Operation and Maintenance Instructions

I. DESCRIPTION & OPERATING CHARACTERISTICS

a) Gear type pumps are used for applying coolants, cutting oils, lubricants, and other liquids which have lubricating quality and which are clean and free of abrasives. These are positive displacement pumps and will develop the following maximum pressures: Model SG1—22 psi; Model SG2—40 psi; Model SG4—70 psi; 1/4 HP—50psi; and 1/2 HP—50 psi.

b) Relief valves are set for the maximum permissible pressure for the motor horsepower. Do not change this relief valve setting.

c) Liquid is drawn in on one side of the gears, carried around to the outside and squeezed out as the gears mesh. If the flow capacity of the pump is not used, the excess liquid will bypass through the pressure relief valve. If that valve is shut off, stuck or adjusted to a pressure higher than the pump motor is capable of delivering, then the motor will stall. Note: There have been two (2) design changes on the gear pump models SG1, SG2 and SG4 from January 1978 to January 1979. These changes are reflected on drawing 795-25280. All gear pump replacement part kits include the necessary components and instructions to repair and update all units to the new design.

II. MAXIMUM VISCOSITY RANGE FOR SAFE OPERATION

a) 1/25 HP Gear pumps will pump up to 100 SSU oil.

b) 1/8, 1/4 and 1/2 HP models are designed to pump up to 500 SSU oil.

c) Temperature may affect viscosity. The viscosity of a 100 SSU oil, for example, may increase substantially as it gets colder. If liquids are too "heavy" (viscosity too high), the motor will slow down and stall.

III. TEMPERATURE LIMITATIONS

A reasonable maximum temperature for standard pumps is 150°F. Consult the factory on applications where the temperature will exceed this. Even at this temperature. The motor will require good ventilation or heat from the pump body will be conveyed to the motor causing it to overheat.

IV. MOUNTING

Graymills Gear pumps are designed to be mounted vertically and usually in a tank where minor leakage through bearings will not be objectionable. The small priming chamber within the pump is also designed for vertical operation.

V. ELECTRICAL CONNECTIONS

a) It is advisable to ground the pump motor.

b) Check the name plate on the pump motor and be sure that it corresponds to the electrical current being used. 1/25 HP, 115 volt or 230 volt motors can be used on 50 cycle current but will produce reduced flow. Make sure 3 phase motors are running in correct direction which is counter-clockwise looking down from top of motor.

VI. MAINTENANCE

a) Keep pump and tank clean. Fine chips and foreign material that may pass through the filter screen or float over the baffle plates may find their way into the gear housing. Periodic cleaning of the gears and housing will greatly extend life of gears. (See disassembly instructions.)

b) Electric motors require no lubrication. Air ports ventilating the motor, however, should not be closed off or blocked in any way. Most 1/4 and 1/2 HP motors are totally enclosed and have no air ports.
c) A filter screen should always be used at the intake of the pump to prevent harmful chips and dirt from entering the pump. Keep the screen clean. When blocked, cavitation will result and pump will be damaged.

VII. DO NOT USE GEAR PUMPS ON GRINDERS, HONING MACHINES, OR OTHER MACHINE TOOLS WHICH PRODUCE ABRASIVE PARTICLES. DO NOT USE WITH PLAIN WATER. PUMPS REQUIRE SOME LUBRICATION. A SOLUBLE OIL IN WATER WILL PROVIDE THAT LUBRICATION.

