DRIVING TRANSMISSION TECHNOLOGY™

Allison Transmission®

HIGHWAY SERIES

DECEMBER 2008

Specifying a vehicle is an important business proposition. And specifying the right transmission for your vehicle is one of the most critical decisions that will impact the performance of that vehicle and your bottom line. The right combination of drivetrain components can not only improve vehicle performance; it can improve the operating cost of the vehicle over its lifetime.

Good for the business.

Allison Highway Series fully automatic transmissions get the most performance out of higher horsepower engines, while putting more control to the wheels. The result is faster acceleration, smooth shifts and higher average road speed; all of which equates to quicker route times throughout the day. This means greater productivity and increased profits for your business.

Designed for the bottom line.

Allison Transmission has built a reputation on our ability to build transmissions that last just about forever. But durability and reliability are not the only things fleets are looking for these days. Every Allison Highway Series automatic transmission is engineered to meet the demands of your particular business while providing outstanding value.

Spec for the job.

While most vehicles are purchased for specific vocational use, they are not always spec'd to fit their particular operating conditions. The majority of on-highway trucks are spec'd for highway driving, yet fleet studies show these trucks spend the majority of their time in urban traffic — under 45 mph. The result is often too much horsepower purchased for the operating ranges that trucks are in 90% of the time. Not only will Allison Automatics increase vehicle productivity, with their extended torque ranges and higher GVW capacities, they allow you to spec a wider array of engine options.

Allison Transmission Fourth Generation Electronic Controls

ENGINE hp (kW)	TORQUE lb-ft (N • m)
300–550 (224–410)	550–1770 (746–2400)

GVW lbs (kg)
19,500–unlimited (8,845–unlimited)

1000 HS, 2100 HS, 2200 HS, 2300 HS, 2350 HS, 2500 HS, 2550 HS

3000 HS

4000 HS, 4500 HS

Torque converter.

The heavy-duty Allison torque converter is at the heart of what makes an Allison Automatic the most effective, efficient and productive commercial transmission in the world. Increased shifting performance, faster acceleration, greater operating flexibility and minimal rollback are all advantages that can be attributed to it. Its cushion effect reduces shock and strain on the entire driveline — including engine, universal joints, driveshafts and rear axle — prolonging the operating life of the components.

Life cycle value.

Over the life of the vehicle, an Allison Automatic provides improved cost-per mile* for on-highway vehicles when compared with the cost of operating a vehicle with a manual or automated manual transmission.

When you factor in all life cycle costs — vehicle purchase price, insurance, fuel, tires, preventive maintenance, component repair, driver wages, taxes, license, permits and retail resale value — along with increased productivity, an Allison Automatic-equipped vehicle costs less per mile* to operate than a comparable manual- or automated manual-equipped vehicle.

*Results may vary depending on your operating conditions. See your local Authorized Allison Dealer to find the potential productivity gains for your particular business.

Road Safety.

Rollback is a concern for drivers of vehicles equipped with manuals and automated manuals because it can cause accidents and product/load damage. Since there is very little rollback on vehicles equipped with Allison Automatics, drivers don't have that concern.

More vehicle control under all conditions, far less fatigue for drivers since they're not shifting hundreds of times a day and so much simpler operation than a manual or automated manual transmission means there simply aren't as many distractions for the driver of an Allison Automatic-equipped vehicle.

FUEL ECONOMY vs. FUEL EFFICIENCY.

Fuel economy is a function of fuel consumed over a certain distance. Fuel efficiency includes time in the equation. Most businesses account for time – how much work is accomplished in a certain amount of time. How many deliveries or runs your trucks make in a day, week or month is what really matters. Not just how many miles they traveled.

With full-power shifts, Allison Automatic-equipped vehicles not only accelerate faster, they get up to and work within the best duty-cycle speeds faster and more efficiently. That saves time on routes, which can lead to greater productivity. In other words, more work gets done. *That's fuel efficiency.*

Tests have shown that an Allison-equipped vehicle can produce higher average speeds and deliver maximum fuel economy during acceleration, deceleration and at various cruise speeds. No other transmission can deliver this type of value. See your Allison truck specification expert for more details.

