



## SPOOL VALVE HYDRAULIC MOTORS

**TYPE MLHM**  
**MLHP**  
**MLHR**  
**MLHH**



**SAE version**

# SPOOL VALVE HYDRAULIC MOTORS

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# SPOOL VALVE HYDRAULIC MOTORS

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## GENERAL INFORMATION:

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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:

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**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.

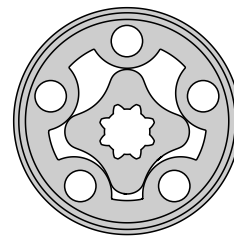
**Motors with Speed Sensor** Motors are available with integrated inductive sensor who registered the speed of the motor. The sensor is a Hall effect device and produced electric output signal with a standard voltage that can be used for regulating the speed of a motor. The torque and radial load of 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

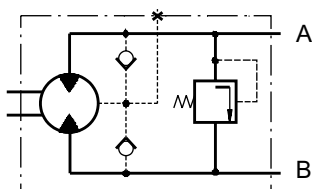
- » Model- Spool valve, gerotor
- » With or without flange
- » Side and rear ports
- » Series with pressure valve(s)
- » Shafts- straight and splined
- » SAE, Metric and BSPP ports
- » Speed sensing
- » Other special features

## GENERAL

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

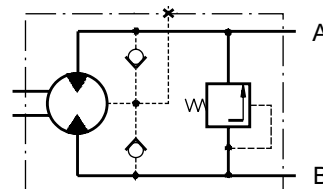
### MLHM...P Series with Integrated Internal Crossover Relief Valve

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

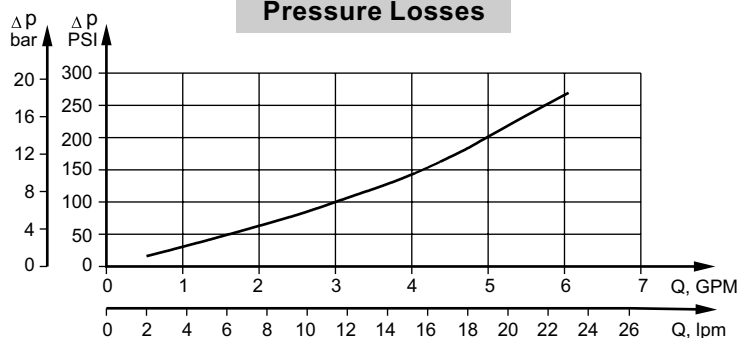


### MLHM...P Series with Integrated Internal Crossover Relief Valve

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

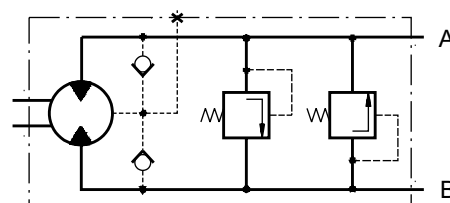


### Pressure Losses



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

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



## SPECIFICATION DATA

| Type                                                                                          |                           | MLHM<br>8  | MLHM<br>12.5 | MLHM<br>20 | MLHM<br>32  | MLHM<br>40  | MLHM<br>50 |
|-----------------------------------------------------------------------------------------------|---------------------------|------------|--------------|------------|-------------|-------------|------------|
| Displacement, in. <sup>3</sup> /rev. [cm. <sup>3</sup> /rev.]                                 |                           | .5 [8,2]   | .79 [12,9]   | 1.22 [20]  | 1.93 [31,8] | 2.44 [40]   | 3.05 [50]  |
| Max. Speed,<br>[RPM]                                                                          | Cont.                     | 1950       | 1550         | 1000       | 630         | 500         | 400        |
|                                                                                               | Int.*                     | 2440       | 1940         | 1250       | 790         | 625         | 500        |
| Max. Torque<br>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<br>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<br>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<br>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<br>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<br>without Drain Line or<br>Max. Pressure<br>in Drain Line,<br>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<br>with Drain Line<br>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<br>Unloaded Shaft, PSI [bar]                                      | Peak**                    | 3260 [225] | 3260 [225]   | 3260 [225] | 3260 [225]  | 3260 [225]  | 3260 [225] |
|                                                                                               |                           |            |              |            |             |             |            |
| Min. Starting Torque<br>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]<br><br>For "F" flange:<br>+ .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 mm<sup>2</sup>/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<br>217      | 45.7<br>207    | 65.5<br>196    | 94.8<br>148   | 109<br>105    | 122<br>55     | 230            |
|                               | 1    | 30<br>450        | 44.5<br>447    | 64.5<br>440    | 98.8<br>405   | 114<br>371    | 132<br>314    | 461            |
|                               | 2    | 27<br>905        | 43.1<br>899    | 62.6<br>880    | 97.1<br>840   | 113<br>812    | 133<br>775    | 923            |
|                               | 3    | 13.9<br>1372     | 40.1<br>1355   | 60.7<br>1332   | 95.4<br>1292  | 111<br>1258   | 130<br>1224   | 1384           |
| Max. Cont.                    | 4.25 |                  | 31.3<br>1924   | 56.7<br>1912   | 91.1<br>1873  | 106<br>1844   | 126<br>1791   | 1961           |
| Max. Int.                     | 5.25 |                  | 0<br>2420      | 52.7<br>2383   | 88.2<br>2338  | 101<br>2316   | 122<br>2270   | 2423           |
| Torque (theor.) in-lb. [daNm] |      | 40.7<br>[0,46]   | 57.5<br>[0,65] | 80.5<br>[0,91] | 119<br>[1,35] | 138<br>[1,56] | 157<br>[1,78] |                |

.50 in<sup>3</sup>./rev. [8,2 cm<sup>3</sup>./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<br>96     | 79<br>91     | 123<br>85     | 169<br>70     | 238<br>40     | 262<br>20     |                | 94,5        |
|                               | 1          | 33<br>187      | 79.5<br>181  | 120<br>173    | 167<br>169    | 242<br>127    | 273<br>106    | 312<br>70      | 189         |
|                               | 2          | 35<br>378      | 78.5<br>375  | 115<br>371    | 163<br>358    | 244<br>323    | 278<br>303    | 318<br>274     | 379         |
|                               | 3          | 31<br>566      | 74<br>564    | 108<br>559    | 155<br>550    | 240<br>518    | 275<br>497    | 319<br>468     | 567         |
|                               | 4          | 25<br>750      | 67<br>746    | 101<br>743    | 148<br>733    | 233<br>700    | 269<br>689    | 315<br>664     | 757         |
|                               | Max. Cont. | 5.5            | 13<br>1038   | 53<br>1035    | 90<br>1031    | 163<br>1024   | 218<br>1000   | 255<br>1993    | 302<br>1960 |
| Max. Int.                     | 6.6        |                | 38<br>1247   | 77<br>1245    | 125<br>1242   | 206<br>1189   | 245<br>1180   | 291<br>1176    | 1250        |
| Torque (theor.) in-lb. [daNm] |            | 47.8<br>[0,54] | 98<br>[1,11] | 140<br>[1,59] | 197<br>[2,23] | 291<br>[3,29] | 338<br>[3,82] | 385<br>[4,36]  |             |

1.22 in<sup>3</sup>./rev. [20 cm<sup>3</sup>./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<br>133      | 70.8<br>129    | 100<br>113      | 147.4<br>65     | 164<br>33       |                 | 146            |
|                               | 1   | 49.2<br>281      | 71.2<br>275    | 101.6<br>260    | 153<br>218      | 172<br>190      | 200<br>138      | 293            |
|                               | 2   | 46.8<br>575      | 69.1<br>566    | 100.4<br>554    | 154<br>516      | 175<br>488      | 206<br>446      | 586            |
|                               | 3   | 43.8<br>866      | 66.3<br>860    | 97.1<br>850     | 150<br>816      | 173<br>792      | 205<br>745      | 880            |
| Max. Cont.                    | 4   | 39.8<br>1160     | 63.1<br>1152   | 94.1<br>1144    | 147<br>1109     | 170<br>1085     | 203<br>1043     | 1170           |
|                               | 5.5 | 30<br>1604       | 55.6<br>1593   | 87<br>1582      | 139<br>1560     | 164<br>1541     | 195<br>1494     | 1612           |
| Max. Int.                     | 6.6 | 14.8<br>1910     | 50<br>1891     | 80<br>1878      | 132<br>1848     | 157<br>1828     | 191<br>1788     | 1937           |
| Torque (theor.) in-lb. [daNm] |     | 62.8<br>[0,71]   | 91.1<br>[1,03] | 127.4<br>[1,44] | 187.6<br>[2,12] | 217.7<br>[2,46] | 248.7<br>[2,81] |                |

.79 in<sup>3</sup>./rev. [12,9 cm<sup>3</sup>./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<br>58         | 130<br>54    | 181<br>49    | 246<br>44    | 366<br>15    |              |              | 59             |
|                               | 1          | 66<br>119        | 132<br>114   | 182<br>108   | 251<br>100   | 375<br>77    | 430<br>63    | 500<br>46    | 119            |
|                               | 2          | 62<br>236        | 128<br>230   | 177<br>226   | 252<br>218   | 377<br>195   | 433<br>183   | 506<br>158   | 238            |
|                               | 3          | 52<br>357        | 115<br>353   | 169<br>348   | 245<br>342   | 373<br>319   | 431<br>304   | 506<br>280   | 357            |
|                               | 4          | 40<br>476        | 108<br>472   | 159<br>468   | 234<br>462   | 363<br>441   | 422<br>429   | 500<br>406   | 476            |
|                               | Max. Cont. | 5.5              | 24<br>654    | 88<br>651    | 144<br>648   | 220<br>640   | 345<br>621   | 406<br>605   | 480<br>585     |
| Max. Int.                     | 6.6        | 7<br>786         | 74<br>784    | 127<br>782   | 204<br>778   | 327<br>761   | 385<br>748   | 453<br>727   | 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] | 248.7 [2,81] |                |

1.93 in<sup>3</sup>./rev. [31,8 cm<sup>3</sup>./rev.]

The Performance data was collected at back pressure 72.5÷145 PSI [5÷10 bar] and oil with viscosity of 150 SUS [32 mm<sup>2</sup>/s] at 122°F [50° C].



## Performance Data MLHM 40

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

2.53 in<sup>3</sup>./rev. [41,5 cm<sup>3</sup>./rev.]

## Performance Data MLHM 50

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

Torque [in-lb] 550  
Speed [RPM] 52

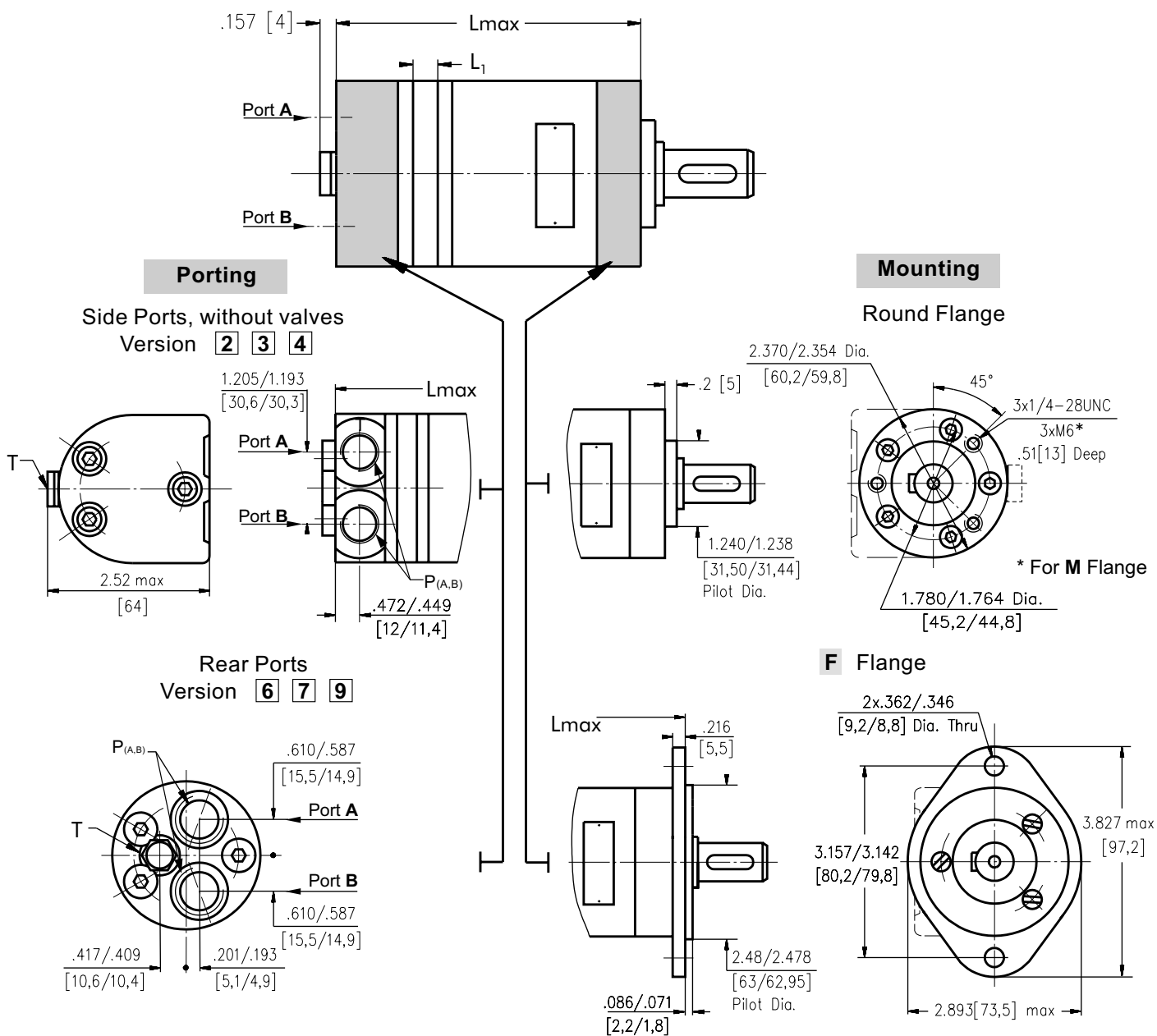
3.14 in<sup>3</sup>./rev. [51,5 cm<sup>3</sup>./rev.]

### 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 mm<sup>2</sup>/s] at 122°F [50° C].

## DIMENSIONS AND MOUNTING DATA



| Versions                 |                   |            |                          |
|--------------------------|-------------------|------------|--------------------------|
|                          | <b>2 6</b>        | <b>3 9</b> | <b>4 7</b>               |
| <b>P<sub>(A,B)</sub></b> | 2xG $\frac{3}{8}$ | 2xM18x1,5  | 2x $\frac{9}{16}$ -18UNF |
| <b>T</b>                 | G $\frac{1}{8}$   | M10x1      | $\frac{3}{8}$ -24UNF     |

### Standard Rotation

Viewed from Shaft End

Port A Pressurized - **CW**

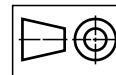
Port B Pressurized - **CCW**

### Reverse Rotation

Viewed from Shaft End

Port A Pressurized - **CCW**

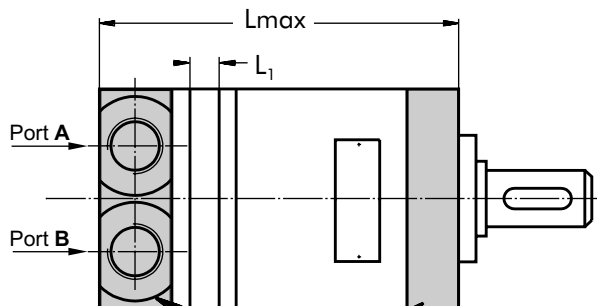
Port B Pressurized - **CW**



| Type        | Side Ports<br>$L_{max}^1$ in.[mm] | Rear Ports<br>$L_{max}^1$ in.[mm] | Type       | Side Ports<br>$L_{max}^1$ in.[mm] | Rear Ports<br>$L_{max}^1$ in.[mm] | $L_1$<br>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]        |



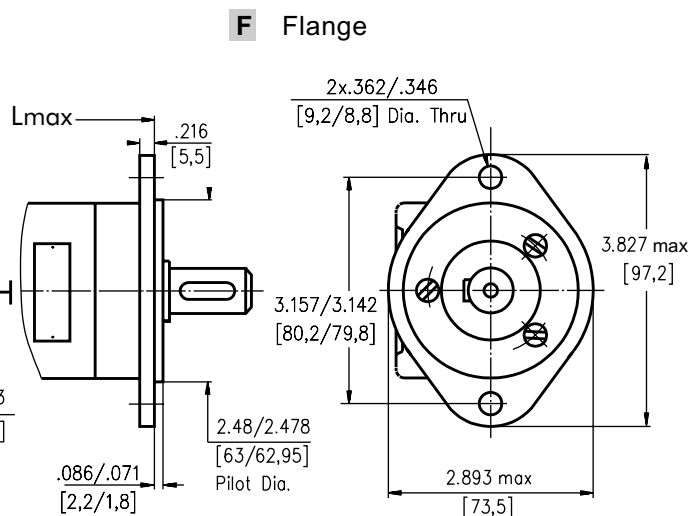
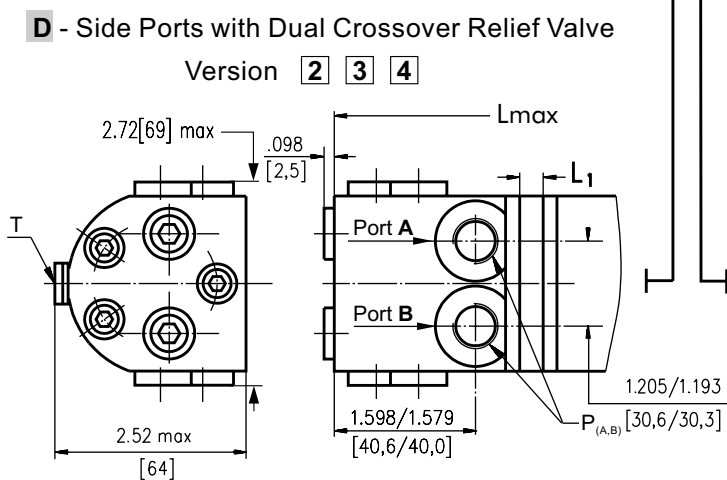
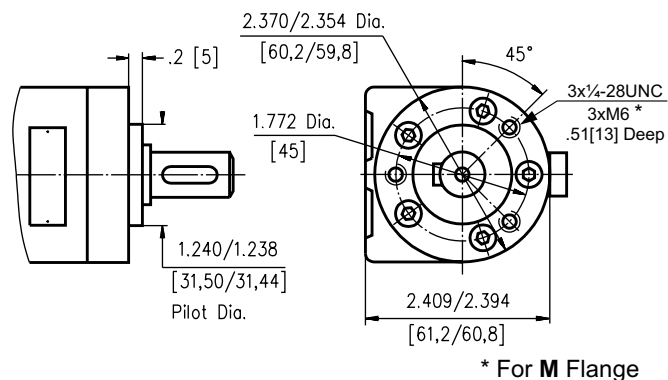
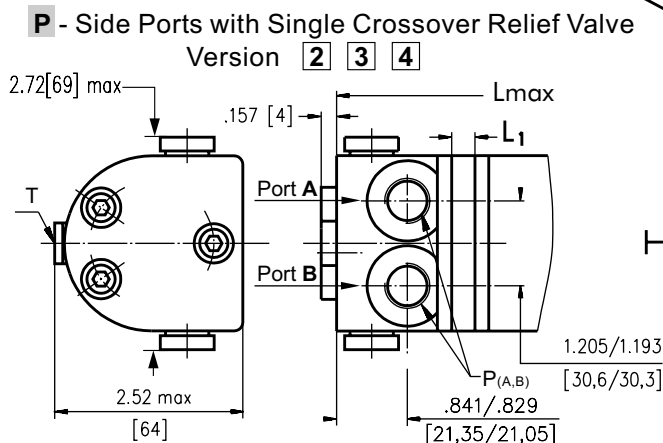
## DIMENSIONS AND MOUNTING DATA



