

# Radial Piston Motor (Multi-Stroke) MCR10

**RE 15207/07.10** 1/16  
Replaces: 02.98

## Data sheet

Series 3X  
Size 780 to 1340  
Differential pressure up to 450 bar  
Torque output up to 8000 Nm  
Speed up to 215 rpm  
Open and closed circuits



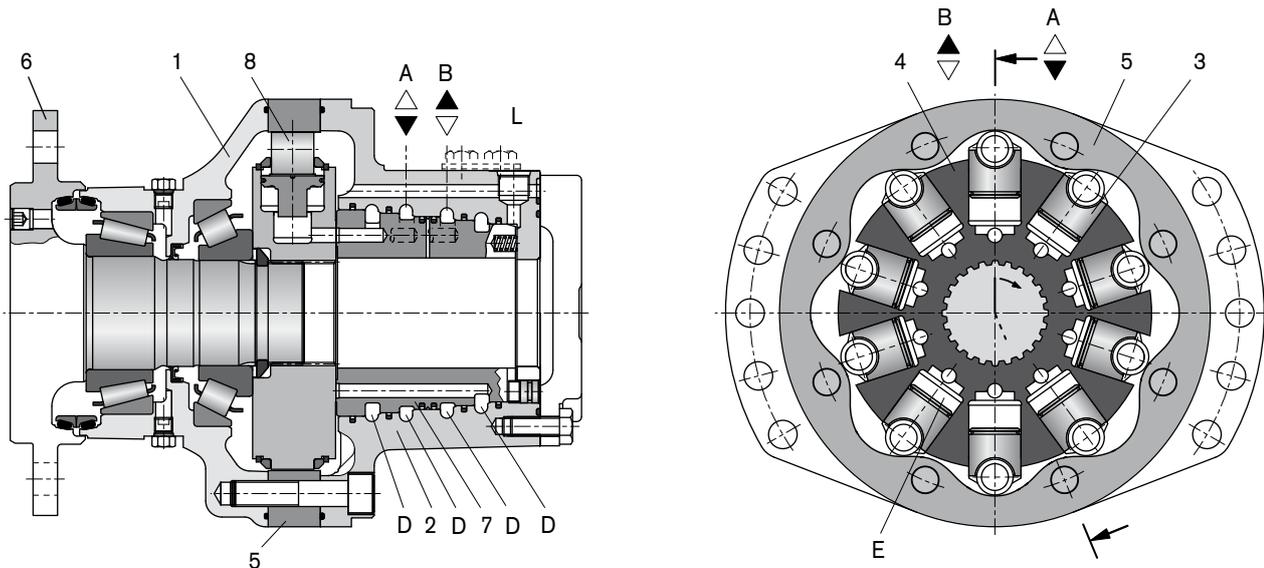
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## Features

- Compact robust construction
- High volumetric and mechanical efficiencies
- High pressure rating
- High reliability
- Low maintenance
- Smooth running at very low speeds
- Low noise
- Reversible
- Sealed tapered roller bearings
- High radial forces permitted on drive shaft
- Freewheeling possible
- Available with optional holding brake (multi-disc) or dynamic (drum) brake
- Available with:
  - Bi-directional two speed
  - Integrated flushing valve
  - Speed sensor

# Functional description



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

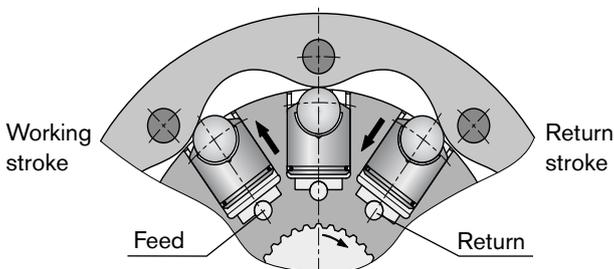
### Construction

Two part housing (1, 2), rotary group (3, 4), cam (5), drive shaft (6) and flow distributor (7)

### Transmission

The cylinder block (4) is connected to the shaft (6) by means of splines. The pistons (3) are arranged radially in the cylinder block (4) and make contact with the cam (5) via rollers (8).

### Torque Generation



The number of working and return strokes corresponds to the number of lobes on the cam x number of pistons (10).

### Flow paths

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

### Bearings

Tapered roller bearings capable of transmitting high axial and radial forces are fitted as standard, except on Hydrobase motors.

### Freewheeling

In certain applications there may be a requirement to freewheel the motor. This may be achieved by connecting ports A and B to zero pressure and simultaneously applying a pressure of 2 bar to the housing through port L. In this condition, the pistons are forced into the cylinder block which forces the rollers to lose contact with the cam thus allowing free rotation of the shaft.

### Two speed operation (2W)

In mobile applications where vehicles are required to operate at high speed with low motor loads, the motor can be switched to a low-torque and high-speed mode. This is achieved by operating an integrated valve which directs hydraulic fluid to only one half of the motor while continuously re-circulating the fluid in the other half. This "reduced displacement" mode reduces the flow required for a given speed and gives the potential for cost and efficiency improvements. The motor maximum speed remains unchanged.

Rexroth has developed a special spool valve to allow smooth switching to reduced displacement whilst on the move. This is known as "soft-shift" and is a standard feature of 2W motors. The spool valve requires either an additional sequence valve or electro-proportional control to operate in "soft-shift" mode.

### Flushing valve

In a closed circuit, the same hydraulic fluid continuously flows between the pump and the motor. This could therefore lead to overheating of the hydraulic fluid.

The function of the flushing valve option is to replace hydraulic fluid in the closed circuit with that from the reservoir. When the hydraulic motor is operated under load, either in the clockwise or anti-clockwise direction, the flushing valve opens and takes a fixed flow of fluid through an orifice from the low pressure side of the circuit. This flow is then fed to the motor housing and back to the reservoir normally via a cooler. In order to charge the low pressure side of the circuit, cool fluid is drawn from the reservoir by the boost pump and is fed to the pump inlet through the check valve. Thus the flushing valve ensures a continuous renewal and cooling of the hydraulic fluid. The flushing feature incorporates a relief valve which is used to maintain a minimum boost pressure and operates at a standard setting of 14 bar (other options available on request).

Different orifice sizes may be used to select varying flows of flushing fluid. The following table gives flushing rate values based on a boost / charge pressure of 25 bar.

# Functional Description

**Flushing flow rates** (for  $p_{\text{charge}} - p_{\text{case}} = 25 \text{ bar}$ )

Ordering code	Flow ( $\pm 1 \text{ l/min}$ )
F1	3 l/min
F2	5 l/min
F7	7 l/min
F4	10 l/min
F8	12.5 l/min
F6	13.5 l/min

## Holding brake (multi-disc brake)

### Mounting

By way of rear housing (2) and brake shaft (16).

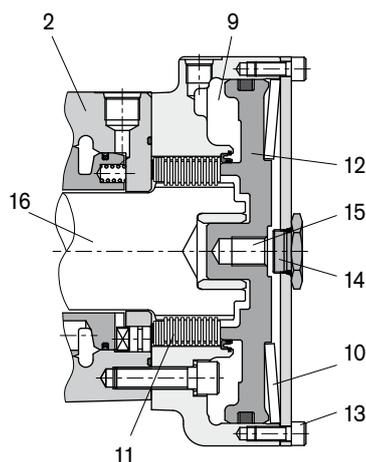
### Brake application

As a safety requirement in mobile applications a parking brake may be provided to ensure that the motor cannot turn when the machine is not in use. The parking brake provides holding torque by means of discs (11) that are compressed by a disc spring (10). The brake is released when oil pressure is applied to brake port "Z" and the pressure in the annular area (9) compresses the disc spring allowing the brake discs to turn independently.

