IMPREZA

Subaru driver Petter Solberg won the FIA World Rally Driver's Championship in 2003.

WRC FIA WORLD RALLY CHAMPIONSHIP

Subaru driver Cody Crocker won the Australian Rally Driver's Championship in 2003, 2004 and 2005.

Subaru won the Australian Rally Manufacturers' Championship in 1997, 1998, 2000, 2001, 2002, 2003, 2004 and 2005.

Impreza Awards

2004
- Australia's Best Cars, Best Sports Car 2004 under $57,000, Subaru Impreza WRX.

2003
- Australia's Best Cars, Best Sports Car 2003 under $57,000, Subaru Impreza WRX.
- Australia's Best Cars, Best Mid-Size Car 2003 Under $28,000, Subaru Impreza GX.

2001
- Australia's Best Cars, Best Sports Car Under $56,000, Subaru Impreza WRX.

2000
- Wheels Car of the Year, Subaru Impreza.
- QLD Car of the Year Awards, Outstanding Compact Car, Subaru Impreza.
- Car of the Decade, Car Magazine UK, Subaru Impreza WRX.
- Gold Medal in Sports/Performance Car Category, Which Car, Australia, Subaru Impreza WRX.

1999
- Best Sports Car Under $56,000, NRMA/RACV, NSW & VIC, Subaru Impreza WRX.

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SUBARU
ALL-WHEEL DRIVE

P.ITG06

IMPREZA

MY06 Impreza - Technical Description

SUBARU
ALL-WHEEL DRIVE

Note: This brochure has been prepared for the benefit of the staff and employees of Subaru (Aust) Pty Ltd and its franchisees.

P.ITG06

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Introduction -
Model Year 2006 Impreza

The MY06 Impreza continues the philosophy of evolution building on the strength's of the current model which have been fine tuned from experience gained in the World rally championship (WRC) since 1994. Significant mechanical improvements of MY06 Model year include increased capacity 2.5L turbocharged engines and a newly developed 2.0L DOHC NA engine for Impreza 2.0R which also features a Direct Control type automatic transmission. Continual development has seen aerodynamic, drive ability and vehicle handling advancements from the previous model. High Intensity Discharge (HID) headlights are now standard on the WRX and STI and projector lights on other models.

Passive safety levels are now world class with side airbags now standard on all models excluding STI. Performance levels of the MY06 engine have been increased and emission performance improved to meet Euro Step 3 exhaust gas emission levels. Fuel consumption has also been decreased.

The new design philosophy of Subaru has been portrayed to express more of the Subaru identity while offering a higher quality feel. The bonnet has been lengthened, and designed to improve airflow. On the WRX and STi this improved airflow assists the intercooler to achieve high levels of cooling efficiency with a smaller bonnet scoop. The front bumper design draws directly from the World Rally Championship and the front fog light size has been reduced from 130mm to 45mm to improve exterior styling and light distribution.

The Impreza WRX STI is fitted with a new roof vane which when combined with the rear diffuser and boot spoiler dramatically improves the aerodynamics for improved stability and handling. The roof vane catches the airflow from the roof and directs it to the rear spoiler thereby enhancing its performance. The rear diffuser smooths the airflow under the car helping to create a smooth airflow on exit. The co-efficient of lift (CL) performance has improved from minus 0.045 to minus 0.075. (Greater down force)

Key mechanical changes in the MY06 Impreza are: -

* New Design Language front body design.
* 2.0R Normally aspirated DOHC engine
* 2.5L Turbocharged engine for WRX and STI
* Improved handling performance and driveability
* Electronic Throttle Control on 2.0R, WRX and STi
* Improved exhaust gas emissions
* Engine intake and exhaust system improvements
* Improved fuel consumption.
* Direct Control Automatic Transmission (2.0R)
* High Intensity Discharge (HID) Headlights on WRX & STi with Projector headlights on other models.

Impreza WRX

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Engine

Construction

The engine used in the MY06 Impreza range is the traditional Subaru horizontally opposed boxer engine with fuel efficient, low emission cylinder heads featuring 'tumble swirl' intake ports.

In the unique configuration of the boxer engine, the pistons move in the horizontal plane from left to right with low levels of noise, vibration and lower power loss. This is due in part to the cancellation of the inertia forces created by the downward force of the pistons that act in opposite directions. With an in-line engine all four pistons are moving in the same direction and therefore a larger and heavier crankshaft is required to counteract this inherent imbalance.

Structurally the horizontal design also yields a more rigid cylinder block because the crankshaft is sandwiched between the left and right hand crankcases and supported by five main bearings. This provides for long life with little wear and tear. The engine crankshaft thrust bearing is located at the rear, providing a reduction in the transfer of natural engine frequencies to the transmission and driveline thereby improving N.V.H. levels in the passenger compartment.

The natural balance of the horizontally opposed engine along with the lightweight crankshaft provides for excellent rotational balance, rotating smoothly all the way up to high engine speeds without the use of balancer shafts that are necessary with in-line engines. This feature along with the aluminium construction achieves a lightweight compact engine that allows for a great deal of freedom in positioning the engine in the vehicle.

Its low height also makes a low centre of gravity possible with a more balanced left/right and front/rear weight distribution for improved vehicle handling.

Impreza 2.0-litre
SOHC engine

Impreza 2.0-litre
DOHC engine

Impreza 2.5-litre
DOHC turbo engine

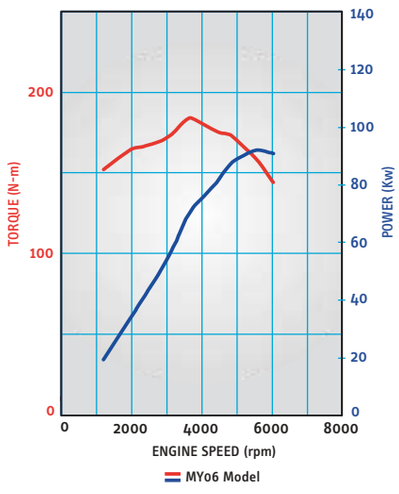
Engine Performance

The engine used in the MY06 Impreza comes in four variants,

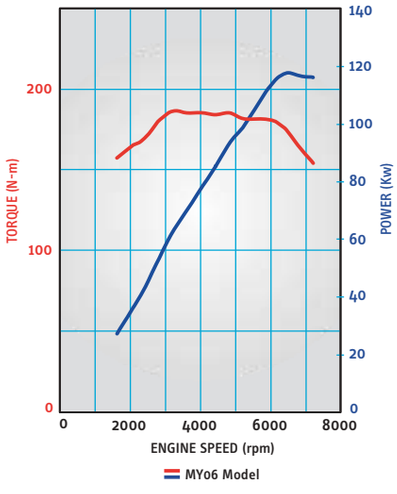
* 2.0i SOHC 2.0 litre non-turbo.
* 2.0R DOHC 2.0 non-Turbo.
* WRX DOHC 2.5 litre turbo
* STI DOHC 2.5 litre high power turbo.

All of these engines while based on the original phase II engine first introduced with the 1999 model year have benefited from increased power and torque outputs, decreased fuel consumption, noise reduction and efficiency and reduced exhaust gas emissions. These engines including the turbo now fully comply with Euro Step 3 (STI Euro 4) exhaust gas emission levels.

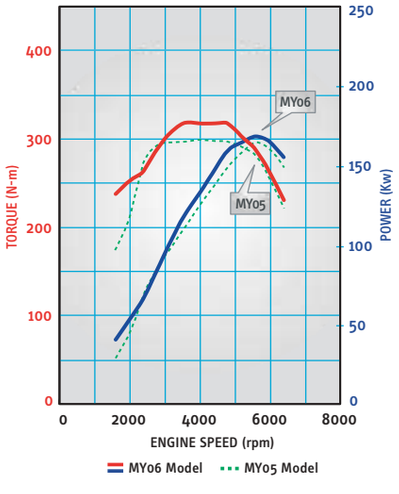
Impreza 2.0i SOHC - Non Turbo



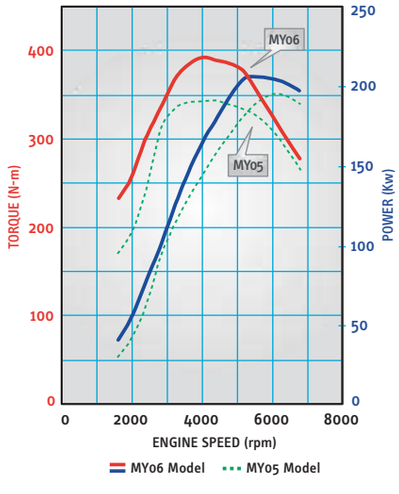
Impreza 2.0R DOHC - Non Turbo



Impreza WRX 2.5 DOHC - Turbo



Impreza STI 2.5 DOHC - Turbo



Engine Specifications

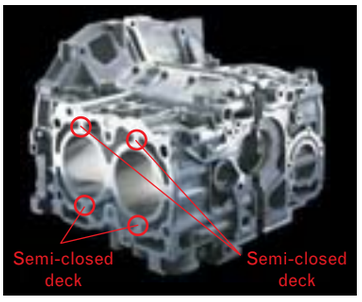
Model	Capacity	Bore	Stroke	kW @ RPM	Nm @ RPM	Compression Ratio
2.0i	1994 cm3	92 mm	75 mm	92 @ 5600	184 @ 3600	10.0:1
2.0R	1994 cm3	92 mm	75 mm	118 @ 6400	186 @ 3200	10.0:1
WRX	2457 cm3	99.5 mm	79 mm	169 @ 5600	320 @ 3600	9.0:1
STI	2457 cm3	99.5 mm	79 mm	206 @ 5600	392 @ 4000	8.0:1

Ongoing development and an increase in engine capacity of Impreza WRX and STI has seen improvements in power, torque and environmental performance. The Impreza 2.0R provides good acceleration up to high engine speeds by adopting the DOHC design with Active Valve Control System.

Engine

Cylinder Block

The cylinder block for the Impreza WRX and STI turbo engine features a “semi closed deck” design due to the higher thermal loads and pressures associated with a turbo engine. This feature allows the cooling efficiency of a completely open deck design with the strength of a closed deck. By providing additional reinforcement at the top of the cylinder liner the bore is less susceptible to bore distortion under the increased pressure generated by a turbo engine. The non turbo range uses a completely open deck design due to the lower thermal loadings of the non turbo engine.



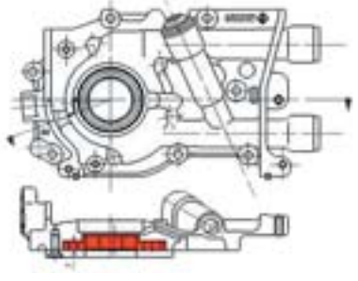
Pistons

The piston head and ring grooves are coated with Alumite and the piston skirt has a molybdenum coating to reduce frictional resistance with the cylinder bore. The piston pin offset has been reduced to accommodate tighter piston to bore clearances and therefore eliminating unburnt gas build-up between cylinder wall and piston head. This aids fuel consumption and reduces combustion gas contamination.

The compression ratio on the non-turbo engine is 10: 1 for greater thermal efficiency, on the turbo engine the compression ratio remains at 9.0: 1. The high static compression ratio on the non turbo is possible due to the ‘Tumble Swirl’ action that provides better atomisation and mixing of the fuel with the air and hence is less susceptible to detonation or pinging.

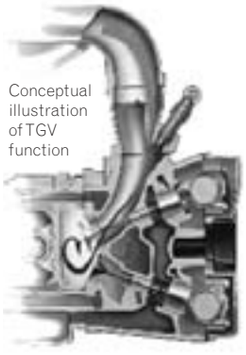
Oil Pump

The oil pump rotor thickness on non-turbo engines is only 7mm to reduce operating friction while still maintaining more than adequate lubricating capacity. The effect is to reduce engine power loss and as a consequence improve fuel consumption.



