

ALMA PRODUCTS COMPANY

NATIONAL LIMITED WARRANTY

ALLISON WARRANTY

Alma Products Company warrants that it will replace, repair, or refund at its sole option, any remanufactured transmission or part supplied by Alma Products Company, which is defective in material or workmanship, per the Allison model warranty allowed. This warranty is limited to the first retail purchaser of the remanufactured transmission ("the Purchaser"). This warranty covers remanufactured transmissions installed in Allison applications. This warranty is limited to defects in workmanship and material furnished by Alma Products Company, and is not an unconditional guarantee against all hazards or failures (see Exclusions and Limitations to Limited Warranty).

If it is determined that a remanufactured transmission or part furnished by Alma Products Company, is defective in workmanship or material, Alma Products Company, will allow a labor allowance (some restrictions apply, see Warranty Labor Allowance). The labor allowance shall be credited to Purchaser only upon a determination that a remanufactured transmission or a part supplied by Alma Products Company is defective in material or workmanship. The limited warranty period begins on the original date of sale to the retail Purchaser. In the event a replacement remanufactured transmission is provided to the Purchaser, the warranty period does not start over on the date the Purchaser is supplied with the replacement. The warranty period runs from the original date of sale to the Purchaser and is not extended by supply of a replacement.

There are no warranties that extend beyond the description herein. All other warranties express or implied, including but not limited to, all warranties of merchantability and fitness for a particular purpose are hereby disclaimed and excluded by Alma Products Company. Alma Products Company transfers only such title or rights as it has on the goods it sells. No statement or undertaking whether a condition, warranty or otherwise, is given by Alma Products Company that the goods do not comprise or include patented, and registered or protected designs inventions or equipment or trademark or copyright material. The above limited warranty is void and will not apply in the event the Purchaser does not follow the vehicle manufacturer's instruction or in any way abuses the vehicle. The above warranty does not apply to goods supplied to vehicles used for racing or any type of vehicular competition. In the event that any provision of this warranty should be or become invalid or unenforceable because of any laws or court action, the remaining terms and conditions hereof shall remain in full force and effect.

EXCLUSIONS AND LIMITATIONS TO LIMITED WARRANTY

This Limited Warranty does not warrant against and does not cover damage or loss due to the following:

1. MISUSE, MAINTENANCE NEGLECT, ABUSE, VANDALISM, ABNORMAL OPERATION, COMMERCIAL SNOW REMOVAL OR ACCIDENTS.
2. DEFECTIVE OR IMPROPER INSTALLATION.
3. ENVIRONMENTAL CONDITIONS, OVERHEATING OR FREEZE CRACKS.
4. LACK OF LUBRICANTS OR FLUIDS.
5. IMPROPER COOLING SYSTEM FLUSHING.
6. FAILURES TO COMPONENTS OR PARTS NOT FURNISHED BY ALMA PRODUCTS COMPANY OR OTHERWISE APPROVED BY ALMA PRODUCTS COMPANY FOR INSTALLATION, OR COMPONENTS OR PARTS UNSUITABLE FOR USE WITH A WARRANTED REMANUFACTURED TRANSMISSION OR PART.
7. ABNORMAL WEAR AND TEAR OR USE OF A REMANUFACTURED TRANSMISSION OR PART FROM WHICH IT WAS ORIGINALLY INTENDED OR A CHANGE FROM ORIGINAL APPLICATION.
8. MODIFICATION WITH AFTERMARKET PERFORMANCE PARTS
9. USE OUTSIDE THE 48 CONTIGUOUS STATES

This Limited Warranty does not cover or provide credit for the following: Replacement fluids or other substances; towing charges, vehicle rental, or other substitute transportation; diagnostic time, labor (except as set forth herein) or service call; gaskets or other parts or items associated with but not included with this limited warranty; transportation charges or lodging; loss of time, income, sales or profits; loss of the use of vehicle; telephone calls or communication expense; lift, truck or storage fees; tune-ups or replacement of hoses or maintenance items; routine or regularly required maintenance; injury or death to persons or damage or destruction of property; or, consequential, incidental or punitive damages.

CONDITIONS TO COVERAGE

This Limited Warranty is subject to the conditions set forth below. Failure to comply with these conditions will void this Limited Warranty.

1. The Purchaser must follow the claims procedure described when making a claim or this warranty will be void and of no force and effect.
2. A remanufactured transmission or part that is furnished as a replacement under this Limited Warranty for a remanufactured transmission or part found to be defective is warranted only for the unexpired warranty period remaining on the original defective remanufactured transmission or part.
3. Warranty Registration Card must be completed and returned within 30 days of the receipt of the remanufactured transmission.
4. **This warranty is limited to one replacement transmission during the warranty period.**

This Limited Warranty is of no force or effect while any payments for remanufactured transmission or parts remain outstanding. Claims for transmission parts must be made at the initial delivery to the Purchaser of the remanufactured transmission.

