

Instrument Cluster -

Description	Nm	lb-ft
Steering column switch assembly	3	2

Instrument Cluster - Instrument Cluster

Description and Operation

OVERVIEW

A new instrument cluster is introduced where in addition to the larger speedometer and tachometer gauges the cluster also incorporates a Thin Film Transistor (TFT) 5" high-definition display unit.

Instrument cluster overview



E123742

Item	Part Number	Description
1	-	Tachometer
2	-	Clock
3	-	Message center
4	-	External temperature
5	-	Speedometer
6	-	Fuel gauge
7	-	Total distance odometer and trip recorder
8	-	Gear selector position display
9	-	Temperature gauge

The TFT display incorporates a 'Message Center' that communicates vehicle information and status data to the driver. Menus displayed in the message center allow access to a number of vehicle functions through the guidance of the message center menus. The driver operates the message center using the 'menu control' located on the right-hand-side of the steering wheel. Refer to the 'Information and Message Center' section for further information.

The instrument cluster features a number of warning indicators, where in addition to those located within the speedometer and tachometer gauges, another six indicators are positioned within the TFT unit above the message center.

DESCRIPTION

Warning Indicators – ROW Diesel Shown



E123743

Item	Part Number	Description
1	-	Automatic high beam active warning - green
2	-	Anti-lock Brake System (ABS) warning - amber
3	-	Brake system warning - amber
4	-	Brake system warning - red
5	-	Park brake system warning - red
6	-	Left-hand turn signal indicator - green
7	-	Warning/information - amber
8	-	Glow plug warning / Low fuel warning (dual function indicator) - amber
9	-	Check engine MIL warning - amber
10	-	Charge indicator - red
11	-	Oil pressure warning - red
12	-	Critical warning - red
13	-	Right-hand turn signal indicator - green
14	-	Side lamps - green
15	-	Seat belt warning - red
16	-	Adaptive Speed Control active - amber
17	-	Adaptive Front lighting System (AFS) warning - amber
18	-	Rear fog lamps active - amber
19	-	Tire pressure monitoring warning - amber
20	-	Speed control active - green
21	-	Ambient light sensor (reference only)
22	-	Forward alert active - green
23	-	Hill Descent Control (HDC) active - green
24	-	Airbag warning secondary - amber
25	-	Front fog lamps active - green
26	-	High beam warning - blue
27	-	Dynamic Stability Control (DSC) off warning - amber
28	-	Low range selected - green
29	-	Security Light Emitting Diode (LED) - red
30	-	Trailer warning - green
31	-	Dynamic Stability Control (DSC) active warning - amber

Warning Indicators - NAS Gasoline Shown



E123745

Item	Part Number	Description
1	-	Automatic high beam active warning - green
2	-	Anti-lock Brake System (ABS) warning - amber
3	-	Brake system warning USA only - amber/red
4	-	Brake system warning Canada only - amber/red
5	-	Park brake system warning Canada only - red
6	-	Park brake system warning USA only - red
7	-	Left-hand turn signal indicator - green
8	-	Warning/information - amber
9	-	Glow plug warning / Low fuel warning (dual function indicator) - amber
10	-	Check engine MIL warning - amber
11	-	Charge indicator - red
12	-	Oil pressure warning - red
13	-	Critical warning - red
14	-	Right-hand turn signal indicator - green
15	-	Side lamps - green
16	-	Seat belt warning - red
17	-	Adaptive Speed Control active - amber
18	-	Adaptive Front lighting System (AFS) warning - amber
19	-	Rear fog lamps active - amber
20	-	Tire pressure monitoring warning - amber
21	-	Speed control active - green
22	-	Ambient light sensor (reference only)
23	-	Forward alert active - green
24	-	Hill Descent Control (HDC) active - green
25	-	Airbag warning secondary - amber
26	-	Front fog lamps active - green
27	-	High beam warning - blue
28	-	Dynamic Stability Control (DSC) off warning - amber
29	-	Low range selected - green
30	-	Security Light Emitting Diode (LED) - red
31	-	Trailer warning - green
32	-	Dynamic Stability Control (DSC) active warning - amber

Stepper motors are used to actuate the mechanical speedometer and tachometer gauges to provide a smooth and progressive response.

The warning indicators above the message center are functioned using Thin Film Transistor (TFT) technology. LEDs are used to illuminate the warning indicators in the speedometer and tachometer gauges and provide backlight illumination of the instrument cluster.

