

Published: 11-May-2011

## Intake Air Distribution and Filtering - I6 3.2L Petrol -

### Torque Specifications

Description	Nm	lb-ft
Air cleaner housing bolts	6	4

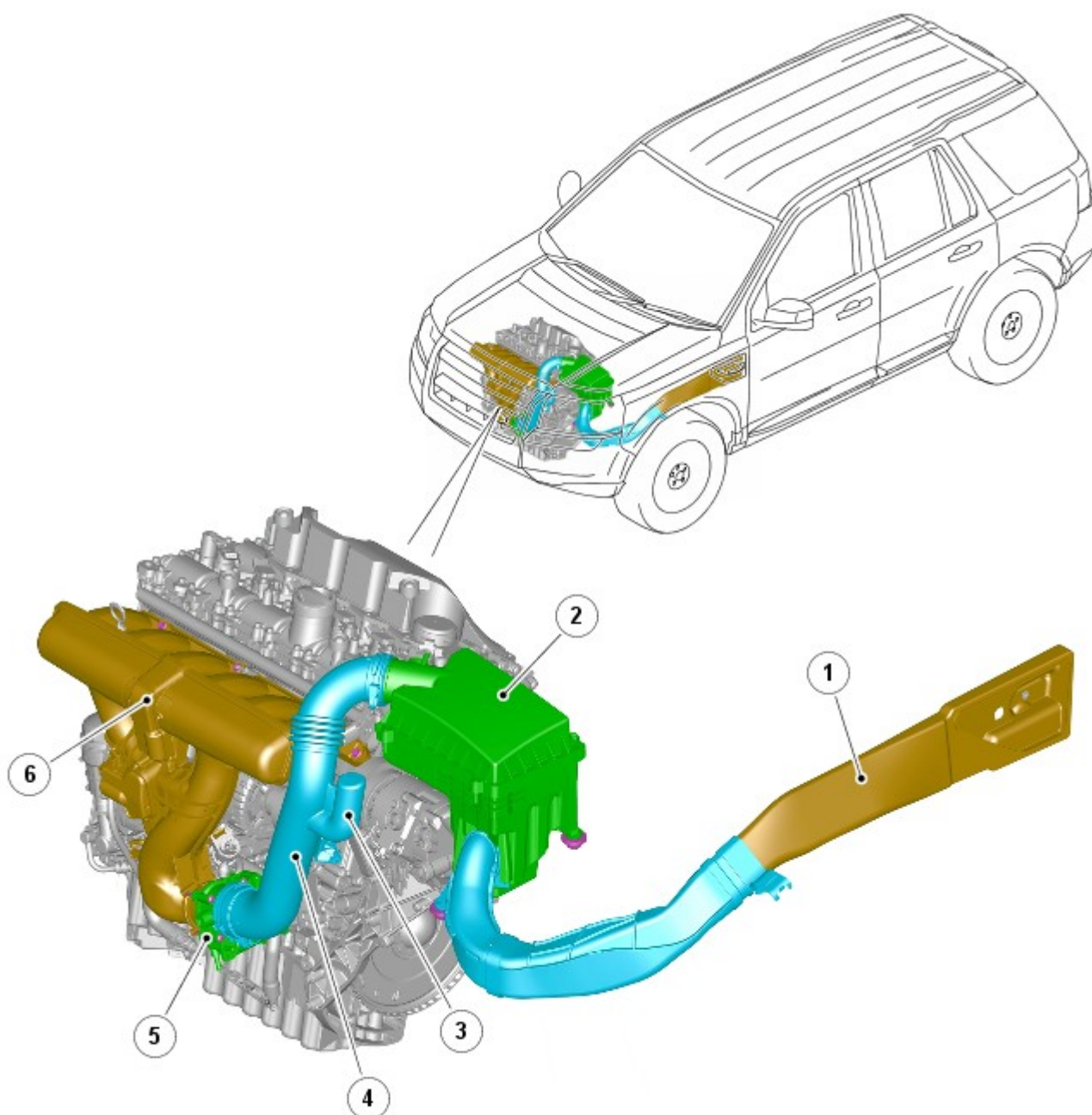
Part Number

Published: 11-May-2011

# Intake Air Distribution and Filtering - I6 3.2L Petrol - Intake Air Distribution and Filtering

Description and Operation

## COMPONENT LOCATION



E79498

Item	Part Number	Description
1	-	Air intake duct - dirty air
2	-	Air filter housing
3	-	Resonator
4	-	Air intake duct - clean air
5	-	Throttle body
6	-	Intake manifold

## OVERVIEW

The air intake system has been designed to:

- make available the appropriate air supply to the engine,

- while providing a wade-proof system to ensure vehicle off-road durability

Fresh air is supplied into the system, through the Left Hand (LH) vent located on the front fender. The vent is positioned above the vehicle's wade line to minimize the risk of water entering the system. This positioning of the vent also prevents hot air from the engine-compartment being drawn into the engine.

