

# ***PE AD Lubrication Pump***

version:01-20090901

01 Main Data, Operation Data and General Design



This manual is intended for the personal use of engine operators and should be at their disposal.  
The content of this manual shall neither be copied nor communicated to a third person.



**T. F. HUDGINS**  
INCORPORATED

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### General Specifications

*This manual covers pumps with serial numbers 92000 and greater.  
For a manual on pumps with other serial numbers, consult factory.*

Speed Range ..... 50 to 1,000 rpm

Delivery Range (Per Cylinder) ..... Minimum — 10 U.S. Pints/Day

Test Oil Specifications ..... 5 wt. oil  
Discharge pressure – 1,650 psig charging  
Pressure – 5 psig 70° F ambient temperature

Minimum Inlet Pressure ..... 1.5 psig (3.5 ft of head)

Maximum Delivery Pressure.....	Plunger Size	Constant Press. psig	Intermittent Press. psig
	6 mm	8,000	10,000
	10 mm	2,900	5,000

Break Horsepower Required ..... See horsepower curve

Pump Media ..... Any mineral base  
lubricant from 50 SSU  
to 2,200 SSU @ 100° F

Direction of Rotation.....Bidirectional

Weight ..... 14 lb. (dry)

For unusual conditions, contact T.F. Hudgins Engineering.  
NOTE: The Pump is capable of handling many types of media.  
If your requirements call for something other than shown above, please contact:  
T.F. Hudgins, Inc.  
4405 Directors Row, Houston, TX 77092  
713.682.3651

## Ordering Information

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### **TO ORDER A NEW PUMP**

The following information is required for ordering a new pump. Note that these items are in addition to available options.

1. The type of fluid to be pumped and its specifications
2. Pump drive coupling location: (right or left when facing inspection cover)
3. The speed, diameter and key size of the shaft which will drive the pump
4. Whether or not the oil (lubricant) will be supplied to the pump under pressure or by gravity
5. The quantity of lubricant in pints/24 hours that each plunger is required to supply
6. If the pump is to replace an existing unit, the type number and serial number of that pump should also be furnished

### **TO ORDER SPARE PARTS**

When spare parts are required, the following procedure should be followed:

Furnish the quantity, item number and part number of the part required. In addition, the information found on the pump name plate (type number and serial number) should also be furnished. Drawings and parts list are available upon request.

### **PUMP ACCESSORIES AND OPTIONS**

Each pump is furnished as standard with drive coupling assembly, overflow valve, bowl assembly and mounting bolts.

The following options are available at additional cost:

1. Clutch assembly with hand crank to enable operation of pump when machine is at rest. When ordering a clutch assembly, furnish the rotation of the drive shaft when facing it.
2. Multiple cylinder pumps can also be furnished whereby each plunger can deliver different oils
3. Prelube connection at the bowl for use with a hand pump
4. Stainless steel tubing and fittings
5. Angle mounting (25° typical)
6. SAE standard mechanical tachometer adaptor

## DESCRIPTION

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The model PE AD lubricating pump is an in-line positive displacement plunger type capable of delivering accurate quantities of fluid under high pressure for both lubricating and process requirements. The pump is capable of delivering precisely metered amounts of fluid under a wide range of pressures and is especially suited for use with centralized lubricating systems.

The model PE AD pump utilizes an eccentric camshaft for actuating the plunger in a uniform stroke. The pump plunger is driven upward by the camshaft on the pressure cycle and is returned by a spring for the inlet cycle. The plunger is precision-fitted to its mating barrel so as to make it unnecessary to utilize any special packing or seals. The plunger and its mating barrel are furnished as a matched set and cannot be interchanged. The metering ability of the pump is accomplished by rotating the plunger in the barrel. This design makes it possible to set an exactly metered amount of fluid to be delivered at any given pressure that the pump is capable of delivering and at any speed up to and including 1,000 rpm.

The pump housing is made of aircraft-grade aluminum and all steel wear parts are hardened. The camshaft is mounted on precision roller bearings which in turn are mounted in detachable end caps, thus insuring ease of serviceability. The camshaft and bearings, which are located in the base or camshaft compartment of the pump, are lubricated by a supply of non-detergent 30 wt. motor oil, which can be easily checked with the pump dip stick. The camshaft lubricating oil is completely separated from the pumped media and should therefore be checked periodically for both cleanliness and level.

