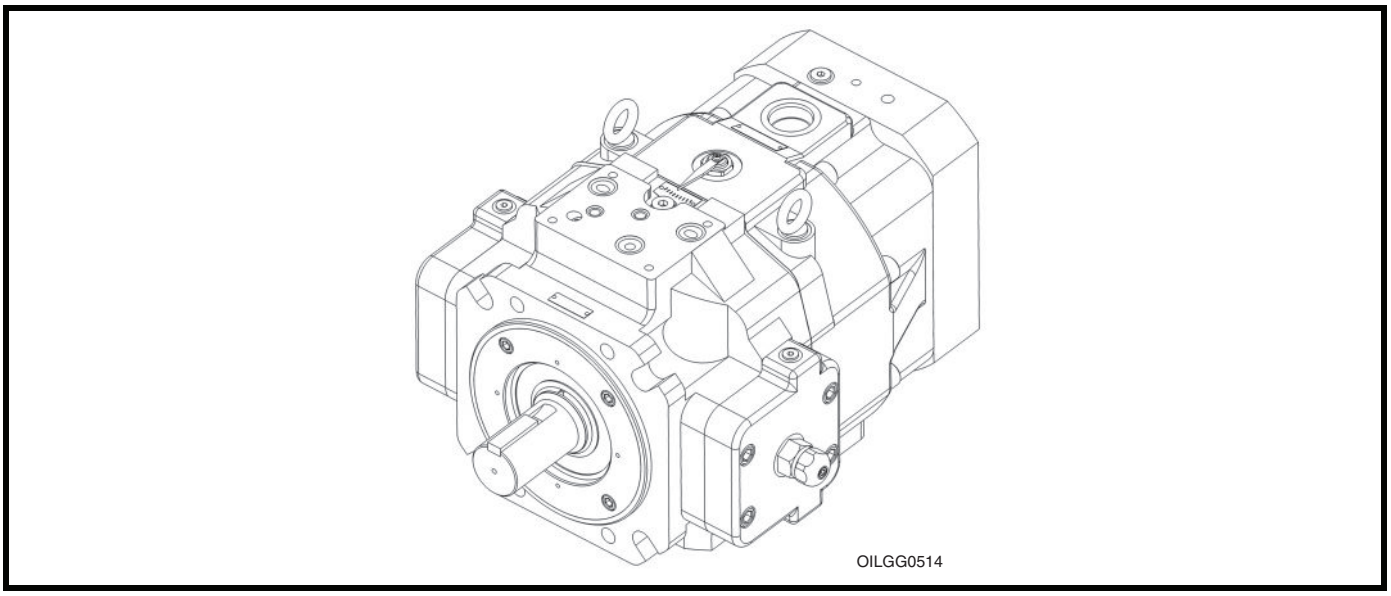
SERVICE INSTRUCTIONS
PVV-440 - A2 SERIES PUMP



Oilgear "PVV-440 A2 Series" Open Loop Pump

PURPOSE OF INSTRUCTIONS

These instructions will simplify the installation, operation, maintenance and troubleshooting of Oilgear type PVV-440 A2 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 that 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
Installation of Vertically Mounted Axial Piston Units ..... Bulletin 90014
PVV Open Loop Pumps Sales ..... Bulletin 47028-E
Oilgear Reference Drawings for PVV-540/440 A2 518260

Pump Control Instructions

VM Control, PVV-440 ..... Data Sheet M47690
Basic Pump Without Control Installation ..... Data Sheet M47683

THE OILGEAR COMPANY
2300 South 51st Street
Milwaukee, Wisconsin 53219

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 IMMINENTLY 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. Or visit our website: 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 2 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 it is 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 driveshaft on a horizontal plane and with case “Port 1” to the top side. Secure the pump to a rigid mounting surface. Refer to **PIPING AND FITTINGS**.

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 6 inches (15 cm) 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.

Horizontal Mounting - Arrange line from the “case drain” so the case remains full of fluid (non-siphoning). Case pressure must be less than 25 psi (1,7 bar). 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.

Vertical Mounting - Refer to referenced Oilgear Installation of Vertically Mounted Axial Piston Units Bulletin 90014.

⚠ 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 driveshaft. If it is too tight, it may be necessary to heat coupling for installation. Refer to manufacturer’s instructions.

Misalignment of pump shaft to the power source’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 an auxiliary (pilot) pump circuit. 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 or more 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. Service air breather regularly according 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 driveshaft a few times by hand with a spanner wrench to make sure parts rotate.

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.*

Unit	PVV-440
Approximate torque to turn driveshaft	36 ft·lb (49 N·m)

Table 1. Torque to Turn Shaft

CONSTRUCTION

See **Figures 6** and **7**

1. A driveshaft **(301A)** runs through the center of the front **(001)** and middle **(002)** pump housing and the valve plate **(401)**.
2. The front driveshaft bearing **(302)** supports one end of the shaft and the rear shaft bearing **(403)** supports the other end of the shaft. A cylinder barrel **(101)** is splined to the driveshaft.
3. Pumping piston/shoe assemblies **(102)** in the cylinder are held against the swashblock wear plate **(202)** by a shoe retainer **(104)** and a hold down retainer **(203)**.
4. A cylinder spring **(105)**, bearing against an inner cylinder spring guide **(106)** and driveshaft **(301A)**, acts against the outer cylinder spring guide **(107)** and a retaining ring **(108)**, which is "snapped" into the cylinder barrel **(101)**, forcing the cylinder and wear plate **(103)** against the port plate **(1)** and valve plate **(401)**.
5. The semi-cylindrical swashblock **(201)** can be swiveled in the saddle bearings **(204)** by operator pistons **(501)**, which are operated by a control (covered in reference material).
6. The stroke indicator assembly **(801-808)** gives a visual indication of the swashblock position.
7. The port plate **(1)** has two crescent-shaped ports; one crescent connects the pumping piston **(102)** during the upper half revolution to the valve plate and port "**A**." The other crescent port connects the pistons during the lower half revolution to the valve plate and port "**B**."

SPECIFICATIONS

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

UNIT SIZE	THEORETICAL MAXIMUM DISPLACEMENT		CONTINUOUS RATED PRESSURE		MAXIMUM PRESSURE		RATED FLOW AT CONTINUOUS RATED PRESSURE					
							1000 rpm		1200 rpm		1500 rpm	
	in 3/rev	ml/rev	psi	bar	psi	bar	gpm	lpm	gpm	lpm	gpm	lpm
440	26.85	440	6500	450	7250	500	104	394	125	473	*	*

* Consult Oilgear Technical Services Department

NOTE *PVV-440 is available for supercharged service only (2-8 bar).*

Table 2. All data is nominal performance with 80-550-SSU viscosity fluid.

UNIT SIZE	POWER INPUT AT CONTINUOUS RATED PRESSURE					
	1000 rpm		1200 rpm		1500 rpm	
	hp	kw	hp	kw	hp	kw
440	489	365	587	438	*	*

* Consult Oilgear Technical Services Department

Table 3. Power Input at Continuous Rated Pressure.

