

SILNIKI HYDRAULICZNE

SILNIKI TŁOKOWE O ZMIENNYM WYDATKU

SERIA 71392, 72450

Variable Displacement Motors

Features & Benefits

- Compact - Ease of Installation
- Numerous Options - Shafts, Ports, Shuttle Valves, speed pickup
- Displacement range: 7.3cc (0.45cid) to 49.2cc (3.0cid)
- Hydraulic De-stroke, Servo Control for remote control

2 Bolt SAE "B" Mount - 71392 Series

40.6 to 21.0 cm³/r [2.48 to 1.28 in³/r] Displacement



2 Bolt SAE "B" Mount - 72450 Series

40.6 cm³/r [2.48 in³/r] Displacement

49.2 cm³/r [3.0 in³/r] Displacement



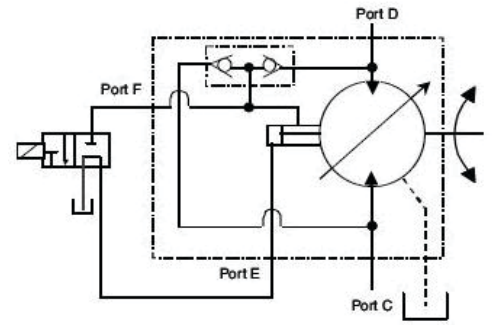
Model 71392 Variable Motor

40.6 to 21.0 cm³/r [2.48 to 1.28 in³/r] Displacement

Identification numbers – Fixed Displacement Motor - Closed Circuit
Stamped on each unit.

7 1 3 X X - D A A
 | | |
 A B C

- A – Product Number Description
71302 / 71392 = Variable Motor 40.6 cm³/r [2.48 in³/r]
- B – Rotation
D = Dual
- C – Sequential Letter



Serial Number Code

10 05 06 XXX 1 000

- Last Two Digits of Year Built. (10 for 2010 etc.)
- Month Built (two digits)
- Day Built (two digits)
- Specific Number of the Pump
- Shift Number
- Manufacturing Cell

TYPICAL PRODUCT NUMBER	MODEL CODE
71392-DAE	AAMGA110M000A0C
71392-DAC	AAMGA210D000A0C
71392-DAJ	AAMGA210H000A0C
71392-DAB	AAMGA260H000A0C

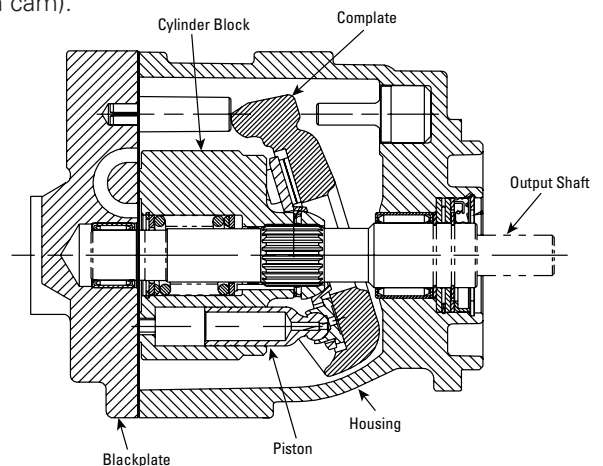
SPECIFICATIONS	MODEL 71302/71392
Maximum Displacement	40.6 to 21.0 cm ³ /r [2.48 to 1.28 in ³ /r]
Maximum Rated Speed	3600 RPM at 17° Control Angle 4500 RPM at 9° Control Angle
Nominal Pressure Rating †	350 bar [5076 lbf/in ²]
Peak Pressure Rating ††	370 bar [5400 lbf/in ²]
Input Flow at Rated Speed and Pressure	175.71 l/min [38.65 GPM] at 17° Control Angle
Output Power at Rated Speed and Pressure	85.30 kW [114.50 hp] at 17° Control Angle
Output Torque at Rated Speed and Pressure	226.27 N•m [2004.54 lbf•in] at 17° Control Angle
Continuous Allowable Case Pressure	1.7 bar [25 lbf/in ²]
Continuous Inlet Temperature	107°C [225°F]
Weight/Single Motor (approximate)	9.5 kg [21 lbs]

† Nominal Pressure: Max delta system pressure at which component fatigue does not occur (motor life estimated by bearing life).

†† Peak Pressure: Max operation pressure which is permissible for a short duration of time (t < 1 sec).

Working Principle

Axial piston motor uses a variable cam / swash plate to change the motor displacement. Shuttle valve mounted on end cover, ports high pressure oil from either side to the control piston. When the control valve is energized, ports E and F are connected and therefore contain equal pressure. The area differential (rod side vs back side of the piston) creates a force that pushes the piston to the right, taking the motor to max displacement. High side system pressure (not charge pressure) must be used to actuate the cylinder. Most of the flow from the pump goes to turn the rotating kit, leaving only a small amount of flow to go across the shuttle valve and into the cylinder. Therefore, there is no issue with too much flow going into the cylinder and having nowhere to go. Schematic shows motor in de-stroked condition (min cam).

