

**MANNESMANN
REXROTH****Hydraulic Motor (Radial piston multi-stroke)
Type MCR 10, Series 3X****RE
15 207/02.98**

Sizes 780 to 1340	up to 450 bar	up to 1340 cm ³	up to 8027 Nm
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Replaces: 10.97

- Compact, robust construction
- Smooth running even at very low speeds
- Low noise
- Reversible
- Sealed taper roller bearings
- High radial forces permitted on the output shaft
- Shaft seal up to 10 bar
- Available with optional built-on holding (multi-disc) brake or dynamic (drum) brake
- switchable
 - free-running
 - half displacement volume
- for open and closed circuit operation

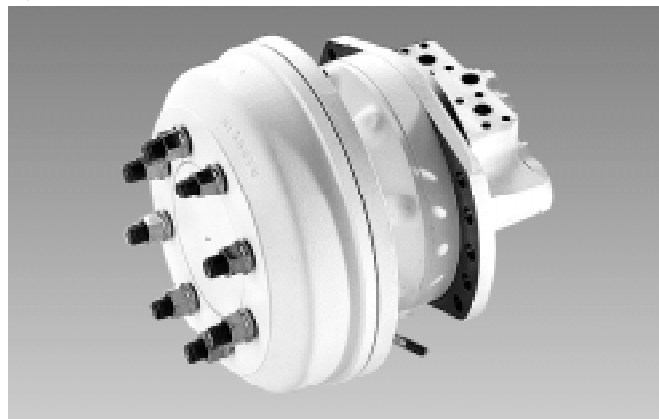
H/A 2387



Type MCR 10 F...F250Z-3X/A0M...



Type MCR 10 F...F250Z-3X/B7M...

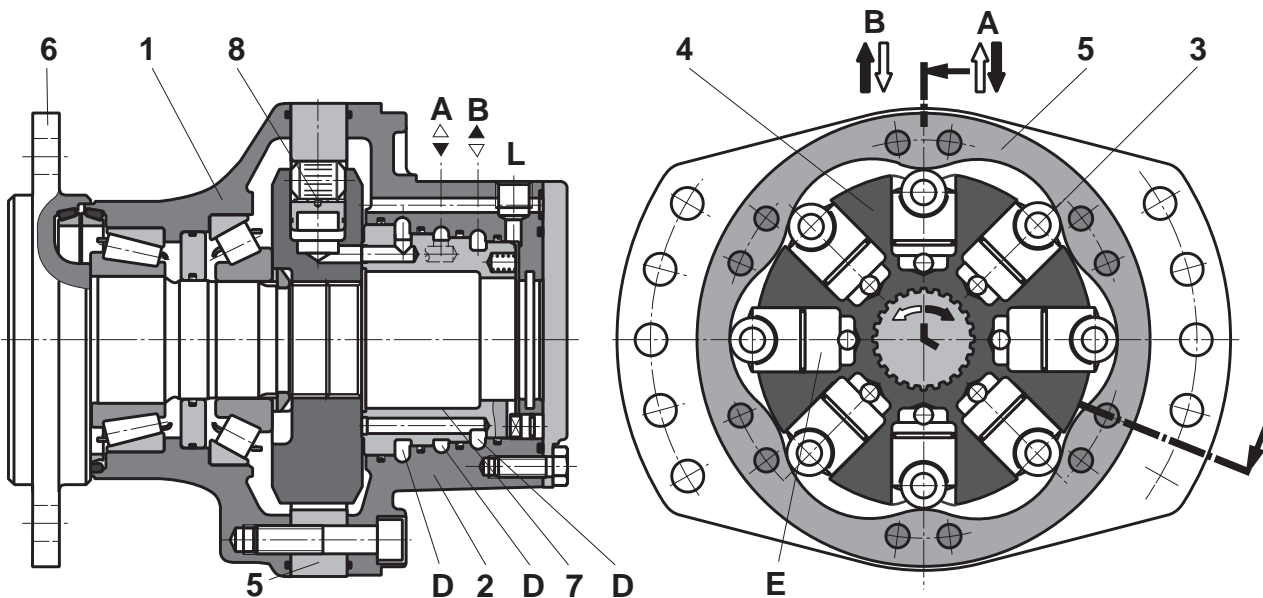


Type MCR 10 F...F250Z-3X/C7.M...

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Cross-section, description of function



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

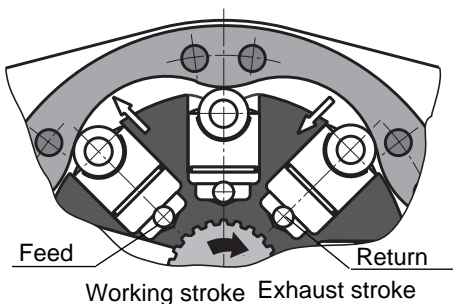
Construction

Two part housing (1; 2), rotor piston assembly (3; 4) cam (5), output shaft (6) and control (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 means of rollers.

Torque generation



The number of working and return strokes per piston corresponds to the number of lobes on the cam.

Control

The cylinder chambers (E) are connected to ports A and B via the axial bores and the annular passages (D).

Bearings

Tapered roller bearings are capable of absorbing high axial and radial forces.

