

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

MS, MT, MV 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.

MS, MT, MV 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.

High Pressure Shaft Seal

The high pressure shaft seals allow the motors to withstand high case pressures at high speeds without external drain line.

Motors with Speed Sensor

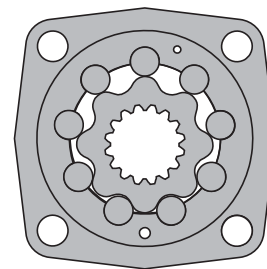
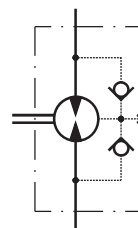
Motors are available with integrated inductive speed sensor. The output signal is a standardized voltage signal that can be used to control the speed of a motor. The torque and the radial load of the motor are not affected by the installation of speed sensor.

HYDRAULIC MOTORS MV



APPLICATION

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



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OPTIONS

- » Model - Disc valve, roll-gerotor
- » Flange and wheel mount
- » Short motor
- » Tacho connection
- » Speed sensing
- » Side ports
- » Shafts - straight, splined and tapered
- » BSPP ports
- » Other special features

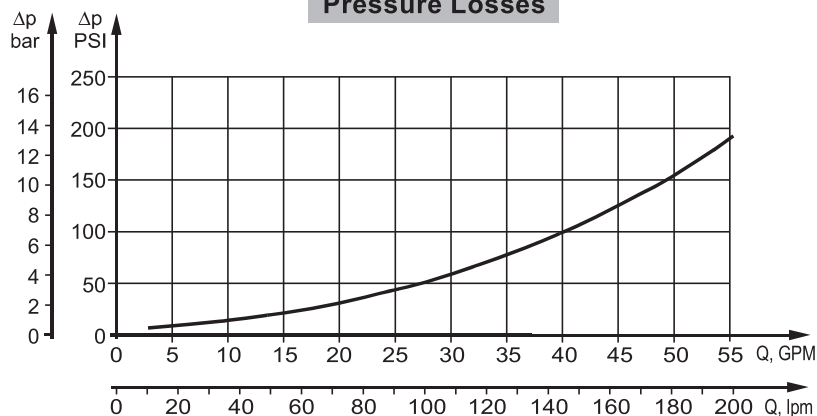
GENERAL

Max. Displacement, cm ³ /rev [in ³ /rev]	801,8 [48.91]
Max. Speed, [RPM]	630
Max. Torque, daNm [lb-in]	cont.: 188 [16650] int.: 211 [18650]
Max. Output, kW [HP]	64 [85,8]
Max. Pressure Drop, bar [PSI]	cont.: 200 [2900] int.: 240 [3480]
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, °C [°F]	-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 microns)

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		MV 315	MV 400	MV 500	MV 630	MV 800
Displacement, cm ³ /rev [In ³ /rev]		314,5 [19.18]	400,9 [24.45]	499,6 [30.48]	629,1 [38.38]	801,8 [48.91]
Max. Speed, [RPM]	Cont.	510	500	400	320	250
	Int.*	630	600	480	380	300
Max. Torque daNm [lb-in]	Cont.	92 [8150]	118 [10450]	146 [12950]	166 [14700]	188 [16650]
	Int.*	111 [9800]	141 [12500]	176 [15550]	194 [17150]	211 [18650]
	Peak**	129 [11400]	164 [14500]	205 [18150]	221 [19550]	247 [21850]
Max. Output kW [HP]	Cont.	42,5 [57]	53,5 [71.7]	53,5 [71.7]	48 [64.4]	42,5 [57]
	Int.*	51 [68.4]	64 [85.8]	64 [85.8]	56 [75]	48 [64.4]
Max. Pressure Drop bar [PSI]	Cont.	200 [2900]	200 [2900]	200 [2900]	180 [2610]	160 [2320]
	Int.*	240 [3480]	240 [3480]	240 [3480]	210 [3050]	180 [2610]
	Peak**	280 [4060]	280 [4060]	280 [4060]	240 [3480]	210 [3050]
Max. Oil Flow lpm [GPM]	Cont.	160 [42.3]	200 [52.8]	200 [52.8]	200 [52.8]	200 [52.8]
	Int.*	200 [52.8]	240 [63.4]	240 [63.4]	240 [63.4]	240 [63.4]
Max. Inlet Pressure bar [PSI]	Cont.	210 [3050]	210 [3050]	210 [3050]	210 [3050]	210 [3050]
	Int.*	250 [3620]	250 [3620]	250 [3620]	250 [3620]	250 [3620]
	Peak**	300 [4350]	300 [4350]	300 [4350]	300 [4350]	300 [4350]
Max. Return Pressure with Drain Line bar [PSI]	Cont.	140 [2040]	140 [2040]	140 [2040]	140 [2040]	140 [2040]
	Int.*	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]
	Peak**	210 [3050]	210 [3050]	210 [3050]	210 [3050]	210 [3050]
Max. Starting Pressure with Unloaded Shaft, bar [PSI]		8 [120]	8 [120]	8 [120]	8 [120]	8 [120]
Min. Starting Torque daNm [lb-in]	At max. press. drop Cont.	71 [6300]	91 [8100]	113 [10000]	133 [11800]	151 [13400]
	At max. press. drop Int.*	85 [7500]	109 [9600]	136 [12000]	155 [13700]	170 [15000]
Min. Speed***, [RPM]		10	9	8	6	5
Weight, kg [lb]	MV	31,8 [70.1]	32,6 [71.9]	33,5 [73.8]	34,9 [76.9]	36,5 [80.5]
	MVW	32,4 [71.4]	33,2 [73.2]	34,1 [75.2]	35,5 [78.3]	37,1 [81.8]
	MVS	22,7 [50]	23,5 [51.8]	24,4 [53.8]	25,6 [56.4]	27,7 [61.1]

* Intermittent operation: the permissible values may occur for max. 10% of every minute.

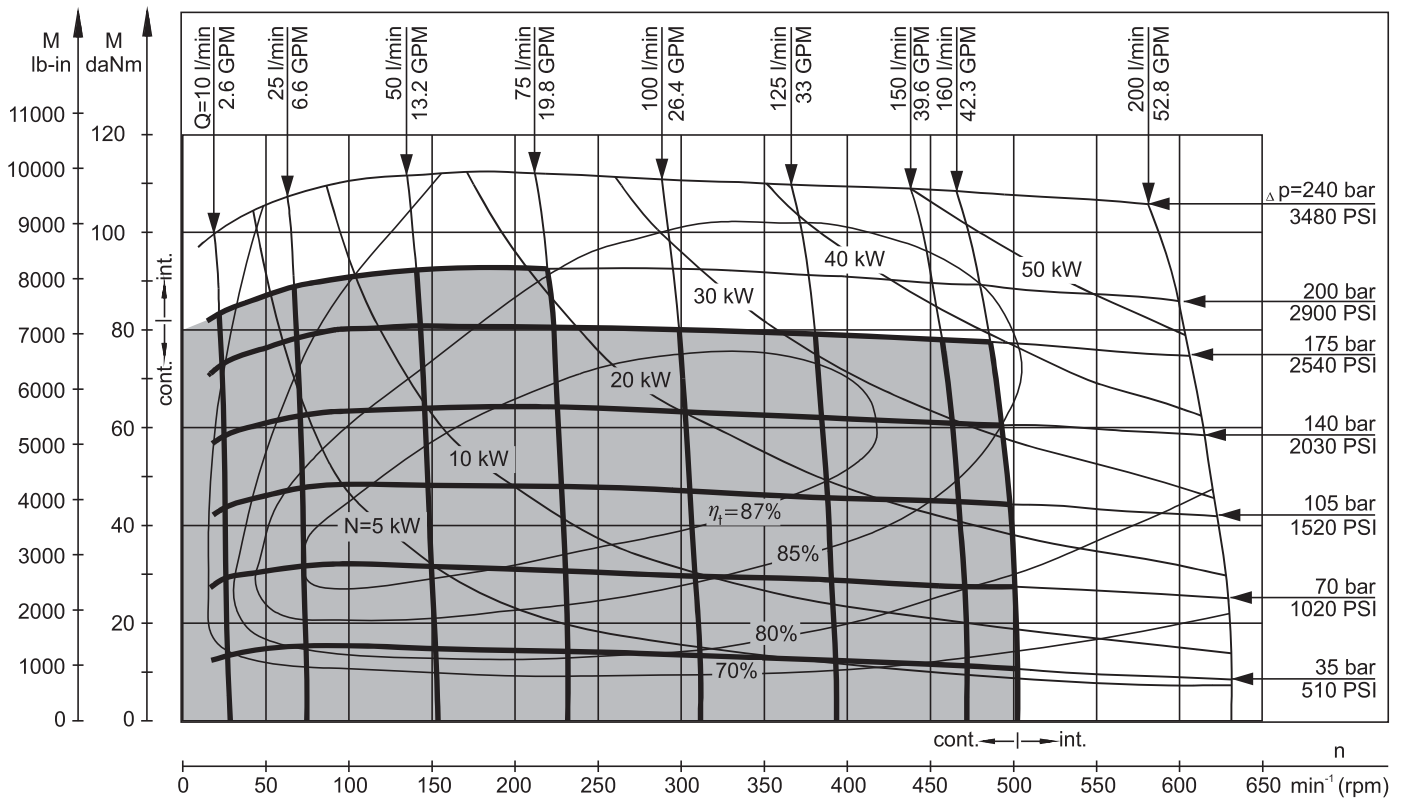
** Peak load: the permissible values may occur for max. 1% of every minute.