UNIT	WIDTH		LENGTH		HEIGHT		WEIGHT		PORT FLANGE		FACE MOUNTING FLANGE
	in.	mm	in.	mm	in.	mm	lb	kg	Port A Pressure Connection	Port B Inlet Connection	
PVV-440	22.8	577,9	22.5	647,7	15.5	393,7	750	340	Consult Factory	4.000 SAE	12.4 in. B.C. (315 mm B.C.)

For detailed dimensions, contact your Oilgear Representative.
Refer to installation drawings for more detailed dimensions and port configurations.

Table 4. Nominal Dimensions and Weights Without Controls

TROUBLESHOOTING

PROBLEM	CAUSES	REMEDY
Unresponsive or Sluggish Control	Faulty or binding control pistons.	Inspect. Clean out if contaminated.
	Insufficient control circuit pressure and/or volume – other auxiliary devices in circuit "robbing" volume from the pump control.	Inspect components. Replace.
	Swashblock **(201)** binding in saddle bearings **(204)**.	
	Swashblock saddle bearings **(204)** worn or damaged.	
Insufficient Pump Volume	Delivery limited by faulty control.	See appropriate control instruction bulletin.
	Maximum volume stop **(701)** limiting pump stroke.	Inspect components. Replace.
	Obstructed inlet circuit or insufficient supercharge volume.	
	Insufficient drive motor speed.	
	Worn or grooved cylinder wear plate **(103)** and/or port plate **(1)**.	
	Worn pistons/shoe assemblies **(102)** or piston bores **(101)**.	
	Worn or damaged piston/shoe assemblies **(102)** swashblock **(201)** or swashblock wear plate **(202)**.	
Irregular or Unsteady Operation	Fluid level in reservoir is low or supercharge is insufficient.	Verify fluid level and/or supercharge.
	Air entering hydraulic system.	Inspect system for leak.
	Faulty control - an oscillating stroke indicator pin **(802)** is indicative of an unstable control.	Inspect components. Replace.
	Worn axial piston pump.	
	Faulty output circuit components (cylinders, motors, valves, etc.).	
Loss of Pressure	Worn piston pump.	Inspect components. Replace.
	Worn or grooved cylinder wear plate **(103)** and/or port plate **(1)**; wear plate and/or port plate separation from cylinder, each other or valve plate **(401)**.	
	Worn pistons/shoes not seated on swashblock wear plate **(202)**.	
	Piston shoe not seated on swashblock wear plate **(202)**.	
	Faulty output circuit components (cylinders, motors, valves, etc.).	
Excessive or High Peak Pressures	Faulty output circuit components (pay particular attention to relief valves).	Inspect components. Replace.
	Seized control piston.	
	Worn or broken saddle bearing.	
Excessive Noise	Pump incorrectly being stopped or started under load.	Verify operation procedure of pump.
	Low fluid level in reservoir or insufficient supercharge resulting in cavitation.	Verify fluid level.
	Air entering hydraulic system.	Inspect system for leak.
	Fluid too cold or viscosity too high.	Verify fluid temperature and type.
	Inlet line problem, i.e., obstructions in line, line too long, line diameter too small, too many bends or loops in line or supercharge pressure too low (2 bar minimum).	Inspect components. Replace.
	Broken or worn piston/shoe assembly **(102)**.	
	Worn or pitted bearings **(302, 004, 403)**.	
	Pump rotating in wrong direction.	Inspect operation direction of pump.
Excessive Heating	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 wear plate **(103)** and/or port plate **(1)**.	
	Faulty output circuit components (continuous blowing relief valves or slip through valves, cylinders, etc.).	
	Insufficient cooling provision or clogged coolers.	Inspect for obstruction.

PRINCIPLE OF OPERATION

A one-way pump driven clockwise (right hand) is described. Diagrams are shown from top (plan) view.

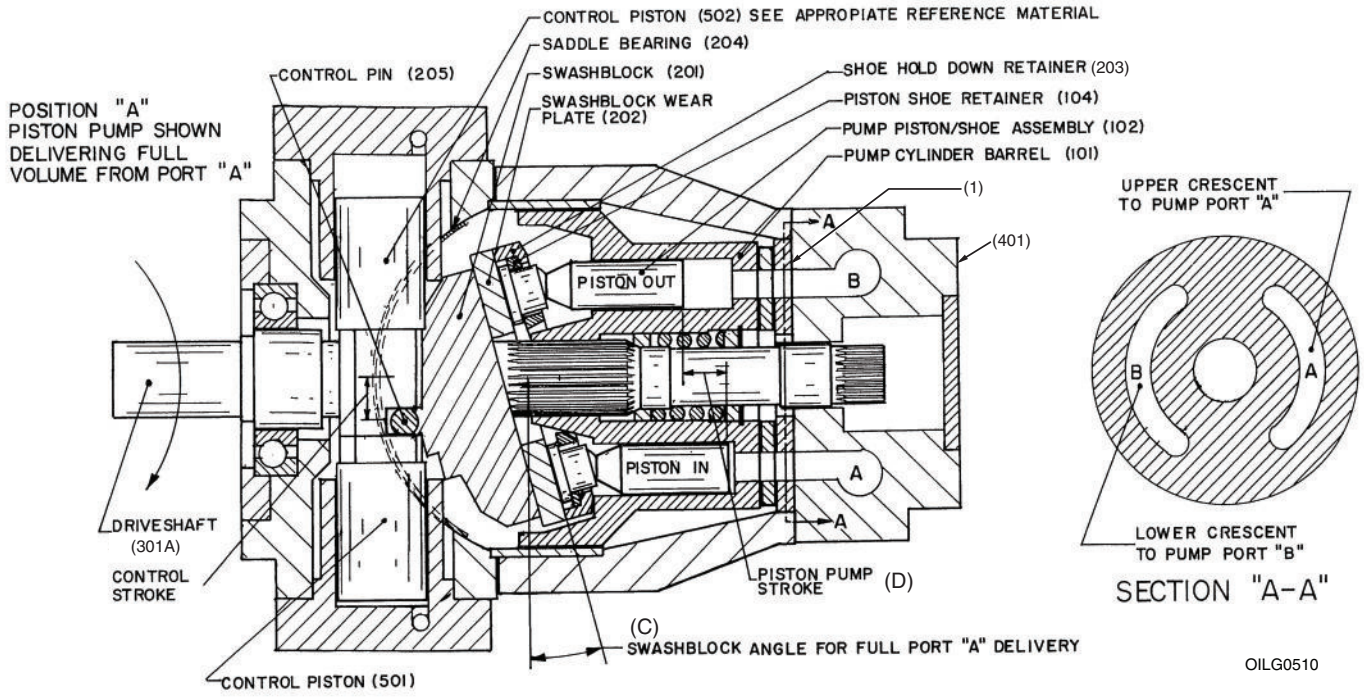


Figure 1. Position "A"
Piston Pump shown delivering full volume from port A.

Position A, Figure 1.

