

# OILGEAR TYPE "PVG" PUMPS - 048/065/075/100/130 SERVICE INSTRUCTIONS

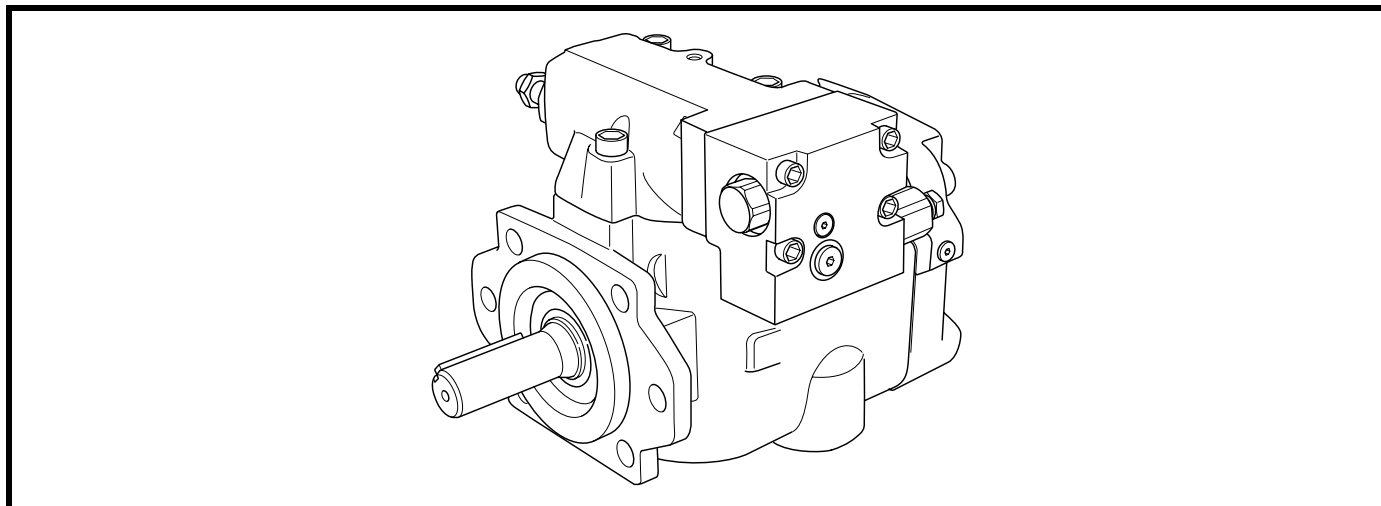


Figure 1. Typical Oilgear "PVG" Open Loop Pump

## PURPOSE OF INSTRUCTIONS

These instructions will simplify the installation, operation, maintenance and troubleshooting of Oilgear type "PVG" pumps.

Become familiar with the construction, principle of operation and characteristics of your pump to help you attain satisfactory performance, reduce shut-down and increase the pump's service life. Some pumps have been modified from those described in this bulletin and other changes may be made without notice.

## REFERENCE MATERIAL

Fluid Recommendations .....	Bulletin 90000
Contamination Evaluation Guide.....	Bulletin 90004
Filtration Recommendations .....	Bulletin 90007
Piping Information .....	Bulletin 90011

## Pump Control Instructions

"P-1NN" Pressure Compensator .....	Data Sheet 947541
"P-1NN/F" Pressure Compensator w/Load Sense .....	Data Sheet 947542
"P-1NN/H" Pressure Compensator w/H.P. Limited.....	Data Sheet 947543
"P-1NN/G" Horsepower Limit w/Load Sense .....	Data Sheet 947544
"P-2 -" Dual Pressure Compensator .....	Data Sheet 947545
"P-A" and "P-B" Electrohydraulic Proportional Pressure Compensator .....	Data Sheet 947546
"P-C -" Soft Starting .....	Data Sheet 947547
"V-S" Electrohydraulic Servo Valve w/o Amplifier.....	Data Sheet 947719
"V-A" Electrohydraulic Servo Valve w/Amplifier .....	Data Sheet 947720

**THE OILGEAR COMPANY**

2300 South 51st Street  
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## Safety First

Read and understand this entire instruction sheet before repairing, or adjusting your Oilgear product.

Those who use and maintain this equipment must be thoroughly trained and familiar with the product. If incorrectly used or maintained, this product and its equipment can cause severe injury.

### SAFETY SYMBOLS

The following signal words are used in this instruction sheet to identify areas of concern where your safety may be involved. Carefully read the text and observe any instructions provided to ensure your safety.

#### **DANGER**

**THIS SIGNAL WORD INDICATES AN IMMEDIATELY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.**

#### **WARNING**

This signal word indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

#### **CAUTION**

This signal word indicates that a potentially hazardous situation exists which, if not avoided, may result in damage to equipment or minor personal injury.

#### **NOTE**

*While not directly relevant to the topic being discussed, the NOTE is used to emphasize information provided, or provide additional information which may be of benefit.*

#### **WARNING**

This service information is designed for the maintenance of your Oilgear product. It contains the information on the correct procedures determined by Oilgear for the safe manner of servicing. Always keep this instruction sheet in a location where it is readily available for the persons who use and maintain the product. Additional copies of this instruction sheet are available through the Oilgear Company. (Contact phone number.) Or visit our website: [www.oilgear.com](http://www.oilgear.com). Please contact us if you have any questions regarding the information in this instruction bulletin.

#### **NOTE**

*The cleanliness of working on this pump or the hydraulic system is extremely important to the safety and reliability of the pump and the system. Always make sure the fittings are clean on the outside before removing them from their connections, are capped and plugged when removed and placed in a clean rag or container until they are reinstalled.*

#### **WARNING**

**Some service operations may require special tools or equipment. If you require information on these items, please contact Oilgear before attempting these repairs and service operations.**

#### **WARNING**

Read, understand, and follow the safety guidelines, dangers, and warnings contained in this instruction sheet to promote reliable operation and prevent serious personal injury.

#### **WARNING**

**DO NOT attempt to service this machinery in an environment where safety regulations are not established and in place.**

#### **WARNING**

**DO NOT operate the hydraulic system if a leak is present. Serious injury may result.**

#### **WARNING**

Hydraulic systems operate under very high pressure. Hydraulic fluid escaping from a pressurized system can penetrate unprotected body tissue. **DO NOT** inspect for hydraulic leaks with bare hands or other exposed body parts. As a minimum, wear leather gloves prior to inspecting for leaks and use cardboard or wood. If leaks are present, relieve pressure and allow system to cool prior to servicing. If injured by escaping hydraulic oil, contact a physician immediately. Serious complications may arise if not treated immediately. If you have questions regarding inspecting for hydraulic leaks, please contact Oilgear prior to servicing.

**⚠ WARNING**

Hydraulic hoses and tubing must be inspected on a daily basis for leaks, cuts, abrasions, damage and improper clearance along any mounting frame for hidden damage before the unit is put into service. Replace damaged hoses or hoses you suspect are damaged before the system is returned to service! Hoses must be replaced every two years. Failure to properly inspect and maintain the system may result in serious injury.

**⚠ WARNING**

Hydraulic systems are hot. **DO NOT TOUCH!** Serious personal injury may result from hot oil. When you have completed working on the hydraulic system, thoroughly clean any spilled oil from the equipment. Do not spill any hydraulic fluids on the ground. Clean any hydraulic fluids from your skin as soon as you have completed maintenance and repairs. Dispose of used oil and system filters as required by law.

**⚠ WARNING**

Use correct hoses, fittings, and adapters with the correct SAE rating when replacing hoses to prevent possible serious injury. Always replace hoses, fittings, and adapters with replacements that have a proper, suitable, working pressure rating. Replacement hoses must be of the correct length and must comply with the hose manufacturer's and Oilgear's installation guidelines and recommendations.

**⚠ WARNING**

Hydraulic hoses have the SAE ratings marked on the hose to assist you in selecting the correct hose. The same manufacturer must supply any replacement hydraulic hoses and fitting assemblies. As an example: Brand "X" hose and brand "Y" fitting will not normally be compatible. No "Twist" is allowed in the hydraulic hoses. "Twist" may result in premature hose failure. This can cause serious injury. Please contact Oilgear for assistance when required.

**⚠ WARNING**

Hydraulic cylinders can be holding a function in a certain position when the pump is OFF. An example of this is a function being held in the lift or partial lift position by the cylinders. If a hydraulic line is removed or the hydraulic circuits or controls are being worked on, gravity may allow the function being held in position to drop. All workers and personnel must remain clear of these areas when working on or operating the hydraulic system. Block and secure all devices and functions which apply before beginning work or operation. Failure to comply with this can result in serious injury or death.

**⚠ WARNING**

Any hydraulic pipe which is replaced must conform to SAE J1065 specifications. If incorrect hydraulic pipe is installed, the hydraulic system may fail, causing serious injury. Damaged or leaking fittings, pipes or hoses must be replaced before the system is returned to service.

**⚠ WARNING**

**DO NOT** heat hydraulic pipe. The carbon content of this steel tube is such that if heated for bending, and either water or air quenched, the pipe may lose its ductility and thereby be subject to failure under high pressure or hydraulic chock conditions. Serious injury can result. Damaged or leaking pipes must be replaced before the system is returned to service. Please contact Oilgear if you require assistance or have questions.

**⚠ WARNING**

All hydraulic pressure must be relieved from the hydraulic system prior to removing any components from the system. To relieve the hydraulic pressure from the hydraulic system, turn off the motor and operate the control panel with the key in the ON position. Failure to comply can result in serious injury. If you have any questions concerning relieving the hydraulic pressure from the system, please contact Oilgear.

### **WARNING**

Hydraulic components can be heavy. Use caution while lifting these components. Serious personal injury can be avoided with proper handling of the components.

### **WARNING**

Please contact Oilgear if you require assistance, when performing hydraulic test procedures, use the proper hydraulic gauges. Installing an incorrect test gauge could result in serious injury if the gauge fails. Use properly rated hydraulic hoses to allow the test gauge to be read away from moving parts and functions.

### **WARNING**

Increasing hydraulic pressure beyond the recommendations may result in serious damage to the pump and system or serious personal injury and may void the Oilgear Warranty. If you have questions concerning hydraulic pressures or testing procedures, please contact Oilgear before attempting the test procedures or making adjustments.

### **WARNING**

An Oilgear pump must not be modified in any way without authorization from Oilgear. Modifications may not comply with safety standards, including ANSI safety standards, and may result in serious personal injury. Please contact Oilgear if you require assistance.

### **WARNING**

DO NOT enter under hydraulic supported equipment unless they are fully supported or blocked. Failure to follow this procedure can result in serious injury or death.

### **WARNING**

Any Oilgear pump safety decals must be replaced anytime they are damaged, missing, or cannot be read clearly. Failure to have proper decals in place can result in serious injury or death. (If you require safety decals, please contact Oilgear for replacement safety decals, at no charge.)

### **WARNING**

Be sure everyone is clear of the area around the hydraulic system before operating after servicing. Remain attentive at all times when operating to check your work until you are completely sure it is safe to return to service. Failure to heed this warning may result in serious personal injury or death.

