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BY APPOINTMENT  
TO HER MAJESTY THE QUEEN  
MANUFACTURERS OF  
LAND ROVER VEHICLES  
LAND ROVER, WARWICK



BY APPOINTMENT  
TO HER MAJESTY THE DUCHESS OF EDINBURGH  
MANUFACTURERS OF  
LAND ROVER VEHICLES  
LAND ROVER, WARWICK



BY APPOINTMENT  
TO HRH THE DUKE OF GLOUCESTER  
MANUFACTURERS OF  
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LAND ROVER, WARWICK



BY APPOINTMENT  
TO HRH THE PRINCE OF WALES  
MANUFACTURERS OF  
LAND ROVER VEHICLES  
LAND ROVER, WARWICK



# OFF-ROAD DRIVING

Publication Part No. JLR 12 49 10\_1E

## Introduction

Please take the time to familiarise yourself with the equipment, descriptions, and operating instructions, for your vehicle before you drive the vehicle off-road. The more that you understand about your vehicle, the greater the safety and pleasure you will derive from driving it.

This handbook can only provide a basic insight into the techniques of, and requirements for, off-road driving. To ensure your safety and enjoyment it is essential that you obtain the correct training and experience before venturing off-road. For more information visit [www.landroverexperience.com](http://www.landroverexperience.com).

## Important

*The information contained in this handbook covers all vehicle derivatives and optional equipment. Some of the options may not be fitted to your vehicle unless they formed part of the original specification. Therefore some information contained in this handbook may not apply to your vehicle. Furthermore, due to printing cycles it may include descriptions of options before they are available.*

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# Safety

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## PERSONAL SAFETY

Driving a vehicle can be a hazardous activity, this is particularly true when driving in unfamiliar circumstances. Before driving off-road it is essential that you familiarise yourself with your vehicle and it's driving controls. Ensure that you read the main Handbook supplied with the vehicle.

You are strongly advised to take part in off-road driver training before you drive off-road. Further information and advice can be found at

<http://www.landroverexperience.com>

Ensure that you familiarise yourself, and any passengers, with the operation of safety devices fitted to the vehicle. Pay particular attention to the operation and use of the seat belts, and door locks (including child locks).

It is imperative that you assess the risks involved in driving a route or negotiating an obstacle. Ultimately you are responsible for the choices you make. Therefore it makes good sense to be as informed as possible.

## Seat belts



### **WARNING:**

**Make sure ALL occupants are securely strapped in at all times.**

**Seat belts are designed to bear upon the bony structure of the body and should be worn low across the pelvis, chest and shoulders, as applicable. Wearing the lap section of the belt across the abdominal area must be avoided.**

**DO NOT wear seat belts over hard, sharp or fragile items in clothing, such as pens, keys, spectacles, etc.**

**Where possible, use the seat belts to secure large items of luggage that are to be carried on the seats. In the event of an accident, unsecured items become missiles, capable of causing serious injury.**

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# Warning Indicators

## WARNING INDICATORS

**Note:** The warning indicators shown provide a general guide only. For specific information on your particular vehicle please refer to the main Handbook.

**Caution: RED warning indicators are of particular importance. Their illumination indicates a fault. If a RED warning indicator illuminates, stop the vehicle safely and review the specific instructions given in this section.**

### Electronic Traction Control (ETC) - AMBER



Illuminates briefly as a bulb check when the starter switch is turned to position II. The indicator also illuminates when DSC is switched off. Deactivating DSC has no effect on traction control.

The indicator will flash while DSC and/or ETC is activated and will remain flashing until the system is no longer active.

If the indicator illuminates constantly, and does not extinguish when the DSC switch is pressed, a fault has been detected in the system and DSC and/or ETC will be inactive - drive with care and seek qualified assistance as soon as possible.

### Transmission fault- AMBER



Illuminates when the transmission oil temperature reaches a pre-determined limit. Stop the vehicle where safety permits and switch off the engine. Allow the transmission to cool for one hour before continuing.

**RED** - the transmission is unable to function properly. Stop as soon as safety permits and turn off the engine. Allow the transmission to cool for at least one hour before continuing.

**Note:** The transmission warning lights only appear on vehicles that are not fitted with a Message Centre.

### Transmission fault - AMBER/RED



Illuminates when the transmission registers a fault.

**AMBER** The operation of the transmission is limited. Seek qualified assistance as soon as possible.

**Caution: The Park function on the automatic transmission may be inoperable. Use the parkbrake.**

**RED** - the transmission is unable to function properly. Stop as soon as safety permits and turn off the engine. Leave the vehicle with the starter switch turned off for five minutes and then turn the starter switch back on. If the red light is still on, do not use the vehicle.

### Transmission oil temperature - RED



Illuminates as a bulb check when the starter switch is turned to position 'II' and extinguishes after 3 seconds approx. If the indicator illuminates while driving, the gearbox oil temperature is too high (most likely to occur in very hot weather during continuous high speed driving, or whilst towing heavy loads on steep inclines or if the handbrake has been applied while driving).

If the indicator illuminates, reduce speed. If the indicator remains on, stop the vehicle and allow the gearbox to cool. Allow the engine to run to draw air over the gearbox oil cooler. Do not drive until the light has extinguished.

Depending on the ambient temperature and the carrying loads imposed on the vehicle, it may take several minutes before the indicator extinguishes and it is safe to drive.

# Warning Indicators

## Differential lock - AMBER



Illuminates whenever the differential is locked. If the indicator remains on after the differential lock is disengaged, transmission 'wind-up' may be present. Reversing for a short distance and then going forward will usually 'unwind' the transmission. If the indicator remains on, contact your dealer as soon as possible.

## Hill descent control (HDC) information - GREEN



Illuminates briefly as a bulb and system check when the starter switch is turned to position II and also illuminates when HDC is selected.

If HDC is selected and the vehicle is within the operating speed range of up to 35 km/h (21 mph), the indicator will illuminate continuously.

If HDC is selected and the vehicle is driven faster than the operating speed range, the indicator will flash and the message **NO HDC - SLOW DOWN** is displayed.

The indicator will also flash during HDC fade-out (see for further information).

If a fault with the HDC system occurs, HDC will fade-out and then deselect, or immediately deselect (depending on the type of fault and whether or not HDC is in operation). The green indicator will extinguish and the message **HDC INACTIVE** will appear in the message centre.

## Hill descent control (HDC) 'failure' - AMBER



The warning indicator illuminates briefly as a bulb check when the starter switch

is turned to position 'II'. The warning indicator will flash if the brakes are in danger of overheating and continue flashing until the brakes have cooled sufficiently to enable HDC to operate again.

If the warning indicator illuminates at any other time, a fault in the system is indicated. If this occurs, deselect HDC and consult your Land Rover Dealer/Authorised Repairer.

## Tyre pressure monitoring - YELLOW



Illuminates as a bulb check when the starter switch is turned to position II. If the indicator stays on or illuminates during driving, the tyre pressure in one or more tyres is significantly low and should be rectified as soon as safely possible.

## LOW gear- GREEN



Illuminates when LOW range has been selected; flashes during range change.

## Seat belt - RED



Illuminates when the starter switch is turned to position II and extinguishes after approximately 6 seconds, even if the driver's seat belt remains unfastened. In some markets illumination of the indicator will be accompanied by a warning chime.

***Note:** In certain markets, the indicator will illuminate until the driver's seat belt is fastened correctly.*

## Door open- RED



Illuminates when the one of the vehicle's doors is open.

# Warning Indicators

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## **Electronic Brake force Distribution (EBD) - RED**

A fault with the EBD system is indicated by illumination of the red brake warning indicator. If this illuminates while the vehicle is being driven, stop the vehicle gently, as soon as safety permits, check and top up brake fluid if necessary. If the lamp remains illuminated, seek qualified assistance before continuing.

## **Suspension- AMBER/RED**



The lamp illuminates both RED and AMBER briefly as a bulb check when the starter is turned to

position II.

The lamp shows amber when a suspension fault occurs which still allows the vehicle to be driven normally. If the symbol flashes red, the vehicle should be driven slowly until qualified assistance can be obtained.

The first illumination of the indicator will be accompanied by a warning chime.

## **Traction Control - AMBER**



Illuminates as a bulb check when the starter switch is turned to

position 'II' and extinguishes after approximately 3 seconds. The indicator illuminates for a minimum of 2 seconds, whenever traction control is operating.

If the warning indicator flashes (for at least 10 seconds) traction control has been operating for too long and has temporarily shut down to allow the system to cool - this will only occur in extreme conditions.

If the indicator illuminates continuously, a fault with the system is indicated; seek qualified assistance.

# Range Rover Driving Controls

## TRANSFER GEARBOX

Your vehicle is equipped with an electronically controlled transfer gearbox allowing the driver to select High or Low range driving gears.

### High range

High range should be used for all normal road driving and also for off-road driving across dry, level terrain.

### Low range

Low range should only be used in situations where low speed manoeuvring is necessary, such as reversing a trailer or negotiating a boulder-strewn river bed, or when moving off while heavily loaded or towing.

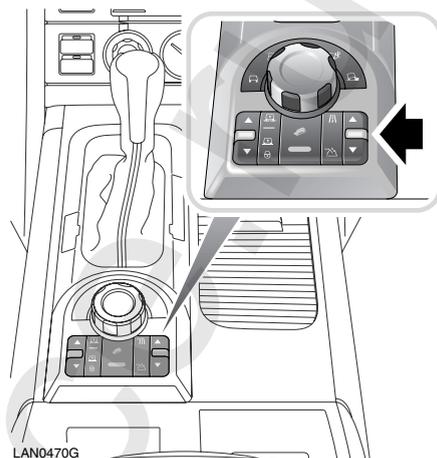
Also use Low range for more extreme off-road conditions, such as steep ascents and descents. Do not attempt to use the Low range for normal road driving.

### Range changing

The recommended method of changing range is with the vehicle stationary. Messages displayed in the main message centre will assist the experienced driver in carrying out a range change on-the-move.

### Stationary method

With the vehicle stationary and the engine running, apply the foot brake and move the automatic gearbox selector to the **N** (neutral) position before pressing the appropriate portion of the transfer gear switch - press the forward arrow to select High range and press the rearward arrow to select Low range. When the switch is released, it returns to the central position.

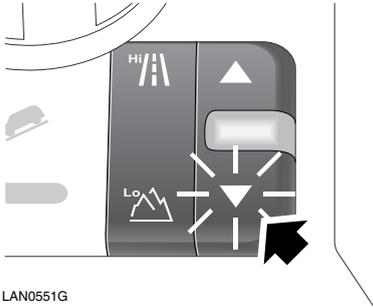
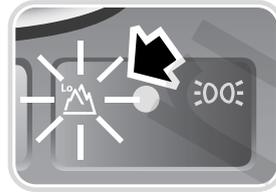


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While the vehicle is in High range, the range indicator in the instrument pack display is extinguished and the High range indicator in the switch is illuminated.

The range indicator in the instrument pack illuminates continuously to act as a reminder that Low range is engaged. It flashes to indicate a range change in progress and extinguishes once the vehicle is in High range.

# Range Rover Driving Controls

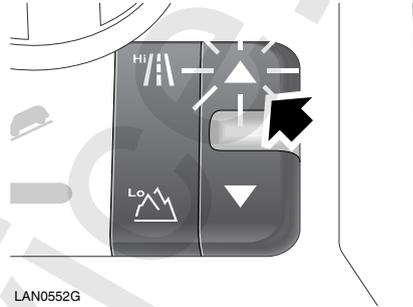


LAN0551G

While a High to Low range change is in progress, the High range indicator in the switch will remain illuminated. The Low range indicators in both the switch and the instrument pack display will flash.

When the range change is complete, the High range indicator in the switch extinguishes. The Low range indicators in both the switch and the instrument pack display will illuminate constantly.

A warning chime will sound, and **LOW RANGE SELECTED** is displayed in the message centre for a few seconds.



LAN0552G

While a Low to High range change is in progress, the Low range indicator in the switch will remain illuminated. The High range indicator in the switch and the instrument pack display will flash.

When the range change is complete, the Low range indicator in both the switch and the instrument pack display extinguishes. The High range indicator in the switch will illuminate constantly.

A warning chime will sound, and **HIGH RANGE SELECTED** is displayed in the message centre for a few seconds.

# Range Rover Driving Controls

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## RANGE CHANGING ON THE MOVE

**Note:** If the vehicle speed is too high when a range change is requested, a warning chime sounds and **SPEED TOO HIGH FOR RANGE CHANGE** appears in the message centre. Slow down to allow a new range to be selected.

If **N** is not selected before using the transfer gear switch, the message **SELECT NEUTRAL FOR RANGE CHANGE** is displayed and a warning chime sounds.

**Note:** Do not attempt to make moving range changes at speeds of 3 km/h (2 mph) or less.

### Changing from High to Low on the move

With the vehicle slowing down and travelling no faster than 40 km/h (24 mph), first select **N** in the main gearbox. Press the rear of the transfer gear switch and release.

Indication of the range change status is the same as for the stationary method.

Now select **D** or manual CommandShift mode. The transmission interlock prevents the engagement of a drive gear until the range change is complete.

### Changing from Low to High on the move

With the vehicle travelling no faster than 60 km/h (38 mph), select **N** in the main gearbox. Press the front of the transfer gear switch and release.

Indication of the range change status is the same as for the stationary method.

Now select **D** (drive). The transmission interlock prevents the engagement of a drive gear until the range change is complete.

**Caution: If the range change indicator still flashes when the starter key is turned from the second position to the first position, apply the parking brake.**

## Transmission fault message

If a fault occurs within the transmission, a message will be displayed in the main message centre.

## AUXILIARY EQUIPMENT

**Caution: Do not use auxiliary equipment, such as roller generators, that are driven by only one or two wheels of the vehicle, as they will cause failure of the transfer gearbox.**

# Range Rover Driving Controls

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## ELECTRONIC TRACTION CONTROL (ETC)

ETC is continuously available to boost vehicle traction when one or more wheels has a tendency to spin, while the others have more grip. It operates in conjunction with the DSC system.

If a wheel is spinning, ETC automatically brakes that wheel until it regains grip. This braking activity causes the engine power to be transferred to the remaining wheels. Some noise may be generated when the brakes are applied.

### Warning indicator



A fault with the ETC system is indicated by illumination of the DSC warning indicator. This could also indicate that the DSC has been manually deactivated. See **WARNING INDICATORS, 6**.

If the indicator illuminates constantly, and does not extinguish when the DSC switch is pressed, a fault has been detected in the system. Any fault will deactivate ETC. Drive with care and seek qualified assistance as soon as possible.

# Range Rover Driving Controls

## HILL DESCENT CONTROL (HDC)

HDC operates in conjunction with ABS to provide greater control in off-road situations particularly when descending severe gradients.

HDC can be used in **D**, **R** and CommandShift. When in **D**, HDC will automatically select the most appropriate gear to enable a controlled descent. The vehicle should not be driven with the HDC active in **N** neutral, unless the driver is changing gear range using the transfer gearbox.

**Note:** *Some of the Terrain Response program/range combinations will activate and deactivate HDC automatically. If HDC is selected manually, it will not be deactivated by Terrain Response.*

### HDC information indicator

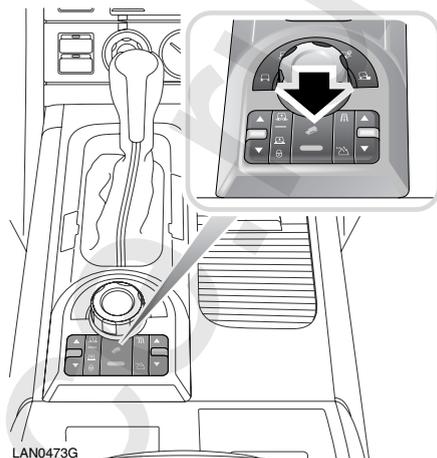


HDC can be selected at speeds below 80 km/h (50 mph), but the vehicle has to be travelling at less than 50 km/h (30 mph) for the system to operate.

The green HDC information indicator will illuminate continuously when HDC operating conditions are met; e.g. vehicle speed reduces below 50 km/h (30 mph) - and HDC is activated.

If the information indicator is flashing, HDC has been selected, but the system's operating conditions have not been met (e.g. the vehicle is travelling too fast), or HDC fade-out is occurring. See **HDC fade-out, 15**.

If HDC is already selected and vehicle speed rises above 50 km/h (30 mph), HDC is suspended and the information indicator will flash. A message will also appear in the main message centre.



### To select HDC

Press and release the switch (arrowed) to select HDC (HDC information indicator illuminates). To deselect, press and release again (indicator extinguishes).

If HDC is deselected when HDC is operating, the system fades out, allowing the vehicle to gradually increase in speed.

When used in Low range, HDC is able to control the vehicle to a lower target speed. Use Low range gears when steep descents are to be attempted.

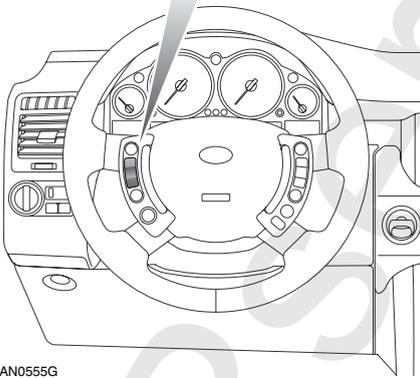
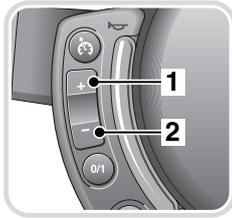
**Note:** *HDC is automatically deselected if the vehicle ignition is switched off for more than 6 hours.*

# Range Rover Driving Controls

## HDC in action

HDC should be used in conjunction with an appropriate gear selection. HDC can be used in **D**, **R** and CommandShift. When in **D**, HDC will automatically select the most appropriate gear to enable a controlled descent.

During a descent, HDC will maintain a target speed of up to a maximum of 20 km/h (20 mph). If engine braking is insufficient to control the vehicle speed, HDC automatically operates the brakes to slow the vehicle and maintain a speed relative to the selected gear range and the accelerator pedal position.



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While HDC is controlling the vehicle speed, the target speed can be varied using the steering wheel-mounted cruise control (1) + and (2) - switches. To reduce the target descent speed, press and hold the - switch. The vehicle speed at the point of switch release will become the new target speed.

To set the minimum target speed for the selected gear, bring the vehicle to a halt using the foot brake, before releasing the foot brake and beginning the descent.

**Note:** Each gear has a pre-defined minimum descent speed.

To increase the target descent speed, press and hold the + switch. The vehicle speed at the point of switch release will become the new target speed. Alternatively, the target speed can be adjusted by tapping the + or - switches. Each press of the switch will adjust the target speed by approximately 0.5 km/h (0.3 mph).

**Note:** The descent speed will only increase if the gradient is sufficiently steep to cause the vehicle to accelerate as the braking effect is reduced. On a shallow slope, pressing the + switch may result in no speed increase.

When driving off-road, HDC can be permanently selected to ensure that control is maintained. ABS and traction control are still fully operational and will assist if the need arises.

**Note:** With HDC selected, gear changes can be carried out in the normal way.

If the brake pedal is depressed when HDC is active, HDC is overridden and the brakes will perform as normal (a pulsation might be felt through the brake pedal). If the brake pedal is then released, HDC will recommence operating at the speed at which the brakes were released.

# Range Rover Driving Controls

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In extreme circumstances, the HDC system may cause brake temperatures to exceed their pre-set limits. If this occurs, **HDC TEMPORARILY NOT AVAILABLE SYSTEM COOLING** will be displayed in the message centre. HDC will then fade out and become temporarily inactive. HDC will not be available until the brakes reach an acceptable temperature, at which time the warning message will disappear from the message centre and HDC will, if required, resume operating.

If a fault is detected in the HDC system, **HDC FAULT SYSTEM NOT AVAILABLE** will appear in the message centre. If the fault is detected while the system is active, HDC will fade out. Do not attempt a steep descent when HDC is unavailable or use a very low gear and/or the foot brake. If a fault has been detected, consult your Land Rover Dealer/Authorised Repairer at the earliest opportunity.

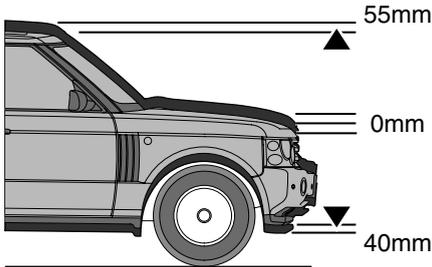
## **HDC fade-out**

HDC fade-out regulates the vehicle's acceleration in a controlled manner, by reducing brake pressure, until the rate of hill descent is controlled by engine braking alone. HDC will then enter stand-by mode. During fade-out, the HDC information indicator will flash.

