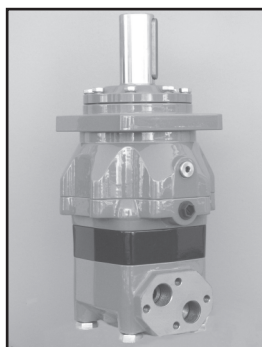
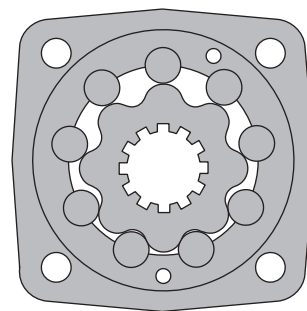


HYDRAULIC MOTOR-BRAKE MT/B



APPLICATION

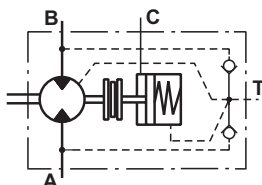
- » Conveyors
- » Metal working machines
- » Agricultural machines
- » Road building machines
- » Mining machinery
- » Food industries
- » Special vehicles
- » Plastic and rubber machinery etc.



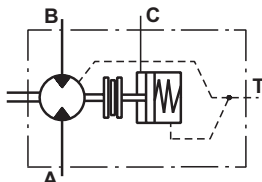
CONTENTS

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With check valves



Without check valves "1"



OPTIONS

- » Model - Disc valve, roll-gerotor
- » Fully integrated friction disk brake
- » Side ports
- » Shafts - straight, tapered, splined
- » BSPP ports
- » Other special features

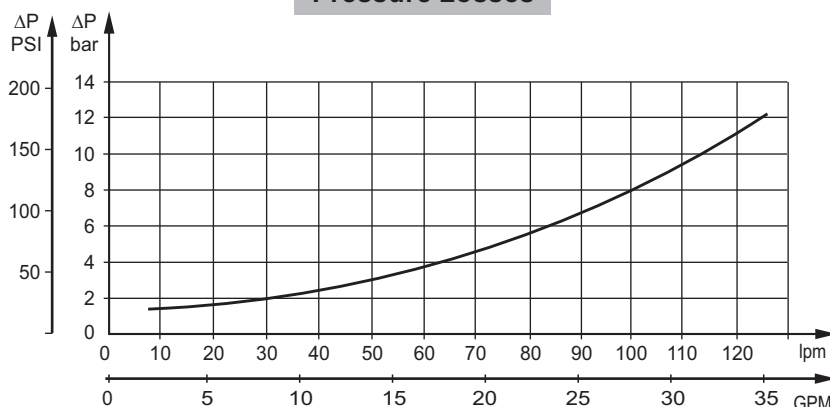
GENERAL

Max. Displacement,	cm ³ /rev [in ³ /rev]	724,3 [44.2]
Max. Speed,	[RPM]	780
Max. Torque,	daNm [lb-in]	cont.: 130 [11505] int.: 148 [13100]
Max. Output,	kW [HP]	40 [54]
Max. Pressure Drop,	bar [PSI]	cont.: 200 [2900] int.: 240 [3450]
Max. Oil Flow,	lpm [GPM]	150 [40]
Min. Speed,	[RPM]	5
Permissible Shaft Loads,	daNm [lb-in]	P _a =1000 [2248]
Pressure fluid		Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range,	°C [°F]	-40÷140 [-40÷284]
Optimal Viscosity range,	mm ² /s [SUS]	20÷75 [98÷347]
Filtration		ISO code 20/16 (Min. recommended fluid filtration of 25 microns)

Oil flow in drain line

Pressure drop bar [PSI]	Viscosity mm ² /s [SUS]	Oil flow in drain line lpm [GPM]
140 [2030]	20 [98]	2,5 [.66]
	35 [164]	1,5 [.39]
210 [3045]	20 [98]	5 [1.32]
	35 [164]	3 [.79]

