SKID STEER CORPORATION

60 Depot Street
Buffalo, NY 14206
Telephone 716-855-2226

TRANSMISSION DESCRIPTION

The Skid Steer transmission consists of two similar but symmetrically opposite transmission halves separated by a center plate. Many components are identical in both halves. Sun gears, pinions, carriers, ring gears, and shift collars are identical in both halves. Transmission cases, shift levers and bands are similar but symmetrically opposite.

A shift collar splined to each output shaft is moved in or out by external diamond shaped levers to engage either the ring gear or carrier hub splines. The output shaft is locked to the carrier drum when forward is selected. The ring gear drum is locked to the output shaft when reverse is selected.

Each transmission half may be individually controlled by a selector which permits selecting either forward (F) neutral (N), or reverse (R). Each transmission half has a u-channel brake lever which is used to control two bands. The two bands in each transmission half are applied or released as required to cause neutral, driving, or braking as required.

It should be realized that transmission braking function is provided for steering. For safety, additional braking should be maintained to stop and hold vehicle.

SPECIAL NOTE

The transmission of power, steering and braking is provided in our transmission when it is positively engaged in forward or reverse and the drive system from transmission output sprockets to the wheel axles, provided by the vehicle manufacturer, is in tact. If the transmission is in neutral or if there is a failure in the chain or driving system to the axles, then no braking can be obtained from the transmission. Make certain you and/or the operator realizes the transmission braking limitations. All vehicles utilizing the Skid Steer transmission must have a secondary braking system.

6x6World.com

6x6World.com

GENERAL OPERATING INSTRUCTIONS

THE FOLLOWING APPLIES TO VEHICLES USING THE SKID-STEER TRANSMISSION. REFER TO THE VEHICLE OPERATOR'S MANUAL FOR CHANGES AND/OR ADDITIONS.

The vehicle's engine may be started with the transmission in forward or reverse gear. Unless the steering laterals are spring loaded forward the laterals will "relax" allowing the engine to start without moving the vehicle. Certain manufacturers do spring load the laterals forward. Follow recommended starting procedures on those vehicles. (Example: Start engine with transmission in neutral or reverse gear)

Select forward or reverse as required by moving the diamond-shaped lever to the desired position, with vehicle gear shift system. (SEE PHOTO) Both levers will normally be moved to the same selection. However, it is possible to select reverse gear on one side and forward gear on the other with individual shifting levers. This depends on the individual manufacturer's shift linkage arrangement.

It is extremely important that the transmission be fully engaged in gear. Proper engagement is indicated by the diamond lever flush against the transmission housing as shown in photo. Damage to the transmission will result if power is applied to a partially engaged transmission. (See trouble shooting chart) Do not expect the transmission to shift into gear easily every time. Gears within the transmission have to mesh to insure proper shifting. Sometimes the gears mesh quickly and easily. Other times the vehicle will need to roll slightly to allow internal parts to rotate and align. DO NOT TRY TO FORCE INTO GEAR. Forcing will not cause gears to mesh. Spend some time when first operating the vehicle by observing the two diamond-shaped levers atop each side of the transmission while shifting. You will notice that occasionally the levers will stop short of proper engagement. Rolling the vehicle slightly to rotate inner gears will allow you to fully shift into gear. Full engagement is mandatory in providing trouble-free operation.

> NOTE: If gears do not mesh (will not go into gear) either the collar(s) or ring gear drum(s) will need to rotate. The carrier plate is used for forward operation and the same would apply. To rotate internal gears while in neutral the following procedure is recommended: For reverse "Brake" the transmission and apply engine throttle. This will start the internal ring drum(s) to rotate and allow gear teeth to mesh. For forward push forward on the lateral(s) which will rotate the carrier plate(s) and apply adequate throttle. The above procedure will rotate internal gears. The output sprockets being able to rotate will have equal results. Using a quick brisk motion shift into gear while these components are rotating.

Do not attempt to shift the transmission on an incline. If the shifter happened to "hang" in neutral during shifting, steering and braking control is lost, and requires the use of the vehicle's secondary braking system for emergency stopping. It is recommended that a hill should not be climbed in reverse gear unless the vehicles secondary braking system is adequate. Operators may lose control if depending fully on the transmission to stop and hold the vehicle.

Vehicle guidance is accomplished by moving the steering laterals (linked to the u-channel bell-crank) to each extreme end of throw as required to actuate driving

or braking each side of the transmission. Adequate pressure should be applied to the laterals and maintained to prevent band slippage. Overheating will occur if the bands are allowed to slip excessively dum to inadequate pressure. More pressure is required as load and terrain dictates. Slightly more pressure is required to maintain forward movement than the amount it takes to brake the transmission. Depending on the load and terrain, the operator should note that braking is very positive and requires little effort. The same is true for the drive output rotation. Although both require little effort for steering, constant attention should be given to forward lateral pressure when the load dictates. Heavier vehicles (700 pounds or more) with heavy lugged tires require more attention to lateral pressure than lighter vehicles.

CAUTION: Do not use excessive force on the vehicle laterals. Band failure may result. Enough force to fail a band is considered abuse to the transmission.

INTERNAL LUBRICATION REQUIREMENTS

Oil capacity is 1 quart. DO NOT OVERFILL. Two (2) types of automatic transmission fluid are recommended. The most common used and unless stated otherwise in the vehicles operators manual is type 'A'. Depending on the particular vehicle requirements this is recommended for most general purpose use. Another fluid, type 'F' (Ford Motor Co.) is recommended for heavier machines. This oil causes the bands to be more sensitive to response. Do not use this oil unless recommended by the vehicle manufacture. Steering may be too sensitive for lighter machines. Use type 'A' when is doubt.

MAINTENANCE PROCEDURES

It is recommended that the following procedures be followed for proper maintenance of the transmission:

1. Check the oil level at the bottom check plug every 25 hours of operation.

2. For maximum life, the oil in the transmission should be changed every 100 hours of operation. This is accomplished by raising the front of the vehicle with the lower transmission plug removed to allow the oil to drain as much as possible. Remove top vent plug and refill only to the bottom of the lower drain plug hole. A suction gun with a small flexible hose can also be used to remove the transmission fluid.

3. Periodically lubricate the shift drum assembly beneath the diamond-shaped shifter where it goes through the aluminum housing to prevent corrosion and binding of the shifter mechanism.

4. Periodically check the four (4) bottom mounting studs and nuts for tightness.

BAND ADJUSTMENT

6x6World.com

Band adjustment may be required to compensate for normal wear. Adjustment is necessary only when there is excessive lateral travel after a long period of use (commercial applications). Excessive throws depends on the vehicle's lateral design. On most vehicle laterals the only components restricting further travel of the lateral from one extreme to the other are the transmission bands. Lateral stoppage indicates

6x6World.com

the band is applying pressure to the planetary drums. This is assuming the linkage and laterals are not retarded from free movement.

Do not adjust the transmission bands for (1) straight direction control (2) lateral position (3) weak performance on one or both sides. (See trouble shooting chart)

Very minor band adjustments may be made to equal the amount of lateral travel. Equal parallel lateral alignment should be adjusted only with the vehicle linkage system.

