



502-2.5-001-03

SERVICE MANUAL AND REPAIR PARTS FOR *Size 2.5 Posidyne*[®] **CLUTCH/BRAKE DRIVES**



WARNING - Read this manual before any installation, maintenance and operation.

MANUFACTURERS OF MECHANICAL AND ELECTRICAL POWER TRANSMISSION EQUIPMENT



FORCE CONTROL INDUSTRIES, INC.

Limited Warranty

Force Control Industries, Inc. ("Force Control") warrants its products to be free from defects in material and workmanship under normal and proper use for a period of one year from the date of shipment. Any products purchased from Force Control that upon inspection at Force Control's factory prove to be defective as a result of normal use during the one year period will be repaired or replaced (at Force Controls' option) without any charge for parts or labor. This limited warranty shall be void in regard to (1) any product or part thereof which has been altered or repaired by a buyer without Force Control's previous written consent or (2) any product or part thereof that has been subjected to unusual electrical, physical or mechanical stress, or upon which the original identification marks have been removed or altered. Transportation charges for shipping any product or part thereof that the buyer claims is covered by this limited warranty shall be paid by the buyer. If Force Control determines that any product or part thereof should be repaired or replaced under the terms of this limited warranty it will pay for shipping the repaired or replaced product or part thereof back to the buyer. EXCEPT FOR THE EXPRESS WARRANTY SET OUT ABOVE, FORCE CONTROL DOES NOT GRANT ANY WARRANTIES EITHER EXPRESSED OR IMPLIED, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR USE. The warranty obligation set forth above is in lieu of all obligations or liabilities of Force Control for any damages. Force Control specifically shall not be liable for any costs incurred by the buyer in disconnecting or re-installing any product or part thereof repaired or replace under the limited warranty set out above. FORCE CONTROL EXPRESSLY EXCLUDES ALL LIABILITY FOR ANY INDIRECT OR CONSEQUENTIAL DAMAGES THE BUYER MAY SUSTAIN IN CONNECTION WITH THE DELIVERY, USE, OR PERFORMANCE OF FORCE CONTROL PRODUCTS. Under no circumstances shall any liability for which Force Control is held responsible exceed the selling price to the buyer of the Force Control products that are proven to be defective. This limited warranty may be modified only in writing signed by a duly authorized officer of the company. This limited warranty applies exclusively to Force Control products; warranties for motors and gear reducers and other component parts may be provided by their respective manufactures. Any legal action for breach of any Force Control warranty must be commenced within one year of the date on which the breach is or should have been discovered.

A Return Goods Authorization (RGA) number must be obtained from the factory and clearly marked on the outside of the package before any equipment will be accepted for warranty work. Force Control will pay the shipping costs of returning the owner parts that are covered by warranty.

Force Control believes that the information in this document is accurate. The document has been carefully reviewed for technical accuracy. In the event that technical or typographical errors exist, Force Control reserves the right to make changes to subsequent editions of this document without prior notice to holders of this edition. The reader should consult Force Control if errors are suspected. In no event shall Force Control be liable for any damages arising out of or related to this document or the information contained in it.

Table of Contents

Section 1-DESCRIPTION and OPERATION

1-1 The Oil Shear Principle	1
1-2 Description	1
1-3 Operation	1

Section 2-SPECIFICATIONS

2-1 Model Designations.....	2
2-2 Specifications	2

Section 3-INSTALLATION

3-1 Receiving the Drive	3
3-2 Mounting the Drive	3
3-3 Compressed Air Connections.....	3

Section 4-LUBRICATION

4-1 Checking the Oil Level	4
4-2 Oil Capacity	4
4-3 Changing the Oil	4
4-4 Type of Oil	4

Section 5-OPERATIONAL CHECKS

5-1 General Set-Up Instructions.....	5
5-2 Checking Clutch/Brake Piston Seals and Movement....	5
5-3 Checking Clutch/Brake Engagement	5
5-4 Drive Motors.....	6
5-5 Pneumatic Control.....	6

Section 6-TROUBLESHOOTING

6-1 Trouble Shooting Chart.....	7
6-2 Checking Clutch/Brake Stacks for Wear.....	9

Section 7-DISASSEMBLY

7-1 General Disassembly Procedure.....	10
7-2 Removing C-Face Mounted Motor Drive.....	10
7-3 Removing Fan Shroud and Fan	10
7-4 Removing Quadrature Encoder.....	10
7-5 Removal of Quadrature Sensor and Magnetic Pickup.10	
7-6 Removal and Disassembly of Differential Line Driver Encoder.....	11
7-7 Removing Manifold Mounted Control Valve	11
7-8 Removing Piggyback Drive Motor, Belt Guard and Mounting Brackets	11
7-9 Access to Clutch and Brake Stacks	12
7-10 Removing Piston Seals	12
7-11 Piston Disassembly.....	12
7-12 Output Housing Disassembly	12
7-13 Disassembly of Input Housing Sub-Assembly	
A. Removing Water Cooled Heat Exchanger.....	13
B. Removing Male Input Shaft	13
C Removing Quill Input Shaft.....	13

Section 8-CLEANING and INSPECTION

8-1 Cleaning and Inspection.....	14
8-2 Repair and Replacement	14

Section 9-REASSEMBLY

9-1 General Reassembly Instructions.....	15
9-2 Reassembly of Input Housing Sub-Assembly	
A. Installing Male Input Shaft.....	15
B. Installing Quill Input Shaft	15
9-3 Installing Water Cooled Heat Exchanger	16
9-4 Output Housing Installation.....	16
9-5 Installing Brake Stack	
A. Horizontal Installation.....	17
B. Vertical Installation	17
9-6 Reassembly of Piston Sub-Assembly.....	17
9-7 Installing Piston Sub-Assembly and Piston Retainer ...	18
9-8 Installing Clutch Stack	18
9-9 Installing Input Housing Sub-Assembly	18
9-10 Installing Manifold Mounted Control Valve	18
9-11 Installing Quadrature Encoder Assembly.....	18
9-12 Installing Quadrature Encoder and Magnetic Pick-up	
A. Quadrature Encoder.....	19
B. Magnetic Pick-up Sensor	19
9-13 Reassembly and Installation of Differential Line Driver Encoder	20
9-14 Installing Fan and Fan Shroud.....	20
9-15 Attaching C-Face Adapters	
A. Output C-Face Adapter	20
B. Input C-Face Adapters	21
9-16 Installing Piggyback Drive Motor, Belt Guard and Mounting Brackets	21
9-17 Final Reassembly	21
9-18 Measuring and Controlling Stack Height Dimensions.....	21

Section 10-ILLUSTRATED PARTS LIST

10-1 General Information	22
10-2 Drive Motors	22
10-3 Factory Rebuild Service.....	22
10-4 Ordering Replacement Parts	22
10-5 Name Plate and Model Number Information	23

REPAIR PARTS

Figure 10.1 - 2.5 Posidyne Clutch/Brake Assembly.....	25
Figure 10.2 - Output C-Face Adapter(8-1/2" AK Dia.).....	26
Figure 10.3 - Input Housing Sub-Assembly	27
Figure 10.4 - Open Collector Quadrature Encoder.....	29
Figure 10.4 - Differential Line Driver Optical Encoder	29
Figure 10.5 - Manifold Mounted Control Valve	30
Figure 10.6 - Fan Cooling.....	31
Figure 10.6 - Water Cooling.....	31
Figure 10.7 - Piggyback Mounting.....	33
Figure 10.8 - Vertical Installation	35

Figure 10.9 - Dimensional Check Sheet.....	36
--	----

Section 1

DESCRIPTION and OPERATION

1-1 THE OIL SHEAR PRINCIPLE

Conventional clutches and brakes depend on the friction between solid surfaces operating in air to transmit torque. Friction does the job, but produces a great amount of heat and wear. The 2.5 Posidyne Clutch/Brake unit is an oil shear drive, with the friction surfaces operating in a bath of oil. The oil molecules tend to cling to each other, and to the friction surfaces. As moving and stationary elements are brought together, a thin but positive film of oil is maintained between them. The oil film is controlled by a clamping pressure and by carefully designed grooves in the elements. Torque is transmitted from one element to the other through the viscous shear of the oil film. So long as there is relative motion between the elements, they are protected by the oil, thus greatly reducing wear. The oil bath also effectively transmits heat away from the friction elements.

1-2 DESCRIPTION

(See Figure 1.1)

In the 2.5 Posidyne Clutch/Brake, the friction surfaces consist of alternate carbon steel plates and advanced friction material on steel discs. The oil control grooves are molded into the friction material disc surfaces. The discs have internal teeth which mate with a spline on the output shaft for both clutch and brake applications. The steel plates are keyed to the input shaft in the clutch and to the housing for the brake when used. The splined sections of the Posidyne output shaft contain centrifugal impellers to maintain a positive flow of oil between the discs and plates.

As noted in Section 2, Specifications, standard Posidyne units may be equipped with a clutch and a brake, or a clutch only.

The Clutch is normally operated by compressed air, although hydraulic pressure can be used. The Posidyne brake may be pressure operated, or it may be spring loaded to operate automatically when the clutch is released, or a combination of both springs and pressure.

1-3 OPERATION

The 2.5 Posidyne cross-section (Figure 1.1) shows the drive with the Brake engaged. A nominal braking force is provided by springs located in the Piston Retainer. Heavier springs are used to provide a greater braking force, when needed. Air Assist (as shown), controlled by external valves, also provides a greater braking force. The drive is normally in the Brake Position. The Drive Plates are keyed to the Output Housing and the Friction Discs are splined to the Output Shaft. The Output Shaft is not able to rotate in this Brake Position.

The Clutch is engaged when the air pressure is exhausted from the Brake Port and applied to the Clutch Port. The Piston moves to compress the Clutch Stack on the Input Shaft. The Drive Plates are keyed to the Input Shaft and the Friction Discs are splined to the Output Shaft. This allows both shafts to rotate at the same speed.

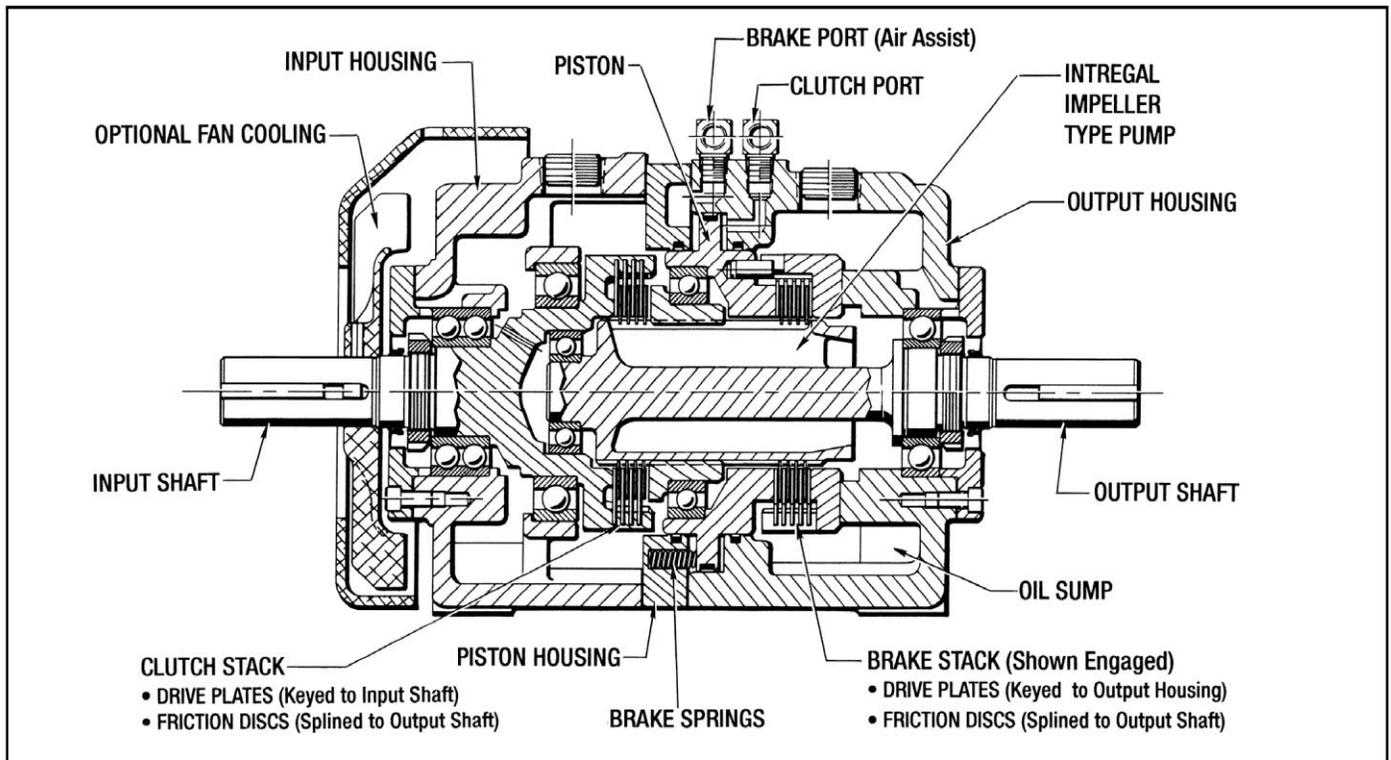


Figure 1.1 - 2.5 Posidyne Clutch/Brake Unit

Section 2 SPECIFICATIONS (2.5 Posidyne CLUTCH/BRAKE)

2-1 MODEL DESIGNATIONS

The model designations specifies the size (2.5) and internal logic type. The types are:

- S** - Pressure actuated clutch, pressure actuated brake.
- SA** - Air set clutch, medium spring set brake with air assist.
- A** - Pressure actuated clutch, medium spring actuated brake (See NOTE following).
- B** - Pressure actuated clutch, heavy spring actuated brake (See NOTE following).
- C** - Pressure actuated clutch, no brake.
- SCP** - Self centered piston, air set clutch and air set brake.
- P** - Pressure actuated clutch and brake, No springs.

NOTE:

Type A and B units both have spring actuated brakes. The difference is that type B units have additional springs.

2-2 OPERATING SPECIFICATIONS

Operating Specifications for the *Posidyne* Clutch/Brake Drives are listed in the **Table 2.1** below.

TORQUE RATINGS

The torque ratings listed are based on maximum actuation pressure as specified in the Table below.

Operating Specifications (Table 2.1)

Size	Logic	Max. Clutch Torque (Lb. In.)			Max. Brake Torque (Lb. In.)					Max. (RPM)		Max. KE per Engmt. (Ft. Lbs.)	Average Thermal HP Cooling*			Air Vol. per Engmt. (In. ³)	Oil Cap. (Qts.)	Inertia of Cyclic Parts (Lb. Ft. ²)
		Static	Dyn.	Max. Air Pr.	Springs Only		With Max. Air Assist			Basic & Fan Cool	Water Cool		Basic	Fan	water **			
					Static	Dyn.	Static	Dyn.	Max. Air Pr.									
2.5	S	1,116	960	60 psi	103	89	1,183	1,017	60 psi	1800	3600	15,865	Horizontal .70 2.00 4.00			5	6	.20
	SA	1,245	1,071	80 psi	418	361	1,378	1,185	40 psi									
	A	1,237	1,064	80 psi	418	361	---	---	---									
	B	794	683	80 psi	835	721	---	---	---									
	C	1,063	914	60 psi	---	---	---	---	---									
	SCP	1,234	1,061	60 psi	---	---	1,051	904	60 psi									
	P	1,260	1,084	60 psi	---	---	1,080	929	60 psi									
									Vertical .35 1.00 2.00									

NOTES: * - Ratings based on 1800 RPM operating speed and 70° ambient temperature.

** - Cooling water flow requirements in GPM equals
.10 x calculated thermal horsepower load.

Δ - Listed air pressures are at maximum. Operating pressures are generally much lower,

Section 3 INSTALLATION

3-1 RECEIVING THE DRIVE

Check the drive for shortage or damage immediately after arrival. Prompt reporting to the carrier's agent, with notations made on the freight bill, will expedite satisfactory adjustment by the carrier. When unloading or handling the drive, keep it upright. All Drives are filled with oil, ready to run, when shipped. However, before placing the unit in service or storage, check the oil level to make sure none has spilled out in transit. Add oil if necessary (refer to Section 4 Lubrication). Remove the red plastic plug and install the Air Breather (#45). If the drive is not to be installed and operated soon after arrival, store it in a clean, dry place having slow, moderate change in ambient temperature.

3-2 MOUNTING THE DRIVE

Installation of the Drive should be made in much the same manner, and receive the same care for a precision gear reducer. Standard Drives are designed for horizontal operation only. (Vertical, ceiling and side wall installed units are available.) Note the following precautions when mounting the drive:

1. The Drive should be mounted on a firm, level base or foundation, common with both the driving and driven components.
2. Use SAE Grade 5 Hex Hd. Cap Screws to bolt the drive securely into place. Before tightening down the bolts, check alignment with both the driving and driven machinery, then recheck after tightening.
3. If the input or output shaft is to be directly coupled, use only a flexible coupling (with horsepower service factor 3 to 1) to take care of maximum torque requirements. Make sure that the shafts to be coupled are concentric within 0.005 in. TIR. Check for horizontal, vertical and angular misalignment. Use shims as necessary to correct.

CAUTION:

Do not drive couplings or bushings on shaft.

4. If the Drive is to be connected through a belt, chain or gear drive, locate as close as possible to the housing to minimize overhung loads. Make sure that the sheaves, sprockets or gears are in line and that the shafts are parallel.
5. After the machinery has been in operation for a few hours, make sure that all mounting bolts are tight and recheck the alignment of all components.
6. After machinery has been in operation for 40 hours check the mounting bolts and tighten if necessary.

3-3 COMPRESSED AIR CONNECTIONS

Figures 3.1, 3.2, 3.3 and 3.4 illustrate typical compressed air systems for the *Posidyne* drives:

See Publication #502-CV-001 for a complete Service Manual and Repair Parts for Pneumatic Control Valves and Accessories.