Cylinder Heads

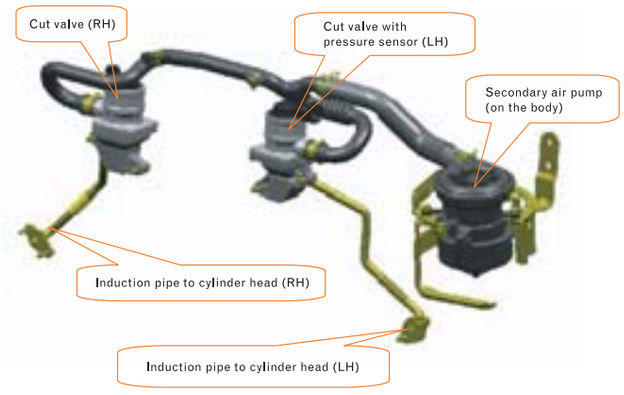
By far the most significant improvement in design from the phase II engine has been cylinder head and intake manifold design. Tumble intake ports create a ‘Tumble Swirl’ air motion as the air and fuel enters the cylinder. This action ensures good mixing of the air with the fuel for uniform flame travel resulting in increased speed of combustion. The cylinder heads also continue to feature four valves per cylinder arranged in a cross flow format for good engine breathing. This means that as a result of more air being inducted, more fuel can be injected and when combined with the ‘Tumble Swirl’ action a higher specific power output is obtained with improved fuel economy. STi, WRX and 2.0R engines use Tumble Generator Valves (TGV) to improve exhaust gas emissions at low speed cold engine conditions. This valve causes the intake airflow to be redirected by closing a butterfly valve in the intake manifold. In doing so a tumble air motion is created at low intake air speeds thereby ensuring good air/fuel mixing for improved combustion efficiency and emissions along with improved starting. Impreza non-turbo engines feature Exhaust Gas Recirculation to further reduce exhaust emissions. EGR uses already burnt exhaust gases and allows them to mix with the new inlet air charge. The effect is lower combustion temperatures, increased engine efficiency and reduction of Nox (Nitrous Oxides) exhaust emission. DOHC engines have also benefited from a redirection of cold coolant flow through the cylinder head around the ignition spark plug resulting in a parallel flow, this improves engine output performance and fuel economy.



Conceptual illustration of TGV function

Secondary Air system

By Introducing a secondary air intake into the cylinder head exhaust port at the time of cold start the non combusted air fuel ratio charge is re combusted in the exhaust port, early catalytic action is promoted and hydrocarbon exhaust emissions are reduced. (DOHC Engine only)



Valve Operation

Valve operation on the 2.0i engine is achieved by the use of a single camshaft for each cylinder head and roller rocker arms. The 2.0R and turbo engines use direct acting twin camshafts per cylinder head.

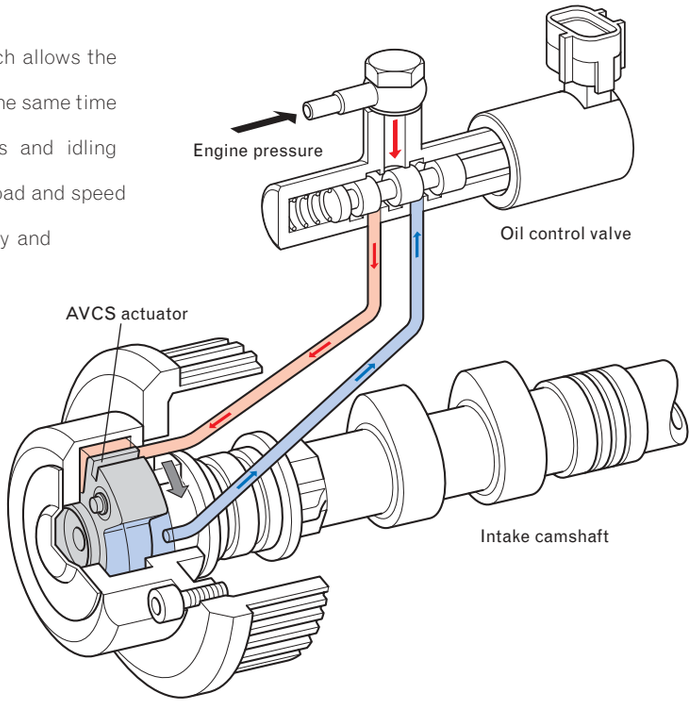
A single timing belt with specially designed round profile teeth for quiet operation drives the camshaft. The belt is made from a strong flexible core wire, wear resistant canvas and heat resistant rubber. The recommended replacement interval for the cam belt is now 125,000 km, or five years, whichever should first occur.

STI benefits from Sodium filled exhaust valve stems that assist in providing low inertia and improved heat dissipation.

Camshaft weight is reduced 1700g by using a hollow shaft and an assembly of sintered cam lobes.

Active Valve Control System

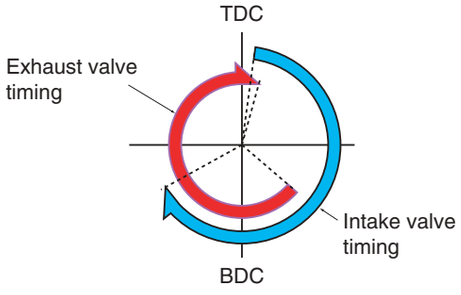
All Impreza DOHC engines use Active Valve Control System which allows the engine to reach higher levels of power and torque output while at the same time gaining improvements in fuel consumption, exhaust emissions and idling stability. By controlling the intake valve timing to suit the engine load and speed conditions this system optimises the engine volumetric efficiency and combustion process. This is achieved by rotating the camshaft sprocket relative to the intake camshaft within a maximum range of 35 crankshaft degrees. This movement is controlled by the engine management computer (ECM), based on input signals from the airflow sensor, engine coolant temperature sensor, throttle position sensor and camshaft position sensors. The ECM then generates a duty ratio electrical output signal to an Oil Control Valve (OCV) positioned at each intake camshaft sprocket to control engine oil pressure which is supplied to advance and retard chambers within the AVCS actuator. Valve timing is continuously and infinitely variable within the 35 crank degree range and controlled according to engine speed and load conditions. There are three computer maps that are used depending on the conditions to provide for optimum valve timing for stable idling, improved fuel consumption in the medium speed range and maximum power at high engine speed and load.

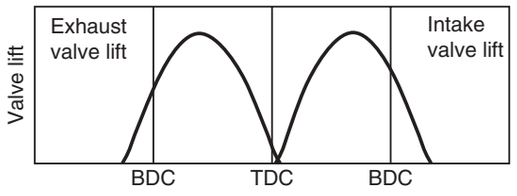


Engine

Active Valve Control System (cont.)

Idle stability control

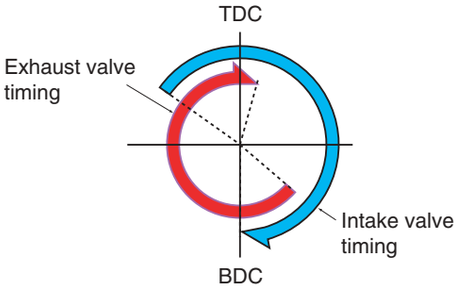


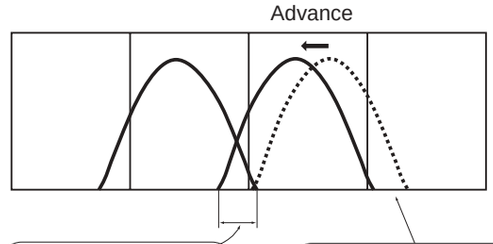


Intake valve closing timing is determined to maximise the air charge efficiency.

Small overlap improves idling stability.

Low to Medium Speed and load range



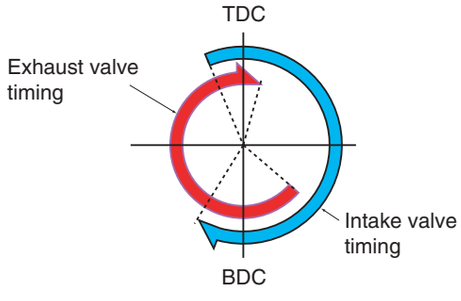


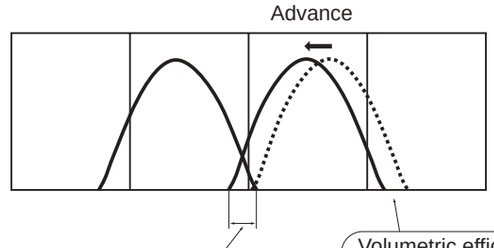
Overlap produces the EGR effect inside the engine (at medium load)

Inertia supercharging effect produced by advancing the intake valve closing time

When the engine is running in the medium speed range and the engine load is small advancing the intake valve timing reduces intake air blow back thereby improving fuel consumption. Increasing the intake and exhaust valve overlap also promotes exhaust gas recirculation (EGR) reducing NOx exhaust gas emissions. When the engine load increases advancing the intake closing time takes advantage of the intake air inertia to create a supercharge effect on the incoming intake air.

High Load range (2000 -3200 rpm)



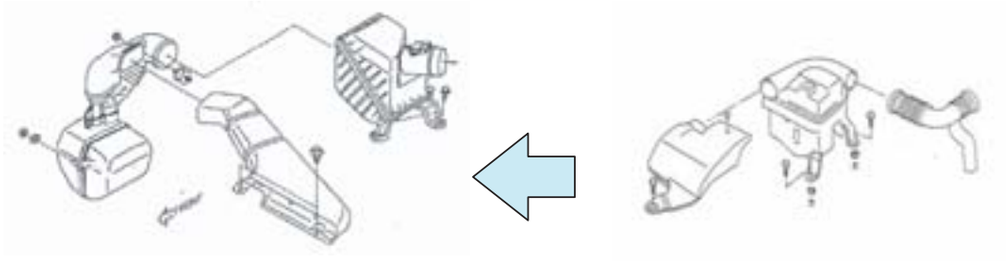


Overlap produces Scavenging effect (due to exhaust pulsation)

Volumetric efficiency improved by advancing the intake valve closing time

At high engine speed and load conditions intake and exhaust valve overlap utilises the scavenging effect produced by the exhaust gas pulsation to draw intake air into the cylinder. Since the intake valve is closed at the end of the intake stroke, air intake efficiency is improved and engine power output is boosted.

Air Intake System



2.0-litre DOHC air-intake system (L-MPI)

2.0-litre SOHC air-intake system (D-MPI)

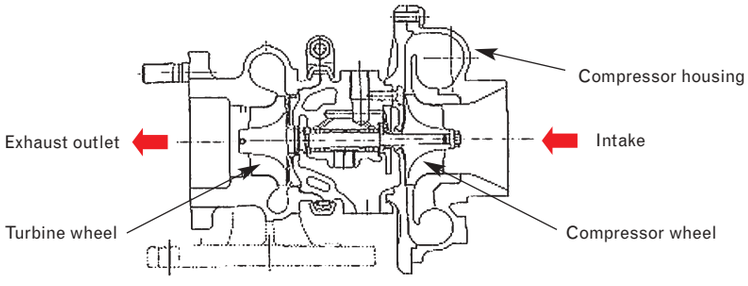
The air intake systems have been specially tuned to help achieve high torque in the low to mid engine speed range and produce flexible and responsive engine performance along with improved fuel economy.

The optimised air intake system consists of an air inlet duct that draws air from outside the under bonnet area thus reducing intake air temperature. Two resonators are incorporated in the air duct to smooth the airflow and a large still air box (2.0i only), mounted on the throttle chamber improves engine response and quietness along with a tuned length inlet manifold.

The air intake system on the 2.0R is similar in performance to the turbocharged engine. Giving increased performance and slightly more intake noise to realise the sporty nature of the DOHC engine. The resonator chamber has been tuned to optimise the frequency of the intake noise.

Intercooler

WRX intercooler size has been increased in width by 64mm, the number of tubes has increased from 29 to 38 and the cooling capacity is 11.9 Kw. STI intercooler size is similar to the previous model with a cooling capacity of 14.0Kw



Turbocharger

WRX turbocharger is a Mitsubishi TD04L unit with approximately a 12% bigger turbine than the previous model (MY 2000) with an A/R ratio of 13 for quick turbo response at low rpm. Maximum turbine speed is 190,000 rpm.

The STI turbocharger is an IHI RHF55 unit and is of similar specification to the MY05 vehicle. The A/R ratio has changed from 15 to 18, which allows the turbocharger to be efficient at the high air volume generated by the 2.5L engine. It uses a Teflon seal on the Compressor wheel to maximise its efficiency.

Both WRX and STI turbochargers are of the floating metal bearing type, which has a metal bearing suspended in oil so that speed differences between components are kept relatively low.

