



502-EH-03/20-001-01

SERVICE MANUAL

AND

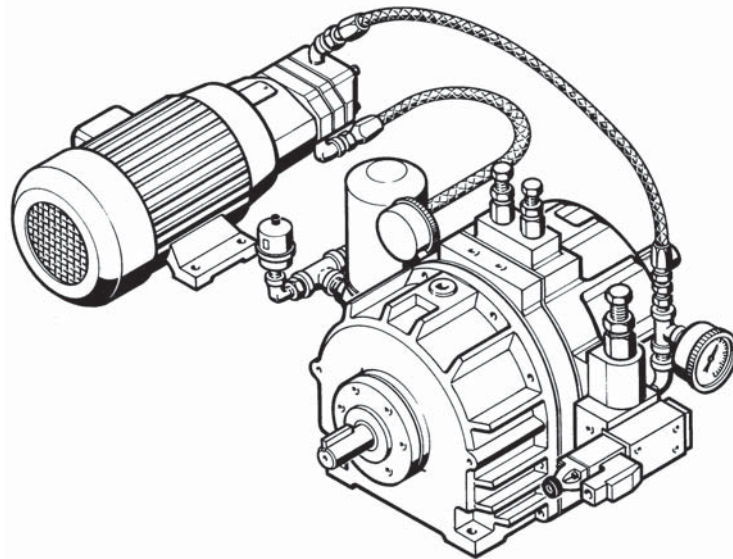
REPAIR PARTS

FOR

Size EH-03 to 20 *Posidyne*[®]

Electro/Hydraulic

CLUTCH/BRAKE DRIVES



FORCE CONTROL INDUSTRIES, INC.

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

MANUFACTURERS OF MECHANICAL AND ELECTRICAL POWER TRANSMISSION EQUIPMENT

Limited Warranty

Upon written approval of the application by Force Control Industries, Inc. the standard warranty period will be extended to 24 months from date of shipment.

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 PERFORMACE 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	5
3-2 Mounting the Drive	5

Section 4-LUBRICATION

4-1 Checking the Oil Level.....	6
4-2 Oil Capacity	6
4-3 Changing the Oil.....	6
4-4 Type of Oil	6

Section 5-OPERATIONAL CHECKS

5-1 Checking Piston Actuation.....	7
5-2 Checking Clutch/Brake Engagement.....	7
5-3 Drive Motors	7

Section 6-TROUBLESHOOTING

6-1 Trouble Shooting Chart.....	8
---------------------------------	---

Section 7-DISASSEMBLY

7-1 General Disassembly Procedure	10
7-2 Removing Hydraulic Control Valves	10
7-3 Removing Fan Shroud and Fan.....	10
7-4 Removal and Disassembly of Differential Line Driver Encoder	10
7-5 Separation and Removal of Major Subassemblies for Access to the Clutch/Brake Stacks.....	11
7-6 Removal of Water Cooled Heat Exchanger.....	11
7-7 Input Housing Disassembly (With Male Input Shaft)	11
7-8 Wear Sleeve Removal Procedure.....	12
7-9 Removing Male Input Shaft from Input Housing	12
7-10 Piston Housing and Retainer Disassembly.....	13
7-11 Output Housing Disassembly.....	13
7-12 Wear Sleeve Removal Procedure (#11 & #14 Only) ..	14
7-13 Removing Output Shaft from Output Housing	14

Section 8-CLEANING and INSPECTION

8-1 Cleaning and Inspection.....	15
8-2 Repair and Replacement.....	15

9-1 General Reassembly Instructions	15
9-2 Installing Bearings on Output Shaft	15
9-3 Output Housing Subassembly.....	17
9-4 Piston Housing and Retainer Subassembly.....	17
9-5 Input Housing Subassembly (With Male Input Shaft) ..	17
9-6 Measuring and Controlling Stack Depth Dimensions .	19
9-7 Reassembly of Major Subassemblies and Clutch/Brake Stacks.....	19
9-8 Measuring Piston Stroke	20
9-9 Fan and Fan Shroud Installation.....	21
9-10 Attaching C-Face Mounted Motor	21
9-11 Installing Belt Driven Sheave or Pulley	21
9-12 Reassembly and Installation of Differential Line Driver Encoder	22
9-13 Final Reassembly.....	22

Section 10-ILLUSTRATED PARTS LIST

10-1 General Information	24
10-2 Drive Motors	24
10-3 Factory Rebuild Service	24
10-4 Ordering Replacement Parts.....	24
10-5 Name Plate	24

REPAIR PARTS (Subassemblies)

Figure 10.1 - Differential Line Driver Encoder.....	25
---	----

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 EH *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 EH *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 EH *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 EH *Posidyne* units are equipped with a clutch and a brake. The Clutch is operated by hydraulic pressure. The EH *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 EH *Posidyne* cross-section (Figure 1.1) shows the drive with the Brake engaged. A nominal braking force is provided by springs located in the Output Housing.. Heavier

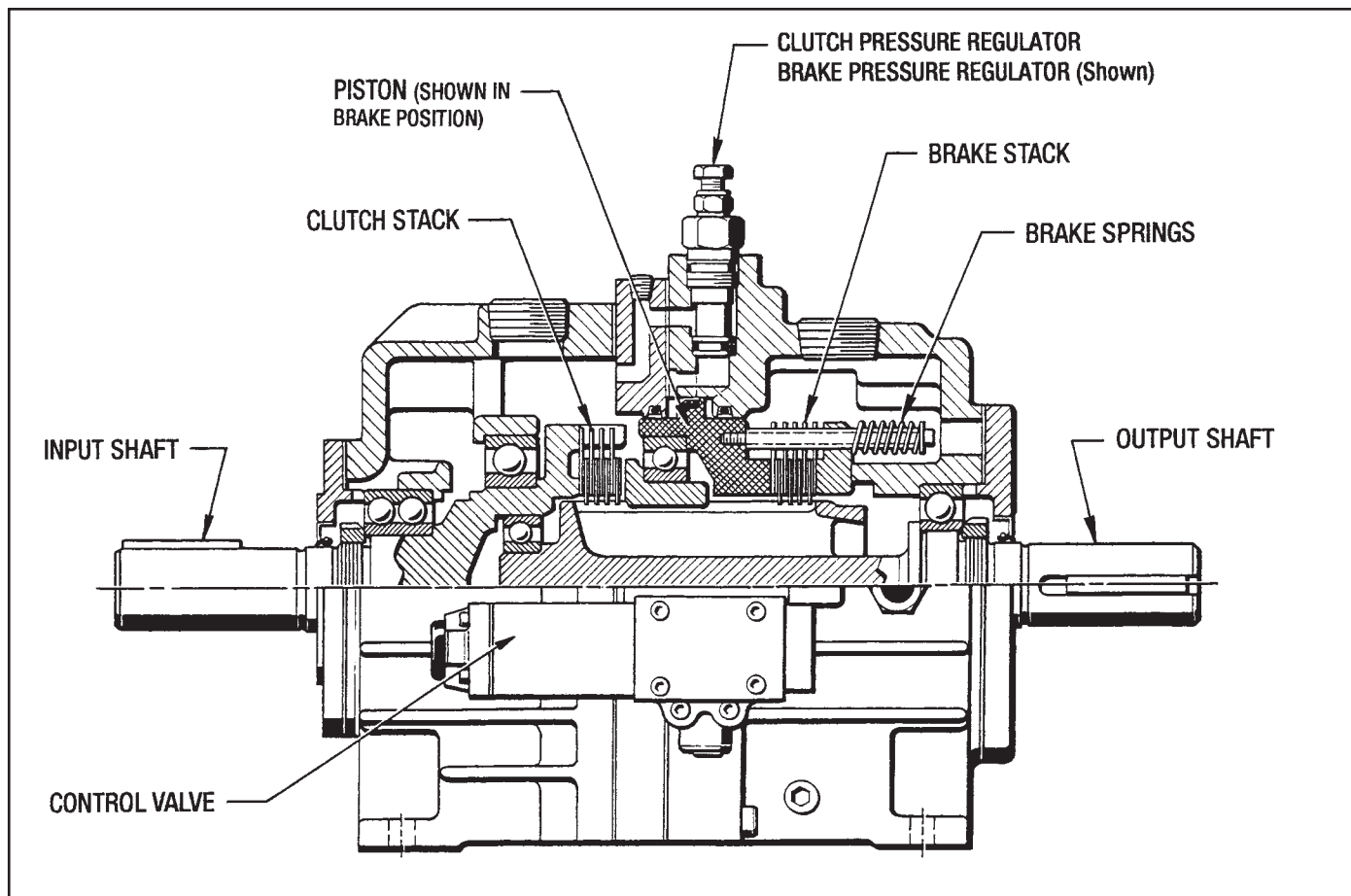


Figure 1.1 - EH *Posidyne* Clutch/Brake Unit

springs are used to provide a greater braking force, when needed. Pressure 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 the Brake Position.

The Clutch is engaged when the hydraulic 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.

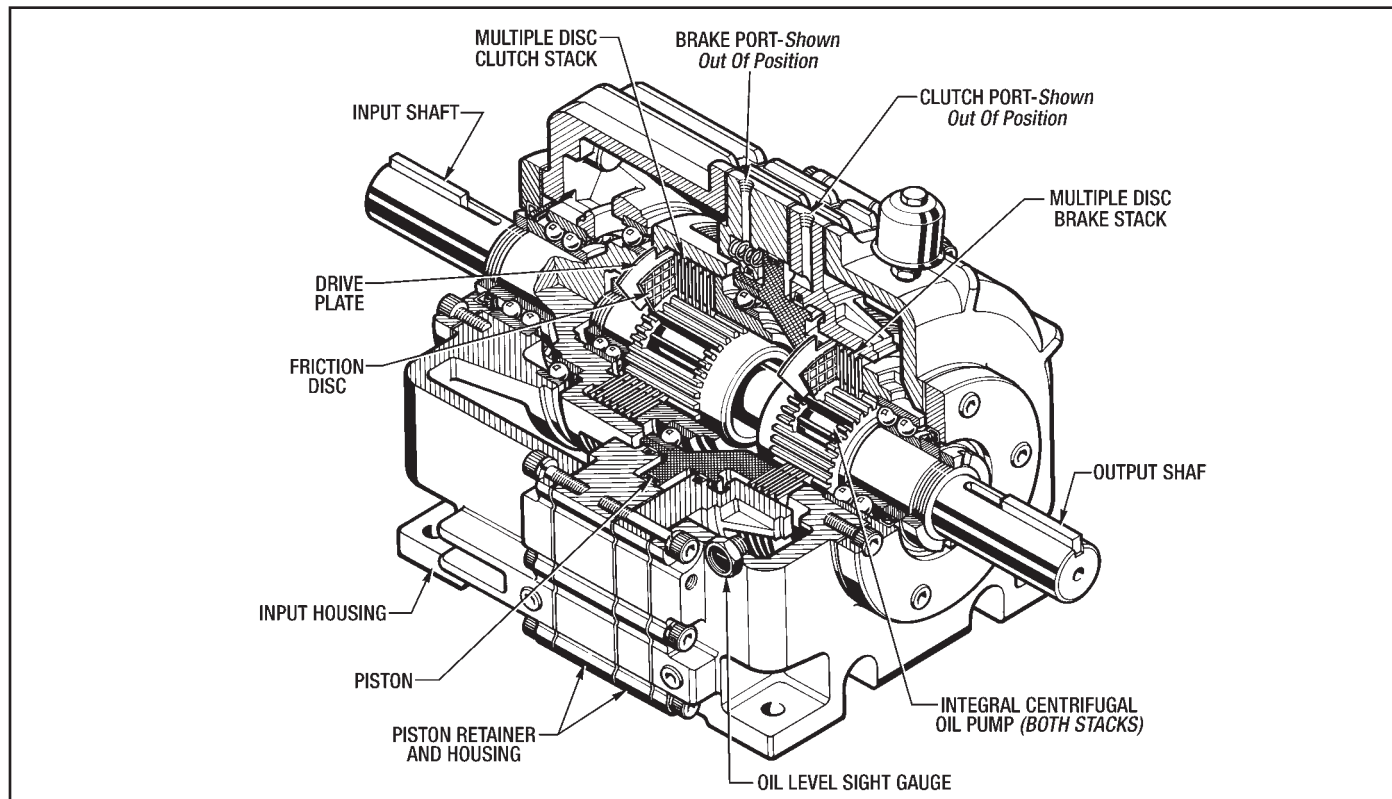


Figure 1.2 - EH Posidyne Clutch/Brake Unit

Section 2 SPECIFICATIONS

(EH *Posidyne* CLUTCH/BRAKE)

2-1 MODEL DESIGNATIONS

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

- S** - Pressure set clutch, light spring set brake with pressure assist.
- SA** - Pressure set clutch, medium spring set brake with pressure assist.
- A** - Pressure set clutch, medium spring set brake (See NOTE following).
- B** - Pressure set clutch, heavy spring set brake (See NOTE following).
- P** - Pressure set 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 SPECIFICATIONS

Specifications for the EH *Posidyne* Clutch/Brake Drives are listed in Table 2.1

TORQUE RATINGS

The torque ratings listed are based on maximum actuation pressure as specified in the Table 2.1.

