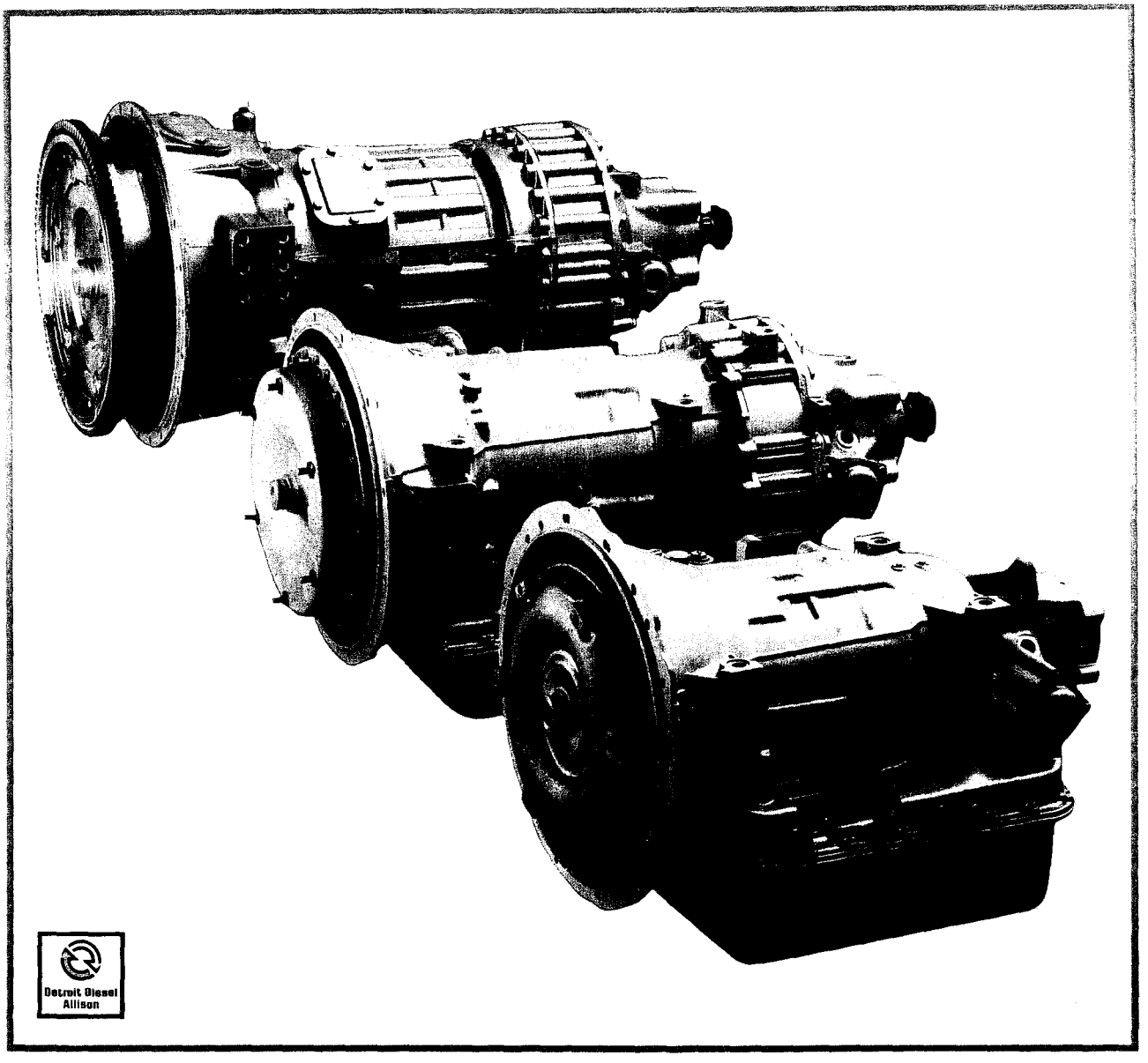
Allison Automatics

Transmissions for Trucks



Detroit Diesel Allison

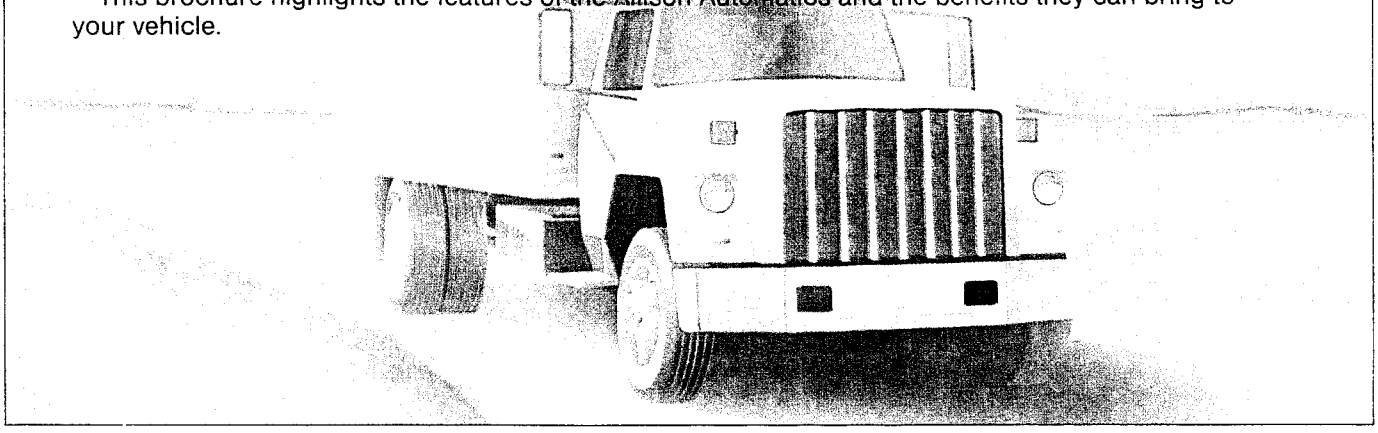
Allison Automatics

An Abrams XM1 main battle tank—elusive, swift, with devastating firepower—races across open terrain at close to 50 MPH. A medium duty truck moves smoothly through city traffic on its beverage delivery route. Two vehicles with radically different missions but with something in common—Allison Automatic transmissions.

The XM1 uses an Allison X-1100 transmission to harness the 1500 horsepower generated by its gas turbine engine. The beverage truck features an Allison AT 545—the automatic transmission that more and more medium duty truck operators are specifying to improve vehicle productivity and efficiency.

These two transmissions reflect the immense amount of technological know-how and manufacturing expertise that has made Detroit Diesel Allison the world's leading producer of automatic transmissions. Today, more than 200 manufacturers throughout North America and around the world offer Allison Automatics in over 1000 different equipment applications. It's likely that any medium or heavy duty truck you may be considering today for a city, highway or on/off highway application is available with an Allison Automatic to efficiently complement engine power.

This brochure highlights the features of the Allison Automatics and the benefits they can bring to your vehicle.



Built right... with precision machines and people who care

Allison transmissions are the product of a highly skilled and dedicated work force. Organized in "Quality Action Program" panels, each member of the team is well aware of his responsibility to produce a quality product. And each team member has a say not only in how things are done but in how to do things better.

