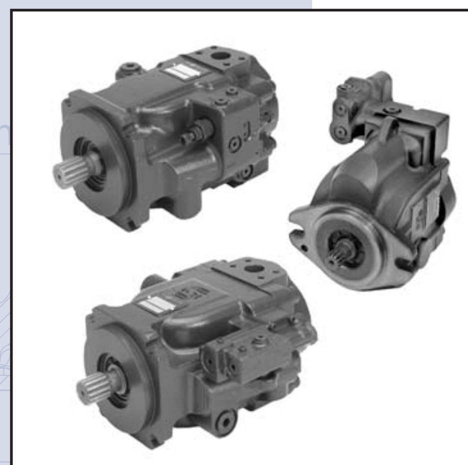
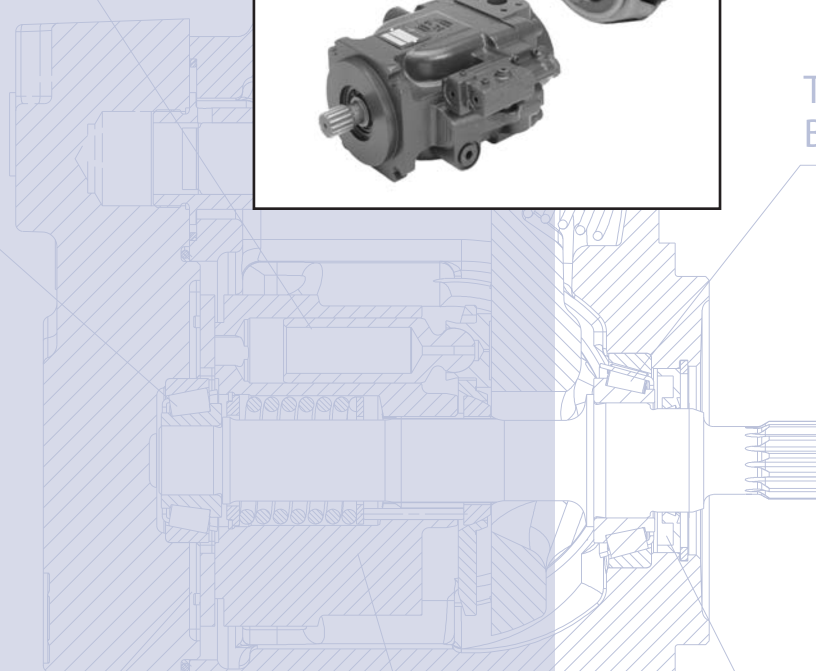
SAUER DANFOSS

Series 45 Open Circuit Axial Piston Pumps

Technical Information





BASIC DESIGN

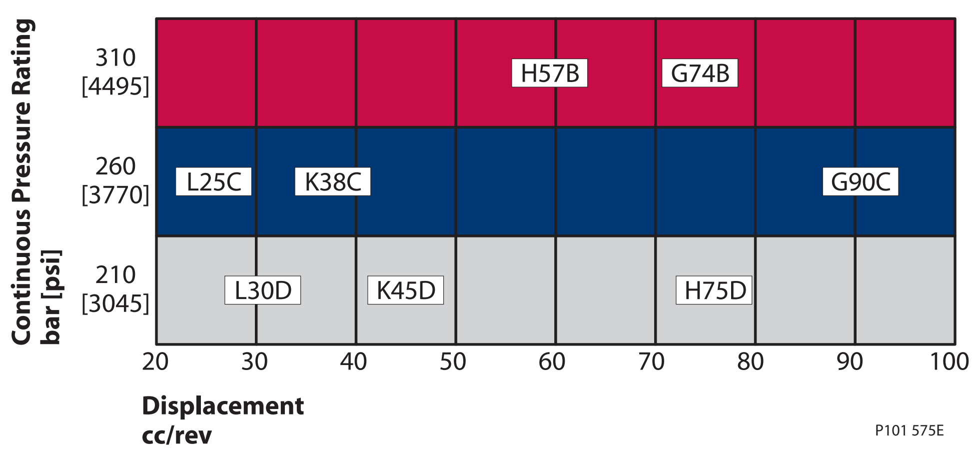
Series 45 open circuit pumps can be applied with other products in a system to transfer and control hydraulic power.

Series 45 pumps provide an infinitely variable flow rate between zero and maximum.

Series 45 variable displacement pumps are compact, high power density units, using the axial piston concept in conjunction with a tiltable swashplate to vary the pump displacement.

Series 45 pumps use a cradle swashplate design. A hydraulic control piston sets the swashplate angle. Control of the displacement piston is provided through a built-in pressure compensator valve. This valve will vary the swashplate angle from its maximum to its minimum position when the set pressure is reached. Controls are also available for remote compensating and load sensing systems. An available displacement limiter (frame G and H units only) allows adjustment of maximum flow to match system requirements. The Series 45 pump controls are designed for low hysteresis and responsive performance.

SERIES 45 PRODUCT RANGE



Series 45 open circuit pumps cover a displacement range from 25cc [1.53 in^3] to 90cc [5.49in^3] and a continuous pressure rating range from 210 bar [3045 psi] to 310 bar [4495 psi] with peak pressure ratings to 400 bar [5800 psi]*. Each pump in the series is optimized to a specific pressure rating. The chart above shows how the displacements are arranged with respect to pressure rating.

Refer to **Technical Data, pages 13 through 15 for specific ratings. For more information on pressure ratings see **Pressure Rating**, page 8 and **Pressure Limits**, page 16.*

CONTENTS

CONTENTS (continued)

A COMPLETE FAMILY TO MEET MARKET NEEDS

- 25 cc [1.53 in³]   57 cc [3.48 in³]
  30 cc [1.83 in³]   74 cc [4.52 in³]
  38 cc [2.32 in³]   75 cc [4.57 in³]
  45 cc [2.74 in³]   90 cc [5.47 in³]
- Additional displacements under development
- Wide range of installation options
- Control system flexibility - pressure compensated, load sensing, and remote pressure compensated controls
- High power auxiliary drives for multiple pump configurations
- Open circuit installations

THE LATEST TECHNOLOGY

- Maximum controllability in all modes of operation
- High power density
- Designed to lower installation costs
- Designed to reduce operating costs
- Designed using the proven methods of quality function deployment (QFD) and design for manufacturability (DFM)
- Unique assembly methods increase reliability

HIGH PERFORMANCE

- Speeds to 3600 min^{-1} (rpm)
- Pressure to 310 bar [4495 psi] continuous
- High overall efficiency
- Fast response times
- Fast recovery times
- Low noise levels

RELIABILITY / DURABILITY

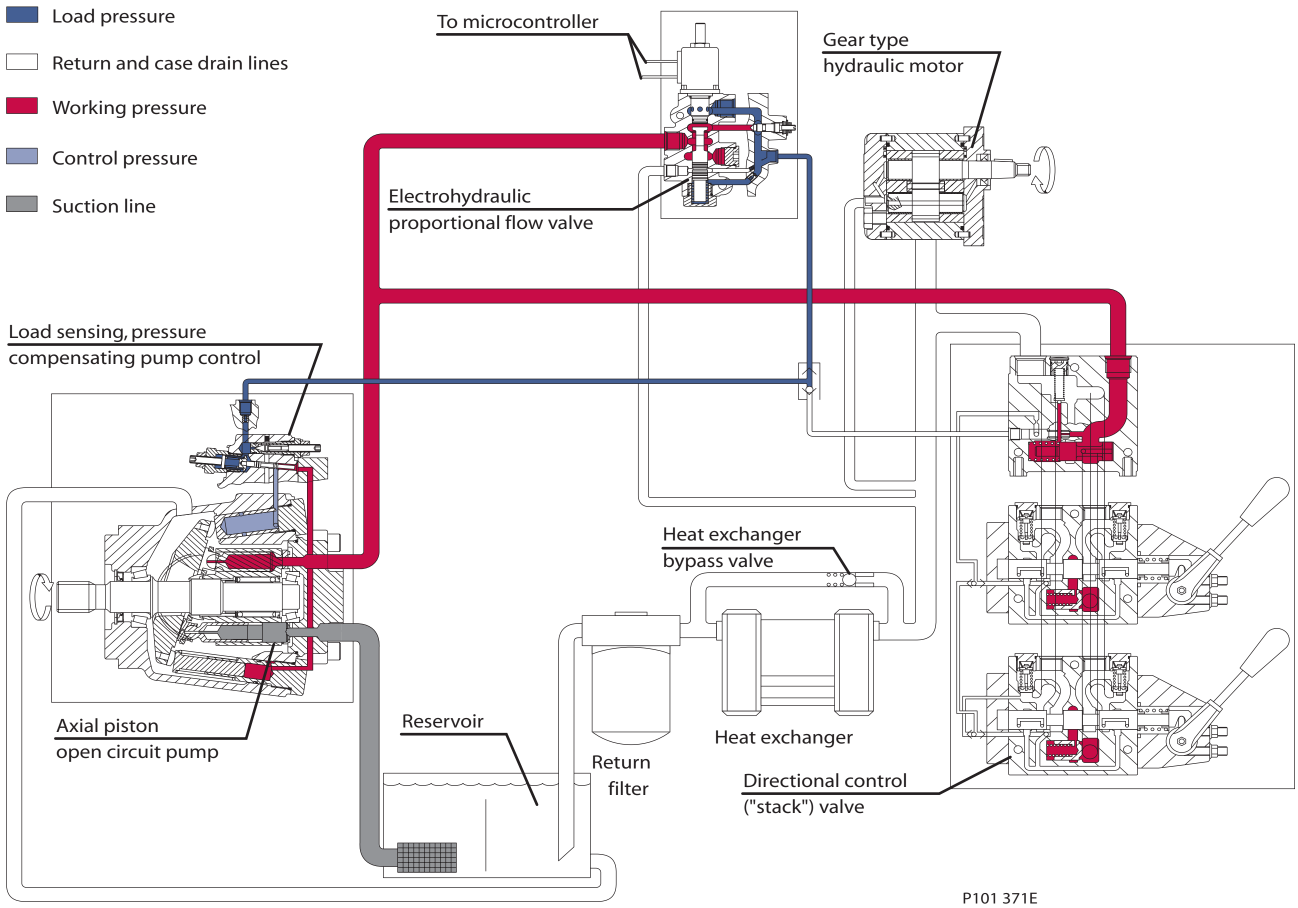
- Designed to rigorous standards
- Proven in the laboratory and in the field
- Manufactured to rigid quality standards
- Long service life
- Significantly fewer parts
- No gasketed joints
- Robust input shaft bearings handle large external shaft loads

GLOBAL PRODUCT

- Designed for worldwide markets
- Identical product available worldwide
- Mobile, industrial, and stationary markets

WORLDWIDE SUPPORT

- Sales and technical support in all industrialized countries of the world
- Serviced by a worldwide network of authorized service centers



This illustration shows an open circuit hydraulic system using a Series 45-57cc Axial Piston Open Circuit Pump with a load sensing, pressure compensating control providing flow in parallel to a modulating fan control valve and a PVG 32 directional flow control valve.

REVISED MODEL CODE

To support the growing family of Sauer-Danfoss variable displacement open circuit piston pumps, the option ordering code was altered in 2000.

Previously, the order code appeared as follows:
45L057 LS 20 20 NN A 3 S1C2 A1N NNN NNN NNN

The new order code appears like this:
HRL 057B LS 20 20 NN A 3 S1C2 A1N NNN NNN NNN

The highlighted area of the new code provides the flexibility to incorporate multiple pump displacements in the same pump design. In the above example:

- H = pump design type (referred to as frame)
- R = open circuit
- L = counter clockwise (CCW) input rotation
- 057 = maximum displacement (cc)
- B = pressure rating

NAME PLATE

Name Plate

PRESSURE RATING

Each pump displacement in the Series 45 product family has a specific maximum and continuous pressure rating. This allows the product selection to be tailored to the flow and pressure requirements of the application. Currently, three pressure ratings exist:

Pressure Rating Codes		
Code	Maximum Pressure, bar [psi]	Continuous Pressure, bar [psi]
B	400 [5800]	310 [4495]
C	350 [5075]	260 [3770]
D	300 [4350]	210 [3045]

Refer to pages 13, 14, 15, and 16 for further information on the pressure ratings for the various pump displacements and definitions of maximum and minimum pressure.

Operating characteristics of the application must be identified to insure proper selection of the pump displacement and pressure rating. Exceeding the pressure rating of the pump will result in reduced component life. Contact your Sauer-Danfoss representative if there is a question regarding the operating pressures of your application.

DESIGN

Mounting
SAE flange, Size C (SAE J744) on frame G and H pumps
SAE flange, Size B on frame L and K pumps, optional on 57cc frame H pumps

Auxiliary Mounting Pad Options
SAE flange, Size A, B, B-B, or C

Control Options
PC: Pressure Compensator
LS: Load Sensing (with Pressure Compensator)
See **Controls**, pages 20 through 23.

Port Connections
Inlet and pressure ports: SAE Flange Ports (Code 61) or SAE O-ring boss
Axial (end) ports or radial (side) ports
Remaining ports: SAE straight thread O-ring boss
Metric port options available

Direction of Rotation
Clockwise or counterclockwise

Installation Position
Installation position discretionary.

HYDRAULIC PARAMETERS

Inlet Pressure
Minimum pressure, continuous = 0.8 bar absolute [23.2 in Hg]
(Refer to **Inlet Pressure Vs. Speed** curves, pages 27 through 34)
Minimum pressure, cold start = 0.5 bar absolute [14.8 in Hg]

Pressure Compensator Valve Setting
Minimum pressure: 100 bar [1450 psi]
Maximum pressure: 310 bar [4495 psi]

Case Pressure
Maximum continuous: 0.5 bar [7 psi] Above inlet
Intermittent: 2 bar [29 psi] Cold start

Temperature Range*
Intermittent, cold start	=	- 40° C [- 40° F]
Continuous	=	82° C [180° F]
Maximum	=	104° C [220° F]

(at the hottest point, i.e. drain line)

Fluid Viscosity Limits
mm^2/s (cSt)			SUS	
ν min	=	9	58	minimum (continuous)
ν min	=	6.4	47	intermittent
ν max	=	110	500	maximum (continuous)
ν max	=	1000	4700	intermittent (cold start)

* Hydraulic fluid viscosity must be maintained within the prescribed limits.

HYDRAULIC PARAMETERS (continued)

Hydraulic Fluids

Ratings and performance data for Series 45 products are based on operating with premium hydraulic fluids containing oxidation, rust, and foam inhibitors.

These premium fluids include premium turbine oils, API CD engine oils per SAE J183, M2C33F or G automatic transmission fluids (ATF), Dexron II (ATF) meeting Allison C-3 or Caterpillar TO-2 requirements, and certain specialty agriculture tractor fluids. For further information, see Sauer-Danfoss publication BLN-9887 or 697581.

Refer to publication ATI-E 9101 for information relating to biodegradable fluids. Never mix hydraulic fluids.

Contact your Sauer-Danfoss representative for more information regarding fluids.

SYSTEM REQUIREMENTS

Filtration

It is imperative that only clean oil be allowed to enter the pump in order to prevent premature wear. System filtration capable of controlling the fluid cleanliness to ISO 4406 class 18/13 or better is required.

Due to changes in pump inlet conditions, system aeration, and duty cycle, suction line filters are not recommended. Instead, a 125 µm (150 mesh) strainer located in the reservoir or in the pump inlet line is recommended to protect the pump from coarse particles.

The selection of a return filter depends on a number of factors including contamination ingression rate and the desired maintenance interval. Filters are selected to meet the above requirements using rating parameters of efficiency and capacity.

Filter efficiency may be measured using a Beta (β) ratio*. A filter with a β-ratio within the range of $\beta_{10} = 10$ or better is typically required.

Since each system is unique, the filtration requirement for that system will be unique and must be determined by test in each case. It is essential that monitoring of prototypes and evaluation of components and performance throughout the test program be the final criteria for judging the adequacy of the filtration system. See Sauer-Danfoss publication BLN-9887 or 697581 and ATI-E 9201 for more information.

* Filter βx-ratio is a measure of filter efficiency defined by ISO 4572. It is defined as the ratio of the number of particles greater than a given size (x) upstream of the filter to number of particles greater than the same size downstream of the filter. The βx-ratio applies to a specific particle size, measured in microns.

SYSTEM REQUIREMENTS (Continued)

Reservoir

The function of the reservoir is to provide clean fluid, dissipate heat, remove entrained air, and allow for fluid volume changes associated with fluid expansion and cylinder differential volumes.

Minimum reservoir capacity depends on the volume needed to cool the oil, hold the oil from all retracted cylinders, and allow expansion due to temperature changes. Normally, a capacity of 1 to 3 times the pump output flow (per minute) is satisfactory.

The reservoir outlet (to pump inlet) should be near the bottom of the reservoir, but far enough above the bottom to take advantage of gravity separation of foreign particles. It must always be covered with fluid. The reservoir inlet (fluid return) from the system should be below the fluid level and be as far away as possible from the outlet port.

The reservoir oil levels must be maintained to allow adequate time for the entrained air to escape. A dwell time of 30 to 60 seconds is normally adequate.

$$\text{Dwell time} = \frac{\text{Reservoir Capacity}}{\text{Flow Rate}}$$

Case Pressure

Case flow is affected by the pump's volumetric efficiency and control flow (under steady state and transient conditions).

Under normal operating conditions, the maximum continuous case pressure must not be greater than 0.5 bar [7 psi] above the pump inlet pressure. Case pressure must never exceed 2 bar [30 psi] gauge pressure.

Temperature Limits

Maximum and continuous allowable temperature limits for petroleum based fluids are found on page 8. These temperature limits apply at the hottest point in the unit, which is normally the case drain.

PUMP INSTALLATION

The pump housing must be filled with clean fluid during installation. The case drain line should be connected to the uppermost case drain port (L1 or L2) in order to keep the housing full of fluid during operation.

The case drain line should be a separate line to allow unrestricted flow to the reservoir. It should connect at the lowest point in the reservoir (below the minimum reservoir fluid level) and as far away from the reservoir outlet (pump inlet) connection as possible. The case drain line plumbing should be sized to limit case pressure to the values specified on page 7.

Pump inlet line plumbing must be designed so that the inlet pressure (vacuum) is within the values listed on page 7. Inlet line losses must be considered. Methods for estimating these losses are shown in the following formulae.

EQUATIONS FOR ESTIMATING INLET LINE LOSSES

$$P_{Total} = P_1 + P_2 + P_3$$

where: P_1 = Acceleration loss, bar [psi]
P_2 = Static head loss, bar [psi]
P_3 = Line losses, bar [psi]

$$P_1 \text{ bar} = \frac{l \cdot sg \cdot Dv}{100 \cdot Dt}$$

$$P_1 \text{ psi} = \frac{l \cdot sg \cdot Dv}{74 \cdot Dt}$$

where: l = Line length, m [ft]
sg = Specific gravity
Dv = Change in fluid velocity, m/s [ft/s]
Dt = Time interval for Dv, seconds

$$P_2 \text{ bar} = \frac{sg \cdot h}{10.19}$$

$$P_2 \text{ psi} = \frac{sg \cdot h}{2.31}$$

where: sg = Specific gravity
h = Elevation change, m [ft]

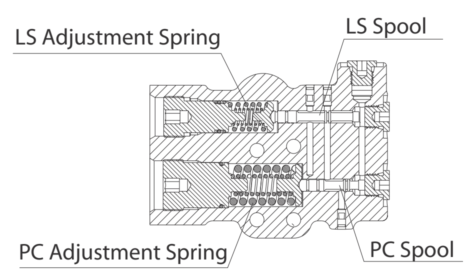
P_3 = Line losses due to hose friction, bends, fittings, etc.

FRAME K AND L PUMPS

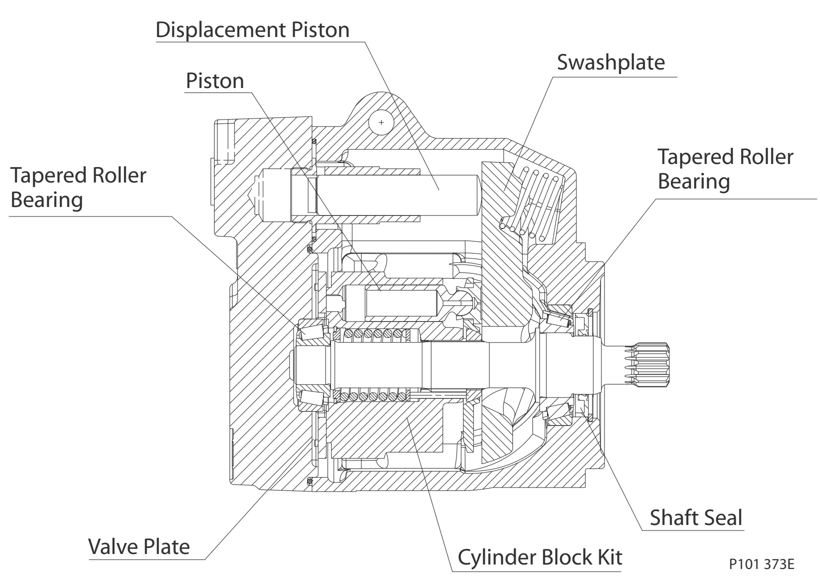
Frame K and L Technical Specifications

		Units	Displacement			
			L25C	L30D	K38C	K45D
Displacement		cm^3 [in^3]	25 [1.53]	30 [1.83]	38 [2.32]	45 [2.75]
Input Speed	Minimum	min^{-1} (rpm)	500	500	500	500
	Rated*	min^{-1} (rpm)	3200	3200	2650	2650
	Maximum*	min^{-1} (rpm)	3600**	3600**	2800**	2800**
Maximum (Peak) Working Pressure		bar [psi]	350 [5075]	300 [4350]	350 [5075]	300 [4350]
Continuous Working Pressure		bar [psi]	260 [3770]	210 [3045]	260 [3770]	210 [3045]
Flow at Rated Speed		l/min [US gal/min]	76.2 [20.3]	90.0 [24.0]	108.3 [28.9]	126.0 [33.6]
Theoretical Input Torque at Maximum Displacement		Nm/bar [lbf·in/1000 psi]	0.395 [243]	0.477 [291]	0.605 [369]	0.716 [437]
Mass Moment of Inertia of the Internal Rotating Parts		kg·m^2 [lbf·ft^2]	0.0016 [0.037]	0.0015 [0.035]	0.0017 [0.040]	0.0020 [0.047]
Weight	Axial Ported Units	kg [lb]	19 [42]	19 [42]	19 [42]	19 [42]
	Radial Ported Units	kg [lb]	24 [53]	24 [53]	24 [53]	24 [53]

* Refer to *Speed Ratings*, page 16.
** With pressurized Inlet.



