RE 15198/2022-11-17
Replaces: 2021-07-08

rexroth
A Bosch Company

# Radial piston motor for wheel drives MCR-F

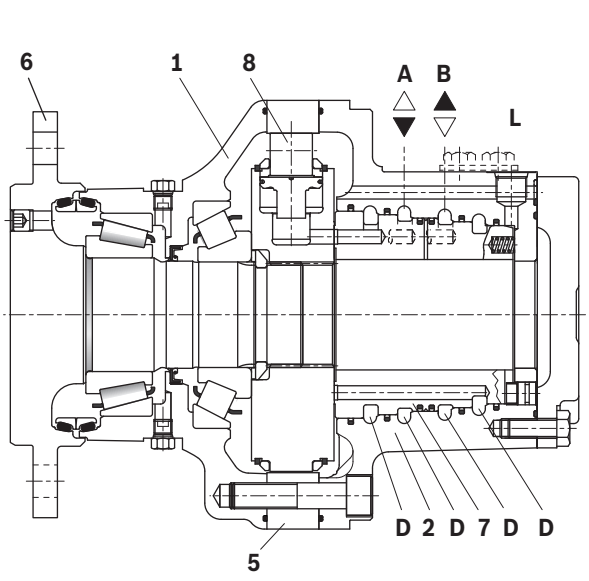
- Frame size MCR3, MCR5, MCR6, MCR10, MCR15 (for frame size 20 see MCR20-C and MCR20-W)
- Displacement 160 cc to 2160 cc
- Differential pressure up to 450 bar
- Torque output up to 13751 Nm
- Speed up to 875 rpm
- Open and closed circuits

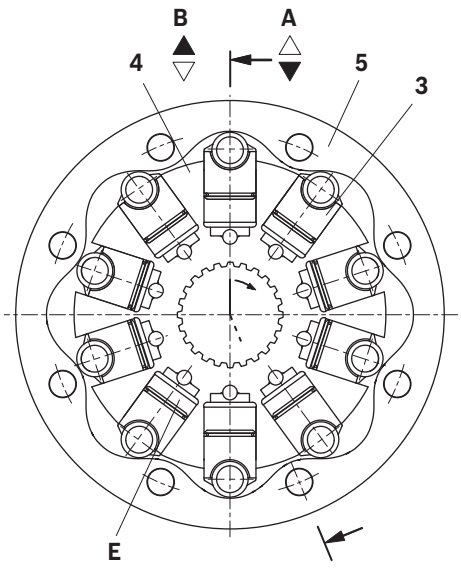
**Features**

- Compact robust construction
- High volumetric and mechanical efficiencies
- Rear case mount
- Wheel flange with wheel studs
- High reliability
- Low maintenance
- Smooth running at very low speeds
- Low noise
- Bi-directional
- Sealed tapered roller bearings
- High radial forces permitted on drive shaft
- Freewheeling possible
- Available with:
  - Holding brake (multi-disc)
  - Bi-directional two speed
  - Integrated flushing valve
  - Speed sensor

**Contents**

## Functional description



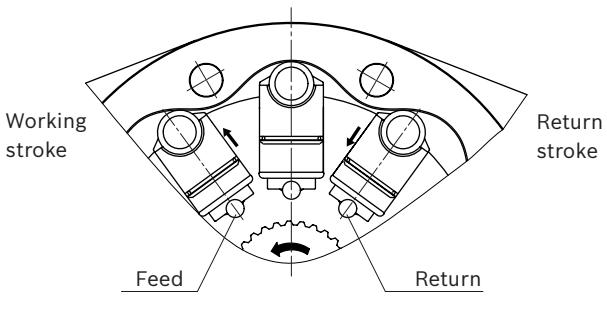




Hydraulic motors of the type MCR-F are radial piston motors with rear case mounting and flange shaft. The MCR-F motors are intended for wheel drives in open or closed circuits. These motors are used in a wide range of applications such as municipal vehicles, fork lift trucks, agricultural and forestry machines. The integrated flange with wheel studs allows easy installation of standard wheel rims.

**Construction**
Two part housing (**1**, **2**), rotary group (**3**, **4, 8**), 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 multiplied by number of pistons in the cylinder block.

**Flow paths**
The ports **A** and **B**, which are located in the rear case, carry oil through the distributor to the cylinder chambers (**E**).

**Bearings**
Tapered roller bearings capable of transmitting high axial and radial forces are fitted as standard.

**Freewheeling**
Certain applications may require the motor to freewheel. This may be achieved by connecting ports **A** and **B** to zero pressure and simultaneously applying low pressure to the housing through port **L**. In this condition the pistons are held within the cylinder block, thus ensuring constant clearance with the cam and allowing the free rotation of the shaft. More information is available in the Freewheeling data sheet (RE15225-02).

**Two speed operation (2W)**

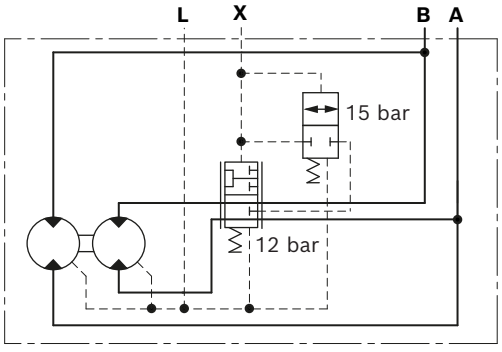
In mobile applications where vehicles are required to operate at high speed with low motor loads, the motor can be switched to a low-torque and high-speed mode. This is achieved by operating an integrated valve which directs hydraulic fluid to only one half of the motor while continuously re-circulating 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.

Bosch 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.

For more information refer to MCR 2-speed soft-shift data sheet (RE 15225-03)

Standard two speed operates with a reduced displacement which is half full displacement. In some cases it is possible to offer a motor with a reduced displacement that is not 50% (e.g. 60% of full displacement). For further information contact Bosch Rexroth Engineering Dept, Glenrothes.

▼ **Schematic**




**Flushing**

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 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. 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.

There are three main characteristic that determine the performance of the flushing.

- Cracking pressure
- Flow rate
- Differential pressure to activate flushing

**Cracking pressure**

(Size of shim fitted to the poppet)

The flushing relief valve closes off the flushing flow if boost/charge pressure falls below the cracking pressure. This protects other functions e.g. park brake or pump charge. Due to variation in different types of applications a choice of different cracking pressures exists. Selection should be made based on boost/charge pressure available and the minimum required for the other functions. The standard cracking pressure is 14.4 ±3 bar. The letter in the code signifies the cracking pressure required. See table below.

**Flow rate**

(Size of orifice in poppet)

A range of flow rates exists for different applications. The first number of the code represents the orifice size. At present the options shown in the table below are available.

**Differential pressure to activate flushing**

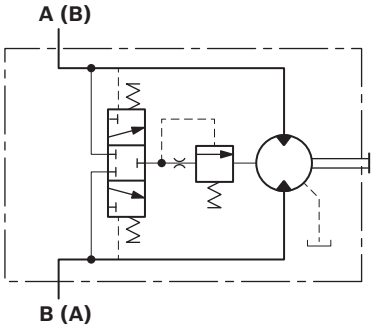
(Spring used in the flushing spool assembly)

The flushing spool selects the low pressure side of the circuit to flush from, preventing flushing with high pressure oil with the associated heating and efficiency losses. The flushing spool requires either a 6 or 8 bar Δp between the A and B ports to shift it. The MCR3 and MCR5 are fitted with Δp 6 bar as standard. MCR10 and MCR15 are fitted with Δp 8 bar as standard. The second number in the code represents the shift spool pressure according to the table below.

**Notice**

- The motor case pressure is applied to the relief outlet. The lift off pressure is therefore the sum of cracking pressure and motor case pressure.
- The hydraulic system, including the flushing relief setting, must be designed to prevent unwanted shifting of the two-speed spool.