Table 2.1 SPECIFICATIONS

Size	Logic	Required Torque		Hydraulic System Pressures (PSI)						Oil Level In Sight Gauge			Oil Cap. (Qts)
		Clutch (Lb. In.)	Brake (Lb. In.)	Clutch	Brake	System	Max. Clutch	Max. Brake	Max. System	0°-5° Output Down	5°-10° Output Down	10°-15° Output Down	
03	S	1400	1200	145	130	195	245	240	295	AT SHAFT CENTER LINE	1" ABOVE SHAFT CENTER LINE	1-1/2" ABOVE SHAFT CENTER LINE	3.5
	SA			175	80	225	290	185	340				
	S	1600	1400	165	155	215	245	240	295				
	SA			190	100	240	290	185	340				
	S	1800	1600	180	180	230	245	240	295				
	SA			210	120	260	290	185	340				
	S	2000	1800	200	210	260	245	240	295				
	SA			225	140	275	290	185	340				
	S	2200	2000	215	235	285	245	240	295				
SA	240			160	290	290	185	340					
05	S	2400	2200	150	125	200	245	240	295	AT SHAFT CENTER LINE	1" ABOVE SHAFT CENTER LINE	2" ABOVE SHAFT CENTER LINE	8
	SA			210	65	260	335	150	385				
	S	2600	2400	160	135	210	245	240	295				
	SA			220	80	270	335	150	385				
	S	2800	2600	170	150	220	245	240	295				
	SA			230	90	280	335	150	385				
	S	3000	2800	180	160	230	245	240	295				
	SA			240	100	290	335	150	385				
	S	3200	3000	190	175	240	245	240	295				
	SA			250	110	300	335	150	385				
	S	3400	3200	200	185	250	245	240	295				
	SA			260	125	310	335	150	385				
S	3600	3400	210	200	260	245	240	295					
SA			270	135	320	335	150	385					
10	S	5000	5000	215	170	265	375	385	435	AT SHAFT CENTER LINE	1"-5/8" ABOVE SHAFT CENTER LINE	3" ABOVE SHAFT CENTER LINE	10
	SA			340	100	390	495	265	545				
	S	5500	5500	230	190	280	375	385	435				
	SA			360	120	410	495	265	545				
	S	6000	6000	245	210	295	375	385	435				
	SA			375	140	425	495	265	545				
	S	6500	6500	265	230	315	375	385	435				
	SA			390	155	440	495	265	545				
	S	7000	7000	280	250	330	375	385	435				
	SA			410	175	460	495	265	545				
	S	7500	7500	300	265	350	375	385	435				
	SA			425	195	475	495	265	545				
S	8000	8000	315	285	365	375	385	435					
SA			445	215	495	495	265	545					

Table 2.1 SPECIFICATIONS Continued

Size	Logic	Required Torque		Hydraulic System Pressures (PSI)						Oil Level In Sight Gauge			Oil Cap. (Qts)
		Clutch (Lb. In.)	Brake (Lb. In.)	Clutch	Brake	System	Max. Clutch	Max. Brake	Max. System	0°-5° Output Down	5°-10° Output Down	10°-15° Output Down	
11	S	8000	8000	255	260	310	505	510	560	AT SHAFT CENTER LINE	1-1/2" ABOVE SHAFT CENTER LINE	2-3/4" ABOVE SHAFT CENTER LINE	10
	SA	7500	5500	365	100	415	510	260	560				
	S	8500	9000	265	295	345	505	510	560				
	SA	8000	6000	375	115	425	510	260	560				
	S	9000	9500	280	315	365	505	510	560				
	SA	8500	6500	390	135	440	510	260	560				
	S	10000	10500	305	350	400	505	510	560				
	SA	9500	7000	415	150	465	510	260	560				
	S	10500	11000	315	370	420	505	510	560				
	SA	10000	7500	425	170	475	510	260	560				
	S	11000	12000	330	405	455	505	510	560				
	SA	10500	8000	440	190	490	510	260	560				
	S	12000	12500	355	420	470	505	510	560				
	SA	11500	8500	465	205	515	510	260	560				
14	S	12500	12500	305	250	355	510	505	560	AT SHAFT CENTER LINE	1-1/2" ABOVE SHAFT CENTER LINE	3" ABOVE SHAFT CENTER LINE	10
	SA	9000	9000	335	105	385	480	275	530				
	S	13500	13500	325	270	375	510	505	560				
	SA	10000	10000	355	130	405	480	275	530				
	S	15000	15000	355	305	405	510	505	560				
	SA	10750	10750	370	145	420	480	275	530				
	S	16000	16000	375	330	425	510	505	560				
	SA	11500	11500	385	165	435	480	275	530				
	S	17250	17250	400	355	450	510	505	560				
	SA	12250	12250	400	180	450	480	275	530				
	S	18250	18250	415	380	465	510	505	560				
	SA	13000	13000	415	200	465	480	275	530				
	S	19500	19500	440	410	490	510	505	560				
	SA	14000	14000	430	220	480	480	275	530				
20	S	17000	17750	175	160	225	295	300	350	AT SHAFT CENTER LINE	2" ABOVE SHAFT CENTER LINE	3-5/8" ABOVE SHAFT CENTER LINE	25
	SA	14000	11000	190	65	240	295	155	345				
	S	18500	19250	185	170	235	295	300	350				
	SA	15500	12000	205	75	255	295	155	345				
	S	20250	21000	200	190	250	295	300	350				
	SA	16750	13000	215	85	265	295	155	345				
	S	21750	22500	215	205	265	295	300	350				
	SA	18000	14000	225	95	275	295	155	345				
	S	23250	24000	230	220	280	295	300	350				
	SA	19250	15000	235	105	285	295	155	345				
	S	24750	25750	240	235	290	295	300	350				
	SA	20500	16000	245	115	295	295	155	345				
	S	26500	27250	255	250	305	295	300	350				
	SA	22000	17000	260	125	310	295	155	345				

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. 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, Flat Washers

and Lock Washers 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.

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 horizontal installations. Refer to section 2 for oil levels for inclined mounting applications.

4-2 OIL CAPACITY

Refer to section 2 for approximate oil capacities.

4-3 CHANGING THE OIL

IMPORTANT

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

After the first 30 days of operation completely drain the oil from the drive using the drain plugs provided. Remove and replace the cartridge oil filter with a new filter. If the oil

sight glass is dirty it should be removed and cleaned.

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

After the first oil change check the oil level and color of the oil at least once per month. Maintain the oil level to the center of the sight glass by adding additional oil as needed. The oil and filter should be changed after every 12 months of operation there after.

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.**

Section 5

OPERATIONAL CHECKS

Make these Operational Checks with the driver shut down and locked out. Also remove the (2) Inspection Plugs from the drive unit. **Do not remove these inspection plugs while the drive unit is running.**

If automatic controls are used, make provisions for manual operation. If the drive unit has been removed for repair, make temporary, manually controlled hydraulic connections. (See Figure 5.1 for Hydraulic Schematic.)

The Manifold (#105), Control Valve (#387), Pressure Relief Valves (#388 and #400) and the Pressure Gauges (#327 and #397) all have to be in place and attached to the unit. (See Figure 10.5)

5-1 CHECKING PISTON ACTUATION

(Motor Driven Hydraulic Pump Units Only)

1. With the hydraulic pump running, press and hold the "Manual Override" button to apply pressure to the clutch port. At the same time, observe the piston movement to see if it actuates quickly and smoothly. If the piston movement is irregular and has a tendency to stick or bind, internal damage may be indicated. If the piston moves slowly, the piston seals are probably leaking.

Release the "Manual Override" button and observe the piston to see if it returns back to its original position quickly and smoothly.

5-2 CHECKING CLUTCH/BRAKE ENGAGEMENT or INPUT SHAFT Vs. OUTPUT SHAFT ROTATION

1. When applying pressure to the clutch port, simply rotate the input shaft by hand and observe the rotation of the output shaft.

When the pressure is not applied to the clutch or when applied to the "Pressure Assist" brake port, the output shaft should be locked and not able to rotate.

With SCP Logic, the output shaft is free to rotate when pressure is not applied to the brake. Applying pressure to the brake should lock the output shaft.

5-3 DRIVE MOTORS

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

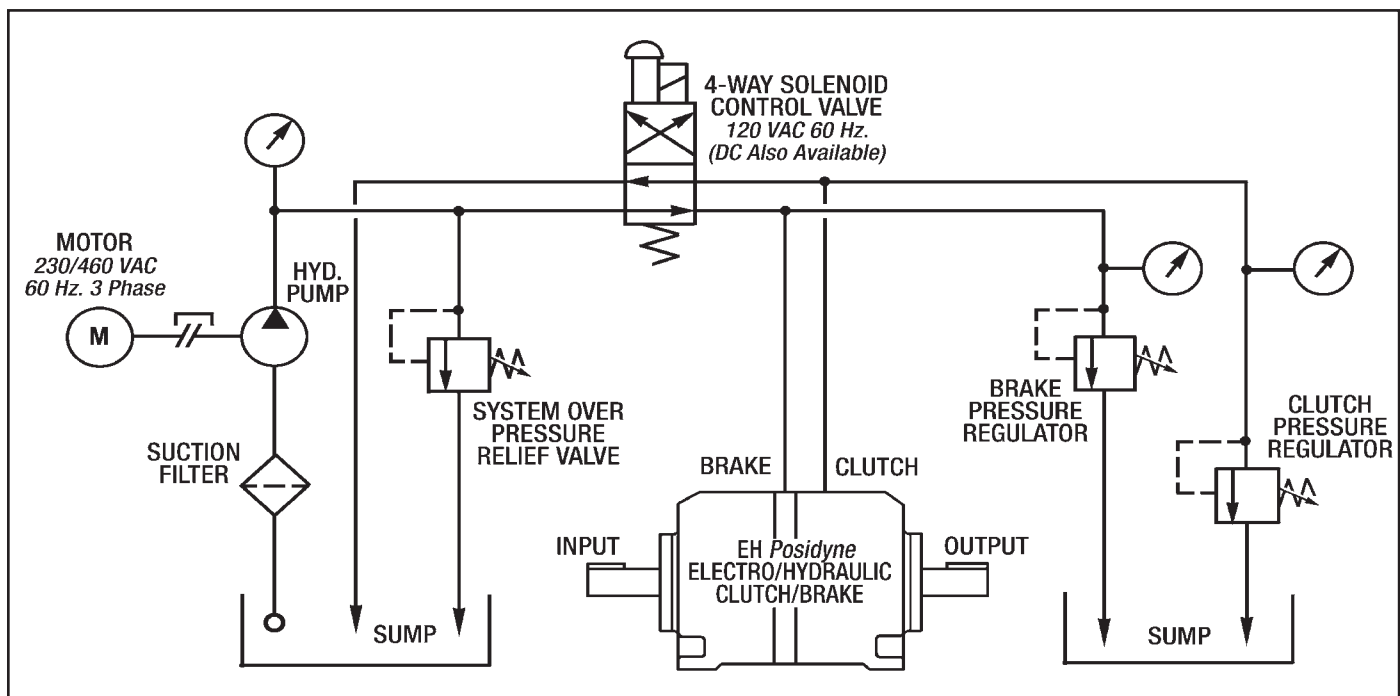


Figure 5.1 - Hydraulic Schematic

Section 6 TROUBLESHOOTING

6-1 TROUBLESHOOTING CHART

TROUBLE	POSSIBLE CAUSE	REMEDY
Both clutch and brake fail to engage properly.	<p>Electrical control circuit.</p> <p>Low hyd. pressure.</p> <p>Hyd. pressure regulator or piping.</p> <p>Worn friction surfaces.</p> <p>Improper type of oil</p>	<p>Check control circuit.</p> <p>Increase hyd. pressure.**</p> <p>Check for improper operation or leaks.</p> <p>Check parts for wear and replace if necessary. (See Section 6-2)</p> <p>Check name plate and change oil if necessary.</p>
Clutch fails to engage properly.	<p>Electrical control circuit.</p> <p>Valve not functioning properly.</p> <p>Internal hyd. leakage.</p> <p>Low hyd. pressure</p> <p>Worn friction surfaces.</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 hyd. pressure.**</p> <p>Check parts for wear and replace if necessary. (See Section 6-2)</p>
Picks up load too quickly.	<p>Hyd. pressure too high.</p> <p>Low oil level.</p>	<p>Reduce hyd. 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 pressure leakage.</p> <p>Low hyd. pressure</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 hyd. pressure.**</p>

TROUBLE	POSSIBLE CAUSE	REMEDY
Brake fails to engage properly. (Continued)	Piston sticking. Weak or broken brake spring. Worn friction surfaces.	Disassemble to extent necessary and check for damaged parts. Replace spring. Check parts for wear and replace if necessary. (See Section 6-2)
Brake fails to disengage properly.	Electrical control circuit. Valve not functioning properly. Piston sticking.	Check control circuit. Check and replace valve if necessary. Disassemble to extent necessary and inspect for damaged parts.
Drive overheats. (Oil temp. above 225° F.)	Inertia or resistance changed. Improper oil level. Improper type of oil. Water turned off. Fan blocked.	Check with Force Control engineering. Check oil level. Add or drain as needed. Check name plate and change oil if necessary Check shut-off valve. Clean shroud.
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. (.020" Max.)	Bearings bad.	Disassemble and replace.
Clutch or Brake does not repeat	Hydraulic pressure changed Improper type of oil *Oil temperature changed. Resistance in machine changed.	Check hydraulic 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.

** - Refer to section 2 for maximum hydraulic pressures.

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.

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 EH Posidyne Units are comprised of (3) basic subassemblies and can be disassembled as complete subassemblies for easy access to the Clutch/Brake Stacks.

1. MAJOR SUBASSEMBLIES and CLUTCH/BRAKE STACKS
2. PRIMARY INPUT HOUSING SUBASSEMBLY
3. OPTIONAL FAN COOLING AND WATER COOLING OPTIONS
4. PISTON HOUSING AND RETAINER SUBASSEMBLY
5. OUTPUT HOUSING SUBASSEMBLY
6. OPTIONAL DIFFERENTIAL LINE DRIVER ENCODER (Figure 10.1)

7-2 REMOVING HYDRAULIC CONTROL VALVES

1. If the Brad Harrison Cable (#902) is still attached to the Control Valve (#387), disconnect it at this time.
2. Remove the (4) Screws (#358) and (4) Lockwashers (#359) and take the Control Valve (#387) off the Manifold (#105).

3. Take the Manifold (#105) off the Posidyne Unit by removing the (4) Screws (#198) and (4) Lockwashers (#182).
4. Remove and check the (4) O-Rings (#104) and (1) O-Ring (#103). Replace if necessary.
5. Remove the Pressure Gauges (#327) and Pressure Regulators (#400) from the housing.

NOTE:

There is only (1) Pressure Gauge and (1) Pressure Regulator for Logics "A" and "B".

7-3 REMOVING FAN SHROUD AND FAN (#03, #10, #11, #14 and #20 Posidyne)

1. Loosen Jam Nut (#86) from the top of the Fan Shroud. (**#05 Posidyne ONLY**)
1. Remove (2) Screws (#67) and (2) Washers (#182) from the side of the Fan Shroud.

(ALL MODELS)

2. Remove (2) Screws (#66) from the bottom rear of the Fan Shroud.
3. Pull the Fan Shroud (#24) away from the Input Housing Subassembly.
4. Loosen Set Screws (#70) and remove Fan (#25) from the Input Shaft (#2).
5. Remove both Keys (#180 and #37).

(#11 and #14 Posidyne ONLY)

6. Remove Spacer (#183) from the Input Shaft.

7-4 REMOVAL and DISASSEMBLY of DIFFERENTIAL LINE DRIVER ENCODER

(Optical Encoder)

(See Figure 10.1)

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)
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.

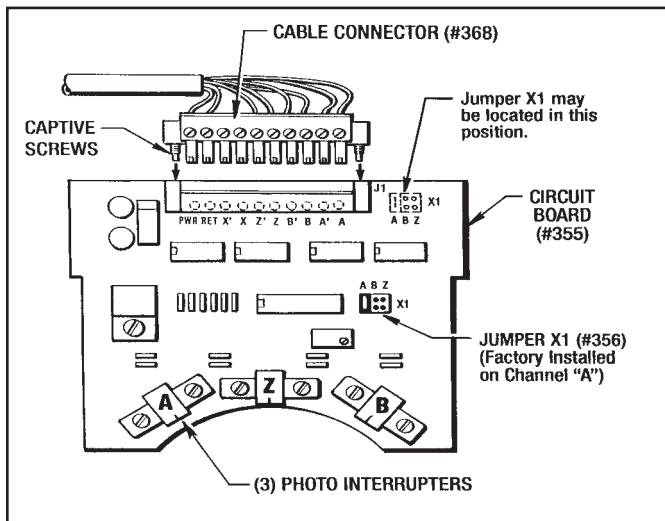


Figure 7.1 - Circuit Board Connector

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. Also (4) Washers (#32) on #10, #11 and #20 Sizes.

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) from the output shaft.
11. Check the Dirt Seal (#269) in the Disc Housing (#17) and remove it if it is damaged.

7-5 SEPARATION AND REMOVAL OF MAJOR SUBASSEMBLIES FOR ACCESS TO THE CLUTCH AND BRAKE STACKS

NOTES:

1. Jackscrew holes are provided to aid in the separation of the subassemblies from each other.
2. Do not attempt to reuse the (2) Gaskets (#53). They must be replaced with new ones when reassembled.
3. When removing the Clutch and Brake Stacks, always keep the Drive Plates (#13) and the Friction Discs (#12) in the same order as they were removed.
1. Remove (11) Soc. Hd. Cap Screws (#61) and (11) Lockwashers (#127) from the input end of the Input Housing Subassembly.
2. Using jackscrews, separate and lift the Input Housing Subassembly away from the Drive Unit.
3. Remove and discard Gasket (#53).

