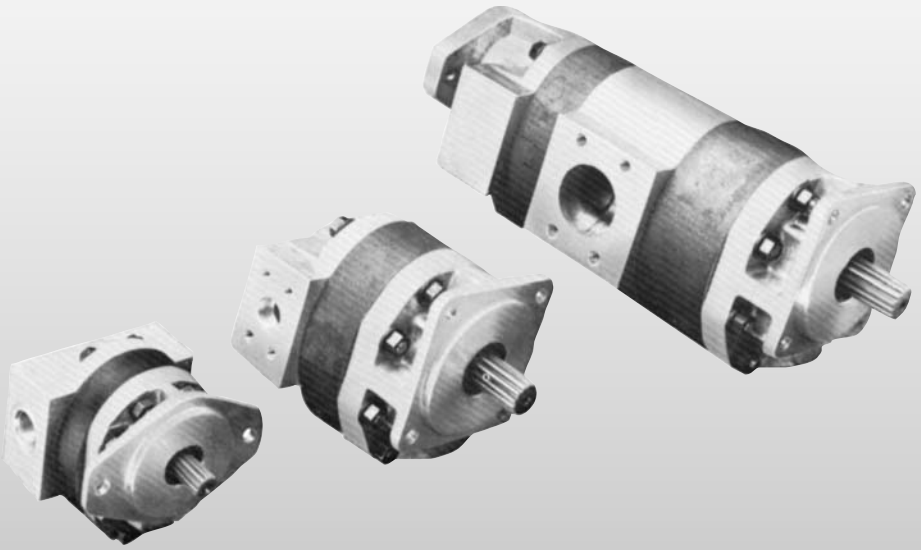
SAUER DANFOSS

CP Series



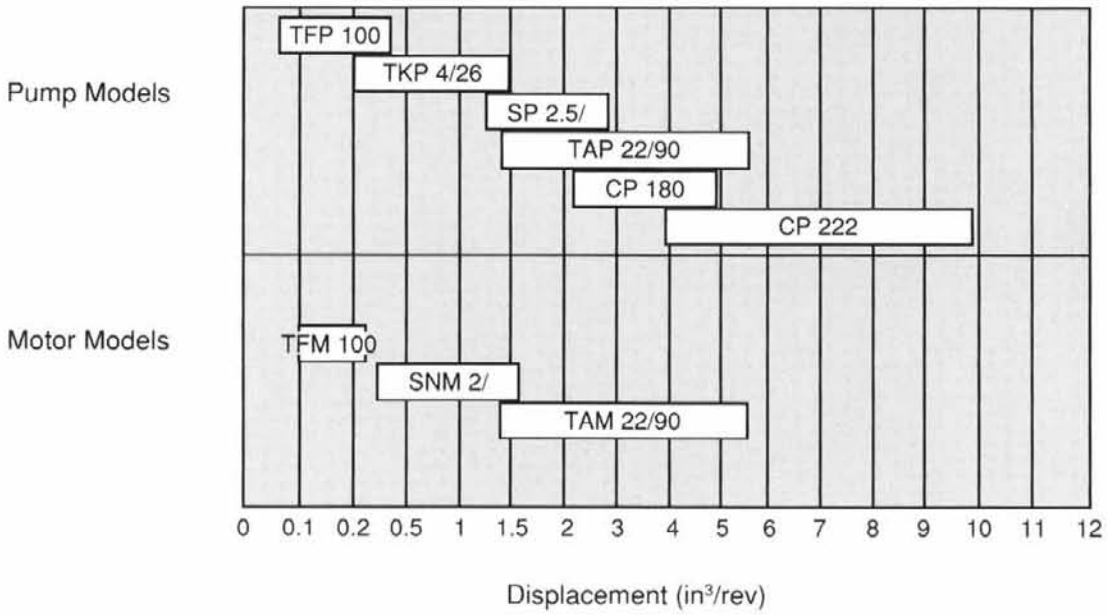
Gear Pumps

Assembly Manual

Sauer-Sundstrand Gear Pumps and Motors

- **High Performance at pressures to 4000 psi (276 BAR) and speeds to 6000 rpm provide flexibility and efficiency in systems design.**
- **Available in a Wide Range of Tandem and Multiple Configurations for efficient system design with simplified installations.**
- **Low Cost design and manufacturing for the requirements of fixed displacement systems.**
- **Worldwide Sales and Service capabilities from the industry leader are part of the package for every Sauer-Sundstrand gear product customer.**

Quick Reference — Displacement / Model



Contents Appear on Pg. 29
Printed in U.S.A. 0890H

C Series Gear Pumps

Introduction

The purpose of this manual is to provide information useful in the assembly of C Series Gear Pumps. C Series Gear Pumps have been designed using modular concepts. With this modular design, the C Series Pumps may be stocked as piece parts and built at the Distributor D.A.S.C. to meet immediate orders. This also allows conversion of single pumps to multiples with the addition of similar parts.

Inventoried parts used in assembling these pumps must be thoroughly cleaned before beginning any assembly. Since dirt or contamination is the greatest enemy of any hydraulic equipment, the greatest possible cleanliness is necessary.

The torque values, pressure settings, and dimensions used throughout this manual are given in English and Metric units.

General Description

The C Series consists of two primary product sizes: CP222 Series (CPA/CPH) and CP180 Series (CPB/CPC/CPD/CPE/CPF/CPG). Single and tandem versions of both sizes are available, as well as optional auxiliary pads. These pumps are applied in open center, open circuit hydraulic systems to provide output flow and pressure for hydraulic functions.

C Series Gear Pumps are high pressure, fixed displacement pumps of pressure balanced, spur gear design. Their design has been optimized to provide high efficiency and light weight by using cast aluminum front and rear housings and compacted graphite gear housings. The pressure plates are steel backed bronze for maximum strength and bearing capability.

Safety Precautions

- **If C Series gear pumps are used in vehicular hydrostatic drive systems, the loss of hydrostatic drive line power in any mode of operation may cause a loss of hydrostatic braking capacity. A braking system, redundant to the hydrostatic transmission must, therefore, be provided which is adequate to stop and/or hold the system should the condition develop.**
- **Certain service procedures may require the vehicle/machine to be disabled (wheels raised off the ground, work function disconnected, etc.) while performing them in order to prevent injury to the technician and bystanders.**
- **Use caution when dealing with hydraulic fluid under pressure. Escaping hydraulic fluid under pressure can have sufficient force to penetrate your skin causing serious injury. This fluid may also be hot enough to burn. Serious infection or reactions can develop if proper medical treatment is not administered immediately.**
- **Some cleaning solvents are flammable. To avoid possible fire, do not use cleaning solvents in an area where a source of ignition may be present.**

Specifications

Input Speed		
Max-RPM		2500
Minimum-RPM		600
Pressure		
Maximum	PSI	3500
	BAR	241
Continuous	PSI	3000
	BAR	207
Temperature		
Buna Seals		
Operating Range	°F	-30 to +180
	°C	-34 to +82
Maximum	°F	220
	°C	104
Viton Seals		
Operating Range	°F	-40 to +225
	°C	-40 to +107
Maximum	°F	250
	°C	121
Fluid Viscosity Limits -- SUS (CST)		
Optimum		75 (14)
Min. Continuous		40 (4.2)
Max. Continuous		500 (110)
Suggested Filtration		
Return		10 micron nominal
Inlet Vacuum at Sea Level		
Normal	in. HG	5
	BAR (abs.)	.8
Cold Start	in. HG	18
	BAR (abs.)	.4

Start-Up Procedure

Prior to installation, inspect the unit for damage incurred in shipping and handling. Make certain all system components (reservoir, valves, fittings, heat exchanger, etc.) are clean prior to filling with fluid.

Fill the reservoir with the recommended hydraulic fluid which has been passed through a 10 micron filter (nominal, no bypass) before entering the reservoir. Use of contaminated fluid will cause damage to internal components.

Be certain the line from the reservoir to pump inlet is free of restrictions and air leaks.

If practical, install a vacuum gauge at pump inlet and a pressure gauge at the pump discharge.

Start the prime mover and run at the lowest possible RPM with no discharge pressure until all air has been purged from the system.

The pump is now ready for normal operation.

Options

Fig. 1 -- Single Pump

Standard Pumps

C Series Pumps are available in two frame sizes with 13 displacements ranging from 3 to 10 in3/rev (49 to 164 cc/rev). Tandem configurations of these frame sizes are available in 36 combinations

Viton Seals

Seal kits for both frame sizes are available in Viton.

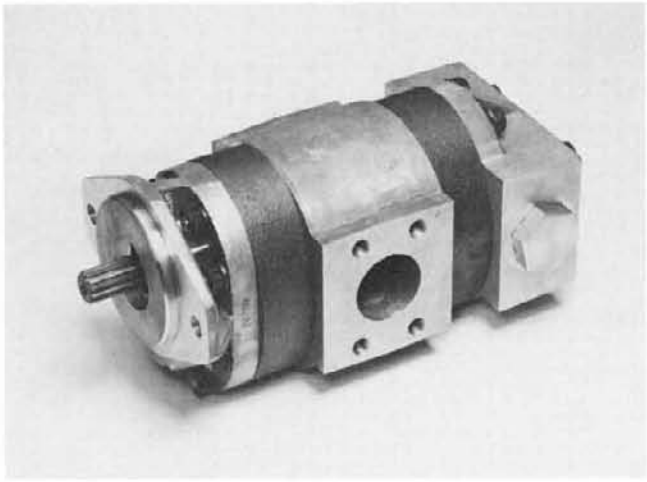


Fig. 2 -- Tandem Pump

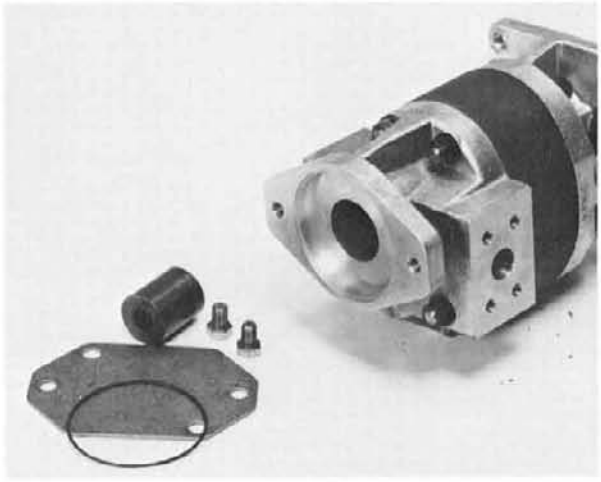


Fig. 3 -- Auxiliary Rear Drive -- SAE "A" & "B" Pads

Auxiliary SAE "A" Pad

Both frame sizes offer the SAE 2 - bolt "A" pad with 9 and 11 tooth shaft configurations.

Auxiliary SAE "B" Pad

Both frame sizes offer the SAE 2 - bolt "B" pad with 13 and 15 tooth ("B" and "B-B") shaft configurations.

Assembly

The procedures on the following pages cover the assembly of the C Series Gear Pumps. All C Series Pumps, whether single or tandem, with or without auxiliary pads, assemble in the same manner.

General

Cleanliness

Cleanliness is the primary means of assuring satisfactory hydraulic pump life. Components such as flanges and covers are best cleaned in soap and hot water, then air dried. Gears should be washed in solvent, air dried, and oiled immediately.

