SERVICE MANUAL
AND
REPAIR PARTS
FOR
Size EH-03 to 20 Posidyne®
Electro/Hydraulic
CLUTCH/BRAKE DRIVES

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

FORCE CONTROL INDUSTRIES, INC.
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 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 manufacturers. 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
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

<table>
<thead>
<tr>
<th>Size</th>
<th>Logic</th>
<th>Required Torque (Lb. In.)</th>
<th>Clutch (Lb. In.)</th>
<th>Brake (Lb. In.)</th>
<th>Clutch</th>
<th>Brake</th>
<th>System</th>
<th>Max. Clutch</th>
<th>Max. Brake</th>
<th>Max. System</th>
<th>Oil Level In Sight Gauge</th>
<th>Oil Cap. (Qt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>03</td>
<td>S</td>
<td>1400</td>
<td>1200</td>
<td></td>
<td>145</td>
<td>130</td>
<td>195</td>
<td>245</td>
<td>240</td>
<td>295</td>
<td>AT SHAFT CENTER LINE</td>
<td>1&quot;</td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>1600</td>
<td>1400</td>
<td></td>
<td>165</td>
<td>155</td>
<td>215</td>
<td>245</td>
<td>240</td>
<td>295</td>
<td>1-1/2&quot; ABOVE SHAFT CENTER LINE</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>1800</td>
<td>1600</td>
<td></td>
<td>180</td>
<td>180</td>
<td>230</td>
<td>245</td>
<td>240</td>
<td>295</td>
<td>1-1/2&quot; ABOVE SHAFT CENTER LINE</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>2000</td>
<td>1800</td>
<td></td>
<td>210</td>
<td>120</td>
<td>260</td>
<td>245</td>
<td>240</td>
<td>295</td>
<td>1-1/2&quot; ABOVE SHAFT CENTER LINE</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>2000</td>
<td>2000</td>
<td></td>
<td>225</td>
<td>140</td>
<td>275</td>
<td>290</td>
<td>185</td>
<td>340</td>
<td>1-1/2&quot; ABOVE SHAFT CENTER LINE</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>2000</td>
<td>2000</td>
<td></td>
<td>240</td>
<td>160</td>
<td>290</td>
<td>290</td>
<td>185</td>
<td>340</td>
<td>1-1/2&quot; ABOVE SHAFT CENTER LINE</td>
<td>3.5</td>
</tr>
<tr>
<td>05</td>
<td>S</td>
<td>2400</td>
<td>2200</td>
<td></td>
<td>150</td>
<td>125</td>
<td>200</td>
<td>245</td>
<td>240</td>
<td>295</td>
<td>1&quot; ABOVE SHAFT CENTER LINE</td>
<td>1&quot;</td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>2600</td>
<td>2400</td>
<td></td>
<td>210</td>
<td>65</td>
<td>260</td>
<td>335</td>
<td>150</td>
<td>385</td>
<td>2&quot; ABOVE SHAFT CENTER LINE</td>
<td>2&quot;</td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>2800</td>
<td>2600</td>
<td></td>
<td>160</td>
<td>135</td>
<td>210</td>
<td>245</td>
<td>240</td>
<td>295</td>
<td>1&quot; ABOVE SHAFT CENTER LINE</td>
<td>1&quot;</td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>3000</td>
<td>2800</td>
<td></td>
<td>220</td>
<td>80</td>
<td>270</td>
<td>335</td>