▼ **Schematic**




**Flushing flow rates**

| Cracking pressure code | Cracking pressure (bar)[2] | Flow (l/min) at 25 bar[3] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | _1_ (Ø1 mm)[1] | | _2_ (Ø1.5 mm)[1] | | _7_ (Ø1.7 mm)[1] | | _4_ (Ø2 mm)[1] | | _6_ (Ø2.3 mm)[1] | |
| | | min | max | min | max | min | max | min | max | min | max |
| N_ _ | 11.2 | 2.2 | 2.7 | 5.0 | 6.1 | 6.5 | 7.8 | 8.7 | 10.7 | 11.5 | 14.0 |
| F_ _ | 14.4 | 2.2 | 2.7 | 5.0 | 6.1 | 6.4 | 7.8 | 8.2 | 10.7 | 8.8 | 11.4 |
| A_ _ | 18.2 | 2.2 | 2.7 | 5.0 | 6.1 | 6.3 | 7.8 | 6.5 | 9.5 | 5.7 | 8.6 |
| B_ _ | 21.4 | 1.9 | 2.7 | 3.5 | 5.4 | 4.3 | 6.5 | 4.4 | 7.0 | 4.4 | 7.1 |
| C_ _ | 24.6 | 1.6 | 2.7 | 2.1 | 4.3 | 2.3 | 4.9 | 3.3 | 4.5 | 3.7 | 6.0 |

| Pressure code | Spool shift pressure (bar) | Standard motor size |
|---|---|---|
| _ _2 | 6 | MCR3, MCR5, MCR6 |
| _ _6 | 8 | MCR10, MCR15 |

## Holding brake (multi-disc brake)

### Mounting

By way of rear housing and brake shaft.

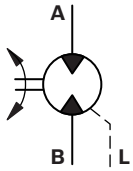
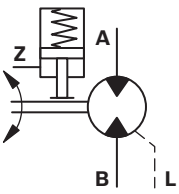
### Brake application

An optional parking brake is available to ensure that the motor cannot turn when the machine is not in use. This works on the principle of a Spring Applied Hydraulic Release (SAHR) Brake and is released when oil pressure is applied to brake port ‘Z’. In the event of a loss of hydraulics, the brake can be released manually. Refer to the operating manual RE15215-01-B for more information.

**Notice**

- The brakes are intended only for static use. Use of the brakes in a dynamic case will cause damage to the motor!
- Holding brake torques account for tolerances and are based on the use of standard mineral oil (HLP/HLVP to DIN 51524 ). Brake torque may be significantly lower when using fluids other than mineral oil. Brake hold performance must be confirmed on an application specific basis when using alternative fluids.

▼ **Schematic diagrams**

| Motor without brake | Motor with holding brake |
|---|---|
|  |  |





1) Code (orifice size)
2) Tolerance ±3 bar
3) For other pressures please contact Bosch Rexroth Engineering Dept, Glenrothes.

### Dynamic brake - caliper disc brake

Caliper brakes are available for MCR3F motors.
For further information contact Engineering department at Bosch Rexroth, Glenrothes.

### Speed sensor

A Hall-effect speed sensor may be fitted as an option. The sensors operate on the Hall-effect principle which detects a change in magnetic field flux across an airgap when a ferromagnetic gear tooth passes the sensor surface. Sensors can then be connected to a controller such as the Rexroth BODAS controller, in order to give information about the motor's speed and direction. Additionally, the latest speed sensors contain an NTC thermistor, enabling temperature measurement at the sensor location.

The sensor is located in a port in the motor's rear case and combined with a toothed target disk fitted to the motor's cylinder block.

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 PA). These "sensor-ready" motors may be fitted with a sensor later. The speed sensors available to use with the MCR motors are as follows:

- DST series 10 (Code PB), datasheet RE95131
- DSA1 series 20 (Code PC), datasheet RE95126
- DSA2 series 20 (Code PD), datasheet RE95126.

Please refer to the respective datasheets for more detailed information.

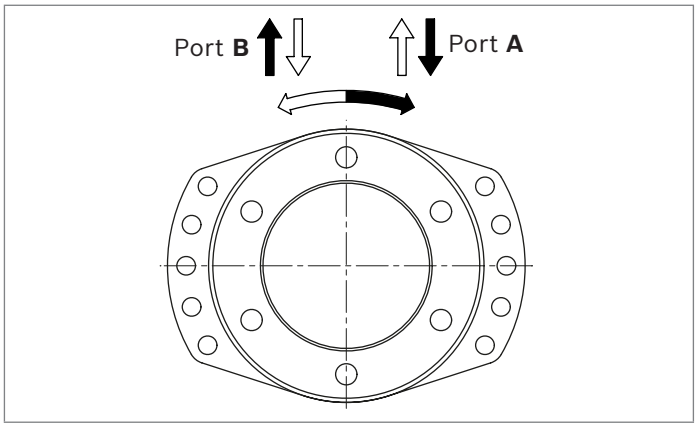
### Target Discs

The following table lists the resolutions of target disc available for each MCRF size.

| Motor size | Teeth number (Standard) | Teeth number (Upon request) |
|---|---|---|
| **MCR3** | 50 | 96 |
| **MCR5/MCR6** | 60 | 100 |
| **MCR10** | 72 | 100 |
| **MCR15** | 85 | – |

### Direction of shaft rotation with flow

(viewed from drive shaft)




### High flow

Certain applications require motors to run at higher speeds than are achievable using our standard motors. In such cases high flow motors can be used which have better flow characteristics which leads to lower power losses, especially at high speed. This allows higher motor speeds to be achieved for a given engine power.
This option is available with single speed MCR 5 motors.
For further information contact Bosch Rexroth Engineering Dept, Glenrothes.

## Ordering code

| 01 | 02 | 03 | 04 | 05 | 06 | | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MCR** | | **F** | | | **Z** | **/** | | | | | | | | | |

**Radial piston motor**

| | | |
|---|---|---|
| 01 | Radial-piston type, low-speed, high-torque motor | **MCR** |

**Frame size**

| | | | |
|---|---|---|---|
| 02 | Frame size | 3 | **3** |
| | | 5 | **5** |
| | | 6 | **6** |
| | | 10 | **10** |
| | | 15 | **15** |

**Housing type**

| | | |
|---|---|---|
| 03 | Rear case mounting flange | **F** |

**Nominal size, displacement $V_g$ in cm³/rev**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 04 | Frame size 3 | | **160** | **225** | **255** | **280** | **325** | **365** | **400** | |
| | Low displacement: motors use standard cylindrical pistons | LD | ● | ● | ● | ● | – | – | – | |
| | High displacement: motors use stepped pistons | HD | – | – | – | – | ● | ● | ● | |
| | Frame size 5 | | **380** | **470** | **520** | **565** | **620** | **680** | **750** | **820** |
| | Low displacement: motors use standard cylindrical pistons | LD | ● | ● | ● | ● | – | – | – | – |
| | High displacement: motors use stepped pistons | HD | – | – | – | – | ● | ● | ● | ● |
| | Frame size 6 | | **820** | **920** | | | | | | |
| | Low displacement: motors use standard cylindrical pistons | LD | – | – | | | | | | |
| | High displacement: motors use stepped pistons | HD | ● | ● | | | | | | |
| | Frame size 10 | | **785** | **865** | **940** | **1140** | **1250** | **1365** | | |
| | Low displacement: motors use standard cylindrical pistons | LD | ● | ● | ● | – | – | – | | |
| | High displacement: motors use stepped pistons | HD | – | – | – | ● | ● | ● | | |
| | Frame size 15 | | **1135** | **1260** | **1515** | **1795** | **2160** | | | |
| | Low displacement: motors use standard cylindrical pistons | LD | ● | ● | ● | – | – | | | |
| | High displacement: motors use stepped pistons | HD | – | – | – | ● | ● | | | |

| **Drive shaft** | | **MCR3** | **MCR5** | **MCR6** | **MCR10** | **MCR15** | |
|---|---|---|---|---|---|---|---|
| 05 | With flange ø180 mm | ● | ● | ● | – | – | **F180** |
| | With flange ø250 mm | – | ● | – | ● | – | **F250** |
| | With flange ø280 mm | – | – | – | – | ● | **F280** |

