



Media Information

Subaru Of America, Inc.
One Subaru Drive
Camden, NJ 08103
Main Number: 856-488-8500

CONTACT: Dominick Infante
(856) 488-8615
dinfante@subaru.com

SUBARU OFFERS FOUR VERSIONS OF SYMMETRICAL ALL-WHEEL DRIVE FOR 2014-2015 MODELS; BRZ SPORTS CAR IS REAR-WHEEL DRIVE

Cherry Hill, N.J., Feb 23, 2014 - Subaru produces passenger cars, SUVs and crossovers equipped as standard with Symmetrical All-Wheel Drive. (The Subaru BRZ sports car is rear-wheel drive.) Symmetrical All-Wheel Drive is a comprehensive system that includes a lightweight horizontally opposed Subaru BOXER engine and the full-time automatic torque distribution system. Rather than take a "one type fits all" approach, Subaru tailors its four different versions of Symmetrical All-Wheel Drive to a particular powertrain or model.

Four Versions of Symmetrical AWD for 2014 and 2015 Subaru models	
Continuous	
Models that use it	2014 Impreza [®] 2.0i and 2014 XV Crosstrek [®] models with 5-speed manual transmission; 2014 Legacy [®] , Outback [®] and Forester [®] models with 6-speed manual transmission and 2015 WRX [®] with 6-speed manual transmission.
How it works	A viscous-coupling locking bevel-gear center differential built into the transmission case distributes torque 50:50 front-to-rear. Slippage at the front or rear wheels causes torque to transfer (up to 100%) to the opposite set of wheels.
Active Torque Split	
Models that use it	All 2014 models, and the 2015 WRX, that are equipped with the Lineartronic [®] continuously variable transmission (CVT).
How it works	An electronically managed continuously variable transfer clutch actively manages torque distribution in response to driving conditions, acceleration, deceleration and cornering. Slippage at the front or rear wheels causes torque to transfer (up to 100%) to the opposite set of wheels.
Variable Torque Distribution (VTD)	
Models that use it	6-cyl. Legacy and Outback models and the Tribeca [™]
How it works	An electronically controlled, continuously variable hydraulic transfer clutch works with a planetary gear-type center differential to control torque distribution between the front and rear wheels. Under most conditions, VTD uses a 45:55 torque split, with the rear-wheel bias contributing to handling agility. VTD

	responds to driving conditions to continually optimize torque distribution on all road surfaces. Slippage at the front or rear wheels causes torque to transfer to the opposite set of wheels.
Driver Controlled Center Differential (DCCD)	
Models that use it	Exclusive to WRX STI
How it works	A limited-slip, planetary gear-type center differential, augmented by an electronically controlled center limited-slip differential, provides a performance-oriented 41:59 torque split. The mechanical limited slip differential has a quicker response and activates just prior to the electronic limited-slip differential. The DCCD AWD System has three automatic modes: "Auto" provides optimal performance for all conditions. The "Auto" (-) Active Sport setting shifts the torque bias to the rear and also opens the center limited-slip differential (no locking factor), which improves steering feel. In any of the system's three automatic modes, the electronically managed continuously variable transfer clutch can vary the distribution ratio through the center differential as needed to suit driving and road-surface conditions. For driving on slippery surfaces, such as gravel or snow, the Auto (+) setting tightens the LSD. Manual mode offers six driver-selectable settings, allowing the driver to vary the front-to-rear torque distribution to optimize All-Wheel Drive performance to suit specific driving conditions.

Continuous	Active	VTD	DCCD
(5-sp. and 6-sp. man. trans.)	(CVT)	(5-sp. auto trans.)	(6-sp. man. trans.)

S = Standard

O = Optional

2014 Impreza® 2.0i	S (5M)	O (CVT)		
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2014 Forester®				
2.5i	S (6M)	O (CVT)		
2.0XT		S (CVT)		

2014 Legacy®				
2.5i	S (6M)	O (CVT)		
2.5i Limited		S (CVT)		
3.6R Limited			S (5A)	

2014 Outback®				
2.5i	S (6M)	O (CVT)		
2.5i Limited		S (CVT)		
3.6R Limited			S (5A)	

2014 XV Crosstrek®	S (5M)	O (CVT)		
2014 XV Crosstrek Hybrid		S (CVT)		

2014 Tribeca™			S (5A)	
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2015 WRX®	S (6M)	O (CVT)		
2015 WRX® STI®				S (6M)

VTD: Variable Torque Distribution

DCCD: Driver Controlled Center Differential

BRZ sports car is rear-wheel drive.

All-Wheel Drive Built In, Not Added On

Subaru develops vehicles around Symmetrical All-Wheel Drive – it does not simply adapt AWD components to a front- or rear-wheel drive vehicle. All versions of Subaru Symmetrical All-Wheel Drive distribute torque to all four wheels all the time, reducing the load on each wheel and reducing and even helping to prevent tire slip, especially on slippery or loose surfaces.

In contrast, some AWD systems on the market function passively, transferring torque away from the main drive wheels only when they slip. When there is no slippage, vehicles equipped with such systems essentially operate in two-wheel drive. Although such automatic “part-time” or “on-demand” systems can help a vehicle traverse a snow-covered road, for example, they may not provide the all-road handling benefits of a true full-time All-Wheel Drive system.

Vehicle Dynamics Control Augments All-Wheel Drive Capability

The Vehicle Dynamics Control (VDC) stability and four-wheel traction control system (TCS) is standard on every 2014 and 2015 Subaru model (the BRZ has VDC and rear-wheel traction control). The VDC system uses an array of sensors to compare where the vehicle is heading to where the driver is steering it. If corrective action is needed to help keep the vehicle on course, VDC can apply momentary brake pressure at individual wheels and can also reduce torque at the wheels via the electronic throttle control system. It is important to note that traction control functions as a second line of defense against wheel slip, after torque distribution by Symmetrical All-Wheel Drive.

BOXER Engine: Compact and Light

Subaru introduced its horizontally opposed (BOXER) engine more than 40 years ago and today remains a staunch adherent to this engine configuration. The Subaru BOXER engine is ideal for an All-Wheel Drive application, because it is inherently compact. The layout concentrates the engine’s mass in a small area and helps provide a lower center of gravity, which contributes to responsive handling and steering. Aluminum-alloy construction of the engine and transmission case results in a lightweight drivetrain.

Mounting the BOXER engine longitudinally allows the transmission to be located directly behind it and within the vehicle’s wheelbase. Torque travels in a straight, near-horizontal line to the rear differential, minimizing frictional loss. This symmetrical, uniform layout also provides excellent left-right balance. By comparison, in a vehicle with a transverse-mounted engine, an All-Wheel Drive system requires additional transfer gearing to reroute the torque from transverse to longitudinal orientation. Such a system can cause more friction and can add extra weight on one side of the vehicle.

In addition, the horizontally opposed layout yields an inherently smooth-running engine, because the motion of the pistons from one cylinder bank (and the vibration the motion creates) cancels the vibrations of the opposing bank. Lower vibration contributes to durability, a Subaru hallmark.

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