### **WARNING**

Wear the proper protective clothing when operating, servicing or maintaining the hydraulic system or the Oilgear pump. Wear the correct protective gear, safety glasses, gloves, and safety shoes. Serious injury can result without proper protective gear.

### **WARNING**

Make sure to keep hands and feet and other parts of your body clear of revolving or moving parts. Failure to comply can cause serious injury.

### **WARNING**

DO NOT wear watches, rings, or jewelry while working with electrical and mechanical equipment. These items can be hazardous and can cause serious and painful injuries if they come into contact with electrical wires, moving parts, or hydraulic equipment.

## PREPARATION AND INSTALLATION

### MOUNTING

Pump Without Reservoir - The pump can be mounted in any position. But, the recommended mounting position is with the drive shaft on a horizontal plane and the case drain port 1 on the top side. Secure the pump to a rigid mounting surface. Refer to the referenced Oilgear Piping Information Bulletin 90011.

Pump With Reservoir - These pumps are usually fully piped and equipped. It may be necessary to connect to a super-charge circuit when used. Mount reservoir on level foundation with the reservoir bottom at least six inches above floor level to facilitate fluid changes.

### PIPING AND FITTINGS

Refer to the referenced Oilgear Piping Information Bulletin 90011 and individual circuit diagram before connecting the pump to the system. Inlet velocity must not exceed 5 fps (1,5 mps). Inlet should be unrestricted and have a minimum of fittings.

#### NOTE

*DO NOT use an inlet strainer.*

Arrange line from "case drain" so the case remains full of fluid (non-siphoning). Case pressure must be less than 25 psi (1,7 bar). For higher case pressures and the special shaft seals required, contact our Customer Service. Each drain line must be a separate line, unrestricted, full sized and connected directly to the reservoir below the lowest fluid level. Make provisions for opening this line without draining (siphoning) reservoir.

### WARNING

Running the pump in NEUTRAL position (zero delivery) for extended periods without a supercharge circuit can damage the pump. The system and pump must be protected against overloads by separate high pressure relief valves. Install bleed valve(s) at the highest point(s) in system.

### POWER

Power is required in proportion to volume and pressure used. Motor size recommendations for specific applications can be obtained from The Oilgear Company. Standard low starting torque motors are suitable for most applications.

### CAUTION

**DO NOT start or stop unit under load unless system is approved by Oilgear. It may be necessary to provide delivery bypass in some circuits.**

### DRIVE

Verify rotation direction plate on the pump's housing. Clockwise pumps must be driven clockwise and counterclockwise pumps must be driven counterclockwise. Use direct drive coupling. Size and install coupling per manufacturer's instructions.

### CAUTION

**DO NOT drive the coupling onto the pump drive shaft. If it is too tight, it may be necessary to heat coupling for installation. Refer to manufacturer's instructions.**

Misalignment of pump shaft to driver's shaft should not exceed 0.005 inches (0,13 mm) Total Indicator Readout (TIR) in any plane.

## FILTRATION

Keep the fluid clean at all times to ensure long life from your hydraulic system. Refer to the referenced Oilgear Filtration Recommendations bulletin 90007 and Oilgear Contamination Evaluation Guide Bulletin 90004. Oilgear recommends use of a filter in the pressure or return line. Replace filter element(s) when the filter condition indicator reaches change area at normal fluid temperature. Drain and thoroughly clean filter case. Use replacement element(s) of same beta 10 ratio (normally a ratio of 4 with hydraulic oils).

## FLUID COOLING

When the pump is operated continuously at the rated pressure or frequently at peak load, auxiliary cooling of the fluid may be necessary. Fluid temperature should not exceed limits specified in the referenced Oilgear Fluid Recommendations Bulletin 90000.

## AIR BREATHER

On most installations, an air breather is mounted on top of fluid reservoir. It is important for the breather to be the adequate size to allow air flow in and out of reservoir as fluid level changes. Keep the breather case filled to the "fluid level" mark. About once every six months, remove cover, wash screen in solvent and allow screen to dry, clean and refill case to level mark and install screen. Refer to the manufacturer's recommendations.

## FLUID, FILLING AND STARTING RECOMMENDATIONS

Refer to instruction plate on the unit, reservoir, machine and/or reference, Fluid Recommendations bulletin. Fire resistant fluids and phosphate ester fluids can be used in accordance with fluid manufacturer's recommendations.

1. Pump all fluid into reservoir through a clean (beta 10 ratio of 4 or more) filter. Fill reservoir to, but not above, "high level" mark on the sight gauge.
2. **Remove case drain line and fill pump case with hydraulic fluid.**
3. Turn drive shaft a few times by hand with a spanner wrench to make sure parts rotate.

Unit	048/065/075/100/130
Approximate Torque to turn drive shaft	9-24 ft•lb (12-32 N•m)

**Table 1. Torque to Turn Shaft**

With pump under "no load" or with pump control at NEUTRAL:

4. Turn drive unit ON and OFF several times before allowing pump to reach full speed. The system can usually be filled by running the pump and operating the control.
5. The fluid level in the reservoir should decrease. Stop the pump. **DO NOT** allow the fluid level to go beyond the "low level." If the level reaches "low level" mark, add fluid and repeat step.

**NOTE** *With differential (cylinder) systems, the fluid must not be above "high level" when the ram is retracted or below "low level" when extended. Bleed air from the system by loosening connections or opening petcocks at the highest point in the system. Close connections or petcocks tightly when solid stream of fluid appears.*

## CONSTRUCTION

See **Figures 2, 8 and 9.**

1. A drive shaft **(301)** runs through the center line of pump housing **(001)** and valve plate **(401)** with the pump cylinder barrel **(101)** splined to it.
2. A bearing **(306)** supports the outboard end of the drive shaft and a bushing supports the inboard end. (The bushing is part of valve plate assembly.)
3. The pump cylinder barrel is carried in a polymerous (journal type) cylinder bearing **(202)**.
4. The valve plate **(401)** has two crescent shaped ports.
5. The pumping piston/shoe assemblies **(102)** in the cylinder barrel are held against a swashblock **(201)** by a shoe retainer **(104)**.

6. The shoe retainer is held in position by the fulcrum ball **(103)** which is forced outward by the shoe retainer spring **(105)**.
7. The spring acts against the pump cylinder barrel, forcing it against the valve plate while also forcing the piston shoes against the swashblock.
8. The semi-cylindrical shaped swashblock limits the piston stroke and can be swiveled in arc shaped saddle bearings **(204)**.
9. The swashblock is swiveled by a control (included in referenced material). Refer to **PRINCIPLE OF OPERATION.**

## SPECIFICATIONS

### NOTE

Refer to reference material, pump control material and individual application circuit for exceptions.

Unit	THEORETICAL MAXIMUM DISPLACEMENT		RATED CONTINUOUS PRESSURE		MAXIMUM PRESSURE		FLOW RATE at 1800 rpm rated continuous pressure and 14,7 psia (bar abs) inlet condition		MAXIMUM SPEED	POWER INPUT at rated continuous pressure & 1800 rpm	
	in 3/rev	ml/rev	psi	bar	psi	bar	gpm	l/mi	rpm	hp	kw
PVG 048	2.93	48,0	5000	344,8	5800	400,0	21.1	79,9	2700	73	54,5
PVG 065	3.98	65,0	5000	344,8	5800	400,0	28.8	108,9	2700	100	74,6
PVG 075	4.60	75,4	3750	258,6	4250	293,1	33.3	126,0	2700	89	66,4
PVG 100	6.00	98,3	5000	344,8	5800	400,0	42.4	160,5	2400	150	111,9
PVG 130	7.94	130,2	3750	258,6	4250	293,1	57.6	218,0	2400	150	111,9

Case pressure should be less than 25 psi (1,7 bar). For higher pressure, consult factory.  
Higher speeds available - consult factory.

**Table 2. Nominal Performance Data with 150--300 SSU viscosity fluids.**

Unit	Length		Width		Height		Weight		Face Mounting
	inches	mm	inches	mm	inches	mm	lbs.	kg	
PVG 048, 065, 075	12.0	303,0	6.9	174,5	6.3	160,4	68*	31	SAE "B" 2 and 4 bolt
PVG 100, 130	13.0	330,5	8.4	212,9	7.3	185,7	110*	50	SAE "C" 2 bolt

All dimensions (without controls) are approximate. For detailed dimensions, contact your Oilgear Representative.

\* Weight with P Control and rear port valve plate

**Table 3. Nominal Dimensions and Weights without controls.**

Refer to installation drawings for more detailed dimensions and port configurations.

## TROUBLESHOOTING

PROBLEM	CAUSES	REMEDY
<b>Unresponsive or Sluggish Control</b>	Low control input (pilot) pressure for "R" and "V" volume type controls only.	Refer to referenced control instruction material.
	Swashblock saddle bearings <b>(204)</b> worn or damaged.	Inspect bearings. Replace.
<b>Insufficient Pump Volume</b>	Delivery limited by faulty control	Refer to appropriate control instruction material.
	Obstructed suction circuit or insufficient supercharge volume.	Inspect for obstruction and verify supercharge.
	Insufficient drive motor speed.	Refer to appropriate power material.
	Worn or grooved cylinder barrel <b>(101)</b> and/or valve plate <b>(401)</b> mating surfaces.	Inspect components. Replace.
	Worn piston/shoe assemblies <b>(102)</b> or piston bores in cylinder <b>(101)</b> .	
Worn or damaged piston shoe or swashblock <b>(201)</b> .		
<b>Irregular or Unsteady Operation</b>	Faulty control.	Inspect components. Replace.
	Fluid level in reservoir is low or supercharge is insufficient.	Verify fluid level and/or supercharge.
	Air entering hydraulic system.	Inspect system for leak.
	Worn axial piston pump.	Inspect components. Replace.
	Faulty output circuit components (cylinder, motors, valves or other related components).	Inspect components. Replace.
<b>Loss of Pressure</b>	Worn piston pump.	Inspect components. Replace.
	Worn or grooved cylinder barrel <b>(101)</b> and/or valve plate <b>(401)</b> mating surfaces.	
	Worn piston/shoe assemblies <b>(102)</b> or piston bores in cylinder.	
	Faulty output circuit components.	
<b>Excessive or High Peak Pressure</b>	Faulty output circuit components.	Check the relief valves.
<b>Excessive Noise</b>	Pump stopped or started incorrectly under load.	Verify operation procedure of pump.
	Low fluid level in reservoir or insufficient supercharge causing cavitation.	Verify fluid level and/or supercharge.
	Air entering hydraulic system.	Inspect system for leak.
	Fluid too cold or viscosity too high.	Verify fluid temperature and/or type.
	Suction line problem i.e.; obstructions in line, line too long, line diameter too small or too many bends and/or loops in line.	Inspect line and for obstruction.
	Broken or worn piston/shoe assembly <b>(102)</b> .	Inspect components. Replace.
	Pump rotating in wrong direction.	Inspect operation direction of pump.
<b>Excessive Heating</b>	Operating pump above rated or peak pressure.	Verify pump limitations.
	Low fluid level in reservoir or insufficient supercharge.	Verify fluid level and/or supercharge.
	Air entering hydraulic system.	Inspect system for leak.
	Worn piston pump.	Inspect components. Replace.
	Worn or grooved cylinder barrel <b>(101)</b> and/or valve plate <b>(401)</b> mating surfaces.	
	Faulty output circuit components (continuous blowing relief valves or "slip" through valves, cylinder or other components).	
	Insufficient cooling provision or clogged coolers.	Inspect for obstruction.

