

# **BRADEN**

**SWING DRIVE**

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**MODEL  
SD66A-SPL-42DAB**

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**PART NUMBER  
05197**

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**SERVICE,  
PREVENTIVE MAINTENANCE  
AND PARTS MANUAL**

## **EXPLANATION OF MODEL NUMBER**

SD 66 A - SPL - 42 DAB - 05197

SD        Designates Swing Drive

66        Designates Maximum Output Torque (66 = 66,000 lb-in.)

A         Designates Model Series Relating to Design Changes

SPL      Designates Unit is Equipped With 1 or More Special Features

42        Designates Overall Gear Reduction

DAB      Designates Unit is Equipped with a Dual Acting Brake

05197    BRADEN Part Number of the Unit

## **GENERAL INFORMATION**

All units are made up of the following sub-assemblies and parts:

1. Dual Acting Brake assembly.
2. Two planetary gear sets sharing a common stationary ring gear.
3. Output pinion and bearing assembly

The static brake assembly is a multiple disc pack with a hydraulically actuated piston on either side. When is “parked”, there is no hydraulic pressure applied to either piston and the brake is spring applied, which locks the gear train to the housing, preventing any rotation. When sufficient pressure is applied to the release piston, the springs are compressed, releasing the brake and allowing the motor to rotate the gear train. While the unit is in the brake released condition, pressure can also be applied to the brake override piston to apply braking force to the rotating gear train. The amount of this brake application is proportional to the pressure applied to the override piston.

The motor is directly coupled to the input sun gear. The friction discs are splined to the motor coupling and the steel spacer plates are pinned to the brake housing. In operation, the brake must be released for the hydraulic motor to operate the drive in either direction. The motor drives through two planetary gear sets. The planet carrier of the second stage gear set drives the output pinion. The ring gear for the planetary gear sets is stationary, resulting in the output pinion turning in the same direction as the motor shaft.

## SPECIFICATIONS

Part No. 05197

|   |                                |
|---|--------------------------------|
| Maximum Continuous Output Torque Rating .....   | 66,000 lb-in.                  |
| Maximum Intermittent Output Torque Rating ..... | 130,000 lb-in.                 |
| Overall Gear Ratio .....                        | 42.25:1                        |
| Motor .....                                     | Customer Supplied              |
| Brake Actuation .....                           | Spring Applied (parking)       |
| .....   | Hydraulically Released         |
| .....   | Hydraulic Override Application |
| <br>  |                                |
| Parking Brake Capacity .....                    | 2,400 lb-in.                   |
| Initial Brake Release Pressure.....             | 130 psi                        |
| Full Brake Release Pressure .....               | 224 psi                        |
| Override Brake Capacity .....                   | 1,200 lb-in. at 265 psi        |
| Override Brake Maximum Working Pressure .....   | 1,000 psi                      |

