

No. 11-603  
April 1997

**Eaton®**  
Medium Duty Piston Pump



**Model 70122, 70422, 70423, and 70523  
Pressure or Pressure-Flow Compensated  
Piston Pumps**

We Manufacture

**Solutions**

Hydraulics

S  
C  
h  
y  
d  
r  
a  
u  
n  
i  
c  
s

# Introduction

The four Pressure or Pressure-Flow Compensated Piston Pumps with the model numbers 70122 (19 cm<sup>3</sup>/r [1.16 in<sup>3</sup>/r]), 70422 (38 cm<sup>3</sup>/r [2.32 in<sup>3</sup>/r]), 70423 (45 cm<sup>3</sup>/r [2.77 in<sup>3</sup>/r]), and 70523 (69 cm<sup>3</sup>/r [4.21 in<sup>3</sup>/r]) are incorporated within this catalog for the convenience of selection.

If additional information or assistance is required, contact a Eaton representative.

## Contents

	Page
<b>Features</b> .....	3
<b>Specifications</b> .....	4
<b>Application Information</b> .....	5
<b>Model 70122, 19 cm<sup>3</sup>/r [1.16 in<sup>3</sup>/r]</b> .....	6
Performance Data .....	7
Model Code .....	8
Installation Drawings .....	9 - 10
<b>Model 70422, 38 cm<sup>3</sup>/r [2.32 in<sup>3</sup>/r]</b> .....	11
Performance Data .....	12
Model Code .....	14
Installation Drawings .....	15 - 17
<b>Model 70423, 45 cm<sup>3</sup>/r [2.77 in<sup>3</sup>/r]</b> .....	11
Performance Data .....	13
Model Code .....	14
Installation Drawings .....	15 - 17
<b>Model 70523, 69 cm<sup>3</sup>/r [4.21 in<sup>3</sup>/r]</b> .....	18
Performance Data .....	19
Model Code .....	20
Installation Drawings .....	21 - 23
<b>Using the Eaton Pressure-Flow Compensated Pump in Load Sensing Hydraulic Systems</b> .....	24
Pressure-Flow Compensated - - Load Sensing System .....	24
Constant Flow - - Load Sensing .....	25
<b>Using the Eaton Pressure Compensated Pump in Closed Center Hydraulic Systems</b> .....	26

# Features

**A. Housing**

- Compact
- Lightweight, Durable Aluminum

**B. Input Shaft and Mounting**

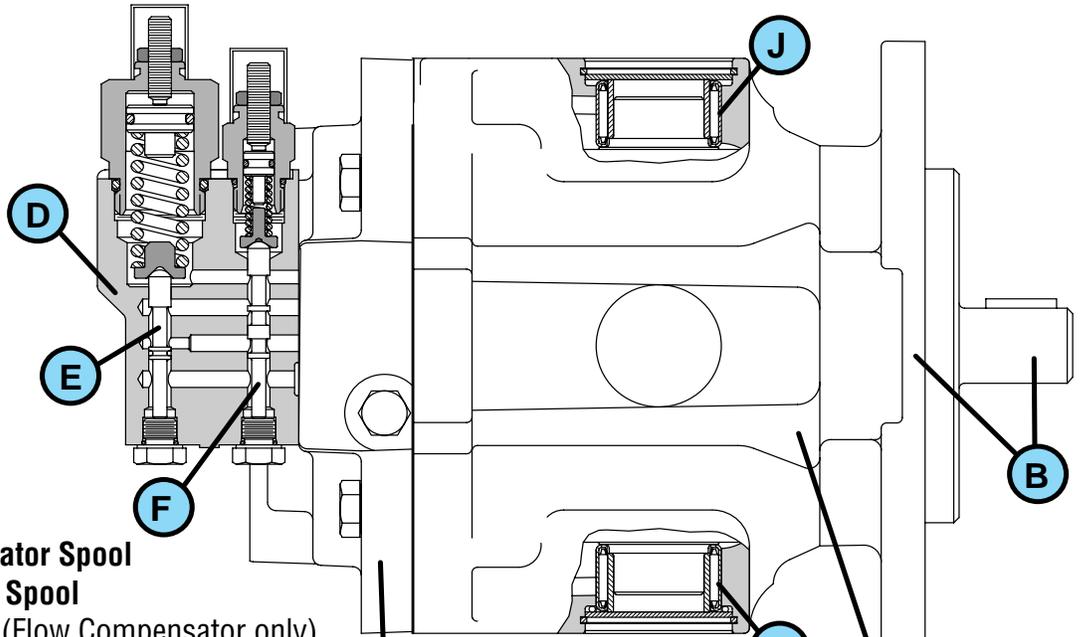
- Numerous Shaft options
- S.A.E. Mounting Flanges
- Tandem Capability

**C. Backplate**

- Side and Rear Porting Available
- Auxiliary Mounting Flange Available

**D. Compensator Assembly**

- Pressure Compensated
- Pressure and Flow Compensated

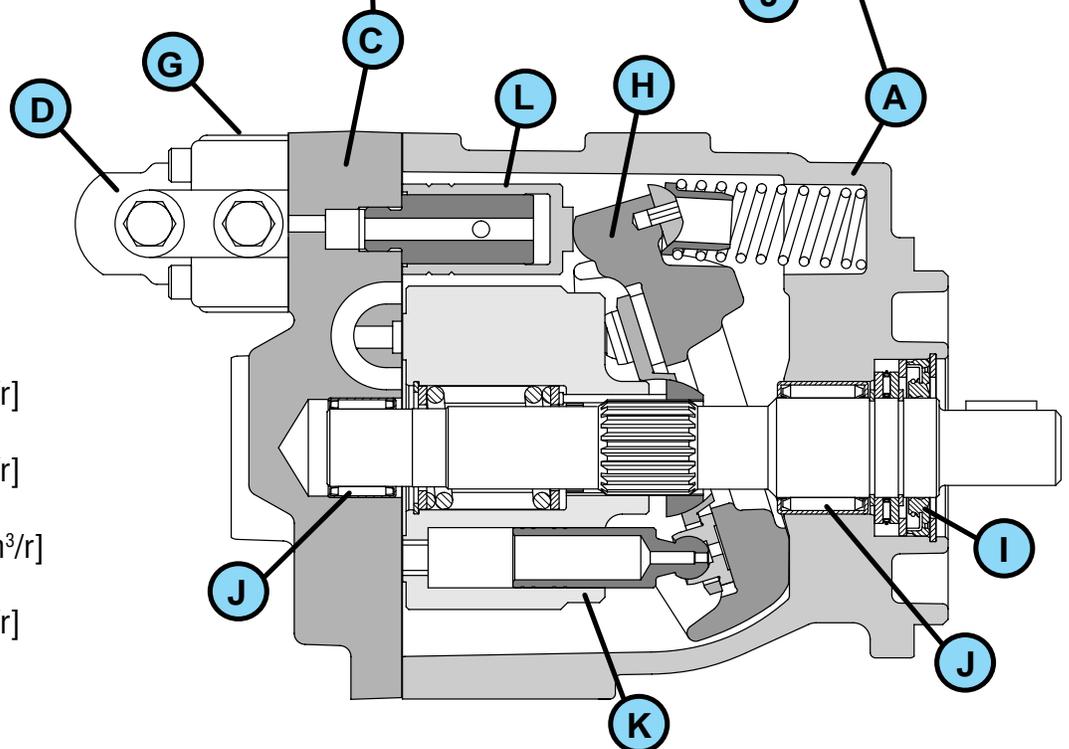


**E. Pressure Compensator Spool**

**F. Flow Compensator Spool**

**G. Load Sensing Port (Flow Compensator only)**

**H. Camplate**



**I. Shaft Seal**

**J. Bearings**

**K. Rotating Group**

- 19 cm<sup>3</sup>/r [1.16 in<sup>3</sup>/r] Displacement
- 38 cm<sup>3</sup>/r [2.32 in<sup>3</sup>/r] Displacement
- 45.4 cm<sup>3</sup>/r [2.77 in<sup>3</sup>/r] Displacement
- 69 cm<sup>3</sup>/r [4.21 in<sup>3</sup>/r] Displacement

**L. Control Piston**

# Model 70122, 70422, 70423, and 70523 Specifications

Specification	Model 70122		Model 70422		Model 70423		Model 70523	
	Metric Units	U.S. Units						
Mounting Flanges	2 bolt SAE "A" Mount		2 Bolt SAE "B" Mount		2 Bolt SAE "B-B" Mount		2 and/or 4 Bolt SAE "C" Mount	
Maximum Displacement / Rev	0 to 19 cm <sup>3</sup> /r	0 to 1.16 in <sup>3</sup> /r	0 to 38 cm <sup>3</sup> /r	0 to 2.32 in <sup>3</sup> /r	0 to 45 cm <sup>3</sup> /r	0 to 2.77 in <sup>3</sup> /r	0 to 69 cm <sup>3</sup> /r	0 to 4.21 in <sup>3</sup> /r
Flow @Rated Speed and PSI	41,6 l/min.	11.0 GPM	98,4 l/min.	26.0 GPM	125 l/min.	33 GPM	159 l/min.	42 GPM
Maximum Rated Speed	2500 RPM	2500 RPM	2700 RPM	2700 RPM	3000 RPM	3000 RPM	2500 RPM	2500 RPM
Continuous Rated Pressure	210 bar	3000 PSI						
Maximum Intermittent Pressure	275 bar	4000 PSI	275 bar	4000 PSI	265 bar	3800 PSI	310 bar	4500 PSI
Continuous Allowable Case Pressure	2 bar	25 PSI						
Maximum High Pressure Setting @ Zero Flow	Standard 210 bar	Standard 3000 PSI						
Low Pressure Setting @ Zero Flow	Standard 14 bar	Standard 200 PSI						
Compensator Response @ Rated PSI and RPM	15 mil. sec.	15 mil. sec.	8 mil. sec.	8 mil. sec.	18 mil. sec.	18 mil. sec.	35 mil. sec.	35 mil. sec.
Compensator Recovery @ Rated PSI and RPM	65 mil. sec.	65 mil. sec.	42 mil. sec.	42 mil. sec.	75 mil. sec.	75 mil. sec.	125 mil. sec.	125 mil. sec.
Maximum Continuous Inlet Vacuum	0,87 bar absolute	4 in. Hg.	0,91 bar absolute	3 in. Hg.	0,94 bar absolute	2 in. Hg.	0,94 bar absolute	2 in. Hg.
Max. Thrust Load Into Pump and Shaft Side Load, for Input Shaft.	Consult an Eaton representative and/or Eaton engineering.		Consult an Eaton representative and/or Eaton engineering.		Consult an Eaton representative and/or Eaton engineering.		Consult an Eaton representative and/or Eaton engineering.	
Maximum Continuous Inlet Temperature	107°C	225° F						
Minimum Operating Temperature	-29° C	-20° F						
Weight per single pump	8 kg	18 lbs.	12,3 kg	27 lbs.	11,8 kg	26 lbs.	35,4 kg	78 lbs.

# Application Information

## Installation Requirements

- Install piston pumps in such a position that the case drain assures an oil level at or above unit center line.
- Oil level must be at center line or above before starting piston pump.
- Provide a case drain line of adequate size to limit the case pressure to 2 bar [25 PSI] maximum.
- Filtration is recommended.
- The combined torque required to turn two or more pumps must not exceed the torque rating of the input drive shaft of the front piston pump.

## Cleanliness

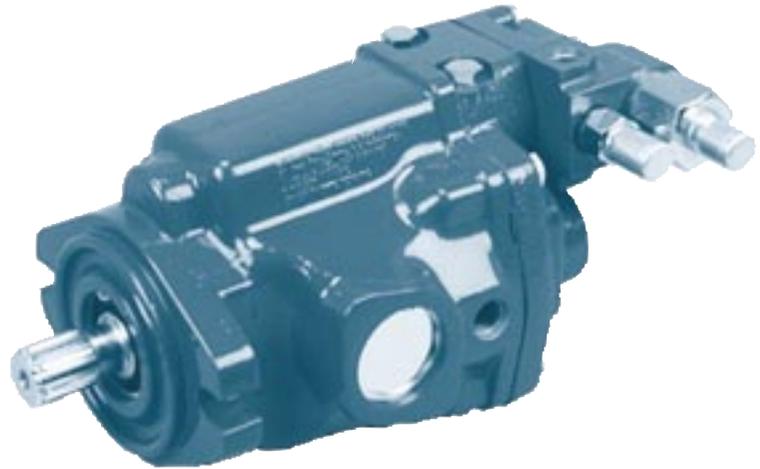
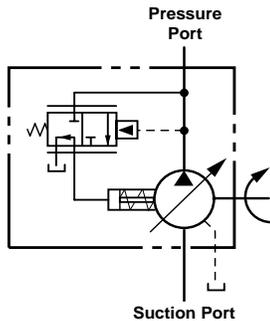
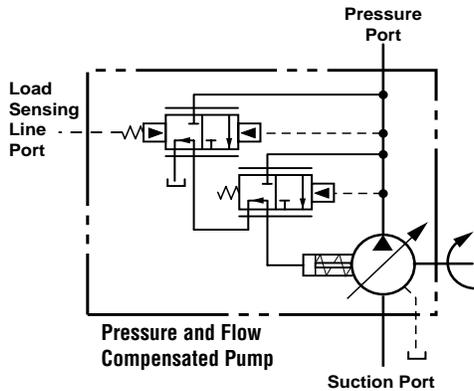
In systems that use Eaton medium duty piston pumps the fluid must be maintained at ISO Cleanliness Code 18/13 or better per SAE J1165. This code allows a maximum of 2,500 particles per milliliter greater than 5  $\mu\text{m}$  and a maximum of 80 particles per milliliter greater than 15  $\mu\text{m}$ . When components with different cleanliness requirements are used in the same system, the cleanest standard should be applied.

## Fluid Recommendations

In hydraulic systems that use Eaton's Medium Duty piston pumps and motors, the optimum viscosity range is 10 - 39 cSt [60 - 180 SUS], at normal operating temperatures. Viscosity should never fall below 6 cSt [45 SUS]. At the lowest expected start-up temperature, the viscosity, with a non-charge system, should not exceed 432 cSt [2,000 SUS].

Refer to Eaton's Technical Data sheet #3-401.