## PRINCIPLE OF OPERATION

The illustrations show the pump driven clockwise (right hand) from the top (plan) view.

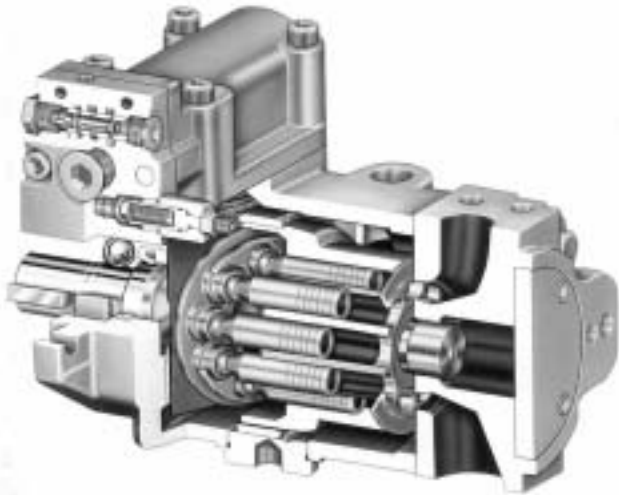


Figure 2. Cut-a-way of a Typical "PVG" Pump (92011R)

### Position B, Pump During Full Delivery FROM PORT B - Figure 3

Rotating the drive shaft (301) clockwise turns the splined cylinder, which contains the pumping pistons (102). When the cylinder rotates, the pistons move in and out within their bores as the shoes ride against the angled (C) swashblock (201).

As the cylinder rotates, the individual piston bores are connected, alternately, to the crescent shaped upper (port A) and lower (port B) in the valve plate. While connected to the upper side (suction) port A, each piston moves outward **OUT**, drawing fluid from port A into the piston bore until its outermost stroke (D) is reached. At this point, the piston bore passes from the upper crescent port A to the lower crescent port B.

While rotating across the lower crescent, each piston moves across the angled swashblock face and then each piston is forced inward **IN**. Each piston then displaces fluid through the lower crescent to port B until its innermost stroke (D) is reached. At this point, the piston bore passes from the lower to the upper crescent again and the cycle is repeated.

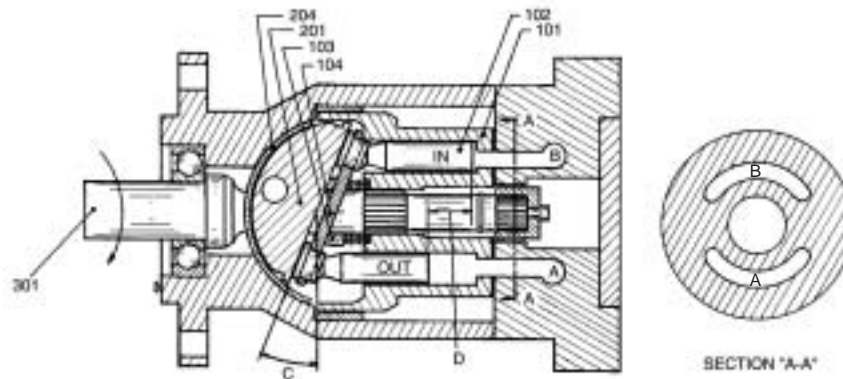


Figure 3. Position B, Pump During Full Delivery From Port B

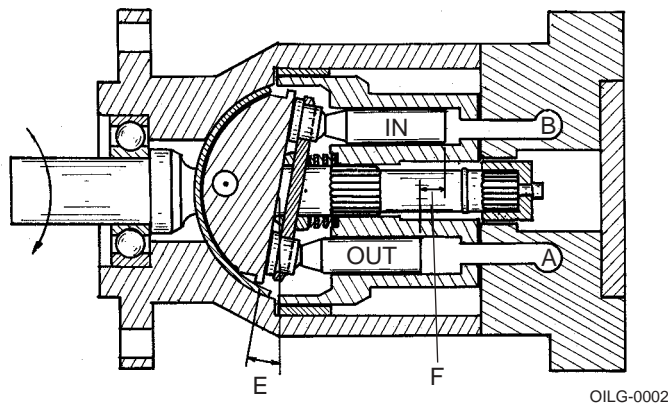
**Position B/2, Pump During One Half Delivery FROM PORT B - Figure 4**

This illustration shows that the angle (E) of the swashblock determines the length of the piston stroke (F), (the difference between outermost and innermost position) which determines the amount of delivery from the pump. In this case, the stroke angle (E) is one-half of the stroke, which means the piston stroke is one-half and the pump delivery is one-half.

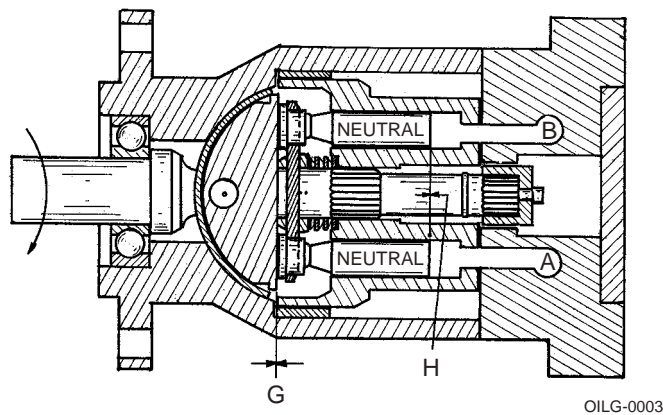
**Position N, Pump In Neutral, No Stroke, No Delivery - Figure 5**

Neutral position results when the control centers the swashblock. The swashblock angle (G) is now zero and swashblock face is parallel to the cylinder face. There is no inward or outward motion of the pump pistons as piston shoes rotate around the swashblock face. With no inward and outward motion or no stroke (H), **NEUTRAL** no fluid is being displaced from the piston bores to the crescents in the valve plate and there is no delivery from pump ports.

**NOTE** Illustration reference numbers match the part item number in the parts list.



**Figure 4. Position B/2, Pump During One Half Delivery From Port B**



**Figure 5. Position N, Pump In Neutral, No Stroke, No Delivery**

Refer to **SPECIFICATIONS**

## TESTING AND ADJUSTING

### **WARNING**

Shut the pump OFF and release pressure from the system before disassembling components. Failure to comply with these instructions could result in personal injury or death. Blocking the pressure line between the pump and the system (or pump) high pressure relief valve will result in damage and could result in serious personal injury.

### PISTON PUMP

To check for a worn piston pump, make a leak measurement test from the case drain while the pump is under pressure. After the unit is warm, either install a flow meter in the drain line or have the flow from the drain line directed into a large container or reservoir. The pump case must remain full of fluid during this test.

### **CAUTION**

**DO NOT** run a pump on stroke against a blocked output unless it is protected by a high pressure relief valve and then run no longer than necessary to check slip. Limit discharge to prevent dropping reservoir fluid below low level.

With an accurate high pressure gauge in the pressure line, start the pump and stall (or block) output device to raise system pressure to maximum (as set by system relief valve). Read the measurement on the flow meter or time and measure the case drain flow used to fill a known size container and calculate the flow rate in terms of cubic inches per minute (cipm). The leakage should conform to **Table 4**.

### **NOTE**

*Additional leakage indicates wear, but does not become critical until it impairs performance.*

## DISASSEMBLY

### **NOTE**

*The cleanliness of working on this pump or the hydraulic system is extremely important to the safety and reliability of the pump and the system.*

*When disassembling or assembling the pump, choose a clean, dry, dust and sand free area where no traces of abrasive particles are in the air which can damage the pump and system. DO NOT work near welding, sandblasting, grinding benches or similar conditions.*

*Always make sure the fittings are clean on the outside before removing them from their connections. Make sure they are capped and plugged when removed. Place them on a clean surface and in a clean rag or container until they are reinstalled. When cleaning parts which have been disassembled, it is important to use CLEAN cleaning solvents and parts are allowed to dry. All tools and gauges should be clean prior to working with the system and use new, CLEAN lint free rags to handle and dry parts.*

### **WARNING**

**DO NOT** attempt to remove or install any components or assembly while the pump and system is running. Always stop the pump, shut OFF the power and release pressure from the system before servicing or testing. Be sure provisions have been made so the case drain line can be disconnected from the unit without causing the line to drain (siphon) the reservoir.

(continued)

## DISASSEMBLY (Continued)

1. Disconnect case drain line from port **1** or **1A**.
2. Drain pump case through the remaining (port **1** or **1A**) on the bottom of case. If plugs are inaccessible, it may be necessary to remove the pump from the mounting and drive motor before draining it.
3. After removing the pump from the mounting and before disassembly, cap or plug all ports and clean the outside of unit thoroughly to prevent dust from entering the system. See **Figures 9 and 10**.

### NOTE

*Depending on what part or parts are to be inspected, it may not be necessary to completely take apart all assemblies.*

## CONTROL GROUP

Refer to the reference material for the information which applies to the control your pump is equipped with. Some force is required to remove the control housing.

1. Remove socket head cap screws.
2. Lift the control group assembly, with control pin, straight up from the top of the pump assembly. The control pin may or may not remain in the swashblock **(201)**.
3. Remove control gasket and O-rings from the pump housing.

## VALVE PLATE GROUP

If another pump is coupled to thru-shaft pumps, it will be necessary to remove coupling half before removing valve plate.

1. Block the pump on a bench with the drive shaft facing down.
2. Remove the valve plate **(401)** by removing four hex head cap screws **(403)** and lifting it straight up.
3. Remove valve plate gasket **(411)** and O-ring **(404)**.

Unit - Size		Case Slip at Full Stroke and Indicated Pressure						
		500 psi	1000 psi	2000 psi	3000 psi	3750 psi	4000 psi	5000 psi
048, 065, 075	cipm	130	195	455	760	1070	N/A	N/A
	lpm	2,1	3,2	7,5	12,5	17,5	N/A	N/A
100	cipm	190	250	400	600		900	1200
	lpm	3,1	4,1	6,5	9,8		14,7	19,7
130	cipm	300	400	600	1000	1400	N/A	N/A
	lpm	4,9	6,6	9,8	16,4	22,9	N/A	N/A

**Table 4. NOMINAL CASE SLIP versus High Pressure at 1800 rpm  
(Viscosities of 90-110 SSU)**

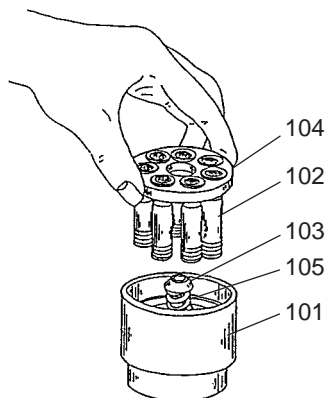
## ROTATING GROUP

### WARNING

The rotating group is heavy. Be careful not to damage cylinder wear surface which mates against the valve plate, bearing diameters or piston shoes. Use proper lifting techniques and assistance from others to prevent personal injury.

