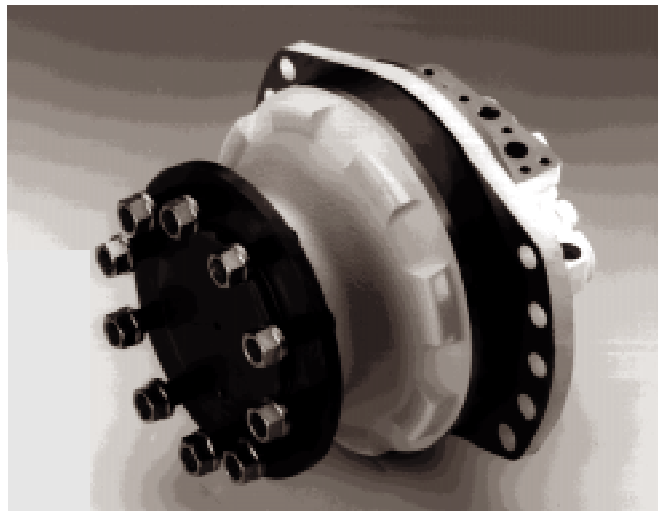


<b>MANNESMANN REXROTH</b>	<b>Hydraulic Motor (Radial Piston Multiple Stroke) Type MCR 20, Series 3X</b>				<b>RE 15 209/03.95</b>  Replaces: 15 217
	Size 1750 to 3000	to 450 bar	to 3000 cm <sup>3</sup>	to 17043 Nm	

**Characteristics:**

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



H/A 2387  
Type MCR 20 C...

**Contents**

Description	Page
Functional description	1 & 2
Ordering codes, symbols	3
Technical data, general	4
Technical data	5
Unit dimensions, radial loads	6
Unit dimensions, brake B19	7

**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.

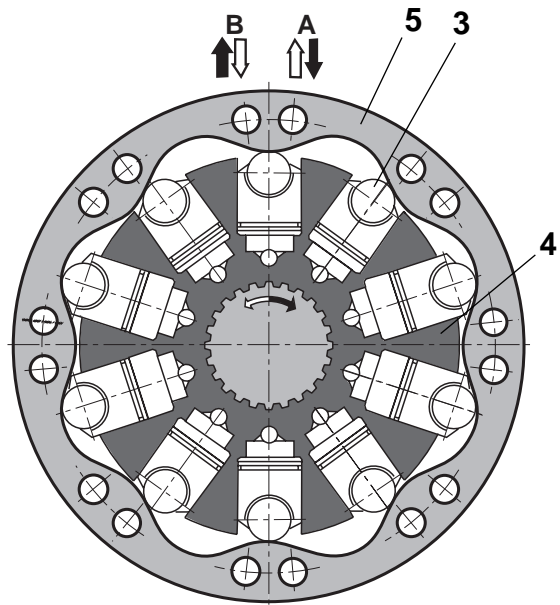
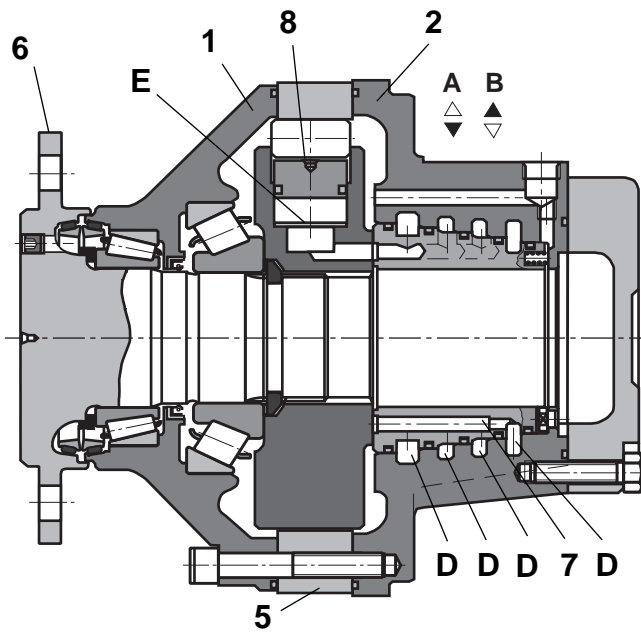
**Open circuit**

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.

