

HYDRAULIC MOTORS MLHH



APPLICATION

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



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OPTIONS

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

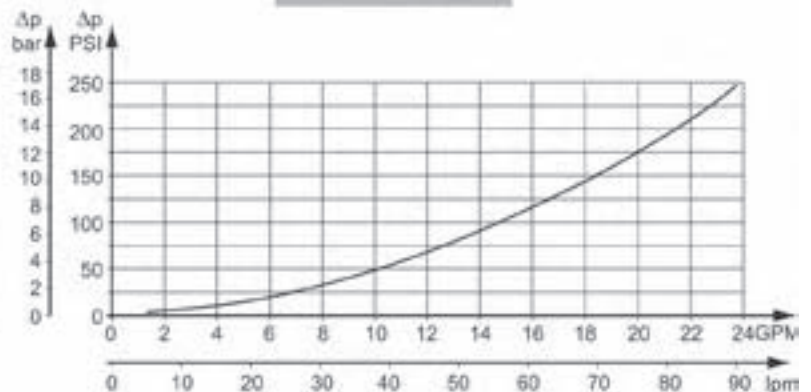
GENERAL

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 [mm ² /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.²/rev. [cm.²/rev.]		12.3 [201,3]	15.4 [252]	16.4 [314,9]	24.2 [396,8]	30.7 [502,4]
Max. Speed, [RPM]	Cont. for normal/LSV version	370/200	295/200	235/200	185	150
	Int.* for normal/LSV version	445/250	350/250	285/250	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]
	Cont. for LSV version	11.3 [8,4]	13.1 [9,8]	15 [11,2]	16.7 [12,5]	14.7 [11]
	Int.*	24.8 [18,5]	24.8 [18,5]	20.7 [15,5]	20.1 [15]	18.7 [14]
	Int.* for LSV version	15.4 [11,5]	17.8 [13,3]	19.4 [14,5]	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]
	Cont. for LSV version	10.6 [40]	13.2 [50]	16.6 [63]	20 [75]	20 [75]
	Int.*	24 [90]	24 [90]	24 [90]	24 [90]	24 [90]
	Int.* for LSV version	13.2 [50]	16.6 [63]	20.6 [78]	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. Return Pressure without Drain Line or Max. Pressure in Drain Line, PSI [bar]	Cont. 0-100 RPM	1450 [100]	1450 [100]	1450 [100]	1100 [75]	1100 [75]
	Cont. 100-200 RPM	725 [50]	725 [50]	725 [50]	580 [40]	580 [40]
Max. Starting Pressure with Unloaded Shaft, PSI [bar]	Cont. 200-300 RPM	290 [20]	290 [20]	290 [20]	290 [20]	290 [20]
	Int.* 0-max. RPM	1450 [100]	1450 [100]	1450 [100]	1100 [75]	1100 [75]
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.

SPECIFICATION DATA

Type		MLHH 200	MLHH 250	MLHH 315	MLHH 400	M
Displacement, in.³/rev. [cm.³/rev.]		12.3 [201,3]	15.4 [252]	16.4 [314,9]	24.2 [396,8]	30.7
Max. Speed, [RPM]	Cont. for normal/LSV version	370/200	295/200	235/200	185	
	Int.* for normal/LSV version	445/250	350/250	285/250	225	
Max. Torque in-lb [daNm]	Cont.	4510 [51]	5398 [61]	6548 [74]	7434 [84]	729
	Int.*	5130 [58]	6195 [70]	7257 [82]	8673 [98]	920
	Peak**	5064 [64]	6992 [79]	8673 [98]	9647 [109]	1034
Max. Output HP [kW]	Cont.	21 [16]	21 [16]	18.7 [14]	16.7 [12,5]	14
	Cont. for LSV version	11.3 [8,4]	13.1 [9,8]	15 [11,2]	16.7 [12,5]	14
	Int.*	24.8 [18,5]	24.8 [18,5]	20.7 [15,5]	20.1 [15]	18
	Int.* for LSV version	15.4 [11,5]	17.8 [13,3]	19.4 [14,5]	20.1 [15]	18
Max. Pressure Drop PSI [bar]	Cont.	2540 [175]	2540 [175]	2540 [175]	2240 [155]	174
	Int.*	2900 [200]	2900 [200]	2900 [200]	2750 [190]	210
Max. Oil Flow GPM [lpm]	Cont.	20 [75]	20 [75]	20 [75]	20 [75]	20
	Cont. for LSV version	10.6 [40]	13.2 [50]	16.6 [63]	20 [75]	20
	Int.*	24 [90]	24 [90]	24 [90]	24 [90]	24
	Int.* for LSV version	13.2 [50]	16.6 [63]	20.6 [78]	24 [90]	24
Max. Inlet Pressure PSI [bar]	Cont.	2900 [200]	2900 [200]	2900 [200]	2900 [200]	290
	Int.*	3260 [225]	3260 [225]	3260 [225]	3260 [225]	326
	Peak**	3626 [250]	3626 [250]	3626 [250]	3626 [250]	362
Max. Return Pressure without Drain Line or Max. Pressure in Drain Line, PSI [bar]	Cont. 0-100 RPM	1450 [100]	1450 [100]	1450 [100]	1100 [75]	110
	Cont. 100-200 RPM	725 [50]	725 [50]	725 [50]	580 [40]	58
	Cont. 200-300 RPM	290 [20]	290 [20]	290 [20]	290 [20]	29
Int.* 0-max. RPM	1450 [100]	1450 [100]	1450 [100]	1100 [75]	110	
Max. Starting Pressure with Unloaded Shaft, PSI [bar]		72 [5]	72 [5]	72 [5]	72 [5]	7
Min. Starting Torque, in-lb [daNm]	At max.press.dropCont	3450 [39]	4600 [52]	5840 [66]	6370 [72]	630
	At max.press.drop Int.*	3980 [45]	5221 [59]	6460 [73]	7788 [88]	770
Min. Speed***, [RPM]		10	10	8	5	
Weight, lb [kg]		23.2 [10,5]	24.3 [11]	25.4 [11,5]	27.1 [12,3]	28

