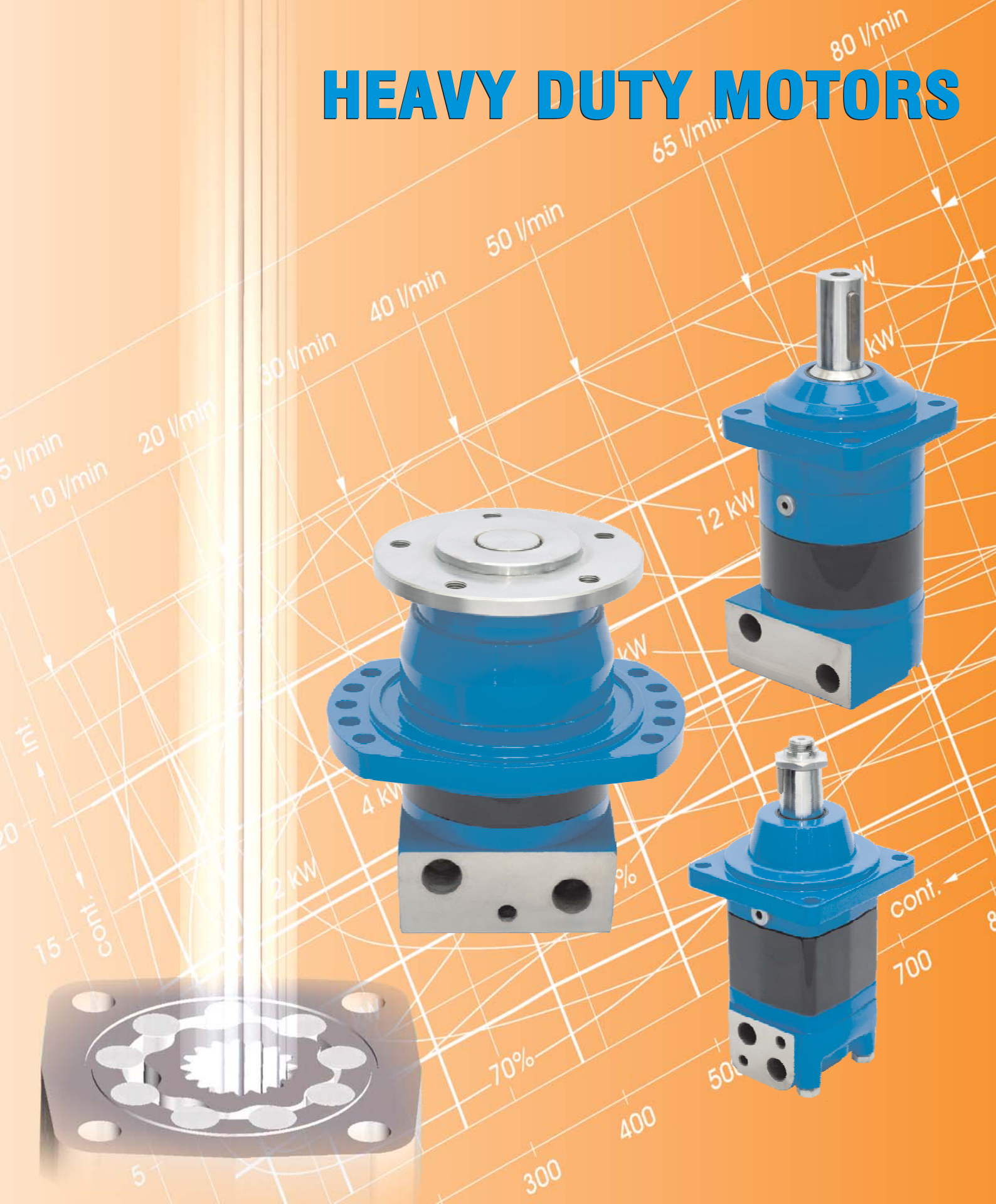
TÜVRheinland® CERT ISO 9001

M+S HYDRAULIC

HEAVY DUTY MOTORS



HEAVY DUTY HYDRAULIC MOTORS

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DISC VALVE HYDRAULIC MOTORS

GENERAL INFORMATION:

Orbit motors convert hydraulic energy (pressure, oil flow) into mechanical energy (torque, speed). Hydraulic orbit motors operate on the principle of an internal gear (rotor) rotating within a fixed external gear (stator). The internal gear transmits the torque generated by the application of pressure from hydraulic oil fed into motor which is then delivered via the motor's output shaft. Orbit motors have high starting torque and constant output torque at wide speed range. The output shaft runs on tapered roller bearings and can absorb high axial and radial forces.

DISTRIBUTOR VALVE
MSWM, MTK, MTM, TMF, MVM, MVMC, VMF series motors have disk valve: the distributor valve has been separated from output shaft and is driven by short cardan shaft. A balance plate counterbalances the hydraulic forces around the distributor valve. It gives the motors high efficiency - even at high pressures, and good starting characteristics.

GEAR WHEEL SET
There are two forms of gear wheel set: Gerotor set has plain teeth and Roll-gerotor set with teeth fitted with rollers.
MSWM, MTK, MTM, TMF, MVM, MVMC, VMF series motors have roll-gerotor set. The rollers reduce local stress and the tangential reaction forces on the rotor reducing friction to a minimum. This gives long operating life and better efficiency even at continuous high pressures.

FEATURES:

Standard Motor The standard motor mounting flange is located as close to the output shaft as possible. This type of mounting supports the motor close to the shaft load. This mounting flange is also compatible with many standard gear boxes.

Wheel Motor The wheel motor mounting flange is located near the center of the motor which permits part or all of the motor to be located inside the wheel or roller hub. In traction drive applications, loads can be positioned over the motor bearings for best bearing life. This wheel motor mounting flange provides design flexibility in many applications.

Short Motor This motor is assembled without the output shaft, bearings and bearing housing and has the same drive components as the standard motors. The short motor is especially suited for applications such as gear boxes, winch, reel and roll drives. Short motor applications must be designed with a bearing supported internal spline to mate with the short motor drive. Product designs using these hydraulic motors provide considerable cost savings.

Low Leakage LL Series hydraulic motors are designed to operate at the whole standard range of working conditions (pressure drop and frequency of rotation), but with considerable decreased volumetric losses in the drain ports. This motors are suitable for hydraulic systems with series-connected motors with demands for low leakage.

Low Speed Valve LSV feature optimizes the motor for low-speed performance. Motors with this valving provide very low speed while maintaining high torque. They are designed to run continuously at low speed (up to 200 RPM) at normal pressure drop and reduced flow. Optimal run is guaranteed at frequency of rotation from 20 to 50 RPM. Motors with this valving have an increased starting pressure and are not recommended for using at pressure drop less than 40 bar [580 PSI].

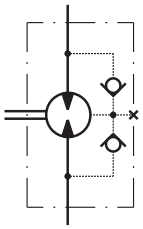
Motors with Speed Sensor Motors are available with integrated inductive speed sensor. The output signal is a standardized voltage signal that can be used to control the speed of a motor. The torque and the radial load of the motor are not affected by the installation of speed sensor.

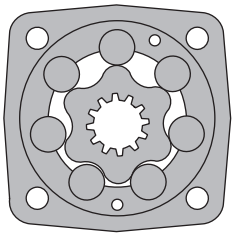
HYDRAULIC MOTORS MSWM



APPLICATION

» Sawmill machines
» Woodworking machines
» Metal working machines
» Agriculture machines
» Road building machines
» Mining machinery
» Food industries
» Special vehicles etc.





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Dimensions and mounting 6
Permissible shaft loads 6
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Order code 7

OPTIONS

» Model - Disc valve, roll-gerotor
» Wheel mount
» Side and rear ports
» Shafts - straight, splined and tapered
» Metric and BSPP ports
» Other special features

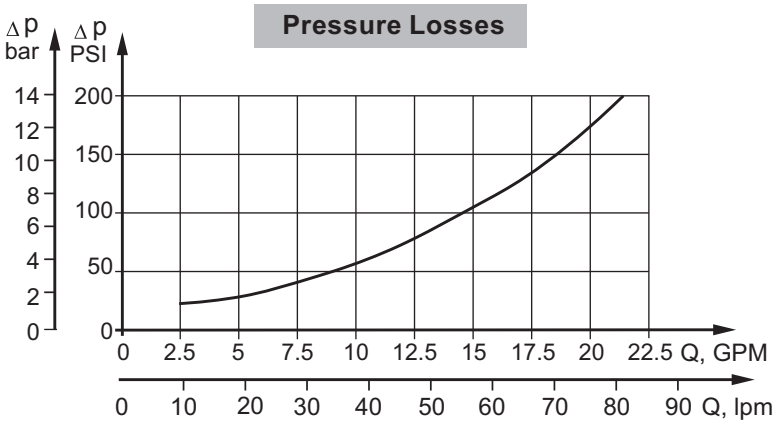
GENERAL

Max. Displacement, cm^3/rev [in^3/rev]	397 [24.2]
Max. Speed, [RPM]	560
Max. Torque, daNm [lb-in]	cont.: 90 [7965] int: 110 [9735]
Max. Output, kW [HP]	24 [32.2]
Max. Pressure Drop, bar [PSI]	cont.: 200 [2900] int: 225 [3270]
Max. Oil Flow, lpm [GPM]	90 [24]
Min. Speed, [RPM]	5
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, ^oC [^oF]	-40÷140 [-40÷284]
Optimal Viscosity range, mm^2/s [SUS]	20÷75 [98÷347]
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 micron)

Oil flow in drain line

Pressure drop bar [PSI]	Viscosity mm^2/s [SUS]	Oil flow in drain line lpm [GPM]
140 [2030]	20 [98]	1,5 [.396]
	35 [164]	1 [.264]
210 [3045]	20 [98]	3 [.793]
	35 [164]	2 [.528]

Pressure Losses



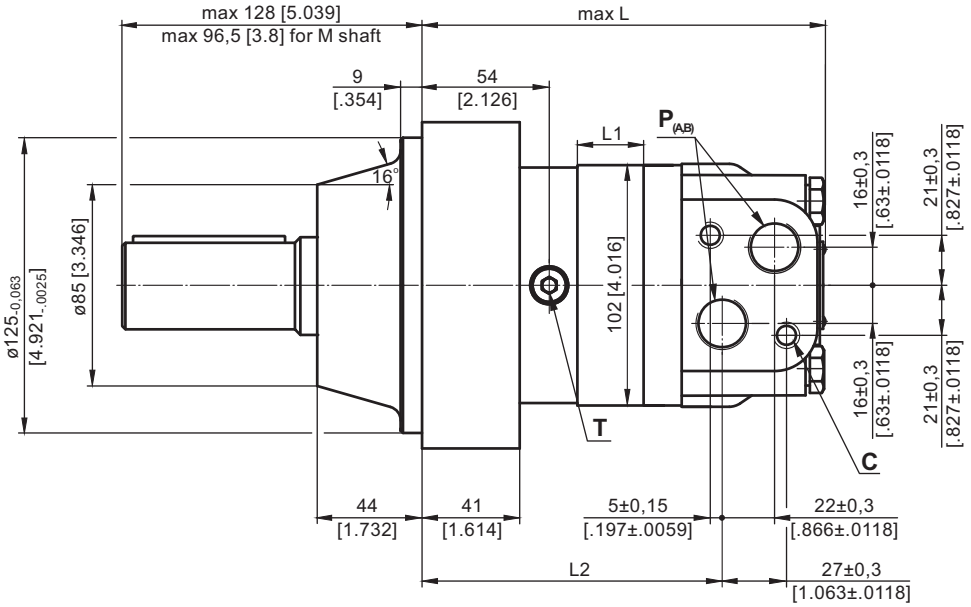
SPECIFICATION DATA

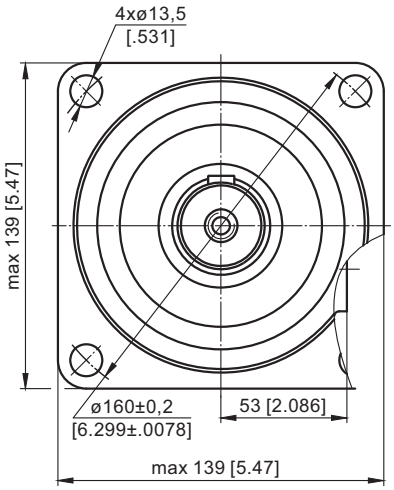
Type		MSWM 160	MSWM 200	MSWM 250	MSWM 315	MSWM 400
Displacement, cm^3/rev [in^3/rev]		159,7 [9.74]	200 [12.2]	250 [15.3]	314,9 [19.2]	397 [24.2]
Max. Speed, [RPM]	Cont.	470	375	300	240	185
	Int.*	560	450	360	285	225
Max. Torque daNm [lb-in]	Cont.	46 [4070]	56,6 [5010]	70,8 [6270]	90,0 [7965]	90,0 [7965]
	Int.*	51,5 [4560]	64,5 [5710]	80,6 [7135]	96,0 [8500]	97,0 [8585]
	Peak**	51,5 [4560]	65 [5755]	80,6 [7135]	108 [9560]	110 [9735]
Max. Output kW [HP]	Cont.	18,6 [24.9]	18,1 [24.3]	18,0 [24.1]	17,0 [22.8]	11,0 [14.7]
	Int.*	24,0 [32.2]	24,0 [32.2]	23,8 [31.9]	20,2 [27.1]	12 [16.1]
Max. Pressure Drop bar [PSI]	Cont.	200 [2900]	200 [2900]	200 [2900]	200 [2900]	160 [2320]
	Int.*	225 [3270]	225 [3270]	225 [3270]	220 [3190]	175 [2540]
	Peak**	225 [3270]	225 [3270]	225 [3270]	225 [3270]	200 [2900]
Max. Oil Flow lpm [GPM]	Cont.	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
	Int.*	90 [24]	90 [24]	90 [24]	90 [24]	90 [24]
Max. Inlet Pressure bar [PSI]	Cont.	210 [3045]	210 [3045]	210 [3045]	210 [3045]	210 [3045]
	Int.*	250 [3625]	250 [3625]	250 [3625]	250 [3625]	250 [3625]
	Peak**	300 [4350]	300 [4350]	300 [4350]	300 [4350]	300 [4350]
Max. Return Pressure with Drain Line bar [PSI]	Cont.	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]
	Int.*	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]
	Peak**	210 [3045]	210 [3045]	210 [3045]	210 [3045]	210 [3045]
Max. Starting Pressure with Unloaded Shaft, bar [PSI]		10 [145]	10 [145]	10 [145]	10 [145]	10 [145]
Min. Starting Torque daNm [lb-in]		36,9 [3270]	46,2 [4090]	58,0 [5135]	73,8 [6530]	72,0 [6370]
Min. Speed***, [RPM]		6	6	6	5	5
Weight, kg [lb]		15,3 [33.7]	15,7 [34.6]	16,2 [35.7]	16,9 [37.3]	17,8 [39.2]

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% of every minute.
*** For speeds lower than given, consult factory or your regional manager.

1. Intermittent speed and intermittent pressure must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm^2/s [70 SUS] at 50°C [122°F].
5. Recommended maximum system operating temperature is 82°C [180°F].
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

DIMENSIONS and MOUNTING DATA

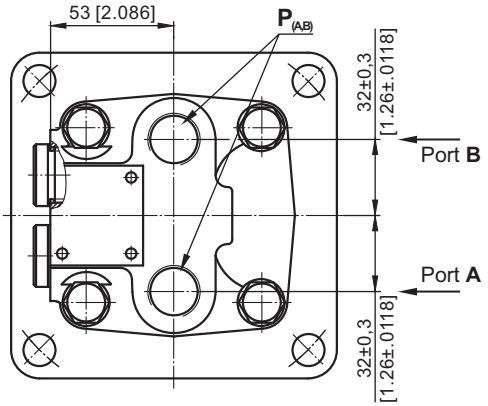




C : 2xM10 - 12 mm [.47 in] depth
$P_{(A,B)}$: 2xG1/2 or 2xM22x1,5 - 15 mm [.59 in] depth
T : G ¼ or M14x1,5 - 12 mm [.47 in] depth (plugged)

Type	L, mm [in]	L_2, mm [in]	L_1, mm [in]
MSWM 160	170,5[6.71]	129,3[5.09]	27,8 [1.09]
MSWME 160	177,5[6.99]		
MSWM 200	177,5[6.99]	136,3[5.37]	34,8 [1.37]
MSWME 200	184,5[7.26]		
MSWM 250	186,0[7.32]	145,0[5.71]	43,5 [1.71]
MSWME 250	193,0[7.60]		
MSWM 315	197,5[7.78]	157,3[6.19]	54,8 [2.16]
MSWME 315	206,5[8.13]		
MSWM 400	212,0[8.35]	171,0[6.73]	69,4 [2.73]
MSWME 400	219,0[8.62]		

E Rear Ports



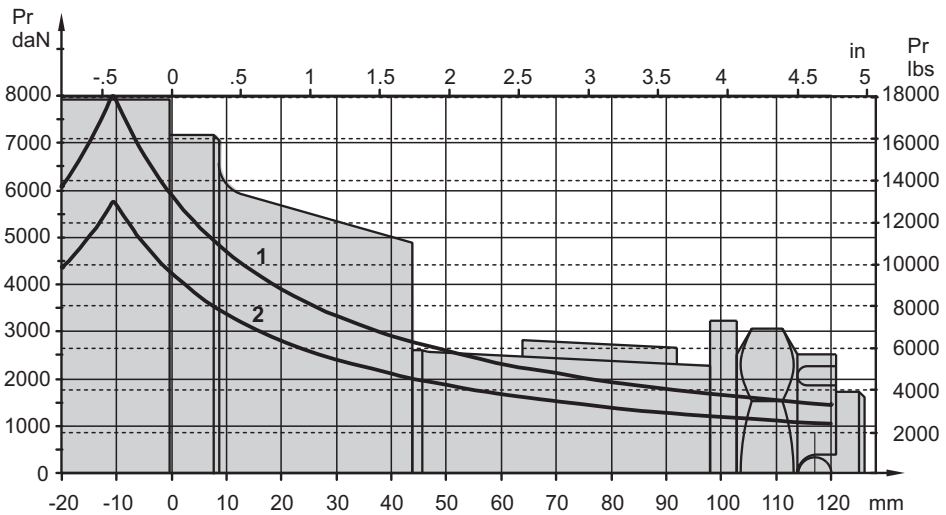
Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

mm [in]

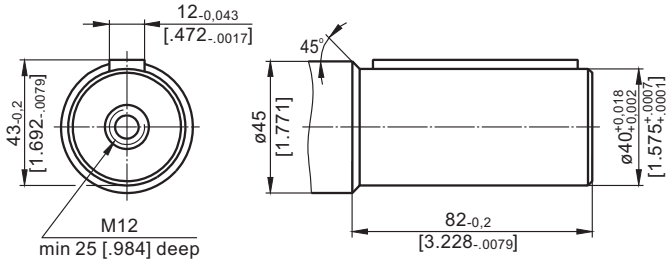
PERMISSIBLE SHAFT LOADS

The output shaft runs in tapered bearings that permit high axial and radial forces.
Curve "**1**" shows max. radial shaft load at bearing life of 2000 hours at 100 RPM.
Curve "**2**" shows max. radial shaft load at bearing life of 3000 hours at 200 RPM.

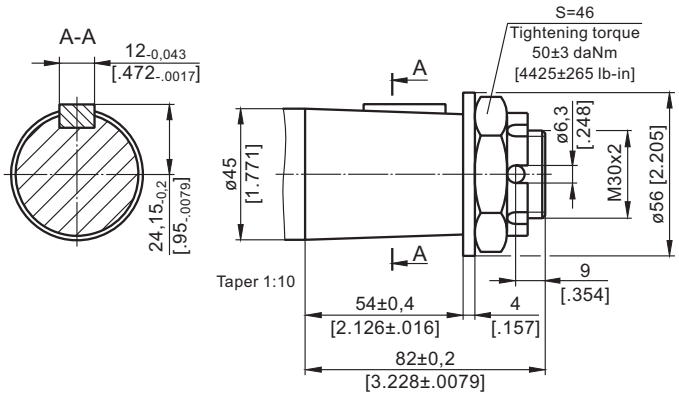


SHAFT EXTENSIONS

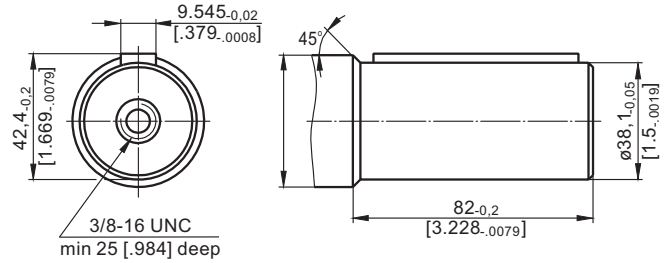
C - ø40 straight, Parallel key A12x8x70 DIN 6885
Max. Torque 132,8 daNm [11755 lb-in]



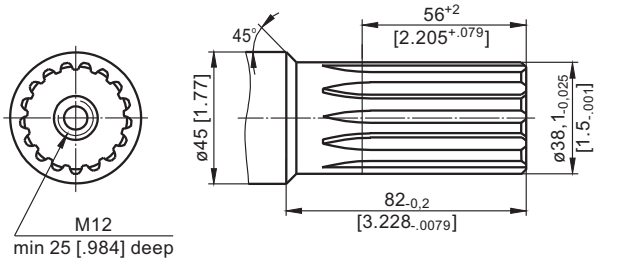
K - tapered 1:10, Parallel key B12x8x28 DIN 6885
Max. Torque 210,7 daNm [18650 lb-in]



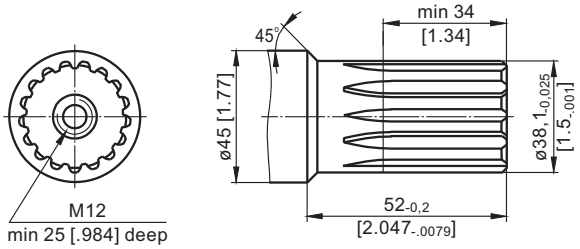
CO - ø1½" straight, Parallel key 3/8"x3/8"x 2¼" BS46
Max. Torque 132,8 daNm [11755 lb-in]



SH - ø1½" splined 17T, DP 12/24 ANSI B92.1-1976
Max. Torque 132,8 daNm [11755 lb-in]



M - ø1½" splined 17T, DP 12/24 ANSI B92.1-1976
Max. Torque 132,8 daNm [11755 lb-in]



mm [in]

ORDER CODE

	1	2	3	4	5	6
M S W M						

Pos.1 - Port type

omit - Side ports
E - Rear ports

Pos.2 - Displacement code

160 - 159,7 cm³/rev [9.74 in³/rev]
200 - 200,0 cm³/rev [12.20 in³/rev]
250 - 250,0 cm³/rev [15.30 in³/rev]
315 - 314,9 cm³/rev [19.20 in³/rev]
400 - 397,0 cm³/rev [24.20 in³/rev]

Pos.4 - Shaft Extensions*

C - ø40 straight, Parallel key A12x8x70 DIN6885
CO - ø1½" straight, Parallel key 3/8"x3/8"x2¼" BS46
K - ø45 tapered 1:10, Parallel key B12x8x28 DIN6885
SH - ø1½" splined 17T ANS B92.1-1976
M - ø1½" splined 17T ANS B92.1-1976

Pos.4 - Ports

omit - BSPP (ISO 228)
E - Metric (ISO 262)

Pos.5 - Additional Options (see page 71)

Pos.6 - Design Series

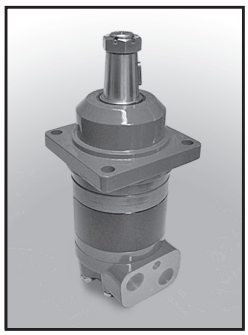
omit - Factory specified

NOTES:

* The permissible output torque for shafts must not be exceeded!

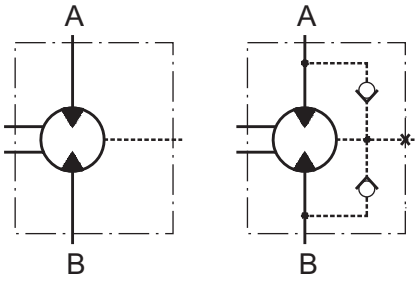
The hydraulic motors are mangano-phosphatized as standard.

HYDRAULIC MOTORS MTK



APPLICATION

- Conveyors
- Metal working machines
- Machines for agriculture
- Road building machines
- Mining machinery
- Food industries
- Special vehicles
- Plastic and rubber machinery etc.



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Shaft extensions 17
Permissible shaft loads 18
Order code 18

OPTIONS

- Model- Disc valve, roll-gerotor
- Flange mount with wheel mount
- Side and rear ports
- Shafts- straight, splined and tapered
- Metric, SAE and BSPP ports
- Other special features

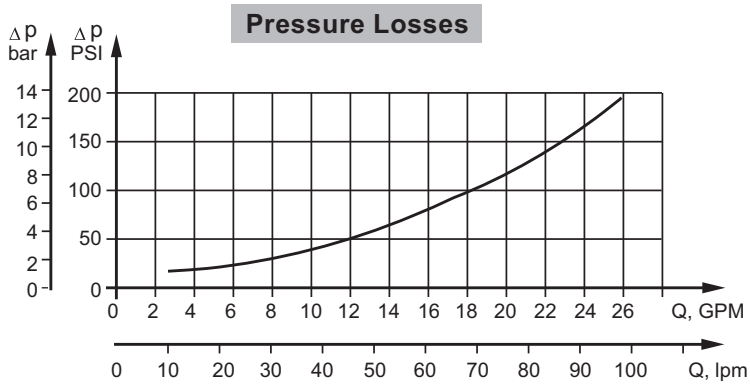
GENERAL

Max. Displacement, cm^3/rev [in^3/rev]	502,4 [30.65]
Max. Speed, [RPM]	630
Max. Torque, daNm [lb-in]	cont.: 109 [9648] int.: 136 [12037]
Max. Output, kW [HP]	27 [36.2]
Max. Pressure Drop, bar [PSI]	cont.: 250 [3626] int.: 325 [4714]
Max. Oil Flow, lpm [GPM]	100 [26.4]
Min. Speed, [RPM]	10
Permissible Shaft Loads, daN [lbs]	P_a=6000 [13488]
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, ^oC [^oF]	-40÷140 [-40÷284]
Optimal Viscosity range, mm^2/s [SUS]	20÷75 [98÷347]
Filtration	ISO code: 18/16/13 According to ISO 4406-1999

Oil flow in drain line

Pressure drop bar [PSI]	Viscosity mm^2/s [SUS]	Oil flow in drain line lpm [GPM]
100 [1450]	20 [98]	2,5 [.660]
	35 [164]	1,8 [.476]
140 [2030]	20 [98]	3,5 [.925]
	35 [164]	2,8 [.740]

Pressure Losses



SPECIFICATION DATA

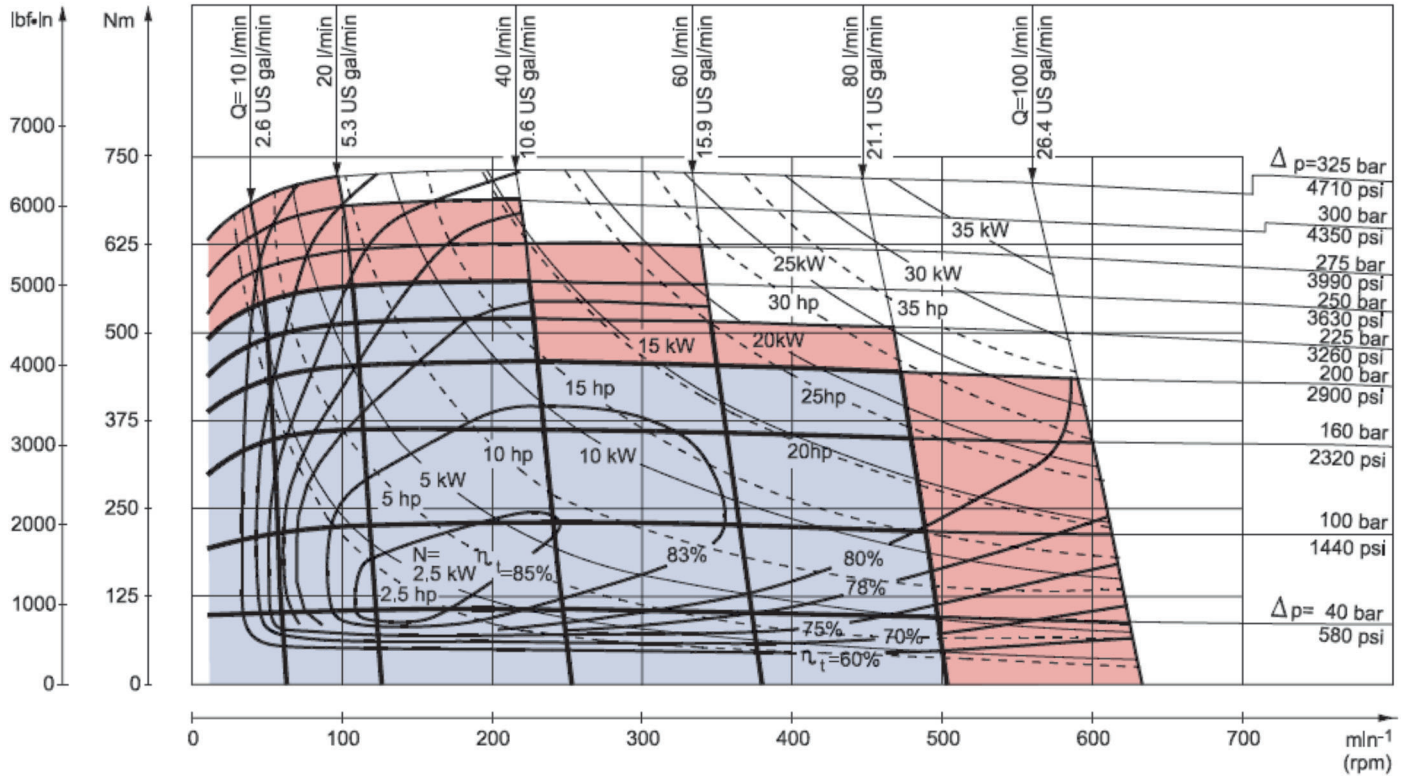
Type		MTK 160	MTK 200	MTK 250	MTK 315	MTK 400	MTK 470	MTK 500
Displacement, cm^3/rev [in^3/rev]		157,9 [9.63]	201,3 [12.28]	252,2 [15.38]	314,9 [19.2]	396,8 [24.2]	470,5 [28.7]	502,4 [30.65]
Max. Speed, [RPM]	Cont.	505	400	320	255	200	170	159
	Int.*	630	500	400	315	250	210	199
Max. Torque, daNm [lb-in]	Cont.	57 [5045]	72 [6373]	91 [8055]	105 [9293]	107 [9470]	102 [9028]	109 [9648]
	Int.*	72,5 [6420]	92 [8143]	107 [9470]	131 [11595]	140 [12390]	133 [11772]	136 [12037]
Max. Output, kW [HP]	Cont.	22 [29.5]	22 [29.5]	21 [28.2]	20 [26.8]	17,5 [23.5]	14 [18.8]	14 [18.8]
	Int.*	27 [36.2]	27 [36.2]	25 [33.5]	23,5 [31.5]	22 [29.5]	17,5 [23.5]	17 [22.8]
Max. Pressure Drop, bar [PSI]	Cont.	250 [3626]	250 [3626]	250 [3626]	250 [3626]	200 [2900]	160 [2320]	160 [2320]
	Int.*	325 [4714]	325 [4714]	300 [4350]	300 [4350]	250 [3626]	200 [2900]	200 [2900]
Max. Inlet Pressure, bar [PSI]	Cont.	250 [3626]						
	Int.*	350 [5077]						
Max. Oil Flow, lpm [GPM]	Cont.	80 [21.1]						
	Int.*	100 [26.4]						
Max. Starting Pressure with Unloaded Shaft, bar [PSI]		8 [116]	8 [116]	7 [102]	7 [102]	7 [102]	7 [102]	7 [102]
Min. Starting Torque, daNm [lb-in]	at max. pressure drop cont.	43 [3806]	54 [4780]	68 [6020]	79 [6992]	80 [7080]	83 [7346]	84 [7435]
	at max. pressure drop int.*	54.5 [4824]	69 [6107]	80 [7080]	98,5 [8720]	105 [9294]	105 [9294]	105 [9294]
Min. Speed**, RPM**		10						
Max. Return Pressure without Drain Line, bar [PSI]		see diagram						
Max. Return Pressure with Drain Line, bar [PSI]	Cont.	140 [2030]						
	Int.*	175 [2540]						
	Peak*	210 [3046]						
Weight, lb [kg]	MTKW	16,0 [35.3]	16,5 [36.4]	17,0 [37.5]	17,5 [38.6]	18,0 [39.7]	18,5 [40.8]	19,0 [41.9]
	MTKC	16,9 [37.3]	17,4 [38.4]	17,9 [39.5]	18,4 [40.6]	18,9 [41.7]	19,4 [42.8]	19,9 [43.9]
	MTKF	14,2 [31.3]	17,7 [32.4]	15,2 [33.5]	15,7 [34.6]	16,2 [35.7]	16,7 [36.8]	17,2 [37.9]

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% of every minute.
*** For speeds of 5 RPM lower than given, consult factory or your regional manager
**** For speeds lower than given, consult factory or your regional manager.

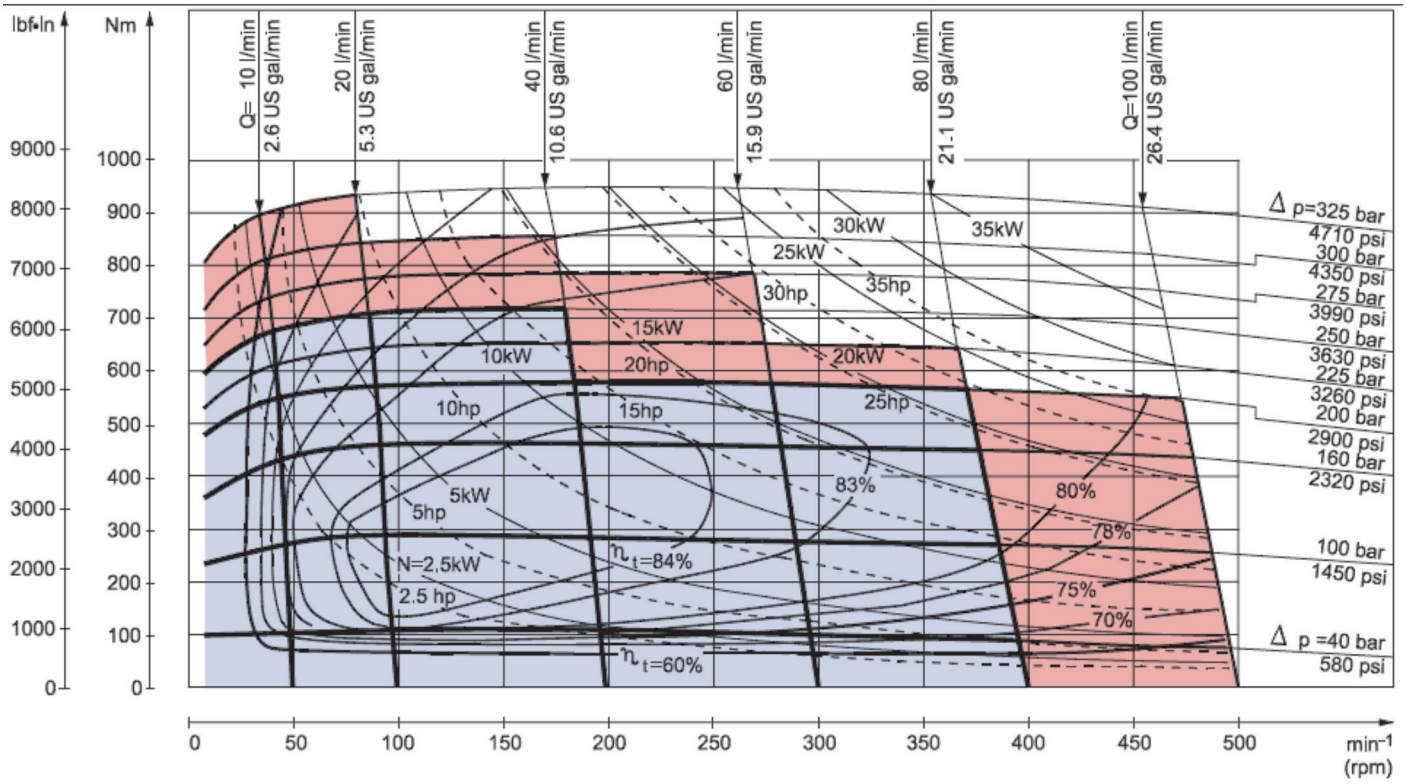
1. Intermittent speed and intermittent pressure must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm^2/s [70 SUS] at 50°C [122°F].
5. Recommended maximum system operating temperature is 82°C [180°F].
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

FUNCTION DIAGRAMS

MTK 160



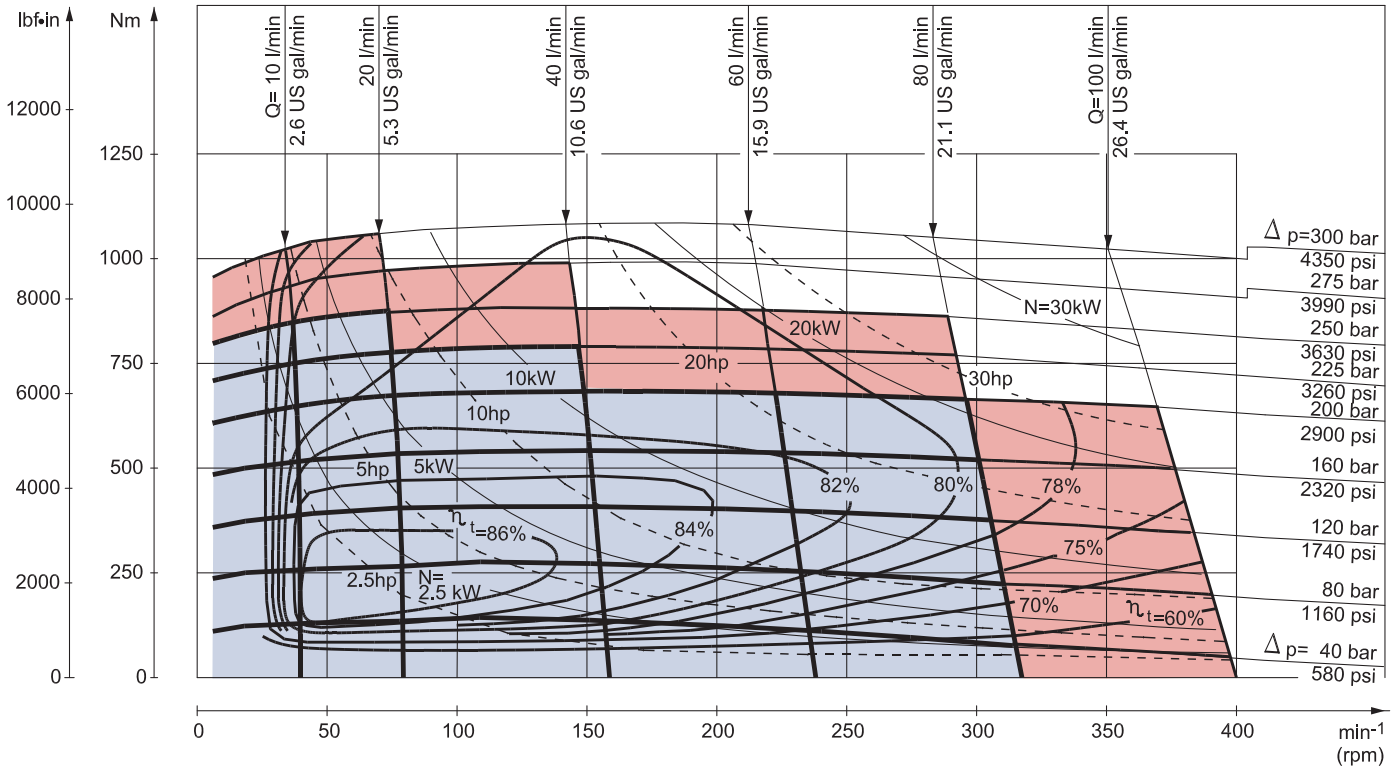
MTK 200



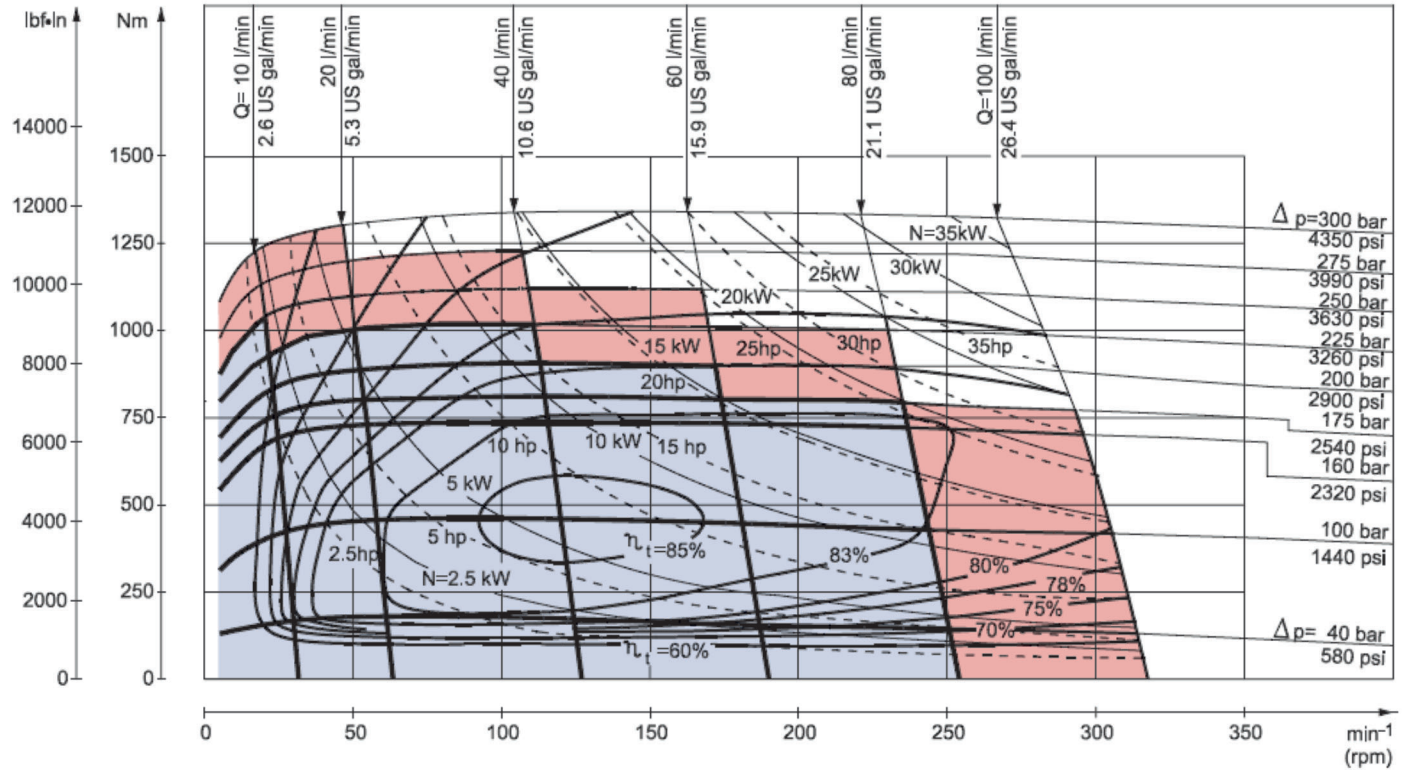
The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5 PSI÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

FUNCTION DIAGRAMS

MTK 250



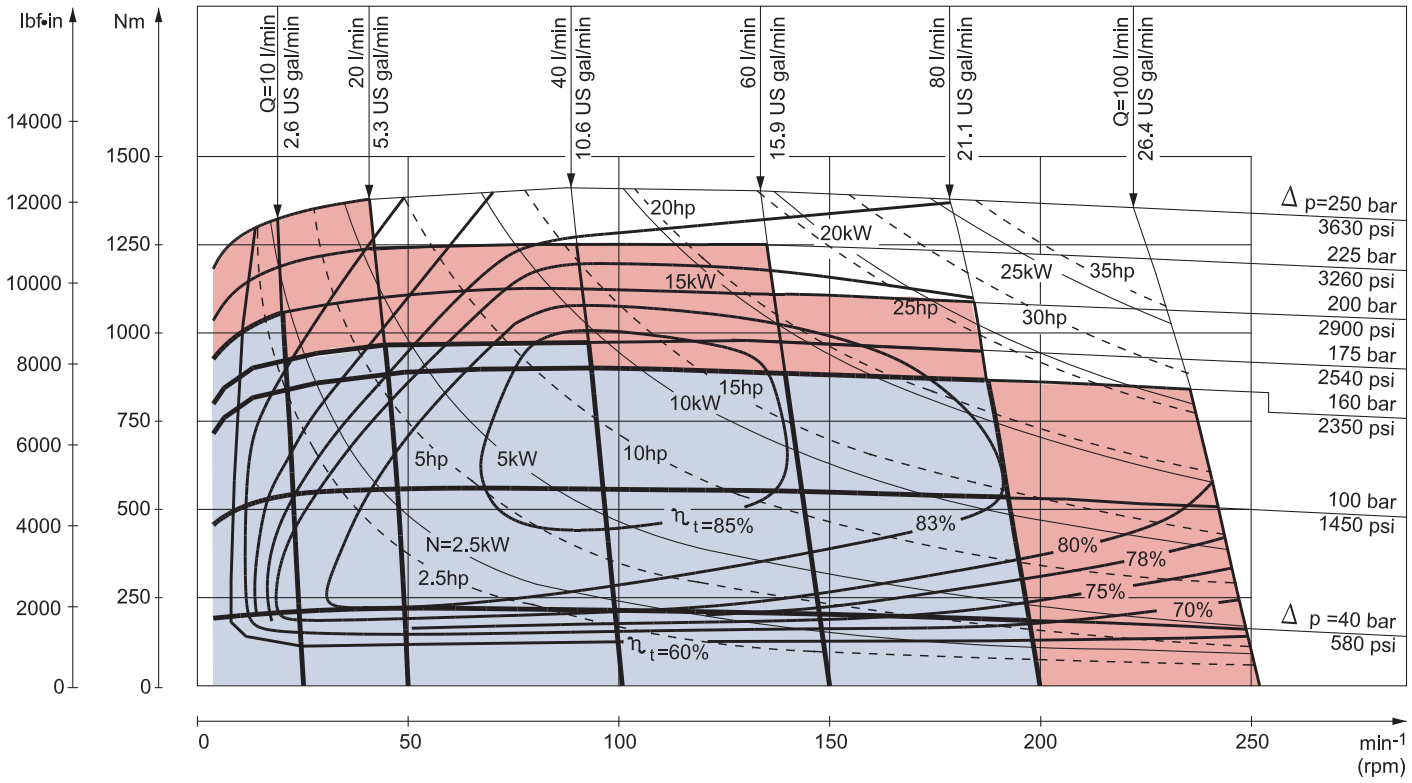
MTK 315



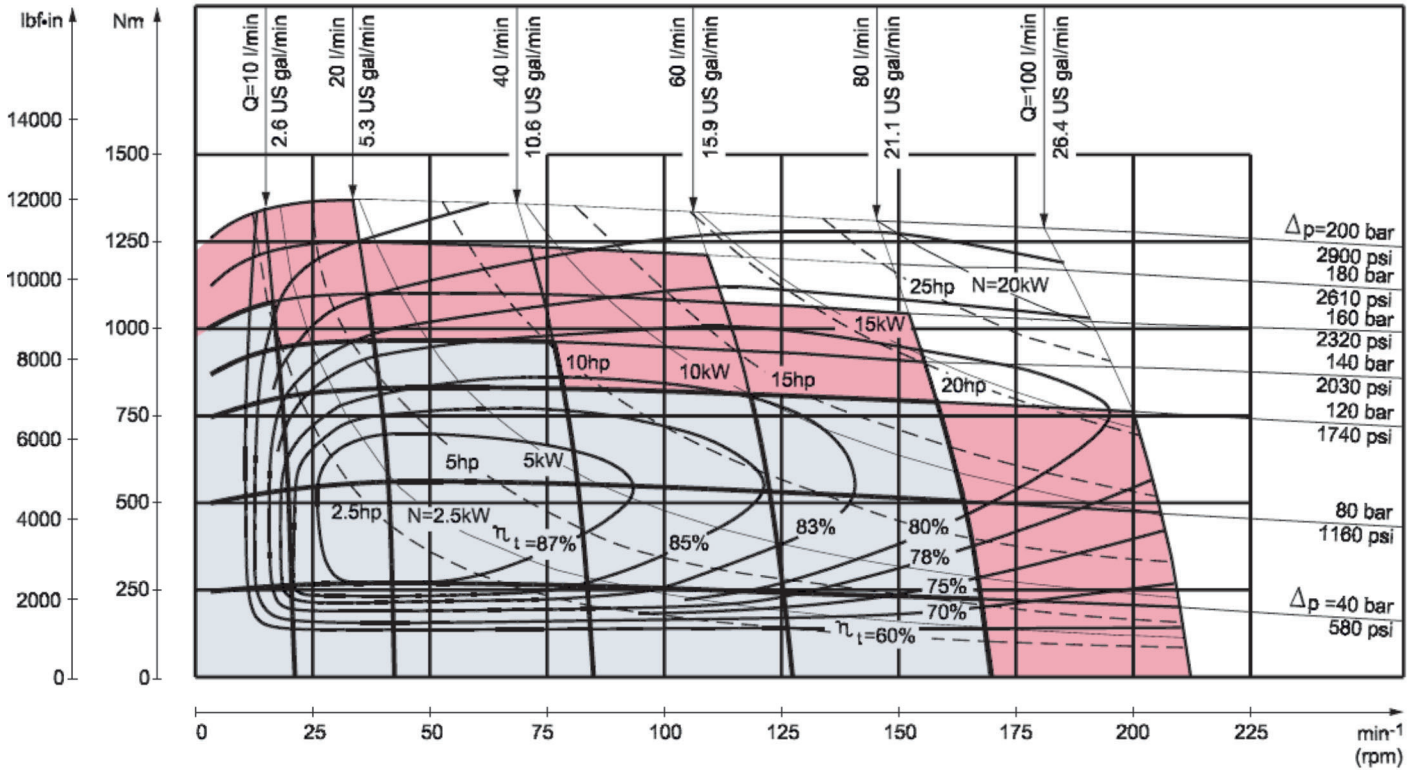
The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5 PSI÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