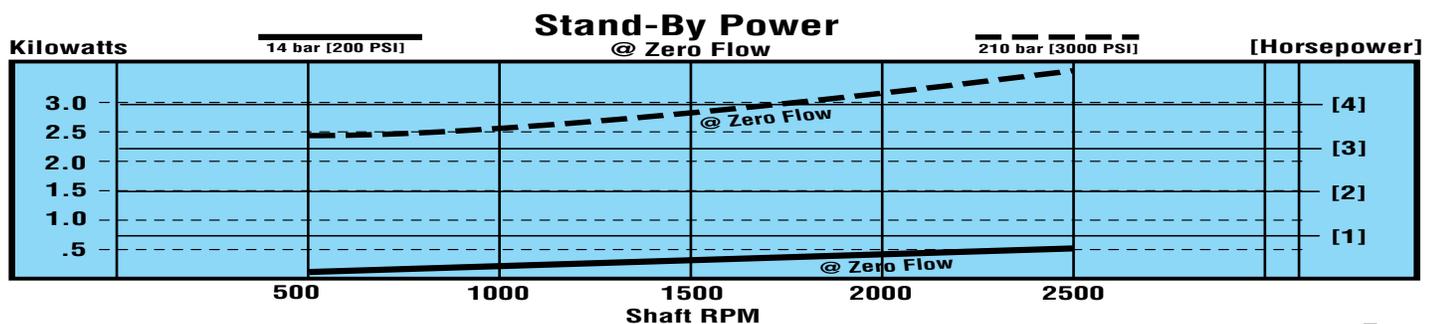
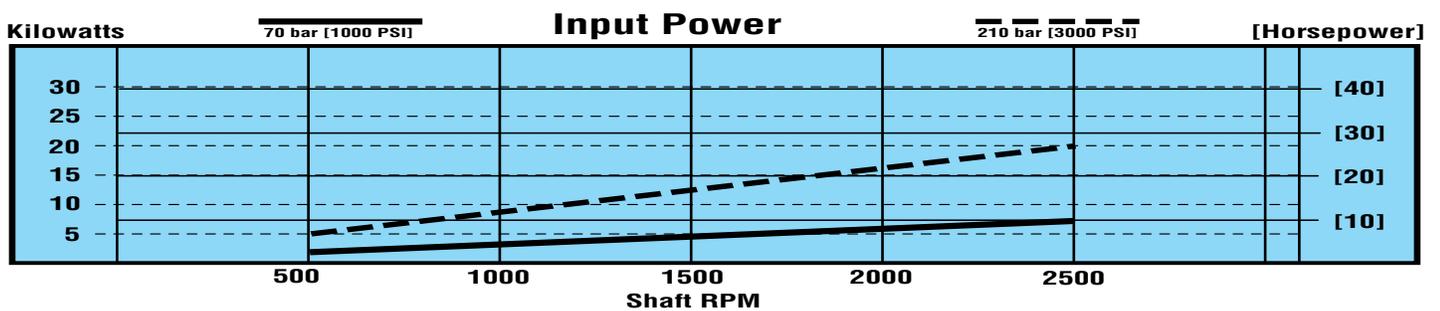
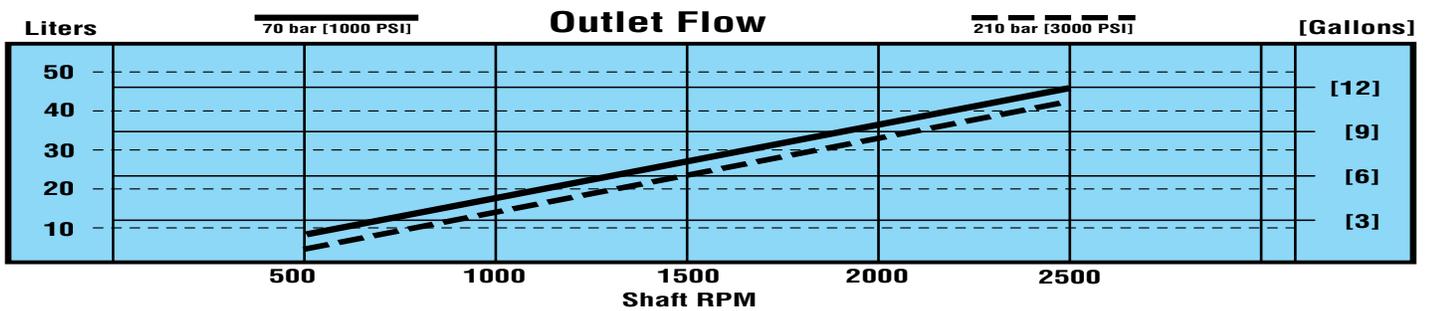
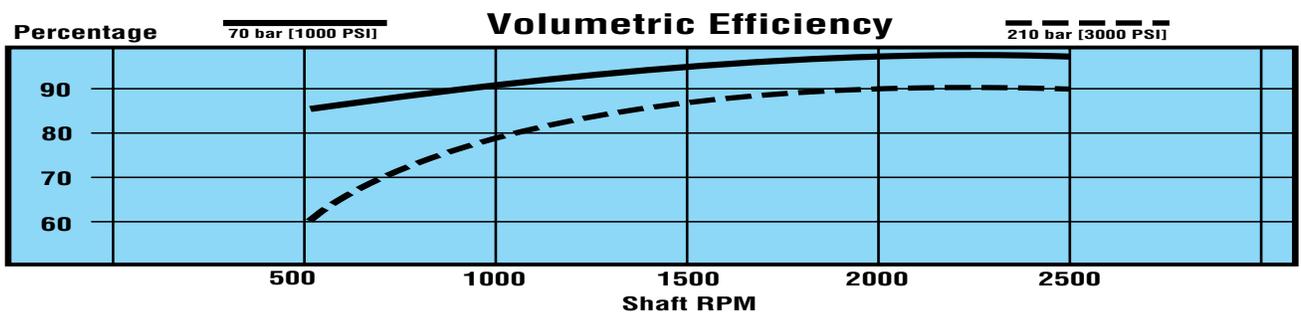
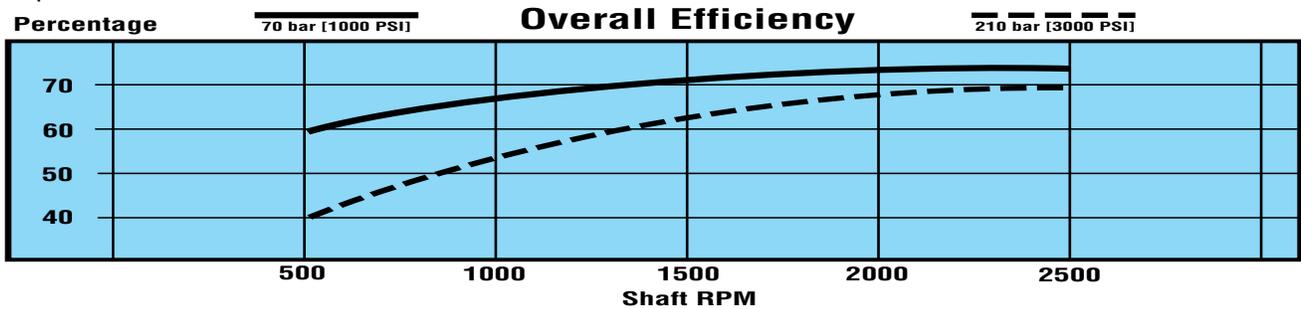
# Model 70122, 19 cm<sup>3</sup>/r [1.16 in<sup>3</sup>/r]



<b>Model 70122</b>		
<b>Specification</b>	<b>Metric Units</b>	<b>U.S. Units</b>
<b>Mounting Flange</b>	2 Bolt SAE "A" Mount	
<b>Maximum Displacement / Rev</b>	0 to 19 cm <sup>3</sup> /r	0 to 1.16 in <sup>3</sup> /r
<b>Flow @Rated Speed and PSI</b>	41,6 l/min.	11.0 GPM
<b>Maximum Rated Speed</b>	2500 RPM	2500 RPM
<b>Continuous Rated Pressure</b>	210 bar	3000 PSI
<b>Maximum Intermittent Pressure</b>	275 bar	4000 PSI
<b>Continuous Allowable Case Pressure</b>	2 bar	25 PSI
<b>Maximum High Pressure Setting @ Zero Flow</b>	Std 210 bar	Std. 3000 PSI
<b>Low Pressure Setting @ Zero Flow</b>	Std. 14 bar	Std. 200 PSI
<b>Compensator Response @ Rated PSI and RPM</b>	15 mil. sec.	15 mil. sec.
<b>Compensator Recovery @ Rated PSI and RPM</b>	65 mil. sec.	65 mil. sec.
<b>Maximum Continuous Inlet Vacuum</b>	0,87 bar absolute	4 in. Hg.
<b>Max. Thrust Load Into Pump and Shaft Side Load, for Input Shaft.</b>	Consult an Eaton representative and/or Eaton engineering.	
<b>Maximum Continuous Inlet Temperature</b>	107°C	225° F
<b>Minimum Operating Temperature</b>	-29° C	-20° F
<b>Weight per single pump</b>	8 kg	18 lbs.

# Model 70122 Performance Data

The charts below are representative of a 19 cm<sup>3</sup>/r [1.16 in<sup>3</sup>/r] Pressure-Flow Compensated Piston Pump. The tests were run at an oil temperature of 82°C [180°F] with viscosity 7 - 9 cSt [50 - 54 SUS] and the pump at maximum displacement.



# Model 70122 Code

The Model 70122 Pressure or Pressure-Flow Compensated Piston Pumps are specified by the following model code. Once a pump is built from the model code, a product number will be assigned to that arrangement.

In using the model code make sure all positions are selected within the 21 digit code for each pump.

**Code Example:**

<b>AA</b>	<b>Y</b>	<b>R</b>	<b>A</b>	<b>B</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>A</b>	<b>A</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>A</b>	<b>0</b>	<b>0</b>	
Position -		1, 2, 3,	4,	5,	6,	7,	8,	9,	10,	11,	12,	13,	14,	15,	16,	17,	18,	19,	20,	21
						0	1			0			0	0	0	0	0	A	0	0

**Position 1, 2, 3 - Code Title**

**AA** = Model 70122, 19 cm<sup>3</sup>/r [1.16 in<sup>3</sup>/r]  
 Pressure or Pressure-Flow Compensated Piston Pump

*All left (CCW) or right (CW) directions given are viewed from the input shaft end of the pump.*

**Position 4 - Input Shaft Rotation**

**R** = Righthand Rotation (CW)  
**L** = Lefthand Rotation (CCW)

**Position 5, 6 - Input Shaft**

**AB** = Straight Shaft Dia. 22,2 [.875], Keyway 6,3 [.25] x 25 [1.0], Shaft Extension 41,1 [1.62] (Key Included)  
**AD** = 13 Tooth 16/32 Spline, Shaft Extension 41,1 [1.62]  
**AF** = Straight Shaft Dia. 19,05 [.75], Keyway 4,73 [.186] x 26,2 [1.03], Shaft Extension 44,4 [1.75] (Key Included)  
**AC** = 13 Tooth 16/32 Spline, Shaft Extension 41,1 [1.62] with snap ring groove

Code	AA
<b>AB</b>	Std.
<b>AD</b>	Std.
<b>AF</b>	Opt.
<b>AC</b>	Opt.

**Position 7, 8 - Pressure Compensator Setting**

**01** = 210-215 bar [3000-3100 PSI]  
 Note: Consult an Eaton representative for additional settings from 35 bar [500 PSI] min.

<b>01</b>	Std.
-----------	------

**Position 9, 10 - Flow Compensator Setting**

**00** = No Flow Compensator  
**01** = 13,1-14,5 bar [190-210 PSI]  
 Note: Consult an Eaton representative for additional settings to a max. of 31 bar [450 PSI]

<b>00</b>	Std.
<b>01</b>	Std.

**Position 11 - Compensator Special Features**

**0** = No Special Feature  
**A** = Bleed Off

<b>0</b>	Std.
<b>A</b>	Opt.

**Position 12 - Main Ports, Size and Location**

**A** = 1.1875-12 UN Suction Port; 1.0625-12 UN Pressure Port; - SAE Straight Thread O-ring Ports - Rear  
**C** = 1.1875-12 UN Suction Port; 1.0625-12 UN Pressure Port; - SAE Straight Thread O-ring Ports - Opposite Sides

<b>A</b>	Std.
<b>C</b>	Std.