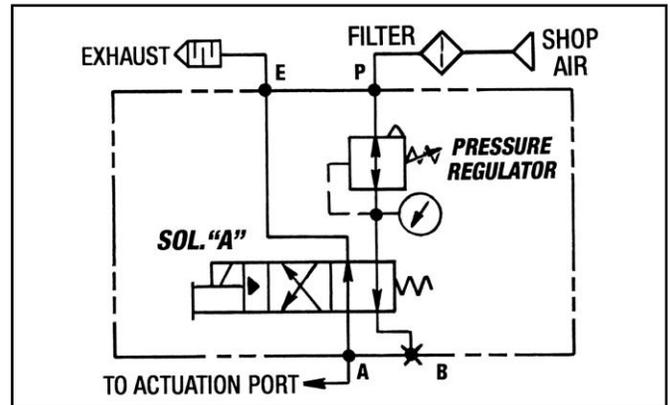


Figure 3.1 - 1PC Control Valve with Sandwiched Regulator - Air operated clutch, Spring-set Brake. (A, B and C Logics)

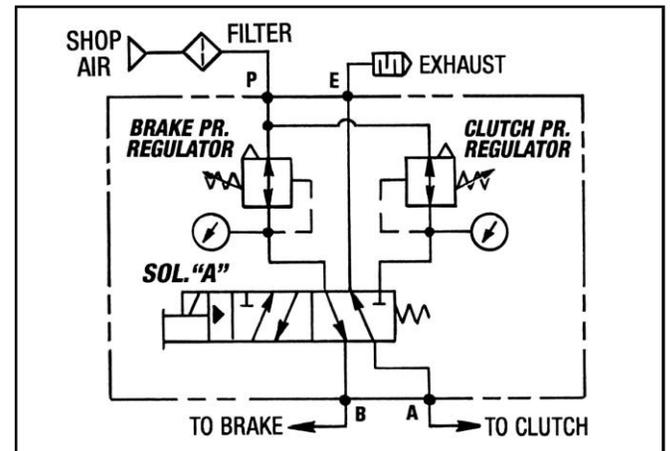


Figure 3.2 - 2PC-3/8 Control Valve with Sandwiched Regulators - Air operated clutch, Spring-set Brake with air assist. (S and SA Logics)

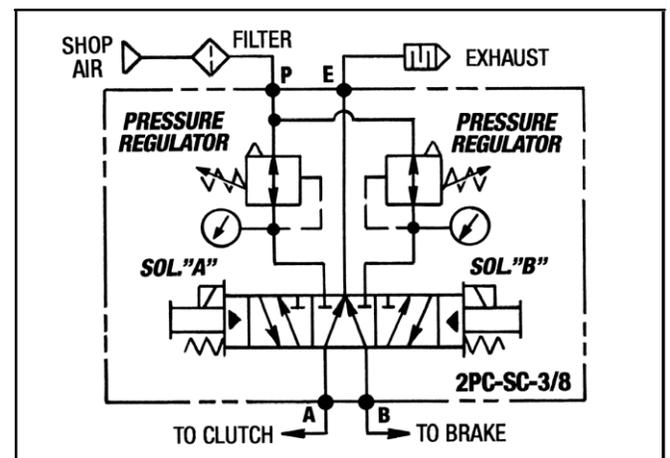


Figure 3.3 - 2PC-SC-3/8 Control Valve with Sandwiched Regulators - Spring Centered Piston, Air operated clutch and brake. (SCP Logic)

Note the following when planning and installing the air system:

1. Use direct acting solenoid air valves or pilot operated valves to give the response speed required. Locate the valves as close as possible to the air inlets on the drive. The valves may be installed directly on the drive if they are supported.
2. Be sure to use valves of at least 1.0 Min. Cv size.
3. The optional accumulators should be used for quick response, particularly if the air line loss and the nature of the air supply is such that recovery is slow. Accumulators can only be used in pneumatic systems where the pressure regulators are installed before the accumulators as shown in *Figure 3.4* for the 2PI-3/8 Control Valve. Size the accumulator to be at least 10 times the air required per engagement (**See Table 2.1**)
4. The air pressure regulator should be sized and set to provide the required torque. (**See Table 2.1**)
5. Pressure is directly proportional to torque. Use only the pressure necessary. (The clutch is not a variable speed drive. Do not let it slip for extended periods.) This will give additional life to the clutch-brake.
6. After using the drive for a few weeks the acceleration time may increase. Increasing the air pressure will restore the acceleration.

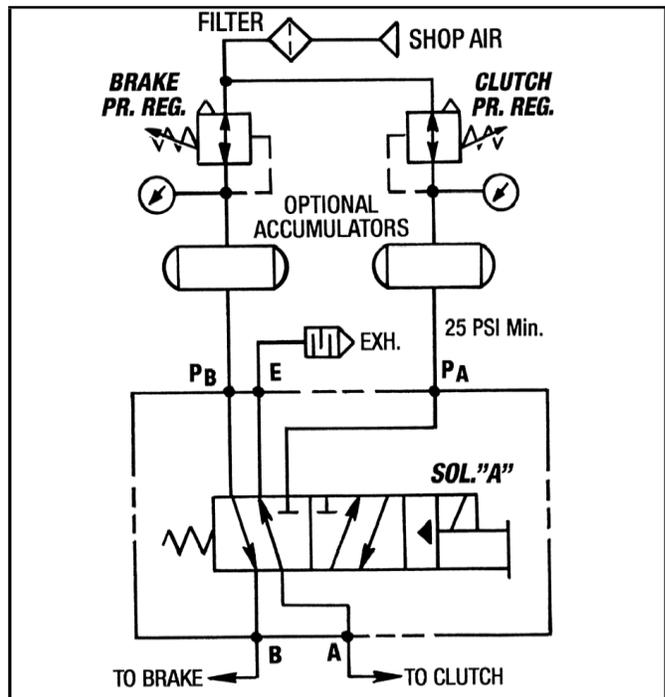


Figure 3.4 - 2PI-3/8 Control Valve without Regulators - Air operated clutch, Spring-set Brake with air assist. (S and SA Logics)

Section 4 LUBRICATION

4-1 CHECKING THE OIL LEVEL

When the drive is installed and weekly thereafter, or until experience dictates otherwise, check the oil level. Always check the oil level with the drive at room temperature and while it is not running.

The drive has an oil sight gauge located at the output end of the drive. The oil level is to be at the center of the gauge.

4-2 OIL CAPACITY

The Oil Capacity for the 2.5 Posidyne is as follows:

Horizontal Installation - 3 Quarts

Vertical Installation - 4 Quarts

4-3 CHANGING THE OIL

IMPORTANT

Open the disconnects to the drive motors before attempting to change the oil.

Every three months completely drain the oil from the drive using the drain plugs provided. If the oil sight gauge is dirty, it should be removed and cleaned.

Reinstall the drain plugs and refill the drive to the center of the sight gauge with fresh oil.

CAUTION

Do not overfill the Drive Unit. Excess oil will cause the unit to overheat.

4-4 TYPE OF OIL

Use only Mobil Automatic Transmission Fluid ATF-210 (type "F") or Mobil Multi-purpose Automatic Transmission Fluid for most drives. Other fluids may be specified for special applications. Always use the type of fluid specified on the Name Plate.

CAUTION

Use of the wrong type of oil will cause erratic operation, premature wear, damage to the unit and void the Warranty.

Section 5 OPERATIONAL CHECKS

These Operational Checks are to be made when the Drive Unit is removed from service for repair. Provisions for manually controlled 60 to 80 PSI air pressure must be made for these Operational Checks.

5-1 GENERAL SET-UP INSTRUCTIONS

Assemble a Pneumatic Testing Set-Up similar to the one shown in *Figure 5.1*

(S, SA and SCP Logic Only) "Air Assist" to Brake

5. Connect the Pneumatic Testing Setup to the Brake Port and apply shop air to it.
6. Repeat Steps 2, 3 and 4.

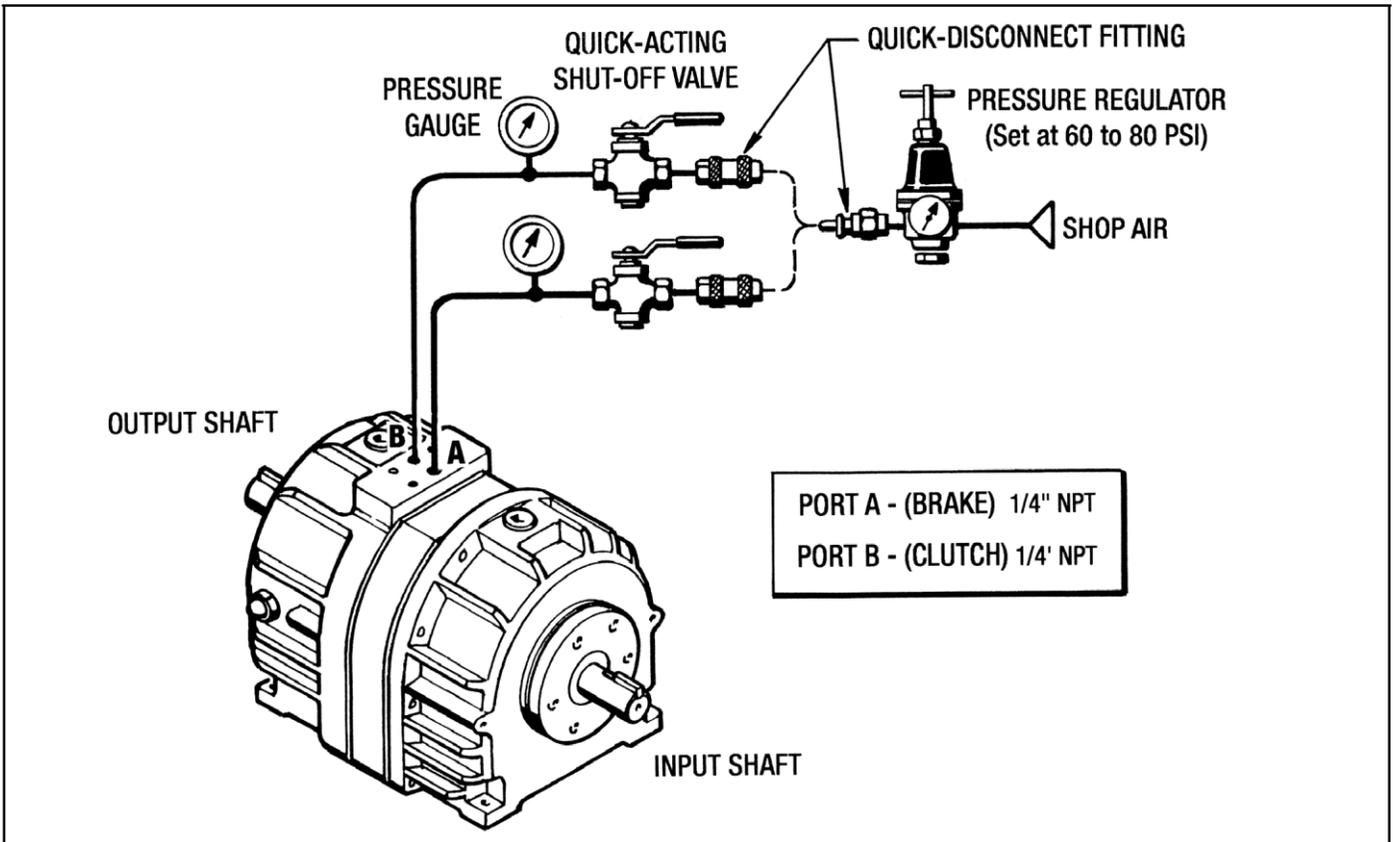


Figure 5.1 - Pneumatic Testing Set-Up for Operational Checks

5-2 CHECKING CLUTCH AND BRAKE PISTON SEALS

(See Figure 5.1)

1. Connect the Pneumatic Testing Setup to the Clutch Port and apply shop air to it.
2. Crack the Shut-off Valve until the air pressure reads about 80 PSI on the Pressure Gauge and then quickly shut the air off.
3. Observe the Pressure Gauge to see if the air pressure stays the same or drops. If the pressure stays the same or drops slowly, the Piston Seals are okay. If the pressure drops rapidly (more than 5 PSI in 5 seconds), the Piston Seals are leaking and will need to be replaced.
4. Disconnect the shop air and exhaust the air pressure from the drive unit.

5-3 CHECKING CLUTCH AND BRAKE ENGAGEMENT OR INPUT SHAFT Vs. OUTPUT SHAFT ROTATION.

(WITH MALE INPUT SHAFTS)

1. When applying air pressure to the Clutch Port, simply rotate the Input Shaft by hand and observe the rotation of the Output Shaft. Likewise, when the air pressure is not applied to the clutch port or when air pressure is applied to the "Air Assist" brake port, the Output Shaft should be locked in the braking position and should not rotate.

With SCP Logic the Output Shaft is free to rotate when air pressure is not applied to the Brake Port. Applying air to the Brake Port should lock the Output Shaft.

(With C-Face Mounted Drive Motor)

If the C-Face mounted drive motor is still attached, then the input shaft is not accessible to be manually rotated to check the Clutch/Brake Stack Engagement and Input Shaft vs. Output Shaft Rotation.

1. Temporally hook-up the drive motor and "Bump" it to check the clutch or brake operating modes and the output shaft rotation.

CAUTION

Do not attempt to run the motor with the inspection plugs (#14) removed. They must first be replaced.

5-4 DRIVE MOTORS

Check wiring connections against the wiring diagram on the Name Plate. "Bump" the motor and check direction of rotation. Check all connections for tightness.

5-5 PNEUMATIC CONTROL

The Pneumatic Control Operational Checks are to be made with Pneumatic Control valves hooked up.

(See Figures 3.1, 3.2, 3.3 and 3.4 for appropriate Pneumatic Control Diagrams.)

1. Shut off air supply, lock it out, and bleed off any trapped air in the system.
2. Insert Diagnostic Pressure Gauges in the air supply between the control valves and the drive. Turn air supply back on.
3. Activate Solenoid Control Valves for desired function.
 - A. Clutch Drive.
 - B. Brake "Air Assist".
4. Check air pressure with installed diagnostic pressure gauges for each function.
5. Check all electrical connections and the solenoid operation per manufacturer's specifications. With SCP Logic the Output Shaft is free to rotate when air pressure is not applied to the "Brake Port". Applying air should lock the Output Shaft.

Section 6 TROUBLESHOOTING

6-1 TROUBLESHOOTING CHART

TROUBLE	POSSIBLE CAUSE	REMEDY
Both clutch and brake fail to engage properly.	Electrical control circuit. Low air pressure. Air pressure regulator or piping. Worn friction surfaces. Improper type of oil	Check control circuit. Increase air pressure.** Check for improper operation or leaks. Check parts for wear and replace if necessary. (See Section 6-2) Check name plate and change oil if necessary.
Clutch fails to engage properly.	Electrical control circuit. Valve not functioning properly. Internal air leakage. Low air pressure Worn friction surfaces.	Check control circuit. Check valve operation. Replace if necessary. Check and replace O-Rings and Liners if necessary. Increase air pressure.** Check parts for wear and replace if necessary. (See Section 6-2)

6-1 TROUBLESHOOTING CHART (Continued)

TROUBLE	POSSIBLE CAUSE	REMEDY
Picks up load too quickly.	<p>Air pressure too high.</p> <p>Low oil level.</p>	<p>Reduce air pressure.</p> <p>Check oil level and add if necessary.</p>
Clutch fails to disengage properly.	<p>Electrical control circuit.</p> <p>Valve not functioning properly.</p> <p>Piston sticking-broken return springs.</p>	<p>Check control circuit.</p> <p>Check and replace valve if necessary.</p> <p>Disassemble to extent necessary and inspect for damaged parts.</p>
Noise and vibration	<p>Mounted on poor foundation.</p> <p>Misaligned couplings.</p> <p>Damaged bearings.</p>	<p>Improve installation. Tighten foot bolts.</p> <p>Recheck alignment.</p> <p>Disassemble to extent necessary and inspect for damaged bearings.</p>
Brake fails to engage properly.	<p>Electrical control circuit.</p> <p>Valve not functioning properly.</p> <p>Internal air leakage.</p> <p>Low air pressure</p> <p>Worn friction surfaces.</p> <p>Piston sticking.</p> <p>Weak or broken brake spring.</p>	<p>Check control circuit.</p> <p>Check valve operation. Replace if necessary.</p> <p>Check and replace O-Rings and Liners if necessary.</p> <p>Increase air pressure.**</p> <p>Check parts for wear and replace if necessary. (See Section 6-2)</p> <p>Disassemble to extent necessary and check for damaged parts.</p> <p>Replace spring.</p>
Brake fails to disengage properly.	<p>Electrical control circuit.</p> <p>Valve not functioning properly.</p> <p>Piston sticking.</p>	<p>Check control circuit.</p> <p>Check and replace valve if necessary.</p> <p>Disassemble to extent necessary and inspect for damaged parts.</p>
Drive overheats. (Oil temp. above 225° F.)	<p>Inertia or resistance changed.</p> <p>Improper oil level.</p> <p>Improper type of oil.</p> <p>Water turned off.</p> <p>Fan blocked.</p>	<p>Check with Force Control engineering.</p> <p>Check oil level. Add or drain as needed.</p> <p>Check name plate and change oil if necessary.</p> <p>Check shut-off valve.</p> <p>Clean shroud.</p>

6-1 TROUBLESHOOTING CHART (Concluded)

TROUBLE	POSSIBLE CAUSE	REMEDY
Oil leakage	Oil seal lips damaged. Gaskets Poor ventilation. Seal retainers loose.	Check to see if oil is leaking around shaft and replace if necessary. Tighten all external bolts. Remove breather and clean. Tighten retainer screws.
Oil leakage out breather.	Damaged seal around piston. Oil level too high.	Disassemble and repair. Drain excess oil.
Excessive shaft end play.	Bearings bad.	Disassemble and replace.
Clutch or brake does not repeat.	Air pressure changed. Improper type of oil. *Oil temperature changed. Resistance in machine changed.	Check air pressure and adjust. Check name plate and change oil if necessary. Check temperature. Lubricate bearings.

* - For installations requiring precise starting and stopping, operating temperatures are important. Operating temperatures between 116°F and 165°F are recommended. If the oil is allowed to drop to ambient temperatures overnight, the clutch input shaft should be run approximately 1/2 hour before operating the machinery.

** - Max. Air Pressure
S, P & C Models: 60 PSIG; A & B Models: 80 PSIG; SA Models: 80 PSIG Clutch & 40 PSIG Brake ; SCP Models: 60 PSIG

Zinc anode On all water cooled drives, a brass plug containing a zinc anode is installed in the water line close to one of the water connection ports. **DO NOT REMOVE IT.** The zinc anode is installed to prevent electrolysis damage to the oil cooler. Water supply should enter the oil cooler at the port nearest the zinc anode. The zinc anode should be checked occasionally and replaced before it is completely eroded.

6-2 CHECKING THE CLUTCH AND BRAKE STACKS FOR WEAR

(A, B and SA ; S, P and SCP Logics Only)

An easy procedure has been established to visually check the Brake and Clutch Stacks for Wear to determine whether or not they need to be replaced.

Four (4) "Stack Wear" Grooves have been machined in the Brake Pressure Plate (#97) Lugs to facilitate this visual check. Depending on which Logic applies to your unit, only (2) of them are used. (See Figure 6.1)

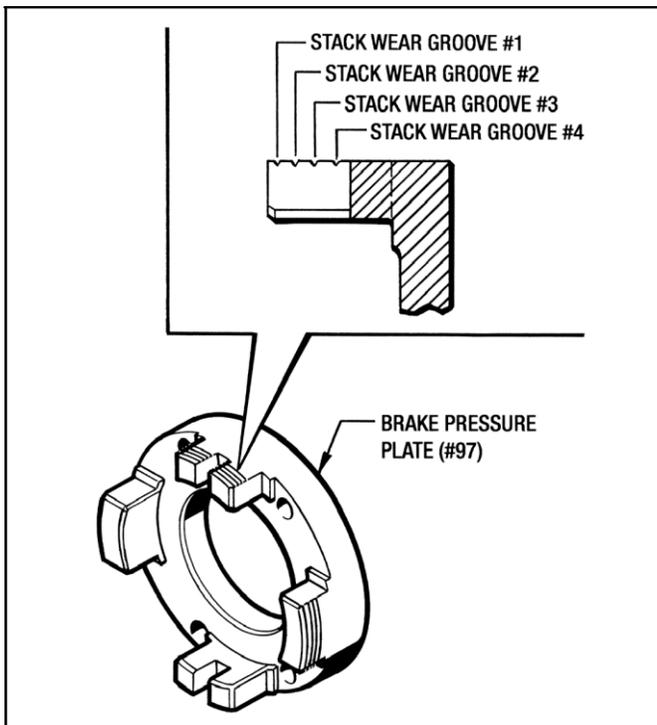


Figure 6.1 - "Stack Wear" Grooves

CAUTION

Disconnect and lock-out all Electrical Power to the Drive Motor. This step must be taken to avoid any possibility of personal injury or damage to the Drive Unit.

1. Remove the Inspection Pipe Plug (#14) from the top of the Output Housing (#9).

A. CLUTCH STACK WEAR (See Figure 6.2)

2. Apply air pressure to the Clutch Port.
3. Using a flash light, observe the Brake Stack through the Inspection Port.

(A, B and SA Logics)

If Surface "A" of the last Drive Plate has moved up to or past the "Stack Wear" Groove (#1), the Clutch Stack needs to be replaced.

(S, P and SCP Logics)

If Surface "A" of the last Drive Plate has moved up to or past

the "Stack Wear" Groove (#2), the Clutch Stack needs to be replaced.

