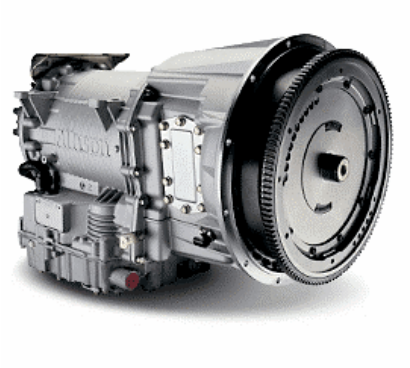
AUTHORIZED ALLISON FULL SERVICE DEALER – GENUINE REMANUFACTURED TRANSMISSIONS



REMAN.GUIDE

EXCLUSIVELY FOR

VOLVO TRUCKS NORTH AMERICA

INDUSTRIAL AUTOMATIC TRANSMISSION SERVICE

2339 East Grauwyler Road
Irving, TX 75061-3313
Ph. (972)-438-1406
(800)-999-8726
Fax (972)-579-7466

WELCOME

Congratulations on your choice to purchase the finest remanufactured Allison transmissions available. Inland Truck Parts & Service (ITP) through its acquisition of Industrial Automatic Transmission Service (IATS) has long been a leader in the Allison industry. Providing you and your business with a genuine Allison product is only the beginning. IATS makes it easy to manage your Allison business. You can build your confidence and your bottom line with a Genuine Allison product from IATS.

✧ ✧ ✧ ✧ ✧ ✧

IATS is a company dedicated to the satisfaction of Allison transmission users across the globe. Our remanufactured products can be found in every type of service vehicle in every part of the United States. Just look in your neighborhood, the bus that takes the children to school, the fire trucks we rely on for safety, the refuse trucks that haul our trash, and the charter coaches that take us on those relaxing getaways, IATS is there. We're proud to be a part of the foundation that keeps our societies productive. We continuously analyze our products and service comparing them to the demands set by the Allison market. IATS is unmatched in our philosophy of putting the customer first and at the forefront of our daily activities. The only choice for a genuine quality transmission and top class service is IATS.

✓ AUTHORIZED ALLISON FULL SERVICE DEALER

✓ ALLISON TECHNICAL EXPERTISE ON STAFF

✓ GENUINE ALLISON REPLACEMENT PARTS

✓ 100% INSPECTION AND DYNO TESTING

✓ TOP CLASS CUSTOMER SERVICE

CONTACT IATS

Ron Friedman, Sales (National Accounts / Fleets): ronf@inlandtruck.com
John Salmon, Sales Manager: johns@inlandtruck.com
Geoff Garafola, General Manager, Allison Manager (Production / Warranty): geoffg@inlandtruck.com
Doug Tyler, Allison Technical Manager (Technical / Warranty): douglast@inlandtruck.com
Stephen Fain, Production Manager: stephenf@inlandtruck.com
Bill Beardslee, Regional Manager: billb@inlandtruck.com

Hours of Operation

Monday-Friday	7:00am - 7:00pm (CST)
Saturday	8:00am - 12:00pm (CST)

Voice Numbers

800-999-TRANs (800-999-8726)
972-438-1406 (Dallas/Fort Worth and surrounding areas)

Fax Number

972-579-7466

Allison Remanufacturing Facility

2339 East Grauwyler Road
Irving, TX 75061
Voice (800) 999-8726
Fax (972) 579-7466

REMAN. TRANSMISSIONS

About The Product

- Genuine Allison Remanufactured Transmissions
- 100% Dyno tested and calibrated

Pricing

- Due to unforeseen circumstances, prices are subject to change without notice. In the event a price change is necessary, IATS will make every attempt to provide a written notice within thirty days
- Some applications and field modifications may affect final transmission price
- Outbound shipments from IATS for On-Highway transmissions are prepaid within the forty-eight (48) contiguous United States.
- Core return freight is not included in exchange price.
- Two year-unlimited miles warranty standard for On-Highway applications except for Off-Highway applications (see **WARRANTY)**

Credit Accounts

- ALL invoices are due net 10^{th} :
  - ✓ Transmission merchandise
  - ✓ Core deposits
  - ✓ Parts
  - ✓ Freight
  - ✓ Optional warranty coverage
  - ✓ Repairs
  - ✓ Warranty replacements
- Credit limits enforced using total account balance

Shelf Life

- Remanufactured transmissions that have not been installed within one year of the remanufactured date may require the following at additional expense:

    1. Dyno test
    2. Electronic integrity testing (ATEC and WT)
    3. Repackaging / make-ready
    4. Freight
    5. Additional charges may apply at time of inspection

- Please contact IATS to determine the original remanufactured date.

Scope of Work

1. PURPOSE

Rebuild of returned cores shall follow the process and procedure outlined in this document.

2. SCOPE

This document shall be in effect for all Allison Transmission cores received for rebuilding at Industrial Automatic Transmission Service.

3. PROCESS

3.1. The rebuilding of cores shall begin with the receipt of the returned unit, documentation of its characteristics, and visual inspection.

3.2. Rebuilding shall be conducted as instructed in the appropriate Allison Transmission Service Manual except when subsequent information is provided through a genuine Allison Transmission publication (e.g. SIL, TR, WATCH, etc.).

3.3. Cores shall be fully disassembled, cleaned and degreased.

3.4. When applicable, parts shall be deburred and polished.

3.5. Inspection of parts shall be conducted as described in the appropriate Allison Transmission Technicians' Guide. Assembly of transmission shall be completed with mandatory new parts in addition to reclaimed and reworked parts.

3.6. Dynamometer testing shall be completed on all remanufactured transmissions and data recorded. Finished products will be released only after a successful test.

3.7. Final test results shall be entered into the resource computer and retained for a minimum of two years.

3.8. Bill of materials and work order comments shall be maintained electronically in tandem with final test results.

3.9. Remanufactured transmission shall be identified with a stamped metal tag, Allison serial number and a unique IATS serial number.

3.10. Units shall be painted and packaged for shipping.

4. PROCEDURE

4.1. Receipt of core

4.1.1. Document core information on Core Receiving Report. A unique number will be assigned to core from the report.

4.1.2. Affix unique numbered tag to core.

4.1.3. Visually inspect core and record results on report.

4.1.4. Enter core information in the electronic ledger.

4.2. Remanufacturing

4.2.1. Disassembly

4.2.1.1. Tear down the core as described in the Allison Transmission Service Manual.

4.2.1.2. Degrease all parts.

4.2.1.3. Polish and debur parts as required.

4.2.2. Inspection

4.2.2.1. Inspect the core parts as described in the appropriate Allison Transmission Technicians' Guide.

4.2.2.2. Remove any spent parts to scrap area.

4.2.2.3. Remove any reclaimable parts to reclaiming basket.

4.2.2.4. Promote approved parts to Assembly.

4.2.2.5. Generate the required bill of materials for Assembly.

4.2.3. Assembly

4.2.3.1. Rebuild the core as described in the Allison Transmission Service Manual.

4.2.3.2. Replace all mandatory parts as required.

4.2.3.3. Re-inspect parts as each install is conducted.

4.2.4. Dynamometer testing

4.2.4.1. Mount transmission to test stand.

4.2.4.2. Fill with approved automatic transmission fluid or Transynd™ as required.

4.2.4.3. Conduct test as outlined in the appropriate Allison Transmission Final Test Specifications.

4.2.4.4. Record all data.

4.2.4.5. Pass only transmissions that meet all specifications; repair, adjust and retest as required.

4.2.4.6. Record final test data into resource computer.

4.2.5. Painting and packaging

4.2.5.1. With port plugged, paint the entire transmission.

4.2.5.2. Seat transmission in shipping skid and secure with metal banding.

4.2.5.3. Attached ancillary documentation as required.

4.2.6. Identifying remanufactured transmissions

4.2.6.1. Stamp metal tag with part number, model and a unique IATS serial number.

4.2.6.2. Affix metal tag to transmission main housing.

4.2.7. Deliver to Shipping/Receiving

4.2.7.1. Invoice is generated.

4.2.7.2. Affix shipping documents to transmission.

4.2.8. Outbound Freight

4.2.8.1. Outbound freight is prepaid by IATS.

5. End Of Document

REMANUFACTURED ALLISON TRANSMISSION LIMITED WARRANTY STATEMENT

Rev.01/2007

OVERVIEW

Inland Truck Parts & Service / Industrial Automatic Transmission Service (ITP/IATS) will provide for repairs or replacement, at our option, during the warranty period of each remanufactured Allison transmission in accordance with the following terms, conditions, and limitations:

1. Warranty Registration must be completed and returned to ITP/IATS for warranty to be valid. All installation steps must be adhered to including installation of a new external filter and replacement or adequate cleaning of transmission cooler.
2. Defective remanufactured transmissions must be returned to ITP/IATS to receive warranty consideration. If the transmission is disassembled before being returned for warranty consideration, the warranty is null and void.
3. The original warranty (from original install date) remains in effect on replaced products.
4. Warranty on transmissions going outside the United States is for parts only. Parts must be returned to ITP/IATS for inspection.