Note: This brake is provided solely for static use - not to be used dynamically.

### Manual release of holding brake

The brake may also be released manually by loosening screws (13), or by removing plug (14) and inserting a puller into the tapped hole on the brake piston (15)

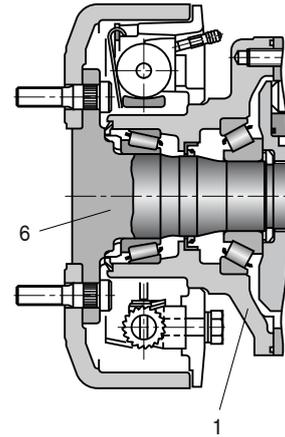


## Dynamic brake

Where mechanical dynamic braking is required, a drum brake may be specified. The drum brake is mounted directly onto the drive shaft (6) and front housing (1). Braking torque is provided by brake shoes acting on the inside of the drum.

### Operation of brake

- hydraulic brake fluid (special order required for mineral oil operation)
- mechanical brake cable (not supplied)

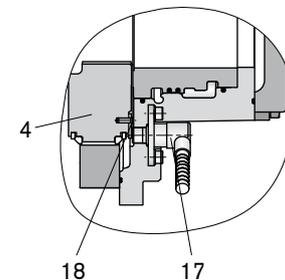


## Speed sensor

A Hall-effect speed sensor (17) may be fitted as an option, giving a two-channel output of phase-displaced square waves, and enabling detection of speed and direction. A toothed target disc (18) is fitted to the motor cylinder block (4), and the sensor, fitted to a port in the rear case, produces a pulse on each channel as each tooth passes in front of it. The frequency of the pulses is proportional to the rotational speed.

Versions are available for use with regulated supplies (Code P1) and for direct connection to a 12 V or 24 V unregulated supply (Code P2).

The motor can also be supplied fitted with a target disc and with a speed sensor port machined, but covered and sealed with a blanking plate (Code P0). These "sensor-ready" motors may be fitted with a sensor at a later date.



# Ordering code

<b>MCR</b>	<b>10</b>				<b>Z</b>	<b>-</b>	<b>3X</b>				<b>42</b>					
01	02	03	04	05	06		07	08	09	10	11	12	13	14	15	16

## Radial piston motor

01																	<b>MCR</b>
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## Frame size

02	Frame size 10																<b>10</b>
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## Housing Type

	Front case flanged, SAE 4 metric holes																<b>D</b>
	Rear case flanged																<b>F</b>
	Hydrobase (half motor)																<b>H</b>

## Nominal size, displacement V in cm<sup>3</sup>/rev

			<b>780</b>	<b>860</b>	<b>940</b>	<b>1120</b>	<b>1250</b>	<b>1340</b>
04	Low Displacement: motors use standard cylindrical pistons	<b>LD</b>	●	●	●	-	-	-
	High Displacement: motors use stepped pistons	<b>HD</b>	-	-	-	●	●	●

## Drive shaft

05	Parallel keyed shaft Ø60 mm (only available with housing type "D" – maximum torque 4800 Nm)																<b>L60</b>
	With flange Ø250 mm (only available with housing type "F")																<b>F250</b>
	Without drive shaft (only available with housing type "H")																<b>Z</b>

## Through shaft

06	Without through shaft																<b>Z</b>
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## Series

07	Series 30 to 39 (series 30 to 39 are dimensionally interchangeable)																<b>3X</b>
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## Brake

08	Without brake																<b>A0</b>
	Hydraulic release spring applied multi-disc holding brake 4400 Nm																<b>B5</b>
	Hydraulic release spring applied multi-disc holding brake 7000 Nm																<b>B7</b>
	Dynamic brake (drum brake) for right hand side of vehicle (see figure page 15)																<b>C7R</b>
	Dynamic brake (drum brake) for left hand side of vehicle (see figure page 15)																<b>C7L</b>

## Seals

09	NBR (nitrile rubber) (except dynamic brake – see page 15)																<b>M</b>
	FKM (fluoroelastomer/Viton) (except dynamic brake – see page 15)																<b>V</b>

## Single / Two-speed operation

10	Single speed, standard direction of rotation																<b>1L</b>
	Bi-directional two speed, standard direction of rotation																<b>2WL</b>

## Ports

11	Tapped with UNF thread (SAE J514) (A and B ports SAE split flange metric bolt holes)																<b>42</b>
----	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-----------

## Studs

12	Without studs (no code)																
	With wheel studs and nuts (6 studs fitted only to motors with housing type "F")																<b>S</b>

## Speed sensor

13	Without sensor (no code)																
	Sensor ready																<b>P0</b>
	Sensor without regulator																<b>P1</b>
	Sensor with regulator																<b>P2</b>

## Flushing

14	Without flushing (no code)																
	With flushing (see table on page 3)																<b>F1 to F8</b>

● = available

- = not available

# Ordering code

<b>MCR</b>	<b>10</b>				<b>Z</b>	<b>-</b>	<b>3X</b>				<b>42</b>					
01	02	03	04	05	06		07	08	09	10	11	12	13	14	15	16

**Special order**

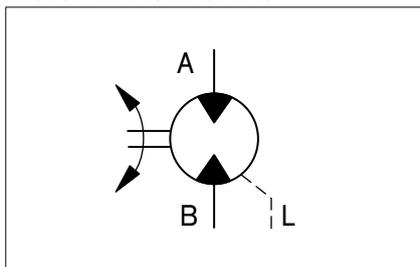
15	Special feature	<b>SOXXX</b>
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**Other**

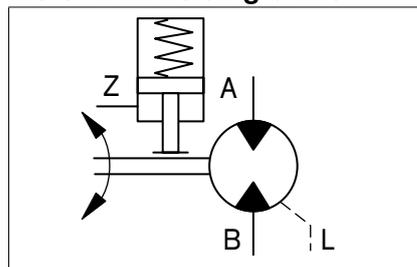
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## Schematic diagrams

