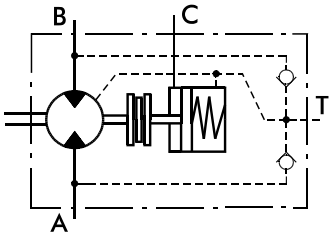
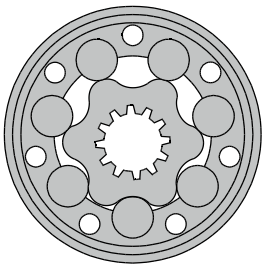
HYDRAULIC MOTOR-BRAKE B/MR



APPLICATION

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



CONTENTS

OPTIONS

» Model- Spool valve, roll-gerotor;
» Fully integrated friction disk brake;
» Side port;
» Shaft - straight;
» BSPP ports.

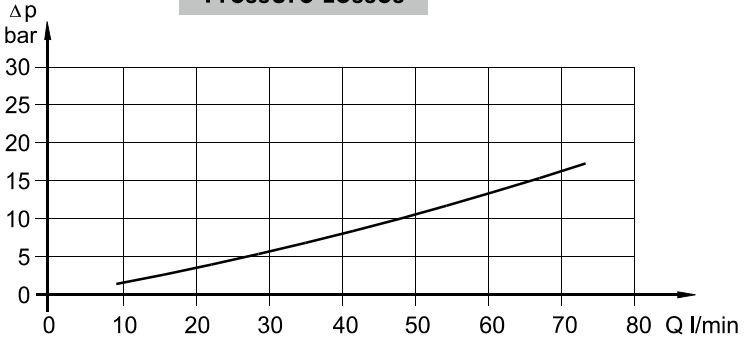
GENERAL

Displacement, [cm^3/rev.]	80,3÷397
Max. Speed, [RPM]	150÷500
Max. Torque, [daNm]	19,5÷55
Max. Output, [kW]	2,2÷16
Max. Pressure Drop, [bar]	45÷175
Max. Oil Flow, [l/min]	40÷60
Min. Speed, [RPM]	10
Permissible Shaft Loads, [daN]	P_a=200
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, [°C]	-30÷90
Optimal Viscosity range, [mm^2/s]	20÷75
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 micron)

Oil flow in drain line

Pressure drop (bar)	Viscosity (mm^2/s)	Oil flow in drain line (l/min)
100	20	2,5
	35	1,8
140	20	3,5
	35	2,8

Pressure Losses



B/MR
MOTOR-BRAKE

SPECIFICATION DATA

Type		B/MR 80	B/MR 100	B/MR 125	B/MR 160 C	B/MR 160 CB	B/MR 200 C	B/MR 200 CB
Displacement, cm.³/rev.		80,3	99,8	125,7	159,6		199,8	
Max. Speed,	Cont.	500	500	475	375		300	
[min⁻¹]	Int.*	600	600	600	470		375	
Max. Torque	Cont.	19,5	24	30	30	39	30	45
[daNm]	Int.*	22	28	34	39	43	39	50
	Peak**)	27	32	37	46	46	56	56
Max. Output	Cont.	16,6	18,6	12,5	10	11,5	7,8	11
[kW]	Int.*	16	16	14,5	12,5	14	12,4	13
Max. Pressure	Cont.	175	175	175	135	175	105	175
Drop, [bar]	Int.*	200	200	200	175	200	145	200
	Peak**	225	225	225	225	225	225	225
Max. Oil Flow	Cont.	40	50	60	60		60	
[l/min]	Int.*	48	60	75	75		75	
Max. Inlet	Cont.	175						
Pressure	Int.*	200						
[bar]	Peak**	225						
Max. Starting Pressure [bar]		10	10	9	7		5	
Min. Starting	At max.press.dropCont	15	20	25	24	32	26	41
Torque, [daNm]	At max.press.dropInt.*	17	23	28	32	37	33	46
Min. Speed***, [min⁻¹]		10	10	10	10	10	10	10
Static Torque of Brake, [daNm]		55						
Min. Brake Release Pressure****, [bar]		21						
Max.Opening Pressure, [bar]		200						
Weight, [kg]		11,0	11,2	11,4	11,6	11,7	12,2	12,3

* 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.

**** 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. Recommended 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 13 mm^2/s at operating temperatures.
5. Recommended maximum system operating temperature is 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.