Oil Type

Texaco Meropa 150 Gear Oil or Equivalent AGMA 4 EP

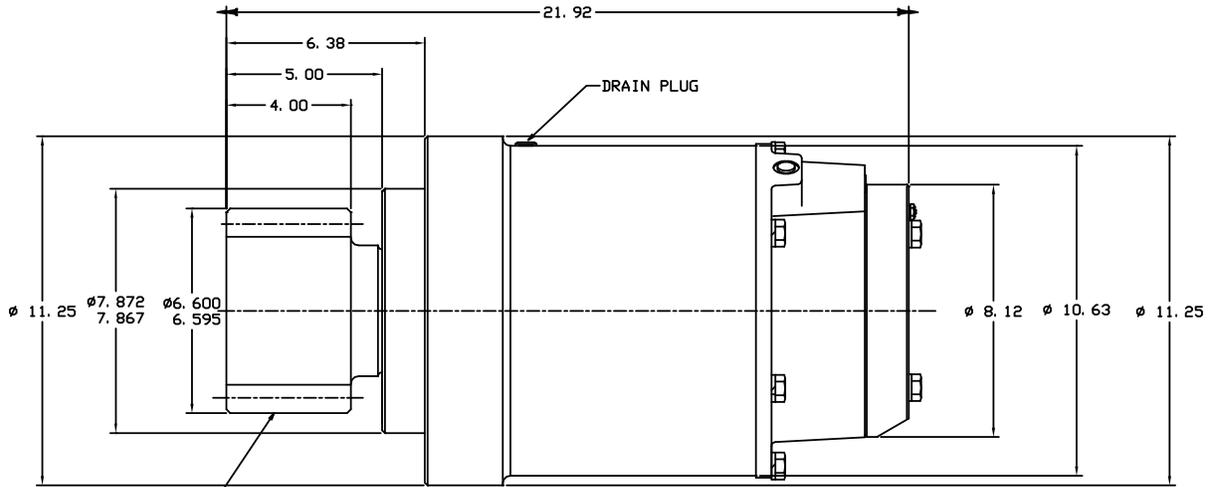
Oil Capacity 8.5 pints

Approximate Unit Weight

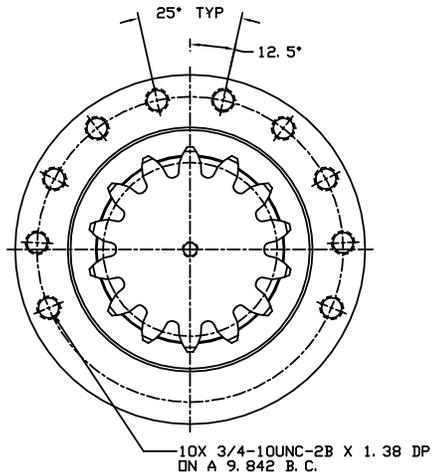
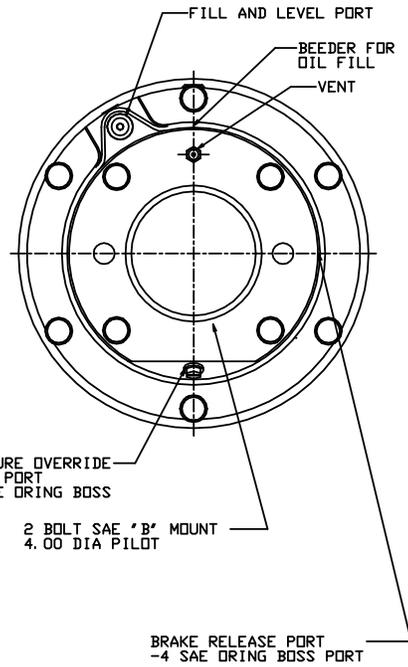
325 lbs (147 kg)

Unit designed for pinion down installations ONLY.

# DIMENSIONAL DRAWING



SPUR GEAR PINION  
FULL DEPTH ROUND BOTTOM  
14 TEETH  
2.5 DIAMETRAL PITCH  
20° PRESSURE ANGLE  
5.600 PITCH DIA



SD66A-SPL-42DAB  
05197

## **PREVENTIVE MAINTENANCE**

A regular program of preventive maintenance for your planetary swing drive is strongly recommended to minimize the need for emergency servicing and promote safe, reliable operation.

Field experience supported by engineering tests, indicates the two service procedures listed below are the **MOST** critical to safe, reliable operation and must be observed.

**Regular Gear Oil Changes** - every 1,000 hours or six (6) months

**Use of Proper Gear Oil** - recommended type

The following minimum service intervals are specified for operating hours of the prime mover.

### **1. Oil Level**

The gear oil level should be checked every 500 hours of operation or three (3) months, whichever occurs first, or whenever there is any sign of oil leakage. Oil level should be visible in the sight glass in the brake housing. If additional oil is needed, refer to "Recommended Gear Oil".

### **2. Oil Change**

The gear oil should be changed after the first one hundred (100) hours of operation, then every 1,000 operating hours or six (6) months, whichever occurs first. The gear oil must be changed to remove wear particles that impede the safe and reliable operation of the brake and erode bearings, gears and seals.

Remove the drain plug from the bottom of the pinion housing and drain the oil into a suitable container (04714 unit has a drain hose with a plug in the end). Remove the vent plug from the top of the brake housing. It is very important to keep this vent clean and unobstructed. Clean the vent in solvent, be sure it is not plugged, and re-install it in the drive. **Do not** paint over the vent or replace it with a solid plug. Refer to "Specifications" for oil capacities.

### **3. Hydraulic System**

The original filter element should be replaced after the first fifty (50) hours of operation, then every 500 operating hours or three (3) months, or in accordance with the equipment manufacturer's recommendations.

### **4. Mounting Bolts**

Tighten all swing drive mounting bolts to recommended torque after the first one hundred (100) hours of operation, then every 1,000 operating hours or six (6) months, whichever occurs first.

### **5. Recommended Planetary Gear Oil**

Field experience, supported by extensive engineering tests, indicates the use of the proper planetary gear oil is essential to reliable and safe operation of the brake and obtaining long gear train life.

For simplicity, we have listed one (1) readily available product which has been tested and found to meet our specifications. This is not to say that other lubricant brands would not perform equally as well. If the following lubricant brand is not available in your area, make certain your lubricant vendor supplies you with oil that is equivalent to the product listed below.

## **! CAUTION !**

Failure to use the proper type and viscosity of planetary gear oil, or the use of aftermarket gear oil additives may contribute to intermittent brake slippage. Some gear lubricants contain large amounts of EP (extreme pressure) and anti-friction additives which may contribute to brake slippage and damage to brake friction discs or seals. Oil viscosity with regard to ambient temperature is also critical to reliable brake operation. Our tests indicate that excessively heavy or thick gear oil may contribute to intermittent brake slippage. Make certain that the gear oil viscosity used in your drive is correct.