A polyfibre porous duct providing low intake noise, directs air into the base of the rigid injection-molded air filter housing. The filter housing is supported on 4 elastomer mountings to minimize noise transmission to the vehicle's body structure. A one-way drain valve, incorporated in the base of the filter housing, releases any water that may have entered the system. Intake air is cleaned as it passes through an oil-soaked filter element which offers minimal obstruction to the flow of air.

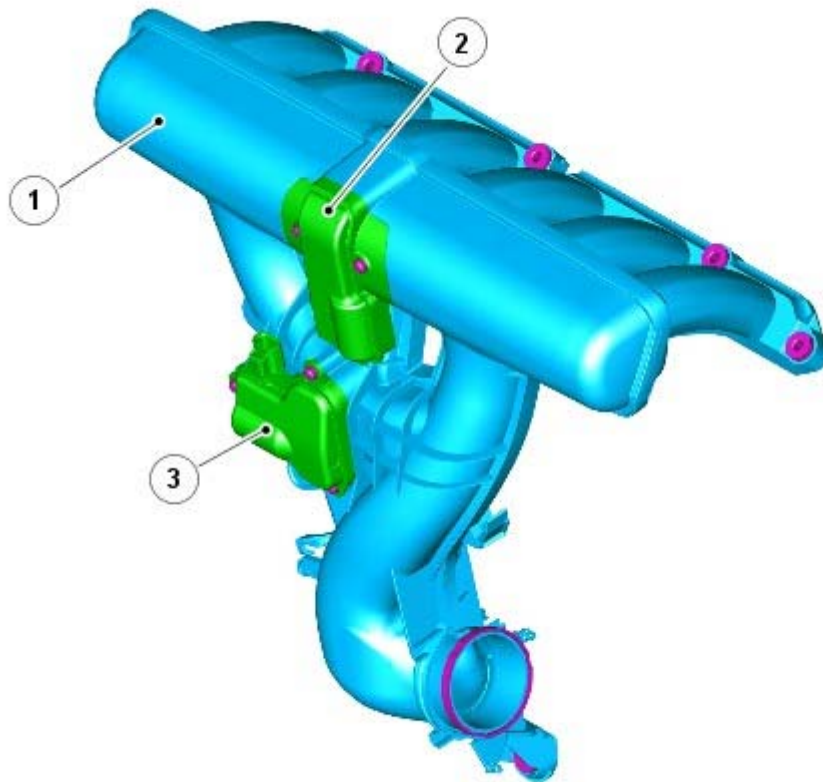
Clean air passes through the Mass Air Flow (MAF) sensor and along a sealed polypropylene duct to the throttle body and intake manifold. The clean air duct features a single quarter-wave resonator tube to enhance engine sound quality during intake manifold tract switching events.

Computational fluid dynamics were extensively used in the design and refinement of the system to minimize air-pressure drop.

The intake manifold is capable of varying both intake tract length and plenum volume. Two separate valves control these features:

- the variable tract valve, and
- the variable plenum valve

Intake Manifold



E81148

Item		Description
1		Intake manifold
2		Variable plenum valve
3		Variable tract valve

At low engine speeds, long intake tracts are functioned to provide optimum engine torque; shorter tracts are used at medium speeds, again to optimize engine torque for the existing engine speed range.

At higher engine speeds the benefits of optimizing the tract lengths are outweighed by necessity of maintaining an appropriate supply of air to meet the engine's requirements. Therefore, the plenum valve is opened to create a single, large plenum volume to provide the maximum quantity of air to charge the engine's cylinders.

#### Variable Induction System Functionality

Engine Speed	Tract Valve	Plenum Valve	Effect
Below 3800 rev/m	Closed	Closed	Long tracts
Between 3800 – 4800 rev/min	Open	Closed	Short tracts

Engine Speed	Tract Valve	Plenum Valve	Effect
Above 4800 rev/min	Open	Open	Open plenum

**PRINCIPLE OF OPERATION**

**Low Engine Speed**

NOTE: Both throttles closed. The air is routed the long way.



E89641

At engine speeds up to 2100 rpm, optimum filling is achieved by how the exhaust gases leave the cylinders. When the exhaust gases leave the cylinders, a empty chamber is created behind the exhaust gases, whereupon a low pressure is created in the cylinders.

By also making adjustments when the intake valves open/close, positive pressure differences are obtained between the cylinder and intake manifold. The intake air is drawn into the cylinders resulting in optimum cylinder filling.

**Engine Speed Up To Approximately 3700rpm**

NOTE: Both throttles are closed.



