Rineer High Torque Vane Motor MV125 Series Technical Data Sheet

- Maximum operating pressure:
  - Code 61: 3000 psi (207 bar)
  - Code 62: 4500 psi (310 bar)

Features

- Ideal for medium speed, high torque applications requiring reliability in a small size
- High power to weight ratio
- 2-port single rotary groups ranging from 60 in^3 to 125 in^3 (983 cc to 2048 cc)
- 2-port double rotary groups ranging from 150 in^3 to 250 in^3 (2458 cc to 4097 cc)
- 4-port double rotary groups ranging from 120 in^3 to 250 in^3 (1966 cc to 4097 cc), capable of two- or three-operation with external valving
- High torque at start and stall, up to 92% of the theoretical value
- Continuous operating speeds of up to 350 RPM
- Available with up to 788 HP (588 kW)
- Available with optional through-hole shaft
- Customizable for direct drive applications
- High reliability in demanding applications
- Long service life
- Support and spare parts available for repairs

Overview of contents

Ordering code

01		02		03		04		05		06		07	08	09		10	
MV125	**–**	**A2**	**–**	**1S**	**–**	**125**	**–**	**30**	**–**	**B1**	**–**	**T**	**B**	**B**	**–**	**000**	

01	**Motor Series**	**MV125**

Port Options – Rear port orientation can be specified. Consult factory.

02	**Code 61 – 3000 psi maximum operating pressure**	
	1-1/2" 4 – bolt flange, 2-port	**A2**
	1-1/2" 4 – bolt flange, 4-port	**A4**
	SAE 24 – 3000 psi maximum operating pressure	
	O-ring boss, 2-port	**C2**
	Code 62 – 4500 psi maximum operating pressure	
	1-1/4" 4 – bolt flange, 2-port	**H2**
	1-1/4" 4 – bolt flange, 4-port	**H4**

Rotary Group Designation

03	Code 61 – standard speed	**1S**
	Code 62 – standard speed	**2S**

Displacement Options

04	**2-port, single rotating group**	
	60 in^3 (983 cc)/rev.	**060**
	68 in^3 (1114 cc)/rev.	**068**
	82 in^3 (1344 cc)/rev.	**082**
	98 in^3 (1606 cc)/rev.	**098**
	113 in^3 (1852 cc)/rev.	**113**
	125 in^3 (2048 cc)/rev.	**125**
	2-port, double rotating group	
	150 in^3 (2458 cc)/rev. – 68/82 rotating groups	**150**
	164 in^3 (2687 cc)/rev. – 82/82 rotating groups	**164**
	180 in^3 (2950 cc)/rev. – 82/98 rotating groups	**180**
	193 in^3 (3163 cc)/rev. – 68/125 rotating groups	**193**
	195 in^3 (3195 cc)/rev. – 82/113 rotating groups	**195**
	196 in^3 (3212 cc)/rev. – 98/98 rotating groups	**196**
	211 in^3 (3458 cc)/rev. – 98/113 rotating groups	**211**
	226 in^3 (3703 cc)/rev. – 113/133 rotating groups	**226**
	250 in^3 (4097 cc)/rev. – 125/125 rotating groups	**250**
	4-port, double rotating group	
	120 in^3 (1966 cc)/rev. – 60/60 rotating groups, suitable for series/parallel circuit	**120**
	128 in^3 (2098 cc)/rev. – 60/68 rotating groups, requires logic circuit for operation as a two or three speed	**128**
	136 in^3 (2229 cc)/rev. – 68/68 rotating groups, suitable for series/parallel circuit	**136**
	150 in^3 (2458 cc)/rev. – 68/82 rotating groups, requires logic circuit for operation as a two or three speed	**150**
	164 in^3 (2687 cc)/rev. – 82/82 rotating groups, suitable for series/parallel circuit	**164**
	180 in^3 (2950 cc)/rev. – 82/98 rotating groups, requires logic circuit for operation as a two or three speed	**180**
	196 in^3 (3212 cc)/rev. – 96/96 rotating groups, suitable for series/parallel circuit	**196**
	226 in^3 (3707 cc)/rev. – 113/113 rotating groups, requires logic circuit for operation as a two or three speed	**226**
	250 in^3 (4097 cc)/rev. – 125/125 rotating groups, suitable for series/parallel circuit	**250**

Motors assembled with largest displacement rotating group closest to front housing. Additional combinations may be available. Consult your Rineer representative.

Ordering code

01		02		03		04		05		06		07	08	09		10	
MV125	**–**	**A2**	**–**	**1S**	**–**	**125**	**–**	**30**	**–**	**B1**	**–**	**T**	**B**	**B**	**–**	**000**	

Shaft Selection

05	Keyed	**30**
	Splined	**31**
	Shaftless for direct mount	**33**
	Keyed shaft out front and rear	**34**
	Internally keyed	**35**
	Internally splined	**36**
	Shaftless for use with customer supplied shaft	**37**
	Hollow shaft with API internal flush threads	**53**

Bearing Selection

06	See shaft and bearing combinations for availability (page 4)	

Shaft Seal (see page 10)

07	TCN (radial lip seal)	**T**
	PolyPak (O-ring loaded U-cup seal)	**P**
	Disogrin (U-cup seal)	**D**
	No shaft seal	**0**

Main Body O-rings (see page 9 for seal material specifications)

08	NBR (Buna) – not available in Code 62	**B**
	FKM (Viton) – optional for Code 61, required for Code 62	**V**

Pedestal O-rings (see page 9 for seal material specifications)

09	NBR (Buna) – standard for Code 61, not available for Code 62	**B**
	FKM (Viton) – optional for Code 61, not available for Code 62	**V**
	Disogrin – required for Code 62	**D**

Special Index Number

10	Standard design – special features are designated with a three-digit code (consult your Rineer representative)	**000**

Ordering code

Shaft and bearing combinations

Code 61, 2-port, single rotating group

	30	31	33	34	35	36
B1	●	●	—	●	—	—
B2	—	—	●	—	●	●
T1	—	○	—	●	—	—

Code 61, 2-port, double rotating group

	30	31	33	34	35
B1	●	●	—	●	—
B2	—	—	●		●

Code 61, 4-port, double rotating group

	30	31
B1	●	●

SAE 24, 2-port, single rotating group

	30	31	34	35	36
B1	●	○	●	—	—
B2	—	—	—	●	●

Code 62, 2-port, single rotating group

	31	33	36	53
B1	●	—	—	—
B2	—	○	—	—
T1	●	—	—	●
T4	—	—	●	—

Code 62, 2-port, double rotating group

	31	53
T1	●	●

Code 62, 4-port, double rotating group

	30
B1	○
T1	●

● = available ○ = upon request — = not available

Note: Other shaft and bearing combinations may be available. Consult your Rineer representative.

Ordering code

Weights

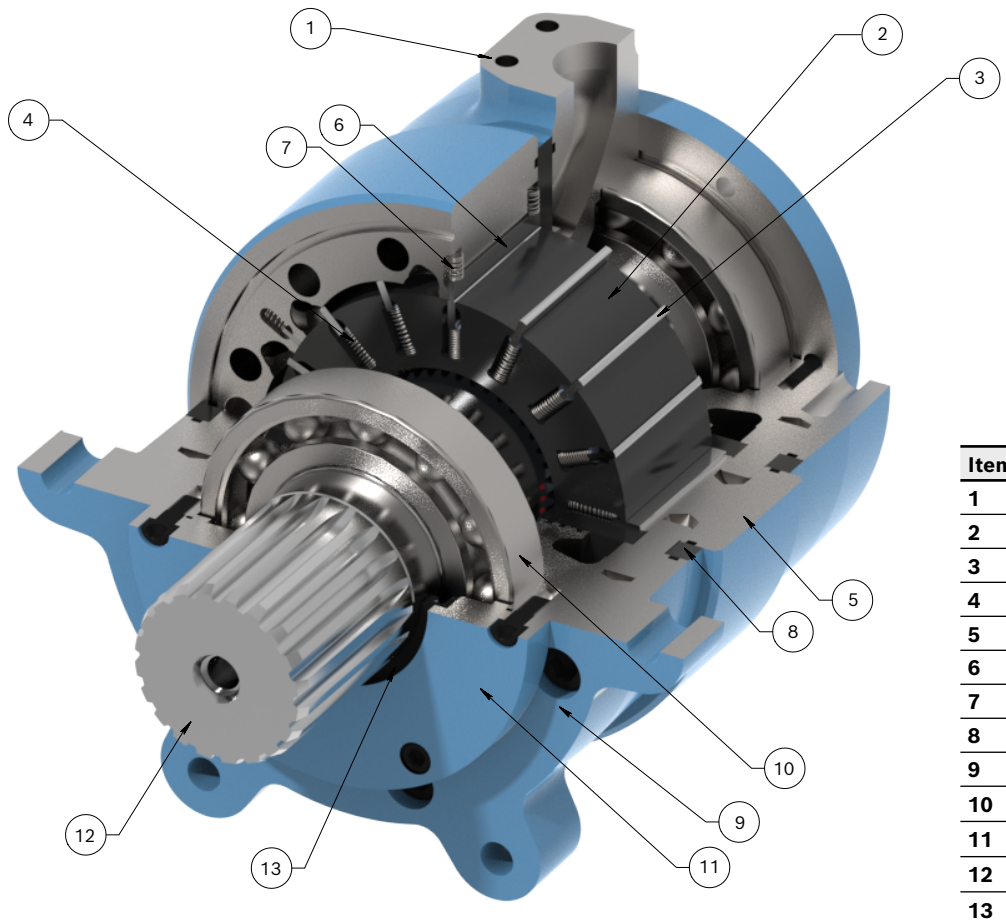
Type of motor	lbs.	kg
Code 61, 2-port	228	104
Code 61, 2-port, 33 shaft	181	82
Code 61, 2-port, 34 shaft	243	110
Code 61, 2-port, 35 & 36 shaft	203	92
Code 61, 2-port, double stack	306	139
Code 61, 2-port, double stack, 33 shaft	248	112
Code 61, 2-port, double stack, 34 shaft	322	146
Code 61, 2-port, double stack, 35 shaft	275	125
Code 61, 4-port	366	166
SAE 24, 2-port	229	104
SAE 24, 2-port, 34 shaft	245	111
SAE 24, 2-port, 35 & 36 shaft	208	94
Code 62, 2-port	287	130
Code 62, 2-port, 33 shaft	233	106
Code 62, 2-port, 36 shaft	261	119
Code 62, 2-port, 53 shaft	280	127
Code 62, 2-port, double stack	384	174
Code 62, 2-port, double stack, 53 shaft	344	156
Code 62, 4-port	372	169

Technical data

The MV125 series motors are hydraulically balanced internally. No significant radial loads are self-induced on the motor bearings, contributing to a long service life, and the ability to run at maximum speed and torque simultaneously. The motor can be configured with various bearing options to accommodate external radial and axial loading. This data sheet details standard configurations (see Figure 1), but custom, application-specific solutions may be available. Please consult your Rineer representative.

Oil supply lines are connected to ports A and B on 2-port, single and double rotating group motors (Figure 2 and 3), and to A1, A2, B1and B2 on 4-port, double rotating group motors (Figure 4). Case drain lines should be installed on the C1 or C2 port. Reference motor unit drawings beginning on page 18 for additional case line locations and Case Drain section on page 10 for details.

Using the “A” port(s) as the inlet will provide clockwise shaft rotation as seen from the front of the shaft. Using the “B” port(s) will provide counterclockwise shaft rotation also seen from the front of the shaft (see Figures 2, 3, and 4).