**Position 13 - Drain Port, Size and Location**

**A** = .5625-18 UNF - SAE Straight Thread O-ring Port - Right Side of Housing

<b>A</b>	Std.
----------	------

**Position 14 - Auxiliary Rear Mounting**

**0** = No Auxiliary Mounting

<b>0</b>	Std.
----------	------

**Position 15 - Maximum Displacement Option**

**0** = As Given in Code Title

<b>0</b>	Std.
----------	------

**Position 16, 17 - Special Features**

**00** = No Special Features

<b>00</b>	Std.
-----------	------

**Position 18, 19 - Paint**

**0A** = Primer

<b>0A</b>	Std.
-----------	------

**Position 20 - Identification**

**0** = Standard

<b>0</b>	Std.
----------	------

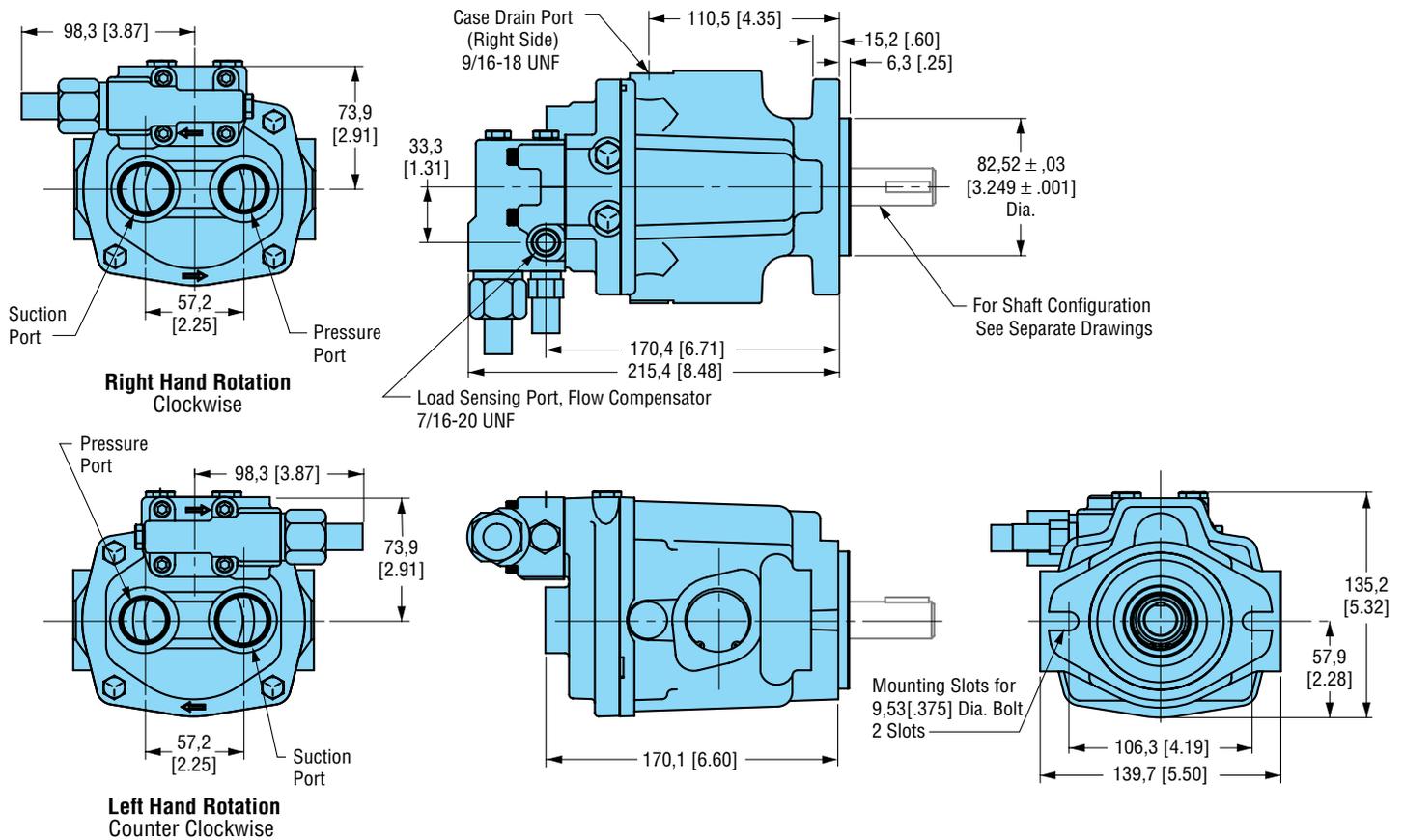
**Position 21 - Design Code**

**0** = Eaton assigned design code

<b>0</b>	Std.
----------	------

# Model 70122 Installation Drawings

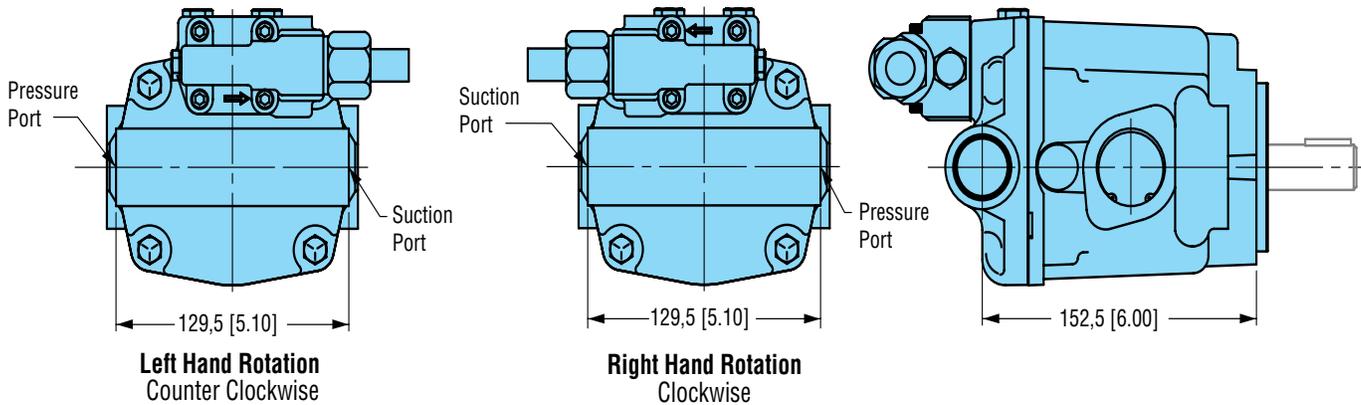
## Rear Porting



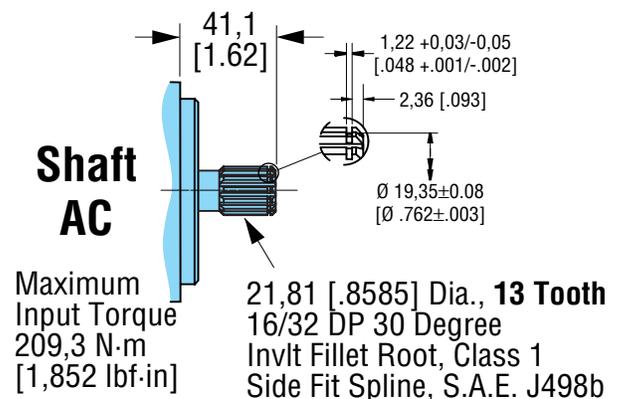
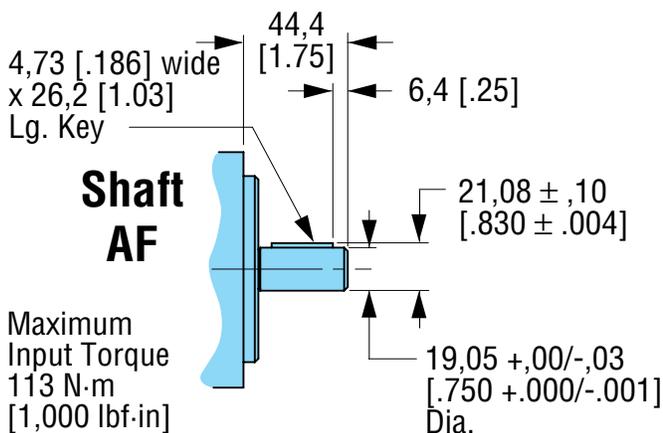
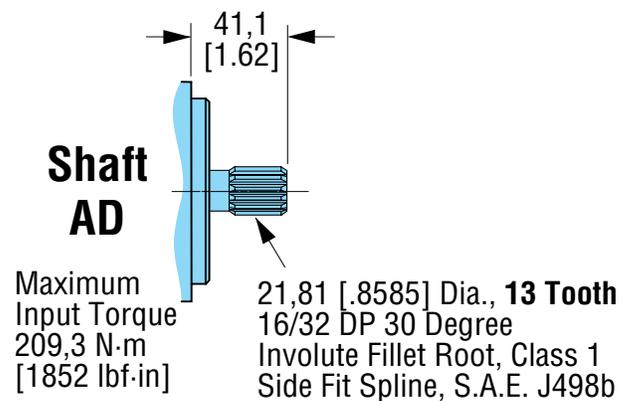
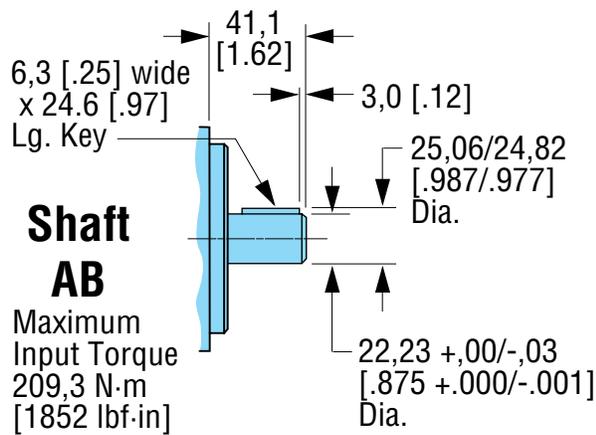
Dimensions are in millimeters [inches], unless otherwise specified.

# Model 70122 Installation Drawings

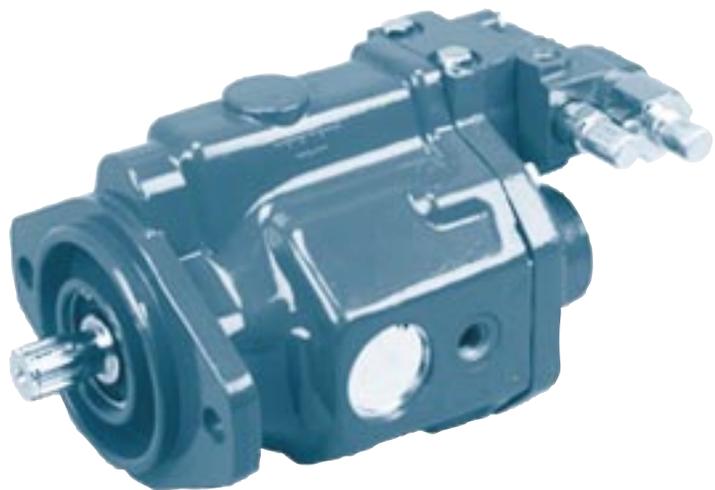
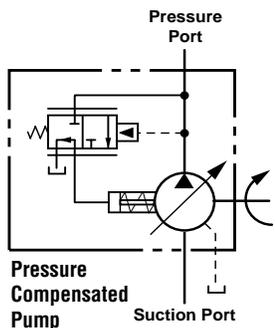
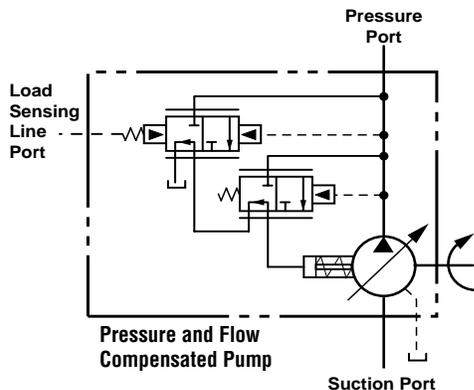
## Opposite Side Porting



## Input Shafts



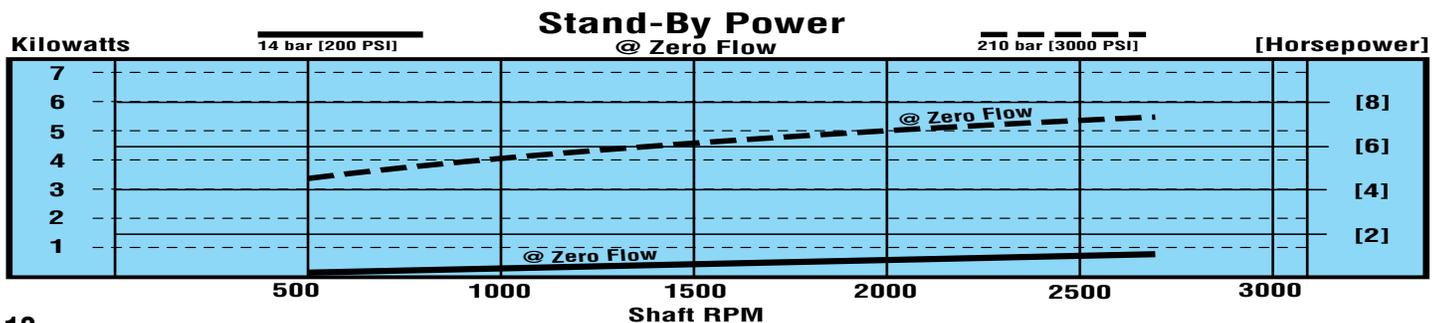
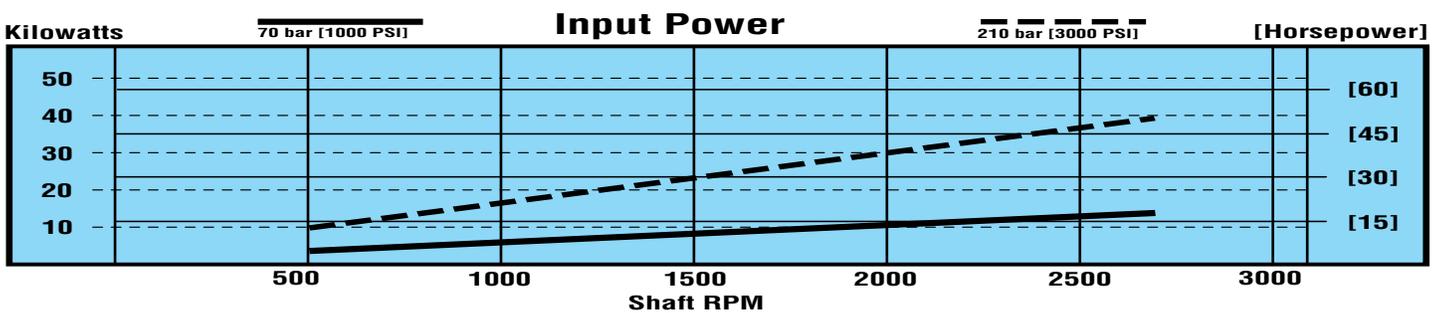
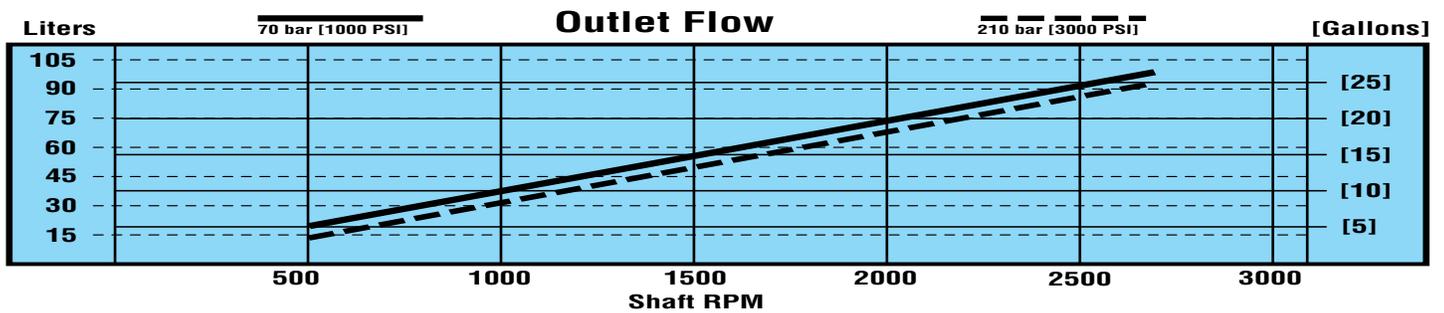
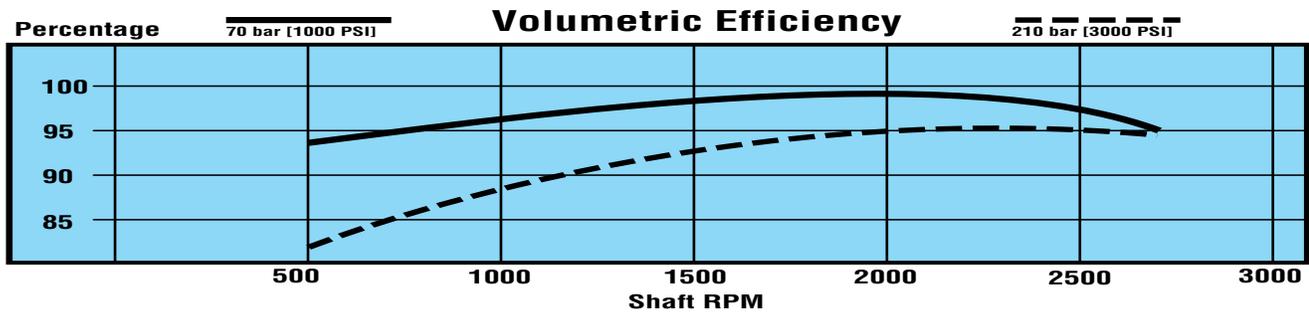
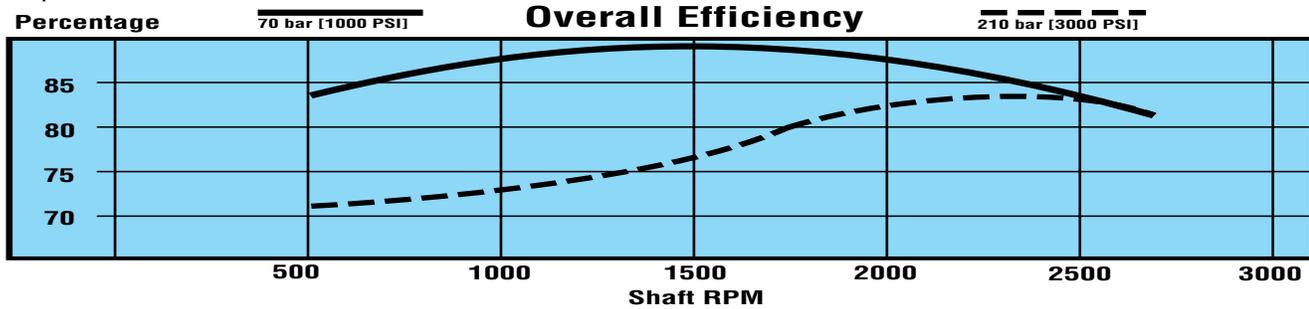
# Model 70422, 38 cm<sup>3</sup>/r [2.32 in<sup>3</sup>/r] and Model 70423, 45.4 cm<sup>3</sup>/r [2.77 in<sup>3</sup>/r]



Specification	Model 70422		Model 70423	
	Metric Units	U.S. Units	Metric Units	U.S. Units
Mounting Flange	2 Bolt SAE "B" Mount		2 Bolt SAE "B-B" Mount	
Maximum Displacement / Rev	0 to 38 cm <sup>3</sup> /r	0 to 2.32 in <sup>3</sup> /r	0 to 45 cm <sup>3</sup> /r	0 to 2.77 in <sup>3</sup> /r
Flow @Rated Speed and PSI	98,4 l/min.	26.0 GPM	125 l/min.	33 GPM
Maximum Rated Speed	2700 RPM	2700 RPM	3000 RPM	3000 RPM
Continuous Rated Pressure	210 bar	3000 PSI	210 bar	3000 PSI
Maximum Intermittent Pressure	275 bar	4000 PSI	265 bar	3800 PSI
Continuous Allowable Case Pressure	2 bar	25 PSI	2 bar	25 PSI
Maximum High Pressure Setting @ Zero Flow	Std. 210 bar	Std. 3000 PSI	Std. 210 bar	Std. 3000 PSI
Low Pressure Setting @ Zero Flow	Std. 14 bar	Std. 200 PSI	Std. 14 bar	Std. 200 PSI
Compensator Response @ Rated PSI and RPM	8 mil. sec.	8 mil. sec.	18 mil. sec.	18 mil. sec.
Compensator Recovery @ Rated PSI and RPM	42 mil. sec.	42 mil. sec.	75 mil. sec.	75 mil. sec.
Maximum Continuous Inlet Vacuum	0,91 bar absolute	3 in. Hg.	0,94 bar absolute	2 in. Hg.
Max. Thrust Load Into Pump and Shaft Side Load, for Input Shaft.	Consult an Eaton representative and/or Eaton engineering.		Consult an Eaton representative and/or Eaton engineering	
Maximum Continuous Inlet Temperature	107°C	225° F	107°C	225° F
Minimum Operating Temperature	-29° C	-20° F	-29° C	-20° F
Weight per single pump	12,3 kg	27 lbs.	11,8 kg	26 lbs.

