

2016.0 F-TYPE (X152), 308-00

MANUAL TRANSMISSION/TRANSAXLE AND CLUTCH - GENERAL INFORMATION - VEHICLES WITH: 6S45 6-SPEED MANUAL TRANSMISSION RWD

DIAGNOSIS AND TESTING

PRINCIPLES OF OPERATION

For a detailed description of the Manual Transmission and Clutch, refer to the relevant Description and Operation section in the workshop manual. REFER to: Manual Transmission and Clutch (308-00, 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.

⚠ NOTES:

- If a control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component.
- When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.
- Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

1. Verify the customer concern

1. Visually inspect for obvious signs of damage and system integrity

Visual Inspection

MECHANICAL

- Manual transmission
- Selector lever
- Selector rod
- Clutch pedal
- Clutch pedal cover
- Clutch master cylinder
- Clutch hydraulic pipe
- Fluid leaks

1.If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step

1.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

1.Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required

SYMPTOM CHARTS

GEAR SHIFTING

SYMPTOM	POSSIBLE	ACTION
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	CAUSES	
Downshifting is difficult - Significant effort required to engage a gear	<ul style="list-style-type: none"> ▪ Gear synchronization is inadequate 	<ul style="list-style-type: none"> ▪ Check the integrity of the selector rod. Check for transmission fluid leaks. If a transmission fluid leakage is confirmed, refer to the 'Transmission Fluid Leakage' symptom chart below
Synchronizer crashing	<ul style="list-style-type: none"> ▪ Gear synchronization is inadequate 	<ul style="list-style-type: none"> ▪ Check the integrity of the selector rod. Check for transmission fluid leaks. If a transmission fluid leakage is confirmed, refer to the 'Transmission Fluid Leakage' symptom chart below
Gear jumps out of engagement while driving	<ul style="list-style-type: none"> ▪ Transmission internal failure 	<ul style="list-style-type: none"> ▪ Install a new transmission
Gear shifting is difficult between some or all gears	<ul style="list-style-type: none"> ▪ Selector rod seized ▪ Clutch not disengaging fully 	<ul style="list-style-type: none"> ▪ Check the integrity of the selector rod. Check for transmission fluid leaks. If a transmission fluid leakage is confirmed, refer to the 'Transmission Fluid Leakage' symptom chart below ▪ Check the clutch. GO to Pinpoint Test A.
Brief scratching or screeching noise during gear shifts	<ul style="list-style-type: none"> ▪ Gear synchronization is inadequate ▪ Clutch not disengaging fully 	<ul style="list-style-type: none"> ▪ Check the integrity of the selector rod. Check for transmission fluid leaks. If a transmission fluid leakage is confirmed, refer to the 'Transmission Fluid Leakage' symptom chart below ▪ Check the clutch. GO to Pinpoint Test A.

TRANSMISSION FLUID LEAKAGE

SYMPTOM	POSSIBLE CAUSES	ACTION

<p>Fluid leak from transmission housing</p>	<ul style="list-style-type: none"> ▪ Leak from the transmission breather - Fluid overfull ▪ Leak from the fill plug ▪ Leak from the drain plug ▪ Output shaft seal damaged ▪ Selector shaft seal damaged ▪ Crankshaft rear seal damaged ▪ Clutch hydraulic system leaking ▪ Input shaft seal damaged 	<ul style="list-style-type: none"> ▪ Check the transmission fluid level. Rectify as necessary ▪ Tighten the fill plug or install a new fill plug as necessary ▪ Tighten the drain plug or install a new drain plug as necessary ▪ Install a new output shaft seal and drive flange ▪ Install a new selector shaft seal ▪ Install a new crankshaft rear seal ▪ Check the clutch hydraulic system for leaks. GO to Pinpoint Test G. ▪ Install a new input shaft seal
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REVERSE SWITCH

SYMPTOM	POSSIBLE CAUSES	ACTION
<p>Reverse lamp and /or rear view camera does not operate when reverse gear is selected</p>	<ul style="list-style-type: none"> ▪ Reverse switch circuit short circuit to ground, short circuit to power, open circuit, high resistance 	<ul style="list-style-type: none"> ▪ Using the Jaguar Land Rover approved diagnostic equipment, check the body control module for related DTCs and refer to the relevant DTC index. Refer to the electrical circuit diagrams and check the reverse switch circuit for short circuit to ground, short circuit to power, open circuit, high resistance. Repair the wiring harness or install a new reverse switch as necessary