Recognizing that you can't inspect quality into a product, our quality control program includes a unique version of *statistical process control* to aid the machine operator in doing his job right the first time. We are also working with truck manufacturers to ensure that proper installation procedures are followed. That way you have the assurance that not only is the transmission built right, it's also installed right.

Fuel economy

A manual transmission and the heavy foot of some truck drivers can knock fuel economy for a real loop. It's the very nature of an Allison Automatic to work for you to save fuel. The Automatic is programmed to select the proper operating gear range for speed, load and road conditions. Its decisions are not subject to driver temperament or skill. The Allison Automatic gets loads started smoothly and quickly with no engine overspeeding or lugging and no need to "get on" and "get off" the accelerator while shifting. The precise, calculated shifts of the automatic result in controlled, efficient use of fuel. In a test of fuel efficiency, the United States Auto Club (USAC) supervised two comparison tests between van type delivery trucks, identical except for transmissions. In each test, one truck was equipped with an Allison Automatic, the other with a manual transmission. Results of the testing showed the Allison Automatics topped the fuel economy of the stick equipped trucks. What's more, results of fleet testing have shown that Allison Automatics, on average, turn in fuel economy equal to, and at times even better, than identical trucks with manual transmissions.

Reduced operating costs

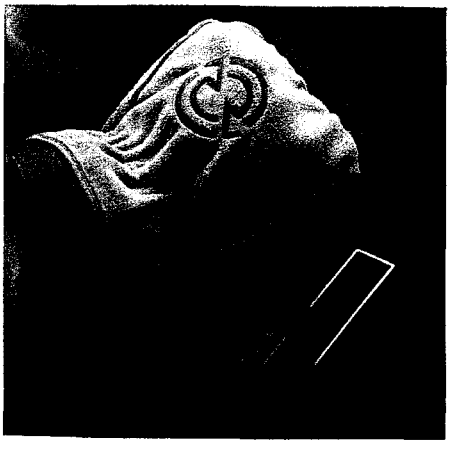
With an Allison Automatic there is no engine-disconnect clutch; a torque converter provides a much smoother, more efficient transfer of power.