On thru-shaft pumps, the tailshaft bushing assembly (307, 308, 309) or a coupling will have to be removed (a “jacking” screw can be used) before the rotating group can be disassembled.

1. Place the pump in a horizontal position.
2. Remove the rotating group by turning shaft (301) slowly, while pulling the cylinder barrel (101) from the housing.
3. Identify (number) each pump piston shoe assembly (102) and its respective bore in the cylinder barrel (101) and shoe retainer (104) for easy reassembly.
4. See Figure 6. Lift out shoe retainer (104) with pistons (102) and remove the fulcrum ball (103) and shoe retainer spring (105).



OILG-0004

Figure 6. Rotating Group Disassembly (5V-12015-L).

5. Remove retaining ring (208) and pull the hydrodynamic bearing (202) and roll pins, if necessary, (205) from the housing. Note the position of roll pin (205) inside of case.

## DRIVE SHAFT GROUP

1. Remove the drive key (303), if used and the drive shaft bearing retainer ring (305).
2. Grasp outboard end of drive shaft (301) and pull it out of the pump housing.
3. Remove the shaft seal retainer (302) and shaft seal (007) from the housing only if necessary.

## SWASHBLOCK GROUP

On 100/130 remove guide plate (203) and (206) first. Reach inside the case and remove the swashblock (201) and saddle bearings (204).

## INSPECTION

Clean all parts thoroughly and allow them to dry. Inspect all seals and O-rings for hardening, cracking or deterioration. Replace if necessary or if you suspect damage. Check all locating pins for damage and springs for cracking or signs of cracking or signs of wear.

### WARNING

Wear proper protective gear when using solvents or compressed air, servicing or maintaining the hydraulic system or the Oilgear pump. Wear correct protective gear, safety glasses, gloves, and safety shoes. Serious injury can result without proper protective gear.

## CONTROL GROUP

Refer to the reference material on pump controls. Be sure to carefully check the control pin for cracks and/or signs of fatigue. Check fit of the pin in the swashblock. It should be a slip-fit without side-play. Replace if necessary or if you suspect damage.

## VALVE PLATE GROUP

Inspect the valveplate (401) surface which mates with the cylinder barrel (101) for excessive wear or scoring. Remove minor defects by lightly stoning the surface with a hard stone which is flat to within 0.001 inches (0,03 mm).

**NOTE** *Be sure to stone lightly. Any excessive stoning will remove the hardened surface. If wear or damage is extensive, replace the valve plate.*

## ROTATING GROUP

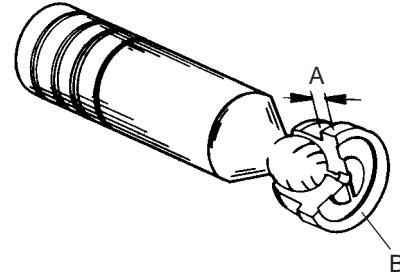
Inspect cylinder barrel (101) piston bores and the face which mate with the valve plate for wear and scoring. Remove minor defects on the face by lightly stoning or lapping the surface.

Inspect the cylinder bearing (202) for damage and replace if necessary. Check all piston and shoe assemblies (102) to be sure they ride properly on the swashblock.

**NOTE** *Be sure to stone lightly. Any excessive stoning will remove the hardened surface. If wear or damage is extensive and defects cannot be removed, replace the cylinder barrel.*

See **Figure 7**. Check each shoe face for nicks and scratches, and the shoe for smooth pivot action on the piston.

**NOTE** *If one or more piston/shoe assembly needs to be replaced, replace all the piston/shoe assemblies. When installing new piston/shoe assemblies or the rotating group, make sure the pistons move freely in their respective bores.*



OILG-0005

**Figure 7. Piston and Shoe Inspection (5V-12015-L)**

- (A) All shoes must be equal within 0.001 inches (0,025 mm) at this dimension.
- (B) All shoe faces must be free of nicks.

**NOTE** *End play should not to exceed 0.003 inches (0,076 mm) when new or 0.006 inches (0,152 mm) when worn.*

## SWASHBLOCK GROUP

Inspect the swashblock (201) for wear and scoring. If defects are minor, stone the swashblock lightly. If damage is extensive, replace the swashblock.

Check the small hole in the face of the swashblock. The hole provides “porting” for the hydrostatic balance fluid of the piston/shoe assembly to be channeled through the swashblock to the face of the saddle bearing, providing pressure lubrication.

Compare the saddle bearing (204) thickness in a worn area to thickness in an unworn area. Replace saddle bearings if the difference is greater than 0.015 inches (0,4 mm).

Check the mating surface of swashblock for cracks or excessive wear. The swashblock movement in the saddle bearings must be smooth. Replace if necessary.

**NOTE** *Be sure to stone lightly. Any excessive stoning will remove the hardened surface. If wear or damage is extensive and defects cannot be removed, replace if necessary or if you suspect them of being bad.*

## DRIVE SHAFT GROUP

Check:

- the shaft seal **(007)** for deterioration or cracks. Replace if necessary (press-out).
- the shaft bearing **(306)** for galling, pitting, binding or roughness.
- the rear shaft bushing in valve plate.
- the shaft and its splines for wear. Replace any parts necessary.

## ASSEMBLY

See **Figures 8, 9 and 10**. Follow the disassembly procedures in reverse for re-assembling the pump.

During assembly, install new gaskets, seals and O-rings. Apply a thin film of CLEAN grease or hydraulic fluid to sealing components to ease assembly. If a new rotating group is used, lubricate thoroughly with CLEAN hydraulic fluid. Apply fluid generously to all wear surfaces.

## SWASHBLOCK GROUP

If removed,

1. Press shaft seal **(007)** into front of pump housing.
2. Place housing on a bench with the mounting flange side down.
3. Press the two roll pins **(207)** (if they are replaced or removed) into the pump housing so the pins extend 0.050 to 0.065 inches (1,3 to 1,6 mm) from the case.
4. Grease the back side of each saddle bearing **(204)** and place on the pin to locate the bearings in the pump case. Make sure the pins do not protrude.
5. PVG 100 and 130, the swashblock is inserted from the valve plate end. PVG 048, 065 and 075, the swashblock is inserted through the control mounting face. Insert swashblock **(201)** into the pump housing. Once in place, be sure the swashblock swivels in the saddle bearings. With new bearings, swiveling may be stiff and not always smooth. PVG 110, 130; assemble **(203)** and **(206)**.

6. Make sure the roll pin **(205)** is inserted into the cylinder bearing **(202)**. Position the cylinder bearing so the pin is located nearest the control facing the outboard end of the drive shaft **(301)**. The bearing should be positioned with "scarf" cuts (PVG 130 only) positioned top and bottom and with the pin **(205)** located on top of internal cast boss. The bearing should fit into place with a little difficulty and be square to the axis of the pump.
7. Tap bearing into place if necessary using extreme care not to damage the bearing.
8. Insert retaining ring **(208)** to hold bearing in place.

## DRIVE SHAFT GROUP

1. Place the housing on its side with the axis horizontal.
2. Install the seal retainer **(302)**.
3. Lubricate the shaft seal **(007)** and shaft.
4. Insert the drive shaft **(301)** and bearing assembly into the housing.
5. Lock in place with the drive shaft bearing retainer ring **(305)**.

## ROTATING GROUP

See **Figure 6**.

1. Place the cylinder barrel **(101)**, wear surface down, on a clean cloth.
2. Place the shoe retainer spring **(105)** in the center of the barrel with the fulcrum ball **(103)** on top of it.
3. Insert the identified pistons **(102)** into their corresponding identified holes of the shoe retainer **(104)**. As a unit, fit the pistons into their corresponding, identified bores in the cylinder barrel. **DO NOT FORCE**. If everything is aligned properly, the pistons will fit smoothly.

## **WARNING**

The rotating group weight is heavy. Be careful not to damage cylinder wear surface which mates against the valve plate, bearing diameters or piston shoes. Use proper lifting techniques and assistance from others to prevent personal injury.

The rotating group can now be carefully installed over the tail of the drive shaft (301) and into the pump housing (001).

**NOTE** *When installing the rotating group, support the weight of the cylinder barrel (101), as cylinder spline is passed over the tailshaft, to avoid scratching or damage.*

4. Push cylinder forward until the cylinder spline reaches the drive shaft spline and rotate slightly to engage shaft splines. Continue to slide cylinder forward until it encounters the cylinder bearing (202). Lifting the tailshaft slightly helps the cylinder (101) and the cylinder bearing (202) engagement. Continue pushing the cylinder forward until the piston shoes contact the swashblock, the back of the cylinder should be located approximately 0.4 inches (10,2 mm) outside the back of the pump housing.

## **NOTE**

*On thru-shaft pumps without another pump or device connected to them, slide assembly onto the shaft (301) and secure cap assembly (307, 309) in with socket head shoulder screw (308).*

## **VALVE PLATE GROUP**

1. Place the pump housing on a bench with the open end facing up.
2. Install new O-ring (411) and gasket (407) on the housing.
3. Position the valve plate (401) on pins (005) and housing. Make sure the tail end of shaft engages the bushing.
4. Hand-tighten the hex head cap screw (403) closest to O-ring (404) first, then alternately tighten the other cap screws. On thru-shaft units connected to another pump or device, install coupling (half).

Refer to **PREPARATION and INSTALLATION** when pump is ready to be returned to service.

PVG Assembly Torques		
Item no.	Pump	
	048/065/075	100/130
002	100 ft-lb	100 ft-lb
004	37 ft-lb	37 ft-lb
206	N/A	87 in-lb
308	57 in-lb	57 in-lb
403	100 ft-lb	100 ft-lb
408	45 in-lb	45 in-lb
409	45 in-lb	45 in-lb
410	120 in-lb	120 in-lb
503 cover plate	28 ft-lb	28 ft-lb
503 SAE A or A-A adapt	15 ft-lb	15 ft-lb
503 SAE B adapter	37 ft-lb	37 ft-lb
503 SAE C adapter	N/A	74 ft-lb
507	28 ft-lb	28 ft-lb

## PARTS LIST

Parts used in these assemblies are per Oilgear specifications. Use only Oilgear parts to ensure compatibility with assembly requirements. When

ordering replacement parts, be sure to include pump type and serial number, bulletin number and item number. Specify type of hydraulic fluid to assure seal and packing compatibility.

