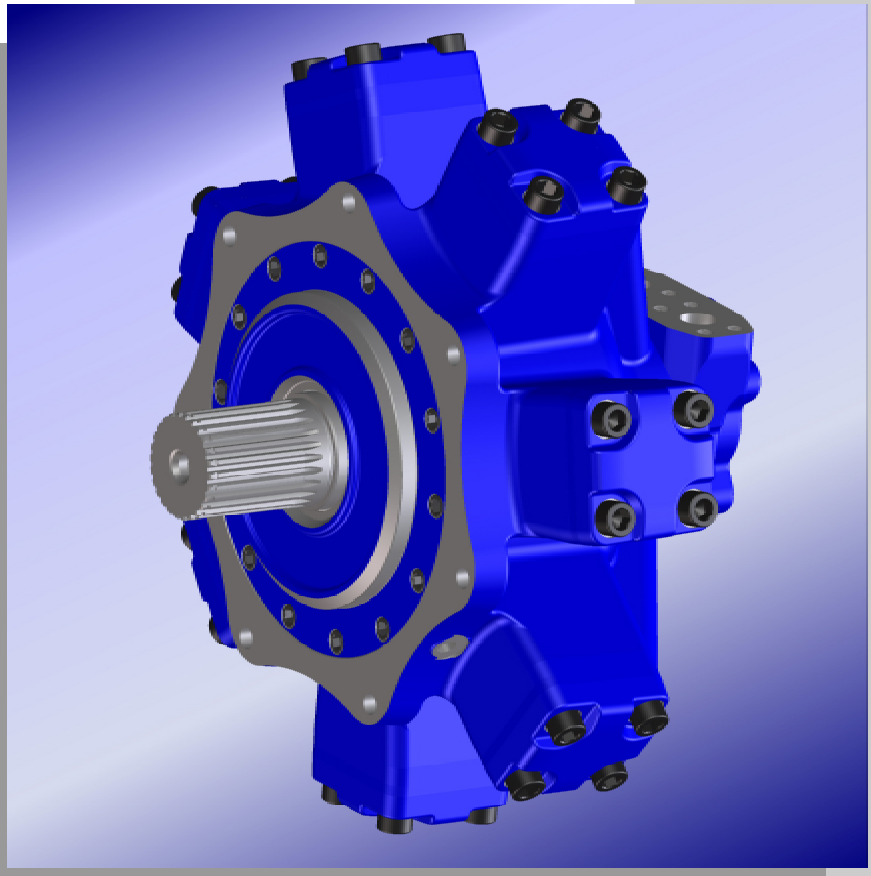


Radial Piston Motors

with fixed displacement
Series RM 1000X - RM 5000X
V_g = 1047 ccm/rev - 5278 ccm/rev

HYDRAULIC-MOTORS

Catalogue No. HM1-013E
Edition 2005.01/03

DÜSTERLOH Fluidtechnik

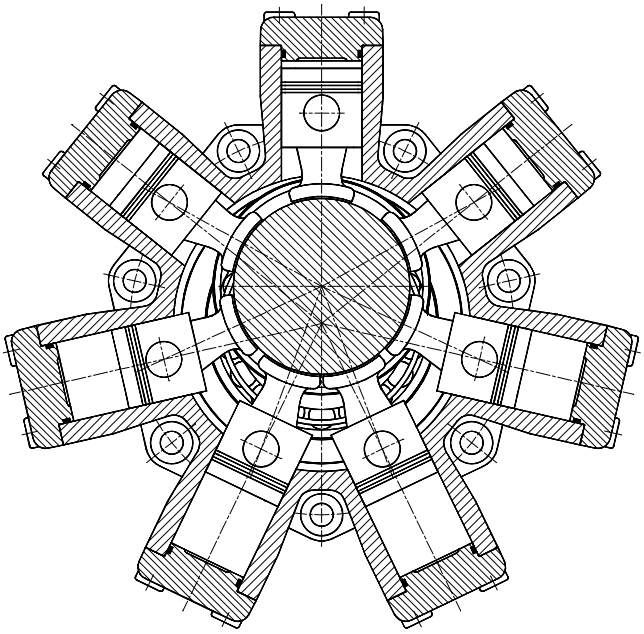
Features:

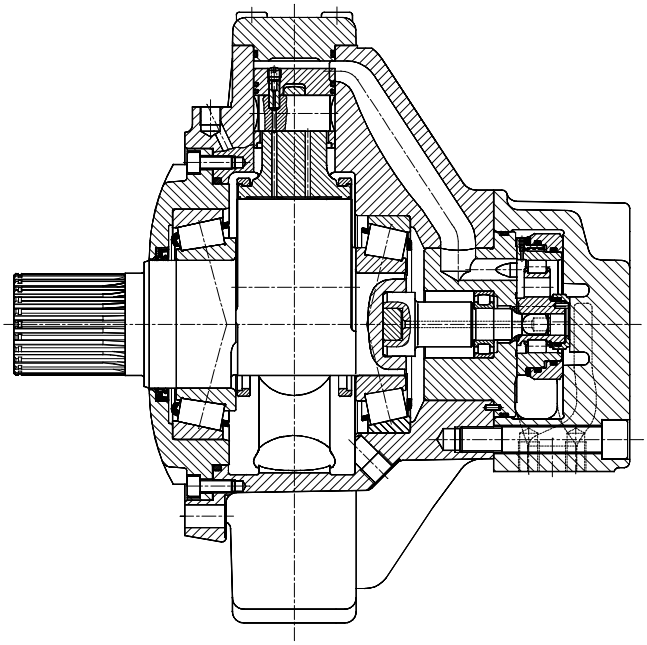
- many displacements for all applications
- very high starting torque
- high efficiencies, high constant power
- smooth running at all speeds
- high resistance to temperature shock
- reversible
- suitable for automatic control engineering
- suitable for inflammable and biologically degradable liquids
- bearings for very long life
- quiet running properties
- design with:
  - instrument shaft
  - brake and / or gearbox
  - valve assembly

Contents

Radial Piston Motor with inner piston support and components hydrostatically discharged.

RM 1000X; RM 1250X; RM 2500X; RM 3150X; RM 4000X; RM 4500X; RM 5000X in 7-cylinder-design
RM 1600X; RM 1800X; RM 2000X in 5-cylinder-design





FUNCTION:

Pressurised fluid to either ports 1 or 2 fills the respective cylinder chambers, forcing the motor to rotate. As the motor rotates the cylinder moves from the pressure, to the return port of the distributor, returning the fluid to tank.

MOTOR DRIVE:

The drive shaft is supported in two large taper roller bearings, capable of accepting high radial and axial loads.

Torque is developed by the pistons acting upon the eccentric camshaft through rigid piston pins and hydrostatically balanced bronze con-rods.

High efficiencies are archieved due the hydrostatic balance of moving parts; also approximately 50% of the pistons are pressurised at any one time.

DISTRIBUTION UNITS:

The eccentric axial distribution system controls the flow to the cylinder bores and is hydrostatically balanced. This results in low leakage and minimal friction losses. The distribution system guarantees automatic compensation of pressure and temperature. It is insensitive to contamination and is shock resistant to temperature, giving a longer live. Furthermore, it offers very good low speed performance, and quiet running at high speed.

LEAKAGE:

The low leakage at the pistons and distributon system helps cooling and lubrication of the motor. This necessary internal leakage is carried away to the tank via one of the drain connections.

FLUSHING:

At higher continuous power, a case drain flushing is necessary to carry away the heat of rods/crankshaft for a longer life.

Radial Piston Motor

RM		X		A1			

Displacement nominal size
1047 ccm/rev = 1000
1266 ccm/rev = **1250**
1608 ccm/rev = 1600
1810 ccm/rev = 1800
2011 ccm/rev = **2000**
2533 ccm/rev = 2500
3167 ccm/rev = **3150**
4013 ccm/rev = 4000
4508 ccm/rev = 4500
5278 ccm/rev = **5000**

Series type - motor
actual series type = **X**

Drive shaft
cylindrical with key
acc. to DIN 6885 = **Z**

male involute splined shaft
acc. to DIN 5480 = **K**

female involute splined shaft
acc. to DIN 5480 = **H**
(not available for RM 4000X; RM 4500X and RM 5000X)

Hydraulic ports
Flange connection radial
SAE J518C 1½" - 6000 PSI = **A1**

Sealing material
NBR, suitable for:
HLP - mineral oils to DIN 51524 part 2 = *

FPM (Viton), suitable for:
phosphoric acid-ester and high temperatures = **V**

2nd shaft end
without 2nd shaft end = *

cylindrical instrument shaft ø10_{h6} for measuring device = **M**

Additional data
Brakes / gearboxes / decoder / special installation-situations / higher leakage pressures etc. = **detailed description**

Bold written Motor-types or Standard-types with shorter times of delivery and lower prices!

* = no indication in type key

Example for ordering:

RM 1000 X K A1 □ M □

- Additional data
- Instrument shaft ø10_{h6}
- Sealing material: NBR
- Flange: SAE J518C 1½" - 6000 PSI
- Drive shaft: male involute splined shaft acc. to DIN 5480
- Series type: X
- Displacement: V_g = 1047 ccm/rev
- Radial Piston Motor

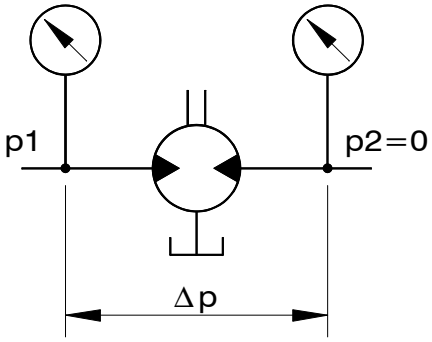
All characteristic quantities at ν = 36 mm²/s; Θ = 50°C; p_{outlet} = without pressure

Nominal size			1000	**1250**	1600	1800	**2000**
Displacement	V_g	ccm/rev	1047	1266	1608	1810	2011
Theor. specific torque	$T_{spec.theor.}$	Nm/bar	16,6	20,1	25,6	28,8	32,0
Average specific torque	$T_{spec.aver.}$	Nm/bar	15,3	18,5	23,6	26,5	29,4
Min. starting torque / theor. torque		%	89,5	91	91	92	92,5
Inlet pressure, max. continuous	$p_{cont.}$	bar	250				
intermittent	$p_{interm.}$	bar	315				
peak	p_{peak}	bar	400				
Total pressure, max. in port A+B	p_{total}	bar	400				
Leakage pressure, max.	p_{Leak}	bar	1,5				
Operating speed range	n	rpm	5-650	5-540	5-430	5-390	5-350
Continuous power, max.	$P_{cont.}$	kW	125	125	130	130	130
Intermittent power, max.	$P_{interm.}$	kW	150	150	160	160	160
Moment of inertia	J	kgm²	0,0423	0,0451	0,0932	0,0977	0,1035
Mass	m	kg	154	154	255	255	255
Temperature range of pressure medium	Θ	°C	-30 up to +80				
Viscosity range	ν	mm²/s	18 up to 1000, recommended: 30 up to 50				

Nominal size			2500	**3150**	4000	4500	**5000**
Displacement	V_g	ccm/rev	2533	3167	4013	4508	5278
Theor. specific torque	$T_{spec.theor.}$	Nm/bar	40,3	50,4	63,9	71,7	84,0
Average specific torque	$T_{spec.aver.}$	Nm/bar	37,1	46,3	58,8	66,0	77,3
Min. starting torque / theor. torque		%	90	92,5	90	91,5	93
Inlet pressure, max. continuous	p_{cont}	bar	250				
intermittent	$p_{interm.}$	bar	315				
peak	p_{peak}	bar	400				
Total pressure, max. in port A+B	p_{total}	bar	400				
Leakage pressure, max.	p_{leak}	bar	1,5				
Operating speed range	n	rpm	3-310	3-250	2-200	2-175	2-150
Continuous power, max.	P_{cont}	kW	145	145	150	150	150
Intermittent power, max.	$P_{interm.}$	kW	180	180	190	190	190
Moment of inertia	J	kgm²	0,1192	0,1285	0,2569	0,2628	0,2848
Mass	m	kg	318	318	500	500	500
Temperature range of pressure medium	Θ	°C	-30 up to +80				
Viscosity range	ν	mm²/s	18 up to 1000, recommended: 30 up to 50				

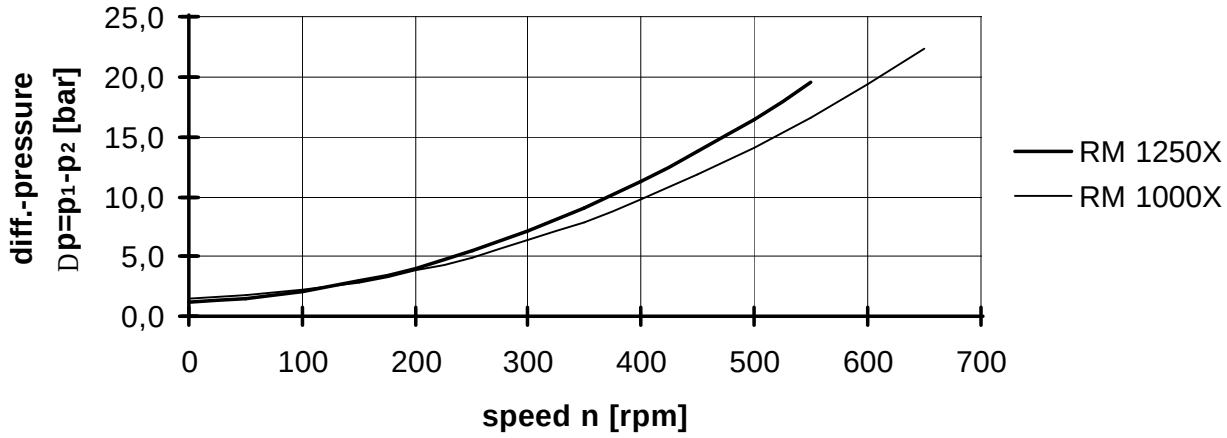
p_{cont} = admissible continuous pressure at limitation to P_{cont}.
p_{max} = maximal admissible operating pressure at limitation to $P_{intermit.}$
p_{peak} = peak pressure, where the components remain safe in function.
P_{cont} = Continuous power (at maximal 10 bar outlet pressure).
Motor flushing must be carried out above P_{cont}.
$P_{interm.}$ = Power, which may be demanded temporarily (max. 10% duty cycle / hour).