B/MR
MOTOR-BRAKE

SPECIFICATION DATA (continued)

Type		B/MR 250 C	B/MR 250 CB	B/MR 315 C	B/MR 315 CB	B/MR 400 C	B/MR 400 CB
Displacement, cm.³/rev.		250,1		315,7		397	
Max. Speed,	Cont.	240		190		150	
[min⁻¹]	Int.*	300		240		190	
Max. Torque	Cont.	30	54	30	55	30	55
[daNm]	Int.*	39	57	42	57	43	57
	Peak**)	60	71	61	71	60	70
Max. Output	Cont.	6.2	10	4,5	9	2,2	7
[kW]	Int.*	9.5	11	7,5	10	5,6	8,7
Max. Pressure	Cont.	85	175	65	135	45	105
Drop, [bar]	Int.*	115	185	90	145	75	115
	Peak**	200	225	150	180	120	140
Max. Oil Flow	Cont.	60					
[l/min]	Int.*	75					
Max. Inlet	Cont.	175					
Pressure	Int.*	200					
[bar]	Peak**	225					
Max. Starting Pressure [bar]		5		5		5	
Min. Starting	At max.press.drop Cont	24	50	26	50	24	44
Torque, [daNm]	At max.press.drop Int.*	31	51,5	35	51,8	38	50
Min. Speed***, [min⁻¹]		10	10	10	10	10	10
Static Torque of Brake, [daNm]		55					
Min. Brake Release Pressure****, [bar]		21					
Max.Opening Pressure, [bar]		200					
Weight, [kg]		12,6	12,7	13,3	13,4	14	14,1

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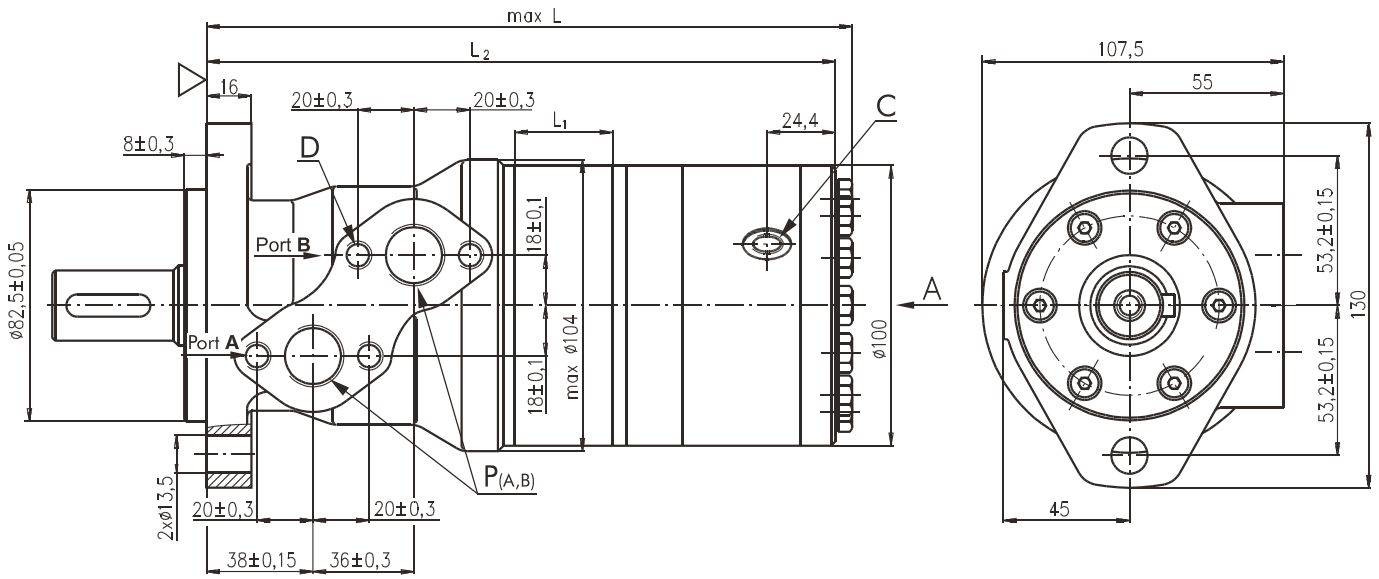
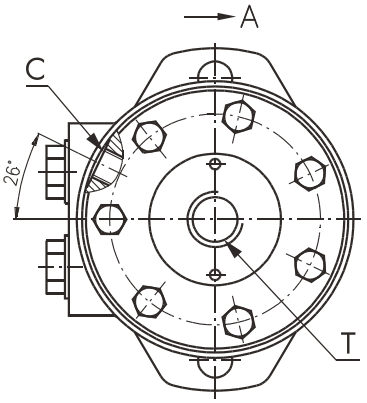
OUTLINE DIMENSINS REFERENCE



D : 4xM8 - 13 mm depth
C : G1/4 - 12 mm depth
$P_{(A, B)}$: 2xG1/2 - 15 mm depth
T : G1/4 - 10 mm depth