E89642

The pulsations, which increase at speeds over 2100 rpm, are forced the long way round. When the pulsation speed is constant and the engine speed is relatively low, the pulsations have a long time to reach the cylinders at the correct time.

However, certain losses occur when a proportion of the pulsations disappear the back way to the air filter (and add to the engine's sound pattern).

**Engine Speed From 3700 To 4700rpm**

NOTE: The lower throttle is open whilst the upper one is closed.



E89643

The pulsations must have access to a shorter route to make it to the cylinders in time. The shorter route is obtained by allowing the lower throttle to be open, which means that the pulsations reach the cylinders in time.

Certain losses occur, however, when a proportion of the pulsations take the long way round and a proportion take the back way round to the air filter.

### Engine Speed Over 4700 rpm

**NOTE:** Both the upper throttle and the lower throttle are open.

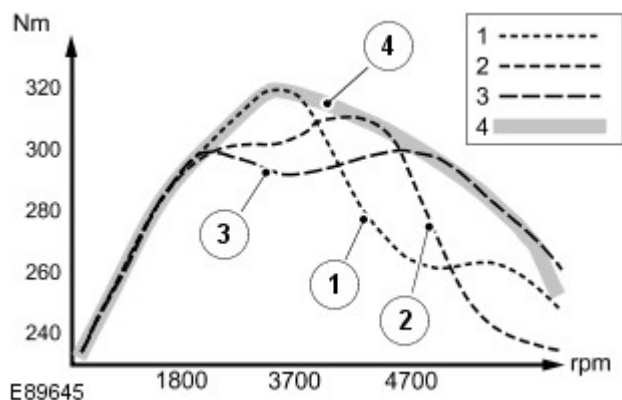


E89644

In this position, the pulsations are only determined by the short intake pipe's geometry.

The total volume for all cylinders now accessible is necessary to have sufficient access to air.

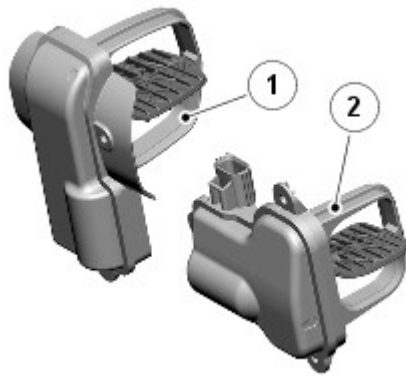
### Torque Development



Item	Description
1	Both throttles closed
2	Only the lower throttle open
3	Both the throttles open
4	Official torque curve

By combining the throttle's position, in principle, three different torque curves are produced, which combined, give a flat torque curve for a naturally aspirated engine.

### Throttle Units (Actuators)



E89646

Item		Description
1		Upper throttle unit
2		Lower throttle unit

The throttle units consist of throttle, Direct Current (DC) motor, worm gear and internal electronics.

The Engine Control Module (ECM) controls the position of the throttle by modulating the relevant throttle unit's control signal. If the signal shifts from low (approximately 1 volt) to high (approximately 10 volts) the internal electronics interpret it as the throttle must close. If the signal shifts from high to low, the throttle must open.

For additional information, refer to: [Electronic Engine Controls](#) (303-14A Electronic Engine Controls - I6 3.2L Petrol, Description and Operation).

If an actuator fails and the flap is in the open position, it is not possible to remove the actuator and flap assembly from the inlet manifold. A small indentation on the body of the actuator allows for a 3 mm Allen key to be pushed through the thin membrane wall of the actuator housing. The Allen key can be engaged in the spindle of the actuator motor, which allows the flap to be turned to the closed position and consequently the actuator and flap assembly can then be removed from the intake manifold.

# Intake Air Distribution and Filtering - I6 3.2L Petrol - Intake Air Distribution and Filtering

Diagnosis and Testing

## Principles of Operation

For a detailed description of the intake air distribution and filtering system, refer to the relevant Description and Operation section in the workshop manual.

REFER to: [Intake Air Distribution and Filtering](#) (303-12A Intake Air Distribution and Filtering - I6 3.2L Petrol, Description and Operation).

## Inspection and Verification



**CAUTION:** Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

### Visual Inspection

Mechanical	Electrical
<ul style="list-style-type: none"> <li>● Hoses and ducts (damage/connections)</li> <li>● Air cleaner element (contaminated/blocked)</li> <li>● Restricted air intake</li> <li>● Seals and gaskets</li> </ul>	<ul style="list-style-type: none"> <li>● Mass Air Flow (MAF) sensor</li> <li>● Throttle body</li> <li>● Harness (security/damage)</li> <li>● Connections (security/damage)</li> </ul>

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart, alternatively, check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index.

