# MARMON-HERRINGTON T-30 SERIES TRANSFER CASE

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Attention!

This manual is intended for use by experienced technicians using safe procedures in a properly equipped shop environment. Safety precautions should always be followed, such as wearing eye protection, using appropriate tools and lifting devices. Marmon-Herrington is not responsible for damages or injury resulting from the service of these components.

Remember to check our website (marmon-herrington.com) for updates and additional information. Find detailed operation and preventative maintenance information in the General Operating Manual. T-30 Parts Manual also available.

MARMON-HERRINGTON T-30 TRANSFER CASE

<table>
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<tr>
<th>INPUT TORQUE (FT LB)</th>
<th>INPUT SPEED MAX (RPM)</th>
<th>WEIGHT APPROX kg (W/O OIL OR PTO)</th>
<th>RATIO</th>
</tr>
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<tbody>
<tr>
<td>11,500</td>
<td>3,500</td>
<td>218</td>
<td>1:1.09 1:2.47</td>
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REPLACEMENT PARTS

When ordering replacement parts for MARMON-HERRINGTON TRANSFER CASES, the following information should be given:

1. FACTORY ORDER NUMBER. Found on ID Plate affixed to Transfer Case Housing. This will be a six (6) digit number. (See illustration below)

2. Model of transfer case, i.e T-60, T-100

3. Give quantity and complete part number including ALL CHARACTERS (including zeros (0), dashes (-), underscores (_), and spaces). Note: Drivelines, shift linkages, etc., can be found on the computer printout of Bill of Material, which is included in the Service Manual

4. Give complete billing and shipping address.

WARRANTY CLAIM PROCEDURE

Before proceeding with repairs or ordering parts that you feel may be covered under warranty, you must first contact Marm-Herrington Customer Service Department and obtain a Repair Authorization number.

Please be prepared to supply all of the following information:

• Factory Order Number - This is located on an ID plate fixed to either the driver’s door panel or the component (axle or transfer case) itself.
• Model and Serial Number (required) - Again located on the ID plate fixed to either the driver’s door panel or the component itself.
• Vehicle year, Make and Model
• Vehicle Identification Number
• Mileage
• In Service Date

EXAMPLE PART NUMBERS

00030216080  5840_333_233

MUST BE INCLUDED  MUST BE INCLUDED

The information necessary for replacement parts and/or warranty claim procedures will be found on the ID Plate
GENERAL OPERATING INFORMATION

TIRES AND GEAR RATIOS
Tires, wheels and axle gear ratios have been carefully selected to minimize torsional “wind-up” between front and rear axles. Please consult tire or gear specialist before installing components differing from original equipment.

OPERATIONS
Except for the case of PD (Proportioning Differential) version transfer cases, Marmon-Herrington equipped vehicles are intended for as-needed AWD (all-wheel-drive) operation in off-road conditions only. DO NOT operate in AWD mode on hard, dry surfaces.

SHIFTING
Marmon-Herrington Axles and Transfer Cases are not fitted with any type of clutching device, and may only be shifted when the vehicle is at a complete stop. This applies to FAE (front axle engagement), high and low range, and locking differentials. The only exceptions are those vehicles equipped with Marmon-Herrington’s Safe-T-Shift system.

The transfer case relies on tooth alignment for internal gears to mesh, and it may be necessary to allow the vehicle to roll forward or backwards several inches to complete the shift. When selecting a shift function, operators must wait for the appropriate indicator to illuminate before accelerating to avoid costly internal damage.

SHIFT PROCEDURE
1. With the vehicle at a complete stop, select the desired range, axle position, or PTO function desired.
2. Place the main transmission in gear.
3. Allow the vehicle to idle forward (or backwards) several inches until shift is completed, evidenced by the appropriate indicator light.

4. Accelerate normally. In case of a manual transmission, ease the clutch out in low gear, allowing the vehicle to “walk” until shift is complete (as per the appropriate dash indicator).