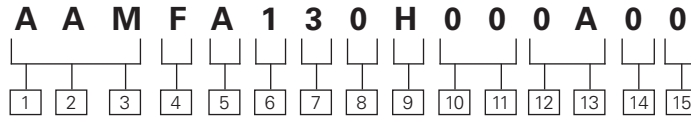


Model 71392 Variable Motor

40.6 cm³/r [2.48 in³/r] Displacement

Variable displacement piston motors are specified by the following model code. Once a motor is built from the model code, a product number will be assigned to that configuration.

Make sure all positions are selected within the 15 digit code for each motor.



1 2 3 Code Title

AAM - 40.6 cm³/r [2.48 in³/r]
Variable displacement
piston motor frame size
2 Bolt B-SAE

4 Control Options

F - Hydraulic De-stroke
Control, Remote Port Down -
Model 71392, (opt.)
G - Hydraulic De-stroke Control,
Remote Port Up - Model
71392, (opt.)

5 Output Shaft

A - 13 Tooth 16/32 spline,
shaft extension 41.1 [1.62],
(std.)
B - 13 Tooth 16/32 spline,
with snap ring groove, shaft
extension 41.1 [1.62], (opt.)

6 Main Port, Size & Location

1 - 1 1/16-12 UN-2B straight
thread O-ring ports - Rear,
(std.)
2 - 1 1/16-12 UN-2B straight
thread O-ring ports - Opposite
Sides, (std.)

7 Drain Port, Size & Location

1 - 9/16-18 UNF-2B straight
thread O-ring port - Right
Side, (std.)
2 - .750-16 UNF -2B SAE O-
ring port - right side
3 - 9/16-18 UNF-2B straight
thread O-ring port - Rear of
Backplate, (opt.)
6 - 9/16-18 UNF-2B straight
thread O-ring port - Top,
(opt.)

8 Auxiliary Mounting Features (rear)

0 - No Auxiliary Mounting
Feature, (std.)
1* - 13 Tooth 16/32 Ext.
Tapered spline with tapped
hole, bottom pad with 5/16-
18 UNC- 2B mounting holes,
(opt.)
* Requires the selection of opposite
side porting only

9 Min-Max Displacements & Control Angles

0 - 00.0-40.6 cm³/r [0.00-2.48
in³/r] minimum - 0°
maximum -17°
D - 17.9 to 40.6 cm³/r [1.09
to 2.78 in³/r], minimum 7° 40'
maximum 9° 0' (std.)
G - 20.5-40.6 cm³/r
[1.25-2.48 in³/r] minimum 8°
45' maximum 17° 0'
(std.)
H - 21.0 to 40.6 cm³/r [1.28
to 2.48 in³/r], minimum 9° 0'
maximum 17° 0'
(std.)
Z - 40.6 cm³/r [2.48 in³/r]
17 deg 0 min maximum
minimum displacement and
control angle determined by
2.6 [1.02] shim thickness

10 11 Special Features

00 - No special feature, (std.)
AA - No V Notches

12 13 Paint

0A - Primer, (std.)
0B - Black Paint, (std.)

14 Identification

0 - Standard, (std.)

