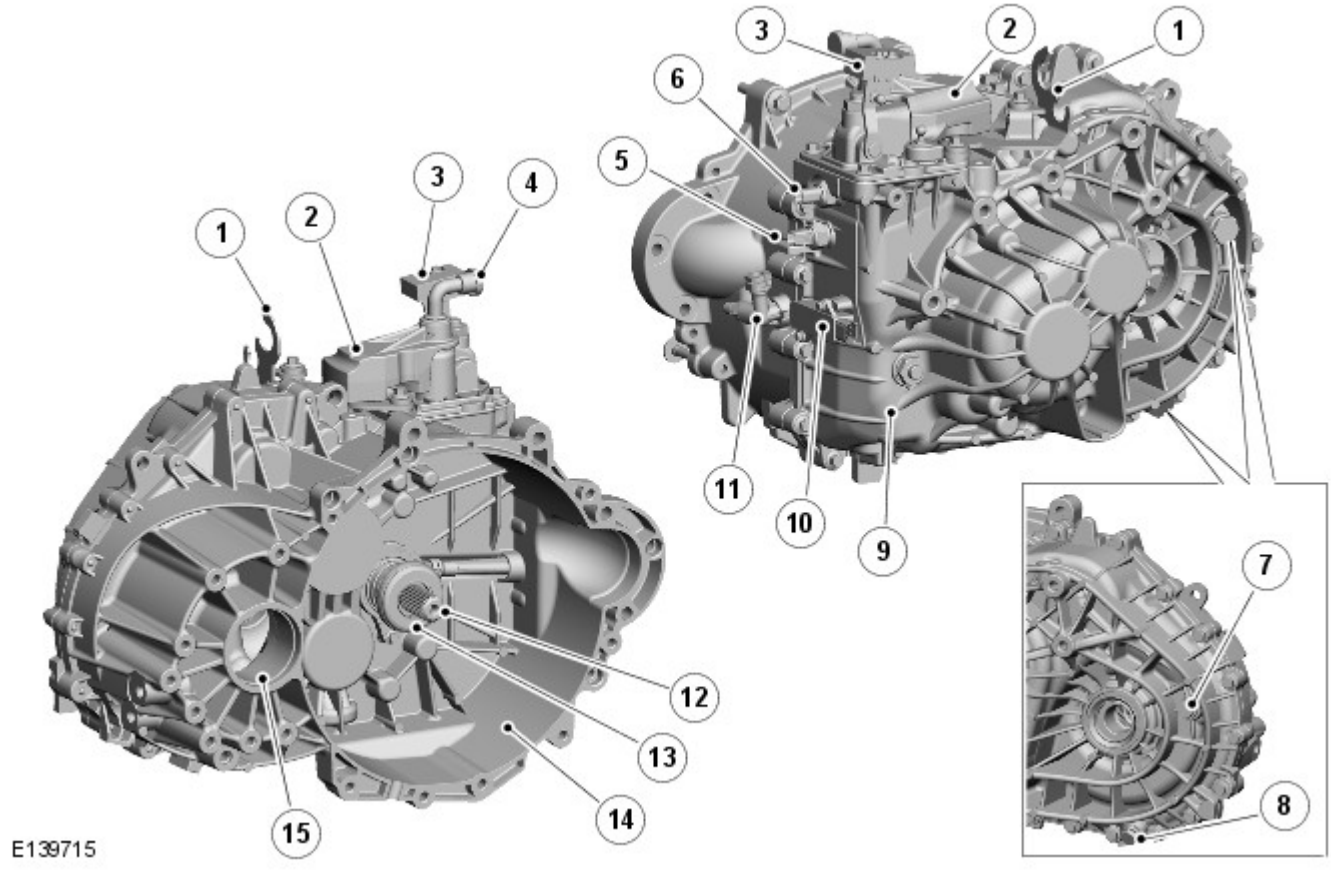
A permanent magnet, linear contactless displacement sensor is located on the exterior of the transmission casing and hardwired to the ECM (engine control module). The sensor's function is to detect that neutral gear has been selected within a calibrated window.
Refer to: Starting System - AWD (303-06A Starting System - TD4 2.2L Diesel, Description and Operation).