GENERAL CONCERNS


SYMPTOM	POSSIBLE CAUSES	ACTION
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Clicking noises in reverse gear	<ul style="list-style-type: none"> ▪ Gear wheel damaged 	<ul style="list-style-type: none"> ▪ Run the vehicle on wheels-free lift to establish the source of the noise. If the source is confirmed to be the transmission, install a new transmission
Gear wheels banging when shifting	<ul style="list-style-type: none"> ▪ Damaged clutch ▪ Transmission internal failure 	<ul style="list-style-type: none"> ▪ Check the clutch. GO to Pinpoint Test A. ▪ Install a new transmission
Noises in the forward gears	<ul style="list-style-type: none"> ▪ Transmission fluid leak ▪ The engine/transmission foul condition with the body/chassis ▪ Engine/transmission flange bolts loose ▪ Transmission input and output shaft bearings worn 	<ul style="list-style-type: none"> ▪ Check the transmission for fluid leaks. Rectify as necessary ▪ Check for a foul condition between the engine/transmission and the body /chassis. Check the integrity of the engine and transmission mountings. Rectify as necessary ▪ Check the integrity of the engine/transmission flange bolts. Rectify as necessary ▪ Install a new transmission
Gears jump out of engagement	<ul style="list-style-type: none"> ▪ Engine/transmission mounting loose/damaged ▪ Selector rod fault ▪ Transmission internal failure 	<ul style="list-style-type: none"> ▪ Check the integrity of the engine and transmission mountings. Rectify as necessary ▪ Check the integrity of the selector rod. Rectify as necessary ▪ Install a new transmission
One of the gears cannot be selected	<ul style="list-style-type: none"> ▪ Selector rod fault ▪ Transmission internal failure 	<ul style="list-style-type: none"> ▪ Check the integrity of the selector rod. Rectify as necessary ▪ Install a new transmission
Clattering, or		<ul style="list-style-type: none"> ▪ Check the integrity of the selector rod. Rectify as necessary

rattling noises	<ul style="list-style-type: none"> ▪ Selector rod loose /damaged/worn ▪ Selector lever joint worn ▪ Selector lever knob loose 	<ul style="list-style-type: none"> ▪ Check the integrity of the selector lever joint. Rectify as necessary ▪ Check the integrity of the selector lever knob. Rectify as necessary
Selector lever has excessive freeplay	<ul style="list-style-type: none"> ▪ Selector lever joint worn ▪ Selector rod loose /damaged/worn 	<ul style="list-style-type: none"> ▪ Check the integrity of the selector lever joint. Rectify as necessary ▪ Check the integrity of the selector rod. Rectify as necessary
Selector lever does not operate freely	<ul style="list-style-type: none"> ▪ Selector lever joint seized ▪ Selector rod damaged /worn ▪ Transmission internal failure 	<ul style="list-style-type: none"> ▪ Check the integrity of the selector lever joint. Rectify as necessary ▪ Check the integrity of the selector rod. Rectify as necessary ▪ Install new transmission

CLUTCH ISSUES

SYMPTOM	POSSIBLE CAUSES	ACTION
Clutch slippage	<ul style="list-style-type: none"> ▪ Clutch mechanical fault <ul style="list-style-type: none"> ▪ Clutch pedal freeplay excessive ▪ Clutch pedal sticking (not returning when released) ▪ Clutch cover assembly failure ▪ Clutch driven plate worn ▪ Clutch driven plate contaminated with oil 	<ul style="list-style-type: none"> ▪ GO to Pinpoint Test A. ▪ Install a new clutch assembly ▪ Allow the clutch temperature to return to normal and retest

	<ul style="list-style-type: none"> ▪ Flywheel damaged/worn ▪ Clutch worn excessively - Cover assembly adjuster ring set to the fully worn position ▪ Clutch temperature excessively high 	
Clutch chatter or shudder	<ul style="list-style-type: none"> ▪ Engine/transmission mounting loose/damaged ▪ Clutch driven plate contaminated with oil ▪ Clutch cover assembly failure ▪ Clutch driven plate worn/warped 	<div style="background-color: #e0f2f7; padding: 5px; border: 1px solid #ccc;"> <p> NOTES:</p> <ul style="list-style-type: none"> ▪ If a new clutch assembly is installed in the unreleased position, some clutch judder may be experienced. ▪ If a new clutch assembly is installed, the new unit should be bedded-in (this may be accomplished through 1 hour of in-town driving or similar). </div> <ul style="list-style-type: none"> ▪ GO to Pinpoint Test B.
Clutch drag	<ul style="list-style-type: none"> ▪ Clutch mechanical fault <ul style="list-style-type: none"> ▪ Clutch hydraulic fluid level low /leaking ▪ Clutch pedal freeplay excessive ▪ Clutch driven plate worn /warped ▪ Clutch driven plate not sliding freely on the transmission input shaft splines ▪ Clutch driven plate contaminated with oil 	<ul style="list-style-type: none"> ▪ GO to Pinpoint Test C. ▪ Check that the clutch pedal can move through its full range of travel

	<ul style="list-style-type: none"> ▪ Clutch pedal travel insufficient /obstructed 	
Clutch pedal pulsation	<ul style="list-style-type: none"> ▪ Clutch and brake pedal pivot shaft not correctly lubricated ▪ Clutch release bearing noisy or worn 	<div style="background-color: #e0f2f7; padding: 5px;">⚠ NOTES:</div> <ul style="list-style-type: none"> ▪ Some levels of vibration at higher engine speeds is normal. ▪ If a new clutch assembly is installed in the unreleased position, some clutch judder may be experienced. ▪ If a new clutch assembly is installed, the new unit should be bedded-in (this may be accomplished through 1 hour of in-town driving or similar). <ul style="list-style-type: none"> ▪ GO to Pinpoint Test D. ▪ Install a new clutch release bearing
Clutch pedal related vibrations	<ul style="list-style-type: none"> ▪ The engine/transmission foul condition with the body/chassis ▪ Accessory drive belt fault ▪ Flywheel bolts loose ▪ Flywheel worn/damaged ▪ Clutch cover assembly imbalance 	<div style="background-color: #e0f2f7; padding: 5px;">⚠ NOTES:</div> <ul style="list-style-type: none"> ▪ Some levels of vibration at higher engine speeds is normal. ▪ If a new clutch assembly is installed in the unreleased position, some clutch judder may be experienced. ▪ If a new clutch assembly is installed, the new unit should be bedded-in (this may be accomplished through 1 hour of in-town driving or similar).

