Lutz-JESCO America Corp.

A measured step forward™

Operations & Maintenance Manual

5700 Series - Model 5701

Total Fluid Management™

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Always give pump SERIAL NUMBER when ordering spare parts.

General Description

The Cyclo/Phramh pump is a positive displacement pump designed to meter liquids. A spring returned plunger, located in the main drive shaft, displaces hydraulic oil. The amplitude of the plunger stroke is controlled by positioning an eccentric shift ring against which the plunger pushes.

At zero capacity, the shift ring axis and the drive shaft axis coincide and no pumping action occurs. By offsetting the shift ring, the plunger stroke is increased and hydraulic oil is pulsed in the connecting passage leading to the diaphragm.

A molded telfon diaphragm separates the process and hydraulic fluids. The diaphragm moves in response to the pulsing fluid so that the volume of liquid on the process side of the diaphragm is alternately increased and decreased.

Double ball check valves prevent the reversal of flow of process fluid occurring through them. During the pump's suction stroke the volume of liquid in the process head is increased, the suction check valves are open, the discharge valves are closed and fluid is drawn into the pump. When the stroke is reversed, discharge occurs as the volume is decreased; the suction check valves are closed and the discharge valves are open.

The check valves are closed at the end of the suction and discharge strokes by their own weight. A positive differential pressure has to exist between suction and discharge to maintain proper check valve operation and to ensure precision and accuracy of operation.

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The diaphragm moves between two backup plates. The volume enclosed between the two plates is more than the maximum displacement of the plunger. In operation, the diaphragm flexes between the hydraulic side backup plate and a point determined by the plunger displacement.

The diaphragm contacts the backup plate near the end of the suction stroke and a preset oil replenishing valve operates to compensate for oil volume changes in the pulsing fluid due to slight leakage at seals, temperature variations, or when discharge capacity is changed.

The pump is equipped with an internal spring loaded relief valve to prevent pulsing fluid pressure, and therefore the process fluid pressure, from exceeding a preset pressure, usually 15 to 20% higher than the maximum discharge pressure. When the relief valve operates, oil is discharged to the pump casing reservoir during the discharge stroke. During the suction stroke the diaphragm contacts its backup plate and make-up oil is admitted through the oil replenishing valve. This will continue during each stroke until the discharge condition is corrected.

Closing off or "starving" the suction flow prevents the diaphragm from returning to its normal position during the suction stroke. Oil enters the pulsing fluid chamber through the replenishing valve in an excessive amount. During the discharge stroke the diaphragm may contact the back-up plate on the process side. The hydraulic pressure rises to the relief valve pressure and any excess oil is discharged through the relief valve. Do not operate the pump in this manner as serious damage may occur to the diaphragm and other parts of the pump.

Cyclo/Phramh pumps use flange mounted motors. The 5700 (A) pump has a 56C frame and motor.

The main drive shaft is mounted on oversized tapered roller bearings. An eccentric cam is cast on the drive shaft. The purpose of the cam is to operate an air venting mechanism which continuously releases entrapped air from the hydraulic system.

A variety of options are available with Cyclo/Phramh pumps. Type 316 stainless steel, Hastelloy C, Carpenter 20 and plastic are available for liquid ends. Several pumps can be driven by the same motor. Pneumatic and electric stroke adjustment can be provided. Motors can be variable or fixed speed. Special provisions can be made for high temperatures, unusual fluid characteristics, or high suction lifts.

Installation Instructions

A. Location

The Cyclo/Phramh pump should be located so that piping to and from the pump is as short and free of turns as possible. Short suction lines are very desirable. Since a flooded suction line helps prevent vapor binding of the pump, try to locate the pump below the liquid level in the suction vessel. See further recommendations under "Piping".

The Cyclo/Phramh pump is adjustable while operating; allow sufficient space around the pump to permit easy access to the capacity adjustment mechanism and for routine maintenance.

B. Removal of Pump from Storage

Before the pump leaves the factory it is given a running test with cold water at operating pressure. Protective plastic caps will be placed over the suction and discharge opening. The pump is shipped fully charged with hydraulic oil suitable for operation above 50°F. Check to assure that the oil level is within ½" of the top of the casing. Remove the shipping plug in back of the pump housing.

C. Foundation

The Cyclo/Phramh pump does not require a concrete foundation. It can be placed on any firm, level floor and need not be bolted down since the pump does not vibrate during operation. You may, however, wish to bolt down the pump to prevent damage to piping should the pump be jarred. Place the pump on a slightly raised platform above floor level if there is to be any hosing down in the area.

D. Piping

1. General

a. Piping materials should be selected to be resistant to corrosion by the liquid being pumped. Select materials to avoid galvanic corrosion at points of connection to the pump suction and discharge cartridges. Use piping rated to withstand maximum pressure and temperatures of the system.

b. Be certain that inside diameters of joints match properly; remove burrs and sharp edges, and avoid welding shot or splatter entering the lines. All lines should be blown out or flushed prior to making final connections to the suction and discharge valve cartridges.

c. Do not spring piping to make connections. Provide for pipe expansion when hot fluids are pumped; support piping so that strain is not placed on the valve cartridges.

d. Suction and discharge piping should be as short and straight as possible. Avoid unnecessary elbows. When possible use long sweep 90° fittings or 45° fittings. Piping should be sloped to eliminate vapor pockets.

e. Flexible hose connections for both suction and discharge cartridges should be used for pumps with plastic liquid ends.

f. Concentric bushings should be used only in vertical lines unless the piping arrangement permits natural venting of horizontal lines.

g. Expansion loops, valves and similar equipment should be installed in positions to prevent formation of vapor pockets.

2. Suction Piping

a. Use next larger pipe size than the suction connection of the pump. See the table of piping sizes for the recommended size for your pump.
b. Suction piping must be absolutely tight. Test suction piping with air and soap solution for leaks. If possible, use tubing for the suction line since it has a smooth inner surface and is easily formed into sweep bends.
c. Tight joints and sufficient net positive suction head are required for efficient pump operation.
d. Use the Pipe Size Recommendation Table and Pressure Drop Chart to determine acceptable piping lengths. (Fig.B)
e. Use an auxiliary feed tank close to the suction side of the Cyclo/Phramh pump if long suction lines from the main feed tank are unavoidable. The auxiliary feed tank may be calibrated and used to check pump capacity by measuring the time required to draw a specific quantity of liquid from it. A typical auxiliary feed tank is shown in Fig. A.

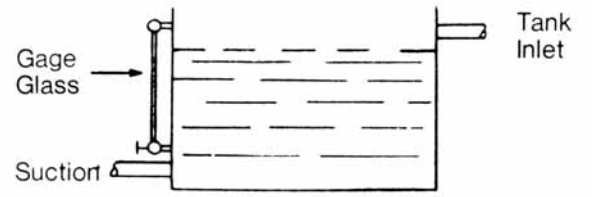


Figure "A". AUXILIARY FEED TANK

Pipe Size Recommendation Table

Suction		
Connection 1/2"" NPTM	Pipe Size 3/4""	Tubing O.D. 1""
Discharge		
Connection 1/2"" NPTM	Min. Pipe Size 1/2""	Min. Tube Size 3/4""

Use this table for the specifc suction and discharge connections as supplied or as specified on the data sheet for the pump selected.

The size of the suction line should be one size larger than the size of the suction connections. The discharge line should not be smaller than the discharge connection. Use a pipe schedule based on the pressure requirements.

Pressure Drop Due to Acceleration

The pulsing nature of the fluid in the suction piping can cause rather substantial pressure drop because the flow must accelerate and decelerate on each stroke of the pump. The energy available to overcome these losses is generally the static head in the feed tank. The suction piping must be sized to assure a positive head at the pump. The pressure drop can be determined using chart. (Fig. B.)

Instructions on use of Pressure Drop Chart

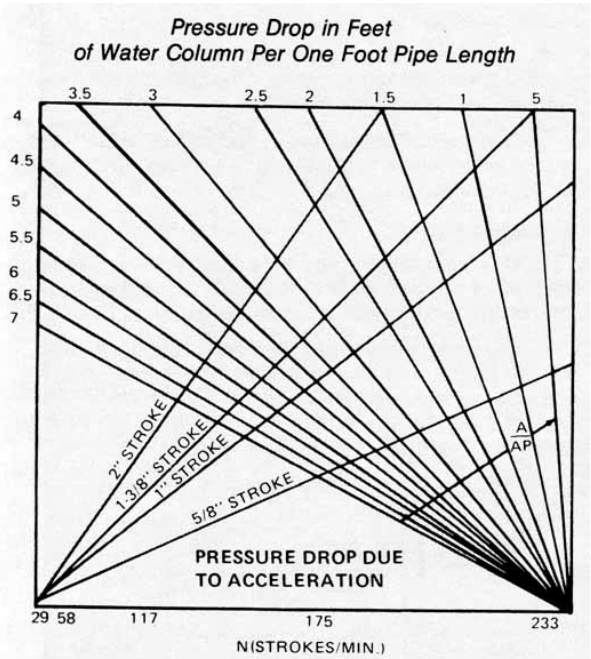


Figure "B".
Refer to instructions opposite for use of this diagram.

1. Determine pump stroking speed, strokes per minute.
2. Maximum stroke length is 5/8".
3. Determine ID of pipe or tube.
4. Determine plunger diameter of pump Model Number as follows:

Number	Diameter
570X-1X-XXXX	7/16" diameter
570X-2X-XXXX	23/32" diameter

5. Determine ratio Plunger dia. and square the Pipe ID ratio to obtain the ratio (A) (AP)
6. Locate pump speed on chart and move vertically to stroke length line. Move horizontally to intersect (A) as determined above. (AP)

Move vertically to read H/L, pressure drop in feet of water per foot of pipe length. The length is measured from the pump suction connection. Considering all head losses, the absolute pressure at the pump suction must be greater than the vapor pressure of the liquid being pumped. Allow .23ft. of water for a gravity operated check valve.

3. Discharge Piping

a. Install adequately sized pipe with a pressure rating in excess of the internal pressure relief valve setting.
b. A positive pressure differential of approximately 30 psi between the suction and discharge valves is recommended for proper seating of the ball checks. Should normal discharge pressure be less than the suction pressure, an artificial pressure head must be furnished. This can be accomplished by use of a back pressure valve, or vented riser in the discharge piping.
c. Relief Valve – The Cyclo/Phram. pump is equipped with an internal relief valve to protect the pump and motor from damage due to overpressure. This valve operates in the hydraulic oil system and does not contact the liquid pumped. It is normally factory set approximately 15% above the maximum discharge pressure shown on the order acknowledgment.

CAUTION! *If the Cyclo/Phramh pump is not the only pressure producing device in the system, an additional externally mounted safety valve will be required for system protection.*

d. For additional safety, a check valve should be included in the discharge line near the point where the line enters a high pressure process vessel.
e. Provide shut off valve in both suction and discharge lines adjacent to the pump. Install unions in these lines, between the shut off valves and the pump to facilitate servicing the diaphragm head in those cases where it must be removed from the pump housing.
f. Provide vent valve between the pump and discharge shut off valve to relieve pressure when pump is stopped.

E. Power Connections

1. Check the nameplate rating of the motor and any auxiliary electrical equipment against the available power supply before making connections. Direction of motor rotation is not important.
2. Motors furnished on Cyclo/Phramh pumps are usually squirrel cage induction type. They have high starting currents (normally in the range of 300 to 350% of maximum running current). Be certain that the power source is rated to handle this type of load. Thermal overload heaters in motor starters should be rated based on full load current approximately 25% higher than indicated by motor nameplate.
3. Standard wiring and conduit piping practice should be followed.
4. Provide adequate ventilation for the drive motor.

F. Application Considerations

Divided Flow

The discharge connection should not be manifolded to several points under pressure if precise metering to each point is required. If any point in a manifolded system is under slightly less pressure than the others, the total flow will not be evenly divided. A separate diaphragm liquid end should be provided for each point of discharge.

Positive Pressure Differential

Cyclo/Phramh pumps are designed to operate against a positive pressure differential to assure proper seating of the ball check valves. Should your system include a condition where suction pressure exceeds discharge pressure, a means of providing a discharge pressure in excess of the suction pressure must be included in the installation. This can be accomplished by one of the following methods.

a. A spring loaded diaphragm type valve designed to open on each discharge pulse from the Cyclo/Phramh pump can be used as a back-pressure valve. The diaphragm in the valve protects the spring from corrosion and also prevents particle build-up from clogging the spring.
b. Figure C represents a vented riser installation in the discharge piping of the Cyclo/Phramh pump.
c. Materials of the wetted parts have to be suitable for use with the fluid.

REFER TO DRAWINGS 070-041839, 070-021740, 070-021827 AND 070-021741 FOR THE PUMP MODEL USED.

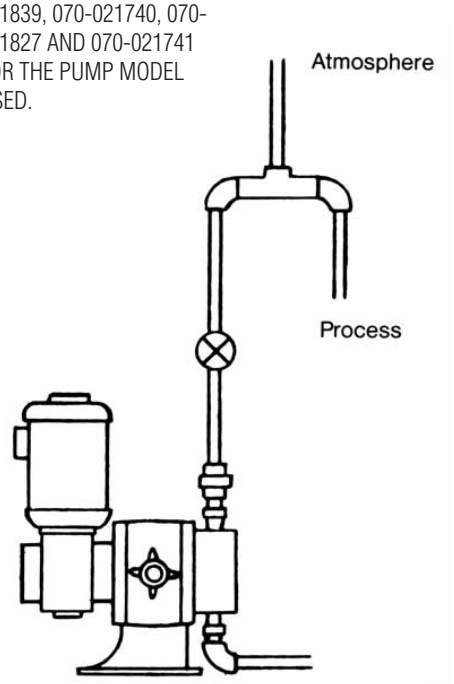


Figure "C". VENTED RISER

Operating Instructions

A. Pre-Start-up Inspection

It is very important that the following items be checked after the pump is installed and before it is started for the first time.

Pump Housing Lubrication

The pump is shipped fully charged with hydraulic oil suitable for operation above 50°F. Check to assure that the oil level is within ½" of the top of the casing. Remove the shipping plug in the back of the pump housing. 2. If initial pump operation will be under other than flooded suction conditions, first remove discharge check valve assembly and fill diaphragm cavity with process fluid or other compatible fluid. Replace discharge check valve assembly and make suction and discharge piping connections using piping procedures to guarantee leak-tightness.

3. If pump is equipped with pneumatic stroke adjustment, refer to "Instructions for Pneumatic Stroke Adjustment" section of this manual.

B. Test Run and Start-Up

Check Oil Level. Oil level should be above the top of the shift ring casting to within 1/2" of the top of the casing.

Priming – Hydraulic Side of Pump

a. Unscrew the complete relief valve assembly approximately 4 turns.
b. Operate pump at full capacity for 10 minutes with suction and discharge valves open. This will clear any air out of the pumping side of the diaphragm and fill the hydraulic oil passages.
c. Re-tighten the relief valve with approximately 20ft/lb of torque. The pump should now be ready for operation. Never operate the pump with the suction valve closed or the suction line restricted.

Priming – Process Side of Pump

a. If sufficient suction head is available, let the fluid flow out through the discharge check valve. This operation will effectively purge the pump diaphragm cavity of air and prime the pump.
b. If the suction head is insufficient to meet the requirements of "a", remove the discharge check valve cartridge and fill the diaphragm cavity with fluid. c. When viscous fluids are to be pumped, perform the priming operations as described in "a" and "b" (preceding) with pump operating at about 50% capacity. This will help purge air from the cavity.