* 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(ISO). 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 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	6488 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 mms/s] at 122°F [50°C].

Performance Data MLHH 500

	Pressure (Δ PSI)					Max. Int.	Speed (theor.)		
	350	700	1200	1500	1800				
Flow [GPM]	1	1449 9	2784 8	4567 6	-	-	-	10	
	3	1560 22	2943 21	4911 19	6291 17	7136 14	8728 10	20	
	5	1557 41	2905 41	4942 38	6323 35	7213 33	8899 27	40	
	8	1505 63	2811 62	4894 60	6235 56	7147 52	8857 46	60	
	10	1427 82	2711 82	4783 77	6146 73	7069 69	8747 62	80	
	13	1277 105	2596 104	4631 99	5969 93	6930 89	8599 81	100	
	16	1058 131	2416 127	4438 121	5768 115	6739 111	8417 101	120	
	18	851 146	2250 145	4267 140	5610 133	6577 127	8259 116	140	
	Max. Cont.	20	695 159	2105 158	4153 154	5472 149	6441 142	8128 128	150
	Max. Int.	24	294 192	1780 191	3729 186	5168 179	6078 172	7828 157	180
Torque (theor.) in-lb. [daNm]		1709 [19,3]	3418 [38,6]	5859 [66,2]	7325 [82,7]	8790 [99,3]	11231 [126,9]		

Metric Conversions
 Flow 1 lpm = 0.264 GPM
 Pressure 1 bar = 14.51 PS
 Torque 1 Nm = 8.85 in-lb

Torque [in-lb] 7828
 Speed [RPM] 157

30.7 in.³/rev. [502,4 cm.³/rev.]

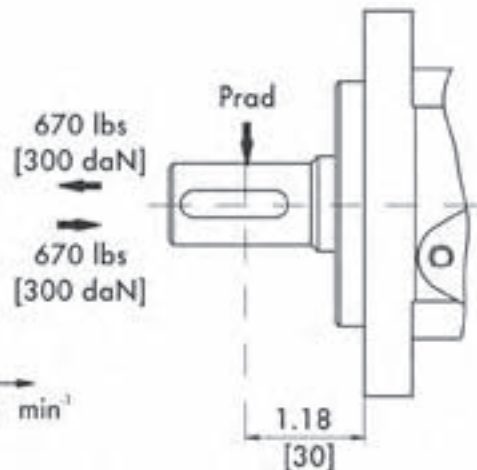
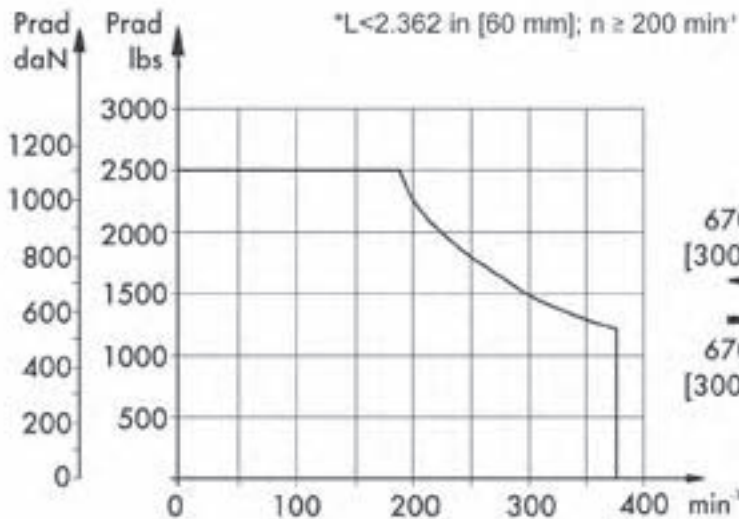
The Performance data was collected at back pressure 72.5+145 PSI [5+10 bar] and oil with viscosity of 150 SUS [32 mm²/s] at 122°F [50°C].