**Rear shaft**

| | | |
|---|---|---|
| 06 | Without rear shaft | **Z** |

**Series**

| | | |
|---|---|---|
| 07 | Series 32 | **32** |
| | Series 33 | **33** |

● = Available – = Not available

| 01 | 02 | 03 | 04 | 05 | 06 | | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MCR** | | **F** | | | **Z** | **/** | | | | | | | | | |

| **Brake** | | | **MCR3** | **MCR5** | **MCR6** | **MCR10** | **MCR15** | |
|---|---|---|---|---|---|---|---|---|
| 08 | Without brake | | ● | ● | – | ● | ● | **A0** |
| | Hydraulic release spring applied multi-disc holding brake | 2200 Nm | ● | ● | ● | – | – | **B2** |
| | | 4400 Nm | – | ● | ● | – | – | **B4** |
| | | 4400 Nm | – | – | ● | ● | – | **B5** |
| | | 7000 Nm | – | – | – | ● | – | **B7** |
| | | 11000 Nm | – | – | – | – | ● | **B11** |

| **Seals** | | |
|---|---|---|
| 09 | NBR (nitrile rubber) | **M** |
| | FKM (fluoroelastomer / Viton) | **V** |

| **Single/two-speed operation** | | **MCR3** | **MCR5** | **MCR6** | **MCR10** | **MCR15** | |
|---|---|---|---|---|---|---|---|
| 10 | Single speed, standard direction of rotation | ● | ● | – | ● | ● | **1L** |
| | Bi-directional two speed, standard direction of rotation | ● | ● | ● | ● | – | **2WL** |
| | **Switchable two speed, anti-clockwise direction of rotation** | – | – | – | – | ● | **2L** |
| | **Switchable two speed, clockwise directon of rotation** | – | – | – | – | ● | **2R** |

| **Ports** | | **MCR3** | **MCR5** | **MCR6** | **MCR10** | **MCR15** | |
|---|---|---|---|---|---|---|---|
| 11 | Tapped with BSP thread (ISO 228-1) | ● | ● | ● | – | – | **01** |
| | Tapped with BSP thread (ISO 228-1) | – | – | – | ● | ● | **11** |
| | Tapped with UNF thread (ISO 11926-1) | ● | ● | ● | – | – | **12** |
| | Tapped with UNF thread (ISO 11926-1)<br>A and B ports split flange metric bolt holes (SAE J518C) | – | – | – | ● | ● | **42** |

| **Studs**[1)] | | |
|---|---|---|
| 12 | Without studs (no code) | |
| | With wheel studs | **W** |

| **Flushing** | | |
|---|---|---|
| 13 | Without flushing (no code) | |
| | Cracking Pressure code (see table on page 4) | ***__** |
| | Orifice Size code (see table on page 4) | **_*_** |
| | Spool shift pressure code (see table on page 4) | **__*** |

| **Speed sensor** | | |
|---|---|---|
| 14 | Without sensor (no code) | |
| | Speed sensor ready (DST series 10, DSA series 20) | **PA** |
| | DST series 10 | **PB** |
| | DSA1 series 20 | **PC** |
| | DSA2 series 20 | **PD** |

| **Special order** | | |
|---|---|---|
| 15 | Special feature | ********** |

● = Available – = Not available

1) Range of wheel nuts can be offered as a separate order upon request from Bosch Rexroth Engineering Dept, Glenrothes

## Technical data

| **Frame size** | | | **MCR3** | **MCR5** | **MCR6** | **MCR10** | **MCR15** | | |
|---|---|---|---|---|---|---|---|---|---|
| Type of mounting | | | Flange mounting | | | | | | |
| Pipe connections[1)2)] | | | Threaded per ISO 11926-1 and ISO228-1; Flanged per SAE J518-2 | | | | | | |
| Shaft loading | | | see page 11 | | | | | | |
| Weight | | | | | | | | | |
| Single speed (1L) | $m$ | kg | 21 | 38 | – | 65 | 95 | | |
| Two speed (2WL, 2L and 2R) | $m$ | kg | 26 | 46 | 53 | 70 | 95 | | |
| Hydraulic fluid[3)] | | | Mineral oil type HLP/HLVP to DIN 51524 | | | | | | |
| Fluid cleaniness | | | ISO 4406, Class 20/18/15 | | | | | | |
| Fluid viscosity range | $v_{min/max}$ | mm²/s | 10 to 2000 | | | | | | |
| Fluid temperature range[8)] | $\theta_{min/max}$ | °C | -20 to +100 | | | | | | |
| Pressure | | | Low displacement | | | | High displacement | | |
| Maximum differential pressure[4)5)] | $\Delta p_{max}$ | bar | 450 | | | | 400 | | |
| Maximum pressure at port **A** or **B**[4)5)] | $p_{max}$ | bar | 470 | | | | 420 | | |
| Maximum case drain pressure | $p_{case\ max}$ | bar | 10 | | | | 10 | | |
| **Motor performance MCR3** | | | | | | | | | |
| Displacement | $V_g$ | cm³/rev | **160** | **225** | **255** | **280** | **325** | **365** | **400** |
| Specific torque | | Nm/bar | 3 | 4 | 4 | 4 | 5 | 6 | 6 |
| Maximum torque[4)] | $T_{max}$ | Nm | 1146 | 1611 | 1826 | 2005 | 2069 | 2324 | 2546 |
| Minimum speed for smooth running | $n_{min}$ | rpm | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** |
| Maximum speed (1L)[6)7)] | $n_{max}$ | rpm | **670** | **475** | **420** | **385** | **330** | **295** | **270** |
| Maximum speed (2WL)[6)7)] | $n_{max}$ | rpm | **875** | **620** | **550** | **500** | **430** | **385** | **350** |
| **Motor performance MCR5** | | | | | | | | | |
| Displacement | $V_g$ | cm³/rev | 380 | 470 | 520 | 565 | 620 | 680 | 750 | 820 |
| Specific torque | | Nm/bar | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Maximum torque[4)] | $T_{max}$ | Nm | 2722 | 3366 | 3724 | 4047 | 3947 | 4329 | 4775 | 5220 |
| Minimum speed for smooth running | $n_{min}$ | rpm | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Maximum speed (1L)[6)7)] | $n_{max}$ | rpm | 475 | 385 | 350 | 320 | 290 | 265 | 240 | 220 |
| High flow motors maximum speed (1L) | $n_{max}$ | rpm | 570 | 465 | 420 | 385 | 350 | 320 | 290 | 265 |
| Maximum speed (2WL)[6)7)] | $n_{max}$ | rpm | 570 | 465 | 420 | 385 | 350 | 320 | 290 | 265 |
| **Motor performance MCR6F** | | | | | | | | | |
| Displacement | $V_g$ | cm³/rev | | | | | 820 | 920 | |
| Specific torque | | Nm/bar | | | | | 13 | 15 | |
| Maximum torque[4)] | $T_{max}$ | Nm | | | | | 5220 | 5857 | |
| Minimum speed for smooth running | $n_{min}$ | rpm | | | | | 0.5 | 0.5 | |
| Maximum speed (1L)[6)7)] | $n_{max}$ | rpm | | | | | 230 | 205 | |
| Maximum speed (2WL)[6)7)] | $n_{max}$ | rpm | | | | | 250 | 250 | |
| **Motor performance MCR10** | | | | | | | | | |
| Displacement | $V_g$ | cm³/rev | 785 | 865 | 940 | | 1140 | 1250 | 1365 |
| Specific torque | | Nm/bar | 12 | 14 | 15 | | 18 | 20 | 22 |
| Maximum torque[4)] | $T_{max}$ | Nm | 5622 | 6195 | 6732 | | 7257 | 7958 | 8690 |
| Minimum speed for smooth running | $n_{min}$ | rpm | 0.5 | 0.5 | 0.5 | | 0.5 | 0.5 | 0.5 |
| Maximum speed (1L and 2WL)[6)7)] | $n_{max}$ | rpm | 215 | 195 | 178 | | 150 | 135 | 125 |
| **Motor performance MCR15** | | | | | | | | | |
| Displacement | $V_g$ | cm³/rev | 1135 | 1260 | 1515 | | 1795 | 2160 | |
| Specific torque | | Nm/bar | 18 | 20 | 24 | | 29 | 34 | |
| Maximum torque[4)] | $T_{max}$ | Nm | 8129 | 9024 | 10850 | | 11427 | 13751 | |
| Minimum speed for smooth running | $n_{min}$ | rpm | 0.5 | 0.5 | 0.5 | | 0.5 | 0.5 | |
| Maximum speed (1L, 2L and 2R)[6)7)] | $n_{max}$ | rpm | 145 | 130 | 110 | | 90 | 75 | |

| | | | MCR3 | MCR5 | | MCR10 | | MCR15 |
|---|---|---|---|---|---|---|---|---|
| Holding brake (disc brake) | | | **B2** | **B2** | **B4** | **B5** | **B7** | **B11** |
| Minimum holding torque | $t_{min/max}$ | Nm | 2200 | 2200 | 4400 | 4400 | 7000 | 11000 |
| Release pressure (min) | $p_{rel\ min}$ | bar | 11 | 11 | 11 | 11 | 11 | 12 |
| Release pressure (max) | $p_{rel\ max}$ | bar | 15 | 15 | 15 | 15 | 15 | 15 |
| Maximum pressure at brake port „**Z**“ | $p_{max}$ | bar | 40 | 40 | 40 | 30 | 30 | 30 |
| Oil volume to operate brake | $V_{rel}$ | $cm^3$ | 23 | 23 | 46 | 17 | 36 | 77 |

**Notice**

- Maximum motor torque values are based on theoretical calculations.
- Efficiencies are not taken into consideration for theoretical calculations.
- For MCR20 frame size, please refer MCR-C data sheet (15197).

