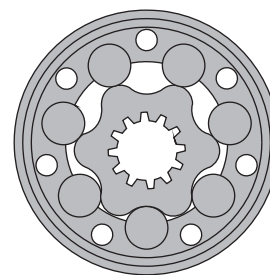


HYDRAULIC MOTOR-BRAKES B/HR



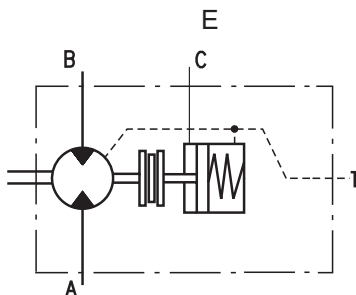
APPLICATION

- » Conveyors
- » Feeding mechanism of robots and manipulators
- » Metal working machines
- » Textile machines
- » Agricultural machines
- » Food industries
- » Wood working and sawmill machinery etc.



CONTENTS

Specification data	20
Dimensions and mounting.	21
Shaft versions	21
Permissible shaft loads.....	22
Order code	22



OPTIONS

- » Model - Spool valve, roll-gerotor
- » Fully integrated friction disk brake;
- » Side ports
- » Shafts - straight, splined and tapered
- » Manifold ports.

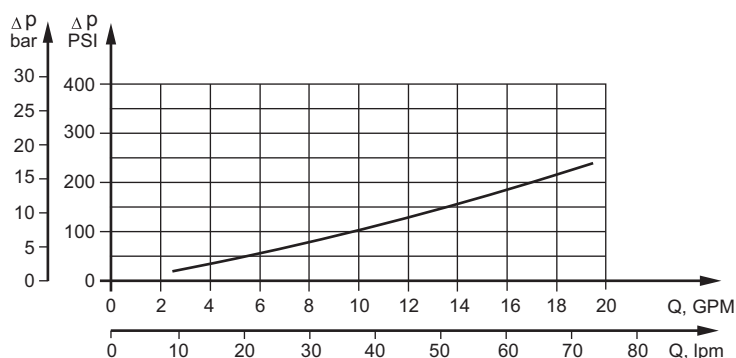
GENERAL

Displacement,	in ³ /rev [cm ³ /rev]	24.4 [397]
Max. Speed,	[RPM]	600
Max. Torque,	lb-in [daNm]	cont. 4250 [48] int. 4870 [55]
Max. Output,	HP [kW]	20.1 [15]
Max. Pressure Drop,	PSI [bar]	cont. 2030 [140] int. 2540 [175]
Max. Oil Flow,	GPM [lpm]	20 [75,7]
Min. Speed,	[RPM]	10
Pressure fluid	Mineral based - HLP(DIN 51524) or HM(ISO 6743/4)	
Temperature range,	°F [°C]	-40÷284 [-40÷140]
Optimal Viscosity range, SUS [mm ² /s]	98÷347 [20÷75]	
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 microns)	

Oil flow in drain line

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

Pressure Losses



SPECIFICATION DATA

Type		B/HR 80	B/HR 100	B/HR 125	B/HR 160	B/HR 200	B/HR 250	B/HR 315	B/HR 400
Displacement, in ³ /rev [cm ³ /rev]		4.90 [80,3]	6.09 [99,8]	7.48 [122,5]	9.37 [153,6]	11.95 [195,8]	14.95 [245]	18.67 [306]	23.56 [386]
Max. Speed, [RPM]	Cont.	500	500	475	375	300	240	190	150
	Int.*	600	600	600	470	375	300	240	191
Max. Torque lb-in [daNm]	Cont.	1390 [15,7]	1750 [19,8]	2210 [25,0]	2830 [32,0]	3045 [34,4]	3540 [40,0]	3850 [43,5]	4250 [48,0]
	Int.*	1725 [19,5]	2125 [24,0]	2655 [30,0]	3450 [39,0]	3450 [39,0]	4160 [47,0]	4515 [51,0]	4870 [55,0]
Max. Output HP [kW]	Cont.	14 [10,5]	14 [10,5]	14 [10,5]	13.7 [10,2]	12.6 [9,4]	10.7 [8]	8.7 [6,5]	8.2 [6,1]
	Int.*	20.1 [15]	20.1 [15]	20.1 [15]	18.8 [14]	18.7 [14]	15.4 [11,5]	12.1 [9]	11 [8,2]
Max. Pressure Drop PSI [bar]	Cont.	2030 [140]	2030 [140]	2030 [140]	2030 [140]	1810 [125]	1595 [110]	1450 [100]	1305 [90]
	Int.*	2540 [175]	2540 [175]	2540 [175]	2540 [175]	2250 [155]	2030 [140]	1810 [125]	1520 [105]
Max. Oil Flow GPM [lpm]	Cont.	10.6 [40]	13 [50]	16 [60,6]	16 [60,6]	16 [60,6]	16 [60,6]	16 [60,6]	16 [60,6]
	Int.*	13 [50]	16 [60,6]	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]	20 [75,7]
Max. Inlet Pressure PSI [bar]	Cont.	2030 [140]	2030 [140]	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]	2540 [175]	2540 [175]
Max. Return Pres- sure, PSI [bar]	Cont.	2030 [140]	2030 [140]	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]	2540 [175]	2540 [175]
Max. Starting Pressure with Unloaded Shaft, PSI [bar]		145 [10]	145 [10]	130 [9]	102 [7]	73 [5]	58 [4]	44 [3]	44 [3]
Min. Starting Torque lb-in [daNm]	At max.press. drop Cont.	1060 [12]	1420 [16]	1770 [20]	2270 [25,6]	2620 [29,5]	2510 [28,3]	2840 [32]	3170 [35,8]
	At max.press. drop Int.*	1310 [14,8]	1780 [20,1]	1930 [21,8]	2860 [32,3]	3150 [35,6]	3400 [38,4]	4580 [51,7]	4040 [45,6]
Min. Speed***, [RPM]		10	10	10	10	10	10	10	10
Static Torque of Brake, lb-in [daNm]		4868 [55]							
Min. Brake Release Pressure****, PSI [bar]		190 [13]							
Max. Opening Pressure, PSI [bar]		2900 [200]							