*** For speeds lower than given, consult factory or your regional manager.

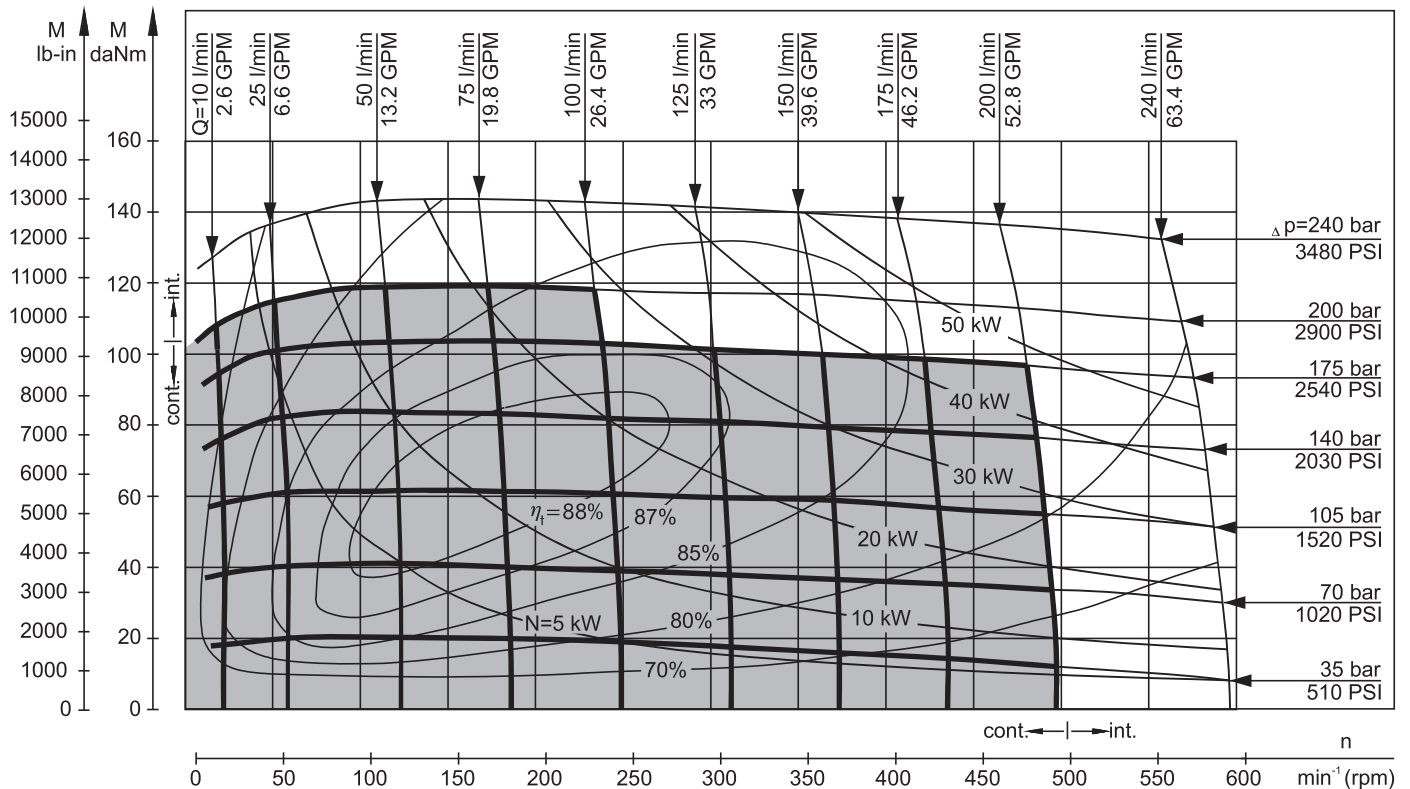
- Intermittent speed and intermittent pressure must not occur simultaneously.
- Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
- Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4).
If using synthetic fluids consult the factory for alternative seal materials.
- Recommended minimum oil viscosity 13 mm²/s [70 SUS] at 50°C [122°F].
- Recommended maximum system operating temperature is 82°C [180°F].
- To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