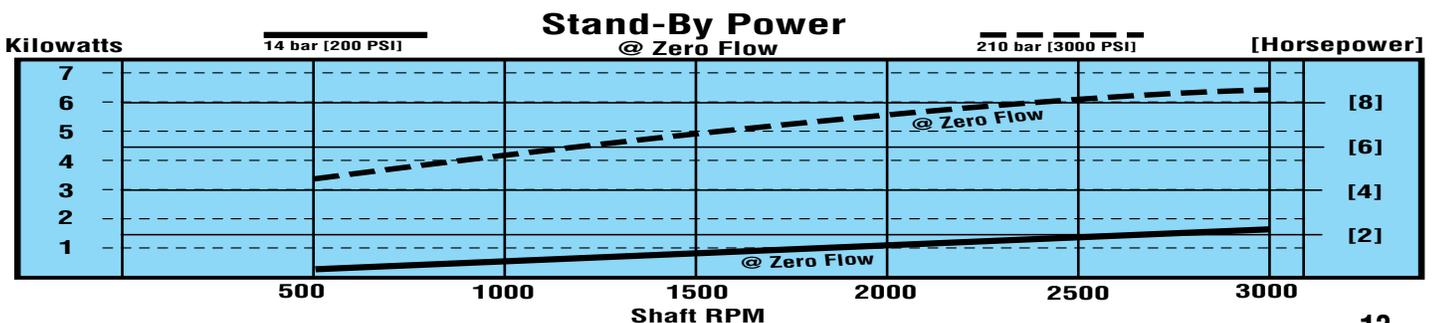
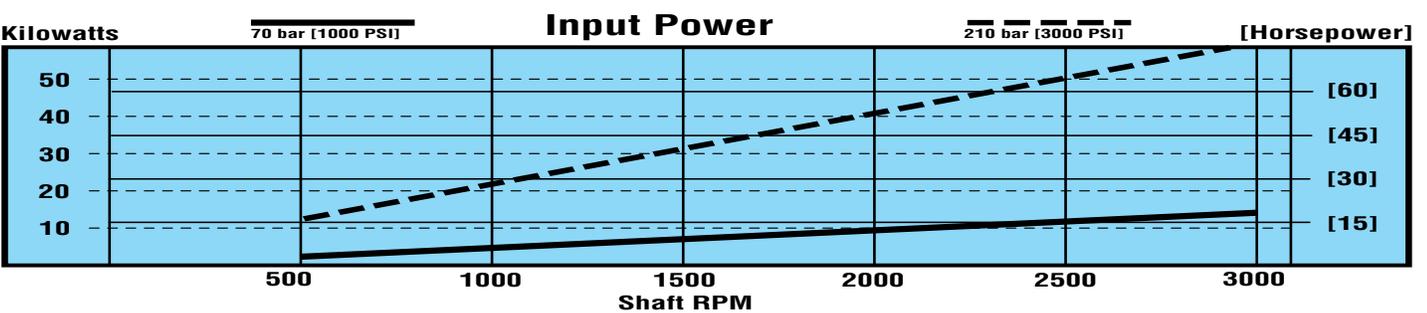
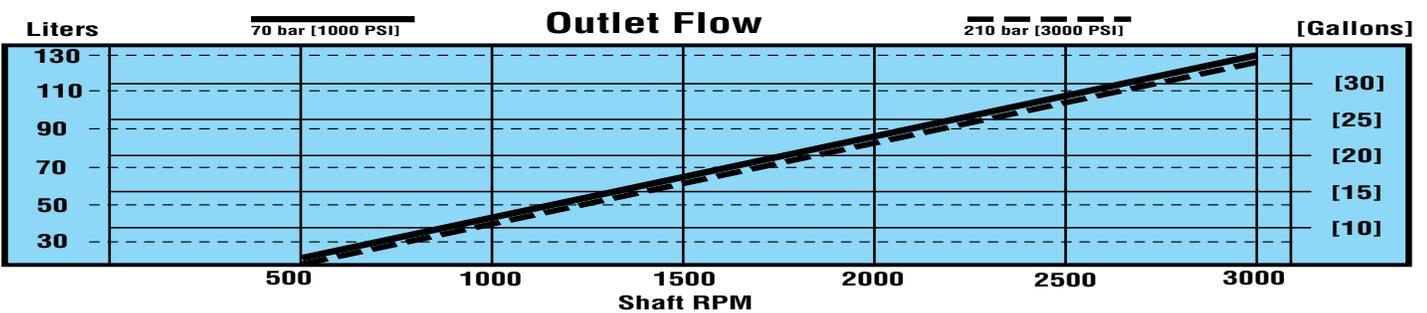
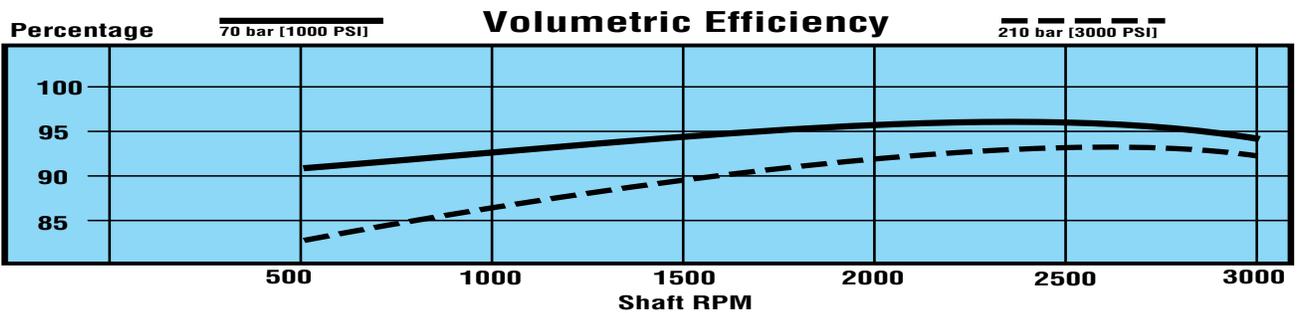
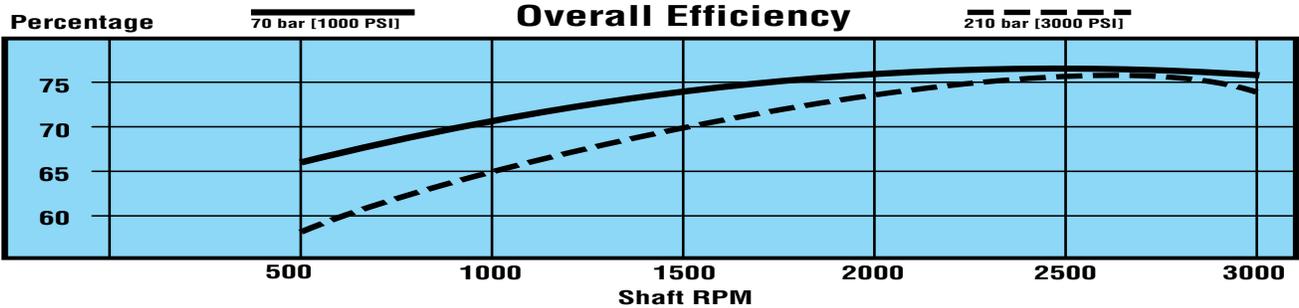
# Model 70422 Performance Data

The charts below are representative of a 38 cm<sup>3</sup>/r [2.32 in<sup>3</sup>/r] Pressure-Flow Compensated Piston Pump. The tests were run at an oil temperature of 82°C [180°F] with viscosity 7 - 9 cSt [50 - 54 SUS] and the pump at maximum displacement.



# Model 70423 Performance Data

The charts below are representative of a 45 cm<sup>3</sup>/r [2.77 in<sup>3</sup>/r] Pressure-Flow Compensated Piston Pump. The tests were run at an oil temperature of 82°C [180°F] with viscosity 7 - 9 cSt [50 - 54 SUS] and the pump at maximum displacement.



# Model 70422 and 70423 Code

The Model 70422 and 70423 Pressure or Pressure-Flow Compensated Piston Pumps are specified by the following model code. Once a pump is built from the model code, a product number will be assigned to that arrangement.

In using the model code make sure all positions are selected within the 21 digit code for each pump.

**Code Example:**

<b>AAG</b>	<b>R</b>	<b>A</b>	<b>F</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>A</b>	<b>A</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>A</b>	<b>0</b>	<b>0</b>
1, 2, 3,	4,	5,	6,	7,	8,	9,	10,	11,	12,	13,	14,	15,	16,	17,	18,	19,	20,	21
				0	1							0	0	0	0	A	0	0

**Position 1, 2, 3 - Code Title**

**AAG** = Model 70422, 38 cm<sup>3</sup>/r [2.32 in<sup>3</sup>/r]  
 Pressure or Pressure-Flow Compensated Piston Pump  
**AAH** = Model 70423, 45,4 cm<sup>3</sup>/r [2.77 in<sup>3</sup>/r]  
 Pressure or Pressure-Flow Compensated Piston Pump

*All left (CCW) or right (CW) directions given are viewed from the input shaft end of the pump.*

**Position 4 - Input Shaft Rotation**

**R** = Righthand Rotation (CW)  
**L** = Lefthand Rotation (CCW)

**Position 5, 6 - Input Shaft**

**AA** = 15 Tooth 16/32 Spline, Shaft Extension 46 [1.81]  
**AF** = 13 Tooth 16/32 Spline, Shaft Extension 41,1 [1.62]  
**AM** = Straight Shaft Dia. 22,2 [.875], Keyway 6,3 [.25] x 25 [1.0], Shaft Extension 41,1 [1.62] (Key Included)  
**AN** = Straight Shaft Dia. 25,4 [1.00], Keyway 6,3 [.25] x 29,5 [1.16], Shaft Extension 46 [1.81] (Key Included)

Code	AAG	AAH
<b>AA</b>	Opt.	Std.
<b>AF</b>	Std.	Opt.
<b>AM</b>	Std.	Opt.
<b>AN</b>	Opt.	Std.

**Position 7, 8 - Pressure Compensator Setting**

**01** = 210-215 bar [3000-3100 PSI]  
 Note: Consult an Eaton representative for additional settings from 35 bar [500 PSI] min.

<b>01</b>	Std.	Std.
-----------	------	------

**Position 9, 10 - Flow Compensator Setting**

**00** = No Flow Compensator  
**01** = 13,1-14,5 bar [190-210 PSI]  
 Note: Consult an Eaton representative for additional settings to a max. of 31 bar [450 PSI]

<b>00</b>	Std.	Std.
<b>01</b>	Std.	Std.

**Position 11 - Compensator Special Features**

**0** = No Special Feature  
**A** = Bleed Off

<b>0</b>	Std.	Std.
<b>A</b>	Opt.	Opt.

**Position 12 - Main Ports, Size and Location**

**A** = 1.625 -12 UN Suction Port; 1.3125-12 UN Pressure Port; - SAE Straight Thread O-ring Ports - Rear  
**B** = 1.625 -12 UN Suction Port; 1.3125-12 UN Pressure Port; - SAE Straight Thread O-ring Ports - Opposite Sides

<b>A</b>	Std.	Std.
<b>B</b>	Std.	Std.

**Position 13 - Drain Port, Size and Location**

**A** = .5625-18 UNF - SAE Straight Thread O-ring Port - Right Side of Housing  
**E** = .5625-18 UNF - SAE Straight Thread O-ring Port - Right and Left Side of Housing

<b>A</b>	Std.	Std.
<b>E</b>	Opt.	Opt.

**Position 14 - Auxiliary Rear Mounting**

**0** = No Auxiliary Mounting  
**B** = [2-Bolt A] SAE Flange Series 82-2 with a 9 Tooth 16/32 Intl. Spline, Accepts 38,1 [1.50] Shaft Extension  
**C** = [2-Bolt A] SAE Flange Series 82-2 with a 9 Tooth 16/32 Intl. Spline, Accepts 38,1 [1.50] Shaft Extension, with Cover Plate  
**D** = [2-Bolt B] SAE Flange Series 101-2 with a 41 Tooth 48/96 External Spline, Accepts 24,9 [.98] Shaft Extension

<b>0</b>	Std.	Std.
<b>B</b>	Opt.	Opt.
<b>C</b>	Opt.	Opt.
<b>D</b>	Opt.	Opt..