Allison Automatics eliminate the erratic torque oscillations that occur during manual shifting. Hundreds of these shifts, day after day, can eventually result in damage to the driveline and engine related components.

In addition, the Allison Automatic can virtually eliminate the kind of driver miscalculation, or abuse, that often ends in costly driveline repairs.

On the average, we have found that trucks equipped with manuals incur twice the total amount of maintenance and repair costs as trucks equipped with automatics. These costs include such things as clutch replacements and adjustment, preventive maintenance, and repairs to the engine and driveline necessitated by lugging and shock.

It has also been found that the smooth, controlled shifting of the automatic reduces the vibration which can be damaging to cabs, bodies, electrical systems and accessories. When you specify an Allison Automatic, your trucks spend less time in the shop and more time on the road.



Productivity

In today's competitive world, vehicle productivity can be a vital factor in your business. An Allison Automatic can boost productivity by eliminating the distracting and fatiguing work of clutching and shifting. The physical work of operating a manual transmission can eventually diminish a driver's dexterity and timing—especially under conditions that require a lot of shifting such as hilly terrain or stop-and-go city streets.

With an Allison Automatic, your drivers don't waste time clutching and shifting. Instead, they get quick, full-power shifts that can cut acceleration time and overall trip time appreciably. And shifts are just as smooth and properly timed at the end of the route as at the beginning. This means your truck or fleet can get more work done every day.

Tests have revealed that average-skilled drivers were approximately 15% more productive driving an Allison Automatic-equipped vehicle than when driving one that was equipped with a manual. With both hands on the wheel and eyes on the road, a driver is in better command of every driving situation and can maneuver his truck to take advantage of traffic or terrain conditions. With the Allison Automatic, you get not only increased vehicle productivity but increased driver alertness.

Another important benefit is that it takes less time to learn to drive an automatic-equipped vehicle and less experience to realize the full performance and economy potential of the engine.

Driveability

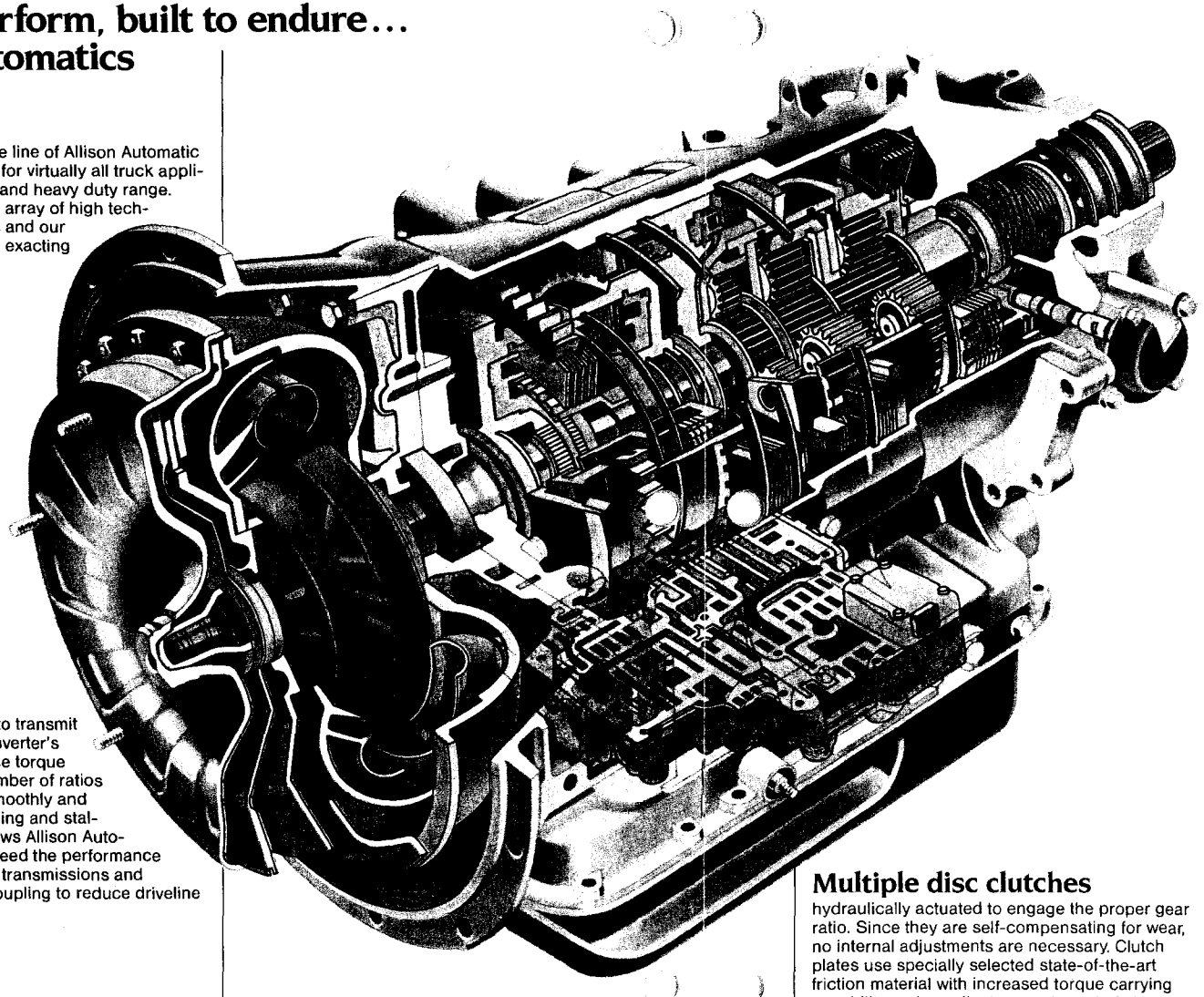
In all normal driving situations, the pressure of the driver's foot on the accelerator pedal controls the automatic shifts in the transmission providing the performance desired—automatically. When the accelerator is depressed to full throttle, the transmission will automatically upshift at a speed just below maximum governed engine speed. With less pedal pressure, the transmission will upshift at a lower engine speed. Automatic selection of the best gear ratio for part-throttle performance, as well as fuel economy, is assured. For added control, the driver can move the control lever to a lower range position. This permits him to restrict upshifts, matching power and speed to meet special road, load and traffic conditions. For example, the driver may wish to keep the transmission from upshifting to high range in stop-and-go traffic. To do so, he simply selects the next lower range. Shifting in all lower ranges remains the same.