		<ul style="list-style-type: none"> ▪ GO to Pinpoint Test E.
Gear shifting is difficult between some or all gears	<ul style="list-style-type: none"> ▪ Clutch hydraulic fluid level low /leaking ▪ Clutch pedal freeplay excessive ▪ Transmission internal failure 	<ul style="list-style-type: none"> ▪ GO to Pinpoint Test F.
Noise is heard from the driveshaft tunnel area	<ul style="list-style-type: none"> ▪ Acoustic shielding boot has become unseated from the body shell 	<ul style="list-style-type: none"> ▪ Check the integrity of the acoustic boot. Rectify as necessary
Fluid leakage	<ul style="list-style-type: none"> ▪ Clutch master cylinder leaking ▪ Clutch slave cylinder leaking ▪ Clutch hydraulic pipe leaking 	<ul style="list-style-type: none"> ▪ GO to Pinpoint Test G.

PINPOINT TESTS

PINPOINT TEST A : CLUTCH SLIPPAGE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: TEST CLUTCH SLIPPAGE	
	1 Chock the wheels and apply the parking brake
	2 Start the engine and engage 4th gear

	3 Increase the engine speed to approximately 2000 rpm
	4 Release clutch pedal slowly
	Does the engine stall when the clutch pedal is fully released? Yes Clutch performing normally No GO to A2 .
A2: TEST CLUTCH FOR CLEARING	
	1 Start the engine
	2 Fully depress the clutch pedal and partially engage reverse gear. Slowly release the clutch pedal until a grating noise is heard and then depress the clutch slowly until the grating stops
	3 Measure the distance between the clutch pedal and the vehicle floor
	Is the measurement between 25 mm and 45 mm? Yes GO to A3 . No Check the clutch cover assembly. GO to Pinpoint Test B.
A3: TEST FULL PEDAL TRAVEL	
	1 Measure the clutch pedal distance between from fully released and fully depressed
	Is the measurement between 140 mm and 150 mm? Yes GO to A4 . No Check clutch pedal for obstructions. Rectify as necessary
A4: TEST CLUTCH PEDAL	
	1 Check the clutch pedal shaft for lubrication

Is the clutch pedal shaft sufficiently lubricated?
Yes
Check the clutch cover assembly. GO to Pinpoint Test **B**.
No
Lubricate the clutch pedal shaft

 **NOTES:**

PINPOINT TEST B : CLUTCH CHATTER OR SHUDDER

TEST CONDITIONS

DETAILS/RESULTS/ACTIONS

B1: TEST CLUTCH CHATTER OR SHUDDER

- If a new clutch assembly is installed in the unreleased position, some clutch judder may be experienced.
- If a new clutch assembly is installed, the new unit should be bedded-in (this may be accomplished through 1 hour of in-town driving or similar).

- 1** Start the engine and engage 1st gear
- 2** Increase the engine speed to between 1200 and 1500 rpm
- 3** Release clutch pedal slowly

Does the vehicle jerk when it starts off?

Yes

GO to **B2** .

No

Clutch performing normally

B2: TEST ENGINE/TRANSMISSION MOUNTINGS

1 Check the integrity of the engine and transmission mountings

Are the engine/transmission mountings loose or damaged?

Yes

Tighten the bolts or install new engine/transmission mountings as necessary. Test the system for normal operation

No

[GO to B3 .](#)

B3: TEST CLUTCH COVER ASSEMBLY

1 Remove the clutch cover assembly

Does the clutch cover assembly have signs of wear or damage?

Yes

Install a new clutch assembly

No

[GO to B4 .](#)

B4: TEST CLUTCH DRIVEN PLATE

1 Check the clutch driven plate

Is the clutch driven plate oil-fouled or does it have burn marks?

Yes

Install a new clutch assembly

No

Check the flywheel

 NOTE:

PINPOINT TEST C : CLUTCH DRAG

TEST CONDITIONS

DETAILS/RESULTS/ACTIONS

C1: CHECK BRAKE FLUID LEVEL

The clutch hydraulic system is supplied with fluid from the brake fluid reservoir.

1 Check the brake fluid level

Is the brake fluid level between the MAX and MIN marks on the brake fluid reservoir?

Yes

[GO to C2](#) .

No

Fill brake fluid. Check the brake and clutch hydraulic systems for leaks. Test system for normal operation

C2: TEST CLUTCH PEDAL FREE TRAVEL

1 Operate clutch pedal manually to the point of resistance and release

2 Measure the clutch pedal freeplay (the distance between fully released and the point of resistance)

Is the measured dimension less than 15 mm?

Yes

Install a new clutch assembly. Test the system for normal operation

No

Check the clutch cover assembly. GO to Pinpoint Test [B](#).

 **NOTES:**

- If a new clutch assembly is installed in the unreleased position, some clutch judder may be experienced.
- If a new clutch assembly is installed, the new unit should be bedded-in (this may be accomplished through 1 hour of in-town driving or similar).

PINPOINT TEST D : CLUTCH PEDAL PULSATION

TEST CONDITIONS

DETAILS/RESULTS/ACTIONS

D1: TEST CLUTCH PEDAL

1 Check the clutch pedal shaft for lubrication

Is the clutch pedal shaft sufficiently lubricated?

