

Meritor MTC3111 (T-2111) Series Transfer Case Service Manual

Pro Gear Meritor MTC3111 (T-2111) Transfer Case Parts Manual to assist in identifying your Meritor / Fabco unit.

If you need any assistance identifying the correct transfer case unit for your truck and equipment, contact your Meritor / Fabco replacement part specialists at Pro Gear and Transmission.

Pro Gear Transmission has same day shipping and 1000's of products in stock and ready to ship internationally for your next project.

For parts or service contact the Meritor / Fabco specialists at Pro Gear & Transmission, Inc.

1 (877) 776-4600
(407) 872-1901
parts@eprogear.com



T-2111 Series Transfer Cases

**Maintenance Manual No. 3D
Revised 2-96**

**T-2111-D
T-2111-PD
T-2111-T
T-2111-HP**

**T-2111-SD
T-2111-SPD
T-2111-ST
T-2111-SHP**

SERVICE NOTES

This Maintenance Manual describes the correct service and repair procedures for the Rockwell T-2111 Series Transfer Case. The information contained in this manual was current at the time of printing and is subject to change without notice or liability.

You must follow your company safety procedures when you service or repair equipment. Be sure you understand all the procedures and instructions before you begin work on the unit.

Rockwell uses the following types of notes to give warning of possible safety problems and to give information that will prevent damage to equipment.



WARNING

A warning indicates procedures that must be followed exactly. Serious personal injury can occur if the procedure is not followed.



CAUTION

A caution indicates procedures that must be followed exactly. If the procedure is not followed, damage to equipment or components can occur. Serious personal injury can also occur in addition to damaged or malfunctioning equipment or components.



TORQUE

This symbol is used to indicate fasteners that must be tightened to a specific torque value.

NOTE:

A note indicates an operation, procedure or instruction that is important for correct services.

Some procedures require the use of special tools for safe and correct service. Failure to use these special tools when required, can cause serious personal injury to service personnel or damage to vehicle components.

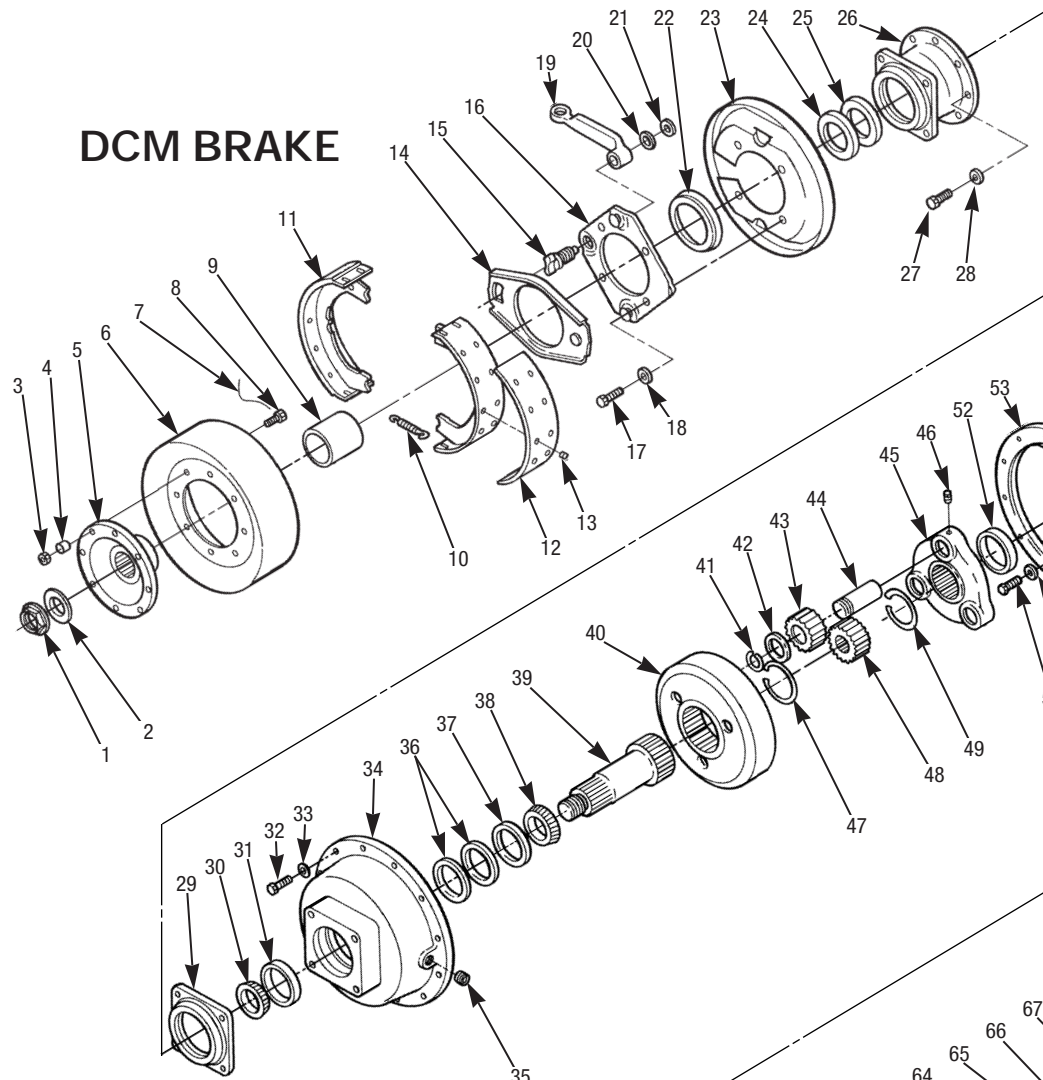


ASBESTOS AND NON-ASBESTOS FIBER WARNING

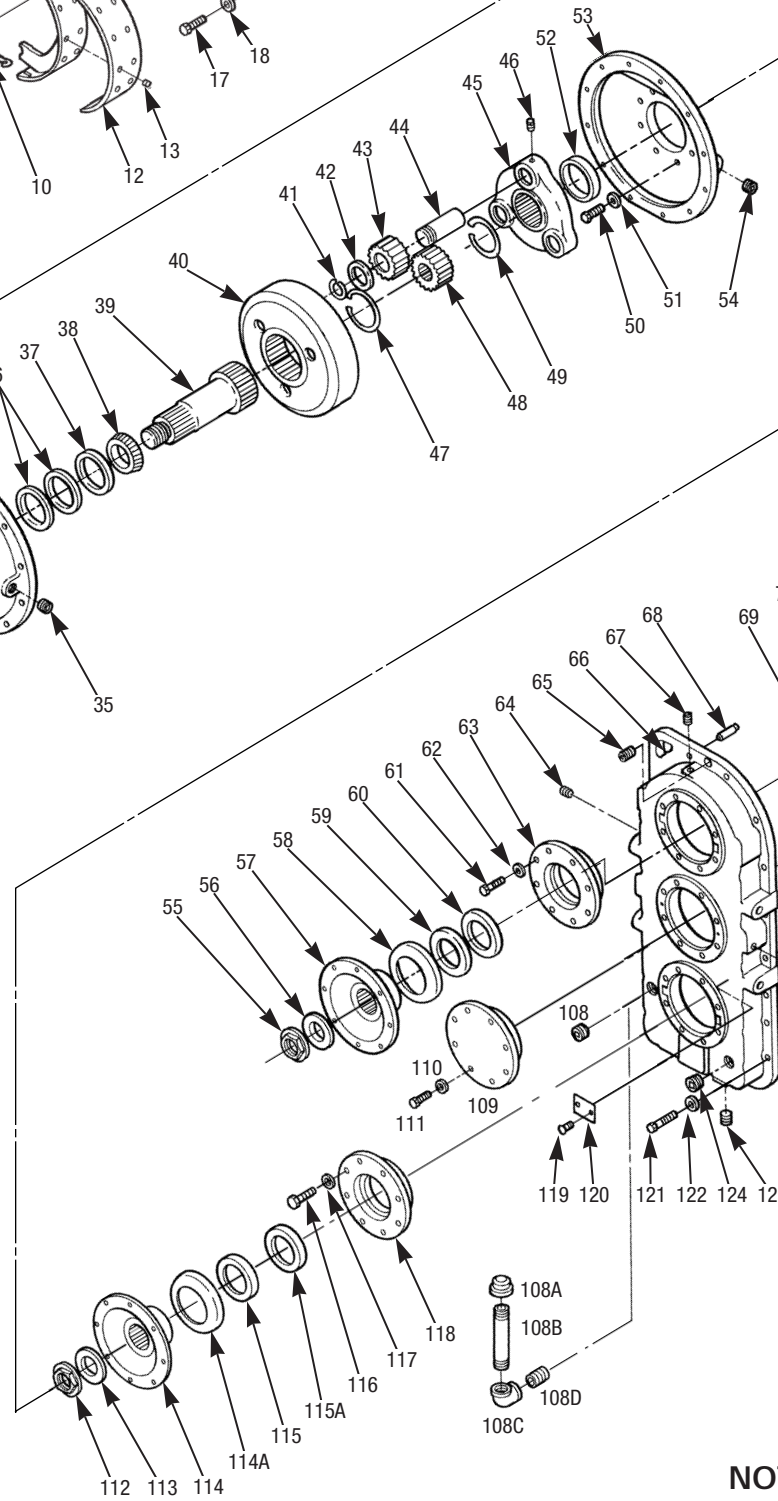
Current Rockwell DCM brake linings do not use asbestos fibers. Some aftermarket brake linings contain asbestos fiber, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers whose long term effects are unknown.

Caution should be exercised in handling both asbestos and non-asbestos materials as described on page 2.

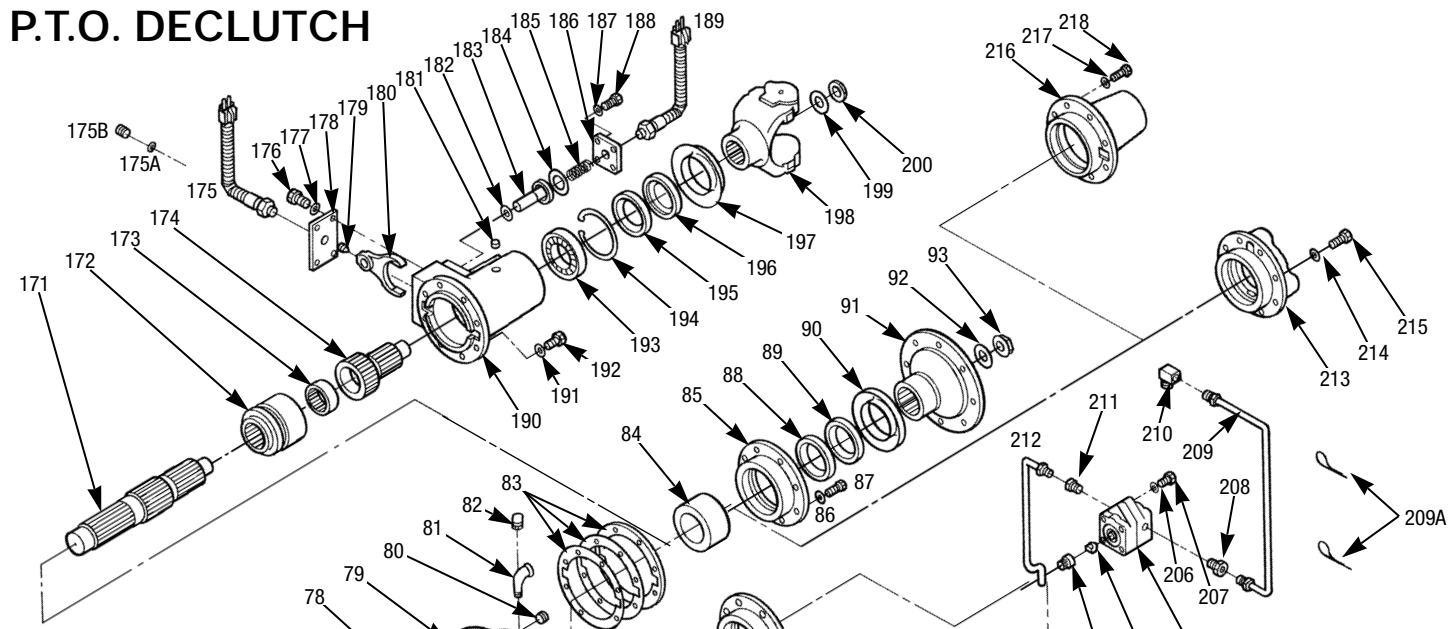
DCM BRAKE



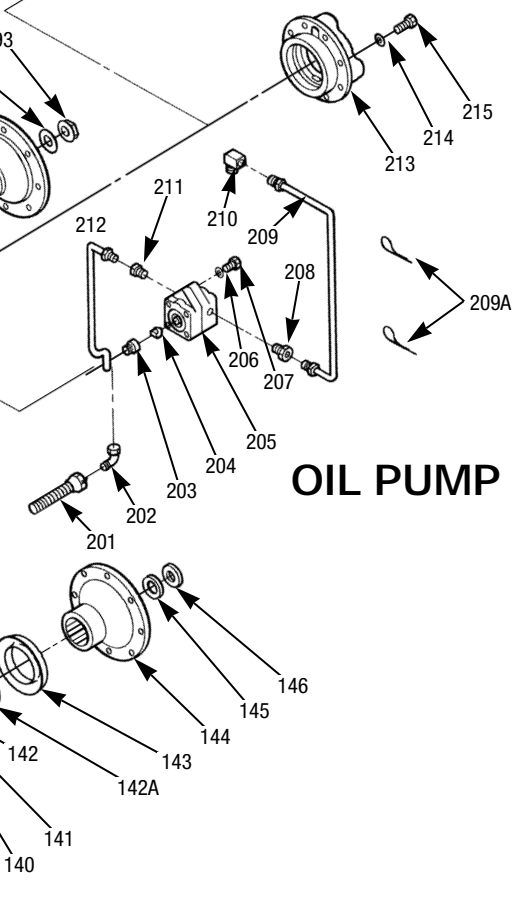
PROPORTIONAL DIFFERENTIAL



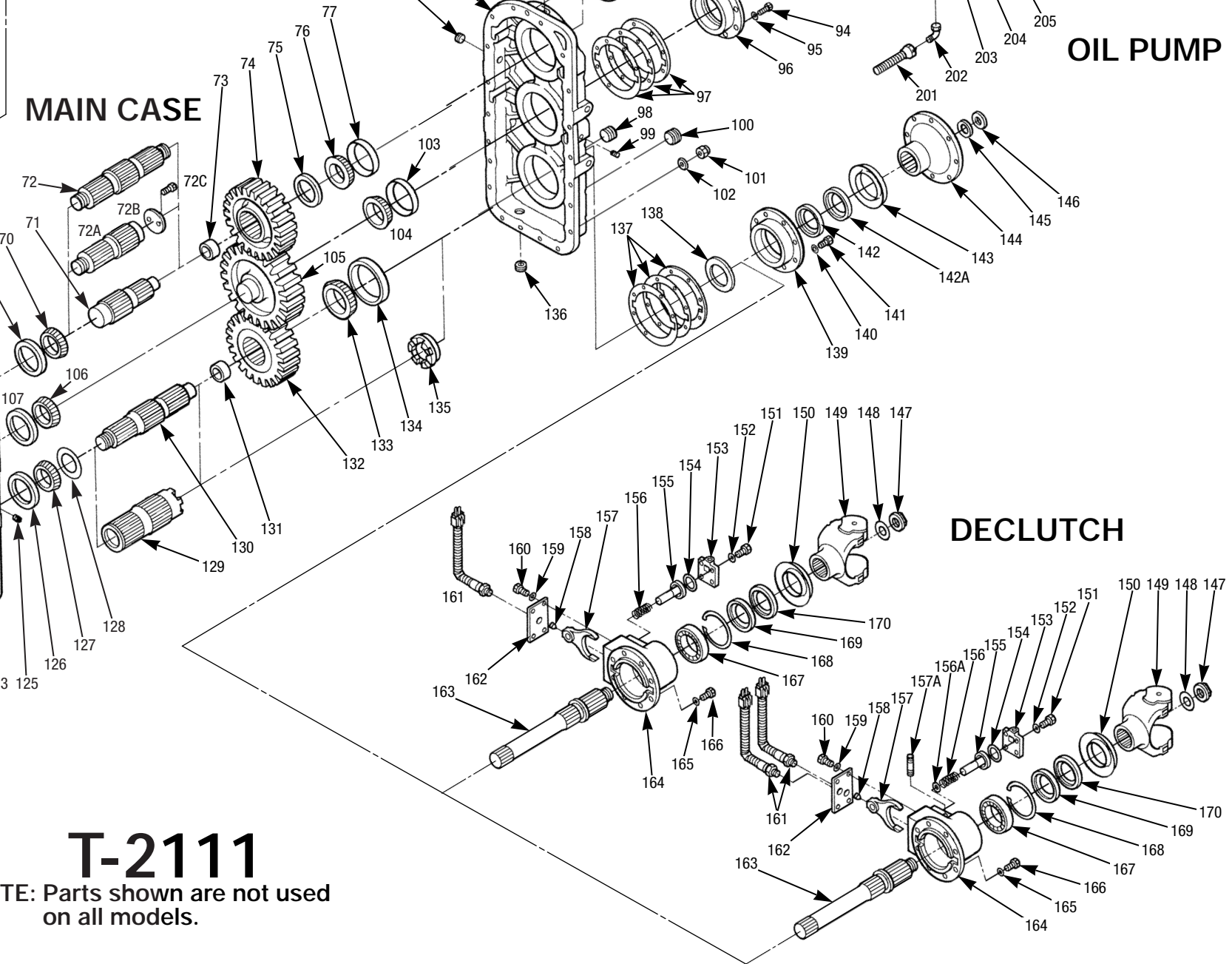
P.T.O. DECLUTCH



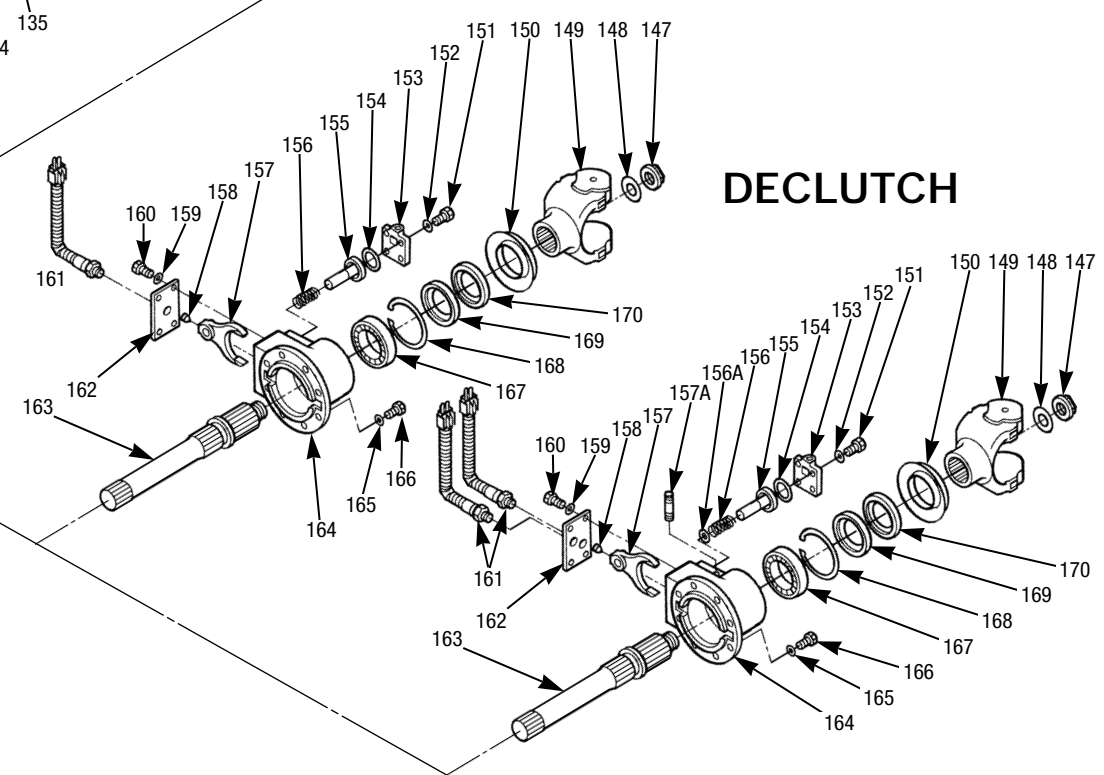
OIL PUMP



MAIN CASE



DECLUTCH



T-2111

NOTE: Parts shown are not used on all models.