Item No.	Description
1	Rear Housing
2	Rotor
3	Rotor Vane
4	Rotor Vane Spring
5	Stator
6	Stator Vane
7	Stator Vane Spring
8	Distributor Plate
9	Front Housing
10	Bearing
11	Seal Plate
12	Shaft
13	Shaft Seal

Figure 1. Basic parts list

Technical data

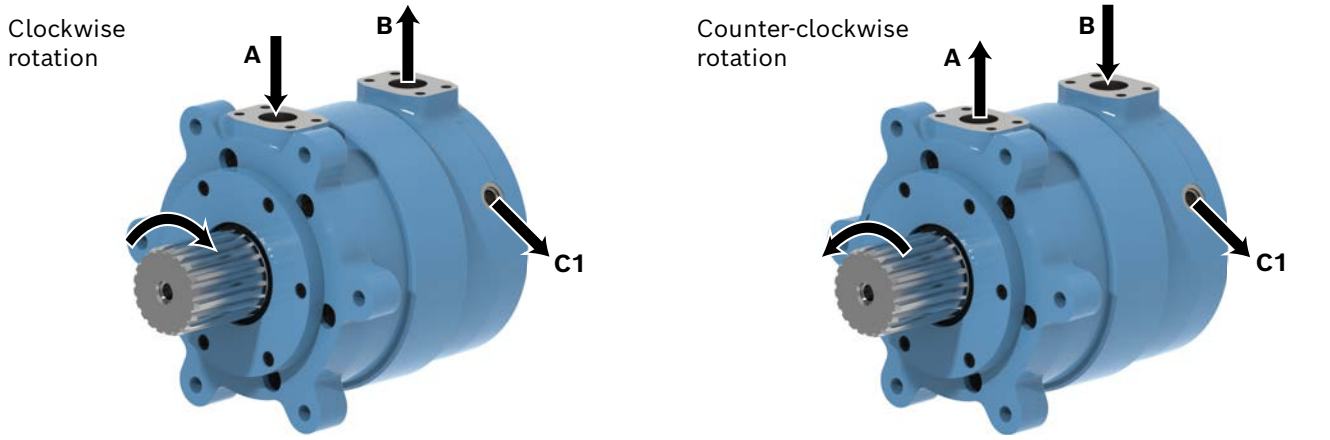


Figure 2. Oil flow direction to establish clockwise and counter-clockwise rotation on 2-port configuration motors.

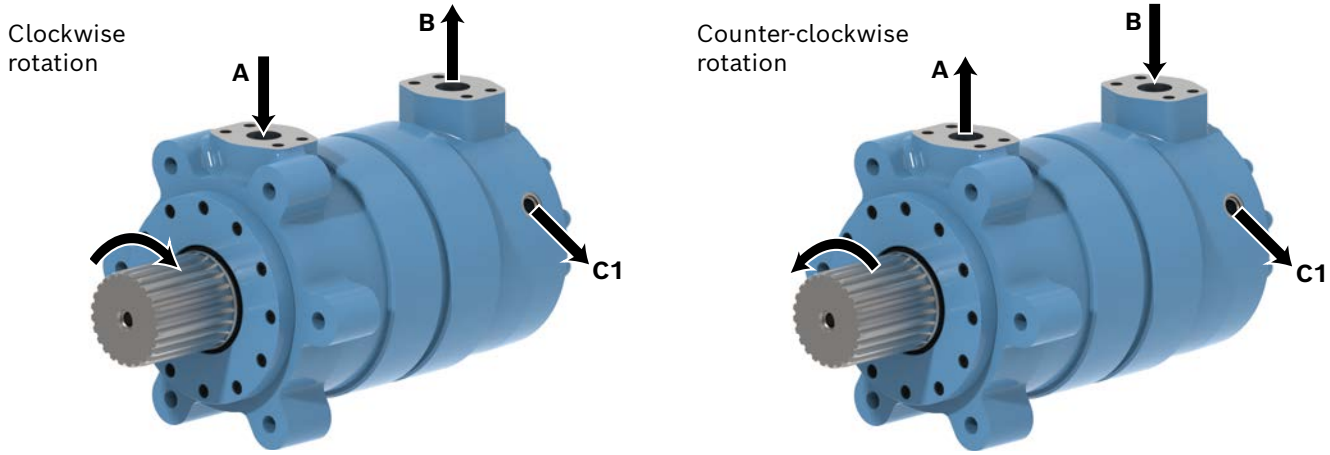


Figure 3. Oil flow direction to establish clockwise and counter-clockwise rotation on 2-port double stack configuration motors.

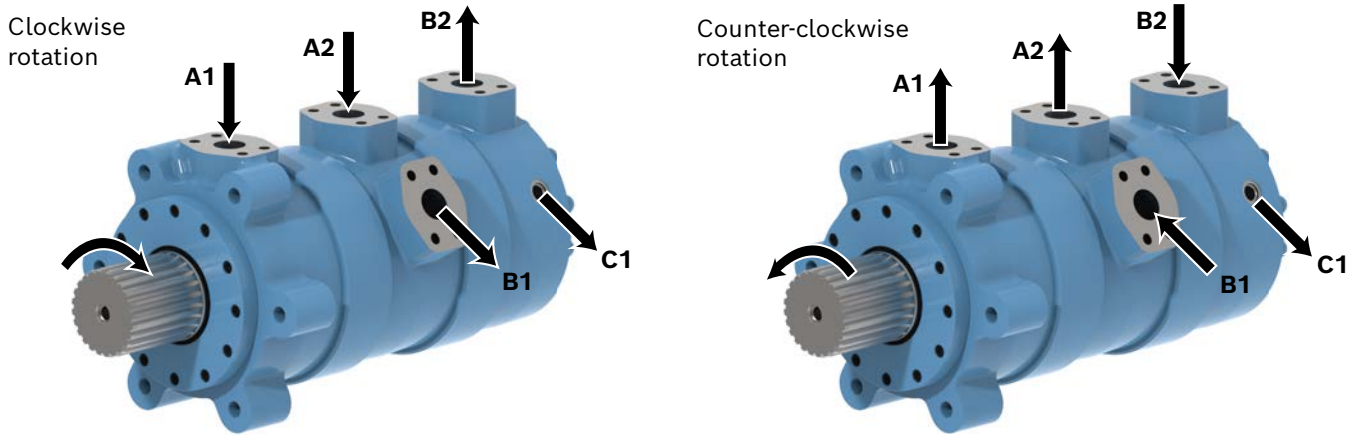


Figure 4. Oil flow direction to establish clockwise and counter-clockwise rotation on 2-port double stack configuration motors

Technical Data

Motor specifications

Standard Series Code 61	Displacement		Pressure				Speed		Torque @ 3000 psid (207 bar)*	
	(in^3/rev)	(cm^3/rev)	Continuous		Intermittent		Continuous	Intermittent	Continuous	
			(psi)	(bar)	(psi)	(bar)	(rpm)	(rpm)	(lb-ft)	(Nm)
MV125-A,C	60	983	3000	207	3500	241	350	400	2188	2967
	68	1114					350	400	2507	3399
	82	1344					300	350	3024	4100
	98	1606					300	350	3589	4866
	113	1852					300	350	4130	5600
	125	2048					300	350	4602	6239

High Performance Series Code 62	Displacement		Pressure				Speed		Torque @ 4500 psid (310 bar)*	
	(in^3/rev)	(cm^3/rev)	Continuous		Intermittent		Continuous	Intermittent	Continuous	
			(psi)	(bar)	(psi)	(bar)	(rpm)	(rpm)	(lb-ft)	(Nm)
MV125-H	60	983	4500	310	5000	345	350	400	3282	4450
	68	1114					350	400	3761	5099
	82	1344					300	400	4536	6150
	98	1606					300	400	5383	7298
	113	1852					300	400	6194	8398
	125	2048					300	400	6903	9359

* Torque values are average performance data measured at maximum speeds with 100 SUS (20 cSt) and standard rotating group.

Note:

1. When considering 2-port double stack or 4-port motors, any two displacements can be combined. The resultant torque is the sum of the two (2) displacements.
2. Maximum speed is limited by the highest displacement selected.
3. Intermittent duty cycle is six (6) seconds per minute.
4. Higher speeds or pressure may be permissible under certain conditions. Consult your Rineer representative.

Technical data

Choice of hydraulic fluid
Bosch Rexroth Rineer high torque vane motors are primarily designed to operate on conventional petroleum based hydraulic oils. The hydraulic oil can be chosen in consultation with the oil supplier or your local sales office, bearing the following requirements in mind:

General
The oil shall have FZG (90) fail stage minimum 11 described in IP 334 (DIN 51354). The oil must also contain inhibitors to prevent oxidation, corrosion and foaming. The viscosity of mineral oil is highly dependent on the temperature. The final choice of oil must depend on the operating temperaturethat can be expected at the motor or that has been established in the system and not in the hydraulic tank.

High temperatures in the system greatly reduce the service life of oil and rubber seals, as well as resulting in low viscosity, which in turn provides poor lubrication. Content of water shall be less than 0.1%.

Oil used in the system should be filtered by a minimum of 25-micron filter.

Fluid Cleanliness

System Pressure	
< 3000 psi / 207 bar	> = 3000 psi / 207 bar
19/17/14*	18/16/13

* ISO 4406 Standard

Viscosity

Minimum Operating Viscosity	100 SSU / 20 cSt
Maximum Operating Viscosity	250 SSU / 54 cSt

Minimum operating viscosities must be met even at maximum temperature. Operating below 20 cSt will result in reduced life expectancy.

Maximum fluid temperature should not exceed 180 °F (82 °C).

Please consult your Rineer representative when using fire resistant fluid, water glycols, biodegradable fluids, or viscosities outside above recommendations.

Seals
Buna N (NBR)
Temperature Range:
–65 °F to +250 °F (–54 °C to +121 °C)

Buna N is a copolymer of butadiene and acrylonitrile with excellent compatibility with petroleum products. For exposure in low temperatures it is necessary to sacrifice some high temperature resistance. The product is superior in compression set, cold flow, tear, and abrasion resistance. Inferior in resistance to ozone, sunlight or weather. It is generally recommended for petroleum, water, diester, and water-glycol. Not recommended for use with halogenated hydrocarbons, phosphate ester, ketones, acids, and brake fluids.

Fluorocarbon (FKM) (Viton)
Temperature Range:
–20 °F to +350 °F (–29 °C to +177 °C)

Viton is a linear copolymer of vinylidene fluoride and hexafluoro propylene which offers the widest temperature range and chemical resistance. The product is compatible and recommended for use with most fluids and gases such as petroleum, silicate ester, diester, halogenated hydrocarbons, and most phosphate esters. Viton has very good ozone, weather and aging resistance. It is not recommended for ketones, glycol-based brake fluids, superheated steam, formic and acetic acids.

Disogrin (TODI/Polyurethane)
Temperature Range:
–54 °F to +230 °F (–48 °C to +110 °C)

Disogrin is a high performance polyurethane. This compound is primarily used on O-rings for heavy duty applications and possesses extremely high mechanical properties, offering outstanding resistance to abrasion, tear and extrusion over a large range of temperatures. It has high temperature stability resulting in very low compression set required for sealing ensuring maximum service life. It is suitable for use with petroleum based fluids and some biodegradable (synthetic and natural Ester) fluids.

Technical data

Bosch Rexroth Rineer offers two types of rotary seals, namely a lip seal and quad ring seal designs in both NBR and FKM materials. Radial lip seals accommodate external radial loads imposed on the shaft and higher speeds to a greater degree than quad seal designs. Both designs will accommodate axial loading on the shaft. Heat failure of the material is the most common failure mode for a rotary seal. Reducing the friction at the shaft / seal interface is the most effective method of reducing heat buildup on the seal. The higher the pressure to be sealed combined with high shaft speeds results in increased friction (heat buildup), decreasing seal life.

Properly performing rotary seals offer unique challenges. Our seals operate with an oil film under the seal / shaft contact area that separates the two surfaces reducing surface wear and providing cooling to the contact area. Slippage oil which by-passes the vanes, rotor and timing plate interface accumulates in the case and lubricates the bearings and seals.

Shaft seal options

Seal Type	Maximum Case Pressure	External Loading
Radial Lip Seal	35 psig (2.4 bar)	Radial / Axial
PolyPak	100 psig (6.9 bar)	Low Radial / Axial
Disogrin	100 psig (6.9 bar)	Low Radial / Axial
No Shaft Seal	500 psig (35 bar)	N/A

When the motor is mated to a gearbox, bearing box, or overhung load adapter, it is possible to specify the motor to have no shaft seal which would allow motor case flow to flush the companion component. In this instance, the driven component must have a case connection to allow flow back to tank at a pressure low enough for the rating of its shaft seal.

Case Drain

The 125 Series motors **REQUIRE** an external case drain of sufficient size to prevent back pressure in excess of 35 psi (2.4 bar) for radial lip seals or 100 psi (6.9 bar) for Disogrin and Polypak seals. The case drain line must be run to the reservoir with minimum restriction as to not exceed the rated capacity of the seals, and any unused case drain ports must be plugged. Never plug all case drain ports as this will cause buildup of pressure in the motor case and blow out the shaft seal. The case drain line should return directly to the reservoir below the surface of the oil, and as far away as possible from the pump suction line. Refer to the unit drawings for case drain port locations. Use of the case drain port at the highest elevation is recommended.

