Important Notice

The descriptions, specifications, and procedures contained in this service publication are based on the latest product information available at the time of publication approval. Advance Adapters reserves the right to discontinue or modify models, procedures and specifications at any time without notice. Any reference to a brand name in this publication is provided only as an example of the types of tools and materials recommended for use and should not be considered an endorsement. Equivalent products may be used.

Departure from the instructions, choice of tools, specifications, materials and recommended parts mentioned in this publication may jeopardize the personal safety of the service technician or vehicle operator.
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Function and Design

The Advance Adapters Atlas transfer case is designed for vehicles that regularly travel over difficult terrain. The gear-driven transfer case features two-speeds and can be ordered in a variety of different configurations. Be sure to understand which specific options your Atlas transfer case includes before performing service. Some options require different servicing procedures. Direct Drive or High Range is always configured as 1:1 ratio. When maximum traction is not needed, 2WD operation is recommended to prevent wear and tear on non-essential front drive components.
Transfer Case Options:

1. Differential output:
   - Left-driver
   - Right-passenger

2. Low Range Ratio: (Standard and HD)
   - 1.5:1
   - 2.0:1
   - 3.0:1
   - 3.8:1
   - 4.0:1
   - 5.0:1

3. Shifter Type:
   - Single direct lever
   - Dual direct lever
   - Single lever cable shifter
   - Dual lever cable shifter

4. Internal Gears:
   - Standard
   - Competition

5. Output Shafts:
   Front:
   - 32-spline
   Rear: 32 spline
   - Standard
   - HD
   - Short

6. Clocking Options: *** DEPENDING ON TRANSMISSION TAILHOUSING BOLT PATTERN***
   Left:
   - 0,8,15,18,22,25,29,32,39, and 49 degrees
   Right:
   - 0,5,12,15,19,22,26,29, and 36 degrees
7. Yoke Options:
   32 Spline:
   • 1310
   • 1310CV
   • 1330CV
   • 1350
   • 1350CV
   • 1410
   • 1410U
   • 1300 flange
   • 1410 flange
   • 1480 flange
   • Toyota flange

8. Speedometer:
   • Mechanical (13T worm with variety of pinion gear counts available
   • Electronic(GM VSS and custom_

9. Input Configuration:
   • Divorced
   • 10-spline
   • 21-spline
   • 23-spline std, long & short
   • 25-spline
   • 26-spline 2012 & newer JK
   • 27-spline
   • 28-spline
   • 29-spline  also offered in a H.D
   • 31-spline
   • 32-spline  also offered in a H.D
   • 35-spline
   • 34-spline
Transfer Case Identification

All Atlas transfer cases come with an identification number that correlates to a customer order number. This number can be found on the back of the housing below the cluster pin.
Power Flow Diagrams:

2WD-Hi

Neutral
Lubrication Specifications

All Atlas II transfer cases are shipped dry. All holes are plugged with red plastic caps to keep contaminates out during shipment.

Preferred lubricant: Amsoil MTG GL-4 or any synthetic 75W-90 meeting GL-4 standards and Amsoil Severe Gear SAE 190 for 1.5:1 units and race applications with other ratios

**Capacity:**
Quarts: 2.0
Liters: 1.98

The Atlas includes a site tube to help you determine the correct fluid level. Once the required two quarts are installed, we recommend marking the oil level on the site tube.

**Operation Temperatures:**
Normal Operating Temperature: 160F - 220F Degrees
Max Intermittent Temperature: 220F - 240F Degrees

**Lubrication Notes:**
Too much fluid will cause foaming at high speeds. Foaming oil expands and fills the entire cavity, which forces fluid out the breather tube; or the breather hose may be restrictive, causing the Atlas to build up pressure.

Advance Adapters recommends a minimum of three feet of 3/8" fuel hose for proper ventilation. This hose should be connected to the brass elbow located on top of the Atlas (Rear shift block).

Your warranty could be voided if the proper gear lubricants are not used and proper oil levels are not maintained.
**Maintenance:**

Lubricant should be changed:
5000 miles (first time)
Every 15000 miles (thereafter)

**Re-torque fasteners:**
Check bolt torque on adapter to the Atlas and yokes 1st time 5000 miles, 2nd time 15000 miles (same time as oil).

**Checking oil:**
Check oil level on level ground.

**Drain oil:**
Remove lower plug on oil pan or fitting on lower site tube.

**Refill:**
Install drain plug. Fill lubrication through upper site tube on back side of Atlas or through the fill hole on some units.

**Race units:**
These units see a complete different type of usage, for these applications please refer to instructions AB2000/AB2001 for service recommendations.
II. Operating Instructions

**Shifting an Atlas:**

**Shifting from High range to Low range:**
Verify that the “FRONT” lever is in NEUTRAL.
Bring the vehicle to a speed of about 3-5mph and place the transmission into neutral.
Shift lever into NEUTRAL. Place the transmission back into gear and resume driving.

**Shifting from Low range to High range:**
Bring the vehicle up to a speed of 5-20mph and shift the transmission into neutral.
Shift transfer case shift lever into neutral.
Apply pressure to lever toward the HIGH position until the Atlas completes the shift into HIGH.
Put the transmission back into gear and resume driving.

**What to do if the moving vehicle shift was not successful (shifting while stationary):**

**Manual Transmission:**
Put the transmission into gear (with vehicle still stationary) and feather the clutch while re-attempting the desired shift by holding steady pressure on the shift lever. Repeat as needed.

**Automatic Transmission:**
Shift the transmission from drive to reverse while maintaining pressure on the transfer case shifter lever. DO NOT SHIFT THE TRANSMISSION INTO PARK. If unsuccessful, turn off the engine with the transmission still in neutral. Now shift the transfer case into gear and re-start the engine.