Item	Description	Qty	Item	Description	Qty	Item	Description	Qty
T-2111 SERIES DCM BRAKES			76	Cone-input shaft bearing	1	151	Capscrew-declutch shift cover	4
1	Locknut-brake	1	77	Cup-input shaft bearing	1	152	Washer-shift cover capscrew	4
2	Washer-brake	1	78	Plug-transfer case	1	153	Cover-declutch cage	1
3	Nut-brake drum to flange	8	79	Case-transfer	1	154	Quad Ring-declutch piston	1
4	Spacer-brake drum to flange	8	80	Plug-transfer case	1	155	Piston-declutch	1
5	Flange/Yoke-brake drum	1	81	Elbow-oil breather	1	156	Spring-declutch piston return	1
6	Drum-brake	1	82	Breather-transfer case	1	156A	Washer-cage capscrew	1
7	Lockwire-brake drum to hub capscrew	2	83	Shim-input shaft	3	157	Fork-declutch	1
8	Bolt-brake drum to hub	8	84	Spacer-input shaft	1	157A	Nipple	1
9	Spacer-brake hub	1	85	Cage Assy.-input shaft bearing	1	158	Setscrew-declutch fork	1
10	Spring-brake shoe return	4	86	Washer-bearing cage capscrew	8	159	Washer-declutch plate capscrew	4
11	Brake Shoe and Lining Assy.	2	87	Capscrew-input shaft bearing cage	8	160	Capscrew-declutch plate	4
12	Lining-brake	2	88	Oil Seal-input shaft bearing cage	1	161	Switch Assy.-declutch shift	1
13	Rivet-Lining to shoe	28	89	Oil Seal-input shaft bearing cage	1	162	Plate-declutch	1
14	Strut Assy.	1	90	Deflector-input flange/yoke	1	163	Shaft-declutch	1
15	Camshaft	1	91	Flange/Yoke-input shaft	1	164	Cage-declutch bearing	1
16	Backing Plate Assy.	1	92	Washer-input shaft	1	165	Washer-declutch cage capscrew	8
17	Capscrew-cover adapter to cage	4	93	Nut-input shaft	1	166	Capscrew-declutch bearing cage	8
18	Washer-cover adapter to cage	4	94	Capscrew-idler gear bearing cage	8	167	Bearing-declutch shaft ball	1
19	Lever-brake	1	95	Washer-bearing cage capscrew	8	168	Snap Ring-declutch bearing	1
20	Washer-brake	1	96	Cage Assy.-idler gear bearing	1	169	Oil Seal Assy.-declutch cage	1
21	Nut-lock	1	97	Shim-idler gear	3	170	Oil Seal Assy.-declutch cage	1
22	Deflector-brake adapter	1	98	Plug-oil suction	1	T-2111 SERIES 11,000 LB-FT DECLUTCH/P.T.O.		
23	Dust Shield	1	99	Plug-transfer case	1	171	Shaft-declutch	2
24	Oil Seal-brake bearing cage	1	100	Plug-oil fill	1	172	Collar-clutch	2
25	Oil Seal-brake bearing cage	1	101	Locknut-transfer case capscrew	20	173	Needle Bearing-declutch shaft	2
26	Cage Assy.-brake bearing	1	102	Washer-transfer case capscrew	20	174	Shaft Assy.-declutch	2
27	Capscrew-brake bearing cage	4	103	Cup-idler gear bearing	1	175	Switch Assy.-declutch shift	2
28	Washer-brake bearing cage capscrew	4	104	Cone-idler gear bearing	1	175A	Washer-declutch plate	1
T-2111 SERIES PROPORTIONAL DIFFERENTIAL			105	Gear-idler	1	175B	Plug-declutch plate	1
29	Adapter-brake assy.	1	106	Cone-idler gear bearing	1	176	Capscrew-declutch plate	8
30	Cone-proportional diff. cage shaft	1	107	Cup-idler gear bearing	1	177	Washer-declutch plate capscrew	8
31	Cup-proportional diff. cage shaft	1	108	Plug-oil fill	1	178	Plate-declutch	2
32	Capscrew-diff. cage to gear case cover	12	108A	Cap-filler pipe	1	179	Setscrew-declutch fork	2
33	Washer-diff. cage to gear case cover	12	108B	Nipple-filler pipe	1	180	Fork-declutch	2
34	Cage-proportional diff.	1	108C	Elbow-filler pipe	1	181	Plug-declutch cage	2
35	Plug-oil drain	1	108D	Nipple-filler pipe	1	182	Quad Ring-declutch piston	2
36	Shim-proportional diff. cage bearing spacer	2	109	Cage Assy.-idler gear bearing	1	183	Piston-declutch	2
37	Cup-proportional diff. cage shaft	1	110	Washer-bearing cage capscrew	8	184	Quad Ring-declutch piston	2
38	Cone-proportional diff. cage shaft	1	111	Capscrew-idler gear bearing cage	8	185	Spring-declutch piston return	2
39	Shaft-output outer	1	112	Nut-output shaft	1	186	Cover-declutch cage	2
40	Gear-proportional diff. ring	1	113	Washer-output shaft	1	187	Washer-shift cover capscrew	8
41	Snap Ring-planet, pinion shaft	3	114	Flange/Yoke-output shaft	1	188	Capscrew-declutch shift cover	8
42	Washer-planet. pinion thrust	3	115	Deflector-output shaft	1	189	Switch Assy.-declutch shift	2
43	Pinion Planet Spider	3	115A	Oil Seal-output shaft	1	190	Cage-declutch bearing	2
44	Shaft-planet pinion	3	116	Oil Seal-output shaft bearing cage	2	191	Washer-declutch cage capscrew	16
45	Spider Assy.-planet gear	1	117	Capscrew-output shaft bearing cage	4	192	Capscrew-declutch brg. cage	16
46	Setscrew-planet pinion shaft	3	118	Washer-bearing cage capscrew	4	193	Bearing-declutch shaft ball	2
47	Snap Ring-outer output shaft	1	119	Cage Assy.-output shaft bearing	1	194	Snap Ring-declutch bearing	2
48	Gear-planet sun	1	120	Screw-name plate	2	195	Oil Seal Assy.-declutch cage	2
49	Snap Ring-inner output shaft	1	121	Name Plate	1	196	Oil Seal Assy.-declutch cage	2
50	Capscrew-output shaft cage	8	122	Capscrew-transfer case	20	197	Deflector-declutch yoke	2
51	Washer-output shaft cage capscrew	8	123	Washer-transfer case capscrew	20	198	Flange/Yoke-declutch	1
52	Spacer-output shaft planet spider	1	124	Plug-oil drain	1	199	Washer-declutch shaft	2
53	Cover-proportional diff. gear case	1	125	Plug-oil suction	1	200	Nut-declutch shaft	2
54	Plug-oil fill hole	1	126	Plug-transfer case	1	T-2111 SERIES OIL PUMP		
T-2111 SERIES MAIN CASE			127	Cup-output shaft bearing	1	201	Fitting/Filter Assy.	1
55	Nut-input shaft lock	1	128	Spacer-output shaft bearing to gear	1	202	Fitting-inlet tube to filter	1
56	Washer-input shaft	1	129	Shaft-output	—	203	Button-pump drive	1
57	Flange/Yoke-input shaft	1	130	Shaft-output	1	204	Coupling-oil pump	1
58	Deflector-input shaft	1	131	Bushing-output	1	205	Pump Assy-oil	1
59	Oil Seal-input shaft bearing cage	1	132	Gear-output shaft	1	206	Washer-oil pump to cage capscrew	4
60	Oil Seal-input shaft bearing cage	1	133	Cone-output shaft bearing	1	207	Capscrew-oil pump to idler cage	4
61	Capscrew-input shaft bearing cage	8	134	Cup-output shaft bearing	1	208	Fitting-oil pump Assy.	1
62	Washer-bearing cage capscrew	8	135	Collar-clutch	1	209	Tube Assy.-lube outlet	1
63	Cage Assy.-input shaft bearing	1	136	Plug-oil drain	1	209A	Clamp	2
64	Plug-transfer case	1	137	Shim-output shaft	3	210	Fitting-outlet tube to cage	1
65	Plug-transfer case	1	138	Spacer-output shaft	1	211	Fitting-oil pump Assy.	1
66	Case-transfer	1	139	Cage Assy.-output shaft bearing	1	212	Tube Assy.-lube inlet	1
67	Plug-transfer case	1	140	Washer-bearing cage capscrew	8	213	Cage-bearing transfer case	1
68	Dowel-transfer case	2	141	Capscrew-output shaft bearing cage	8	214	Washer-cage capscrew	1
69	Cup-input shaft bearing	1	142	Oil Seal-output shaft	1	215	Capscrew	1
70	Cone-input shaft bearing	1	142A	Oil Seal-output shaft bearing cage	1	216	Cage-bearing transfer case	1
71	Shaft-input	1	143	Deflector-output flange/yoke	1	217	Washer-cage capscrew	1
72	Shaft-input	1	144	Flange/Yoke-output shaft	1	218	Capscrew-output bearing shaft	4
72A	Shaft-input	1	145	Washer-output shaft	1	T-2111 SERIES 5450 LB-FT DECLUTCH/P.T.O.		
72B	Retaining Plate-bearing	1	146	Nut-output shaft	1	147	Nut-declutch shaft	1
72C	Capscrew-retaining plate	2				148	Washer-declutch shaft	1
73	Bushing-input	1				149	Flange/Yoke-declutch	1
74	Gear-input shaft	1				150	Deflector-output flange/yoke	1
75	Spacer-input shaft	1						

Table of Contents


SUBJECT	PAGE
 Asbestos and Non-Asbestos Fiber Warnings	2
1. Introduction	
Description.....	3
Operation.....	5
Identification.....	6
2. Removal and Installation	
Remove Transfer Case from Vehicle	7
Install Transfer Case in Vehicle	8
Drain and Replace Oil.....	8
Check and Adjust Oil Level	8
3. Disassembly	
Disassemble Parking Brake.....	9
Disassemble Proportional Differential.....	10
Disassemble Planetary Spider Assembly	10
Disassemble Yokes from Input and Output Shafts	11
Disassemble Bearing Cages from Front Half Side	11
Disassemble Declutch Assembly.....	12
Disassemble Proportional Differential Lockout and Front Output Shaft Assembly	13
Disassemble Housing Valves	13
Disassemble Bearing Cages and Differential Cover from Housing	14
Disassemble Idler Gear, Input and Output Shaft Assemblies	14
Disassemble Input and Idler Shaft Bearing Cages	14
4. Cleaning and Inspection	
Clean Ground and Polished Parts	15
Clean Rough Parts	15
Clean Transfer Case Assemblies	15
Dry Cleaned Parts	15
Prevent Corrosion and Rust on Cleaned Parts.....	15
Inspect Parts.....	16
5. Assembly	
Assemble Input Shaft, Idler Gear and Output Shaft Assemblies	18
Assemble Bearing Cages and Differential Cover in Rear Case Half	19
Install Input Shaft, Idler Gear and Output Shaft Assemblies	19
Assemble Transfer Case Housing	20
Install Remaining Bearing Cages	20
Check Bearing Endplay	22
Assemble Front Output Shaft Differential Lockout Assembly	23
Install Yokes	24
Assemble Planetary Spider Assembly.....	24
Assemble Proportional Differential	25
Check Bearing Endplay	25

Table of Contents (continued)

SUBJECT	PAGE
Install Output Shaft and Bearing Cage Assembly	27
Assemble Parking Brake	27
Application of Silicone Gasket Material	29
6. Lubrication	
Recommended Oil	30
Oil Substitutes	30
Acceptable Motor Oil Alternatives	30
Transfer Case Oil Levels	31
7. Diagnostics	
Overheating	32
Oil Blowing Out Of Breather	32
Oil Seal Leaks	32
Noise/Vibration	32
Declutch Indicator Not Functioning	32
Premature Gear/Bearing Wear	32
8. Specifications	
T-2111-D/SD, T-2111-PD/SPD, T-2111-T/ST, T-2111-HP/SHP Specifications	33
Allowable Maximum Speed	33
Transfer Case Oil Change Intervals	34
Transfer Case Oil Specifications	34
Transfer Case Oil Capacities	34
Driveline Application Guideline	35
Driveline Length Guideline	35
Maximum Driveline Angle Guideline	35
Torque Chart	36
Tire Mismatch	37
T-2111 Transfer Case Variations	38



ASBESTOS FIBER WARNING

The following procedures for servicing brakes are recommended to reduce exposure to asbestos fiber dust, a cancer and lung disease hazard. Material Safety Data Sheets are available from Rockwell.

Hazard Summary

Because some brake linings contain asbestos, workers who service brakes must understand the potential hazards of asbestos and precautions for reducing risks. Exposure to airborne asbestos dust can cause serious and possibly fatal diseases, including asbestosis (a chronic lung disease) and cancer, principally lung cancer and mesothelioma (a cancer of the lining of the chest or abdominal cavities). Some studies show that the risk of lung cancer among persons who smoke and who are exposed to asbestos is much greater than the risk for non-smokers. Symptoms of these diseases may not become apparent for 15, 20 or more years after the first exposure to asbestos.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to asbestos dust follow. Consult your employer for more details.

Recommended Work Practices

1. **Separate Work Areas.** Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons. OSHA has set a maximum allowable level of exposure for asbestos of 0.1 f/cc as an 8-hour time-weighted average and 1.0 f/cc averaged over a 30-minute period. Scientists disagree, however, to what extent adherence to the maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling asbestos dust. OSHA requires that the following sign be posted at the entrance to areas where exposures exceed either of the maximum allowable levels:

**DANGER: ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA**

2. **Respiratory Protection.** Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA for use with asbestos at all times when servicing brakes, beginning with the removal of the wheels.
3. **Procedures for Servicing Brakes.**
 - a) Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.
 - b) As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
 - c) If an enclosed vacuum system or brake washing equipment is not available, employers may adopt their own written procedures for servicing brakes, provided that the exposure levels associated with the employer's procedures do not exceed the levels associated with the enclosed vacuum system or brake washing equipment. Consult OSHA regulations for more details.
 - d) Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.
 - e) **NEVER** use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA filter when cleaning brake parts or assemblies. **NEVER** use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.
4. **Cleaning Work Areas.** Clean work areas with a vacuum equipped with a HEPA filter or by wet wiping. **NEVER** use compressed air or dry sweeping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos. When you replace a HEPA filter, wet the filter with a fine mist of water and dispose of the used filter with care.
5. **Worker Clean-Up.** After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.
6. **Waste Disposal.** Dispose of discarded linings, used rags, cloths and HEPA filters with care, such as in sealed plastic bags. Consult applicable EPA, state and local regulations on waste disposal.

Regulatory Guidance

References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.

Page 2



NON-ASBESTOS FIBER WARNING

The following procedures for servicing brakes are recommended to reduce exposure to non-asbestos fiber dust, a potential cancer and lung disease hazard. Material Safety Data Sheets are available from Rockwell.

Hazard Summary

Most recently manufactured brake linings do not contain asbestos fibers. These brake linings may contain one or more of a variety of ingredients, including glass fibers, mineral wool, aramid fibers, ceramic fibers and silica that can present health risks if inhaled. Scientists disagree on the extent of the risks from exposure to these substances. Nonetheless, exposure to silica dust can cause silicosis, a non-cancerous lung disease. Silicosis gradually reduces lung capacity and efficiency and can result in serious breathing difficulty. Some medical experts believe other types of non-asbestos fibers, when inhaled, can cause similar diseases of the lung. In addition, silica dust and ceramic fiber dust are known to the State of California to cause lung cancer. U.S. and international agencies have also determined that dust from mineral wool, ceramic fibers and silica are potential causes of cancer.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to non-asbestos dust follow. Consult your employer for more details.

Recommended Work Practices

1. **Separate Work Areas.** Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons.
2. **Respiratory Protection.** OSHA has set a maximum allowable level of exposure for silica of 0.1 mg/m³ as an 8-hour time-weighted average. Some manufacturers of non-asbestos brake linings recommend that exposures to other ingredients found in non-asbestos brake linings be kept below 1.0 f/cc as an 8-hour time-weighted average. Scientists disagree, however, to what extent adherence to these maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling non-asbestos dust.

Therefore, wear respiratory protection at all times during brake servicing, beginning with the removal of the wheels. Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA, if the exposures levels may exceed OSHA or manufacturer's recommended maximum levels. Even when exposures are expected to be within the maximum allowable levels, wearing such a respirator at all times during brake servicing will help minimize exposure.

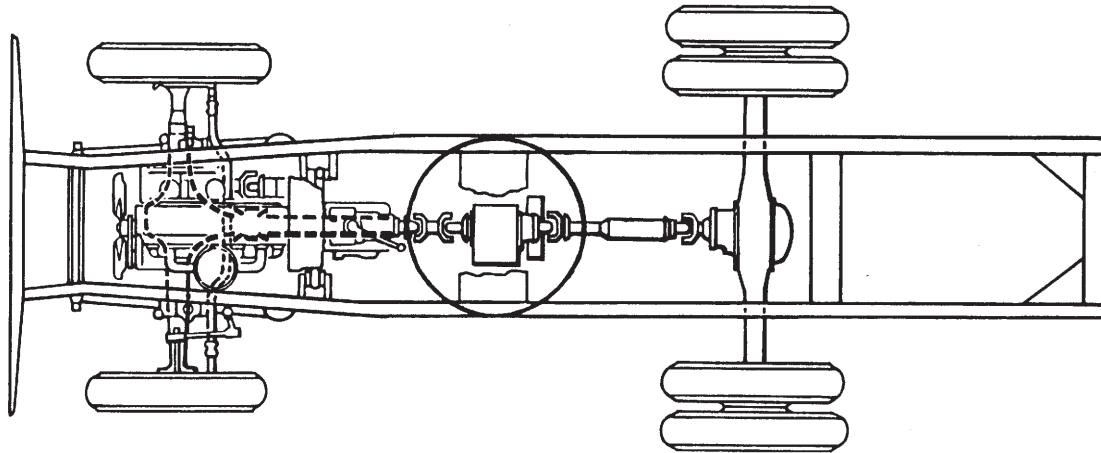
3. **Procedures for Servicing Brakes.**
 - a) Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.
 - b) As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
 - c) If an enclosed vacuum system or brake washing equipment is not available, carefully clean the brake parts in the open air. Wet the parts with a solution applied with a pump-spray bottle that creates a fine mist. Use a solution containing water, and, if available, a biodegradable, non-phosphate, water-based detergent. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
 - d) Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.
 - e) **NEVER** use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA filter when cleaning brake parts or assemblies. **NEVER** use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.
4. **Cleaning Work Areas.** Clean work areas with a vacuum equipped with a HEPA filter or by wet wiping. **NEVER** use compressed air or dry sweeping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA, if the exposure levels may exceed OSHA or manufacturers' recommended maximum levels. When you replace a HEPA filter, wet the filter with a fine mist of water and dispose of the used filter with care.
5. **Worker Clean-Up.** After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.
6. **Waste Disposal.** Dispose of discarded linings, used rags, cloths and HEPA filters with care, such as in sealed plastic bags. Consult applicable EPA, state and local regulations on waste disposal.