Engine

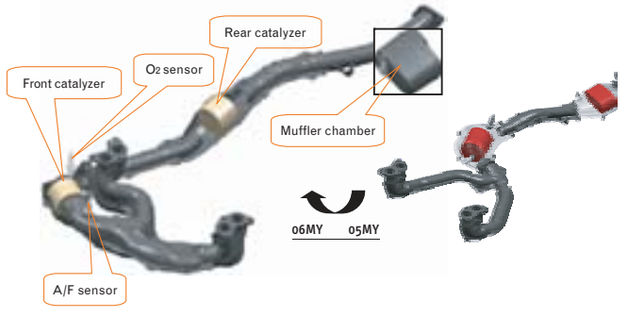
Turbocharger (cont.)

Model	MY05 STI	MY06 STI	MY05 WRX	MY06 WRX
Manufacturer	IHI	IHI	MHI	MHI
Turbocharger Type	RHF55	RHF55	TD04L	TD04L
Turbine Blade No.	11	11	12	12
Compressor Blade No.	6 + 6	6 + 6	6 + 6	6 + 6
Turbine Rotor Size	53mm / 48mm	53mm / 48mm	47mm	47mm
Compressor Rotor Size	60mm / 46.5mm	60mm / 46.5mm	56mm	56mm
Maximum Turbine Speed	165000 rpm	165000 rpm	190000 rpm	190000 rpm
Wastegate Open Pressure	78 kPa	77.7 kPa	64.7 kPa	45.3 kPa
A/R Ratio	15	18	13	13
Compressor Seal Material	Synthetic mica + teflon	Synthetic mica + teflon	-	-
Maximum Target Boost	113 kPa (16.4 psi)	103 kPa (14.93 psi)	93 kPa (13.5 psi)	93 kPa (13.5 psi)
Bearing Type	Floating Metal Bearing	Floating Metal Bearing	Floating Metal Bearing	Floating Metal Bearing

Engine Mountings (STi)

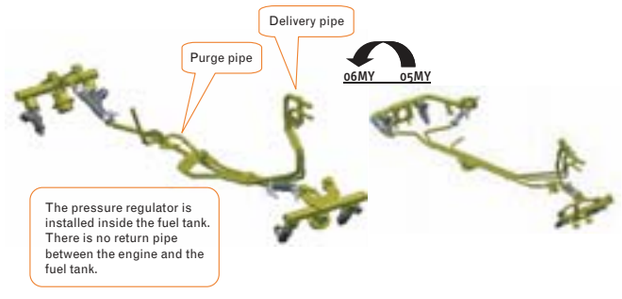
Engine mountings have been changed in order to improve steering stability performance and riding comfort. The rigidity ratio of the cushioning rubber has been changed and the steering stability performance has been improved this has been achieved by the introduction of resin liquid filled engine mounts. Strength and durability are maintained by the use of heat resistant materials.

Exhaust system



Impreza 2.0R features a 4-2-1 equal length, constant pulsation exhaust system to improve engine output performance. Layout, size and specifications of the catalyst have also been revised for improved exhaust gas emission performance. The exhaust pipe diameter has increased from 48.6mm to 54mm to increase engine output by reducing airflow resistance by 50% and the “Subaru boxer sound” has been emphasised by use of a large diameter tailpipe, large capacity muffler (18-litre) and a 5.5 -litre resonator. A sportier sound has been achieved on the 2.0R by the use of an isometric exhaust system design.

Fuel system/Return system inside fuel tank



The fuel system in the Impreza 2.0R engine has been changed so that the return system is now located inside the fuel tank. This eliminates the fuel return flow from the engine bay. This prevents fuel evaporation and helps to control fuel temperature by reducing heat soak from the engine. Fuel pressure has been increased from 300Kpa to 350Kpa. This has been made possible due a more controlled fuel temperature.

Engine Management System

The engine management system used on the Impreza is a computer controlled multi-point sequential fuel injection system with full direct ignition control.

The 2.0i model ignition system has two ignition coils; one for each pair of cylinders, 1,2 and 3,4 which fire the spark plugs directly twice per cycle. There are no moving parts such as a distributor to wear and therefore maintenance is limited to the replacement of the spark plugs every 25,000 km.

On the DOHC models each cylinder has its own ignition coil positioned in the cylinder head, directly above the platinum tipped spark plug. This again means no moving parts or high-tension leads to wear and the spark plugs only require replacement every 112,500Km.

Both systems also have an ignition knock control facility with fuzzy logic that enables the maximum ignition advance angle to be used without detonation. This means the computerised ignition programme constantly adapts itself to changes in environmental conditions and fuel quality.

Fuel injectors inject the precise amount of fuel required at any given time and are constantly monitored and corrected to ensure the air fuel ratio is ideal.

This system is called the feedback control system and is accomplished by means of the computers (ECM) ability to learn from information provided by the exhaust oxygen sensor and a wide band Air/Fuel ratio sensor. The ECM can adjust the Air / Fuel mixture according to the inputs provided. The ECM can also decipher if the driver is cruising, accelerating or de-accelerating and choose the correct A/F ratio for these conditions.

All Impreza models are equipped with the latest Euro OBD (On board diagnosis) system that constantly monitors the exhaust gas emissions and signals to the driver via a warning light when it is performing at less than its optimum.

On DOHC engines, the Electronic Throttle Control Assembly maintains constant idle speed. If idle speed requires adjustment, the ECM sends a Duty ratio signal to a DC motor fitted inside the ETC unit to open or close the throttle plate. If a failure occurs, the throttle plate will revert to a failsafe position.

The ECMs ability to learn and memorise enables it to constantly monitor and evaluate the operating conditions. Put simply, the engine constantly tunes itself as you drive. In fact it is no longer possible for the workshop to 'tune' a new generation Subaru.

From a maintenance point of view it is now only a question of replacing spark plugs, filters, belts and changing lubricating oils.

In the unlikely event of a fault occurring, the computer has the ability to diagnose the defect and then store the fault in its memory. Depending on the fault, it can also generate a pseudo input to compensate for the defect and therefore provide a failsafe mode to enable the vehicle to be driven to a dealer for rectification. When this occurs the 'Engine Malfunction Indicator' light illuminates on the dash advising the driver that attention is required. When the vehicle arrives at the Subaru dealer, a special device called a Subaru Select Monitor is connected to the vehicle, which then interrogates the computer to assist the technician in locating the actual fault.

All of this means from the owners point of view that the vehicle always performs with good performance and fuel economy and if attention is required, it is obtained with a minimum of inconvenience and expense.

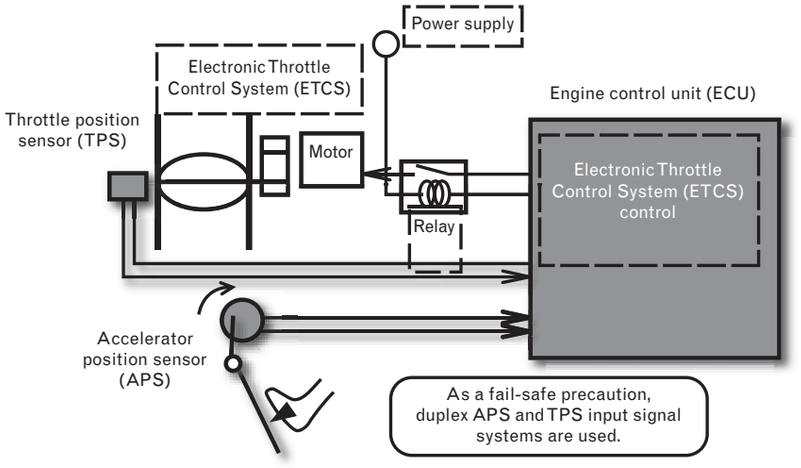
Engine

Electronic Throttle Control System (ETC)

ETC is now used on Impreza 2.0R, WRX and STI.

Electronic Throttle control (ETC) sometimes referred to as fly by wire, means that there is no hard connection between the driver's foot and the throttle butterfly, which controls engine speed and power. Previously throttle opening was largely linear and directly proportional to the movement of the accelerator pedal inside the vehicle. Now the engine management computer can finely adjust the throttle opening, which is still controlled by the driver's foot, to better suit the operating conditions for smoother response and more faithfully follow the driver's intention. For example the kangarooing action that can sometimes occur at slow speed due to unintended pulsation of the drivers foot can be eliminated. Similarly other functions such as idle speed increase due to cold start, air conditioning operation or cruise control can all be performed by the ETC.

Throttle valve opening is now performed by an electric motor controlled by an electronic control unit, based on input from the accelerator pedal sensor (APS) and as a failsafe precaution the throttle position sensor. Input signals are also received from the engine management computer based on the engine operating conditions to provide for smooth operation with improved fuel consumption.



Transmission

Automatic Transmission

The 2.0R Impreza features newly adopted D-4AT, Direct type 4 speed Automatic Transmission. It is 2.5 kg lighter than the previous models transmission. By using the direct control-type AT, gear change shock is reduced, Response to throttle has been improved, it also features a learning procedure that measures the friction co-efficient of each clutch assembly while driving, and stores a learnt value to achieve a smooth gear change operation during the service life of the transmission.

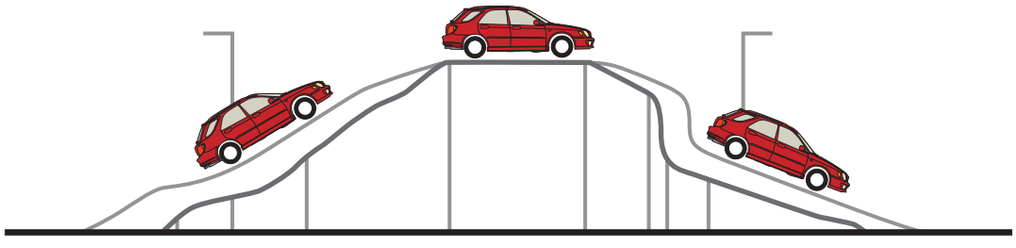
This transmission is not a revised version of the old transmission but a completely new design incorporating;

* Lower weight-moving components for reduced inertia and shift shock.
* Increased capacity hydraulic control system for more precise control of clutch and brake application thereby providing smoother torque transmission.
* Lower level of engine power loss for improved fuel economy.
* More powerful electronic control system using a computer to monitor 18 separate operating parameter inputs and to generate 8 separate outputs to precisely control shift timing and quality.
* The transmission computer also interfaces with the engine computer to regulate engine torque delivery during gearshift.

Gradient Control

The D-4AT uses Up or Down Gradient control which automatically selects a lower gear and holds that gear whilst going up or down a hill with a slope greater than 6.5%.

When going downhill it also requires the speed of the vehicle to be less than 70 km/hr and the brake to be applied by the driver, which signals a requirement to slow the car. As a result a lower gear is automatically selected and greater engine braking is therefore applied.



Selector Lever

The Selector Lever now features a Shift Lock Solenoid, which prevents the movement of the selector lever from Park unless the ignition is switched on, and the foot brake is applied. Another feature of the shift lock solenoid is to prevent selection of reverse gear if forward vehicle speed is above 10Kph.