4. Exhaust the air pressure from the Clutch Port.

B. BRAKE STACK WEAR (See Figure 6.2)

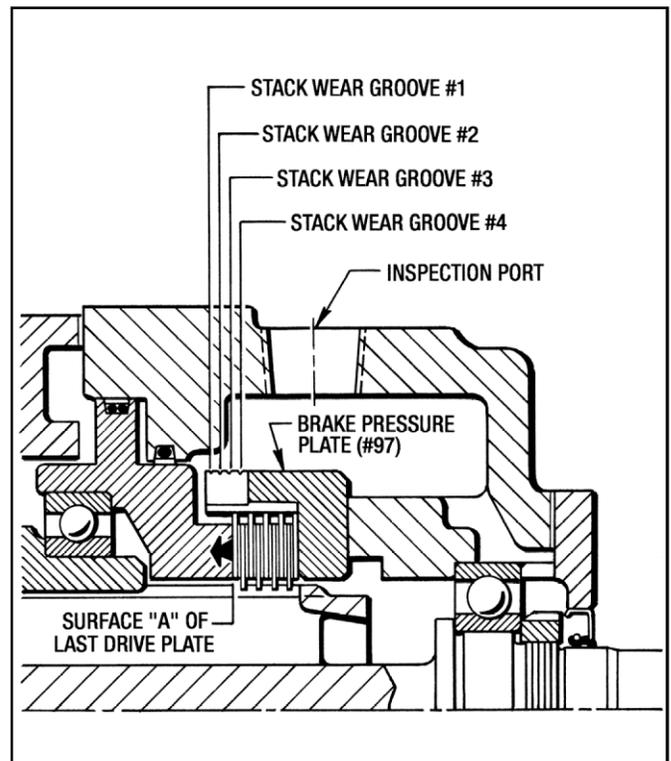


Figure 6.2 - Checking Clutch and Brake Stacks for Wear

5. Apply air pressure to the Brake Port.

NOTE:

This Step #5 only applies to S, P, SCP and SA Logics. There is no Brake Port for A and B Logics.

6. Using a flash light observe the Brake Stack through the Inspection Port.

(A, B and SA Logics)

If Surface "A" of the last Drive Plate has moved up to or past the "Stack Wear" Groove (#3), the Brake Stack is worn and needs to be replaced.

(S, P and SCP Logics)

If Surface "A" of the last Drive Plate has moved up to or past the "Stack Wear" Groove (#4), the Brake Stack is worn and needs to be replaced.

IMPORTANT NOTE:

Even though both the Brake Stack and the Clutch Stack can individually be checked for wear. If either Stack is worn and needs to be replaced, both Stacks should be replaced as a complete set. Refer to Section 7 - DISASSEMBLY and Section 9 - REASSEMBLY for Brake and Clutch Stack Replacement.

Section 7 DISASSEMBLY

7-1 GENERAL DISASSEMBLY PROCEDURE

1. Disconnect the Drive and move it to a suitable work area.

NOTES:

1. On Belt Driven or Direct Coupled Units, remove all necessary safety guards, belts, sheaves and couplings
2. For Water Cooled Units, disconnect water inlet and outlet piping. Drain water from the unit.
3. Disconnect all necessary pneumatic piping.

2. Remove drain plugs at the bottom of the Drive Unit and drain out all of the oil into suitable container and either save for reuse or discard as conditions warrants.

NOTES:

1. We recommend that you set the Drive Unit on the Output End with the Output Shaft in a vertical down position, for ease of disassembly. Supply suitable bracing and clamping to stabilize the Drive Unit for Disassembly.
2. An overhead crane and a soft sling is also recommended, if necessary, to remove heavy castings and parts.

The 2.5 Posidyne Clutch/ Brake Unit is comprised of the Input Housing Sub-Assembly and the General Overall Assembly which includes the Clutch Stacks, Piston Retainer, Piston, Brake Stack, Output Housing and Output Shaft.

Optional equipment is also covered in this manual. They are as follows: (1) Position Encoder Assemblies; (2) Manifold Mounted Control Valve; (3) Fan Cooling and Water Cooling; (4) Input and Output C-Face Flanges; (5) Piggyback Mounting; (6) Vertical Installation.

The Repair Parts Lists and Exploded View Drawings shown in Section 10 are for all Standard and Optional Equipment. They are as follows:

1. 2.5 Posidyne Clutch/Brake Assembly.....(Figure 10.1)
2. Output C-Face Adapter (8-1/2" AK)(Figure 10.2)
3. Input Housing Sub-Assembly(Figure 10.3)
4. Open Collector Quadrature Encoder.....(Figure 10.4)
5. Differential Line Driver Encoder.....(Figure 10.4)
6. Manifold Mounted Control Valve.....(Figure 10.5)
7. Fan Cooling and Water Cooling(Figure 10.6)
8. Piggyback Mounting(Figure 10.7)
9. Vertical Installation.....(Figure 10.8)

Please refer to these Parts Lists and Exploded View Drawings during the Disassembly Procedure for a visual reference and guide to all parts being disassembled.

7-2 REMOVING C-FACE MOUNTED DRIVE MOTOR and C-FACE FLANGES

(With Quill Input Shaft Only)

(See Figure 10.3)

1. Attach an appropriate sling and hoist to the Input Drive Motor for support and removal.
2. Remove (4) Hex Hd. Screws (#415) and (4) Lockwashers (#416) from the C-Face Adapter (#200).
3. Slide the motor shaft out of the Quill Input Shaft (#2).
4. Remove the (4) Soc. Hd. Screws (#201) and (4) Lockwashers (#202) from the C-Face Adapter (#200).
5. Pull the C-Face Adapter (#200) off of the Input Housing.

(With 8-1/2" AK Output C-Face Adapter)

(See Figure 10.2)

1. Remove the (4) Screws (#204) and the (4) Lockwashers (#205) from the C-Face Adapter (#203).
2. Pull the C-Face Adapter (#203) off of the Output Housing.

7-3 REMOVING FANSHROUD and FAN

(See Figure 10.6)

1. Remove the (2) Screws (#66) from the rear of the Fan Shroud (#24) and remove the Fan Shroud from the Input Housing.
2. Loosen the (2) Set Screws (#70) and pull the Fan (#25) off the Input Shaft (#2).
3. Remove both Keys (#37) and (#180) from the Input Shaft.

7-4 REMOVING QUADRATURE ENCODER

(See Figure 10.4)

1. If the 5-Pin Brad Harrison Cable (#259) is still attached, disconnect it at this time.
2. Take the Housing Cover (#253) off by removing (4) Screws (#268).
3. Remove the (4) Screws (#76) and (4) Lockwashers (#257) from the Pick-Up Housing (#17) and pull the housing off the Output Housing.
4. Loosen the Set Screw (#154) and pull the Pulse Gear (#186) off of the Output Shaft (#1).
5. Remove both keys (#181) and (#234) from the Output Shaft.

7-5 REMOVAL OF QUADRATURE SENSOR (#355) and MAGNETIC PICK-UP (#22)

(Quadrature Encoder Only)

(See Figure 10.4)

NOTE:

The Quadrature Encoder Assembly does not have to be removed from the Output Housing to replace the Sensors.

1. Remove the (4) Screws (#225) and take the Top Cover (#372) off the Pick-Up Housing (#17).

2. Disconnect the wires from the Brad Harrison Cable Connector (#368) to both Sensors.
3. Loosen the Set Screw (#241) and pull the Magnetic Pick-Up (#22) out of the housing. (Do not remove this set screw.)
4. Remove the (2) Screws (#226) and lift the Quadrature Sensor (#355) out of the housing.
5. If any Shims (#900 to 903) are under this Sensor, remove them and save for Reassembly.

7-6 REMOVAL and DISASSEMBLY of DIFFERENTIAL LINE DRIVER ENCODER (Optical Encoder)

(See Figure 10.4)

Any Drive Sheaves, Pulleys or Couplings must first be removed from the output shaft.

1. Take out the (4) Screws (#225) and remove the Top Cover (#372) and the upper Gasket (#19) from the Upper Enclosure (#18). This gasket is reusable.
2. Pull the Insulator (#373) up and out of the Upper Enclosure (#18).
3. Loosen the (2) captive screws in the Cable Connector (#368) and unplug it from the Circuit Board (#355). (See Figure 7.1)

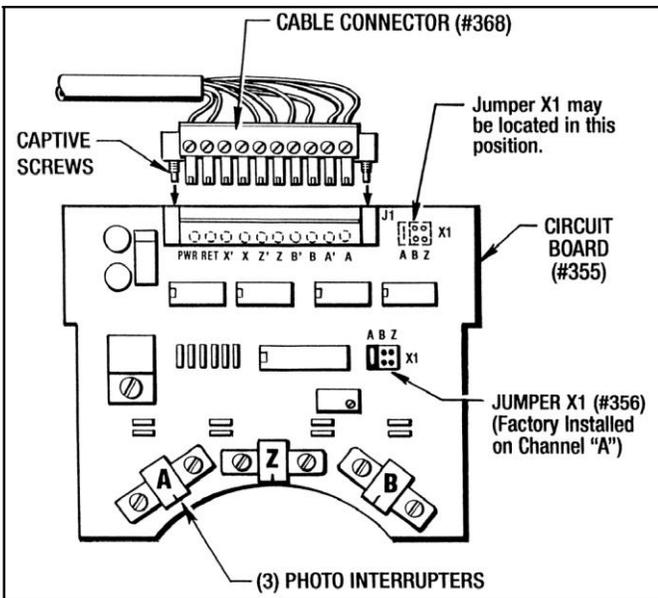


Figure 7.1 - Circuit Board Connector

4. Pull the Cable Grommet (#260), Cable (#259) and Cable Connector (#368) out of the Top Enclosure slot.
5. Remove the (2) Cap Screws (#77) and take the Upper Enclosure (#18) and lower Gasket (#19) off of the Disc Housing (#17). This gasket is also reusable.
6. Pull the Circuit Board (#355) straight up and out of the Disc Housing (#17).
7. Remove the (4) Screws (#76) and pull the Disc Housing off the Posidyne mounting face.

CAUTION

Be very careful not to bump or bend the Optical Disc (#186) which is still attached to the output shaft or damage the Dirt Seal (#269) located in the Disc Housing (#17).

8. If the Posidyne still has the main driving key in the output shaft, remove it at this time.
9. Loosen the Set Screw (#154) and pull the Optical Disc Assembly (#186) off of the output shaft.
10. Remove the Key (#234) then the Spacer (#270) from the output shaft.
11. Check the Dirt Seal (#269) in the Disc Housing (#17) and remove it if necessary.

7-7 REMOVING MANIFOLD MOUNTED CONTROL VALVE

(See Figure 10.5)

1. Disconnect the Air Hoses and the 4-Pin Brad Harrison Cable.
2. Unscrew (2) Screws (#725) and lift the Control Valve (#700) off the Manifold (#701).
3. Check the (2) Seal Rings (#808) and replace if necessary.
4. Remove the Manifold by taking out the (4) Screws (#730) and (4) Washers (#740).
5. Remove Gasket (#807) and discard.

7-8 REMOVING PIGGYBACK DRIVE MOTOR, BELT GUARD and MOUNTING BRACKETS

(See Figure 10.7)

1. Remove the top and front sections of the Belt Guard (#124).
2. Loosen the belt tension by backing-off the (4) top Jam Nuts (#152). Remove the Timing Belt from the Pulleys.
3. Unscrew the (4) motor hold-down bolts and with an overhead hoist remove the Drive Motor.
4. Take the Pulley off the Posidyne Input Shaft. (See Figure 7.2 for procedure.)

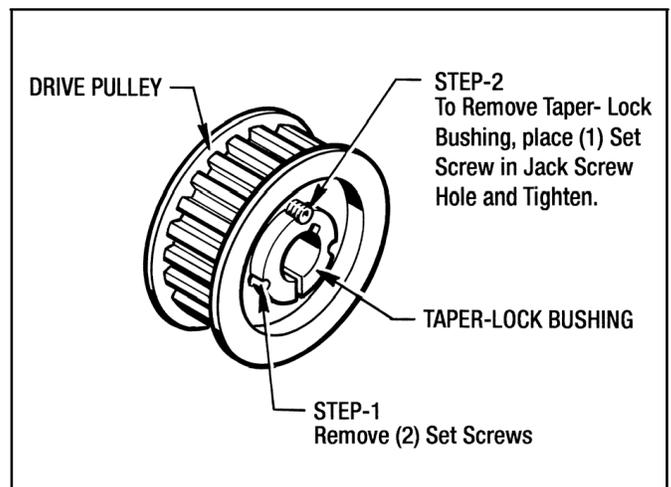


Figure 7.2 - Removing Drive Pulley

5. The lower back plate of the Belt Guard can now be removed by removing Screws (#305) and (#268).
6. Remove all other motor mounting brackets and mounting hardware necessary for further Disassembly.

7-9 ACCESS TO THE CLUTCH and BRAKE STACKS

(See Figure 10.1)

IMPORTANT NOTE:

When removing the Clutch and Brake Stacks, always keep the Drive Plates and Friction Discs in the same order as they were removed.

A. Clutch Stack

1. Remove the (10) Screws (#69) and the (10) Lockwashers (#127) from the Output Housing (#9).
2. Using the (2) jackscrew holes in the Input Housing (#8), separate the Input Housing from the Piston Retainer (#11).
3. Remove and discard Gasket (#53).

The Clutch Stack can now be removed from the Output Shaft Spline.

B. Brake Stack

4. **Evenly loosen** the (4) Screws (#62) in the Piston Retainer (#11). (**Do not remove them at this time.**) Using the (2) jackscrew holes, separate the Piston Retainer (#11) from the Output Housing (#9).

CAUTION:

This Piston Retainer is under spring pressure and care must be taken to avoid personal injury when removing this Piston Retainer.

5. **Evenly remove** the (4) Screws (#62) and the (4) Lockwashers (#128) and remove the Piston Retainer (#11), being careful not to damage the Teflon Liner (#42) in the Piston Retainer.
6. Take the (5) Springs (#36) out of the Piston Retainer. Make a free hand sketch of spring locations. This will help at Reassembly.
7. Remove and discard Gasket (#51).
8. Pull the Piston Sub-Assembly out of the Output Housing, being careful not to damage the Teflon Liner (#43) in the Piston (#3).
9. On **SCP Logic**, there are (5) more Springs (#36) located in the Output Housing. Remove them at this time. Make a free hand sketch of Spring Locations.

The Brake Stack can now be removed from the Output Shaft Spline.

If replacement of the Clutch and Brake Stacks is the only repair to be done, then proceed to Section 8 CLEANING and INSPECTION.

7-10 REMOVING PISTON SEALS (Teflon Liners and O-Rings)

(See Figure 10.1)

It is recommended that all Liners and O-Rings that are removed at Disassembly should be replaced with new ones at Reassembly.

1. Remove the Teflon Liner (#42) and O-Ring (#39) from the Output Housing (#9) and discard, if necessary.
2. Remove the Teflon Liner (#42) and O-Ring (#39) from the Piston Retainer (#11) and discard, if necessary.
3. Remove the Teflon Liner (#43) and (2) O-Rings (#40) from the Piston (#3) and discard, if necessary.

7-11 PISTON DISASSEMBLY

(See Figures 7.3 and 10.1)

IMPORTANT

Only disassemble this Piston if either the Thrust Plate (#5) or Bearing (#27) needs to be replaced.

1. Press the Thrust Plate (#5) and the Bearing (#27) out of the Piston (#3) with an arbor press as shown in Figure 7.3.

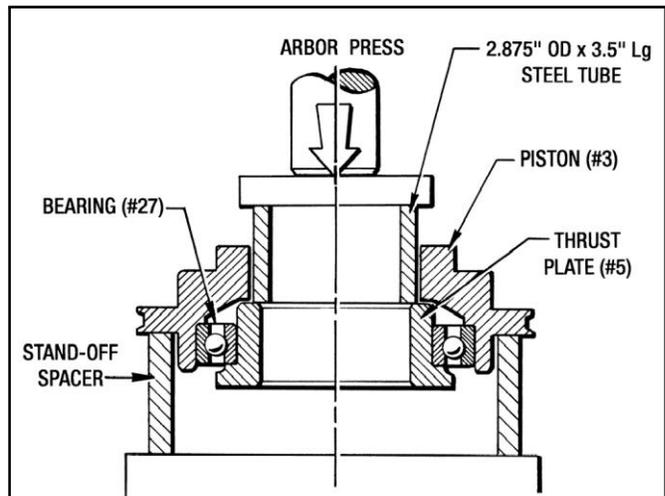


Figure 7.3 - Piston Disassembly

7-12 OUTPUT HOUSING DISASSEMBLY

(See Figure 10.1)

1. If the Key (#181) is still in the Output Shaft, remove it at this time.
2. Remove the Bearing Retainer (#7) by taking out (6) Screws (#63). Pull the Bearing Retainer off and over the Output Shaft, being careful not to damage the lip of Oil Seal (#31).
3. Check the Oil Seal (#31) and if it needs replaced, press it out of the Bearing Retainer (#7) with an arbor press.
4. Remove and discard Gasket (#55).
5. If necessary, remove the Brake Pressure Plate (#97) by taking out (4) Screws (#64).
6. With a mallet, tap the Output Shaft out of the Output Housing as shown in Figure 7.4.

IMPORTANT

Do not attempt to remove the Output Shaft unless Bearings (#28) and (#35) are damaged and have to be replaced.

7. Heat up the Locknut (#34) and remove it from the Output Shaft. (Also clamp the Output Shaft in a vise to make the disassembly easier.)
8. With a bearing splitter or puller, remove Bearings (#28) and (#35).

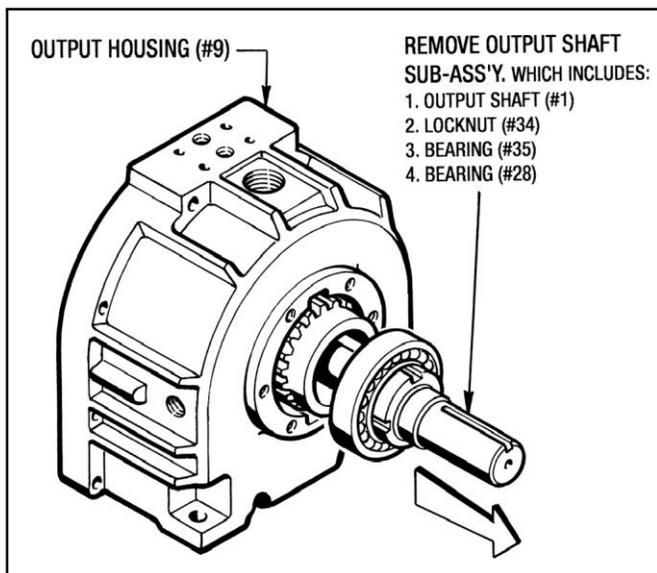


Figure 7.4 - Removing Output Shaft

7-13 DISASSEMBLY OF INPUT HOUSING SUB-ASSEMBLY

(See Figure 10.3)

A. Removing Water Cooled Heat Exchanger

(See Figure 10.6)

NOTES:

1. Only remove the Heat Exchanger (#48) if replacement or repair is required.
2. It will be necessary to use a suitable punch to drive the tube ends out of the Input Housing. Care must be taken not to damage external machined surfaces.

1. Remove all external fittings from the Input Housing.
2. Remove (2) Screws (#56).
3. Tap out the tube ends, with a suitable punch, from the Housing (#8) and remove the Heat Exchanger (#48).

B. Removing Male Input Shaft

IMPORTANT

Do not attempt to remove the Input Shaft unless Bearings (#26) and (#38) are damaged and have to be replaced.

1. If the Key (#180) is still intact in the Input Shaft (#2), remove it at this time.
2. Remove (6) Screws (#63) and remove the Bearing Retainer (#7) taking care not to damage the lip of the Oil Seal (#31).
3. Check Oil Seal (#31) and replace if necessary. If replacement is necessary, use an arbor press to press it out of the Bearing Retainer (#7).
4. Remove and discard Gasket (#55).
5. Take the Locknut (#34) off the Input Shaft.
6. Place the Input Housing (#8) into an arbor press with the Input Shaft pointing up. Use appropriate spacers under the housing. Press the Input Shaft (#2) down and out of the housing.