The lower ranges also give complete vehicle control through engine braking on downgrades. The driver simply places the selector lever in one of the lower ranges in order to maintain a safe speed in descending a grade. The transmission will then downshift only when it is safe to do so, preventing excessive engine overspeeding. The automatic transmission is easier on the driver... yet he's always in total command.

Think about these performance benefits and how they can help you. In today's tougher world, an Allison Automatic may just give you the competitive advantage you need.

Built to perform, built to endure... Allison Automatics

We produce a complete line of Allison Automatic transmissions suitable for virtually all truck applications in the medium and heavy duty range. Each series reflects an array of high technology design features and our serious commitment to exacting and unyielding quality standards.



Torque converter

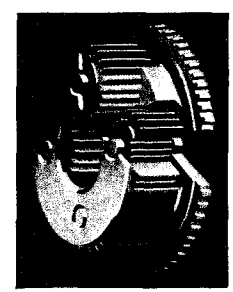
the most efficient way to transmit engine torque. The converter's ability to multiply engine torque provides an infinite number of ratios to get a load started smoothly and quickly—free from lugging and stalling. The converter allows Allison Automatics to match or exceed the performance of multi-speed manual transmissions and also provides a fluid coupling to reduce driveline shock.

Multiple disc clutches

hydraulically actuated to engage the proper gear ratio. Since they are self-compensating for wear, no internal adjustments are necessary. Clutch plates use specially selected state-of-the-art friction material with increased torque carrying capability and excellent wear characteristics, while they provide smooth gear changes under the most adverse conditions.

Planetary gearing

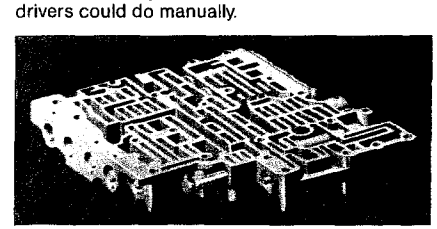
achieves various amounts of reduction by coupling together or holding stationary selected elements of the system—the sun gear, ring gear or planet gear carrier. Requiring no internal adjustments, it provides a completely balanced torque load and uninterrupted power flow to the drive wheels—clearly superior to the manual transmission with gears that slide in and out of mesh to achieve various gear ratios. The constant mesh feature of the Allison Automatics combines with hydraulic clutches to provide fast, full-power shifts. And by coupling this compact, fast acting planetary gear section to the torque converter, you get ideal power transmittal to start a load and keep it moving under absolute control.