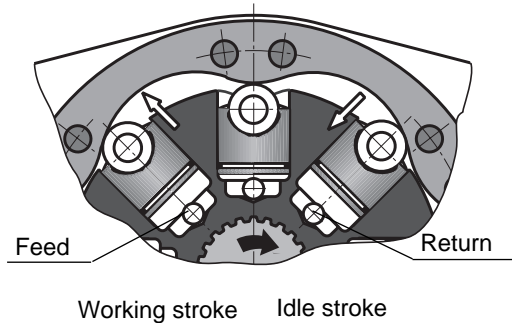
**Construction**

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.

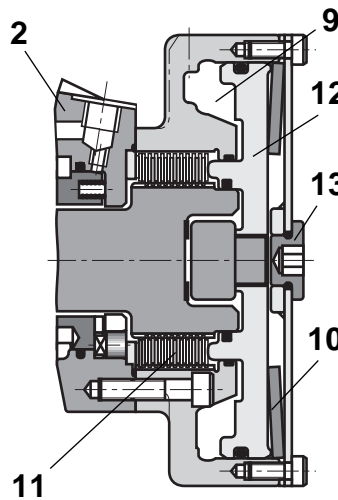
**Freewheeling**

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.

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



**Mounting:**

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

**Brake application**

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

**Brake release**

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

**Ordering codes**

MCR	20	C			Z -3X/	M /			*
-----	----	---	--	--	--------	-----	--	--	---

Further details  
in clear text

**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,  
**2W =** switchable displacement

**Seals**

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

**Brake mounting**

**AO =** without brake  
**B19 =** hydraulic holding brake (spring pressure disc brake)

**Sizes/Displacement V**

Size 1750	= 1750 cm <sup>3</sup>	= 1750
Size 2100	= 2100 cm <sup>3</sup>	= <b>2100</b>
Size 2500	= 2500 cm <sup>3</sup>	= <b>2500</b>
Size 3000	= 3000 cm <sup>3</sup>	= <b>3000</b>

**1st shaft end**

with flange 280 = **F 280**

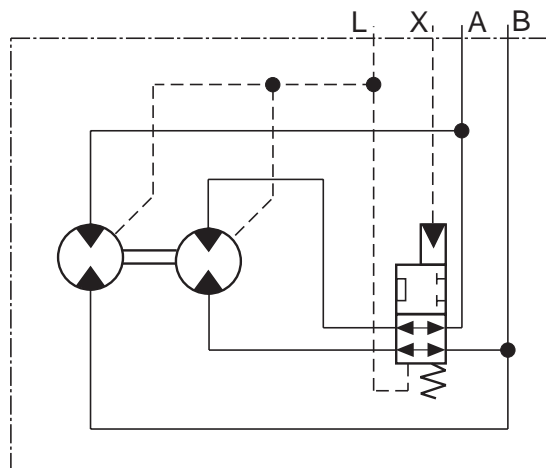
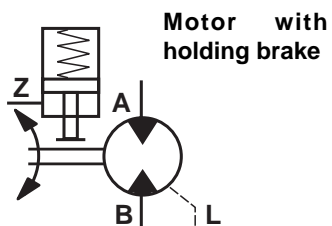
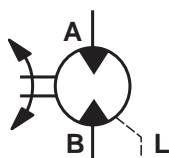
without 2nd shaft end = **Z**

**Series**

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

**Symbols to DIN ISO 1219**

**Motor for two speeds**



**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 20...					
Type of mounting	Flange mounting; face mounting					
Type of connection	Threaded, flange					
Mounting position	Optional					
Shaft load	See page 6					
Direction of rotation	Right / left - reversible					
Frame size	20					
Nominal size		1750	2100	2500	3000	
Displacement	$V$	$\text{cm}^3$	1750	2100	2500	3000
Displacement flow at $n = 100 \text{ rev/min}/100 \text{ bar}$	$Q$	$\text{L/min}$	176	211	252	302
Output torque <sup>1), 7)</sup>						
– spec. torque (at $\Delta p = 100 \text{ bar}$ )	$T$	$\text{Nm}$	2785	3342	3979	4775
– max. torque	$T$	$\text{Nm}$	11 531	13 762	14 244	17 093
Output speed						
– min. speed	$n$	$\text{rev/min}$	5 to 10 when running smoothly, depending on application			
– max. continuous speed	$n$	$\text{rev/min}$	125	125	115	115
– max. intermittent speed	$n$	$\text{rev/min}$	160	160	115	115
– freewheeling	$n$	$\text{rev/min}$	500			
Output power <sup>1)</sup>						
Weight – continuous power	$P$	$\text{kW}$	70	70	85	85
– motor	$m$	$\text{kg}$	110			
– motor with holding brake	$m$	$\text{kg}$	140			