WARRANTY UNIT LABOR ALLOWANCE

A labor allowance may be issued upon request at Alma Products Company's discretion. A labor allowance may only be issued in the warranty period per Allison application in the allowed warranty. Alma Products Company may supply the Purchaser with a replacement, remanufactured transmission. In order to receive a labor allowance, the Purchaser must have first contacted the store where the remanufactured transmission was purchased and speak with the Alma Technical Department. The Purchaser must receive a claim reference number for the transmission. Alma Products Company must have been contacted **prior** to the removal of the transmission that is allegedly defective. Upon receiving the allegedly defective transmission, Alma Products Company will thoroughly inspect, analyze and determine the reason for failure. Valid reasons for an allowance to be issued include remanufacturing error, part failure, and torque converter failure. Installer, vehicle, wrong application or other (no problem found) claims will not receive labor allowance. In addition, Alma Products Company reserves the right to bill the purchaser for any installation damage, abuse and damage due to improper cooling system flushing. Labor allowance credits will be given pursuant to the following schedule:

ALLISON WARRANTY LABOR ALLOWANCE

Allison Labor Time Guide @ \$50.00 per hour with a cap of \$400 per transmission.

No other labor allowance credit shall be provided by Alma Products Company other than as specified above.

**If you have questions, please call our technical support line, 1-800-428-7726
Sales Department press 1, or Tech Department press 2,**

**Business hours Monday - Friday 8:00am to 5:00pm (Eastern)
(Hours subject to change)**

WARRANTY CLAIM PROCEDURE

In the event your Alma transmission doesn't initially perform properly, the following procedure **MUST** be followed: This statement doesn't automatically assume there is a transmission problem, just a performance issue.

- Make certain you have completed and mailed or faxed us your Warranty Registration Card.
- Next call our Technical Hotline at 1-800-428-7726 (option 2) and ask to speak with one of our technicians. He or she will walk you through several important checks. Most problems are easily handled during this process.
- If our technician is unable to resolve the problem, you may request that a Warranty Claim be initiated.
- Our technician will issue you a Claim Reference Number for tracking purposes. Issuing this Claim Reference Number does not in any way imply liability.
- Any unit that is returned to Alma Products Company without a claim reference number by a customer intact and is the same as unit type may receive **CORE CREDIT ONLY** unless the unit is broken then they will receive **NO CREDIT**.
- At this time, you may arrange for a replacement transmission. There will be no charge at this time for a replacement. However, when the failed unit is returned and analyzed, the failure mode will be identified. If the unit did not fail due to remanufacturing workmanship, you will be invoiced for the cost of the replacement unit.
- Drain ALL transmission fluid from the unit, and install the torque converter retaining brackets and the electrical connector protective brackets provided with your remanufactured transmission.
- Following our Core Return Procedure, carefully repackage the transmission as it was originally shipped to you. If it was shipped to you in a plastic POD, carefully place the transmission in the POD and tighten the internal straps to hold the transmission in place. If it was shipped to you on a wooden pallet, place the transmission in the plastic bag, place the bagged transmission on the pallet and secure the transmission to the pallet
- Call our technical hotline, and arrangements will be made to pick up your transmission.

Failure to follow this procedure may void your warranty.

CORE CREDIT REQUIREMENTS

A core charge is required. To receive full credit the core must be complete and useable or the following charges will be assessed.

- Torque converter is not returned – 25% of core
- Case damaged or cracked – 50% of core
- Returnable dunnage is not returned -\$100
- Yoke plate is not returned (MD3000 family) -\$75
- If core does not match the transmission and converter sold, **NO CREDIT** will be given

CORE RETURN INSTRUCTIONS

Attach the following to the core before shipping

- Wire the core tag that was wired to the remanufactured transmission. It identifies your core.
- Apply the provided 4" x 6" return label to the outside of the package.
- Include the Reverse Bill of Lading (included with the documents you received)

Cores are to be returned to the following address.

Core Return Center
150 N. Court Street
Alma, MI 48801

Please contact your local Con-Way terminal or call 1-800-421-4007 to schedule a pick-up of your core.

Contact our representative at 1-800-428-7726 if you have questions about returning your core.

ALMA PRODUCTS COMPANY HANDLING WARRANTY CLAIMS

Procedure:

Whenever a warranty situation arises, it is essential that the customer contact our Technical Service Department at 1-800-428-7726. The Technical representative will analyze the problem and determine the next steps. The customer will need to provide us with the serial number of the transmission in question along with the mileage of the vehicle and the original date of sale so that we may access the transmission history (i.e. test data/invoice & vehicle information). In many cases, our technical support personnel will be able to analyze the problem and recommend adjustments that will eliminate the need for a replacement transmission. If a warranty unit is required, the technical department will issue an RMA number for the unit. It is essential that an RMA number be obtained in order for any labor credit to be allowed or approved. The customer may place an order for a replacement unit at this time. In rare situations of repeated failure or inconsistent problem definition, the technical department may choose to issue what we call a "LIVE GREEN TAG" (*Definition: Pick up customer's unit to rebuild, whether it be a defect or "new"*). In these situations, Alma Products Company will request to pick up the defective transmission for analysis. This is done to protect all parties involved as we determine the failure and remedy the problem.

When returning a defective transmission to Alma Products Company, the RMA number, along with the serial number, must be provided on the packing slip for proper identification. In addition, the defective transmission should be fully assembled and include the torque converter and in-line filter (**if supplied**) for full credit to be issued.

Invoicing:

Warranty transmissions will be invoiced at the standard price. Upon receiving and inspecting the defective transmission, a "warranty" credit will be issued for the value of the transmission therefore offsetting the charge. Credit will be issued provided the serial number returned is still under warranty (time and / or miles) and it is a defect in remanufacturing.