CAUTION – All suction line connections must be absolutely leak-tight to prevent air from being drawn into the lines, causing loss of prime.

Normal Operating COnditions

Under normal operating conditions, the temperature of the gear end of fractional horsepower units can rise to 200°F without harm. See "Gear Reducer" instruction pages.

Capacity Calibration

Test runs to determine the exact capacity of the Cyclo/Phramh diaphragm metering pump under specific operating conditions can be made after the initial break-in period of 12 hours. The pump should be set up to pump process fluid for this period at some nominal flow setting. Either measure the quantity collected from the discharge side of the pump or measure the drop in liquid level from a calibrated tank on the suction side of the pump during a given time interval.

High Pressure – Low Capacity Operation

The discharge and suction lines of Cyclo/Phramh units operating at high pressures should be free of entrained air. To fill the system completely with liquid, operate the pump under zero discharge pressure for a short time prior to starting pressure tests. Since there is a possibility that air will enter the system due to liquid temperature changes after the Cyclo/Pharmh pump has been idle for some time, provisions should be made for purging the system prior to restarting. This can be accomplished easily by installing a tee and a valve in the discharge line to allow fluid to be pumped to atmosphere upon start-up.

Capacity Adjustment

The capacity adjustment on all Cyclo/Phramh pumps is calibrated in percent of maximum capacity. The approximate maximum capacity is shown on the Data Plate and the approximate output can be obtained by adjusting the capacity knob to the proper calculated percentage of this valve. To prevent the pump drifting from its set-point, the lock screw on the control knob should be tightened after each adjustment. Loosen the locking screw before readjusting the flow setting. The exact pump output must be determined by the user under exact operating conditions since all Cyclo/Phram. pumps are tested at the factory with water under standard conditions. Lock screw may be set or thumb screw.

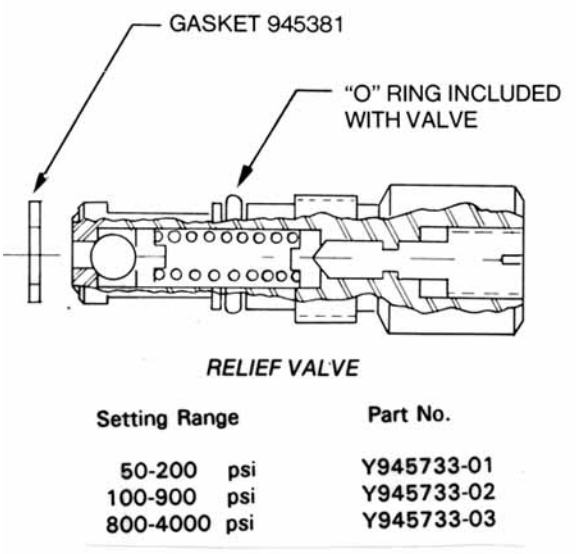
Maximum Operating Conditions

a. Maximum discharge pressure is stamped on Cyclo/Phram. Data Plate.
b. Pump maximum temperature: 180°F (Metal), 120°F (Plastic).
c. Pressure effect on capacity : 1 1/2% per 100 psi.
d. Linearity: ±2% of maximum capacity.
e. Operating interval: Cyclo/Phramh pumps are designed for continuous operation
f. Precision:±1% repetitive accuracy with manual adjustment; ±2% with electric or pneumatic adjustment.

Relief Valve

If it should be necessary to reset the relief valve to a value other than that set at the factory, use the following procedure. A discharge pressure gage is required for this test.

a. Adjust pump to zero stroke.
b. Stop pump
c. Close discharge valve and open valve to operate discharge pressure gage.
d. Adjust relief valve to maximum pressure by turning slotted screw clockwise until stop is reached.
e. Start pump
f. Slowly increase stroke until discharge pressure gage shows desired relief pressure. This should be equal to the maximum operating pressure plus 15%. NOTE: The maximum operating pressure is stamped on the Data Plate.
g. Reduce relief valve setting by turning slotted screw counter -clockwise until pressure gage indication starts to decrease.
h. Slowly increase setting (CW rotation) until pressure settles to the desired setting.
i. CAUTION - Do not overset the relief valve.
j. If it is necessary to remove the relief valve from the pump, back-off the adjusting screw of the valve to unload the spring before removing the relief valve assembly from the pump.



RELIEF VALVE

Setting Range	Part No.
50-200 psi	Y945733-01
100-900 psi	Y945733-02
800-4000 psi	Y945733-03

Air Release Mechanism

All Cyclo/Phramh diaphragm metering pumps incorporate a mechanically actuated air release system that continuously purges the hydraulic side of entrapped air. This system functions satisfactorily in either direction of drive shaft rotation and requires no attention or maintenance.

A. Lubrication Schedule

1. The Cyclo/Phramh pump has been designed to require a minimum of attention and to provide long and trouble-free service with maximum user satisfaction. It is recommended that the Cyclo/Phramh pump casing be drained of lubricant after every 2000 hours of operation, or at 6 month intervals, whichever comes first. Refill with a high quality extreme pressure lubricant of approximately 800 SSU viscosity at 100°F. This is satisfactory for operation when ambient temperatures are as low as 50°F. To operate the Cyclo/Phramh pump under ambient conditions to -10°F, dilute the oil with 25% kerosene.
   Changing of the lubricants in the pump casing and gear box constitute the only periodic maintenance required of Cyclo/Phramh diaphragm metering pumps. To drain the oil, remove the oil drain plug and permit the oil to drain from the pump. Replace the drain plug. Fill the pump casing with oil through the oil fill hole. Oil level should be above the top of the shift ring casting to within ½" of the top of the casing. See priming instructions for repriming the hydraulic side of the pump.
2. Motors are furnished with precision, pre-loaded bearings which are lubricated with an extra large supply of long-life grease for 10 years of normal operation.
3. Sump capacity is 3 pints.

B. Spare Parts Data

Spare Parts

A small quantity of spare parts should be kept on hand to prevent delay in making emergency repairs.

Quantity	Item No.	Description
1	31	Plunger Spring
1	69	Diaphragm
4	104	Valve Seat
4	102	Valve Guide Half
2	101	Valve Retainer
4	103	Valve Ball Check
4	105	Valve "O" Ring
1	26	Ring Seal
2	26	"O" Ring
1	33	Spring, Seal Bushing

Replacement Parts

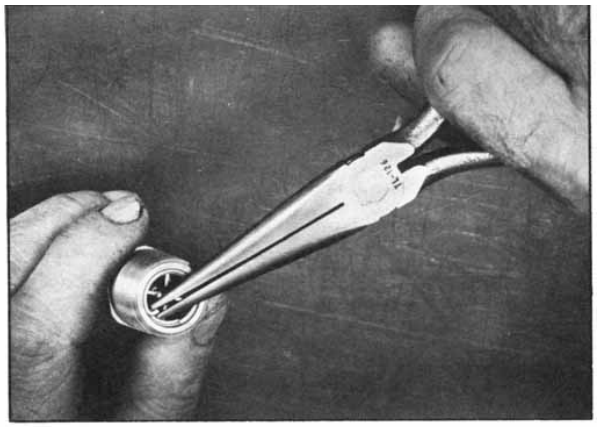
a. Cyclo/Phramh pump parts – Please refer to the pump serial number and give the complete data from the nameplate when ordering spare parts. Specify the exact quantity of each part, and specify each part by name and number (refer to parts list and drawings back of manual).
   In most multiplex pumps, the individual sides are of different diaphragm head materials and different plunger sizes. Please be certain to indicate on which side the spare parts are to be used. On the multiple head pumps, side number is indicated on the nameplate.

b. Motor Parts – Motors furnished with Cyclo/Phramh pumps are standard commercial units. Parts for these items should be ordered directly from the motor manufacturer. When sending your inquiries to these manufacturers, be certain to include full nameplate data from the unit involved.

C. REPLACING SPARE PARTS

Check valve cartridges, (metal)

The Cyclo/Phramh check valve cartridges incorporate replaceable and reversible seats sealed to the inner surfaces of the check valve body by TFE "O" rings. Should these valves require cleaning due to system contaminance, or replacement of internals due to abrasive or corrosive wear, the cartridges can be disassembled by first removing the retainer ring (Item 101) and then driving out all internal parts with a short brass rod through the opposite end, being careful not to damage lower valve seat if the seats are to be reversed. All parts not showing excessive wear may be reassembled and the seats can be reversed to provide new seating surfaces. Always use new TFE "O" rings to assure leak-tight valve assemblies. The TFE "O" rings are split for ease of installation. Note: plastic check valves DO NOT have reversible seats Tighten check valves in metal heads no more than 45ft/lb. Tighten check valves in plastic heads only firm finger tight.



Removing the retaining ring from check valve.

Replenishing Valve

The replenishing valve utilized in the Cyclo/phramh pump is preset at the optimum negative pressure for proper diaphragm pump operation. Under normal operating conditions, the replenishing valve should require no attention as it automatically replaces the oil lost from the hyrdraulic side. If service to the replenishing valve should be required, it is necessary to drain the oil. Remove the foot mounting plate. Replenishing valve can now be removed with a standard socket wrench. If disassembly due to pump service necessitates a dry start-up, steps as described in the operating instruction section, paragraph B-1 titled "Test Runs and Start-Up" should be followed.

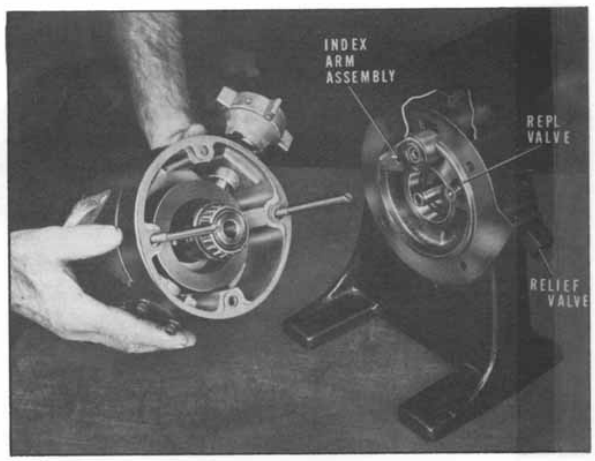
Plunger or Plunger Spring

Disconnect suction and discharge piping and drain off from pump housing. Remove motor and rear bearing housing (Item 50A) and pump housing (Item 1) making drive shaft accessible. Pull out drive shaft while holding plunger to prevent plunger and spring from jumping out. Install new plunger on spring and insert drive shaft back into housing while holding plunger in drive shaft.

CAUTION!!!

Care must be exercised when removing drive shaft (Item 29) from the shift ring (Item 53) to prevent the plunger (Item 32) from ejecting from its bore in the drive shaft. In the same manner, care must be exercised in replacing the plunger in the drive shaft when reassembling.

Assemble rear bearing housing and housing to pump. Assemble torsion spring of air vent mechanism.



Assembling the simplex housing assembly to the foot mounting plate asembly. Note the wire holding the index arm assembly clear of the roller bearing and cam. Relief valve is located on the right of the foot mounting plate.

Hold the index arm with a piece of fine wire or string to clear the cam (on the drive shaft) when the foot mounting plate is reassembled to the pump. Pull out the wire and tighten all bolts. Fill the pump housing with new oil and connect suction and discharge piping. To place the pump back in operation, follow the Operating Instructions, Sec. B.

Foot mounting plate bolts should be tightened evenly to 45-65 in/lb of torque.

Diaphragm or Back-up Plate

Disconnect suction and discharge piping. Remove diaphragm head bolts (Item 71) and diaphragm head (Item 68). Carefully remove diaphragm (Item 69) with a knife or other pointed object. Install new diaphragm or back-up plates (Item 70 and 71) as necessary.

CAUTION!!! *The back-up plate on the hydraulic side of the diaphragm is always steel; the back-up plate on the process side is usually made of corrosion resistant alloy. Be certain when re-assembling the pump that the proper material is used on each side of the diaphragm. Assemble diaphragm head and tighten bolts evenly and crosswise to 50ft/lb.*

NOTE: Be certain one of the holes in the outer circle of perforations in the back-up plates is in the topmost position when re-assembling the pump.

Locate hole in back-up plate at top when assembling.

Roller Bearings

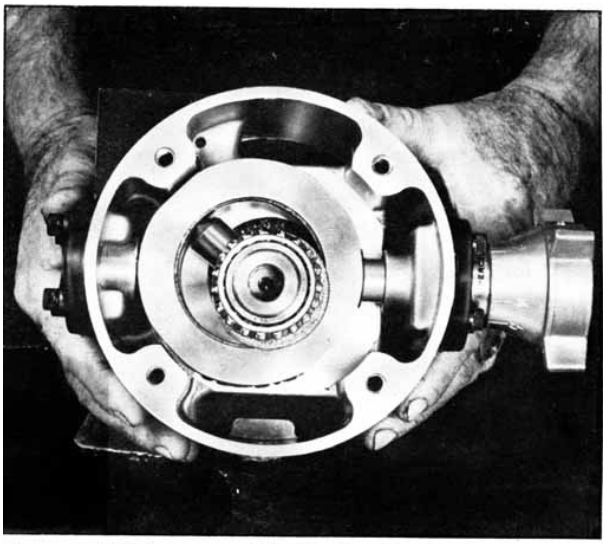
Disconnect suction and discharge piping and drain oil from pump housing. Remove housing (Item 9) and rear bearing housing (Item 50A) and drive shaft (Item 29).

In order to avoid a recalibration of the capacity adjustment, it is important to proceed as follows:

- Set adjustment below 0 until a definite stop is reached. Lock adjustment by tightening set screw of thumb screw (Item 35). Unscrew complete adjustment assembly (knob, Item 36; adjustment screw Item 38; adjustment screw cap, Item 13). Leave adjustment assembly locked until it is to be reassembled to the pump. Remove shift ring assembly (Item 53) from housing and replace inner race (Item 51) if examination indicates excessive wear
- Replace shift ring assembly in pump housing.
- The trunnion with the "O" ring should be pointing toward the adjustment mechanism. Engage adjustment screw into shift ring and screw the complete adjustment assembly into the housing until it comes to a dead stop.
- Line up bolt holes and tighten bolts.
- Complete assembly by following steps described in Maintenance Instructions, Sec. C.

To replace pump bearings, drain motor oil, remove motor (Item 81), rear bearing housing (Item 50A). Remove pump housing (Item 9) from foot mounting plate (Item 1). Remove shaft (Item 29) from shift ring (Item 53) bearings (Item28) can now be inspected or replaced as necessary, in reassembly, reverse procedure making certain bolts are taken up evenly to avoid cocking shift on bearings in housing. Tighten bolts evenly to 45-65in/lb of torque.

When bearings are replaced the gaskets between foot mounting plate (Item 1) and pump housing (Item 9) also have to be replaced. Measure the gasket (Item 58) thickness of the gaskets between foot mounting plate and housing and make up the same dimension with new gaskets (a selection of gaskets of various thicknesses is included). Assemble near bearing housing (Item 50A) without gasket and tighten bolts (Item 62) finger tight evenly and check clearance at circumference with feeler gage until equal around periphery. Select proper gasket thickness (Item 58) or series of gaskets to equal gap measured. Remove rear bearing housing, install gasket (applying gasket cement to both sides of each gasket) and tighten bolts (Item 62). Apply approximately 45-65in/lb of torque bolts.



View of shift ring assembled in the simplex housing.