VIII. WHAT TO CHECK IF FLOW IS REDUCED BELOW RATED OUTPUT

a) Check the intake screen to make sure nothing is blocking the entrance of liquid into the pump.
b) Check hoses to make sure there is no crimping or unusual restriction.
c) Check viscosity of liquid to make sure it is not so heavy that the pump cannot handle it and is slowing down.
d) Check the voltage, cycle and phase to make sure pump is operating on the right electrical current.
e) Check the direction of rotation if a 3 phase motor is used.
f) Make sure that the intake of the pump is in the liquid.
g) Check the relief valve for dirt or chips lodging on the valve seat which will prevent the ball from closing. This will cause liquid to constantly bypass. When reassembling the relief valve, make sure that the settings are the same so that the motor is not overloaded.
h) Make sure that the motor turns freely and does not bind. Sometimes through rough handling in transit, the motor on SG1 Series pumps may be knocked out of line with the pump casting. This will result in binding. When motor and pump are in alignment, the motor should start instantly, run freely, and when the switch is turned off pump should not come to a sudden stop, but should turn for a few revolutions if there is no other load on the pump.
i) If there is evidence of binding on SG1 series pumps (1) remove pump from container; it is in a container, (2) loosen the 2 nuts which hold the motor to the pump casting; Tap the pump casting until it is in alignment and the pump runs freely; (4) retighten the nuts carefully; do not draw the nuts up so tightly that the motor bolts will be pulled out of the motor; (5) make sure there is clearance between the upper and lower part of the coupling so there is *no end* thrust forcing the gears against the bottom plate or casting.

IX. DISASSEMBLY

a) Remove the bottom end cap on Models SG1, SG2, and SG4.
b) Remove idler gear by pulling it out of pump casting (for cleaning the gear housing, this is the only disassembly required).
c) Remove drive gear by pulling it out of pump casting (on pumps, which have a one-piece drive gear and drive shaft, it is necessary to loosen the set screw in the pump end segment of the 3-piece coupling before removing the drive gear).
d) Remove the motor from the pump casting (the motor end of the 3-piece coupling and the spider will come off with the motor).
e) If Oilite Bearing is worn or damaged, remove by pressing out from motor end of pump casting and replace.

X. ASSEMBLY

a) Press Oilite Bearings into Pump Casting.
b) Replace Drive Gear—be sure gear pocket with through hole is used.
c) Replace Idler Gear.
d) Replace Gasket and End Cap on Model SG1; replace End Cap using Gasket Sealer on Model SG2 and SG4.
e) Replace the Pump End of the 3-piece Coupling on the Drive Shaft.
f) Check freedom of rotation for assembled unit by rotating the Drive Shaft slowly using the Pump End segment of the coupling to grasp.
Note: The unit must rotate freely without any rubbing or tight spots.
g) Connect the motor to the pump casting and the motor shaft to the Drive Shaft through the 3-piece Coupling. Make sure that the flexible Spider is in place and there is no more than 1/8" and not less than 1/32" clearance between the Motor End and Pump End of the Coupling so that they do not cause binding. If the coupling and Spider are too close, a swelling of the rubber will cause pressure against the gears forcing them against the bottom plate. On the SG1 which is driven by a small motor, this friction is sufficient to stall the motor.
h) Next, replace the relief valve and any other parts that were removed.

XI. HOW TO ORDER PARTS

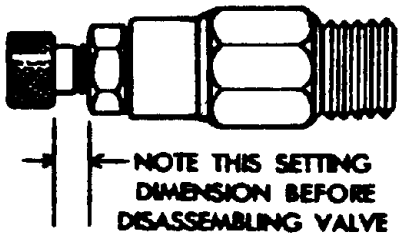
Give model number of pump. If model number cannot be determined, the motor serial number, horsepower, speed and type will help. Approximate date of purchase will also help.

Give serial or lot number of pump. Refer to the Gear Pump Parts List Form PALPG.

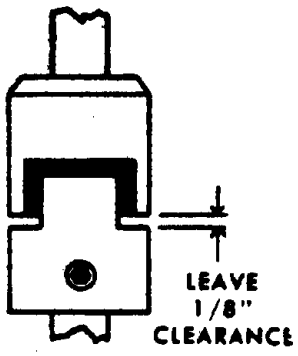
SERIES SG2: HOW TO ORDER REPLACEMENT WITH PUMP BODY.

In order to attain the higher pressure rating for the Model SG2 pump, a closer fit is required between the gears and the pump housing. This is accomplished at the factory where gears are assembled within the pump body and the bottom surfaces are ground as a unit. *Replacement gears* may be slightly longer or shorter than the gear pockets, when assembled in the surface ground pump casting. If shorter, pressure will not be maintained as fluid slippage will occur through the clearance. The pump surface should be ground down to match the gears. If longer, the bottom plate will require a gasket* for proper spacing. User may wish to perform this service as a replacement gear set *is* offered. It includes a new seal and bearing.

Or gears may be ground down.