If required (e.g. the angle of the descent levels out significantly), fade-out may be achieved deliberately by deselecting HDC while the system is operating - the information indicator will extinguish.

# Range Rover Driving Controls

## AIR SUSPENSION



H6505G

The air suspension system maintains the correct vehicle height by controlling the quantity of air in the vehicle's air springs.

Unless stated otherwise, height changes may only be made while the engine is running and the driver and passenger doors are closed.

When the air suspension system lifts the vehicle, it normally uses compressed air stored in its reservoir. The suspension will rise much more slowly if this reservoir is depleted due to repeated raising and lowering of the suspension.

### On-road height

The normal height for the vehicle.

### Off-road height

This is 55 mm (2.2 in.) higher than On-road height. It provides improved ground clearance and approach, departure and break-over angles.

See **RANGE ROVER OFF-ROAD DATA, 97**.

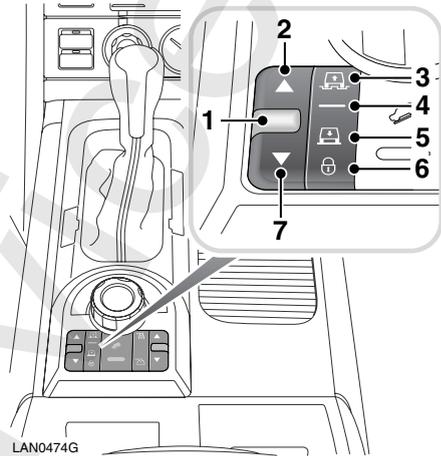
Off-road height can be selected at any speed up to 40 km/h (24 mph). When the system is at Off-road height, the system will automatically select On-road height if the vehicle speed exceeds 50 km/h (30 mph).

**Note:** When using Terrain Response, some of its programs/range combinations will adjust suspension height automatically

### Messages

Messages relating to the air suspension system will be displayed in the main message centre.

### Adjusting suspension heights



1. Raise/lower switch
2. Raising indicator
3. Off-road indicator
4. On-road indicator
5. Access indicator
6. Lock indicator
7. Lowering indicator

# Range Rover Driving Controls

## Suspension heights

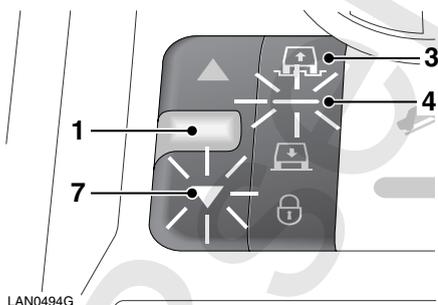
The raise/lower switch (1) is used to move up or down through the suspension heights. Indicators (3), (4) or (5) will be lit to show the height selected. A message indicating the suspension height will also be displayed in the message centre when Off-road, Access or Crawl is selected.

Indicators (2) or (7) will be lit to show the direction of movement. They extinguish when the height change movement is completed.

If a height change is requested that is not allowed, such as attempting to raise the height of the vehicle with the engine not running, indicators (2) and (7) will flash twice and a chime will sound. A message will be displayed on the message centre.

A flashing indicator (2) or (7) indicates that the system is in a waiting state or shows that it will automatically override the driver's choice if speed criteria are exceeded.

## Automatic height change warnings



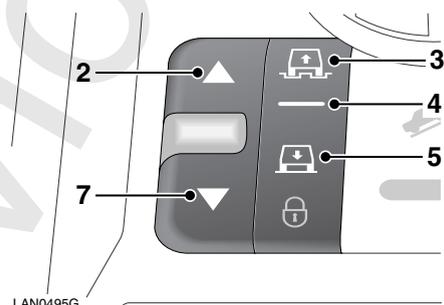
When the suspension is at Off-road height, Access or Crawl, the suspension height will change automatically when vehicle speed exceeds predetermined levels.

When the suspension is at Off-road height or Crawl, it warns the driver that the vehicle is approaching a speed threshold. A chime will sound, a message will be displayed on the message centre and the On-road indicator (4) and either (2) or (7) will flash.

The Off-road height speed warning is shown above. If the vehicle slows down, the warning will disappear.

## Door open override

If a door is opened during a height change while the vehicle is at rest, the height change will be restricted.



The indicator for the target height (3, 4 or 5) will remain lit and the raising indicator (2) or the lowering indicator (7) will flash.

The height change will resume if all of the doors are closed within 90 seconds.

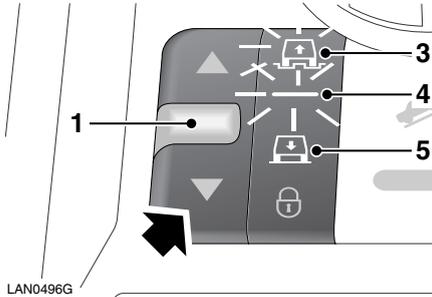
If the doors are not closed within this time, the raising indicator (2) or the lowering indicator (7) will extinguish and the indicators showing the heights above and below the current position will be illuminated.

Selecting a new height using the raise/lower switch (1), or driving off will reset the system.

# Range Rover Driving Controls

## Extended mode

If the vehicle is grounded and traction control is induced, the system raises the vehicle by 35 mm (1.4 in.) to clear the obstruction. Extended mode is activated automatically and cannot be selected manually.



When Extended mode is activated, indicator (3) will flash if the suspension is above Off-road height. Indicators (3) and (4) will flash if the suspension is between Off-road and On-road heights. Indicators (4) and (5) will flash if the suspension is between On-road and Access heights. A message will be displayed on the message centre.

To exit Extended mode, either press the raise/lower switch (1) briefly up or down, or drive the vehicle at a speed greater than 5 km/h (3 mph) for 30 seconds.

## Additional lift whilst in extended mode

When Extended mode has been invoked and the automatic lifting of the vehicle has been completed, the driver can request an additional lift in order to clear the obstacle. This can be particularly useful when Extended mode has been invoked on soft surfaces.

To request additional lifting wait for the raising indicator (2) to extinguish, then press and hold the switch (1) in the up direction for 3 seconds while also pressing the brake pedal. A chime will sound to confirm that the request has been accepted. The raising indicator (2) will be illuminated while the vehicle is being lifted.

## Suspension freeze

If the system is attempting to change the suspension height and it detects that the suspension is prevented from moving, the system will freeze all movements.

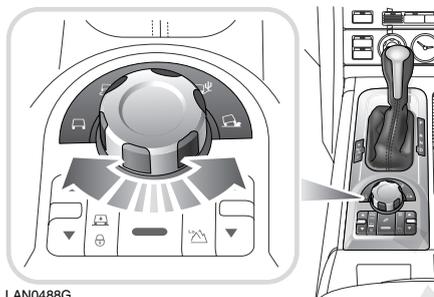
This can be caused by attempting to lower the vehicle onto an obstacle or attempting to lift the vehicle against an obstruction.

The symbols behave in the same way as described in Extended mode and the same message will be displayed on the message centre. As in Extended mode, to exit this freeze state, either press the switch (1) up or down, or drive the vehicle at a speed greater than 20 km/h (12 mph).

# Range Rover Driving Controls

## TERRAIN RESPONSE™

The Terrain Response system is permanently active, continuously providing benefits in traction and driveability. These can be further enhanced for specific on and off-road driving conditions by the selection of special programs, using one simple driver interface.



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This interface allows the driver to tell the vehicle what sort of terrain is to be driven over. Based on the selected special program, the system optimises the vehicle set-up for the prevailing conditions, providing the optimum in traction, driveability and vehicle composure.

The Terrain Response special programs automatically bring in changes in vehicle drive and suspension systems that have until now been only individually and manually controllable by the driver.

The suspension and drive systems comprising Terrain Response are:

- Engine management.
- Gearbox management.
- Intelligent differential control.
- Dynamic stability, traction control and HDC systems.
- Air suspension.

The system will provide a variable accelerator response, ranging from very cautious for slippery conditions (where a large pedal movement has only a small effect on engine power) to very responsive, for example, for sand, where engine power is allowed to rise more quickly.

This further extends the breadth of off-road capability of Land Rover vehicles. In addition, Terrain Response offers control of systems that have previously not been manually controllable.

**Note:** Since each Terrain Response special program uses the optimum settings of each drive component - accelerator response, suspension, transmission, etc. - relative to the terrain being driven over, it follows that changing from one special program to another brings in a different set of criteria.

*This means that, for instance, the engine revs produced by the current accelerator pedal position might increase or decrease slightly in the new program, or the suspension could change height. The changes are not dramatic, but are noticeable.*

*To obtain the maximum benefits from the system, it is suggested that you first try it out in circumstances where any distraction will not affect other road users.*

Terrain Response is designed to benefit the driver, regardless of the level of off-road driving experience. The enhanced traction system, with the control of many system parameters through one simple driver input, coupled with specific advice from the message centre, will aid drivers with limited off-road experience. Additionally, the system can back-up the skills of experienced drivers, who will also benefit from the wider performance envelope available through the special programs.

# Range Rover Driving Controls

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## Using Terrain Response

The Terrain Response system is always active and can not be switched off. When the vehicle is started, the system will normally start in its General program. Using the correct special program, will provide benefits in how the vehicle can be driven over different surfaces or terrains. It is recommended that a special program be engaged, whenever driving conditions could become difficult.

Depending on the terrain, it may be beneficial for the automatic transmission to change gear under different speed and load conditions. Each special program will provide the most appropriate gear-shift points for the terrain, including the most appropriate gear to set off in (i.e., second, High range, or third, Low range, in Grass-Gravel-Snow or first, Low range, when in Rock Crawl).

The amount of slip allowed in the electronically controlled differentials will be optimised continuously, both from the point of view of traction and vehicle stability.

Depending on the Terrain Response program selected, the control of the differentials will vary to provide the optimum settings.

**Note:** *Special programs should be engaged pro-actively - before starting to drive in particular conditions. They are not intended as a means of extracting a vehicle that has been driven into difficulties.*

The system has been designed to instil confidence regarding choice of special program, despite the fact that conditions associated with each program are distinctly different. However, the vehicle will be very capable under all circumstances, even when no special program is selected, as some sub-systems will react to the conditions where possible. In case of any uncertainties about the most appropriate special program selection, it will be best to leave the system in Terrain Response General program until terrain conditions become more distinct and a program choice can be made with more confidence.

The system is of particular use when driving off-road, but, even here, it should be used pro-actively and not be used as a means of retrieving control.

If a Terrain Response special program has been selected, then the transmission can be left in **D**. If descending a slippery slope, CommandShift **1** or **2** should be considered.



### **WARNING:**

**When towing, the automatic vehicle height rise associated with using the system in low range, will be automatically prevented by the system. This will be indicated by a warning in the message centre. However, this function relies on the fitting of a Land-Rover approved towing electrical socket. Failure to fit a Land-Rover approved towing electrical socket or to follow these guidelines may lead to the vehicle being raised to Off-road height even with a trailer attached.**

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# Range Rover Driving Controls

## Driver over-ride options

All systems will be set to optimum parameters for the terrain conditions reflected in the choice of control program. The following two systems controlled by Terrain Response, may also be operated independently by the driver:

- Air suspension.
- Hill Descent Control.

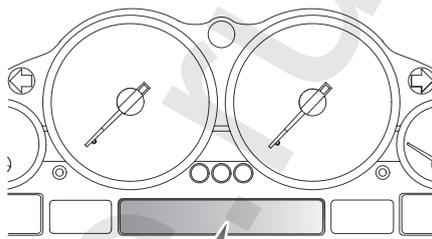
In some special programs, the Terrain Response system will switch on HDC and in Low range the system will automatically move the suspension to Off-road height.



### WARNING:

**This height increase will start regardless of whether the vehicle is moving or not.**

Both the HDC and ride height automatic selections can be cancelled by the driver at any time. Conversely, if HDC or a specific ride height has not been automatically selected by the system, the driver can always choose to operate it as normal at any time.



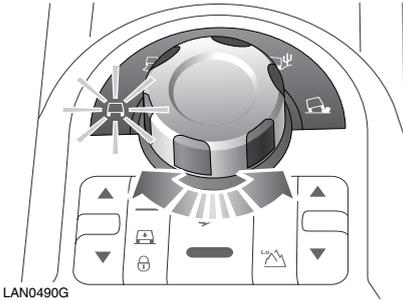
LAN0489ENG

Whether the HDC or ride height options are being brought in automatically by the system, or manually by the driver, the changes of state will be confirmed through the message display and by the individual system information indicators. Use of the system in the special programs, particularly in low range, may prompt some driving advice and warnings as well as additional information to be displayed on the touch-screen and in the message centre.

**Note:** Gear selection can be overridden by using the CommandShift function on the gearbox to lock the vehicle in a particular gear.

# Range Rover Driving Controls

## Operation



A rotary knob just behind the gear lever is rotated to select the required special program. When the selector reaches either end of the selection range, it can be turned further, but doing so has no effect.

In addition to the Terrain Response General setting, four special programs are available:

- Grass/gravel/snow (also includes ice).
- Mud/ruts.
- Sand.
- Rock Crawl.

When the starter switch is turned on, the graphics around the control knob are illuminated, with the active program highlighted in amber. The brightness of graphic illumination at night, is controlled as part of the instrument illumination control; the brightness of the amber lighting is high or low depending on the use of the headlamps.



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When a Terrain Response program is selected, the appropriate symbol will also be displayed on the message centre and a confirmation pop-up screen on the touch-screen will be displayed (as illustrated).

If the starter switch is turned off with a special program selected, then the system will remember for approximately six hours which program was selected and return to that program once the starter switch is turned back on.

The system indicates, via the message centre, that the previously selected special program is still selected. When the starter switch has been in the off position continually for more than six hours, the Terrain Response system defaults to the General program.



*It is possible to have the Terrain Response system configured so that if the Grass Gravel Snow program is selected, and the starter switch is turned off, the system will not default back to the General program after the six hour period. The Grass Gravel Snow program will remain selected until it is deselected manually. Consult your Land Rover Dealer/Authorised Repairer.*

# Range Rover Driving Controls

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## Terrain Response general



When the Terrain Response special programs are off, the system will be in its General program. This will be indicated by the above symbol being displayed briefly on the message centre. Sub-systems will adapt to the prevailing terrain conditions and select control settings based on the conditions sensed.

This program setting is compatible with all on and off-road terrain conditions. Normal conditions in which it is not necessary to select a specific program include driving on surfaces that closely match a hard road surface. Dry cobbles, Tarmac or even wooden planks are all included in the scope which consists of hard supportive surfaces with no loose coating of water, dust or similar material.

It is recommended that a special program be de-selected, once the specific conditions for its use no longer prevail. This is done by turning the selector knob back to the General program position.

When a special program is de-selected, all vehicle systems will be returned to their normal control settings. The one exception is HDC, which will remain active if it was manually selected previously. Also, as a precaution, the vehicle will change from raised to Normal ride height only when moving.

## Grass-Gravel-Snow



Use this program for surfaces where the underlying base is fairly firm, but a coating of other material gives a tendency to slip. The coating can be water, slime, grass, snow or loose gravel, shale or pebbles, or even a thin coating of sand. This program should also be selected in icy conditions.

In this special program the Terrain Response systems will select settings to give the best traction, handling and driveability for predominantly slippery conditions. Hill Descent Control will be engaged automatically in low range, but can be manually de-selected. See **HILL DESCENT CONTROL (HDC), 13**.

In slippery conditions, it is often beneficial to start off in a higher gear than usual, for example, CommandShift **2** in HIGH range or CommandShift **3** in LOW range.

For use of the vehicle with snow chains fitted, see **SNOW CHAINS, 92**.

**Note:** *When in deep snow, if the vehicle is struggling for forward traction or is stuck, then switching off Dynamic Stability Control (DSC) may be an advantage. If DSC is switched off, then it must be switched back on as soon as the difficulty is overcome.*

# Range Rover Driving Controls

## Mud-Ruts



Use this program when traversing ground that is not only muddy or deeply rutted, but possibly soft and uneven to the point of demanding maximum axle displacement. This unevenness can also be that brought about by sizeable wooden debris in the form of roots, brushwood, small logs, etc.

This acts like the previous program, except that it selects settings for the individual systems that optimise traction and driveability for muddy/rutted driving conditions, with driver over-ride options as before. The program is available in High and Low range, but Low range is recommended.

It is anticipated that this program will usually be used in low range. If not, the driver will be prompted to consider selecting low range. If the Mud-Ruts program and low range are selected together, the vehicle ride height will be raised automatically.

## Sand



Use this program to drive on soft and predominantly dry, yielding sandy ground, such as dry beaches, dunes and sand deserts. Also consider using this program for deep gravel.

The Sand special program uses the control settings and software logic best suited to driving on sand, with the driver-override option as before.

In instances where the sand is damp or wet and soggy, the conditions are better addressed by the use of mud/ruts special program.

Where the sand is extremely soft and dry and of a depth that allows the wheels to sink well into it, there may be additional benefit in switching off the Dynamic Stability Control.

## Rock Crawl



Use this program to cross wet or dry, solid, unyielding ground, such as clusters of boulders, which demands high levels of road-wheel displacement and careful vehicle control. This program would also be used for crossing river beds strewn with large rock features submerged below water.

Unlike the other options, Rock Crawl is only selectable in Low range. If selection is attempted in High range, the special program selection will not be accepted and the driver will be prompted to select Low range. This special program will utilise system control settings to optimise the vehicle suspension and traction system for the conditions, which are likely to require extreme suspension articulation and good low-speed control.

When a special program requires increased air suspension height, the system will automatically select it, unless it suspects that a trailer is attached because an electric load is seen on the trailer socket.

A message will be displayed on the message centre.

**Caution: Selection of a wholly inappropriate special program for the prevailing terrain conditions will not endanger the driver or immediately damage the vehicle. However, if continued, such an action will impair vehicle response to those conditions and will reduce the durability of the suspension and drive systems.**

# Range Rover Driving Controls

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## **Inappropriate special program selection**

If an inappropriate special program is attempted to be selected - such as choosing Rock Crawl while in High range - the symbol of that program will flash amber, an audio warning will sound and the message centre will advise that the chosen special program is unavailable and will suggest corrective action to be taken.

If, after 60 seconds, the requirements have not been met, the warnings will cease and the message centre will show which program remains active.

Should the system become partly inoperable for any reason, it may not be possible to select certain special programs and a warning will be given when selection of an affected program is attempted. If the system should become totally inoperable, all of the control program symbols will be switched off and the message centre will display message.

The air suspension system provides an automatic levelling function. See **AIR SUSPENSION, 16**. In circumstances where the system is used in Low range, it is most likely that mobility and vehicle composure would benefit from increased ground clearance.

## **System messages**

Messages relating to the Terrain Response system are displayed on the message centre.

# Range Rover Sport Driving Controls

## TRANSFER GEARBOX

Your vehicle is equipped with an electronically controlled transfer gearbox allowing the driver to select HIGH or LOW range driving gears.

### HIGH range

HIGH range should be used for all normal road driving and also for off-road driving across dry, level terrain.

### LOW range

LOW range should **ONLY** be used in situations where low speed manoeuvring is necessary, such as reversing a trailer or negotiating a boulder-strewn river bed, or when moving off while heavily loaded or towing.

Also use LOW range for more extreme off-road conditions, such as steep ascents and descents. **DO NOT** attempt to use the LOW range for normal road driving.

### Range changing

The recommended method of changing range is with the vehicle stationary. For vehicles equipped with a message centre, the messages displayed will assist the experienced driver in carrying out a range change on-the-move.

### Stationary method

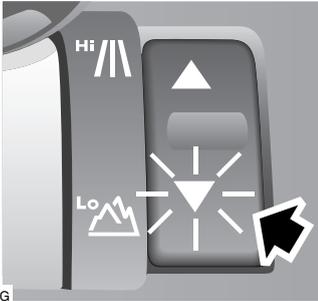
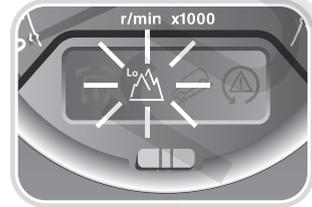
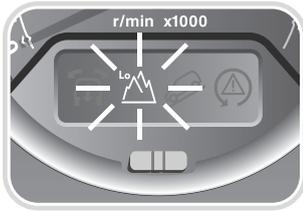
With the vehicle stationary and the engine running, apply the foot brake and move the automatic gearbox selector to **N** (neutral). Press the transfer gear switch to select HIGH or LOW and release it.



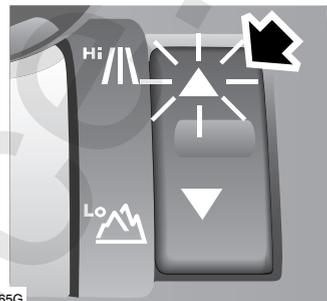
While the vehicle is in HIGH range, the range indicator in the instrument pack display is extinguished and the HIGH range indicator at the switch is illuminated.