COVERAGE

The following coverage periods apply:

Allison Transmission Approved Applications	Warranty Limitations (effective Jan. 2007)	
	Months	Transmission Miles / Hours
On Highway (includes Ag, Refuse, & School Bus)	**0-24**	**No Limit**
Off Highway	**0-6**	**No Limit**

Repairs/Replacement Labor

1. **ALL** payment for work performed is the responsibility of the vehicle owner regardless of warranty. ITP/IATS may consider full or partial reimbursement for labor bills submitted against warrantable repairs/replacement (see #2 below). There **IS NOT** a pre-authorization of repairs that makes provisions for billing directly to ITP/IATS.

2. Labor for repairs/replacement will be considered **ONLY** when the following are adhered to:
   - ✓ Transmission is within the warranty period
   - ✓ Prior approval was given by authorized ITP/IATS personnel
   - ✓ Transmission and/or vehicle has not been modified
   - ✓ Failed transmission has been returned for failure analysis
   - ✓ Failure analysis shows malfunction resulting from defects in material or workmanship
   - ✓ Original installation was performed by an authorized service center
   - ✓ Labor times are per Allison Labor Time Guide
   - ✓ Labor rates are reasonable for the geographic area of the repairs
   - ✓ The paid repair order is submitted with all requests for reimbursement

NOT COVERED

This warranty does not cover:

- × Shipping charges, fluids, shop supplies, towing/travel, downtime, rentals, incidental expenses, or any other charges that might occur from economic loss and extra expenses
- × Damage due to accident, misuse, or alteration
- × Failure caused by poor installation, misapplication, unapproved application, abuse, lack of maintenance, unapproved fluids, or any other factors beyond the control of ITP/IATS

ALLISON TRANSMISSION CRITERIA FOR CORES

Rev.01/2007

OVERVIEW

The core criteria below have been redesigned to be more user-friendly to our customers: in normal circumstances, we have eliminated internal charge backs for all *on-highway* models! We believe that this will allow you to conduct your business more proficiently and allow you to provide faster service to your customers or to your own fleet. Should you have any questions, please contact us for help.

CORE INTEGRITY

- Cores must not have been previously disassembled. Cores that have been disassembled will be subject to an evaluation fee of 10% of the original core charge. Missing/damaged parts will be charged.
- All transmission components must be present (e.g. torque converter, housings, retarder, output shaft, oil pan/control module, etc.). Missing components will be charged.
- Both input and output must be free turning (not freewheeling). Cores that are not free turning or cores that are freewheeling will be subject to internal evaluation and charges.

CORE VINTAGE

- Transmissions are exchanged on a like for like basis. Cores that do not match the components (physical, hydraulic, and electronic) of the original purchased transmission will be subject to charges up to the full core charge.

EXTERNAL INSPECTION

- All cores must be drained of fluids and plugged to prevent leakage.
- Close visual inspection of all the external housings will be conducted. The visual inspection will include all: housings, oil pan/control module, threaded ports/holes, mounting surfaces and the like. Broken, cracked, crushed, corroded, etc. housings and components will be charged.
- Damage from freight will be the responsibility of the shipper.
- *All support/ancillary equipment and packaging must be removed. We assume no responsibility for parts such as brackets, fittings, flanges/yokes, p.t.o.s, studs, solenoids, shift levers, etc. left on cores. Failure to remove such equipment will result in a labor charge.*

V SERIES CORES

- All V-drive transmissions with damaged bevel gears, flywheel, right angle drive, and/or case damage are considered non-rebuildable cores and will receive no credit. The customer may supply another core or good replacements for the damaged parts in order to have core credit consideration.

OFF HIGHWAY CORES

- All transmissions designated off highway must undergo a fully disassembled inspection.
- All shafts, housings, and updates are not considered in standard overhaul price and will be charged if they do not meet our quality standards.
- Flywheel damage on 5000/6000 series transmissions with remote front drive is unacceptable for full core credit. Flywheel replacement cost will be charged.

OTHER

- *We reserve the right to refuse any core that does not meet the criteria described previously or for any other reason is not in the best interest of our company.*
- A customer request for tear down report that does not involve warranty will result in a fee to the customer for this service.
- All cores received that do not meet our core criteria may be eligible for partial credit and/or at the request of the customer: disposed to scrap or returned (disassembled) at customer's expense.
- Cores must be returned within 90 days to receive full core credit consideration.
- Customers who ship cores freight collect will have those charges billed back to them unless prior arrangements have been made with our personnel to accommodate incoming freight.

CORE RETURN FORM

RETURN CORES TO:

Industrial Automatic Transmission Service
2339 East Grauwyler Road
Irving, TX 75061
(800) 999-8726
(972) 438-1406
Fax (972) 579-7466

Date	
Company Name	
Address	
Contact Person	
Phone	
e-mail	
Freight Carrier	
Shipment Method *check appropriate box*	**Freight Prepaid** ☐ **Freight Collect** ☐
Comments	

Line No.	Model	Part Number	Core Serial Number	IATS Installed Serial Number	Core Damages
1					
2					
3					
4					

RETURNS

Authorizing

- Only pre-arranged and approved returns will be accepted

- Returned transmissions must be in re-saleable condition, must have zero (0) miles accumulated, and must not have been mounted, adjusted, or modified in any way.

- Returned products must be shipped freight prepaid to IATS

Charges and Credits

- Stock returns will receive special consideration when a product order for the same number of units is placed at the time of return

- Return merchandise units may receive core credit if a core deposit invoice is open on account

- A returned product may be subject to charges that include, but are not limited to, the following:

  - ✓ Restocking
  - ✓ Repackaging / make-ready
  - ✓ Dyno test
  - ✓ Electronic integrity testing (ATEC and WT)
  - ✓ Original outbound freight (if applicable)

- No cash reimbursements will be given.

RETURN MERCHANDISE FORM

RETURN PRODUCT TO:

Industrial Automatic Transmission Service
2339 East Grauwyler Road
Irving, TX 75061
(800) 999-8726
(972) 438-1406
Fax (972) 579-7466

ATTN: Returns Department

AUTHORIZED RETURNS ONLY	
Date	
Company Name	
Address	
Contact Person	
Phone	
e-mail	
IATS Authorized By	
Serial Number	
Part Number	
Model	
Date of Purchase	
Original Purchase Order	
Installed (yes/no)	
Modified (yes/no)	
Reason for return	

MODELS & SERIES AVAILABLE

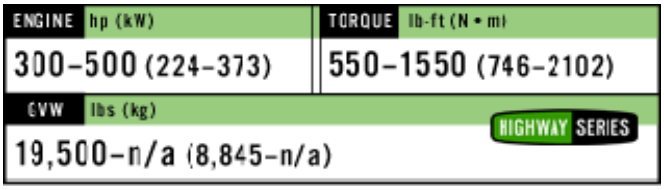
- 1000
- 2000
- 2400
- 3000MH
- 4000MH
- AT 500
- B 300
- B 400
- B 500
- CL(B)T 700
- DP 8000
- HD 4000
- HT 700
- MD 3000
- M/S 5000
- M/S 6000
- M/S 9000
- MT 600
- VOCATIONAL MODELS
    - HIGHWAY
    - PUPIL TRANSPORT/SHUTTLE
    - RUGGED DUTY
    - BUS
    - EMERGENCY VEHICLE
    - MOTORHOME
    - TRUCK RV

Due to a variety of applications, certain field modifications may require additional charges.

VOCATIONAL MODELS OVERVIEW

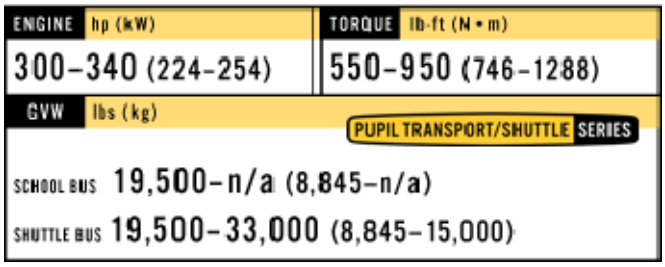
HIGHWAY SERIES

Allison Highway Series automatic transmissions are designed to meet all the horsepower needs of strictly on-highway vehicles that do not require PTO operation.



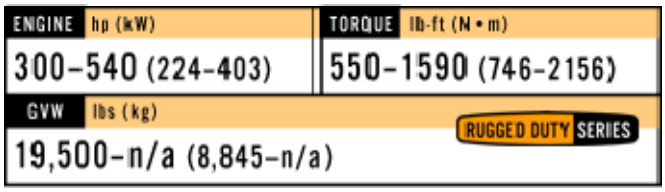
PUPIL TRANSPORT/SHUTTLE SERIES

Allison Pupil Transport/Shuttle Series automatic transmissions are ideally suited for school, non-school and shuttle bus use.