Cross-section, pump control

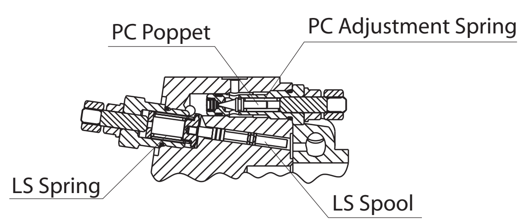


Cross-section, pump

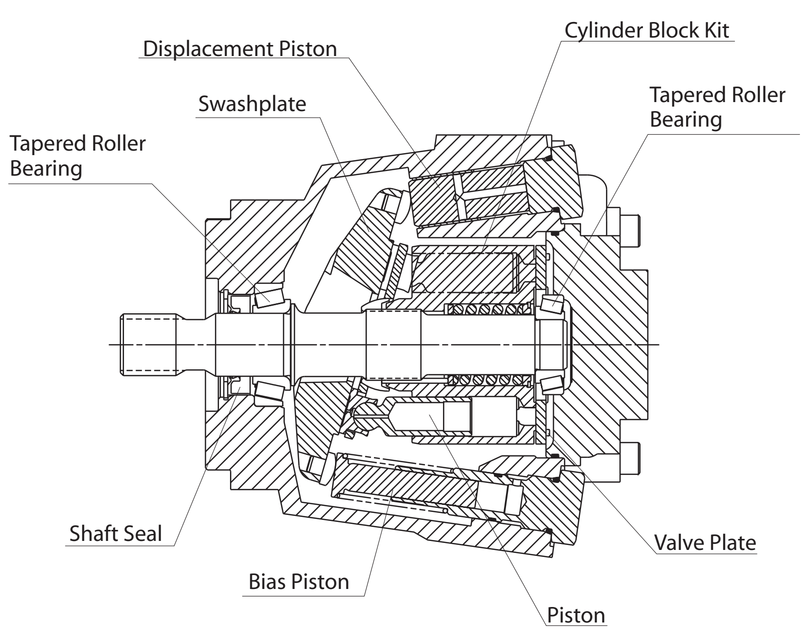
FRAME H PUMPS

Frame H Technical Specifications				
		Dimension	Displacement	
			H57B	H75D
Displacement		cm³ [in³]	57 [3.48]	75 [4.57]
Input Speed	Minimum	min⁻¹ (rpm)	500	500
	Rated*	min⁻¹ (rpm)	2600	2400
	Maximum*	min⁻¹ (rpm)	3200**	2800**
Maximum (Peak) Working Pressure		bar [psi]	400 [5800]	300 [4350]
Continuous Working Pressure		bar [psi]	310 [4495]	210 [3045]
Flow at Rated Speed		l/min [US gal/min]	148.2 [39.5]	180.0 [48.0]
Theoretical Input Torque at Maximum Displacement		Nm/bar [lbf·in/1000 psi]	0.907 [554]	1.194 [726]
Mass Moment of Inertia of the Internal Rotating Parts		kg·m² [lbf·ft²]	0.0043 [0.1014]	0.0043 [0.1014]
Weight	Axial Ported Units	kg [lb]	24 [53]	24 [53]
	Radial Ported Units	kg [lb]	27 [60]	27 [60]

* Refer to *Speed Ratings*, page 16.
** With pressurized Inlet.



Cross-section, pump control



Cross-section, pump

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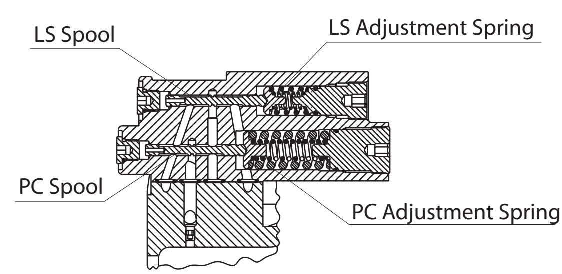
FRAME G PUMPS

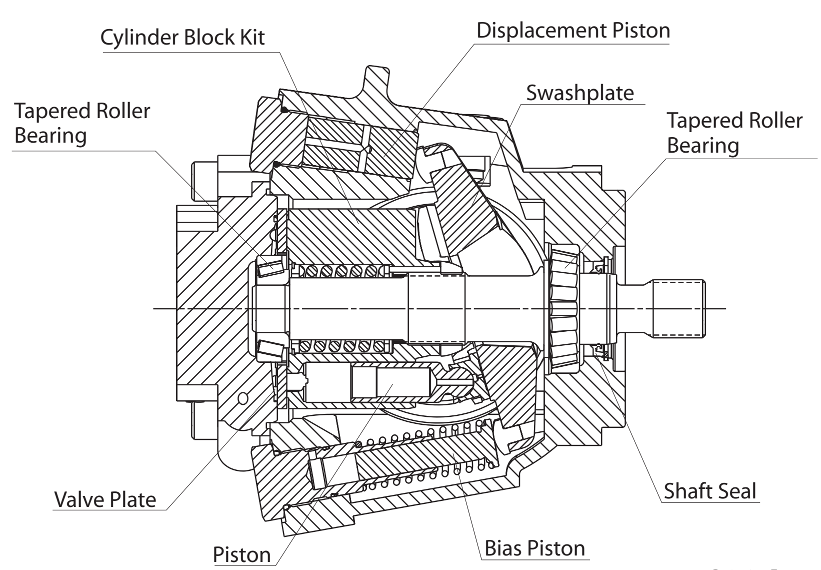
Frame G Technical Specifications

		Dimension	Displacement	
			G74B	G90C
Displacement		cm^3 [in^3]	74 [4.52]	90 [5.49]
Input Speed	Minimum	min^{-1} (rpm)	500	500
	Rated*	min^{-1} (rpm)	2400	2200
	Maximum*	min^{-1} (rpm)	2800**	2600**
Maximum (Peak) Working Pressure		bar [psi]	400 [5800]	350 [5075]
Continuous Working Pressure		bar [psi]	310 [4495]	260 [3770]
Flow at Rated Speed		l/min [US gal/min]	177.6 [47.4]	198.0 [52.8]
Theoretical Input Torque at Maximum Displacement		Nm/bar [lbf·in/1000 psi]	1.178 [720]	1.432 [874]
Mass Moment of Inertia of the Internal Rotating Parts		$kg\cdot m^2$ [$lbf\cdot ft^2$]	0.0063 [0.1500]	0.0063 [0.1500]
Weight	Axial Ported Units	kg [lb]	29 [63]	29 [63]
	Radial Ported Units	kg [lb]	36 [80]	36 [80]

* Refer to *Speed Ratings*, page 16.
** With pressurized Inlet.



Cross-section, pump control



Cross-section, pump

DEFINITIONS

Speed Ratings

Rated speed is the maximum speed recommended under full power conditions at which normal life can be expected.

The rated speed is valid for an inlet pressure of 1 bar [14.5 psi] absolute. All other operating conditions (e.g. fluid viscosity and temperature) must be within recommended limits.

Maximum speed is the highest operating speed recommended and cannot be exceeded without reduction in the life of the product or risk of premature failure and loss of hydraulic power. Reductions in pump outlet flow and/or a pressurized inlet are required to achieve max speed.

Pressure Limits

System pressure is a dominant operating variable affecting hydraulic unit life.

Maximum (peak) working pressure is the highest pressure allowed and is controlled by the system relief valve. This pressure is determined by the maximum machine load demand. Exceeding this pressure will reduce pump life.

Continuous working pressure is the average regularly occurring operating pressure that should yield satisfactory product life. For all applications, the load should move below this pressure.

In order for Sauer-Danfoss representatives to calculate an appropriate design pressure, it is desirable to have a machine duty cycle with the percentage of time at various flows, pressures, and pump speeds. This method of selecting operating pressure is recommended whenever duty cycle information is available.

HYDRAULIC EQUATIONS FOR PUMP SELECTION

Unit:	Metric System:	Inch System:
Pump output flow	$Q = \dfrac{V_g \cdot n \cdot \eta_v}{1000}$ l/min	$Q = \dfrac{V_g \cdot n \cdot \eta_v}{231}$ US gal/min
Input torque	$M = \dfrac{V_g \cdot \Delta p}{20 \cdot \pi \cdot \eta_m}$ Nm	$M = \dfrac{V_g \cdot \Delta p}{2 \cdot \pi \cdot \eta_m}$ lbf•in
Input power	$P = \dfrac{V_g \cdot n \cdot \Delta p}{600\,000 \cdot \eta_m}$ kW	$P = \dfrac{V_g \cdot n \cdot \Delta p}{396\,000 \cdot \eta_m}$ hp

Description:

V_g	=	Pump displacement per rev.	cm^3	$[in^3]$
n	=	Pump speed	min^{-1}(rpm)	
Δp	=	Hydraulic pressure differential	bar	[psi]
η_v	=	Pump volumetric efficiency		
η_m	=	Pump mechanical efficiency		

AUXILIARY MOUNTING PADS

Auxiliary mounting pads are available for all radial ported Series 45 pumps. These pads are typically used for mounting auxiliary hydraulic pumps.

Since the auxiliary pad operates under case pressure, an O-ring must be used to seal the auxiliary pump mounting flange to the pad. The drive coupling is lubricated by oil from the main pump case.

Spline sizes and torque ratings are shown in the accompanying table. Continuous ratings are based on spline tooth wear. Maximum ratings are based on shaft strength; do not exceeded them.

- All mounting pads meet SAE J744 Specifications.
- The combination of auxiliary pad shaft torque, plus the main pump torque must not exceed the maximum pump input shaft rating shown in the *Shaft Availability and Torque Ratings* table on page 17.
- All torque values assume a 58 Rc shaft spline hardness on the mating pump shaft.
- Applications subject to severe vibratory or high-G loading may require an additional structural support to prevent possible mounting flange damage. Refer to *Mounting Flange Loads*, page 25, for additional information.

Auxiliary Mounting Pad Specifications for Frame K and L

Mounting Pad Size	Internal Spline Engagement	Minimum Spline Engagement	Torque Ratings Nm [lbf•in]	
			Maximum	Continuous
SAE A	9 Tooth 16/32 Pitch	13.5 mm 0.53 in	107* [950]	51 [450]
SAE A (SPECIAL)	11 Tooth 16/32 Pitch	13.5 mm 0.53 in	147* [1300]	90 [800]
SAE B	13 Tooth 16/32 Pitch	14.2 mm 0.56 in	249* [2200]	100 [885]
SAE B-B	15 Tooth 16/32 Pitch	16.1 mm 0.63 in	280* [2480]	105 [925]

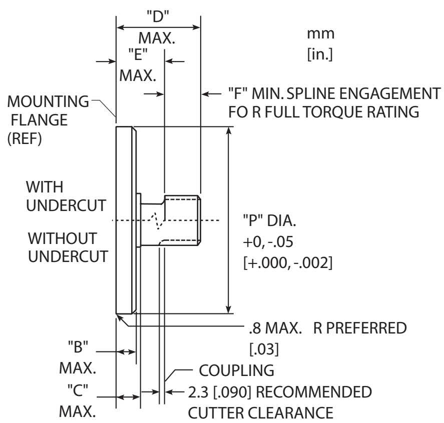
* Contact your Sauer-Danfoss representative if auxiliary torque approaches these limits.

Auxiliary Mounting Pad Specifications for Frame G and H

Mounting Pad Size	Internal Spline Engagement	Minimum Spline Engagement	Torque Ratings Nm [lbf•in]	
			Maximum	Continuous
SAE A	9 Tooth 16/32 Pitch	13.5 mm 0.53 in	107 [950]	51 [450]
SAE A (SPECIAL)	11 Tooth 16/32 Pitch	15.0 mm 0.59 in	147 [1300]	90 [800]
SAE B	13 Tooth 16/32 Pitch	14.2 mm 0.56 in	249 [2200]	124 [1100]
SAE B-B	15 Tooth 16/32 Pitch	18.9 mm 0.74 in	339 [3000]	235 [2080]
SAE C	14 Tooth 12/24 Pitch	18.3 mm 0.72 in	339 [3000]	235 [2080]

AUXILIARY MOUNTING PADS (continued)

Pump mounting flanges and shafts with the dimensions noted in the accompanying drawing are compatible with the auxiliary mounting pads on the Series 45 pumps.



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Mating Auxiliary Pumps

Dimensions						
Flange	"P"	"B"	"C"	"D"	"E"	"F"
SAE A	82.55 [3.250]	6.350 [0.250]	12.70 [0.500]	58.20 [2.290]	15.00 [0.590]	13.50 [0.530]
SAE B	101.60 [4.000]	9.650 [0.380]	15.20 [0.600]	53.10 [2.090]	17.50 [0.690]	14.20 [0.560]
SAE C	127.00 [5.000]	12.70 [0.500]	23.37 [0.920]	55.60 [2.190]	30.50 [1.200]	18.30 [0.720]

Dimensions in mm [in]

INPUT SHAFTS

Series 45 pumps are available with a variety of splined, parallel, and tapered end shafts. Nominal shaft sizes and torque ratings are shown in the accompanying table.

Continuous torque ratings for splined shafts are based on spline tooth wear, and assume the mating spline has a minimum full spline depth hardness of 55 Rc and good lubrication. Torque ratings of spline shafts are based on no external radial loads.

Shaft Availability and Torque Ratings

Shaft Options		Rating Nm [lbf•in]	Frame		
			K and L	H	G
C2 D2	Spline, 13 Tooth 16/32 Pitch (SAE 'B' housing only)	Maximum Continuous	275 [2435] 100 [885]	282 [2495] 102 [900]	Not Available
S1	Spline, 14 Tooth 12/24 Pitch	Maximum Continuous	Not Available	734 [6500] 283 [2500]	734 [6500] 283 [2500]
C3 D3	Spline, 15 Tooth 16/32 Pitch (SAE 'B' housing only)	Maximum Continuous	400 [3540] 210 [1850]	362 [3200] 192 [1700]	Not Available
S2	Spline, 17 Tooth 12/24 Pitch	Maximum Continuous	Not Available	Not Available	1017 [9000] 497 [4400]
T0	Tapered, 1:8 31.75 mm [1.25 in.] Diameter	Maximum	Not Available	734 [6495]	734 [6495]
K4 L4	Parallel 31.75 mm [1.25 in.] Diameter	Maximum	Not Available	655 [5800]	734 [6495]
T1	Tapered, 1:8 25.4 mm [1.0 in.] Diameter	Maximum	420 [3720]	Not Available	Not Available
T2	Tapered, 1:8 22.22 mm [0.875 in.] Diameter	Maximum	265 [2345]	Not Available	Not Available

Note: Recommended mating splines for Series 45 splined input shafts should be in accordance with ANSI B92.1 class 5. Sauer-Danfoss external splines are modified class 5 fillet root side fit. The external spline major diameter and circular tooth thickness dimensions are reduced in order to assure a clearance fit with the mating spline.

DISPLACEMENT LIMITER

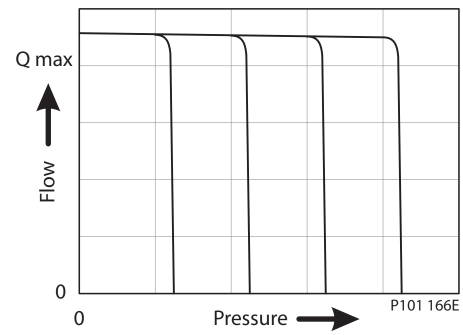
Series 45 - H57, H75, G74, and G90 pumps are available with an optional mechanical maximum displacement (stroke) limiter. The maximum displacement of the pump can be limited to any value from maximum to 75% displacement.

Series 45- K38, K45, L25, L30 pumps only have fixed displacement limiters. Consult the model code or price list for option availability.

PRESSURE COMPENSATOR (PC) CONTROL

The **pressure compensator control** is designed to limit the maximum pressure in the hydraulic circuit by varying the output flow of the pump. This type of control is typically used with closed center valves.

When system pressure at the pump outlet drops below the compensator setting, the control will increase the pump displacement to maximum (maximum output flow). Once system pressure reaches the compensator setting, the control regulates pump displacement to produce an output flow which limits system pressure to the compensator setting. Control response (off-stroke) and recovery (on-stroke) times are shown in the table below.



Pressure Compensator Control Characteristics

PC Control Response/Recovery Time								
(ms)	25	30	38	45	57	74	75	90
Response	30	30	30	30	30	35	30	40
Recovery	90	100	105	110	125	130	130	140

The pressure compensator setting is externally adjustable. The setting range for the pressure compensator is shown in the table below.

PC Control Setting Range								
bar [psi]	25	30	38	45	57	74	75	90
Minimum	100 [1450]	100 [1450]	100 [1450]	100 [1450]	100 [1450]	100 [1450]	100 [1450]	100 [1450]
Maximum	260 [3770]	210 [3045]	260 [3770]	210 [3045]	310 [4495]	310 [4495]	210 [3045]	260 [3770]

REMOTE PC CONTROL

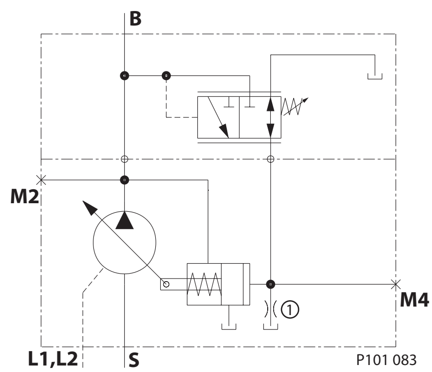
A **remote pressure compensator control** can be added to the system by connecting an appropriate external pressure control valve to the load sense port (port X). This will allow the pressure compensator setting to be controlled mechanically or electrically below the setting of the integral pressure compensator pilot valve. The external valve and its plumbing should be sized for a pilot oil flow of 3.8 l/min [1 US gal/min].

A low standby pressure can be provided by venting the remote compensator port to reservoir through an external 2-way on – off valve (not shown). When this valve is open, the pump standby pressure will be 15 to 20 bar [215 to 300 psi].

For additional system protection, install a relief valve in the pump outlet line.

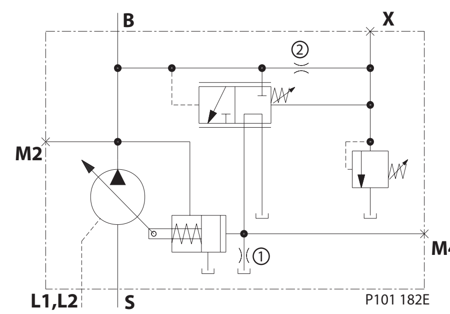
PC CONTROL SCHEMATIC DIAGRAMS

PC Control Schematic for Frame G, K, and L



Ports:
B = Main pressure line
S = Suction line
L1, L2 = Case drain lines
M2 = Gauge port for port B
M4 = Gauge port - servo pressure
1 = Gain orifice

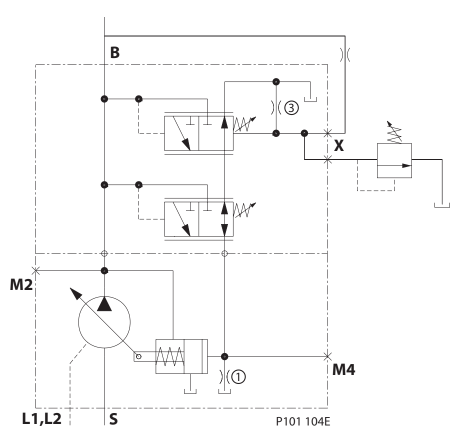
PC Control Schematic for Frame H



Ports:
B = Main pressure line
S = Suction line
L1, L2 = Case drain lines
M2 = Gauge port for port B
M4 = Gauge port - servo pressure
1 = Gain orifice
2 = Pilot orifice

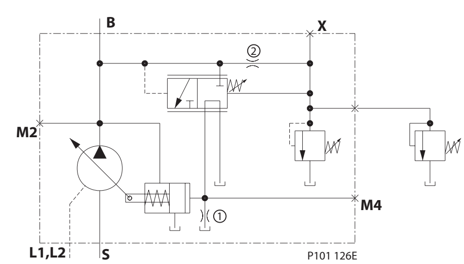
REMOTE PC CONTROL SCHEMATIC DIAGRAMS

Remote PC Control Schematic for Frames G, K, and L



Ports:
B = Main pressure line
S = Suction line
L1, L2 = Case drain lines
X = Load sensing pressure port
M2 = Gauge port for port B
M4 = Gauge port - servo pressure
1 = Gain orifice
3 = Bleed orifice (optional)

Remote PC Control Schematic for Frame H

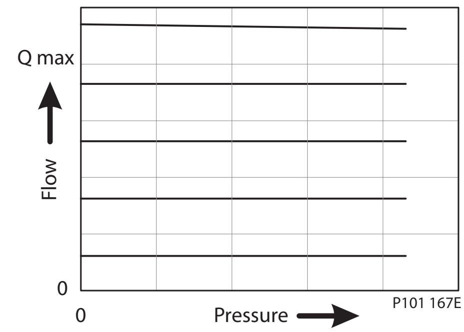


Ports:
B = Main pressure line
S = Suction line
L1, L2 = Case drain lines
X = Load sensing pressure port
M2 = Gauge port for port B
M4 = Gauge port - servo pressure
1 = Gain orifice
2 = Pilot orifice

LOAD SENSING (LS) CONTROL

The load sensing control is designed to match pump outlet flow with system demand. This control option is typically used with closed center, load sensing directional control valves.

When the control valve is centered, the load sensing port on the pump is drained to the reservoir through the a bleed orifice located either in the control valve or the pump control. This maintains a standby pressure at the pump outlet equal to the load sensing setting.



Load Sensing Control Characteristics

When the control valve is actuated, the load sensing port (port 'X') is connected to load pressure. The control then adjusts the pump output flow to maintain a constant pressure drop – equal to the load sensing setting – across the control valve. The pump thereby provides flow to the load as demanded by the control valve position. Control response (off-stroke) and recovery (on-stroke) times are shown in the table below.

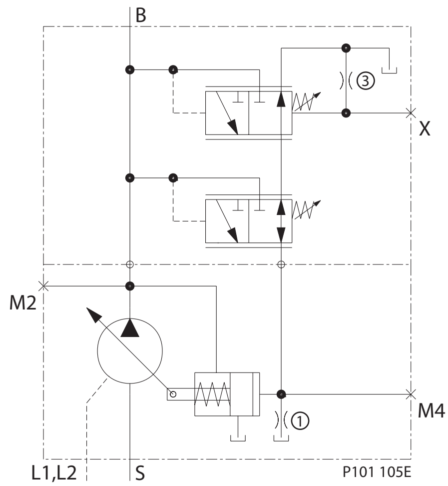
Load Sensing Control Response/Recovery Time								
(ms)	25	30	38	45	57	74	75	90
Response	20	20	30	30	30	35	30	40
Recovery	70	70	80	80	90	100	95	130

A pressure compensator valve is built into the load sensing control. When the pump outlet pressure reaches the pressure compensator setting, the pump reduces its displacement to limit the system pressure. Operation of the pressure compensator valve is similar to the PC control.

The load sensing setting is externally adjustable. The setting range for the load sensing control is shown in the table below.

Load Sensing Control Setting Range								
bar [psi]	25	30	38	45	57	74	75	90
Minimum	12 [175]	12 [175]	12 [175]	12 [175]	7 [100]	10 [175]	7 [100]	10 [175]
Maximum	36 [522]	36 [522]	36 [522]	36 [522]	30 [435]	30 [435]	30 [435]	30 [435]

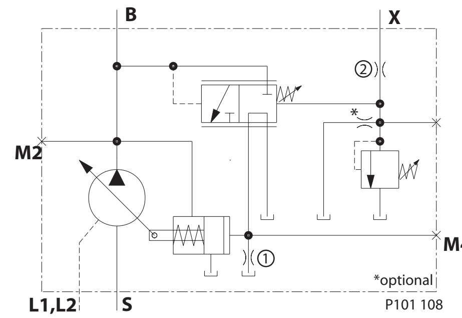
LS CONTROL SCHEMATIC DIAGRAMS



Load Sensing Control Schematic Diagram
Frames L, K, and G

Ports:

B	=	Main pressure line
S	=	Suction line
L1, L2	=	Case drain lines
X	=	Load sensing pressure port
M2	=	Gauge port for port B
M4	=	Gauge port - servo pressure
1	=	Gain orifice
3	=	Bleed orifice (optional)



Load Sensing Control Schematic Diagram
Frame H

Ports:

B	=	Main pressure line
S	=	Suction line
L1, L2	=	Case drain lines
X	=	Load sensing pressure port
M2	=	Gauge port for port B
M4	=	Gauge port - servo pressure
2	=	Pilot orifice
3	=	Bleed orifice (optional)

BEARING LIFE

Normal bearing B_{10} life in hours is indicated in the table below. These values are calculated using a weighted average pressure, 1800 rpm shaft speed, and no external shaft side load.