ADJUSTMENT PROCEDURE (for normal wear or when installing new bands)

1. Remove u-channel bell-crank hair pin spring clips.

2. Method (A): Slide adjusting tool (Skid-Steer part no. SS-10) under the head of each bolt on one lever. Alternately turn each bolt in to keep the channel parallel with front of transmission. Torque each bolt slightly (15 lb. in.) at which time the channel should be parallel with housing front face. Remove tools and loosen from ¼ to ½ turn to permit bolt head to enter channel in bolt retainer. Method (B): With spring clip removed, position channel bolt retainer in order to turn the bottom hex head cap screw. Tightening this bolt will reduce forward travel throw. The amount of adjustment will depend on band wear. Try to provide a forward travel amount equal to that when the vehicle was new. Adjustment of the top hex bolt will depend on band wear. It may not require any if the bottom bolt adjustment has corrected the excessive travel. It is very important that adequate travel is provided to allow the bands to release freely. The bands are too tight if the hex bolt head will not return to the channel bolt retainers.

3. Replace channel lever clips. Repeat steps on the other channel bell crank.

TROUBLE SHOOTING GUIDE

Zero power output on one or both sides

1. Transmission remains in neutral gear

Reason: Shift pin has broken from shifting drum and not able to move collar back and forth. Collar remains in neutral position although diamond lever is moving. (replace part)

2. Output sprocket or chain damaged

3. Band damage

Reason: Sudden excessive travel in lateral indicates a broken band and cannot operate planetary gear drums. (replace part)

REMAINS IN GEAR: Even though shift lever is moving

1. Shift pin broken

2. Collar groove damaged

Reason: A section of the outer lip may be "busted" out. This would result in the shift pin not being able to move the collar out of forward. It will however move into forward. By rotating the collar (splined to output shaft) an undamaged portion of the collar will rotate in line with the shifter pin to allow a full shift. It is possible the broken pieces will damage other components.

Poor output performance - Excessive lateral pressure required to brake and/or propel

1. Band slipping (*assuming adequate input power)

Reason: (A) Band has worn out, causing metal-to-metal contact with planetary drum(s).

(B) Band has overheated and crystallized, causing a hard surface unsuitable for gripping the drums. (replace bands)

2. Inadequate lateral pressure to bands

Reason: (A) Linkage obstruction (B) Operator not exerting sufficient lateral force

3. Ring gear drum bearing seized to shift collar (uncommon)

Reason: (A) Excessive load (B) Lack of proper oil

Hard to shift F-R-N

1. Diamond lever will not move with ordinary pressure

Reason: (A) Output chain(s) are too tight (B) Shifting drum assembly binding to housing due to rust or damage (C) Shift linkage not operating properly (D) Shift collar binding to ouput shaft or ring gear drum.

2. Difficult to get into gear. Assuming the vehicles linkage is working properly, this is characteristic of this sliding gear type manual shift. Do not expect an easy shift everytime. When the output sprocket has difficulty rotating slightly, internal gears do not mesh easily.

Will not stay in gear Caution: Do Not operate the vehicle in this condition.

1. Shift collar not moving through full travel

Reason: (A) Shift pin worn excessively because: (1) for proper operation the vehicle shifter system should allow the shift drum pin to float freely in the collar groove. While fully in gear the diamond lever should have a slight amount of play to allow the pin to center itself in the collar groove. By allowing it to center itself the pin will not wear against the collar groove; (2) If power is applied to a partially engaged transmission the collar will try to "cam" out of gear. If the pin does not break it will wear very fast on one side. An excessively worn pin will not locate the collar fully into gear.

6x6World.com

* Engine power may be insufficient or torque converter failure. Example: Belt slipping or 2-cylinder engine running on one cylinder.

(B) Shift linkage obstruction

(C) Operator did not shift fully into gear.

2. Shift collar detent spring failure (shift collar moves excessively easy) Do not operate the vehicle in this condition. Part must be replaced.

Overheating

1. The ATF oil has a burnt smell

Reason: (A) Inadequate lateral pressure for terrain and load conditions

(B) Too much oil

(C) Bands adjusted too tight

(D) Inadequate oil level

NOTE: Transmission is not overheated if merely too hot to touch. Transmissions will run hotter during repeated sharp maneuvers. A hot transmission will cause water to steam.

Output Shaft Seals Rupture From Housing

Reason: (1) Excessive oil level (2) Vent plug defective

REPAIR AND REPLACEMENT

Shifter Drum Repair (See photos)

1. Remove internal snap ring in aluminum housing groove under diamond lever. (NOTE: Some vehicle manufacturers omit this snap ring using an external bracket to hold the assembly in place.)

2. The shift drum assembly should lift out. It may require pressure to remove.

3. For in field repair or until a new shifter can be installed, shift the transmission into forward gear by sliding the collar in toward the center of the unit with a screwdriver.

4. It is not necessary to remove the broken shift pin. For field repairs, replace the broken shift drum in the exposed hole to retain the oil.

NOTE: Earlier built Borg-Warner transmissions utilized a "T" paddle shift pin. Some manufacturers removed these paddles prior to installation in the vehicle. These paddles, if used, must be removed if broken. Contact Skid-Steer for removal instructions. The "T" paddle pin is not recommended as a replacement part. The "T" paddle is used if the broken stem remaining in the shifter drum has a course inner texture and/or can be removed from the drum. A straight 1/4" needle bearing shift pin used by Skid-Steer and some Borg-Warner built transmissions will break with a smooth inner finish. These pins are pressed in and cannot be removed.