Freewheeling

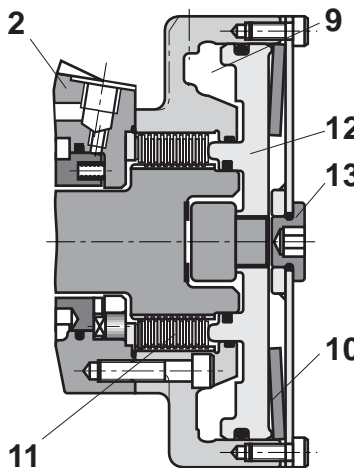
If the two ports A and B are connected with no pressure loading and a pressure of 2 bar is simultaneously applied to the housing by way of port "L", the pistons will be forced into the rotary piston assembly. The rollers will no longer be lying against the cam curve and it will be possible for the end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

Switching to half displacement volume

On certain radial piston motor models the displacement volume can be halved. This happens when, at working stroke, only alternate pistons are supplied with hydraulic fluid via a valve in the control. The remaining pistons are connected to the discharge side of the motor. The motor operates at double speed but half torque.

Brake mounting

Holding brake (disc brake)



Mounting:

by way of control housing (2) and through-drive facility.

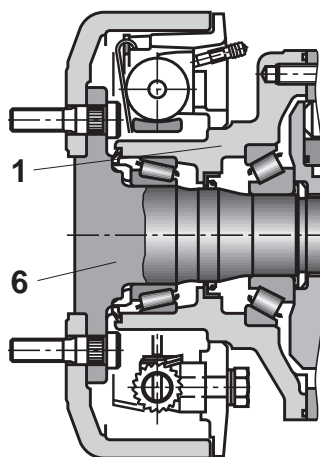
Brake application:

If the pressure in the annular area (9) fails to reach a certain pressure, the Belleville washer (10) will compress the disc package (11).

Release of holding brake:

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

Travel brake (drum brake)



Mounting:

directly on drive shaft (6) and flange housing (1).

Operation of brake:

- hydraulic – for dynamic braking
- mechanical – as holding brake

Description of function

Closed circuit

The minimum inlet pressure should be adapted to take account of operating conditions, noting among other points the following: pressure at idle, flow resistance, negative torque.
The feed pump minimum flow should be adapted to take account of operating conditions.

Open circuit

The minimum inlet pressure should be adapted to take account of operating conditions, noting for example: pressure at idle, flow resistance, negative torque.
The output pressure must be at least 2 bar higher than pressure in the housing.

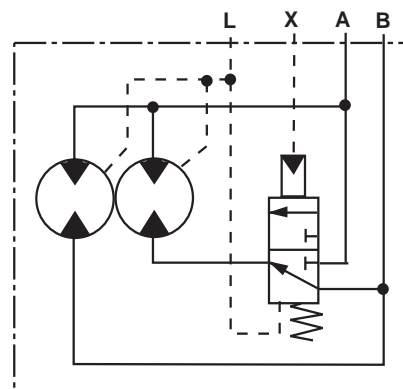
Where motors are connected in series please consult the manufacturer.

Ordering codes

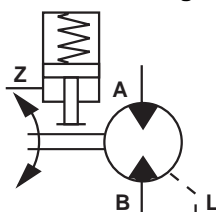
Frame size Frame size 10 = 10	MCR 10				Z -3X/	M			*	Further details in clear text
Flange housing Short motor = C Wheel motor = F Flange motor = D										Studs No code = without studs /S = with studs for wheel mounting
Size/displacement volume V Size 780 = 780 cm ³ = 780 Size 940 = 940 cm ³ = 940 Size 1120 = 1120 cm ³ = 1120 Size 1250 = 1250 cm ³ = 1250 Size 1340 = 1340 cm ³ = 1340										Connections /11 = Pipe thread to ISO 228/1 /42= UNF-SAE-thread
Single shaft end With flange Ø 250 = F250 ¹⁾ Parallel with key Ø 60 = L60 ^{2:3)}										Switchable displacement No code = not switchable 2R = switchable, preferred rotation c/w 2L = switchable, preferred rotation a/cw
Without 2nd shaft end = Z										Seals M = NBR seals suitable for mineral oil to DIN 51 524 (HL, HLP)
Series nos. Series 30 to 39 (30 to 39, externally interchangeable) = 3X										Brake mounting A0 = no brake B7 = hydraulically released holding brake (spring pressure disc brake) 4) C7R = travel brake (drum brake) for right hand side of vehicle, see fig., p. 9 4) C7L = travel brake (drum brake) for left hand side of vehicle, see fig., p. 9