Rotating the driveshaft **(301A)** clockwise turns the splined pump cylinder barrel **(101)**, which contains the pumping pistons **(102)**. A piston shoe retainer **(104)** and a shoe hold down retainer **(203)** hold the piston shoes against the swashblock wear plate **(202)**. 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 upper (port **A**) and lower (port **B**) crescent-shaped ports in port plate **(1)** and valve plate **(401)**. While connected to the lower side (suction) port **B**, each piston moves outward, drawing fluid from port **B** into the piston bore until its outermost stroke **(D)** is reached. At this point, the piston bore passes from the lower crescent to the upper crescent port.

While rotating across the upper crescent, each piston is forced inward by the swashblock wear plate face. Each piston displaces fluid through the upper crescent to port **A** until its innermost stroke is reached. At this point, the piston bore passes from the upper crescent to the lower crescent again and the operating cycle is repeated.

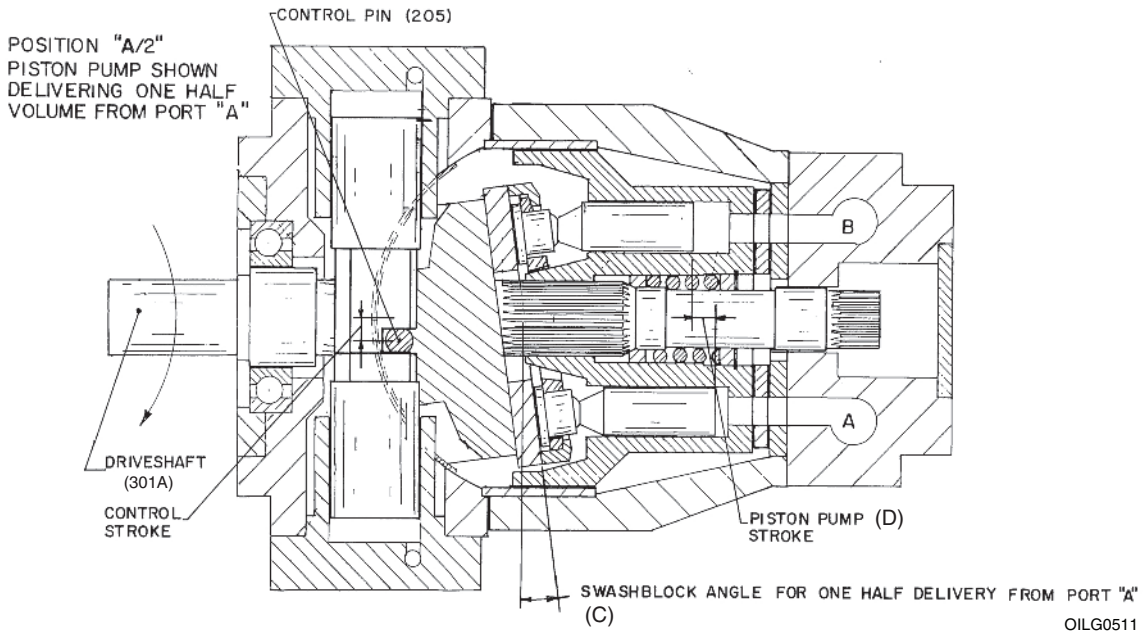


Figure 2. Position "A/2"
Piston Pump shown delivering one half volume from port A.

Position A/2 - Figure 2.

This illustration shows the linear stroke of the control piston/shoe assembly **(501)** setting the angular position **(C)** of the swashblock **(201)** and the swashblock wear plate **(202)** which determines the length of piston stroke **(D)** (difference between outermost and innermost position) which determines the amount of delivery from the high pressure port A. In this case, the linear stroke of the control piston and the angle of the swashblock is one half of the former (position **A**) and pump delivery is one half of the former delivery.

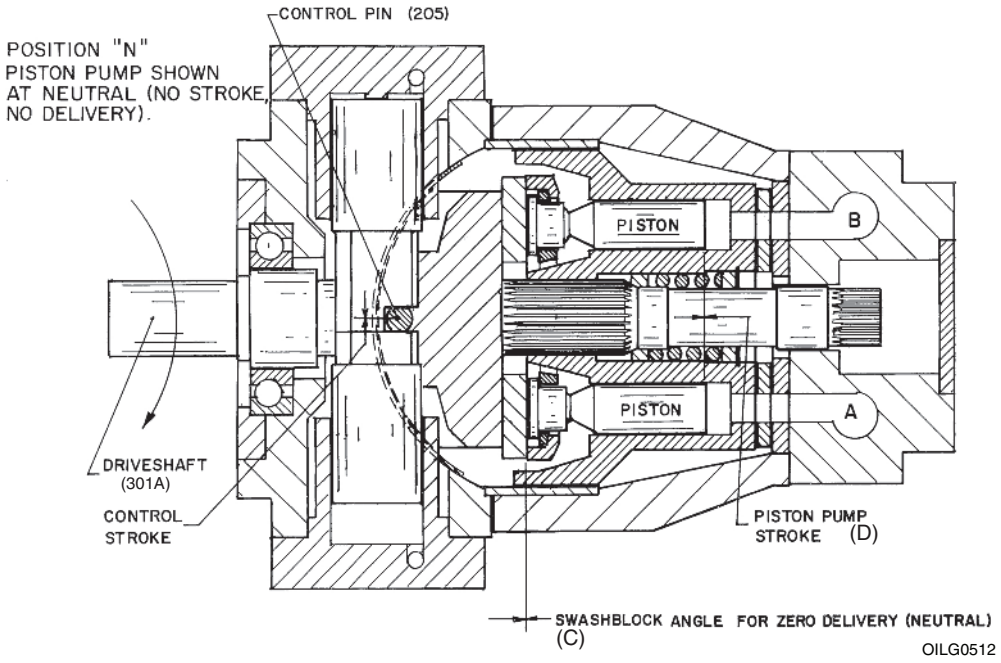


Figure 3. Position "N"
Piston pump shown at NEUTRAL (no stroke, no delivery).

Position N - Figure 3.

NEUTRAL position results when the control piston/shoe assembly centers the swashblock. The swashblock wear plate face is now parallel to the cylinder face and the angle **(C)** is now zero. There is no inward or outward motion **(D)** of the pump pistons or no stroke as the piston shoes rotate around the swashblock wear plate face. There is no fluid being displaced from the piston bores to the crescents in port plate to the valve plate and no delivery from pump ports.

DISASSEMBLY

⚠ 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.

Refer to **Figures 6 and 7**.

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.

1. Disconnect case drain line(s) from port **1A** or **1B**, inlet, pressure and all auxiliary lines.
2. Drain pump case. If pump case drain plugs are inaccessible, it may be necessary to remove the pump from the mounting and drive motor before draining it.

⚠ WARNING

Seek assistance from others and use a crane or hoist capable of handling 1000 lb (454 kg) and proper lifting techniques to prevent personal injury.

NOTE *Tag similar parts (particularly screws, plugs and o-rings) during disassembly to make sure they don't become confused with similar parts and to ensure they will be returned to their original location. Do not remove (locator) roll pins unless they are deformed or need to be replaced.*

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.

