

**MANNESMANN
REXROTH****Hydraulic Motor (Radial Piston Multiple Stroke)
Type MCR 15, Series 3X****RE
15 208/10.94**

Size 1130 to 2150

to 450 bar

to 2150 cm³

to 13688 Nm

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) or wheel brake (drum brake)
- switchable
 - freewheeling
 - half displacement
- for open and closed circuits



H/A 2388

Type MCR 15 F...F280Z-3X/B11M/...

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Functional description (open and closed circuits)**Closed circuit**

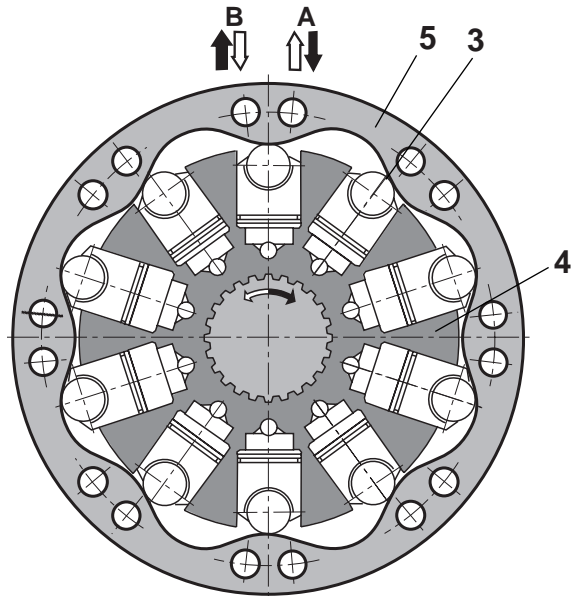
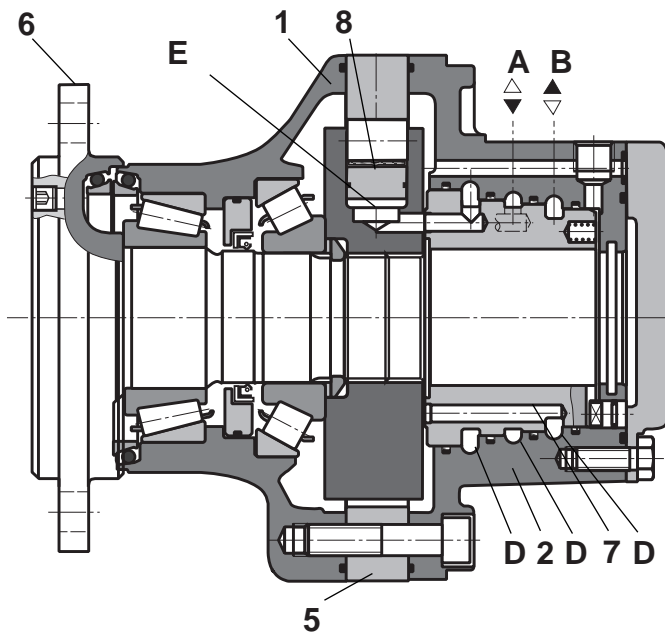
Minimum inlet pressure must be adapted to suit operating conditions; the following must be taken into consideration: idling pressure, flow resistances, pump operation. Minimum flow of the feed pump must be adapted to suit operating conditions.

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.

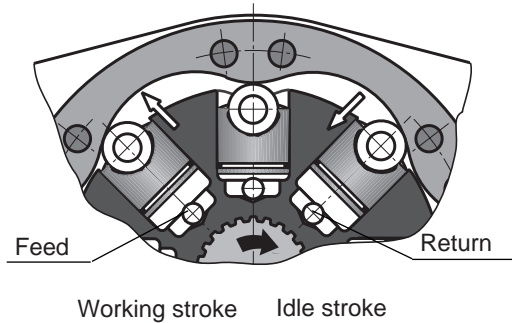
Construction

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



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

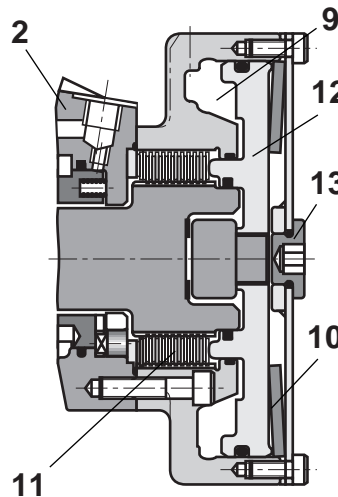
If the two ports A and B are connected with no pressure loading and a pressure of 2 bar is simultaneously applied to the housing by way of port "L", the pistons will be forced into the rotary piston assembly. The rollers will no longer be lying against the cam curve and it will be possible for the end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

