This press pack accompanied the media launch of the fourth generation Lexus LS in November 2012. The model underwent a number of changes during its time on sale and these can be tracked using the Timeline feature on the LS archive home page. Further assets and information regarding the LS range can be obtained from the Lexus press office.

THE LEXUS LS
LS 600h and LS 460

1 LS PRODUCT CONCEPT

History

In August 1983, Eiji Toyoda, then Toyota Chairman, challenged his senior executives to build, quite simply, "the best luxury car in the world."

Conceived under the tenet "everything we can do in one car", and driven by a fundamental philosophy of the new Lexus brand – "the relentless pursuit of perfection" - it took 1,400 engineers and 2,300 technicians, 450 prototypes and six years to complete the LS 400. Two years after the vehicle's introduction in 1989, Lexus had become the best selling luxury import brand in America.

The LS 400 redefined the concept of quality, applying it to even the smallest details, and in so doing established a global benchmark for a new generation of luxury cars. Painstaking attention to the reduction of noise, vibration and harshness succeeded in creating an exceptionally quiet, comfortable cabin. Advanced aerodynamics – a class-leading aspect of every LS evolution – afforded the LS 400 a drag coefficient of just 0.29, further enhancing the car's remarkable quietness at high speed.

The outstanding durability and reliability that have become a hallmark of the Lexus were developed through comprehensive testing on an unprecedented scale. More significantly, Lexus engineers recognised that the continuous re-analysis of the basic aspects of automotive engineering is fundamental to ensuring that technology serves a clear purpose. These principles have remained central to the development of every LS model to date.

Launched in 1994, the second generation LS further advanced the unrivalled levels of quietness and ride comfort established by its predecessor. The wheelbase was lengthened, improving both cabin and luggage space, and a number of new, advanced features, such as multi-zone air conditioning and a multi-function touch-screen display with voice recognition, further raised the levels of comfort and convenience on board.

Significant changes made for the third generation LS launched in 2000 included a more sophisticated exterior design and interior displaying even higher standards of quality and functionality. It also marked the debut of a new 4.3-litre V8 engine that delivered true flagship performance.

Safety performance, always a key element of the LS, was taken to new levels with the introduction of advanced systems including ABS, Electronic Brakeforce Distribution, and developments in airbag system design and efficiency. In 2003 Lexus introduced its ground-breaking, millimetre wave radar-based Pre-Crash Safety system.

In 2007, the LS 600h introduced Lexus's high performance hybrid technology to the LS line-up and it remains the world's most powerful hybrid production car. Its Lexus Hybrid Drive system delivers precisely the driving characteristics that characterise Lexus drivetrain engineering, harnessing high technology to deliver a sophisticated, intelligent driving experience that is exceptionally powerful, refined and efficient.

The LS has evolved with the times throughout its 23-year history, yet it has always remained true to its roots, adhering through successive generations to four key traits: adoption of world first, cutting edge technologies; the highest levels of quality combined with a uniquely Japanese sense of style and detail; unrivalled cabin quietness; and the smooth, comfortable ride expected of a luxury saloon.

More than 730,000 LS models have been sold since the launch of the first LS 400 and the majority are still on the road today.

Development concept

Since its launch in 2006, the current generation LS has benefited from more than 2,500 improvements. At a stroke, the new LS adds 3,000 changes, among them three world firsts and 15 Lexus-first features and technical innovations.

Lexus has responded in detail to customer feedback in every aspect of the new LS's development with the aim of raising the bar higher in terms of refinement, comfort, driving performance, technical excellence and, above all, quality.

Reflecting the style direction next-generation Lexus models will take, the LS's new spindle front grille design gives the car stronger road presence and distinctive brand identity that is in line with the advances made in its driving dynamics, responsiveness and handling agility.

The car's increased body rigidity not only gives better stability, but also allows for a more comfortable ride without compromising handling. Pitch and bounce control has been improved to give an even flatter, road-hugging ride, while revisions to the steering deliver noticeable improvements in accuracy and turn-in response. The braking system has also been revised for more immediate power and better pedal feel.

More than merely a packaging exercise, the new F SPORT grade combines more sporting exterior and interior design with genuine dynamic enhancements, from the lowering of ride height by 10mm to the addition (on the LS 460) of a Torsen limited slip differential and Brembo 6-piston front brake callipers.

Striving for the ultimate in refinement and luxury, the new LS lays claim to being one of the quietest cars in the world. The revised interior design not only focuses on even greater levels of refinement and comfort, but also responds to the demands of a further development of Lexus's HMI (human machine interface) technologies.

Improvements in safety performance focus on pedestrian collisions and lane keeping assistance. The new Advanced Pre-Crash Safety system with collision avoidance assist is among the most advanced automotive safety systems available today. A-PCS is designed to help the driver avoid a collision, and to mitigate the consequences if a collision with vehicles and pedestrians, across a wide range of speeds, and by day or night.

An Adaptive High-beam System greatly extends the time the driver can enjoy full-beam lighting without risk of dazzling other traffic, and the Lane-Keep Assist system has been enhanced to automatically correct deviations caused by road camber changes and crosswinds

Lexus's new flagship has been designed to reinforce the outstanding quality that has earned Lexus numerous global awards. With customer feedback fundamental to the car's development, every stage of the design and manufacturing process has been re-analysed to ensure that the unparalleled levels of quality and craftsmanship for which the brand has become renowned are reflected in every aspect of LS ownership.

2 DESIGN

- New LS adopts latest Lexus styling cues, including distinctive spindle-shaped front grille design
- Lexus-first use of LED technology for all exterior lights, including new L-shaped seamless light tube daytime running lights
- New dashboard design, incorporating 12.3-inch multimedia screen
- New three-spoke steering wheel design with extra adjustment range

Exterior design

The new LS displays major changes to its exterior which represent further development of Lexus's L-finesse design language, aimed at expressing refinement with dynamic and modern styling that is appropriate for a flagship model.

The vehicle is 30mm longer than its predecessor, at 5,090mm, while the wheelbase remains 2,970mm. Front and rear overhangs have increased by 10 and 20mm respectively.

The key element in the new design is the frontal treatment, where Lexus's distinctive new spindle-shaped arrangement of the upper and lower front grilles has been adopted. The upper, trapezoid grille and slanted lower grille are combined in a single element that bridges the middle of the bumper, giving a distinctive look that increases the LS's road presence.

Its shape is further accentuated by a blacked-out finish to the grille and a chrome-plated frame that extends to the bumper openings.

There is a more muscular bonnet design, too, and true to another hallmark of Lexus design, the headlamps are positioned on a higher plane than the grille.

Two types of headlamp are available on the new LS. High-intensity Discharge bi-xenon lights with Lexus's intelligent adaptive front-lighting system are fitted to the LS 460 and LS 460 F Sport, while the LS 600h has three-projector units with full LED lamps.

An array of 12 LEDs is used for the turn indicators and the headlamp units are underlined by integral LED daytime running lights. The latter are of a new design, featuring a single seamless light tube that forms an L-shape, adding to the LS's distinctive visual signature.

The new, deep front bumper design forms a wide, trapezoid shape that anchors the strong front wings and flared wheel arches, reinforcing the car's wide front track and low centre of gravity.

Sharply sculpted housings contain the LED fog lamps, which have a vertical structure that harmonises with spindle grille design and L-shaped daytime running lights. The lights feature the world's smallest photoelectric sensor (PES) lenses, measuring 30mm in diameter, allowing for excellent illumination and adding to the LS's singular appearance.

In profile the new LS shares its predecessor's long, elegant cabin proportions. The shape of the rocker panels and the mouldings below the doors has been changed, continuing the sharp form of the wheel arches and accentuating the sense of a smooth airflow along the car's flanks. The new-design door mirrors have chrome-plated detailing and are fitted with LED puddle lights and new turn signals.

At the rear, the spindle shape seen at the front is reflected in flowing lines that cut across the boot surface from the C-pillars, before flaring out towards the lower half of the body.

The L-shape motif inside the rear lamp clusters harmonises with the new trapezoidal design. All the rear lights use LEDs, adding depth and clarity, with the tail lights forming a clear L-shape whether switched on or off.

Interior design

Human-oriented design is a fundamental part of the L-finesse design philosophy and it is with this clearly in mind that the LS's new instrument panel moves to a more horizontal layout to make it more comfortable and ergonomically efficient for the driver to view and use.