The range indicator in the instrument pack display illuminates continuously to act as a reminder that LOW range is engaged. It flashes to indicate a range change in progress and extinguishes once the vehicle is in HIGH range.

# Range Rover Sport Driving Controls



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While a HIGH to LOW range change is in progress, the HIGH range indicator in the switch will remain illuminated. The LOW range indicators in both the switch and the instrument pack display will flash.

When the range change is complete, the HIGH range indicator in the switch extinguishes. The LOW range indicators in both the switch and the instrument pack display will illuminate constantly.

A warning chime will sound, and **LOW RANGE ENGAGED** is displayed in the message centre for a few seconds.

While a LOW to HIGH range change is in progress, the LOW range indicator in the switch will remain illuminated. The HIGH range indicators in both the switch and the instrument pack display will flash.

When the range change is complete, the LOW range indicator in both the switch and the instrument pack display extinguishes. The HIGH range indicator in the switch will illuminate constantly.

A warning chime will sound, and **HIGH RANGE ENGAGED** is displayed in the message centre for a few seconds.

# Range Rover Sport Driving Controls

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## RANGE CHANGING ON THE MOVE

**Note:** If the vehicle speed is too high when a range change is requested, a warning chime sounds and **SPEED TOO HIGH FOR RANGE CHANGE** appears in the message centre.

If **N** is not selected before using the transfer gear switch, the message **SELECT NEUTRAL FOR RANGE CHANGE** is displayed and a warning chime sounds.

**Note:** Do not attempt to make moving range changes at speeds of 3 km/h (2 mph) or less.

### Changing from HIGH to LOW on the move

With the vehicle slowing down and travelling NO FASTER THAN 40 km/h (24 mph), first select **N** in the main gearbox. Press the rear of the transfer gear switch to the LOW position and release it.

Indication of the range change status is the same as for the Stationary method.

Now select **D** or manual CommandShift mode. The transmission interlock prevents the engagement of a drive gear until the range change is complete.

### Changing from LOW to HIGH on the move

**Caution: If the range change indicator still flashes when the starter key is turned from position II to position I, apply the parkbrake.**

With the vehicle travelling NO FASTER THAN 60 km/h (38 mph), select **N** in the main gearbox. Press the front of the transfer gear switch to the HIGH position and release it.

Indication of the range change status is the same as for the stationary method.

Now select **D** (drive). The transmission interlock prevents the engagement of a drive gear until the range change is complete.

## Transmission fault message

If a fault occurs within the transmission, a message will be displayed in the main message centre.

## AUXILIARY EQUIPMENT

**Caution: DO NOT use auxiliary equipment, such as roller generators, that are driven by only one or two wheels of the vehicle, as they will cause failure of the transfer gearbox.**

# Range Rover Sport Driving Controls

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## ELECTRONIC TRACTION CONTROL (ETC)

ETC is continuously available to boost vehicle traction when one or more wheels has a tendency to spin, while others do not. It operates in conjunction with the DSC system.

If a wheel is spinning, ETC automatically brakes that wheel until it regains grip. This braking activity allows the engine power to be transmitted to the remaining wheels. Some noise may be generated when the brakes are applied.

### Warning indicator



A fault with the ETC system is indicated by illumination of the amber DSC warning indicator.

This could also indicate that the DSC has been manually deactivated. See **WARNING INDICATORS, 6**.

If the indicator illuminates constantly, and does not extinguish when the DSC switch is pressed, a fault has been detected in the system. Any fault will deactivate ETC. Drive with care and seek qualified assistance as soon as possible.

# Range Rover Sport Driving Controls

## HILL DESCENT CONTROL (HDC)

HDC operates in conjunction with ABS to provide greater control in off-road situations particularly when descending severe gradients.

HDC is fully functional and should only be used in first and reverse gears in HIGH range and all gears in LOW range.

HDC is fully functional and should only be used in **D**, **R** and CommandShift **1** in HIGH range and in **D**, **R** and all CommandShift gears in LOW range. When in **D**, the vehicle will automatically select the most appropriate gear. The vehicle should not be driven with the HDC active in **N** neutral.

**Note:** *Some of the Terrain response program/range combinations will activate or deactivate HDC automatically.*

### Warning indicator



HDC can be selected at speeds below 80 km/h (50 mph). The green warning indicator will illuminate continuously when vehicle speed reduces below 50 km/h (30 mph) and full HDC function is activated.

If the vehicle speed exceeds 80 km/h (50 mph), HDC will deselect and the green HDC indicator will extinguish.

If HDC is already selected and vehicle speed rises above 50 km/h (30 mph) in HIGH range, HDC function is suspended and the green HDC indicator will flash. A message will also appear in the main message centre.



LAN0263G

### To select HDC

Press and release the switch (arrowed) to select HDC. To deselect, press and release again.

The green information indicator will extinguish. If HDC is deselected when HDC is operating, the system fades out, allowing the vehicle to gradually increase in speed.

When used in LOW range, HDC controls the vehicle speed more aggressively. Use LOW range gears when steep descents are to be attempted.

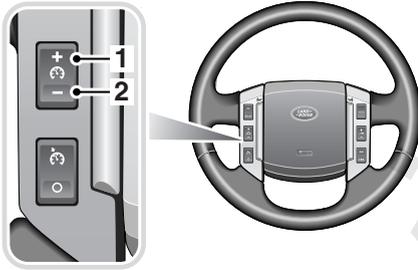
**Note:** *HDC is automatically deselected if the vehicle starter is switched off for more than 6 hours.*

# Range Rover Sport Driving Controls

## HDC in action

HDC should be used in conjunction with an appropriate gear selection.

During a hill descent, if engine braking is insufficient to control the vehicle speed, HDC automatically operates the brakes to slow the vehicle and maintain a speed relative to the selected gear range and the accelerator pedal position.



LAN0266G

While HDC is controlling the vehicle speed, descent speeds can be varied using the steering-wheel-mounted cruise control (1) + and (2) - switches. To reduce the descent speed, press and hold the - switch. The vehicle speed at the point of switch release will become the new descent speed.

To increase the descent speed, press and hold the + switch. The vehicle speed at the point of switch release will become the new descent speed. Alternatively, the descent speed can be adjusted by tapping the + or - switches. Each press of the switch will adjust the descent speed by approximately 0.5 km/h (0.3 mph).

**Note:** Each gear has a pre-defined minimum descent speed.

**Note:** The descent speed will only increase if the gradient is sufficiently steep to cause the vehicle to accelerate as the braking effect is reduced. On a shallow slope, pressing the + switch may result in no speed increase.

When driving off-road, HDC can be permanently selected to ensure that control is maintained. ABS and traction control are still fully operational and will assist if the need arises.

**Note:** With HDC selected, gear changes can be carried out in the normal way.

If the brake pedal is depressed when HDC is active, HDC is overridden and the brakes will perform as normal (a pulsation might be felt through the brake pedal). If the brake pedal is then released, HDC will recommence operating at the speed at which the brakes were released.

In extreme circumstances, the HDC system may cause brake temperatures to exceed their pre-set limits. If this occurs, **HDC TEMPORARILY NOT AVAILABLE SYSTEM COOLING** will be displayed in the message centre. HDC will then fade out and become temporarily inactive. HDC will not be available until the brakes reach an acceptable temperature, at which time the warning message will disappear from the message centre and HDC will, if required, resume operating.

If a fault is detected in the HDC system, **HDC FAULT SYSTEM NOT AVAILABLE** will appear in the display. If the fault is detected while the system is active, HDC will fade out. Do not attempt a steep descent when HDC is unavailable or use a very low gear and/or the foot brake. If a fault has been detected, consult your Land Rover Dealer/Authorised Repairer at the earliest opportunity.

# Range Rover Sport Driving Controls

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## **HDC fade-out**

HDC fade-out gradually decreases the HDC function with the effect that the rate of hill descent will increase. HDC will be disabled completely once the descent is complete.

If required (e.g. the angle of the descent levels out significantly), fade-out may be achieved deliberately by deselecting HDC while the system is operating.

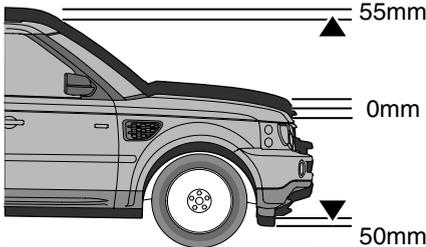
## **HDC information indicator - GREEN**

If HDC is selected and the operating conditions are met, the indicator will illuminate continuously.

If the indicator flashes while HDC is active, HDC operating conditions are not met.

# Range Rover Sport Driving Controls

## AIR SUSPENSION



LAN0277G

The air suspension system maintains the correct vehicle height by controlling the quantity of air in the vehicle's air springs.

Unless stated otherwise, height changes may only be made while the engine is running and the driver and passenger doors are closed.

When the air suspension system lifts the vehicle, it normally uses compressed air stored in its reservoir. The suspension will rise much more slowly if this reservoir is depleted due to repeated raising and lowering of the suspension.

### On-road height

The normal height for the vehicle.

### Off-road height

This is 55 mm (2.2 in.) higher than On-road height. It provides improved ground clearance and approach, departure and break-over angles. See **RANGE ROVER SPORT OFF-ROAD DATA, 98**.

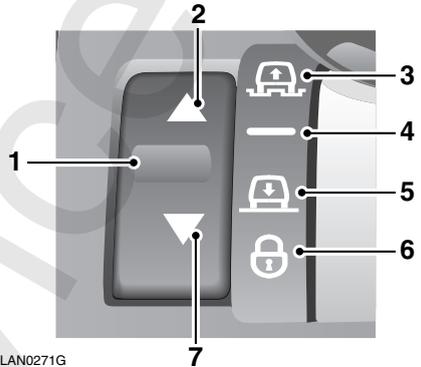
Off-road height can be selected at any speed up to 40 km/h (24 mph). When the system is at Off-road height, the system will automatically select On-road height if the vehicle speed exceeds 50 km/h (30 mph).

**Note:** When using Terrain Response, some of its programs/range combinations will adjust suspension height automatically

## Messages

The main message centre displays messages relating to the air suspension system.

## Adjusting suspension heights



LAN0271G

1. Raise/lower switch
2. Raising indicator
3. Off-road indicator
4. On-road indicator
5. Access indicator
6. Lock indicator
7. Lowering indicator

# Range Rover Sport Driving Controls

## Suspension heights

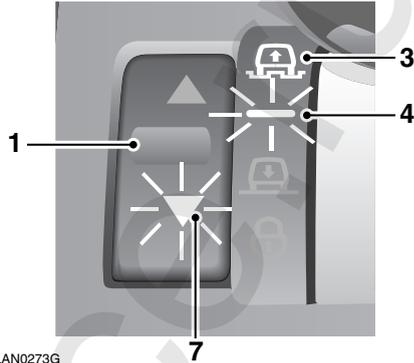
The raise/lower switch (1) is used to move up or down through the suspension heights. Indicators (3), (4) or (5) will be lit to show the height selected. A message indicating the suspension height will also be displayed in the message centre when Off-road, Access or Crawl is selected.

Indicators (2) or (7) will be lit to show the direction of movement. They extinguish when the height change movement is completed.

If a height change is requested that is not allowed, such as attempting to raise the height of the vehicle with the engine not running, indicators (2) and (7) will flash twice and a chime will sound. A message will be displayed on the message centre.

A flashing indicator (2) or (7) indicates that the system is in a waiting state or shows that it will automatically override the driver's choice if speed criteria are exceeded.

## Automatic height change warnings



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When the suspension is at Off-road height, Access or Crawl, the suspension height will change automatically when vehicle speed exceeds predetermined levels.

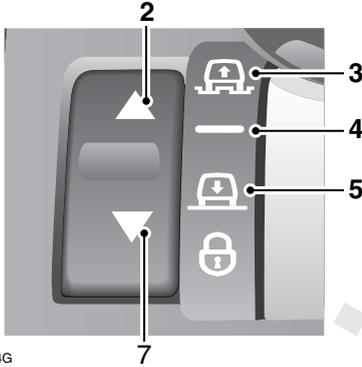
When the suspension is at Off-road height or Crawl, it warns the driver that the vehicle is approaching a speed threshold. A chime will sound, a message will be displayed on the message centre and the On-road indicator (4) and either (2) or (7) will flash.

The Off-road height speed warning is shown above. If the vehicle slows down, the warning will disappear.

# Range Rover Sport Driving Controls

## Door open override

If a door is opened during a height change while the vehicle is at rest, the height change will be restricted.



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The indicator for the target height (3, 4 or 5) will remain lit and the raising indicator (2) or the lowering indicator (7) will flash.

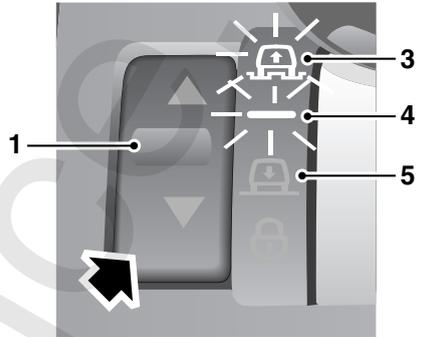
The height change will resume if all of the doors are closed within 90 seconds.

If the doors are not closed within this time, the raising indicator (2) or the lowering indicator (7) will extinguish and the indicators showing the heights above and below the current position will be illuminated.

Selecting a new height using the raise/lower switch (1), or driving off will reset the system.

## Extended mode

If the vehicle is grounded and traction control is induced, the system raises the vehicle by 35 mm (1.4 in.) to clear the obstruction. Extended mode is activated automatically and cannot be selected manually.



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When Extended mode is activated, indicator (3) will flash if the suspension is above Off-road height. Indicators (3) and (4) will flash if the suspension is between Off-road and On-road heights. Indicators (4) and (5) will flash if the suspension is between On-road and Access heights. A message will be displayed on the message centre.

To exit Extended mode, either press the raise/lower switch (1) briefly up or down, or drive the vehicle at a speed greater than 5 km/h (3 mph) for 30 seconds.

# Range Rover Sport Driving Controls

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## **Additional lift whilst in Extended mode**

When Extended Mode has been invoked and the automatic lifting of the vehicle has been completed, the driver can request an additional lift in order to clear the obstacle. This can be particularly useful when Extended Mode has been invoked on soft surfaces.

To request additional lifting wait for the raising indicator (2) to extinguish, then press and hold the switch (1) in the up direction for 3 seconds whilst ALSO pressing the brake pedal. A chime will sound to confirm that the request has been accepted. The raising indicator (2) will be illuminated while the vehicle is being lifted

## **Suspension freeze**

If the system is attempting to change the suspension height and it detects that the suspension is prevented from moving, the system will freeze all movements.

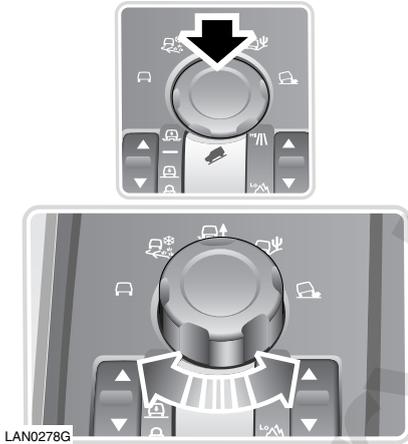
This can be caused by attempting to lower the vehicle onto an obstacle or attempting to lift the vehicle against an obstruction.

The symbols behave in the same way as described in Extended mode and the same message will be displayed on the message centre. As in Extended mode, to exit this freeze state, either press the switch (1) up or down, or drive the vehicle at a speed greater than 20 km/h (12 mph).

# Range Rover Sport Driving Controls

## TERRAIN RESPONSE™

The Terrain Response system is permanently active, continuously providing benefits in traction and driveability. These can be further enhanced for specific on and off-road driving conditions by the selection of special programs, using one simple driver interface.



To raise the rotary knob, press down on it lightly and release. To lower the rotary knob, press down until it clicks.

This interface allows the driver to tell the vehicle what sort of terrain is to be driven over. Based on the selected special program, the system optimises the vehicle set-up for the prevailing conditions, providing the optimum in traction, driveability and vehicle composure.

The Terrain Response special programs, automatically bring in changes in vehicle drive and suspension systems, that have until now been only individually and manually controllable by the driver.

The suspension and drive systems comprising Terrain Response are:

- Engine management.
- Gearbox management.
- Intelligent differential control.
- Dynamic stability, traction control and HDC systems.
- Air suspension.

The system will provide a variable accelerator response, ranging from very cautious for slippery conditions (where a large pedal movement has only a small effect on engine power) to very responsive, e.g. for sand, where engine power is allowed to rise more quickly.

This further extends the breadth of off-road capability of Land Rover vehicles. In addition, Terrain Response offers control of systems that have previously not been manually controllable.

# Range Rover Sport Driving Controls

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**Note:** *Since each Terrain Response special program uses the optimum settings of each drive component - accelerator response, suspension, transmission, etc. - relative to the terrain being driven over, it follows that changing from one special program to another brings in a different set of criteria.*

*This means that, for instance, the engine revs produced by the current accelerator position might increase or decrease slightly in the new program, or the suspension could change height. The changes are not dramatic, but are noticeable.*

*To obtain the maximum benefits from the system, it is suggested that you first try it out in circumstances where any distraction will not affect other road users.*

Terrain Response is designed to benefit the driver, regardless of the level of off-road driving experience. The enhanced traction system, with the control of many system parameters through one simple driver input, coupled with specific advice from the message centre, will aid drivers with limited off-road experience. Additionally, the system can back-up the skills of experienced drivers, who will also benefit from the wider performance envelope available through the special programs.

## Using Terrain Response



### **WARNING:**

**When towing, the automatic vehicle height rise associated with using the system in low range, will be automatically prevented by the system. This will be indicated by a message in the message centre. However, this function relies on the fitting of a Land-Rover approved towing electrical socket. Failure to fit a Land-Rover approved towing electrical socket or to follow these guidelines may lead to the vehicle being raised to off-road height even with a trailer attached.**

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The Terrain Response system is always active and can not be switched off. When the vehicle is started, the system will normally start in its General program. Using the correct special program, will provide benefits in how the vehicle can be driven over different surfaces or terrains. It is recommended that a special program be engaged whenever driving conditions could become difficult.

Depending on the terrain, it may be beneficial for the automatic transmission to change gear under different speed and load conditions. Each special program will provide the most appropriate gear-shift points for the terrain, including the most appropriate gear to set off in (i.e., second, HIGH range, or third, LOW range, in Grass-Gravel-Snow or first, LOW range, when in Rock Crawl).

The amount of slip allowed in the electronically controlled differentials will be optimised continuously, both from the point of view of traction and vehicle stability.

Depending on the Terrain Response program selected, the control of the differentials will vary to provide the optimum settings.

# Range Rover Sport Driving Controls

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**Note:** *Special programs should be engaged pro-actively - before starting to drive in particular conditions. They are not intended as a means of extracting a vehicle that has been driven into difficulties.*

The system has been designed to instil confidence regarding choice of special program, despite the fact that conditions associated with each program are distinctly different. However, the vehicle will be very capable under all circumstances, even when no special program is selected, as some sub-systems will re-act to the conditions where possible. In case of any uncertainties about the most appropriate special program selection, it will be best to leave the system in Terrain Response General program until terrain conditions become more distinct and a program choice can be made with more confidence.

The system is of particular use when driving off-road, but, even here, it should be used pro-actively and not be used as a means of retrieving control.

If a Terrain Response special program has been selected, then the transmission can be left in **D**. If descending a slippery slope, CommandShift **1** or **2** should be considered.

## Driver over-ride options



### **WARNING:**

**This height increase will start regardless of whether the vehicle is moving or not.**

---

All systems will be set to optimum parameters for the terrain conditions reflected in the choice of control program. Two of the systems controlled by Terrain Response may also be operated independently by the driver:

- Air suspension.
- Hill Descent Control.

In some special programs, the Terrain Response system will switch on HDC and in LOW range the system will automatically move the suspension to Off-road height.

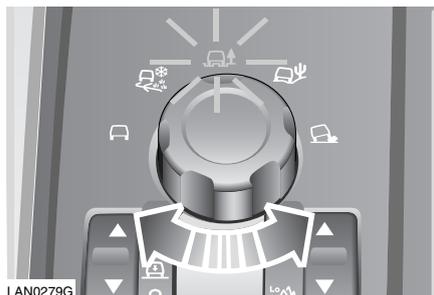
Both the HDC and ride height automatic selections can be cancelled by the driver at any time. Conversely, if HDC or a specific ride height has not been automatically selected by the system, the driver can always choose to operate it as normal at any time.

Whether the HDC or ride height options are being brought in automatically by the system, or manually by the driver, the changes of state will be confirmed through the message display and by the individual system information indicators. Use of the system in the special programs, particularly in low range, may prompt some driving advice and warnings as well as additional information to be displayed on the message centre.