Yes

Check the flywheel

No

Lubricate the clutch pedal shaft. Test the system for normal operation

 **NOTES:**

- If a new clutch assembly is installed in the unreleased position, some clutch judder may be experienced.
- If a new clutch assembly is installed, the new unit should be bedded-in (this may be accomplished through 1 hour of in-town driving or similar).

PINPOINT TEST E : CLUTCH RELATED VIBRATIONS

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E1: CHECK FOR ENGINE COMPONENT GROUNDING	
	1 Raise and support the vehicle
	2 Check the engine mountings for grounding on the body frame
	3 Check the exhaust manifold or other engine component grounding on the body or frame
	Is there evidence of grounding on body or frame? Yes Repair or install new components as necessary. Test the system for normal operation No GO to E2 .
E2: CHECK FOR ACCESSORY DRIVE VIBRATIONS	
	1 Feel accessory vibration at clutch engage/disengage when engine torque changes
	2 Disconnect the accessory drive belt and check for vibration
	Does the vibration stop when the accessory drive belt has been removed from the engine? Yes Repair or install new accessory drive belt components as necessary No GO to E3 .

E3: CHECK FOR RELEASE BEARING NOISE

1 Start the engine

2 Depress and hold the clutch pedal

Is a whirring, grating or grinding noise present?

Yes

Install a new clutch assembly. Test the system for normal operation

No

GO to E4 .

E4: INSPECT FLYWHEEL

1 Remove the transmission

2 Check for loose flywheel bolts

Is the flywheel installed correctly?

Yes

Diagnose engine vibration concern

No

If flywheel bolts are loose, they will need to be removed, the threads cleaned of oil and the bolts replaced with new fixings. If the flywheel is damaged, install a new flywheel. Test the system for normal operation

NOTE:

The clutch hydraulic system is supplied with fluid from the brake fluid reservoir.

PINPOINT TEST F : HARD SHIFTING

TEST CONDITIONS

DETAILS/RESULTS/ACTIONS

F1: CHECK FLUID LEVEL

1 Check the brake fluid level

Is the fluid within the MAX and MIN level marks?

Yes

Test clutch pedal free travel, GO to Pinpoint Test **C**.

No

Fill brake fluid. Check the brake and clutch hydraulic systems for leaks. Test system for normal operation

PINPOINT TEST G : FLUID LEAKAGE

TEST CONDITIONS

DETAILS/RESULTS/ACTIONS

G1: INSPECT CLUTCH MASTER CYLINDER

1 Inspect the clutch master cylinder for leakage

Is the clutch master cylinder OK?

Yes

GO to G2 .

No

Install a new clutch master cylinder

G2: INSPECT SYSTEM HYDRAULIC TUBES

1 Inspect the clutch hydraulic tubes for loose or damaged fittings causing leakage

Are the clutch hydraulic tubes OK?

Yes

Carry out road test to verify customer complaint

No

Install new components as necessary. Carry out road test

DTC INDEX

For a list of Diagnostic Trouble Codes (DTCs) that could be logged on this vehicle, please refer to Section 100-00.

2016.0 F-TYPE (X152), 308-00

MANUAL TRANSMISSION/TRANSAXLE AND CLUTCH - GENERAL INFORMATION - VEHICLES WITH: 6S45 6-SPEED MANUAL TRANSMISSION RWD

CLUTCH SYSTEM BLEEDING (G1822839)

GENERAL PROCEDURES

33.15.01	CLUTCH HYDRAULIC SYSTEM - BLEED	ALL DERIVATIVES	0.3	USED WITHINS
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GENERAL EQUIPMENT

EQUIPMENT NAME

Brake/clutch system pressure bleeder/filler

DRAINING

 **WARNING:**

Do not allow dirt or foreign liquids to enter the reservoir. Use only new brake fluid of the correct specification from airtight containers. Do not mix brands of brake fluid as they may not be compatible.

 **CAUTIONS:**

- Make sure that the brake fluid level does not drop below the MIN mark.
- The pressure bleeder must not exceed 2 bar.