### Porting

### Mounting

#### Round Flange



|                    | Versions                        |           |                                        |
|--------------------|---------------------------------|-----------|----------------------------------------|
|                    | 2                               | 3         | 4                                      |
| P <sub>(A,B)</sub> | 2xG <sup>3</sup> / <sub>8</sub> | 2xM18x1,5 | 2x <sup>9</sup> / <sub>16</sub> -18UNF |
| T                  | G <sup>1</sup> / <sub>8</sub>   | M10x1     | <sup>3</sup> / <sub>8</sub> -24UNF     |

#### Standard Rotation

Viewed from Shaft End

Port A Pressurized - CW

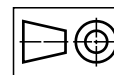
Port B Pressurized - CCW

#### Reverse Rotation

Viewed from Shaft End

Port A Pressurized - CCW

Port B Pressurized - CW

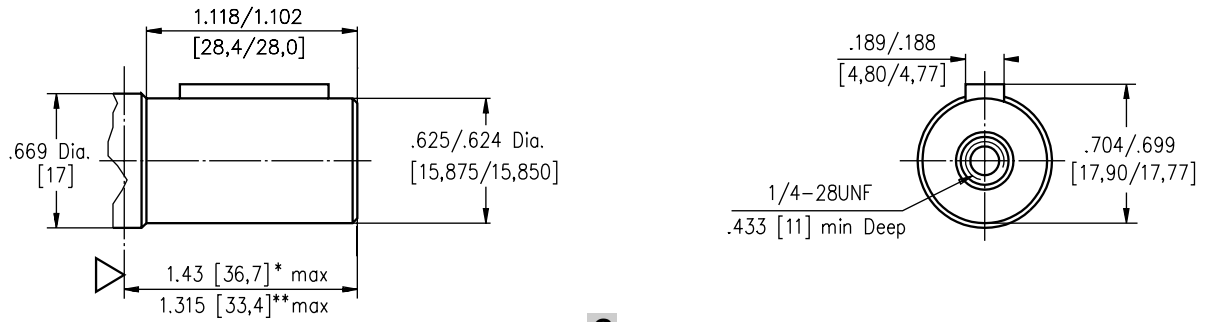


| Type            | L <sub>max</sub> , in.[mm] | Type          | L <sub>max</sub> , in.[mm] | Type            | L <sub>max</sub> , in.[mm] | Type          | L <sub>max</sub> , in.[mm] | L <sub>1</sub> , in.[mm] |
|-----------------|----------------------------|---------------|----------------------------|-----------------|----------------------------|---------------|----------------------------|--------------------------|
| 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

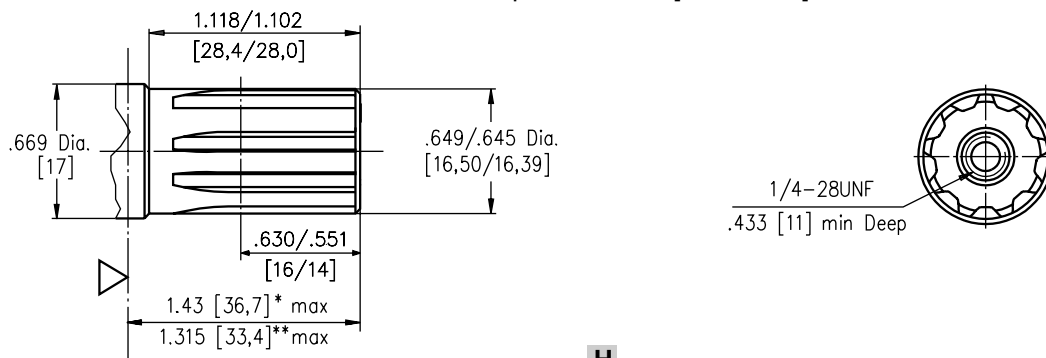
**C**

$\frac{5}{8}$ " [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]



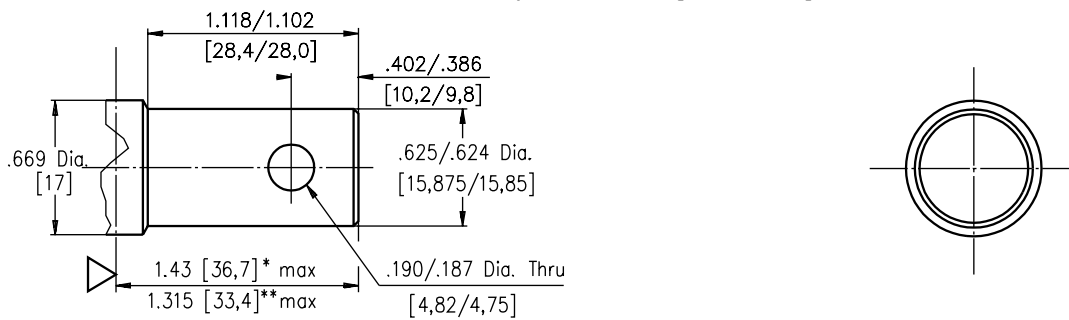
**G**

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



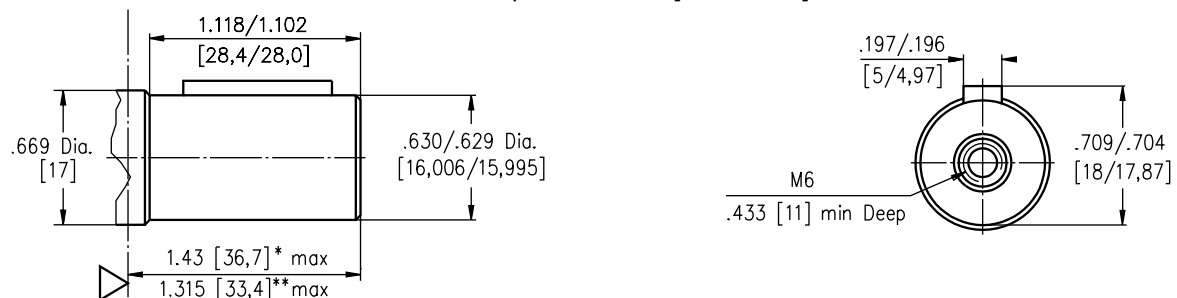
**H**

$\frac{5}{8}$ " [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]

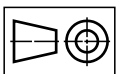


\* For Round Flange

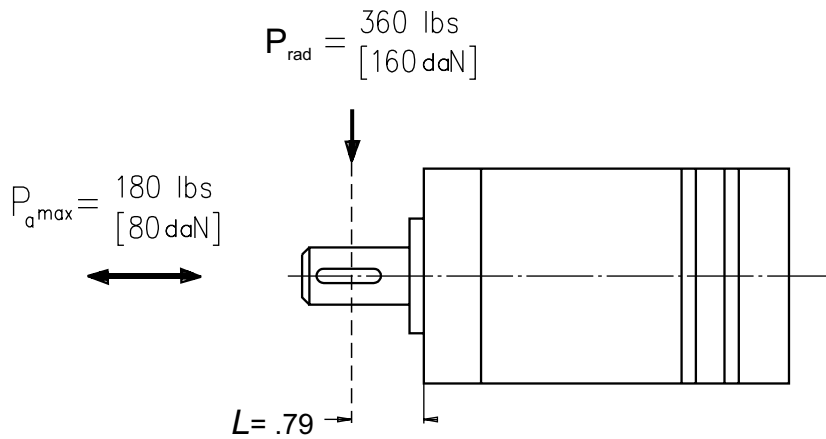
▽ - Motor Mounting Surface

\*\* 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:

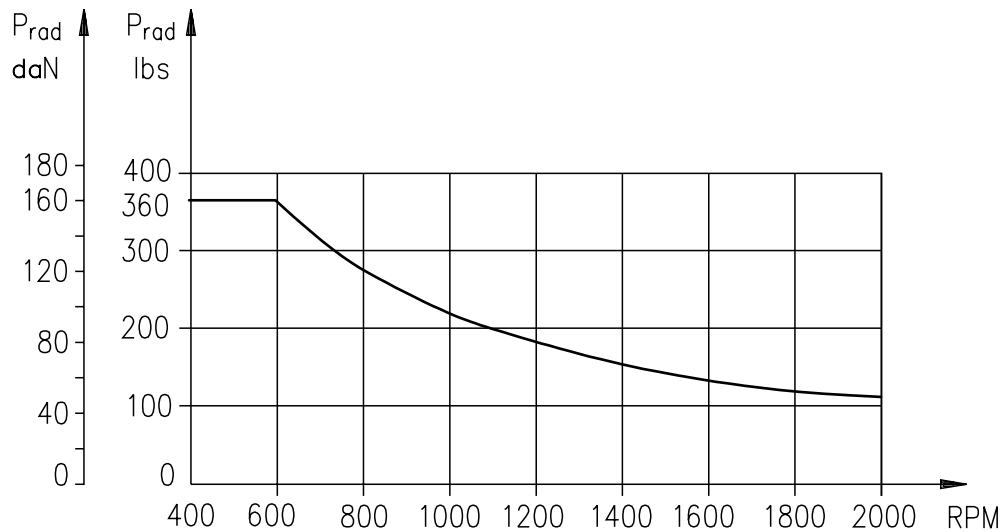
$$* P_{rad} = \frac{600}{n} \times \frac{1155}{2.42 + L}, [\text{lbs}]$$

\* 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 |
|----------------|---|---|---|---|---|---|---|---|
| <b>M L H M</b> |   |   |   |   |   |   |   |   |

### 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.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**12.5** - .79 [12,9] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**20** - 1.22 [20,0] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**32** - 1.93 [31,8] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**40** - 2.44 [40,0] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**50** - 3.05 [50,0] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

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

**C** - <sup>5</sup>/<sub>8</sub>" [15,8] straight, Parallel key

**VC** - <sup>5</sup>/<sub>8</sub>" [15,8] straight, Parallel key w/ corrosion resistant bushing

**G** - Involute Splined- Metric B17x14 DIN5482

**H** - <sup>5</sup>/<sub>8</sub>" [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

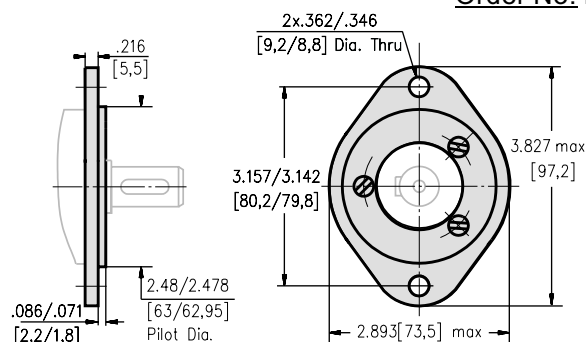
Notes: \* The permissible output torque for shafts must not be exceeded!

\*\* 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



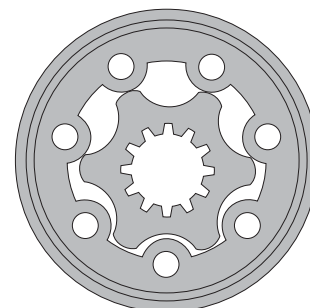
Flange Kit includes 3 screws - 1/4-28 UNF for attaching flange to the motor.

# 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.



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## 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

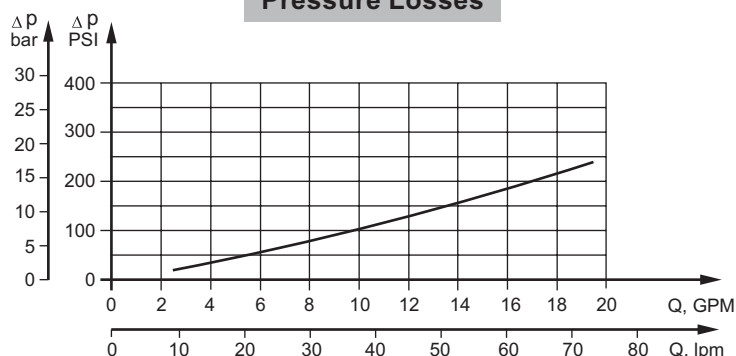
## GENERAL

|                                                        |                                              |                                                                 |
|--------------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------|
| <b>Displacement,</b>                                   | in <sup>3</sup> /rev [cm <sup>3</sup> /rev.] | 1.52÷38.05 [25÷623,6]                                           |
| <b>Max. Speed,</b>                                     | [RPM]                                        | 97÷1600                                                         |
| <b>Max. Torque,</b>                                    | in-lb [daNm]                                 | 290÷4415 [3,3÷50]                                               |
| <b>Max. Output,</b>                                    | HP [kW]                                      | 4.4÷14.1 [3,3÷10,5]                                             |
| <b>Max. Pressure Drop,</b>                             | PSI [bar]                                    | 800÷2030 [55÷140]                                               |
| <b>Max. Oil Flow,</b>                                  | GPM [lpm]                                    | 10.5÷16 [40÷60,6]                                               |
| <b>Min. Speed,</b>                                     | [RPM]                                        | 10                                                              |
| <b>Pressure fluid</b>                                  |                                              | Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)                 |
| <b>Temperature range,</b>                              | °F [°C]                                      | -22÷194 [-30÷90]                                                |
| <b>Optimal Viscosity range, SUS [mm<sup>2</sup>/s]</b> |                                              | 98÷347 [20÷75]                                                  |
| <b>Filtration</b>                                      |                                              | ISO code 20/16 (Min. recommended fluid filtration of 25 micron) |

### Oil flow in drain line

| Pressure drop<br>PSI [bar] | Viscosity<br>SUS [mm <sup>2</sup> /s] | Oil flow in<br>drain line<br>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<br>25 | MLHP<br>32 | MLHP<br>40  | MLHP<br>50  | MLHP<br>80   | MLHP<br>100 | MLHP<br>125  |
|---------------------------------------------------------------|--------------------------|------------|------------|-------------|-------------|--------------|-------------|--------------|
| Displacement, in. <sup>3</sup> /rev. [cm. <sup>3</sup> /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,<br>[RPM]                                          | Cont.                    | 1600       | 1560       | 1515        | 1225        | 765          | 612         | 489          |
|                                                               | Int.*                    | 1815       | 1720       | 1760        | 1530        | 956          | 765         | 611          |
| Max. Torque<br>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<br>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<br>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<br>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 [75,7]   | 20 [75,7]    | 20 [75,7]   | 20 [75,7]    |
| Max. Inlet Pressure<br>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-<br>sure with Drain Line<br>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<br>Unloaded Shaft, PSI [bar]      |                          | 145 [10]   | 145 [10]   | 145 [10]    | 145 [10]    | 145 [10]     | 145 [10]    | 131 [9]      |
| Min. Starting Torque<br>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]<br>For rear ports<br>+.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 mm<sup>2</sup>/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<br>160  | MLHP<br>200 | MLHP<br>250  | MLHP<br>315  | MLHP<br>400 | MLHP<br>500 | MLHP<br>630   |
|---------------------------------------------------------------|--------------------------|--------------|-------------|--------------|--------------|-------------|-------------|---------------|
| Displacement, in. <sup>3</sup> /rev. [cm. <sup>3</sup> /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,<br>[RPM]                                          | Cont.                    | 382          | 306         | 245          | 191          | 153         | 122         | 97            |
|                                                               | Int.*                    | 479          | 383         | 306          | 239          | 191         | 153         | 121           |
| Max. Torque<br>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<br>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<br>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<br>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<br>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-<br>sure with Drain Line<br>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<br>Unloaded Shaft, PSI [bar]      |                          | 116 [8]      | 100 [7]     | 87 [6]       | 73 [5]       | 73 [5]      | 73 [5]      | 73 [5]        |
| Min. Starting Torque<br>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]<br>For rear ports<br>+.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 mm<sup>2</sup>/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<br>25            | MLHP<br>32 | MLHP<br>40  | MLHP<br>50  | MLHP<br>80   | MLHP<br>100 | MLHP<br>125  |
|---------------------------------------------------------------|--------------------------|-----------------------|------------|-------------|-------------|--------------|-------------|--------------|
| Displacement, in. <sup>3</sup> /rev. [cm. <sup>3</sup> /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,<br>[RPM]                                          | Cont.                    | 1600                  | 1560       | 1515        | 1225        | 765          | 612         | 489          |
|                                                               | Int.*                    | 1815                  | 1720       | 1760        | 1530        | 956          | 765         | 611          |
| Max. Torque<br>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<br>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<br>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<br>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 [75,7]   | 20 [75,7]    | 20 [75,7]   | 20 [75,7]    |
| Max. Inlet Pressure<br>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-<br>sure with Drain Line<br>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<br>Unloaded Shaft, PSI [bar]      |                          | 145 [10]              | 145 [10]   | 145 [10]    | 145 [10]    | 145 [10]     | 145 [10]    | 131 [9]      |
| Min. Starting Torque<br>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]<br>For rear ports: +.992 [0,450]              |                          | MLHP(F)<br>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 mm<sup>2</sup>/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<br>160          | MLHP<br>200 | MLHP<br>250  | MLHP<br>315  | MLHP<br>400 | MLHP<br>500 | MLHP<br>630   |
|---------------------------------------------------------------|--------------------------|----------------------|-------------|--------------|--------------|-------------|-------------|---------------|
| Displacement, in. <sup>3</sup> /rev. [cm. <sup>3</sup> /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,<br>[RPM]                                          | Cont.                    | 382                  | 306         | 245          | 191          | 153         | 122         | 97            |
|                                                               | Int.*                    | 479                  | 383         | 306          | 239          | 191         | 153         | 121           |
| Max. Torque<br>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<br>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<br>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<br>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<br>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-<br>sure with Drain Line<br>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<br>Unloaded Shaft, PSI [bar]      |                          | 116 [8]              | 100 [7]     | 87 [6]       | 73 [5]       | 73 [5]      | 73 [5]      | 73 [5]        |
| Min. Starting Torque<br>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]<br>For rear ports: +.992 [0,450]              |                          | MLHP(F)<br>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 mm<sup>2</sup>/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 ( $\Delta$ PSI) |               |               |               | Max. Int.     |               | Speed (theor.) |
|---------------------------------------------------------|----|--------------------------|---------------|---------------|---------------|---------------|---------------|----------------|
|                                                         |    | 450                      | 900           | 1160          | 1450          | 1740          | 2030          |                |
| Flow [GPM]                                              | 1  | 98<br>121                | 181<br>78     | 227<br>46     | -<br>-        | -<br>-        | -<br>-        | 150            |
|                                                         | 2  | 103<br>272               | 191<br>226    | 237<br>193    | 296<br>144    | 350<br>81     | 398<br>20     | 303            |
|                                                         | 3  | 102<br>424               | 191<br>376    | 237<br>343    | 298<br>293    | 357<br>224    | 411<br>154    | 454            |
|                                                         | 5  | 99<br>717                | 188<br>665    | 236<br>630    | 297<br>580    | 360<br>518    | 419<br>451    | 757            |
|                                                         | 7  | 94<br>1008               | 182<br>955    | 231<br>921    | 293<br>869    | 357<br>806    | 420<br>736    | 1060           |
|                                                         | 9  | 87<br>1311               | 174<br>1253   | 225<br>1214   | 287<br>1161   | 351<br>1102   | 415<br>1033   | 1364           |
| Max. Cont.                                              | 11 | 76<br>1546               | 166<br>1488   | 218<br>1450   | 282<br>1400   | 345<br>1335   | 410<br>1270   | 1664           |
| Max. Int.                                               | 12 | 70<br>1764               | 157<br>1703   | 211<br>1664   | 275<br>1615   | 339<br>1555   | 403<br>1490   | 1817           |
| Torque (theor.) in-lb. [daNm]                           |    | 108<br>[1,23]            | 218<br>[2,47] | 281<br>[3,18] | 352<br>[3,98] | 422<br>[4,77] | 493<br>[5,57] |                |
| 1.52 in <sup>3</sup> ./rev. [25 cm <sup>3</sup> ./rev.] |    |                          |               |               |               |               |               |                |