**Hydraulic**

Nominal pressure	$p$	$\text{bar}$	250			
Pressure difference, cont. <sup>2), 6), 7)</sup>	$\Delta p$					
– with mineral oil (HL, HLP)		$\text{bar}$	250			
Pressure difference, peak <sup>3), 6), 7)</sup>	$\Delta p$					
– with mineral oil (HL, HLP)		$\text{bar}$		450		400
Inlet pressure port "A" or "B"	$p$	$\text{bar}$		470		420
Summated pressure <sup>4), 6)</sup> port "A" + "B"	$p$	$\text{bar}$		470		420
Case drain pressure	$p$	$\text{bar}$	10			
Fluid <sup>5)</sup>	Mineral oil (HL, HLP) to DIN 51 524					
Fluid temperature range	$t$	$^{\circ}\text{C}$	– 20 to 80			
Viscosity range	$v$	$\text{mm}^2/\text{s}$	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	$T$	$\text{Nm}$	19 000			
Brake release pressure, min – max	$p$	$\text{bar}$	Min. 15 Max. 30			

<sup>1)</sup> The data given apply after 100 hours running-in time

<sup>2)</sup> Continuous operation

<sup>3)</sup> Peak values may occur for a maximum duration of one second within an operating minute.

<sup>4)</sup> In the return line we recommend  $p_{\text{min}} = 15 \text{ bar}$

<sup>5)</sup> Environmentally friendly fluids HETG, HEPG, HEE to RE 90 221

<sup>6)</sup> For connection in series, please consult the technical sales department.

<sup>7)</sup> **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 $Q_L$  = mean case leakage in L/min

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

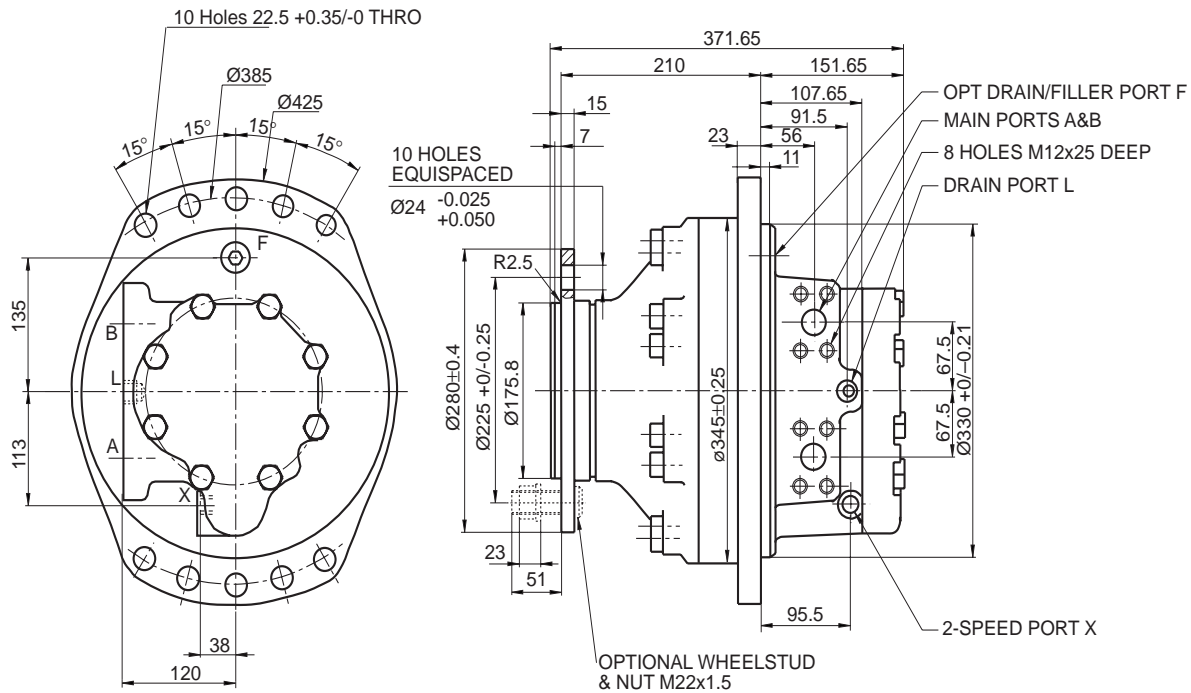
– For "half displacement" operating mode multiply the torques and  $Q$ -values by 0.5.– For maximum case leakage multiply  $Q_L$  by 2