Customer Repair Labor Credits:

Alma Products Company offers technical support whenever necessary. It is our goal to educate our customers by walking them through the test procedures and processes used for on-sight repair. In cases where the customer is requesting labor reimbursement, Alma Products Company has instituted a Purchase Order system to track the credits. We have also defined the repairs for which we will issue labor credit and have setup a standard rate defining the amounts. In order to qualify for these credits, the customer must contact our technical support staff and obtained a P.O. number. When parts are found to be the reason for failure, the old parts must be tagged and returned to Alma Products Company for inspection in order for credit to be issued.

****URGENT****

AT500**TECHNICAL INSTALLATION INFORMATION**
ALLISON INSTALLATION PROCEDURES**1-10. AUXILIARY FILTER**

If a condition occurs that introduces debris into the transmission hydraulic system, a complete cleanup of the cooler and lines is recommended.

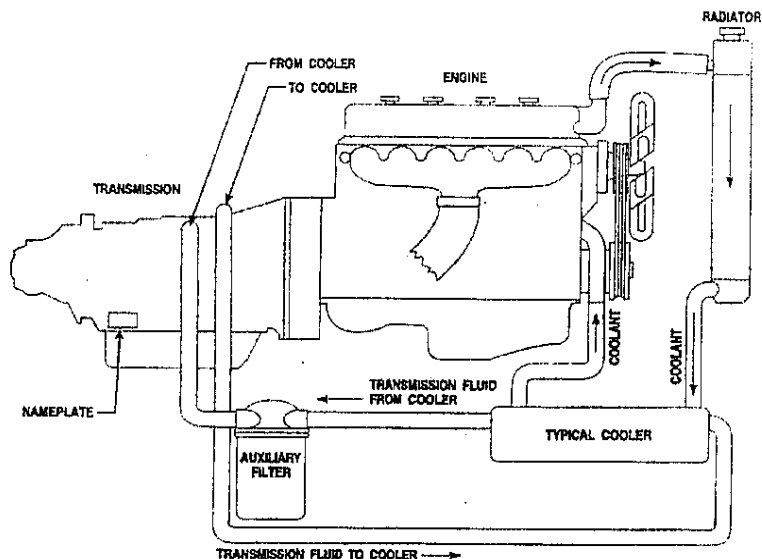
Because repeated cleaning and flushing may not remove all debris, installation of an auxiliary filter in the cooler-out line (between cooler and transmission) is recommended. This recommended applies whether the transmission is overhauled or replaced by a new or rebuilt unit.



CAUTION: DO NOT install an auxiliary filter in the AT500R primary cooler circuit. This reduces retarder effectiveness. An auxiliary filter in the secondary cooler circuit is sufficient.

IF ANY DOUBT EXISTS ABOUT THE CLEANUP OF THE COOLER, REPLACE THE COOLER.

The auxiliary filter should have at least a 40-micron filter element or finer and a maximum filter pressure drop of 3 psi (21 kPa) at 4.5 gpm (17 liters/minute) at 180°F (82°C). The maximum external circuit pressure drop must not exceed 35 psi (241 kPa) at 4.5 gpm (17 liters/minute) at operating temperature, in N (Neutral), and at 2400 rpm.

AT 500, 1500 SERIES AUTOMATIC TRANSMISSIONS

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The following auxiliary filters are recommended:

Table 1-5. Auxiliary Filter Recommendations

Filter Assembly	Filter Element
Allison 29510923* AC PM 13-16 AC PM 16-1 FX 11583 Fram HP 1-1 Purolator OF-15C-1 Purolator 20-10	Allison 29510922* PF 897 PF 141 HF6520 HP 1 or AC HD 222 OF-2C-1 PER-20

* High-efficiency filter and element are available from your authorized Allison distributor. Ref: SIL

Table 4-1. Measurements

Component or Subassembly	Required Inspections	Limits
Flywheel Housing	Bore Diameter Bore Eccentricity* Face Squareness*	16.125-16.130 in. (409.28-409.70 mm) 0.020 in. (0.51 mm) T.I.R. **
Crankshaft Hub And/or Adapter	Converter Pilot Diameter Face Squareness Eccentricity†	1.703-1.705 in. (43.26-43.31 mm) 0.0005 in (0.013 mm) T.I.R. **
Flexplate	Check for radial cracks Check for elongated mounting holes Check for any signs of distress and/or wear	None Permitted None Permitted None Permitted
Mounted Flexplate	Axial Location Flatness -AT 540/AT 542/AT 545 -AT 543 Models -AT 1500 Models Flatness -Formed Plates†† -Flat Plates	1.581-1.741 in. (40.16-44.22 mm) 1.600-1.721 in. (40.64-43.71 mm) 2.715-2.875 in. (68.96-73.03 mm) 0.039 in. (0.99 mm) 0.157 in. (3.99 mm)

* Limits are for installed engines.

** T.I.R. per inch of diameter.

†Eccentricity with respect to crankshaft center of rotation.

††A formed flexplate will not be flat, but may have raised areas at the boltholes and/or have offset bends in the plate.