Pressure Losses



SPECIFICATION DATA

Type		MT/B 160	MT/B 200	MT/B 250	MT/B 315	MT/B 400	MT/B 500	MT/B 630	MT/B 725
Displacement, cm³/rev [in³/rev]		161,1 [9.83]	201,4 [12.29]	251,8 [15.36]	326,3 [19.90]	410,9 [25.06]	523,6 [31.95]	631,2 [38.5]	724,3 [44.2]
Max. Speed, [RPM]	Cont.	625	625	500	380	305	240	197	172
	Int.*	780	750	600	460	365	285	234	209
Max. Torque, daNm [lb-in]	Cont.	47 [4160]	59 [5220]	73 [6460]	95 [8410]	108 [9560]	122 [10800]	130 [11505]	127 [11240]
	Int.*	56 [4960]	71 [6285]	88 [7790]	114 [10090]	126 [11150]	137 [12125]	148 [13100]	147 [13010]
Max. Output, kW [HP]	Cont.	26,5 [36]	33,5 [45]	33,5 [45]	33,5 [45]	30 [40]	26,5 [36]	24,3 [33]	20,2 [27]
	Int.*	32 [43]	40 [54]	40 [54]	40 [54]	35 [45]	30 [40]	27,5 [37]	26,8 [36]
Max. Pressure Drop bar [PSI]	Cont.	200 [2900]	200 [2900]	200 [2900]	200 [2900]	180 [2600]	160 [2300]	140 [2030]	120 [1740]
	Int.*	240 [3450]	240 [3450]	240 [3450]	240 [3450]	210 [3050]	180 [2600]	160 [2300]	140 [2030]
Max. Oil Flow, lpm [GPM]	Cont.	100 [26.5]	125 [33]	125 [33]	125 [33]	125 [33]	125 [33]	125 [33]	125 [33]
	Int.*	125 [33]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]
Max. Inlet Pressure, bar [PSI]	Cont.	210 [3050]	210 [3050]	210 [3050]	210 [3050]	210 [3050]	210 [3050]	210 [3050]	210 [3050]
	Int.*	250 [3600]	250 [3600]	250 [3600]	250 [3600]	250 [3600]	250 [3600]	250 [3600]	250 [3600]
Max. Return Pressure with Drain line, bar [PSI]	Cont.	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]
	Int.*	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]
Max. Starting Pressure with Unloaded Shaft, bar [PSI]		10 [150]	10 [150]	10 [150]	10 [150]	10 [150]	10 [150]	10 [150]	10 [150]
Min. Starting Torque, daNm [lb-in]	At max. pressure drop Cont.	34 [3010]	43 [3800]	53 [4690]	74 [6550]	84 [7435]	95 [8410]	95 [8410]	95 [8410]
	At max. pressure drop Int.*	41 [3630]	52 [4600]	63 [5580]	89 [7880]	97 [8585]	106 [9380]	110 [9735]	115 [10180]
Min. Speed**, [RPM]		10	9	8	7	6	5	5	5
Static Torque of Brake, daNm [lb-in]		143 [12657]							
Min. Brake Release Pressure***, bar [PSI]		32-35 [464-507]							
Max. Opening Pressure, bar [PSI]		280 [4060]							
Max. Pressure in Drain Line, bar [PSI]		5 [73]							
Weight, kg [lb]		27,5 [60.6]	28 [61.7]	28,5 [62.8]	29,5 [65]	30,5 [67.2]	31,5 [69.4]	31 [68.3]	32 [70.5]