The PE AD lubricating pump is extremely versatile and can be furnished in one, two, three, or four cylinder versions. The pump can be ordered driven from either the right or left hand side. It can be driven either clockwise or counter-clockwise. For your convenience, a general assembly and outline dimension drawing is including in this manual.

It should be noted that for many years Gerhardt, Inc., was the manufacturer of the model "B" lubricating pump. This pump was discontinued at the beginning of 1978 and replaced with the current model "AD" pump. The only differences between the model "B" and the current model "AD" pump are that the "AD" pump is smaller in overall size and the mounting arrangement is different. Those customers with a model "B" lubricating pump who require a replacement will be supplied the "AD" pump. The change-over will require virtually no changes in the piping and the "AD" pump can be supplied at customer request with a mounting adaptor assembly which will allow the "AD" pump to be mounted in the exact location as the existing model "B" pump.

## Installation

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The PE AD lubrication pump is designed for base mounting utilizing four (4) hold down bolts as shown on the enclosed general assembly. The pump should always be mounted to a rigid frame which is adjacent to the driveshaft. The pump is designed to be driven with a flexible type coupling that must be accurately aligned between the pump and the drive shaft. Misalignment will cause undue stress to the camshaft and could cause permanent damage.

The pump should never be driven by a belt or chain attached directly to the camshaft; therefore, if this type of arrangement is required, a short jack shaft should be utilized so that the pump can be driven through a flexible coupling. Always make certain that the coupling set screws are tightened and that no external piping attached to the pump can cause undue stress due to expansion or mechanical forces.

Although the pump requires very little maintenance, it is necessary to periodically check the quality and level of the oil lubricating the camshaft compartment. It may also become necessary to revise the settings of the pump to meet new requirements of the machinery being lubricated. Therefore, it is always advisable to install a pump with the removable cover plate and dip stick facing an open area easily accessible by maintenance personnel.

## Startup

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After the pump is mounted and the lubrication lines made up, the entire installation should be checked. Drive coupling should be properly aligned so as not to "jam" the flexible member, all capscrews and fittings checked for tightness and the oil level in the pump checked.

To purge the system for startup, remove the delivery valve holder(s), and the delivery valves(s), fill the cavity with the lubricant to be pumped. Reinstall the delivery valve and delivery holder(s). Tighten to 35 ft lbs torque.

## Operation and Maintenance

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The lubrication pump is a positive displacement type which is not capable of performing a suction cycle. Therefore, the inlet oil to the pump should always be held under a slight pressure. This pressure can range anywhere from 1.5 psig to 50 psig. Naturally, this inlet oil pressure can be supplied either from a pressure source or from an adequately mounted day tank for gravity feed.

In either method of supplying oil to the pump, the oil should be properly filtered to insure its cleanliness for protection of the pump and the entire lubricating system. It is recommended that a minimum 40 micron filter be utilized in the oil supply to the pump and that this filter be of sufficient size so as to insure an appreciable amount of time before it becomes plugged. Supply line should be 1/4" standard weight pipe or 3/8" min. OD tubing and should contain as few elbows and bends as possible.

For applications where the pump is to be supplied with oil from a gravity feed system, the pump is fitted with a metal bowl assembly attached directly to the pump oil inlet. As oil enters the bowl, it passes up the stand pipe and spills over to fill the bowl. Oil at the bottom of the bowl enters the pump and any air that entered the bowl during startup can be vented by opening the petcock mounted at the top of the bowl. Once the pump is purged of air and the bowl shows full of oil, the petcock can be closed.

The pump housing is also fitted with a petcock near the top opposite the oil inlet. This petcock is also used on startup to vent air from the pump inlet and can be closed when the oil flow from it is clear of any entrained air bubbles.

