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Chrysler Canada : New Tigershark Engines and Three new powertrains including the Turbo 1.4-litre MultiAir Engine Power 2013 Dodge Dart

- All-new Dodge Dart features three new technologically advanced, fuel-efficient and powerful engines
- All-new 2.0-litre Tigershark engine to be standard engine for 2013 Dodge Dart
- All-new 2.4-litre Tigershark MultiAir and 1.4-litre Turbocharged MultiAir engines available
- All-new Tigershark 2.4-litre MultiAir standard on the R/T Model
- Transmission choices will include six-speed manual, new six-speed Dual Dry Clutch Transmission (DDCT) and six-speed automatic
- Dodge Dart “AERO” model expected fuel economy of 4.7 L/100 km highway

April 27, 2012, Windsor, Ontario - Dodge Dart is the first sedan built in North America to feature MultiAir. The all-new 2013 Dodge Dart will be powered by three refined, fuel-efficient and powerful, state-of-the-art four-cylinder engines that add to Dart’s fun-to-drive quotient.

The 2.0-litre Tigershark engine mated to the six-speed manual transmission has an EnerGuide fuel economy rating of 8.1 L/100 km City / 5.4 L/100 km Highway. The 1.4-litre MulitAir Turbo engine mated to the six-speed manual transmission has an Energuide fuel economy rating of 7.4 L/100 km (City) and 4.9 L/100 km (Highway). The Dodge Dart “AERO” model is expected to achieve a 4.7 L/100 km highway fuel economy rating (Late Availability).

Drivers can select from a new Tigershark 16-valve 2.0-litre engine, a 16-valve 1.4-litre MultiAir Intercooled Turbo engine and a new Tigershark 16-valve 2.4-litre MultiAir four-cylinder engine.

“The three new engines available in the new Dodge Dart have been designed and tested to meet consumer’s needs for fuel economy, refinement, durability and power in a compact car,” said Bob Lee, Vice President – Engine and Electrified Propulsion Engineering, Chrysler Group LLC. “Technologies, including the latest generation of MultiAir and turbocharging, provide improved fuel economy, reduced emissions and increased power. A forged steel crankshaft, forged connecting rods and select fit main bearings are just a few of the many design features that contribute to the highly refined sound character of these engines.”

The 2013 Dodge Dart will be the first compact sedan built in North America to feature MultiAir engine technology. MultiAir technology delivers optimum combustion at any speed under all driving conditions by allowing direct and dynamic control of air intake and combustion. The result is up to a 15 per cent increase in low engine rpm torque and up to a 7.5 per cent improvement in fuel efficiency and a 10 per cent reduction in carbon dioxide emissions.

These three engines, combined with three transmission choices, redefine performance by providing the most diverse powertrain lineup in the Dart’s class.

2.0-litre Tigershark Engine

Standard on the new 2013 Dodge Dart SE, SXT, Rallye and Limited models and one of three powerplants available on the Dart is an all-new 2.0-litre Tigershark Dual Overhead Cam (DOHC) engine that provides high levels of refinement, fuel efficiency and performance.

“With a host of new engine components designed for reduced friction, customers of the Dodge Dart will benefit from improved fuel efficiency, refinement and quiet operation,” said Greg Macfarlane, Chief Engineer for the Tigershark

engine family. “More than 88 per cent of the 2.0-litre components and 80 per cent of the 2.4-litre components are brand new, excluding some carryover fasteners and sealants.”

Produced in Dundee, Mich., the 2.0-litre I-4 engine is part of the new Tigershark family of four-cylinder engines from the Chrysler Group that will debut in 2012.

The new 2.0-litre engine will be available with a manual or automatic six-speed transmission.

Performance ratings for the 2.0-litre engine are 160 hp at 6,300 rpm with torque of 148 lb-ft at 4,600 rpm. Maximum engine speed is 6,750 rpm.

Engine block and lower reciprocating assembly

Constructed of high-pressure die-cast aluminum, the block is fitted with cast-iron bore liners. Bore diameter is 88 mm, an increase from 86 mm of the previous design. Stroke is decreased to 82 mm from 86 mm from the previous 2.0-litre engine. Total displacement is 1,995 cc compared with 1,998 cc for the former engine.