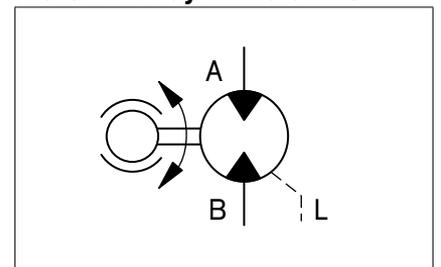
**Motor without brake**



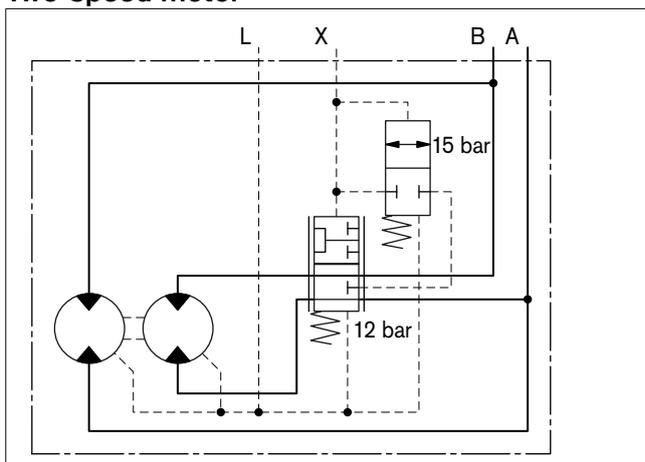
**Motor with holding brake**



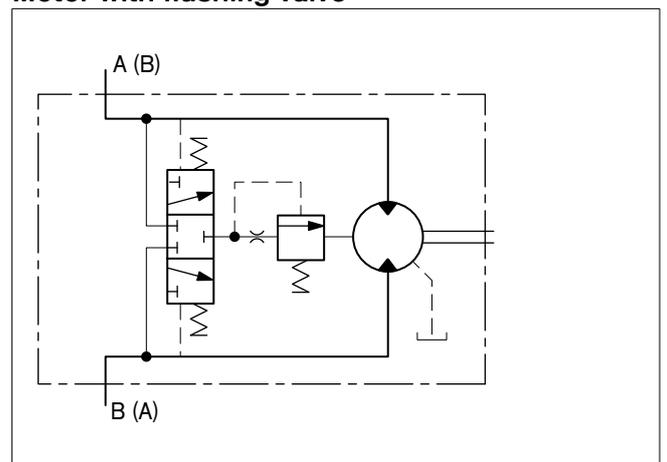
**Motor with dynamic brake**



**Two-speed motor**

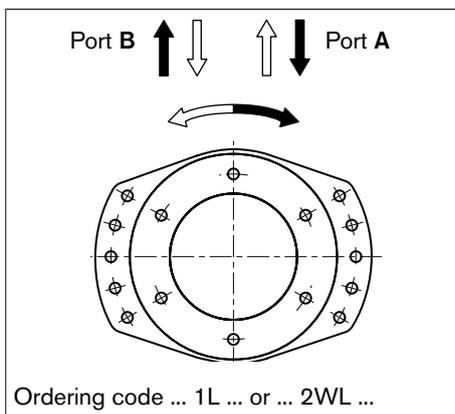


**Motor with flushing valve**



## Direction of rotation

Direction of shaft rotation with flow (viewed from drive shaft)



# Technical data

(For operation outside of these parameters, please consult Rexroth)

Description	Radial-piston type, low-speed, high-torque motor							
Frame size	MCR10							
Type of mounting	Flange mounting; face mounting							
Pipe connections <sup>1)2)</sup>	Flanged per SAE J518 (code 62), Threaded per SAE J514							
Shaft loading	See page 9							
Displacement	$V_g$	cm <sup>3</sup> /rev	780	860	940	1120	1250	1340
Output torque								
Specific torque (at $\Delta p = 250$ bar)		Nm	2790	3080	3370	4010	4480	4800
Maximum torque <sup>3)4)</sup>	$T_{max}$	Nm	5030	5540	6060	6420	7160	7680
Output speed								
Minimum speed for smooth running <sup>5)</sup>	$n_{min}$	rpm	5	5	5	0,5	0,5	0,5
Maximum speed (1L and 2W) <sup>6)7)</sup>	$n_{max}$	rpm	215	195	180	150	135	125
Output power								
Nominal power <sup>8)</sup>	$P$	kW	44	44	44	50	50	50
Weight	$m$	kg	see dimensions on pages 10 - 15					
Moment of inertia	$J_m$	kgm <sup>2</sup>	see dimensions on pages 10 - 15					
<b>Hydraulic</b>								
Pressure <sup>9)</sup>								
Nominal pressure <sup>8)</sup>	$p_{nom}$	bar	250	250	250	250	250	250
Maximum differential pressure <sup>3)</sup>	$\Delta p_{max}$	bar	450	450	450	400	400	400
Maximum pressure at port "A" or "B" <sup>3)</sup>	$p_{max}$	bar	470	470	470	420	420	420
Maximum case drain pressure	$p_{case\ max}$	bar	10	10	10	10	10	10
Hydraulic fluid <sup>10)11)</sup>	Mineral oils (HLP) to DIN 51 524							
Hydraulic fluid temperature range <sup>12)</sup>	$t_{min/max}$	°C	-20 to + 85					
Viscosity Range	$v_{min/max}$	mm <sup>2</sup> /s	10 to 2000					
Fluid cleanliness	ISO 4406, Class 20/18/15							
<b>Brake</b>								
Holding brake (disc brake)				B5			B7	
Minimum holding torque <sup>13)</sup>	$T_{min}$	Nm	4400			7000		
Maximum pressure at brake port "Z"			40			40		
Release pressure (min/max)	$p_{rel}$	bar	11/15			11/15		
Oil volume to operate brake	$V_{rel}$	cm <sup>3</sup>	17			36		
Dynamic brake (drum brake)	see information on page 15							

1) Ensure motor case is filled with oil prior to start-up. See operating manual RE 15215-B.

2) For installation and maintenance details, please see operating manual RE 15215-B.

3) Maximum values should only be applied for a small portion of the duty cycle.

Please consult Rexroth Engineering Department in Glenrothes for motor life calculations based on particular operating cases.

4) For motors with housing type D, maximum torque is 4800 Nm, which restricts maximum pressure accordingly.

5) For continuous operation at speeds < 5 rpm please consult Rexroth Engineering Department in Glenrothes.

6) Based on nominal no-load  $\Delta p$  of 20 bar in full-displacement mode.

7) Warning! During the running in period of the motor (min. 20 hrs) it should not be run unloaded at > 100 rpm.

8) When operating motors in series, please consult Rexroth Engineering Department in Glenrothes.

9) Nominal values are guide values for continuous operation.

10) For use with environmentally acceptable fluids HEES, HEPG, HETG, Viton seals must be specified.

For further information, please refer to RE 90221.

11) For use with HF hydraulic fluids please refer to RE 90229.

12) Extension of the allowable temperature range may be possible depending on specification.

Please consult Rexroth Engineering Department in Glenrothes for further details.

13) Holding brake torque values apply when used with standard mineral oil (HLP) and may change where other fluids or friction modifying additives are used.

## Technical data (Mean values, measured at $v = 46 \text{ mm}^2/\text{s}$ and $t = 45 \text{ }^\circ\text{C}$ )

- All torques apply to run-in motors
- For reduced displacement operating mode multiply the torques by ratio of reduced displacement

T = Torque in Nm

$q_v$  = Input flow in l/min

$q_{vL}$  = Mean case leakage in l/min

p = Minimum charge pressure in pump mode in bar

### Note

- Case pressure must be added to minimum charge pressures quoted. Quoted pressures are guide values but can be circuit-dependant. Please contact Bosch Rexroth Engineering Department in Glenrothes for further advice. Figures quoted in technical data tables below are average values.
- Where flushing is used,  $q_{vL}$  will increase by the flushing flow rate. Mean case leakage values are average values for single speed motors

		MCR10 . 780					
Pressure Diff. $\Delta p$ (bar)	Speed n rpm		0	25	50	100	150
100	T	Nm	646	1030	1092	1077	1034
	$q_v$	l/min	0.63	20.13	39.63	78.63	117.63
	$q_{vL}$	l/min	0.09	0.09	0.09	0.09	0.09
200	T	Nm	1490	2110	2235	2221	2217
	$q_v$	l/min	1.25	20.75	40.25	79.25	118.25
	$q_{vL}$	l/min	0.18	0.18	0.18	0.18	0.18
300	T	Nm	2384	3240	3352	3331	
	$q_v$	l/min	1.88	21.38	40.88	79.88	
	$q_{vL}$	l/min	0.27	0.27	0.27	0.27	
400	T	Nm	3377	4370	4370		
	$q_v$	l/min	2.51	22.01	41.51		
	$q_{vL}$	l/min	0.35	0.35	0.35		
Min. charge pressure	p	bar	1	3	3	5	6

		MCR10 . 860				
		0	25	50	100	150
		712	1136	1204	1184	1117
		0.63	22.13	43.63	86.63	129.63
		0.09	0.09	0.09	0.09	0.09
		1642	2327	2464	2446	2379
		1.25	22.75	44.25	87.25	130.25
		0.18	0.18	0.18	0.18	0.18
		2628	3572	3696	3693	
		1.88	23.38	44.88	87.88	
		0.27	0.27	0.27	0.27	
		3723	4818	4818		
		2.51	24.01	45.51		
		0.35	0.35	0.35		
		1	3	3	5	7