For applications where the pump is to be supplied oil pressure over 18 psig, the pump is fitted with a bowl assembly identical to the one describe above; however, the petcock is replaced with a tube connector to one side of the overflow valve and will automatically vent any air that may enter the bowl assembly. The overflow or relief valve is directly attached to the pump opposite the oil inlet. The overflow valve has two main purposes, one of which is to maintain approximately 18 psi in the oil inlet side of the pump when it is fed with pressured oil. In addition, it also vents any air which may have entered the pump oil inlet area. The customer connection of the overflow valve returns oil to the oil sump or tank. The overflow valve also acts as a check valve when the pump is shut down and will entrap oil in the pump oil inlet area, thus insuring an air-free supply of oil for startup.

The plunger and barrel assembly of the lubricating pump is very closely fitted so as to enable the pump to discharge lubricant at extremely high pressures. Even though the plunger and barrel assemblies are so accurately fitted together that they can only be supplied as an assembly, some clearance is required for long life and smooth operation. Due to the clearance, a small leakage of the pumped media will occur over a period of time. This leakage, although extremely small, can eventually raise the level of oil in the camshaft compartment. This leakage is normal and is actually necessary for proper lubrication of the lower portions of the plunger and barrel assembly. Excessive camshaft compartment oil level will indicate this leakage may be occurring and if the frequency of the excess is such that it becomes a problem, the pump should be returned for repair.

As the plunger and barrel wear, more leakage will be noted; however, this should not be a matter of concern unless the leakage becomes great enough to prevent the required pressure and quantity of oil which is expected.

## Adjustments

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The lubricating pump, as a positive displacement delivery device, can have its delivery completely adjustable over the full range of the pump specification by changing the speed of the pump, or more normally, by adjusting the individual plungers. The plunger, which is closely fitted to the barrel, has a helical groove milled in its top section which aligns with radial charging ports located in upper portion of the barrel. By rotating the plunger in relation to these radial charging ports, an exacting amount of lubricant can be established at the delivery point. The individual plunger and barrel assemblies of any one pump can be adjusted so that each delivery point has the required amount of lubricant being delivered at any given pump speed. Naturally, changing the speed of the pump will change the delivery quantities of all of the cylinders incorporated in the pump. The following adjustment procedures should be utilized when it is desired to change the delivery of one or all of the cylinder assemblies incorporated in the pump.

### Adjusting Pump Delivery

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1. Remove the pump inspection cover taking care not to damage the inspection cover gasket.

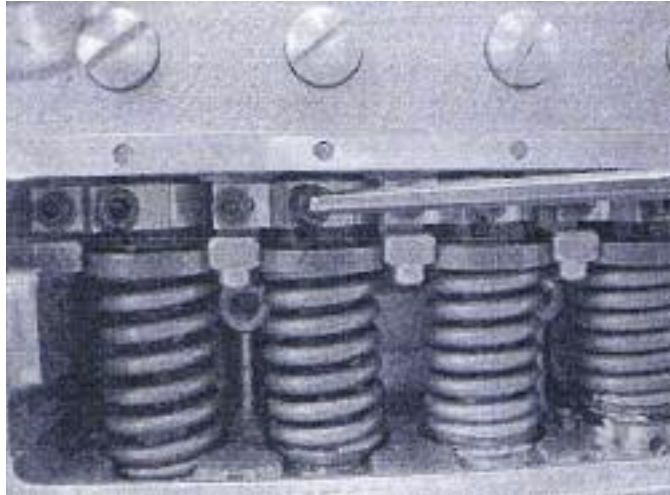
#### **COARSE ADJUSTMENT**

2. See Figure 1. Insert a 5/64" Allen wrench into the head of the segment tension screw which holds the segment and rotate counterclockwise approximately three-quarters of a turn. This will relieve the tension applied by the segment to the control sleeve and allow the next step to be taken.
3. See Figure 2. Using a small screwdriver or Allen wrench to engage one of the slots in the control sleeve, rotate the sleeve counterclockwise for decreasing delivery or clockwise for increasing delivery.
4. Tighten segment tension screw and check pump delivery. If delivery is within  $\pm 3$  pints per day of required delivery, proceed to step 5. If delivery is not close enough to required delivery, go back to Step 3.

