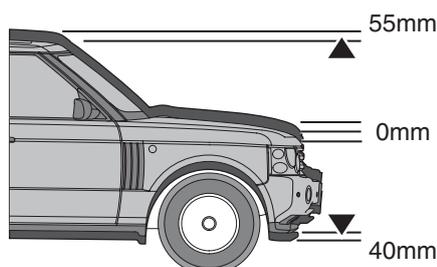


Air Suspension

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 **VEHICLE DIMENSIONS, 285**.

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

Access height

This is 40 mm (1.6 in.) lower than On-road height. It provides easier entry, exit and loading of the vehicle.

Access height can be selected at any time, but the system response will depend on the vehicle's speed:

- If the vehicle speed is greater than 20 km/h (12 mph), the suspension will wait for up to one minute for the vehicle to slow down. If the vehicle does not slow down to below 20 km/h (12 mph) within this time, the Access height request will be cancelled.
- If the vehicle speed is less than 20 km/h (12 mph), the suspension will move to a part-lowered height and remain at this height for up to one minute. If the vehicle does not slow down to 8 km/h (5 mph) within this time, the Access height request will be cancelled.
- If the vehicle speed is lower than 8 km/h (5 mph), the suspension will be lowered to Access height immediately.

Access height may be selected up to 40 seconds after the starter switch is turned off, provided that the driver's door has not been opened within this time.

WARNING

The driver should ensure that the vehicle is clear of obstacles and people before lowering the vehicle. Remember that, for example, the clearance under the floor and bumpers, and in the wheel arches, will be 95 mm (3.7 in.) less at Access height than at Off-road height.

Air Suspension

The suspension will automatically rise from Access height when the vehicle speed exceeds 10 km/h (6 mph).

If Access height was selected directly from Off-road height, the system will return to Off-road height when the vehicle speed exceeds 10 km/h (6 mph). Otherwise the system will lift the suspension to On-road height.

High speed height

This feature is designed to improve vehicle stability at higher speeds, and lowers the suspension ride height by 20 mm (0.8 in.), if the vehicle exceeds 160 km/h (100 mph) for longer than five seconds. This action is automatic and cannot be over-ridden. Ride height will return to normal when vehicle speed remains below 130 km/h (80 mph) for 30 seconds.

Note: *Never exceed the speed limits.*

Crawl (locked at Access height)

This mode enables the vehicle to be driven at low speeds at Access height to give increased roof clearance in low car parks, etc.

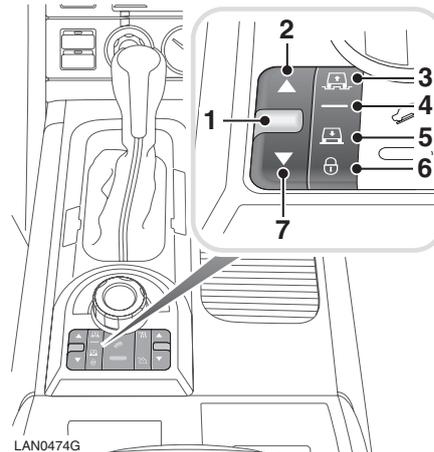
Crawl can be selected when the vehicle speed is below 35 km/h (22 mph). When the vehicle is in Crawl, On-road height will be selected automatically if the vehicle speed exceeds 40 km/h (24 mph).

Messages

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

See **MAIN MESSAGE CENTRE, 90**.

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

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.

Air Suspension

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.

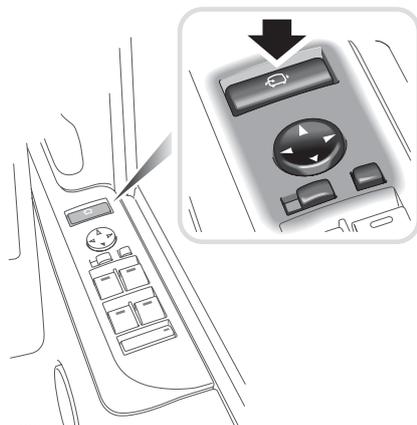
A flashing indicator (2) or (7) indicates that the system is in a waiting state or shows that it will automatically override the driver's choice if speed criteria are exceeded.

Selecting Access height

If Access height is selected above 20 km/h (12 mph), indicators (5) and (7) will flash while the system waits for the vehicle to slow down.

When the vehicle slows down to 20 km/h (12 mph), indicator (4) will extinguish as the system goes to the part-lowered height. indicator (5) will be lit and indicator (7) will continue to flash.

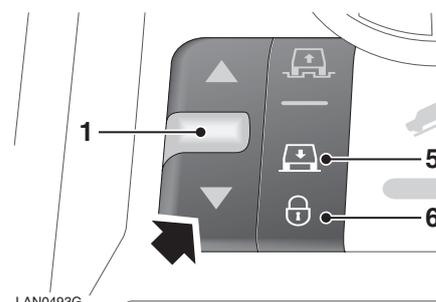
When the vehicle slows down to 8 km/h (5 mph), indicators (5) and (7) will be lit. When Access height is reached, indicator (7) will extinguish.