Transmission

5-speed Manual transmission

The compact five speed manual All Wheel Drive (AWD) transmission is the culmination of more than twenty years experience in AWD technology during which time continuous development has occurred

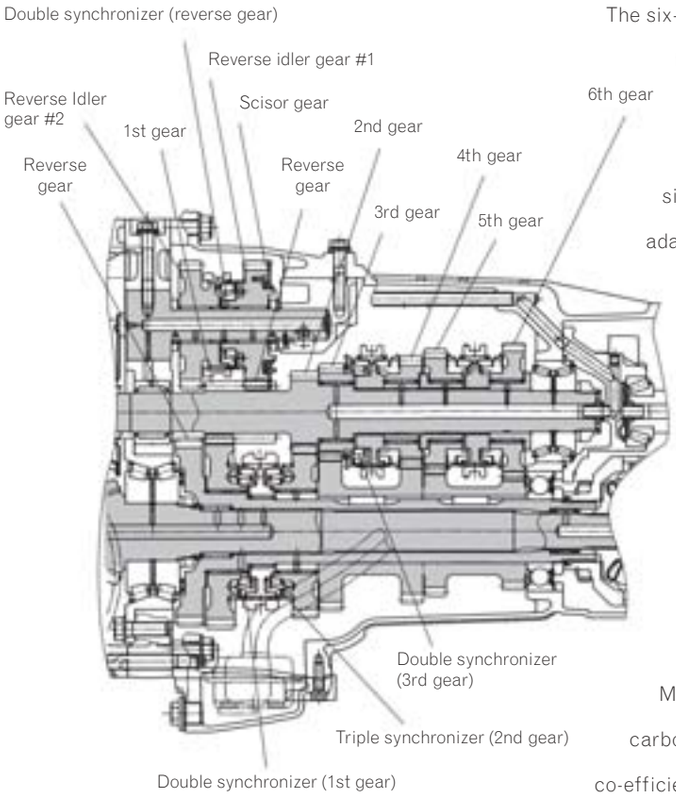
Features of this transmission include:

* 8 attaching bolts from the transmission to the engine. This provides for a more rigid power plant unit and as a result reduces transmission noise vibration and harshness (NVH).
* Cold forging and a shot peen hardening processes of gears for improved durability.
* Change of shift stroke length for improved gearshift operations feel.
* Lever ratio has changed from 5.9:1 to 4.8:1; the stroke is now 10mm shorter, from 60mm to 50mm.
* Change from pull type clutch to a push type clutch has reduced overall weight of the transmission, less components are now required and the clutch assembly is lighter which gives more positive shift feel and increases synchroniser performance.
* All synchromesh baulk rings and gear engagement teeth angles along with the double cone synchros are tuned to provide a precise but smooth gear shift action.
* Double cone synchro fitted to 1st, 2nd and 3rd gears

The 2.0i hatch and RV are also equipped with a dual range transmission with a 45% low range reduction which can be selected on the move and features full synchromesh action. This means that low range can be selected whilst driving without loss of momentum.
The transmission case is of single unit construction housing all five forward and the reverse gears along with the reduction and AWD transfer gears in the one housing. This provides for a compact transmission with a symmetrical driveline without any complex gear arrangements or countershafts.
The clutch is an increased capacity single plate diaphragm with hydraulic operation. Also incorporated on 2.0i and 2.0R is the unique Subaru 'hill holder' system. This feature prevents roll back and is particularly useful and effective when towing a trailer or in severe driving conditions on a steep uphill slope.

6-speed Manual transmission

The six-speed STi manual transmission has been specially developed to meet the needs of a high performance vehicle in terms of improved durability, closer ratio gear set and a shorter and smoother shift mechanism.



The six-speed gear set plus the reverse gear are constant mesh type with the main shaft and drive pinion shaft in a parallel arrangement similar to the five-speed transmission. The transmission case however is no longer of the split half arrangement but now of a single unit construction. The gear set is mounted on a cast steel adaptor plate that is bolted to the front differential casing and supported at the rear by the transmission main casing.

To meet the demands of high power and torque output engines all gears are helical cut and increasing the gear diameter and thickness has optimised gear strength. Bearing size has also been increased to accommodate the higher engine output.

Gearshift strength and smoothness has been enhanced through the use of double cone synchromesh mechanisms on 1st, 3rd and reverse gears and a triple cone synchroniser on 2nd gear. For MY06 models fourth, fifth and sixth gear synchronisers have a carbon coating on the friction surface. The result is a higher friction co-efficient and improved gear operation feel.

A parallel link gear select mechanism is used to shorten the gearshift and sliding bearings are used on the shift fork rods to reduce operating friction.

A trochoidal oil pump mounted in the rear of the transmission case pressurises and feeds lubricating oil to the main shaft, pinion shaft and transfer gears and a regulator and pressure relief valve maintain oil pressure. While driving oil is accumulated in an oil chamber mounted on the front of the drive pinion shaft thereby reducing the oil level in the oil pan. This reduces the agitation resistance and foaming of the oil caused by the gear rotation.

The clutch is a single plate diaphragm with clamping load of 930 Kg compared to the 830 Kg of the standard Impreza WRX. The clutch operating system is also equipped with a temperature compensating hydraulic damper mechanism to prevent sudden clutch engagement thereby ensuring smooth drive-away performance.

Transmission

DCCD

The MY06 STI uses a torque cam type Limited Slip Differential (LSD) has been incorporated inside the planetary gear centre differential in addition to the electromagnetic limited slip differential. The torque cam generates a thrust force to activate the LSD according to the actual torque difference between the front and rear wheels. Because of this additional LSD affect, the vehicle has more stability in transient situations, such as engine torque changing due to a different throttle position, even before the vehicle shows an oversteer motion. A steering angle sensor has also been added as an input signal to the drivers control centre differential control module. With this input, the DCCD can detect the drivers intended direction. With the new design centre differential, the control module can control the electromagnetic application without upsetting the vehicles dynamics. This new torque cam LSD is active even when manual mode is selected.

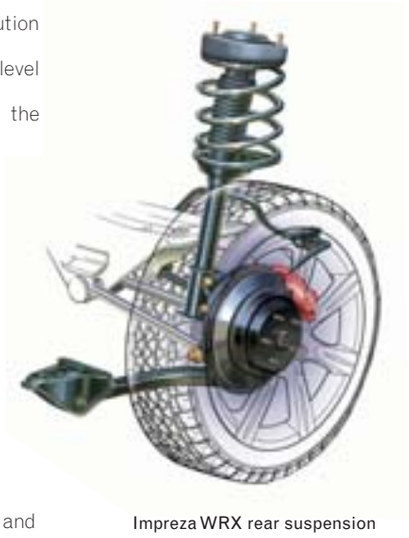
The Torque distribution ratio between front and rear wheels in the static position is now 41:59.

Suspension

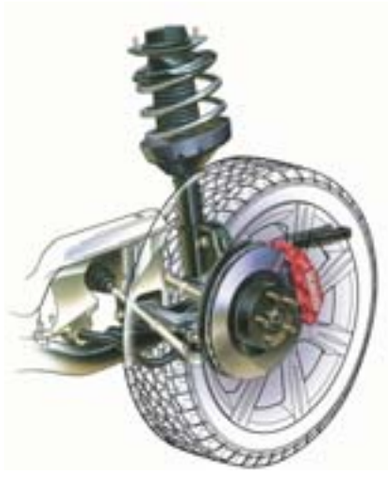
Suspension

The front suspension for the MY06 Impreza is an evolution of the current system that already provides for a high level of lateral rigidity, which significantly contributes, to the vehicle's superior handling characteristics.

The front suspension is a lightweight MacPherson strut independent system that has proven its durability during the World Rally Championship (WRC). It features a 'L' shaped transverse link and coil springs that are offset, so that the centre line of the spring coincides with the pivot axis, thereby minimising the friction generated by the up and down movement of the strut. The effect is to lessen vibration and reduce the feeling of thrust transmitted from the road thereby providing good ride comfort with good road tracking.



Impreza WRX rear suspension



Impreza WRX front suspension

On the Impreza WRX and STI sedan the lower front transverse link suspension arm, is made of cast aluminium to reduce the unsprung weight. This is a direct input from the World Rally and STI development program.

Suspension geometry retains negative scrub steering roll radius, which provides for improved braking stability when braking forces on left and right wheels are uneven due to varying road surface coefficients of friction.

The rear suspension is a dual link strut configuration, the objective being to produce a sports handling performance. Strut suspension is more suitable in this regard due to its lighter unsprung weight, smaller number of moving parts and adaptability for motor sport competition. Impreza WRX has further lightened the rear unsprung weight by use of two aluminium rear lateral link arms. The STI has the additional benefit of all four rear lateral link arms being aluminium with pilot ball type joints.

The WRX and STI also feature "inverted" struts for higher bending rigidity due to a larger damping tube that also provides superior damping characteristics with less damping fade as a result of increased piston size.

The benefit of an increase in strut bending resistance as a result of increased lateral strenght is that under hard cornering there is less change in the dynamic suspention geometery. This means the ideal tyre to road contact pattern is maintained and increased cornering power is achieved due to increased tyre traction.

Lastly but not least the high level of body strength has meant that the rubber suspension bushings are tuned for improved Noise, Vibration and Harshness (NVH) and comfort levels without compromising vehicle stability and handling.

Brakes

Brakes

The MY06 Impreza braking system features high capacity four-wheel discs and the traditional diagonally linked interior piping system with electronic pressure control for greater braking power, safety and reliability.

The diagonally linked split system means that if one circuit of the brake hydraulic system should fail then braking is retained in the remaining circuit on opposite corners of the vehicle. This results in the vehicle pulling up under control without any violent lurching to one side, which can occur on vehicles that are split on a front and rear basis. The interior routing of the brake pipes also means that there is less likelihood of damage or fracture of a pipe when driving in rough terrain whilst corrosion of the brake pipes is virtually impossible.

Electronic Brake Force Distribution (EBD) pressure control is also used to balance the braking force to the weight distribution of the vehicle.

The Impreza WRX features high braking performance with four pot callipers matched to 294mm diameter ventilated discs on the front and two pot callipers on 290mm diameter, ventilated discs on the rear. The 2.0i and 2.0R models front brakes have 277mm diameter, ventilated discs with heavy-duty twin piston floating callipers. While on the rear 266mm discs with single piston floating callipers are used.

A vacuum suspended tandem booster provides power assistance with an effective diameter of 205 + 230mm for reduced pedal effort but retaining a firm braking feel.

Large capacity 'Brembo' ventilated disc brakes are used on the STi to match the high performance engine output to ensure that stopping power is consistent with pulling power.

Front Brake

Rear Brake

Impreza WRX STI brakes

The STi front brakes feature 326mm diameter by 30mm thick ventilated discs with four piston calipers. The caliper features a 'large' (46mm) and 'small' (40mm) diameter piston on each side of the disc, with the smaller diameter being on the 'leading' edge to ensure that brake pad wear is consistent across the length of the brake pad. The rear brakes have 316mm diameter by 20mm thick ventilated discs with two piston calipers (2x36mm).

Active Safety

ABS

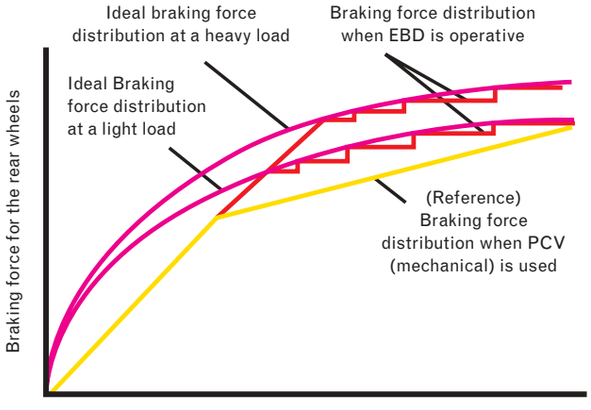
ABS braking is standard on all models and features the Bosch system made under licence by Nippon ABS.

It is a full four channel, three phase, four-sensor system with the front wheels being controlled individually and the rear wheels controlled jointly through the select low method. This system features a high level of wheel speed control and is capable of operating the three-phase control cycle 30 times per second. The select low method uses the rear wheel with the lower co-efficient of adhesion to determine the brake pressure applied to both rear wheels. This select low control, along with electronic delayed build up of braking force at the front wheel and negative steering roll radius, minimises the tendency for the vehicle to turn about its vertical axis (spin) when braking on uneven road surfaces. Tuning the ABS operation for Australian conditions is vitally important for the performance of ABS in the unique conditions especially gravel roads. With this in mind, Subaru engineers have carried out extensive testing in Australia's unique conditions and have developed ABS computer logic for Australian conditions. It should be remembered however that whilst it is still true that non-ABS vehicles have shorter stopping distances on gravel roads, all direction control is lost when the wheels lock. The STi braking system also comes equipped with Super Sports ABS with Electronic Brake force Distribution (EBD). This improves ABS performance during cornering and reduces stopping distances with greater stability under heavy braking. Super Sports ABS uses input from a lateral 'G' sensor to individually control brake pressures more accurately when ABS operates during hard cornering under brakes, leading to reduced understeer. Normally ABS would jointly control both rear brakes to the same braking force when the inside wheel loses traction, with a resultant increase in stopping distance and cornering understeer. Under these same conditions Super Sports ABS controls rear braking force individually leading to a reduction in stopping distance and cornering understeer.