Low levels of noise, vibration and harshness (NVH) are assured with dual counter-rotating balance shafts that are driven with an optimized hydraulic chain tensioner. Included are low-friction nylon chain guides and a tensioner arm for improved fuel economy. The chain arrangement includes inverted teeth that minimize noise in the timing drive system.

A new forged-steel crankshaft with increased pin diameters from 48 mm to 53 mm, adds stiffness. Full counterweight balancing and a relocated crank thrust bearing from the third to second journal offer improved durability and less noise, vibration and harshness.

To help improve fuel efficiency and reduce oil demand, crankshaft upper-main bearings include a revised upper-main bearing oil groove. Fitted to the crankshaft are new powder forged-steel connecting rods featuring a full-floating piston pin that has been coated with a diamond-like carbon surface treatment for reduced friction and improved fuel efficiency.

Cast-aluminum pistons are designed for an optimized 10.2:1 compression ratio and the piston ring packs are treated for compatibility with E85 fuel. Each bore is fitted with individual piston oil squirters in the block that spray oil on the bottom of the pistons and bore walls to help maintain cylinder wall and piston temperatures and avoid hot spots.

Two-bolt main bearing caps coupled with a cast-iron structural bearing beam secured at the 2, 3, and 4 main caps also help reduce flexing and maintain stiffness along the bottom of the block. For additional structural rigidity, a lightweight lost-foam, aluminum ladder with an integral oil filter and oil cooler adapter is sandwiched between the block and steel oil pan.

The steel oil pan, with a capacity of 4.7 litres of oil (5 quarts) of oil, also reduces noise emanating from the reciprocating assembly with a sandwich-type design that includes acoustic material between the outer and inner steel stamped layers.

Helping to minimize vibration, a balance shaft module has been incorporated into the design of the engine.
The 2.0-litre engine also features a two-stage pressure relief system that reduces engine oil pumping load at low engine speeds for better fuel efficiency.

A refined oil life system calculates oil life based on a number of variables including engine speed, operating temperature and load. Oil changes are then recommended when needed – up to 6 months or 13,000 kilometres or when the service indicator light turns on.

An electronically controlled thermostat is used to keep the engine at optimal temperatures for fuel efficiency during moderate driving conditions and manage coolant temperatures during heavy loads.

2.0-litre cylinder head

The aluminum cylinder head is a dual-overhead camshaft (DOHC) design with a four-valves-per-cylinder

arrangement. Super-finish processed roller-element rocker arms and hydraulic lash adjusters are used to minimize friction and improve fuel efficiency.

The new cylinder head includes revised intake ports, larger intake valves and revised combustion chambers for a high-charge motion that provides better fuel efficiency and performance. Larger intake valves, measuring 36 mm, provide exceptional performance without sacrificing fuel efficiency.

The timing system for the 2.0-litre includes dual-independent variable-valve timing on both the intake and exhaust side with an extended cam phaser range enabling up to 60 crankshaft angle degrees of motion. Unlike a traditional camshaft arrangement with mechanically fixed relationships, the cam phaser system optimizes valve events at various engine speeds and loads to help reduce inherent pumping losses that occur in the engine. The result is better fuel efficiency along with performance.

Also included are an isolated aluminum head cover and an aluminum front engine cover. Often found on premium engines, the covers more effectively isolate engine noise.

To ensure consistent brake booster levels, full engine vacuum is assured at all speeds and driving conditions with the addition of a standard vacuum pump.

To help reduce emissions, particularly at engine start-up, the catalytic converter is located immediately downstream of the tubular exhaust manifold to ensure quick light-off. The new 2.0-litre engine also is capable of meeting super ultra-low emissions vehicle (SULEV) and Euro 6 emission levels. The revised location of the exhaust manifold to the front of the engine also helps to reduce exhaust noise into the passenger compartment.

