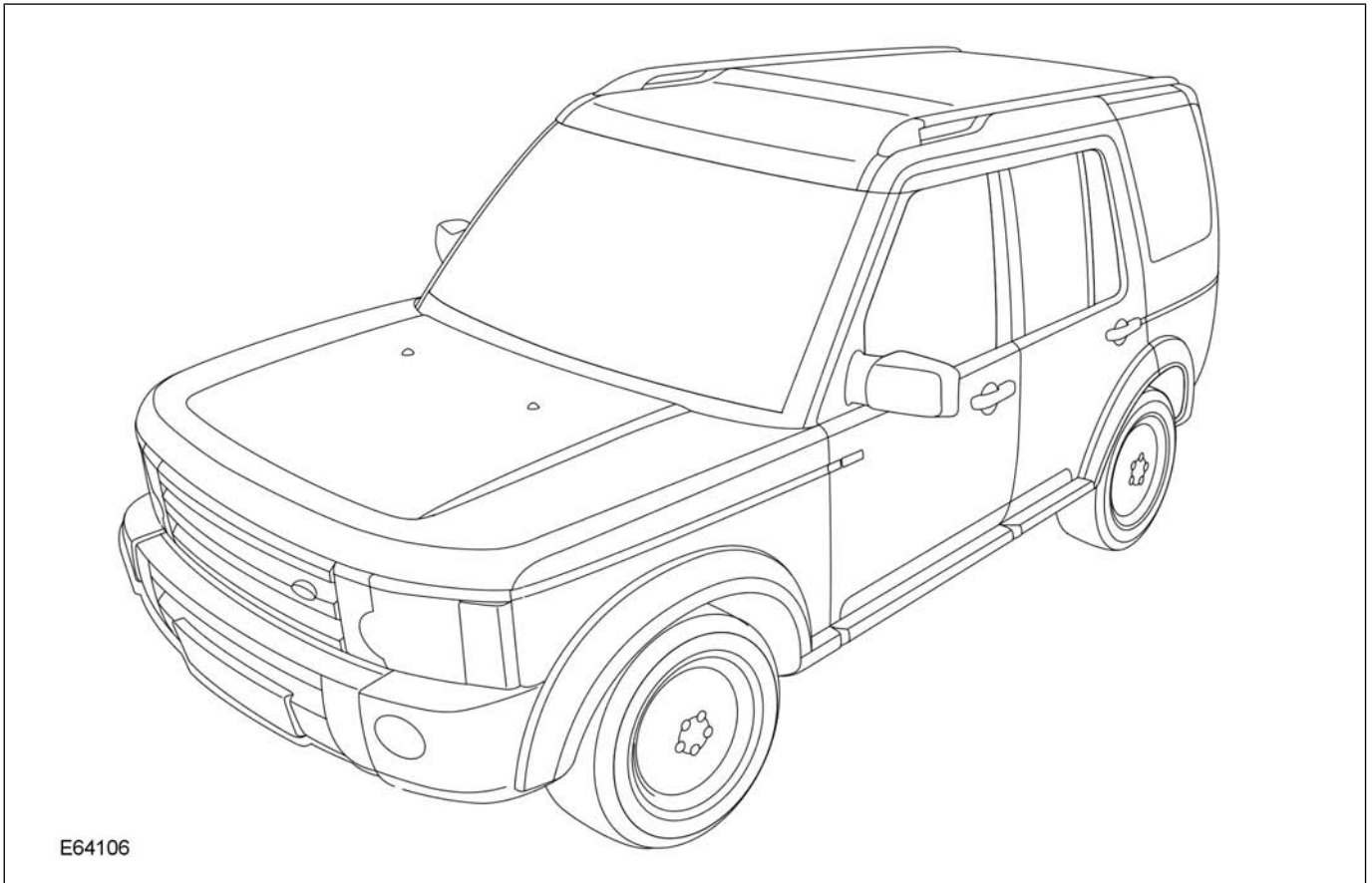


DISCOVERY 3 / LR3**System Checks**

The air suspension control module can store fault codes which can be retrieved using the T4 diagnostic unit.

Diagnostic information is obtained via the diagnostic socket which is located in the lower instrument panel closing panel, on the driver's side, below the steering column.