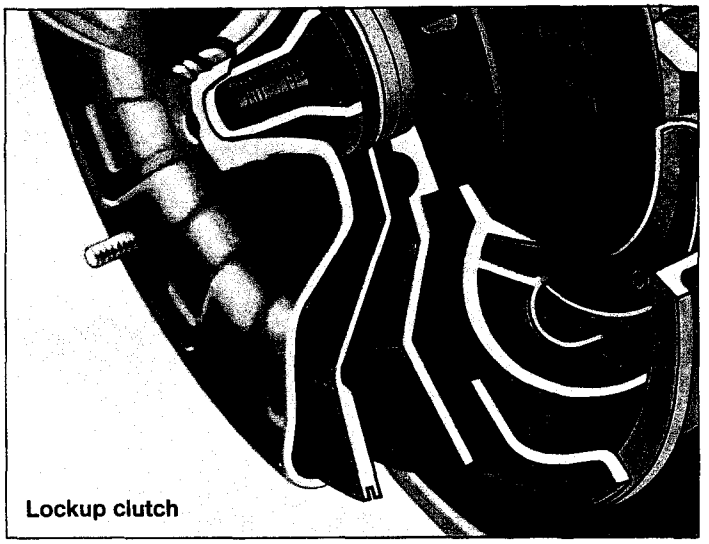
Hydraulic control system

the "brain" of the transmission. It makes the transmission "automatic." It's here that speed, load and road conditions are instantly translated to the proper clutch action and required gear ratios.

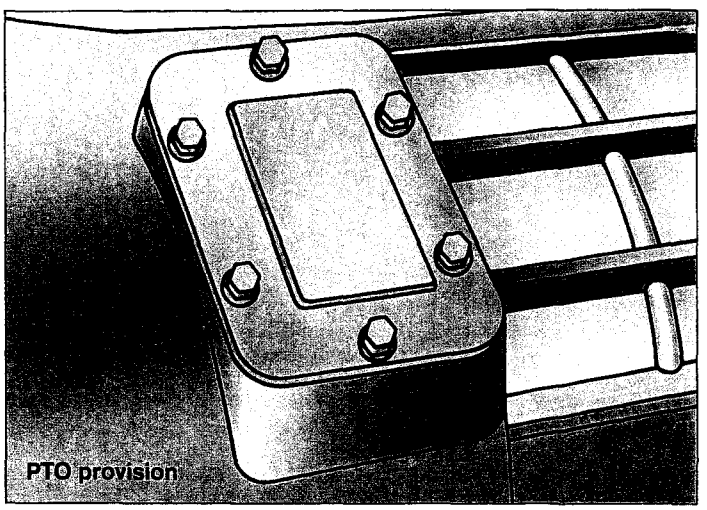
This "sensing and computing action" is continuous and provides a far more accurate balance of engine supply and load demand than most drivers could do manually.



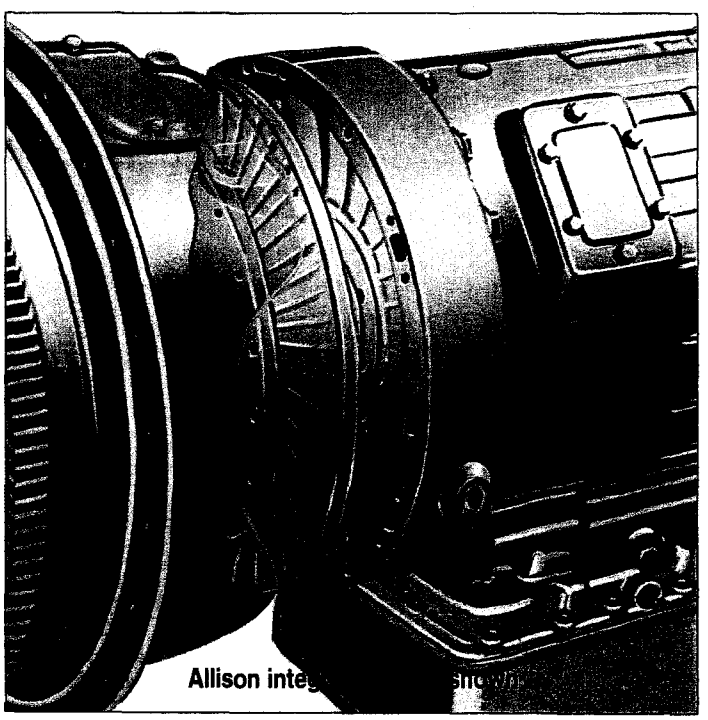
Special features



Lockup clutch



PTO provision



Allison inte[illegible]

Lockup clutch

for added performance and operating efficiency. MT 600 and HT 700 Series transmissions feature an automatic lockup clutch in the higher gear ranges. The lockup clutch improves efficiency by creating a direct mechanical link, from the engine through the transmission, to the drive wheels. This feature provides optimum fuel economy because there is no power loss or "slippage" in the torque converter.

