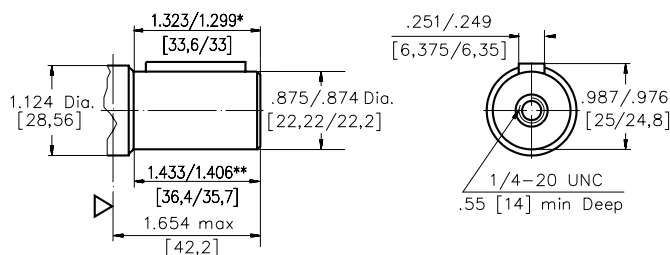
C

1" [25,4] straight, Parallel key 1/4"x1/4"x1 1/4" BS 46
Max. Torque 3009 in-lb [34 daNm]



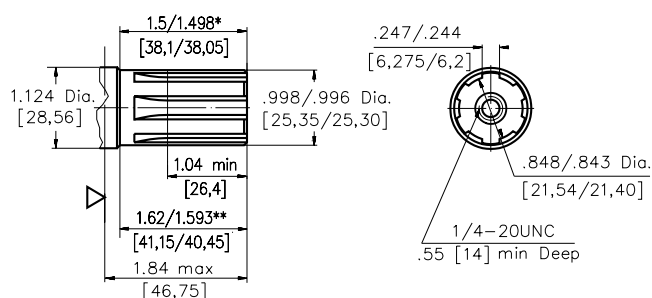
D

7/8" [22,2] straight, Parallel key 1/4"x1/4"x1" BS 46
Max. Torque 3200 in-lb [36 daNm]



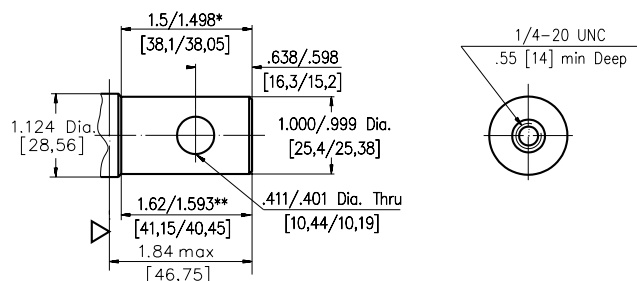
G

1" [25,4], SAE 6B Splined
Max. Torque 3540 in-lb [40 daNm]



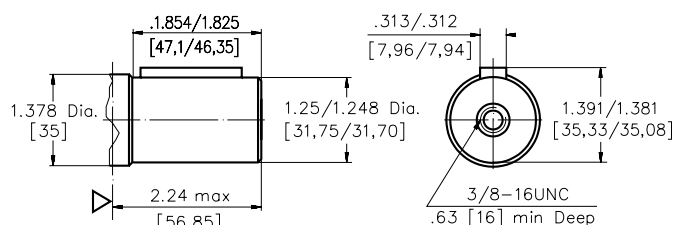
H

1" [25,4] straight, w/ .406 [10,3] Crosshole
Max. Torque 3009 in-lb [34 daNm]



K

1 1/4" [31,75] straight, Parallel key 5/16"x5/16"x1 1/4" BS 46
Max. Torque 6815 in-lb [77 daNm]

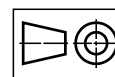


* For SAE A and F Flange

** For M and Q Flange

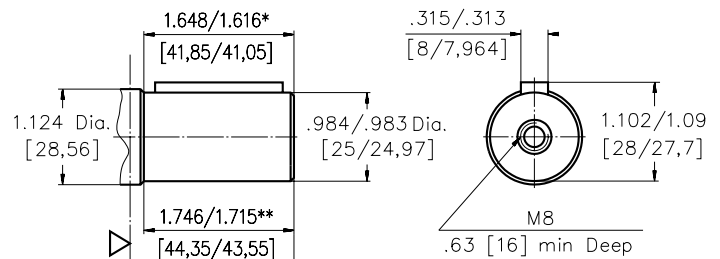
▷ - Motor Mounting Surface

Requirement max. Torque must be not exceeded.



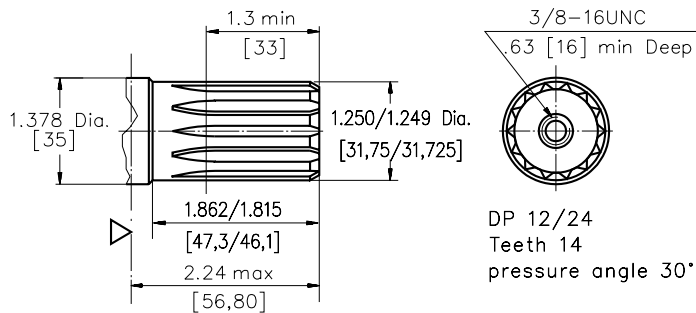
M

ø25 straight, Parallel key A8x7x32 DIN 6885
Max. Torque 3009 in-lb [34 daNm]



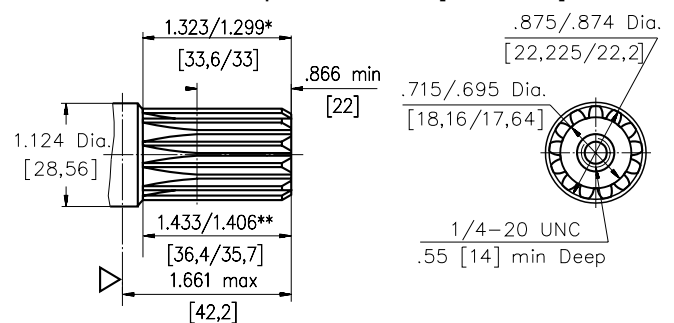
L

14T Splined, 1 1/4" [31,75], ANS B 92.1-1976
Max. Torque 6815 in-lb [77 daNm]



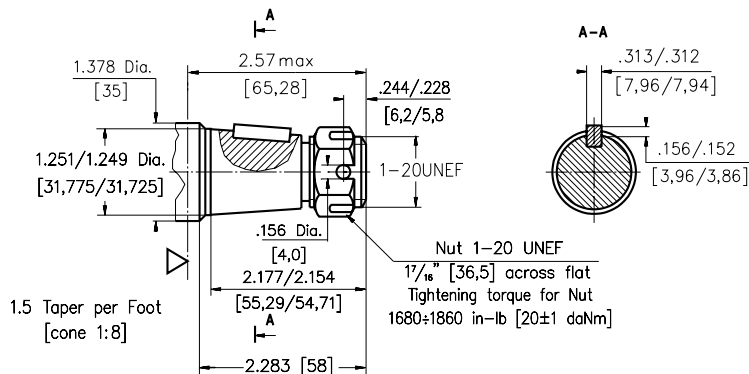
S

13T Splined, 7/8" [22,2], ANS B 92.1-1976
Max. Torque 3200 in-lb [36 daNm]



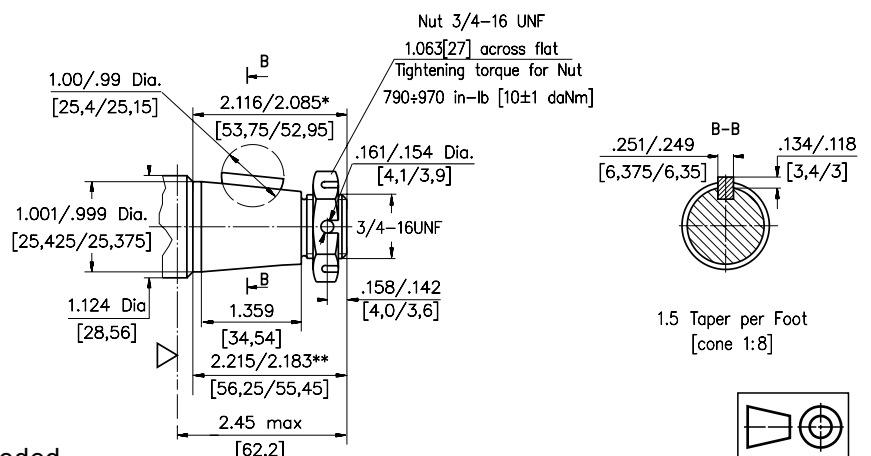
R

1 1/4" [31,75], SAE J501 Tapered
Parallel key 5/16"x 5/16"x1"
Max. Torque 6815 in-lb [77 daNm]



T

1" [25,4], SAE J501 Tapered
Woodruff key 1/4"x1" SAE J502
Max. Torque 3540 in-lb [40 daNm]



* For SAE A and F Flange

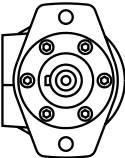
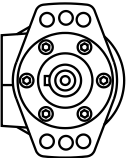
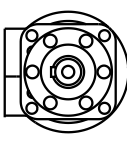
** For M and Q Flange

▷ - Motor Mounting Surface

Requirement max. Torque must be not exceeded.

PERMISSIBLE SHAFT LOADS FOR MLHP AND MLHR MOTORS

The permissible radial shaft load P_{rad} depends on the speed RPM and distance L from the point of load to the mounting flange.

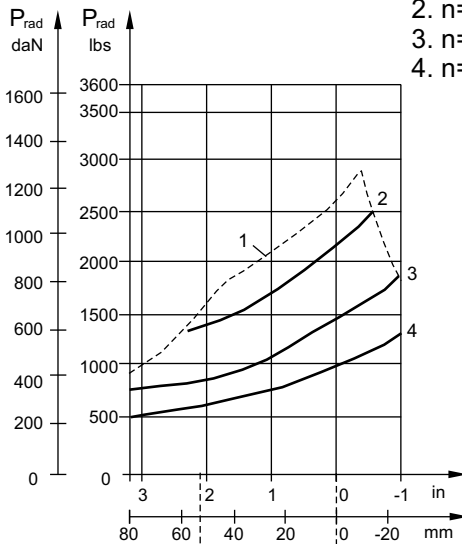
Mounting Flange				
Shaft Version	Keyed C Splined G		Keyed B Splined L	
Radial Shat Load P_{rad}[*]	$\frac{800}{\text{RPM}} \times \frac{2215}{3.74+L}$,lbs		$\frac{800}{\text{RPM}} \times \frac{1660}{3.74+L}$,lbs	
	$\frac{800}{\text{RPM}} \times \frac{2215}{3.98+L}$,lbs			

- * 1. L - in inch
2. RPM < 200; max P_{rad} =1800 lbs [800 daN]
3. RPM ≥ 200; $L \leq 2.2$

MLHPN AND MLHRN

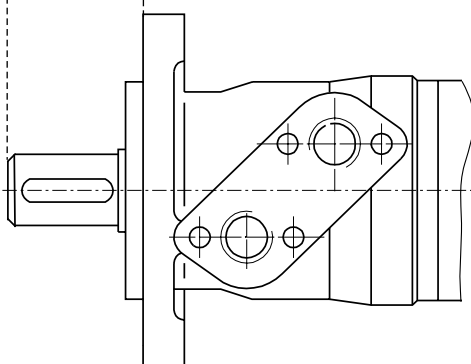
The curves apply to a B10 bearing life of 2000 hours.

1. Max. radial shaft load
2. $n = 50$ RPM
3. $n = 200$ RPM
4. $n = 800$ RPM



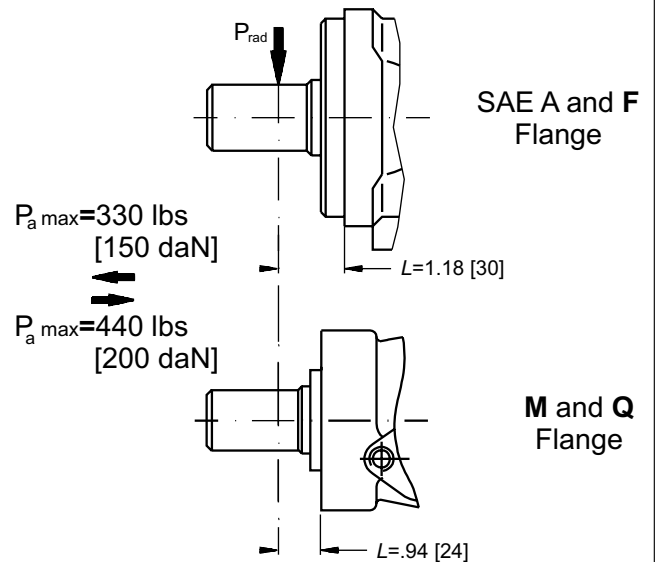
$P_{a \max} = 330$ lbs
[150 daN]

$P_{a \max} = 440$ lbs
[200 daN]



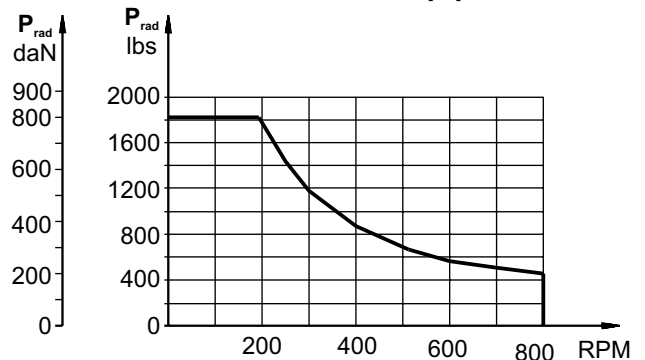
MLHP AND MLHR

Radial Shaft Load P_{rad} for C and G Shafts
by $L = 1.18/94$



$P_{a \max} = 330$ lbs
[150 daN]

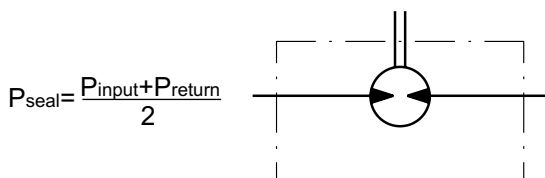
$P_{a \max} = 440$ lbs
[200 daN]



MAX. PERMISSIBLE SHAFT SEAL PRESSURE FOR MLHP AND MLHR MOTORS

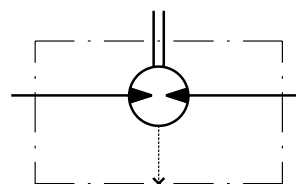
MLHP/MLHR...U1 motors with high pressure seal and without drain connection:

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



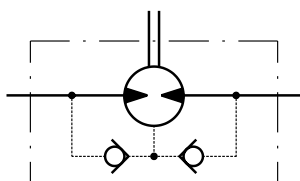
MLHP/MLHR...U motors with high pressure seal and drain connection:

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



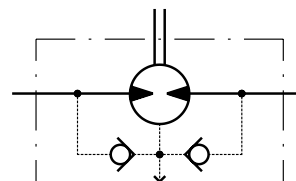
MLHP/MLHR...1 motors with standard shaft seal and without drain connection:

The shaft seal pressure never exceeds the pressure in the return line.