WARNING

Certain cleaning solvents are flammable. Do not allow sources of ignition in the area when using cleaning solvents.

Protect all exposed surfaces and open cavities from damage and foreign material.

CAUTION

Gear journals and gear faces are super finished. Take care not to touch these surfaces after oil and solvent have been removed.

Lubrication of Moving Parts

During assembly, all running surfaces (DU bushings and pressure plates) must be lightly lubricated with a clean oil or aerosol lubricant.

Tools Required for Assembly

Torque wrench, 0 - 150 ft.lbsf. (0 - 200 Nm)
Open end wrenches
Seal Installation Tools

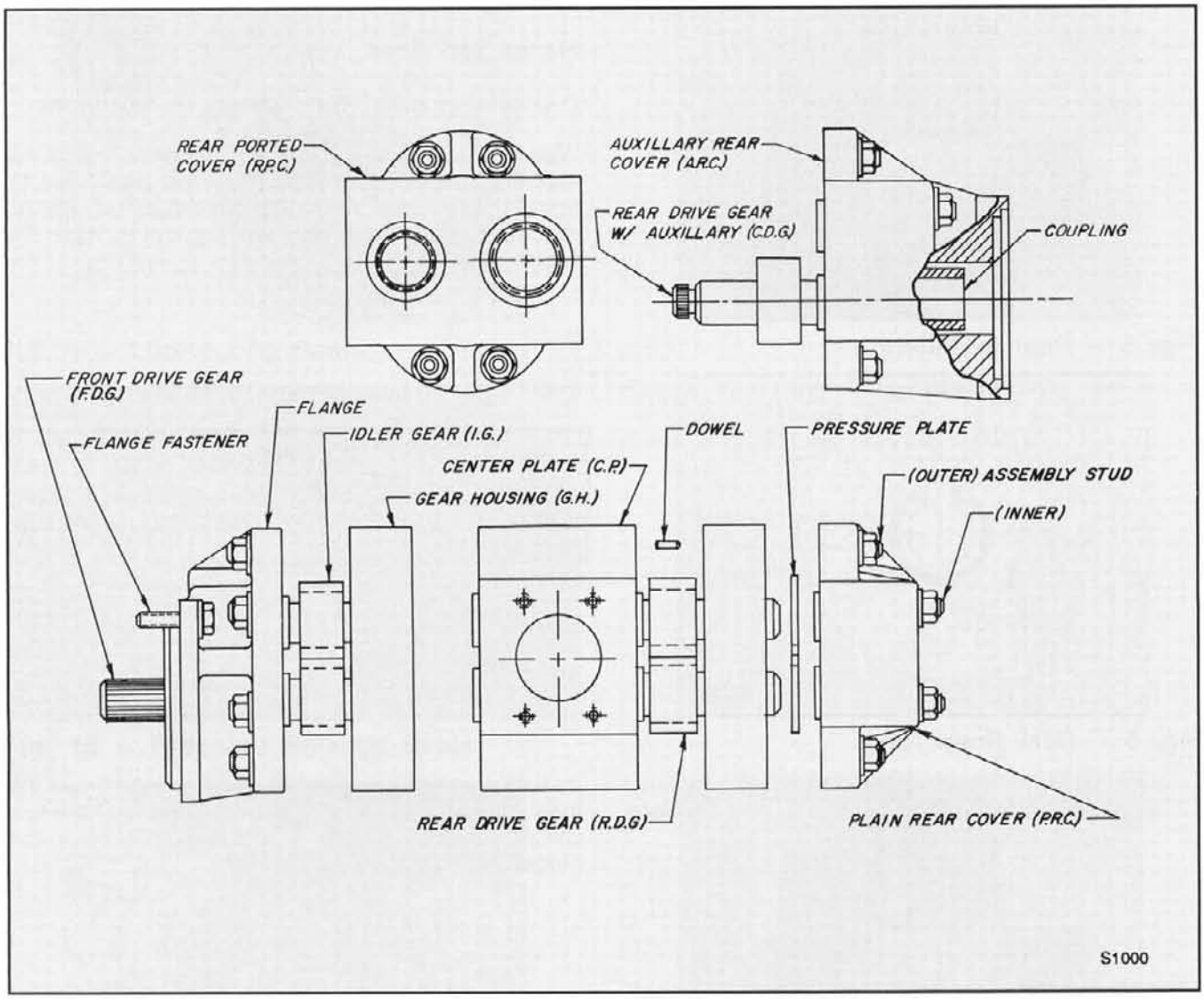


Fig. 4 -- Gear Pump Parts Description

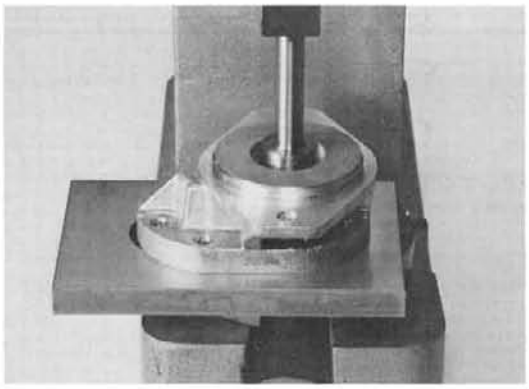


Fig. 5 -- Seal Installation

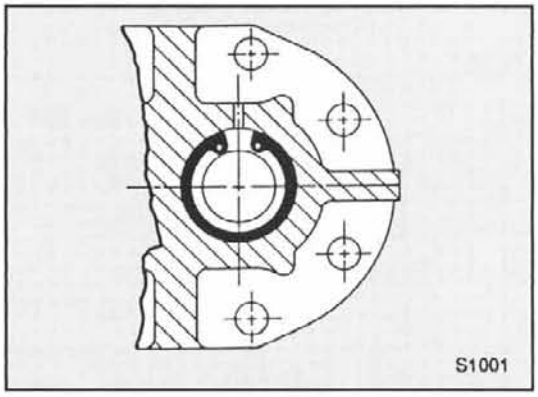


Fig. 6 -- Seal Snap Ring

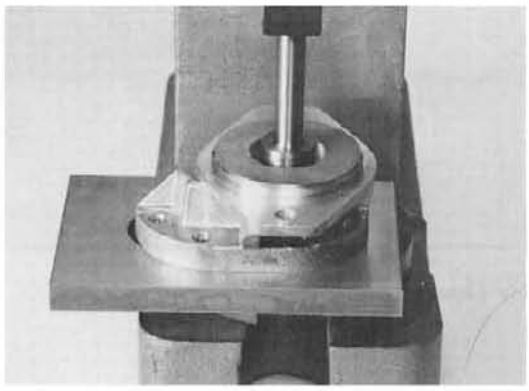


Fig. 7 -- Installing Outer Seal

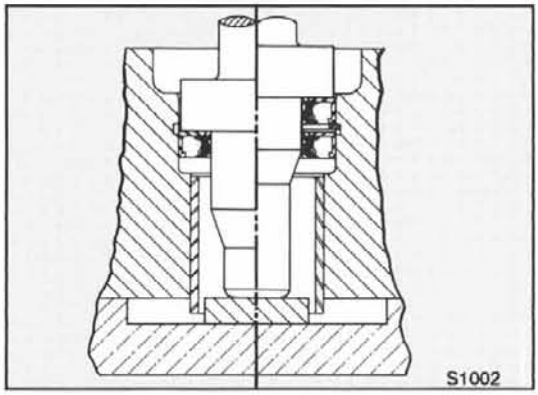


Fig. 8 -- Seal Installation Tools

Sub-Assemblies

Flange and Shaft Seals

Inspect flange assembly for damage and cleanliness.

With the flange resting on the fixture plate, install the inside lip seal using the appropriate tool (see Table 1). Install the first seal so that the steel face is outward. Press the seal into the bore until the tool contacts the fixture plate.

Install snap ring with opening over seal drain hole.

CAUTION

Snap ring must have opening over "weep hole" in order to allow leakage to escape through hole.

Install the second seal in the same orientation as the inner seal. Press the seal into the bore until the tool contacts the fixture plate to assure the seal is in the proper location.

Tools are designed to install the lip seals as shown.

CAUTION

Failure to use assembly tools may cause leakage or premature failure.

Fig. 9 -- Lubricating Seals

Lightly apply O-Ring or seal grease to both seals.

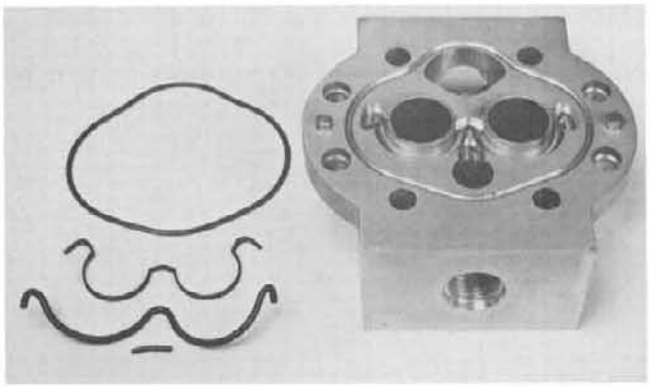


Fig. 10 -- Pressure Balance Seals

Flange and Cover Pressure Balance Seals

Remove the following from the seal kit:

1 - O-Ring
1 - Nylon Backup Strip
1 - Stuffer Strip
1 - O.D. O-Ring

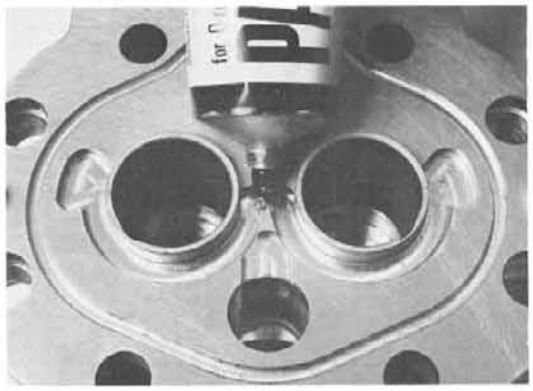


Fig. 11 -- Applying Grease to Seal Groove

Lubricate O-Rings and seals with O-Ring grease. Apply grease to seal grooves before installing seals.

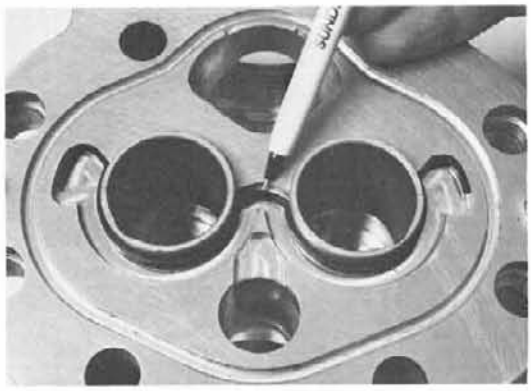


Fig. 12 -- Install Backup Strip

Install the backup strip into the milled slot.

