MANNESMANN REXROTH

Hydraulic Motor (Radial Piston Multiple Stroke) Type MCR 40, Series 3X

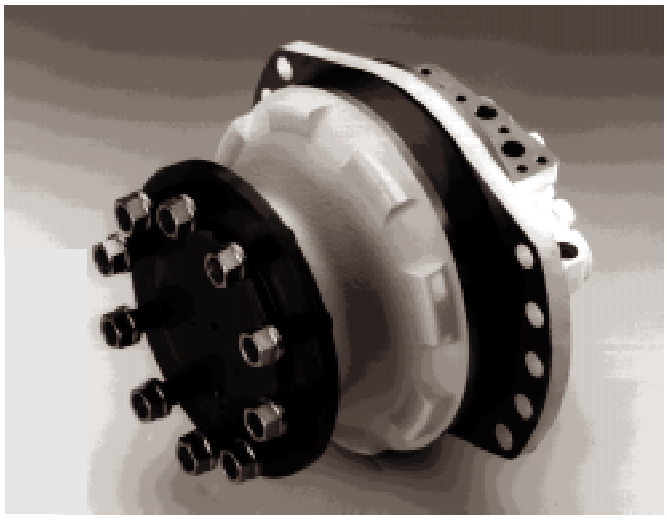
Size 2500 to 4200	to 450 bar	to 4200 cm^3	to 26771 Nm

RE 15 210/05.95

Replaces: 15 217

Characteristics:

- compact, sturdy construction
- smooth running even at very low speeds
- low noise
- reversible
- sealed tapered roller bearing
- high radial forces permitted on output shaft
- shaft seal up to 10 bar
- optional integral holding brake (multi-disc brake)
- switchable
  - freewheeling
  - half displacement
- for open and closed circuits



H/A 2387
Type MCR 40

Contents

Functional description (open and closed circuits)

Closed circuit

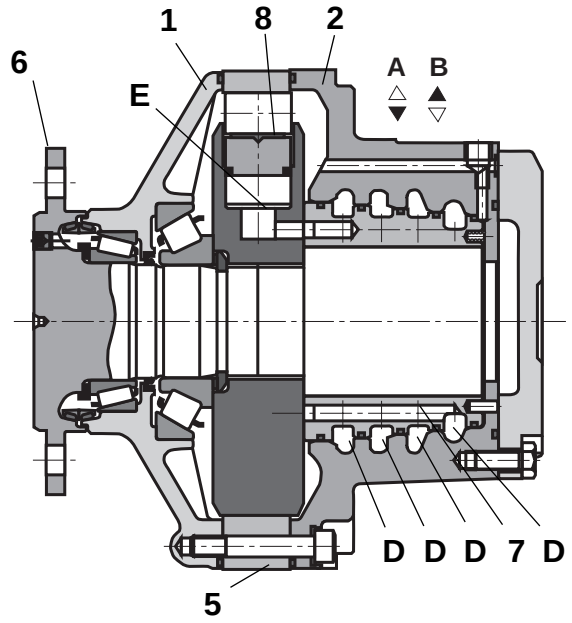
Minimum inlet pressure must be adapted to suit operating conditions; the following must be taken into consideration: idling pressure, flow resistances, pump operation.
Minimum flow of the feed pump must be adapted to suit operating conditions.

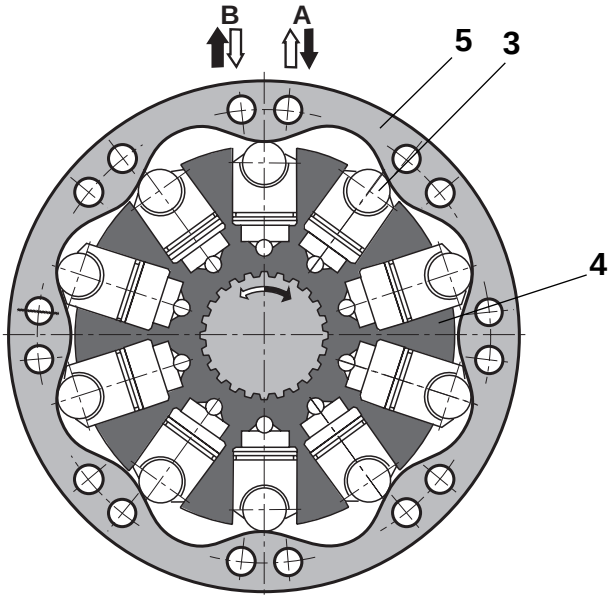
Open circuit

Minimum inlet pressure must be adapted to suit operating conditions; the following must be taken into consideration: idling pressure, flow resistances, pump operation.
The outlet pressure must be at least 2 bar greater than the pressure in the housing.