Item	Qty.	Description
<b>HOUSING ASSEMBLY GROUP</b>		
001	1	Housing, Pump
003	1	Nameplate, Identification
004	1	Plug
005	4	Pin, Roll - 048, 065, 130
005	2	Pin, Roll - 100, 130
006	2	Pin, Roll - 100, 130
007	1	Seal, Shaft
008	2	Screw
010	1	Seal, O-ring
<b>ROTARY ASSEMBLY GROUP</b>		
101	1	Barrel, Cylinder
102	9	Assembly, Piston/Shoe
103	1	Ball, Fulcrum
104	1	Retainer, Shoe
105	1	Spring, Shoe Retainer
<b>SWASHBLOCK ASSEMBLY GROUP</b>		
201	1	Swashblock
202	1	Bearing, Cylinder
203	1	Guide Plate - 100, 130 only
204	2	Bearing, Saddle
205	1	Pin, Roll (2 for PVG 130)
206	2	Screw - 100, 130 only
207	2	Pin, Roll
208	1	Ring, Retainer

**PARTS LIST** drawings on pages 19, 20 and 30.

Parts are common between pumps. Only the differences are shown.

### O-ring Sizes ARP 568 Uniform Size number with Durometer

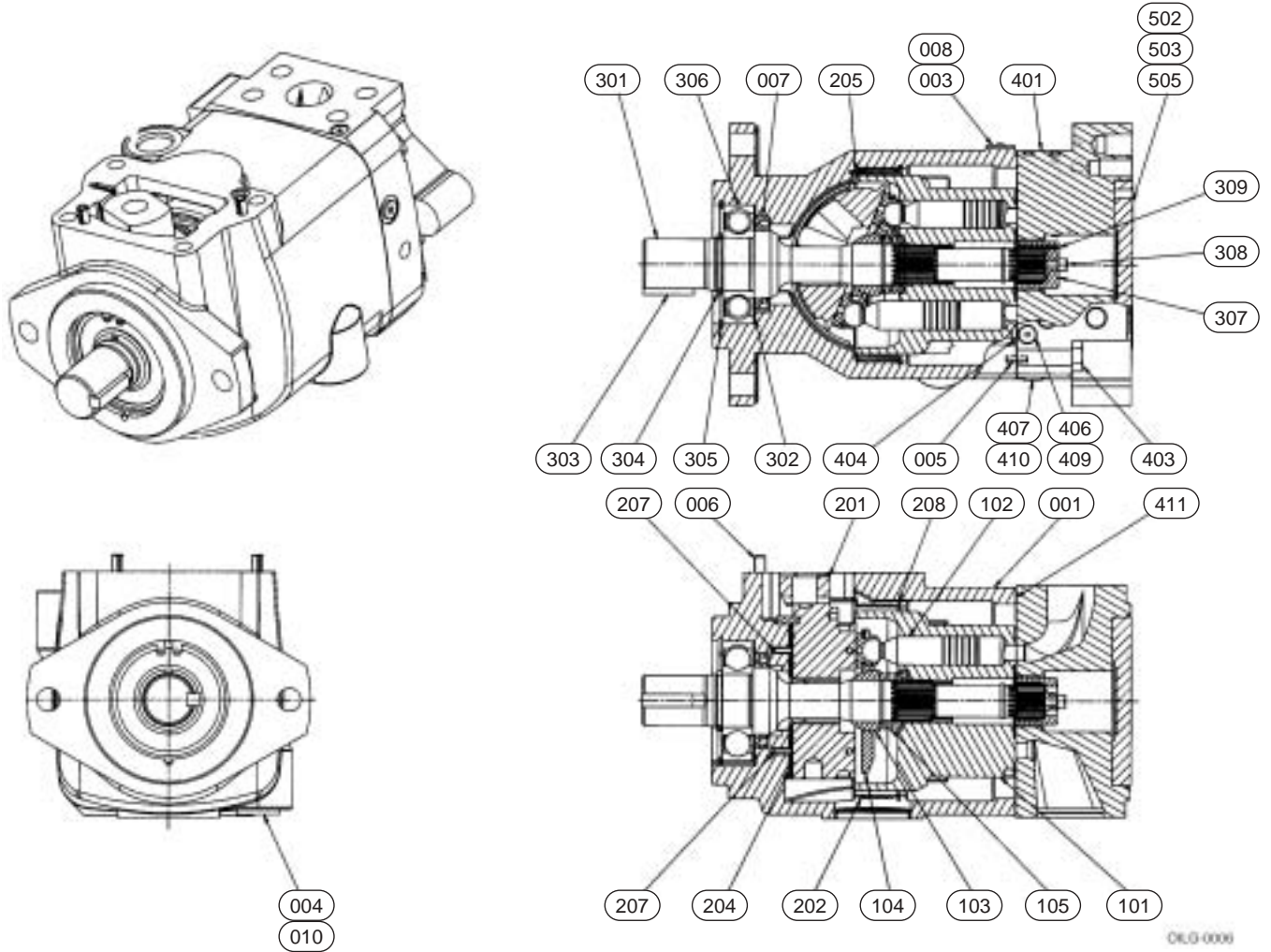
Item Number	Pump	
	048, 065, 075	100, 130
010	916 - 70	916 - 70
404	012 - 90	013 - 90
405	902 - 90	902 - 90
406	903 - 90	903 - 90
407	904 - 90	904 - 90
413	138 - 70	138 - 70

Item	Qty.	Description
<b>DRIVE SHAFT ASSEMBLY GROUP</b>		
301	1	Drive Shaft
302	1	Retainer, Seal Side
303	1	Key, Drive Shaft (keyed shafts only)
304	1	Ring, Retainer, External
305	1	Ring, Retainer, Internal
306	1	Bearing, Front
307	1	Bushing (used on thru-shaft w/ cover plate)
308	1	Screw (used on thru-shaft w/ cover plate)
309	1	Roll Pin (used on thru-shaft w/ cover plate)
<b>VALVE PLATE ASSEMBLY GROUP</b>		
401	1	Valve Plate w/bearing
403	4	Screw, Socket Head Cap (048, 065, 075)
403	4	Screw, Hex Head Cap (100, 130)
404	1	Seal, O-ring
405	1	Seal, O-ring
406	1	Seal, O-ring (not required for all versions)
407	1	Seal, O-ring
408	1	Plug, #2 HP
409	1	Plug, #3 HP (not required for all versions)
410	1	Plug, #4 HP
411	1	Gasket, Valve Plate

**PARTS LIST** drawings on pages 19, 20 and 30.

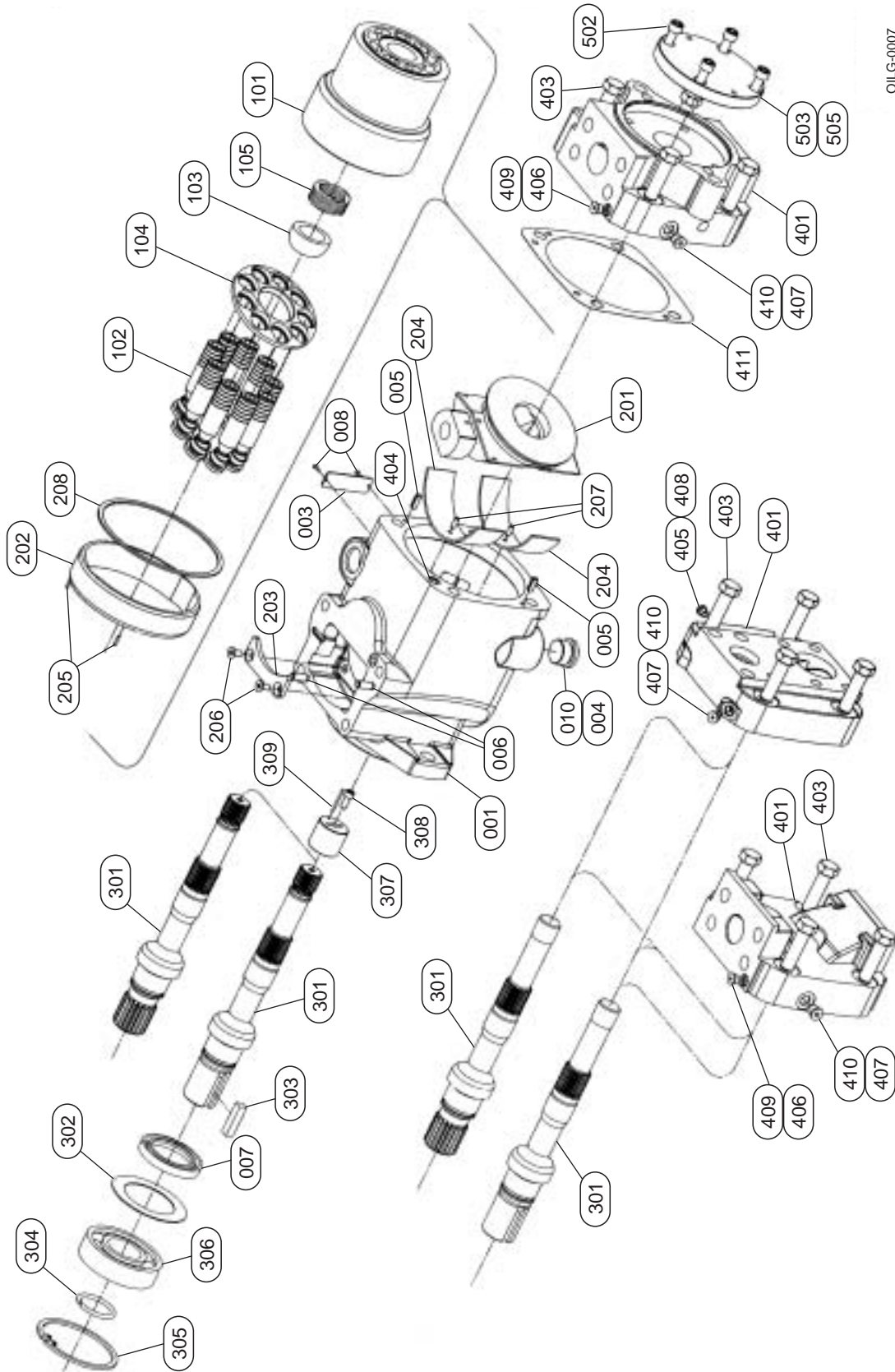
Parts are common between pumps. Only the differences are shown.

Parts used in this assembly are per Oilgear specifications. Use only Oilgear parts to ensure the compatibility with the assembly requirements. When ordering replacement parts, be sure to include pump type and serial number, bulletin number and item number. To assure seal and packing compatibility, specify type of hydraulic fluid.



**Figure 8. Cross section and plan view parts drawing, PVG 100/130 (516246 sheet 1 of 3).**

**NOTE** Pins shown out of position. Hydrobearing (202) to be assembled with scarf cuts positioned top and bottom with pins (205), which locate on top of internal cast boss (PVG 130 only).



OILG-0007

Figure 9. Exploded parts drawing, PVG 100/130 (516246 sheet 2 of 3).

# SERVICE KITS

## PVG B Pump Service Kits

SERVICE KIT Drawings on pages 30 and 31.