Symbols

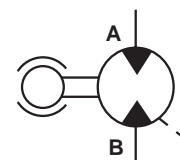
2-speed motor




Motor with holding brake



Motor with travel brake



Technical data (for applications outside these parameters please consult us)							
General							
Type	Radial piston motor						
Description	Radia piston multi-disc motor, switchable displacement						
Model description	MCR 10...						
Type of mounting	Flange mounting; face mounting						
Connections	Threaded or flanged						
Mounting position	Optional						
Shaft loading	See page 6						
Rotation	clockwise/anti-clockwise - reversible						
Frame size	10						
Size			780	940	1120	1250	1340
Displacement	V	cm ³	780	940	1120	1250	1340
Flow $n = 100$ rpm/100 bar	q_v	L/min	79	95	113,5	126,5	136,5
Output torque ^{1; 7)}							
– specific torque (at $\Delta p = 100$ bar)	T	Nm	1240	1494	1783	1990	2130
– peak torque	T	Nm	5134	6187	6659	7432	8027
Output speed ^{1; 7)}			5 to 10 for smooth running, depending on application				
– min. speed	n	rpm	5 to 10 for smooth running, depending on application				
– max. speed	n	rpm	170	150	150	140	120
– freewheeling speed	n	rpm	400				
Output power ^{1; 7)}							
– continuous power	P	kW	44	44	50	50	50
Weight							
– motor	m	kg	69				
– motor with holding brake	m	kg	81				
– motor with travel brake	m	kg	92				
Hydraulic							
Nominal pressure	p	bar	250				
Pressure differential, cont. ^{2; 6; 7; 8)}	Δp						
– for mineral oil (HL, HLP)		bar	250				
Pressure differential, peak ^{3; 6; 7; 8)}	Δp						
–for mineral oil (HL, HLP)		bar	450			400	
Inlet pressure ⁶⁾ Port "A" or "B"	p	bar	470			420	
Summated pressure ^{4; 6)} Port "A" + "B"	p	bar	470			420	
Case drain pressure, max.	p_{max}	bar	10				
Switching pressure (displacement switching)		bar	10 to 30				
Hydraulic fluid ⁵⁾			Mineral oil (HL, HLP) to DIN 51 524				
Hydraulic fluid temperature range	ϑ	°C	– 20 to 80				
Viscosity range	ν	mm ² /s	10 to 2000				
Fluid cleanliness:	Maximum permissible degree of contamination of fluid to NAS 1638 Class 9. We therefore recommend a filter with a minimum retention rate of $\beta_{10} \geq 75$.						
Brake							
Holding brake (disc brake)							
Holding torque	T	Nm	7000				
Release pressure	p	bar	min. 15; max. 30				
Travel brake (drum brake)	see table page 10						
¹⁾ The values given apply after 100 hours run-in time ²⁾ Continuous operation ³⁾ Peak values may occur for a maximum duration of one second only within an operating minute ⁴⁾ We recommend $p_{min} = 15$ bar in the return line ⁵⁾ Environmentally-friendly fluids HETG, HEPG, HEES to RE 90 221 ⁶⁾ When operating motors in series please consult our technical office ⁷⁾  Warning: When running the motor in (min. 20 hours) note that : motor should not be run unloaded at more than 50 % maximum speed. ⁸⁾ For single shaft end "L60" max. permissible pressure differential $\Delta p = 250$ bar							

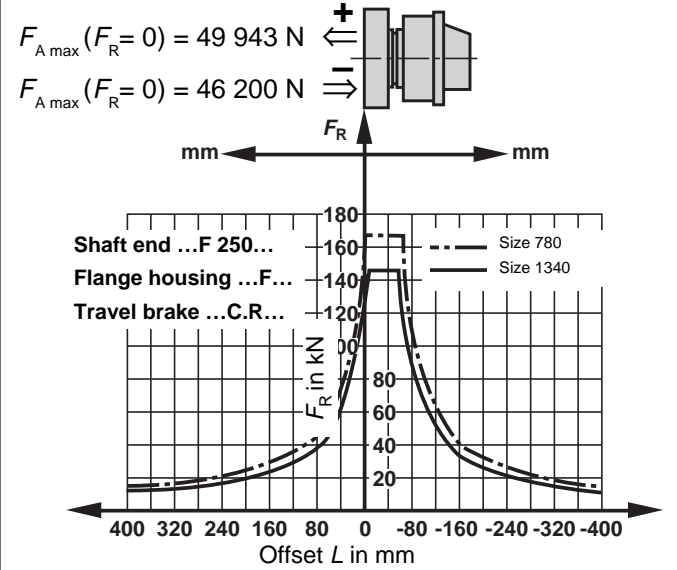
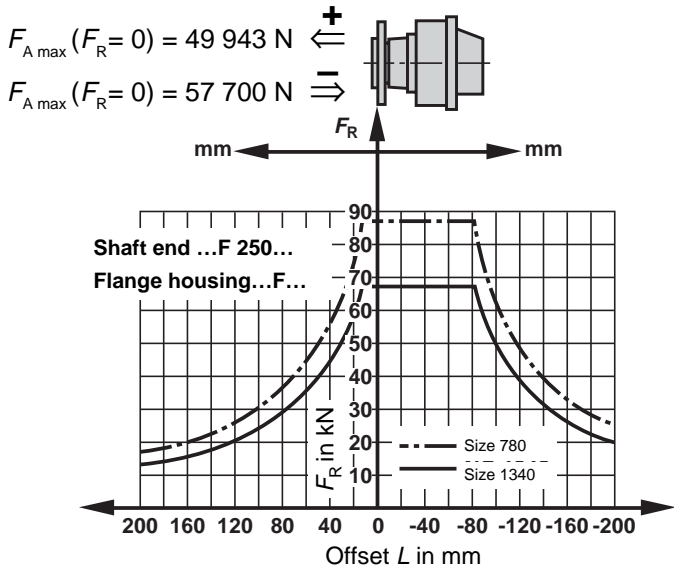
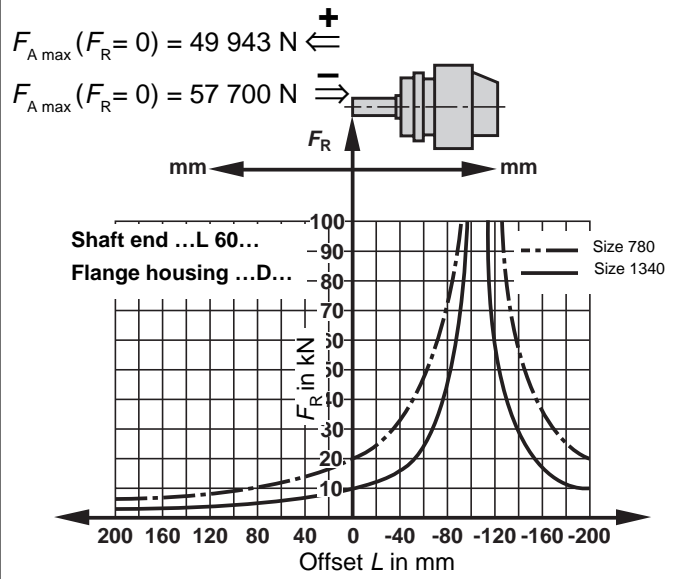
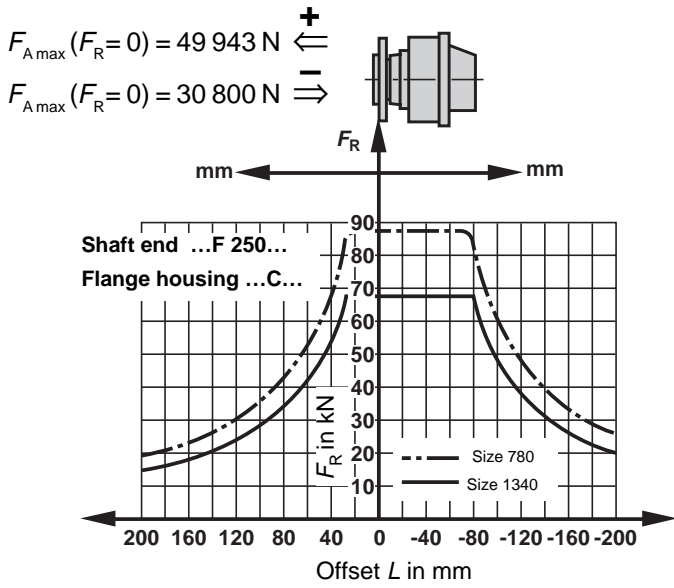
Technical data (mean values, measured at $v = 46 \text{ mm}^2/\text{s}$ and $\vartheta = 45 \text{ }^\circ\text{C}$)**Notes on technical data** T = Torque in Nm q_v = Inlet flow in L/min q_{vL} = Case drain flow in L/min