If the motor circuits are in series please consult the manufacturer.

Section, functional description



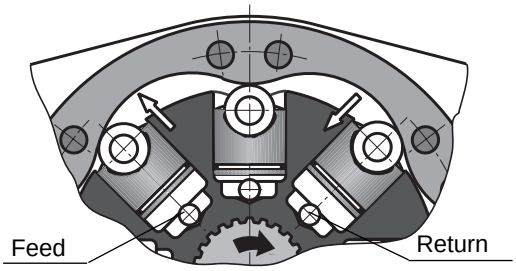


Hydraulic motors Type MCR are radial piston motors with a rotating shaft.

Construction
Two-part housing (1; 2), rotary piston assembly (3; 4) cam (5), output shaft (6) and control section (7)

Transmission
The rotor (4) is connected to the shaft (6) by means of splines.The pistons (3) are arranged radially in the rotor (4) and are supported on the cam plate (5) by way of rollers (8).

Torque generation



Working stroke Idle stroke

The number of working and idle strokes corresponds to the number of cams on the stroke curve.

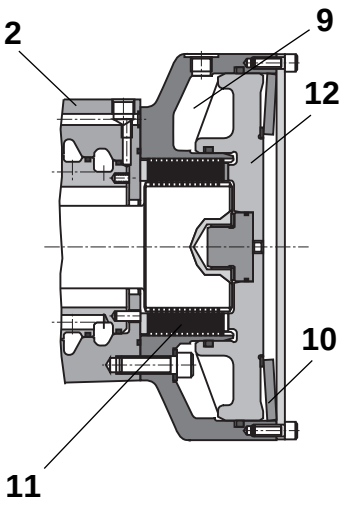
Open loop control
The cylinder chambers (E) are connected to ports A or B by means of the axial bores and the annular passages (D).

Bearings
Tapered roller bearings capable of transmitting high axial and radial forces.

Freewheeling
If the two ports A and B are connected with no pressure loading and a pressure of 2 bar is simultaneously applied to the housing by way of port "L" , the pistons will be forced into the rotary piston assembly. The rollers will no longer be lying against the cam curve and it will be possible for the end of the shaft to be rotated.

Switching to half displacement
On certain models of radial piston motors halving of displacement is possible. This means that at working stroke only half the pistons are supplied with fluid by way of a valve in the control system. The remaining pistons are connected to the outlet side of the motor. When connected the motor will run at twice the speed but at half torque.

Holding brake (multi-disc brake)



Mounting:
By way of control housing (2) and through drive.

Brake application
If the pressure in the annular area (9) falls short of a pre-determined level, the Belleville washer (10) will press the disc package (11) together.

Brake release
If the pressure in the annular area (9) exceeds the required level, the brake piston (12) will be pushed against the Belleville washer (10). The load is taken off the disc package (11), and the holding brake released.

Ordering codes

MCR	40	C			Z –3X/	M/			*

Further details in clear text

Studs
no code = without studs
/S = with studs for wheel mounting

Ports
/01 = BSP thread to ISO 228/1
/42 = UNF-SAE threads

no code = not switchable,
2 W = switchable displacement

Seals
M = NBR seals, suitable for mineral oil to DIN 51 524 (HL, HLP)

Brake mounting
AO = without brake
B27 = hydraulic holding brake (spring pressure disc brake)

Flange housing
wheelmotor

Sizes/Displacement *V*

Size 2500	= 2500 cm³	**= 2500**
Size 3000	= 3000 cm³	**= 3000**
Size 3500	= 3500 cm³	**= 3500**
Size 4200	= 4200 cm³	**= 4200**

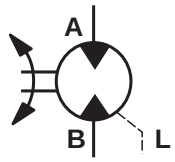
1st shaft end
with flange 280 **= F 280**

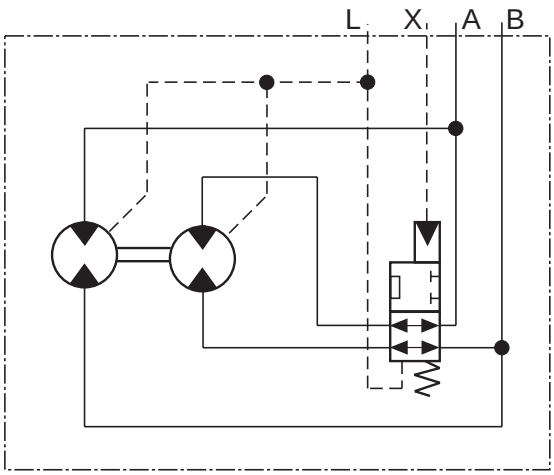
without 2nd shaft end **= Z**

Series
Series 30 to 39 **= 3X**
(30 to 39, externally interchangeable)

