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Ram Unveils Most Powerful Half-ton Truck — Rebel TRX Concept With 575 Supercharged Horsepower

- Supercharged 6.2-liter HEMI® V-8 delivers 575 horsepower
- TorqueFlite eight-speed automatic transmission integrates Ram's 4x4 Performance Control System with powerful supercharged engine and paddle-shifters
- Front and rear axles feature severe-duty components to handle the high horsepower and off-road rigor

September 29, 2016, Auburn Hills, Mich. - The Ram Rebel TRX concept is a pickup truck powertrain marvel.

Once the powertrain engineering team was given details on performance expectations and packaging concerns for the Rebel TRX concept, it became clear only one option would meet the requirements. In order to address those demands, the Rebel TRX is driven by FCA's supercharged 6.2-liter HEMI® V-8 with an output of 575 horsepower – the most powerful Ram 1500 the company has ever built. The V-8 mill is mated to the TorqueFlite 8HP70 eight-speed automatic transmission.

"The Rebel TRX concept demands an engine with specific abilities in a small package. Reaching such horsepower per-liter efficiencies requires forced induction," said Bob Lee, Vice President — Engine, Powertrain and Electrified Propulsion Systems Engineering — FCA North America. "The proven supercharged 6.2-liter HEMI V-8 delivers 575 horsepower to move this 6,000-pound beast through punishing terrain at a ferocious pace."

New calibrations were used for the engine, transmission and Ram's 4x4 Performance Control System to optimize the expected high-speed off-road driving cycle.

Supercharged

The engine's blower sits on top of the intake manifold making the supercharged 6.2-liter V-8 a tall engine package. Engineers and designers made modifications to the Ram 1500 engine bay, including the forward cab area to fit the engine and meet acceptable gap tolerances. A custom induction system was designed to feed massive amounts of air to the supercharger and a modified Ram Heavy Duty hood helps clear the engine's additional height.

The engine features a forged-steel crankshaft with induction-hardened bearing surfaces able to withstand firing pressures of 1,595 psi (110 bar) – the equivalent of five family sedans standing on each piston, every two revolutions. A specially tuned crank damper has been tested to 13,000 rpm.

The 2,380cc per revolution blower features integral charge coolers and an integrated electronic bypass valve to regulate boost pressure to a maximum of 80 kPa (11.6 psi). The supercharger unit is sealed for life with premium synthetic oil, boasts a drive ratio of 2.36:1 and has a maximum speed of 14,600 rpm. The drive system's one-way clutch de-coupler improves refinement, while allowing for precisely the kind of auditory feedback high-performance customers find alluring.

Such performance promises an under-hood environment that is torturous, to say the least. Engineers responded with some clever applications.

The large-nosed crank drives a high-flow gerotor oil pump that feeds a lubrication circuit servicing eight high-flow piston cooling jets. A high-capacity oil to air heat exchanger, mounted behind the front bumper, mitigates oil temperatures when driving conditions are harshest, such as sand or mud.

The supercharged 6.2-liter V-8 exhaust flows through a 3-inch H-pipe dual side system and out dual five-inch tips that dump just in front of the rear wheels.

TorqueFlite eight-speed automatic transmission
Fully electronic, the TorqueFlite 8HP70 transmission features a torque capacity capable of handling the enormous power of the supercharged HEMI engine. The Ram Rebel TRX concept adds paddle controls for manual shifting capability. In auto mode, more than 40 individual shift maps for very specific conditions optimize shift quality and shift points for fuel economy, performance and drivability. The intelligent software takes into account variables, including engine torque gradients, kick-down events, longitudinal and lateral acceleration, hill detection, friction detection and downshift detection to determine the appropriate shift map. Additional parameters integrated into the control strategy include vehicle speed control, electronic stability control interaction and temperature. The result is automatic shifting ideally attuned to the performance requirements of almost any driving demand.

High efforts in shifting have been eliminated with the help of paddle shifters. Shift positions, selected by the driver are transmitted electronically with no mechanical linkage from the paddles to the outside of the transmission. Elimination of this linkage removes any shift effort from the driver's gear selection, but maintains an intuitive operation with a direct and confident feel.

To anchor power to the ground, the standard Ram 1500 front driveshaft and a custom rear drive shaft link the transfer case to the axles.

Transfer case
The Rebel TRX concept is equipped with Ram's 4x4 Performance Control System and leverages the Borg Warner 44-45 transfer case, which enables part-time four-wheel-drive operation with a two-speed gear system. The transfer case controls the modes of operation indicated by a TRX pictogram in different environments:

N (neutral) – Disconnects the driveline from the engine and transmission for flat-towing the truck.

2H Normal (two-wheel drive) – Rear-wheel drive only with rear open differential for tractive environments such as dry pavement. This is the best selection for everyday driving.

4H Wet/snow (four-wheel drive) – All four wheels can provide traction with open differentials front and rear. This is the best setting for slick roads, snow, gravel or rain.

4L Off-road (four-wheel drive, low speed) – All four wheels can provide traction with a locked transfer case, open differential in front and locked in rear. This setting leverages torque and is best for very slow (1-5 miles per hour) driving over extremely rough terrain, large rocks and uneven hill climbs.

4H Baja mode (four-wheel drive) – This setting is best when driving like a beast off-road, mostly at full throttle. The system locks the transfer case and locks the rear differential for maximum traction and drive-by-throttle dynamics at high speed in low-traction terrain.

Axles
The Ram Rebel TRX concept uses a standard Ram 1500 front axle with an open differential and custom CV half-shafts to handle the wider track dimension. The spindles are moved forward to make room within the fender wells for massive 37-inch tires.

In the rear, a Dynatrac Pro 60 axle spools power through an electric, selectable locker to 35-spline, 1.5-inch axle shafts. When unlocked, the rear differential operates appropriately when traction is easily available, allowing left and right wheels to turn at different speeds for driving comfort. When locked, the differential forces equal power through both axle shafts and to the wheels.

Available in all modes of operation, the locker commits both rear wheels to traction at the same speed, spreads the torque load and maximizes the tractive effort (power put to the ground) in full-throttle maneuvers.

Ram Truck Brand

In 2009, the Ram Truck brand launched as a stand-alone division, focused on meeting the demands of truck buyers and delivering benchmark-quality vehicles. With a full lineup of trucks - the Ram 1500, 2500/3500 Heavy Duty, 3500/4500/5500 Chassis Cab and ProMaster - the Ram brand builds trucks that get the hard work done and families where they need to go.

Ram continues to outperform the competition and sets the benchmark for:

- Best-in-class standard horsepower
- Segment-first 1,000 lb.-ft of torque with Cummins Turbo Diesel
- Most luxurious: Ram 1500 Tungsten with real metal and leather elements and a new 14.5-inch Uconnect touchscreen
- Best ride and handling with a double wishbone front suspension and five-link solid rear axle with available, segment-exclusive, active-level, four-corner air suspension
- Best-in-class available rear leg room
- The most cargo space available in any traditional full size cargo van
- Most capable full-size off-road pickup – Ram Power Wagon
- Most awarded light-duty truck in America
- Highest owner loyalty of any half-ton pickup

The latest J.D. Power APEAL study,which rates the emotional bond between customers and their vehicles, named the 2023 Ram 1500 as the best full-size light-duty pickup.

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