TORQUE
“Torque Shock” or “Loading” is a damaging mode of failure that is easily avoidable. It generally occurs in situations when a vehicle is operating in an area of low traction at high RPM with the wheels spinning. When the tires make abrupt contact with a tractable surface, a violent shock-load is transmitted through the drive train. This can result in damage to axles, drive shafts, transfer cases and transmissions.
Simply engaging the front axle and operating in low range at lower speeds will allow the vehicle to proceed without imparting undue stress on the drive train.

SUMMARY
Before retreating from the subject of shifting, it must be reemphasized that no transfer case, PTO, axle differential, or power divider should ever be shifted while the vehicle is in motion. The engagement of these components is intended for off-road use only, in poor traction conditions.
T-30 TRANSFER CASE

DRAIN OIL IN WARM CONDITIONS.
DRAIN LUBE THROUGH BOTTOM PLUG (3).
CLEAN MAGNETIC PLUG AND REPLACE.
ADD LUBE THROUGH FILL PLUG (1) UNTIL
LUBE JUST STARTS TO FLOW FROM PORT (2).
REPLACE PLUG.

LUBE QTY: APPROX. 6.2L / 13.1 PINTS

1 - FILL PLUG
2 - LEVEL PLUG
3 - DRAIN PLUG
4 - VENT
SAE 85W/140
SAE 75W/90
SAE 90

See General Operating Manual for recommended maintenance schedule as well as alternative weight and grade of approved lubricants.
1 - DISASSEMBLY

T-Case (general)

1.1 Mount transfer case in appropriate stand.
1.2 Remove drain plug and drain lube.

1.3 Remove drive flanges

Note: It may be necessary to use threaded or hydraulic puller to remove flanges from shafts.

Note: Input flange and rear output flange bolts are M16X2.00X70, while front output flange bolt is M16X1.50X70. Keep bolts with correct flange to

FAE Shift Housing

1.4 Remove Front Axle Engage (FAE) indicator switch, extension pin, snap ring, and shoulder. (See figure 4)
1.4.1 Remove FAE housing bolts.

1.4.2 Loosen shift fork adjuster to relieve tension on shift rod.
1.4.3 Remove FAE housing assembly.

**T-Case (general)**
1.5 Remove case bolts and bearing cover bolts.

**HI / LO Shift Cylinder**

A - Cylinder  
B - Pistons  
C - O-rings  
D - Shims  
E - Retaining nut  
F - Rear cover
1.6 Remove shift cylinder mounting bolts.

Figure 10

1.6.1 Remove shift cylinder cover.

Figure 11

1.6.2 Remove retaining nut.

Figure 12
1.6.3 Blow air into this hole to release pistons.

1.6.4 Remove outer piston. Inspect 0-rings for wear.

1.6.5 Remove 0-ring at end of shaft, then use magnet to retrieve shims.
1.6.6 Blow air into hole again to remove inner piston.

1.6.7 Tap cylinder lightly with rubber mallet to break seal, then remove cylinder.

1.6.8 Remove O-ring from air passage.
Housing

1.7 Remove rear input bearing cover.

1.7.1 Retrieve shims and keep with cover.

1.7.2 Remove rear output bearing cover and intermediate shaft cover.
1.7.3 Use pry bar to break case seal.

Remove rear housing cover.

**Gear-Set Removal**

A - Input shaft
B - Intermediate shaft
C - Output shaft
1.8 Lift out intermediate shaft.

1.8.1 Lift out rear output shaft and oil baffle.

1.8.2 Lift out input shaft as an assembly with shift fork assembly.
**Housing (general)**

1.9 Use appropriate puller to remove intermediate shaft bearing race.

1.9.1 Using a chisel, remove input shaft seal carrier.

*Note: This is a sacrificial part, and cannot be re-used.*

Input shaft seal carrier.