Bearing Life								
Bearing Life B_{10} Hours	Displacement							
	25	30	38	45	57	74	75	90
at 140 bar [2030 psi]	49100	24600	35300	19600	29712	41383	10755	19847
at 210 bar [3045 psi]	14100	7230	11400	6200	6834	9048	2474	4339
at 260 bar [3770 psi]	6590	-	5870	-	3151	4062	-	1948
at 310 bar [4495 psi]	-	-	-	-	1666	2101	-	-

SHAFT LOADS

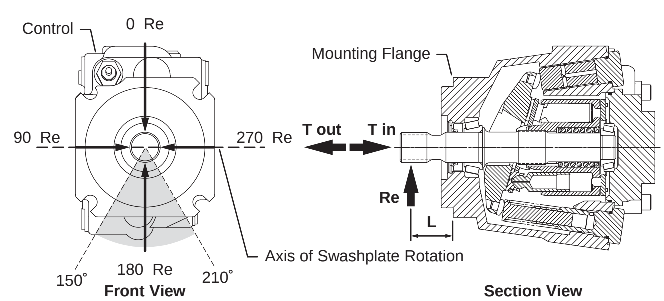
Series 45 pumps are designed with bearings that can accept external some radial and thrust loads. The external radial shaft load limits are a function of the load position and orientation, and the operating conditions of the pump.

The maximum allowable radial side load (Re), based on the maximum external moment (Me) and the distance (L) from the mounting flange to the load, may be determined from the table and diagram below. Thrust (axial) load limits are also shown.

Maximum Allowable Radial Side Load, Re = Me / L

All external shaft loads will have an effect on bearing life. In applications where external shaft loads can not be avoided, bearing life may be maximized by orientating the load between the 150 and 210 degree positions, as shown.

Tapered input shafts or clamp-type couplings are recommended for applications where radial shaft side loads are present.

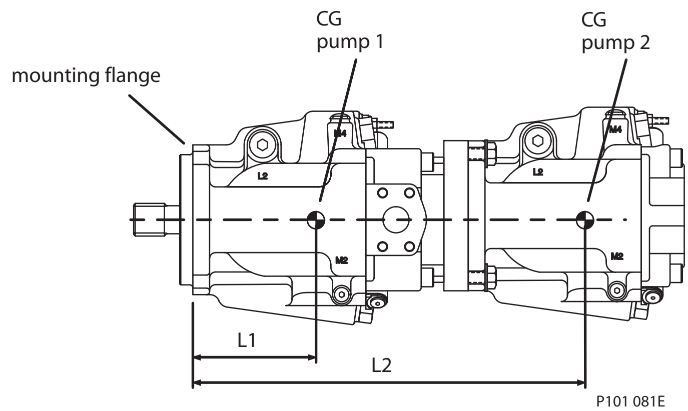


External Shaft Load Orientation

Maximum Allowable External Shaft Loads								
Load Type	Displacement							
	25	30	38	45	57	74	75	90
External Moment (M_e) – Nm [lbf•in]	61 [540]	61 [540]	76 [673]	76 [673]	226 [2000]	300 [2655]	226 [2000]	300 [2655]
Maximum Shaft Thrust In (T_{In}) – N [lbf]	1000 [225]	1000 [225]	1200 [270]	1200 [270]	2200 [500]	2900 [650]	2200 [500]	2900 [650]
Maximum Shaft Thrust Out (T_{out}) – N [lbf]	1000 [225]	1000 [225]	1200 [270]	1200 [270]	2200 [500]	2900 [650]	2200 [500]	2900 [650]

MOUNTING FLANGE LOADS

Adding tandem mounted auxiliary pumps and/or subjecting pumps to high shock loads may result in excessive loading of the mounting flange. The overhung load moment for multiple pump mounting may be estimated as shown in the accompanying figure.



Overhung Load Distance From Mounting Flange

ESTIMATING OVERHUNG LOAD MOMENTS

W = Weight of pump

L = Distance from mounting flange to pump center of gravity (refer to pump installation drawings)

$M_S = G_S (W_1L_1 + W_2L_2 + ... + W_nL_n)$

$M_C = G_C (W_1L_1 + W_2L_2 + ... + W_nL_n)$

Where:

M_S = Shock load moment

M_c = Continuous load moment

G_s = Maximum shock acceleration (gs)

G_c = Continuous (vibratory) acceleration (gs)

Allowable overhung load moment values are shown in the accompanying table. Exceeding these values will require additional pump support.

Allowable Overhung Load Moments

Frame	Flange	Continuous Moment (M_c)		Shock Load Moment (M_c)	
		Nm	[lbf•in]	Nm	[lbf•in]
K and L	All	1005	[8900]	3550	[31400]
H	All	880	[10000]	3090	[35000]
	Modified B flange	740	[6500]	2600	[23000]
	Standard B flange	740	[6500]	2600	[23000]
G	All	1580	[14000]	5650	[50000]

SOUND LEVELS

The accompanying table includes sound levels measured in dB(A) at 1.52 meter [5 ft.] from the pump in a semi-anechoic chamber. Anechoic levels can be estimated by subtracting 3 dB(A) from these values.

Sound Levels dB (A)

Displ.	210 bar [3045 psi]		260 bar [3770 psi]		310 bar [4495 psi]	
	1800 rpm	Rated	1800 rpm	Rated	1800 rpm	Rated
25	68	72	69	73	-	-
30	69	73	-	-	-	-
38	69	73	70	74	-	-
45	70	74	-	-	-	-
57	72	75	73	76	74	77
74	78	81	77	79	78	80
75	74	77	-	-	-	-
90	77	79	78	80	-	-

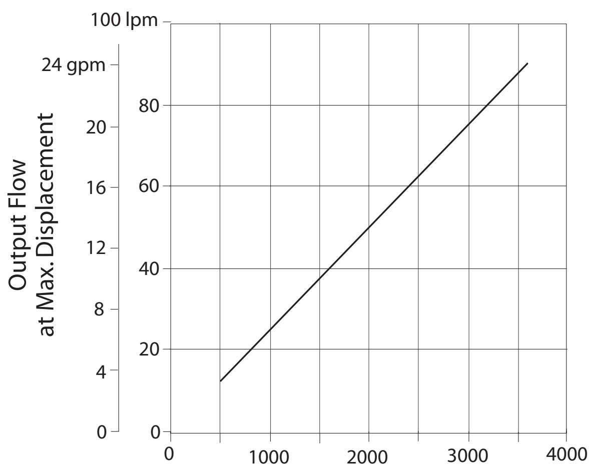
Noise is unwanted sound. Fluid power systems create noise. There are many techniques available to minimize noise. Understanding how it's generated and transmitted is necessary to apply these methods effectively.

Noise energy is transmitted as fluid borne noise (pressure ripple) or structure borne noise. Pressure ripple is the result of the number of pumping elements (pistons) delivering oil to the outlet and the pump's ability to gradually change the volume of each pumping element from low to high pressure. Pressure ripple is affected by the compressibility of the oil as each pumping element discharges into the outlet of the pump. Pressure pulsations travel along hydraulic lines at the speed of sound (about 1400 m/s in oil) until there is a change in the system (such as an elbow fitting). Thus, the pressure pulsation amplitude varies with overall line length and position.

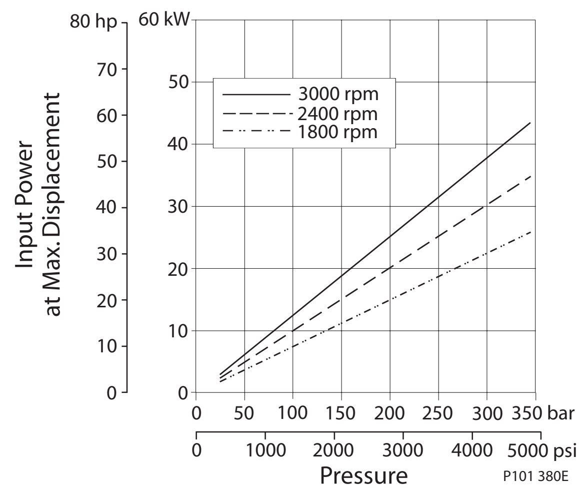
Structure borne noise may be transmitted wherever the pump casing is connected to the rest of the system.

The way circuit components respond to excitation depends on their size, form, and mounting. Because of this, a system line may actually have a greater noise level than the pump. To minimize noise, use:
- flexible hoses (if you must use steel plumbing, clamp the lines)
- flexible (rubber) mounts

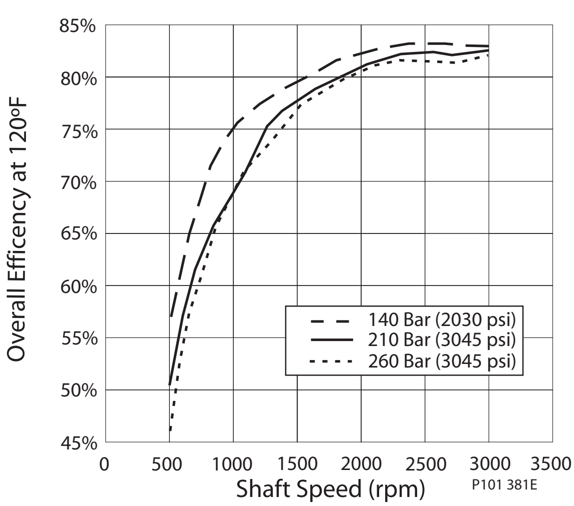
Output Flow vs Speed (Theoretical)



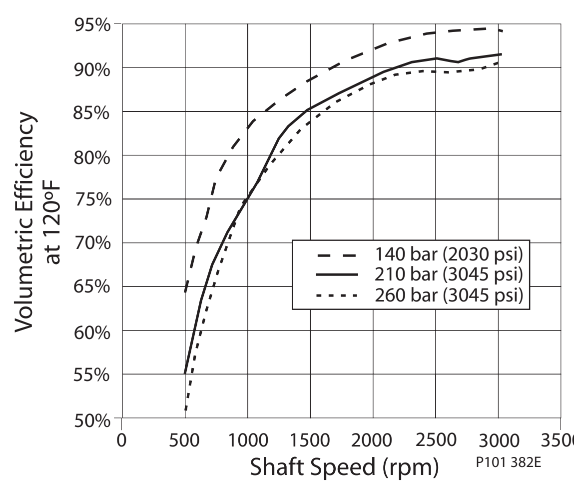
Input Power vs Pressure (Theoretical)



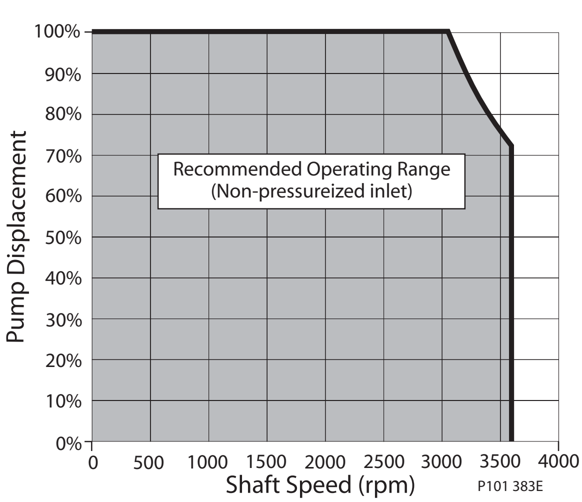
Overall Efficiency



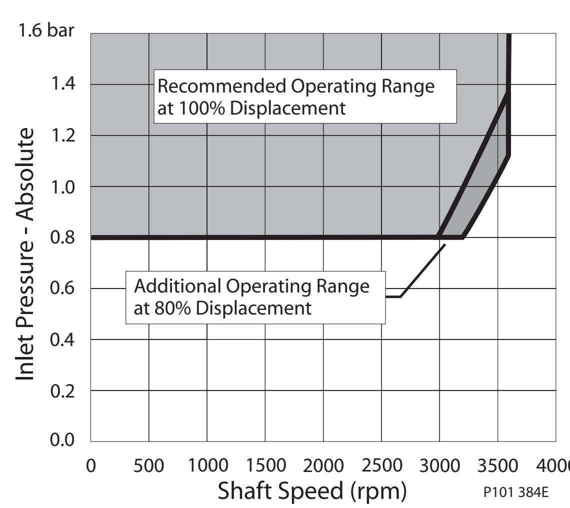
Volumetric Efficiency



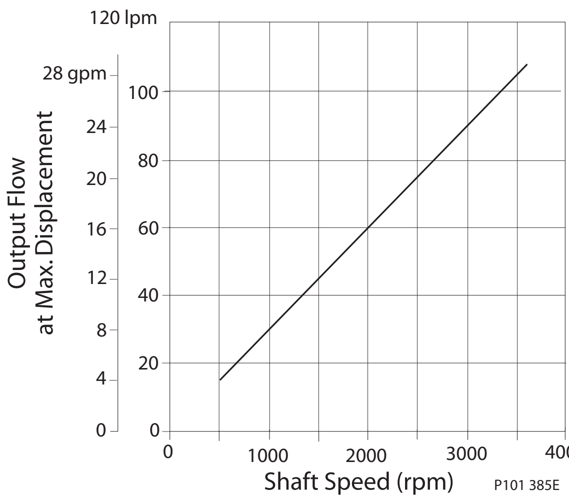
Maximum Speed versus Displacement



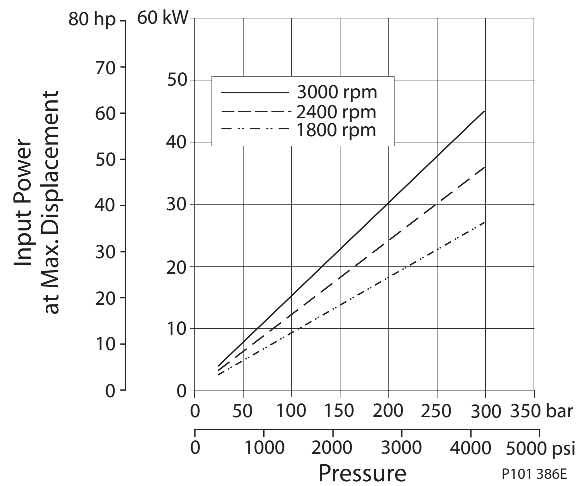
Inlet Pressure versus Speed



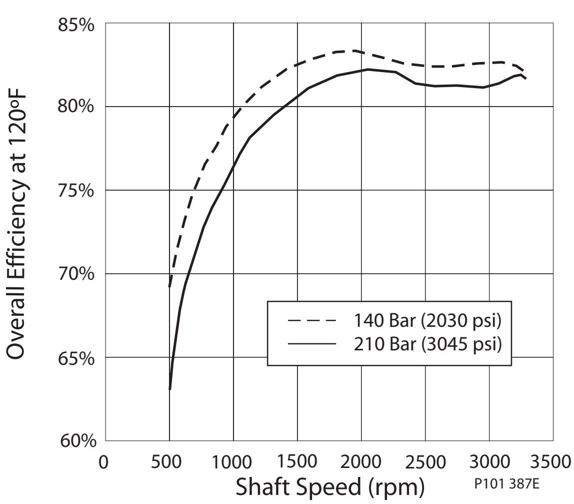
Output Flow vs Speed (Theoretical)



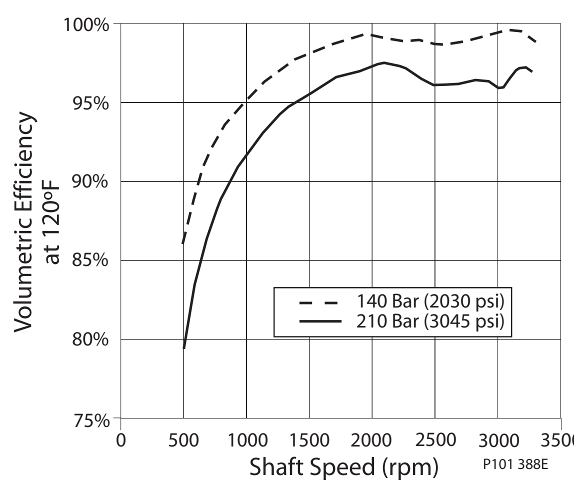
Input Power vs Pressure (Theoretical)



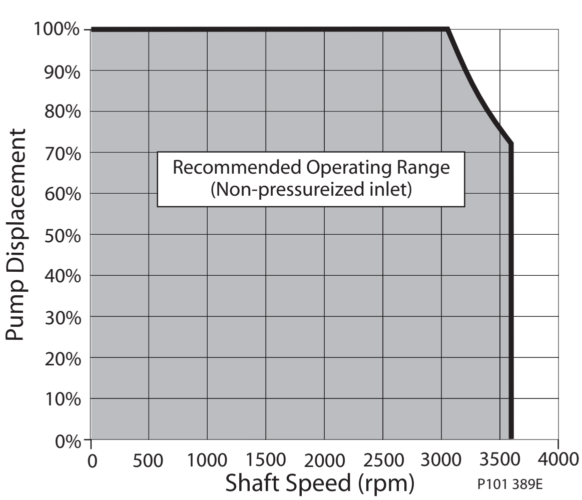
Overall Efficiency



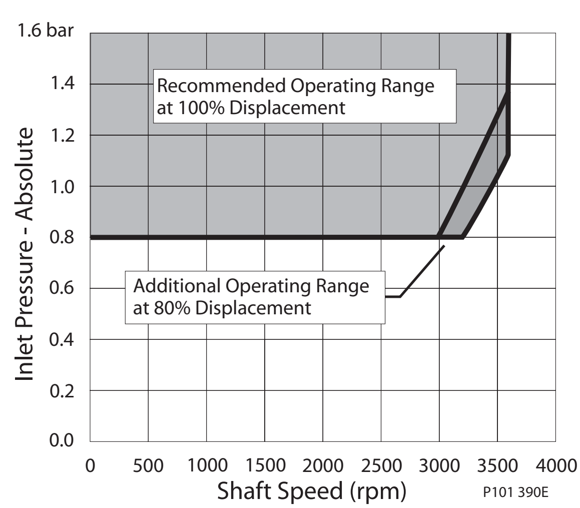
Volumetric Efficiency



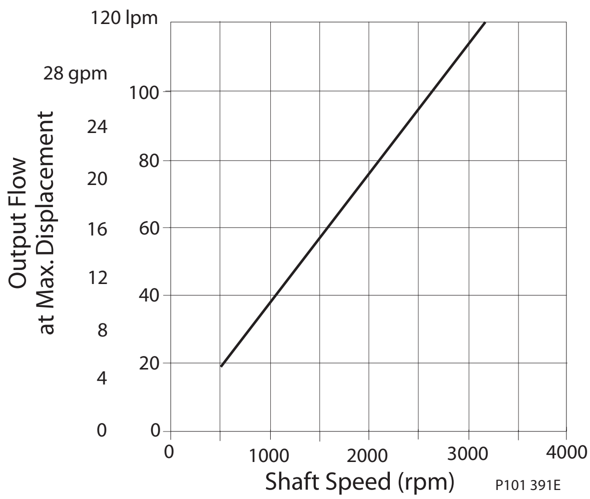
Maximum Speed versus Displacement



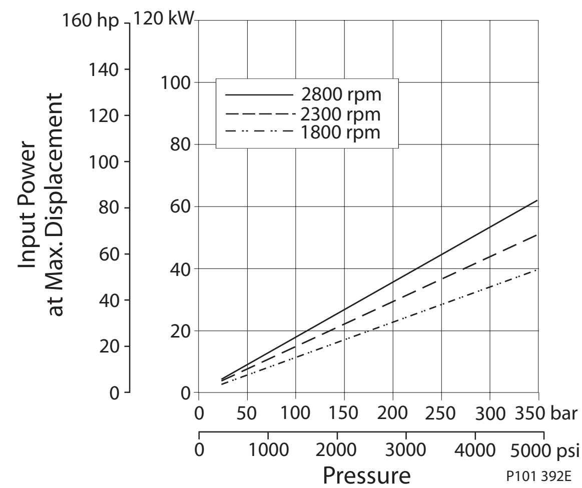
Inlet Pressure versus Speed



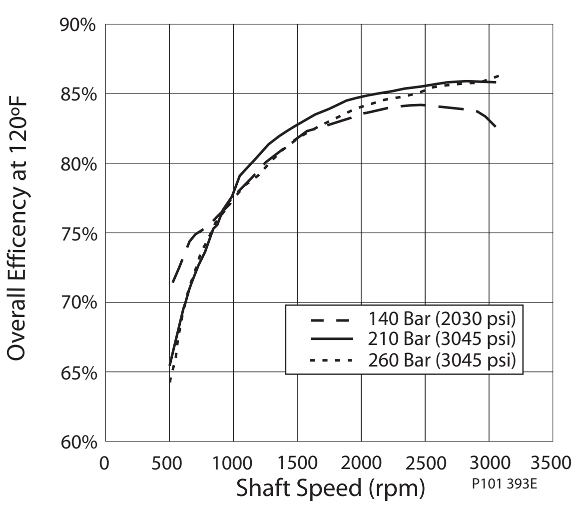
Output Flow vs Speed (Theoretical)



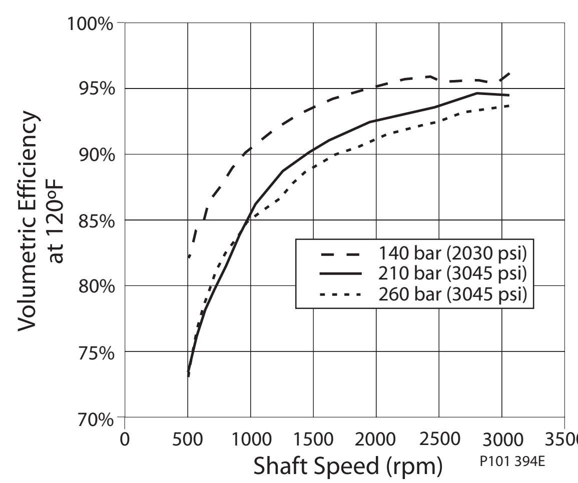
Input Power vs Pressure (Theoretical)