	STi	WRX
Stopping Distance (m)	46.4	52.7
Slide Distance (m)	1.5	3.5

Electronic Brake-Force Distribution

Electronic Brake-Force Distribution (EBD) more accurately regulates brake force distribution between front and rear wheels to the ideal level, thus improving stopping distances and stability. This is performed by electronic monitoring of individual wheel speeds and deceleration G force to calculate the amount of braking force that can be supplied to the rear wheels. Conventional braking systems rely on a mechanical proportioning valve to limit the braking force at the rear wheels, to reduce the possibility of rear wheel lock under heavy braking due to weight transfer. A mechanical proportioning valve however restricts rear-braking force to a level well below the ideal limit, requiring the front brakes to take more of the braking load. This leads to increased understeer and under utilisation of the rear brakes.



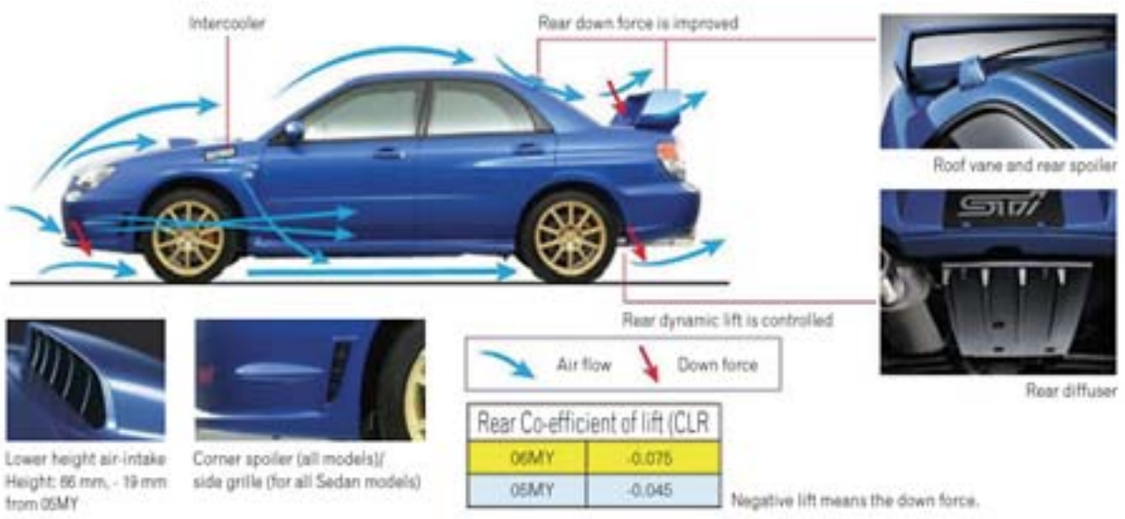
Active Safety

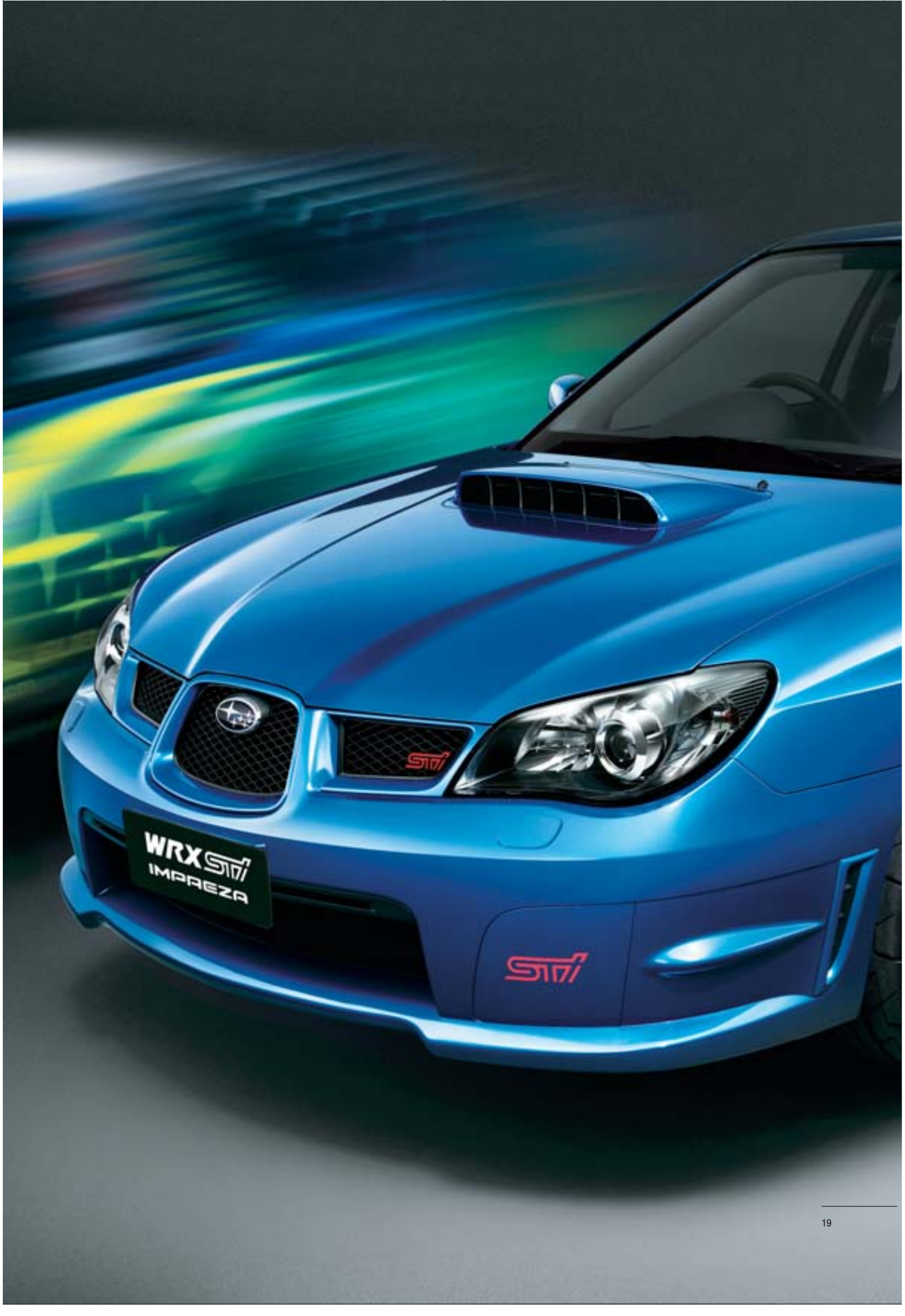
Aerodynamics

The MY06 Impreza STI features a completely revised aerodynamic package compared to the previous MY05 model. Additions include a WRC look front bumper which generates frontal downforce, also front corner spoilers and grilles. These components provide air extraction from the area behind the front bumper, and improve the airflow down the side of the car.

The new roof vane combines with the rear diffuser and boot spoiler dramatically improves the aerodynamics for improved stability and handling. The roof vane catches the airflow from the roof and directs it to the rear spoiler thereby enhancing its performance. The rear diffuser smooths the airflow under the car helping to create a smooth airflow on exit.

The co-efficient of lift (CL) performance has improved from minus 0.045 to minus 0.075. (Greater down force) which is a 67% improvement on the MY05 model



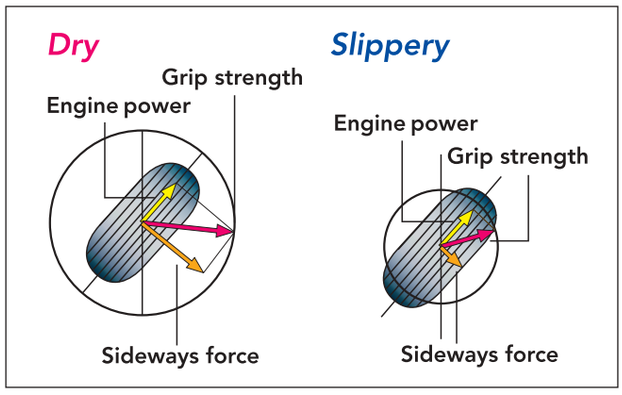

WRX STI
IMPREZA

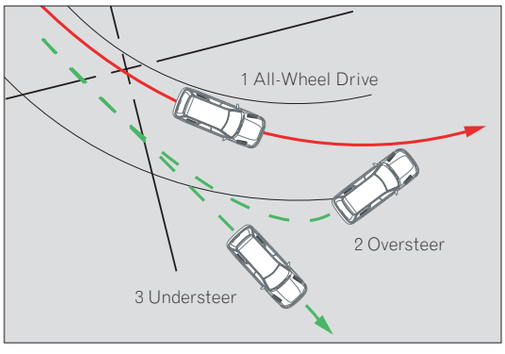
Active Safety

All-Wheel Drive

New Active Torque Split AWD System (ACT-4)

The All-Wheel Drive AWD automatic transmission distributes the motive power constantly to all four wheels. It is known as the active torque split system and uses a computer to constantly monitor the driving conditions and distribute torque accordingly. This system can infinitely vary the torque distribution to a maximum of 60% front and 40% rear with static weight distribution. The result is that when combined with dynamic weight distribution and selected gear range, the transmission can distribute the drive to provide the best possible traction and fuel efficiency for the conditions at that time.



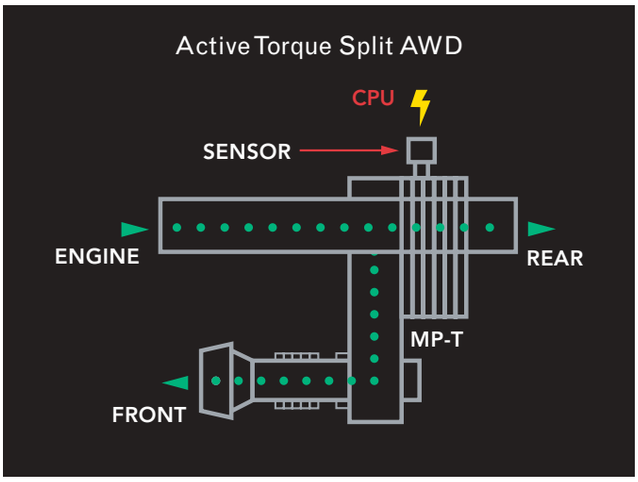


As a result of the 'direct control' automatic transmission control, (2.0R) 'real time' monitoring and distribution of front and rear drive can be achieved for a smoother and highly responsive AWD system. This new system constantly monitors all four-wheel speeds and engine output to distribute driving power according to 'real time' conditions. For example during economy driving, power distribution is undertaken to minimise torque loss however when slippery conditions are encountered traction performance equivalent to direct AWD is achieved. When hard cornering more accurate distribution of front – rear drive, also helps to minimise understeer and oversteer hereby assisting the driver to maintain the ideal driving line.

Unlike part time 4WD systems that require the driver to recognise the necessity for four wheel drive and other competitor AWD systems which require rear wheel loss of traction to react, the active torque split system automatically drives all four wheels constantly, therefore minimising any loss of traction.

When road and driving conditions suddenly change the Subaru Active torque Split system is already driving all four wheels. This means that the level of available traction at each wheel for stability and manoeuvrability is greatly increased. A genuine safety feature even on the bitumen when the road surface changes halfway around a corner or is sharper than anticipated.

In first gear range position the system also increases four-wheel drive pressure applied to the transfer clutch for increased drive distribution to the rear wheels for closed throttle operation (steep descent). This provides for better control in difficult slow speed conditions.



All-Wheel Drive

5 Speed Manual Transmission AWD

In the manual transmission a viscous coupling limited slip centre differential is used to constantly transmit the engine power to all four wheels. During straight line driving the torque split by the differential is 50/50 to front and rear wheels. Torque distribution at the road however is also dependent on load distribution and tyre grip. During actual driving conditions load movement when cornering, accelerating or braking etc. causes the torque distribution to also move in the same proportions.

When wheel slip occurs a rotational speed difference between the front and rear axles is created and the viscous coupling automatically matches the torque to grip in order to restore maximum traction.

The nerve centre of the limited slip differential is the viscous coupling which is a housing containing a number of inner plates connected to the rear wheels and outer plates connected to the front wheels. The housing is also filled with silicone fluid that increases in viscosity as a difference in front and rear wheel speed occurs. When wheel spin occurs, there is a rotational speed difference between front and rear axles and as a result the inner and outer plates also turn at a different speed.