Thermal Shock

Consideration to cold temperature environments must be provided in the event that a temperature differential exists between the motor and the system in excess of 50 °F (28 °C). Contact a Bosch Rexroth Rineer representative if this is a possibility. In cold temperature environments it may be necessary to warm up the oil in the hydraulic system before the system is used. Typically the warm up is limited to the oil, the pump and directional control valve; leaving other components in the circuit such as the motor cold. When a directional control valve is shifted, the warm oil in the hydraulic system flows through a cold motor resulting in a non-uniform expansion of the internal parts of the motor which may lead to galling and component failure. Low pressure oil can be circulated through the motor case at a maximum flow rate of 3 gpm (11 lpm) or idled at low speed of 20 rpm maximum until the motor temperature is within 50 °F (28 °C) or less than system oil temperature.

Technical data

Selecting / Sizing a Motor

Motor selection is dependent on the application and generally the required horsepower, motor speed range, and available supply pressure are to be defined. Alternatively desired output torque and speed for a given application can be used. Motor speed (shaft speed) is a function of flow delivered to the motor and displacement. Torque output is a function of differential pressure and motor displacement. The charts illustrated are based on actual performance data and account for losses in a given motor.

For example:
An application requirement is 136 hp (101.4 kW) at 200 rpm with an available supply pressure of 3200 psi (221 bar) and a return line pressure of 200 psi (14 bar). The pressure differential is 3000 psi (207 bar).

Calculations:

Theoretical torque (ideal no losses):

Metric:

$$T = \frac{P \times 9549.09}{n} = \frac{101.4 \times 9549.09}{200} = \sim 4841 \text{ N-m}$$

U.S.:

$$T = \frac{P \times 5252}{n} = \frac{136 \times 5252}{200} = \sim 3571 \text{ lb-ft}$$

Theoretical displacement (ideal no losses):
for condition T = 4841 N-m (T = 3571 lb-ft)

Metric:

$$d = \frac{T \times 62.81}{p} = \frac{4841 \times 62.81}{207} = \sim 1469 \text{ cc}$$

U.S.:

$$d = \frac{T \times 75.4}{p} = \frac{3571 \times 75.4}{3000} = \sim 89 \text{ in}^3$$

Referencing the chart *"Torque 98 in³ (1606 cc)"*
A 98 in³ (1606 cc) displacement motor at a pressure 3000 psid (207 bar) will develop torque of approximately 3589 lb-ft (4866 N-m).

Referencing the chart *"Total Required Flow 98 in³ (1606 cc)"*
A 98 in³ (1606 cc) displacement motor at a pressure of 3000 psid (207 bar) operating at 200 rpm will require a total flow of approximately 97 gpm (367 lpm).

Nomenclature

Symbol	Measureable Quantity	U.S.	Metric
d	Displacement	in^3 or $\frac{in^3}{rev}$	cc or $\frac{cm^3}{rev}$
Q	Flow	gpm or $\frac{gal}{min}$	lpm or $\frac{liters}{min}$
n	Shaft Speed	rpm or $\frac{revolutions}{min}$	rpm or $\frac{revolutions}{min}$
P	Power	hp	kW
Δp	Differential pressure	psid	bar
T	Torque	lb-ft	N-m

Calculation Fundamentals

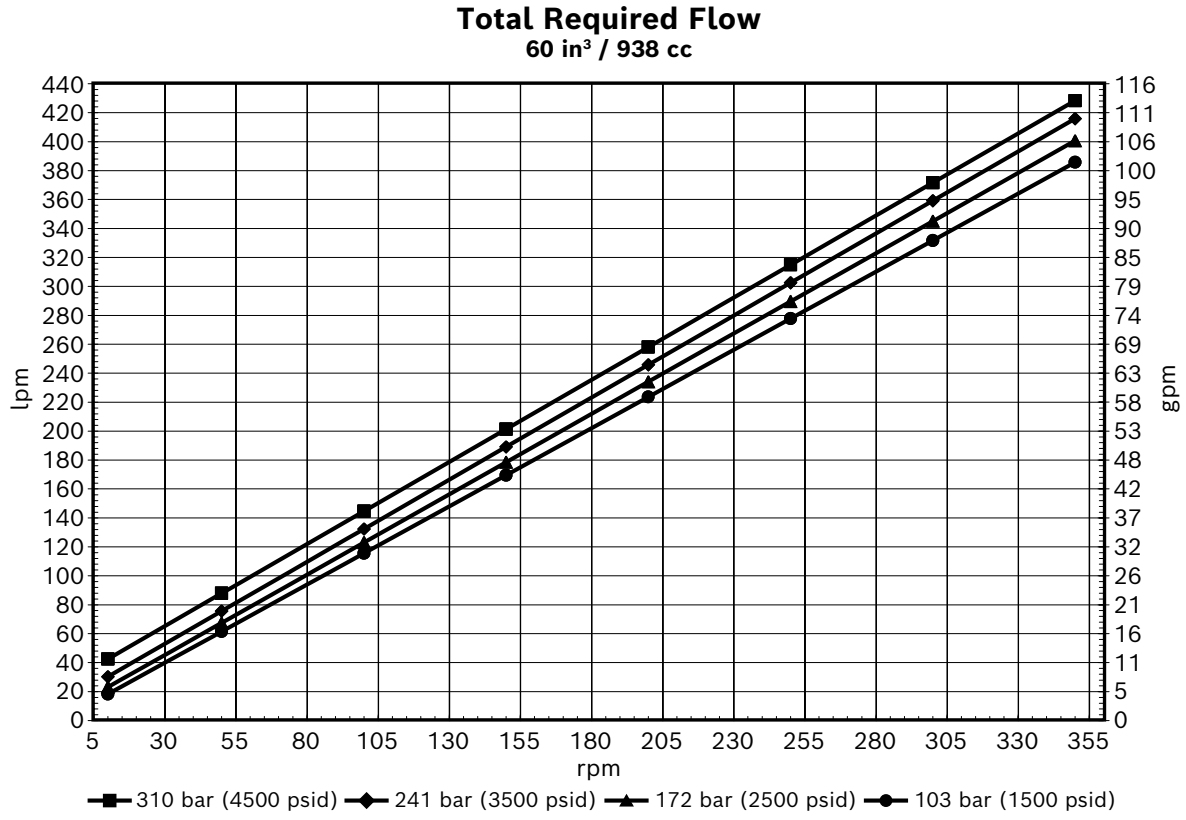
U.S.	Metric
$T = \frac{P \times 5252}{n}$	$T = \frac{P \times 9549.09}{n}$
$T = \frac{d \times \Delta p}{75.4}$	$T = \frac{d \times \Delta p}{62.81}$
$P_{shaft} = \frac{T \times n}{5252}$	$P_{shaft} = \frac{T \times n}{9549.09}$
$P_{shaft} = \frac{Q \times \Delta p}{1714}$	$P_{shaft} = \frac{Q \times \Delta p}{599.29}$
$Q = \frac{d \times n}{231}$	$Q = \frac{d \times n}{1000}$
$n = \frac{P \times 5252}{T}$	$n = \frac{P \times 9549.09}{T}$
$d = \frac{T \times 75.4}{\Delta p}$	$d = \frac{T \times 62.81}{\Delta p}$

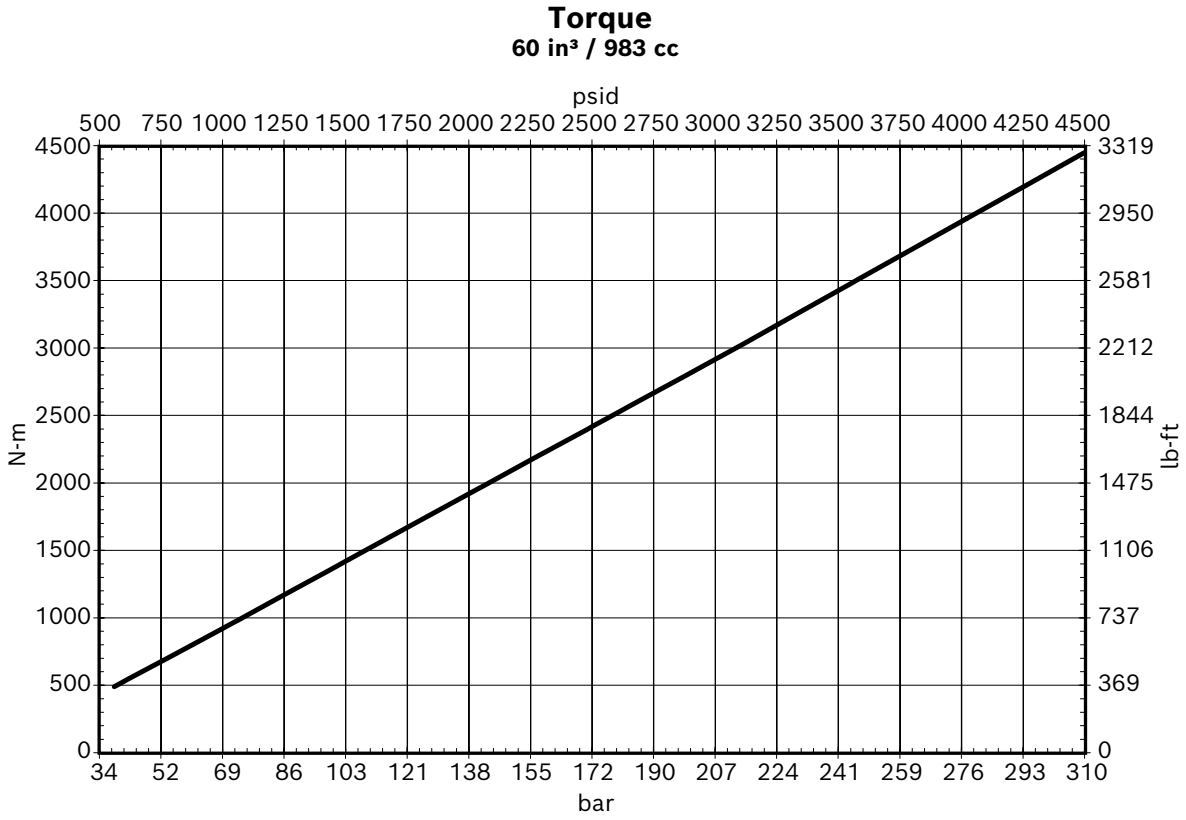
Unit Conversions

Quantity	Symbol	Metric	Convert	U.S.
Torque	T	N-m	÷ 1.356	lb-ft
Power	P	kW	x 1.341	hp
Displacement	d	cm^3/rev	÷ 16.385	in^3/rev
Flow Rate	Q	lpm	÷ 3.78	gpm
Rotational Speed	n	rpm	=	rpm
Pressure	p	bar	x 14.504	psi