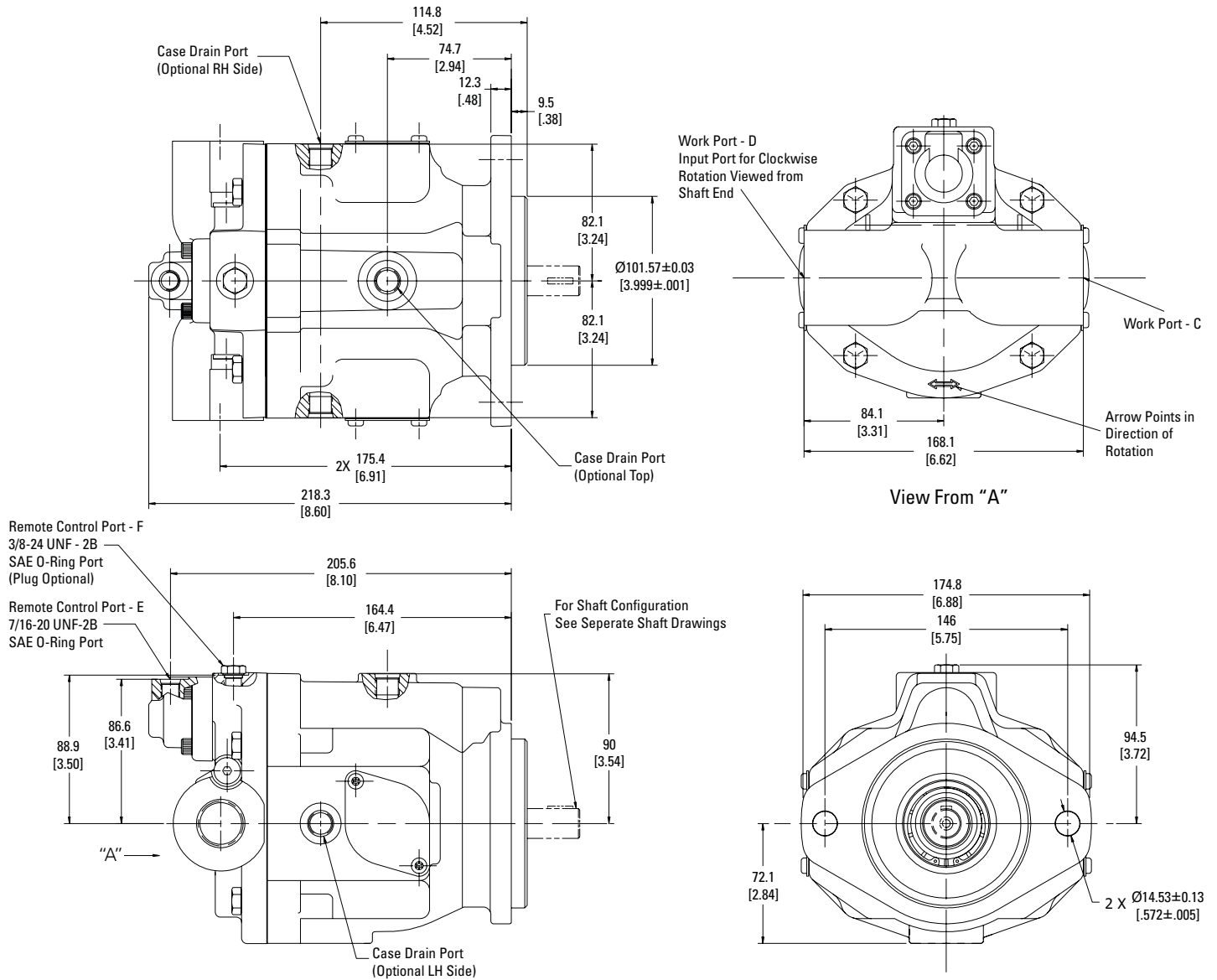
15 Design Code

C - Valve plate

Note: All ports are SAE (J1926)
O-ring ports.

Model 71392 Variable Motor

Installation Drawing



TYPE OF PORT	SIZE AND DESCRIPTION
Work Port	1- 1/16 - 12 UN-2B SAE O-ring
Drain Port	9/16 - 18 UN-2B SAE O-ring

Note: All ports are SAE (J1926) O-ring ports. Dimensions are in millimeters [inches], unless otherwise specified.

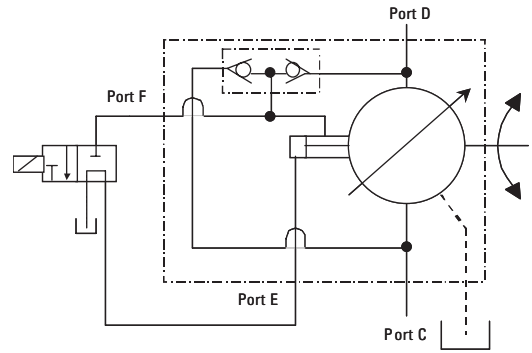
Model 71392 Variable Motor

Control Options and Output Shafts

Hydraulic De-stroke Control

(Code position 4, selection F or G)

The Hydraulic De-stroke Control feature allows the operator to control the motor without any mechanical linkage to the motor. A normally closed valve is required to provide maximum displacement to the motor. The valves must be rated for maximum system pressure.

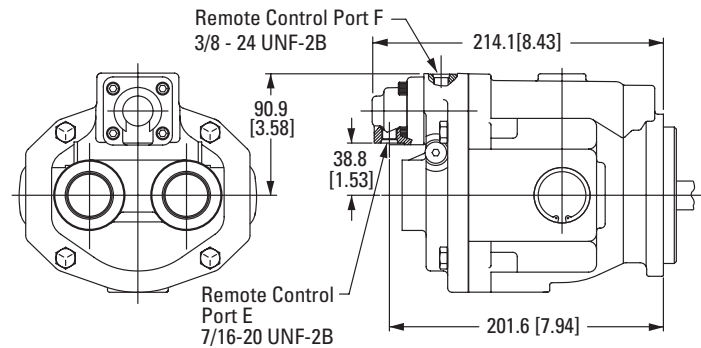
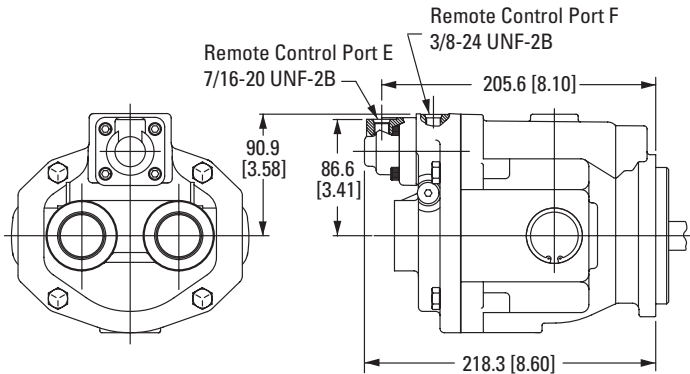


Control Port up

(Code position 4, Selection G)

Control Port Down

(Code position 4, Selection F)