Power Train Assembly used with 56C Motors (Refer to Dwg. 070-041839).

a. Intermediate Shaft Removal - Disconnect wires and unbolt motor from motor adapter (Item 6) and lift motor. Coupling halves will separate for disassembly. Loosen set screw attaching the coupling half to the intermediate shaft (Item 7). Remove socket head cap screws (Item 5) and lift motor adapter (Item 6) from the pump housing (Item 9), and the drive worm (Item 20). The thrust bearing (Item 22) and thrust bearing races (Item 21) should remain in the lower bearing seat if the shaft is vertical. The thrust bearing will come out with the shaft if the shaft is horizontal; care must be taken to withdraw thrust bearing with shaft.

b. Intermediate Shaft Assembly – Check location of thrust bearing and races. If oil seal needs replacement, press new part into motor adapter (Item 6). Check location of worm on shaft and that grooved pin (Item 198) connects the intermediate shaft (Item 19A) to the worm (Item 20).

Trouble Shooting Chart

Problem	Possible Cause	Recommended Action
Motor Overheats	Overload due to operation in excess of pump rating	Check actual operating conditions vs. pump nameplate data.
	Power supply incorrect or voltage low	Check power supply vs. motor nameplate data.
	Improper gear lubrication	Check type and level of lubricant. Replace if in doubt.
Pump Fails to Deliver Rated Capacity	Leaky suction piping	Repair or replace defective piping.
	Excessive suction lift	Relocate pump or suction vessel to reduce suction lift.
	Liquid close to boiling point	Increase suction pressure or cool liquid.
	Suction starved	Increase suction pressure, or use larger sized suction piping.
	Liquid viscosity too high	a) Increase suction pressure. b) Reduce liquid viscosity. c) Increase suction piping size. d) Use spring assisted diaphragm.
	Internal relief valve set too low	Readjust to 15%-20% above normal operating discharge pressure.
	Worn or dirty ball valves or seats	Replace or clean ball valves or seats. Seats are reversible.
	Inorrect setting of micrometer capacity adjustment	Adjust properly.
	Incorrect pump speed	Check line voltage and frequency vs. motor nameplate data.
	Worn seal bushing “O” ring	Replace “O” ring and back-up ring. Check drive shaft for end play.
	Air bubble accumulation in hydraulic chamber	Air release mechanism inoperative replace defective parts.
Pump Fails to Operate	Blown fuse	Replace fuse after correcting cause of overload.
	Open thermal overload in motor starter	Reset after correcting cause of overload. If malfunction recurs, check heater size.
	Low liquid level cutoff is actuated.	Fill suction tank.
	Open circuit in limit switches, timers, or other control devices in pump motor starter circuit.	Reset
	Low line voltage	Determine cause and correct.
	Suction or discharge lines blocked	Open lines.
	Liquid frozen in pump or lines	Thaw out pump.
	Broken wire	Locate and repair.
	Pump not primed	Refer to Paragraph A-2 of Operating Instructions.
	Diaphragm cavity and internal passages air bound	Refer to Paragraph B-1 of Operating Instructions.
Pump Operates Erratically	Suction line leaks	Repair or replace suction piping.
	Insufficient suction pressure	Pressurize suction tank or raise level in tank to increase suction pressure. Use spring assisted diaphragm.
	Liquid close to boiling point	Increase suction pressure or cool liquid.
	Liquid viscosity too high	a) Increase suction pressure. b) Reduce liquid viscosity. c) Increase suction piping size. d) Use spring assisted diaphragm.
	Internal relief valve leaks	Repair or replace.
	Worn or dirty ball valves or seats	Replace or clean ball valves or seats. Seats are reversible.
Noisy Operation	Ball valves	Ball valves make a clicking sound as they operate. Rattling noises may also be heard. On occasion, these noises are amplified by natural resonance of piping. These noises are normal.
	Excessive backlash in gear reducer	Adjust or replace gears if noise is objectionable.
	Shim shaft.	Shim shaft.
	Improper lubrication	Drain and refill gear case with proper lubricant.
	Worn bearings	Replace

Instructions for Pneumatic Stroke Adjustment

General Description

The 5700 (A) Pump Actuator is equipped with a Conoflow Commandaire Model 31 Positioner. For instructions and parts list, refer to Conoflow Commandaire Model 31 Instruction. The appropriate piping schematic is shown in the Commandaire Manual, No. 31.

The actuator operates on the rack and pinion principle. It requires two full turns of the adjusting knob to adjust the pump through its entire delivery range (0-100%). The equivalent piston travel is 2 7/8 inches. The actuator is equipped with a manual override. In case air supply or signal pressure should fail, pump can be adjusted manually by turning the adjustment knob.

The actuator may be mounted in either a vertical or horizontal position. A pressure regulator for statically loading the underside of the piston is installed on the unit and is adjusted to approximately 40psi. No further adjustment is required in the field when using supply pressures of 80psi or greater. Air supply should be regulated and filtered.

Operation

Normal range of the actuator positioner for full stroke is 3-15 psi (other ranges, including 3-9psi and 9-15psi, are available). Connect the output line of the instrument to the connection marked INSTRUMENT on the positioner. Then connect a supply of clean, filtered air to the supply connection (see Piping Schematic in the Commandaire Model 31 Instruction) to supply both the positioner and the cushion loading regulator. The actuator operates satisfactorily with a minimum supply pressure of 40psi and is limited to 100psi maximum. For best results, the cushion pressure should be adjusted to half of the supply pressure. The positioner has been tested and adjusted for operation with a supply pressure up to 80psi.

Zero Adjustment

To check zero adjustment (preset at factory), set the instrument output signal at the mid-point of its range (9psi on a 3-15psi range), turn zero adjustment coupling and note resultant position of actuator stem. Continue rotation of zero adjustment coupling in proper direction until adjusting knob indicates 50% of stroke. Adjust instrument output signal to low and high points in range and check the knob position at both ends of the adjustment.

Range Adjustment

The signal range to actuators can be modulated by installing a special restrictor. Turning the signal head screw on the restrictor c/w will decrease the signal range.

Mainenance

Positioner – requires a minimum of maintenance. If servicing or replacement is required, refer to Conoflow Instructions and Parts List Booklet for Commandaire Model 31.

Cylinder – Normal life of the "O" ring seals is such that replacement will seldom be necessary under normal operating conditions. However, if required, the following procedure must be used in dismantling the unit. Piston disc (164) should be in "up" position. Disconnect tubing and bleed all air out of unit. Remove cap from positioner (161) and Spirolox ring directly under cap so that positioner head plate can be lifted out. Loosen set screw and remove spring rod nut. Then remove six cap screws around positioner flange and lift positioner from body (171). Drain oil from pump housing. Remove actuator from pump housing by removing 4 cap screws (162) and turning complete actuator counterclockwise until gear pinion shaft disengages from pump shift ring. Remove pipe plug (172) and push piston-rack assembly out of housing. Turn adjusting knob clockwise until it disengages. Replace "O" rings.

Actuator Reassembly

Engage gear pinion shaft by turning it ccw until micrometer dial reads 20% below zero. Install piston-rack assembly and line up pinion and rack teeth. Press piston into cylinder while slightly turning pinion shaft back and forth until gears have engaged and rack is guided in housing bore. Rotate knob ccw until outer indexing line is just visible. Measure distance from top of piston to top of cylinder. It must measure 2 1/8 + 1/8 – 0 at this point. The piston may be repositioned by disengaging the rack and pinion and picking up or dropping teeth. Install actuator to the pump by rotating the entire actuator onto the shift ring and into the pump housing until the actuator tightens against the pump housing while the adjusting knob is indexed to zero (outer line). Back off actuator until it is in desired position. Install the 4 flange screws and tighten. Rotate the adjusting knob ccw. The knob should turn 2 full turns plus a faction. When the knob is turned c/w the stop sleeve should align with the top of the cylinder.

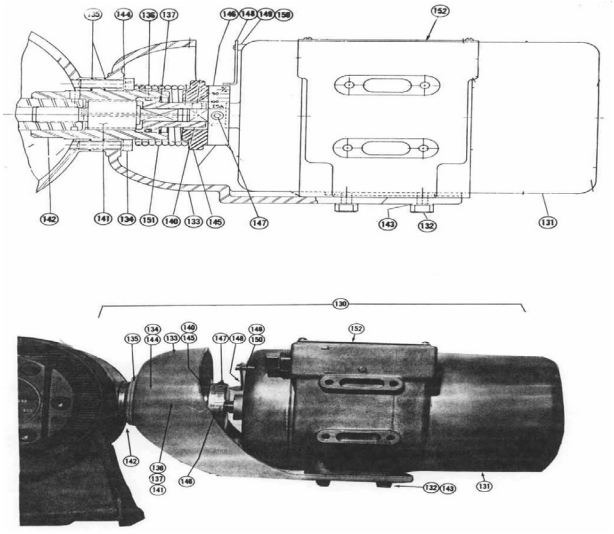
To install positioner refer to Conoflow Instruction Manual No. 31.

Trouble Shooting Chart

Problem	Possible Cause	Recommended Action
Actuator does not move to full stroke	Air supply too low.	Increase supply pressure.
	Actuator does not return from zero	Decrease cushion pressure.
	Rack & pinion not properly assembled.	Pick up one or more piston teeth.
Actuator does not return from zero	Cushion pressure too low.	Increase cushion pressure.
	Rack and pinion not properly assembled.	Slip one or more pinion teeth.

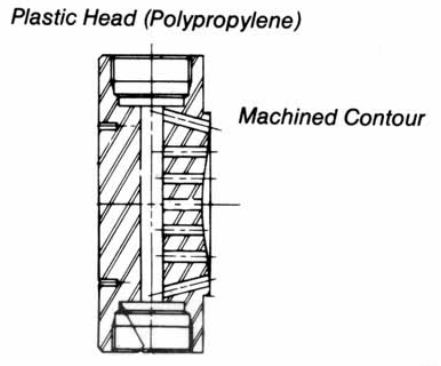
High Suction Lift

A spring assisted diaphragm is available in most metals and has an internal configuration different from the regular heads. This configuration is shown on the drawing below. When reassembling this assembly be sure that spring seats and springs are located concentrically around the center of the diaphragm pad.



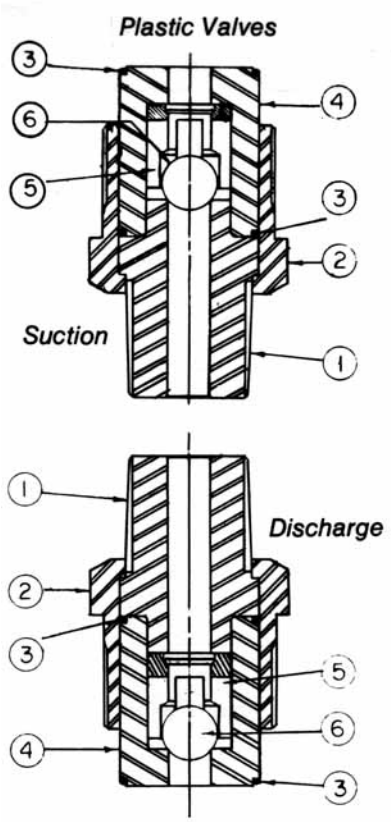
Plastic Heads and Check Valves

The polypropylene diaphragm head differs from the conventional metal heads in that it does not have a separate diaphragm plate. The head is machined from polypropylene bar stock; the contour of the diaphragm plate is machined into the head (see drawing).



The check valves for the polypropylene pumps are different from the metal check valves. The plastic check valves have two different configurations, suction and discharge.

NOTE: IF THESE VALVES ARE REVERSED THE PUMP WILL NOT OPERATE PROPERLY.



NOTE: Prior to assembly check the fit of the ball in the insert. The ball must move freely.

Number	Part Name	Material
1	Upper Body	Polypropylene
2	Clamp	416 SS
3	O-Ring	Teflon
4	Lower Body	Polypropylene
5	insert	Polypropylene

Instructions for Electric Stroke Adjustment

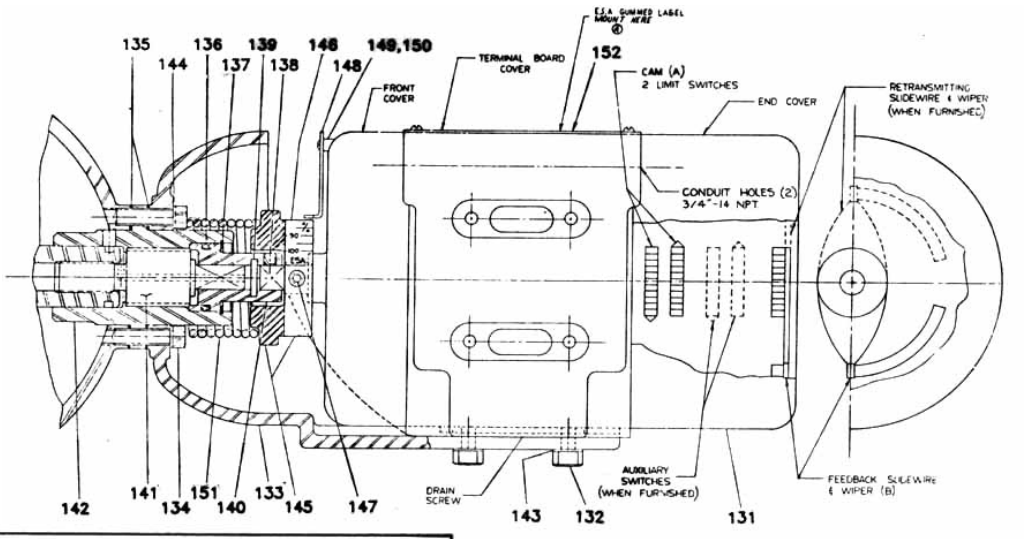
The electric stroke adjustment incorporates a Honeywell “Actionator” motor mounted on the side of the pump. The details are shown on the drawing.

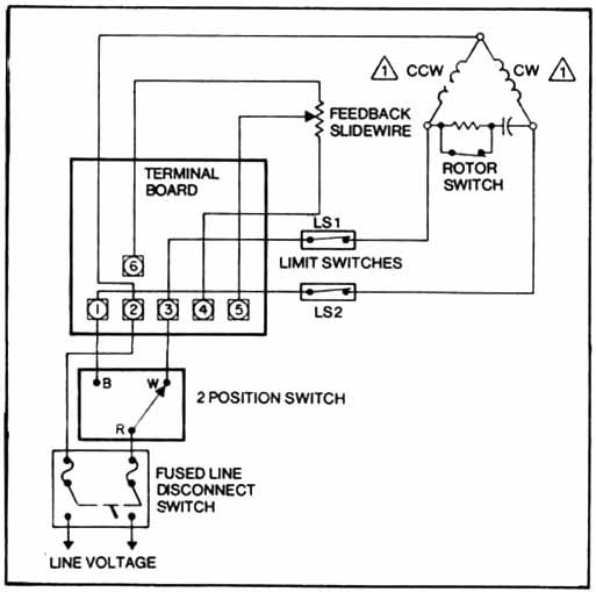
This motor moves clockwise and counterclockwise through an arc of 150°maximum. This motion results in full stroke adjustment.

The Actionator is used with or without a proportioning relay. The proportioning relay is used when the control signal is a 4-20 MA (or similar) signal. The feedback slidewire in the Actionator motor has a resistance of 135ohms and is matched to the relay. The electric stroke adjustment is used without a relay when the control signal is a 115 V.A.C signal. The feedback slidewire in this model is 1000ohms.