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

If **only** the port plate **(1)** is to be inspected, it is possible to remove valve plate group only. The driveshaft group can be removed, without disassembling the rest of the pump, to access the front driveshaft bearing **(302)** and/or shaft seal **(007)**.

CONTROL GROUP

To disassemble the rotating group and/or swashblock group, it will be necessary to remove the control cap assemblies **(503)**.

See reference materials for information which applies to the control on your unit.

1. Remove screws **(508)** and the control cap assemblies **(503)** and identify which bore (right or left side facing shaft) the control cap assembly **(503)** is removed from.

It is also very important to note the orientation of each control piston **(501)** with respect to the swashblock **(201)** and the control cap **(503)** because they will have to be reinstalled in the same orientation.

STROKE INDICATOR GROUP

To disassemble the rotating group and/or swashblock group, it will be necessary to unscrew and remove the stroke indicator indicator assembly **(801 through 808)**.

DRIVESHAFT GROUP

1. Position pump vertically, with driveshaft **(301A)** pointing up and block securely in place.
2. Alternately back out screws **(307)** partially to relax the cylinder spring **(105)**, until they can be loosened by hand and then remove.
3. Lift out shaft retaining plate **(303)**. The driveshaft **(301A)** can be pulled upward from the front pump housing.
4. Remove key **(306)** if used, and if necessary, the shaft bearing retaining ring **(305)** can be removed and front driveshaft bearing **(302)** pressed off the shaft. The seal retainer **(304)** and shaft seal **(007)** can also be removed if necessary.

NOTE *If the seal is removed it cannot be reused. It must be replaced.*

FRONT HOUSING-MIDDLE HOUSING SEPARATION

CAUTION

Damage to the equipment or personal injury can occur. Use the eye bolts and a hoist to support the weight of front housing assembly (001).

1. Move pump to the horizontal position.
2. Reach into the front housing **(001)** through the cavities that accept control caps **(503)** to remove screws **(210)** that fasten the swashblock **(201)** to its wear plate **(202)**. It might be necessary to pull the swashblock toward the side you are working on to reach and turn the screws with an Allen wrench.
3. Pry wear plate **(202)** away from swashblock as far as possible.
4. Loosen and remove screws **(014)** that fasten the front and middle housing.
5. Carefully separate the front and rear housings.
6. Shift the middle housing to the vertical position with the valve plate **(401)** resting on a clean surface.
7. Remove gasket **(003)** and seal rings **(011)** from housing.

ROTATING GROUP

⚠ WARNING

The rotating group is heavy. Damage to the equipment or personal injury can occur. 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.

1. Thread eyebolts into swashblock wear plate **(202)** and use a hoist to lift wear plate/piston assembly from the cylinder. Set assembly on blocks 8-1/2" (21,6 cm) apart.
2. Remove screws **(209)** and pull swashblock wear plate **(202)** from hold down retainer **(203)**.
3. Lift out and number each piston/shoe assembly **(102)** and each corresponding hole in the shoe retainer **(104)** and cylinder bore.
4. Remove the shoe retainer **(104)** from hold down retainer **(203)**.
5. Using the threaded lifting holes provided, lift the pump cylinder **(101)** from the middle pump housing. If necessary, the cylinder wear plate **(103)** can be removed as well as the retaining ring **(108),** outer cylinder spring guide **(107)**, cylinder spring **(105)** and inner cylinder spring guide **(106)**.
6. The cylinder bearing **(004)** is a pressed fit, but can be tapped out from the inside of housing.

VALVE PLATE GROUP

CAUTION

Damage to the equipment or personal injury can occur. Use the eye bolts and a hoist to support the weight of the valve plate. Do not damage the faces of the port plate and the matching faces of both the valve plate and cylinder barrel.

NOTE *Screws **(405)** have been fastened with a high torque value. To prevent damage to the housing, the middle housing must be firmly secured before removing the screws.*

1. **If only the valve plate is being removed,** the cylinder spring **(105)** holds the pump cylinder **(101)** and its wear plate **(103)** against port plate **(1)**. To avoid damage to these parts, partially back out the screws **(405)** on alternate corners until they can be loosened by hand, then remove the valve plate **(401)**.
2. **If the middle housing group is removed,** back out screws **(405)** and separate valve plate **(401)** from pump middle housing **(002)** and remove o-ring **(019)** from housing.
3. If necessary, remove screws **(404)** and lift port plate **(1)** from valve plate **(401)**. Do not remove the rear shaft bearing **(403)** unless replacement is necessary. If removed, note the direction the slot faces. Remove the o-rings **(019)** and **(407)** from housing and valve plate.

SWASHBLOCK GROUP

CAUTION

Damage to the equipment or personal injury can occur. Use the eye bolts and a hoist to support the weight of the valve plate. Do not damage the faces of the port plate and the matching faces of both the valve plate and cylinder barrel.

1. Shift front housing **(001)** to the vertical position with the swashblock facing up.
2. Remove the shorter swashblock pin **(005)** from the bottom and the longer swashblock pin **(006)** from the top.
3. Using a strap and hoist to support the swashblock, pull swashblock **(201)** from the front pump housing **(001)**. If necessary, stroke indicator lever **(212)** can be removed from swashblock.
4. Remove saddle bearings **(204)** from front housing. If necessary, control pins **(205)** can be pulled out after removal of retaining ring **(206)**.

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, and when 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

See reference material for information that applies to the control on your unit. Be sure to carefully check control piston **(501)** for cracks and/or signs of excessive wear, making sure it does not bind in the control cap assembly **(503)**. Make sure the control piston does not show signs of excessive wear and it slides smoothly in the control cylinder bore.

VALVE PLATE GROUP

Inspect mating surfaces of the valve plate **(401),** cylinder wear plate **(103)**, port plate **(1)** and the rear of the cylinder barrel **(101)** for excessive wear (scuffing and polishing are normal). If the mating surfaces are not flat and smooth, the cylinder will "lift off" from the port plate **(1)** and cause delivery loss and damage to the pump. Remove minor defects by lightly stoning the surface with a hard stone which is flat to within 0.001 inches. (0,025 mm).

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

STROKE INDICATOR GROUP

Check:

- that the indicator pin **(802)** and stroke indicator lever **(212)** are not twisted or bent.
- that pin **(802)** rotates freely within gland **(801)**.
- that the connection between pin **(802)** and lever **(212)** is without play.

ROTATING GROUP

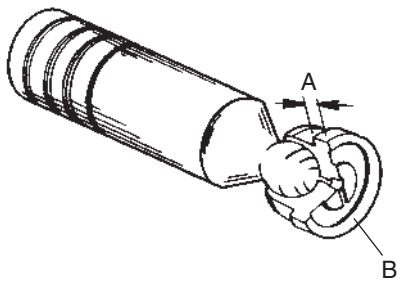
Inspect cylinder barrel **(101)**, piston bores and the face which mates with the port plate **(1)** and cylinder wear plate **(103)** for wear and scoring. Remove minor defects on the face by lightly stoning or lapping the surface.

Inspect the hydrodynamic cylinder bearing **(004)** for damage and replace if necessary. Check all piston and shoe assemblies **(102)** to be sure they ride properly on the swashblock wear plate **(202)**.