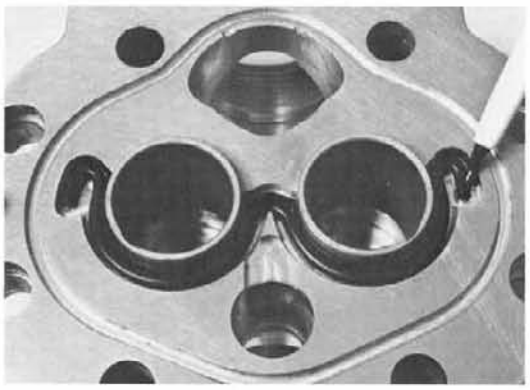


Fig. 13 -- Install O-Ring

Install the O-Ring into the milled slot, engaging the curved side of the backup strip.

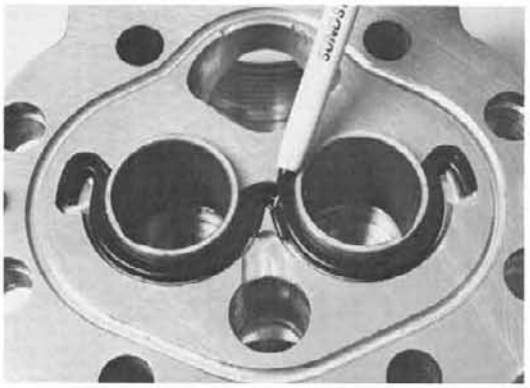


Fig. 14 -- Install Stuffer Strip

Install the stuffer strip to hold the assembly in place.

NOTE: With molded O-Rings, the stuffer strip is not required.

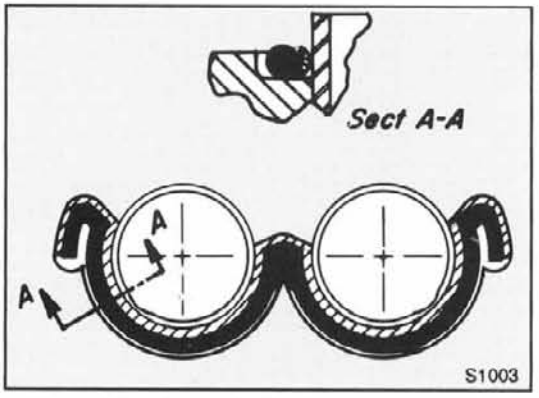


Fig. 15 -- Seal Installation

Install the seals as shown.

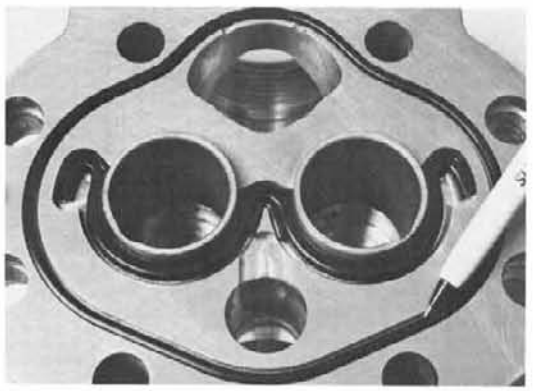


Fig. 16 -- Install O.D. Seal

Flange and Cover O.D. Seal

Install the O-Ring in the groove as shown.

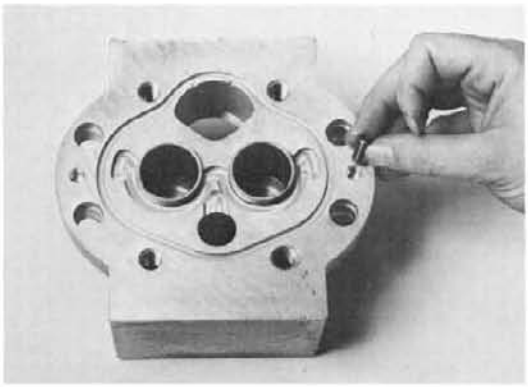


Fig. 17 -- Install Dowels

Flange and Cover Dowels

Install two dowels in both the cover and the flange assembly as shown.

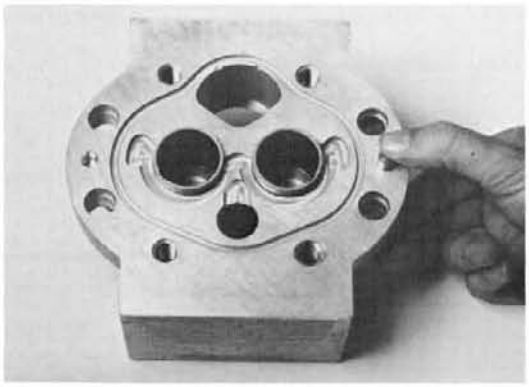


Fig. 18 -- Dowels Installed

Press dowels in until they bottom on the shoulder in their bore.

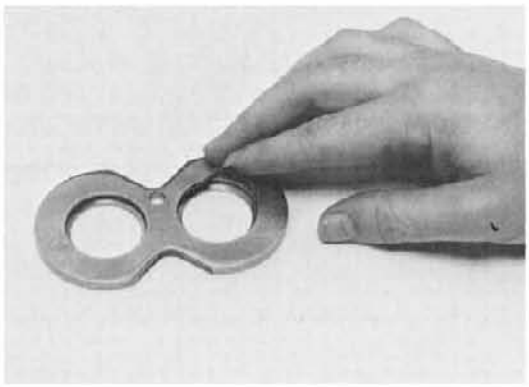


Fig. 19 -- Install Pressure Plate O-Rings

Pressure Plates

Remove the O-Rings for the pressure plates from the seal kit.

Install two (2) O-Rings on each pressure plate as shown.

Single Pump Assembly

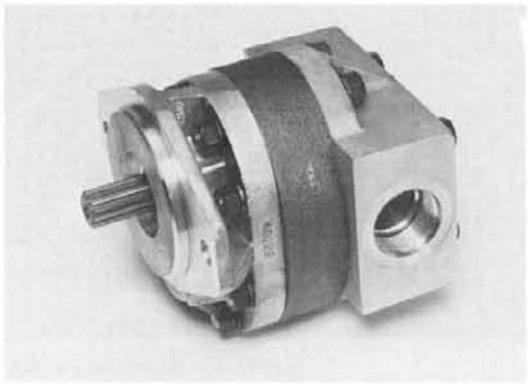


Fig. 20 -- Single Pump

Fig. 21 -- Single Pump Components

General Procedure

Position the cover on a flat, rigid surface.

Lubricate the pressure plate O-Rings and install the pressure plate on the cover.

CAUTION

Orientation is critical. Be sure the plate is installed so the thru hole is on the high pressure side.

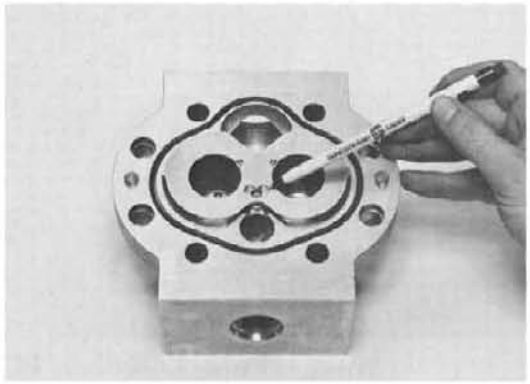


Fig. 22 -- Pressure Plate Thru Hole

Install the gear housing over the pressure plate. Dowels are a close fit, therefore, gear housing must be aligned with care to guarantee proper assembly.

CAUTION

The gear housing is not symmetrical. Install with the cored inlet towards the cover plate inlet.

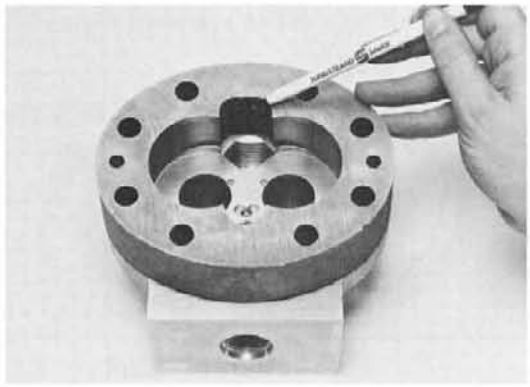


Fig. 23 -- Gear Housing Inlet

Lightly lubricate the face of the pressure plate and the D. U. bushings

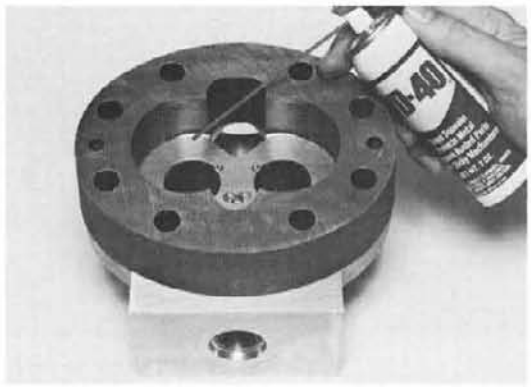


Fig. 24 -- Lubricate Plate and Bushings

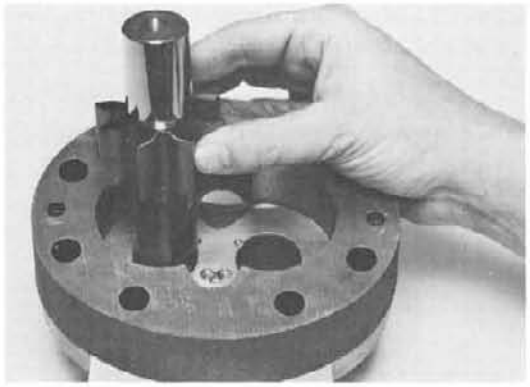


Fig. 25 -- Install Idler Gear

Install the idler gear, taking precautions to not touch the superfinished journals.

CAUTION

The relative position of the idler and drive gears determine the rotation of the pump.

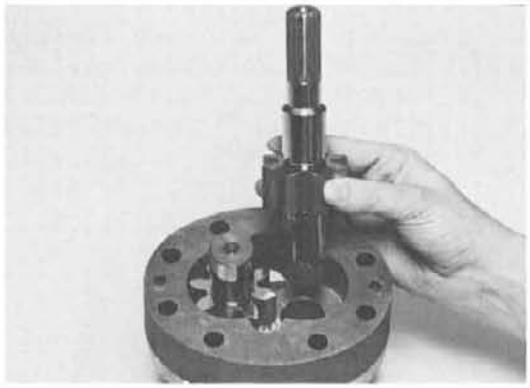


Fig. 26 -- Install Drive Gear

Install the drive gear, meshing it with the idler. Take precautions to not touch the superfinished journals.

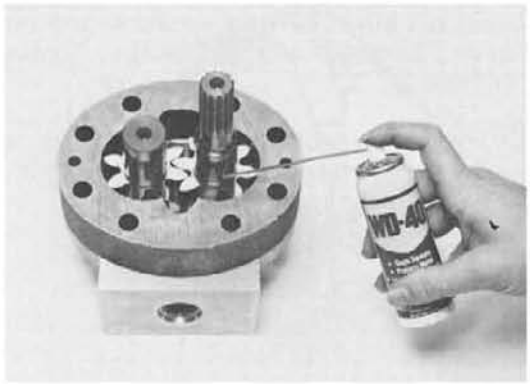


Fig. 27 -- Lubricate Gear Faces and Journals

Lightly lubricate the gear faces and journals.

CAUTION

These surfaces must be free of all contaminants. Use CLEAN lubricant.