Document Number: 517105-SK

Revision: 0 (10-6-03)

Sheet 1 of 3

Description	Kit No.	Design Series	Items Included (quantity is 1 unless noted)
<b>Housing Kits</b>			
Viton Seals	L517105-604	All(A)	001,002,003,004,005(4),007,008(2),010,011,207(2)
Nitrile Seals	L517105-603	All(A)	
EPR Seals	L517105-602	All(A)	
<b>Shaft &amp; Bearing Kits</b>			
Viton or Nitrile seals			
1" Dia. Keyed (Code Y) Std	L517104-301	All	301B,302,303,304,305,306
13T, 16/32 Spline (Code K) Std	L517104-305	All	301C,302,304,305,306
15T, 16/32 Spline (Code S) Std	L517104-302	All	301A,302,304,305,306
1" Dia. Keyed (Code Y) T-S	L517104-303	All	301D,302,303,304,305,306
13T, 16/32 Spline (Code K) T-S	L517104-306	All	301E,302,304,305,306
15T, 16/32 Spline (Code S) T-S	L517104-304	All	301E,302,304,305,306
EPR Seals			
1" Dia. Keyed (Code Y) Std	L517104-313	All	301B,302,303,304,305,306
13T, 16/32 Spline (Code K) Std	L517104-315	All	301C,302,304,305,306
15T, 16/32 Spline (Code S) Std	L517104-317	All	301A,302,304,305,306
1" Dia. Keyed (Code Y) T-S	L517104-312	All	301D,302,303,304,305,306
13T, 16/32 Spline (Code K) T-S	L517104-314	All	301E,302,304,305,306
15T, 16/32 Spline (Code S) T-S	L517104-316	All	301E,302,304,305,306
<b>Swashblock</b>			
All	516597-050	B2(B)	201
<b>Saddle Bearing</b>			
Standard	L517105-220	All	204(2)
High Temp	L517105-221	All	
<b>Hydrodynamic Bearing Kit</b>			
All	L517105-210	All	202,205,208
<b>Rotating Group</b>			
PVG-048/065	L517104-103	B2(B)	101,102(9),103,104,105
PVG-075	L517105-103	B2(B)	
<b>Piston &amp; Shoe Sub-Assembly</b>			
PVG-048/065	K407905-R65	B2(B)	102(9)
PVG-075	K407905-A75	B2(B)	
<b>Shoe Retainer &amp; Fulcrum Ball</b>			
PVG-048/065	L319221-365	All	103,104
PVG-075	L319221-375	All	

**PVG B Pump Service Kits**

Reference: 517105 Ass'y Drwg

**Document Number: 517105-SK**

**Revision: 0 (10-6-03)**

**Sheet 2 of 3**

Description	Kit No.	Design Series	Items Included (quantity is 1 unless noted)
<b>Valve Plate Kits</b>			
PVG-048/065 Rear Port LH			
Viton Seals	L517104-401	All	401A,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L517104-411	All	
EPR Seals	L517104-408	All	
PVG-048/065 Rear Port RH			
Viton Seals	L517104-402	All	401B,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L517104-412	All	
EPR Seals	L517104-413	All	
PVG-048/065 Side Port LH			
Viton Seals	L517104-405	All	401C,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L517104-414	All	
EPR Seals	L517104-415	All	
PVG-048/065 Side Port RH			
Viton Seals	L517104-406	All	401D,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L517104-416	All	
EPR Seals	L517104-417	All	
PVG-048/065 Side Port, Thru-Shaft LH			
Viton Seals	L517104-403	All	401E,403(4),404,405(2),407(2),408(2),410(2),411
Nitrile Seals	L517104-418	All	
EPR Seals	L517104-410	All	
PVG-048/065 Side Port, Thru-Shaft RH			
Viton Seals	L517104-404	All	401F,403(4),404,405(2),406,407,408(2),409,410,411
Nitrile Seals	L517104-419	All	
EPR Seals	L517104-420	All	
PVG-075 Rear Port LH			
Viton Seals	L517105-401	All	401A,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L517105-417	All	
EPR Seals	L517105-410	All	
PVG-075 Rear Port RH			
Viton Seals	L517105-402	All	401B,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L517105-418	All	
EPR Seals	L517105-411	All	
PVG-075 Side Port LH			
Viton Seals	L517105-405	All	401C,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L517105-419	All	
EPR Seals	L517105-414	All	
PVG-075 Side Port RH			
Viton Seals	L517105-406	All	401D,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L517105-420	All	
EPR Seals	L517105-415	All	
PVG-075 Side Port, Thru-Shaft LH			
Viton Seals	L517105-403	All	401E,403(4),404,405(2),407(2),408(2),410(2),411
Nitrile Seals	L517105-409	All	
EPR Seals	L517105-412	All	
PVG-075 Side Port, Thru-Shaft RH			
Viton Seals	L517105-404	All	401F,403(4),404,405(2),406,407,408(2),409,410,411
Nitrile Seals	L517105-416	All	
EPR Seals	L517105-413	All	

**PVG B Pump Service Kits**

Reference: 517105 Ass'y Drwg

**Document Number: 517105-SK**

**Revision: 0 (10-6-03)**

**Sheet 3 of 3**

Description	Kit No.	Design Series	Items Included (quantity is 1 unless noted)
<b>Basic Seal Kit</b>			
Viton Seals	K517105-B11	All	007,010,011,404,405(2),406,407(2),411 Control 313,330,341(2)
Nitrile Seals	K517105-B12	All	
EPR Seals	K517105-B13	All	
<b>Seal Kits for Options</b>			
<b>Standard Cover Plate</b>			
Viton Seals	238270-138	All	505
Nitrile Seals	233370-138	All	
EPR Seals	242080-138	All	
<b>SAE B Adaptor</b>			
Viton Seals	L250667-017	All	505,506
Nitrile Seals	L250667-016	All	
EPR Seals	L250667-018	All	
<b>SAE A Adaptor</b>			
Viton Seals	L250667-014	All	505,506
Nitrile Seals	L250667-013	All	
EPR Seals	L250667-015	All	
<b>SAE A-A Adaptor</b>			
Viton Seals	L250667-019	All	505,508
Nitrile Seals	L250667-020	All	
EPR Seals	L250667-021	All	
<b>Shaft Seal</b>			
Viton Seals	51155-5	All	007
Nitrile Seals	51155-7	All	
EPR Seals	L51155-3RP	All	
<b>Cover Plate Kit</b>			
Viton Seals	L319076-101	All	307,308,309,502,503(4),505
Nitrile Seals	L319076-105	All	
EPR Seals	L319076-115	All	
<b>Rear Shaft Cover Kit</b>			
All	L319263	All	307,308,309
<b>SAE B Adaptor/Coupling Kit</b>			
Viton Seals	L319076-100	All	501,502,503(2),504(2),505,506
Nitrile Seals	L319076-107	All	
EPR Seals	L319076-108	All	
<b>SAE A Adaptor/Coupling Kit 9 tooth</b>			
Viton Seals	L319076-103	All	501,502,503(2),504(2),505,506,507(4)
Nitrile Seals	L319076-109	All	
EPR Seals	L319076-110	All	
<b>SAE A Adaptor/Coupling Kit 11 tooth</b>			
Viton Seals	L319076-106	All	501,502,503(2),504(2),505,506,507(4)
Nitrile Seals	L319076-111	All	
EPR Seals	L319076-112	All	
<b>SAE A-A Adaptor/Coupling Kit</b>			
Viton Seals	L319076-104	All	501,502,503(2),504(2),505,507(4),508
Nitrile Seals	L319076-113	All	
EPR Seals	L319076-114	All	
<b>Name Tag &amp; Screws</b>			
All	L50921	All	003,008(2)

Std = Rear ported or Side ported w/o thru-shaft, T-S = Side ported w/ thru-shaft

(A) Pump cases are interchangeable

A1 series has #12 SAE threaded case drain connection

B1 and B2 have #16 SAE threaded case drain connection

(B) Swashblock and Rotating group/piston and shoe assembly must have matching design series

B2 parts must all be same design series

A1, B1 parts can be intermixed between series

**PVG C Pump Service Kits**

**Document Number: 516246-SK**

**Revision: 0 (10-6-03)**

**Sheet 1 of 6**

Description	Kit No.	Design Series	Items Included (quantity is 1 unless noted)
<b>Housing Kits</b>			
USA			001,002,003,004,005(2),006(2),007,008(2),010,011,207(2)
Viton Seals	L516275-601	All(A)	
Nitrile Seals	L516275-603	All(A)	
EPR Seals	L516275-602	All(A)	
Metric			
Viton Seals	L516679-601	All(A)	
Nitrile Seals	L516679-602	All(A)	
EPR Seals	L516679-605	All(A)	
<b>Shaft &amp; Bearing Kits</b>			
Viton or Nitrile seals			
1.50" Dia. Keyed (Code Z) Short	L516175-301	All(B)	301D,302,303,304,305,306
1.50" Dia. Keyed (Code Y) Std	L516175-307	All(B)	301D,302,303,304,305,306
14T, 12/24 Spline (Code K) Std	L516175-305	All	301E,302,304,305,306
17T, 12/24 Spline (Code S) Std	L516175-302	All	301E,302,304,305,306
1.50" Dia. Keyed (Code Z) T-S Short	L516175-303	All(B)	301A,302,303,304,305,306
1.50" Dia. Keyed (Code Y) T-S	L516175-308	All(B)	301A,302,303,304,305,306
14T, 12/24 Spline (Code K) T-S	L516175-306	All	301B,302,304,305,306
17T, 12/24 Spline (Code S) T-S	L516175-304	All	301B,302,304,305,306
EPR Seals			
1.50" Dia. Keyed (Code Z) Short	L516175-328	All(B)	301D,302,303,304,305,306
1.50" Dia. Keyed (Code Y) Std	L516175-322	All(B)	301D,302,303,304,305,306
14T, 12/24 Spline (Code K) Std	L516175-324	All	301E,302,304,305,306
17T, 12/24 Spline (Code S) Std	L516175-326	All	301E,302,304,305,306
1.50" Dia. Keyed (Code Z) T-S Short	L516175-327	All(B)	301A,302,303,304,305,306
1.50" Dia. Keyed (Code Y) T-S	L516175-321	All(B)	301A,302,303,304,305,306
14T, 12/24 Spline (Code K) T-S	L516175-323	All	301B,302,304,305,306
17T, 12/24 Spline (Code S) T-S	L516175-325	All	301B,302,304,305,306
<b>Swashblock</b>			
All	515794	All	201
<b>Guide Plate Assembly</b>			
USA	L516175-225	All	203,206(2)
Metric	L516679-225	All	
<b>Saddle Bearing</b>			
Standard	L516175-220	All	204(2)
High Temp	L516175-221	All	
<b>Hydrodynamic Bearing Kit</b>			
PVG-100	L516175-210	All	202,205,208
PVG-130	L516275-210	All	
<b>Rotating Group</b>			
PVG-100	L516175-101	All	101,102(9),103,104,105
PVG-130	L516275-102	C2(C)	