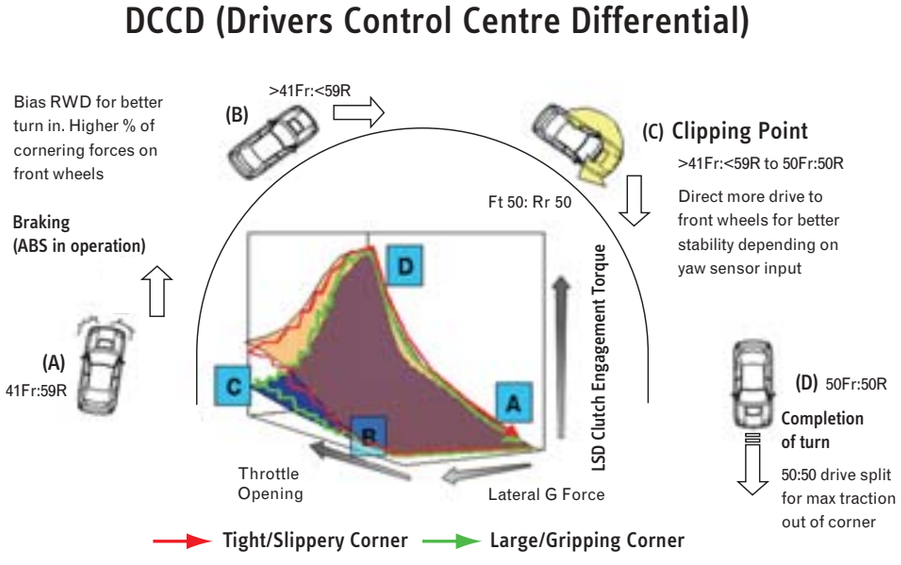
This causes an increase in the viscosity of the silicone fluid due to the shearing of the fluid between the plates. The increase in viscosity makes the silicone fluid more difficult to shear and hence torque is transferred from the slipping axle to the axle that still has traction.

6 Speed Manual Transmission

In the 6 speed manual transmission an electronically controlled, mechanical limited slip centre differential is used to transmit the engine power to all four wheels

The torque cam type centre LSD is constantly and accurately reacting to torque differences between front and rear wheels and in the event of a mid corner change in throttle position, the LSD affect is still maintained to control under steer and over steer.

This system can be used in full automatic mode which relies on the computer to control the drive distribution ratio as shown in the diagram by using preprogrammed logic and input signals from the Yaw sensor, G sensor and throttle positions as primary inputs. The MY06 also now has a steering angle sensor as input of the drivers intended direction to further refinine the stability control. It also can be switched to manual mode where the driver can select from six different torque distribution ratios depending on their driving preference.



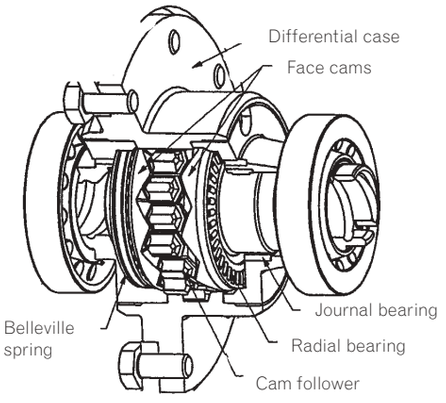
Active Safety

All-Wheel Drive

Rear Differential

The Impreza WRX comes equipped with rear “Suretrac” limited slip differential. These LSDs respond to a torque differential between left and right wheels transferring the torque from the slip wheel to the non-slip wheel.

The benefit is that they only activate under drive and do not respond to differences in left & right wheel cornering speed when coasting. This means that at the limit of adhesion torque is transferred from the inside wheel that is losing traction as a result of weight transfer to the outside that has traction. The effect is to noticeably reduce understeer under hard cornering with full engine power.

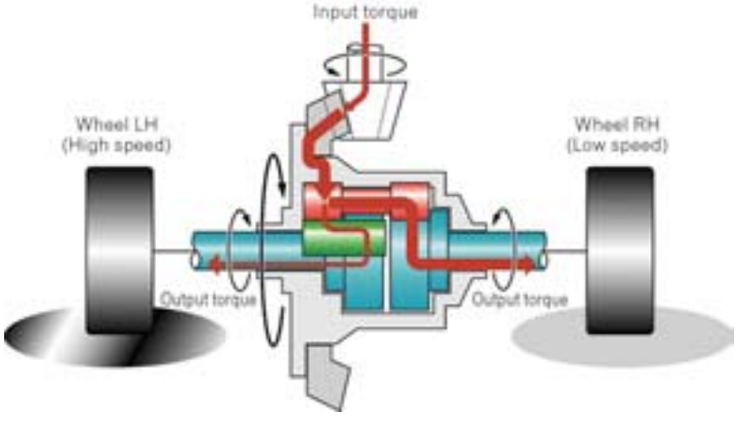


Impreza STI is equipped with a Clutch type Limited slip rear differential. The Clutch plate design comprises of multiple drive and driven plates splined to the axles. The advantage of a clutch type LSD is that it has a progressive limited slip affect and also an increased limited slip torque capacity compared to a viscous type LSD.

Front Differential (STi)

The Impreza STI is fitted with a helical torque-sensing differential. It works through internal friction and gear reaction forces to transfer torque from the slip wheel to the non-slip wheel under drive conditions. In other words it only transfers torque when the throttle is applied.

During hard cornering as the inside wheel loses traction as a result of weight transfer, when the throttle is applied the torque is increased on the outside wheel. This increased tractive force helps to pull the vehicle into the corner.



Symmetrical Layout

The horizontally opposed engine used in the Subaru has a symmetrical horizontal layout which provides for excellent weight distribution not possible with other engine configurations. From engine to rear differential, the entire All-Wheel Drive (AWD) power train is located on the centre line, in a unique symmetrical horizontal layout.

If an East West four cylinder engine with a transfer case transmission was used. The rear wheels and driveshaft would be positioned slightly offset from the engine's centre line. This would result in an unbalanced left/right symmetry and weight distribution.

If an In-line 'North South' engine configuration is used, the longer less compact engine creates an imbalance of front/rear weight distribution caused by increased weight overhang past the front wheels. This would also result in unbalanced symmetry and weight distribution.

Weight Distribution

Weight distribution is one of the major factors in determining the available level of traction between tyre and road and is of paramount importance in the level of vehicle stability. Therefore to provide as close as possible to neutral balance handling characteristics, symmetrical weight distribution is of prime importance. However, in reality because the engine and transmission are two of the heaviest components in a motor vehicle, this is not entirely possible. In a Subaru All-Wheel Drive AWD vehicle with the horizontally opposed engine, the static weight distribution is approximately 60% front, 40% rear. To further complicate the matter however, weight distribution is not static. When the vehicle is in motion it is dynamic and shifts constantly when accelerating, braking, climbing hills and cornering. A well-balanced vehicle in the first instance however, is considerably easier to control than a vehicle, which has excessive left/right or front/rear imbalance.

The low centre of gravity created by the low height of the boxer engine also provides not only for improved and safer performance on the highway but also for greater stability in more difficult terrain.

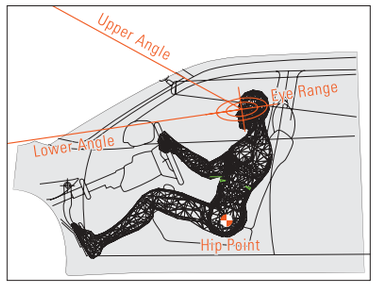
Active Safety

Visibility & Comfort

Occupant comfort and optimum visibility are important considerations not only from the point of view of creature comfort but also with regard to active safety. Active safety in the first instance is all about improving the driver's ability to control the vehicle. In this context it is important that the driver is not distracted due to poor visibility or having to move awkwardly to operate the controls.

The choice of the correct eye point not only creates a feeling of freedom and roominess inside the vehicle; it also reduces the number of blind spots and allows the driver to easily judge the exterior dimensions of the vehicle.

The drivers seat position and forward visibility have been set so that the leading edge of the bonnet can always be seen. This is possible because the horizontal opposed engine is low in the chassis frame and therefore the bonnet can also be positioned low. The drivers and passengers front seat framing has been changed to reduce the 'Submarine affect' in the event of a frontal impact. Front seats also incorporate the Liberty style towel rail bar to aid forward and back adjustment. When combined with the ratchet seat lifter, which provides a range of 50mm, any driver of virtually of any size can attain the optimum driving position.



It is also important to minimise the amount of eye movement and refocussing which is necessary to take in essential information from the instrument panel. Switches and controls have therefore been designed to facilitate operation using sense of touch rather than having to take ones eyes from the road to verify its operation.

Headlight performance has been dramatically improved. On the WRX and STi HID (High Intensity Discharge) Xenon self-levelling lights are used with 60W halogen high beam and a 35W HID low beam unit with a high-pressure pop up headlight washer. Headlight washers are required on all vehicles fitted with HID lighting systems to minimise light beam refraction and hence the tendency to dazzle oncoming drivers. On other models 'Projector' 55W low beams and 60W halogen high beams are used. A low level of interior noise also makes a significant contribution to the level of comfort and safety of the vehicle and therefore one of the prime objectives of the designers was comfort and quietness of operation.

Passive Safety

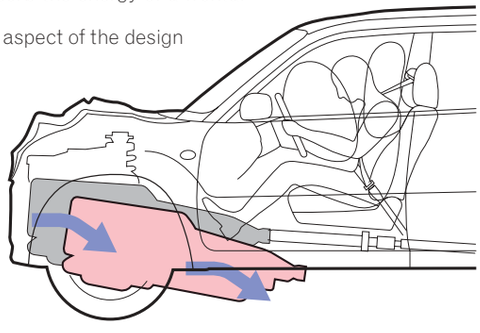
Body

Body construction is the most important aspect of passive safety. The Impreza range achieves a high four star rating in ANCAP independent safety rating assessments. In this structure, the centre pillars, roof and floor are connected to form a ring shape for increased rigidity and effective dispersal of the impact energy in a side collision. The structure of the centre pillar also uses a high strength lightweight construction method called “Tailored blanked welding”. This method uses two steel plates (2.6mm & 1.2mm) that are laser welded together prior to stamping. The double thickness plate is only used in the specific area where additional strength is required and therefore this method retains the high strength of a single one piece stamping at a much-reduced weight. In a full frontal or an offset collision the hydro-formed sub-frame and side frames protect the occupants by absorbing and dispersing the impact energy. This two stage structure splits the impact energy into two streams one of which is dispersed by the floor and side sill frame and the other by the ‘A” pillar and roof frame. Strategic placement of two side door reinforced beams in the front door and one in the rear provide additional strength against side collision. Further strengthening of the rear door wheel arch and floor prevent the rear door being forced into the cabin in a side impact. A high strength rigid body also provides a solid frame structure as a base for the suspension and ensures that body flex does not impact upon the precision and superior stability, which are fundamental to Subaru’s Active Safety System.

To achieve this, lightweight yet rigid double skinned box sections were used for both pillar and roof rails whilst heavy duty reinforced parts are used for the attachment of suspension and steering components. This feature is essential to the Subaru design philosophy as it effectively lowers the centre of gravity and at the same time keeps the body weight to a minimum.

Power Train Layout Advantage

The compact longitudinally mounted horizontally opposed engine and transmission allows for installation in the vehicle with room to spare on all sides, especially to the front and rear. This means that the side frame that acts to absorb the energy of a frontal collision can be designed to the optimum shape and size for its purpose. Another superior aspect of the design is that in the event of a frontal collision the power train will move downwards and backwards underneath the floor without intrusion into the passenger compartment. The engine bay then becomes a high efficiency crush zone to absorb the shock and energy of the impact. Conversely with an inline transversely mounted engine and transmission layout due to its greater dimension and greater overall height, it cannot move underneath the vehicle and it is forced into the passenger compartment.