6x6World.com

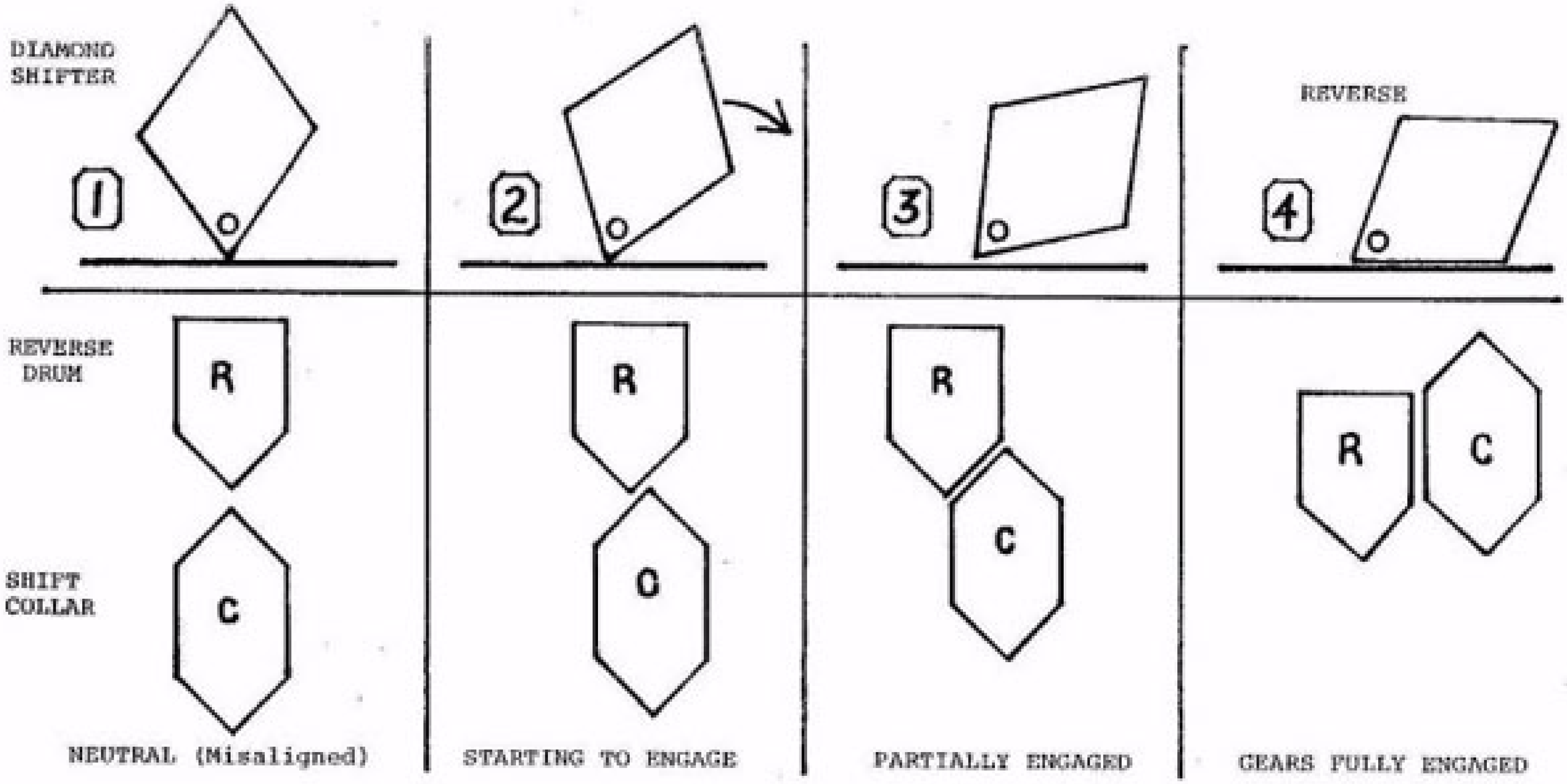
6x6World.com

PARTS FOR SKID STEER TRANSMISSION

KEY NO.	DESCRIPTION	PART NO.	NO. REQ.
SHIFTER GROUP			
1	Shift Lever, Right	1AT20-40	1
	Shift Lever, Left	AT20-40	1
2	O Ring	4804-TT	2
3	Snap Ring	4828 J	2
4	Shift Collar	055-002	2
5	Spring Garter	T20-42	2
OUTPUT SHAFT GROUP			
1	Output Shaft,Right	671-007	1
	Output Shaft, Left	671-009	1
2	Needle Bearing, Input	4840Z	1
3	Oil Seal	T20-106	1
4	Snap Ring	4048L	2
5	Bearing, Output	B207BS	2
6	Seal, Output	T20-110	2
7	Snap, Ring	4758A	2
PLANETARY GROUP			
1	Carrier Drum	659-002	2
2	Planet Gear	T20-5	6
3	Needle Bearing	4840X	6
4	Carrier Plate	014-002	2
5	Ring Gear Drum	662-003	2
6	Sun Gear	T20-4	2
7	Input Shaft	189-002	1
8	C Ring	4747E	2

KEY NO.	DESCRIPTION	PART NO.	NO. REQ.
THRUST WASHER GROUP			
1	Washer, Carrier Plate	193-001	2
2	Washer, Sun Gear	193-002	2
3	Washer, Planet Gear(1 5/8)	193-003	6
4	Washer, Ring Gear Drum	193-004	AR
5	Washer, Planet Gear(1 3/16)	193-005	AR
HOUSING GROUP			
1	Housing Assembly R.H.	565-004	1
	Housing Assembly L.H.	565-002	1
N.I.	Oil Pocket Washer	T20-58	2
N.I.	Stud	454480	4
2	Center Housing Plate	007-002	1
3	Gasket	T20-145	2
4	Vent Plug	04-03-001-01	1
	Drain Plug	438159	1
BAND GROUP			
1	Brake Band L.H.	AT20-33	2
	Brake Band R.H.	AT20-133	2
2	Band Clevis	T20-32	4
N.I.	Roll Pin	453675	4
3	O Ring	4804UU	4
4	Brake Lever	098-003	2
5	Hair Pin Clip	056-003	4
N.I.	Bolt Retainer	056-002	4
N.I.	Bolt	181639	4
6	Band Anchor Rod	T20-51	2
N.I.	Sleeve	T20-44	2

NOTE: The above parts are used in the manufacturing of "Skid Steer" units. Parts for Borg-Warner units using the brake lever shown are identical. Certain earlier built Borg Warner unit components are obsolete and serivce parts are not available. Contact factory for availability. When ordering parts specify if the transmission is not the later design. All transmissions using the brake lever shown are the later design. Skid Steer offers a service to rebuild aluminum housing and ring gear drum bushings.



GEAR SHIFT TEETH ILLUSTRATION

6x6World.com

Occasionally Skid Steer gear shift teeth do not mesh easily. The above illustration shows how the collar teeth, when not in line with an "open" space will resist shifting. This is characteristic of all sliding type gear arrangements. The components need to be able to rotate slightly and find an opening in which to mesh. Many times the gears will be in alignment and perfect shifting can be expected. As shown in illustration 2 the gear teeth will "clash". The "roof top" chamfers will try to align the teeth by rotating each other. However, both and/or one of the components will have to be capable of rotating to provide alignment. Illustration 3 position is responsible for 90% of all transmission failures. If in this position the operator activates the reverse drum with adequate transmission input, damage will occur. The "roof top" chamfers will drive off each other and result in a camming action. This camming action will drive (force) the collar into neutral, as the reverse drum is rotating. By internally forcing the collar, splined to the output shaft, into neutral the shift pin and/or collar will be damaged. The shift pin will attempt to hold the collar in gear. However, enough power is being applied to overcome it's strength. Excessive wear or breakage will result to both the pin and collar. The operator can expect failure if illustration 3 is allowed to occur. Follow instructions for repair.

NOTE: The above only applies to reverse on Skid Steer manufactured transmissions. It will apply to both forward and reverse on Borg Warner units. Failure of shifting components is not a manufacturing defect. It is the result of improper shifting.