FUNCTION DIAGRAMS

MTK 400

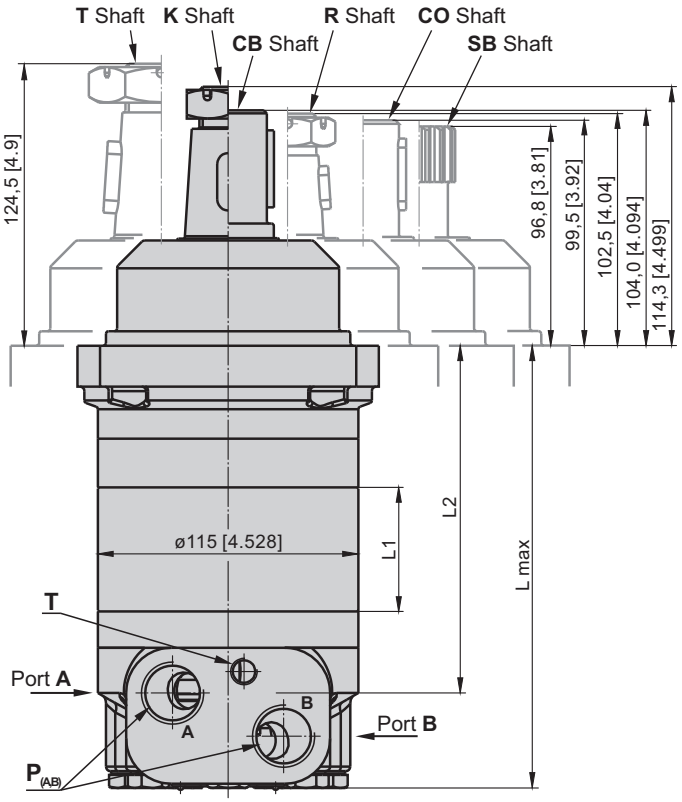


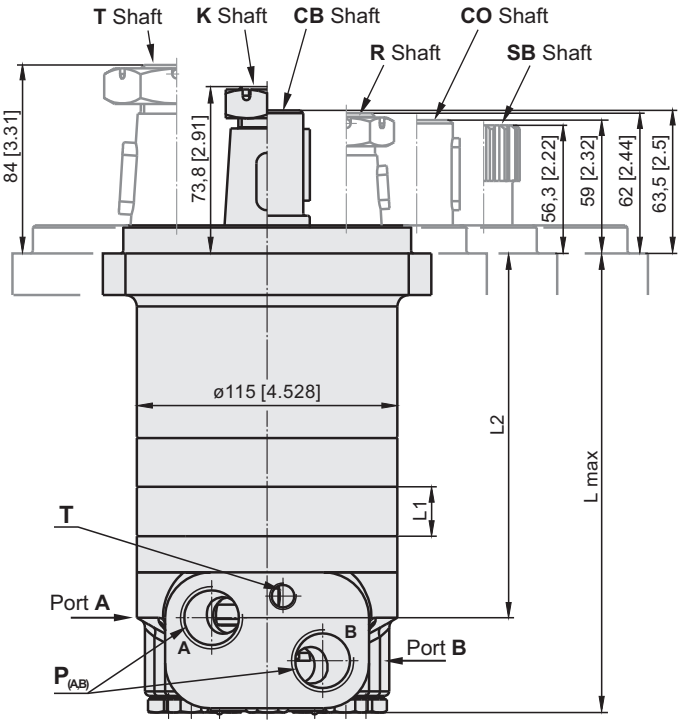
MTK 470



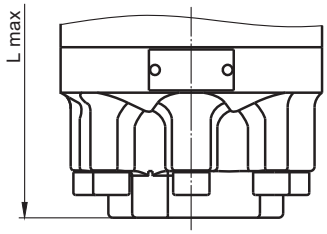
The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5 PSI÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

DIMENSIONS - MTK W and MTK C





E Rear ports



Flange Dim. See Page 15

Ports Dim. See Page 16

Shaft Dim. See Page 17

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

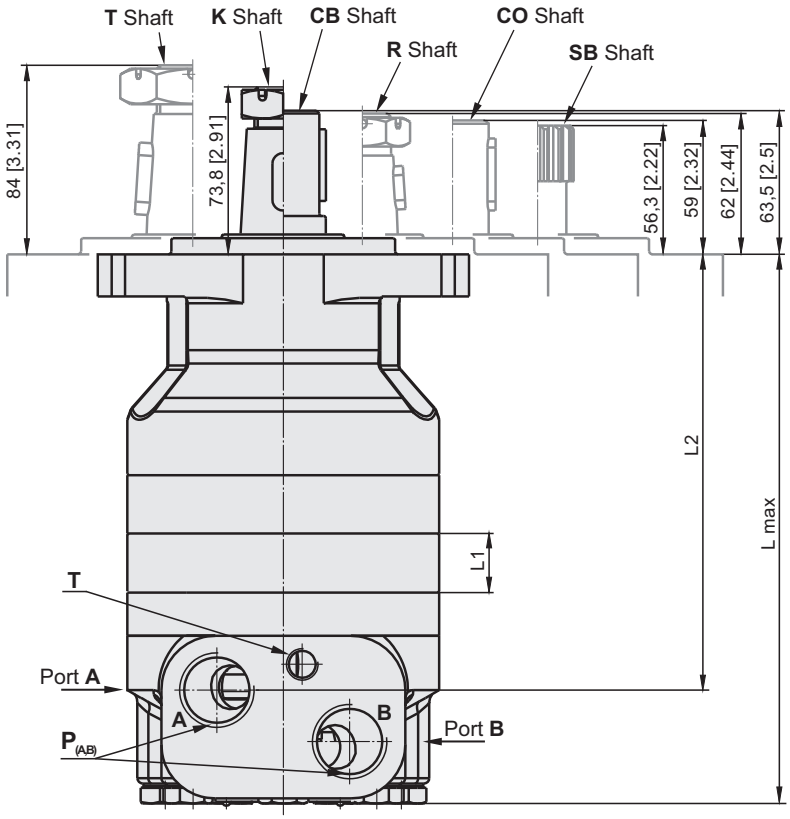
Warning: Drain line should always be used (if no check valves)!

mm [in]

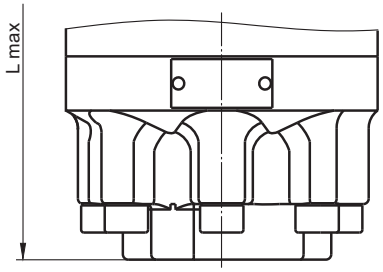
	Versions				
	Side			Rear	
	2	3	4	6	8
$P_{(A,B)}$	2xG3/4 17 mm [.67 in] depth	2xM27x2 17 mm [.67 in] depth	2x1 1/16-12UN 15 mm [.59 in] depth	2xG1/2 15 mm [.59 in] depth	2x 7/8 -14UNF 17 mm [.67 in] depth
T	G1/4 12 mm [.472 in] depth	M14x1,5 12 mm [.472 in] depth	7/16 -20UNF 12 mm [.472 in] depth	G1/4 12 mm [.472 in] depth	7/16 -20UNF 12 mm [.472 in] depth

Type	L_{max}, mm [in]	L_2, mm [in]	*L_E, mm [in]	Type	L_{max}, mm [in]	L_2, mm [in]	*L_E, mm [in]	L_1, mm [in]
MTKW160	162,7 [6.41]	120,3 [4.74]	176,3 [6.94]	MTKC160	203,2 [8.00]	160,8 [6.33]	216,8 [8.54]	21,8 [.86]
MTKW200	168,7 [6.64]	126,3 [4.97]	182,3 [7.18]	MTKC200	209,2 [8.24]	166,8 [6.57]	222,8 [8.77]	27,8 [1.09]
MTKW250	175,7 [6.92]	133,3 [5.25]	189,3 [7.45]	MTKC250	216,2 [8.51]	173,8 [6.84]	229,8 [9.05]	34,8 [1.37]
MTKW315	183,4 [7.22]	142,0 [5.59]	198,0 [7.79]	MTKC315	224,9 [8.85]	182,5 [7.19]	238,5 [9.39]	43,5 [1.71]
MTKW400	195,7 [7.70]	153,3 [6.04]	209,3 [8.24]	MTKC400	236,2 [9.29]	193,8 [7.63]	249,8 [9.83]	54,8 [2.16]
MTKW470	205,9 [8.12]	163,5 [6.44]	219,5 [8.64]	MTKC470	246,4 [9.70]	204,0 [8.03]	260,0 [10.24]	65,0 [2.56]
MTKW500	209,3 [8.24]	167,9 [6.61]	223,9 [8.81]	MTKC500	250,8 [9.87]	208,4 [8.20]	264,4 [10.41]	69,4 [2.73]

DIMENSIONS - MTK F



E Rear ports



Flange Dim. See Page 15

Ports Dim. See Page 16

Shaft Dim. See Page 17

Warning: Drain line should always be used (if no check valves)!

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

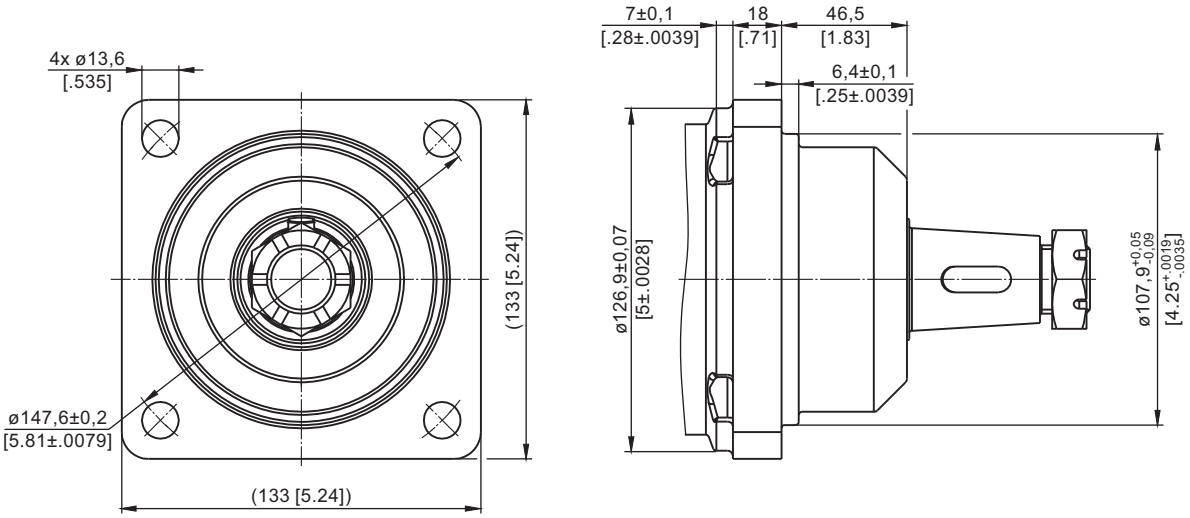
	Versions				
	Side			Rear	
	2	3	4	6	8
$P_{(A,B)}$	2xG3/4 17 mm [.67 in] depth	2xM27x2 17 mm [.67 in] depth	2x1 1/16-12UN 15 mm [.59 in] depth	2xG1/2 15 mm [.59 in] depth	2x 7/8 -14UNF 17 mm [.67 in] depth
T	G1/4 12 mm [.472 in] depth	M14x1,5 12 mm [.472 in] depth	7/16-20UNF 12 mm [.472 in] depth	G1/4 12 mm [.472 in] depth	7/16-20UNF 12 mm [.472 in] depth

Type	L_{max}, mm [in]	L_2, mm [in]	*L_E, mm [in]	L_1, mm [in]
MTKF 160	203,2 [8.00]	160,8 [6.33]	216,8 [8.54]	21,8 [.86]
MTKF 200	209,2 [8.24]	166,8 [6.57]	222,8 [8.77]	27,8 [1.09]
MTKF 250	216,2 [8.51]	173,8 [6.84]	229,8 [9.05]	34,8 [1.37]
MTKF 315	224,9 [8.85]	182,5 [7.19]	238,5 [9.39]	43,5 [1.71]
MTKF 400	236,2 [9.29]	193,8 [7.63]	249,8 [9.83]	54,8 [2.16]
MTKF 470	246,4 [9.70]	204,0 [8.03]	260,0 [10.24]	65,0 [2.56]
MTKF 500	250,8 [9.87]	208,4 [8.20]	264,4 [10.41]	69,4 [2.73]

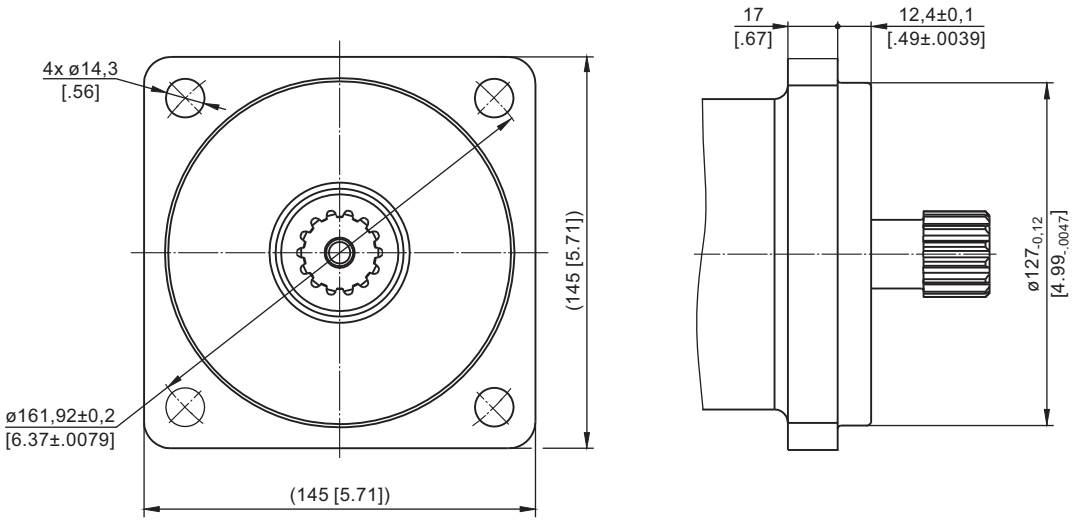
mm [in]

MOUNTING

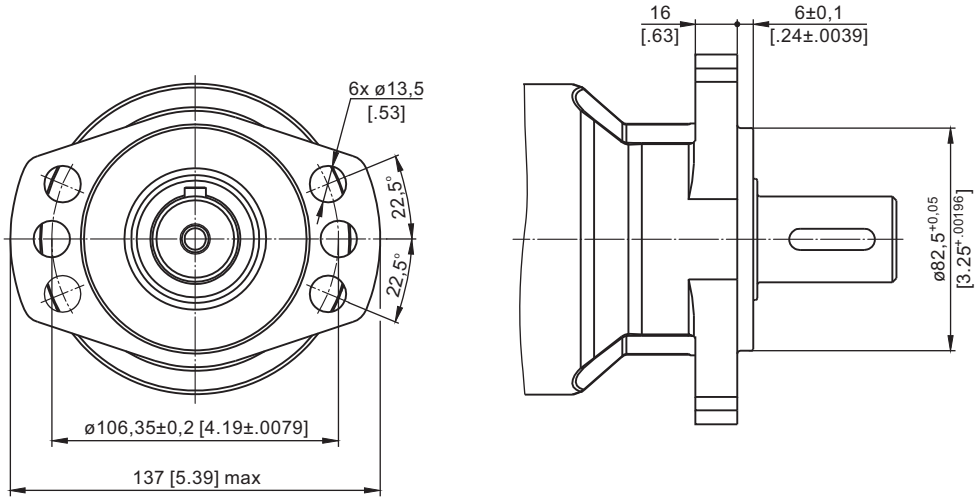
W Wheel Mount (4 Holes)



C Square Mount (4 Holes)



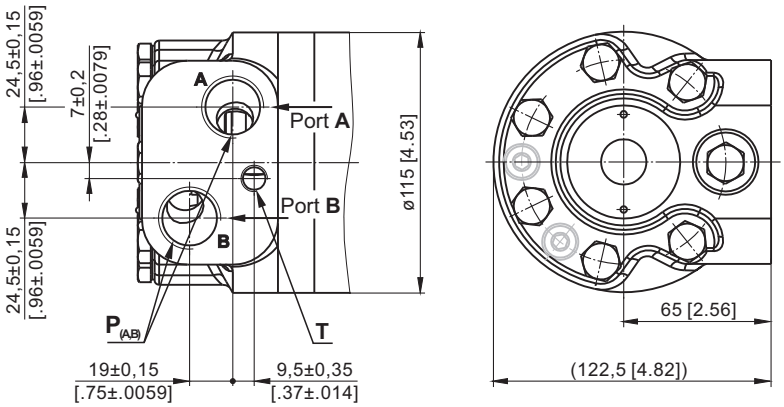
F Magneto Mount (6 Holes)



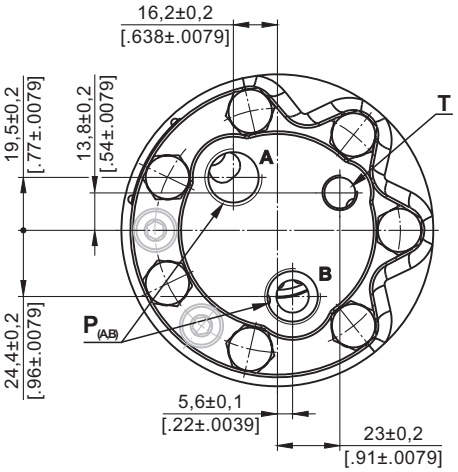
mm [in]

PORTS

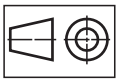
Versions 2 3 4



Versions 6 8



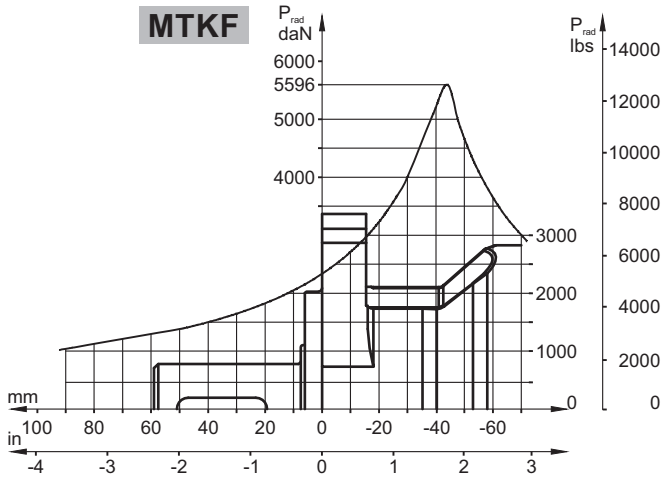
	Versions				
	Side			Rear	
	2	3	4	6	8
$P_{(A,B)}$	2xG3/4 17 mm [.67 in] depth	2xM27x2 17 mm [.67 in] depth	2x1 1/16-12UN 15 mm [.59 in] depth	2xG1/2 15 mm [.59 in] depth	2x 7/8 -14UNF 17 mm [.67 in] depth
T	G¼ 12 mm [.472 in] depth	M14x1,5 12 mm [.472 in] depth	7/16-20UNF 12 mm [.472 in] depth	G¼ 12 mm [.472 in] depth	7/16-20UNF 12 mm [.472 in] depth



mm [in]

PERMISSIBLE SHAFT LOADS

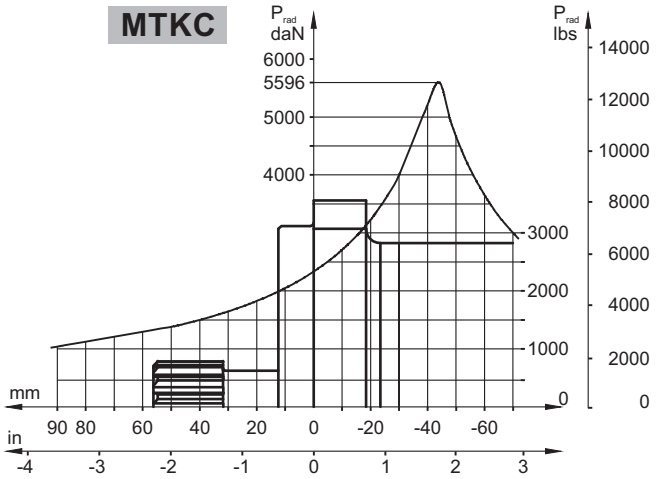
MTKF



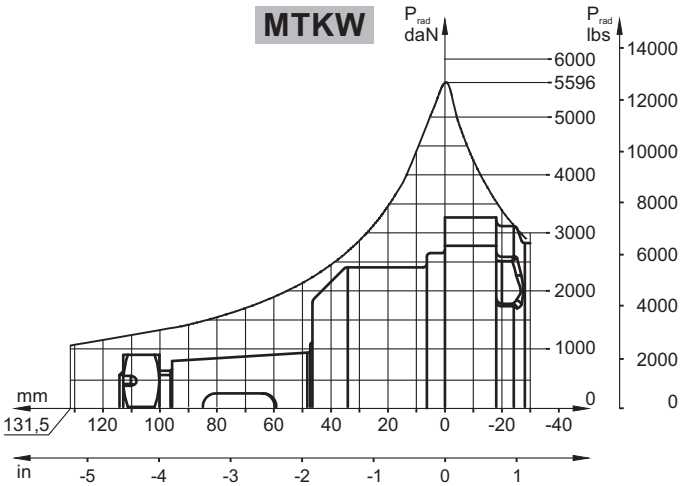
The curves apply to a B10 bearing life (ISO281) of 2000 hours at 100 RPM.

The curves apply to a B10 bearing life (ISO281) of 2000 hours at 100 RPM.

MTKC

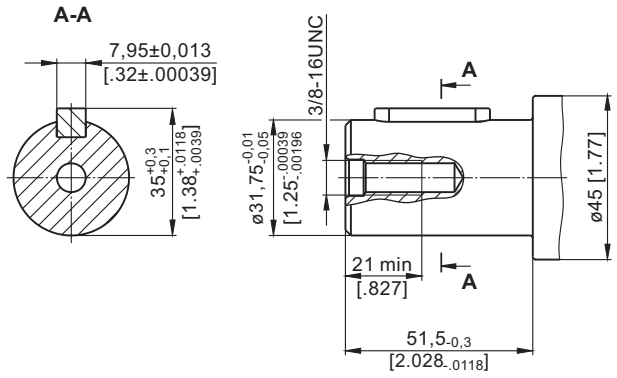


MTKW

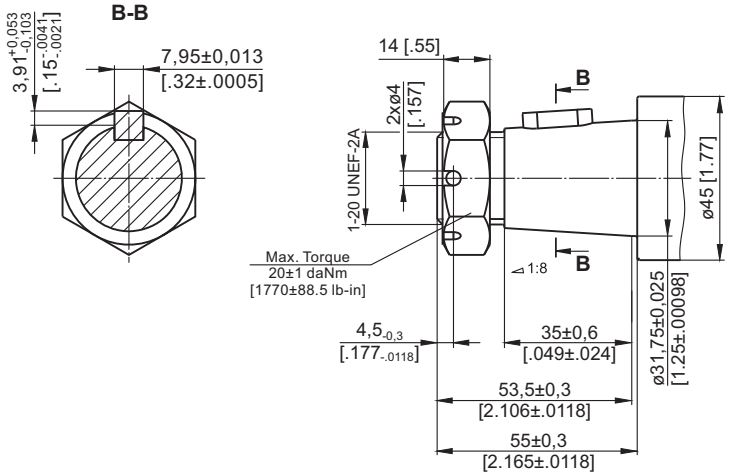


SHAFT EXTENSIONS

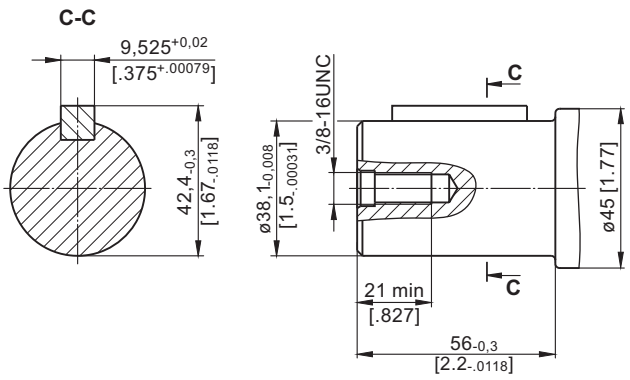
CO - ø1¼" [31,75] srtaight, Parallel key 5/16"x5/16"x1¼"
Max. Torque 77 daNm [6815 lb-in]



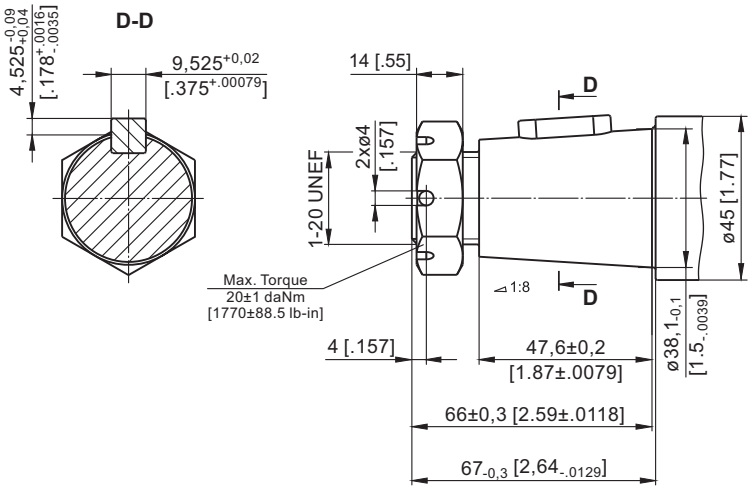
R - ø1¼" [31,75] tapered 1:8, Parallel key 5/16"x5/16"x¾"
Max. Torque 77 daNm [6815 lb-in]



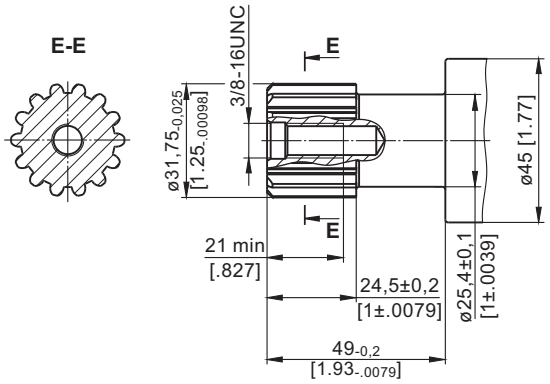
CB - ø1½" [38,1] straight, Parallel key 3/8"x3/8"x1¼" BS46
Max. Torque 132,8 daNm [11755 lb-in]



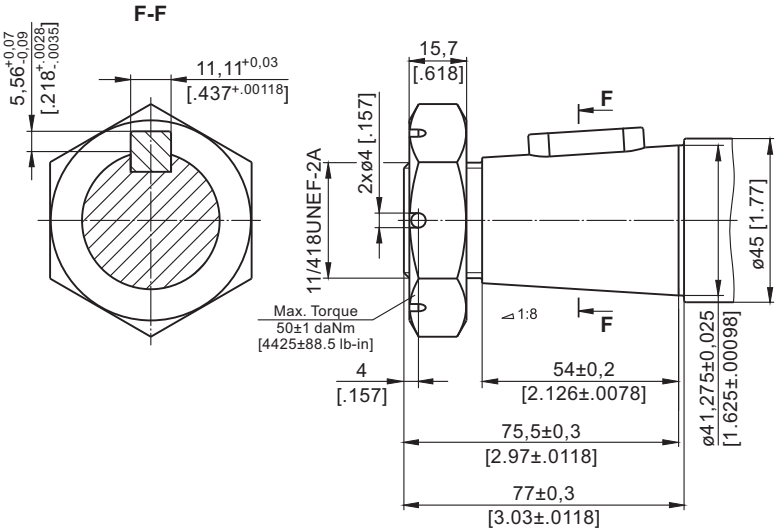
K - ø1½" [38,1] tapered 1:8, Parallel key 3/8"x3/8"x1"
Max. Torque 89 daNm [7878 lb-in]



SB - ø1¼" [31,75] 14T Splined ANSI B92.1-1970, 12/24
Max. Torque 77 daNm [6815 lb-in]



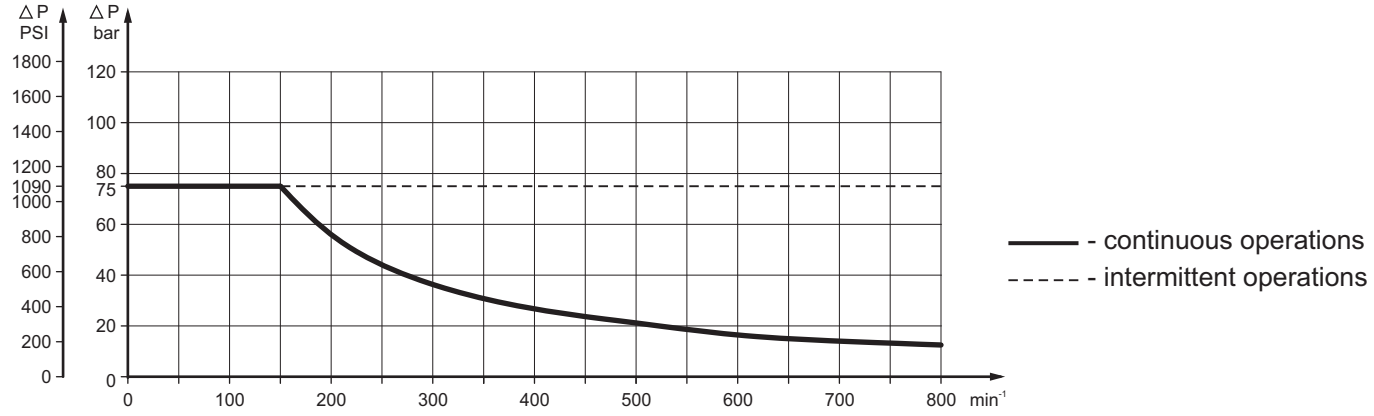
T - ø1 1/16" [41,275] tapered 1:8, Parallel key 7/16"x7/16"x1¼"
Max. Torque 100 daNm [8850 lb-in]



mm [in]

MAX. PERMISSIBLE SHAFT SEAL PRESSURE

Max. return pressure without drain line or
max. pressure in the drain line



ORDER CODE

	1	2	3	4	5	6	7	8
M T K							**HD**	

Pos.1 - Mounting Flange

- **W** - 4-Bolt flange, Wheel Motor spigot diameter 107,9 mm [2.25 in] - BC 147,6 mm [5.81 in]
- **C** - 4-Bolt flange, spigot diameter 127 mm [4.99 in]- BC 161,92 mm [6.375 in]
- **F** - Bolt flange, spigot diameter 82,5 mm [3.25 in]- BC 106,35 mm [4.19 in]

Pos.2 - Port type

- omit - Side ports
- **E** - Rear ports

Pos.3 - Displacement code

- **160** - 157,9 cm^3/rev [9.63 in^3/rev]
- **200** - 201,3 cm^3/rev [12.28 in^3/rev]
- **250** - 252,2 cm^3/rev [15.38 in^3/rev]
- **315** - 314,9 cm^3/rev [19.20 in^3/rev]
- **400** - 396,8 cm^3/rev [24.20 in^3/rev]
- **470** - 470,5 cm^3/rev [28.70 in^3/rev]
- **500** - 502,4 cm^3/rev [30.65 in^3/rev]

Pos.4 - Shaft Extensions*

- **CO** - ø1¼" [31,75] straight, Parallel key 5/16"x5/16"x1¼", 3/8-16 UNC
- **CB** - ø1½" [38,1] straight, Parallel key 3/8"x3/8"x1¾B S46
- **SB** - ø1¼" [31,75] 14T Splined ANSI B92.1-1970, 12/24
- **R** - ø1¼" [31,75] tapered 1:8, Parallel key 5/16"x5/16"x3/4", 1-20 UNEF
- **K** - ø1½" [38,1] tapered 1:8, Parallel key 3/8"x3/8"x1", 1-20 UNEF
- **T** - ø1 1/16" [41,275] tapered 1:8, Parallel key 7/16"x7/16"x1¼"

Pos.5 - Port Size/Type

- **2** - side ports, 2xG 3/4, G1/4 BSP (ISO 228)
- **3** - side ports, 2xM27x2, M14x1,5 - 6H (ISO 262)
- **4** - side ports, 2x1 1/16-12 UN, 7/16-20 UNF
- **6** - rear ports, 2xG 1/2, G1/4 BSP (ISO 228)
- **8** - rear ports, 2x7/8-14 UNF, 7/16-20 UNF

Pos.6 - Check Valves

- omit - without check valves
- **1** - with check valves

Pos.7 - Additional Options

- **HD** - Reinforced motor **HD****

For Other **Additional Options** see page 71

Pos.8 - Design Series

- omit - Factory specified

Notes: * The permissible output torque for shafts must be not exceeded!
** Drain line should always be used.

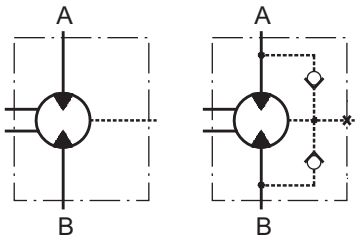
The hydraulic motors are mangano phosphatized as standard.

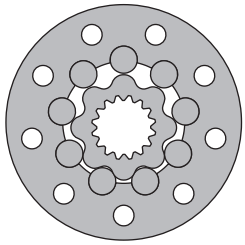
HYDRAULIC MOTORS MTM



APPLICATION

» Skid Steer Loaders
» Metal working machines
» Trenchers
» Augers
» Agriculture machines
» Road building machines
» Special vehicles
» Mine machines
» Woodworking and sawmill machinery
» Conveyors etc.





CONTENTS

Specification data 20
Function diagrams ..... 21÷24
Dimensions and mounting ..... 25÷27
Permissible shaft seal pressure 28
Shaft extensions 29
Permissible shaft loads 29
Dimensions and mounting MTMV 30
Dimensions and mounting MTM6V 31
Internal spline data 33
Order code 33

OPTIONS

» Model- Disc valve, roll-gerotor
» Flange with wheel mount
» Short motor
» Side ports
» Shafts- straight, splined and tapered
» BSPP ports;
» Other special features.

EXCELLENCE

» High torque and pressure drop
» High inlet pressure
» High starting torque
» Improved efficiency at high pressure drop
» Smooth operation at low speed

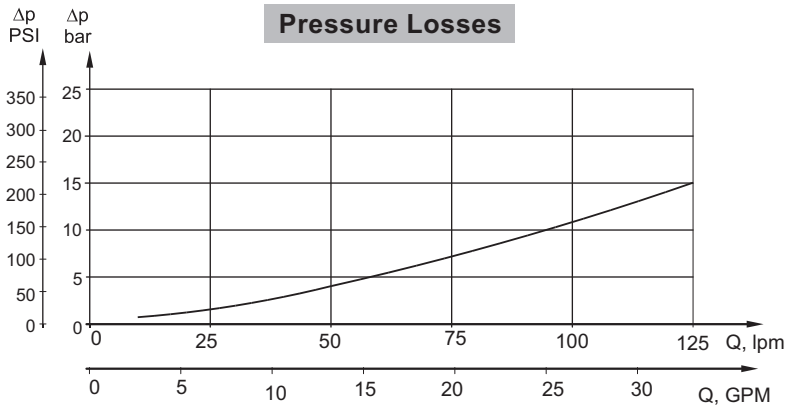
GENERAL

Max. Displacement,	cm^3/rev [in^3/rev]	724 [44.2]
Max. Speed,	[RPM]	750
Max. Torque,	daNm [lb-in]	cont.: 183 [16200] int.: 229 [20270]
Max. Output,	kW [HP]	70 [94]
Max. Pressure Drop,	bar [PSI]	cont.: 250 [3600] int.: 350 [5080]
Max. Oil Flow,	lpm [GPM]	150 [40]
Min. Speed,	[RPM]	5
Pressure fluid		Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range,	^{O}C [^{O}F]	-40÷140 [-40÷284]
Optimal Viscosity range,	mm^2/s [SUS]	20÷75 [98÷347]
Filtration		ISO code: 18/16/13 According to ISO 4406-1999

Oil flow in drain line

Pressure drop bar [PSI]	Viscosity mm^2/s [SUS]	Oil flow in drain line lpm [GPM]
140 [2030]	20 [98]	2,5 [.660]
	35 [164]	1,5 [.396]
210 [3045]	20 [98]	5 [1.321]
	35 [164]	3 [.793]

Pressure Losses



M+S HYDRAULIC

SPECIFICATION DATA

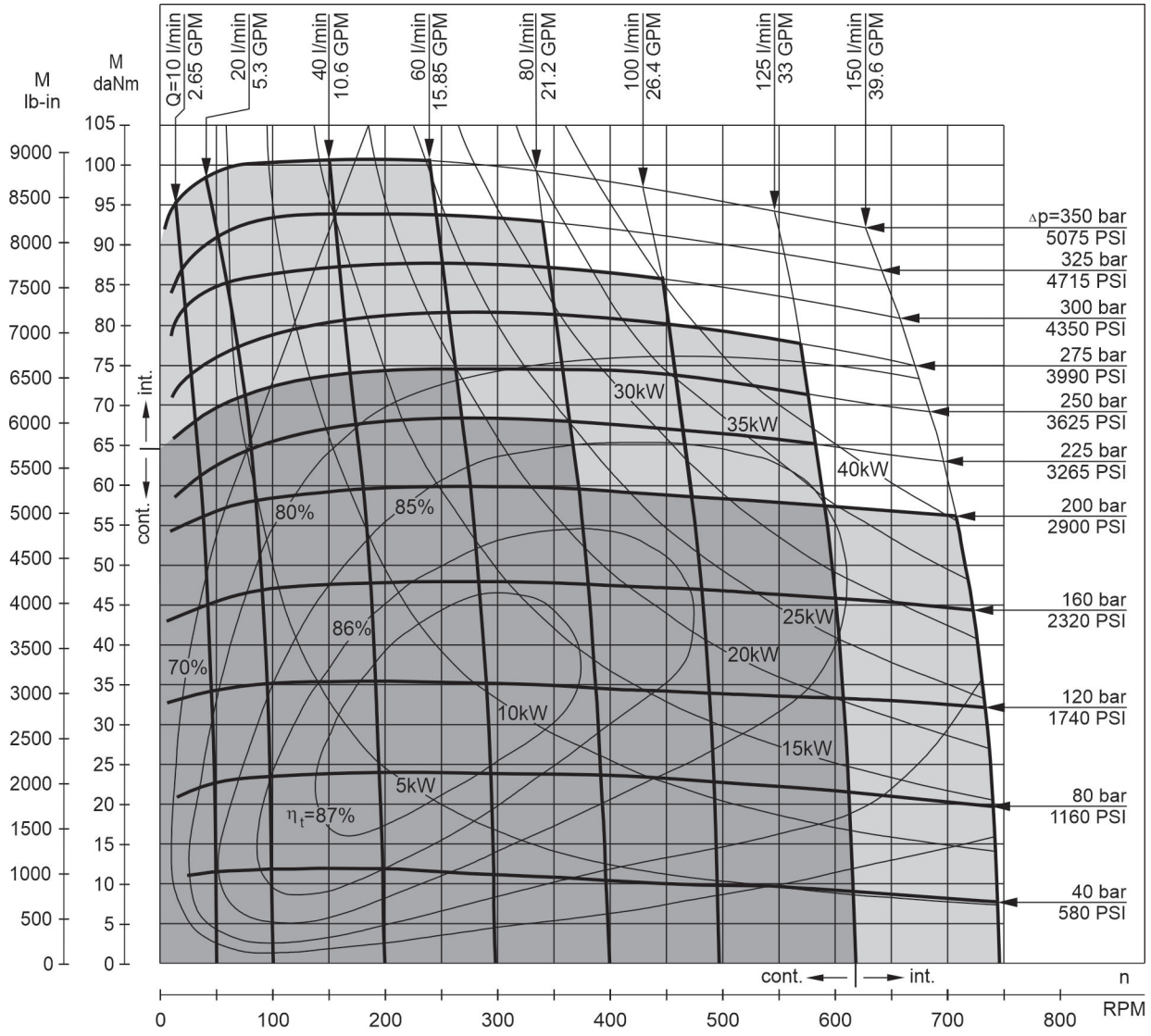
Type		MTM 200	MTM 250	MTM 315	MTM 400	MTM 470	MTM 500	MTM 630	MTM 725
Displacement, cm^3/rev [in^3/rev]		201,4 [12.29]	251,8 [15.36]	326,3 [19.9]	410,9 [25.06]	475 [28.97]	523,6 [31.95]	631,2 [38.52]	724 [44.2]
Max. Speed, [RPM]	Cont.	625	500	380	305	260	240	190	170
	Int.*	750	600	460	365	315	285	230	215
Max. Torque, daNm [lb-in]	Cont.	74 [6550]	90 [7965]	116 [10265]	147 [13010]	171 [15135]	172 [15225]	183 [16200]	160 [14160]
	Int.*	102 [9030]	128 [11330]	163 [14425]	206 [18232]	215 [16030]	215 [16030]	229 [20270]	192 [17000]
	Peak**	115 [10180]	144 [12745]	186 [16460]	235 [20800]	240 [21240]	240 [21240]	274 [24250]	240 [21240]
Max. Output, kW [HP]	Cont.	41 [55]	41 [55]	41 [55]	41 [55]	41 [55]	37,5 [50]	28 [37,5]	26 [35]
	Int.*	70 [94]	70 [94]	70 [94]	70 [94]	55 [74]	51 [68]	42 [56]	40 [54]
Max. Pressure Drop, bar [PSI]	Cont.	250 [3600]	250 [3600]	250 [3600]	250 [3600]	250 [3600]	230 [3340]	200 [2900]	160 [2320]
	Int.*	350 [5080]	350 [5080]	350 [5080]	350 [5080]	315 [4570]	280 [4060]	250 [3625]	210 [3045]
	Peak**	400 [5800]	400 [5800]	400 [5800]	400 [5800]	350 [5080]	320 [4640]	300 [4350]	260 [3770]
Max. Oil Flow, lpm [GPM]	Cont.	125 [33]	125 [33]	125 [33]	125 [33]	125 [33]	125 [33]	125 [33]	125 [33]
	Int.*	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]
Max. Inlet Pressure, bar [PSI]	Cont.	270 [3920]	270 [3920]	270 [3920]	270 [3920]	270 [3920]	270 [3920]	270 [3920]	270 [3920]
	Int.*	370 [5370]	370 [5370]	370 [5370]	370 [5370]	370 [5370]	370 [5370]	370 [5370]	370 [5370]
	Peak**	420 [6100]	420 [6100]	420 [6100]	420 [6100]	420 [6100]	420 [6100]	420 [6100]	420 [6100]
Max. Starting Pressure with Unloaded Shaft, bar [PSI]		6 [90]	6 [90]	6 [90]	6 [90]	6 [90]	6 [90]	6 [90]	6 [90]
Min. Starting Torque, daNm [lb-in]		60 [5310]	75 [6640]	97 [8585]	122 [10800]	142 [12570]	143 [12655]	145 [12830]	148 [13100]
Min. Speed*, [RPM]**		5	5	5	5	5	5	5	5
Weight, kg [lb]	MTM	26,9 [59.3]	27,3 [60.2]	28,1 [62]	29 [64]	29,7 [65.5]	30,2 [66.6]	29,7 [65.5]	31 [68.4]
	MTMW	27,4 [60.4]	27,8 [61.3]	28,6 [63.1]	29,5 [65.1]	30,2 [66.6]	30,7 [67.7]	30,2 [66.6]	31,5 [69.5]
	MTMV	15,7 [34.6]	16,1 [35.5]	16,9 [37.3]	17,8 [39.3]	18,5 [40.8]	19 [41.9]	18,5 [40.8]	19,8 [43.7]

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% of every minute.
*** For speeds lower than given, consult factory or your regional manager.