**Note:** *Gear selection can be overridden, by using the CommandShift function on the gearbox to lock the vehicle in a particular gear.*

# Range Rover Sport Driving Controls

## Operation



A rotary knob just behind the gear lever is rotated to select the required special program. When the selector reaches either end of the selection range, it can be turned further, but doing so has no effect.

In addition to the Terrain Response General setting, four special programs are available:

- Grass/gravel/snow (also includes ice).
- Mud/ruts.
- Sand.
- Rock Crawl.

When the starter switch is turned on, the graphics around the control knob are illuminated, with the active program highlighted in amber. The brightness of the graphics night illumination is controlled as part of the instrument illumination control; the brightness of the amber lighting is high or low, depending on the use of the headlamps.

If a special program is active, the special program symbol will also be displayed on the message centre.



If the starter switch is turned off when any special program is selected, then the system will remember for approximately six hours which program was selected, and return to that program once the starter switch is turned back on.

The system indicates, via the message centre that the previously selected special program is still selected. After more than six hours, the system will automatically revert back to the General program (special programs off).

# Range Rover Sport Driving Controls

## Terrain Response general



When the Terrain Response special programs are off, the system will be in its General program. This will be indicated by the above symbol being displayed briefly on the message centre. Sub-systems will adapt to the prevailing terrain conditions and select control settings based on the conditions sensed.

This program setting is compatible with all on and off-road terrain conditions. Normal conditions in which it is not necessary to select a specific program include driving on surfaces that closely match a hard road surface. Dry cobbles, Tarmac or even wooden planks are all included in the scope which consists of hard supportive surfaces with no loose coating of water, dust or similar material.

It is recommended that a special program be de-selected, once the specific conditions for its use no longer prevail. This is done by turning the selector knob back to the General program position.

When a special program is de-selected, all vehicle systems will be returned to their normal control settings. The one exception is HDC, which will remain active if it was manually selected previously. Also, as a precaution, the vehicle will change from raised to Normal ride height only when moving.

## Grass-Gravel-Snow



Use this program for surfaces where the underlying base is fairly firm, but a coating of other material gives a tendency to slip. The coating can be water, slime, grass, snow or loose gravel, shale or pebbles, or even a thin coating of sand. This program should also be selected in icy conditions.

In this special program the Terrain Response systems will select settings to give the best traction, handling and driveability for predominantly slippery conditions. Hill Descent Control will be engaged automatically in low range, but can be manually de-selected. See **HILL DESCENT CONTROL (HDC), 30**.

In slippery conditions, it is often beneficial to start off in a higher gear than usual, for example, CommandShift **2** in HIGH range or CommandShift **3** in LOW range.

For use of the vehicle with snow chains fitted, see **SNOW CHAINS, 92**.

***Note:** When in deep snow, if the vehicle is struggling for forward traction or is stuck, then switching off Dynamic Stability Control (DSC) may be an advantage. If DSC is switched off, then it must be switched back on as soon as the difficulty is overcome.*

# Range Rover Sport Driving Controls

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## Mud-Ruts



Use this program when traversing ground that is not only muddy or deeply rutted, but possibly soft and uneven to the point of demanding maximum axle displacement. This unevenness can also be that brought about by sizeable wooden debris in the form of roots, brushwood, small logs, etc.

This acts like the previous program, except that it selects settings for the individual systems that optimise traction and driveability for muddy/rutted driving conditions, with driver over-ride options as before. The program is available in HIGH and LOW range, but LOW range is recommended.

It is anticipated that this program will usually be used in low range. If not, the driver will be prompted to consider selecting low range. If the Mud-Ruts program and low range are selected together, the vehicle ride height will be raised automatically.

## Sand



Use this program to drive on soft and predominantly dry, yielding sandy ground, such as dry beaches, dunes and sand deserts. Also consider using this program for deep gravel.

The Sand special program uses the control settings and software logic best suited to driving on sand, with the driver-override option as before.

In instances where the sand is damp or wet and soggy, the conditions are better addressed by the use of mud/ruts special program.

Where the sand is extremely soft and dry and of a depth that allows the wheels to sink well into it, there may be additional benefit in switching off the Dynamic Stability Control.

## Rock Crawl

**Caution: Selection of a wholly inappropriate special program for the prevailing terrain conditions, will not endanger the driver or immediately damage the vehicle. However, if continued, such an action will impair vehicle response to those conditions and will reduce the durability of the suspension and drive systems.**



Use this program to cross wet or dry, solid, unyielding ground, such as clusters of boulders, which demands high levels of road-wheel displacement and careful vehicle control. This program would also be used for crossing river beds strewn with large rock features submerged below water.

Unlike the other options, Rock Crawl is only selectable in LOW range. If selection is attempted in HIGH range, the special program selection will NOT be accepted and the driver will be prompted to select LOW range. This special program will utilise system control settings to optimise the vehicle suspension and traction system for the conditions, which are likely to require extreme suspension articulation and good low-speed control.

When a special program requires increased air suspension height, the system will automatically select it, unless it suspects that a trailer is attached because an electric load is seen on the trailer socket.

A message will be displayed on the message centre.

# Range Rover Sport Driving Controls

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## **Inappropriate special program selection**

If an inappropriate special program is attempted to be selected - such as choosing Rock Crawl while in HIGH range - the symbol of that program will flash amber, an audio warning will sound, and the message centre will advise that the chosen special program is unavailable and will suggest corrective action to be taken.

If, after 60 seconds, the requirements have not been met, the warnings will cease and the message centre will show which program remains active.

Should the system become partly inoperable for any reason, it may not be possible to select certain special programs and a warning will be given when selection of an affected program is attempted. If the system should become totally inoperable, all of the control program symbols will be switched off and the message centre will display a message.

The air suspension system provides an automatic levelling function. See **AIR SUSPENSION, 33**. In circumstances where the system is used in LOW range, it is most likely that mobility and vehicle composure would benefit from increased ground clearance.

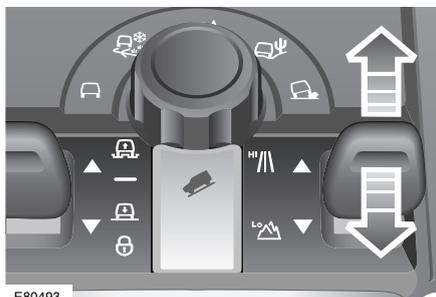
## **System messages**

Messages relating to the Terrain Response system are displayed on the message centre.

# Discovery 3/LR 3 Driving Controls

## TRANSFER GEARBOX

**Caution: Do not use auxiliary equipment, such as roller generators, that are driven by only one or two wheels of the vehicle, as they will cause failure of the transfer gearbox.**



E80493

Your vehicle is equipped with an electronically controlled transfer gearbox allowing the driver to select high or low range driving gears.

### HIGH range (Hi)

Hi should be used for all normal road driving and also for off-road driving across dry, level terrain.

### LOW range (Lo)

Lo should only be used in situations where low speed manoeuvring is necessary, such as reversing a trailer or negotiating a boulder-strewn river bed, or when moving off while heavily loaded or towing. On vehicles with manual transmission, this will prevent prolonged slipping of the clutch.

Also use **Lo** for more extreme off-road conditions, such as steep ascents and descents. Do not attempt to use the **Lo** for normal road driving.

## Range changing

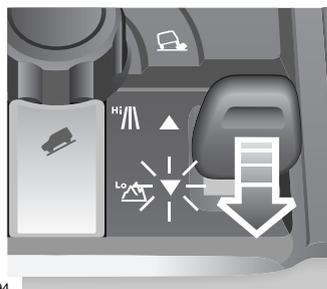
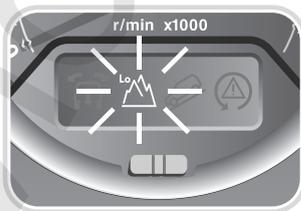
The recommended method of changing range is with the vehicle stationary. For vehicles equipped with a message centre, the messages displayed will assist the experienced driver in carrying out a range change on-the-move.

## Range change indicators

When the vehicle is in Hi, the Hi range indicator lamp at the switch is illuminated.



When the vehicle is in **Lo**, the green warning indicator in the instrument pack and the **Lo** range indicator lamp at the switch are illuminated.



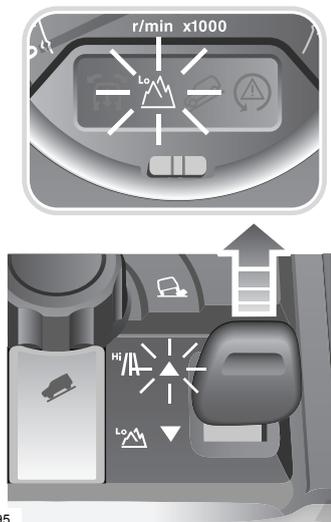
E80494

While a **Hi** to **Lo** change is in progress, the **Lo** range indicator lamps at the switch and instrument pack display will flash.

When the range change is complete, the high range indicator lamp at the switch extinguishes. The **Lo** range indicator lamps at both the switch and the instrument pack display will illuminate constantly.

# Discovery 3/LR 3 Driving Controls

A warning chime will sound, and **LOW RANGE ENGAGED** is displayed in the message centre for a few seconds.



E80495

While a **Lo** to **Hi** range change is in progress, the high range indicator lamp at the switch and the **Lo** range indicator in the instrument pack display will flash.

When the range change is complete, the **Lo** range indicator lamp at the switch and in the instrument pack will extinguish. The **Hi** range indicator lamp at the switch will illuminate constantly.

A warning chime will sound, and **HIGH RANGE ENGAGED** is displayed in the message centre for a few seconds.

## Stationary range changing

With the vehicle stationary and the engine running select the neutral position.

Move the transfer gear switch towards the range required (**Hi** or **Lo**) and then release. When the switch is released, it returns to the default position. Range change status will be confirmed after a couple of seconds by the instrument pack and message centre at which point any manual gear can be selected normally using the clutch.

## Range changing on the move

*Note: If the vehicle speed is too high when a range change is requested, a warning chime sounds and **SPEED TOO HIGH FOR RANGE CHANGE** appears in the message centre.*

*Note: If the vehicle speed is too high for a range change and the shift lever is not in neutral, there will be no message or warning chime.*

## Automatic Transmission - High to Low

If **N** is not selected before using the transfer gear switch, the message **SELECT NEUTRAL FOR RANGE CHANGE** is displayed and a warning chime sounds.

*Note: Do not attempt to make moving range changes at speeds of 3 km/h (2 mph) or less.*

With the vehicle slowing down and travelling no faster than 40 km/h (24 mph), select **N**.

Pull the transfer gear switch fully rearwards to the **Lo** position and release it.

Indication of the range change status is the same as for the Stationary method.

When the range change is confirmed by the indicators, select **D**.

An interlock prevents selection of a drive gear until the range change is complete.

# Discovery 3/LR 3 Driving Controls

## Manual transmission - High to Low

If neutral is not selected before using the transfer gear switch, the message **SELECT NEUTRAL FOR RANGE CHANGE** is displayed and a warning chime sounds.

**Note:** Do not attempt to make moving range changes at speeds of 3 km/h (2 mph) or less.

With the vehicle slowing down and travelling no faster than 20 km/h (12 mph), depress the clutch and select neutral.

Pull the transfer gear switch fully rearwards to the **Lo** position and release it.

Indication of the range change status is the same as for the Stationary method.

When the range change is confirmed by the indicators, select the most appropriate manual gear for the vehicle speed.

If a gear is selected before the range change is complete, the change will cancel and may leave the transfer box in neutral. An audible warning will be given if this happens.

A failed range change condition produces loss of drive, and attempting to move the vehicle in this state is not possible. After a failed range change, it will be necessary to reselect neutral in the main gearbox and request the range change again in the normal way.

## Changing from Low to High

With the vehicle travelling no faster than 60 km/h (38 mph), select **N** or neutral. Press the front of the transfer gear switch to the **Hi** position and release it.

Indication of the range change status is the same as for the stationary method.

Now select **D** or the most appropriate manual gear for the vehicle speed.

## Transmission warning indicators and messages

If a fault occurs within the transmission, depending on the vehicle specification, either a lamp will illuminate in the instrument pack or a message will be displayed in the main message centre.



The transmission warning lamp illuminates amber when the operation of the transmission is limited. Seek qualified assistance as soon as possible.

The transmission warning lamp illuminates red when the transmission is unable to function properly. Stop as soon as safety permits and turn off the engine. Leave the vehicle with the starter switch turned off for five minutes and then turn the starter switch back on. If the red light is still on, do not use the vehicle.

**Note:** This warning indicator is not fitted to vehicles with a message centre.



The transmission temperature warning lamp illuminates red when the transmission oil temperature reaches a pre-determined limit. Stop the vehicle where safety permits and switch off the engine. Allow the transmission to cool for one hour before continuing.

**Note:** This warning indicator is not fitted to vehicles with a message centre.

# Discovery 3/LR 3 Driving Controls

## Messages

The following table lists the messages relating to transfer box that could appear in the message centre. Market criteria mean that some messages will not apply to your vehicle and will therefore not appear.

Message	Meaning	What to do?
TRANSMISSION FAULT STOP SAFELY	Advises driver that a fault has occurred with the electronic rear differential.	Stop the vehicle as soon as it is safe to do so.
TRANSMISSION FAULT TRACTION REDUCED	Advises driver that a fault has occurred with the transfer box control system.	Reduce speed and seek qualified assistance immediately. Off-road performance will be reduced.
TRANSMISSION OVERHEAT SLOW DOWN	Rear differential temperature has reached or is approaching the overheat threshold.	Reduce speed and seek qualified assistance immediately.
TRANSMISSION RANGE CHANGE NOT AVAILABLE	Advises driver that a fault has occurred which prevents the transfer box from changing range.	Reduce speed and seek qualified assistance immediately.
TRANSMISSION TRACTION REDUCED	Transfer box control module fault.	Reduce speed and seek qualified assistance immediately.
SELECT NEUTRAL FOR RANGE CHANGE	Alerts driver that range change will not occur until neutral is selected on the transmission.	Select neutral.
SPEED TOO HIGH FOR RANGE CHANGE	Driver has requested range change when vehicle speed is too high.	Reduce speed to 40 km/h (25mph) on automatic transmission or 20 km/h (12 mph) on manual transmission.

# Discovery 3/LR 3 Driving Controls

## ELECTRONIC TRACTION CONTROL (ETC)

Electronic Traction Control (ETC) improves vehicle traction when one or more wheels has a tendency to spin. It operates in conjunction with the Dynamic Stability Control (DSC) system.

If a wheel is spinning, ETC automatically brakes that wheel until it regains grip.



An amber warning indicator in the instrument pack illuminates briefly as a bulb check when the starter switch is turned to position **II**.

If ETC or DSC is activated by the system, the warning indicator will flash and continue to flash until the vehicle regains traction and or stability.

The indicator will be constantly illuminated if DSC is manually deactivated. Deactivating DSC has no effect on traction control.

If the warning indicator illuminates constantly, and does not extinguish when the DSC switch is pressed, a fault has been detected in the system. Any fault will deactivate the system.

Drive with care and seek qualified assistance urgently.

## HILL DESCENT CONTROL (HDC)

HDC operates in conjunction with ABS to provide greater control in off-road situations particularly when descending severe gradients.

During a hill descent, if engine braking is insufficient to control the vehicle speed, HDC automatically operates the brakes to slow the vehicle and maintain a speed relative to the selected gear range and the accelerator pedal position.

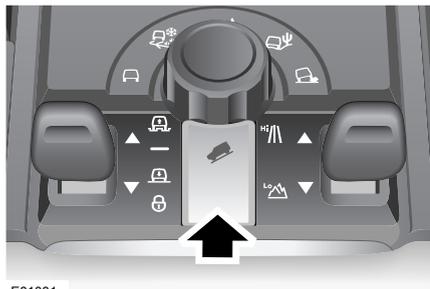
In vehicles with manual transmission, HDC should only be used in first and reverse gears in high range and all gears in low range. Once the vehicle is moving, the clutch pedal should be fully released.

In vehicles with automatic transmission, HDC should only be used in **D**, **R** and CommandShift **1** in high range and in **D**, **R** and all CommandShift gears in low range. When in **D**, the vehicle will automatically select the most appropriate gear.

**Note:** If Terrain Response is fitted, some of the program and range combinations will activate or deactivate HDC automatically.

# Discovery 3/LR 3 Driving Controls

## USING HDC



E81081

HDC should be used in conjunction with an appropriate gear.

Press and release the switch (arrowed) to select HDC. To deselect, press and release again.

HDC can be selected at speeds below 80 km/h (50 mph), but full HDC function is not active until the vehicle speed falls below 50 km/h (30 mph). The green HDC indicator will illuminate.

If the vehicle speed exceeds 80 km/h (50 mph), HDC will deselect and the green HDC indicator will extinguish.

If HDC is selected and vehicle speed rises above 50 km/h (30 mph) in high range, HDC function is suspended and the green HDC indicator will flash. A message will also appear in the message centre.

If HDC is deselected when HDC is operating, the system fades out, allowing the vehicle to gradually increase speed.

In low range, HDC controls the vehicle speed more aggressively. Use low range when descending steep slopes.

When driving off-road, HDC can be permanently selected to ensure that control is maintained. ABS and traction control are still operational.

**Note:** HDC is automatically deselected if the starter switch is turned off for more than 6 hours.

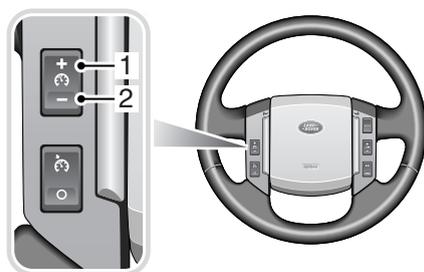
## Hill Descent Control (HDC) in action



The green warning indicator illuminates briefly as a bulb and system check when the starter switch is turned to position II.

If HDC is selected and all operating conditions are met, the indicator will illuminate. If all operating conditions are not met (vehicle in neutral, clutch pedal pressed, vehicle speed above HDC operating range) the indicator will flash.

If an HDC fault occurs, HDC will fade-out and then deselect, or deselect immediately (depending on the type of fault and whether or not HDC is in operation). The indicator will extinguish and the message **SYSTEM NOT AVAILABLE** will appear in the message centre or the HDC fault amber indicator will illuminate.



E81082

While HDC is controlling the vehicle speed, descent speeds can be varied using the steering-wheel-mounted cruise control switches. To reduce the descent speed, press and hold switch 2. Release the switch when the desired speed is reached.

# Discovery 3/LR 3 Driving Controls

To increase the descent speed, press and hold switch **1**. Release the switch when the desired speed is reached.

Alternatively, the descent speed can be adjusted by tapping switch **1** or **2**. Each press of the switch will adjust the descent speed by approximately 0.5 km/h (0.3 mph).

**Note:** Each gear has a pre-defined minimum descent speed.

*The descent speed will only increase if the gradient is sufficiently steep to cause the vehicle to accelerate as the braking effect is reduced. On a shallow slope, pressing switch **1** may result in no speed increase.*

**Note:** With HDC selected, gear changes can be carried out in the normal way.

If the brake pedal is depressed when HDC is active, HDC is overridden and the brakes will perform as normal (a pulsation might be felt through the brake pedal). If the brake pedal is then released, HDC will start operating at the reduced speed.

## Hill Descent Control (HDC) faults

Faults in the HDC system can be displayed by the message centre or by the amber warning indicator.

More information on the messages that may be displayed is given later in this section.



The HDC amber indicator is fitted to models without a message centre and has two functions.

1. Illuminate continuously if there is a fault in the HDC system. If the fault is detected while the system is active, HDC will fade out. Do not attempt a steep descent when HDC is unavailable, alternatively use a very low gear and/or the foot brake. Consult your Land Rover Dealer/Authorised Repairer at the earliest opportunity.
2. Flash if the brake temperatures reach a pre-defined limit. HDC will fade out and become temporarily inactive. HDC will not be available until the brakes reach an acceptable temperature.

## HDC fade-out

HDC fade-out gradually decreases the HDC function with the effect that the rate of hill descent will increase. HDC will be disabled completely once the descent is complete.

# Discovery 3/LR 3 Driving Controls

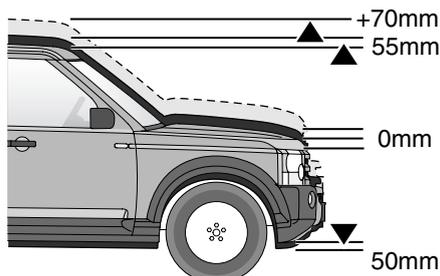
## Messages

The following table lists the messages relating to Hill Descent Control (HDC) that could appear in the message centre. Market criteria mean that some messages will not apply to your vehicle and will therefore not appear.