**PVG C Pump Service Kits**

**Document Number: 516246-SK**

**Revision: 0 (10-6-03)**

**Sheet 2 of 6**

Description	Kit No.	Design Series	Items Included (quantity is 1 unless noted)
<b>Piston &amp; Shoe Sub-Assembly</b>			
PVG-100	K407812-800	All	102(9)
PVG-130	K407837-800	All	
<b>Shoe Retainer &amp; Fulcrum Ball</b>			
PVG-100	L318925-001	All	103,104
PVG-130	L318926	All	
<b>Valve Plate Kits</b>			
<b>USA</b>			
<b>PVG-100 Rear Port LH</b>			
Viton Seals	L516175-401	All	401D,403(4),404,405,407,408,410,411
Nitrile Seals	L516175-413	All	
EPR Seals	L516175-407	All	
<b>PVG-100 Rear Port RH</b>			
Viton Seals	L516175-402	All	401D,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L516175-414	All	
EPR Seals	L516175-408	All	
<b>PVG-100 Side Port LH</b>			
Viton Seals	L516175-405	All	401E,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L516175-417	All	
EPR Seals	L516175-411	All	
<b>PVG-100 Side Port RH</b>			
Viton Seals	L516175-406	All	401E,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L516175-418	All	
EPR Seals	L516175-412	All	
<b>PVG-100 Side Port, Thru-Shaft LH</b>			
Viton Seals	L516175-403	All	401A,403(4),404,405(2),406,407,408(2),409,410,411
Nitrile Seals	L516175-415	All	
EPR Seals	L516175-409	All	
<b>PVG-100 Side Port, Thru-Shaft RH</b>			
Viton Seals	L516175-404	All	401A,403(4),404,405(2),406,407,408(2),409,410,411
Nitrile Seals	L516175-416	All	
EPR Seals	L516175-410	All	
<b>PVG-130 Rear Port LH</b>			
Viton Seals	L516275-401	C2(C)	401D,403(4),404,405,407,408,410,411
Nitrile Seals	L516275-425	C2(C)	
EPR Seals	L516275-407	C2(C)	
<b>PVG-130 Rear Port RH</b>			
Viton Seals	L516275-402	C2(C)	401D+D161,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L516275-428	C2(C)	
EPR Seals	L516275-408	C2(C)	
<b>PVG-130 Side Port LH</b>			
Viton Seals	L516275-405	C2(C)	401E,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L516275-417	C2(C)	

**PVG C Pump Service Kits**

**Document Number: 516246-SK**

**Revision: 0 (10-6-03)**

**Sheet 3 of 6**

Description	Kit No.	Design Series	Items Included (quantity is 1 unless noted)
PVG-130 Side Port RH			
Viton Seals	L516275-424	C2(C)	401E,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L516275-418	C2(C)	
EPR Seals	L516275-412	C2(C)	
PVG-130 Side Port, Thru-Shaft LH			
Viton Seals	L516275-403	C2(C)	401A,403(4),404,405(2),406,407,408(2),409,410,411
Nitrile Seals	L516275-415	C2(C)	
EPR Seals	L516275-409	C2(C)	
PVG-130 Side Port, Thru-Shaft RH			401A,403(4),404,405(2),406,407,408(2),409,410,411
Viton Seals	L516275-404	C2(C)	
Nitrile Seals	L516275-416	C2(C)	
EPR Seals	L516275-410	C2(C)	
<b>Metric</b>			
PVG-100 Rear Port LH			
Viton Seals	L516678-401	All	401D,403(4),404,405,407,408,410,411
Nitrile Seals	L516678-407	All	
EPR Seals	L516678-408	All	
PVG-100 Rear Port RH			
Viton Seals	L516678-402	All	401D,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L516678-409	All	
EPR Seals	L516678-410	All	
PVG-100 Side Port LH			
Viton Seals	L516678-405	All	401E,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L516678-411	All	
EPR Seals	L516678-412	All	
PVG-100 Side Port RH			
Viton Seals	L516678-406	All	401E,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L516678-413	All	
EPR Seals	L516678-414	All	
PVG-100 Side Port, Thru-Shaft LH			
Viton Seals	L516678-403	All	401A,403(4),404,405(2),406,407,408(2),409,410,411
Nitrile Seals	L516678-415	All	
EPR Seals	L516678-416	All	
PVG-100 Side Port, Thru-Shaft RH			
Viton Seals	L516678-404	All	401A,403(4),404,405(2),406,407,408(2),409,410,411
Nitrile Seals	L516678-417	All	
EPR Seals	L516678-418	All	
PVG-130 Rear Port LH			
Viton Seals	L516679-425	C2(C)	401D,403(4),404,405,407,408,410,411
Nitrile Seals	L516679-427	C2(C)	
EPR Seals	L516679-429	C2(C)	
PVG-130 Rear Port RH			
Viton Seals	L516679-420	C2(C)	401D+D161,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L516679-414	C2(C)	
EPR Seals	L516679-430	C2(C)	
PVG-130 Side Port LH			
Viton Seals	L516679-407	C2(C)	401E,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L516679-419	C2(C)	
EPR Seals	L516679-431	C2(C)	

**PVG C Pump Service Kits**

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**Sheet 4 of 6**

Description	Kit No.	Design Series	Items Included (quantity is 1 unless noted)
PVG-130 Side Port RH			
Viton Seals	L516679-428	C2(C)	401E,403(4),404,405,406,407,408,409,410,411
Nitrile Seals	L516679-432	C2(C)	
EPR Seals	L516679-433	C2(C)	
PVG-130 Side Port, Thru-Shaft LH			
Viton Seals	L516679-421	C2(C)	401A,403(4),404,405(2),406,407,408(2),409,410,411
Nitrile Seals	L516679-434	C2(C)	
EPR Seals	L516679-435	C2(C)	
PVG-130 Side Port, Thru-Shaft RH			
Viton Seals	L516679-404	C2(C)	401A,403(4),404,405(2),406,407,408(2),409,410,411
Nitrile Seals	L516679-436	C2(C)	
EPR Seals	L516679-437	C2(C)	
<b>Basic Seal Kit</b>			
USA			007,010,011,404,405(2),406,407(2),411 Control 330,313
Viton Seals	K516175-C11	All	
Nitrile Seals	K516175-C12	All	
EPR Seals	K516175-C13	All	
Metric			
Viton Seals	K516678-C11	All	
Nitrile Seals	K516678-C12	All	
EPR Seals	K516678-C13	All	
<b>Seal Kits for Options</b>			
Standard Cover Plate			505
Viton Seals	238270-138	All	
Nitrile Seals	233370-138	All	
EPR Seals	242080-138	All	
SAE C Adaptor			505
Viton Seals	238270-049	All	
Nitrile Seals	233370-049	All	
EPR Seals	242080-049	All	
SAE B Adaptor			505,506
Viton Seals	L250667-017	All	
Nitrile Seals	L250667-016	All	
EPR Seals	L250667-018	All	
SAE A Adaptor			505,506
Viton Seals	L250667-014	All	
Nitrile Seals	L250667-013	All	
EPR Seals	L250667-015	All	
SAE A-A Adaptor			505,508
Viton Seals	L250667-019	All	
Nitrile Seals	L250667-020	All	
EPR Seals	L250667-021	All	
<b>Shaft Seal</b>			
Viton Seals	51156-5	All	007
Nitrile Seals	51156-7	All	
EPR Seals	L51156-3RP	All	

**PVG C Pump Service Kits**

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**Sheet 5 of 6**

Description	Kit No.	Design Series	Items Included (quantity is 1 unless noted)
<b>Cover Plate Kit</b>			
USA			
Viton Seals	L319076-001	All	307,308,309,502,503(4),505
Nitrile Seals	L319076-013	All	
EPR Seals	L319076-301	All	
Metric			
Viton Seals	L319076-M01	All	
Nitrile Seals	L319076-M07	All	
EPR Seals	L319076-M08	All	
<b>Rear Shaft Cover Kit</b>			
All	L319066-006	All	307,308,309
<b>SAE C Adaptor/Coupling Kit</b>			
USA			
Viton Seals	L319076	All	501,503(2),504(2),505
Nitrile Seals	L319076-008	All	
EPR Seals	L319076-300	All	
Metric			
Viton Seals	L319076-M00	All	
Nitrile Seals	L319076-M09	All	
EPR Seals	L319076-M10	All	
<b>SAE B-B Adaptor/Coupling Kit</b>			
USA			
Viton Seals	L319076-005	All	501,502,503(2),504(2),505,506
Nitrile Seals	L319076-012	All	
EPR Seals	L319076-014	All	
Metric			
Viton Seals	L319076-M05	All	
Nitrile Seals	L319076-M11	All	
EPR Seals	L319076-M12	All	
<b>SAE B Adaptor/Coupling Kit</b>			
USA			
Viton Seals	L319076-002	All	501,502,503(2),504(2),505,506
Nitrile Seals	L319076-007	All	
EPR Seals	L319076-302	All	
Metric			
Viton Seals	L319076-M02	All	
Nitrile Seals	L319076-M13	All	
EPR Seals	L319076-M14	All	
<b>SAE A Adaptor/Coupling Kit 9 tooth</b>			
USA			
Viton Seals	L319076-003	All	501,502,503(2),504(2),505,506,507(4)
Nitrile Seals	L319076-011	All	
EPR Seals	L319076-303	All	
Metric			
Viton Seals	L319076-M03	All	
Nitrile Seals	L319076-M15	All	
EPR Seals	L319076-M16	All	