Power, speed and bearing life may be increased when flushing with 5 - 8 liters flushing oil.
For queries, please look at page 22.

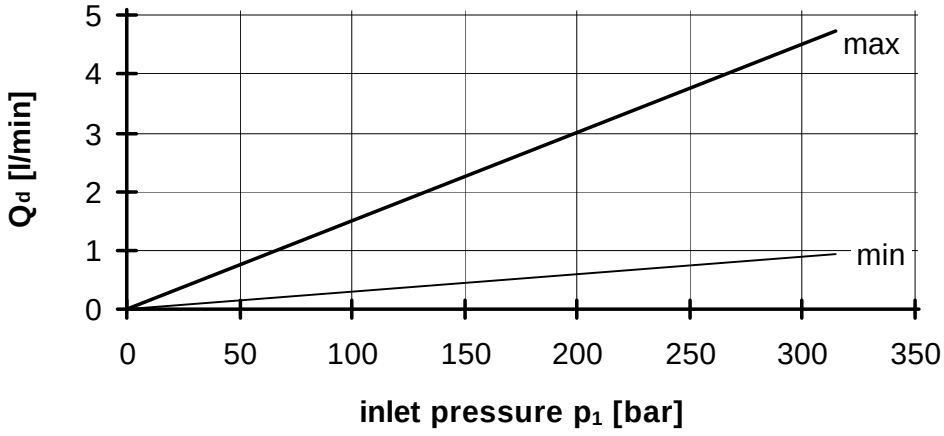


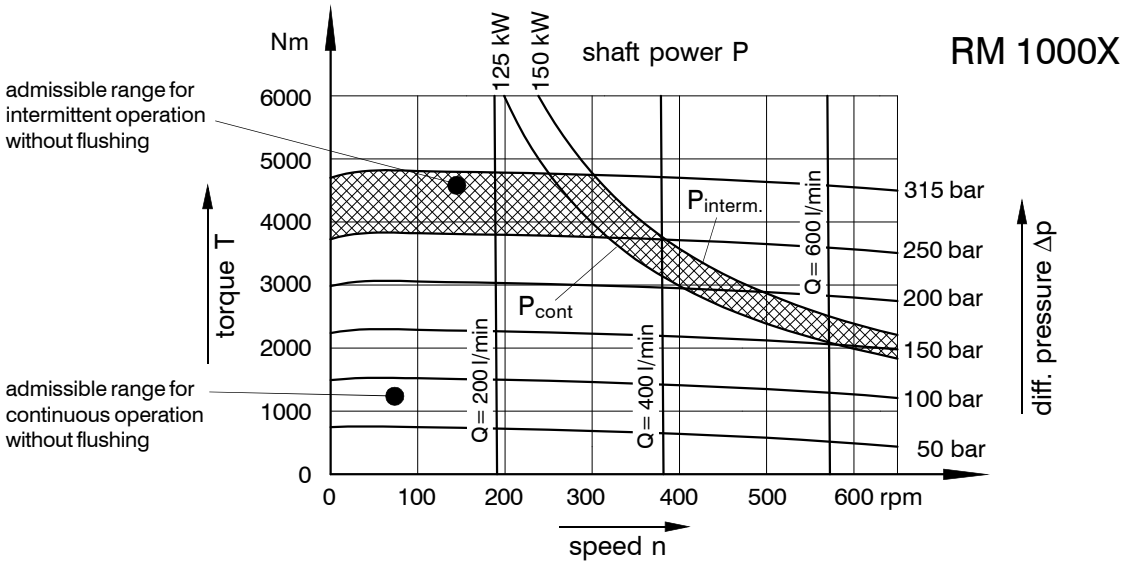
Outlet pressure p_2 = 0 bar
Temperature Θ = 50° C
Viscosity ν = 36 mm²/s

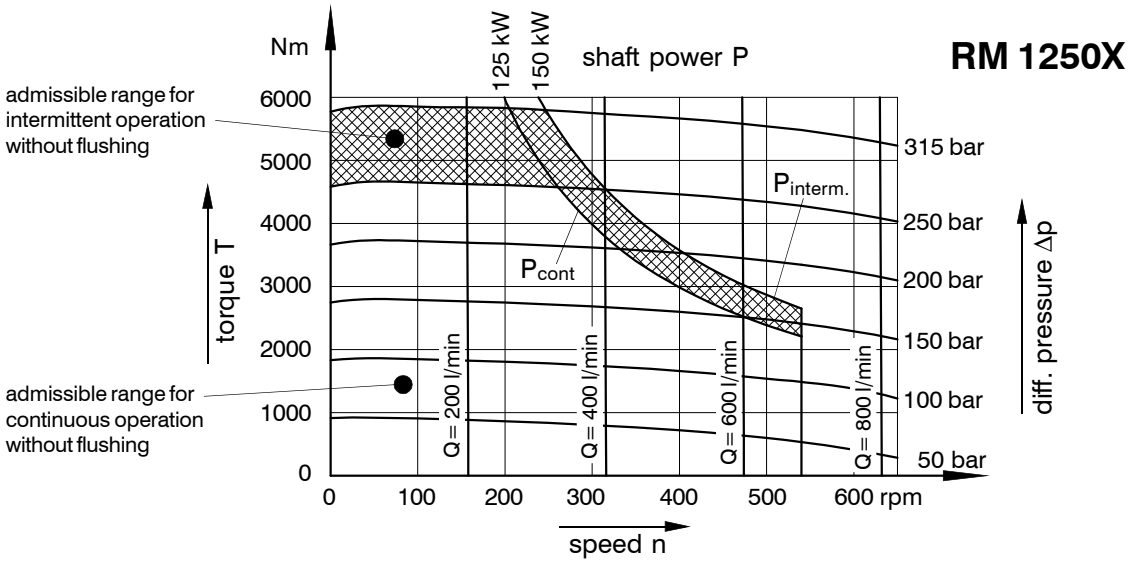
idling characteristics

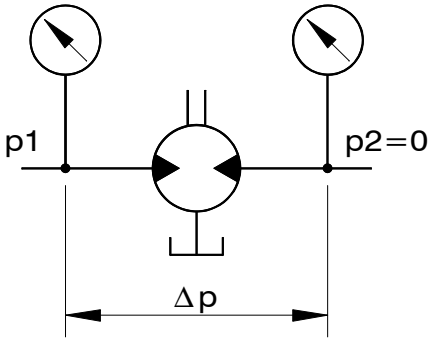


total leakage (internal + external)



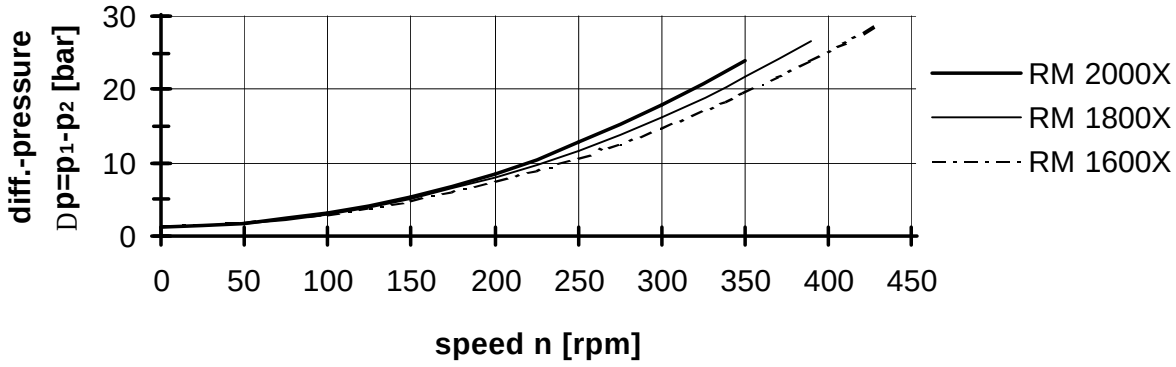

RM 1000X
Nm
shaft power P
125 kW
150 kW
admissible range for intermittent operation without flushing
admissible range for continuous operation without flushing
torque T
$P_{interm.}$
P_{cont}
Q = 200 l/min
Q = 400 l/min
Q = 600 l/min
315 bar
250 bar
200 bar
150 bar
100 bar
50 bar
diff. pressure Δp
6000
5000
4000
3000
2000
1000
0
0
100
200
300
400
500
600 rpm
speed n


RM 1250X
Nm
shaft power P
125 kW
150 kW
admissible range for intermittent operation without flushing
admissible range for continuous operation without flushing
torque T
$P_{interm.}$
P_{cont}
Q = 200 l/min
Q = 400 l/min
Q = 600 l/min
Q = 800 l/min
315 bar
250 bar
200 bar
150 bar
100 bar
50 bar
diff. pressure Δp
6000
5000
4000
3000
2000
1000
0
0
100
200
300
400
500
600 rpm
speed n

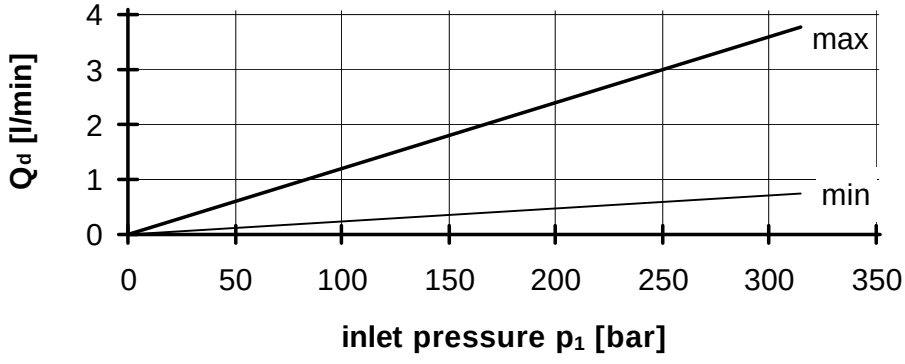


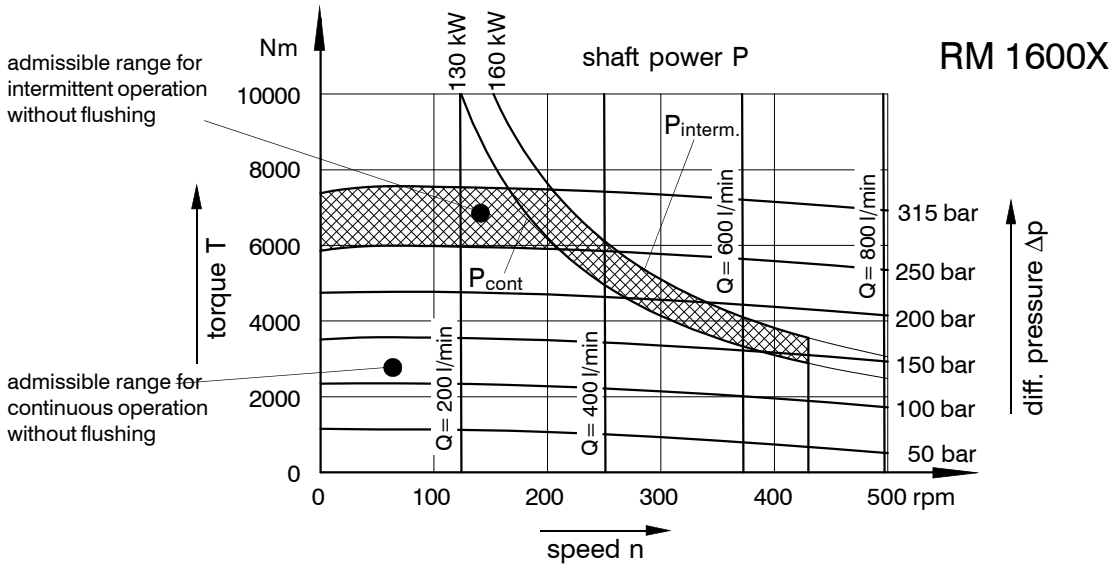
Outlet pressure p_2 = 0 bar
Temperature Θ = 50° C
Viscosity ν = 36 mm²/s