* 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 lower than given, consult factory or your regional manager.

**** Motor-brakes must always have a drain line. The brake release pressure is the difference between the pressure in the brake release line and the pressure in the drain line.

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

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

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

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

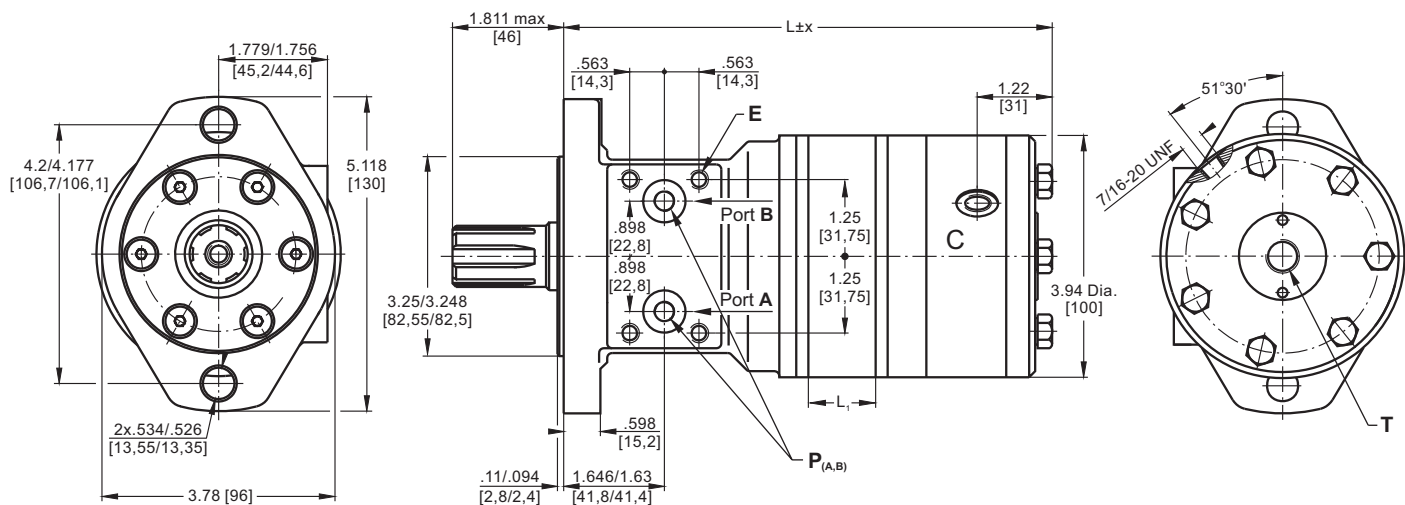
4. Recommended minimum oil viscosity 70 SUS [13 mm²/s] at 122°F [50°C].