Regulatory Guidance

References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.

Section 1 Introduction

Figure 1



TYPICAL 4x4 HOOKUP

Description

The Rockwell T-2111-D, T-2111-PD, T-2111-T, T-2111-HP and T-2111-SD/SPD/ST transfer cases are a three-shaft design with single speed front and rear output and 1:1 ratio for use with 4x4 and 6x6 vehicles. Their 16.125 inch (409.5 mm) input to output drop permits engine clearance. **Figure 1.**

NOTE:

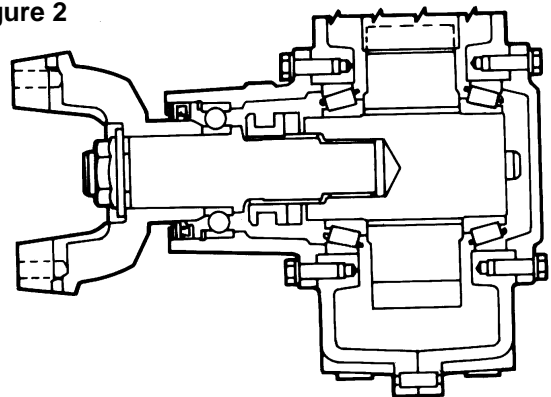
The T-2111-SD/ST/SPD transfer cases vary only in their main case configuration from the T-2111. All options and features are the same as described in this Maintenance Manual.

Rockwell transfer case air actuated Front Axle Declutch, Proportional Differential (PD) and Full Torque PTO Lockups options are driver controlled from the cab. By activating an air plunger or electric switch usually mounted on the instrument panel, the driver engages or disengages a mechanical clutch in each of these devices. Optional indicator switches show when each clutch is fully engaged or disengaged.

Air actuated options include:

- **Axle declutch option** permits shifting from 4-wheel drive to 2-wheel drive. **Figure 2.**

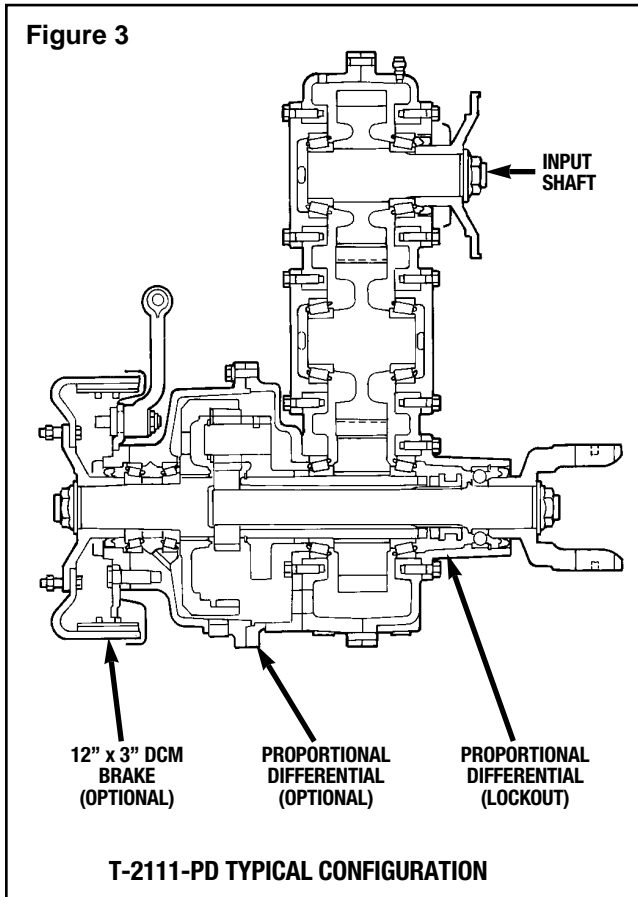
Figure 2



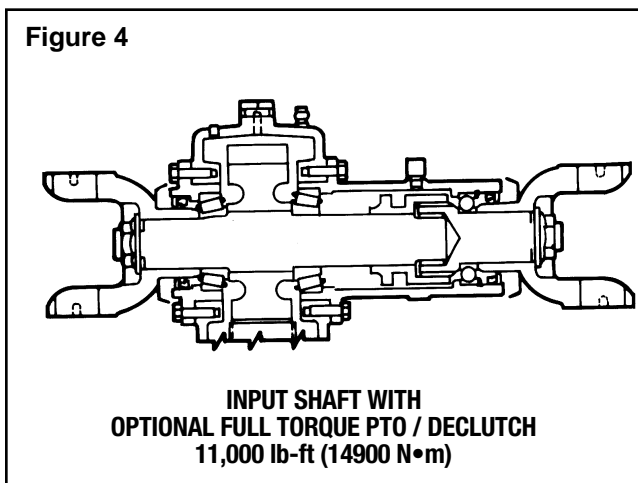
OPTIONAL AXLE DECLUTCH
5450 lb-ft (7400 N•m)

Section 1 Introduction

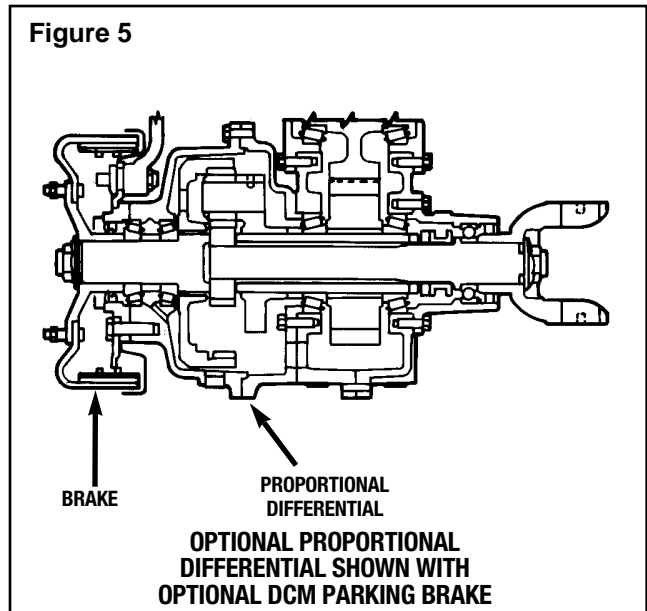
- **PD option transfer cases** permit full-time All-wheel drive. **Figure 3.**



- **Full torque PTO** provides an outlet from the transfer case to drive auxiliary power devices. PTO has the same type of clutch as the declutch and PD lockup units. **Figure 4.**



- **Proportional Differential** with a 30/70 torque split (Front axle, 30%; rear axle, 70%) can be locked up to give full power to each axle. **Figure 5.**



Other options include:

- **Indicator switches** for Declutches, Full Torque PTOs and Proportional Differentials.
- **A 12" x 3" (305 mm x 76 mm) DCM parking brake** on the rear output shaft.
- **Oil pump** to provide lubrication to top mounted PTOs, declutches or main case assembly in 500 rpm duty cycle operations.
- **SAE 2-bolt hydraulic pump mount.**
- **Thru-shaft** for higher torque applications.
- **Multiple PTOs and declutches** to permit flexible configurations. PTOs and declutches are available in 5450 lb.-ft. (7400 N•m) and 11,000 lb.-ft. (14900 N•m) capacities.

CAUTION

Continuous use of the axle declutch and proportional differential on good operating surfaces will damage the transfer case.

Section 1

Introduction

Operation

NOTE:

- *The Axle Declutch and Proportional Differential (PD) Lockup provide maximum vehicle traction on poor operating surfaces. Both provide assured torque to all connected axles by completely locking their input shafts together to prevent spinout.*
- *Disengage the Front Axle Declutch during normal operation. Engage it only to provide additional vehicle traction during poor operating conditions.*



CAUTION

To avoid speed differences between axles, do not actuate the declutch or PD lockup units during normal driving conditions or high speed operations.

Engaging the Front Axle Declutch and PD Lockup

1. The declutch or PD lockup can be engaged only when:
 - vehicle stopped
 - or vehicle operating at constant low speed



CAUTION

The wheels must not be slipping at the time of engagement. This can cause damage to components.

2. If engagement is initiated and the clutch does not engage, turn the steering wheel in one direction and rock the vehicle back and forth until engagement occurs. The operator will know engagement occurs by:
 - hearing engagement
 - improved vehicle performance
 - optional indicator lights mounted in cab signal engagement.
3. When the declutch or PD lockup are engaged, the vehicle should be operated only at speeds under 25 mph (40 km).



CAUTION

- *The declutch and PD lockup should only be locked under poor operating conditions. Turning radius and steering responsiveness will be different in the locked condition. Under poor operating conditions unlock the declutch and PD lockup whenever possible.*
 - *Do not engage the declutch or PD lockup when wheels are slipping or while the vehicle is traveling up or down steep grades. Engaging the declutch or PD lockup during these conditions can cause damage to the transfer case and a potential loss of vehicle stability.*
4. Always monitor the optional engaged/disengaged indicator lights. Do not operate the vehicle until the proper engagement position is achieved.

Engaging and Disengaging the Full Torque PTO

1. The PTO can be engaged or disengaged only when:
 - transmission in NEUTRAL
 - vehicle stopped
 - all transfer case prop shafts no longer turning
2. If engagement is initiated and the clutch does not fully engage, put the transmission into LOW and slowly begin to spin the transfer case until engagement occurs. The operator will know engagement occurs by:
 - hearing engagement or disengagement
 - improved vehicle performance
 - optional indicator lights mounted in cab signal engagement or disengagement.
3. When possible, the driven auxiliary device should provide some resistance to spinning to assist in engaging the PTO.



CAUTION

Do not engage the PTO if the transfer case is stopped while the device that the PTO is to drive is turning. Engaging the device during these conditions can cause damage to the transfer case.

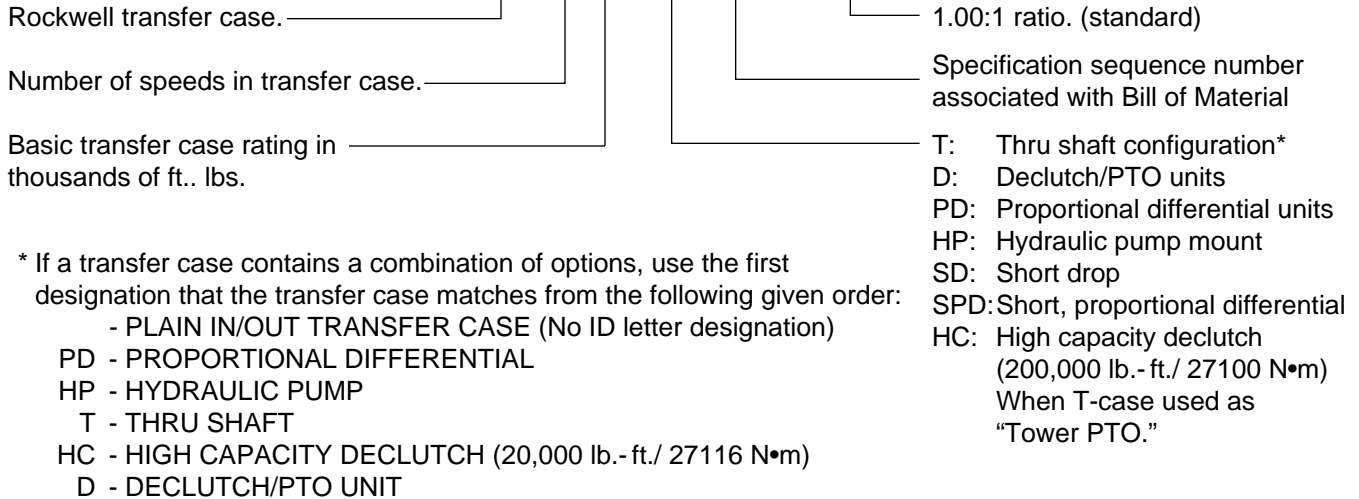
4. Always monitor the optional engaged/disengaged indicator lights. Do not operate the vehicle until the proper engagement position is achieved.

Section 1 Introduction

Identification

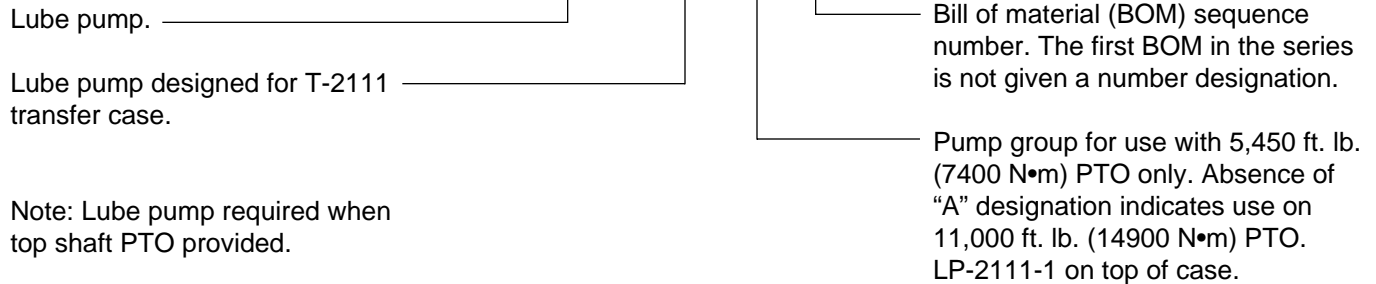
T-2111 TRANSFER CASE

T - 2 1 1 1 - T 1 0 1 - 1 0 0



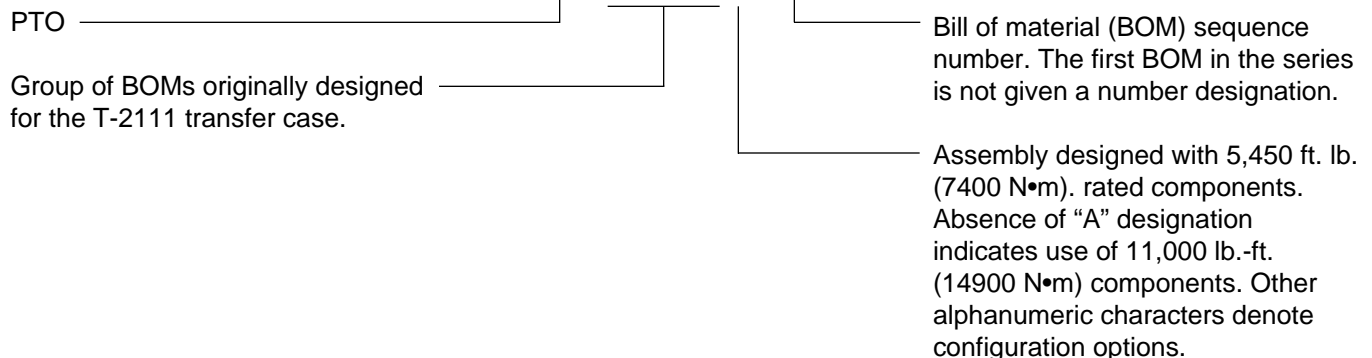
T-2111 LUBE PUMP

L P - 2 1 1 1 A - 1



T-2111 DECLUTCH/PTO/LOCKUP

P - 2 1 1 1 A - 1



Section 2

Removal and Installation

Remove Transfer Case from Vehicle



WARNING

To prevent serious eye injury, always wear safe eye protection when doing maintenance or service.



WARNING

The proportional differential eliminates dead engine holding ability if one end of the vehicle is raised without air pressure applied to the differential lockout. Serious personal injury can occur.



WARNING

Support the vehicle with safety stands. Do not work under a vehicle only supported by jacks. Jacks can slip or fall over and cause serious personal injury.

1. Make sure the vehicle is on a level surface.
2. Put blocks under the wheels not being raised to keep the vehicle from moving.
3. Raise the vehicle so that the area to be serviced is off the ground. Support the vehicle with safety stands.
4. Remove the drain plug from the bottom of the transfer case and the Proportional Differential (if equipped). Drain the lubricant from the transfer case. See page 8.

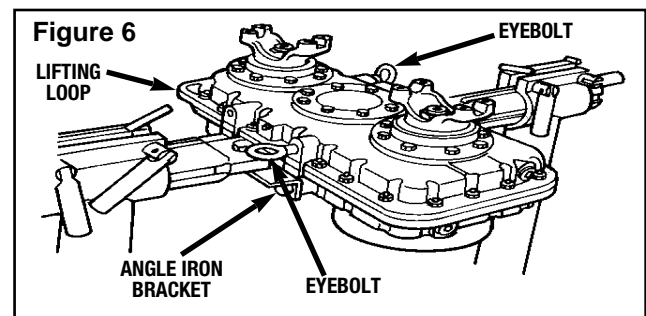
Also remove the drain plug from the bottom of the differential, if used, to drain the oil from the differential. See page 8.
5. Disconnect the drivelines from the input and output yokes or flanges of the transfer case.
6. Disconnect the brake actuator linkage from the parking brake.
7. Disconnect the air line to the differential lockout or the declutch/PTO.
8. Disconnect the harness for the indicator switch wires.

9. Use a hydraulic roller jack to support the transfer case. Remove the mounting bolts that hold the case to the vehicle.
10. Carefully remove the transfer case with the hydraulic jack.
11. Steam clean the outside of the transfer case to remove heavy amounts of dirt.

NOTE:

Close or cover all openings before steam cleaning. These openings include the breather and oil/level drain.

12. Attach angle iron brackets with bolts in the mounting holes of the brake half of the transfer case housing. **Figure 6.**



13. For a transfer case **without** lifting loops, install eye bolts in the mounting holes in the other half of the transfer case housing. The eye bolts permit easier lifting of the transfer case.



WARNING

To avoid serious personal injury and possible damage to components, be very careful when using lifting devices.

- **Inspect to make sure that the lifting loops or lifting straps are not damaged.**
 - **Always use both lifting loops and lifting straps when lifting.**
 - **Do not subject lifting loops or lifting straps to any shock or drop loading.**
14. Use a lifting device attached to the lifting loops or eye bolts to lift the transfer case. Use the angle iron brackets to mount the case in the repair stand. **Figure 6.**

Section 2

Removal and Installation

Install Transfer Case in Vehicle

1. With a lifting device, remove the transfer case from the repair stand to a hydraulic roller jack. If used, remove the temporary eyebolts and angle iron brackets from the transfer case housing.
2. Move the transfer case into position under the vehicle with the hydraulic roller jack.
3. Install the transfer case into the vehicle with the mounting bolts. Tighten the bolts to the torque specification supplied by the vehicle manufacturer.
4. Connect the drivelines to the input and output yokes of the transfer case.
5. Connect the brake actuator linkage to the parking brake.
6. Fill the transfer case with proper quantity of specified lubricant. See page 34 for lubricant specifications and capacities.

NOTE:

Allow time for the lubricant to flow through the rear output bearing into the proportional differential if the unit is so equipped.

Drain and Replace Oil

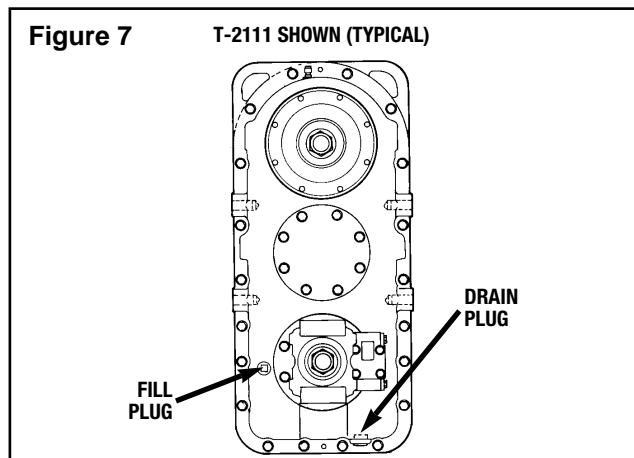
1. Make sure the vehicle is parked on a level surface. Put a large container under the transfer case.