FUNCTION DIAGRAMS

MV 315



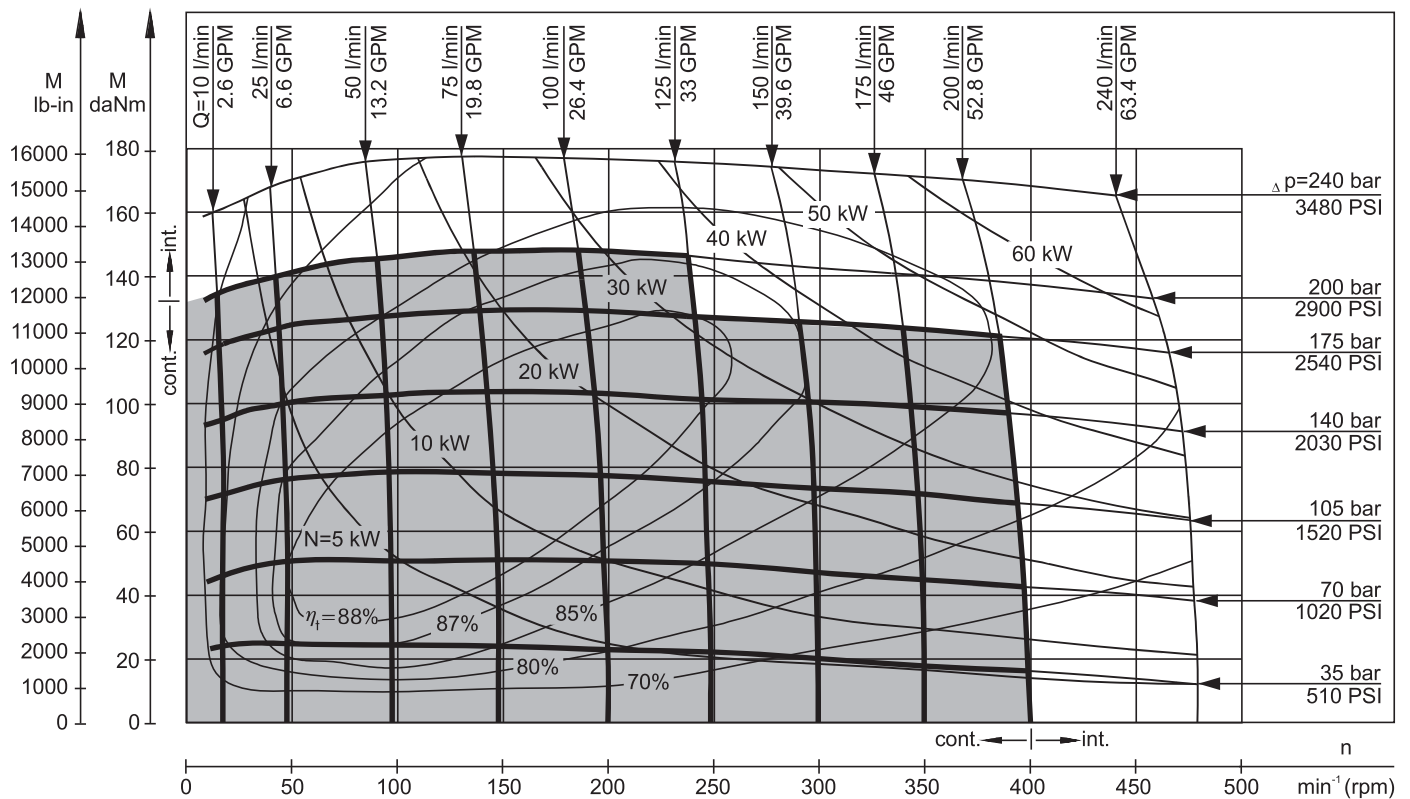
MV 400



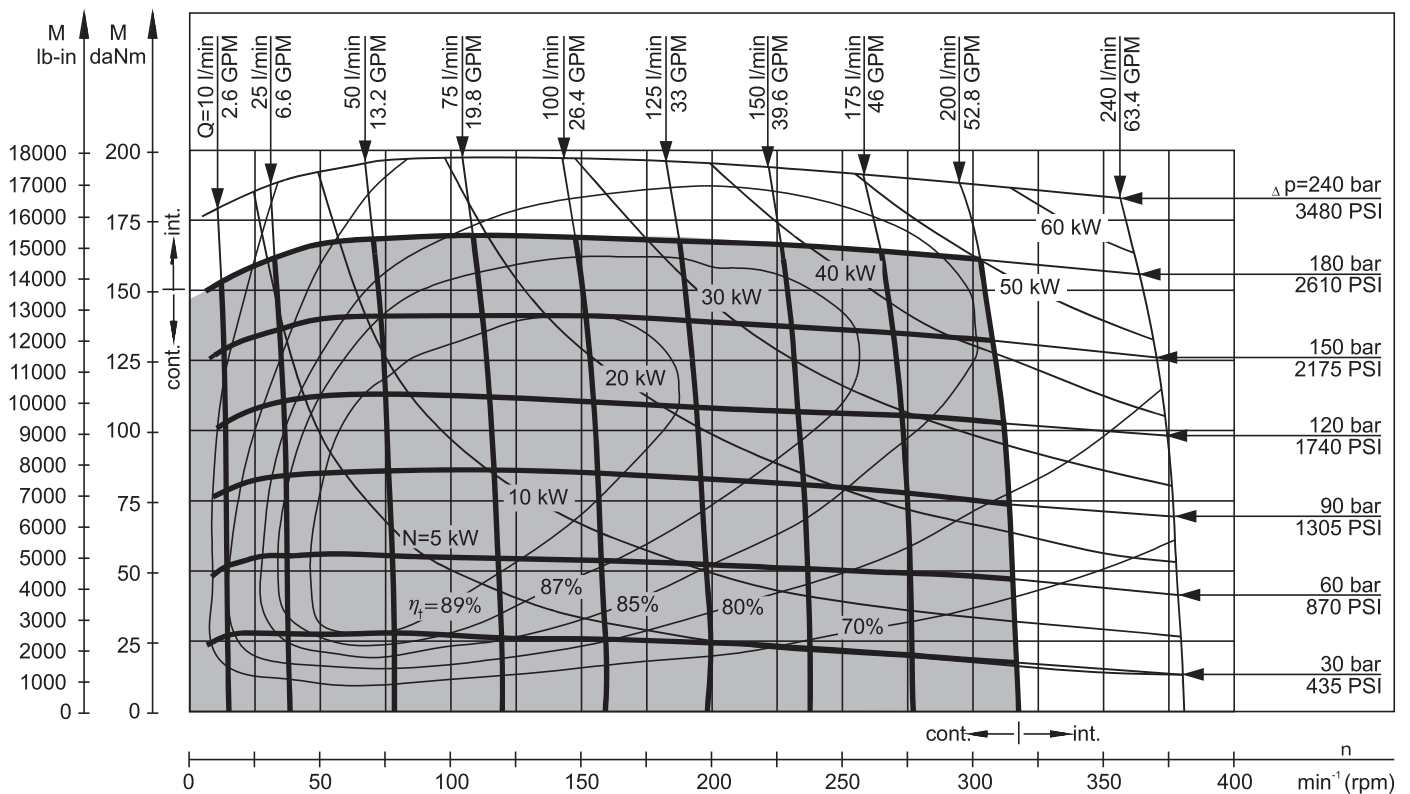
The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