Power takeoff provisions

to drive auxiliary equipment. Allison Automatics can supply power through a selection of PTO locations.

Converter-driven power takeoff drive gears are available on all series transmissions. Engine-driven power takeoff drive gears are optional on the HT 700 Series.

With the converter driven power takeoff, loads can be smoothly started, inched, held, raised or lowered by throttle action alone. Torque converter smoothness and flexibility protect the driven equipment from sudden shock.

For applications such as crash and pump trucks, the HT 700 Series offers an engine driven PTO for constant speed.

The Allison retarders

provide a storehouse of braking power available throughout the gear ranges to make downhill runs faster and safer, while significantly reducing the wear on vehicle service brakes. A driver can apply just the right amount of braking power with the retarder to meet grade and load conditions with no wheel lockup on icy or slippery roads. The highly controllable braking force over the entire speed range gives drivers a new feeling of confidence while helping to reduce trip times and increase vehicle productivity.

Allison integral retarder

(available on HT 700 Series transmissions) Small, lightweight and powerful—an integral part of the transmission with no added external lines or remote components. The hydraulic design concept of the Allison integral retarder has been proved over the years in heavy duty applications such as deep pit mining, logging and construction. This rugged fluid power device adds only 4 inches to the length of the transmission yet is capable of absorbing over 400 braking horsepower.

Allison output retarder

(available on MTB 600 Series transmissions) The Allison MTB Output Retarder is a proven combination of hydrodynamic and multi-disc braking, providing effective braking force without the necessity of using the service brakes.

The hydrodynamic braking section is particularly effective at high speeds. As the vehicle slows down, the multi-disc brake comes into operation, supplementing the hydrodynamic braking smoothly and effectively.

The retarder is mounted on the rear of the transmission, transmitting its braking force directly to the driveshaft. This helps prevent wear because the retardation power is not transmitted through the planetary gear section.

Quiet, lightweight and inexpensive, the MTB retarder can be operated with either hand or foot controls.

Our commitment to quality

The intensive effort at Detroit Diesel Allison to produce transmissions of the highest quality starts with a plan that clearly defines the responsibilities of everyone involved in the production of these transmissions. The extraordinary way we build and test transmissions may be a glance into the future for other manufacturers. But for us, the future is now.

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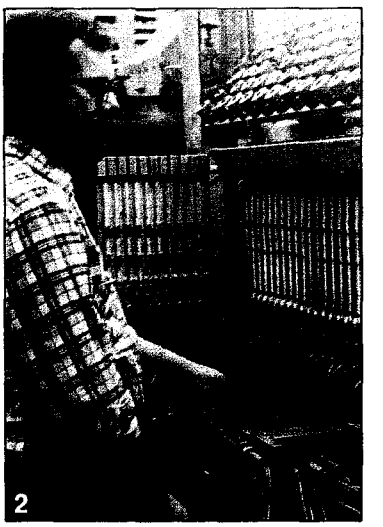
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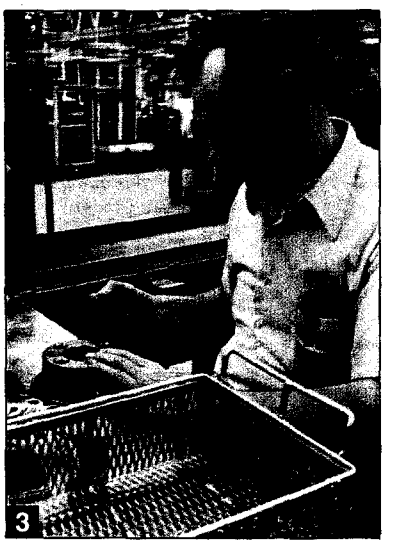
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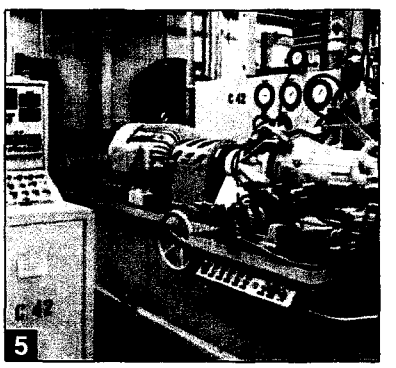
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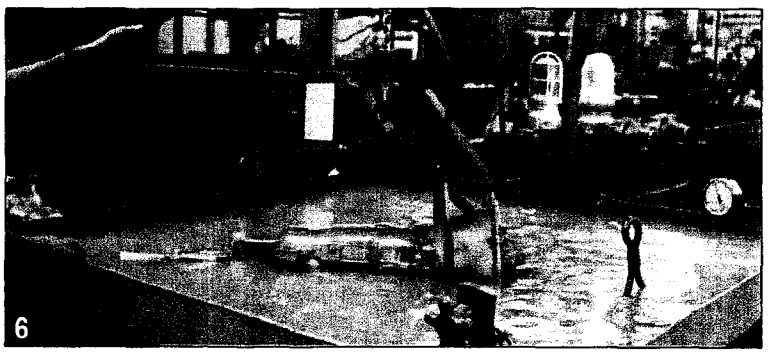
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1 High quality is maintained by keeping the human factor in the parts making process. Machine operators inspect all the parts they make. Some of the more critical components undergo a second 100% inspection.