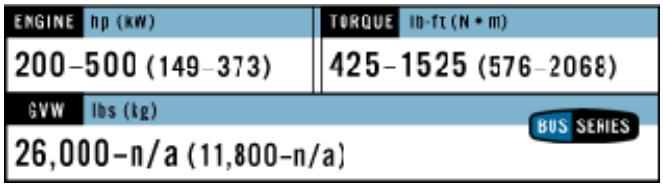
RUGGED DUTY SERIES

Allison Rugged Duty Series automatic transmissions are suited for any vehicle that operates on/off highway and/or requires PTO operation



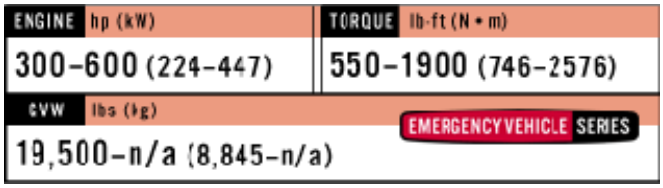
BUS SERIES

Allison Bus Series automatic transmissions are ideally suited for Federal Transit Authority (FTA) funded transit properties, FTA-like transit properties and tour coaches, and shuttle buses exceeding 33,000 lbs. GVW



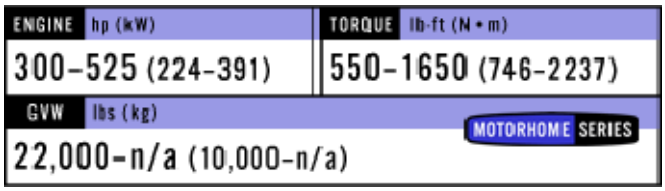
EMERGENCY VEHICLE SERIES

The Allison Emergency Vehicle Series offers a complete family of automatic transmissions to meet the special needs of fire and emergency vehicles.



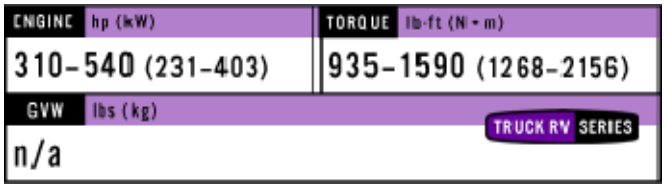
MOTORHOME SERIES

Allison Motorhome Series automatic transmissions are designed to provide enhanced performance and exceptional value to the motorhome market.



TRUCK RV SERIES

Allison Truck RV Series automatic transmissions are specifically designed to provide more power and more performance for truck recreational vehicles.



Vocational Model Release Details

Vocational Model start of production was January 5, 2004. Shipments commenced on January 12, 2004.

All vehicles produced for operation in North America must be specified with the appropriate vocational model by January 3, 2005.

Vocational Models are globally acceptable and thus can be used for North American exports.

OEMs exporting chassis into North America January 1, 2005 or after must have a Vocational Model.

Contact your local truck dealer for a complete listing of vehicle models featuring Allison Transmission Vocational Models, or contact your Authorized Allison representative.

AT 545 (R)

SPECIFICATIONS

General rating

Net input power (max).....235 hp (175 kW)
Input speed range.....2400 - 4000 rpm (diesel),
3200 - 4400 rpm (gasoline)
Input speed range w/retarder option.....2400 - 3600 rpm (diesel),
3200 - 3600 rpm (gasoline)
Net input torque (max).....445 lb ft (603 N·m)
Vehicle weight (GVW or GCW).....Up to 30,000 lbs
(13,608 kg)

Mounting

Engine...SAE 3 automotive flywheel housing with flex plate drive
Vehicle.....One vertical mounting pad each side

Torque converter

Type.....Single-stage, 3-element, multiphase
Stall torque ratio.....TC 230-2.60; TC 275-1.96; TC 290-1.72

Gearing

Type.....Constant mesh, spur type planetary

Range	Ratios*
First	3.45:1
Second	2.25:1
Third	1.41:1
Fourth	1.00:1
Reverse	5.02:1

** Gear ratio does not include torque converter ratio.*

Power takeoff provision*

Converter driven (SAE 6-bolt Regular Duty PTO)
Location.....Right side (viewed from rear)
Drive gear ratio..... All ranges--1.00 x turbine speed
Drive gear rating.....200 lb ft (270 N·m) continuous;
250 lb ft (340 N·m) intermittent

Oil system

Oil type.....Dexron® IIE;, Dexron® III, C 4
Capacity (excluding external circuit)...20 U.S. qts (18.9 liters)
(w/std. oil pan)
Filter.....Full flow, replaceable element, remote mounted
Cooler.....Remote mounted

(Filter and cooler not furnished on transmission assembly but is supplied by vehicle manufacturer.)

Size

Length.....27.2 in (692 mm)
Width.....19.8 in (503 mm)
Height.....(with standard 5.3" oil pan)..20.4 in (519 mm)
Depth Below Center Line.....11.2 in (284 mm)
Weight (dry).....289 lbs (131 kg)
Weight (dry w/retarder option).....329 lbs (149 kg)

+NOTE: Vocational ratings may vary by vocation.
**NOTE: The PTO provision is not available on the retarder models.*

Design Features & Benefits

- Designed for use with diesel and gasoline engines up to 235 nhp (175 kW). Four forward ranges and one reverse. This transmission model is best suited for school buses, fuel delivery, beverage delivery, general P&D, limited transit coach and light-duty dump truck applications.
- Clutches are multidisc design, oil-cooled, hydraulically-operated and self-compensating for normal wear. Spur-type planetary gears are designed for strength, quietness and long life.
- Automatic upshifting and downshifting within each drive range. Built-in inhibitors prevent downshifts or shifts into reverse unless vehicle speed is within an acceptable range.
- The Allison three-element torque converter provides smooth, shock-free operation. A choice of converters permits matching the AT 545(R) to a wide variety of engines.
- Converter-driven power takeoff drive on right side of transmission (as viewed from the rear) is standard on non-retarder models. Design is SAE 6-bolt.
- Provisions for neutral start switch, reverse signal switch, SAE regular-duty thread-type speedometer drive, electronic speedometer drive and parking brake.
- 5.3 inch oil pan is standard. Optional 3.8 inch oil pan is available when ground clearance dictates its use. Optional 3.8 inch oil pan is not available with retarder option.
- An optional additional neutral position allows for "park brake" position on the shift selector for application of an OEM-supplied parking brake system.
- Optional input retarder with power absorption capacity of 160 hp at 2600 rpm for vehicle downhill speed control. This option requires the 5.3 inch oil pan.

Typical Applications

- Stepvan
- Tanker Truck
- P&D Truck
- Emergency Vehicle
- Lease/Rental Vehicle
- Refrigerated Van
- Motorhome
- School Bus
- Flatbed Truck
- Small Wrecker
- Utility Truck
- Road Sweeper
- Other applications are available.

The AT 545 (R) is not approved for use in trucks with front mounted snow plows or garbage packers over 9 cubic yards.

MT 643

SPECIFICATIONS

General rating

Net input power (max).....250 hp (186 kW)
Input speed range.....2000 - 4000 rpm
Net input torque (max).....640 lb ft (868 N·m)
Vehicle weight (GVW or GCW).....Up to 73,280 lbs (33,239 kg)

Mounting

Direct.....SAE 2 flywheel housing with flex plate drive

Torque converter

Type.....Single-stage, 3-element, multiphase
Stall torque ratio.....TC 350-3.04; TC 360-2.86; TC 370-2.40;
TC 378-2.27; TC 380-1.82
Lockup Clutch, automatic.....Effective in 3rd & 4th

Gearing

Type.....Constant mesh, spur type planetary

Range	Ratios*:
First	3.58:1
Second	2.09:1
Third	1.39:1
Fourth	1.00:1
Reverse	5.67:1

** Gear ratio does not include torque converter ratio.*

Power takeoff provision

Converter driven (SAE 6-bolt)
Location.....Right side (viewed from rear)
Drive gear ratio..... All ranges--1.00 x turbine speed
Drive gear rating.....300 lb ft (407 N·m)

Oil system

Oil type..... Dexron® III, C 4
Capacity (excluding external circuit).....18 U.S. qts (17 liters)
(w/std. oil pan)
Filter.....Full flow, replaceable element, remote mounted
Cooler.....Remote mounted

(Filter and Cooler not furnished on transmission assembly but is supplied by vehicle manufacturer.)

Size

Length.....30.4 in (773 mm)
Width.....19.3 in (489 mm)
Height (with 5.1" pan).....22.4 in (568 mm)
Weight (dry).....510 lbs (231 kg)
Weight (dry) w/output retarder.....638 lbs (289 kg)
+NOTE: Vocational ratings may vary by vocation.