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 4**. 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 4. Piston and Shoe Inspection

(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.*

Inspect the cylinder bearing **(004)** and pump cylinder barrel **(101)** surfaces for galling, pitting or roughness, and replace if necessary.

SWASHBLOCK GROUP

Check:

- the swashblock wear plate **(202)** for scratches, grooves, cracks or uneven surfaces. The swashblock wear plate cannot be repaired if it is defective. It must be replaced.
- the saddle bearings **(204)** for evidence of tearing, wear-through or deterioration of bearing material.
- mating surface of swashblock for cracks or excessive wear; replace if necessary. The swashblock movement in saddle bearings **(204)** must be smooth.

DRIVESHAFT GROUP

Check:

- the shaft seal **(007)** for deterioration, cracks or its ability to seal. (It should hold its shape when it is pressed.) Replace if necessary (press out).
- the shaft bearing **(302)** for galling, pitting, binding or roughness.
- the shaft and its splines for wear. Replace any parts necessary.

NOTE *If the driveshaft seal is removed, it cannot be reused. It must be replaced.*

ASSEMBLY

NOTE *During reassembly, torque fasteners and plugs to specifications in **Screw and Plug Torques for PVV-440**.*

See **Figures 6** and **7**. Follow the disassembly procedures in reverse for reassembling 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.

VALVE PLATE GROUP AND MIDDLE HOUSING GROUP

⚠ WARNING

Avoid personal injury; use the eye bolts and a hoist to support the weight of the valve plate and seek assistance from others. Use proper lifting techniques.

CAUTION

Use extreme care not to damage the faces of the valve plate (401) and matching faces of the port plate (1), cylinder wear plate (103) and cylinder barrel (101).

1. Lay valve plate **(401)** on bench with crescent port opening surface facing up.
2. Press tailshaft bearing **(403)** into valve plate bore. When properly installed, bearing **(403) must protrude upward** 0.60 inches (15,2 mm) from the machined face, with slot facing the same direction as original bearing.
3. If previously removed, replace the 1/8" orifice plug **(411)** in the NPT port located near the upper left-hand corner of the valve plate.

NOTE *Make sure the bearing **(403)** protrudes to the given dimension.*

4. Slide port plate **(1)** over tailshaft bearing and tap into position with a soft mallet. Position with shoulder screws **(404)**; the screws should only position the port plate, not lock it tightly in position.
5. Install new o-ring **(019)** in groove on back side of pump middle housing **(002)**.
6. Remove o-ring **(407)** in housing and discard; reinstall new o-ring.

7. Lubricate screws **(405)** and place in their respective bores in the valve plate before mounting valve plate. Secure valve plate (**401)** to middle pump housing **(002**). Torque screws **(405)** in an alternate and cross pattern to 600 ft·lb (814 N·m). Final torquing should be done after the pump is mounted.

ROTATING GROUP

If locating pins **(025)** were removed, press locating pins into cylinder bearing **(004)** and slide or tap bearing into pump housing **(002)**.

1. Place the inner cylinder spring guide **(106)** with chamfered edge facing in, into the center bore of the pump cylinder **(101)**. Follow the guide with the cylinder spring **(105)** and outer cylinder spring guide **(107)**.
2. Secure by snapping retaining ring **(108)** into groove in cylinder.
3. If locating pins **(109)** were removed, press locating pins into the rear end of the cylinder. Spread a coat of grease on the rear of the cylinder and locate cylinder wear plate **(103)** on the locating pins **(109)**.
4. Lubricate port plate **(1)** and cylinder bearing **(004)** generously with hydraulic fluid. With middle pump housing **(002)** and valve plate **(401)** assembly on a bench, with the open end up, use eyebolts and a hoist to carefully lift cylinder **(101)** assembly up and carefully lower into bearing **(004)** and housing **(002)**.
5. Insert the identified pistons in their corresponding identified holes in retainer **(104)**.
6. Place shoe hold down retainer **(203)** on bench blocks, insert the shoe retainer **(104)** with chamfered side down and lower each piston/shoe assembly **(102)** into its corresponding hole.
7. Lubricate assembly liberally with hydraulic fluid.
8. Place swashblock wear plate **(202)**, with locating pin **(211)** in it, on top of assembly and secure with new Nylock threaded screws **(209)**. Make sure parts are centered and the shoulder between retainer **(203)** and wear plate **(202)** is equal all the way around their circumferences. The shoes should move freely within the shoe retaining mechanism, 0.001 - 0.004 inches (0,025 - 0,102 mm) clearance between the shoes and the wear plate.
9. Place eyebolts in swashblock wear plate **(202)** and use a hoist to lift the assembly from the blocks. Make sure none of the pistons are binding in their shoes and that they swivel freely.
10. Lubricate bores in cylinder and the cylinder splines, and lower assembly slowly into pump case. Make sure pistons are returned to their original bores by working piston/shoe assemblies **(102)** into the cylinder while continuously lowering the wear plate assembly until the weight is no longer supported by the hoist.
11. Remove the eyebolts and turn the assembly so locating pin **(211)** is positioned at the bottom of the housing. Pin will be used to position wear plate **(202)** on swashblock **(201)**.

FRONT HOUSING AND SWASHBLOCK GROUP

1. Place front housing **(001)** on bench with open end facing up.
2. Place saddle bearing **(204)** on saddle bearing locating pins **(016)**. Make sure the locating pin **(016)** inside diameters are clean and free of debris; they also provide lubrication to the swashblock **(201)** and the swashblock liners **(204)**. If reinstalling original saddle bearings, make sure the one you identified for the “top” is returned to the upper location, and tap into place.
3. Insert both control pins **(205)** in swashblock **(201)** and secure with retaining rings **(206)**.
4. Secure stroke indicator lever **(212)** on swashblock with screw **(208)**.
5. Slide swashblock **(201)** on machined pads into front pump housing **(001)** until the swashblock **(201)** is seated in the saddle bearings **(204)**.
6. To hold swashblock **(201)** in place, screw in upper (longer) swashblock pin **(006)** and lower (shorter) swashblock pin **(005)** with o-rings **(012)** in place. With pins in place, swashblock should be able to swivel freely.
7. Spread grease on housing surface and place a new pump housing gasket **(003)** and new o-rings with backup **(011)** in the pump front housing **(001)**.

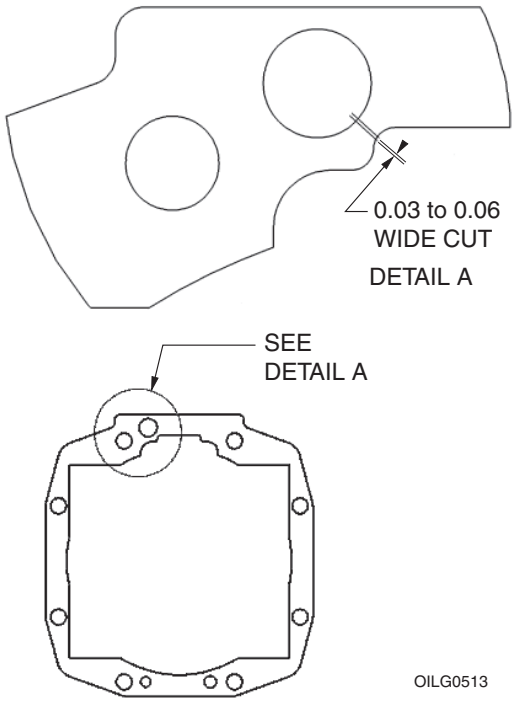


Figure 5. Gasket Pressure Relief Cut

8. After installing gasket **(003),** a small pressure relief cut should be added to the gasket at the location of o-ring **(011)** as shown in **Figure 5**.