The diagnostic socket allows the exchange of information between the various control modules on the bus systems and T4 system or diagnostic tool.

This allows the fast retrieval of diagnostic information and programming of certain functions using the T4 system.

Fault Detection

The air suspension control module performs fault detection and plausibility checks.

Fault detection is limited to faults that the control module can directly measure:

- Sensor electrical hardware faults
- Valve electrical hardware faults
- Sensor and actuator supply faults
- Bus failures
- Control module hardware errors

Plausibility checks are checks on signal behavior, as follows:

Height Changes

- Average height does not change correctly
- Height changes too slowly

Gallery Pressure

- Does not increase fast enough when reservoir filling requested
- Increases when system is inactive
- Too low when lifting is requested
- Increases too rapidly when filling reservoir
- Does not decrease when gallery is vented
- Pressure varies too much when inactive

Compressor Temperature

- Sensor voltage too large - head and brush sensors (short circuit to battery)
- Takes too long to be readable after suitable compressor run time - head and brush sensors
- Does not increase when compressor active - head sensor only

Sensor Activity

- Signal floating
- Constant articulation when moving

When a fault is detected, the air suspension control module will attempt to maintain a comfortable ride quality and where possible will retain as much functionality as possible.

The system functionality depends on the severity of the fault.

Fault Categories

Faults are categorized into order of severity and effect on the system as follows:

- 1 = Minor fault
- 5 = Major fault

Height sensor faults (hardware faults) and reservoir valve block failure

- Retain full functionality with no 'refinements'
- Cross-link valves inoperative
- No compensation for uneven surfaces

Pressure sensor faults, compressor faults, corner valves stuck shut

- Road speed signal not available
- Vehicle returns to on-road mode height when next requested
- Levels at 'current' height

Reservoir valve stuck open, exhaust valve stuck shut if below on-road mode height, corner valves stuck open if above on-road mode height

- Vehicle returns to on-road mode height when next requested
- Does not level at 'current' height

Failure of multiple height sensors, cross-articulation when driving, calibration corrupted

- Vehicle lowers to bump stops

ABS module failure, CAN bus failure

- If the air suspension control module loses communications with the ABS module or the ABS module reports a fault, the air suspension control module immediately returns to the 'default' height, which is below the on-road ride height
- Once at the default height, the control module will continue to level the vehicle at this height
- It is unlikely that the fault will be in the air suspension control module
- When the fault is repaired, the air suspension control module will resume full functionality but the error will remain in the control module memory

For major faults the control module will not level the vehicle at the 'current' ride height.

The control module freezes height changes until it receives a manual or automatic request for height change.

The control module will return to standard height if possible and freezes once standard height is achieved.

If the suspension is above the on-road height and the air suspension control module cannot lower the suspension, all height changes will be frozen.

ABS / CAN Failures

The control module will issue a message on the high speed CAN bus which is received by the instrument cluster which displays a maximum advisable speed in the message center.

An immediate 'freeze' of the vehicle height is caused by the following:

- Failure of more than one height sensor - vehicle on bump stops
- Implausible articulation symptoms detected - vehicle on bump stops
- Valve or solenoid failure - corner valve stuck open below on-road height or exhaust valve stuck shut above on-road height
- Stuck corner or whole vehicle (diagnosed using plausibility of the sensor inputs)

If height change is not possible, e.g. exhaust valve failed closed at off-road height or compressor failed at access height, the control module will not level or change height.

If the air suspension control module has a hardware fault, the control module will disable all air suspension functions.

Detectable hardware errors include memory error, control module failure and calibrations errors.

Fault Messages

The air suspension has two methods which it can use to inform the driver of a fault in the air suspension system; the air suspension switch LED's and the instrument cluster message center.

When minor faults occur and the air suspension control module is able to level the vehicle to the 'current' ride height, the air suspension switch LED's will display the current ride height.

If the air suspension control module suffers a major failure and there is no air suspension control, all the control switch LED's will remain off.

If a fault occurs and the air suspension control module can determine the ride height and the vehicle is not above on-road height, the driver will be notified via an 'air suspension fault max speed 18.6 mph (30 km/h)' warning in the message center.

If the control module cannot determine the height of the vehicle, or the vehicle is above on-road height, cannot be lowered and the vehicle speed is too high, an air suspension fault message is displayed.