The clean design forms a wide horizontal plane that helps accentuate the cabin's spaciousness, with the shape of the door and centre console trims serving to make the driver and front passenger feel they are cocooned in a secure environment.

The dashboard is divided into two zones. The upper Display Zone is dominated by the 12.3-inch LCD multimedia screen – the widest on the market – positioned for easy, at-a-glance viewing. The lower Operation Zone houses the system controls, including the new, second-generation of Lexus's Remote Touch Interface.

All aspects of the driving position have been taken into account to ensure controls are ideally located, to maximise comfort and minimise driver distraction and fatigue. The number of switches on the dashboard has been reduced, by combining some of their functions in single controls. The centre instrument cluster has also been made smaller.

The driver's instrument binnacle features large Optitron dials and a 5.8-inch TFT multi-information screen – the largest found in any Lexus – with an improved display. The new LS follows the CT 200h and new GS in adopting a Drive Mode Select system, with the meter and multi-information display illumination changing from blue to red when the driver switches to any of the sports driving modes; at the same time, the hybrid system indicator in the LS 600h is automatically switched to a tachometer.

An analogue clock is positioned in the centre of the instrument panel. Precision-machined in aluminium, it has a Lexus-first GPS time-correction function. To emphasise the sense of craftsmanship, the clock's hands and scale have been made as slim as possible, and

the 12 o'clock marking has been specially cut to concentrate light when the minute hand aligns with it.

The area immediately around the driver has been revised, notably with the addition of a new three-spoke steering wheel. Measuring 300mm across, it is 10mm smaller than the four-spoke design previously used, giving the driver a sportier feel and closer engagement with the car's driving dynamics. The asymmetric, aluminium gear shift has gained a new leather trim.

Both the driver and front passenger seat have been redesigned to give more comfort and support (full details are in the chapter on Refinement and Comfort).

Wheels, colour schemes and trim

The LS 460 is fitted with 10-spoke 18-inch rims, with a forged 19-inch wheel specific to the LS 460 F Sport. A different design of 19-inch wheel is featured on the LS 600h.

UK models will be available in nine exterior colours: Arctic Pearl, F Sport White, Atlantic Blue, Celestial Black, Obsidian Black, Velvet Black (solid), Mesa Red, Mercury Grey and the new Sonic Silver.

Lexus developed an advanced coating process for the Sonic Silver finish, which gives the car both stronger shading and more defined, sharper highlights. As a result, the car's subtle and defined bodylines are more noticeable and the surface of the bodywork appears more highly polished.

There are five shades of leather upholstery: Mellow White, Black, Venaro Grey, Topaz Tan and Ivory. These can be combined with three wood trims: matt brown ash burl, polished black Shimamoku and dark brown walnut.

An example of traditional Japanese craftsmanship, *Shimamoku* – translated as '*striped wood*'- involves the painstaking layering and angled cutting of dark and light shaded wood veneers. The process involves 67 manufacturing steps over the course of 38 days to complete.

3 REFINEMENT, COMFORT AND ADVANCED FEATURES

- Greater body rigidity thanks to Lexus-first laser screw welding and adhesive body bonding
- New, ottoman-style fold-out calf support for front passenger seat
- Lexus Climate Concierge, world-first multi-zone climate control, integrating seat heating and cooling and steering wheel heater
- Interior features world-first Advanced Illumination System, with LED instrument panel lighting
- 12.3-inch multimedia display with second generation Remote Touch interface
- Blu-ray rear seat entertainment system

Since the original model was launched in 1989, the Lexus LS has enjoyed a reputation for peerless quietness and refinement. Successive generations have consistently improved cabin quietness and comfort, and benefited from the introduction of numerous world-first, advanced on-board features and technologies. The result has been unparalleled comfort, convenience, discreet hospitality and carefully considered driver interaction.

The new LS takes these achievements further still to make it one of the world's quietest and most comfortable cars.

Improved sound insulation

Comprehensive improvements have been made to the sound insulation throughout the vehicle.

The dashboard silencer seal structure has been strengthened and insulation has been added to the engine cover, reducing engine noise. Engine and road noise have been brought down by using thicker insulation material in the front wheel arch liners and revising the noise insulating structure in the tibia pad.

Road noise has also been countered by adjusting the coverage of the floor silencer; adding insulation materials beneath the rear seat; changing the material used for the rear wheel arch liner; increasing the area of boot trim sound insulation; and reinforcing the seal structure in the rear partition panel.

Wind and road noise have been reduced by adding more insulation to the inner door weather strips and service hole covers. And wind noise has been reduced by changing the insulation material for the roof trim, smoothing the A-pillar and door frame mouldings, and adding aero fins to the door mirrors to reduce air turbulence.

The results of these many enhancements are readily noticeable in the cabin. Driver and front passenger experience the lowest engine noise levels of any car in the LS's class, while in the rear the level of "conversation clarity" is almost 100 per cent when the car is travelling at 62mph/100km/h.

Body structure rigidity

High body rigidity is not only fundamental to vehicle stability and handling agility, it also plays a significant role in reducing the transmission of noise and vibration from the engine bay and road surface to the cabin, thus supporting a more comfortable ride.

Several measures have been taken to further reduce vibration and raise comfort levels in the LS. In a first for Lexus, a new laser screw welding technique enables panel joint adhesion across entire surfaces, as opposed to individual spots, increasing overall body rigidity.

Extra engine member support joints have been added, and the characteristics of the engine mount have been improved. A larger tunnel brace and larger partition panel reinforcement have been adopted, along with larger front seat brackets.

These measures combine to deliver a noticeable reduction in vibration, particularly in the floor around the driver's seat.

Improved seat comfort and air conditioning

The LS's front seats have a new design that minimises pressure peaks, gives better support and helps reduce tiredness on long journeys.

The upper back section has a larger contact surface, and the cushion thickness has been increased by 20mm. Adding cushion length adjustment increases comfort and there is better pelvic support to help maintain a correct lower body posture.

The front passenger seat has a new, ottoman-style fold-out calf support that eases pressure on the heels and thighs.

An improved air conditioning system is fitted as standard to both front seats and is also provided as part of the rear seat upgrade package. The seats have a larger heating area around the shoulders and back of the knees. Heater output has been more than doubled, too, from 100 to 210W, which means seats in the new LS warm up in half the time.

Similarly, the seats have a larger cooling area, with twin low pressure drop heat exchangers increasing airflow by about 30 per cent, larger diameter perforations in the seat upholstery; and a larger blower unit.

Front and rear seat climate control can be automatically incorporated in operation of the new Lexus Climate Concierge air conditioning system (see below).

Lexus Climate Concierge

Lexus Climate Concierge – featured as standard on the LS 600h L Premier – is a world-first system that enables everyone on board to experience the best possible thermal comfort. The most advanced technology of its kind, it provides all the benefits of the multi-zone automatic climate control featured in the current LS together with automatic integration of the seat heating and cooling functions and the steering wheel heater.

The four-zone independent control system goes beyond simply managing cabin air temperature. It is fully customisable, controlling the temperature in contact points – the seats and steering wheel – so that each person on board can enjoy their preferred temperature as quickly as possible.

For example, in cold weather, before the air conditioning heating has reached maximum efficiency, the steering wheel heater and individual seat heaters are switched on to warm up driver and passengers quickly. Once the rapid seat heating has reached a comfortable

temperature – accomplished in half the time taken by the previous system – the seat heater automatically reduces temperature before switching off.

Likewise on hot days, a rapid cooling function controls seat temperature before air conditioning cooling has reached maximum efficiency.

The Climate Concierge uses up to 13 sensors, managed by a central ECU, including (as part of the rear seat upgrade package) a roof-mounted infra-red matrix sensor that measures climatic conditions throughout the cabin. Measuring the surface temperature of people sitting in the rear seats allows the system to assess their specific thermal comfort and then make specific adjustments to the air conditioning's performance in the two independent rear zones.

There are 20 individual outlets distributing warm or cool air through the cabin. As well as vents in the B-pillars, rear seat occupants are served by generously sized roof climate diffusers above each seat, ensuring the desired temperature and airflow around the head and neck.

The new LS 600h L benefits from a heat exchanger with integrated PTC (positive temperature coefficient) heating elements, in addition to the standard system included in LS 460. This system will warm up the front cabin area as quickly as possible after vehicle start-up, before the engine itself has reached a high enough temperature to supply heating to the air conditioning.

Nanoe technology

The climate control system uses new air purifying nanoe technology. Operating automatically when the air conditioning is switched on, it releases minute nanoe particles into the cabin.