		MCR10 . 940					
Pressure Diff. $\Delta p$ (bar)	Speed n rpm		0	25	50	100	150
100	T	Nm	778	1242	1317	1282	1307
	$q_v$	l/min	0.63	24.13	47.63	94.63	141.63
	$q_{vL}$	l/min	0.09	0.09	0.09	0.09	0.09
200	T	Nm	1795	2543	2693	2678	
	$q_v$	l/min	1.25	24.75	48.25	95.25	
	$q_{vL}$	l/min	0.18	0.18	0.18	0.18	
300	T	Nm	2872	3905	4039		
	$q_v$	l/min	1.88	25.38	48.88		
	$q_{vL}$	l/min	0.27	0.27	0.27		
400	T	Nm	4069	5266	5266		
	$q_v$	l/min	2.51	26.01	49.51		
	$q_{vL}$	l/min	0.35	0.35	0.35		
Min. charge pressure	p	bar	1	3	3	5	8

		MCR10 . 1120				
		0	25	50	100	150
		927	1480	1569	1498	1346
		0.63	28.63	56.63	112.63	168.63
		0.09	0.09	0.09	0.09	0.09
		2139	3030	3209	3206	
		1.25	29.25	57.25	113.25	
		0.18	0.18	0.18	0.18	
		3422	4652	4813		
		1.88	29.88	57.88		
		0.27	0.27	0.27		
		4848	6275	6275		
		2.51	30.51	58.51		
		0.35	0.35	0.35		
		1	3	3	5	9

## Technical data (Mean values, measured at $v = 46 \text{ mm}^2/\text{s}$ and $t = 45 \text{ }^\circ\text{C}$ )

			MCR10 . 1250				
Pressure Diff. $\Delta p$ (bar)	Speed n	rpm	0	25	50	100	125
100	T	Nm	1035	1651	1751	1635	1530
	$q_v$	l/min	0.63	31.88	63.13	125.63	156.88
	$q_{vL}$	l/min	0.09	0.09	0.09	0.09	0.09
200	T	Nm	2387	3382	3581	3486	
	$q_v$	l/min	1.25	32.50	63.75	126.25	
	$q_{vL}$	l/min	0.18	0.18	0.18	0.18	
300	T	Nm	3820	5192	5371		
	$q_v$	l/min	1.88	33.13	64.38		
	$q_{vL}$	l/min	0.27	0.27	0.27		
400	T	Nm	5411	7003	7003		
	$q_v$	l/min	2.51	33.76	65.01		
	$q_{vL}$	l/min	0.35	0.35	0.35		
Min. charge pressure	p	bar	1	3	3	7	9

MCR10 . 1340				
0	25	50	100	125
1109	1770	1877	1726	1601
0.63	34.13	67.63	134.63	168.13
0.09	0.09	0.09	0.09	0.09
2559	3626	3839	3670	
1.25	34.75	68.25	135.25	
0.18	0.18	0.18	0.18	
4095	5566	5758		
1.88	35.38	68.88		
0.27	0.27	0.27		
5801	7507	7507		
2.51	36.01	69.51		
0.35	0.35	0.35		
1	3	3	7	9

# Permitted loading on drive shaft

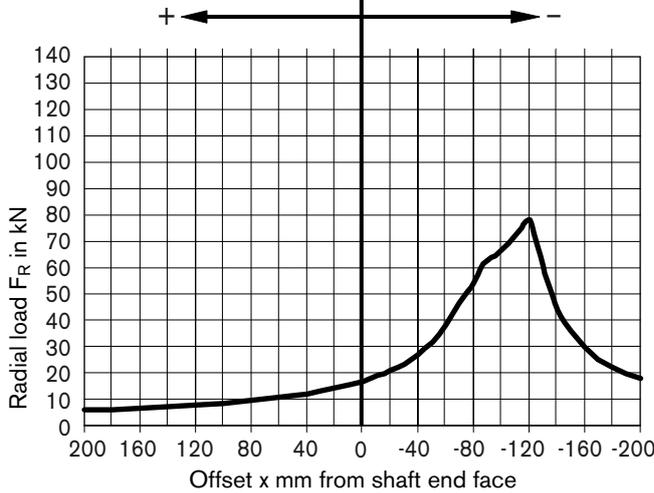
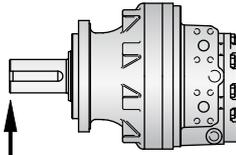
(Speed  $n = 50$  rpm, pressure differential  $\Delta p = 250$  bar, 2000 hrs L10 life at 50 °C)

## Drive shaft ...L60...

Housing type ...D...

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

$F_{ax\ max} = 78700\ N \leftarrow +$   
 $F_{ax\ max} = 63400\ N \rightarrow -$

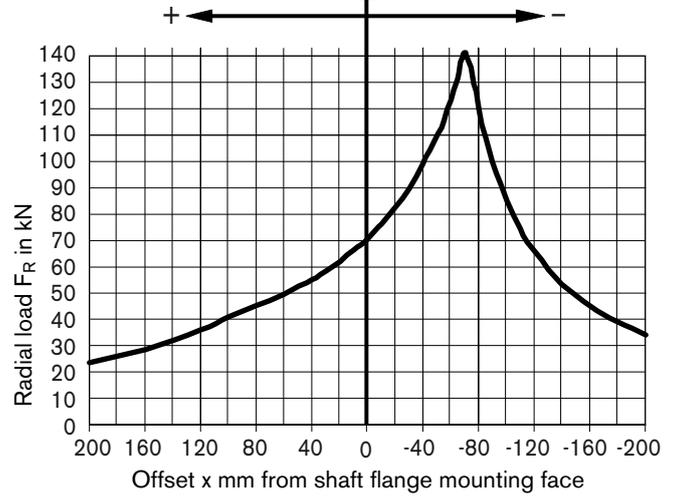
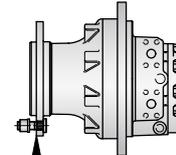


## Drive shaft ...F250... (6 studs M18)

Housing type ...F...

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

$F_{ax\ max} = 76000\ N \leftarrow +$   
 $F_{ax\ max} = 69800\ N \rightarrow -$

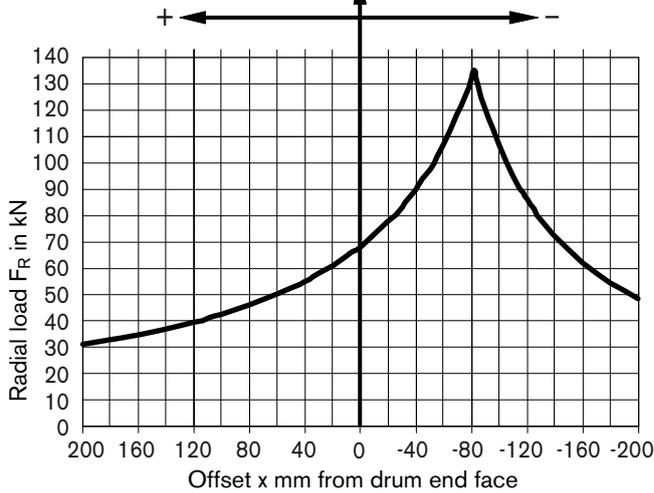
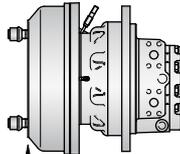