4. The Clutch Stack can now be removed from the Output Shaft Spline.
5. Remove (11) Soc. Hd. Cap Screws (#69) and (11) Lockwashers (#127) from the output end of the Output Housing.
6. Using jackscrews, separate and lift the Piston Housing Subassembly away from the Output Housing Subassembly.
7. Remove and discard Gasket (#53).
8. The Brake Stack can now be removed from the Output Shaft Spline.

If repair or replacement of the Clutch or Brake Stacks are the only repair to be done, then proceed to **Section 8 CLEANING AND INSPECTION**.

7-6 REMOVAL OF WATER COOLED HEAT EXCHANGER

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 both Elbows (#71), Tee (#242) and the Zinc Anode (#176) 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).

MAJOR SUBASSEMBLIES

7-7 INPUT HOUSING DISASSEMBLY (WITH MALE INPUT SHAFT)

1. If the Key (#180) is still intact in the Input Shaft (#2), remove it at this time.

(#03 and #05 Posidyne)

2. Remove Locknut (#15) from the Input Shaft (#2).
3. Remove (6) Screws (#63) and remove the Bearing Retainer (#7) taking care not to damage the lip of the Oil Seal (#31).
4. Check Oil Seal (#31) and replace if necessary.
5. Remove and discard Gasket (#55).

(#10 Posidyne)

2. Remove Locknut (#15) from the Input Shaft (#2).
3. Remove (6) Screws (#63) and remove the Bearing Retainer (#7) taking care not to damage the lip of the Oil Seal (#31).
4. Check Oil Seal (#31) and replace if necessary.
5. Remove O-Ring (#87) and replace if necessary.
6. The Mating Ring (#4) is not a press fit for these Models so it can be removed by hand. Also remove and check O-Ring (#80).

(#11 and #14 Posidyne)

2. Remove (6) Screws (#63) and remove Bearing Retainer (#7), taking care not to damage the lip of the Oil Seal (#31).
3. Check Oil Seal (#31) and remove if it is damaged and needs to be replaced.
4. Remove and check O-Ring (#87).
5. Remove the Wear Sleeve (#4). See 7-12 WEAR SLEEVE REMOVAL PROCEDURE. (Figure 7.2)
6. Remove Locknut (#15) and Lockwasher (#155) if Bearings (#26) or (#35) need to be replaced and the Input Shaft is to be pressed out of the Input Housing.

(#20 Posidyne)

2. Remove Locknut (#15) from the Input Shaft (#2).
3. Remove (6) Screws (#63) and remove the Bearing Retainer (#7), taking care not to damage the lip of the Oil Seal (#31).
4. Check Oil Seal (#31) and O-Ring (#87) and replace if necessary.
5. If the Wear Sleeve (#250) needs to be replaced see Section 7-12 WEAR SLEEVE REMOVAL PROCEDURE. (Figure 7.2)

7-8 WEAR SLEEVE REMOVAL PROCEDURE

(#11, #14 and #20 Posidyne)

Only remove this Wear Sleeve if it is damaged and needs to be replaced.

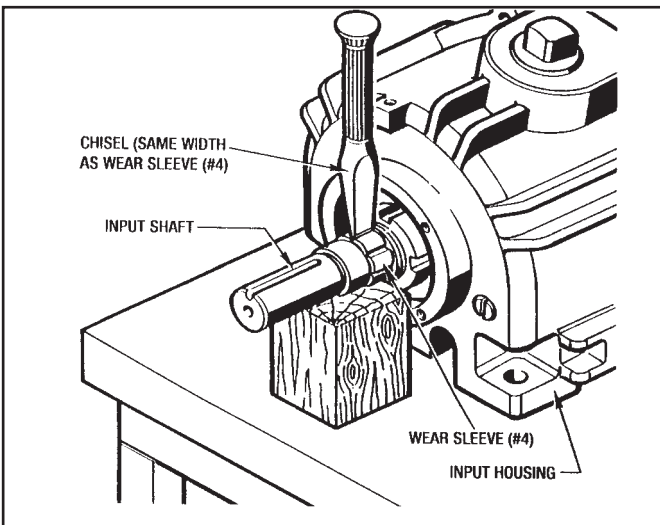


Figure 7.2 - Wear Sleeve Removal (#11 and 14 Posidyne)

(#11 and #14 Posidyne)

1. With a chisel the same width as the Wear Sleeve (#4), make about 5 or 6 notches in the Sleeve parallel to the Input Shaft. (See Figure 7.2)

(#20 Posidyne)

1. Pull the Mating Ring (#4), with the Wear Sleeve (#250) on it, off the Input Shaft.

2. With a chisel the same width as the Wear Sleeve (#250) make about 5 or 6 notches in the Wear Sleeve, as shown in Figure 7.3. It can now be removed from the Mating Ring by hand.

7-9 REMOVING THE MALE INPUT SHAFT FROM THE INPUT HOUSING

IMPORTANT

Do not attempt to remove the Input Shaft unless Bearings (#26), (#27) or (#35) need to be replaced.

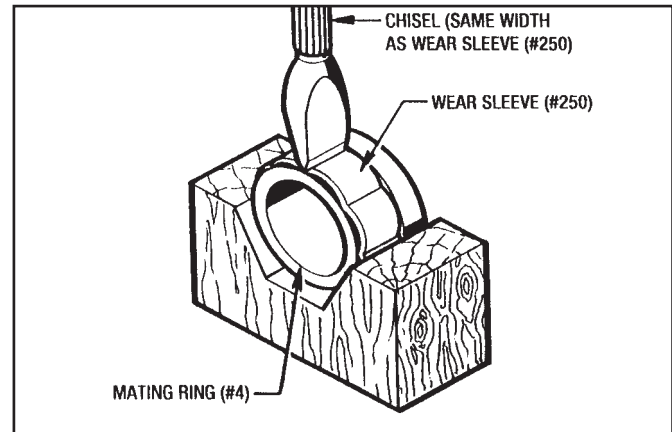


Figure 7.3 - Wear Sleeve Removal (#20 Posidyne Only)

(ALL MODELS)

1. Place the Input Housing in an arbor press with the Input Shaft pointing up. Use appropriate spacers (approximately 2-1/2" high) under the Housing. Press the Input Shaft down and out of the Input Housing.

(#03 and #05 Posidyne)

2. The Mating Ring (#4) will be pushed off the Input Shaft when pressed out of the Input Housing. Check the Mating Ring for damage. Remove Bearing (#26) from the Input Housing.

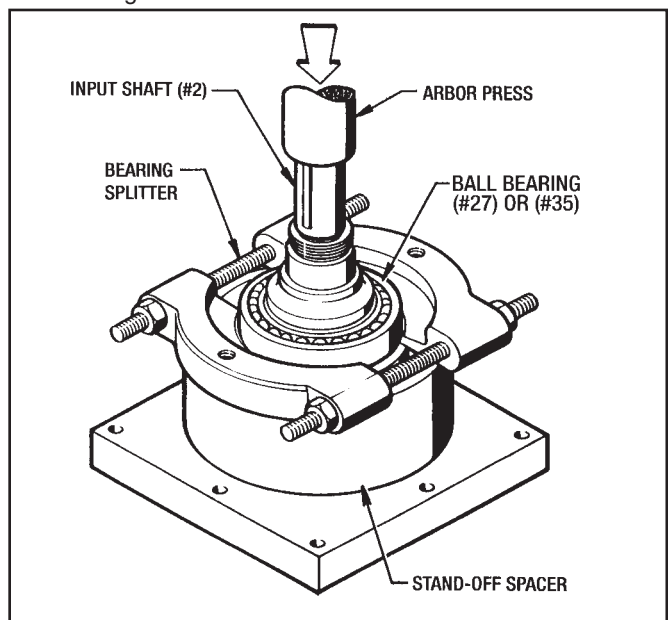


Figure 7.4 - Removing Bearing From Input Shaft

(#10, #11, #14 and #20 Posidyne)

2. Remove Bearings (#26) from the Input Housing.

(#03, #05, #10 Posidyne)

3. Use a Bearing Splitter to remove Bearing (#27) from the Input Shaft. (See Figure 7.4).

(#11, #14 and #20 Posidyne)

3. Use a Bearing Splitter to remove Bearing (#35) from the Input Shaft. (See Figure 7.4).

7-10 PISTON HOUSING AND RETAINER DISASSEMBLY

1. Evenly back out and remove (4) Screws (#62) and (4) Lockwashers (#128).

CAUTION - The Piston Subassembly is under spring pressure and care must be taken to avoid personal injury when removing these Screws (#62) and separating the Subassembly.

2. Separate the Piston Retainer (#11) from the Piston Housing (#10). Remove and discard Gasket (#51).
3. Remove the Piston Subassembly which consists of: (a) Thrust Plate (#5), (b) Piston (#3), (c) Bearing (#37), (d) Teflon Liner (#43) and (e) (2) O-Rings (#40).
4. The Teflon Liner (#43) and the (2) O-Rings (#40) can now be removed for inspection and replacement. (See Figure 7.5)
5. Using an Arbor Press, remove the Clutch Thrust Plate (#5) and Bearing (#27) from the Piston (#3).

IMPORTANT

Only remove the Clutch Thrust Plate (#5) and the Bearing (#27) if replacement of either one is necessary.

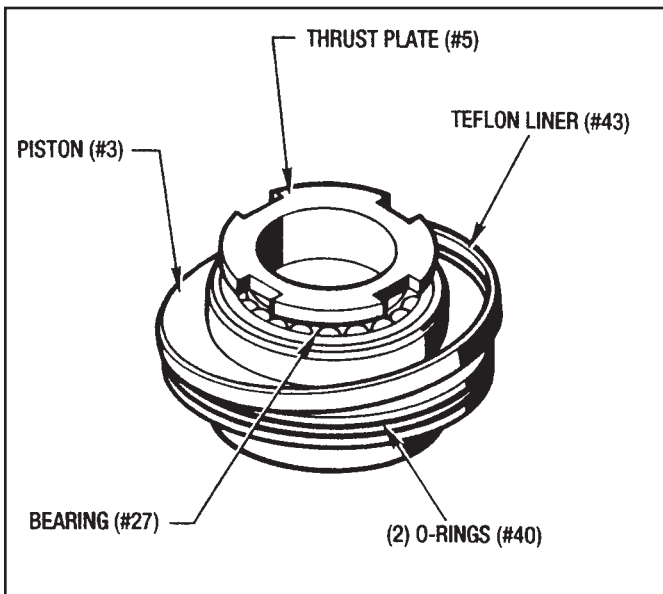


Figure 7.5 - Piston Sub-Assembly

6. Remove Springs (#36), and on Drives with SCP Logic, also remove Springs (#96). The quantity of Springs are pre-determined at the factory for your Torque Requirements.

When removing these Springs, it would be helpful for you

to make a free hand sketch locating the position of the Springs. This will help at Reassembly.

7. Remove the Teflon Liner (#42) and O-Ring (#39) from the Piston Retainer (#11) and, for SCP Logic, the Piston Housing (#10).

7-11 OUTPUT HOUSING DISASSEMBLY

(ALL MODELS)

1. First, remove the Key (#181) from the Output Shaft (#1) and place tape over the keyway.

(#03 AND #05 Posidyne)

2. Heat up the Locknut (#15) with an acetylene torch to melt the Loctite and with a special Locknut Ass'y. Tool, remove it from the Output Shaft (#1). **CAUTION: Wear suitable gloves when handling heated parts.**

NOTE:

This Locknut Ass'y. Tool is available from the Force Control factory. Order Part No. 601-05-003.

3. Remove (6) Screws (#63) and remove the Bearing Retainer (#7) taking care not to damage the lip of the Oil Seal (#31).
4. Check Oil Seal (#31) and replace if necessary.
5. Remove and discard Gasket (#55).
6. The Wear Ring (#4) is not a press fit so remove it from the output shaft by hand. Check it carefully and replace it if necessary.

(#10 Posidyne)

2. Heat up the Locknut (#15) and remove it from the Output Shaft (#1). **CAUTION: Wear suitable gloves when handling heated parts.**
3. Remove (6) Screws (#63) and remove the Bearing Retainer (#7) taking care not to damage the lip of the Oil Seal (#31). Also check to see if there is a Bearing Shim (#378). If there is remove it from the bearing bore.
4. Check Oil Seal (#31) and replace if necessary.
5. Remove O-Ring (#87) and replace if necessary
6. The Mating Ring (#4) is not a press fit for these models so it can be removed by hand. Also remove and check O-Ring (#80).

(#11 and #14 Posidyne)

2. Remove (6) Screws (#63) and remove the Bearing Retainer (#7) taking care not to damage the lip of the Oil Seal (#31). Also check to see if there is a Bearing Shim (#378). If there is remove it from the bearing bore.
3. Check Oil Seal (#31) and replace if necessary.
4. Remove O-Ring (#87) and replace if necessary.

(#14 Posidyne Only)

5. Also remove (2) O-Rings (#104) from the rear face of the Bearing Retainer (#104).

(#11 and #14 Posidyne)

6. Remove the Wear Sleeve (#4) as shown in Figure 7.6 and described in **WEAR SLEEVE REMOVAL PROCEDURE - Section 7-12.**

- Heat up the Locknut (#15) and remove it and the Lockwasher (#155) if the Bearings (#26) or (#35) are to be replaced and the Output Shaft is to be pressed out of the Output Housing. **CAUTION: Wear suitable gloves when handling heated parts.**

(#20 Posidyne)

- Remove Locknut (#15) from the Output Shaft (#1).
- Remove (6) Screws (#63) and remove the Bearing Retainer (#7) taking care not to damage the lip of the Oil Seal (#31).
- Check Oil Seal (#31) and replace if necessary.
- Remove O-Ring (#87) and replace if necessary
- Pull the Mating Ring (#4), with the Wear Sleeve (#250) on it, off of the Output Shaft (#2)
- Use the same procedure as described in **Section 7-8 WEAR SLEEVE REMOVAL PROCEDURE** (Figure 7.3) to remove the Wear Sleeve (#250) from the Mating Ring (#4).

7-12 WEAR SLEEVE REMOVAL PROCEDURE

(#11 and #14 Posidyne ONLY)

NOTE:

Only remove this Wear Sleeve if damage is indicated and replacement is necessary.