Shifting performance. Not even the most expert driver can shift at the precise shift points to optimize vehicle performance under all road and load conditions. An Allison Automatic automatically makes the right shift at the right time to maximize vehicle performance and protect the driveline.

On a vehicle with a manual or automated manual transmission, there are seven to eight shifts per mile in an average cycle. The power interrupts that occur during these shift changes result in lower average wheel horsepower and a loss of 14-16 seconds every mile.

There are no power interrupts with Allison Automatics, just smooth, seamless full-power shifts. By making full use of the engine's horsepower, an Allison Automatic may allow you to specify a smaller engine, saving you money in the long run. Plus, faster trips add up to more deliveries per day, which means increased incremental revenue from your vehicle.

Shift energy management. 1000 HS, 2100 HS, 2200 HS, 2300 HS, 2500 HS, 3000 HS and 4500 HS models feature Shift Energy Management (SEM) to help conserve fuel, provide better acceleration and help carry a load more efficiently. With SEM, the transmission electronically controls the engine during shifts to maintain a constant output of torque. SEM helps get all the torque needed to get the job done.

Idle efficiency. Reduced Engine Load at Stop (RELS), available on the 3000 HS, 4000 HS, 4500 HS, ensures that the transmission won't waste energy when the vehicle is at full stop. With RELS, the transmission reduces the load on the engine, achieving benefits similar to shifting into neutral. This not only saves fuel, it reduces overall vehicular emissions.

Economy and performance modes. Only Allison Transmission offers you a choice of operating modes to best suit your driving conditions and business needs. Allison Highway Series models offer primary and secondary shift schedules to enhance fuel savings or add more power. In "economy" mode, the transmission shifts at lower engine speed to provide added fuel savings during operation. In "performance" mode, the transmission upshifts at higher engine speed for quicker acceleration.

Working smarter. Allison Automatics offer a variety of electronic control packages that help drivers work smarter and provide important safety control features.

SECONDARY SHIFT SCHEDULE
Select between two pre-programmed shift patterns – quickly and easily. Match shift characteristics to the driving conditions with the simple push of a button.

RETARDER ENABLE
Get the best braking possible through total transmission retarder/vehicle integration. Electronic controls precisely blend the transmission, retarder and service brakes for peak efficiency.

OUTPUT SPEED INDICATOR
Exceed a preset output speed and the transmission electronic controls produce a usable electronic signal for warning devices and other auxiliary vehicle equipment.

Smooth operation. Allison Highway Series transmissions offer a variety of features ideally suited for on-highway vocational usage. The 1000 HS, 2100 HS, 2200 HS, and 2300 HS models feature high-density start and stop calibrations* providing improved shift operation, especially in congested traffic areas.

*Calibrations are required for the 1000 HS, 2100 HS and 2200 HS.

Low maintenance costs. Drivers simply can't mis-shift an Allison Automatic. The smooth, seamless shifts virtually eliminate driveline component shock. Since Allison Automatics don't have mechanically-applied clutches, you won't have routine clutch burnout and replacement — a major downtime concern with manual and automated manual transmissions.

Routine oil and filter changes are the only regular preventive maintenance required with an Allison Automatic. Easily accessible integral and spin-on oil filters reduce labor costs and valuable downtime. TranSynd™ TES 295 transmission fluid greatly extends oil change intervals for most applications.

Comprehensive coverage. Allison Highway Series vocational models offer comprehensive coverage with 100% parts and labor. Coverage may vary by model and by application. Please contact your Authorized Allison Dealer for further details.