Occupant Restraint

SRS Airbags

Dual SRS front airbags are standard equipment on all vehicles along with electric pre-tensioner seatbelts with load limiters as a total occupant restraint system. The SRS (supplemental restraint system) airbag is an auxiliary device, which is designed to operate in conjunction with the seatbelt, and therefore the matching of the deployment of both units is critical in ensuring maximum protection to the occupant. During a collision if the deceleration force is above the pre-determined value, the SRS (Supplemental Restraint System) rapidly inflates airbags in front of the driver and passenger. This system, which uses two satellite sensors positioned on the chassis rail, determines if the impact is a side or frontal impact. The main sensor in the control unit determines if the impact exceeds the preset deployment threshold (Deceleration rate), which has been set for Australian conditions and regulations. The inflation rate is tuned to the operation of the seatbelt pre tensioner. The most important consideration remains the protection of the occupants from severe injury and the system is calibrated with this as the primary objective. The airbags, inflate within approximately 30 ms to cushion and absorb the forward momentum of the occupants. Vents in the side of the airbag then allow the bag to deflate as the body strikes the bag thereby decelerating the body at a more favourable rate. This prevents the occupant's head from striking the vehicles dash or steering wheel. Side airbag units are now standard on all models (excluding STI) and protect the front seat occupants in the event of a side impact above a pre-determined level.

Seat Belt Reminder

All Impreza models are fitted with seat belt warning alerts on the drivers seat. The seat belt reminder system receives inputs from the drivers seat buckle switch.

Pre-tensioner Load Limiter Seatbelts

An important measure in ensuring a high level of passive safety even when SRS airbags are used is the efficacy of the seatbelts. The effectiveness of the seatbelt in minimising injury is increased when the occupant is restrained quickly. If restraint is delayed, the difference in speed of the vehicle and the occupant's body increases and it is therefore subjected to extreme force when it stops suddenly. This speed difference will increase if there is any slack between the belt and the body, particularly if the belt is incorrectly positioned or the occupant is wearing bulky clothes. The pre-tensioner load limiter seatbelt is designed to quickly upon impact tighten the seat belt to take up the slack but then to also limit the load placed on the occupant's chest by feeding out the belt to absorb the shock of the impact. This mechanism is located in the retractor unit bolted to the lower 'B' pillar and is controlled by the same computer, which triggers the airbag deployment.

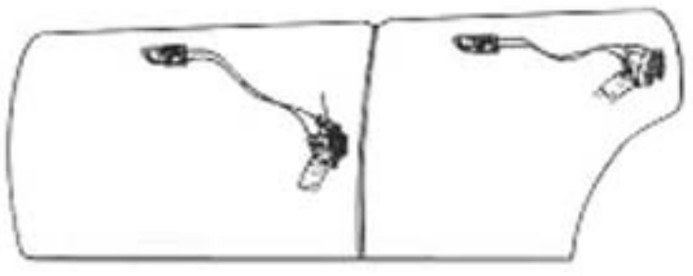
The front seatbelt top anchor point is also fully adjustable and the buckle is integrated into the seat to ensure the optimum belt position that is most effective in restraining the occupant is possible irrespective of the size of the occupant. Three point ELR seatbelts are also installed in all three rear-seating positions. On the hatch when not required the centre lap sash seatbelt can be disengaged from the lower anchor point and allowed to retract to the right hand rear D pillar.

Theft Prevention

Immobiliser

The immobiliser system is linked directly with the engine management computer (ECU). This system is a transponder type that utilises a rolling code for additional security. Once the key is inserted in the ignition lock and the ignition turned on an antenna amplifier positioned around the ignition lock reads the transponder code and transmits it to the engine management and immobiliser computer. The ECU and immobiliser computer that are also encripted with the code sequence compare the transmitted code for the correct sequence and, if correct, allow the engine to start. The ECU will allow two attempts at starting and if on both occasions an incorrect code is obtained then the engine will refuse to start.
Remote central locking transmitter is incorporated as one unit into the key along with the immobiliser transponder.
If a duplicate key is required, the transponder code needs to be registered with the ECU. This teaching operation can only be performed with special equipment and the software is only available to authorised personnel.
In addition to the factory immobiliser system the WRX and STI is fitted as standard with a Subaru Australian designed 'Dual Stage Security System'. This system provides two separate security systems. The remote locking transmitter operates one system and the other by a PIN operated keypad.
This provides for additional six points of immobilisation, anti hijack mode, automatic re-arm, intrusion alert, false alarm prevention, internal screamer, infrasonic sensor, valet mode and also features anti cross pollination software for additional theft protection.

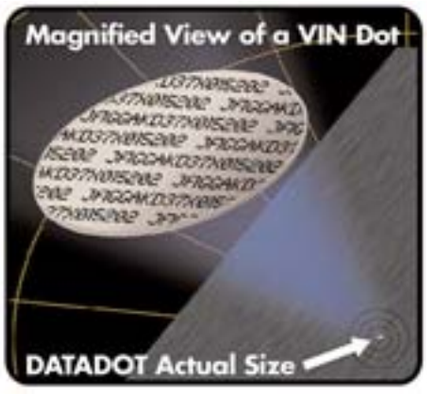
Door locks



Exterior key cylinder locks have also been removed from the passenger's door and the tailgate to further improve security against theft by minimising the number of access points. As all models are equipped with keyless entry primary unlocking of all doors is performed electrically and only the drivers doors is equipped with a manual key cylinder. One of the most common access points for auto thieves is via the door lock linkages through the window glass aperture. To prevent entry via this means the linkage from the inner door handle and locking knob is now shielded cables.
On the WRX and STI models an additional double locking system is used which isolates the interior unlock buttons when the system is double locked using the remote transmitter. This means when activated the doors can only be unlocked using the remote transmitter and cannot be opened from the inside of the vehicle. When the key is in the ignition however this function is isolated to prevent anyone getting trapped inside the car.

Security - DataDot Technology

Vehicle Identification Theft Protection



All Impreza models have been coded with up to 7,000 microscopic DataDots, taking theft protection to an even higher level. This system provides for vehicle and component identification thereby deterring professional thieves from targeting the Subaru. By making it difficult to change the identity of stolen vehicles or use parts from multiple vehicles to "re-birth" a car the Subaru is less attractive to them.

The DataDot system carries the endorsement of the Government appointed National Motor Vehicle Theft Reduction Council. It is also supported by an extensive infrastructure of registration and justice agencies that have been trained to recognise this unique vehicle identifier when carrying out the process of vehicle and/or component identification.

On WRX and STI self voiding (VIN) labels are also applied to all major panels with a VIN plate positioned behind the windscreen.

What Are DataDots?

DataDots represent state of the art identification technology. They are the size of a grain of sand, made from a high tech polyester substrate and suspended in a clear drying adhesive with a UV trace featuring its own DNA qualities.

How do they Work?

DataDot Technology is a simple and effective theft deterrent system, based on the reliable identification of a vehicle's key component parts. As a result the vehicle is of little value to a professional thief. They are only interested in vehicles where they can easily change their identity or strip for parts. Seven Thousand (7,000) DataDots, are laser etched with your unique Vehicle Identification Number (VIN), using a unique, patented spray process. They are a permanent identification solution for the vehicle and the warning labels clearly mark the vehicle and component parts as being easily identifiable by authorities in the event of theft.

How can the dots be seen?

The DataDots are almost invisible to the naked eye, yet under UV light the clear drying adhesive shines brightly and is easy to detect, even from a distance. Having located a single DataDot, it can be simply viewed under a minimum of 30 times magnification. Police and registration authorities are generally equipped with suitable magnification tools. This enables authorities and Police to conduct on the spot verification of the DataDot VIN against the VIN plate affixed to the vehicle.

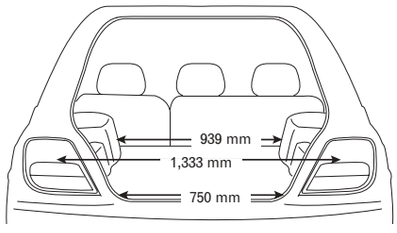
How does it reduce theft risk?

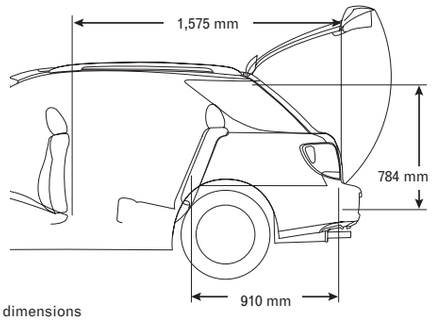
The deterrence of theft is the ultimate protection for the vehicle and DataDot Technology helps the police to prove the true identity of a vehicle and hence increases the risk of conviction. Hence the Protected by DataDot Technology decals warn thieves to stay away from the vehicle and look elsewhere.

Interior Dimensions

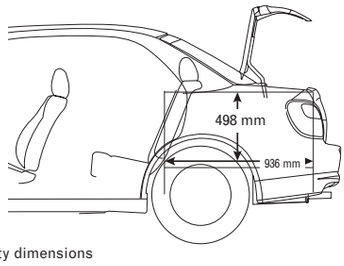
Cargo Volume (measured by VDA)			Litres
With back seat up (V11) To lower end of rear quarter window			356
With back seat folded down (V14)			1266
Boot volume			401 (395) STI
Interior Size (measured by SAE/FHI)	**FHI**	**SAE No.**	**mm**
Front shoulder room		W3	1344
Rear shoulder room		W4	1340
Effective leg room (front)		L34	1090
Effective head room (front) Sedan/Hatch		H61	985/1010
Effective head room (rear) Sedan/Hatch		H63	932/960
Rear opening lower width	3		750
Cargo space height	4	H505	784
Cargo floor width (rear quarter)	2		1333
Cargo floor width (wheel house)	1	W201	939
Cargo floor length (back seat up)	6	L203	910
Cargo floor length (back seat down)	5	L202	1396
Boot height	7		498
Boot length	8		936
Hip room front			1353
Hip room rear			1319