A single ambient light sensor is used to measure cabin lighting and adjust the backlight brightness of the instrument cluster accordingly. The instrument cluster also incorporates an anti-glare coating.

When the vehicle is locked the TFT unit goes off. When the vehicle is unlocked, a welcome screen is displayed featuring a

Land Rover logo and an image of the vehicle, together with the current date and odometer information.

The coolant temperature and fuel quantity gauges are the default display when the stop/start button is pressed. These can be overwritten by different permutations of screens which are available to cover numerous vehicle functions through a menu selection. Refer to the 'Information and Message Center' section for further information.

Thin Film Transistor Display Unit



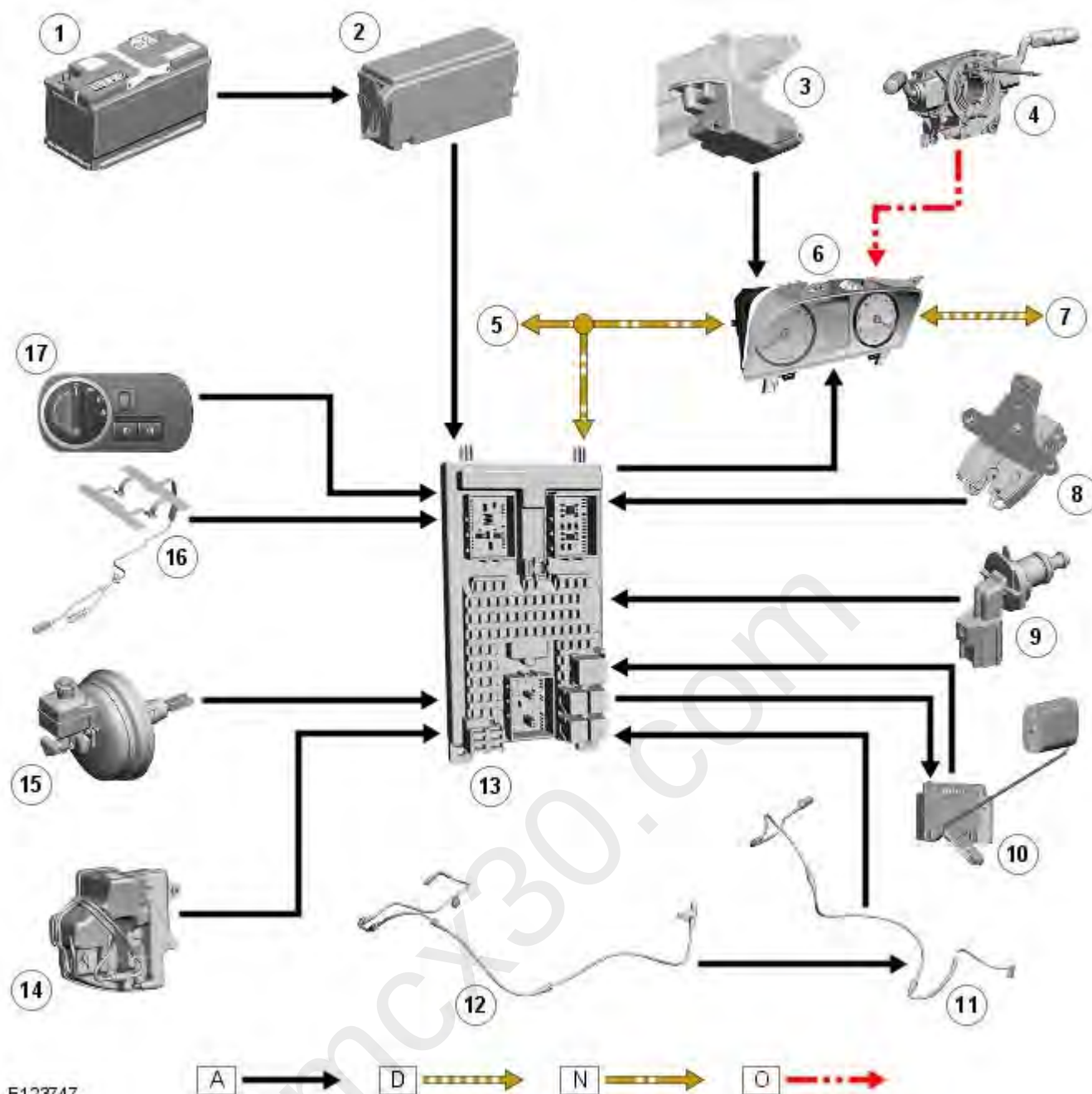
E123746

Item	Part Number	Description
1	-	Warning Indicators - this area cannot be overwritten by other information
2	-	Message Center - this area can be overwritten by other information
3	-	Gear Selection and Digital Speedometer Display - this area cannot be overwritten by other information