- All torques apply to run-in motors (see note p. 4, footnote 7)
- For “half displacement” mode multiply torque- and q_v -values by 0.5.
- The torque values at half displacement do not apply to both directions of rotation but only to the preferred direction of rotation marked (see pp. 7-9).

Size		780					1250					
Speed n in rpm		0	25	50	100	150	0	25	50	100	150	
Pressure differential Δp in bar	100	T Nm	806	994	1049	1029	911	1094	1818	1726	1517	1309
		q_v L/min	0,3	19,8	39,47	79,00	118,20	1,00	32,09	63,73	126,69	189,30
		q_{vL} L/min	0,15	0,15	0,24	0,50	0,60	0,50	0,56	0,63	0,76	0,90
	200	T Nm	1736	2232	2282	2232	2158	2586	3669	3684	3497	
		q_v L/min	0,60	20,10	39,80	79,50	118,8	2,86	33,03	64,63	127,82	
		q_{vL} L/min	0,30	0,30	0,40	0,75	0,9	1,43	1,44	1,45	1,46	
	300	T Nm	2604	3348	3422	3348		4178	5550	5574		
		q_v L/min	0,80	20,30	40,00	80,00		4,08	34,08	66,16		
		q_{vL} L/min	0,40	0,40	0,50	1,00		2,04	2,10	2,16		
	400	T Nm	3472	4464	4563			5730	7432	7416		
		q_v L/min	1,40	20,90	40,80			5,68	35,11	67,35		
		q_{vL} L/min	0,70	0,70	0,90			2,84	2,92	3,00		
450	T Nm	3906	5022	5134								
	q_v L/min	1,6	21,10	41,00								
	q_{vL} L/min	0,8	0,8	1,00								
Size		940					1340					
Speed n in rpm		0	25	50	100	150	0	25	50	100		
Pressure differential Δp in bar	100	T Nm	971	1198	1264	1240	1098	1182	1964	1865	1639	
		q_v L/min	1,00	23,80	47,47	95,00	142,20	1,00	34,61	68,78	136,76	
		q_{vL} L/min	0,15	0,15	0,24	0,50	0,60	0,50	0,56	0,63	0,76	
	200	T L/min	2091	2690	2750	2689		2793	3962	3979	3777	
		q_v L/min	0,60	24,10	47,80	95,50		2,86	35,56	69,68	137,93	
		q_{vL} L/min	0,30	0,30	0,40	0,75		1,43	1,44	1,45	1,46	
	300	T Nm	3137	4035	4124			4512	5994	6020		
		q_v L/min	0,80	24,30	48,00			4,08	36,64	71,24		
		q_{vL} L/min	0,40	0,40	0,50			2,04	2,10	2,16		
	400	T Nm	4183	5380	5500			6188	8027	8010		
		q_v L/min	1,40	24,90	48,80			5,68	37,67	72,50		
		q_{vL} L/min	0,70	0,70	0,90			2,84	2,92	3,00		
450	T Nm	4706	6052	6187								
	q_v L/min	1,60	25,10	49,00								
	q_{vL} L/min	0,80	0,80	1,00								
Size		1120										
Speed n in rpm		0	25	50	100	150						
Pressure differential Δp in bar	100	T Nm	980	1629	1547	1360	1173					
		q_v L/min	1,00	28,82	57,19	113,62	169,80					
		q_{vL} L/min	0,50	0,56	0,63	0,76	0,90					
	200	T Nm	2317	3287	3301	3134						
		q_v L/min	2,86	29,76	58,07	114,71						
		q_{vL} L/min	1,43	1,44	1,45	1,46						
	300	T Nm	3743	4973	4994							
		q_v L/min	4,08	30,76	59,49							
		q_{vL} L/min	2,04	2,10	2,16							
	400	T Nm	5134	6660	6645							
		q_v L/min	5,68	31,76	60,87							
		q_{vL} L/min	2,84	2,92	3,00							