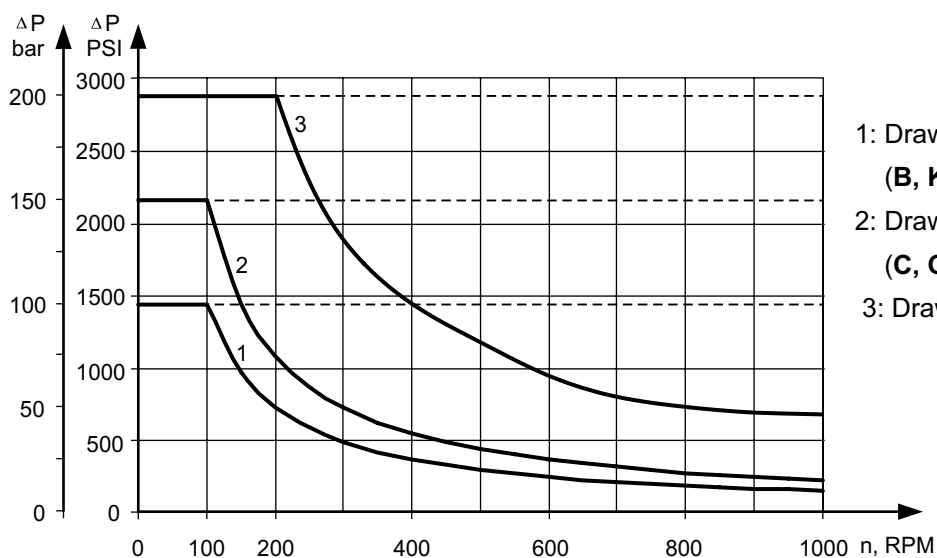


MLHP/MLHR... motors with standard shaft seal and with drain connection:

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



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



- 1: Drawing for Standard Shaft Seal
(B, K, L, R shafts)
- 2: Drawing for Standard Shaft Seal
(C, G, D, H, M, S, T shafts)
- 3: Drawing for High Pressure Seal ("U" Seal)

— - continuous operations
- - - - intermittent operations

	1	2	3	4	5	6	7	8	9
M L H P									

Pos.1 - Mounting Flange

omit - SAE A, two holes

F - Magneto, four holes (six holes at customer's request)

M - Square metric, four bolts M10

Q - Square, four bolts

W - Wheel motor

Pos.2 - Displacement code
25 - 1.52 [25,0] in.³/rev. [cm.³/rev.]

32 - 1.95 [32,0] in.³/rev. [cm.³/rev.]

40 - 2.44 [40,0] in.³/rev. [cm.³/rev.]

50 - 3.02 [49,5] in.³/rev. [cm.³/rev.]

80 - 4.83 [79,2] in.³/rev. [cm.³/rev.]

100 - 6.04 [99,0] in.³/rev. [cm.³/rev.]

125 - 7.55 [123,8] in.³/rev. [cm.³/rev.]

160 - 9.66 [158,4] in.³/rev. [cm.³/rev.]

200 - 12.1 [198,0] in.³/rev. [cm.³/rev.]

250 - 15.1 [247,5] in.³/rev. [cm.³/rev.]

315 - 19.3 [316,8] in.³/rev. [cm.³/rev.]

400 - 24.16 [396,0] in.³/rev. [cm.³/rev.]

500 - 30.2 [495,0] in.³/rev. [cm.³/rev.]

630 - 38.05 [623,6] in.³/rev. [cm.³/rev.]

Pos.3 - Shaft Extensions* [see pages 28 and 29]

C - 1" [25,4] straight, Parallel key

VC - 1" [25,4] straight, Parallel key w/ corrosion resistant bushing

D - ⁷/₈" [22,2] straight, Parallel key

G - 1" [25,4] SAE 6B Splined

H - 1" [25,4] straight w/ .406 [10,3] Crosshole

M - 25 mm straight, Parallel key

VM - 25 mm straight, Parallel key w/ corrosion resistant bushing

S - ⁷/₈" [22,2] 13T Splined

T - 1" [25,4] SAE J501 Tapered

B - 32 mm straight, Parallel key

K - 1¼" [31,75] straight, Parallel key

L - 1¼" [31,75] 14T Splined

R - 1¼" [31,75] SAE J501 Tapered

Pos. 4 - Option [needle bearings]

omit - none

N - with needle bearings

Pos. 5 - Port Size/Type [standard manifold to each]

2 - side ports, 2xG1/2, G1/4, BSP thread, ISO 228

3 - side ports, 2xM22x1,5, M14x1,5, metric thread, ISO 262

4 - side ports, 2x7/8-14 UNF, O-ring, 7/16-20 UNF

5 - side ports, 2x1/2-14 NPTF, 7/16-20 UNF

6 - rear ports, 2xG1/2, G1/4, BSP thread, ISO 228

7 - rear ports, 2x7/8-14 UNF, O-ring, 7/16-20 UNF

8 - rear ports, 2x1/2-14 NPTF, 7/16-20 UNF

9 - rear ports, 2xM22x1,5, M14x1,5, metric thread, ISO 262

Pos. 6 - Shaft Seal Version [see page 31]

omit - Standard shaft seal

U - High pressure shaft seal (without check valves)

Pos. 7 - Drain Port

omit - with drain port

1 - without drain port

Pos. 8 - Special Features [see page 52]

Pos. 9 - Design Series

omit - Factory specified

Notes : The following combinations are not allowed:

- **Q, M, W** flange with **B, K, L, R** shafts.
- **N** option with **B, K, L, R** shafts, **U** option and **RS** option.
- **W** flange with rear ports and **U** option
- **B, K, L, R** shafts with **U** option.

* The permissible output torque for shafts must not be exceeded!

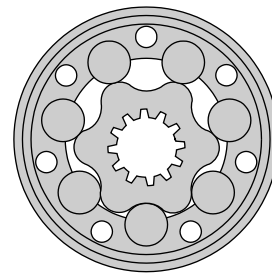
The hydraulic motors are mangano-phosphatized as standard.

HYDRAULIC MOTORS MLHR



APPLICATION

- » Conveyors
- » Feeding mechanism of robots and manipulators
- » Metal working machines
- » Textile machines
- » Machines for agriculture
- » Food industries
- » Grass cutting machinery etc.



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OPTIONS

- » Model- Spool valve, roll-gerotor
- » Flange mount
- » Motor with needle bearing
- » Side and rear ports
- » Shafts- straight, splined and tapered
- » SAE, Metric and BSPP ports
- » Speed sensing
- » Other special features

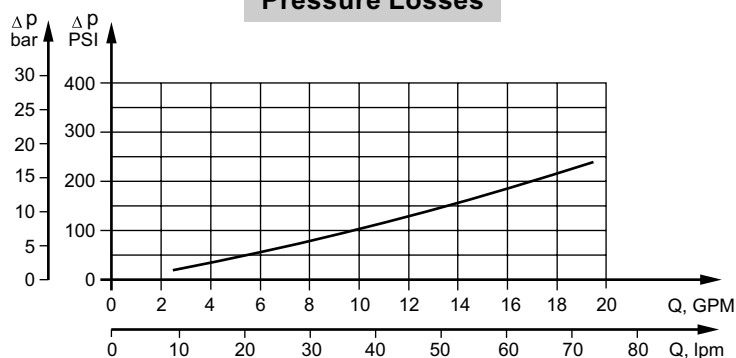
GENERAL

Displacement,	in ³ /rev [cm ³ /rev.]	3.14÷24.4 [51,5÷397]
Max. Speed,	[RPM]	150÷775
Max. Torque,	in-lb [daNm]	900÷5400 [10,1÷61]
Max. Output,	HP [kW]	6.4÷17.4 [5÷13]
Max. Pressure Drop,	PSI [bar]	1020÷2540 [70÷175]
Max. Oil Flow,	GPM [lpm]	10÷16 [37,8÷60,6]
Min. Speed,	[RPM]	10
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)	
Temperature range,	°F [°C]	-22÷194 [-30÷90]
Optimal Viscosity range, SUS [mm²/s]	98÷347 [20÷75]	
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 micron)	

Oil flow in drain line

Pressure drop PSI [bar]	Viscosity SUS [mm ² /s]	Oil flow in drain line GPM [lpm]
1450 [100]	98 [20]	.660 [2,5]
	164 [35]	.476 [1,8]
2030 [140]	98 [20]	.925 [3,5]
	164 [35]	.740 [2,8]

Pressure Losses



SPECIFICATION DATA

Specification Data for MLHR... motors with **C, D, G, H, M, S** and **T** shafts.

(1.124 [28,56] sealing diameter)

Type		MLHR 50	MLHR 80	MLHR 100	MLHR 125	MLHR 160	MLHR 200	MLHR 250	MLHR 315	MLHR 400
Displacement, in. ³ /rev. [cm. ³ /rev.]		3.14 [51,5]	4.90 [80,3]	6.09 [99,8]	7.67 [125,7]	9.74 [159,6]	12.19 [199,8]	15.26 [250,1]	19.26 [315,7]	24.4 [397]
Max. Speed, [RPM]	Cont.	734	750	607	482	379	303	240	190	152
	Int.*	1029	940	758	602	474	379	303	240	191
Max. Torque in-lb [daNm]	Cont.	900 [10,1]	1725 [19,5]	2125 [24]	2655 [30]	3450 [39]	3410 [38,5]	3450 [39]	3450 [39]	3360 [38]
	Int.*	1150 [13]	1947 [22]	2480 [28]	3010 [34]	3805 [43]	4070 [46]	5150 [58]	5045 [57]	5310 [60]
	Peak**	1505 [17]	2390 [27]	2832 [32]	3275 [37]	4070 [46]	4960 [56]	6280 [71]	7400 [83]	7700 [87]
Max. Output HP [kW]	Cont.	9.5 [7]	17 [12,5]	17.4 [13]	16.8 [12,5]	15.4 [11,5]	12 [9]	8.7 [6,5]	8 [6]	6.4 [4,8]
	Int.*	11.9 [8,5]	20.1 [15]	20.1 [15]	19.5 [14,5]	18.8 [14]	15.4 [11,5]	14.1 [10,5]	12.9 [9,6]	11.8 [8,8]
Max. Pressure Drop PSI [bar]	Cont.	2030 [140]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2030 [140]	1600 [110]	1300 [90]	1020 [70]
	Int.*	2540 [175]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2540 [175]	2540 [175]	2030 [140]	1670 [115]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3045 [210]	2540 [175]
Max. Oil Flow GPM [lpm]	Cont.	10 [37,8]	16 [60,6]	16 [60,6]	16 [60,6]	16 [60,6]	16 [60,6]	16 [60]	16 [60]	16 [60,6]
	Int.*	14 [53]	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]
Max. Inlet Pressure PSI [bar]	Cont.	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]
	Int.*	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]
Max. Return Pres- sure with Drain Line PSI [bar]	Cont.	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]
	Int.*	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]
Max. Starting Pressure with Unloaded Shaft, PSI [bar]		145 [10]	145 [10]	145 [10]	130 [9]	102 [7]	73 [5]	58 [4]	44 [3]	44 [3]
Min. Starting Torque in-lb [daNm]	At max.press. drop Cont.	710 [8]	1330 [15]	1770 [20]	2215 [25]	2832 [32]	2920 [33]	2740 [31]	2920 [33]	2650 [30]
	At max.press. drop Int.*	85 [10]	1505 [17]	2035 [23]	2480 [28]	3275 [37]	3540 [40]	4250 [48]	5220 [58]	4425 [50]
Min. Speed***, [RPM]		10	10	10	10	10	10	10	10	10
Weight, lb [kg]	MLHR(F)(N)	15 [6,8]	15,2 [6,9]	15.9 [7,2]	16.1 [7,3]	15.2 [7,5]	17.6 [8]	18.5 [8,4]	20 [9,1]	21.6 [9,8]
For rear ports +1.433 [0,650]	MLHRQ(M)(N)	13.7 [6,2]	13.9 [6,3]	14.6 [6,6]	15 [6,8]	15.4 [7,6]	14.7 [7,2]	17.2 [7,8]	19 [8,6]	20.5 [9,3]