Output Shafts

(Code Position 5)

Selection A

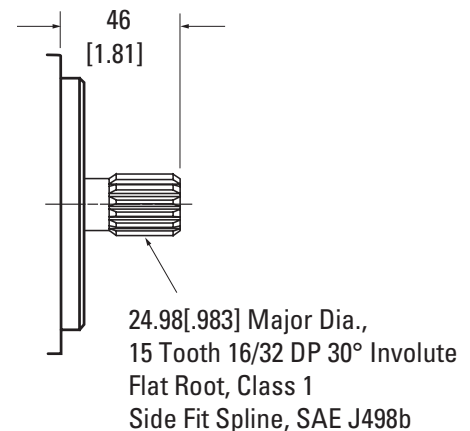
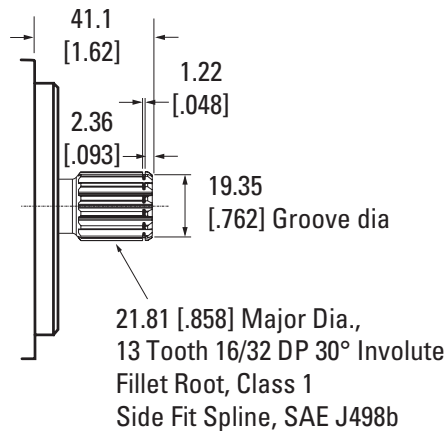
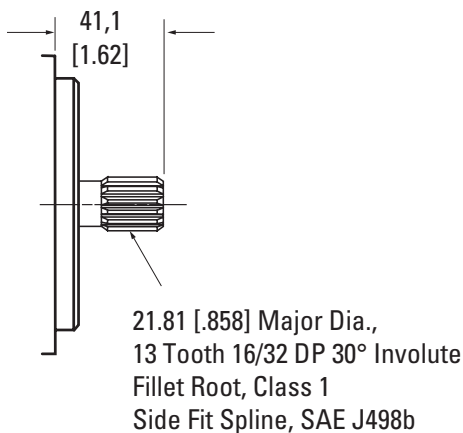
Maximum Torque on Shaft
209.3 N•m [1,852 lbf•in]

Selection B

Maximum Torque on Shaft
209.3 N•m [1,852 lbf•in]

Selection D

Maximum Torque on Shaft
337.5 N•m [2,987 lbf•in]



Note: All ports are SAE (J1926) O-ring ports. Dimensions are in millimeters [inches], unless otherwise specified.

Model 72450 Variable Servo Motor

Installation Drawings

Features

- SAE B- B, 2 Bolt Mount, Cradle Swashplate
- Bi-directional rotation
- Auxiliary through-drive shaft available for brake mounts
- Standard SAE splined shafts, Optional taper shafts
- Same Side ports
- System pressure guage ports
- Optional shuttle valve available



7 2 4 X X - D A A - 02
 A B C D

Identification numbers

Stamped on each unit.

A – Product Number Description

72450 = Variable Motor 40.6 cm³/r [2.48 in³/r],
 49.2 cm³/r [3.00 in³/r]

B – Rotation

D = Dual

C – Sequential Letter

D – Design Code number

TYPICAL PRODUCT NUMBER	MODEL CODE
72450-DAG-02	ACTA0B200B0B000B
72450-DAM-02	ACTA0B200F0B040B

Serial Number Code

10 05 06 XXX 1 000

Last Two Digits of Year Built. (10 for 2010 etc.)

Month Built (two digits)

Day Built (two digits)

Specific Number of the Pump

Shift Number

Manufacturing Cell

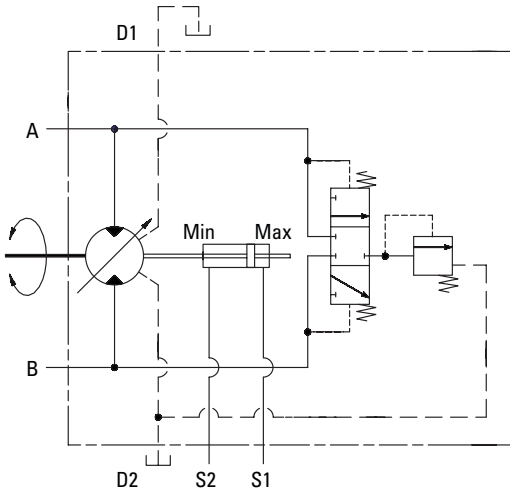
SPECIFICATIONS	MODEL 72450	MODEL 72450
Maximum Displacement	40.6 cm ³ /r [2.48 in ³ /r]	49 cm ³ /r [3.00 in ³ /r]
Maximum Rated Speed	4500 RPM at minimum stroke angle 3600 RPM at maximum stroke angle	4500 RPM at minimum stroke angle 3600 RPM at maximum stroke angle
Nominal Pressure Rating †	350 bar [5076 lbf/in ²]	280 bar [4061 lbf/in ²]
Peak Pressure Rating ††	372 bar [5395 lbf/in ²]	310 bar [4496 lbf/in ²]
Input Flow at Rated Speed and Pressure	175.71 l/min [38.65 GPM]	212.53 l/min [46.75 GPM]
Output Power at Rated Speed and Pressure	85.30 kW [114.50 hp]	82.36 kW [110.81 hp]
Output Torque at Rated Speed and Pressure	226.27 N•m [2004.54 lbf•in] at 17° Control Angle	218.47 N•m [1940 lbf•in] at 17° Control Angle
Continuous Allowable Case Pressure	1.7 bar [25 lbf-in ²]	1.7 bar [25 lbf-in ²]
Continuous Inlet Temperature	107° C [225° F]	107° C [225° F]

† Nominal Pressure: Max delta system pressure at which component fatigue does not occur (motor life estimated by bearing life).