## Drive shaft ...F250... (8 studs M20)

Housing type ...F...C7

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

$F_{ax\ max} = 75800\ N \leftarrow +$   
 $F_{ax\ max} = 53900\ N \rightarrow -$



**Note:**

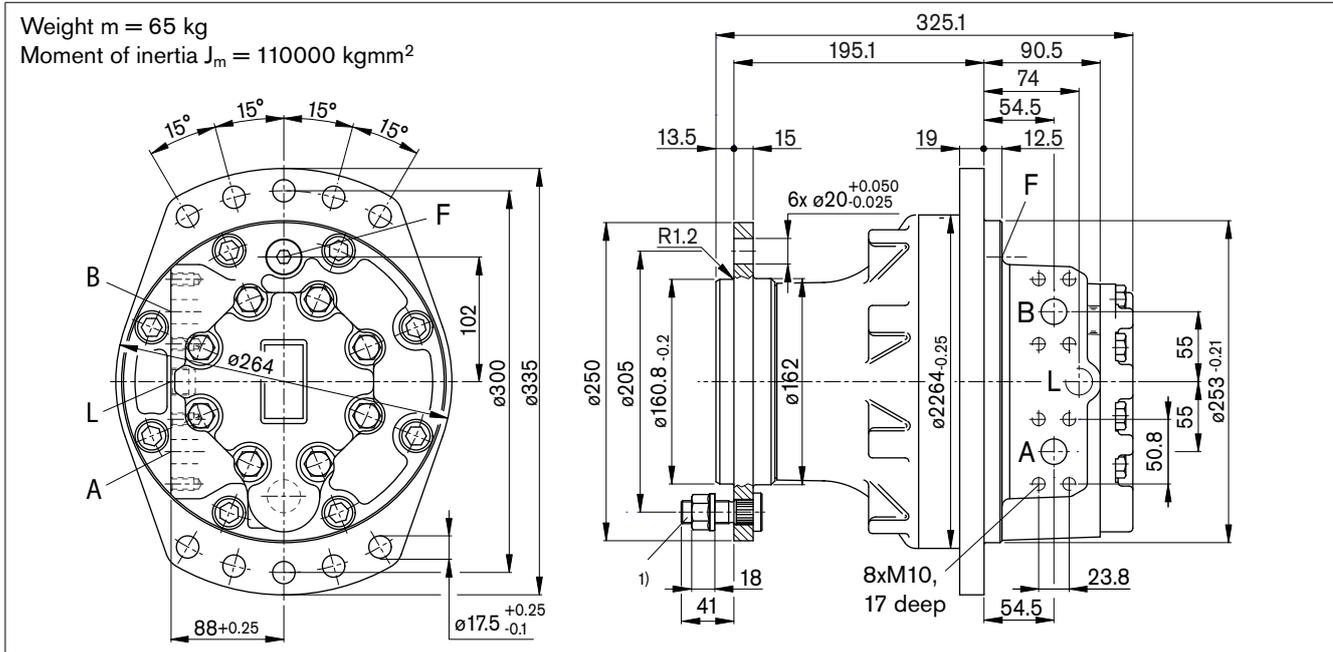
These values and graphs are for initial guidance only.  
For actual motor life calculations under typical or specified duty cycles, contact Rexroth Engineering Department in Glenrothes.

# Dimensions

Before finalizing your design, request a binding installation drawing. Dimensions in mm.

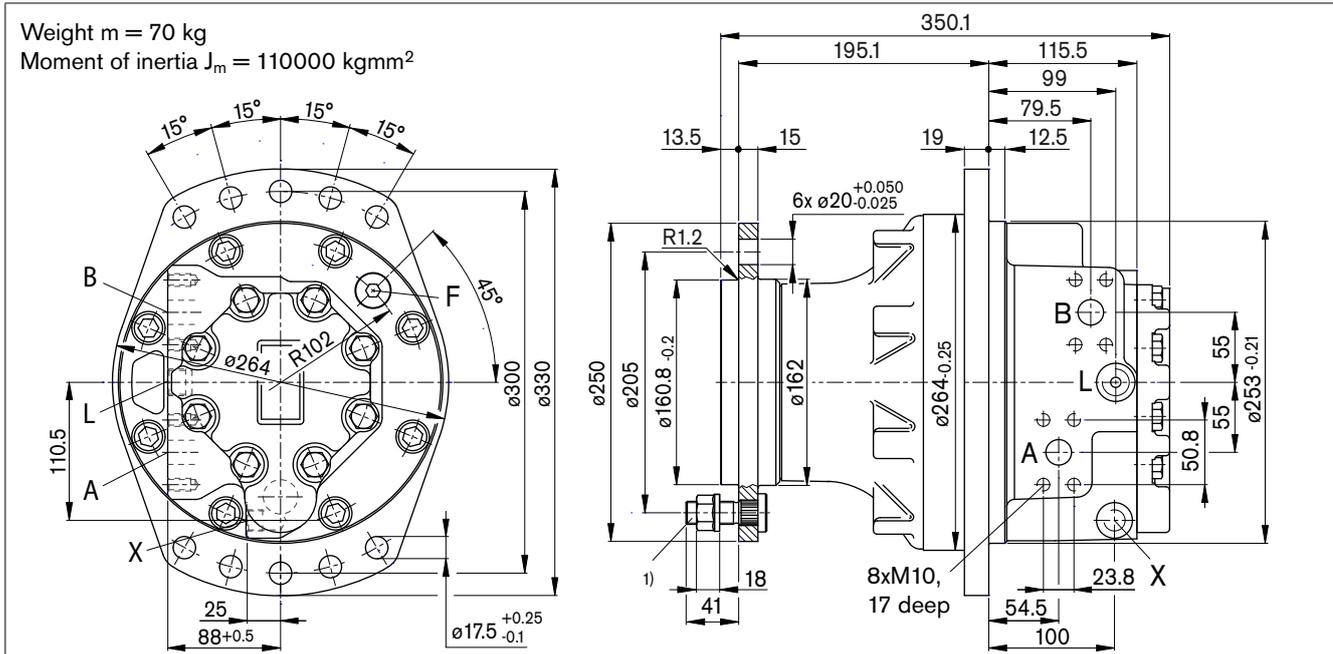
## Flanged rear housing, flanged drive shaft, single speed (1)

Ordering code: "MCR10F...F250Z-32/A0.1L/42./..."



## Flanged rear housing, flanged drive shaft, two speed (2W)

Ordering code: "MCR10F...F250Z-32/A0.2WL/42./..."



### Ports

Designation	Port function	Code 42	Size	Peak pressure [bar]	State
A, B	Inlet, outlet	SAE J518 <sup>2)</sup>	3/4 in	470/420 <sup>3)</sup>	O
L	Case drain	SAE J514	3/4 in - 16 UNF	10	O
X	2 speed port	SAE J514	9/16 in - 18 UNF	35	O
F	Filler port	SAE J514	3/4 in - 16 UNF	10	X

1) 6x wheel studs M18 x 1.5 with flat nuts (DIN74361-2) for wheel fixing, clamping length 5 to 23 mm, ordering code S (wheel studs and nuts equally spaced on P.C.D. of 205)

2) Only dimensions according to SAE J518 (code 62 – high pressure series)

3) Depends on nominal size

O = Must be connected (plugged /covered for transportation)