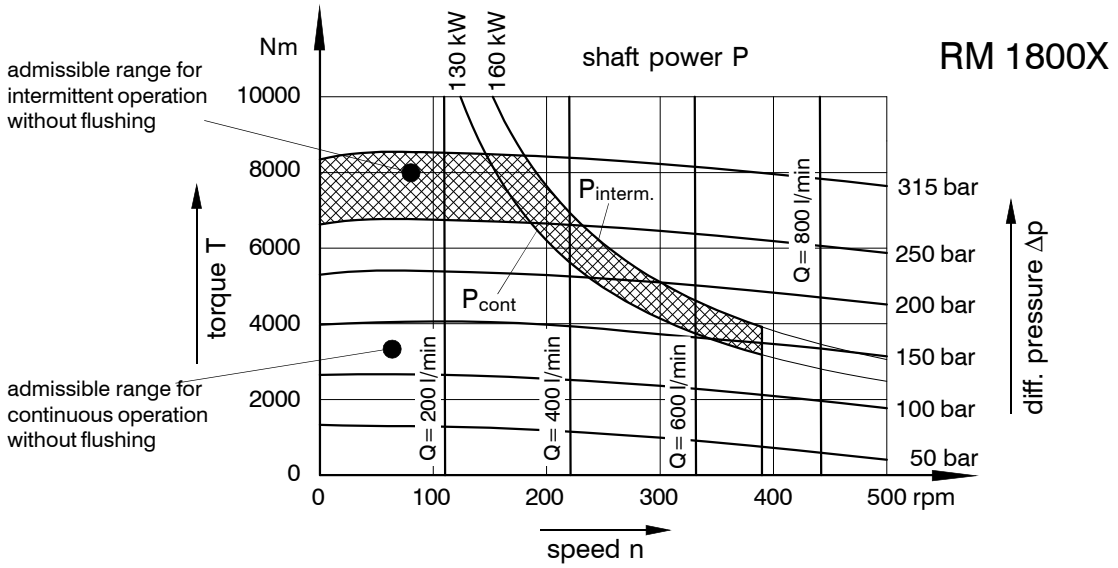
idling characteristics

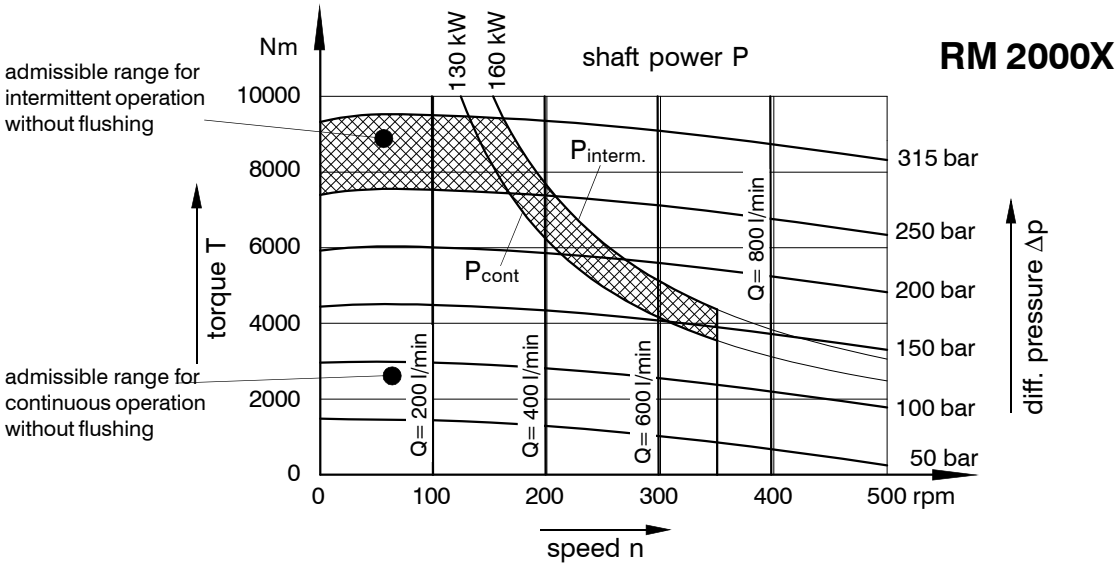


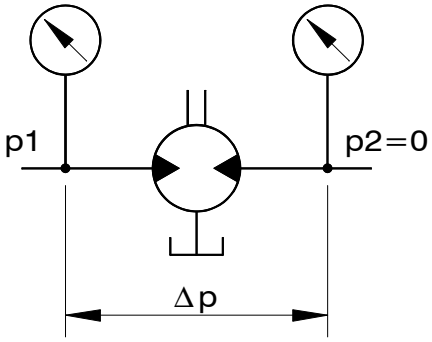
total leakage (internal + external)




RM 1600X
admissible range for intermittent operation without flushing
admissible range for continuous operation without flushing
Nm
shaft power P
130 kW
160 kW
$P_{interm.}$
P_{cont}
Q= 200 l/min
Q= 400 l/min
Q= 600 l/min
Q= 800 l/min
torque T
315 bar
250 bar
200 bar
150 bar
100 bar
50 bar
diff. pressure Δp
10000
8000
6000
4000
2000
0
0
100
200
300
400
500 rpm
speed n

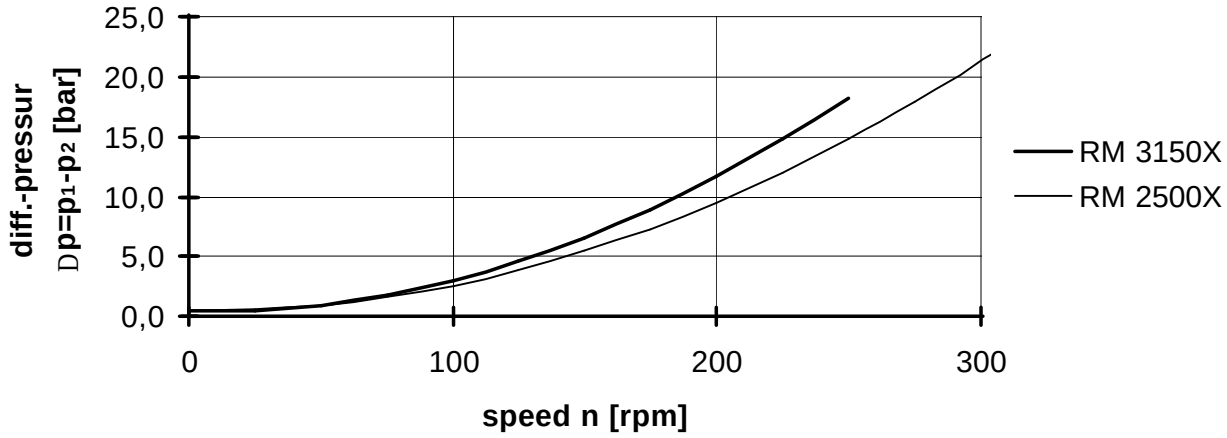

RM 1800X
admissible range for intermittent operation without flushing
admissible range for continuous operation without flushing
Nm
shaft power P
130 kW
160 kW
$P_{interm.}$
P_{cont}
Q= 200 l/min
Q= 400 l/min
Q= 600 l/min
Q= 800 l/min
torque T
315 bar
250 bar
200 bar
150 bar
100 bar
50 bar
diff. pressure Δp
10000
8000
6000
4000
2000
0
0
100
200
300
400
500 rpm
speed n


RM 2000X
admissible range for intermittent operation without flushing
admissible range for continuous operation without flushing
Nm
shaft power P
130 kW
160 kW
$P_{interm.}$
P_{cont}
Q= 200 l/min
Q= 400 l/min
Q= 600 l/min
Q= 800 l/min
torque T
315 bar
250 bar
200 bar
150 bar
100 bar
50 bar
diff. pressure Δp
10000
8000
6000
4000
2000
0
0
100
200
300
400
500 rpm
speed n

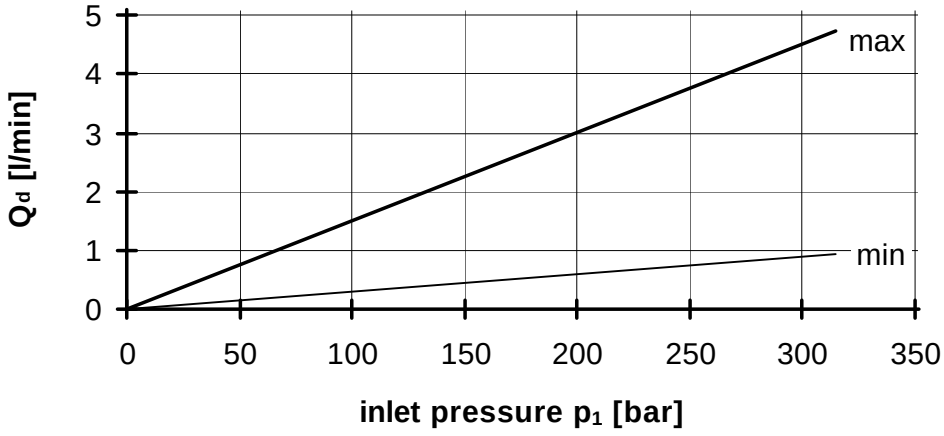


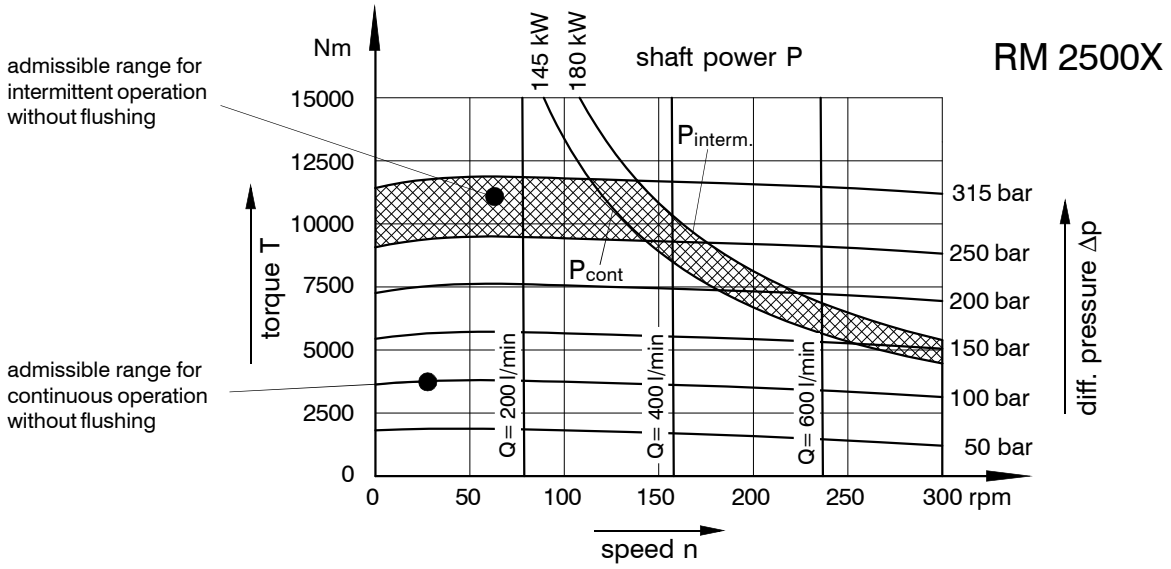
Outlet pressure p_2 = 0 bar
Temperature Θ = 50° C
Viscosity ν = 36 mm²/s