7.1 Lift the Bearing (#26) out of the bearing bore.

8. Use a Bearing Splitter to remove Bearing (#38) from the Input Shaft. (See Figure 7.5)

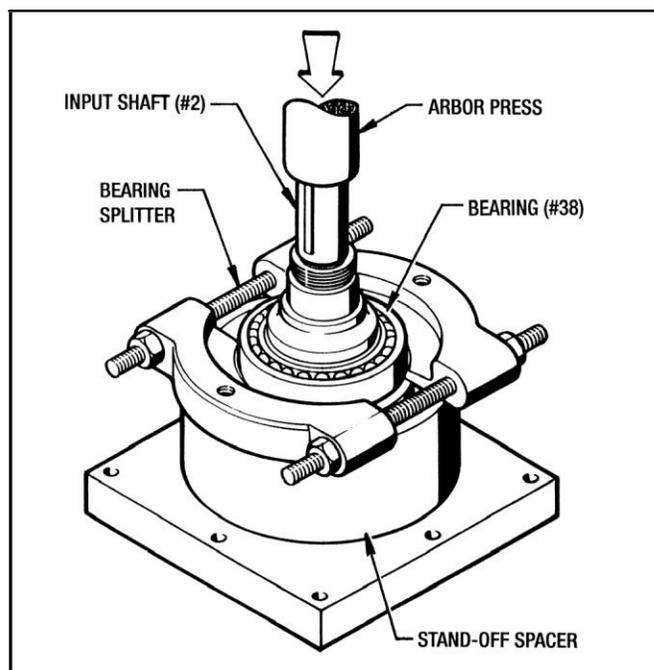


Figure 7.5 - Removing Bearing From Input Shaft

C. Removing Quill Input Shaft

IMPORTANT

Do not attempt to remove the Input Shaft unless Bearings (#26) and (#38) are damaged and have to be replaced.

1. If the Key (#180) is still intact in the Input Shaft (#2), remove it at this time.
2. Remove (6) Screws (#110) and remove the Bearing Retainer (#207) taking care not to damage the lip of the Oil Seal (#208).
3. Check Oil Seal (#208) and replace if necessary. If replacement is necessary, use an arbor press to press it out of the Bearing Retainer (#207).
4. Remove and discard Gasket (#206).
5. Take the Locknut (#209) off the Input Shaft.
6. Place the Input Housing (#8) into an arbor press with the Input Shaft pointing up. Use appropriate spacers under the housing. Press the Input Shaft (#2) down and out of the housing.
7. Lift the Bearing (#26) out of the bearing bore.
8. Use a Bearing Splitter to remove Bearing (#38) from the Input Shaft. (See Figure 7.5)

**Disassembly is now complete for your
2.5 Posidyne Clutch/ Brake Unit**

Section 8 CLEANING and INSPECTION

8-1 CLEANING AND INSPECTION

Clean metal parts in a suitable solvent and dry in a stream of low pressure compressed air. The Clutch and Brake Drive Plates (#13) can be cleaned in a solvent, but DO NOT clean the Clutch and Brake Friction Discs (#12) in solvent. Use only a clean, dry and lint-free rag to clean these Friction Discs. (Solvent will damage the resilient paper-based friction material used on the Friction Discs). Keep the Drive Plates and Friction Discs in the same order as they were removed. After cleaning, inspect parts for cracks, distortion, scoring, nicks, burrs or other damage would affect serviceability. Pay particular attention to the following:

1. Check the disc wear surfaces for scoring, galling or evidence of uneven wear.
2. Check the clutch and brake plates for scoring or galling. Make sure they are flat. If a perceptible ridge is worn in any of the drive plates, replace all of the drive plates and friction discs as a complete set.
3. Carefully check the piston and bore surfaces for nicks, scratches, scoring or other damage which would affect operation or cause leakage.

4. Pay particular attention to shafts in the area of rotary seals. Check for nicks, scratches which would cause leakage. Replace any damaged parts.
5. It is not necessary to remove the ball bearings to check their operation. Slowly rotate the free race of each bearing by hand checking to see if it turns freely without rough or flat spots.

8-2 REPAIR AND REPLACEMENT

A fine stone or crocus cloth may be used to remove minor surface defects from parts so long as the operating or sealing action of the part is not affected. The use of coarser abrasive or other machining methods should not be attempted. Otherwise, damaged parts should be replaced.

Replacement is recommended also for the following, as applicable:

1. Replace all O-Rings, Liners, Gaskets and Oil Seals removed during the course of disassembly.
2. Replace Clutch or Brake Discs and Drive Plates in complete sets only.

Section 9 REASSEMBLY

9-1 GENERAL REASSEMBLY INSTRUCTIONS

1. Lubricate O-Rings and the lips of all the Oil Seals with the same oil as used in the Drive Unit immediately before Reassembly and Installation of any mating parts.
2. O-Ring Liners (#43) will be easier to install if heated in a oven to 250° F. maximum.

The installation of press fitted parts can be eased by heating the outside parts in a oven. Heat Bearings to 250° F. maximum. **Always wear suitable gloves when handling heated parts.**

3. Apply Gasket Sealant (**Permatex #3D**), or equivalent, to all flat gaskets except where otherwise noted.
4. Use Cap Screw Adhesive (**Loctite #271**), or equivalent, on all Cap Screws and Locknuts. Use sparingly and clean off any excess with (**Loctite (#755)** Adhesive Cleaner.
5. Unless otherwise specified, torque all bolts to SAE Grade 5 specifications.

Basically the Reassembly is just a reverse order of the Disassembly Procedure described in Section 7.

9-2 REASSEMBLY OF INPUT HOUSING SUB-ASSEMBLY

(See Figure 10.3)

A. Installing Male Input Shaft

1. Press Bearing (#38) onto the Input Shaft (#2) with an arbor press.
2. Insert the Input Shaft (#2) with the Bearing (#38) on it into the rear of the Input Housing (#8) until the Bearing (#38) seats in the bearing bore.

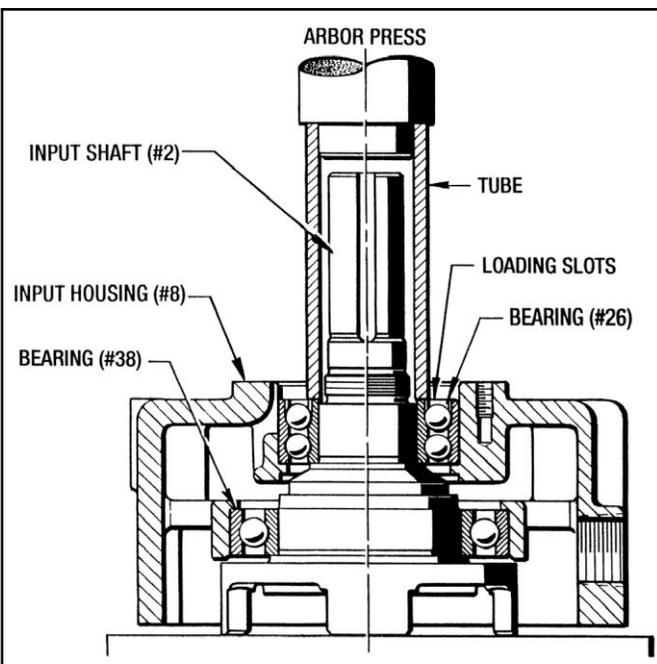


Figure 9.1 - Installing Male Input Shaft

3. Set the Input Housing into an arbor press as shown in Figure 9.1. Place the Bearing (#26) onto the Input Shaft and with an appropriate sized tube, press on the inner race of the bearing until it bottoms out. (Do not press on the bearing cage of the outer race.)
4. Install Locknut (#34) onto the Input Shaft (#2). Use Thread-Locker (Loctite #271) on the threads. **Wipe off any excess.**
5. Apply a thin coat of Sealant (Permatex #3D) to the oil seal bore in the Bearing Retainer (#7) and press the Oil Seal (#31) into the bore.
6. Place the Gasket (#55) onto the Bearing Retainer (#7), aligning the screw holes up. **(Do not use any gasket sealant on this gasket.)**
7. Place masking tape over the keyway and slide the Bearing Retainer (#7) with the Gasket (#55) over the shaft, being careful not to damage the lip of the Oil Seal (#31). Attach with (6) Screws (#63). **Torque to 9 Ft. Lbs.**
8. Replace Key (#180) back into the Input Shaft.

B. Installing Quill Input Shaft

1. Press Bearing (#38) onto the Input Shaft (#2) with an arbor press.
2. Insert the Input Shaft (#2) with the Bearing (#38) on it into the rear of the Input Housing (#8) until the Bearing (#38) seats in the bearing bore.
3. Set the Input Housing into an arbor press as shown in Figure 9.2. Place the Bearing (#26) onto the Input Shaft and with an appropriate sized tube, press on the inner race of the bearing until it bottoms out. **(Do not press on the bearing cage of the outer race.)**

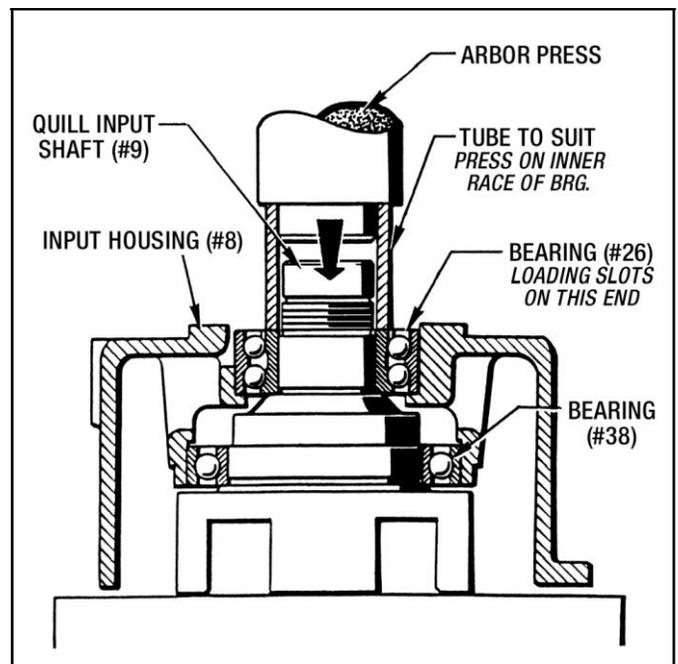


Figure 9.2 - Installing Quill Input Shaft

4. Install Locknut (#209) onto the Input Shaft (#2). Use Thread-Locker (**Loctite #271**) on the threads. **Wipe off any excess.**
5. Apply a thin coat of Sealant (Permatex #3D) to the oil seal bore in the Bearing Retainer (#207) and press the Oil Seal (#208) into the bore.
6. Place the Gasket (#206) onto the Bearing Retainer (#207), aligning the screw holes up. (**Do not use any gasket sealant on this gasket.**)
7. Slide the Bearing Retainer (#207) with the Gasket (#206) over the shaft, being careful not to damage the lip of the Oil Seal (#208). Attach with (6) Screws (#210). **Torque to 14 Ft. Lbs.**
8. Replace Key (#180) back into the Input Shaft.

9-3 INSTALLING WATER COOLED HEAT EXCHANGER

(See Figure 10.6)

1. Guide the Heat Exchanger (#48) into the Input Housing, making sure that the tube ends project out the (2) holes in the rear face of the Housing. Attach with (2) Screws (#56).
2. Mark the tubing approximately 1/16" beyond the face of the housing. (See Figure 9.3).
3. Remove the Heat Exchanger from the Housing and cut off the tubes on the 1/16" marks. **NOTE-The ends of the tubes must be free of all burrs before reassembly.**

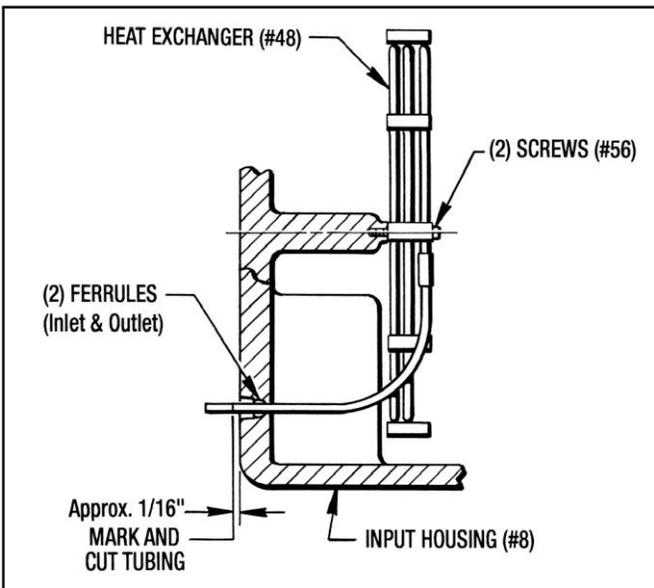


Figure 9.3 - Installing Water Cooled Heat Exchanger

4. Reinstall the Heat Exchanger back into the Housing. Apply **Loctite #271** to the tubing O.D. Then place the (2) Compression Fittings with Ferrules (#71) on the tubing. (See Figure 9.3).

IMPORTANT

When tightening Fittings (#71), do not over tighten and then back off. This will cause the compression seal to leak.

5. Install all external pipe fittings shown on Figure 10.6.

9-4 OUTPUT HOUSING INSTALLATION

(See Figure 10.1)

1. Install both Bearings (#28) and (#35) onto the Output Shaft (#1) with an arbor press.
2. Next install the Locknut (#34) onto the Output Shaft. Use (**Loctite #271**) on the threads. **Wipe off any excess.**
3. Press the Oil Seal (#31) into the Bearing Retainer (#7) Use a light coat of (Permatex #3D) on the O.D. of the oil seal. Wipe off any excess.
4. Insert the Output Shaft with the (2) Bearings on it into the Output Housing (#9) until Bearing (#35) seats into the bearing bore. (See Figure 9.4)

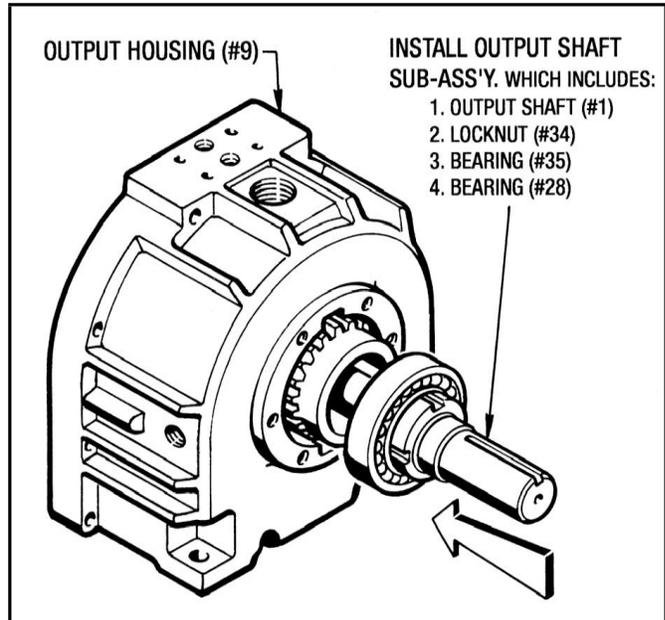


Figure 9.4 - Installing Output Shaft

5. Place gasket (#55) onto the Bearing Retainer (#7), aligning the holes in the gasket with the holes in the bearing retainer. **Do not use any Gasket Sealant on this gasket.**
6. Slide the Bearing Retainer (#7), Gasket (#55) and Oil Seal (#31) over the Output Shaft (#1). **Be careful not to damage the oil seal lip on the shaft keyway.** Attach with (4) Screws (#63). **Torque to 9 Ft. Lbs.**
7. For ease of installation, place the Output Housing in a vertical position with the splined end of the Output Shaft pointing up.
8. Slide the Brake Pressure Plate (#97) down and over the Output Shaft spline and attach it to the inside of the Output Housing with (4) Screws (#64). **Torque to 14 Ft. Lbs.**

9-5 INSTALLING BRAKE STACK

(See Figure 10.1)

A. Horizontal Installation

(See Figure 9.5)

See Section 9-18 for Measuring and Controlling Stack Height Dimensions.

1. Install the Brake Stack onto the Output Shaft Spline (#1) and Brake Pressure Plate (#97). Start with a Drive Plate (#13) then a Friction Disc (#12), ending with a Drive Plate (#13).

Align the notches in the Drive Plate (#13) with the lugs on the Brake Pressure Plate (#97) and the internal teeth in the Friction Discs (#12) with the splined teeth on the Output Shaft (#1). (See Figure 9.5 for Quantities needed for different Logics.)

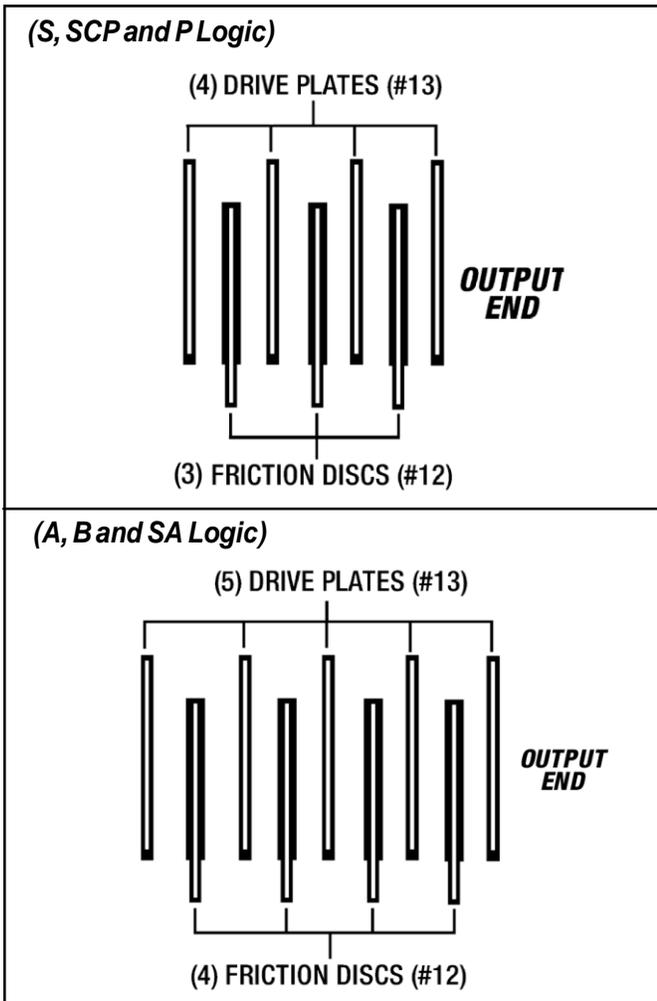


Figure 9.5 - Brake Stack (Horizontal Installation)

B. Vertical Installation

(See Figure 9.6)

1. Install the Brake Stack onto the Output Shaft Spline (#1) and Brake Pressure Plate (#97). Start with a Drive Plate (#13), then a Friction Disc (#12), then a Drive Plate (#323) with (4) Separator Springs (#349) ending with a Drive Plate (#323) also with (4) Separator Springs (#349).

Align the notches in the Drive Plates (#13) and (#323) with the lugs on the Brake Pressure Plate (#97) and the internal teeth in the Friction Discs (#12) with the splined teeth on the Output Shaft (#1). (See Figure 9.6 for Quantities needed for different Logics.)