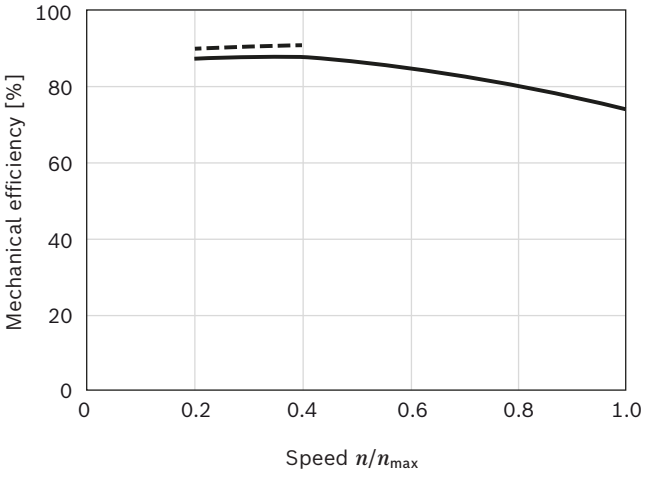
Please refer the related foot notes for more details.

Footer from page 8 and 9

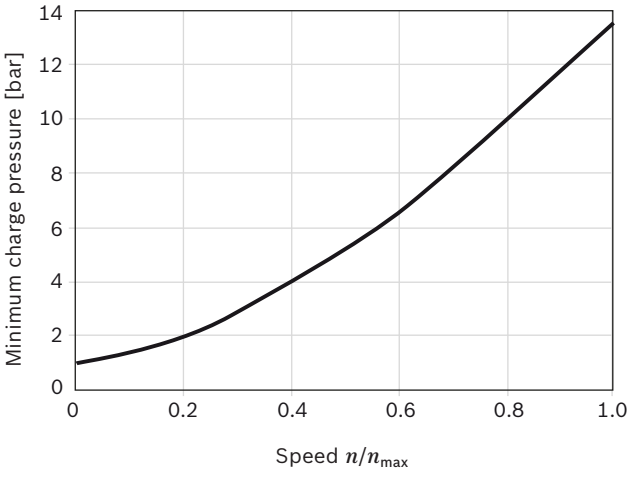
1) Ensure motor case is filled with oil prior to start-up. See instruction manual 15215-B.
2) For installation and maintenance details, please see instruction manual 15215-B.
3) For more information on hydraulic fluids see datasheet 90220.
4) Maximum values should only be applied for a small portion of the duty cycle. Please consult Bosch Rexroth Engineering. Department in Glenrothes for motor life calculations based on particular operating cases.
5) When operating motors in series, please consult Bosch 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) Providing that fluid viscosity limits are adhered to.

## Efficiencies

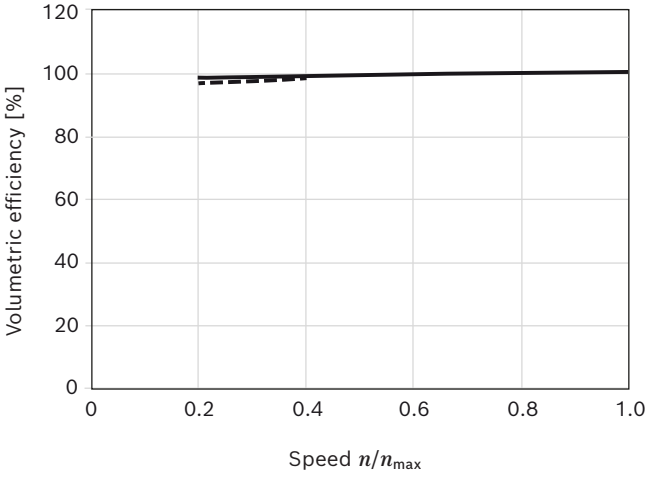
▼ **Mechanical efficiency**




▼ **Charge pressure**




▼ **Volumetric efficiency**




**Notice**

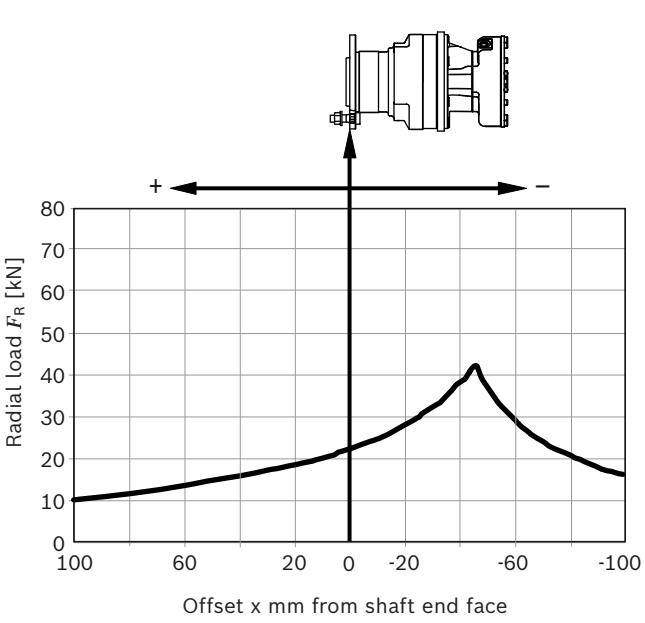
- For specific performance information or operating conditions contact the Engineering Department at Bosch Rexroth, Glenrothes.
- If the correct charge pressure is not maintained and the motor is starved of oil, the motor may go into free wheel mode!

## Permitted loading on drive shaft

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

**Drive shaft ...3F F180...**

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



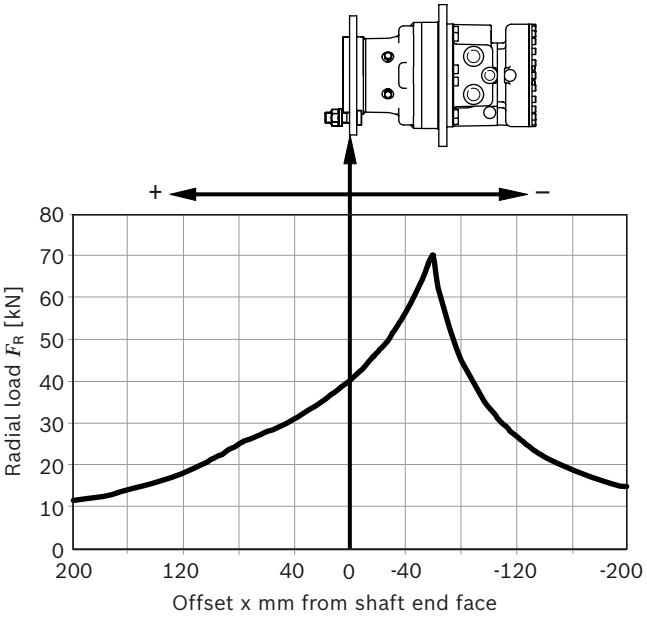

Maximum axial load $F_{ax\,max}$ (with radial load $F_R$ = 0):

$F_{ax\,max}$ = 18300 N ← +

$F_{ax\,max}$ = 28000 N → –

**Drive shaft ...5F F250...**

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



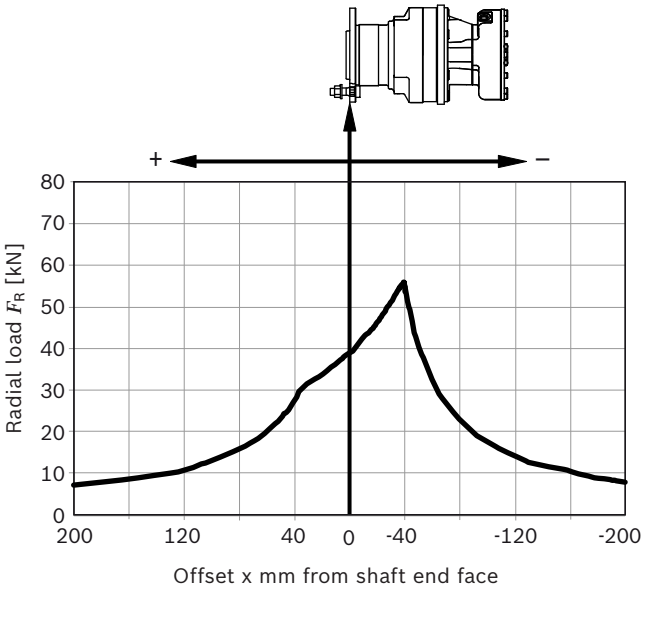

Maximum axial load $F_{ax\,max}$ (with radial load $F_R$ = 0):