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4-2. CHECKING CHASSIS, DRIVELINE

Inspect the chassis and driveline and correct any faulty conditions:

- Broken or worn transmission mounts
- Missing, cracked, or swollen isolators (rubber mounts)
- Improper or damaged bolts or other hardware.
- Permanent deformation of springs in rear support.
- Damaged or worn cross-frame members.
- Lack of lubrication, excessive endplay or wear, or deformation of driveline midship or hanger bearing.
- Inadequate freedom of movement, wear, lack of lubrication or damaged needle bearings in universal joints.
- Nonconformance to manufacturer's recommendations for driveline angles and universal joint phasing.
- Conditions of alignment, flanges, yokes, backlash, fluid leaks, or torque tightness of mounting bolts for auxiliary transmission or transfer case mountings.
- Excessive backlash in vehicle differential ring gear and pinion (refer to the vehicle manufacturer's specifications).
- Damaged conditions or improper alignment of PTO-driven equipment, shafts, and couplings.

4-4 CHECKING CONTROLS

Inspect transmission control components on vehicle and correct any faulty conditions:

- Shift selector control- inadequate freedom of movement, frayed or kinked cables, lack of lubrication, worn rod ends or clevis pins, damaged threads, or improper routing.
- Mechanical modulator control- inadequate freedom of movements, frayed or kinked cables, lack of lubrication, worn rod ends or clevis pins, damaged threads, or improper routing.
- Parking brake controls- cracks, bends, damaged threads, worn rod ends or clevis pins.
- PTO control-damage, wear, improper operation, lack of lubrication, or improper routing.
- Speedometer drive cable- wear, damage, kinks, lack of lubrication, improper routing, or incorrect drive torque.
- Wiring and related electrical components, sensors, and switches- poor connections, frayed wiring, or other damage.

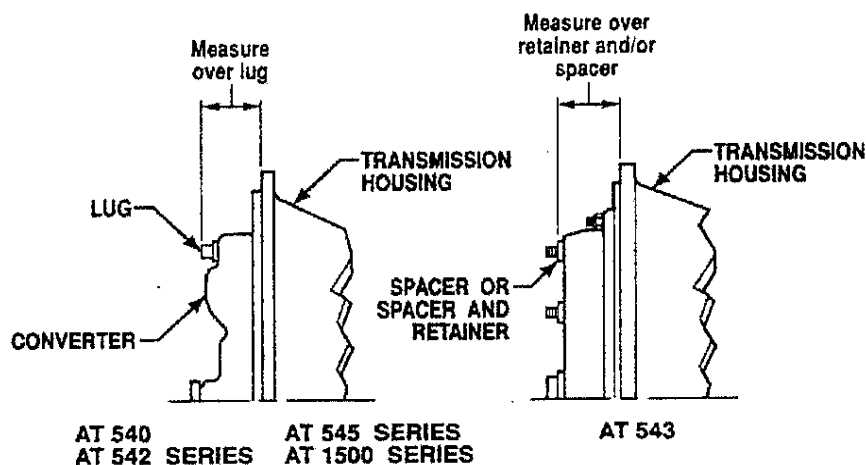


Figure 3-1. Converter Position Measurements

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5-8. CONNECTING SHIFT SELECTOR CONTROL

- Place the operator's shift selector control at the **N** (Neutral) position by the selector lever (hidden inside the transmission pan) in the **N** (Neutral) position by one of the following two methods (Figure 5-4):
- For vehicles with shift selector with **P** (Park) position
 - ✓ Rotate the selector shaft counterclockwise as far it will go. This puts the selector lever in the **P** (Park) position.
 - ✓ Carefully rotate the selector shaft clockwise two detents. This puts the selector lever in the **N** (Neutral) position.
- For vehicles with shift selectors without a **P** (Park) position
 - ✓ Rotate the selector shaft counterclockwise as far it will go. This puts the selector lever in the **R** (Reverse) position.
 - ✓ Carefully rotate the selector shaft clockwise one detent. This puts the selector lever in the **N** (Neutral) position
- Adjust the linkage so that it matches full movement of the selector on the transmission. Connect the linkage to the selector lever.
- Shift through and check all selector positions to ensure the valve body detent positions correspond to the respective selector positions and the selector lever is freely positioned by the transmission detent.