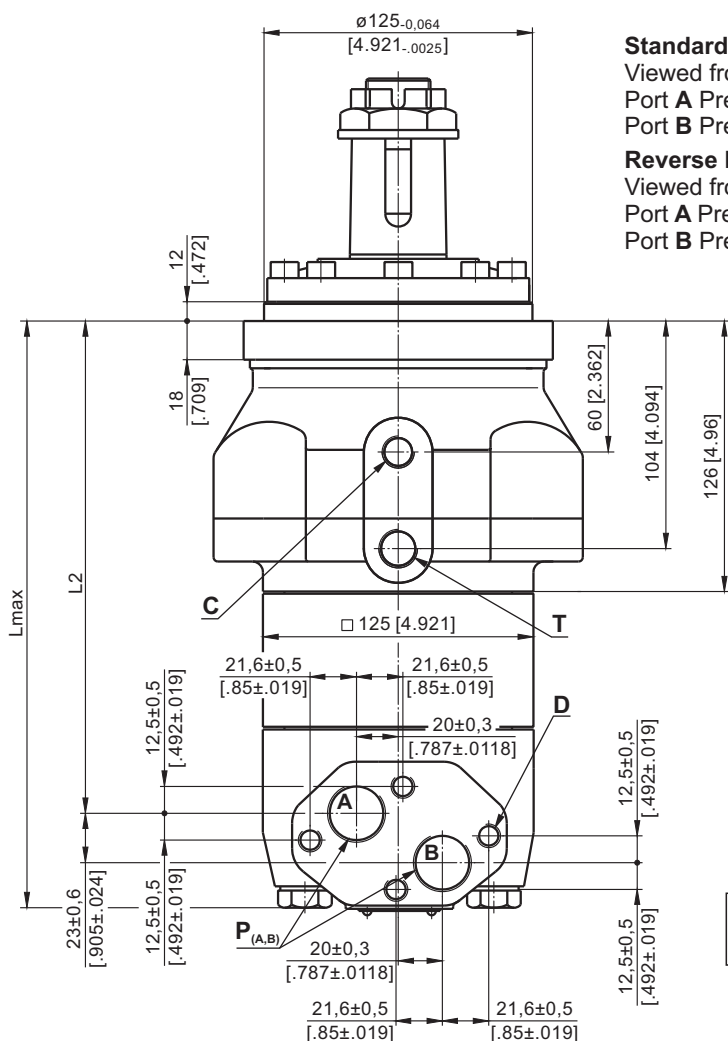
* Intermittent operation: the permissible values may occur for max. 10% of every minute.

** 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.

- 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 13 mm²/s [70 SUS] at 50°C [122°F].
- Recommended maximum system operating temperature is 82°C [180°F].
- To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

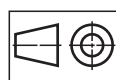
DIMENSIONS and MOUNTING DATA



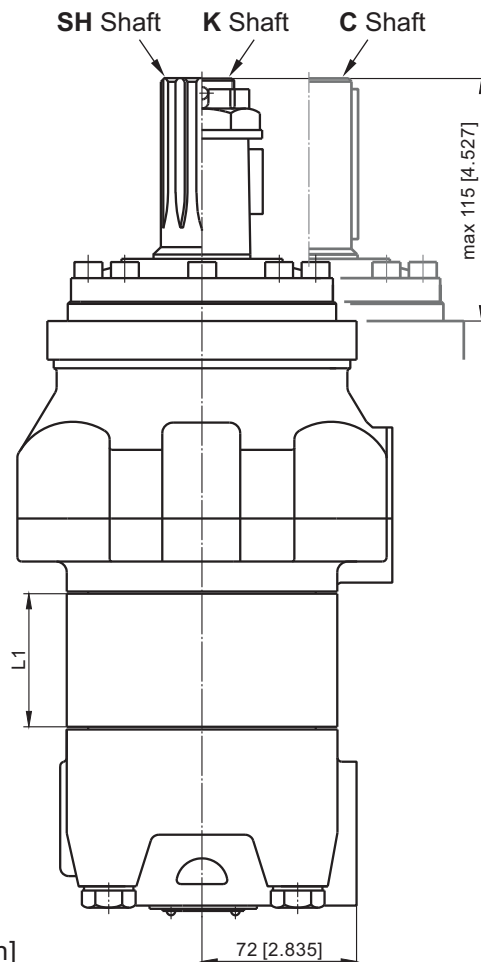
Standard Rotation
Viewed from Shaft End
Port A Pressurized - CW
Port B Pressurized - CCW

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

Shaft Dim.
See Page 35



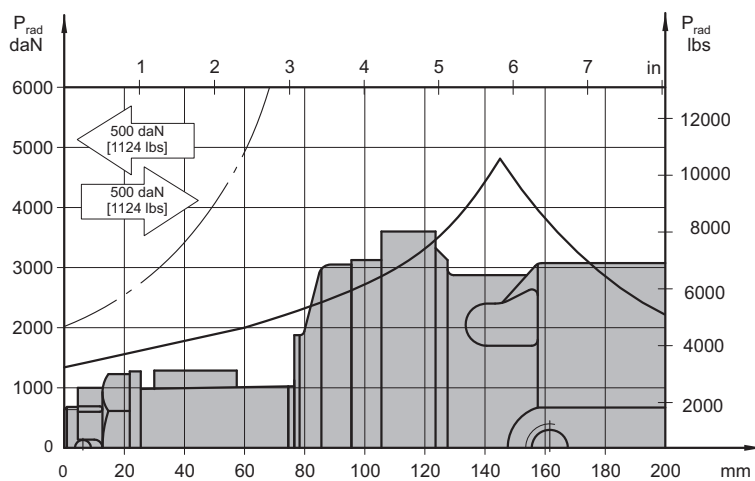
mm [in]