Design Features & Benefits

- Designed for use with large bore gasoline and mid-range diesel engines up to 250 nhp (186 kW). Four forward ranges and one reverse. This transmission model is best suited for school bus, P&D, emergency vehicles and motorhomes.
- Clutches are multidisc design, oil-cooled, hydraulically-operated, and self-compensating for normal wear. Spur-type planetary gears are designed for strength, quietness, and long life.
- Automatic lockup clutch, throttle-modulated for maximized fuel economy and enhanced engine braking. Automatic upshifting and downshifting within each drive range. Built-in inhibitors prevent downshifts or shifts into reverse unless vehicle speed is within an acceptable range.
- The Allison three-element torque converter provides smooth, shock-free operation. A choice of converters permits matching the MT 643 to a wide variety of engines.
- Converter-driven power take-off drive on right side of transmission (as viewed from rear) is standard. Design is SAE 6-bolt.
- Provisions for neutral start switch, reverse signal switch, SAE regular - duty thread-type speedometer drive, and parking brake.
- 5.1 inch oil pan is standard. Optional 4.3 and 7.1 inch pans are available when ground clearance or heavy duty operation dictates their use.

Typical Applications

- Shorthaul Tractor
- P&D Truck
- Fire Truck
- Utility Truck
- Stake Truck
- Dump Truck
- Flat Bed Truck
- Motorhome
- Beverage Truck
- School Bus
- Refrigerated Van
- Refuse Truck
- Tanker Truck
- Wrecker
- Other applications are available.

MT 653DR

SPECIFICATIONS

General rating+

	MT 653DR
Net input power	250 hp (186 kW)
Input speed range	2000 - 4000 rpm
Net input torque (max)	640 lb ft (868 N·m)
Vehicle weight (GVW or GCW)	Up to 73,280 lbs (33,239 kg)

Mounting

Direct.....SAE 2 flywheel housing with flex plate drive

Torque converter

Type.....Single-stage, 3-element multiphase
Stall torque ratio.....TC 350-3.04; TC 360-2.86; TC 370-2.40; TC 378-2.27; TC 380-1.82
Lockup clutch, automatic.....Effective in 4th & 5th

Gearing

Type.....Constant mesh, spur type, planetary

Range	Ratios*:
First(manually selected)	8.05:1
Second	3.58:1
Third	2.09:1
Fourth	1.39:1
Fifth	1.00:1
Reverse	5.67:1

** Gear ratio does not include torque converter ratio.*

Power takeoff provision

Converter driven (SAE 6-bolt)
Location.....Right side (viewed from rear)
Drive gear ratio..... All ranges--1.00 x turbine speed
Drive gear rating.....300 lb ft (407 N·m) continuous

Oil system

Oil type.....Dexron III®, C 4
Capacity (excluding external circuit).....18 U.S. qts (17 liters) (w/std. oil pan)
Filter.....Full flow, replaceable element, remote mounted
Cooler.....Remote mounted

(Filter and Cooler not furnished on transmission assembly but is supplied by vehicle manufacturer.)

Size

Length.....36.2 in (920 mm)
Width.....19.3 in (489 mm)
Height (with 5.1" pan).....22.4 in (568 mm)
Weight (dry).....602 lbs (273 kg)
+NOTE: Vocational ratings may vary by vocation.

Design Features & Benefits

- Designed for use with large bore gasoline and mid-range diesel engines up to 250 nhp (186 kW). Five forward ranges and one reverse, with fully-automatic shifting in the upper four ranges. First range is manually selected. This transmission model is best suited for on- and on/off-highway applications.
- Clutches are multidisc design, oil-cooled, hydraulically-operated, and self-compensating for normal wear. Spur-type planetary gears are designed for strength, quietness and long life. Automatic lockup clutch, throttle-modulated for maximized fuel economy and enhanced engine braking. Automatic upshifting and downshifting within each drive range. Built-in inhibitors prevent downshifts or shifts into reverse unless vehicle speed is within an acceptable range.
- The Allison three-element torque converter provides smooth, shock-free operation. A choice of converters permits matching the MT 653 to a wide variety of engines. Converter-driven power take-off drive on right side of transmission (as viewed from the rear) is standard. Design is SAE 6-bolt.
- Provisions for neutral start switch, reverse signal switch, SAE regular-duty thread-type speedometer drive, and parking brake.
- 5.1 inch oil pan is standard. Optional 4.3 and 7.1 inch pans are available when ground clearance or heavy duty operation dictates their use.

Typical Applications

- Refuse Truck
- Transit Mixer
- Dump Truck
- Municipal Truck
- Construction Material
- Tractor Trailer Flat Bed
- Stake Truck
- Tanker Truck
- Utility Truck
- Flat Bed Truck
- Snow Plow
- Wrecker
- Other applications are available.

HT 740

SPECIFICATIONS

General rating+

Net input power (max).....445 hp (332 kW)
Input speed range.....1900 - 2400 rpm
Net input torque (max).....1435 lb ft (1946 N·m)
Vehicle weight (max).....Up to 80,000 lbs (36,287 kg) GVW
and 130,000 lbs (58,967 kg) GCW

Mounting

Direct.....SAE 1 flywheel housing with flex plate drive
Remote.....Converter housing side pads, and rear housing top pad

Torque converter

Type.....Single-stage, 3-element, polyphase
Stall torque ratio.....TC 487-1.50; TC 488-1.70; TC 497-2.72;
TC 470-2.83; TC 495-2.39; TC 496-1.78;
TC 498-2.45; TC 499-1.91
Automatic lockup clutch.....Effective in all forward ranges
or effective in 2nd through 4th ranges
– depending on model used

Gearing

Type.....Constant mesh, spur type, planetary

Range	Ratios*:
First	3.69:1
Second	2.02:1
Third	1.38:1
Fourth	1.00:1
Reverse	6.04:1

** Gear ratio does not include torque converter ratio.*

Power takeoff provision

Converter driven (SAE 6-bolt)
Location.....10 o'clock position (as viewed from rear)
Drive gear ratio.....1.00 x turbine speed
Drive gear rating.....300 lb ft (407 N·m) continuous;
400 lb ft (543 N·m) intermittent

Engine driven (optional) (SAE 8-bolt)
Location....converter housing: one at 1 o'clock position and one
at 8 o'clock position (as viewed from rear)
Drive gear ratio.....1 o'clock position – 1.35 x turbine speed;
8 o'clock position – 0.84 x turbine speed
Drive gear rating.....200 lb ft (149 N·m) continuous;
260 lb ft (194 N·m) intermittent

Oil system

Oil type.....Dexron II®, C4
Capacity
(excluding external circuit)...7.5 U.S. gals (28.5 liters)
(w/std. oil pan)
Filter.....External, remote mounted
Cooler.....Remote mounted

(Filter and Cooler not furnished on transmission assembly but is supplied by vehicle manufacturer.)

Size

Length.....37.4 in (950 mm)
Width.....21.7 in (552 mm)
Height.....26.6 in (675 mm)
Weight (dry).....840 lbs (381 kg) (approx.)

+NOTE: Vocational ratings may vary by vocation.

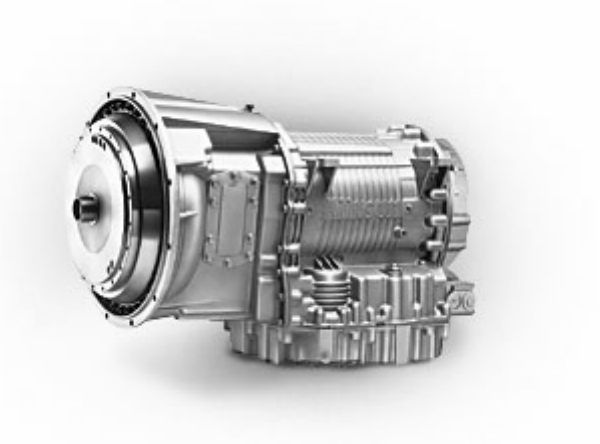
Design Features & Benefits

- Designed for use with diesel engines up to 445 nhp (332 kW). Four forward ranges and one reverse. This transmission model is best suited for medium- and heavy-duty trucks and buses. Clutches are multidisc design, oil-cooled, hydraulically-operated, and self-compensating for normal wear. Spur-type planetary gears are designed for strength, quietness, and long life. Automatic lockup clutch, throttle-modulated for maximized fuel economy and enhanced engine braking. Automatic upshifting and downshifting within each drive range. Built-in inhibitors prevent downshifts or shifts into reverse unless vehicle speed is within an acceptable range.
- The Allison three-element torque converter provides smooth, shock-free operation. A choice of converters permits matching the HT 740 to a wide variety of engines.
- Converter-driven power takeoff drive on right side of transmission (as viewed from the rear) is standard. Design is SAE 6-bolt.
- Optional engine-driven power takeoff is available in two locations - upper right and lower left sides, as viewed from rear. Design is SAE 8-bolt.
- Provisions for neutral start switch, reverse signal switch, SAE regular-duty thread-type speedometer drive, electronic speedometer drive, and parking brake.