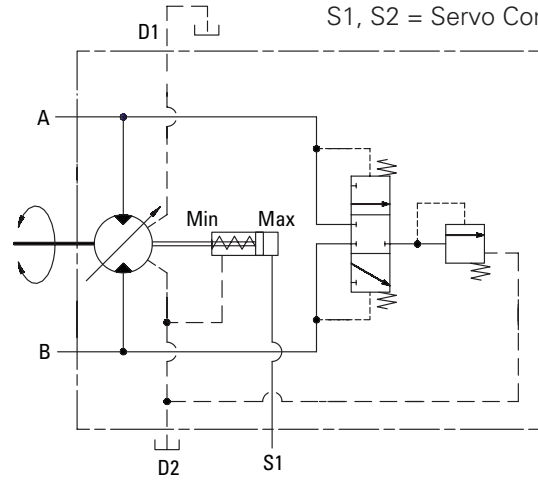
†† Peak Pressure: Max operation pressure which is permissible for a short duration of time (t < 1 sec).

Model 72450 Variable Servo Motor

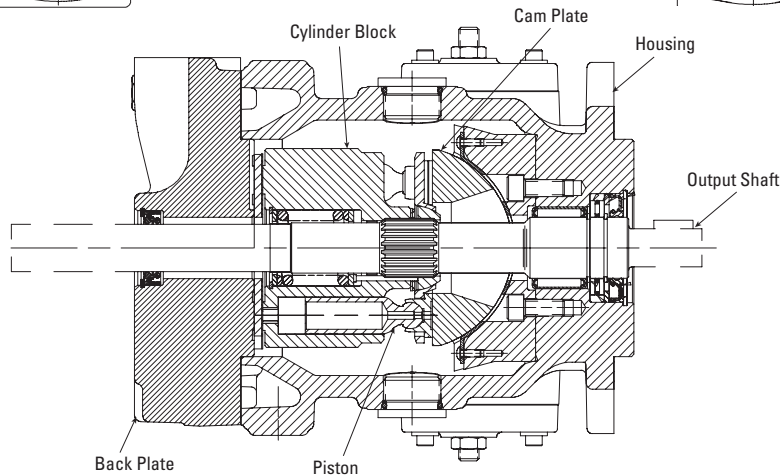
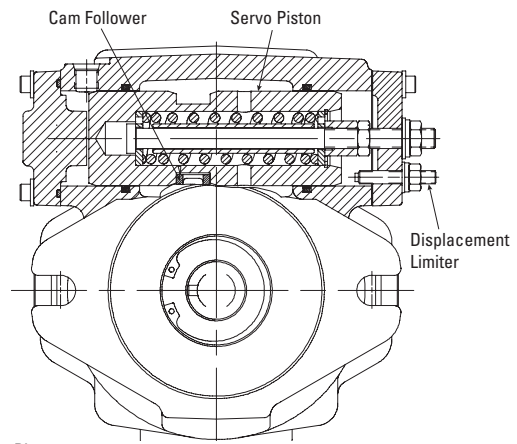
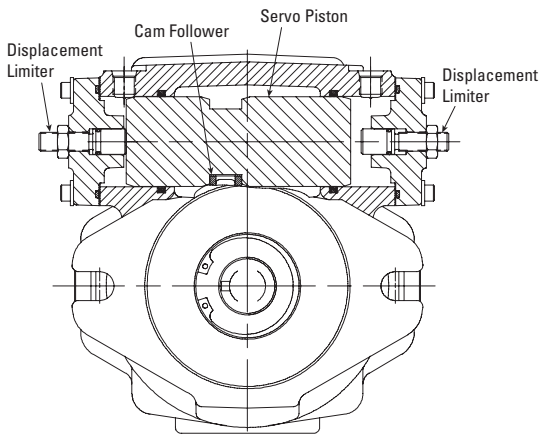
D1, D2 = Drain Ports
 A, B = Main Ports
 S1, S2 = Servo Control Port



72450 Min - Max. Displacement Servo Motor Schematic



72450 Spring Biased Servo Motor Schematic



Working Principle

Servo piston mounted on top of the motor is connected to cam / swash plate and is used to change the cam angle. This in turn varies the motor displacement. Servo piston is actuated by means of external pilot pressure acting on either side of the piston.

There are two options available to actuate the piston, Min-Max position piston and spring biased servo piston.