These negatively charged ions are wrapped in water molecules and attach themselves to other airborne particles and molecules. As well as cleaning the air inside the car, they also have a deodorising effect on upholstered surfaces. And with moisture content around 1,000 times greater than conventional ions, they are also believed to have a moisturising effect on skin and hair.

Advanced Illumination System

The new LS's cabin features the world's first Advanced Illumination System (AIS), with soft white interior lights and LED instrument panel lighting.

Elements of the LED lighting are illuminated to greet occupants as they approach the car, before it is unlocked. They activate, then fade in sequence with the vehicle start-up procedure.

The numerous AIS lights around the cabin have three different white tones to suit their purpose – soft for the central and vanity mirror lights; brighter for the general cabin lighting; and sharper still for illumination of the meters, instrument panel and clock.

The timing, brightness and distribution of the lighting are fully co-ordinated, which means interior and exterior lighting varies according different vehicle operation and driving scenarios.

A "greeting" sequence guides the driver to the vehicle and welcomes them on board. When the door is unlocked, the daytime running lights and door mirror puddle lamps light up. As the driver approaches the vehicle, footwell and centre dome lights come on and the clock and instrument panel light up gently.

The "vehicle start" sequence illuminates the meters, switches and clock to full brightness, the navigation screen opening sequence begins, and brighter instrument panel band illumination flows from the centre to each side. The interior door handles and footwells are also lit up.

The "driving sequence" dims the instrument panel band from the sides to the centre, simultaneously dimming the footwell and door handle lighting and reducing the meter, switch and clock illumination to the driver's preferred level.

On switching the car off, the "vehicle parked" sequence flashes and then dims the instrument panel band lighting from each side to a central point before extinguishing it

completely. Once the instrument panel light is off, the entire interior is lit, including door handles and footwells.

Second generation Remote Touch Interface with 12.3-inch multimedia display

Lexus has adjusted its Remote Touch Interface multi-function control to make it simpler to operate and more user-friendly. It's the first system of its kind to adopt a slide haptic joystick mechanism – a slide-type controller that is much like a computer mouse. Its operation has been changed so that an Enter command is now made simply by pushing the controller. It also gains ambient lighting and the height difference between the RTI and the armrest has been reduced.

The cursor can be moved quickly and easily across the multimedia display, which at 12.3 inches is the widest found in any production car. The full colour, LED screen has an ultra-wide 24:9 format and is large enough for two types of information to be displayed simultaneously, such as the map and audio; night view and map; and navigation and incoming call.

Lexus navigation system

The Lexus navigation system is operated using the Remote Touch Interface and uses a powerful HDD system, making it one of the fastest and most accurate systems on the market.

Thanks to the 12.3-inch display, it now had a multi-screen capability, allowing the permanent display – and independent control – of three types of information simultaneously from a menu that includes map, audio, vehicle information, navigation input, air conditioning functions and incoming call.

The system provides an automatic screen zoom at intersections and several other new functions, including a true 3-D view with city model and landmark graphics; replication of motorway signs; and speed limit information.

The advanced voice recognition system has been improved, with better recognition performance and a reduction in the number of operational steps. Users can search phone and music databases and there is a one-shot navigation address input function.

By linking to the internet through a Bluetooth mobile phone connection with compatible smartphones, the system gives access to the Google Local Search database to locate points of interest and for addresses from Google Maps to be added as destinations.

It also features an integrated RDS-TMC traffic information service, offering advanced information delivery in nine western European countries. This means the most accurate information can be used when the system is calculating a route, giving the driver the option of taking an alternative route to avoid any traffic incidents or delays.

In some European countries, traffic information is also transmitted on DAB+ using TPEG (Transport Protocol Expert Group). This marks a significant improvement over RDS-TMC technology in that the digital signal can carry much more information; its pin-point accuracy allows for better navigation routing; and it offers a wider service with more precise information about traffic flow and parking availability.

Mark Levinson Reference Surround System

All UK versions of the LS are equipped with a Mark Levinson Reference Surround System, More than 2,000 hours of laboratory and on-road testing have fine-tuned the system to suit the specific acoustics of the new LS. Controlled in conjunction with 12.3-inch multimedia screen, it provides a complete, discrete 5.1 home theatre entertainment experience.

The discrete circuitry, 15-channel, ML3-16 Processor Power Amplifier covers a frequency range of 20Hz to 20kHz producing up to 450W with less than 0.1 Total Harmonic Distortion (THD).

The separate, full-range side and surround channels in the 7.1-channel surround speaker architecture deliver a sense of audio depth and envelopment for all passengers. Notably rear seat passengers do not only experience sound from behind, as with other automotive 5.1 systems.

The array of 19 speakers is key to the system’s performance. Twelve are unique to the Lexus’s system, and each one is custom engineered for the acoustic characteristics of its

location within the vehicle. There are seven 25mm tweeters, seven 100mm midrange units, two 150mm x 230mm woofers, two 165mm woofers and one 250mm subwoofer.

Mark Levinson loudspeakers use a variety of advanced materials, construction techniques and geometry to reduce distortion and coloration, while increasing the system's dynamic capability.

Blu-Ray rear seat entertainment system

The Lexus LS 600h L Premier's rear seat entertainment system features a separate DVD/CD player and nine-inch VGA screen for delivering the Mark Levinson Reference Surround System's 5.1 home theatre entertainment experience.

The system has been upgraded for the new LS, and now provides an SD card slot and, in a first for Lexus, a high contrast, high definition Blu-Ray player. The system's remote control has been made smaller and its controls more intuitive to use.

There is also an additional input socket for connecting portable devices such as games consoles or a video camera. Two sets of headphones can be connected to the system at the same time, so rear seat passengers can enjoy the full range of entertainment options without disturbing the driver or front seat passenger.

LS 600h L Premier rear seating

The long wheelbase LS 600h L Premier is fitted with two ottoman-style individual full leather rear seats. These are electrically adjustable, using either switches on the centre console or a remote control unit. Both can be reclined and have a centre seatback flexing function.

The left-hand rear sat can be reclined to a maximum of 45 degrees and comes with fully retractable ottoman thigh and footrest. To give the best possible legroom when the seat is fully reclined, the travel limit of the front passenger seat has been extended by 40mm.

One touch of a memory button is all that's needed to recline the rear seat and extend the thigh and footrest, while at the same time moving the front passenger forward and folding down its headrest. The ottoman automatically retracts when the rear passenger door is

opened; opening the front passenger door returns the front passenger seat to its standard forward position with headrest raised.

Rear seat relaxation system

The left-hand rear seat is fitted with a new, air-assisted massage system, in addition to a conventional vibration massage function, using technology like that seen in high-end massage chairs.

An air pump, located in the luggage compartment to ensure silent operation, supplies eight pneumatic chambers that cover the area around the occupant's shoulders, back and hips. It reproduces professional massage techniques in a range of different programmes that can be adjusted for intensity, including shiatsu and shoulder and lower back acupressure.

Rear seat cushion airbag

The 'ottoman' rear seat also incorporates a seat cushion airbag – a feature exclusive to the LS in the luxury car segment. This airbag activates in a frontal impact, inflating the front area of the seat base to reduce forward and downward motion of the pelvis, thus helping protect against abdominal injuries.

Rear power sunshade

Power sunshades are fitted to rear and side door windows, including the rear quarterlight, affording both comfort and privacy. When reverse gear is selected, the rear shade is automatically retracted.

Card key

A card key is provided for the LKS 600h L Premier. Just 3.3mm thick and smaller than a credit card, it can be kept in a wallet or pocket while driving. It allows doors and boot to open at the touch of the handle and for the engine to be switched on using the push-start button.

4 DRIVING DYNAMICS

- Improved body and steering support rigidity
- Enhanced aerodynamics

- Revised multilink suspension with new four-wheel interlock Adaptive Variable Suspension
- Revised steering and improved braking power and feel
- Drive Mode Select with up to five driving modes
- Nine per cent reduction in CO_2 emissions for both petrol and full hybrid LS

Lexus has thoroughly revised the driving dynamics of the new LS to improve its combination of refinement, ride comfort and high speed stability and deliver a more sporting and engaging drive.

Body rigidity has been increased and the car's aerodynamics have been improved to give an even flatter, road-hugging ride with damping characteristics adjusted to give even greater comfort. The electric power steering and the air suspension system have been revised so there is better steering feel and response, with greater handling agility and stable vehicle behaviour.