Technical data

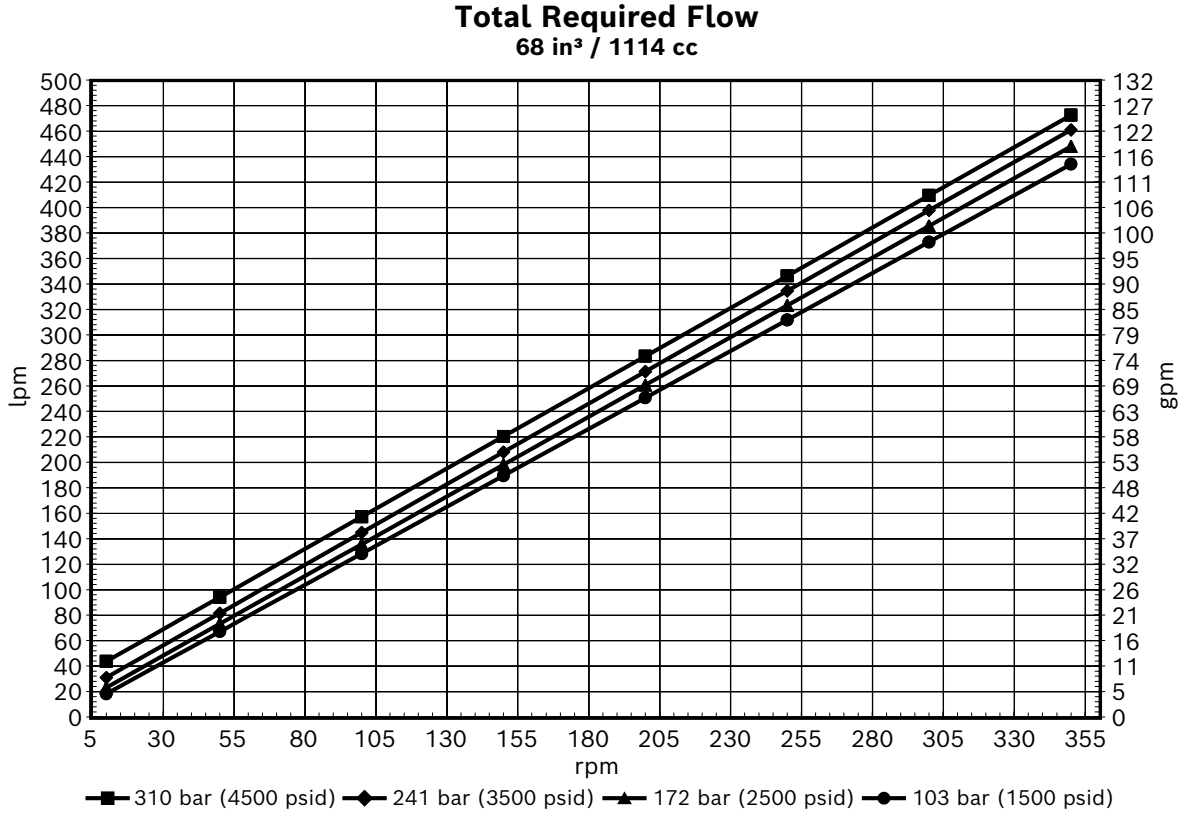
Flow & output torque – 60 in³

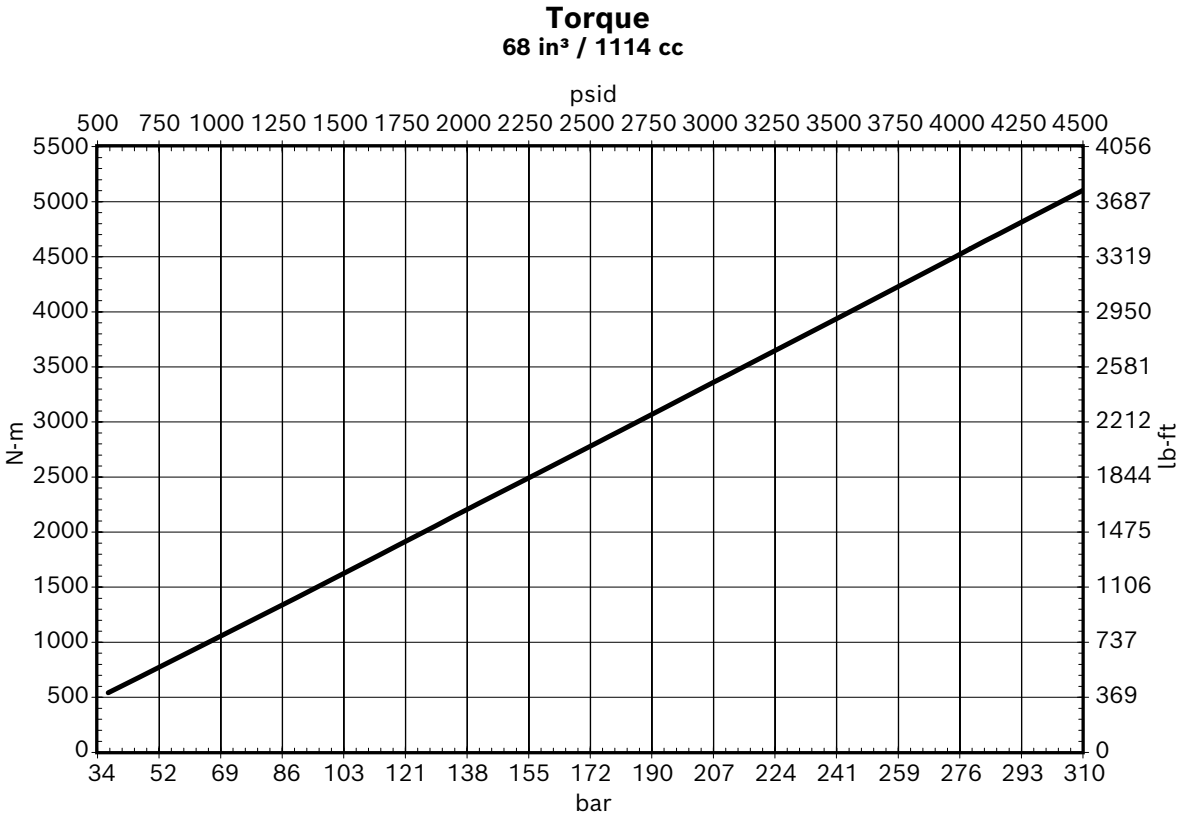




Technical data

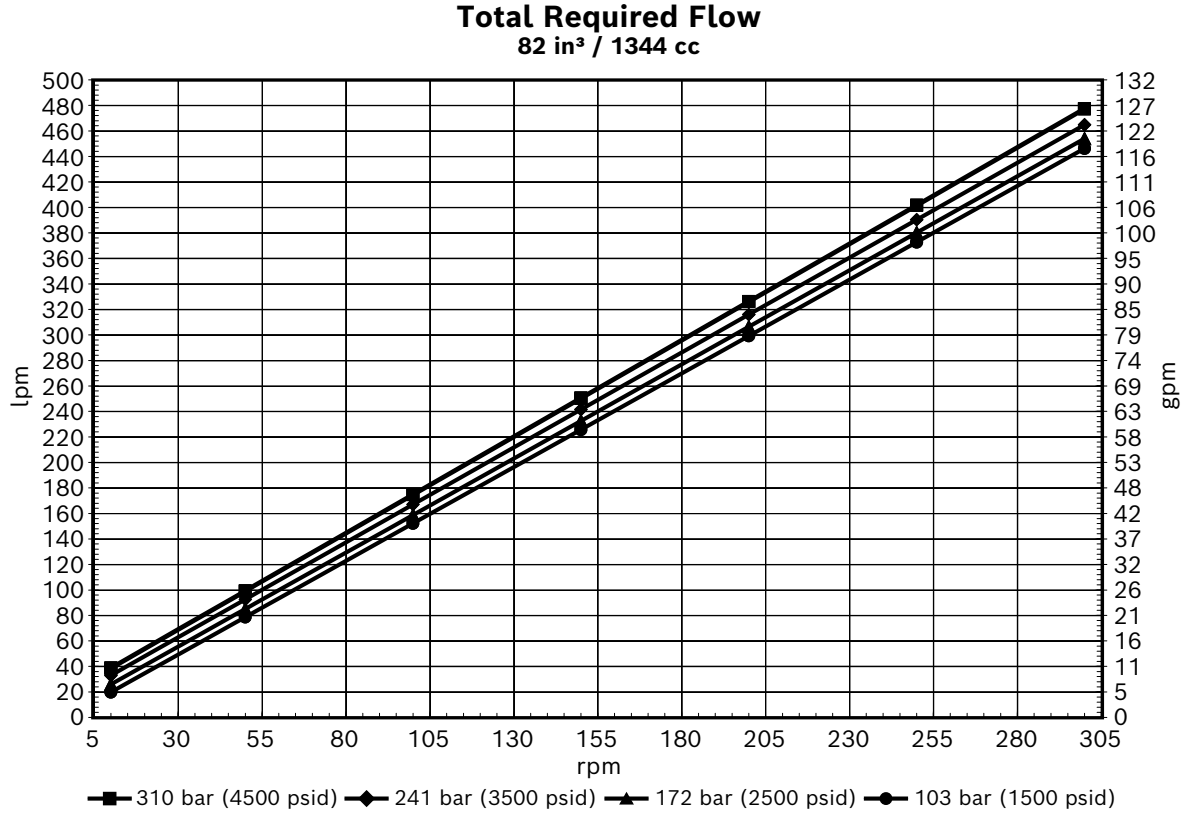
Flow & output torque – 68 in³

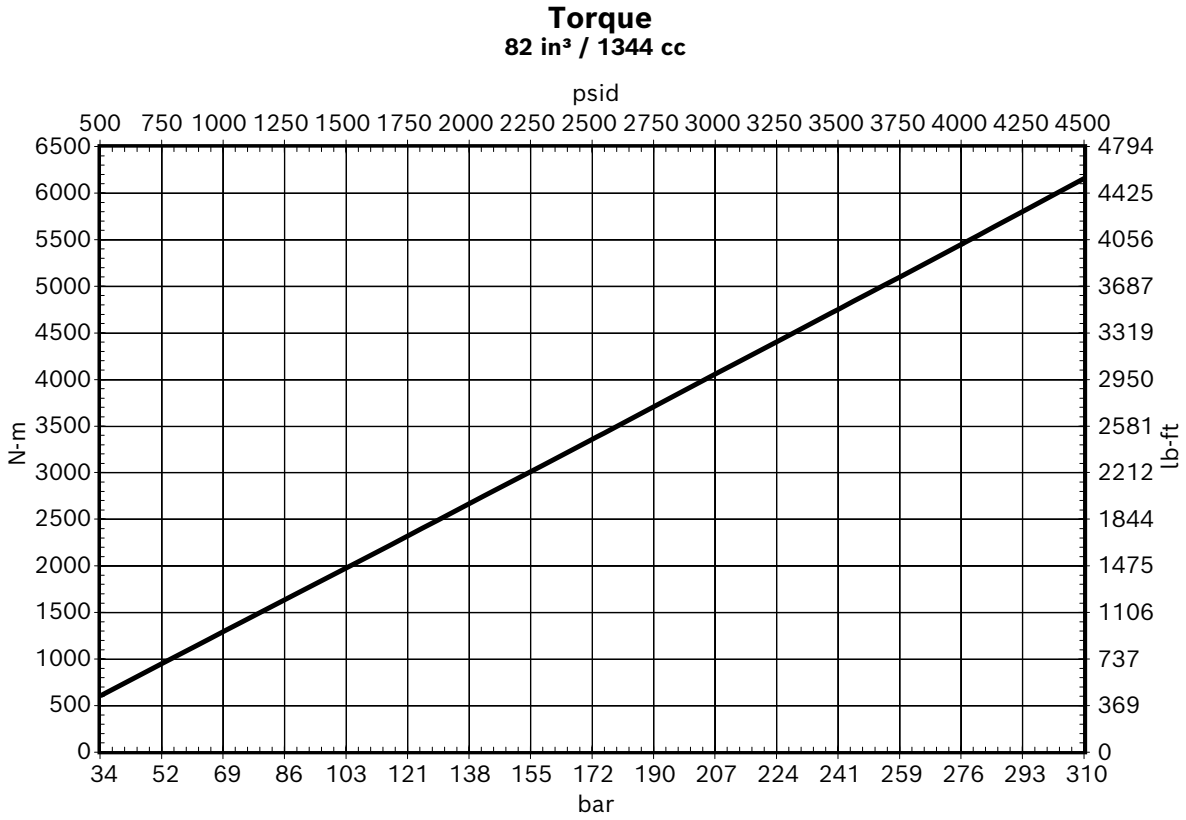




Technical data