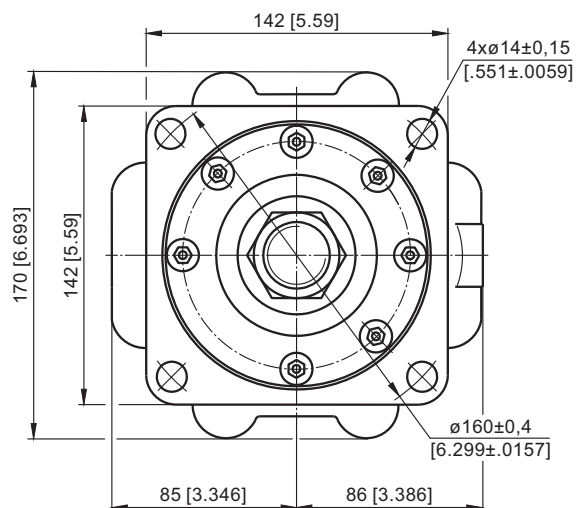
- P_(A,B)** - 2xG3/4, 17 mm [.669] depth
C - Brake release port, G1/4, 12 mm [.472 in] depth
T - Drainage tap, G3/8, 13 mm [.512] depth
D - 4xM10, 10 mm [.394] depth

PERMISSIBLE SHAFT LOADS

The curve applies to a B10 bearing life of 3000 hours at 200 RPM.
 Max. permissible radial shaft load with a safety factor of 3:1.



Warning: Drain line should always be used.

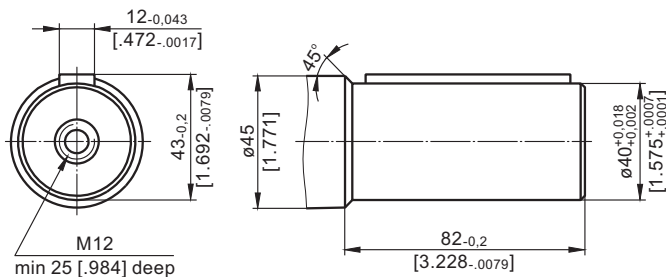


Type	L1, mm [in]	L2, mm [in]	Lmax, mm [in]
MT/B 160	17,0 [.67]	178,0 [7.01]	228 [8.98]
MT/B 200	22,0 [.87]	183,0 [7.21]	233 [9.17]
MT/B 250	28,3 [1.11]	189,3 [7.45]	239 [9.41]
MT/B 315	37,5 [1.48]	198,5 [7.81]	248 [9.76]
MT/B 400	48,0 [1.89]	209,0 [8.23]	259 [10.2]
MT/B 500	62,0 [2.44]	223,0 [8.78]	273 [10.8]
MT/B 630	58,0 [2.28]	219,0 [8.62]	269 [10.6]
MT/B 725	67,0 [2.64]	228,0 [8.98]	278 [10.9]

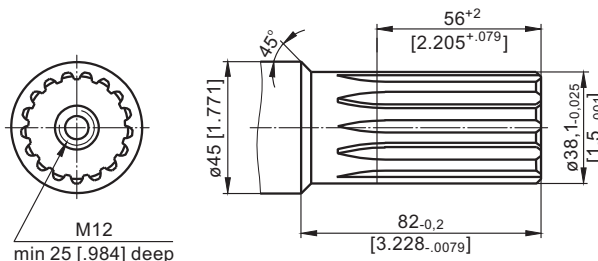
* The width of the gerotor is 3,5 mm [.138 in] greater than L1.