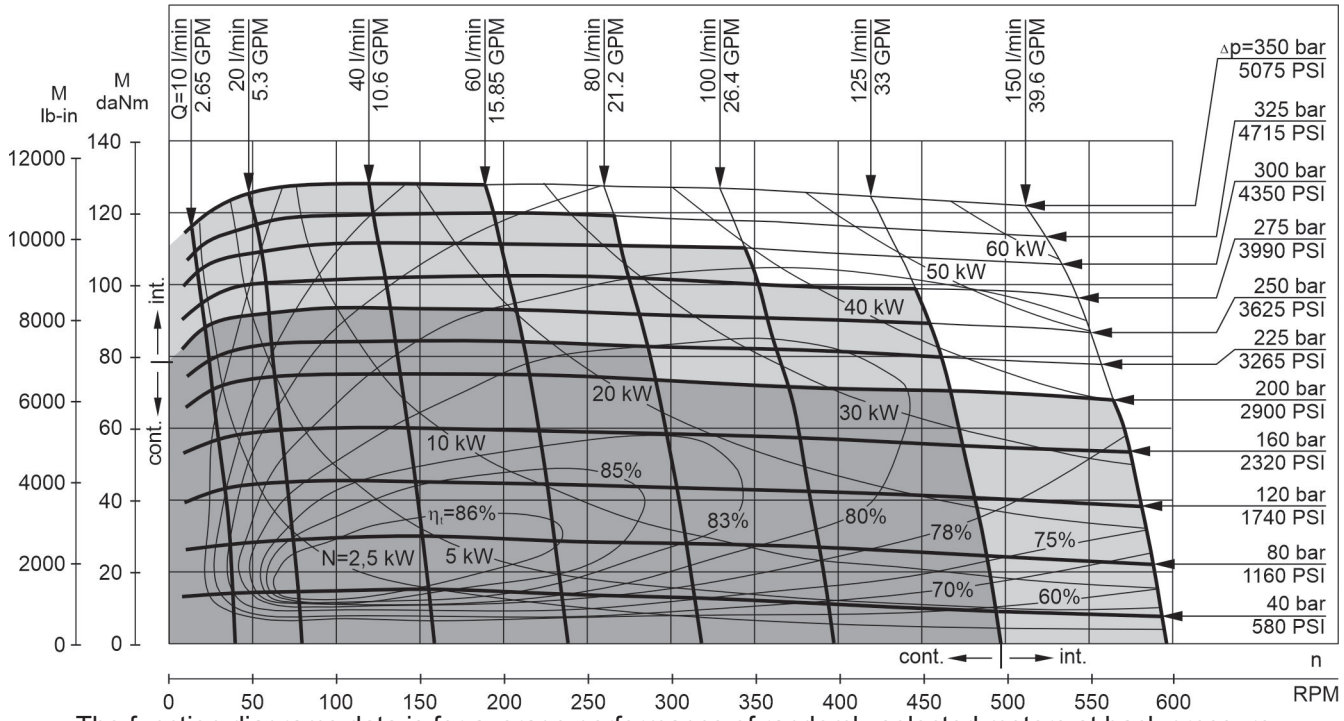
1. Intermittent speed and intermittent pressure must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm^2/s [70 SUS] at 50°C [122°F].
5. Recommended maximum system operating temperature is 82°C [180°F].
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

MTM 200

FUNCTION DIAGRAMS



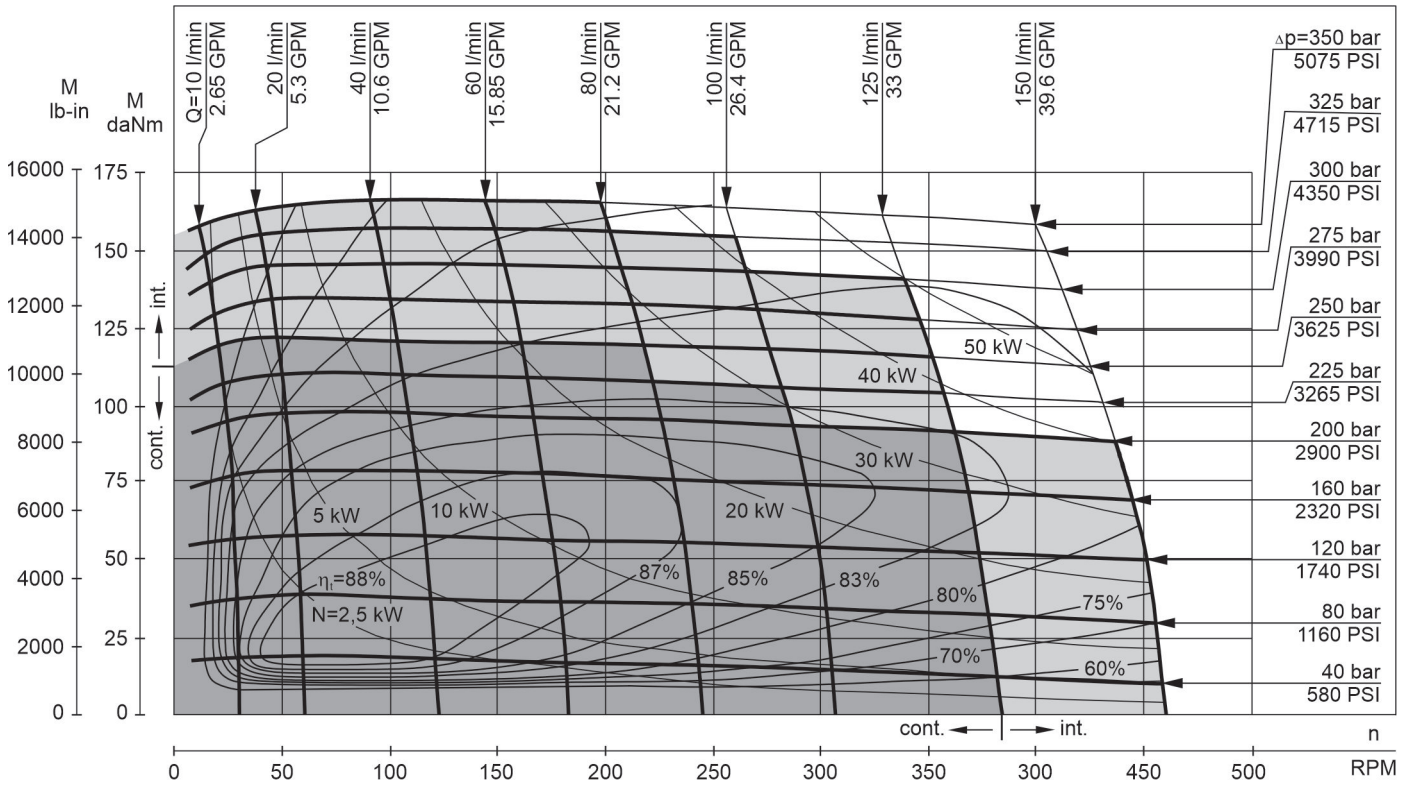
MTM 250



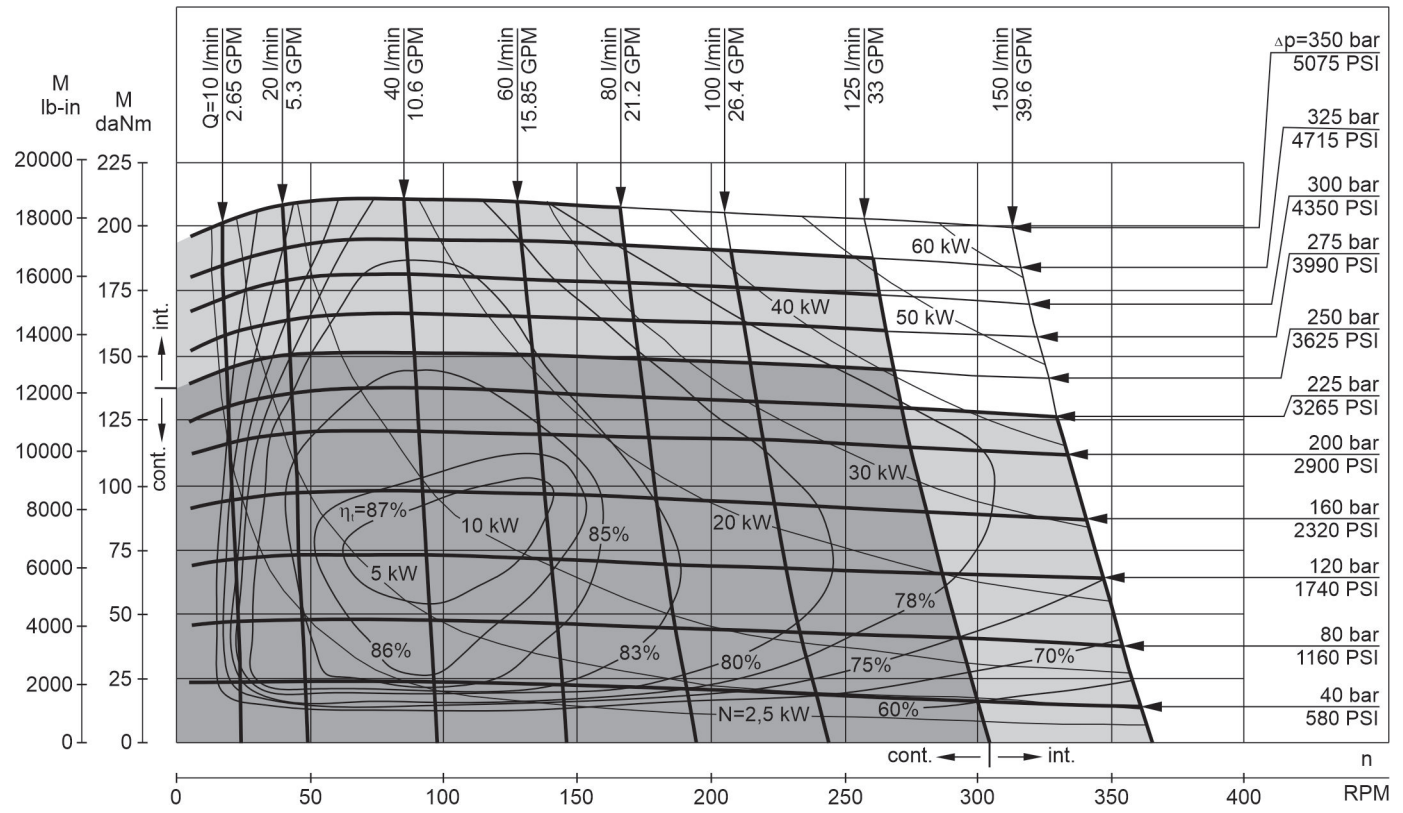
The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5 PSI÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

FUNCTION DIAGRAMS

MTM 315



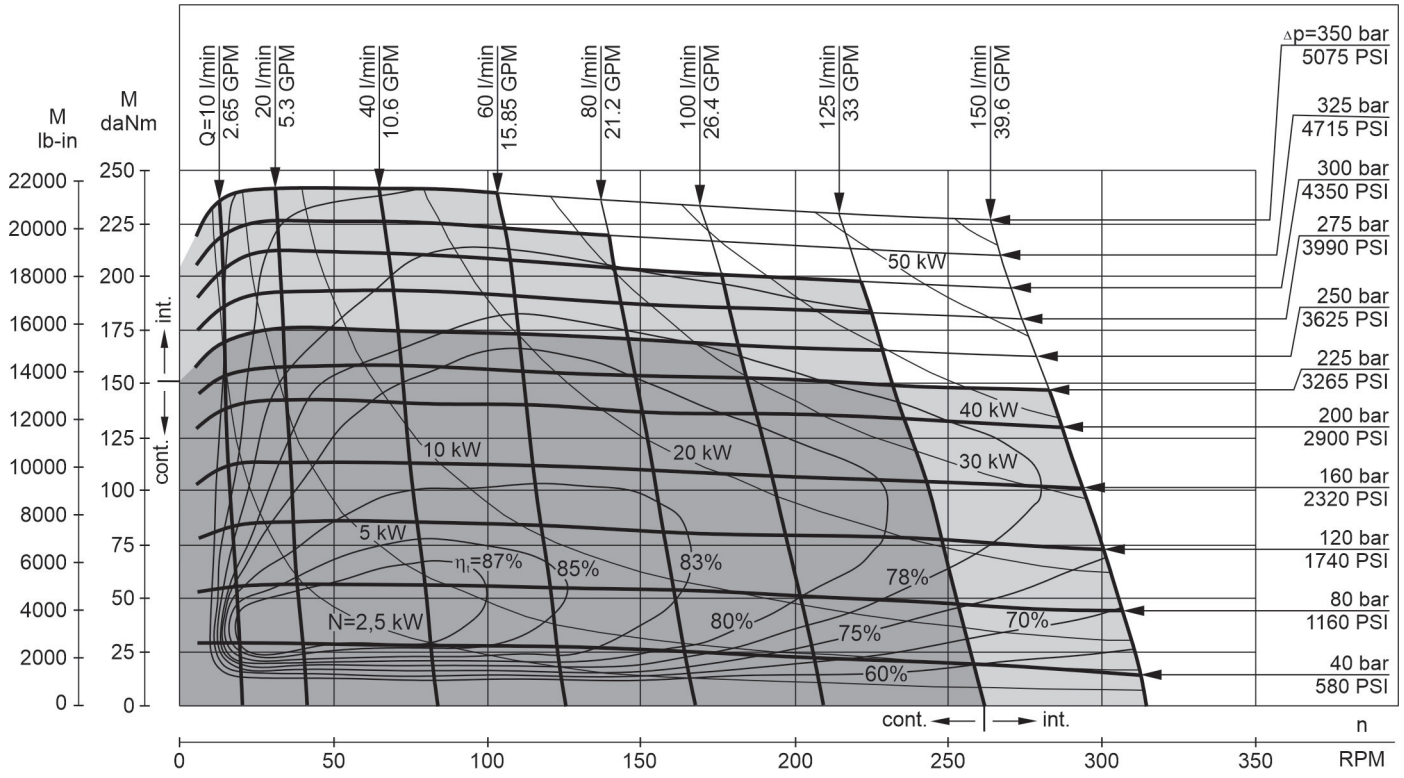
MTM 400



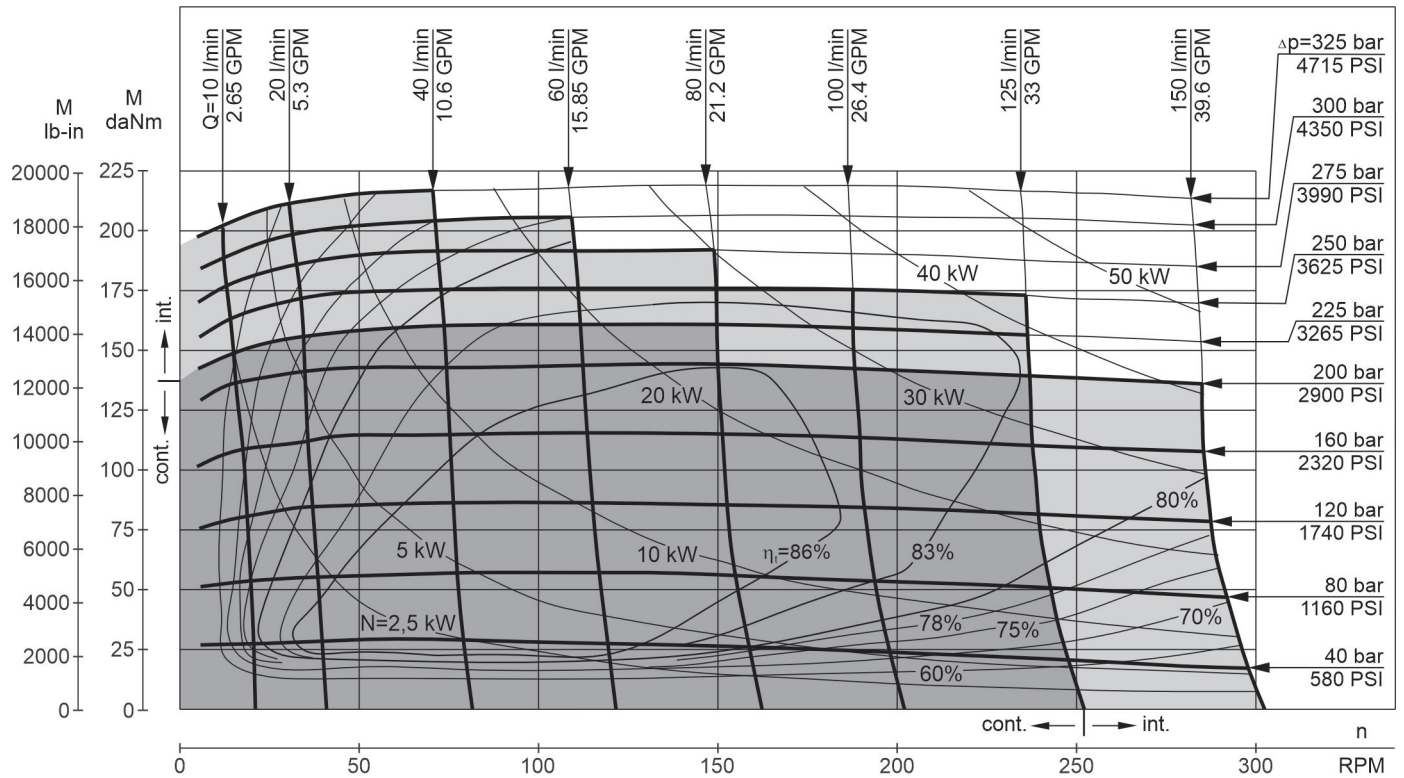
The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5 PSI÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

FUNCTION DIAGRAMS

MTM 470



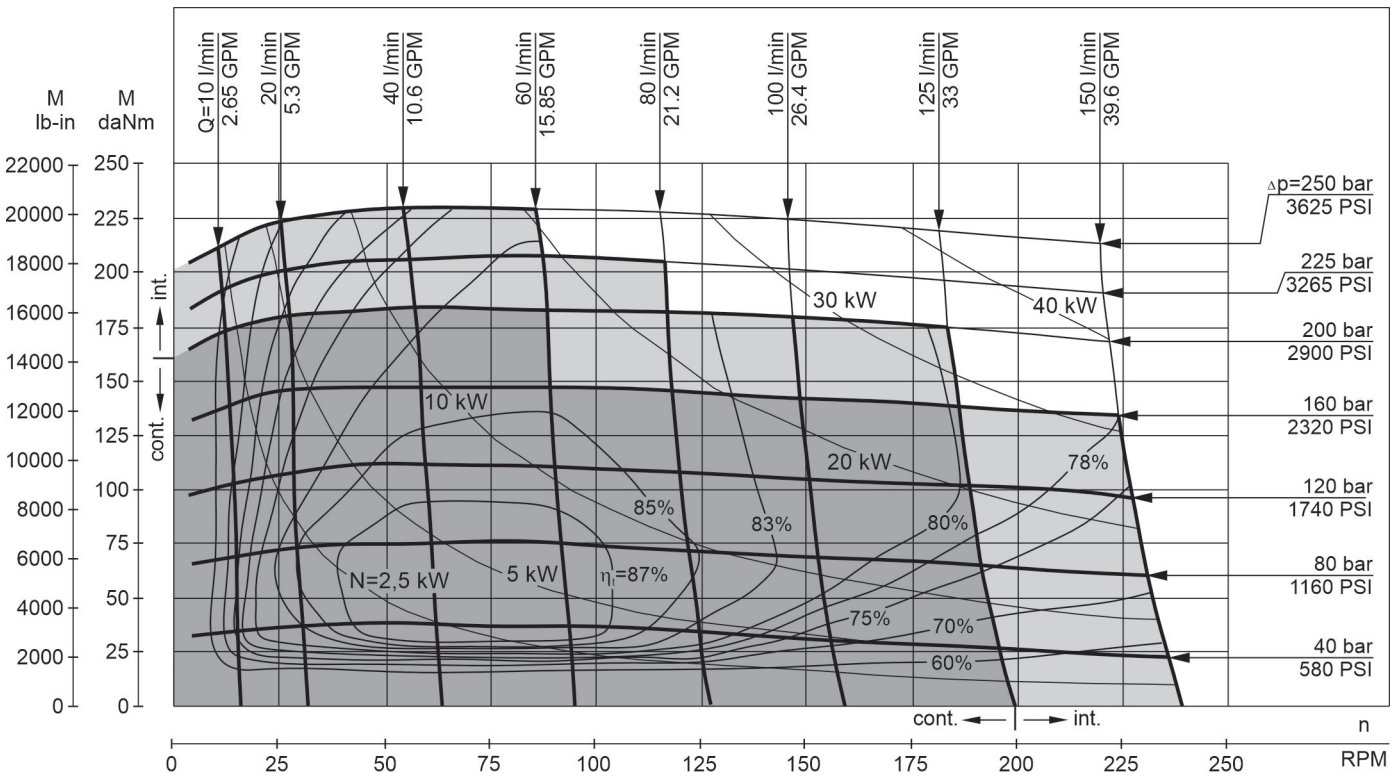
MTM 500



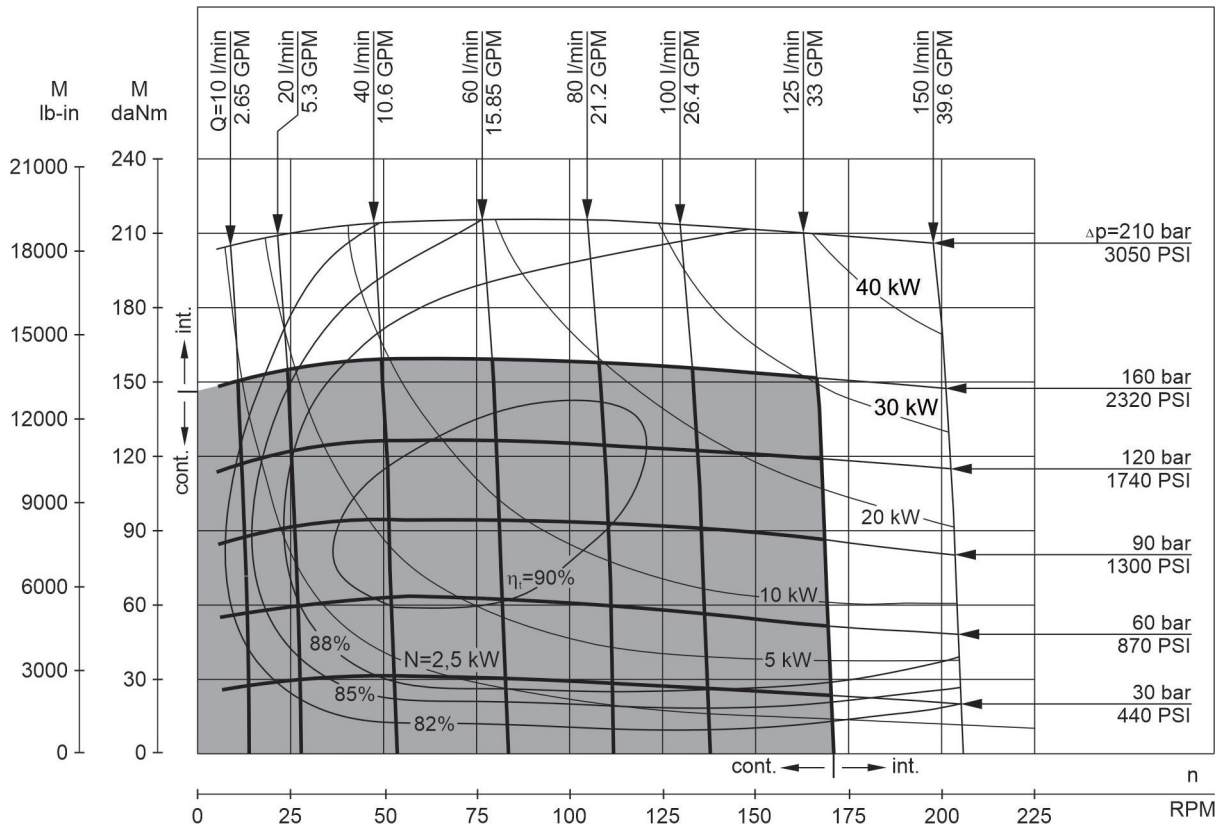
The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5 PSI÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

FUNCTION DIAGRAMS

MTM 630

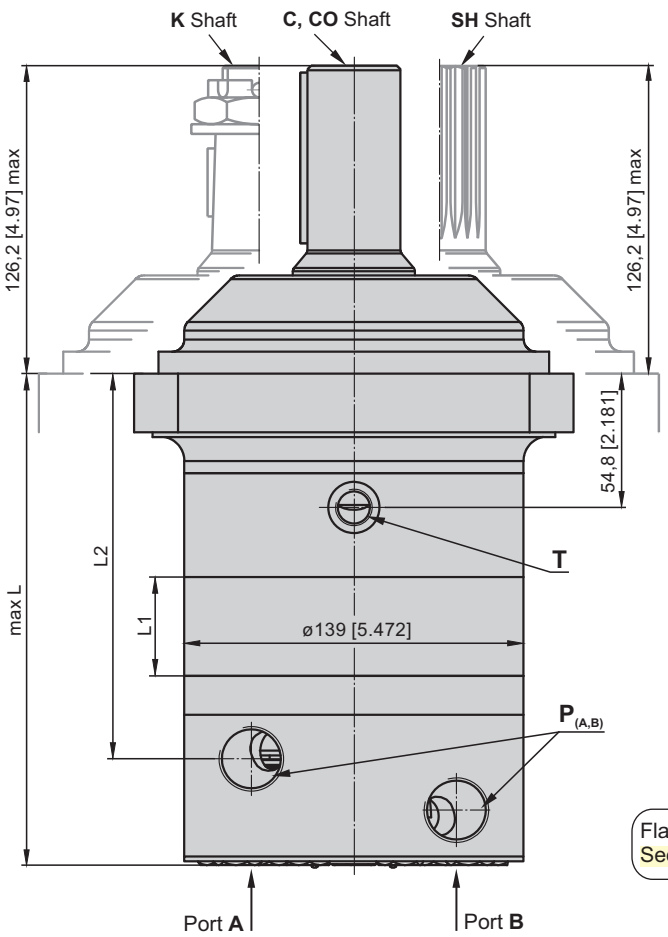


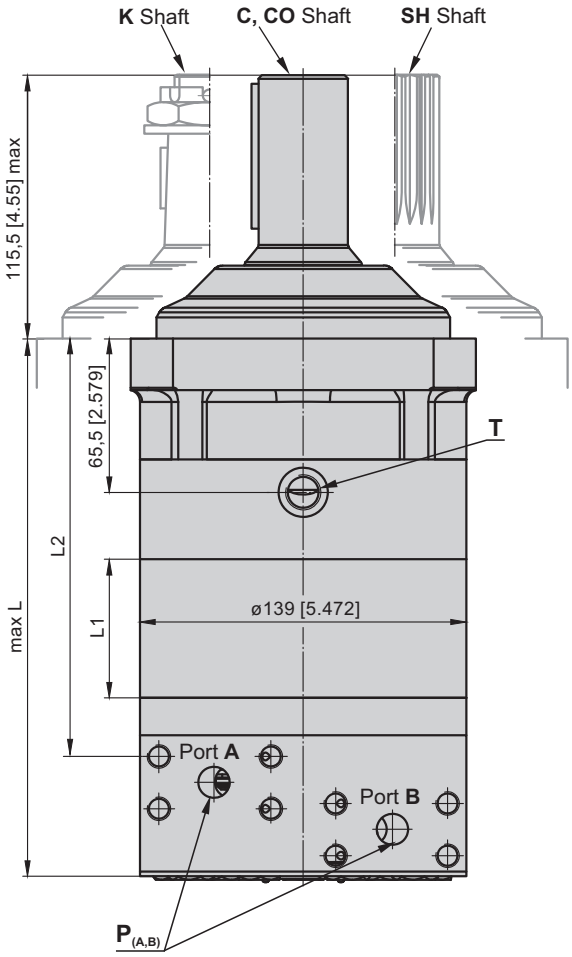
MTM 725



The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5 PSI÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

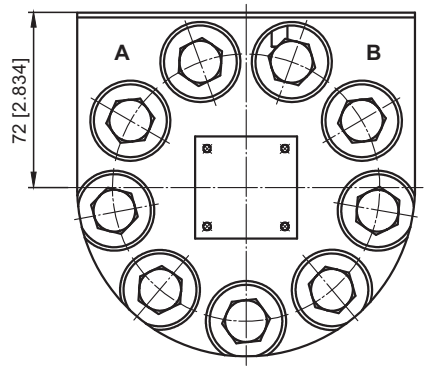
DIMENSIONS and MOUNTING DATA for MTM and MTMC - versions ..., 4, 5





Flange Dim. See Page 27

Shaft Dim. See Page 29



Warning: Drain line should always be used (if no check valves)!

mm [in]

	Versions		
	-	4	5
$P_{(A,B)}$	2xG3/4 17 mm [.67] depth	2x1 1/16-12UN O-ring 17 mm [.67] depth	2x3/4"SAE PSI3000 with 8xM10 threads 10 mm [.39] depth
T	G1/4 12 mm [.47] depth	9/16-18UN 13 mm [.51] depth	G1/4 12 mm [.47] depth

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

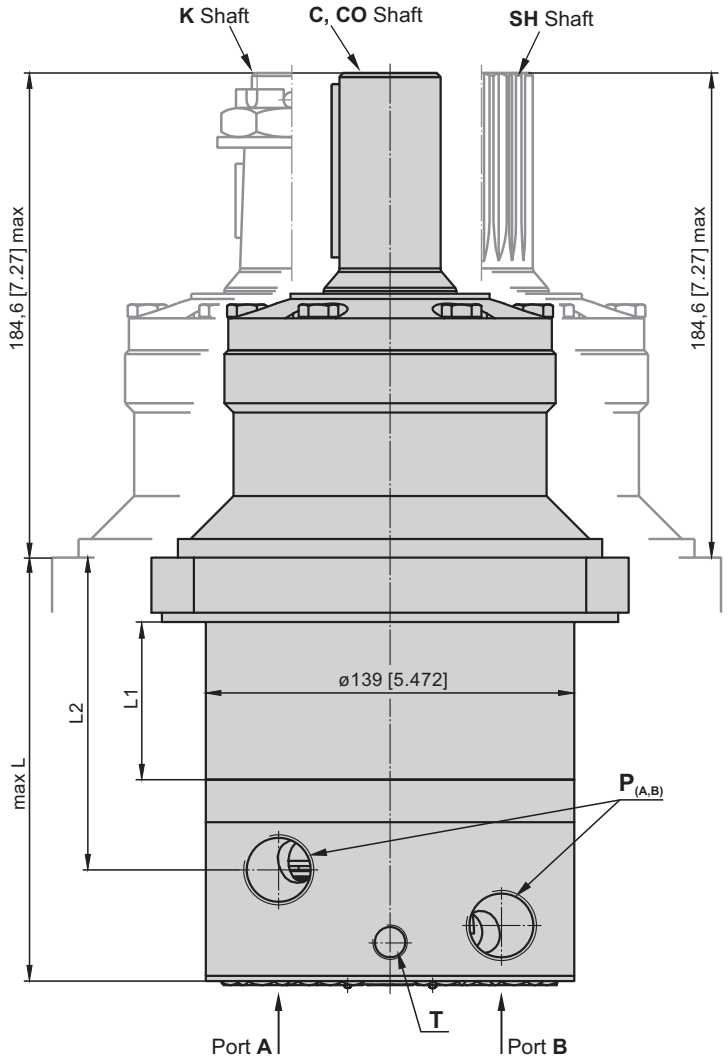
Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

Type	L, mm [in]	L_2, mm [in]	Type	L, mm [in]	L_2, mm [in]	Type	L, mm [in]	L_2, mm [in]	Type	L, mm [in]	L_3, mm [in]	L_1, mm [in]
MTM200 ...,4	188 [7.40]	142,3 [5.60]	MTMC200 ...,4	198 [7.79]	153 [6.02]	MTM200 5	188 [7.40]	133,5 [5.26]	MTMC200 5	198 [7.79]	144 [5.67]	25 [.98]
MTM250 ...,4	194 [7.64]	148,6 [5.85]	MTMC250 ...,4	204,5 [8.05]	159,3 [6.27]	MTM250 5	194 [7.64]	139,5 [5.49]	MTMC250 5	204,3 [8.04]	150,3 [5.92]	31,3 [1.23]
MTM315 ...,4	203 [7.99]	157,8 [6.21]	MTMC315 ...,4	213,5 [8.40]	168,5 [6.63]	MTM315 5	203 [7.99]	149,0 [5.87]	MTMC315 5	213,5 [8.41]	159,5 [6.28]	40,5 [1.59]
MTM400 ...,4	214 [8.43]	168,3 [6.63]	MTMC400 ...,4	224 [8.82]	179 [7.04]	MTM400 5	214 [8.43]	159,5 [6.28]	MTMC400 5	224 [8.82]	170 [6.69]	51 [2.01]
MTM470 ...,4	222 [8.74]	176,3 [6.94]	MTMC470 ...,4	232 [9.13]	187 [7.36]	MTM470 5	222 [8.74]	167,5 [6.59]	MTMC470 5	232 [9.13]	178 [7.01]	59 [2.32]
MTM500 ...,4	228 [8.98]	182,3 [7.18]	MTMC500 ...,4	238 [9.37]	193 [7.60]	MTM500 5	228 [8.98]	173,5 [6.83]	MTMC500 5	238 [9.37]	184 [7.24]	65 [2.56]
MTM630 ...,4	224 [8.82]	178,3 [7.02]	MTMC630 ...,4	234 [9.21]	189 [7.44]	MTM630 5	224 [8.82]	169,5 [6.67]	MTMC630 5	234 [9.21]	180 [7.09]	61 [2.40]
MTM725 ...,4	233 [9.17]	187,3 [7.37]	MTMC725 ...,4	243 [9.56]	198 [7.79]	MTM725 5	233 [9.17]	178,5 [7.03]	MTMC725 5	243 [9.57]	189 [7.44]	70 [2.76]

DIMENSIONS and MOUNTING DATA for MTMW - versions ... and 4

Flange Dim. See Page 27

Shaft Dim. See Page 29



Warning: Drain line should always be used (if no check valves)!

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

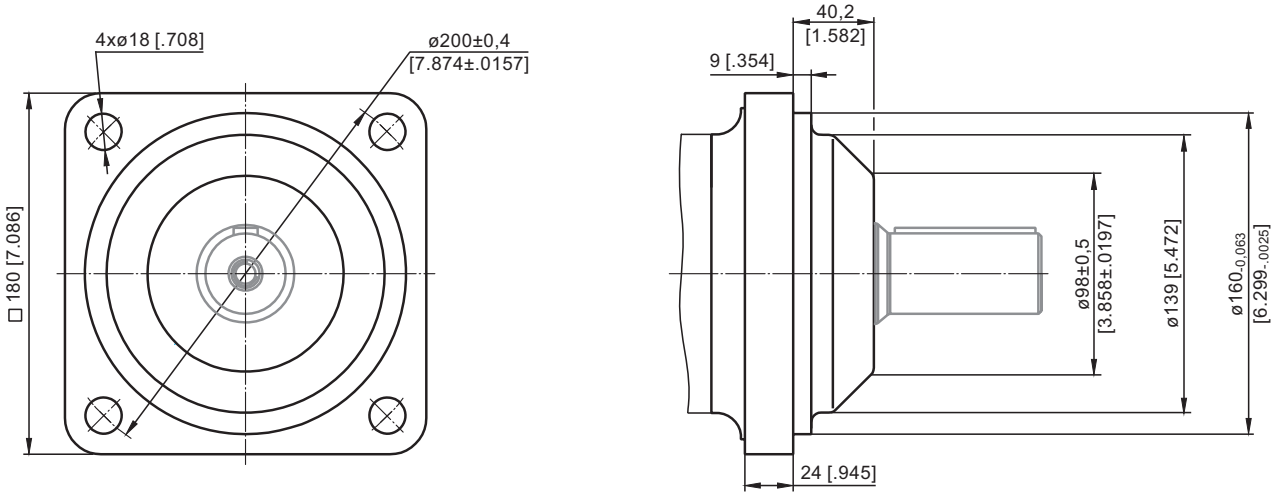
	Versions	
	-	4
$P_{(A,B)}$	2xG3/4 17 mm [.67] depth	2x1 1/16-12UN O-ring 17 mm [.67] depth
T	G1/4 12 mm [.47] depth	9/16-18UN 13 mm [.51] depth

Type	L, mm [in]	L_2, mm [in]	L_1, mm [in]
MTMW 200 ...,4	129 [5.08]	83,8 [3.30]	25 [.98]
MTMW 250 ...,4	135 [5.32]	90,1 [3.55]	31,3 [1.23]
MTMW 315 ...,4	144 [5.67]	99,3 [3.91]	40,5 [1.59]
MTMW 400 ...,4	155 [6.10]	109,8 [4.32]	51 [2.01]
MTMW 470 ...,4	163 [6.42]	117,8 [4.64]	59 [2.32]
MTMW 500 ...,4	169 [6.65]	123,8 [4.87]	65 [2.56]
MTMW 630 ...,4	165 [6.50]	119,8 [4.72]	61 [2.40]
MTMW 725 ...,4	174 [6.85]	128,8 [5.07]	70 [2.76]

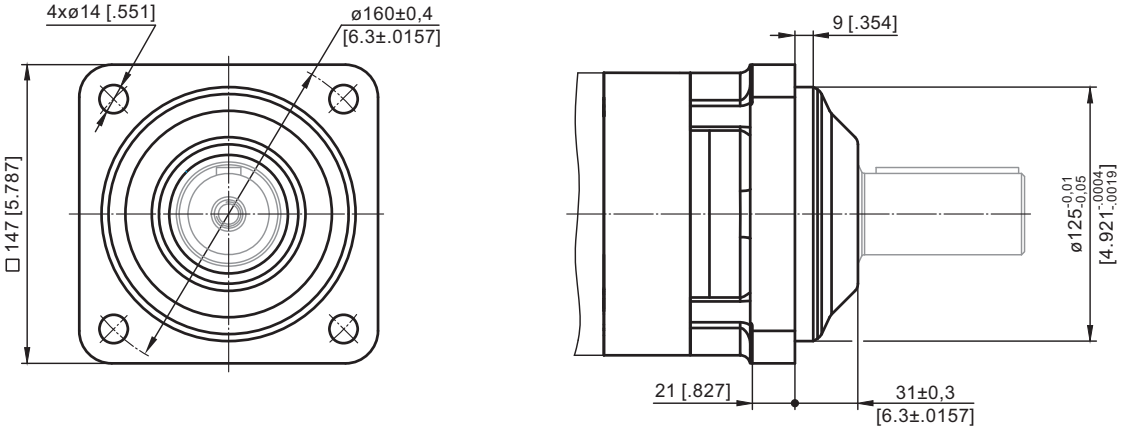
mm [in]

MOUNTING

4-Bolt flange
spigot diameter ø160 mm [6.3 in] - BC ø200 mm [7.874 in]

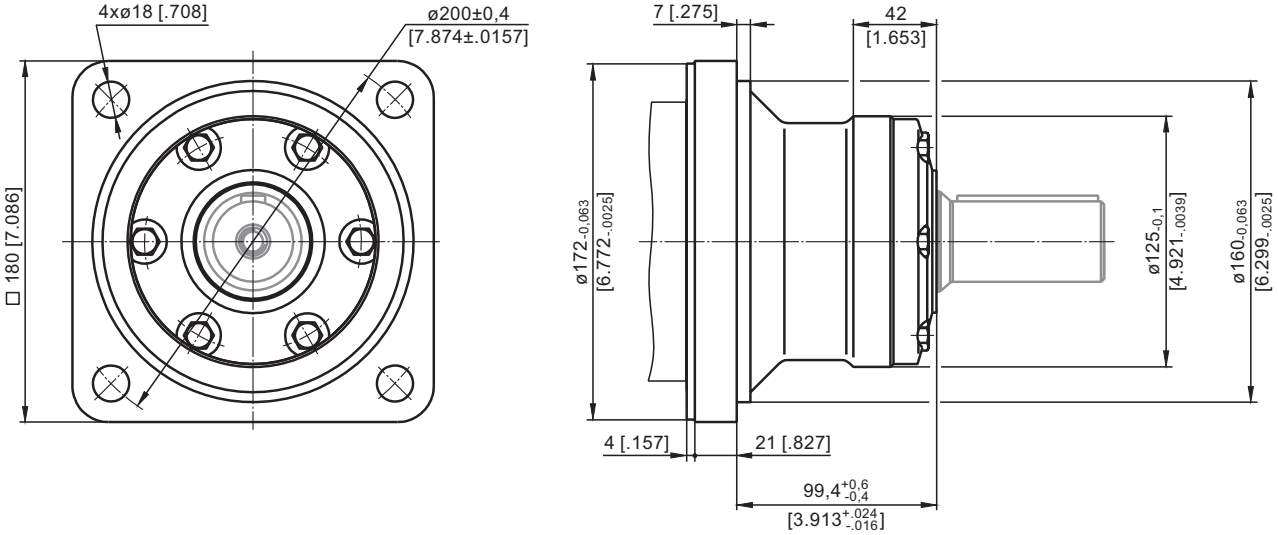


C 4-Bolt flange
spigot diameter ø125 mm [4.921 in] - BC ø160 mm [6.3 in]



mm [in]

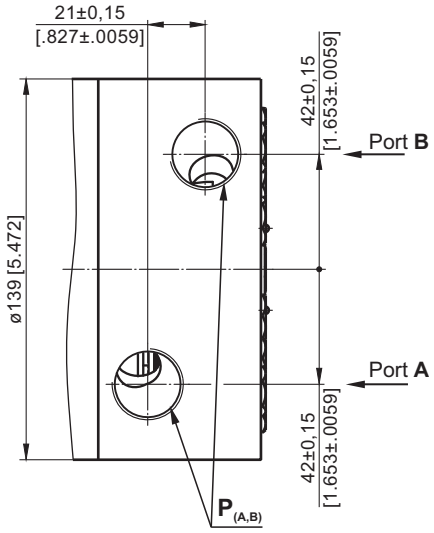
W 4-Bolt flange, Wheel Motor
spigot diameter ø160 mm [6.3 in] - BC ø200 mm [7.874 in]



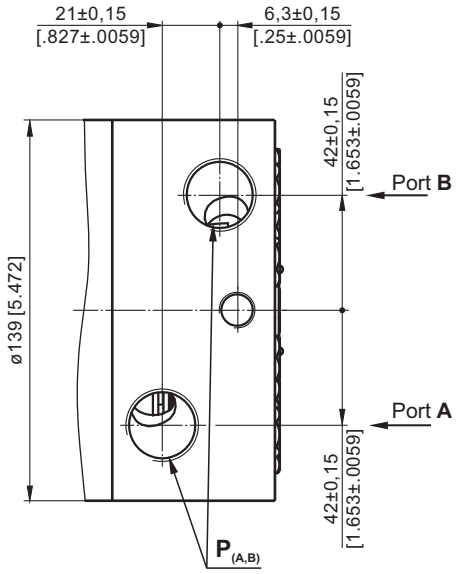
PORTS

Versions [-] [4]

For **MTM** and **MTMC**

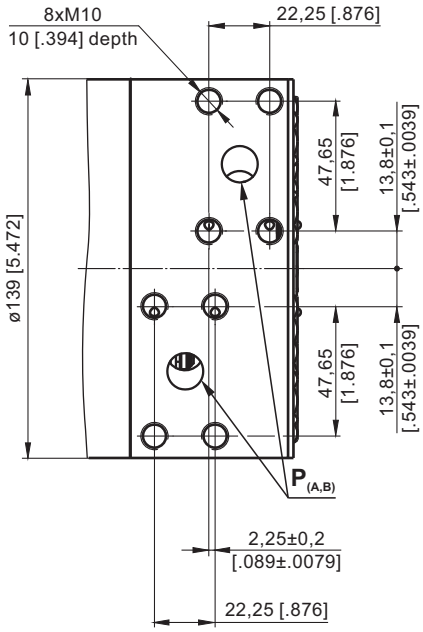


For **MTMW**



Version [5]

For **MTM** and **MTMC**

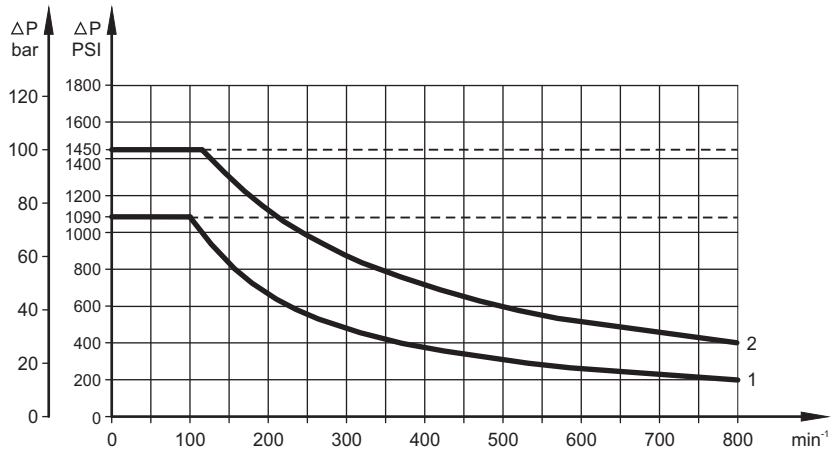


	Versions		
	-	[4]	[5]
$P_{(A,B)}$	2xG3/4 17 mm [.67] depth	2x1 1/16-12UN O-ring 17 mm [.67] depth	2x3/4"SAE PSI3000 with 8xM10 threads 10 mm [.39] depth
T	G1/4 12 mm [.47] depth	9/16-18UN 13 mm [.51] depth	G1/4 12 mm [.47] depth

mm [in]

MAX. PERMISSIBLE SHAFT SEAL PRESSURE

Max. return pressure without drain line or max. pressure in the drain line



1: Drawing for Standard Shaft Seal

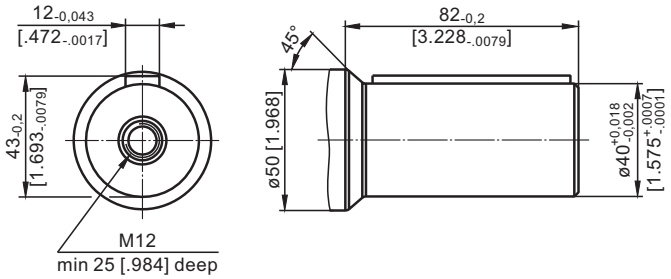
2: Drawing for High Pressure Seal ("**U**" Seal)

——— - continuous operations

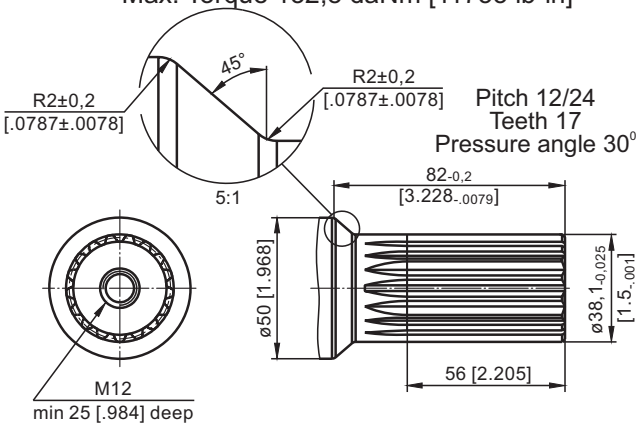
- - - - - - intermittent operations

SHAFT EXTENSIONS

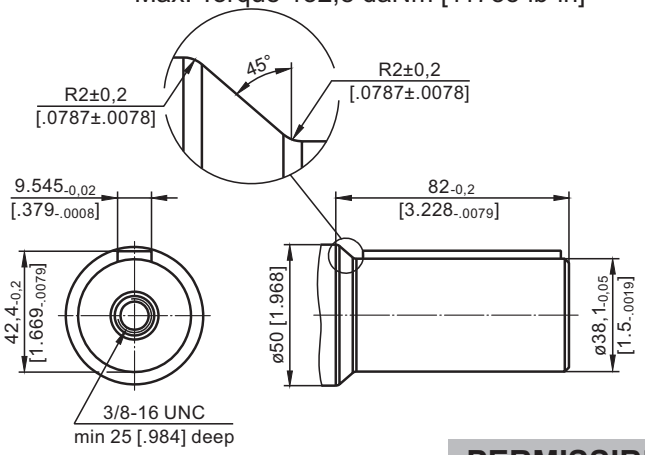
C - ø40 straight, Parallel key A12x8x70 DIN 6885
Max. Torque 132,8 daNm [11755 lb-in]



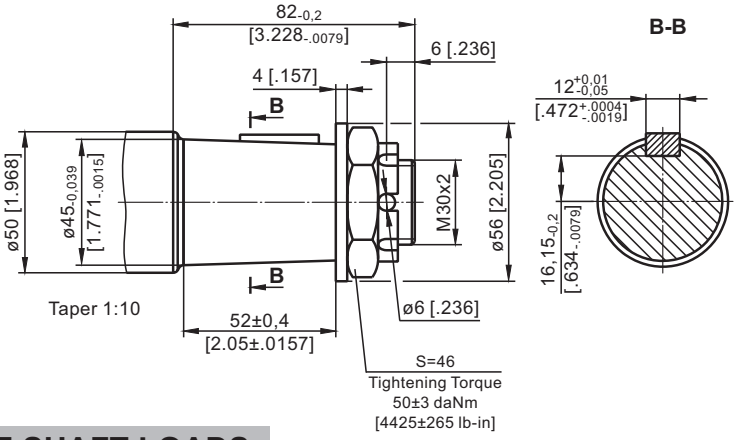
SH - ø1½" splined 17T, DP 12/24 ANSI B92.1-1976
Max. Torque 132,8 daNm [11755 lb-in]



CO - ø1½" straight, Parallel key ⅜"x⅜"x 2¼" BS46
Max. Torque 132,8 daNm [11755 lb-in]

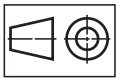


K - tapered 1:10, Parallel key B12x8x28 DIN 6885
Max. Torque 210,7 daNm [18650 lb-in]



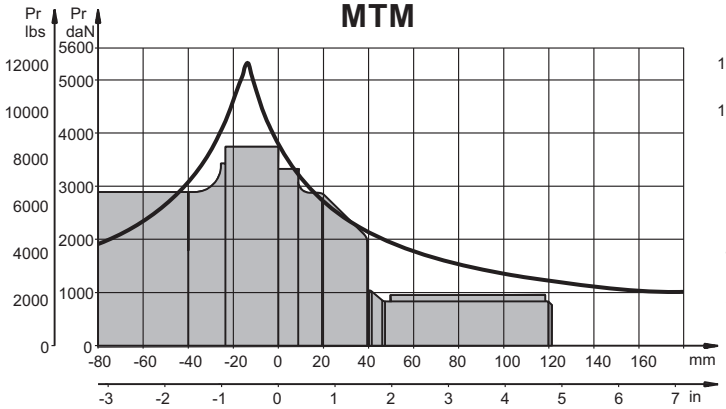
PERMISSIBLE SHAFT LOADS

The curves apply to a B10 bearing life (ISO281) of 2000 hours at 200 RPM.