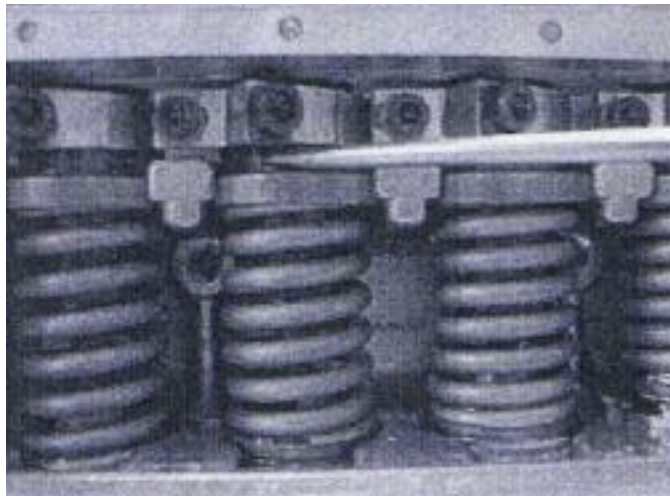
#### **FINE ADJUSTMENT**

(Note: Segment tension screw must be tightened)

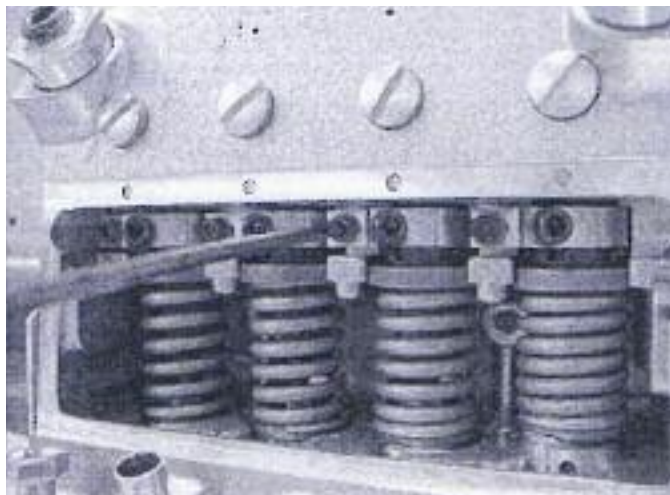
5. See Figure 3. Using a 1/16" Allen wrench, turn the segment adjustment screw clockwise to increase delivery or counterclockwise to decrease delivery.
6. Recheck pump delivery and if necessary repeat Step 5.
7. Upon the completion of adjustment, replace the pump inspection cover using a small amount of gasket treatment to insure sealing.