FRONT AND MIDDLE HOUSING

1. Place middle housing **(002)** with assembled rotating group on bench with open end facing up.
2. Using eyebolts and hoist, lift front housing **(001)** with assembled swashblock and orient housing so open end faces open end of middle housing **(002)**. Gasket faces of both housings should be parallel.
3. Carefully lower the front housing **(001)** onto the middle housing **(002)**. Be sure the stroke lever **(212)** clears the side of the middle housing and continue to lower the front housing while aligning the slot in the indicator lever with the hole in the rear housing for bushing **(801)**. Also be sure the chamfered hole in the swashblock **(201)** lines up with locating pin **(211)** in the swashblock wear plate **(202)** and that the locating pin **(017)** engages both housings.

NOTE *During this process it is important that the gasket **(003)** not be allowed to slide. The gasket must be positioned around o-ring seal **(011)**, not on top of it.*

4. Tighten all bolts **(014)** gradually on alternate corners until all are torqued to 240 ft·lb (325 N·m).
5. With case halves secured, position pump in the horizontal position with stroke indicator **(803)** side up.

FINAL HOUSING

The swashblock wear plate **(202)** must be fastened to the swashblock **(201)** using two screws **(210)**. Adjust swashblock position as required to access holes for screws **(210)**. If swashblock wear plate **(202)** is too far from the swashblock **(201)** to reach with screws **(210)**, it may be necessary to temporarily use longer screws as assembly tools to thread into the wear plate and pull it up against the swashblock, before inserting screws **(210)**.

STROKE INDICATOR

1. Replace packing **(804)** on stroke indicator pin **(802)** (with "V" opening pointing toward pump centerline).
2. Place stroke indicator arrow **(803)** on stroke indicator pin **(802)** and secure with screw **(806)**.
3. Insert pin into stroke indicator gland **(801)** and place o-ring **(805)** on gland.
4. Place Delrin washer **(807)** on pin and lock with retaining ring **(808)**.
5. Insert assembly into pump housing so the indicator pin **(802)** taper is inserted in stroke indicating lever **(212)** fork. Tighten down gland **(801)** to force the taper pin into the fork.

DRIVESHAFT GROUP

If seal **(007)** was removed, reinstall a new seal into the pump front housing **(001)** with "U" opening of the seal toward inside of housing.

1. Place seal retainer **(304)** over seal.
2. Press shaft bearing **(302)** onto driveshaft **(301A)** and secure with retainer ring **(305)**.
3. Lubricate driveshaft **(301A)** and lower the driveshaft so it passes through the front housing, swashblock **(201)**, cylinder barrel **(101)**, cylinder wear plate **(103)**, port plate **(1)** and into the rear shaft bearing **(403)**. Gently rotate the driveshaft back and forth to help the splines on the driveshaft **(301A)** engage the splines of the pump cylinder barrel **(101)**. The resistance of the cylinder spring **(105)** will keep the front driveshaft bearing **(302)** from seating completely in its bore.
4. Place shaft retainer plate **(303)** over front driveshaft bearing **(302)**.

5. Use screws **(307)** in an alternate cross pattern to “press” the retainer into its bore and compress the pump cylinder spring **(105)**. Continue to tighten screws **(307)** until it is firmly seated.

CONTROL GROUP

1. Remove o-rings **(009)** and **(010)** from front pump housing **(001)** and discard. Install new o-rings **(009)** and **(010)**.
2. Reinstall control piston/shoe assemblies **(501)** in the bores they were removed from.
3. Use screws **(508)** to put control cap assemblies **(503)** back to the sides they were removed from.

See reference material which applies to the control on your unit and appropriate control reference for control group mounting.

SCREW AND PLUG TORQUES FOR PVV-440

Item Number	Type & Size	Tightening Torque
014	SCR, SHC, M20 X 160 MM LG.	240 ft•lb (325 N•m)
015	1.50 BSP PLUG	250 ft•lb (339 N•m)
028	0.375 BSP Plug	35 ft•lb (47,5 N•m)
030	SAE #4 Plug	120 in•lb (13,5 N•m)
208	SCR, SHC	87 in•lb (10 N•m)
209	SCR, SHC, M6 X 25 MM LG.	87 in•lb (10 N•m)
210	SCR, SHC, M8 X 45 MM LG.	15 ft•lb (20 N•m)
307	SCR, SHC, M12 X 45 MM LG.	68 ft•lb (92 N•m)
402 and 506	SAE #6 PLUG	200 in•lb (23 N•m)
404	SCR, SHC, M10 X 16 MM LG.	35 ft•lb (47,5 N•m)
405	SCR, SHC	600 ft•lb (187 N•m)
508	SCR, SHC, M16 X 55 MM LG.	138 ft•lb (187 N•m)

ROTATION CONVERSIONS

Refer to the Reference Material and Oilgear Reference Drawings **518260** when converting rotation.

Base Pump w/o Control

Refer to **518260**, Sheets 1 through 4. The following parts are necessary for conversion, one of each are required:

- Port Plate **(1)**
- Dowel Pin **(215)** - optional

Remove and replace port plate **(1)** for desired rotation.

CONTROL O-RING SEALS FOR PVV-440 A2 SERIES PUMP

Item Number	Cross-Section x O.D.	Shore A Durometer
009	1/4 x 5-5/8	70
010	1/8 x 1	90
011	3/32 X 7/8 + Special Bronze Backup Ring	90
012	910 ARP	70
013	924 ARP	70
018	1/8 x 1-1/4	90
019	1/4 x 10	70
207	1/16 x 1/2	90
406	906 ARP	90
407	3/32 x 3/4	90
505	906 ARP	90
705	1/16 x 3/4	90
805	912 ARP	70

PARTS LIST FOR PVV-440

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.