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

## Performance Data

## MLHP 32

|                                                         |      | Pressure ( $\Delta$ PSI) |               |               |               | Max. Int.     |               | Speed (theor.) |
|---------------------------------------------------------|------|--------------------------|---------------|---------------|---------------|---------------|---------------|----------------|
|                                                         |      | 450                      | 900           | 1160          | 1450          | 1740          | 2030          |                |
| Flow [GPM]                                              | 1    | 118<br>90                | 229<br>52     | 291<br>25     | -<br>-        | -<br>-        | -<br>-        | 118            |
|                                                         | 2    | 118<br>210               | 232<br>171    | 298<br>141    | 373<br>100    | 445<br>51     | -<br>-        | 237            |
|                                                         | 3    | 118<br>331               | 233<br>291    | 302<br>260    | 377<br>219    | 454<br>166    | 520<br>113    | 355            |
|                                                         | 5    | 113<br>564               | 229<br>527    | 302<br>491    | 379<br>448    | 460<br>390    | 531<br>315    | 592            |
|                                                         | 7    | 107<br>798               | 224<br>759    | 296<br>726    | 376<br>683    | 457<br>631    | 535<br>558    | 828            |
|                                                         | 9    | 98<br>1036               | 216<br>992    | 289<br>958    | 371<br>916    | 452<br>865    | 532<br>800    | 1066           |
| Max. Cont.                                              | 11   | 90<br>1268               | 207<br>1222   | 280<br>1191   | 362<br>1149   | 445<br>1097   | 526<br>1035   | 1300           |
|                                                         | 13   | 81<br>1510               | 198<br>1460   | 271<br>1424   | 353<br>1380   | 438<br>1321   | 518<br>1261   | 1538           |
| Max. Int.                                               | 14.5 | 74<br>1693               | 190<br>1641   | 261<br>1607   | 344<br>1560   | 432<br>1504   | 510<br>1437   | 1715           |
| Torque (theor.) in-lb. [daNm]                           |      | 140<br>[1,58]            | 280<br>[3,16] | 360<br>[4,07] | 450<br>[5,09] | 541<br>[6,11] | 631<br>[7,13] |                |
| 1.95 in <sup>3</sup> ./rev. [32 cm <sup>3</sup> ./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 mm<sup>2</sup>/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<br>87        | 278<br>74     | 364<br>61     | 443<br>47     | 533<br>28     | 617<br>8      | -<br>-        | 95        |      |                |
|                               | 2    | 138<br>180       | 289<br>165    | 376<br>152    | 459<br>137    | 552<br>116    | 643<br>92     | 710<br>74     |           | 189  |                |
|                               | 4    | 135<br>367       | 283<br>353    | 375<br>340    | 460<br>327    | 559<br>308    | 657<br>285    | 724<br>258    |           |      |                |
|                               | 6    | 129<br>557       | 274<br>544    | 370<br>533    | 457<br>519    | 558<br>501    | 656<br>478    | 724<br>451    |           | 568  |                |
|                               | 8    | 121<br>748       | 263<br>735    | 362<br>722    | 450<br>711    | 552<br>696    | 650<br>674    | 719<br>657    |           |      | 757            |
|                               | 10   | 109<br>941       | 249<br>929    | 352<br>918    | 441<br>906    | 543<br>889    | 640<br>872    | 708<br>858    |           | 946  |                |
|                               | 12   | 97<br>1128       | 236<br>1114   | 340<br>1100   | 428<br>1088   | 532<br>1073   | 629<br>1056   | 697<br>1044   |           |      | 1136           |
|                               | 14   | 84<br>1313       | 220<br>1300   | 328<br>1287   | 416<br>1274   | 519<br>1260   | 617<br>1243   | 685<br>1231   |           | 1325 |                |
| Max. Cont.                    | 16   | 68<br>1500       | 203<br>1485   | 316<br>1472   | 402<br>1460   | 505<br>1444   | 604<br>1427   | 673<br>1414   | 1514      |      |                |
|                               | 18.5 | 47<br>1739       | 179<br>1722   | 297<br>1703   | 381<br>1689   | 485<br>1671   | 586<br>1653   | 655<br>1642   |           | 1751 |                |
| Torque (theor.) in-lb. [daNm] |      | 174<br>[1,97]    | 350<br>[3,95] | 450<br>[5,09] | 563<br>[6,36] | 676<br>[7,64] | 789<br>[8,91] | 874<br>[9,88] | Torque    |      |                |

2.44 in<sup>3</sup>/rev. [40 cm<sup>3</sup>/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<br>71         | 345<br>63     | 459<br>45     | 571<br>19     | -<br>-        | -<br>-        | -<br>-         | -<br>-         | -<br>-         | 77     |                |
|                               | 2  | 176<br>150        | 357<br>133    | 482<br>113    | 591<br>86     | 727<br>70     | 760<br>51     | 816<br>30      | -<br>-         | -<br>-         | 153    |                |
|                               | 4  | 165<br>304        | 355<br>290    | 477<br>274    | 604<br>255    | 730<br>232    | 771<br>213    | 853<br>182     | 971<br>137     | 1054<br>97     | 306    |                |
|                               | 6  | 158<br>454        | 346<br>443    | 474<br>432    | 600<br>413    | 729<br>390    | 776<br>378    | 854<br>368     | 988<br>325     | 1080<br>298    | 459    |                |
|                               | 8  | 145<br>613        | 339<br>602    | 462<br>587    | 594<br>566    | 725<br>543    | 772<br>532    | 848<br>518     | 986<br>486     | 1078<br>459    | 612    |                |
|                               | 10 | 128<br>767        | 329<br>757    | 450<br>743    | 584<br>724    | 712<br>696    | 760<br>687    | 840<br>670     | 972<br>639     | 1067<br>617    | 765    |                |
|                               | 12 | 115<br>922        | 312<br>912    | 437<br>902    | 567<br>886    | 701<br>862    | 748<br>851    | 828<br>836     | 959<br>804     | 1054<br>781    | 918    |                |
|                               | 14 | 98<br>1078        | 290<br>1069   | 420<br>1058   | 552<br>1040   | 682<br>1018   | 726<br>1004   | 810<br>990     | 943<br>958     | 1028<br>937    | 1071   |                |
| Max. Cont.                    | 16 | 79<br>1232        | 272<br>1217   | 400<br>1206   | 543<br>1193   | 660<br>1173   | 708<br>1167   | 793<br>1155    | 918<br>1131    | 1001<br>1110   | 1224   |                |
| Max. Int.                     | 18 | 57<br>1389        | 244<br>1368   | 374<br>1355   | 504<br>1342   | 635<br>1325   | 685<br>1314   | 771<br>1304    | 896<br>1270    | 975<br>1240    | 1377   |                |
|                               | 20 | 34<br>1540        | 215<br>1521   | 347<br>1510   | 476<br>1492   | 603<br>1483   | 648<br>1474   | 740<br>1466    | 867<br>1428    | 941<br>1402    | 1530   |                |
| Torque (theor.) in-lb. [daNm] |    | 216<br>[2,44]     | 432<br>[4,88] | 553<br>[6,25] | 697<br>[7,88] | 836<br>[9,44] | 870<br>[9,83] | 975<br>[11,02] | 1115<br>[12,6] | 1221<br>[13,8] | Torque |                |

3.02 in<sup>3</sup>/rev. [49,5 cm<sup>3</sup>/rev.]

The Performance data was collected at back pressure 72.5÷145 PSI [5÷10 bar] and oil with viscosity of 150 SUS [32 mm<sup>2</sup>/s] at 122°F [50° C].

## Performance Data

## MLHP 80

|                                                           |    | Pressure ( Δ PSI) |              |               |                |                 |                | Max.<br>Cont.   | Max.<br>Int.    | Speed<br>(theor.) |     |
|-----------------------------------------------------------|----|-------------------|--------------|---------------|----------------|-----------------|----------------|-----------------|-----------------|-------------------|-----|
|                                                           |    | 450               | 900          | 1150          | 1450           | 1740            | 1810           | 2030            | 2320            | 2540              |     |
| Flow<br>[GPM]                                             | 1  | 296<br>43         | 578<br>34    | 716<br>25     | 900<br>17      | -<br>-          | -<br>-         | -<br>-          | -<br>-          | -<br>-            | 48  |
|                                                           | 2  | 299<br>90         | 565<br>80    | 749<br>67     | 937<br>51      | 1115<br>30      | 1161<br>18     | -<br>-          | -<br>-          | -<br>-            | 96  |
|                                                           | 4  | 300<br>185        | 590<br>178   | 760<br>168    | 976<br>150     | 1146<br>133     | 1202<br>121    | 1331<br>111     | 1492<br>75      | -<br>-            | 191 |
|                                                           | 6  | 286<br>282        | 578<br>275   | 749<br>265    | 972<br>255     | 1137<br>237     | 1196<br>229    | 1334<br>218     | 1529<br>183     | 1673<br>158       | 287 |
|                                                           | 8  | 268<br>379        | 566<br>379   | 733<br>362    | 954<br>351     | 1123<br>333     | 1180<br>326    | 1318<br>315     | 1520<br>280     | 1668<br>257       | 382 |
|                                                           | 10 | 247<br>473        | 548<br>468   | 717<br>460    | 930<br>447     | 1112<br>430     | 1165<br>425    | 1298<br>410     | 1505<br>378     | 1659<br>354       | 478 |
|                                                           | 12 | 207<br>568        | 528<br>561   | 696<br>552    | 909<br>543     | 1087<br>526     | 1142<br>521    | 1275<br>504     | 1482<br>477     | 1640<br>453       | 574 |
|                                                           | 14 | 204<br>664        | 501<br>658   | 671<br>650    | 864<br>638     | 1061<br>623     | 1120<br>618    | 1255<br>604     | 1453<br>577     | 1618<br>555       | 669 |
| Max.<br>Cont.                                             | 16 | 168<br>759        | 481<br>752   | 642<br>746    | 852<br>736     | 1038<br>721     | 1094<br>716    | 1230<br>703     | 1430<br>676     | 1590<br>652       | 765 |
| Max.<br>Int.                                              | 18 | 140<br>855        | 446<br>848   | 605<br>839    | 823<br>832     | 1006<br>818     | 1063<br>813    | 1198<br>799     | 1401<br>777     | 1560<br>753       | 860 |
|                                                           | 20 | 103<br>946        | 392<br>940   | 566<br>933    | 782<br>923     | 982<br>910      | 1036<br>907    | 1165<br>894     | 1363<br>866     | 1526<br>848       | 956 |
| Torque (theor.)<br>in-lb.<br>[daNm]                       |    | 345<br>[3,9]      | 690<br>[7,8] | 884<br>[9,99] | 1115<br>[12,6] | 1338<br>[15,12] | 1390<br>[15,7] | 1561<br>[17,64] | 1784<br>[20,16] | 1947<br>[22]      |     |
| 4.83 in <sup>3</sup> ./rev. [79,2 cm <sup>3</sup> ./rev.] |    |                   |              |               |                |                 |                |                 |                 |                   |     |
| Torque<br>Speed                                           |    |                   |              |               |                |                 |                |                 |                 |                   |     |

4.83 in<sup>3</sup>/rev. [79,2 cm<sup>3</sup>/rev.]

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

## Performance Data

## MLHP 100

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

6.04 in<sup>3</sup>/rev. [99,0 cm<sup>3</sup>/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 mm<sup>2</sup>/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<br>28        | 922<br>21       | 1223<br>14      | -<br>-         | -<br>-          | -<br>-          | -<br>-          | -<br>-          | -<br>-          | 31             |
|                                   | 2  | 479<br>59        | 924<br>55       | 1246<br>51      | 1545<br>41     | 1837<br>28      | 1920<br>23      | 2102<br>12      | -<br>-          | -<br>-          | 62             |
|                                   | 4  | 474<br>120       | 923<br>115      | 1253<br>111     | 1554<br>102    | 1857<br>89      | 1965<br>83      | 2155<br>68      | 2432<br>44      | 2617<br>24      | 122            |
|                                   | 6  | 450<br>180       | 905<br>177      | 1224<br>172     | 1534<br>166    | 1843<br>156     | 1941<br>152     | 2136<br>144     | 2456<br>125     | 2655<br>110     | 183            |
|                                   | 8  | 417<br>240       | 881<br>237      | 1203<br>233     | 1498<br>226    | 1815<br>217     | 1905<br>213     | 2117<br>203     | 2420<br>187     | 2632<br>176     | 245            |
|                                   | 10 | 393<br>300       | 851<br>297      | 1176<br>294     | 1462<br>289    | 1786<br>278     | 1875<br>275     | 2084<br>265     | 2377<br>247     | 2590<br>236     | 306            |
|                                   | 12 | 351<br>361       | 816<br>358      | 1131<br>354     | 1429<br>348    | 1739<br>339     | 1825<br>336     | 2045<br>327     | 2341<br>310     | 2560<br>295     | 367            |
|                                   | 14 | 308<br>424       | 780<br>420      | 1099<br>417     | 1383<br>411    | 1685<br>401     | 1786<br>398     | 1995<br>390     | 2292<br>375     | 2526<br>359     | 428            |
| Max. Cont.                        | 16 | 259<br>483       | 732<br>479      | 1045<br>475     | 1340<br>470    | 1637<br>463     | 1727<br>460     | 1945<br>450     | 2242<br>435     | 2471<br>421     | 489            |
| Max. Int.                         | 18 | 205<br>543       | 672<br>540      | 997<br>536      | 1291<br>531    | 1578<br>522     | 1675<br>518     | 1888<br>512     | 2188<br>496     | 2407<br>484     | 550            |
|                                   | 20 | 149<br>602       | 616<br>599      | 932<br>596      | 1214<br>589    | 1504<br>585     | 1616<br>581     | 1822<br>573     | 2125<br>557     | 2331<br>534     | 612            |
| Torque (theor.) in-lb. [daNm]     |    | 540<br>[6,1]     | 1082<br>[12,22] | 1382<br>[15,62] | 1744<br>[19,7] | 2092<br>[23,64] | 2176<br>[24,59] | 2441<br>[27,58] | 2790<br>[31,52] | 3054<br>[34,51] |                |
| 47.55 in³./rev. [123,8 cm³./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<br>24         | 1100<br>20      | 1471<br>16      | 1853<br>13     | -<br>-          | -<br>-          | -<br>-          | -<br>-          | -<br>-          | 24             |
|                                                          | 2  | 563<br>48         | 1102<br>46      | 1500<br>44      | 1885<br>39     | 2252<br>28      | 2358<br>23      | 2590<br>13      | -<br>-          | -<br>-          | 48             |
|                                                          | 4  | 552<br>95         | 1111<br>92      | 1511<br>90      | 1882<br>86     | 2270<br>79      | 2361<br>76      | 2627<br>67      | 3026<br>48      | 3275<br>27      | 96             |
|                                                          | 6  | 523<br>145        | 1082<br>142     | 1477<br>139     | 1860<br>135    | 2234<br>130     | 2329<br>127     | 2616<br>121     | 3015<br>103     | 3295<br>90      | 143            |
|                                                          | 8  | 496<br>191        | 1054<br>189     | 1450<br>188     | 1824<br>185    | 2200<br>180     | 2306<br>177     | 2572<br>171     | 2968<br>157     | 3251<br>143     | 191            |
|                                                          | 10 | 454<br>238        | 1017<br>237     | 1404<br>236     | 1771<br>233    | 2151<br>230     | 2270<br>228     | 2532<br>223     | 2917<br>206     | 3215<br>192     | 239            |
|                                                          | 12 | 416<br>288        | 952<br>287      | 1355<br>286     | 1725<br>285    | 2114<br>280     | 2207<br>278     | 2483<br>271     | 2878<br>257     | 3172<br>244     | 287            |
|                                                          | 14 | 363<br>337        | 914<br>336      | 1290<br>335     | 1660<br>333    | 2053<br>329     | 2147<br>327     | 2434<br>321     | 2812<br>307     | 3124<br>295     | 335            |
| Max. Cont.                                               | 16 | 296<br>385        | 850<br>384      | 1235<br>383     | 1810<br>382    | 2000<br>378     | 2092<br>375     | 2361<br>370     | 2747<br>358     | 3052<br>348     | 382            |
| Max. Int.                                                | 18 | 236<br>433        | 781<br>432      | 1162<br>431     | 1535<br>430    | 1925<br>426     | 2034<br>425     | 2296<br>420     | 2670<br>406     | 2980<br>396     | 430            |
|                                                          | 20 | 167<br>481        | 712<br>480      | 1108<br>479     | 1461<br>478    | 1842<br>475     | 1948<br>473     | 2210<br>468     | 2592<br>457     | 2896<br>446     | 478            |
| Torque (theor.) in-lb. [daNm]                            |    | 692<br>[7,82]     | 1383<br>[15,63] | 1769<br>[19,99] | 2230<br>[25,2] | 2676<br>[30,24] | 2784<br>[31,46] | 3123<br>[35,28] | 3570<br>[40,33] | 3908<br>[44,15] |                |
| 9.66 in <sup>3</sup> /rev. [158.4 cm <sup>3</sup> /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 mm<sup>2</sup>/s] at 122°F [50° C].



## Performance Data MLHP 200

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

12.1 in<sup>3</sup>./rev. [198,0 cm<sup>3</sup>./rev.]

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

## Performance Data MLHP 250

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

15.1 in<sup>3</sup>./rev. [247,5 cm<sup>3</sup>./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 mm<sup>2</sup>/s] at 122°F [50° C].