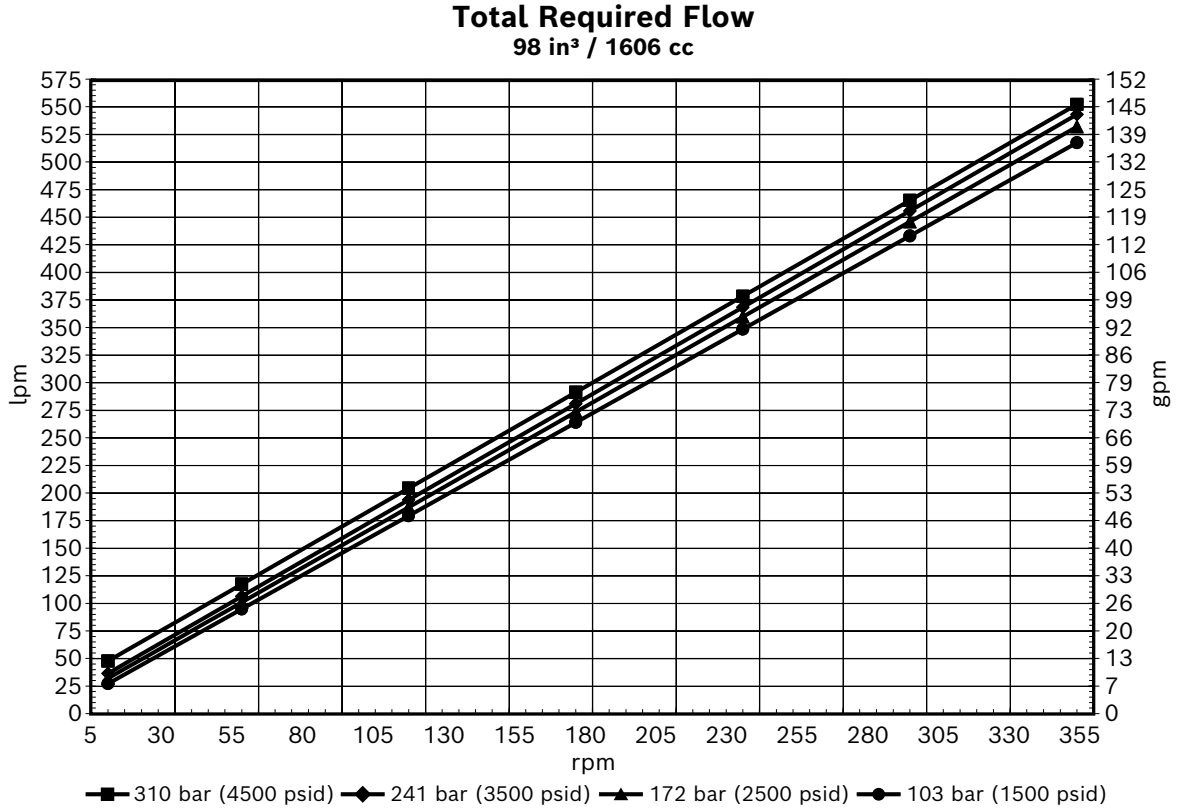
Flow & output torque – 82 in³

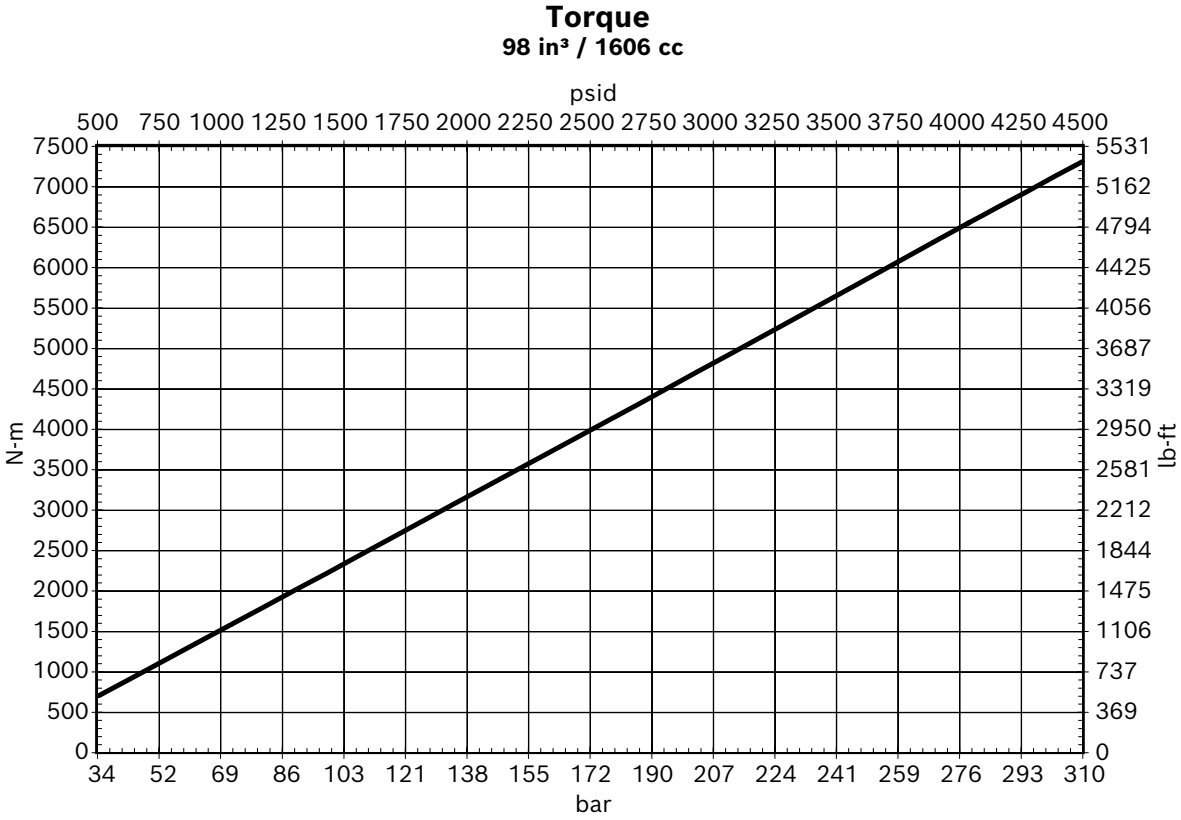




Technical data

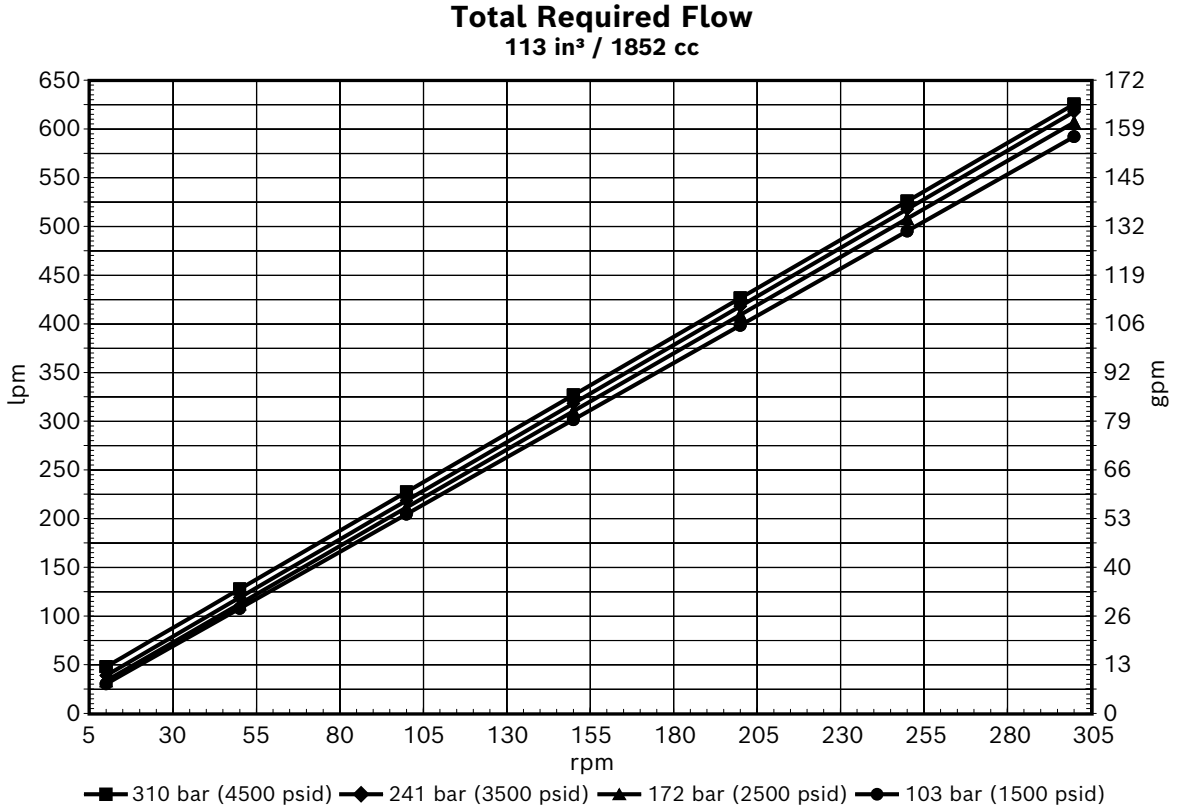
Flow & output torque – 98 in³

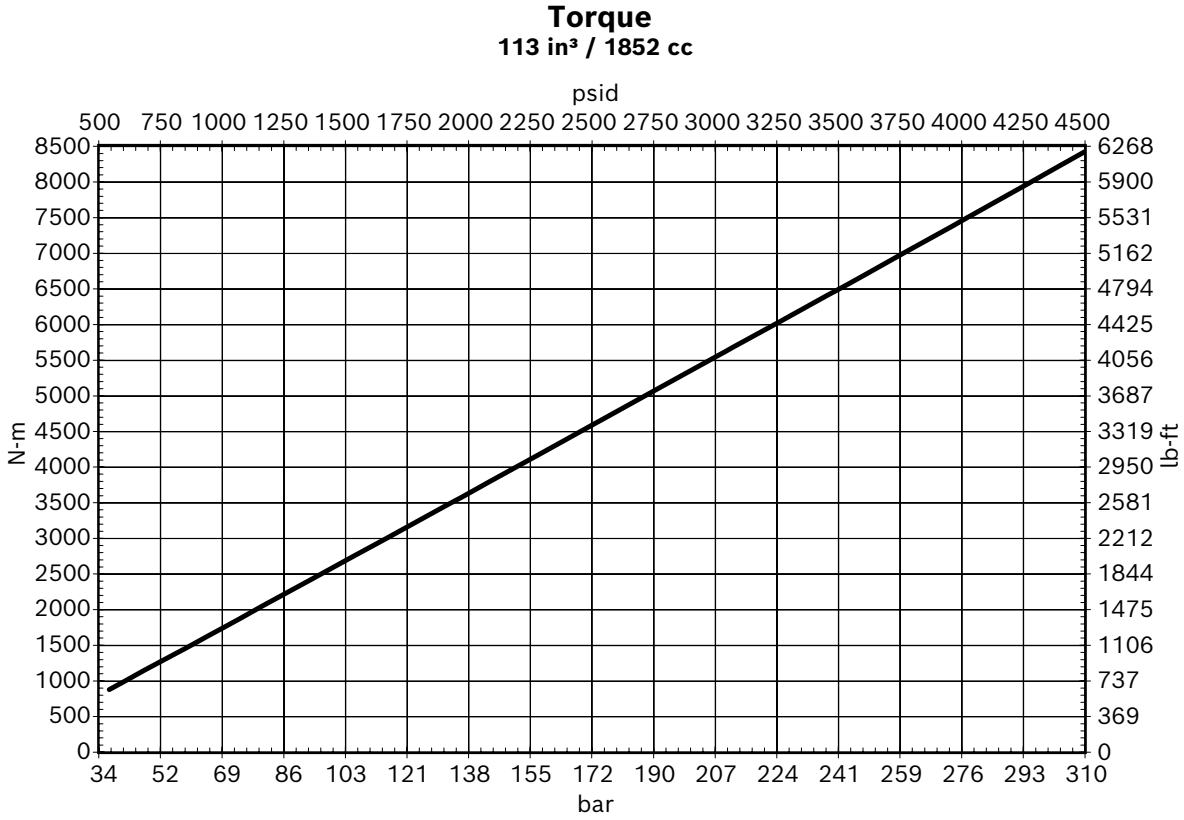




Technical data

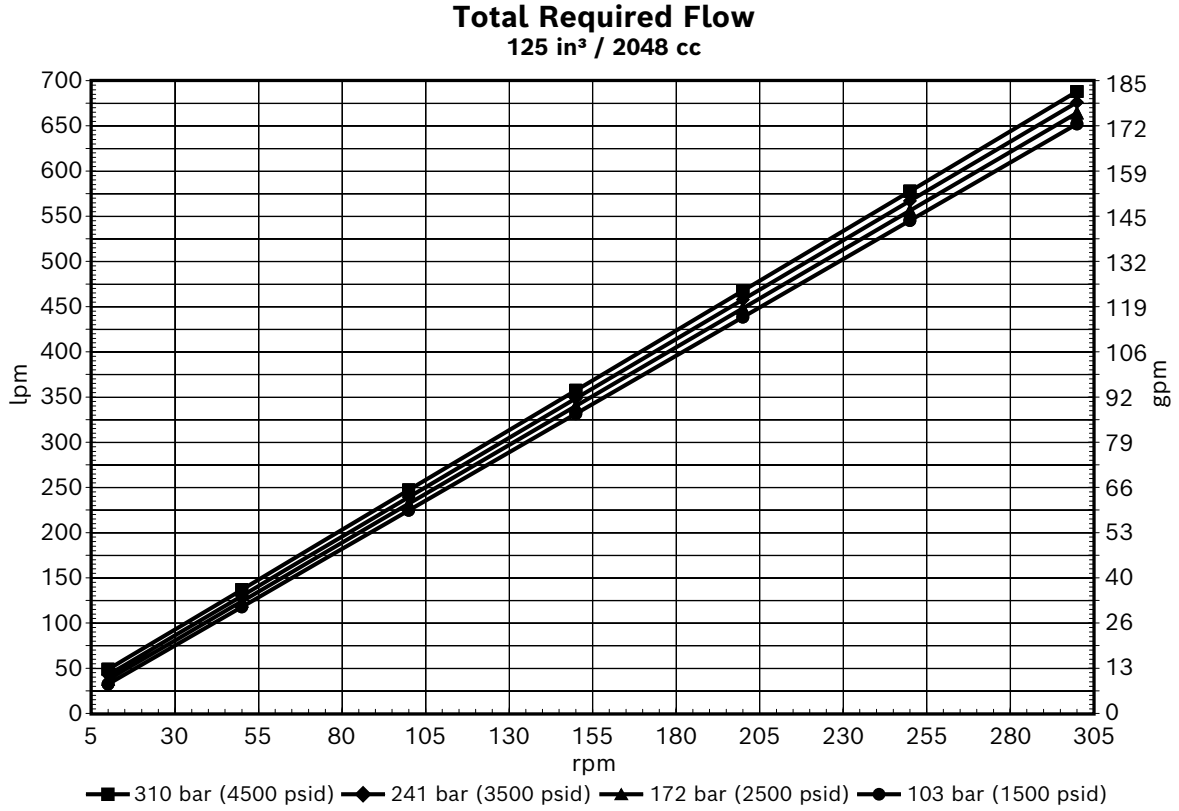