<td>150</td>
<td>385</td>
<td>2&quot; ABOVE SHAFT CENTER LINE</td>
<td>2&quot;</td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>3200</td>
<td>3000</td>
<td></td>
<td>190</td>
<td>175</td>
<td>240</td>
<td>245</td>
<td>240</td>
<td>295</td>
<td>1&quot; ABOVE SHAFT CENTER LINE</td>
<td>1&quot;</td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>3400</td>
<td>3200</td>
<td></td>
<td>250</td>
<td>110</td>
<td>300</td>
<td>335</td>
<td>150</td>
<td>385</td>
<td>2&quot; ABOVE SHAFT CENTER LINE</td>
<td>2&quot;</td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>3600</td>
<td>3400</td>
<td></td>
<td>200</td>
<td>185</td>
<td>250</td>
<td>245</td>
<td>240</td>
<td>295</td>
<td>1&quot; ABOVE SHAFT CENTER LINE</td>
<td>1&quot;</td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>3800</td>
<td>3600</td>
<td></td>
<td>260</td>
<td>125</td>
<td>310</td>
<td>335</td>
<td>150</td>
<td>385</td>
<td>2&quot; ABOVE SHAFT CENTER LINE</td>
<td>2&quot;</td>
</tr>
<tr>
<td>10</td>
<td>S</td>
<td>5000</td>
<td>5000</td>
<td></td>
<td>190</td>
<td>175</td>
<td>240</td>
<td>245</td>
<td>240</td>
<td>295</td>
<td>1&quot;-1/2&quot; ABOVE SHAFT CENTER LINE</td>
<td>3&quot;</td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>5000</td>
<td>5000</td>
<td></td>
<td>250</td>
<td>110</td>
<td>300</td>
<td>335</td>
<td>150</td>
<td>385</td>
<td>3&quot; ABOVE SHAFT CENTER LINE</td>
<td>3&quot;</td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>6000</td>
<td>6000</td>
<td></td>
<td>200</td>
<td>185</td>
<td>250</td>
<td>245</td>
<td>240</td>
<td>295</td>
<td>1&quot;-1/2&quot; ABOVE SHAFT CENTER LINE</td>
<td>3&quot;</td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>6000</td>
<td>6000</td>
<td></td>
<td>260</td>
<td>125</td>
<td>310</td>
<td>335</td>
<td>150</td>
<td>385</td>
<td>3&quot; ABOVE SHAFT CENTER LINE</td>
<td>3&quot;</td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>7000</td>
<td>7000</td>
<td></td>
<td>210</td>
<td>200</td>
<td>260</td>
<td>245</td>
<td>240</td>
<td>295</td>
<td>1&quot;-1/2&quot; ABOVE SHAFT CENTER LINE</td>
<td>3&quot;</td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>7000</td>
<td>7000</td>
<td></td>
<td>270</td>
<td>135</td>
<td>320</td>
<td>335</td>
<td>150</td>
<td>385</td>
<td>3&quot; ABOVE SHAFT CENTER LINE</td>
<td>3&quot;</td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>8000</td>
<td>8000</td>
<td></td>
<td>240</td>
<td>160</td>
<td>290</td>
<td>290</td>
<td>185</td>
<td>340</td>
<td>3&quot; ABOVE SHAFT CENTER LINE</td>
<td>3&quot;</td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>8000</td>
<td>8000</td>
<td></td>
<td>240</td>
<td>160</td>
<td>290</td>
<td>290</td>
<td>185</td>
<td>340</td>
<td>3&quot; ABOVE SHAFT CENTER LINE</td>
<td>3&quot;</td>
</tr>
</tbody>
</table>