$F_{ax\,max}$ = 37500 N ← +

$F_{ax\,max}$ = 36800 N → –

**Drive shaft ...5F F180...**

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



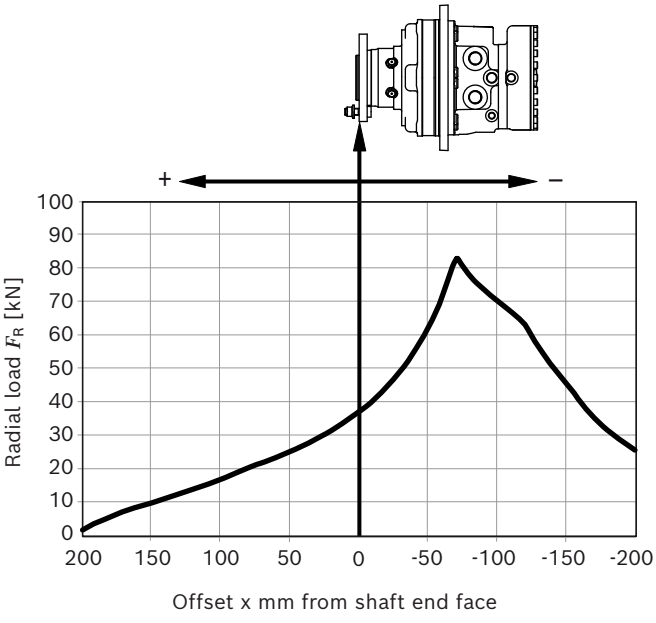

Maximum axial load $F_{ax\,max}$ (with radial load $F_R$ = 0):

$F_{ax\,max}$ = 37500 N ← +

$F_{ax\,max}$ = 36800 N → –

**Drive shaft ...6F F180...**

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



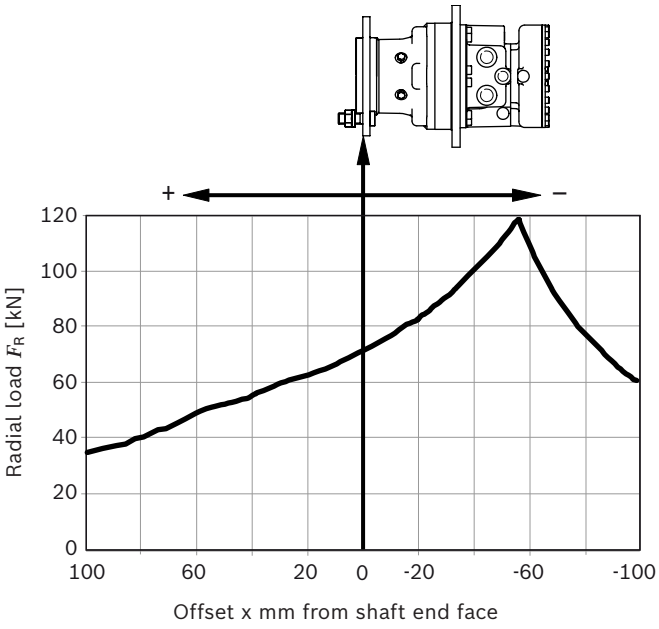

Maximum axial load $F_{ax\,max}$ (with radial load $F_R$ = 0):

$F_{ax\,max}$ = 31000 N ← +

$F_{ax\,max}$ = 35500 N → –

**Drive shaft ...10F F250...**

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



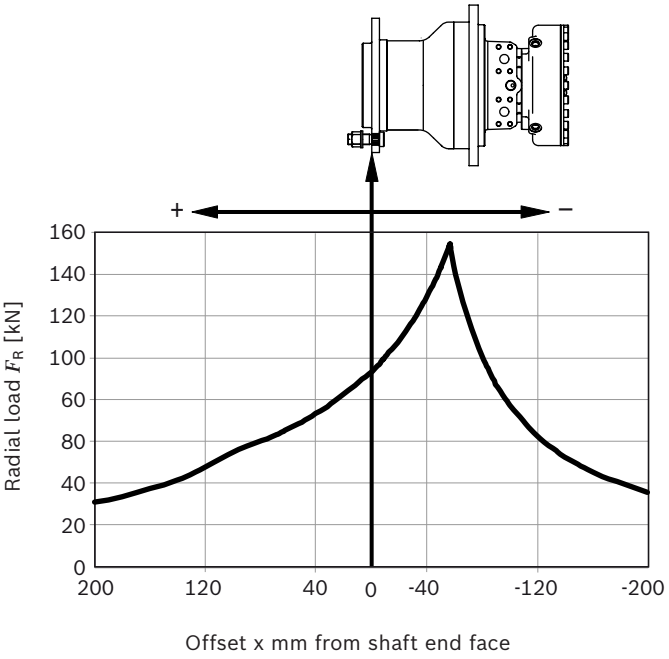

Maximum axial load $F_{ax\,max}$ (with radial load $F_R$ = 0):