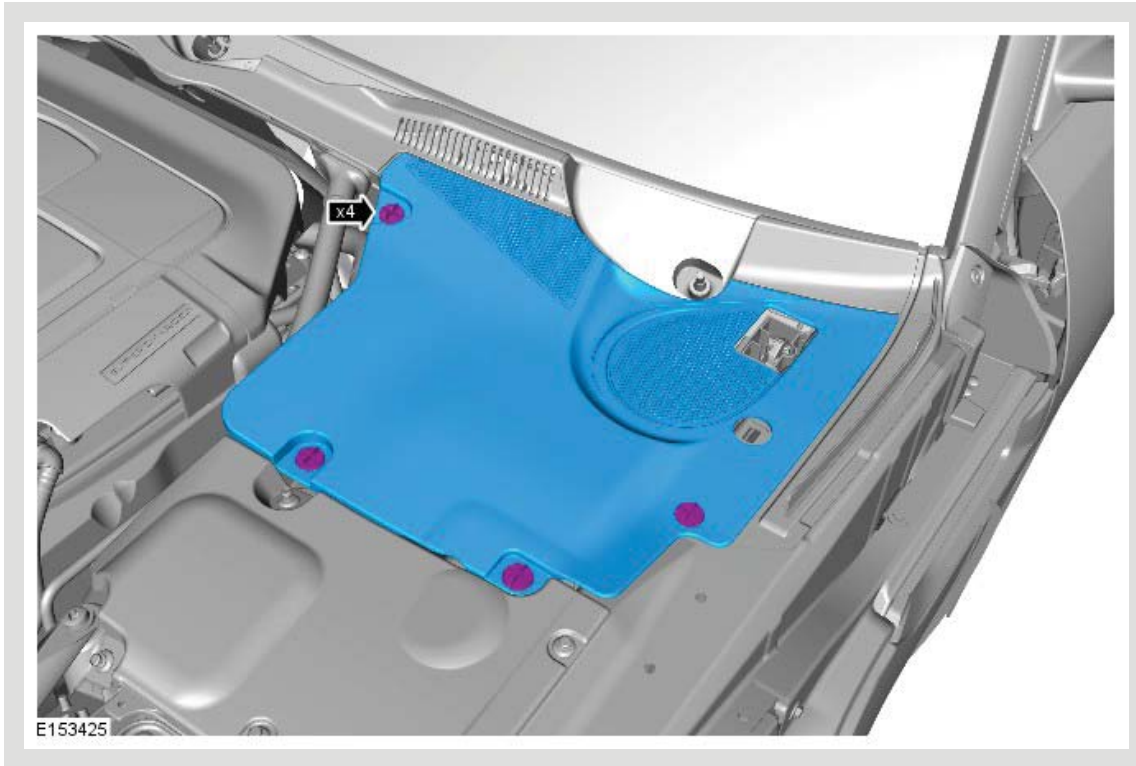
 **NOTE:**

Some variation in the illustrations may occur, but the essential information is always correct.

1.

 **NOTE:**

LHD vehicles.

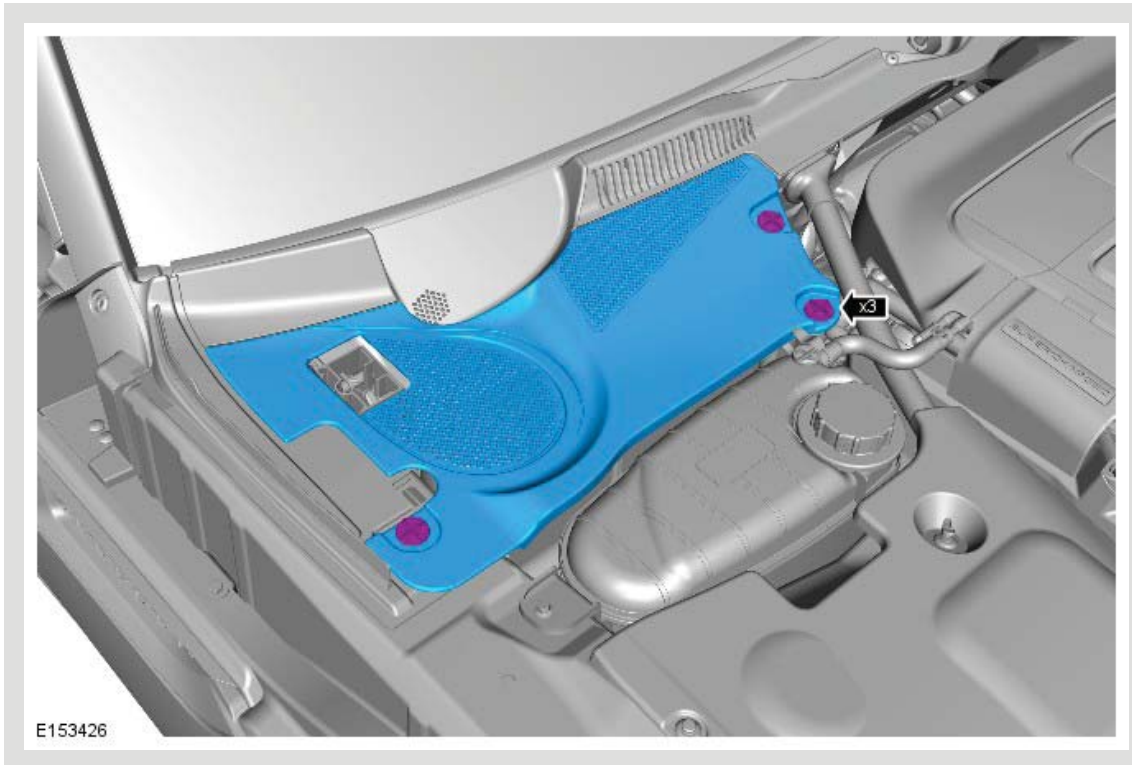


Remove the cowl vent screen.

2.

 **NOTE:**

RHD vehicles.



Remove the cowl vent screen.

3. Remove the engine cover.

Refer to: [Engine Cover](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).