Permitted radial force F_R and axial force F_A on output shaft

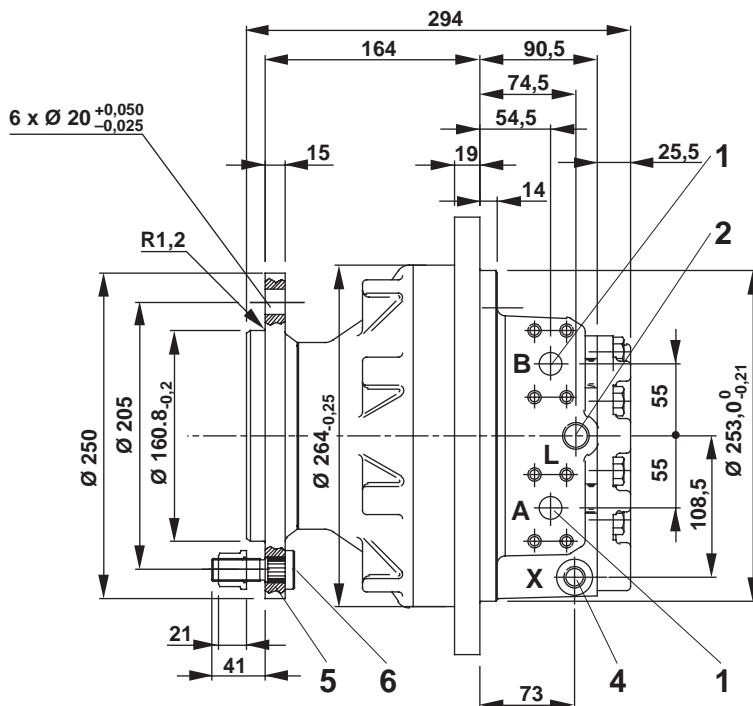
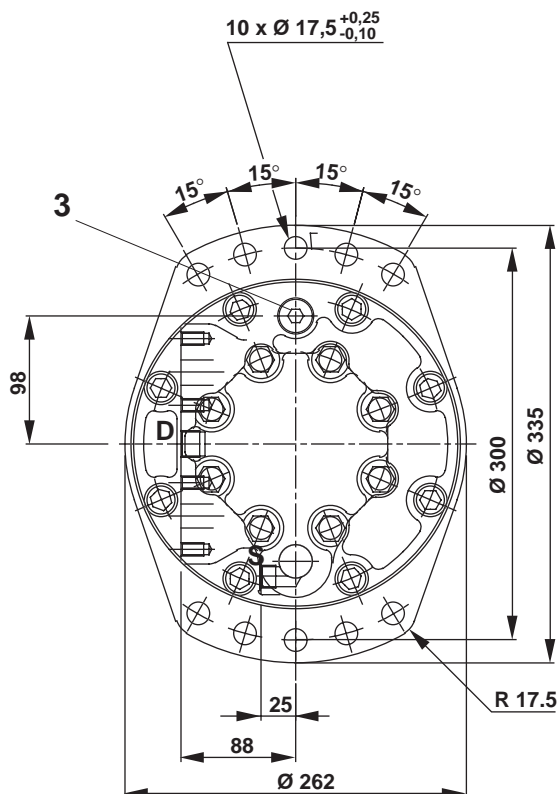
Measured at a speed of $n = 50$ rpm, pressure differential $\Delta p = 250$ bar



Unit dimensions

(in mm)

Flange housing: ordering code "C"

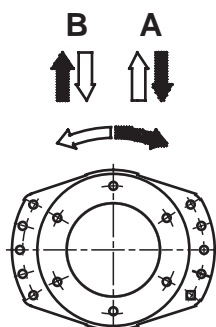


Port	Threaded dimension	
	Ordering code "11"	Ordering code "42"
A, B	3/4 SAE	
L, F	1/2"BSP	3/4-16 SAE
X	3/8"BSP	9/16-18 SAE

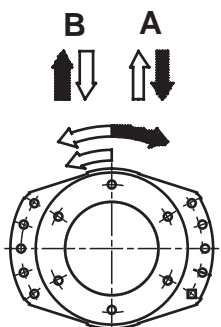
- 1 Port A; B (Inlet, output)
- 2 Case drain port L
- 3 Filler port F, may also be used as drain port
- 4 Pilot oil port X for displacement switching, ordering code **..2L..** or **..2R..** (Switching pressure $p = 10$ to 30 bar)
- 5 Shaft end with flange, ordering code **"F250"**
- 6 Studs M18 x 1.5 with nut, for securing wheel Ordering code **../S..**

Rotation (viewed on output shaft)

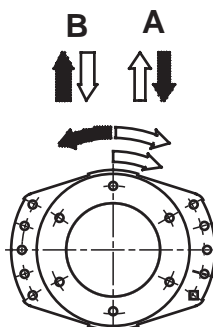
Standard model



Switchable (preferred rotation)