## **RECOMMENDED GEAR OIL**

**Texaco Meropa 150 or Equivalent AGMA 4 EP**

## SWING DRIVE SERVICE

### Foreword to Drive Service

Before any part is removed from the swing drive, all service instructions should be read and understood. Work in a clean, dust free area as cleanliness is of utmost importance when servicing hydraulic equipment. Inspect all replacement parts prior to installation to detect any damage which might have occurred in shipment.

Use only genuine BRADEN replacement parts for optimum results. Never reuse expendable parts such as oil seals and O-rings.

Inspect all machined surfaces for excessive wear or damage before beginning to reassemble the drive.

Lubricate all O-rings and oil seals with gear oil prior to installation.

Use a non-hardening sealing compound on the outside surface of oil seals and a light coat of thread sealing compound on pipe threads. Avoid getting thread compound inside parts or passages that conduct oil.

Thoroughly clean all parts in a good grade of non-flammable safety solvent. Wear protective clothing as required.

Refer to cross-section drawings in this manual for item numbers used in service procedures.

**! WARNING !**

**DO NOT CLEAN BRAKE FRICTION DISCS IN SOLVENT. SOLVENT MAY CAUSE DAMAGE TO FRICTION MATERIAL WHICH MAY RESULT IN BRAKE FAILURE AND LOSS OF CONTROL.**

### DRIVE DISASSEMBLY

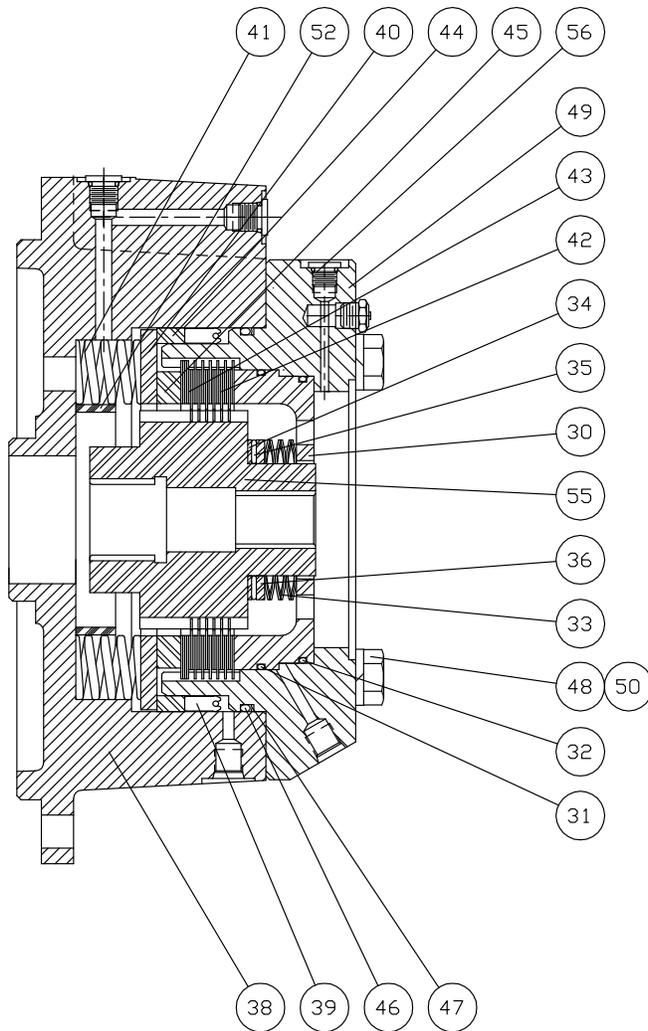
1. Remove and plug all hydraulic lines from the motor. Remove and plug all brake lines and any other lines from the drive.
2. Remove the fasteners securing the drive. Use an adequate lifting device to remove the drive (NOTE: approximate unit weight is from 325 pounds [147 kg]).
3. If the oil has not already been drained, remove the drain plug and drain the oil into an adequate container. Recycle or dispose of the used oil in an environmentally responsible manner. Contact your local government agency for information concerning proper disposal. Remove the vent plug from the top of the brake housing. It is very important to keep this vent clean and unobstructed. Clean the vent in solvent, be sure it is not plugged, and re-install it in the drive. **Do not** paint over the vent or replace it with a solid plug.