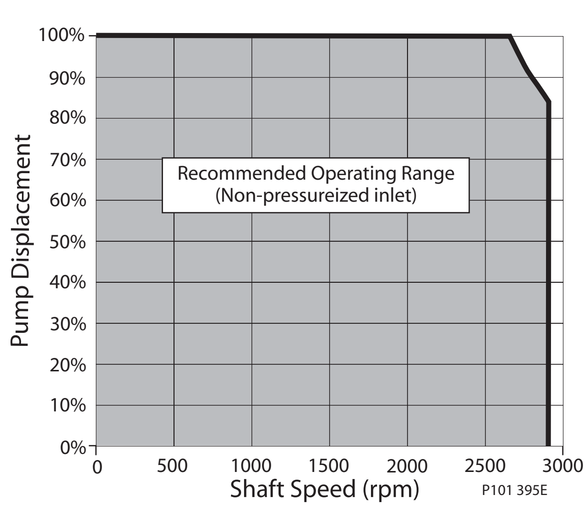
Overall Efficiency



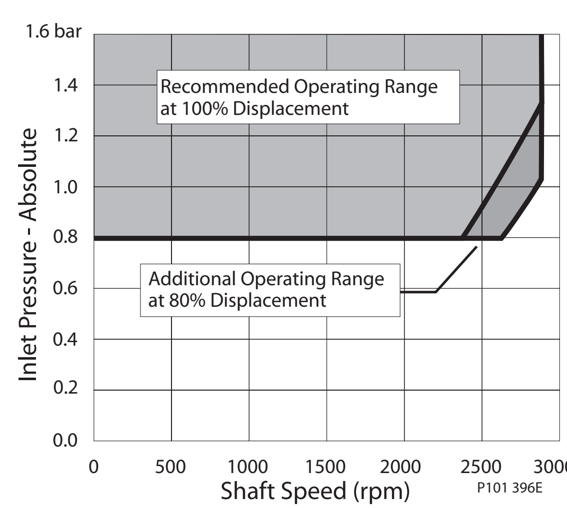
Volumetric Efficiency



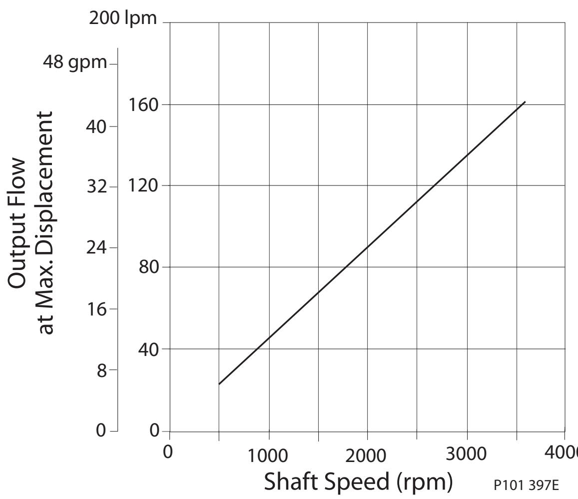
Maximum Speed versus Displacement



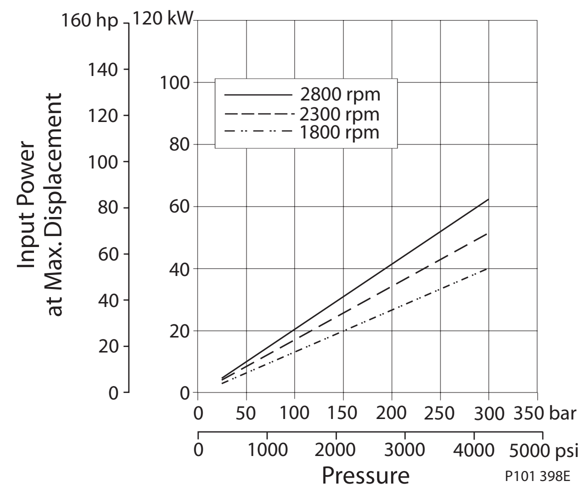
Inlet Pressure versus Speed



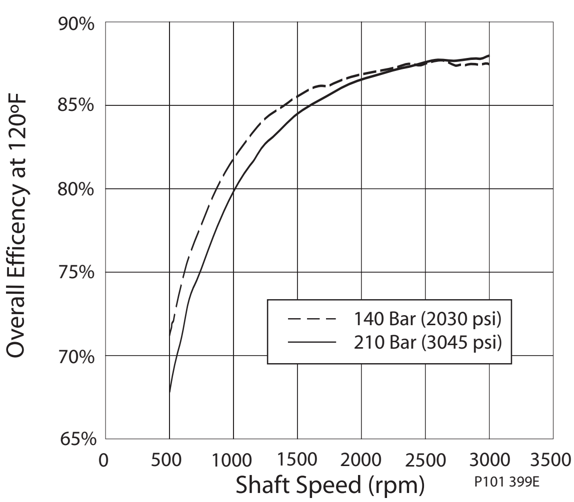
Output Flow vs Speed (Theoretical)



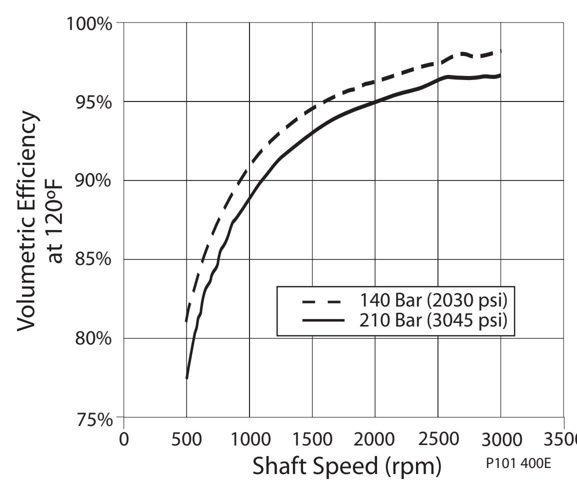
Input Power vs Pressure (Theoretical)



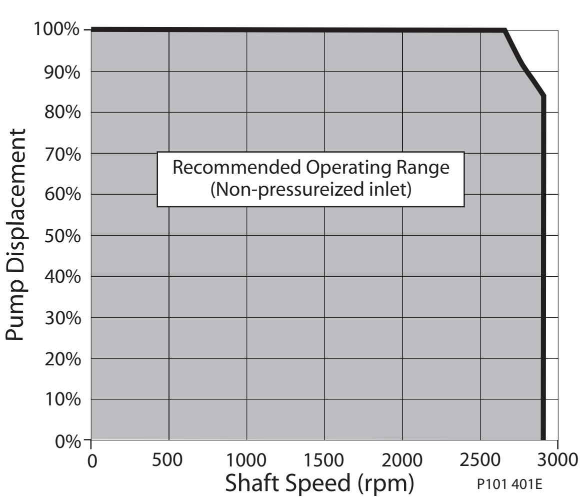
Overall Efficiency



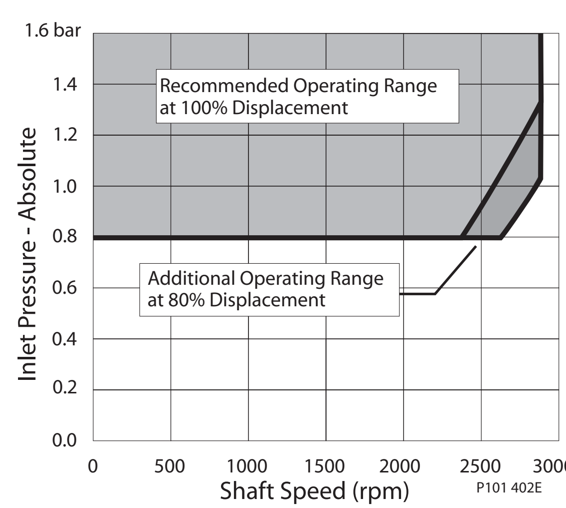
Volumetric Efficiency



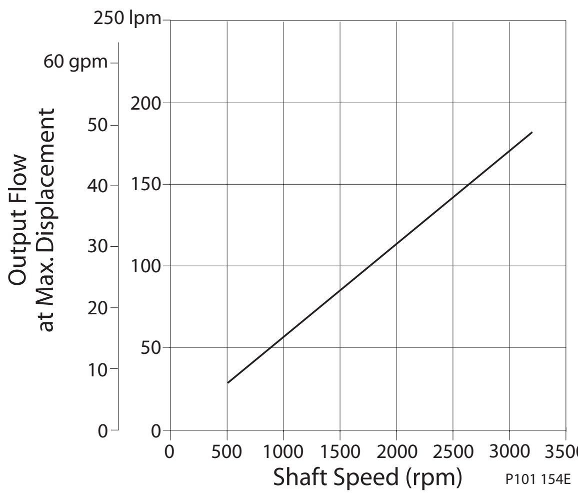
Maximum Speed versus Displacement



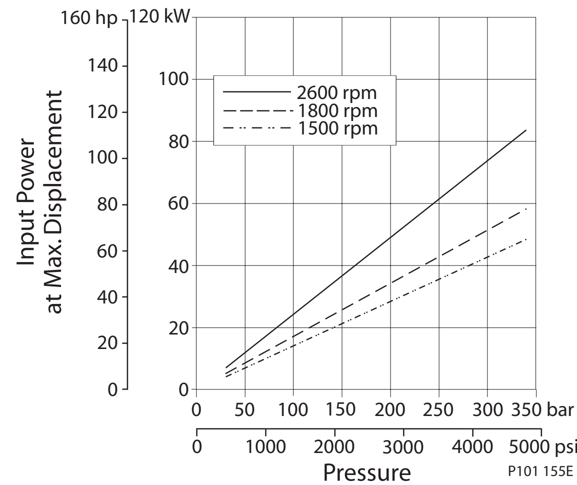
Inlet Pressure versus Speed



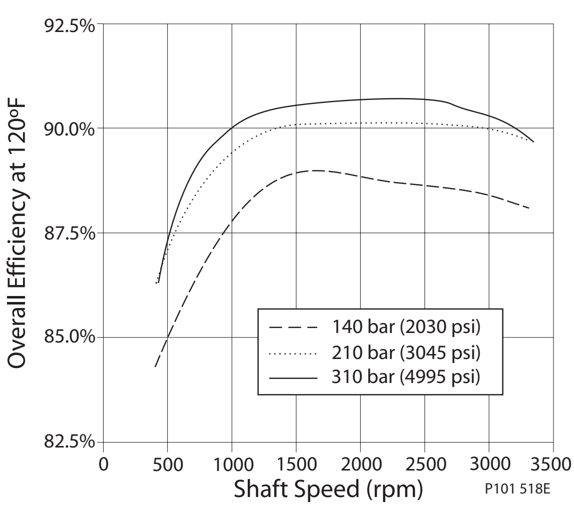
Output Flow vs Speed (Theoretical)



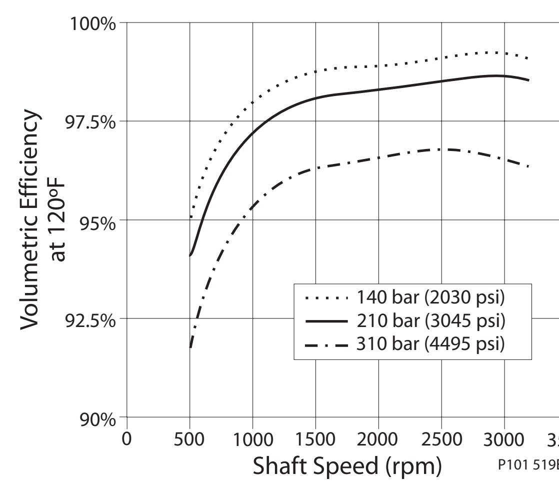
Input Power vs Pressure (Theoretical)



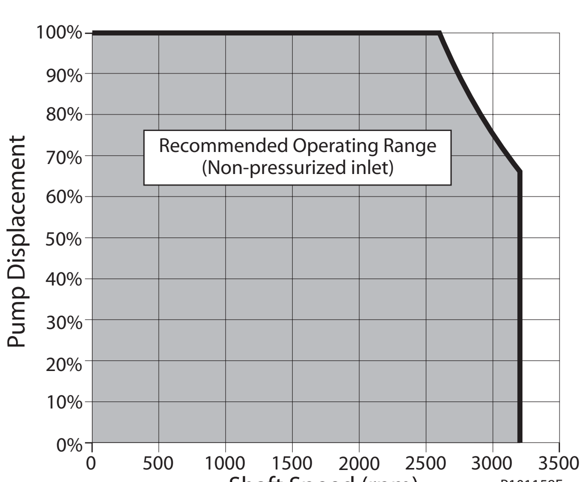
Overall Efficiency



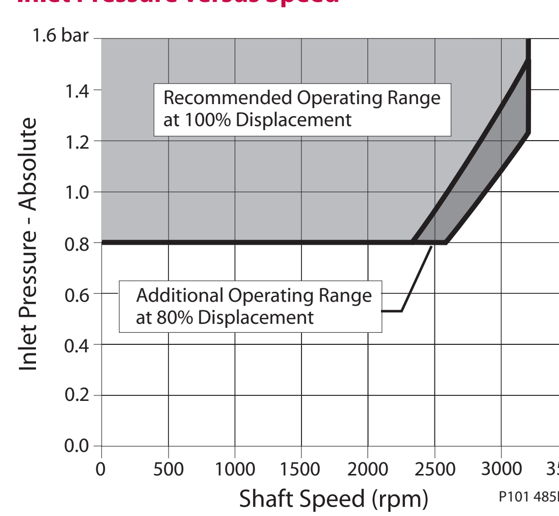
Volumetric Efficiency



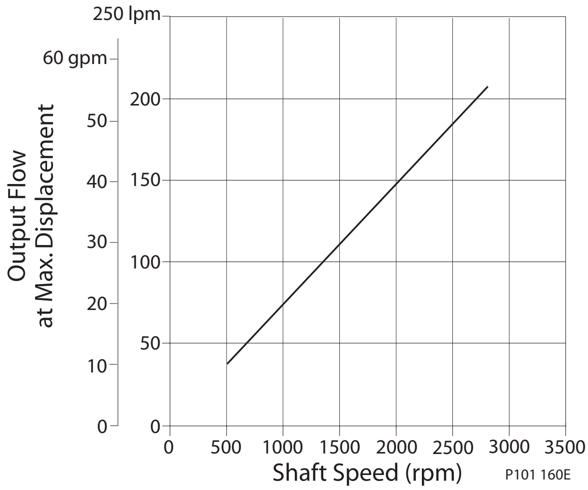
Maximum Speed versus Displacement



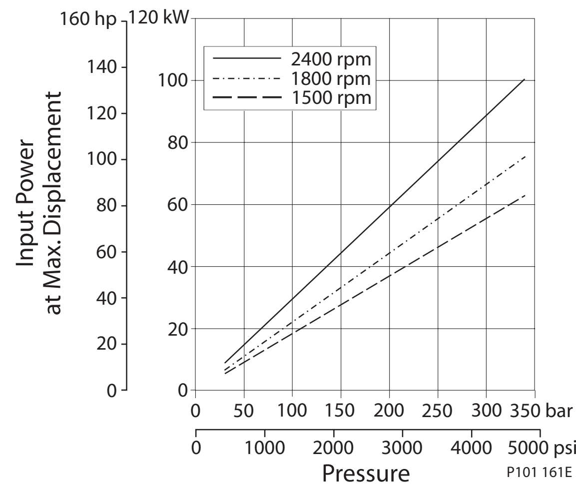
Inlet Pressure versus Speed



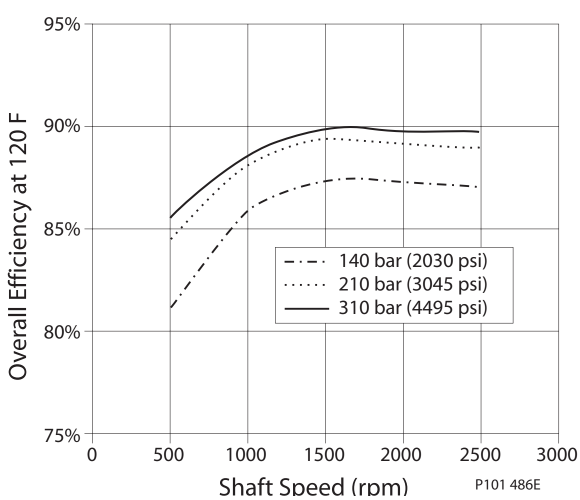
Output Flow vs Speed (Theoretical)



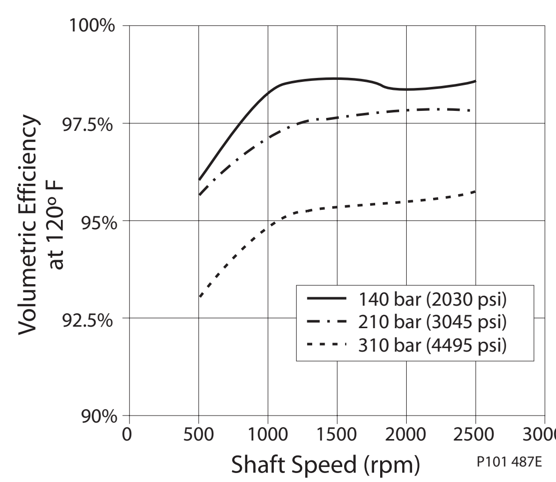
Input Power vs Pressure (Theoretical)



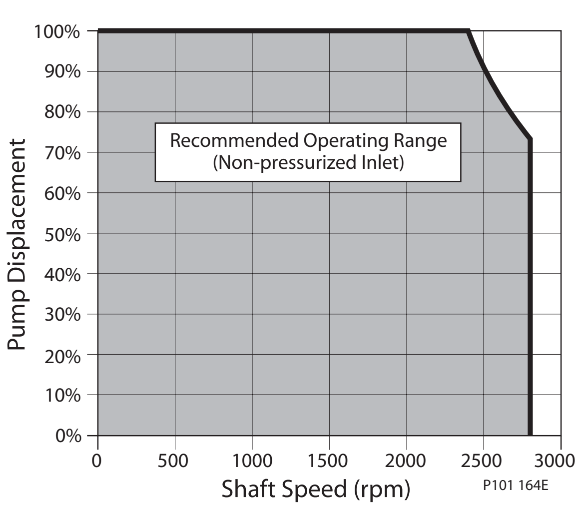
Overall Efficiency



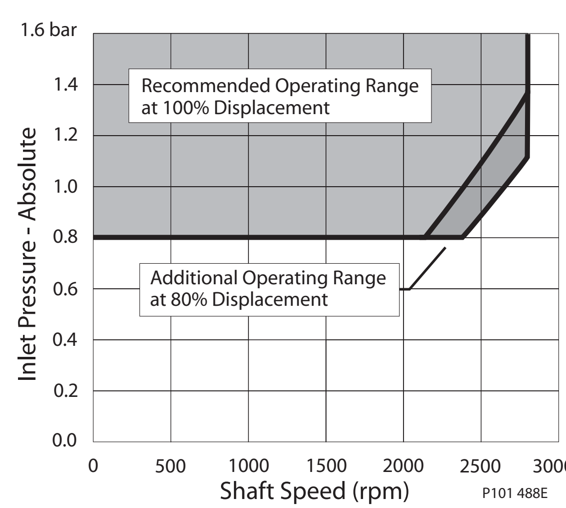
Volumetric Efficiency



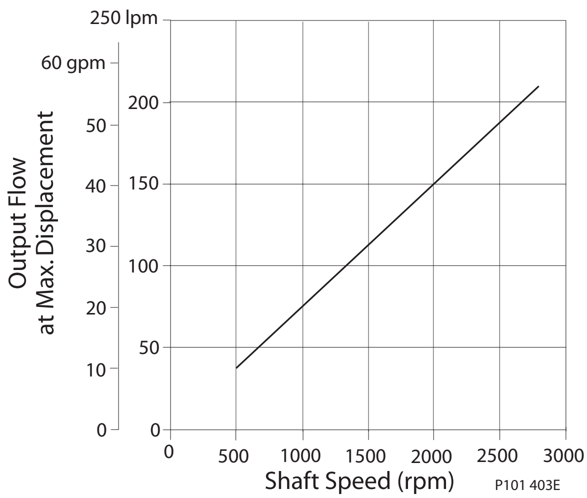
Maximum Speed versus Displacement



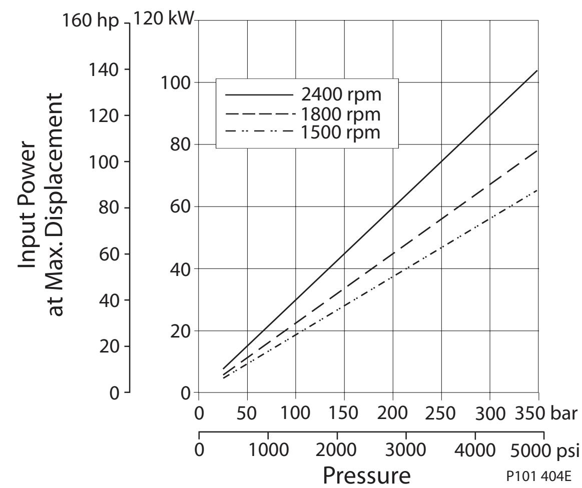
Inlet Pressure versus Speed



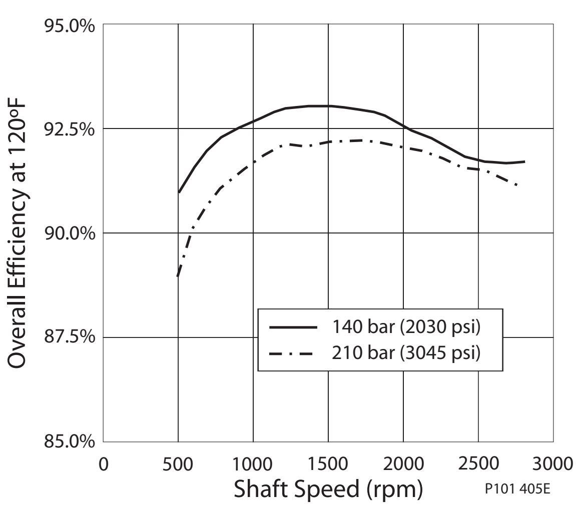
Output Flow vs Speed (Theoretical)



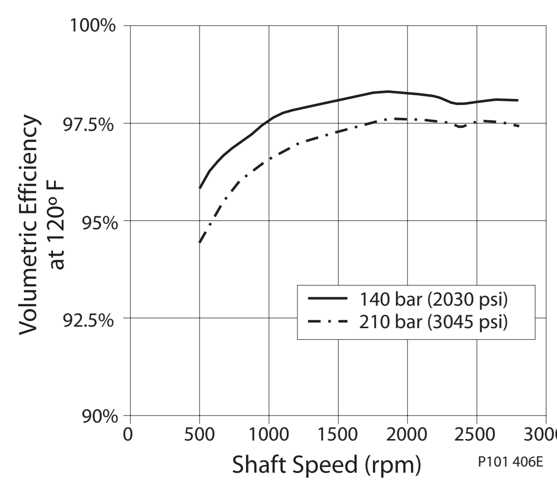
Input Power vs Pressure (Theoretical)



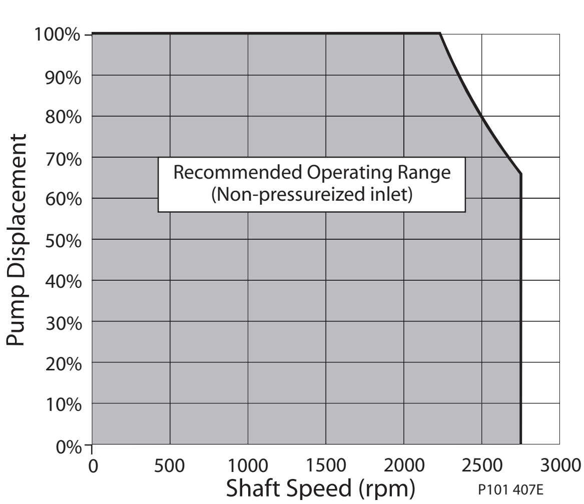
Overall Efficiency



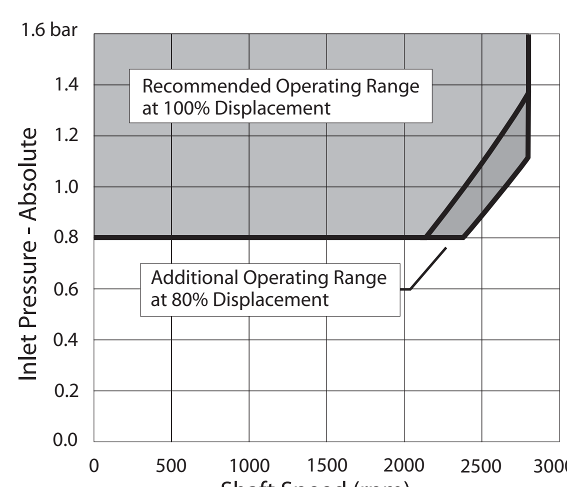
Volumetric Efficiency



Maximum Speed versus Displacement

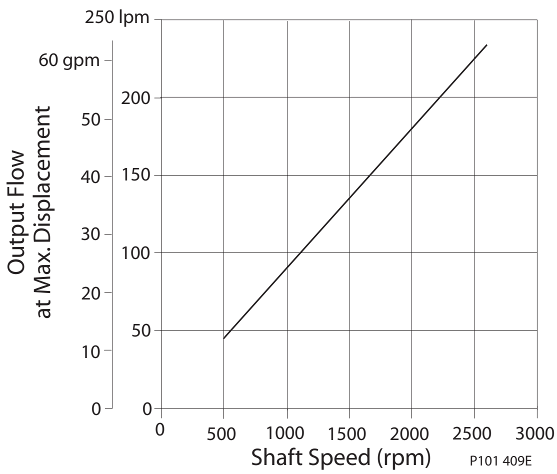


Inlet Pressure versus Speed

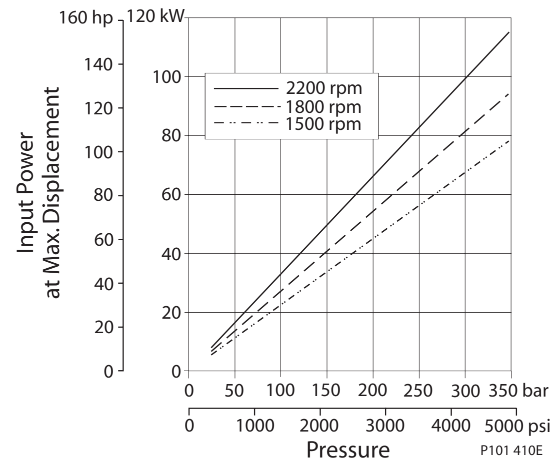


Performance Graphs - 90cc

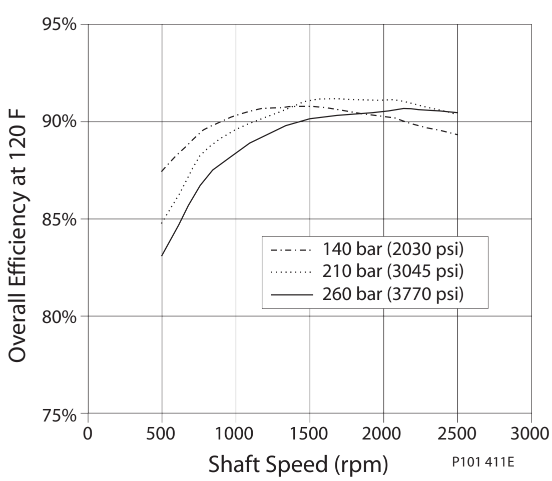
Output Flow vs Speed (Theoretical)