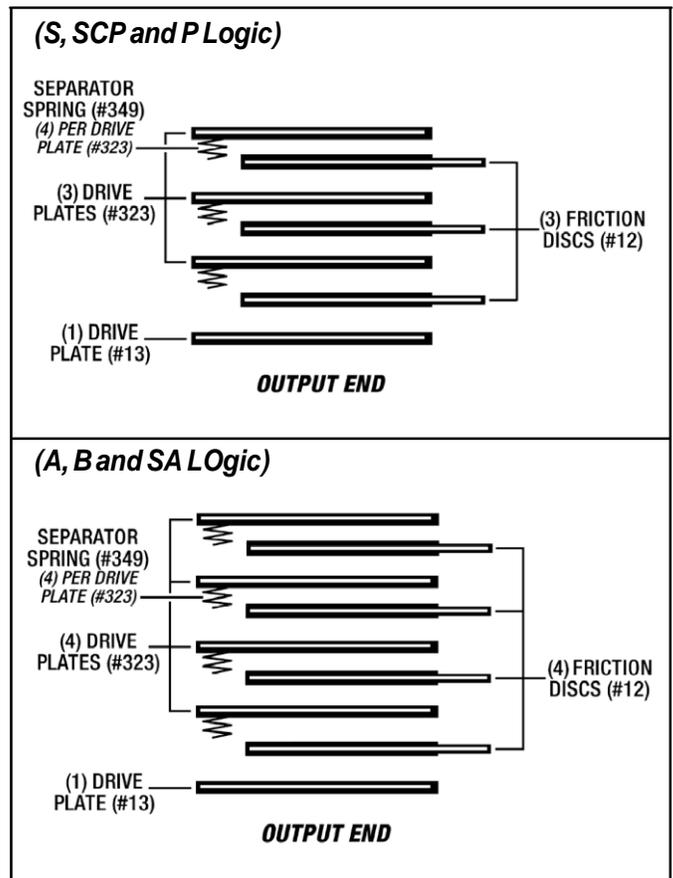


Figure 9.6 - Brake Stack (Vertical Installation)

9-6 REASSEMBLY OF PISTON SUB-ASSEMBLY

(See Figure 10.1)

1. Apply Sealant (**Loctite #620**) to the I.D. of Bearing (#27) and press it onto the Thrust Plate (#5). Make sure that the Bearing is firmly seated on the Thrust Plate shoulder.
2. Apply Sealant (**Loctite #620**) to the O.D. of Bearing (#27). Press the Bearing and Thrust Plate into the Piston (#3). Again, make sure the bearing is firmly seated in the Piston.
3. Lubricate the (2) O-Rings (#40) and install them on the Piston (#3).
4. Heat the Teflon Liner (#43) to 200° F. max. and install it on the Piston (#3). Also lubricate this Liner before installing it.

CAUTION

Use suitable work gloves when handling heated parts.

9-7 INSTALLING PISTON SUB-ASSEMBLY

AND PISTON RETAINER (See Figures 9.7 and 10.1)

1. Lubricate the O-Ring (#39) and the Teflon Liner (#42) and install them into the Output Housing (#9).
2. **This step only applies to SCP Logic.** Place the (5) Springs (#36) back into the appropriate spring pockets in the Output Housing (#9).

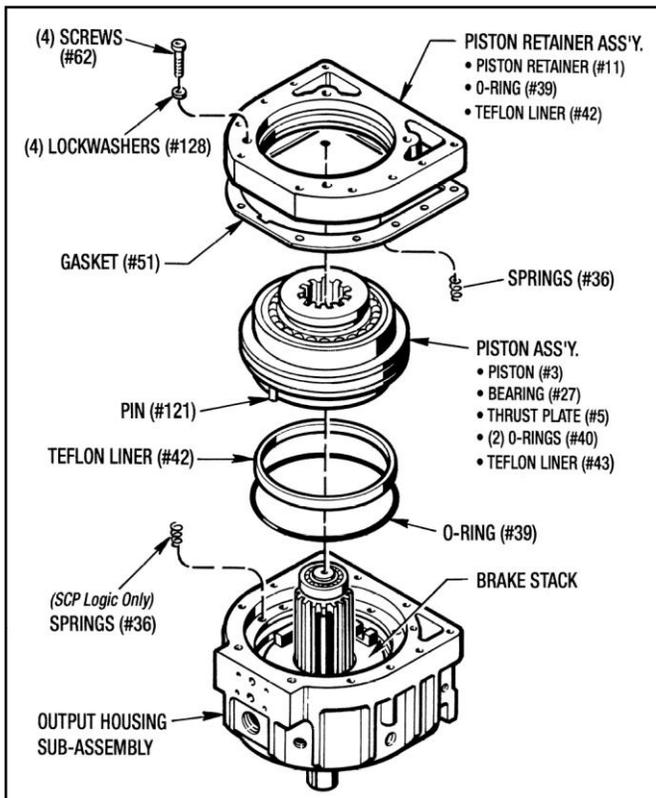


Figure 9.7 - Installing Piston and Piston Retainer

3. Insert the Piston Sub-Assembly down over the Output Shaft Spline and into the Output Housing. Align the (2) Pins (#121) in the Piston with the (2) slots in the Brake Pressure Plate (#97). **Be careful not to damage the installed Teflon Liners (#42) and (#43).**
4. Lubricate the O-Ring (#39) and the Teflon Liner (#42). Install them into the Piston Retainer (#11).
5. Place the Gasket (#51) onto the Output Housing (#9), using the Dowel Pin (#68) to assure proper alignment. **Use Gasket Sealant (Permatex #3D). Wipe off any excess.**
6. Place the Springs (#36) back into the appropriate holes in the Piston Retainer (#11). White Grease may be used to hold the Springs in place.
7. Push the Piston Retainer (#11) down and over the Piston (#3) and onto the Output Housing. **Be careful not to damage the Teflon Liner (#42) in the Piston Retainer.**
8. Attach with (4) Screws (#62) and (4) Lockwashers (#128).

IMPORTANT

Compress these (4) Screws in an even manner to compress the Springs (#36) correctly. Torque to 14 Ft. Lbs.

9-8 INSTALLING CLUTCH STACK

(See Figure 10.1)

See Section 9-18 for Measuring and Controlling Stack Height Dimensions.

1. Install the Clutch Stack onto the Output shaft spline, starting with a Friction Disc (#12), then a Drive Plate (#13) end-

ing with a Drive Plate (#13). There are (4) Friction Discs and (4) Drive Plates.

Align the notches in the Drive Plates with each other and align the internal teeth in the Friction Discs with the spline in the Output Shaft.

9-9 INSTALLING INPUT HOUSING SUB-ASSEMBLY

(See Figure 10.1)

1. Place the Gasket (#53) on the Piston Retainer (#11), using the (2) Pins (#68) for alignment. Use **(Permatex #3D) Gasket Sealant**. Wipe off any excess.
2. Lower the Input Housing Sub-Assembly down onto the Piston Retainer, aligning the lugs on the Input Shaft (#2) with the notches in the Drive Plates (#13). Press the Input Housing down until the (2) Dowel Pins (#68) engage the Input Housing. Make sure that Gasket (#53) stays in position.

CAUTION

Do not force the Input Shaft Lugs into the Clutch Stack. This could damage the Drive Plates. Lower the Input Housing slowly and, if necessary, manually adjust the Drive Plates.

3. With the (10) Screws (#69) and (10) Lockwashers (#127) bolt the Housings together. Use (Loctite #271) Thread-Locker on the threads. Torque to 14 Ft. Lbs.
4. If your Drive Unit has a Male Input Shaft, but does not have Fan Cooling, install Key (#180) into the Input Shaft (#2).

Before proceeding any further an **Operational Check of the Piston Movement should be made**. Apply 60 to 80 PSI as indicated in **Section 5 - Operational Checks**. Observe the piston movement through the inspection ports.

9-10 INSTALLING MANIFOLD MOUNTED

CONTROL VALVE (See Figure 10.5)

1. Put the Gasket (#807) on the Output Housing (#9). Use **(Permatex #3D) Gasket Sealant**. **Make sure that no sealant gets into the pressure ports.**
2. Attach Manifold (#701) with (4) Screws (#730) and (4) Lockwashers (#740).
3. Attach the Control Valve (#700) to the Manifold (#701) with (2) Screws (#725). Align the pressure port in the control valve with the Locating Tube (#810) sticking up out of the Manifold (#701). **Also make sure that the (2) Seal Rings (#808) are in place under the Control Valve.**

9-11 INSTALLING QUADRATURE ENCODER ASS'Y.

(See Figures 9.9 and 10.4)

1. Replace Key (#234) into the Posidyne output shaft if it was removed.
2. Attach the Housing (#17) to the Posidyne Output Housing with (2) Screws (#76) and (2) Washers (#257).
3. Slide the Pulse Gear (#186) onto the output shaft and align as shown in *View B-B in Figure 9.9*. Tighten Set Screw (#154)

Jump ahead to Section 9-12 and install the Quadrature Encoder (#355) and the Magnetic Pick-Up (#22).

- Attach the Top Cover (#372) with (4) Screws (#225) and the Front Cover (#253) with (4) Screws (#268).

9-12 INSTALLING QUADRATURE ENCODER (#355) AND MAGNETIC PICK-UP (#22)

(See Figure 10.4)

Before installing the Quadrature Encoder and Magnetic Pick-Up a Special .015" Shim must be made to set the Gap between them and the Pulse Gear. (See Figure 9.8)

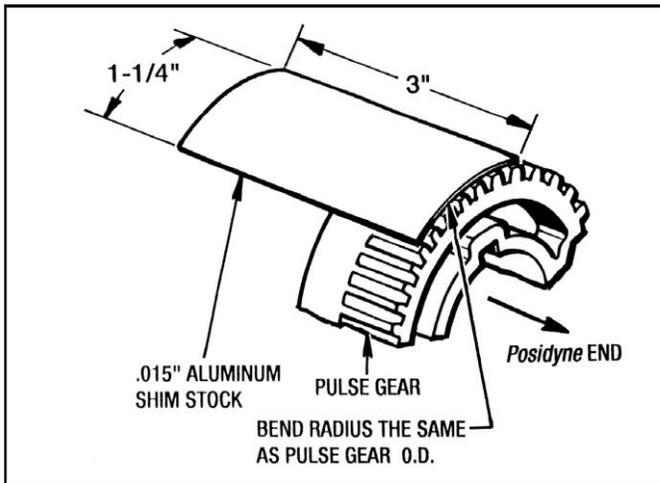


Figure 9.8 - Sensor Gap Shim

A. QUADRATURE ENCODER (See Figure 9.9)

- Looking through the hole where the Encoder is to be placed, check to see that the Pulse Gear (#186) is in position so the teeth will be aligned with the Encoder.
- Position the Encoder so the (2) mounting holes are lined up with the holes in the housing. Insert the Sensor into the slot and attach with (2) Screws (#226).

NOTES:

- The holes are offset to one side so the Encoder can only be installed one way.
- Do not install any Shims (#900 to 903) at this time. **The Gap must be checked first.**
- Check the Gap between the Pulse Gear and the Encoder with the Special .015" Shim that you made. If necessary, remove the Encoder and place Shims (#900 to #903) under the Encoder. (Usually .015" is sufficient.) Re-attach the Encoder and re-check the Gap. (See Figure 9.9)
- Connect the sensor wires to the Brad Harrison Connector.

B. MAGNETIC PICK-UP SENSOR (See Figure 9.9)

- Visually check through the hole to see if the single tooth in the Pulse Gear (#186) is aligned with the Sensor and that the teeth for the Quadrature Encoder will not be visible to the Magnetic Pick-Up Sensor.

The Magnetic Pick-Up Sensor has a **Scribed Line** down one side of it. To facilitate installation, highlight this **Scribed Line** with a felt tip pen.

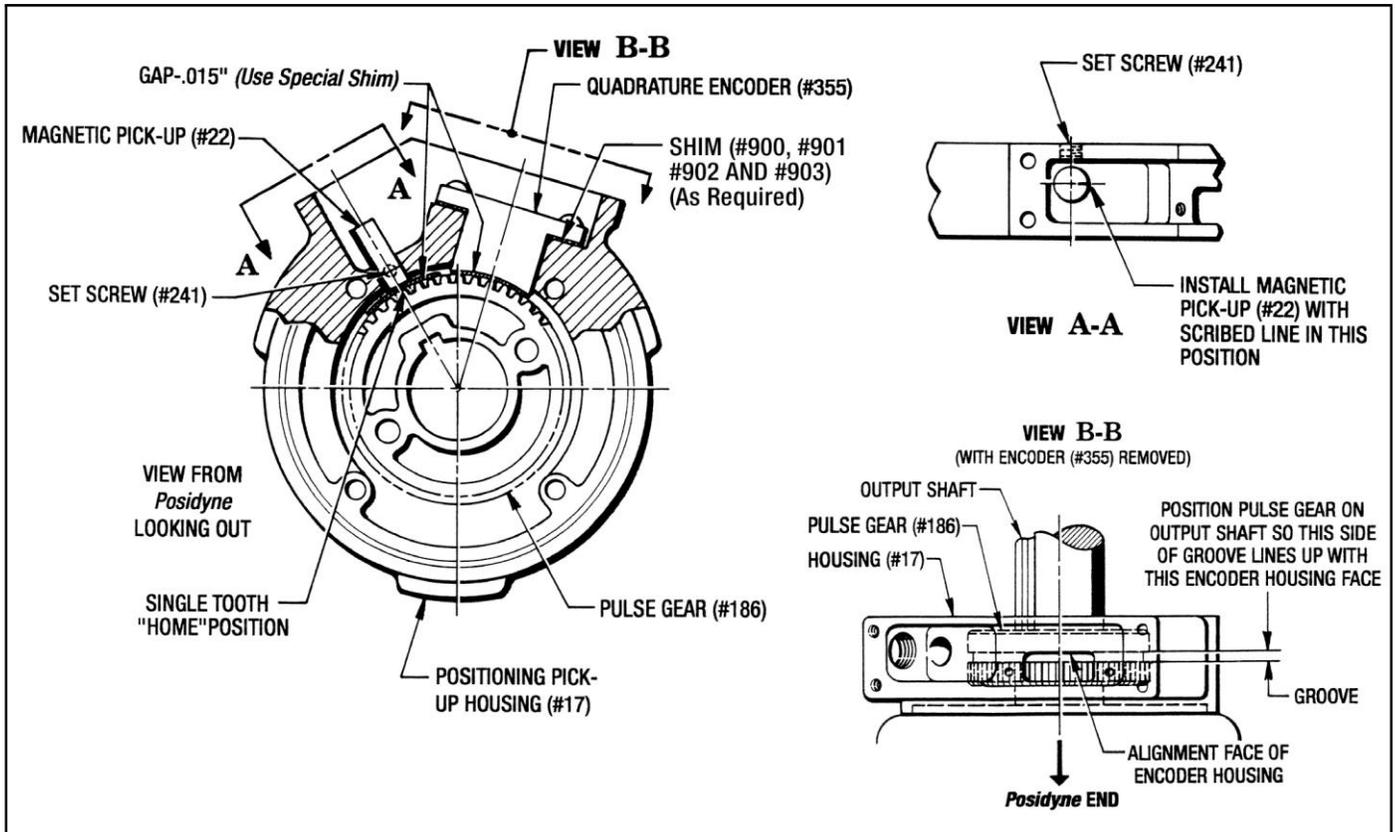


Figure 9.9 - Installation of Position Sensors

2. Insert the Magnetic Pick-Up Sensor (#22) into the hole with the **Scribed Line** in position as shown in *Figure 9.9, View A-A*
3. Insert the Special .015" Shim in between the Pulse Gear and the Sensor. Tighten the Set Screw (#241).
4. Connect the sensor wires to the Brad Harrison Connector.

9-13 REASSEMBLY and INSTALLATION of DIFFERENTIAL LINE DRIVER ENCODER (*Optical Encoder*)

(See *Figure 10.4*)

1. First slide the Spacer (#270) onto the output shaft as far as it will go. Install Key (#234), then slide the Optical Disc Assembly onto the output shaft, butting it up against the Spacer. (See *Figure 9.10*)

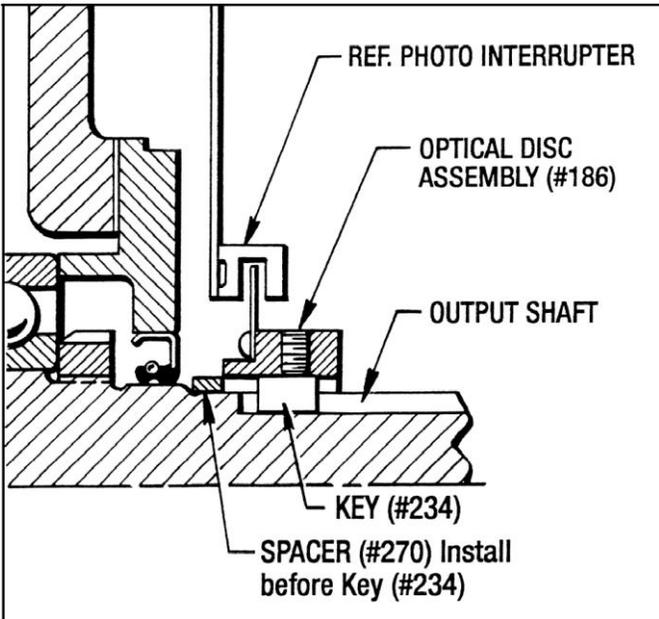


Figure 9.10 - Optical Disc and Hub Positioning

2. Tighten Set Screw (#154) and recheck the Hub position on the output shaft.
3. Apply a light coat of grease to the area on the Hub where the Dirt Seal (#269) rides.
4. If the Dirt Seal (#269) was removed then install it onto the Disc Housing (#17).
5. Attach the Disc Housing (#17) to the output end of the Posidyne with the (4) Screws (#76).
6. Place the Gasket (#19) on top of the Disc Housing.
7. Carefully insert the Circuit Board (#355) into the top of the Disc Housing making sure the (3) Photo Interrupters straddle the Optical Disc. (See *Figures 9.10 and 9.11*)
8. While holding the Circuit Board upright slide the Upper Enclosure (#18) down over the Circuit Board onto the Disc Housing. Make sure the edges of the Circuit Board are in the (2) side retaining slots located in the Upper Enclosure. (See *Figure 9.11*)
9. Check the Gasket (#19) to see if it is still in place. Insert the (2) Screws (#77) and tighten down.

10. Slide the Insulator (#373) down and into the Upper Enclosure (#18) behind the Circuit Board (#355) placing the upper tabs into the circuit board slots. (See *Figure 9.11*)

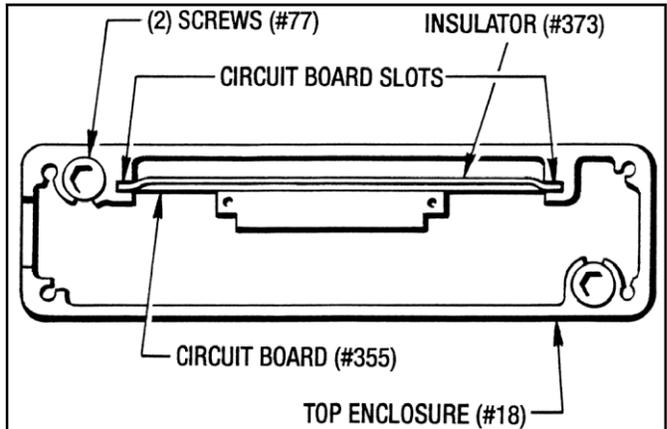


Figure 9.11 - Circuit Board Slots

11. Place the Cable Grommet (#260) and Cable (#259) into the upper slot and plug in the Cable Connector (#368) to the Circuit Board Connector and tighten the (2) Captive Screws in the Cable Connector. (See *Figure 9.12*)
12. Place the top Gasket (#19) on the Upper Enclosure and attach the Top Cover (#372) with (4) Screws (#225).

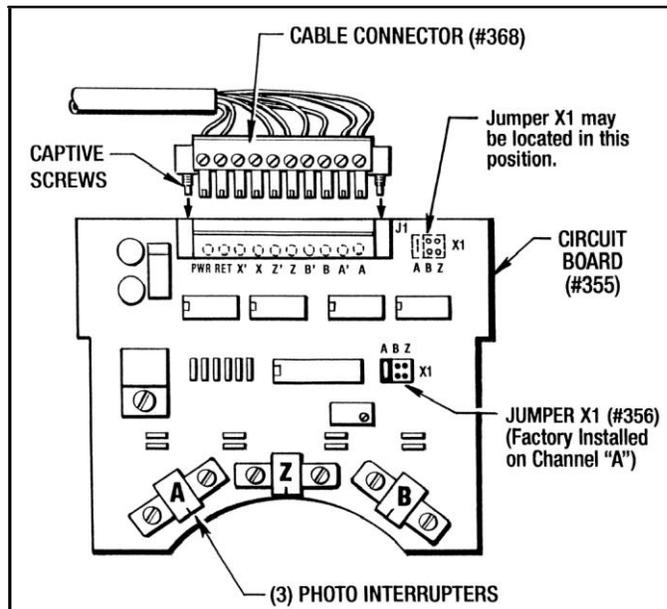


Figure 9.12 - Circuit Board Connector

9-14 INSTALLING FAN AND FAN SHROUD

(See *Figure 10.6*)

1. Install Key (#37) into the Input Shaft.
2. Place Fan (#25) on the Input Shaft until it butts up against the shoulder on the input shaft. Tighten the (2) Set Screws (#70).
3. Place the Fan Shroud (#24) into position and attach with (2) Screws (#66).
4. Install Key (#180) into the Input Shaft.