Brake pedal feel and operation have been improved too, and a new Drive Mode Select system has been introduced giving five switchable modes to match the driver's preferred balance of economy, comfort, performance and handling.

In the UK the LS 460 is offered as a rear-wheel drive model; in other markets an AWD version is available. The full hybrid LS 600h L has all-wheel drive and a long wheelbase as standard. For the first time for the LS range, a more dynamic, sports-styled and engineered F Sport version of the LS 460 will be available.

Body rigidity

Lexus has significantly increased the body rigidity of the new LS, improving both handling stability and ride comfort.

It has used new, cutting-edge production technologies to improve the body's vibration damping characteristics. These include a Lexus-first laser screw welding around the upper door apertures, which joins a larger panel area than traditional welding and gives better suppression of any deformation. Also, body adhesives are used to join the lower back and

roof headers, connecting the entire area where the panels meet and thus maximising the joints' rigidity.

Other measures to increase bodyshell rigidity include reinforcement of the front and rear suspension brace members; a larger floor tunnel brace (which increases rigidity by 60 per cent); extra reinforcements for the cabin, partition panel and lower back; an increase in the number of spot welds around the cowl and dash; and reinforcement joints for the instrument panel.

An increase in the engine support member joints, improved engine mounts and larger front seat brackets all contribute to minimising vibrations and achieving better ride quality.

A 20 per cent increase in steering support rigidity has improved steering feel and response, with an increase in both the thickness of the outer mounting plate and the number of joints to the body. The pipe thickness of the support itself has also been made larger, with extra welding added next to the steering column.

Aerodynamics

Since the launch of the original LS 400 with a drag coefficient of 0.29, each generation of the model has continued to benefit from class-leading aerodynamics. With a Cd of just 0.26 across all versions, the new LS maintains this achievement.

The new model features aero-stabilising fins on the base of the door mirrors and to the sides of the rear lamp clusters. These reduce turbulence, helping air flow smoothly down the sides of the vehicle and cleanly away from the rear. This helps improve straight-line stability and suppresses swaying under steering inputs.

Further measures have been introduced beneath the car, with the introduction of airflow-smoothing fins on the engine and boot undercovers and a change in the shape of the spats fitted behind the front wheel arches. The fins serve to give better downforce, which improves steering feel at higher speeds and better traction.

As a result of these changes, the new LS's front and rear coefficient of lift figures are 0.02 and 0.01 respectively. Notably the figure for the rear of the car – fundamental to high speed cornering ability – is 0.06 lower than that of its closest competitor.

Multilink suspension with four-wheel interlock AVS

The Lexus LS was the first car in its class to use a multilink design for both front and rear air suspension systems. Lexus has evolved this system in the new LS, with improved yaw responsiveness achieved by a six per cent increase in the lateral rigidity of the bushings.

The rebound spring design has been changed to a non-linear progressive type, which minimises the roll angle without detracting from ride comfort. Also, the variable damping range has been expanded, which helps reduce excess roll at the moment of initial steering input.

Together these suspension changes deliver more ride comfort while at the same time reducing roll angles and noticeably improving initial response to steering inputs.

The air suspension system works in co-operation with the Adaptive Variable Suspension. AVS automatically activates the adjustable damping force shock absorbers to fulfil a number of different control functions.

The AVS gradually increases damping force as speeds rise, to give low speed comfort and high speed driveability and stability. Front-end damping force is increased under braking to reduce front-dive; a similar increase at the rear minimises vehicle squat under acceleration. Continuous adjustment of the damping force delivered by the inner and outer shock absorbers as the car passes through a bend optimises vehicle posture and stability.

AVS also maintains optimum ground clearance, regardless of the load weight and distribution of passengers on board. It automatically lowers the vehicle at high speed to gain aerodynamic efficiency and stability.

The new LS further gains a four-wheel interlock control and improved control software. Where AVS previously adjusted suspension performance at each wheel independently, it

now suppresses the three-direction vibration of roll, pitch and heave simultaneously at all four wheels, minimising vibration in the direction of roll.

As a result, the excellent vertical vibration suppression performance of the current LS has been retained, while damping response has been made smoother and more highly controlled to give an even flatter, more comfortable ride.

Where drivers previously could switch the AVS between comfort, normal and sport, the settings are now integrated in the new five-mode Drive Select System (see below).

Active stabiliser system

The F Sport version of the new LS is fitted with an active stabiliser system, with variable twist-torque anti-roll bars for better body control and precise steering response in high performance driving. In keeping with the energy saving principle of Lexus Hybrid Drive, it is inactive during straight line driving.

The system features an actuator, centrally located on both front and rear anti-roll bars. These are able to apply torque to the left and right hand sections of the bar. The twist force, applied independently to the front and rear stabiliser bars, controls the vehicle's roll motion, reducing body roll angle for greater stability, better cornering performance and, with better steering response, improved agility.

Steering

As well as having a new, smaller steering wheel and a wider range of adjustment for the driving position, the new LS's steering has been revised for better feel and feedback, helping the driver realise the benefits in handling agility delivered by the changes to the suspension. Key to this has been a revision of the steering gear friction characteristics of the Variable Gear Ratio Steering.

VGRS can vary the steering gear ratio by up to 30 per cent – equal to a 130-degree phase in steering wheel angle. The gear ratio varies between 2.7 turns lock-to-lock at very low speeds, to 3.2 turns at high speed.

The VGRS system actuator is linked to the LS's Vehicle Dynamics Integrated Management system (see below), which helps maintain vehicle stability with minimum

driver input. It also co-operates with the Pre-Crash Safety system's emergency steering assist by providing a quicker steering response when an obstacle is detected in the vehicle's path.

Braking

The new LS remains the only car in its segment to use an electro-hydraulic braking system. This gives it not only a weight-saving advantage, but also allows for more precise brakeforce distribution, which in turn aids optimum operation of the car's VDIM.

The Electronically Controlled Braking system has been revised for better response and effectiveness, and better pedal feel. The pedal stroke has been shortened to help achieve faster response, and the pedal pressure required has been reduced.

The contact surface angle of the brake pedal has been changed, too, so less ankle articulation is needed at the top of the pedal stroke, helping the driver make a smooth shift from throttle to brake pedal. The pedal's contact surface radius has been altered so the foot contact point is now at the centre, making for more natural brake operation.

The ECB uses 357mm front and 337mm rear discs, all fitted with spiral fin ventilation and working with pads with a high grip coefficient to increase judder-free high speed braking efficiency. The shape of the front brake ducts has been changed; improving cooling performance and suppressing brake fade cause by a build-up of heat.

Drive Mode Select

The new LS gains another Lexus first in the form of its Drive Mode Select, offering up to five switchable driving modes: Eco, Comfort, Normal, Sport S and Sport S+. These help the driver gain his or her preferred combination of economy, comfort, performance and handling characteristics.

A number of vehicle systems that were previously operated independently have now been consolidated within the Drive Mode Select for ease of use. Changing modes is quick and easy, using a dial selector on the front console.

Eco mode controls related systems to minimise use of energy, tailor performance to save fuel and reduce impact on the environment. It reduces throttle response and engine power output in relation to use of the accelerator pedal to maximise fuel efficiency. It also automatically limits the voltage of the power control unit, while at the same time providing comprehensive control air conditioning and seat heater performance.

The new Comfort mode changes the suspension characteristics to give a smoother straight line ride, in the same fashion as using the AVS switch on the current LS.

Sport and Sport S modes tap into the powertrain's full potential, maximising throttle response and engine power output to give a sporting drive with no loss of ride comfort.

Going further, Sport S+ combines this enhanced performance with adjustments to the chassis and steering control systems. AVS automatically increases the difference between inner and outer shock absorber damping through corners by about 20 per cent to further reduce vehicle roll. At the same time, the Active Stabiliser system engages the front and rear anti-roll bars and the VGRS automatically reduces the steering gear ratio by about 10 per cent and the electric power steering increases steering assist torque by some four per cent. Together these measures minimise body roll, sharpen vehicle handling and improve steering feel for a sportier driving experience.

Drive mode select setting	**Powertrain**	**AC**	**AVS**	**EPS**	**VGRS**
COMFORT	NORMAL	NORMAL	COMFORT	NORMAL	NORMAL
ECO	ECO	ECO	NORMAL	NORMAL	NORMAL
NORMAL (Default)	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SPORT S	SPORT	NORMAL	NORMAL	NORMAL	NORMAL
SPORT S+	SPORT	NORMAL	SPORT	SPORT	SPORT

Revised acceleration characteristics and engine sound tuning

Together with the introduction of Drive Mode Select, the LS 460's eight-speed automatic transmission has been modified to give a greater impression of luxury and dynamic ability under acceleration.