---

Figure 28

Figure 29

Figure 30
Oil Pump

A - Internal and external rotors
B - Shift ring
C - Center plate
D - Flat spring
E - Roll pin
F - Pump cover

2.0 Remove retaining screws. Then remove pump cover, rotors, and shift ring.

Internals (general)

2.1 Remove air passage o-ring seal.
2.1.1 Remove internal oil lines.

2.1.2 Remove snap ring and pressure relief valve.

Front output housing.

2.2 Remove air passage o-rings.
2.2.1 Remove housing bolts.

Figure 37

2.2.2 Separate housing halves.

Figure 38

2.2.3 Remove adjustment bolt and lock-nut.

Figure 39
2.2.4 Remove shift rod.

2.2.5 Use a brass drift to remove piston.

2.2.6 Remove large snap ring.

Figure 40

Figure 41

Figure 42
2.2.7 Press out front output shaft and bearing.

2.2.8 Press bearing from front output shaft.

Drive shafts.

2.3 Using appropriate puller, remove bearing from rear output shaft.
2.3.1 Using appropriate puller, remove bearings from intermediate shaft.

2.3.2 Grind out dimple-lock on input shaft nut and remove nut.

    note: lock-nut may not be re-used.

2.3.3 Press drive gears, spacers, and bearings from input shaft.
2.3.4 Remove shift collar and HI/LO drive gears.

Note: Inspect engagement teeth of shift collar and drive gears.

Planetary Differential

The following pertains to models fitted with optional Planetary Differential.

2.4 Remove bolts securing differential housing and lift off differential shaft.
2.4.1 Remove large snap ring.

2.4.2 Lift off drive shaft.

2.4.3 Lift off planetary ring gear.
2.4.4 Remove socket head bolts from planet housing.

Figure 55

2.4.5 Remove snap ring from snout shaft if replacing inner bearing race.

Figure 56

2.4.6 Use pry bars to lift planetary out of case.

Figure 57
Planet gears with shaft housing removed.

Figure 58

Planet gears, bearings and spacers.

Figure 59

Planetary gear shafts are held in place with a spring and set pin. (see figures 61, 62)

Figure 60
2.4.7 During assembly, hold pin against spring while inserting gear shaft. Align set hole with pin, and lock into place.

2.4.8 Inspect inner drive shaft bearings for wear.
Planetary Assembly

2.4.9 Assembly of planetary is reverse order of disassembly.

Note: Use Loctite 243 on case half bolts and torque to 57-70 Nm

Transfer Case Assembly

2.5 Reassemble shaft groups.

Note: Freeze shafts to aid bearing installation. Heat bearings to 200F degrees.

Input shaft assembly.

Lube gear seats on shaft and slip gears into place. Install bearings. Torque shaft nut to 420-480 Nm, then peen dimple-skirt at locating hole in shaft.

2.5.1 Note that the Input Shaft has a small bushing installed at the rear. The top oiling spray tube fits through this bushing (figure 64).
2.5.2 Input shaft - Gently drive bushing into bore until completely seated.

2.5.3 Intermediate shaft assembly. Heat bearings to 200F. Freeze gear shaft and install bearings.

2.5.4 Output shaft assembly (non PD version).

Heat bearings to 200F, freeze shaft, then install bearings.

Note: See PD (proportioning differential) section if applicable.
Lubrication System

2.6 Install internal lube lines and air passage o-rings.

Torque compression nuts to 54-66 Nm.

2.6.1 Install pressure relief valve.

2.6.2 Install lube spray pipe at 20 degree angle to case edge. Torque nut to 60 Nm.
2.6.3 Install oil pump rotors, shift ring and center plate. Hold flat spring in slot on shift ring while inserting center plate. (see figure 31)

Note: Install shift ring “dull side” up.

Note: Coat assembly with lube before installing pump cover!