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.

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

*L < 2.362 in [60 mm]; n ≥ 200 min⁻¹



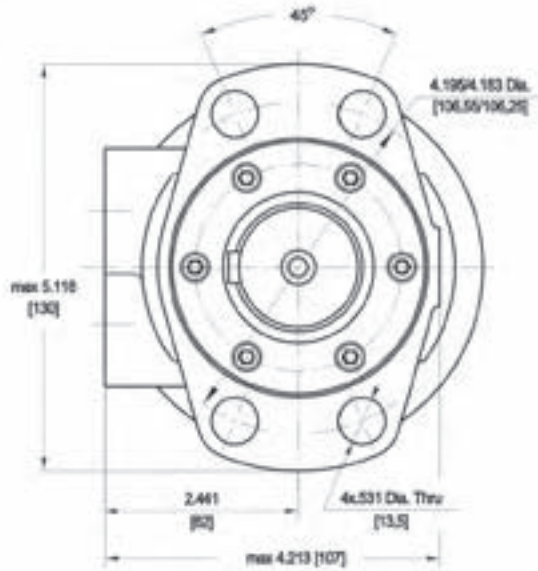
DIMENSIONS AND MOUNTING DATA

Magneto Mounting Flange with 4 hole

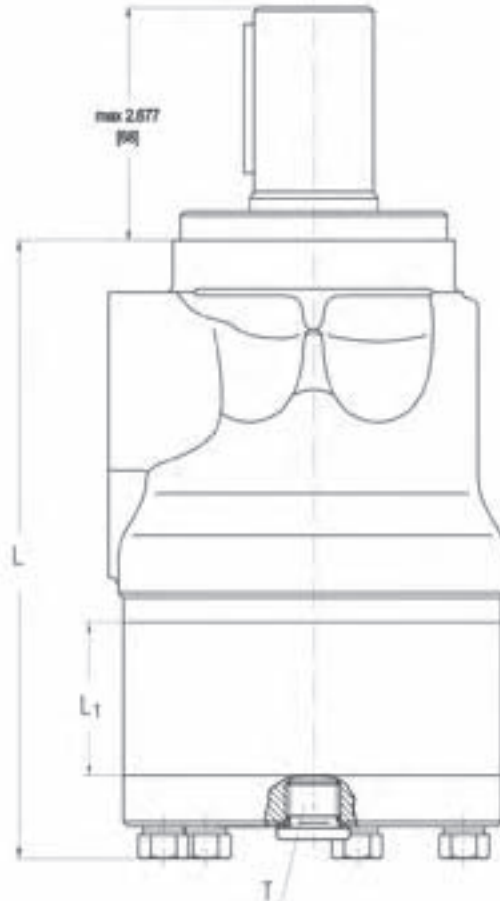
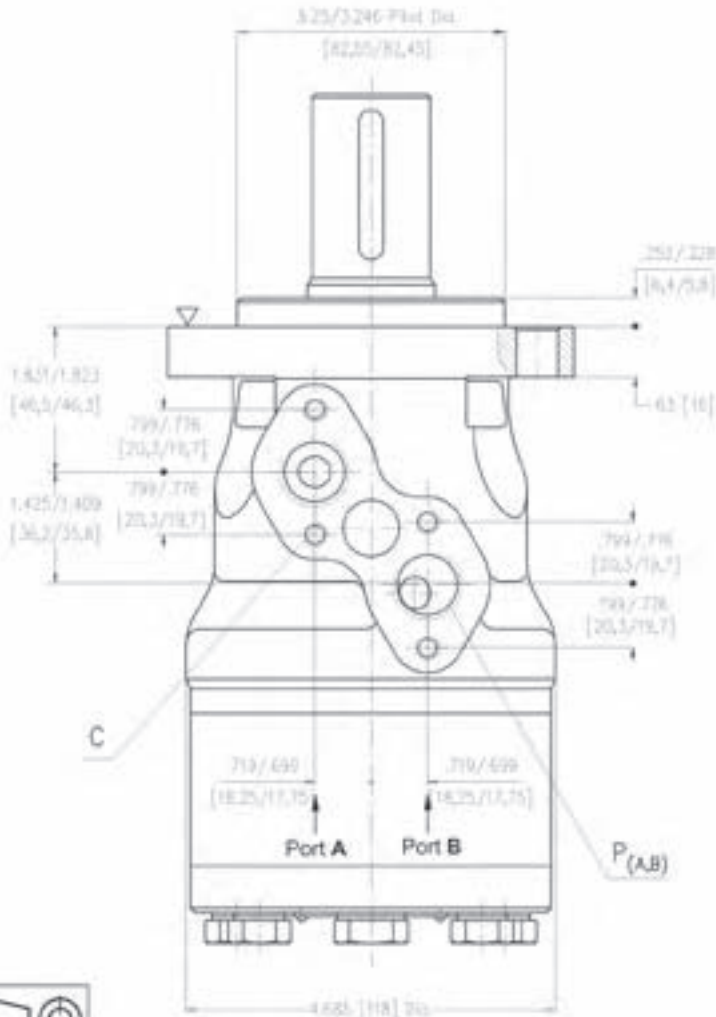
Type	L, mm	L ₁ , mm
MLHH 200	6.65 [169]	1.09 [27.8]
MLHH 250	6.93 [176]	1.37 [34.8]
MLHH 315	7.24 [184]	1.71 [43.5]
MLHH 400	7.72 [196]	2.16 [54.8]
MLHH 500	8.31 [211]	2.73 [69.4]