Flow & output torque – 113 in³

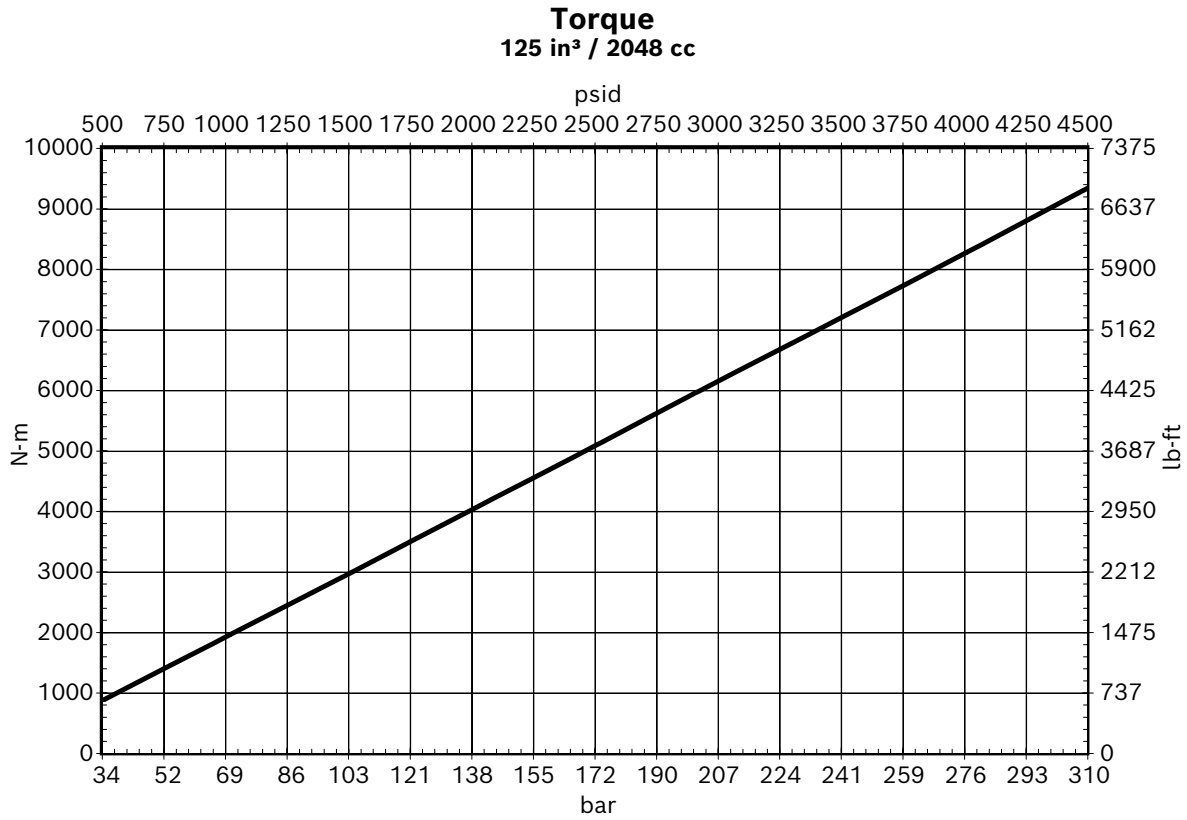




Technical data

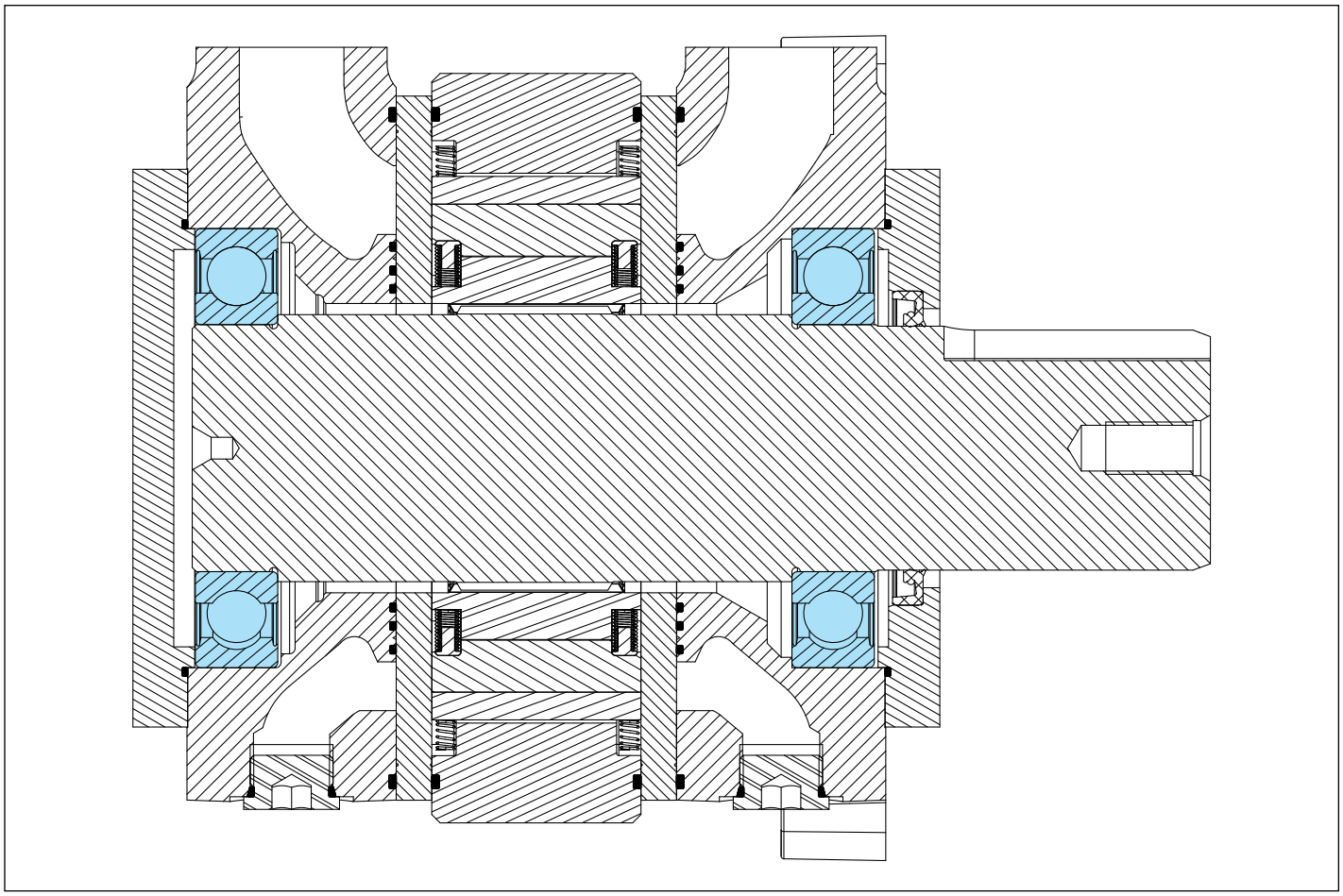
Flow & output torque – 125 in³

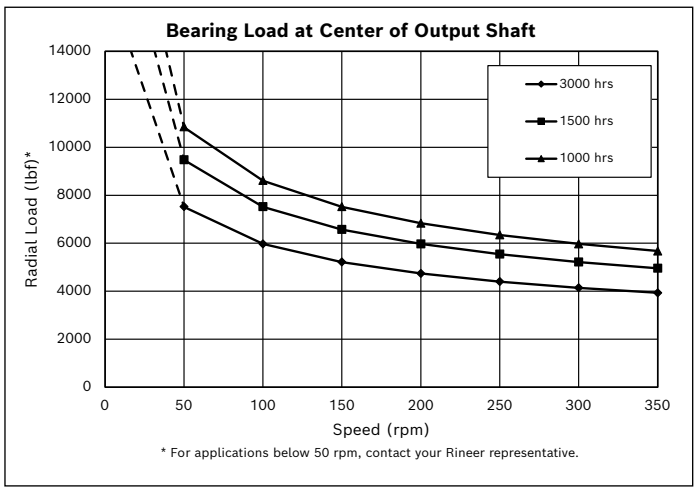


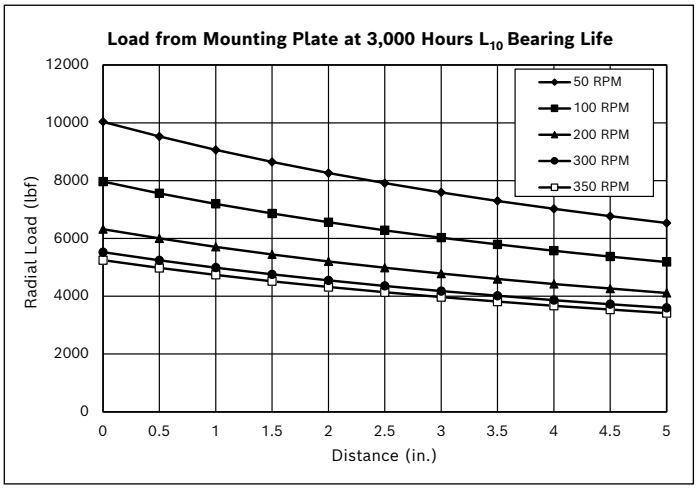


Technical data

Bearing data – Code 61 Motor (B1 Bearing)