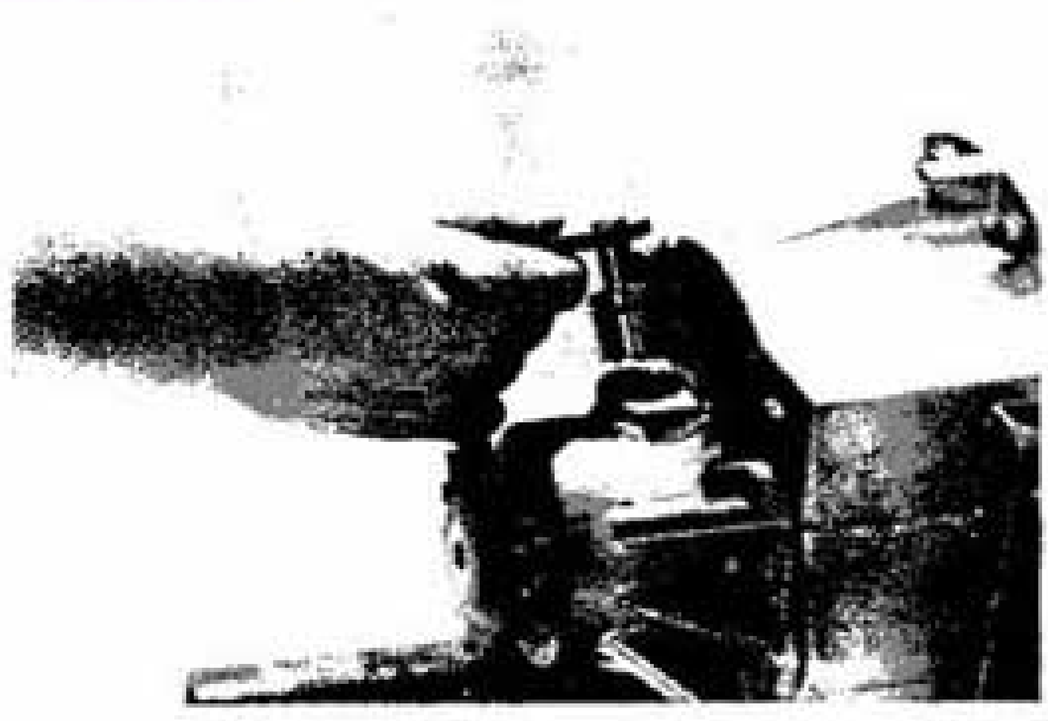
TRANSMISSION IN FORWARD GEAR

TRANSMISSION IN REVERSE GEAR

TRANSMISSION SHIFTER REPAIR PROCEDURES

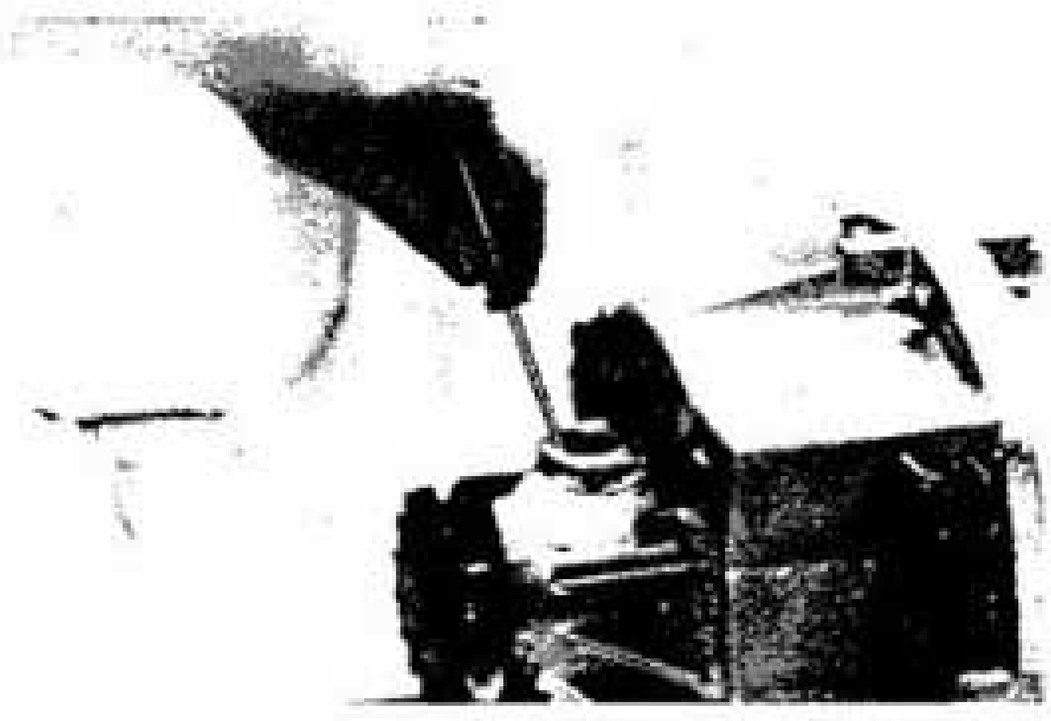
6x6World.com

REMOVING SNAP RING

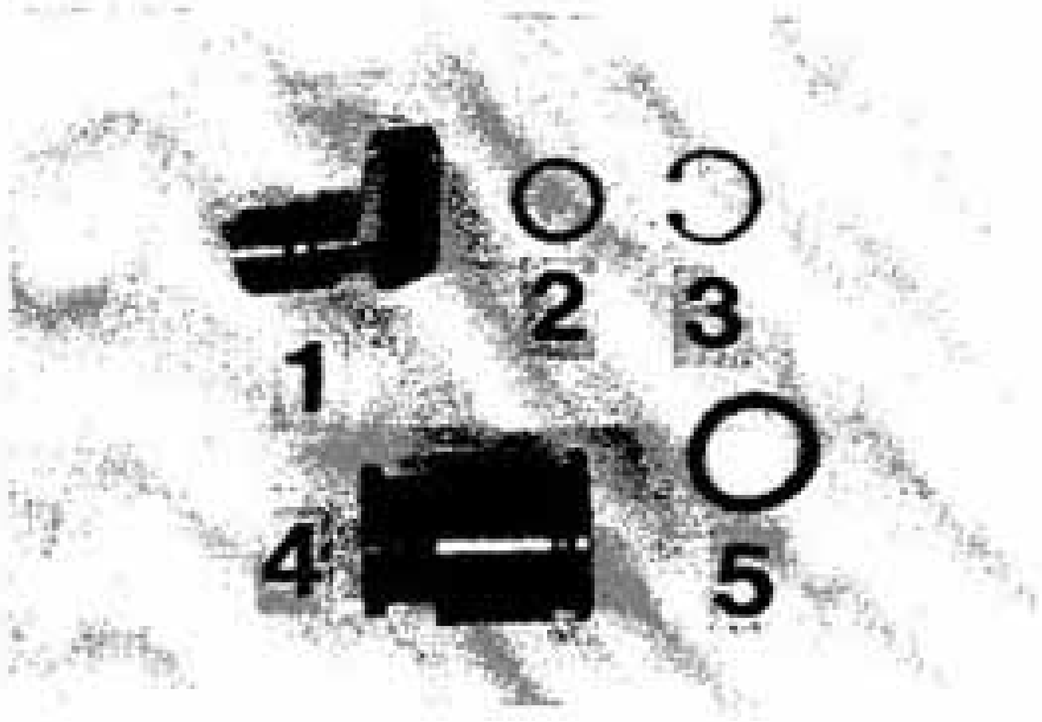


LIFTING SHIFT DRUM OUT

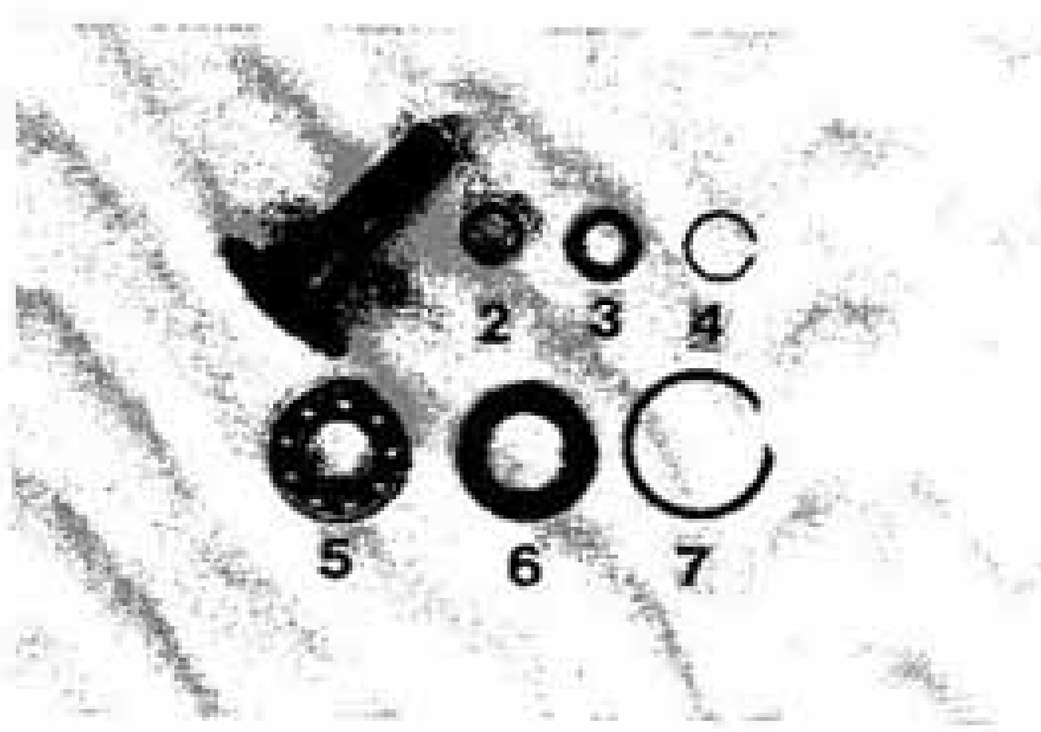
MAY REQUIRE PRESSURE TO REMOVE



SHIFTING WITH SCREWDRIVER

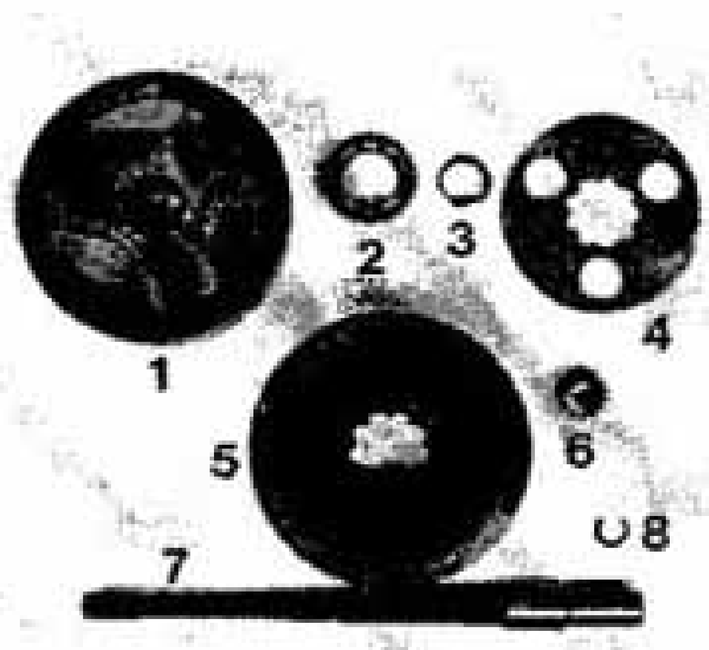


SHIFTER GROUP

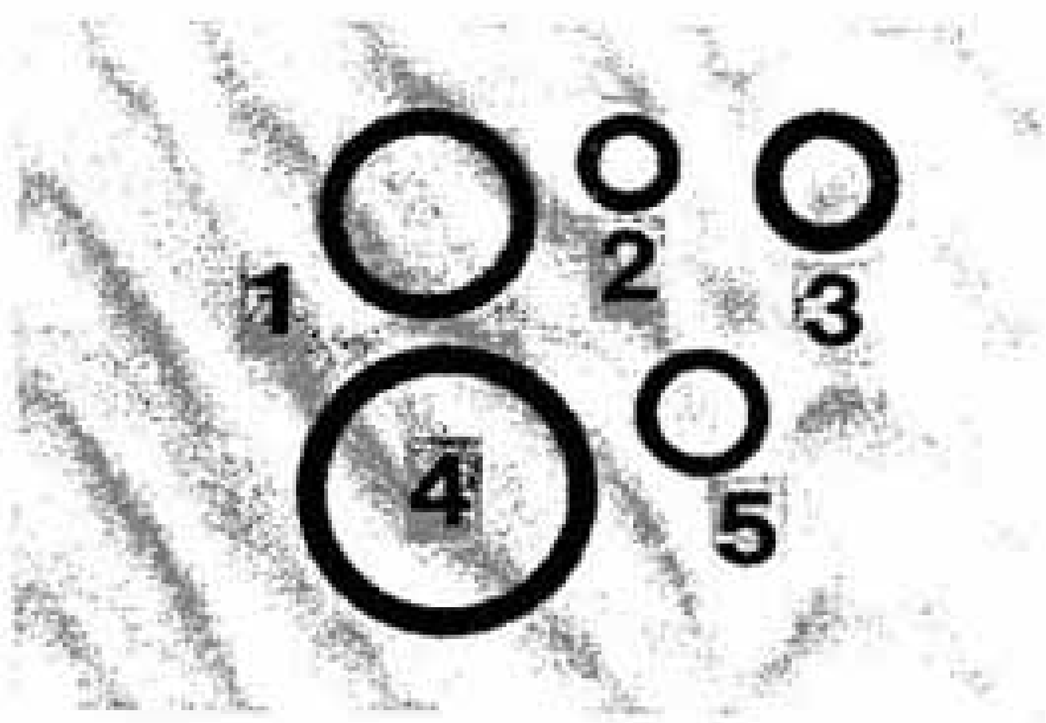


OUTPUT SHAFT GROUP

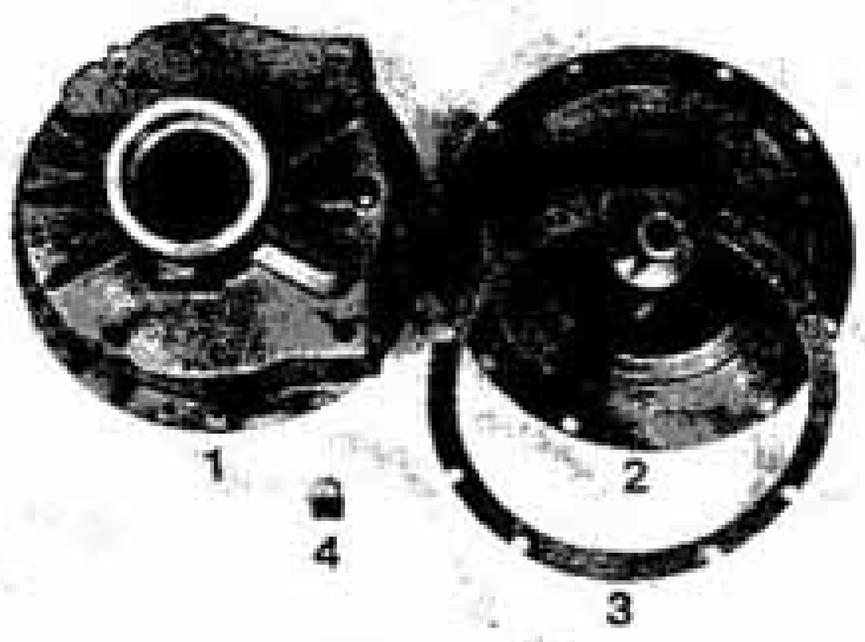
6x6World.com



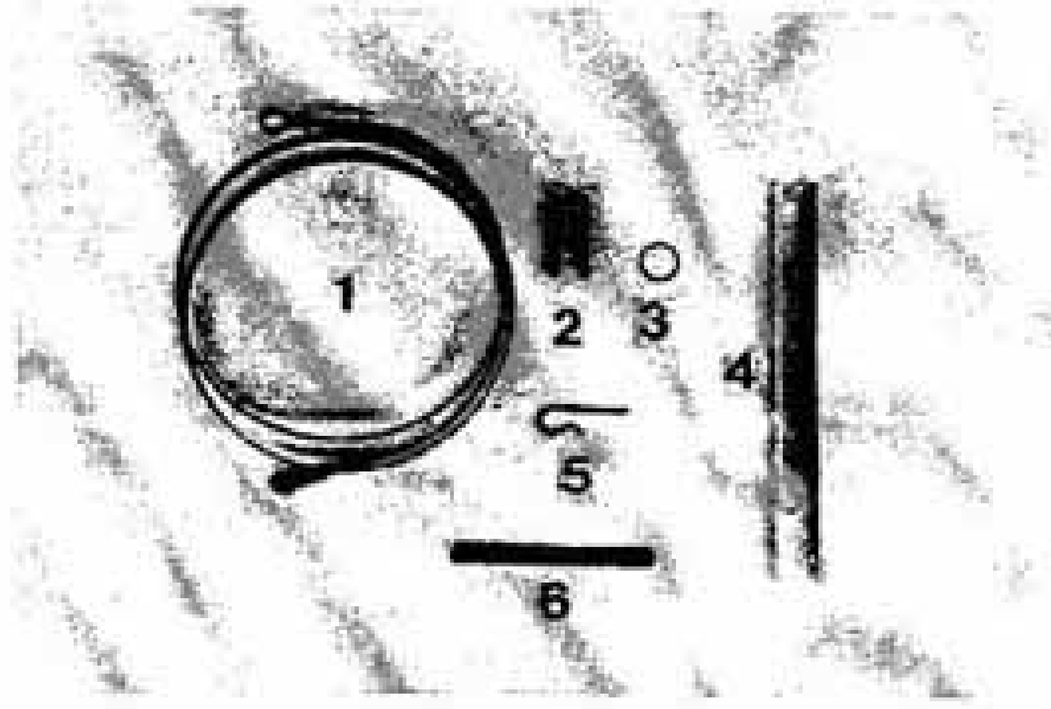
PLANETARY GROUP



THRUST WASHER GROUP



HOUSING GROUP



BAND GROUP

6x6World.com

INDEX NO.	PART DESCRIPTION	PART NUMBER		13-13-086-001	AS1-T20	13-13-000-005	13-13-000-009	13-13-000-007	PART KIT 13-13-410-001
1	OUTPUT SHAFT & SPROCKET ASSEMBLY - R.H.	AT20-102	(6)		1				
		13-13-671-003	(7)	1					
		13-13-671-007				1			
		13-13-671-010					1		
		13-13-671-013						1	
N.I.	SPROCKET	T20-25			1	1			
		13-13-144-001		1				1	
		13-13-144-002					1		
2	HOUSING, BUSHING & OIL POCKET WASHER ASS'Y. - R.H.	13-13-585-004		1 (1)	1 (1)	1	1	1	
N.I.	OIL POCKET WASHER	T20-58		2	2	2	2	2	
N.I.	STUD	4044DD		4	4				
N.I.	DOWEL PIN	10-00-043-031		2	2				
3	"O" RING	4804TT		2	2	2	2	2	2
4	SHIFT LEVER ASSEMBLY - R.H.	13-13-508-002		1	1				
		13-13-622-002				1	1	1	