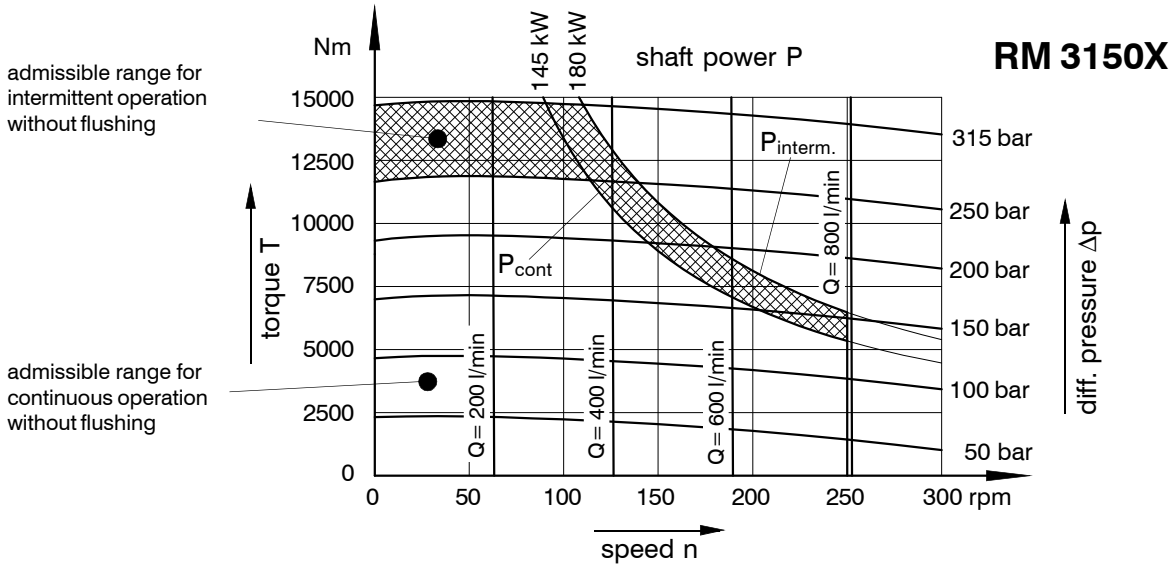
idling characteristics

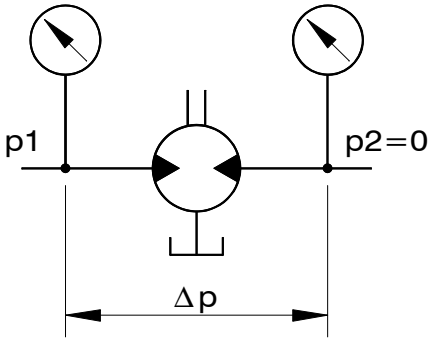


total leakage (internal + external)



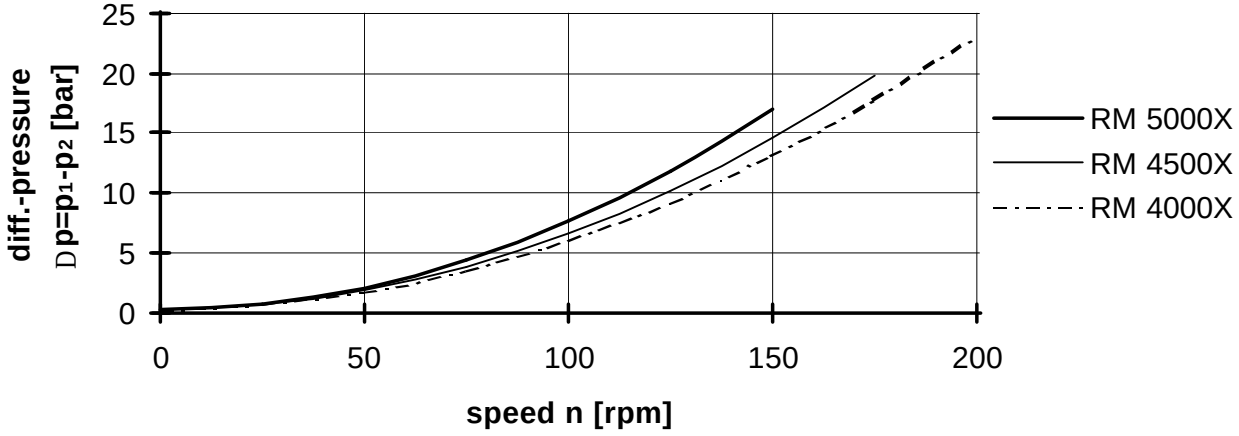

RM 2500X
admissible range for intermittent operation without flushing
admissible range for continuous operation without flushing
Nm
15000
12500
10000
7500
5000
2500
0
torque T
145 kW
180 kW
shaft power P
$P_{interm.}$
P_{cont}
315 bar
250 bar
200 bar
150 bar
100 bar
50 bar
diff. pressure Δp
Q = 200 l/min
Q = 400 l/min
Q = 600 l/min
0
50
100
150
200
250
300 rpm
speed n


RM 3150X
admissible range for intermittent operation without flushing
admissible range for continuous operation without flushing
Nm
15000
12500
10000
7500
5000
2500
0
torque T
145 kW
180 kW
shaft power P
$P_{interm.}$
P_{cont}
315 bar
250 bar
200 bar
150 bar
100 bar
50 bar
diff. pressure Δp
Q = 200 l/min
Q = 400 l/min
Q = 600 l/min
Q = 800 l/min
0
50
100
150
200
250
300 rpm
speed n

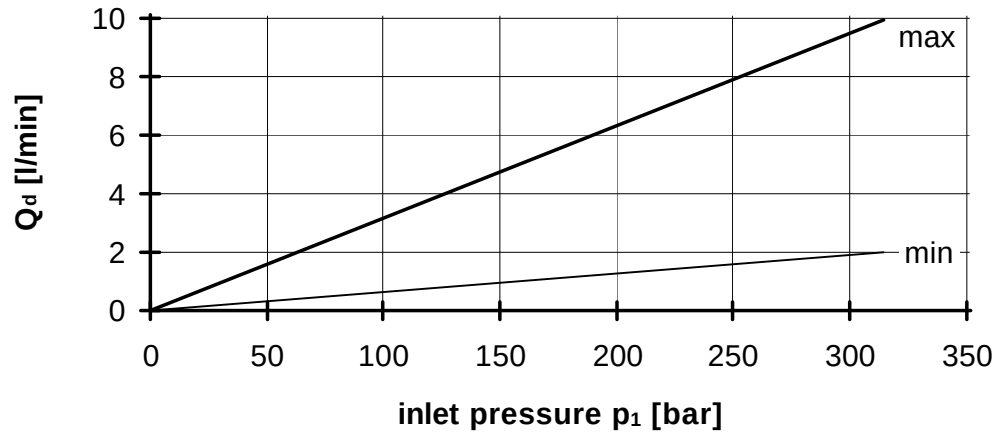


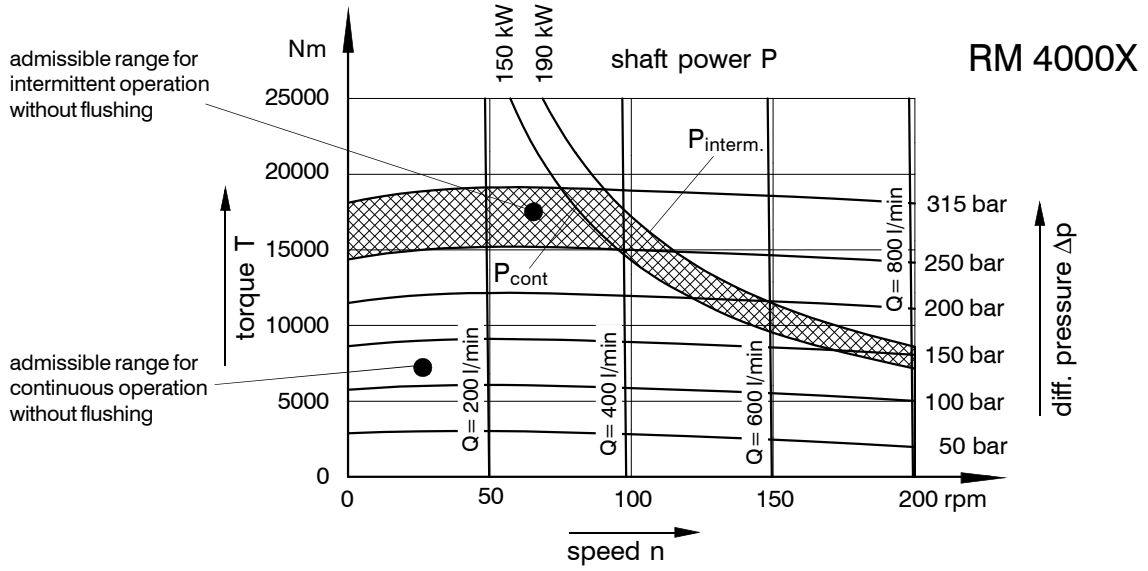
Outlet pressure p_2 = 0 bar
Temperature Θ = 50° C
Viscosity ν = 36 mm²/s