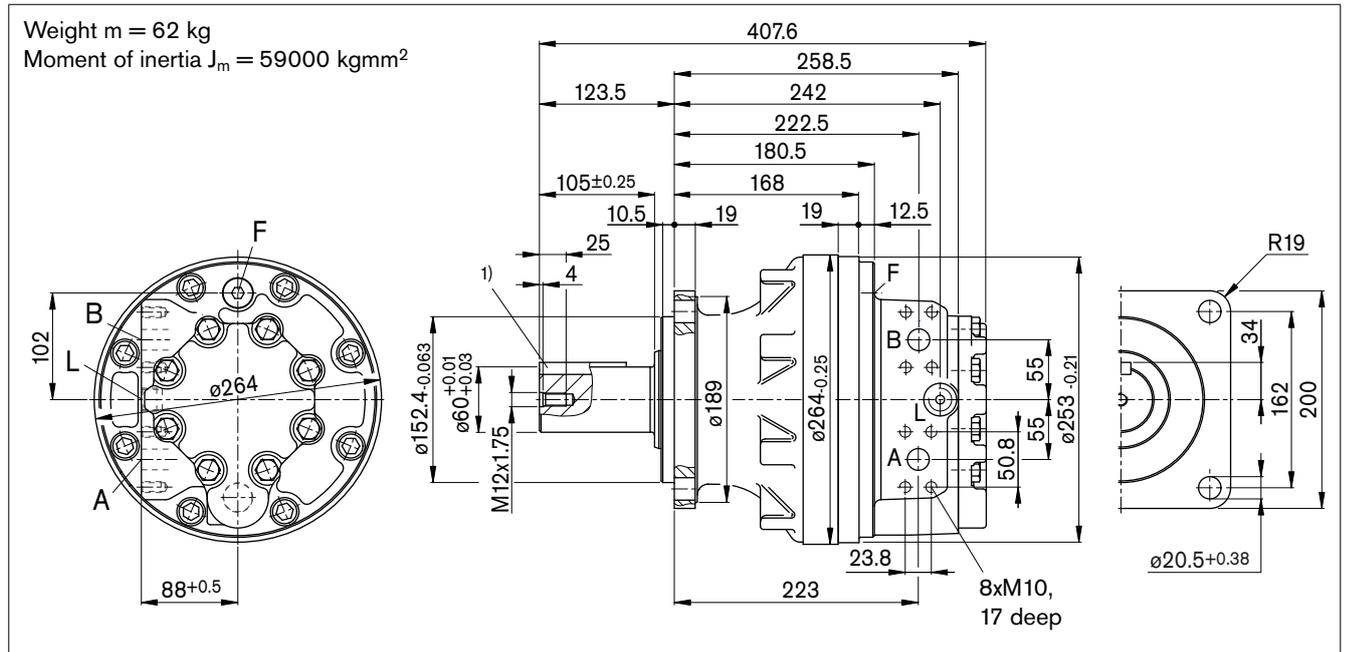
X = Plugged (in normal operation)

# Dimensions

Before finalizing your design, request a binding installation drawing. Dimensions in mm.

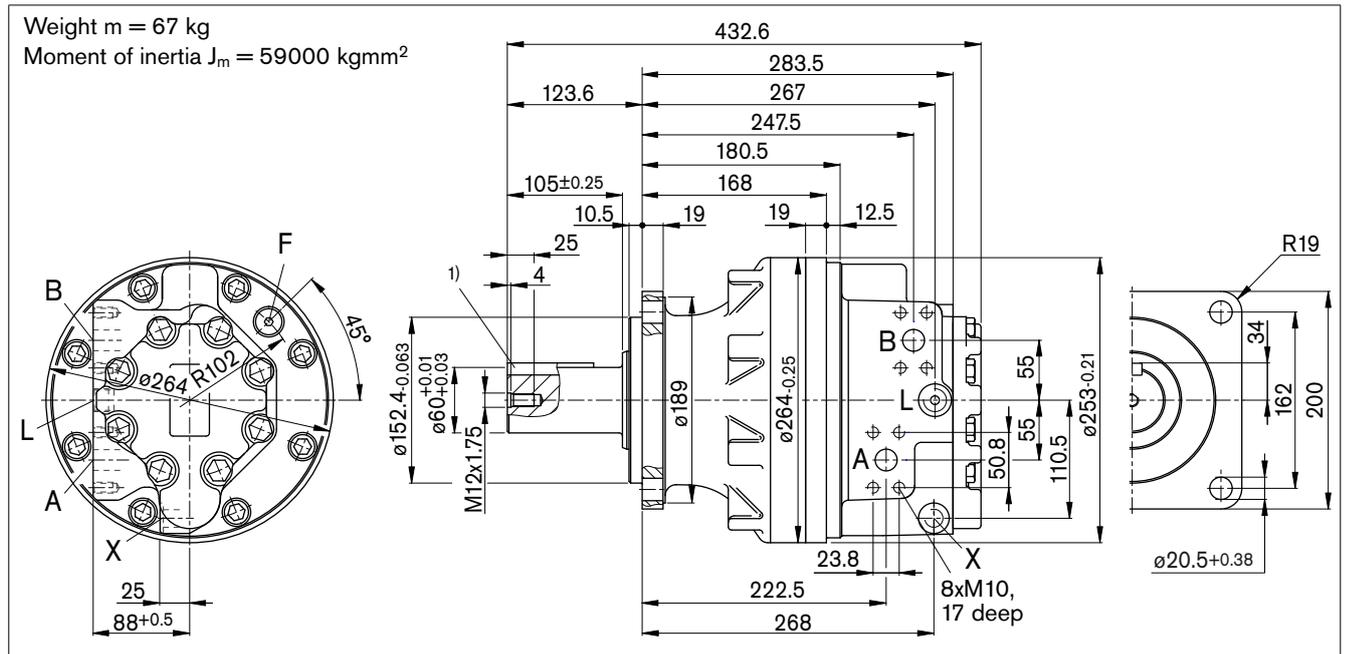
## 4 Hole SAE flanged front housing, parallel drive shaft, single speed (1)

Ordering code: "MCR10D...L60Z-32/A0.1L/42./..."



## 4 Hole SAE flanged front housing, parallel drive shaft, two speed (2W)

Ordering code: "MCR10D...L60Z-32/A0.2WL/42./..."



## Ports

Designation	Port function	Code 42	Size	Peak pressure [bar]	State
A, B	Inlet, outlet	SAE J518 <sup>2)</sup>	3/4 in	470/420 <sup>3)</sup>	O
L	Case drain	SAE J514	3/4 in - 16 UNF	10	O
X	2 speed port	SAE J514	9/16 in - 18 UNF	35	O
F	Filler port	SAE J514	3/4 in - 16 UNF	10	X

1) Parallel key A18 x 11 x 80 DIN 6885

2) Only dimensions according to SAE J518 (code 62 – high pressure series)

3) Depends on nominal size

O = Must be connected (plugged /covered for transportation)