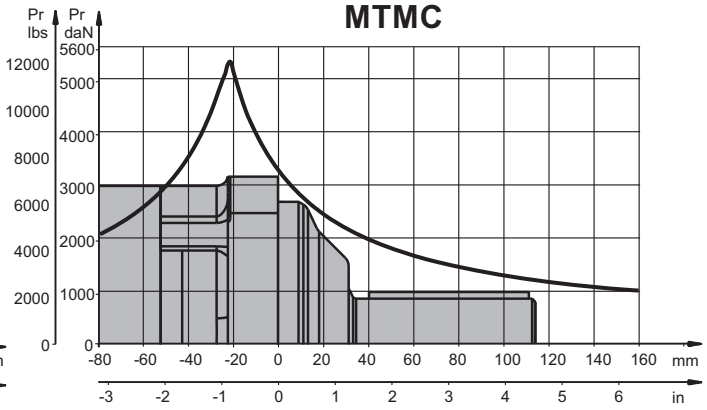


mm [in]

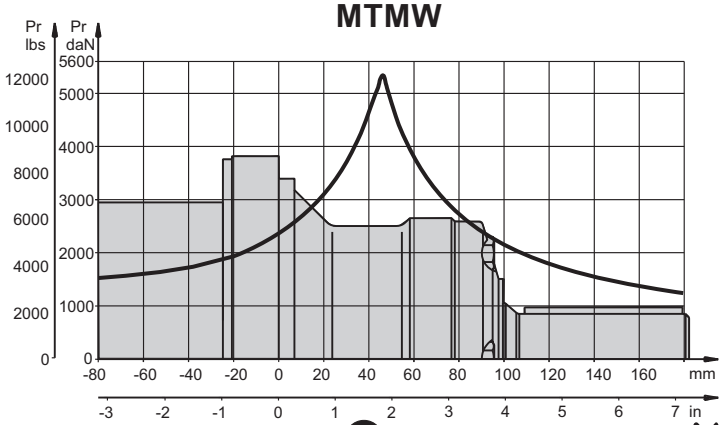
MTM



MTMC

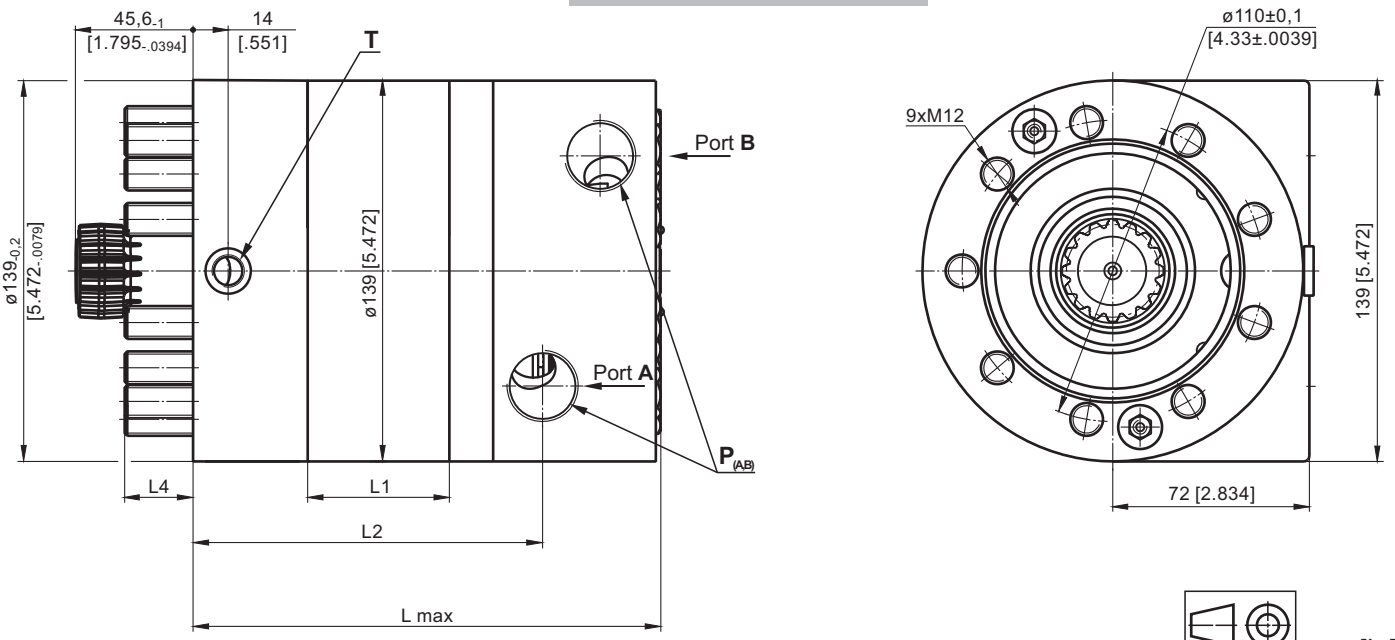


MTMW



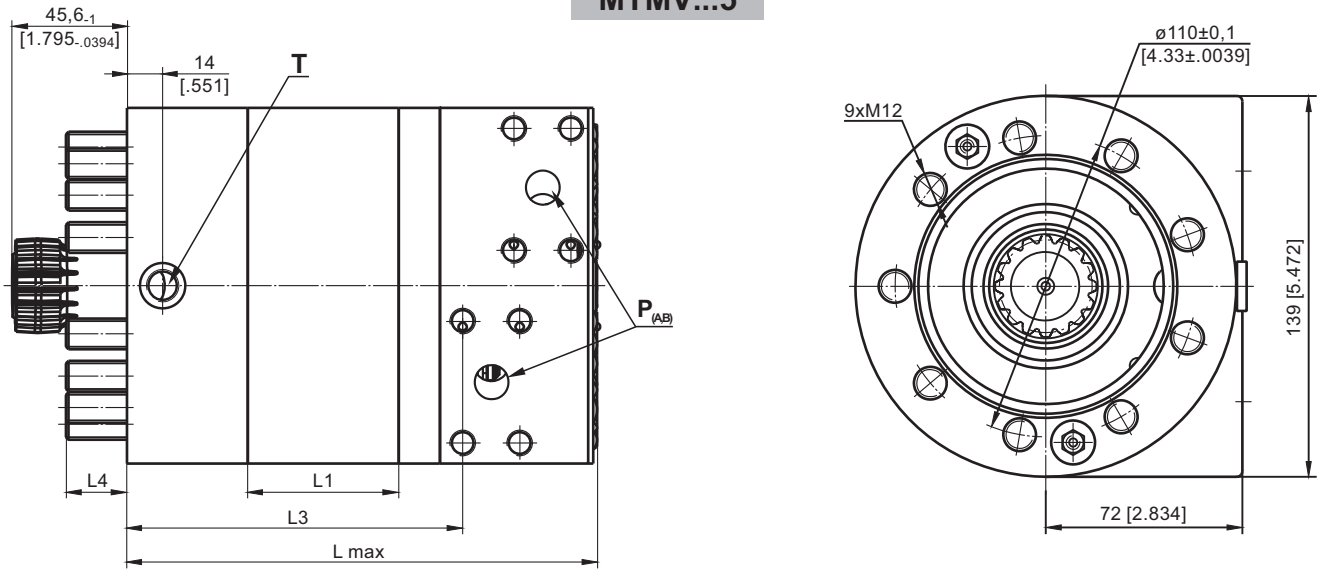
DIMENSIONS and MOUNTING DATA for MTMV

MTMV... and MTMV...4



mm [in]

MTMV...5



Warning: Drain line should always be used (if no check valves)

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

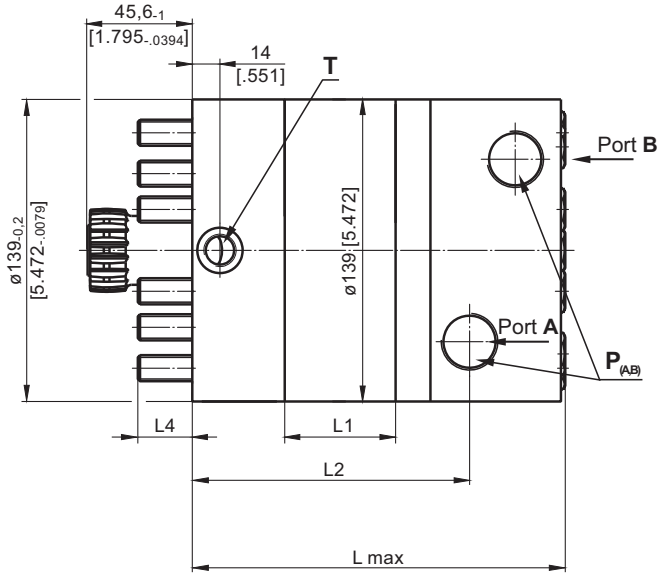
Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

	Versions		
	-	4	5
$P_{(A,B)}$	2xG3/4 17 mm [.67] depth	2x1 1/16-12UN O-ring 17 mm [.67] depth	2x3/4"SAE PSI3000 with 8xM10 threads 10 mm [.39] depth
T	G1/4 12 mm [.47] depth	9/16-18UN 13 mm [.51] depth	G1/4 12 mm [.47] depth

Type	L, mm [in]	L_2, mm [in]	L_3, mm [in]	L_4, mm [in]	L_1, mm [in]
MTMV 200	151 [5.945]	106,5 [4.193]	97,2 [3.827]	27,8 [1.094]	25,0 [.98]
MTMV 250	157 [6.181]	112,8 [4.441]	103,5 [4.075]	26,5 [1.043]	31,3 [1.23]
MTMV 315	167 [6.575]	122,0 [4.803]	112,7 [4.437]	22,3 [.878]	40,5 [1.59]
MTMV 400	177 [6.968]	132,5 [5.217]	123,2 [4.850]	21,8 [.858]	51,0 [2.01]
MTMV 470	185 [7.283]	140,5 [5.531]	131,2 [5.165]	23,8 [.937]	59,0 [2.32]
MTMV 500	191 [7.520]	146,5 [5.768]	137,2 [5.402]	27,8 [1.094]	65,0 [2.56]
MTMV 630	187 [7.362]	142,5 [5.610]	133,2 [5.244]	21,8 [.858]	61,0 [2.40]
MTMV 725	196 [7.717]	151,5 [5.965]	142,2 [5.598]	22,8 [.898]	70,0 [2.76]

DIMENSIONS and MOUNTING DATA for MTM6V

MTM6V... and MTM6V...4



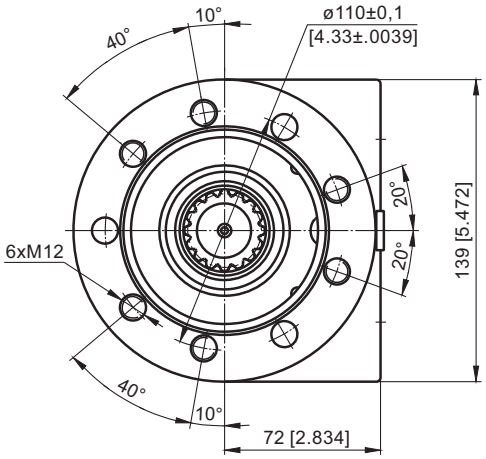
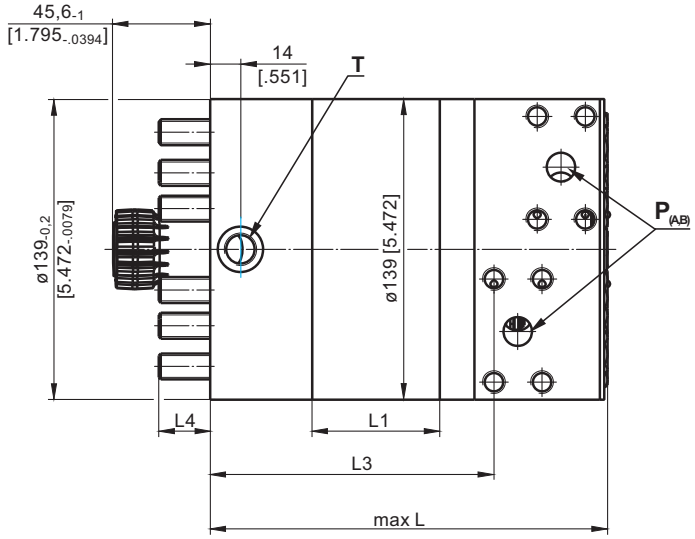


Fig.1

mm [in]

MTM6V...5



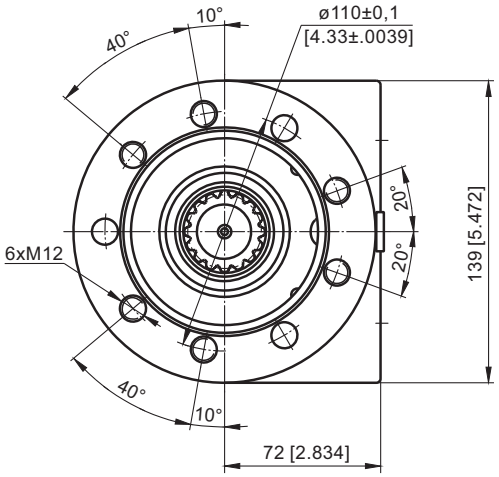


Fig.1

Warning: Drain line should always be used (if no check valves)

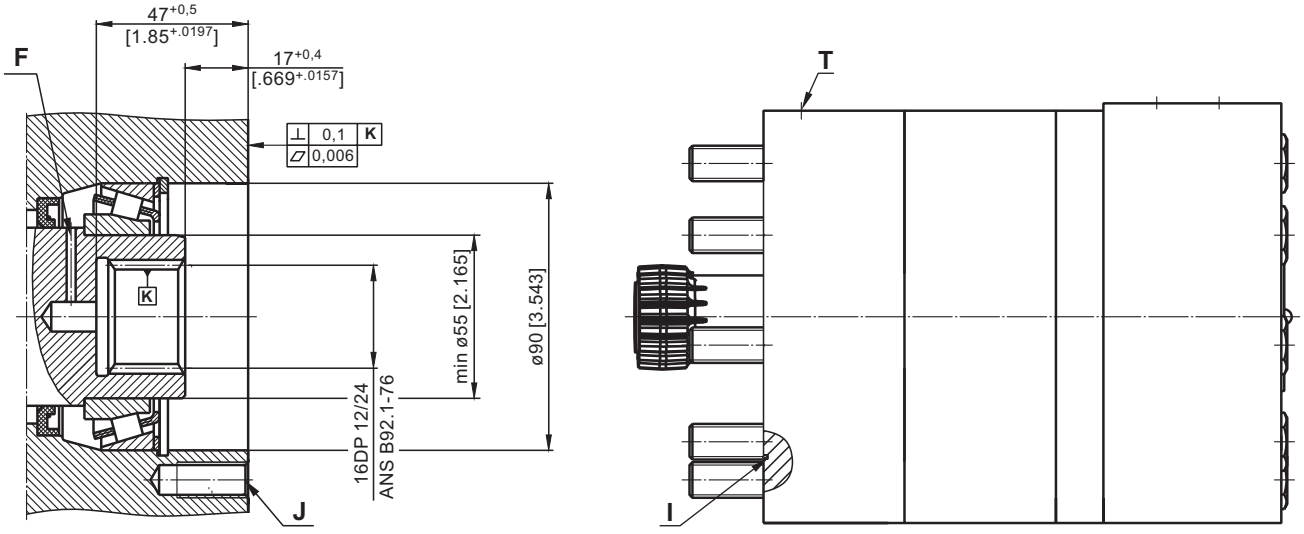
Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

	Versions		
	-	4	5
$P_{(A,B)}$	2xG3/4 17 mm [.67] depth	2x1 1/16-12UN O-ring 17 mm [.67] depth	2x3/4"SAE PSI3000 with 8xM10 threads 10 mm [.39] depth
T	G1/4 12 mm [.47] depth	9/16-18UN 13 mm [.51] depth	G1/4 12 mm [.47] depth

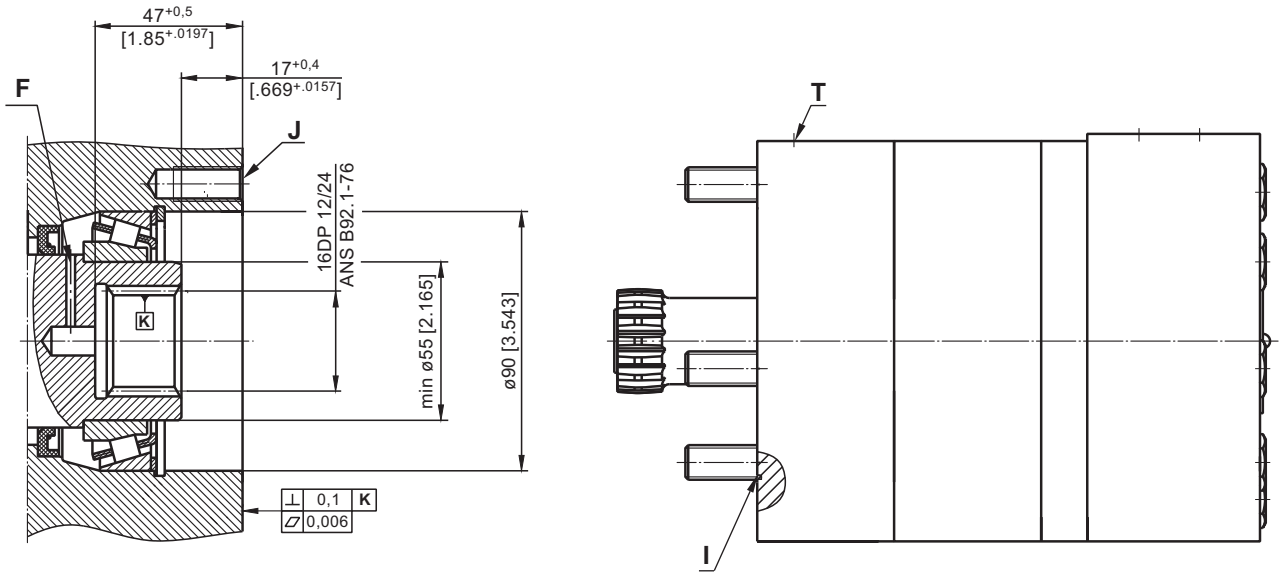
Type	L, mm [in]	L_2, mm [in]	L_3, mm [in]	L_4, mm [in]	L_1, mm [in]
MTM6V 200	151 [5.945]	106,5 [4.193]	97,2 [3.827]	27,8 [1.094]	25,0 [.98]
MTM6V 250	157 [6.181]	112,8 [4.441]	103,5 [4.075]	26,5 [1.043]	31,3 [1.23]
MTM6V 315	167 [6.575]	122,0 [4.803]	112,7 [4.437]	22,3 [.878]	40,5 [1.59]
MTM6V 400	177 [6.968]	132,5 [5.217]	123,2 [4.850]	21,8 [.858]	51,0 [2.01]
MTM6V 470	185 [7.283]	140,5 [5.531]	131,2 [5.165]	23,8 [.937]	59,0 [2.32]
MTM6V 500	191 [7.520]	146,5 [5.768]	137,2 [5.402]	27,8 [1.094]	65,0 [2.56]
MTM6V 630	187 [7.362]	142,5 [5.610]	133,2 [5.244]	21,8 [.858]	61,0 [2.40]
MTM6V 725	196 [7.717]	151,5 [5.965]	142,2 [5.598]	22,8 [.898]	70,0 [2.76]

DIMENSIONS of the ATTACHED COMPONENT



F: Oil circulation hole
J: 9xM12 - 30 mm [1.181 in] depth, 40^0, ø110±0,1 [4.33±.0039]
I : O-Ring 93x1,5 mm [3.661x.059 in]
T: Drain connection G1/4

DIMENSIONS of THE ATTACHED COMPONENT for MTM6V



F: Oil circulation hole
J: 9xM12 - 30 mm [1.181 in] depth, 40^0, ø110±0,1 mm [4.33±.0039 in] or 6xM12 - 30 mm [1.181 in] depth, situated in accordance with the bolts M12, shown on Fig.1, ø110±0,1 mm [4.33±.0039 in]
I : O-Ring 93x1,5 mm [3.661x.059 in]
T: Drain connection G1/4

mm [in]

DRAIN CONNECTION

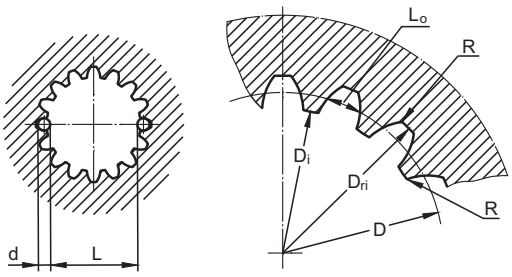
A drain line ought to be used when pressure in the return line can exceed the permissible pressure. It can be connected at the drain connection of the attached component. The maximum pressure in the drain line is limited by the attached component and its shaft seal.

The drain line must be possible for oil to flow freely between motor and attached component and must be led to the tank. The maximum pressure in the drain line is limited by the attached component and its seal.

INTERNAL SPLINE DATA for the ATTACHED COMPONENT

Standard ANS B92.1-1976, class 5
[m=2.1166; corrected x.m=+1,0]

Fillet Root Side Fit		inch	mm
Number of Teeth	z	16	16
Diametral Pitch	DP	12/24	12/24
Pressure Angle		30^0	30^0
Pitch Dia.	D	1.3333	33,8656
Major Dia.	Dri	1.5118÷1.5275	$38,4^{+0,4}$
Minor Dia.	Di	1.2657÷1.2673	$32,15^{+0,04}$
Circular Space Width	Lo	.1763÷.1791	4,516±0,037
Fillet Radius	R	.02	0,5
Dimension Between Two Pins	L	1.063÷1.059	$26,9^{+0,10}$
Pin Dia.	d	.19026÷.19034	4,835±0,001



Hardening Specification:
HV=750±50 on the surface.
HV=560 at 0,7±0,2 [.035÷.019] case depth
Material: 20 MoCr4 EN 10084 or SAE8620.

ORDER CODE

	1	2	3	4	5	6	7	8
M T M							**HD**	

Pos.1 - Mounting Flange

omit - 4-Bolt flange, spigot dia. ø160, BC ø200
C - 4-Bolt flange, spigot dia. ø125, BC ø160
W* - Wheel motor
V - Very short mount, 9xM12 mounting bolts
6V - Very short mount, 6xM12 mounting bolts

Pos.2 - Displacement code

200 - 201,4 cm^3/rev [12.29 in^3/rev]
250 - 251,8 cm^3/rev [15.36 in^3/rev]
315 - 326,3 cm^3/rev [19.90 in^3/rev]
400 - 410,9 cm^3/rev [25.06 in^3/rev]
470 - 475,0 cm^3/rev [28.97 in^3/rev]
500 - 523,6 cm^3/rev [31.95 in^3/rev]
630 - 631,2 cm^3/rev [38.52 in^3/rev]
725 - 724,3 cm^3/rev [44.20 in^3/rev]

Pos.3 - Shaft Extensions**

C - ø40 straight, Parallel key A12x8x70 DIN6885
CO - ø1½" straight, Parallel key $^3/_8$"x$^3/_8$"x2¼" BS46
K - ø45 tapered 1:10, Parallel key B12x8x28 DIN6885
SH - ø1½" splined 17T ANSI B92.1-1976

Pos.4 - Shaft Seal Version* (see page 31)**

omit - Low pressure seal
U - High pressure seal

Pos.5 - Ports

omit - 2xG3/4, G1/4, BSPP (ISO 228)
4 - 2x1$^1/_{16}$-12 UN, O-ring, $^9/_{16}$-18 UNF
5 - 2x3/4"SAE PSI3000 with 8xM10 threads, G1/4

Pos.6 - Check Valves

omit - without check valves
1 - with check valves

Pos.7 - Additional Options

HD - Reinforced motor **HD***
For Other **Additional Options** see page 71

Pos.8 - Design Series

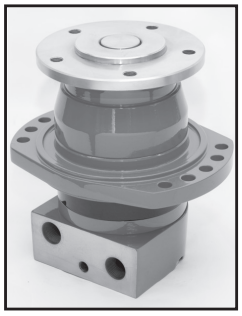
omit - Factory specified

NOTES:

* Not applicable for "5" version.
** The permissible output torque for shafts must be not exceeded!
*** Shaft seal is available with the "omit" and "W" mounting flange only!

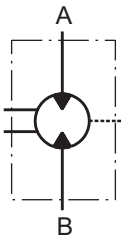
The hydraulic motors are mangano-phosphatized as standard.

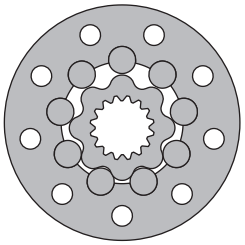
HYDRAULIC MOTORS TMF



APPLICATION

» Marine equipment
» Forestry equipment
» Metal working machines
» Agricultural machines
» Road building machines
» Mining machinery
» Special vehicles etc.





CONTENTS

Specification data 35
Function diagrams ..... 36÷39
Dimensions and mounting TMF..... 40
Dimensions and mounting TMFA 41
Permissible shaft loads 42
Order code 42

OPTIONS

» Model - Disc valve, roll-gerotor
» Wheel mounting flange
» Side ports
» Shaft - thread hole flange
» SAE and BSPP ports
» Other special features

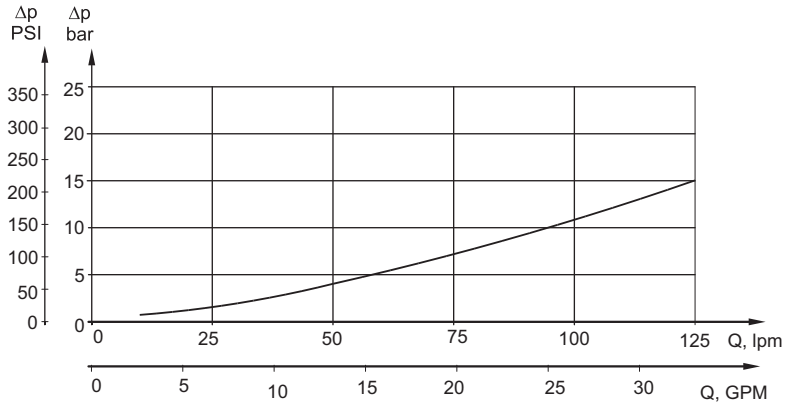
GENERAL

Max. Displacement, cm^3/rev [in^3/rev]	724 [44.2]
Max. Speed, [RPM]	750
Max. Torque, daNm [lb-in]	cont.: 175 [15490] int.: 217 [19206]
Max. Output, kW [HP]	70 [94]
Max. Pressure Drop, bar [PSI]	cont.: 250 [3600] int.: 350 [5080]
Max. Oil Flow, lpm [GPM]	150 [39.6]
Min. Speed, [RPM]	5
Permissible Shaft Loads, daN [lbs]	P_a=1000 [2250]
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, ^{O}C [^{O}F]	-40÷140 [-40÷284]
Optimal Viscosity range, mm^2/s [SUS]	20÷75 [98÷347]
Filtration	ISO code: 18/16/13 According to ISO 4406-1999

Oil flow in drain line

Pressure drop bar [PSI]	Viscosity mm^2/s [SUS]	Oil flow in drain line lpm [GPM]
200 [2900]	20 [98]	2,5 [.660]
	35 [164]	1,5 [.400]
275 [3990]	20 [98]	4 [1.057]
	35 [164]	2,5 [.660]

Pressure Losses



SPECIFICATION DATA

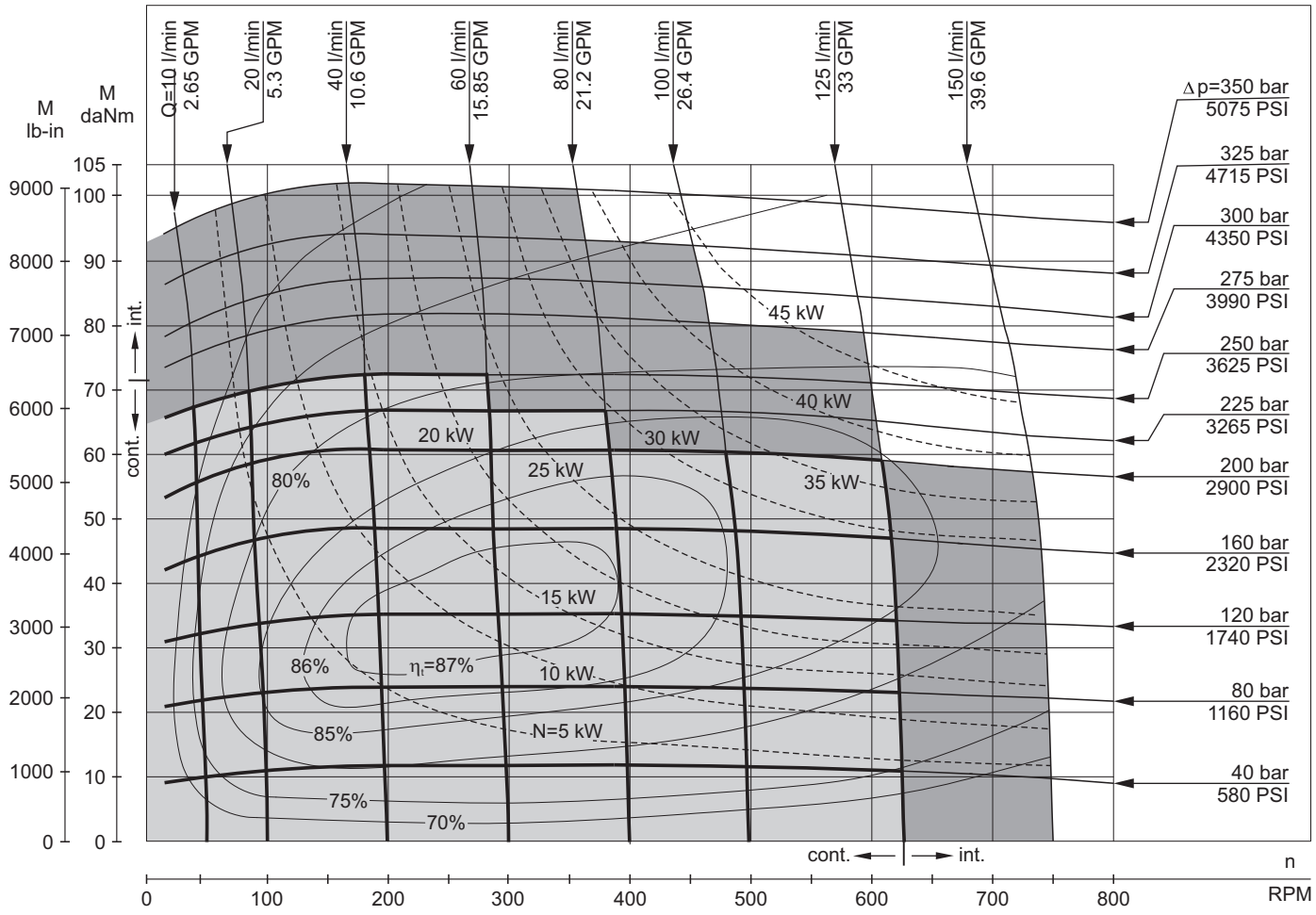
Type		TMF 200	TMF 250	TMF 315	TMF 400	TMF 470	TMF 500	TMF 630	TMF 725
Displacement, cm^3/rev [in^3/rev]		201,4 [12.29]	251,8 [15.36]	326,3 [19.9]	410,9 [25.06]	475 [28.97]	523,6 [31.95]	631,2 [38.52]	724 [44.2]
Max. Speed, [RPM]	Cont.	625	500	380	305	260	240	190	170
	Int.*	750	600	460	365	315	285	230	210
Max. Torque, daNm [lb-in]	Cont.	74 [6550]	90 [7965]	116 [10265]	147 [13010]	171 [15135]	172 [15225]	175 [15490]	160 [14160]
	Int.*	102 [9030]	128 [11330]	163 [14425]	206 [18232]	217 [19206]	217 [19206]	217 [19206]	192 [17000]
	Peak**	115 [10180]	144 [12745]	186 [16460]	235 [20800]	240 [21240]	240 [21240]	250 [22127]	240 [21240]
Max. Output, kW [HP]	Cont.	41 [55]	41 [55]	41 [55]	41 [55]	41 [55]	37,5 [50]	28 [37,5]	26 [35]
	Int.*	65 [87]	70 [94]	70 [94]	70 [94]	55 [74]	51 [68]	42 [56]	40 [54]
Max. Pressure Drop, bar [PSI]	Cont.	250 [3600]	250 [3600]	250 [3600]	250 [3600]	250 [3600]	230 [3340]	185 [2680]	160 [2320]
	Int.*	350 [5080]	350 [5080]	350 [5080]	350 [5080]	320 [4640]	280 [4060]	225 [3260]	210 [3045]
	Peak**	400 [5800]	400 [5800]	400 [5800]	400 [5800]	400 [5800]	320 [4640]	270 [3915]	260 [3770]
Max. Oil Flow, lpm [GPM]	Cont.	125 [33]	125 [33]	125 [33]	125 [33]	125 [33]	125 [33]	125 [33]	125 [33]
	Int.*	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]
Max. Inlet Pressure, bar [PSI]	Cont.	270 [3920]	270 [3920]	270 [3920]	270 [3920]	270 [3920]	270 [3920]	270 [3920]	270 [3920]
	Int.*	370 [5370]	370 [5370]	370 [5370]	370 [5370]	370 [5370]	370 [5370]	370 [5370]	370 [5370]
	Peak**	420 [6100]	420 [6100]	420 [6100]	420 [6100]	420 [6100]	420 [6100]	420 [6100]	420 [6100]
Max. Return Pressure w/o Drain Line or Max. Pressure in Drain Line, bar [PSI]	Cont. 0-100 RPM	75 [1100]	75 [1100]	75 [1100]	75 [1100]	75 [1100]	75 [1100]	75 [1100]	75 [1100]
	Cont.100-300 RPM	40 [580]	40 [580]	40 [580]	40 [580]	40 [580]	40 [580]	40 [580]	40 [580]
	Cont. >300 RPM	20 [290]	20 [290]	20 [290]	20 [290]	20 [290]	-	-	-
	Int.* 0-max. RPM	75 [1100]	75 [1100]	75 [1100]	75 [1100]	75 [1100]	75 [1100]	75 [1100]	75 [1100]
Max. Return Pressure with Drain Line, bar [PSI]	Cont.	140 [2000]	140 [2000]	140 [2000]	140 [2000]	140 [2000]	140 [2000]	140 [2000]	140 [2000]
	Int.*	175 [2500]	175 [2500]	175 [2500]	175 [2500]	175 [2500]	175 [2500]	175 [2500]	175 [2500]
	Peak**	210 [3000]	210 [3000]	210 [3000]	210 [3000]	210 [3000]	210 [3000]	210 [3000]	210 [3000]
Max. Starting Pressure with Unloaded Shaft, bar [PSI]		6 [90]	6 [90]	6 [90]	6 [90]	6 [90]	6 [90]	6 [90]	6 [90]
Min. Starting Torque, daNm [lb-in]		60 [5310]	75 [6640]	97 [8585]	122 [10800]	142 [12570]	143 [12655]	145 [12830]	148 [13100]
Min. Speed***, RPM		5	5	5	5	5	5	5	5
Weight, kg [lb]		26,9 [59.3]	27,3 [60.2]	28,1 [62]	29 [64]	29,7 [65.5]	30,2 [66.6]	29,7 [65.5]	31 [68.4]

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% of every minute.
*** For speeds lower than given, consult factory or your regional manager.

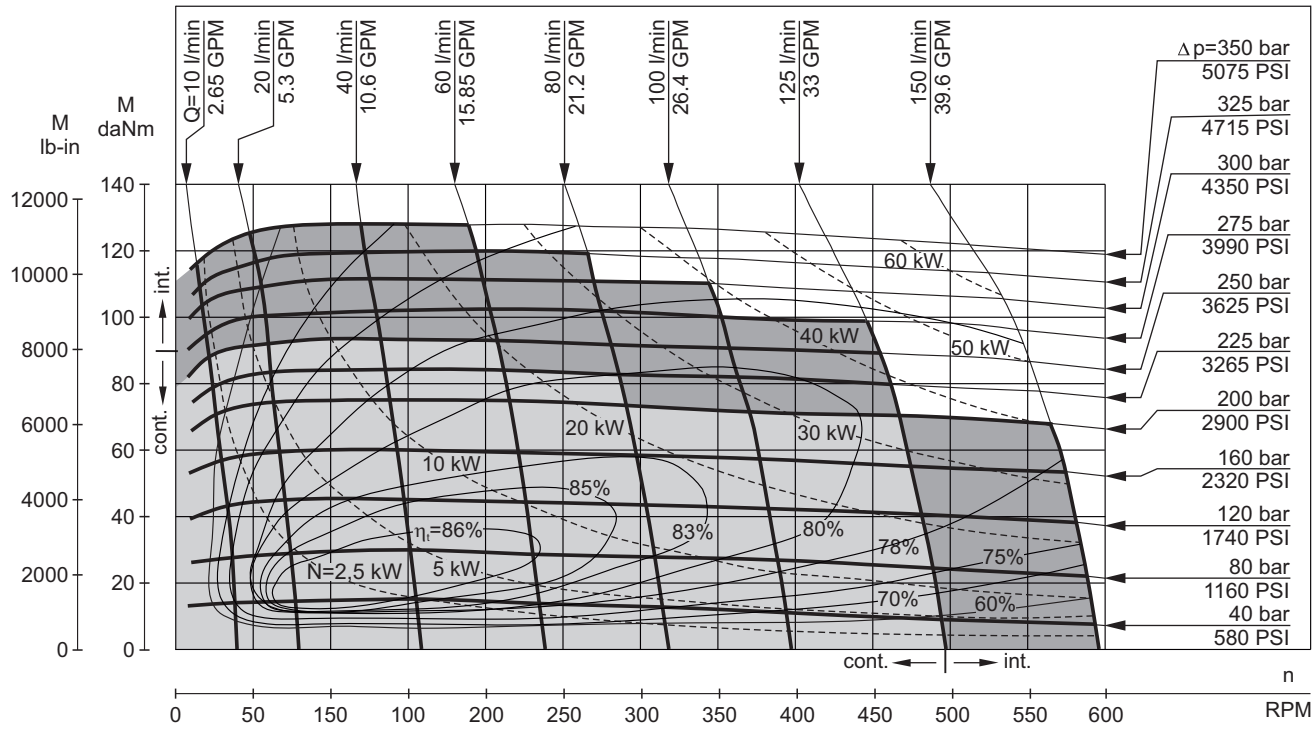
1. Intermittent speed and intermittent pressure must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm^2/s [70 SUS] at 50°C [122°F].
5. Recommended maximum system operating temperature is 82°C [180°F].
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

FUNCTION DIAGRAMS

TMF 200



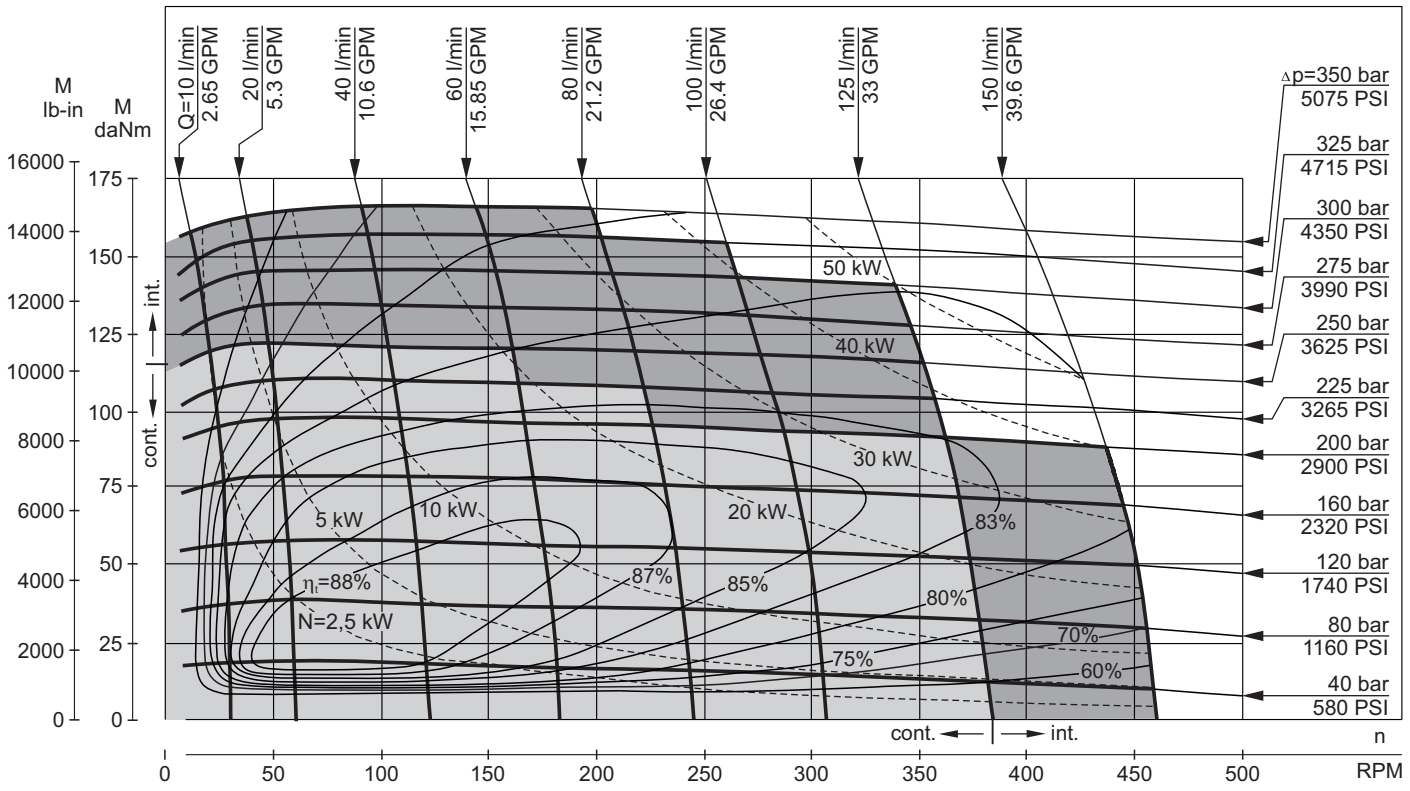
TMF 250



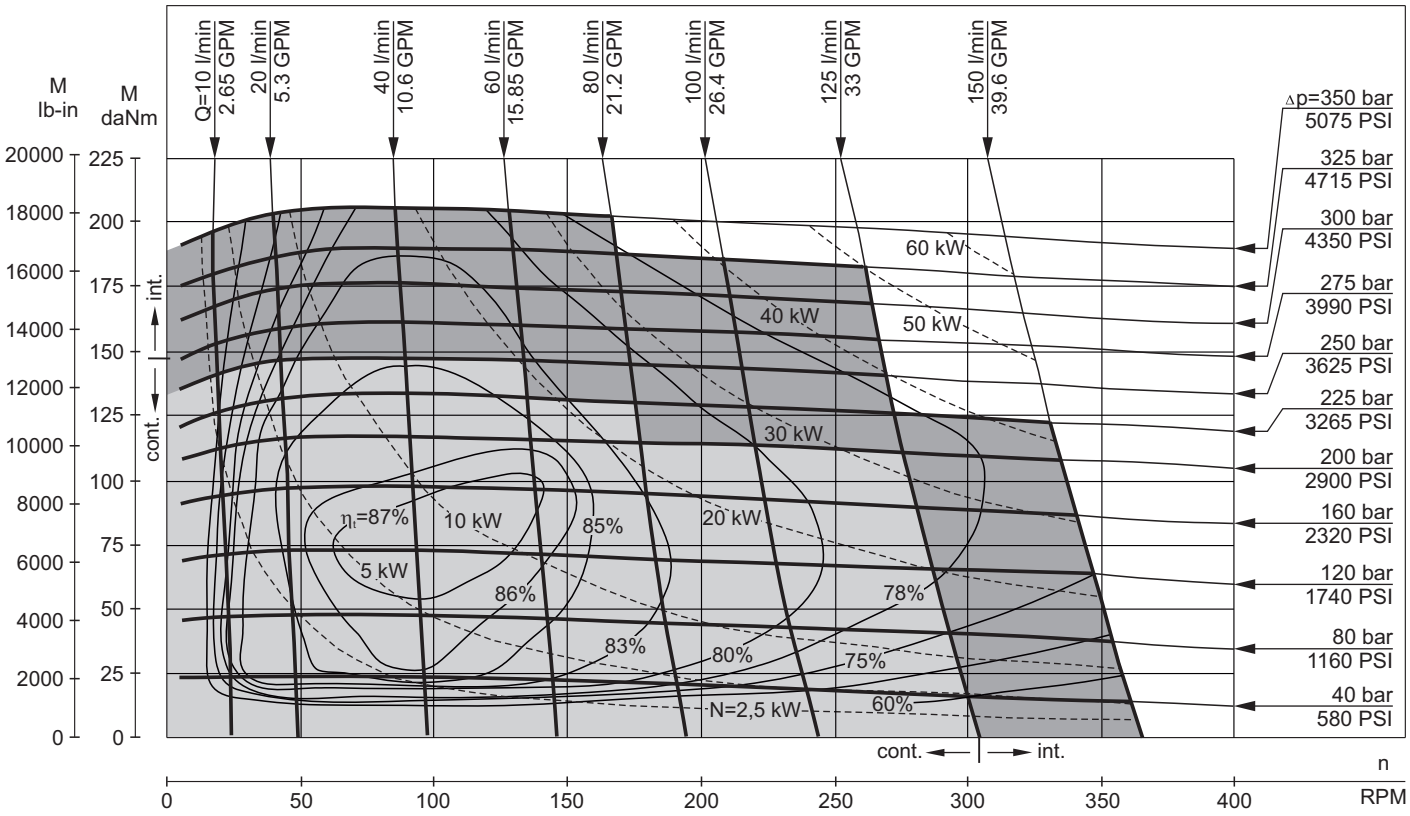
The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5 PSI÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

FUNCTION DIAGRAMS

TMF 315



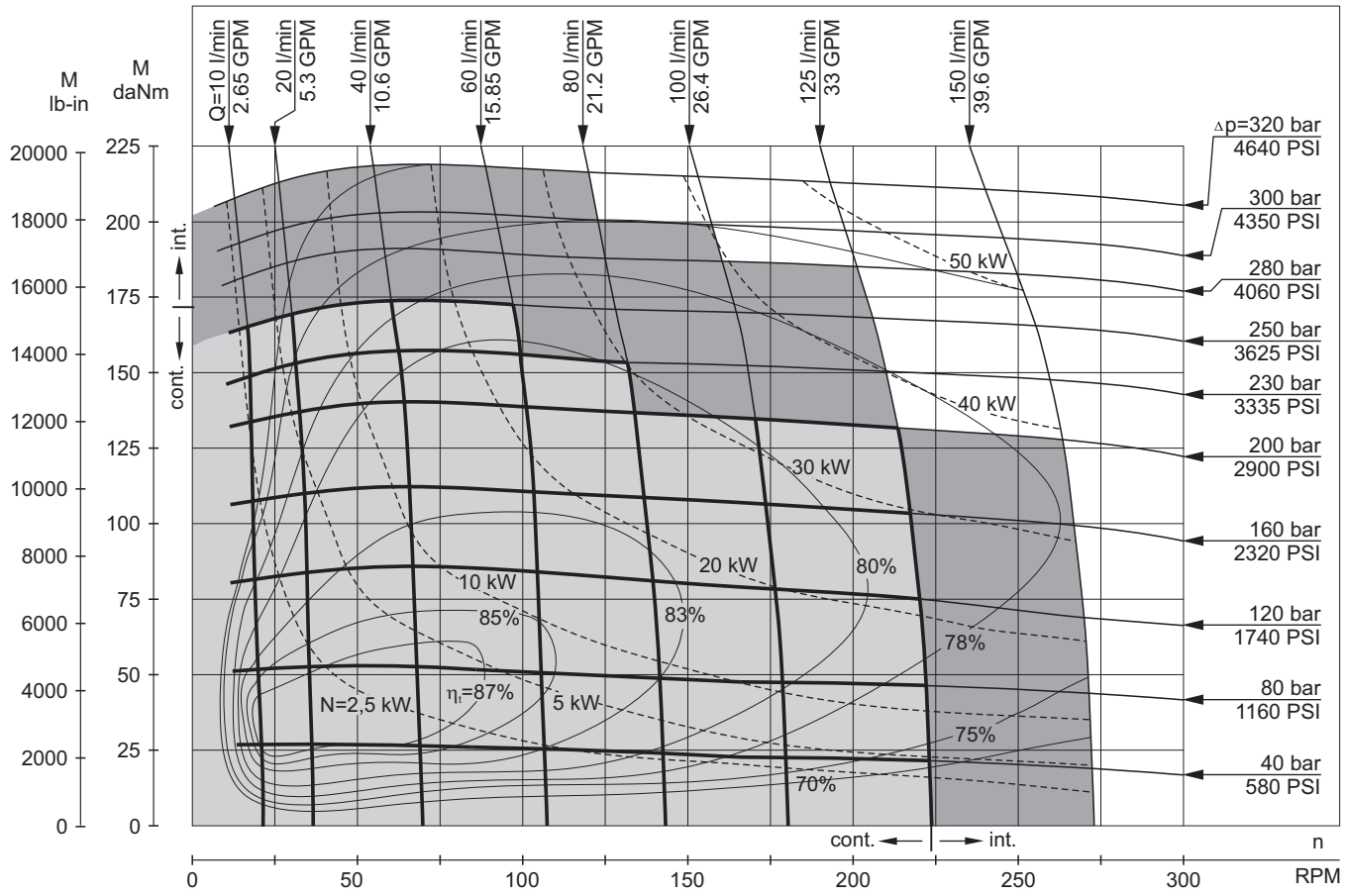
TMF 400



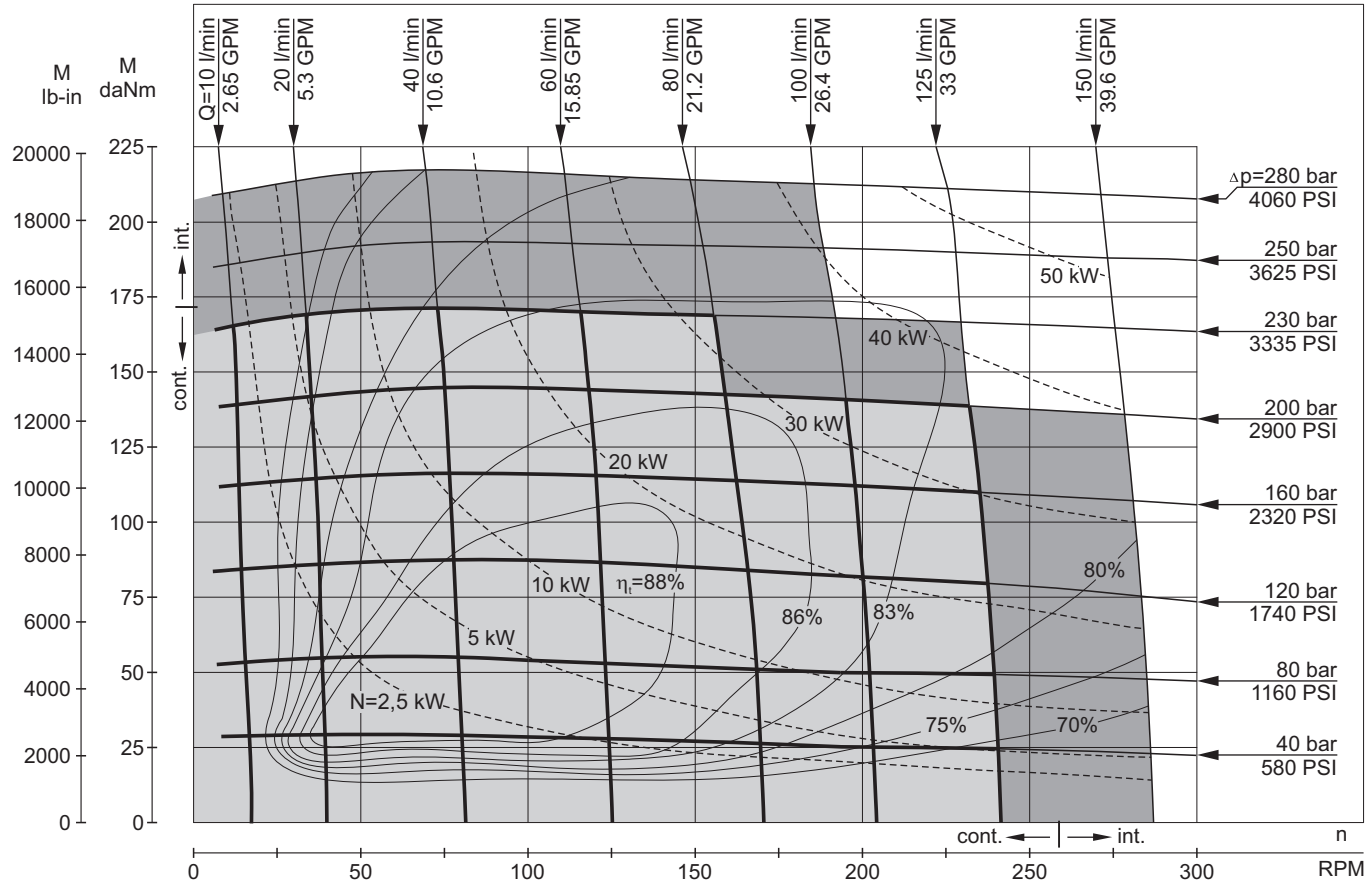
The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5 PSI÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