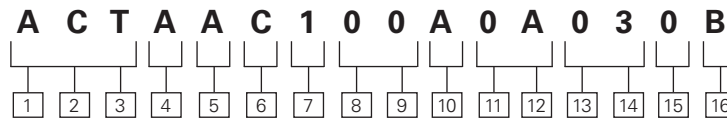
In min-max displacement option, external pilot pressure moves the piston from minimum cam to maximum cam angle. No intermittent position is achievable. Displacement limiters are provided on both sides of the piston to set the maximum and minimum cam angle.

In spring biased servo piston design, external servo pressure works against servo spring force. As pressure inside servo cavity increases, servo piston moves towards maximum displacement and vice-versa.

Model 72450 Variable Servo Motor

Variable displacement piston motors are specified by the following model code. Once a motor is built from the model code, a product number will be assigned to that configuration.

Make sure all positions are selected within the 16 digit code for each motor.



1 2 3 Code Title

ACT - 40.6 cm³/r [2.48 in³/r]
Servo Controlled Variable Displacement piston motor
******* - 49.2 cm³/r (3.00 in³/r)
Servo Controlled Variable Displacement motor.

Note: see position 13,14 special features.

4 Output Shaft

A - 13 Tooth 1/32 spline, Shaft extension 41.4 [1.62]
B - 13 Tooth 16/32 spline, with snap ring groove, shaft extension 41.1[1.62]
C - 15 Tooth 16/32 spline, shaft extension 46 [1.81]

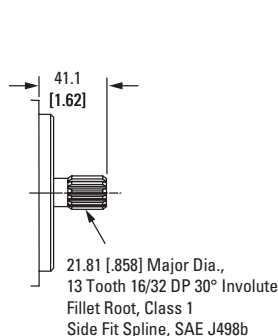
5 Auxiliary Mounting Features (rear)

0 - No Auxiliary Mounting Features
A - Diameter 22.22 mm (.875 in) taper shaft

Output Shaft Options (Code Position 4)

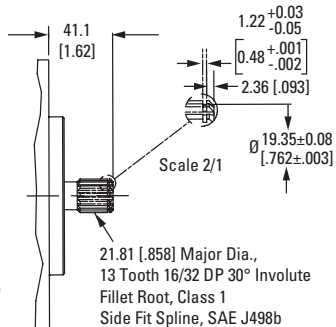
Selection A

Maximum Torque on Shaft
209.3 N•m [1,852 lbf•in]



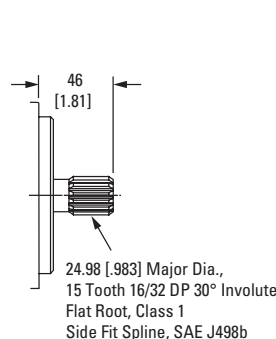
Selection B

Maximum Torque on Shaft
209.3 N•m [1,852 lbf•in]



Selection C

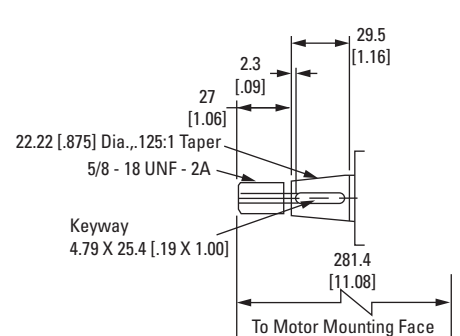
Maximum Torque on Shaft
337.5 N•m [2987 lbf•in]



Auxiliary Mounting Features (Rear) (Code Position 5)

Taper Shaft Selection A

Maximum through torque
209.3 N-m [1852 lbf-in]



6 Drain Port, Size, & Location

A - 1-1/16-12 UN-2B SAE O-ring, left and right side
B - 1-1/16-12 UN-2B SAE O-ring, left and right side. Right side plugged.
C - 1-1/16-12 UN-2B SAE O-ring, left and right side. Left side plugged.

7 Main Port, Size, & Location

1 - 1-5/16-12 UN-2B SAE O-ring (A&B) same side (right side)
2 - 1-5/16-12 UN-2B SAE O-ring (A&B) same side (left side)
4 - 1 1/16 -12 UN-2B SAE O-ring port (A & B) – same side (left side)
6 - Dash 12 STC Type II+ direct port (A & B) – left side

8 9 Control Assembly

00 - No control assembly Port plate control

10 Min-Max Displacements

3 - 13.5-40.6 cm³/r [0.82-2.48in³/r] 5 deg 48 minutes min - 17 deg 0 minutes max
A - 20.5-40.6 cm³/r (1.25-2.48 in³/r) 8° 45 minutes min. - 17° 0 minutes max.
D - 26.7-36.7 cm³/r [1.63-2.24 in³/r] 11 deg 20 minutes min - 15 deg 24 minutes max
F - 24.5-49.2 cm³/r [1.49-3.00 in³/r] 8° 34 minutes min. - 17° 0 minutes max.
L - 14.7-40.6 cm³/r [0.90-2.48 in³/r] 6 deg 20 minutes min - 17 deg 0 minutes max

11 12 Paint

0A - Primer, (std.)
0B - Black Paint, (std.)