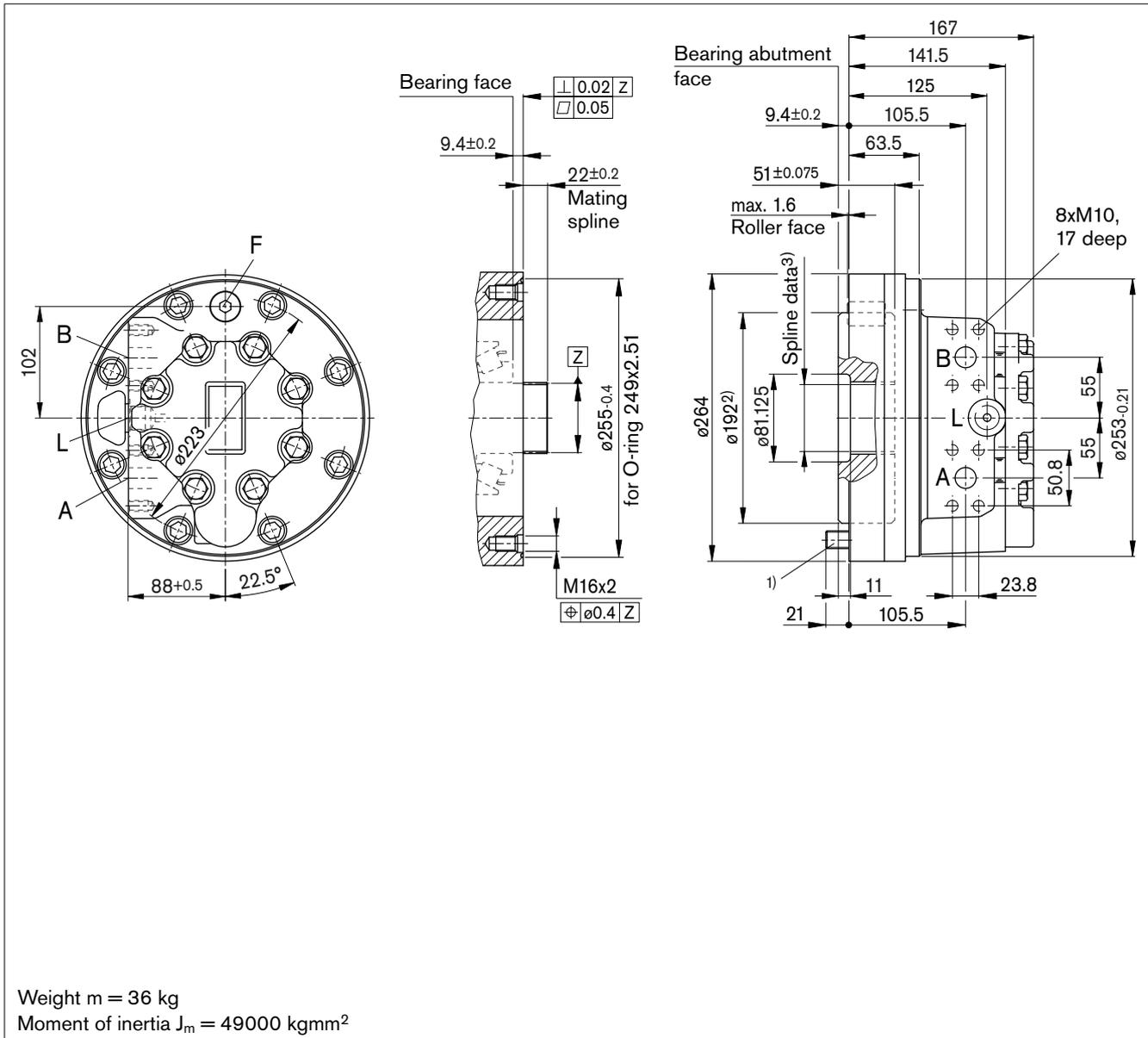
X = Plugged (in normal operation)

# Dimensions

Before finalizing your design, request a binding installation drawing. Dimensions in mm.

## Hydrobase for mounting on customer's shaft, single speed (1)

Ordering code: "MCR10H...ZZ-32/A0.1L/42./..."



## Ports

Designation	Port function	Code 42	Size	Peak pressure [bar]	State
A, B	Inlet, outlet	SAE J518 <sup>4)</sup>	3/4 in	470/420 <sup>5)</sup>	O
L	Case drain	SAE J514	3/4 in - 16 UNF	10	O
F	Filler port	SAE J514	3/4 in - 16 UNF	10	X

- 1) 8x hexagon socket head cap screw ISO 4762 M16x70 on a P.C.D of 223
- 2) Mating part must clear this diameter
- 3) Spline data: N65x2x31x9H DIN 5480
- 4) Only dimensions according to SAE J518 (code 62 – high pressure series)
- 5) Depends on nominal size

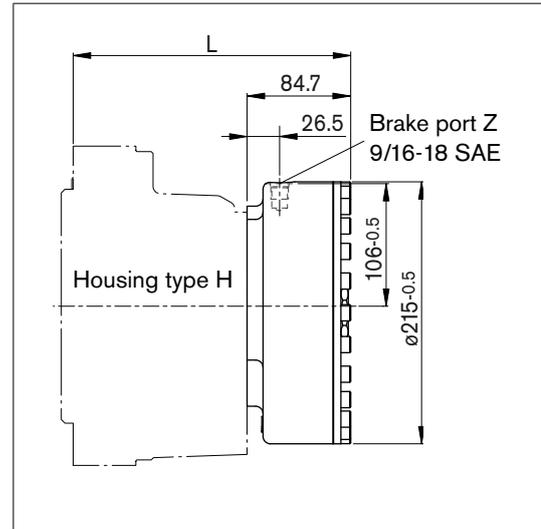
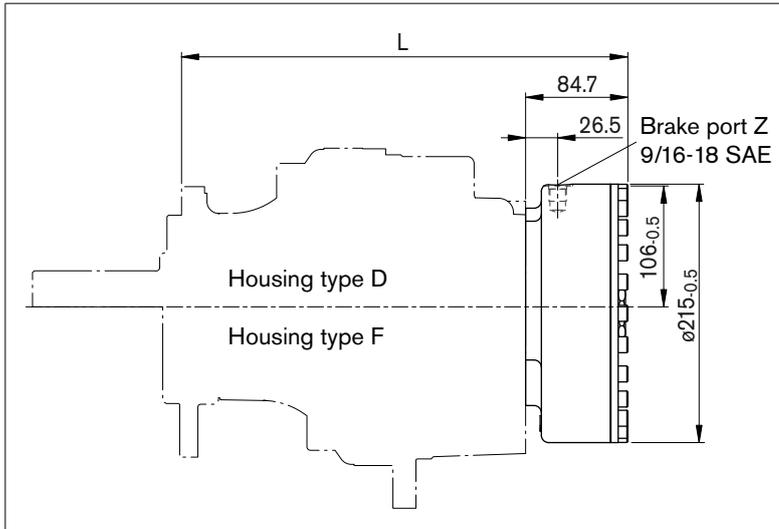
O = Must be connected (plugged /covered for transportation)  
 X = Plugged (in normal operation)



# Dimensions

Before finalizing your design, request a binding installation drawing. Dimensions in mm.

## Holding Brake (multi-disc brake): ordering code "B5"



Housing type	Single speed (1)	Two speed (2W)
	L	L
D	343.2	368.2
F	370.3	395.3

Housing type	Single speed (1)	Two speed (2W)
	L	L
H	226.2	251.2

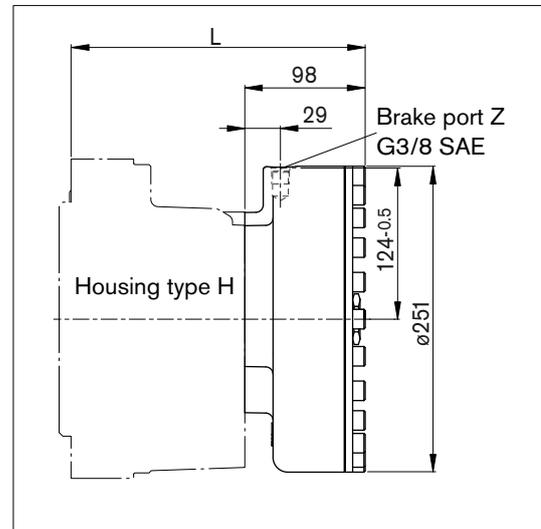
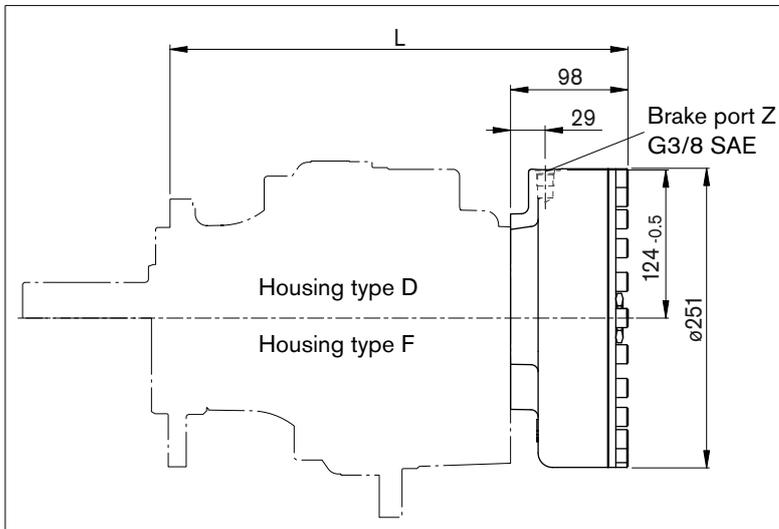
Weight m = 19 kg