FUNCTION DIAGRAMS

TMF 470



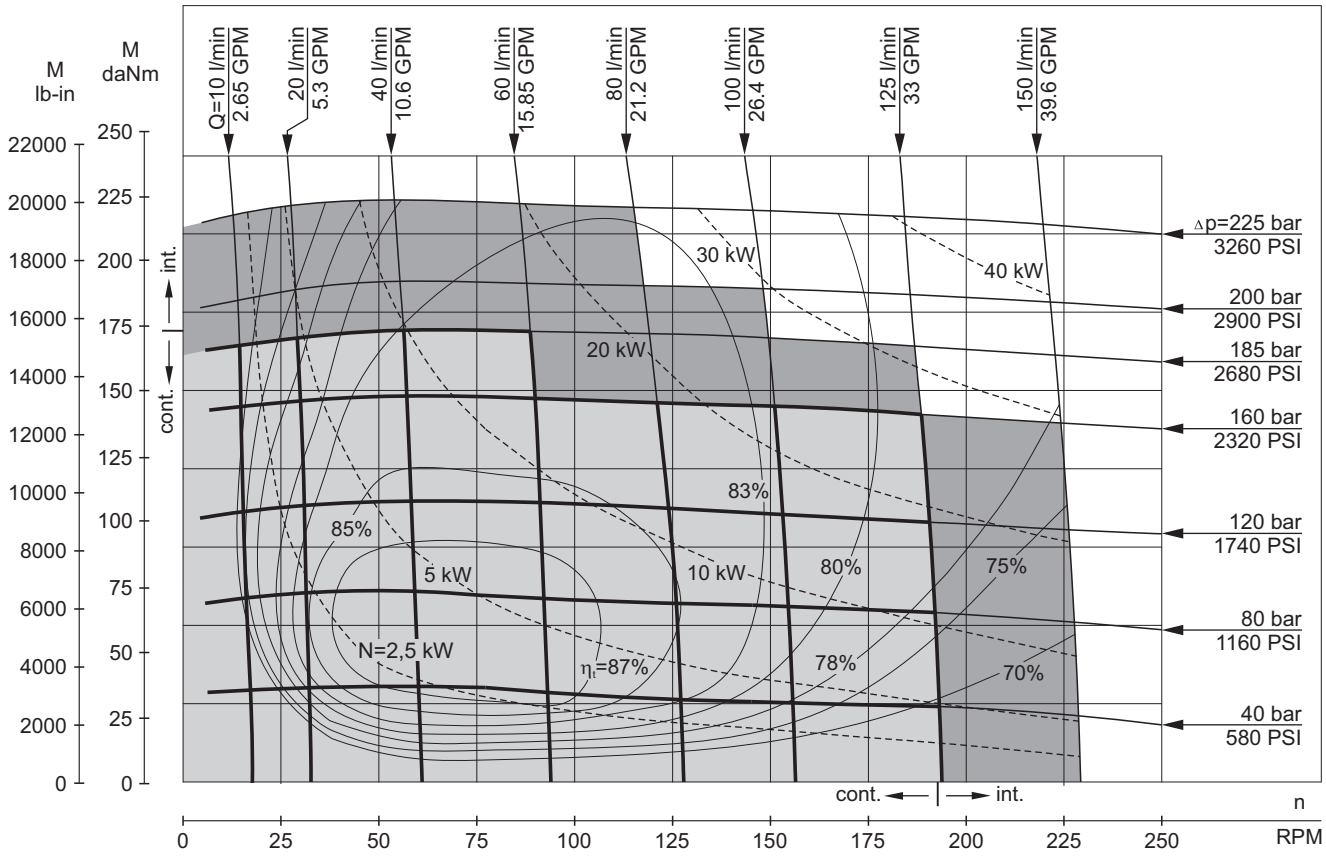
TMF 500



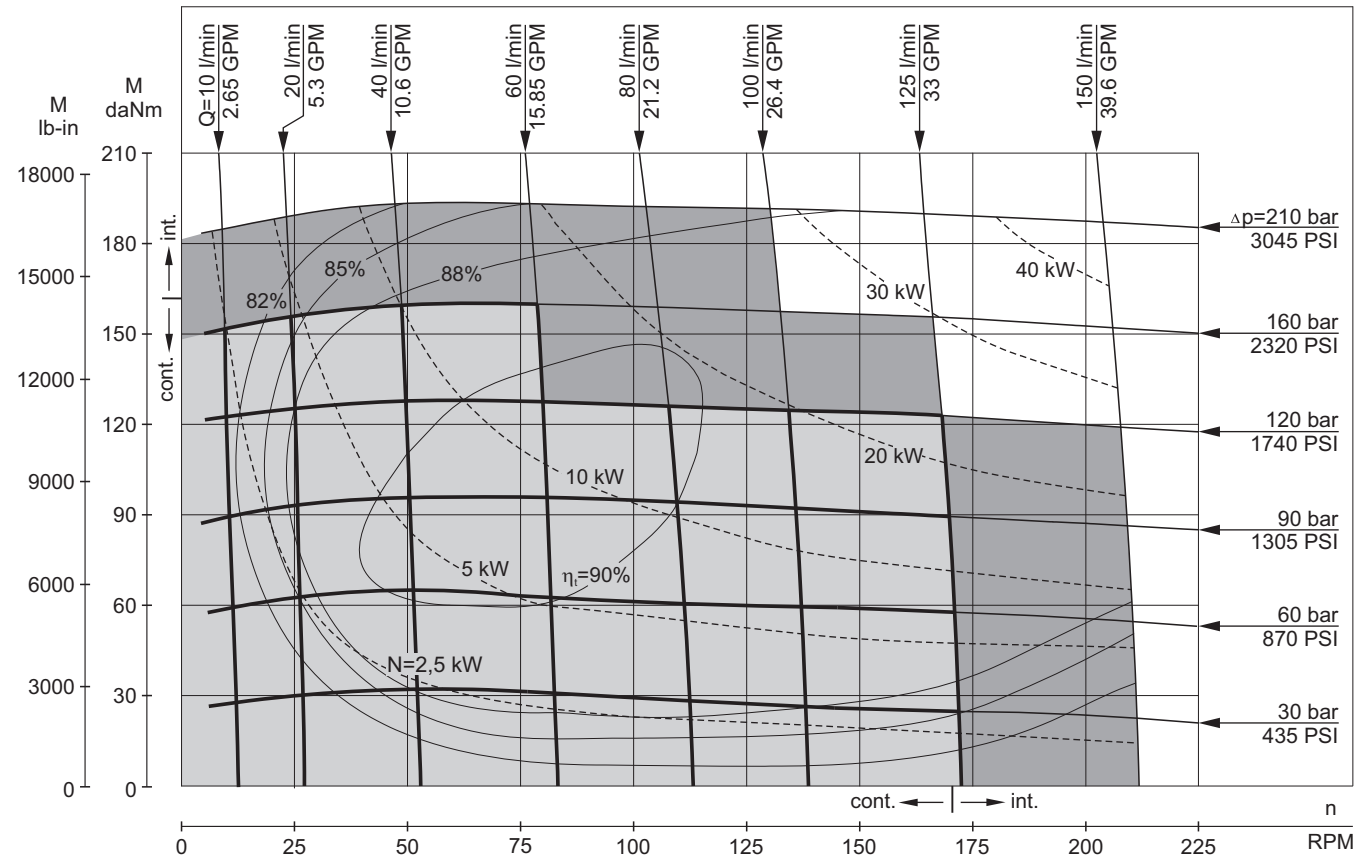
The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5 PSI÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

FUNCTION DIAGRAMS

TMF 630

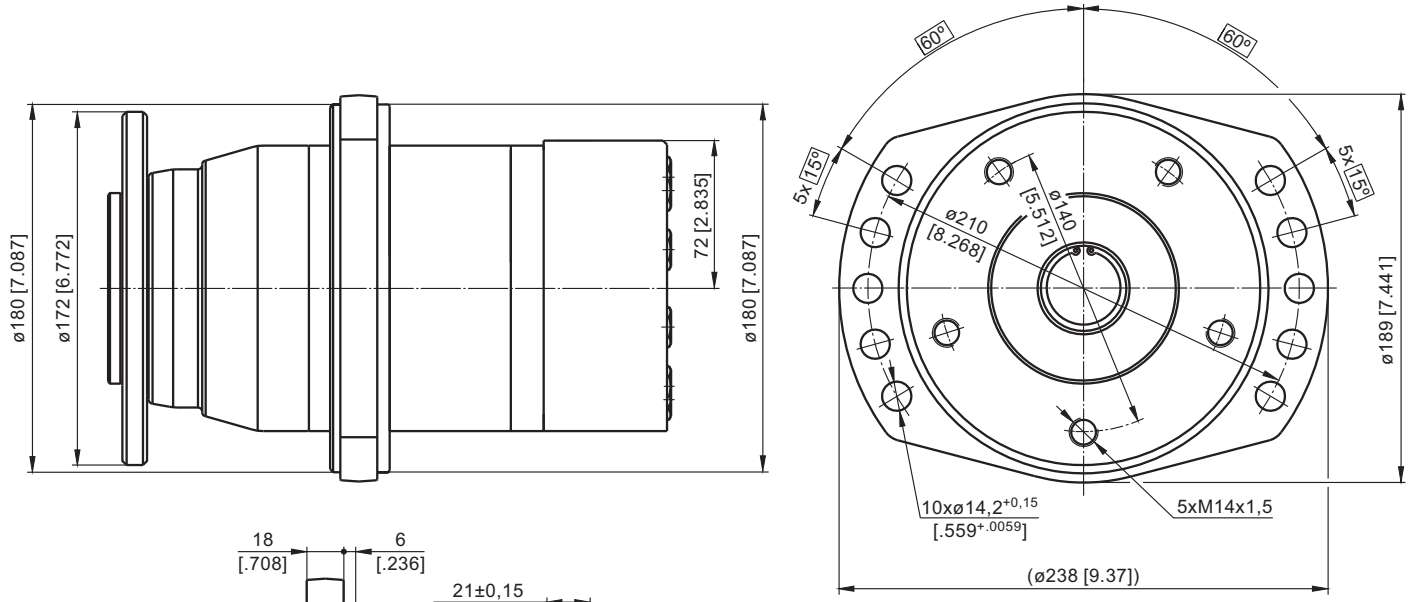


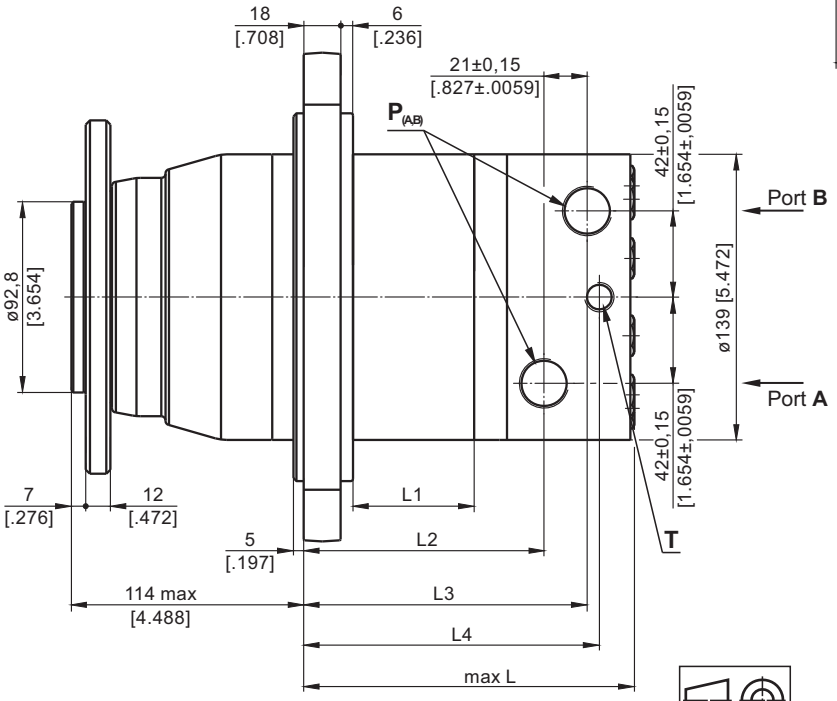
TMF 725

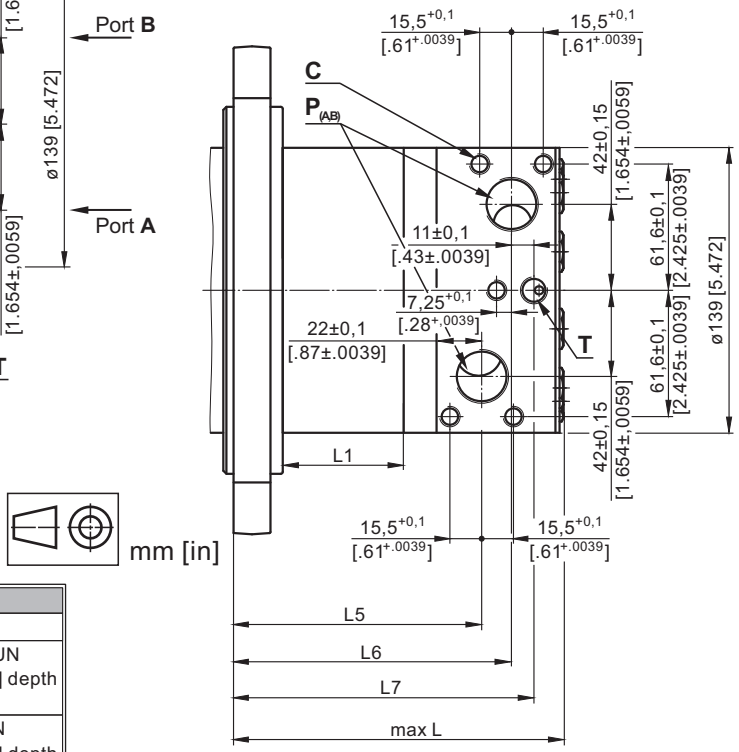


The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5 PSI÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

DIMENSIONS and MOUNTING DATA - TMF







mm [in]

Warning: Drain line should always be used.

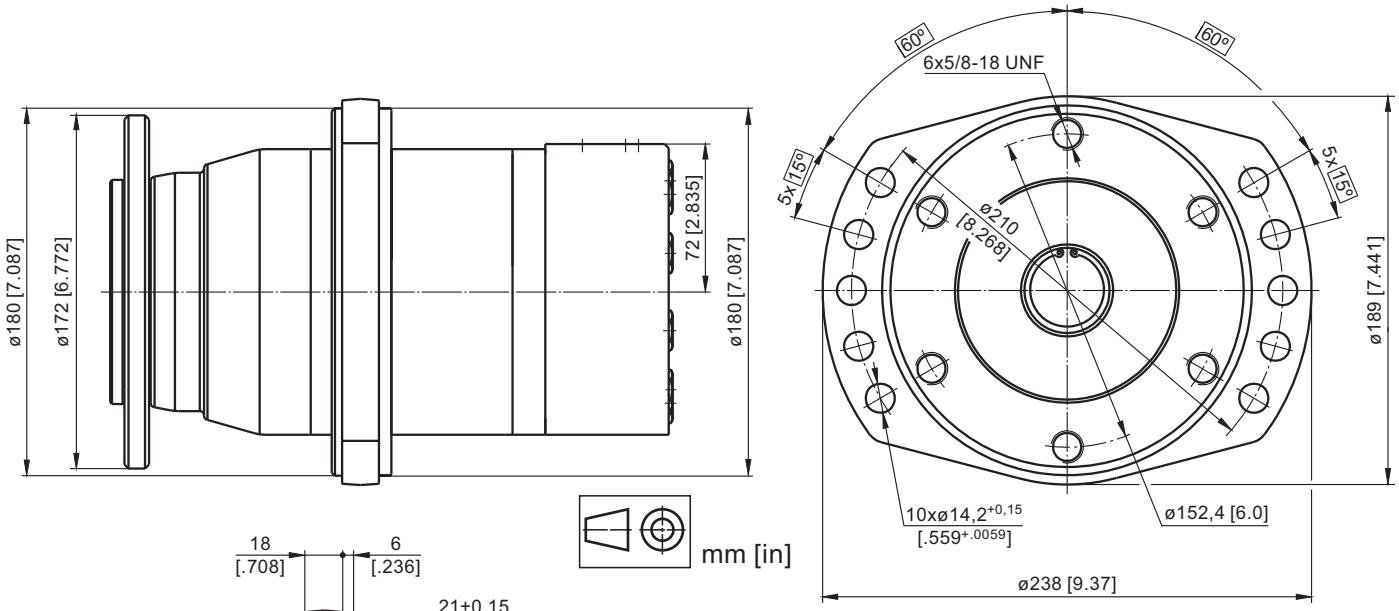
	Versions		
	2	3	4
P(A,B)	2xG3/4 17 mm [.669 in] depth	2xG3/4 17 mm [.669 in] depth	2x1 1/16-12 UN 17 mm [.669 in] depth O-ring
T	G1/4 12 mm [.472 in] depth	G1/4 12 mm [.472 in] depth	9/16-18 UN 12 mm [.472 in] depth O-ring
C	-	5xM10 17 mm [.669 in] depth	-

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

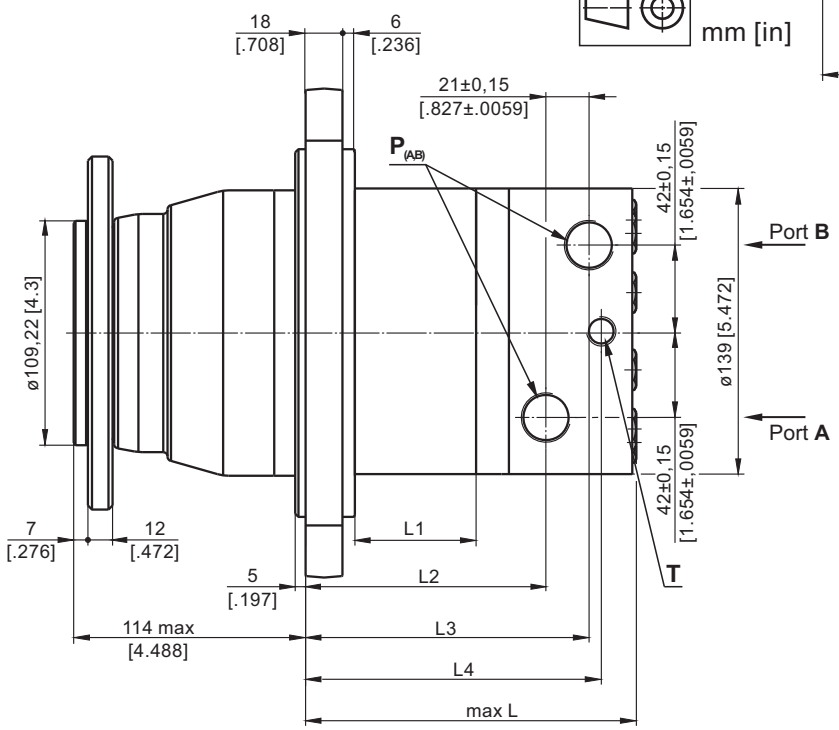
Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

Type	L_{max}, mm [in]	L_1, mm [in]	L_2,mm [in]	L_3, mm [in]	L_4, mm [in]	L_5, mm [in]	L_6, mm [in]	L_7, mm [in]
TMF 200	128,0 [5.04]	25,0 [.98]	83,0 [3.27]	104,0 [4.09]	110,3 [4.34]	87,0 [3.43]	101,5 [3.99]	112,5 [4.43]
TMF 250	134,0 [5.28]	31,3 [1.23]	89,3 [3.52]	110,3 [4.34]	116,6 [4.59]	93,5 [3.68]	108,0 [4.25]	118,8 [4.68]
TMF 315	143,5 [5.65]	40,5 [1.59]	98,5 [3.88]	119,5 [4.70]	125,8 [4.95]	102,5 [4.04]	117,0 [4.61]	128,0 [5.04]
TMF 400	154,0 [6.06]	51,0 [2.01]	109,0 [4.29]	130,0 [5.12]	136,3 [5.37]	113,0 [4.45]	127,5 [5.02]	138,5 [5.45]
TMF 470	162,0 [6.38]	59,0 [2.32]	117,0 [4.61]	138,0 [5.43]	144,3 [5.68]	121,0 [4.76]	135,0 [5.33]	146,5 [5.77]
TMF 500	168,0 [6.61]	65,0 [2.56]	123,0 [4.84]	144,0 [5.67]	150,3 [5.92]	127,0 [5.00]	141,5 [5.57]	152,5 [6.00]
TMF 630	164,0 [6.46]	61,0 [2.40]	119,0 [4.69]	140,0 [5.51]	146,3 [5.76]	123,0 [4.84]	137,5 [5.41]	148,5 [5.85]
TMF 725	173,0 [6.81]	70,0 [2.76]	128,0 [5.04]	149,0 [8.87]	155,3 [6.11]	132,0 [5.20]	146,5 [5.77]	157,5 [6.20]

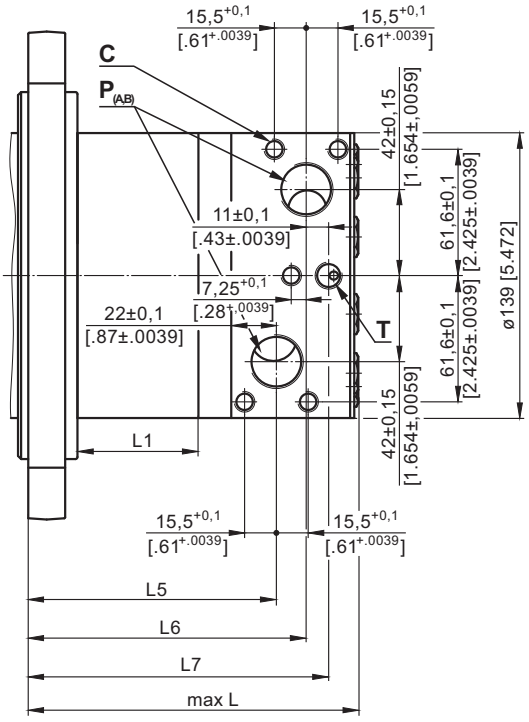
DIMENSIONS and MOUNTING DATA - TMFA



mm [in]



TMF - version 3



Warning: Drain line should always be used.

	Versions		
	2	3	4
P(A,B)	2xG3/4 17 mm [.669 in] depth	2xG3/4 17 mm [.669 in] depth	2x1 1/16-12 UN 17 mm [.669 in] depth O-ring
T	G1/4 12 mm [.472 in] depth	G1/4 12 mm [.472 in] depth	9/16-18 UN 12 mm [.472 in] depth O-ring
C	-	5xM10 17 mm [.669 in] depth	-

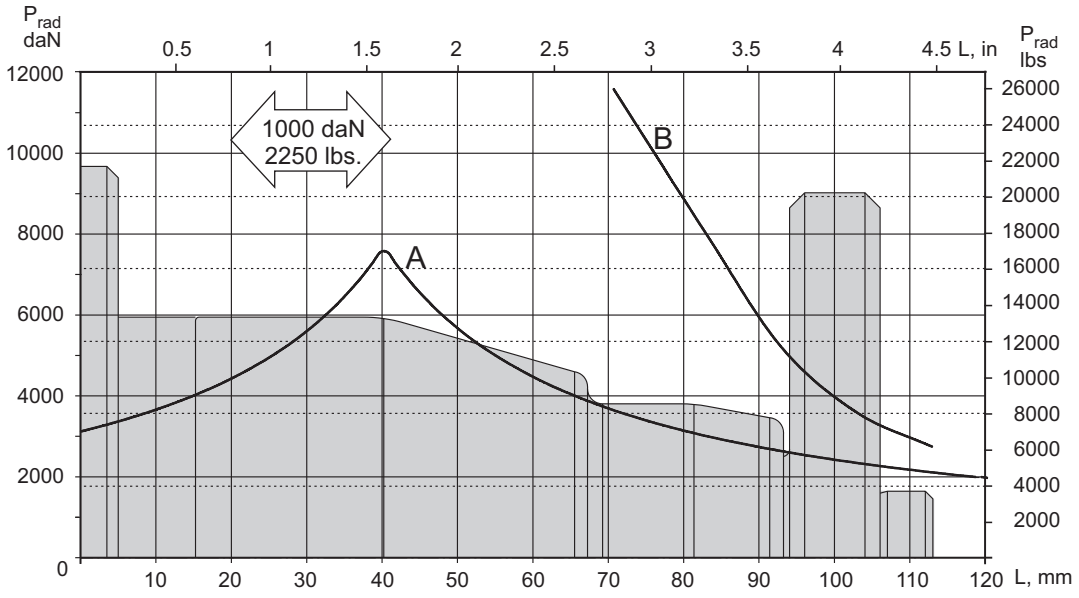
Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

Type	Lmax, mm [in]	L1, mm [in]	L2, mm [in]	L3, mm [in]	L4, mm [in]	L5, mm [in]	L6, mm [in]	L7, mm [in]
TMF 200	128,0 [5.04]	25,0 [.98]	83,0 [3.27]	104,0 [4.09]	110,3 [4.34]	87,0 [3.43]	101,5 [3.99]	112,5 [4.43]
TMF 250	134,0 [5.28]	31,3 [1.23]	89,3 [3.52]	110,3 [4.34]	116,6 [4.59]	93,5 [3.68]	108,0 [4.25]	118,8 [4.68]
TMF 315	143,5 [5.65]	40,5 [1.59]	98,5 [3.88]	119,5 [4.70]	125,8 [4.95]	102,5 [4.04]	117,0 [4.61]	128,0 [5.04]
TMF 400	154,0 [6.06]	51,0 [2.01]	109,0 [4.29]	130,0 [5.12]	136,3 [5.37]	113,0 [4.45]	127,5 [5.02]	138,5 [5.45]
TMF 470	162,0 [6.38]	59,0 [2.32]	117,0 [4.61]	138,0 [5.43]	144,3 [5.68]	121,0 [4.76]	135,0 [5.33]	146,5 [5.77]
TMF 500	168,0 [6.61]	65,0 [2.56]	123,0 [4.84]	144,0 [5.67]	150,3 [5.92]	127,0 [5.00]	141,5 [5.57]	152,5 [6.00]
TMF 630	164,0 [6.46]	61,0 [2.40]	119,0 [4.69]	140,0 [5.51]	146,3 [5.76]	123,0 [4.84]	137,5 [5.41]	148,5 [5.85]
TMF 725	173,0 [6.81]	70,0 [2.76]	128,0 [5.04]	149,0 [8.87]	155,3 [6.11]	132,0 [5.20]	146,5 [5.77]	157,5 [6.20]

PERMISSIBLE SHAFT LOADS

The load diagram is valid for an average bearings life of 2000 hours at 100 RPM



A - Permissible radial shaft load.
B - Max. radial shaft load. Any shaft load exceeding the values shown in the curve will involve a risk of breakage.

ORDER CODE

	1	2	3	4	5
TMF				**HD**	

Pos.1 - **Mounting Flange**

omit - Thread hole flange, 5xM14x1,5 on ø140 [5.512]

A - Thread hole flange, 6x5/8-18 UNF on ø152,4 [6.0]

Pos.2 - **Displacement code**

200 - 201,4 cm^3/rev [12.29 in^3/rev]

250 - 251,8 cm^3/rev [15.36 in^3/rev]

315 - 326,3 cm^3/rev [19.90 in^3/rev]

400 - 410,9 cm^3/rev [25.06 in^3/rev]

470 - 475,0 cm^3/rev [28.97 in^3/rev]

500 - 523,6 cm^3/rev [31.95 in^3/rev]

630 - 631,2 cm^3/rev [38.52 in^3/rev]

725 - 724,3 cm^3/rev [44.20 in^3/rev]

Pos.3 - **Ports**

2 - side ports, 2xG3/4, G1/4, BSP thread, ISO 228

3 - side ports, 2xG3/4, G1/4, 5xM10 BSP thread, ISO 228

4 - side ports, 2x1 1/16-12 UN, O-ring, 9/16-18 UNF

Pos.4 - **Additional Options**

HD - Reinforced motor **HD***

For Other **Additional Options** see page 71

Pos.5 - **Design Series**

omit - Factory specified

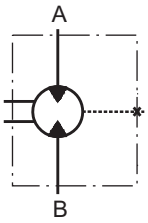
NOTES: * Drain line should always be used.

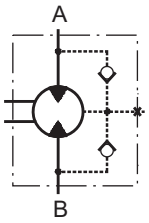
The hydraulic motors are mangano-phosphatized as standard.

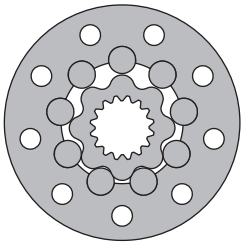
HYDRAULIC MOTORS TMYF

APPLICATION

»Marine equipment
»Forestry equipment
»Metal working machines
»Agriculture machines
»Road building machines
»Mining machinery
»Special vehicles etc.







CONTENTS

Specification data 44
Function diagrams ..... 45÷47
Dimensions and mounting TMYF ..... 48÷50
Permissible shaft loads 51
Order code 51

OPTIONS

»Model- Disc valve, roll-gerotor
»Wheel mounting flange
»Side ports
»Shaft- thread hole flange
»SAE and BSPP ports
»Other special features

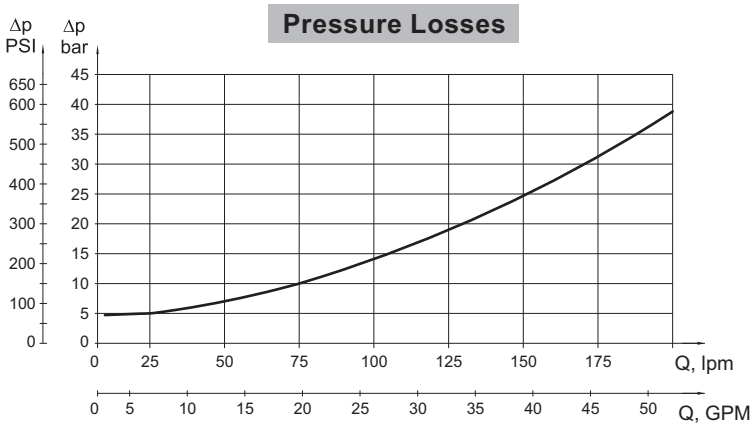
GENERAL

Max. Displacement, cm^3/rev [in^3/rev]	801,8 [48.91]
Max. Speed, [RPM]	590
Max. Torque, daNm [lb-in]	cont.: 259 [22920] int.: 340 [30090]
Max. Output, kW [HP]	65 [87]
Max. Pressure Drop, bar [PSI]	cont.: 250 [3600] int.: 350 [5080]
Max. Oil Flow, lpm [GPM]	240 [63.4]
Min. Speed, [RPM]	5
Permissible Shaft Loads daN [lbs]	P_a=1500 [3300]
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, ^oC [^oF]	-40÷140 [-40÷284]
Optimal Viscosity range, mm^2/s [SUS]	20÷75 [98÷347]
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 micron)

Oil flow in drain line

Pressure drop bar [PSI]	Viscosity mm^2/s [SUS]	Oil flow in drain line lpm [GPM]
200 [2900]	20 [98]	2,5 [.660]
	35 [164]	1,5 [.400]
275 [3990]	20 [98]	4 [1.057]
	35 [164]	2,5 [.660]

Pressure Losses



SPECIFICATION DATA

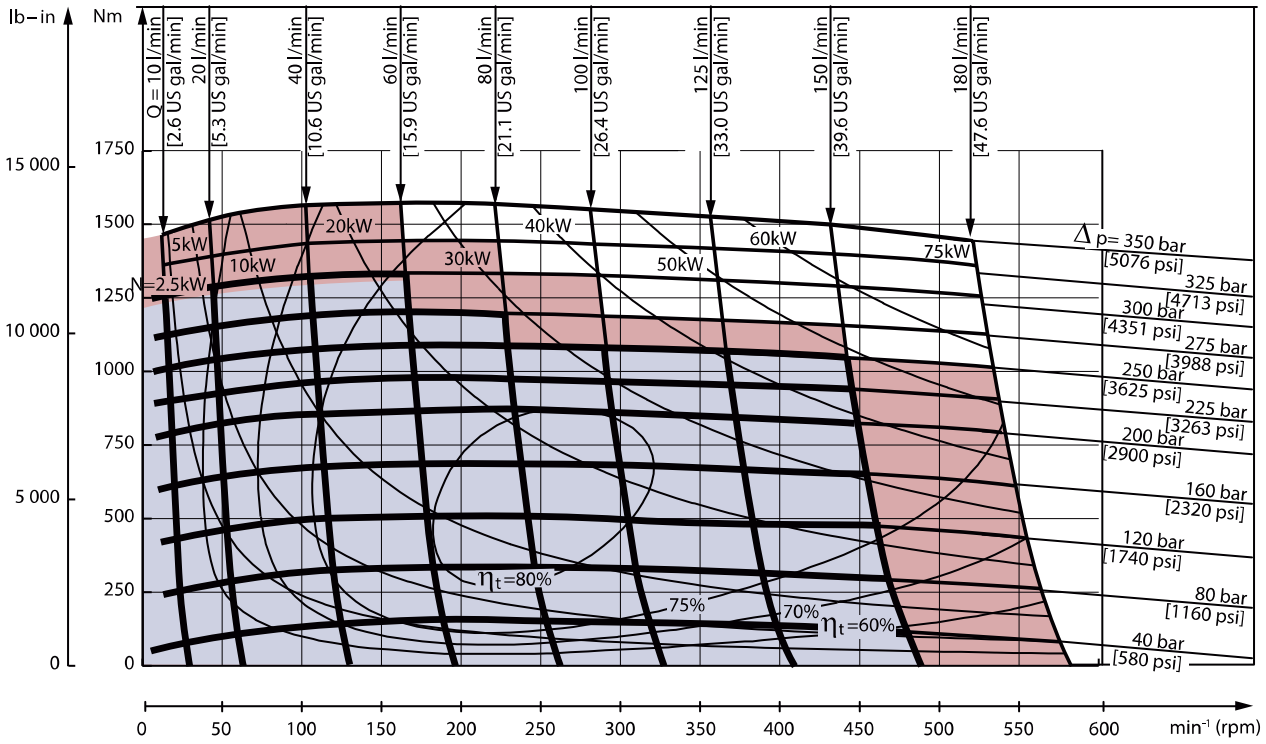
Type		TMYF 315	TMYF 400	TMYF 500	TMYF 630	TMYF 800
Displacement, cm^3/rev [in^3/rev]		314,5 [19.19]	400,9 [24.5]	499,6 [30.5]	629,1 [38.38]	801,8 [48.91]
Max. Speed, [RPM]	Cont.	480	450	400	315	240
	Int.*	570	590	480	370	290
Max. Torque, daNm [lb-in]	Cont.	135 [11950]	172 [15220]	224 [19820]	259 [22920]	270 [23900]
	Int.*	160 [14160]	200 [17700]	260 [23010]	320 [28320]	340 [30090]
	Peak**	180 [15930]	230 [20355]	286 [25315]	360 [31860]	402 [35580]
Starting Torque, daNm [lb-in]		92 [8140]	115 [10180]	144 [12745]	180 [15930]	205 [18140]
Max. Output, kW [HP]	Cont.	50 [67]	55 [74]	55 [74]	50 [67]	50 [67]
	Int.*	55 [74]	60 [80]	65 [87]	60 [80]	60 [80]
Max. Pressure Drop, bar [PSI]	Cont.	300 [4350]	300 [4350]	300 [4350]	275 [3990]	225 [3263]
	Int.*	350 [5080]	350 [5080]	350 [5080]	350 [5080]	300 [4350]
	Peak**	400 [5800]	400 [5800]	400 [5800]	400 [5800]	350 [5080]
Max. Oil Flow, lpm [GPM]	Cont.	150 [39.6]	180 [47.6]	200 [52.8]	200 [52.8]	200 [52.8]
	Int.*	180 [47.6]	240 [63.4]	240 [63.4]	240 [63.4]	240 [63.4]
Max. Inlet Pressure, bar [PSI]	Cont.	300 [4350]	300 [4350]	300 [4350]	300 [4350]	300 [4350]
	Int.*	380 [5510]	380 [5510]	380 [5510]	380 [5510]	380 [5510]
	Peak**	420 [6090]	420 [6090]	420 [6090]	420 [6090]	420 [6090]
Max. Starting Pressure with Unloaded Shaft, bar [PSI]		5 [70]	5 [70]	5 [70]	5 [70]	5 [70]
Max. Return Pressure with Drain Line, bar [PSI]	Cont.	140 [2030]				
	Int.*	175 [2540]				
	Peak**	210 [3046]				
Drain line:		**Should always be used!**				
Weight, kg [lb]	TMYFT	31,2 [68.8]	31,8 [70.1]	32,4 [71.4]	34 [74.9]	34,5 [76.1]
	TMYFV	38,2 [84.4]	38,8 [85.5]	39,4 [86.9]	41 [90.4]	41,5 [91.5]

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% of every minute.
*** For speeds lower than given, consult factory or your regional manager.

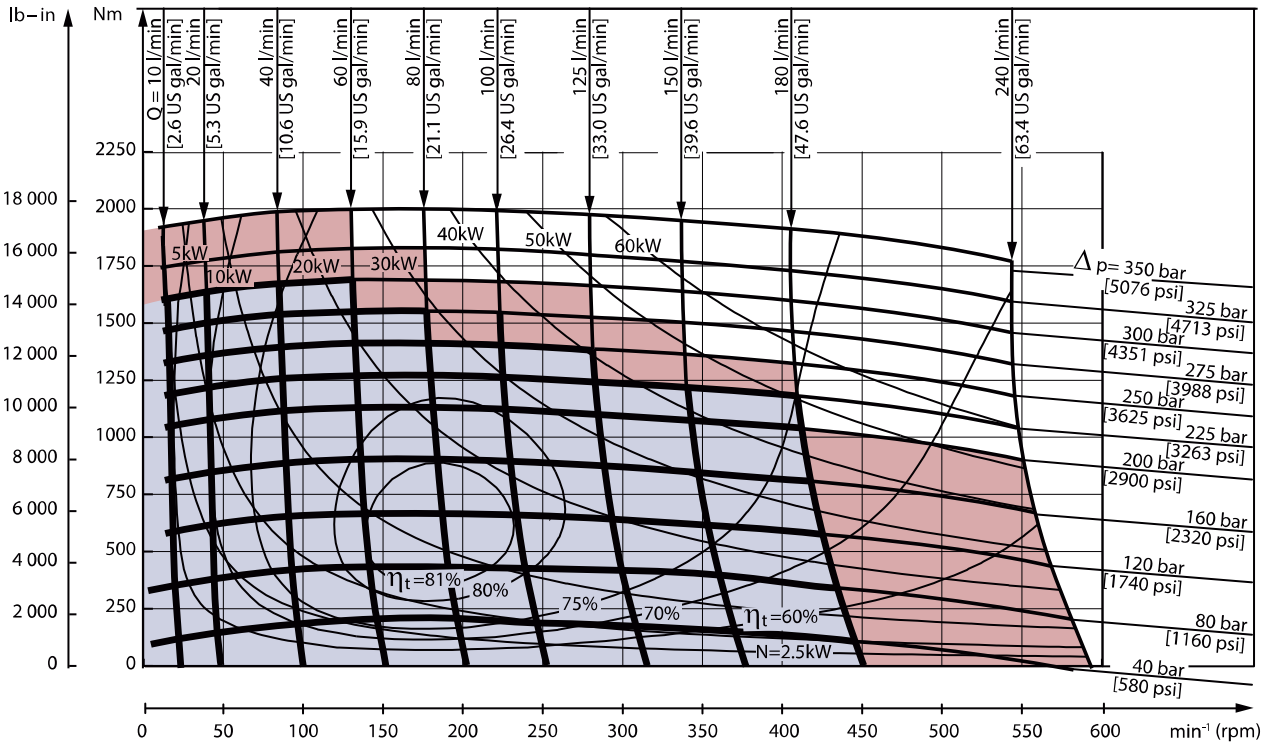
1. Intermittent speed and intermittent pressure must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm^2/s [70 SUS] at 50°C [122°F].
5. Recommended maximum system operating temperature is 82°C [180°F].
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

FUNCTION DIAGRAMS

TMYF 315



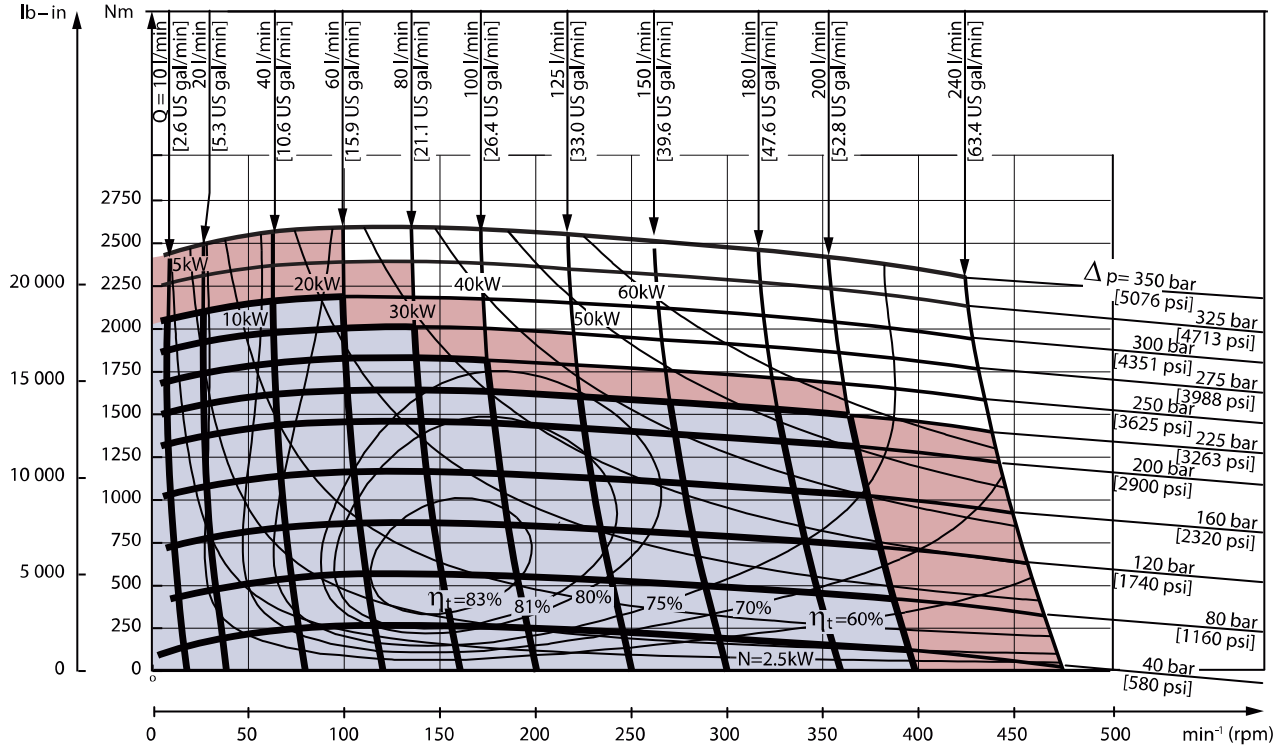
TMYF 400



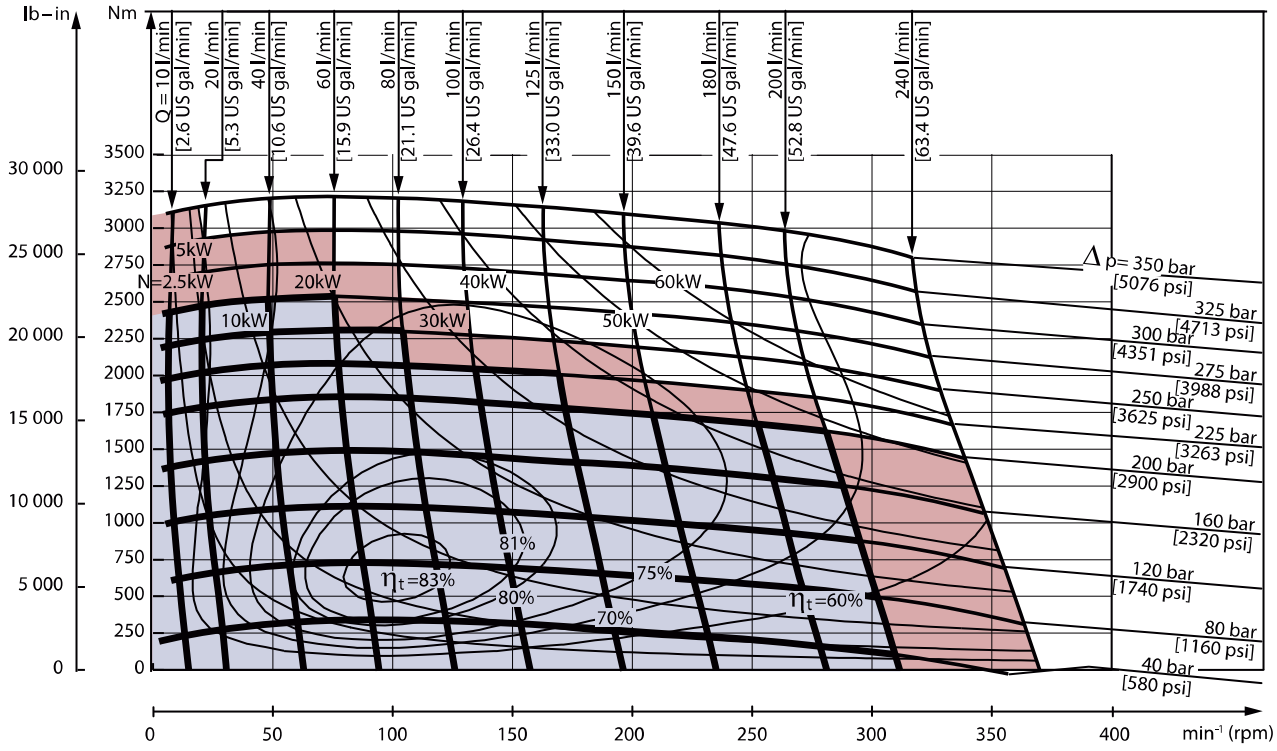
The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5 PSI÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

FUNCTION DIAGRAMS

TMYF 500



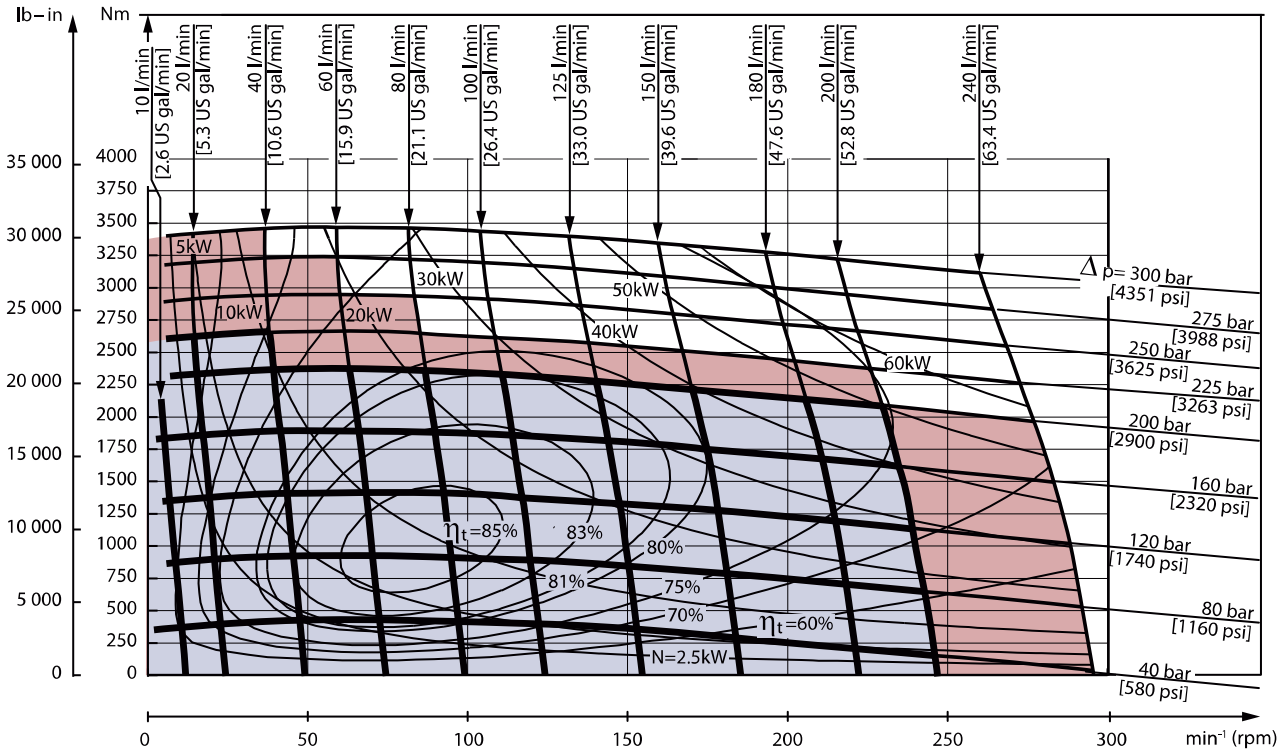
TMYF 630



The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5 PSI÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

FUNCTION DIAGRAMS

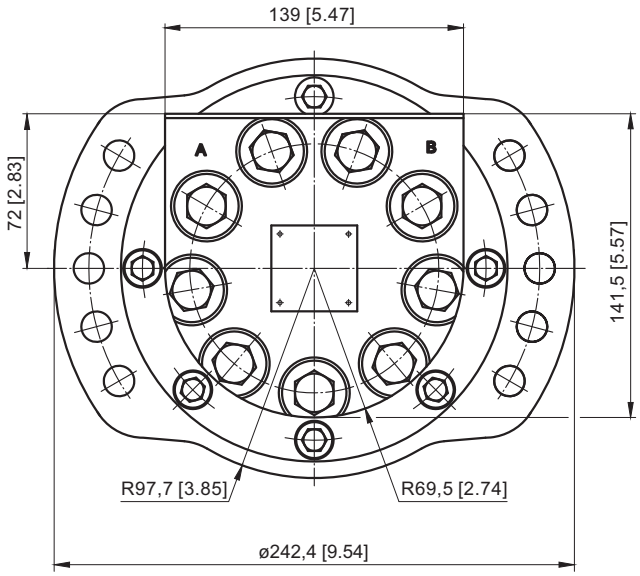
TMYF 800



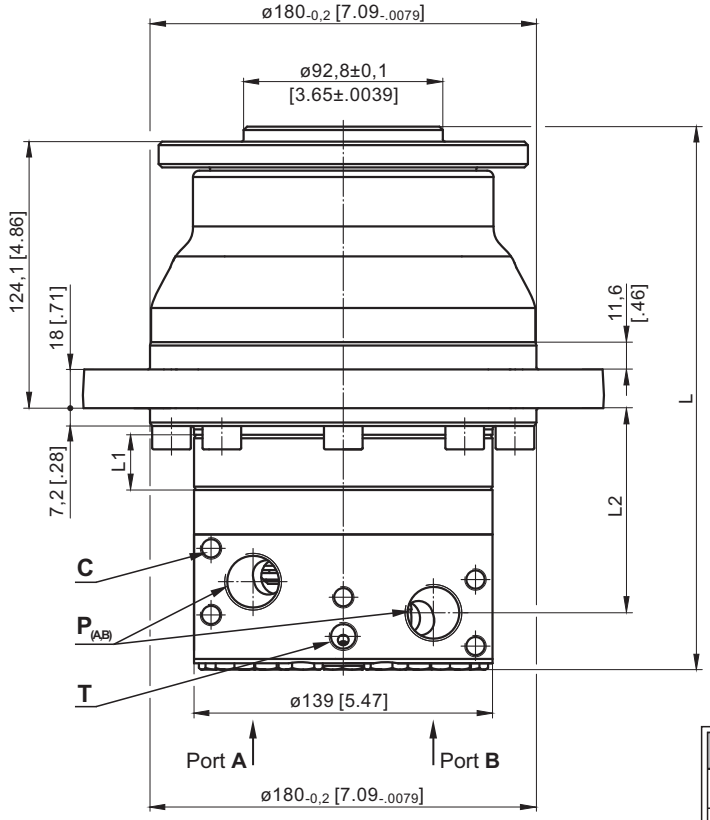
The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5 PSI÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

OUTLINE DIMENSIONS REFERENCE

TMYFT...5...