**Position 15 - Maximum Displacement Option**

**0** = As Given in Code Title

<b>0</b>	Std.	Std.
----------	------	------

**Position 16, 17 - Special Features**

**00** = No Special Features

<b>00</b>	Std.	Std.
-----------	------	------

**Position 18, 19 - Paint**

**0A** = Primer

<b>0A</b>	Std.	Std.
-----------	------	------

**Position 20 - Identification**

**0** = Standard

<b>0</b>	Std.	Std.
----------	------	------

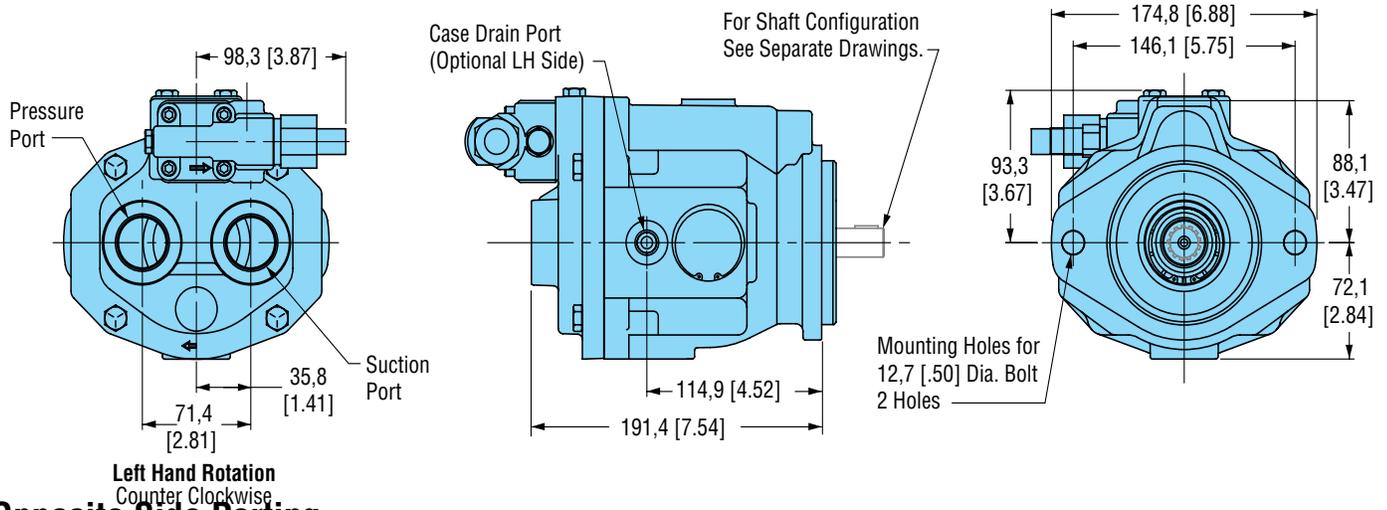
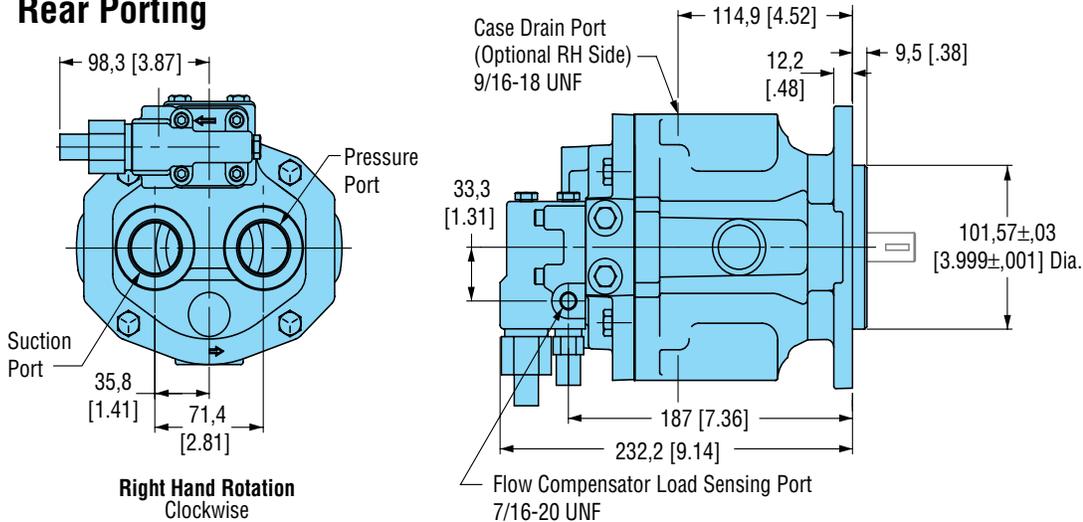
**Position 21 - Design Code**

**0** = Eaton assigned design code

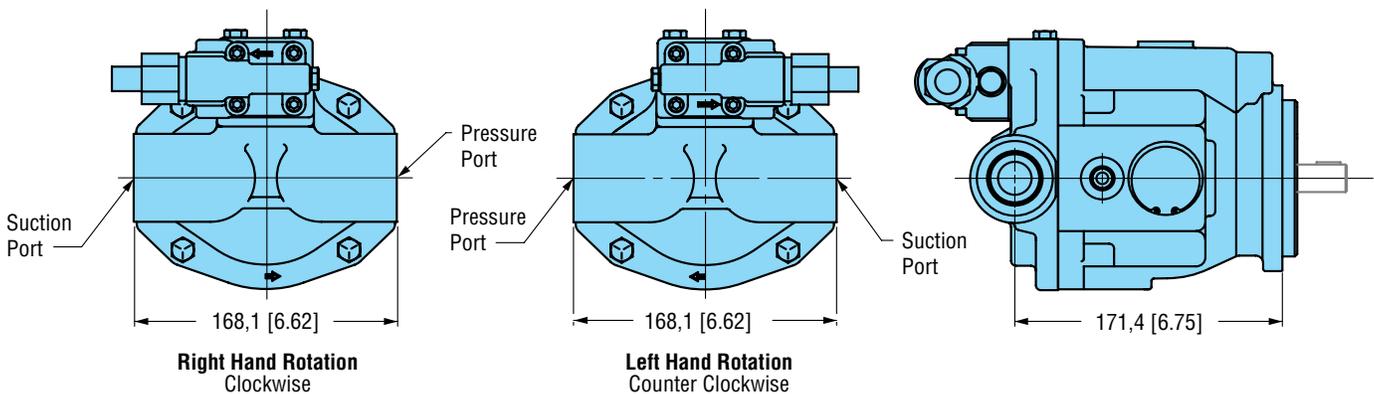
<b>0</b>	Std.	Std.
----------	------	------

# Model 70422 and 70423 Installation Drawings

## Rear Porting

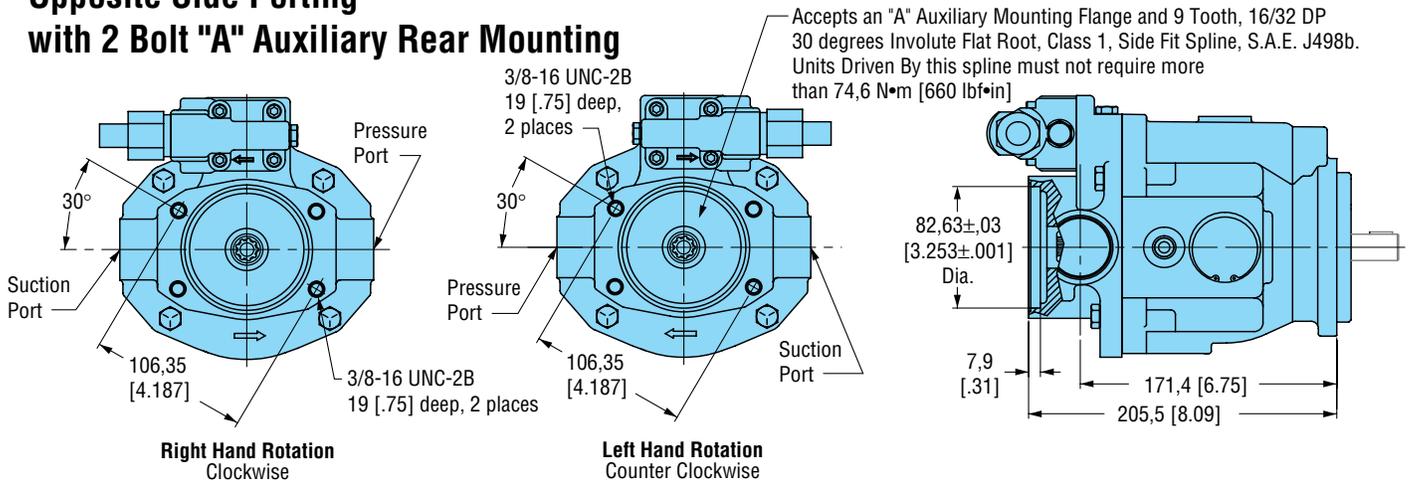


## Opposite Side Porting

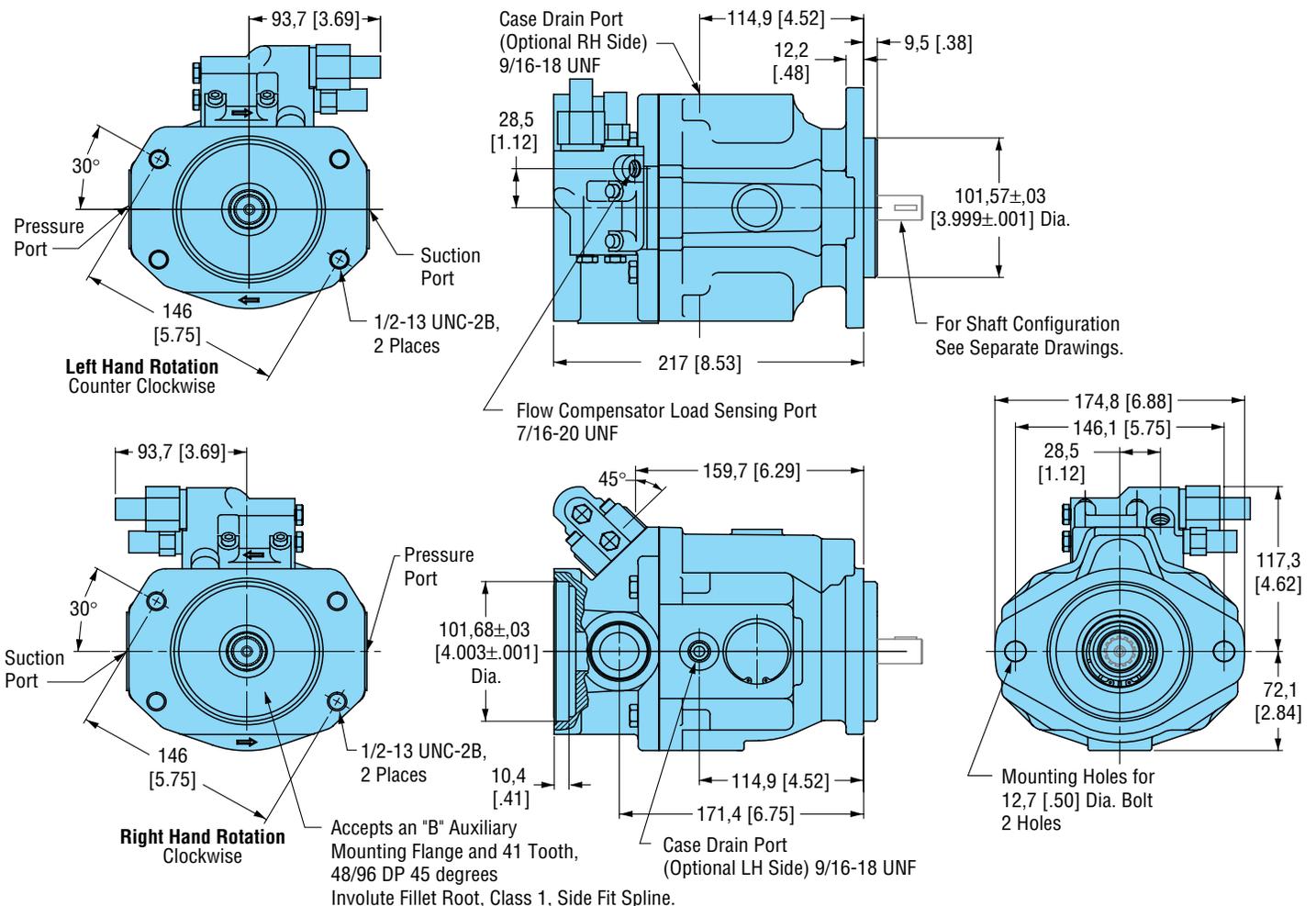


# Model 70422 and 70423 Installation Drawings

## Opposite Side Porting with 2 Bolt "A" Auxiliary Rear Mounting

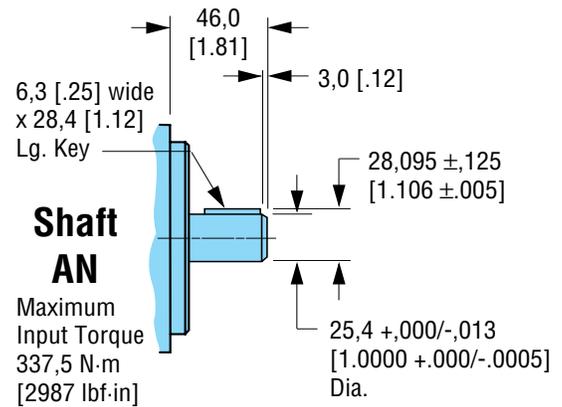
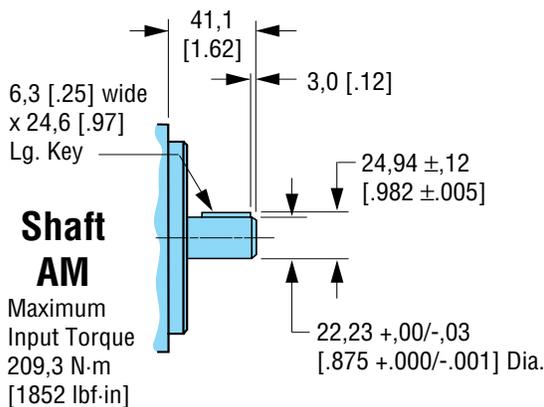
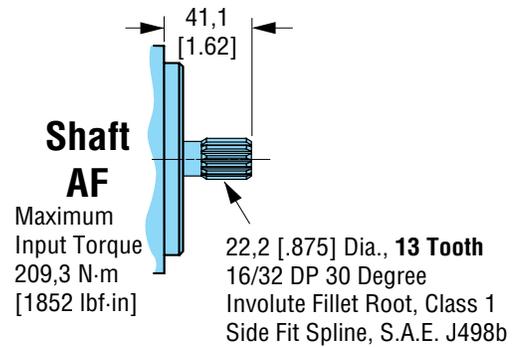
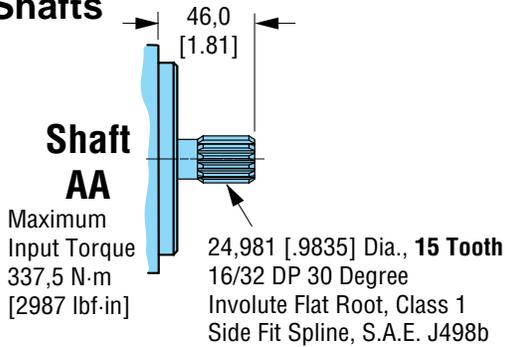