N.I.	SHIFT PADDLE	13-13-096-001				2	2	2	
N.I.	NEEDLE ROLLER	4741B		2	2				
5	SHIFT DRUM RETAINING RING	4823J		2	2	2	2	2	
6	FILLER PLUG	0000438159		1	1	1	1	1	
7	SHAFT RETAINER RING	4823L		2	2	2	2	2	
8	DETENT SPRING (Garter Type)	T20-42		2	2	2	2	2	2
9	SHIFT COLLAR	T20-15	(3)	2	2				
		13-13-058-002	(3)			2	2	2	
10	BRAKE LEVER - EARLY TYPE	T20-39		2	2				
	BRAKE LEVER - LATE TYPE	13-13-096-003				2	2	2	
N.I.	LEVER CLIP	13-13-056-003				4	4	4	
N.I.	BOLT RETAINER	13-13-056-002				4	4	4	
N.I.	3/8 - 24 x 1-1/4 HEX HEAD BOLT	0000181539				4	4	4	
11	SAND ANCHOR ROD	T20-51		2	2	2	2	2	
12	SAND ANCHOR SLEEVE	T20-44		2	2	2	2	2	
13	BRAKE BAND - R.H.	AT20-133		2	2	2	2	2	
14	RING GEAR, DRUM & BUSHING ASSEMBLY	AT20-6	(3)	2	2				
		13-13-662-003	(3)			2	2	2	
N.I.	THRUST WASHER	13-13-193-004				2	2	2	
15	SUN GEAR	T20-4		2	2	2	2	2	
16	CARRIER, DRUM, BUSHING & PIN ASSEMBLY	1AT20-30	(4)	2	2				
		13-13-659-002				2	2	2	
16a	NEEDLE BEARING	4840X		6	6	6	6	6	
16b	PLANET GEAR & NEEDLE BEARING ASSEMBLY	AT20-5		6	6	6	6	6	
16c	CARRIER PLATE (18 TEETH)	T20-54	(2)	2	2				
	(9 WIDE TEETH)	13-13-014-002	(2)			2	2	2	
N.I.	THRUST WASHER	13-13-193-001				2	2	2	
N.I.	CARRIER PIN	T20-38		6	6	6	6	6	
N.I.	THRUST WASHER (1-5/8 O.D.)	13-13-193-003				6	6	6	
N.I.	THRUST WASHER (1-7/16 O.D.)	13-13-193-005				6	6	6	
17	BRAKE BAND - L.H.	AT20-33		2	2	2	2	2	