Pressure Differential $\Delta p$ bar		Speed in RPM					Speed in RPM				
		MCR20. 1750					MCR20. 3000				
		0	25	50	100	125	0	25	50	100	115
100	$T$ Nm	1950	2423	2507	2206	2111	2626	3915	4011	3247	2435
	$Q$ L/min	1.6	45.4	89.3	176.8	221.0	1.6	76.6	151.8	301.8	347.0
	$Q_L$ L/min	0.8	0.8	0.9	0.9	1.1	0.8	0.8	0.9	0.9	1.0
200	$T$ Nm	3899	5013	5124	5013		6207	8212	8403		
	$Q$ L/min	2.4	46.2	90.3	178.0		2.4	77.4	152.8		
	$Q_L$ L/min	1.2	1.2	1.4	1.5		1.2	1.2	1.4		
300	$T$ Nm	5850	7520	7688			10027	126052	12891		
	$Q$ L/min	3.4	47.2	91.3			3.4	78.4	153.8		
	$Q_L$ L/min	1.7	1.7	1.9			1.7	1.7	1.9		
400	$T$ Nm	7799	10028	10251			13751	16998			
	$Q$ L/min	4.4	48.2	92.1			4.4	79.4			
	$Q_L$ L/min	2.2	2.2	2.3			2.2	2.2			
450	$T$ Nm	8774	11281	11531							
	$Q$ L/min	4.8	48.6	92.6							
	$Q_L$ L/min	2.4	2.4	2.6							
		<b>MCR20. 2100</b>									
		0	25	50	100	125					
100	$T$ Nm	2335	2902	3002	2570	2390					
	$Q$ L/min	1.6	54.1	106.8	211.8	269.7					
	$Q_L$ L/min	0.8	0.8	0.9	0.9	1.1					
200	$T$ Nm	4670	6005	6138	6005						
	$Q$ L/min	2.4	54.9	107.8	213						
	$Q_L$ L/min	1.2	1.2	1.4	1.5						
300	$T$ Nm	7006	9007	9207							
	$Q$ L/min	3.4	55.9	108.8							
	$Q_L$ L/min	1.7	1.7	1.9							
400	$T$ Nm	9341	12010	12276							
	$Q$ L/min	4.4	56.9	109.6							
	$Q_L$ L/min	2.2	2.2	2.3							
450	$T$ Nm	10508	13510								
	$Q$ L/min	4.8	57.3								
	$Q_L$ L/min	2.4	2.4								
		<b>MCR20. 2500</b>									
		0	25	50	100	115					
100	$T$ Nm	2188	3263	3342	2706	2594					
	$Q$ L/min	1.6	64.1	126.8	251.8	289.5					
	$Q_L$ L/min	0.8	0.8	0.9	0.9	1.0					
200	$T$ Nm	5173	6844	7003	6605						
	$Q$ L/min	2.4	64.9	127.8	253						
	$Q_L$ L/min	1.2	1.2	1.4	1.5						
300	$T$ Nm	8356	10504	10743							
	$Q$ L/min	3.4	65.9	128.8							
	$Q_L$ L/min	1.7	1.7	1.9							
400	$T$ Nm	11459	14165	14244							
	$Q$ L/min	4.4	66.9	129.6							
	$Q_L$ L/min	2.2	2.2	2.3							

**Unit dimensions**

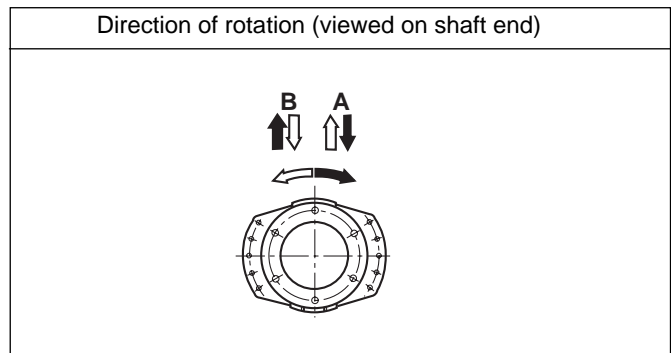
(in mm)

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



- 1 Port A; B (inlet, outlet)
- 2 Case drain port L
- 3 Filling port F, may also be used as drain port
- 4 Pilot port X for switching displacement, (switching pressure  $p = 10$  to  $30$  bar)
- 5 Shaft end with flange, ordering code "F280"
- 6 M22 x 1,5 studs with nut, for retaining wheels ordering code ..S..