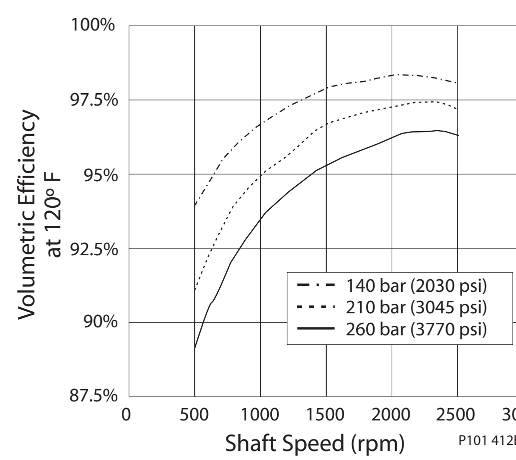
Input Power vs Pressure (Theoretical)



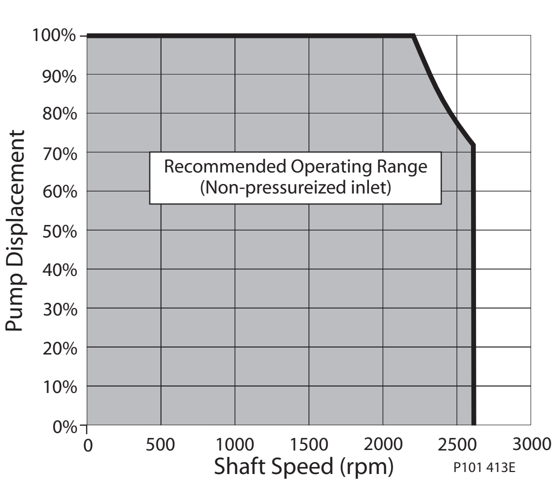
Overall Efficiency



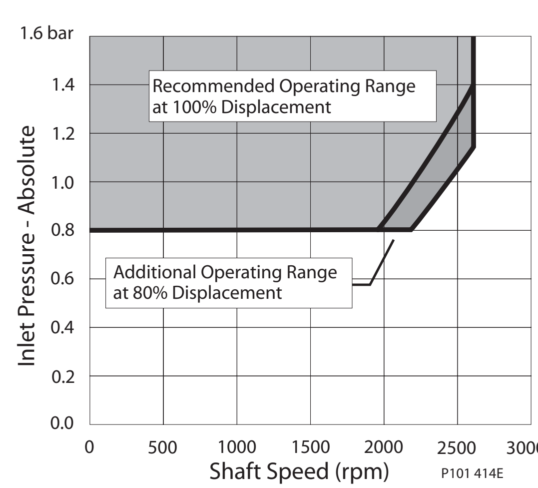
Volumetric Efficiency



Maximum Speed versus Displacement

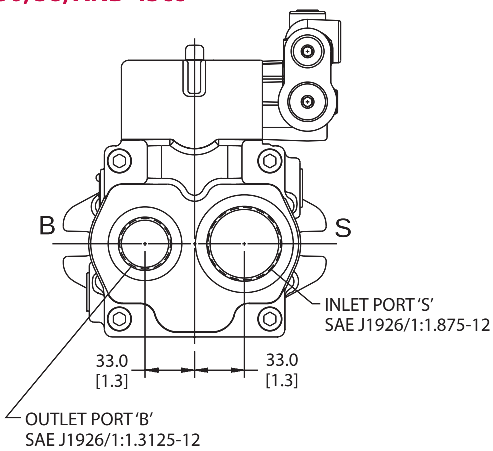


Inlet Pressure versus Speed

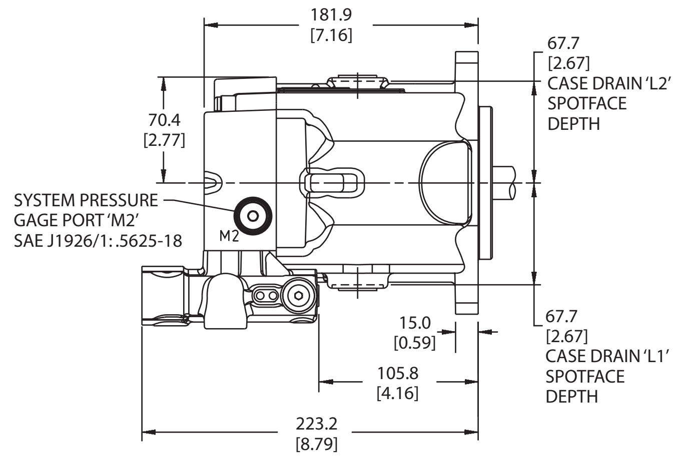


DIMENSIONS FRAMES K AND L 25, 30, 38, AND 45cc

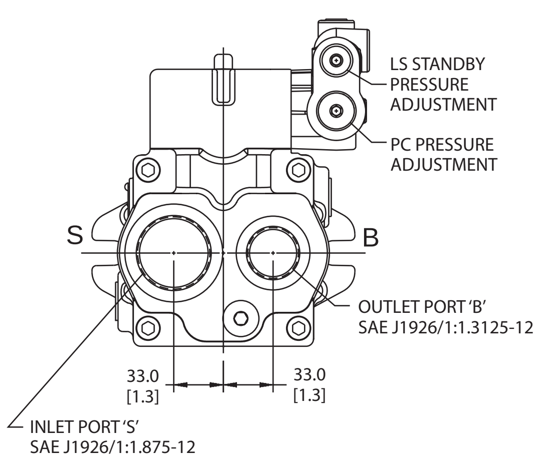
SAE B Flange with Axial Porting



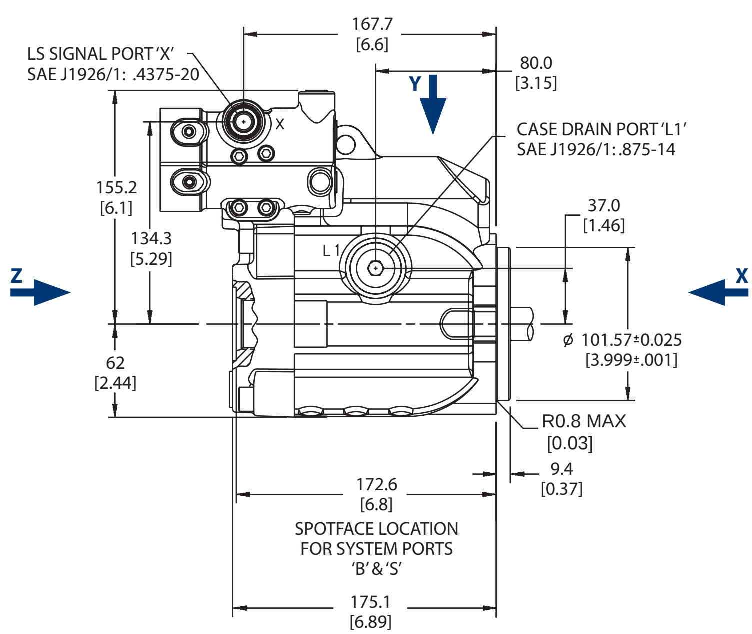
VIEW IN DIRECTION Z
REAR VIEW FOR LH (CCW) ROTATION



VIEW IN DIRECTION Y
TOP VIEW



VIEW IN DIRECTION Z
REAR VIEW FOR RH (CW) ROTATION



LEFT SIDE VIEW

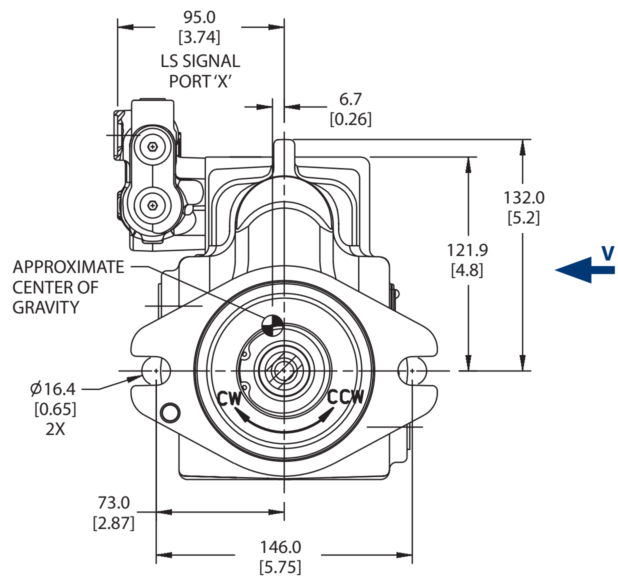
P101 415E

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

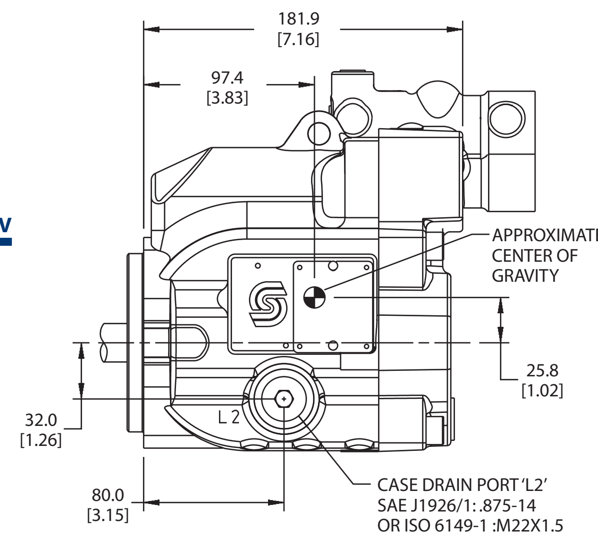
Dimensions in mm [in]

DIMENSIONS FRAMES K AND L 25, 30, 38, AND 45cc (continued)

SAE B Flange with Axial Porting (continued)



VIEW IN DIRECTION X
FRONT VIEW



VIEW IN DIRECTION V
RIGHT SIDE VIEW

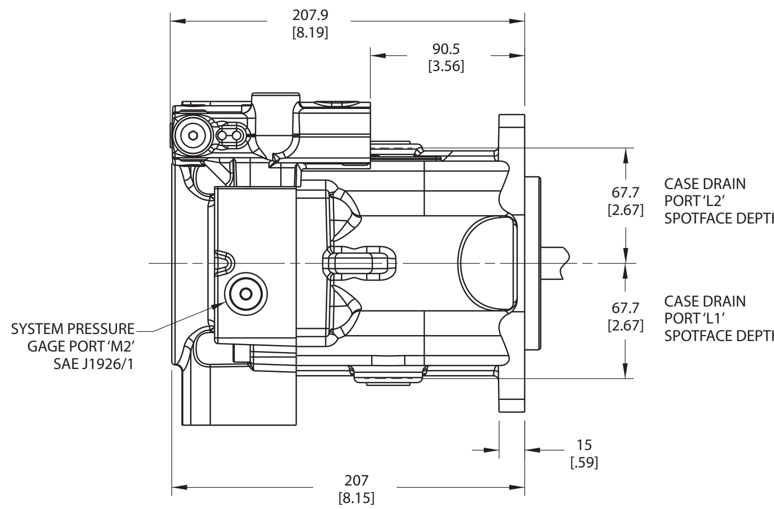
P101 416E

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

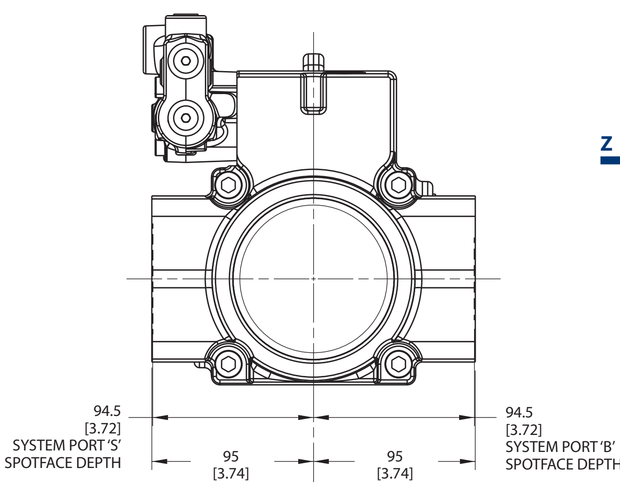
Dimensions in mm [in]

DIMENSIONS FRAMES K AND L 25, 30, 38, AND 45CC (continued)

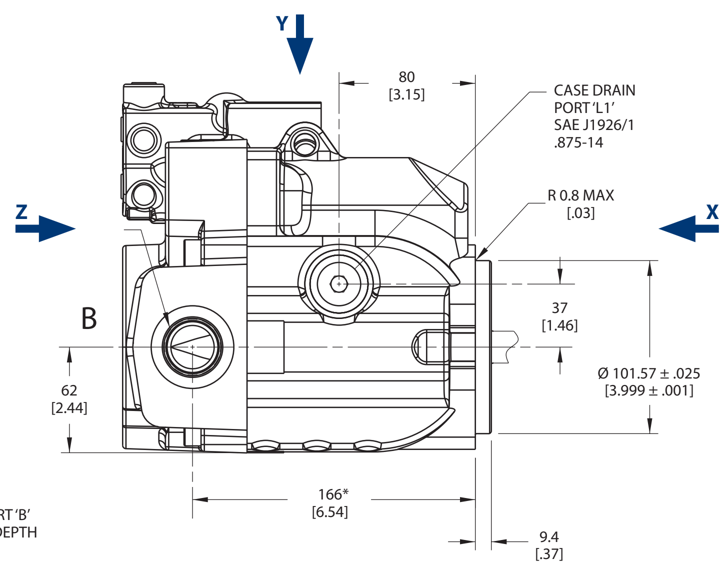
SAE B Flange with Radial Porting



VIEW IN DIRECTION Y



VIEW IN DIRECTION Z
REAR VIEW



P101 576

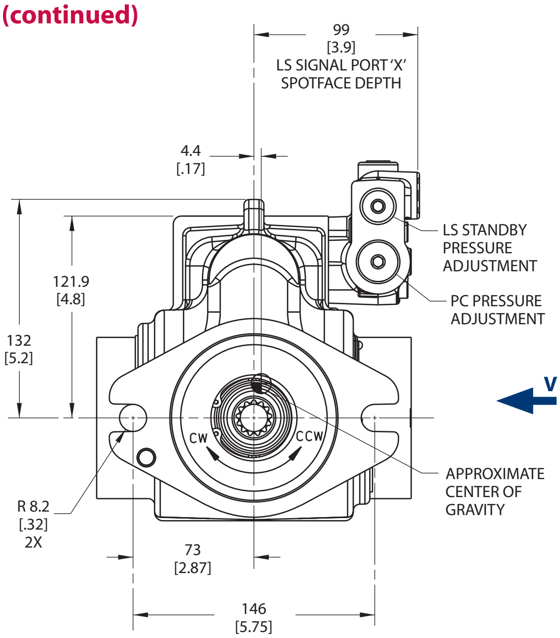
LEFT SIDE VIEW
RH (CW) ROTATION SHOWN

* Dimension to center of port is equal for LH (CCW) or RH (CW) rotation.
All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

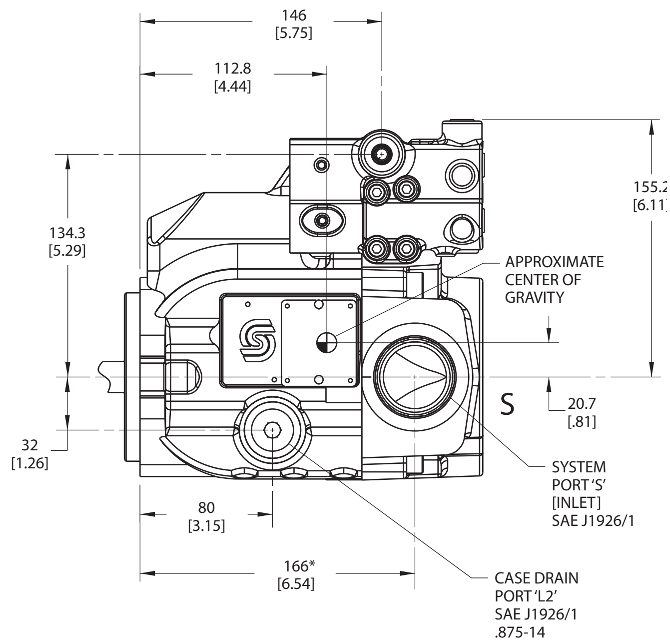
Dimensions in mm [in]

DIMENSIONS FRAMES K AND L 25, 30, 38, AND 45CC (continued)

SAE B Flange with Radial Porting (continued)



VIEW IN DIRECTION X
FRONT VIEW



VIEW IN DIRECTION V
RIGHT SIDE VIEW
RH (CW) ROTATION SHOWN

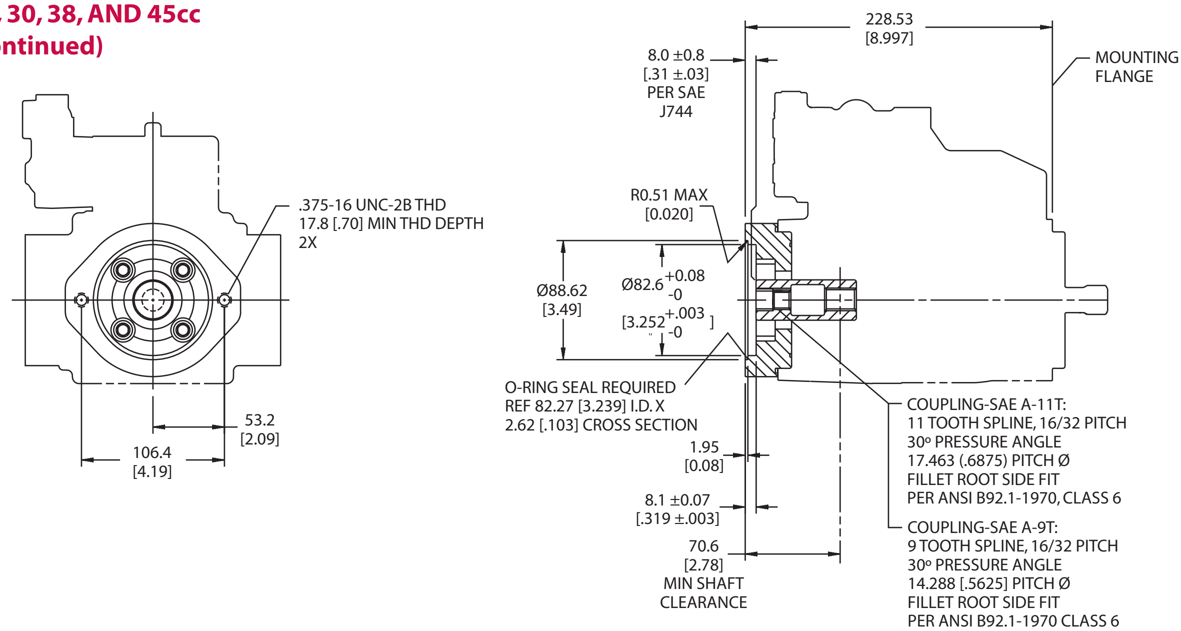
P101 577

* Dimension to center of port is equal for LH (CCW) or RH (CW) rotation.
All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

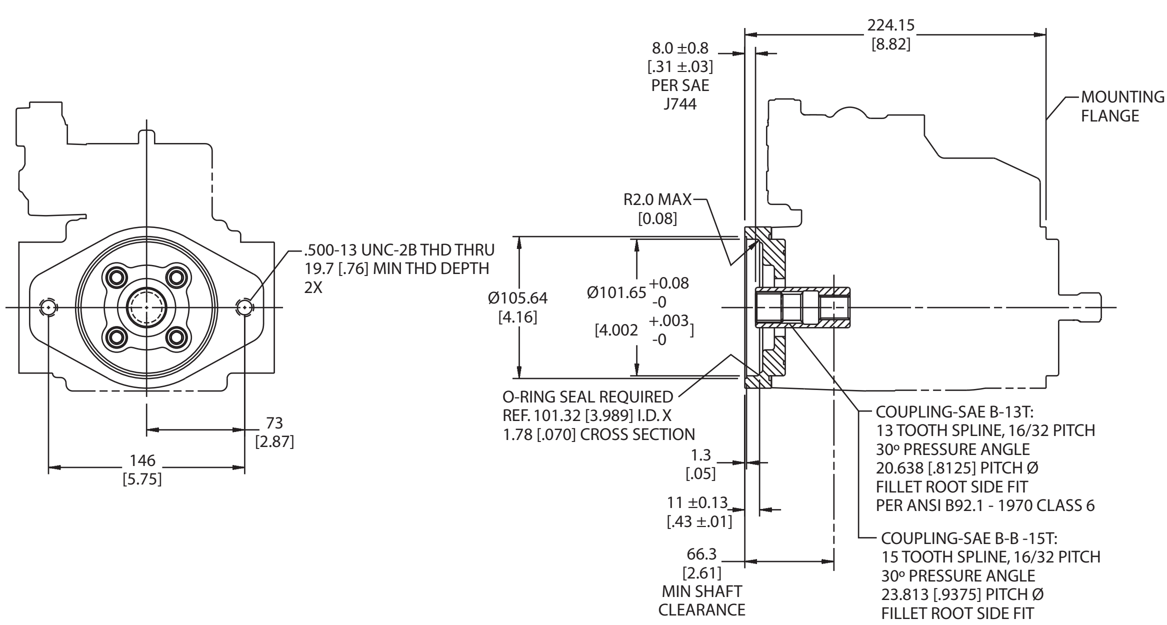
Dimensions in mm [in]

DIMENSIONS FRAMES K AND L 25, 30, 38, AND 45cc (continued)