## Symptom Chart

Symptom	Possible Cause	Action
Vehicle does not start/hard starting/poor performance	<ul style="list-style-type: none"> <li>● Restricted/blocked air intake</li> <li>● Restricted/blocked air cleaner element</li> </ul>	<ul style="list-style-type: none"> <li>● Ensure the air intake system is free from blockage and is correctly installed</li> <li>● Install a new air cleaner element as necessary. REFER to: <a href="#">Air Cleaner</a> (303-12A Intake Air Distribution and Filtering - I6 3.2L Petrol, Removal and Installation).</li> </ul>
Excessive intake noise	<ul style="list-style-type: none"> <li>● Intake pipe disconnected/damaged after the air cleaner</li> <li>● Air cleaner assembly incorrectly assembled/damaged</li> </ul>	<ul style="list-style-type: none"> <li>● Check for correct installation and integrity of air intake system</li> <li>● Check for correct installation and integrity of the air cleaner assembly. REFER to: <a href="#">Air Cleaner</a> (303-12A Intake Air Distribution and Filtering - I6 3.2L Petrol, Removal and Installation).</li> </ul>

## DTC Index

**NOTE:** If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

**NOTE:** Generic scan tools may not read the codes listed, or may read only five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give additional information read by the manufacturer approved diagnostic system).

**NOTE:** When performing voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the DMM leads into account.

**NOTE:** Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

**NOTE:** Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

**NOTE:** If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be



the cause. Always check for loose connections and corroded terminals.

DTC	Description	Possible Causes	Action
P010100	Mass or volume air flow A circuit range/performance	<ul style="list-style-type: none"> <li>● Mass air flow (MAF) sensor circuit: short circuit to ground</li> <li>● Mass air flow (MAF) sensor circuit: open circuit</li> <li>● Mass air flow (MAF) sensor failure</li> </ul>	Check the MAF sensor and circuits. Refer to the electrical guides. Install a new sensor as required. REFER to: <a href="#">Mass Air Flow (MAF) Sensor</a> (303-14A Electronic Engine Controls - I6 3.2L Petrol, Removal and Installation).
P010121	Mass or volume air flow A circuit range/performance - signal amplitude less than minimum	<ul style="list-style-type: none"> <li>● Mass air flow (MAF) sensor circuit: short circuit to ground</li> <li>● Mass air flow (MAF) sensor circuit: open circuit</li> <li>● Mass air flow (MAF) sensor failure</li> </ul>	Check the MAF sensor and circuits. Refer to the electrical guides. Install a new sensor as required. REFER to: <a href="#">Mass Air Flow (MAF) Sensor</a> (303-14A Electronic Engine Controls - I6 3.2L Petrol, Removal and Installation).
P010122	Mass or volume air flow A circuit range/performance - signal amplitude greater than maximum	<ul style="list-style-type: none"> <li>● Mass air flow (MAF) sensor circuit: short circuit to power</li> <li>● Mass air flow (MAF) sensor failure</li> </ul>	Check the MAF sensor and circuits. Refer to the electrical guides. Install a new sensor as required. REFER to: <a href="#">Mass Air Flow (MAF) Sensor</a> (303-14A Electronic Engine Controls - I6 3.2L Petrol, Removal and Installation).
P010200	Mass or volume air flow A circuit low	<ul style="list-style-type: none"> <li>● Mass air flow (MAF) sensor circuit: short circuit to ground</li> <li>● Mass air flow (MAF) sensor circuit: open circuit</li> <li>● Mass air flow (MAF) sensor failure</li> </ul>	Check the MAF sensor and circuits. Refer to the electrical guides. Install a new sensor as required. REFER to: <a href="#">Mass Air Flow (MAF) Sensor</a> (303-14A Electronic Engine Controls - I6 3.2L Petrol, Removal and Installation).
P010300	Mass or volume air flow A circuit high	<ul style="list-style-type: none"> <li>● Mass air flow (MAF) sensor circuit: short circuit to power</li> <li>● Mass air flow (MAF) sensor failure</li> </ul>	Check the MAF sensor and circuits. Refer to the electrical guides. Install a new sensor as required. REFER to: <a href="#">Mass Air Flow (MAF) Sensor</a> (303-14A Electronic Engine Controls - I6 3.2L Petrol, Removal and Installation).
P010600	Manifold absolute pressure/BARO sensor range/performance	<ul style="list-style-type: none"> <li>● Faulty hose connection</li> <li>● Manifold absolute pressure (MAP)/BARO sensor circuit: high resistance</li> <li>● Manifold absolute pressure (MAP)/BARO sensor failure</li> </ul>	Check the hose connection/condition. Rectify as necessary. Check the MAP/BARO sensor and circuits. Refer to the electrical guides. Install a new sensor as required. REFER to: <a href="#">Manifold Absolute Pressure (MAP) Sensor</a> (303-14A Electronic Engine Controls - I6 3.2L Petrol, Removal and Installation).
P010621	Manifold absolute pressure/BARO sensor range/performance	<ul style="list-style-type: none"> <li>● Manifold absolute pressure (MAP)/BARO sensor circuit: short circuit to ground</li> <li>● Manifold absolute pressure (MAP)/BARO sensor circuit: open circuit</li> <li>● Manifold absolute pressure (MAP)/BARO sensor failure</li> </ul>	Check the MAP/BARO sensor and circuits. Refer to the electrical guides. Install a new sensor as required. REFER to: <a href="#">Manifold Absolute Pressure (MAP) Sensor</a> (303-14A Electronic Engine Controls - I6 3.2L Petrol, Removal and Installation).
P010622	Manifold absolute pressure/BARO sensor range/performance	<ul style="list-style-type: none"> <li>● Manifold absolute pressure (MAP)/BARO sensor circuit: short circuit to power</li> <li>● Manifold absolute pressure (MAP)/BARO sensor failure</li> </ul>	Check the MAP/BARO sensor and circuits. Refer to the electrical guides. Install a new sensor as required. REFER to: <a href="#">Manifold Absolute Pressure (MAP) Sensor</a> (303-14A Electronic Engine Controls - I6 3.2L Petrol, Removal and Installation).
P010700	Manifold absolute pressure/BARO sensor low	<ul style="list-style-type: none"> <li>● Manifold absolute pressure (MAP)/BARO sensor circuit: short circuit to ground</li> <li>● Manifold absolute pressure (MAP)/BARO sensor circuit: open circuit</li> <li>● Manifold absolute pressure (MAP)/BARO sensor failure</li> </ul>	Check the MAP/BARO sensor and circuits. Refer to the electrical guides. Install a new sensor as required. REFER to: <a href="#">Manifold Absolute Pressure (MAP) Sensor</a> (303-14A Electronic Engine Controls - I6 3.2L Petrol, Removal and Installation).
P010800	Manifold absolute pressure/BARO sensor high	<ul style="list-style-type: none"> <li>● Manifold absolute pressure (MAP)/BARO sensor circuit: short circuit to power</li> <li>● Manifold absolute pressure (MAP)/BARO sensor failure</li> </ul>	Check the MAP/BARO sensor and circuits. Refer to the electrical guides. Install a new sensor as required. REFER to: <a href="#">Manifold Absolute Pressure (MAP) Sensor</a> (303-14A Electronic Engine Controls - I6 3.2L Petrol, Removal and Installation).