FUNCTION DIAGRAMS

MV 500



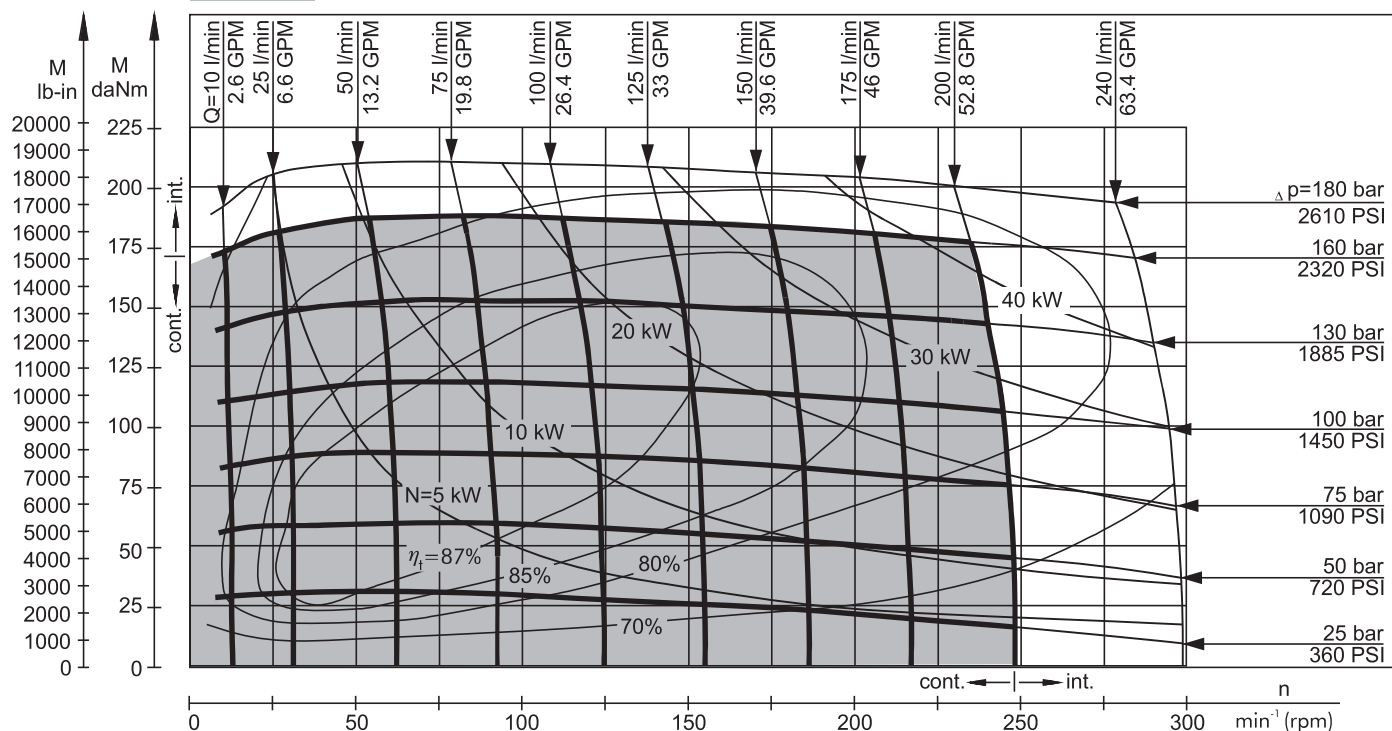
MV 630



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

FUNCTION DIAGRAMS

MV 800



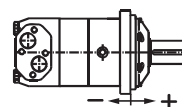
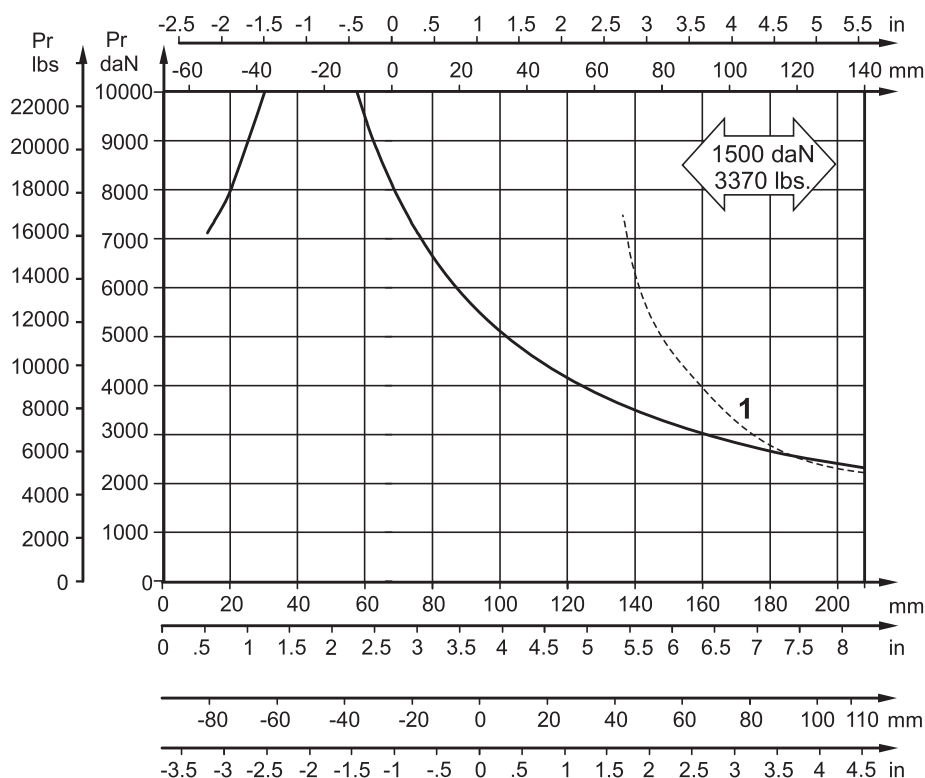
The function diagrams data is for average performance of randomly selected motors at back pressure 5 ± 10 bar [72.5 $\pm$ 145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

PERMISSIBLE SHAFT LOADS

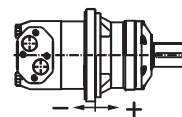
The output shaft runs in tapered bearings that permit high axial and radial forces. The permissible radial load on the shaft is shown for an axial load of 0 N as function of the distance from the mounting flange to the point of load application. The curves apply to a B10 bearing life of 2000 hours at 100 RPM.

Curve "1" shows max. radial shaft load. Any shaft load exceeding the values shown by the curve will seriously reduce motor life.

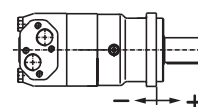
Mounting Flange:



Standard

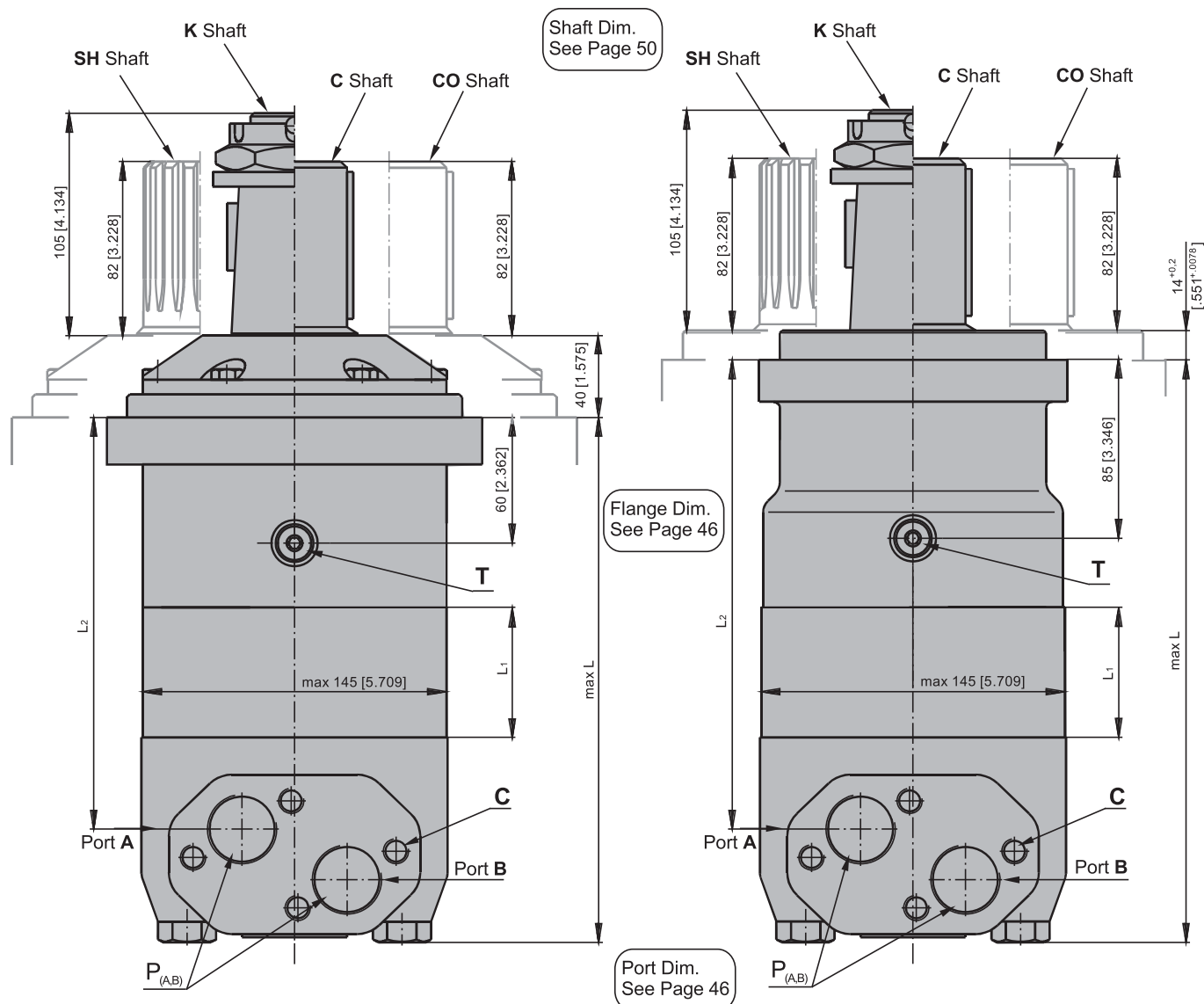


W - Wheel



SAE C

DIMENSIONS AND MOUNTING DATA - MV and MVC



C: 4xM12 - 12 mm [.47 in] depth
P_(A,B): 2xG1 - 20 mm [.79 in] depth
T: G 1/4 - 12 mm [.47 in] depth