Ordering code **..2L..**

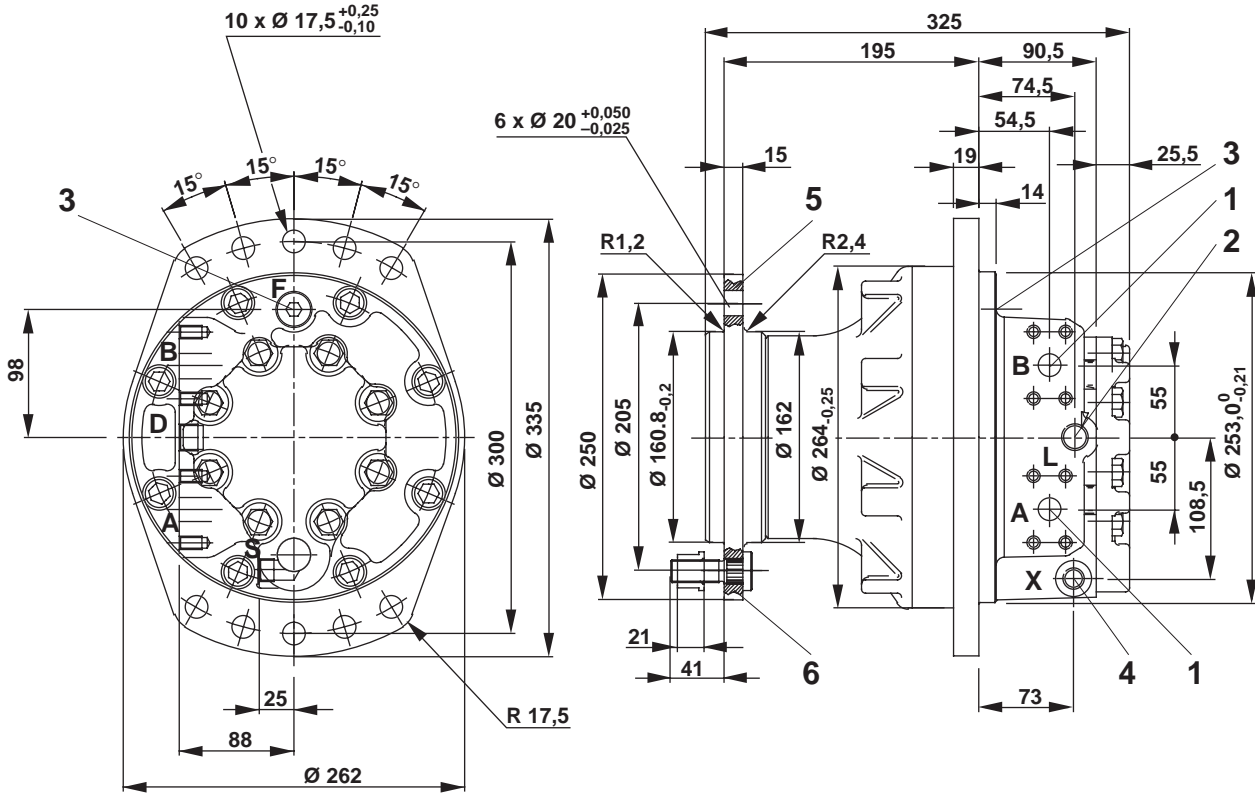


Ordering code **..2R..**

Unit dimensions

(in mm)

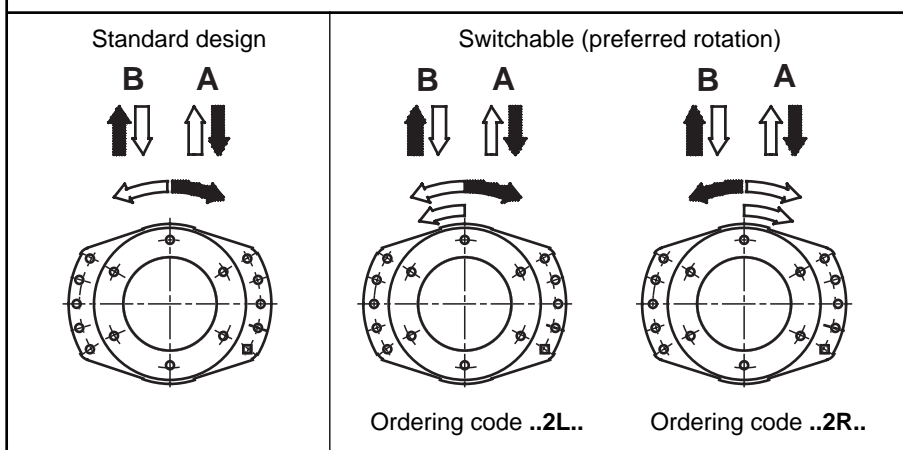
Flange housing : Ordering code "F"



Port	Threaded dimension	
	Ordering code "11"	Ordering code "42"
A, B	3/4 SAE	
L, F	1/2"BSP	3/4-16 SAE
X	3/8"BSP	9/16-18 SAE

- 1 Port A; B (inlet, outlet)
- 2 Case drain port L
- 3 Filler port F, may also be used as drain port
- 4 Pilot oil port X for displacement switching, ordering code ..2L.. or ..2R.. (Switching pressure $p = 10$ to 30 bar)
- 5 Shaft end with flange, ordering code "F250"
- 6 Studs M18 x 1.5 with nut, for securing wheel Ordering code ..JS..