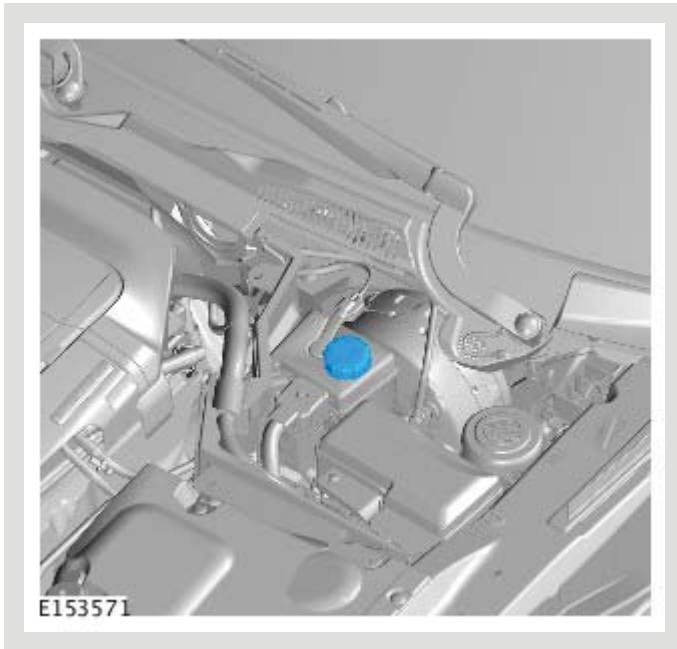
4.

 **WARNING:**

Do not allow dirt or foreign liquids to enter the reservoir. Use only new brake fluid of the correct specification from airtight containers. Do not mix brands of brake fluid as they may not be compatible.

 **NOTE:**

Left illustration shown, Right is similar.



Remove the brake fluid reservoir cap.

5.

⚠ CAUTION:

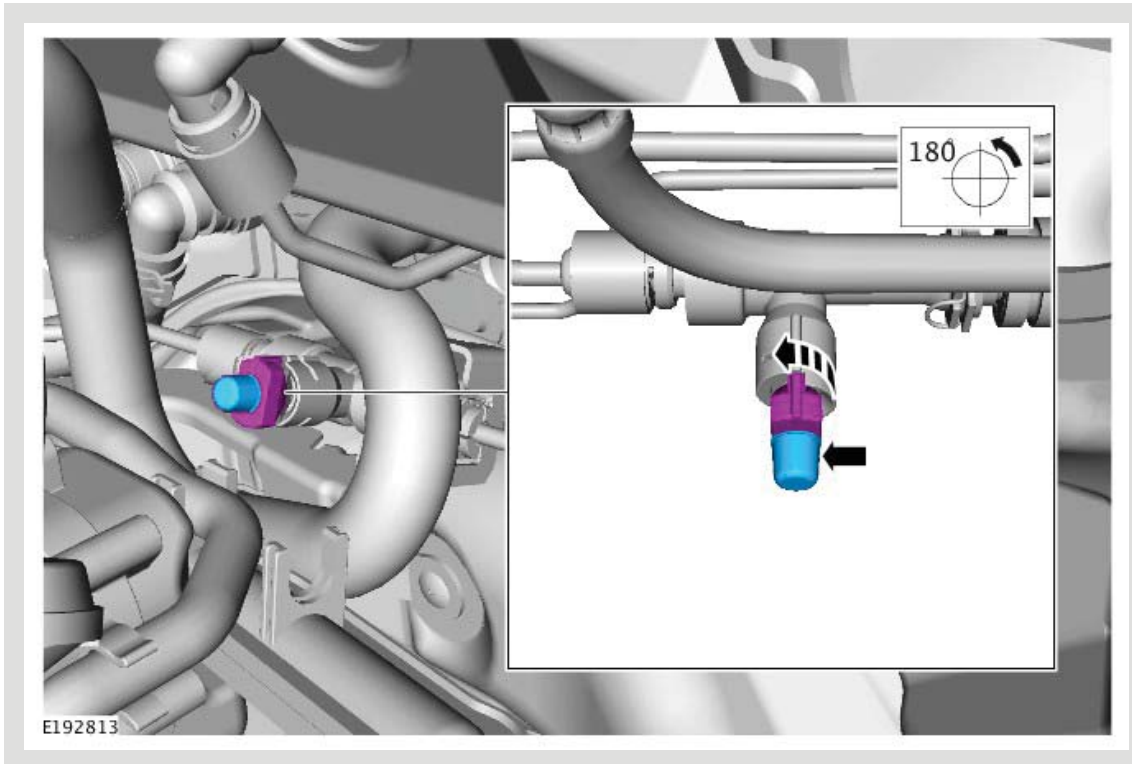
The brake fluid reservoir must remain full with new, clean brake fluid at all times during bleeding.



Fill the brake fluid reservoir to the MAX mark.

6. Connect the Jaguar approved pressure bleeding tool to the master cylinder reservoir.
General Equipment: [Brake/clutch system pressure bleeder/filler](#)

- 7.