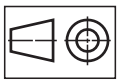


	Versions		
	2	4	5
C	-	-	5xM10
P(A,B)	2xG¾	2x1 1/16-12 UN O-ring	2xG¾
T	G¼	9/16-18 UNF	G¼



Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

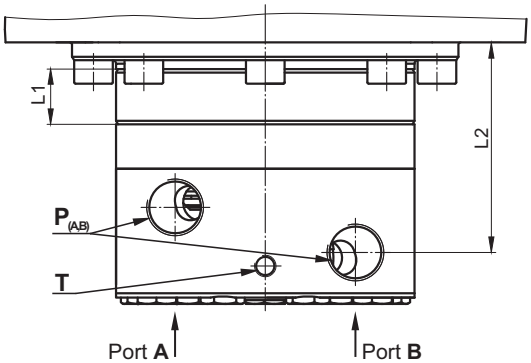
Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**



mm [in]

Type	Lmax, mm [in]	L2, mm [in]	L1, mm [in]
TMYFT 315...5	253,5 [9.98]	95,5 [3.76]	25,5 [1.00]
TMYFT 400...5	260,5 [10.26]	102,5 [4.04]	32,5 [1.28]
TMYFT 500...5	268,5 [10.58]	110,5 [4.35]	40,5 [1.59]
TMYFT 630...5	279,0 [10.98]	121,0 [4.76]	51,0 [2.00]
TMYFT 800...5	293,0 [11.54]	135,0 [5.31]	65,0 [2.56]

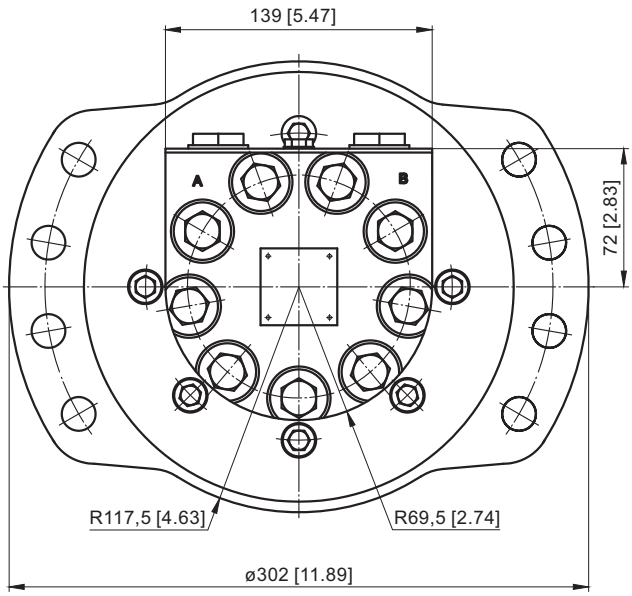
TMYFT...2(4)...



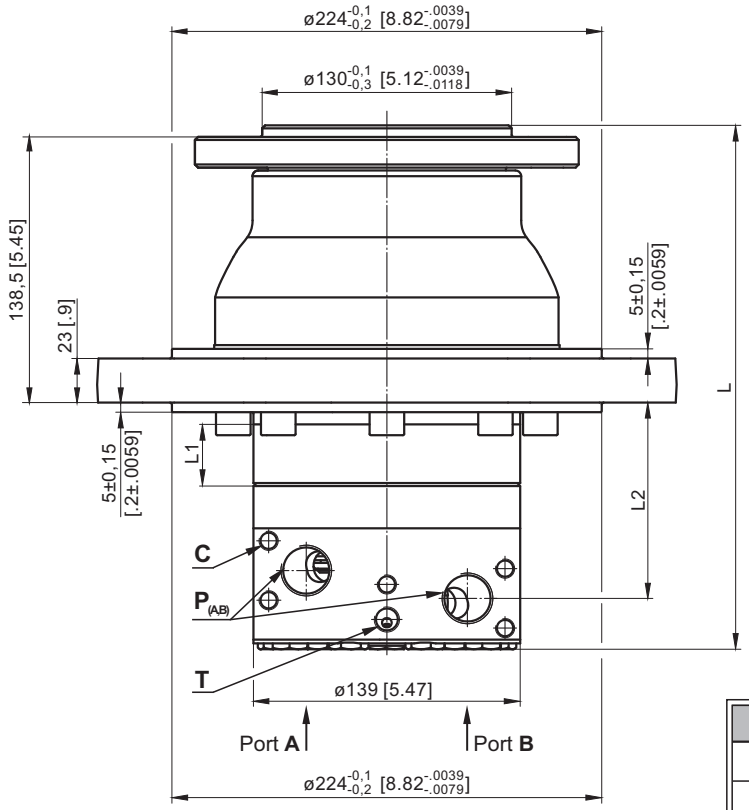
Type	Lmax, mm [in]	L2, mm [in]	L1, mm [in]
TMYFT 315...2(4)	253,5 [9.98]	98,0 [3.86]	25,5 [1.00]
TMYFT 400...2(4)	260,5 [10.26]	105,0 [4.13]	32,5 [1.28]
TMYFT 500...2(4)	268,5 [10.58]	113,0 [4.45]	40,5 [1.59]
TMYFT 630...2(4)	279,0 [10.98]	123,5 [4.86]	51,0 [2.00]
TMYFT 800...2(4)	293,0 [11.54]	137,5 [5.41]	65,0 [2.56]

OUTLINE DIMENSIONS REFERENCE

TMYFV...5...



	Versions		
	2	4	5
C	-	-	5xM10
P(A,B)	2xG¾	2x1 1/16-12 UN O-ring	2xG¾
T	G¼	9/16-18 UNF	G¼



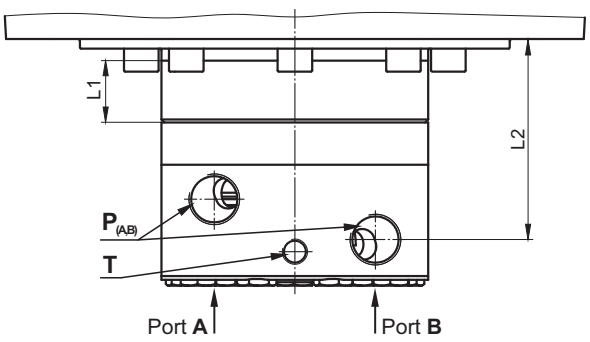
Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

mm [in]

Type	Lmax, mm [in]	L2, mm [in]	L1, mm [in]
TMYFV 315...5	266,0 [10.47]	95 [3.74]	25,5 [1.00]
TMYFV 400...5	273,0 [10.75]	102 [4.02]	32,5 [1.28]
TMYFV 500...5	281,0 [11.06]	110 [4.33]	40,5 [1.59]
TMYFV 630...5	291,5 [11.48]	121 [4.76]	51,0 [2.00]
TMYFV 800...5	305,5 [12.03]	135 [5.31]	65,0 [2.56]

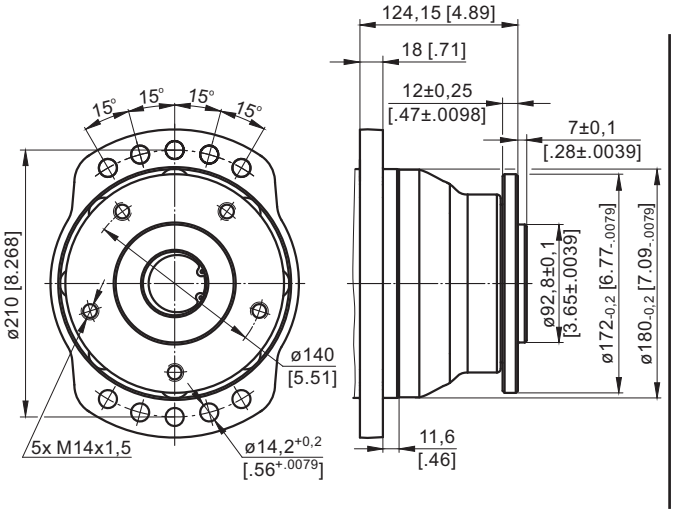
TMYFV...2(4)...



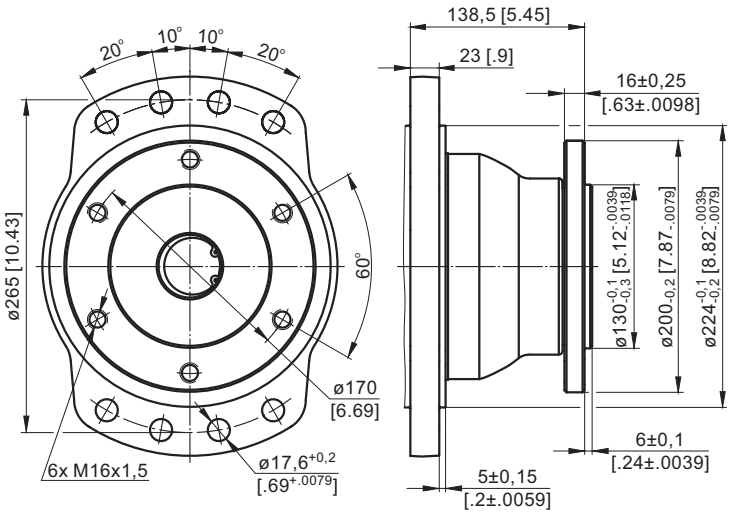
Type	Lmax, mm [in]	L2, mm [in]	L1, mm [in]
TMYFV 315...2(4)	266,0 [10.47]	97,5 [3.84]	25,5 [1.00]
TMYFV 400...2(4)	273,0 [10.75]	104,5 [4.11]	32,5 [1.28]
TMYFV 500...2(4)	281,0 [11.06]	112,5 [4.43]	40,5 [1.59]
TMYFV 630...2(4)	291,5 [11.48]	123,5 [4.86]	51,0 [2.00]
TMYFV 800...2(4)	305,5 [12.03]	137,5 [5.41]	65,0 [2.56]

MOUNTING

TMYFT

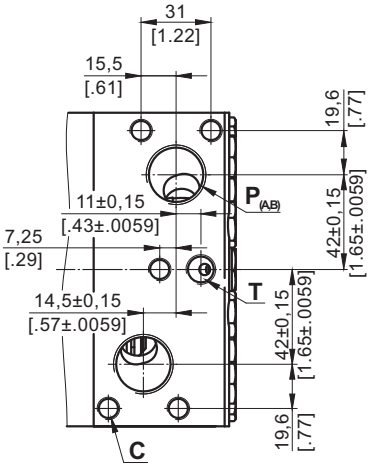


TMYFV

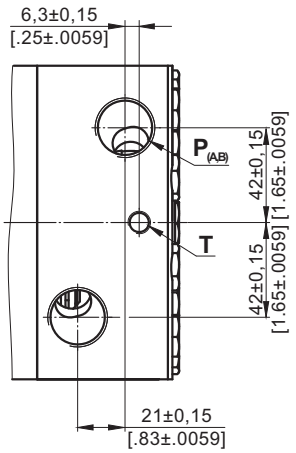


PORTS

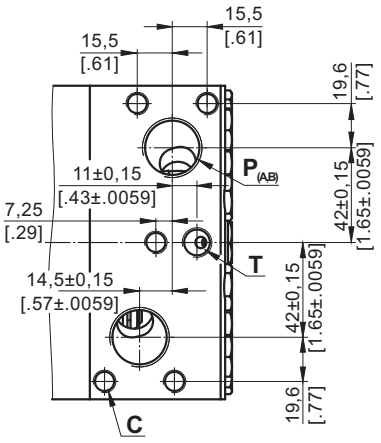
TMYFT...5...



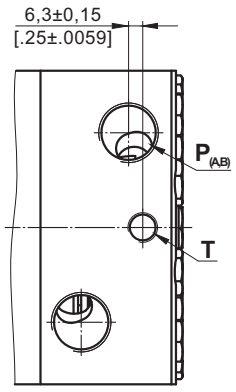
TMYFT...2(4)...



TMYFV...5...



TMYFV...2(4)...



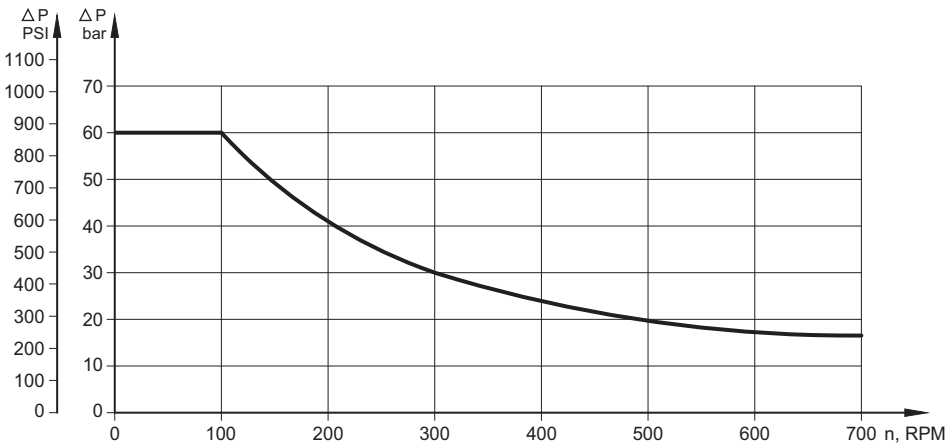
	Versions		
	2	4	5
C	-	-	5xM10
P(A,B)	2xG¾	2x1 1/16-12 UN O-ring	2xG¾
T	G¼	9/16-18 UNF	G¼

mm [in]

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

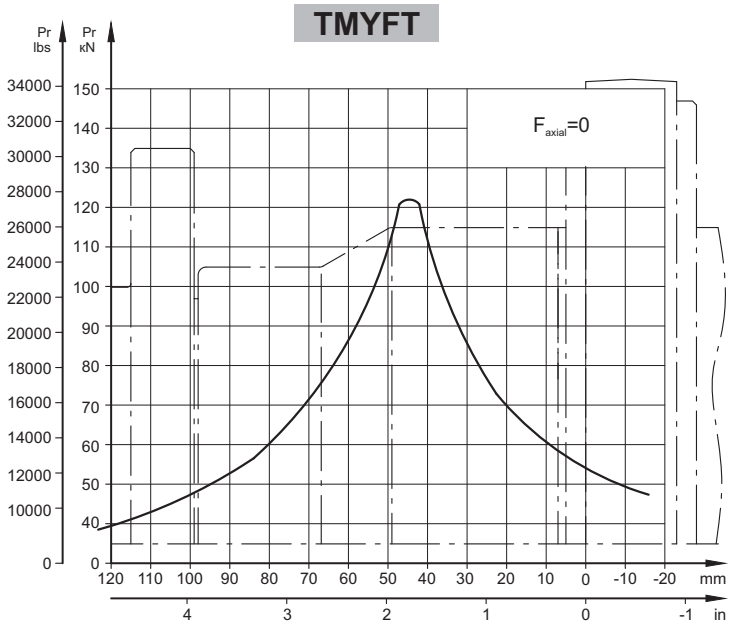
Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

MAX. PERMISSIBLE SHAFT SEAL PRESSURE



PERMISSIBLE SHAFT LOADS

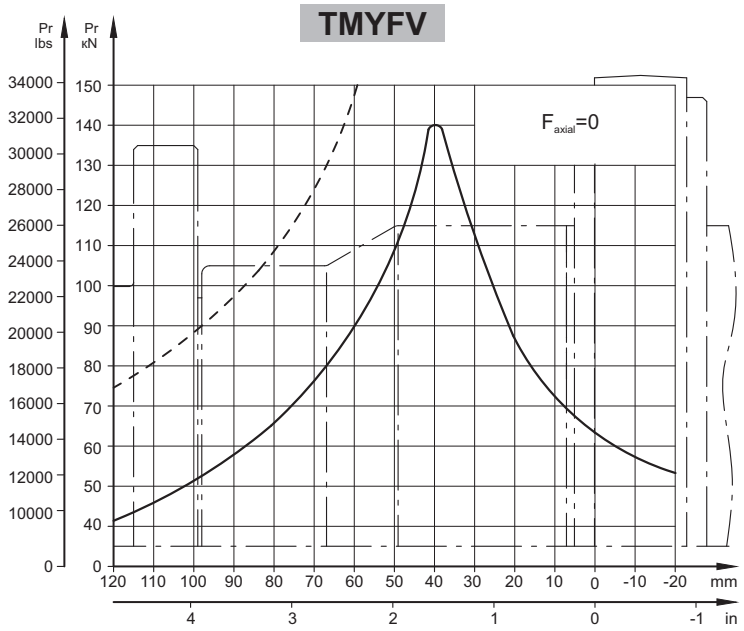
TMYFT



n min^{-1}	Correction factor -
50	1,23
100	1,00
200	0,81
300	0,72
400	0,66
500	0,62

The curve of the radial load is based on the bearing life L10 by ISO 281 (2000 h at 100 min^{-1} or 12 000 000 revolutions). For calculation of the radial load at speed different than 100 min^{-1} must be used the coefficients shown in the table.

TMYFV



ORDER CODE

	1	2		3	4	5	6
T M Y F			**-**			**HD**	

Pos.1 - Mounting Flange

- **T** - 10-Bolt flange, spigot dia. ø180, BC ø210
- **V** - 8-Bolt flange, spigot dia. ø200, BC ø265

Pos.2 - Displacement code

- **315** - 314,5 cm^3/rev [19.19 in^3/rev]
- **400** - 400,9 cm^3/rev [24.50 in^3/rev]
- **500** - 499,6 cm^3/rev [30.50 in^3/rev]
- **630** - 629,1 cm^3/rev [38.38 in^3/rev]
- **800** - 801,8 cm^3/rev [48.91 in^3/rev]

Pos.3 - Port Size/Type [standard manifold to each]

- **2** - side ports, 2xG3/4, G1/4, BSP thread, ISO 228
- **4** - side ports, 2x1 $^1/_{16}$-12 UN, O-ring, 9/16-18 UNF
- **5** - side ports, 2xG3/4, G1/4, 5xM10

Pos.4 - Check Valves

- omit - without check valves
- **1*** - with check valves

Pos.5 - Additional Options

- **HD** - Reinforced motor **HD****

For Other **Additional Options** see page 71

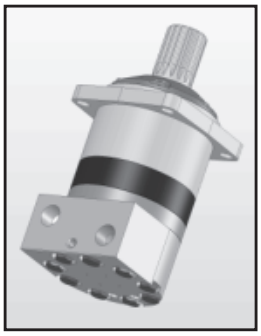
Pos.6 - Design Series

- omit - without check valves

NOTES: * Not for Port Size Version **5**!
** Drain line should always be used.

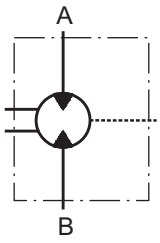
The hydraulic motors are mangano-phosphatized as standard.

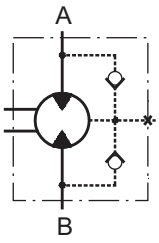
HYDRAULIC MOTORS MVM

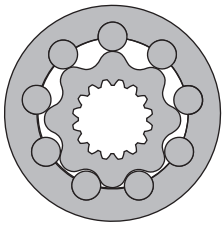


APPLICATION

» Conveyors
» Metal working machines
» Agricultural machines
» Road building machines
» Mining machinery
» Food industries
» Special vehicles
» Plastic and rubber machinery etc.







CONTENTS

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Internal spline data of the attached component ... 61
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Permissible shaft loads 64
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OPTIONS

» Model - Disc valve, roll-gerotor
» Wheel mounting flange
» Short motor
» Side ports
» Shafts - straight, splined and tapered
» BSPP ports Metric, SAE and BSPP ports
» Other special features.

EXCELLENCE

» High torque and pressure drop
» High inlet pressure
» High starting torque
» Improved efficiency at high pressure drop and frequent reversing
» Smooth operation at low speed
» High radial and axial bearing capacity

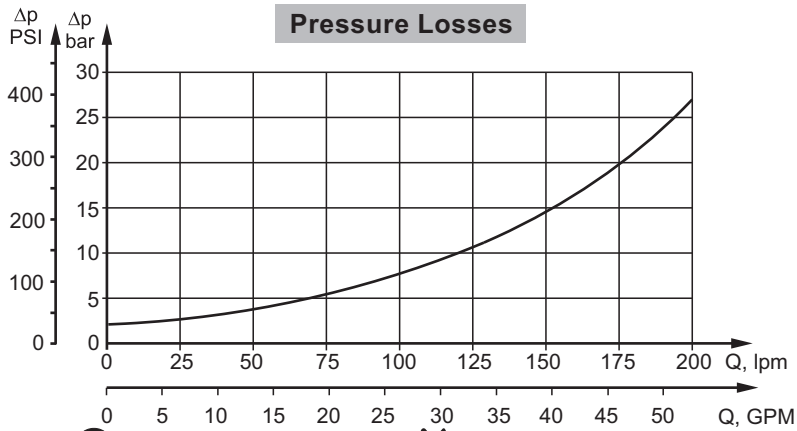
GENERAL

Max. Displacement,	cm^3/rev [in^3/rev]	801,1 [48.91]
Max. Speed,	[RPM]	763
Max. Torque,	daNm [lb-in]	cont.: 259 [22920] int.: 340 [30090]
Max. Output,	kW [HP]	12 [150]
Max. Pressure Drop,	bar [PSI]	cont.: 250 [3630] int.: 350 [5080]
Max. Oil Flow,	lpm [GPM]	240 [63.4]
Min. Speed,	[RPM]	5
Permissible Shaft Loads,	daN [lbs]	P_a=1500 [3370]
Pressure fluid		Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range,	^{o}C [^{o}F]	-40÷140 [-40÷284]
Optimal Viscosity range,	mm^2/s [SUS]	20÷75 [98÷347]
Filtration		ISO code: 18/16/13 According to ISO 4406-1999

Oil flow in drain line

Pressure drop bar [PSI]	Viscosity mm^2/s [SUS]	Oil flow in drain line lpm [GPM]
140 [2030]	20 [98]	3 [.793]
	35 [164]	2 [.528]
210 [3045]	20 [98]	6 [1.585]
	35 [164]	4 [1.057]

Pressure Losses



SPECIFICATION DATA

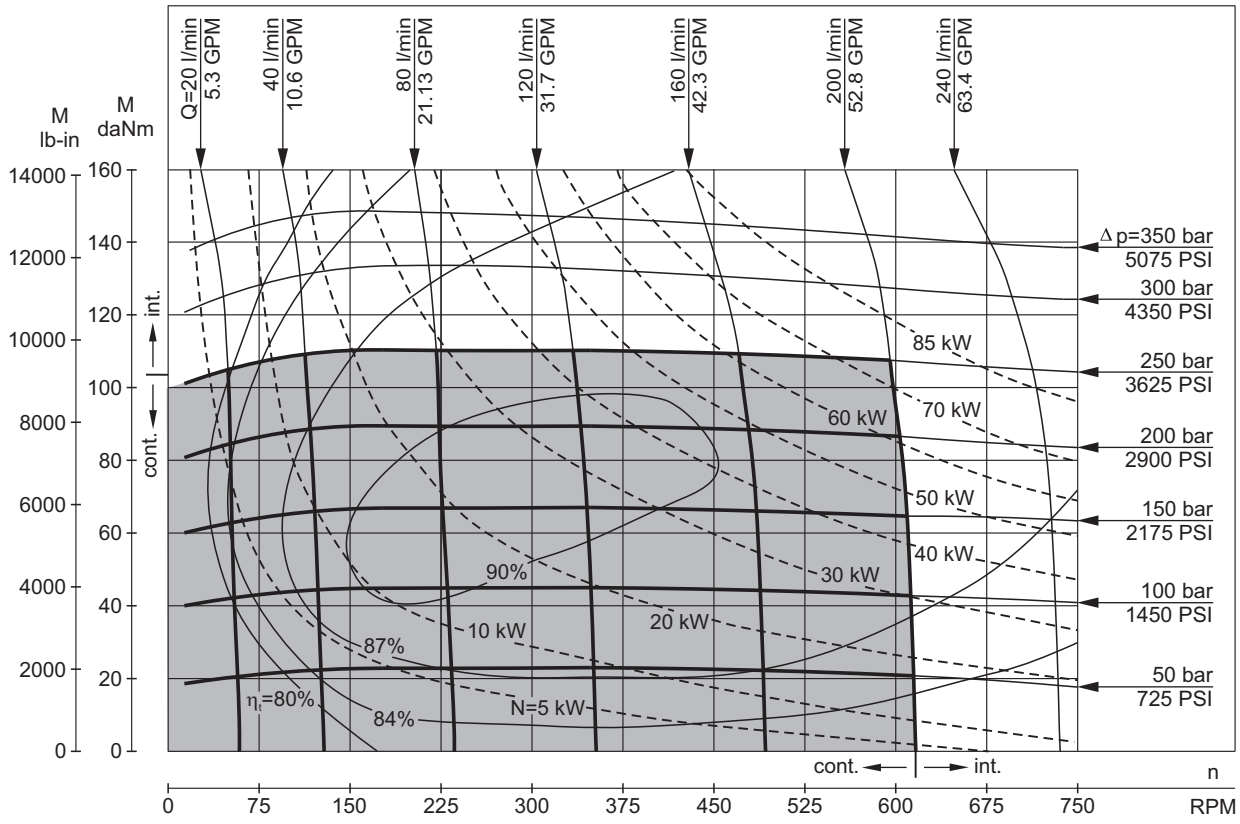
Type		MVM 315	MVM 400	MVM 500	MVM 630	MVM 677	MVM 800
Displacement, cm^3/rev [in^3/rev]		314,5 [19.19]	400,9 [24.5]	499,6 [30.5]	629,1 [38.38]	675,8 [41.24]	801,8 [48.91]
Max. Speed, [RPM]	Cont.	636	500	400	315	296	250
	Int.*	763	600	480	380	355	300
Max. Torque, daNm [lb-in]	Cont.	115 [10180]	144 [12745]	180 [15930]	227 [20090]	242 [21420]	259 [22920]
	Int.*	160 [14160]	200 [17700]	260 [23010]	310 [27440]	290 [25670]	340 [30090]
	Peak**	180 [15930]	230 [20355]	286 [25315]	360 [31860]	387 [34250]	402 [35580]
Max. Output, kW [HP]	Cont.	67 [90]	67 [90]	67 [90]	67 [90]	67 [90]	67 [90]
	Int.*	112 [150]	112 [150]	112 [150]	112 [150]	112 [150]	112 [150]
Max. Pressure Drop, bar [PSI]	Cont.	250 [3630]	250 [3630]	250 [3630]	250 [3630]	250 [3630]	225 [3260]
	Int.*	350 [5080]	350 [5080]	350 [5080]	350 [5080]	310 [5000]	300 [4350]
	Peak**	400 [5800]	400 [5800]	400 [5800]	400 [5800]	400 [5800]	350 [5080]
Max. Oil Flow, lpm [GPM]	Cont.	200 [52.8]	200 [52.8]	200 [52.8]	200 [52.8]	200 [52.8]	200 [52.8]
	Int.*	240 [63.4]	240 [63.4]	240 [63.4]	240 [63.4]	240 [63.4]	240 [63.4]
Max. Inlet Pressure, bar [PSI]	Cont.	270 [3915]	270 [3915]	270 [3915]	270 [3915]	270 [3915]	270 [3915]
	Int.*	370 [5365]	370 [5365]	370 [5365]	370 [5365]	370 [5365]	370 [5365]
	Peak**	420 [6090]	420 [6090]	420 [6090]	420 [6090]	420 [6090]	420 [6090]
Max. Return Pressure with Drain Line, bar [PSI]	Cont.	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]
	Int.*	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]
	Peak**	210 [3045]	210 [3045]	210 [3045]	210 [3045]	210 [3045]	210 [3045]
Max. Starting Pressure with Unloaded Shaft, bar [PSI]		5 [70]	5 [70]	5 [70]	5 [70]	5 [70]	5 [70]
Min. Starting Torque, daNm [lb-in]		92 [8140]	115 [10180]	144 [12745]	180 [15930]	194 [17170]	205 [18145]
Min. Speed*, [RPM]**		10	9	8	6	6	5
Weight, kg [lb]	MVM	41,3 [91]	42,1 [93]	43 [95]	44,5 [98]	45,2 [99.65]	46 [101.4]
	MVMC	43,8 [96.6]	44,9 [99]	45,8 [101]	48,3 [106.5]	49 [108.03]	50,4 [111.1]
	MVMCA	38,5 [84.88]	39,6 [87.3]	40,5 [89.29]	43 [94.8]	43,7 [96.34]	45,1 [99.43]

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% of every minute.
*** For speeds lower than given, consult factory or your regional manager.

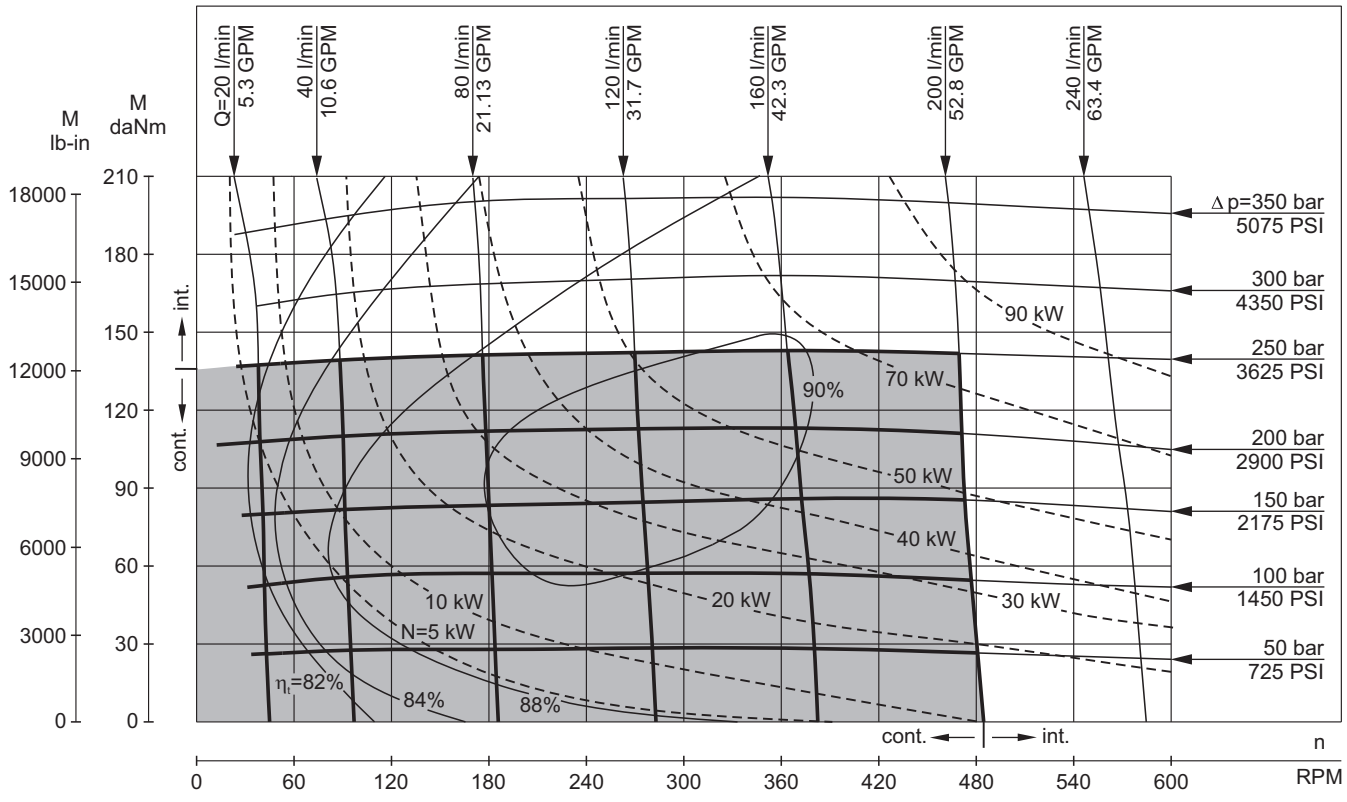
1. Intermittent speed and intermittent pressure must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm^2/s [70 SUS] at 50°C [122°F].
5. Recommended maximum system operating temperature is 82°C [180°F].
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

FUNCTION DIAGRAMS

MVM 315



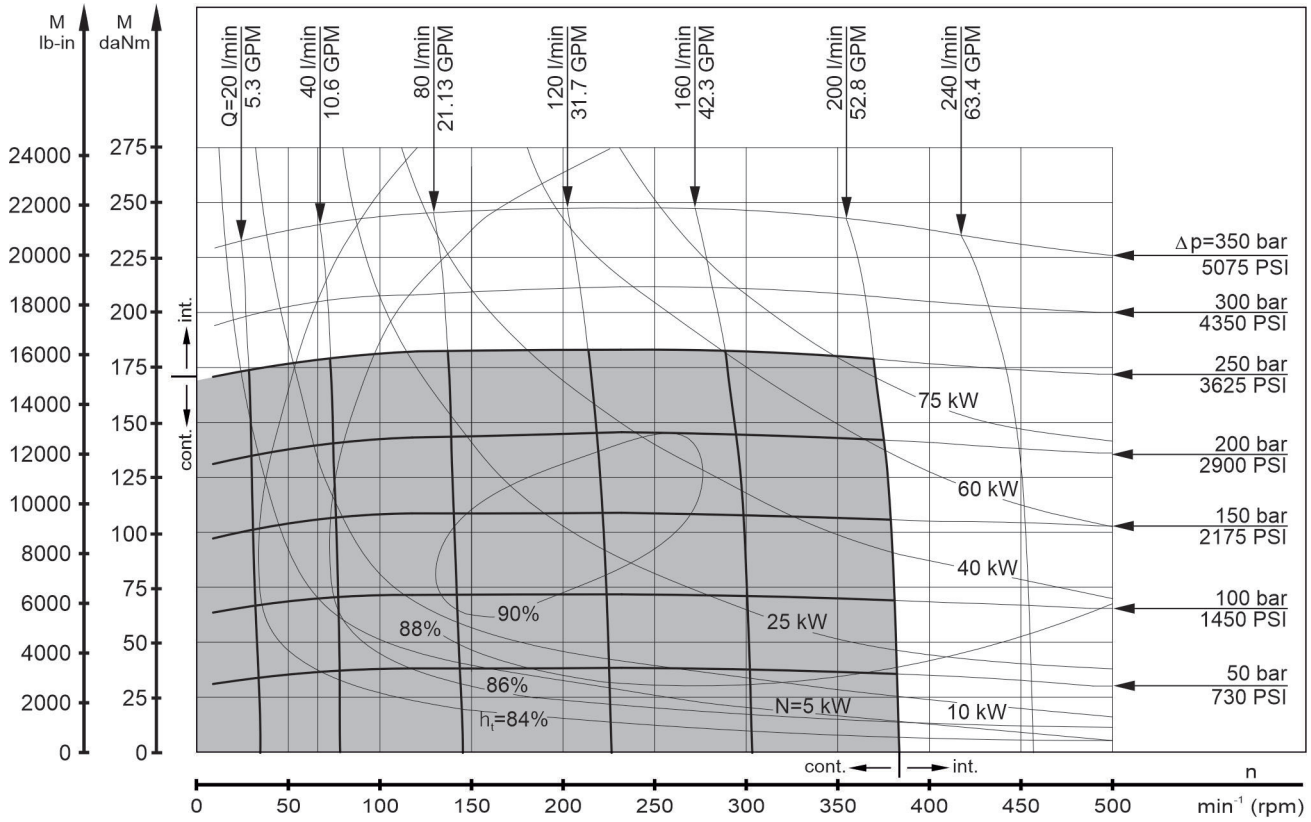
MVM 400



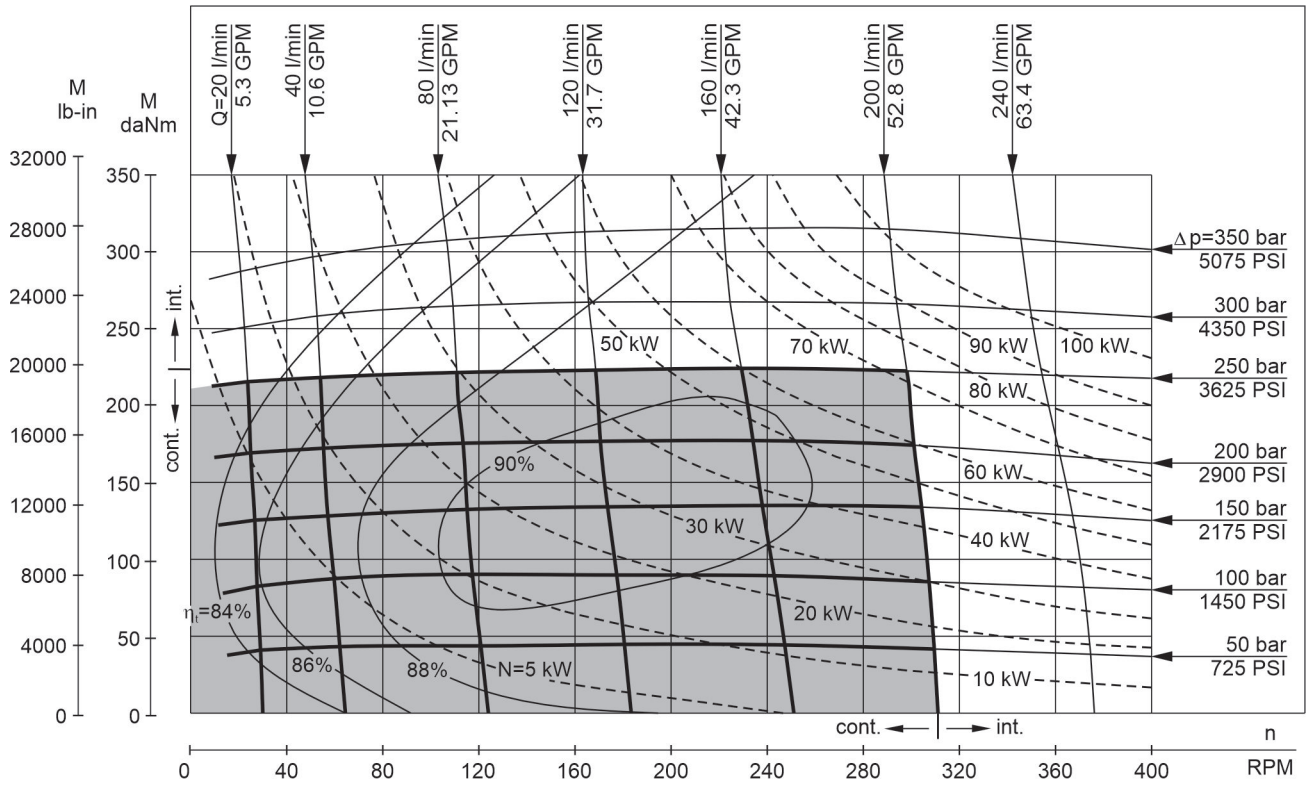
The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5 PSI÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

FUNCTION DIAGRAMS

MVM 500



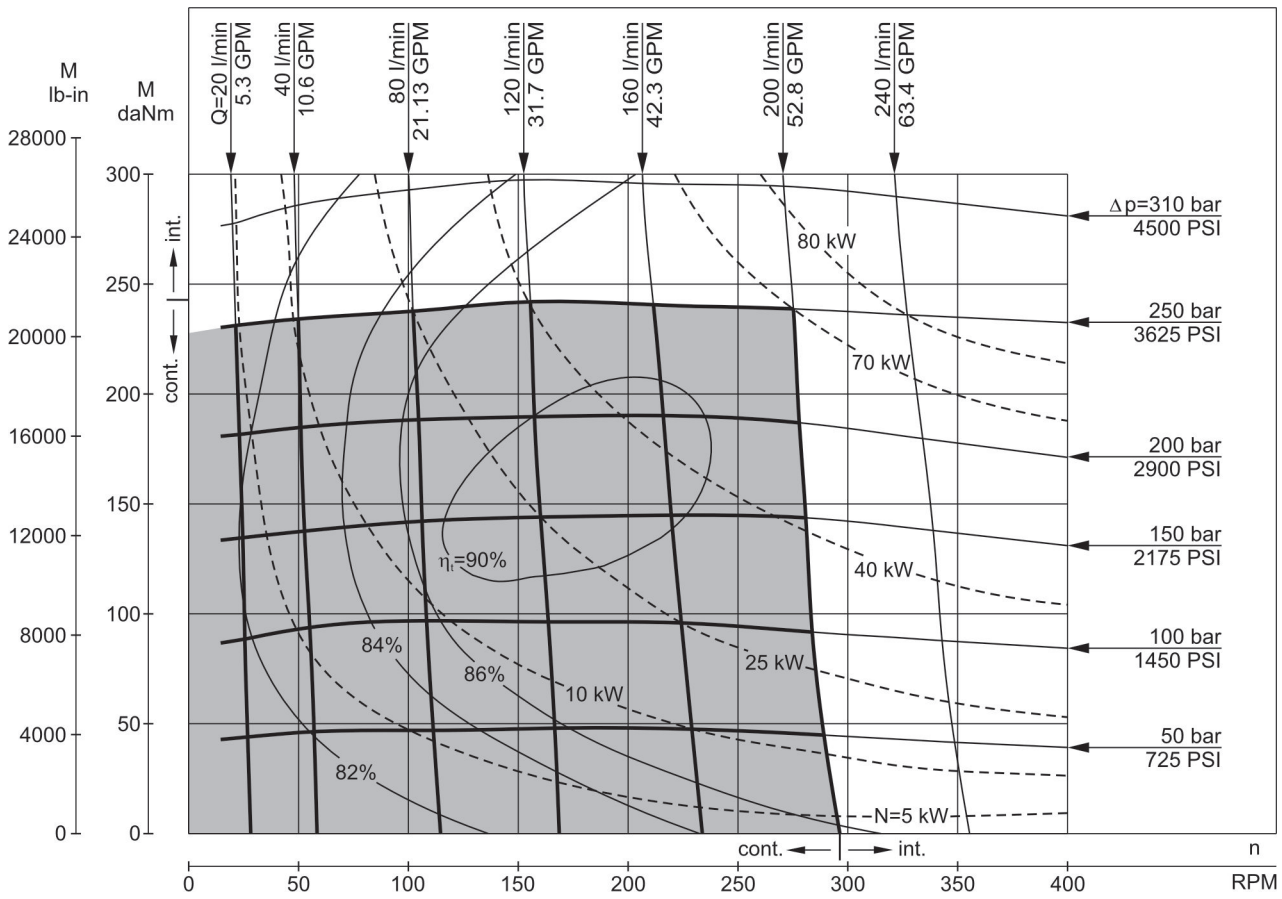
MVM 630



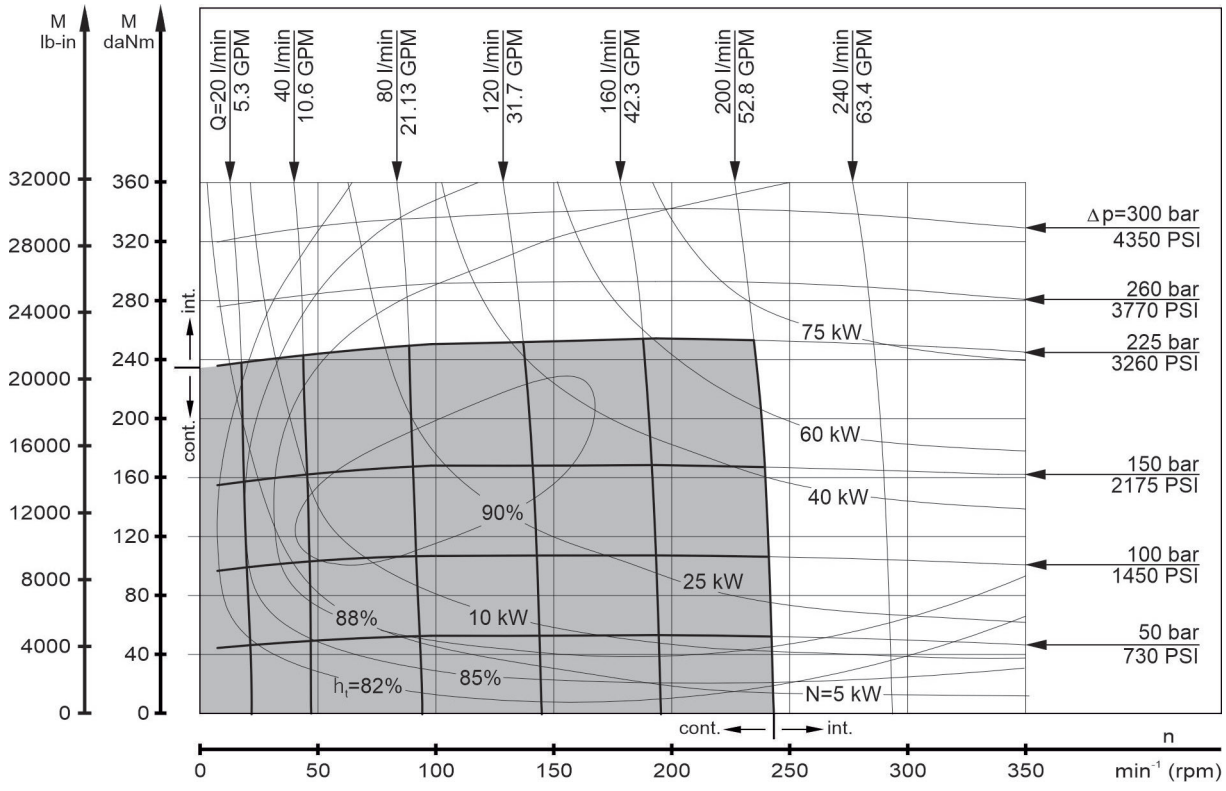
The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5 PSI÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

FUNCTION DIAGRAMS

MVM 677

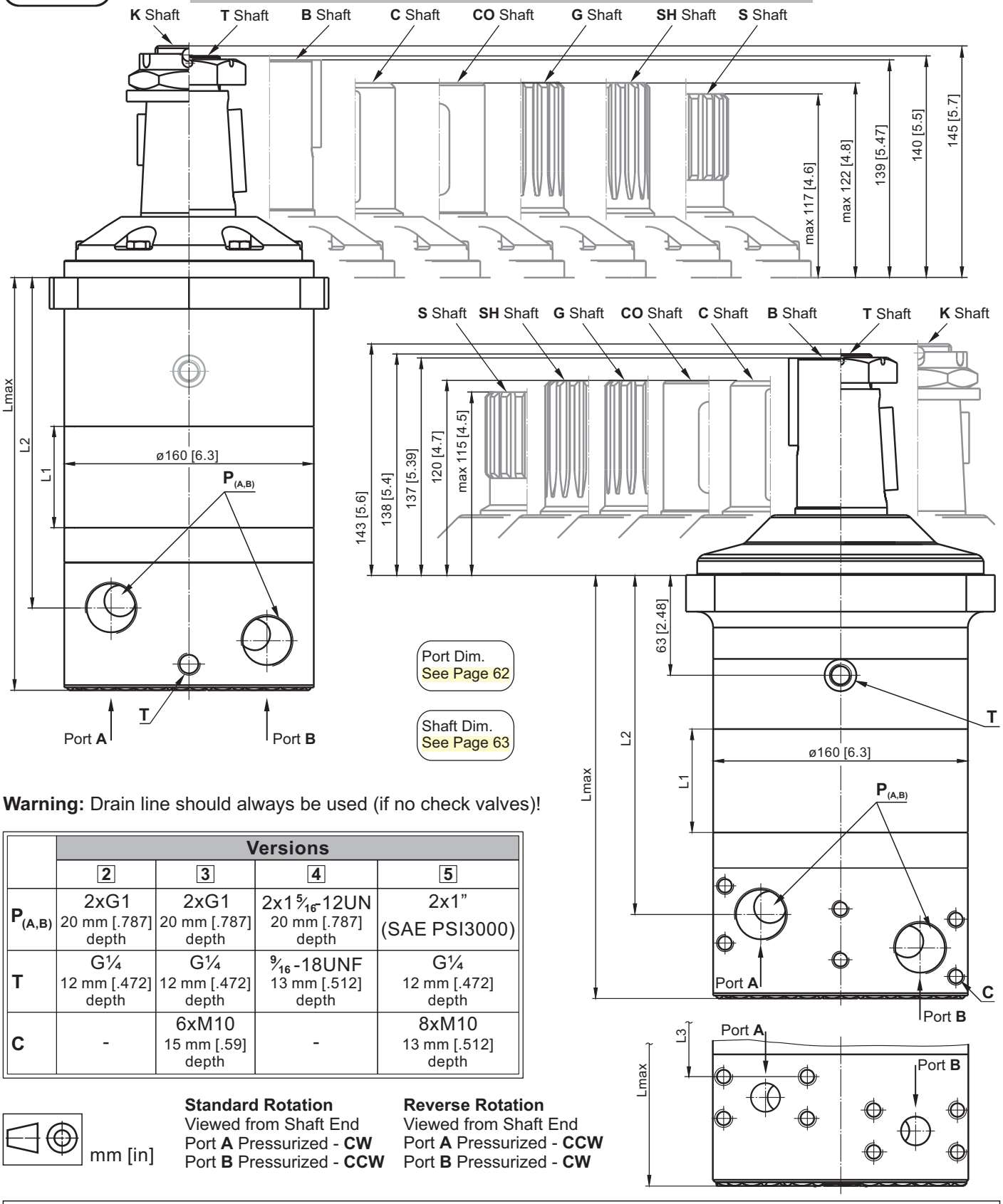


MVM 800



The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5 PSI÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

DIMENSIONS and MOUNTING DATA for MVM and MVMC



Warning: Drain line should always be used (if no check valves)!