In Normal mode the transmission now gives smoother, seamless acceleration from standstill, with a more gentle increase in G force.

In Sport mode, not only does the transmission provide more power, more rapidly under full throttle acceleration from standstill, it has also been tuned to offer more dynamic acceleration control. The transmission will automatically downshift under hard braking for a corner; hold a lower gear through the corner; and then give a stronger power response to full acceleration when exiting the corner.

The engine note has been tuned for a sportier sound under full acceleration, with typical Lexus attention to fine detail: the sound has been balanced with a significant reduction in middle and high frequencies, and a lesser reduction in low frequency sound to reduce engine booming noise.

Improved V8 engine and full hybrid powertrain

The 4.6-litre V8 engine of the LS 460 and the full hybrid powertrain in the LS 600h both deliver higher efficiency, more power and lower CO_2 emissions.

Both now use low viscosity engine oil, a low resistance differential gear and completely revised control systems, including the air conditioning. Their performance is supported by the fitting of low rolling resistance tyres. The full hybrid system additionally provides more efficient energy regeneration during deceleration. For the LS 460 gains are made through a reduction in agitation losses in the oil pan.

As a result, maximum power in the LS 460 has risen by 7bhp (5kW) and CO_2 emissions for both powertrains have fallen by nine per cent (combined cycle) with the V8 achieving 249g/km and the LS 600h 199g/km.

The 4,608cc V8 engine is the most technologically advanced internal combustion unit Lexus has built. Its precision technology features include a dual-pipe intake system, Acoustic Control Induction System, D-4S stoichiometric direct injection and third generation Dual VVT-i.

It generates the highest specific output of any normally aspirated V8 engine in the premium segment, 382bhp (285kW) at 6,400rpm, and 493Nm of torque at 4,100rpm.

Mated to the world's first eight-speed automatic transmission it will accelerate the LS from rest to 62mph in 5.7 seconds, and from 50 to 75mph in 4.9 seconds. Top speed is 155mph.

The LS 600h was the world's first vehicle to use a full hybrid V8 powertrain, featuring a 5.0-litre petrol engine with a powerful, high output electric motor, large-capacity battery pack, dual-stage electronically controlled continuously variable transmission and permanent all-wheel drive.

This Lexus Hybrid Dive system gives an unmatched balance of performance and environmental efficiency. It combines the 389bhp (290kW) power of the V8 with 221bhp (165kW) electric motor output to generate a peak combined power of more than 439bhp (327kW). This enables nought to 62mph acceleration in 6.1 seconds and an electronically governed 155mph top speed. The system's motor also delivers potent mid-range torque: working in tandem with the V8 engine it can deliver 300Nm instantaneously and seamlessly from standstill. This proves its value most noticeably in mid-range performance when overtaking: acceleration from 50 to 75mph can be accomplished in just 4.2 seconds.

At the same time, the LS 600h is more fuel-frugal than comparable luxury saloons, returning class-leading figures of 32.9mpg (a figure on par with that of a 3.5-litre vehicle) plus 199g/km CO_2 emissions and exceptionally clean exhaust gases.

All-wheel drive

The LS 600h has an all-wheel drive system with a central, permanently engaged Torsen limited slip differential which distributes drive power between the front and rear axles.

The Torsen Type A and Type B LSDs provide an equal 50:50 torque split between the axles, so Lexus engineers developed a highly compact Type C unit for the LS with a 40:60 rear axle bias that can suppress understeer while still enabling the ride comfort and stability under acceleration required for a rear-wheel drive luxury saloon.

The Type C differential's highly responsive torque distribution is continuously controlled and optimised according to driving conditions, and can be varied from between 48:52 and

32:68 split between the front and rear axles. This further improves grip, traction and cornering stability under acceleration.

Vehicle Dynamics Integrated Management

The new LS uses the latest generation of Lexus's Vehicle Dynamics Integrated Management (full details can be found in the Safety chapter). VDIM integrates the vehicle's Electronically Controlled Braking, ABS, EBD, traction control and Vehicle Stability Control active safety systems with the Adaptive Variable Suspension, electric power steering and Variable Gear Ratio Steering.

Unique to the LS 600h, the full hybrid powertrain's Driving Response and Acceleration Management System gives VDIM unprecedented interaction with engine and transmission, enabling control of engine and electric motor output to effect faster, smoother and more precise response in situations where there is a risk of a loss of traction, such as mid-corner gear changes.

Where conventional active safety systems are only activated immediately after the limit of vehicle performance is reached, VDIM engages progressively before that threshold, making for smoother performance and less obtrusive intervention.

5 NEW LS 460 F SPORT

- F Sport grade introduced to the LS range for the first time
- Exterior features include front styling elements, 19-inch alloys and six-piston Brembo brake callipers
- Interior features include sports seats, leather steering wheel and gear lever trim and grade-exclusive trims and colour ways
- Improved driving dynamics with 10mm reduction in ride height, greater body rigidity, Torsen limited slip differential and Active Stabiliser system
- Intake sound generator creates sporty engine note

Lexus has taken the opportunity of the launch of the new LS to launch its first F Sport version of the luxury model.

In the UK the petrol-powered LS 460 F Sport will be available, benefiting from a package of styling and dynamic handling elements inspired by the ultra-high performance Lexus LFA and designed to exploit and enhance the driving qualities of the revised LS platform.

F Sport is designed for LS owners who want to drive themselves, extending both the equipment specification and the performance potential of the V8 engine. Dedicated design features are introduced, inside the car and out, and the chassis is tuned for greater handling agility and driver involvement.

Exterior design

Targeting the kind of spirited driving that's made possible by a low centre of gravity, the F Sport has a sports air suspension which lowers the body height by 10mm. The sports appearance is further emphasised by a new front grille and front and rear bumper treatments, 19-inch alloy wheels and F Sport badging.

The front bumper features a specific F Sport mesh pattern in the spindle-shaped grille, giving a stronger three-dimensional appearance and larger apertures for cooling. The grille finish is changed from chrome to black and simple, round fog lamps replace the slanted LED lights featured on the standard LS models.

From the side, the F Sport can be distinguished by its dedicated 19-inch wheels, which have a grade-specific paint finish; plus the Lexus emblem on the Brembo front brake callipers and F Sport badging. To the rear the lower bumper design incorporates a chrome-plated bar along its bottom edge, accentuating the car's lower centre of gravity

Interior design

Two exclusive colour schemes are available for the LS 460 F Sport: black with white-grey and black with mellow white, both teamed with an Alcantara roof lining. Also specific to the F Sport grade, solid aluminium detailing can be specified.

The authentic sports seats are 16-way electrically adjustable and are upholstered in perforated leather, embossed with the F Sport emblem and finished with white and grey stitching. Their body-holding performance is 25 per cent greater than the standard LS seats.

There is also an F Sport steering wheel with a bespoke, dimple-perforated leather finish, paddle shift controls, a matching leather gear lever trim and aluminium sports pedals and scuff plates.

Driving dynamics

The LS 460 F Sport combines the class-leading comfort and quietness of the standard model range with a more sporting, dynamic chassis.

The multilink air suspension has been lowered by 10mm and brace reinforcement has been added to the rear suspension member to further increase body rigidity, which gives a flatter, more stable ride and improves chassis response to steering inputs.

The rear-wheel drive LS 460 F Sport gains a torque-sensing Torsen limited slip differential, which distributes torque between the rear wheels to improve traction for faster acceleration out of corners. An Active Stabiliser system (fully described in the Driving Dynamics chapter), gives a flat ride posture and ride comfort, with enhanced body control and precise steering response in high-performance driving. Brembo six-piston front brake callipers give appropriately smooth and highly stable braking performance.

Paddle shifts are fitted for manual override control of the eight-speed automatic transmission. On the LS 460 F Sport these incorporate automatic throttle blipping on downshifts for a smooth and engaging drive.

The right engine note is all part of the sporting driving experience and the F Sport package adds an intake sound generator to the engine. This uses a damper to amplify the vibration of the intake pulse, which is introduced into the cabin – with all unnecessary noise eliminated.