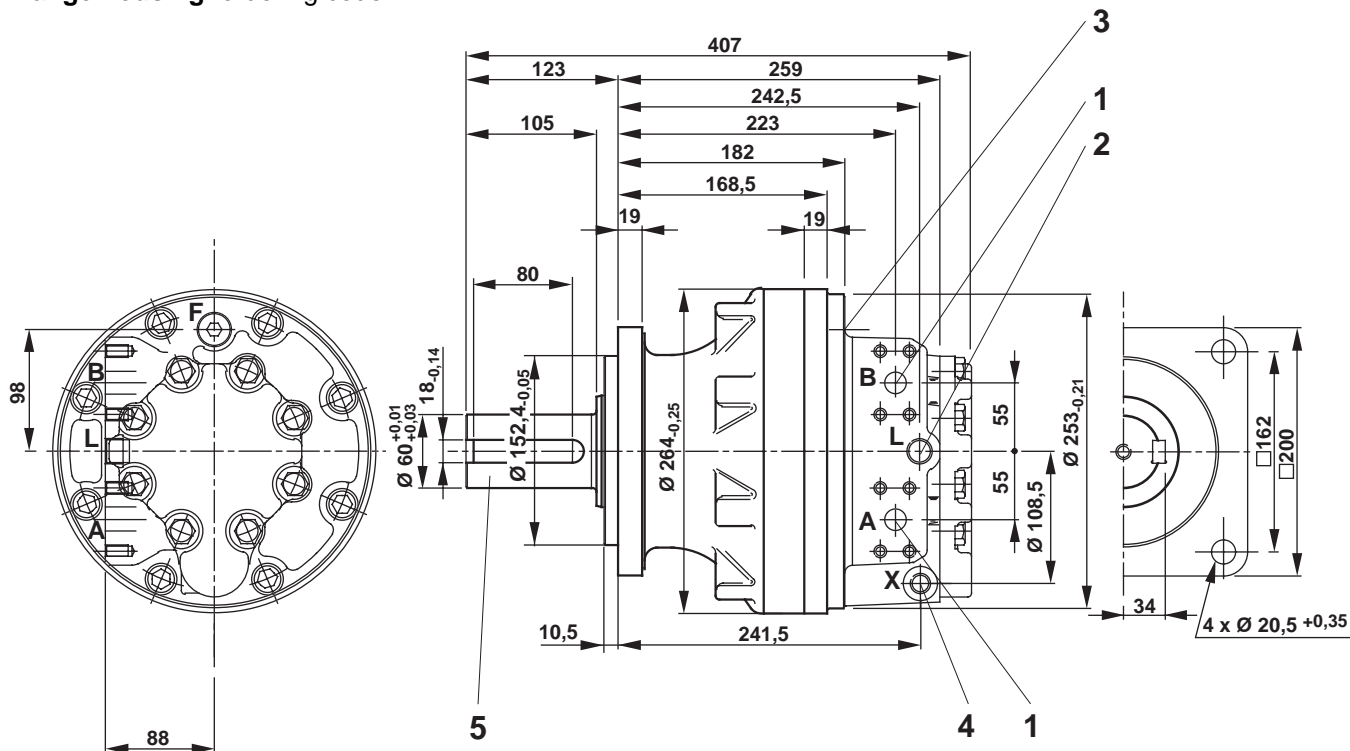
Rotation (viewed on output shaft)



Unit dimensions

(in mm)

Flange housing: ordering code "D"



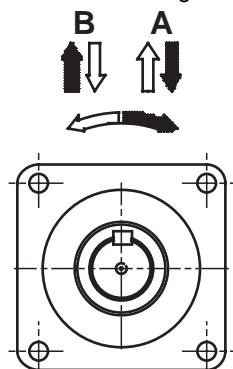
Port	Threaded dimension	
	Ordering code "11"	Ordering code "42"
A, B	3/4 SAE	
L, F	1/2" BSP	3/4-16 SAE
X	3/8" BSP	9/16-18 SAE

- 1 Port A; B (inlet, outlet)
- 2 Case drain port L
- 3 Filler port F, may also be used as drain port
- 4 Pilot oil port X for displacement switching, ordering code **..2L..** or **..2R..** (Switching pressure $p = 10$ to 30 bar)
- 5 Parallel shaft end $\varnothing 60$ with key, ordering code **"L60"**

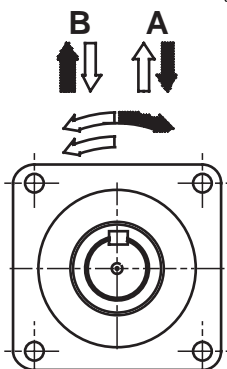
Warning:
max. pressure differential $\Delta p = 250$ bar

Rotation (viewed on output shaft)

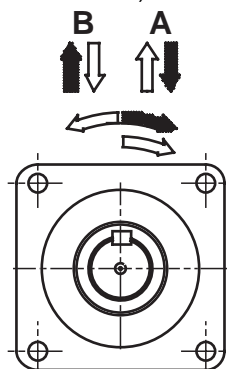
Standard design



Switchable (preferred rotation)