Auxiliary Mounting Flanges



SAE A AUXILIARY MOUNTING FLANGE WITH SAE A -9T AND SAE A-11T COUPLINGS



P101 417E

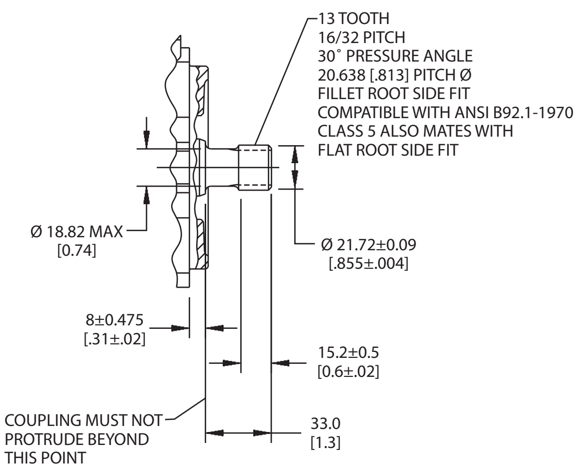
SAE B AUXILIARY MOUNTING FLANGE WITH SAE B-13T AND SAE B-B-15T COUPLINGS

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

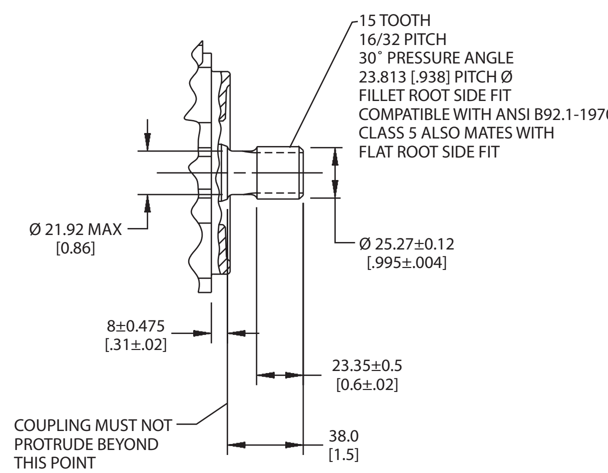
Dimensions in mm [in]

DIMENSIONS FRAMES K AND L 25, 30, 38, AND 45cc (continued)

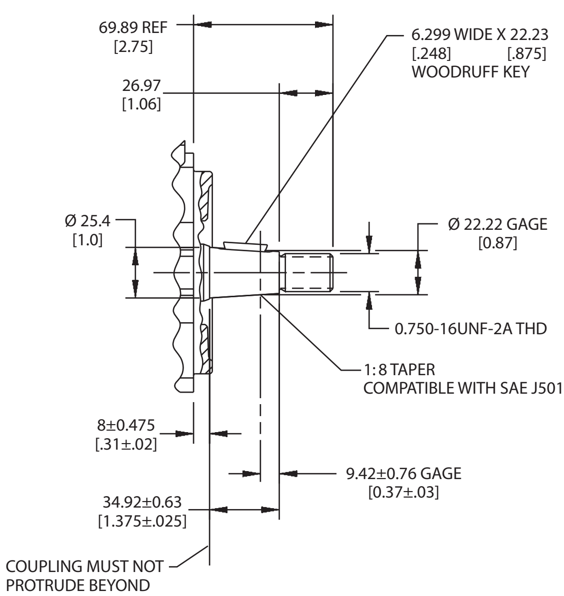
Input Shafts



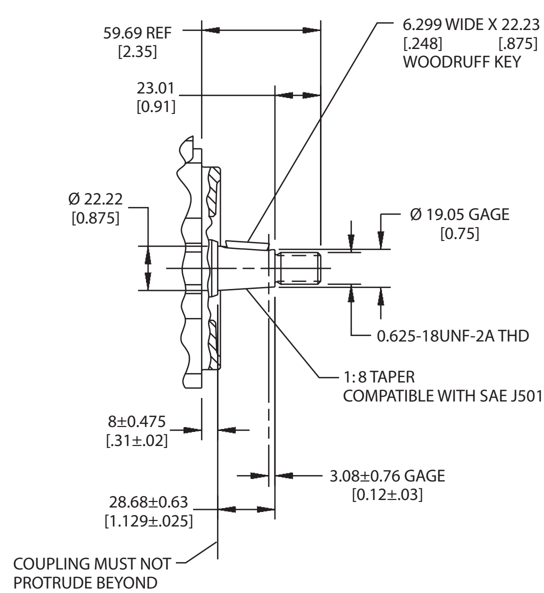
SHAFT OPTION - C2
13T Spline



SHAFT OPTION - C3
15T Spline



SHAFT OPTION - T1
1:8 Tapered



SHAFT OPTION - T2
1:8 Tapered

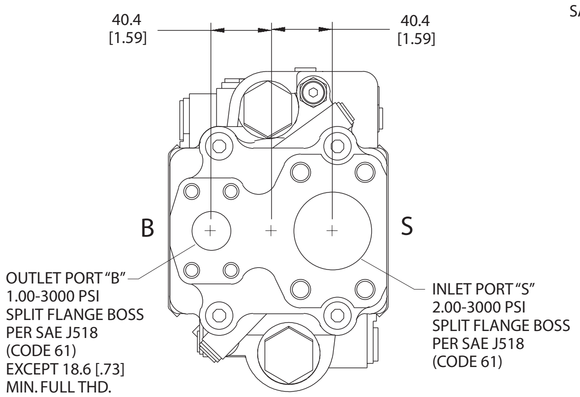
P101 418E

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

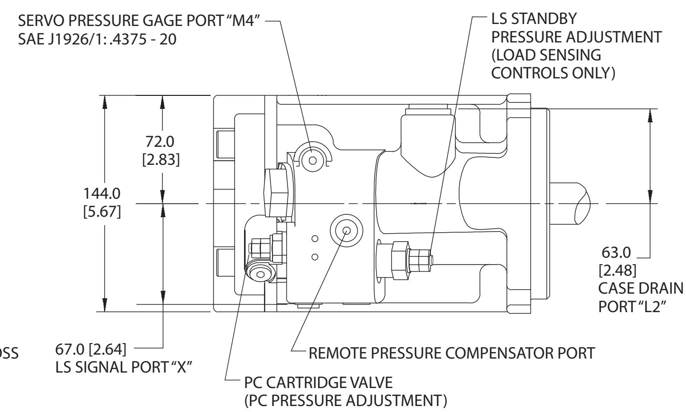
Dimensions in mm [in]

DIMENSIONS
FRAME H
57 AND 75cc

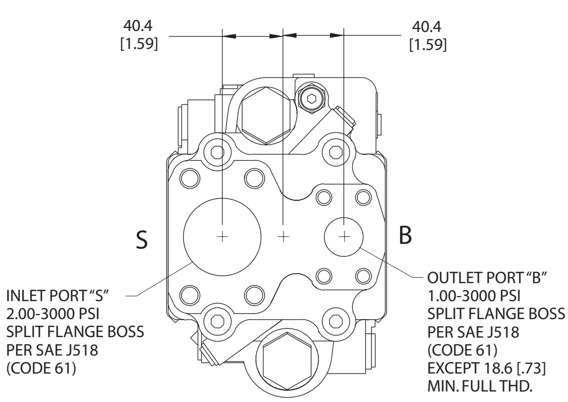
SAE C Flange with Axial Porting



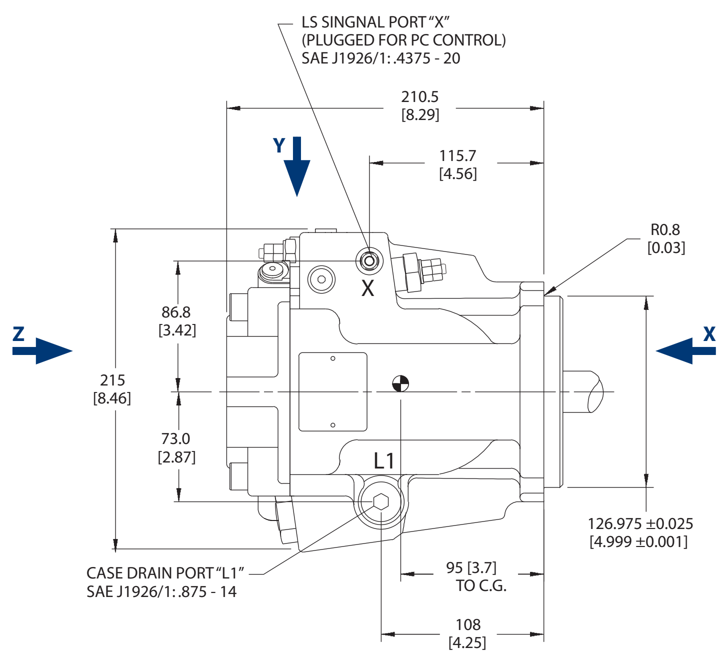
VIEW IN DIRECTION Z
REAR VIEW FOR LH (CCW) ROTATION



VIEW IN DIRECTION Y
TOP VIEW



VIEW IN DIRECTION Z
REAR VIEW FOR RH (CW) ROTATION



LEFT SIDE VIEW

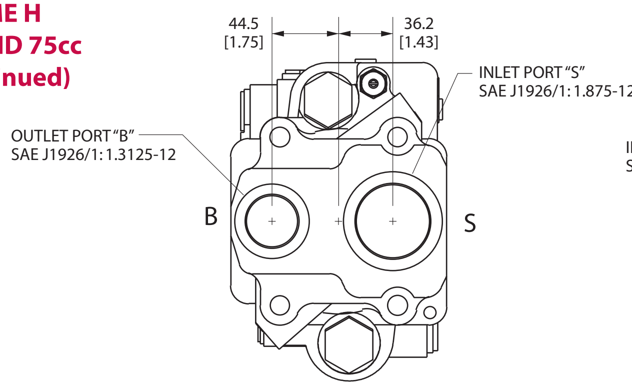
P101 084E

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

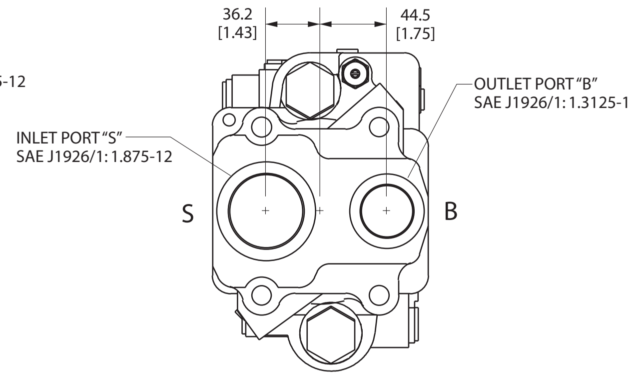
Dimensions in mm [in]

DIMENSIONS FRAME H 57 AND 75cc (continued)

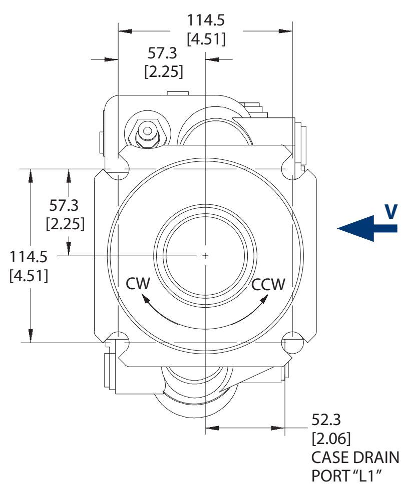
SAE C Flange with Axial Porting (continued)



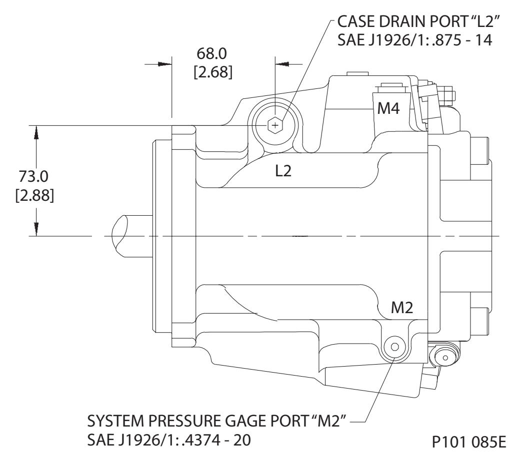
VIEW IN DIRECTION Z
REAR VIEW FOR LH (CCW) ROTATION



VIEW IN DIRECTION Z
REAR VIEW FOR RH (CW) ROTATION



VIEW IN DIRECTION X
FRONT VIEW



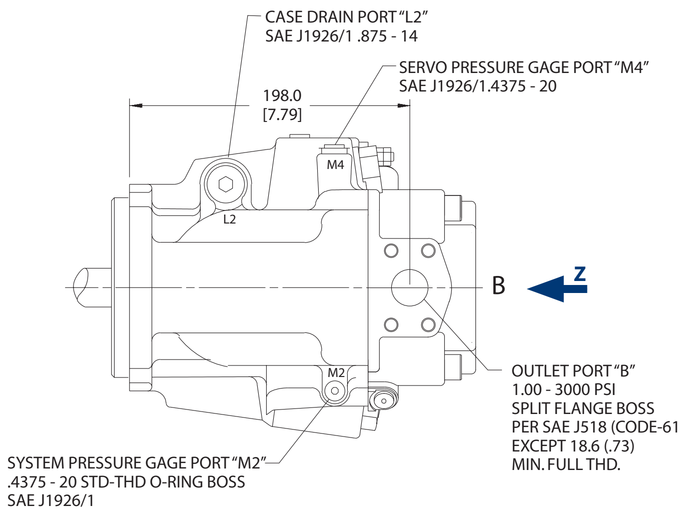
VIEW IN DIRECTION V
RIGHT SIDE VIEW

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

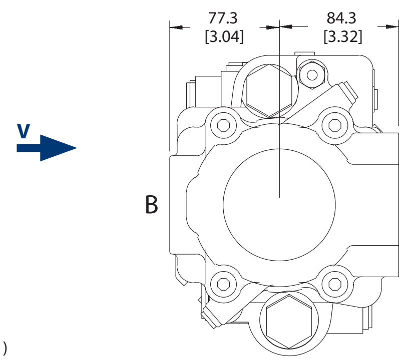
Dimensions in mm [in]

DIMENSIONS FRAME H 57 AND 75cc (continued)

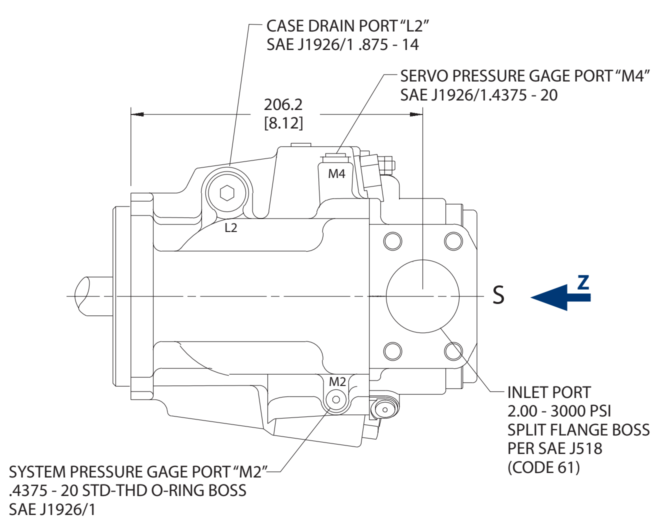
SAE C Flange with Radial Porting



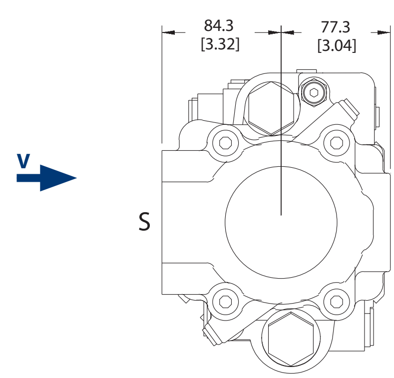
VIEW IN DIRECTION V
RIGHT SIDE VIEW FOR LH (CCW) ROTATION



VIEW IN DIRECTION Z
REAR VIEW FOR LH (CCW) ROTATION



VIEW IN DIRECTION V
RIGHT SIDE VIEW FOR RH (CW) ROTATION



VIEW IN DIRECTION Z
REAR VIEW FOR RH (CW) ROTATION

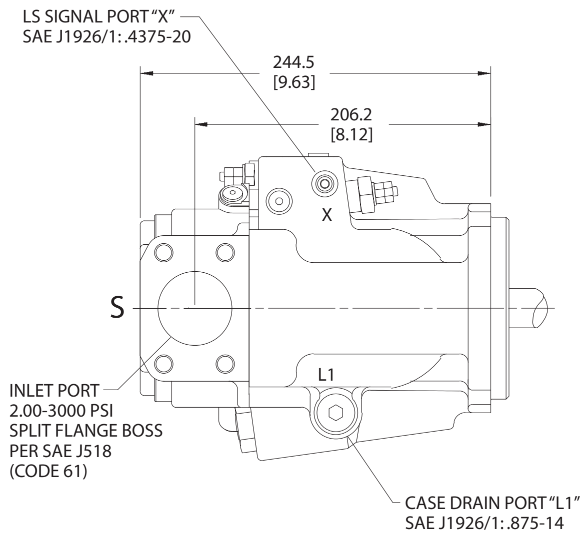
P101 086E

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

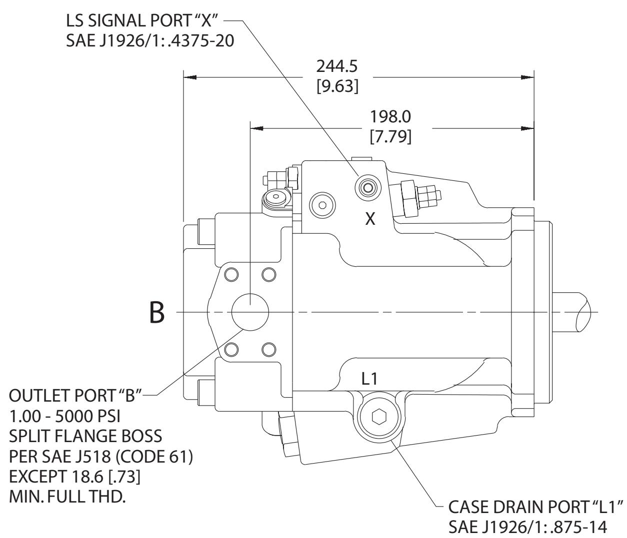
Dimensions in mm [in]

DIMENSIONS FRAME H 57 AND 75cc (continued)

SAE C Flange with Radial Porting (continued)



LEFT SIDE VIEW FOR LH (CCW) ROTATION



LEFT SIDE VIEW FOR RH (CW) ROTATION

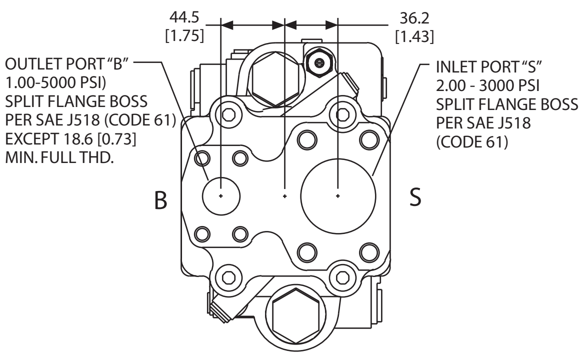
P101087E

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

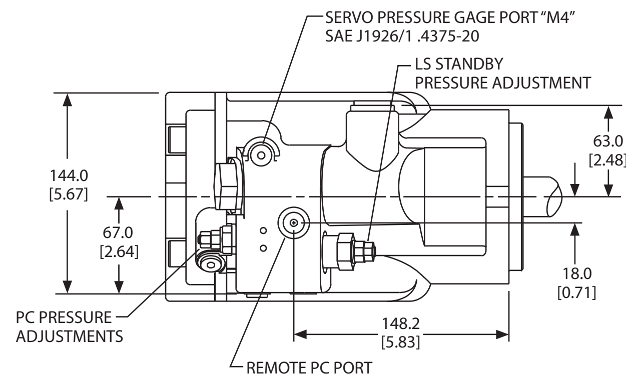
Dimensions in mm [in]

DIMENSIONS
FRAME H
57 AND 75cc
(continued)

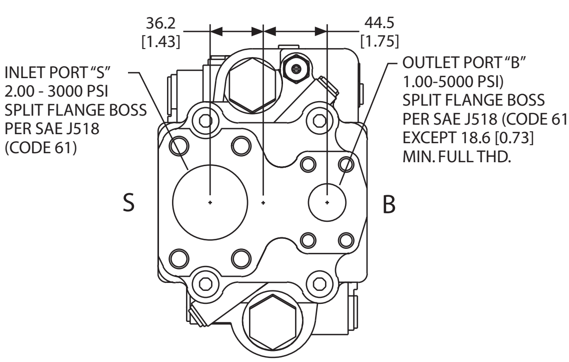
SAE B Flange with Axial Porting



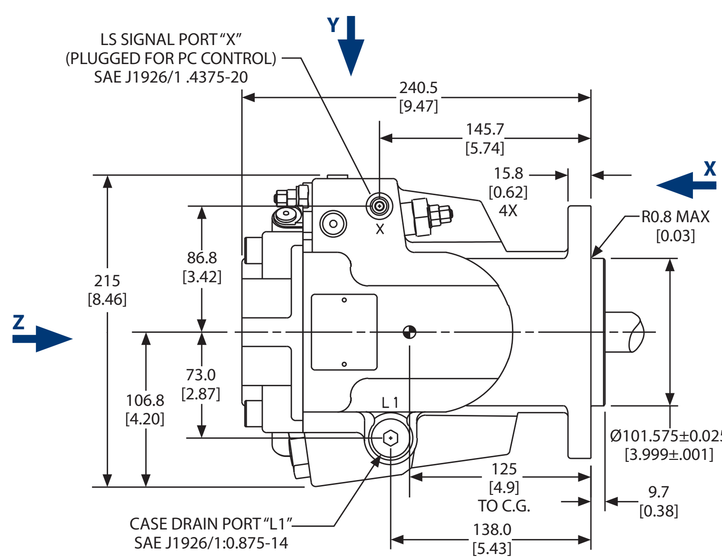
VIEW IN DIRECTION Z
REAR VIEW FOR LH ROTATION



VIEW IN DIRECTION Y
TOP VIEW



VIEW IN DIRECTION Z
REAR VIEW FROM RH ROTATION



LEFT SIDE VIEW

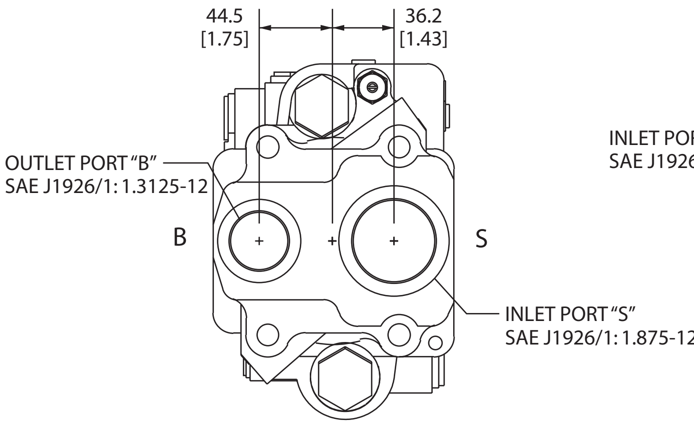
P101 107E

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

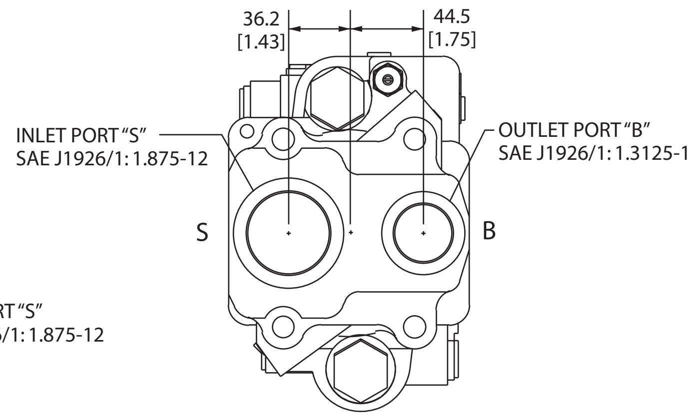
Dimensions in mm [in]