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

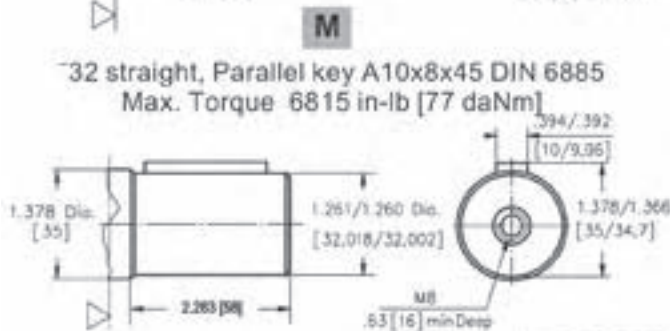
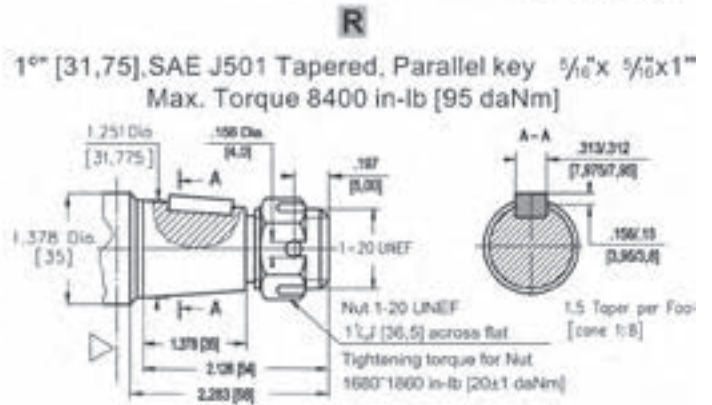
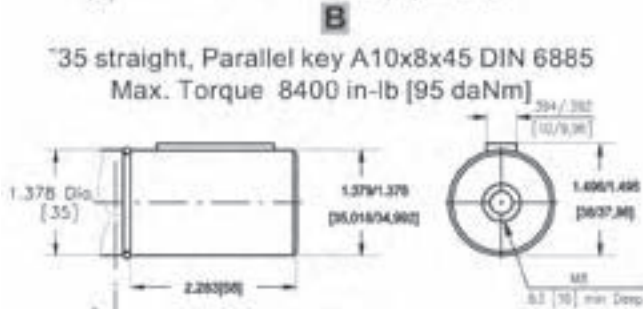
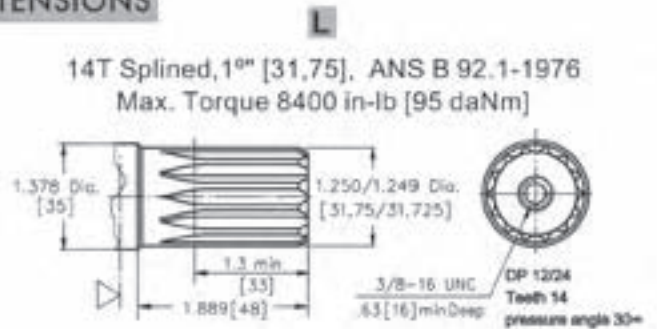
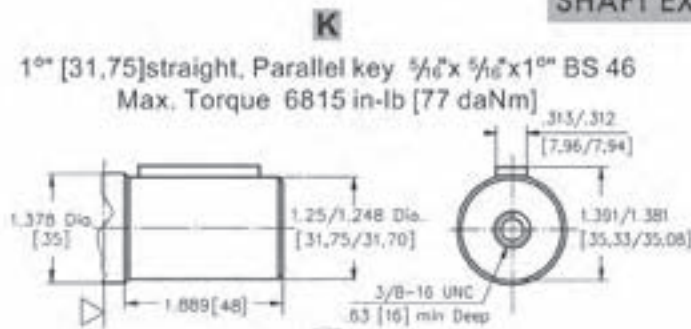
Reverse Rotation
Viewed from Shaft End
Port A Pressurized - CCW
Port B Pressurized - CW