## Performance Data MLHP 315

|                               |    | Pressure ( $\Delta$ PSI) |                 |                 |                 |                 |                 | Max. Cont.      | Max. Int.       | Speed (theor.) |
|-------------------------------|----|--------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|
|                               |    | 450                      | 700             | 1000            | 1230            | 1450            | 1740            |                 | 2030            |                |
|                               |    | 450                      | 700             | 1000            | 1230            | 1450            | 1740            |                 | 2030            |                |
| Flow [GPM]                    | 1  | 1140<br>12               | 1850<br>10      | -<br>-          | -<br>-          | -<br>-          | -<br>-          | -<br>-          | -<br>-          | 10             |
|                               | 2  | 1122<br>24               | 1875<br>22      | 2555<br>20      | 3105<br>16      | 3600<br>11      | -<br>-          | -<br>-          | -<br>-          | 24             |
|                               | 4  | 1075<br>48               | 1800<br>46      | 2515<br>44      | 3095<br>40      | 3595<br>35      | 4285<br>28      | 4960<br>20      | 4960<br>20      | 48             |
|                               | 6  | 1015<br>71               | 1750<br>70      | 2462<br>68      | 3035<br>64      | 3540<br>59      | 4220<br>52      | 4942<br>44      | 4942<br>44      | 72             |
|                               | 8  | 940<br>96                | 1686<br>95      | 2400<br>93      | 2970<br>89      | 3462<br>85      | 4150<br>77      | 4882<br>69      | 4882<br>69      | 97             |
|                               | 10 | 878<br>121               | 1612<br>120     | 2310<br>118     | 2885<br>114     | 3390<br>111     | 4075<br>103     | 4782<br>95      | 4782<br>95      | 120            |
|                               | 12 | 782<br>146               | 1522<br>145     | 2210<br>143     | 2800<br>140     | 3285<br>137     | 3955<br>129     | 4655<br>121     | 4655<br>121     | 143            |
|                               | 14 | 686<br>170               | 1410<br>169     | 2110<br>167     | 2696<br>165     | 3170<br>162     | 3835<br>155     | 4550<br>147     | 4550<br>147     | 167            |
|                               | 16 | 560<br>195               | 1302<br>194     | 2015<br>192     | 2535<br>190     | 3050<br>187     | 3700<br>181     | 4420<br>174     | 4420<br>174     | 191            |
|                               | 18 | 448<br>220               | 1155<br>219     | 1865<br>217     | 2418<br>216     | 2865<br>213     | 3560<br>207     | 4240<br>200     | 4240<br>200     | 215            |
| Max. Cont.                    | 18 | 448<br>220               | 1155<br>219     | 1865<br>217     | 2418<br>216     | 2865<br>213     | 3560<br>207     | 4240<br>200     | 4240<br>200     | 215            |
| Max. Int.                     | 20 | 330<br>244               | 980<br>243      | 1720<br>242     | 2270<br>240     | 2722<br>238     | 3415<br>233     | 4090<br>226     | 4090<br>226     | 239            |
| Torque (theor.) in-lb. [daNm] |    | 1383<br>[15,63]          | 2153<br>[24,33] | 2184<br>[24,68] | 3785<br>[42,76] | 4462<br>[50,41] | 5354<br>[60,49] | 6246<br>[70,57] | 6246<br>[70,57] |                |

19.3 in<sup>3</sup>./rev. [316,8 cm<sup>3</sup>./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            |                |
|                               |    | 400             | 650             | 800             | 945             | 1160            | 1400            |                 | 1670            |                |
| Flow [GPM]                    | 1  | 1382<br>10      | -<br>-          | -<br>-          | -<br>-          | -<br>-          | -<br>-          | -<br>-          | -<br>-          | 10             |
|                               | 2  | 1380<br>19      | 2090<br>18      | 2570<br>17      | 3065<br>15      | 3760<br>11      | -<br>-          | -<br>-          | -<br>-          | 19             |
|                               | 4  | 1375<br>38      | 2065<br>37      | 2545<br>36      | 3020<br>34      | 3780<br>31      | 4365<br>27      | 5075<br>21      | 5075<br>21      | 38             |
|                               | 6  | 1340<br>56      | 2030<br>55      | 2500<br>55      | 2960<br>54      | 3725<br>51      | 4330<br>46      | 5015<br>39      | 5015<br>39      | 57             |
|                               | 8  | 1272<br>77      | 1965<br>76      | 2420<br>76      | 2875<br>75      | 3620<br>72      | 4240<br>67      | 4945<br>60      | 4945<br>60      | 77             |
|                               | 10 | 1195<br>96      | 1885<br>95      | 2300<br>94      | 2795<br>93      | 3540<br>90      | 4175<br>85      | 4835<br>80      | 4835<br>80      | 96             |
|                               | 12 | 1095<br>116     | 1765<br>115     | 2210<br>114     | 2700<br>113     | 3430<br>110     | 4025<br>105     | 4705<br>98      | 4705<br>98      | 115            |
|                               | 14 | 955<br>136      | 1645<br>135     | 2090<br>134     | 2578<br>133     | 3270<br>131     | 3895<br>126     | 4540<br>119     | 4540<br>119     | 134            |
|                               | 16 | 820<br>155      | 1495<br>154     | 1940<br>153     | 2435<br>153     | 3100<br>151     | 3780<br>146     | 4360<br>140     | 4360<br>140     | 153            |
|                               | 18 | 645<br>174      | 1330<br>173     | 1790<br>172     | 2270<br>172     | 2940<br>170     | 3610<br>164     | 4220<br>158     | 4220<br>158     | 172            |
| Max. Cont.                    | 16 | 820<br>155      | 1495<br>154     | 1940<br>153     | 2435<br>153     | 3100<br>151     | 3780<br>146     | 4360<br>140     | 4360<br>140     | 153            |
| Max. Int.                     | 20 | 425<br>198      | 1105<br>198     | 1600<br>196     | 2050<br>195     | 2685<br>194     | 3345<br>190     | 3930<br>186     | 3930<br>186     | 191            |
| Torque (theor.) in-lb. [daNm] |    | 1538<br>[17,38] | 2500<br>[28,25] | 3077<br>[34,76] | 3635<br>[41,07] | 4462<br>[50,41] | 5385<br>[60,84] | 6423<br>[72,57] | 6423<br>[72,57] |                |

24.16 in<sup>3</sup>./rev. [396,0 cm<sup>3</sup>./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 mm<sup>2</sup>/s] at 122°F [50° C].

## Performance Data MLHP 500

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

30.20 in<sup>3</sup>./rev. [495,0 cm<sup>3</sup>./rev.]

## Performance Data MLHP 630

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

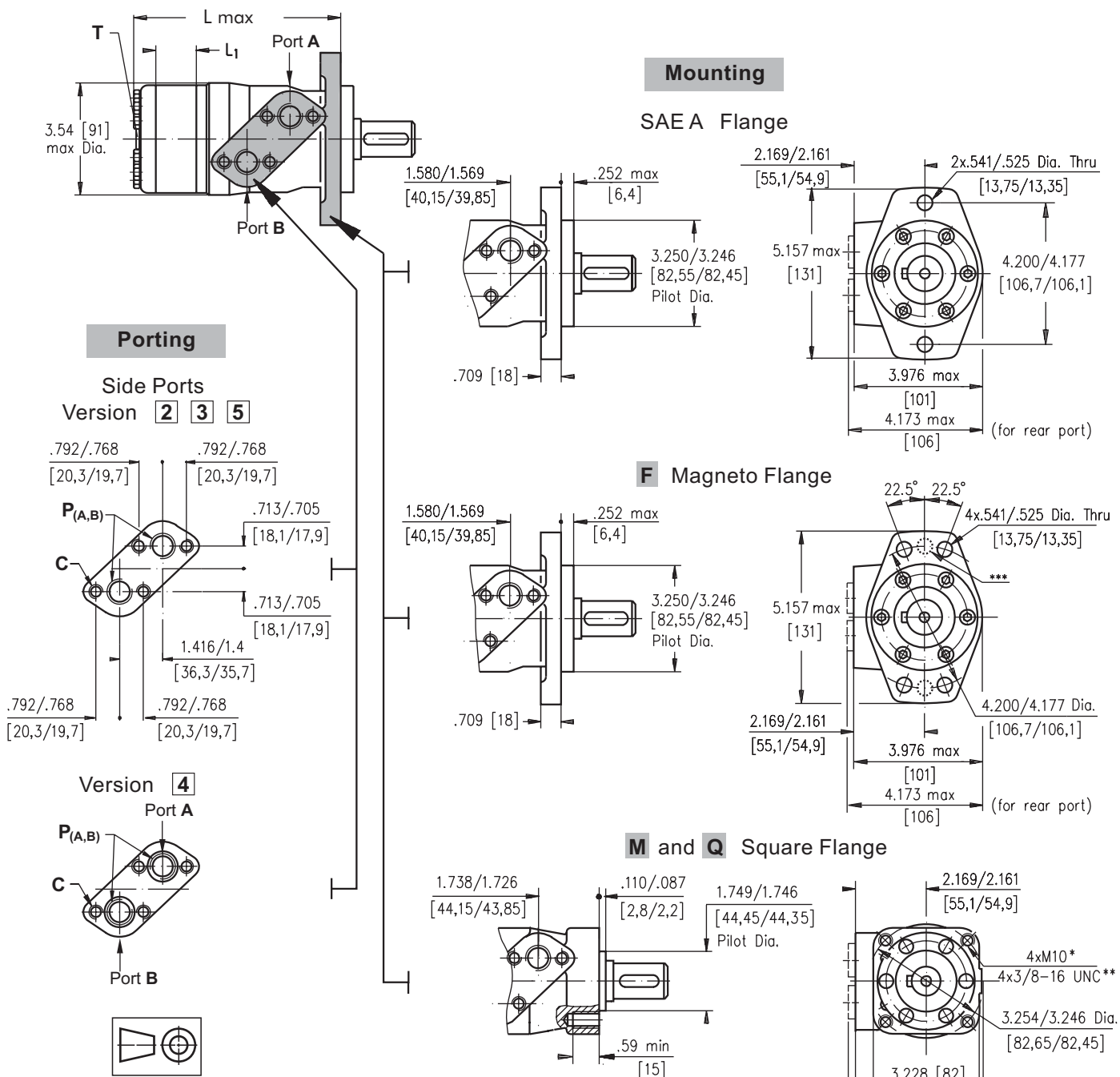
38.5 in<sup>3</sup>./rev. [623,6 cm<sup>3</sup>./rev.]

### 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 mm<sup>2</sup>/s] at 122°F [50° C].

## DIMENSIONS AND MOUNTING DATA



| Type        | Lmax, in.[mm] | Type         | Lmax, in.[mm] | L <sub>1</sub> , 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

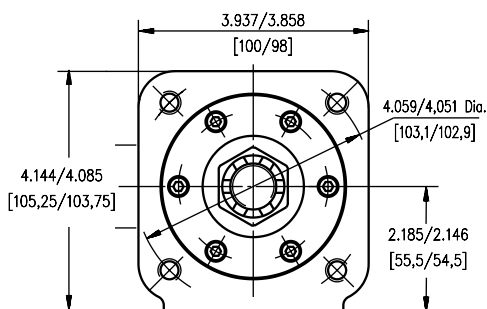
Viewed from Shaft End

Port A Pressurized - CCW

Port B Pressurized - CW

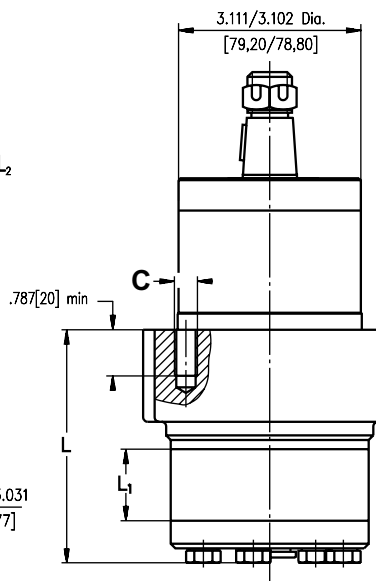
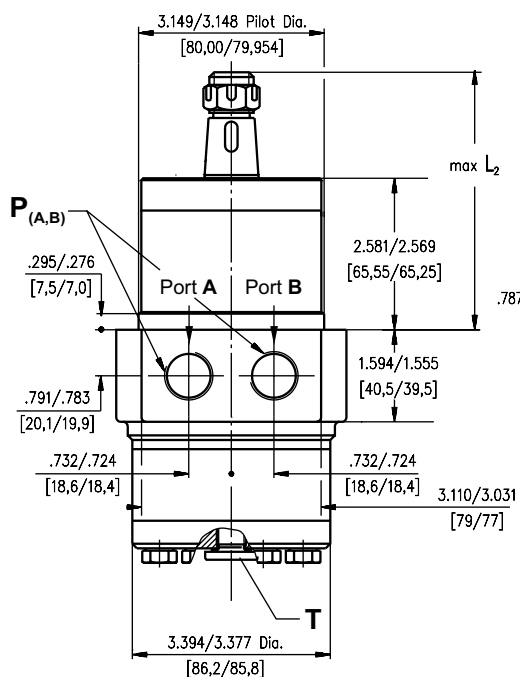
|                    | Versions          |           |                           |                           |
|--------------------|-------------------|-----------|---------------------------|---------------------------|
|                    | 2                 | 3         | 4                         | 5                         |
| C                  | 4xM8              | 4xM8      | 4x $\frac{3}{16}$ -18 UNC | 4x $\frac{3}{16}$ -18 UNC |
| P <sub>(A,B)</sub> | 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 <sub>(A,B)</sub> | 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 <sub>2</sub> , 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

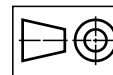
Port B Pressurized - CCW

### Reverse Rotation

Viewed from Shaft End

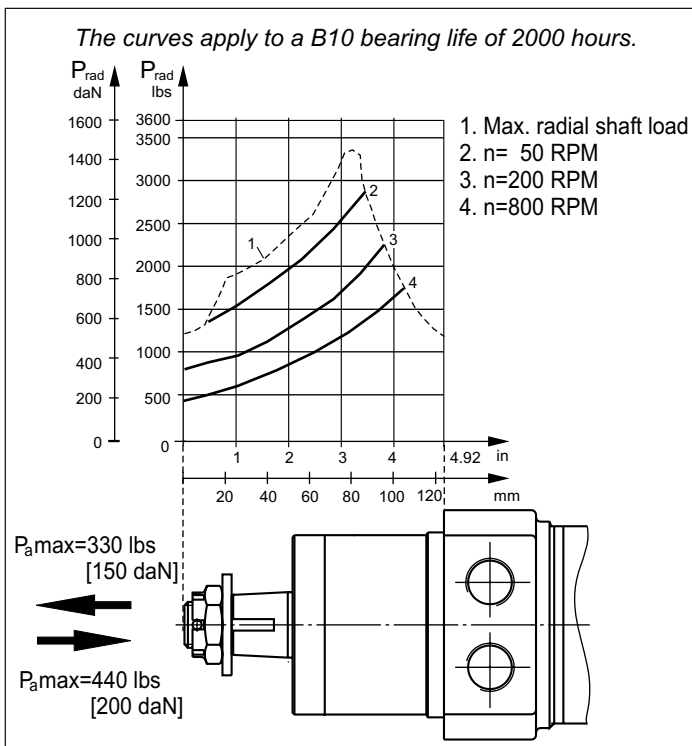
Port A Pressurized - CCW

Port B Pressurized - CW

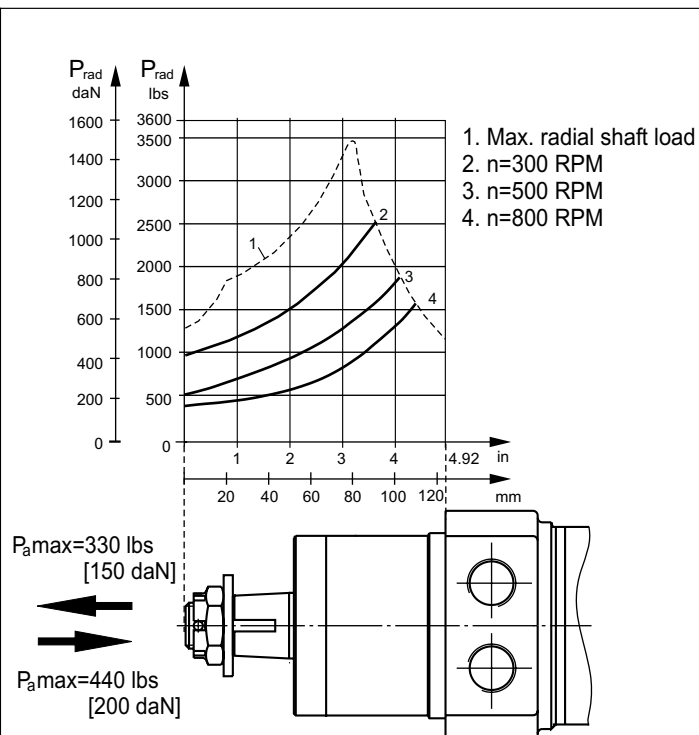


## PERMISSIBLE SHAFT LOADS

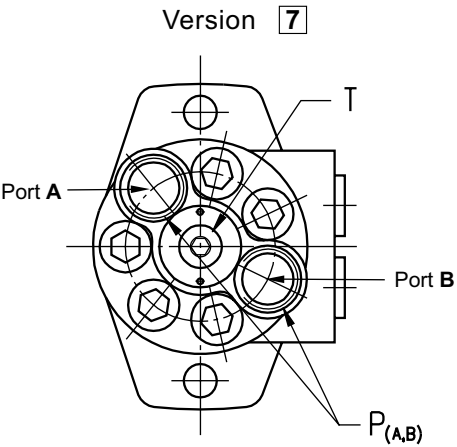
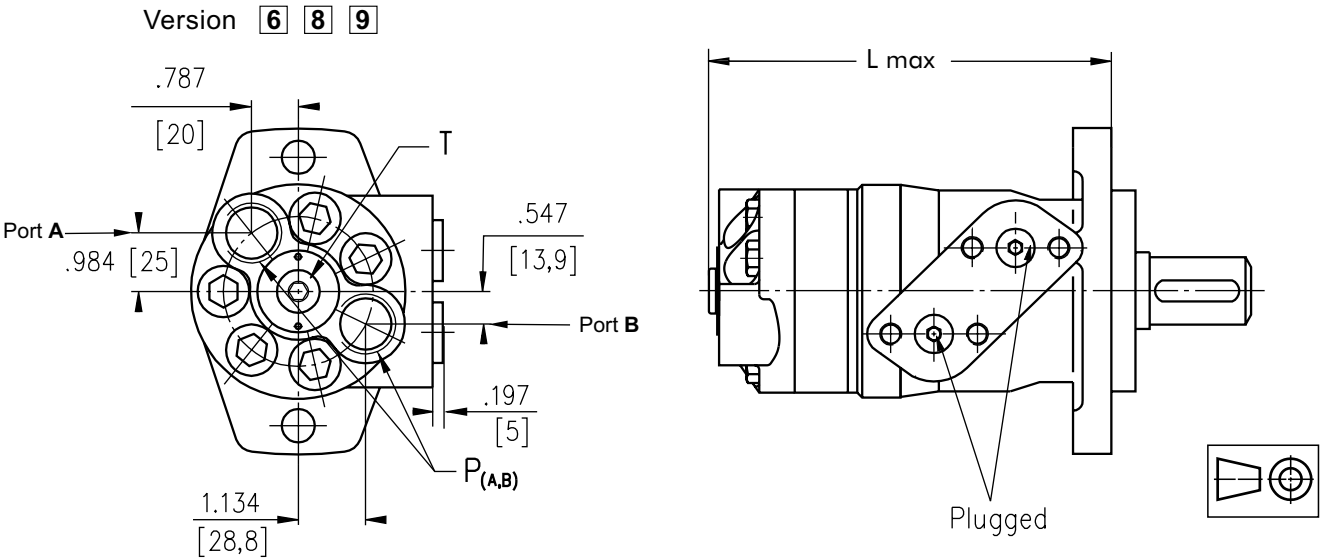
### MLHPWN