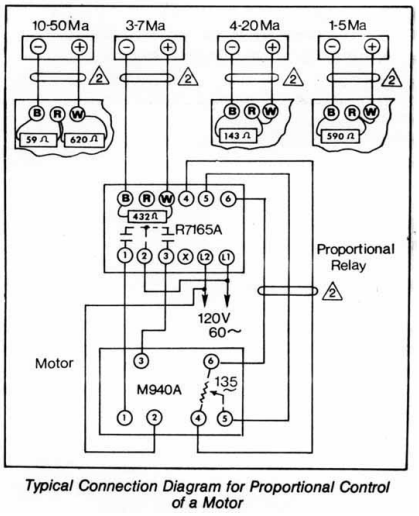
Part No.	Quantity	Description	Part No.	Quantity	Description
131	1	Motor	142	1	Cap Adjusting Screw
132	4	Hex Head Cap Screw	143	4	Lock Washer
133	1	Motor Frame	144	4	Washer
134	4	Socket Head Cap Screw	145	1	Retainer, Spring Scale
135	2	Gasket	146	1	Scale
136	1	O-Ring	147	2	Set Screw
137	1	Retaining Ring	148	1	Pointer
138	2	Set Screw	149	1	Bushing
139	1	Disc, Seal	150	1	Screw, Special
140	1	Drive Adapter	151	1	Spring, Torsion
141	1	Lead Screw	152	1	E.S.A. Gummed Label

A complete explanation of the operation of the Actionator motor and the proportioning relay can be found in the booklets shipped with the pump: Instructions 95-8131, M640A, D, M940A Actionator motors. Instructions, Proportioning Relay, R7165A.





1 Direction of rotation as viewed from output end of motor. M640A Internal Wiring (Two Auxiliary Switch Model shown.)

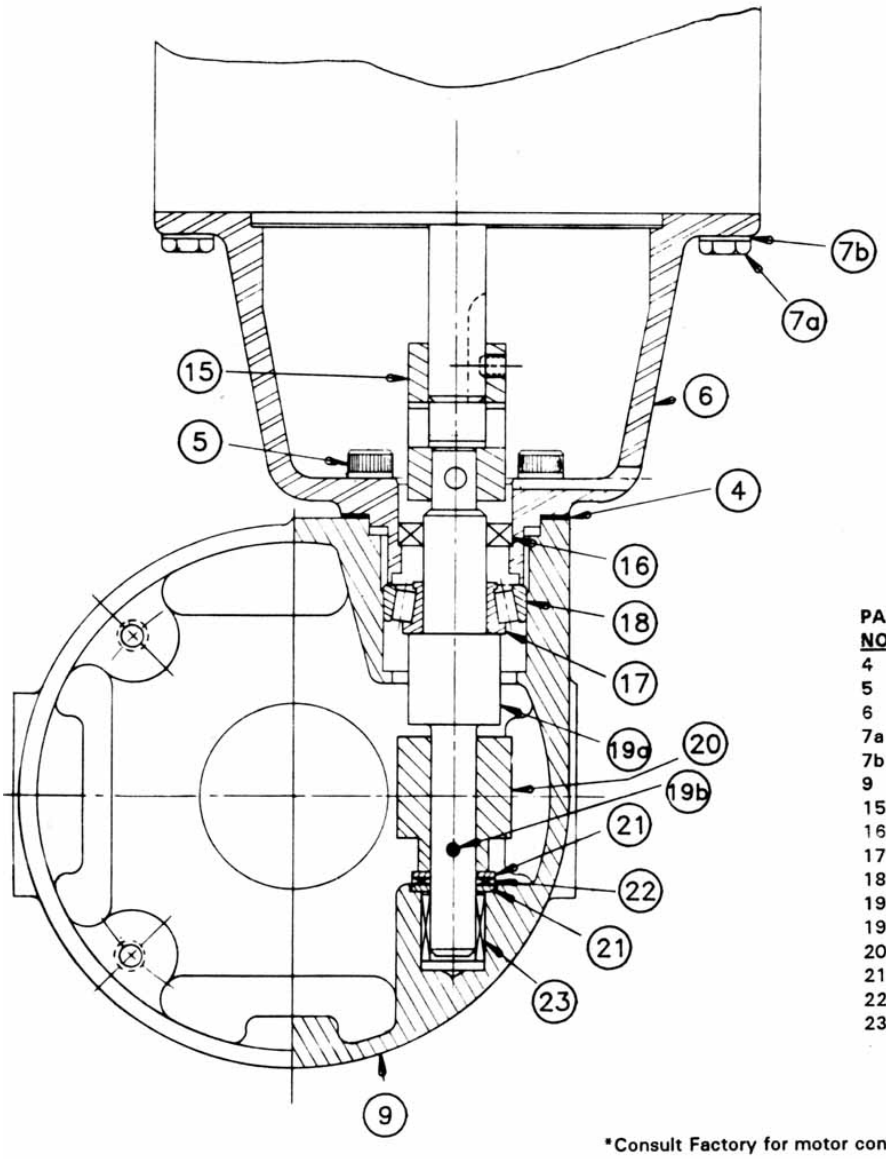


Typical Connection Diagram for Proportional Control of a Motor

Note: Resistors connected across B-R terminals must be ±1%; those across R-W may be ±5%.

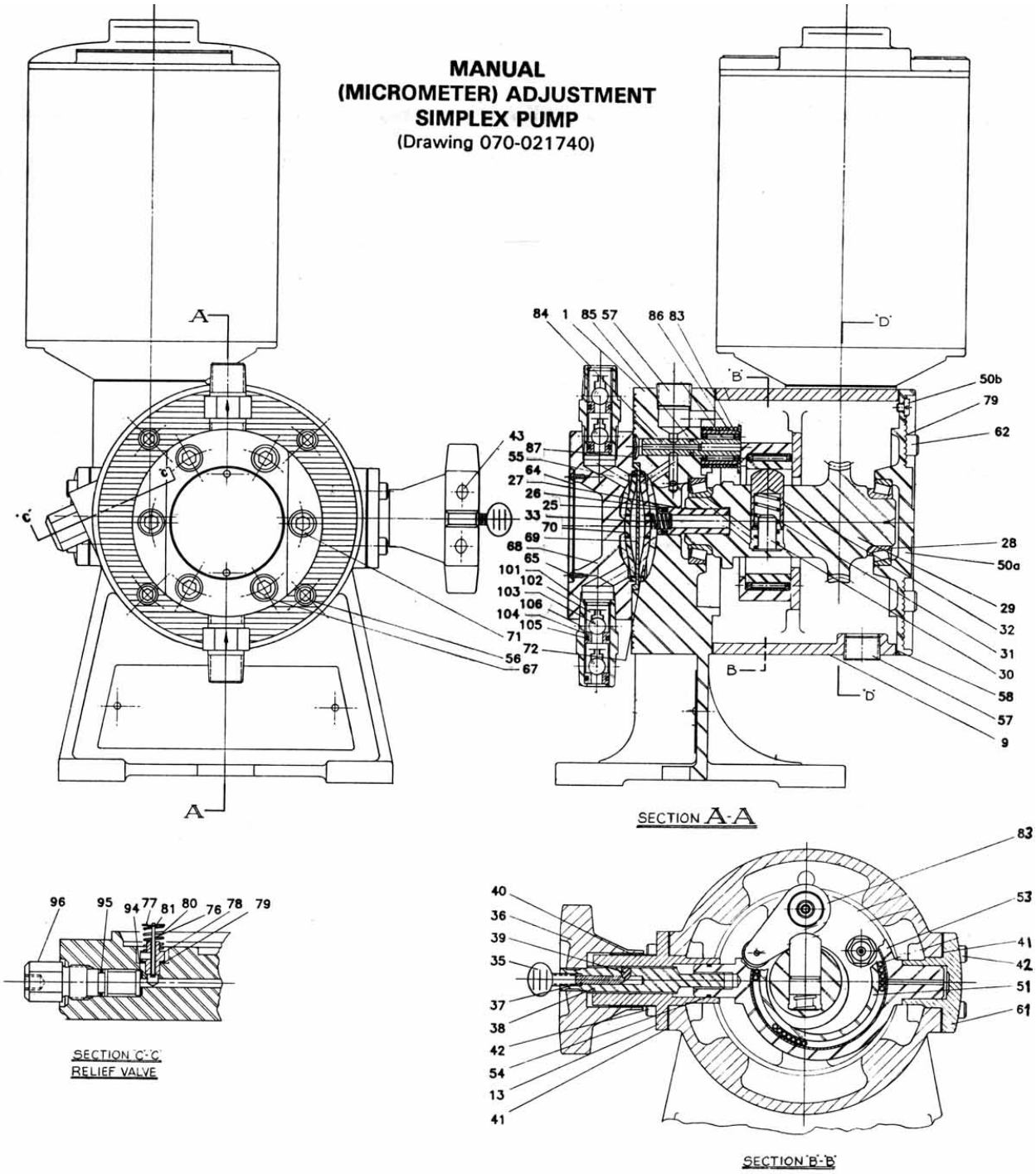
2 Run these leads in conduit containing no line voltage wiring (to avoid inductive pickup).

POWER TRAIN ASSEMBLY*
NEMA 56-C FRAME
(DRAWING 070-041839)



PART NO.	DESCRIPTION
4	Gaskets
5	Socket Head Cap Screws
6	Motor Adaptor
7a	Hex Head Screws
7b	Lockwashers
9	Housing
15	Coupling
16	Oil Seal
17	Bearing Cone
18	Bearing Cup
19a	Intermediate Shaft
19b	Grooved Pin
20	Worm
21	Thrust Bearing Race
22	Thrust Bearing
23	Caged Needle Bearing

*Consult Factory for motor configuration prior to 1980


MANUAL
(MICROMETER) ADJUSTMENT
SIMPLEX PUMP
(Drawing 070-021740)
SECTION A-A
SECTION C-C
RELIEF VALVE
SECTION B-B

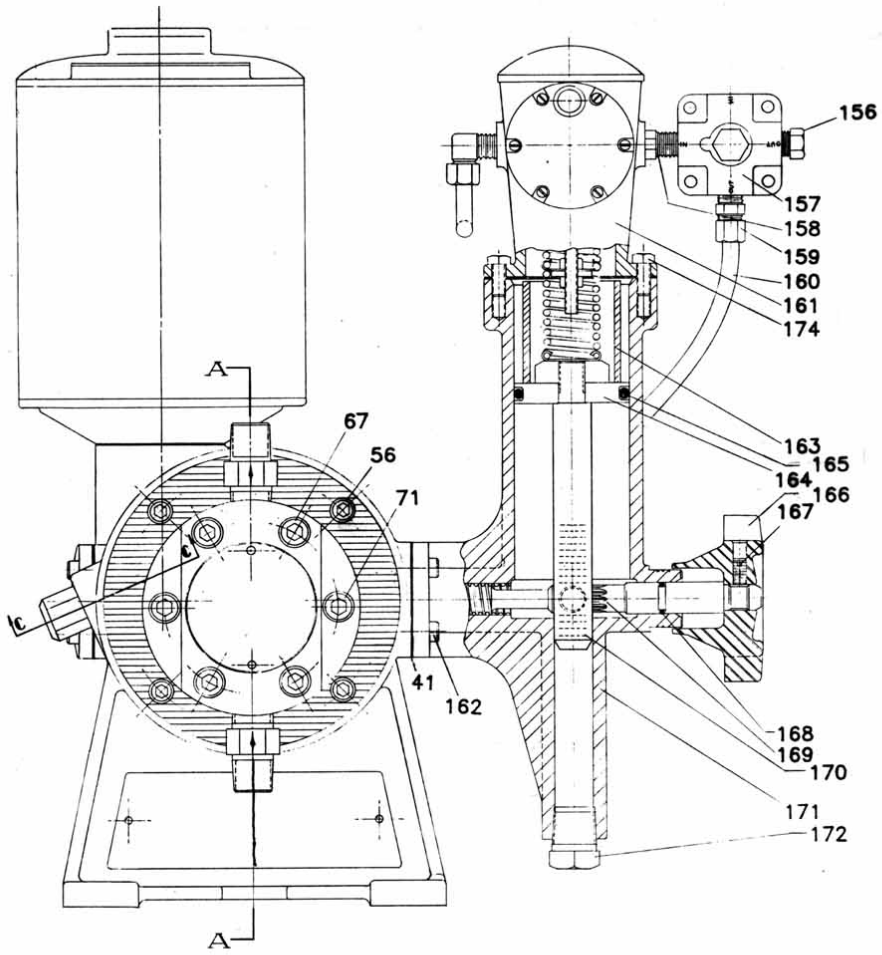
Parts LIst 5700 (A) Model

Part No.	Description	Part No.	Description
1	Foot Mounting Plate	58	Gasket
4	Flange Gasket	61	Shift Ring Cap
8	Motor	62	Rear Housing Bolts
9	Simplex Housing	64	Name Plate
13	Adjusting Screw Cap	65	Screw
25	"O" Ring	67	Cap Screw
26	Seal Ring G	68	Diaphragm Head
27	Seal Bushing	69	Diaphragm
28	Bearing Cone (Thrust)	70	Diaphragm Plate
29	Drive Shaft	71	Cap Screw
30	Guide Pin	72	Diaphragm Plate
31	Spring	76	Valve Stem**
32	Plunger	77	Spring Retainer Washer**
33	Spring	78	Replenishing Valve Body**
35	Thumb Screw	79	Washer (Replenish Valve)
36	Adjustment Knob	80	Spring**
37	Lockpin	81	Retaining Ring**
38	Adjustment Screw	83	Index Arm Assembly*
39	Insert	84	Air Escape Shaft
40	Stroke Adjustment Scale	85	"O" Ring
41	Gasket, Shift Ring Cap	86	Spring
42	Cap Screw	87	Expansion Plug
43	Set Screw	94	Washer, Relief Valve
50a	Rear Bearing Housing	95	"O" Ring
50b	Vent Plug	96	Relief Valve
51	Reaction Ring	101	Retainer
53	Shift Ring Assembly	102	Guide Half
54	"O" Ring	103	Ball
55	Bearing Cup (Thrust	104	Valve Seat
56	Cap Screw	105	"O" Ring
57	Pipe Plug	106	Check Valve Body

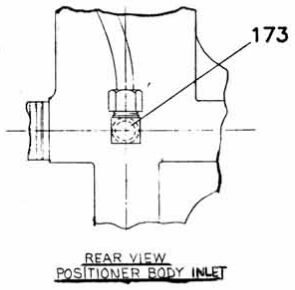
Index Arm Assembly* and Replenishing Valve** available as assembly only.