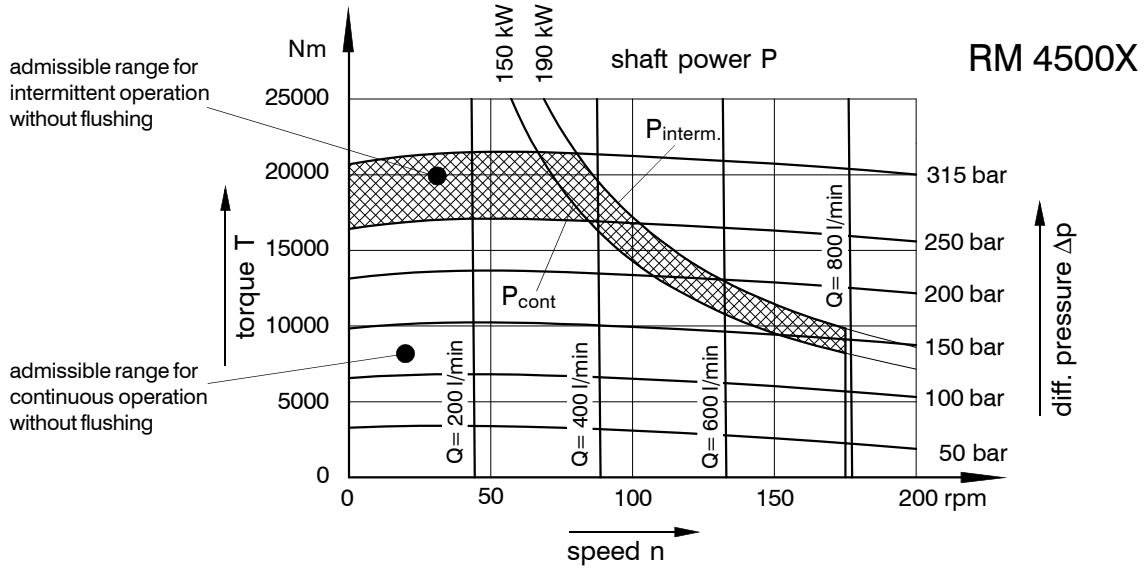
idling characteristics

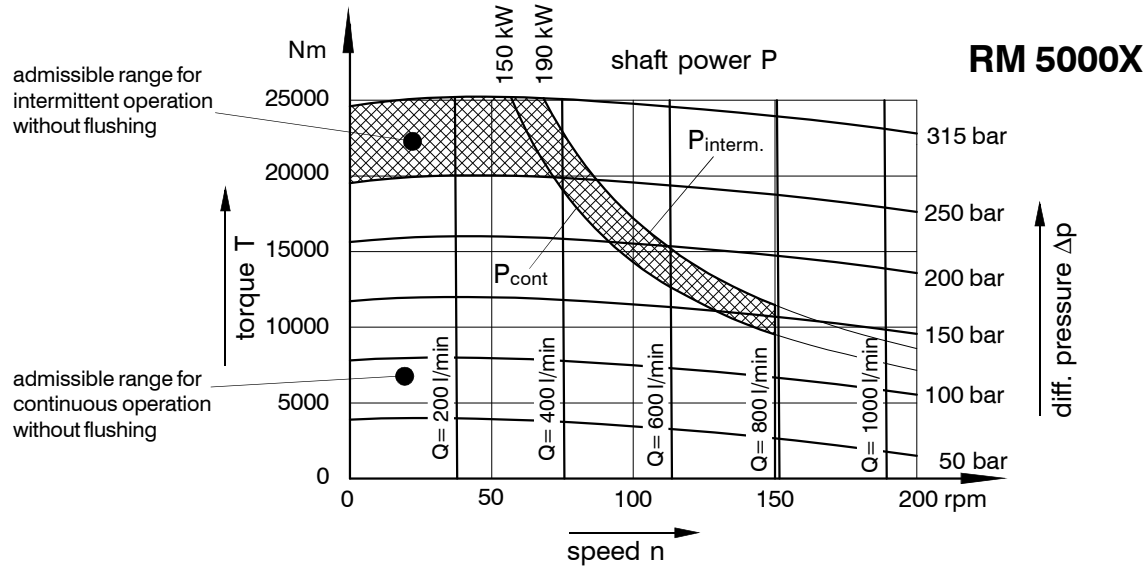


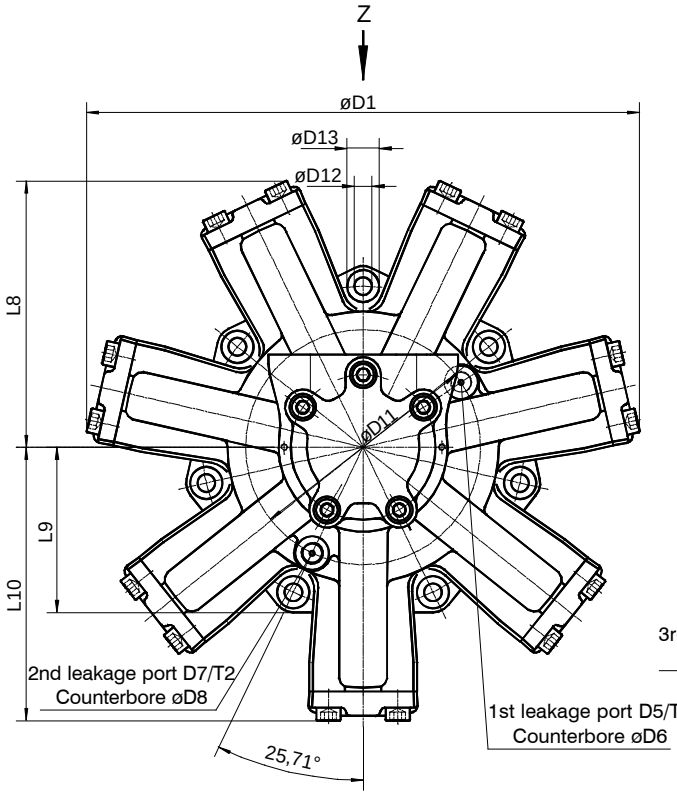
total leakage (internal + external)

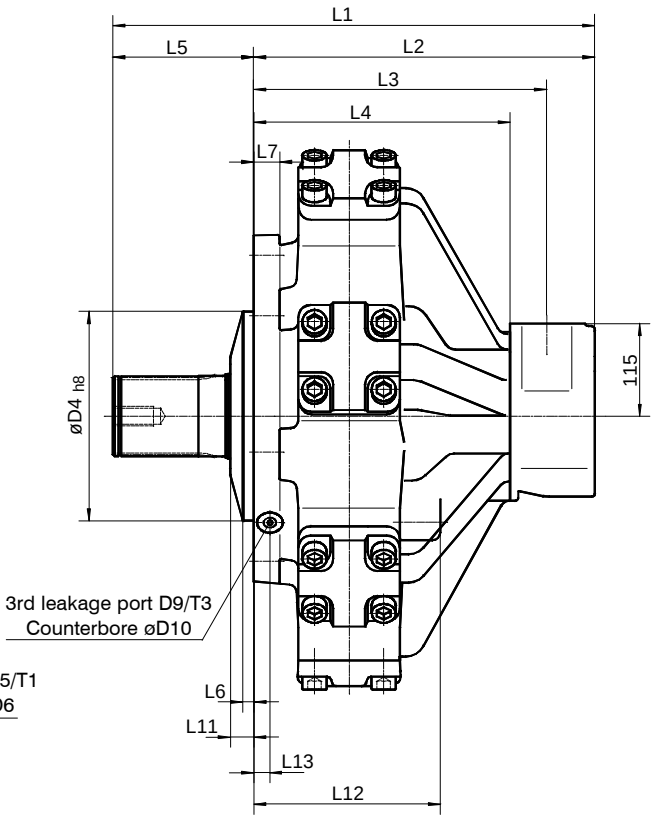


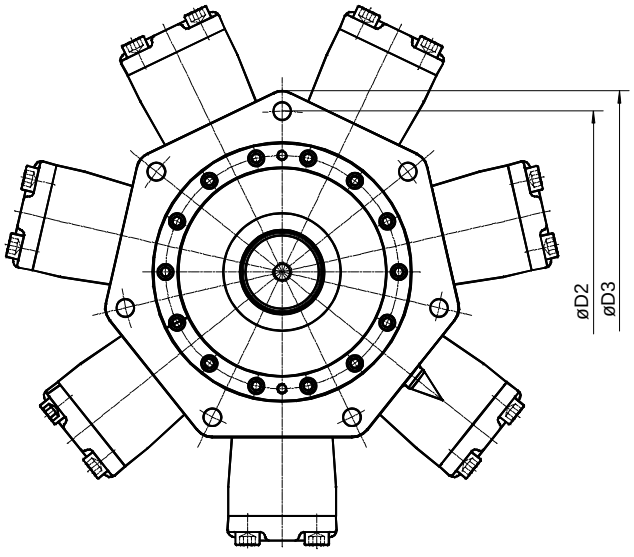

RM 4000X
Nm
150 kW
190 kW
shaft power P
admissible range for intermittent operation without flushing
admissible range for continuous operation without flushing
torque T
$P_{interm.}$
P_{cont}
Q= 200 l/min
Q= 400 l/min
Q= 600 l/min
Q= 800 l/min
315 bar
250 bar
200 bar
150 bar
100 bar
50 bar
diff. pressure Δp
25000
20000
15000
10000
5000
0
0
50
100
150
200 rpm
speed n

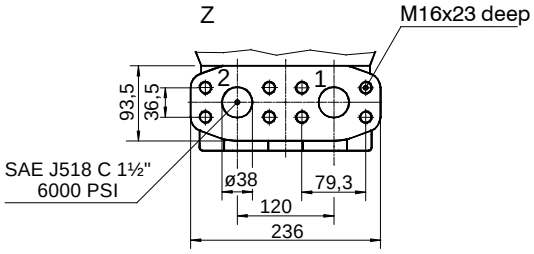

RM 4500X
Nm
150 kW
190 kW
shaft power P
admissible range for intermittent operation without flushing
admissible range for continuous operation without flushing
torque T
$P_{interm.}$
P_{cont}
Q= 200 l/min
Q= 400 l/min
Q= 600 l/min
Q= 800 l/min
315 bar
250 bar
200 bar
150 bar
100 bar
50 bar
diff. pressure Δp
25000
20000
15000
10000
5000
0
0
50
100
150
200 rpm
speed n


RM 5000X
Nm
150 kW
190 kW
shaft power P
admissible range for intermittent operation without flushing
admissible range for continuous operation without flushing
torque T
$P_{interm.}$
P_{cont}
Q= 200 l/min
Q= 400 l/min
Q= 600 l/min
Q= 800 l/min
Q= 1000 l/min
315 bar
250 bar
200 bar
150 bar
100 bar
50 bar
diff. pressure Δp
25000
20000
15000
10000
5000
0
0
50
100
150
200 rpm
speed n





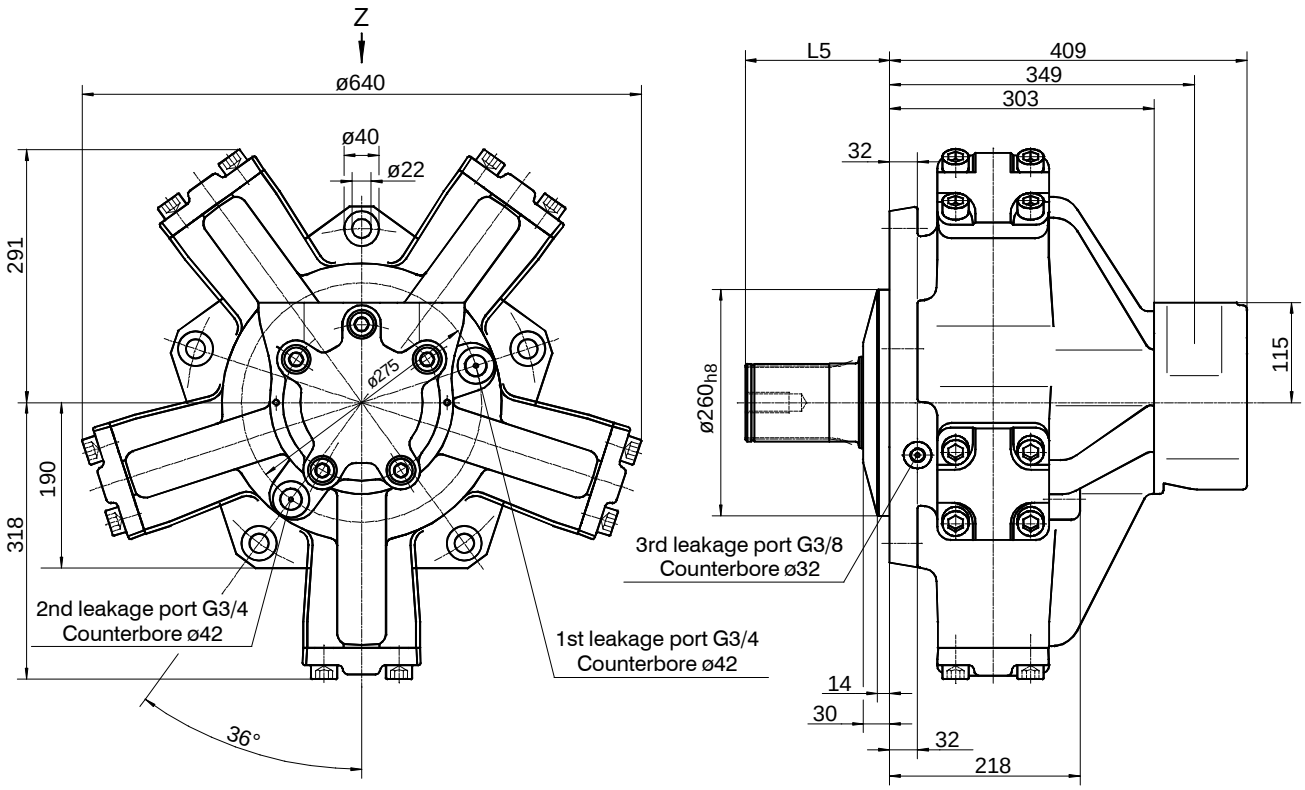


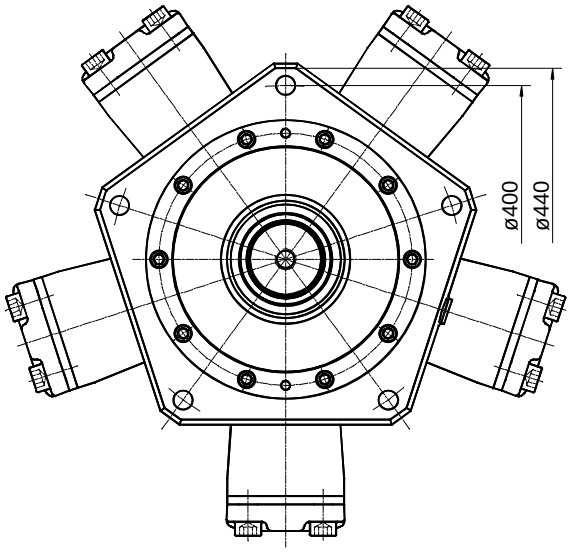


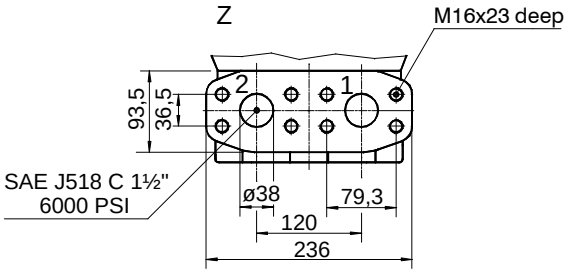
Sense of rotation at sight onto shaft front side:
clockwise: at flow from port 2 to port 1
anticlockwise: at flow from port 1 to port 2

Connection of the leakage lines: please observe assembly and initiation instructions page 23.