Mounting the brakes

Holding brake (multi-disc brake)



Mounting:

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

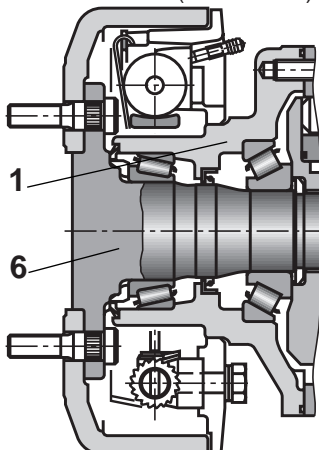
Brake application

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.

Wheel brake (drum brake)



Mounting

Directly onto output shaft (6) and flange housing (1).

Operating the brake

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

Ordering codes

MCR	15				Z -3X/	M /				*
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Further details in clear text

Flange housing

Compact version = **C**
 Wheel version = **F**

Sizes/Displacement V

Size 1130	= 1130 cm ³	= 1130
Size 1250	= 1250 cm ³	= 1250
Size 1500	= 1500 cm ³	= 1500
Size 1780	= 1780 cm ³	= 1780
Size 2150	= 2150 cm ³	= 2150

1st shaft end

with flange 250 ¹⁾ = **F 250**
 with flange 280 ²⁾ = **F 280**

without 2nd shaft end = **Z**

Series = **3X**

Series 30 to 39
 (30 to 39, externally interchangeable)

¹⁾ only with flange housing C

²⁾ only with flange housing F

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

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

no code = not switchable, anti-clockwise rotation preferred
2R = switchable, clockw. rotation preferred
2L = switchable, anti-clw. rotation preferred

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

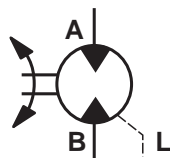
Brake mounting

AO = without brake
B11 = hydraulic holding brake (spring pressure disc brake)

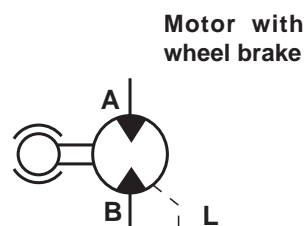
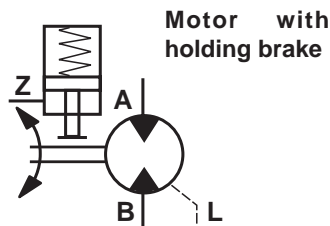
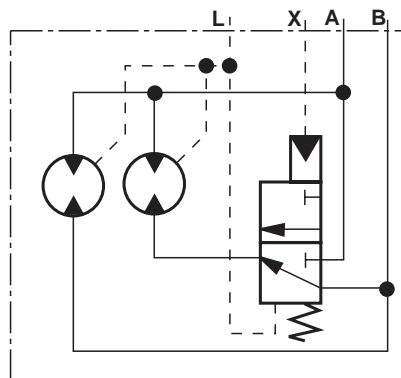
²⁾ **C12R** = Wheel brake (drum brake) for right side of vehicle, see Fig. on page 8

²⁾ **C12L** = Wheel brake (drum brake) for left side of vehicle, see Fig. on page 8