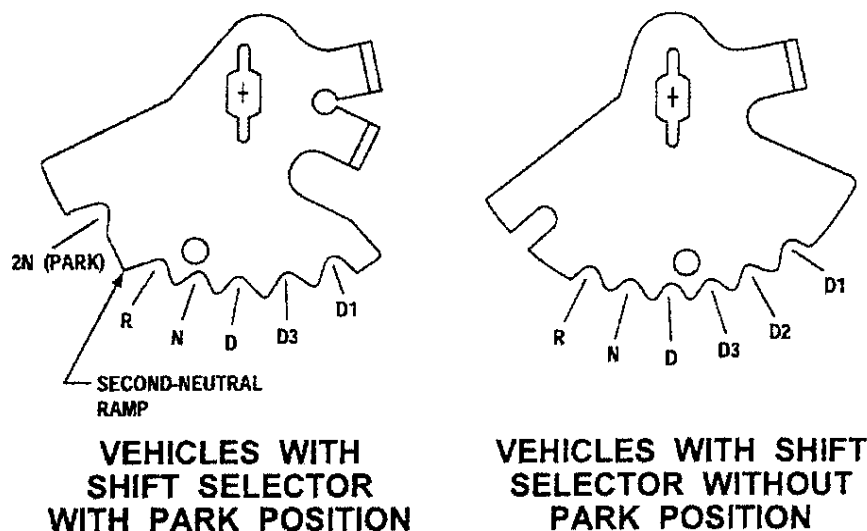


Figure 5-4. Identification of Internal Selector Levers

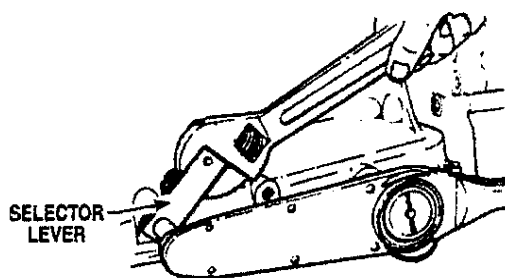


Figure 3-2. Tightening Selector Lever Nut

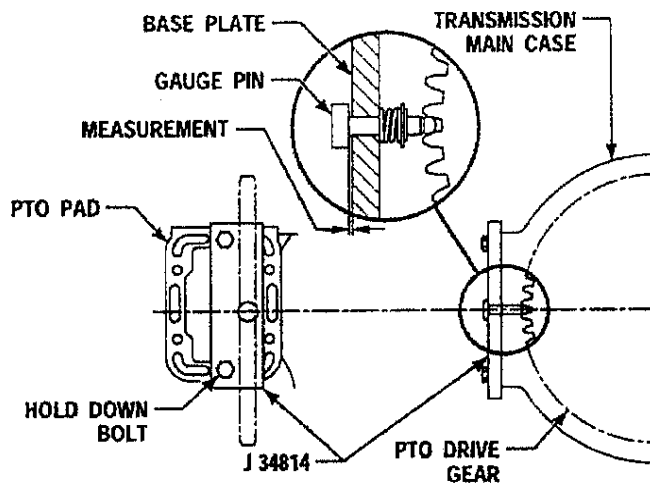


Figure 3-3. Measuring Turbine-Driven PTO Backlash

Measurement	Correction
0.011 – 0.045 in. (0.27 – 1.16 mm)	One – 0.030 in. Gasket (one 0.76 mm Gasket)
0.047 – 0.070 in. (1.19 – 1.78 mm)	Two – 0.030 in. Gaskets (two 0.76 mm Gaskets)

On PTO assemblies that require pressure lubrication, install the lubrication tube and fittings. The lubricating fluid comes from the line returning to the transmission from the cooler. Fluid should be directed to the PTO lubrication circuit after passing through a 0.032-inch (0.81 mm) restriction. (Usually, the restriction is already located in the PTO.)

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3-6 INSTALLING POWER TAKEOFF (PTO)



CAUTION: Cork or other soft gaskets must never be used to mount the PTO. Use only shims or gaskets recommended by the PTO manufacturer.

Space limitations will determine whether the PTO should be installed before or after the transmission is installed.

- The prescribed backlash between the drive gear (in transmission) and driven gear (in PTO) is 0.006 – 0.029 inch (0.15 – 0.73 mm) or as specified by the PTO manufacturer.
- Determining PTO Backlash
 - ✓ PTO not installed: backlash can be measured with special tool J 34814 (Figure 3-3). Reference SIL 50-TR-83 (latest revision)
 - ✓ PTO installed: measure through the inspection port with dial indicator while rotating PTO shaft back and forth. Rattling rears indicate too much backlash. Difficult engagement or whining gears indicate too tight a fit.



NOTE: One gasket (minimum) is required to prevent fluid leakage.

Install the PTO unit and gasket(s) flush to the mounting pad, do not force. Avoid bumping the snap ring (Figure 3-4), which could be displaced. Secure the PTO with six mounting bolts; tighten to 26-32 lb-ft (35-43 Nm).

3-6 INSTALLING SHIFT MODULATION CONTROL

Install the modulation control after the transmission is put into the vehicle. Refer to Paragraph 5-9.

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5-9 INSTALLING, ADJUSTING MECHANICAL MODULATOR CONTROL



NOTE: There are 12V and 24V electrical modulators available as of June 1994. See SIL 27-TR-94

- Connect the engine (throttle) end of the modulator cable housing to its mounting.
- Open the engine throttle fully and check whether the throttle linkage will push or pull the cable core when the throttle linkage is moving toward full throttle position. If it will push the cable core, then push the cable core until it reaches the end of its travel. If movement of the throttle linkage toward full throttle position will pull the cable, then pull the cable to the end of its travel.
- Adjust the clevis or rod end on the cable core until it registers with the hole in the throttle linkage lever and the connecting pin can be freely inserted. With pin removed, rotate the clevis or rod end one additional turn counterclockwise (viewing cable core from end) for pull-type arrangement, or one additional turn clockwise for push-type arrangement. Install the clevis pin or rod end to connect the throttle linkage and cable. Tighten the lock nut against the clevis or rod end. This adjustment assures the ability to achieve full throttle on the engine without interference from the modulator control.
- Check the travel of the cable core when the throttle is moved from fully open to fully closed position. The system is designed to provide a travel of 1.187 – 1.560 inches (30.15-39.62 mm)
- The most common type of mechanical control is the cable-operated actuator with a lever to vary the force on the modulator valve. The type of control is convertible; either push or pull force can be used on the cable when the throttle is opened. Ensure the modulator control, when connected to the throttle linkage, provides an increasing force against the modulator rod in the transmission when the engine throttle is moved toward the open throttle position.
- Later model actuators include a lever marked 'PUSH' on side and 'PULL' on the opposite side. When the modulator control cover is removed, the word PUSH or PULL can be seen and indicates how the device is assembled.
- Conversion to the opposite mode of operation is only a matter of reassembling the internal parts. Reverse the positions of the lever, spring, and thimble to convert it.
- Be sure the modulator control action is as required.