With a chisel, the same width as the Wear Sleeve, make about 5 or 6 notches in the ring parallel to the Output Shaft. It can now be removed from the Output Shaft by hand. (See Figure 7.6)

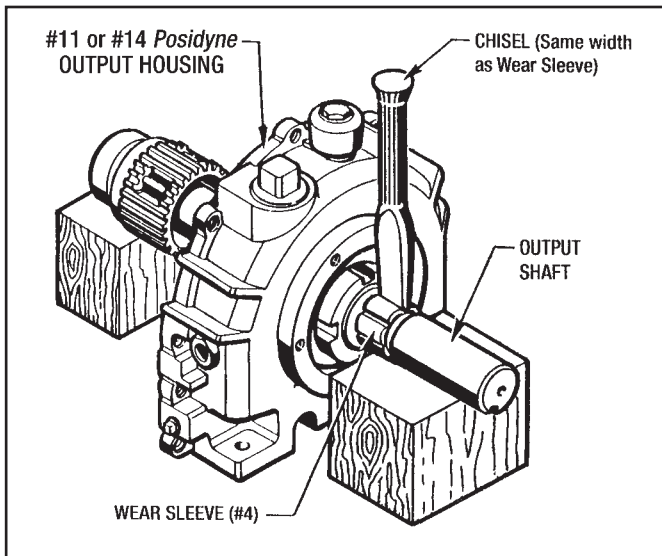


Figure 7.6 - Wear Sleeve Removal

7-13 REMOVING THE OUTPUT SHAFT FROM THE OUTPUT HOUSING

IMPORTANT

Do not attempt to remove the Output Shaft unless Bearings (#26) or (#28) have to be replaced.

(ALL MODELS)

- With a mallet tap the Output Shaft (#1) out of the Output Housing as shown in Figure 7.7.

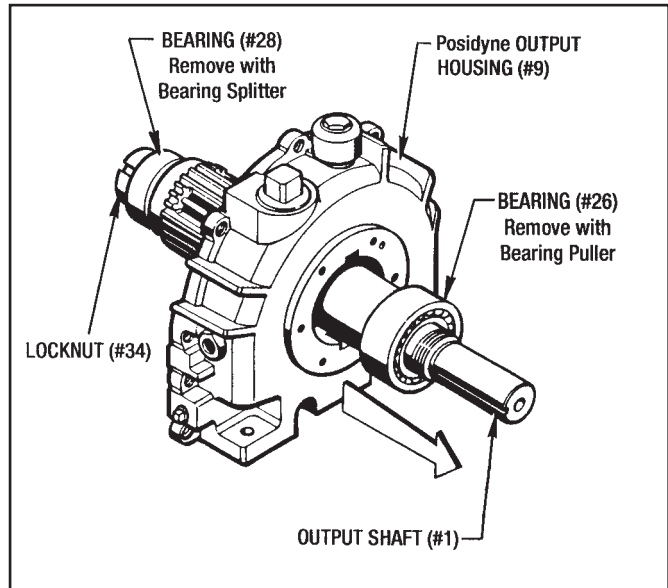


Figure 7.7 - Removing the Output Shaft

(#03 and #05 Posidyne)

- Remove Bearing (#26) from the Output Shaft with a Bearing Puller or a Bearing Splitter like the one shown in Figure 7.4.

(#10, #11, #14 and #20 Posidyne)

- With a Bearing Puller or Bearing Splitter, remove both Bearings (#26). For #10 Posidyne only, also remove the Bearing Spacer (#183) from the output shaft. Remove Bearing Spacer (#288) from #20 Posidyne.

(#03, #05, #10 and #20 Posidyne)

- Heat up the Locknut (#34) and remove it from the Output Shaft (#1). **NOTE:** Clamp the Output Shaft in a vice to ease the removal of the Locknut (#34) and Bearing (#28).

CAUTION: Wear suitable gloves when handling heated parts.

(ALL MODELS)

- If Bearing (#28) has to be replaced, use a Bearing Splitter, like the one shown in Figure 7.4, to remove it.

(#20 Posidyne)

- Also Remove the Pilot Bearing Spacer (#289).

**Disassembly is now complete for your
EH 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.

CAUTION

Wear suitable gloves when handling heated parts.

3. Apply Gasket Sealant (Permatex #3), or equivalent, to all flat gaskets.
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.

MAJOR SUBASSEMBLIES

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

9-2 INSTALLING BEARINGS ON OUTPUT SHAFT

IMPORTANT

#03 and #05 Posidyne Outboard Bearing (#26) must be installed with the Loading Slots towards the output end of the shaft. (See Figure 9.1).

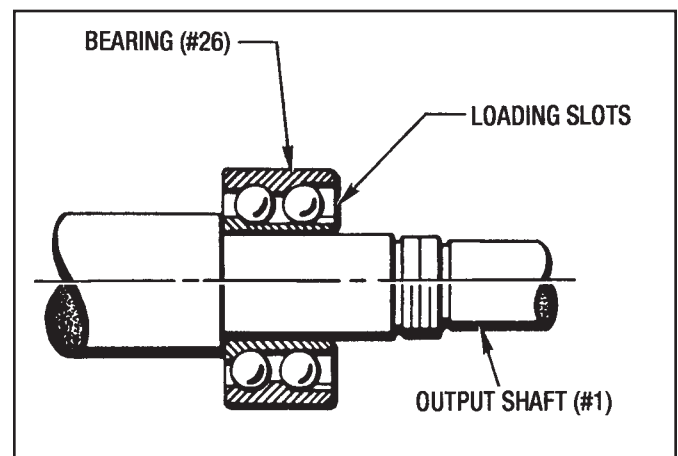


Figure 9.1 - Bearing Loading Slots (#03 and #05 Posidyne)

(#03 AND #05 Posidyne)

1. Press Bearing (#26) onto the Output Shaft (#1) using an Arbor Press.
2. Place Mating Ring (#4) onto the Output Shaft and with the special Locknut Ass'y. Tool, screw the Locknut (#15) on to the Output shaft.

NOTES:

1. Use (Loctite #271) on the threads.
2. This Locknut Ass'y. Tool is available from the Force Control factory. To order use Part No. 601-05-003.
3. Press Bearing (#28) onto the other end of the Output Shaft. Screw Locknut (#34) onto the shaft. Use Thread-Locker (Loctite #271) on the threads.

(#10 , #11 AND #14 Posidyne)

To determine if a Bearing Shim (#378) is needed for the output shaft, measure the thickness of the (2) Bearings (#26) when clamped together as shown in Figure 9.2. If the bearings measure smaller than 2.1160" for Size #10 and 1.9586" for Size #11 and #14, then a Bearing Shim (#378) will be required. If the bearings measure larger than the specified dimensions, no shim will be needed. **NOTE:** This Shim will be installed when the Bearing Retainer (#7) is attached to the housing.

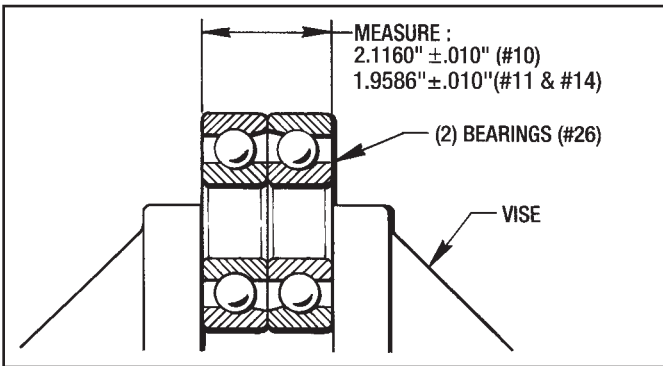


Figure 9.2 - Measuring Thickness of Bearings (#26)

(#10, #11, #14 AND #20 Posidyne)

1. Press (2) Outboard Bearings (#26) onto the Output Shaft (#1) using an Arbor Press. **NOTE:** First install Bearing Spacer (#183) for #10 Posidyne and (#288) for #20 Posidyne as shown in Figure 9.3.

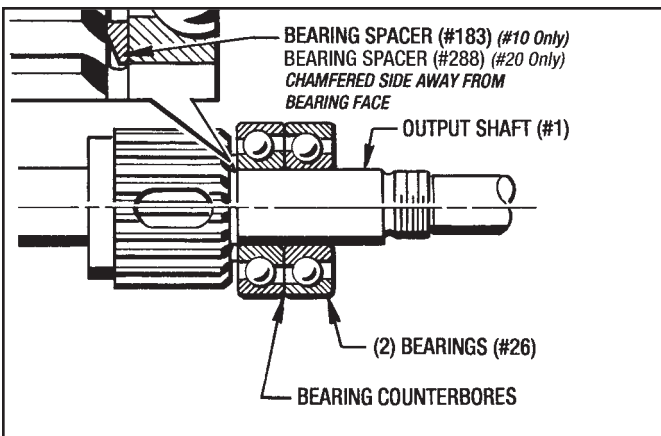


Figure 9.3 - Installing Outboard Bearings

IMPORTANT

#10, #11, #14 and #20 Posidyne Outboard Bearings (#26) must be installed with the Counterbores facing each other. (See Fig. 9.3)

(#10 Posidyne ONLY)

2. Place O-Ring (#80) onto the Output Shaft. Slide the Mating Ring (#4) onto the Output Shaft after the O-Ring. Install Locknut (#15) onto the Output Shaft (#1). Use (Loctite #271) Thread Locker on the threads. Wipe off any excess.
3. Press Bearing (#28) onto the other end of the Output Shaft. Screw Locknut (#34) onto the Output Shaft, using (Loctite #271) Thread Locker on the threads. Wipe off any excess.

(#11 AND #14 Posidyne ONLY)

2. Place Lockwasher (#155) onto the Output Shaft and screw Locknut (#15) onto the shaft. Use (Loctite #271) Thread-Locker on the threads, Wipe off any excess.
3. Press Bearing (#28) onto the other end of the Output Shaft.
4. Press Wear Sleeve (#4) onto the Output Shaft. Also use (Loctite #271) between the shaft and the sleeve. Wipe off any excess.

(#20 Posidyne ONLY)

2. Place O-Ring (#80) onto the Output Shaft.
3. Press Wear Sleeve (#250) onto the Mating Ring (#4) Use a sealant (Loctite #271) between the Wear Sleeve and Mating Ring. Wipe off any excess.
4. Place Mating Ring and Wear Sleeve (#4 and #250) onto the Output Shaft. Screw Locknut (#15) onto the Output Shaft. Use (Loctite #271) Wipe off any excess.
5. Place the Bearing Spacer (#289) on the tail end of the Output shaft. Press the Bearing (#28) on the shaft with an arbor press.
6. Install Locknut (#34) on the shaft. Use Loctite #271.

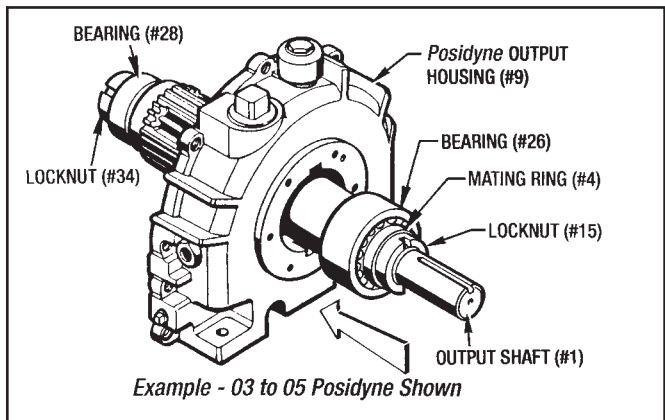


Figure 9.4 - Installing Output Shaft Sub-Assembly

9-3 OUTPUT HOUSING SUBASSEMBLY

(ALL MODELS)

1. Guide the Output Shaft Subassembly into the Output Housing (#9), as shown in *Figure 9.4*.
2. Press the Oil Seal (#31) into the Bearing Retainer (#7). Use sealant (Permatex #30) on the outside of the Oil Seal.

(#03 AND #05 Posidyne)

3. Lubricate the lip of the Oil Seal (#31) and the Mating Ring (#4) with ATF-210 oil.
4. Place the Gasket (#55) onto the Bearing Retainer (#7). Align the holes in the Gasket with the holes in the Bearing Retainer.
5. Slide the Bearing Retainer (#7), Gasket (#55) and Oil Seal (#31) onto the Output Shaft (#1), being careful not to damage the lip of the Oil Seal. Attach with (6) Screws (#63) to the Output Housing.

(#10, #11 and #14 Posidyne)

3. Lubricate and install O-Ring (#87) onto the shoulder of the Bearing Retainer (#7). On #14 Posidyne only, also install (2) O-rings (#104) into the back face of Bearing Retainer (#7).
4. Lubricate the lip of the Oil Seal (#31) and the Mating Ring (#4) with ATF-210 oil.
5. If it was determined earlier that a Shim (#378) was needed, place it into the bearing bore and slide the Bearing Retainer (#7), O-Ring (#87) and Oil Seal (#31) onto the Output Shaft (#1), being careful not to damage the lip of the Oil Seal. Attach with (6) Screws (#63) to the Output Housing.

(#20 Posidyne)

3. Lubricate and install O-Ring (#87) onto the shoulder of the Bearing Retainer (#7).
4. Lubricate the lip of the Oil Seal (#31) and the Mating Ring (#4) with ATF-210 oil.
5. Slide the Bearing Retainer (#7), O-Ring (#87) and Oil Seal (#31) onto the Output Shaft (#1), being careful not to damage the lip of the Oil Seal Lip. Attach with (6) Screws (#63) to the Output Housing.

(ALL MODELS)

6. Replace Air Breather (#45), Sight Gauge (#46) and any other plugs or fittings removed at disassembly.
7. Install Key (#181) back into the Output Shaft keyway.

9-4 PISTON HOUSING AND RETAINER SUBASSEMBLY

1. Install O-Rings (#39) and Liners (#42) into Piston Retainer (#11) and Piston Housing (#10). Lubricate O-Rings before installation.

NOTES:

1. Drive Units "A" and "B" Logic will not have an O-Ring and Liner in the Piston Housing.
2. Spring (#96) is only used for "SCP" Logic only.

IMPORTANT

Before applying (Loctite #620) to the Bearing (#27) I.D. and O.D. clean it well with (Loctite #755) cleaning solvent or equivalent.

2. Apply Sealant (Loctite #620) to the I.D. of Bearing (#27) and press it into the Thrust Plate (#5). Make sure that the Bearing is firmly seated on the Thrust Plate Shoulder.
3. Apply Sealant (Loctite #620) to the O.D. of Bearing (#27) and press the Bearing and Thrust Plate into the Piston (#3). Again, make sure that the Bearing is firmly seated against the Piston Shoulder.
4. Lubricate the (2) O-Rings (#40) and install them onto the Piston (#3).
5. Heat the Teflon Liner (#43) in an oven to 200° F. maximum and install it on the outside diameter of the Piston.
6. Place Springs (#36 and / or #96), back into the appropriate holes in the Housing or Retainer. Grease may be used to hold the Springs in their holes during assembly.
7. Insert the Piston Sub-assembly into the Piston Retainer (#10).

IMPORTANT - When placing the Piston Retainer over the Piston, be careful not to damage the Teflon Liner (#42) in the Piston Retainer and the Teflon Liner (#43) on the Piston.

8. Align Gasket (#51) on the Piston Housing, using the Dowel Pins (#68) to ensure proper alignment.
9. Assemble the Piston Retainer to the Piston Housing with (4) Screws (#62) and (4) Lockwashers (#128).

IMPORTANT - Tighten down Screws (#62) in an even manner to compress the Springs correctly.