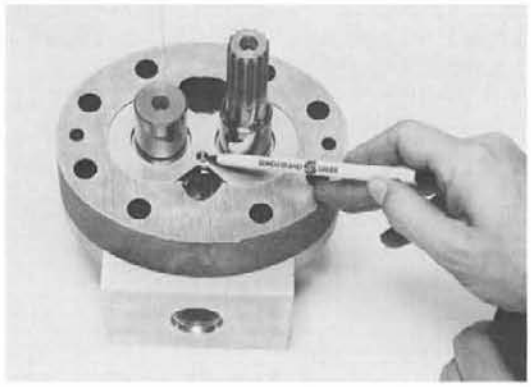


Fig. 28 -- Install Second Pressure Plate

Position second pressure plate in gear housing with bronze side toward the gear faces.

Be certain the O-Rings are properly installed in the pressure plate.

CAUTION

Orientation is critical. Be sure the plate is installed so the thru hole is on the high pressure side.

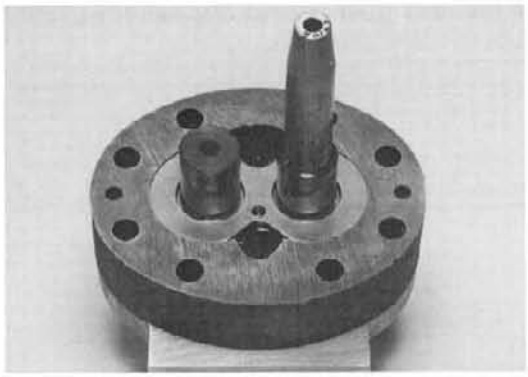


Fig. 29 -- Install Shaft Seal Protector Bullet

Place shaft bullet (refer to Table 1 for part number) over drive gear and inspect the bullet for burrs or other damage.

NOTE: On keyed shaft, use 1/2" (12 mm) wide plastic tape as a seal protector.

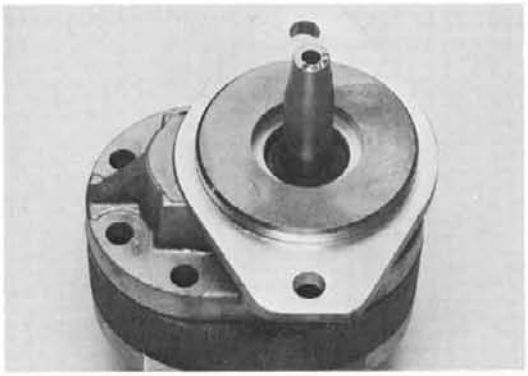


Fig. 30 -- Install Flange Assembly

Insure all seals and dowels are in place. Carefully install flange assembly (with seals installed) over the drive gear shaft. Lower the flange onto the dowels as the bushings engage the pressure plate. Slight pressure may be required to engage dowels.

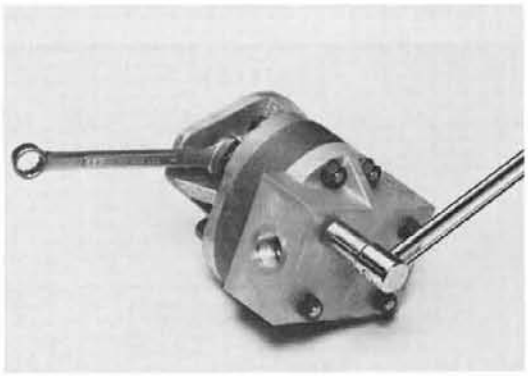


Fig. 31 -- Install Hardware

Install pump thru-studs with washers and nuts (or screws) and torque in a cross pattern. Torques are listed in Table 2.

NOTE: For pumps equipped with C4 flanges, refer to the next step before installing hardware.

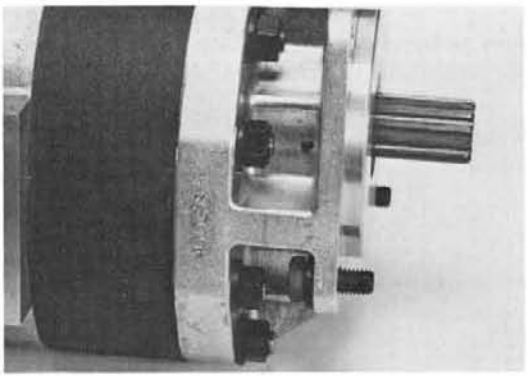


Fig. 32 -- Install Hardware (Pumps with C4 Flange)

For pumps with C4 flanges, install the two (2) pump mounting screws and washers before installing the pump thru-bolts and hardware. (These screws cannot be installed after the thru-studs are installed.)

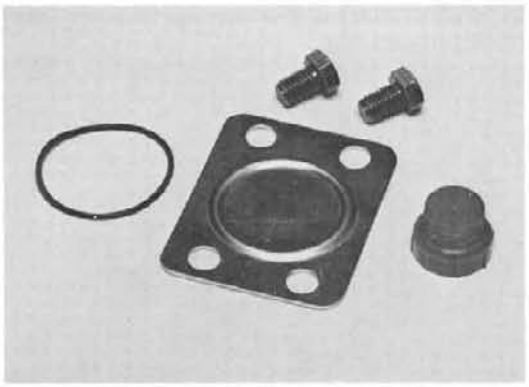


Fig. 33 -- Port Covers

Cover the pump ports with appropriate covers while unit is awaiting test. Replace port covers after test.

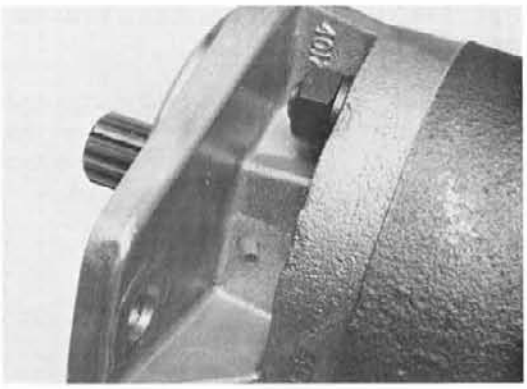


Fig. 34 -- Location of Pump Data Stamp

After testing, install port covers and stamp the required data on the flange assembly.

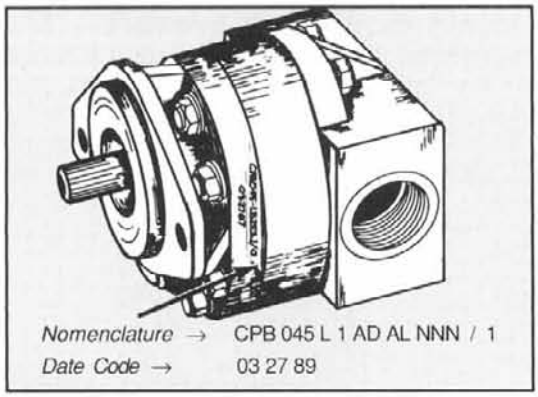


Fig. 35 -- Required Pump Data

Required Data:

Line 1 - Pump Nomenclature / Revision
Line 2 - Date Code (Ship Date): Month/Day/Year

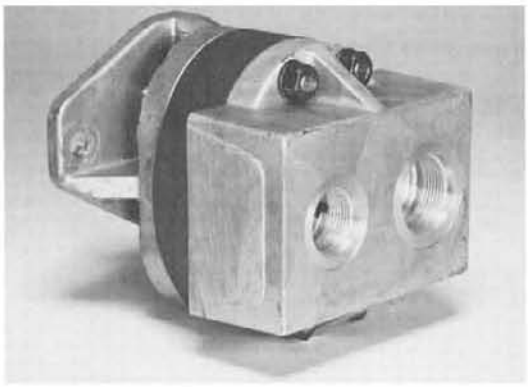


Fig. 36 -- Rear Ported Cover

Special Instructions for 180 Frame Size Pumps with Rear Ported Covers

With rear ports, it is not possible to use thru-studs. Therefore, the inner pattern uses blind studs.

NOTE: Rear ported cover cannot be used with B4 flanges due to the blind studs.

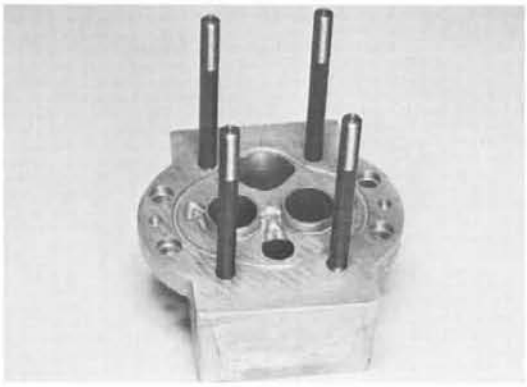


Fig. 37 -- Blind Studs

Install the blind studs in the cover, and assemble pump as outlined previously.

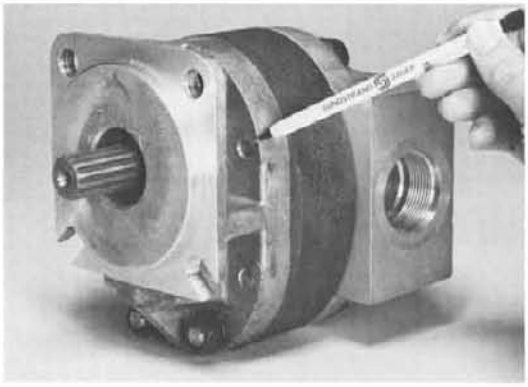


Fig. 38 -- 180 Series Pump with B4 Flange

Special Instructions for 180 Frame Size Pumps with B4 Flanges

180 Frame Size pumps with the B4 flange use thru-studs on the outer holes and blind studs on the inner holes as shown. This allows clearance for attachment screws at the slotted mounting flange holes.

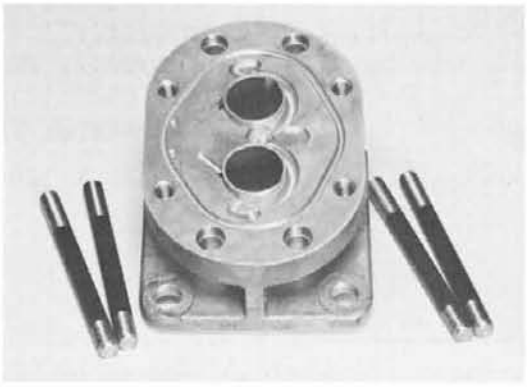


Fig. 39 -- B4 Flange Unique Parts

Unique parts for the B4 flange include the flange with four (4) thru-holes and four (4) tapped holes, plus four (4) studs. These blind studs have coarse threads on the end which screws into the aluminum flange, and fine threads on the other end for the nuts and washers.

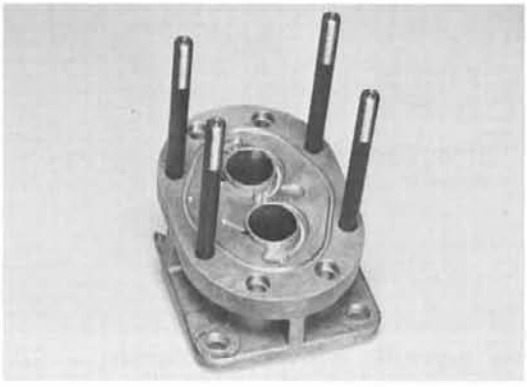


Fig. 40 -- Studs Installed in B4 Flange

Install the blind studs into the flange assembly (coarse threads in the aluminum flange) and assemble the pump as outlined previously.