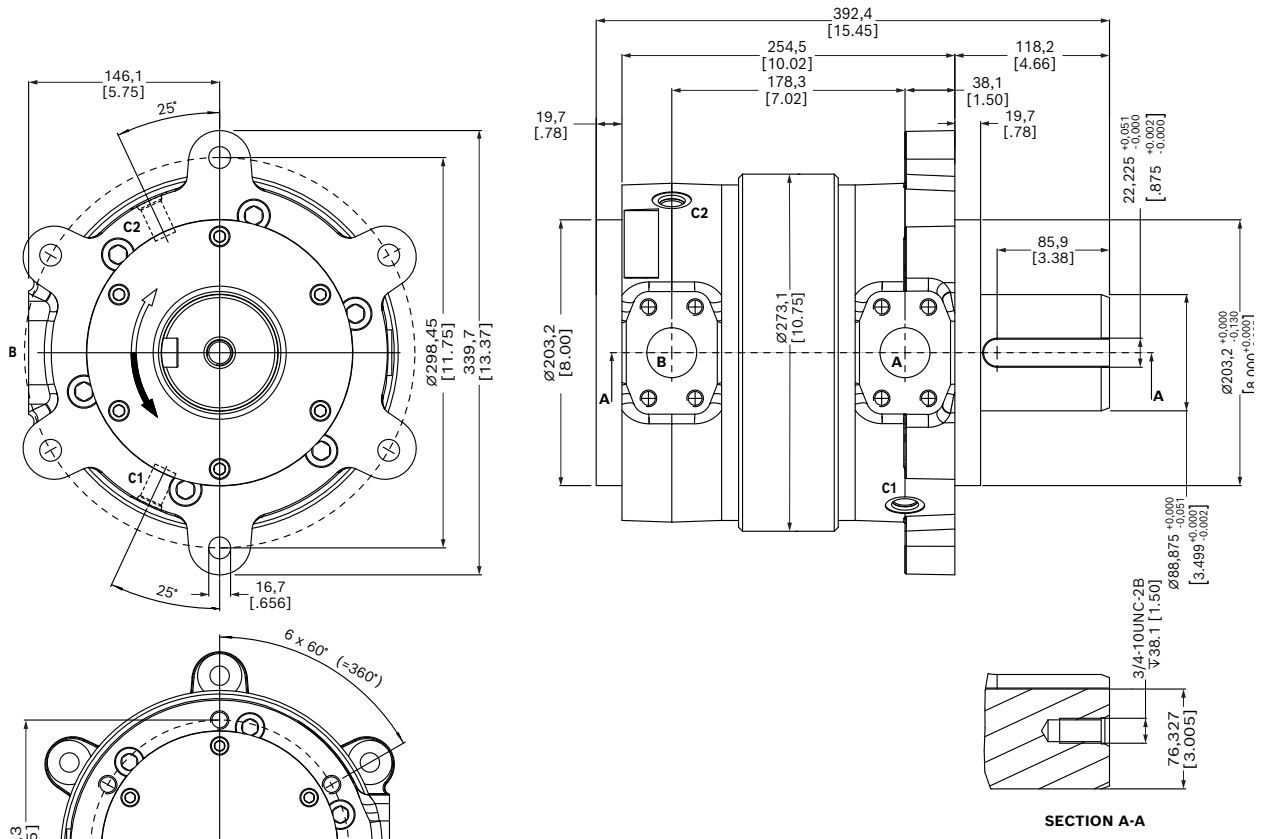






Technical data

Unit dimensions – Code 61 Motor (B1 Bearing)

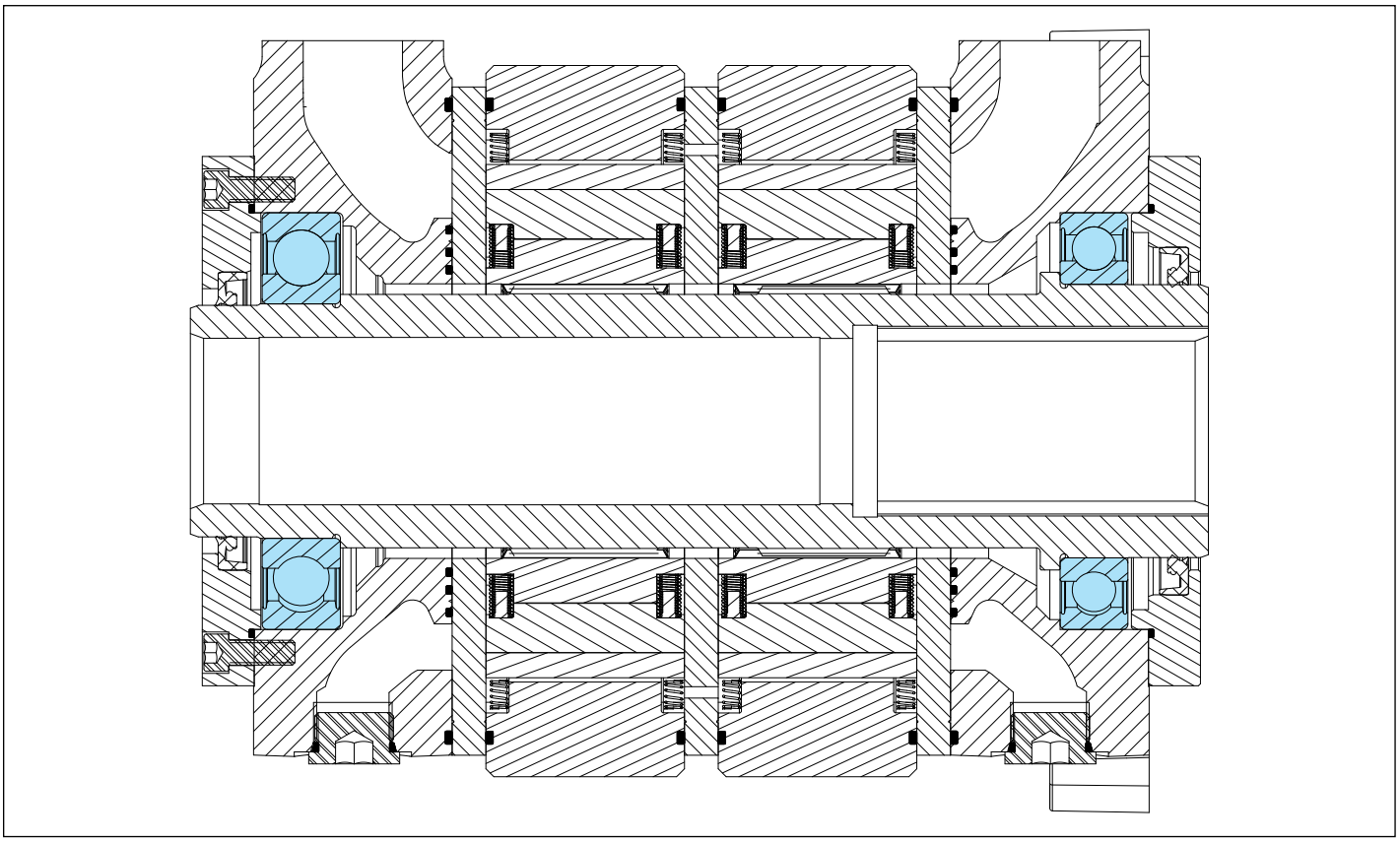


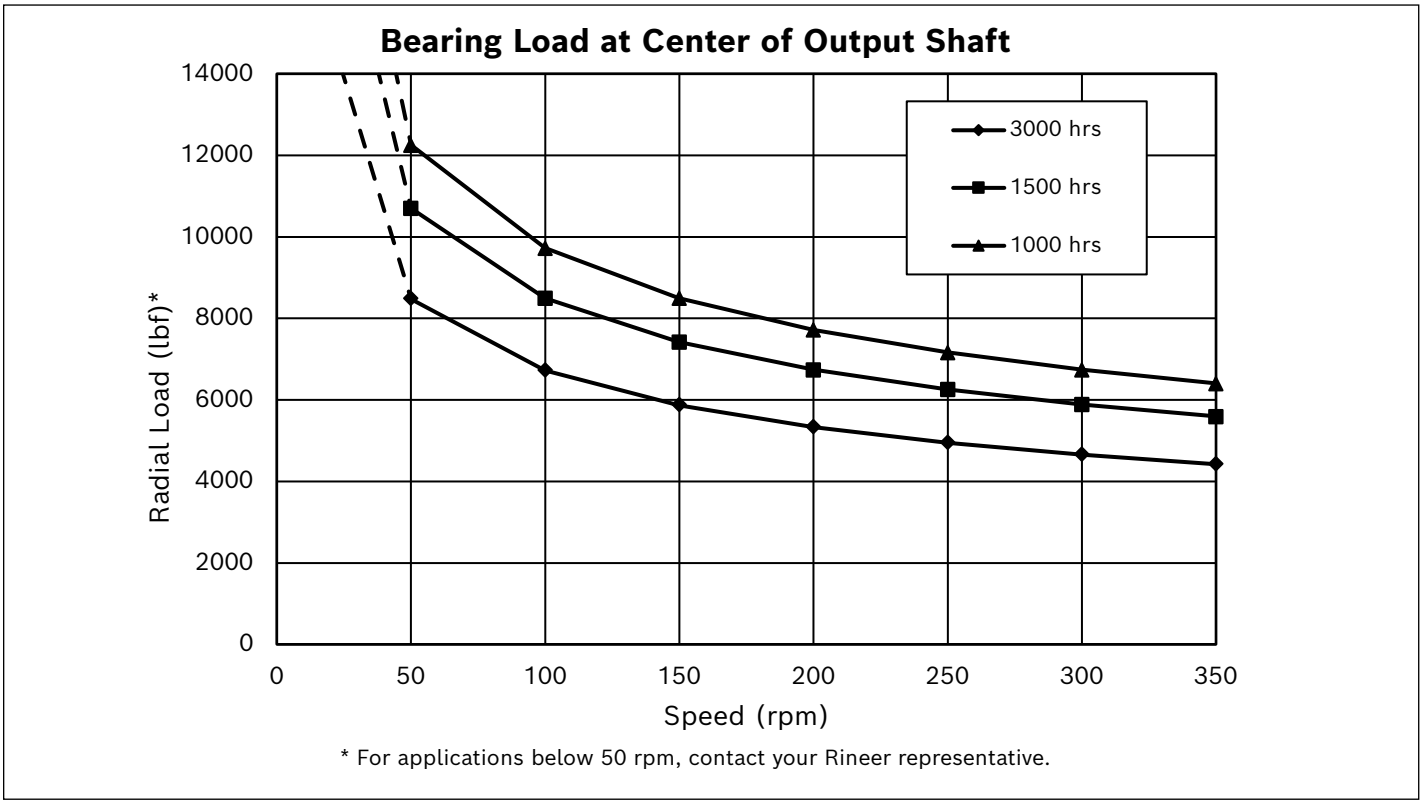
Model #:

MV125-A2-1S-***-30-B1-***-000

Technical data

Bearing data – Code 61 Motor (B2 Bearing)

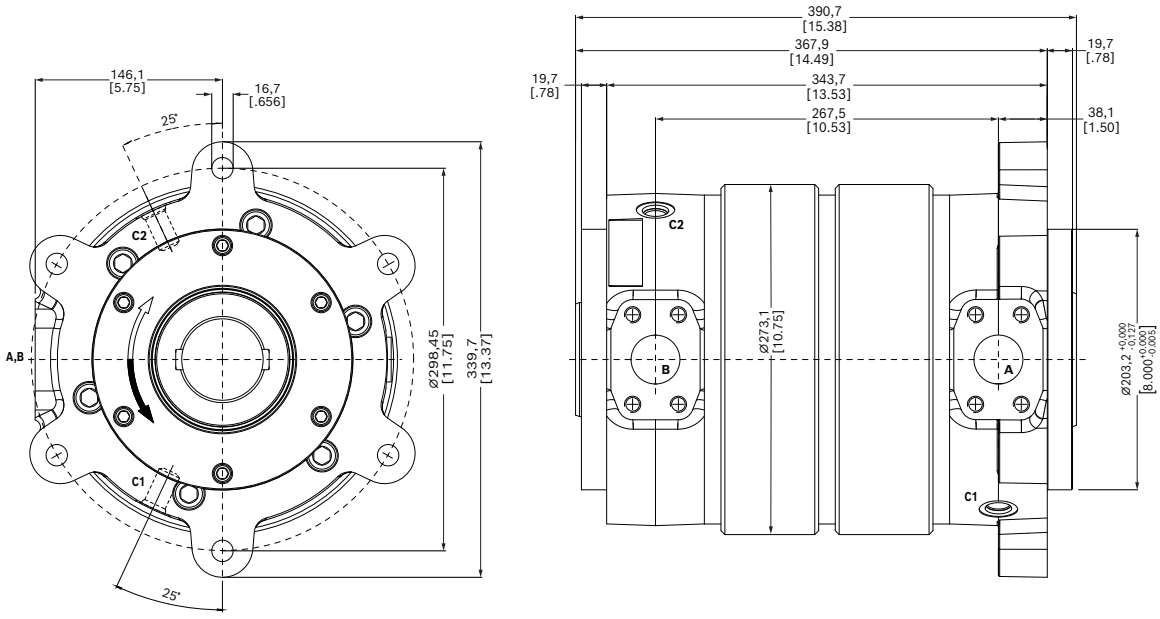




* For applications below 50 rpm, contact your Rineer representative.