## Opposite Side Porting with 2 Bolt "B" Auxiliary Rear Mounting



# Model 70422 and 70423 Installation Drawings

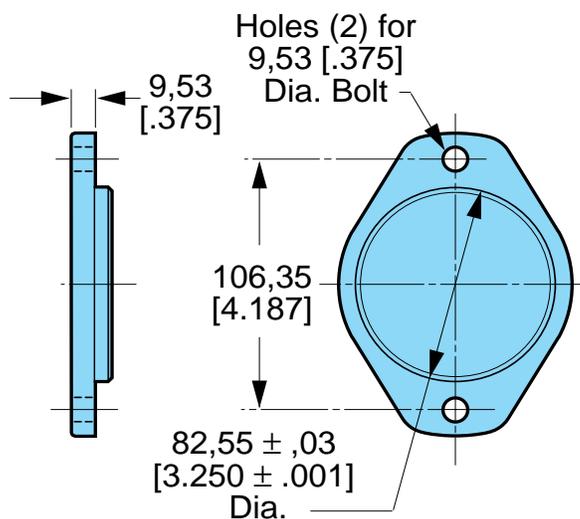
## Input Shafts



## Cover Plate

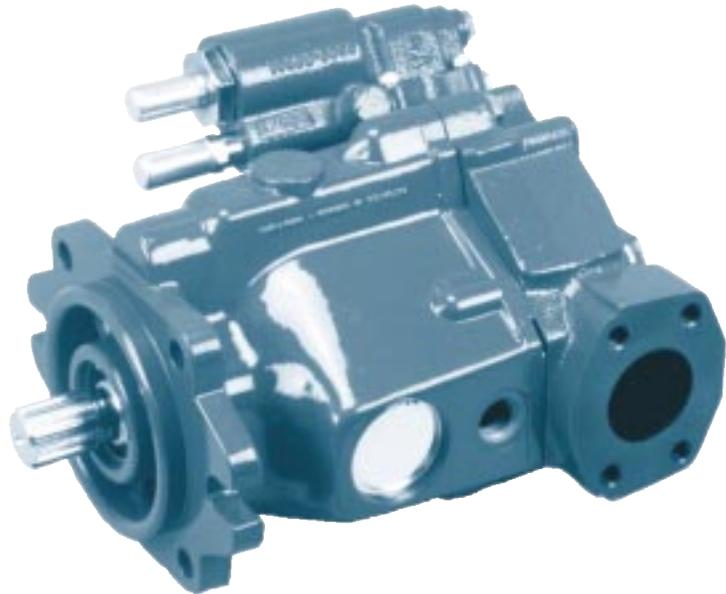
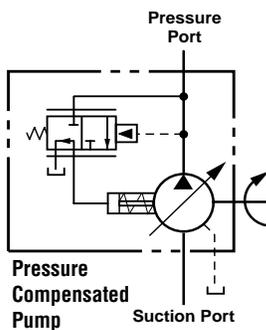
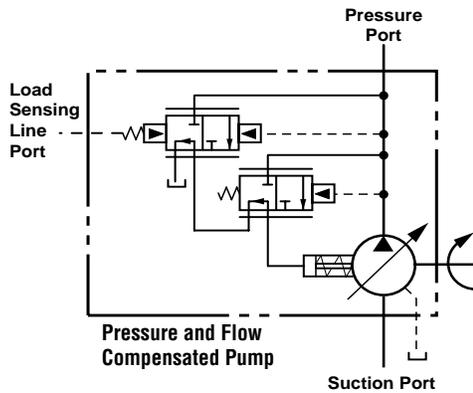
Fits SAE "A" Auxiliary Mounting Flange in place of auxiliary pump.

A kit (#70142-915) includes Cover Plate, 2 Cap Screws, and O-ring.



Dimensions are in millimeters [inches], unless otherwise specified.

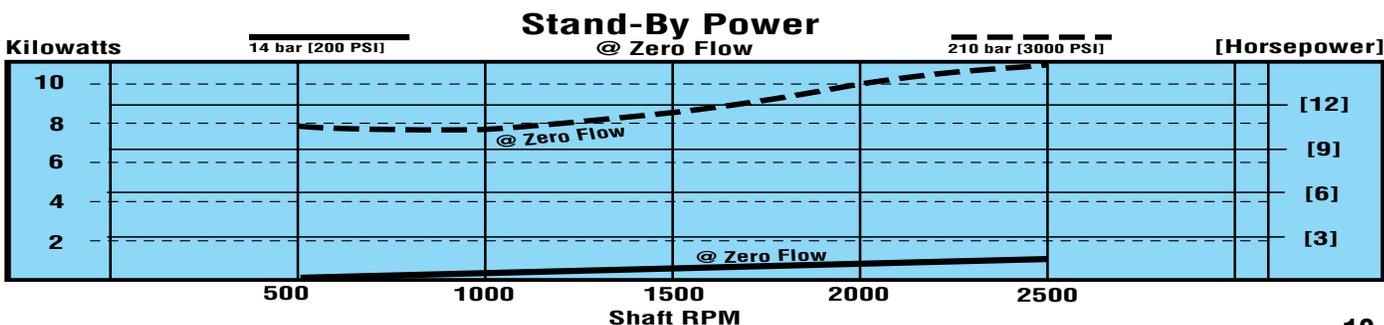
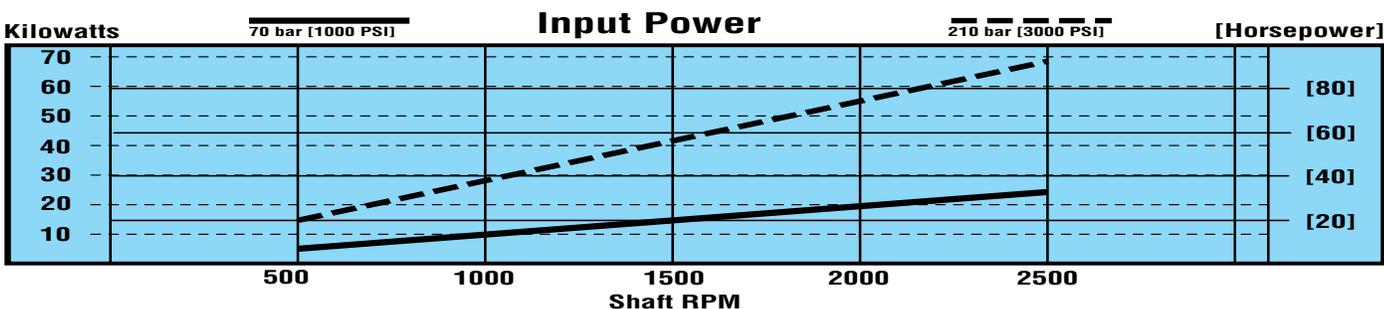
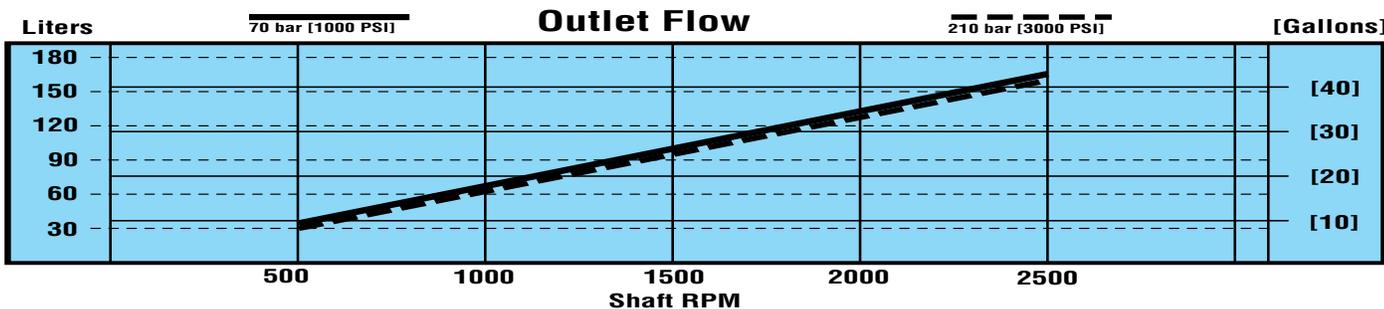
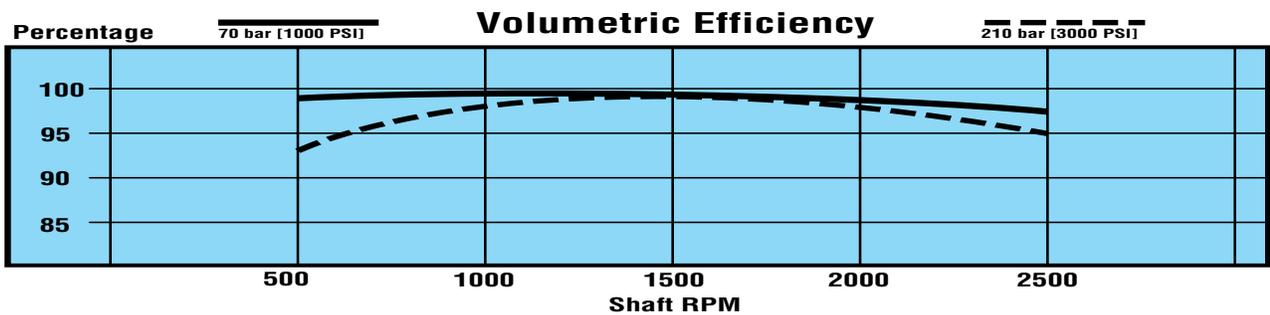
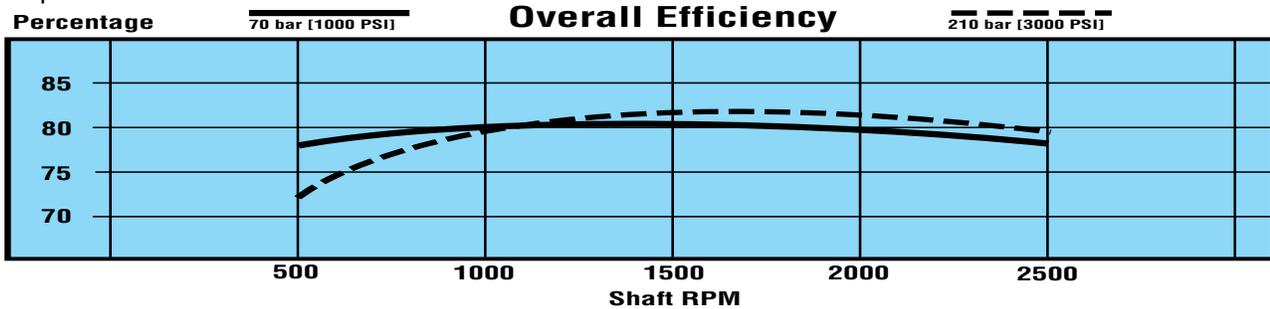
# Model 70523, 69 cm<sup>3</sup>/r [4.21 in<sup>3</sup>/r]



Specification	Model 70523	
	Metric Units	U.S. Units
Mounting Flange	2 and/or 4 Bolt SAE "C" Mount	
Maximum Displacement / Rev	0 to 69 cm <sup>3</sup> /r	0 to 4.21 in <sup>3</sup> /r
Flow @ Rated Speed and PSI	159 l/min.	42 GPM
Maximum Rated Speed	2500 RPM	2500 RPM
Continuous Rated Pressure	210 bar	3000 PSI
Maximum Intermittent Pressure	310 bar	4500 PSI
Continuous Allowable Case Pressure	2 bar	25 PSI
Maximum High Pressure Setting @ Zero Flow	Std. 210 bar	Std. 3000 PSI
Low Pressure Setting @ Zero Flow	Std. 14 bar	Std. 200 PSI
Compensator Response @ Rated PSI and RPM	35 mil. sec.	35 mil. sec.
Compensator Recovery @ Rated PSI and RPM	125 mil. sec.	125 mil. sec.
Maximum Continuous Inlet Vacuum	0,94 bar absolute	2 in. Hg.
Max. Thrust Load Into Pump and Shaft Side Load, for Input Shaft.	Consult an Eaton representative and/or Eaton engineering	
Maximum Continuous Inlet Temperature	107°C	225° F
Minimum Operating Temperature	-29° C	-20° F
Weight per single pump	35,4 kg	78 lbs.

# Model 70523 Performance Data

The charts below are representative of a 69 cm<sup>3</sup>/r [4.21 in<sup>3</sup>/r] Pressure-Flow Compensated Piston Pump. The tests were run at an oil temperature of 82°C [180°F] with viscosity 7 - 9 cSt [50 - 54 SUS] and the pump at maximum displacement.



# Model 70523 Code

The Model 70523 Pressure or Pressure-Flow Compensated Piston Pumps are specified by the following model code. Once a pump is built from the model code, a product number will be assigned to that arrangement.

In using the Model Code make sure all positions are selected within the 21 digit code for each pump.

**Code Example:**

<b>AAW</b>	<b>R</b>	<b>A</b>	<b>A</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>A</b>	<b>B</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>A</b>	<b>0</b>	<b>0</b>
1, 2, 3,	4,	5,	6,	7,	8,	9,	10,	11,	12,	13,	14,	15,	16,	17,	18,	19,	20,	21
				0	1							0	0	0	0	A	0	0

**Position 1, 2, 3 - Code Title**

**AAW** = Model 70523, 69 cm<sup>3</sup>/r [4.21 in<sup>3</sup>/r]  
 Pressure or Pressure-Flow Compensated Piston Pump

*All left (CW) or right (CCW) directions given are viewed from the input shaft end of the pump.*

**Position 4 - Input Shaft Rotation**

**R** = Righthand Rotation (CW)  
**L** = Lefthand Rotation (CCW)

**Position 5, 6 - Input Shaft**

**AA** = 14 Tooth 12/24 Spline, Shaft Extension 55.6 [2.19]  
**AC** = Straight Shaft Dia. 31.8 [1.25], Keyway 7.98 [.314] x 34.11 [1.343], Shaft Extension 55.6 [2.19] (Key Included)

Code	AAW
<b>AA</b>	Std.
<b>AC</b>	Std.

**Position 7, 8 - Pressure Compensator Setting**

**01** = 210-215 bar [3000-3100 PSI]  
 Note: Consult an Eaton representative for additional settings from 35 bar [500 PSI] min.

<b>01</b>	Std.
-----------	------

**Position 9, 10 - Flow Compensator Setting**

**00** = No Flow Compensator  
**01** = 13.1-14.57 bar [190-210 PSI]  
 Note: Consult an Eaton representative for additional settings to a max. of 31 bar [450 PSI]

<b>00</b>	Std.
<b>01</b>	Std.

**Position 11 - Compensator Special Features**

**0** = Top Mounted Compensator Assembly, No Special Features  
**D** = Rear Mounted Compensator Assembly, No Special Features  
**G** = Top Mounted Compensator Assembly with Bleed Off

<b>0</b>	Std.
<b>D</b>	Opt..
<b>G</b>	Opt.

**Position 12 - Main Ports, Size and Location**

**A** = 50.8 [2.00] Suction Port; 25.4 [1.00] Pressure Port; - 4 Bolt Flange, Code 61 - Opposite Sides  
**B** = 50.8 [2.00] Suction Port; 31.8 [1.25] Pressure Port; - 4 Bolt Flange, Code 61 - Opposite Sides  
**C** = 50.8 [2.00] Suction Port; 31.8 [1.25] Pressure Port; - 4 Bolt Flange, Code 61 - Rear Ports

<b>A</b>	Std.
<b>B</b>	Opt.
<b>C</b>	Opt.

**Position 13 - Drain Port, Size and Location**

**A** = .875-14 - UNF SAE Straight Thread O-ring Port - Left Side of Housing  
**B** = .875-14 - UNF SAE Straight Thread O-ring Port - Right Side of Housing

<b>A</b>	Std.
<b>B</b>	Std.

**Position 14 - Auxiliary Rear Mounting**

**0** = No Auxiliary Mounting  
**B** = [2- Bolt B] SAE Flange Series 101-2 with a 13 Tooth 16/32 External Spline (Coupler and O-ring not Included)  
**C** = [2- Bolt A] SAE Flange Series 82-2 with a 9 Tooth 16/32 External Spline (Coupler and O-ring Included)

<b>0</b>	Std.
<b>B</b>	Opt.
<b>C</b>	Opt.