### 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 <sub>(A,B)</sub> | 2xG <sup>1</sup> / <sub>2</sub> | 2x <sup>7</sup> / <sub>8</sub> -14 UNF | 2x <sup>1</sup> / <sub>2</sub> -14 NPTF | 2xM22x1,5 |
| T                  | G <sup>1</sup> / <sub>4</sub>   | <sup>7</sup> / <sub>16</sub> -20 UNF   | <sup>7</sup> / <sub>16</sub> -20 UNF    | M14x1,5   |

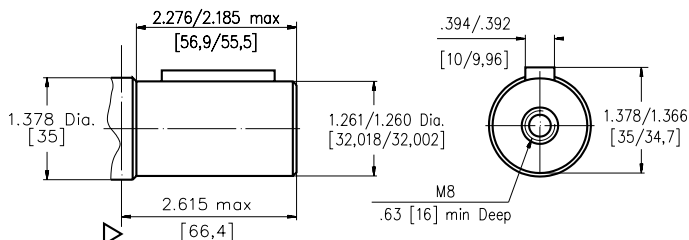
**Standard Rotation**  
Viewed from Shaft End  
Port A Pressurized - **CW**  
Port B Pressurized - **CCW**

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

## SHAFT EXTENSIONS FOR MLHP AND MLHR MOTORS

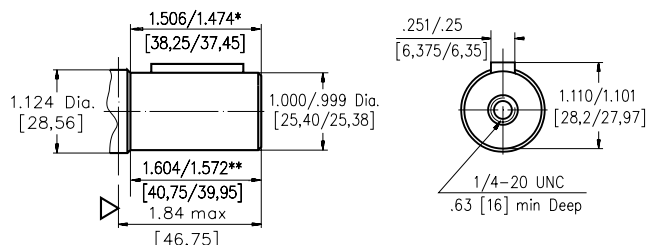
**B**

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



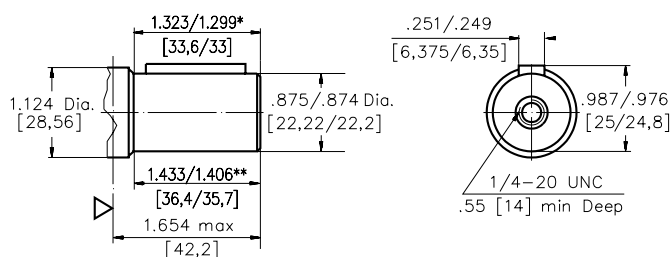
**C**

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



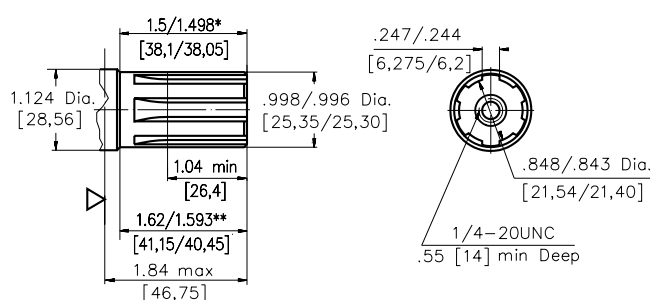
**D**

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



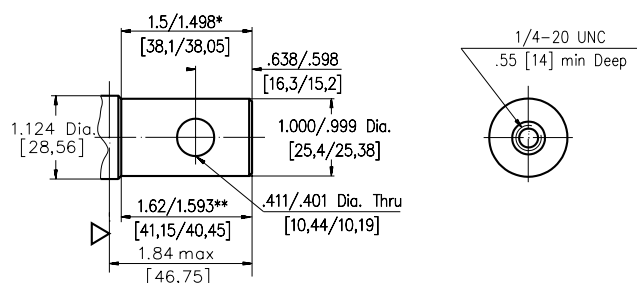
**G**

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



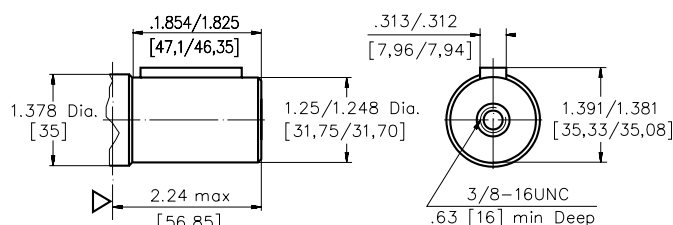
**H**

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]

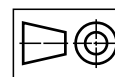


\* For SAE A and F Flange

\*\* For M and Q Flange

▷ - Motor Mounting Surface

Requirement max. Torque must be not exceeded.

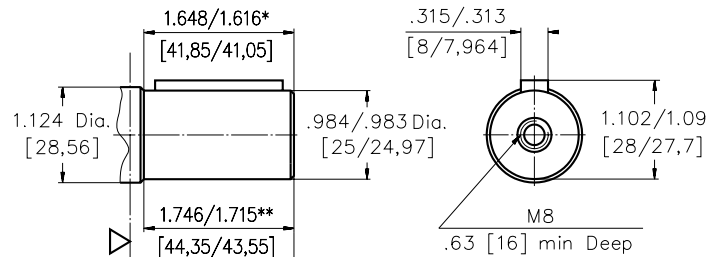




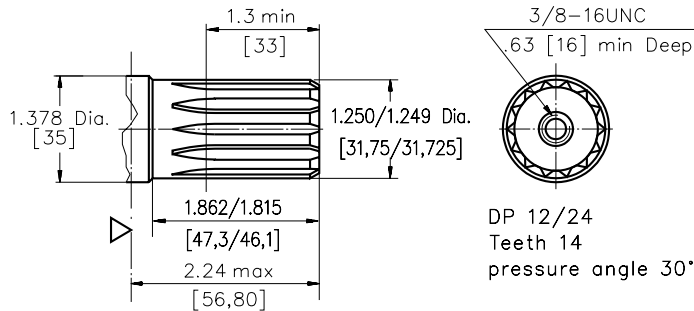
## SHAFT EXTENSIONS FOR MLHP AND MLHR MOTORS (continued)

**M**

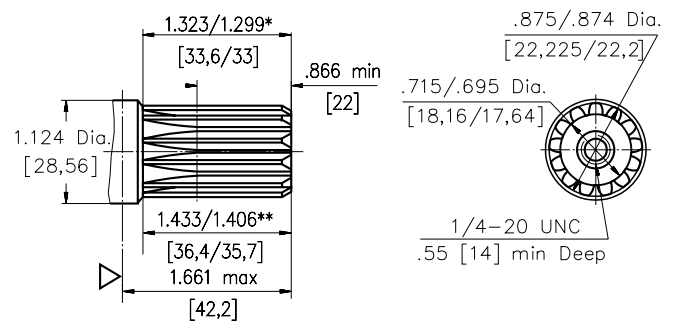
ø25 straight, Parallel key A8x7x32 DIN 6885  
Max. Torque 3009 in-lb [34 daNm]

**L**

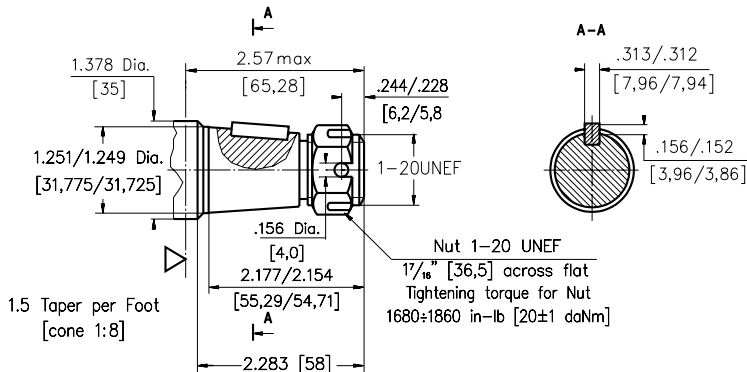
14T Splined, 1 1/4" [31,75], ANS B 92.1-1976  
Max. Torque 6815 in-lb [77 daNm]

**S**

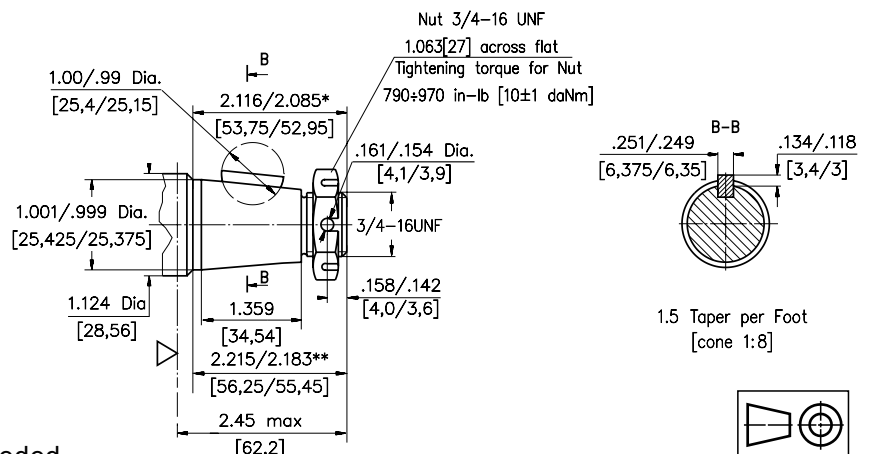
13T Splined, 7/8" [22,2], ANS B 92.1-1976  
Max. Torque 3200 in-lb [36 daNm]

**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

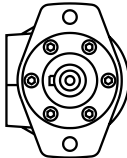
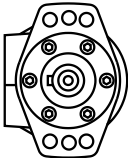
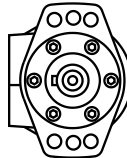
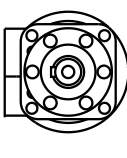
\*\* For M and Q Flange

▷ - 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.

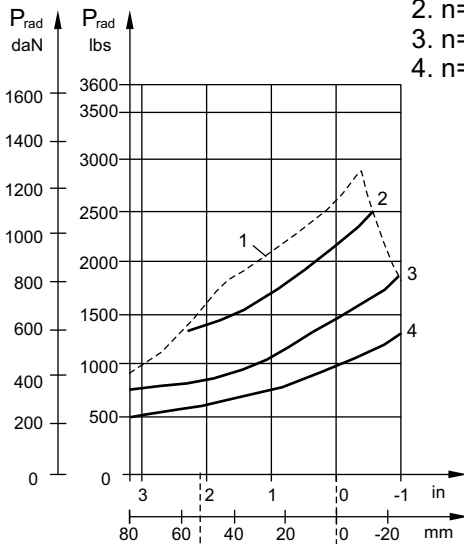
|                                                     |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                          |
|-----------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------|
| Mounting Flange                                     |  |  |  |  |                                                          |
| Shaft Version                                       | Keyed <b>C</b><br>Splined <b>G</b>                                                |                                                                                   | Keyed <b>B</b><br>Splined <b>L</b>                                                 |                                                                                     | Keyed <b>C</b><br>Splined <b>G</b>                       |
| Radial Shat Load <b>P<sub>rad</sub><sup>*</sup></b> | $\frac{800}{\text{RPM}} \times \frac{2215}{3.74+L}$ ,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

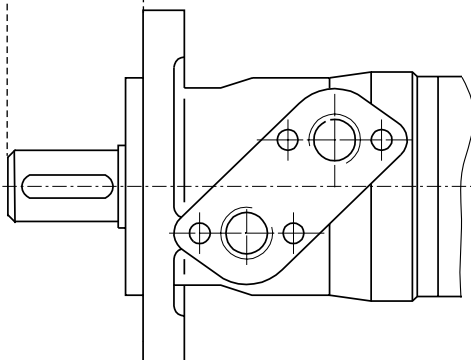
The curves apply to a B10 bearing life of 2000 hours.

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



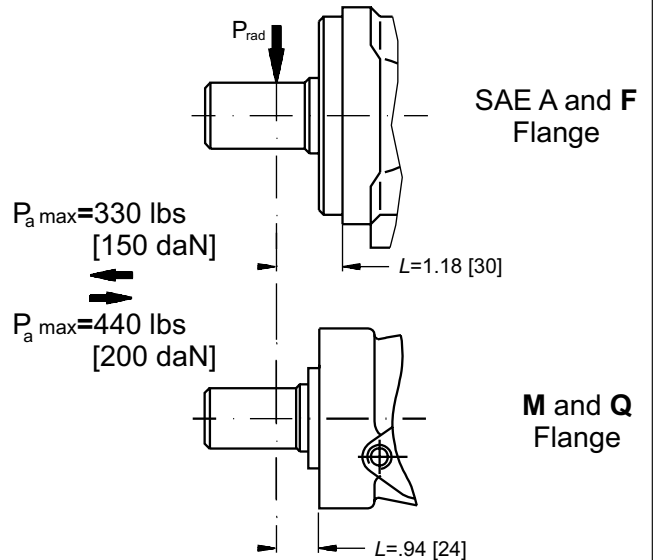
$P_{a \max} = 330$  lbs  
[150 daN]

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



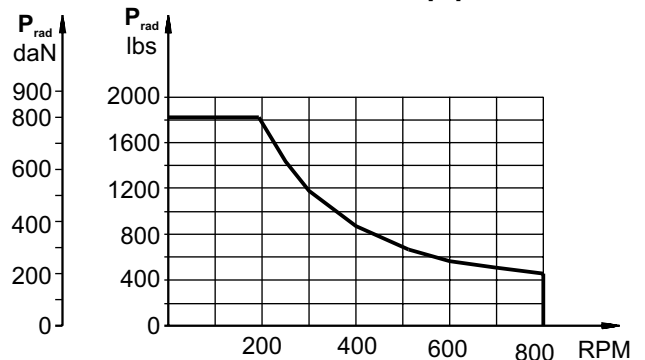
### MLHP AND MLHR

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



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

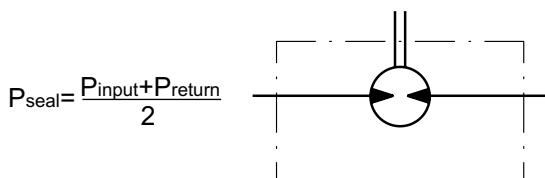
$P_{a \max} = 440$  lbs  
[200 daN]



## MAX. PERMISSIBLE SHAFT SEAL PRESSURE FOR MLHP AND MLHR MOTORS

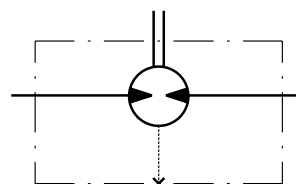
### **MLHP/MLHR...U1 motors with high pressure seal and without drain connection:**

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



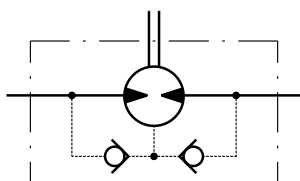
### **MLHP/MLHR...U motors with high pressure seal and drain connection:**

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



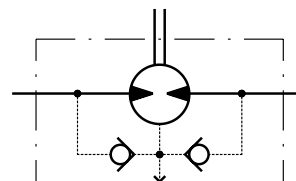
### **MLHP/MLHR...1 motors with standard shaft seal and without drain connection:**

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

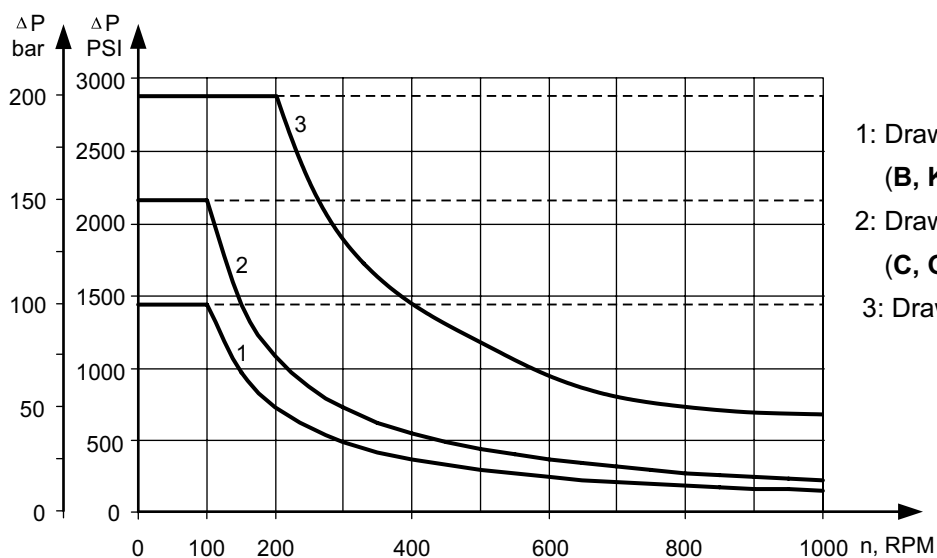


### **MLHP/MLHR... motors with standard shaft seal and with drain connection:**

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 |
|----------------|---|---|---|---|---|---|---|---|---|
| <b>M L H P</b> |   |   |   |   |   |   |   |   |   |

**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.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**32** - 1.95 [32,0] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**40** - 2.44 [40,0] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**50** - 3.02 [49,5] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**80** - 4.83 [79,2] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**100** - 6.04 [99,0] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**125** - 7.55 [123,8] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**160** - 9.66 [158,4] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**200** - 12.1 [198,0] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**250** - 15.1 [247,5] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**315** - 19.3 [316,8] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**400** - 24.16 [396,0] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**500** - 30.2 [495,0] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**630** - 38.05 [623,6] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/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** - <sup>7</sup>/<sub>8</sub>" [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** - <sup>7</sup>/<sub>8</sub>" [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 or **RS** option.
- **W** flange with rear ports.
- **B, K, L, R** shafts with **U** option.

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

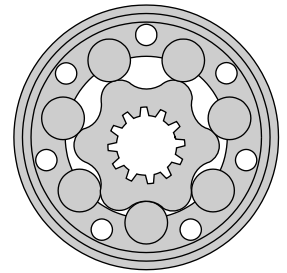
The hydraulic motors are mangano-phosphatized as standard.