Torque Specifications

Part No.	Description	Torque
42	All	8-9 ft/lb
56	All	45-65 in/lb
57	All	20-22 ft/lb
67&71	All Metals	50-55 ft/lb
67&71	Plastics	24-36 ft/lb
78	All	46-50 in/lb
96	All	20-22 ft/lb
106	Check Valve (Metal)	40-45 ft/lb
106	Check Valve (Metal) cast iron head	30-35 ft/lb
108	Check Valve Plastic	60-100 in/lb



(DWG. 070-021827)

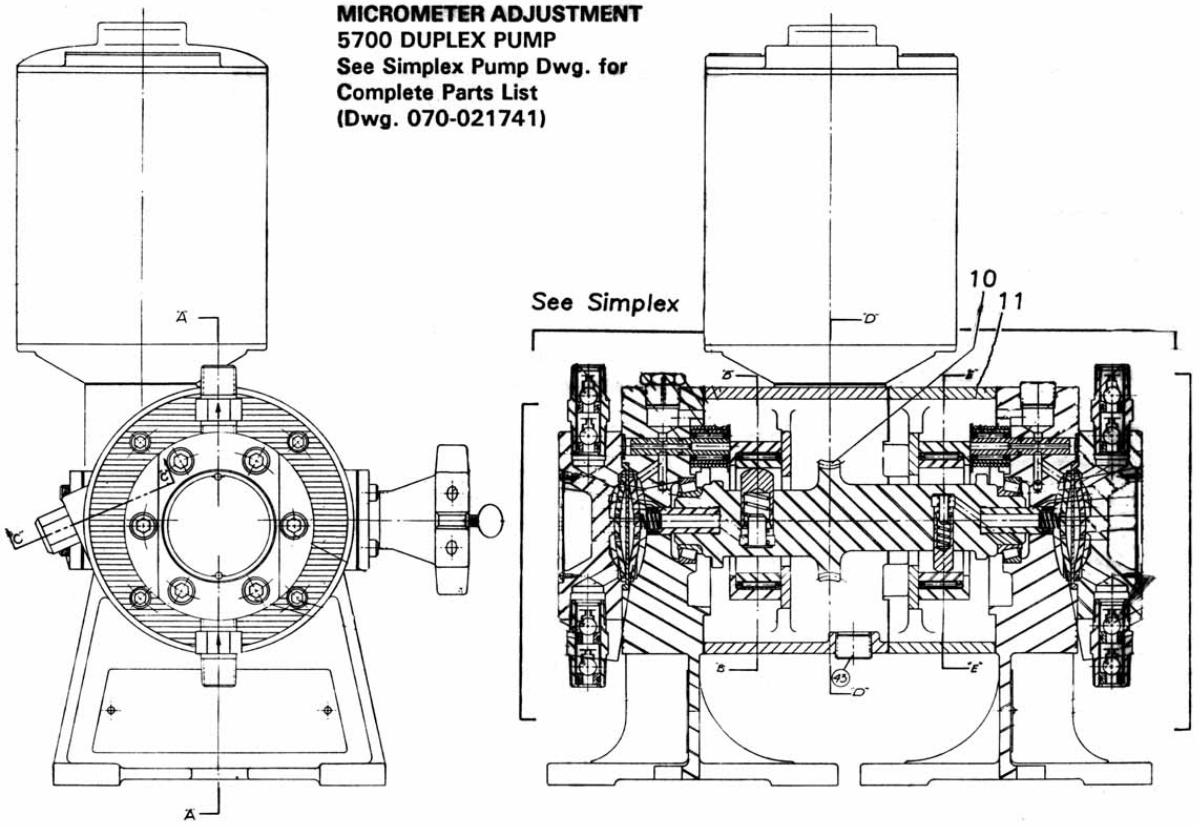


PARTS LIST

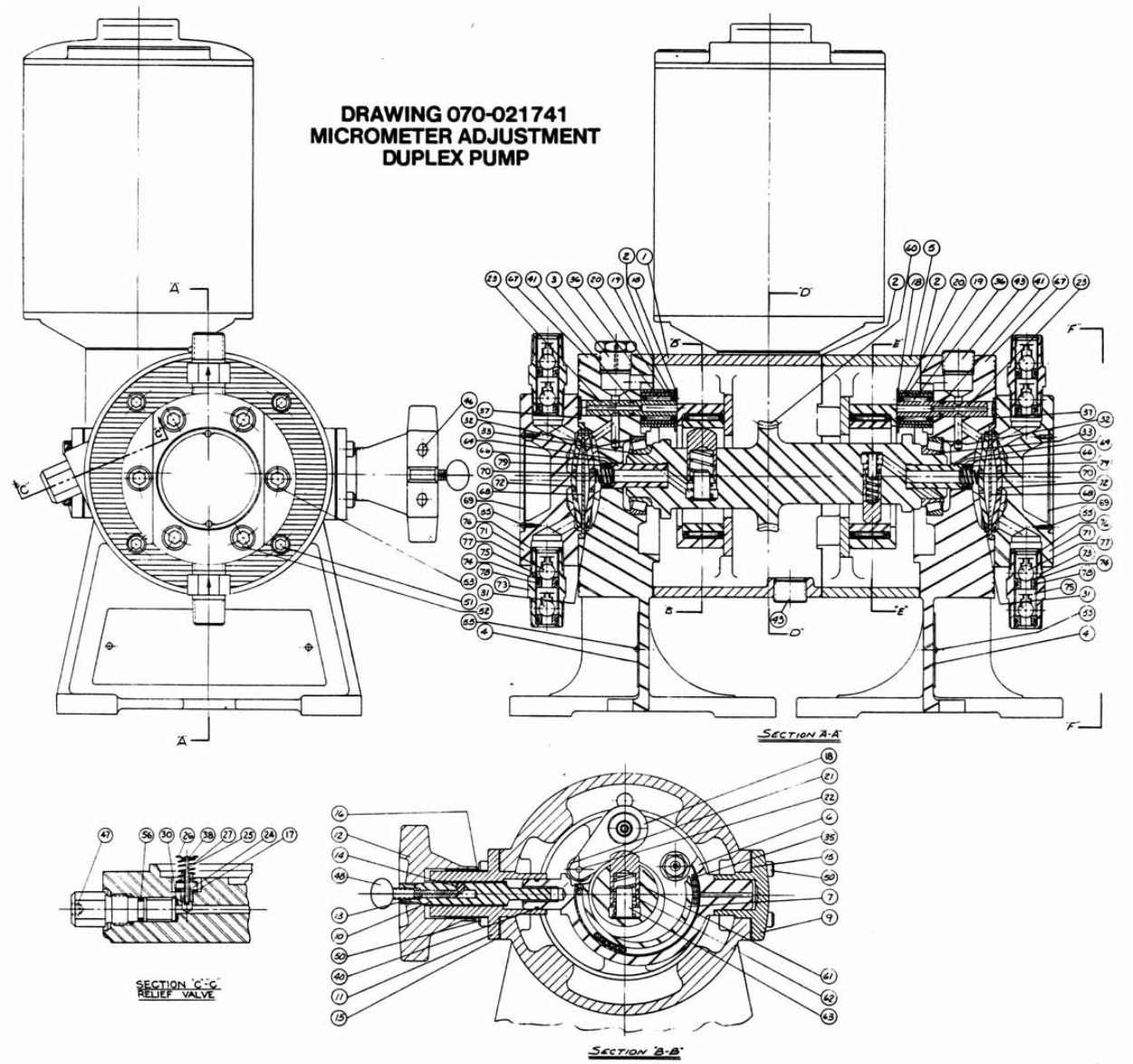
PART NO.	DESCRIPTION
41	Gasket
56	Cap Screw
67	Cap Screw
71	Cap Screw
156	Pipe Plug
157	Regulator
158	Nipple (Brass)
159	Connector (Brass)
160	Tube
161	Positioner
162	Cap Screw
163	Sleeve
164	Piston Disc
165	"O" Ring
166	Adjustment Knob
167	Set Screw
168	"O" Ring
169	Control Shaft
170	Gear Rack
171	Body, Actuator
172	Pipe Plug
173	Elbow (Brass)
174	Cap Screw

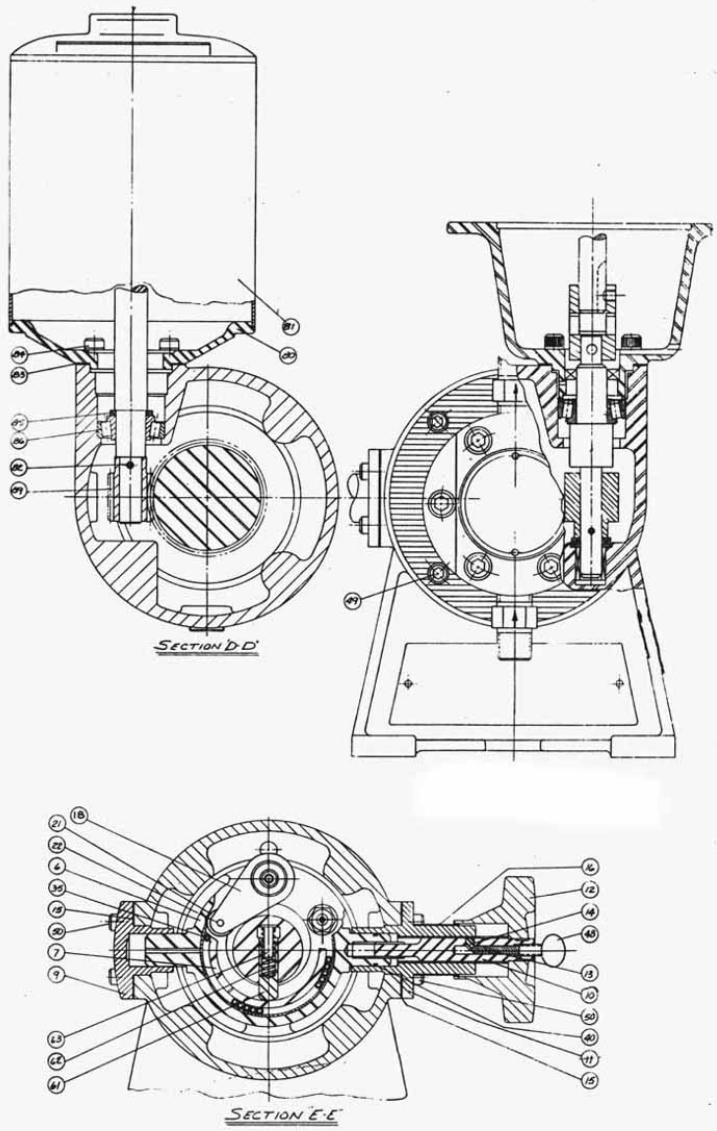
Index Arm Assembly* And Replenishing Valve* Available As Assembly Only.

MICROMETER ADJUSTMENT
5700 DUPLEX PUMP
See Simplex Pump Dwg. for Complete Parts List
(Dwg. 070-021741)



ITEM NO.	DESCRIPTION
10	Duplex Drive Shaft (see parts list)
11	Housing Extension

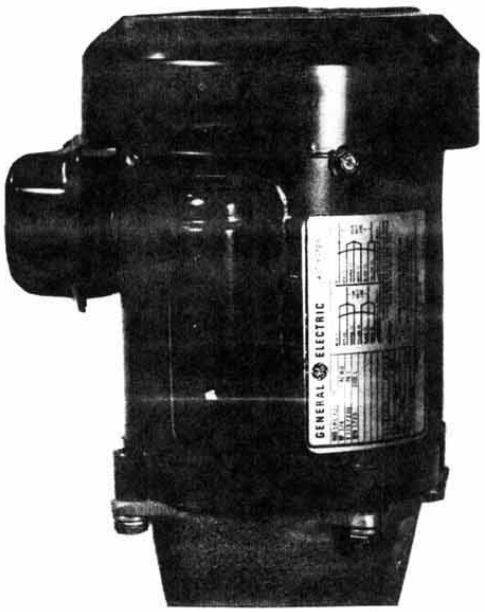

DRAWING 070-021741
MICROMETER ADJUSTMENT
DUPLEX PUMP
SECTION A-A
SECTION 'C-C'
RELIEF VALVE
SECTION 'B-B'



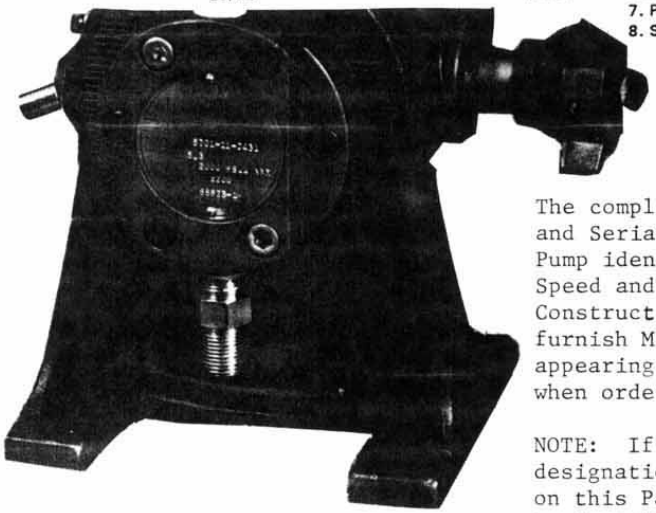
PARTS LIST CYCLO/PHRAM 5700 (A) MODEL

PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
1	Simplex Housing	47	Relief Valve
2	Gasket	48	Thumb Screw
3	Vent Plug	50	Cap Screw
4	Data Plate	51	Cap Screw
6	Shift Ring	52	Cap Screw
7	Reaction Ring	53	Cap Screw
9	Shift Ring Cap	55	Drive Screw
10	Adjustment Screw	56	"O" Ring (Relief Valve)
11	Adjusting Screw Cap	60	Drive Shaft
12	Adjustment Knob	61	Plunger
13	Lockpin	62	Spring
14	Insert	63	Guide Pin
15	Gasket, Shift Ring Cap	64	Seal Bushing
16	Stroke Adjustment Scale	66	Seal Ring E
17	Washer	67	Foot Mounting Plate
18	*Index Arm	68	Diaphragm
19	*Index Hub	69	Nameplate
20	Spring	70	Spring
21	*Roller	71	Diaphragm Head
22	*Pin	72	Diaphragm Plate
23	Air Escape Shaft	73	Check Valve Body
24	**Replenishing Valve Body	74	Valve Seat
25	**Replenishing Valve Stem	75	Guide Half
26	**Spring Retainer Washer	76	Retainer
27	**Spring (Replenishing Valve)	77	Ball
30	Washer (Relief Valve)	78	"O" Ring
31	Diaphragm Plate	79	"O" Ring
32	Bearing Cup (Thrust)	80	Motor Adapter
33	Bearing Cone (Thrust)	81	Motor
35	Needle Bearing	82	Groove Pin
36	*Clutch	83	Gasket
37	Expansion Plug	84	Cap Screw
38	**Retaining Ring (Replenishing Valve)	85	Shoulder Ring
		86	Roller Bearing
40	"O" Ring	87	Rear Bearing Housing
41	"O" Ring	89	Worm
43	Pipe Plug	90	Cap Screw
46	Set Screw		

Index Arm Assembly* And Replenishing Valve** Available As Assembly Only.



5	7	0				0			
PRODUCT CODE			LIQUID ENDS 1. Simplex 5. Duplex	PLUNGER DIAMETER 1. 7/16" 2. 23/32" 3. 7/16"& 23/32"	MOTOR 1. ¼ Hp.	GEAR REDUCER	SPM 1. 29 2. 58 3. 117 4. 233	LIQ. END MAT'L 3. 316 SS 4. CA. #20 5. Hast. C 6. H_2SO_4 7. Polypro. 8. Special	CAPACITY ADJUST. 1. Manual 2. Pneu. w/o Signal Trim. 3. Electric 7. Pneu. w/ Signal Trim. 9. Special



The complete Model Number and Serial No. of this Pump identifies its Size, Speed and Materials of Construction. Always furnish Model Number appearing on Pump Nameplate when ordering parts.

NOTE: If Model Number designation does not appear on this Parts List, order by Part Name and Reference Number, plus complete Pump Model Number and Serial No.