WARNING

- **Use only the type of lubricant specified by the equipment manufacturer. Do not mix different types of lubricant. The wrong lubricant can cause damage, incorrect operation and serious personal injury.**
 - **Do not reuse lubricant. Used lubricant can be contaminated and can cause damage, incorrect operation and serious personal injury.**
2. Remove the drain plug from the bottom of the transfer case. Drain and properly discard the oil. Clean the plug. **Figure 7.**

3. Install and tighten the drain plug to 35-50 lb-ft (47-68 N•m).



4. Clean the area around the fill plug. Remove the fill plug from the transfer case.
5. Add the specified oil until the oil level is even with the bottom of the fill plug hole or to top of standpipe if used.
6. Install and tighten the fill plug to 35-50 lb-ft (47-68 N•m).



Check and Adjust Oil Level

1. Make sure the vehicle is parked on a level surface.
2. Clean the area around the fill plug. Remove the fill plug from the transfer case. **Figure 7.**
3. The oil level must be even with the bottom of the hole for the fill plug or to top of standpipe if used. See page 31.
 - If oil flows from the hole when the plug is loosened, the oil level is high. Let the oil drain to the correct level.
 - If the oil level is below the bottom of the hole of the fill plug, add the specified oil.
4. Install and tighten the fill plug to 35-50 lb-ft (47-68 N•m).



Section 3 Disassembly

Disassemble Parking Brake



WARNING

To prevent serious eye injury, always wear safe eye protection when doing maintenance or service.



WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers whose long term effects are unknown. Caution should be exercised in handling both asbestos and non-asbestos materials as described on page 2.

1. Remove transfer case from vehicle as described on page 7.
2. Rotate the transfer case in the repair stand so that the brake is facing upward.
3. Remove the output flange or yoke nut.
4. Lift the brake drum and flange assembly from the output shaft. If necessary, remove the brake drum from the flange.

NOTE:

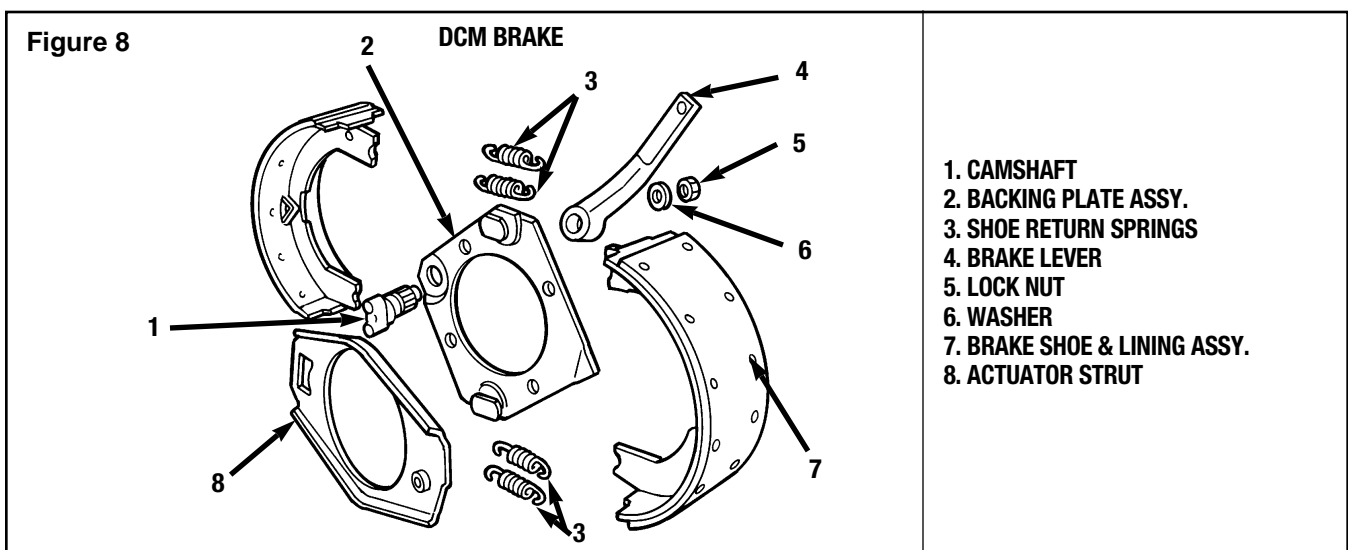
- Match mark the brake drum and flange so these parts can be put together in the same position at assembly.
- Refer to Figure 8 to disassemble the parking brake.

5. Use a brake shoe return spring removal tool to remove the brake shoe return springs (3) from the ends of the brake shoes (7). Discard the springs and replace them with new springs at reassembly.
6. Remove both brake shoes and mark them to identify their original position so that they are installed in the same position at reassembly.
7. Lift the actuator strut (8) from the brake backing plate (2).

NOTE:

Make a note of how the brake backing plate is mounted. Use the position of the camshaft as the reference point.

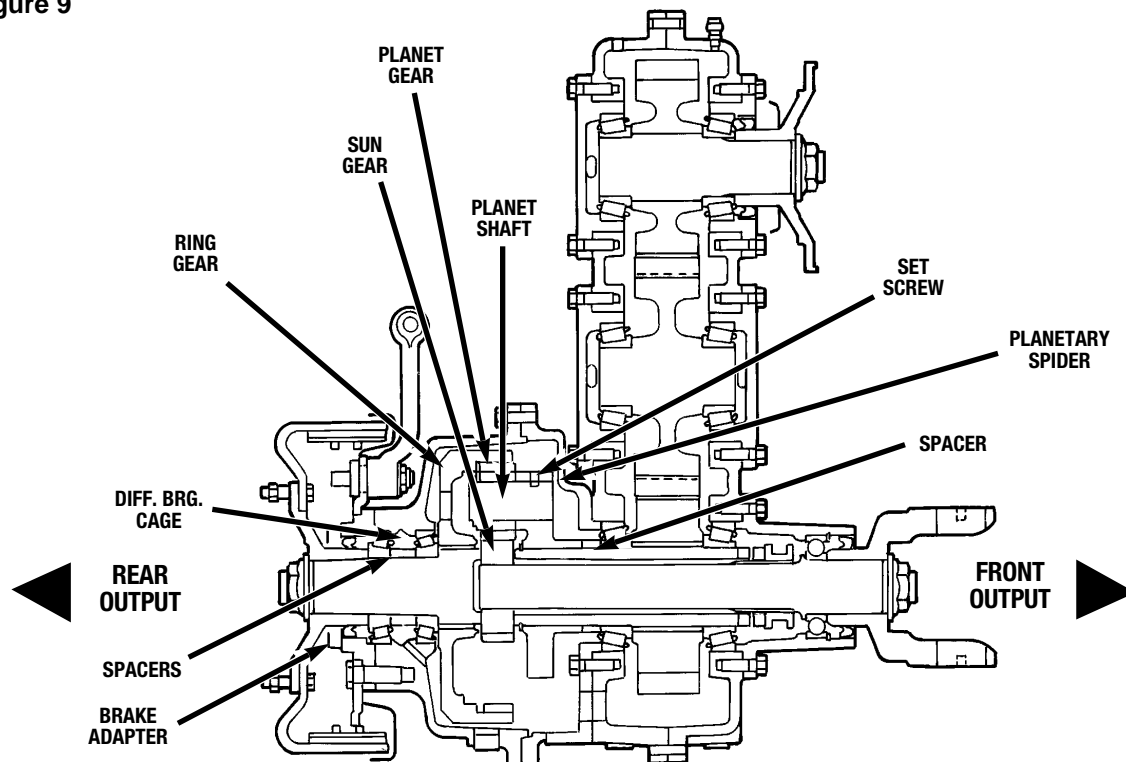
8. Remove the four brake backing plate mounting capscrews. Lift the backing plate and adapter assembly from the output shaft.
9. Remove the nut (5) and washer (6) that hold the camshaft to the brake lever (4). Remove the camshaft (1) and lever.
10. Remove the oil slinger and oil seal from the adapter.



Section 3

Disassembly

Figure 9



Disassemble Proportional Differential

NOTE:

Refer to Figure 9 to disassemble the proportional differential.

1. Remove the differential bearing cage-to-cover capscrews and washers. Lift the bearing cage and shaft assembly from the transfer case.
2. Remove the snap ring and the ring gear from the shaft.
3. Remove the shaft, bearing cones and spacers. Press the shaft out toward the large end of the bearing housing.
4. Use a bearing puller to remove the bearing cups from the housing.
5. Remove the sun gear from the front output shaft.
6. Remove the snap ring from the rear output shaft. Remove the planetary spider assembly and spacer.

Disassemble Planetary Spider Assembly

1. Remove the snap ring from the ends of the planet shafts.
2. Remove the thrust washer and planet gear from the planet shafts.
3. Remove the set screws from the planet shafts.
4. Press the planet pins out of the spider. Use care when handling the planet pins. **If the nylon coating on the pin is cut, the pin must be discarded.**

Section 3 Disassembly

Disassemble Yokes from Input and Output Shafts

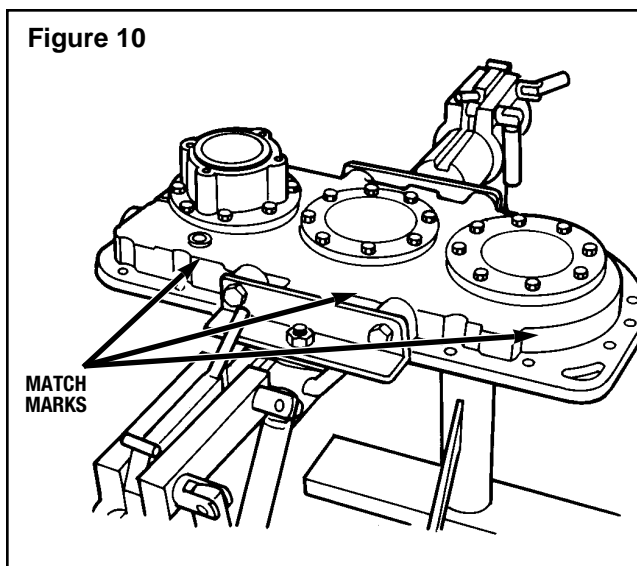
1. Rotate the transfer case in the repair stand so the yokes face upward.
2. Remove the yoke nuts and washers from the input and output shafts.
3. Remove the yokes from the output shafts.

NOTE:

Do not remove the oil slinger from the yoke or flange unless it is damaged.

Disassemble Bearing Cages from Front Half Side

1. Match mark the bearing cages and transfer case housing so that they can be put together in the same position at reassembly. **Figure 10.**

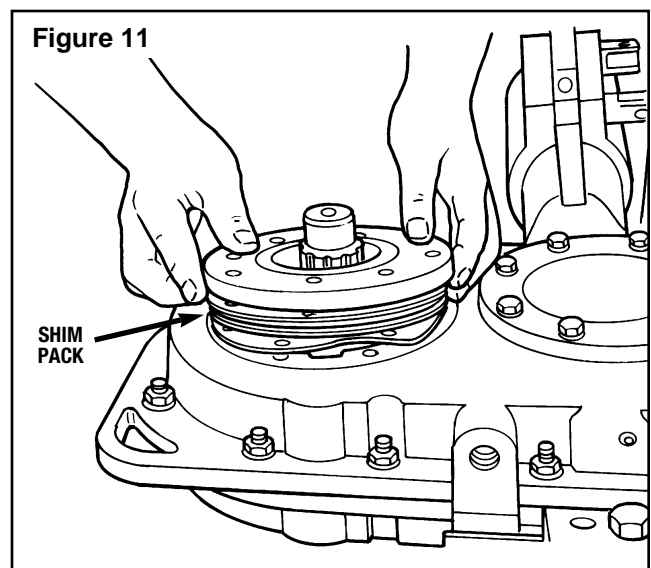


2. Remove the capscrews and washers that attach the bearing cages to the transfer case housing.

CAUTION

Be careful not to damage the shims when removing the bearing cage. Damaged shims can cause fluid leakage.

3. Lift the bearing cage and shim pack from both shafts. Keep the shim packs for use at reassembly. **Figure 11.**

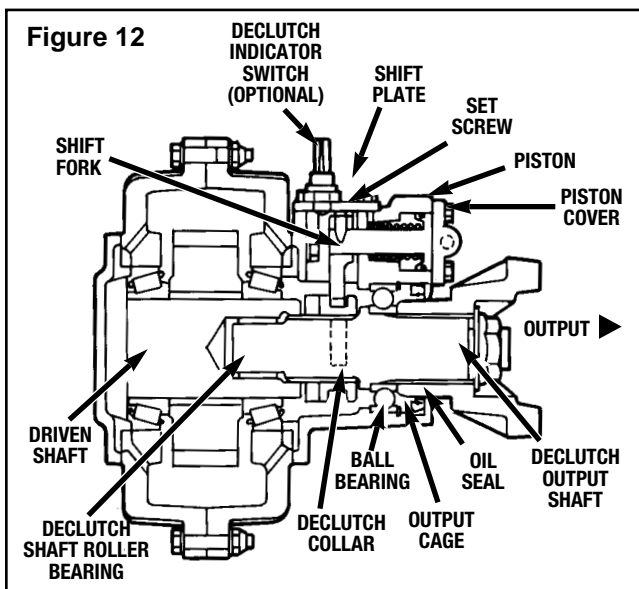


Section 3

Disassembly

Disassemble Declutch Assembly

5450 ft. lb. (7400 N•m) Version: Figure 12.



1. Rotate the transfer case in the repair stand so that the declutch assembly is facing upward.
2. If the declutch assembly has a declutch indicator switch, remove the declutch indicator switch from the shift plate.
3. Remove the capscrews and washers from the declutch shift plate. Remove the plate.
4. Remove the setscrew from the declutch shift fork.
5. Remove the capscrews and washers from the cover of the declutch piston. Remove the cover.
6. Remove the declutch piston and the return spring.
7. Remove the quad seal from the declutch piston. Discard the quad seal. Install a new quad at assembly.
8. Remove the shift fork.
9. Remove the two internal output cage mounting capscrews and washers.
10. Remove the external output cage mounting capscrews and washers.

CAUTION

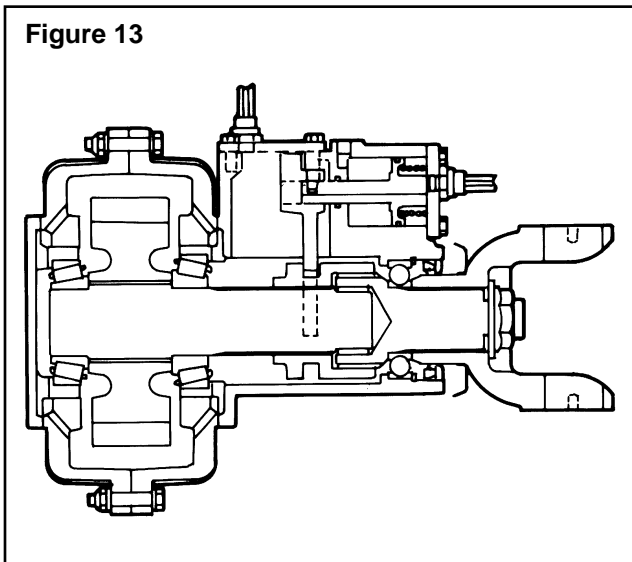
Be careful not to damage the shims when removing the bearing cage. Damaged shims can cause fluid leakage.

11. Lift the bearing cage and shaft assembly from the housing. If there are any shims in between the transfer case housing and bearing cage, keep them. You will use these shims at assembly. **Replace damaged or worn shims.**
12. Remove the oil and dirt seals from the bearing cage assembly.
13. Remove the ball bearing retention snap ring.
14. Remove the declutch output shaft and ball bearing assembly in the direction of the oil seal and snap ring bores.
15. Remove the sliding declutch collar.
16. Remove the ball bearing from the declutch output shaft.

NOTE:

Continue with steps 17 and 18 for “full torque” version.

11,000 ft. lb. (14900 N•m) “Full Torque” Version: Figure 13.



17. Remove the quad ring seal from the declutch bearing cage bore for the air piston shaft.
18. Remove the needle bearing from the bore of the declutch output shaft.

Section 3

Disassembly

Disassemble Proportional Differential Lockout and Front Output Shaft Assembly

1. Rotate the transfer case in the repair stand so that the declutch assembly is facing upward. **Figure 14.**
2. If the declutch assembly has a declutch indicator switch, remove the declutch indicator switch from the shift plate.
3. Remove the capscrews and washers from the declutch shift plate.
4. Remove the setscrew from the declutch shift fork.
5. Remove the capscrews and washers from the cover of the declutch piston. Remove the cover.
6. Remove the declutch piston and the return spring.
7. Remove the quad seal from the declutch piston. Discard the quad seal. Install a new quad seal at assembly.
8. Remove the shift fork.
9. Remove the two internal output cage mounting capscrews and washers.
10. Remove the external output cage mounting capscrews and washers.

CAUTION

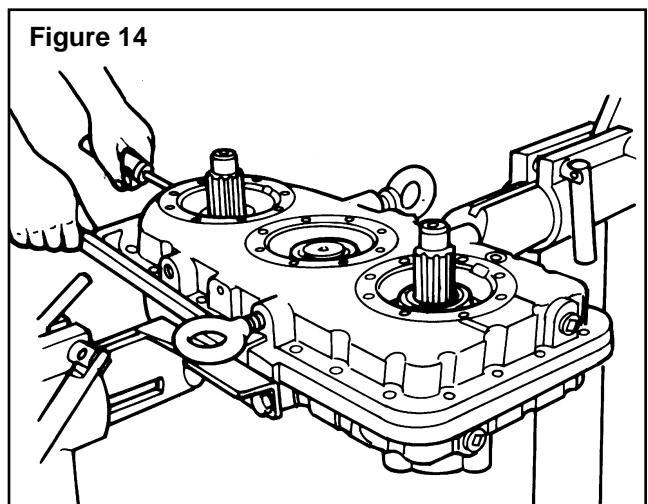
Be careful not to damage the shims when removing the bearing cage. Damaged shims can cause fluid leakage.

11. Lift the bearing cage and shaft assembly from the housing. If there are any shims in between the transfer case housing and bearing cage, keep them. You will use these shims at assembly. Replace damaged or worn shims.
12. Remove the oil and dirt seals from the bearing cage assembly.
13. Remove the ball bearing retention snap ring.
14. Remove the declutch output shaft and ball bearing assembly in the direction of the oil seal and snap ring bores.

15. Remove the sliding declutch collar.
16. Remove the ball bearing from the declutch output shaft.

Disassemble Housing Halves

1. Remove the bolt, washers and nuts from the outer flange of the housing.
2. Separate the case halves with a pry bar. **Figure 14.**



WARNING

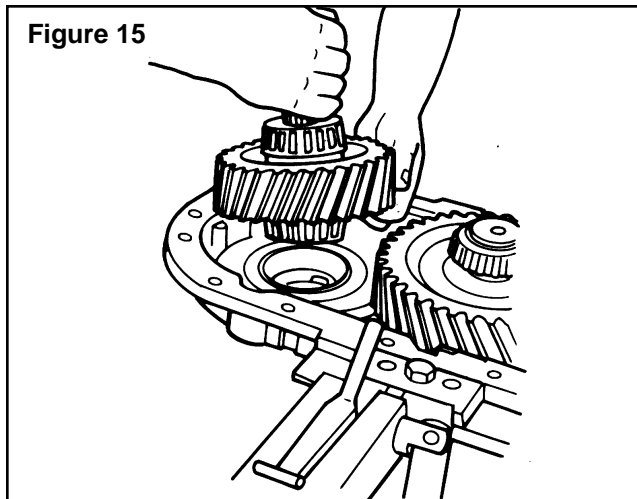
To avoid serious personal injury and possible damage to components, be very careful when using lifting devices.