Technical data

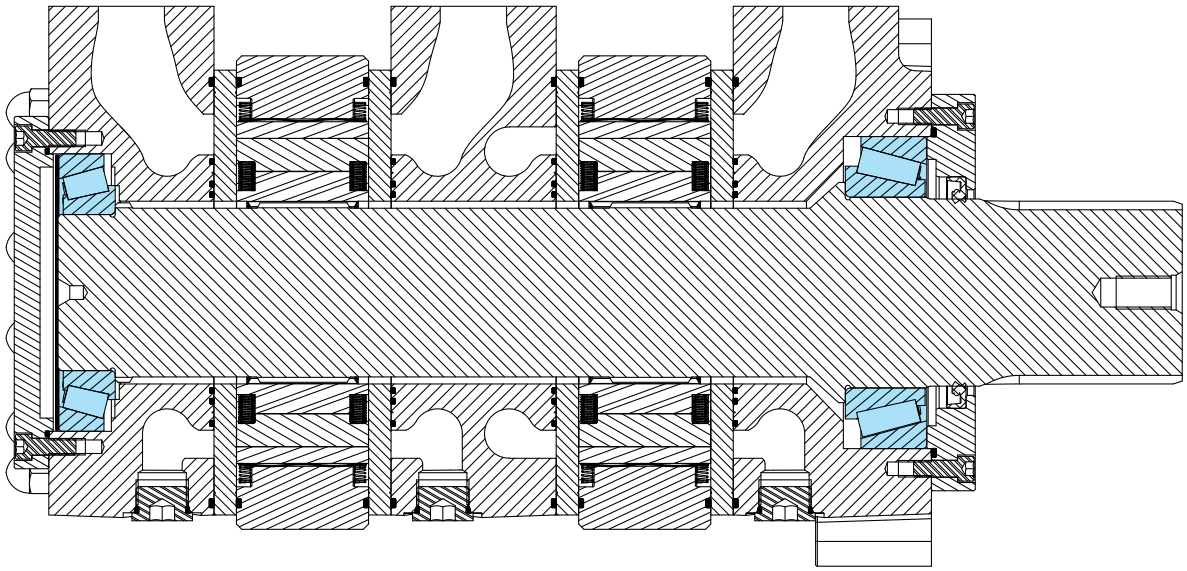
Unit dimensions – Code 61 Motor (B2 Bearing)

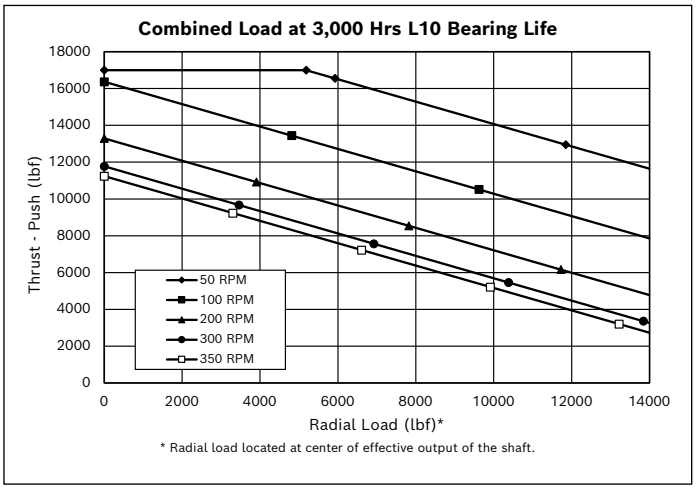


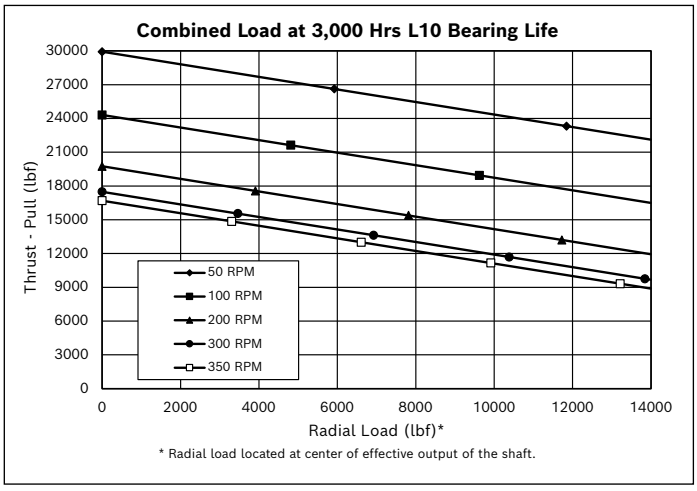
Model #:
MV125-A2-1S-***-35-B2-**-000

Technical data

Bearing data – Code 62 Motor (T1 Bearing)

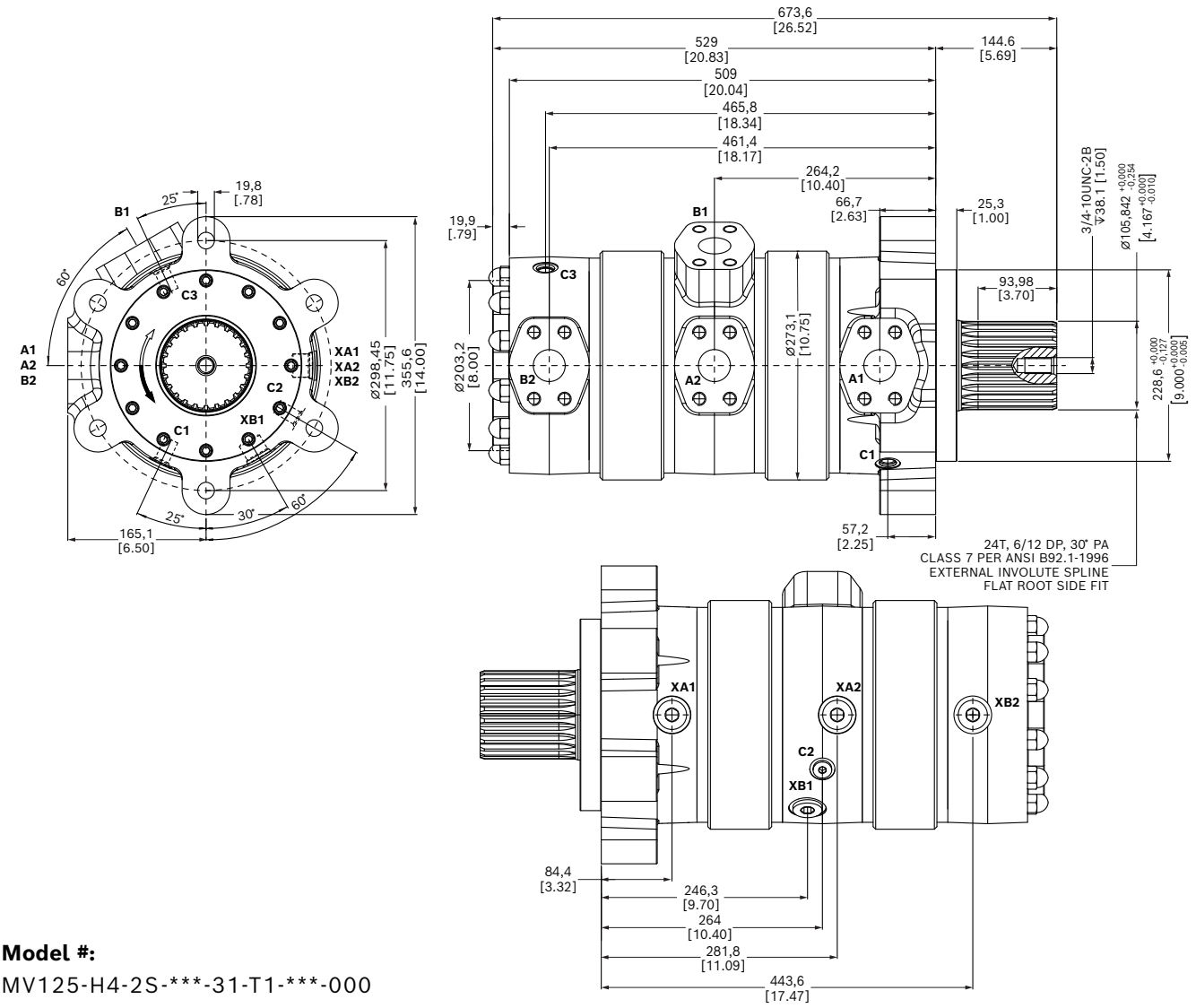






Technical data

Unit dimensions – Code 62 Motor (T1 Bearing)



Model #:

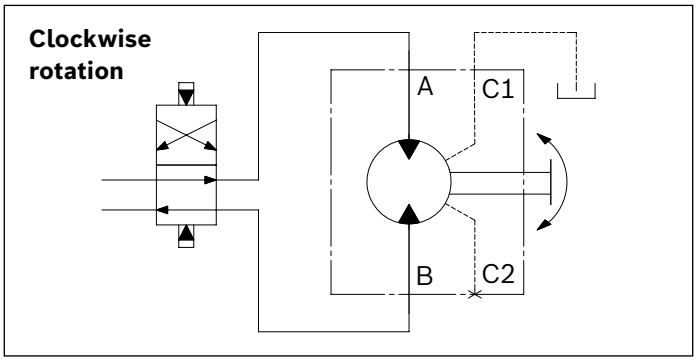
MV125-H4-2S-***-31-T1-***-000

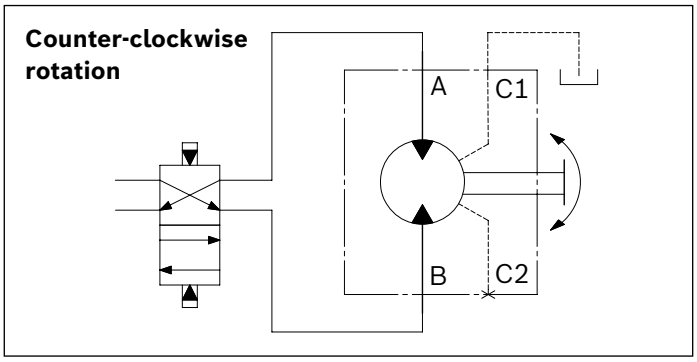
Engineering guidelines

Circuit design

2-port motor circuit

When fluid flow is provided to the “A” port, the rotation of the shaft, as seen from its end, will be clockwise. The “B” port will be the return line flow. Using the “B” port for inlet flow will reverse the direction of the shaft rotation, and the “A” port will become the return line port.





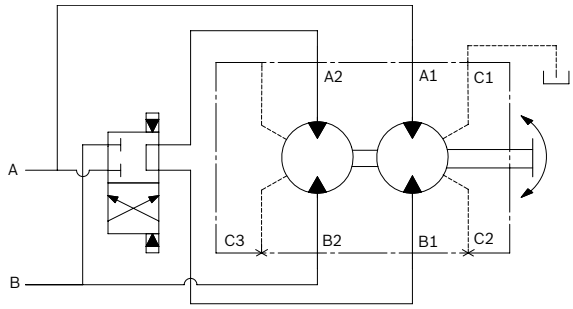
4-port motor circuit

The front housing has a port designated “A1.” The center housing has 2 ports, designated “A2” and “B1”. Port “A2” is on the same plane as port “A1”. Port “B1” is offset from “A2” by 90 degrees. The rear housing has a port designated “B2”, located on the same plane as “A1” and “A2.” The 4-ported motor is capable of single speed operation, and with external valving, two speed operation. Two-speed operation with the 4-port motor can be accomplished using either series, parallel, or logic circuits.

Series/parallel circuit

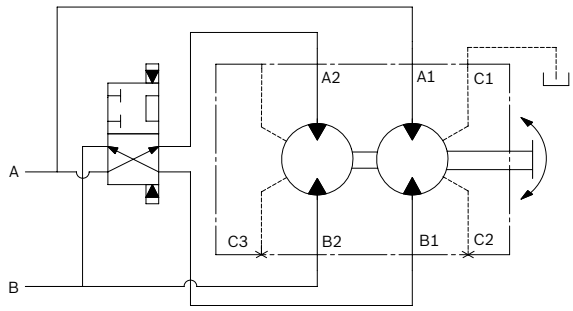
When using a series/parallel circuit with the 4-port motor, equal displacement rotating groups must be used. See the circuit diagram below for reference only.

Series Circuit



Note: Circuit between A2 and B2 port must be rated for full system pressure.

Parallel Circuit



Note: Circuit between A2 and B2 port must be rated for full system pressure.

Notes

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Bosch Rexroth Corporation, RA10553, edition: 2025-09 (replaces: 2021-11)