If the vehicle is restricted to on-road height an air suspension fault normal height only message is displayed.

Connector Information**Connector Pin Detail - C2030**

Pin No	Description	Input or Output
1	Rear control valve - Cross link valve - positive (+)	Output
2	Not used	Not used
3	Not used	Not used
4	Not used	Not used
5	Air supply unit - Motor temperature sensor signal	Input
6	Not used	Not used
7	Air supply unit - Motor temperature sensor - Ground	Input
8	Switch pack display - Raising LED	Output
9	Switch pack display - Lowering LED	Output
10	Switch pack display - On-road mode LED	Output
11	Rear control valve - Cross link valve - negative (-)	Input
12	Not used	Not used
13	Not used	Not used
14	Not used	Not used
15	Not used	Not used
16	Not used	Not used
17	Switch pack display - Crawl mode LED	Output
18	Switch pack display - Access mode LED	Output
19	Not used	Not used
20	Input Switch pack - Raise switch signal	Input

Connector Pin Detail - C2320

Pin No	Description	Input or Output
1	Air supply unit voltage signal input from Air supply unit relay	Input
2	Reservoir control valve - Pressure sensor - 5 volt supply	Output
3	Reservoir control valve - Pressure sensor - Signal	Input

Pin No	Description	Input or Output
4	Reservoir control valve - Pressure sensor - Ground	Input
5	Air supply unit - Exhaust valve - Negative (-)	Input
6	Air supply unit - Exhaust valve - Positive (+)	Output
7	Not used	Not used
8	Not used	Not used

Connector Pin Detail - C2321

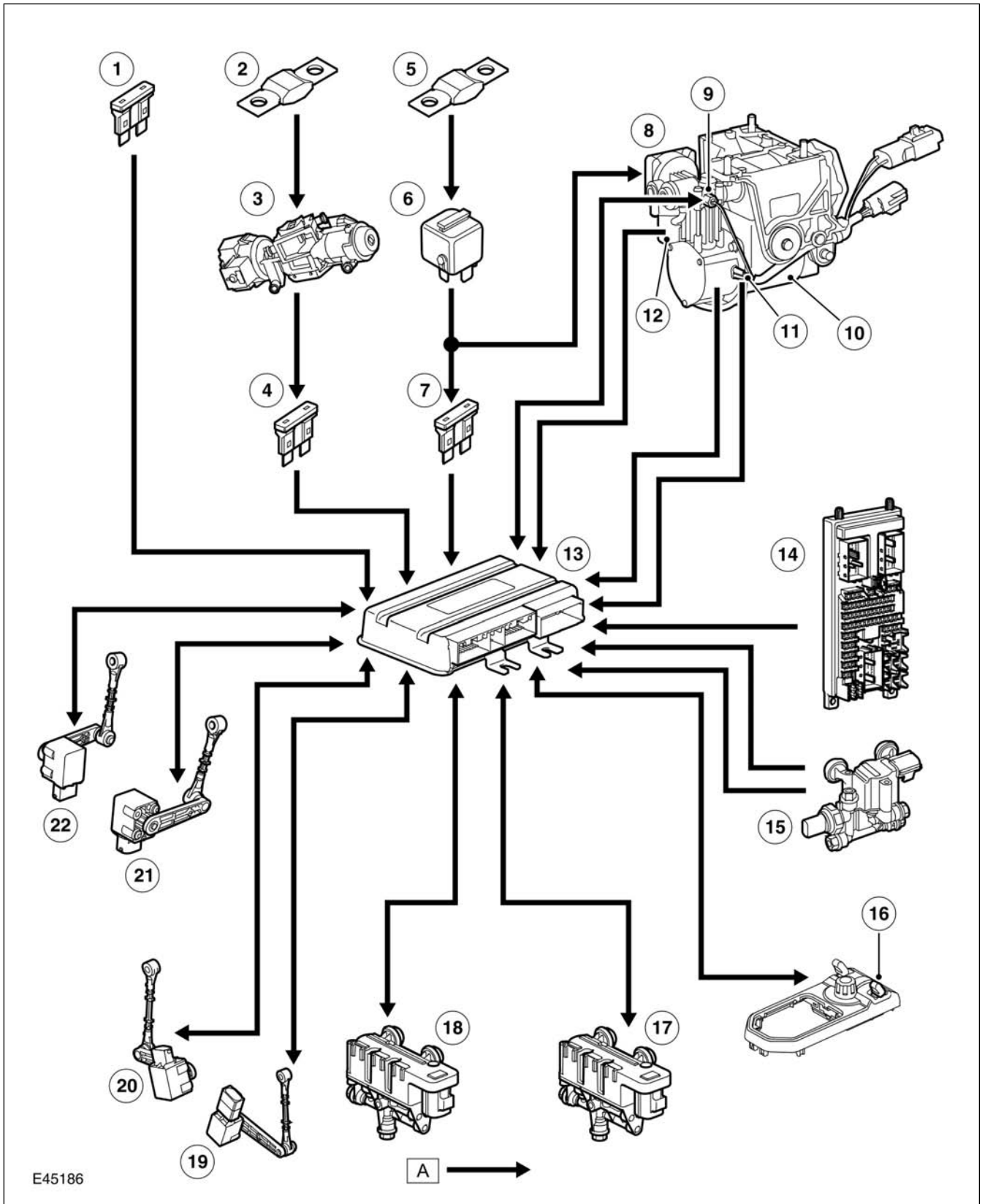
Pin No	Description	Input or Output
1	12V Permanent battery supply	Input
2	Compressor temperature sensor - Signal	Input
3	Front LH height sensor - 5 Volt supply	
4	Front LH height sensor - Signal	Input
5	Front LH height sensor - Ground	Input
6	Air supply unit relay coil - positive	
7	Air supply unit relay coil - ground	Input
8	Reservoir control valve coil - positive (+)	
9	Front control valve - RH corner valve - negative (-)	Input
10	Front control valve - RH corner valve - positive (+)	
11	Front control valve - LH corner valve - negative (-)	Input
12	Front control valve - LH corner valve - positive (+)	
13	Not used	Not used
14	Front RH height sensor - 5V supply	
15	Front RH height sensor - signal	Input
16	Front RH height sensor - ground	Input
17	Compressor temperature sensor - ground	Input
18	Not used	Not used
19	Not used	Not used
20	Not used	Not used