Message	Meaning	What to do?
HDC FAULT SYSTEM NOT AVAILABLE	Hill Descent Control system fault.	Drive with care and do not attempt to descend steep slopes. Seek qualified assistance immediately.
HDC NOT AVAILABLE IN THIS GEAR	HDC not operative because of incorrect gear selection. HDC is fully functional in 1st and Reverse gears in manual transmissions and <b>1</b> , <b>R</b> and <b>D</b> in automatic in High range. It operates in all gears in Low range.	Select correct gear if HDC is required. In Low range, HDC operates in all gears for manual and automatic transmissions.
HDC NOT AVAILABLE SPEED TOO HIGH	HDC unavailable, speed threshold exceeded. Maximum HDC operating speed is 50 km/h (30 mph), maximum speed for HDC selection is 80 km/h (50 mph).	Reduce vehicle speed.
HDC TEMPORARILY NOT AVAILABLE SYSTEM COOLING	HDC switched off while brake system is cooling.	Wait until message disappears before attempting to descend steep slopes.

# Discovery 3/LR 3 Driving Controls

## AIR SUSPENSION



E80695

The air suspension system maintains the correct vehicle height by controlling the quantity of air in the vehicle's air springs.

Unless stated otherwise, height changes may only be made while the engine is running and the driver and passenger doors are closed.

When the air suspension system lifts the vehicle, it normally uses compressed air stored in its reservoir. The suspension will rise much more slowly if this reservoir is depleted due to repeated raising and lowering of the suspension.

### On-road height

The normal height for the vehicle.

### Off-road height

This is 55 mm (2.2 in.) higher than on-road height. It provides improved ground clearance and approach, departure and break-over angles. See **DISCOVERY 3/LR 3 OFF-ROAD DATA, 99**.

Off-road height can be selected at any speed up to 40 km/h (24 mph). When the system is at off-road height, the system will automatically select on-road height if the vehicle speed exceeds 50 km/h (30 mph).

**Note:** If Terrain Response is in use, some of its programs/range combinations will adjust suspension height automatically.

**Note:** If the trailer socket is in use, increased suspension height control will be inhibited.

### Suspension warning indicator



The suspension warning indicator in the instrument pack illuminates both red and amber briefly as a bulb check when the starter is turned to position II.

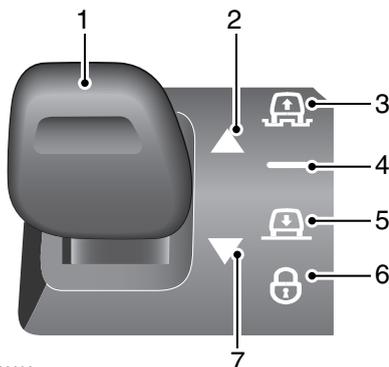
If the indicator illuminates amber, a suspension fault has been detected, but the vehicle can still be driven normally.

If the indicator flashes red, a serious suspension fault has been detected and the vehicle should be driven slowly until qualified assistance can be obtained.

The first illumination of the indicator will be accompanied by a warning chime.

# Discovery 3/LR 3 Driving Controls

## ADJUSTING THE SUSPENSION



E80690

1. Raise/lower switch
2. Raising indicator
3. Off-road indicator
4. On-road indicator
5. Access indicator
6. Lock indicator
7. Lowering indicator

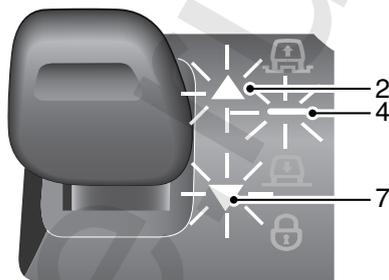
### Suspension height indicators

Indicators 2 or 7 will illuminate to show the direction of movement. They extinguish when the height change is completed.

If a height change is requested that is not allowed, such as attempting to raise the height of the vehicle with the engine not running, indicators 2 and 7 will flash twice and a chime will sound. A message will be displayed on the message centre.

A flashing indicator 2 or 7 indicates that the system is in a waiting state or shows that it will automatically override the driver's choice if speed criteria are exceeded.

## Automatic height change warnings



E80692

When the suspension is at off-road height, access or locked at access height, the suspension height will change automatically when vehicle speed exceeds predetermined levels.

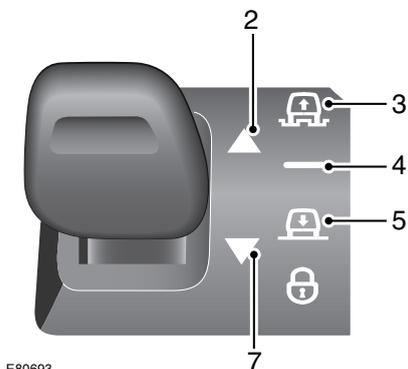
When the suspension is at off-road height or locked at access height, it warns the driver that the vehicle is approaching a speed threshold. A chime will sound, a message will be displayed on the message centre and the on-road indicator 4 and either 2 or 7 will flash.

The off-road height speed warning is shown above. If the vehicle slows down, the warning will disappear.

# Discovery 3/LR 3 Driving Controls

## Door open override

If a door is opened during a height change while the vehicle is at rest, the height change will be restricted.



E80693

The indicator for the target height **3**, **4** or **5** will remain lit and the lifting indicator **2** or the lowering indicator **7** will flash.

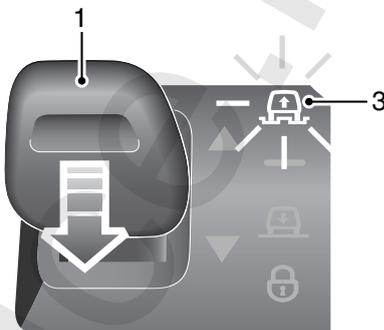
The height change will resume if all of the doors are closed within 90 seconds.

If the doors are not closed within this time, the raising indicator **2** or the lowering indicator **7** will extinguish and the indicators showing the heights above and below the current position will be illuminated.

Selecting a new height using the raise/lower switch **1**, or driving off will reset the system.

## Extended mode

If the vehicle is grounded and traction control is induced, the system raises the vehicle clear of the obstruction. Extended mode is activated automatically and cannot be selected manually.



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When extended mode is activated, indicator **3** will flash. A message will be displayed on the message centre.

To exit extended mode, either press the raise/lower switch **1** briefly up or down or drive the vehicle at a speed greater than 5 km/h (3 mph) for 30 seconds.

## Additional lift whilst in extended mode

When extended mode is invoked and the automatic lifting of the vehicle has been completed, the driver can select an additional lift in order to clear the obstacle. This can be particularly useful when extended mode has been invoked on soft surfaces.

To request additional lifting, wait for the raising indicator **2** to extinguish then press and hold the switch **1** for three seconds whilst pressing the brake pedal. A chime will sound to confirm that the request has been accepted. Indicator **2** will be illuminated while the vehicle is being lifted.

## Discovery 3/LR 3 Driving Controls

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To exit extended mode briefly press either the raise or lower switch. Alternatively, the vehicle will automatically lower if driven at a speed greater than 5 km/h (3 mph) for 30 seconds.

### **Suspension freeze**

If the system is attempting to change the suspension height and it detects that the suspension is prevented from moving, the system will freeze all movements.

This can be caused by attempting to lower the vehicle on to an obstacle or attempting to lift the vehicle against an obstruction.

The indicators operate in the same way as described in extended mode and the same message will be displayed on the message centre. As in extended mode, to exit this freeze state, either press the switch **1** up or down, or drive the vehicle at a speed greater than 20 km/h (12 mph).

# Discovery 3/LR 3 Driving Controls

## AIR SUSPENSION MESSAGES

When a message centre is fitted to the vehicle, messages relating to the air suspension system may be displayed. For an explanation of those messages, refer to the following table.

Message	Meaning	What to do?
CAUTION! RISK OF GROUNDING WITH SUSPENSION AT NORMAL HEIGHT	Displayed when the Terrain Response system would normally have provided off-road height but the driver has manually lowered the vehicle (or the system cannot raise the vehicle).	Raise suspension manually to off-road height if possible and appropriate.
RECOMMEND RAISING SUSPENSION TO OFF ROAD HEIGHT IN DEEP MUD-RUTS	In deep ruts it is beneficial to raise the vehicle to off-road height. This is done automatically in low range but has to be done manually if mud/ruts program is used in high range.	Raise suspension manually to off-road height.
RESET SUSPENSION HEIGHT IF CLEAR OF OBSTACLE	Suspension still in extended mode.	Check if vehicle is clear of obstacle. If clear, select required suspension.
SLOW DOWN OR VEHICLE WILL LOWER/RAISE	Vehicle will automatically lower/raise if vehicle speed increases.	Choose to slow down or accept height change.
SUSPENSION CLOSE DOOR TO CHANGE HEIGHT	Air suspension height change is prevented because a door is open.	Close all doors.
SUSPENSION FAULT	A fault has been detected in the air suspension system. System may still operate normally.	Seek qualified assistance immediately.
SUSPENSION FAULT MAX SPEED 50 km/h (MAX SPEED 30 mph)	A major fault has been detected in the air suspension system. Height cannot be controlled.	Drive slowly until fault can be rectified.
SUSPENSION FAULT NORMAL HEIGHT ONLY	A fault has been detected in the air suspension system. Only normal height is available.	Seek qualified assistance immediately.
SUSPENSION FAULT STOP SAFELY STOP ENGINE	Major component failure.	Stop vehicle immediately and seek qualified assistance.

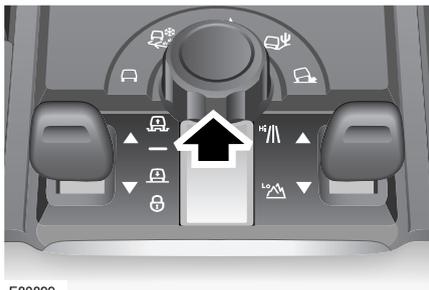
## Discovery 3/LR 3 Driving Controls

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Message	Meaning	What to do?
SUSPENSION SPEED TOO HIGH TO CHANGE HEIGHT	A height change has been requested but is prevented because speed is too high.	Reduce vehicle speed.
SUSPENSION START ENGINE TO RAISE VEHICLE	Vehicle height can only be raised with the engine running.	Start the engine.
SUSPENSION WILL RAISE WHEN SYSTEM COOLED	Air suspension compressor is cooling. Lifting will resume when compressor has cooled.	Wait for suspension to carry out lifting sequence.

# Discovery 3/LR 3 Driving Controls

## TERRAIN RESPONSE™



The Terrain Response system is a permanently active system, continuously providing benefits in traction and driveability. These benefits can be further enhanced for specific off-road driving conditions by the selection of one of the four special programs.

Dependant on the selected special program, the system optimises the vehicle set-up for the prevailing conditions, providing the maximum in traction, driveability and vehicle response.

The systems comprising Terrain Response are:

- Engine management.
- Gearbox management.
- Intelligent differential control.
- Dynamic stability, traction control and Hill Descent Control (HDC) systems.
- Air suspension.

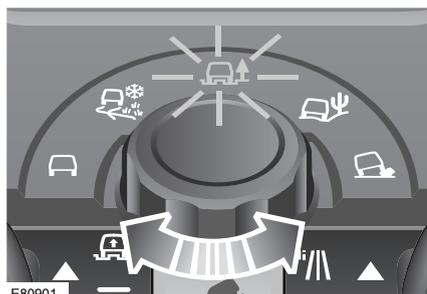
The system will provide a variable throttle response, ranging from very cautious (large pedal movement has a minimum effect on engine power) when driving in slippery conditions, to very responsive (engine power is allowed to rise more quickly) when driving over sand.

**Note:** Changing from one special program to another will result in the system adopting a different set of criteria for the systems it controls. For instance, the engine revs produced by the current throttle position might increase or decrease slightly in the new program, or the suspension could change height. The changes are not dramatic, but are noticeable.

To obtain the maximum benefits from the system, it is suggested that you experiment with the different features in an environment that will not affect other road users.

# Discovery 3/LR 3 Driving Controls

## USING TERRAIN RESPONSE



Rotate the control to select the required special program. When the selector reaches either end of its range, it can be turned further, but doing so has no effect.

In addition to General, four special programs are available:

- Grass/gravel/snow (also includes ice).
- Mud/ruts.
- Sand.
- Rock Crawl.

When the starter switch is turned on, the indicators around the control are illuminated, with the active program highlighted in amber.

If a special program is active, the special program indicator will also be displayed on the message centre.



If the starter switch is turned off when a special program is selected, the program will remain in the system memory for approximately six hours. The system will return to that program when the starter switch is turned back on.

The message centre will confirm that the previously selected special program is still selected. After six hours, the system will automatically revert back to the General program.

### General



Select as soon as a special program is not required.

All systems, except Hill Descent Control (HDC), will adopt settings based on the conditions sensed. HDC will remain active if it was manually selected. The suspension will also change from raised to normal ride height when the vehicle starts moving.

The General setting is suitable for surfaces that match typical road surfaces, including dry cobbles, Tarmac or wooden planks.

### Grass-Gravel-Snow



Use this special program for surfaces which are firm, but have a coating of loose material. This could be grass, snow or loose gravel, pebbles or sand. This program should also be selected in icy conditions.

HDC will engage automatically in low range, but can be manually de-selected. See **HILL DESCENT CONTROL (HDC)**, 48.

Start off in a higher gear than usual, second gear in high range or third gear in low range.

Manual transmission vehicles: when Grass/Gravel/Snow program is selected, confirmation will be given in the message centre. This message will appear only once per ignition cycle.

# Discovery 3/LR 3 Driving Controls

Using the vehicle with snow chains fitted could affect operation of Terrain Response. See

## **SNOW CHAINS, 92.**

**Note:** *If the vehicle cannot obtain forward traction in deep snow, switch off Dynamic Stability Control (DSC). DSC must be switched on as soon as conditions permit.*

## **Mud-Ruts**



Use this special program when traversing muddy or deeply rutted ground that is soft and uneven and demands maximum axle displacement. Unevenness of the ground could be caused by roots, brushwood or small logs.

System settings are similar to Grass-Gravel-Snow, except for the individual systems that optimise traction and driveability in muddy/rutted driving conditions. Low range is recommended for this program.

If low range is not selected, the message centre will prompt the driver. If the Mud-Ruts program and low range are selected together, the vehicle ride height will be raised automatically.

## **Sand**



Use this special program on soft and predominantly dry, yielding sandy ground, such as dry beaches and sand deserts. Also use for deep gravel.

Where the sand is damp or wet, select Mud-Ruts special program.

**Note:** *If the sand is extremely soft and dry and of a depth that allows the wheels to sink, switch off Dynamic Stability Control (DSC). DSC must be switched on as soon as conditions permit.*

## **Rock Crawl**



Use this special program on solid, unyielding ground, which demands high levels of wheel displacement and careful vehicle control, such as clusters of boulders. This program would also be used for crossing river beds strewn with submerged rocks.

Rock Crawl is only selectable in low range. If selection is attempted in high range, the driver will be prompted to select low range. This special program will utilise system control settings to optimise the vehicle suspension and traction system for extreme suspension articulation and good low-speed control.

## **Wading**

When driving through water less than 600 mm (24 inches) deep, select the Terrain Response program suitable for the surface beneath the water.

## **Increased suspension height**

When a special program requires increased suspension height, the system will automatically raise the suspension, unless there is electric load on the trailer socket, indicating that a trailer is attached to the vehicle.

A message will be displayed on the message centre.

# Discovery 3/LR 3 Driving Controls

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## Driver override options

The following two systems controlled by Terrain Response may also be operated by the driver.

- Air Suspension
- Hill Descent Control

In some special programs, the Terrain Response system will switch on HDC and, in low range, the system will automatically raise the suspension to off-road height.

Both the HDC and ride height selections can be cancelled by the driver at any time. If HDC or a specific ride height has not been selected by the system, the driver can select them at any time.

HDC and ride height selections will be confirmed through the message centre and by the individual system information indicators, irrespective of whether the system or driver selected them. Use of special programs, particularly in low range, may prompt some driving advice and warnings as well as additional information on the message centre.

**Note:** Use the CommandShift function on the gearbox to lock the vehicle in a particular gear.

## Inappropriate special program selection

**Caution: Selecting an inappropriate special program will not endanger the driver or damage the vehicle. It will, however, impair the vehicle's response to the conditions and reduce the durability of the suspension and drive systems.**

If selection of an inappropriate special program is attempted, such as choosing Rock Crawl while in high range - the symbol of that program will flash amber and an audible chime will sound. The message centre will advise that the special program is unavailable and suggest corrective action.

If the requirements have not been met after 60 seconds, the warnings will cease and the message centre will show the active program.

If the system becomes partly inoperable, it may not be possible to select some special programs. A warning will be given when selection of an affected program is attempted.

If the system becomes totally inoperable, all of the special program indicators will be switched off and the message centre will display a message.

The suspension system provides an automatic levelling function. See **AIR SUSPENSION, 52**. If low range is needed, it is likely that mobility and vehicle composure would benefit from increased ground clearance.

# Discovery 3/LR 3 Driving Controls

## Messages

The following table lists the messages relating to Terrain Response that could appear in the message centre. Market criteria mean that some messages will not apply to your vehicle and will therefore not appear.

Message	Meaning	What to do?
CAUTION! RISK OF GROUNDING WITH SUSPENSION AT NORMAL HEIGHT	Terrain Response system would have selected off-road height but the driver has manually lowered the vehicle (or the system cannot raise the vehicle).	Raise suspension manually to off-road height if possible and appropriate.
HDC FAULT SYSTEM NOT AVAILABLE	HDC system fault.	Drive with care and do not attempt to descend steep slopes. Seek qualified assistance immediately.
HDC NOT AVAILABLE IN THIS GEAR	HDC not operative because of incorrect gear selection. <b>USING HDC, 167</b>	Select correct gear if HDC is required.
HDC NOT AVAILABLE SPEED TOO HIGH	HDC unavailable, speed threshold exceeded. Max HDC operating speed is 50 km/h (30 mph), max speed for HDC selection is 80 km/h (50 mph).	Reduce vehicle speed.
HDC TEMPORARILY NOT AVAILABLE SYSTEM COOLING	HDC switched off while brake system is cooling.	Wait until message disappears before attempting to descend steep slopes.
PROGRAM CHANGE IN PROGRESS	It is temporarily impossible to select a new program. This can be due to ABS or DSC activity or the overheating of the electronic differentials.	If conditions change within 60 seconds, the chosen program will be selected. If the message is prompted by electronic differential overheat, then it will take longer but there will be separate advice about this. Once the differentials have cooled, try to reselect the special program.

## Discovery 3/LR 3 Driving Controls

Message	Meaning	What to do?
RECOMMEND LOW RANGE IS SELECTED FOR MUD-RUTS PROGRAM	Low range is recommended for Mud-Ruts special program.	Select low range.
RECOMMEND RAISING SUSPENSION TO OFF ROAD HEIGHT IN DEEP MUD-RUTS	Mud-Ruts program is being used in high range. Suspension raised automatically in low range.	Raise suspension manually to off-road height or select low range.
RECOMMEND STARTING IN 2ND/3RD GEAR FOR SLIPPERY CONDITIONS	In slippery conditions start off in a higher gear than usual.	Select second/third gear.
RESET SUSPENSION HEIGHT IF CLEAR OF OBSTACLE	Suspension still in extended mode.	Check if vehicle is clear of obstacle. If clear, select required suspension.
SELECT LOW RANGE TO ACTIVATE ROCK CRAWL	Vehicle is not in low range, so Rock Crawl cannot be activated.	Select low range if Rock Crawl is required.
SELECT NEUTRAL FOR RANGE CHANGE	Range change will not occur until neutral is selected.	Select neutral.
SLOW DOWN OR VEHICLE WILL LOWER/RAISE	Vehicle will automatically lower/raise if vehicle speed increases.	Choose to slow down or accept height change.
SPEED TOO HIGH FOR RANGE CHANGE	Vehicle speed is too high for requested range change.	Reduce speed to 40 km/h (25mph) on automatic transmission or 20 km/h (12 mph) on manual transmission.
SYSTEM FAULT SOME PROGRAMS NOT AVAILABLE	There is a fault on the Terrain Response system.	Be careful off-road as full Terrain Response programs are not available. Seek qualified assistance immediately.
SYSTEM FAULT SPECIAL PROGRAMS NOT AVAILABLE	There is a fault on the Terrain Response system.	Be careful off-road as Terrain Response programs are not available. Seek qualified assistance immediately.

## Discovery 3/LR 3 Driving Controls

Message	Meaning	What to do?
TRAILER CONNECTED OFF ROAD HEIGHT NOT SELECTED AUTOMATICALLY	Vehicle has not achieved off-road height as trailer socket is being used.	If a trailer is connected, do nothing. If no trailer is connected but something else, such as a bike rack, is connected, raise to off-road height manually. If nothing is connected, check socket for faults.