*NOTE: Before beginning to disassemble the drive, it is advisable to mark the relative position of connecting parts in order to reassemble the drive with the correct orientation. Mark the position of the motor to the motor support. Mark the motor support in relation to the brake cylinder, and the cylinder in relation to the ring gear.*

4. Remove the two capscrews securing the motor to the drive and remove the motor. Remove and discard the motor pilot O-Ring.
5. Remove the six capscrews and washers (items 27 and 28) holding the brake housing (item 38) and brake assembly to the ring gear. Lift the brake sub-assembly off of the drive. Remove and discard the O-Ring (item 25) from the brake cylinder.
9. Remove the input sun gear (item 23). Lift out the primary planet carrier assembly and thrust washer (item 29). Remove the thrust washer (item 24) between the primary and output planet carriers. Remove the output sun gear (item 22). Remove the output planet carrier assembly. The split ring (item 7) is held in place by the output planet carrier and is maintaining pinion bearing preload. It is usually necessary to use tapered chisel or soft drift to remove the split ring halves.
10. Support the ring gear on its mounting surface and press the pinion out of the housing. Thoroughly clean and inspect the ring gear for damage. Check the ring gear teeth for nicks, spalling or excessive wear. Replace the ring gear if gear tooth wear is greater than 0.015 in. (0.4 mm) when compared to unworn area of teeth. Thoroughly clean and inspect the bearings for any signs of damage or excessive wear. If the rollers show any signs of spalling, corrosion, discoloration, material displacement or abnormal wear, the bearing should be replaced.

This completes disassembly of the drive. Refer to the following sections for sub-assembly service procedure

## BRAKE SERVICE



### Disassembly

#### **! CAUTION !**

The motor support is under brake spring tension load. To avoid unexpected release of spring pressure, loosen the four capscrews one turn at a time in a criss-cross pattern.

1. Loosen the four capscrews (item 49) holding the motor support to the brake cylinder. Loosen them in a criss-cross pattern, one turn at a time to evenly release spring load.
2. Remove the motor support from the brake cylinder. Remove and discard all O-Rings, backup rings and piston seal.
3. All remaining components can now be removed and cleaned in solvent, **EXCEPT** the friction discs.

#### **!! WARNING !!**

DO NOT CLEAN BRAKE FRICTION DISCS IN SOLVENT. SOLVENT MAY CAUSE DAMAGE TO FRICTION MATERIAL WHICH MAY RESULT IN BRAKE FAILURE AND LOSS OF CONTROL.

Thoroughly clean and inspect all parts at this time for any signs of damage or excessive wear. Pay particular attention to machined areas and sealing surfaces.

Place each friction disc on a flat surface and check for distortion with a straight edge. Friction material should appear even across entire surface with groove pattern visible. Replace friction disc if splines are worn to a point, disc is distorted, friction material is worn unevenly, groove pattern is worn away or friction material is burned. Place each steel disc on a flat surface and check for distortion with a straight edge. Check surface for signs of material transfer or heat. Replace steel disc if disc is distorted or heat discolored.

Measure the free length of all 6 springs. Minimum free length is 1-3/16 in. (30.2 mm). Check springs for any sign of cracking or failure. If a brake spring must be replaced for any reason, then **ALL** brake springs **MUST** be replaced.

### **! CAUTION !**

Failure to replace brake springs as a set may result in uneven brake application pressure and repeated brake spring failure.

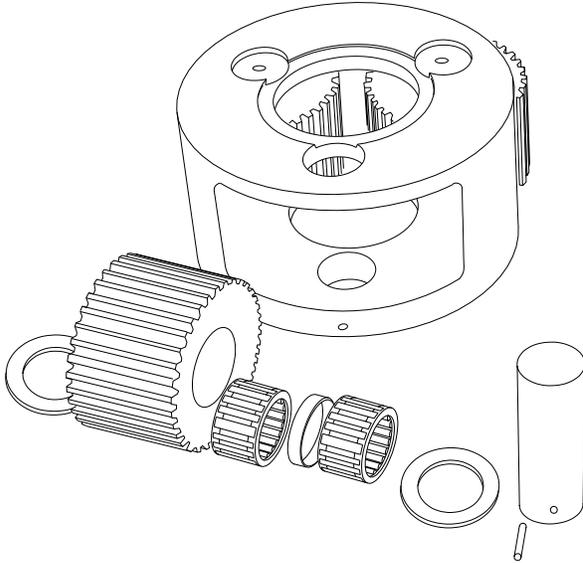
## **Assembly**

NOTE: Always lubricate seals, O-Rings and brake plates with a light coat of hydraulic oil before installing them.