**General notes on Shifting:**
The Atlas Transfer Case is a Synchronized gear box. This means that in order for the case to shift easily and smoothly the vehicle must be moving in a forward direction. This will allow the synchronizers to function properly. Note that when the transfer case is shifted when not in motion, the teeth may or may not be aligned. If the teeth are aligned, then the unit will slip into gear easily. If the unit does not slip into gear easily, then no amount of pulling on the lever will cause the unit to shift, under these circumstances. Once the transfer case is allowed to rotate slightly, or the binding is relieved it should slip right into gear.
The Atlas is classified as a Part-Time Transfer case. As with all part-time transfer cases, 4WD should be used in low traction conditions only. Anytime the unit is in 4WD low or 4WD high, the rear output and the front output are locked to each other and can only spin at the exact same speed. This characteristic is essential for extreme off road usage but becomes a hindrance on dry pavement.

When a vehicle turns a corner, the front driveshaft spins at a different speed than the rear driveshaft. This creates a binding in the drive train if the tires cannot slip to relieve this torque. How does this relate to shifting an Atlas? When being operated in high traction conditions, the Atlas will not shift to its potential, especially when shifting out of 4WD. If the transfer case becomes stuck in 4WD, try driving at least half of the vehicle onto a surface that will allow the tires to slip before re-attempting to shift out of 4WD. Deactivating locking differentials (if applicable) will also help in this situation.
Towing:
When a vehicle is being towed with the Atlas, the shift levers should be in the Neutral position.

Figure 2-flat towing should be avoided when possible

Figure 3-raised towing is the preferred method

Transmission towing positions are as follows (please also verify in your owner’s manual what the vehicle manufacturer recommends):
Automatic transmissions should be left in park.
Manual transmissions should be left in any gear.
III. Troubleshooting

Noisy Operation:

Due to the fact that the Atlas is gear driven, it will typically create more noise than a typical chain driven transfer case. This noise is more noticeable on applications where the direct lever type shifter is used.

Should your Atlas exhibit a new sound, check the oil level and inspect the color of the oil at the sight tube. If oil is low or appears to be contaminated, change it immediately.

Gear wine is typically a result of inadequate lubrication. This can result if a leak occurs or if water or other substance mixes with the lubrication.

If noisy condition is not remedied by oil change, disassembly and inspection of individual wear components is recommended.

Vibration:

Vibrations can come from several areas in the drive train (transmission, drivelines, axles, tires). Such vibrations may be most noticeable at the Atlas shifter if equipped with a direct linkage type shift mechanism. Be sure to check other components prior to the Atlas. In most cases, vibration is the result of a worn component such as a CV driveline or failed transmission mount or isolator.

Improper driveline angles can also result in vibrations. Inspect both front and rear driveline angles in relation to the axle pinion yoke. Driveline angles greater than 4 degrees can cause a noticeable vibration. This type of vibration can be remedied by adjusting axle pinion angle.

Improper driveline angles are responsible for 99.9% of all noises that “seem” to be coming from the Atlas.

If all other components appear to be intact, check the Atlas front and rear output shafts for excessive movement. Improper yoke nut torque may allow a slight amount of in and out movement. Check the yoke nut torque specifications periodically. The 32 splined shafts should be torqued at 150 lb-ft.
Difficulty Shifting:

There are two main reasons an Atlas may be difficult to shift. First, the linkage could be binding. You may need to inspect for possible trouble areas. Refer to the Final Installation section under the subtitle Shifter Problem Checklist for more information.

Notes on shifting:
Shifting the Atlas is an acquired “touch” and “feel”. You will not learn it overnight. It is twice as hard to shift the transfer case if the vehicle is not at least slowly rolling forward. In addition, trying to shift the transfer case while the steering wheels are turned puts a bind on the synchronizers, making it almost impossible to shift in or out of gear.
IV. Removal from Vehicle

Recommended Equipment:
- Floor jack to support the transmission when the crossmember is removed.
- Transmission jack for raising and lowering the transfer case.
- Pneumatic impact gun.
- Magnetic parts tray.

Procedure:

1. Prior to removing the Atlas from a vehicle, place shifter(s) in neutral and drain the lubrication fluid.
2. Disconnect vehicle negative battery cable.
3. Remove front and rear drivelines from vehicle.
4. Disconnect shift linkage by removing e-clips that retain shift rod button ends.
5. Remove divorced Atlas mounting bracket from chassis.
6. Support the rear portion of the Atlas with a transmission jack or similar device.
7. Remove six mounting bolts that secure the transfer case to the transmission.
8. Disconnect the speedometer cable or wires.
9. Remove any wiring related to the 4WD/4L switches.
10. Remove the vent hose from the transfer case.
11. Separate the transfer case from the transmission by pulling straight back.
12. After separation, lower transfer case from vehicle.
V. Disassembly

Tools required:
Dead blow hammer
¾-inch socket
½-inch socket
¾-inch Allen socket
½-inch socket

Procedure:

1. Start with a clean work area.
2. Remove the brass elbow on the top of the transfer case or top of the shifter block.
3. Shift the unit into 4WD low range (both shift rods back into the case).
4. Set the unit upside-down on a work surface.
5. Remove shifter mechanisms/components and divorced bracket if equipped.
6. Remove all output yokes.
7. Remove oil pan and inspect internal components for signs of unusual wear.
8. Remove shift fork to shift rail retaining bolts.
9. Remove shift rail housing retaining bolts.
10. Remove the cluster pin bolts from both the front and rear of the transfer case.
11. From the front of the transfer case, push the cluster pin out of the case.
12. Support the cluster gear with one hand as you push out the cluster pin with the other.
13. Once the cluster pin is removed, remove the cluster gear from the case.
14. Be careful so that the caged needle bearings do not fall out of the cluster gear.
15. Remove the two thrust washers (300355) from the inside of the case.
16. To remove the shift fork assembly, use one hand to support the Atlas shift forks from inside the case.
17. Using a plastic dead blow hammer, gently tap the shift rails from the front of the case.
18. Remove six input housing bolts to free the input ring assembly from the transfer case.
19. Remove the five bolts from the front output shaft retainer.
20. Remove four rear bearing cap bolts for front output shaft.
21. Remove the front subassembly from the case.
22. Remove the five bolts retaining the rear output subassembly.
23. Remove input sub-assembly.
Front Output Sub-assembly:

**Tools required:**
- Impact gun
- ¼ Allen wrench socket
- ½ inch socket
- Snap ring pliers
- Press

**Procedure:**

1. Remove front output housing (300103) from case.
2. Remove rear bearing retainer (300105) from case.
3. Remove front output gear from output shaft.
4. Remove caged needle bearings (300517) from shaft.
5. Remove brass Synchro blocker ring (300370) from shift hub assembly.
6. Remove two springs (300373) that retain the shift hub (300371) and three synchro dogs (300372) to the front output shaft hub (300123).
7. Remove tapered roller bearings (300511) from shaft with press.
Input Sub-assembly:

Tools required:
Impact gun
¼ Allen wrench socket
Snap ring pliers
1 1/8” socket
Arbor press

Procedure:
1. Remove six 1/4-inch Allen head bolts (723730) retaining input housing. Remove the input subassembly from case.
2. Remove the input gear snap ring (716453) from the input shaft.
3. Remove input gear from shaft
Rear output sub-assembly:

Tools required:
- Impact gun
- ¼ Allen wrench socket
- Snap ring pliers

Procedure:
1. Remove speedometer housing (300628) from tail housing assembly.
2. Remove six 1/4-inch Allen head bolts (723730) retaining tail housing to case.
3. Remove tail housing from output shaft.
4. Remove rear output shim (300491) from output shaft.
5. Remove speedometer gear (300625) from output shaft.
6. Remove snap ring (300627) from output shaft.
7. Remove tapered roller bearing (300314) from output shaft. Critical: Do not let tooling make contact with bearing surface on output shaft.
8. Remove brass Synchro blocker ring (300370) from shift hub assembly.
9. Remove two springs (300373) that retain the shift hub (300371) and three synchro dogs (300372) to the rear output shaft.
10. Remove tapered roller bearing (300314) from output shaft.
Shift rail housing sub-assembly:

**Tools required:**
- ¼-inch Allen socket
- ¾-inch socket
- ⅞-inch socket

**Procedure:**

1. Remove 4WD and Low range shift switches (300378) from shift rail housing with 7/8-inch socket.
2. Remove three bolts retaining shift rail housing to Atlas case with ¼-inch Allen socket.
3. Remove shift detent plugs (302019) from shift rail housing with ¾-inch socket.
4. Remove corresponding detent balls and springs.
5. Shift the front shift rail into neutral shift position (middle slot).
6. Remove rear shift rail from shift rail housing by pulling straight out.
7. Remove front shift rail (300381) from shift rail housing by pulling straight out.
VI. Cleaning and Inspection

Advance Adapters recommends the following practices for powertrain assembly:

**Part cleanliness:**
Thoroughly clean all parts prior to assembly.
- Less debris/contamination in oil.
- More accurate part fitment.
- Maximizes oil seal life.
- Reduces bearing wear.

![Figure 5](image_url) - shows correctly cleaned housing on left and dirty housing on right

**Part inspection:**
Inspect used and new parts for signs of damage or wear prior to assembly.
- Allows for easier assembly.
- Guarantees a good repair.
- Damaged used parts may indicate other problems.

![Figure 6](image_url) - damaged component
Magnetic drain plug inspection:
- Inspect debris collected by magnet.
- Easy to check when performing oil change.
- A small amount of material is normal due to wear.
- Larger amounts of debris may indicate a problem.
Bearing installation:
- Leave bearing in original packaging until just before installation (reduces risk of debris in bearing)
- Bearing into housing: press on outer race
- Bearing onto shaft: press on inner race

VII. Assembly
The Atlas II transfer case consists of six subassemblies. Each subassembly requires a specific set of procedures. In the following pages, you will find step by step instructions for each subassembly.

Six main sub-assemblies: (In order of assembly)
- Front output
- Rear output
- Input
- Shift rail housing
- Cluster gear
- Divorced mount
Front output sub-assembly:
The part number listed in the exploded view are an example of one assembly, your application may require different part numbers.

Tools required:
- SST-104
- SST-105
- SST-100
- Arbor press
- Snap ring pliers
Procedure:

1. Start by installing bearing race (300513) into retainer casting (300103). Press bearing race into housing with special service tool SST-104. Ensure bearing race is fully seated into housing.
2. Press front output yoke seal into housing with SST-104.
3. Position front output shaft (300123) as shown and install synchro slider (300371) on to shaft.

4. Position shaft as shown and install synchro slider over the synchro hub.
5. Use thumb and fore finger to cover up the three synchro dog holes on the shorter side of the shaft.
6. Install three synchro dogs (300372). Note: Spring retaining flanges should face shaft.
7. Install synchro dog synchro spring (300373) on long side of shaft. This retains the three synchro dogs to the synchro hub.

8. Install second synchro spring into groove on short side of shaft (inside void of synchro hub).

9. Install two needle bearings (300517) on long side of shaft.
10. Install brass blocker synchro ring (300370) on shaft. Ensure three notches line up with the synchro dogs in the hub.

11. Apply assembly lube to needle bearings and synchro ring.
12. Install front output high range gear as shown.

13. Install thrust washer (300393) on shaft. Ensure that chamfered edge is pointed towards gear.
14. Install tapered roller bearing (300513) with minor end facing up.

Rear output sub-assembly:
The part number listed in the exploded view are an example of one assembly, your application may require different part numbers.

**Tools required:**
- Assembly oil (spray type)
- SST-104
- SST-105
- SST-106
- Press
- Snap ring pliers
- Dead blow hammer
- Dial indicator
- Micrometer
- Pry bar
- ¼ Allen wrench socket

![Figure 19-exploed view rear output]
Procedure:

1. Start by pressing bearing race (300513) into the tail housing (300104). Ensure that bearing race is fully seated into housing.