6 ADVANCED SAFETY

- Suite of advanced safety systems featured as standard on the LS 600h L Premier
- Advanced Pre-crash Safety system with collision avoidance assist
- Upgraded Lane-Keep Assist
- Improved Blind Spot Monitor

- Lexus's first Adaptive High-beam System
- Adaptive Cruse Control, operations at speed from nought to 125mph

Safety is of fundamental importance to Lexus, as witnessed by the advanced systems it has designed to help avoid or mitigate accidents through intelligent anticipation. The LS has consistently offered an outstanding array of sophisticated, integrated, active and passive safety technology.

In 2003 Lexus's ground-breaking Pre-Crash Safety system was introduced, and since then its sophistication and operating parameters have been continually enhanced with each new generation of the LS.

The new LS delivers improved pedestrian safety performance with a new Adaptive High-beam System, and an upgraded Advanced Pre-crash Safety system with collision avoidance assist. The latter can help the driver detect moving pedestrians at different driving speeds, by day or night

The Lane-Keep Assist system has been revised with the introduction of yaw rate feedback control to help correct deviations caused by changes in road camber and crosswinds. An improved Blind Spot Monitor is also available.

Advanced Pre-Crash Safety system

Available as part of an Advanced Safety Pack option for the new LS 600h, the upgraded Advanced Pre-Crash Safety (A-PCS) System with collision avoidance assist is the most advanced automotive active safety system in the industry. It can help the driver avoid collisions or mitigate the consequences of an impact with vehicles or pedestrians.

Its Advanced Obstacle Detection system combines information identified by a front-mounted millimetre wave radar, near infrared projectors and a stereo camera to help detect a wide range of obstacles with precision, by day or night. Because many pedestrian collisions occur after dark, the A-PCS's night-time detection capabilities are a key enhancement to the system's effectiveness.

Obstacle detection provides improved recognition controls for analysing images from stereo cameras. This allows the A-PCS system to function at a wide range of vehicle speeds – down to just 3mph (5km/h) – and, for the first time, to help detect moving, as well as stationary pedestrians, by day or night.

Having identified an obstacle in front of the vehicle, A-PCS will assess the likelihood of a collision based on the position, speed and trajectory of the object. If it calculates there is a high probability of collision, it activates a warning buzzer and a red screen 'BRAKE' alert on the instrument binnacle.

Simultaneously, the new A-PCS will automatically activate a number of integrated safety systems: -

- Variable Gear Ratio Steering Emergency Steering Assist, to help improve the vehicle's response to the driver's steering input.
- Adaptive Variable Suspension, stiffening the dampers to help control front-end "nose dive" when Pre-Crash braking is engaged, helping increase the car's responsiveness to evasion steering inputs.
- Vehicle Dynamics Integrated Management (VDIM), to increase vehicle stability during an evasive manoeuvre.
- Pre-Crash Brake Assist, to increase emergency braking force when the driver presses the brake pedal.

If the system subsequently determines that a collision is unavoidable, A-PCS then activates the Pre-Crash Seatbelt, pre-tensioning the seatbelts to improve restraint.

If the relative speed between the LS and the obstacle ahead exceeds 25mph, the system automatically applies the brakes and brake assist to reduce the severity of a collision. If the relative speed is less than 25mph, but the driver does not take corrective action following the alarm alert, the system will similarly initiate braking.

A-PCS has increased the system's maximum braking power to approximately 1G and reduced the time taken to achieve maximum deceleration to within a second, thus significantly improving the driver's chances of avoiding a collision at relative speeds of less than 25mph.

Note: *This system is intended to assist drivers, but it is the driver's responsibility to be aware of the vehicle's surroundings. The system cannot prevent all collisions and performance is dependent upon road, weather, and vehicle conditions.*

PCS Driver Monitoring System

The PCS Driver Monitoring System constantly monitors the movement of the driver's head when looking from side to side. If the driver turns his or her head away from the road ahead for a few seconds while the vehicle is in motion and the system detects that a collision is probable, it will automatically bring forward the pre-crash warning alarm. If the situation persists, it will briefly apply the brakes. If the driver does not then respond immediately, all PCS functions will engage.

An additional function monitors the driver's eyes. Using the Driver Monitoring System's CCD camera, it will automatically bring forward the Pre-Crash warning time if it detects the driver's eyes are closed.

Rear Pre-Crash Safety System

The Rear Pre-Crash Safety system operates whether the LS is stationary or in motion, using a millimetre-wave radar installed in the rear bumper to continually scan the area around the back of the vehicle.

If it calculates that a collision is unavoidable, the system automatically activates the front headrests, which move forward and up to reduce the risk of whiplash injury.

Upgraded Lane-keeping Assist

An upgraded Lane-Keeping Assist system (available in the LS 600h optional Advanced Safety Pack) provides better lane-keeping assistance by taking into account external issues such as lateral road camber and crosswinds.

Subject to weather conditions, the system monitors white line road markings via the Advanced Obstacle Detection System stereo imaging camera to determine whether the vehicle is drifting out of a given lane, or off the road. It can provide an audible warning as well as steering power support to help the driver regain the correct course.

The upgraded system gains a yaw rate feedback control, which means discrepancies between ideal and actual vehicle posture caused by uneven road camber or crosswinds are detected quickly, and steering torque is automatically adjusted in accordance with vehicle speed, helping the driver keep within a chosen lane.

LKA offers a choice of two functions, dependent on whether or not the Adaptive Cruise Control is operating at the same time. If ACC is inactive, the system offers a Lane Departure Warning function only. At speeds above 31mph, if the system detects the possibility of a lane departure, LDW encourages the driver to steer back into the lane, triggering an audiovisual warning and brief corrective steering.

If LKA is activated while ACC is in operation, it further offers a Lane Keep function, at speeds between 47 and 112mph (the upper speed range differs by market). Once again, should the system detect the possibility of a lane departure, LK will activate a warning sound and apply corrective steering torque.

New Blind Spot Monitor (BSM)

An all-new feature for the LS, the Blind Spot Monitor plays a significant role in lane changing safety. It uses the PCS rear millimetre-wave radar to help monitor the blind spots on the vehicle's rear sides.

The radar's precision enables it to distinguish walls and other stationary objects from approaching vehicles. This has made it possible to significantly lower the vehicle speed at which the system begins operating to just 10mph, which means it can used effectively in slow-moving urban traffic.

Automatic High Beam

A forward-facing camera in the rear-view mirror detects light sources in front of the vehicle, including the headlamps of oncoming vehicles, the tail lamps of a vehicle ahead and street lighting, and automatically switches the headlamp high beam on and off accordingly.

Adaptive Cruise Control

Complementary to the PCS system, the LS also features Adaptive Cruise Control. It works in two modes, constant speed control and vehicle-to-vehicle distance control, and can be used at any vehicle speed between 0 and 125mph.

Thanks to the millimetre-wave radar's low speed, close proximity distance measuring ability, ACC can be used in slow-moving traffic, and can bring the car to a standstill, accelerating away once the road ahead is clear.

The constant speed control works like a conventional cruise control system. Capable of differentiating between vehicles directly ahead of the Lexus and those in an adjacent lane, it will automatically slow the LS, match the speed of the vehicle in front and, once the road is clear ahead, accelerate to the cruising speed previously selected by the driver.
Note:*The ACC system is intended to assist drivers, but it is the driver's responsibility to be aware of the vehicle's surroundings and drive the vehicle in a safe manner. The system performance is dependent upon road, weather, and vehicle conditions.*

Variable Gear Ratio Steering and VDIM co-operation
On all models, the new LS's Variable Gear Ratio Steering co-operates fully with the car's VDIM system to ensure rapid and appropriate steering response in different conditions where the vehicle reaches the limit of its stability.

For example, on a road surface with differing degrees of grip on either side of the vehicle, sudden braking will cause the vehicle to pull towards the side with the higher friction coefficient. As well as improving the efficiency of the Electronically Controlled Brake system, VDIM simultaneously activates the Electronic Power Steering and VGRS to automatically regulate the steering angle and counteract the disparate, left and right-side braking forces, minimising the driver steering input needed to maintain straight line braking.

Similarly, when differing degrees of road surface grip cause the vehicle to pull towards the side of the lower friction coefficient under acceleration, VDIM automatically regulates the steering angle to help maintain vehicle stability with minimum driver input.

In the case of oversteer, VDIM automatically activates a counter-steer function within the EPS and VGRS which, operating in tandem with throttle and ECB system control, helps the driver to control a skid. Under such conditions, the combined use of brake and steering control reduces the deceleration inherent in traditional braking systems.