- 7.0 inch oil pan is standard. Optional 6.0, 4.5 and 8.5 inch pans are available when ground clearance or heavy duty operation dictates their use.

Typical Applications

- Dump Truck
- Refuse Hauler
- Lowboy Truck
- Hook & Ladder Truck
- Transit Mixer
- Fire Truck
- Logging Truck
- Rear Loader (Refuse)
- Agricultural
- Motorhome
- Construction Equipment Hauler
- Wrecker (Tandem Axle)
- Public Utility (All Wheel Drive Tandem Axle)
- Other applications are available.



MD 3060P/MD 3560P

SPECIFICATIONS

Standard Rating

Gross input power (maximum).....275 hp (205 kW)
Gross input torque (maximum).....800 lb ft (1085 N·m)
Net input power (maximum).....265 hp (198 kW)
Net input torque (maximum).....780 lb ft (1058 N·m)
Rated input speed (minimum-maximum).....2000 - 2800 rpm

Specialty Rating+

Gross input power (maximum).....300 hp (224 kW)
Gross input torque (maximum).....950 lb ft (1288 N·m)
Net input power (maximum).....285 hp (213 kW)
Net input torque (maximum).....905 lb ft (1227 N·m)
Rated input speed (minimum-maximum).....2000 - 2800 rpm

Mounting

Engine.....SAE 2 flywheel housing, flex disk drive
Chassis.....Rear support available
(required for some installations)

Torque converter

Type.....One stage, three element, polyphase
Stall torque ratio.....TC 411-2.71; TC 413-2.44; TC 415-2.35;
TC 417-2.20; TC 418-1.98; TC 419-2.02; TC 421-1.78
Lockup clutch with torsional damper.....Integral/standard

Gearing

Type.....Patented, constant mesh, helical, planetary

Range	MD 3060P Ratios*	MD 3560P Ratios*
First	3.49:1	4.59:1
Second	1.86:1	2.25:1
Third	1.41:1	1.54:1
Fourth	1.00:1	1.00:1
Fifth	0.75:1	0.75:1
Sixth	0.65:1	0.65:1
Reverse	5.03:1	5.00:1
Ratio coverage		
Forward	5.34:1	7.05:1

** Gear ratio does not include torque converter multiplication.*

Power Takeoff Provision

Optional power takeoff units.....Engine-driven, constant-drive,
265-335 lb ft (360-455 N·m) intermittent
Engine-driven, clutched-drive,
265-335 lb ft (360-455 N·m) intermittent
Engine-driven, clutched-drive,
415-575 lb ft (560-780 N·m) intermittent
Left or right side .....Standard

Oil system

Oil type...C4, MIL-L-2104, MIL-L-46167, Dexron®-II, Dexron®-IIIE
Capacity (excluding external circuits)...29 U.S. qts (28 liters)
Filter - main & cooler.....Replaceable element, integral
Heat exchanger type.....Oil to water, integral or
remote mount available

Size

	MD 3060P/MD 3560 with PTO drive
Length (FW housing to output flange face	33.2 in (843 mm)
Depth	12.8 in (325 mm)
Weight.....w/retarder	575 lb (261 kg)

	MD 3060P/MD 3560 without PTO drive
Length (FW housing to output flange face	29.0 in (736 mm)
Depth	12.8 in (325 mm)
Weight (dry)	535 lb (243 kg)

+Specialty vehicles cover: emergency vehicles, motorhomes, heavy equipment haulers, and tactical military vehicles.

¤Vocational shift calibrations vary by application. Consult Allison Transmission Sales for specific information.

Design Features & Benefits

- The WT family incorporates the latest technology in design, manufacturing techniques, and diagnostics.
- Hydraulic torque converter with lockup clutch and integral torsional vibration damper and planetary gear package.
- Unique patented helical gear arrangement provides 4, 5, or 6-speeds in a compact package. The electronic control system is standard and includes:
  - Cab mounted Integral electronic control unit and shift selector (Pushbutton or lever)
  - Wiring harness
  - Neutral-range inhibit
  - Adaptive closed loop controls for shift quality
  - Performance/economy mode schedules
  - Remote shift selector optional
  - Various vocational calibration packages available
- Integral externally accessible cartridge type oil filters simplify maintenance.
- PTO provision and #2 FW housing adaptation are standard features. To reduce length, weight and cost, the PTO drive provision can be deleted.

- Optional features available are:
  - Output flanges/yokes
  - Flex disk engine adaptation
  - Oil level sensor (12 or 24 volt capability)
  - Shallow sump
  - Direct mounted oil cooler
  - Output retarder
  - Parking brake/provision (non-retarder)
  - Tachograph drive provision (non-retarder)

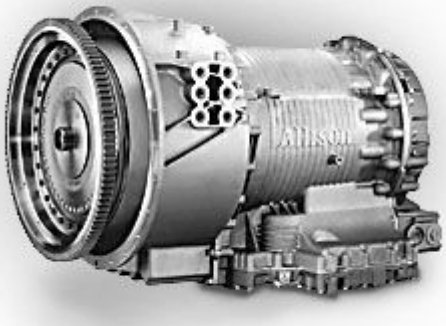
Typical Applications

- Refuse Truck
- Beverage Truck
- Van Truck
- Dump Truck
- Stake Truck
- Tank Truck
- Utility Truck
- Snow Removal
- School Bus
- Ready Mix
- Motorhome
- Shorthaul Tractor
- Wrecker

Specialty Vocations*

- Emergency Vehicles
- Motorhome
- Tactical Military Vehicles
- Heavy Equipment Haulers
- Other applications are available.

**Factory approval required*



B 500/B 500R

SPECIFICATIONS

Transit

Gross input power (maximum).....400 hp (298 kW)
Gross input torque (maximum).....1300 lb ft (1763 N·m)
Net Input power (maximum).....375 hp (280 kW)
Net input torque (maximum).....1200 lb ft (1627 N·m)
Rated input speed (minimum-maximum).....1700 - 2300 rpm

Intercity

Gross input power (maximum).....450 hp (336 kW)
Gross input torque (maximum).....1460 lb ft (1979 N·m)
Net Input power (maximum).....445 hp (332 kW)
Net input torque (maximum).....1435 lb ft (1946 N·m)
Rated input speed (minimum-maximum).....1700 - 2300 rpm

Mounting

Engine.....SAE #1 flywheel housing, flex disk drive
Chassis.....18 bolt min. flange mount or 6 bolt side pads

Torque converter

Type.....One-stage, three element, polyphase
Stall torque ratio.....TC 521-2.4; TC 531-2.3; TC 541-1.9
TC 551-1.8; TC 561-1.6
Lockup clutch with torsional damper.....Integral/standard
(available in all ranges)

Gearing

Type.....Patented, constant mesh, helical, planetary.
Available in 4,5 or 6-speed shift calibrations.

Range	Ratios*:
First	3.51:1
Second	1.91:1
Third	1.43:1
Fourth	1.00:1
Fifth	0.74:1
Sixth	0.64:1
Reverse	4.80:1

Ratio Coverage

Forward (5 speed).....5.48:1

** Gear ratios do not include torque converter multiplication.*

Oil system

Oil type....C4, MIL-L-2104, MIL-L-46167, DEXRON®-II, DEXRON®-IIE

Capacity.....(excluding external circuit)
Initial fill 47 U.S. qts (45 liters)
Oil change..... 37 U.S. qts (39 liters)
Filters-main & cooler.....Replaceable element, integral
Heat exchanger type.....Oil to water, direct-mount or remote-mount available

Size

	B 500
Length (FW housing to outputflange face)	34.0 in (865 mm)
Depth (centerline to lowest point)	13.1 in (328 mm)
Weight (dry)**	831 lbs (378 kg)

	B 500R
Length (FW housing to outputflange face)	34.0 in (865 mm)
Depth (centerline to lowest point)	13.1 in (328 mm)
Weight (dry)**	906 lbs (412 kg)

***Weight inclues output flange/yoke and adaptation.*

Design Features

- The WT Bus Series incorporates the latest technology in design and manufacturing techniques.
- Hydraulic torque converter with lockup clutch and integral torsional vibration damper, planetary gear package, and oil pump on one concentric axis.
- Unique patented helical gear arrangement provides up to 6 speeds in a compact package.
- The electronic control system is standard equipment. This includes a bus pushbutton selector and wiring harness.
- Integral externally accessible cartridge type oil filters simplify maintenance.
- Pressure balanced rotating clutches provide quick, smooth shifts.
- Adaptive controls tailor shifts to the driving conditions.
- The B 500R includes as standard:
    - Integral retarder
    - Remote oil cooler
    - Output flange/yoke
    - Engine adaptation*
    - Shallow sump for ground clearance
    - Oil level sensor
    - Two year bus warranty
    - Secondary shift schedule
    - Integral pushbutton or lever selector and max feature ECU
    - Throttle position sensor (TPS)
    - Wiring harness
    - Vehicle interface module (VIM)

Certain features listed above can be handled as delete options.