## Component Description

### DESCRIPTION

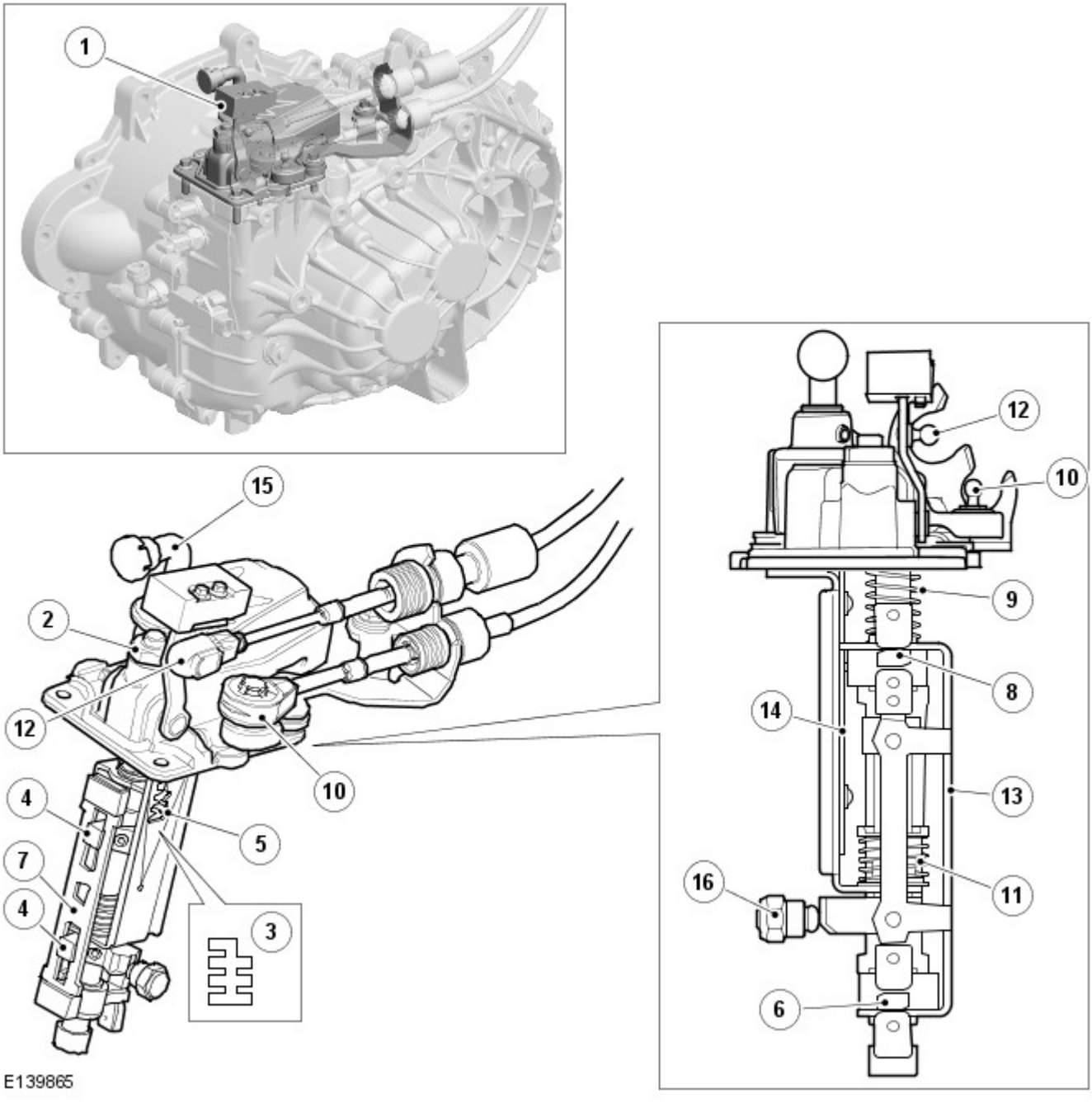
For shift cable and selector lever description refer to External Controls.
Refer to: External Controls (308-06 Manual Transmission/Transaxle External Controls, Description and Operation).

#### Transmission




| Item | Description |
|---|---|
| 1 | Cable retaining bracket |
| 2 | Longitudinal lever |
| 3 | Lateral lever |
| 4 | Breather |
| 5 | 1st gear detection switch |
| 6 | Reverse detection switch |
| 7 | Transmission oil level/filler plug |
| 8 | Transmission drain plug |
| 9 | Transmission casing |
| 10 | Neutral gear sensor |
| 11 | Hydraulic clutch bleed adaptor |
| 12 | Input shaft |
| 13 | Clutch slave cylinder |
| 14 | Clutch housing |
| 15 | Differential output (RH side) |

Shift Control Mechanism




| Item | Description |
|---|---|
| 1 | Shift control mechanism |
| 2 | Ball limiter 5th - 6th gear control |
| 3 | Gearshift gate |
| 4 | Flange |
| 5 | Gear shift gate pin |
| 6 | Lower gear selector |
| 7 | Gear selector rod |
| 8 | Upper gear selector |
| 9 | Spring |
| 10 | Longitudinal lever |
| 11 | Spring |
| 12 | Lateral lever |
| 13 | Catch plate |
| 14 | Carrier plate |
| 15 | Breather |
| 16 | Ball limiter for gear selector |

The transmission is operated by two shift cables which are attached to the selector lever. Movement of the selector lever is passed via the cables to two lever mechanisms on the top of the transmission. The levers operate a shift control

mechanism within the transmission to select the requested gear ratio.