	RM 1000X	**RM 1250X**	RM 2500X	**RM 3150X**	RM 4000X	RM 4500X	**RM 5000X**
L1	478	478	599	599	633	633	633
L2	345	345	424	424	455	455	455
L3	285	285	364	364	395	395	395
L4	240	240	319	319	349	349	349
L5	133	133	175	175	179	179	179
L6	9	9	14	14	16	16	16
L7	32	32	32	32	40	40	40
L8	239	239	331	331	384	384	384
L9	155	155	205	205	262	262	262
L10	244	244	340	340	394	394	394
L11	30	30	29	29	26	26	26
L12	155	155	232	232	282	282	282
L13	20	20	32	32	32	32	32
øD1	495	495	689	689	799	799	799
øD2	300	300	400	400	520	520	520
øD3	340	340	450	450	570	570	570
øD4	250_{h8}	250_{h8}	260_{h8}	260_{h8}	320_{h8}	320_{h8}	320_{h8}
øD5	G 1/2	G 1/2	G 3/4	G 3/4	G 3/4	G 3/4	G 3/4
T1	17	17	19	19	19	19	19
øD6	34	34	42	42	42	42	42
øD7	G 1/2	G 1/2	G 3/4	G 3/4	G 3/4	G 3/4	G 3/4
T2	17	17	19	19	19	19	19
øD8	34	34	42	42	42	42	42
øD9	G 3/8	G 3/8	G 3/8	G 3/8	G 1/2	G 1/2	G 1/2
T3	14	14	14	14	14	14	14
øD10	29	29	32	32	32	32	32
øD11	236	236	292	292	348	348	348
øD12	18	18	22	22	22	22	22
øD13	33	33	40	40	40	40	40



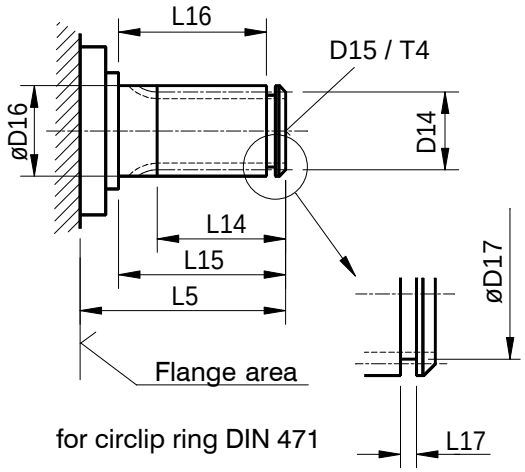




Sense of rotation at sight onto shaft front side:
clockwise: at flow from port 2 to port 1
anticlockwise: at flow from port 1 to port 2

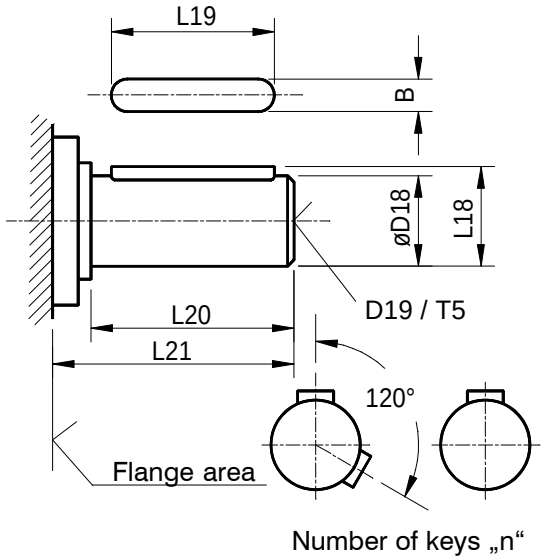
Connection of the leakage lines: please observe assembly and initiation instructions page 23.

Shaft type „K“
male splined shaft, DIN 5480 quality 7h



Type	RM 1000X **RM 1250X**	RM 1600X RM 1800X **RM 2000X**	RM 2500X **RM 3150X**	RM 4000X RM 4500X **RM 5000X**
D14	W80x3x25	W90x4x21	W100x4x24	W110x4x26
D15	M20	M24	M24	M24
øD16	80_{j6}	90_{j6}	100_{j6}	110_{j6}
øD17	76,5	86,5	96,5	106
L5	133	165	175	179
L14	69	95	105	115
L15	101	130	140	150
L16	95	120	130	140
L17	2,65	3,15	3,15	4,15
T4	42	50	50	50

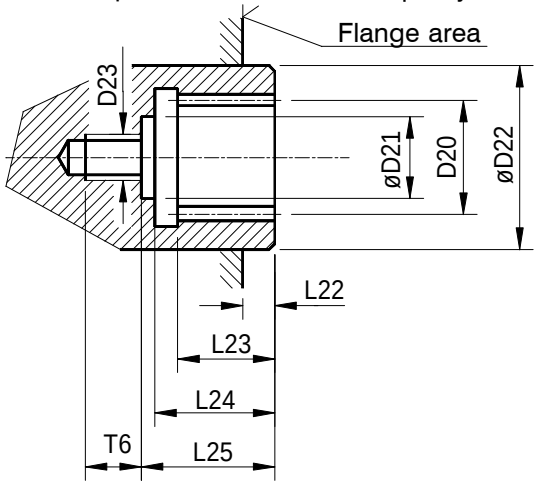
Shaft type „Z“
cylindrical shaft with key acc. to DIN 6885



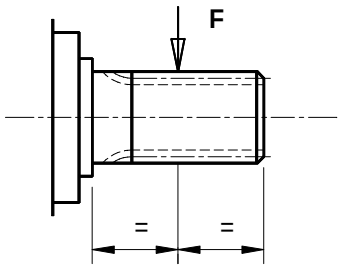
Number of keys „n“

B	22	25	28	28
øD18	80_{m6}	90_{m6}	100_{m6}	110_{m6}
D19	M20	M24	M24	M24
L18	85	95	106	116
L19	110	160	160	200
L20	130	170	170	210
L21	162	205	205	239
T5	42	50	50	50
n	2	1	2	2

Shaft type „H“
female splined shaft, DIN 5480 quality 9H

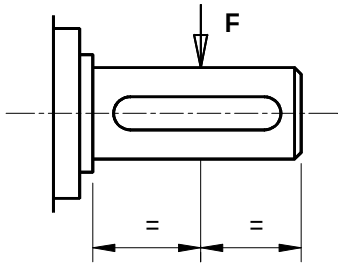


D20	N70x3x22	N85x3x27	N85x3x27	Not available
øD21	50^{H7}	50^{H7}	50^{H7}	
øD22	ø100	ø105	ø105	
øD23	M20	M20	M20	
L22	31±1	35±1	35±1	
L23	40	55	55	
L24	50	65	65	
L25	56	71	71	
T6	30	30	30	



Shaft type „K“

Motor type	Admissible (short-time) radial force at max. operating pressure [F in kN[1)]]	Max. admissible shaft load in the middle of the shaft end, based on L_{nah10} = 8000 hours Differential pressure Δp=100 bar [F in kN[2)]]	Differential pressure Δp=150 bar [F in kN[2)]]	Differential pressure Δp=200 bar [F in kN[2)]]	at speed [n in rpm]
RM 1000XK	84	37,1	30,5	20,6	325
RM 1250XK	70	38,5	32,1	22,6	270
RM 1600XK	71	49,3	42,3	32,1	215
RM 1800XK	61	50,2	43,3	33,3	195
RM 2000XK	50	51,2	44,4	34,7	175
RM 2500XK	54	64,5	51,8	31,9	155
RM 3150XK	45	67,4	55,1	36,3	125
RM 4000XK	80	81,4	57,3	-	100
RM 4500XK	66	83,9	60,4	11,0	87,5
RM 5000XK	50	87,2	64,5	22,1	75



Shaft type „Z“

Motor type	Admissible (short-time) radial force at max. operating pressure [F in kN[1)]]	Max. admissible shaft load in the middle of the shaft end, based on L_{nah10} = 8000 hours Differential pressure Δp=100 bar [F in kN[2)]]	Differential pressure Δp=150 bar [F in kN[2)]]	Differential pressure Δp=200 bar [F in kN[2)]]	at speed [n in rpm]
RM 1000XZ	74	34,8	28,7	19,3	325
RM 1250XZ	62	36,1	30,2	21,2	270
RM 1600XZ	63	46,1	39,6	30,1	215
RM 1800XZ	54	47,0	40,5	31,2	195
RM 2000XZ	44	48,0	41,6	32,5	175
RM 2500XZ	48	61,6	49,4	30,4	155
RM 3150XZ	40	64,3	52,6	34,7	125
RM 4000XZ	66	74,8	52,6	-	100
RM 4500XZ	55	77,1	55,5	10,1	87,5
RM 5000XZ	41	80,1	59,3	20,3	75

1) Admissible (short-time) radial force in the middle of the shaft end at p_{max} = 315 bar and safety factor v=1.
2) Max. admissible radial force in the middle of the shaft end at a given bearing life of 8000 h and different operating pressures. The speed is inversely proportional to bearing life .

Bearing life without shaft load F_R ($L_{nah\ 10}$).

For various pressure drops at half speed, without shaft load.

The speed is inversely proportional to bearing life.

Motor type	at Dp=100 bar h	at Dp=150 bar h	at Dp=200 bar h	at Dp=250 bar h	at Dp=300 bar h	Speed [n in rpm]
RM 1000X	154.600	40.000	15.300	7.300	4.000	325
RM 1250X	170.200	44.000	16.900	8.000	4.400	270
RM 1600X	213.600	55.300	21.200	10.100	5.500	215
RM 1800X	224.600	58.100	22.300	10.600	5.800	195
RM 2000X	237.600	61.500	23.600	11.200	6.100	175
RM 2500X	133.000	34.400	13.200	6.300	3.400	155
RM 3150X	148.600	38.500	14.700	7.000	3.800	125
RM 4000X	77.900	20.200	7.700	3.700	2.000	100
RM 4500X	83.500	21.600	8.300	3.900	2.100	87,5
RM 5000X	90.400	23.400	9.000	4.300	2.300	75

Bearing life with shaft load F_R ($L_{nah\ 10}$).

Shaft type „K“, shaft load in the middle of the shaft end (see page 18).

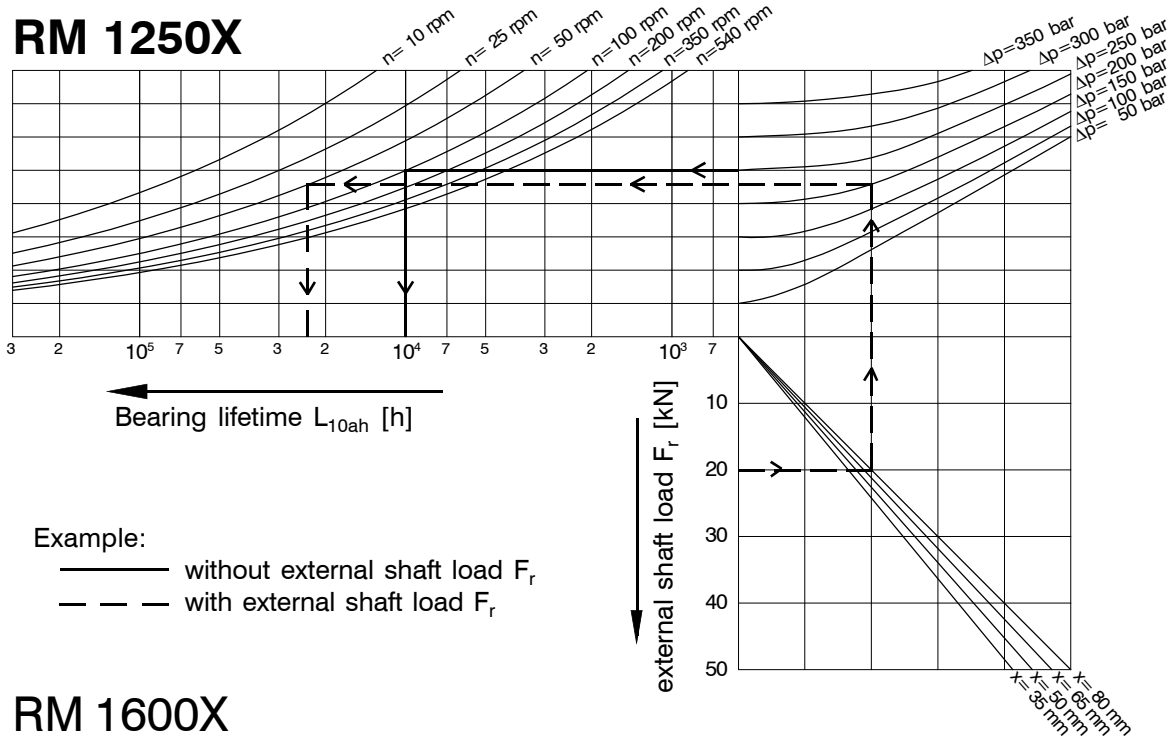
For various pressure drops at half speed, and shaft load F_R.