Tandem Pump Assembly (from Single Pump)

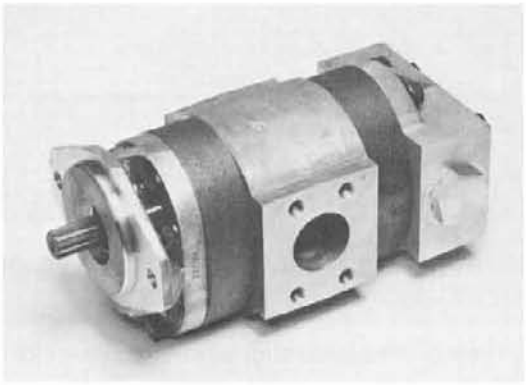


Fig. 41 -- Tandem Pump

Fig. 42 -- Tandem Pump Components

General Procedure

Position the single pump with studs removed on the flange end. Remove cover as shown, leaving the gear housing on the flange assembly and the pressure plate on the gears.

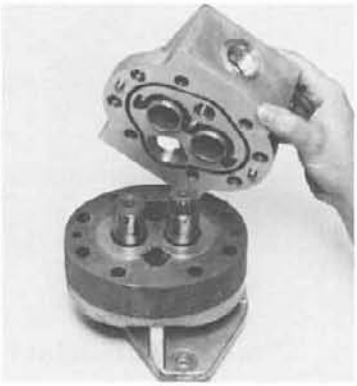


Fig. 43 -- Remove Cover from Single Pump

Position the coupling in the center plate through the inlet port. The coupling should be positioned between the bushings in the plate.

NOTE: The coupling cannot be installed after the center plate is installed.

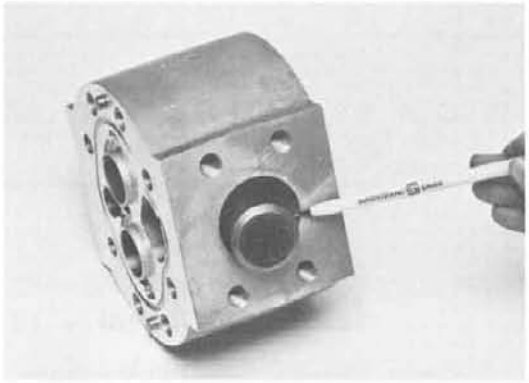


Fig. 44 -- Installing Coupling in Center Plate

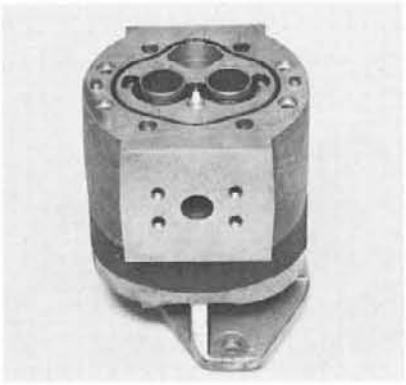


Fig. 45 -- Install Center Plate

Install the backup rings, seal rings, stuffer strips, and O.D. seals to both sides of the center plate.

Install four (4) dowels in the center plate.

CAUTION

Center plates are unidirectional. Be sure the correct plate for the pump's rotation is used.

Lubricate O-Rings. Be certain the O-Rings are properly installed in the pressure plate.

Install the center plate, aligning the drive gear spline with the coupling.

Engage the dowels and press center plate down lightly.

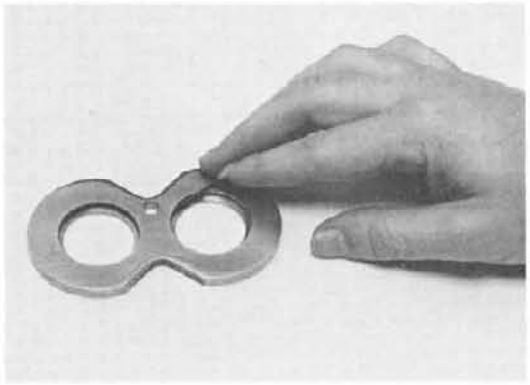


Fig. 46 -- Install Pressure Plate O-Rings

Remove the O-Rings for the two (2) pressure plates from the seal kit.

Install two (2) O-Rings on each pressure plate as shown.

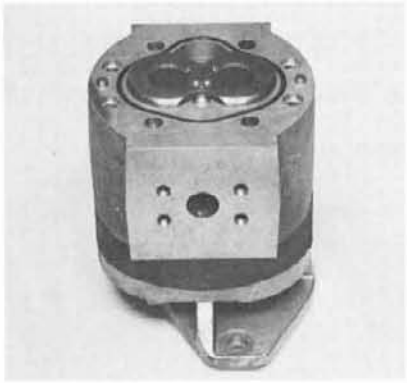


Fig. 47 -- Install Pressure Plate

Lubricate the pressure plate O-Rings and install the pressure plate on the center plate. Be certain the O-Rings are properly installed in the pressure plate.

CAUTION

Orientation is critical. Be sure the plate is installed so the thru hole is on the high pressure side.

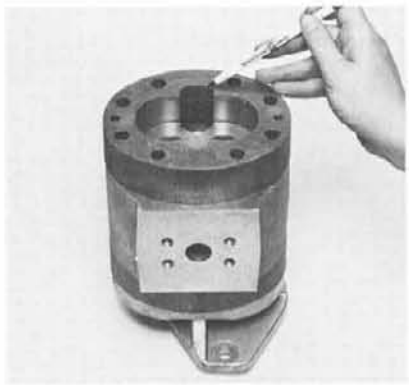


Fig. 48 -- Gear Housing Inlet

Install the gear housing over the pressure plate. Dowels are a close fit, therefore, gear housing must be aligned with care to guarantee proper assembly.

CAUTION

The gear housing is not symmetrical. Install with the cored inlet towards the center plate inlet.

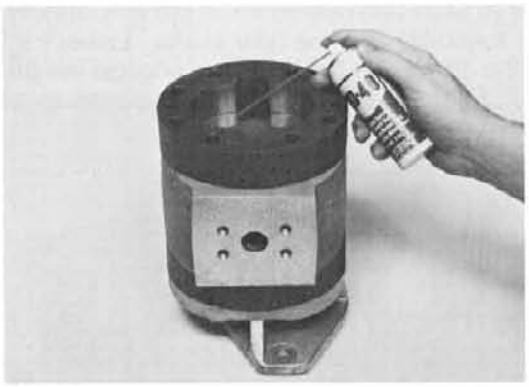


Fig. 49 -- Lubricate Plate and Bushings

Lightly lubricate the face of the pressure plate and the D. U. bushings

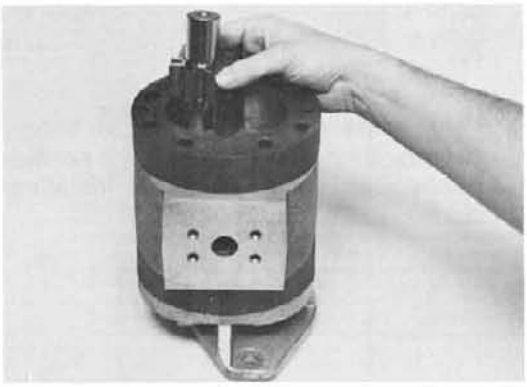


Fig. 50 -- Install Idler Gear

Install the idler gear, taking precautions to not touch the superfinished journals.

Fig. 51 -- Install Drive Gear

Install the drive gear, meshing it with the idler. Take precautions to not touch the superfinished journals.

Rotate the drive gear to engage the coupling in the center plate.

Lightly lubricate the gear faces and journals.

CAUTION

These surfaces must be free of all contaminants. Use CLEAN lubricant.

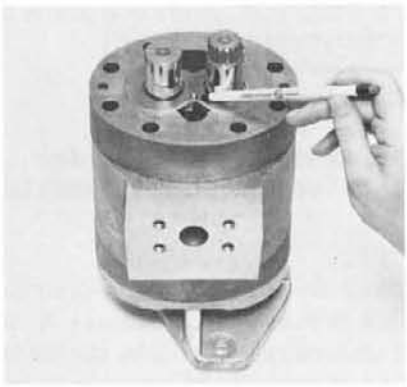


Fig. 52 -- Install Second Pressure Plate

Position second pressure plate in gear housing with bronze side toward the gear faces.

Be certain the O-Rings are properly installed in the pressure plate.

CAUTION

Orientation is critical. Be sure the plate is installed so the thru hole is on the high pressure side.

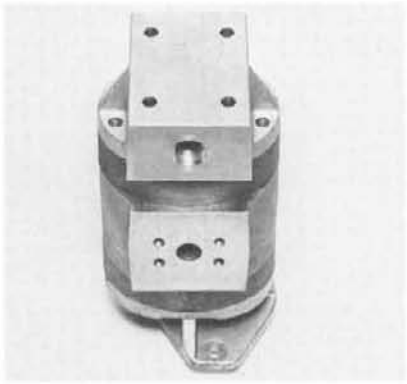


Fig. 53 -- Install Cover Assembly

Insure all seals and dowels are in place. Carefully install cover assembly over the gear shafts. Lower the flange onto the dowels as the bushings engage the pressure plate. Slight pressure may be required to engage dowels.

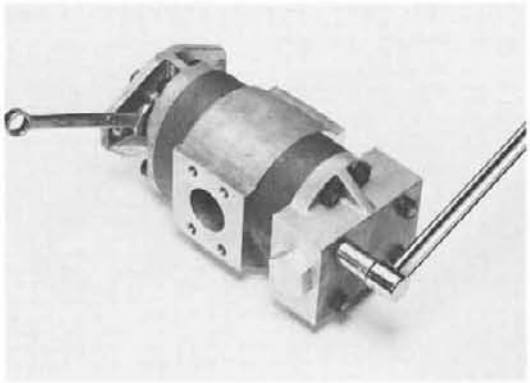


Fig. 54 -- Install Hardware

Install pump thru-studs with washers and nuts (or screws) and torque in a cross pattern. Torques are listed in Table 2.

NOTE: For pumps equipped with C4 flanges, be certain the pump mounting screws and washers are installed before installing thru-studs.

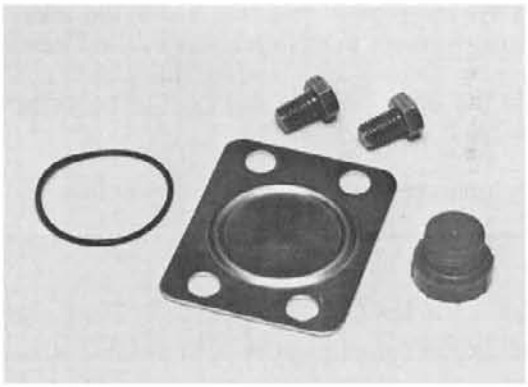


Fig. 55 -- Port Covers

Cover the pump ports with appropriate covers while unit is awaiting test. Replace port covers after test.