9-15 ATTACHING C-FACE ADAPTERS

A. Output C-Face Adapter

(See Figure 10.2)

1. Attach the C-Face Adapter (#203) with (8) Screws (#204) and (8) Lockwashers (#205). **Torque to 25 Ft. Lbs.**

B. Input C-Face Adapters (With Quill Input Shaft Only)

(See Figure 10.3)

1. Attach C-Face Adapter (#200) with (6) Screws (#201) and (6) Lockwashers (#202). **Torque to 25 Ft. Lbs.**

9-16 INSTALLING PIGGYBACK DRIVE MOTOR, BELT GUARD and MOUNTING BRACKETS

(See Figure 10.7)

1. Attach Input Motor Mounting Bracket (#148) with (4) Screws (#255).
2. If you do not have Fan Cooling, then attach the (2) Mounting Brackets (#165) with (2) Screws (#150) and (2) Lockwashers (#265).
3. Attach the Output Motor Mounting Bracket (#149) with (4) Screws (#76).
4. Attach the (2) Motor Adapter Plates (#153) with the (4) Studs (#254), (8) Jam Nuts (#152) and (4) Lockwashers (#257) as shown in Figure 10.7.

NOTE - These Studs (#254) and Jam Nuts (#152) are used to raise and lower the drive motor for installing the Drive Belt and Belt Tensioning procedure.

5. Reinstall the lower back plate of Belt Guard (#124) with (2) Screws (#305) and (4) Screws (#268).

NOTE - If you do not have Fan Cooling, the (2) Spacers (#288) will go behind the (2) Screws (#305).

6. Lower the Drive Motor into place and attach with (4) motor mounting bolts.
7. Install Drive Pulleys and Drive Belt as per Manufacturer's Specifications. (See Figure 9.13 for Drive Pulley Installation)

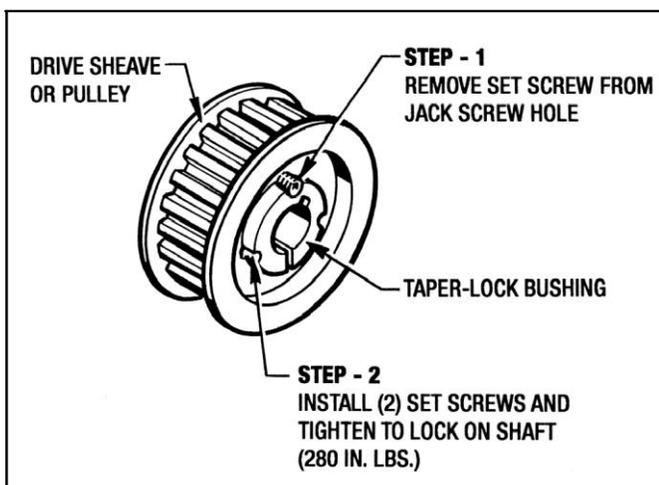


Figure 9.13 - Installation of Drive Pulley

9-17 FINAL REASSEMBLY

1. Replace all Pipe Plugs and Fittings removed for Inspection or Disassembly.
2. Fill the Drive Unit with Mobil Automatic Transmission Fluid type ATF-210 type "F" or Mobil Multi-purpose Automatic Transmission Fluid, as indicated in **Section 4 LUBRICATION**.
NOTE - Other fluids may be specified for special drives. Check the Name Tag.
3. Replace all external motor drive parts, safety guards, sheaves, pulleys, belts and couplings on belt drive units.
4. Before placing the Drive Unit back into service, completely check out the Operation as described in **Section 5 OPERATIONAL CHECKS**.

REASSEMBLY IS NOW COMPLETE AND THE DRIVE UNIT IS READY FOR SERVICE.

9-18 MEASURING AND CONTROLLING STACK HEIGHT DIMENSIONS

(See Figure 9.14)

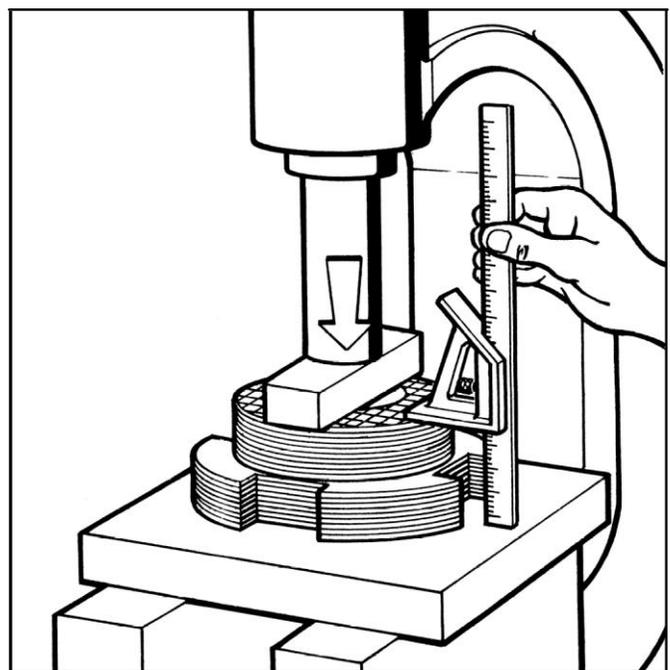


Figure 9.14 - Measuring Stack Height

To assure correct piston travel and stack engagement, the following steps must be taken when replacing the Clutch and Brake Stacks. **Worn Stack Condition** can also be determined with this procedure.

Measure the stacks as shown in Figure 9.14. **Always measure each stack separately.**

Place the correct number of Drive Plates (#13) and/or (#323) and Friction Discs (#12) in an arbor press as shown in Figure 9.14. (See page 24 for the correct quantity of Drive Plates and Friction Discs required for each logic.

Clamp firmly and measure the Stack Height. Compare the Measured Height with the tabulated value given in the Stack Height Table.

If the Measured Height exceeds the Min. or Max. contact Force Control Industries, Inc.

NOTE - The "Worn Stack Condition" given in the Stack Height Table can be used to determine whether or not your old stacks are worn enough to be replaced. Use this method if the drive unit is disassembled, otherwise if the drive unit is still assembled see Section 6-2 Checking the Clutch and Brake Stacks for Wear.

STACK HEIGHT TABLE (Inches)

STACK	LOGIC	NEW STACK HEIGHT				WORN STACK CONDITION	
		MINIMUM		MAXIMUM		DECIMAL	NEAREST FRACTION
		DECIMAL	NEAREST FRACTION	DECIMAL	NEAREST FRACTION		
CLUTCH	S, SA & A	.640	41/64	.684	11/16	.531	17/32
	B, P & C						
BRAKE	SA, A & B	.700	45/64	.749	3/4	.574	37/64
	S & P	.539	35/64	.579	37/64	.439	7/16

Section 10 ILLUSTRATED REPAIR PARTS

10-1 GENERAL INFORMATION

This section illustrates, lists and describes all available repair parts for the Force Control *Posidyne* Clutch/Brake Drives. Parts are identified on the exploded views with Part Reference Numbers. These Numbers correspond to the Part Reference Number given in the Parts List. The Part Name and Quantity Used is also given in the Parts List. This Part Reference Number, Part Name and Quantity should be used when ordering parts.

10-2 DRIVE MOTORS

The motors used with these Drive Units are standard and may be repaired or replaced by any qualified motor rebuild facility or supplier.

10-3 FACTORY REBUILD SERVICE

Reconditioning service is offered by Force Control Industries at the factory. The cost of a complete factory rebuild will be 50% the cost of a new unit if the housings are reusable. If the housings need to be replaced there will be an additional cost. Before returning a unit for this service, however, be sure to first contact the Force Control Industries Service Sales Department for authorization and shipping instructions. Force Control Industries cannot be responsible for units returned to the factory without prior notice and authorization.

Care must be given to the packing of return drives. Always protect mounting feet by attaching to a skid. Shipment-damaged drives always delay repairs. It is usually impossible to recover damage costs from the carrier. When possible describe the problem experienced on your shipping papers.

Return to: **Force Control Industries, Inc.**
3660 Dixie Highway
Fairfield, Ohio 45014
Phone: (513) 868-0900
Fax: (513) 868-2105
E-Mail: info@forcecontrol.com

10-4 ORDERING REPLACEMENT PARTS

When ordering replacement parts, please specify all of the following information:

1. **Drive Model Number** (on the nameplate)
2. **Drive Serial Number** (on the nameplate)
3. **Part Reference Number** (from the parts list or exploded view drawing.)
4. **Part Name** (from the parts list)
5. **Quantity** (from the parts list)
6. **Complete Shipping Information**

Failure to include information for items 1 thru 6 will only delay your parts order. Unless another method is specified for item 6, parts less than 150 pounds will be shipped United Parcel Service, parts over 150 pounds will be shipped Motor Freight. Air freight and other transportation services are available but only if specified on your order.

10-5 NAME PLATE AND MODEL NUMBER

The Name Plate shown is located on the housing.

Force Control Industries, Inc.
Fairfield, Ohio

For Service/Parts Call
513-868-0900

Posidyne® Clutch/Brake

Model No.

Serial No.

Use Mobil® ATF 210

Posidyne Model Numbers



SIZE (1,2)
2 5 = 2.5

INPUT (3)
1 = Standard
3 = 4-1/2" FAK, 7/8" U
4 = 8-1/2" FAK, 1-1/8" U
5 = 8-1/2" FAK, 1-3/8" U
7 = Piggyback or Ceiling Mount
9 = 4-1/2" FAK, 7/8" U
A = 8-1/2" FAK, 1-1/8" U
B = 8-1/2" FAK, 1-3/8" U

C-Face
 C-Face Long Coupled

LOGIC (4)
S = Std.
A = A - Med. Spring Set Brake, 75/25.
B = B - Heavy Spring Set Brake, 50/50.
C = C - Clutch Only.
D = SA - Spring Set Brake, Air Assist.
F = SA/ACP - Spring Set Brake, Air Assist / Air Centered Piston.
G = B/ACP - Heavy Spring Set Brake / Air Centered Piston.
J = A/ACP - Med. Spring Set Brake / Air Centered Piston.
P = No Return Springs

OUTPUT (5)
1 = Standard
3 = 4-1/2" FAK, 7/8" U
4 = 8-1/2" FAK, 1-1/8" U
5 = 8-1/2" FAK, 1-3/8" U
7 = Piggyback or Ceiling Mount
8 = Magnetic Encoder
C = Optical Encoder

C-Face

MOUNTING POSITION (6)
H = Horizontal.
D = VID - Vertical, Input Down.
U = VIU - Vertical, Input Up.
L = Wall Mount Left.*
R = Wall Mount Right.*
 * Viewing input shaft.

STACK COMBINATION (8)
R = Red with ATF-210 Fluid
Q = Green with ATF-210 Fluid

COOLING (7)
1 = Basic (Radiant)
2 = Water
5 = Fan
7 = Fan-Split Shroud
9 = Force Lube

ENGINEERING REVISION (9)
 By Force Control Industries, Inc.

(Repair Parts List for Figure 10.1)
2.5 Posidyne CLUTCH/BRAKE ASSEMBLY

REF No.	PART NAME	QTY.	REF. No.	PART NAME	QTY.
1	Output Shaft	1	*46	Sight Gauge	1
3	Piston	1	*51	Gasket, Output Housing.....	1
5	Thrust Plate, Clutch.....	1	*53	Gasket, Input Housing.....	1
7	Bearing Retainer	1	*55	Gasket, Bearing Retainer.....	1
9	Output Housing	1	62	Soc. Hd. Cap Screw.....	4
11	Piston Retainer.....	1	63	Soc. Hd. Cap Screw.....	6
*12	Friction Disc (See Below).....	AR	64	Soc. Hd. Cap Screw.....	4
*13	Drive Plate (See Below)	AR	68	Dowel Pin	2
14	Pipe Plug, 1" NPT	1	69	Soc. Hd. Cap Screw.....	10
*27	Bearing	1	72	Pipe Plug, 1" NPT	1
*28	Bearing	1	73	Pipe Plug, 1/4" NPT Mag.	2
*31	Oil Seal.....	1	90	Reducer Bushing, 3/8" x 1/4"	1
*34	Locknut	1	97	Brake Pressure Plate	1
*35	Bearing	1	121	Dowel Pin	2
*36	Spring		122	Dowel Pin	2
	S Logic	5	126	Street Elbow (As Required).....	1
	SA Logic.....	16	127	Lockwasher	10
	A Logic	9	128	Lockwasher	4
	B Logic	18	181	Key, Output Shaft	1
	SCP Logic	10	*323	Drive Plate w/ Rivets (Vert.) (See Below)	AR
*39	O-Ring	2	343	Pipe Plug	2
*40	O-Ring	2	*349	Spring, Separator (Vertical Installation)	
*42	Liner, I.D. Sealing	2		A, B and SA Logic	16
*43	Liner, O.D. Sealing	1		S, SCP and P Logic	12
*45	Breather.....	1			

* - Indicates parts in Overhaul Kit.

AR - As Required.

DRIVE PLATE & FRICTION DISCS QUANTITIES

BRAKE STACK	LOGIC						
	A	B	SA	S	SCP	P	C
<i>HORIZONTAL UNIT</i>							
Drive Plate (#13)	5			4			----
Friction Disc (#12)	4			3			----
<i>VERTICAL UNIT</i>							
Drive Plate (#13)	1			1			----
Drive Plate (#323) With Rivets	4			3			----
Friction Disc (#12)	4			3			----

The Clutch Stack has (4) Drive Plates (#13) and (4) Friction Discs (#12) for all Logics.

(Repair Parts List for Figures 10.2 & 10.3)

**INPUT HOUSING SUB-ASSEMBLY
OUTPUT C-FACE ADAPTER**

REF No.	PART NAME	QTY.	REF. No.	PART NAME	QTY.
2	Input Shaft.....	1	200	C-Face Flange, Input	1
7	Bearing Retainer	1	201	Soc. Hd. Cap Screw	6
8	Input Housing.....	1	202	Lockwasher.....	6
14	Pipe Plug, 1" NPT	1	203	C-Face Flange, Output	1
*26	Bearing.....	1	204	Soc. Hd. Cap Screw	8
*31	Oil Seal	1	205	Lockwasher.....	8
*34	Locknut	1	*206	Gasket.....	1
*38	Bearing.....	1	207	Bearing Retainer	1
*55	Gasket.....	1	*208	Oil Seal	1
63	Soc. Hd. Cap Screw	6	*209	Locknut	1
99	Freeze Plug.....	1	210	Soc. Hd. Cap Screw	6
104	O-Ring.....	1	415	Hex Hd. Cap Screw	4
180	Key, Input Shaft.....	1	416	Lockwasher.....	4

* - Indicates parts in Overhaul Kit.

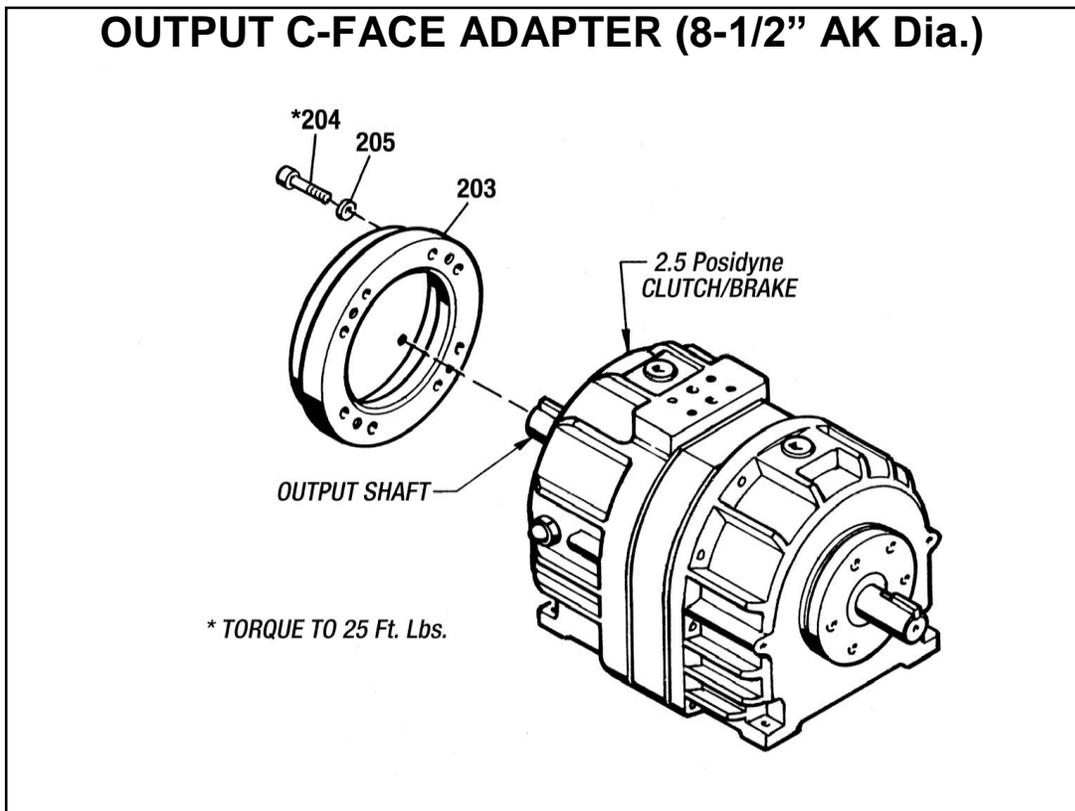
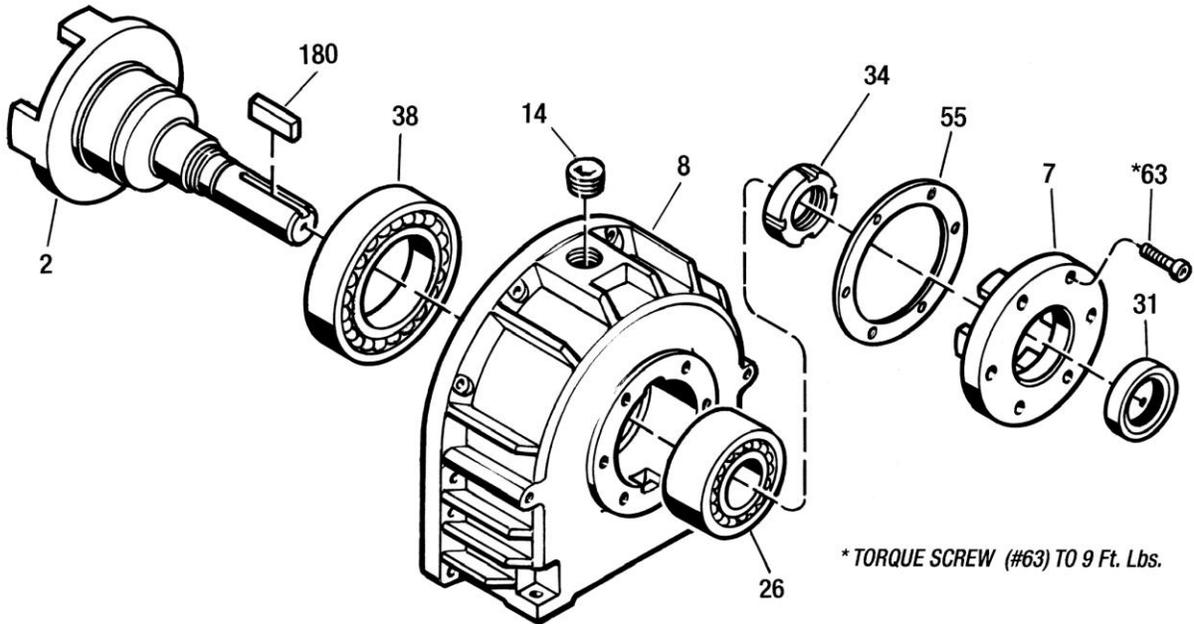


Figure 10.2 - Output C-Face Adapter (8-1/2" AK Dia.)