$F_{ax\,max}$ = 76100 N ← +

$F_{ax\,max}$ = 67400 N → –

**Drive shaft ...15F F280...**

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




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

$F_{ax\,max}$ = 95400 N ← +

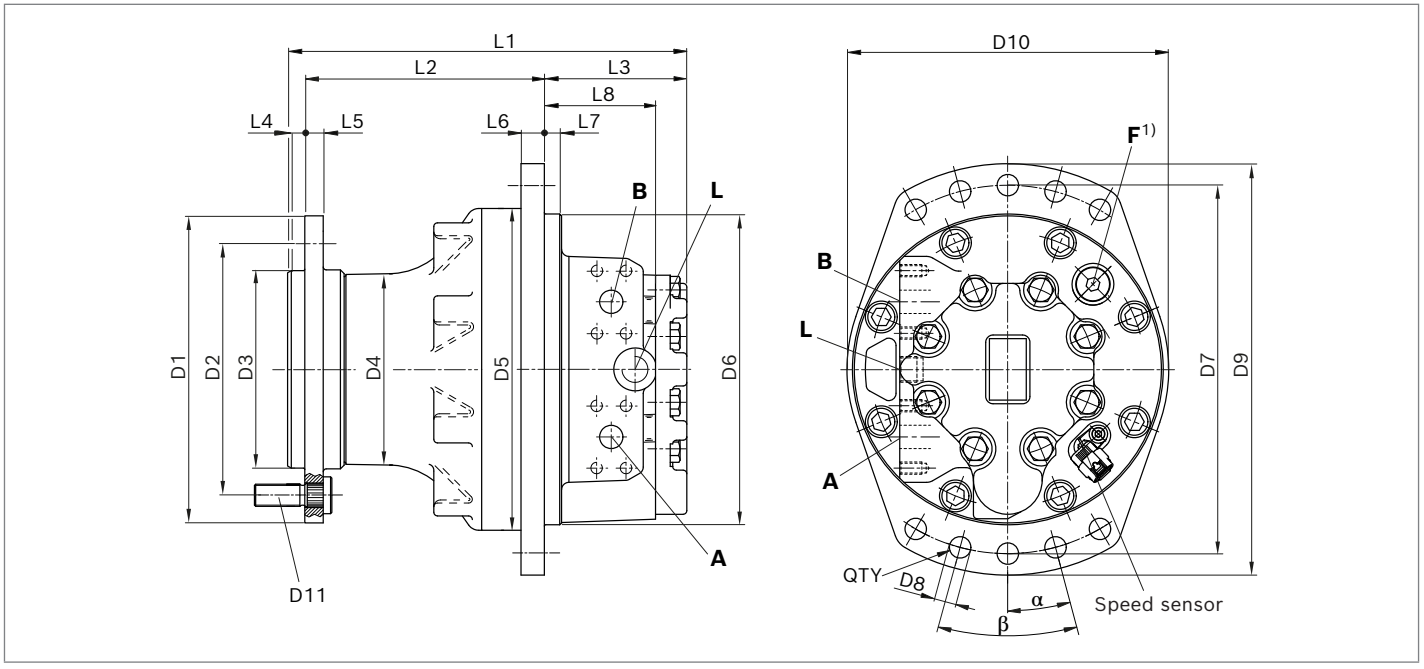
$F_{ax\,max}$ = 88700 N → –

**Notice**

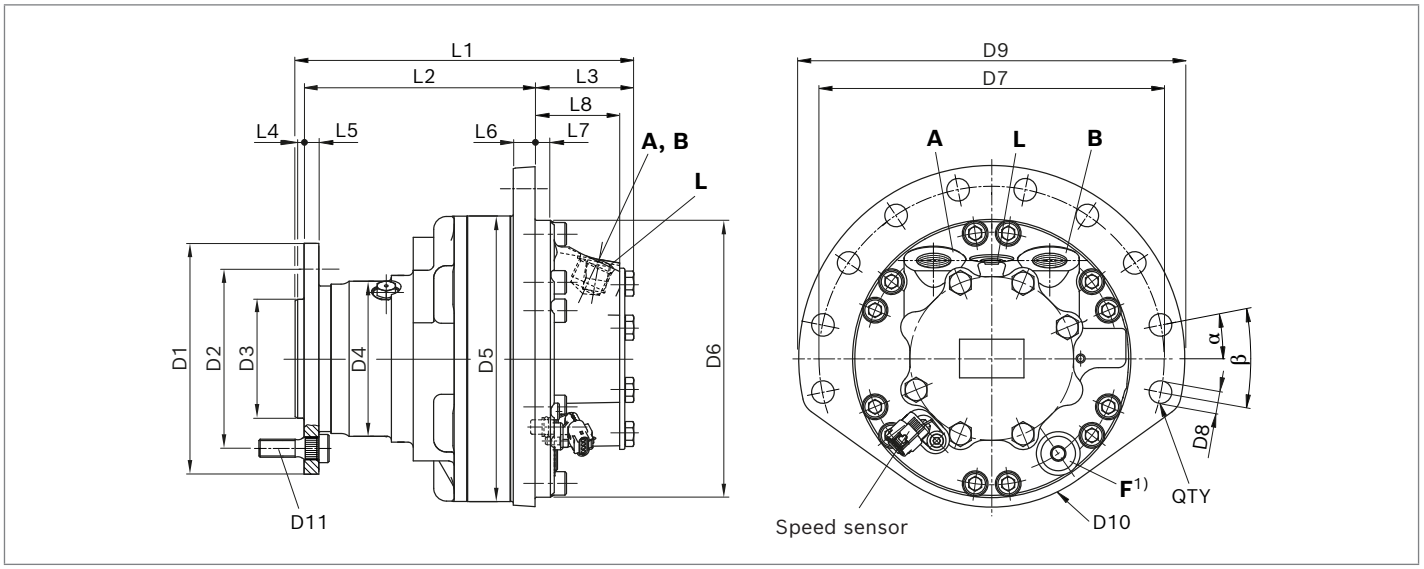
- These values and graphs are for initial guidance only
- For actual motor life calculations under typical or specified duty cycles, contact the Engineering Department at Bosch Rexroth, Glenrothes.

## Dimensions

### MCR3F, MCR10F and MCR15F single speed (1L)




### MCR5F single speed (1L)




| Motor | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 | D9 | D10 | D11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **MCR3** | ø172.5 | ø140 | ø92.7 | – | ø180 | ø180 | ø210 | ø14 | ø237 | ø190 | 5×M14×1.5 |
| **MCR5** | ø180 | ø140 | ø92.7 | ø116.5 | ø223 | ø215.95 | ø267 | ø17.4 | ø298 | ø228 | 10×M14×1.5 |
| **MCR10** | ø250 | ø205 | ø160.8 | ø162 | ø264 | ø253 | ø300 | ø17.5 | ø335 | ø264 | 6×M18×1.5 |
| **MCR15** | ø280 | ø225 | ø175.8 | ø190 | ø304 | ø285 | ø335 | ø22.4 | ø375 | – | 10×M22×1.5 |

| Motor | L1 | L2 | L3 | L4 | L5 | L6 | L7 | L8 | α | β | QTY |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **MCR3** | 215.6 | 143.6 | 65 | 5 | 12 | 13 | 6 | 54 | 0° | 15° | 10 |
| **MCR5** | 264.1 | 180 | 77 | 5 | 11.5 | 17 | 12 | 66 | 11.25° | 22.5° | 10 |
| **MCR10** | 304.6 | 195 | 95.5 | 14.1 | 15 | 19 | 12.5 | 90.5 | 0° | 15° | 10 |
| **MCR15** | 334 | 219.4 | 98.9 | 14 | 16 | 36.5 | 9 | 73.4 | 10° | 20° | 8 |

Before finalising your design, request a specific installation drawing. Dimensions may vary from the data sheet.

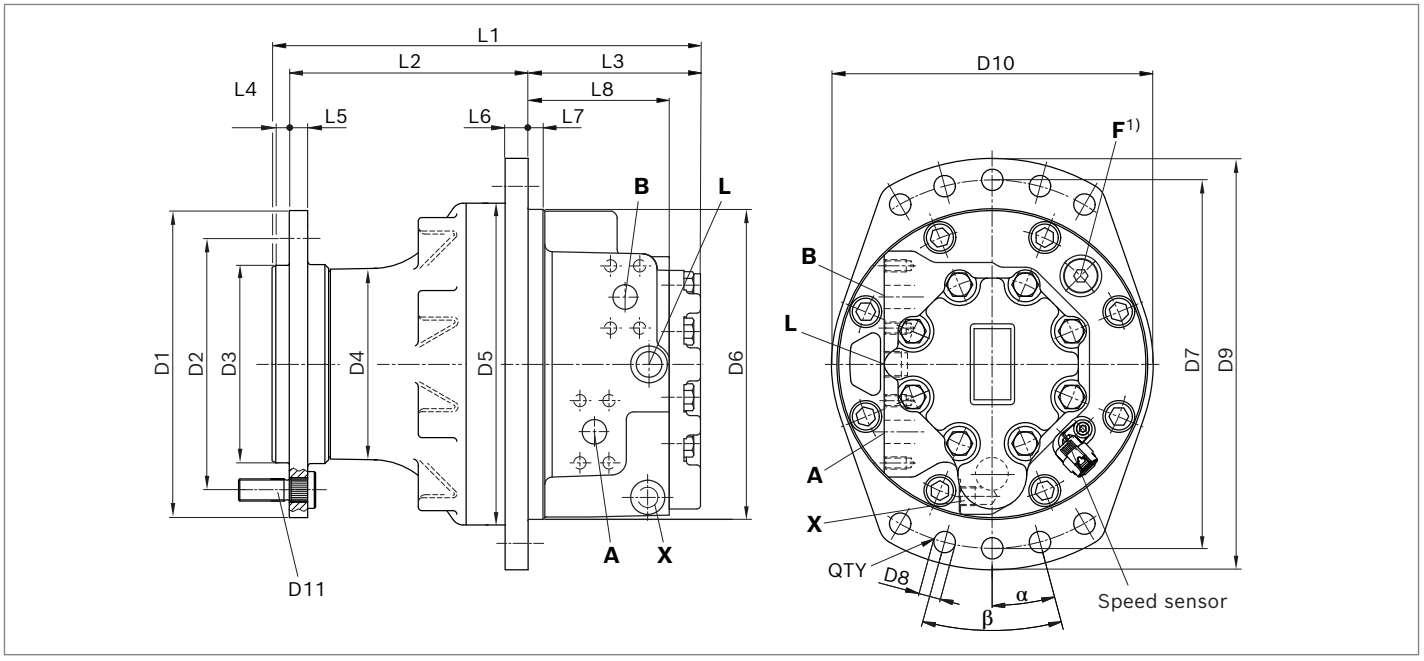
1) Filler port can be requested as a special option