# 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.



## CONTENTS

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| Performance data .....                   | 36÷40 |
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| Permissible shaft Seal Pressure .....    | 31    |
| Order code .....                         | 43    |

## 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

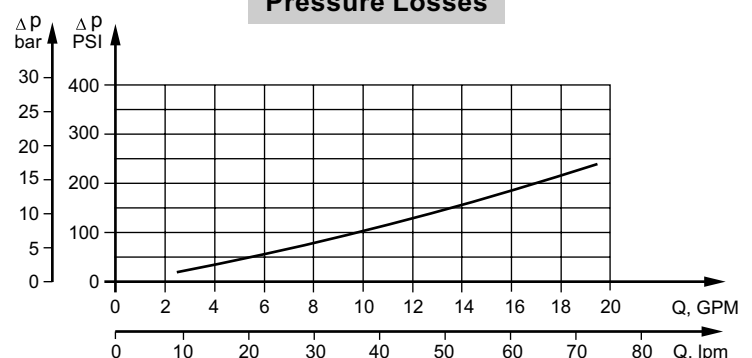
## GENERAL

|                                                        |                                                                 |                      |
|--------------------------------------------------------|-----------------------------------------------------------------|----------------------|
| <b>Displacement,</b>                                   | in <sup>3</sup> /rev [cm <sup>3</sup> /rev.]                    | 3.14÷24.4 [51,5÷397] |
| <b>Max. Speed,</b>                                     | [RPM]                                                           | 150÷775              |
| <b>Max. Torque,</b>                                    | in-lb [daNm]                                                    | 900÷5400 [10,1÷61]   |
| <b>Max. Output,</b>                                    | HP [kW]                                                         | 6.4÷17.4 [5÷13]      |
| <b>Max. Pressure Drop,</b>                             | PSI [bar]                                                       | 1020÷2540 [70÷175]   |
| <b>Max. Oil Flow,</b>                                  | GPM [lpm]                                                       | 10÷16 [37,8÷60,6]    |
| <b>Min. Speed,</b>                                     | [RPM]                                                           | 10                   |
| <b>Pressure fluid</b>                                  | Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)                 |                      |
| <b>Temperature range,</b>                              | °F [°C]                                                         | -22÷194 [-30÷90]     |
| <b>Optimal Viscosity range, SUS [mm<sup>2</sup>/s]</b> | 98÷347 [20÷75]                                                  |                      |
| <b>Filtration</b>                                      | ISO code 20/16 (Min. recommended fluid filtration of 25 micron) |                      |

### Oil flow in drain line

| Pressure drop<br>PSI [bar] | Viscosity<br>SUS [mm <sup>2</sup> /s] | Oil flow in<br>drain line<br>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<br>50     | MLHR<br>80     | MLHR<br>100    | MLHR<br>125     | MLHR<br>160     | MLHR<br>200      | MLHR<br>250      | MLHR<br>315      | MLHR<br>400   |
|------------------------------------------------------------------|-----------------------------|----------------|----------------|----------------|-----------------|-----------------|------------------|------------------|------------------|---------------|
| Displacement, in. <sup>3</sup> /rev.<br>[cm. <sup>3</sup> /rev.] |                             | 3.14<br>[51,5] | 4.90<br>[80,3] | 6.09<br>[99,8] | 7.67<br>[125,7] | 9.74<br>[159,6] | 12.19<br>[199,8] | 15.26<br>[250,1] | 19.26<br>[315,7] | 24.4<br>[397] |
| Max. Speed,<br>[RPM]                                             | Cont.                       | 734            | 750            | 607            | 482             | 379             | 303              | 240              | 190              | 152           |
|                                                                  | Int.*                       | 1029           | 940            | 758            | 602             | 474             | 379              | 303              | 240              | 191           |
| Max. Torque<br>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<br>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<br>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<br>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<br>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-<br>sure with Drain Line<br>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<br>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<br>in-lb [daNm]                             | At max.press.<br>drop Cont. | 710 [8]        | 1330 [15]      | 1770 [20]      | 2215 [25]       | 2832 [32]       | 2920 [33]        | 2740 [31]        | 2920 [33]        | 2650 [30]     |
|                                                                  | At max.press.<br>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.

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 6743/4).

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

4. Recommended minimum oil viscosity 70 SUS[13mm<sup>2</sup>/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 MLHR... motors with **B, K, R** and **L** shafts.  
(1.378 [35] sealing diameter)

| Type                                                             |                             | MLHR<br>50     | MLHR<br>80     | MLHR<br>100    | MLHR<br>125     | MLHR<br>160     | MLHR<br>200      | MLHR<br>250      | MLHR<br>315      | MLHR<br>400   |
|------------------------------------------------------------------|-----------------------------|----------------|----------------|----------------|-----------------|-----------------|------------------|------------------|------------------|---------------|
| Displacement, in. <sup>3</sup> /rev.<br>[cm. <sup>3</sup> /rev.] |                             | 3.14<br>[51,5] | 4.90<br>[80,3] | 6.09<br>[99,8] | 7.67<br>[125,7] | 9.74<br>[159,6] | 12.19<br>[199,8] | 15.26<br>[250,1] | 19.26<br>[315,7] | 24.4<br>[397] |
| Max. Speed,<br>[RPM]                                             | Cont.                       | 734            | 750            | 607            | 482             | 379             | 303              | 240              | 190              | 152           |
|                                                                  | Int.*                       | 1029           | 940            | 758            | 602             | 474             | 379              | 303              | 242              | 191           |
| Max. Torque<br>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<br>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<br>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<br>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<br>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-<br>sure with Drain Line<br>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<br>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<br>in-lb [daNm]                             | At max.press.<br>drop Cont. | 710 [8]        | 1330 [15]      | 1770 [20]      | 2215 [25]       | 2832 [32]       | 3630 [41]        | 4000 [45]        | 4000 [45]        | 4340 [49]     |
|                                                                  | At max.press.<br>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]<br>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[13mm<sup>2</sup>/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.<br>Cont. | Max.<br>Int.   |             | Speed<br>(theor.) |
|-------------------------------------|---------------|-------------------|--------------|---------------|---------------|---------------|--------------|--------------|----------------|---------------|----------------|-------------|-------------------|
|                                     |               | 500               | 700          | 900           | 1100          | 1300          | 1500         | 1700         | 2030           |               | 2300           | 2540        |                   |
| Flow<br>[GPM]                       | 1             | 215<br>73         | 300<br>72    | 374<br>69     | 458<br>65     | 538<br>61     | 613<br>55    | 675<br>46    | 775<br>21      | -<br>-        | -<br>-         |             | 74                |
|                                     | 2             | 215<br>146        | 305<br>144   | 385<br>142    | 482<br>140    | 560<br>138    | 680<br>136   | 780<br>132   | 856<br>127     | 930<br>114    | 1076<br>106    |             | 147               |
|                                     | 4             | 220<br>292        | 308<br>290   | 396<br>288    | 492<br>283    | 580<br>278    | 690<br>271   | 785<br>262   | 878<br>250     | 996<br>240    | 1088<br>230    |             | 293               |
|                                     | 6             | 218<br>438        | 305<br>436   | 395<br>432    | 490<br>425    | 580<br>418    | 690<br>411   | 780<br>403   | 876<br>395     | 998<br>385    | 1092<br>370    |             | 441               |
|                                     | 8             | 215<br>583        | 302<br>518   | 392<br>578    | 480<br>573    | 575<br>567    | 676<br>558   | 770<br>548   | 870<br>538     | 996<br>527    | 1092<br>514    |             | 588               |
|                                     | Max.<br>Cont. | 10                | 198<br>730   | 294<br>726    | 380<br>722    | 468<br>714    | 558<br>706   | 652<br>698   | 745<br>690     | 855<br>680    | 982<br>668     | 1080<br>650 |                   |
| Max.<br>Int.                        | 12            | 180<br>878        | 282<br>874   | 368<br>867    | 456<br>859    | 540<br>850    | 624<br>840   | 712<br>830   | 832<br>820     | 960<br>805    | 1060<br>785    |             | 881               |
|                                     | 14            | 150<br>1025       | 250<br>1020  | 340<br>1014   | 425<br>1008   | 515<br>1002   | 588<br>995   | 672<br>985   | 805<br>970     | 928<br>950    | 1030<br>930    |             | 1030              |
| Torque (theor.)<br>in-lb.<br>[daNm] |               | 254<br>[2,87]     | 363<br>[4,1] | 450<br>[5,08] | 544<br>[6,15] | 653<br>[7,38] | 752<br>[8,5] | 850<br>[9,6] | 1018<br>[11,5] | 1150<br>[13]  | 1275<br>[14,4] |             | Tor               |

3.14 in<sup>3</sup>./rev. [51.5 cm<sup>3</sup>./rev.]

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

## Performance Data MLHR 80

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

4.9 in<sup>3</sup>./rev. [80,3 cm<sup>3</sup>./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 mm<sup>2</sup>/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 in<sup>3</sup>./rev. [99,8 cm<sup>3</sup>./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 in<sup>3</sup>./rev. [125,7 cm<sup>3</sup>./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 mm<sup>2</sup>/s] at 122°F [50° C].

## Performance Data MLHR 160

|                               |    | Pressure ( $\Delta$ PSI) |              |              |              |              |              | Max. Cont.   | Max. Int.   | Speed (theor.) |
|-------------------------------|----|--------------------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|----------------|
|                               |    | 450                      | 900          | 1150         | 1400         | 1700         | 2030         | 2540         | 2900        |                |
| Flow [GPM]                    | 1  | -                        | -            | -            | -            | -            | -            | -            | -           | -              |
|                               | 2  | 610                      | 1210         | 1590         | 1935         | 2270         | 2505         | -            | -           | 47             |
|                               | 4  | 595                      | 1220         | 1625         | 2030         | 2415         | 2780         | 3390         | 3740        | 95             |
|                               | 6  | 577                      | 1215         | 1620         | 2015         | 2405         | 2780         | 3420         | 3810        | 143            |
|                               | 8  | 550                      | 1185         | 1585         | 1980         | 2390         | 2760         | 3400         | 3795        | 190            |
|                               | 10 | 510                      | 1135         | 1530         | 1950         | 2345         | 2730         | 3390         | 3765        | 238            |
|                               | 12 | 460                      | 1085         | 1480         | 1900         | 2300         | 2690         | 3340         | 3725        | 285            |
|                               | 14 | 410                      | 1025         | 1430         | 1845         | 2235         | 2625         | 3290         | 3660        | 333            |
| Max. Cont.                    | 16 | 346                      | 955          | 1355         | 1765         | 2180         | 2585         | 3220         | 3610        | 380            |
| Max. Int.                     | 18 | 280                      | 885          | 1300         | 1690         | 2110         | 2520         | 3145         | 3540        | 427            |
|                               | 20 | 200                      | 805          | 1210         | 1605         | 2015         | 2425         | 3085         | 3460        | 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<sup>3</sup>./rev. [159,6 cm<sup>3</sup>./rev.]

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

## Performance Data MLHR 200

|                               |    | Pressure ( $\Delta$ PSI) |              |              |              |             |              |              |              | Max. Cont.  | Max. Int.   | Speed (theor.) |
|-------------------------------|----|--------------------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|-------------|-------------|----------------|
|                               |    | 450                      | 900          | 1150         | 1500         | 1700        | 1810         | 1950         | 2250         | 2500        | 2900        |                |
| Flow [GPM]                    | 1  | -                        | -            | -            | -            | -           | -            | -            | -            | -           | -           | -              |
|                               | 2  | 812                      | 1500         | 2000         | 2550         | 2855        | 3040         | 3280         | 3565         | 3850        | -           | 38             |
|                               | 4  | 805                      | 1522         | 2006         | 2590         | 2932        | 3120         | 3394         | 3685         | 3975        | 4385        | 76             |
|                               | 6  | 796                      | 1496         | 1972         | 2570         | 2905        | 3100         | 3366         | 3660         | 3952        | 4385        | 114            |
|                               | 8  | 694                      | 1448         | 1946         | 2515         | 2872        | 3050         | 3328         | 3615         | 3905        | 4355        | 152            |
|                               | 10 | 650                      | 1392         | 1880         | 2460         | 2798        | 2980         | 3255         | 3560         | 3855        | 4320        | 190            |
|                               | 12 | 575                      | 1322         | 1805         | 2390         | 2748        | 2925         | 3198         | 3515         | 3825        | 4290        | 228            |
|                               | 14 | 504                      | 1246         | 1735         | 2330         | 2662        | 2840         | 3122         | 3450         | 3772        | 4235        | 265            |
| Max. Cont.                    | 16 | 434                      | 1176         | 1670         | 2260         | 2565        | 2730         | 3035         | 3360         | 3685        | 4130        | 303            |
| Max. Int.                     | 18 | 358                      | 1100         | 1610         | 2168         | 2494        | 2655         | 2955         | 3300         | 3625        | 4065        | 340            |
|                               | 20 | 274                      | 1008         | 1496         | 2065         | 2375        | 2530         | 2862         | 3200         | 3525        | 3955        | 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<sup>3</sup>./rev. [199,8 cm<sup>3</sup>./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 mm<sup>2</sup>/s] at 122°F [50° C].

## Performance Data MLHR 250

|                                                             |    | Pressure ( $\Delta$ PSI) |                 |                 |                 |                 |                 | Max. Cont.      | Max. Int.      | Speed (theor.) |
|-------------------------------------------------------------|----|--------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
|                                                             |    | 450                      | 900             | 1200            | 1400            | 1600            | 2030            | 2540            | 2900           |                |
| Flow [GPM]                                                  | 1  | -                        | -               | -               | -               | -               | -               | -               | -              | -              |
|                                                             | 2  | 1005<br>28               | 1918<br>26      | 2598<br>23      | 5880<br>20      | 3325<br>17      | 4095<br>10      | -               | -              | 31             |
|                                                             | 4  | 1000<br>59               | 1940<br>57      | 2646<br>54      | 3118<br>51      | 3400<br>49      | 4195<br>41      | 4950<br>32      | 5540<br>22     | 61             |
|                                                             | 6  | 952<br>89                | 1882<br>87      | 2622<br>84      | 3118<br>81      | 3388<br>78      | 4175<br>68      | 4890<br>58      | 5520<br>48     | 91             |
|                                                             | 8  | 882<br>120               | 1824<br>119     | 2585<br>116     | 3052<br>112     | 3335<br>109     | 4145<br>96      | 4820<br>81      | 5410<br>67     | 122            |
|                                                             | 10 | 810<br>151               | 1740<br>150     | 2505<br>147     | 2988<br>142     | 3265<br>139     | 4095<br>122     | 4740<br>102     | 5350<br>85     | 152            |
|                                                             | 12 | 735<br>180               | 1665<br>179     | 2410<br>177     | 2882<br>174     | 3175<br>170     | 4030<br>152     | 4665<br>125     | 5260<br>100    | 182            |
|                                                             | 14 | 624<br>211               | 1570<br>210     | 2330<br>206     | 2795<br>201     | 3060<br>197     | 3930<br>174     | 4580<br>150     | 5175<br>120    | 212            |
| Max. Cont.                                                  | 16 | 546<br>241               | 1470<br>240     | 2275<br>237     | 2680<br>233     | 2965<br>230     | 3800<br>212     | 4470<br>181     | 5000<br>156    | 243            |
| Max. Int.                                                   | 18 | 458<br>272               | 1364<br>271     | 2135<br>268     | 2565<br>263     | 2875<br>259     | 3705<br>240     | 4375<br>205     | 4920<br>175    | 272            |
|                                                             | 20 | 318<br>302               | 1235<br>301     | 1988<br>298     | 2435<br>295     | 2715<br>292     | 5590<br>274     | 4280<br>242     | 4765<br>213    | 303            |
| Torque (theor.)<br>in-lb.<br>[daNm]                         |    | 1092<br>[12,34]          | 2184<br>[24,68] | 2924<br>[33,03] | 3417<br>[38,61] | 3875<br>[43,78] | 4932<br>[55,72] | 6165<br>[69,65] | 7045<br>[79,6] |                |
| 15.26 in <sup>3</sup> ./rev. [250,1 cm <sup>3</sup> ./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<br>23       | 1750<br>22      | 2445<br>21      | 3040<br>20      | 3340<br>19      | 3860<br>19      | 4478<br>18      | 4800<br>16      | 6065<br>8       | 24              |
|                                                             | 4  | 1210<br>47       | 1780<br>46      | 2495<br>45      | 3075<br>44      | 3365<br>43      | 3890<br>42      | 4490<br>40      | 4830<br>38      | 6175<br>28      | 48              |
|                                                             | 6  | 1176<br>71       | 1760<br>70      | 2470<br>68      | 3035<br>67      | 3335<br>66      | 3850<br>65      | 4485<br>62      | 4810<br>61      | 6110<br>51      | 72              |
|                                                             | 8  | 1105<br>95       | 1716<br>94      | 2438<br>92      | 2990<br>90      | 3300<br>89      | 3810<br>87      | 4395<br>84      | 4745<br>81      | 6010<br>70      | 96              |
|                                                             | 10 | 1034<br>118      | 1625<br>116     | 2365<br>113     | 2938<br>110     | 3250<br>108     | 3750<br>105     | 4330<br>101     | 4660<br>98      | 5940<br>82      | 120             |
|                                                             | 12 | 904<br>142       | 1520<br>140     | 2275<br>137     | 2860<br>134     | 3170<br>131     | 3660<br>129     | 4225<br>122     | 4560<br>117     | 5850<br>107     | 144             |
|                                                             | 14 | 780<br>166       | 1405<br>164     | 2170<br>160     | 2760<br>255     | 3080<br>152     | 3550<br>146     | 4150<br>138     | 4485<br>133     | 5765<br>107     | 168             |
| Max. Cont.                                                  | 16 | 656<br>191       | 1280<br>189     | 2035<br>185     | 2625<br>180     | 2950<br>177     | 3400<br>175     | 4010<br>164     | 4355<br>159     | 5535<br>137     | 192             |
| Max. Int.                                                   | 18 | 565<br>215       | 1158<br>213     | 1930<br>210     | 2482<br>205     | 2850<br>201     | 3290<br>192     | 3900<br>184     | 4250<br>177     | 5395<br>154     | 216             |
|                                                             | 20 | 410<br>239       | 1000<br>237     | 1755<br>234     | 2342<br>230     | 2705<br>227     | 3120<br>218     | 3770<br>211     | 4095<br>203     | 5135<br>175     | 240             |
| Torque (theor.)<br>in-lb.<br>[daNm]                         |    | 1377<br>[15,56]  | 2000<br>[22,59] | 2888<br>[32,63] | 3554<br>[40,16] | 4000<br>[45,18] | 4576<br>[51,71] | 5554<br>[62,75] | 6000<br>[67,77] | 7775<br>[87,85] | Torque<br>Speed |
| 19.26 in <sup>3</sup> ./rev. [315.7 cm <sup>3</sup> ./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 mm<sup>2</sup>/s] at 122°F [50° C].