**FORCE CONTROL INDUSTRIES, INC.**
Table 2.1 SPECIFICATIONS Continued

<table>
<thead>
<tr>
<th>Size</th>
<th>Logic</th>
<th>Required Torque (Lb. In.)</th>
<th>Clutch (Lb. In.)</th>
<th>Brake (Lb. In.)</th>
<th>Clutch</th>
<th>Brake</th>
<th>System</th>
<th>Max. Clutch</th>
<th>Max. Brake</th>
<th>Max. System</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>S</td>
<td>8000</td>
<td>8000</td>
<td>255</td>
<td>260</td>
<td>310</td>
<td>505</td>
<td>510</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>7500</td>
<td>5500</td>
<td>365</td>
<td>100</td>
<td>415</td>
<td>510</td>
<td>260</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>8500</td>
<td>9000</td>
<td>265</td>
<td>295</td>
<td>345</td>
<td>505</td>
<td>510</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>8000</td>
<td>6000</td>
<td>375</td>
<td>115</td>
<td>425</td>
<td>510</td>
<td>260</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>9000</td>
<td>9500</td>
<td>280</td>
<td>315</td>
<td>365</td>
<td>505</td>
<td>510</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>8500</td>
<td>6500</td>
<td>390</td>
<td>135</td>
<td>440</td>
<td>510</td>
<td>260</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>10000</td>
<td>10500</td>
<td>305</td>
<td>350</td>
<td>400</td>
<td>505</td>
<td>510</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>9500</td>
<td>7000</td>
<td>415</td>
<td>150</td>
<td>465</td>
<td>510</td>
<td>260</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>10500</td>
<td>11000</td>
<td>315</td>
<td>370</td>
<td>420</td>
<td>505</td>
<td>510</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>10000</td>
<td>7500</td>
<td>425</td>
<td>170</td>
<td>475</td>
<td>510</td>
<td>260</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>11000</td>
<td>12000</td>
<td>330</td>
<td>405</td>
<td>455</td>
<td>505</td>
<td>510</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>10500</td>
<td>8000</td>
<td>440</td>
<td>190</td>
<td>490</td>
<td>510</td>
<td>260</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>12000</td>
<td>12500</td>
<td>355</td>
<td>420</td>
<td>470</td>
<td>505</td>
<td>510</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>11500</td>
<td>8500</td>
<td>465</td>
<td>205</td>
<td>515</td>
<td>510</td>
<td>260</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>S</td>
<td>12500</td>
<td>12500</td>
<td>305</td>
<td>250</td>
<td>355</td>
<td>510</td>
<td>505</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>9000</td>
<td>9000</td>
<td>335</td>
<td>105</td>
<td>385</td>
<td>480</td>
<td>275</td>
<td>530</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>13500</td>
<td>13500</td>
<td>325</td>
<td>270</td>
<td>375</td>
<td>510</td>
<td>505</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>10000</td>
<td>10000</td>
<td>355</td>
<td>130</td>
<td>405</td>
<td>480</td>
<td>275</td>
<td>530</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>15000</td>
<td>15000</td>
<td>355</td>
<td>305</td>
<td>405</td>
<td>510</td>
<td>505</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>10750</td>
<td>10750</td>
<td>370</td>
<td>145</td>
<td>420</td>
<td>480</td>
<td>275</td>
<td>530</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>16000</td>
<td>16000</td>
<td>375</td>
<td>330</td>