**FIG. 1**



**FIG. 2**



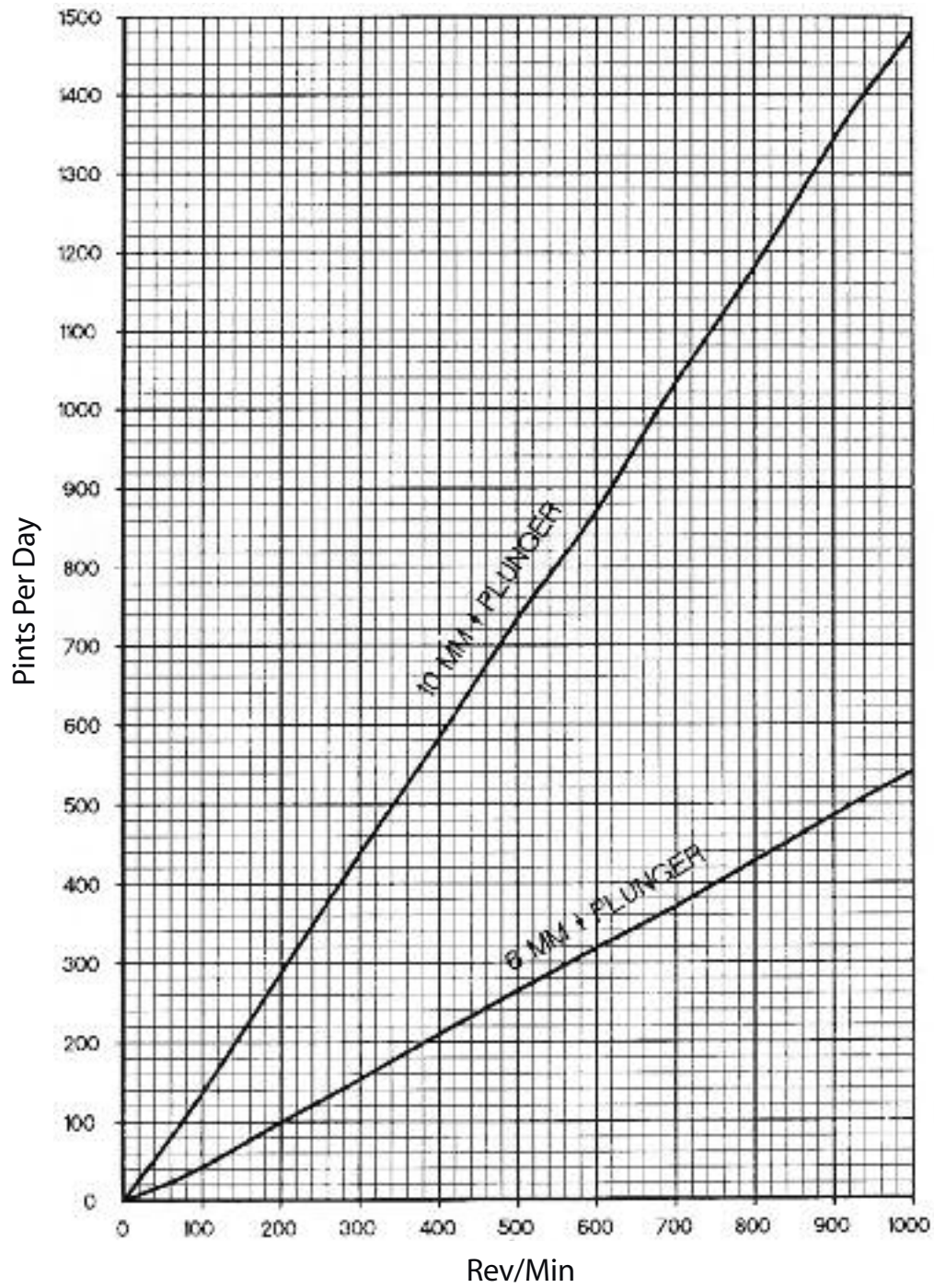
**FIG. 3**



## Troubleshooting

<i>Trouble</i>	<i>Probable Cause</i>	<i>Possible Remedy</i>
<b>Unit will not pump</b>	Restricted inlet or plugged filter	Change the filter
	Air in pump	Loosen the delivery valve holder until air-free oil flows freely and then re-torque the holders to 30-35 ft lb
	Stuck or frozen plunger	Remove the inspection cover and ascertain whether or not the plunger is moving up and down
	Dirt under delivery valve	Clean
	Delivery valve stuck open or broken spring	Check torque and/or replace broken spring
<b>Pump stops pumping while running</b>	Restricted inlet or plugged filter	Change the filter
	Air in pump	Loosen the delivery valve holder until air-free oil flows freely and then re-torque the holders to 30-35 ft lb
	Stuck or frozen plunger	Check for foreign matter in the lubricant
<b>Output decreases rapidly</b>	Worn delivery valve or plunger	Replace parts or repair
	Defect in the counter	Replace counter

### Model PE AD Maximum Delivery Curves



## Model PE AD Lube Pump Specification Sheet

CYL 1	CYL 2	CYL 3	CYL 4	Notes
				Pints in 24 Hours
				6 or 10 mm Plunger & Barrel
				Max. Operating Pressure
				Indicate Separate Chambers (P) or (G)

**GENERAL INFORMATION**

1. Pump rpm \_\_\_\_\_
2. LH or RH \_\_\_\_\_
3. Gravity (G) FED \_\_\_\_\_ Pressure (P) FED \_\_\_\_\_
4. Supply P/N & S/N if this is a replacement pump  
 P/N \_\_\_\_\_ S/N \_\_\_\_\_