▽- Motor Mounting Surface

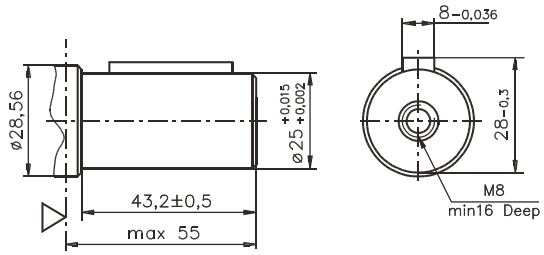
Type	L_1, mm	L_2, mm	L_{max}, mm
B/MR 80	14,0	205,5	213,5
B/MR 100	17,4	209,0	217,0
B/MR 125	21,8	213,5	221,5
B/MR 160	27,8	219,5	227,5
B/MR 200	34,8	226,5	234,5
B/MR 250	43,5	235,0	243,0
B/MR 315	54,8	246,5	254,5
B/MR 400	69,4	261,0	269,0

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

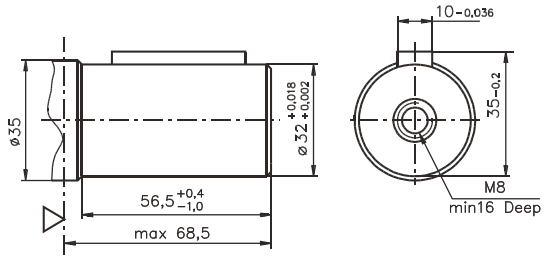
Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

SHAFT EXTENSIONS

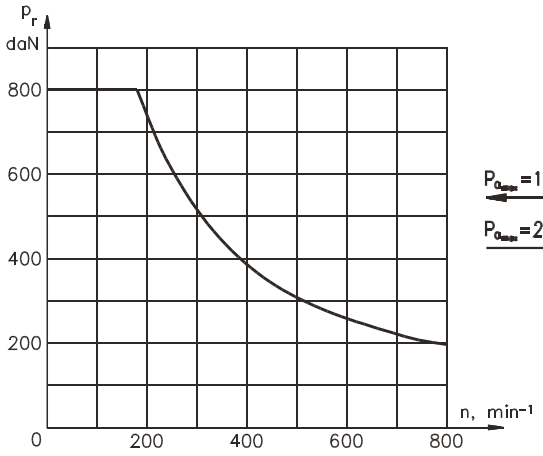
C - ø25 straight, Parallel key A8x7x32 DIN 6885
Max. Torque 34 daNm

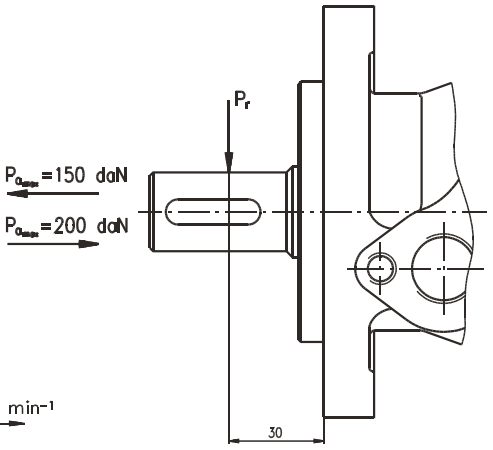


CB - ø32 straight, Parallel key A10x8x45 DIN 6885
Max. Torque 77 daNm



PERMISSIBLE SHAFT LOADS

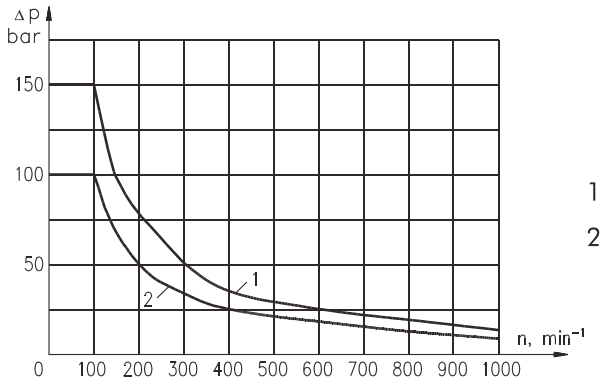




For Rotation speed $n \geq 200$ min^{-1} and distance $L \neq 30$ mm the radial load could be calculated by

$$P_r = \frac{800}{n} \times \frac{25\,000}{95+L}, \text{ daN}$$

MAX. PERMISSIBLE SHAFT SEAL PRESSURE



1: Drawing for "C" shaft

2: Drawing for "CB" shaft

ORDER CODE

	1	2	3	4
B/MR				

Pos.1 - Displacement code

80	- 80,3 [cm^3/rev]
100	- 99,8 [cm^3/rev]
125	- 125,7 [cm^3/rev]
160	- 159,6 [cm^3/rev]
200	- 199,8 [cm^3/rev]
250	- 250,1 [cm^3/rev]
315	- 315,7 [cm^3/rev]
400	- 397,0 [cm^3/rev]