<td>425</td>
<td>510</td>
<td>505</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>11500</td>
<td>11500</td>
<td>385</td>
<td>165</td>
<td>435</td>
<td>480</td>
<td>275</td>
<td>530</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>17250</td>
<td>17250</td>
<td>400</td>
<td>355</td>
<td>450</td>
<td>510</td>
<td>505</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>12250</td>
<td>12250</td>
<td>400</td>
<td>180</td>
<td>450</td>
<td>480</td>
<td>275</td>
<td>530</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>18250</td>
<td>18250</td>
<td>415</td>
<td>380</td>
<td>465</td>
<td>510</td>
<td>505</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>13000</td>
<td>13000</td>
<td>415</td>
<td>200</td>
<td>465</td>
<td>480</td>
<td>275</td>
<td>530</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>19500</td>
<td>19500</td>
<td>440</td>
<td>410</td>
<td>490</td>
<td>510</td>
<td>505</td>
<td>560</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>14000</td>
<td>14000</td>
<td>430</td>
<td>220</td>
<td>480</td>
<td>480</td>
<td>275</td>
<td>530</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>S</td>
<td>17000</td>
<td>17750</td>
<td>175</td>
<td>160</td>
<td>225</td>
<td>295</td>
<td>300</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>14000</td>
<td>11000</td>
<td>190</td>
<td>65</td>
<td>240</td>
<td>295</td>
<td>155</td>
<td>345</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>18500</td>
<td>19250</td>
<td>185</td>
<td>170</td>
<td>235</td>
<td>295</td>
<td>300</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>15500</td>
<td>12000</td>
<td>205</td>
<td>75</td>
<td>255</td>
<td>295</td>
<td>155</td>
<td>345</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>20250</td>
<td>21000</td>
<td>200</td>
<td>190</td>
<td>250</td>
<td>295</td>
<td>300</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>16750</td>
<td>13000</td>
<td>215</td>
<td>85</td>
<td>265</td>
<td>295</td>
<td>155</td>
<td>345</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>21750</td>
<td>22500</td>
<td>215</td>
<td>205</td>
<td>265</td>
<td>295</td>
<td>300</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>18000</td>
<td>14000</td>
<td>225</td>
<td>95</td>
<td>275</td>
<td>295</td>
<td>155</td>
<td>345</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>23250</td>
<td>24000</td>
<td>230</td>
<td>220</td>
<td>280</td>
<td>295</td>
<td>300</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>19250</td>
<td>15000</td>
<td>235</td>
<td>105</td>
<td>285</td>
<td>295</td>
<td>155</td>
<td>345</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>24750</td>
<td>25750</td>
<td>240</td>
<td>235</td>
<td>290</td>
<td>295</td>
<td>300</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>20500</td>
<td>16000</td>
<td>245</td>
<td>115</td>
<td>295</td>
<td>295</td>
<td>155</td>
<td>345</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>26500</td>
<td>27250</td>
<td>255</td>
<td>250</td>
<td>305</td>
<td>295</td>
<td>300</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>22000</td>
<td>17000</td>
<td>260</td>
<td>125</td>
<td>310</td>
<td>295</td>
<td>155</td>
<td>345</td>
<td></td>
</tr>
</tbody>
</table>
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
### 6-1 TROUBLESHOOTING CHART