The shift control mechanism is located at the front of the transmission and transfers the shift cable movement into gear selections.

The shift control mechanism is a one-piece assembly which is retained in the transmission housing with 4 bolts. The shift control mechanism moves the upper and lower gear selector forks via the lateral and longitudinal levers on the top of the shift control mechanism. There are 2 upper selector forks and 2 lower selector forks as follows:

- The 2 upper gear selector forks are used to engage reverse, 1st or 2nd gears
- The 2 lower gear selector forks are used to engage 3rd, 4th, 5th and 6th gears.

The 4 selector forks transfer movement from the shift control mechanism to the relevant shift coupling sleeve. The shift forks are mounted in bearings in the transmission case.

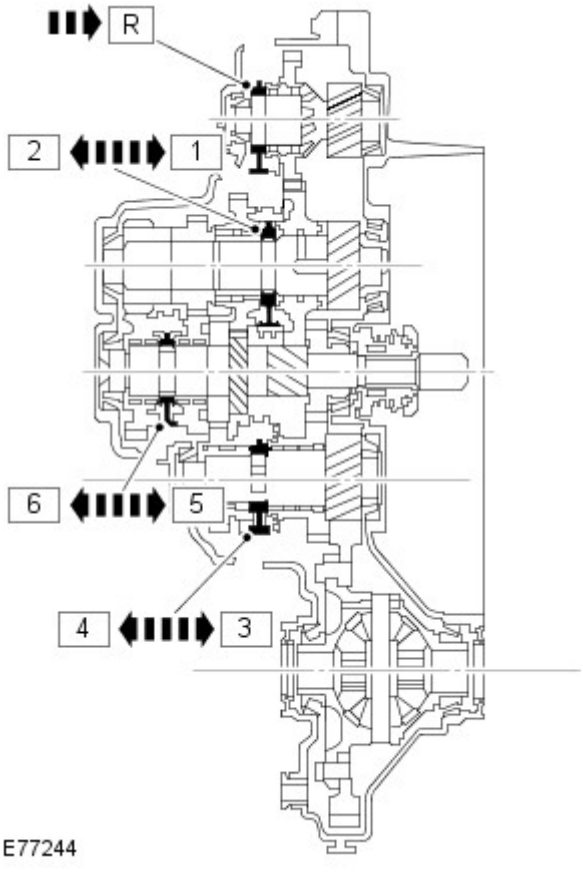
Two carrier plates transfer torque from the longitudinal lever to the sliding gear selectors. The carriers are located and run in a groove in the gear selector plate.

The carrier plates can move vertically between 4 positions. The different gears are selected from one of the 4 positions as follows:

- Uppermost position - gear selector selects reverse gear
- Second uppermost position - gear selector selects 1st and 2nd gears
- Second lowest position - gear selector selects 5th and 6th gears
- Lowest position - gear selector selects 3rd and 4th gears.

The shift control mechanism has two springs that return the selector lever to the neutral position.

Transmission Shift Selector Shafts




The above illustration shows the coupling sleeves for each gear cluster. Movement of these sleeves as selected by the shift control mechanism, connect the required gear trains together to produce the required output ratio.

The coupling sleeve is part of the synchronizing hub assembly which also consists of a flange and the hub. Each synchronizing hub is joined to its shaft by splines and rotates with it. Idler wheels are fitted on both sides of each synchronizing hub. The idler wheels rotate freely on the shaft (with the exception of reverse gear). Each idler wheel is constantly engaged in its pinion. The synchronizing set is positioned between the synchronizing hub and the idler wheel.

The synchronizing units are positioned on the shafts in the transmission as follows:

- The synchronizing unit for 1st - 2nd gear is on the intermediate shaft 1st - 2nd, 5th - 6th
- The synchronizing unit for 3rd - 4th gear is on the intermediate shaft 3rd - 4th
- The synchronizing unit for 5th-6th gear is on the input shaft
- The synchronizing unit for reverse gear is on the reverse shaft.

The synchronizing rings expand when heated by the same amount as the components they are in contact with. As a result no safety margin is required to counter expansion. The idler wheels for single and double synchronization have no cones. An inner ring on the synchronizer unit performs this function instead.