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



**Permissible load on output shaft**

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

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

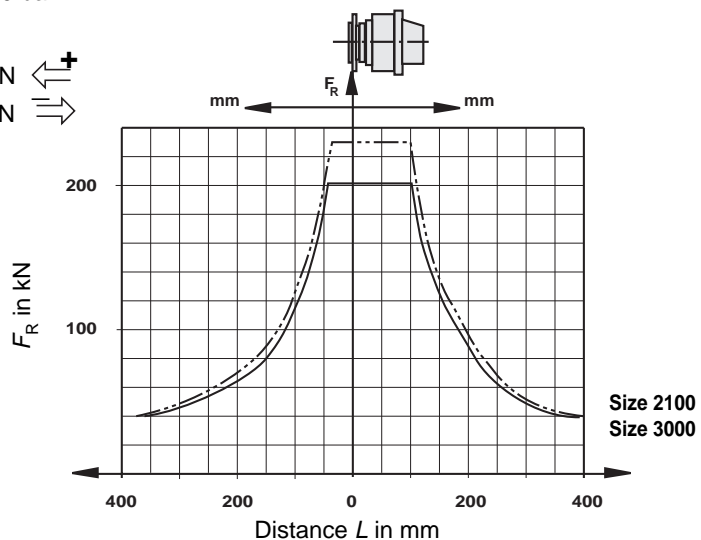
$F_{A \max} = +77\ 143\text{N}$  ←

$F_{A \max} = -45\ 200\text{N}$  →

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

Shaft end ...F 280...

Flange housing ...C...

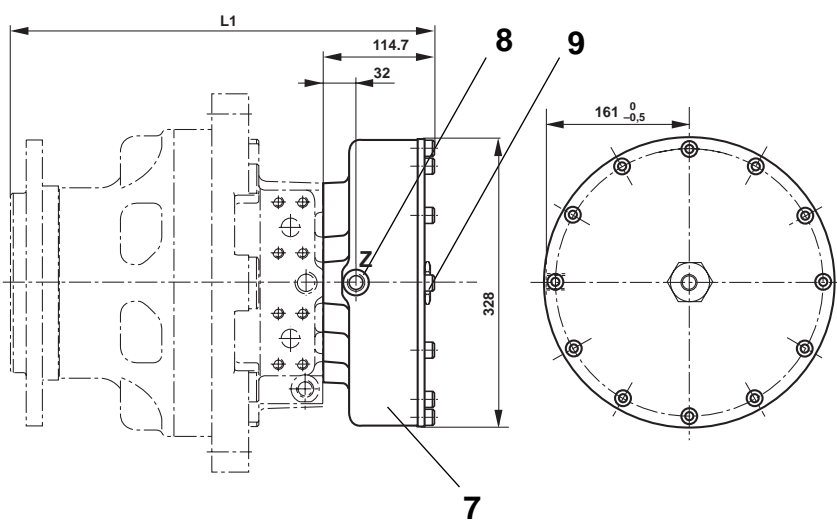


**Unit dimensions**

( in mm)

**Holding brake (multi-disc brake):** Ordering code "**B19**"

Flange housing	L1
C	442.35



- 7** Holding brake (multi-disc brake)  
Ordering code "**B19**"
- 8** Brake release port **Z**
- 9** Threaded bore for emergency mechanical release of holding brake

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

**Notes**



**Mannesmann Rexroth AG**  
D-97813 Lohr am Main  
Jahnstraße 3-5 • D-97816 Lohr am Main  
Telefon 0 93 52 / 18-0 • Telefax 0 93 52 / 18-10 40  
Telex 6 89 418

**Mannesmann Rexroth Ltd.,**  
Cromwell Road, St. Neots,  
Cambridgeshire, PE19 2ES  
Tel: 01480 223200  
Fax: 01480 219052