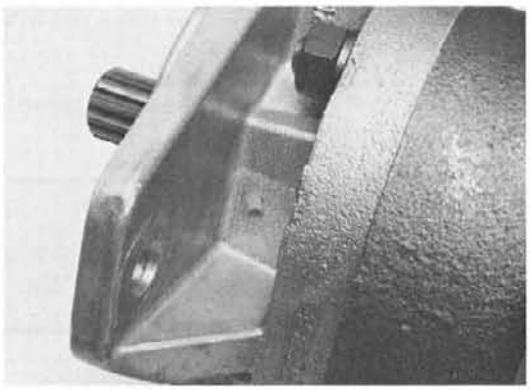


Fig. 56 -- Location of Pump Data Stamp

After testing, install port covers and stamp the required data on the flange assembly.

Required Data:

Line 1 - Pump Nomenclature / Revision
Line 2 - Date Code (Ship Date): Month/Day/Year

Tools

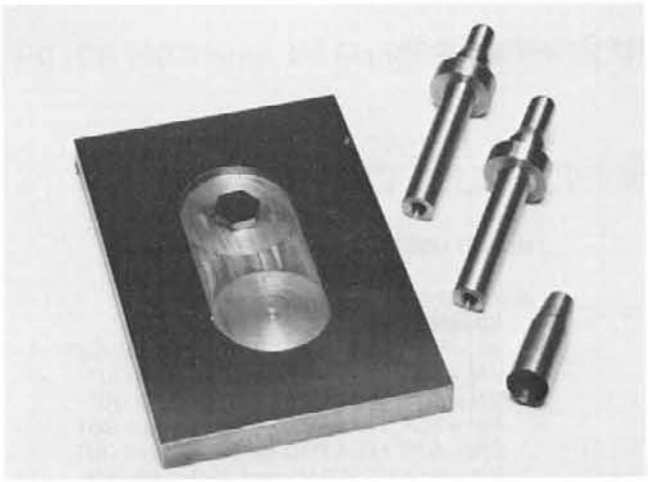


Fig. 57 -- Seal Installation Tools

Tools to aid in assembly are available from Sauer-Sundstrand. Table 1 lists tool part numbers for installing the shaft seals to their proper depth and preventing seal damage during assembly.

Table 1: Special Tools

Frame Size	*CP180		*CP222
Tool	1.0" (25.4 mm) Splined Shaft	.875" (22.2 mm) Splined Shaft	Splined Shaft
Shaft Bullet (Seal Protector)	50126	50127	50125
Seal Installer:			
Inner	50228	50230	50219
Outer	50227	50229	50220
Installation Plate	50221		50221

NOTE: On keyed Shaft, use 1/2" (12 mm) wide plastic tape as a seal protector when installing the flange assembly.

Torque Chart

Table 2: Screw and Nut Torques

Pump Frame Size	Studs and Nuts	Screws in Aluminum
180	70 ft.lbsf. (95 Nm)	70 ft.lbsf. (95 Nm)
222	100 ft.lbsf. (136 Nm)	85 ft.lbsf. (115 Nm)

Testing

Sauer-Sundstrand Authorized Service Centers (ASC) are capable of assembling and testing the C Series pumps. Test stands which will successfully test hydrostatic transmissions will perform gear pump testing as well.

CAUTION

C Series Pumps "track-in" during their initial testing. Take caution to filter the "swarf" before the flow enters test stand valving.

CP 180 Gear Pumps Ordering Information

CPB (CP 180 Single, B2 Flange, Side Ports) Modular Ordering Code

B: PRODUCT
"CONSTRUCTION" PUMP
FRAME SIZE 180 SINGLE
B2 FLANGE
SIDE PORTS

C: FRONT DISPLACEMENT
023 = 2.3 CIR
030 = 3.0 CIR
035 = 3.5 CIR
040 = 4.0 CIR
045 = 4.5 CIR
050 = 5.0 CIR

E: ROTATION (VIEWING SHAFT)
L = LEFT HAND (CCW)
R = RIGHT HAND (CW)

F: SEAL KIT
1 = BUNA (13 TOOTH SHAFT)
2 = BUNA (15 TOOTH OR STR. KEY)
3 = VITON (13 TOOTH SHAFT)
4 = VITON (15 TOOTH OR STR. KEY)

G: FRONT DRIVE GEAR
AR = 13 TOOTH 023
AA = 13 TOOTH 030
AB = 13 TOOTH 035
AC = 13 TOOTH 040
AD = 13 TOOTH 045
AE = 13 TOOTH 050
AS = 15 TOOTH 023
AF = 15 TOOTH 030
AG = 15 TOOTH 035
AH = 15 TOOTH 040
AJ = 15 TOOTH 045
AK = 15 TOOTH 050
AT = STR. KEY 023
AL = STR. KEY 030
AM = STR. KEY 035
AN = STR. KEY 040
AP = STR. KEY 045
AQ = STR. KEY 050

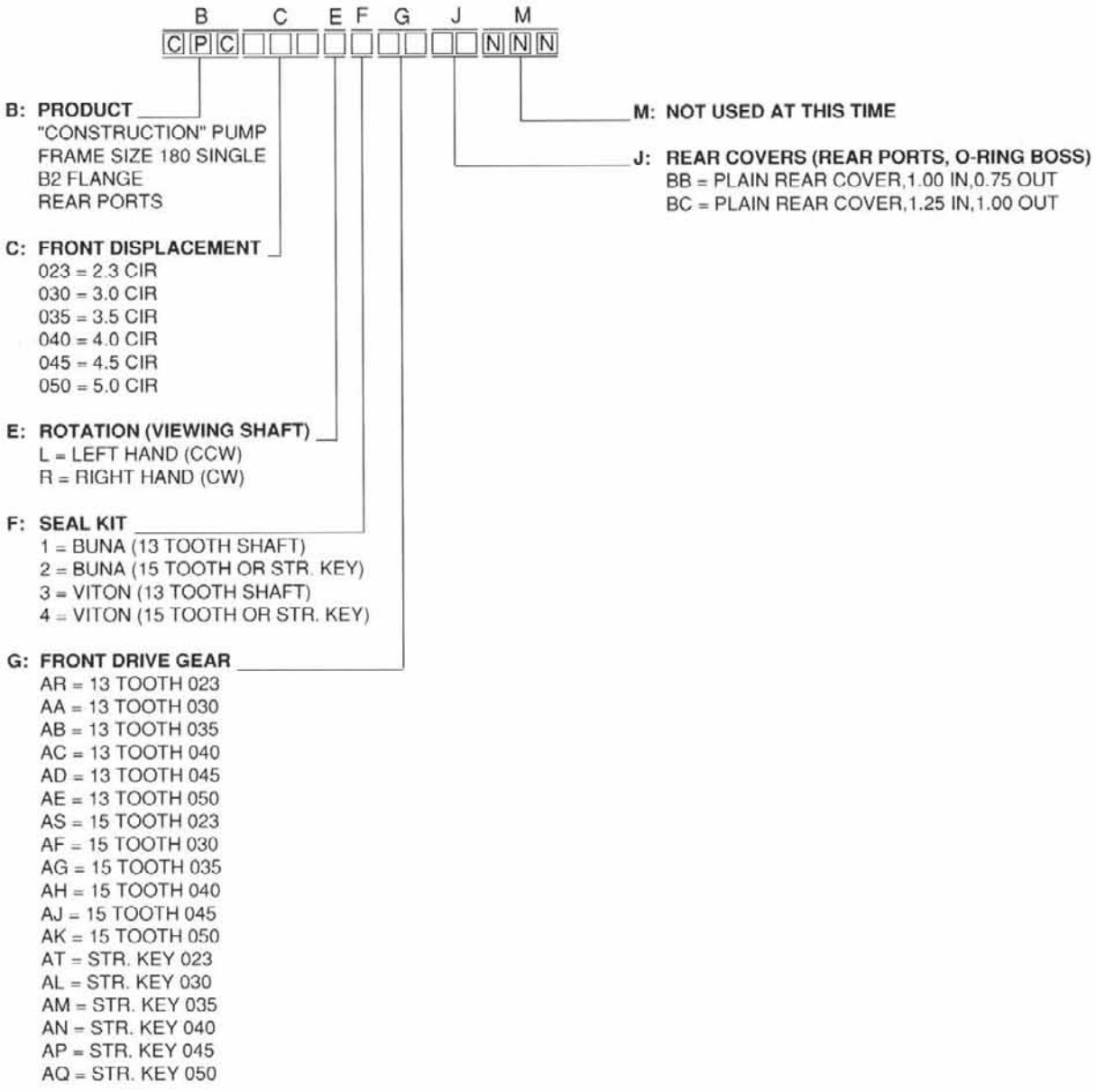
M: NOT USED AT THIS TIME

J: REAR COVERS
(O-RING PORTS)
AL = PLAIN REAR COVER,1.25 IN,1.00 OUT
AM = AUX, 9T,A-PAD,LH,1.25 IN,1.00 OUT
AN = AUX, 9T,A-PAD,RH,1.25 IN,1.00 OUT
BM = AUX, 11T,A-PAD,LH,1.25 IN,1.00 OUT
BN = AUX, 11T,A-PAD,RH,1.25 IN,1.00 OUT
AP = AUX,13T,B-PAD,LH,1.25 IN,1.00 OUT
AQ = AUX,13T,B-PAD,RH,1.25 IN,1.00 OUT
BP = AUX, 15T,B-PAD,LH,1.25 IN,1.00 OUT
BQ = AUX, 15T,B-PAD,RH,1.25 IN,1.00 OUT
(CODE 61 PORTS)
AR = PLAIN REAR COVER,1.25 IN,1.00 OUT
AS = AUX, 9T,A-PAD,LH,1.25 IN,1.00 OUT
AT = AUX, 9T,A-PAD,RH,1.25 IN,1.00 OUT
BR = AUX, 11T,A-PAD,LH,1.25 IN,1.00 OUT
BS = AUX, 11T,A-PAD,RH,1.25 IN,1.00 OUT
AU = AUX,13T,B-PAD,LH,1.25 IN,1.00 OUT
AV = AUX,13T,B-PAD,RH,1.25 IN,1.00 OUT
BT = AUX, 15T,B-PAD,LH,1.25 IN,1.00 OUT
BU = AUX, 15T,B-PAD,RH,1.25 IN,1.00 OUT
(CODE 61 PORTS)
AW = PLAIN REAR COVER,1.50 IN,1.25 OUT
AX = AUX, 9T,A-PAD,LH,1.50 IN,1.25 OUT
AY = AUX, 9T,A-PAD,RH,1.50 IN,1.25 OUT
BV = AUX, 11T,A-PAD,LH,1.50 IN,1.25 OUT
BW = AUX, 11T,A-PAD,RH,1.50 IN,1.25 OUT
AZ = AUX, 13T,B-PAD,LH,1.50 IN,1.25 OUT
BA = AUX, 13T,B-PAD,RH,1.50 IN,1.25 OUT
BX = AUX, 15T,B-PAD,LH,1.50 IN,1.25 OUT
BY = AUX, 15T,B-PAD,RH,1.50 IN,1.25 OUT