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

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

*** For speeds of 10 RPM or lower than given, consult factory or your regional manager.

- Intermittent speed and intermittent pressure must not occur simultaneously.
- Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
- Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4).
If using synthetic fluids consult the factory for alternative seal materials.
- Recommended minimum oil viscosity 70 SUS[13mm²/s] at 122°F [50°C].
- Recommended maximum system operating temperature is 180°F [82°C].
- To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

SPECIFICATION DATA (continued)

Specification Data for MLHR... motors with **B, K, R** and **L** shafts.
(1.378 [35] sealing diameter)

Type		MLHR 50	MLHR 80	MLHR 100	MLHR 125	MLHR 160	MLHR 200	MLHR 250	MLHR 315	MLHR 400
Displacement, in. ³ /rev. [cm. ³ /rev.]		3.14 [51,5]	4.90 [80,3]	6.09 [99,8]	7.67 [125,7]	9.74 [159,6]	12.19 [199,8]	15.26 [250,1]	19.26 [315,7]	24.4 [397]
Max. Speed, [RPM]	Cont.	734	750	607	482	379	303	240	190	152
	Int.*	1029	940	758	602	474	379	303	242	191
Max. Torque in-lb [daNm]	Cont.	900 [10,1]	1725 [19,5]	2125 [24]	2655 [30]	3450 [39]	4000 [45]	4780 [54]	4870 [55]	5400 [61]
	Int.*	1150 [13]	1947 [22]	2480 [28]	3010 [34]	3805 [43]	4425 [50]	5400 [61]	5580 [63]	6100 [69]
	Peak**	1505 [17]	2390 [27]	2832 [32]	3275 [37]	4070 [46]	4960 [56]	6280 [71]	7350 [83]	7700 [87]
Max. Output HP [kW]	Cont.	9.5 [7]	17 [12,5]	17.4 [13]	16.8 [12,5]	15.4 [11,5]	14.8 [11]	13.4 [10]	12 [9]	10.5 [7,8]
	Int.*	11.9 [8,5]	20.1 [15]	20.1 [15]	19.5 [14,5]	18.8 [14]	17.4 [13]	16.1 [12]	14.8 [11]	14.2 [10,6]
Max. Pressure Drop PSI [bar]	Cont.	2030 [140]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	1960 [135]	1670 [115]
	Int.*	2540 [175]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2320 [160]	2030 [140]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3045 [210]	2540 [175]
Max. Oil Flow GPM [lpm]	Cont.	10 [37,8]	16 [60,6]	16 [60,6]	16 [60,6]	16 [60,6]	16 [60,6]	16 [60]	16 [60,6]	16 [60,6]
	Int.*	14 [53]	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]
Max. Inlet Pressure PSI [bar]	Cont.	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]
	Int.*	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]
Max. Return Pres- sure with Drain Line PSI [bar]	Cont.	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2540 [175]
	Int.*	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]
Max. Starting Pressure with Unloaded Shaft, PSI [bar]		145 [10]	145 [10]	145 [10]	130 [9]	102 [7]	73 [5]	58 [4]	44 [3]	44 [3]
Min. Starting Torque in-lb [daNm]	At max.press. drop Cont.	710 [8]	1330 [15]	1770 [20]	2215 [25]	2832 [32]	3630 [41]	4000 [45]	4000 [45]	4340 [49]
	At max.press. drop Int.*	885 [10]	1505 [17]	2035 [23]	2480 [28]	3275 [37]	4070 [46]	4870 [55]	5840 [66]	5400 [61]
Min. Speed***, [RPM]		10	10	10	10	10	10	10	10	10
Weight, lb [kg] For rear ports +1.433 [0,650]		15,2 [6,9]	15,4 [7]	16.1 [7,3]	16.3 [7,4]	15.4 [7,6]	18.9 [8,1]	18.7 [8,5]	20.3 [9,2]	21.8 [9,9]

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

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

*** For speeds of 10 RPM or lower than given, consult factory or your regional manager.

- Intermittent speed and intermittent pressure must not occur simultaneously.
- Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
- Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4).
If using synthetic fluids consult the factory for alternative seal materials.
- Recommended minimum oil viscosity 70 SUS[13mm²/s] at 122°F [50°C].
- Recommended maximum system operating temperature is 180°F [82°C].
- To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

Performance Data MLHR 50

		Pressure (Δ PSI)								Max. Cont.	Max. Int.		Speed (theor.)
		500	700	900	1100	1300	1500	1700	2030		2300	2540	
Flow [GPM]	1	215 73	300 72	374 69	458 65	538 61	613 55	675 46	775 21	- -	- -		74
	2	215 146	305 144	385 142	482 140	560 138	680 136	780 132	856 127	930 114	1076 106		147
	4	220 292	308 290	396 288	492 283	580 278	690 271	785 262	878 250	996 240	1088 230		293
	6	218 438	305 436	395 432	490 425	580 418	690 411	780 403	876 395	998 385	1092 370		441
	8	215 583	302 518	392 578	480 573	575 567	676 558	770 548	870 538	996 527	1092 514		588
	Max. Cont.	10	198 730	294 726	380 722	468 714	558 706	652 698	745 690	855 680	982 668	1080 650	
Max. Int.	12	180 878	282 874	368 867	456 859	540 850	624 840	712 830	832 820	960 805	1060 785		881
	14	150 1025	250 1020	340 1014	425 1008	515 1002	588 995	672 985	805 970	928 950	1030 930		1030
Torque (theor.) in-lb. [daNm]		254 [2,87]	363 [4,1]	450 [5,08]	544 [6,15]	653 [7,38]	752 [8,5]	850 [9,6]	1018 [11,5]	1150 [13]	1275 [14,4]		Tor

3.14 in³./rev. [51.5 cm³./rev.]

Torque [in-lb] 1030
Speed [RPM] 930

Performance Data MLHR 80

		Pressure (Δ PSI)							Max. Cont.	Max. Int.	Speed (theor.)
		450	900	1150	1400	1700	2030	2540		2900	
Flow [GPM]	1	-	-	-	-	-	-	-	-	-	-
	2	300 92	590 87	790 82	950 72	1125 59	1250 39	-	-	-	94
	4	295 188	600 182	800 178	985 170	1180 156	1370 137	1650 104	1830	1895	189
	6	270 282	590 278	790 270	1000 265	1190 251	1390 234	1695 198	1895	1895	283
	8	255 376	570 371	775 364	990 357	1185 344	1365 329	1705 294	1930	1930	377
	10	240 467	555 458	755 450	965 443	1170 432	1345 418	1700 382	1940	1940	472
Max. Cont.	12	215 561	525 553	740 542	940 532	1150 519	1330 501	1690 467	1930	1930	566
	14	185 660	500 650	715 640	905 628	1125 614	1320 601	1685 566	1910	1910	661
	16	150 752	470 742	675 735	880 727	1080 718	1290 700	1640 667	1880	1880	755
Max. Int.	18	110 846	435 835	640 827	840 816	1040 806	1255 790	1600 751	1845	1845	847
	20	90 919	405 903	610 897	815 887	1015 876	1220 860	1575 827	1815	1815	943
Torque (theor.) in-lb. [daNm]		351 [3,97]	702 [7,94]	906 [10,24]	1098 [12,42]	1325 [14,98]	1586 [17,92]	1982 [22,4]	2265 [25,6]	2265	2265

4.9 in³./rev. [80,3 cm³./rev.]

Torque [in-lb] 1815
Speed [RPM] 784

The Performance data was collected at back pressure 72.5÷145 PSI [5÷10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50° C].

Performance Data MLHR 100

		Pressure (Δ PSI)							Max. Cont.	Max. Int.	Speed (theor.)
		450	900	1150	1400	1700	2030	2540		2900	
Flow [GPM]	1	-	-	-	-	-	-	-	-	-	-
	2	385	750	980	1195	1405	1565	-	-	-	75
	4	365	758	1007	1265	1485	1720	2080	2335	68	152
	6	345	735	995	1255	1500	1740	2140	2435	141	228
	8	320	705	972	1236	1495	1730	2145	2460	214	304
	10	290	675	950	1210	1460	1705	2135	2445	286	380
	12	265	645	918	1172	1430	1680	2111	2416	362	455
	14	228	610	870	1130	1390	1645	2075	2395	440	531
	16	186	570	825	1085	1350	1600	2035	2340	516	608
	18	146	530	780	1050	1280	1550	1995	2300	589	682
Max. Cont.	20	103	480	740	1000	1250	1500	1935	2250	664	758
Torque (theor.) in-lb. [daNm]		436 [9,93]	872 [9,86]	1125 [12,72]	1365 [15,42]	1646 [18,6]	1970 [22,26]	2462 [27,83]	2815 [31,8]		

6.09 in³./rev. [99,8 cm³./rev.]

Performance Data MLHR 125

		Pressure (Δ PSI)							Max. Cont.	Max. Int.	
		450	900	1150	1400	1700	2030	2540		2900	
Flow [GPM]	1	-	-	-	-	-	-	-	-	-	-
	2	482	965	1255	1535	1756	1905	-	-	-	60
	4	470	951	1275	1580	1895	2155	2560	2740	16	120
	6	445	935	1260	1560	1886	2190	2670	2950	76	180
	8	430	905	1230	1540	1840	2170	2665	2980	137	242
	10	395	880	1195	1510	1805	2140	2640	2965	192	302
	12	360	840	1155	1470	1775	2110	2615	2950	240	362
	14	325	815	1110	1435	1755	2070	2600	2925	307	422
	16	278	750	1060	1390	1710	2010	2550	2885	340	483
	18	220	695	1010	1320	1640	1955	2460	2805	432	541
Max. Cont.	20	165	640	955	1270	1560	1900	2395	2710	500	603
Torque (theor.) in-lb. [daNm]		549 [6,2]	1098 [12,4]	1416 [16]	1717 [19,4]	2071 [23,4]	2478 [28]	3097 [35]	3540 [40]		

7.67 in³./rev. [125,7 cm³./rev.]

Torque (in-lb) 2250
Speed (RPM) 664

Torque (in-lb) 2710
Speed (RPM) 500

The Performance data was collected at back pressure 72.5±145 PSI [5±10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50° C].

Performance Data MLHR 160

		Pressure (Δ PSI)						Max. Cont.	Max. Int.	Speed (theor.)
		450	900	1150	1400	1700	2030	2540	2900	
Flow [GPM]	1	-	-	-	-	-	-	-	-	-
	2	610 43	1210 40	1590 35	1935 30	2270 24	2505 13	-	-	47
	4	595 91	1220 87	1625 83	2030 80	2415 76	2780 69	3390 52	3740 37	95
	6	577 141	1215 136	1620 131	2015 126	2405 120	2780 113	3420 94	3810 81	143
	8	550 187	1185 182	1585 178	1980 173	2390 166	2760 155	3400 127	3795 108	190
	10	510 232	1135 229	1530 225	1950 220	2345 212	2730 199	3390 165	3765 138	238
	12	460 282	1085 278	1480 275	1900 272	2300 263	2690 250	3340 212	3725 185	285
	14	410 327	1025 323	1430 321	1845 317	2235 309	2625 297	3290 262	3660 238	333
Max. Cont.	16	346 377	955 373	1355 369	1765 365	2180 359	2585 345	3220 310	3610 270	380
Max. Int.	18	280 425	885 420	1300 416	1690 412	2110 402	2520 386	3145 350	3540 319	427
	20	200 472	805 469	1210 465	1605 460	2015 451	2425 438	3085 401	3460 366	475
Torque (theor.) in-lb. [daNm]		696 [7,87]	1394 [15,75]	1800 [20,32]	2180 [24,64]	2630 [29,72]	3147 [35,56]	3934 [44,45]	4496 [50,8]	
9.73 in ³ ./rev. [159,6 cm ³ ./rev.]										