- ***Inspect to make sure that the lifting loops or lifting straps are not damaged.***
 - ***Always use both lifting loops and lifting straps when lifting.***
 - ***Do not subject lifting loops or lifting straps to any shock or drop loading.***
3. Use the lifting loops or eyebolts to lift and remove the top half of the case.

Section 3

Disassembly

4. Lift and remove the three gear and shaft assemblies from the bottom of the case. **Figure 15.**



5. Remove the output shaft bearing cup from the lower housing half.

Disassemble Bearing Cages and Differential Cover from Housing

1. Rotate the case half in the work stand so the bearing cages face upward.
2. Match mark the bearing cages and the housing so that they can be reassembled in the same position.
3. Remove the capscrews and washers from the differential cover. Remove the cover.
4. Remove the capscrews and washers from the input and idler shaft bearing cages.
5. To loosen the bearing cages from the housing, hit the cage with a soft mallet from inside the housing.
6. Remove the bearing cages from the housing.

NOTE:

There are no shims under the bearing cages on this side of the housing.

Disassemble Idler Gear, Input and Output Shaft Assemblies

1. Use a bearing puller to remove the bearing cones from the idler gear assembly.



WARNING

Observe all WARNINGS and CAUTIONS provided by the press manufacturer concerning press operation to avoid serious personal injury and possible damage to components.

2. Use a hydraulic press with the correct support blocks to press the input and output shafts out of the gears and bearing cones.

Disassemble Input and Idler Shaft Bearing Cages

1. Remove and discard the oil seal from the input bearing cage.
2. Use a bearing puller to remove the bearing cups from the input shaft and idler shaft bearing cages.

Section 4

Cleaning and Inspection

Clean Ground and Polished Parts



WARNING

To prevent serious eye injury, always wear safe eye protection when doing maintenance or service.



WARNING

If you use cleaning solvents, hot solution tanks or alkaline solutions incorrectly, serious personal injury can occur. To prevent serious personal injury, follow the instructions supplied by the manufacturer of these products. Do NOT use gasoline to clean parts. Gasoline can explode and cause serious personal injury.



CAUTION

- *Use only solvent cleaners to clean ground or polished metal parts. Hot solution tanks or water and alkaline solutions will damage these parts. Isopropyl alcohol, kerosene or diesel fuel can be used for this purpose.*
- *If required, use a knife to remove gasket material from parts. Be careful not to damage the ground or polished surfaces.*

Clean Rough Parts

1. Rough parts can be cleaned with cleaning solvent or in a hot solution tank with a weak alkaline solution.
2. Parts must remain in hot solution tanks until completely cleaned and heated.
3. Remove the parts from the hot solution and wash them with water until the hot solution is removed.

Clean Transfer Case Assemblies

1. A transfer case can be steam cleaned on the outside to remove heavy amounts of dirt.
2. Before the transfer case is steam cleaned, close or put a cover over all openings in the case.

Dry Cleaned Parts

1. Dry the parts immediately after cleaning and washing.
2. Dry the parts with clean soft paper or cloth rags.



CAUTION

Do not dry bearings with compressed air. Bearings can be damaged if dried by rotating with compressed air.

3. Except for bearings, parts can be dried with compressed air.

Prevent Corrosion and Rust on Cleaned Parts

1. Apply transfer case lubricant to all cleaned and dried parts that are to be immediately assembled.
2. If parts are to be stored, apply a special material and paper that prevents corrosion and rust to all surfaces.

Section 4

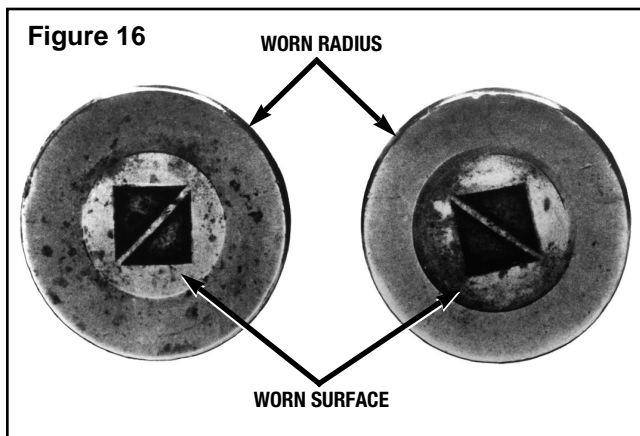
Cleaning and Inspection

Inspect Parts

It is very important to inspect all parts carefully and completely before the transfer case is assembled. Check all parts for wear and stress. Replace all damaged parts. Replacement of the damaged parts before assembly can prevent complete failure of the assembly later.

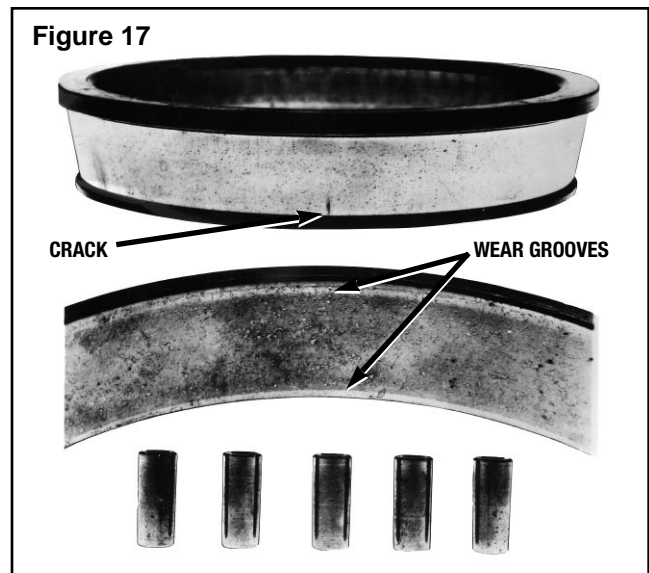
1. Inspect the tapered roller bearings. Inspect the cup, cone, rollers and cage of all tapered roller bearings in the assembly. If any of the following conditions exist, the bearing must be replaced:

- A. The center of the large diameter end of the rollers is worn level with or below the outer surface.
- B. The radius at the large diameters end of the rollers is worn to a sharp edge. **Figure 16.**

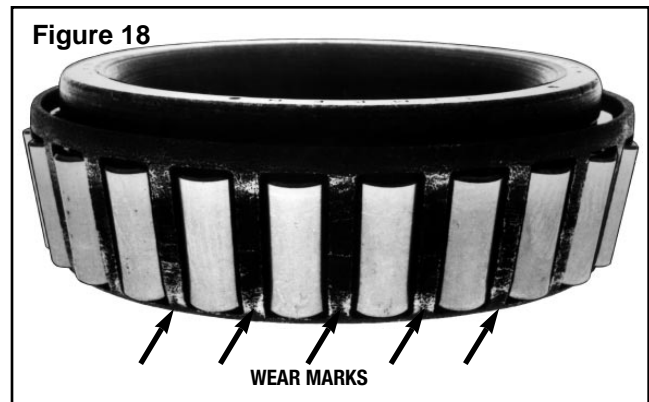


C. A visible roller groove is worn in the inner race surfaces of the cup or cone. The groove can be seen at the small or large diameter end of both parts.

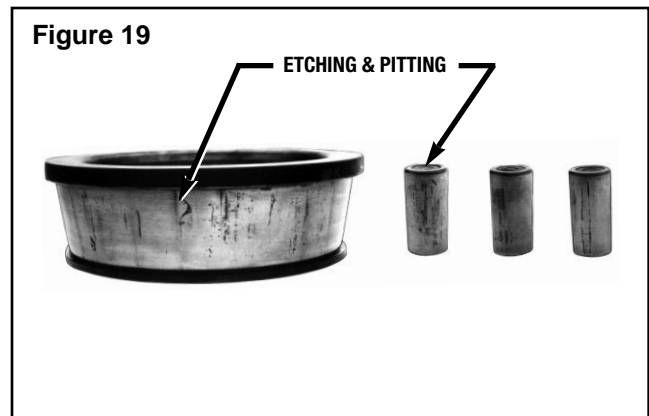
D. Deep cracks or breaks appear in the surfaces of the cup, cone inner race or rollers. **Figure 17.**



E. Bright wear marks appear on the outer surface of the roller cage. **Figure 18.**



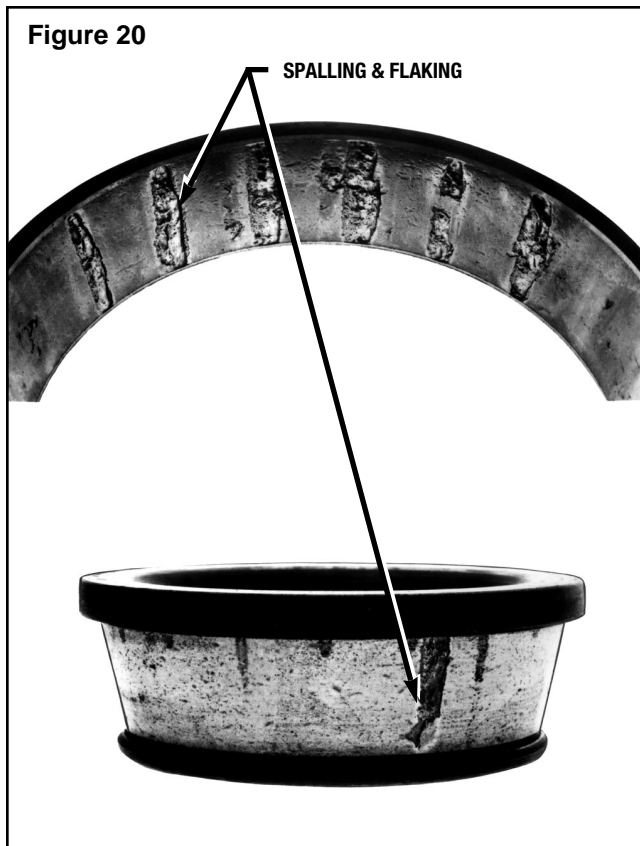
F. The rollers and surfaces of the cup and cone inner race that touch the rollers are damaged. **Figure 19.**



Section 4

Cleaning and Inspection

G. The cup and cone inner race surfaces that touch the roller are damaged. **Figure 20.**



2. Inspect the gears for wear or damage. Replace worn or damaged gears.

3. Inspect the housing:

A. Remove all dirt from the housing and oil lubrication passages, troughs, slots and holes.

B. Inspect machined surfaces for cracks and damage. Repair or replace damaged parts.

4. Inspect all shafts and flange/yokes for wear, stress and cracks at the splines, shaft and yoke ears. Replace shafts and flange/yokes that are worn or cracked.

A. Make sure oil passages in the output shaft are clean and free of debris.

5. Inspect the brake drum:

A. Remove all dirt from the drum.

B. Inspect the inside of the drum for cracks or scratches. Replace drums that are worn or damaged with new brake flange and drum assemblies.

6. Inspect the parking brake components:

A. Remove all dirt from the brake components.

B. Inspect all castings, struts and backing plates for cracks, wear and correct alignment. Replace all damaged parts.

C. Inspect springs, camshafts, levers and all other components for corrosion and wear. Replace all corroded or worn parts.

D. Inspect the brake linings for scratches, cracks, wear and oil soaking. Replace damaged, worn or oil-soaked shoe and lining assemblies.

7. Inspect the declutch and output shaft components (if applicable):

A. Inspect the clutch collar internal splines, external declutch teeth and shift for grooves. Replace worn, cracked or damaged collars.

B. Inspect the collar pads of the shift fork for wear. If the pads are worn, replace the shift fork.

C. Inspect the declutch shaft and yoke for wear, stress and cracks at the splines, shaft and yoke ears. Replace worn or cracked shafts and yokes.

D. Inspect the detent balls of the transfer shift shaft, declutch shift shaft and PTO shift for wear or damage. Replace worn or damaged detent balls.

Section 5

Assembly

Assemble Input Shaft, Idler Gear and Output Shaft Assemblies



WARNING

To prevent serious eye injury, always wear safe eye protection when doing maintenance or service.



WARNING

Observe all WARNINGS and CAUTIONS provided by the press manufacturer concerning press operation to avoid serious personal injury and possible damage to components.



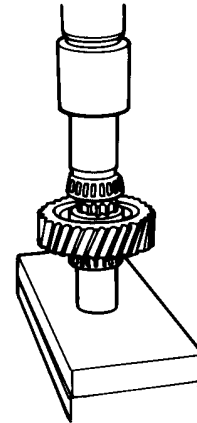
CAUTION

Be careful not to damage the roller cage. Use a sleeve that presses against the inner race only.

1. Press the bearing cones over the splined ends of the input and driven shafts. Press until the cone is shouldered against the shaft to gear spline.
2. Turn the shafts over and assemble the gears on the shafts.
 - The drive gear has a loose fit with the shaft splines and should slip on to the shaft.
 - The driven gear has a crossover fit to the shaft splines and may have to be pressed on to the shaft.

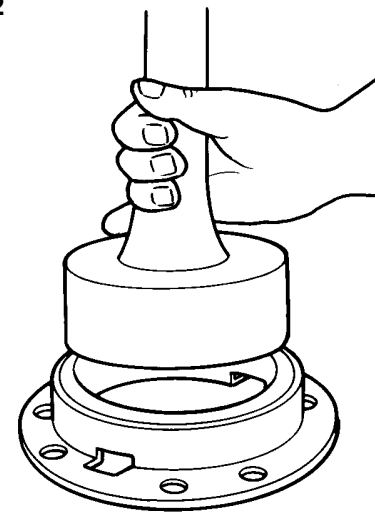
3. Press the bearing cones on to the other ends of the shafts until they are flat against the gears. **Figure 21.**

Figure 21



4. Press the bearing cones to the idler gear until they are flat against both sides of the gear.
5. Install the bearing cups into the bores of all four bearing cages with the correct size driver. **Figure 22.**

Figure 22



6. Install a new seal into the input bearing cage with the correct size driver. Make sure that the seal is flat in its bore.

Assemble Bearing Cages and Differential Cover in Rear Case Half

1. Rotate the rear case half in the repair stand so that the outside of the case faces upward.

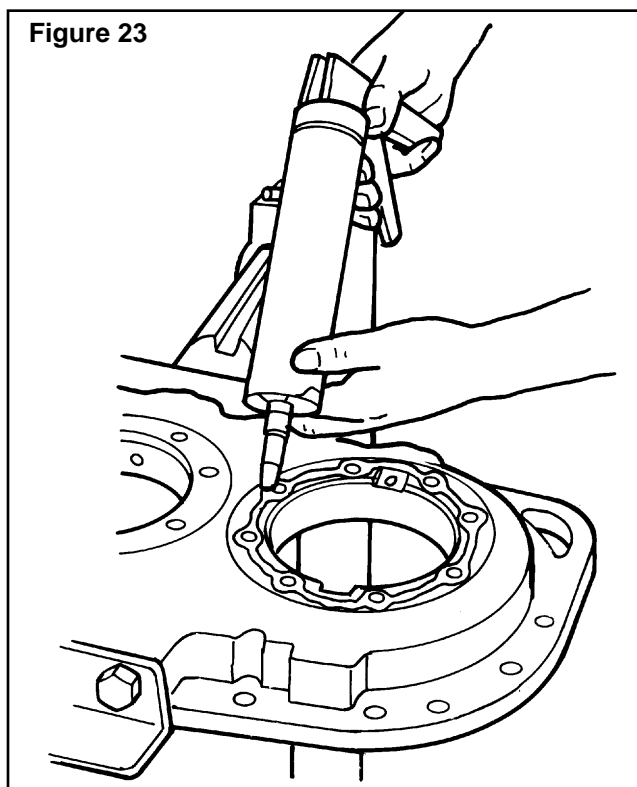
NOTE:

Do not install shims on this side of the transfer case.

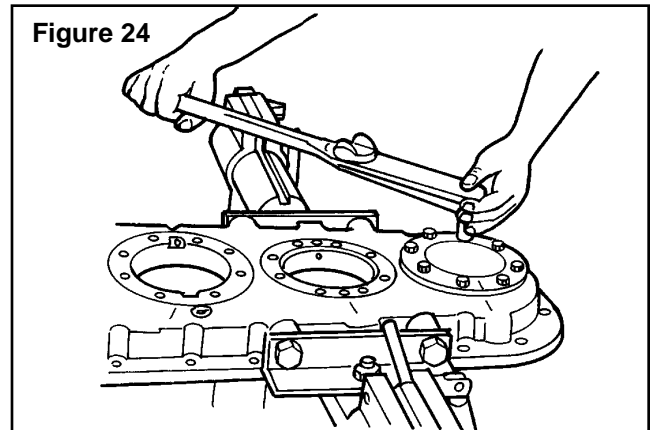
WARNING


Small amounts of acid vapor are present when applying silicone gasket material. To prevent possible serious personal injury, make sure there is good ventilation in the work area. If the silicone gasket material gets in your eyes, flush your eyes with water for 15 minutes. Have your eyes checked by a doctor.

2. Apply a 0.125 inch (3.18 mm) diameter continuous bead of silicone gasket material around the mounting surface of the input bearing cage on the housing. Also apply the gasket material around the edge of all the fastener holes. **Figure 23.** See complete instructions on page 29.



3. Align the capscrew holes of the input bearing cage and the housing. Use the match marks made at disassembly. **Figure 24.**



4. Install the capscrews and washers. Tighten the capscrews 60-75 lb-ft (81-102 N•m). 

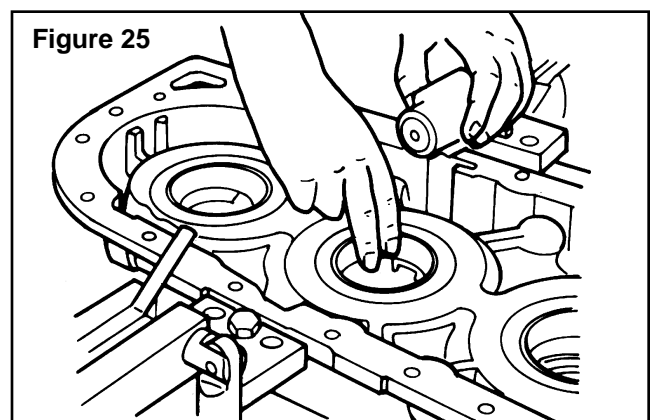
5. Repeat Steps 2, 3 and 4 to install in this order:

- 1) the idler bearing cage
- 2) the differential housing

Make sure that the fill plug on the differential cover is in the correct position.

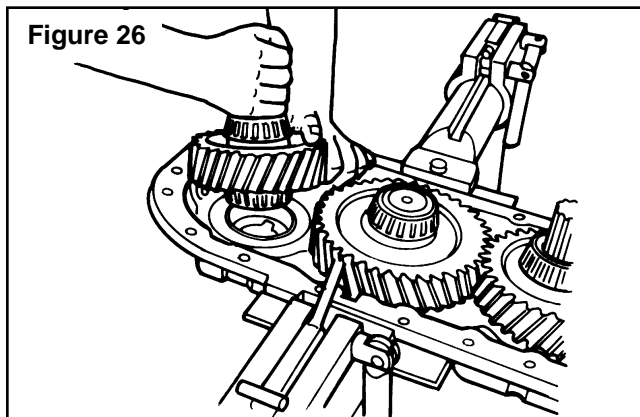
Install Input Shaft, Idler Gear and Output Shaft Assemblies

1. Rotate the housing half in the repair stand so the open side faces upward.
2. Install the output shaft bearing cup in the housing bore.
3. Apply a small amount of transfer case lubricant around the surfaces of the three installed bearing cups. **Figure 25.**



Section 5 Assembly

- Set the three shaft assemblies in their correct positions in the housing. Make sure that the gear teeth are correctly engaged. The dog teeth on the output shaft should be pointing up. **Figure 26.**



Assemble Transfer Case Housing



WARNING

Small amounts of acid vapor are present when applying silicone gasket material. To prevent possible serious personal injury, make sure there is good ventilation in the work area. If the silicone gasket material gets in your eyes, flush your eyes with water for 15 minutes. Have your eyes checked by a doctor.