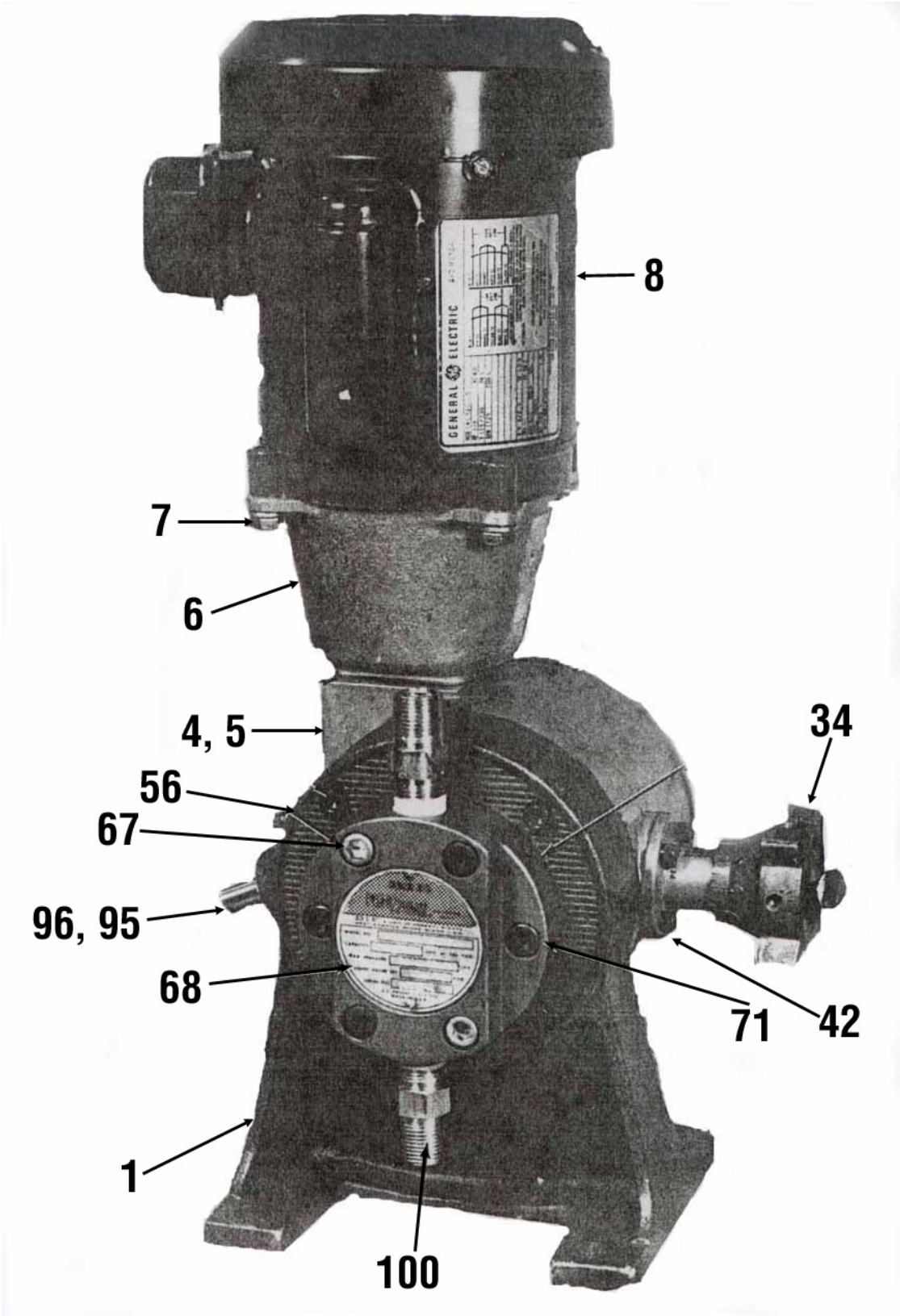


Figure 1 - Complete Pump Assembly

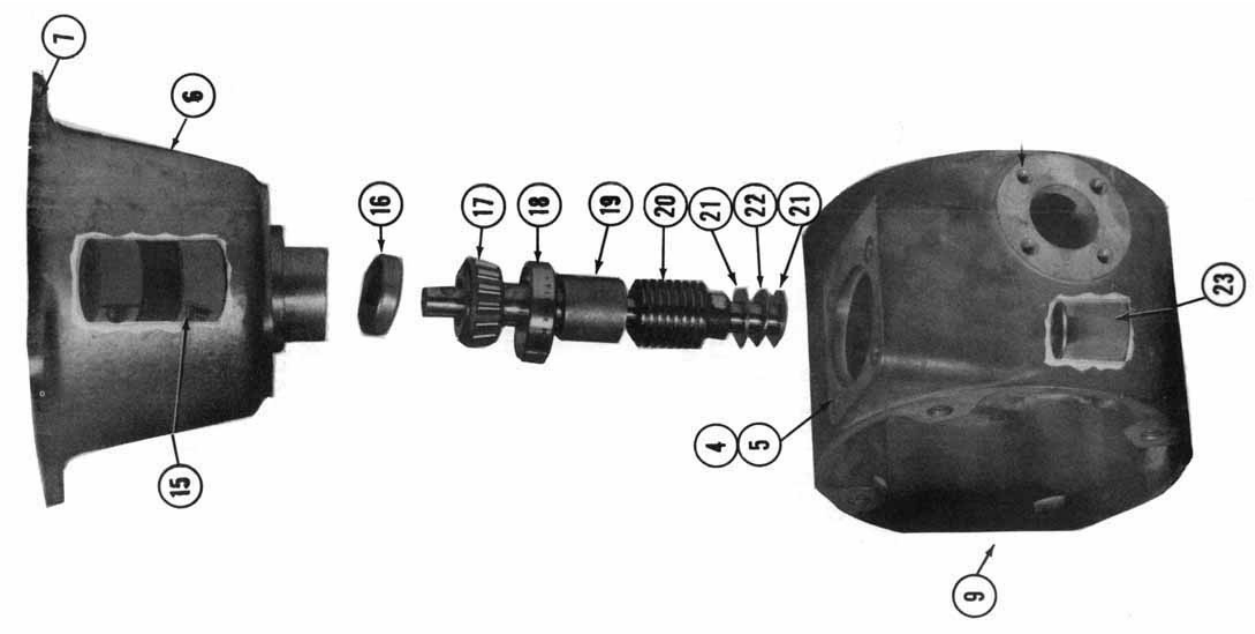


Figure 2 - Worm Gear Assembly

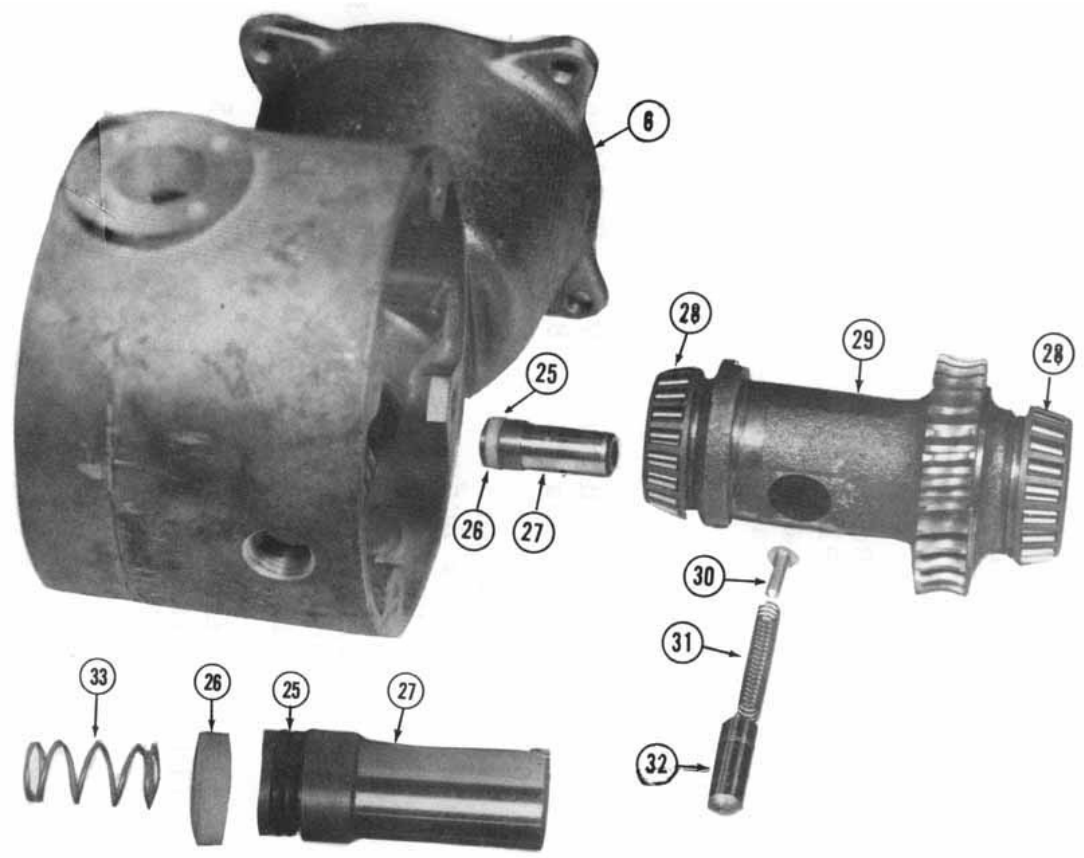


Figure 3 - Plunger and Drive Shaft Assembly

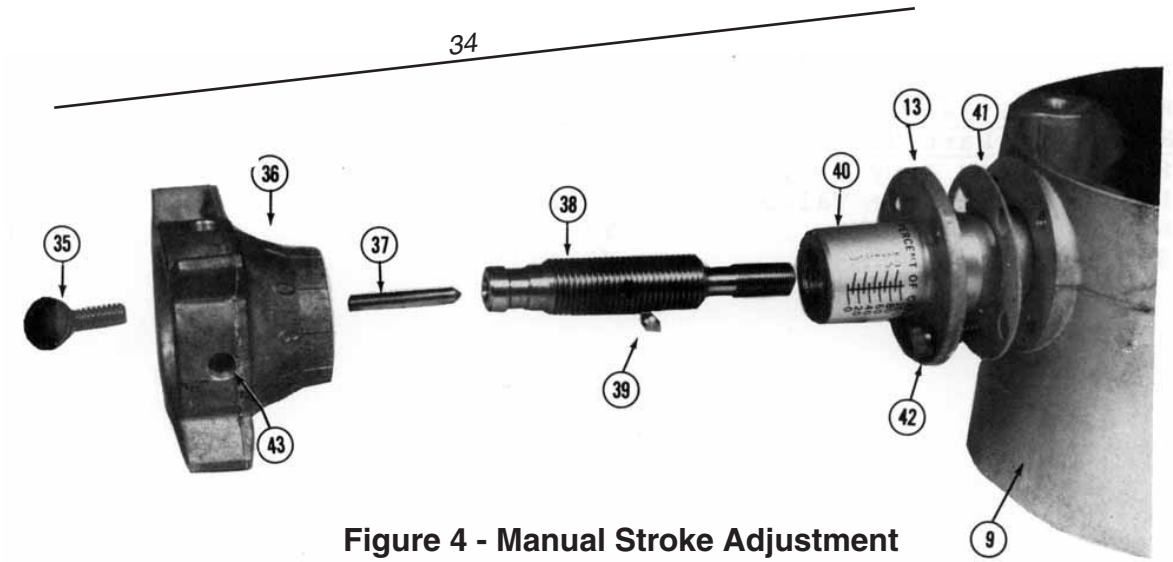


Figure 4 - Manual Stroke Adjustment

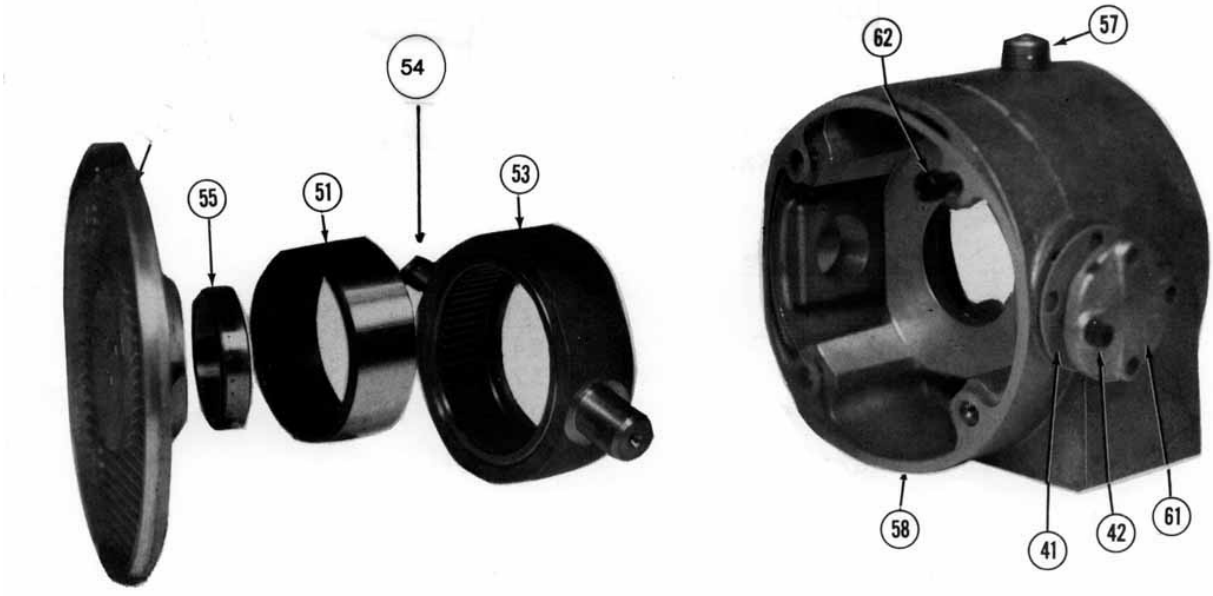


Figure 5 - Housing & Shift Ring Assembly

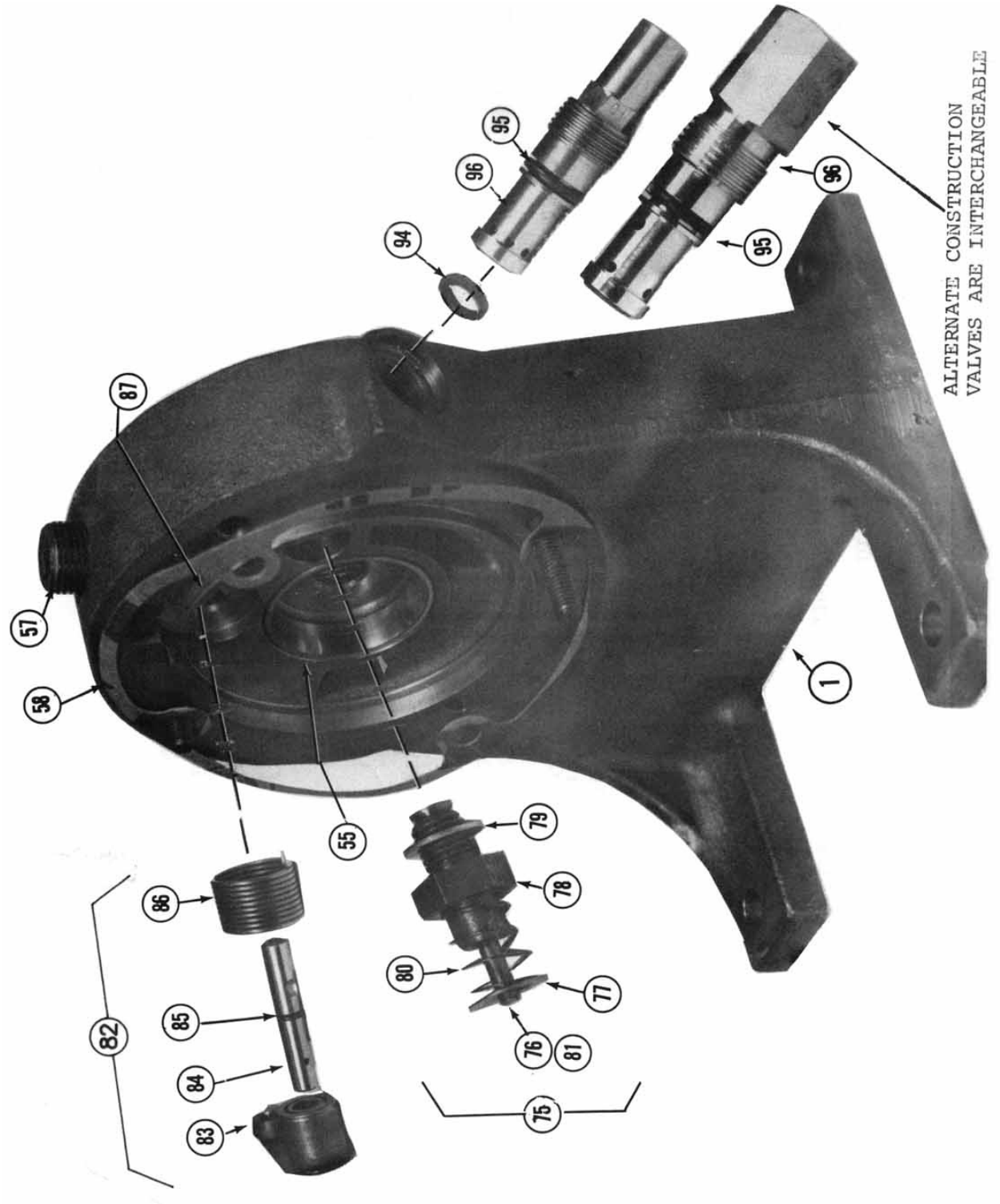


Figure 6 - Foot Mounting Plate with Air Vent Assembly, Replenishing Valve and Relief Valve

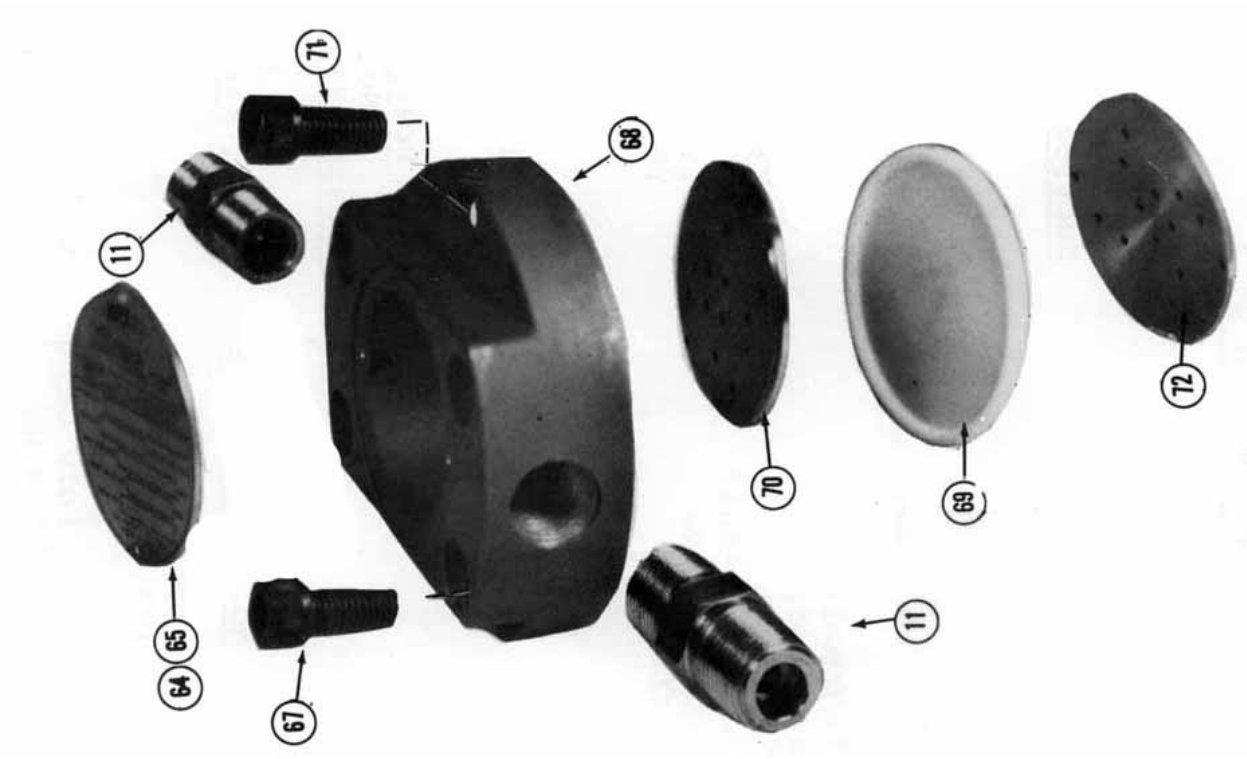


Figure 7 - Head Assembly

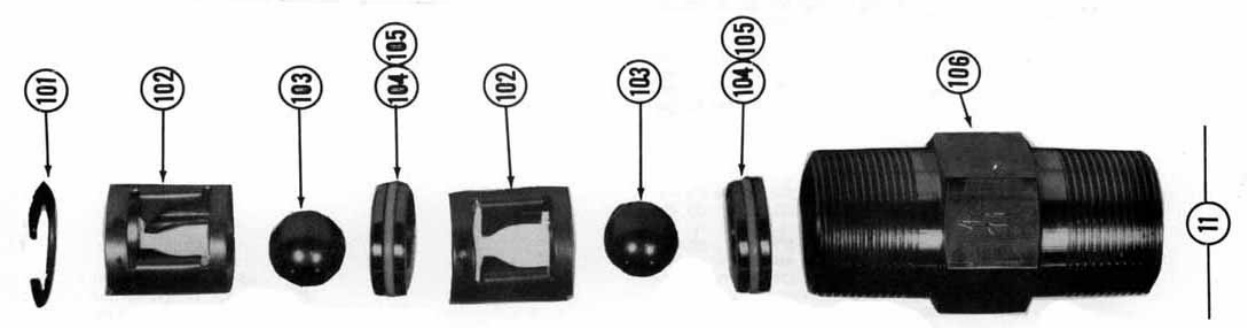


Figure 8 - Check Valve Assembly

5700 Simplex Pump with Manual Stroke Adjustment

Item No.	See Figure	Description	Notes		Part No.
1	1, 6	Foot Mounting Plate			Y021967
♦ 4	1, 2	Gasket	Set of 5		Y933976-10
5	1, 2	Cap Screw	(4 Req'd)		417-0053-219
6	1, 2, 7	Adapter			Y041833
7a	1, 2	Cap Screw	(4 Req'd)		417-0052-139
7b	1, 2	Lockwasher	(4 Req'd)		417-0036-025
8	1	Motor - 115/230 TENV	56C- Frame – ¼ Hp		Y938423-01
		115/230 XPNV			Y938423-03
		230/460 TENV			Y938423-17
		230/460 XPNV			Y938423-19
9	2, 4	Housing			Y060102
13	4	Adjustment Screw Cap			Y019400
15	2	Motor Coupling			Y304744
♦ 16	2	Oil Seal			Y302716
17	2	Bearing Cone			Y302647
18	2	Bearing Cup			Y302646
19a	2	Int. Shaft			Y102641
19b	2	2 Groove Pin			4170041028
Plunger Drive Shaft					See figure 3
	Code Number	1	2	3	4
	SPM	29	58	117	233
	Description	Part No.			
	Kit Complete[1]				
	(7/16")	Y934109-01	Y934109-02	Y934109-03	Y934109-04
	(23/32")	Y934110-01	Y934110-04	Y934110-03	Y934110-04
20	Worm	Y933987-05	Y933987-04	Y933987-03	Y933987-02
29	Drive Shaft				
	(7/16")	Y019404-05	Y019404-04	Y019404-03	Y019404-02
	(23/32")	Y019410-05	Y019410-04	Y019410-03	Y019410-02
21	2	Thrust Race	(2 Req'd)		815455-1
22	2	Thrust Bearing			815445
23	2	Needle Bearing			Y304747
♦ 24	3	Hydraulic Oil			Y302950
♦ 25	3	O-Ring			Y300773
♦ 26	3	Seal Ring			Y948259
27	3	Seal Bushing			Y948551
28	3	Bearing			Y302649
30	3	Guide Pin	7/16" Plunger		Y933978-01
			23/32"" Plunger		Y933978-02
31	3	Spring	7/16"" Plunger		Y933981-01
			23/32"" Plunger		Y933981-02

[1]Includes items 20, 28 (Qty. 2), 29, 30, 31, 32
♦ Recommended spare parts

5700 Simplex Pump with Manual Stroke Adjustment (con't)

Item No.	See Figure	Description	Notes	Part No.
32	3	Plunger	7/16""	Y933985-01
-			23/32""	Y933985-02
33	3	Spring		Y305098
34	1, 4	Manual Stroke Adjustment	Complete Assembly!	Y934108
35	4	Thumb Screw		Y305060
36	4	Adjustment Knob		Y933963
37	4	Lock Pin		Y933975
38	4	Adjustment Screw		Y933986
♦ 39	4	Insert		Y933974
40	4	Scale		Y952258
♦ 41	4, 5	Gasket	4 required	Y933977
42	1, 4, 5	Cap Screw	4 required	417-0053-041
43	4	Set Screw		Y302651
50a	5	Rear Bearing Housing		Y041816
50b	5	Vent Screw		Y305019
51	5	Reaction Ring		Y933979
53	5	Shift Ring Asembly		Y933989
54	5	O-Ring		Y302645
55	5, 6	Bearing Cup		Y302648
56	1	Cap Screw		417-0053-062
57	5, 6	Oil Plug		200719-4
♦ 58	5, 6	Housing Gasket	Set of 5	Y019409-10
61	5	Shift Ring Cap		Y933962
62	5	Rear Housing Bolts		417-0053-055
	7	Head Assembly[2]	Code 3/316 SS	Y934106-03