Sportshatch utility dimensions

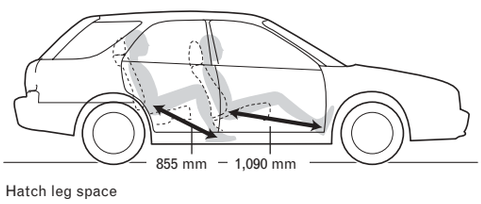




Hatch dimensions

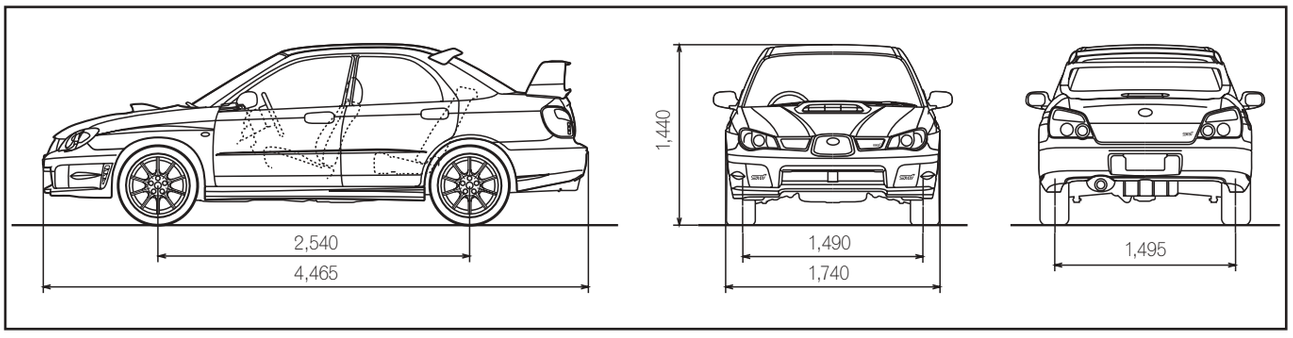


Sedan utility dimensions

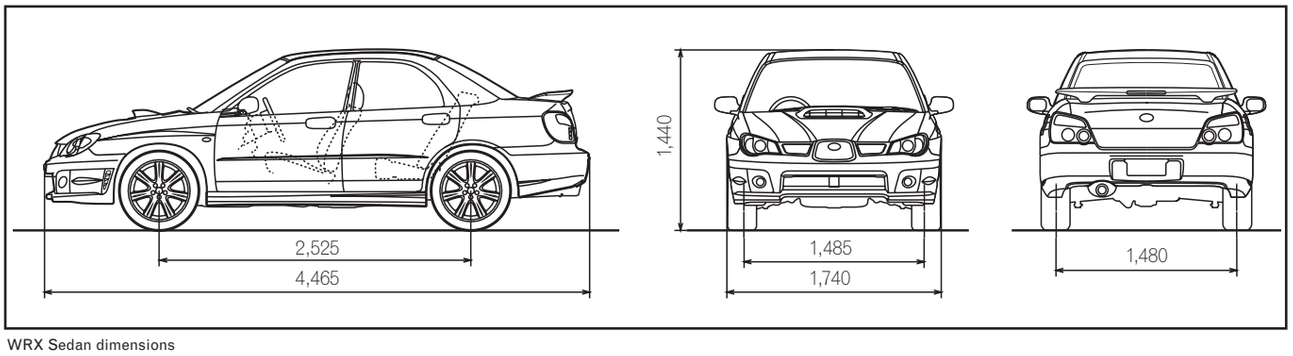


Hatch leg space

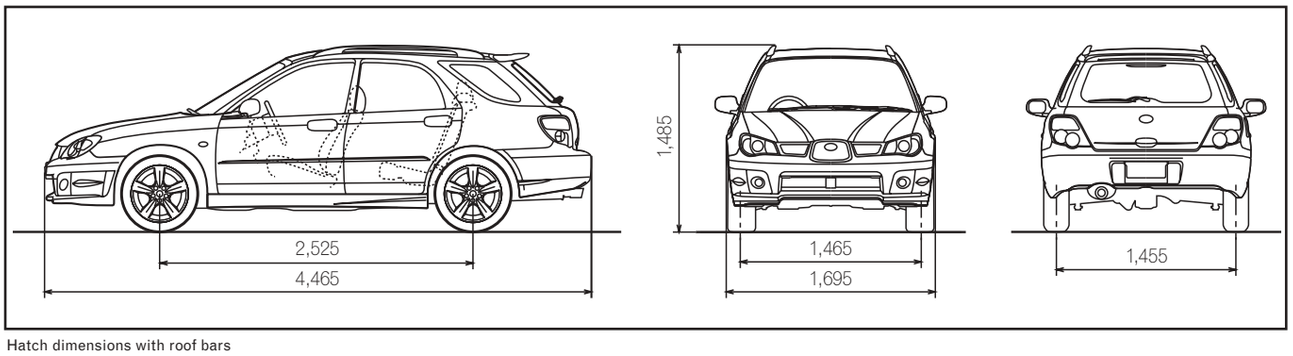
Exterior Dimensions



STI Sedan dimensions



WRX Sedan dimensions



Hatch dimensions with roof bars
2.0i. 2.0R, WRX

Impreza Specifications

Model	2.0i	RV	2.0R	WRX 2.5	STI 2.5
BODY					
Overall Lenght mm Sedan (Hatch)	4465 (4465)	NA (4465)	4465 (4465)	4465 (4465)	4465 (NA)
Overall Width mm Sedan (Hatch)	1740 (1695)	NA (1710)	1740 (1695)	1740 (1695)	1740 (NA)
Overall Height mm Sedan (Hatch) without rail	1440 (1465)	NA (1475)	1440 (1465)	1440 (1465)	1440 (NA)
Wheelbase mm	2525	2525	2525	2525	2540
Front Track mm Sedan (Hatch)	1485 (1465)	NA (1460)	1485 (1465)	1485 (1465)	1490 (NA)
Rear Track mm Sedan (Hatch)	1475 (1455)	NA (1455)	1475 (1455)	1480 (1455)	1495
Min Road clearance @ UM mm Sedan (Hatch)	150 (150)	NA (160)	150 (150)	155 (155)	155 (NA)
Approach Angle deg.	15	15	15	15	15
Departure Angle deg.	18	19	17	17	16
Breakover angle deg.	14	15	15	15	15
Unladen mass (UM) Kgs Manual Sedan (Hatch)	1310 (1355)	NA (1345)	1348 (1388)	1415 (1430)	1495
Unladen mass (UM) Kgs Automatic Sedan (Hatch)	1330 (1365)	NA (1360)	1368 (1398)	NA	NA
Gross Vehicle mass Kgs Sedan (Hatch)	1760 (1800)	NA (1800)	1780 (1820)	1860 (1860)	1900
Payload Kgs (inc passengers) Manual - Sedan (Hatch)	450 (445)	NA (455)	432 (432)	445 (430)	405
Payload Kgs (inc passengers) Automatic - Sedan (Hatch)	430 (435)	NA (440)	412 (422)	NA	NA
ENGINE					
Type	Horizontal opposed 4 cyl sohc	Horizontal opposed 4 cyl sohc	Horizontal opposed 4 cyl sohc	Horizontal opposed 4 cyl sohc	Horizontal opposed 4 cyl sohc
Capacity cc	1994	1994	1994	2457	2457
Bore x Stroke mm	92x75	92x75	92x75	99.5 x 79	99.5 x 79
Comp. Ratio	10:0	10:0	10:0	9:0	8:0
Max output Kw/rpm	92/5600	92/5600	118/6400	169/5600	206/5600
Max Torque Nm/rpm	184/3600	184/3600	186/3200	320/3600	392/4000
Power to weight ratio kg/Kw Manual Sed, (Hatch)	14.2 (14.7)	14.6	11.4 (11.8)	8.4 (8.5)	7.3
Power to weight ratio kg/Kw Auto Sed, (Hatch)	14.4 (14.8)	14.7	11.6 (11.9)	NA	NA
Power/litre Kw/ Litre	46.14	46.14	59.18	68.78	83.84
Fuel system	Multi point sequential injection	Multi point sequential injection	Multi point sequential injection	Multi point sequential injection	Multi point sequential injection
Fuel Requirement RON (research octane number)	90	90	90	95	98
Alternator	12volt 90 amp	12volt 90 amp	12volt 110 amp	12volt 110 amp	12volt 110 amp
Battery	12volt 27 amp hr	12volt 27 amp hr	12volt 27 amp hr	12volt 48 amp hr	12volt 48 amp hr
TRANSMISSION					
Type	Automatic	Automatic	Automatic		
Gear ratio 1st	2.785	2.785	2.785		
Gear ratio 2nd	1.545	1.545	1.545		
Gear ratio 3rd	1.000	1.000	1.000		
Gear ratio 4th	0.694	0.694	0.694		
Gear ratio Rev	2.272	2.272	2.272		
Final Drive axle ratio	4.111	4.111	4.111		
Type	Manual	Manual	Manual	Manual	Manual
Gear ratio 1st	3.454	3.454	3.454	3.166	3.636
Gear ratio 2nd	2.062	2.062	2.062	1.882	2.235
Gear ratio 3rd	1.448	1.448	1.448	1.296	1.521
Gear ratio 4th	1.088	1.088	1.088	0.972	1.137
Gear ratio 5th	0.825	0.825	0.825	0.738	0.891
Gear ratio 6th					0.707
Gear ratio Rev	3.333	3.333	3.333	3.333	3.545
Axle ratio	3.900	3.900	4.111	4.444	3.900
High/Low ratio - Hatch only	1.447	1.447	1.447		
STEERING					
Type	Rack & Pinion	Rack & Pinion	Rack & Pinion	Rack & Pinion	Rack & Pinion
Turning circle diameter curb to curb metres	10.40	11.00	10.40	11.00	11.60
Tyre size	195/60 R15 88H	205/55 R16 89V	205/50R16 87V	215/45R17 87W	225/45R17 90W
Manufacturer	Michelin	Bridgestone	Michelin	Bridgestone	Bridgestone
Model	Energy XH1	RE92A	Pilot Primaci	Potenza RE 050A	Potenza RE070
Rim size	6 JJ x 15	6 JJ x 16	6 JJ x 16	7 JJ x 17	8 JJ x 17
Rim offset mm	55	55	55	55	53

Impreza Specifications

Model	2.0i	RV	2.0R	WRX 2.5	STI 2.5
SUSPENSION					
Front	Macpherson strut, Independent coil spring	Macpherson strut, Independent coil spring	Macpherson strut, Independent coil spring	Macpherson strut, Independent coil spring	Macpherson strut, Independent coil spring
Rear	Dual link strut, Independent coil spring	Dual link strut, Independent coil spring	Dual link strut, Independent coil spring	Dual link strut, Independent coil spring	Dual link strut, Independent coil spring
BRAKES					
System	Disc ventilated front/ Disc solid rear	Disc ventilated front/ Disc solid rear	Disc ventilated front/ Disc solid rear	Disc ventilated front/ Disc solid rear	Disc ventilated front/ Disc solid rear
Front ventilated disc outer diameter mm	277	277	277	294	326
Front brake caliper (pot size) mm	Twin Piston Floating (2x42.8)	Twin Piston Floating (2x42.8)	Twin Piston Floating (2x42.8)	4 Piston (4x40.4)	4 Piston (2x40, 2x46)
Rear disc outer diameter mm	266	266	266	290	316
Rear brake caliper (pot size) mm	Single Piston Floating (1x38.1)	Single Piston Floating (1x38.1)	Single Piston Floating (1x38.1)	Twin Piston (2x 38.1)	Twin Piston (2x36)
Brake Booster Type (size mm)	Vacuum 205 + 230	Vacuum 205 + 230	Vacuum 205 + 230	Vacuum 205 + 230	Vacuum 205 + 230
CAPACITIES					
Fuel tank litres	50	50	60	60	60
Fuel range Km @ ADR81/01 combined cycle, Manual (Auto)	532 (538)	532 (538)	612 (625)	550 (NA)	517 (NA)
Engine Oil Litres	approx 4.5	approx 4.5	approx 4.5	approx 5.0	approx 5.0
Engine Coolant Litres	7.0 man 7.3 auto	7.0 man 7.3 auto	7.0 man 7.3 auto	7.7 man	7.7 man
TOWING WEIGHTS					
Unbraked trailer Kgs	500	500	500	500	500
Braked trailer Kgs Manual (Auto)	900	900	900	900	900
Max towball download	75	75	75	75	75
Maximum roof load Kgs	80	80	80	80	80
FUEL CONSUMPTION					
ADR81/01 Litre/100 Km Combined cycle Manual (Auto)*	9.4 (9.3)	9.4 (9.3)	9.8 (9.6)	10.9	11.6
PERFORMANCE					
Max. Speed Km/hr man	192	192	210 (203)	210 limited	255 limited
Max. Speed Km/hr auto	182	182	191 (187)	NA	NA
0-100 Km/hr secs. man (Hatch)	10.2	10.2	8.8	5.9 (6.1)	5.4
0-100 Km/hr secs. Auto	12.7	12.7	11.6	NA	NA
MAX tan _ Maximum Safety Angle (Hatch)	53° (53°)	(50°)	53° (50°)	53° (50°)	53°
CARGO VOLUME (measured by VDA) Litres					
With back seat up (V11) To lower end of rear quarter window (Hatch)	356	356	356	356	NA
With back seat folded down (V14) (Hatch)	1266	1266	1266	1266	NA
INTERIOR SIZE (measured by SAE/FHI) mm					
Front shoulder room (W3)	1344	1344	1344	1344	1344
Rear shoulder room (W4)	1340	1340	1340	1340	1340
Effective leg room (front) (L34)	1090	1090	1090	1090	1090
Effective leg room (rear) (L51)	-	-	-	-	-
Effective head room - front (H61) - Sedan (Hatch) *36mm less with sunroof*	985 (1010)	985 (1010)	985 (1010)	985 (1010)	985
Effective head room - rear (H63) - Sedan (Hatch) *2 mm less with sunroof*	932 (960)	932 (960)	932 (960)	932 (960)	932
Rear opening lower width (FHI 3) - Hatch only	750	750	750	750	750
Cargo space height (FHI 4 / H505) - Sedan (Hatch)	498 (784)	498 (784)	498 (784)	498 (784)	498
Cargo floor width (rear quarter) (FHI 2)	1333	1333	1333	1333	1333
Cargo floor width (wheel house) (FHI 1 / W201)	939	939	939	939	939
Cargo floor length (back seat up) (FHI 6 / L203) Sedan (Hatch)	936 (910)	NA (910)	936 (910)	936	936
Cargo floor length (back seat down) (FHI 5 / L202) Sedan (Hatch)	NA (1396)	NA (1396)	NA (1396)	NA (1396)	NA

*Fuel consumption measured according to the new standard which results in a higher numerical figure, but the same rate of consumption.
Subaru Australia reserves the right to change mechanical specification and equipment levels without notice. **95 RON fuel is not available in all areas of Australia.