Symbols to DIN ISO 1219



Motor for two speeds



Technical data (for applications outside these parameters please consult us)						
General						
Type	Piston machine					
Model	Radial piston multi-stroke motor, switchable displacement					
Type code	MCR 15...					
Type of mounting	Flange mounting; face mounting					
Type of connection	Threaded, flange					
Mounting position	Optional					
Shaft load	See pages 6, 7					
Direction of rotation	Right / left - reversible					
Frame size	15					
Nominal size	1130	1250	1500	1780	2150	
Displacement V cm^3	1130	1250	1500	1780	2150	
Displacement flow at $n = 100 \text{ rev/min}/100 \text{ bar}$ Q L/min	114	126	151	179	216	
Output torque ^{1), 7)}						
– spec. torque T Nm (at $\Delta p = 100 \text{ bar}$)	1799	1990	2388	2833	3422	
– max. torque T Nm	8095	8955	9552	11332	13688	
Output torque ^{1), 7)}						
– min. speed n rev/min	5 to 10 when running smooth, depending on application					
– max. speed n rev/min	150	150	150	125	125	
– freewheeling n rev/min	300					
Output power ¹⁾						
– continuous power P kW	55	55	55	60	60	
Weight						
– motor m kg	93					
– motor with holding brake m kg	120					
– motor with wheel brake m kg	135					
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	400	
Inlet pressure port "A" or "B" p bar				470	420	
Summated pressure ^{4), 6)} port "A" + "B" p bar				470	420	
Case drain pressure p bar	10					
Fluid ⁵⁾	Mineral oil (HL, HLP) to DIN 51 524					
Fluid temperature range t $^{\circ}\text{C}$	– 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 $\beta_{10} \geq 75$.					
Brake						
Holding brake (multi-disc brake)						
Holding torque T Nm	11 000					
Brake release pressure, min – max p bar	Min. 15 max. 30					
Wheel brake (drum brake)	See table page 8					
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 $p_{\text{min}} = 15 \text{ bar}$ 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 $v = 46 \text{ mm}^2/\text{s}$ and $t = 45 \text{ }^\circ\text{C}$)**Notes on the technical data** T = torque in Nm Q = input flow in L/min Q_L = 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.

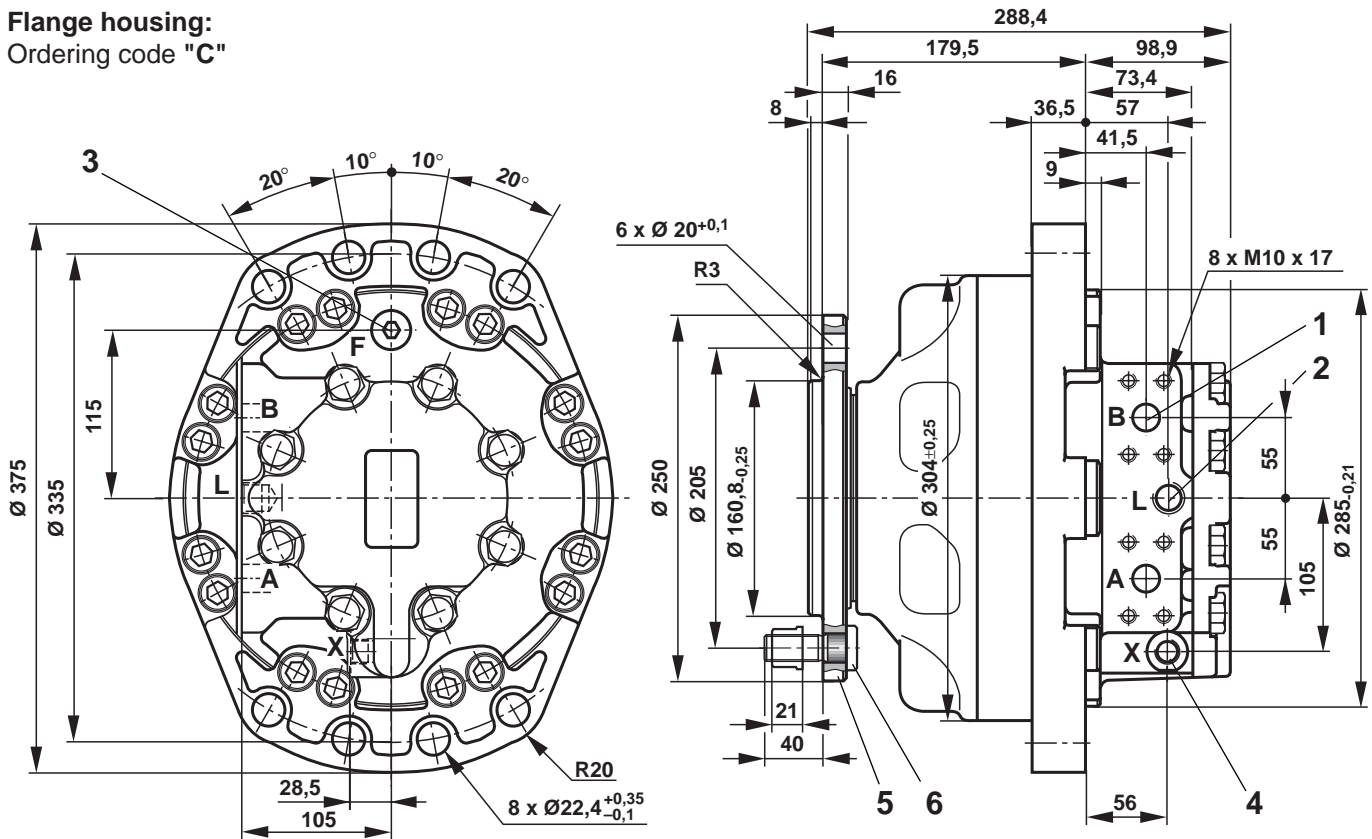
– The torques given for 50% displacement do not apply to both directions of rotation, but only to the preferred direction of rotation indicated (see page 4)