INPUT HOUSING SUB-ASSEMBLY (With Male Input Shaft For Coupling or Belt Drive)



(With Quill Input Shaft For C-Face Mounting)

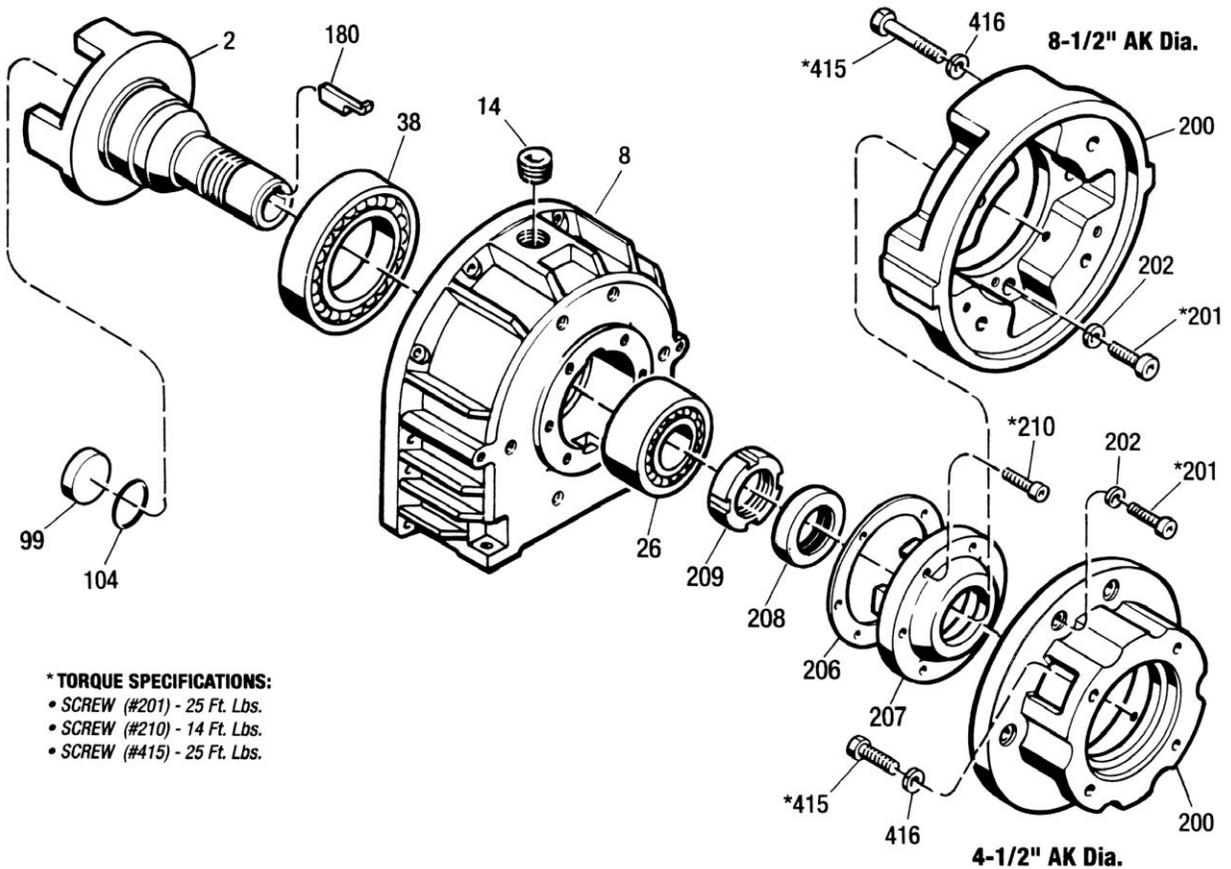


Figure 10.3 - Input Housing Sub-Assembly

(Repair Parts List for Figure 10.4)
OPEN COLLECTOR QUADRATURE ENCODER

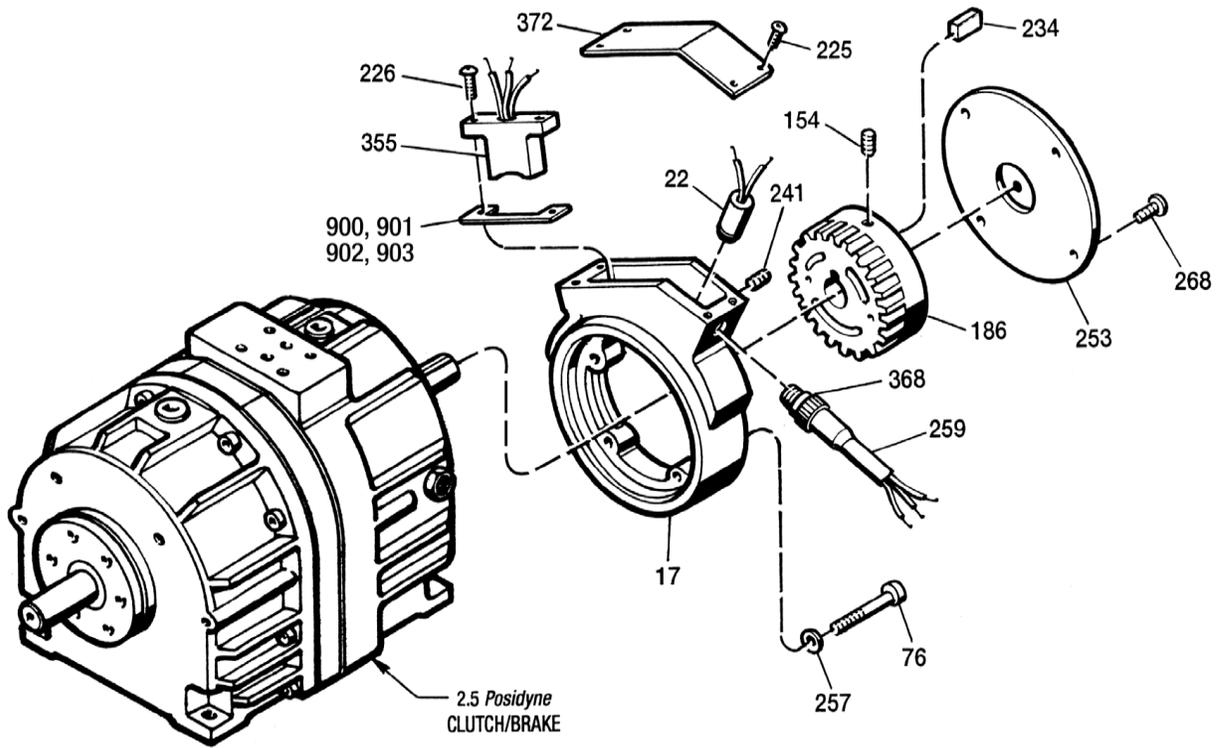
REF No.	PART NAME	QTY.	REF. No.	PART NAME	QTY.
17	Magnetic Pickup Housing	1	257	Lockwasher.....	4
22	Magnetic Pickup	1	259	Cable, 5 Pin Straight.....	1
76	Soc. Hd. Cap Screw	4	268	But. Hd. Cap Screw	4
154	Set Screw	1	355	Quadrature Pickup	1
186	Pulse Gear	1	368	Cable Receptacle	1
225	But. Hd. Cap Screw	4	372	Top Cover	1
226	Rd. Hd. Cap Screw	2	900	Shim, .005" Thick.....	AR
234	Key	1	901	Shim, .010" Thick.....	AR
241	Set Screw	1	902	Shim, .020" Thick.....	AR
253	Housing Cover	1	903	Shim, .0305" Thick.....	AR

* - Indicates parts in Overhaul Kit.
AR - As Required.

(Repair Parts List for Figure 10.4)
DIFFERENTIAL LINE DRIVER OPTICAL ENCODER

REF No.	PART NAME	QTY.	REF. No.	PART NAME	QTY.
17	Disc Housing	1	259	Cable	1
18	Upper Enclosure	1	260	Cable Grommet.....	1
19	Gasket	2	269	Dirt Seal	1
76	Soc. Hd. Cap Screw.....	4	270	Spacer	1
77	Soc. Hd. Cap Screw.....	2	355	Circuit Board	1
154	Set Screw.....	1	356	Jumper	1
186	Optical Disc Assembly	1	368	Cable Connector	1
225	Button Hd. Screw	4	372	Top Cover.....	1
234	Key	1	373	Insulator	1

OPEN COLLECTOR QUADRATURE ENCODER



DIFFERENTIAL LINE DRIVER OPTICAL ENCODER

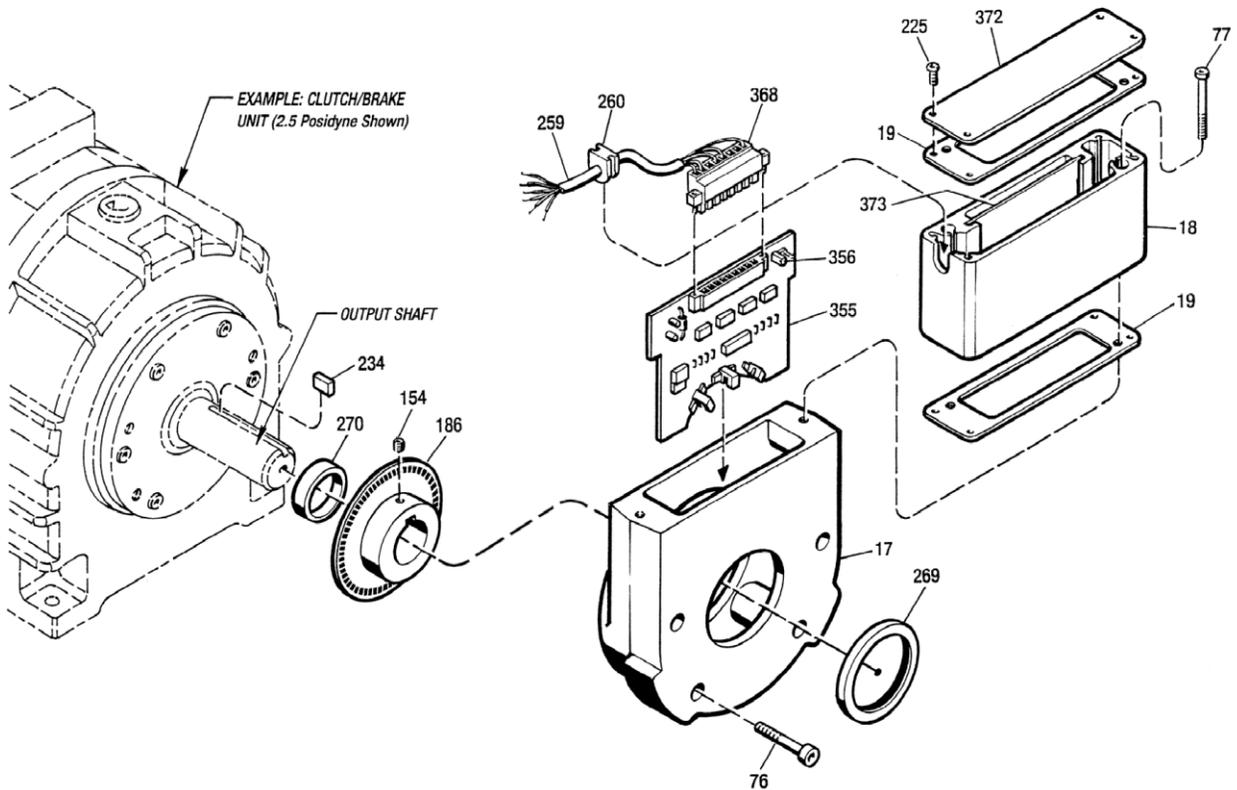


Figure 10.4 - Encoders

(Repair Parts List for Figure 10.5)
MANIFOLD MOUNTED CONTROL VALVE

REF No.	PART NAME	QTY.	REF. No.	PART NAME	QTY.
700	Control Valve	1	779	Muffler	1
701	Manifold.....	1	*807	Gasket Manifold	1
725	Soc. Hd. Cap Screw.....	2	*808	O-Ring	2
727	Soc. Hd. Cap Screw.....	4	810	Locating Tube.....	1
737	Lockwasher	4	811	Fastener	2
767	Pressure Gauge				
	1PC-3/8 Valve	1			
	2PC-3/8 Valve	2			

* - Indicates parts in Overhaul Kit.

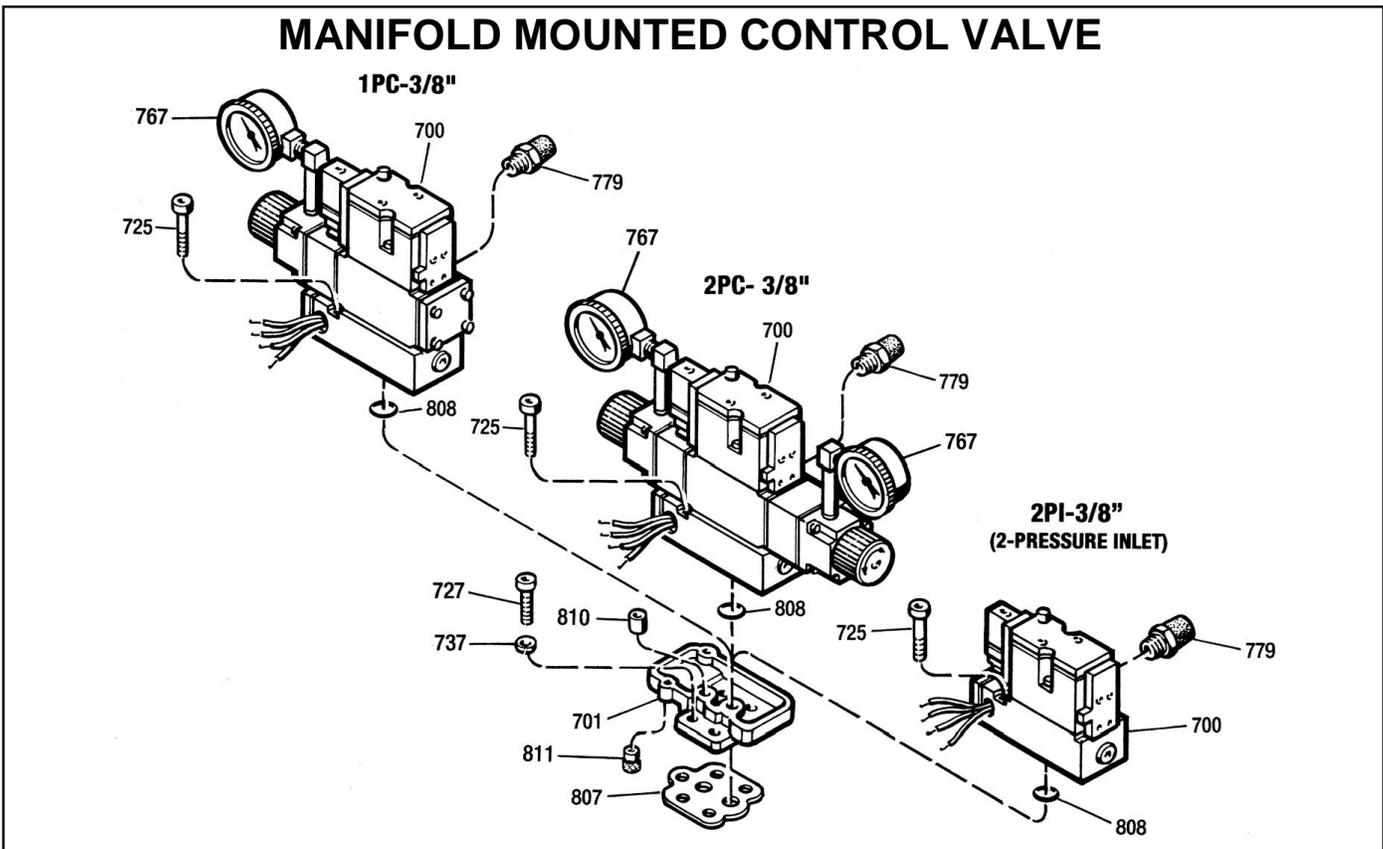
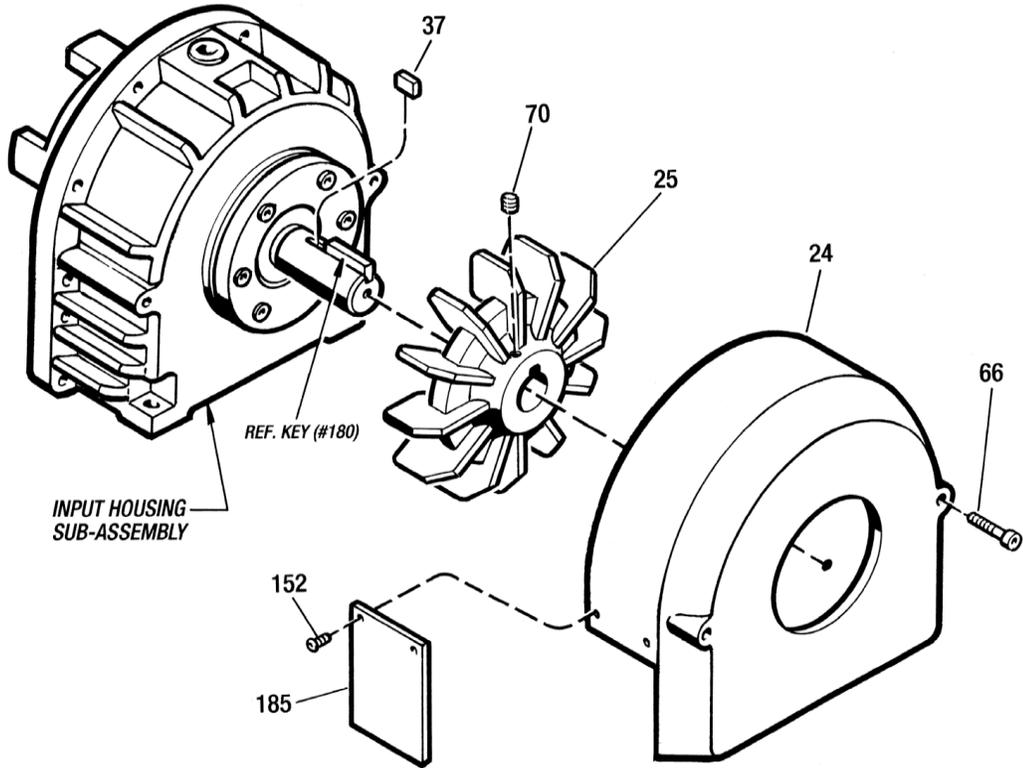


Figure 10.5 - Manifold Mounted Control Valve

(Repair Parts List for Figure 10.6)
FAN COOLING & WATER COOLING

REF No.	PART NAME	QTY.	REF. No.	PART NAME	QTY.
24	Fan Shroud.....	1	152	But. Hd. Cap Screw.....	4
25	Fan	1	176	Zinc Anode.....	1
37	Key	1	177	Pipe Coupling	1
48	Heat Exchanger.....	1	178	Pipe Nipple	1
56	Soc. Hd. Cap Screw	2	185	Access Cover	2
66	Soc. Hd. Cap Screw	2	237	Anti-Rotation Tag	2
70	Set Screw	2	242	Pipe Tee.....	1
71	Compression Fitting.....	2			