9-5 INPUT HOUSING SUBASSEMBLY WITH MALE INPUT SHAFT

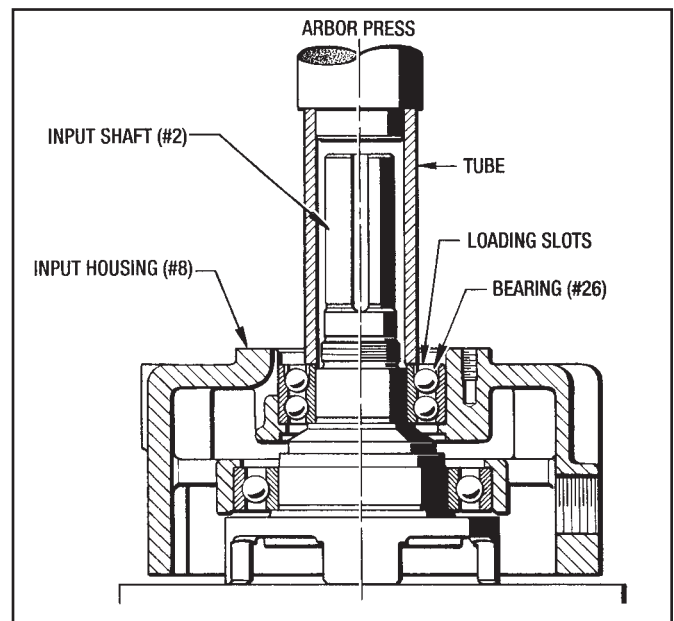


Figure 9.5 - Pressing Bearing (#26) into Input housing

(ALL MODELS)

1. Press Bearing (#27 or #35) onto the Input Shaft (#2).
2. Insert the Input Shaft (#2) into the rear of the Input Housing (#8) until the Bearing (#27 or #35) seats in the bearing bore.
3. Set the Input Housing Subassembly into an Arbor Press as shown in *Figure 9.5*. Using an appropriate size tube, press on the inner race of Bearing (#26) until it bottoms out. **(Do not press on the bearing cage of the outer race)**
4. Apply a thin coat of Sealant (Permatex #3) to the oil seal bore in the Bearing Retainer (#7) and press the Oil Seal (#31) into the Bearing Retainer (#7).

(#03 AND #05 Posidyne)

5. Press the Wear Sleeve (#4) onto the Input Shaft. Screw Locknut (#15) onto the Input Shaft. Use Thread-Locker (Loctite #271) on the threads. Be sure to wipe off any excess.
6. Place the Gasket (#55) on to the Bearing Retainer (#7). Align the holes in the gasket with the holes in the bearing retainer.
7. Place tape over the keyway and then slide the Bearing Retainer (#7) over the shaft, being careful not to damage the lip of the Oil Seal (#31). Attach the Bearing Retainer with (6) Screws (#63).

(#10 Posidyne ONLY)

5. Lubricate the O-Ring (#80) and place it on the Input Shaft. Slide Mating Ring (#4) onto the Input Shaft after the O-Ring (#80). Screw the Locknut (#15) onto the Input Shaft, using Thread-Locker (Loctite #271) on the threads. Wipe off any excess.
6. Lubricate the O-Ring (#87) and place it on the Bearing Retainer Shoulder.
7. Place tape over the keyway and slide the Bearing Retainer (#7) over the Input Shaft, being careful not to damage the lip of the Oil Seal (#31). Attach the Bearing Retainer with (6) Screws (#63).

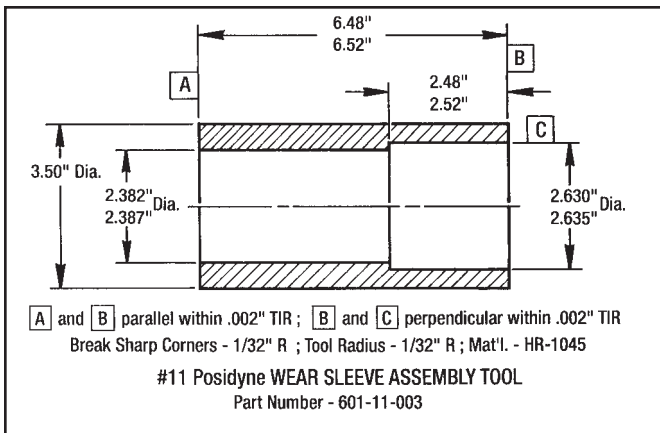


Figure 9.6 - Wear Sleeve Assembly Tool (#11 & #14 Posidyne)

(#11 AND #14 Posidyne ONLY)

5. Place the Lockwasher (#155) and the Locknut (#15) on to the Input Shaft (#2). Tighten the Locknut. Use (Loctite #271) on the threads. Wipe off any excess.

A special Wear Sleeve Assembly Tool must be used to install the Wear Sleeve (#4) onto the Input Shaft. This Tool can be ordered from Force Control by using Part Number 601-11-003. Machining Dimensions are given in *Figure 9.6* if you prefer to make your own.

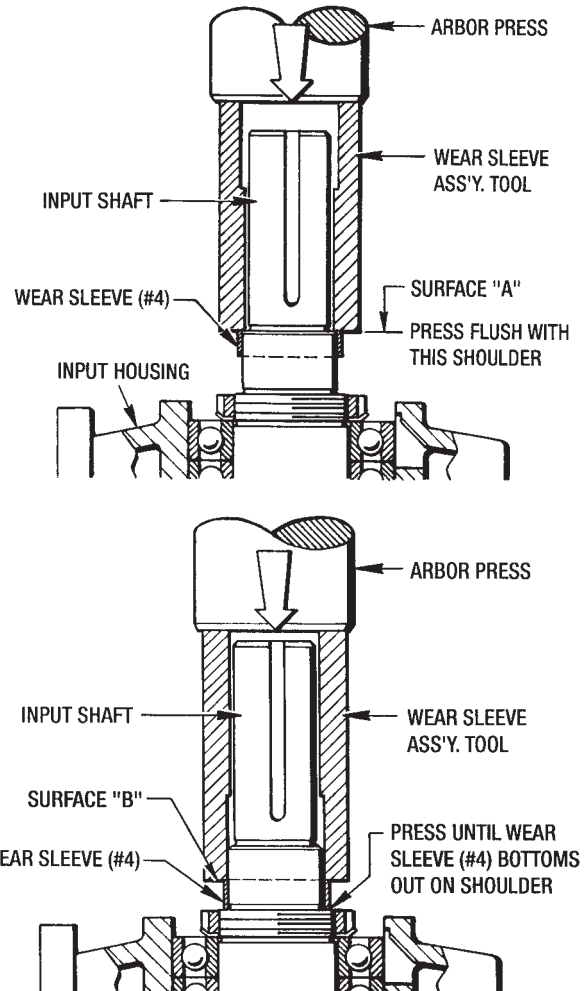


Figure 9.7 - Installing Wear Sleeve (#4)

6. Place the Input Housing and Input Shaft into an arbor press. Using Surface "A" of the Ass'y. Tool, press the Wear Sleeve (#4) until it is flush with the input shaft shoulder (*See Figure 9.7 Step 1*). Turn the Tool around and proceed to press the Wear Sleeve (#4) completely onto the shaft until it bottoms out on the next shaft shoulder. (*See Figure 9.7 Step 2*).
7. Lubricate the O-Ring (#87) and place it on the Bearing Retainer shoulder.
8. Place tape over the keyway and slide the Bearing Retainer (#7) over the Input Shaft, being careful not to damage the lip of the Oil Seal (#31). Attach the Bearing Retainer with (6) Screws (#63).

(#20 Posidyne ONLY)

5. Lubricate O-Ring (#80) and install it on the Input Shaft (#2).

A special Wear Sleeve Assembly Tool must be used to install the Wear Sleeve (#250) onto the Mating Ring (#4). This Tool can be ordered from Force Control by using Part Number 601-20-011. Machining Dimensions are also given in Figure 9.8 if you prefer to make your own.

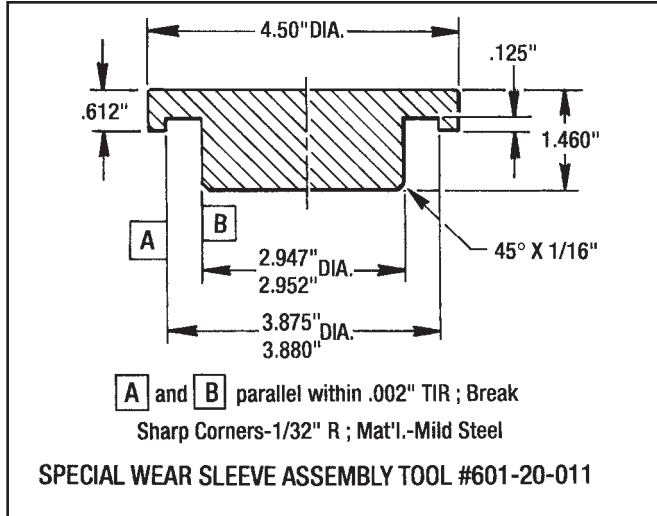


Figure 9.8 - Wear Sleeve Assembly Tool (#20 Posidyne)

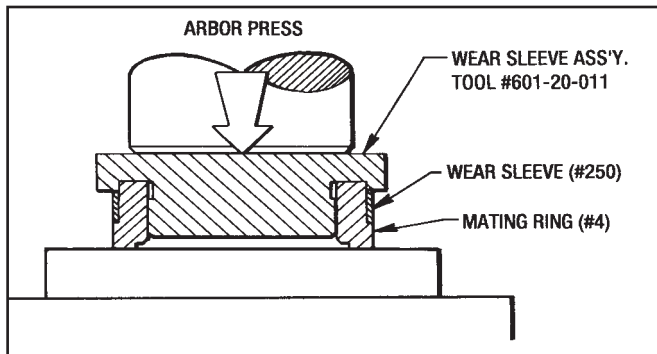


Figure 9.9 - Installing Wear Sleeve (#250) on Mating Ring (#4)

6. Apply Sealant (Loctite #271) on the I.D. of the Wear Sleeve (#250) and press the Wear Sleeve (#250) onto the Mating Ring (#4). (See Figure 9.9).
7. Slide Wear Sleeve / Mating Ring Subassembly onto the Input Shaft.
8. Place tape over the keyway and slide the Bearing Retainer (#7) over the Input Shaft, being careful not to damage the lip of the Oil Seal (#31). Attach the Bearing Retainer with (6) Screws (#63).

9-6 MEASURING AND CONTROLLING STACK HEIGHT DIMENSIONS

(Does Not Apply to SCP Logic)

To assure correct piston travel, the following steps must be done when replacing the Clutch and Brake Stacks.

1. Based on the parts list, place the total number of Friction Discs and Drive Plates in an arbor press as shown in Figure 9.10.

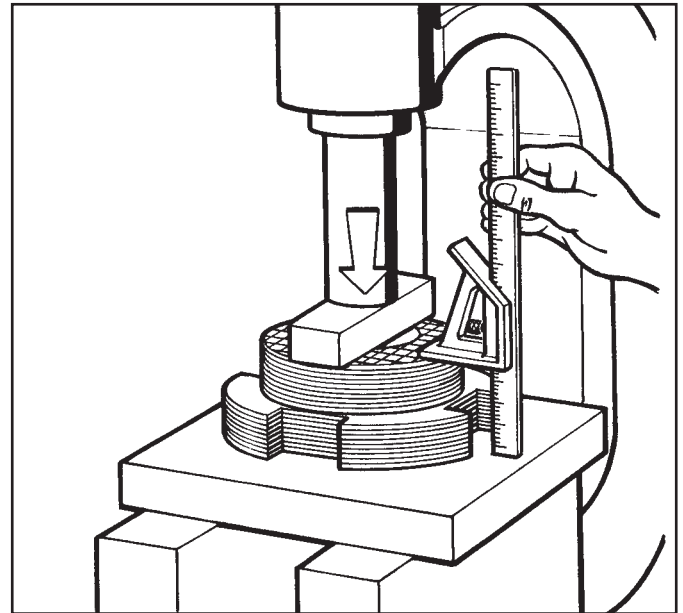


Figure 9.10 - Measuring Stack Height

STACK HEIGHT TABLE

SIZE	MIN. (Nearest Fraction)
03S	1.735 (1-47/64)
03SA, A, B	1.899 (1-29/32)
05S	3.120 (3-1/8)
05SA, A, B	3.284 (3-9/32)
10	3.287 (3-9/32)
11	3.537 (3-17/32)
14	4.908 (4-29/32)
20	N/A

2. Clamp firmly and measure the Stack Height
3. Compare the measurement with the tabulated values (See Stack Height Table) and, if necessary, add Stack Shim Plate(s) (#380 and/or #381) to bring the stack above Minimum Height

NOTE:

Always add the extra Stack Shim Plate(s) to the stack side away from the piston. Add 1st. extra Stack Shim Plate to clutch stack and add 2nd. extra Stack Shim Plate to the brake stack.

9-7 REASSEMBLY OF MAJOR SUBASSEMBLIES AND CLUTCH / BRAKE STACKS (See Assembly Dwg)

1. Place the Output Housing in such a position that the key end of the Output Shaft is down and the Housing is on a stable flat surface.

2. Install the Brake Stack onto the Output Shaft Spline, starting with a Drive Plate (#13) and then a Friction Disc (#12), ending with a Drive Plate. Align the notches in the Drive Plate with the lugs on the Piston Retainer and align the internal teeth in the Friction Discs with the teeth on the Output Shaft Spline.
3. Align Gasket (#53) onto the Output Housing (#9) using the dowel pin holes for proper alignment.
4. Lower the Piston Housing Subassembly onto the Output Housing, aligning the lugs with the slots in the Drive Plates. Press the Piston Housing until the Dowel Pins (#68) engage the Output Housing. Check the Gasket (#53) to see if it is still properly aligned.
5. Lay the Piston Housing and Output Housing Subassembly over until the Pilot Bearing (#38) rests on the table.
6. Use (11) Screws (#69) and (11) Lockwashers (#127) to attach the Piston Housing to the Output Housing. Use Thread-Locker (Loctite #271) on the threads. Wipe off any excess.
7. Stand the Piston Housing and Output Housing Subassembly back on the Output Housing with the Output Shaft down.
8. Install the Clutch Stack onto the Output Shaft Spline, starting with a Drive Plate (#13) and then a Friction Disc (#12), ending with a Drive Plate. Align the notches in the Drive Plate with the notches in the Clutch Thrust Plate (#5) and align the internal teeth in the Friction Discs with the teeth on the Output Shaft Spline.
9. Align Gasket (#53) onto the Piston Housing (#10) using the Dowel Pins (#68) for proper alignment.
10. Lower the Input Housing Subassembly onto the Piston Housing, aligning the lugs on the Input Shaft (#2) with the slots in the Drive Plates (#13) and Clutch Thrust Plate (#5). Press the Input Housing down until the Dowel Pins (#68) engage the Input Housing. Check the Gasket (#53) to see if it is still properly aligned.
11. Use Screws (#69) and Lockwashers (#127) to attach the Input Housing, Piston Housing and Output Housing together. Use Thread-Locker (Loctite #271) on the screw threads. Wipe off any excess.
12. If your Drive Unit had a Male Input Shaft and is not equipped with Fan Cooling, then replace the Key (#180) into the Input Shaft.

This completes the Reassembly Procedure for the Major Subassemblies. Before proceeding any further, an OPERATIONAL CHECK of the Clutch and Brake Movement should be made. Apply 60 to 80 PSI to the Clutch and Brake Ports, as indicated in **Section 5 - OPERATIONAL CHECKS**, and observe the piston movement through the inspection ports.

9-8 MEASURING PISTON STROKE (Does Not Apply to SCP Logic)

After the unit has been completely assembled, set the unit upright on a table and apply 60 PSI air to the Clutch Port.