Standard Rotation

Viewed from Shaft End

Port A Pressurized - **CW**

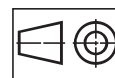
Port B Pressurized - **CCW**

Reverse Rotation

Viewed from Shaft End

Port A Pressurized - **CCW**

Port B Pressurized - **CW**

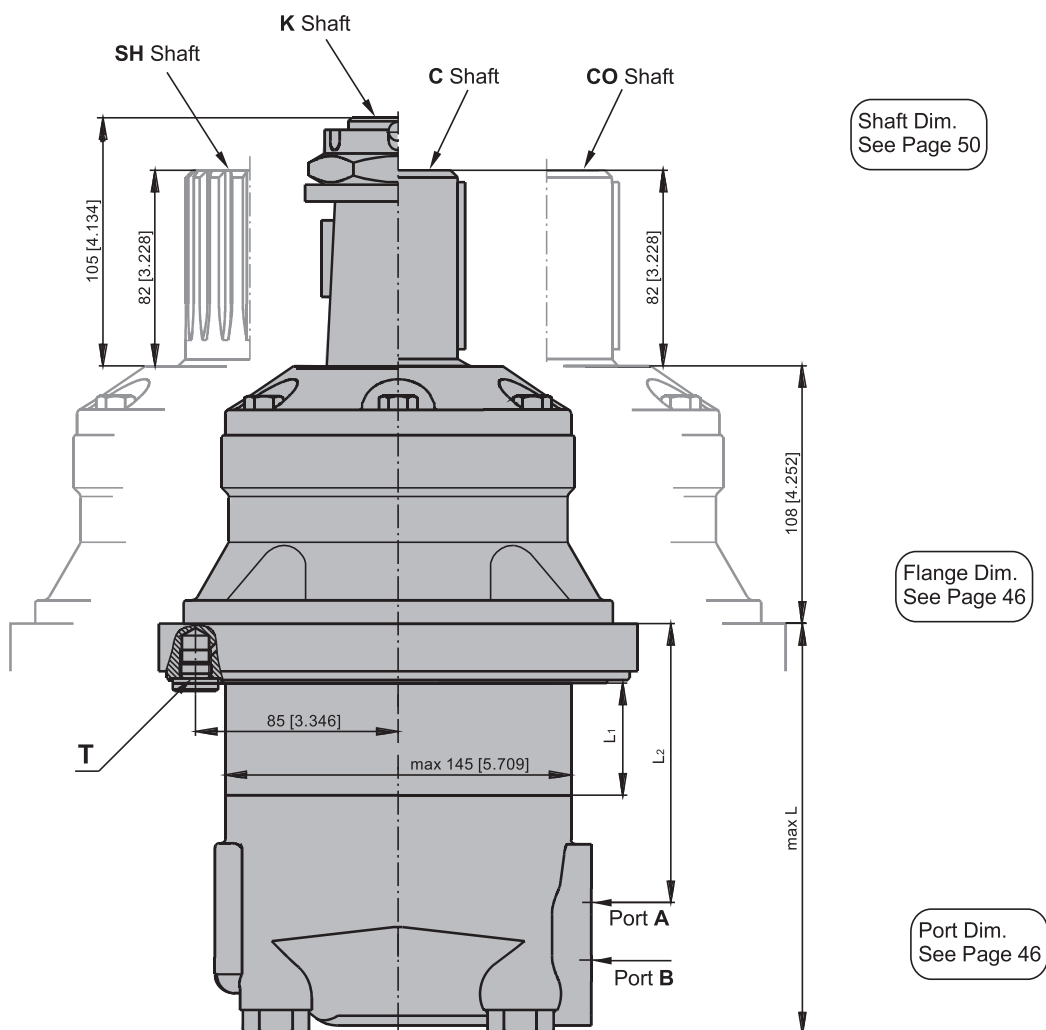


mm [in]

Type	L, mm [in]	L2, mm [in]	Type	L, mm [in]	L2, mm [in]	*L1, mm [in]
MV 315	214,5 [8.45]	160 [6.30]	MVC 315	239,0 [9.41]	185,5 [7.30]	22,0 [.87]
MV 400	221,5 [8.72]	167 [6.58]	MVC 400	246,0 [9.68]	192,5 [7.58]	29,0 [1.14]
MV 500	229,5 [9.04]	175 [6.89]	MVC 500	254,0 [10.0]	200,5 [7.89]	37,0 [1.46]
MV 630	240,0 [9.45]	186 [7.32]	MVC 630	264,5 [10.41]	211,0 [8.31]	47,5 [1.87]
MV 800	254,0 [10.0]	200 [7.87]	MVC 800	278,5 [10.96]	225,0 [8.86]	61,5 [2.42]

* The width of the roll-gerotor is 4 mm [.157 in.] greater than L1.

DIMENSIONS AND MOUNTING DATA - MVW



C: 4xM12 - 12 mm [.47 in] depth
P_(A,B): 2xG1 - 20 mm [.79 in] depth
T: G 1/4 - 12 mm [.47 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**

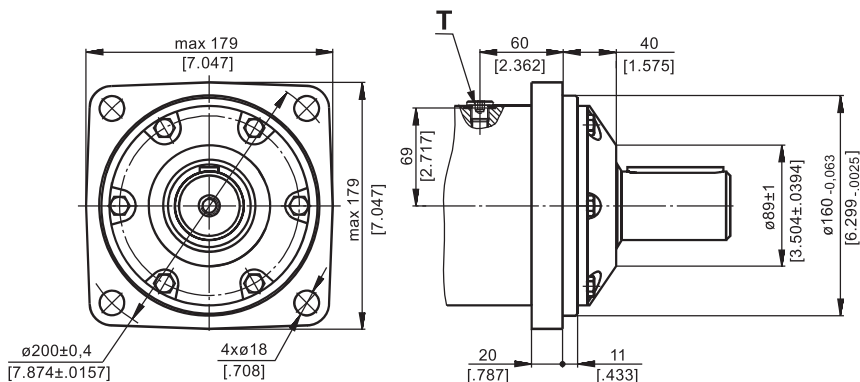


Type	L, mm [in]	L ₂ , mm [in]	*L ₁ , mm [in]
MVW 315	146 [5.75]	92 [3.62]	22,0 [.87]
MVW 400	153 [6.02]	99 [3.90]	29,0 [1.14]
MVW 500	161 [6.34]	107 [4.21]	37,0 [1.46]
MVW 630	172 [6.77]	118 [4.65]	47,5 [1.87]
MVW 800	185 [7.28]	132 [5.20]	61,5 [2.42]

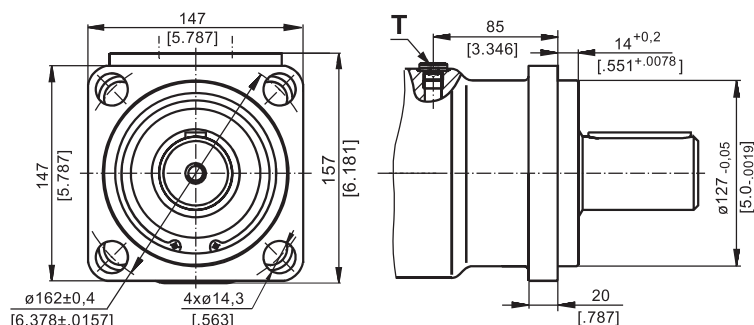
* The width of the roll-gerotor is 4 mm [.157 in.] greater than L₁.

MOUNTING

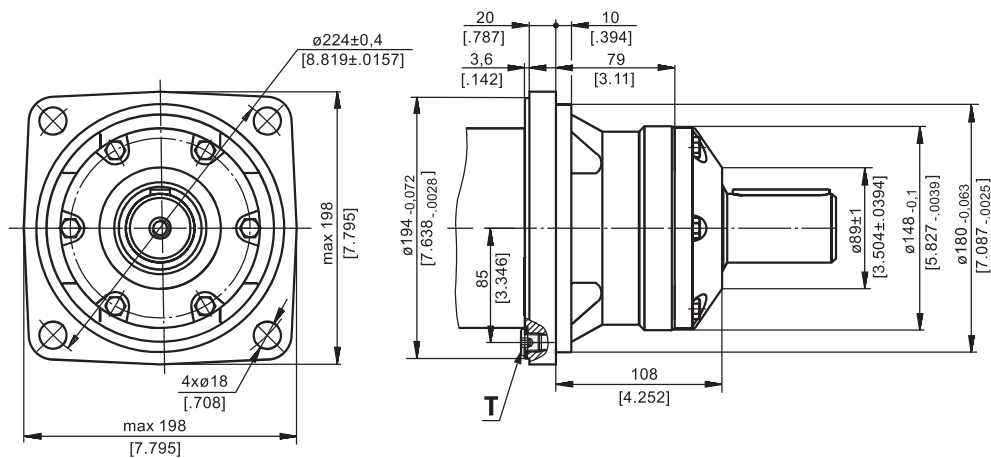
Square Mount (4 Holes)



C SAE C Mount

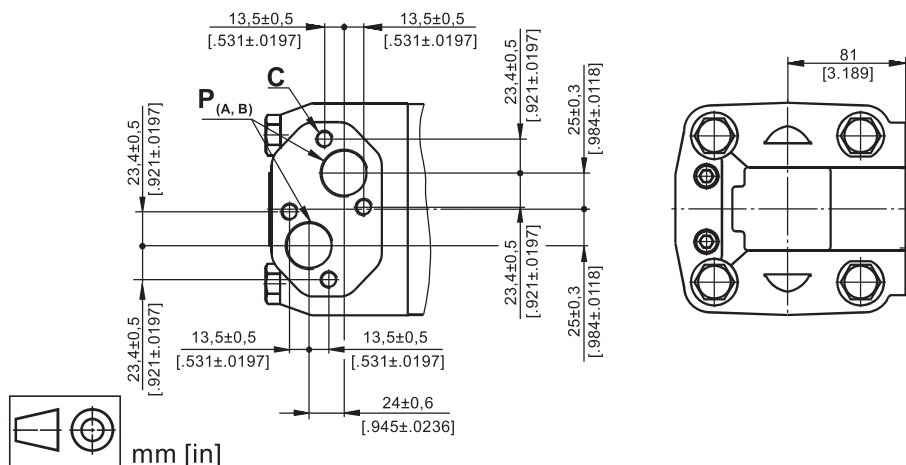


W Wheel Mount



PORTS

Side Ports



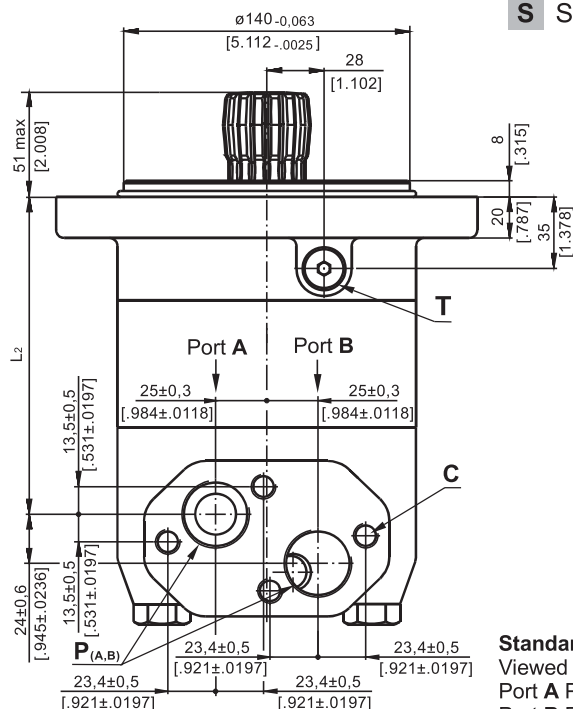
- C:** 4xM12 - 12 mm [0.47 in] depth
- P_(A,B):** 2xG1 - 20 mm [0.79 in] depth
- T:** G 1/4 - 12 mm [0.47 in] depth