Torque [in-lb] 3460
Speed [RPM] 366

Performance Data MLHR 200

		Pressure (Δ PSI)								Max. Cont.	Max. Int.	Speed (theor.)
		450	900	1150	1500	1700	1810	1950	2250	2500	2900	
Flow [GPM]	1	-	-	-	-	-	-	-	-	-	-	-
	2	812 36	1500 34	2000 32	2550 29	2855 26	3040 24	3280 22	3565 19	3850 14	-	38
	4	805 74	1522 73	2006 71	2590 68	2932 65	3120 62	3394 59	3685 54	3975 48	4385 29	76
	6	796 113	1496 111	1972 108	2570 104	2905 100	3100 96	3366 92	3660 86	3952 78	4385 63	114
	8	694 150	1448 149	1946 146	2515 139	2872 132	3050 127	3328 123	3615 116	3905 108	4355 92	152
	10	650 189	1392 188	1880 186	2460 178	2798 171	2980 165	3255 158	3560 148	3855 137	4320 119	190
	12	575 227	1322 226	1805 224	2390 215	2748 207	2925 202	3198 196	3515 183	3825 169	4290 142	228
	14	504 264	1246 263	1735 261	2330 252	2662 245	2840 238	3122 230	3450 217	3772 202	4235 172	265
Max. Cont.	16	434 302	1176 301	1670 300	2260 292	2565 285	2730 278	3035 270	3360 258	3685 242	4130 215	303
Max. Int.	18	358 340	1100 339	1610 337	2168 330	2494 322	2655 315	2955 309	3300 291	3625 270	4065 242	340
	20	274 378	1008 377	1496 374	2065 367	2375 360	2530 355	2862 347	3200 331	3525 314	3955 280	379
Torque (theor.) in-lb. [daNm]		872 [9,86]	1745 [19,72]	2251 [25,44]	2900 [32,75]	3293 [37,2]	3518 [39,75]	3800 [42,93]	4362 [49,29]	4841 [54,7]	5629 [63,6]	
12.19 in ³ ./rev. [199,8 cm ³ ./rev.]												

Torque [in-lb] 3955
Speed [RPM] 280

The Performance data was collected at back pressure 72.5÷145 PSI [5÷10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50° C].

Performance Data MLHR 250

		Pressure (Δ PSI)						Max. Cont.	Max. Int.	Speed (theor.)
		450	900	1200	1400	1600	2030	2540	2900	
Flow [GPM]	1	-	-	-	-	-	-	-	-	-
	2	1005 28	1918 26	2598 23	5880 20	3325 17	4095 10	-	-	31
	4	1000 59	1940 57	2646 54	3118 51	3400 49	4195 41	4950 32	5540 22	61
	6	952 89	1882 87	2622 84	3118 81	3388 78	4175 68	4890 58	5520 48	91
	8	882 120	1824 119	2585 116	3052 112	3335 109	4145 96	4820 81	5410 67	122
	10	810 151	1740 150	2505 147	2988 142	3265 139	4095 122	4740 102	5350 85	152
	12	735 180	1665 179	2410 177	2882 174	3175 170	4030 152	4665 125	5260 100	182
	14	624 211	1570 210	2330 206	2795 201	3060 197	3930 174	4580 150	5175 120	212
Max. Cont.	16	546 241	1470 240	2275 237	2680 233	2965 230	3800 212	4470 181	5000 156	243
Max. Int.	18	458 272	1364 271	2135 268	2565 263	2875 259	3705 240	4375 205	4920 175	272
	20	318 302	1235 301	1988 298	2435 295	2715 292	5590 274	4280 242	4765 213	303
Torque (theor.) in-lb. [daNm]		1092 [12,34]	2184 [24,68]	2924 [33,03]	3417 [38,61]	3875 [43,78]	4932 [55,72]	6165 [69,65]	7045 [79,6]	
15.26 in ³ ./rev. [250,1 cm ³ ./rev.]										

Torque [in-lb] 4765
Speed [RPM] 213

Performance Data MLHR 315

		Pressure (Δ PSI)							Max. Cont.	Max. Int.	Speed (theor.)
		450	650	950	1150	1300	1500	1800	1950	2540	
Flow [GPM]	1	-	-	-	-	-	-	-	-	-	-
	2	1162 23	1750 22	2445 21	3040 20	3340 19	3860 19	4478 18	4800 16	6065 8	24
	4	1210 47	1780 46	2495 45	3075 44	3365 43	3890 42	4490 40	4830 38	6175 28	48
	6	1176 71	1760 70	2470 68	3035 67	3335 66	3850 65	4485 62	4810 61	6110 51	72
	8	1105 95	1716 94	2438 92	2990 90	3300 89	3810 87	4395 84	4745 81	6010 70	96
	10	1034 118	1625 116	2365 113	2938 110	3250 108	3750 105	4330 101	4660 98	5940 82	120
	12	904 142	1520 140	2275 137	2860 134	3170 131	3660 129	4225 122	4560 117	5850 107	144
	14	780 166	1405 164	2170 160	2760 255	3080 152	3550 146	4150 138	4485 133	5765 107	168
Max. Cont.	16	656 191	1280 189	2035 185	2625 180	2950 177	3400 175	4010 164	4355 159	5535 137	192
Max. Int.	18	565 215	1158 213	1930 210	2482 205	2850 201	3290 192	3900 184	4250 177	5395 154	216
	20	410 239	1000 237	1755 234	2342 230	2705 227	3120 218	3770 211	4095 203	5135 175	240
Torque (theor.) in-lb. [daNm]		1377 [15,56]	2000 [22,59]	2888 [32,63]	3554 [40,16]	4000 [45,18]	4576 [51,71]	5554 [62,75]	6000 [67,77]	7775 [87,85]	Torque Speed
19.26 in ³ ./rev. [315.7 cm ³ ./rev.]											

Torque [in-lb] 5135
Speed [RPM] 175

The Performance data was collected at back pressure 72.5+145 PSI [5+10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50° C].

Performance Data MLHR 400

		Pressure (Δ PSI)									Max. Cont.	Max. Int.	Speed (theor.)
		215	430	645	785	1000	1150	1300	1520	1670		2030	
Flow [GPM]	2	710 18.5	1412 18.5	2145 18	2650 17.5	3375 16.5	3855 15.5	4315 14.5	4790 14	5264 13		6035 12	19
	4	746 37.5	1420 37	2165 36	2688 35	3418 34	3950 32.5	4455 31	4890 31.5	5300 30		6035 27	38
	6	710 56	1385 55.5	2160 55	2646 54	3370 52.5	3942 51	4400 49	4970 45	5255 42		6005 34	57
	8	658 75.5	1314 75	2076 74.5	2540 74	3290 73	3830 72	4265 70	4680 66	5182 62		5990 49	76
	10	568 95	1186 94.5	1972 94	2410 93.5	3190 92	3712 90.5	4172 88.5	4580 85	5094 82		5850 67	96
	12	498 114	1065 113.5	1825 113	2290 112	3055 111	3588 109	4062 107	4430 103	4975 100		5740 84	115
	14	390 133	920 132	1605 131	2130 130	2895 129	3410 128	3890 126	4380 122	4864 118		5626 100	134
Max. Cont.	16	255 152	754 151	1495 149	1992 148	2770 147	3250 146	3738 145	4215 143	4692 142		5472 125	153
Max. Int.	18	110 171	568 171	1305 170	1804 169	2565 168	3058 167	3552 166	4040 163	4535 161		5310 144	172
	20	0 190	355 190	1080 189	1600 188	2400 187	2878 186	3342 185	3870 183	4380 181		5032 168	191
Torque (theor.) in-lb. [daNm]		839 [9,48]	1678 [18,96]	2989 [28,12]	3020 [34,13]	3915 [44,24]	4475 [50,56]	5034 [56,88]	5874 [66,36]	6432 [72,68]		7831 [88,48]	

Torque [in-lb] 5032
Speed [RPM] 168

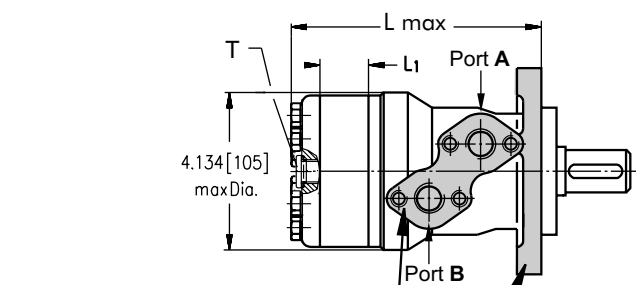
24.2 in³./rev. [397 cm³./rev.]

Metric Conversions

Flow 1 lpm = .2642 GPM
 Pressure 1 bar = 14.51 PSI
 Torque 1 Nm = 8.85 in-lb

The Performance data was collected at back pressure 72.5±145 PSI [5±10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50° C].

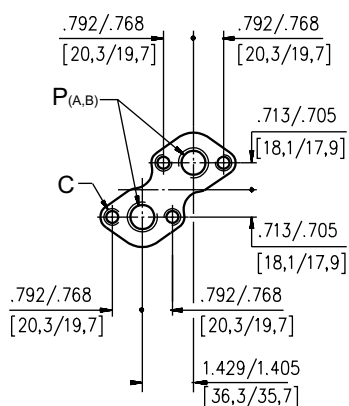
DIMENSIONS AND MOUNTING DATA



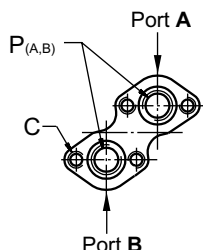
Porting

Side Ports

Version **2 3 5**

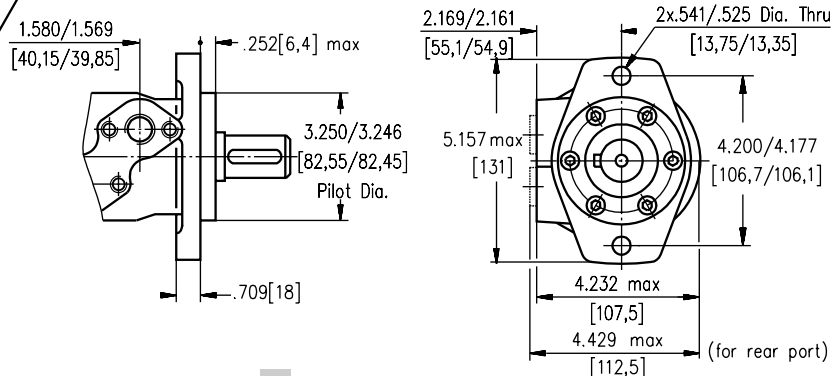


Version **4**

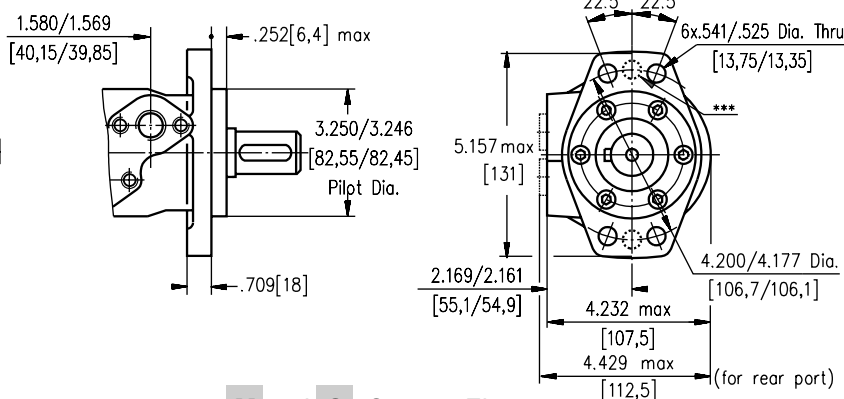


Mounting

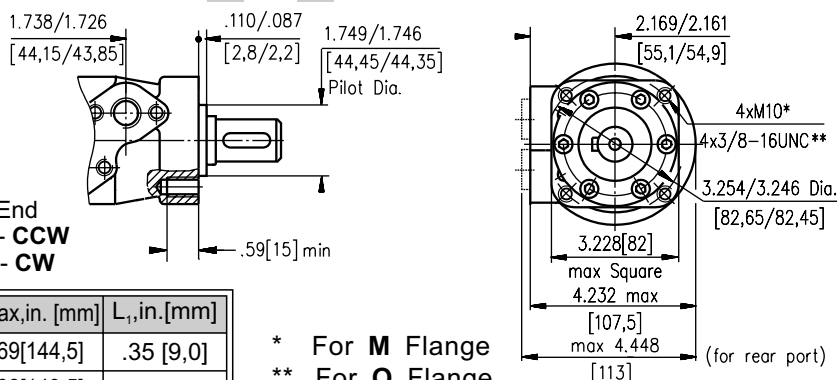
SAE A Flange



F Magneto Flange



M and Q Square Flange



Standard Rotation

Viewed from Shaft End
Port A Pressurized - **CW**
Port B Pressurized - **CCW**

Reverse Rotation

Viewed from Shaft End
Port A Pressurized - **CCW**
Port B Pressurized - **CW**

Type	L max,in. [mm]	Type	L max,in. [mm]	L ₁ ,in.[mm]
MLHR(F) 50	5.51[140,0]	MLHRQ(M) 50	5.69[144,5]	.35 [9,0]
MLHR(F) 80	5.71[145,0]	MLHRQ(M) 80	5.88[149,5]	.55[14,0]
MLHR(F) 100	5.85[148,5]	MLHRQ(M) 100	6.02[153,0]	.69[17,4]
MLHR(F) 125	6.02[153,0]	MLHRQ(M) 125	6.18[157,0]	.86[21,8]
MLHR(F) 160	6.26[159,0]	MLHRQ(M) 160	6.42[163,0]	1.09[27,8]
MLHR(F) 200	6.54[166,0]	MLHRQ(M) 200	6.69[170,0]	1.37[34,8]
MLHR(F) 250	6.87[174,5]	MLHRQ(M) 250	7.05[179,0]	1.71[43,5]
MLHR(F) 315	7.32[186,0]	MLHRQ(M) 315	7.48[190,0]	2.16[54,8]
MLHR(F) 400	7.89[200,5]	MLHRQ(M) 400	8.07[205,0]	2.73[69,4]