Induction

Designed to deliver both excellent performance and fuel efficiency across the operating range of the engine, the induction system includes a glass-filled nylon intake manifold with tuned intake runners. The port fuel-injection system includes fuel injectors with multiple orifices to support optimal combustion for lower emissions. Throttle opening is determined through drive-by-wire controls and the throttle body diameter is 64 mm.

Both the intake manifold and fuel-injection rail have acoustically dampened covers for reduced NVH ensuring a quiet cabin environment.

Regular unleaded fuel with an octane rating of 87 is recommended.

Ignition system

The high-energy ignition system includes a compact coil-on-plug assembly that improves combustion for better fuel efficiency. Dual precious-metal spark plugs, including iridium and platinum, provide up to 161,000 kilometres of durability. Located in the centre of the cam cover, the spark plugs are easily accessible when service is required.

1.4-litre MultiAir Turbo Engine

The new 1.4-litre MultiAir Turbo four-cylinder engine offers increased torque to provide a better performance driving experience.

“With the addition of the new downsized, turbocharged 1.4-litre engine that benefits from Fiat’s exclusive MultiAir valve-control system technology combined with a pair of transmission offerings, the 2013 Dodge Dart offers the performance of a larger engine while achieving the fuel economy expected from traditional four-cylinder engines,” Mike Vincent, Engine Platform Manager said.

The new 1.4-litre MultiAir Turbo engine transmits it power through high-strength components throughout the drivetrain, including equal-length half shafts and a 4.11 final-drive ratio.

The 1.4-litre is rated at 160 hp at and 184 lb.-ft. of torque. When mated to the six-speed manual transmission it achieves an Energuide fuel economy rating of 7.4 L/100 km (City) and 4.9 L/100 km (Highway).

High-performance engine design with high-performance output and fuel economy

Selected as the “Best International Engine in 2010,” by a panel of 72 journalists from 36 countries, the new 1.4-litre MultiAir Turbo engine is designed to meet the rigourous demands of performance driving throughout its 6,500 rpm range.

Structurally, the 1.4-litre MultiAir Turbo engine starts with a durable cast-iron block and a structural aluminum bedplate. The bore is 72 mm and stroke 84 mm for a total displacement of 1,368 cc.

At the bottom end, a forged-steel crankshaft with select-fit main bearings is supported across five main journals. The crankshaft has been designed with lightened counterweights to reduce overall mass for high engine rpm operation. Durability is ensured with the use of lightweight forged-steel connecting rods that have been designed with a unique cross section to minimize the longitudinal and lateral bending of the rod.

Lightweight cast-aluminum pistons, with a compression ratio of 9.8:1, contribute to the overall efficiency of the reciprocating assembly and the engine’s high rpm capability. Full-floating piston pins are used for added strength.

Piston cooling jets, located at the bottom of each cylinder, contribute to fuel economy by squirting oil on the bottom of the pistons to help maintain cylinder temperatures and reduce the possibility of hot spots along the cylinder walls or at the top of the piston that could lead to spark knock.

“The 1.4-litre MultiAir has been extensively refined for North America in the Dodge Dart,” said David Schmidt, Chief Engineer. “Thousands of development hours and kilometres were devoted to make sure this engine surpasses the unique challenges of the North American market, ensuring durability and excellent fuel economy to complement the performance driving excitement.”

This high-performance 1.4-litre engine also is fitted with a structural aluminum oil pan with a crankcase capacity of 3.8 litres (4 quarts) with a dry filter. Synthetic 5W-40 engine oil is recommended, due to higher overall temperatures with the turbocharger. Oil change intervals are set at 6 months or 13,000 kilometres or when the service indicator light turns on.

Innovative MultiAir cylinder head

The valve train for the high-performance 1.4-litre MultiAir Turbo engine features Fiat’s exclusive MultiAir technology. Unlike engines that rely on direct action from fixed lobes on the camshaft to control intake valve opening and closing, MultiAir is an electro-hydraulic system that can control intake air, cylinder by cylinder and stroke by stroke depending on the precise operating conditions and the demands from driver and engine control system.