Nominal size		1130					1780				
Speed n in rev/min		0	25	50	100	150	0	25	50	100	
100	T Nm	1133	1529	1583	1493	1397	1558	2456	2420	2043	
	Q L/min	0,72	28,95	57,40	114,19	171,31	0,74	45,41	90,05	179,22	
	Q_L L/min	0,20	0,20	0,30	0,50	0,90	0,37	0,41	0,45	0,53	
200	T Nm	2447	3166	3238	3166	3133	3683	5049	5116	4833	
	Q L/min	2,18	29,59	58,09	114,98	172,16	2,18	46,55	91,22	180,55	
	Q_L L/min	0,40	0,40	0,50	0,60	1,00	1,09	1,11	1,13	1,17	
300	T Nm	3670	4749	4858	4694		5949	7692	7794		
	Q L/min	4,04	30,10	59,02	115,52		4,04	48,00	93,10		
	Q_L L/min	0,50	0,50	0,70	0,70		2,02	2,15	2,28		
400	T Nm	4892	6331	6474			8160	10335	10425		
	Q L/min	5,84	31,00	59,81			5,82	49,46	94,81		
	Q_L L/min	1,00	1,00	1,00			2,92	3,21	3,50		
450	T Nm	5503	7122	7284							
	Q L/min	6,90	31,46	60,59							
	Q_L L/min	1,10	1,10	1,30							
Nominal size		1250					2150				
Speed n in rev/min		0	25	50	100	150	0	25	50	100	
100	T Nm	1253	1692	1751	1691	1512	1882	2967	2922	2467	
	Q L/min	0,74	31,95	63,40	126,19	189,31	0,72	54,66	108,55	216,22	
	Q_L L/min	0,20	0,20	0,30	0,50	0,90	0,37	0,41	0,45	0,53	
200	T Nm	2707	3503	3582	3503		4448	6098	6180		
	Q L/min	2,18	32,59	64,09	126,98		2,18	55,80	109,72		
	Q_L L/min	0,40	0,40	0,50	0,60		1,09	1,11	1,13		
300	T Nm	4060	5254	5373			7186	9290	9414		
	Q L/min	4,04	33,10	65,02			4,04	57,25	111,60		
	Q_L L/min	0,50	0,50	0,70			2,02	2,15	2,28		
400	T Nm	5411	7003	7162			9855	12483			
	Q L/min	5,82	34,00	65,81			5,84	58,71			
	Q_L L/min	1,00	1,00	1,00			2,92	3,21			
450	T Nm	6088	7878	8057							
	Q L/min	6,90	34,46	66,59							
	Q_L L/min	1,10	1,10	1,30							
Nominal size		1500									
Speed n in rev/min		0	25	50	100	150					
100	T Nm	1504	2030	2101	1983	1719					
	Q L/min	0,40	37,90	75,60	151,00	226,80					
	Q_L L/min	0,20	0,20	0,30	0,50	0,90					
200	T Nm	3248	4203	4298	4203						
	Q L/min	0,80	38,30	76,00	151,20						
	Q_L L/min	0,40	0,40	0,50	0,60						
300	T Nm	4872	6304	6448							
	Q L/min	1,00	38,50	76,40							
	Q_L L/min	0,50	0,50	0,70							
400	T Nm	6494	8403	8594							
	Q L/min	2,00	39,50	77,40							
	Q_L L/min	1,00	1,00	1,00							
450	T Nm	7305	9454	9669							
	Q L/min	2,20	39,70	77,60							
	Q_L L/min	1,10	1,10	1,30							