13 14 Special Features

00 - None
03 - Shuttle valve and backpressure valve set 15.2-17.2 Bar (220-250 PSI) rear facing S1, S2 servo control ports
*****04**- Ref. code title
11 - Biased to maximum displacement ; rear facing s1 port only.
12 - 9.2 cm³/r [3.00 in³/r] rotating group; biased to maximum displacement ; rear facing s1 port only.

15 Customer Identification

0 - Standard, (std.)

16 Design Code

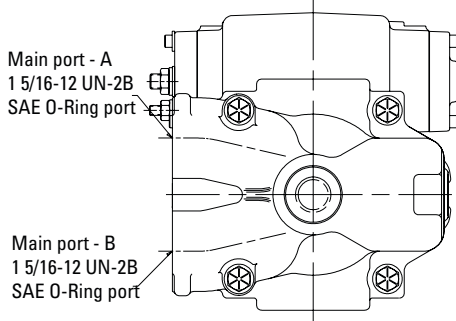
B - Eaton assigns current design code, (std.)

Model 72450 Variable Servo Motor

Installation Drawings

Port Right Side

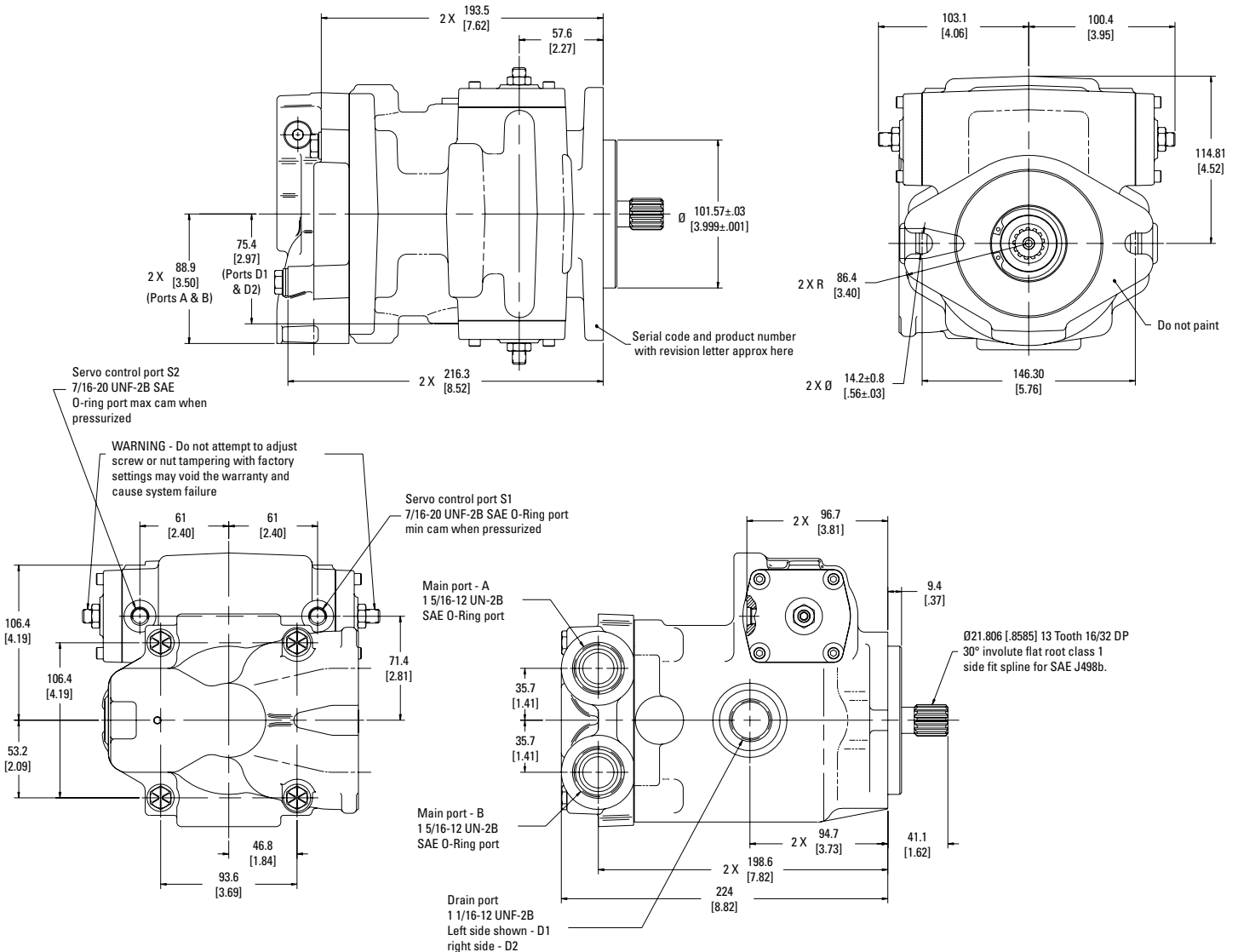
(Code Position 7, Selection 1)