Pin No	Description	Input or Output
21	Reservoir control valve coil - negative (-)	Input
22	Front control valve - cross link valve - positive (+)	
23	Front control valve - cross link valve - negative (-)	Input
24	Ground	Input

Connector Pin Detail - C0867

Pin No	Description	Input or Output
1	Rear control valve - LH corner valve positive (+)	Output
2	Rear control valve - LH corner valve negative (-)	Input
3	Door status signal from CJB	Input
4	Switch pack - Lower switch signal	Input
5	Rear LH height sensor - 5v supply	Output
6	Rear LH height sensor - Signal	Input
7	Rear LH height sensor - Ground	Input
8	Rear RH height sensor - 5v supply	Output
9	Rear RH height sensor - Signal	Input
10	Rear RH height sensor - Ground	Input
11	Rear control valve - RH corner valve positive (+)	Output
12	Rear control valve - RH corner valve negative (-)	Input
13	Air suspension control - CJB signal	Input
14	Switch pack display - LED ground	Input
15	Switch pack display - LED high	Output
16	CAN IN positive (+)	Input
17	CAN OUT positive (+)	Output
18	CAN OUT negative (-)	Input
19	CAN IN negative (-)	Output
20	12v ignition switch supply	Input

Control Schematic



Item	Description	Item	Description
1.	Fuse 26E (20 amp)	12.	Exhaust valve solenoid
2.	Fusible link 11E (30 amp)	13.	Air suspension control module
3.	Ignition switch	14.	Central junction box (CJB)
4.	Fuse 35P (5 amp)	15.	Reservoir control valve
5.	Fusible link 10E (60 amp)	16.	Air suspension control switch
6.	Air supply unit relay	17.	Front valve block
7.	Fuse 3E (5 amp)	18.	Rear valve block
8.	Air supply unit	19.	RHR height sensor
9.	Compressor temperature sensor	20.	LHR height sensor
10.	Motor	21.	RHF height sensor
11.	Motor temperature sensor	22.	LHF height sensor