<table>
<thead>
<tr>
<th>TROUBLE</th>
<th>POSSIBLE CAUSE</th>
<th>REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Both clutch and brake fail to engage properly.</td>
<td>Electrical control circuit.</td>
<td>Check control circuit.</td>
</tr>
<tr>
<td></td>
<td>Low hyd. pressure.</td>
<td>Increase hyd. pressure.**</td>
</tr>
<tr>
<td></td>
<td>Hyd. pressure regulator or piping.</td>
<td>Check for improper operation or leaks.</td>
</tr>
<tr>
<td></td>
<td>Worn friction surfaces.</td>
<td>Check parts for wear and replace if necessary. (See Section 6-2)</td>
</tr>
<tr>
<td></td>
<td>Improper type of oil</td>
<td>Check name plate and change oil if necessary.</td>
</tr>
<tr>
<td>Clutch fails to engage properly.</td>
<td>Electrical control circuit.</td>
<td>Check control circuit.</td>
</tr>
<tr>
<td></td>
<td>Valve not functioning properly.</td>
<td>Check valve operation. Replace if necessary.</td>
</tr>
<tr>
<td></td>
<td>Internal hyd. leakage.</td>
<td>Check and replace O-Rings and Liners if necessary.</td>
</tr>
<tr>
<td></td>
<td>Low hyd. pressure</td>
<td>Increase hyd. pressure.**</td>
</tr>
<tr>
<td></td>
<td>Worn friction surfaces.</td>
<td>Check parts for wear and replace if necessary. (See Section 6-2)</td>
</tr>
<tr>
<td>Picks up load too quickly.</td>
<td>Hyd. pressure too high.</td>
<td>Reduce hyd. pressure.</td>
</tr>
<tr>
<td></td>
<td>Low oil level.</td>
<td>Check oil level and add if necessary.</td>
</tr>
<tr>
<td>Clutch fails to disengage properly.</td>
<td>Electrical control circuit.</td>
<td>Check control circuit.</td>
</tr>
<tr>
<td></td>
<td>Valve not functioning properly.</td>
<td>Check and replace valve if necessary.</td>
</tr>
<tr>
<td></td>
<td>Piston sticking-broken return springs.</td>
<td>Disassemble to extent necessary and inspect for damaged parts.</td>
</tr>
<tr>
<td>Noise and vibration</td>
<td>Mounted on poor foundation.</td>
<td>Improve installation. Tighten foot bolts.</td>
</tr>
<tr>
<td></td>
<td>Misaligned couplings.</td>
<td>Recheck alignment.</td>
</tr>
<tr>
<td></td>
<td>Damaged bearings.</td>
<td>Disassemble to extent necessary and inspect for damaged bearings.</td>
</tr>
<tr>
<td>Brake fails to engage properly.</td>
<td>Electrical control circuit.</td>
<td>Check control circuit.</td>
</tr>
<tr>
<td></td>
<td>Valve not functioning properly.</td>
<td>Check valve operation. Replace if necessary.</td>
</tr>
<tr>
<td></td>
<td>Internal pressure leakage.</td>
<td>Check and replace O-Rings and Liners if necessary.</td>
</tr>
<tr>
<td></td>
<td>Low hyd. pressure</td>
<td>Increase hyd. pressure.**</td>
</tr>
<tr>
<td>TROUBLE</td>
<td>POSSIBLE CAUSE</td>
<td>REMEDY</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>--------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Brake fails to engage properly.</td>
<td>Piston sticking.</td>
<td>Disassemble to extent necessary and check for damaged parts.</td>
</tr>
<tr>
<td>(Continued)</td>
<td>Weak or broken brake spring.</td>
<td>Replace spring.</td>
</tr>
<tr>
<td></td>
<td>Worn friction surfaces.</td>
<td>Check parts for wear and replace if necessary. (See Section 6-2)</td>
</tr>
<tr>
<td>Brake fails to disengage properly.</td>
<td>Electrical control circuit.</td>
<td>Check control circuit.</td>
</tr>
<tr>
<td></td>
<td>Valve not functioning properly.</td>
<td>Check and replace valve if necessary.</td>
</tr>
<tr>
<td></td>
<td>Piston sticking.</td>
<td>Disassemble to extent necessary and inspect for damaged parts.</td>
</tr>
<tr>
<td>Drive overheats.</td>
<td>Inertia or resistance changed.</td>
<td>Check with Force Control engineering.</td>
</tr>
<tr>
<td>(Oil temp. above 225° F.)</td>
<td>Improper oil level.</td>
<td>Check oil level. Add or drain as needed.</td>
</tr>
<tr>
<td></td>
<td>Improper type of oil.</td>
<td>Check name plate and change oil if necessary</td>
</tr>
<tr>
<td></td>
<td>Water turned off.</td>
<td>Check shut-off valve.</td>
</tr>
<tr>
<td></td>
<td>Fan blocked.</td>
<td>Clean shroud.</td>
</tr>
<tr>
<td>Oil leakage</td>
<td>Oil seal lips damaged.</td>
<td>Check to see if oil is leaking around shaft and replace if necessary.</td>
</tr>
<tr>
<td></td>
<td>Gaskets</td>
<td>Tighten all external bolts.</td>
</tr>
<tr>
<td></td>
<td>Poor ventilation.</td>
<td>Remove breather and clean.</td>
</tr>
<tr>
<td></td>
<td>Seal retainers loose.</td>
<td>Tighten retainer screws.</td>
</tr>
<tr>
<td>Oil leakage out breather.</td>
<td>Damaged seal around piston.</td>
<td>Disassemble and repair.</td>
</tr>
<tr>
<td></td>
<td>Oil level too high.</td>
<td>Drain excess oil.</td>
</tr>
<tr>
<td>Excessive shaft end play. (.020&quot; Max.)</td>
<td>Bearings bad.</td>
<td>Disassemble and replace.</td>
</tr>
<tr>
<td>Clutch or Brake does not repeat</td>
<td>Hydraulic pressure changed</td>
<td>Check hydraulic pressure and adjust.</td>
</tr>
<tr>
<td></td>
<td>Improper type of oil</td>
<td>Check name plate and change oil if necessary</td>
</tr>
<tr>
<td></td>
<td>*Oil temperature changed.</td>
<td>Check temperature.</td>
</tr>
<tr>
<td></td>
<td>Resistance in machine changed.</td>
<td>Lubricate bearings.</td>
</tr>
</tbody>
</table>