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ALLISON AT 500, AT 1500 SERIES ON-HIGHWAY TRANSMISSIONS PARTS CATALOG

27-TR-94, REV. A

MAY, 1996

PRODUCT CODE(S): 05, 24, 25, 32

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Installation Requirements:

When installing the modulator, remember:

1. Discard the original O-ring from the original modulator.
2. Torque the retainer bolt to 10 – 16 lb-ft (14 – 22 N-m)
3. Refer to Figure 2 for the recommended wiring (customer-supplied).
4. **DO NOT USE THE TRANSMISSION FOR GROUNDING PURPOSES.**

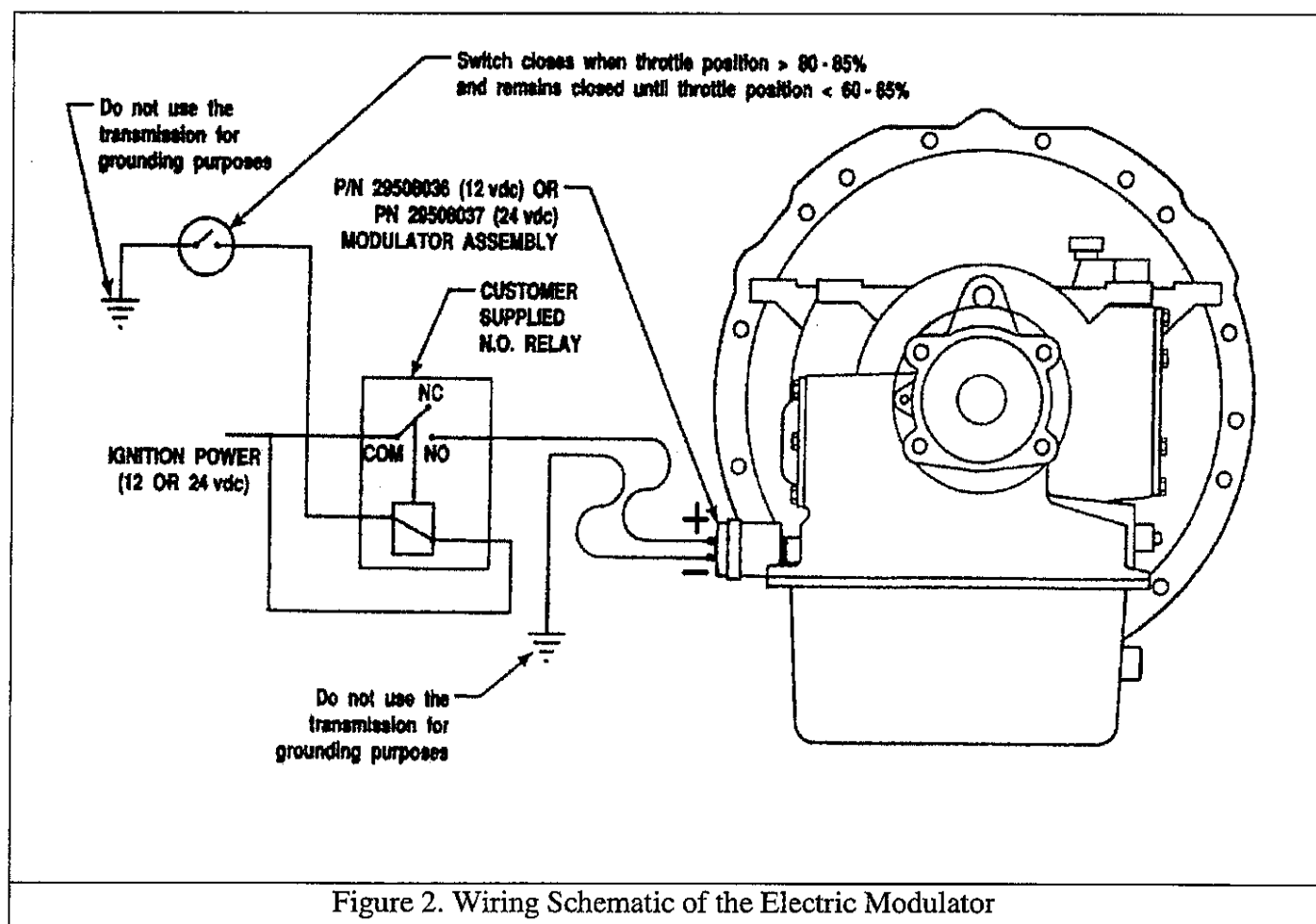


Table 1-2. Fluid and Filter Change Intervals

AT Transmission	Fluid Change	Internal Sump	External Auxiliary Filter**
On-Highway, Light Duty	Paper Filter: 25,000 miles (40,000 km) or 12 months* Brass Filter: 50,000 miles (80,000 km) or 24 months*	Paper Filter: at each fluid change interval. Brass Filter: 50,000 miles (80,000 km) with no time limit.	After first 5,000 miles (8,000 km) and at 25,000 miles (40,000 km) or 12 months, thereafter*.
On-Highway, Heavy Duty	Paper or Brass Filter: 25,000 miles (40,000 km) or 12 months*	Paper Filter: at each fluid change interval. Brass Filter: 50,000 miles (80,000 km) with no time limit.	After first 5,000 miles (8,000 km) and at normal fluid change intervals, thereafter*.
Off-Highway	Paper or Brass Filter: 1000 hours max. or 12 months*	Paper or Brass Filter: at each fluid change interval.	After first 500 hours and at normal fluid change intervals, thereafter*.
<p>* Whichever occurs first.</p> <p>** When an Allison high-efficiency filter is used, the change interval is until the Change Filter light indicates the filter is contaminated or until it has been in use to three years, whichever occurs first.</p> <p>No mileage restrictions apply.</p>			

WE USE ONLY BRASS FILTERS IN OUR AT540/AT542/AT545/AT1500 TRANSMISSIONS

Table 1-3. Transmission Fluid Refill Capacities

Fluid capacity, approx. (excluding external circuits)	Fill From Factory		Initial Fill After Rebuild		Refill After Servicing	
	U.S. Qts.	Liters	U.S. Qts.	Liters	U.S. Qts.	Liters
Shallow oil pan- 4.0 inches (102 mm)	13	12	15	14	9	8.5
Deep oil pan 5.3 inch (135 mm)	20	19	22	21	16	15

1-6. RECOMMENDED AUTOMATIC TRANSMISSION FLUID AND VISCOSITY GRADE

RECOMMENDED AUTOMATIC TRANSMISSION FLUID AND VISCOSITY GRADE

Hydraulic fluids (oils) used in the transmission are important influences on transmission performance, reliability, and durability.

The following transmission fluid and viscosity grades are recommended.

- DEXRON®-III fluids for standard duty, on-highway applications
- Type C-4 fluids (Allison approved SAE 10W or SAE 30) for severe duty and off-highway applications
- Type C-4 SAE 30 for all applications where the ambient temperatures is consistently above 95°F (35°C)
- Type C-4 SAE 30 for dropboxes