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**

DIMENSIONS AND MOUNTING

S Short Mount



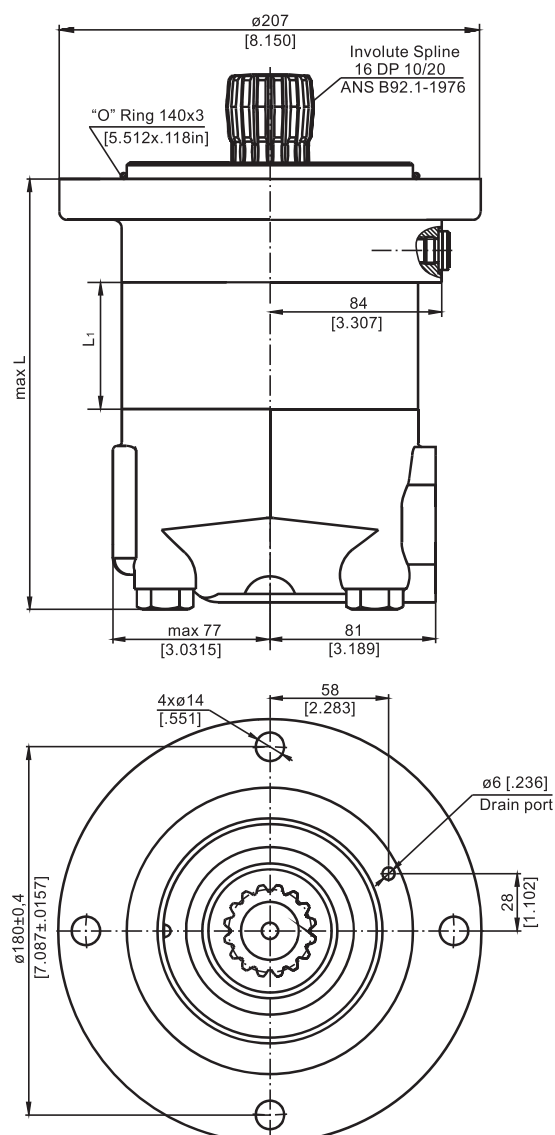
C: 4xM12 - 12 mm [.47 in] depth
P_(A,B): 2xG1 - 20 mm [.79 in] depth
T: G 1/4 - 12 mm [.47 in] depth

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

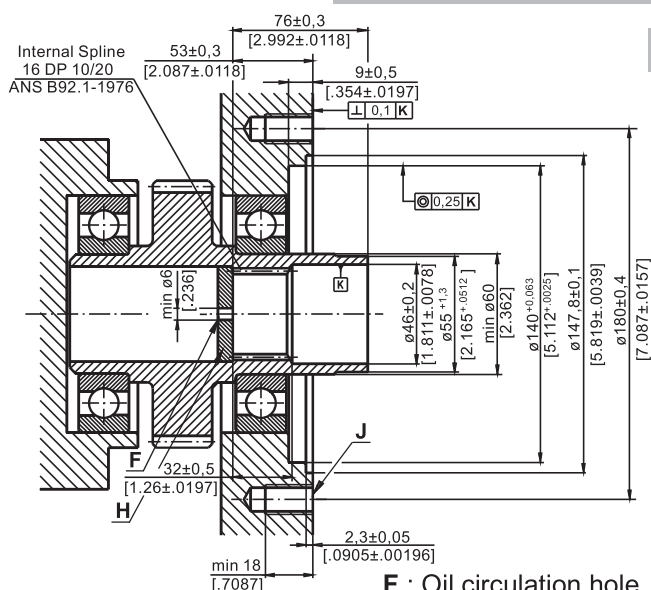
Reverse Rotation
 Viewed from Shaft End
 Port A Pressurized - CCW
 Port B Pressurized - CW

Type	L, mm [in]	L ₂ , mm [in]	*L ₁ , mm [in]
MVS 315	171[6.73]	117[4.61]	22,0 [0.87]
MVS 400	179[7.05]	124[4.88]	29,0 [1.14]
MVS 500	186[7.32]	132[5.20]	37,0 [1.46]
MVS 630	197[7.76]	143[5.63]	47,5 [1.87]
MVS 800	211[8.31]	157[6.18]	61,5 [2.42]

* The width of the roll-gerotor is 4 mm [.157 in] greater than L₁.

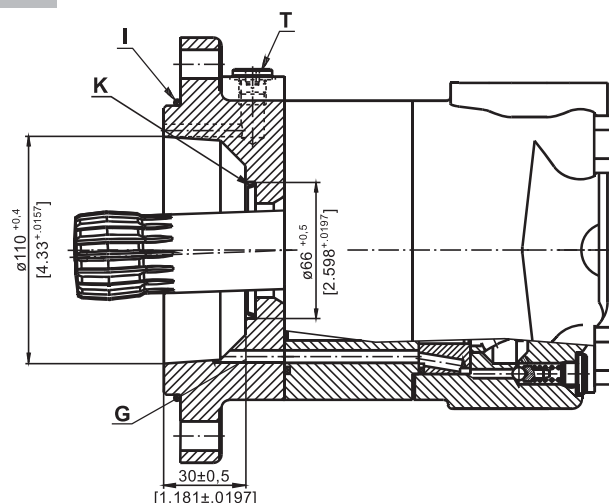


DIMENSIONS OF THE ATTACHED COMPONENT



F: Oil circulation hole
G: Internal drain channel
H: Hardened stop plate
I: O-Ring 140x3mm [5.512x.118in]

MVS

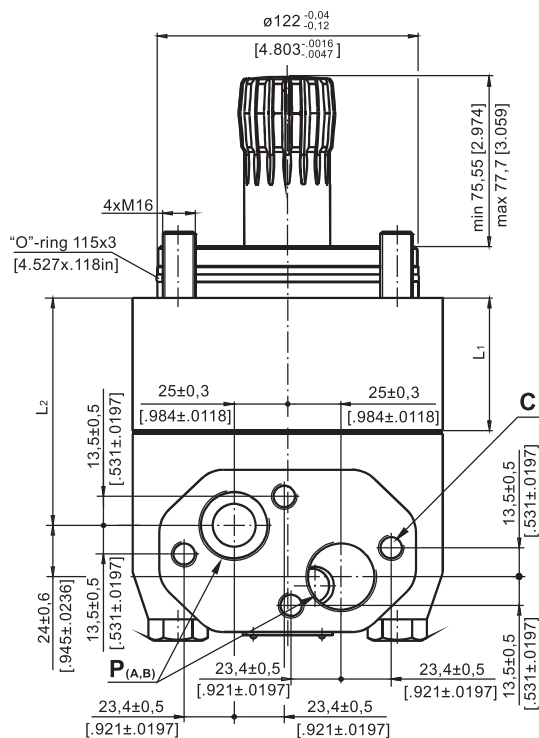


J: 4xM12-18 mm [.709 in] depth, 90°
K: Conical seal ring
T: Drain connection G1/4 - 12 mm [.47 in] depth