DTC	Description	Possible Causes	Action
P011100	Intake air temperature sensor 1 circuit range/performance	<ul style="list-style-type: none"> <li>● Intake air temperature (IAT) sensor 1 circuit: high resistance</li> <li>● Intake air temperature (IAT) sensor failure</li> </ul>	Check the IAT sensor and circuits (the IAT sensor is incorporated into the MAF sensor). Refer to the electrical guides. Install a new sensor as required. REFER to: <a href="#">Mass Air Flow (MAF) Sensor</a> (303-14A Electronic Engine Controls - I6 3.2L Petrol, Removal and Installation).
P011200	Intake air temperature sensor 1 circuit low	<ul style="list-style-type: none"> <li>● Intake air temperature (IAT) sensor 1 circuit: short circuit to ground</li> <li>● Intake air temperature (IAT) sensor 1 circuit: open circuit</li> <li>● Intake air temperature (IAT) sensor failure</li> </ul>	Check the IAT sensor and circuits (the IAT sensor is incorporated into the MAF sensor). Refer to the electrical guides. Install a new sensor as required. REFER to: <a href="#">Mass Air Flow (MAF) Sensor</a> (303-14A Electronic Engine Controls - I6 3.2L Petrol, Removal and Installation).
P011300	Intake air temperature sensor 1 circuit high	<ul style="list-style-type: none"> <li>● Intake air temperature (IAT) sensor 1 circuit: short circuit to power</li> <li>● Intake air temperature (IAT) sensor 1 circuit: open circuit</li> <li>● Intake air temperature (IAT) sensor failure</li> </ul>	Check the IAT sensor and circuits (the IAT sensor is incorporated into the MAF sensor). Refer to the electrical guides. Install a new sensor as required. REFER to: <a href="#">Mass Air Flow (MAF) Sensor</a> (303-14A Electronic Engine Controls - I6 3.2L Petrol, Removal and Installation).
P011400	Intake air temperature sensor 1 circuit intermittent/erratic	<ul style="list-style-type: none"> <li>● Intake air temperature (IAT) sensor 1 circuit: high resistance</li> <li>● Intake air temperature (IAT) sensor failure</li> </ul>	Check the IAT sensor and circuits (the IAT sensor is incorporated into the MAF sensor). Refer to the electrical guides. Install a new sensor as required. REFER to: <a href="#">Mass Air Flow (MAF) Sensor</a> (303-14A Electronic Engine Controls - I6 3.2L Petrol, Removal and Installation).
P017100	System too lean (bank 1)	<ul style="list-style-type: none"> <li>● Intake air leak</li> <li>● Between MAF sensor and cylinder head</li> <li>● Fuel system restriction</li> <li>● MAF sensor fault</li> <li>● Low intake flow</li> <li>● Exhaust leak, before catalytic converter</li> </ul>	Check for intake air leaks. Check for low fuel pressure and MAF sensor DTCs. Rectify as necessary. Check for exhaust leaks before the catalytic converter
P017200	System too rich (bank 1)	<ul style="list-style-type: none"> <li>● Restricted air filter</li> <li>● Oil contaminated with fuel</li> <li>● Too many cold starts with vehicle subsequently not getting hot enough for long enough</li> <li>● Leaking fuel injectors</li> <li>● MAF sensor fault</li> <li>● High intake flow</li> <li>● Leaking evaporative emission system purge valve</li> </ul>	Check the condition of the air cleaner element: REFER to: <a href="#">Air Cleaner</a> (303-12A Intake Air Distribution and Filtering - I6 3.2L Petrol, Removal and Installation). Check engine the oil condition. Check for leaking injectors. Check for MAF sensor, injector and evaporative emission system DTCs.
P017400	System too lean (bank 2)	<ul style="list-style-type: none"> <li>● Intake air leak</li> <li>● Between MAF sensor and cylinder head</li> <li>● Fuel system restriction</li> <li>● MAF sensor fault</li> <li>● Low intake flow</li> <li>● Exhaust leak, before catalytic converter</li> </ul>	Check for intake air leaks. Check for low fuel pressure and MAF sensor DTCs. Rectify as necessary. Check for exhaust leaks before the catalytic converter
P017500	System too rich (bank 2)	<ul style="list-style-type: none"> <li>● Restricted air filter</li> <li>● Oil contaminated with fuel</li> <li>● Too many cold starts with vehicle subsequently not getting hot enough for long enough</li> <li>● Leaking fuel injectors</li> <li>● MAF sensor fault</li> <li>● High intake flow</li> <li>● Leaking evaporative emission system purge valve</li> </ul>	Check the condition of the air cleaner element: REFER to: <a href="#">Air Cleaner</a> (303-12A Intake Air Distribution and Filtering - I6 3.2L Petrol, Removal and Installation). Check engine the oil condition. Check for leaking injectors. Check for MAF sensor, injector and evaporative emission system DTCs.