To measure the Piston Stroke a Gap Tool, as shown in *Figure*

9.11, must be used. To order this Gap Tool from the Force Control factory use the following Part Numbers:

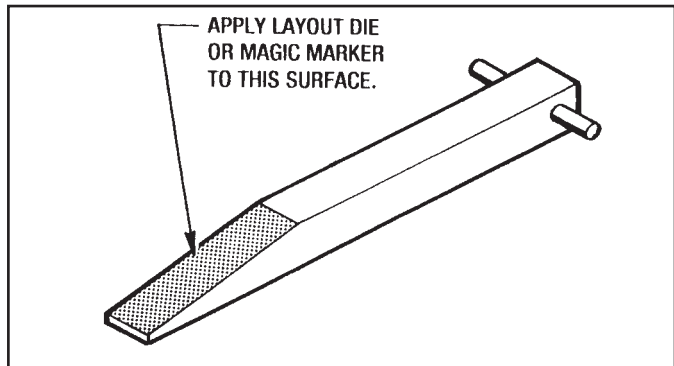


Figure 9.11 - Gap Tool

Size #03, #05 and #10(Part No. 601-03-011)
Size #11, #14 and #20(Part No. 601-11-001)

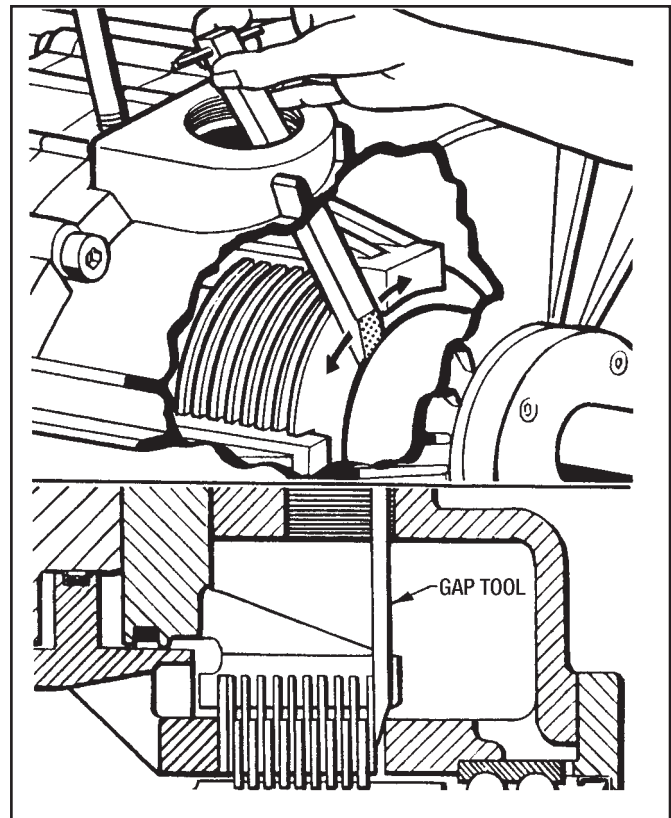


Figure 9.12 - Inserting Gap Tool

(#03, #05, #10 and #20 Posidyne)

2. Remove the Sq. Hd. Pipe Plug (#14) from the top of the Output Housing.

(#11 AND #14 Posidyne ONLY)

2. Remove the Air Breather (#45) and the Special Reducer Fitting (#216) from the top of the Output Housing.

(ALL MODELS)

3. Apply machinists fast drying layout die or (use a black magic marker) to the sloping surface of the Gap Tool as shown in Figure 9.11.
4. Firmly insert the Gap Tool through the inspection port above the Brake Stack so that any slack is removed from the Brake Stack. **NOTE:** The straight side of the Gap Tool is towards the Brake Stack. (See Figure 9.12)
5. The solid shoulder will scrape the bluing off the Gap Tool as shown in Figure 9.13. To get an accurate measurement, slightly push the Gap Tool side to side when it is firmly inserted. (This will remove the bluing in a straight line rather than an arc.)

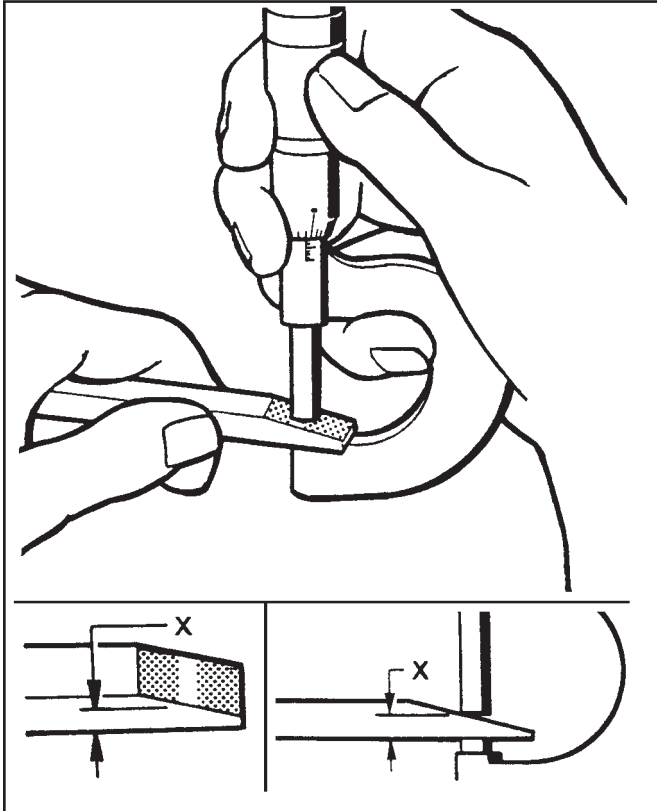


Figure 9.13 - Measuring Piston Stroke

6. Measure distance "X" with a micrometer as shown in Figure 9.13. Compare the measurement with the tabulated limits shown in the Piston Stroke Table on the next page.

PISTON STROKE TABLE

SIZE	"X" MIN.	"X" MAX.
03	.070"	.135"
05	.085"	.150"
10, 11, 14	.100"	.190"
20	.100"	.230"

9-9 FAN AND FAN SHROUD INSTALLATION

(#11 AND #14 Posidyne ONLY)

1. Place Spacer (#183) on the Input Shaft (#2).

(ALL MODELS)

2. Install Key (#37) on the Input Shaft (#2).
3. Place Fan (#25) on the Input Shaft and tighten Set Screw (#70).
4. Place the Fan Shroud (#24) into place and attach with (2) Screws (#66) from the front of the Shroud.
5. Install Key (#180) into the Input Shaft.

(#03, #10, #11, #14 AND #20 Posidyne)

6. Clamp the Fan Shroud with Nuts (#86)

(#05 Posidyne ONLY)

6. Attach Fan Shroud with (2) Screws (#67) and (2) Washers (#182) on both sides of the Shroud.

9-10 ATTACHING C-FACE MOUNTED MOTOR

1. Attach an appropriate soft sling or lifting hook to the Drive Motor, and, with care, slide the motor shaft into the Quill Input Shaft, making sure the key in the motor shaft aligns with the keyway in the Input Shaft.

CAUTION

Be very careful not to bump the Input Shaft. This could damage the Bearings and the lip of the Oil Seals.

2. Attach the Drive Motor with (4) Screws (#216) and (4) Lockwashers (#202).

9-11 INSTALLING BELT DRIVEN SHEAVE OR PULLEY (Male Input Shaft Only)

1. Install Guard Back Plate if necessary.
2. Assemble the Taper Lock Bushing and the Drive Sheaves or Pulley with the (2) Set Screws placed in the (2) Locking Holes.

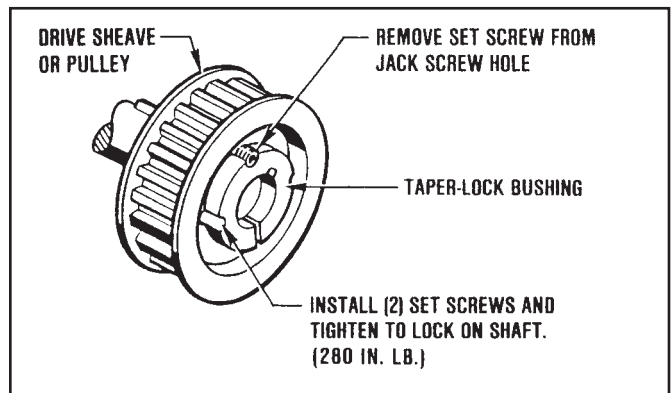


Figure 9.14 - Installing Pulley with Taper Lock Bushing

3. Place assembled Drive Sheave or Pulley onto the Male Input Shaft as close as possible to the Drive Unit to minimize overhang shaft deflection. Tighten (2) Set Screws to lock it on the Input Shaft. (See Figure 9.14)

9-12 REASSEMBLY and INSTALLATION of DIFFERENTIAL LINE DRIVER ENCODER (Optical Encoder)

(See Figure 10.1)

1. Install Key (#234), then slide the Optical Disc Assembly (#186) onto the output shaft, butting it up against the Locknut (#15). (See Figure 9.15)

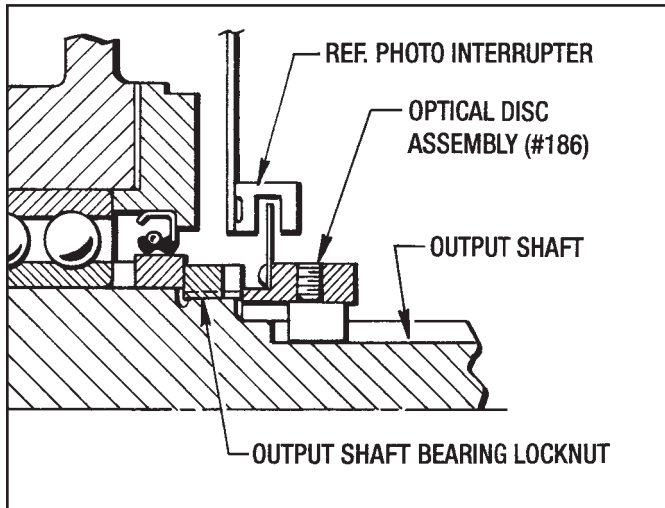


Figure 9.15 - Optical Disc and Hub Positioning

NOTE: On size 11 and 14 *Posidyne* the Optical Disc Assembly (#186) will butt up against the output shaft shoulder.

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).

NOTE: There is also (4) Lockwashers (#32) on sizes 10, 11 and 20.

6. Place the Gasket (#19) on top of the Disc Housing.

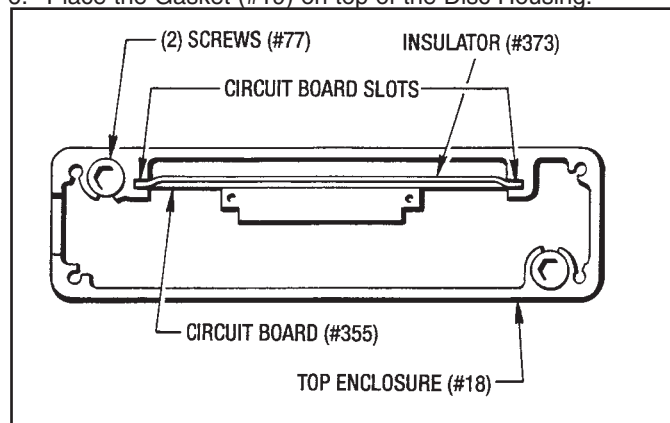


Figure 9.16 - Circuit Board Slots

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 9.15 and 9.16)
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 9.16)
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 9.16)

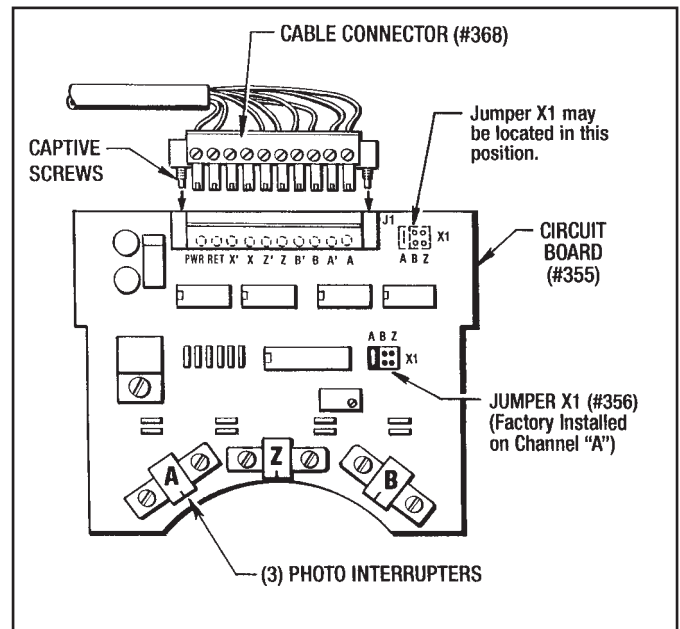


Figure 9.17 - Circuit Board Connector

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 9.17)
12. Place the top Gasket (#19) on the Upper Enclosure and attach the Top Cover (#372) with (4) Screws (#225).

9-13 FINAL REASSEMBLY

1. Replace all Pipe Plugs and Fittings removed for Inspection
2. Fill the *Posidyne* Clutch/Brake 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.

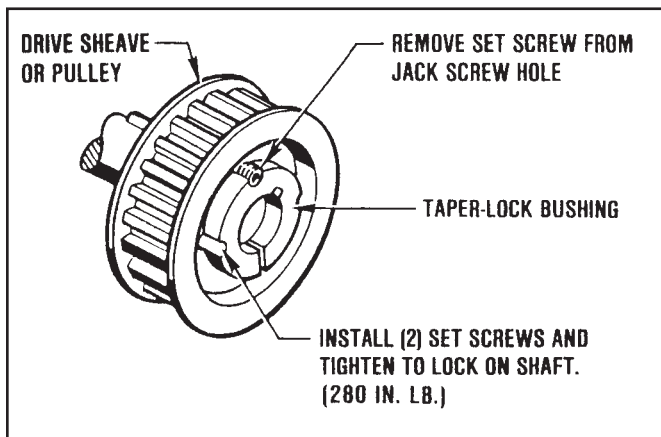


Figure 9.18 - Installing Pulley With Taper Lock

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.

Section 10

ILLUSTRATED PARTS LIST

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

Force Control Industries, Inc.	
Fairfield, Ohio	
	For Service/Parts Call
513-868-0900	
Posidyne® Clutch/Brake	
Model No.	<input style="width: 100%;" type="text"/>
Serial No.	<input style="width: 100%;" type="text"/>
Use Mobil® ATF 210	

Repair Parts List - Figure 10.1
DIFFERENTIAL LINE DRIVER OPTICAL ENCODER (Optical)

REF No.	PART NAME	QTY.	REF. No.	PART NAME	QTY.
17	Disc Housing.....	1	225	Button Hd. Screw.....	4
18	Upper Enclosure.....	1	234	Key.....	1
*19	Gasket.....	2	259	Cable.....	1
32	Lockwasher (10, 11, 14 and 20 Only).....	4	260	Cable Grommet.....	1
76	Soc. Hd. Cap Screw.....	4	*269	Dirt Seal.....	1
77	Soc. Hd. Cap Screw.....	2	355	Circuit Board.....	1
154	Set Screw.....	1	356	Jumper.....	1
184	Dowel Pin (10, 11, 14 and 20 Only).....	2	368	Cable Connector.....	1
186	Optical Disc Assembly.....	1	372	Top Cover.....	1
218	Roll Pin.....	2	373	Insulator.....	1

* - Indicates parts in the Minor Overhaul Kit.