Figure 20

Figure 21-bearing race fully seated
2. Install caged needle bearing (300515) into the rear pocket of the output shaft. Critical: Ensure that the tapered side of bearing faces inside pocket. Use special service tool SST-106

3. Slide tapered roller (300313) onto output shaft.
Checking and setting output shaft endplay:

The rear output sub-assembly utilizes two tapered roller bearings to support the rear output shaft. This setup requires shimming to achieve the desired bearing preload during operation. While the initial endplay is set at the factory, any Atlas rebuild may require an adjustment due to normal bearing wear.

A. Temporarily assemble rear output assembly (housing, shaft, bearings, shim, yoke, and nut)
B. Fasten output assembly to empty Atlas main housing using existing fasteners as seen in Fig. 16
C. Gently drive the output shaft assembly with a soft hammer to seat rear output bearing as seen in Fig. 16
D. Clamp dial indicator base to exterior of Atlas as shown in Fig. 17
E. Use pry bar to apply vertical force to bottom side of flange yoke.
F. Record indicator value and compare to factory specification seen below.
G. Endplay specification: \(0.001-0.0025\)”\([0.025-0.064\text{mm}]\) At 65-80°F [18-27°C]
H. **To decrease endplay:** use a smaller shim than the one used for measurement
I. **To increase endplay:** use a larger shim than the one used for measurement
J. Using a micrometer, choose an appropriate shim that will adjust endplay into the range given above.
K. Disassemble rear output assembly to change to newly selected shim
L. Install new shim onto output shaft and reassemble output shaft assembly
M. Recheck output shaft end play. Repeat steps A through L if necessary to achieve correct endplay.
Rear output continued:

4. Install tail housing (300104) and bearing (300513) onto output shaft.
5. Install output yoke and retaining nut. Torque to 150 lb-ft.
6. Install tail housing seal (300473) with special service tool SST-104
7. With output shaft seal installed, remove tail housing from output shaft.
8. Install o-ring (300490) around tail housing mounting flange base.
9. Temporarily remove end play shim.
10. Remove bearing (300104) from output shaft. Critical: do not let tool touch ground needle bearing surface on shaft.
11. With the bearing removed, install shift synchro hub over the hub section of the output shaft.
12. Install three synchro dogs (300372) with the legs facing the output shaft.

13. Install two retaining springs (300373) to either side of the hub assembly. This retains the three synchro dogs to the synchro hub.
**Input sub-assembly: (divorced housing shown)**

The part number listed in the exploded view are an example of one assembly, your application may require different part numbers.

**Tools required:**
- Assembly oil (spray type)
- SST-100
- SST-101
- Press
- Snap ring pliers

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**Figure 24-exploded view divorced input assembly**
Procedure:

1. Start by installing the first of two input shaft main bearings (300510) on the input shaft as shown in Fig. 18.

2. Once the main bearing is in place on the input shaft, place the shaft into the fixture with the flange side of the fixture facing the bearing.

3. Use the fixture to hold the input shaft vertically on work surface.

4. Install front input housing (300106 divorced, 300102 std.).

5. Install second input shaft bearing (300510) on input shaft.

6. Press both bearings into input housing with press. Use special service tool SST-101 on top and SST-100 on the bottom.

9. With both bearings and seal in place, install input gear onto splined section of input shaft.
10. Use snap ring (716453) to retain input gear to input shaft.
**Shift rail housing sub-assembly:**
The part number listed in the exploded view are an example of one assembly, your application may require different part numbers.

**Tools required:**
- Assembly oil (spray type)
- SST-112
- Arbor press
- Flat head screwdriver or similar
- Torque wrench
- ¾-inch socket
- ⅞-inch socket

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*Figure 29-exploded view shift rail housing*
Procedure:

1. Apply spray lubrication to the inner bore of the shift rod detent holes as shown.

![Figure 30](image)

2. Install lockout pills (300388) into previously lubricated holes.

3. Install front shift rail (300382) into shift rail housing as shown. Critical: Ensure that the three detent slots on the shift rail face the holes where detent balls and springs are installed.

![Figure 31](image)

4. Position the front shift rail in the neutral shift position (middle slot). This will allow installation of rear shift rail.

5. Install rear shift rail (300381) into shift rail housing. Critical: Ensure that the three detent slots on the shift rail face the holes where detent balls and springs are installed.

6. Position the shift rail housing so that the shift detent holes face up.

7. Install shift detent ball (300392) into each detent hole of shift housing.
8. Install shift detent spring (300390) into each detent hole of shift housing. Ensure that each spring touches each detent ball.
9. Apply assembly lubrication into shift detent holes of shift housing.
10. Apply assembly lubrication on each shift detent o-ring (300482).
11. Install shift detent o-rings (300482) on each shift detent plug (302019).
12. Install each shift detent plug (302019) with ¾-inch socket. Torque to 12 lb-ft.
13. Install shift housing freeze plugs (300389) in shift housing as shown. Use SST-112 and hammer to set plugs in place. Note: New freeze plugs are only needed when installing new replacement shift housing.
14. Install 4WD shift switch (300378 or plug) into hole on front shift rail side of shift housing. Tighten to 12 lb-ft. with ⅞-inch socket.
15. Install Low range shift switch (300378 or plug) into hole on rear shift rail side of shift housing. Tighten to 12 lb-ft. with ⅞-inch socket.
Final Assembly

**Tools required:**
- Assembly oil (spray type)
- SST-100
- SST-110
- SST-111
- Arbor press
- Torque wrench
- ¾-inch socket
- 1-1/8”-inch socket
- ¼-inch Allen socket
- Depth micrometer
- Micrometer
- LocTite 518
- LocTite thread locking compound (medium strength)
- RTV silicone
- Synthetic grease
- Solvent
- Clean rags
**Procedure:**

1. Install front output tapered race (300512) into hole on rear side of Atlas main case. Use SST-100 and arbor press. Tapered side should face front. Race should be flush with exterior surface of case.

2. Apply assembly lubricant to low range gear (309520) as shown.

![Figure 32](image)

3. Install brass synchronizer blocker ring (30370) on low range gear (309520) as shown.

![Figure 33](image)
4. Install Low range bearing (300518) on front output subassembly shaft (300123) as shown. Coat bearing with assembly lubrication.