RE-SET EXACTLY SAME



CAUTION

To avoid overloading of motor, extreme care should be taken in reassembly of

Leave approximately 1/8" clearance between neoprene spider and coupling to

FIGURE "A" – DESIGN PRIOR TO JAN.'78

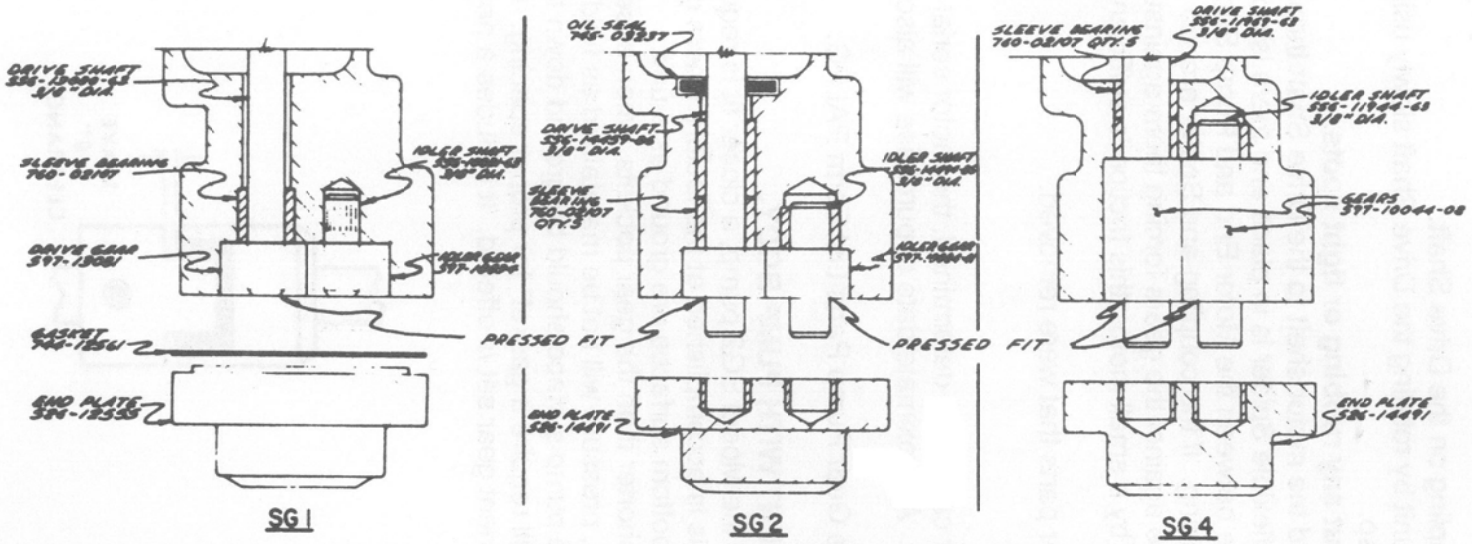


FIGURE "B" – INTERIM DESIGN

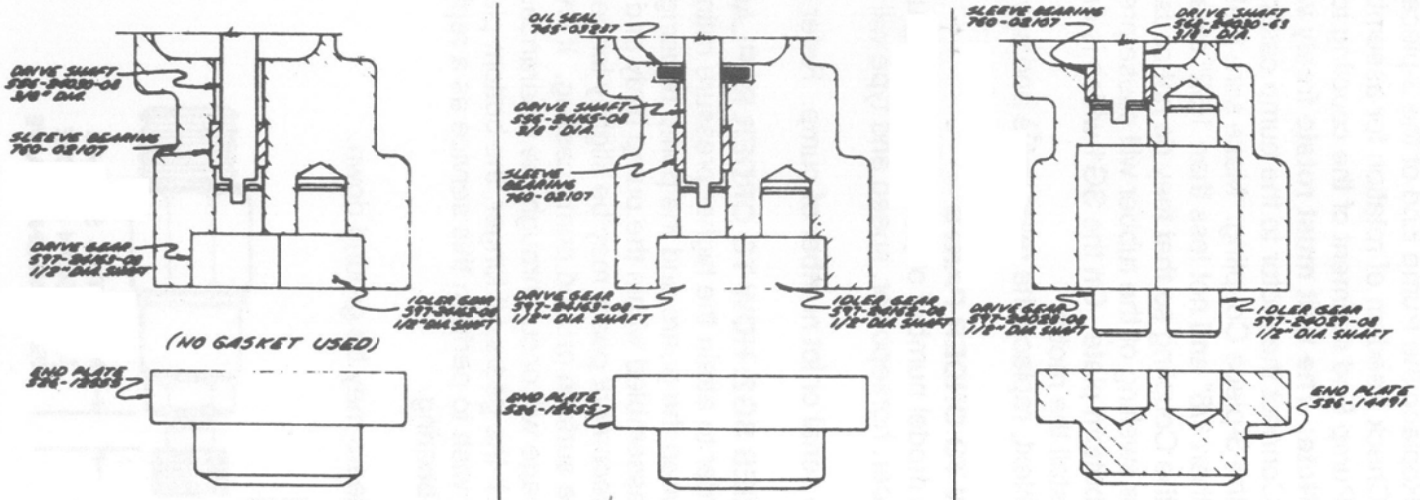
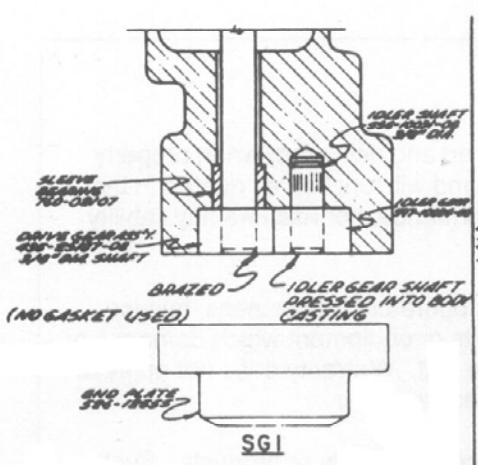
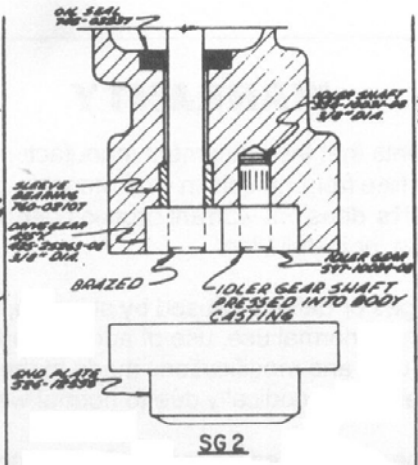