Ordering code **..2L..**



Ordering code **..2R..**

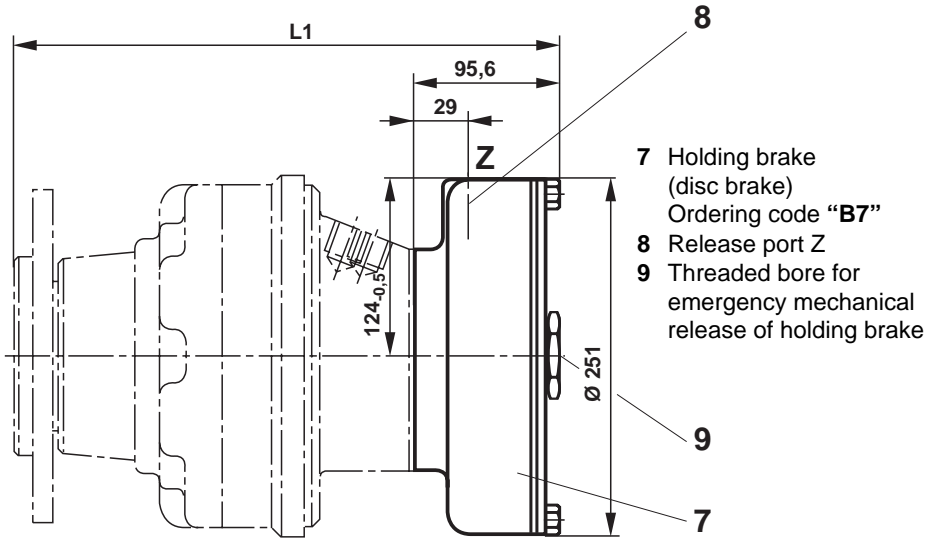
Unit dimensions: Holding brake (disc brake)

(in mm)

Port	Threaded dimension	
	Ordering code "/11"	Ordering code "/12"
Z	3/8"BSP	9/16-18 SAE
Item 9	M24	M24

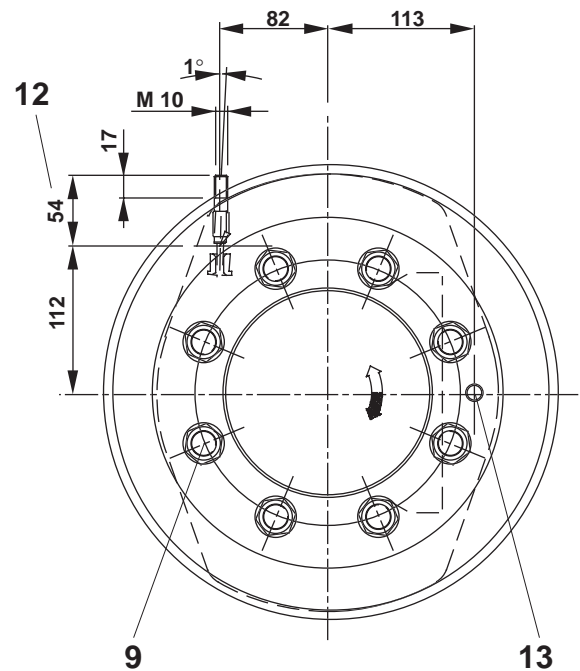
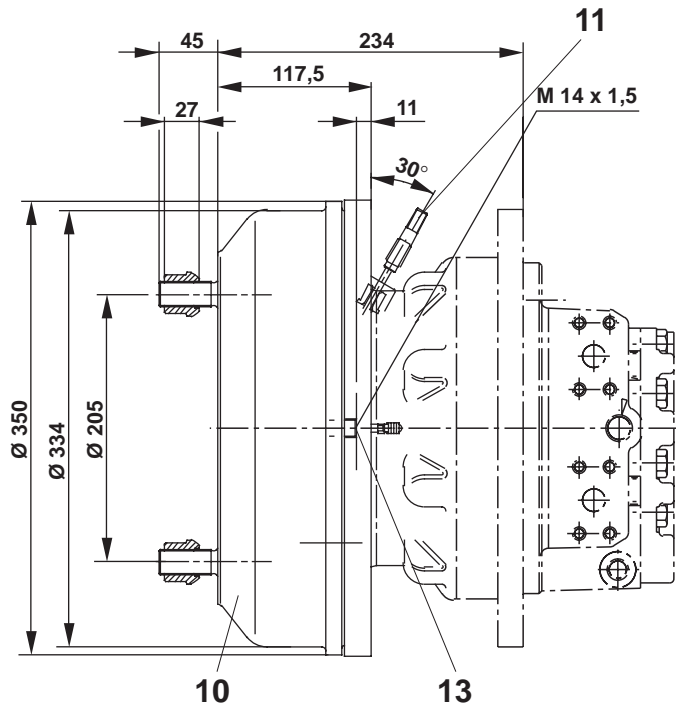
Pipe thread (BSP) to ISO 228/1

Flange housing	L1
C	364,5
F	395,5



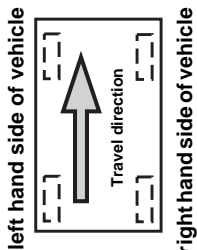
Unit dimensions: Travel brake (drum brake)

(in mm)



Travel brake as parking brake		Travel brake	
Holding torque static	Tension brake cable	Braking torque dynamic	Port
4700 Nm	1755 N	4700 Nm	89 bar
6500 Nm	2406 N	6500 Nm	122 bar

- 6 8 studs M20 with nut for securing wheel
- 10 Travel brake (drum brake) ordering code "C7R"
- 11 Braking cable (Bowden cable), the brake illustrated is for right hand side of vehicle: the left hand side brake is a mirror image of this (ordering code "C7L") – see illustration left
- 12 Brake cable length
- 13 Brake port: $p_{max} = 122 \text{ bar}$



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