# Freelander 2/LR 2 Driving Controls

## HILL DESCENT CONTROL (HDC)

HDC operates in conjunction with ABS to provide greater control when off-road, particularly when descending steep slopes. HDC operation is fully automatic when engaged.

During a hill descent when driving off-road, engine braking is used to control the speed of descent. If engine braking alone is insufficient to control the vehicle's speed, HDC will slow the vehicle using the braking system. HDC will control the descent speed relative to the gear selected and accelerator position.

If the vehicle is fitted with a manual transmission, HDC should only be used in first, or reverse gears. If the vehicle is fitted with an automatic transmission, HDC should only be used in **D**, **R**, or CommandShift **1**. When in **D** the vehicle will select the the most appropriate gear.

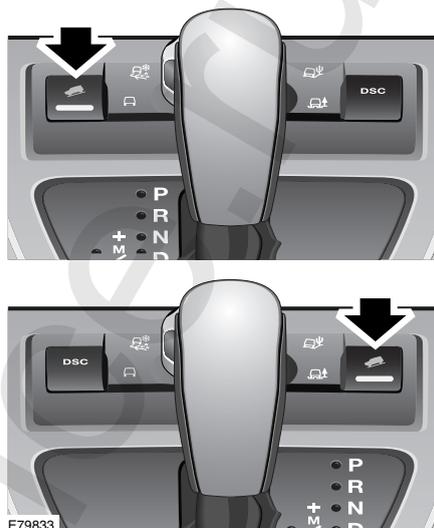
**Note:** *HDC is automatically selected by some of the Terrain Response special programs.*

## Gradient Release Control (GRC)

With HDC activated, if the vehicle is stopped on a slope using the footbrake, GRC will become active. When the footbrake is released, GRC will automatically delay the brake release to allow take up of drive and build up of engine torque. The brakes will then gradually release to allow the vehicle to move smoothly away under the control of HDC.

GRC operates in forward and reverse and requires no driver intervention.

## Selecting HDC



HDC can be selected at speeds below 80 km/h (50 mph). To select HDC, press and release the HDC on/off switch.



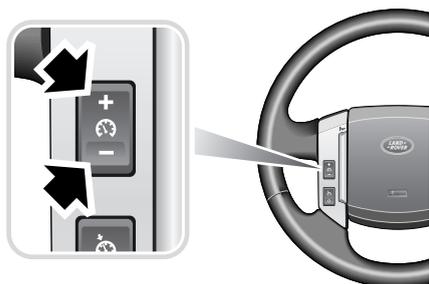
The green HDC indicator will illuminate continuously at speeds below 50 km/h (30 mph) to indicate that HDC is fully active.

If the vehicle speed exceeds 80 km/h (50 mph), HDC will disengage and the HDC indicator will extinguish.

If HDC has been selected and the vehicle speed rises above 50 km/h (30 mph), HDC is suspended and the HDC indicator will flash. A message will appear in the message centre to confirm the suspension of HDC.

# Freelander 2/LR 2 Driving Controls

## HDC operation



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With HDC engaged, the speed of descent can be altered using the cruise control steering wheel switches. + increases the speed and - decreases the speed.

To increase speed, press and hold the + switch until the desired speed is achieved. When the switch is released, the speed will be maintained.

To decrease speed, press and hold the - switch until the desired speed is achieved. When the switch is released, the speed will be maintained.

to increase or decrease the speed gradually, tap the + or - switch as required. Each tap of the switch will increase or decrease the speed in increments of 0.5 km/h (0.3 mph). The accelerator pedal can also be used to increase the speed, up to the threshold in each gear.

**Note:** Each gear has a pre-determined minimum speed.

*Descent speed will only increase on a slope steep enough to provide additional momentum. Therefore, use of the + switch on a gentle slope may not increase the speed.*

*When using HDC in vehicles fitted with a manual transmission, depressing the clutch pedal will prevent HDC from controlling the speed of descent.*

*If the brake pedal is depressed, HDC will be overridden and the brakes will operate as normal. When the brake pedal is released, HDC will resume control of the descent.*

*If HDC is switched off during a descent, HDC assistance will fade out gradually. This is to prevent loss of control if HDC is switched off in error. HDC will resume control when switched back on if assistance is still required, but at the speed the vehicle is travelling when the pedal is released.*

*When driving off-road, HDC can be permanently selected, but it will only provide assistance when the speed parameters are met.*

## **WARNING:**

**Do not attempt a steep descent if HDC is inoperative or warning messages are displayed.**

## **Brake temperature**

In extreme circumstances, the HDC system may cause brake temperatures to exceed their pre-set limits. If this occurs, the warning message **HDC TEMPORARILY NOT AVAILABLE SYSTEM COOLING** will be displayed in the message centre. HDC will then fade out and become temporarily inactive.



If the vehicle is not fitted with a message centre, then the amber HDC warning indicator will flash.

HDC will remain unavailable until the brakes reach an acceptable temperature. Once the brakes have reached this temperature, the message will disappear (or the warning indicator will extinguish) and HDC will, if required resume operation.

# Freelander 2/LR 2 Driving Controls

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## System fault

If a fault is detected in the HDC system, **HDC FAULT SYSTEM NOT AVAILABLE** will appear in the message centre.



If the vehicle is not fitted with a message centre, then the amber HDC warning indicator will

illuminate.

If the fault is detected whilst the system is operating, HDC assistance will fade out.

If a fault is detected, contact your Land Rover Dealer/Authorised Repairer as soon as possible.

## ELECTRONIC TRACTION CONTROL (ETC)

ETC operates in conjunction with Dynamic Stability Control (DSC) and is designed to assist when one or more wheels have lost traction.

If a wheel loses traction, ETC will operate the brake on that wheel until it regains traction.



If a fault is detected within the ETC system, the warning indicator will illuminate.

# Freelander 2/LR 2 Driving Controls

## TERRAIN RESPONSE™

The Terrain Response system provides an opportunity for the driver to feed back terrain information to the vehicle by choosing a general setting or one of three special programs. It then uses that information to optimise the vehicle's systems for improved traction and driveability. It does this by bringing together vehicle drive control systems which operate individually.

The drive systems optimised by the Terrain Response system are:

- Engine management.
- Gearbox management.
- Intelligent coupling control.
- Dynamic stability, Traction and HDC controls.

The system will provide a variable accelerator pedal response, ranging from very cautious for slippery conditions (where a large pedal movement has only a small effect on engine power) to very responsive (where engine power is allowed to rise more quickly).

***Note:** Changing from one special program to another will introduce noticeably different responses. For example, the engine revs produced by the current accelerator position may increase or decrease in the new program.*

*To familiarise yourself and get the best from the system, you should try out the programs in circumstances which are safe for you and other road users.*

Terrain Response has been designed to benefit the driver, no matter what their level of off-road driving experience. The system will aid those with less experience and enhance the skills of those with more experience.

## Using Terrain Response

*Note: The Terrain response system is designed to be engaged before crossing difficult terrain. Do not wait until control has been lost before using the special programs.*

When the vehicle is started, the Terrain Response system will be in its General program. The General program will allow the vehicle to operate capably in most conditions, as some of the sub-systems will react to the conditions where appropriate. When conditions change and more difficult conditions are encountered, the appropriate special program should be selected.

## Driver over-ride options

All systems will be set to their optimum parameters for the conditions reflected in the choice of special program. However, if required, Hill Descent control can be operated independently. See **HILL DESCENT CONTROL (HDC)**, 65. If it has not been automatically selected by the special program, it may be engaged as required. Conversely, if it has been selected, but is not required, it may be turned off.

The HDC status will be displayed on the message centre whether it is engaged or disengaged by the system, or the driver. Use of HDC in special programs may prompt additional driving advice and warnings to be displayed on the message centre.

Although Dynamic Stability Control (DSC) is automatically engaged when a special program is selected, it can be turned off if required.

Automatic gearbox gear selection can be overridden by using the CommandShift function.

# Freelander 2/LR 2 Driving Controls

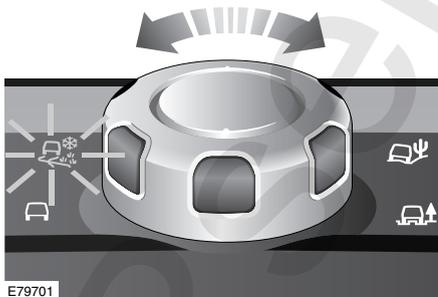
## Terrain Response operation



A rotary control, just in front of the gear lever, is used to select the required special program. When the selector reaches the end of the selection range in either direction it can be rotated further, but it has no effect.

In addition to the General program, there are three special programs:

- Grass/Gravel/Snow (also used for ice).
- Mud/ruts.
- Sand.



When the starter button is pressed, the indicators around the rotary control are illuminated. The active program is highlighted in amber and the program icon is displayed in the message centre.



The special programs remain active for six hours after the ignition is turned off. If the ignition is turned on again within six hours, the program will remain active. After six hours the General program is automatically selected.

### General program



This program is compatible with all on and off-road conditions. If not already active, it should be selected before driving on surfaces which are similar to a hard road surface. Dry cobbles, tarmac, dry wooden planks, etc. all fall into this category.

This program should be selected once the need for a special program has passed. Once the special program has been deselected, all of the vehicle systems will return to their normal settings except HDC. HDC will remain active if it was selected manually.

### Grass-Gravel-Snow



This program should be used where a firm surface is covered with loose or slippery material. Surfaces covered in water, ice, slime, grass, gravel, shale, pebbles or a thin coating of sand for example.

**Note:** For deep gravel it is recommended that the Sand program is selected.

In slippery conditions, it may be beneficial to pull away in a higher gear than usual.

# Freelander 2/LR 2 Driving Controls

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For information on the fitment and use of snow chains, see **SNOW CHAINS, 92**.

**Note:** If the vehicle is unable to gain traction in deep snow, switching DSC off may help. DSC should be switched on again as soon as the difficulty is overcome.

## Mud-Ruts



This program should be used for crossing terrain that is muddy, rutted, soft or uneven.

## Sand



This program should be used for terrain which is predominantly soft dry sand or deep gravel.

**Note:** If the vehicle is unable to gain traction in extremely soft dry sand, switching DSC off may help. DSC should be switched on again as soon as the difficulty is overcome.

If the sand to be crossed is damp/wet and sufficiently deep to cause the wheels to sink into the surface, the Mud-Ruts program should be used.

## System difficulties

**Note:** Selection of an inappropriate special program will not endanger the driver, nor will it immediately damage the vehicle. However, if continued, use of an incorrect program will impair the vehicle's response to the terrain and can reduce the durability of the drive systems.

If the system becomes partially inoperable for any reason, it may not be possible to select special programs. A warning will be given when selection of a special program is attempted. If the Terrain Response system becomes totally inoperable, all of the program indicators will be switched off and the message centre will display the relevant message.

If a participating vehicle system becomes temporarily inoperable, the General program will be automatically selected. Once the system returns to normal operation, the previously active program will be re-activated unless the ignition has been turned off in the mean time.

# Freelander 2/LR 2 Driving Controls

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## Terrain Response messages

Messages relating to the Terrain Response system are displayed on the message centre.

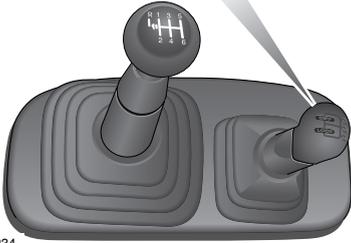
Most of the messages that appear will be for information only and require no driver intervention, **SAND PROGRAM SELECTED** for example.

Messages that require driver intervention are shown in the following table.

Message	Meaning	What to do?
PROGRAM CHANGE IN PROGRESS	Conditions exist which temporarily prevent selection of a new program.	If conditions change within 60 seconds, the chosen program will be activated. If the message is prompted by electronic coupling overheat, the delay will be longer. A separate message will also be displayed.
SYSTEM FAULT SPECIAL PROGRAMS NOT AVAILABLE	A fault exists which renders the Terrain Response programs unavailable.	Use extreme caution if travelling off-road and seek qualified assistance immediately.
RECOMMEND COMMAND SHIFT FOR DEEP SOFT SAND	In extreme sand conditions, it may be beneficial to select CommandShift to improve driver control.	Select CommandShift if required.

# Defender Driving Controls

## TRANSFER GEARBOX



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The transfer box is used to select the high or low range of gears. It also has a neutral position between high and low.

### High range

High range should be used for all normal road driving and also for off-road driving across level terrain.

### Low range

Low range should only be used in situations where low speed manoeuvring is necessary (e.g. reversing a trailer or negotiating a boulder-strewn river bed). Also use Low range for more extreme off-road conditions where progress in high range cannot be maintained. Do not attempt to use low range for normal road driving.

### Neutral

In transfer neutral, drive is not transmitted to the road wheels, regardless of the main gear lever position. Use transfer neutral when the vehicle is being towed.

# Defender Driving Controls

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## USING THE TRANSFER GEARBOX

A gear range change can be performed with the vehicle stationary or with the vehicle on the move, as follows:

### Stationary method

With the vehicle stationary and the engine running:

1. Depress the clutch.
2. Move the transfer lever from the current range setting into the neutral position (e.g. from high to neutral).
3. Move the transfer lever from neutral into the desired range setting (e.g. from neutral to low).

If there is resistance when trying to engage the gear range, do not force the lever. Instead:

1. With the clutch depressed and the transfer gearbox in neutral, select 2nd gear in the main gearbox.
2. Release the clutch momentarily, then depress the clutch again and attempt to select the desired range.
3. Select the appropriate gear in the main gearbox to pull away.

### Changing from high to low on the move

With the vehicle slowing to a stop and travelling no faster than 8 km/h (5 mph):

1. Depress the clutch and move the transfer lever into neutral.
2. Just before the road wheels stop turning (with the clutch depressed), push the lever fully forward into low range.

**Note:** Use positive and confident moves, but do not rush the gear change.

### Changing from low to high on the move

1. Apply slight rearward pressure to the transfer lever, in preparation for the range change.
2. Then, in three simultaneous moves, depress the clutch, release the accelerator and pull the transfer lever into neutral.
3. Release the clutch pedal for approximately three seconds, before depressing it again and moving the transfer lever firmly into the high range position.
4. Select a suitable main gear, in the main gearbox, release the clutch and continue driving as normal.

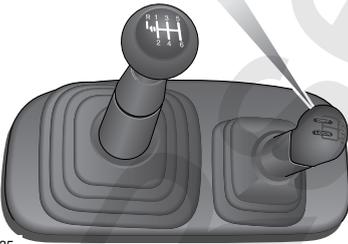
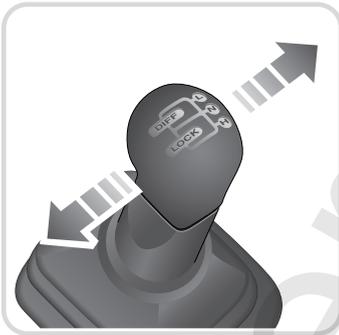
# Defender Driving Controls

## THE DIFFERENTIAL LOCK

**Caution: Do not engage the diff lock if one or more wheels are slipping - this could damage the transmission. If wheels are slipping, ease off the accelerator before engaging the diff lock.**

**Do not engage the diff lock from the transfer neutral position.**

**If the vehicle is driven on normal road surfaces with the differential locked, the steering will feel stiff, excessive tyre wear will occur and the transmission will be 'wound up'. This places excessive strain on the transmission.**



E85235

Your vehicle is fitted with a lockable differential between the front and rear driveshafts. When the differential is locked, both axles will rotate at the same speed. The differential should be locked when driving off-road on loose and slippery surfaces.

With the differential unlocked, the different running requirements of the two axles can be accommodated as they can rotate independently. The differential should be unlocked for all normal road driving or as soon as a hard grippy surface is reached when driving off-road.

### Locking the differential

The differential lock can be engaged or disengaged either with the the vehicle stationary or when driving at any road speed. However, with the vehicle in motion, it is essential to be travelling on firm ground, in a straight line and without wheel slip.

Briefly ease the accelerator and move the transfer gear lever to the left - from either the high or low range position. The differential lock warning indicator on the instrument panel will illuminate.

### Unlocking the differential

Move the transfer gear lever to the right - to either the high or low position as required. When the differential lock disengages, the warning indicator will extinguish.

### Differential lock warning indicator



The amber warning indicator illuminates when the differential lock is actually engaged (rather than when it has been selected). Similarly, it will only extinguish after the differential lock has actually disengaged. This accounts for a slight delay between deselection and the warning light extinguishing.

**Note:** *If the warning indicator does not extinguish after the differential lock has been deselected, some transmission wind-up may be present.*

# Defender Driving Controls

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## Transmission wind-up

If transmission wind-up is suspected and when it is safe to do so, reverse the vehicle a short distance and then drive forward. This should unwind the transmission and the differential lock warning indicator should extinguish.

If, after two or three attempts to unwind the transmission have been made and the warning indicator remains illuminated, consult your Land Rover Dealer/Authorised Repairer as soon as possible. Your nearest Land Rover Experience centre will also be able to offer advice.

## ANTI-LOCK BRAKES (ABS)



### WARNING:

**ABS cannot overcome the physical limitations of braking distance. Nor can it overcome the lack of grip on a road surface, aquaplaning on water for example.**

**Braking distance is increased on a slippery surface. This applies to all vehicles, even those fitted with ABS.**

**The driver should not be tempted to take risks when driving, in the hope that ABS will correct errors of judgement. In all cases it remains the driver's responsibility to drive with due care and attention, paying particular attention to the effects of speed, weather, road conditions etc.**

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ABS allows maximum brake pressure and thus maximum braking efficiency to be applied and prevents the wheels locking. This allows the driver to retain steering control during heavy braking under most road conditions.

During emergency braking conditions, ABS constantly monitors the speed of each wheel. ABS varies the brake pressure to individual wheels, according to the grip available. The constant alteration of brake pressure can be felt as a pulsing sensation through the brake pedal. This is not a cause for concern, as it is designed to demonstrate to the driver that ABS is operating.

### ABS warning indicator



If this amber warning indicator illuminates, drive with extra caution, avoid heavy braking where possible and seek qualified assistance as soon as possible.

# Defender Driving Controls

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## **ABS and off-road driving**

ABS will operate when driving off-road, however it may be unwise to rely on its assistance under some conditions.

Stopping distances will be increased when travelling over rough or bumpy terrain.

## **Soft surfaces**

On soft or deep surfaces such as powdery snow, sand or gravel, the braking distance required will be increased. This is because the natural action of a locked wheel (which cannot happen when ABS is operating) is to form a wedge of surface material in front of the wheel, which reduces the stopping distance.

## **Steep slopes**

If the vehicle is stationary on a steep, slippery slope, it may begin to slide even with the brakes applied. This is because without wheel rotation, the ABS cannot determine vehicle movement.

To counteract this, briefly release the brakes to allow some wheel rotation. Then re-apply the brakes to allow ABS to gain control.

## **Emergency Brake Assist (EBA)**

If the driver rapidly applies the brakes, EBA automatically boosts the braking force to its maximum in order to bring the vehicle to a halt as quickly as possible. If the driver applies the brakes slowly, but conditions mean that ABS operates on the front wheels, EBA will increase the braking force in order to apply ABS control to the rear wheels.

EBA stops operating as soon as the brake pedal is released.

A fault with the EBA system is indicated by the red brake warning indicator illuminating.

## **Electronic Brake Distribution (EBD)**

EBD controls the balance of braking forces supplied to the front and rear wheels, in order to maintain maximum braking efficiency.

If the vehicle has a light load (only the driver in the vehicle for example), the EBD will reduce the braking force applied to the rear wheels. If the vehicle is heavily laden, then EBD will increase the braking force to the rear wheels.

A fault with the EBD system is indicated by the red brake warning indicator illuminating.

# Off-road Driving

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## FRAGILE EARTH OFF-ROAD CODE

Land Rover take pride in their environmental policies. These policies extend to the use of our vehicles, and the impact that they have on our environment.