Actual opening of the valves is controlled by a small actuating piston and hydraulic fluid running through a narrow passage that is controlled by a dual-action solenoid. When the solenoid is closed, under highway speeds or full acceleration, intake valves are fully open much like a traditional engine for maximum power. At lower speeds, the solenoid opens precisely during the intake stroke allowing oil to bypass the passage, thus decoupling the valves. This allows for infinite control of the valves and controls the amount of fresh air into the cylinders reducing wasted energy that is common with fixed intake lobes on a camshaft.

Spent exhaust gases are released through exhaust valves operated by traditional lobes on the camshaft and exit through a cast stainless steel exhaust manifold.

Ignition is through a single output, coil-on-plug system. Spark plugs are dual precious metal for durability and smooth idle.

Fuel delivery is sequential, multi-port and electronically controlled with injectors located to direct the fuel spray at the intake valves in a wide spray pattern that increases fuel atomization and enhances complete combustion for a smooth driving experience.

MultiAir technology on normally aspirated 1.4-litre engines provides up to a 15 per cent increase in low engine rpm torque, up to 7.5 per cent improvement in fuel efficiency and a 10 percent reduction in carbon dioxide emissions.

Intercooled Turbocharger provides 160 Horsepower

The boost to 184 lb-ft on the new 2013 Dodge Dart is largely due to its single turbocharger that operates off engine exhaust and uses energy that would normally be wasted through the tailpipe.

The turbocharger spins up to 230,000 rpm to convert exhaust heat and pressure into rotation that drives a compressor. The compressor draws cool air and pumps it into the intake manifold at increased pressure. The result is more air in the cylinders, hence more torque and power. Boost pressure is dynamically managed to provide a broad torque curve over a wide variety of ambient conditions, with a peak pressure of 22 psi at 4,000 rpm.

The 1.4-litre MultiAir Turbo's induction system on the Dodge Dart includes a single intercooler that is designed to remove heat in the air charge that the turbocharger generates while compressing incoming air. Removing heat provides a cooler, denser air charge that helps increase the potential for more power. A cooler air charge also reduces the potential for engine knock.

High-performance engine components

Delivering more power also required a number of powertrain improvements to the engine and transmission components needed for the demands of high-performance driving.

On the intake side, the 1.4-litre MultiAir Turbo features a fresh-air intake system with high-flow air filter, redesigned air box for improved air flow and smooth-flowing plumbing for maximum power and low induction noise. Components are unique to the Dodge Dart to meet new underhood packaging requirements.

A low-restriction exhaust system delivers minimal exhaust gas backpressure for maximum power.
The Powertrain Control Module (PCM) integrates all of the MultiAir Turbo engine's control functions, including management of the MultiAir system.

An upgraded electrical system includes a high-output 140-amp alternator and 500-amp cold-cranking, maintenance-free battery for increased vehicle system charging.

High-performance transmission and driveline

The new Dodge Dart can be equipped with either a six-speed manual or six-speed DDCT transmission with the 1.4-litre MultiAir Turbo engine. The transmissions feature final-drive ratios of 4.43 (DDCT) and 4.11 (manual) for quick acceleration and faster top speed, while maintaining fuel economy.

Designed to handle the increased torque loads, both transmissions of the new Dodge Dart include a 40 mm tubular intermediate shaft with equal-length half shafts to mitigate torque steer. The bar shafts are 26.8 mm in diameter and larger for increased strength and to reduce torsional stress in the driveline during performance driving on the road or track. To handle the increase power and torque of the new 1.4-litre MultiAir Turbo engine, larger constant velocity joints with high torsional strength deliver added durability and refinement. Shudderless inboard joints are used for refinement.

2.4-litre Tigershark Engine with MultiAir The 2.4-litre Tigershark MultiAir is the largest and most powerful four-cylinder engine from the new gas engine family and is standard in the R/T (available 3rd quarter 2012).

The 2.4-litre engine is designed to take full advantage of the exclusive MultiAir valve train system developed by Fiat Powertrain and includes a host of new engine components designed for reduced friction to enhance the performance and fuel efficiency of Dodge's latest offering in the compact car market.