DTC	Description	Possible Causes	Action
P050600	Idle air control system RPM lower than expected	<ul style="list-style-type: none"> <li>● Intake air restriction</li> <li>● Restricted/Contaminated injector/fuel system</li> <li>● Accessory drive overload (defective/seized component)</li> <li>● Variable intake system (VIS) fault</li> <li>● Throttle body fault</li> </ul>	Check the intake air system, air cleaner, etc. Check the fuel system for restriction/contamination. Check the accessory drive driven components for excessive resistance to turning/seizure. Rectify as necessary. Check for DTCs indicating a VIS or throttle body fault.
P050700	Idle air control system RPM higher than expected	<ul style="list-style-type: none"> <li>● Intake air leakage</li> <li>● Variable intake system (VIS) fault</li> <li>● Throttle body fault</li> </ul>	Check the intake air system for leakage. Rectify as necessary. Check for DTCs indicating a VIS or throttle body fault.
P050B00	Cold start ignition timing performance	<ul style="list-style-type: none"> <li>● Blocked intake system</li> <li>● Sticking/slow throttle</li> <li>● Poor engine condition</li> </ul>	Check the intake air system, including the air cleaner element. Carry out a complete vehicle read for related DTCs. Rectify as necessary.
P061A00	Internal control module torque performance	<ul style="list-style-type: none"> <li>● Air leakage in the intake system after the MAF sensor and throttle body</li> <li>● Throttle body fault</li> <li>● Mass air flow (MAF) sensor fault</li> <li>● Engine coolant temperature (ECT) sensor fault</li> <li>● Flywheel sensor fault</li> <li>● Manifold air pressure (MAP) sensor fault</li> <li>● Camshaft reset valve fault</li> <li>● Variable valve timing (VVT) fault</li> <li>● ECM fault</li> </ul>	Retrieve the flight recorder data and customer statement for return to engineering for analysis. Check the intake system for leakage. Check for DTCs indicating a throttle body, sensor or VVT fault. Rectify as necessary. Refer to the warranty policy and procedures manual if a module is suspect.
P061A62	Internal control module torque performance - signal compare failure	<ul style="list-style-type: none"> <li>● Air leakage in the intake system after the MAF sensor and throttle body</li> <li>● Throttle body fault</li> <li>● Mass air flow (MAF) sensor fault</li> <li>● Engine coolant temperature (ECT) sensor fault</li> <li>● Flywheel sensor fault</li> <li>● Manifold air pressure (MAP) sensor fault</li> <li>● Camshaft reset valve fault</li> <li>● Variable valve timing (VVT) fault</li> <li>● ECM fault</li> </ul>	Retrieve the flight recorder data and customer statement for return to engineering for analysis. Check the intake system for leakage. Check for DTCs indicating a throttle body, sensor or VVT fault. Rectify as necessary. Refer to the warranty policy and procedures manual if a module is suspect.
P061B64	Internal control module torque performance - signal plausibility failure	<ul style="list-style-type: none"> <li>● Air leakage in the intake system after the MAF sensor and throttle body</li> <li>● Throttle body fault</li> <li>● Mass air flow (MAF) sensor fault</li> <li>● Engine coolant temperature (ECT) sensor fault</li> <li>● Flywheel sensor fault</li> <li>● Manifold air pressure (MAP) sensor fault</li> <li>● Camshaft reset valve fault</li> <li>● Variable valve timing (VVT) fault</li> <li>● ECM fault</li> </ul>	Retrieve the flight recorder data and customer statement for return to engineering for analysis. Check the intake system for leakage. Check for DTCs indicating a throttle body, sensor or VVT fault. Rectify as necessary. Refer to the warranty policy and procedures manual if a module is suspect.
P222700	Barometric pressure circuit - range/performance	<ul style="list-style-type: none"> <li>● BARO sensor failure</li> <li>● the BARO sensor is internal to the ECM</li> </ul>	Refer to the warranty policy and procedures manual if a module is suspect.