2.6.4 Be sure to align shift ring roll pin with large slot in pump cover.

2.6.5 Coat socket head screws with Loctite 243 and torque to 5.5 Nm.
2.6.6 Freeze shaft bearing races and install.

Installing Drive Shafts.
The process of measuring and adjusting shaft bearing preload is identical for all three shafts. With the shaft staged in its race, install the rear case half with 10 bolts tightened to 72-88Nm. Measure the height of the locating shoulder on the bearing cap. Then measure the depth from case surface to top of bearing race. Subtract height from depth and add 0.15mm. Add shims as necessary to obtain this value.

Secure bearing cover and torque bolts to proper value. Use Torque-O-Meter to determine rolling torque. Add or subtract shims to obtain 4-7 Nm.

Input and output shaft may be measured at the same time. Intermediate shaft preload must be performed with input and output shafts removed.

Note: Install shaft seals into bearing covers after rotational torque adjustments are completed.

2.7 Install input and output shafts. Then install case half with 10 bolts torque to 72-88Nm.
2.7.1 Measure height of bearing cover locating shoulder.

2.7.2 Measure depth of bearing race top from case surface, and subtract this value from measurement in step 2.7.1, and add 0.15mm.

2.7.3 Add shims to equal the value determined in step 2.7.2.
2.7.4 Bolt bearing cover in place.

2.7.5 Check rotational torque. Add or remove shims as needed to achieve 4-7 Nm.

Note: Install shaft seals into bearing covers after rotational torque adjustment is completed.

Note: Front axle intermediate housing serves as the front output bearing cover, and must be installed when completing the measurement process.

In the case of a PD (proportioning differential), the PD assembly is measured in the same fashion as a non-PD output shaft.
2.8.0 **Drive Shaft Installation**

Install fork onto shift rail and torque bolts to 42-50 Nm.

Apply lube to slider and install into fork.

Install inner o-ring on shift rail.

2.8.1 Install input shaft and shift fork as an assembly.

2.8.2 Install output shaft and oil deflector. Ensure that baffle locating pins are fully seated in their bores.
2.8.3 Insert oil pump drive key into slot of intermediate shaft. Ensure that it is fully seated in slot.

2.8.4 Align drive key in intermediate shaft with slot in oil pump rotor, and lower shaft into place.

Note: pump rotor has two key slots: radiused and square backed. Drive key will fit squared backed hole only!

Lowering intermediate shaft into place. Ensure that oil pump drive key engages slot in pump rotor!
2.9.0 Case Housing

Apply Loctite 518 sealant to mating surface.

2.9.1 Install air passage o-rings per application requirements.

2.9.2 Install rear case half.
2.9.3 Treat bolt threads with Loctite 243 and torque to 72-88 Nm.

2.9.4 Apply Loctite 518 sealant to mating surfaces of bearing covers.

2.9.5 Install bearing covers. Treat bolt threads with Loctite 243 and torque to 46 Nm.
3.0.0 HI / LO Range Shift Mechanism

Install air passage 0-ring and coat mating surface of shift cylinder with Loctite 518.

3.0.1 Inspect shift rail O-Ring in cylinder bore.

3.0.2 Install shift cylinder. Use plastic dead-blow to tap into place if necessary.
3.0.3 Install flat piston (low range) and o-ring. Press piston inward by hand to engage high range. It may be necessary to rotate input shaft to align engagement teeth.

With piston and shaft pushed fully forward into high range, measure distance from top of piston to upper deck of cylinder. This is measurement “A”.

The T-30 features 3-position (High, Low, Neutral) Range Shifting. The Neutral position of pistons are adjusted first, followed by High and Low.

Note: Neutral adjustment is set by manually moving shift rail between high and low range. Air is then used to set high and low adjustments.

3.0.4 Remove adjustment screw and lock-nut. Insert drift pin into hole and push shift rail forward to engage low range gear.

With shift rail pushed fully aft into low range, re-measure distance from top of piston to upper deck of cylinder. This measurement “B”.