The 2.4-litre is the third engine to feature MultiAir technology from the Chrysler Group and features the second generation "MultiAir" system that further enhances combustion control, improves fuel efficiency and reduces exhaust emissions. Naturally aspirated, the 2.4-litre will be available with either a manual six-speed transmission or the new Powertech six-speed automatic transmission.

Performance ratings for the 2.4-litre engine are 184 hp at 6,250 rpm with torque of 171 lb-ft at 4,800 rpm.

Engine block and lower reciprocating assembly

The 2.4-litre starts life with a high-pressure, die cast-aluminum block fitted with cast-iron bore liners. Bore diameter is 88 mm and stroke is 97 mm. Total displacement is 2,360 cc.

A new forged-steel crankshaft features increased pin diameters from 48 mm to 53 mm that add stiffness. The crank thrust bearing is relocated from the third to second journal, and eight counterweights offer improved durability and less NVH.

To improve fuel efficiency and reduce oil demand, crankshaft upper main bearings include a revised upper main bearing oil groove. Fitted to the crankshaft are new powder forged-steel connecting rods that feature a full-floating piston pin that has a diamond-like carbon (coated surface treatment for reduced friction and improved fuel efficiency).

Cast-aluminum pistons with a compression ratio of 10:1 are designed specifically for the engine and MultiAir system. The piston ring packs also are treated for compatibility with E85 fuel. Each bore is fitted with individual piston oil squirters in the block that spray oil on the bottom of the pistons and bore walls help maintain cylinder wall and piston temperatures, avoid hot spots that could lead to knock and improve performance and fuel economy.

Two-bolt main bearing caps coupled with a cast-iron structural bearing beam secured at the 2, 3 and 4 main caps reduce flexing and maintain stiffness along the bottom of the block.

A lightweight, lost-foam aluminum ladder frame with an integral oil filter and oil cooler adapter is sandwiched between the block and steel oil pan and helps maintain structural rigidity in the block.

Noise emanating from the reciprocating assembly is reduced with a new oil pan that includes a steel sandwich-type design that includes acoustic material between the outer and inner steel stampings of the oil pan.

Vibration from the piston forces is minimized with the use of a balance shaft module that has been incorporated into the engine. To maintain adequate oiling at all engine speeds, the 2.4-litre engine features a two-stage oil pressure relief system that reduces engine oil pumping loads at low engine speeds for better fuel efficiency.

A refined oil life system calculates oil life based on a number of variables including engine speed, operating temperature and engine load and recommends oil changes when needed — up to 8000 rpm.

2.4-litre cylinder head includes MultiAir fuel delivery

Constructed of aluminum, the cylinder head features a four-valve arrangement. MultiAir is standard on the 2.4-litre engine and this latest version of the MultiAir system has been enhanced to provide more flexibility for valve openings and closings along with levels of internal exhaust gas recirculation for improved fuel efficiency.

The intake side of the valve train for the 2.4-litre MultiAir engine is an electro-hydraulic system that can control intake air, cylinder-by-cylinder and stroke-by-stroke, depending on the operating condition and demands from the driver. Electronic throttle control is standard with the 2.4-litre engine.

Actual opening of the valves is controlled by a small actuating piston and hydraulic fluid running through a narrow passage that is controlled by a dual action solenoid. When the solenoid is closed, under full acceleration, intake valves are fully open much like a traditional engine for maximum power. At lower speeds and loads, the solenoid opens precisely during the intake stroke allowing oil to bypass the passage, thus decoupling the valves. This allows for infinite control of the valves, and controls the amount of fresh air into the cylinders that reduces wasted energy that is common with fixed intake lobes on a camshaft.

Large, 36 mm diameter intake valves provide exceptional performance without sacrificing fuel efficiency. Revised combustion chambers provide a high-charge motion for better fuel efficiency and performance. Exhaust valves are controlled via traditional lobes on the camshaft and exhaust gases exit through a fabricated, tubular stainless steel exhaust manifold.

Ignition is through a single output, coil-on-plug system. Spark plugs are dual precious metal, platinum and iridium, for durability and idle smoothness.