* For M Flange

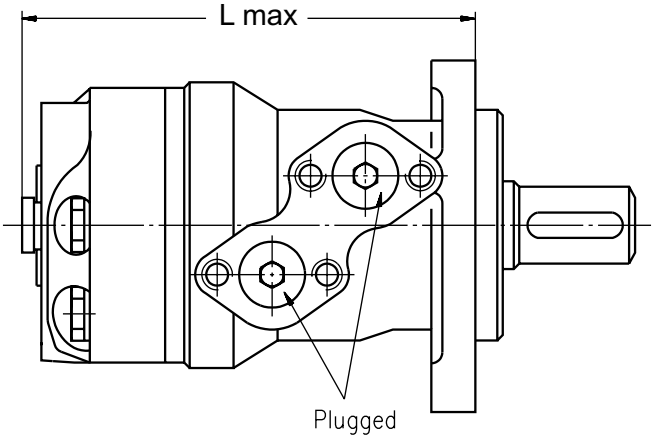
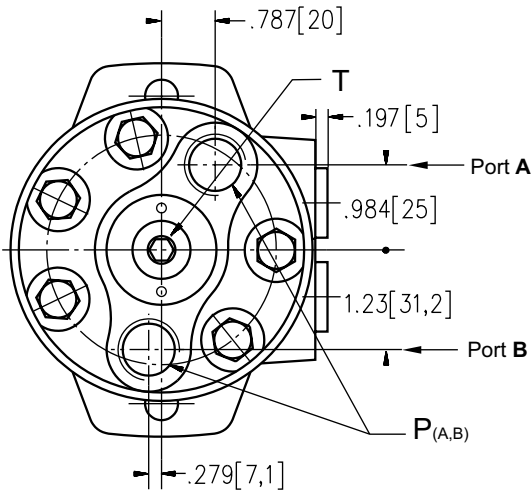
** For Q Flange

*** Perform at customer's request

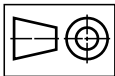
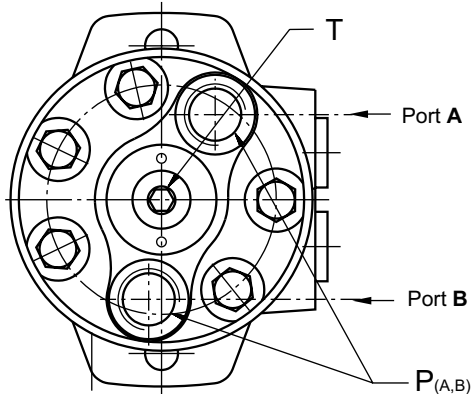
Versions				
	2	3	4	5
C	4xM8	4xM8	4x ⁵ / ₁₆ -18UNC	4x ⁵ / ₁₆ -18UNC
P _(A,B)	2xG ¹ / ₂	2xM22x1,5	2x ⁷ / ₈ -14UNF	2x ¹ / ₂ -14NPTF
T	G ¹ / ₄	M14x1,5	⁷ / ₁₆ -20UNF	⁷ / ₁₆ -20UNF

MLHR - REAR PORTS

Version **6** **8** **9**



Version **7**



Standard Rotation

Viewed from Shaft End
Port A Pressurized - **CW**
Port B Pressurized - **CCW**

Reverse Rotation

Viewed from Shaft End
Port A Pressurized - **CCW**
Port B Pressurized - **CW**

	Versions			
	6	7	8	9
P(A,B)	2xG $\frac{1}{2}$	2x $\frac{7}{8}$ -14 UNF	2x $\frac{1}{2}$ -14 NPTF	2xM22x1,5
T	G $\frac{1}{4}$	$\frac{7}{16}$ -20 UNF	$\frac{7}{16}$ -20 UNF	M14x1,5

Type	L max,in. [mm]	Type	L max,in. [mm]
MLHR(F) 50	6.24 [158,5]	MLHRQ(M) 50	6.42 [163,0]
MLHR(F) 80	6.44 [163,5]	MLHRQ(M) 80	6.61 [168,0]
MLHR(F) 100	6.58 [167,0]	MLHRQ(M) 100	6.73 [171,0]
MLHR(F) 125	6.75 [171,5]	MLHRQ(M) 125	6.91 [175,5]
MLHR(F) 160	6.99 [177,5]	MLHRQ(M) 160	7.14 [181,5]
MLHR(F) 200	7.26 [184,5]	MLHRQ(M) 200	7.42 [188,5]
MLHR(F) 250	7.60 [193,0]	MLHRQ(M) 250	7.78 [187,5]
MLHR(F) 315	8.05 [204,5]	MLHRQ(M) 315	8.21 [208,5]
MLHR(F) 400	8.62 [219,0]	MLHRQ(M) 400	8.78 [223,0]

ORDER CODE

	1	2	3	4	5	6	7	8	9
MLHR									

Pos.1 - Mounting Flange

omit - SAE A, two holes

F - Magneto, four holes (six holes at customer's request)

M - Square metric, four bolts M10

Q - Square, four bolts

Pos.2 - Displacement code

50 - 3.14 [51,5] in.³/rev. [cm.³/rev.]

80 - 4.90 [80,3] in.³/rev. [cm.³/rev.]

100 - 6.09 [99,8] in.³/rev. [cm.³/rev.]

125 - 7.67 [125,7] in.³/rev. [cm.³/rev.]

160 - 9.74 [159,6] in.³/rev. [cm.³/rev.]

200 - 12.19 [199,8] in.³/rev. [cm.³/rev.]

250 - 15.26 [250,1] in.³/rev. [cm.³/rev.]

315 - 19.26 [315,7] in.³/rev. [cm.³/rev.]

400 - 24.40 [397,0] in.³/rev. [cm.³/rev.]

Pos.3 - Shaft Extensions* [see pages 28 and 29]

C - 1" [25,4] straight, Parallel key

VC - 1" [25,4] straight, Parallel key w/ corrosion resistant bushing

D - $\frac{7}{8}$ " [22,2] straight, Parallel key

G - 1" [25,4] SAE 6B Splined

H - 1" [25,4] straight w/ .406 [10,3] Crosshole

M - 25 mm straight, Parallel key

VM - 25 mm straight, Parallel key w/ corrosion resistant bushing

S - $\frac{7}{8}$ " [22,2] 13T Splined

T - 1" [25,4] SAE J501 Tapered

B - 32 mm straight, Parallel key

K - 1 $\frac{1}{4}$ " [31,75] straight, Parallel key

L - 1 $\frac{1}{4}$ " [31,75] 14T Splined

R - 1 $\frac{1}{4}$ " [31,75] SAE J501 Tapered

Pos. 4 - Option [needle bearings]

omit - none

N - with needle bearings

Pos. 5 - Port Size/Type [standard manifold to each]

2 - side ports, 2xG1/2, G1/4, BSP thread, ISO 228

3 - side ports, 2xM22x1,5, M14x1,5, metric thread, ISO 262

4 - side ports, 2x7/8-14 UNF, O-ring, 7/16-20 UNF

5 - side ports, 2x1/2-14 NPTF, 7/16-20 UNF

6 - rear ports, 2xG1/2, G1/4, BSP thread, ISO 228

7 - rear ports, 2x7/8-14 UNF, O-ring, 7/16-20 UNF

8 - rear ports, 2x1/2-14 NPTF, 7/16-20 UNF

9 - rear ports, 2xM22x1,5, M14x1,5, metric thread, ISO 262

Pos. 6 - Shaft Seal Version [see page 31]

omit - Standard shaft seal

U - High pressure shaft seal (without check valves)

Pos. 7 - Drain Port

omit - with drain port

1 - without drain port

Pos. 8 - Special Features [see page 52]

Pos. 9 - Design Series

omit - Factory specified

Notes : The following combinations are not allowed: - **Q** and **M** flange with **B**, **K**, **L**, **R** shafts;
- **N** option with **B**, **K**, **L**, **R** shafts, **U** option and **RS** option;

* The permissible output torque for shafts must not be exceeded!

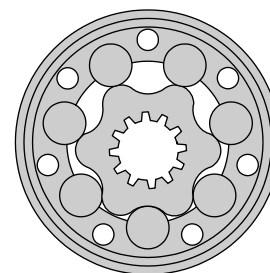
The hydraulic motors are mangano-phosphatized as standard.

HYDRAULIC MOTORS MLHH



APPLICATION

- » Conveyors
- » Feeding mechanism of robots and manipulators
- » Metal working machines
- » Textile machines
- » Machines for agriculture
- » Food industries
- » Mining machinery etc.



CONTENTS

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Performance data	46÷48
Permissible shaft loads	48
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Permissible shaft seal pressure....	50
Shaft extensions	51
Order code	51

OPTIONS

- » Model- Spool valve, roll-gerotor
- » Flange mount
- » Shafts- straight, splined and tapered
- » SAE, Metric and BSPP ports
- » Speed sensing
- » Other special features

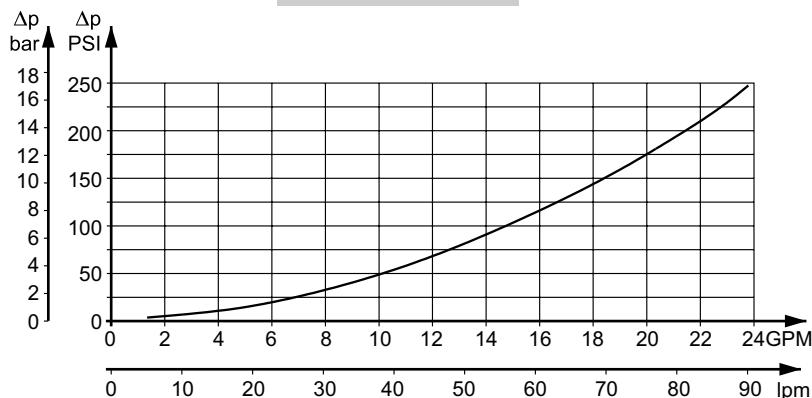
GENERAL

Displacement,	in ³ /rev [cm ³ /rev.]	12.3÷30.7 [201,3÷502,4]
Max. Speed,	[RPM]	150÷370
Max. Torque,	in-lb [daNm]	4510÷7434 [51÷84]
Max. Output,	HP [kW]	11÷21 [8,5÷16]
Max. Pressure Drop,	PSI [bar]	1300÷2540 [90÷175]
Max. Oil Flow,	GPM [lpm]	20 [75]
Min. Speed,	[RPM]	5÷10
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)	
Temperature range,	°F [°C]	-22÷194 [-30÷90]
Optimal Viscosity range, SUS [mm²/s]	98÷347 [20÷75]	
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 micron)	

Oil flow in drain line

Pressure drop PSI [bar]	Viscosity SUS [mm ² /s]	Oil flow in drain line GPM [lpm]
1450 [100]	98 [20]	.660 [2,5]
	164 [35]	.476 [1,8]
2030 [140]	98 [20]	.925 [3,5]
	164 [35]	.740 [2,8]

Pressure Losses



SPECIFICATION DATA

Type		MLHH 200	MLHH 250	MLHH 315	MLHH 400	MLHH 500
Displacement, in. ³ /rev. [cm. ³ /rev.]		12.3 [201,3]	15.4 [252]	16.4 [314,9]	24.2 [396,8]	30.7 [502,4]
Max. Speed, [RPM]	Cont.	370	295	235	185	150
	Int.*	445	350	285	225	180
Max. Torque in-lb [daNm]	Cont.	4510 [51]	5398 [61]	6548 [74]	7434 [84]	7257 [82]
	Int.*	5130 [58]	6195 [70]	7257 [82]	8673 [98]	9204 [104]
	Peak**	5064 [64]	6992 [79]	8673 [98]	9647 [109]	10350 [117]
Max. Output HP [kW]	Cont.	21 [16]	21 [16]	18.7 [14]	16.7 [12,5]	14.7 [11]
	Int.*	24.8 [18,5]	4.8 [18,5]	20.7 [15,5]	20.1 [15]	18.7 [14]
Max. Pressure Drop PSI [bar]	Cont.	2540 [175]	2540 [175]	2540 [175]	2240 [155]	1740 [120]
	Int.*	2900 [200]	2900 [200]	2900 [200]	2750 [190]	2100 [145]
	Peak**	3260 [225]	3260 [225]	3260 [225]	3045 [210]	2390 [165]
Max. Oil Flow GPM [lpm]	Cont.	20 [75]	20 [75]	20 [75]	20 [75]	20 [75]
	Int.*	24 [90]	24 [90]	24 [90]	24 [90]	24 [90]
Max. Inlet Pressure PSI [bar]	Cont.	2900 [200]	2900 [200]	2900 [200]	2900 [200]	2900 [200]
	Int.*	3260 [225]	3260 [225]	3260 [225]	3260 [225]	3260 [225]
	Peak**	3626 [250]	3626 [250]	3626 [250]	3626 [250]	3626 [250]
Max. Starting Pressure with Unloaded Shaft, PSI [bar]		72 [5]	72 [5]	72 [5]	72 [5]	72 [5]
Min. Starting Torque, in-lb [daNm]	At max.press.dropCont	3450 [39]	4600 [52]	5840 [66]	6370 [72]	6370 [72]
	At max.press.drop Int.*	3980 [45]	5221 [59]	6460 [73]	7788 [88]	7788 [88]
Min. Speed***, [RPM]		10	10	8	5	5
Weight, lb [kg]		23.2 [10,5]	24.3 [11]	25.4 [11,5]	27.1 [12,3]	28.7 [13]