2 Every bore of every valve body is tested for accuracy to within .0001 in. tolerance. Precise, uniform bores enable the valve body to accurately interpret speed and load signals, for sure shifts at the proper moment.

3 Some assembly processes are best handled by people. So to assure that these preselected gears find their way into the right carrier assembly, they are hand-assembled.

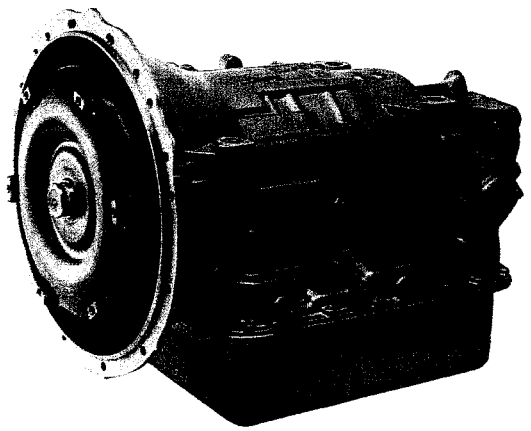
4 A high level of efficiency is maintained on the production line by a system of job task rotation, controlled by the line workers themselves. This progressive system effectively combats the tedium of assembly line work, while increasing productivity. In addition, modular component assemblies are designed for errorless installation on the line, with the added benefit of easier servicing later.

5 Every transmission goes through a series of 55 functional checks. Should a transmission fail some test, the nature and general area of the problem are recorded, the transmission reworked, and then retested.

6 All transmissions are pressure-tested in a dip tank for leaks from improper sealing or seating of componentry. At the same time, ferrous metals are coated with a corrosion inhibitor.

The complete family of Allison Automatics

AT SERIES



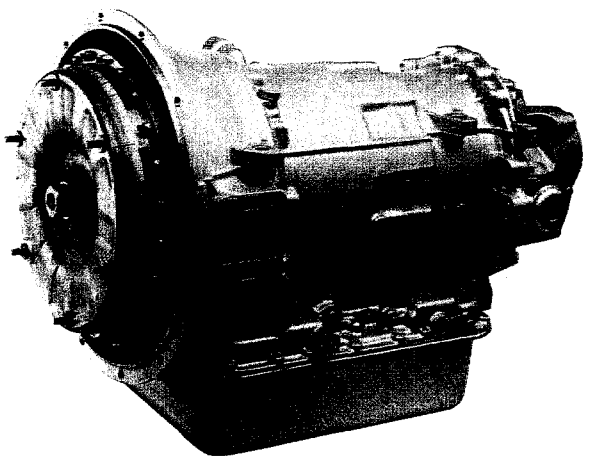
AT 545

It's natural to think of Allison when you think of automatic transmissions. No other manufacturer produces transmissions suited to such a wide range of vehicles and vocations. Whether your vehicle is gas or diesel powered, an Allison Automatic can mean better profitability and productivity.

AT 545 (Up to 235 HP)

The AT 545 improves productivity in a broad range of applications—city delivery vans, rental fleets, farm trucks, beverage delivery, single axle dump trucks or snow plows.

MT SERIES



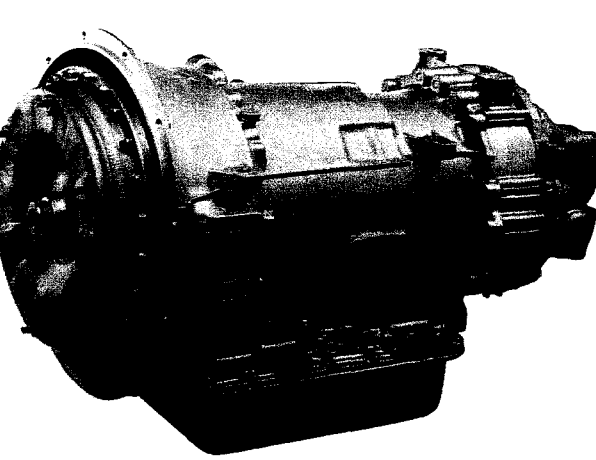
MT 643 shown

MT 643 (Up to 250 HP)

Teamed with gasoline or mid-range diesel engines, this transmission provides outstanding performance in utility trucks, fire trucks, city tractors and bulk delivery vehicles. This rugged 4-speed automatic provides smooth, shock-free operation with automatic lockup in 3rd and 4th gears. Built-in inhibitors prevent harmful downshifts, engine overspeed and inadvertent reverse shifts.