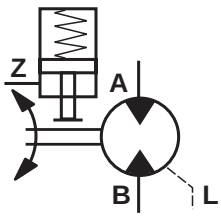
Symbols to DIN ISO 1219

Motor for two speeds





Motor with holding brake



Technical data (for applications outside these paramters please consult us)

General

Type			Piston machine			
Model			Radial piston multi-stroke motor, switchable displacement			
Type code			MCR 40...			
Type of mounting			Flange mounting			
Type of connection			Threaded, flange			
Mounting position			Optional			
Shaft load			See page 6			
Direction of rotation			Right / left - reversible			
Frame size			40			
Nominal size			2500	3000	3500	4200
Displacement	V	cm^3	2500	3000	3500	4200
Displacement flow at n = 100 rev/min/100 bar	Q	L/min	253.0	303.0	353.0	423.0
Output torque [1], [7])5						
– spec. torque (at Δp = 100 bar)	T	Nm	3979	4776	5573	6688
– max. torque	T	Nm	16 114	19 187	22 310	26 772
Output speed						
– min. speed	n	rev/min	5 to 10 when running smoothly, depending on application			
– max. speed	n	rev/min	120	120	110	110
– freewheeling	n	rev/min	450			
Output power [1]						
– continuous power	P	kW	100	100	100	100
Weight – motor	m	kg	190			
– motor with holding brake	m	kg	253			

Hydraulic

Nominal pressure	p	bar	250
Pressure difference, cont. [2], [6], [7])	Δp		
– with mineral oil (HL, HLP)		bar	250
Pressure difference, peak [3], [6], [7])	Δp		
– with mineral oil (HL, HLP)		bar	450
Inlet pressure [6]) port “A” or “B”	p	bar	470
Summated pressure [4; 6]) port “A” + “B”	p	bar	470
Case drain pressure, max.	p_{max}	bar	10
Switching pressure	p	bar	10 to 30
Fluid [5])			Mineral oil (HL, HLP) to DIN 51 524
Fluid temperature range	t	°C	– 20 to 80
Viscosity range	v	mm^2/s	10 to 2000
Fluid cleanliness			Max. permissible degree of contamination of the fluid to NAS 1638 class 9. We therefore recommend a filter with a minimum retention rate of $ß_{10} \geq 75$.

Brake

Holding brake (multi-disc brake)			
Holding torque	T	Nm	27 000
Brake release pressure, min – max	p	bar	Min. 15 Max. 30

[1]) The data given apply after 100 hours running-in time
[2]) Continuous operation
[3]) Peak values may occur for a maximum duration of one second within an operating minute.
[4]) In the return line we recommend p_{min} = 15 bar
[5]) Environmentally friendly fluids HETG, HEPG, HEE to RE 90 221
[6]) For connection in series, please consult the technical sales department.
[7]) **Warning!** During the running-in time of the motor (min. 20 hours) motors should not be run unloaded at greater than 50% of maximum speed.

Technical data (mean values, measured at v = 46 mm²/s and t = 45 °C)

Notes on the technical data

T = torque in Nm Q = input flow in L/min Q_L = mean case leakage in L/min

– All torques given apply to run-in motors (see page 4, footnote 7)