1. Place the brake cylinder (item 38) onto a clean work surface. Install the six (6) springs and spring spacer.
2. Place the motor support (item 48) onto a clean work surface, with the motor mounting surface down. Install O-Ring and backup ring (items 46 & 47) into the groove on the motor support. The backup ring should be down (toward the motor), with the curved surface facing up. The O-Ring then fits into the curved surface of the backup ring. Install the seal (item 39) and the backup ring (item 44) onto the motor support. Be sure the seal is installed as shown in the drawing above.
3. Install O-Rings (items 31 & 32) onto the override piston. Insert the override piston into the motor support, being careful not to cut or damage the O-Rings.
4. Install one steel brake plate (item 43) into the motor support. Alternately install one friction disc (item 42) and one steel disc until all six (6) friction discs and six (6) of the steel discs are in place. Install the remaining four (4) steel discs on top of the last friction disc. At this time it is helpful to use the brake coupling (item 55) to align the splines of the friction discs. This will make it easier to install the coupling in the next step.
5. Install the bearing race (item 34), the needle bearing (item 35) and bearing race (item 36) onto the motor end of the brake coupling. NOTE: Bearing race (item 34) is the thinner of the 2 races and must be installed onto the coupling first. Install the wave spring (item 33) onto the coupling. While holding the wave spring and needle bearing assembly in place, invert the brake coupling and install it into the motor support, engaging the splines of the friction discs. Install the spacer (item 45) and pressure plate (item 40) over the coupling, onto the steel discs.
6. Lightly lubricate the inside diameter of the brake cylinder with hydraulic oil. Invert the brake cylinder, being careful to keep the springs and spacer in position, and place it onto the assembled motor support. Turn the entire assembly over.
7. Align the motor support to the brake cylinder, using the marks made during disassembly. Install the four (4) capscrews and lockwashers (items 49 & 50), and hand tighten. Tighten the capscrews in a criss-cross pattern one turn at a time to evenly compress the brake springs. Continue tightening until the motor support is fully seated against the brake cylinder. Torque evenly to 110 lb-ft.

## PLANET CARRIER SERVICE

### Disassembly



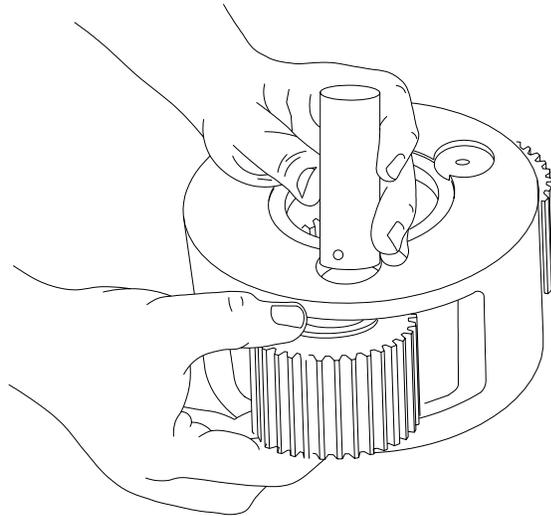
**NOTE: The drawing above and the following instructions are for the output planet carrier assembly. The input planet carrier assembly follows the same procedure, except there is only one bearing and no spacer, under each planet gear.**

1. Each planet gear is removed by first driving the rollpin into the planet gear shaft. The planet gear shaft can then be pushed through the planet carrier. Drive the rollpin out of the shaft and discard. Remove the planet gear and two thrust races from the carrier. Remove the two roller bearings and bearing spacer from the planet gear.

Repeat this procedure for each of the other two gears.

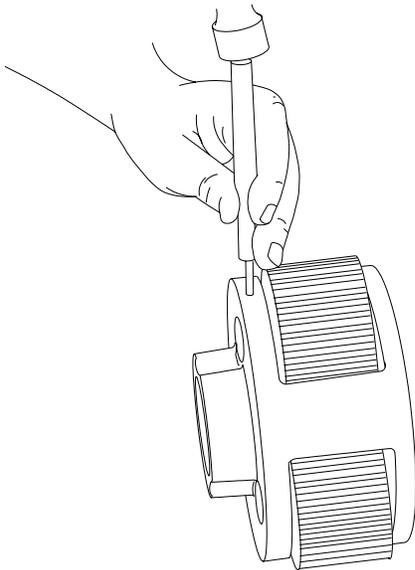
Thoroughly clean all parts and inspect for damage and wear. The bearing rollers should not exhibit any irregularities. If the rollers show any sign of spalling, corrosion, discoloration, material displacement or abnormal wear, the bearing should be replaced. Likewise, the cage should be inspected for unusual wear or deformation, particularly the cage bars. If there is any damage that will impair the cage's ability to separate, retain and guide the rollers properly, the bearing should be replaced. The thrust washer contact areas should be free from any surface irregularities that may cause abrasions or friction. The gears and shafts should be inspected for abnormal wear or pitting and replaced if necessary.

## Assembly

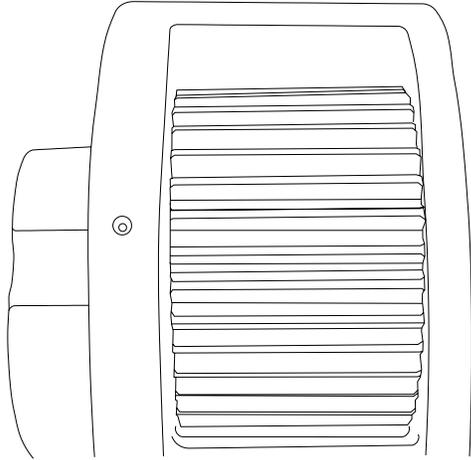


NOTE: The input planet assembly has a thrust plate (item 37) that must be installed into the planet carrier BEFORE the planet gears are installed.