DIMENSIONS
FRAME H
57 AND 75cc
(continued)

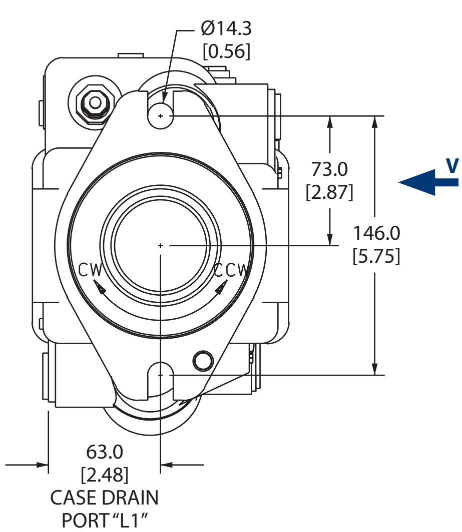
SAE B Flange with Axial Porting (continued)



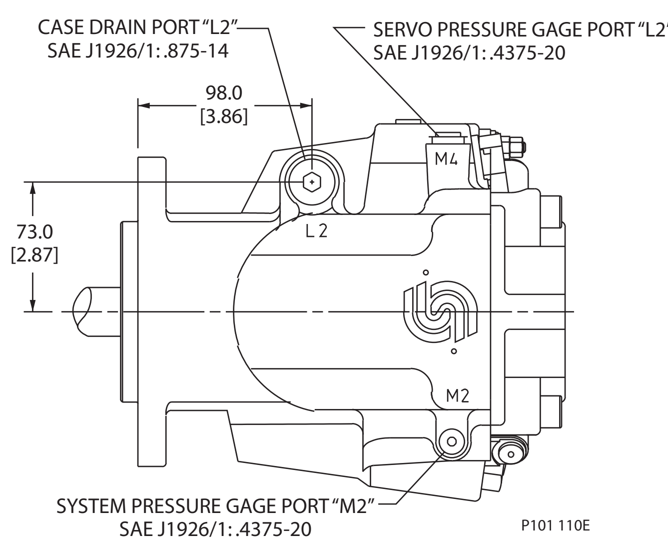
VIEW IN DIRECTION Z
REAR VIEW FOR LH ROTATION



VIEW IN DIRECTION Z
REAR VIEW FROM RH ROTATION



VIEW IN DIRECTION X
FRONT VIEW



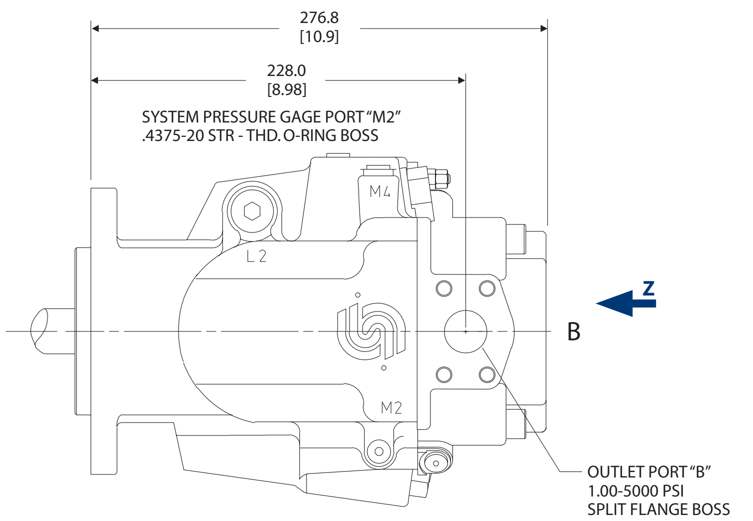
VIEW IN DIRECTION V
RIGHT SIDE VIEW

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

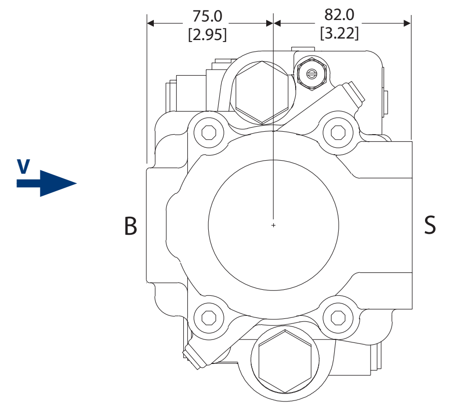
Dimensions in mm [in]

DIMENSIONS FRAME H 57 AND 75cc (continued)

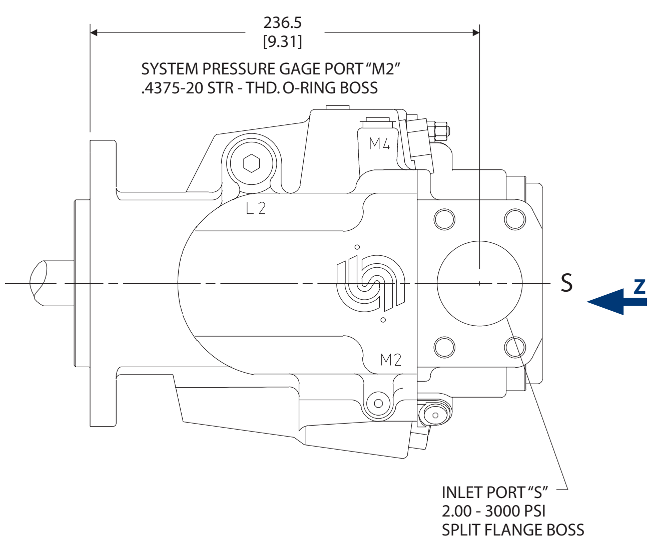
SAE B Flange with Radial Porting



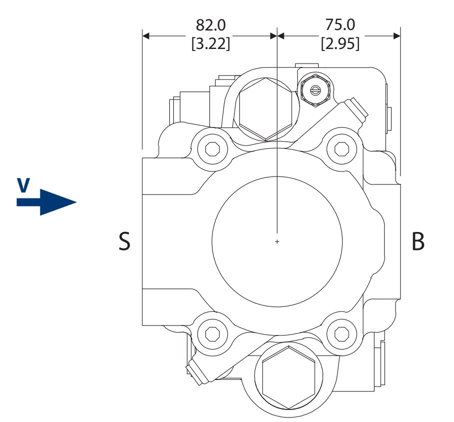
VIEW IN DIRECTION V
RIGHT SIDE VIEW FOR LH (CCW) ROTATION



VIEW IN DIRECTION Z
REAR VIEW FOR LH (CCW) ROTATION



VIEW IN DIRECTION V
RIGHT SIDE VIEW FOR RH (CW) ROTATION



VIEW IN DIRECTION Z
REAR VIEW FOR RH (CW) ROTATION

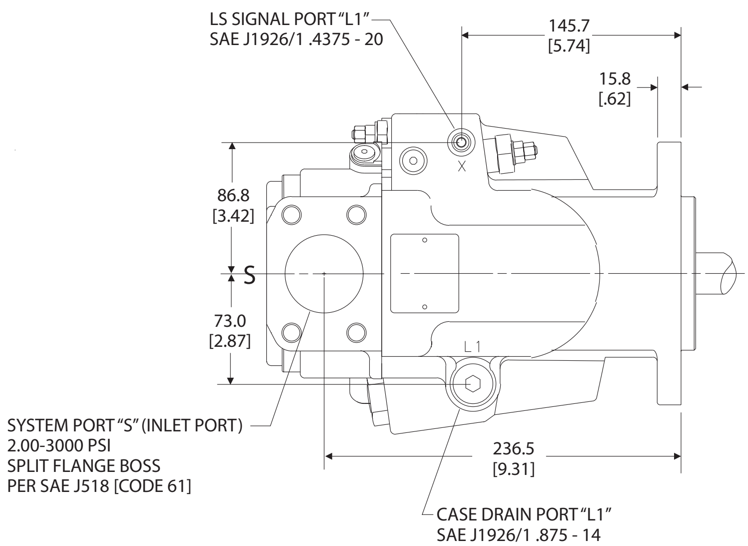
P101 111E

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

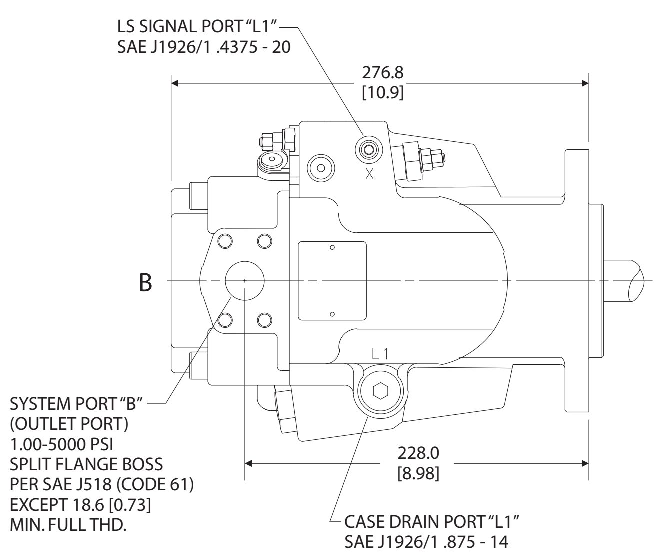
Dimensions in mm [in]

DIMENSIONS FRAME H 57 AND 75cc (continued)

SAE B Flange with Radial Porting (continued)



LEFT SIDE VIEW FOR LH (CCW) ROTATION



LEFT SIDE VIEW FOR RH (CW) ROTATION

P101 112E

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

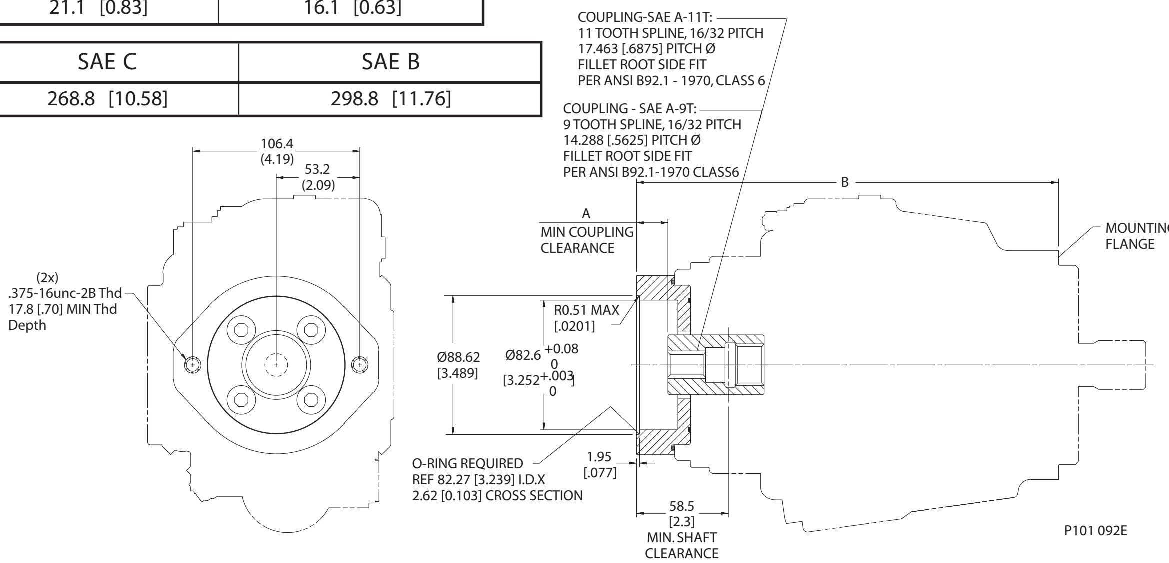
Dimensions in mm [in]

DIMENSIONS FRAME H 57 AND 75cc (continued)

Auxiliary Mounting Flanges

	COUPLING - SAE A-9T	COUPLING - SAE A-11T
A	21.1 [0.83]	16.1 [0.63]

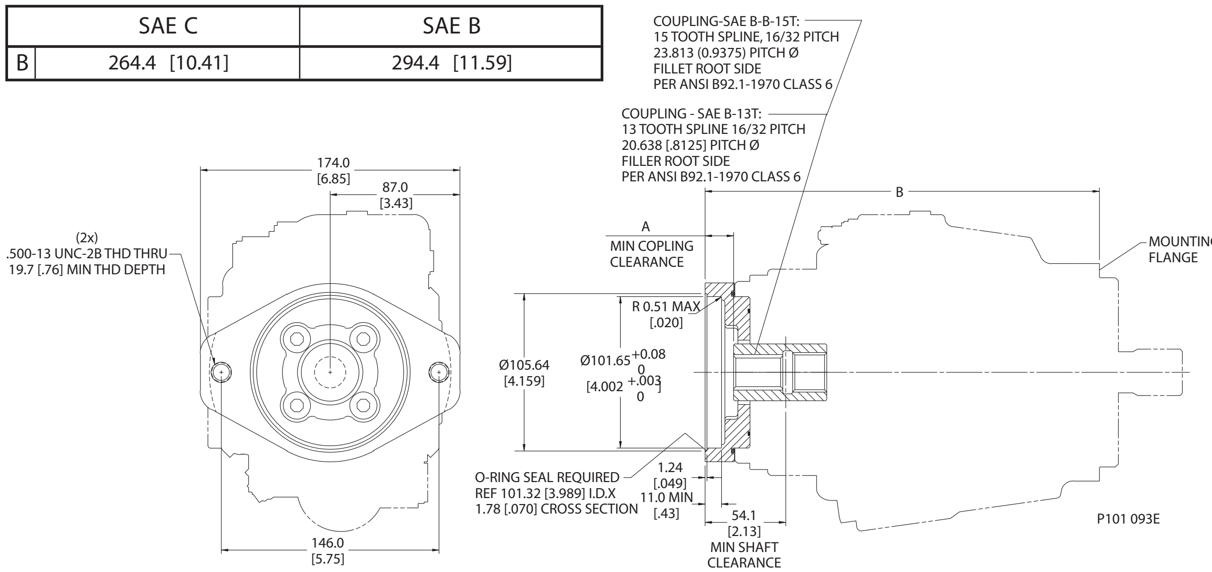
	SAE C	SAE B
B	268.8 [10.58]	298.8 [11.76]



SAE A AUXILIARY MOUNTING FLANGE WITH SAE A-9T AND SAE A-11T COUPLINGS

	COUPLING - SAE B-13T	COUPLING - SAE B-B-15T
A	20.7 [0.81]	12.7 [0.50]

	SAE C	SAE B
B	264.4 [10.41]	294.4 [11.59]



SAE B AUXILIARY MOUNTING FLANGE WITH SAE B-13T AND SAE B-B-15T COUPLINGS

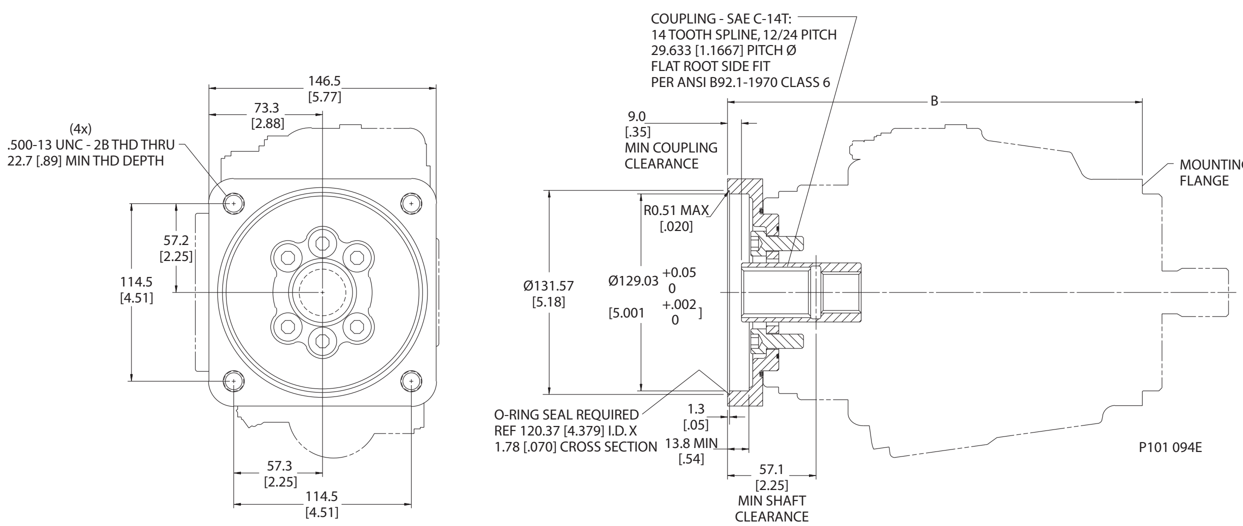
All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

Dimensions in mm [in]

DIMENSIONS FRAME H 57 AND 75cc (continued)

Auxiliary Mounting Flanges (continued)

	SAE C	SAE B
B	264.4 [10.41]	294.4 [11.59]



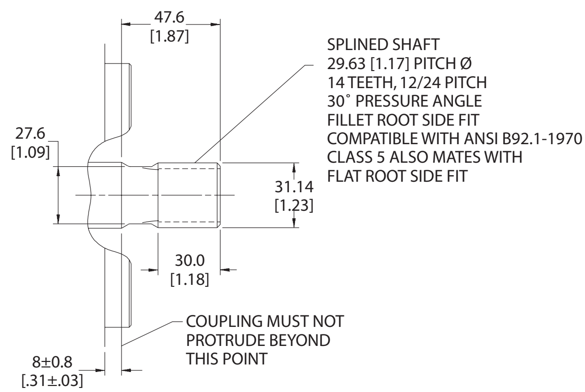
SAE C AUXILIARY MOUNTING FLANGE WITH SAE C-14T COUPLING

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

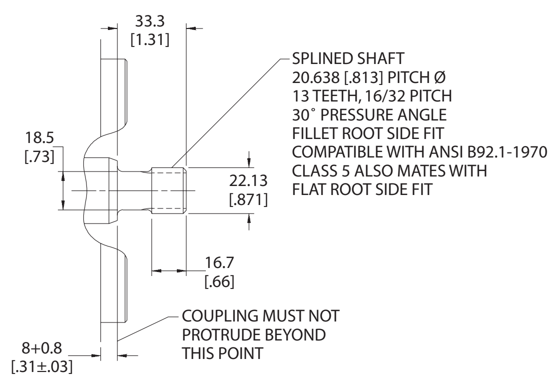
Dimensions in mm [in]

DIMENSIONS FRAME H 57 AND 75cc (continued)

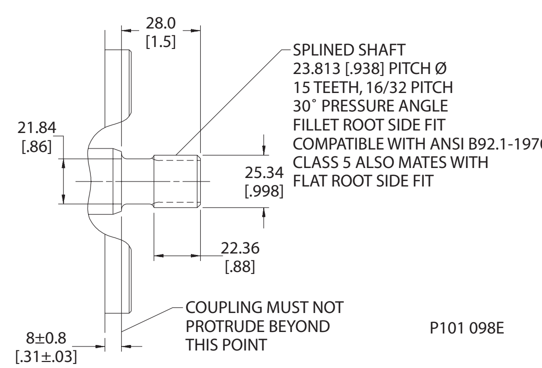
Input Shafts



SHAFT OPTION - S1
14T Spline



SHAFT OPTION - C2/D2
13T Spline



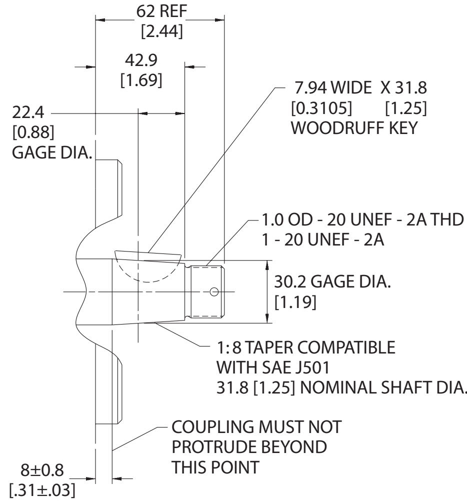
SHAFT OPTION - C3/D3
15T Spline

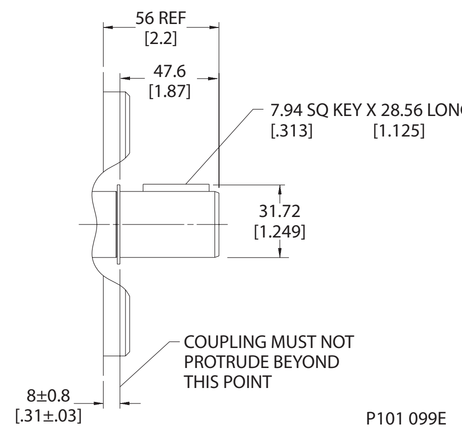
All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

Dimensions in mm [in]

DIMENSIONS
FRAME H
57 AND 75cc
(continued)

Input Shafts (continued)





P101 099E

SHAFT OPTION - TO
1:8 Tapered

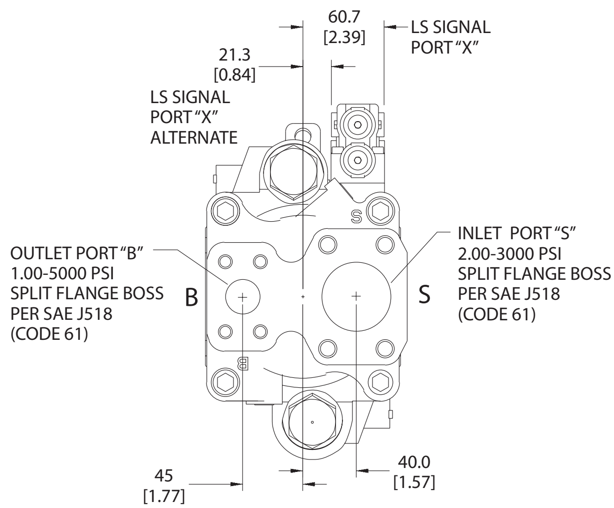
SHAFT OPTION - K4/L4
Straight Keyed

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

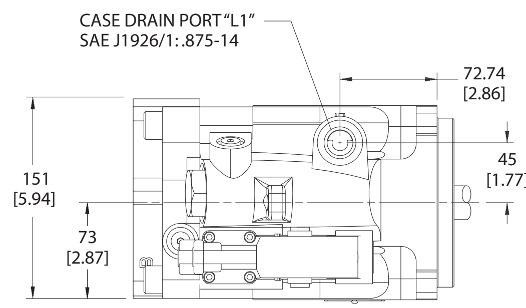
Dimensions in mm [in]