- Rights of access vary from country to country. Do not assume they will be the same as back home, always check. Where required seek permission to cross/access private land.
- Follow existing routes wherever possible.
- Respect the peace and tranquillity of others.
- Avoid imposing your presence on other road/track users.
- Drive carefully to minimise erosion and damage to the land. Avoid causing ruts as they can form channels which lead to water erosion.
- Always repair any damage caused to the surface that has been driven over.
- 'As slowly as possible, as fast as necessary' will get you through most obstacles and minimise environmental impact.
- If your vehicle is equipped with a differential lock, ensure that it is engaged before venturing onto low traction surfaces (mud, sand, snow etc). If your vehicle is equipped with Terrain Response, engage the appropriate mode.
- Animals/livestock can be startled by vehicles. Be prepared to proceed slowly, or switch your engine off and wait for them to move off.
- Ensure that your vehicle is properly maintained, equipped, and supplied for the journey.
- Do not allow any vehicle fluids to contaminate water courses. If your vehicle is leaking any fluid the leak should be repaired before venturing off-road.
- Do not leave litter behind.
- Avoid cutting/removing any vegetation from your route or the surrounding area.
- Ensure that you are familiar with any codes of conduct, by-laws, or restrictions for use of the area.
- Take extra care to avoid sparks or flames near dry vegetation.
- Do not park your vehicle in long grass or other vegetation following a journey. The heat from the exhaust can be sufficient to start a fire.
- Only clean your vehicle in an area approved for the washing of vehicles.
- Be aware that diseases can be transported from one area to another by vehicles. Avoid any area of suspected infection.

# Off-road Driving

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## BEFORE DRIVING OFF-ROAD

Before venturing off-road, it is **absolutely essential** that inexperienced drivers become fully familiar with the vehicle's controls.

Study the off-road driving techniques described on this and the following pages, but be aware that they are only a guide.

Inexperienced drivers should seek professional training before venturing off-road. For more information visit

<http://www.landroverexperience.com>

Carry out a visual inspection of the vehicle prior to going off-road. Checks should include:-

- Fuel, oil and water levels, and the security of the caps.
- Radiator grille (ensure it's clear of debris and obstructions).
- Wheels, tyres, and valves should be checked for condition and pressures. Ensure that each valve has the valve cap firmly in place.
- Identify jacking points.
- Identify towing points.
- Identify the lowest points on the vehicle.
- Approach, departure, and ramp angles.
- The position of the air intake, and the exhaust outlet.
- Position and functionality of the driving controls, as well as the warning lights and indicators.

Ensure that your seat, steering wheel, mirrors etc are set to give maximum comfort and visibility. Be aware that the settings required may be different to those used when driving on-road.

## Low profile tyre and wheel combinations

**Caution: Low profile tyre and wheel combinations should not be used for off-roading, as damage to the tyres, wheels and/or the vehicle may result.**

**Land Rover recommends using off-road tyre and wheel combinations, which can be purchased as an accessory.**

## Basic kit to be carried

There are certain supplies and equipment that are recommended to be carried when off-roading. This list is not exhaustive, and the items to be included or discarded will depend greatly upon the terrain and weather conditions. Therefore, use this list as a primer:-

- First aid kit.
- Any medical supplies required by driver or passengers. Insulin for example.
- Fire extinguisher.
- Wet weather, and climate related clothing.
- Boots/Wellingtons.
- High visibility jacket.
- Wheel changing equipment, including a suitable base for jacking on soft ground.
- Navigation equipment. (Maps, compass, local guide etc). Satellite navigation should NOT be the only navigational aid that you take off-road.
- Two-way radio, and/or mobile telephone.
- Clean drinking water/Hot drinks depending on climate.

Additional items will be required, depending on the terrain to be travelled, duration of the trip, and weather conditions etc.

# Off-road Driving

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## Risk assessment

Before travelling off-road, or negotiating any obstacle, assess the risks involved.

The risk assessment should be approached in the following order.

1. Risks to personnel.
2. Risks to the environment (flora and fauna).
3. Risks to the vehicle.

In many instances it will be necessary to get out of the vehicle to make an informed assessment. It may also be necessary to walk some distance ahead before proceeding in the vehicle.

Before driving off-road it is important that you check the condition of the wheels and tyres and that the tyre pressures are correct. Worn or incorrectly inflated tyres will adversely affect the performance, stability and safety of the vehicle.

**Note:** *If the vehicle is equipped with a Temporary spare wheel and you need to fit it whilst driving off-road, then you must proceed with extra caution.*

It is good practice to anticipate possible problems and be prepared for them. Extra equipment should include, at the very least, a shovel, a tow rope, local maps and a torch.

**Caution: DO NOT drive if the fuel level is low - undulating ground and steep inclines could cause fuel starvation to the engine and consequent damage to the catalytic converter and fuel pump.**

**To prevent damage, and improve departure angles, it may be necessary to remove and stow any towing equipment fitted to the vehicle.**

**As a precaution against accidental loss, remove the towing eye cover before driving off-road.**

## BASIC OFF-ROAD TECHNIQUES



### WARNING:

Off-road driving can be hazardous.

- **DO NOT take unnecessary risks and be prepared for emergencies at all times.**
  - **Your vehicle has a higher ground clearance and hence a higher centre of gravity than an ordinary passenger car. An abrupt manoeuvre at an inappropriate speed or on an unstable surface could cause the vehicle to go out of control or rollover.**
  - **Familiarize yourself with the recommended driving techniques in order to reduce risks to yourself, your vehicle AND your passengers.**
  - **Always ensure that seat belts are worn for personal protection while driving on-road or off-road.**
  - **Keep all windows closed during off-road driving to prevent ingress of dirt and water and to prevent tree branches from injuring occupants.**
  - **DO NOT drive off-road alone or without letting someone know where you are going and when you plan to return.**
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# Off-road Driving

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These basic driving techniques are an introduction to the art of off-road driving and do not necessarily provide the information needed to successfully cope with every single off-road situation, including off-road recovery techniques.

We strongly recommend that owners who intend to drive off-road frequently, should seek as much additional information and practical experience as possible.

## Starting the engine

In some extreme off-road driving conditions, it may be desirable to start the engine with a gear engaged, e.g. a steep hill start. Use the following procedure to start the engine with a manual transmission.

1. Press the clutch and select a gear.
2. Release the clutch.
3. Release the parkbrake. Do not release the parkbrake before a gear is selected.
4. Start the engine. An interlock will prevent the engine from cranking until the parkbrake is released.

**Note:** *The battery charging and oil pressure warning lights should extinguish as soon as the engine is running.*

## Gear selection (Automatic transmission)

With the main selector lever set at **D**, the gearbox automatically provides the correct gear for the appropriate gear range selected (HIGH or LOW). For greater vehicle control through gear selection, manual CommandShift mode is recommended.

HIGH range gears should be used whenever possible - only change to LOW range when ground conditions become very difficult.

## Braking

As far as possible, vehicle speed should be controlled through correct gear selection and the use of Hill Descent Control (HDC). Application of the brake pedal should be kept to a minimum. In fact, if the correct gear and HDC have been selected, braking will be largely unnecessary.

If the brake pedal is depressed when HDC is active, HDC is overridden and the brakes will perform as normal. If the brake pedal is then released, HDC will recommence operating, at reduced speed.

## Use of engine for braking

Before descending steep slopes, stop the vehicle at least its length before the descent, engage LOW range and then select HDC. Use of manual CommandShift™ gear selection to limit the transmission to lower gears will also increase engine braking. Select **1** or **2** LOW range, depending on the severity of the descent.

While descending a slope (either forwards or in **R** - reverse) it should be remembered that HDC and the engine will provide sufficient braking effort to control the rate of descent. In extreme circumstances the brakes may be applied.

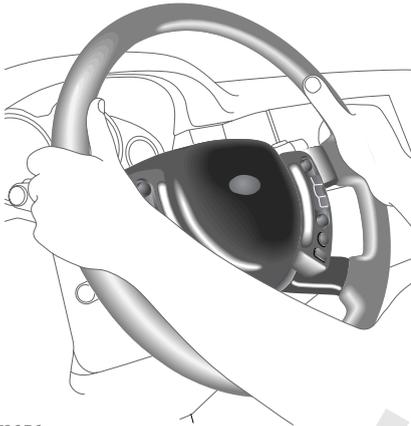
## Accelerating

Use the accelerator with care - any sudden surge of power may induce wheel spin and, therefore, invoke unnecessary operation of traction control, or in extreme conditions could lead to loss of control of the vehicle.

# Off-road Driving

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## Steering



H3876



### **WARNING:**

**DO NOT** hold the steering wheel with your thumbs inside the rim - a sudden kick of the wheel as the vehicle negotiates a rut or boulder could seriously injure them.

**ALWAYS** grip the wheel on the outside of the rim (as shown) when traversing uneven ground.

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## Ground clearance

Don't forget to allow for ground clearance beneath the vehicle suspension components and under the front and rear bumpers. Note also that there are other parts of the vehicle which may come into contact with the ground - take care not to ground the vehicle.

Ground clearance is particularly important at the bottom of steep slopes, or where wheel ruts are unusually deep and where sudden changes in the slope of the ground are experienced.

**ALWAYS** attempt to avoid obstacles that may foul the vehicle.

## Electronic air suspension

Select Off-road height, to increase approach/departure angles and ground clearance.

## Loss of traction

If the vehicle is immobilised due to loss of wheel grip, the following hints could be of value:

- Remove obstacles before trying to cross them.
- Reverse a short distance, then attempt an increased speed approach - additional momentum may overcome the obstacle.

## CD autochanger

Playing CDs while negotiating arduous off-road terrain is not recommended. Severe jolting of the vehicle may disturb the operation of the autochanger, causing the disc to jump or skip.

# Off-road Driving

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## DRIVING ON ROUGH TRACKS

Although rough tracks can sometimes be negotiated in normal drive, on very rough tracks, engage LOW range to enable a steady, low speed to be maintained without constant use of the brake pedal. Engage Terrain Response/Differential lock before proceeding.

## DRIVING ON SLIPPERY SURFACES (ice, snow, mud, wet grass)

- Select **D** (drive) in LOW range.
- Engage Terrain Response/Differential lock before proceeding.
- Drive away using the MINIMUM accelerator possible.
- Drive slowly at all times, keeping braking to a minimum and avoiding violent movements of the steering wheel.

## DRIVING ON SOFT SURFACES, DRY SAND

The ideal technique for driving on soft surfaces (dry sand for example) requires the vehicle to be kept moving at all times - soft sand causes excessive drag on the wheels resulting in a rapid loss of motion once driving momentum is lost.

For Range Rover, deactivate DSC. Select **D** (drive) and REMAIN in that gear until a firm surface is reached. It is generally advisable to use LOW range, as this will enable you to accelerate through worsening conditions without the risk of being unable to restart. Engage Terrain Response/Differential lock before proceeding.

## Stopping the vehicle on soft ground, in sand or on an incline

If you do stop the vehicle, remember:

- Starting on an incline or in soft ground or sand may be difficult. Always park on a firm level area, or with the vehicle facing downhill.
- To avoid wheel spin, select **D** (drive) and use the MINIMUM accelerator necessary to get the vehicle moving.
- If forward motion is lost, avoid excessive use of the accelerator - this may dig the vehicle into the sand. Clear sand from around the tyres and ensure that the vehicle underside is not bearing on the sand before again attempting to move.
- If the wheels have sunk, use an air bag lifting device or high lift jack to raise the vehicle, and then build up sand under the tyres so that the vehicle is again on level ground. If a restart is still not possible, place sand mats or ladders beneath the tyres.

# Off-road Driving

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## CLIMBING STEEP SLOPES

ALWAYS follow the fall line of the slope - travelling diagonally could encourage the vehicle to slide broadside down the slope.

**Caution: Do not attempt to drive the vehicle continuously at angles greater than 35 degrees nose up or down, or 30 degrees side to side. It is acceptable to drive up or down at angles between 35 degrees and 45 degrees, but only momentarily.**

**Failure to follow these instructions will result in damage to the engine.**

Steep climbs will usually require the LOW gear range and selecting **2**, CommandShift selection is recommended. It is advisable to engage HDC, in case there is a need to reverse down the slope. Engage Terrain Response/Differential lock before proceeding. If the surface is loose or slippery, use sufficient speed in the highest practical gear to take advantage of your vehicle's momentum and disable DSC. However, too high a speed over a bumpy surface may result in a wheel lifting, causing the vehicle to lose stability. In this case try a slower approach. Traction can also be improved by easing off the accelerator just before loss of forward motion.

If the vehicle is unable to complete a climb, do not attempt to turn it around while on the slope. Instead, adopt the following procedure to reverse downhill to the foot of the slope.

1. Hold the vehicle stationary using the foot brake.
2. Engage **N** (neutral) and engage LOW range, then select **R** (reverse).
3. Restart the engine if necessary.
4. Select Hill Descent Control (HDC).
5. Fully release the foot brake and allow the vehicle to reverse down the slope using engine braking and HDC to control the rate of descent.
6. If the vehicle begins to slide, accelerate slightly to allow the tyres to regain grip.

When the vehicle is back on level ground and safety permits, a faster approach may enable the hill to be climbed. However, **DO NOT** take unnecessary risks, if the hill is too difficult to climb, find an alternative route.



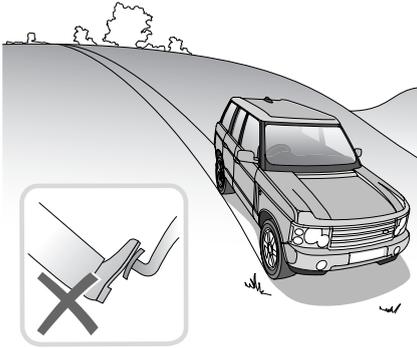
### **WARNING:**

**DO NOT attempt to reverse down a slope without the engine running and ensure that reverse gear (R) is selected. Otherwise, HDC and the braking effect of the gearbox will be lost.**

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# Off-road Driving

## DESCENDING STEEP SLOPES



H6530G

**Caution:** Do not attempt to drive the vehicle continuously at angles greater than 35 degrees nose up or down, or 35 degrees side to side. It is acceptable to drive up or down at angles between 35 degrees and 45 degrees, but only momentarily.

Failure to follow these instructions will result in damage to the engine.



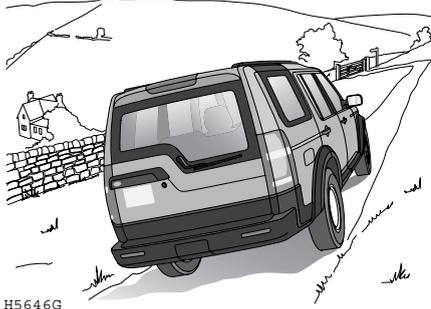
### **WARNING:**

**Failure to follow these instructions may cause the vehicle to roll over.**

- Slow the vehicle and select LOW range.
- With the transmission in manual CommandShift mode, change down the gears to select **1** before bringing the vehicle to a stop at least vehicle length before the start of the slope.
- Engage Terrain Response/Differential lock before proceeding.
- Select Hill Descent Control (HDC).
- Once the descent has been started, **D** can be selected in the main gearbox. HDC will continue to operate and the previously selected manual gear will be retained until the descent is complete.

# Off-road Driving

## TRAVERSING A SLOPE



H5646G



### WARNING:

**Failure to follow these instructions may cause the vehicle to roll over.**

**Traversing a slope is widely considered as one of the most dangerous activities when driving off-road.**

Before crossing a slope ALWAYS observe the following precautions:

- Check that the ground is firm and not slippery.
- Check that the wheels on the downhill side of the vehicle are not likely to drop into depressions in the ground and that the uphill wheels will not run over rocks, tree roots, or similar obstacles that could suddenly increase the angle of tilt.
- Ensure that passenger weight is evenly distributed, that all roof rack luggage is removed and that all other luggage is properly secured and stowed as low as possible. Always remember; any sudden movement of the load could cause the vehicle to overturn.

- Rear seat passengers should sit on the uphill side of the vehicle or, in extreme conditions, should vacate the vehicle until the sloping ground has been safely negotiated.
- Engage Terrain Response/Differential lock before proceeding in 1st gear low range.

## NEGOTIATING A 'V' SHAPED GULLY

Observe extreme caution! Steering up either of the gully walls could cause the side of the vehicle to be trapped against the opposite gully wall.

## DRIVING IN EXISTING WHEEL TRACKS

As far as possible allow the vehicle to steer itself along the bottom of the ruts and always keep a light hold of the steering wheel to prevent it from spinning free. Deactivation of DSC may help in deep ruts.

Raise the air suspension to Off-Road height, and engage Terrain Response/Differential lock before proceeding.

The vehicle may appear to be driving straight ahead in the ruts, but in actual fact is unknowingly on full right or left lock. Then, when level ground is reached, or if a dry patch of ground is encountered, the wheels will find traction and cause the vehicle to suddenly veer to left or right.

# Off-road Driving

## CROSSING A RIDGE



H7007G

Approach at right angles so that both front wheels cross the ridge together - an angled approach could cause stability to be lost, through diagonally opposite wheels lifting from the ground at the same time. Engage Terrain Response/Differential lock before proceeding.

## CROSSING A DITCH



H6244G

Cross ditches at an angle so that three wheels always maintain contact with the ground. If a ditch is approached head on, both front wheels will drop into the ditch together, possibly resulting in the chassis and front bumper being trapped on opposite sides of the ditch. If the severity of terrain makes this inevitable, selecting Off-road height with the Air Suspension, to increase clearance between the ground and the bottom of the vehicle, may help.

# Off-road Driving

## WADING



H7341G



### WARNING:

**DO NOT attempt to wade through fast moving water. Fast moving water is capable of washing a vehicle away.**

**Fast moving water can also carry debris, (trees, branches, etc) which can cause injury to the occupants, or damage to the vehicle.**

**Caution: The maximum advisable wading depths are:-**

- **700mm (28 inches) for Range Rover, Range Rover Sport and Discovery 3/LR 3 with the air suspension at off-road height.**
- **600mm (24 inches) for Discovery 3/LR 3 with coil springs.**
- **500mm (20 inches) for Defender & Freelander 2/LR 2.**

**Wading at a depth greater than the maximum advisable wading depth regularly, is not recommended.**

**Severe electrical damage may occur if the vehicle remains stationary for any length of time when the water level is above the door sills.**

Before wading, ensure the electronic air suspension is set to off-road height and engage Terrain Response/Differential lock before proceeding.

If the water is likely to exceed the maximum wading depth, the following precautions should be observed:

- Fix a plastic sheet in front of the radiator grille to prevent water from soaking the engine and mud from blocking the radiator.
- Ensure that the silt bed beneath the water is free of obstacles and firm enough to support the vehicle's weight and provide sufficient traction.
- Ensure that the engine air intake is clear of the water level.
- Drive slowly into the water and accelerate to a speed which causes a bow wave to form; then maintain that speed.
- Remove the CD autochanger.

At all times, keep all the doors fully closed.

**Caution: Do not switch off the engine during wading. If the engine stalls during wading, restart it immediately and, as soon as possible, get the vehicle checked by a Land Rover Dealer/Authorised Repairer.**

**If, during wading, it is thought that water may have entered the engine air intake, switch off the engine immediately. Have the vehicle towed out and delivered to a Land Rover Dealer/Authorised Repairer for checking.**

**Note:** *If deep wading is to be carried out regularly, contact your Land Rover Dealer/Authorised Repairer and/or your local Land Rover Experience centre for advice.*

### After wading

- Drive the vehicle a short distance and apply the foot brake to check that the brakes are fully effective.

# Off-road Driving

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- DO NOT rely on the handbrake to hold the vehicle stationary until the brakes have thoroughly dried out; in the meantime, leave the vehicle parked in **P** for an automatic transmission, or in gear for a manual transmission.
- Remove any protective covering from in front of the radiator grille.
- If the water was particularly muddy, remove any blockages (mud and leaves) from the condenser and radiator to reduce the risk of overheating.
- If deep water is regularly negotiated, check all oils for signs of water contamination - contaminated oil can be identified through its milky appearance. In addition, check the air filter element for water ingress and replace if wet - consult a Land Rover Dealer/Authorised Repairer if necessary.
- If salt water is frequently negotiated, thoroughly wash the underbody components and exposed body panels with fresh water.

## AFTER DRIVING OFF-ROAD

**Note:** In some countries it is illegal to contaminate the highway with mud etc. In any event, contaminating the highway with mud, soil, etc can prove hazardous to other road users. Ensure that your vehicle is cleared of mud, dirt etc before driving on the highway.

Before rejoining the public highway, or driving at speeds above 40 km/h (24 mph), consideration should be given to the following:

- Wheels and tyres must be cleaned of mud and inspected for damage.
- If wheels and tyres are not cleaned properly, damage to the wheels, tyres, braking system and suspension components could occur.
- Brake discs and calipers should be examined and any stones or grit removed that may affect braking or handbrake efficiency.
- Inspect the drive belts and pulleys at the front of the engine for damage.
- The underside of the vehicle should be checked for damage, especially the suspension air springs, dampers, drive-shaft boots and steering gear boots. Any debris, packed mud, etc should be cleared from the areas around the drive shaft boots, including the chassis portholes. All rubber components such as drive shaft boots, steering boots, air springs etc should be checked for splits, punctures and deformities.
- Any damage to paint or protective coatings, should be rectified by a Land Rover Dealer/Authorised Repairer as soon as possible.

If you have any doubt whether the vehicle has been damaged, have the vehicle inspected by a Land Rover Dealer/Authorised Repairer.