Unit dimensions

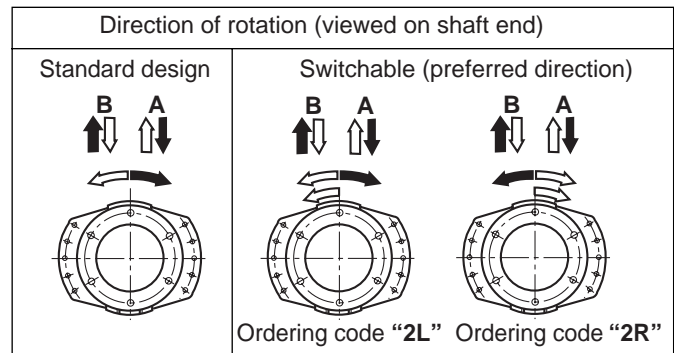
(in mm)

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, ordering code `..2L..` or `..2R..` (switching pressure $p = 10$ to 30 bar)
- 5 Shaft end with flange, ordering code "F250"
- 6 M18 x 1,5 studs with nut, for retaining wheels ordering code `..S..`

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

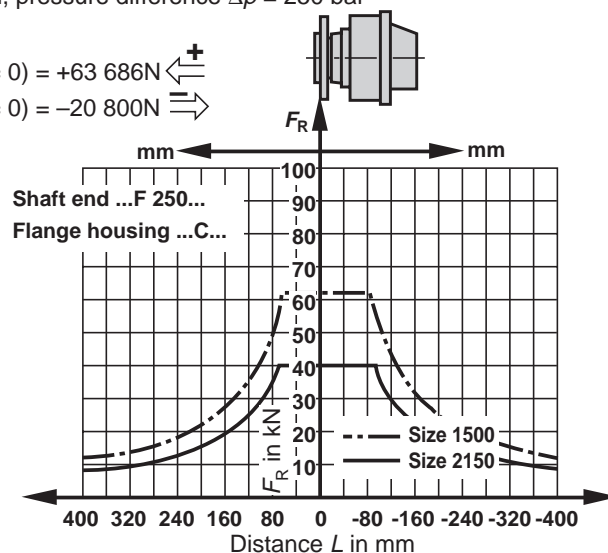


Permissible radial load on output shaft