DIMENSIONS
FRAME G
74 AND 90cc

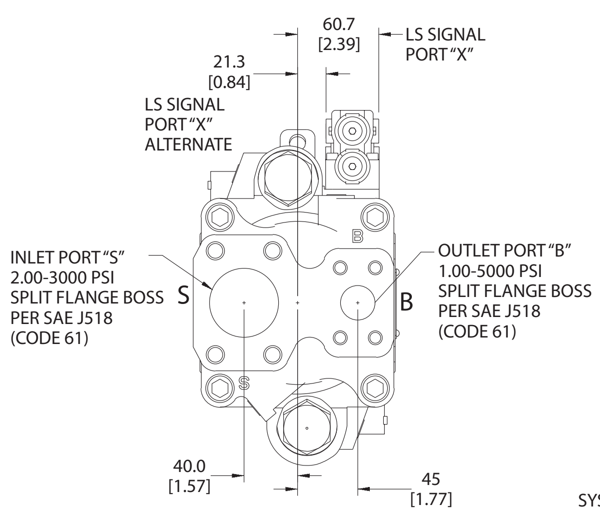
SAE C Flange with Axial Porting



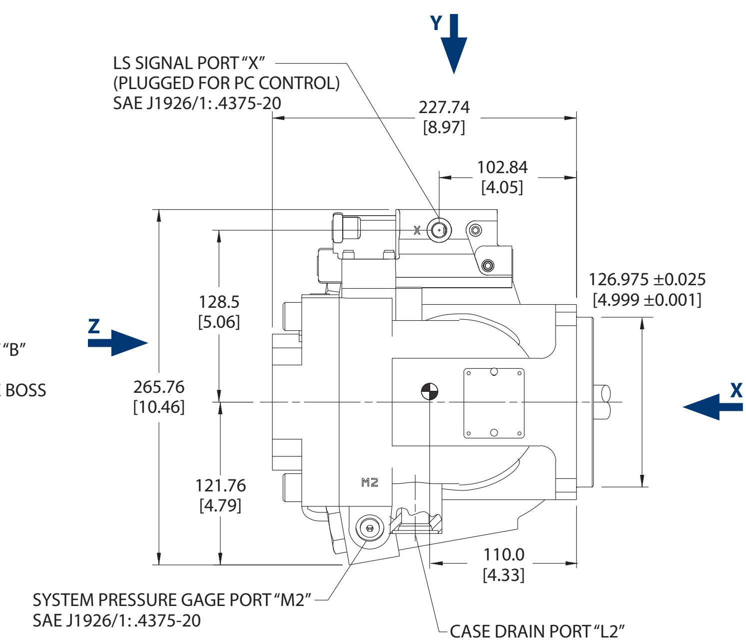
VIEW IN DIRECTION Z
REAR VIEW FOR LH (CCW) ROTATION



VIEW IN DIRECTION Y
TOP VIEW



VIEW IN DIRECTION Z
REAR VIEW FOR RH (CW) ROTATION



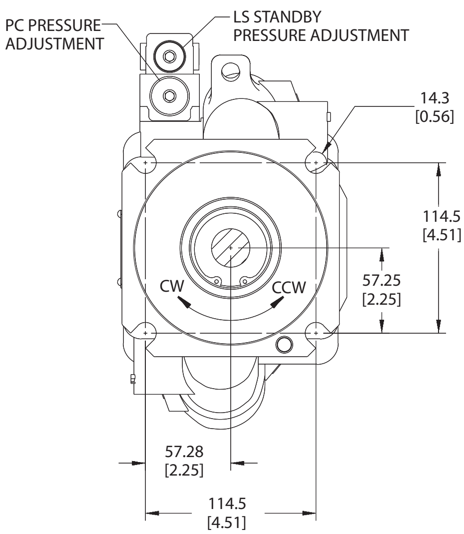
LEFT SIDE VIEW

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

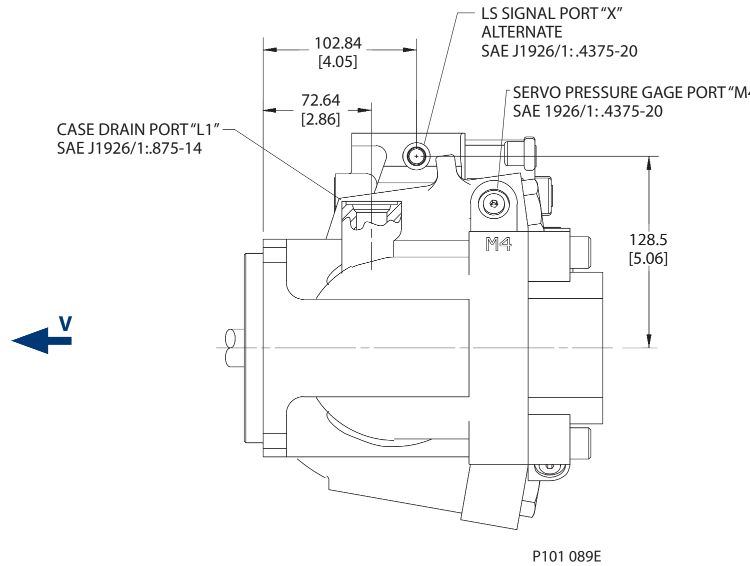
Dimensions in mm [in]

DIMENSIONS FRAME G 74 AND 90cc (continued)

SAE C Flange with Axial Porting (continued)



VIEW IN DIRECTION X
FRONT VIEW



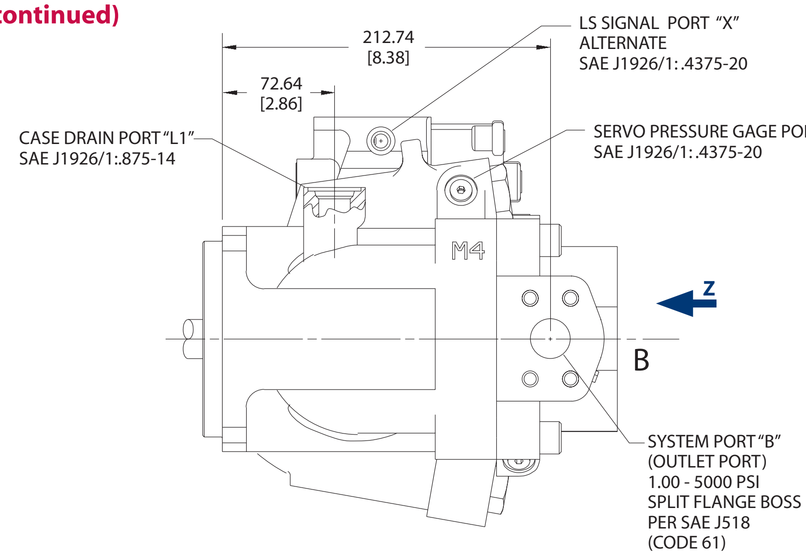
VIEW IN DIRECTION V
RIGHT SIDE VIEW

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

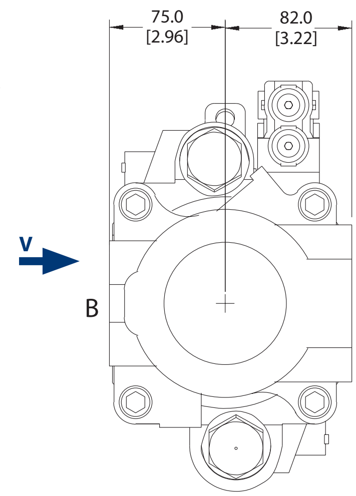
Dimensions in mm [in]

DIMENSIONS FRAME G 74 AND 90cc (continued)

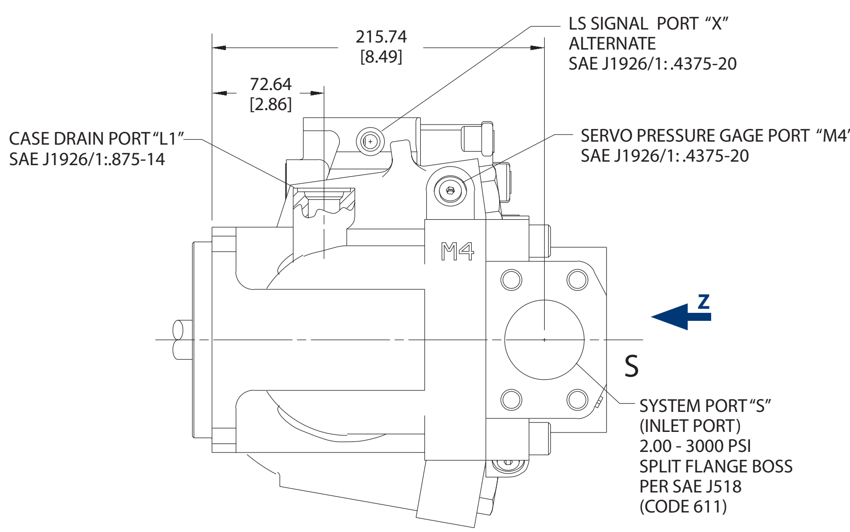
SAE C Flange with Radial Porting



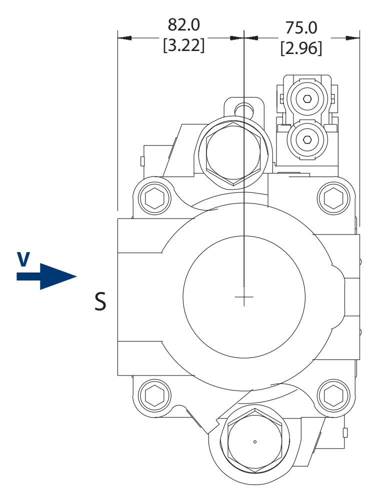
VIEW IN DIRECTION V
RIGHT SIDE VIEW FOR LH (CCW) ROTATION



VIEW IN DIRECTION Z
REAR VIEW FOR LH (CCW) ROTATION



VIEW IN DIRECTION V
RIGHT SIDE VIEW FOR RH (CW) ROTATION



VIEW IN DIRECTION Z
REAR VIEW FOR RH (CW) ROTATION

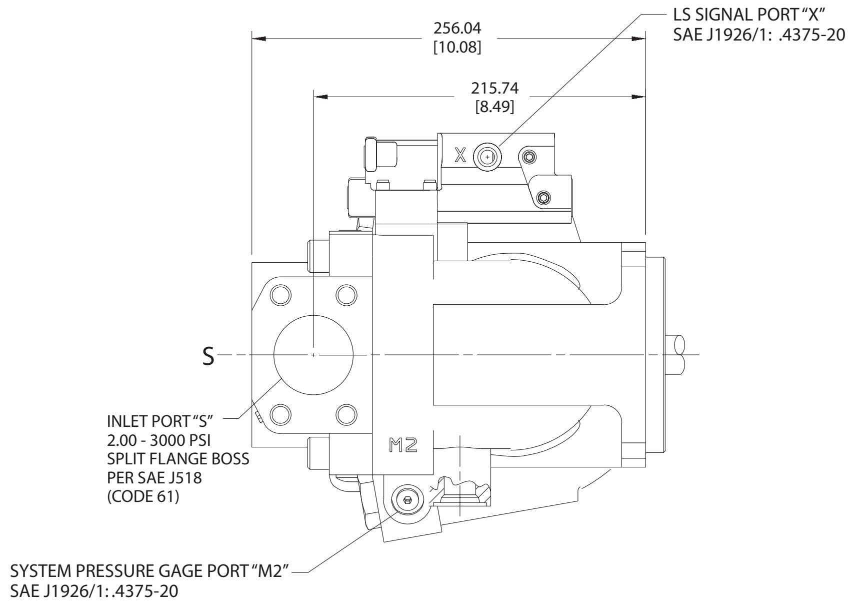
P101 090E

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

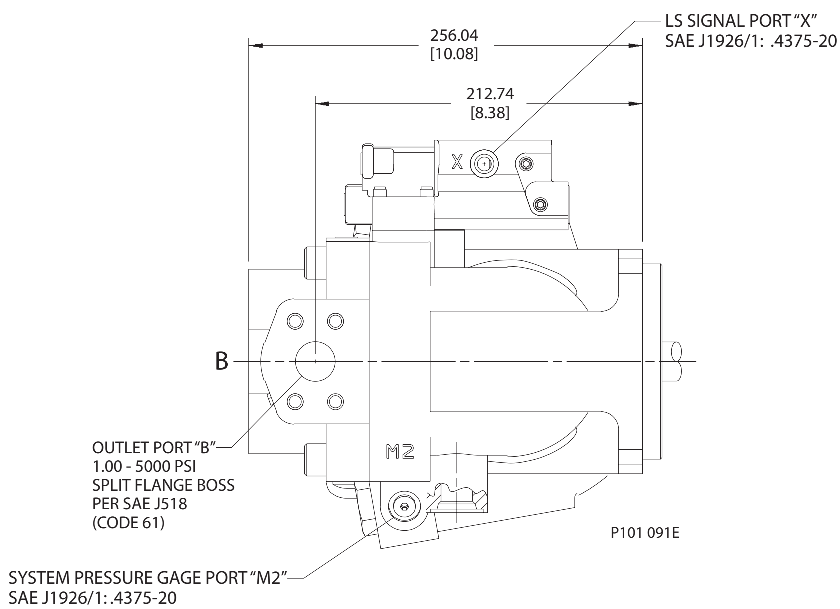
Dimensions in mm [in]

DIMENSIONS FRAME G 74 AND 90cc (continued)

SAE C Flange with Radial Porting (continued)



LEFT SIDE VIEW FOR LH (CCW) ROTATION



LEFT SIDE VIEW FOR RH (CW) ROTATION

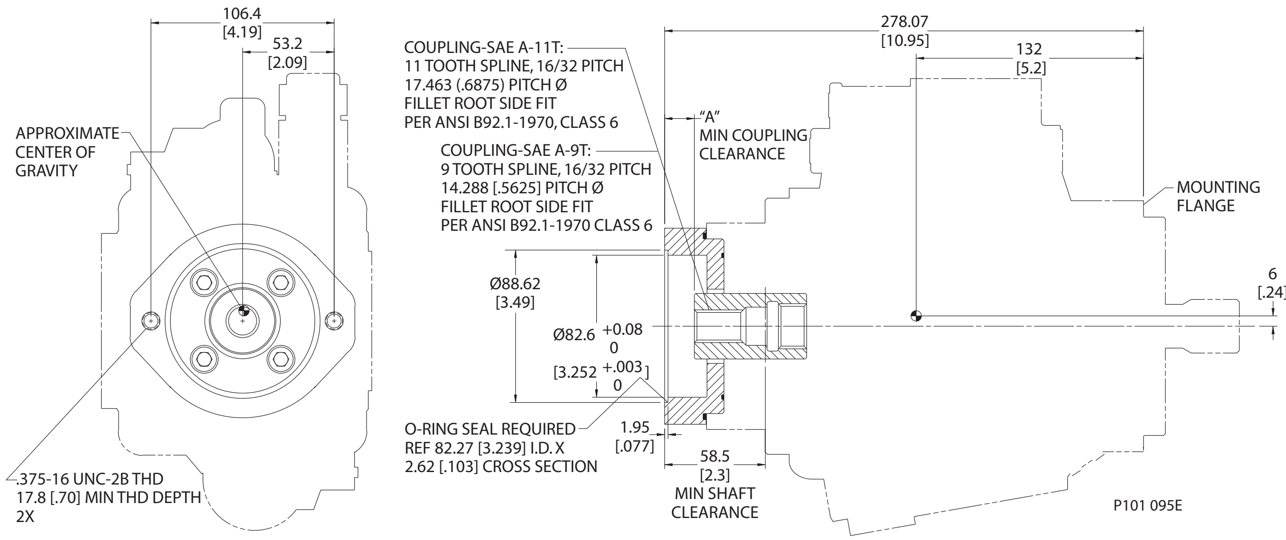
All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

Dimensions in mm [in]

DIMENSIONS
FRAME G
74 AND 90cc
(continued)

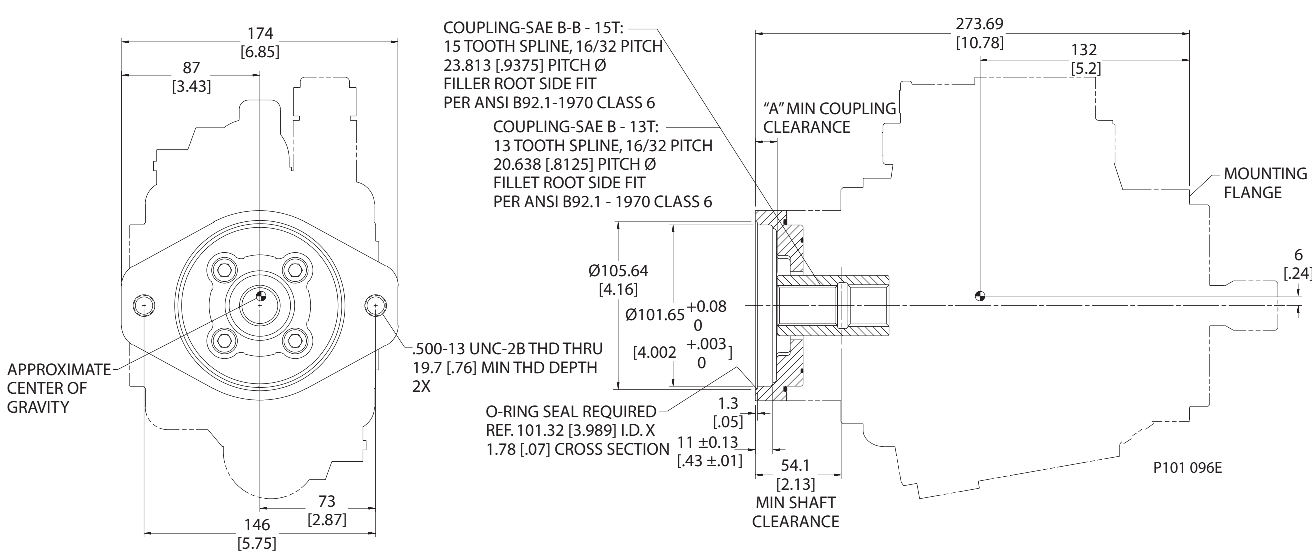
Auxiliary Mounting Flanges

	COUPLING - SAE A-9T	COUPLING - SAE A-11T
A	21.1 [0.83]	16.1 [0.63]



SAE A AUXILIARY MOUNTING FLANGE WITH SAE A -9T AND SAE A-11T COUPLINGS

	COUPLING - SAE B-13T	COUPLING - SAE B-B-15T
A	20.7 [0.81]	12.7 [0.50]



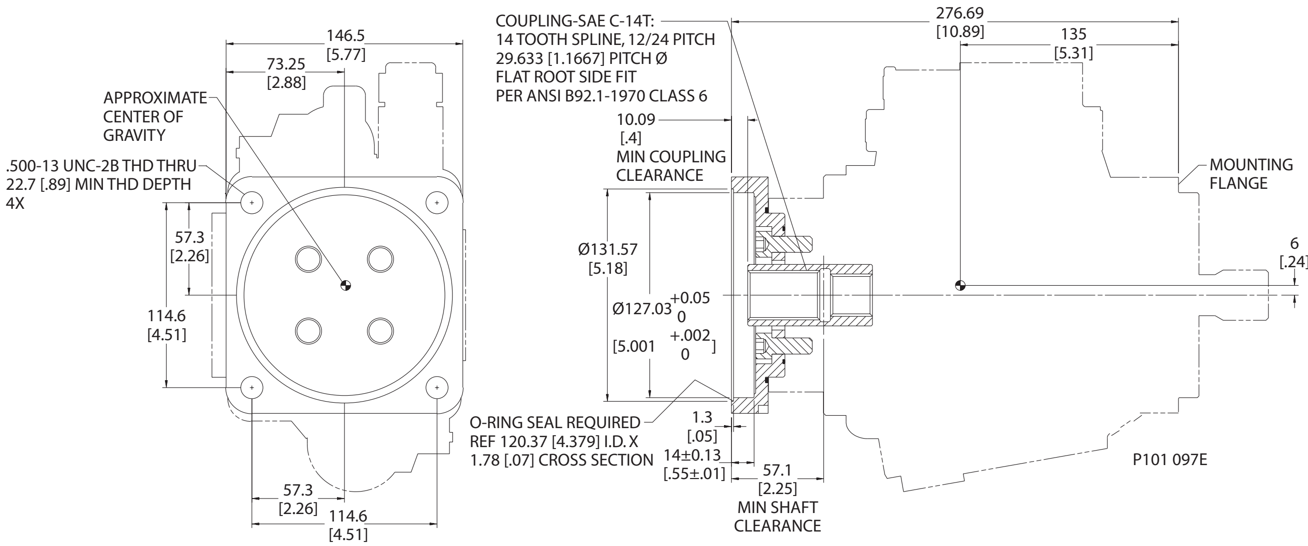
SAE B AUXILIARY MOUNTING FLANGE WITH SAE B-13T AND SAE B-B-15T COUPLINGS

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

Dimensions in mm [in]

DIMENSIONS
FRAME G
74 AND 90cc
(continued)

Auxiliary Mounting Flanges (continued)



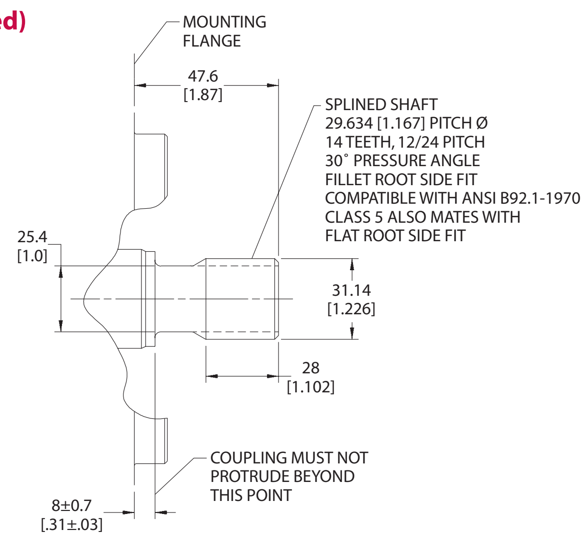
SAE C AUXILIARY MOUNTING FLANGE WITH SAE C - 14T COUPLING

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

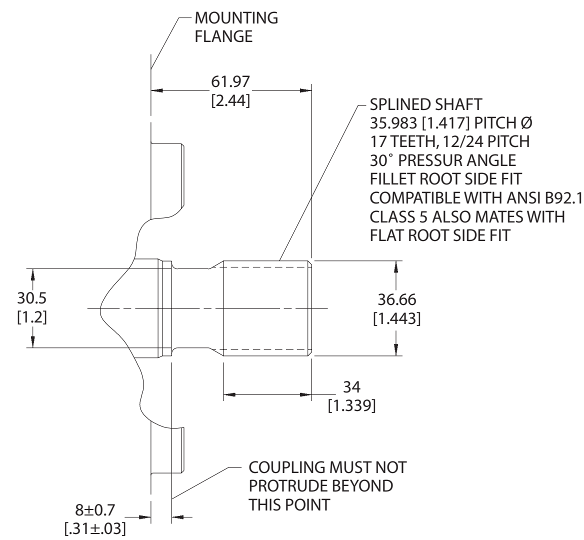
Dimensions in mm [in]

DIMENSIONS FRAME G 74 AND 90cc (continued)

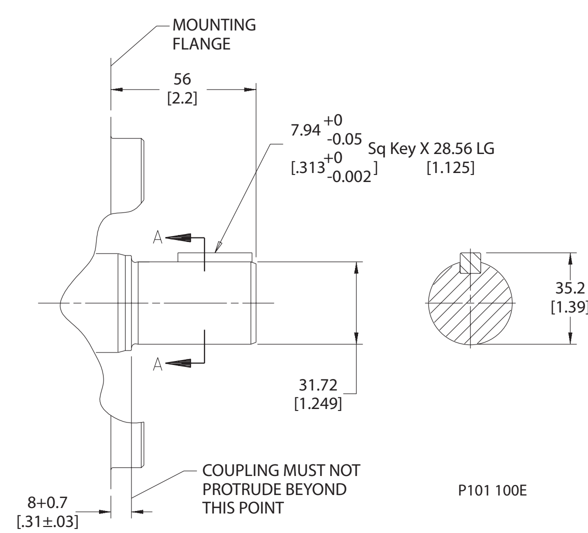
Input Shafts



SHAFT OPTION - S1
14T Spline



SHAFT OPTION - S2
17T Spline



P101 100E

SHAFT OPTION - K4
Straight Keyed

All SAE straight thread O-ring ports per SAE J514.
Shaft rotation is determined by viewing pump from input shaft end.
Contact your Sauer-Danfoss representative for specific installation drawings.

Dimensions in mm [in]

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