NOTE *Parts drawings may not be identical to Oilgear drawings referenced.*

Item	Description	Qty
	COMMON PARTS GROUP	
001	Housing, Pump, Front	1
002	Housing, Pump, Middle	1
003	Gasket, Pump Housing	1
004	Bearing, Pump Cylinder	1
005	Pin, Lower Swashblock Locating	1
006	Pin, Upper Swashblock Locating	1
007	Seal, Shaft	1
008	Eyebolt, Lifting	2
009	Seal, O-ring	2
010	Seal, O-ring	8
011	Seal, O-ring & Bronze Backup Ring	3
012	Seal, O-ring	2
013	Seal, O-ring	1
014	Screw, Socket Head Cap	8
015	Plug, SAE	1
016	Pin, Saddle Bearing Locating	2
017	Pin, Housing Locating	1
018	Seal, O-ring	3
019	Seal, O-ring	1
020	Screw, Drive	8
021	Nameplate, Rotation	1
022	Nameplate, Stroke Indicator	1
023	Nameplate, Identification	1
024	Nameplate, Caution	1
025	Pin, Cylinder Bearing Locating	2
	ROTARY ASSEMBLY GROUP	
101	Barrel, Cylinder	1
102	Assembly, Piston/Shoe	9
103	Wear Plate, Cylinder	1
104	Retainer, Shoe	1
105	Spring, Cylinder	1
106	Guide, Inner Cylinder Spring	1
107	Guide, Outer Cylinder Spring	1
108	Ring, Retainer	1
109	Pin, Locating, Cylinder Wear Plate	2

Item	Description	Qty
	SWASHBLOCK ASSEMBLY GROUP	
201	Swashblock	1
202	Wear Plate, Swashblock	1
203	Retainer, Shoe Hold Down	1
204	Bearing, Saddle	2
205	Pin, Control	2
206	Ring, Retainer	2
207	Seal, O-ring	1
208	Screw, Socket Head Cap	1
209	Screw, Socket Head Cap	9
210	Screw, Socket Head Cap	2
211	Pin, Swashblock Wear Plate Locating	1
212	Lever, Stroke Indicator	9
	DRIVESHAFT ASSEMBLY GROUP	
301A	Driveshaft, w/Keyway (Rear Ported Pump)	1
302	Bearing, Front Driveshaft	1
303	Retainer, Plate (Shaft)	1
304	Retainer, Seal	1
305	Ring, Shaft Bearing Retainer	1
306	Key, Driveshaft	1
307	Screw, Socket Head Cap	4
	VALVE PLATE ASSEMBLY GROUP	
401	Valve Plate, Rear Ported	1
402	Plug, SAE	2
403	Bearing, Rear Shaft	1
404	Screw, Shoulder	2
405	Screw, Socket Head Cap	4
406	Seal, O-ring	2
407	Seal, O-ring	1
411	0.125 NPT Plug w/D43 Orifice	1

PARTS LIST FOR PVV-440 - CONTINUED

Item	Description	Qty
	CONTROL HEAD ASSEMBLY	
501	Piston, Full Area Short Yoke	2
502	Piston, Full Area Long Yoke	2
503	Cap	2
505	Seal, O-ring	6
506	Plug, SAE	6
508	Screw	4
509	Screw, Socket Head Cap	4
	VOLUME STOPS	
701	Stop, Minimum/Maximum Volume	2
702	Gland, Volume Stop	2
703	Nut, Lock	2
704	Seal, O-ring	2
705	Seal, O-ring	2
706	Ring, Backup	2
	STROKE INDICATOR ASSEMBLY	
801	Bushing, Indicator Pin	1
802	Pin, Stroke Indicator	1
803	Arrow, Indicator	1
804	Packing, Block “V”	1
805	Seal, O-ring	1
806	Screw, Socket Head Cap	1
807	Washer, Delrin	1
808	Ring, Retainer	1

SERVICE KITS

Reference: 518260-440 Ass'y Drwg

PVV-440 Basic Pump

Assembly drawings:
518260(A2)

Document Number: 519257-SK
Revision: 0 (09-23-2005)

Description	Kit No.	Design Series	Items Included (quantity is 1 unless noted)
Common Parts Kits			
Viton Seals, USA	K518260-001	A2	001, 002, 003, 004, 005, 006, 007, 008(2), 009(2), 010(4), 011, 012(2), 013, 014(8), 015, 016(2), 017, 018(3), 019, 020(8), 021, 022, 023, 024, 025(2)
Viton Seals, Metric	K518260-002	A2	
Shaft & Bearing Kits			
2.48" Dia. Keyed (Code Y)	K518260-311	A2	301A, 302, 304, 305, 306
2.50" Dia. Keyed (Code T)	K518260-315	A2	
Shaft & Bearing Kits (with Retainer & Bolts)			
USA			
2.48" Dia. Keyed (Code Y)	K518260-301	A2	301A, 302, 303, 304, 305, 306, 307
Metric			
2.48" Dia. Keyed (Code Y)	K518260-303	A2	301A, 302, 303, 304, 305, 306, 307
Swashblock Kits			
USA	K518260-201	A2	201, 202, 203, 204(2), 205(2), 206(2), 208, 209(9), 210(2), 211, 212(9)
Metric	K518260-202	A2	
Swashblock Liners			
All	L407773	A2	204(2)
Swashblock Wear Plate with Screws & Roll Pin			
USA	K515881-003	A2	202, 209(9), 210(2), 211
Metric	K515881-303	A2	
Shoe Retainer & Hold-Down Ring with Screws			
USA	K515882-000	A2	104, 203, 209(9)
Metric	K515882-300	A2	
Hydrodynamic Bearing Kit			
All	K318912	A2	004, 025(2)
Housing Gasket Kit			
All	K407772	A2	003, 011(3)
Port Plate Kits			
Left-hand, Metric	K723635-300	A2	1, 404(2)
Right-hand, Metric	K723635-301	A2	

PVV-440 A2 Series Service Kits

Reference: 518260-440 Ass'y Drwg

Document Number: 519257-SK

Revision: 0 (09-23-2005)

Sheet 2 of 2

Description	Kit No.	Design Series	Items Included (quantity is 1 unless noted)
Valve Plate Kits			
Rear Port, Viton Seals, Metric	K518260-403	A2	401, 402(2), 403, 404(2), 405(4), 406(2), 407
Stroke Indicator			
Viton Seals	K518260-812	A2	801, 802, 803, 804, 805, 806, 807, 808, 809
Basic Pump Seal Kits			
Viton Seals	K518260-A21	A2	003, 007, 009(2), 010(8), 011(3), 012(2), 013, 018(3), 019, 207, 407, 505(6), 704(2), 705(2), 706(2), 804, 805
Shaft Seal			
Viton Seals	250486-001	A2	007
Driveshaft Bearing			
All	250487	A2	302
Tailshaft Bearing			
All	250797	A2	403
Nameplate & Screws			
All	K312665-001	A2	020(8), 023