***: OPTIONAL AUXILIARY PAD SHIPPING COVER**
"A" PAD
"B" PAD

CP 180 Gear Pumps Ordering Information

CPC (CP 180 Single, B2 Flange, Rear Ports) Modular Ordering Code



CP 180 Gear Pumps Ordering Information

CPD (CP 180 Single, B4 Flange, Side Ports) Modular Ordering Code

B: PRODUCT
"CONSTRUCTION" PUMP
FRAME SIZE 180 SINGLE
B4 FLANGE
SIDE PORTS

C: FRONT DISPLACEMENT
023 = 2.3 CIR
030 = 3.0 CIR
035 = 3.5 CIR
040 = 4.0 CIR
045 = 4.5 CIR
050 = 5.0 CIR

E: ROTATION (VIEWING SHAFT)
L = LEFT HAND (CCW)
R = RIGHT HAND (CW)

F: SEAL KIT
1 = BUNA (13 TOOTH SHAFT)
2 = BUNA (15 TOOTH OR STR. KEY)
3 = VITON (13 TOOTH SHAFT)
4 = VITON (15 TOOTH OR STR. KEY)

G: FRONT DRIVE GEAR
AR = 13 TOOTH 023
AA = 13 TOOTH 030
AB = 13 TOOTH 035
AC = 13 TOOTH 040
AD = 13 TOOTH 045
AE = 13 TOOTH 050
AS = 15 TOOTH 023
AF = 15 TOOTH 030
AG = 15 TOOTH 035
AH = 15 TOOTH 040
AJ = 15 TOOTH 045
AK = 15 TOOTH 050
AT = STR. KEY 023
AL = STR. KEY 030
AM = STR. KEY 035
AN = STR. KEY 040
AP = STR. KEY 045
AQ = STR. KEY 050

M: NOT USED AT THIS TIME

J: REAR COVERS
(O-RING PORTS)
AL = PLAIN REAR COVER,1.25 IN,1.00 OUT
AM = AUX, 9T,A-PAD,LH,1.25 IN,1.00 OUT
AN = AUX, 9T,A-PAD,RH,1.25 IN,1.00 OUT
BM = AUX, 11T,A-PAD,LH,1.25 IN,1.00 OUT
BN = AUX, 11T,A-PAD,RH,1.25 IN,1.00 OUT
AP = AUX,13T,B-PAD,LH,1.25 IN,1.00 OUT
AQ = AUX,13T,B-PAD,RH,1.25 IN,1.00 OUT
BP = AUX, 15T,B-PAD,LH,1.25 IN,1.00 OUT
BQ = AUX, 15T,B-PAD,RH,1.25 IN,1.00 OUT
(CODE 61 PORTS)
AR = PLAIN REAR COVER,1.25 IN,1.00 OUT
AS = AUX, 9T,A-PAD,LH,1.25 IN,1.00 OUT
AT = AUX, 9T,A-PAD,RH,1.25 IN,1.00 OUT
BR = AUX, 11T,A-PAD,LH,1.25 IN,1.00 OUT
BS = AUX, 11T,A-PAD,RH,1.25 IN,1.00 OUT
AU = AUX,13T,B-PAD,LH,1.25 IN,1.00 OUT
AV = AUX,13T,B-PAD,RH,1.25 IN,1.00 OUT
BT = AUX, 15T,B-PAD,LH,1.25 IN,1.00 OUT
BU = AUX, 15T,B-PAD,RH,1.25 IN,1.00 OUT
(CODE 61 PORTS)
AW = PLAIN REAR COVER,1.50 IN,1.25 OUT
AX = AUX, 9T,A-PAD,LH,1.50 IN,1.25 OUT
AY = AUX, 9T,A-PAD,RH,1.50 IN,1.25 OUT
BV = AUX, 11T,A-PAD,LH,1.50 IN,1.25 OUT
BW = AUX, 11T,A-PAD,RH,1.50 IN,1.25 OUT
AZ = AUX, 13T,B-PAD,LH,1.50 IN,1.25 OUT
BA = AUX, 13T,B-PAD,RH,1.50 IN,1.25 OUT
BX = AUX, 15T,B-PAD,LH,1.50 IN,1.25 OUT
BY = AUX, 15T,B-PAD,RH,1.50 IN,1.25 OUT

***: OPTIONAL AUXILIARY PAD SHIPPING COVER**
"A" PAD
"B" PAD

CP 180 Tandem Gear Pumps Ordering Information

CPE (CP 180 Tandem, B2 Flange, Side Ports) Modular Ordering Code

B: PRODUCT
"CONSTRUCTION"
PUMP
FRAME SIZE 180
TANDEM
B2 FLANGE
SIDE PORTS

C: FRONT DISP.
030 = 3.0 CIR
035 = 3.5 CIR
040 = 4.0 CIR
045 = 4.5 CIR
050 = 5.0 CIR

D: REAR DISPLACEMENT
030 = 3.0 CIR
035 = 3.5 CIR
040 = 4.0 CIR

E: ROTATION (VIEWING SHAFT)
L = LEFT HAND (CCW)
R = RIGHT HAND (CW)

F: SEAL KIT
1 = BUNA (13 TOOTH SHAFT)
2 = BUNA (15 TOOTH OR STR. KEY)
3 = VITON (13 TOOTH SHAFT)
4 = VITON (15 TOOTH OR STR. KEY)

G: FRONT DRIVE GEAR
AA = 13 TOOTH 030
AB = 13 TOOTH 035
AC = 13 TOOTH 040
AD = 13 TOOTH 045
AE = 13 TOOTH 050
AF = 15 TOOTH 030
AG = 15 TOOTH 035
AH = 15 TOOTH 040
AJ = 15 TOOTH 045
AK = 15 TOOTH 050
AL = STR. KEY 030
AM = STR. KEY 035
AN = STR. KEY 040
AP = STR. KEY 045
AQ = STR. KEY 050

M: NOT USED AT THIS TIME

L: ASSEMBLY STUD KITS
AA = 030–030
AB = 030–035
AC = 030–040
AD = 030–045
AE = 030–050
AF = 035–035
AG = 035–040
AH = 035–045
AJ = 035–050
AK = 040–040
AL = 040–045
AM = 040–050

K: CENTER PLATE (ALL PORTS CODE 61)
1 = L.H.,2.00 INLET,1.00 OUTLET
2 = R.H.,2.00 INLET,1.00 OUTLET
3 = L.H.,2.00 INLET,1.25 OUTLET
4 = R.H.,2.00 INLET,1.25 OUTLET

J: REAR COVERS
** = NO INLET (SINGLE INLET TANDEM)
AA = PLAIN REAR COVER,**,1.00 CODE61 OUT
AB = AUX. 9T A-PAD,LH,**,1.00 CODE61 OUT
AC = AUX. 9T A-PAD,RH,**,1.00 CODE61 OUT
BD = AUX.11T A-PAD,LH,**,1.00 CODE61 OUT
BE = AUX.11T A-PAD,RH,**,1.00 CODE61 OUT
AD = AUX.13T B-PAD,LH,**,1.00 CODE61 OUT
AE = AUX.13T B-PAD,RH,**,1.00 CODE61 OUT
AF = PLAIN REAR COVER,**,1.25 CODE61 OUT
AG = AUX. 9T A-PAD,LH,**,1.25 CODE61 OUT
AH = AUX. 9T A-PAD,RH,**,1.25 CODE61 OUT
BH = AUX.11T A-PAD,LH,**,1.25 CODE61 OUT
BJ = AUX.11T A-PAD,RH,**,1.25 CODE61 OUT
AJ = AUX.13T B-PAD,LH,**,1.25 CODE61 OUT
AK = AUX.13T B-PAD,RH,**,1.25 CODE61 OUT

H: REAR DRIVE GEARS
1 = AUXILARY DRIVE 030
2 = AUXILARY DRIVE 035
3 = AUXILARY DRIVE 040

***: OPTIONAL AUX. PAD SHIPPING COVER**
"A" PAD
"B" PAD

CP 180 Gear Pumps Ordering Information

CPF (CP 180 Tandem, B2 Flange, Rear Ports) Modular Ordering Code

B: PRODUCT
"CONSTRUCTION"
PUMP
FRAME SIZE 180
TANDEM
B2 FLANGE
REAR PORTS

C: FRONT DISP.
030 = 3.0 CIR
035 = 3.5 CIR
040 = 4.0 CIR
045 = 4.5 CIR
050 = 5.0 CIR

D: REAR DISPLACEMENT
030 = 3.0 CIR
035 = 3.5 CIR
040 = 4.0 CIR

E: ROTATION (VIEWING SHAFT)
L = LEFT HAND (CCW)
R = RIGHT HAND (CW)

F: SEAL KIT
1 = BUNA (13 TOOTH SHAFT)
2 = BUNA (15 TOOTH OR STR. KEY)
3 = VITON (13 TOOTH SHAFT)
4 = VITON (15 TOOTH OR STR. KEY)

G: FRONT DRIVE GEAR
AA = 13 TOOTH 030
AB = 13 TOOTH 035
AC = 13 TOOTH 040
AD = 13 TOOTH 045
AE = 13 TOOTH 050
AF = 15 TOOTH 030
AG = 15 TOOTH 035
AH = 15 TOOTH 040
AJ = 15 TOOTH 045
AK = 15 TOOTH 050
AL = STR. KEY 030
AM = STR. KEY 035
AN = STR. KEY 040
AP = STR. KEY 045
AQ = STR. KEY 050

H: REAR DRIVE GEARS
1 = AUXILARY DRIVE 030
2 = AUXILARY DRIVE 035
3 = AUXILARY DRIVE 040

J: REAR COVERS (REAR PORTS, O-RING BOSS)
BB = 1.00 INLET,0.75 OUTLET
BC = 1.50 INLET,1.00 OUTLET

K: CENTER PLATE (ALL PORTS CODE 61)
1 = L.H.,2.00 INLET,1.00 OUTLET
2 = R.H.,2.00 INLET,1.00 OUTLET
3 = L.H.,2.00 INLET,1.25 OUTLET
4 = R.H.,2.00 INLET,1.25 OUTLET

L: ASSEMBLY STUD KITS
AR = 030–030
AS = 030–035
AT = 030–040
AU = 030–045
AV = 030–050
AW = 035–035
AX = 035–040
AY = 035–045
AZ = 035–050
BA = 040–040
BB = 040–045
BC = 040–050

M: NOT USED AT THIS TIME

CP 180 Tandem Gear Pumps Ordering Information

CPG (CP 180 Tandem, B4 Flange, Side Ports) Modular Ordering Code

B: PRODUCT
"CONSTRUCTION"
PUMP
FRAME SIZE 180
TANDEM
B4 FLANGE
SIDE PORTS

C: FRONT DISP.
030 = 3.0 CIR
035 = 3.5 CIR
040 = 4.0 CIR
045 = 4.5 CIR
050 = 5.0 CIR

D: REAR DISPLACEMENT
030 = 3.0 CIR
035 = 3.5 CIR
040 = 4.0 CIR

E: ROTATION (VIEWING SHAFT)
L = LEFT HAND (CCW)
R = RIGHT HAND (CW)

F: SEAL KIT
1 = BUNA (13 TOOTH SHAFT)
2 = BUNA (15 TOOTH OR STR. KEY)
3 = VITON (13 TOOTH SHAFT)
4 = VITON (15 TOOTH OR STR. KEY)