# Off-road Driving

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## Cleaning after off-road driving

**Caution: Ensure that the areas around air intakes and the front grille are clean and clear of debris. Pay particular attention to the lower grille and radiator. Failure to do so may cause the engine to overheat, leading to severe engine damage.**

Ensure that the vehicle and underside is cleaned soon after off-road driving, taking particular care to clean areas where mud and debris has compacted.

After wading in salt water or driving on sandy beaches, use a hose to wash the underbody components and any exposed body panels with fresh water. This will help to protect the vehicle's cosmetic appearance and prevent impairment of park brake efficiency.

Ensure that the vehicle is only cleaned in an area designated as suitable for vehicle cleaning. Vehicle cleaning products, and water run off can damage the environment if not processed properly. This includes products which are described as 'Eco Friendly' or 'Environmentally safe' etc.

## Servicing requirements

Vehicles operated in arduous conditions, particularly on dusty, muddy or wet terrain, and vehicles undergoing frequent or deep wading conditions will require more frequent servicing. Contact a Land Rover Dealer/Authorised Repairer for advice.

# Maintenance

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## OWNER MAINTENANCE

In addition to routine services and inspections, a number of simple checks must be carried out more frequently.

**Caution: Any significant or sudden drop in fluid levels, or uneven tyre wear, should be reported to a Land Rover Dealer/Authorised Repairer without delay.**

### *Daily checks*

- Operation of lights, horn, direction indicators, wipers, washers and warning lights.
- Operation of seat belts and brakes.
- Look for fluid deposits underneath the vehicle that might indicate a leak.

Condensation drips from the Air Conditioning are normal.

- Engine oil level.
- Brake fluid level.
- Power steering fluid level.
- Screen washer fluid level.
- Tyre pressures and condition.
- Operate air conditioning.



### **WARNING:**

**If the brake pedal travel is unusually long or if there is any significant loss of brake fluid, contact your Land Rover Dealer/Authorised Repairer immediately. Driving under such conditions could result in extended stopping distances or complete brake failure.**

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## DRIVING IN ARDUOUS CONDITIONS

When a vehicle is operated in arduous conditions, more frequent attention must be paid to servicing requirements.

For example: if your vehicle experiences deep wading conditions, DAILY servicing could be necessary to ensure the continued safe and reliable operation of the vehicle.

Arduous driving conditions include:

- Driving in dusty and/or sandy conditions.
- Driving on rough and/or muddy roads and/or wading.
- Driving in extremely hot or cold conditions.
- Towing a trailer or driving in mountainous conditions.

Contact a Land Rover Dealer/Authorised Repairer for advice.

## PREPARATION FOR WINTER

Before the onset of winter, to prevent the door seals from freezing closed, apply Land Rover silicone spray to the seals across the tops of the doors.

This action will need to be repeated at the start of each winter to maintain protection.

# Tyres

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## Tyre pressures



### **WARNING:**

**If the vehicle has been parked in strong sunlight or used in high ambient temperatures, DO NOT reduce tyre pressures. Move the vehicle into the shade and allow the tyres to cool before checking.**

**Under-inflation causes excessive flexing and uneven wear to the tyre. This can lead to sudden failure. Over-inflation causes a harsh ride, uneven tyre wear and poor handling.**

**A cold tyre, at or below the recommended cold inflation pressure, is dangerously under-inflated.**

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Correctly inflated tyres will ensure that you enjoy the best combination of tyre life, ride comfort, fuel economy and road handling.

Under-inflated tyres wear more rapidly, can seriously affect vehicle road handling characteristics and fuel consumption, as well as increasing the risk of tyre failure.

Over-inflated tyres give a harsher ride, wear unevenly and are more prone to damage.

Tyre pressures should be checked at least once a week with normal road use, but should be checked DAILY if the vehicle is used off-road.

Check the pressures (including the spare wheel) when the tyres are cold - be aware that it only takes a mile of driving to warm up the tyres sufficiently to affect the tyre pressures.

**Note:** *Air pressure naturally increases in warm tyres; if it is necessary to check the tyres when they are warm (after the vehicle has been driven for a while), you should expect the pressures to have increased by up to 30 - 40 kPa (0.28 - 0.4 bar/4 - 6 lbf/in<sup>2</sup>). In this circumstance, DO NOT let air out of the tyres in order to match the recommended cold tyre pressures.*

# Tyres

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## SNOW CHAINS

Snow chains are designed for use on metalled roads in extreme snow conditions only, and are not recommended for off-road use. If it is necessary to fit snow chains to your vehicle, ALWAYS observe the following:

- The correct position (front, rear, or both) for snow chains is given in the main vehicle handbook. You must refer to the vehicle handbook BEFORE fitting snow chains.
- Whether chains are to be fitted to the front wheels, rear wheels, or to all four wheels, then ONLY Land Rover approved chains should be used - these are designed for your vehicle and will eliminate any risk of damage to other components. Approved snow chains are only available from a Land Rover Dealer/Authorised Repairer.
- Always adhere to the snow chain fitting and retensioning instructions and the speed limitations recommended for varying road conditions. NEVER exceed 50 km/h (31 mph).
- ONLY fit snow chains in pairs.
- Avoid tyre damage by removing the chains as soon as the road is free from snow.
- If you are unsure as to any aspect of snow chain fitment or use please consult your Land Rover Dealer/Authorised repairer.

**Caution: DO NOT fit unapproved snow chains - this could damage tyres, wheels, suspension and brake components and could result in damage to the bodywork of the vehicle.**

## TYRE PRESSURE MONITORING SYSTEM

Your vehicle may be equipped with a Tyre Pressure Monitoring System (TPMS) which monitors pressure in each tyre, including a full-size spare tyre. Temporary spare tyres are not fitted with sensors and are consequently not monitored.



### WARNING:

**The TPMS is NOT a substitute for manually checking tyre pressures. The tyre pressure should be checked regularly, when cold, using an accurate pressure gauge. Failure to properly maintain your tyre pressures could increase the risk of tyre failure, with consequential loss of vehicle control and personal injury.**

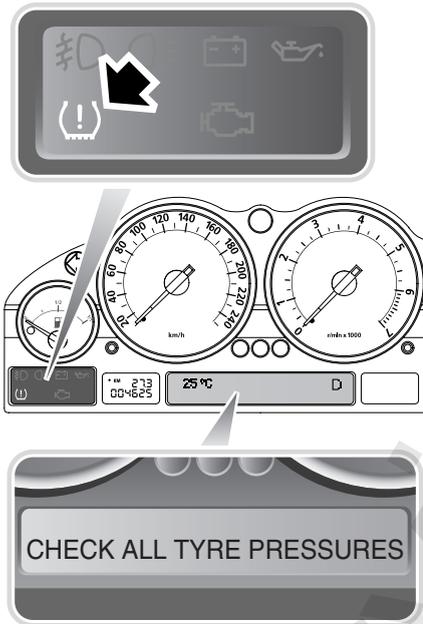
**The TPMS can NOT register damage to a tyre. Regularly check the condition of your tyres, especially if the vehicle is driven off-road.**

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### TPMS operation

The system monitors the pressure of the tyres via sensors located in each wheel and a receiver located within the vehicle. Communication between sensor and receiver is via Radio Frequency (RF) signals.

# Tyres



H6559L

The tyre pressure warning comprises a yellow warning telltale within the instrument cluster and an associated message within the message centre.

Each tyre, including the spare (if provided), should be checked monthly when cold and inflated to the inflation pressure recommended by the vehicle manufacturer on the vehicle placard or tyre inflation pressure label. (If your vehicle has tyres of a different size than the size indicated on the vehicle placard or tyre inflation pressure label, you should consult the appropriate section of this owner's handbook to determine the proper tyre inflation pressure.)

When the low tyre pressure telltale is illuminated, one or more of your tyres is significantly under-inflated.

You should stop and check your tyres as soon as possible and inflate them to the proper pressure.

Driving on a significantly under-inflated tyre causes the tyre to overheat and can lead to tyre failure. Under-inflation also reduces fuel efficiency and tyre tread life, and may affect the vehicle's handling and stopping ability.

**Caution: When inflating the tyres, care should be taken to avoid bending or damage to the TPMS valves. Always ensure correct alignment of the inflation head to the valve stem.**

Your vehicle has also been equipped with a TPMS malfunction telltale to indicate when the system is not operating properly. When the malfunction telltale is illuminated, the system may not be able to detect or signal low tyre pressure as intended. TPMS malfunctions may occur for a variety of reasons, including the installation of incompatible replacement tyres on the vehicle. Always check the TPMS malfunction telltale after replacing one or more tyres on your vehicle to ensure that the replacement tyres are compatible with the TPMS.

## Full-size spare wheel and tyre change

Should it be necessary to change a wheel and tyre with the spare, then the system will automatically recognise the change in wheel positions. After driving above 25 km/h (18 mph), the TPMS warnings will clear typically within five minutes.

# Tyres

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## Temporary spare wheel and tyre change

Should it be necessary to change a wheel and tyre with the temporary spare, then the system will automatically recognise the change in wheel positions. Then, after approximately 10 minutes of driving above 25 km/h (18 mph), the yellow warning telltale will illuminate and a text message, e.g. **FRONT RIGHT TYRE PRESSURE NOT MONITORED** will be displayed and accompanied by an audible warning.

## Spare tyre pressure

The spare tyre should be inflated to the highest pressure for the specified tyre size.

## If a tyre needs to be changed

It is recommended that you always have your tyres serviced by a Land Rover Dealer/ Authorised Repairer or qualified technician. If a TPMS is fitted, each wheel and tyre assembly, with the exception of a temporary spare, is equipped with a tyre pressure sensor connected to the tyre valve stem.

In order to avoid damage to the sensor, the tyres **MUST** be removed and refitted to the road wheel in a specified manner. Care must be taken to avoid contact between the bead of the tyre and the sensor during removal and refitting of the tyre, otherwise the sensor may become damaged and/or inoperable.



## WARNING:

**Valve stem seal, washer, nut, valve core and cap should be replaced at every tyre change.**

**Valve stem seal, washer and nut must be replaced if valve retention nut is loosened. Sensor units and nuts must be refitted using correct torques and associated torque profile.**

**Sensors can be removed from the wheel by unscrewing the valve retention nut**

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## Replacement sensor fitment procedure

A replacement sensor must be fitted to a running wheel in order to be recognised by the system. Recognition only occurs when the vehicle is driven above 25 km/h (18 mph) for approximately 10 minutes.

Should the TPMS warning for any wheel not clear, even after ensuring correct inflation and driving for more than 10 minutes above 25 km/h (18 mph), please consult your Land Rover Dealer/Authorised Repairer.

# Cleaning and Vehicle Care

## WASHING YOUR VEHICLE



H6538G

**Caution: Read individual product warnings before using any car cleaning or washing products.**

**Some high pressure cleaning systems are sufficiently powerful to penetrate door and window seals and damage rubbing strips and locking mechanisms. Never aim the water jet directly at heater air intakes, body and sunroof seals, or at any components that might easily be damaged.**

Wash your vehicle frequently using a sponge and generous quantities of cold or lukewarm water containing a car shampoo. Rinse and dry off with a chamois leather.

- Do not use hot water!
- Do not use detergent soap products or washing-up liquid!
- In hot weather, do not wash the vehicle in direct sunlight.

## Removing tar spots

Use white spirit to remove tar spots and stubborn grease stains from paintwork. Then wash immediately with soapy water to remove all traces of spirit.

## Underbody maintenance

Corrosive materials used for snow and ice removal and dust control can collect on underbody parts. If these materials are not removed, accelerated rusting can occur. Use a hose to regularly flush the underbody with plain water, taking particular care to thoroughly clean those areas where mud and other debris can easily collect.

Similarly, after off-road driving or wading in muddy or salt water conditions, use a hose to wash underbody components and other exposed parts of the vehicle.

When using a hose, do not direct the jet into the heater air intake ducts, or through the wheel trim apertures onto the brake components, or at the door, window or sunroof seals, where water pressure could penetrate the seals.

If damage or corrosion to the underbody area is detected, please have the vehicle checked by a Land Rover Dealer/Authorised Repairer at the earliest opportunity.

## Cleaning after off-road driving

**Caution: Ensure that the areas around air intakes and the front grille are clean and clear of debris. Pay particular attention to the lower grille and radiator. Failure to do so may cause the engine to overheat, leading to severe engine damage.**

Ensure that the vehicle and underside is cleaned soon after off-road driving, taking particular care to clean areas where mud and debris has compacted.

# Technical Data

## WHEELS AND TYRES

### Tyre inflation pressure

It is important that tyres be properly inflated.

Air pressure enables a tyre to support the vehicle load, so proper inflation is critical.

Failure to maintain correct inflation pressures may result in rapid and uneven tread wear, erratic vehicle handling and excessive heat build-up, which may result in tyre failure.

It is impossible to determine if a tyre is properly inflated just by looking at it.

Tyre pressures listed in the owner's handbook are considered to be the recommended cold tyre inflation pressure, at maximum gross vehicle weight condition, measured when the tyres are **cold**, after the vehicle has been parked for at least 3 hours or driven less than 3 miles (5 km). Tyre pressures at normal operating conditions are shown in the table above.

When you drive for more than 3 miles (5 km), the tyres, and the air inside them, warm up and it is normal for the tyre pressure to increase above the recommended cold pressure. When checking tyre pressure in this condition, never 'bleed' or reduce air pressure.

### Accessory wheels - insert details

Wheel size	Tyre	Snow Chain Fitment	
		Front	Rear

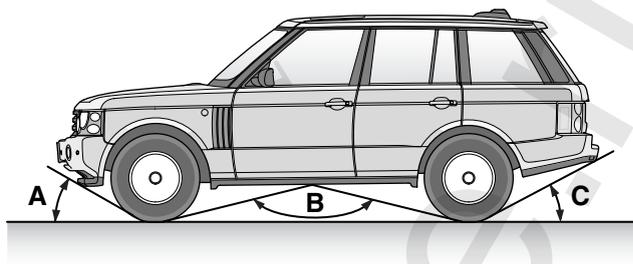
### Accessory tyres - insert details

Loading condition	Position	Tyre Pressure
Normal operating conditions	Front	
	Rear	
Vehicle loaded to maximum gross vehicle weight	Front	
	Rear	

**Note:** Accessory fit off-road tyres (with a speed rating of Q or T) are subject to speed restrictions. Q-rated tyres should not be used at speeds greater than 160 km/h (100 mph), T-rated tyres should not be used at speeds greater than 190 km/h (118 mph).

# Technical Data

## RANGE ROVER OFF-ROAD DATA

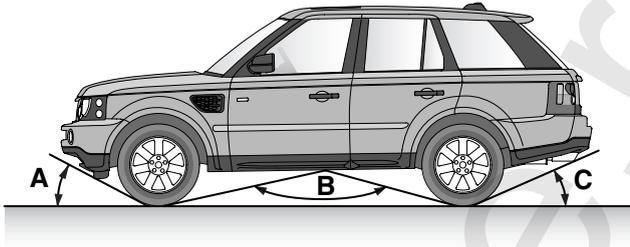


H7002G

<b>A</b>	Approach angle (at EEC kerb weight and Off-road height)	34°
<b>B</b>	Breakover angle (at EEC kerb weight and Off-road height)	120°
<b>C</b>	Departure angle without tow hitch (at EEC kerb weight) Off-road height	26.6°
	Departure angle with tow hitch (at EEC kerb weight) Off-road height	17.4°
	Minimum ground clearance (Off-road height)	283 mm (11.1 in)

# Technical Data

## RANGE ROVER SPORT OFF-ROAD DATA

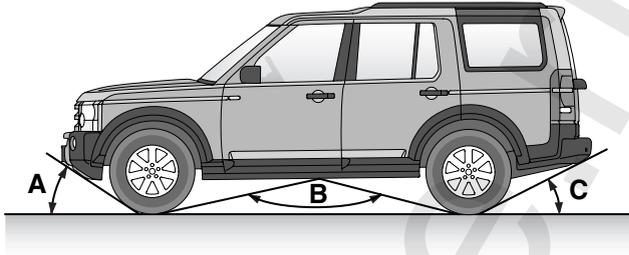


H7003G

<b>A</b>	Approach angle (at EEC kerb weight and Off-road height)	34 <sup>0</sup>
<b>B</b>	Breakover angle (at EEC kerb weight and Off-road height)	130 <sup>0</sup>
<b>C</b>	Departure angle without tow hitch (at EEC kerb weight) Off-road height	29.0 <sup>0</sup>
	Departure angle with tow hitch (at EEC kerb weight) Off-road height	17.8 <sup>0</sup>
	Minimum ground clearance (Off-road height)	227 mm (8.9 in)
	Maximum gradient (at EEC kerb weight): Continuous operation	35 <sup>0</sup>
	Drive through operation	45 <sup>0</sup>

# Technical Data

## DISCOVERY 3/LR 3 OFF-ROAD DATA



H7004G

### Air Suspension

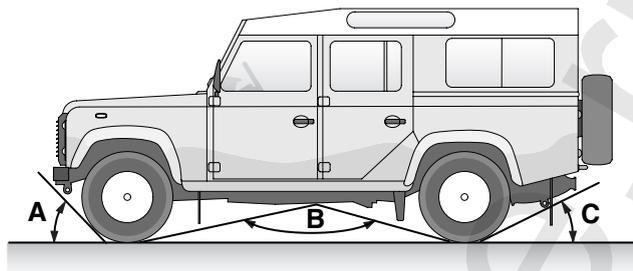
<b>A</b>	Approach angle (at EEC kerb weight and Off-road height)	37.2°
<b>B</b>	Breakover angle (at EEC kerb weight and Off-road height)	124.2°
<b>C</b>	Departure angle without tow hitch (at EEC kerb weight and Off-road height)	29.6°
	Departure angle with tow hitch (at EEC kerb weight) Off -road height	18.5°
	Minimum ground clearance (Off-road height)	240 mm (9.4 in)
	Maximum gradient, nose up/down:	
	Continuous operation	35°
	Drive-through	45°

### Coil Spring Suspension

<b>A</b>	Approach angle (at EEC kerb weight)	32.2°
<b>B</b>	Breakover angle (at EEC kerb weight)	157.2°
<b>C</b>	Departure angle without tow hitch (at EEC kerb weight)	24.9°
	Departure angle with tow hitch (at EEC kerb weight)	15.7°
	Minimum ground clearance (Off-road height)	185 mm (7.3 in)
	Maximum gradient, nose up/down:	
	Continuous operation	35°
	Drive-through	45°

# Technical Data

## DEFENDER OFF-ROAD DATA



H7006G

*110 Station Wagon illustrated*

### 90 models

	Maximum gradient (at EEC kerb weight)	45°
<b>A</b>	Approach angle (at EEC kerb weight): Soft top & Pick-up	48°
	Hard top & Station Wagon	51.5°
<b>B</b>	Breakover angle (at EEC kerb weight): Soft top & Pick-up	145°
	Hard top & Station Wagon	141°
<b>C</b>	Departure angle (at EEC kerb weight): Soft top & Pick-up	49°
	Hard top & Station Wagon	53°
	Minimum ground clearance (unladen):	253.5 mm (10 in)
	Soft top & Pick-up	191 mm (7.5 in)
	Hard top & Station Wagon	229 mm (9 in)

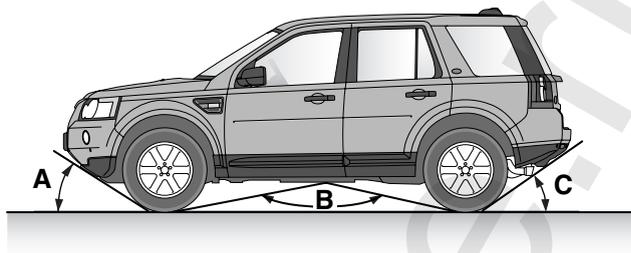
### 110 & 130 models

	Maximum gradient (at EEC kerb weight)	45°
<b>A</b>	Approach angle (at EEC kerb weight)	50°
<b>B</b>	Breakover angle (at EEC kerb weight): 110 models	152°
	130 models	155°
<b>C</b>	Departure angle (at EEC kerb weight): 110 models	35°
	130 models	34°
	Minimum ground clearance (unladen)	215 mm (8.5 in)

**Note:** *Departure angles do not account for the addition of a tow hitch.*

# Technical Data

## FREELANDER 2/LR 2 OFF-ROAD DATA



H7349G

<b>A</b>	Approach angle (at EEC kerb weight)	31°
<b>B</b>	Breakover angle (at EEC kerb weight)	157°
<b>C</b>	Departure angle without towbar (at EEC kerb weight)	34°
	Departure angle with towbar (at EEC kerb weight)	18°
	Minimum ground clearance	186 mm (7.3 in)
	Maximum wading depth	500 mm (19.7 in)

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