Some DEXRON® fluids are also qualified as C-4 fluids. To ensure the fluid is qualified for use in Allison transmissions, check for a DEXRON® or C-4 fluid license, or approval numbers on the container, or consult the distributor before using fluid types; fluid types such as Type F and universal farm fluid may or may not be properly qualified for use in your Allison transmission.



CAUTION: Disregarding minimum fluid temperatures limits can result in transmission malfunction or reduced transmission life.

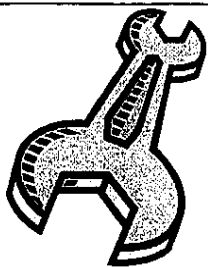
When choosing the optimum viscosity grade of fluid to use, duty cycle, preheat capabilities, and/or geographical location must be taken into consideration. Table 2-4 lists the minimum fluid temperatures at which the transmission may be safely operated. Preheat with auxiliary heating equipment or by running the vehicle with the transmission in N (Neutral) or P (Park) for a minimum of 20 minutes before attempting range operation.

Viscosity Grade	Ambient Temperature Below Which Preheat is Required	
	Celsius (°C)	Fahrenheit (°F)
TransSynd™/SAE 0W-20*	-30	-22
DEXRON®-III	-27	-17
SAE 10W	-20	-4
SAE 15W-40	-15	5
SAE 30W	0	32
SAE 40W	10	32
***Arctic** as defined by MIL-L-46167B		(Ref. SIL 13-TR-90)

1-7 FLUID AND FILTER CHANGE INTERVALS



Fluid and filter change frequency is determined by severity of transmission service and by the filter equipment installed. Table 1-2 is a general guide. More frequent changes may be required when operations are subject to high levels of contamination or overheating.



CHECKS AND ADJUSTMENTS

Section VI

6-1. INSTALLATION CHECKLIST



Proper Torque

- ☐ Drive cover bolts (AT 540, AT 542, AT 542N, AT 545, AT 545N, and AT1500 Series)- 42-50 lb-ft (57 – 68 N-m)
- ☐ Flexplate nuts (AT543) – 34 – 40 lb-ft (46 – 54 N-m)
- ☐ Transmission-to-engine bolts*
- ☐ Transmission-to-frame mounting bolts -- 164 -192 lb-ft (220 – 260 N-m)
- ☐ Output flange retaining bolts -- 102 – 121 lb-ft (138 – 164 N-m)
- ☐ Companion flange or universal joints bolts*
- ☐ Manual selector lever nut – 15 – 20 lb-ft (20 – 27 N-m)
- ☐ PTO mounting bolts --- 26 – 32 lb-ft (35 – 43 N-m)
- ☐ Modulator control retaining bolts --- 10 – 16 lb-ft (14 – 22 N-m)
- ☐ Parking brake mounting bolts --- 81 – 97 lb-ft (110 – 132 N-m)
- ☐ Bell crank and cable support bracket to transmission --- 42 – 49 lb-ft (57 – 67 N-m)
- ☐ Hydraulic line fittings in transmission housing or retarder vale body --- 15 – 22 lb-ft (20 – 30 N-m)
- ☐ Primary cooler fitting in retarder valve body --- 40 – 50 lb-ft (54 – 68 N-m)
- ☐ Fill tube fitting --- 65 – 75 lb-ft (88 – 102 N-m) or 90 – 100 lb-ft (122 – 136 N-m) with 0.675 inch long oil pan boss
- ☐ Drain Plug --- 15 – 20 lb-ft (20 – 27 N-m)
- ☐ Speedometer driven gear assembly to rear cover --- 45 – 50 lb-ft (61 – 68 N-m)