The following add options are available direct from Allison and also carry the full WT transmission warranty:

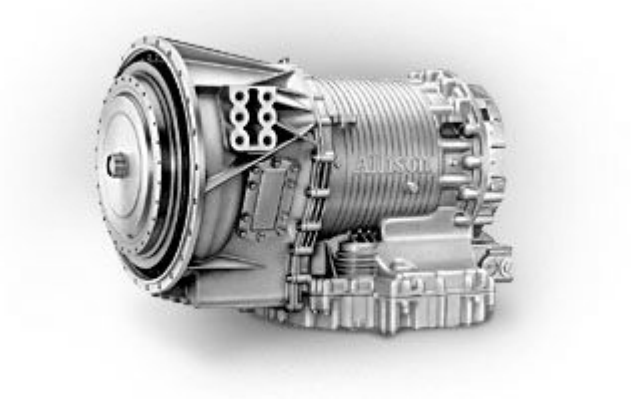
- Remote shift selector
- Power takeoff provision (adds 3.8 in to length of transmission)

- Power takeoff units
- Direct-mount oil cooler

Typical Applications

- Transit Bus
- Intercity Bus
- Intercity/Tour Bus
- Articulated Transit Bus

Areas of the world may differ in approved models



HD 4060P / 4560P

SPECIFICATIONS

Standard Rating

Gross input power (maximum).....450 hp (336 kW)
Gross input torque (maximum).....1460 lb ft (1979 N·m)
Net input power (maximum).....445 hp (332 kW)
Net input torque (maximum).....1435 lb ft (1946 N·m)
Rated input speed (minimum-maximum).....1700 - 2300 rpm

HD 4060 **Specialty Rating+**

Gross input power (maximum).....525 hp (391 kW)
Gross input torque (maximum).....1550 lb ft (2102 N·m)
Net input power (maximum).....500 hp (373 kW)
Net input torque (maximum).....1550 lb ft (2102 N·m)
Rated input speed (minimum-maximum).....1700 - 2300 rpm

HD 4560 **Specialty Rating+**

Gross input power (maximum).....500 hp (373 kW)
Gross input torque (maximum).....1530 lb ft (2074 N·m)
Net input power (maximum).....465 hp (347 kW)
Net input torque (maximum).....1460 lb ft (1979 N·m)
Rated input speed (minimum-maximum).....1700 - 2300 rpm

Mounting

Engine.....SAE 1 flywheel housing, flex disk drive
Chassis.....18 bolt min. flange mount or 6 bolt side pads

Torque converter

Type.....One stage, three element, polyphase
Stall torque ratio.....TC 521-2.4; TC 531-2.3; TC 541-1.9; TC 551-1.8; TC 561-1.6
Lockup clutch with torsional damper.....Integral/standard

Gearing

Type.....Patented, constant mesh, helical, planetary

Range	HD 4060P Ratios*	HD 4560P Ratios*
First	3.51:1	4.70:1
Second	1.91:1	2.21:1
Third	1.43:1	1.53:1
Fourth	1.00:1	1.00:1
Fifth	0.74:1	0.76:1
Sixth	0.64:1	0.67:1
Reverse	4.80:1	5.55:1
Ratio coverage		
Forward	5.48:1	7.01:1

** Gear ratio does not include torque converter multiplication.*

Power Take Off Provision

Optional power takeoff units.....Engine-driven, constant-drive,
265-335 lb ft (360-455 N·m) intermittent
Engine-driven, clutched-drive,
265-335 lb ft (360-455 N·m) intermittent
Engine-driven, clutched-drive,
415-575 lb ft (560-780 N·m) intermittent
Standard positions.....8 o'clock and 1 o'clock, viewed from rear

Oil system

Oil type.....C4, MIL-L-2104, MIL-L-46167, Dexron® III
Capacity.....(excluding external circuit)
Initial fill 47 U.S. qts (45 liters)
Oil Change.....37 U.S. qts (39 liters)
Filter - main & cooler.....Replaceable element, integral
Heat exchanger type.....Oil to water, integral or
remote mount available

Size

HD 4060P/HD 4560 with PTO drive

Length (FW housing to output flange face).....34.1 in (867 mm)
Depth.....14.7 in (373 mm)
Weight.....w/retarder.....968 lb (440 kg)
without retarder.....893 lb (406 kg)

HD 4060P/HD 4560 without PTO drive

Length (FW housing to output flange face).....31.3 in (794 mm)
Depth.....14.7 in (373 mm)
Weight.....w/retarder.....906 lb (412 kg)
without retarder.....831 lb (378 kg)

+Specialty vehicles cover: emergency vehicles, motorhomes, heavy equipment haulers, and tactical military vehicle.
¤Vocational shift calibrations vary by application.

Design Features & Benefits

- The WT family incorporates the latest technology in design, manufacturing techniques and diagnostics.
- Hydraulic torque converter with lockup clutch and integral torsional vibration damper and planetary gear package.
- Unique patented helical gear arrangement provides 4, 5, or 6 speeds in a compact package.
- The electronic control system is standard and includes:
- Cab mounted Integral electronic control unit and shift selector (Pushbutton or lever)
- Wiring harness
- Transmission mounted control module
- Neutral-range inhibit
- Adaptive closed loop controls
- Performance/economy mode shift schedules
- Integral externally accessible cartridge type oil filters simplify maintenance.
- PTO provision and SAE 1 flywheel housing adaptation are standard features.

To reduce length, weight and cost, the PTO drive provision can be deleted.

- Optional features available are:
  - Output flanges/yokes
  - Flex disk engine adaptation
  - Rear support
  - Remote shift selector
  - Oil level sensor
  - Direct mounted oil cooler
  - Tach-o-graph
  - Output retarder

These options are available direct from Allison and carry the full HD transmission warranty.

Typical Applications

- Linehaul/Shorthaul
- Construction Hauler
- Dump Truck
- Agricultural Tractor
- Motorhome
- Transit Mixer
- Fire Truck
- Refuse (side load)
- Refuse
- Utility
- On/Off-Highway Logging Truck
- Lowboy Equipment Hauler
- Specialty Vocations*
- Fire Truck
- Motorhome
- Tactical Military Vehicles
- Other applications are available.

*Factory approval required

INTRODUCTION

Congratulations, you have just purchased the finest remanufactured *Allison Transmission* available!

At any time please call

(800) 999-TRAN

for help and assistance

Please do the following:

- ✓ **Observe safety at all times**
- ✓ Fax or Mail your **Warranty Registration** immediately after installation
- ✓ Follow each installation step closely – **DO NOT ASSUME ANYTHING!**
- ✓ Some steps may or may not apply to your specific model transmission
- ✓ Modifications to your previous transmission or vehicle that were not noted will produce a mismatched application-to-part number issue and cause a variety of problems

VERY IMPORTANT FACTS

- **DO NOT** attempt to install an Allison transmission without the proper training and tools necessary to complete the installation correctly – you may void your warranty!
- Your transmission is **NOT** full of oil – **CALIBRATE YOUR DIPSTICK** and fill to the proper level before operating!
- **INSPECT YOUR OUTPUT YOKE OR FLANGE** for wear; leaks from this source are not covered under warranty – replace it if necessary!
- Malfunctioning or unadjusted modulators are the most frequent **CAUSE** of transmission complaints – check your modulator for proper use and function!
- After installing a World Transmission™ you **MUST** have the ECU set to “Fast Adaptive” to eliminate shift problems!
- The most frequent cause of voided warranty is **CONTAMINATION/DEBRIS** from an inadequately flushed cooler!
- The second moss frequent cause of voided warranty is **LACK OF MAINTENANCE** – follow the recommended maintenance guidelines!
- **YOUR FIRST FILTER CHANGE IS AT 5,000 MILES** – see the maintenance section of this document for details!
- **DO NOT TOW** your vehicle without disconnecting the transmission’s outputs regardless of distance or time traveled!
- **NEVER** try to repair a transmission under warranty – call first for troubleshooting and instructions!

INSTALLATION

The following is a basic installation guideline only

1) Install as many support equipment parts on the transmission as possible before rolling the transmission under the vehicle.

2) Roll the transmission under the vehicle. Install (2) headless bolts into the flywheel housing to keep the transmission square and aligned. Jack the transmission up so the two guide bolts line up with the proper holes in the converter housing. At this time lubricate center crankshaft pilot bore and the converter nose with Molycoat G (or equivalent grease) and remove the converter-shipping strap. Now roll the transmission into the engine flywheel housing. It should go all the way in against the flywheel housing face without any force. (Do not use bolts to pull the transmission into the housing. This will cause damage to the transmission housing.) Install all transmission to engine bolts and torque per OEM specifications.

3) Install converter bolts or nuts finger tight, then go around and torque to the proper specifications.