- Apply a 0.125 inch (3.18 mm) diameter continuous bead of silicone gasket material around the mounting surface of the housing in the repair stand. Also apply the gasket material around the edge of all the fastener holes in the mounting surface. (See complete instructions on page 29).



WARNING

To avoid serious personal injury and possible damage to components, be very careful when using lifting devices:



- Inspect to make sure that the lifting loops or lifting straps are not damaged.
- Do not subject lifting loops or lifting straps to any shock or drop loading.

- Use the lifting loops or eye bolts to lift the other housing half and put it in the correct position.
- Align the two dowels in the top and bottom of the housing halves. Assemble the housing with bolts, washers and nuts.

NOTE:

Use two washers with each bolt:

- One washer under the bolt head
- One washer under the nut

- First tighten the bolts on each side of the two dowels to 60-75 lb-ft (81-102 N•m). 
- Then tighten the remaining bolts to 60-75 lb-ft (81-102 N•m). 

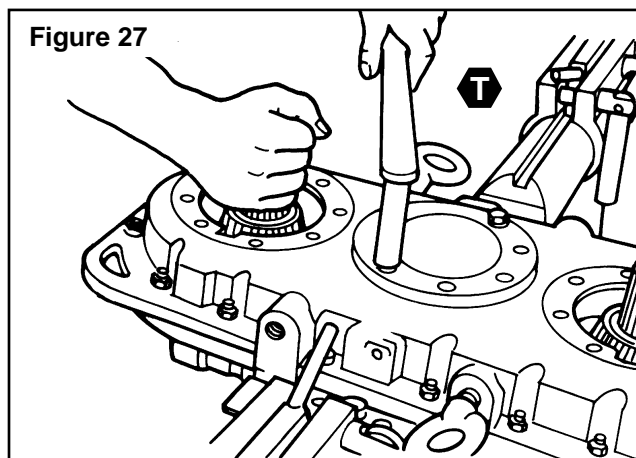
Install Remaining Bearing Cages

- Apply a small amount of transfer case lubricant around the surfaces of the two remaining bearing cages.
- Set the bearing cage for the idler gear in position over the bearing cone.

NOTE:

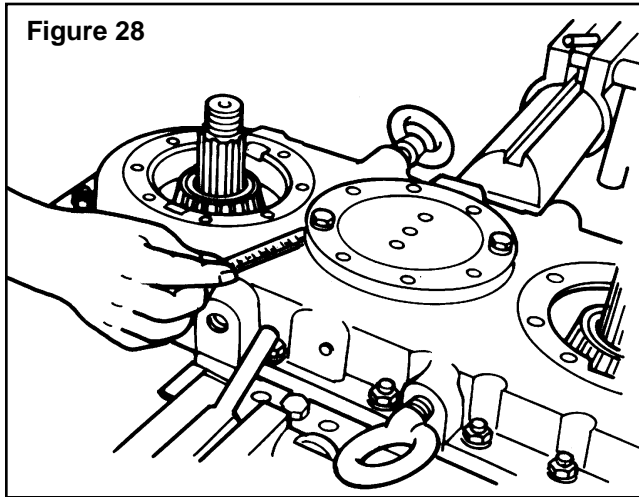
Do not install the shims at this time.

- Align the capscrew holes of the bearing cage and the housing. Use the match marks made at disassembly.
- Fasten the bearing cage to the housing with two capscrews 180 degrees apart.
- Tighten the two capscrews to 30 lb-in (3.4 N•m) while rotating one of the shafts in both directions. **Figure 27.**



Section 5 Assembly

6. Measure the gap between the cage and the mounting surface on the housing at the two capscrews with a feeler gauge. **Figure 28.**



7. The average of the two measurements plus 0.008 inch (.20 mm) is equal to the thickness of the shim pack to be installed under this bearing cage.

EXAMPLE

Gap at Capscrew #1	0.032 in.	0.813 mm
Gap at Capscrew #2	0.028 in.	0.711 mm
Total Gap	0.060 in.	1.524 mm
Average Gap	0.030 in.	0.762 mm
	+0.008 in.	0.203 mm
Total Shim Pack	0.038 in.	0.965 mm

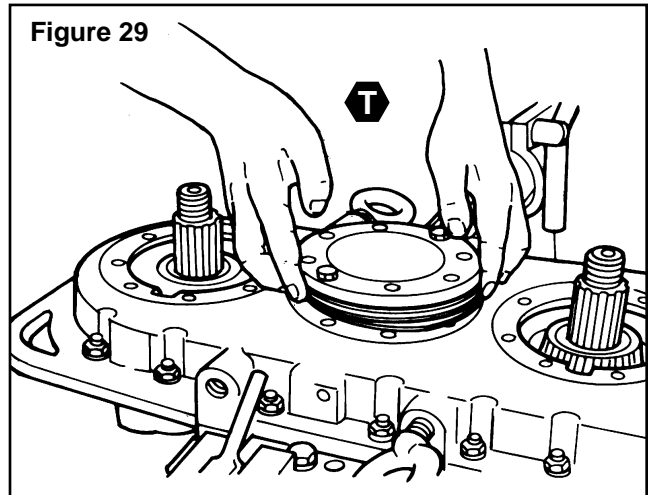
NOTE:

Use a minimum of three shims in a pack. If the shim pack is made from different thickness shims, install the thinnest shims on both sides of the pack for maximum sealing.

8. Remove the bearing cage.

9. Assemble the bearing cap and correct shim pack to the housing with eight capscrews and washers. Tighten the capscrews to 60-75 lb-ft (81-102 N•m).

Figure 29. 



10. Repeat Steps 2 through 9 to install the input shaft bearing cage.

11. Install the output shaft bearing cup into its housing bore.

12. Repeat Steps 2 through 9 to install the front output shaft bearing cage.

NOTE:

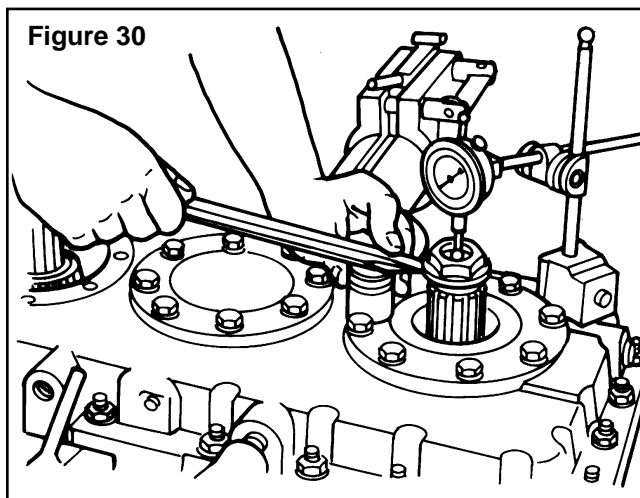
Do not install the two "internal" mounting capscrews at this time (end play must be checked before installing the capscrews).

Section 5

Assembly

Check Bearing End Play

1. Install the yoke nut on the input shaft finger tight.
2. Set a small steel ball in the hole on the end of the input shaft.
3. Check the end play with a dial indicator mounted against the ball on the shaft. **Figure 30.**



NOTE:

It is critical that the bearings be completely seated in both directions.

- a. Seat the lower bearings by using the weight of the gear plus a rotational and shaking motion. Proper seating of the lower bearings is indicated when movement of the dial indicator ceases. At this point, zero the dial indicator.*
- b. Using the same rotational and shaking motion, apply upward lift sufficient to seat the upper bearing. Proper seating of the upper bearing is indicated when the dial indicator ceases to register upward movement.*

NOTE:

The movement indicated by the dial indicator is the preliminary end play that exists with the initial shim stack.

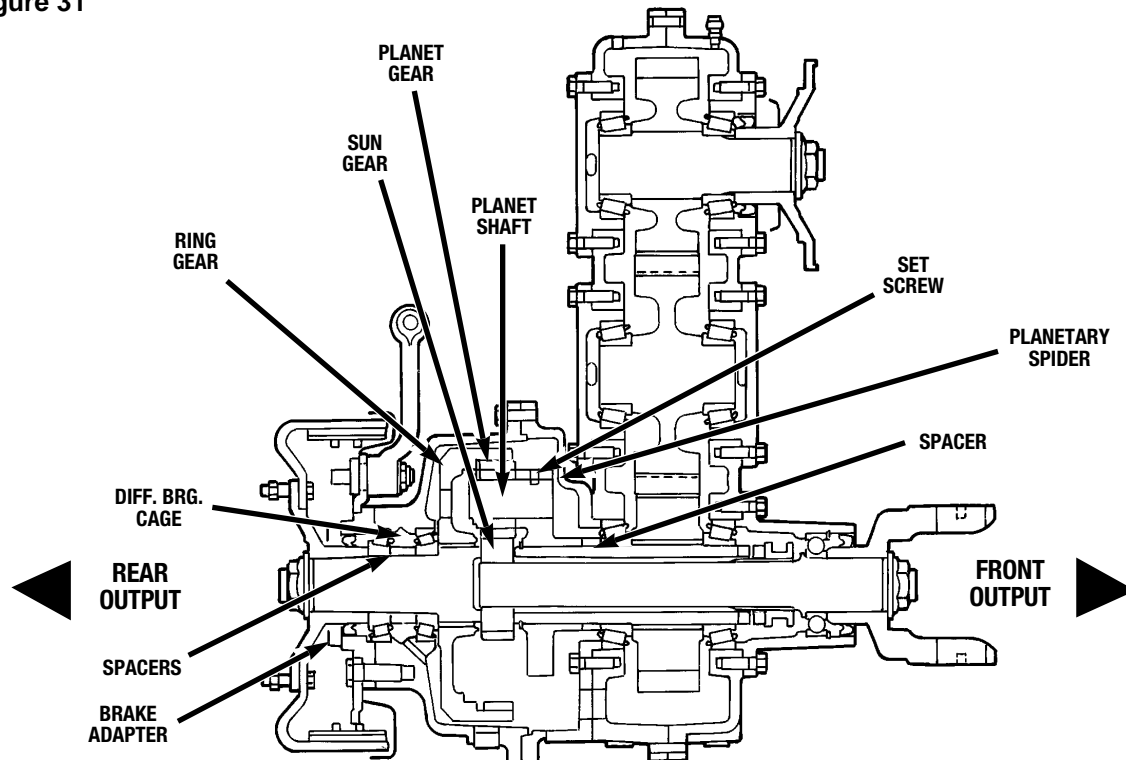
- c. Subtract the appropriate shim quantity and thickness to close the end plays to within the specified limits.*

Example:


*0.058 in. (1.473 mm) Preliminary end play
-0.003 in. (0.076 mm) Nominal desired end play
=0.055 in. (1.39 mm) Shim stack to be removed*

4. The end play must be between 0.001 - 0.005 inch (0.025 - 0.127 mm). Add shims to increase end play or remove shims to decrease end play.
5. To check the end play of the rear output shaft, the transfer case must be rotated so that the rear output is on top.
6. Install the snap ring in the end of the output shaft.
7. Check the end play with a dial indicator mounted against the end of the shaft. Take the reading while you pry up against the snap ring and rotate the shaft in both directions.
8. The end play must be between 0.001 - 0.005 inch (0.025 - 0.127 mm). Add shims under the front output bearing cage to increase end play or remove shims to decrease end play.

Figure 31



Assemble Front Output Shaft and Differential Lockout Assembly

1. Rotate the transfer case in the repair stand so that the front of the case is facing up. **Figure 31**.
2. Install the two internal front output cage mounting capscrews and washers. Tighten the capscrews to 60-75 lb-ft (81-102 N•m). 
3. Press the ball bearing on to the front output shaft.
4. Install the shaft collar on the end of the driven shaft so that the dog teeth engage.
5. Install the front output shaft into the bearing cage and through the shift collar.
6. Install the bearing retention snap ring into the bearing cage.
7. Press a new oil seal into the bearing cage with the correct size driver. Make sure that the seal is flat in its bore and flush with the end face of the cage.

8. Fit the shift fork through the cage opening and on to the shift collar.
9. Install a new quad seal in the declutch piston. Make sure that the seal is not twisted.
10. Coat the O.D. of the seal and the bore of the piston in the output cage with a light film of oil.
11. Install the return spring and declutch shift piston into the piston bore.

WARNING

To avoid serious personal injury, be careful when using Loctite. Follow the manufacturer's instructions for safe use to prevent irritation to eyes and skin. Wash after skin contact. If the Loctite gets in eyes, flush the eyes with water for 15 minutes. Have eyes checked by a doctor.

12. Apply one or two drops of Loctite 277 to the threads in the shift fork. Assemble the fork on to the piston.

NOTE:

The piston return spring may have to be compressed to assemble the fork on to the piston.

Section 5

Assembly

13. Install the set screw and tighten to 15-25 lb-ft (20-34 N•m).



WARNING

Small amounts of acid vapor are present when applying silicone gasket material. To prevent possible serious personal injury, make sure there is good ventilation in the work area. If the silicone gasket material gets in your eyes, flush your eyes with water for 15 minutes. Have your eyes checked by a doctor.

14. Apply a light film of liquid gasket material to the mounting face of the piston front output cage.
15. Install the piston cover with capscrews and washers. Tighten the capscrews to 35-50 lb-ft (47-68 N•m).
16. Apply a 0.125 inch (3.18 mm) diameter continuous bead of silicone gasket material around the mounting surface of the bearing cage for the shift cover plate. Also apply the gasket material around the fastener holes. (See complete instructions on page 29).
17. Put the declutch shift cover plate in position and install the capscrews and washers. Tighten the capscrews to 35-50 lb-ft (47-68 N•m).



Install Yokes

1. Install the yokes on the input and front output shafts.



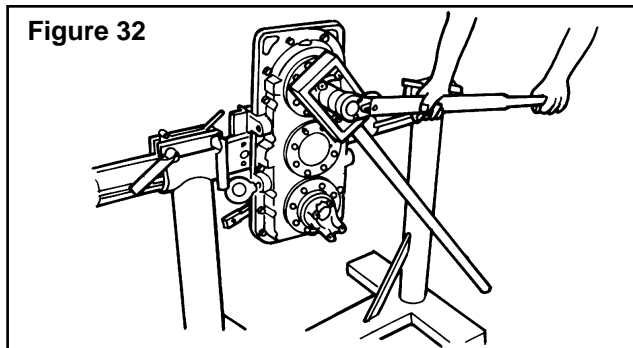
WARNING

To avoid serious personal injury, be careful when using Permatex. Follow the manufacturer's instructions for safe use to prevent irritation to eyes and skin. Wash after skin contact. If the Permatex gets in eyes, flush the eyes with water for 15 minutes. Have eyes checked by a doctor.

2. Apply a small amount of Permatex to the face of the yoke nuts.
3. Install the yoke nuts on to the shafts. Use a yoke holder and tighten the nuts to 700-900 lb-ft (950-1220 N•m). Figure 32.



Figure 32

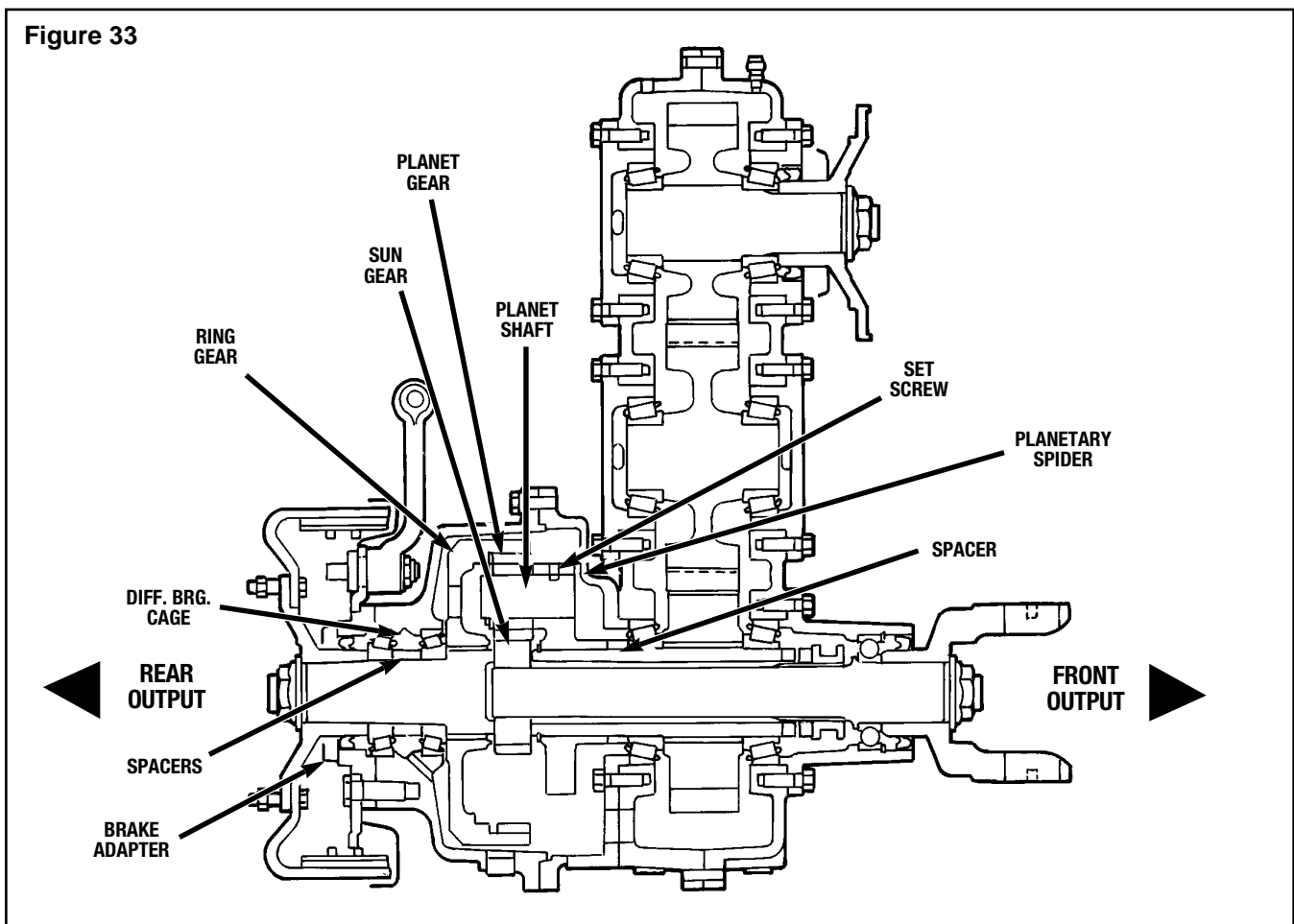


Assemble Planetary Spider Assembly

1. Press the new planetary shafts into the spider until the ends of the shafts are 1.775-1.770 inch (45.09-44.96 mm) from the spider boss face.
2. Drill .3125 inch (7.94 mm) diameter set screw holes .250 inch (6.35 mm) deep in each new planetary shaft by drilling through the tapped holes in the planetary spider. Use care to avoid severe damage to the spider internal threads.
3. Inspect the nylon coating on the shaft to make sure that it is not cut or gouged. If it is cut or gouged, the shaft must be replaced.
4. Apply one or two drops of Loctite into the setscrew holes in the spider.
5. Install the set screws and tighten them to 15-25 lb-ft (20-34 N•m).
6. Apply a generous film of gear lube to the bores of the planetary gears and to the nylon O.Ds. of the planetary shafts. Install the planetary gears on the planet shafts.
7. Assemble the thrust washers and snap rings on the ends of the planetary shafts.