## Performance Data MLHR 400

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

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

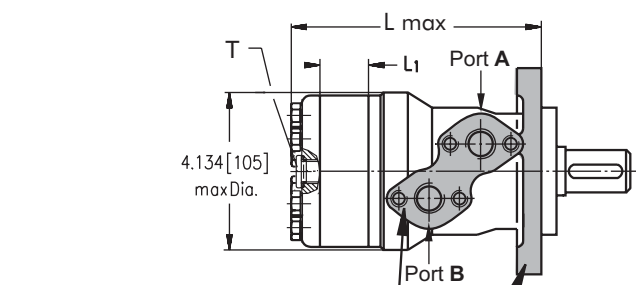
24.2 in<sup>3</sup>./rev. [397 cm<sup>3</sup>./rev.]

## 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 mm<sup>2</sup>/s] at 122°F [50° C].

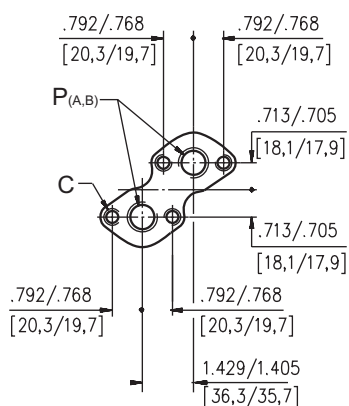
## DIMENSIONS AND MOUNTING DATA



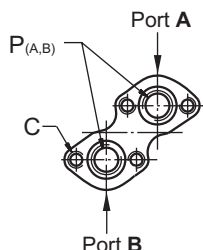
### Porting

#### Side Ports

Version **2** **3** **5**

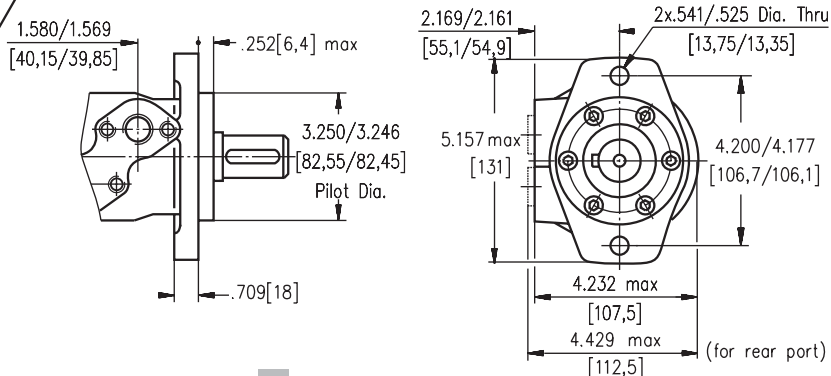


Version **4**

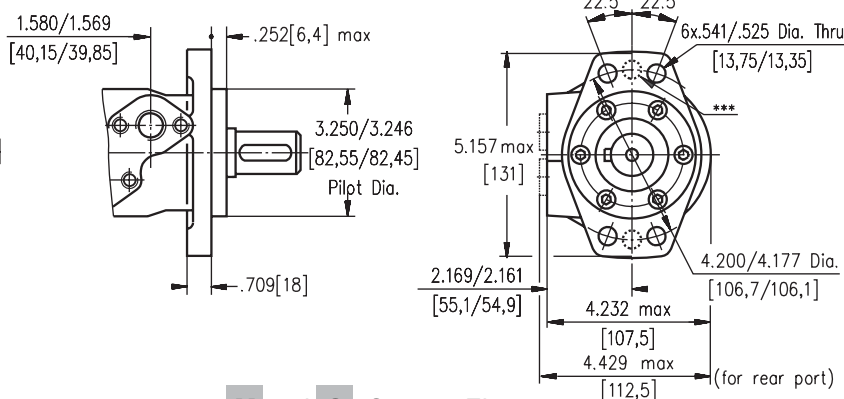


### Mounting

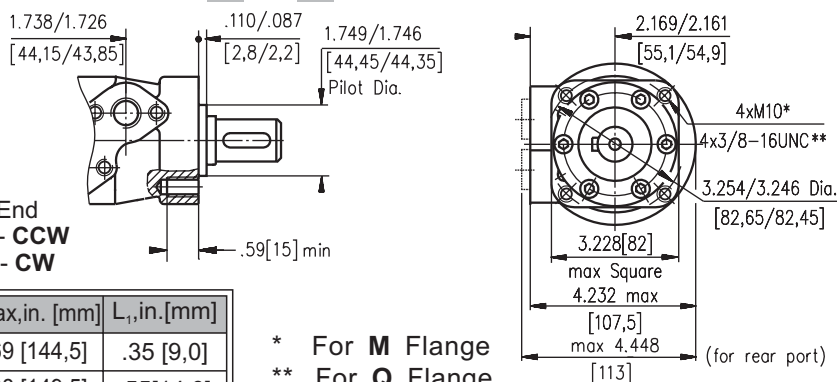
#### SAE A Flange



#### 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 <sub>1</sub> ,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

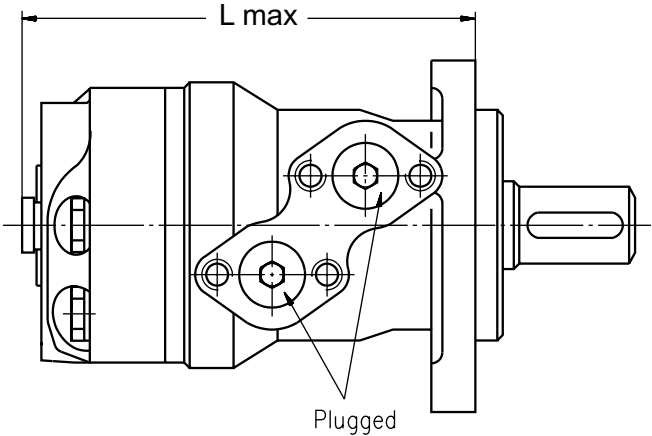
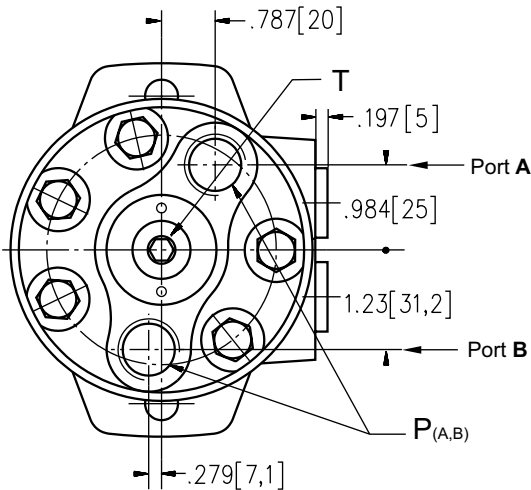
\*\* For Q Flange

\*\*\* Perform at customer's request

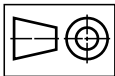
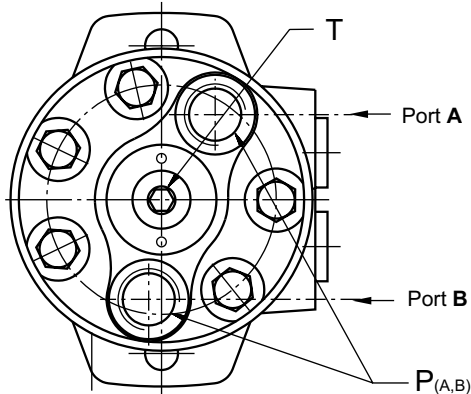
| Versions           |                                 |           |                                        |                                        |
|--------------------|---------------------------------|-----------|----------------------------------------|----------------------------------------|
|                    | 2                               | 3         | 4                                      | 5                                      |
| C                  | 4xM8                            | 4xM8      | 4x <sup>5</sup> / <sub>16</sub> -18UNC | 4x <sup>5</sup> / <sub>16</sub> -18UNC |
| P <sub>(A,B)</sub> | 2xG <sup>1</sup> / <sub>2</sub> | 2xM22x1,5 | 2x <sup>7</sup> / <sub>8</sub> -14UNF  | 2x <sup>1</sup> / <sub>2</sub> -14NPTF |
| T                  | G <sup>1</sup> / <sub>4</sub>   | M14x1,5   | <sup>7</sup> / <sub>16</sub> -20UNF    | <sup>7</sup> / <sub>16</sub> -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 |
|-------------|---|---|---|---|---|---|---|---|---|
| <b>MLHR</b> |   |   |   |   |   |   |   |   |   |

### 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.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**80** - 4.90 [80,3] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**100** - 6.09 [99,8] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**125** - 7.67 [125,7] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**160** - 9.74 [159,6] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**200** - 12.19 [199,8] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**250** - 15.26 [250,1] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**315** - 19.26 [315,7] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]

**400** - 24.40 [397,0] in.<sup>3</sup>/rev. [cm.<sup>3</sup>/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.

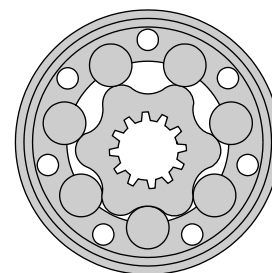


# HYDRAULIC MOTORS MLHH



## APPLICATION

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



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## OPTIONS

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

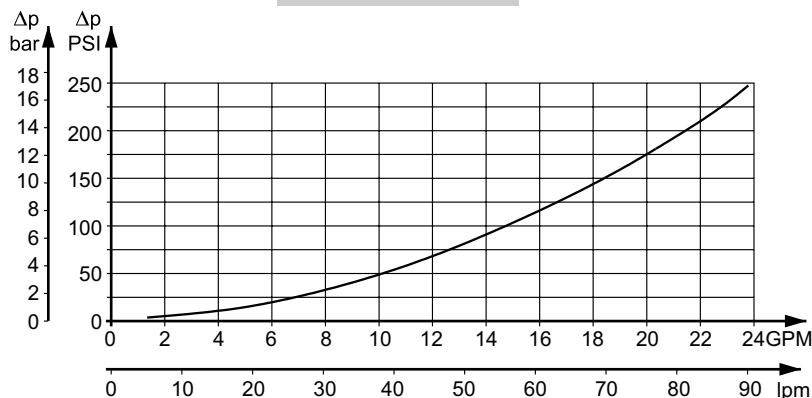
## GENERAL

|                                                        |                                              |                                                                 |
|--------------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------|
| <b>Displacement,</b>                                   | in <sup>3</sup> /rev [cm <sup>3</sup> /rev.] | 12.3÷30.7 [201,3÷502,4]                                         |
| <b>Max. Speed,</b>                                     | [RPM]                                        | 150÷370                                                         |
| <b>Max. Torque,</b>                                    | in-lb [daNm]                                 | 4510÷7434 [51÷84]                                               |
| <b>Max. Output,</b>                                    | HP [kW]                                      | 11÷21 [8,5÷16]                                                  |
| <b>Max. Pressure Drop,</b>                             | PSI [bar]                                    | 1300÷2540 [90÷175]                                              |
| <b>Max. Oil Flow,</b>                                  | GPM [lpm]                                    | 20 [75]                                                         |
| <b>Min. Speed,</b>                                     | [RPM]                                        | 5÷10                                                            |
| <b>Pressure fluid</b>                                  |                                              | Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)                 |
| <b>Temperature range,</b>                              | °F [°C]                                      | -22÷194 [-30÷90]                                                |
| <b>Optimal Viscosity range, SUS [mm<sup>2</sup>/s]</b> |                                              | 98÷347 [20÷75]                                                  |
| <b>Filtration</b>                                      |                                              | ISO code 20/16 (Min. recommended fluid filtration of 25 micron) |

### Oil flow in drain line

| Pressure drop<br>PSI [bar] | Viscosity<br>SUS [mm <sup>2</sup> /s] | Oil flow in<br>drain line<br>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<br>200  | MLHH<br>250 | MLHH<br>315  | MLHH<br>400  | MLHH<br>500  |
|------------------------------------------------------------------|-------------------------|--------------|-------------|--------------|--------------|--------------|
| <b>Displacement, in.<sup>3</sup>/rev. [cm.<sup>3</sup>/rev.]</b> |                         | 12.3 [201,3] | 15.4 [252]  | 16.4 [314,9] | 24.2 [396,8] | 30.7 [502,4] |
| <b>Max. Speed,<br/>[RPM]</b>                                     | Cont.                   | 370          | 295         | 235          | 185          | 150          |
|                                                                  | Int.*                   | 445          | 350         | 285          | 225          | 180          |
| <b>Max. Torque<br/>in-lb [daNm]</b>                              | 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]  |
| <b>Max. Output<br/>HP [kW]</b>                                   | Cont.                   | 21 [16]      | 21 [16]     | 18.7 [14]    | 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]    |
| <b>Max. Pressure<br/>Drop<br/>PSI [bar]</b>                      | 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]   |
| <b>Max. Oil Flow<br/>GPM [lpm]</b>                               | Cont.                   | 20 [75]      | 20 [75]     | 20 [75]      | 20 [75]      | 20 [75]      |
|                                                                  | Int.*                   | 24 [90]      | 24 [90]     | 24 [90]      | 24 [90]      | 24 [90]      |
| <b>Max. Inlet Pressure<br/>PSI [bar]</b>                         | 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]   |
| <b>Max. Starting Pressure with<br/>Unloaded Shaft, PSI [bar]</b> |                         | 72 [5]       | 72 [5]      | 72 [5]       | 72 [5]       | 72 [5]       |
| <b>Min. Starting Torque,<br/>in-lb [daNm]</b>                    | 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]    |
| <b>Min. Speed***, [RPM]</b>                                      |                         | 10           | 10          | 8            | 5            | 5            |
| <b>Weight, lb [kg]</b>                                           |                         | 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 mm<sup>2</sup>/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 ( $\Delta$ PSI) |              |                |                |              | Max. Cont.   | Max. Int.    | Speed (theor.) |
|-------------------------------------|----|--------------------------|--------------|----------------|----------------|--------------|--------------|--------------|----------------|
|                                     |    | 500                      | 1000         | 1500           | 2000           | 2540         |              | 2900         |                |
| Flow [GPM]                          | 1  | 850<br>22                | 1679<br>20   | 2452<br>17     | -<br>-         | -<br>-       | -<br>-       | -<br>-       | 25             |
|                                     | 3  | 872<br>49                | 1758<br>47   | 2599<br>42     | 3377<br>33     | 4229<br>16   | -<br>-       | -<br>-       | 50             |
|                                     | 5  | 856<br>96                | 1740<br>93   | 2630<br>89     | 3468<br>81     | 4466<br>66   | 5053<br>53   | 5053<br>53   | 99             |
|                                     | 8  | 839<br>148               | 1705<br>146  | 2595<br>142    | 3475<br>133    | 4479<br>116  | 5080<br>103  | 5080<br>103  | 149            |
|                                     | 10 | 774<br>195               | 1640<br>194  | 2521<br>191    | 3442<br>180    | 4449<br>161  | 5064<br>146  | 5064<br>146  | 198            |
|                                     | 13 | 705<br>246               | 1583<br>244  | 2453<br>242    | 3389<br>233    | 4390<br>212  | 5008<br>198  | 5008<br>198  | 248            |
|                                     | 16 | 634<br>298               | 1500<br>296  | 2364<br>293    | 3319<br>284    | 4329<br>265  | 4938<br>249  | 4938<br>249  | 296            |
|                                     | 18 | 544<br>346               | 1411<br>344  | 2283<br>343    | 3229<br>332    | 4217<br>312  | 4861<br>296  | 4861<br>296  | 347            |
| Max. Cont.                          | 20 | 509<br>373               | 1358<br>372  | 2239<br>370    | 3165<br>362    | 4170<br>341  | 4793<br>325  | 4793<br>325  | 372            |
| Max. Int.                           | 22 | 455<br>400               | 1296<br>400  | 2188<br>399    | 3092<br>390    | 4086<br>370  | 4720<br>355  | 4720<br>355  | 412            |
|                                     | 24 | 341<br>447               | 1206<br>445  | 2081<br>442    | 3004<br>434    | 4001<br>414  | 4613<br>399  | 4613<br>399  | 447            |
| Torque (theor.)<br>in-lb.<br>[daNm] |    | 977<br>[11]              | 1953<br>[22] | 2929<br>[33,1] | 3907<br>[44,1] | 4961<br>[56] | 5665<br>[64] | 5665<br>[64] |                |

12.3 in.<sup>3</sup>/rev. [201,3 cm.<sup>3</sup>/rev.]

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

## Performance Data MLHH 250

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

15.4 in.<sup>3</sup>/rev. [252 cm.<sup>3</sup>/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 mm<sup>2</sup>/s] at 122°F [50°C].

## Performance Data MLHH 315

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

19.2 in.<sup>3</sup>/rev. [314,9 cm.<sup>3</sup>/rev.]

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

## Performance Data MLHH 400

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

24.2 in.<sup>3</sup>/rev. [396,8 cm.<sup>3</sup>/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 mm<sup>2</sup>/s] at 122°F [50°C].

## Performance Data MLHH 500

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

30.7 in.<sup>3</sup>/rev. [502,4 cm.<sup>3</sup>/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

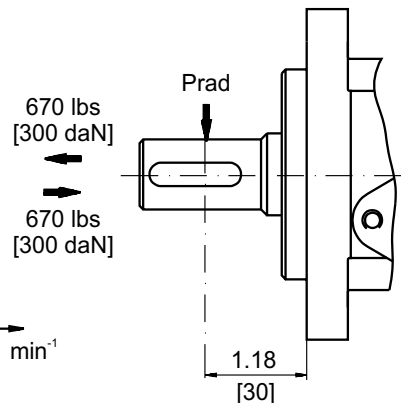
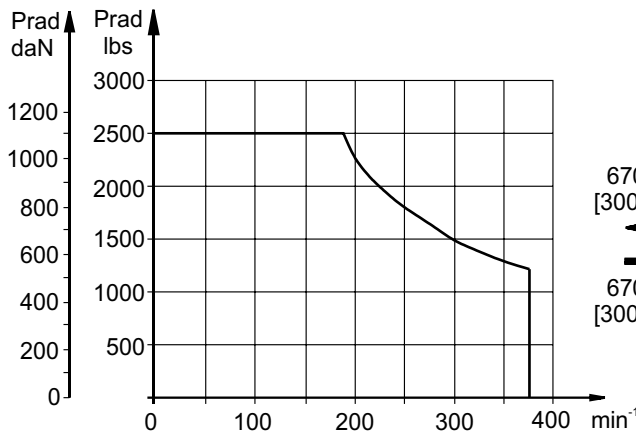
The Performance data was collected at back pressure 72.5÷145 PSI [5÷10 bar] and oil with viscosity of 150 SUS [32 mm<sup>2</sup>/s] at 122°F [50°C].