Measured at speed $n = 50$ rev/min, pressure difference $\Delta p = 250$ bar

$$F_{A \max} (F_R = 0) = +63\ 686\text{N} \leftarrow +$$

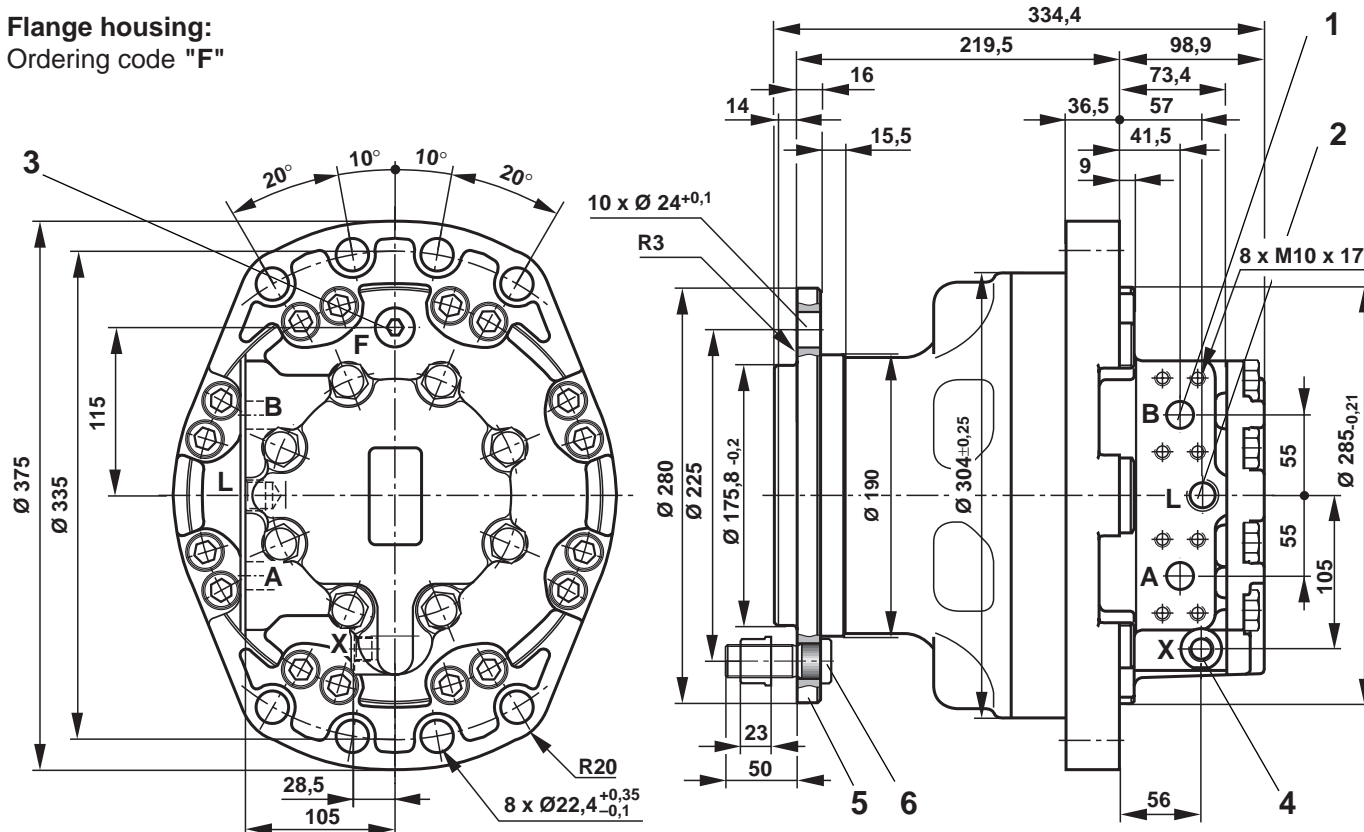
$$F_{A \max} (F_R = 0) = -20\ 800\text{N} \Rightarrow -$$



Unit dimensions

(in mm)

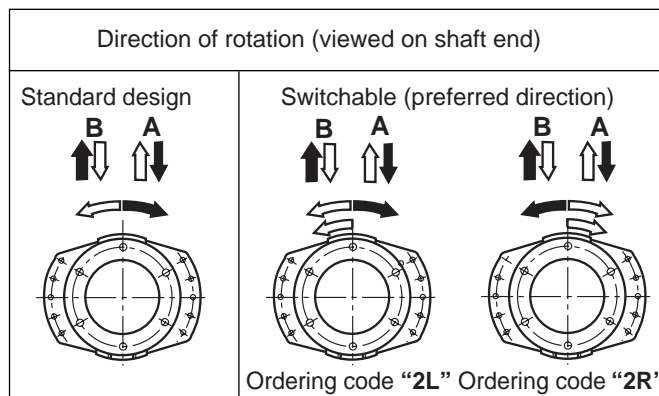
Flange housing:
Ordering code "F"



- 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, ordering code **..2L..** or **..2R..** (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 **..JS..**