4) Remove the transmission jack from under the vehicle. Starting at the front of the transmission and working toward the rear, start connecting and installing all the external support equipment such as cooler lines, linkages, dipstick tube, driveline, etc.

5) Adjust linkages (as required)
   a) Shift linkages. Place the operators shift selector in the neutral position. Rotate the shift selector on the transmission as far counterclockwise as possible. If your vehicle has a Park position rotate the shift selector two detents clockwise. This put the transmission in Neutral. For vehicles without a Park position the far counterclockwise position is Reverse. Rotate the shift selector one detent clockwise to put the transmission in Neutral. Adjust the linkage so that the operators shift selector and the transmission shift selector are both in Neutral. Shift through and check all selector positions to ensure the detent positions correspond with the selector positions.
   b) Mechanical modulator linkage. Adjust the clevis or rod on the cable core until it registers with the hole in the throttle linkage lever, and the connecting pin can be freely inserted. With the pin removed, rotate the clevis or rod end one additional turn counterclockwise (viewing cable core from its end) for pull-type arrangement, or one additional turn clockwise for push-type arrangement. This ensures that the modulator does not prevent the throttle lever from reaching the full on position. Install the clevis pin or rod end to connect the throttle linkage and cable. Tighten the lock nut against the clevis or rod end. Check the travel of the cable core when throttle is moved from the fully open to the fully closed position.
   c) Check electric modulator voltage. Verify voltage, with ignition key on and accelerator at wide-open throttle should have at least 10 volts at the electric modulator. If the voltage is zero, check source. At closed throttle voltage should read zero volts, if voltage is present check wiring. Be sure the wires are properly installed (+/-) and modulator is marked for proper installation of wires.
   d) Emergency brake linkage, if used. Refer to the OEM for proper instructions.

6) Make sure the dipstick is properly calibrated. Refer to Mechanic's Tip for proper procedures.

7) Check Neutral start circuit. Repair/replace wiring as necessary. Check Neutral start switch operation by unplugging the neutral start switch wires. Using a multimeter and connect the red end in one wire and the black end in the other wire, turn on the ignition on with the shifter in Neutral. You should have continuity. Move the shifter to Drive and Reverse. You should not have any continuity in these positions. Remove the multimeter. If the switch is good, plug the switch back in to the vehicle wiring.

8) Check reverse pressure switch, (if used). Check to see if the switch is working by using a multimeter, make sure the brakes are set, start the engine and select Reverse. You should have voltage at this time. If no voltage replace the switch.

9) Inspect driveline, U-joints and carrier bearing(s).

10) At this time, tie-wrap all wires and hoses up out of the way from sharp objects and the exhaust system. Now visually inspect your installation to make sure everything is hooked up and in its proper place.

11) Lower the vehicle to a level floor and fill the transmission with approximately 12 quarts of DEXRON®-III or TranSynd™ transmission fluid. Start the engine and add fluid until your level is at the COLD FULL MARK. Look under the vehicle for any oil leaks and make sure everything is out from under the vehicle. Now road test the vehicle to make sure the transmission performs like new. After the road test check the oil level and make sure it is at the HOT RUN FULL MARK, and also check for leaks again.

For model specific details you may order a Mechanic's Tips booklet produced by Allison. It is available by calling 1-800-999-8726.

There is a nominal charge for this booklet.

ADAPTATION REQUIREMENTS

AT/MT/HT series transmissions:

ⓘ Required tools

- 24 inch Vernier caliper
- Telescoping gage (AT/MT 1.5-2.0 inch, HT 2.125-3.500 inch)
- Outside micrometer (AT/MT 1-2 inch, HT 2-3 inch)
- Dial indicator and attachments
- Depth micrometer set (0-6 inch)
- 18 inch straight edge

ⓘ Checking Flexplate, Engine Features

Area to check	AT	MT	HT
Flywheel housing or installed adapter bore diameter	16.125-16.130 inch	17.625-17.630 inch	20.125-20.130 inch
Flywheel housing bore eccentricity	Not to exceed 0.020-inch T.I.R.	0.020-inch T.I.R.	0.020-inch T.I.R.
Flywheel housing face squareness	Not to exceed 0.020-inch T.I.R.	0.020-inch T.I.R.	0.020-inch T.I.R.
Crankshaft hub (or adapter) pilot diameter	1.703-1.705 inch	1.703-1.705 inch	2.437-2.439 inch
Crankshaft hub (or adapter) face squareness	Not to exceed 0.0005-inch T.I.R. per inch of measured diameter	0.0005-inch T.I.R.	0.0005-inch T.I.R.
Crankshaft hub (or adapter) pilot eccentricity	Not to exceed 0.010-inch T.I.R.	0.010-inch T.I.R.	0.005-inch T.I.R.
Mounted flexplate flatness in area adjacent to each converter mounting hole	Formed plate – 0.039-inch Flat plate – 0.157-inch	Formed plate – 0.039-inch Flat plate – 0.157-inch	N/A
Flexplate flatness at converter mounting bolt hole diameter	N/A	N/A	0.020-inch T.I.R.
Converter axial location (Face of trans housing to end of converter lug)	1.600/1.740-inch	MT643/653: 2.854-3.014 in. MT644/647/654: 4.336-4.486 in.	3.413-3.592-inch

WORLD TRANSMISSION™ series:

ⓘ Required tools

- 24 inch vernier caliper
- Telescoping gage (2-4 inch)
- Outside micrometer (1-3 inch)
- Dial indicator and attachments
- Depth micrometer set (0-6 inch)
- 18 inch straight edge

ⓘ Checking Flexplate, Engine Features

Area to check	1K2K24K	MD/B300	HD/B500
Flywheel housing pilot bore diameter	No. 3 Housing: 16.125-16.130 inch No. 2 Housing: 17.625-17.630 inch	17.625-17.630 inch	20.125-20.130 inch
Flywheel housing bore runout	Not to exceed 0.020 in T.I.R.	Not to exceed 0.020 in T.I.R.	Not to exceed 0.020 in T.I.R.
Flywheel housing face squareness	Not to exceed 0.020 in T.I.R.	Not to exceed 0.020 in T.I.R.	Not to exceed 0.020 in T.I.R.
Crankshaft hub pilot or adapter diameter	1.703-1.705 inch	2.006-2.008 inch	2.006-2.008 inch
Crankshaft hub pilot or adapter squareness	Not to exceed 0.0005 inch T.I.R.	Not to exceed 0.005 inch T.I.R.	Not to exceed 0.005 inch T.I.R.
Crankshaft hub pilot or adapter concentricity	Not to exceed 0.010 inch T.I.R.	Not to exceed 0.005 inch T.I.R.	Not to exceed 0.005 inch T.I.R.
Flexplate bolt hole flatness	@ 11.5 inch diameter, must be 0.030 in T.I.R.	N/A	N/A
Torque converter axial location (measure from face of converter housing to converter flexplate adapter mounting face)	No. 3 Housing: 1.581-1.741 inch No. 2 Housing: 1.201-1.361 inch	1.943-1.983 inch	1.793 inch

ⓘ Flexplates

Check for radial cracks	None Permitted
Check for elongated mounting holes	None Permitted
Check for any signs of distress and/or wear	None Permitted

INSTALLATION CHECKLIST

ⓘ **Below is a basic checklist to assist in your installation. Some areas may not be applicable to your specific model transmission:**

Area to check	✓
Cooler fluid Lines and Air hoses	
No leaks	
Correct routing	
Connections tight	
Linkage	
Adjustment at all positions	
Ease of movement	
Neutral safety (starts only in N)	
Shift selector (freedom)	
Modulator	
Functioning	
Adjustment	
Ease of operation	
Routing of lines	
Parking Brake	
Proper clearance	
Adjust for full apply	
Check for full release	
Throttle Sensor	
Proper adjustment	
Correct routing	
Driveline	
Proper indexing of u-joints	
Proper angles	
Backlash	
Lubricated joints	

Area to check	✓
Hydraulic system	
Recommended fluid used	
Correct level in transmission	
Dipstick calibrated	
Fill tube tight	
Fill tube cap tight	
Breather clean and unobstructed	
No leaks	
Power Takeoff	
Backlash properly established	
Controls connected and operative	
Correctly coupled to driven equipment	
Lube line correctly installed	
Instruments / Electrical Equipment	
Proper wiring connections	
Instruments, gauges, and lights work	
Shift selector display is on	
Speedometer	
Fluid temperature gauge	
Reverse signal switch	
Neutral start switch	

SHELF LIFE

- **Transmissions that are not installed within one year of purchase must be returned for dyno test prior to installation.**
- **Installing a transmission that is beyond its shelf life may contribute to premature failure of the transmission and <u>void your warranty</u>.**

DIPSTICK CALIBRATION

ALWAYS CHECK DIPSTICK MARKINGS TO ENSURE PROPER OIL FILL

CAUTION:

LOW OIL LEVEL IS A MAJOR CAUSE OF TRANSMISSION MALFUNCTION AND FAILURE!