	Versions			
	2	3	4	5
C	4xM8	4xM8	4x $\frac{7}{16}$ -18UNC	4x $\frac{7}{16}$ -18UNC
P _(A,B)	2xG Ω	2xM22x1,5	2x $\frac{7}{8}$ -14UNF	2x Ω -14NPTF
T	G ^o	M14x1,5	$\frac{7}{8}$ -20UNF	$\frac{7}{8}$ -20UNF



SHAFT EXTENSIONS



D - 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" [31,75] straight, Parallel key
L	- 1" [31,75] Splined 14T ANS B92.1-1976
B	- 35 straight, Parallel key
R	- 1" [31,75] SAE J501 Tapered
M	- 32 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 - Special Features

omit	- none
LL	- Low Leakage
LSV	- Low Speed Valve

Pos. 5 - Rotation

omit	- Standard Rotation
R	- Reverse Rotation

Pos. 6 - Option [Paint]**

omit	- no Paint
P	- Painted
PC	- Corrosion Protected Paint

Pos. 7 - Design Series

omit	- Factory specified
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Notes : * The permissible output torque for shafts must be not exceeded!

** Color at customer's request.

The hydraulic motors are mangano phosphatized as standard.

DISC VALVE HYDRAULIC MOTORS

DISC VALVE's function is to distribute fluid to the Roller Gear Set. The pressure balanced sealing surface on the valve face and the separately driven maintains minimal leakage and mechanical losses. These gives the motors high efficiency- even at high pressures, and good starting characteristics.

ROLLER GEAR SET minimizes friction and thereby increases efficiency while providing smooth output shaft

MLHS, MLHT and **MLHV** are suitable for continuous operation under rough operating conditions- high pressures, thin oil, or frequent reversals. The Tapered roller bearings permit high radial loads.

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 The wheel motor mounting flange is located near the center of the motor which permits part or all of the motor to be located inside the wheel or roller hub. In traction drive applications, loads can be positioned over the motor bearings for best bearing life. This wheele motor mounting flange provides design flexibility in many applications.

Short Motor This motor is assembled without the output shaft, bearings and bearing housing and has the same drive components as the standard and wheel motors. The short motor is especially suited for applications such as gear boxes, winch, reel and roll drives. Short motor applications must be designed with a bearing supported internal spline to mate with the bearing less motor drive. Product designs using these hydraulic motors provide considerable cost savings.

Low Leakage **LL** Series hydraulic motors have been 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 drainage ports. Their main purpose is to operate as series-connected motors in hydraulic systems.
For this version is permissible decreasing of the maximal torque with up to 5% (at middle speed) and up to 10% (at high speed) in comparison to the standard versions of motors.
This version is available for the MLHS motors.

Low Speed Valve **LSV** Series hydraulic motors have been designed to operate with normal pressure drop and to ensure smooth run at low speed (up to 200 RPM), as the best security for operation is guaranteed at frequency of rotation 20 + 50 RPM. They have an increased starting pressure drop and are not recommended for using at pressure less than 40 bar.
This version is available for the MLHS motors.