**OPTIONS:**

1. \_\_\_\_\_ Tachometer drive adaptor
2. \_\_\_\_\_ Manifold/gauge package P/N G361001
3. \_\_\_\_\_ Provisions for 25 degree angle mounting
4. \_\_\_\_\_ Separate oil supply chamber (see table)
5. \_\_\_\_\_ Stainless Steel fittings
6. \_\_\_\_\_ Normal duty coupling ( 1/2" – 1-1/8" ) size
7. \_\_\_\_\_ Heavy duty coupling (over 1-1/8" ) size
8. \_\_\_\_\_ Provision for drive coupling on both ends of pump
9. \_\_\_\_\_ Overrunning clutch with adapter
10. \_\_\_\_\_ Add reservoir/Delete reservoir
11. \_\_\_\_\_ Add overflow valve/Delete overflow valve
12. \_\_\_\_\_ 2" shaft extension
13. \_\_\_\_\_ Delete coupling (standard size)
14. \_\_\_\_\_

Other Special Requirements \_\_\_\_\_

\* Pressure Fed — Use Bowl      Gravity Fed — Delete Bowl

PLEASE PHOTOCOPY AND FAX TO T.F. HUDGINS, INC.  
 Fax: 713.682.1109 Attn. Technical Dept.





ITEM	QUANTITY				PART NO.	MATERIAL NO.	DESCRIPTION
	1 C/U	2 C/U	3 C/U	4 C/U			
1	1	1	1	1	G360328		FLANGE HOUSING
2	1	1	1	1	G360132		INSPECTOR COVER
3	2	2	2	2	G360133		INSPECTOR COVER SCREW
4	2	2	2	2	G360134		INSPECTOR COVER SCREW GASKET
5	1	1	1	1	G360135		SP-STEEL
6	4	4	4	4	G360136		BASE FLANG
7	48	48	48	48	G360137		FLANGE AND BUSH ASSEMBLY (L/Hand)
7A	48	48	48	48	G360138		FLANGE AND BUSH ASSEMBLY (R/Hand)
8	1	2	3	4	G360139		DRUMMER VALVE SPRING
9	1	2	3	4	G360140		DRUMMER VALVE SPRING
10	4	4	4	4	G360151		DRUMMER VALVE GASKET
11	1	2	3	4	G360152		DRUMMER VALVE GASKET
12	2	2	2	2	G360163		CLAMPING LAW ASSEMBLY
13	4	4	4	4	G360164		DRUMMER VALVE EXCLUSIVE RING
14	48	48	48	48	G360166		RETROCK LIFT RIT
15	2	2	2	2	G360206		WELSH PLATE
16	1	1	1	1	G360170		WASH STOP SCREW
17	1	1	1	1	G360216		CONTROL SEGMENT
18	1	2	3	4	G360172		CONTROL SLIDE
19	1	1	1	1	G360272		CONTROL SEGMENT TENSION SCREW
20	1	1	1	1	G360273		CONTROL RIT
21	2	2	2	2	G360175		WASHER AND BUSH ASSEMBLY
22	2	2	2	2	G360177		SPACER
23	2	4	6	8	G360276		WASHER
24	48	48	48	48	G360179		SHIM
25	1	1	1	1	G360129		ADJUSTING BOLT KIT
26	1	1	1	1	G360181		OLE SEAL
27	3	2	1	0	G360130		CLAMPING FLANG
28	1	1	1	1	G360183		FLANGE COVER (RIGHT END)
29	1	1	1	1	G360229		FLANGE COVER (LEFT END)
30	8	8	8	8	G360185		FLANGE COVER SCREW
31	2	2	2	2	G360186		FLANGE COVER SCREW
32	3	2	1	0	G360187		FLANGED DRIVER WAVE HOUSING
33	48	48	48	48	G360177		COMPLING LIFT
33	48	48	48	48	G360197		COMPLING LIFT
33	48	48	48	48	G360203		COMPLING LIFT
33	48	48	48	48	G360202		COMPLING LIFT
33	48	48	48	48	G360202		COMPLING LIFT
33	48	48	48	48	G360203		COMPLING LIFT
34	1	1	1	1	G360165		SPACER
34	1	1	1	1	G360166		SPACER
35	1	1	1	1	G360167		CLAMPING WAVE HALF SPRT
36	48	48	48	48	G360202		FLANG
37	2	2	2	2	G360206		FLANG
38	1	1	1	1	G360191		DRUMMER VALVE GASKET
39	1	1	1	1	G360192		DRUMMER VALVE GASKET
40	1	2	3	4	G360194		SPRING SPRING SCANT
41	1	2	3	4	G36013535		SPRING SPRING SCANT