H4001

Access height may be selected directly by pressing the Access switch on the driver's door panel.

Selecting and cancelling Crawl (locked at Access height)



LAN0493G

When the suspension is at On-road or Access height and the vehicle speed is below 35 km/h (22 mph), press the raise/lower switch (1) in the down direction for one second. Indicators (5) and (6) will be lit to confirm the selection.

Crawl can be cancelled manually by pressing the raise/lower switch in the up direction for one second. Indicator (6) will extinguish.

Note: When Crawl is cancelled, the suspension will rise to On-road height if the vehicle speed is greater than 10 km/h (6 mph).

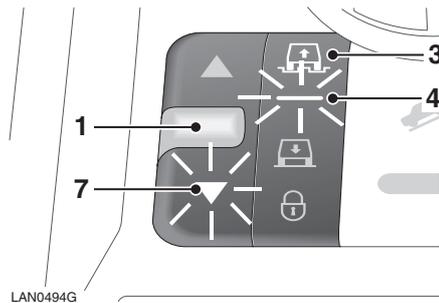
Selecting Access height directly from Off-road height

When the suspension is at Off-road height, press switch (1) down, then press it again before indicator (7) goes out.

The system will remember to return the suspension to Off-road height automatically if the vehicle is driven above 10 km/h (6 mph).

Air Suspension

Automatic height change warnings



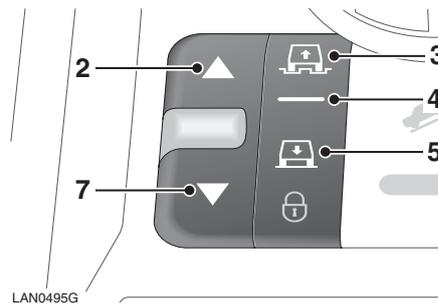
When the suspension is at Off-road height, Access or Crawl, the suspension height will change automatically when vehicle speed exceeds predetermined levels.

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.

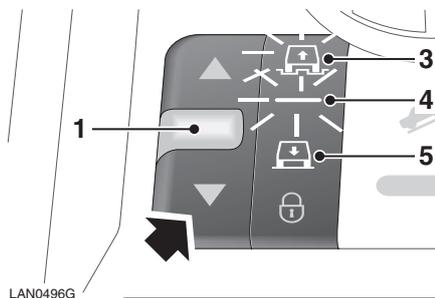
If the doors are not closed within this time, the raising indicator (2) or the lowering indicator (7) will extinguish and the indicators showing the heights above and below the current position will be illuminated.

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

Air Suspension

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.

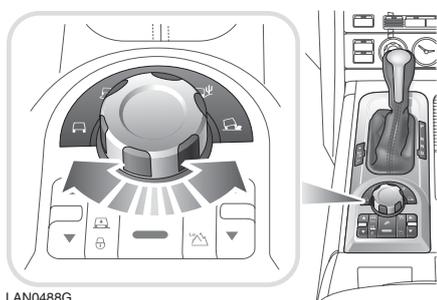
This can be caused by attempting to lower the vehicle onto an obstacle or attempting to lift the vehicle against an obstruction.

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).

Terrain Response

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.



LAN0488G

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.

Terrain Response

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.

Terrain Response

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:

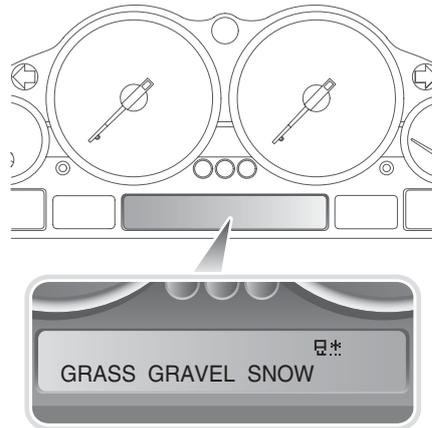
- Air suspension.
- Hill Descent Control.

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.



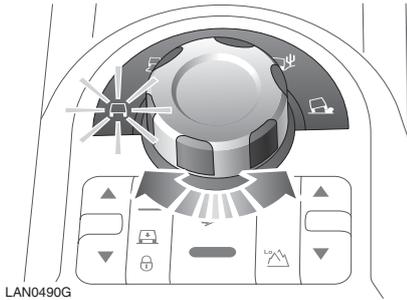
LAN0489G

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.

Terrain Response

Operation



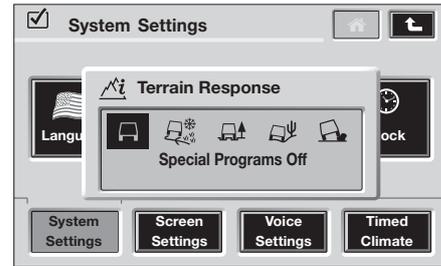
LAN0490G

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.



LAN0492 ENG

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.

Terrain Response

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, 186**.

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, 238**.

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.*

Terrain Response

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. See

Deactivating DSC operation, 184.

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.

Terrain Response

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, 189**. 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.

For an explanation of those messages, see **MAIN MESSAGE CENTRE, 90**.