* - 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.

   **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 (2) Screws (#67) and (2) Washers (#182) from the side of the Fan Shroud.

3. Remove (2) Screws (#66) from the bottom rear of the Fan Shroud.

4. Pull the Fan Shroud (#24) away from the Input Housing Subassembly.

5. Loosen Set Screws (#70) and remove Fan (#25) from the Input Shaft (#2).

6. Remove both Keys (#180 and #37).

7. 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.
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.
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).

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.

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.

(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.

(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.
(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.

6. Remove Springs (#36), and on Drives with SCP Logic, also remove Springs (#96). The quantity of Springs are predetermined 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.
7. 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.**

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

(20 Posidyne)
2. Remove Locknut (#15) from the Output Shaft (#1).

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. Pull the Mating Ring (#4), with the Wear Sleeve (#250) on it, off of the Output Shaft (#2).

7. 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)

(03 and #05 Posidyne)
2. 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)
2. 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)
3. 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)
4. If Bearing (#28) has to be replaced, use a Bearing Splitter, like the one shown in Figure 7.4, to remove it.

(20 Posidyne)
5. Also Remove the Pilot Bearing Spacer (#289).

Disassembly is now complete for your EH Posidyne Clutch/Brake Unit.

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.
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)](image-url)
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.

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.


(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.

#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.

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.


(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.

#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.


(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.
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) onto 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).

(#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.

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).
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.

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.

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:

<table>
<thead>
<tr>
<th>Size</th>
<th>Part Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>#03, #05 and #10</td>
<td>(Part No. 601-03-011)</td>
</tr>
<tr>
<td>#11, #14 and #20</td>
<td>(Part No. 601-11-001)</td>
</tr>
</tbody>
</table>

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.
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.)

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

<table>
<thead>
<tr>
<th>SIZE</th>
<th>“X” MIN.</th>
<th>“X” MAX.</th>
</tr>
</thead>
<tbody>
<tr>
<td>03</td>
<td>.070”</td>
<td>.135”</td>
</tr>
<tr>
<td>05</td>
<td>.085”</td>
<td>.150”</td>
</tr>
<tr>
<td>10, 11, 14</td>
<td>.100”</td>
<td>.190”</td>
</tr>
<tr>
<td>20</td>
<td>.100”</td>
<td>.230”</td>
</tr>
</tbody>
</table>

---

**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).


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.

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)

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.

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)

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.
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

For Service/Parts Call
513-868-0900

Posidyne® Clutch/Brake

Model No.
Serial No.

Use Mobil® ATF 210
Repair Parts List - Figure 10.1
DIFFERENTIAL LINE DRIVER OPTICAL ENCODER (Optical)

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

* Indicates parts in the Minor Overhaul Kit.

Figure 10.1 - Differential Line Driver Encoder (Optical)
NOTE:
TO ASSEMBLE REF. #10, 11, 51, 54 & 119
BOLT TOGETHER WITH #62 AND REPLACE ONE AT A TIME WITH #64.
<table>
<thead>
<tr>
<th>REVISION NUMBER</th>
<th>REVISION DATE (Mo./Yr.)</th>
<th>PRINTING DATE (Mo./Yr.)</th>
<th>REVISION/ACTION DESCRIPTION</th>
<th>REVISION INITIATED BY: (Name)</th>
<th>REVISION MADE BY: (Name)</th>
</tr>
</thead>
<tbody>
<tr>
<td>502-EH-03/20-001</td>
<td>5/09</td>
<td>------</td>
<td>New Manual</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td></td>
<td>------</td>
<td>------</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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"