In moderate understeer conditions, VDIM combines engine output and braking control to automatically help stabilise the vehicle. In the case of excessive understeer, however, an increase in the steering gear ratio by the VGRS allied to steering torque assistance by the EPS automatically helps curb excessive turning of the front wheels.

In all the above cases, VDIM activated VGRS can provide up to three degrees of additional steering input, effectively coaching the driver to make the correct steering wheel input needed to help maintain vehicle stability. Moreover, simultaneous VDIM control of the Adaptive Variable Suspension automatically regulates the suspension's shock absorber rates to both increase body control under extreme conditions and reduce vehicle nose diving under emergency braking.

Lexus Night View

The Lexus Night View system (available as an option on the LS 600h L Premier) uses a near-infra-red camera mounted at the head of the windscreen, near-infra-red projectors in the headlamp clusters and a night view ECU to capture and display a real-time view of the road ahead on the centre console display.

Using the 12.3-inch display allows for a larger picture and easier viewing compared to the system in the previous generation LS, where images were shown in the driver's instrument binnacle.

The camera is in constant operation and the projectors are activated at speeds above 9mph (15km/h). The system displays an area up to 20 metres in front of the vehicle.

Additional Safety Features

Comprehensive airbag protection includes two-stage front airbags including a twin-chamber passenger airbag; driver and front passenger knee airbags; front and rear side airbags; and full-length curtain airbags.

7 MANUFACTURING

- New LS built with advanced craftsmanship and state-of-the art automated manufacturing techniques at Lexus's Tahara plant
- Introduction of laser screw welding and body adhesive for greater body rigidity and vibration damping
- Stringent built-in quality checks

The LS continues to be built at the Tahara factory in Japan, where its advanced craftsmanship production process has proved fundamental to delivering the kind of quality that has earned Lexus numerous awards around the world for vehicle reliability and customer satisfaction.

Lexus recognises that human skills still outperform even the most sophisticated automated systems in many areas of manufacturing, and so continues to put a human focus on subliminal quality – those aspects of a car that cannot be physically measured or quantified, but which are fundamental to perceptions of the highest overall quality.

To do this, it combines its automated manufacturing processes with the expertise and experience of *Takumi* master craftsmen and highly skilled technicians at every stage of development, production and quality control.

The Tahara assembly process involves numerous, stringent built-in quality checks unique to Lexus. This painstaking checking process is further bolstered by several tests that are exclusive to LS manufacture: all assembled parts are measured during the inspection process, every engine undergoes a rigorous balance test, and every vehicle is test driven before delivery to the customer.

New production technologies

New, cutting-edge production technologies have been introduced for the LS, together with high-precision laser welding to improve the body's vibration damping characteristics. Laser screw welding has been added to the process for the new LS, which allows a larger panel area to be joined than with traditional welding techniques. Also, body adhesives

have been introduced to join the entire area where panels meet, maximising the rigidity of the joints.

At every stage of manufacture, from component assembly to suspension, steering and powertrain sub-assembly, and final assembly, an in-line inspection and measurement system has been introduced to ensure that both individual components and completed assemblies correspond to the Lexus engineers' exacting design data measurements.

Within the assembly process, individual component design figures do not usually reflect the imposition of load inherent in their integration with other sub-assemblies, or the completed vehicle. So each sub-assembly is checked for distortion under a loading commensurate with that of a fully completed vehicle before moving to the next production stage.

Finally, in a process exclusive to the LS, all assembled parts are measured during the final inspection process –in 24 places at the front of the vehicle and 16 to the rear- to ensure that the required levels of built-in quality have been maintained throughout the production process.

8 LEXUS LS TECHNICAL SPECIFICATIONS

ENGINE	LS 460	LS 600h
Engine code	1UR-FSE	2UR-FSE
Type	V8, longitudinally mounted	V8, longitudinally mounted
Valve mechanism	4 valves per cylinder DOHC, chain drive, dual VVT-i, VVT-iE for intake	4 valves per cylinder DOHC, chain drive, dual VVT-i, VVT-iE for intake
Bore x stroke (mm)	94.0 x 83.0	94.0 x 89.5
Displacement (cc)	4,608	4,969
Compression ratio	11.8:1	11.8:1
Fuel system	D-4S direct injection, two injectors per cylinder	D-4S direct injection, two injectors per cylinder
Fuel type	95 octane petrol, or higher	95 octane petrol, or higher
Max. power (bhp/kW @ rpm)	382/285 @ 6,400	389/290 @ 6,400
Max. torque (Nm @ rpm)	493 @ 4,100	520 @ 4,000
ELECTRIC MOTOR	**LS 460**	**LS 600h**
Type	-	AC synchronous,

			permanent magnet
Max. power (bhp/kW)		-	221/165
Max. torque (Nm)		-	300
Voltage (V)		-	650
HYBRID SYSTEM		-	
Type		-	Series/parallel, full hybrid
Combined power (bhp/kW)		-	439/327
ELECTRIC GENERATOR		**LS 460**	**LS 600h**
Type		-	AC synchronous, permanent magnet
Voltage (V)		-	650
TRANSMISSION		**LS 460**	**LS 600h**
Type		8 AT	E-CVT
Gear ratios	1st	4.596	-
	2nd	2.724	-
	3rd	1.863	-
	4th	1.464	-
	5th	1.231	-
	6th	1.000	-
	7th	0.824	-
	8th	0.685	-
	Reverse	2.176	-
	Differential	2.937	3.916
Drive		Rear-wheel drive with Torsen limited slip differential	Permanent 4-wheel drive with Torsen limited slip differential
2-speed motor reduction gear ratios	Low	-	3.900
	High	-	1.900
Final drive ratio front/rear		-	3.357
HIGH VOLTAGE BATTERY		**LS 460**	**LS 600h**
Type		-	Nickel metal-hydride (Ni-MH)
Number of cells		-	240 (6 x 40 modules)
Voltage (V)		-	288
Capacity (Ah)		-	6.5
PERFORMANCE		**LS 460**	**LS 600h**
0-62mph (sec)		5.7	6.1
50-75mph (sec)		4.9	4.2
Maximum speed (mph)		155	155
FUEL ECONOMY		**LS 460**	**LS 600h**
Urban (mpg)		18.0	26.9
Extra urban (mpg)		36.2	37.7
Combined (mpg)		26.4	32.8
EMISSIONS, VED AND INSURANCE			
CO_2 emissions (g/km)		249	199
VED band		L	J
Insurance group		tba	tba

DIMENSIONS & CAPACITIES	LS 460 Luxury	LS 460 F Sport	LS 600h L
Overall length (mm)	5,090	5,090	5,210
Overall width (mm)	1,875	1,875	1,875
Overall height (mm)	1,465	1,455	1,480
Wheelbase (mm)	2,970	2,970	3,090
Track – front (mm)	1,615	1,610	1,610
Track – rear (mm)	1,620	1,615	1,610
Overhang – front (mm)	925	925	925
Overhang – rear (mm)	1,195	1,195	1,195
Coefficient of drag (Cd)	0.26	0.26	0.27
Fuel tank capacity (l)	84	84	84
WEIGHTS	**LS 460 Luxury**	**LS 460 F Sport**	**LS 600h L**
Kerb weight (kg)	1,980 – 2,080	1,980 – 2,020	2,370 – 2,440
Gross vehicle weight (kg)	2,455	2,455	2,785 (5 seats) 2,750 (4 seats)

SUSPENSION	LS 460	LS 600h L
Front	Multilink	Multilink
Rear	Multilink	Multilink
Additional features	Air suspension with Adaptive Variable Suspension (AVS) Lateral dampers (F Sport)	Air suspension with Adaptive Variable Suspension (AVS)
BRAKES		
Front (diameter, mm)	357, ventilated discs (18in wheel) 380, ventilated discs (19in wheel)	380, ventilated discs
Rear (diameter, mm)	335, ventilated discs	335, ventilated discs
STEERING		
Steering gear type	Rack and pinion Electric Power Steering with Variable Gear Ratio Steering	Rack and pinion Electric Power Steering with Variable Gear Ratio Steering
Turns lock-to-lock	2.44 – 3.65 (18in wheel) 2.4 – 3.59 (19in wheel)	2.32 – 3.66
Minimum turning radius – tyre (m)	5.4 (18in wheel) 5.3 (19in wheel)	5.9
Minimum turning radius – body (m)	5.8 (18in wheel) 5.9 (19in wheel)	6.3