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# Manual Transmission / Transaxle External Controls -

**Torque Specifications**

| Description | Nm | lb-ft | lb-in |
|---|---|---|---|
| Gearshift lever mechanism to support bracket bolts | 10 | 7 | - |
| Instrument panel bracket to body bolts | 25 | 18 | - |
| Gearshift cables grommet to body nuts | 7 | - | 62 |
| Gearshift linkage to transmission bolts | 24 | 18 | - |

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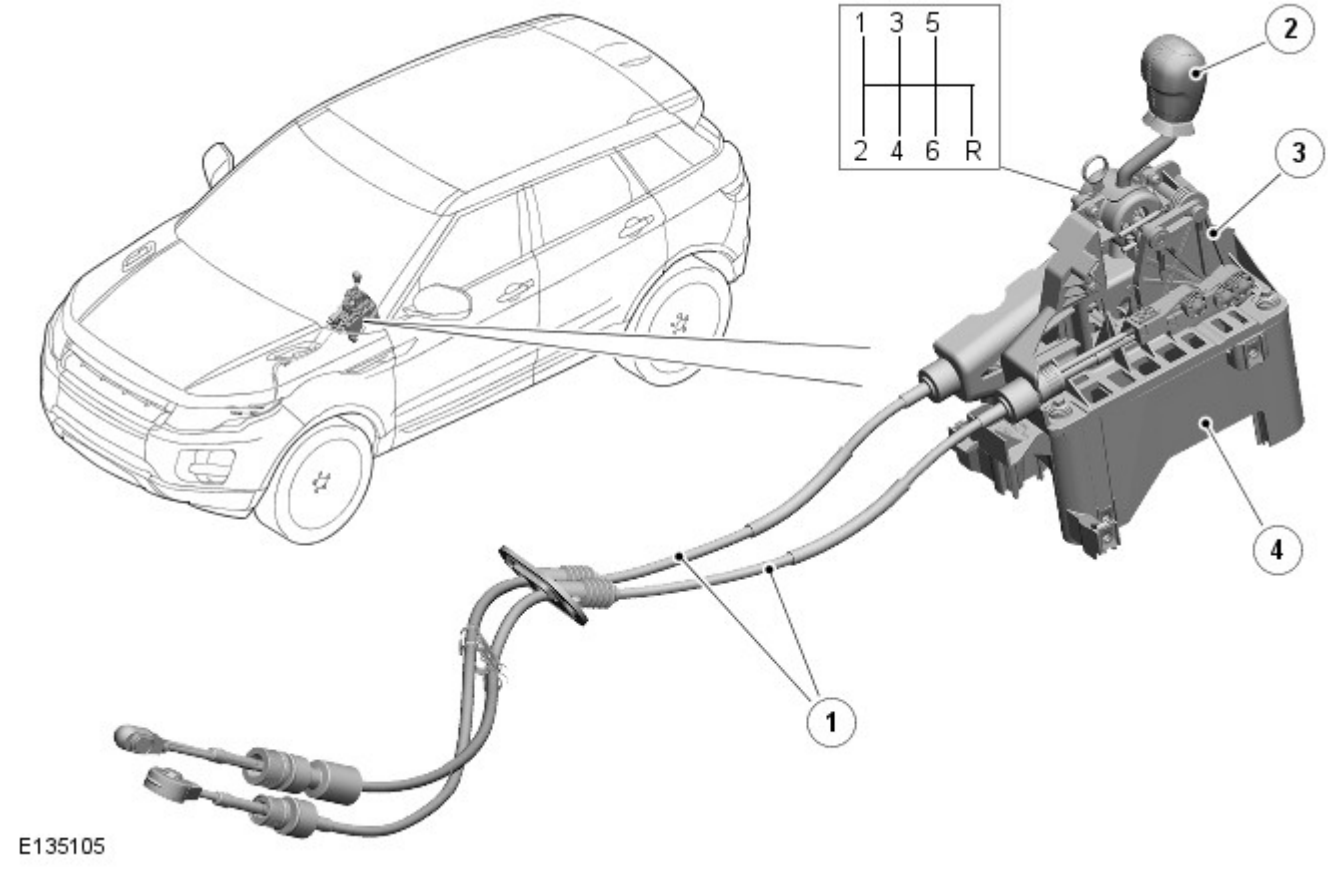
# Manual Transmission / Transaxle External Controls - External Controls - Component Location

Description and Operation

COMPONENT LOCATION




| Item | Description |
|---|---|
| 1 | Shift cables |
| 2 | Gear knob |
| 3 | Selector lever assembly |
| 4 | Selector lever mounting plate |

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# Manual Transmission / Transaxle External Controls - External Controls - Overview

Description and Operation

## OVERVIEW

The manual transmission external controls comprise a selector lever and two shift cables. The selector lever allows the driver to select 6 forward gears and reverse gear.