## Ports

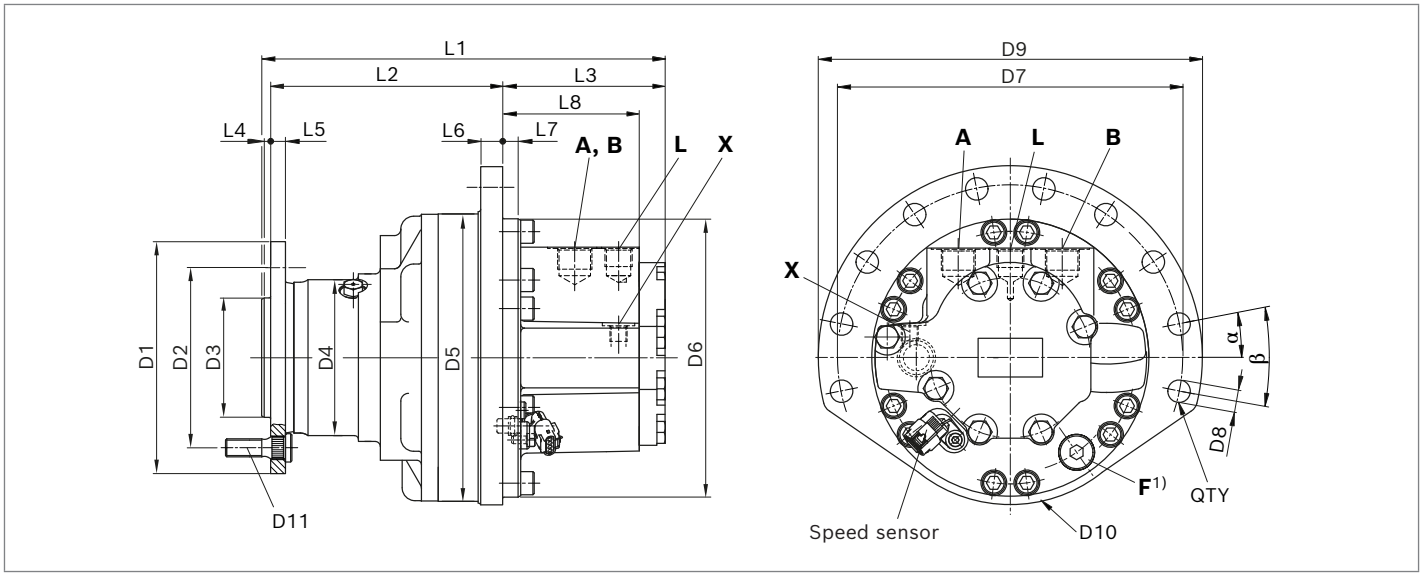
| Motor | Designation | Port function | SAE Ports | | BSP Ports | | $p_{max}$ [bar] | State[3] |
|---|---|---|---|---|---|---|---|---|
| | | | Standard | Size | Standard | Size | | |
| **MCR3** | **A, B** | Inlet, outlet | ISO 11926-1 | 7/8-14 UNF | ISO 228-1 | 1/2 BSP | 470/420[2] | O |
| | **L** | Case drain | ISO 11926-1 | 9/16-18 UNF | ISO 228-1 | 3/8 BSP | 10 | O |
| | **F**[1] | Filler port | ISO 11926-1 | 3/4-16 UNF | ISO 228-1 | 1/2 BSP | 10 | X |
| **MCR5** | **A, B** | Inlet, outlet | ISO 11926-1 | 1 1/16-12 UNF | ISO 228-1 | 3/4 BSP | 470/420[2] | O |
| | **L** | Case drain | ISO 11926-1 | 3/4-16 UNF | ISO 228-1 | 3/8 BSP | 10 | O |
| | **F**[1] | Filler port | ISO 11926-1 | 3/4-16 UNF | ISO 228-1 | 1/2 BSP | 10 | X |
| **MCR10** | **A, B** | Inlet, outlet | SAE J518C | 3/4 in | SAE J518-2 | 3/4 in | 420 | O |
| | **L** | Case drain | ISO 11926-1 | 3/4-16 UNF | ISO 228-1 | 1/2 BSP | 10 | O |
| | **F**[1] | Filler port | ISO 11926-1 | 3/4-16 UNF | ISO 228-1 | 1/2 BSP | 10 | X |
| **MCR15** | **A, B** | Inlet, outlet | SAE J518C | 3/4 in | SAE J518-2 | 3/4 in | 420 | O |
| | **L** | Case drain | ISO 11926-1 | 3/4-16 UNF | ISO 228-1 | 1/2 BSP | 10 | O |
| | **F**[1] | Filler port | ISO 11926-1 | 3/4-16 UNF | ISO 228-1 | 1/2 BSP | 10 | X |

1) Filler port can be requested as a special option
2) Depends on displacement
3) O = Must be connected (plugged on delivery)
X = Metal plug fitted (in normal operation)

### MCR3F, MCR10F and MCR15F two speed (2WL, 2L and 2R)




### MCR5F and MCR6F two speed (2WL)




| Motor | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 | D9 | D10 | D11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **MCR3** | ø172 | ø140 | ø92.7 | – | ø180 | ø180 | ø210 | ø14 | ø237 | ø190 | 5×M14×1.5 |
| **MCR5** | ø180 | ø140 | ø92.7 | ø116.5 | ø223 | ø216 | ø267 | ø17.5 | ø297 | ø228 | 10×M14×1.5 |
| **MCR6** | ø180 | ø140 | ø92.7 | ø121 | ø238.25 | ø235.85 | ø267 | ø17.5 | ø299.7 | ø230.7 | 10×M14×1.5 |
| **MCR10** | ø250 | ø205 | ø160.8 | ø162 | ø264 | ø253 | ø300 | ø17.5 | ø330 | ø262 | 6×M18×1.5 |
| **MCR15** | ø280 | ø225 | ø175.8 | ø190 | ø304 | ø285 | ø335 | ø22.4 | ø375 | – | 10×M22×1.5 |

| Motor | L1 | L2 | L3 | L4 | L5 | L6 | L7 | L8 | α | β | QTY |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **MCR3** | 274.1 | 143.5 | 123.5 | 5 | 12 | 13 | 6 | 105.5 | 0° | 15° | 10 |
| **MCR5** | 313.8 | 180 | 126.7 | 5 | 11.5 | 17 | 12 | 103.7 | 11.25° | 22.5° | 10 |
| **MCR6** | 317.3 | 183 | 127.2 | 7 | 16.5 | 17 | 12 | 103.7 | 11.25° | 22.5° | 10 |
| **MCR10** | 350 | 195 | 141 | 13 | 15 | 19 | 12.5 | 115.5 | 0° | 15° | 10 |
| **MCR15** | 334 | 219.4 | 98.9 | 14 | 16 | 36.5 | 9 | 73.4 | 10° | 20° | 8 |

Before finalising your design, request a specific installation drawing. Dimensions may vary from the data sheet.

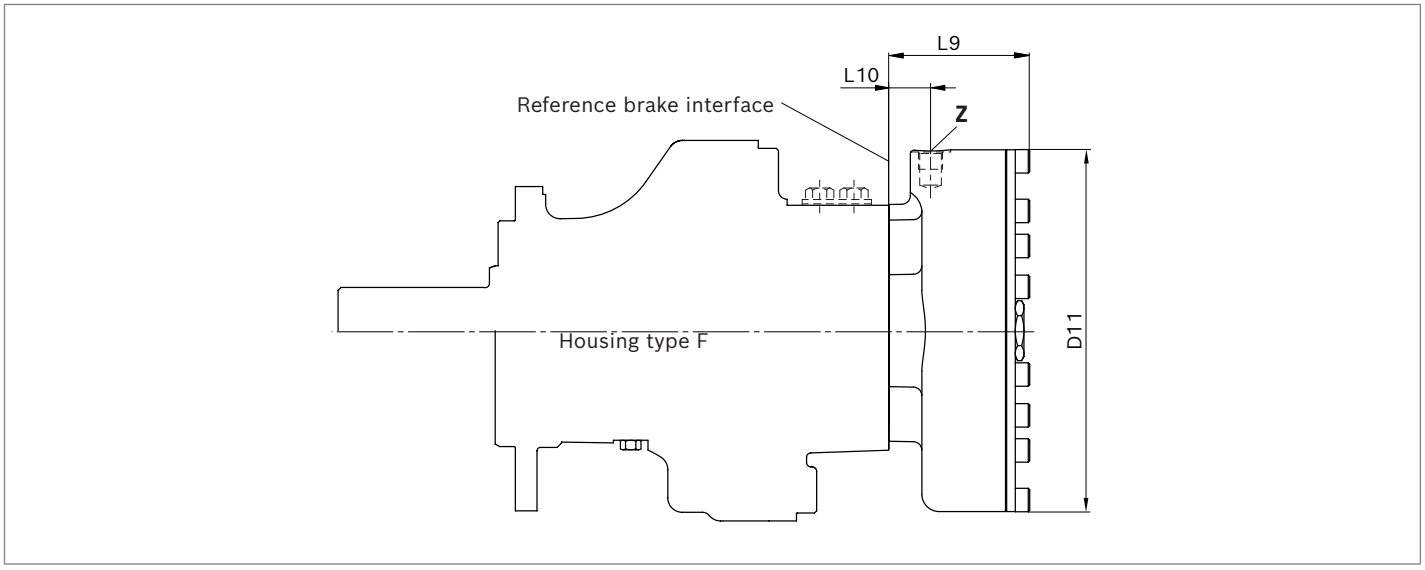
1) Filler port can be requested as a special option