Figure 33



Assemble Proportional Differential

1. Rotate the transfer case so that the rear of the case is on top.
2. Install the spacer and planetary spider assembly on to the driven shaft.
3. Install the snap ring on to the end of the driven shaft.
4. Slide the sun gear on to the front output shaft.
5. Press the bearing cups into the rear output bearing cage. Use the correct size driver.
6. Press one bearing cone on to the rear output shaft until it is flat against the shoulder. Be careful not to damage the roller cage, use a sleeve that presses against the inner race only.

7. Install the ring gear and snap ring on the output shaft.

8. Fit the bearing cage over the shaft.

9. Install the two bearing spacers.

10. Press the remaining bearing cone in place.

Check Bearing End Play

The rear output bearing end play is controlled by the spacers between the bearings. If the original bearings are used when reassembling the transfer case, the original spacers should provide the correct end play. If new bearings are installed, these spacers may have to be changed. Use the following procedure to check the end play:

1. Install the bearing cage/output shaft assembly on the transfer case with two capscrews and washers.

Section 5

Assembly

2. Install the yoke and nut on the shaft finger tight.
3. Set a small steel ball in the hole on the end of the output shaft.
4. Check the end play with a dial indicator mounted against the ball on the shaft.

NOTE:

It is critical that the bearings be completely seated in both directions.

- a. *Seat the lower bearings by using the weight of the gear plus a rotational and shaking motion. Proper seating of the lower bearings is indicated when movement of the dial indicator ceases. At this point, zero the dial indicator.*
- b. *Using the same rotational and shaking motion, apply upward lift sufficient to seat the upper bearing. Proper seating of the upper bearing is indicated when the dial indicator ceases to register upward movement.*

NOTE:

The movement indicated by the dial indicator is the preliminary end play that exists with the initial shim stack.

- c. *Subtract the appropriate shim quantity and thickness to close the end plays to within the specified limits.*

Example:

0.058 in. (1.473 mm) Preliminary end play
-0.003 in. (0.076 mm) Nominal desired end play
=0.055 in. (1.39 mm) Shim stack to be removed

5. The end play must be between 0.001 - 0.005 inch (0.025 - 0.127 mm). If it is not, different bearing spacers must be used to achieve the correct end play.
6. Six spacers of different widths are specified on the T-2111 Bill of Material. Any two can be used to achieve the correct end play. The six part numbers and widths are:

2203-W-9851	0.478 in.	12.141 mm
2203-X-9852	0.482 in.	12.243 mm
2203-Y-9853	0.490 in.	12.446 mm
2203-Z-9854	0.498 in.	12.649 mm
2203-A-9855	0.506 in.	12.852 mm
2203-B-9856	0.510 in.	12.954 mm

7. Remove the yoke nut and yoke, then remove the bearing cage/output shaft assembly from the transfer case.
8. Press the shaft out of the assembly and identify the two spacer part numbers.
9. Find the combined thickness of the two spacers removed by using the above chart. If too much end play exists, the combined spacer thickness must be decreased by the amount of the excess end play. If preload exists, the combined spacer thickness must be increased by the amount of preload plus 0.001 inch (0.0254 mm).
10. Use the above chart to find two spacers with the combined width to give the correct end play.

EXAMPLE:

Measured end play is 0.011 in. (0.2794 mm)

The two spacers removed are 2203-X-9852 and 2203-Y-9854.

The combined width of these spacers is:

2203-X-9852	0.482 in.	12.243 mm
2203-Y-9854	0.498 in.	12.649 mm
	0.980 in.	24.892 mm

Since there is too much end play, the combined spacer width must be decreased:

Measured end play:	0.011 in.	0.2794 mm
Desired end play:	0.003 in.	0.0762 mm
Required width decrease:	0.008 in.	0.2032 mm

Old spacers combined width:	0.980 in.	24.8920 mm
Required decrease:	0.008 in.	0.2032 mm
New spacer combined width:	0.972 in.	24.6888 mm

Reviewing the part number and width chart, replace the 2203-Y-9854 with 2203-Z-9853 to get the correct combined spacer width:

2203-X-9852	0.482 in.	12.243 mm
2203-Z-9853	0.490 in.	12.446 mm
	0.972 in.	24.689 mm

11. Repeat the assembly of the bearing cage/output shaft using the correct spacers.

Install Output Shaft and Bearing Cage Assembly

1. After correct bearing end play has been achieved, remove the output shaft and bearing cage assembly from the transfer case.

WARNING

Small amounts of acid vapor are present when applying silicone gasket material. To prevent possible serious personal injury, make sure there is good ventilation in the work area. If the silicone gasket material gets in your eyes, flush your eyes with water for 15 minutes. Have your eyes checked by a doctor.

2. Apply a 0.125 inch (3.18 mm) diameter continuous bead of silicone gasket material around the mounting surface of the differential cover. Also apply the gasket material around the edge of all fastener holes. (See page 29 for complete instructions).
3. Align the capscrew holes of the bearing cage and the differential cover. Make sure that the drain plug in the bearing cage is facing the bottom of the transfer case.
4. Install the capscrews and washers. Tighten the capscrews to 60-75 lb-ft (81-102 N•m).



Assemble Parking Brake

1. Install a new seal into the brake adapter with the correct size driver. Make sure that the seal is flat in the bore and flush with the adapter face.
2. Install the oil slinger on the brake adapter.

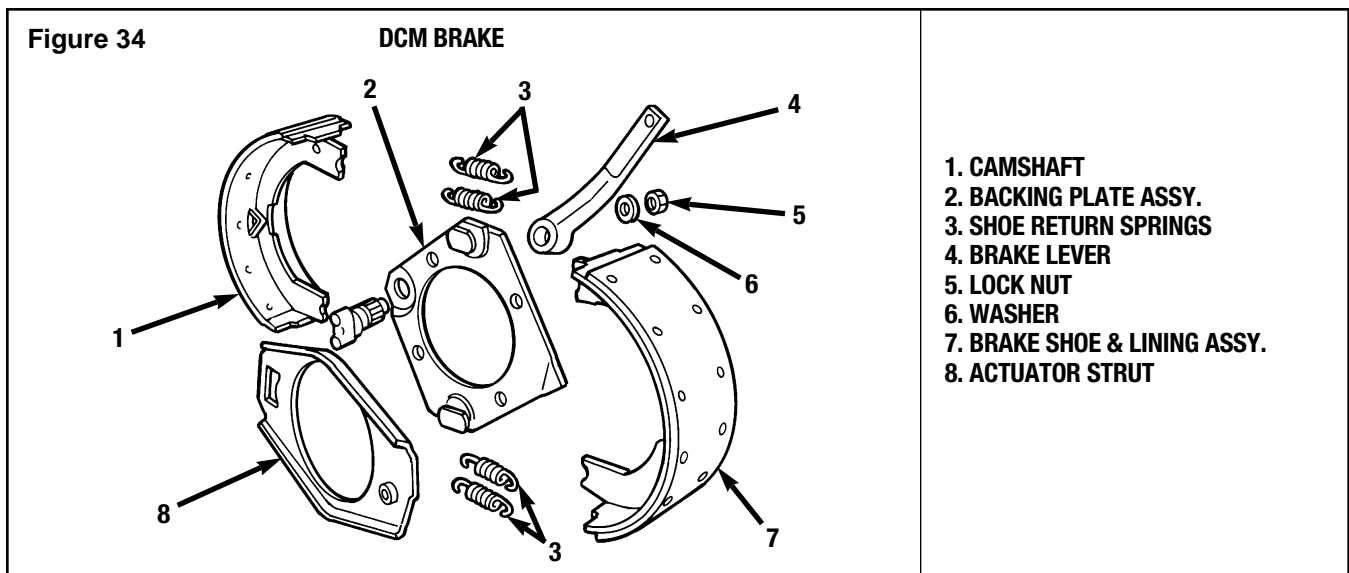
CAUTION

Do not permit grease to come in contact with the brake drum or linings. Grease on the linings can cause poor brake performance. Contaminated linings must be replaced. Always replace both linings. If only one lining is replaced, possible damage can occur.

3. Before assembly, apply a thin layer of brake lubricant, NLGI Grade No. 2 grease, Rockwell Specification 0-616, to the following parts.
 - A. Cam head face and journals.
 - B. The sides of the shoe webs and the actuator strut that slide together.
 - C. Both sides of the backing plate at the cam hole.

NOTE:

Refer to figure 34 to assemble parking brake.



Section 5

Assembly

4. Assemble the cam (1) through the backing plate (2), lever, lock washer and nut. Tighten the nut to give an end play of 0.001" to 0.010" (.025 mm to .254 mm) as measured with a feeler gauge between the backing plate and the lever.



WARNING

To avoid serious personal injury, be careful when using Loctite. Follow the manufacturer's instructions for safe use to prevent irritation to eyes and skin. Wash after skin contact. If the Loctite gets in eyes, flush the eyes with water for 15 minutes. Have eyes checked by a doctor.

5. If the original brake backing plate mounting capscrews are reused, apply 4 or 5 drops of Loctite #277 to the side of each internal hole in the bearing cage. (New capscrews have a pre-applied locking agent so this Step is not required).
6. Assemble the brake backing plate, lever and cam assembly and the brake adapter to the bearing cage with capscrew. Tighten the capscrews to 180-230 lb-ft (244-312 N•m).



7. Install new brake shoe return springs (3) on one end of the two brake shoes (7).
8. Install the brake shoes in the same position as marked at disassembly with the web ends in position on the backing plate bosses.
9. Install the actuator strut (8) with the pressure points against the shoe web pressure points.

10. Install the two remaining new shoe return springs with spring pliers.

11. Install the brake drum on to the flange.

12. Install the brake drum and flange assembly on to the output shaft. (Complete seating of the flange will result from tightening the flange nut in Step 14).



WARNING

To avoid serious personal injury, be careful when using Permatex. Follow the manufacturer's instructions for safe use to prevent irritation to eyes and skin. Wash after skin contact. If the Permatex gets in eyes, flush the eyes with water for 15 minutes. Have eyes checked by a doctor.

13. Apply a small amount of Permatex to the face of the flange nut.

14. Install the flange nut on the shaft. Use a yoke holder and tighten the nut to 700-900 lb-ft. (950-1220 N•m).



15. Install the transfer case in the vehicle. See page 8.

Application of Silicone Gasket Material



WARNING

Small amounts of acid vapor are present when applying silicone gasket material. To prevent possible serious personal injury, make sure there is good ventilation in the work area. If the silicone gasket material gets in your eyes, flush your eyes with water for 15 minutes. Have your eyes checked by a doctor.

The following silicone gasket products can be used on Rockwell components:

- A. Dow Corning Silicone Rubber Sealant, No. 737 Black
- B. General Electric No. RTV-1473 Black
- C. From Rockwell International:
 - 40 lb. containers, Part No. 2297-F-5258
 - Ten oz. tubes, Part No. 2297-G-5259
 - Three oz. tubes, Part No. 2297-Z-6656

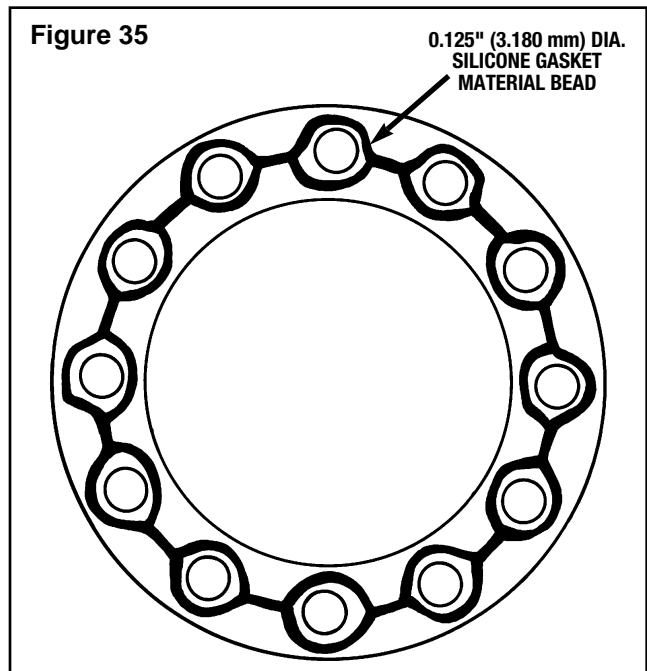
1. Remove all old gasket material from both surfaces.
2. Clean the surfaces where the silicone gasket material will be applied. Remove all oil, grease, dirt and moisture.
3. Dry both surfaces.



CAUTION

The amount of silicone gasket material applied MUST NOT exceed a 0.125 inch (3.18 mm) diameter bead. Too much gasket material can block lubrication passages and result in damage to the components.

4. Apply a 0.125 inch (3.18 mm) diameter continuous bead of silicone gasket material around one surface. Also apply the gasket material around the edge of all the fastener holes on that surface. **Figure 35.**



5. Assemble the components immediately to permit the gasket material to compress evenly between the parts. Tighten the fasteners to the required torque value for that size fastener. See the Torque Chart on page 38. There is no special procedure or additional torque required.
6. Wait 20 minutes before filling the assembly with lubricant.

Section 6

Lubrication

Recommended Oil

API GL-1 85W
API GL-1 90W
API GL-1 140W

CAUTION

Do not use API GL-5 oils as transfer case lubricants. These oils contain extreme pressure additives which tend to form sludge at the operating temperatures of normal transfer cases. These additives may also be harmful to some internal transfer case components.

NOTE:

- *The transfer case oil sump should have a maximum continuous operating temperature of 225°F (107°C) and an absolute maximum temperature of 250°C (121°C).*
- *If the transfer case continuous sump temperature is over 225°F (107°C) due to high input speeds with high ambient temperatures and poor air circulation, use a lighter viscosity oil from the above recommended lubrication oils.*
- *A lighter viscosity oil can also be needed if the transfer case operates in extremely cold climates.*

CAUTION

Rockwell transfer cases can operate above 190°F (88°C) without damage. However, when the oil temperature reaches 250°F (121°C), the vehicle must be stopped immediately and checked for the cause of overheating.

Oil Substitutes

CAUTION

- *Rockwell does not approve the use of multi-viscosity motor oils. Multi-viscosity API GL-1 oils within the recommended viscosity range are acceptable but not suggested if another option is available.*
- *Petroleum base and synthetic oils are both acceptable for Rockwell transfer cases only if the following rule is followed:*

ONCE ONE OF THESE TWO TYPES OF OIL HAS BEEN SELECTED FOR USAGE, IT MUST NOT BE CONVERTED TO THE OTHER TYPE OF OIL FOR THE LIFETIME OF THE TRANSFER CASE. OIL SEAL DAMAGE CAN OCCUR.

Acceptable Motor Oil Alternatives

40W motor oil: Same viscosity as a light API GL-1 90W down to a medium viscosity API GL-1 85W.

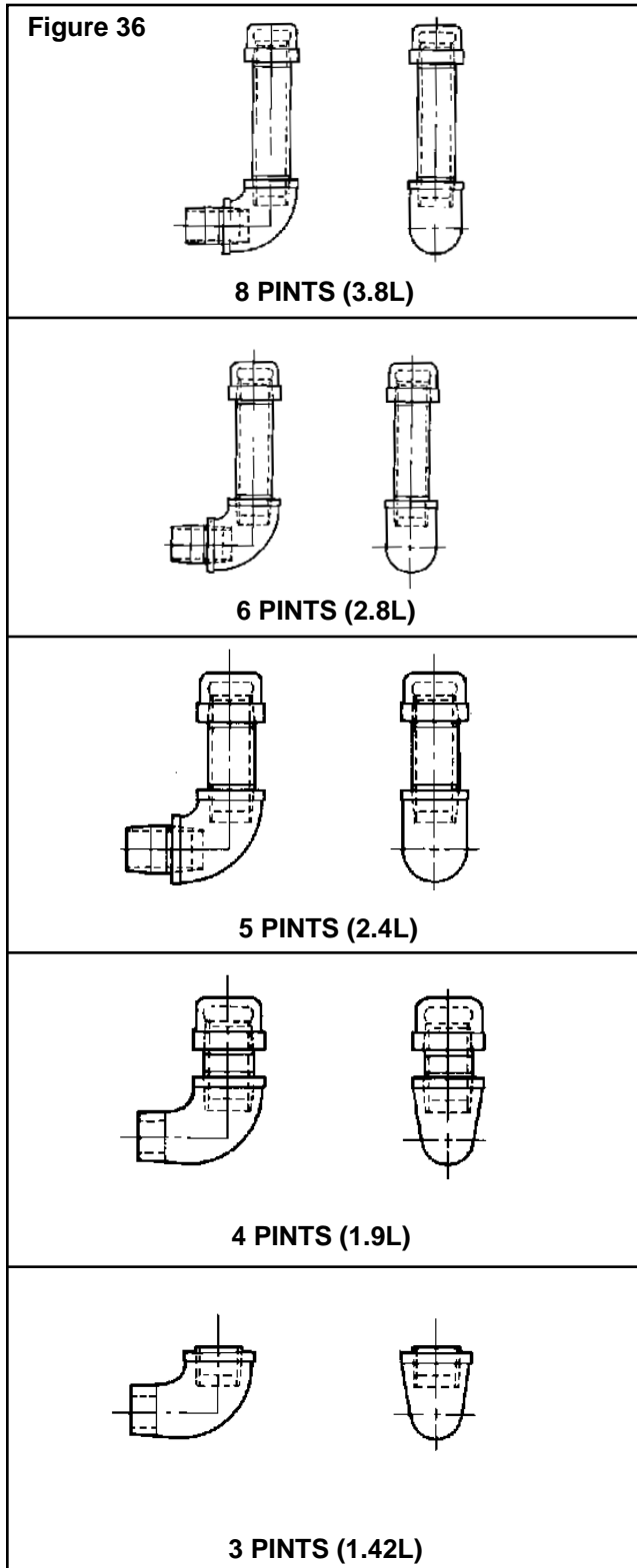
50W motor oil: Same viscosity as a mid-range API GL-1 synthetic oil.

CAUTION

Petroleum base oils and synthetic oils react differently with sealing materials. Changing from one oil type to the other can cause the transfer case to leak. There can be a small possibility that a synthetic oil can react to a transfer case's components adversely. For complete assurance, synthetic oils should be approved by the Rockwell Engineering Department.

Section 6 Lubrication

Oil Fill Options



Transfer Case Oil Levels

WARNING

- Use only the type of lubricant specified by the equipment manufacturer. Do not use or mix different types of lubricant. The wrong lubricant can cause damage, incorrect operation and serious personal injury.
- Do not reuse lubricant. Used lubricant can be contaminated and can cause damage, incorrect operation and serious personal injury.

NOTE:

- Prior to adding the fill pipe type of oil fill option, only a single plug location was available at approximately the 5 pint level.
- Various oil levels are put onto transfer cases due to the optional constructions, add on equipment and special operating circumstances. The pints assigned are the approximate amount of oil required to fill the transfer case to the appropriate level depending upon the transfer case construction and orientation within the vehicle. The actual amount of oil may be substantially different from that shown in Figure 36.
- For specific duty transfer cases, Rockwell may vary oil level recommendations which may not agree with the unit's oil stand pipe level as originally provided by Rockwell.