Fuel delivery is sequential, multi-port, electronic, with injectors located to direct the fuel spray at the intake valves in a spray pattern that increases fuel atomization and enhances complete combustion for a smooth driving experience. Also included are an aluminum head cover and an aluminum front engine cover. Often found on premium engines, these covers effectively dampen engine noise.

Maximum engine speed is 6,500 rpm.

Full vacuum for consistent brake booster performance is assured at all speeds and driving conditions with the addition of a standard vacuum pump.

Contributing to lower emissions, particularly at engine start-up, the catalytic converter is located immediately downstream of the tubular exhaust manifold to ensure quick light-off. The revised location of the exhaust manifold to the front of the engine also helps to reduce exhaust noise into the passenger compartment.

The new 2.4-litre engine also is capable of meeting super ultra-low emissions vehicle (SULEV) and Euro 6 emission levels.

Induction
Designed to deliver both excellent performance and fuel efficiency across the operating range of the engine, the induction system includes a glass-filled nylon intake manifold with tuned intake runners. The port fuel-injection system includes multi-orifice fuel injectors to support optimal combustion for lower emissions. Throttle opening is controlled through drive-by-wire, and the throttle body diameter is 64 mm.

Both the intake manifold and the fuel-injection rail have acoustically dampened covers that help to reduce NVH.

Ignition system

The high-energy ignition system includes a compact coil-on-plug assembly that improves the combustion flame for better fuel efficiency. Dual precious-metal spark plugs, including iridium and platinum, provide up to 161,000 kilometres durability. Located in the centre of the cam cover, the spark plugs are easily accessible when service is required.

The 2.4-litre MultiAir engine marks the first time MultiAir technology is offered beyond the 1.4-litre variants.

Six-speed Manual, DDCT and automatic transmissions offered

Exceptional fuel efficiency and spirited performance are just two attributes from the new Dodge Dart's full range of transmission offerings. Additionally, each transmission has undergone extensive testing and evaluation to ensure that customer expectations in the area of refined shifting characteristics and low noise levels are met.

"Depending on individual driving tastes, we've engineered each of the three six-speed transmissions for the 2013 Dodge Dart for efficiency and performance while delivering more of the fun factor to driving," said Mircea Gradu, Vice President, Transmission, Powertrain and Driveline Engineering — Chrysler Group LLC. "Working closely with our engine group, we've carefully matched each transmission for individual engine applications to achieve the best efficiency and refinement for the driver."

Three transmissions, including a standard C635 six-speed manual, a new C635 dual dry clutch six-speed and a world-class 6F24 six-speed automatic will be available depending on engine selection.

Six-Speed C635 manual transmission

Standard with all three engine choices is the C635 manual transmission. Developed by Fiat as part of a new family of global transmissions, the six-speed manual is compact and lightweight with gearing that is optimized to operate at both low engine rpm and at highway speeds to provide optimal fuel efficiency.

The transmission also is designed for reduced highway engine rpm to ensure a quiet cabin environment. Included is a dual-mass flywheel that permits lower engine rpm at any gear to help increase fuel economy. Maximum input speed

for 1-2 and 2-3 shifts is up to 7,000 rpm and 6,500 for all other shifts. Drivers also will notice reduced gear rattle and reduced shift times.

Robust and reliable, the transverse-mounted gearbox is designed to withstand maximum torque values. For optimal viscosity, in all temperature and driving extremes, synthetic oil is used. The transmission is a filled for life design with no transmission oil changes ever required under normal driving conditions. Additionally, the clutch is self-adjusting requiring no periodic adjustments.

Ratio spread is 6.68 for the 1.4-litre MultiAir Turbo and 6.27 for the 2.0-litre and 2.4-litre Tigershark engines. For the best acceleration characteristics, a tall, 4.15 first gear is used on the 1.4-litre while the 2.0-litre and 2.4-litre feature a 3.90. Sixth gear, which helps reduce engine rpm at highway speeds, is 0.62. Using an ideal set of gears, the transition from 1-6 provides the ideal balance of performance and comfort.