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

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

*** For speeds of 5 RPM lower than given, consult factory or your regional manager.

- 1) Intermittent speed and intermittent pressure must not occur simultaneously.
- 2) Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
- 3) Recommend using a premium quality, anti-wear type mineral based hydraulic oil, HLP(DIN51524) or HM(ISO6743/4).
If using synthetic fluids consult the factory for alternative seal materials.
- 4) Recommended minimum oil viscosity 70 SUS [13 mm²/s] at 122°F [50°C].
- 5) Recommended maximum system operating temperature is 180°F [82°C].
- 6) To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

Performance Data MLHH 200

		Pressure (Δ PSI)					Max. Cont.	Max. Int.	Speed (theor.)
		500	1000	1500	2000	2540		2900	
Flow [GPM]	1	850 22	1679 20	2452 17	- -	- -	- -	- -	25
	3	872 49	1758 47	2599 42	3377 33	4229 16	- -	- -	50
	5	856 96	1740 93	2630 89	3468 81	4466 66	5053 53	5053 53	99
	8	839 148	1705 146	2595 142	3475 133	4479 116	5080 103	5080 103	149
	10	774 195	1640 194	2521 191	3442 180	4449 161	5064 146	5064 146	198
	13	705 246	1583 244	2453 242	3389 233	4390 212	5008 198	5008 198	248
	16	634 298	1500 296	2364 293	3319 284	4329 265	4938 249	4938 249	296
	18	544 346	1411 344	2283 343	3229 332	4217 312	4861 296	4861 296	347
Max. Cont.	20	509 373	1358 372	2239 370	3165 362	4170 341	4793 325	4793 325	372
Max. Int.	22	455 400	1296 400	2188 399	3092 390	4086 370	4720 355	4720 355	412
	24	341 447	1206 445	2081 442	3004 434	4001 414	4613 399	4613 399	447
Torque (theor.) in-lb. [daNm]		977 [11]	1953 [22]	2929 [33,1]	3907 [44,1]	4961 [56]	5665 [64]	5665 [64]	

12.3 in.³/rev. [201,3 cm.³/rev.]

Torque [in-lb] 4613
Speed [RPM] 399

Performance Data MLHH 250

		Pressure (Δ PSI)					Max. Cont.	Max. Int.	Speed (theor.)
		500	1000	1300	1700	2100	2540	2900	
Flow [GPM]	1	1040 18	2111 16	2760 14	3387 11	- -	- -	- -	20
	3	1117 39	2214 38	2872 36	3618 33	4486 27	5186 14	- -	40
	5	1113 76	2215 74	2886 73	3679 70	4530 62	5413 51	6119 40	79
	8	1050 118	2155 116	2841 114	3653 108	4530 98	5416 86	6103 77	119
	10	986 156	2062 154	2800 150	3597 144	4463 134	5371 122	6079 110	159
	13	904 196	1991 195	2723 192	3502 185	4394 173	5285 159	5990 147	198
	16	810 238	1891 236	2623 232	3411 224	4318 211	5200 197	5893 185	238
	18	699 275	1793 274	2502 272	3313 263	4216 249	5080 235	5805 219	277
Max. Cont.	20	618 297	1741 296	2433 294	3243 286	4132 273	5007 257	5740 242	297
Max. Int.	22	566 320	1665 319	2373 315	3156 307	4062 295	4938 279	5669 263	329
	24	423 357	1530 356	2226 353	3025 345	3947 333	4812 317	5529 299	357
Torque (theor.) in-lb. [daNm]		1224 [13,8]	2450 [27,7]	3185 [35,9]	4165 [47]	5144 [58,1]	6221 [70,3]	7104 [80,26]	

15.4 in.³/rev. [252 cm.³/rev.]

Torque [in-lb] 5529
Speed [RPM] 299

The Performance data was collected at back pressure 72.5÷145 PSI [5÷10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50°C].

Performance Data MLHH 315

		Pressure (Δ PSI)					Max. Cont.	Max. Int.	Speed (theor.)
		500	1100	1500	1900	2250	2540	2900	
Flow [GPM]	1	1348 14	2901 10	-	-	-	-	-	16
	3	1419 31	3051 28	4136 21	4754 16	-	-	-	32
	5	1465 61	3115 58	4279 52	4976 46	5860 38	6468 30	7131 18	64
	8	1430 94	3069 90	4289 83	4960 78	5908 68	6529 60	7262 47	95
	10	1338 123	3002 121	4245 113	4937 106	5853 94	6507 84	7292 69	127
	13	1223 157	2899 153	4152 146	4861 137	5788 124	6427 114	7261 97	158
	16	1047 190	2783 189	4016 181	4748 171	5672 156	6311 145	7161 126	190
	18	896 220	2656 219	3880 210	4626 200	5571 183	6200 172	7053 153	222
Max. Cont.	20	819 239	2562 236	3802 227	4529 218	5495 199	6142 186	6985 168	238
Max. Int.	22	713 257	2467 255	3702 247	4433 238	5395 220	6069 206	6915 182	263
	24	539 286	2287 284	3520 278	4240 269	5234 251	5903 237	6758 212	286
Torque (theor.) in-lb. [daNm]		1529 [17,3]	3363 [38]	4587 [51,8]	5810 [65,6]	6880 [77,7]	7768 [87,7]	8869 [100,2]	
		19.2 in. ³ /rev. [314,9 cm. ³ /rev.]							

Torque [in-lb] 6758
Speed [RPM] 212

Performance Data MLHH 400

		Pressure (Δ PSI)					Max. Cont.	Max. Int.	Speed (theor.)
		500	900	1400	1800	2240		2750	
Flow [GPM]	1	1670 11	3109 10	4102 8	-	-	-	-	13
	3	1741 26	3247 25	4338 24	6021 20	7394 13	-	-	25
	5	1782 48	3274 47	4311 45	6073 40	7525 35	8521 30		50
	8	1715 75	3193 74	4310 72	6062 65	7442 58	8484 53		76
	10	1658 97	3090 95	4226 93	6016 83	7391 75	8394 69		101
	13	1474 125	2964 123	4114 119	5891 108	7306 98	8265 91		126
	16	1309 151	2851 149	3978 146	5732 132	7176 119	8139 110		151
	18	1178 174	2723 172	3814 168	5570 155	7011 140	7979 130		176
Max. Cont.	20	1090 189	2626 187	3704 183	5462 169	6905 154	7857 143		189
Max. Int.	22	958 205	2477 204	3587 200	5328 186	6771 168	7753 154		209
	24	767 227	2289 227	3439 222	5102 209	6605 189	7600 171		227
Torque (theor.) in-lb. [daNm]		1929 [22]	3472 [39,2]	5400 [61]	6944 [78]	8642 [97,6]	10609 [119,9]		
		24.2 in. ³ /rev. [396,8 cm. ³ /rev.]							

Torque [in-lb] 7600
Speed [RPM] 171

The Performance data was collected at back pressure 72.5÷145 PSI [5÷10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50°C].

Performance Data MLHH 500

		Pressure (Δ PSI)					Max. Cont.	Max. Int.	Speed (theor.)
		350	700	1200	1500	1800		2300	
Flow [GPM]	1	1640 7	3010 6	5013 5	6351 5	7223 4		8898 3	8
	3	1640 22	3192 20	5243 19	6546 17	7692 13		9272 11	23
	5	1685 37	3101 36	5335 34	6595 32	7786 29		9553 25	38
	8	1640 59	3101 58	5243 55	6448 52	7692 50		9553 44	60
	10	1457 73	2918 69	4967 71	6155 67	7598 62		9366 55	75
	13	1366 97	2827 96	4967 91	6351 88	7317 85		9179 75	98
	16	1184 120	2645 119	4875 112	6057 108	7223 101		9038 95	121
	18	911 133	2462 129	4645 128	5862 125	7082 118		8804 87	136
Max. Cont.	20	774 149	2371 147	4599 145	5667 141	6942 133		8711 120	151
Max. Int.	22	547 164	2234 163	4415 160	5569 153	6895 147		8617 135	166
	24	501 176	2006 174	4231 168	5471 171	6567 161		8430 147	181
Torque (theor.) in-lb. [daNm]		1709 [19,3]	3418 [38,6]	5859 [66,2]	7325 [82,7]	8790 [99,3]		11231 [126,9]	

30.7 in.³/rev. [502,4 cm.³/rev.]

Metric Conversions

Flow 1 lpm = 0.264 GPM

Pressure 1 bar = 14.51 PSI

Torque 1 Nm = 8.85 in-lb

Torque [in-lb] 7828

Speed [RPM] 157

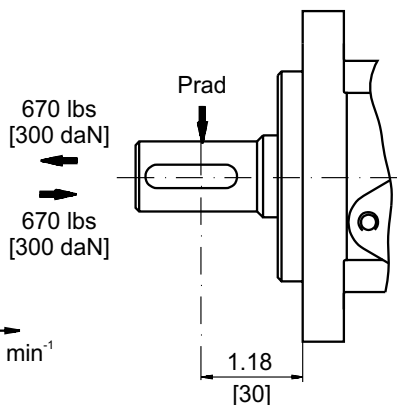
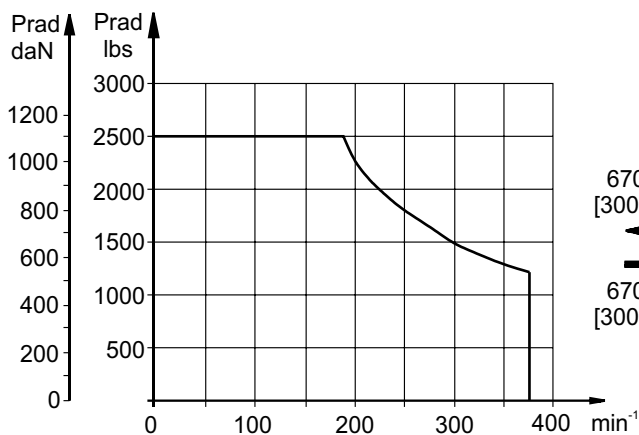
The Performance data was collected at back pressure 72.5÷145 PSI [5÷10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50°C].

PERMISSIBLE SHAFT LOADS FOR MLHH MOTORS

The permissible radial shaft load P_{rad} depends on the speed (RPM) and distance (L) from the point of load to the mounting flange.

$$\text{Radial Shaft Load } P_{rad} = \frac{1100}{\text{RPM}} \times \frac{2215}{4.075+L}, \text{ lbs}^*$$