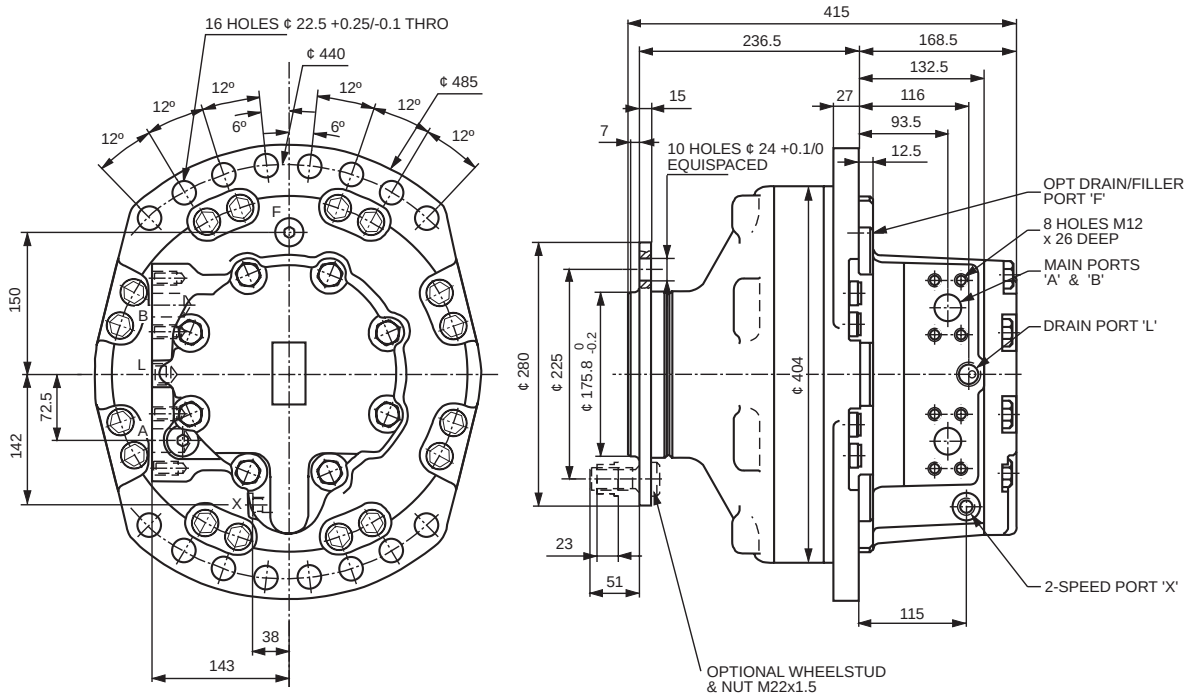
– For "half displacement" operating mode multiply the torques and Q–values by 0.5.

– For maximum case leckage multiply Q_L by 2

Pressure Differential Δp **bar**		**Speed in RPM**					**Speed in RPM**				
		MCR40. 2500					**MCR40. 3500**				
		0	25	50	100	120	0	25	50	100	110
100	T Nm	2188	3183	3287	2706	2440	3064	4456	4601	3788	3610
	Q L/min	2.6	65.1	128.0	253.0	303.2	2.6	90.1	178.0	353.0	388.6
	Q_L L/min	1.3	1.3	1.5	1.5	1.8	1.3	1.3	1.5	1.5	1.8
200	T Nm	5173	6645	6804	5825	5372	7242	9303	9525		
	Q L/min	3.8	66.3	129.6	254.8	305.2	3.8	91.3	179.6		
	Q_L L/min	1.9	1.9	2.3	2.4	2.6	1.9	1.9	2.3		
300	T Nm	8356	10206	10447			11698	14288	14622		
	Q L/min	5.6	68.1	131.2			5.6	93.1	181.2		
	Q_L L/min	2.8	2.8	3.1			2.8	2.8	3.1		
400	T Nm	11459	13926	14324			16043	19497			
	Q L/min	7.2	69.7	132.7			7.2	94.7			
	Q_L L/min	3.6	3.6	3.7			3.6	3.6			
450	T Nm	13071	15756	16115			18298	22059			
	Q L/min	7.8	70.3	133.4			7.8	95.3			
	Q_L L/min	3.9	3.9	4.2			3.9	3.6			
		MCR40. 3000					**MCR40. 4200**				
		0	25	50	100	120	0	25	50	100	
100	T Nm	2626	3848	3944	3247	2927	3677	5388	5521	4545	
	Q L/min	2.6	77.6	153.0	303.0	363.6	2.6	107.6	213.0	423.0	
	Q_L L/min	1.3	1.3	1.5	1.5	1.8	1.3	1.3	1.5	1.5	
200	T Nm	6207	8031	8222	6990		8690	11243	11511		
	Q L/min	3.8	78.8	154.6	304.8		3.8	108.8	214.6		
	Q_L L/min	1.9	1.9	2.3	2.4		1.9	1.9	2.3		
300	T Nm	10027	12333	12619			14038	17266			
	Q L/min	5.6	80.6	156.2			5.6	110.6			
	Q_L L/min	2.8	2.8	3.1			2.8	2.8			
400	T Nm	13751	16826	17189			19251	23556			
	Q L/min	7.2	82.2	164.8			7.2	112.2			
	Q_L L/min	3.6	3.6	3.7			3.6	3.6			
450	T Nm	15685	19037				21958	26651			
	Q L/min	7.8	82.8				7.8	112.8			
	Q_L L/min	3.9	3.9				3.9	3.9			