Weight m = 19 kg

Moment of inertia  $J_m = 3220 \text{ kgmm}^2$  (single speed)

Moment of inertia  $J_m = 3819 \text{ kgmm}^2$  (two speed)

## Holding Brake (multi-disc brake): ordering code "B7"



Housing type	Single speed (1)	Two speed (2W)
	L	L
D	356.5	381.5
F	383.6	408.6

Housing type	Single speed (1)	Two speed (2W)
	L	L
H	239.5	264.5

Weight m = 25 kg

Weight m = 25 kg

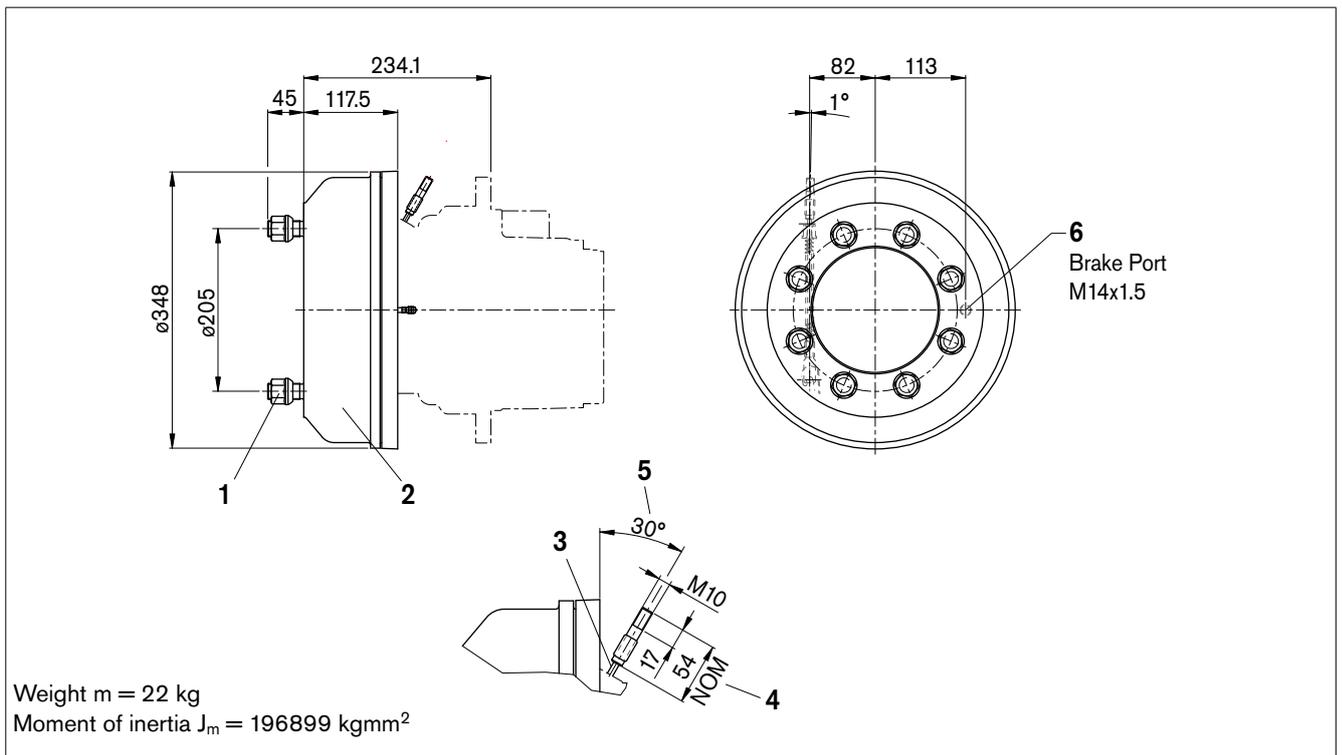
Moment of inertia  $J_m = 3660 \text{ kgmm}^2$  (single speed)

Moment of inertia  $J_m = 4030 \text{ kgmm}^2$  (two speed)

# Dimensions

Before finalizing your design, request a binding installation drawing. Dimensions in mm.

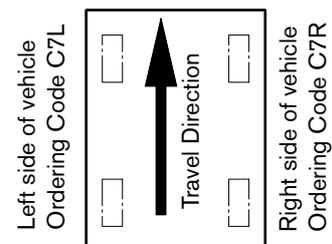
## Dynamic brake (drum brake): ordering code "C7R" / "C7L"



- 1 8 Studs M20x1.5 with spherical wheel nuts
- 2 Dynamic brake (drum brake) ordering code C7L/R for use with brake fluid DOT 3+5 or SAE J 1703.  
If brake is to be used with mineral oil a special order is to be made.  
Please state if seals for mineral oil are required when placing order.
- 3 Brake cable (Bowden cable).  
The brake illustrated is for right side of vehicle. The left side is a mirror image of this (see fig. below).
- 4 Brake cable length.
- 5 Angular position of brake cable.
- 6 Brake port  $p_{max} = 120$  bar.  
Brake cylinder operating volume  $V = 13$  cm<sup>3</sup>.

### MCR dynamic drum brake run-in procedure

- Brake the machine hard in forward and reverse directions until the brake drum temperature reaches 200 °C.
- Allow the brake to cool.
- To remove residue, brake gently 2 times each in the forward and reverse directions.



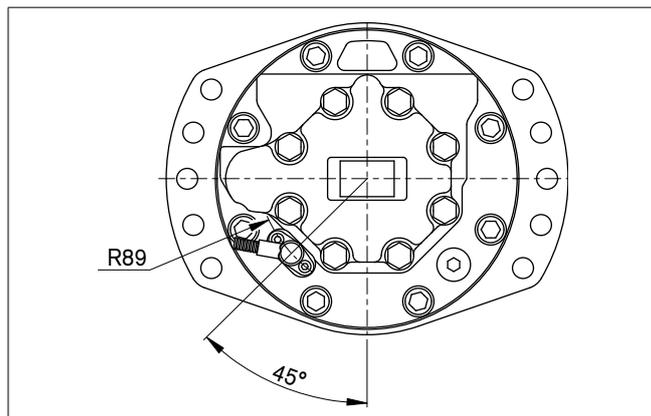
### Brake torque after run-in

Braking torque	Cable tension	Braking torque	Port pressure
4700 Nm	1755 N	4700 Nm	89 bar
6400 Nm	2400 N	6400 Nm	120 bar

# Dimensions

Before finalizing your design, request a binding installation drawing. Dimensions in mm.

Speed sensor: ordering code "P1" / "P2"



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