			Code 4/Carp. 20	Y934106-04
			Code 5/Hast. C	Y934106-05
			Code 6/H_2SO_4	Y934106-06
			Code 7/Polypro	Y934106-3
64	7	Data Plate		Y102901
65	7	Screws		417-0054-007
67	7	Cap Screw	Metal Head, 4 required Polypro Head, 6 required	417-0053-075 417-0053-077
68	1, 7	Diaphragm Head	Code 3/316 SS	Y102892-91
			Code 4/Carp. 20	Y102892-84
			Code 5/Hast. C	Y102892-82
			Code 6/H_2SO_4	Y102892-91
			Code 7/Polypro	Y043949-66
♦ 69	7	Diaphragm		Y933995
70	7	Diaphragm Plate (Process Side)	Code 3/316 SS	Y042835-91
			Code 4/Carp. 20	Y042835-84
			Code 5/Hast. C	Y042835-82
			Code 6/ H_2SO_4	Y042835-91
71	1, 7	Cap Screw	Metal Head, 2 required	417-0053-072

[1]Includes items 13, 35, 36, 37, 38, 39, 40
[2]Includes items 67 (4), 68, 70, 71 (2)
♦ Recommended spare part

5700 Simplex Pump with Manual Stroke Adjustment (con't)

Item No.	See Figure	Description	Notes		Part No.
72	7	Diaphragm Plate (Oil Side)			Y042835-79
75	6	Replenishing Valve	Includes 76 to 81		Y933956
76	6	Stem			Y933928
77	6	Retainer			Y933929
78	6	Valve Body			Y933927
79	6	Alum. Washer			Y933941
80	6	Spring			Y933930
81	6	Truarc			417-0105-003
82	6	Air Vent Assembly	Includes 83,84,85,86		Y934083-03
83	6	Index Arm Assembly			Y102399
84	6	Air Escape Shaft			Y933926
♦ 85	6	O-Ring			Y302285
86	6	Spring			Y934038
87-	6	Expansion Plug			Y302281
♦ 94	6	Washer			Y945381
		Relief Valve Assembly	Includes 95,96		
95	1, 6	O-Ring			Y302953
96	1, 6	Relief Valve	50-200 PSI Range		Y945733-01
			100-900 PSI Range		Y945733-02
			800-4000 PSI Range		Y945733-03
Check Valves – Suction and Discharge – Std ½" NPT					See Figure 8
	Code Numb	3	4	5	6
	Material	316 SS	CA20	Hast. C	H_2SO_4
	Description	Part No.			
♦ 100	Complete Ass'y	Y933958-91	Y933958-84	Y933958-82	Y933958-01
♦ 101	Retainer	Y933948-91	Y933948-82	Y933948-82	Y933948-82
♦ 102	Guide-half	Y019395-91	Y019395-84	Y019395-82	Y019393-84
♦ 103	Ball	Y933950-91	Y933950-82	Y933950-82	Y933950-81
♦ 104	Seat	Y933946-91	Y933946-84	Y933946-82	Y933946-84
♦ 105	O-Ring	Y948548-01			
106	Body	Y933945-91	Y933945-84	Y933945-82	Y933945-84
♦ 100	Check Valves[2] – Polypro – Suction (Y948245), Discharge (Y948244) – Std ½" NPT				
107		Insert	Figure not Shown		Y948196
108		Upper Body			Y948195
109		Lower Body			Y948194
110		Poly Clamp			Y948193
♦ 111		O-Ring			Y305047
♦ 112		Ceramic Ball			Y303517
113		Warning Label			Y947905
114		Warning Tag			DL-148

[1]Includes items 101, 102 (4), 103 (2), 104 (2), 105 (2), 106
[2]Includes items 107, 108, 109, 110, 111 (2), 112
♦ Recommended spare part

Drive Shaft for Duplex Pump

SPM	7/16 & 7/16 IN. Plungers	23/32 & 23/32 IN. Plungers	7/16 & 23/32 IN. Pungers
29	Y041823-05	Y041822-05	Y041824-05
58	Y041823-04	Y041822-04	Y041824-04
117	Y041823-03	Y041822-03	Y041824-03
233	Y041823-02	Y041822-02	Y041824-02

Recommended Spare Parts Kits – Model 5700 Pump

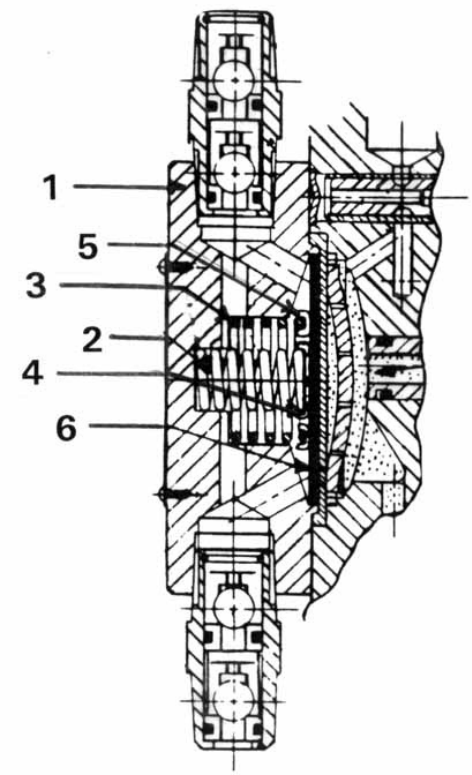
These sets include all recommended spare parts for one year's operation of a simplex pump. For multiple pump orders, one set for each plunger diameter and liquid end material on the order will normally on the order will normally be satisfactory for every two or three pumps.