Unit dimensions (in mm)

Flange housing:
Ordering code **"C"**



1 Port A; B (inlet, outlet)

2 Case drain port L

3 Filling port F, may also be used as drain port

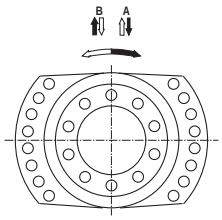
4 Pilot port X for switching displacement, (switching pressure p = 10 to 30 bar)

5 Shaft end with flange, ordering code **"F280"**

6 M22 x 1,5 studs with nut, for retaining wheels ordering code **../S..**

Port	Dimensions of threads	
	Ordering code **"11"**	Ordering code **"42"**
A, B	1" SAE (410 bar/6000 PSI)	
F,L	1/2" BSP	3/4-16 SAE
X	3/8" BSP	9/16-18 SAE

Direction of rotation (viewed on shaft end)



Permissible load on output shaft

Measured at 50 rev/min, pressure difference Δp = 250 bar

Maximum axial load $F_{A\,max}$ (with radial load F_R = 0)

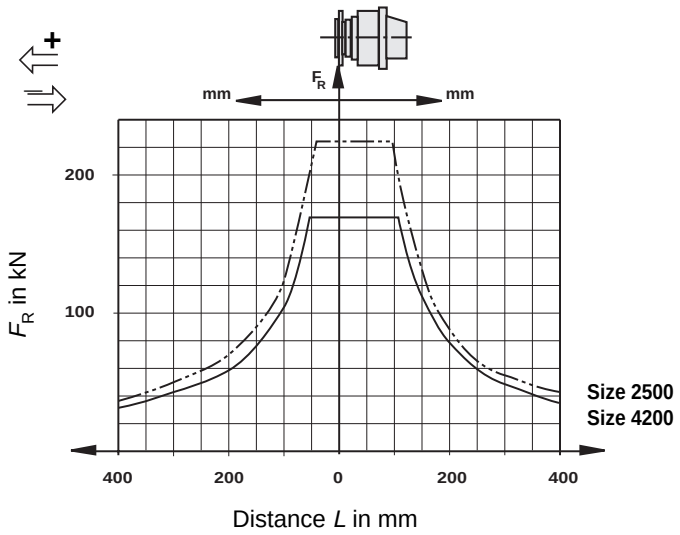
$F_{A\,max}$ = +68 600N

$F_{A\,max}$ = –45 200N

Maximum radial load F_R (with axial load F_A = 0)

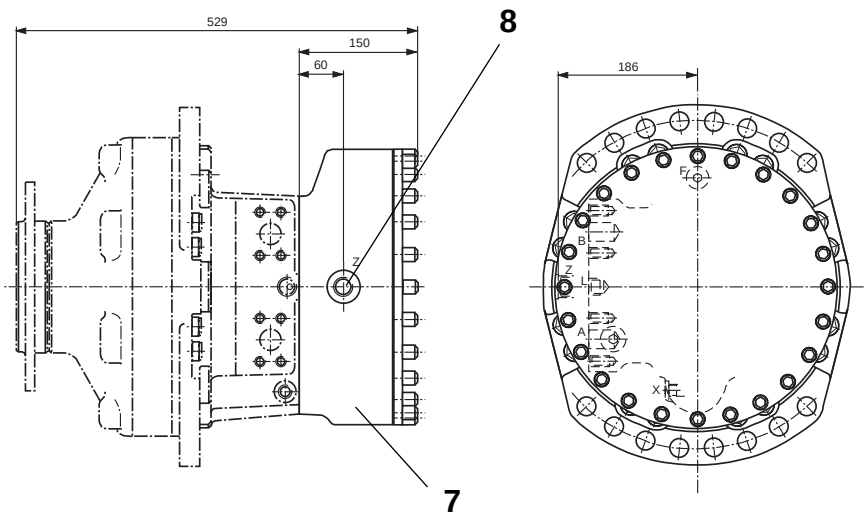
Shaft end ...F 280...

Flange housing ...C...



Unit dimensions (in mm)

Holding brake (multi-disc brake)**:** Ordering code **"B27"**



7 Holding brake (multi-disc brake)
Ordering code **"B27"**
8 Brake release port **Z**

Port	Dimensions of threads	
	Ordering code **"/11"**	Ordering code **"/42"**
Z	1/2" BSP	3/4-16 SAE

Notes

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