1. Insert two bearings with a spacer between them into a planet gear (only one bearing and no spacer for input planet gears). Place a thrust race on each side of the gear and position this assembly in the planet carrier. Slide the planet gear shaft through the carrier and gear assembly, aligning the pin hole in the shaft with the hole in the carrier.



2. Drive a NEW rollpin into place. **Always use NEW rollpins.** When properly positioned, the rollpin will be slightly below the surface of the carrier. When properly positioned, 50% of the rollpin length should be engaged in the planet gear shaft with the remaining 50% in the carrier.



3. With a center punch, stake the carrier next to the rollpin hole. This will distort the hole in the carrier so the rollpin will not back out when in service. Repeat steps 1 through 3 for each of the other two planet gears.

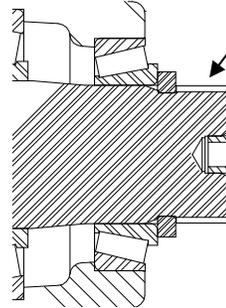
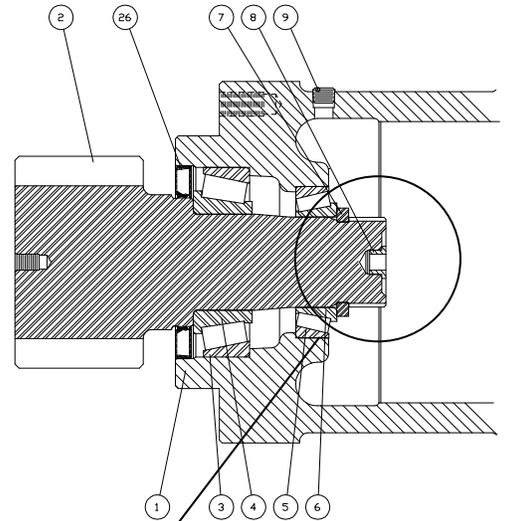
## PINION SERVICE

### Disassembly

1. Separate and remove the two halves of the split ring (item 7).
2. Remove the pinion (item 2) from the housing.
3. Remove the seal (item 26) from the housing.

Thoroughly clean all parts and inspect for damage and wear. The bearing rollers should not exhibit any irregularities. If the rollers show any sign of spalling, corrosion, discoloration, material displacement or abnormal wear, the bearing should be replaced. Likewise, the cage should be inspected for unusual wear or deformation, particularly the cage bars. If there is any damage that will impair the cage's ability to separate, retain and guide the rollers properly, the bearing should be replaced.

Inspect the thrust bushing (item 8) in the end of the pinion shaft. If the flange thickness is worn to less than 1/16 inch (1.6 mm), the bushing should be replaced.



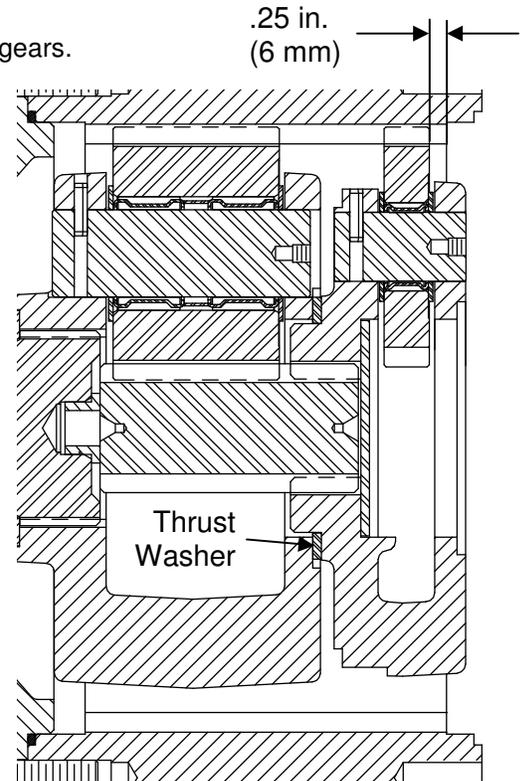
### Assembly

1. If the bearings are being replaced, press the small bearing cup (item 5) into the housing. Press the large bearing cup (item 3) into the bearing housing until it is fully seated in the housing. Install the large bearing cone (item 4).
2. Apply a non-hardening sealant to the threads of the oil drain plug and install it into the housing.
3. Apply a non-hardening sealant to the outside diameter of the seal (item 26) and press it into the housing with the spring side toward the bearings. Use a flat plate to avoid distorting the seal. The outside surface of the seal should be even with the housing.
4. Lightly lubricate the sealing surface of the pinion and install it into the housing. Carefully turn the assembly over. Lubricate the smaller bearing cone (item 6) and install it onto the pinion. The housing should rotate smooth and freely on the pinion.
5. Using a hydraulic press, apply approximately 11 tons (22,000 lbs) force to the bearing cone (item 6). Release the press and install the split ring (item 7).

The pinion sub-assembly is now complete.