Each set includes:

1 – Set of O-Rings
1 – Seal Bushing Ring Seal
1 – Plunger Spring
1 – Diaphragm
4 – Valve seats
4 – Valve guides
2 – Valve retainer
4 – Valve ball checks
4 – Valve O-Rings

Kit Part Number

Plunger Size	316SS	H_2SO_4 Service	Polypropylene
7/16""	Y938725-12	Y938725-01	
23/32""	Y938725-17	Y938725-06	Y938725-17P

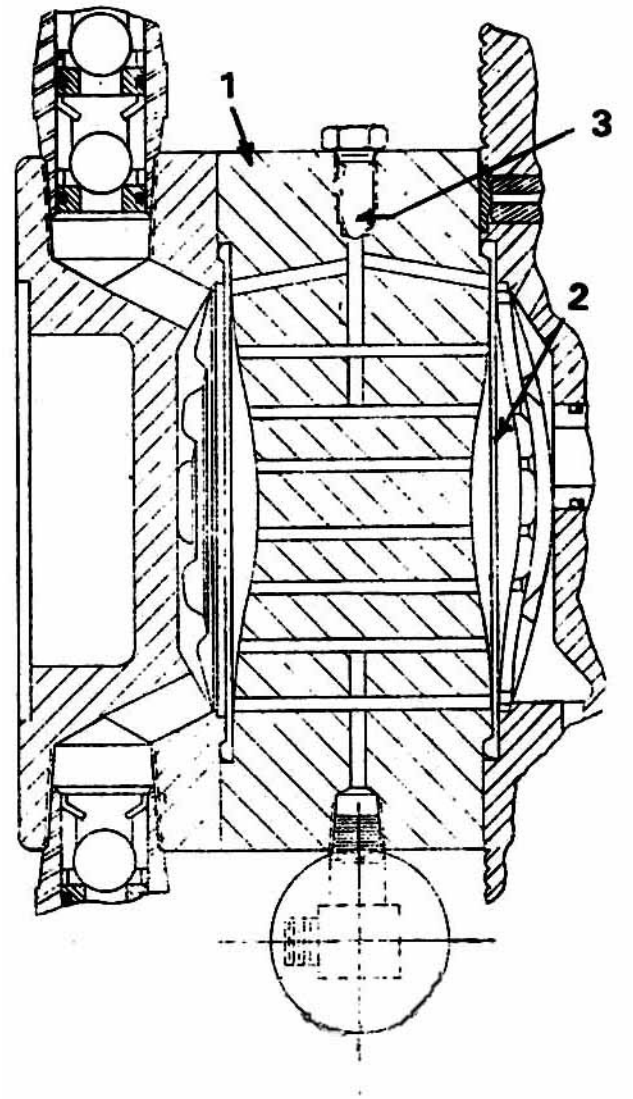


High Suction Lift Assembly (Optional)

Assembly : Y934106-23 Material: 316ss

Item No.	Description	Part No.
1	DiaphragmHead(316ss)	Y042873-91
2	Inner Spring (316ss)	Y942065-91
3	Outer Spring (316ss)	Y942064-91
4	Seat, Inner	Y942070-01
5	Seat, Outer	Y942069-01
6	Diaphragm Pad	Y942068-01
*	Cap Screws (6 req'd)	417-0053-078

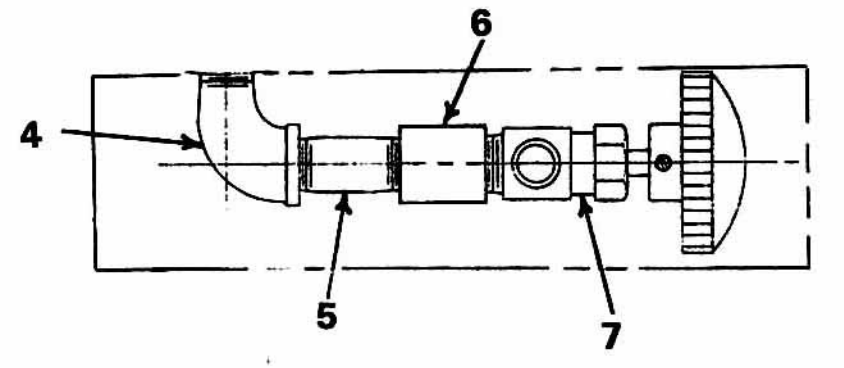
*Not Shown



Double Diaphragm Assembly (Optional)

Assembly : Y948181

Item No.	Description	Part No.
1	Double Diaphragm Head	Y042748
2	Diaphragm	Y933995
3	Pipe Plug, Hex Socket	Y305001
4	Elbow	416-1208-001
5	Nipple	Y303791
6	Coupling	416-1203-001
7	Angle Valve	Y303793
	Cap Screw (6 req'd)	417-0053-079
	Tag	DT155



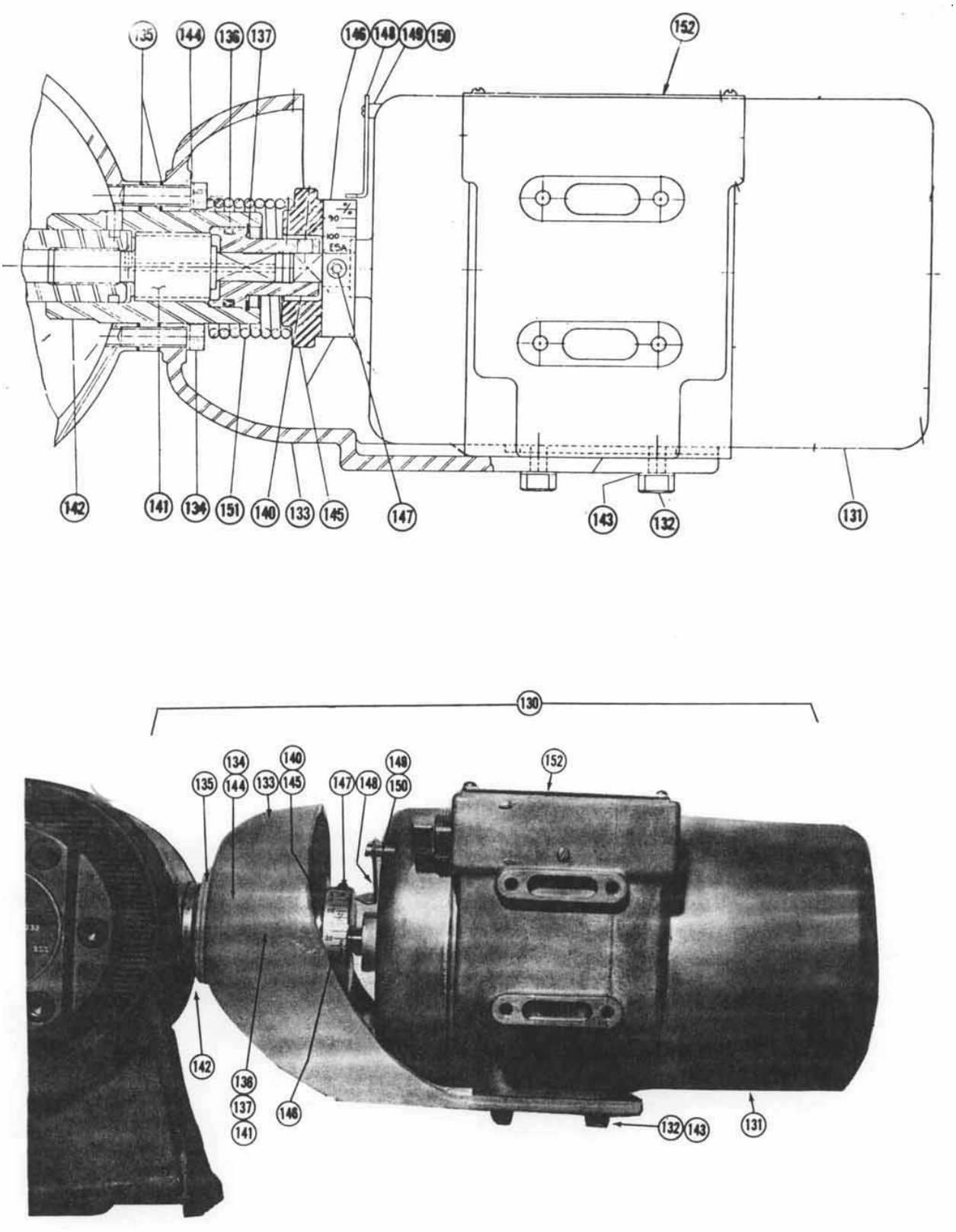


Figure 9 - Electric Stroke Adjustment

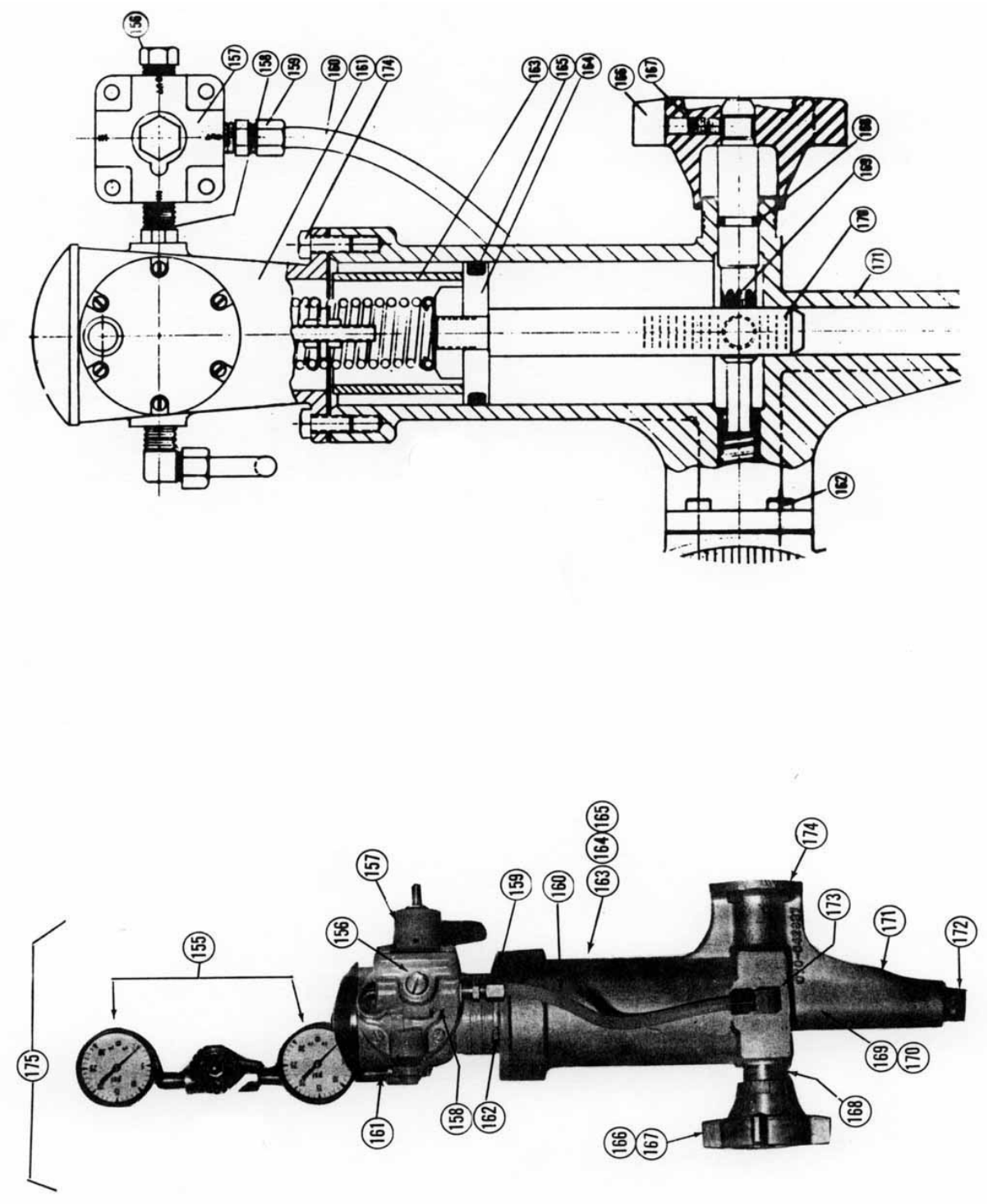


Figure 10 - Pneumatic Stroke Adjustment

Electric Stroke Adjustment (see Figure 9)

Item No.	Description	Notes	Part No.
130	Electric Stroke Adjustment	Complete Assembly	Y9406080-01
131	Motor – Actuator		Y947467-01
132	Hex Head Cap Screws	4 required	417-0052-110
133	Motor Frame		Y061433
134	Socket Head Cap Screws	4 required	417-0053-045
♦ 135	Gasket	2 required	Y933977
♦ 136	O-Ring		Y304489
♦ 137	Retaining Ring	2 required	Y304488
138	Set Screw Y		Y304582
139	Seal Disc		245235
140	Drive Adaptor		Y946072
141	Lead Screw (Not Shown)		Y946073
142	Cap Adjust. Screw		Y102405
143	Lock Washer	4 required	417-0036-672
144	Washer	4 required	Y933941
145	Spring Scale Retainer		Y102675
146	Scale		Y946090
147	Set Screw	2 required	Y304810
148	Pointer		Y946159
149	Bushing		Y946091
150	Special Screw		Y304524
151	Torsion Spring		Y947121
152	Label		Y949564
153	Relay (Not Shown)		Y946779-01

Electric Stroke Adjustment (see Figure 10)

Item No.	Description	Notes	Part No.
155	Gauge 3 – 15 psi		Y949419-01
	3 – 30 psi		Y949419-02
156	Pipe Plug ¼"		Y303169
157	Regulator		Y303151
158	Brass Nipple		Y303155
159	Brass Connector		Y303163
160	Tube		Y303153
161	Positioner 3 – 15 psi		Y303152
	3 – 27 psi		Y304243
162	Cap Screw		417-0053-041
163	Sleeve		Y940483
164	Disc Piston		Y940482
♦ 165	Piston O-Ring		Y303150
166	Adjusting Knob		Y100856
167	Set Screw		Y302651
♦ 168	O-Ring		Y302953
169	Control Shaft		Y100855
170	Gear Rack		Y940484
171	Actuator Body		Y042638
172	Pipe Plug ½"		416-1210-020
173	Elbow		Y303154
174	Cap Screw		417-0053-041
175	Pneumatic Stroke Adjustment	Complete Assembly	Y934105

♦ Recommended spare parts

Accessories

Chemical Feed Systems

Measuring and Control Technology

Transfer Pumps

Metering Pumps

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