Add measurements A and B and divide by 2. Subtract 51.3 mm, and add shims (as shown in fig. 99) equaling this value (measurement C).
3.0.5 Add shims per measuring procedure in 3.0.4.

3.0.6 Install 2nd o-ring onto outer groove of shift rail.

3.0.7 Install high range and neutral pistons. Inspect o-rings and replace as necessary.
3.0.8 Apply Loctite 243 to threads and install shift rail end nut.

3.0.9 Torque end nut to 100 Nm.

3.1.0 Apply Loctite 518 to cylinder mating surface and install cylinder end cover. Torque cover bolts to 46 Nm.

Install applicable position sensor.
3.1.1 Refer to Fig. 105 for the following adjustments.

Remove lock-nut and adjustment bolt. Apply air (REGULATED 15 PSI ONLY!) to high range port. Rotate input shaft to ensure full mesh of engagement teeth.

Re-install adjustment bolt, but tighten only until making contact with end of shift rail. Turn additional 1/2 turn, then secure lock nut.

Replace indicator switch and extension pin.

3.1.2 Loosen low range adjustment screw and lock nut. Apply air (REGULATED 15 PSI) to low range port on shift cylinder. It may be necessary to rotate input shaft to fully mesh engagement teeth.

Turn adjustment screw until it contacts end of shift rail. Turn additional 1/2 turn, then secure lock-nut.

Note: Indicator switch must be installed during adjustment procedures to prevent air leakage.

3.1.3 Test both high and low shifting. If input shaft will not turn, adjustment is too tight. If “ratcheting” can be felt, adjustment is too loose.

Note: Indicator switch must be installed during adjustment procedures to prevent air leakage.

Greater than 15 PSI applied during testing, will result in erroneous adjustment.
4.0 Front Axle Engage (FAE) Mechanism

Heat bearing “A” to 100°C and install onto FAE shaft “B”.

4.0.1 Freeze shaft and bearing assembly and install into outer FAE housing.

4.0.2 Install snap ring, ensuring that snap ring ends are positioned at relief channel as shown in figure 110.
4.0.3 Install inner and outer o-rings on FAE piston.

Note: coat all pistons and o-rings with moly-type assembly lubricant.

4.0.4 Install o-ring into FAE housing piston bore.

4.0.5 Install piston into FAE housing.
4.0.6 Install fork and shift collar onto FAE output shaft while guiding fork over piston extension.

Note: apply assembly lube to piston extension.

4.0.7 Install FAE shift rail through fork and piston. Rotate until approximately 15/16" - 1" of thread is exposed on outer portion as shown in figure 116.

15/16" to 1" of exposed thread.
4.0.8 While maintaining the 15/16" - 1" of exposed thread on the shift rail, ensure that inside end of rail is flush, or just below housing deck to prevent binding.

4.0.9 Install o-ring into air passage on FAE outer cover.

Apply coat of Loctite 518 to mating surface.

4.1.0 Position FAE return spring.
4.1.1 Mate inner and outer FAE housing halves and secure with two socket-head bolts. Tighten gradually to 46 Nm.

4.1.2 Install o-rings in air passages on back of FAE housing.

4.1.3 Apply gear lube to output shaft bore. Coat mating surface of housing with Loctite 518.
4.1.4 Install FAE housing and torque bolts to 80 Nm.

4.1.5 FAE Shift Adjustment.

Loosen lock nut and adjustment bolt. Apply 120 PSI to air port. Rotate output flange to ensure full engagement. Screw in adjustment bolt until contact with shift rail is felt. Back bolt 1/2 turn. Apply Loctite 243 to lock nut and tighten to 100 Nm.

4.1.6 Install drive flanges.

Heat flanges to 200°C and install flange. Treat bolt with Loctite 243, and torque to 600 Nm.

Note: Remember that input and rear output bolt thread pitch is M16X2.00X70. Front output bolt is M16X1.50X70. Installation of incorrect bolts may cause damage drive shafts!