## Ports

| Motor | Designation | Port function | SAE Ports | | BSP Ports | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Standard | Size | Standard | Size | $p_{max}$ [bar] | State[3] |
| **MCR3** | **A, B** | Inlet, outlet | ISO 11926-1 | 1 1/16-12 UNF | ISO 228-1 | 3/4 BSP | 470/420[2] | O |
| | **L** | Case drain | ISO 11926-1 | 9/16-18 UNF | ISO 228-1 | 3/8 BSP | 10 | O |
| | **F**[1] | Filler port | ISO 11926-1 | 3/4-16 UNF | ISO 228-1 | 1/2 BSP | 10 | X |
| | **X** | 2 speed port | ISO 11926-1 | 9/16-18 UNF | ISO 228-1 | 1/4 BSP | 35 | O |
| **MCR5** | **A, B** | Inlet, outlet | ISO 11926-1 | 1 1/16-12 UNF | ISO 228-1 | 3/4 BSP | 470/420[2] | O |
| | **L** | Case drain | ISO 11926-1 | 3/4-16 UNF | ISO 228-1 | 3/8 BSP | 10 | O |
| | **F**[1] | Filler port | ISO 11926-1 | 3/4-16 UNF | ISO 228-1 | 1/2 BSP | 10 | X |
| | **X** | 2 speed port | ISO 11926-1 | 9/16-18 UNF | ISO 228-1 | 1/4 BSP | 35 | O |
| **MCR6** | **A, B** | Inlet, outlet | ISO 11926-1 | 1 1/16-12 UNF | SAE J518C | 3/4 BSP | 420 | O |
| | **L** | Case drain | ISO 11926-1 | 3/4-16 UNF | ISO 228-1 | 1/2 BSP | 10 | O |
| | **F**[1] | Filler port | ISO 11926-1 | 3/4-16 UNF | ISO 228-1 | 1/2 BSP | 10 | X |
| | **X** | 2 speed port | ISO 11926-1 | 9/16-18 UNF | ISO 228-1 | 1/4 BSP | 35 | O |
| **MCR10** | **A, B** | Inlet, outlet | SAE J518C | 3/4 in | SAE J518C | 3/4 in | 420 | O |
| | **L** | Case drain | ISO 11926-1 | 3/4-16 UNF | ISO 228-1 | 1/2 BSP | 10 | O |
| | **F**[1] | Filler port | ISO 11926-1 | 3/4-16 UNF | ISO 228-1 | 1/2 BSP | 10 | X |
| | **X** | 2 speed port | ISO 11926-1 | 9/16-18 UNF | ISO 228-1 | 3/8 BSP | 35 | O |
| **MCR15** | **A, B** | Inlet, outlet | SAE J518C | 3/4 in | SAE J518C | 3/4 in | 420 | O |
| | **L** | Case drain | ISO 11926-1 | 3/4-16 UNF | ISO 228-1 | 1/2 BSP | 10 | O |
| | **F**[1] | Filler port | ISO 11926-1 | 3/4-16 UNF | ISO 228-1 | 1/2 BSP | 10 | X |
| | **X** | 2 speed port | ISO 11926-1 | 9/16-18 UNF | ISO 228-1 | 3/8 BSP | 35 | O |

1) Filler port can be requested as a special option
2) Depends on displacement
3) O = Must be connected (plugged on delivery)
X = Metal plug fitted (in normal operation)

**Holding brake (multi-disc brake)**




| Motor | Brake | L9 | L10 | D11 |
|---|---|---|---|---|
| **MCR3** | **B2** | 67.3 | 22 | ø174 |
| **MCR5** | **B2** | 67.3 | 22 | ø174 |
| | **B4** | 80.7 | **26.5** | ø215 |
| **MCR6** | **B4** | 80.7 | **26.5** | ø215 |
| **MCR10** | **B5** | 84.7 | 26.5 | ø215 |
| | **B7** | 97.8 | 29 | ø251 |
| **MCR15** | **B11** | 102.3 | 33 | ø282 |

| | | | SAE Ports | | BSP Ports | | | |
|---|---|---|---|---|---|---|---|---|
| **Motor** | **Designation** | **Port function** | **Standard** | **Size** | **Standard** | **Size** | **$p_{max}$ [bar]** | **State**[1)] |
| **MCR3** | **Z** | Brake port | ISO 11926-1 | 9/16-18 UNF | ISO 228-1 | 1/4 BSP | 40 | O |
| **MCR5** | **Z** | Brake port | ISO 11926-1 | 9/16-18 UNF | ISO 228-1 | 1/4 BSP | 40 | O |
| **MCR6** | **Z** | Brake port | ISO 11926-1 | 9/16-18 UNF | ISO 228-1 | 1/4 BSP | 40 | O |
| **MCR10** | **Z** | Brake port | ISO 11926-1 | 9/16-18 UNF | ISO 228-1 | 3/8 BSP | 30 | O |
| **MCR15** | **Z** | Brake port | ISO 11926-1 | 9/16-18 UNF | ISO 228-1 | 3/8 BSP | 30 | O |

1) O = Must be connected (plugged on delivery)

Before finalising your design, request a specific installation drawing. Dimensions may vary from the data sheet.

## Project Planning Notes

- The project planning, installation and commissioning of the MCR motor should only be carried out by competent personnel.
- Before using the Radial Piston Motor read the MCR Instruction Manual RE15215-01-B.
- Before finalising your machine design request a binding Installation Drawing from the Engineering Department at Bosch Rexroth, Glenrothes.
- The limitations specified in this datasheet must not be exceeded unless authorisation has been given by the Engineering Department at Bosch Rexroth, Glenrothes.
- Unauthorised modification to parts of the MCR may affect the motors integrity & performance and could create a hazard to personnel or property.
- Holding brake torques account for tolerances and are based on the use of standard mineral oil (HLP/HLVP to DIN 51524 ). Brake torque may be significantly lower when using fluids other than mineral oil. Brake hold performance must be confirmed on an application specific basis when using alternative fluids.

## Selection guide

| Data sheet | Motor type<br>Application | | Frame size<br>3<br>160 cc to 400 cc | 4<br>260 cc to 470 cc | 5<br>380 cc to 820 cc | 6<br>820 cc to 920 cc | 8<br>1030 cc to 1130 cc | 10<br>780 cc to 1340 cc | 15<br>1130 cc to 2150 cc | 20<br>1750 cc to 3000 cc |
|---|---|---|---|---|---|---|---|---|---|---|
| 15198 | **MCR-F**<br>Wheel drives |  | ● | – | ● | ● | – | ● | ● | – |
| 15200 | **MCR-W**<br>Heavy duty wheel drives |  | ● | – | ● | – | – | ● | – | ● |
| 15197 | **MCR-C**<br>Compact drives |  | – | – | – | – | – | – | – | ● |
| 15195 | **MCR-A**<br>Frame integrated drives |  | ● | – | ● | – | – | ● | ● | – |
| 15226 | **MCR-S**<br>Chain drives |  | – | ● | – | – | – | – | – | – |
| 15221 | **MCR-T**<br>Track drives |  | – | – | ● | ● | ● | ● | – | – |
| 15199 | **MCR-H**<br>Integrated drives |  | ● | – | ● | – | – | ● | ● | ● |
| 15223 | **MCR-R Series 41**<br>Hydraulic drive assist |  | – | – | – | – | – | ● | – | – |
| 15196 | **MCR-D**<br>Industrial applications |  | ● | – | ● | – | – | ● | – | – |
| | **MCR-E**<br>Industrial applications |  | – | – | ● | – | – | – | – | – |

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