	Versions			
	2	3	4	5
$P_{(A,B)}$	2xG1 20 mm [.787] depth	2xG1 20 mm [.787] depth	2x1 5/16-12UN 20 mm [.787] depth	2x1” (SAE PSI3000)
T	G¼ 12 mm [.472] depth	G¼ 12 mm [.472] depth	9/16-18UNF 13 mm [.512] depth	G¼ 12 mm [.472] depth
C	-	6xM10 15 mm [.59] depth	-	8xM10 13 mm [.512] depth

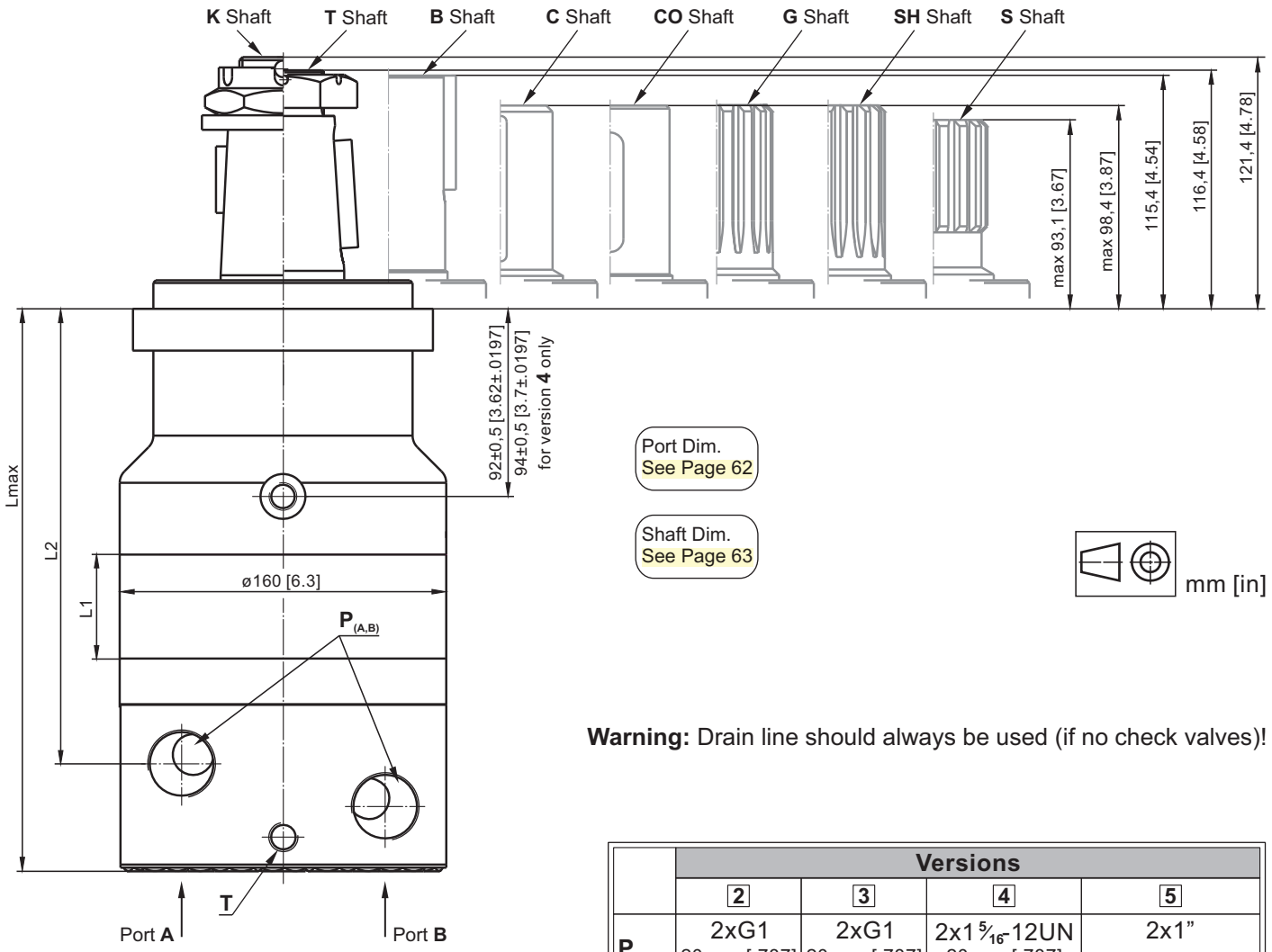
mm [in]

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

Type	L_{max}, mm [in]	L_2, mm [in]	L_3, mm [in]	Type	L_{max}, mm [in]	L_2, mm [in]	L_3, mm [in]	L_1, mm [in]
MVM 315	226,5 [8.92]	172,5 [6.79]	157,4 [6.20]	MVMC 315	227,5 [8.957]	173,8 [6.84]	158,7 [6.25]	25,5 [1.00]
MVM 400	233,5 [9.19]	179,5 [7.07]	164,4 [6.47]	MVMC 400	234,5 [9.232]	180,8 [7.12]	165,7 [6.52]	32,5 [1.28]
MVM 500	241,5 [9.51]	187,5 [7.38]	172,4 [6.79]	MVMC 500	242,5 [9.547]	188,8 [7.43]	173,7 [6.84]	40,5 [1.59]
MVM 630	252,0 [9.92]	198,0 [7.79]	182,9 [7.20]	MVMC 630	253,0 [9.961]	199,3 [7.85]	184,2 [7.25]	51,0 [2.01]
MVM 677	256,0 [10.08]	201,8 [7.94]	186,7 [7.35]	MVMC 677	256,5 [10.10]	203,1 [8.00]	188,0 [7.40]	54,8 [2.16]
MVM 800	266,0 [10.47]	212,0 [8.35]	196,9 [7.75]	MVMC 800	267,0 [10.518]	213,3 [8.39]	198,2 [7.80]	65,0 [2.56]

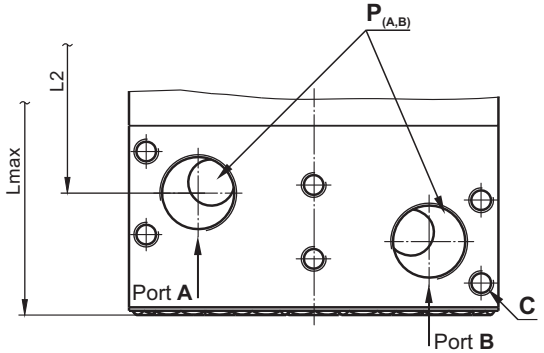
DIMENSIONS and MOUNTING DATA MVMCA

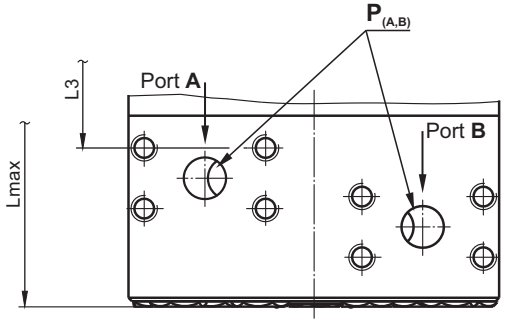


Port Dim. See Page 62

Shaft Dim. See Page 63

mm [in]





Warning: Drain line should always be used (if no check valves)!

	Versions			
	2	3	4	5
$P_{(A,B)}$	2xG1 20 mm [.787] depth	2xG1 20 mm [.787] depth	2x1 5/16-12UN 20 mm [.787] depth	2x1" (SAE PSI3000)
T	G¼ 12 mm [.472] depth	G¼ 12 mm [.472] depth	9/16-18UNF 13 mm [.512] depth	G¼ 12 mm [.472] depth
C	-	6xM10 15 mm [.59] depth	-	8xM10 13 mm [.512] depth

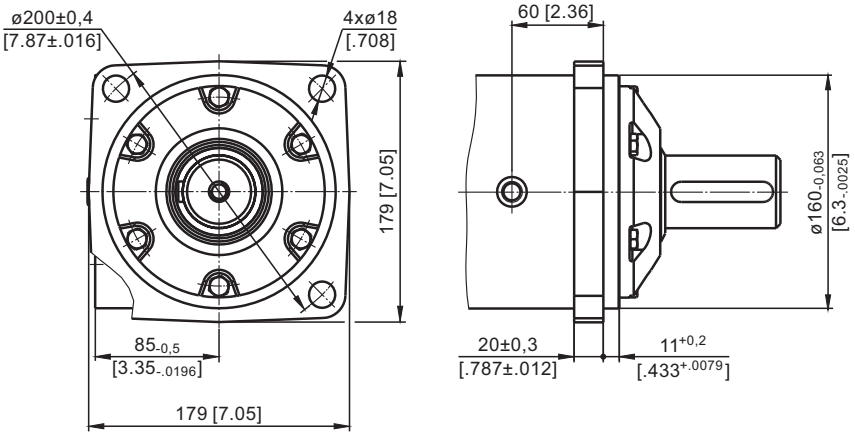
Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

Type	L_{max}, mm [in]	L_2, mm [in]	L_3, mm [in]	L_1, mm [in]
MVMCA 315	251,5 [9.90]	197,5 [7.78]	182,4 [7.18]	25,5 [1.00]
MVMCA 400	258,5 [10.18]	204,5 [8.05]	189,4 [7.46]	32,5 [1.28]
MVMCA 500	266,5 [10.49]	212,5 [8.37]	197,4 [7.77]	40,5 [1.59]
MVMCA 630	277,0 [10.91]	223,0 [8.78]	207,9 [8.19]	51,0 [2.01]
MVMCA 677	281,0 [11.06]	226,8 [8.93]	211,7 [8.33]	54,8 [2.16]
MVMCA 800	291,0 [11.46]	237,0 [9.33]	221,9 [8.74]	65,0 [2.56]

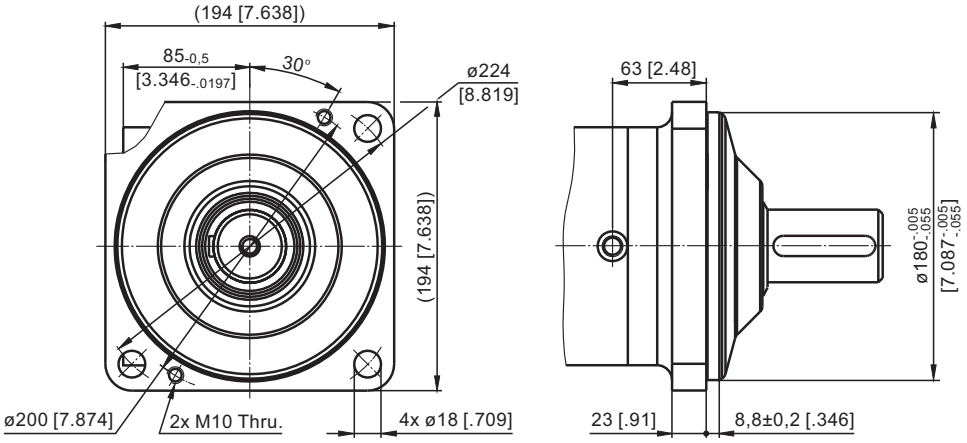
MOUNTING

Square Mount (four holes)

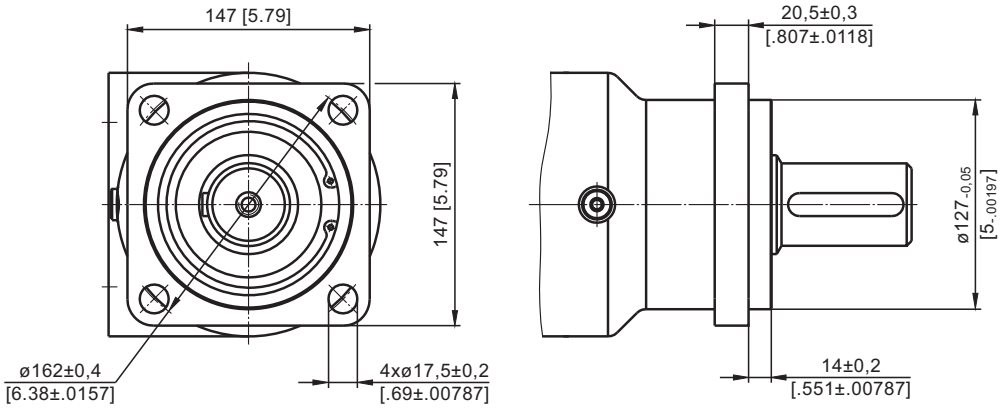


mm [in]

C Square Mount (four holes)

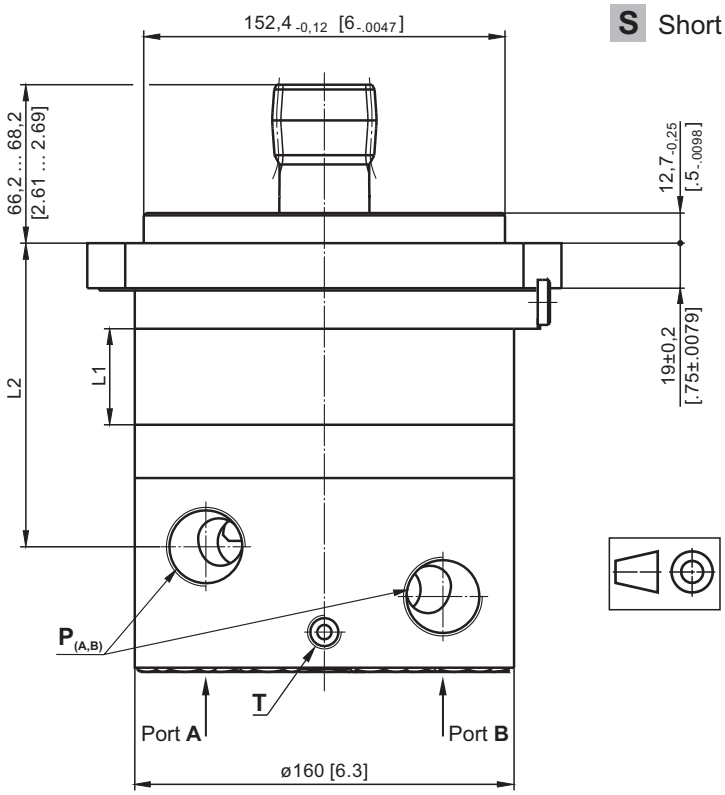


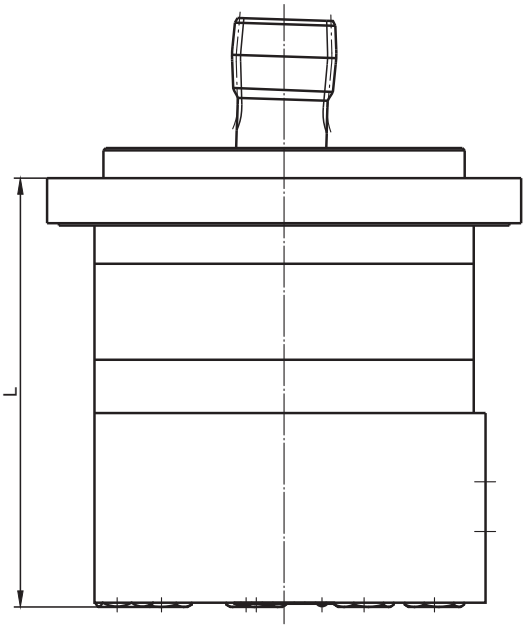
CA Square Mount (four holes)



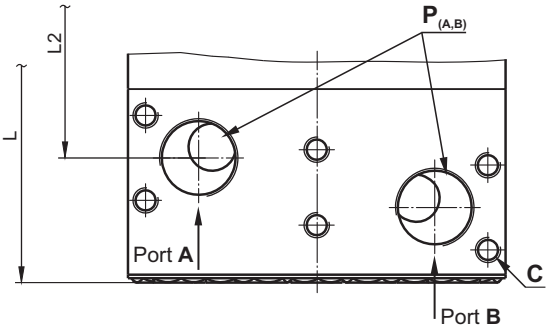
DIMENSIONS and MOUNTING DATA MVMS

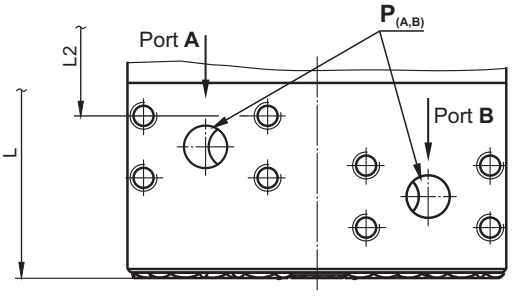
S Short Mount

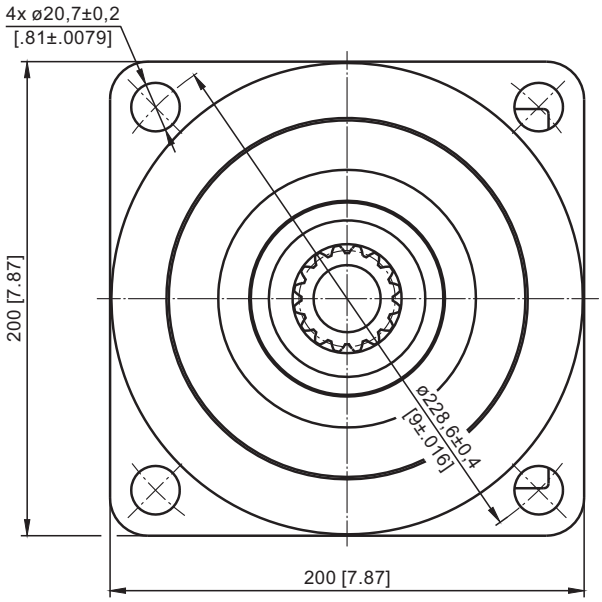




mm [in]







	Versions			
	2	3	4	5
$P_{(A,B)}$	2xG1 20 mm [.787] depth	2xG1 20 mm [.787] depth	2x1⁵⁄₁₆-12UN 20 mm [.787] depth	2x1" (SAE PSI3000)
T	G¼ 12 mm [.472] depth	G¼ 12 mm [.472] depth	⁹⁄₁₆-18UNF 13 mm [.512] depth	G¼ 12 mm [.472] depth
C	-	6xM10 15 mm [.59] depth	-	8xM10 13 mm [.512] depth

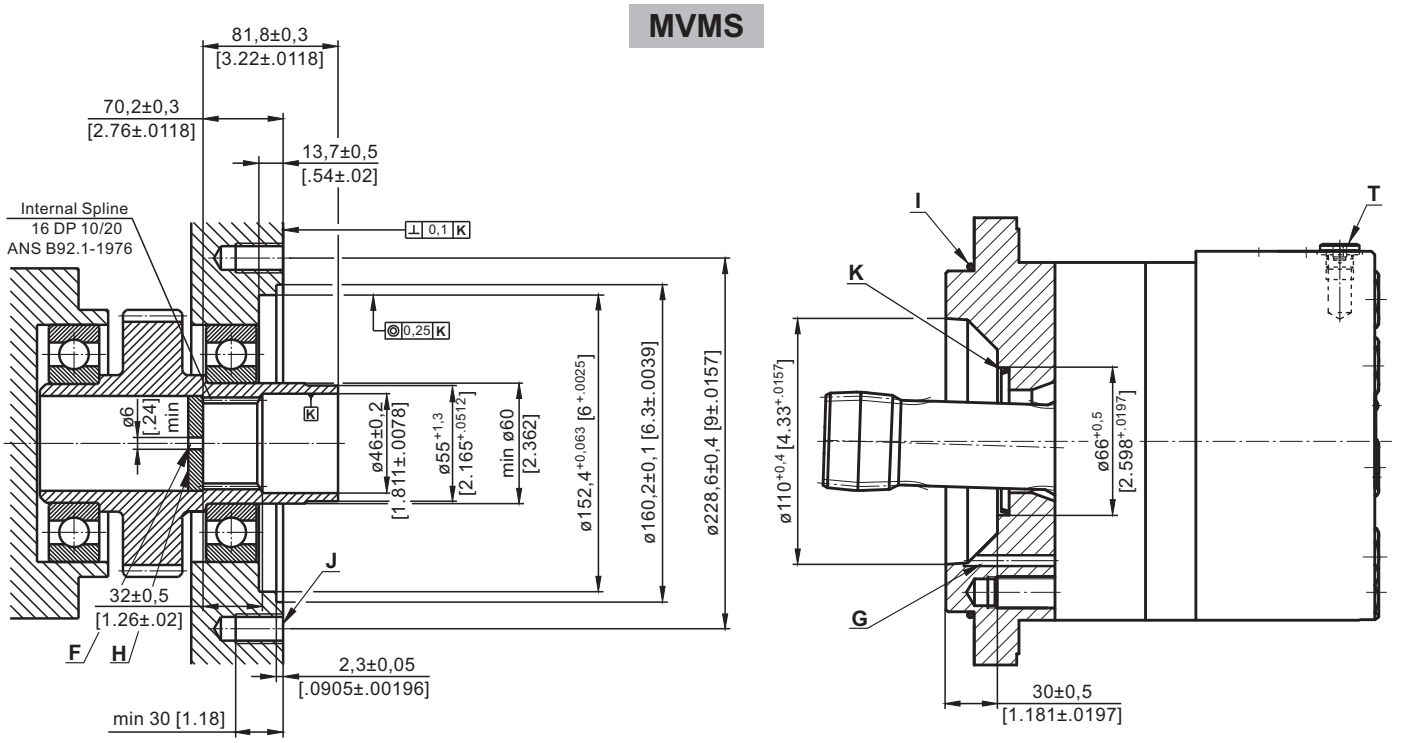
Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

Type	L +1,2 [.047] -1,4 [.055], mm [in]	L2 +0,7 [.028] -0,5 [.020], mm [in]	Type	L +1,2 [.047] -1,4 [.055], mm [in]	L2 +0,7 [.028] -0,5 [.020], mm [in]	L1, mm [in]
MVMS 315...2,3,4	165,9 [6.53]	113,1 [4.45]	MVMS 315...5	165,9 [6.53]	98,0 [3.86]	25,5 [1.00]
MVMS 400...2,3,4	172,9 [6.81]	120,1 [4.73]	MVMS 400...5	172,9 [6.81]	105,0 [4.13]	32,5 [1.28]
MVMS 500...2,3,4	180,9 [7.12]	128,1 [5.04]	MVMS 500...5	180,9 [7.12]	113,0 [4.45]	40,5 [1.59]
MVMS 630...2,3,4	191,4 [7.54]	138,6 [5.46]	MVMS 630...5	191,4 [7.54]	123,5 [4.86]	51,0 [2.01]
MVMS 677...2,3,4	195,2 [7.69]	142,4 [5.61]	MVMS 677...5	195,2 [7.69]	127,3 [5.01]	54,8 [2.16]
MVMS 800...2,3,4	205,4 [8.09]	152,6 [6.01]	MVMS 800...5	205,4 [8.09]	137,5 [5.41]	65,0 [2.56]

DIMENSIONS of the ATTACHED COMPONENT

MVMS



mm [in]

F : Oil circulation hole
G: Internal drain channel
H: Hardened stop plate
I : O-Ring 152x3 mm [5.98x.118 in]

J : 4xM20-30 mm [1.18 in] depth, 90°
K: Conical seal ring
T: Drain connection G1/4 - 12 mm [.47 in] depth

DRAIN CONNECTION

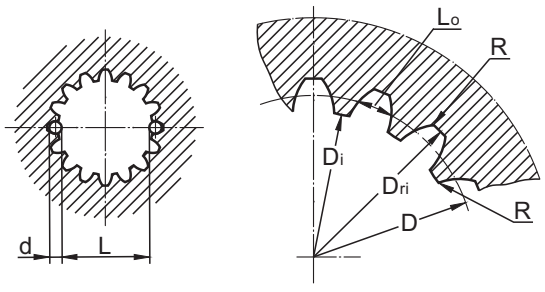
A drain line has to be used when pressure in the return line can exceed the permissible pressure. It can be connected to the drain port of the motor.

The drain line must be possible for oil to flow freely between motor and attached component and must be led to the tank. The maximum pressure in the drain line is limited by the attached component and its seal.

INTERNAL SPLINE DATA for the ATTACHED COMPONENT

Standard ANS B92.1-1976, class 5
[m=2.54; corrected x.m=+1,0]

Flat Root Side Fit		mm	inch
Number of Teeth	z	16	16
Diametral Pitch	DP	10/20	10/20
Pressure Angle		30°	30°
Pitch Dia.	D	40,640	1.6
Major Dia.	Dri	$45,2^{+0,4}$	1.796÷1.780
Minor Dia.	Di	$38,5^{+0,039}$	1.5175÷1.516
Space Width [Circular]	Lo	5,18±0,037	.2055÷.2025
Fillet Radius	R	0,4	.015
Max. Measurement between Pins	L	$32,47^{+0,15}$	1.284÷1.278
Pin Dia.	d	5,6±0,001	.22051÷.22043

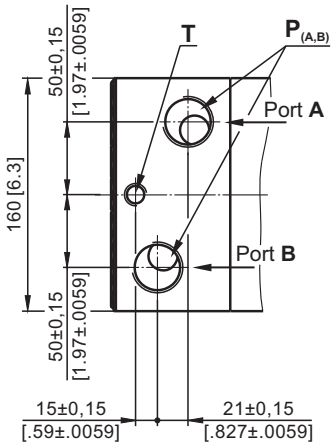


Hardening Specification:
HV=750±50 on the surface.
HV=560 at 0,7±0,2 mm [.035±.019in] case depth
Material: 20 MoCr4 EN 10084 or better.

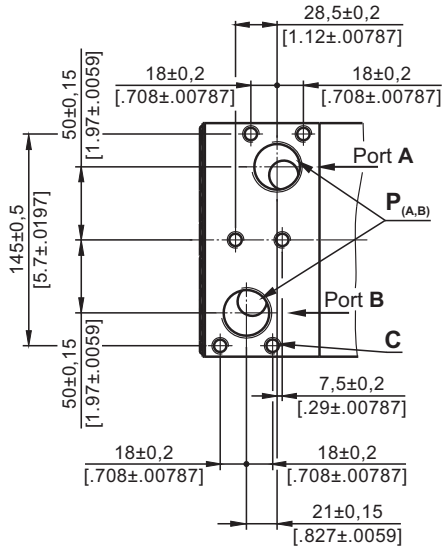
PORTS

Side Ports

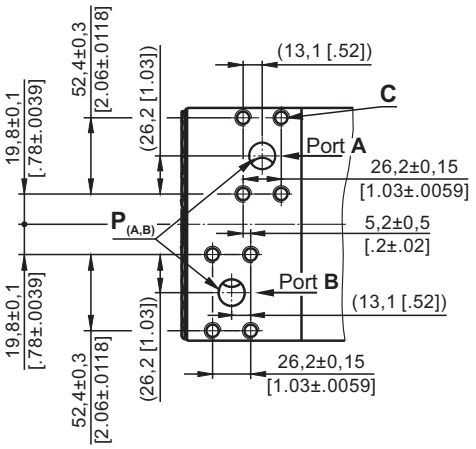
Versions 2 4



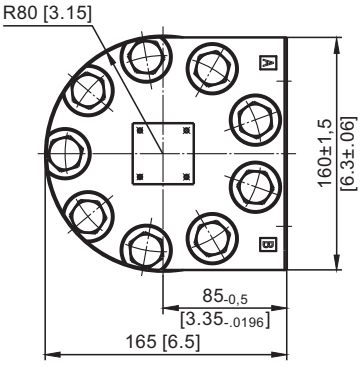
Versions 3



Versions 5



mm [in]



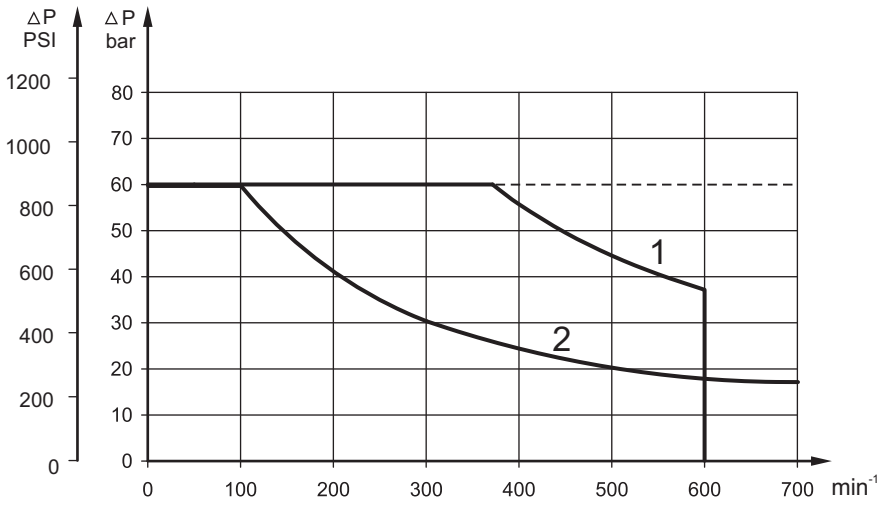
Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

	Versions			
	2	3	4	5
P(A,B)	2xG1	2xG1	2x1 5/16-12UN	2x1" (SAE PSI3000)
T	G¼	G¼	9/16-18UNF	G¼
C	-	6xM10	-	8xM10

MAX. PERMISSIBLE SHAFT SEAL PRESSURE

Max. return pressure without drain line or max. pressure in the drain line

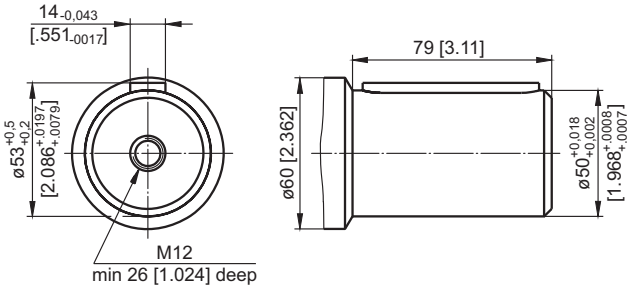


1: Drawing for High Pressure Seal ("U" Seal)
2: Drawing for Standard Shaft Seal

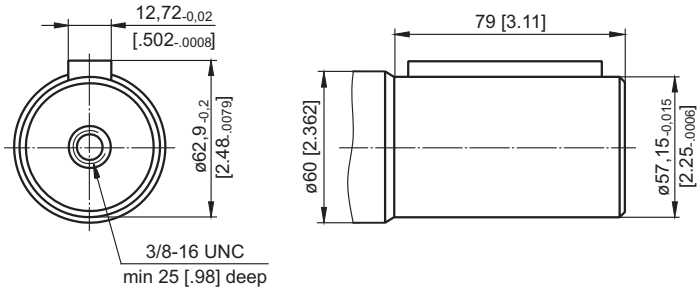
——— - continuous operations
- - - - - - intermittent operations

SHAFT EXTENSIONS

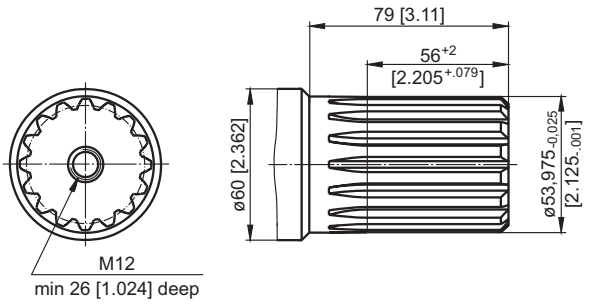
C - ø50 straight, Parallel key A14x9x70 DIN 6885
Max. Torque 271,2 daNm [24000 lb-in]



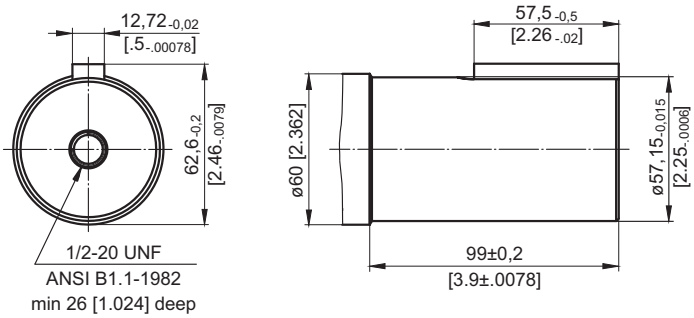
CO - ø2¼" [57,15] straight, Parallel key ½ "x½"x 2¼" BS46
Max. Torque 271,2 daNm [24000 lb-in]



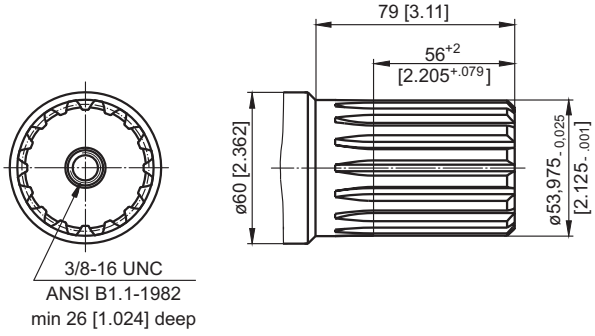
SH - ø2⅛" (ø53,975) splined 16 DP 8/16 ANS B92.1-1976
Max. Torque 271,2 daNm [24000 lb-in]



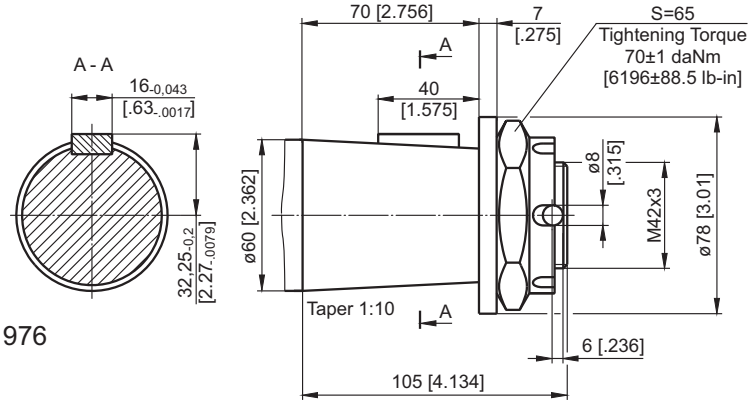
B - ø2¼" [57,15] straight, Parallel key ½ "x½"x 2¼" BS46
Max. Torque 271,2 daNm [24000 lb-in]



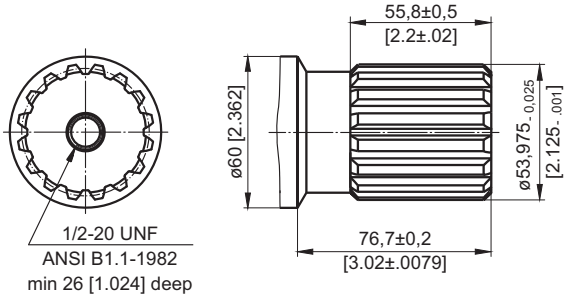
G - ø2⅛" (ø53,975) splined 16 DP 8/16 ANS B92.1-1976
Max. Torque 271,2 daNm [24000 lb-in]



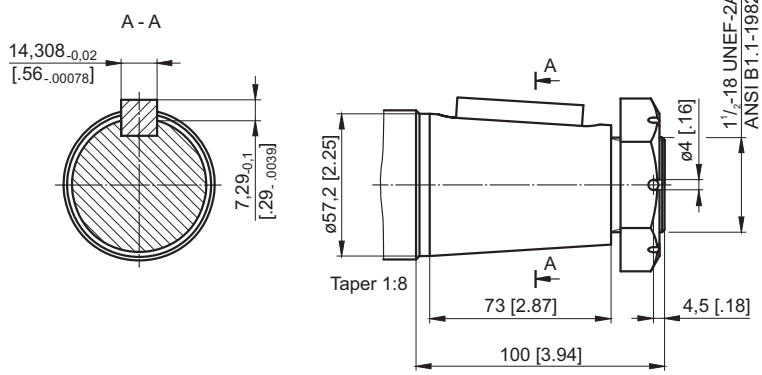
K - ø60, tapered 1:10, Parallel key B16x10x32 DIN 6885
Max. Torque 271,2 daNm [24000 lb-in]



S - ø2⅛" (ø53,975) splined 16 DP 8/16 ANS B92.1-1976
Max. Torque 271,2 daNm [24000 lb-in]



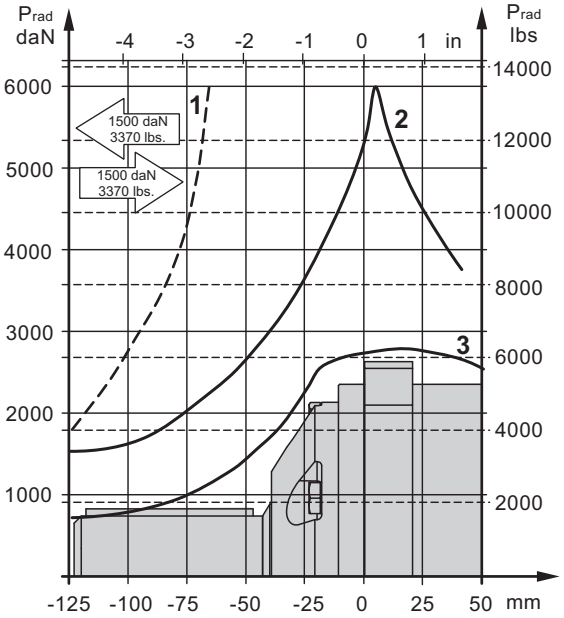
T - ø2¼" [57,15] SAE J501, tapered 1:8, key $^{9}/_{16}$"x$^{9}/_{16}$"x2" BS46
Max. Torque 271,2 daNm [24000 lb-in]



mm [in]

PERMISSIBLE SHAFT LOADS

The output shaft runs in tapered bearings that permit high axial and radial forces. Curve "**1**" shows max. radial shaft load. Any shaft load exceeding the values shown by the curve will seriously reduce motor life. The two other curves apply to a B10 bearing life of 3000 hours at 200 RPM.



2 - P_a=0 daN [0 lbs]

3 - P_a=1500 daN [3370 lbs]

ORDER CODE

	1	2	3	4	5	6	7	8
M V M							**HD**	

Pos.1 - Mounting Flange

omit - Standard square mount, four holes, spigot dia. ø160 [6.3], BC200

C - Square mount, four holes, dia. ø180 [7.1], BC224

CA - Square mount, four holes, dia. ø127 [5.0], Bc162

S - Short mount

Pos.2 - Displacement code

315 - 314,5 cm^3/rev [19.80 in^3/rev]

400 - 400,9 cm^3/rev [24.45 in^3/rev]

500 - 499,6 cm^3/rev [30.48 in^3/rev]

630 - 629,1 cm^3/rev [38.38 in^3/rev]

677 - 675,8 cm^3/rev [41.24 in^3/rev]

800 - 801,8 cm^3/rev [48.91 in^3/rev]

Pos.3 - Shaft Extensions*

omit - for Short mount

C - ø50 straight, Parallel key A14x9x70 DIN6885

CO - ø2¼" [57,15] straight, Parallel key $^1/_2$"x$^1/_2$"x2¼" BS46

B - ø2¼" [57,15] straight, Parallel key $^1/_2$"x$^1/_2$"x2¼" BS46

SH - ø2$^1/_8$" [53,975] splined, 16DP 8/16 ANS B92.1-1976

G - ø2$^1/_8$" [53,975] splined, 16DP 8/16 ANS B92.1-1976

S - ø2$^1/_8$" [53,975] splined, 16DP 8/16 ANS B92.1-1976

K - ø60 tapered 1:10, Parallel key B16x10x32 DIN6885

T - ø2¼" [57,15] SAE J501, tapered 1:8, key $^9/_{16}$"x$^9/_{16}$"x2" BS46

Pos.4 - Ports

2 - side ports 2xG1, G1/4, BSP thread, ISO 228

3 - side ports 2xG1, G1/4, BSP thread, ISO 228, 6xM10

4 - side ports 2x1 5/16-12 UN, O-ring, 9/16-18 UNF

5 - side ports 2x1" (SAE PSI3000), G1/4, BSP thread, ISO 228, 8xM10

Pos.5 - Check Valves

omit - without check valves

1 - with check valves

Pos.6 - Shaft Seal Version**

omit - Low pressure shaft seal

U - High pressure shaft seal

Pos.7 - Additional Options

HD - Reinforced motor **HD*****

For Other **Additional Options** see page 71

Pos.8 - Design Series

omit - Factory specified

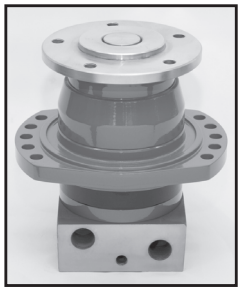
NOTES: * The permissible output torque for shafts must not be exceeded!

** Shaft seal is available with the **omit**, **C** and **CA** mounting flange only!

*** Drain line should always be used (if no check valves).

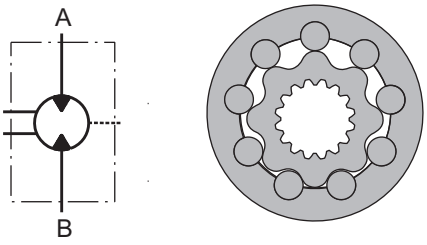
The hydraulic motors are mangano-phosphatized as standard.

HYDRAULIC MOTORS VMF



APPLICATION

» Marine equipment
» Forestry equipment
» Metal working machines
» Agricultural machines
» Road building machines
» Mining machinery
» Special vehicles etc.