Below is a basic guide for dipstick markings

- Always take the necessary safety precautions when performing any work on your vehicle!
- COLD RUN is used only to determine if the transmission has enough fluid to be safely operated until a hot check can be made.
- Perform a hot check after normal operating sump temperature 160-200°F is reached.
- Be sure vehicle is on a level surface.

Dipstick markings for AT, MT, HT Transmissions

- See Figure 1 below

Dipstick markings for WT Transmissions

- See Figure 2 below

FIGURE 1

TRANS MODEL	OIL PAN DEPTH (IN.)	DISTANCE FROM TOP OF OIL PAN (IN.)			
		A	B	C	D
AT	3.80	0.50	1.00	1.50	1.80
	5.30	0.50	1.00	1.50	1.80
MT	4.34	TOP OF OIL PAN	0.75	1.50	1.80
	5.10	0.75	1.50	2.22	2.55
	7.00	0.75	1.50	N/A	N/A
HT	4.50	1.00	1.50	1.75	2.00
	6.00	1.50	2.50	3.00	3.75
	7.00	2.50	3.50	3.50	4.75
	8.50	2.50	3.50	3.50	4.75

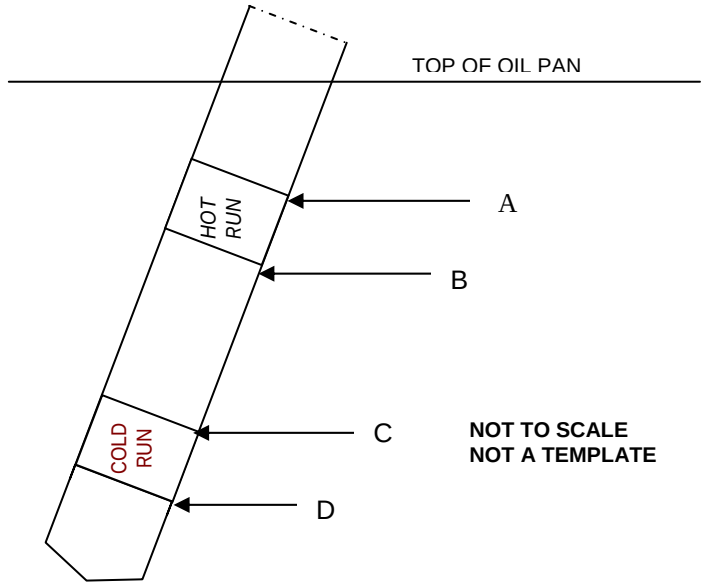
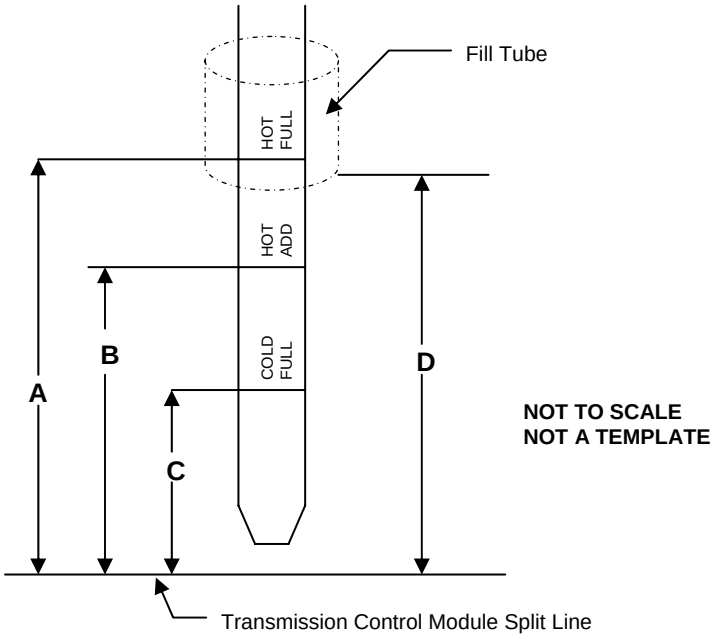


FIGURE 2

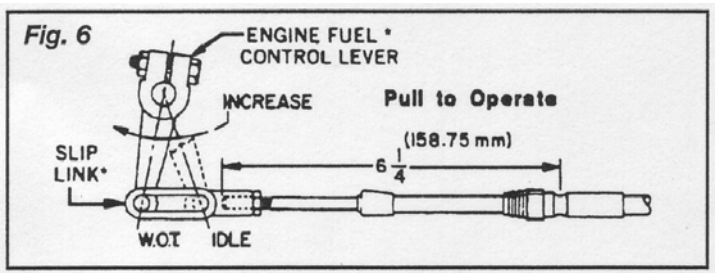
TRANS MODEL	SUMP DEPTH (IN.)	DIMENSION (IN.)			
		A	B	C	D
HD/B500	ALL	4.20	3.00	2.60	5.22
MD/B3/400	2.00	4.00	2.90	2.00	3.41
MD/B3/400	4.00	4.00	2.50	1.80	3.41
MD3070PT	7.00	4.00	2.50	1.80	3.41

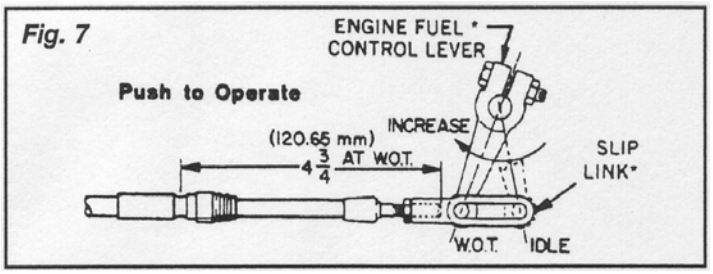


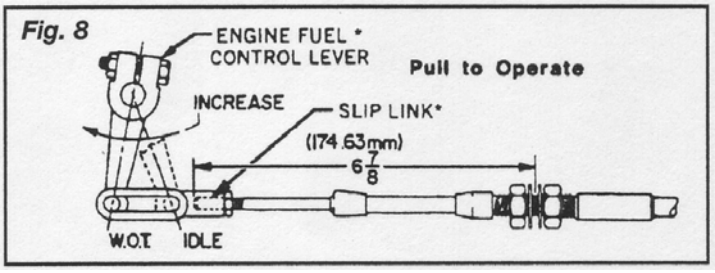
MODULATOR / THROTTLE POSITION SENSOR (TPS)

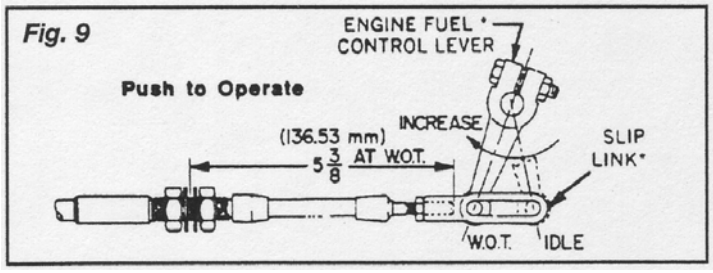
Function of the Modulator / TPS

- Using a modulator / TPS allows the transmission to “communicate” with the engine and determine the most appropriate shift(s).
- In order for proper shifting it is essential for the transmission to know the amount of acceleration being applied to the engine at all times.
- **Modulators** are specific to **Hydraulic** (non-electronic controlled) transmissions. They can be cable, vacuum, electronic, or air operated systems.
- **TPS** are specific to **Electronic** transmissions. They can be analog or digital and in either case send an electronic signal (or count) to the transmission’s electronic control unit (ECU) or transmission control module (TCM).
- Shift problems **WILL** occur from improper function of the modulator / TPS.
- **ADJUST** or **REPLACE** modulators when shift problems/quality arises.
- Use diagnostic data from an approved reader to determine proper function of the TPS.









Adjusting Mechanical Modulators

1. See Figures 6, 7, 8, and 9. Rotate the fuel control lever to wide open throttle (W.O.T.) position.

2. Pull (or push) the cable to its maximum travel to coincide with the direction of the fuel control lever in Step 1.

3. Adjust the Slip Link on the end of the cable to permit “free pin” with the fuel control lever at wide open throttle position:

CAUTION:

After “free pin” position has been made at the end of the slot in the slip link, the following adjustment is essential to prevent damage and malfunctioning of the modulator by backing off the mechanism from its internal stop. This is done as follows: for a “pull to operate” modulator (viewing the cable from the end) screw the slip link one complete turn from the “free pin” condition in a counter-clockwise direction and replace the clevis pin into the slip link and fuel control lever. For a “push to operate” modulator (viewing the cable from the end) screw the slip link one complete turn from the “free pin” condition in a clockwise direction and replace the clevis pin into the slip link and fuel control lever.

4. Tighten the Locknut on the cable rod against the Slip Link.

5. Check for a free return to the idle position.

NOTES

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