5. Place Low range gear and synchronizer blocker ring inside Atlas main housing. Brass synchronizer side should face front of case.
6. Install front subassembly through front output opening of Atlas main housing case. Hold low range gear up with opposite hand as shown.

7. Carefully align brass blocker synchro ring (300370) with the three synchro dogs (300372) in the front output shaft hub.
8. Install front output washer (300509) onto front output shaft with chamfered edge facing towards gear.
9. Install tapered roller (300511) on front output shaft as shown. Coat bearing with assembly lubrication.

![Figure 36](image1)

10. Align rear side of front output shaft with finger while pushing front subassembly in place with other hand.

11. Reposition case on workbench as shown.

![Figure 37](image2)
12. Install o-ring (300490) on front output housing as shown.

13. Install front output housing ensuring that holes line up with threaded holes in Atlas main housing.

14. Coat each of the five retaining bolts with RTV silicone prior to installation. Torque bolts to 35 foot-pounds with ¼-inch Allen socket (new bolts 2014 have a seal patch sealant on them and do not use silicon).

15. Apply assembly lubrication to front output yoke seal.
16. Apply RTV silicone to inner splines of front output yoke.
17. We no longer use the yoke seal washer on any yokes, the silicon on step 16 will seal the yoke to the shaft. **Do not use P/N seal washer (300474) inside of yoke.**
18. Install front output yoke. Torque retaining nut to 150 Lb-ft with 1-1/8” inch socket.
19. Reposition case on workbench to access rear side of front output. Clean case with solvent and rag in the area where the front output bearing retainer (300105) mates to case.
Front output preload adjustment:
  a. Measure rear bearing retainer depth (D) using depth micrometer:
     0.130” [3.302mm] is the nominal depth

b. Measure bearing race height (H) from main housing using depth micrometer
c. Factory preload specification: 0.000-0.0015" [0.000-0.038mm] At 65-80°F [18-27°C]
d. Example preload calculation:

**Bearing retainer depth (D):** 0.130” [3.302mm]
**Bearing race height (H):** 0.113” [2.870mm]
**Desired preload (P):** 0.001” [0.025mm]

Equation: \( D - H + P = \text{required thickness of shims} \)

Calculation: 0.130” - 0.113” + 0.001” = .018” [.457mm] (Required thickness of shims)

e. Choose from available shims to construct calculated thickness

Available shims: 0.010” [0.254mm], 0.008” [0.203mm], 0.0045” [0.114mm]
f. Place shims in bearing housing and measure depth with depth micrometer verify correct thickness of shims

20. Apply continuous bead of silicon to mating surface of front output bearing retainer as shown.


22. Apply assembly lubricant to Low range gear (309520) as shown in Fig. 23.

23. Install brass blocker synchro ring (300370) on low range gear (309520).

24. Place low range gear and blocker synchro ring inside Atlas main housing (input side). Brass synchronizer side should face front of case.
25. Align low range gear (309520) with one hand while installing rear output sub-assembly in place with other hand. Critical: Align brass blocker synchro ring (300370) with the three synchro dogs (300372) in the input shaft hub.

26. Position case on workbench with front side facing up.

27. Insert rear output shaft through input bore and then into previously installed low range gear.

28. Install large tapered roller (300511) onto output shaft.
29. Reposition case upside down on workbench. Hold output shaft tight against rear portion of case while rotating case into position.
30. Use snap ring pliers to install snap ring (300627) on output shaft as shown.
31. Install speedometer gear (300625) on output shaft.
32. Install rear output shim (300491) on output shaft.
33. Install rear output housing onto rear output shaft aligning the five mounting bolt holes with the tapped holes in the Atlas main housing.

34. Coat each of five 5/16-inch Allen bolts (301401) with RTV Silicone as shown (new bolts 2014 do not require).

35. Tighten the five rear output housing bolts by hand with 5/16-inch Allen socket. Torque to 35 lb-ft

36. Apply assembly lubrication to rear output bearing (300511) and pocket bearing (300515).

37. Apply assembly lubrication to synchronizer cone on input shaft subassembly.

38. Install brass synchro blocker on rear output gear hub.

39. Align the three notches of the brass synchronizer blocker ring with the synchronizer dogs in the rear output sub-assembly.

40. Install input sub-assembly. Correct housing alignment is seen when the indicating mark is oriented towards the bottom of the main housing.
41. Support the splined section of the rear output shaft as you mate the input sub-assembly with the rear output sub-assembly. Be sure that the synchronizer dogs line up properly as the two sub-assemblies are joined.

42. Align the six mounting holes of the input housing with threaded holes in the case.

43. Apply medium strength LocTite to the six 5/16-inch Allen bolts (301401).

44. Install the six mounting bolts and washers by hand to ensure proper thread engagement. Torque to 40 lb-ft.

45. Use solvent to clean mating surfaces of shift housing sub-assembly and main case where sub-assembly is to be installed.

46. Apply silicon to mounting face of shift rail housing subassembly.

47. Position transfer case on workbench with tail housing facing you.

48. Install shift forks (301378A & 301378B) on appropriate shift hub. Critical: Install the shift forks with minor side of tubular fork interface towards the rear of case (longer curved surface of fork should point down towards work surface).
49. Insert shift rail housing sub-assembly into main housing. Align shift fork holes with corresponding shift rail. Wiggle the shift sub-assembly as you attempt installation.
50. Install three shift rail housing support bolts by hand. Torque to 30 lb-ft with ¼-inch Allen socket.
51. Position transfer case upside down on workbench so that the input shaft faces you.
52. Attach shift rail rod ends (303055) to threaded ends of shift rails.
53. Place both shift rails in the Neutral position.
54. Align each shift fork so that the retaining screws (300385) can be installed in each shift rail.
55. Apply medium strength LocTite to the two 3/8-inch mounting screws (300385).
56. Secure each shift fork to corresponding shift rail by hand with appropriate tool. Torque to 150 lb-in.
57. Test each shift fork to ensure bind-free operation. After testing, place both shifters in low range.
58. Apply assembly lubrication to rear output yoke seal. Apply RTV silicone to inner splines of rear output yoke.
59. We no longer use the yoke seal washer on any yokes, the silicon on step 16 will seal the yoke to the shaft. Do not use P/N seal washer (300474) inside of yoke.
60. Install rear output yoke. Torque retaining nut to 150 lb-ft with 1 1/8 inch socket.
61. Apply assembly lube to one side of each cluster gear thrust washer (300355). This will help retain the washers in place while installing the cluster gear assembly.
62. Install rear cluster gear thrust washer inside case as shown.