MT 644 (Up to 300 HP)

The MT 644 is designed for use with constant horsepower diesel engines in applications such as fire trucks. The high capacity torque converter with automatic lockup after start provides "better than stick" startability combined with maximum performance and fuel economy.



MT 653DR shown

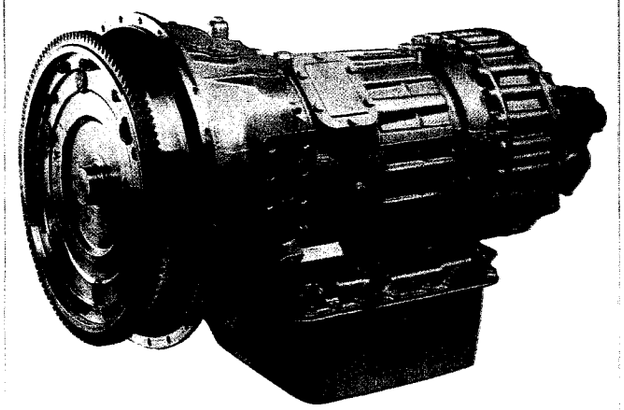
MT 653DR (Up to 250 HP)

This 5-speed transmission provides a deep reduction in first gear for exceptional gradeability. Heavy loads start easily and smoothly—even in severe on/off road applications. Construction trucks, refuse removal trucks and specialized vehicles are applications in which the MT 653DR's are particularly beneficial.

MT 654CR (Up to 300 HP)

With close ratio gear steps and deep 4.17:1 first gear, the MT 654CR is ideal for highway trucks with limited off-road usage such as refuse and dump trucks.

HT SERIES



HT 754CR shown

HT 740 (Up to 425 HP)

The HT 740 is designed for use with high torque rise diesel engines in linehaul tractor applications and other over-the-road vehicles; also with high torque rise and conventional diesels in emergency vehicles such as fire trucks and crash trucks.

HT 750 (Up to 425 HP)

HT 754CR

This version of the HT 750 Series provides automatic shifting in all five forward ranges for maximum highway performance as speed and load demand. In linehaul operations the HT 754CR has shown it can cut trip time and still deliver fuel economy comparable to manually-equipped units.

HT 750DR

With the HT 750DR, automatic shifts occur in the upper four ranges. The manually-controlled first range is ideal for tough off-road conditions. On these rugged jobs, the HT 750DR ensures top performance over varied terrain conditions.

SPECIFICATIONS

	Models	Net Input Power	Input Speed	Net Input Torque	Capacity
AT Series	**AT 545**	235 hp (175 kW) (max)	2400-3200 rpm* (diesel) 3200-4000 rpm* (gasoline)	385 lb. ft. (522 N·m) (max)	10,000 to 30,000 lbs. (4,500-14,000 kg) GVW/GCW
MT Series	**MT 643**	250 hp (186 kW) (max)	4000 rpm* (max) 2200 rpm* (min)	585 lb. ft. (793 N·m) (max)	up to 73,280 lbs. (33,240 kg) GVW/GCW
	MT 653DR	250 hp (186 kW) (max)	4000 rpm* (max) 2200 rpm* (min)	585 lb. ft. (793 N·m) (max)	up to 73,280 lbs. (33,240 kg) GVW/GCW
	MT 644	300 hp (224 kW) (max)	3000 rpm* (max) 2000 rpm* (min)	780 lb. ft. (1058 N·m) (max)	up to 50,000 lbs. (22,680 kg) GVW/GCW
	MT 654CR	300 hp (224 kW) (max)	3000 rpm* (max) 1800 rpm (min)	950 lb. ft. (1288 N·m) (max)	up to 80,000 lbs. (36,288 kg) GVW/GCW
HT Series	**HT 740**	425 hp (317 kW) (max)	2400 rpm* (max) 1900 rpm* (min)	1300 lb. ft. (1762 N·m) (max)	up to 80,000 lbs. (36,280 kg) GVW up to 130,000 lbs. (58,960 kg) GCW
	HT 750	425 hp (317 kW) (max)	2400 rpm (max) 1900 rpm (min)	1300 lb. ft. (1762 N·m) (max)	up to 80,000 lbs. (36,280 kg) GVW up to 130,000 lbs. (58,960 kg) GCW

*Full load governed

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