The selector lever assembly is located in a central position on the transmission tunnel, between the driver and passenger seat. The assembly is secured to the tunnel with four bolts. The selector lever assembly is a non-serviceable mechanical assembly.

Selections made using the selector lever are passed to the transmission lever arm by two shift cables. Ball pins on the selector lever provide for attachment of the shift cables.

The selector has a speed dependant solenoid interlock. This ensures that the driver cannot select reverse gear when the vehicle is moving forwards above a predetermined speed.

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# Manual Transmission / Transaxle External Controls - External Controls - System Operation and Component Description

Description and Operation

## System Operation

### OPERATION

Movement of the selector lever in a longitudinal direction pushes or pulls the transmission selector lever in the direction of the selected gear.

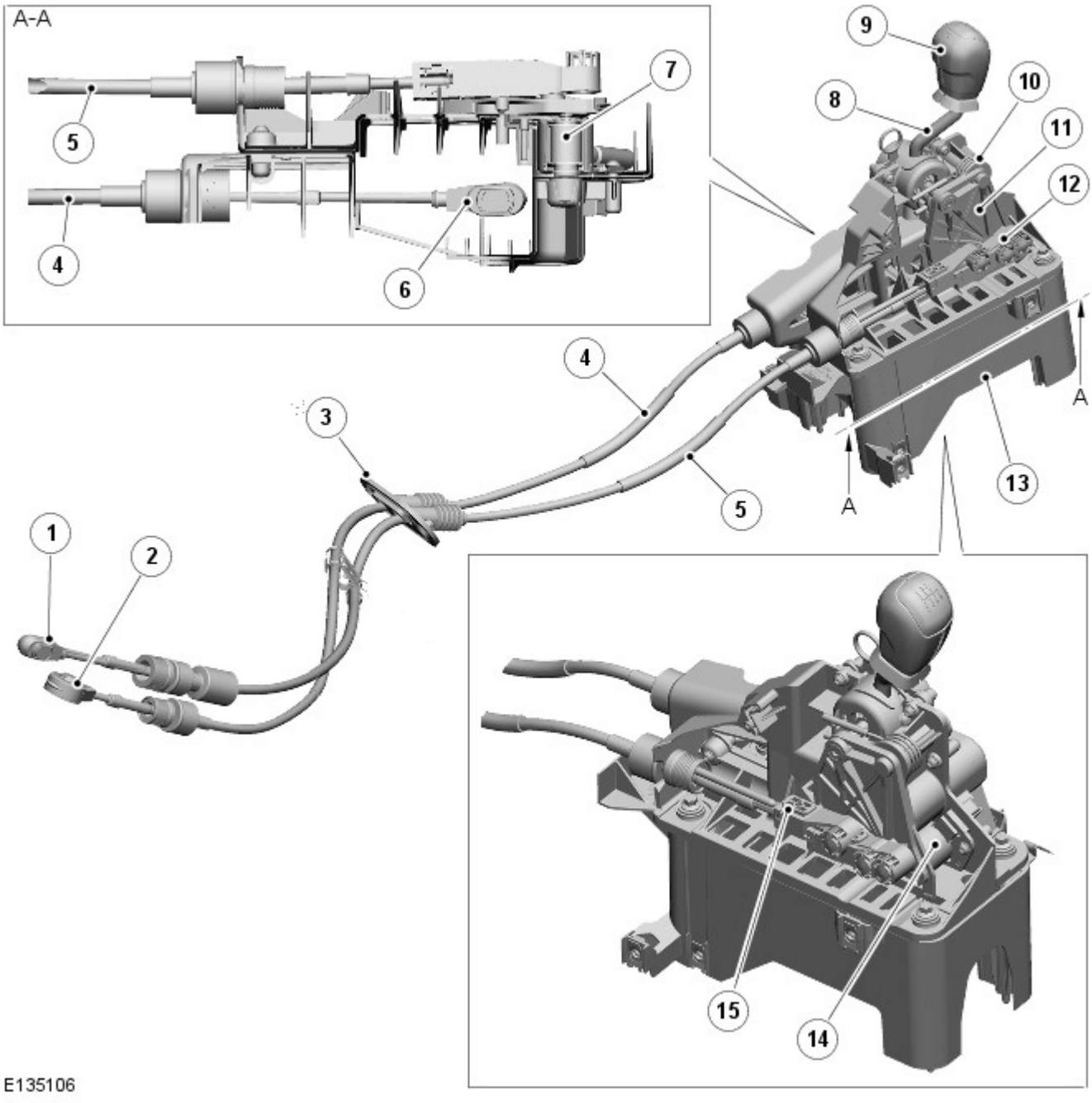
Movement of the lever in the lateral direction across the gate pushes or pulls the transmission selector lever to correspond to the gear selected.