TYPE OF PORT	SIZE AND DESCRIPTION
Work Port (A, B)	1- 1/16 - 12 UN-2B SAE O-ring
	1- 5/16 - 12 UN-2B SAE O-ring
Drain Port (D1, D2, D3)	Dash 12 STC Type II + Direct Ports
	1- 1/16 - 12 UN-2B SAE O-ring
Servo Control Pressure Port	7/16 - 20 UN-2B SAE O-ring

Port Left Side

(Code Position 7, Selection 2)



Model 72450 Variable Servo Motor

Shuttle and Charge Pressure Relief Valve

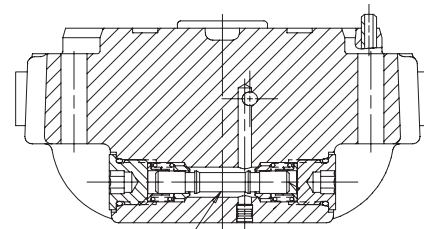
(Code Position 13,14 Selection 03)

Variable motor incorporate integral shuttle valve. The shuttle and charge pressure valve work together to bypass closed loop oil. This allows the oil to be cooled, filtered, and returned to tank. Refer page 19 for further details.

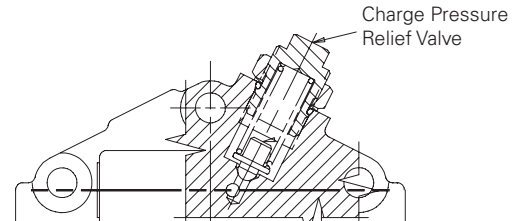
The shuttle valve flow is listed below in relationship to the charge pressure valve setting.

For 72450 series motor:

Charge Pressure	Flow	Code Selection
15.2-17.2 bar [220-250 psi]	9.46 to 13.25 l/m [2.5 to 3.5 gal/min]	03
22.1-23.4 bar [320-340 psi]	14.0 to 17.8 l/m [3.7 to 4.7 gal/min]	05
20.0-21.4 bar [290-310 Psi]	12.5 to 16.27 l/m [3.3 to 4.3 gal/min]	08



Shuttle Valve



Charge Pressure Relief Valve

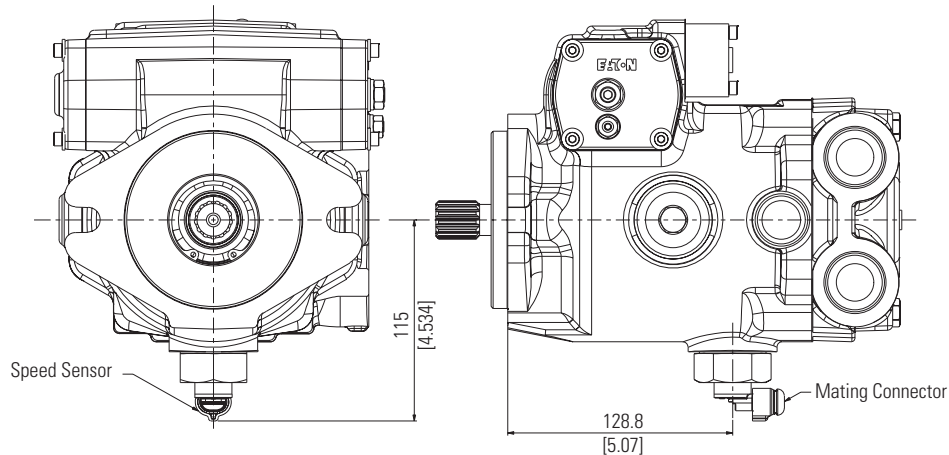
Speed Sensor

(Code Position 13,14 Selection 13)

Eaton has developed a speed sensor, based on the field proven technology of our Hall Effect and Magnetic sensor. Output – Digital signals from NPN transistors (open collector output with internal 10K pull up resistors).

This sensor has reverse polarity protection, short circuit protection, load dump protection, and EMC (Electrical Magnetic Capability) protection (the customer should qualify the EMC protection in their specific application)

Supply Voltage: 8 to 24 Volt DC (compatible with 12V vehicle conditions)



Speed Sensor

Mating Connector

Parameter	Condition	Value
Operating Temperature Limit		-40° to 150°C [-40° to 302° F]
Sensor Resistance	25°C (77° F)	1.5 K To 3.5 K Ohms
Sensor Inductance	25°C (77° F)	0.6 to 3.7 H
Output Voltage	25°C (77° F) 9.3 Hz @ 2.29mm [.090 inch] Gap	400 mVpp Min
300 Hz @ 0.25mm [.010 inch] Gap 80 Vpp Max.	300 Hz @ 0.25mm [.010 inch] Gap	80 Vpp Max.
Air Gaps		0.26 to 2.28 mm [.010 to .090 inch]
Vibration Voltage	15G random Vibration	0.4V P-P Max

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

Mating Packard Connector

Connector Body – 1216 2192

Connector Seal – 1204 0750

Cable Seal – 1204 0751

Socket – 1212 4075

Optional Mating Connectors

Connector Assembly (Body, Cable Seal, Seal) – 1216 2193

Socket (16 – 18 AWG) – 1212 4075

Socket (20 – 22 AWG) – 1212 4076

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