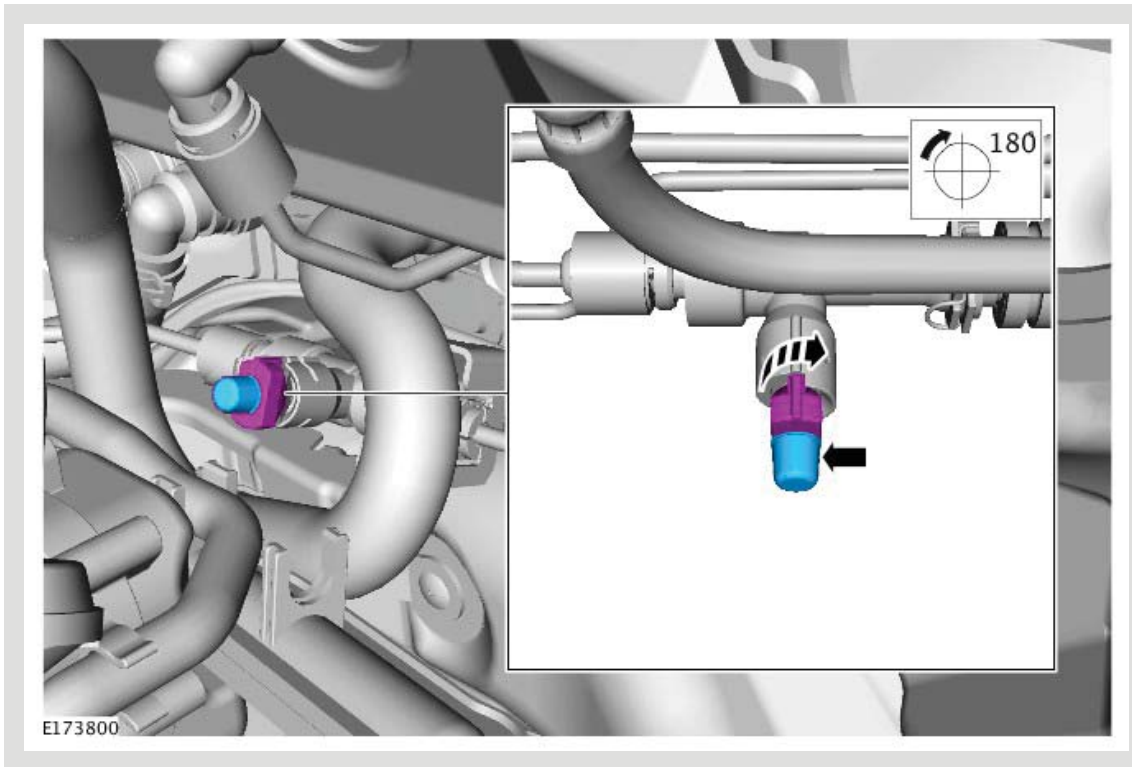


1. Attach the clear bleed tube to the clutch bleed port and immerse the free end of the bleed tube in a bleed jar containing a small quantity of approved brake fluid.
1. Open clutch bleed port.

8.

⚠ CAUTION:

The brake fluid reservoir must remain full with new, clean brake fluid at all times during bleeding.



1. Switch on the Jaguar approved pressure bleeding tool until a steady flow of clean air free fluid is running from the bleed point.

1. Close the clutch bleed port.

9. Before disconnecting or removing the components, make sure the area around the joint faces and connections are clean and dry. Plug open connections to prevent contamination.

10.

ⓘ CAUTION:

Make sure the clutch bleed port cap is installed after bleeding. This will prevent contamination with dirt or foreign liquids.

Disconnect the Jaguar approved pressure bleeding tool from the master cylinder reservoir.

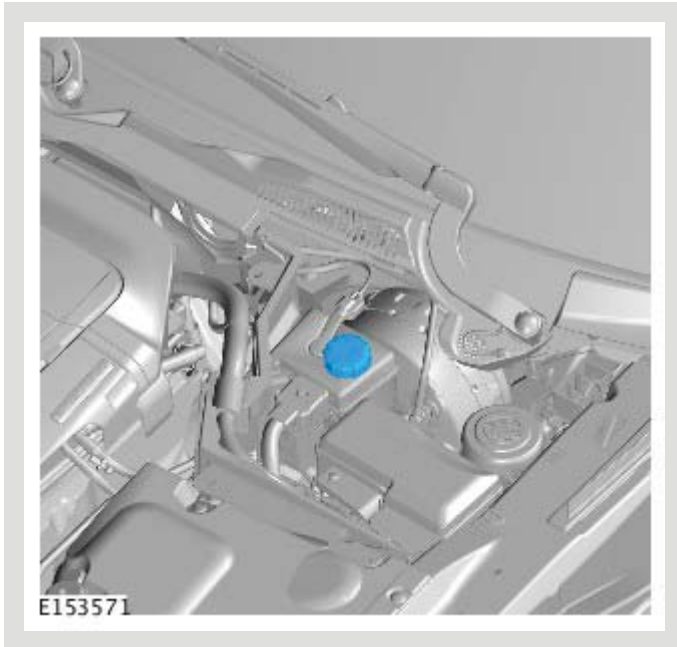
General Equipment: [Brake/clutch system pressure bleeder/filler](#)

11.



Fill the brake fluid reservoir to the MAX mark.

12.



Install the brake fluid reservoir cap.

13.

⚠ WARNING:

After carrying out repairs, the clutch system must be checked visually for leaks. Failure to follow these instructions may result in personal injury.

Operate the clutch pedal and check for leaks.