Reverse gear is inhibited using a solenoid interlock located on the selector lever assembly. When the solenoid is energized, movement of the lever plate is restricted to prevent the reverse gear position from being accessed. The solenoid is activated at speeds in excess of 25 km/h (15 mph) to prevent inadvertent selection of reverse gear. The solenoid is deactivated at speeds below 15 km/h (9 mph). The CJB (central junction box) controls the solenoid operation using speed signals received on the high speed CAN (controller area network) bus from the ABS (anti-lock brake system) module.

## Component Description

### DESCRIPTION

Selector Lever and Shift Cables




| Item | Description |
|---|---|
| 1 | Lateral shift cable - transmission attachment |
| 2 | Longitudinal shift cable - transmission attachment |
| 3 | Bulkhead seal |
| 4 | Longitudinal shift cable |
| 5 | Lateral shift cable |
| 6 | Longitudinal cable attachment to selector lever ball end |
| 7 | Reverse interlock solenoid |
| 8 | Gear selector lever |
| 9 | Gear knob |
| 10 | Centering spring |
| 11 | Lever plate |
| 12 | Lateral cable attachment to lever plate ball end |
| 13 | Mounting plate |
| 14 | Reverse interlock solenoid |
| 15 | Lateral cable adjustment button |

The selector lever assembly is a plastic moulded construction. The lever is attached to a gimbal mechanism which allows easy movement in the lateral and longitudinal planes.

The lever has a ball end on its base to which the longitudinal cable is attached. This cable passes all longitudinal

movements of the lever to the transmission. A second ball end is attached at 90 degrees to the lever and engages with a centering spring. The centering spring returns the lever to a position between 3rd and 4th gears when neutral is selected.

The second ball end locates in a rotating lever plate. This plate is spring loaded and has a ball end for attachment of the lateral shift cable. The lever plate rotates with movements of the selector lever from side to side and passes lateral movements of the selector lever to the lateral shift cable.

The two shift cables have abutments which locate in the selector lever assembly and in brackets on the transmission. The lateral shift cable is adjustable at the cable ball end attachment. Both shift cables have eye ends which locate on ball ends on the transmission selector shift mechanism levers.

The lateral shift cable has an adjustment setting mechanism at the selector lever end. The purpose of the mechanism is to accommodate vehicle build tolerances. This ensures that the selector lever movements are correctly aligned with movements of the transmission selector lever. This is essential to ensure the correct operation of the selector mechanism. The longitudinal cable does not require any adjustment or setting.

### Cable Setting Procedure

The correct cable adjustment is achieved by use of a yellow adjustment button in the selector lever arm eye end of the lateral shift cable.

Ensure that the transmission is in neutral and release the yellow adjustment button. Allow the centering spring to center the selector lever in the lateral direction.

Once the cable is in the correct position, the yellow adjustment button can be pressed back into the locked position to engage with the serrated portion of the cable. Ensure that the selector lever is not moved before the button is pressed.

Check the cable for the correct setting by selecting 3rd gear and checking that the lateral movement of the selector feels symmetrical.

The cable should be reset whenever any part of the transmission selector has been disturbed or replaced, including the transmission, cables and selector lever assembly.

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# Manual Transmission / Transaxle External Controls - Gearshift Linkage

Removal and Installation

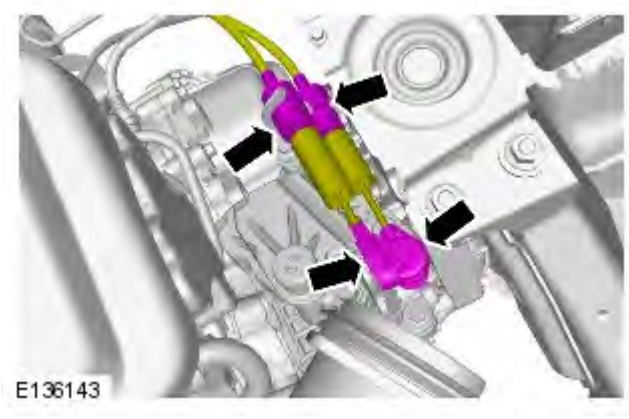
## Removal

NOTES:

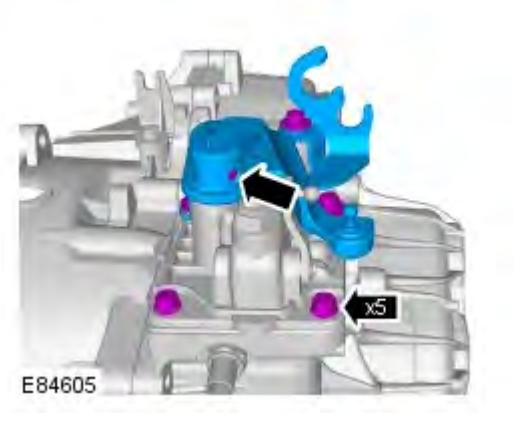
Removal steps in this procedure may contain installation details.