DIMENSIONS AND MOUNTING

V Very Short Mount

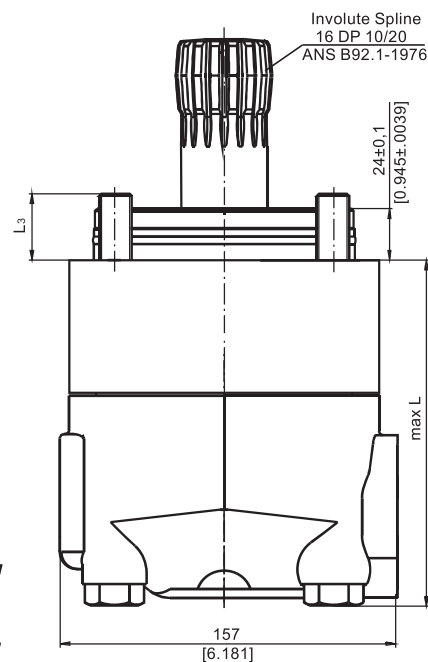


C: 4xM12 - 12 mm [.47 in] depth

P_(A,B): 2xG1 - 20 mm [.79 in] depth

Type	L, mm[in.]	L2, mm [in.]	L3, mm [in.]	*L1, mm [in.]
MVV 315	121,5[4.78]	68[2.68]	29,5[1.16]	22,0 [0.87]
MVV 400	128,5[5.06]	75[2.95]	32,5[1.28]	29,0 [1.14]
MVV 500	136,5[5.37]	83[3.27]	34,5[1.36]	37,0 [1.46]
MVV 630	147,0[5.79]	93[3.66]	34,0[1.34]	47,5 [1.87]
MVV 800	161,0[6.34]	107,5[4.23]	30,0[1.18]	61,5 [2.42]

* The width of the roll-gerotor is 4 mm [.157 in] greater than L1.



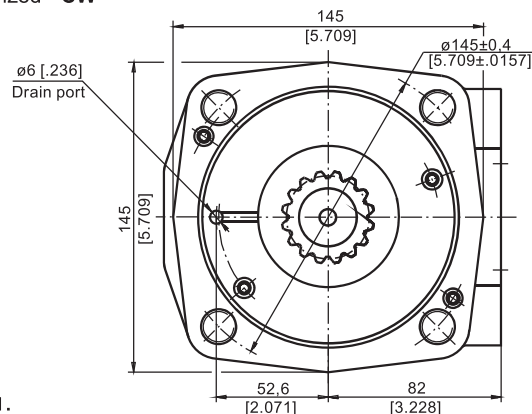
Standard Rotation

Viewed from Shaft End

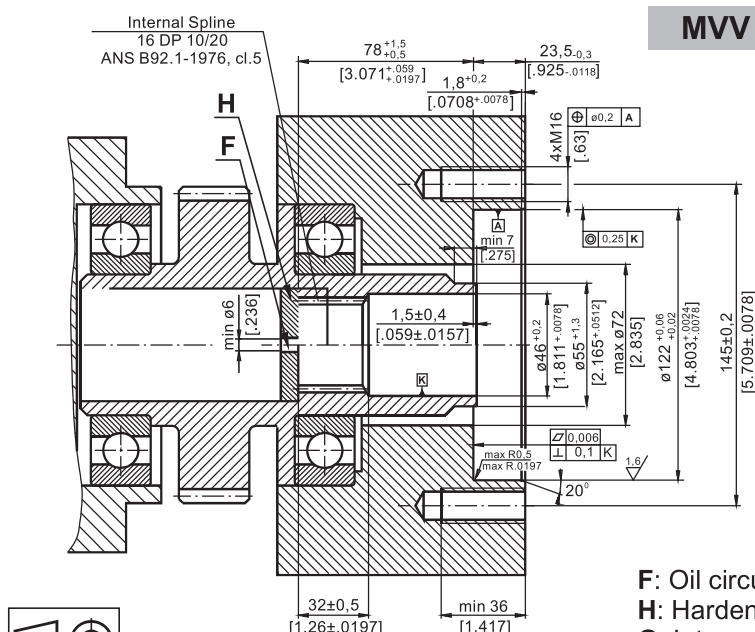
Port **A** Pressurized - **CW**Port **B** Pressurized - **CCW**

Reverse Rotation

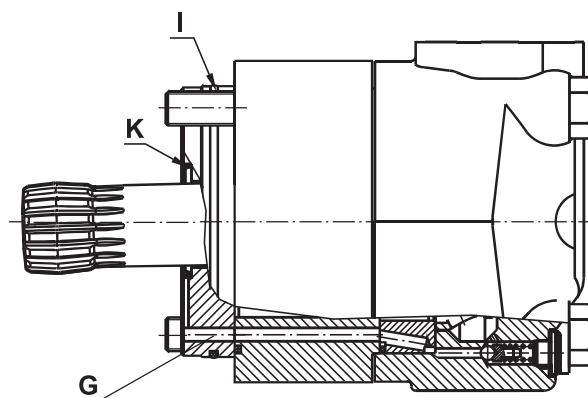
Viewed from Shaft End

Port **A** Pressurized - **CCW**Port **B** Pressurized - **CW**

DIMENSIONS OF THE ATTACHED COMPONENT



MVV



F: Oil circulation hole
H: Hardened stop plate
G: Internal drain channel

I: O- Ring 115x3mm [4.527x.118in]
K: Conical seal ring

DRAIN CONNECTION

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

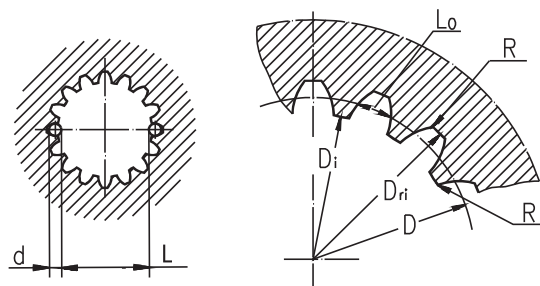
- For MVS to the drain port of the motor;
- For MVV to the drain connection of the attached component. The maximum pressure in the drain line is limited by the attached component and its shaft seal.

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=2.54; corrected x.m=+1,0*]

Fillet 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.	D _{ri}	45,2 ^{+0,4}	1.796÷1.780
Minor Dia.	D _i	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



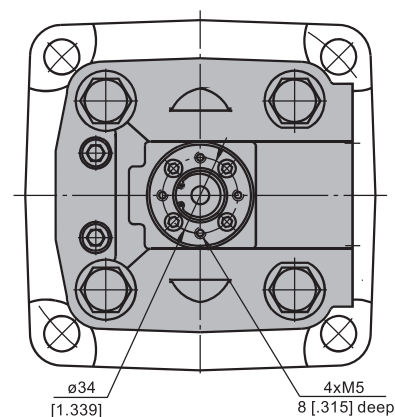
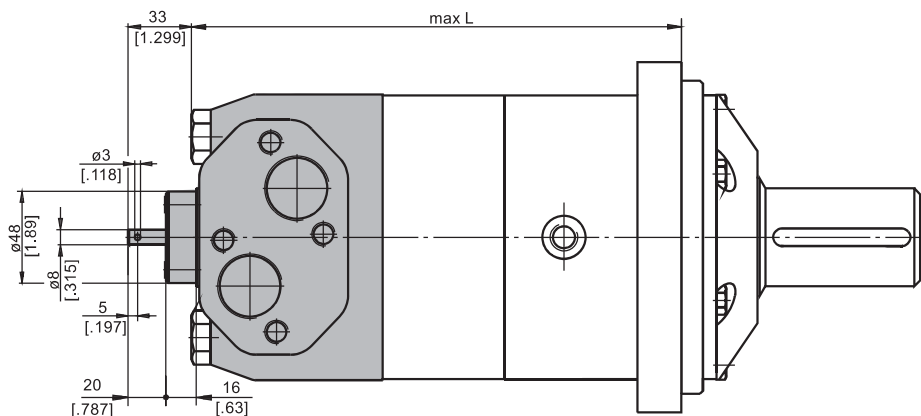
Hardening Specification:

HV=750±50 on the surface.

HV=560 at 0,7±0,2 mm [.035±.019in] case depth

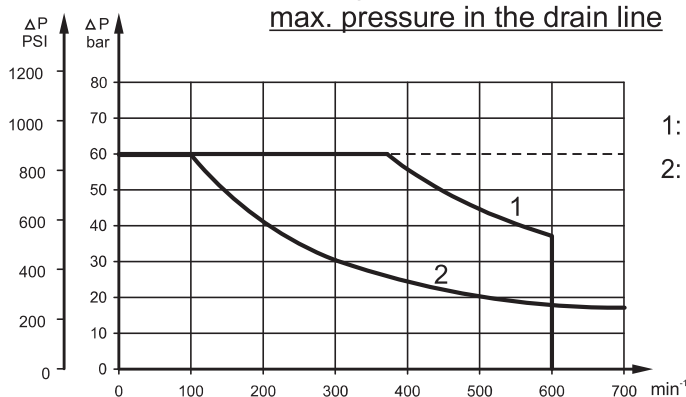
Material: 20 MoCr4 EN 10084 or better.