63. Install cluster gear shaft (300022) from back side of transfer case, aligning flat relief area parallel with bottom of transfer case.

64. Push cluster gear shaft through rear case opening until flush with inner surface of rear cluster shaft washer (300355).

65. Install front cluster shaft washer to front inside of case. Use special service tool SST-110 to retain washer.

66. Install cluster gear needle bearings and spacer as shown in Fig. 47.
67. Position transfer case on work bench as shown.

68. Hold cluster gear as shown.
69. Gently lower the cluster gear into the main housing.
70. Rotate front/rear output yokes back and forth until the cluster gear assembly drops into alignment with SST-110.
71. Use SST-110 to retain cluster gear assembly in place.
72. Install first o-ring (300358) on back side of cluster shaft.
73. Push cluster shaft through cluster gear until the second o-ring groove is exposed on the opposite side of the main housing. Catch SST-110 with free hand.
74. Install second o-ring (300358) on exposed cluster shaft groove.
75. Install both cluster shaft retaining bolts by hand with a ½-inch socket. Torque to 12 lb-ft.
76. Shift each shift fork to the neutral position.
77. Apply assembly lubricant to both shift rail seals (300387).
78. Install one shift rail seal (300387) on each shift rail.
79. Use hammer and SST-111 to drive both shift rail seals (300387) into main housing as seen in Fig. 51.

80. Clean the oil pan mounting flanges with solvent and a clean rag.
81. Install oil pan gasket (301400) and oil pan (301106).
82. Torque 14 oil pan retaining bolts (301401 & 301402) to 23 lb-ft
83. Install oil pan drain plug. Torque to 10 foot-pounds.
84. Install ¼-inch site tube fittings into case if case is equipped. Torque fittings to 15 lb-ft
85. Install site tube if case is equipped.
86. Install brass vent fitting on top of case or to the shifter block.
Please note that in 2014 Advance Adapters switched most of its bolts for the Atlas to a “N.D.” patch fastener. The bolts have a locking and sealing property that does not require Loctite or silicone. These bolts are reusable for up to 12 times per the manufacture specifications.

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>FASTENER DESCRIPTION</th>
<th>QTY</th>
<th>BOLT SEALANT/THREADLOCK</th>
<th>WASHER</th>
<th>TORQUE SPEC. (Fl-Lbs, N-m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOUSING - OIL PAN - BLIND</td>
<td>5/16-18x1 FHCS</td>
<td>10</td>
<td>RTV SILICONE</td>
<td>N</td>
<td>23, 31</td>
</tr>
<tr>
<td>HOUSING - OIL PAN - THRU</td>
<td>5/16-18x1 FHCS</td>
<td>4</td>
<td>RTV SILICONE</td>
<td>N</td>
<td>23, 31</td>
</tr>
<tr>
<td>HOUSING - OIL PAN - DIVORCED</td>
<td>5/16-18x1 1/4 FHCS</td>
<td>10</td>
<td>RTV SILICONE</td>
<td>N</td>
<td>23, 31</td>
</tr>
<tr>
<td>HOUSING - INPUT/MARRIED/DIVORCED</td>
<td>3/8-16x1 1/4 SHCS</td>
<td>6</td>
<td>RTV SILICONE</td>
<td>N</td>
<td>40, 54</td>
</tr>
<tr>
<td>HOUSING - DIVORCED INPUT</td>
<td>3/8-16x1 1/4 SHCS</td>
<td>6</td>
<td>MED. STRENGTH THREADLOCK</td>
<td>Y</td>
<td>40, 54</td>
</tr>
<tr>
<td>HOUSING - REAR OUTPUT</td>
<td>3/8-16x1 1/4 SHCS</td>
<td>5</td>
<td>RTV SILICONE</td>
<td>N</td>
<td>35, 46</td>
</tr>
<tr>
<td>HOUSING - FRONT OUTPUT</td>
<td>3/8-16x1 1/4 SHCS</td>
<td>5</td>
<td>RTV SILICONE</td>
<td>N</td>
<td>35, 46</td>
</tr>
<tr>
<td>HOUSING - SHIFT RAIL</td>
<td>3/8-16x1 1/4 SHCS</td>
<td>2</td>
<td>RTV SILICONE</td>
<td>N</td>
<td>30, 41</td>
</tr>
<tr>
<td>HOUSING - SHAFT RAIL</td>
<td>3/8-16x1 1/4 SHCS</td>
<td>1</td>
<td>RTV SILICONE</td>
<td>N</td>
<td>30, 41</td>
</tr>
<tr>
<td>HOUSING - SHIFTER SUPPORT</td>
<td>3/8-16x1 1/4 SHCS</td>
<td>3</td>
<td>RTV SILICONE</td>
<td>N</td>
<td>30, 41</td>
</tr>
<tr>
<td>HOUSING - FRONT BRG. CAP</td>
<td>5/16-18x1 FHCS</td>
<td>4</td>
<td>RTV SILICONE</td>
<td>N</td>
<td>23, 34</td>
</tr>
<tr>
<td>BRACKET - DIVORCED MOUNT PAN</td>
<td>5/16-18x1 1/4 FHCS</td>
<td>10</td>
<td>RTV SILICONE</td>
<td>N</td>
<td>23, 31</td>
</tr>
<tr>
<td>BRACKET - DIVORCED MOUNT INPUT</td>
<td>3/8-16x1 1/4 SHCS</td>
<td>6</td>
<td>MED. STRENGTH THREADLOCK</td>
<td>Y</td>
<td>40, 54</td>
</tr>
<tr>
<td>SHAFT - CLUSTER</td>
<td>3/8-16x1/2 HHCS</td>
<td>2</td>
<td>SEAL WASHER</td>
<td>Y</td>
<td>20, 27</td>
</tr>
<tr>
<td>RETAINER - SPEEDO</td>
<td>5/16-16x3/4 HHCS</td>
<td>1</td>
<td>RTV SILICONE</td>
<td>N</td>
<td>10, 13</td>
</tr>
<tr>
<td>FITTING - SITE TUBE</td>
<td>1/4&quot; NPT</td>
<td>2</td>
<td>RTV SILICONE</td>
<td>N</td>
<td>15, 20</td>
</tr>
<tr>
<td>FITTING - BREATHER</td>
<td>90 DEGREE 1/8&quot; NPT</td>
<td>1</td>
<td>RTV SILICONE</td>
<td>N</td>
<td>10, 13</td>
</tr>
<tr>
<td>PLUG - OIL PAN</td>
<td>9/16-18 W/MAG</td>
<td>1</td>
<td>SEAL WASHER</td>
<td>Y</td>
<td>10, 13</td>
</tr>
<tr>
<td>PLUG - SHIFT HOUSING SWITCH BORE</td>
<td>5/8-18 HHCS</td>
<td>2</td>
<td>SEAL WASHER</td>
<td>Y</td>
<td>12, 16</td>
</tr>
<tr>
<td>SWITCH-4WD/LOW RANGE</td>
<td>5/8-18 HHCS</td>
<td>2</td>
<td>NONE</td>
<td>N</td>
<td>12, 16</td>
</tr>
<tr>
<td>SHIFT FORK - SHIFT RAIL</td>
<td>3/8-24x1/2 CFSS</td>
<td>2</td>
<td>MED. STRENGTH THREADLOCK</td>
<td>N</td>
<td>12, 16</td>
</tr>
<tr>
<td>NUT - YOKE - 26XPL</td>
<td>3/8-16 (INT. FT)</td>
<td>1</td>
<td>SEAL WASHER</td>
<td>Y</td>
<td>130, 176</td>
</tr>
<tr>
<td>NUT - YOKE - 32XPL</td>
<td>7/8-20 (INT. FT 170in-lbs)</td>
<td>1</td>
<td>SEAL WASHER</td>
<td>Y</td>
<td>150, 204</td>
</tr>
</tbody>
</table>
Figure 60