*L < 2.362 in [60 mm]; n ≥ 200 min⁻¹



DIMENSIONS AND MOUNTING DATA

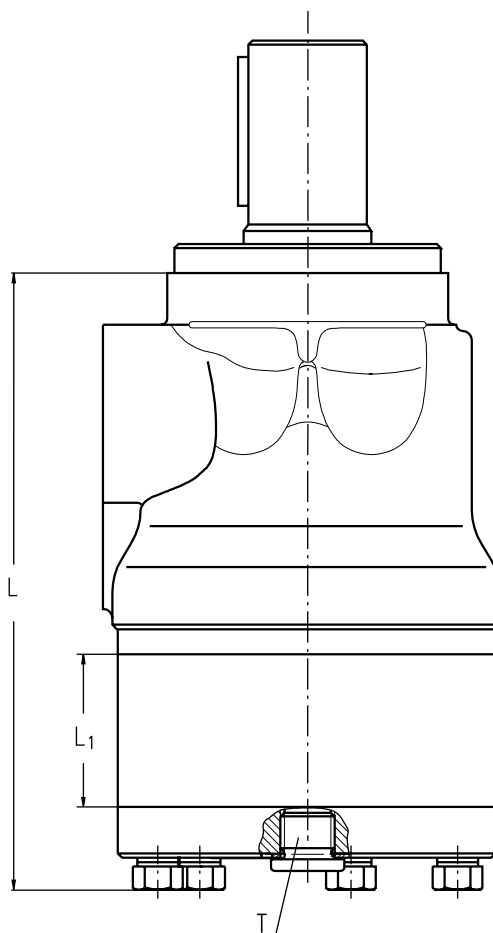
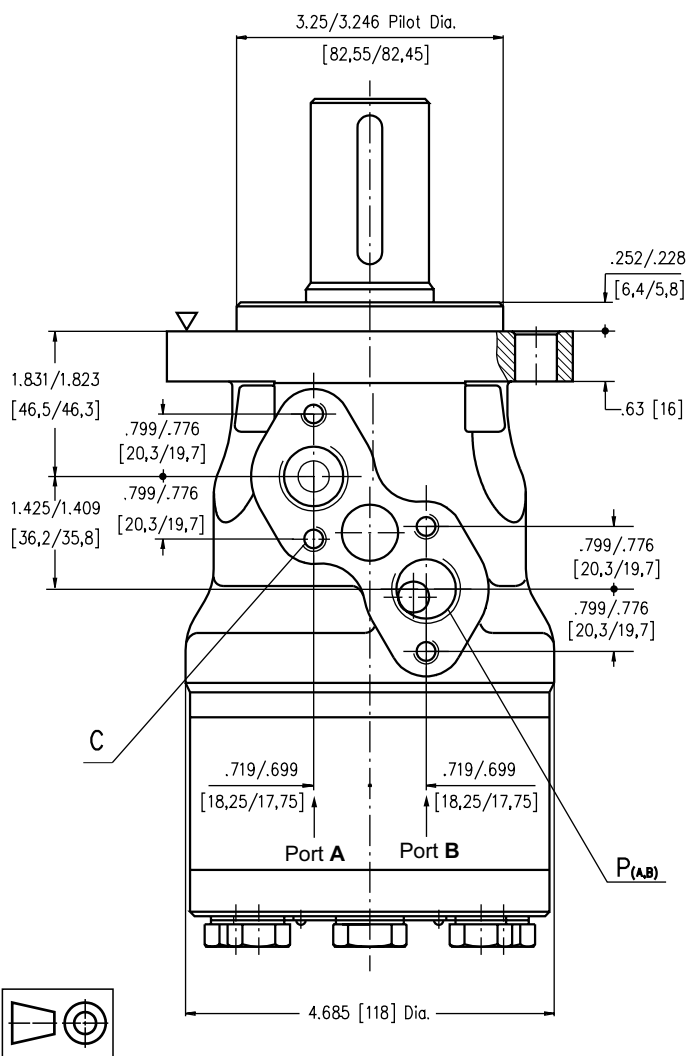
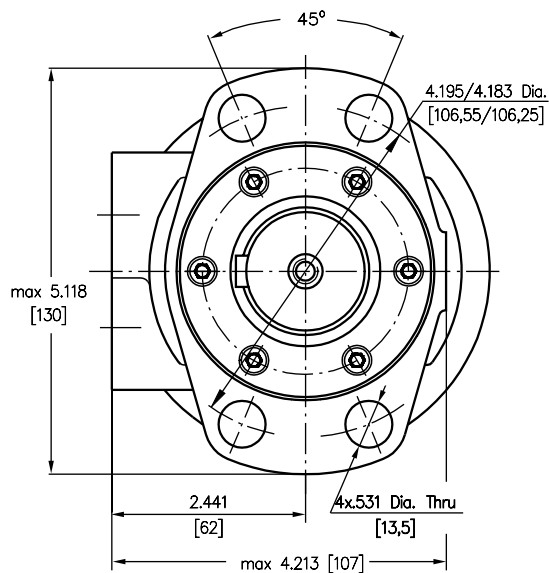
Magneto Mounting Flange with 4 hole

Type	L, mm	L ₁ , mm
MLHH 200	6.65 [169]	1.09 [27,8]
MLHH 250	6.93 [176]	1.37 [34,8]
MLHH 315	7.24 [184]	1.71 [43,5]
MLHH 400	7.72 [196]	2.16 [54,8]
MLHH 500	8.31 [211]	2.73 [69,4]

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

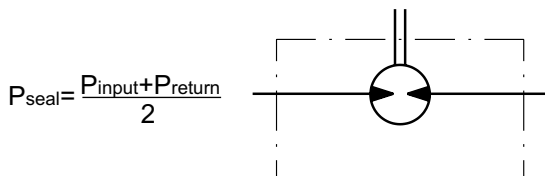
	Versions			
	2	3	4	5
C	4xM8	4xM8	4x ⁵ / ₁₆ -18UNC	4x ⁵ / ₁₆ -18UNC
P_(A,B)	2xG ¹ / ₂	2xM22x1,5	2x ⁷ / ₈ -14UNF	2x ¹ / ₂ -14NPTF
T	G ¹ / ₄	M14x1,5	⁷ / ₁₆ -20UNF	⁷ / ₁₆ -20UNF



MAX. PERMISSIBLE SHAFT SEAL PRESSURE FOR MLHH MOTORS

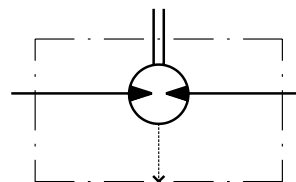
MLHH...U1 motors with high pressure seal and without drain connection:

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



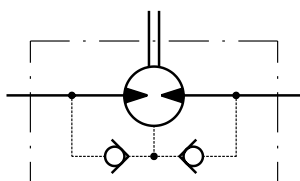
MLHH...U motors with high pressure seal and drain connection:

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



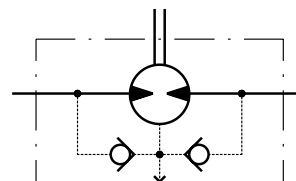
MLHH...1 motors with standard shaft seal and without drain connection:

The shaft seal pressure never exceeds the pressure in the return line.

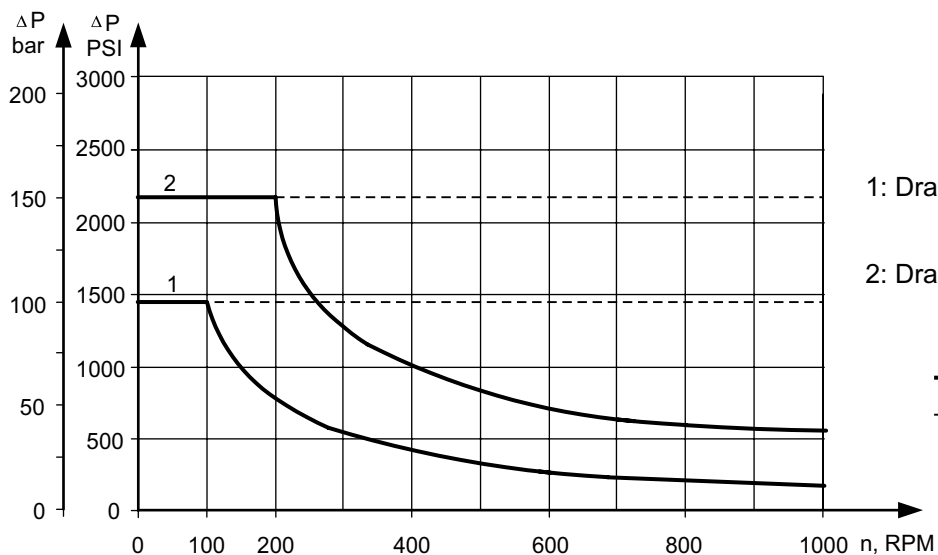


MLHH... motors with standard shaft seal and with drain connection:

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



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



1: Drawing for Standard Shaft Seal

2: Drawing for High Pressure Seal ("U" Seal)

— - continuous operations

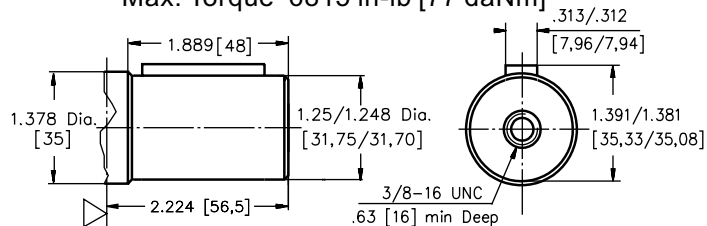
- - - - - intermittent operations

SHAFT EXTENSIONS

K

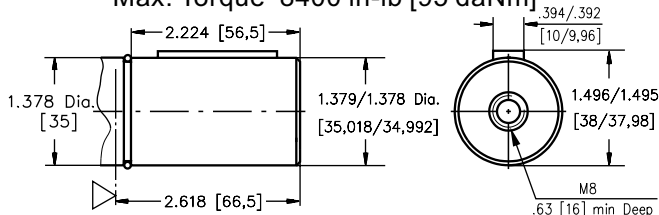
1 1/4" [31,75] straight, Parallel key 5/16"x 5/16"x1 1/4" BS 46

Max. Torque 6815 in-lb [77 daNm]


B

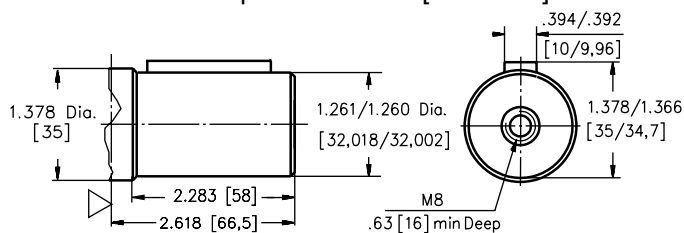
ø35 straight, Parallel key A10x8x45 DIN 6885

Max. Torque 8400 in-lb [95 daNm]


M

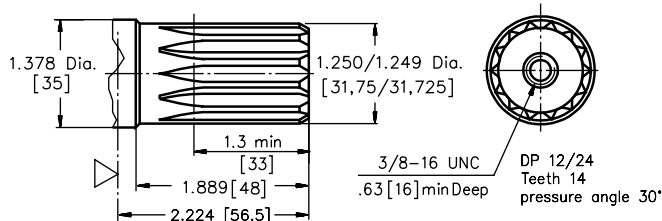
ø32 straight, Parallel key A10x8x45 DIN 6885

Max. Torque 6815 in-lb [77 daNm]


L

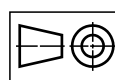
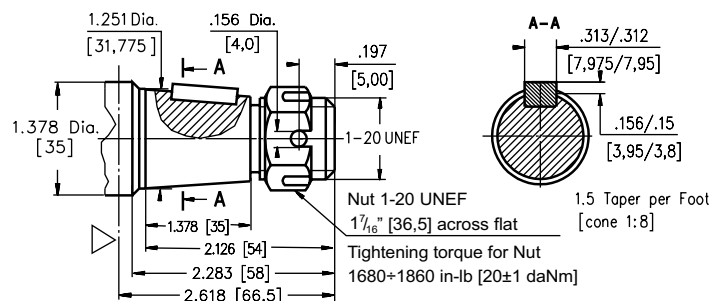
14T Splined, 1 1/4" [31,75], ANS B 92.1-1976

Max. Torque 8400 in-lb [95 daNm]


R

1 1/4" [31,75], SAE J501 Tapered, Parallel key 5/16"x 5/16"x1"

Max. Torque 8400 in-lb [95 daNm]



△- Motor Mounting Surface Requirement max. Torque must be not exceeded.

ORDER CODE

	1	2	3	4	5	6	7
MLHH							

Pos.1 - Displacement code

200	- 12.3 [201,3] in. ³ /rev. [cm. ³ /rev.]
250	- 15.4 [252,0] in. ³ /rev. [cm. ³ /rev.]
315	- 16.4 [314,9] in. ³ /rev. [cm. ³ /rev.]
400	- 24.2 [396,8] in. ³ /rev. [cm. ³ /rev.]
500	- 30.7 [502,4] in. ³ /rev. [cm. ³ /rev.]

Pos.2 - Shaft Extensions*

K	- 1 1/4" [31,75] straight, Parallel key
L	- 1 1/4" [31,75] Splined 14T ANS B92.1-1970
B**	- ø35 straight, Parallel key
R	- 1 1/4" [31,75] SAE J501 Tapered
M	- ø32 straight, Parallel key

Pos.3 - Port Size/Type [standard manifold to each]

2	- side ports, 2xG1/2, G1/4, BSP thread, ISO 228
3	- side ports, 2xM22x1,5, M14x1,5, metric thread, ISO 262
4	- side ports, 2x7/8-14 UNF, O-ring, 7/16-20 UNF
5	- side ports, 2x1/2-14 NPTF, 7/16-20 UNF

Pos.4 - Shaft Seal Version [see page 50]

omit	- Standard shaft seal
U	- High pressure shaft seal (without check valves)

Pos.5 - Drain Port

omit	- with drain port
1	- without drain port

Pos.6 - Special Features [see page 52]

Pos.7 - Design Series

omit	- Factory specified
------	---------------------

Notes : * The permissible output torque for shafts must not be exceeded!

** The following combination is not allowed: "B" shaft with U shaft seal.

The hydraulic motors are mangano-phosphatized as standard.