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

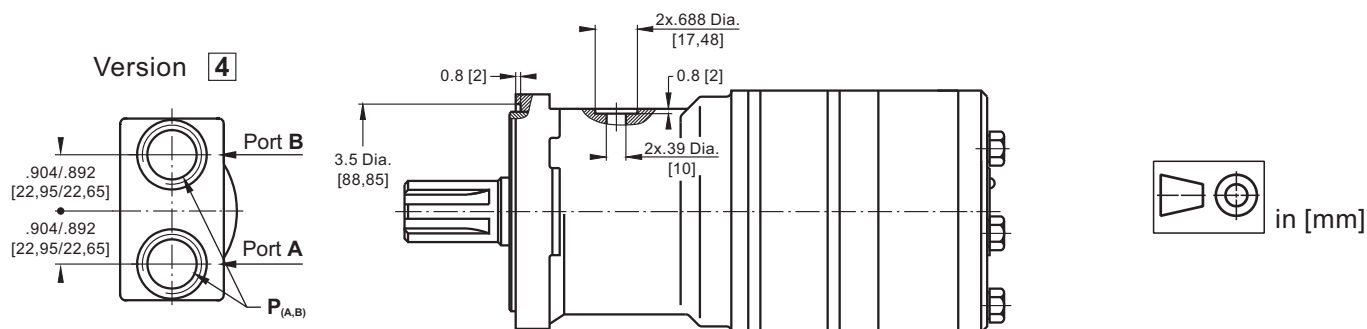
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

DIMENSIONS AND MOUNTING DATA

Version **1**



Version **4**



Type	L±x, in [mm]	L ₁ , in [mm]
B/HR 80	7.73 [196,3]	.55 [14,0]
B/HR 100	7.86 [199,7]	.69 [17,4]
B/HR 125	7.86 [199,7]	.69 [17,4]
B/HR 160	8.04 [204,1]	.86 [21,8]
B/HR 200	8.27 [210,1]	1.09 [27,8]
B/HR 250	8.55 [217,1]	1.37 [34,8]
B/HR 315	8.89 [225,8]	1.71 [43,5]
B/HR 400	9.33 [237,1]	2.16 [54,8]

x=.059 in [1,5 mm]

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

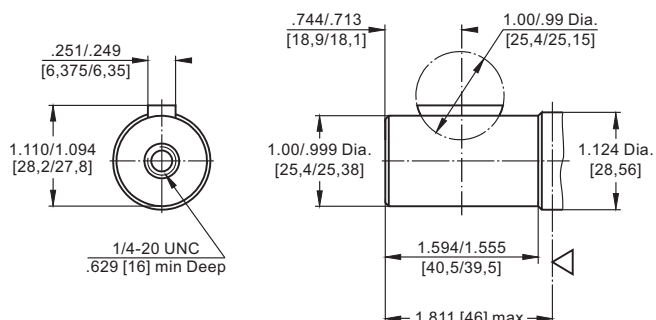
Reverse Rotation
Viewed from Shaft End
Port A Pressurized - **CCW**
Port B Pressurized - **CW**

	Versions	
	1	4
C	4x 5/16-18UNC	-
P _(A,B)	2x.39 Dia [2x10]	2x 7/8-14UNF
T	7/16 -20UNF	7/16 -20UNF

SHAFT EXTENSIONS

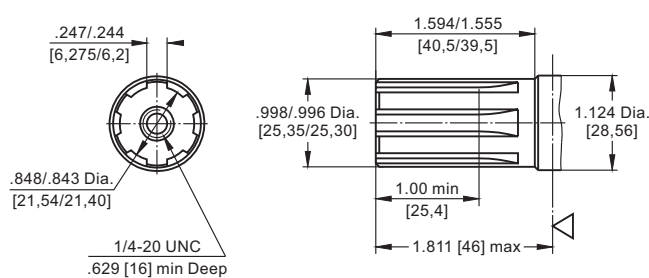
C

1" [25,4] straight, Woodruff key 1/4"x1" SAE J502
Max. Torque 3900 in-lb [44 daNm]



G

1" [25,4], SAE 6B Splined
Max. Torque 3900 in-lb [44 daNm]



PERMISSIBLE SHAFT LOADS

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

$$\text{Radial Shaft Load } P_{rad} = \frac{650}{\text{RPM}} \times \frac{24800}{97+L}, \text{ daN}^*$$