9 LEXUS LS EQUIPMENT SPECIFICATIONS

SAFETY & DRIVING DYNAMICS	LS 460 Luxury	LS 460 F Sport	LS 600h L Premier
ABS	✓	✓	✓

Brake Assist System (BAS)		✓	✓	✓
Electronic Brakeforce Distribution (EBD)		✓	✓	✓
Emergency Brake Signal		✓	✓	✓
Brembo braking system		×	✓	✓
Electronically Controlled Braking (ECB)		✓	✓	✓
Traction control (TRC)		✓	✓	✓
Vehicle Stability Control (VSC) with cut-off switch		✓	✓	✓
Variable Gear Ratio Steering (VGRS)		✓	✓	✓
Vehicle Dynamics Integrated Management (VDIM)		✓	✓	✓
Two-stage driver and front passenger airbags		✓	✓	✓
Twin-chamber front passenger airbag with cut-off switch		✓	✓	✓
Front passenger airbag cut-off switch		✓	✓	✓
Driver and front passenger knee airbags		✓	✓	✓
Front and rear curtain shield airbags		✓	✓	✓
Rear side airbags		×	×	✓
Thorax-Abdomen-Pelvis (TAP) front side airbags		✓	✓	✓
Rear seat cushion airbags		×	×	✓
Whiplash Injury Lessening (WIL) front seats		✓	✓	✓
Front and outer rear seatbelt pretensioners		✓	✓	✓
ISOFIX child seat mounts, outer rear seats		✓	✓	✓
Audible/visible seatbelt reminder		✓	✓	✓
Air suspension		✓	✓	✓
Adaptable Variable Suspension (AVS)		✓	✓	✓
Electric Power Steering (EPS), speed sensitive		✓	✓	✓
Electronic Parking Brake (EPB)		✓	✓	✓
Tyre Pressure Warning System (TPWS)		✓	✓	✓
Night View system		×	×	Opt
Advanced Safety Package		×	×	✓
	Advanced Pre-Crash Safety (A-PCS) system			
	Rear Pre-Crash Safety system			
	Advanced Obstacle Detection system			
	Driver Monitoring System			
	Emergency Steering Assist			
	Lane Keep Assist			
	Blind Spot Monitor			
	Pre-Crash Safety compatible front seats			
	LED low beam headlights with cleaners, auto-levelling and automatic high beam			
SECURITY		**LS 460 Luxury**	**LS 460 F Sport**	**LS 600h L Premier**
Anti-theft system with immobiliser, intrusion sensor, inclination sensor and siren		✓	✓	✓
Double door locks		✓	✓	✓
Auto door locking		✓	✓	✓
Laminated windscreen and side window glass		✓	✓	✓

ENTERTAINMENT, INFORMATION & COMMUNICATIONS	LS 460 Luxury	LS 460 F Sport	LS 600h L Premier
Mark Levinson 19-speaker Reference Surround audio system with DVD player	✓	✓	✓
DAB digital tuner	✓	✓	✓
USB port	✓	✓	✓
Bluetooth	✓	✓	✓
12.3-inch multimedia display	✓	✓	✓
Colour TFT multi-information display	✓	✓	✓
HDD navigation system	✓	✓	✓
Steering wheel controls for audio, phone and voice control	✓	✓	✓
Voice command function for audio, navigation, telephone and climate control operation	✓	✓	✓
Parking assist sensors	✓	✓	✓
Reversing camera with back guide monitor	✓	✓	✓
Rear Seat Entertainment, Blu-Ray DVD player with roof-mounted 9in screen	×	×	✓
COMFORT & CONVENIENCE	**LS 460 Luxury**	**LS 460 F Sport**	**LS 600h L Premier**
Smart entry and start system	✓	✓	✓
Dynamic illuminated entry system with puddle lights	✓	✓	✓
Illuminated front and rear vanity mirrors	✓	✓	✓
LED interior lighting	✓	✓	✓
Cruise control	✓	✓	×
Adaptive Cruise Control with full speed follow function	×	×	✓
Electric multi-adjustable steering wheel with memory	✓	✓	✓
Three-spoke wood-trimmed steering wheel	✓	✓	✓
Electric boot closer	✓	✓	✓
Easy exit & entry auto-retracting steering wheel	✓	✓	✓
Auto-dimming rear-view mirror	✓	✓	✓
Analogue clock with GPS time setting	✓	✓	✓
Electric windows with one-touch operation	✓	✓	✓
Electric steering wheel adjustment	✓	✓	✓
Electric rear screen sunshade	✓	✓	×
Electric rear screen and rear doors sunshades	×	×	✓
VENTILATION	**LS 460 Luxury**	**LS 460 F Sport**	**LS 600h L Premier**
Electronic dual zone climate control with separate driver/passenger controls	✓	✓	×
Automatic recirculation mode	×	×	✓
Clean air filter with nanoe technology	✓	✓	✓
Climate Concierge	×	×	✓
4-zone climate control with rear left/right temperature control	×	×	✓
Roof-mounted climate diffusers	×	×	✓
SEATING, UPHOLSTERY & TRIM	**LS 460 Luxury**	**LS 460 F Sport**	**LS 600h L Premier**
Heated and air conditioned front seats	✓	✓	✓
Heated rear seats	✓	✓	×

Heated and air conditioned rear seats		×	×	✓
16-way electrically adjustable driver's seat and active headrest with memory		✓	✓	✓
14-way electrically adjustable front passenger seat and active headrest		✓	✓	✓
Leather upholstery		✓	×	×
F Sport leather upholstery		×	✓	×
Semi-aniline leather upholstery		×	×	✓
Memory function for front seats, seatbelt anchor position, steering wheel and door mirrors with three pre-sets		✓	✓	✓
Front seat lumbar support		✓	✓	✓
Rear Seat Upgrade Package		×	×	✓
	4-zone climate control with rear left/right temperature control			
	Rear multi-function centre armrest			
	Electric rear seat adjustment with memory and lumbar massage			
	Air conditioned and heated rear seats			
	Electrically adjustable "butterfly" design rear headrests			
	Rear side airbags			
	Electric side window sunshades			
Upholstery Upgrade Package	Semi-aniline leather upholstery	×	×	✓
	Alcantara roof lining and pillar trim			
	Leather dashboard, upper door panels and door armrests			
Electrically adjustable front seatbelt height with memory (driver and front passenger)		✓	✓	✓
F-Sport leather-trimmed steering wheel		×	✓	×
Heated leather and wood steering wheel		×	×	✓
Wood trim inlays		✓	Aluminium	✓
Rear centre armrest with through hatch to compartment		✓	✓	✓
F Sport pedals		×	✓	×
F Sport scuff plates		×	✓	×
F Sport aluminium interior trim		×	✓	×
Rear Seat Relaxation Package	Electric reclining rear seats	×	×	✓
	Ottoman thigh and leg rest for left rear seat			
	Electric folding front passenger headrest			
	Rear left seat massage			

	functions with remote control			
	Seat cushion airbag in rear left hand seat			
	Fixed rear centre console with wood inlay			
	Body temperature sensing climate control			
	Blu-Ray DVD player in rear console (5-seat configuration)			
	Drop-down 9in VGA LCD monitor for DVD playback (4-seat configuration)			
BODY & EXTERIOR		**LS 460 Luxury**	**LS 460 F Sport**	**LS 600h L Premier**
18in alloy wheels		✓	×	×
19in F Sport alloy wheels		×	✓	×
19in alloy wheels		×	×	✓
Tyre repair kit		✓	✓	✓
HID (high-intensity discharge) headlamps with Adaptive Front-lighting System (AFS)		✓	✓	×
LED headlamps with Adaptive Front-lighting System (AFS)		×	×	✓
Automatic headlamp high beam operation		✓	✓	✓
Auto dimming electrically adjustable heated and folding door mirrors		✓	✓	✓
LED side lights		✓	✓	✓
Front fog lights		✓	✓	✓
F Sport fog lights and driving lights		×	✓	×
F Sport bumpers and front grille		×	✓	×
Turn indicators integrated in door mirrors		✓	✓	✓
LED brake, tail and licence plate lights		✓	✓	✓
Rain-sensing wipers		✓	✓	✓
UV and heat-insulating tinted glass		✓	✓	✓
Water-repellent front side window glass		✓	✓	✓
Metallic/mica paint finish		Opt	Opt	Opt