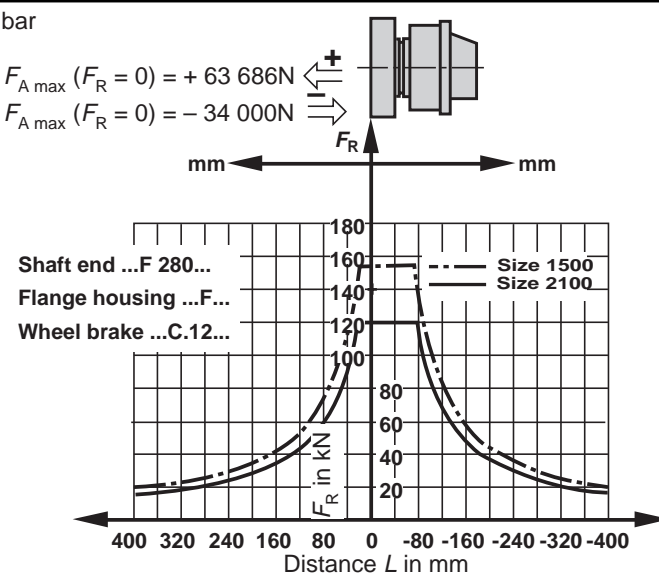
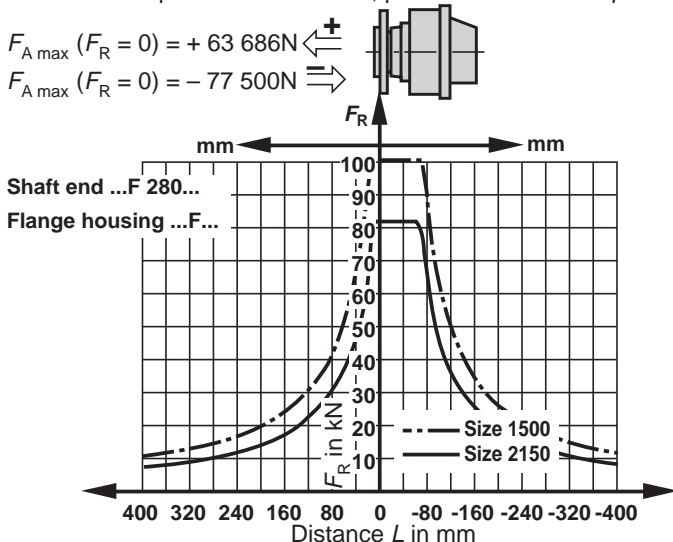
Port	Dimensions of threads	
	Ordering code "11"	Ordering code "42"
A, B	3/4 SAE (410 bar/6000 PSI)	
L, F	1/2" BSP	3/4-16 SAE
X	3/8" BSP	9/16-18 SAE

Pipe thread (...BSP) to ISO 228/1



Permissible radial load on output shaft

Measured at speed $n = 50$ rev/min, pressure difference $\Delta p = 250$ bar

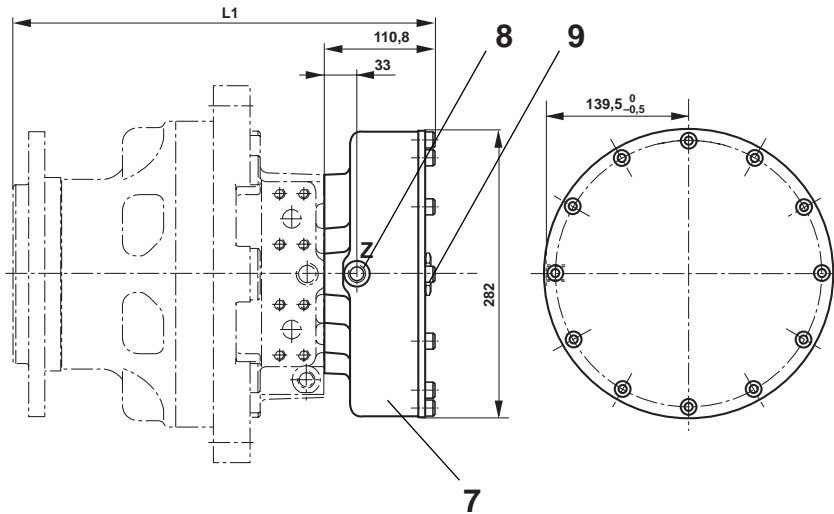


Unit dimensions

(in mm)

Holding brake (multi-disc brake): Ordering code "B11"