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

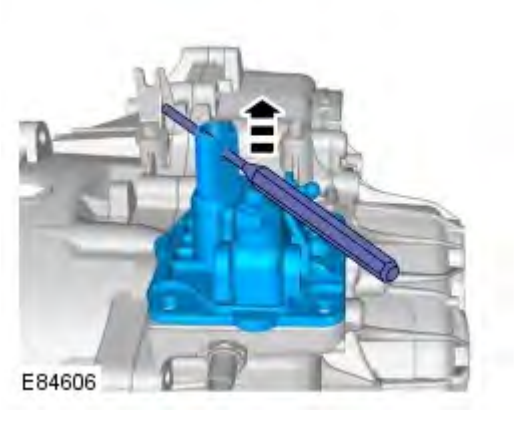
1. Refer to: Air Cleaner (303-12, Removal and Installation).




2.




3. *Torque:* 24 Nm




4.

## Installation

1. CAUTION: Make sure that the mating faces are clean and free of corrosion and foreign material.

   NOTE: Apply a suitable amount of approved sealant to one of the mating faces.

   To install, reverse the removal procedure.

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# Manual Transmission / Transaxle External Controls - Gearshift Lever

Removal and Installation

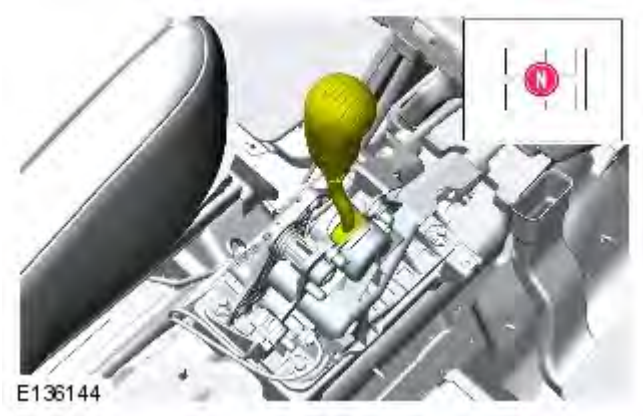
## Removal

NOTES:

Removal steps in this procedure may contain installation details.

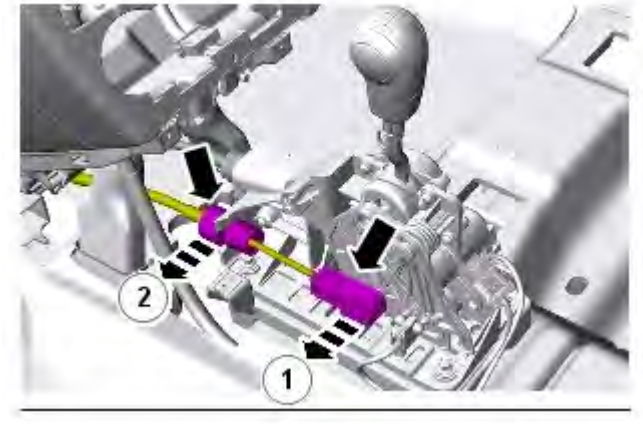
Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Floor Console (501-12 Instrument Panel and Console, Removal and Installation).