SHAFT EXTENSIONS

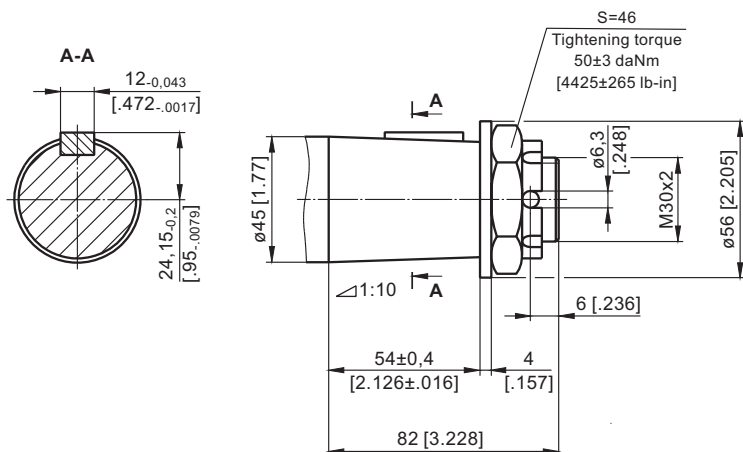
C - $\varnothing 40$ straight, Parallel key A12x8x70 DIN 6885
Max. Torque 123 daNm [10886 lb-in]



SH - $\varnothing 1\frac{1}{2}$ " splined 17T, DP 12/24 ANSI B92.1-1976
Max. Torque 123 daNm [10886 lb-in]



K - tapered 1:10, Parallel key B12x8x28 DIN 6885
Max. Torque 210 daNm [18587 lb-in]



ORDER CODE

	1	2	3	4	5
MT/B					

Pos.1 - Displacement code

160	- 161,1 cm ³ /rev [9.83 in ³ /rev]
200	- 201,4 cm ³ /rev [12.29 in ³ /rev]
250	- 251,8 cm ³ /rev [15.36 in ³ /rev]
315	- 326,3 cm ³ /rev [19.90 in ³ /rev]
400	- 410,9 cm ³ /rev [25.06 in ³ /rev]
500	- 523,6 cm ³ /rev [31.95 in ³ /rev]
630	- 631,2 cm ³ /rev [38.50 in ³ /rev]
725	- 724,3 cm ³ /rev [44.20 in ³ /rev]

Pos.2 - Shaft Extensions*

C	- $\varnothing 40$ straight, Parallel key A12x8x70 DIN6885
SH	- $\varnothing 1\frac{1}{2}$ " splined 17 DP12/24 ANS B922.1-76
K	- $\varnothing 45$ tapered 1:10, Parallel key B12x8x28 DIN 6885

Pos.3 - Check Valves

omit	- with check valves
1	- without check valves

Pos.4 - Additional Options (see page 77)

Pos.5 - Design Series

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

NOTES:

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

The motor-brakes are mangano-phosphatized as standard.

MOTOR-BRAKE ADDITIONAL OPTIONS

Additional Options Description	Order Code	Motor type						
		B/MR	BD/MR	MT/B	MT/BX	MTM/B	SW	TW
Low Leakage	LL	O	O	-	O	O	-	-
Low Speed Valving	LSV	O	O	-	O	O	-	-
Free Running	FR	-	O	-	-	O		-
Reinforced unit	HD	-	-	O	-	O	-	-
Reverse Rotation	R	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
Special Paint**	PS	O	O	O	O	O	O	O
	PCS							
Check Valves		S	-	S***	S	-	S	S

O	Optional
-	Not applicable
S	Standard

* Colour at customer's request.

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

*** Without check valves for "HD" option.

⚠ For more information about HD option please contact with "M+S Hydraulic".

APPLICATION CALCULATION

VEHICLE DRIVE CALCULATIONS

1. Motor speed: n [RPM]

$$n = \frac{2.65 \times V_{km} \times i}{R_m} \quad n = \frac{168 \times V_{mi} \times i}{R_{in}}$$

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

V_{mi} - 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 , daN [lbs]

The resistance force resulted in wheels contact with different surfaces:

$$RR = G \times \rho$$

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

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 , daN [lbs]

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

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 , daN [lbs]

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

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

FA - acceleration force, daN [lbs];

t - time, [s]

5. Tractive effort: DP , daN [lbs]

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 , daN [lbs]

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 , daNm [lb-in]

Necessary torque moment for every hydraulic motor:

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

N - motor numbers;

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

8. Cohesion between tire and road covering:

M_w , daNm [lb-in]

Necessary torque moment for every hydraulic motor:

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

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

f - frictional factor;

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

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

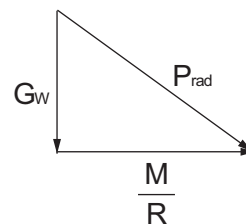
9. Radial motor loading: P_{rad} , daN [lbs]

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.