**Position 15 - Maximum Displacement Option**

**0** = As Given in Code Title

<b>0</b>	Std.
----------	------

**Position 16, 17 - Special Features**

**00** = No Special Features

<b>00</b>	Std.
-----------	------

**Position 18, 19 - Paint**

**0A** = Primer

<b>0A</b>	Std.
-----------	------

**Position 20 - Identification**

**0** = Standard

<b>0</b>	Std.
----------	------

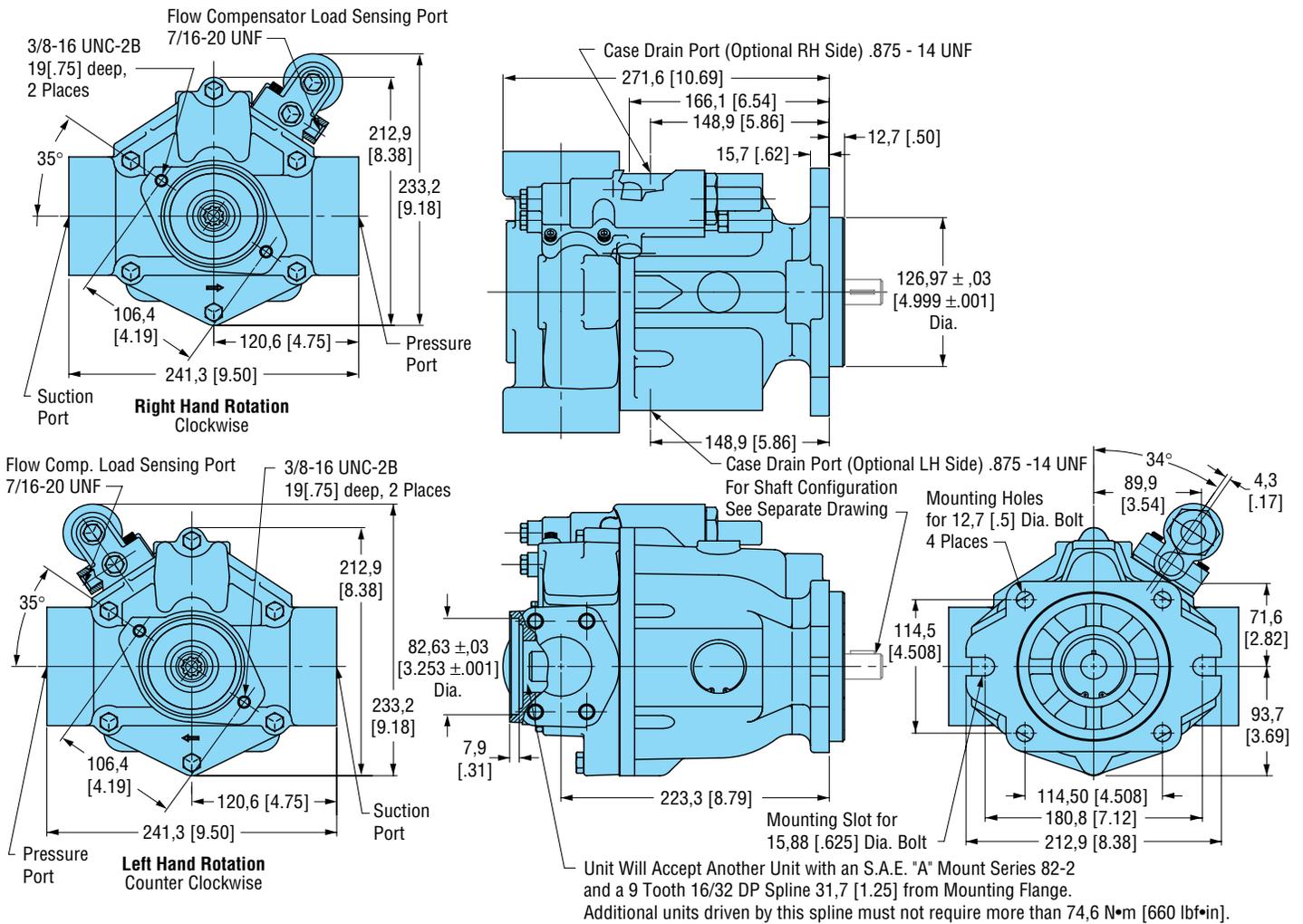
**Position 21 - Design Code**

**0** = Eaton assigned design code

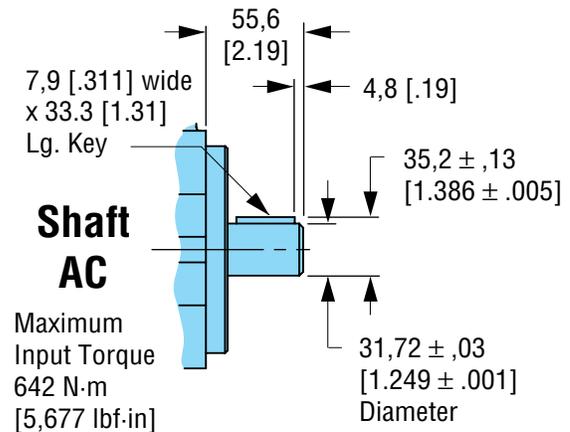
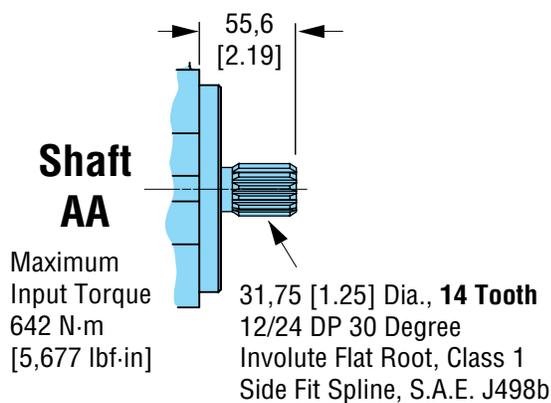
<b>0</b>	Std.
----------	------

# Model 70523 Installation Drawings

## Opposite Side Porting with 2 Bolt "A" Auxiliary Rear Mounting and Compensator in Top Position

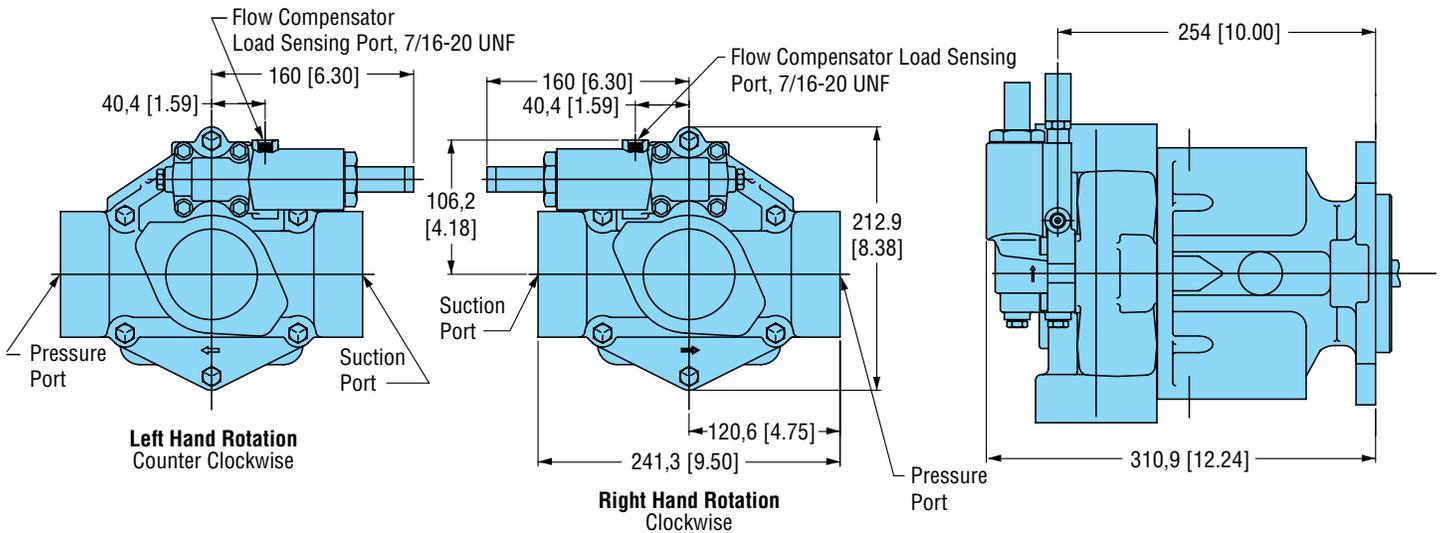


### Input Shafts

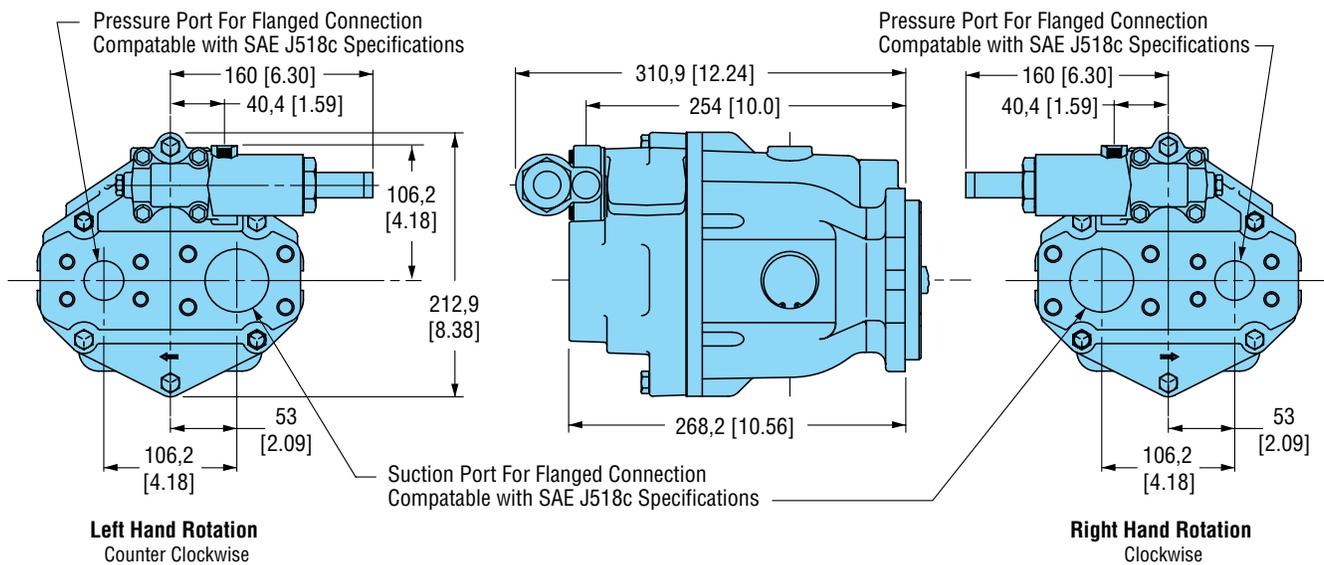


# Model 70523 Installation Drawings

## Opposite Side Porting with Compensator Position on the Rear

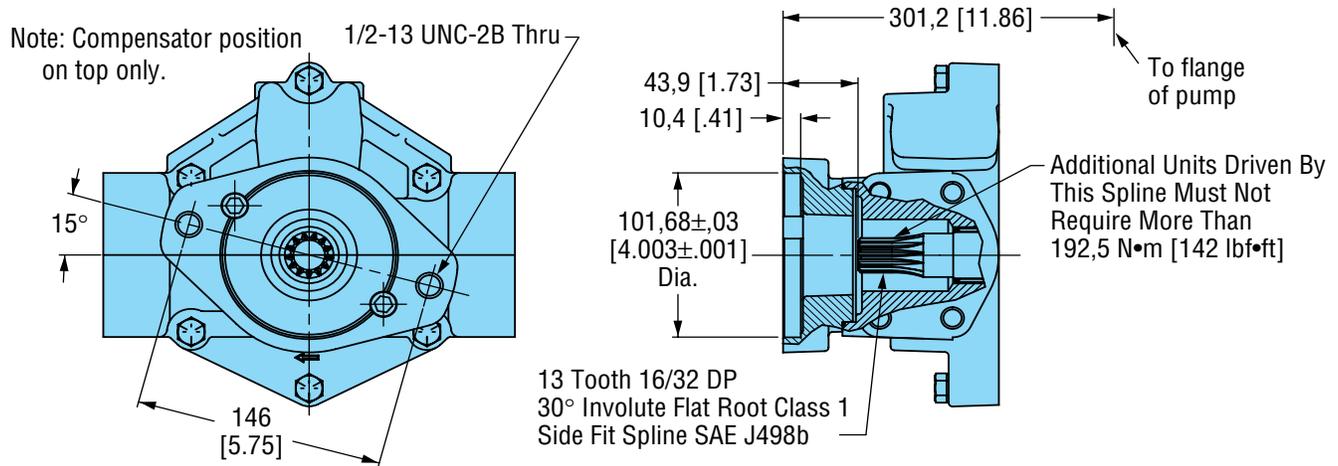


## Rear Porting with Compensator Position on the Rear



# Model 70523 Installation Drawings

## 2-Bolt "B" Auxiliary Rear Mounting



# Using the Eaton Pressure-Flow Compensated Piston Pump in Load Sensing Hydraulic Systems.

## Operating Characteristics of Pressure-Flow Compensated Piston Pump in Load Sensing Systems:

- Variable pressure and variable flow.
- Pump is in low-pressure standby mode when system is not actuated.
- Pump automatically adjusts output flow and pressure to meet system requirements.
- Allows for simultaneous operation of multiple functions.
- Fast response to system pressure and flow requirements.
- One pump may be used instead of multiple pumps.

The Eaton Pressure-Flow Compensated Piston Pump senses pressure and flow requirements and provides only flow and pressure required, plus 14 bar [200 PSI], to operate the compensator. The low pressure standby, 14 bar [200 PSI], prevents excessive heat buildup in the pump and eliminates unnecessary horsepower drain. The pressure-flow compensated load sensing system is noted for its high efficiency and controllability. The following two systems demonstrate the general load sensing concept.

## Pressure-Flow Compensated - - Load Sensing System.

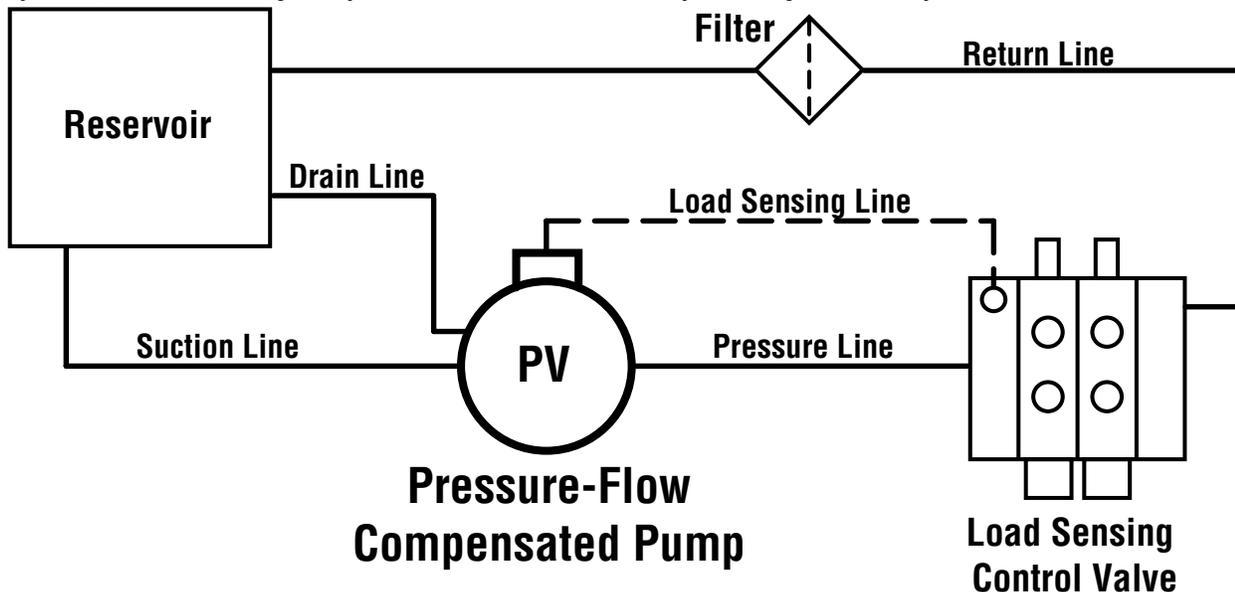
When used with a closed center load sensing control valve, and the hydraulic system is not actuated, the pressure-flow compensated piston pump will remain in the low pressure standby mode at only 14 bar [200 PSI].