The speed is inversely proportional to bearing life.

Motor type	at Dp=100 bar h	at Dp=150 bar h	at Dp=200 bar h	at Dp=250 bar h	at Dp=300 bar h	Shaft load F_R in N	Speed [n in rpm]
RM 1000X	13.200	8.100	5.000	3.100	2.100	30.000	325
RM 1250X	14.600	8.900	5.500	3.500	2.300	30.000	270
RM 1600X	13.500	8.800	5.700	3.700	2.500	40.000	215
RM 1800X	14.200	9.200	6.000	3.900	2.700	40.000	195
RM 2000X	15.100	9.800	6.300	4.200	2.800	40.000	175
RM 2500X	11.100	6.800	4.200	2.700	1.800	56.000	155
RM 3150X	12.500	7.700	4.700	3.000	2.000	56.000	125
RM 4000X	13.600	7.000	3.800	2.200	1.400	63.000	100
RM 4500X	14.600	7.500	4.100	2.400	1.500	63.000	87,5
RM 5000X	15.900	8.100	4.400	2.600	1.600	63.000	75

If calculations are requested, please fill in the form at page 22.

RM 1000X
RM 1250X

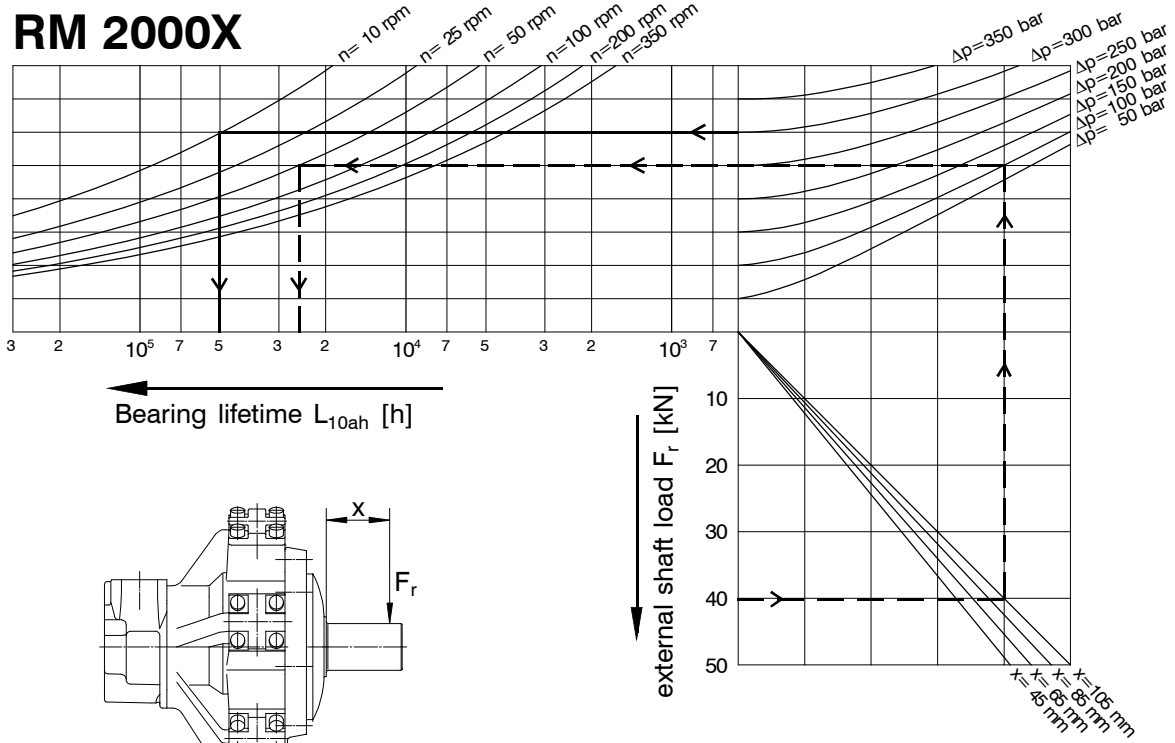


Example:

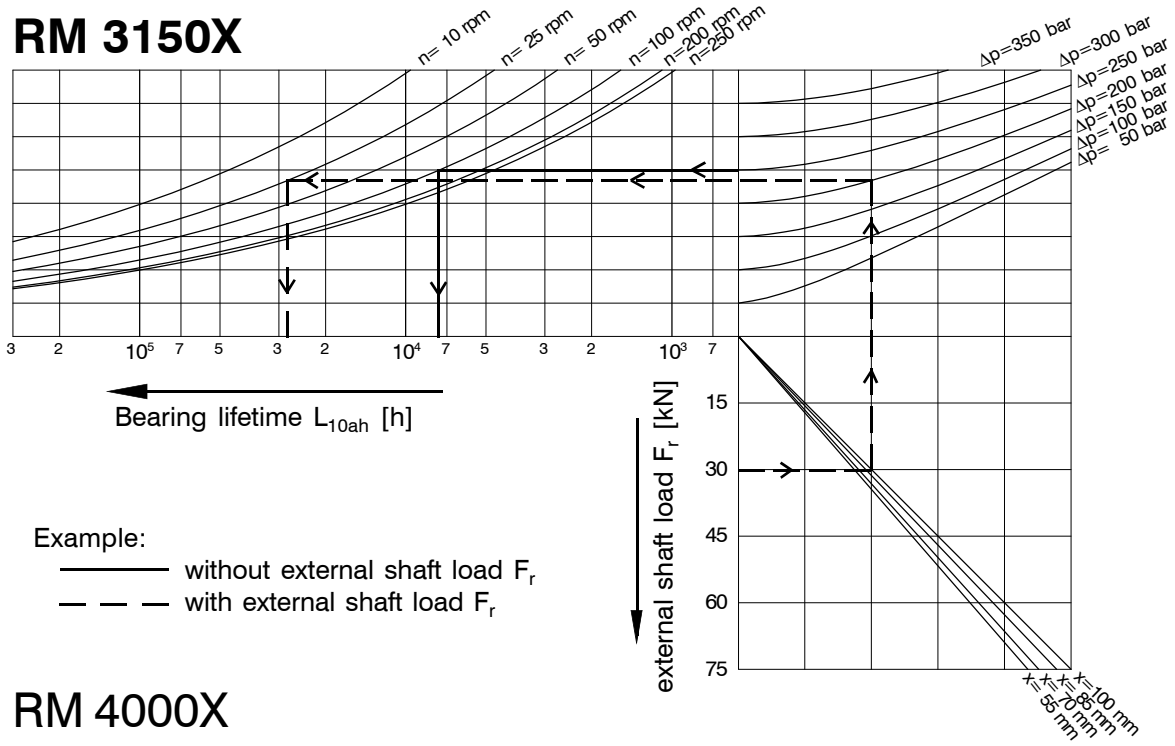
——— without external shaft load F_r

— — — with external shaft load F_r

RM 1600X
RM 1800X
RM 2000X

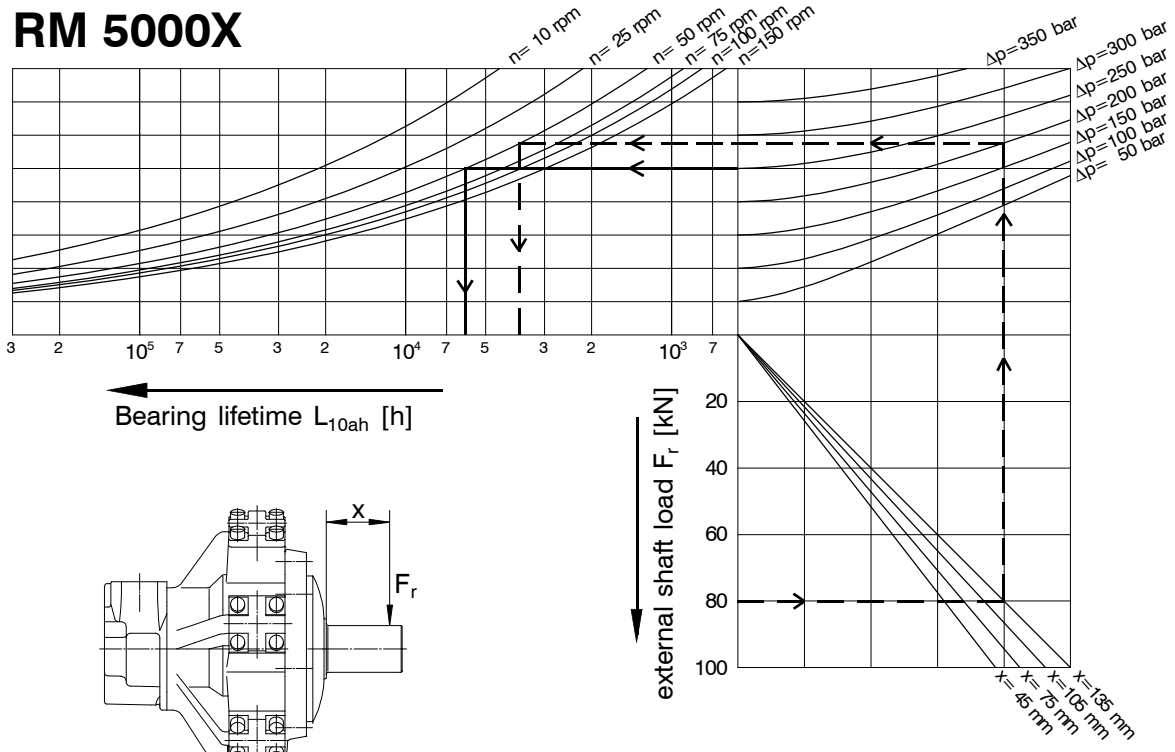


RM 2500X
RM 3150X



Example:
——— without external shaft load F_r
— — — with external shaft load F_r

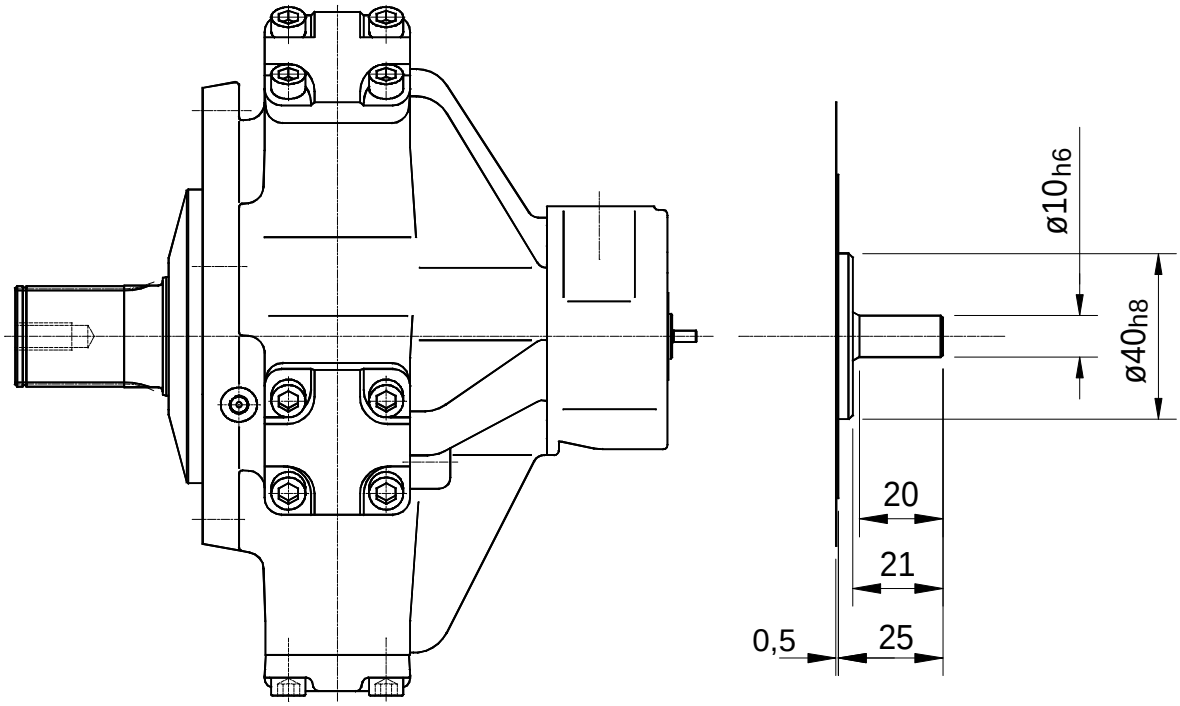
RM 4000X
RM 4500X
RM 5000X

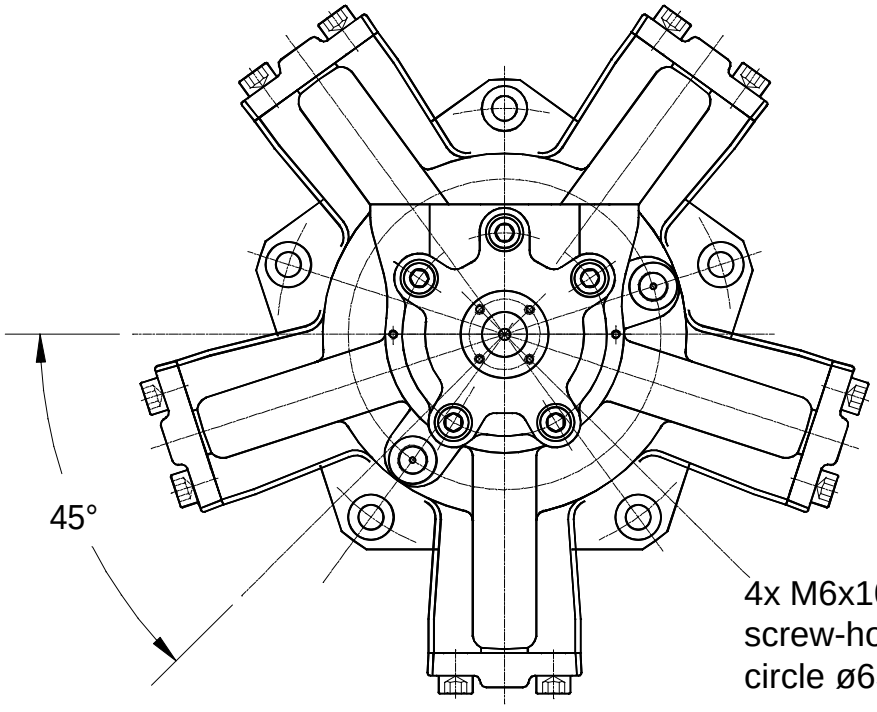


All radial piston motors with type mark „M“ are equipped with an instrument shaft.

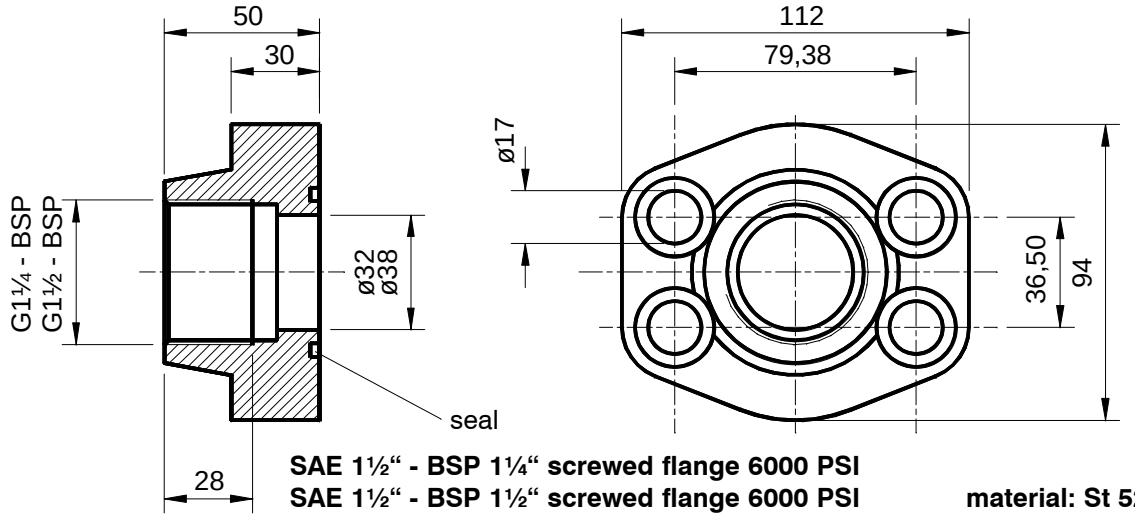
The instrument shaft transmits a maximal torque of 5 Nm.

On request further documentation is available relating to installation of tacho-generators for registration of speed and incremental encoders for registration of turning angle up to 3600 impulses per revolution.



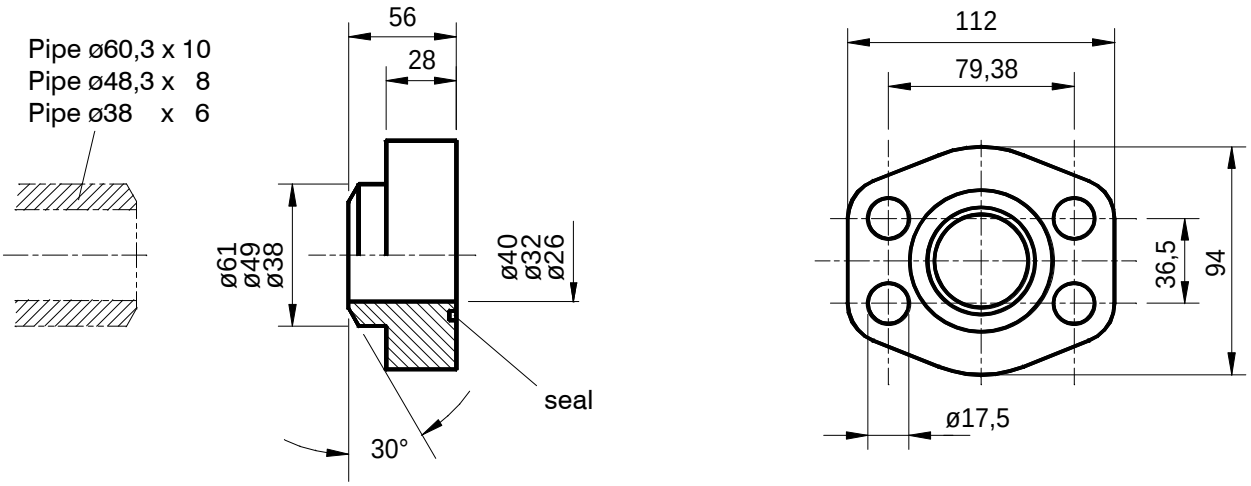


For every radial piston motor 2 flanges, 2 o-ring seals and 8 bolts are required.



SAE 1½“ - BSP 1¼“ screwed flange 6000 PSI
SAE 1½“ - BSP 1½“ screwed flange 6000 PSI **material: St 52.3**

Designation	Seal-material	Thread DIN ISO 228/1	Order-No.
1 SAE 1½“- screwed flange complete, metric 6000 PSI with BSP-thread, with 4 bolts M16 x 50 DIN 912 - 8.8 and 1 o-ring 47,22 x 3,53	NBR	G1¼	59.0000.03
	FPM	G1¼	59.0000.04
	NBR	G1½	59.0000.05
	FPM	G1½	59.0000.06



SAE 1½“ - welding flange 6000 PSI **material: St 52.3**

Designation	Seal-material	Pipe	Order-No.
1 SAE 1½“- welding flange complete, metric 6000 PSI with 4 bolts M16 x 50 DIN 912 - 8.8 and 1 o-ring 47,22 x 3,53	NBR	ø38 x 6	59.0000.13
	FPM	ø38 x 6	59.0000.14
	NBR	ø48,3 x 8	59.0000.15
	FPM	ø48,3 x 8	59.0000.16
	NBR	ø60,3 x 10	59.0000.17
	FPM	ø60,3 x 10	59.0000.18

You know your product, we know our radial piston motors! Give us your conditions, we will calculate all important data for the suitable drive.

1. **Company** _____ **For attention of** _____

Street / P.O.Box _____ **Department** _____

Postal code / City _____ **Phone No.** _____

Country _____ **Fax No.** _____

2. **Operating data:** secondary drive

2.1 Machine type: _____ project: _____

2.2 Machine operating factor at gearboxes k = _____

2.3 Installation position: ☐ horizontal ☐ vertical
☐ drive shaft upwards ☐ drive shaft downwards

2.4 Forces onto drive shaft: ☐ pressure ☐ tension
radial: _____ N axial: _____ N

2.5 Nominal torque T_N = _____ Nm speed n _____ min^{-1} time _____ min

2.6 Continuous torque T_{cont} = _____ Nm speed n _____ min^{-1} time _____ min

2.7 Maximum torque T_{max} = _____ Nm speed n _____ min^{-1} time _____ min

2.8 Minimum torque T_{min} = _____ Nm speed n _____ min^{-1} time _____ min

2.9 Maximum speed n_{max} = _____ min^{-1} time t _____ min

2.10 Minimum speed n_{min} = _____ min^{-1} time t _____ min

2.11 Information about working cycle: _____

_____

2.12 ☐ Secondary drive with valve assembly on the motor

2.13 ☐ Control drive with proportional- / servo valve

2.14 Maximum power: P_{max} = _____ kW continuous power: P_{cont} = _____ kW

2.15 ☐ one-shift-operation ☐ two-shift-operation ☐ three-shift-operation

2.16 Desired bearing life: L_{h10} = _____ hours

2.17 Remarks: _____

_____

_____

3. **Operating data:** primary drive

Hydraulic fluid: _____ operating temperature: Θ= _____ °C

Delivery volume of pump Q_P = _____ l/min

☐ opened circuit ☐ closed circuit

Feeding pressure p_F = _____ bar

System pressure p_{Sys} = _____ bar

Desired operating pressure at T_N p_N ~ _____ bar

Hydraulic fluids:

HLP Mineral oil to DIN 51524 part 2.
Biologically degradable fluids (gaskets NBR / FPM to clarify with supplier of fluid).

HFC Reduce pressure to about 70%, re-calculate bearing life.

HFD Phosphoric acid-ester, FPM-seals (Viton) are necessary.

Filtering:

Max. admissible contamination degree of the fluid to NAS 1638 class 9,
filter recommendation with a minimum retaining value of $\beta_{10} \geq 100$.

For a long life NAS 1638 class 8, filter recommendation with a minimum retaining value of $\beta_5 \geq 100$.

Assembly / attachment:

Installation position optional, leakage oil outlet see below.
Motor align exactly, fastening screws min. 10.9.
For frequent reversing, 2 fastening screws to be used as dowel screws.

Coupling:

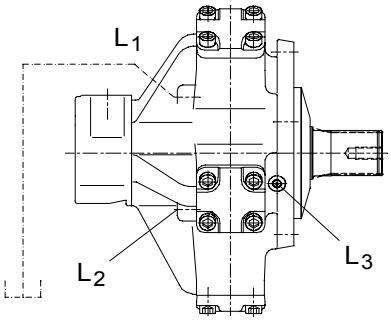
Install the coupling with a screw (not with a hammer).

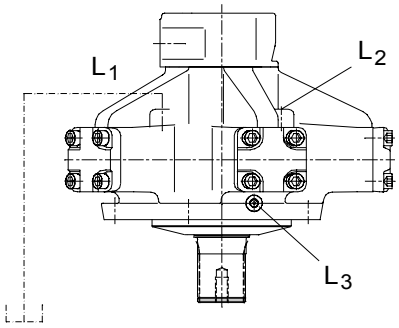
Pipelines:

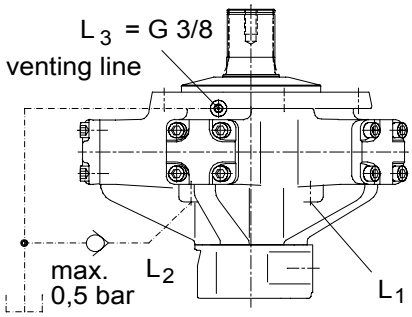
The motor has flange connections SAE J518C 1½“ - 6000 PSI.
Use flange acc. to page 21.

Leakage line:

Before starting fill the motor with hydraulic fluid. Lay the leakage line in a way that the motor cannot drain off and no big air bubble builds up within the housing.







Flushing:

Connect the flushing line (with about 5 - 8 liters/minute, 1.5 bar maximum) in that way that the oil inlet enters at the lowest leakage connection L_1 / L_2. The drain L_3 may be connected into L, or L_2, which ever is the return line, via a small 0.5 bar check valve.

Changes reserved!

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