The basic rules for establishing the correct transfer case oil level are as follows:

- For a T-2111 transfer case, the base oil level should be 3 pints (1.42L).
- For each declutch, PTO and oil pump that supplies oil only to the top of the transfer case, add 1 pint (0.47L).
- A proportional differential unit should have a 5 pint (2.4L) fill level, although the transfer case will require substantially more oil.
- For applications over 2500 RPM, the proportional differential unit may require less lube.
- If an exterior oil cooler is used, add 2 pints (0.94L).

Section 7

Diagnostics

Diagnostics:T-2111 Series Transfer Cases

Problem	Possible Cause
Overheating	<ol style="list-style-type: none"> 1. Excess lube quantity 2. Incorrect lube viscosity 3. Excessive speed (RPM) 4. Excessive axle ratio (Tire size mismatch)
Oil blowing out of breather	<ol style="list-style-type: none"> 1. Excessive speed (RPM) 2. Excess lube quantity 3. Unusual mounting orientation 4. Incorrect lube 5. Incorrect breather location
Oil seal leaks	<ol style="list-style-type: none"> 1. Seals damaged at installation 2. Yoke journal surface defect or grind lead 3. Seals damaged from overheating
Noise / Vibration	<ol style="list-style-type: none"> 1. Excessive driveline angles/balance/wear 2. T-Case mounting location/method 3. Engine torsional acceleration not damped 4. Excessive T-case bearing end play 5. Operating on good surface with declutch engaged
Declutch indicator light not functioning	<ol style="list-style-type: none"> 1. Damaged switch or declutch unit 2. Inadequate air pressure 3. Defective piston seal 4. Bulb burned out
Premature gear/bearing wear	<ol style="list-style-type: none"> 1. Contaminated or inadequate quantity of lube 2. Incorrect bearing adjustment 3. Excessive axle ratio/tire size mismatch 4. Excessive PD or front declutch lock up

Section 8 Specifications

T-2111-D/SD, T-2111-PD/SPD, T-2111-T/ST and T-2111-HP/SHP Specifications*

TYPE:

Three Shaft Design
Single Speed
Front and Rear Outputs

INPUT TO OUTPUT DROP:

16.125 Inches (409.58 mm)

RATIO:

1.0:1

INPUT TORQUE RATING:

MODEL	LBS. FT.	N•m
T-2111-D or SD	11,000	14900
T-2111-PD or SPD	11,000	14900
T-2111-T or ST	14,500	19650
T-2111-HP or SHP	11,000	14900

MOUNTING:

Tapped for Side Brackets (0.75-10 Threads, Four Holes Each Side)

YOKES OR COMPANION FLANGES:

Rockwell Full Round and Easy Service Yokes or Companion Flanges Available as Specified.

OPTIONS:

- Front Declutch (5450, 11,000 lb-ft/7400, 14900 N•m)
- Rear Declutch (5450, 11,000, 20,000 lb-ft/7400, 14900, 27100 N•m)
- Full Torque P.T.O.
- Proportional Differential – Torque Distribution:
 - Front 30%, Rear 70%
- All Above are Air Actuated By Integral Air Cylinder.
- Optional Indicator Switch Available for All (PTO/Declutches)
 - Two Switches
- Parking Brake - 12" x 3" (305 mm x 76 mm)
 - DCM (Duplex Cam Mechanical)
- Oil Pump Available

***GVW RATING: (TYPICAL)**

80,000 lbs. (36,288 kg)
(Based on 15 x 22.5 Tire and 3.91 Axle Ratio)

WEIGHTS: (less oil)

MODEL COMPONENT	LBS.	KG
T-2111-D (Base Model)**	325	147.4
T-2111-PD (Base Model)**	356	161.5
T-2111-T (Base Model)**	305	138.3
T-2111-HP (Base Model)**	325	147.4
Declutch (5450, 11,000, 20,000 lb.-ft.)	35/60/80	15.9/27.2/36.3
Full Torque P.T.O. (5450, 11,000 lb.-ft.)	35/60	15.9/27.2
Proportional Differential	50	22.7
Parking Brake 12" x 3" DCM	52	23.6
Yokes (Each)	12/15	5.4/6.8
Flanges (Each)	7	3.2

**Base Models are Less Declutches and Yokes or Flanges.

*Permitted use of axles and components, including capacity ratings where stated vary with application and service. Installation must be approved by the Rockwell Off-Highway Engineering Department. Approved ratings may be higher or lower than indicated above, dependent upon engineering review.

Allowable Maximum Speed



CAUTION

As input speed increases, more heat is generated due to the viscous shearing of lubricant by the gear components, noise increases and transfer case component integrity can be compromised.

Model	Ratio	Recommended Maximum Speed (Input RPMs)
T-2111	1.00:1	2850 RPM

Section 8 Specifications

Transfer Case Oil Change Intervals

Off-Highway Intervals			On-Highway		
Check Oil Level	Initial Oil Change	Scheduled Oil Change	Check Oil Level	Initial Oil Change	Scheduled Oil Change
40 operating hours	40-100 operating hours	200-300 operating hours	2,000 mi (3219 km)	2,500 mi (4023 km)	12,000 to 25,000 mi (19312 to 40233 km)

Transfer Case Oil Specifications ^①

Oil Description	Rockwell Specification	A.P.I. Specification	Military Specification	SAE Grade	Outside Temperature
Petroleum GL-1 Oil with Rust and Oxidation Inhibitor	—	A.P.I. - GL-1	—	90 80	Above 10°F (-12°C) Above -15°F (-26°C)
Heavy Duty Engine Oil	—	A.P.I.CD, CE, SF, SG	MIL-L-2104B, G,D,E	40 50	Above 10° (-12°C) Above 10° (-12°C)

NOTES:

① Multi-Viscosity and EP (Extreme Pressure) GL-5 gear oils are not recommended.

DO NOT MIX OILS IN THE TRANSFER CASE.

Transfer Case Oil Capacities

Transfer Case Model	Oil Capacity	
	Pints	Liters
T-2111 ^①	3.0	1.42
T-2111-D ^① or SD	3.0	1.42
T-2111-HP ^① or SHP	3.0	1.42
T-2111-PD ^② or SPD	6.3	3.0
T-2111-T or ST	3.0	1.42

NOTES:

① Add 1 pint (0.47 liters) for each lower mounted PTO/declutch/oil pump option.

② Includes bottom mounted lock-up or declutch assembly.

Section 8 Specifications

Driveline Application Guideline

NOTE:

All of the options shown below may not be available for each transfer case configuration. The values given are for Rockwell manufactured parts. If parts from other manufacturers are used, torque values may be different.

WING STYLE YOKES	MAX TORQUE RATING (Lb-ft)	FLANGE STYLE
62N	5,000 (6779 N•m)	
58WB	7,025 (9561 N•m)	
72N	7,080 (9599 N•m)	
82N	11,080 (15022 N•m)	
85WB	12,500 (16948 N•m)	
92N	23,000 (31184 N•m)	

FULL ROUND (NYS) EASY SERVICE (TYS) STYLE YOKES	MAX TORQUE RATING (Lb-ft)	FLANGE STYLE
131 NYS and TYS	1,950 (2644 N•m)	
133 NYS and TYS	2,330 (3159 N•m)	
135 NYS and TYS	3,080 (4176 N•m)	
141 NYS and TYS	3,750 (5084 N•m)	
148 NYS and TYS	5,000 (6779 N•m)	
155 NYS and TYS	6,250 (8474 N•m)	
16 NYS and TYS	7,100 (9626 N•m)	
17 NYS and TYS	9,600 (13016 N•m)	
176 NYS and TYS	16,000 (21693 N•m)	
18 NYS and TYS	21,000 (28472 N•m)	

Driveline Length Guideline

Smallest yoke sizes (131 Series): Maximum driveline length of approximately 48 inches (1.2 m).

Largest yoke sizes (92N Series): No more than an 80 inch (2.03 m) long driveline. Other maximum driveline lengths should fall between these values, increasing with relative size.

Maximum Driveline Angle Guideline

NOTE:

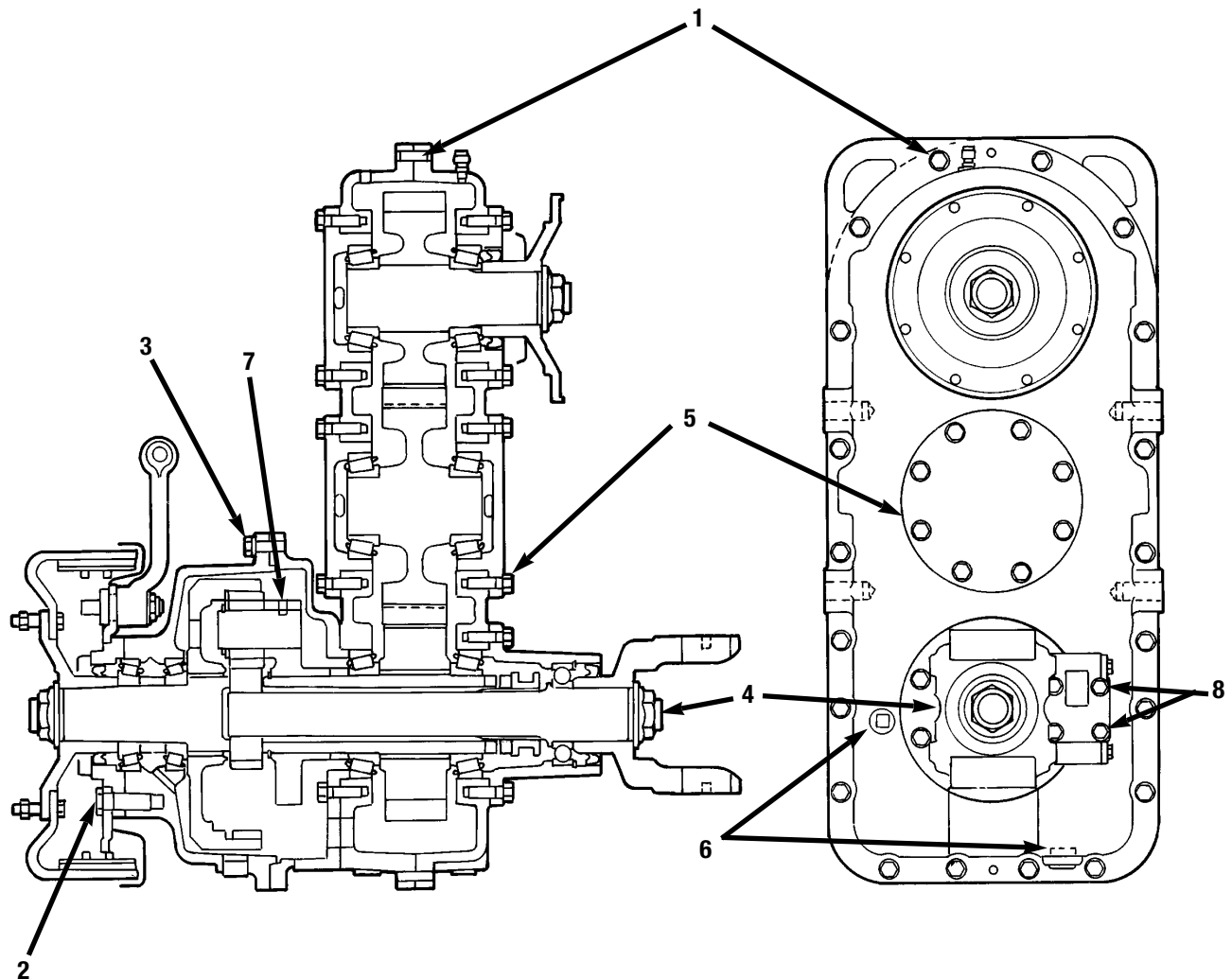
Values shown below are guidelines only for two joint shafts without mismatch. For more detailed information on performing driveline calculations refer to Rockwell publication SP-7711. Final approval should be made with Rockwell's Driveline Engineering Department.

DRIVELINE RPM	MAXIMUM OPERATING ANGLE (DEG)
4000	4.25
3500	5.00
3000	5.85
2500	7.00
2000	8.65

Section 8 Specifications

Torque Chart

Figure 37



ITEM	DESCRIPTION	TORQUE	ITEM	DESCRIPTION	TORQUE
1	Housing Cap screws	60-75 lb-ft (87-102 N•m)	5	Brg. Cage Cap screws	60-75 lb-ft (87-102 N•m)
2	Brake Backing Plate Cap screws	180-230 lb-ft (244-312 N•m)	6	Drain and Fill Plugs	35 lb-ft (47 N•m) Minimum
3	Diff. Cover Cap screws	60-75 lb-ft (87-102 N•m)	7	Set Screws	15-20 lb-in (1.6-2.2 N•m)
4	Yoke Nuts	700-900 lb-ft (950-1220 N•m)	8	Declutch Piston and Cover Cap screws	35-50 lb-ft (47-68 N•m)

Section 8

Specifications

Tire Mismatch

NOTE:

- **Positive mismatch calculations indicate the front axle is PULLING.**
- **Negative mismatch calculations indicate the rear axle is PUSHING.**
- **A positive mismatch is the preferred condition for vehicle performance and stability.**

The following calculation is based on tire mismatch at low speeds before tire expansion occurs. This is the normal usage of a transfer case as one axle, usually the front, will be disengaged at higher operating speeds.

$$\% \text{ Mismatch}_{LO} = \frac{[(LR_F) (R_{AR}) - (LR_R) (R_{AF})] * 100\%}{(LR_F) (R_{AR})}$$

LR_F = Tire Loaded Radius - Front

LR_R = Tire Loaded Radius - Rear

R_{AR} = Axle Ratio - Rear

R_{AF} = Axle Ratio - Front

The following calculation is for high speeds. A normal transfer case should have one drive output declutched in this condition. This calculation is mainly for transfer cases which include a differential.

$$\% \text{ Mismatch}_{HI} = \frac{[(TRPM_R) (R_{AR}) - (TRPM_F) (R_{AF})] * 100\%}{(TRPM_R) (R_{AR})}$$

$TRPM_R$ = Revs Per Mile of Rear Tires

$TRPM_F$ = Revs Per Mile of Front Tires

Acceptable limits for calculations:

With thru shaft between front and rear output:

High speed mismatch: $\pm 1.5\%$

Low speed mismatch: $\pm 1.0\%$

With declutch but no differential:

High speed mismatch: $\pm 2.0\%$

Low speed mismatch: $\pm 1.5\%$

With differential:

High speed mismatch: $\pm 3.0\%$

Low speed mismatch: $\pm 3.0\%$

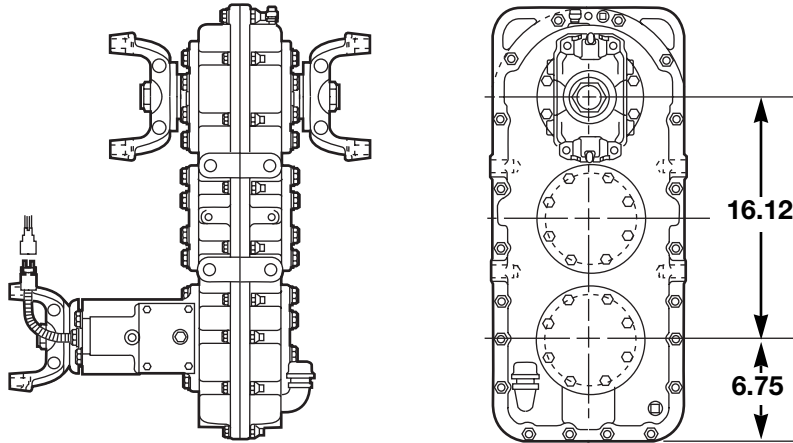
NOTE:

For special off-road low traction conditions, higher values may be acceptable. The allowable mismatch is increased in applications where the transfer case has excess torque capacity.

Section 8 Specifications

T-2111 TRANSFER CASE VARIATIONS

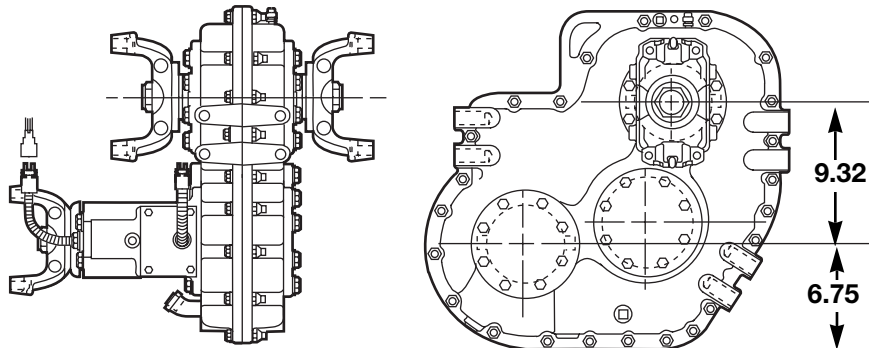
1) T-2111 VERTICAL CASE
(T-2111-T [THRU DRIVE] MODEL SHOWN)



ALSO USED ON MODELS:

T-2111-D
T-2111-PD
T-2111-HP

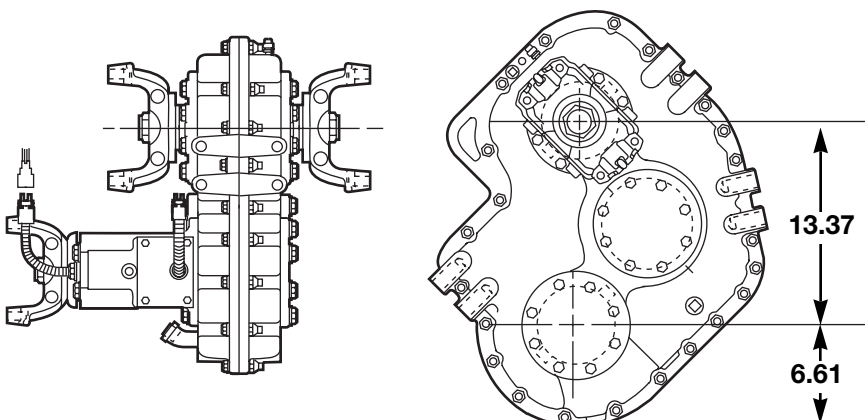
2) T-2111 SHORT DROP CASE WITH OFFSET ORIENTATION:
(T-2111-ST [THRU DRIVE] MODEL SHOWN)



ALSO USED ON MODELS:

T-2111-SD
T-2111-SPD
T-2111-SHP

3) T-2111 SHORT DROP CASE WITH VERTICAL ORIENTATION:
(T-2111-ST [THRU DRIVE] MODEL SHOWN)



ALSO USED ON MODELS:

T-2111-SD
T-2111-SPD
T-2111-SHP

NOTE:

For more information on parts and kits, see Meritor publication PB-90199, T-215 and T-2111 Series Transfer Cases. This catalog is available from:

Meritor Literature Distribution Center
c/o Vispac, Inc.
35000 Industrial Road
Livonia, MI 48150

Or call (800) 535-5560



Information contained in this publication was in effect at the time the publication was approved for printing and is subject to change without notice or liability. Meritor Heavy Vehicle Systems, LLC, reserves the right to revise the information presented or discontinue the production of parts described at any time.

Meritor Heavy Vehicle Systems, LLC

2135 West Maple Road
Troy, MI 48084 U.S.A.
248-435-1085
800-535-5560 (North America only)
meritor.com

Meritor do Brasil Ltda.

Av. João Batista, 824
06097-900 Osasco-SP
BRAZIL
(55-11) 704-6510
Fax: (55-11) 702-6510

Meritor Heavy Vehicle Systems, LLC – St. Etienne S.A.

4, rue Jean Servanton
BP 656
42042 St. Etienne Cedex 1
FRANCE
(33-477) 92-8800 Fax:(33-477) 92-889047865/24240

Maintenance Manual No. 3D
Revised 2-96