18	CENTER HOUSING PLATE	T20-6	(5)	1	1				
		13-13-007-002				1	1	1	
N.I.	THRUST WASHER	T20-17		2	2				
		13-13-193-002				2	2	2	2
19	5/16-24 x 1/2 HEX HEAD BOLT	0000181343		9	9	9	9	9	
20	OUTPUT SHAFT ASSEMBLY--L.H.--INCLUDES SPROCKET, NEEDLE BEARING AND OIL SEAL	1AT20-2	(2)		1				
		13-13-671-002		1					
		13-13-671-009				1			
		13-13-671-012					1		
		13-13-671-015						1	
21	OIL SEAL	T20-108		1	1	1	1	1	1
N.I.	1/2-14 VENTED PIPE PLUG	04-03-001-01		1	1	1	1	1	
N.I.	SPROCKET	T20-25			1	1			
		13-13-144-001		1				1	
		13-13-144-002					1		
N.I.	NEEDLE BEARING	4840Z		1	1	1	1	1	
22	"C" RING - NO LONGER USED-USE 4747E	4747		2	2	2	2	2	2
23	INPUT SHAFT	T20-16		1	1				
		13-13-189-001				1	1	1	
24	CLEVIS PIN	T20-35		4	4				
25	EYE BOLT	T20-31		4	4				
26	"O" RING	4804UU		4	4	4	4	4	4
27	SNAP RING (FOR CLEVIS PIN)	4828K		4	4				4
N.I.	LOCK NUT FOR EYE BOLT	0000107823		4	4				
29	HOUSING, BUSHING & OIL POCKET WASHER ASS'Y -L.H.	13-13-585-002		1 (1)	1 (1)	1	1	1	
30	SHIFT LEVER ASSEMBLY - L.H.	13-13-508-001		1	1				
		13-13-622-001				1	1	1	
31	5/16 - 24 HEX LOCKNUT	0000214279		9	9	9	9	9	
32	GASKET	T20-145		2	2	2	2	2	2
33	ANNULAR BEARING	B20709		2	2	2	2	2	
34	BEARING SNAP RING	4758A		2	2	2	2	2	
35	OIL SEAL	T20-110		2	2	2	2	2	2
N.I.	BRAKE BAND CLEVIS	T20-32		4	4	4	4	4	
N.I.	SPRING PIN	3000453675		4	4	4	4	4	
N.I.	BOLT	0000176835		2	2	4	4	4	