**PVG C Pump Service Kits**

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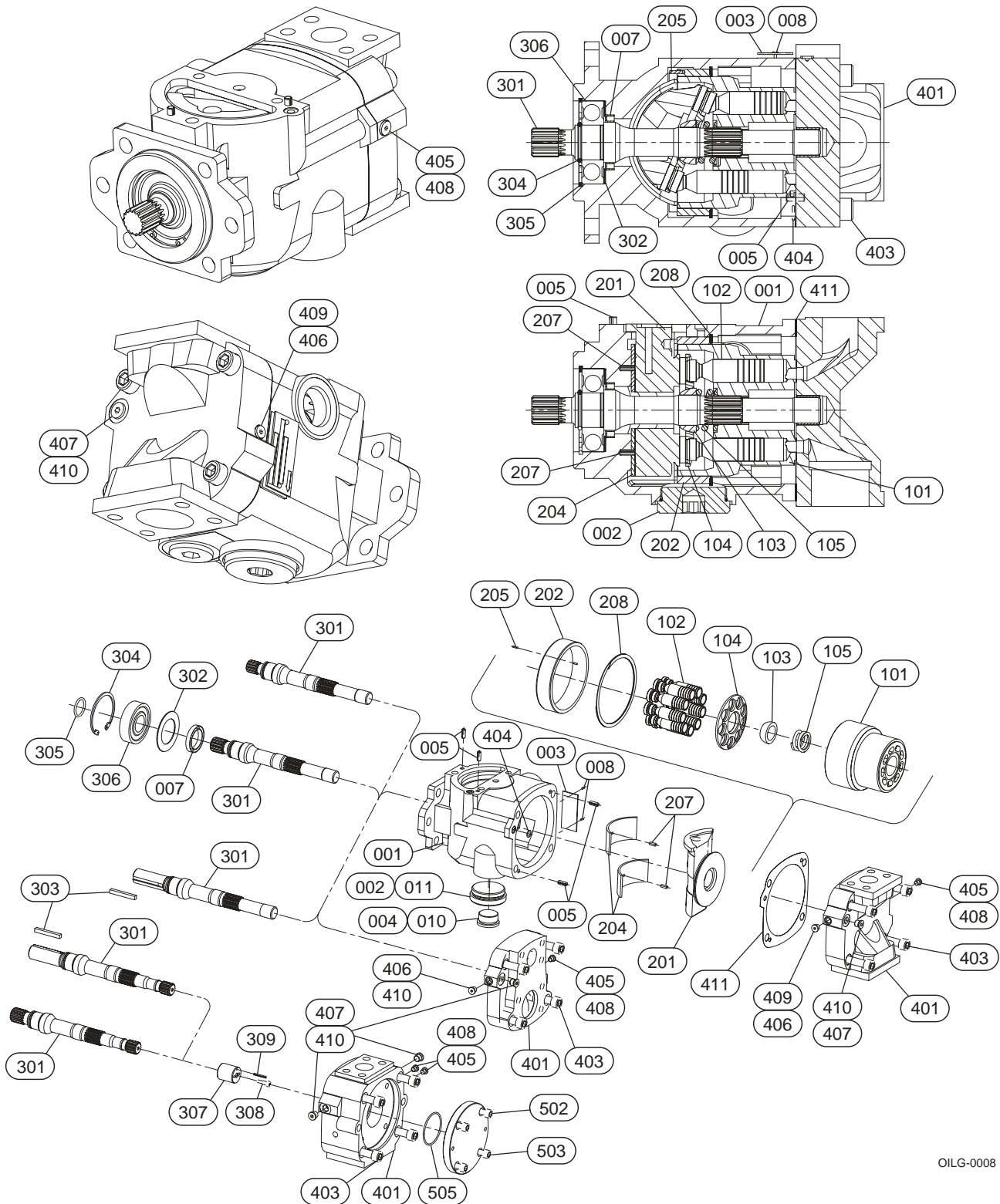
**Revision: 0 (10-6-03)**

**Sheet 6 of 6**

Description	Kit No.	Design Series	Items Included (quantity is 1 unless noted)
<b>SAE A Adaptor/Coupling Kit 11 tooth</b>			
USA			501,502,503(2),504(2),505,506,507(4)
Viton Seals	L319076-006	All	
Nitrile Seals	L319076-015	All	
EPR Seals	L319076-016	All	
Metric			
Viton Seals	L319076-M06	All	
Nitrile Seals	L319076-M17	All	
EPR Seals	L319076-M18	All	
<b>SAE A-A Adaptor/Coupling Kit</b>			
USA			501,502,503(2),504(2),505,507(4),508
Viton Seals	L319076-004	All	
Nitrile Seals	L319076-017	All	
EPR Seals	L319076-018	All	
Metric			
Viton Seals	L319076-M04	All	
Nitrile Seals	L319076-M19	All	
EPR Seals	L319076-M20	All	
<b>Name Tag &amp; Screws</b>			
All	L50921	All	003,008(2)

Std = Rear ported or Side ported w/o thru-shaft, T-S = Side ported w/ thru-shaft

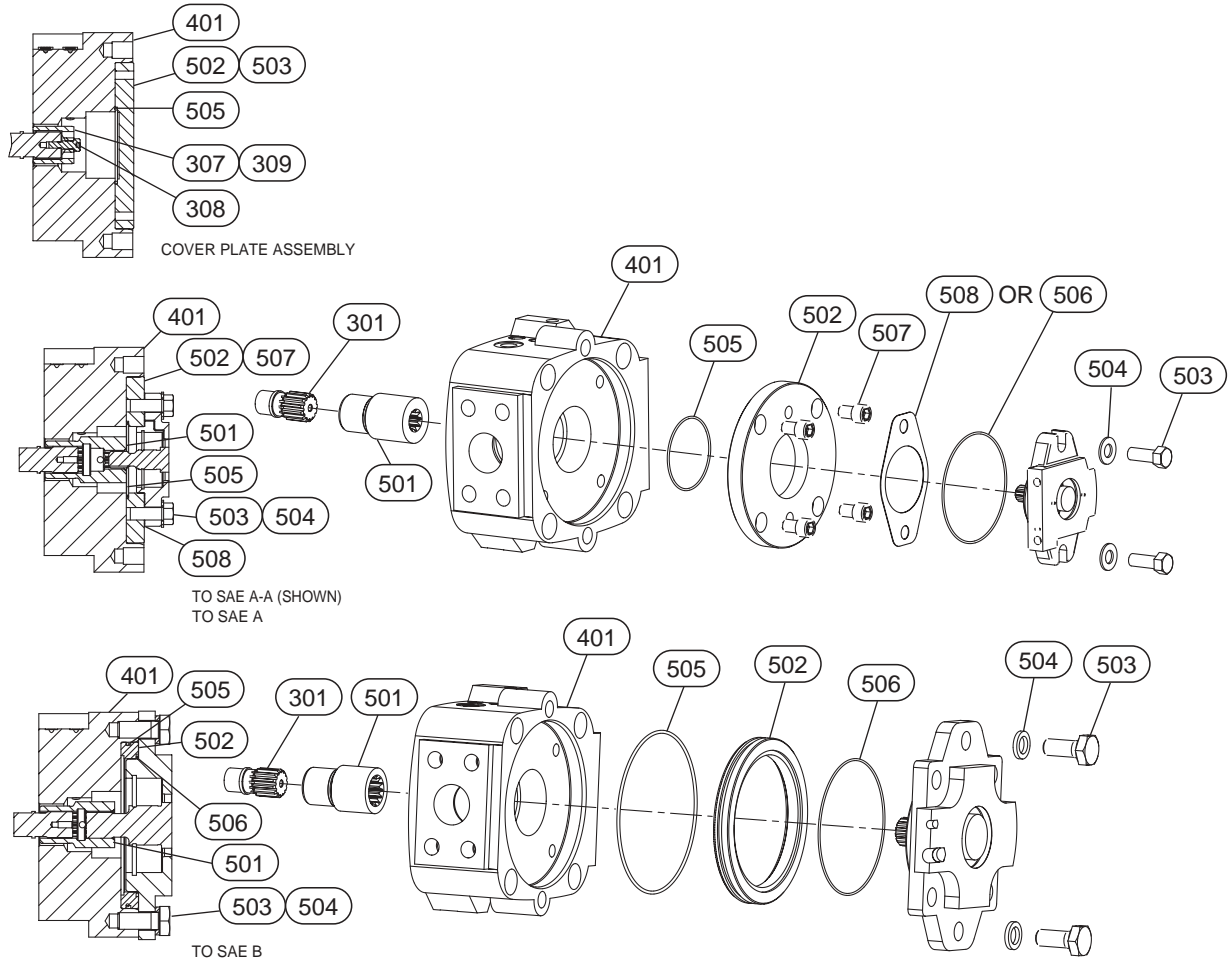
- (A) Pump cases are interchangeable
  - A1 series has #12 SAE threaded case drain connection
  - B1, C1, C2, D3, D4, E1 have #16 SAE threaded case drain connection
- (B) Code "Y" shaft is length of Code "Z" shaft for Design Series "A1"  
Parts are interchangeable between Design Series
- (C) PVG130 Valve plate and Rotating group must be matched
  - A1, B1, C1 parts can be intermixed between series
  - C2, D3, D4, E1 parts can be intermixed between series



OILG-0008

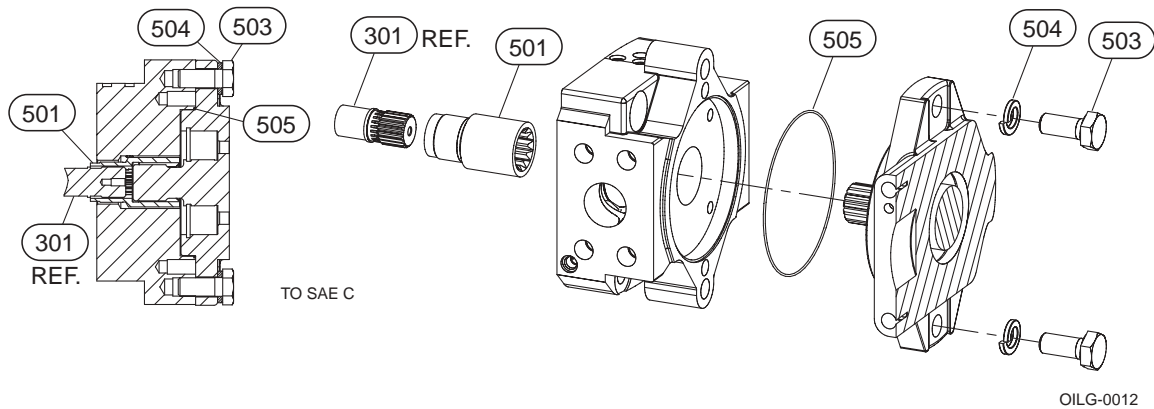
Figure 10. Cross Section and Exploded Parts Drawing for PVG 048, 065 and 075 (517105 sheet 1 and 2)

**NOTE** Cylinder bearing (202) to be held in position with roll pin (205) which must be located in the cast side slot of housing (001).



THRU-SHAFT OPTIONS OILG-0009

Available for PVG 048, 065, 075, 100 and 130  
(Drawing 517105 sheet 6 and 7)



OILG-0012

Available for PVG 100 and 130  
(Drawing 516246 sheet 6, 7 and 8)

Figure 11. Cross Section and Exploded Parts Drawing

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## **AFTER SALES SERVICES**

At Oilgear we build products to last. It is the nature of this type of machinery to require proper maintenance regardless of the care we put into manufacturing. Oilgear has several service programs in place to help you.

### **STAY-ON-STREAM SERVICE**

By signing up for Oilgear's Stay-On-Stream program, you can prepare for problems before they happen. Certain field tests such as fluid testing, slip testing and electronic profile recording comparisons can be performed by our field service people or your own factory trained personnel. These tests can indicate problems before they become "down-time" difficulties.

## **SERVICE SCHOOLS**

Oilgear conducts training to train your maintenance personnel. "General" hydraulic or electronic training is conducted at our Milwaukee, Wisconsin plant on a regular basis. "Custom" training, specifically addressing your particular hydraulic and electro-hydraulic equipment can be conducted at your facilities.

### **SPARE PARTS AVAILABILITY**

Prepare for your future needs by stocking Oilgear original factory parts. Having the correct parts and necessary skills "in-plant" enables you to minimize "down-time." Oilgear has developed parts kits to cover likely future needs. Oilgear Field Service Technicians are also ready to assist you and your maintenance people in troubleshooting and repairing equipment.



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