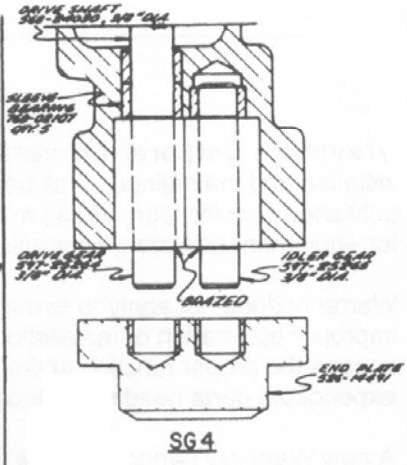
FIGURE "C" — NEW DESIGN



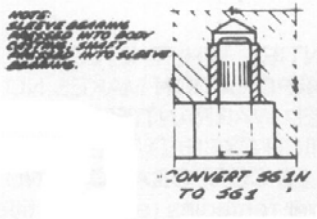
SG1

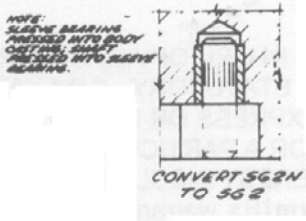


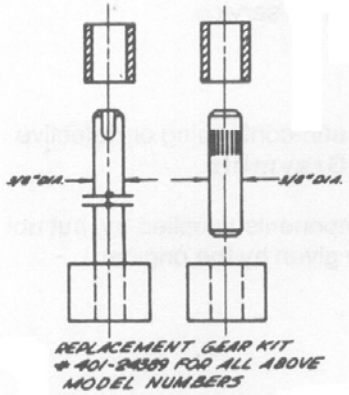
SG2

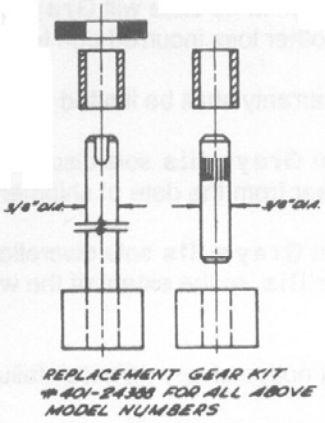


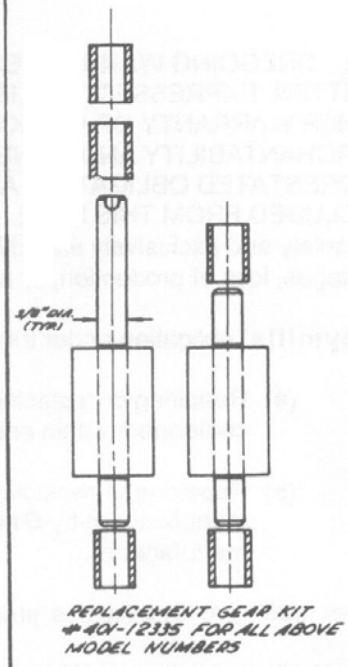
SG4











SG1

To convert B into C press 2 bushings into pump body. Press knurled end idler pin into one bushing. Gear and shaft kit #401-24389 will include 2 gears, idler pin & 2 bushings. Drive gear has integral shaft. Replacement gear set for style A will be the same as for B #401-24389.

Also note the newest model No. will again be SG1.

Note: Gasket not required with flat and plate.

SG2

To convert interim model SG2 (Dwg. B) into present model (Dwg. C). Press two bushings into pump body. Press knurled end of idler pin into one bushing. Idler gear slips over this pin and drive gear with integral shaft attached to coupling after seal is inserted in pump body. This replacement kit #401-24388 includes idler gear, drive gear, idler pin, 2 bushings and seal.

Also note the newest model No. will again be SG2.

SG4

To convert B to C, press 3 bushings into pump body, and 2 bushings into end plate. Insert two new gears into the bushing and reassemble (The newest gears have 3/8" diameter shafts which fit into the bushing.
The interim model had 1/2 diameter shaft fitting into the cast iron pump body and end plate.

The gear set for (SG4 #401-12335 consists of idler gear, drive gear (with integral shafts) & 5 bushings.

Also note the newest model number will again be SG4.

WARRANTY

Graymills Corporation warrants that the equipment manufactured and delivered, when properly installed and maintained, shall be free from defects in workmanship and will function as quoted in the published specification. **Graymills** does not warrant process performance, nor assume any liability for equipment selection, adaptation, or installation.

Warranty does not apply to damages or defects caused by shipping, operator carelessness, misuse, improper application or installation, abnormal use, use of add-on-parts or equipment which damages or impairs the proper function of the unit, and modifications made to the unit. Warranty does not apply to expendable parts needing replacement periodically due to normal wear and tear.

A new Warranty period shall not be established for repaired or replaced materials or products. Such items shall remain under Warranty for only the remainder of the Warranty period of the original material or product.

THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, WHETHER ORAL, WRITTEN, EXPRESSED, IMPLIED OR STATUTORY. **GRAYMILLS CORPORATION** MAKES NO OTHER WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEED THE AFORESTATED OBLIGATION ARE HEREBY DISCLAIMED BY **GRAYMILLS CORPORATION** AND EXCLUDED FROM THIS SALE. **Graymills** warranty obligations and Buyer remedies (except to title), are solely and exclusively stated herein. In no case will **Graymills** be liable for consequential damages, loss of production, or any other loss incurred due to interruption of service.

Graymills' obligation under this Warranty shall be limited to:

(a) Repairing or replacing (at **Graymills** sole discretion) any non-conforming or defective component within one year from the date of shipment from **Graymills**.

(b) Repairing or replacing (at **Graymills** sole discretion), components supplied by, but not manufactured by **Graymills**, to the extent of the warranty given by the original manufacturer.

Buyer must give **Graymills** prompt notice of any defect or failure.

If you believe you have a Warranty claim, contact **Graymills** at (773) 248-6825. Any return material must have an RMA number on the outside of the package and shipping prepaid or shipment will be refused. **Graymills** will promptly examine the material and determine if it is defective and within the Warranty period.