Six-Speed Dual Dry Clutch Transmission (DDCT)

Available in models of the Dart with the optional 1.4-litre MultiAir Turbo engine, the dual dry clutch transmission (DDCT) is designed specifically for lighter vehicle applications and represents the first application of this front-wheel-drive powertrain technology for Dodge passenger cars. The DDCT will be available as an option in the 3rd quarter of 2012.

Like the manual transmission it is based from, the new six-speed DDCT transmission is capable of handling maximum torque.

Unlike common six-speed planetary transmissions and wet clutch DCT's, the DDCT eliminates the traditional torque converter or constant pressure pumps and the associated parasitic losses.

Lower emissions as a result of improved transmission efficiency also are a key benefit with the new DDCT. The DDCT technology offers the potential to reduce both Carbon C02 and nitrous oxides (NOx) compared with a conventional automatic transmission.

The use of a six-speed DDCT allows the driver a broad range of shifting behaviours from enthusiasts looking for sporty performance to commuters looking for optimal fuel efficiency. Driver input to the accelerator pedal defines the power required from the engine. The transmission control unit (TCU) defines the optimal engine torque/speed mix.

Advanced features of the DDCT also include a Hill-start Assist feature. If a driver is stopped on an inclined ramp, the transmission, working through the brake control unit, will help prevent vehicle rollback by maintaining vehicle brake pressure momentarily until adequate torque is reached to pull forward.

A smart-drive unit signals an electro-hydraulically activated transmission oil pump on demand. Unlike mechanical units that are driven continuously, with the on-demand feature, engagement of the pump is reduced significantly. In city driving cycles, the pump rarely exceeds 25 per cent of its full capacity. The result is improved fuel efficiency due to reduced operation of the pump and minimizing the energy losses associated with pump engagement.

By design, the DDCT operates much like a manual transmission with two clutch discs driven independently by a common flywheel assembly. Odd numbered gears (1, 3 and 5) are located on one shaft assembly while even gears (2, 4 and 6) on the other. With two gearboxes running in parallel of each other, each with its own clutch, this allows for the selection and engagement of subsequent gears while the previous gear is still engaged. Gear changes are gradual, rather than sudden and abrupt, ensuring a continuous delivery of engine torque and traction. Essentially, each gear change is anticipated and preselected. As one clutch is opened, the other is closed to allow shifting without torque interruption and resulting in faster acceleration and near-seamless shifting.

Additionally, with the lay-shaft arrangement of gears, there is flexibility to change gear ratios for optimal performance and fuel economy.

Smoother shifts, due to ideal gear spacing, are immediately noticeable to the driver. Ratios have been ideally spaced to help provide a smooth transition in between the steps of gear changes.

6F24 six-speed automatic

Available exclusively in the Dodge Dart and across the entire line-up of powertrains and models is the world-class 6F24 six-speed automatic transmission. Independently developed by Powertech and refined for application to the 2013 Dart, the six-speed automatic is fully electronic and designed for increased fuel efficiency.

Compact and lightweight, the 6F24 eliminated many potential extra engineering efforts from a packaging standpoint with the chassis layout. Overall length of the transmission is 378.5 mm.

The six-speed automatic features a closely aligned 5.46 gear spread that provides nearly imperceptible shifting from launch through highway speeds. With a 4.21 first gear and standard Auto/Stick™ for manual-like shifting, acceleration characteristics deliver fun-to-drive excitement.

With a 0.77 sixth gear, engine rpm is significantly reduced at highway speeds for excellent fuel economy. The stepped shift schedule across all six gears is designed for increased fuel economy in city driving as well. Customers will notice extremely quiet operation throughout the gear ranges with the use of noise-resistant gears that effectively reduce NVH.

The six-speed transmission also helps reduce maintenance cost with its fill for life design. There is no transmission dipstick and transmission filter or fluid changes are not required under normal driving conditions. Low-viscosity fluid is used to improve fuel economy by enabling quicker operating temperatures on the transmission to reduce drag on internal components. Maximum input speed (redline) is 6,500 rpm. Designed for low rpm operation, the final-drive ratio for the 6F24 automatic transmission is 3.20.

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