DISASSEMBLY PROCEDURES

6x6World.com

1 — Drain oil.

2 — Remove brake levers #10 and eye bolt assemblies #24, 25, 26, 27 and 28.

3 — Remove bolts #19 and nuts #31.

4 — Unit should be placed in clean area or on clean bench with input shaft end uppermost.

5 — Lift upper housing #29 and center plate #18 from lower housing half #2 and set aside.

6 — Remove carrier drum #16 and associated parts from assembly.

7 — Remove ring gear drum #14.

8 — Remove anchor pin #11 and sleeve #12.

9 — Remove brake bands #13 from inside of housing.

10 — Remove snap ring #5 and shift lever assembly #4.

11 — Remove shift collar #9 from output shaft #1 by quick jerk — hand operation only.

12 — Remove snap ring #7 from output shaft on insidehousing. (Note: Care must be taken not to damage internal housing bushing.)

13 — Pull output shaft #1 out of bearing #33 by hand from outside of housing.

14 — Remove seal #35 from housing by means of large screw driver. (Note: Care must be taken not to damage housing.)

15 — Remove snap ring #34 from housing. (Note: EXTREME CARE MUST BE USED not to damage oil seal surface.)

16 — Bearing #33 can now be removed if necessary.

17 — Remove "C" ring #22 from small end of input shaft #23.

18 — Remove sun gear #15.

19 — Remove center plate #18.

20 — Remove carrier drum #16 and associated parts from assembly.

21 — Remove ring gear drum #14.

22 — Remove anchor pin #11 and sleeve #12.

23 — Remove brake bands #17 from inside of housing.

24 — Remove sun gear #15 from input shaft.

25 — Remove "C" ring #22 from input shaft.

26 — Remove input shaft #23 from outside of housing.

27 — Remove snap ring #5 and shift lever #30 from outside of housing.

28 — Remove shift collar #9 by quick jerk — hand operation only.

29 — Remove snap ring #7 from output shaft on inside of housing. (Note: Care must be used not to damage internal housing bushing.)

30 — Pull output shaft #20 out of bearing #33 by hand from outside of housing.

31 — Remove seal #35 from housing by means of large screw driver. (Note: Care must be taken not to damage housing.)

32 — Remove snap ring #34 from housing. (Note: EXTREME CARE MUST BE USED not to damage oil seal surface.)

33 — Bearing #33 can now be removed if necessary.

ASSEMBLY INSTRUCTIONS

NOTE: *Use petrolatum (vasoline) to hold gaskets and thrust washers in position and to lubricate seals and "O" rings during assembly.*

1) Press an annuair bearing (33) into bore of each housing.

2) Use care to prevent damage to seal bore as a snap ring (34) is assembled against each bearing in housing groove.

3) Coat the seal bores lightly with plastic lead sealer and press a seal .012" below flush in each housing.

4) Press a new needle bearing, if required, into left output shaft.

5) Coat seal bore with plastic lead sealer and press a seal into a position flush with end of left output shaft.

6) Assemble left output shaft through bearing in left housing and right output shaft through bearing in right housing.

7) Assemble a snap ring (7) against the annular bearing in output shaft groove of each shaft.

8) Assemble the garter type detent spring into groove in each shift collar bore. Use a screw driver to start garter spring over output shaft. Position shift collars in the neutral position.

9) Use petrolatum to hold shift paddle in position in shift collar grooves. Shift paddles were not used in early units.

10) Assemble a new "O" ring into each drum groove. Place snap ring in position on stem of shift drum. Lower a shift lever and drum into housing bore in alignment with shift paddle in each housing.

11) Assemble the snap ring into housing groove behind each shift drum. Shift levers should both point outward in the neutral position. Early shift drums had a needle roller pressed into hole where shift paddle is now assembled.

12) Assemble the input shaft through left output shaft. Use suitable blocking to hold shaft in position with open end of housing located up. Assemble a snap ring into input shaft groove near shift collar. Two types of snap rings have been used in this location. The one type can be assembled into shaft prior to assembling shaft into housing.

13) Assemble a sun gear over input shaft splines and into position against the snap ring. Assemble a thrust washer against sun gear face. Early units used a thrust washer with a tab, which must be aligned with a recess in center plate.

14) Use a spring pin to attach a clevis to the apply end of all bands. Bands which spiral to the right will normally have the anchor end marked with a spot of light blue and must be assembled into the left housing. Bands which spiral to the left will normally have the anchor end marked with a spot of white and must be assembled into the right housing. The marking die is sometimes faded or missing and for that reason, it is best to identify bands during disassembly to insure proper replacement.

NOTE: *The anchor end of the band is heliarc welded and lays closer to the circumference of the band than the apply end which is pressure welded.*

15) Assemble the outermost band in position in each housing, sliding band clevis into case bore far enough to expose the "O" ring groove and permit the "O" ring to be assembled and lubricated outside of case. The housing bore is chamfered and the "O" ring will not be damaged as clevis is pulled back into the housing bore to a position approximately flush with front face of housing.

16) Slide an anchor pin through anchor end of band and into hole provided in each housing. Slide a sleeve over the anchor pin.

17) Assemble the innermost band in position and slide band clevis into housing and assemble the "O" ring as described in step 15. Rock the inner band up to one side to permit ring gear and drum to be assembled.

18) Assemble a 3-1/4" outside diameter thrust washer against outer thrust face of ring gear and brake drum. Assemble ring gear and brake drum (14) through band and over shift collar in each housing. Early units did not use this thrust washer.

19) Assemble a 2-3/8" diameter thrust washer against ring gear and drum thrust face in both housings. Some units do not use these thrust washers.

20) Center carrier plate over thrust washers. The chamfer on carrier plate splines should be located toward shift collar in both housings.

21) Center a 1-7/16" diameter thrust washer and a pinion gear over each of the three holes in carrier plate in each housing. Early units did not use these thrust washers.

22) Rock the innermost band back into position in housing but the anchor end should not be assembled to the anchor pin.

23) Place a 1-5/8" diameter thrust washer over each of the three carrier pins and lower carrier into position with each carrier pin passing through one of the pinion gears and into holes of carrier plate. Some units do not use these thrust washers.

24) Wrap band enough to assemble anchor end over anchor pin.

25) Position a gasket on face of each housing.