## 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<sup>-1</sup>



## DIMENSIONS AND MOUNTING DATA

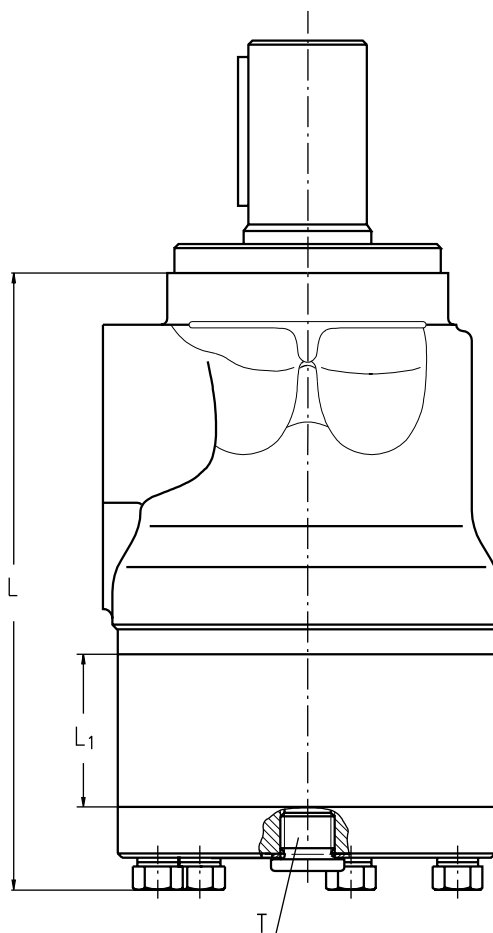
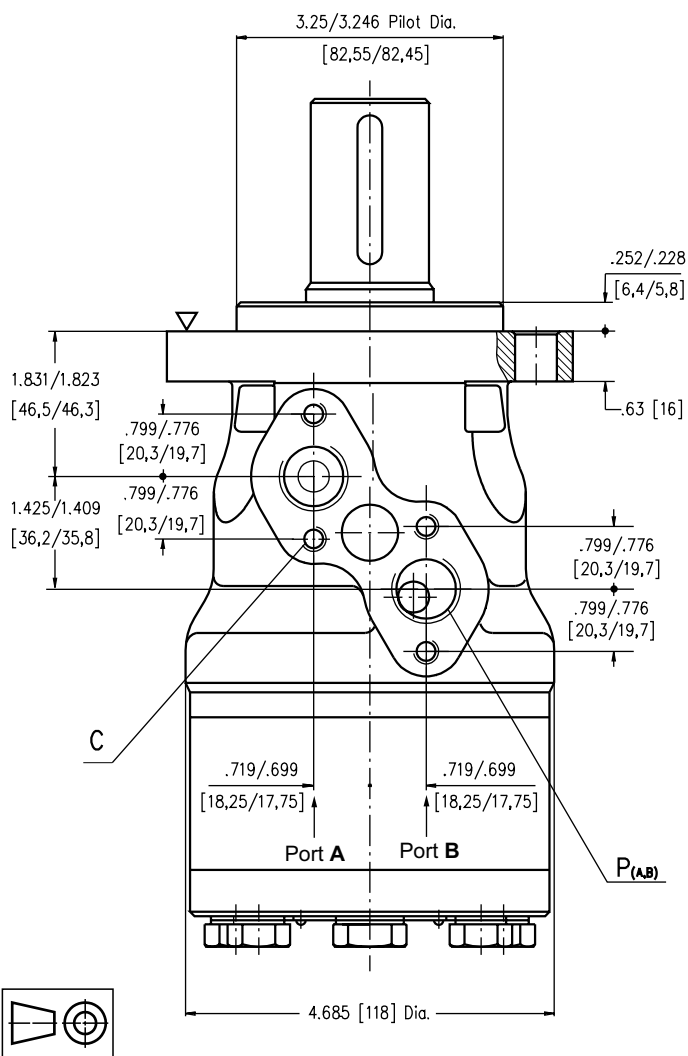
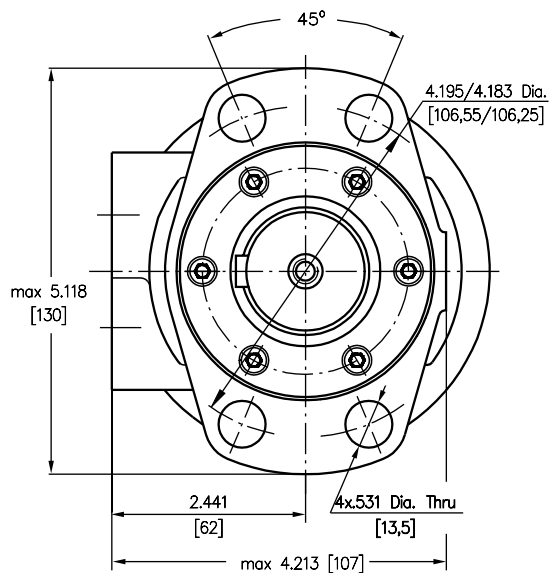
## Magneto Mounting Flange with 4 hole

| Type     | L, mm      | L <sub>1</sub> , 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**

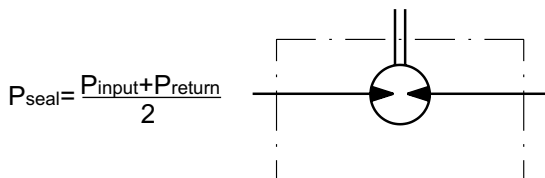
|                          | Versions                        |           |                                        |                                        |
|--------------------------|---------------------------------|-----------|----------------------------------------|----------------------------------------|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



## MAX. PERMISSIBLE SHAFT SEAL PRESSURE FOR MLHH MOTORS

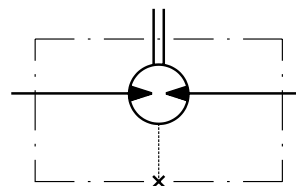
### *MLHH...U1 motors with high pressure seal and without drain connection:*

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



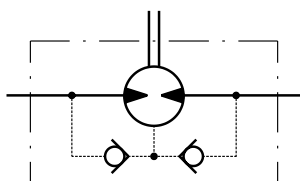
### *MLHH...U motors with high pressure seal and drain connection:*

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



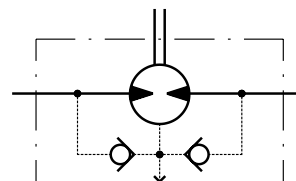
### *MLHH...1 motors with standard shaft seal and without drain connection:*

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

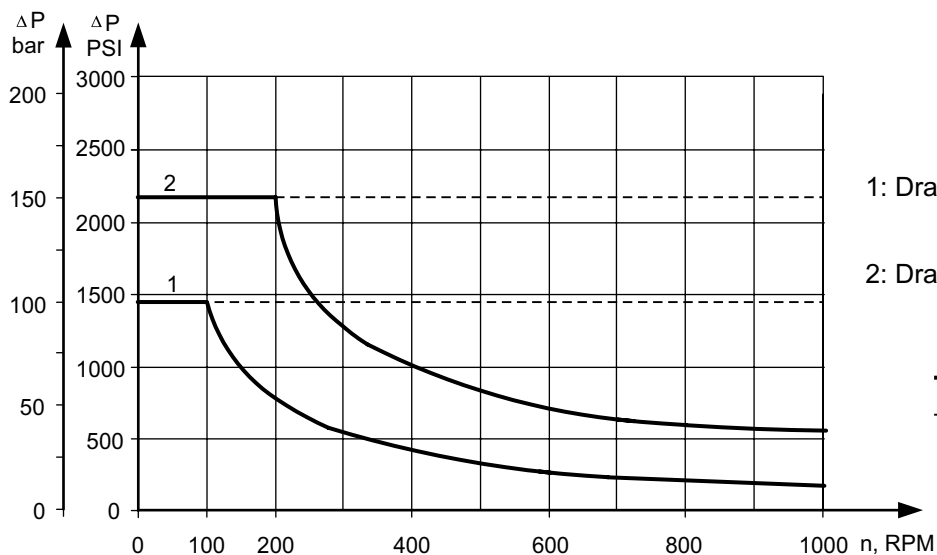


### *MLHH... motors with standard shaft seal and with drain connection:*

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

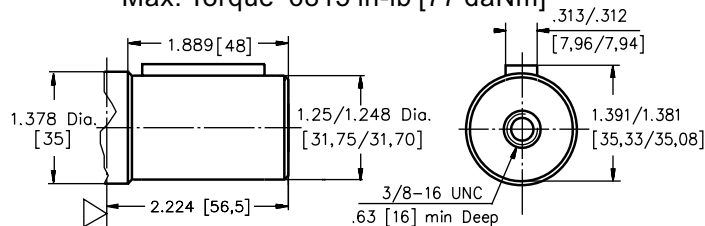
2: Drawing for High Pressure Seal ("U" Seal)

— - continuous operations  
- - - - - intermittent operations

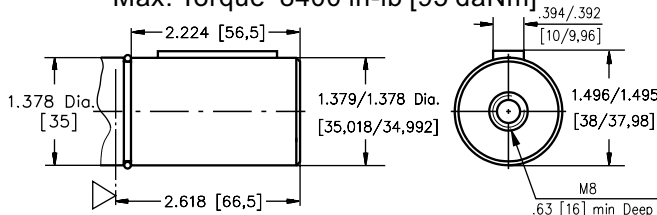
## SHAFT EXTENSIONS

**K**

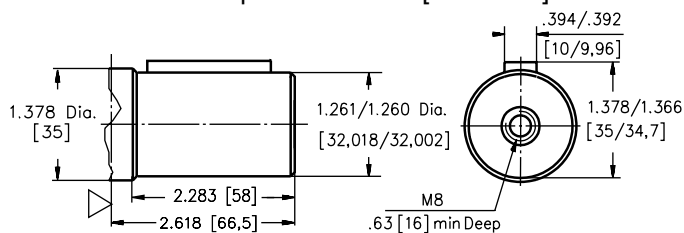
1 1/4" [31,75] straight, Parallel key 5/16"x 5/16"x1 1/4" BS 46  
 Max. Torque 6815 in-lb [77 daNm]


**B**

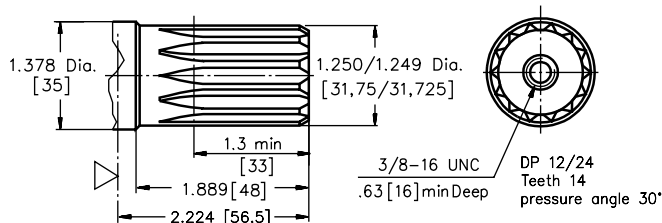
ø35 straight, Parallel key A10x8x45 DIN 6885  
 Max. Torque 8400 in-lb [95 daNm]


**M**

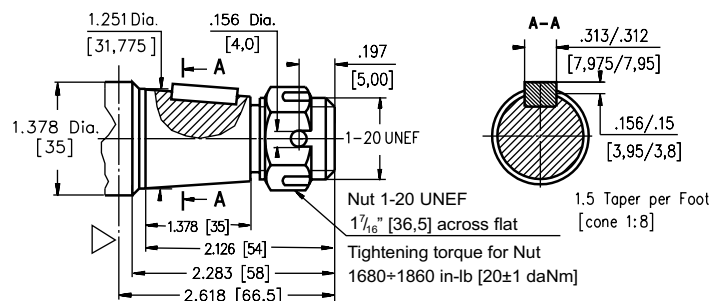
ø32 straight, Parallel key A10x8x45 DIN 6885  
 Max. Torque 6815 in-lb [77 daNm]


**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 |
|-------------|---|---|---|---|---|---|---|
| <b>MLHH</b> |   |   |   |   |   |   |   |

### Pos.1 - Displacement code

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

### Pos.2 - Shaft Extensions\*

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

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

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

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

|          |                                                   |
|----------|---------------------------------------------------|
| omit     | - Standard shaft seal                             |
| <b>U</b> | - High pressure shaft seal (without check valves) |

### Pos.5 - Drain Port

|          |                      |
|----------|----------------------|
| omit     | - with drain port    |
| <b>1</b> | - 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

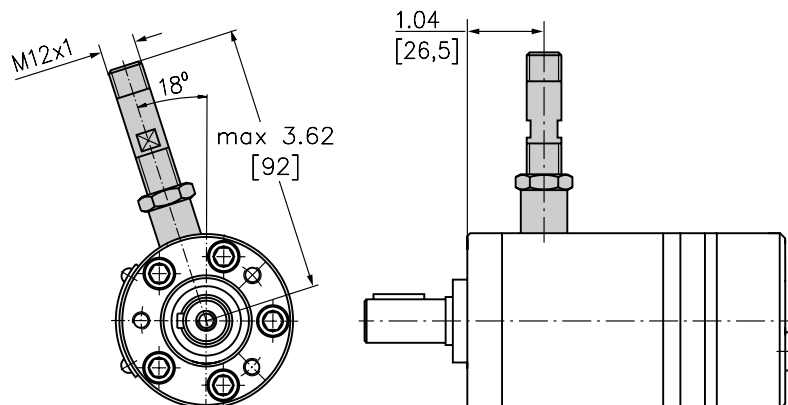
\* for sensor ordering see page 53

\*\* color at customer's request.

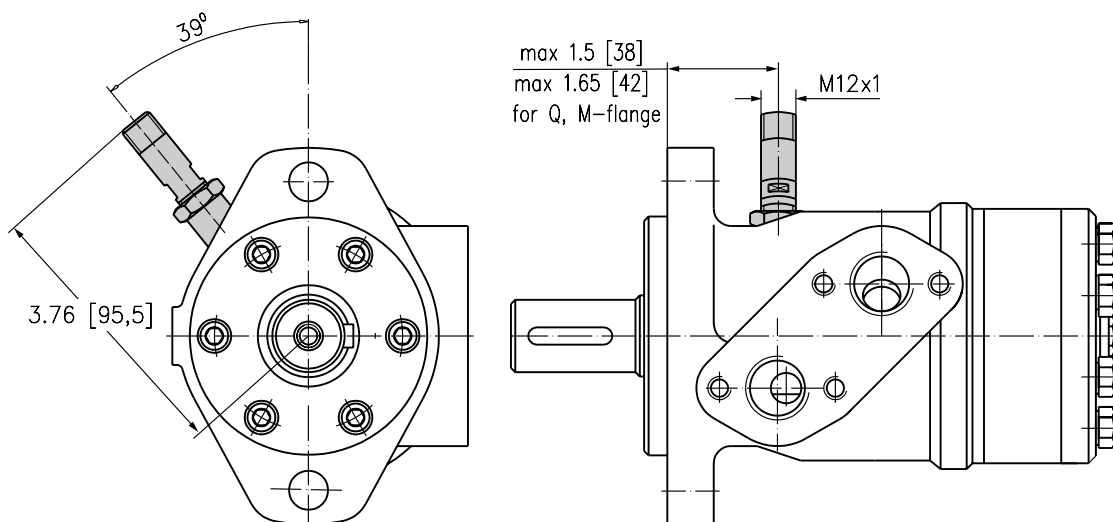
\*\*\* without check valves for "U" shaft seal versions (see page 31 and 50)

# MOTORS WITH SPEED SENSOR

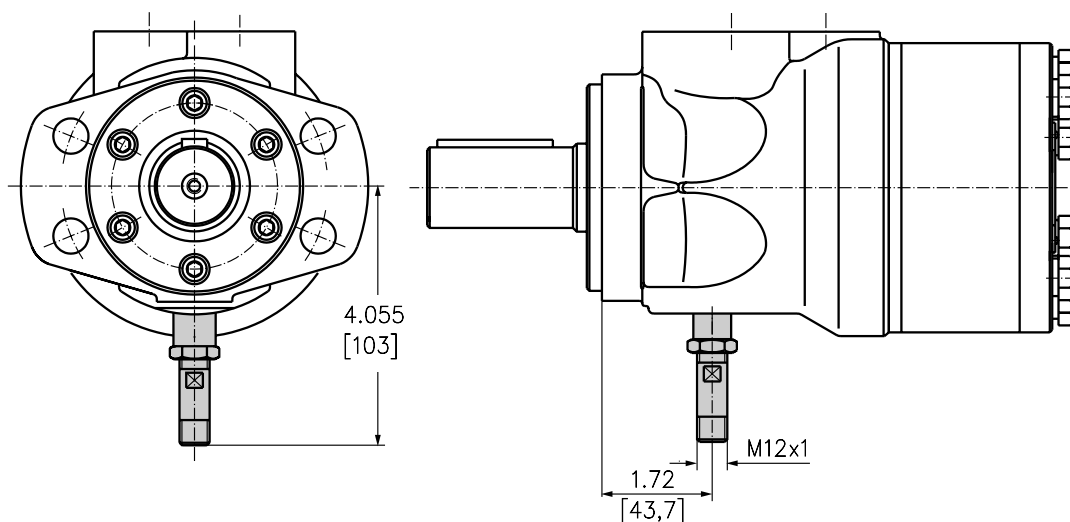
## MLHM...RS



## MLHP...RS and MLHR...RS



## MLHH...RS

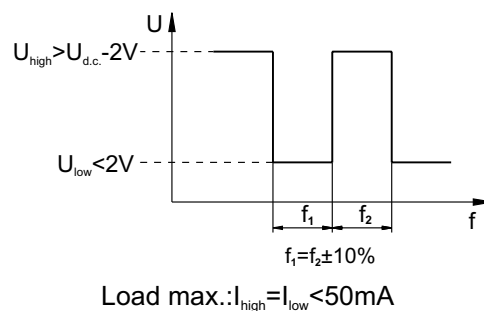


## TECHNICAL DATA OF THE SPEED SENSOR

### 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                    |

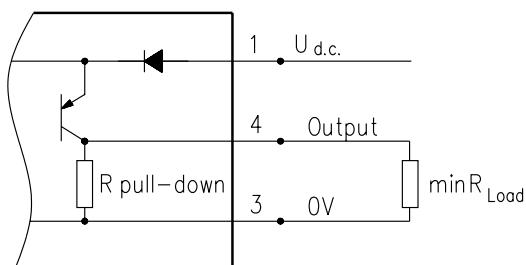
### Output signal



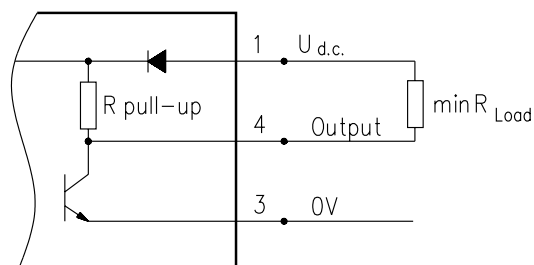
| Motor type            | MLHM | MLHP | MLHR | MLHH |
|-----------------------|------|------|------|------|
| Pulses per revolution | 30   | 36   | 36   | 42   |

### Wiring diagrams

#### PNP

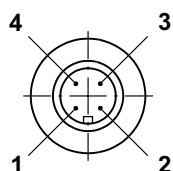


#### NPN



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

### 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                   |
|--------------|-------------|---------------------------------------|
| <b>RSN</b>   | NPN         | Connector BINDER 713 series           |
| <b>RSP</b>   | PNP         | Connector BINDER 713 series           |
| <b>RSNL5</b> | NPN         | Cable output 3x0,25; 196 in [5m] long |
| <b>RSPL5</b> | 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<br>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 % | $\alpha$ Degrees | Grade % | $\alpha$ 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;

$\eta_m$ - 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                   |

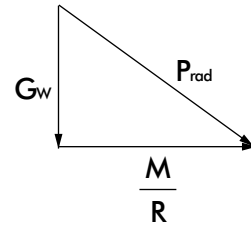
### 9.Radial motor loading: $P_{rad}$ , lbs [daN]

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.