HIGHWAY SERIES

Ratings and Specifications

RATINGS

MODEL	RATIO	PARK PAWL	MAX INPUT POWER[1]	MAX INPUT TORQUE[1]	MAX INPUT TORQUE w/SEM, OR TORQUE LIMITING[1,2]	MAX TURBINE TORQUE[3]	MAX GVW	MAX GCW
			hp (kW)	lb-ft (N • m)	lb-ft (N • m)	lb-ft (N • m)	lbs (kg)	lbs (kg)
1000 HS	Close Ratio	Yes	340[4,8] (254)[4,8]	550 (746)	660[4,8,9] (895)[4,8,9]	850 (1152)	19,500 (8,845)	26,000 (11,800)
2100 HS	Close Ratio	No	340[4,8] (254)[4,8]	550 (746)	660[4,8,9] (895)[4,8,9]	850 (1152)	26,000 (11,800)	26,000 (11,800)
2200 HS	Close Ratio	Yes	340[4,8] (254)[4,8]	550 (746)	660[4,8,9] (895)[4,8,9]	850 (1152)	26,000 (11,800)	26,000 (11,800)
2300 HS[5]	Close Ratio	No	325 (242)	n/a	450 (610)	850 (1152)	33,000 (15,000)	33,000 (15,000)
2350 HS[8]	Close Ratio	Yes	340[4] (254)[4]	550 (746)	660[4,9] (895)[4,9]	850 (1152)	30,000 (13,600)	30,000 (13,600)
2500 HS	Wide Ratio	No	340[4,8] (254)[4,8]	550 (746)	660[4,8,9] (895)[4,8,9]	850 (1152)	33,000 (15,000)	33,000 (15,000)
2550 HS[8]	Wide Ratio	Yes	340[4] (254)[4]	550 (746)	660[4,9] (895)[4,9]	850 (1152)	30,000 (13,600)	30,000 (13,600)
3000 HS	Close Ratio	n/a	370 (276)	1100 (1491)	1250[6] (1695)[6]	1600 (2169)	80,000 (36,288)	80,000 (36,288)
4000 HS	Close Ratio	n/a	550 (410)	1770 (2400)	n/a	2600 (3525)	–	–
4500 HS	Wide Ratio	n/a	550 (410)	1650 (2237)	1770[7] (2400)[7]	2600 (3525)	–	–

1 Gross ratings as defined by ISO 1585 or SAE J1995. 2 SEM = engine controls with Shift Energy Management. 3 Turbine torque limit based on iSCAAN standard deductions. 4 SEM and torque limiting are required to obtain this rating.
5 Only available for VORTEC 8.1L gasoline powered engine applications. 6 Requires Allison Transmission engine-transmission combination approval. Only available in gears three through six. 7 Available in gears two through six.
8 Check with your OEM to ensure offerings. 9 Only available in gears three through six.

GEAR RATIOS – TORQUE CONVERTER MULTIPLICATION NOT INCLUDED

MODEL	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	REVERSE
1000/2100/ 2200/2300 HS	3.10:1	1.81:1	1.41:1	1.00:1	0.71:1	0.61:1[2]	-4.49:1
2350 HS	3.10:1	1.81:1	1.41:1	1.00:1	0.71:1	0.61:1[2]	-4.49:1
2500/2550 HS	3.51:1	1.90:1	1.44:1	1.00:1	0.74:1	0.64:1[2]	-5.09:1
3000 HS	3.49:1	1.86:1	1.41:1	1.00:1	0.75:1	0.65:1[1]	-5.03:1
4000 HS	3.51:1	1.91:1	1.43:1	1.00:1	0.74:1	0.64:1	-4.80:1
4500 HS	4.70:1	2.21:1	1.53:1	1.00:1	0.76:1	0.67:1	-5.55:1

1 Six-speed applications are restricted for engine speeds which exceed 2200 rpm. The maximum engine speed in sixth range at 105 km/hr (65 mph) must be less than or equal to 88% of the engine full-load governed rpm. Note: This is not the same as no-load governed speed or high-idle governed speed.
2 Check with your OEM to ensure offerings.

ENGINE SPEEDS

MODEL	FULL LOAD GOVERNED SPEED	IDLE SPEED IN DRIVE	OUTPUT SHAFT SPEED
	Min-Max (rpm)	Min-Max (rpm)	rpm
1000/2100/2200/2300/2350 HS	2200-4600[1]	500-820	5000
2500/2550 HS	2200-3200	500-820	4500
3000 HS	2000-2800**	500-800	3600[2]
4000/4500 HS	1700-2300	500-800	–

1 Engines with full load governed speed greater than 3800 rpm require Application Engineering review. 2 Retarder-equipped models only.