* Tighten to vehicles manufacturer's specifications

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PROPER TORQUE (*cont'd*)

- ☐ Neutral start switch to transmission housing--- 50 – 60 lb-ft (68 – 81 N-m)
- ☐ Reverse signal switch to transmission housing--- 4 – 5 lb-ft (5 – 7 N-m)
- ☐ Modulator retaining bolt--- 10 – 16 lb-ft (14 – 22 N-m)
- ☐ Retarder low speed cutoff switch in transmission housing--- 4 – 5 lb-ft (5 – 7 N-m)
- ☐ Retarder temperature sensor fitting in retarder valve body--- 15 – 20 lb-ft (22 – 27 N-m)
- ☐ Retarder main pressure tap fitting in transmission housing and in retarder valve body--- 4 – 5 lb-ft (5 – 7 N-m)

COOLER, AIR, AND VACUUM LINES

- ☐ Shift selector
 - Adjustment (at all positions)
 - Ease of movement
 - Neutral safety switch (start only in neutral)
 - Shift tower (for freedom of operation)
- ☐ Mechanical modulator control
 - Adjustment (proper shift points)
 - Ease of operation
 - Routing
- ☐ Parking brake
 - Adjust for proper clearance
 - Adjust for full apply
 - Check for full release

DRIVELINE

- ☐ Check for proper indexing of universal joints
- ☐ Check for proper drive shaft angles
- ☐ Check for driveline backlash
- ☐ Lubricate universals and slip-joints

HYDRAULIC SYSTEM

- ☐ Recommended fluid (refer to Paragraph 1-6)
- ☐ Sufficient fluid in transmission (refer to Paragraph 1-4)
- ☐ Dipstick properly marked
- ☐ Fill cap tight

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HYDRAULIC SYSTEM (cont'd)

- ☐ Fill tube tight at pan
- ☐ Breather clean, free of restriction
- ☐ Filter differential pressure switch and alarm circuit

POWER TAKEOFF

- ☐ Backlash properly established
- ☐ Controls connected and operative
- ☐ Properly coupled to driven equipment
- ☐ Lubrication line properly routed and connected

INSTRUMENTS, ELECTRIC COMPONENTS

- ☐ Speedometer
- ☐ Fluid temperature gauge
- ☐ Wiring and electrical connection, especially retarder or electric modulator
- ☐ Check neutral start switch

MOUNTING

- ☐ No interference between engine/transmission components and frame on acceleration
- ☐ Rubber mounts free and in good condition
- ☐ Tail support preload properly aligned
- ☐ Linkages and hoses do not restrain engine "roll" on acceleration

6-2. ROAD TEST AND VEHICLE OPERATION CHECKLIST

NEUTRAL START

- ☐ Check the position of the operator's selector lever in each drive range and N (Neutral). The lever should align with the mark indicating a range (or N (Neutral) or P (Park)).
- ☐ Check the neutral safety switch by trying to actuate the starter in every selector position. The starter should operate only when the selector lever is in N (Neutral) position or P (Park).

INSTRUMENTS

- ☐ Check the instruments associated with the transmission. These include the speedometer and the transmission oil temperature gauge.

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PARKING BRAKE

- ☐ Check application and release of the parking brake.
- ☐ Ensure the brake is not dragging or heating up while released.
- ☐ Ensure the brake is fully applied before the lever reaches full travel.

POWER TAKEOFF (PTO)

- ☐ Check operation of the PTO. Refer to the Operator's Manual (OM1334EN) for general operating instructions, or to the vehicle manufacturer's specific instructions. Specific instructions.

NO-LOAD GOVERNED SPEED

- ☐ Check the no-load governed speed of the engine.
- ☐ Adjust the governor, if necessary, to meet the no-load governed speed specified for your particular engine-transmission match (available from the vehicle manufacturer).

SHIFT SEQUENCE

- ☐ Drive the vehicle and check the wide-open throttle upshift points. If adjustment of the shift points is required, refer to the applicable AT Service Manual. The shifts should occur at the following speeds:
 - 1-2 upshift occurs within 400 rpm of full-load governed speed
 - 2-3 upshift occurs within 300 rpm of full-load governed speed
 - 3-4 upshift occurs within 200 rpm of full-load governed speed

RETARDER

- ☐ Check that the retarder responds correctly to 50 percent or 100 percent apply.
- ☐ Check that the retarder enable switch turns off the retarder.
- ☐ Check that retarder only applies at closed throttle.
- ☐ Check that low speed cutoff switch turns off the retarder in first range.
- ☐ Check that the retarder temperature indicator increases rapidly when the retarder is applied.
- ☐ Check that the brake lights come on when the retarder is applied.

OTHER CHECKS

- ☐ Stall check
 - ☐ Shift quality
 - ☐ Comments: _____
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