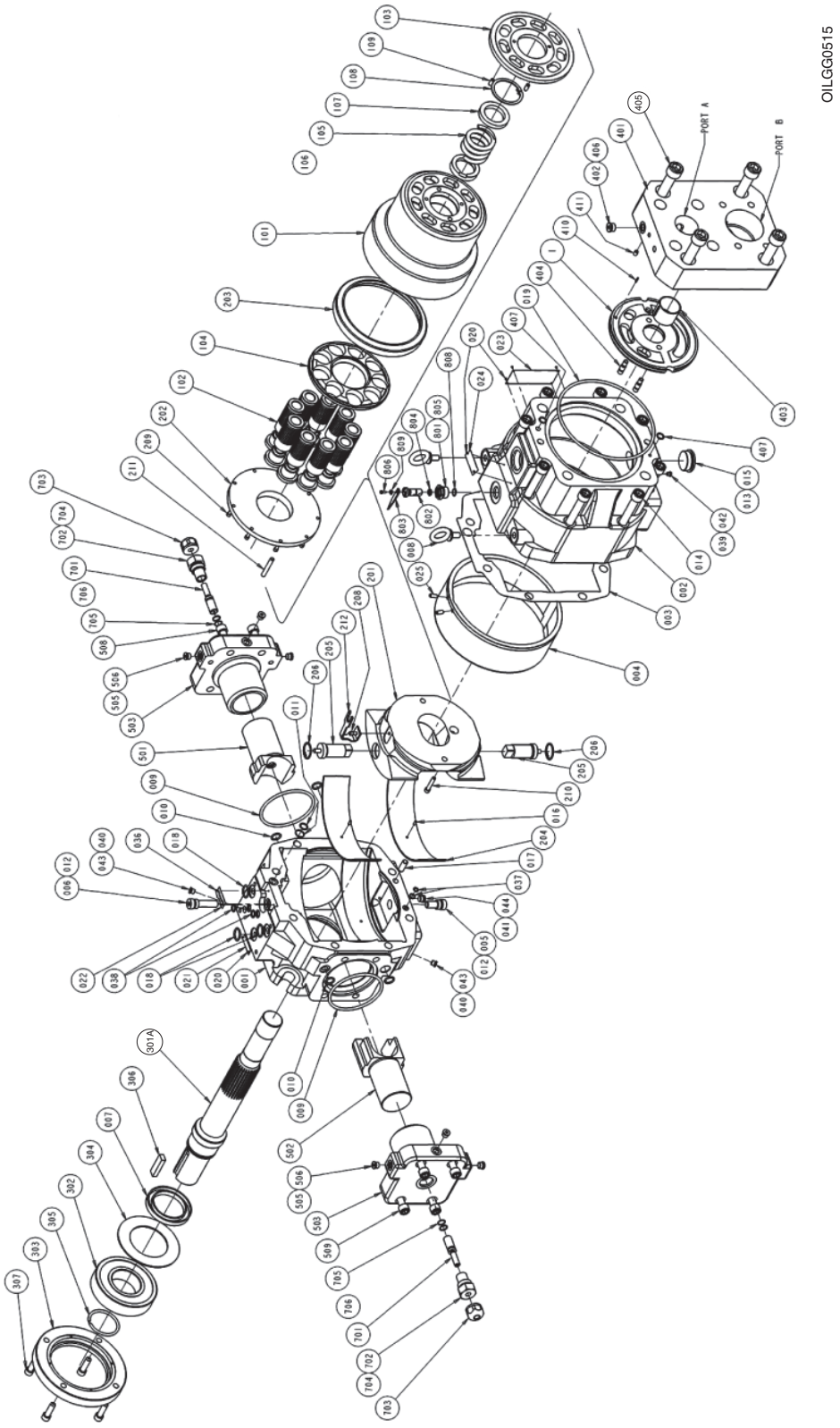


Figure 6. Exploded Parts Drawing for PVV-440 A2 w/Rear-Ported Valve Plate (518260 sheet 2)

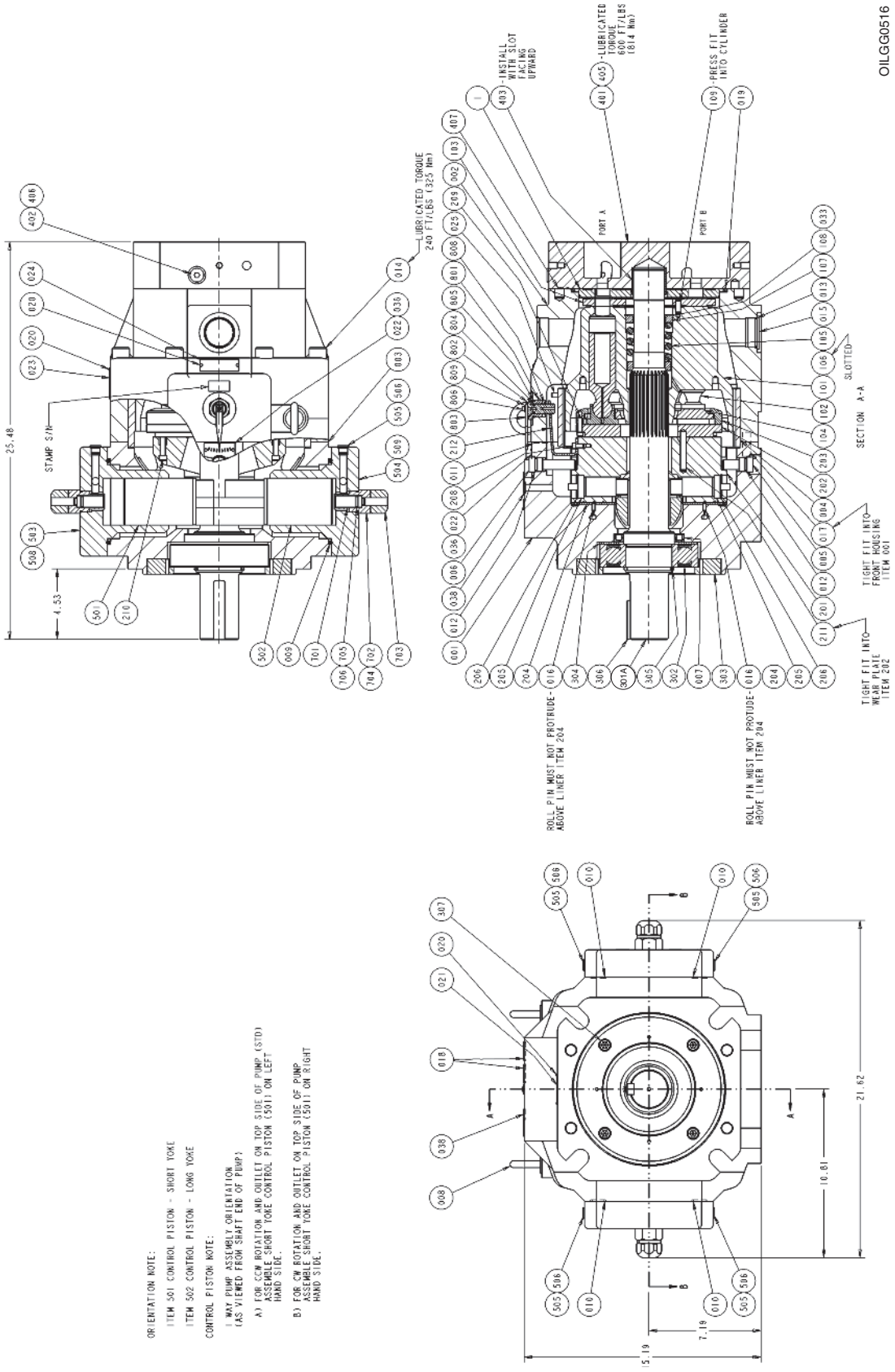


Figure 7. Exploded Parts Drawing for PVV-440 A2 (518260 sheet 1)

NOTES

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.