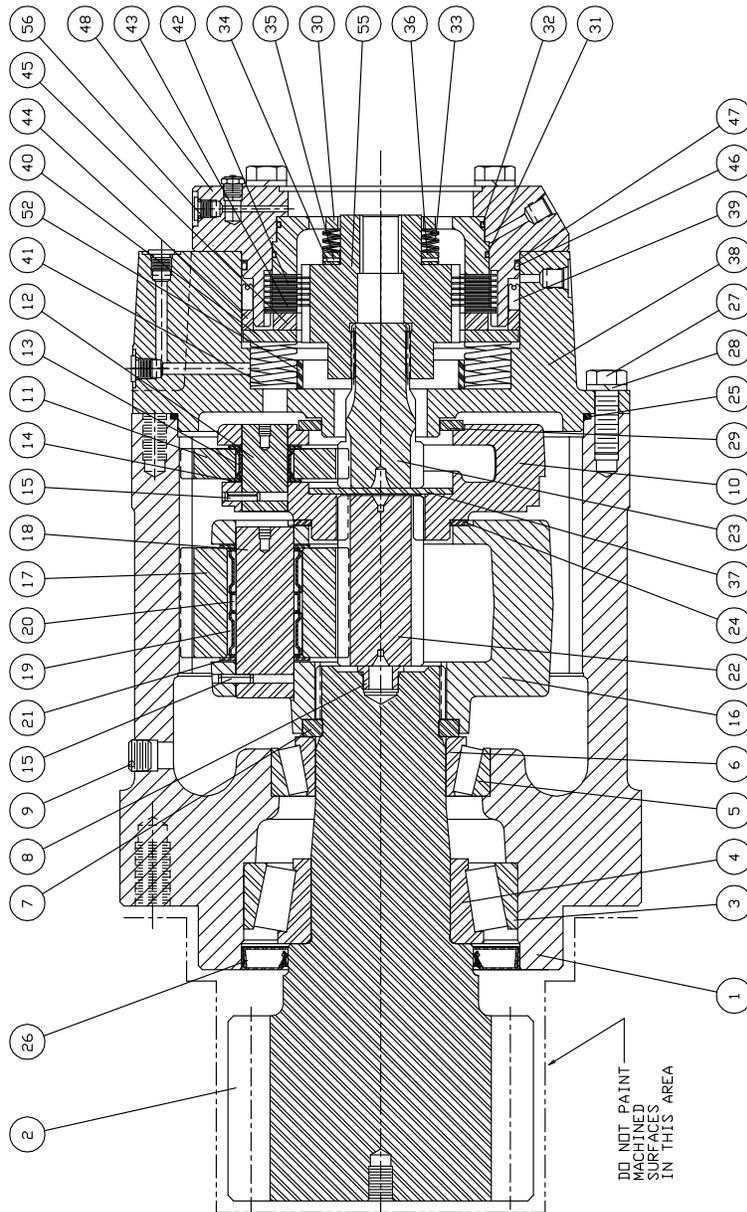
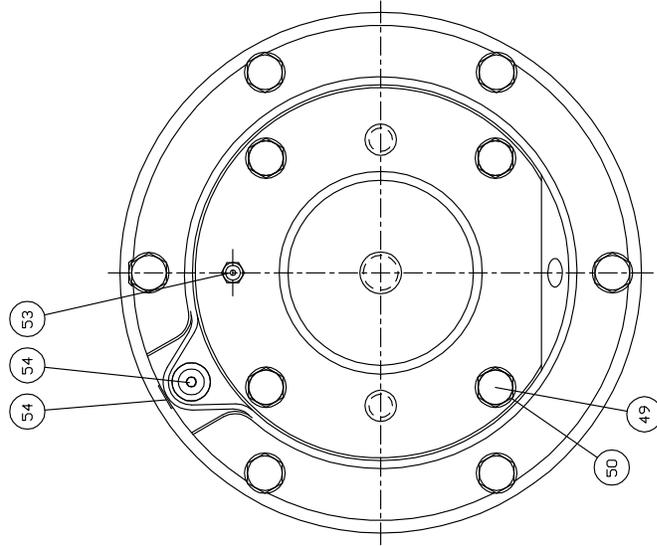
## DRIVE ASSEMBLY

1. Place the pinion/ring gear assembly on your work surface with the pinion gear down. It is advisable to support the pinion housing on its mounting surface for increased stability.
2. Install the output planet carrier assembly into the ring gear. It may be necessary to rotate the planet carrier to engage the splines on the pinion shaft.
5. Install the output sun gear (item 22) into the center of output planet gears.
6. Apply a liberal coating of oil soluble grease or petroleum jelly to the thrust washer (item 24) and install it onto the pilot of the primary planet carrier. Install the primary planet assembly into the ring gear. It may be necessary to rotate the planet carrier to engage the output sun gear. Be sure the thrust washer remains in its proper position. When all components are properly installed, the primary planet gears will be approximately 0.25 in. (6 mm) below the top of the ring gear teeth (see drawing).
7. Install the input sun gear (item 23) into the center of the primary planet gears.
8. Lightly lubricate and install a new O-Ring (item 25) onto the pilot of the housing adapter (item 1). Set the brake sub-assembly over the sun gear. Rotate the brake assembly as required to engage the brake coupling with the input sun gear. Orient the brake cylinder with the housing, using the marks made during disassembly. Install the six capscrews and lockwashers (items 48 and 50) securing the brake cylinder to the housing.
9. Install a new O-Ring onto the motor pilot, and install the motor. Install the two capscrews (item 35) securing the motor to the housing.