** Six-speed applications are restricted for engine speeds which exceed 2200 rpm full-load governed speed.

OPTIONAL RETARDER PROVISION
– INTEGRAL, HYDRAULIC TYPE

BASE MODEL	TORQUE CAPACITY lb-ft (N • m)	POWER CAPACITY hp (kW)
3000 HS		
– High	1600 (2170)	600 (447)
– Medium	1300 (1760)	500 (373)
– Low	1100 (1490)	400 (298)
4000 HS		
– High	2000 (2710)	600 (447)
– Medium	1600 (2170)	600 (447)
– Low	1300 (1760)	500 (373)

TORQUE CONVERTER SPECIFICATIONS

BASE MODEL	TORQUE CONVERTER	NOMINAL STALL TORQUE
1000 HS	TC-210	2.05
	TC-211	1.91
	TC-221	1.73
	TC-222	1.58
2000 HS	TC-210	2.05
	TC-211	1.91
	TC-221	1.73
	TC-222	1.58
3000 HS	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	1.77
4000 HS	TC-521	2.42
	TC-531	2.34
	TC-541	1.90
	TC-551	1.79
	TC-561	1.58

PHYSICAL DESCRIPTION

BASE MODEL	LENGTH[1] in (mm)	DEPTH[2] w/DEEP OIL PAN/SUMP in (mm)	DEPTH[2] w/SHALLOW OIL PAN/SUMP in (mm)	DRY WEIGHT lbs (kg)
1000 HS				
– SAE No. 3 mounting	28.01 (711.4)	11.22 (284.9)	10.71 (272.0)	330 (150)
– SAE No. 2 mounting	28.39 (721.1)	11.22 (284.9)	10.71 (272.0)	330 (150)
2000 HS				
– SAE No. 3 mounting	28.01 (711.4)	11.22 (284.9)	10.71 (272.0)	330 (150)
– SAE No. 2 mounting	28.39 (721.1)	11.22 (284.9)	10.71 (272.0)	330 (150)
3000 HS				
– Basic model	28.29 (718.6)	12.90 (327.8)	11.14 (283.1)	535 (243)
– With retarder	28.29 (718.6)	12.90 (327.8)	11.14 (283.1)	615 (279)
4000 HS				
– Basic model	30.54 (775.8)	14.75 (374.7)	13.17 (334.6)	831 (377)
– With retarder	30.54 (775.8)	14.75 (374.7)	13.17 (334.6)	906 (411)

1 Length measured from flywheel housing to end of output shaft. 2 Depth measured below transmission centerline.

OIL SYSTEM

BASE MODEL	CAPACITY[1] quarts (liters)	MAIN CIRCUIT FILTER	LUBE CIRCUIT FILTER	ELECTRONIC OIL LEVEL SENSOR (OLS)
1000 HS		Spin-On Canister	–	–
– Deep Oil Pan	5.3[2] (5.0)[2]			
– Shallow Oil Pan	3.2[2] (3.0)[2]			
2000 HS		Spin-On Canister	–	–
– Deep Oil Pan	5.3[2] (5.0)[2]			
3000 HS		Integral	Integral	Standard
– Deep Oil Sump	29[3] (27.4)[3]			
4000 HS		Integral	Integral	Standard
– Deep Oil Sump	48[3] (45)[3]			

Recommended oil types for all models are TranSynd™ / TES 295 approved.

1 Transmission only. Does not include cooler, hoses or fittings. 2 Amount of oil necessary to facilitate start up. 3 Amount of oil necessary to fill a dry transmission.

POWER TAKEOFF PROVISION

Not Available on Highway Series

Ask for the Allison

HIGHWAY SERIES

Ask your truck dealer for a complete listing of vehicle models featuring Allison Highway Series transmissions, or contact your Authorized Allison Distributor. For the representative close to you, visit **www.allisontransmission.com.**

DRIVING TRANSMISSION TECHNOLOGY™

Information highway.

Visit **www.allisontransmission.com** for a comprehensive library of informational brochures, including Mechanic's Tips, Operator's Manuals, Parts Catalogs, Troubleshooting Flyers and Service Manuals.

Allison Transmission

P.O. Box 894, Speed Code PF3
Indianapolis, Indiana 46206-0894

Information or specifications subject to change without notice or obligation.

SA3741EN (2008/12) Litho in U.S.A.
ISO/QS 9000 and ISO 14001 Certified