\* = NOT SHOWN

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REV	DATE	DESCRIPTION

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**LUBE PUMP BILL OF MATERIALS**  
 PRODUCTS / **TEHJDGNS**  
MANUFACTURED

DATE	REVISED BY	DATE	REVISED BY
11/20/11	TR		

QUANTITY				
	2	3	0	

BILL OF MATERIAL

ITEM	QUANTITY				PART NO.	MATERIAL NO.	DESCRIPTION
	1 C/L	2 C/L	3 C/L	4 C/L			
42	1	2	3	4	G360196		LOWER SPRING SHRT
43	1	2	3	4	G360197		SHIM
44	1	2	3	4	G360198		WEDGE BRASSING TAPE ASSEMBLY
45	1	2	3	4	G360198		SCREW ADJUSTING SCREW
46	1	2	3	4	G180072		TENSION SPRING
47	AR	AR	AR	AR	G33001		NUT
48	AR	AR	AR	AR	G12084		METAL BOWL ASSEMBLY
49	1	1	1	1	G310660		BOWL ASSEMBLY OF RING
50	AR	AR	AR	AR	G330114		TEE
51	AR	AR	AR	AR	G340039		FEI COCK 1/8" NPT
52	AR	AR	AR	1	G340032		ELBOW BRACE 1/4" BUNG TO 1/8" NPT
53	AR	AR	AR	1	G331012		ELBOW 1/4" TUBING TO 1/4" NPT
54	AR	AR	AR	AR	G360026		OVERFLOW VALVE STEEL (NOT SHOWN)
55	1	1	1	1	G292844		SERIAL NO NAME PLATE
56	1	1	1	1	G300027		CYLINDER ID NAME PLATE
57	1	1	1	1	G190032		BOX
58	1	1	1	1	G210065		INSPECTION COVER GASKET
59	AR	AR	AR	AR	G340005		COPPER TUBING FOR COMPRESSION FITTINGS
60	AR	AR	AR	AR	G340049		OVERFLOW VALVE BRASS ASSY ITEMS 52, 53, 64, 65
61	AR	AR	AR	AR	G380027		SER. N. 1.586 COUPLING ASSEMBLY
62	AR	AR	AR	AR	G380027		SER. N. 1.586 COUPLING ASSEMBLY
63	AR	AR	AR	AR	G340001		MATERIAL DIAL/GAGE/PACKAGE (OPTIONAL ITEM)
64	AR	AR	AR	AR	G360048		CHECK VALVE
65	4	4	4	4	G510035		BRUDED WASHERS FOR PUMP MOUNTING
66	4	4	4	4	G510033		5/16" HEX NUT FOR PUMP MOUNTING
67	4	4	4	4	G360002		5/16" HEX NUT FOR SCREW FOR BOWL MOUNTING
68	1	2	3	4	G360035		INSERT METAL COU
69	AR	AR	AR	AR	G360047		TEE BRASS

\* = NOT SHOWN

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**LUBE PUMP BILL OF MATERIALS**

DATE	REVISED BY	DESIGNED BY	CHECKED BY
02/20/11	TEH	TEH	TEH
DATE	REVISED BY	DESIGNED BY	CHECKED BY
03/02/11	TEH	TEH	TEH

## Standard Product Warranty

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Lubrication Products Division, T.F. Hudgins, Incorporated warrants its products to be free of defects in materials and workmanship for a period of one year from the date first placed in operation or for 18 months from the date originally sold by Lubrication Products, whichever is shorter. This warranty is limited to the repair, replacement or refund of purchase price of the article claimed defective (at the option of Lubrication Products) FOB factory, Houston, Texas.

Lubrication Products can assume no liability for contingent damages for its products since they are operated beyond its control. In any event, claims for damage under this warranty shall not exceed the price of the goods. Such replacement, repairs, or service as may be necessary as the result of accidents, tampering, improper installation or abuse is not included in this warranty.

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T.F. Hudgins, Incorporated  
SA02.0393 LPD

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