MOTOR SPECIAL FEATURES

Special Feature Description	Order Code	Motor type						
		MLHM	MLHP	MLHPN	MLHPW	MLHR	MLHRN	MLHH
Motor for Speed Sensor*	RS	O	O	-	-	O	-	O
Low Leakage	LL	O	O	-	O	O	-	O
Low Speed Valving	LSV	-	-	-	O	O	-	O
Free Running	FR	O	O	-	-	O	-	O
Reverse Rotation	R	O	O	O	O	O	O	O
Paint**	P	O	O	O	O	O	O	O
Corrosion Protected Paint**	PC	O	O	O	O	O	O	O
Check Valves		S	S***	S	S	S***	S	S

O Optional

- Not applicable

S Standard

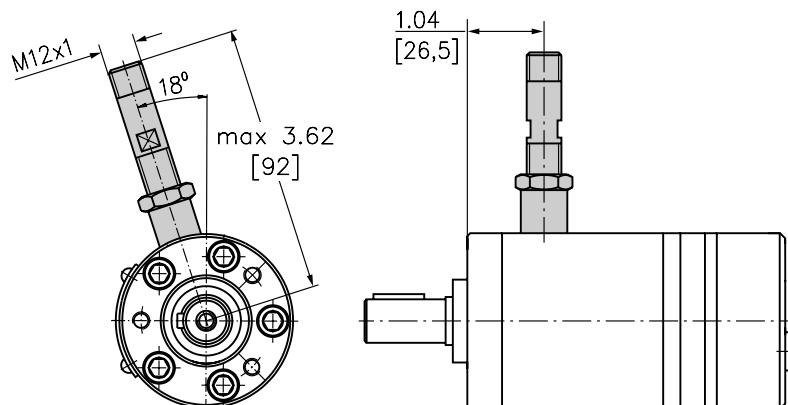
* for sensor ordering see page 53

** color at customer's request.

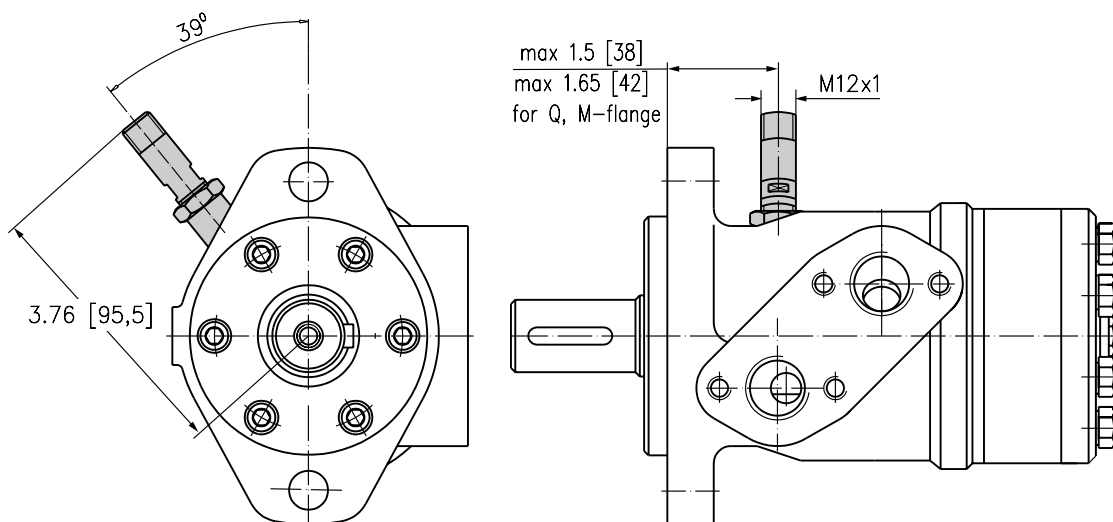
*** without check valves for "U" shaft seal versions (see page 31)

MOTORS WITH SPEED SENSOR

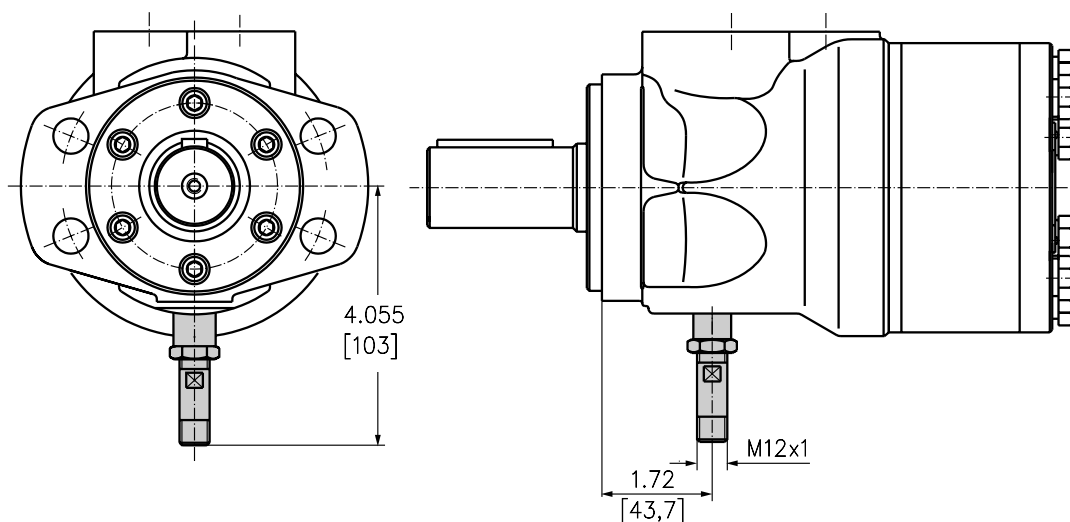
MLHM...RS



MLHP...RS and MLHR...RS



MLHH...RS

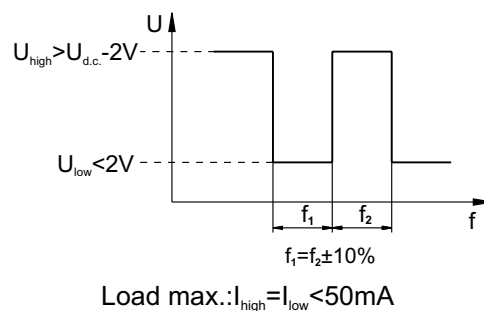


TECHNICAL DATA OF THE SPEED SENSOR

Technical data

Frequency range	0...15 000 Hz
Output	PNP, NPN
Power supply	10...36 VDC
Current input	20 mA (@24 VDC)
Ambient Temperature	-40...+257°F [-40...+125°C]
Protection	IP 67
Plug connector	M12-Series
Mounting principle	ISO 6149

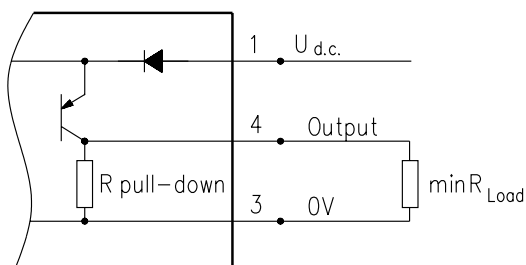
Output signal



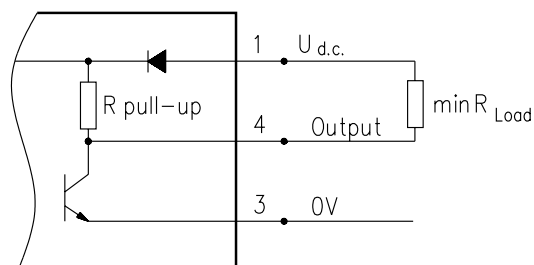
Motor type	MLHM	MLHP	MLHR	MLHH
Pulses per revolution	30	36	36	42

Wiring diagrams

PNP

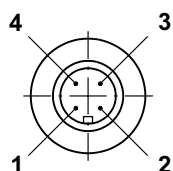


NPN



$$R_{Load} [\text{k}\Omega] = U_{d.c.} [\text{V}] / I_{max} [\text{mA}]$$

Stick type



Terminal No.	Connection	Cable Output
1	$U_{d.c.}$	Brown
2	No connection	White
3	0V	Blue
4	Output signal	Black

Order Code for Speed Sensor

Sensor Code	Output type	Electric connection
RSN	NPN	Connector BINDER 713 series
RSP	PNP	Connector BINDER 713 series
RSNL5	NPN	Cable output 3x0,25; 196 in [5m] long
RSPL5	PNP	Cable output 3x0,25; 196 in [5m] long

NOTE: The speed sensor is not fitted at the factory, but is supplied in a plastic bag with the motor.
For installation see enclosed instructions.

HYDRAULIC MOTORS

MOTOR APPLICATION

VEHICLE DRIVE CALCULATIONS

1. Motor speed: n , RPM

$$n = \frac{168 \times v_{ml} \times i}{R_m} \quad n = \frac{2,65 \times v_{km} \times i}{R_m}$$

v_{km} - vehicle speed, km/h;

v_{ml} - vehicle speed, mil/h;

R_m - wheel rolling radius, m;

R_{in} - wheel rolling radius, in;

i - gear ratio between motor and wheels.

If no gearbox, use $i=1$.

2. Rolling resistance: RR , lbs [daN]

The resistance force resulted in wheels contact with different surfaces:

$$RR = G \times$$

G - total weight loaded on vehicle, lbs [daN];

- rolling resistance coefficient (Table 1).

Table 1

Rolling resistance coefficient In case of rubber tire rolling on different surfaces	
Surface	
Concrete- faultless	0.010
Concrete- good	0.015
Concrete- bad	0.020
Asphalt- faultless	0.012
Asphalt- good	0.017
Asphalt- bad	0.022
Macadam- faultless	0.015
Macadam- good	0.022
Macadam- bad	0.037
Snow- 5 cm	0.025
Snow- 10 cm	0.037
Polluted covering- smooth	0.025
Polluted covering- sandy	0.040
Mud	0.037÷0.150
Sand- Gravel	0.060÷0.150
Sand- loose	0.160÷0.300

3. Grade resistance: GR , lbs [daN]

$$GR = G \times (\sin \alpha + \cos \alpha)$$

- gradient negotiation angle (Table 2)

Table 2

Grade %	α Degrees	Grade %	α Degrees
1%	0° 35'	12%	6° 5'
2%	1° 9'	15%	8° 31'
5%	2° 51'	20%	11° 19'
6%	3° 26'	25%	14° 3'
8%	4° 35'	32%	18°
10%	5° 43'	60%	31°

4. Accelerate force: FA , lbs [daN]

Force FA necessary for acceleration from 0 to maximum speed v and time t can be calculated with a formula:

$$FA = \frac{v_{ml} \times G}{22 \times t}, [\text{lbs}]; \quad FA = \frac{v_{km} \times G}{3,6 \times t}, [\text{daN}]$$

FA - accelerate force, lbs [daN];

t - time, [s].

5. Tractive effort: DP , lbs [daN]

Tractive effort DP is the additional force of trailer. This value will be established as follows:

-acc.to constructor's assessment;

-as calculating forces in items 2, 3 and 4 of trailer; the calculated sum corresponds to the tractive effort requested.

6. Total tractive effort: TE , lbs [daN]

Total tractive effort TE is total effort necessary for vehicle motion; that the sum of forces calculated in items from 2 to 5 and increased with 10 % because of air resistance.

$$TE = 1,1 \times (RR + GR + FA + DP)$$

RR - force acquired to overcome the rolling resistance;

GR - force acquired to slope upwards;

FA - force acquired to accelerate (acceleration force);

DP - additional tractive effort (trailer).

7. Motor Torque moment: M , in-lb [daNm]

Necessary torque moment for every hydraulic motor:

$$M = \frac{TE \times R_{in} [R_m]}{N \times i \times \eta_m}$$

N - motor numbers;

η_m - mechanical gear efficiency (if it is available).

8. Cohesion between tire and road covering: M_w , in-lb [daNm]

$$M_w = \frac{G_w \times f \times R_{in} [R_m]}{i \times \eta_m}$$

To avoid wheel slipping, it should be observed the following condition $M_w > M$

f - frictional factor;

G_w - total weight over the wheels, lbs [daN].

Table 3

Surface	Frictional factor f
Steel on steel	0.15 ÷ 0.20
Rubber tire on polluted surface	0.5 ÷ 0.7
Rubber tire on asphalt	0.8 ÷ 1.0
Rubber tire on concrete	0.8 ÷ 1.0
Rubber tire on grass	0.4

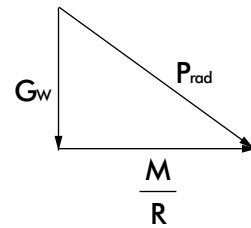
9.Radial motor loading: P_{rad} , lbs [daN]

When motor is used for vehicle motion with wheels mounted directly on motor shaft, the total radial loading of motor shaft P_{rad} is a sum of motion force and weight force acting on one wheel.

G_w - Weight held by wheel;

P_{rad} - Total radial loading of motor shaft;

M/R - Motion force.



$$P_{rad} = \sqrt{G_w^2 + \left(\frac{M}{R}\right)^2}$$

In accordance with calculated loadings the suitable motor from the catalogue is selected.

DRAINAGE SPACE AND DRAINAGE PRESSURE

Advantages in oil drainage from drain space: Cleaning; Cooling and Seal lifetime prolonging.