FAN COOLING



WATER COOLING

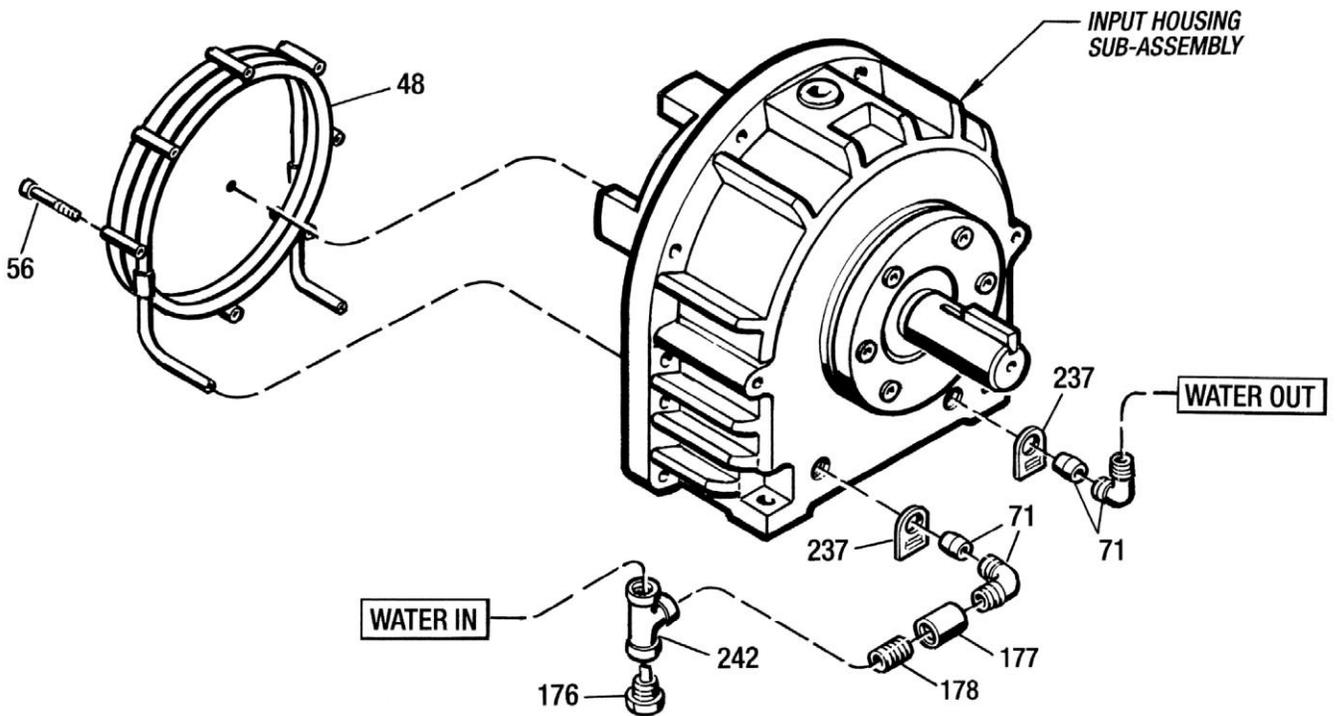


Figure 10.6 - Fan Cooling and Water Cooling

(Repair Parts List for Figure 10.7)

PIGGYBACK MOUNTING

REF No.	PART NAME	QTY.	REF. No.	PART NAME	QTY.
*45	Breather.....	1	148	Bracket, Motor Mounting - I.P.....	1
74	Pipe Plug, Sq. Hd. 1/2" NPT	1	149	Bracket, Motor Mounting - O.P.	1
76	Soc. Hd. Cap Screw.....	4	150	Soc. Hd. Cap Screw (w/o Fan Cooling)	2
77	90° Street Elbow, 1/2" NPT	1	152	Jam Nut.....	8
78	90° Elbow, 1/2" NPT.....	1	153	Adapter Plate, Motor	2
81	Pipe Nipple, 1/2" 5" Lg.	1	165	Mounting Bracket (w/o Fan Cooling).....	1
89	Reducer Bushing, 1" x 1/2"	1	254	Stud	4
90	Reducer Bushing, 3/8" x 1/4"	1	255	Flat Hd. Cap Screw	4
124	Belt Guard, Piggyback	1	257	Lockwasher	4
136	Street Elbow, 1/4" NPT	1	265	Lockwasher (w/o Fan Cooling)	2
137	Pipe Coupling, 1/4" NPT	2	268	But. Hd. Cap Screw (w/o Fan Cooling).....	4
138	Pipe Nipple, 1/4" NPT	2	288	Spacer (w/o Fan Cooling)	2
139	90° Street Elbow, 1/4" NPT	2	305	Soc. Hd. Cap Screw.....	2

* - Indicates parts in Overhaul Kit.

PIGGYBACK MOUNTING

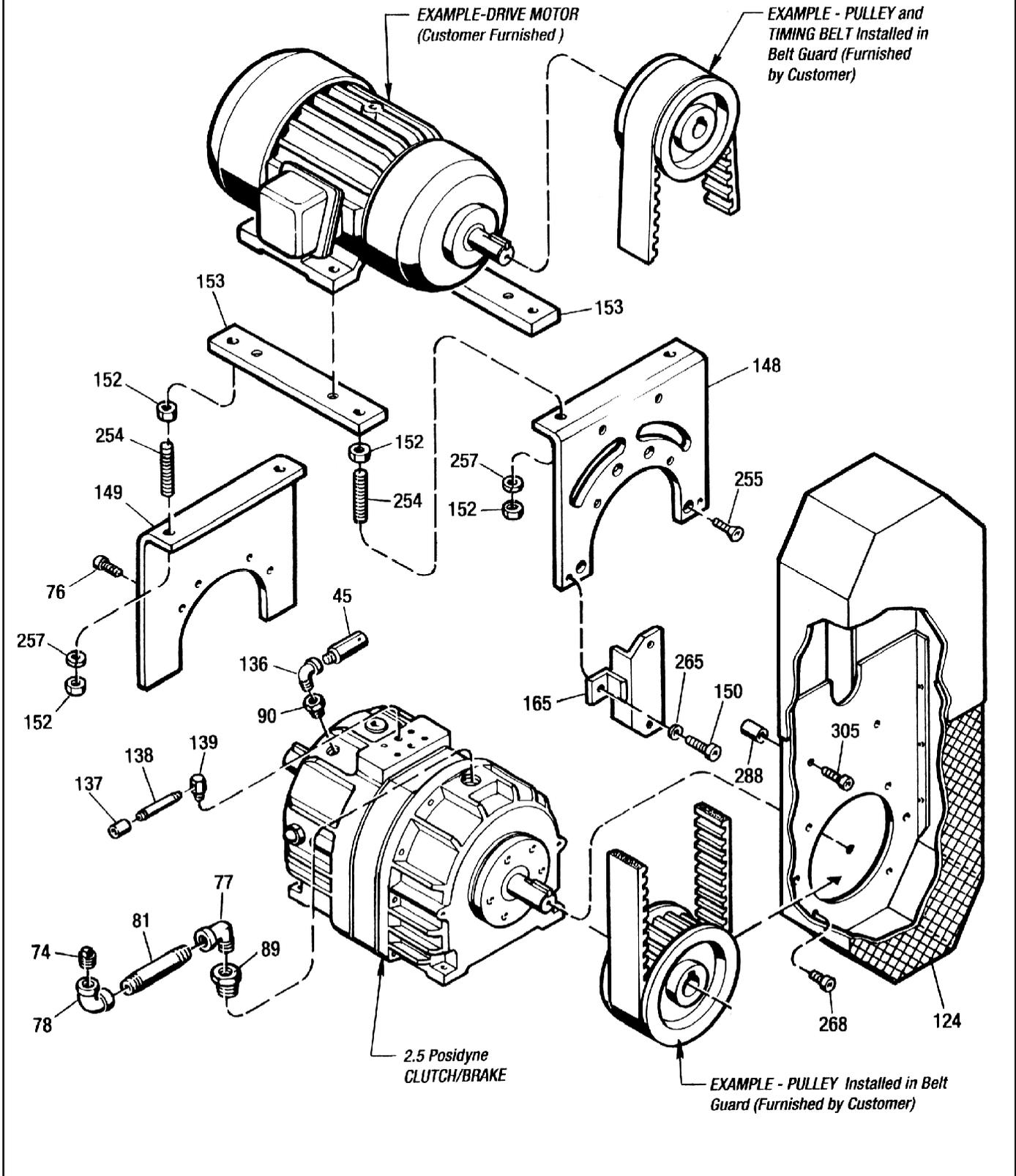


Figure 10.7 - Piggyback Mounting

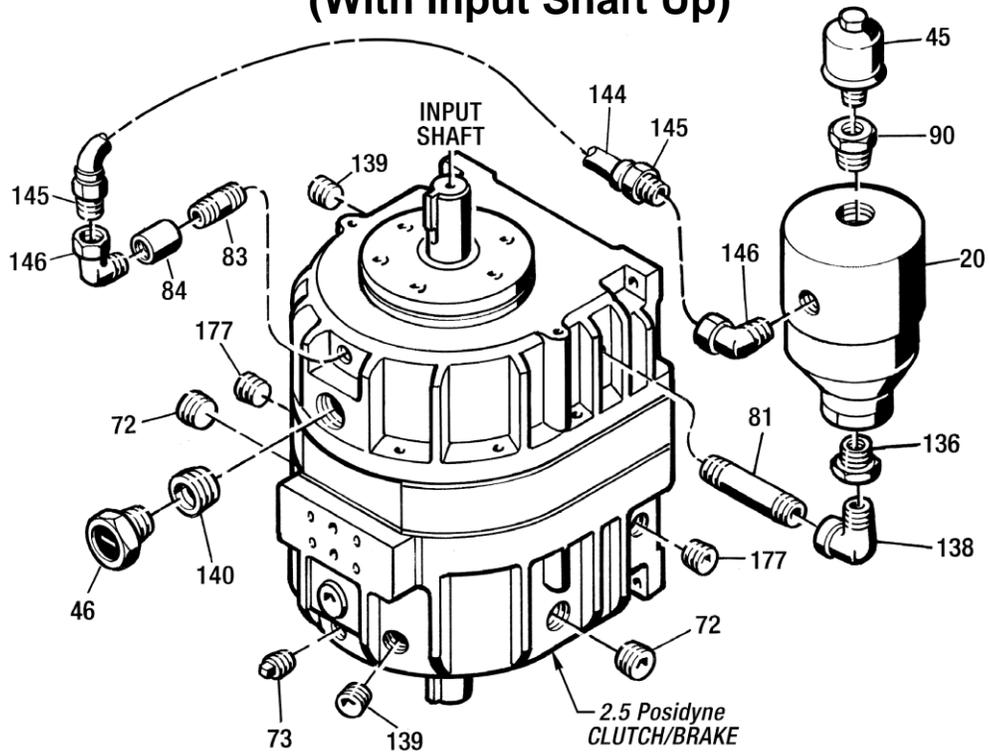
(Repair Parts List for Figure 10.8)

VERTICAL INSTALLATION

REF No.	PART NAME	QTY.	REF. No.	PART NAME	QTY.
20	Expansion Tank	1	136	Reducer Bushing, 1/2" x 3/8"	1
*45	Breather.....	1	137	Reducer Bushing, 3/4" x 1/4"	1
*46	Sight Gauge	1	138	90° Street Elbow, 3/8" NPT	1
72	Pipe Plug, 1/2" NPT	2	139	Pipe Plug, 3/8" NPT	2
73	Pipe Plug, Mag. 1/4" NPT	1	140	Face Bushing, 1/2" x 1/4"	1
74	Pipe Plug, 1/4" NPT	1	144	Push-Lok Hose.....	1
81	Pipe Nipple, 3/8" x 3" Lg.	1	145	Hose Fitting	2
83	Pipe Nipple, 1/4" Close (With Fan Cooling).	1	146	Swivel Connector	2
84	Pipe Coupling, 1/4" NPT (With Fan Cooling)	1	177	Pipe Plug, 3/8" NPT	2

* - Indicates parts in Overhaul Kit.

VERTICAL INSTALLATION (With Input Shaft Up)



(With Input Shaft Down)

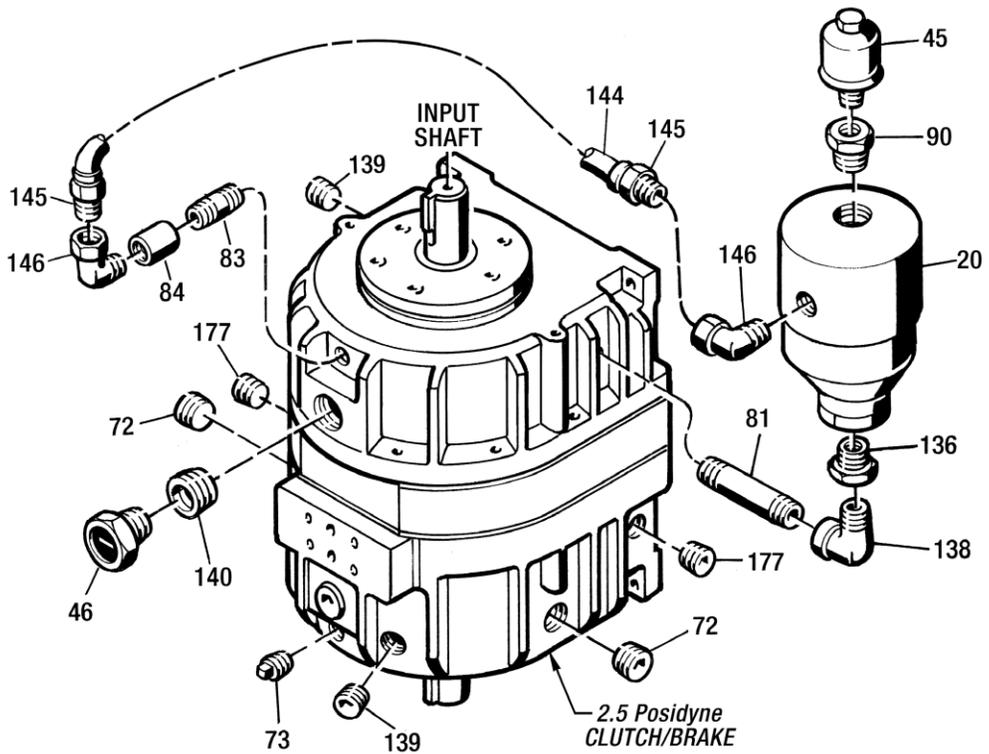
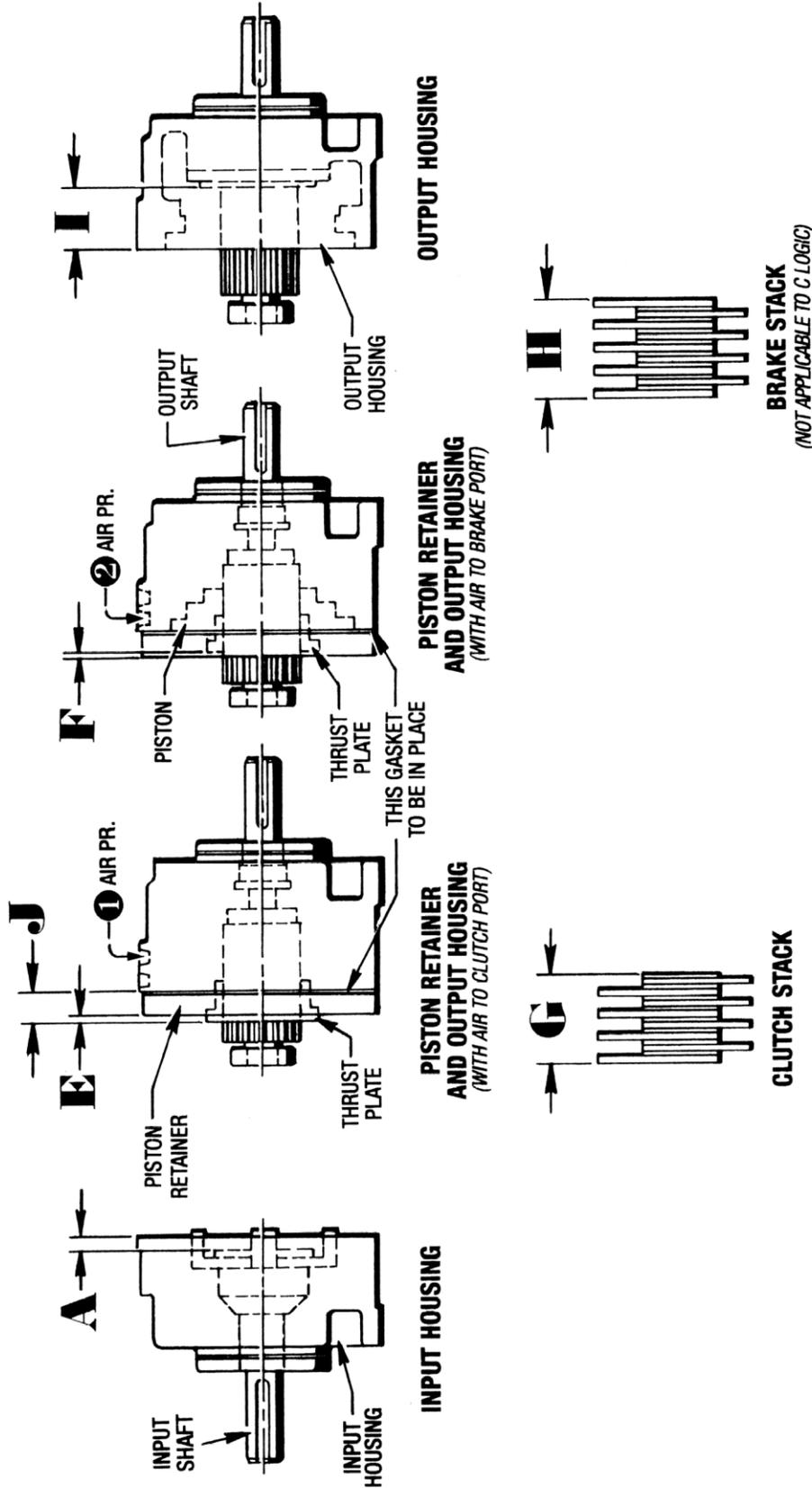


Figure 10.8 - Vertical Installation

SIZE 2.5 Posidyne DIMENSIONAL CHECK SHEET



2.5 Posidyne CLUTCH/BRAKE DIMENSIONS (Inches)

LOGIC	A	E	F*	G*	H*	I	J
SA, A, B			.110	.7245			
S, SCP, P	.594	.0799		.662	.559	2.441	.798
C			.228	-----			

* MEAN DIMENSIONS

① MAX. TEST AIR PRESSURE - 20 PSI for S, SA, SCP and P Logics.
- 40 PSI for A and B Logics.

② MAX. TEST AIR PRESSURE - 20 PSI for S, SA, SCP and P Logics.
- (Not Applicable for A and B Logics.)

ALL DIMENSIONS ARE WITH GASKETS REMOVED, EXCEPT WHERE NOTED.

Figure 10.9 - Dimensional Check Sheet

Manual Revision & Printing History

2.5 Posidyne Clutch/Brake

REVISION NUMBER	REVISION DATE (Mo./Yr.)	PRINTING DATE (Mo./Yr.)	REVISION/ACTION DESCRIPTION	REVISION INITIATED BY: (Name)	REVISION MADE BY: (Name)
502-2.5-001-01	-----	10/03	Printed	-----	-----
502-2.5-001-02	3/04	-----	Added Friction Disc and Drive Plate Quantities to page 24. Added Revision History.	M. Sharratt	Brooks
502-2.5-001-03	11/17	-----	Converted to Word format. Removed thrust plate and terms major and minor from spare parts tables.	R. Fuhrman	T. Stoner

FORCE CONTROL INDUSTRIES, INC.

Worldwide Leader in Oil Shear Technology.

*Providing today's industries
with Oil Shear Clutch and
Brake Drives that delivers:
Flexibility • Efficiency
Endurance • Performance
Dependability*

“Built to Last - Guaranteed to Perform”



FORCE CONTROL INDUSTRIES, INC.

MAIN OFFICE

P.O. Box 18366
Fairfield, Ohio 45018

3660 Dixie Highway
Fairfield, Ohio 45014

Tel: (513) 868-0900

Fax: (513) 868-2105

E-Mail: info@forcecontrol.com

Web Site: www.forcecontrol.com