When a hydraulic function is actuated, the pressure-flow compensated piston pump senses the demand for flow and adjusts the pump displacement to increase the flow required at only the pressure required to operate the circuit, plus the 14 bar [200 PSI] to operate the compensator. The pump will strive to maintain the flow required, at only 14 bar [200 PSI] over the pressure required, under all working conditions of the system. A load sensing line is connected from the load sensing control valve to the pump to feed all the circuit requirements to the pump compensator. The pump will respond to the highest pressure of all the circuits and provide the total flow required to operate multiple circuits. A load sensing line bleed orifice is preferred in the load sensing control valve to prevent high pressure compensation of the piston pump when the control valve is returned to neutral.

If the load on the system produces a hydraulic pressure that is equal to the high pressure setting of the compensator, the pump will go into high pressure standby mode and destroke until the load is overcome or the control valve is returned to neutral. This prevents a large volume of pump flow from passing over the system relief valve as compared to the conventional open center hydraulic system.

To achieve true simultaneous operation of individual circuits, a flow compensator should be incorporated in each circuit, otherwise the system will send the most flow to the circuit with the least resistance.

In many cases, the heat exchanger may be eliminated because of the systems higher efficiency.

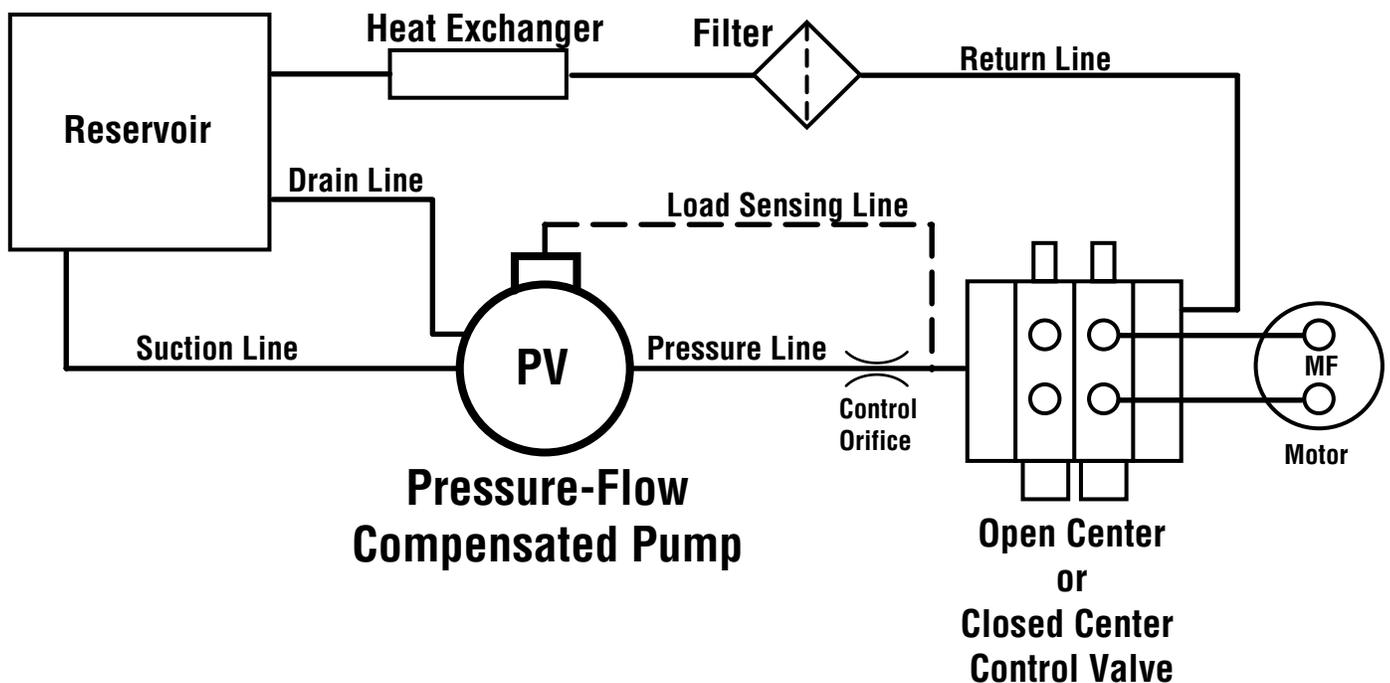


### Constant Flow - - Load Sensing System

When using the pressure-flow compensated piston pump with an **open center control valve**, the control orifice (fixed or variable) will regulate the volume of oil from the piston pump to the control valve. With the valve spool in neutral, the regulated flow will pass through the control valve then back to tank. The load sensing line is teed into the pressure line downstream from the control orifice. When the control valve spool is actuated, the pump will provide the controlled flow at the actual system operating pressure, plus 14 bar [200 PSI]. If the system stalls out under a load, the pump will go into high pressure standby until the load is overcome or the control valve is returned to neutral. This feature eliminates the need for a system relief valve and the inefficiency that it produces.

When using the pressure-flow compensated piston pump with a **closed center control valve**, the pump will be in high pressure standby when the spool is in neutral. When the valve spool is actuated, the pump will provide the flow at maximum pump pressure up to the control valve where the flow capacity of the valve circuit will dictate the flow capacity of the pump. If the controlling orifice is more flow restrictive than the control valve circuit, then the pump will provide the controlled flow at the actual circuit operating pressure plus 14 bar [200 PSI]. If the system stalls out under load, the pump will go into the high pressure standby mode until the load is overcome. This feature eliminates the need for a system relief valve and the inefficiency that it produces.

In many cases, the heat exchanger may be eliminated because of the systems higher efficiency. A high pressure relief valve set at 14 - 35 bar [200 - 500 PSI] above the pressure compensatr setting may be necessary.



This system can also be used as a **constant speed load sensing system** to drive a motor. By eliminating the control valve and installing a fixed or variable orifice, the pump can be used to drive a motor at a constant speed regardless of load on the motor. With the load sensing line connected to the downstream side of the orifice, the pump will maintain a constant flow to the motor maintaining a constant motor speed. The only change in motor speed will be from the motor's volumetric efficiency change in relation to system pressure change. The pump input shaft speed may also be varied within limits while the motor speed remains constant.

# Using the Eaton Pressure Compensated Piston Pump in Closed Center Hydraulic Systems.

## Operating Characteristics of Pressure Compensated Piston Pump in Closed Center Systems:

- Constant Pressure and variable flow.
- Pump is in high-pressure standby mode when system is not actuated.
- Pump automatically adjusts output flow to meet system requirements.
- Allows for simultaneous operation of multiple functions.
- Fast response to system pressure or flow requirements.
- One pump may be used instead of multiple pumps.

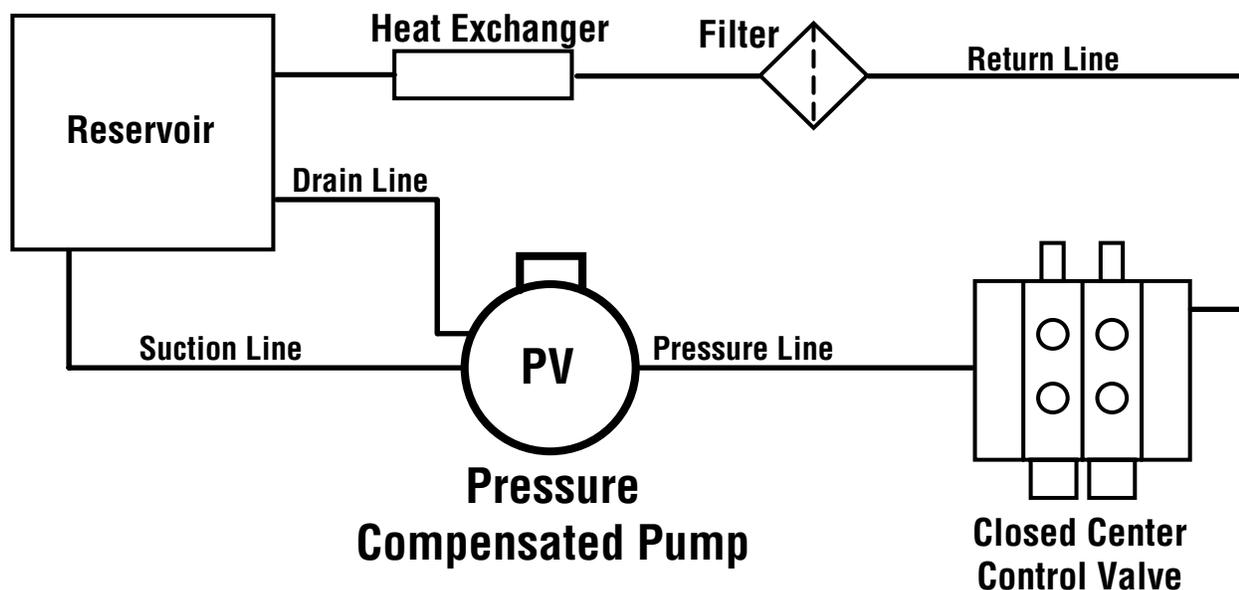
Closed Center systems are ideal when the hydraulic system requires several separate functions to operate simultaneously.

When used with a closed center control valve, and the hydraulic system is not actuated, the pressure compensated piston pump will remain in the high pressure standby mode at pressures up to 210 bar [3000 PSI]. The pump will maintain the high pressure and zero flow as long as the system is not actuated.

When a hydraulic function is actuated, the pressure compensated piston pump senses the change in the demand for flow and adjusts the pump displacement to increase the flow required while maintaining full system pressure up to the control valve. The pump will strive to maintain maximum system pressure to the control valve under all working conditions. The pump will adjust output flow to meet any change in system flow requirements. The pump will maintain full system pressure as long as the system flow requirement does not exceed the total flow capacity of the pump.

With constant system pressure and a known working pressure, each function can be independently orificed to provide simultaneous operation and precise cycle time of individual circuits within the hydraulic system.

If the hydraulic system stalls out under a load, the pump will go into the high pressure standby mode until the load is overcome. This prevents a large volume of pump flow from passing over the system relief valve as happens in the typical open center hydraulic system.



---

## Product Catalogs

To order catalogs, call your Eaton representative

- 11-104 - Char-Lynn Hydraulic Motors, J Series 70422, 70423 and 70523
- 11-107 - Medium Duty Piston Motors, Models 74111, 74118, 74318 and 74348 11-605 - Gear Pumps, L2 Series Model 25500 through 25508
- 11-111 - Char-Lynn Hydraulic Motors, W Series 11-606 - Medium Duty Piston Pumps, Model 70142/70144 and Model 70145 Variable Displacement Pump
- 11-112 - VIS Hydraulic Motors 11-609 - Gear Pumps, 26 Series Model 26000
- 11-301 - Power Steering, Char-Lynn, 2 Series 11-700 - Cylinders, Wyr-Loc, Model 580
- 11-302 - Char-Lynn Torque Generator, 217 Series and 227 Series 11-866 - Heavy Duty Hydrostatic Transmissions, Models 33 - 76; Includes description of Pump and Motor Controls
- 11-303 - Power Steering, Char-Lynn, 20 Series 11-872 - Char-Lynn Power Steering - 3,6,12, 4, 110, 230, 450, 25, and 40 Series; Includes Priority Valves, Cushion Crossover Relief Anticavitation Valves, Inlet check Valve, Steering Columns, Steering Wheels, Sizing and Application
- 11-500 - Directional Control Valves, Model 31920 and 31930 11-878 - Char-Lynn Disc Valve Hydraulic Motors, 2000, 4000, 6000 and 10000 Series
- 11-501 - Directional Control Valves, Models 31520 and 31530 11-879 - Hydraulic Motors, ME Series
- 11-503 - In-line Self-Level Valves, Model 39055 11-880 - Light Duty Hydrostatic Transmission, Model 6, 7, 11 and Model 11 Pump
- 11-504 - In-line Flow Control Valves, Part no. 32604 11-882 - Controls for Model 33 through 76 Hydrostatic Transmissions
- 11-506 - Directional Control Valves, Model 30540 11-885 - Char-Lynn General Purpose Hydraulic Motors, H, S and T Series
- 11-507 - Directional Control Valves, Model 30920 and 30930 11-888 - Hydrostatic Transaxles, Models 751, 851, 771, and 781
- 11-508 - Priority, Proportional, Variable Priority and Load Sensing Priority Flow Dividers 1-144 - Hydraulic Gear Motors, B1 Series Model 21300
- 11-509 - Manually Operated Selector Valves 1-406 - Hydrostatic Right Angle Transaxles, Model 778
- 11-510 - Relief Valve Assemblies and Cartridges
- 11-600 - Medium Duty Piston Pumps, Model 70342 and 70344
- 11-601 - Medium Duty Piston Pumps, model 72400 (Servo Controlled)
- 11-603 - Medium Duty Piston Pumps, Model 70122,

For the nearest Eaton representative, contact: Eaton Corporation  
**Hydraulics Division**  
15151 Highway 5  
Eden Prairie, MN 55344

<http://www.eatonhydraulics.com>



Eaton Corporation is a global manufacturer of highly engineered products that serve industrial, vehicle, construction, commercial and semiconductor markets. Principal products include electrical power distribution and control equipment, truck drivetrain systems, engine components, hydraulic products, ion implanters and a wide variety of controls. Headquartered in Cleveland, the company has 49,000 employees and 143 manufacturing sites in 26 countries around the world. Sales for 1997 were \$7.6 billion.

Information contained in this catalog is accurate as of the publication date and is subject to change without notice. Performance values are typical values. Customers are responsible for selecting products for their applications using normal engineering methods.

Eaton Corporation  
**Hydraulics Division**  
15151 Highway 5  
Eden Prairie, MN 55344

Eaton Ltd.  
**Hydraulics Division**  
Glenrothes, Fife  
Scotland, KY7 4NW  
Telephone +44 (0) 1592-771-771  
Fax: +44 (0) 1592-773-184

Eaton GmbH  
**Hydraulics Division**  
Am Schimmersfeld 7  
40880 Ratingen, Germany  
Telephone: +49 (0) 2102-406-830  
Fax: +49 (0) 2102-406-800



**Quality System Certified**  
Products in this catalog are  
manufactured in an  
ISO-9001-certified site.

[www.eatonhydraulics.com](http://www.eatonhydraulics.com)