DTC	Description	Possible Causes	Action
P222721	Barometric pressure circuit range/performance - signal amplitude less than minimum	<ul style="list-style-type: none"> <li>● BARO sensor failure</li> <li>● the BARO sensor is internal to the ECM</li> </ul>	Refer to the warranty policy and procedures manual if a module is suspect.
P222722	Barometric pressure circuit range/performance - signal amplitude greater than maximum	<ul style="list-style-type: none"> <li>● BARO sensor failure</li> <li>● the BARO sensor is internal to the ECM</li> </ul>	Refer to the warranty policy and procedures manual if a module is suspect.
P222800	Barometric pressure circuit low	<ul style="list-style-type: none"> <li>● BARO sensor failure</li> <li>● the BARO sensor is internal to the ECM</li> </ul>	Refer to the warranty policy and procedures manual if a module is suspect.
P222900	Barometric pressure circuit high	<ul style="list-style-type: none"> <li>● BARO sensor failure</li> <li>● the BARO sensor is internal to the ECM</li> </ul>	Refer to the warranty policy and procedures manual if a module is suspect.

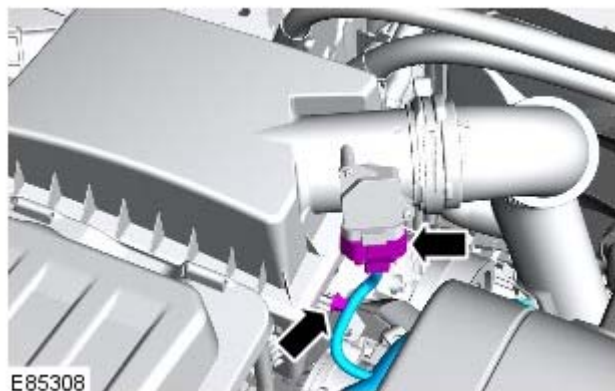
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## Intake Air Distribution and Filtering - I6 3.2L Petrol - Air Cleaner