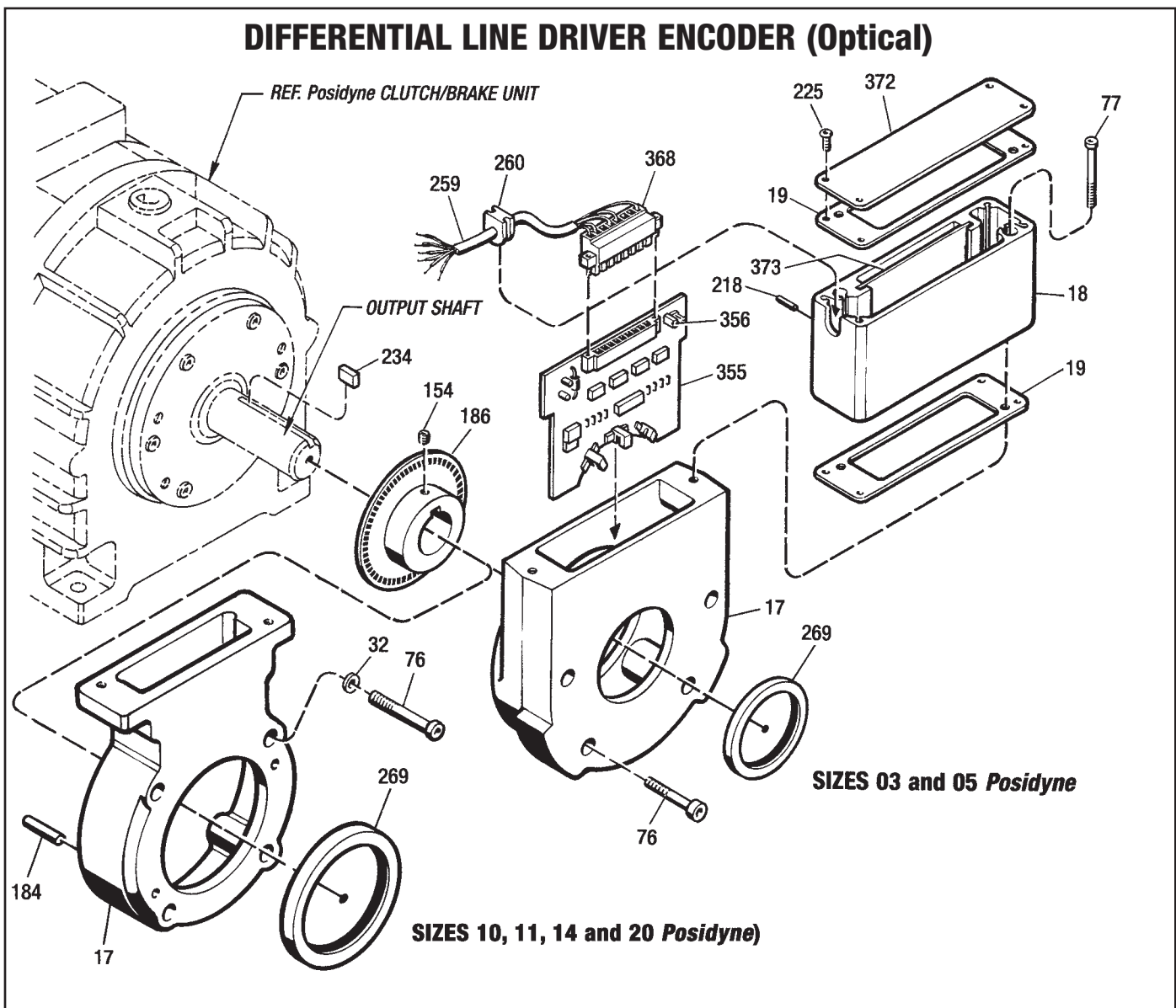
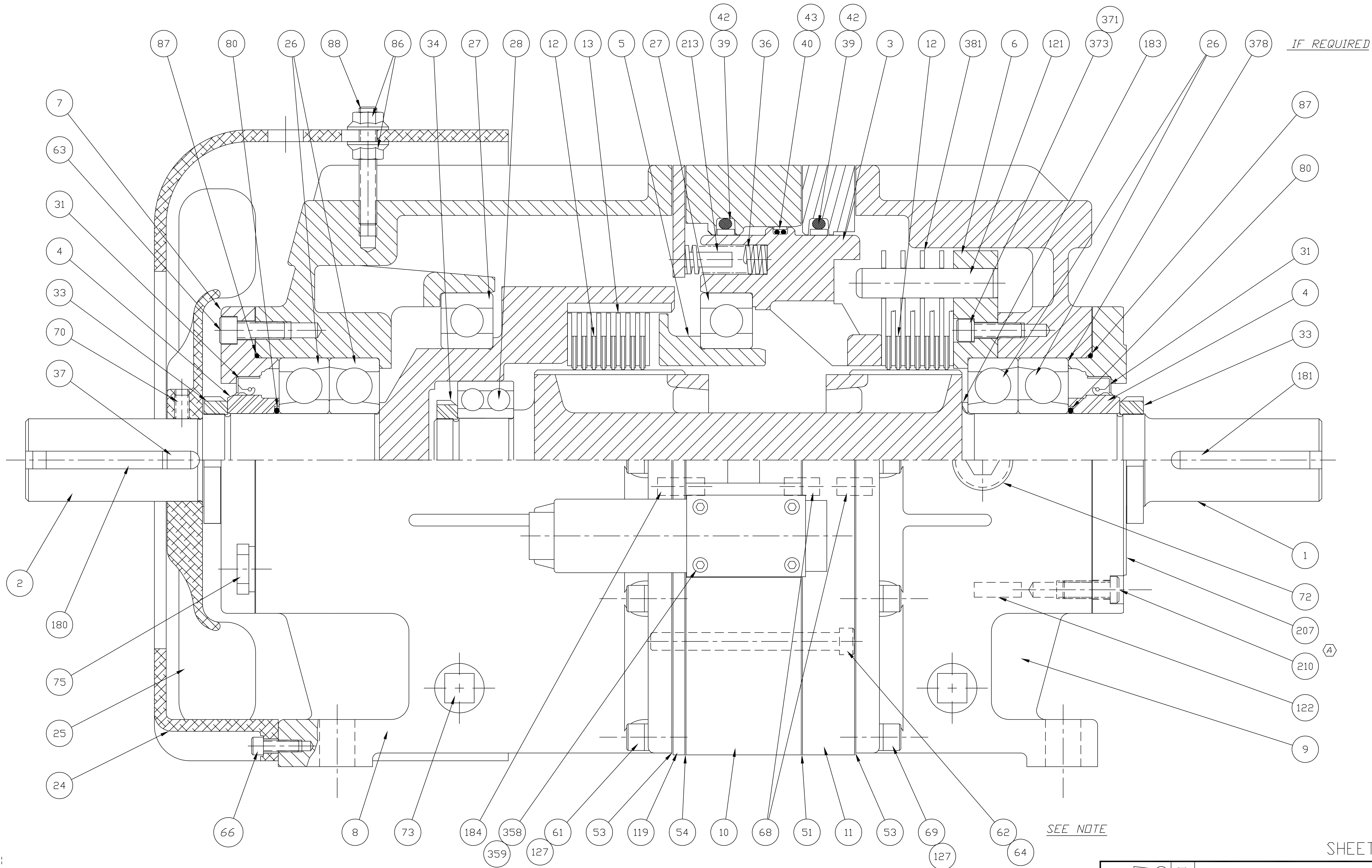


Figure 10.1 - Differential Line Driver Encoder (Optical)



IF REQUIRED

SEE NOTE

NOTE:
 TO ASSEMBLE REF. #10, 11, 51, 54 & 119
 BOLT TOGETHER WITH #62 AND REPLACE
 ONE AT A TIME WITH #64.

SHEET 1 OF 2

45-10-426-07

3 PLACE DECIMAL X.XXX ±0.005									
2 PLACE DECIMAL X.XX ±0.01									
1 PLACE DECIMAL X.X ±0.10									
ANGLES ±1°									
MACHINING TOLERANCE EXCEPT AS NOTED	1577	△	—	6-27-06	M.G.	ADDED BALLOON #'S FOR ITEMS 207 & 210			
ECO#	LETTER	REVISION	DATE	BY	DESCRIPTION				

PROPRIETARY INFORMATION
 THE INFORMATION CONTAINED IN
 THIS DRAWING IS AND REMAINS
 THE PROPERTY OF FORCE CON-
 TROL INDUSTRIES, INC. AND RE-
 CEIPT OR POSSESSION OF THIS
 DOCUMENT CONFERS OR TRANS-
 FERS NO RIGHT IN OR LICENSE
 TO USE OR TO DISCLOSE TO
 OTHERS FOR ANY PURPOSE THE
 INFORMATION HEREIN

PROJECTION	DWG. NO.	TITLE	ASSEMBLY
		#10 ELECTRO-HYDRAULIC	
MATERIAL SPECIFICATIONS	USED ON	DR.	BACHMANN 02/23/06
		CHK.	D.W.L. 02/28/06
SCALE	ENG.		
1 = 1	APP'D.	J.K.M.	02/28/06

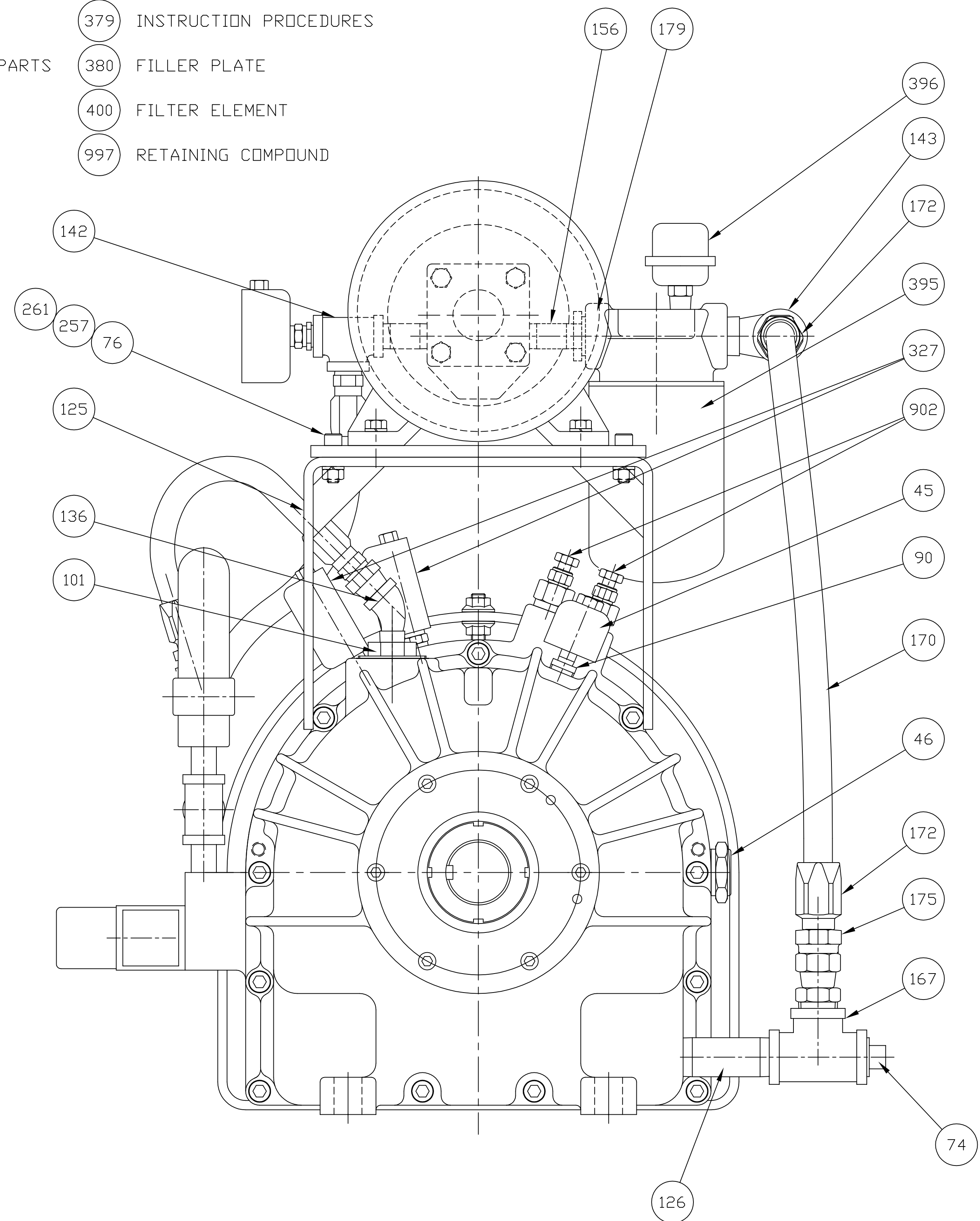
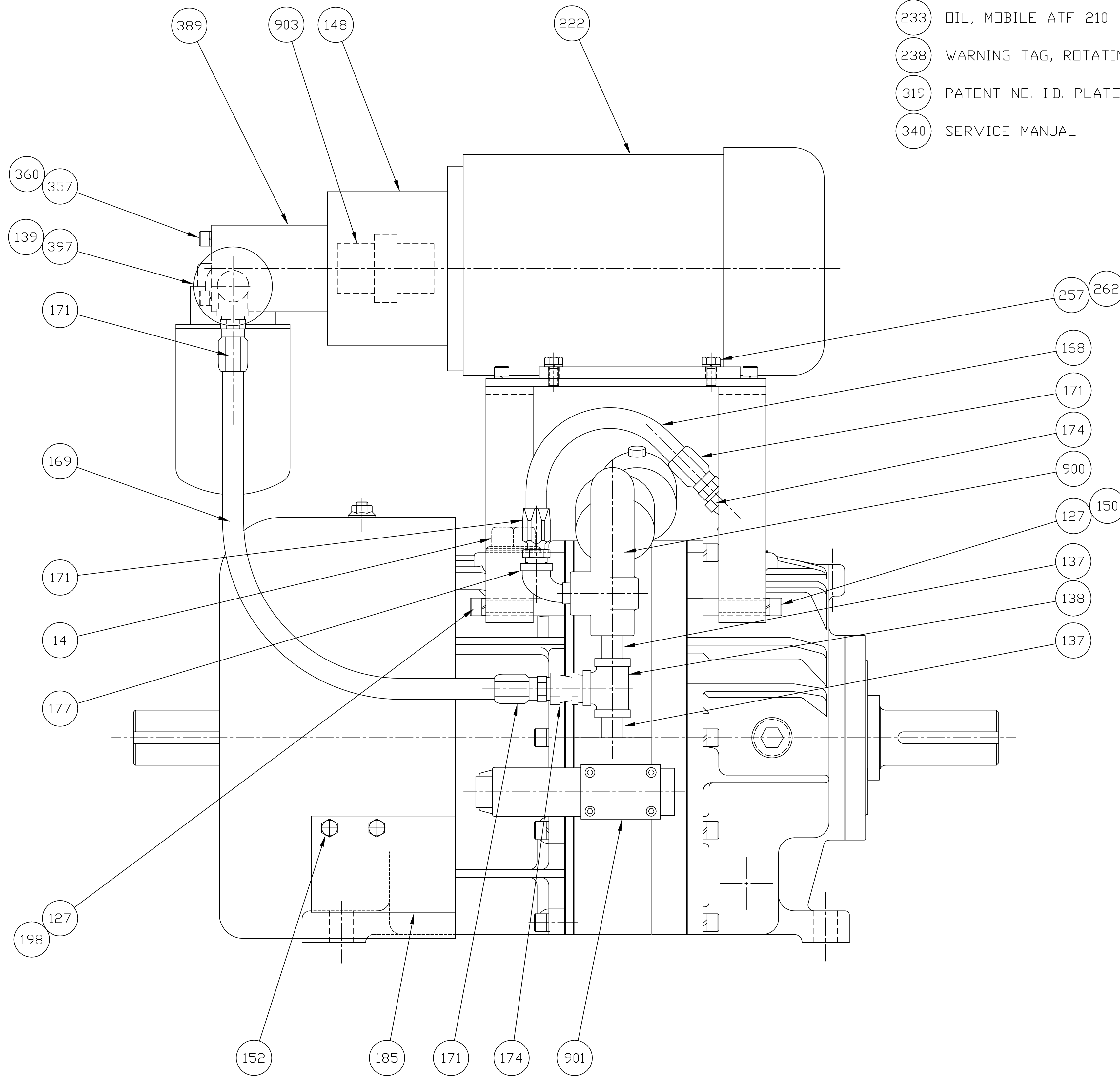