Pos. 2 - Shaft Extensions*

C	- ø25 straight, Parallel key A8x7x32 DIN 6885
CB	- ø32 straight, Parallel key A10x8x45 DIN 6885

Pos. 3 - Special Features **(see page 53)**

Pos. 4 - Design Series

omit - Factory specified

NOTES:

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

The hydraulic motors are mangano phosphatized as standard.

MOTOR SPECIAL FEATURES

Special Feature Description	Order Code	Motor type						
		PL	RL	RW	HW	PK	RK	B/MR
Low Leakage	LL	O	O	O	O	O	O	O
Low Speed Valving	LSV	O	O	O	O	O	O	O
Free Running	FR	O	O	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

* color at customer's request.

O Optional
- Not applicable
S Standard

MOTOR APPLICATION

VEHICLE DRIVE CALCULATIONS

1.Motor speed: n, [min^{-1}]

$$n=\frac{2,65 \times v \times i}{R}$$

v- vehicle speed, [km/h];
R- wheel rolling radius, [m];
i- gear ratio between motor and wheels.
If no gearbox, use i=1.

2.Rolling resistance: RR, [daN]
The resistance force resulted in wheels contact with different surfaces:

$$RR=G \times \rho$$

G- total weight loaded on vehicle, [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, [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. Accelerate force: FA, [daN]
Force **FA** necessary for acceleration from 0 to maximum speed v and time t can be calculated with a formula:

$$FA=\frac{v \times G}{3,6 \times t}, \text{ [daN]}$$

FA- accelerate force, [daN];
t- time, [s].

5.Tractive effort: DP, [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, [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: M, [daNm]
Necessary torque moment for every hydraulic motor:

$$M=\frac{TE \times R}{N \times i \times \eta_M}$$

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

8.Cohesion between tire and road covering: M_W, [daNm]

$$M_W=\frac{G_W \times f \times R}{i \times \eta_M}$$

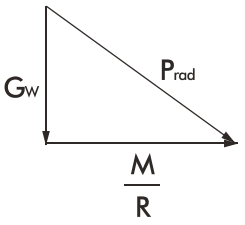
To avoid wheel slipping, it should be observed the following condition $M_W > M$
f - frictional factor;
G_W- total weight over the wheels, [daN].

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} , [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.



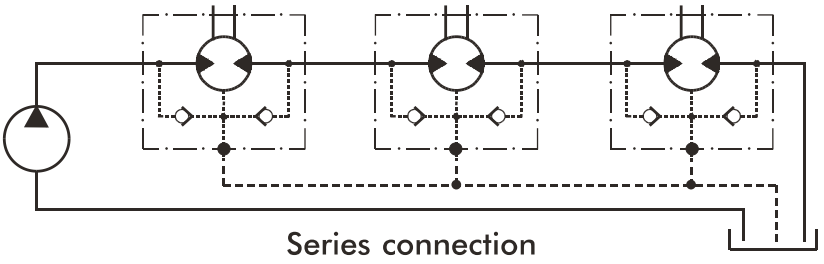
$$P_{rad} = \sqrt{G_w^2 + \left(\frac{M}{R}\right)^2}$$

G_w - Weight held by wheel;
P_{rad} - Total radial loading of motor shaft;
M/R- Motion force.

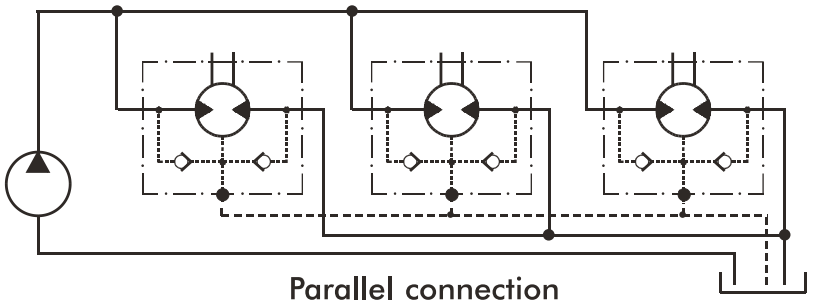
In accordance with calculated loadings the suitable motor from the catalogue is selected.

DRAINAGE SPACE AND DRAINAGE PRESSURE

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



Series connection



Parallel connection