MOTOR WITH TACHO CONNECTION



MAX. PERMISSIBLE SHAFT SEAL PRESSURE for MV motors

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



1: Drawing for High Pressure Seal ("U" Seal)

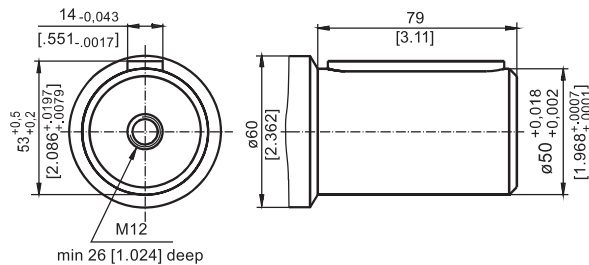
2: Drawing for Standard Shaft Seal

— - continuous operations
- - - - intermittent operations

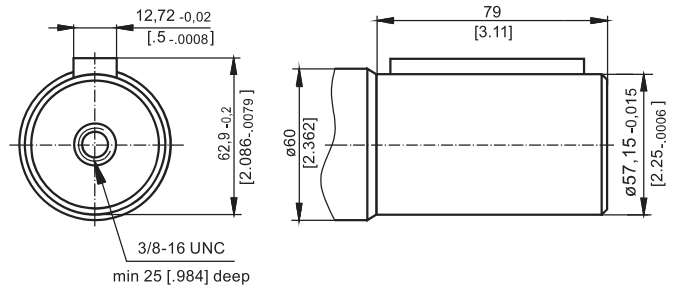


SHAFT EXTENSIONS

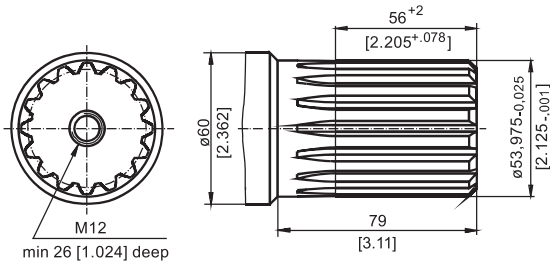
C - $\varnothing 50$ straight, Parallel key A14x9x70 DIN 6885



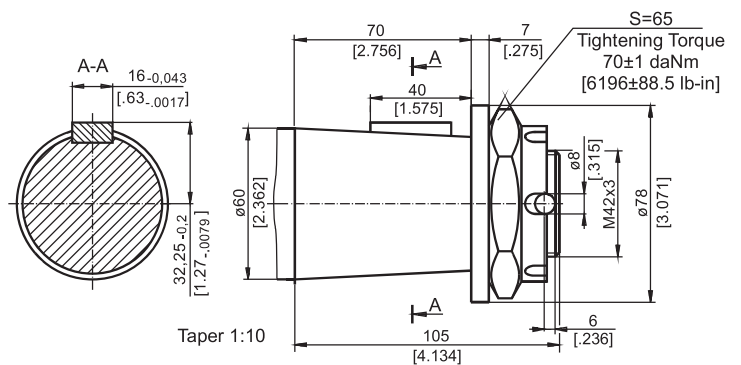
CO - $\varnothing 2\frac{1}{4}$ " [57,15] straight, Parallel key $\frac{1}{2}$ " x $\frac{1}{2}$ " x $2\frac{1}{4}$ " BS46



SH - $\varnothing 2\frac{1}{8}$ " splined, 16 DP 8/16 ANS B92.1-1976



K - tapered 1:10, Parallel key B16x10x32 DIN 6885



ORDER CODE

	1	2	3	4	5	6
M V						

Pos. 1 - Mounting Flange

omit - Square mount, four holes

C - SAE C mount

W - Wheel mount

S - Short mount

V - Very short mount

Pos. 2 - 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. 3 - Shaft extensions*

omit - for **S** and **V** mounting flange

C - $\varnothing 50$ straight, Parallel key A14x9x70 DIN6885

CO - $\varnothing 2\frac{1}{4}$ " straight, Parallel key $\frac{1}{2}$ " x $\frac{1}{2}$ " x $2\frac{1}{4}$ " BS46

SH - $\varnothing 2\frac{1}{8}$ " splined, ANS B92.1-1976

K - $\varnothing 60$ tapered 1:10, Parallel key B16x10x32 DIN6885

Pos. 4 - Shaft Seal Version (see page 49)

omit - Low pressure shaft seal

U - High pressure shaft seal

Pos. 5 - Special Features (see page 51)

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.

MOTOR SPECIAL FEATURES

Special Feature Description	Order Code	Motor type		
		MS	MT	MV
Speed Sensor*	RS	O	O	O
Tacho Connection**	T	O	O	O
Reinforced motor	HD	-	O	O
Low Leakage	LL	O	O	O
Low Speed Valving	LSV	O	O	O
Reverse Rotation	R	O	O	O
Paint***	P	O	O	O
Corrosion Protected Paint***	PC	O	O	O
Special Paint****	PS	O	O	O
	PCS			
Check Valves		S	S*****	S*****

O	Optional
-	Not applicable
S	Standard

* For sensor ordering see pages 52÷53.

** For side ports only!

*** Colour at customer's request.

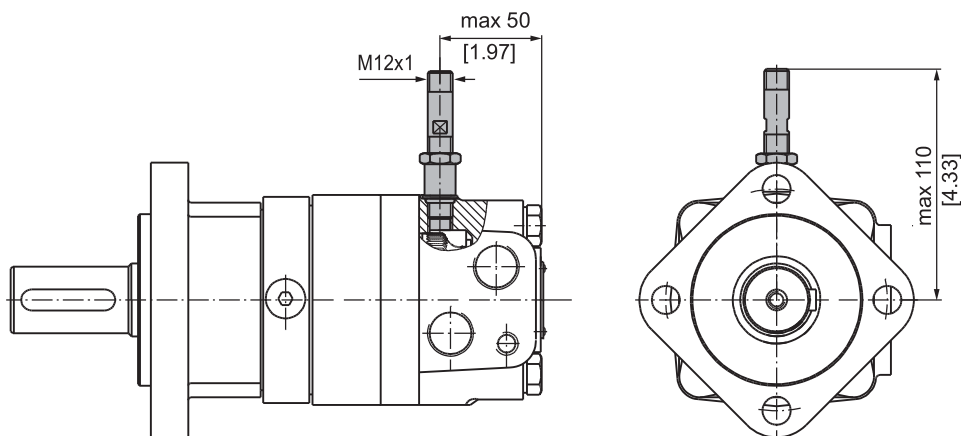
**** Non painted feeding surfaces, colour at customer's request.

***** Without check valves for "HD" option.

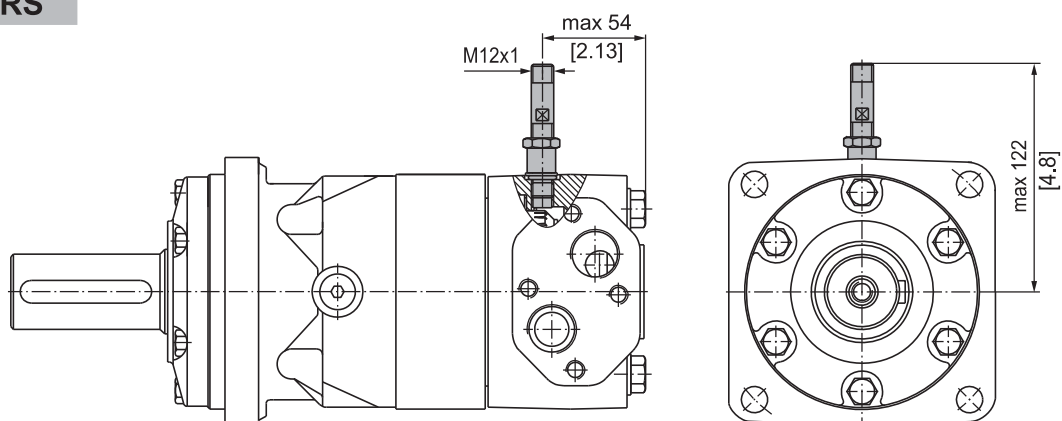
⚠ For more information about HD option please contact with "M+S Hydraulic".

MOTORS WITH SPEED SENSOR

MS...RS



MT...RS



MV...RS