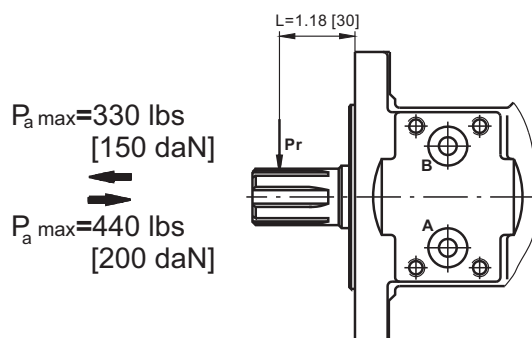
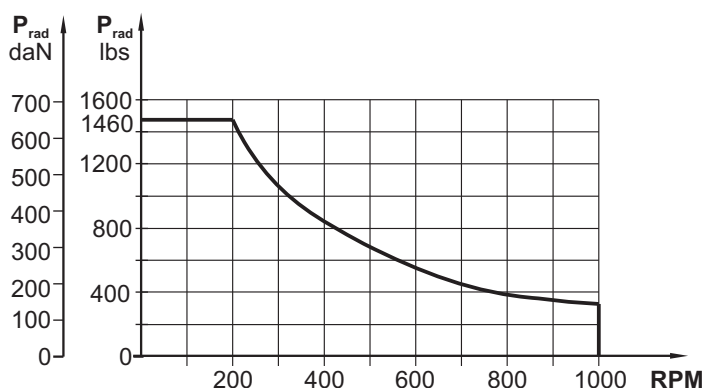
* L - in mm.

$$\text{Radial Shaft Load: } P_{rad} = \frac{1460}{\text{RPM}} \times \frac{976}{3.82+L}, \text{ lbs}^*$$

* L - in inch

1. $\text{RPM} < 200$: max P_{rad} = 1460 lbs [650 daN]

2. $\text{RPM} \geq 200$: $L < 2.2$ in [55 mm]



Warning: Drain line should always be used.

ORDER CODE

	1	2	3	4	5
B / H R					

Pos.1 - Displacement code

80	- 4.90 in ³ /rev [80,3 cm ³ /rev]
100	- 6.09 in ³ /rev [99,8 cm ³ /rev]
125	- 7.67 in ³ /rev [125,7 cm ³ /rev]
160	- 9.74 in ³ /rev [159,6 cm ³ /rev]
200	- 12.19 in ³ /rev [199,8 cm ³ /rev]
250	- 15.26 in ³ /rev [250,1 cm ³ /rev]
315	- 19.26 in ³ /rev [315,7 cm ³ /rev]
400	- 24.40 in ³ /rev [397,0 cm ³ /rev]

Pos.2 - Shaft Extensions**

C	- 1" [25,4] straight, Woodruff key
G	- 1" [25,4] SAE 6B Splined

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

1	- side ports, Manifold [5/16-18 UNC Mounting Threads], 7/16-20 UNF
4	- side ports, 2x7/8-14 UNF, O-ring, 7/16-20 UNF

Pos.4 - Additional Options [See page 55]

Pos.5 - Design Series

omit - Factory specified

NOTES: * For the Performance Data please look at "M+S Hydraulic" Catalogue for MLHR motors.

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

The hydraulic motors are manganophosphatized as standard.

MOTOR-BRAKE ADDITIONAL OPTIONS

Additional Options Description	Order Code	Motor type			
		B/HR	RWB	SW	TW
Low Leakage	LL	O	O	-	-
Low Speed Valving	LSV	O	O	-	-
Free Running	FR	-	-		-
Reverse Rotation	R	O	O	-	-
Paint*	P	O	O	O	O
Corrosion Protected Paint*	PC	O	O	O	O
Special Paint**	PS	O	O	O	O
	PCS				
Check Valves		-	O	S	S

O	Optional
-	Not applicable
S	Standard

* Colour at customer's request.

** Non painted feeding surfaces, colour at customer's request.

APPLICATION CALCULATION

VEHICLE DRIVE CALCULATIONS

1. Motor speed: n , RPM

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

v_{km} - vehicle speed, km/h;
 v_{mi} - vehicle speed, mile/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:

$$RR = G \times \rho$$

G - total weight loaded on vehicle, lbs [daN];
 ρ - rolling resistance coefficient (Table 1).

Table 1

Rolling resistance coefficient In case of rubber tire rolling on different surfaces	
Surface	ρ
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]

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

α - gradient negotiation angle (Table 2)

Table 2

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

4. Acceleration force: FA , lbs [daN]

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

$$FA = \frac{v_{mi} \times G}{22 \times t}, [\text{lbs}]; \quad FA = \frac{v_{km} \times G}{36 \times t}, [\text{daN}]$$

FA - acceleration 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 , lb-in [daNm]

Necessary torque moment for every hydraulic motor:

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

N - motor numbers;
 η_M -mechanical gear efficiency (if it is available).

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

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

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

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

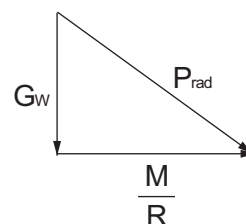
9.Radial motor loading: P_{rad} , lbs [daN]

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.