The drive is now completely assembled and ready to be installed.

05197  
PARTS



**PARTS LIST**  
**SD66A-SPL-42DAB**  
**05197**

| ITEM NO | DESCRIPTION                    | PART NUMBER | QTY |
|---------|--------------------------------|-------------|-----|
| 1       | HOUSING                        | 103951      | 1   |
| 2       | OUTPUT PINION                  | 103950      | 1   |
| 3       | BEARING CUP                    | 11848       | 1   |
| 4       | BEARING CONE                   | 11847       | 1   |
| 5       | BEARING CUP                    | 101992      | 1   |
| 6       | BEARING CONE                   | 101993      | 1   |
| 7       | SPLIT RING                     | 101843      | 1   |
| 8       | FLANGE BUSHING                 | 101994      | 1   |
| 9       | PLUG                           | 23095       | 1   |
| 10      | PRIMARY PLANET CARRIER         | 100852      | 1   |
| 11      | PRIMARY PLANET GEAR            | 26466       | 3   |
| 12      | PRIMARY PLANET GEAR SHAFT      | 25614       | 3   |
| 13      | ROLLER BEARING                 | 24175       | 3   |
| 14      | BEARING RACE                   | 25361       | 6   |
| 15      | SPIROL PIN                     | 24113       | 3   |
| 15A     | SPIROL PIN                     | 23584       | 3   |
| 16      | PLANET CARRIER                 | 101748      | 1   |
| 17      | PLANET GEAR                    | 26467       | 3   |
| 18      | PLANET GEAR SHAFT              | 25613       | 3   |
| 19      | ROLLER BEARING                 | 25292       | 6   |
| 20      | BEARING SPACER                 | 25443       | 3   |
| 21      | THRUST WASHER                  | 24306       | 6   |
| 22      | OUTPUT SUN GEAR                | 100854      | 1   |
| 23      | PRIMARY SUN GEAR               | 101343      | 1   |
| 24      | THRUST WASHER                  | 40129       | 1   |
| 25      | O-RING                         | 25108       | 1   |
| 26      | OIL SEAL                       | 101995      | 1   |
| 27      | CAPSCREW (1/2 X 1-1/2 NC G8 Z) | 104322      | 6   |
| 28      | LOCKWASHER (1/2)               | 11026       | 6   |
| 29      | THRUST WASHER                  | 40128       | 1   |
| 30      | PISTON, OVERRIDE               | 103953      | 1   |
| 31      | O-RING                         | 74112       | 1   |
| 32      | O-RING                         | 29717       | 1   |
| 33      | WAVE SPRING                    | 102426      | 1   |
| 34      | THRUST RACE                    | 24581       | 1   |
| 35      | NEEDLE BEARING                 | 29286       | 1   |
| 36      | THRUST RACE                    | 13680       | 1   |
| 37      | PRIMARY SPACER                 | 25729       | 1   |
| 38      | BRAKE CYLINDER                 | 103952      | 1   |
| 39      | SEAL                           | 25642       | 1   |
| 40      | PRESSURE PLATE                 | 25635       | 1   |
| 41      | SPRING                         | 103954      | 6   |
| 42      | DISC-FRICTION                  | 21036       | 6   |
| 43      | STEEL DISK                     | 100027      | 10  |
| 44      | PISTON BACKUP RING             | 25636       | 1   |
| 45      | SPACER                         | 25637       | 1   |
| 46      | O-RING                         | 24981       | 1   |
| 47      | BACK-UP RING                   | 25643       | 1   |
| 48      | CAPSCREW (1/2 X 2-1/4 NC G8 Z) | 104137      | 4   |
| 49      | MOTOR SUPPORT                  | 103991      | 1   |
| 50      | LOCKWASHER (1/2)               | 11026       | 4   |
| 51      | SHIPPING PLUG                  | 25403       | 2   |
| 52      | SPRING SPACER                  | 100200      | 1   |
| 53      | VENT PLUG                      | 18062       | 1   |
| 54      | PLUG                           | 25665       | 2   |
| 55      | BRAKE COUPLING                 | 103992      | 1   |
| 56      | PLUG                           | 70177       | 1   |
| 58      | BLEEDER FITTING                | 27472       | 2   |
| 59      | O-RING                         | 21063       | 1   |