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SST-100</td>
<td>ASSEMBLY TOOL-ATLAS-INPUT BRG.</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>SST-101</td>
<td>ASSEMBLY TOOL-ATLAS-DIVIDED INPUT BRG.</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>SST-104</td>
<td>ASSEMBLY TOOL-ATLAS-FRONT/REAR OUTPUT SEAL</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>SST-105</td>
<td>ASSEMBLY TOOL-ATLAS-TAPERED RACE</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>SST-106</td>
<td>ASSEMBLY TOOL-ATLAS-REAR OUTPUT INTERNAL BRG.</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>SST-110</td>
<td>ASSEMBLY TOOL-ATLAS-CLUSTER GEAR</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>SST-111</td>
<td>ASSEMBLY TOOL-ATLAS-SHIFT RAIL SEAL</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>SST-112</td>
<td>ASSEMBLY TOOL-ATLAS-SHIFT HOUSING FREEZE PLUG</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>SST-120</td>
<td>ASSEMBLY TOOL-ATLAS-YOKE REMOVAL</td>
<td>1</td>
</tr>
<tr>
<td>9.1</td>
<td>SST-120A</td>
<td>ASSEMBLY TOOL-ATLAS-YOKE REMOVAL PLATE</td>
<td>1</td>
</tr>
<tr>
<td>9.2</td>
<td>SST-120B</td>
<td>ASSEMBLY TOOL-ATLAS-3/4-18X3&quot; CPSS</td>
<td>1</td>
</tr>
<tr>
<td>9.3</td>
<td>SST-120C</td>
<td>ASSEMBLY TOOL-ATLAS-5/16-16X2&quot; 12PT HHCS</td>
<td>2</td>
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<tr>
<td>9.4</td>
<td>SST-120D</td>
<td>ASSEMBLY TOOL-ATLAS-5/16-18 12PT NUT</td>
<td>2</td>
</tr>
</tbody>
</table>
## Assembly fluids:

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Approved Manufacturers</th>
<th>Location of Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium Strength Thread Locking Compound</td>
<td>Locktite 271, Lawson 67137</td>
<td>Input Housing Bolts, Front Divorced Mount Bolts</td>
</tr>
<tr>
<td>Anoeric Sealant</td>
<td>Locktite 518</td>
<td>Front Output Rear Bearing Retainer, Shifter Rail Housing, Shifter Housing</td>
</tr>
<tr>
<td>RTV Silicone</td>
<td>Lawson 93204,03844 Permatex 81173</td>
<td>Oil Pan Bolts, Tailhousing Bolts, Front Output Housing Bolts, Yoke Splines</td>
</tr>
<tr>
<td>Engine Assembly Lube</td>
<td>All</td>
<td>Clúster Gear Thrust Washer</td>
</tr>
<tr>
<td>Synthetic Bearing Grease</td>
<td>All (W/O Lithium)</td>
<td>Input Housing Seal</td>
</tr>
<tr>
<td>Assembly Oil</td>
<td>Torco MPZ, 75W-90 Gear Oil</td>
<td>Light Coating Applied to Bearings for Initial Startup</td>
</tr>
</tbody>
</table>

Figure 61
### Recommended hand tools:

<table>
<thead>
<tr>
<th>TOOL</th>
<th>DRIVE</th>
<th>SIZE</th>
<th>HEAD STYLE</th>
<th>DESCRIPTION</th>
<th>LOCATION OF USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARBOR PRESS</td>
<td>NA</td>
<td>2 TON</td>
<td>NA</td>
<td>2 TON MIN. CAPACITY</td>
<td>BEARINGS, SHAFTS, AND SEALS</td>
</tr>
<tr>
<td>PNEUMATIC IMPACT GUN</td>
<td>3/8&quot;</td>
<td>100 FT-LB</td>
<td>MIN.</td>
<td>NA</td>
<td>LIGHT DUTY IMPACT FOR DISASSEMBLY</td>
</tr>
<tr>
<td>PNEUMATIC IMPACT GUN</td>
<td>1/2&quot;</td>
<td>180 FT-LB</td>
<td>MIN.</td>
<td>NA</td>
<td>HEAVY DUTY IMPACT FOR DISASSEMBLY</td>
</tr>
<tr>
<td>TORQUE WRENCH #1</td>
<td>3/8&quot;</td>
<td>5-50 FT-LB</td>
<td>NA</td>
<td>3/8&quot; DRIVE, 5-50 FT-LB TORQUE RANGE</td>
<td>VARIOUS FASTENER ASSEMBLY</td>
</tr>
<tr>
<td>TORQUE WRENCH #2</td>
<td>1/2&quot;</td>
<td>150FT-LB</td>
<td>NA</td>
<td>1/2&quot; DRIVE, 150 FT-LB MIN. TORQUE CAPACITY</td>
<td>YOKE NUT ASSEMBLY</td>
</tr>
<tr>
<td>SOCKET</td>
<td>3/8&quot;</td>
<td>T40</td>
<td>BHO2/TORK</td>
<td>USED ON ATLAS PRIOR TO SERIAL# 10550</td>
<td>OIL PAN BOLTS (BHO2 T40 TORK)</td>
</tr>
<tr>
<td>SOCKET</td>
<td>3/8&quot;</td>
<td>1/2&quot;</td>
<td>HHCS/6PT</td>
<td>1/2&quot; HEX HEAD</td>
<td>OIL PAN BOLTS/REAR BEARING CAP</td>
</tr>
<tr>
<td>SOCKET</td>
<td>3/8&quot;</td>
<td>3/16&quot;</td>
<td>HHCS</td>
<td>3/16&quot; SOCKET HEAD DRIVER</td>
<td>SHIFT FORK RETAINING SCREWS</td>
</tr>
<tr>
<td>SOCKET</td>
<td>3/8&quot;</td>
<td>1/2&quot;</td>
<td>HHCS/12PT</td>
<td>1/2&quot; HEX HEAD</td>
<td>CLUSTER SHAFT RETAINING BOLTS</td>
</tr>
<tr>
<td>SOCKET</td>
<td>3/8&quot;</td>
<td>7/8&quot;</td>
<td>HHCS/8PT</td>
<td>7/8&quot; HEX HEAD</td>
<td>DRAIN PLUG, 4WD SWITCH</td>
</tr>
<tr>
<td>SOCKET</td>
<td>3/8&quot;</td>
<td>5/16&quot;</td>
<td>HHCS</td>
<td>5/16&quot; SOCKET HEAD DRIVER</td>
<td>BEARING HOUSING, TAILHOUSING, SHIFT HOUSING</td>
</tr>
<tr>
<td>SOCKET</td>
<td>1/2&quot;</td>
<td>1-1/8&quot;</td>
<td>HHCS/6PT</td>
<td>1-1/8&quot; IMPACT SOCKET</td>
<td>YOKE NUT INSTALLATION/REMOVAL</td>
</tr>
<tr>
<td>DEPTH MICROMETER</td>
<td>NA</td>
<td>0-1&quot;</td>
<td>T25MM</td>
<td>NA</td>
<td>0.001&quot; (0.025MM) GRADUATION</td>
</tr>
<tr>
<td>RATCHET WRENCH</td>
<td>3/8&quot;</td>
<td>NA</td>
<td>NA</td>
<td>RATCHET WRENCH USED W/ SOCKETS</td>
<td>USED TO START ALL FASTENERS</td>
</tr>
<tr>
<td>RETAINING RING PLIERS #1</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>EXTERNAL RETAINING RING PLIERS, 3/8&quot; MIN. CAPACITY, 1/4&quot; MAX TIP DIAMETER</td>
<td>FIRST STAGE RETAINING RING INSTALLATION</td>
</tr>
<tr>
<td>RETAINING RING PLIERS #2</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>INTERNAL RETAINING RING PLIERS, 3/8&quot; MIN. CAPACITY, 1/4&quot; MAX TIP DIAMETER</td>
<td>FIRST STAGE RETAINING RING INSTALLATION(MARRIED SETUP ONLY)</td>
</tr>
<tr>
<td>RETAINING RING PLIERS #3</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>3/8&quot; INTERNAL RETAINING RING PLIERS, 3/8&quot; STRAIGHT TIP, 1/32&quot; CAPACITY</td>
<td>GAGE/BAR GAGE, 3/8&quot; DEEP, INTERNAL RETAINING RING INSTALLATION</td>
</tr>
<tr>
<td>SOCKET EXTENSION</td>
<td>3/8&quot;</td>
<td>4&quot; LONG</td>
<td>NA</td>
<td>SOCKET EXTENSION ADAPTER</td>
<td>SETS WITH SOCKET HEAD BEAD, SETS TO INSTALL &quot;SOFT POINT&quot; #2</td>
</tr>
<tr>
<td>DEAD BLOW HAMMER</td>
<td>NA</td>
<td>48OZ</td>
<td>NA</td>
<td>48OZ DEAD BLOW HAMMER OR Mallet</td>
<td>GENERAL ASSEMBLY/DISASSEMBLY</td>
</tr>
<tr>
<td>SEAL REMOVER</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NOSE PIECE SEAL REMOVER 1.075&quot;-3.375&quot;</td>
<td>REMOVAL OF LIP STYLE OIL SEALS</td>
</tr>
</tbody>
</table>

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**Figure 62**