CONTENTS

Specification data 66
Function diagrams ..... 67÷69
Permissible shaft loads 69
Dimensions and mounting 70
Permissible shaft seal pressure 70
Order code 70

OPTIONS

» Model - Disc valve, roll-gerotor
» Wheel mounting flange
» Side ports
» Shaft - thread hole flange
» SAE and BSPP ports
» Other special features

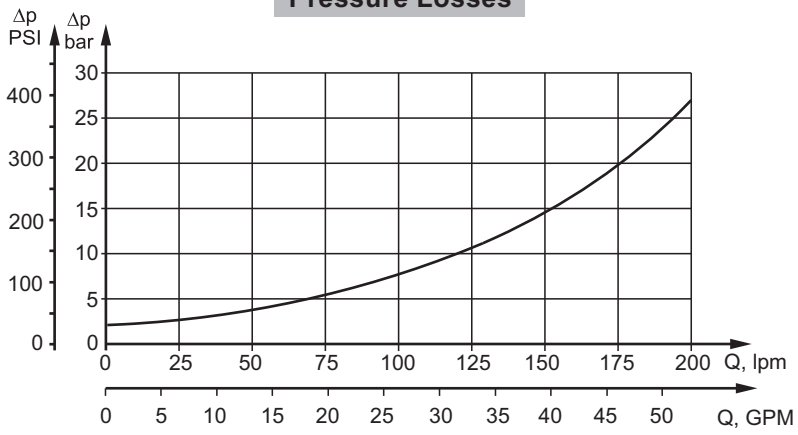
GENERAL

Max. Displacement, cm^3/rev [in^3/rev]	801,8 [48.91]
Max. Speed, [RPM]	736
Max. Torque, daNm [lb-in]	cont.: 259 [22920] int.: 340 [30090]
Max. Output, kW [HP]	112 [150]
Max. Pressure Drop, bar [PSI]	cont.: 250 [3630] int.: 350 [5080]
Max. Oil Flow, lpm [GPM]	240 [63.4]
Min. Speed, [RPM]	5
Permissible Shaft Loads, daN [lbs]	P_a=1500 [3370]
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, ^{o}C [^{o}F]	-40÷140 [-40÷284]
Optimal Viscosity range, mm^2/s [SUS]	20÷75 [98÷347]
Filtration	ISO code: 18/16/13 According to ISO 4406-1999

Oil flow in drain line

Pressure drop bar [PSI]	Viscosity mm^2/s [SUS]	Oil flow in drain line lpm [GPM]
140 [2030]	20 [98]	3 [.793]
	35 [164]	2 [.528]
210 [3045]	20 [98]	6 [1.585]
	35 [164]	4 [1.057]

Pressure Losses



SPECIFICATION DATA

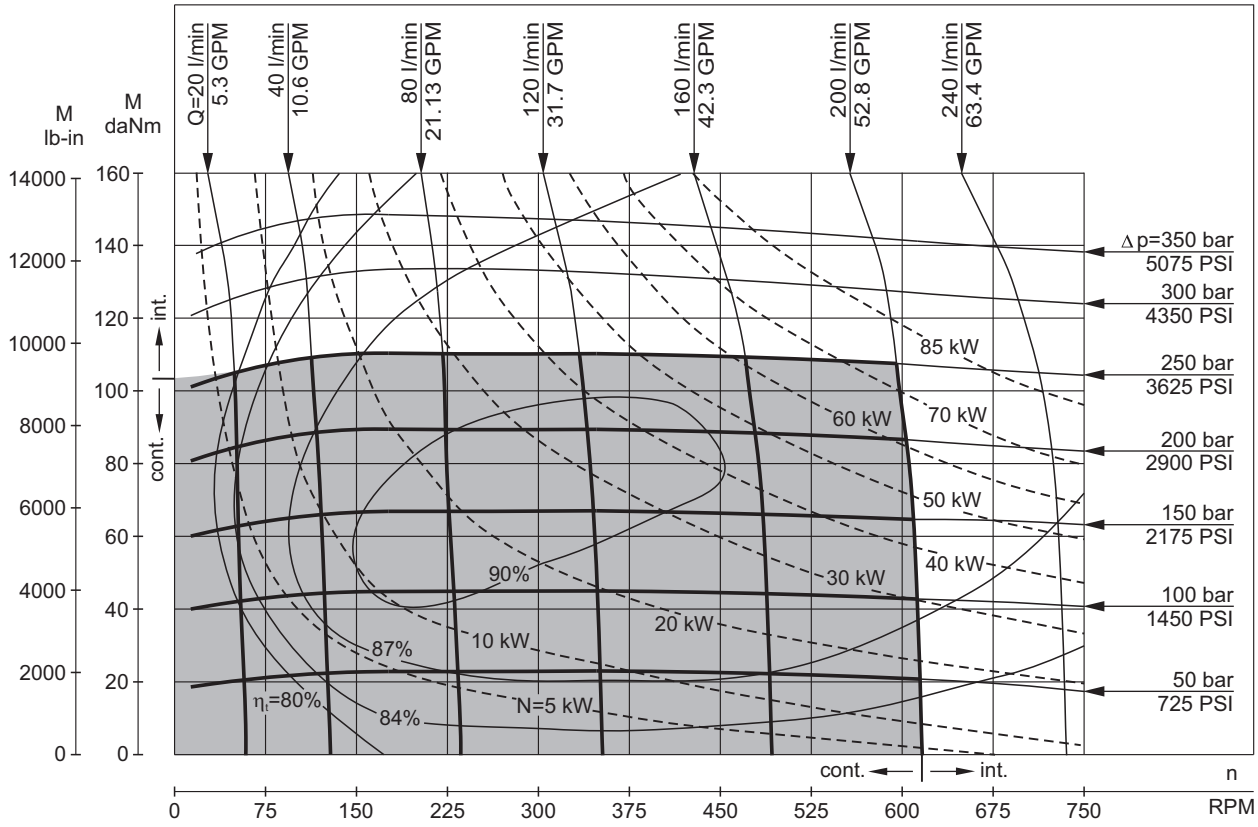
Type		VMF 315	VMF 400	VMF 500	VMF 630	VMF 800
Displacement, cm^3/rev [in^3/rev]		314,5 [19.18]	400,9 [24.5]	499,6 [30.5]	629,1 [38.38]	801,8 [48.91]
Max. Speed, [RPM]	Cont.	636	500	400	315	250
	Int.*	736	600	480	380	300
Max. Torque, daNm [lb-in]	Cont.	115 [10180]	144 [12745]	180 [15930]	227 [20090]	259 [22920]
	Int.*	160 [14160]	200 [17700]	260 [23010]	310 [27440]	340 [30090]
	Peak**	180 [15930]	230 [20355]	286 [25315]	360 [31860]	402 [35580]
Max. Output, kW [HP]	Cont.	67 [90]	67 [90]	67 [90]	67 [90]	67 [90]
	Int.*	112 [150]	112 [150]	112 [150]	112 [150]	112 [150]
Max. Pressure Drop, bar [PSI]	Cont.	250 [3630]	250 [3630]	250 [3630]	250 [3630]	225 [3260]
	Int.*	350 [5080]	350 [5080]	350 [5080]	350 [5080]	350 [5080]
	Peak**	400 [5800]	400 [5800]	400 [5800]	400 [5800]	400 [5800]
Max. Oil Flow, lpm [GPM]	Cont.	200 [52.8]	200 [52.8]	200 [52.8]	200 [52.8]	200 [52.8]
	Int.*	240 [63.4]	240 [63.4]	240 [63.4]	240 [63.4]	240 [63.4]
Max. Inlet Pressure, bar [PSI]	Cont.	270 [3915]	270 [3915]	270 [3915]	270 [3915]	270 [3915]
	Int.*	370 [5365]	370 [5365]	370 [5365]	370 [5365]	370 [5365]
	Peak**	420 [6090]	420 [6090]	420 [6090]	420 [6090]	420 [6090]
Max. Return Pressure with Drain Line, bar [PSI]	Cont.	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]
	Int.*	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]
	Peak**	210 [3045]	210 [3045]	210 [3045]	210 [3045]	210 [3045]
Max. Starting Pressure with Unloaded Shaft, bar [PSI]		5 [70]	5 [70]	5 [70]	5 [70]	5 [70]
Min. Starting Torque, daNm [lb-in]		92 [8140]	115 [10180]	144 [12745]	180 [15930]	205 [18145]
Min. Speed***, [RPM]		10	6	8	6	5
Weight, kg [lb]		46 [101.4]	47,2 [104,1]	48,5 [106.9]	50 [110.2]	51,5 [113.5]

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% of every minute.
*** For speeds lower than given, consult factory or your regional manager.

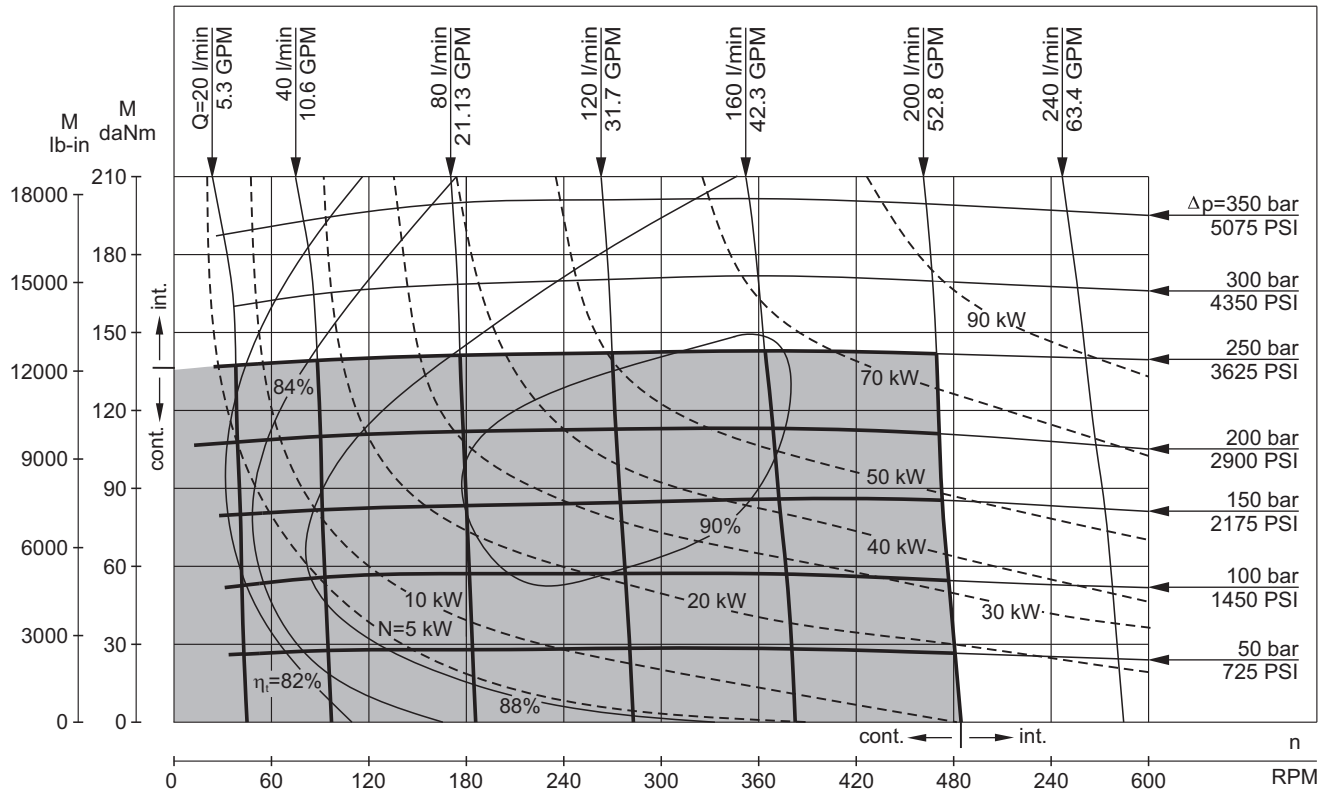
1. Intermittent speed and intermittent pressure must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm^2/s [70 SUS] at 50°C [122°F].
5. Recommended maximum system operating temperature is 82°C [180°F].
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

FUNCTION DIAGRAMS

VMF 315



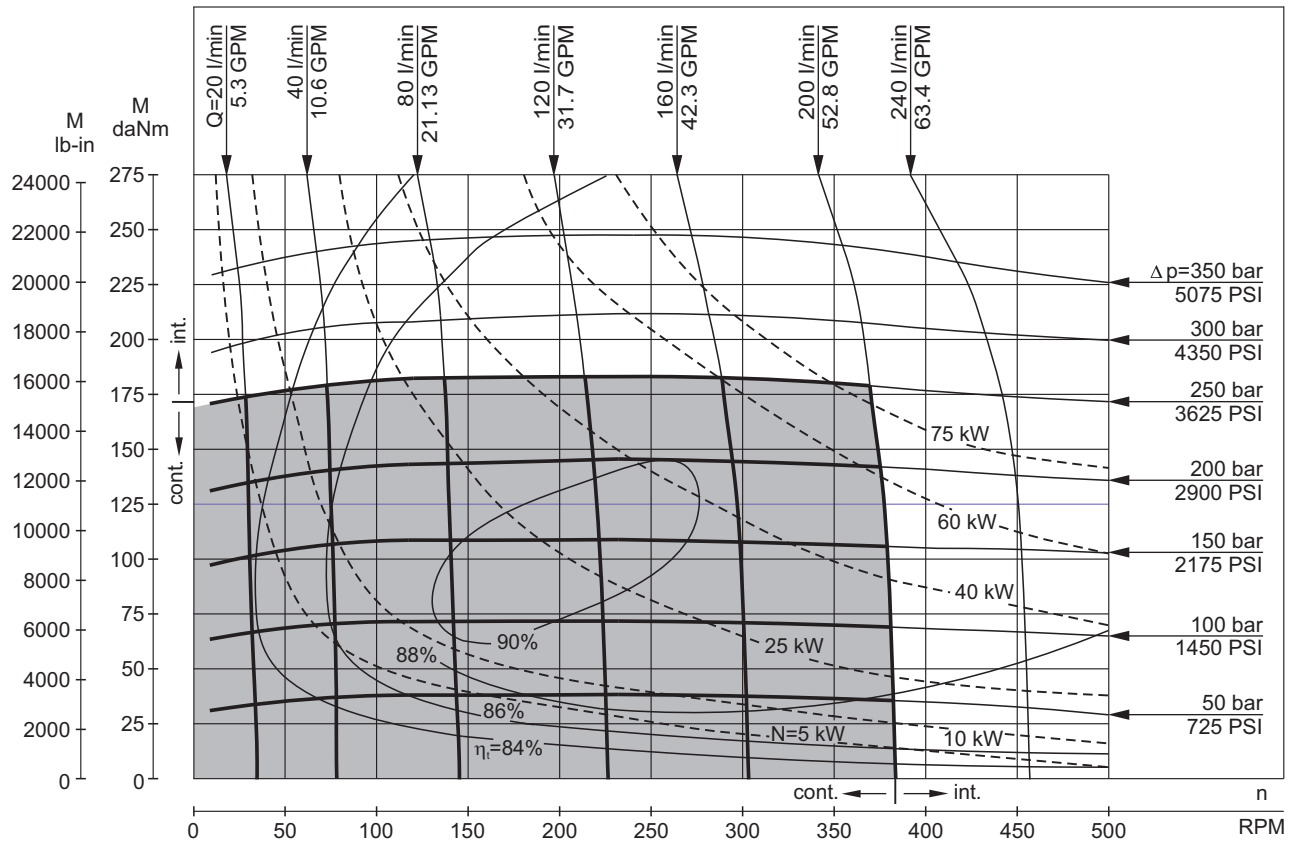
VMF 400



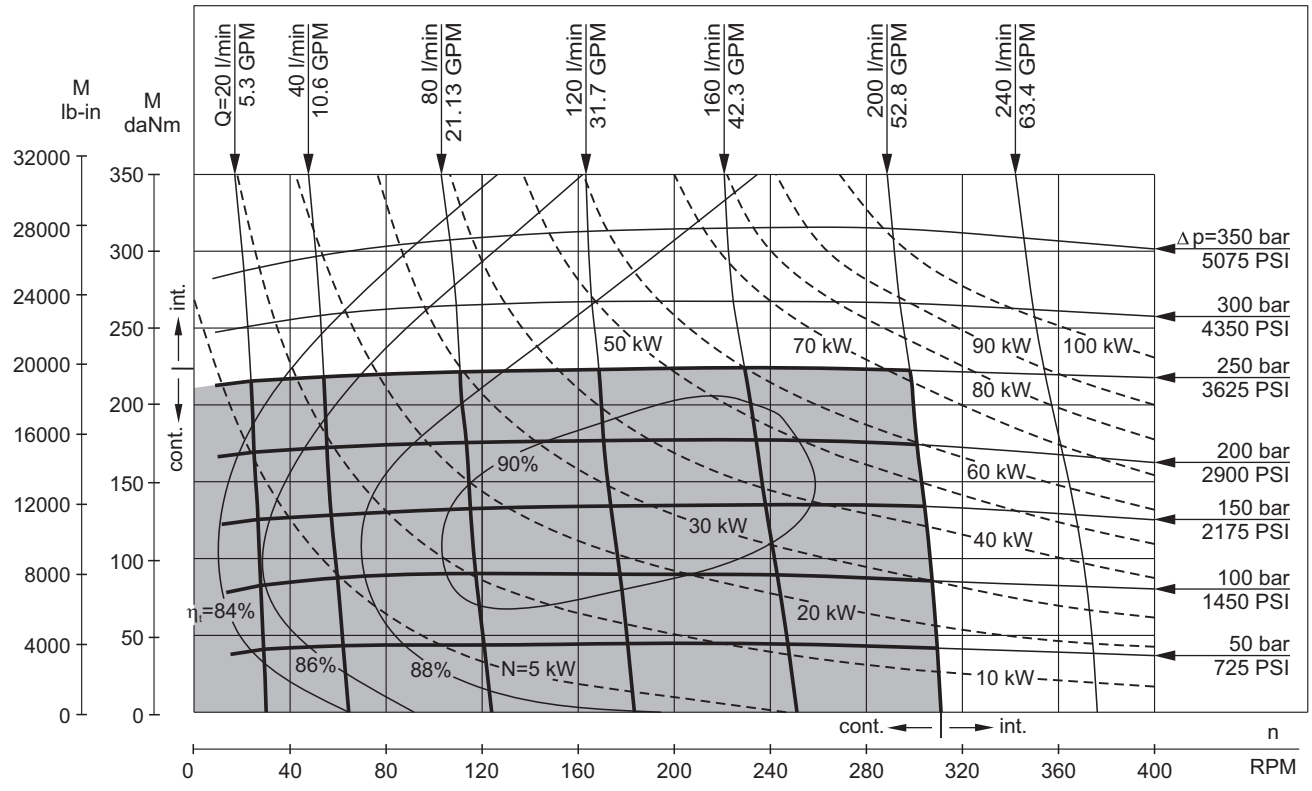
The function diagrams data was collected at back pressure 5÷10 bar (72.5PSI÷145PSI) and oil with viscosity of 32 mm²/s [150SUS] at 50° C [122°F].

FUNCTION DIAGRAMS

VMF 500



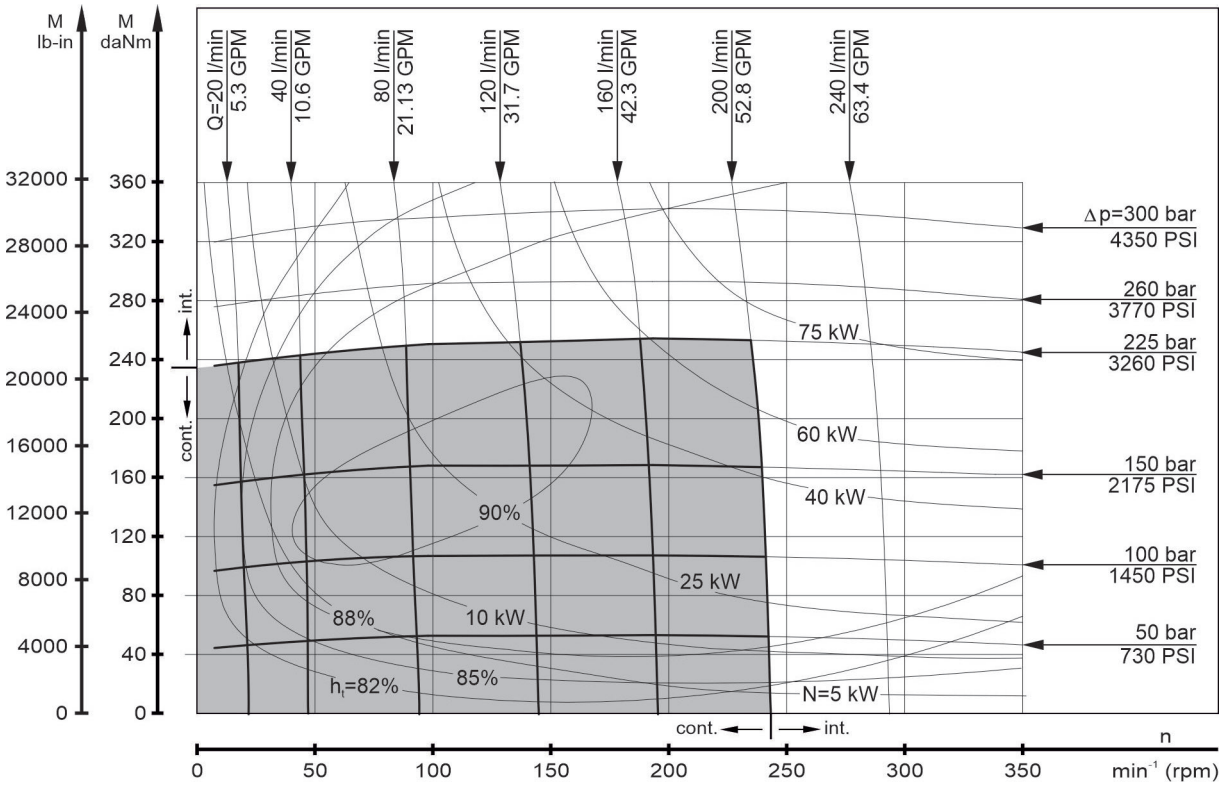
VMF 630



The function diagrams data was collected at back pressure 5÷10 bar (72.5 PSI÷145 PSI) and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

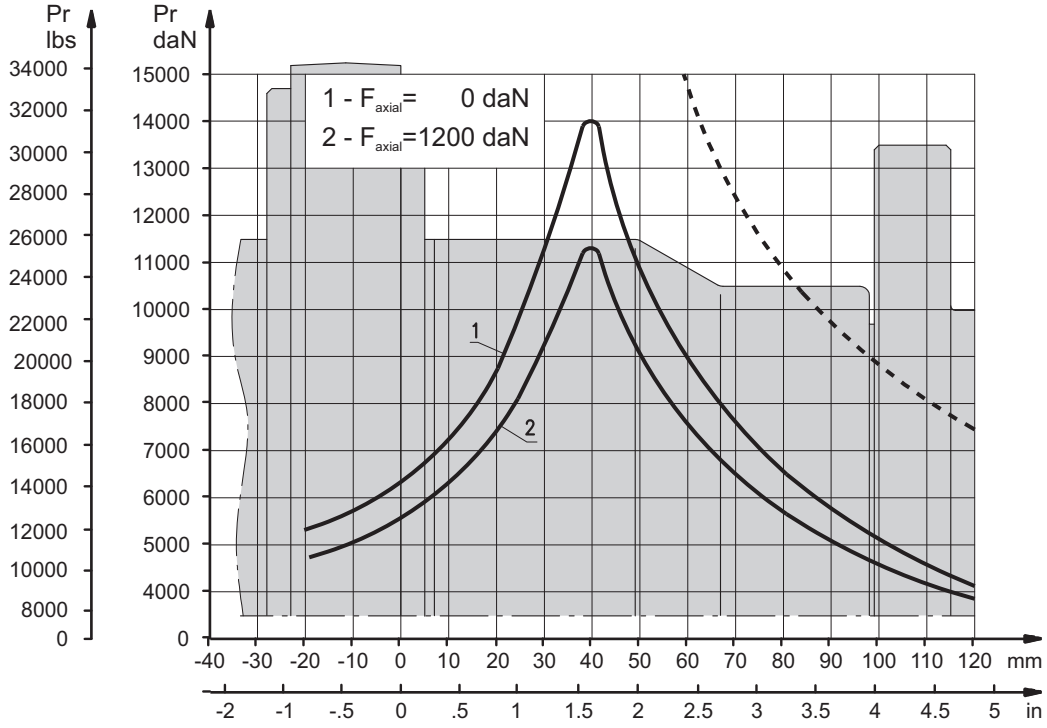
FUNCTION DIAGRAMS

VMF 800



The function diagrams data was collected at back pressure 5÷10 bar (72.5PSI÷145PSI) and oil with viscosity of 32 mm²/s [150SUS] at 50° C [122°F].

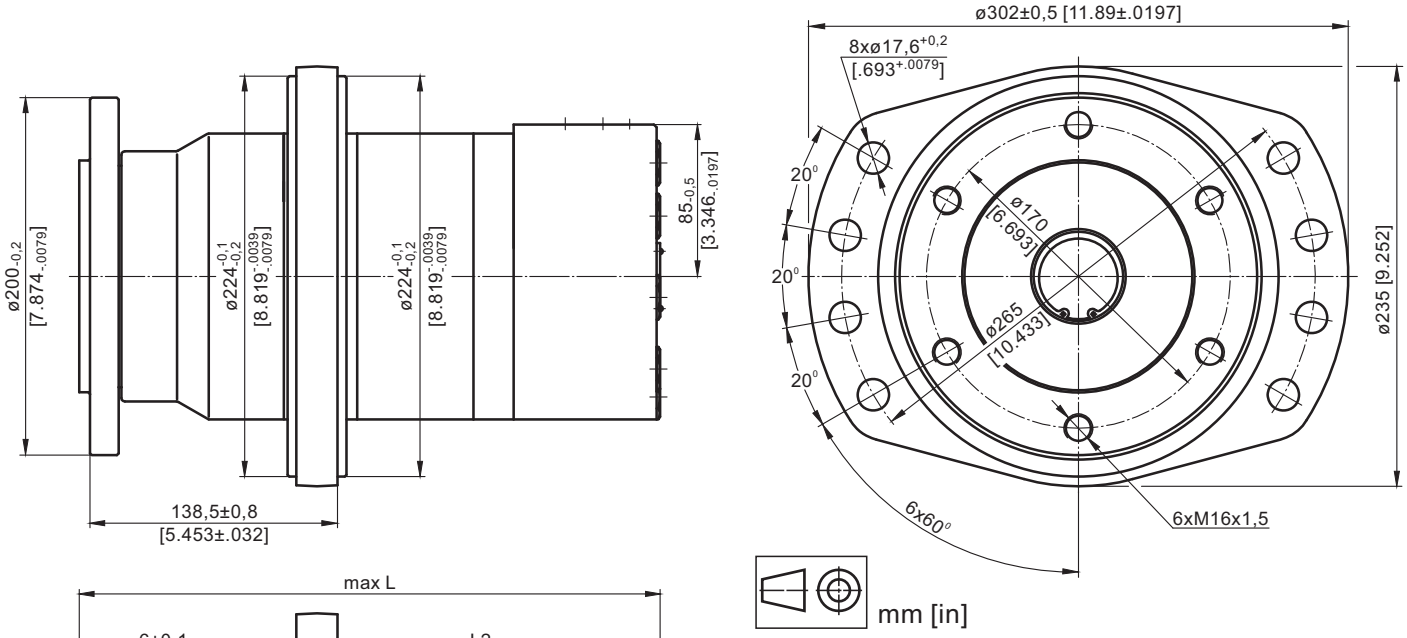
PERMISSIBLE SHAFT LOADS



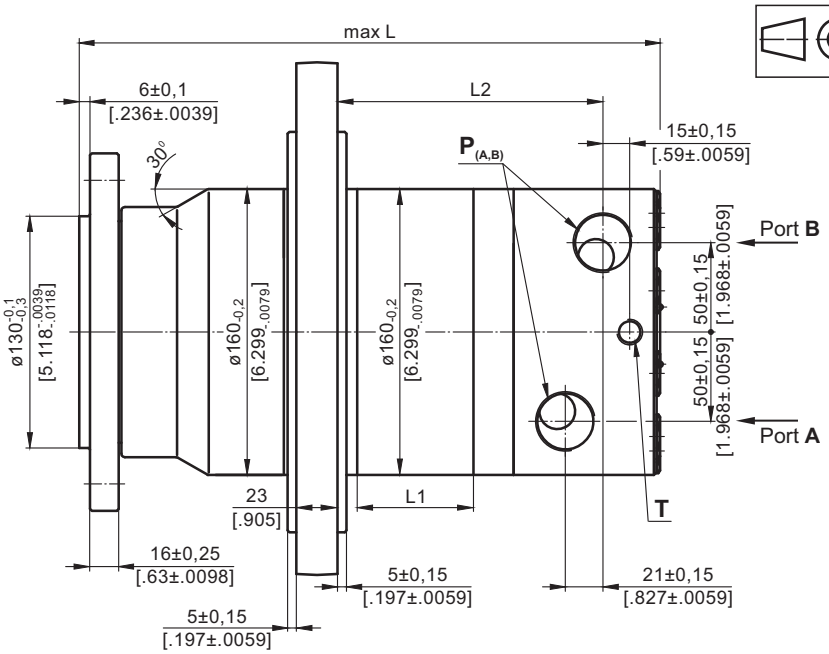
1 - Bearing curve: The curve applies to a B10 bearing life of 2000 hours at 100 RPM.

2 - Shaft curve: The curve represents Max. permissible radial shaft load with safety factor 2:1.

DIMENSIONS and MOUNTING DATA



mm [in]



	Versions	
	2	4
$P_{(A,B)}$	2xG1	2x1⅝-12UN
T	G¼	⅜-18UNF

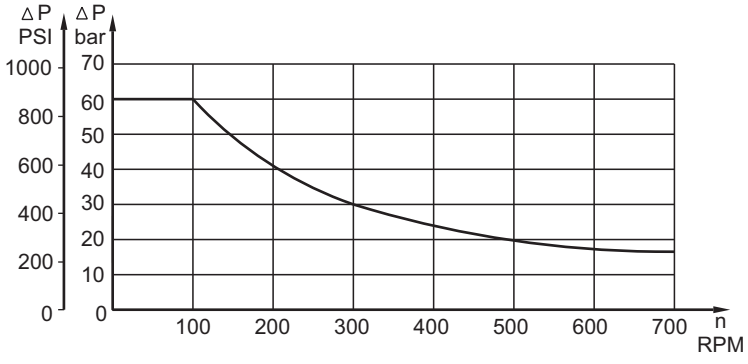
Type	L, mm [in]	L_1, mm [in]	L_2, mm [in]
VMF 315	286,5 [11.28]	25,5 [1.00]	109,5 [4.31]
VMF 400	293,5 [11.56]	32,5 [1.28]	116,5 [4.59]
VMF 500	301,5 [11.87]	40,5 [1.59]	124,5 [4.90]
VMF 630	312,0 [12.28]	51,0 [2.01]	135,0 [5.31]
VMF 800	326,0 [12.83]	65,0 [2.56]	149,0 [5.87]

Warning: Drain line should always be used.

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

MAX. PERMISSIBLE SHAFT SEAL PRESSURE



ORDER CODE

1	2	3	4
VMF			HD	

Pos.1 - Displacement code

315	- 314,5 cm³/rev [19.18 in³/rev]
400	- 400,9 cm³/rev [24.45 in³/rev]
500	- 499,6 cm³/rev [30.48 in³/rev]
630	- 629,1 cm³/rev [38.38 in³/rev]
800	- 801,8 cm³/rev [48.91 in³/rev]

Pos.2 - Ports

2	- side ports, 2xG1, G¼, BSP thread, ISO 228
4	- side ports, 2x1⅝-12 UN, O-ring, ⅜-18 UNF

Pos.3 - Additional Options

HD	- Reinforced motor **HD***

For Other **Additional Options** see page 71

Pos.4 - Design Series

omit - Factory specified

* Drain line should always be used.

The hydraulic motors are mangano-phosphatized as standard.

MOTOR ADDITIONAL OPTIONS

Additional Options Description	Order Code	Motor type						
		MSWM	MTK	MTM	TMF	TMYF	MVM	VMF
Speed Sensor*	RS	O	O	O	O	O	O	O
Reinforced motor	HD	–	S	S	S	S	S	S
Low Leakage	LL	O	O	O	O	O	O	O
Low Speed Valving	LSV	O	O	O	O	O	O	O
Free Running	FR	–	O	O	–	O	O	–
Reverse Rotation	R	O	O	O	O	O	O	O
Paint**	P	O	O	O	O	O	O	O
Corrosion Protected Paint**	PC	O	O	O	O	O	O	O
Special Paint***	PS	O	O	O	O	O****	O	O
	PCS							
Check Valves		S	O	O	–	O	O	–

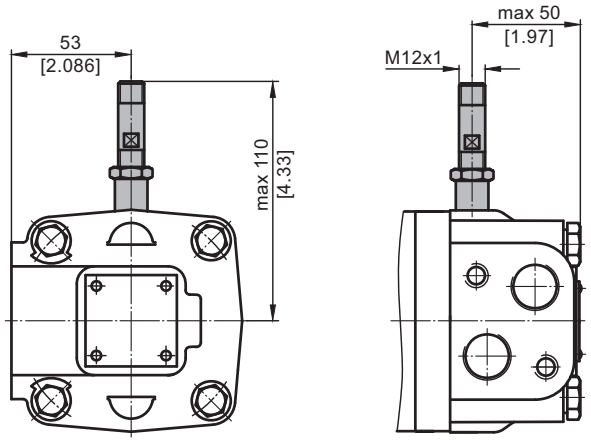
O	Optional
–	Not applicable
S	Standard

* For sensor ordering see pages 72÷73.
** Colour at customer's request.
*** Non painted feeding surfaces, colour at customer's request.
**** For Port Size Version **5** only!

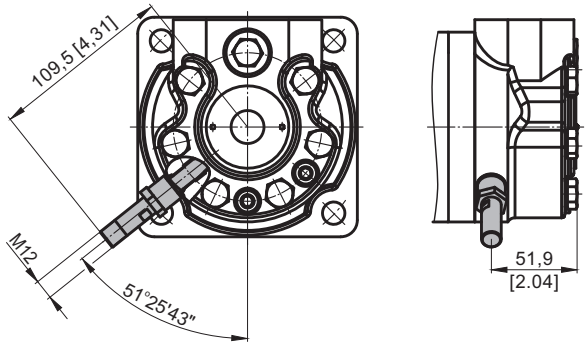
⚠ For more information about **HD** option please contact with "M+S Hydraulic".

MOTORS WITH SPEED SENSOR

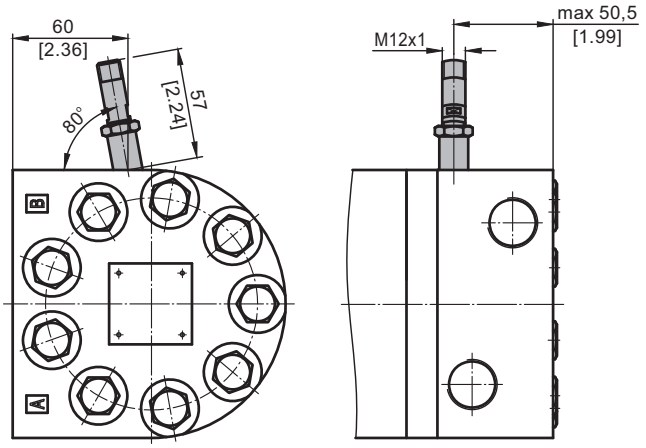
MSWM...RS



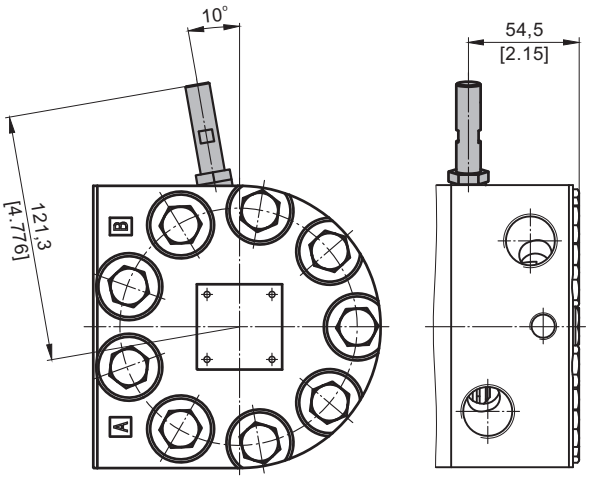
MTK...RS



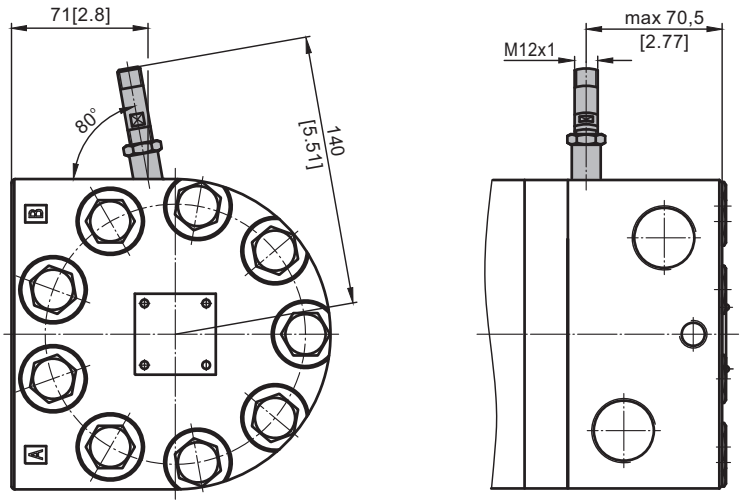
MTM...RS
TMF...RS



TMYF...RS



MVM...RS
VMF...RS



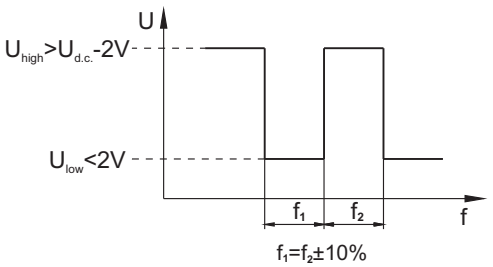
mm [in]

TECHNICAL DATA of the SPEED SENSOR

Technical data

Frequency range	0...15 000 Hz
Output	Universal PUSH PULL
Power supply	10-30 VDC (10-36 for TMYF)
Current input	<20 mA (@24 VDC)
Maximum output current	500 mA
Ambient Temperature	-40...+125°C [-40...+257°F]
Protection	IP 67
Plug connector	M12-Series
Mounting principle	ISO 6149

Output signal

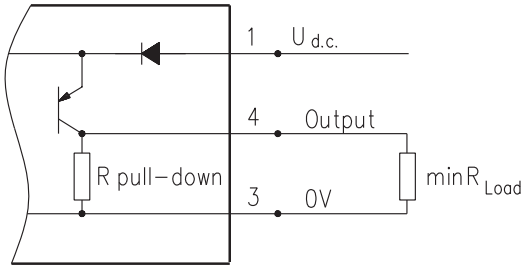


Load max.: $I_{high}=I_{low}<50mA$

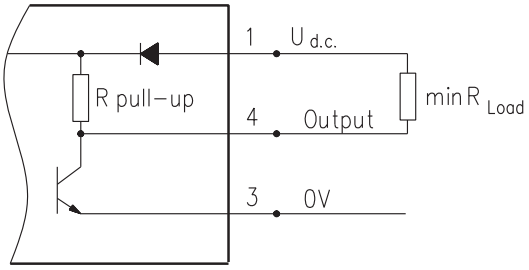
Motor type	MSWM MTK	MTM TMF, TMYF	MVM VMF
Pulses per revolution	54	84	102

Wiring diagrams

PNP

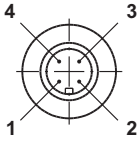


NPN



$R_{Load}\,[k\Omega]=U_{d.c.}\,[V]/I_{max}\,[mA]$

Stick type



Terminal No.	Connection	Cable Output
1	$U_{d.c.}$	Brown
2	No connection	White
3	0V	Blue
4	Output signal	Black

Order Code for Speed Sensor

Sensor Code	Electric connection
RS	Connector BINDER 713 series
RSL2,5	Cable output 3x0,25; 2,5 m [98 in] long
RSL3,5	Cable output 3x0,25; 3,5 m [138 in] long
RSL5	Cable output 3x0,25; 5 m [196 in] long
RSL10	Cable output 3x0,25; 10 m [394 in] long

NOTE: * - The speed sensor is not fitted at the factory, but is supplied in a plastic bag with the motor. For installation see enclosed instructions.

APPLICATION CALCULATION

VEHICLE DRIVE CALCULATIONS

1. Motor speed: n [RPM]

$$n=\frac{2.65 \times V_{km} \times i}{R_m} \qquad n=\frac{168 \times V_{ml} \times i}{R_{in}}$$

$\mathbf{v_{km}}$ - vehicle speed, km/h;
$\mathbf{v_{ml}}$ - vehicle speed, mil/h;
$\mathbf{R_m}$ - wheel rolling radius, m;
$\mathbf{R_{in}}$ - wheel rolling radius, in;
i - gear ratio between motor and wheels. If no gearbox, use i=1.

2. Rolling resistance: RR, daN [lbs]

The resistance force resulted in wheels contact with different surfaces:

$$RR=G \times \rho$$

G - total weight loaded on vehicle, daN [lbs];
ρ - rolling resistance coefficient (Table 1).

Table 1

Rolling resistance coefficient In case of rubber tire rolling on different surfaces	
Surface	ρ
Concrete- faultless	0.010
Concrete- good	0.015
Concrete- bad	0.020
Asphalt- faultless	0.012
Asphalt- good	0.017
Asphalt- bad	0.022
Macadam- faultless	0.015
Macadam- good	0.022
Macadam- bad	0.037
Snow- 5 cm	0.025
Snow- 10 cm	0.037
Polluted covering- smooth	0.025
Polluted covering- sandy	0.040
Mud	0.037÷0.150
Sand- Gravel	0.060÷0.150
Sand- loose	0.160÷0.300

3. Grade resistance: GR, daN [lbs]

$$GR=G \times (\sin\alpha + \rho \times \cos\alpha)$$

α - gradient negotiation angle (Table 2).

Table 2

Grade %	α Degrees	Grade %	α Degrees
1%	0º 35'	12%	6º 5'
2%	1º 9'	15%	8º 31'
5%	2º 51'	20%	11º 19'
6%	3º 26'	25%	14º 3'
8%	4º 35'	32%	18º
10%	5º 43'	60%	31º

4. Accelerarion force: FA, daN [lbs]

Force **FA** necessary for acceleration from 0 to maximum speed **v** and time **t** can be calculated with a formula:

$$FA=\frac{V_{km} \times G}{36 \times t}, [daN] \qquad FA=\frac{V_{ml} \times G}{22 \times t}, [lbs]$$

FA - acceleration force, daN [lbs];
t - time, [s]

5. Tractive effort: DP, daN [lbs]

Tractive effort **DP** is the additional force of trailer. This value will be established as follows:
- acc. to constructor's assessment;
- as calculating forces in items 2, 3 and 4 of trailer; the calculated sum corresponds to the tractive effort requested.

6. Total tractive effort: TE, daN [lbs]

Total tractive effort **TE** is total effort necessary for vehicle motion; that the sum of forces calculated in items from 2 to 5 and increased with 10% because of air resistance.

$$TE=1,1 \times (RR + GR + FA + DP)$$

RR - force acquired to overcome the rolling resistance;
GR - force acquired to slope upwards;
FA - force acquired to accelerate (acceleration force);
DP - additional tractive effort (trailer).

7. Motor Torque moment: M, daNm [lb-in]

Necessary torque moment for every hydraulic motor:

$$M=\frac{TE \times R_m [R_{in}]}{N \times i \times \eta_M}$$

N - motor numbers;
η_M - mechanical gear efficiency (if it is available).

8. Cohesion between tire and road covering: M_W, daNm [lb-in]

Necessary torque moment for every hydraulic motor:

$$M_W=\frac{G_W \times f \times R_m [R_{in}]}{i \times \eta_M}$$

To avoid wheel slipping, the following condition should be observed $M_W > M$

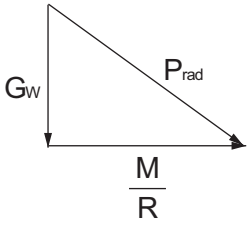
f - frictional factor;
$\mathbf{G_W}$ - total weight over the wheels, daN [lbs].

Table 3

Surface	Frictional factor f
Steel on steel	0.15 ÷ 0.20
Rubber tire on polluted surface	0.5 ÷ 0.7
Rubber tire on asphalt	0.8 ÷ 1.0
Rubber tire on concrete	0.8 ÷ 1.0
Rubber tire on grass	0.4

9. Radial motor loading: P_{rad}, daN [lbs]

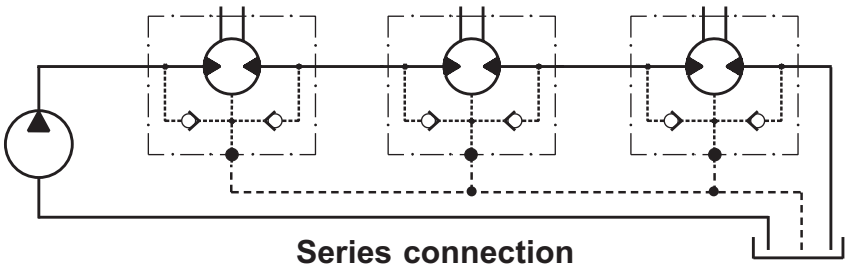
When motor is used for vehicle motion with wheels mounted directly on motor shaft, the total radial loading of motor shaft Prad is a sum of motion force and weight force acting on one wheel.



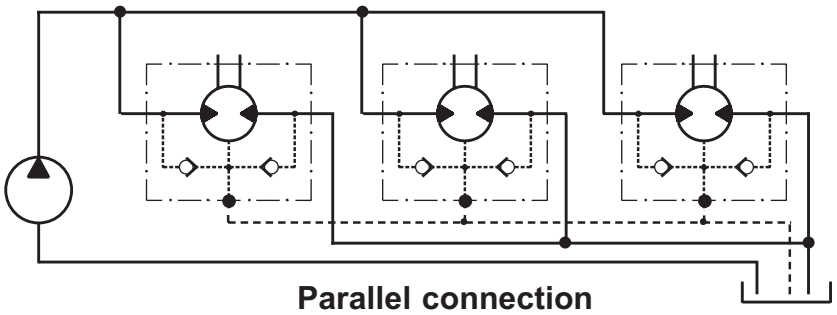
G_w - weight held by wheel;
P_{rad} - total radial loading of motor shaft;
M/R - motion force.

$$P_{rad}=\sqrt{G_w^2+\left(\frac{M}{R}\right)^2}$$

In accordance with calculated loadings the suitable motor from the catalogue is selected.



Series connection



Parallel connection

WARRANTY

M+S Hydraulic warrants, that its products, supplied directly to original equipment manufacturer, authorized distributor or other customer, will be free of defects in material or workmanship at the time of shipment from M+S Hydraulic and will conform to the products technical documentation (drawings and specifications) under sale agreement with Buyer.

This warranty will apply only to defects appearing within applicable Warranty period, mentioned below. If Buyer notifies M+S Hydraulic within the Warranty period about any such defects, M+S, at its sole option will replace or repair the defective products or their parts found by M+S Hydraulic to be defective in material or workmanship.

THE FOREGOING LIMITED WARRANTY IS AVAILABLE ONLY IF “M+S HYDRAULIC” IS PROMPTLY NOTIFIED IN WRITTEN OF THE ALLEGED DEFECT AND DOES NOT COVER FAILURE TO FUNCTION CAUSED BY DAMAGE TO THE PRODUCT, IMPROPER INSTALLATION, UNREASONABLE USE OR ABUSE OF THE PRODUCT, FAILURE TO PROVIDE OR USE OF IMPROPER MAINTENANCE OR USUAL, DEGRADATION OF THE PRODUCT DUE TO PHYSICAL ENVIRONMENTS OF AN USUAL NATURE. THE FOREGOING REMEDIES ARE THE SOLE AND EXCLUSIVE REMEDIES AVAILABLE TO CUSTOMER. To facilitate the inspection, M+S Hydraulic may require return of the product/part, which Buyer claims to be defective.

M+S Hydraulic shall not be liable for labor costs or any other expenses incurred during the disassembling or reinstalling of the product/part.

In case the claimed products are returned to M+S Hydraulic in bad condition: dirty, disassembled, with damaged or missing parts during transportation, the warranty will be considered as not applicable and the products will not be liable to repair.

Warranty periods

New products: The Warranty period is limited to 24 consecutive months (2 years) from the date of production of the product.

Repaired products: If the product is repaired in M+S Hydraulic during its warranty period, the warranty period of the repaired item shall continue for the balance of original Warranty period or for a period equal to 50% of the original new product Warranty period, whichever is later.

Spare parts: The Warranty period for Spare parts is 12 consecutive months (1 year) from the dispatch date of such parts from M+S Hydraulic.

LIMITATION OF LIABILITY M+S Hydraulic's liability for claim of any kind, for loss or damage arising out of, connected with or resulting from an order, or from the performance or branch thereof, or from the design, manufacture, sale delivery, operation or use of any of its products shall be limited to, at M+S 's sole option, replacement, repair of any defective product or the issuance of a credit to Customer against any future purchases. Cash refunds will not be made under any circumstances and Customer will not be entitled to recover any damages of any kind against M+S Hydraulic, including but not limited to incidental or consequential damages, whether direct or indirect, known or unknown, foreseen or unforeseen.



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