G: FRONT DRIVE GEAR
AA = 13 TOOTH 030
AB = 13 TOOTH 035
AC = 13 TOOTH 040
AD = 13 TOOTH 045
AE = 13 TOOTH 050
AF = 15 TOOTH 030
AG = 15 TOOTH 035
AH = 15 TOOTH 040
AJ = 15 TOOTH 045
AK = 15 TOOTH 050
AL = STR. KEY 030
AM = STR. KEY 035
AN = STR. KEY 040
AP = STR. KEY 045
AQ = STR. KEY 050

M: NOT USED AT THIS TIME

L: ASSEMBLY STUD KITS
AA = 030–030
AB = 030–035
AC = 030–040
AD = 030–045
AE = 030–050
AF = 035–035
AG = 035–040
AH = 035–045
AJ = 035–050
AK = 040–040
AL = 040–045
AM = 040–050

K: CENTER PLATE (ALL PORTS CODE 61)
1 = L.H.,2.00 INLET,1.00 OUTLET
2 = R.H.,2.00 INLET,1.00 OUTLET
3 = L.H.,2.00 INLET,1.25 OUTLET
4 = R.H.,2.00 INLET,1.25 OUTLET

J: REAR COVERS
** = NO INLET (SINGLE INLET TANDEM)
AA = PLAIN REAR COVER,**,1.00 CODE61 OUT
AB = AUX. 9T A-PAD,LH,**,1.00 CODE61 OUT
AC = AUX. 9T A-PAD,RH,**,1.00 CODE61 OUT
BD = AUX.11T A-PAD,LH,**,1.00 CODE61 OUT
BE = AUX.11T A-PAD,RH,**,1.00 CODE61 OUT
AD = AUX.13T B-PAD,LH,**,1.00 CODE61 OUT
AE = AUX.13T B-PAD,RH,**,1.00 CODE61 OUT
AF = PLAIN REAR COVER,**,1.25 CODE61 OUT
AG = AUX. 9T A-PAD,LH,**,1.25 CODE61 OUT
AH = AUX. 9T A-PAD,RH,**,1.25 CODE61 OUT
BH = AUX.11T A-PAD,LH,**,1.25 CODE61 OUT
BJ = AUX.11T A-PAD,RH,**,1.25 CODE61 OUT
AJ = AUX.13T B-PAD,LH,**,1.25 CODE61 OUT
AK = AUX.13T B-PAD,RH,**,1.25 CODE61 OUT

H: REAR DRIVE GEARS
1 = AUXILARY DRIVE 030
2 = AUXILARY DRIVE 035
3 = AUXILARY DRIVE 040

***: OPTIONAL AUX. PAD SHIPPING COVER**
"A" PAD
"B" PAD

CP 222 Gear Pumps Ordering Information

CPA (CP 222 Single, C4 Flange, Side Ports) Modular Ordering Code

B: PRODUCT
"CONSTRUCTION" PUMP
FRAME SIZE 222 SINGLE
C4 FLANGE
SIDE PORTS

C: FRONT DISPLACEMENT
040 = 4.0 CIR
050 = 5.0 CIR
060 = 6.0 CIR
070 = 7.0 CIR
080 = 8.0 CIR
090 = 9.0 CIR
100 = 10.0 CIR

E: ROTATION (VIEWING SHAFT)
L = LEFT HAND (CCW)
R = RIGHT HAND (CW)

F: SEAL KIT
1 = BUNA
2 = VITON

G: FRONT DRIVE GEAR
AA = 14 TOOTH 040
AB = 14 TOOTH 050
AC = 14 TOOTH 060
AD = 14 TOOTH 070
AE = 14 TOOTH 080
AF = 14 TOOTH 090
AG =14 TOOTH 100
AH = STR. KEY 040
AJ = STR. KEY 050
AK = STR. KEY 060
AL = STR. KEY 070
AM = STR. KEY 080
AN = STR. KEY 090
AP = STR. KEY 100

M: NOT USED AT THIS TIME

J: REAR COVERS (ALL PORTS CODE 61)
AU = PLAIN REAR COVER,1.50 IN,1.25 OUT
AV = AUX, 9T,A-PAD,LH,1.50 IN,1.25 OUT
AW = AUX, 9T,A-PAD,RH,1.50 IN,1.25 OUT
AX = AUX,11T,A-PAD,LH,1.50 IN,1.25 OUT
AY = AUX,11T,A-PAD,RH,1.50 IN,1.25 OUT
AZ = AUX,13T,B-PAD,LH,1.50 IN,1.25 OUT
BA = AUX,13T,B-PAD,RH,1.50 IN,1.25 OUT
BB = AUX,15T,B-PAD,LH,1.50 IN,1.25 OUT
BC = AUX,15T,B-PAD,RH,1.50 IN,1.25 OUT
BN = PLAIN REAR COVER,2.00 IN,1.50 OUT
BP = AUX, 9T,A-PAD,LH,2.00 ,1.50 OUT
BQ = AUX, 9T,A-PAD,RH,2.00 IN,1.50 OUT
BR = AUX,11T,A-PAD,LH,2.00 IN,1.50 OUT
BS = AUX,11T,A-PAD,RH,2.00 IN,1.50 OUT
BT = AUX,13T,B-PAD,LH,2.00 IN,1.50 OUT
BU = AUX,13T,B-PAD,RH,2.00 IN,1.50 OUT
BV = AUX,15T,B-PAD,LH,2.00 IN,1.50 OUT
BW = AUX,15T,B-PAD,RH,2.00 IN,1.50 OUT

***: OPTIONAL AUX. PAD SHIPPING COVER**
"A" PAD
"B" PAD

CP 222 Gear Pumps Ordering Information

CPH (CP 222 Tandem, C4 Flange, Side Ports) Modular Ordering Code

B: PRODUCT
"CONSTRUCTION"
PUMP
FRAME SIZE 222
TANDEM
C4 FLANGE
SIDE PORTS

C: FRONT DISP.
040 = 4.0 CIR
050 = 5.0 CIR
060 = 6.0 CIR
070 = 7.0 CIR
080 = 8.0 CIR
090 = 9.0 CIR
100 = 10.0 CIR

D: REAR DISPLACEMENT
040 = 4.0 CIR
050 = 5.0 CIR
060 = 6.0 CIR

E: ROTATION (VIEWING SHAFT)
L = LEFT HAND (CCW)
R = RIGHT HAND (CW)

F: SEAL KIT
1 = BUNA
2 = VITON

G: FRONT DRIVE GEAR
AA = 14 TOOTH 040
AB = 14 TOOTH 050
AC = 14 TOOTH 060
AD = 14 TOOTH 070
AE = 14 TOOTH 080
AF = 14 TOOTH 090
AG =14 TOOTH 100
AH = STR. KEY 040
AJ = STR. KEY 050
AK = STR. KEY 060
AL = STR. KEY 070
AM = STR. KEY 080
AN = STR. KEY 090
AP = STR. KEY 100

M: NOT USED AT THIS TIME

L: ASSEMBLY STUD KITS

AA = 040–040	AK = 050–070
AB = 040–050	AL = 050–080
AC = 040–060	AM = 050–090
AD = 040–070	AN = 050–100
AE = 040–080	AP = 060–060
AF = 040–090	AQ = 060–070
AG = 040–100	AR = 060–080
AH = 050–050	AS = 060–090
AJ = 050–060	AT = 060–100

K: CENTER PLATE (ALL PORTS CODE 61)
1 = LH, 2.50 INLET,1.25 OUTLET
2 = RH, 2.50 INLET,1.25 OUTLET
3 = LH, 2.50 INLET,1.50 OUTLET
4 = RH, 2.50 INLET,1.50 OUTLET

J: REAR COVERS (ALL PORTS CODE 61)
** = NO INLET PORT (SINGLE INLET TANDEM)
AA = PLAIN REAR COVER,**,1.25 OUTLET
AB = AUX, 9T,A-PAD,LH,**,1.25 OUTLET
AC = AUX, 9T,A-PAD,RH,**,1.25 OUTLET
AD = AUX,11T,A-PAD,LH,**,1.25 OUTLET
AE = AUX,11T,A-PAD,RH,**,1.25 OUTLET
AF = AUX,13T,B-PAD,LH,**,1.25 OUTLET
AG = AUX,13T,B-PAD,RH,**,1.25 OUTLET
AH = AUX,15T,B-PAD,LH,**,1.25 OUTLET
AJ = AUX,15T,B-PAD,RH,**,1.25 OUTLET
AK = PLAIN REAR COVER,**,1.50 OUTLET
AL = AUX, 9T,A-PAD,LH,**,1.50 OUTLET
AM = AUX, 9T,A-PAD,RH,**,1.50 OUTLET
AN = AUX,11T,A-PAD,LH,**,1.50 OUTLET
AP = AUX,11T,A-PAD,RH,**,1.50 OUTLET
AQ = AUX,13T,B-PAD,LH,**,1.50 OUTLET
AR = AUX,13T,B-PAD,RH,**,1.50 OUTLET
AS = AUX,15T,B-PAD,LH,**,1.50 OUTLET
AT = AUX,15T,B-PAD,RH,**,1.50 OUTLET

H: REAR DRIVE GEARS
1 = AUXILARY DRIVE 040
2 = AUXILARY DRIVE 050
3 = AUXILARY DRIVE 060

***: OPTIONAL AUX. PAD SHIPPING COVER**
"A" PAD
"B" PAD

Notes

Contents

SAUER DANFOSS

Hydraulic Power Systems

SAUER-DANFOSS Hydraulic Power Systems - Market Leaders Worldwide

SAUER-DANFOSS is a world leader in the design and manufacture of Hydraulic Power Systems. Research and development resources in both North America and Europe enable SAUER-DANFOSS to offer a wide range of design solutions utilizing hydraulic power system technology.

SAUER-DANFOSS specializes in integrating a full range of system components to provide vehicle designers with the most advanced total-design system.

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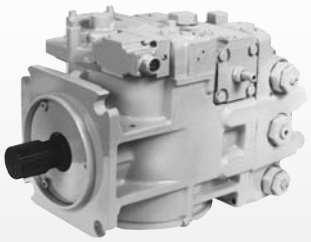
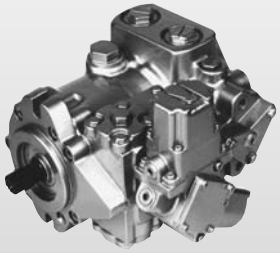


Heavy Duty Axial Piston Pumps and Motors

Heavy Duty Bent Axis Variable Motors

Cartridge Motors/ Compact Wheel Drives



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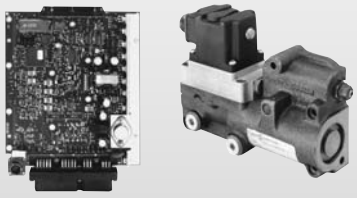
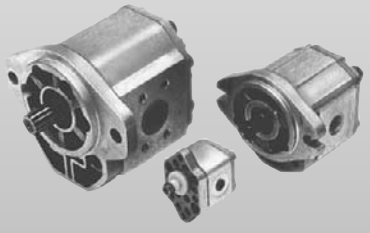


Microcontrollers and Electrohydraulic Controls

Hydrostatic Transmission Packages

Open Circuit Axial Piston Pumps



Gear Pumps and Motors

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SAUER-DANFOSS provides comprehensive worldwide service for its products through an extensive network of Authorized Service Centers strategically located in all parts of the world.

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