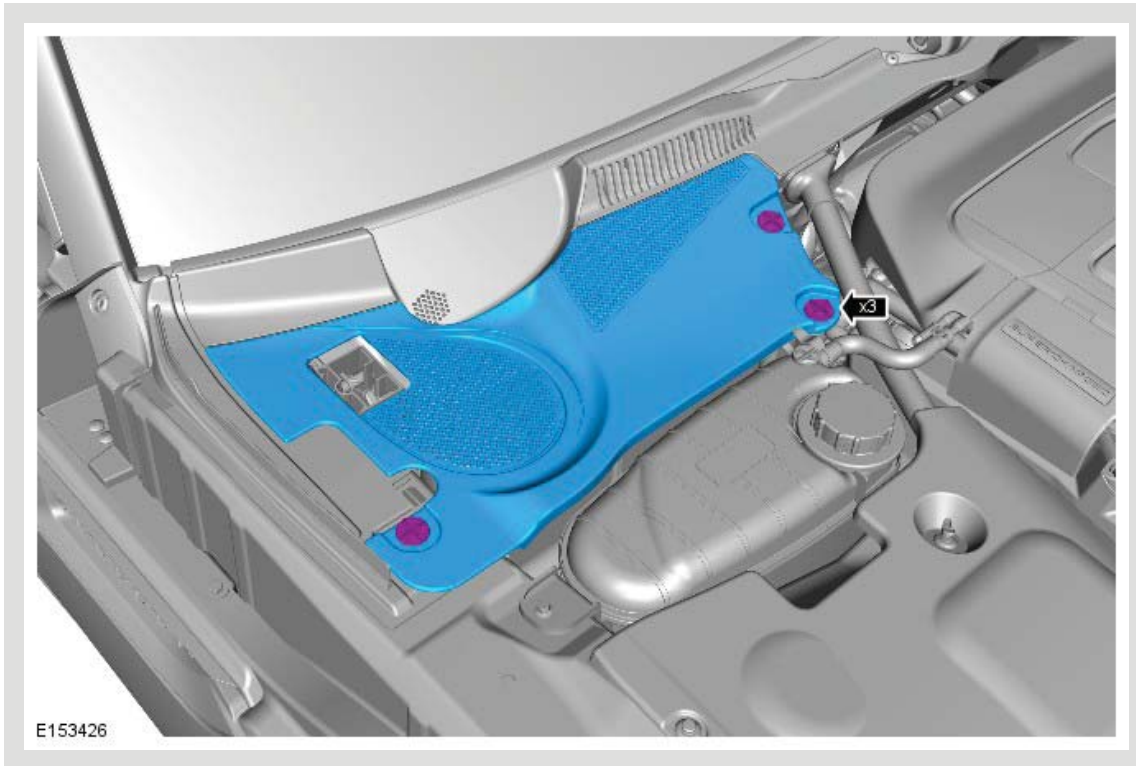
14. Install the engine cover.

Refer to: [Engine Cover](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).

15.

 **NOTE:**

RHD vehicles.

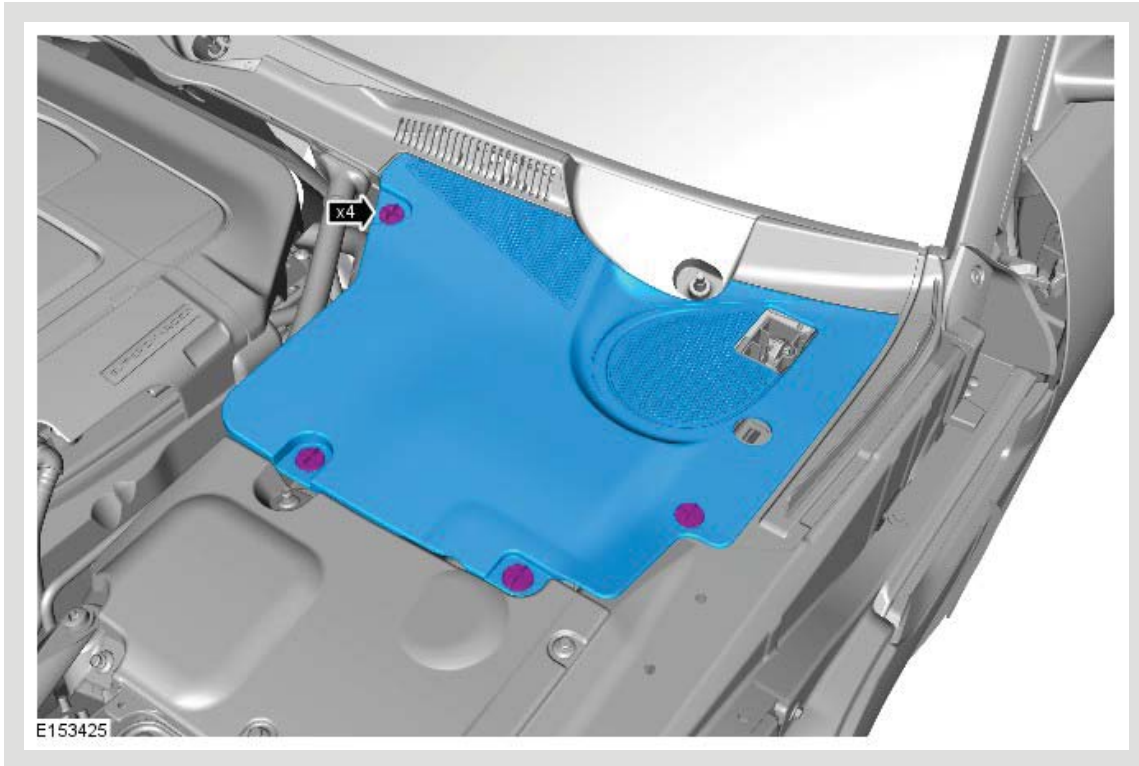


Install the cowl vent screen.

16.

 **NOTE:**

LHD vehicles.



Install the cowl vent screen.