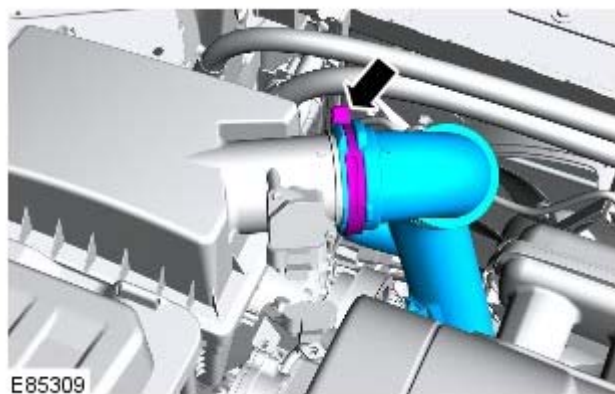
Removal and Installation

### Removal

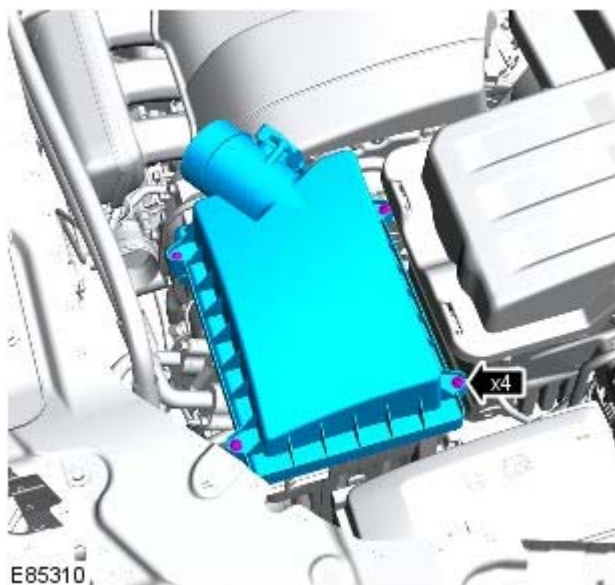
NOTE: Petrol model shown, diesel similar.



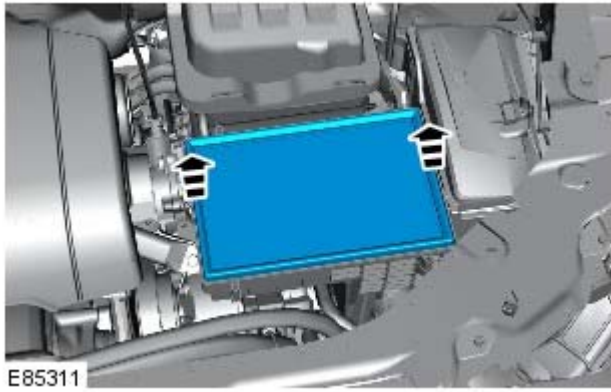
1.



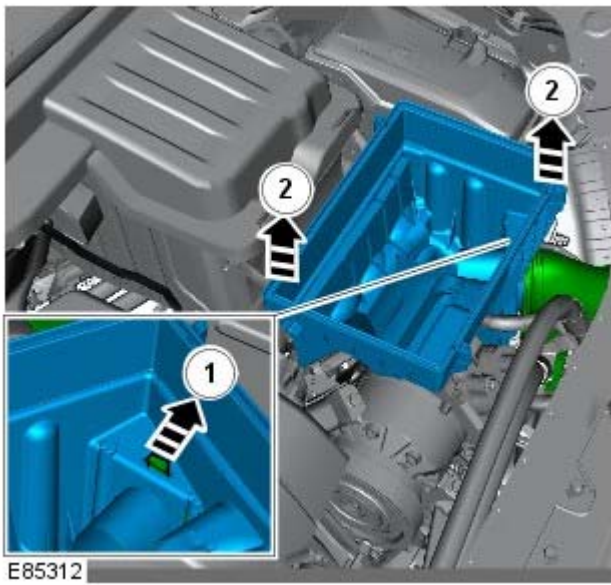
2.



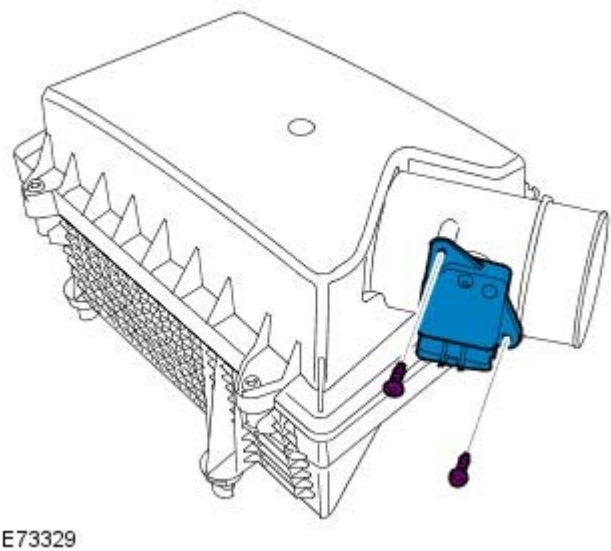
3.



4.



5. NOTE: Note the fitted position.



6. NOTE: Do not disassemble further if the component is removed for access only.

## Installation

1. Install the air cleaner element.
2. Install the MAF sensor.

3. NOTE: [Align to the position noted on removal.](#)

Install the air cleaner housing.

4. Install the air cleaner outlet pipes.

5. Connect the MAF sensor electrical connector.