26) Assemble the center plate to left housing. Bolt holes will permit plate to be positioned in only one position however either face of the plate may face either housing.

27) Assemble a thrust washer against center plate thrust face. Assemble a sun gear against thrust washer. Assemble a snap ring into input shaft groove next to sun gear.

6x6World.com

ASSEMBLY INSTRUCTIONS

NOTE: *Use petrolatum (vasoline) to hold gaskets and thrust washers in position and to lubricate seals and "O" rings during assembly.*

1) Press an annualr bearing (33) into bore of each housing.

2) Use care to prevent damage to seal bore as a snap ring (34) is assembled against each bearing in housing groove.

3) Coat the seal bores lightly with plastic lead sealer and press a seal .012" below flush in each housing.

4) Press a new needle bearing, if required, into left output shaft.

5) Coat seal bore with plastic lead sealer and press a seal into a position flush with end of left output shaft.

6) Assemble left output shaft through bearing in left housing and right output shaft through bearing in right housing.

7) Assemble a snap ring (7) against the annular bearing in output shaft groove of each shaft.

8) Assemble the garter type detent spring into groove in each shift collar bore. Use a screw driver to start garter spring over output shaft. Position shift collars in the neutral position.

9) Use petrolatum to hold shift paddle in position in shift collar grooves. Shift paddles were not used in early units.

10) Assemble a new "O" ring into each drum groove. Place snap ring in position on stem of shift drum. Lower a shift lever and drum into housing bore in alignment with shift paddle in each housing.

11) Assemble the snap ring into housing groove behind each shift drum. Shift levers should both point outward in the neutral position. Early shift drums had a needle roller pressed into hole where shift paddle is now assembled.

12) Assemble the input shaft through left output shaft. Use suitable blocking to hold shaft in position with open end of housing located up. Assemble a snap ring into input shaft groove near shift collar. Two types of snap rings have been used in this location. The one type can be assembled into shaft prior to assembling shaft into housing.

13) Assemble a sun gear over input shaft splines and into position against the snap ring. Assemble a thrust washer against sun gear face. Early units used a thrust washer with a tab, which must be aligned with a recess in center plate.

14) Use a spring pin to attach a clevis to the apply end of all bands. Bands which spiral to the right will normally have the anchor end marked with a spot of light blue and must be assembled into the left housing. Bands which spiral to the left will normally have the anchor end marked with a spot of white and must be assembled into the right housing. The marking die is sometimes faded or missing and for that reason, it is best to identify bands during disassembly to insure proper replacement.

NOTE: *The anchor end of the band is heliarc welded and lays closer to the circumference of the band than the apply end which is pressure welded.*

15) Assemble the outermost band in position in each housing, sliding band clevis into case bore far enough to expose the "O" ring groove and permit the "O" ring to be assembled and lubricated outside of case. The housing bore is chamfered and the "O" ring will not be damaged as clevis is pulled back into the housing bore to a position approximately flush with front face of housing.

16) Slide an anchor pin through anchor end of band and into hole provided in each housing. Slide a sleeve over the anchor pin.

17) Assemble the innermost band in position and slide band clevis into housing and assemble the "O" ring as described in step 15. Rock the inner band up to one side to permit ring gear and drum to be assembled.

18) Assemble a 3-1/4" outside diameter thrust washer against outer thrust face of ring gear and brake drum. Assemble ring gear and brake drum (14) through band and over shift collar in each housing. Early units did not use this thrust washer.

19) Assemble a 2-3/8" diameter thrust washer against ring gear and drum thrust face in both housings. Some units do not use these thrust washers.

20) Center carrier plate over thrust washers. The chamfer on carrier plate splines should be located toward shift collar in both housings.

21) Center a 1-7/16" diameter thrust washer and a pinion gear over each of the three holes in carrier plate in each housing. Early units did not use these thrust washers.

22) Rock the innermost band back into position in housing but the anchor end should not be assembled to the anchor pin.

23) Place a 1-5/8" diameter thrust washer over each of the three carrier pins and lower carrier into position with each carrier pin passing through one of the pinion gears and into holes of carrier plate. Some units do not use these thrust washers.

24) Wrap band enough to assemble anchor end over anchor pin.

25) Position a gasket on face of each housing.

26) Assemble the center plate to left housing. Bolt holes will permit plate to be positioned in only one position however either face of the plate may face either housing.

27) Assemble a thrust washer against center plate thrust face. Assemble a sun gear against thrust washer. Assemble a snap ring into input shaft groove next to sun gear.

6x6World.com

28) Carefully bring the housings together and assemble the 9 bolts and locknuts. Torque bolts and nuts to 12-20 lb. in.

19) Assemble brake levers, bolt retainers and bolts, and adjust bands on late units. Bands should be adjusted in early units prior to assembling levers as described in "Adjust Early Models."

BAND ADJUSTMENTS

Brake band adjustment may be required to compensate for normal wear. Early units had flat levers which pivoted on a pin. These units should be adjusted when lever travel exceeds 1-5/8", measured from the center of clevis pin to hosuing face.

ADJUST EARLY MODELS

1) Loosen lock nuts.

2) Remove pins (24) from brake levers and slide band clevis into housing being careful not to exceed 1/2" of travel into housing or the "O" ring in clevis groove will be damaged.

3) Remove brake levers (10).

4) Pull plunger outward as far as possible with fingers. Adjust each eyelet (25) to obtain 1-1/4" distance from center to eyelet to housing face.

5) Replace levers and clevis pins then tighten locknuts.

ADJUST LATE MODELS

1) Remove brake band lever spring clips.

2) Slide an adjusting tools (see tool section) under the head of both bolts on one lever.

3) Alternately turn each bolt in to keep the lever parallel with front of transmission. Torque each bolt to 15 lb. in. at which time the lever should be within .002" of parallel with housing front face.

4) Remove tools and loosen bolts from 1/4 to 1/2 turn to permit bolt head to enter channel in bolt retainer.

5) Replace brake band lever spring clips. Repeat steps on the other lever.

MAINTENANCE RECOMMENDATION

1) Check oil level at least every 25 hours of operation.

2) Change oil every 50 hours of operation.

3) Type "A" Suffix "A" automatic transmission fluid, type "F" or Dexron automatic transmission fluid must be used. Approximately one U.S. quart (liquid measure) is required to fill unit. (Note: The warranty on the transmission is void if other than recommended fluids are used.)

TROUBLE SHOOTING

1) Low oil level usually indicates leaks which should be found and the necessary repairs should be made.

2) Steering linkage travel will gradually increase due to normal band wear. Adjust band when linkage travel becomes excessive.

3) A sudden change in steering linkage travel indicates a broken part. The vehicle should be stopped immediately and taken to a dealer for this inspection. DO NOT OPERATE THE VEHICLE IN THIS CONDITION.

4) If one side of the unit does not function but the other side does, check each gear shift lever to see if it is fully engaged. Also, check the brake band adjustment. If the unit still does not work, return vehicle to dealer for his inspection.

5) If the unit will not shift, check the transmission shift lever by disconnecting linkage and manually shifting each shift lever. If it still does not shift, then return vehicle to dealer.

6) If neither side of the unit functions (will not steer in either direction) and you are sure it is engaged in gear, then check the torque converter belt and the keyway on the input shaft. If the unit still does not function, return vehicle to dealer.

7) If the vehicle does not go in a straight direction, check the tire circumferences and pressures before trouble shooting the transmission.

6x6World.com