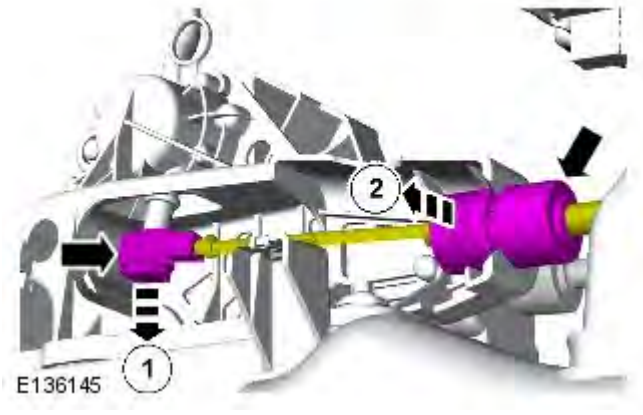


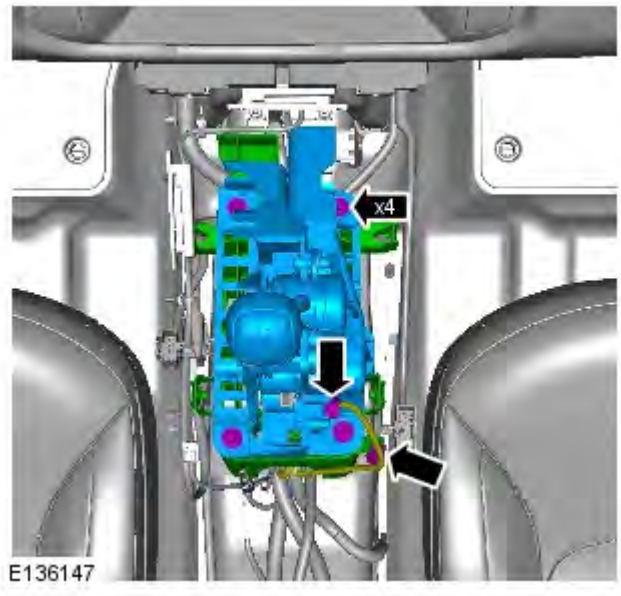

2. NOTE: Neutral must be selected before the cables are released to allow the cables to be correctly set on the install.

   Install the gear selector knob.




3.



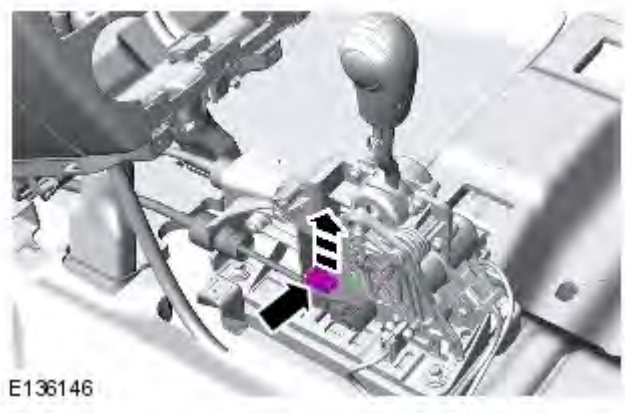



4. *Torque:* 10 Nm

5. Remove the gear selector knob.

## Installation

1. To install, reverse the removal procedure.




2.
- Release the LH cable securing clip.
- Allow the gearshift lever to come to rest in the neutral position.
- Secure the cable selector clip, without disturbing the gearshift selector lever position.

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# Manual Transmission / Transaxle External Controls - Gearshift Lever Knob

Removal and Installation

## Removal

NOTE: Removal steps in this procedure may contain installation details.


1. WARNING: The selector lever knob will be released suddenly, keep face clear during removal.

## Installation

1. To install, reverse the removal procedure.

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# Manual Transmission / Transaxle External Controls - Gearshift Cables

Removal and Installation

## Removal

NOTES:

Removal steps in this procedure may contain installation details.

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

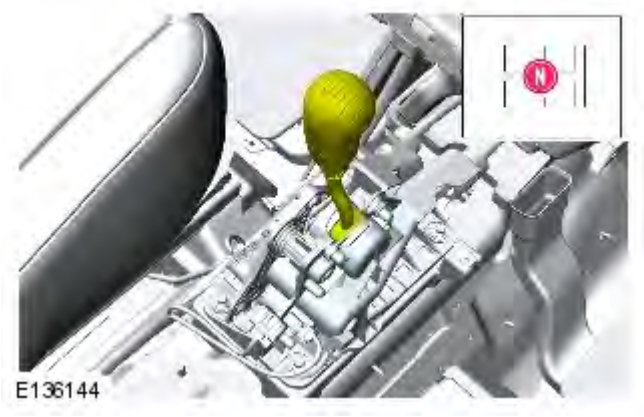
1. WARNING: Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

2. Refer to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).

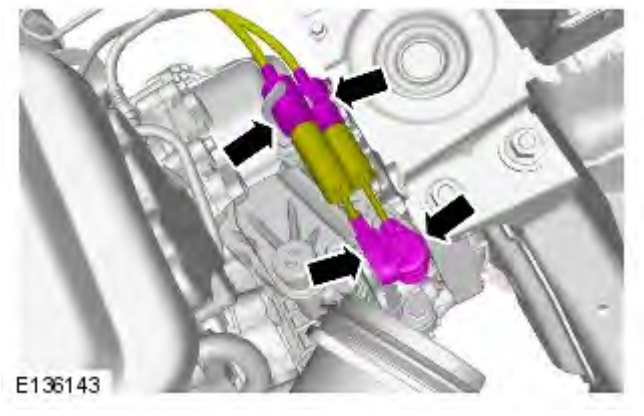
3. Refer to: Air Cleaner (303-12, Removal and Installation).

4. Refer to: Floor Console (501-12 Instrument Panel and Console, Removal and Installation).




5. NOTE: Neutral must be selected before the cables are released to allow the cables to be correctly set on the install.

   Install the gear selector knob.




6.