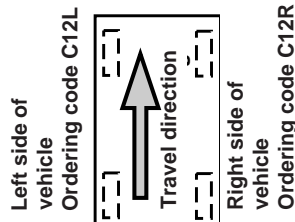
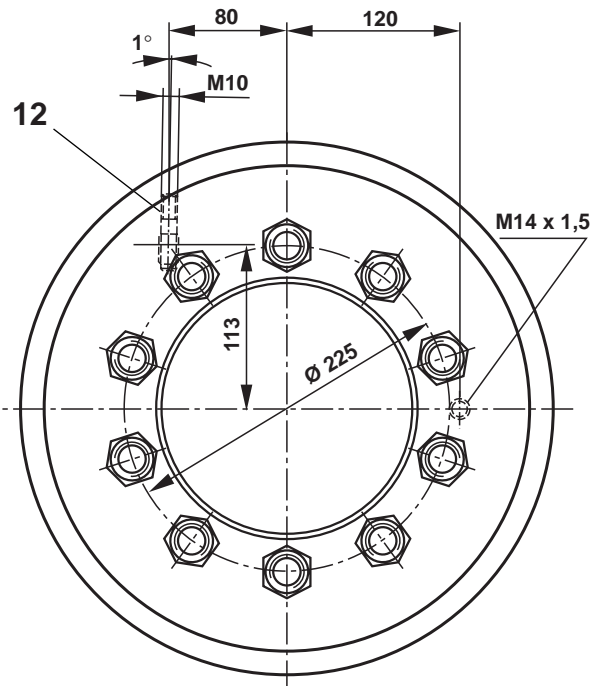
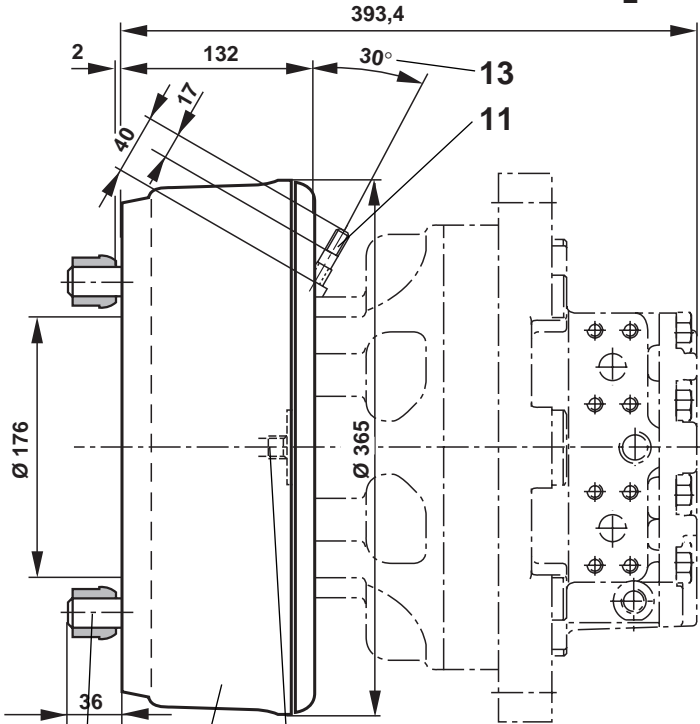
Flange housing	L1
C	373,7
F	419,7



- 7 Holding brake (multi-disc brake)
Ordering code "B11"
- 8 Brake release port Z
- 9 Threaded bore for emergency mechanical release of holding brake

Port	Dimensions of threads	
	Ordering code "/11"	Ordering code "/42"
Z	3/8" BSP	9/16-18 SAE
Item 9	M24	M24

Wheel brake (drum brake) Ordering code "C12" " R L



- 6 10 M22 studs with nut for retaining wheels
- 10 Wheel brake (drum brake) Ordering code "C12R"
- 11 Cable pull (Bowden control), a motor is shown with brakes for the vehicle right hand side. For the left hand side, ordering code "C12L", the position of the cable pull is reversed (see drum brake diagram)
- 12 Cable pull length
- 13 Angled position of cable pull
- 14 Port for brake: $p_{max} = 112$ bar

Wheel brake as clamping brake		Wheel brake	
Holding torque static	Pull force of cable	Braking torque dynamic	Port
12000 Nm	3460 N	1200 Nm	112 bar

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