FORCE CONTROL INDUSTRIES, INC.
 3660 DIXIE HIGHWAY
 FAIRFIELD, OHIO 45014

1 2 3 4 5 6 7

NOT SHOWN:

- (230) THREADLOCKER
- (231) NAME TAG, POSIDYNE
- (233) OIL, MOBILE ATF 210
- (238) WARNING TAG, ROTATING PARTS
- (319) PATENT NO. I.D. PLATE
- (340) SERVICE MANUAL
- (343) PIPE PLUG C' SUNK 1/4 NPT
- (370) SSS 3/8-16 x 1/2 FLAT POINT
- (379) INSTRUCTION PROCEDURES
- (380) FILLER PLATE
- (400) FILTER ELEMENT
- (997) RETAINING COMPOUND



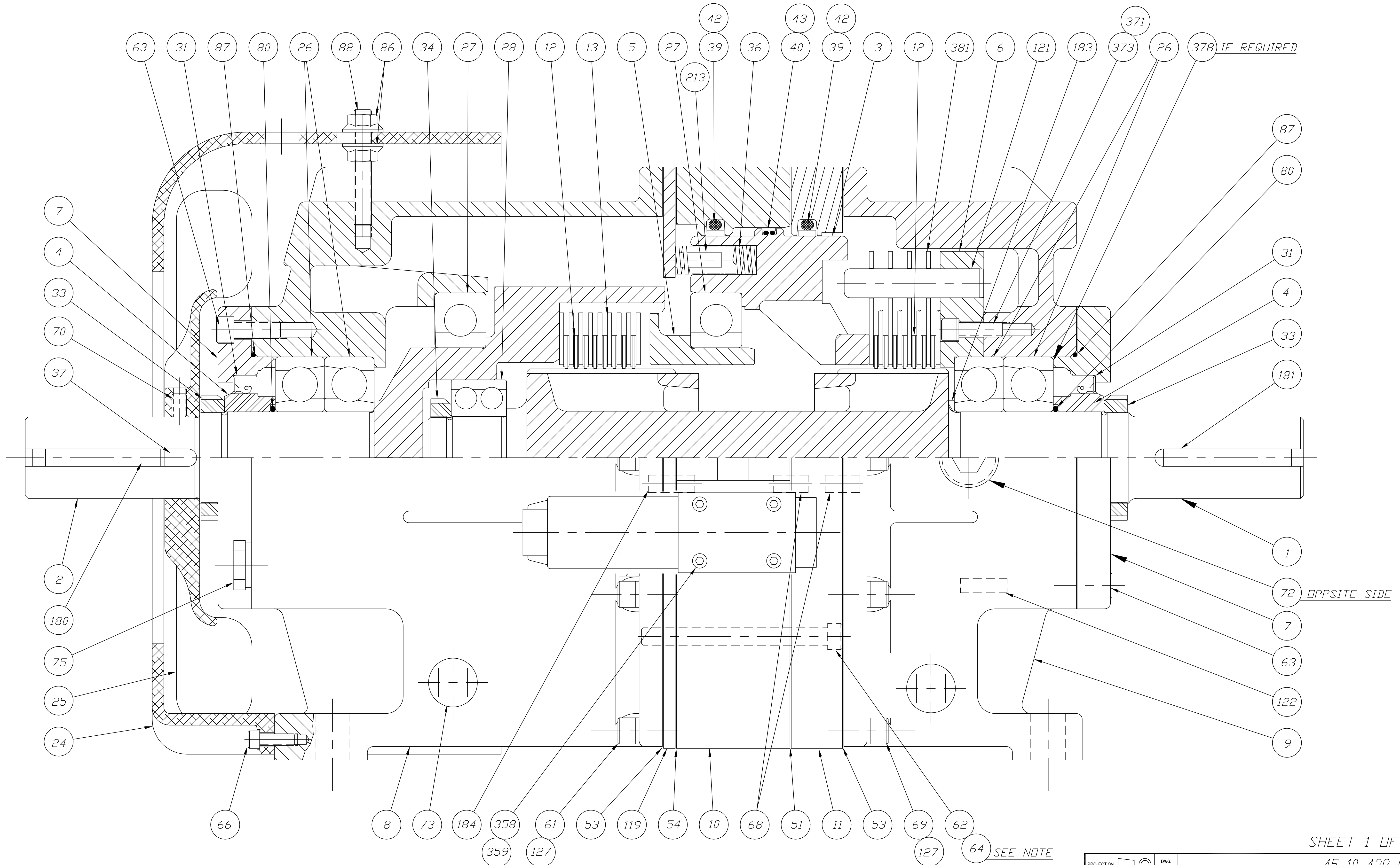
SHEET 2 OF 2

3 PLACE DECIMAL X.XXX ±0.005									
2 PLACE DECIMAL X.XX ±0.01									
1 PLACE DECIMAL X.X ±0.10									
ANGLES ±1°									
MACHINING TOLERANCE EXCEPT AS NOTED									
ECO#	LETTER	REVISION	DATE	BY					DESCRIPTION

PROPRIETARY INFORMATION
 THE INFORMATION CONTAINED IN THIS DRAWING IS AND REMAINS THE PROPERTY OF FORCE CONTROL INDUSTRIES, INC. AND RECEIPT OR POSSESSION OF THIS DOCUMENT CONFERS OR TRANSFERS NO RIGHT IN OR LICENSE TO USE OR TO DISCLOSE TO OTHERS FOR ANY PURPOSE THE INFORMATION HEREIN

PROJECTION	DWG. NO.	45-10-426-07	
MATERIAL SPECIFICATIONS	TITLE	ASSEMBLY	
	USED ON	#10 ELECTRO-HYDRAULIC	
	DR.	BACHMANN	02/23/06
	CHK.	D.W.L.	02/28/06
	ENG.		
	APP'D.	J.K.M.	02/28/06

FORCE CONTROL INDUSTRIES, INC.
 3660 DIXIE HIGHWAY
 FAIRFIELD, OHIO 45014



NOTE:

TO ASSEMBLE REF. #10, 11, 51, 54 & 119
BOLT TOGETHER WITH #62 AND REPLACE
ONE AT A TIME WITH #64.

3 PLACE DECIMAL X.XXX ±0.005							
2 PLACE DECIMAL X.XX ±0.01							
1 PLACE DECIMAL X.X ±0.10							
ANGLES ±1°							
MACHINING TOLERANCE EXCEPT AS NOTED	1961	△	—	7/17/08	M.G.	ADDED BALLON #'S 173 & 175	
	ECO#	LETTER	REVISION	DATE	BY	DESCRIPTION	

PROPRIETARY INFORMATION
THE INFORMATION CONTAINED IN
THIS DRAWING IS AND REMAINS
THE PROPERTY OF FORCE CON-
TROL INDUSTRIES, INC. AND RE-
CEIPT OR POSSESSION OF THIS
DOCUMENT CONFERS OR TRANS-
FERS NO RIGHT IN OR LICENSE
TO USE OR TO DISCLOSE TO
OTHERS FOR ANY PURPOSE THE
INFORMATION HEREIN

PROJECTION	DWG. NO.	45-10-428-07
MATERIAL SPECIFICATIONS	TITLE	ASSEMBLY
	USED ON	#10 ELEC/HYD. POSIDYNE
	DR.	M.GODBY 01/31/08
	CHK.	D.W.L. 02/06/08
SCALE	ENG.	
FULL	APP'D.	B.C.H. 02/08/08

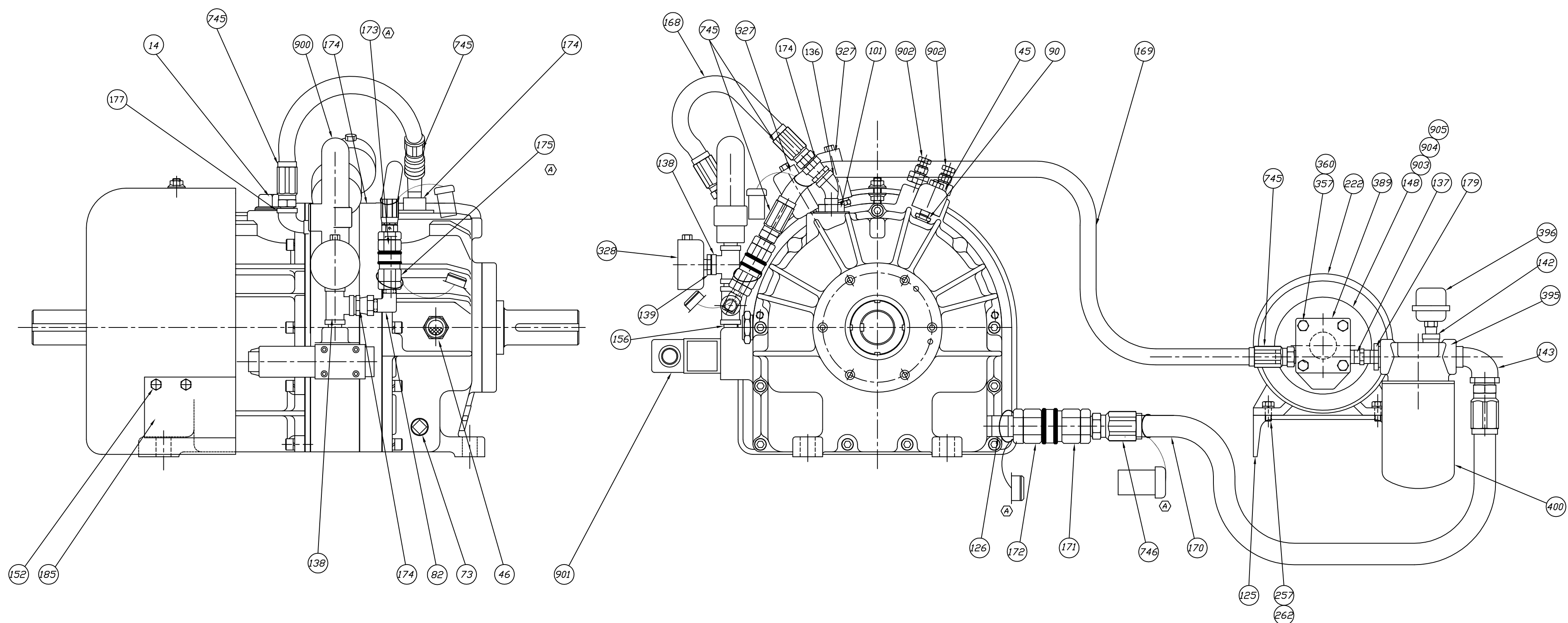
SHEET 1 OF 2



FORCE CONTROL INDUSTRIES, INC.
3660 DIXIE HIGHWAY
FAIRFIELD, OHIO 45014

NOT SHOWN:

- (230) THREADLOCKER
- (231) NAME TAG, POSIDYNE
- (233) OIL, MOBILE ATF 210
- (238) WARNING TAG, ROTATING PARTS
- (319) PATENT NO. I.D. PLATE
- (340) SERVICE MANUAL
- (343) PIPE PLUG C' SUNK 1/4 NPT
- (370) SSS 3/8-16 x 1/2 FLAT POINT
- (379) INSTRUCTION PROCEDURES
- (997) RETAINING COMPOUND



SHEET 2 OF 2
45-10-428-07

3 PLACE DECIMAL X.XXX ±0.005						
2 PLACE DECIMAL X.XX ±0.01						
1 PLACE DECIMAL X.X ±0.1						
ANGLES ±1°						
MACHINING TOLERANCE EXCEPT AS NOTED	1961	A	—	7/17/08	M.G.	ADDED BALLON #'S 173 & 175, DRAW IN DUST COVERS, REMOVED ITEM # 132
	ECO#	LETTER	REVISION	DATE	BY	DESCRIPTION

PROPRIETARY INFORMATION
THE INFORMATION CONTAINED IN THIS DRAWING IS AND REMAINS THE PROPERTY OF FORCE CONTROL INDUSTRIES, INC. AND RECEIPT OR POSSESSION OF THIS DOCUMENT CONFERS OR TRANSFERS NO RIGHT IN OR LICENSE TO USE OR TO DISCLOSE TO OTHERS FOR ANY PURPOSE THE INFORMATION HEREIN

PROJECTION		DWG. NO.	
MATERIAL SPECIFICATIONS		TITLE	ASSEMBLY
		USED ON	#10 ELEC/HYD. POSIDYNE
		DR.	M.GODBY 01/31/08
		CHK.	D.W.L. 02/06/08
		ENG.	
SCALE	1 = 4	APP'D.	B.C.H. 02/08/08

FORCE CONTROL INDUSTRIES, INC.
3660 DIXIE HIGHWAY
FAIRFIELD, OHIO 45014

Manual Revision & Printing History

EH Posidyne Clutch/Brake Drives

REVISION NUMBER	REVISION DATE <i>(Mo./Yr.)</i>	PRINTING DATE <i>(Mo./Yr.)</i>	REVISION/ACTION DESCRIPTION	REVISION INITIATED BY: <i>(Name)</i>	REVISION MADE BY: <i>(Name)</i>
502-EH-03/20-001	5/09	-----	New Manual	-----	-----
	-----	-----		-----	-----

FORCE CONTROL INDUSTRIES, Inc.

*Providing today's industries
with Oil Shear Clutch and
Brake Drives that deliver ...*

- *Flexibility • Efficiency*
- *Endurance • Performance*
and • Dependability.

" Built to Last - Guaranteed to Perform "



FORCE CONTROL INDUSTRIES, Inc.

3660 Dixie Highway
Fairfield, Ohio 45014

Tel: (513)868-0900
Fax: (513)868-2105

E-Mail: info@forcecontrol.com
Web: www.forcecontrol.com