OPERATION

Control Diagram

- NOTE: A = Hardwired; D = High Speed CAN; N = Medium Speed CAN; O = LIN Bus;



Item	Part Number	Description
1	-	Battery
2	-	Battery Junction Box (BJB)
3	-	Steering-column-lock module
4	-	Clockspring
5	-	Medium-speed CAN bus connection to other vehicle systems
6	-	Instrument cluster
7	-	High-speed CAN bus connection to other vehicle systems
8	-	Tailgate ajar switch
9	-	Engine coolant level sensor
10	-	Fuel level sensor
11	-	Front brake-pad wear sensor
12	-	Rear brake-pad wear sensor
13	-	Central Junction Box (CJB)
14	-	Washer fluid level sensor
15	-	Brake fluid level sensor
16	-	Safety belt – occupant detection pressure sensor
17	-	Exterior light control switch

The instrument cluster receives a permanent fused supply from the Battery Junction Box (BJB).

The cluster is connected to other vehicle systems and control modules via the:

- medium speed CAN bus,
- high speed CAN bus and
- LIN bus connections

However, some vehicle sensors are hardwired directly to the instrument cluster.

The steering lock control module is connected to a hardwired connection to the instrument cluster. Security information from other control modules is passed via the network buses and when the conditions are correct the instrument cluster instructs the steering lock control module to unlock the steering column.

The clockspring is connected to the instrument cluster on a LIN bus connection. The LIN bus passes driver selections made on the steering wheel mounted switches to the instrument cluster for processing and transmission to other control modules.

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Instrument Cluster - Instrument Cluster

Diagnosis and Testing

Principles of Operation

For a detailed description of the instrument cluster system and operation, refer to the relevant Description and Operation section of the workshop manual. REFER to: [Instrument Cluster](#) (413-01 Instrument Cluster, 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 checked and/or the donor vehicle.

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

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

Visual Inspection

Electrical	
● Battery ● Fuses ● Wiring harness ● Damaged, loose or corroded connectors ● Controller Area Network (CAN) circuits ● Instrument Cluster (IPC) ● Central Junction Box (CJB) ● Engine Control Module (ECM)	

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, check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index.

DTC Index

For a list of Diagnostic Trouble Codes (DTCs) that could be logged on this vehicle, please refer to Section 100-00. REFER to: [Diagnostic Trouble Code \(DTC\) Index - DTC: Instrument Cluster \(IPC\)](#) (100-00 General Information, Description and Operation).

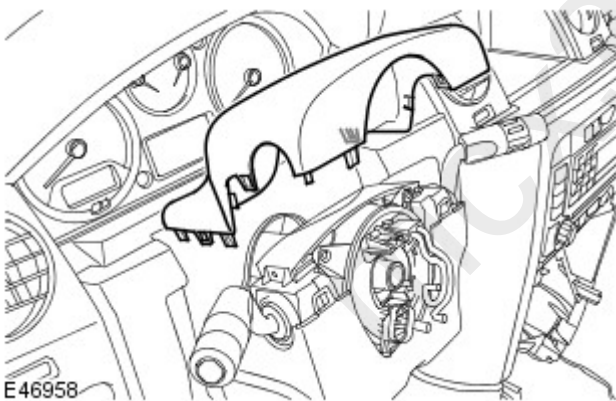
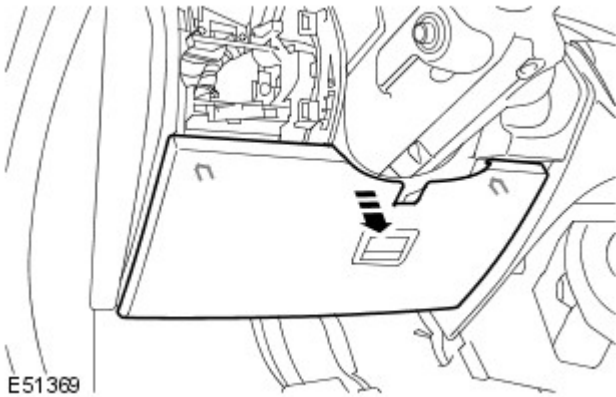
Instrument Cluster - Instrument Cluster

Removal and Installation

Removal

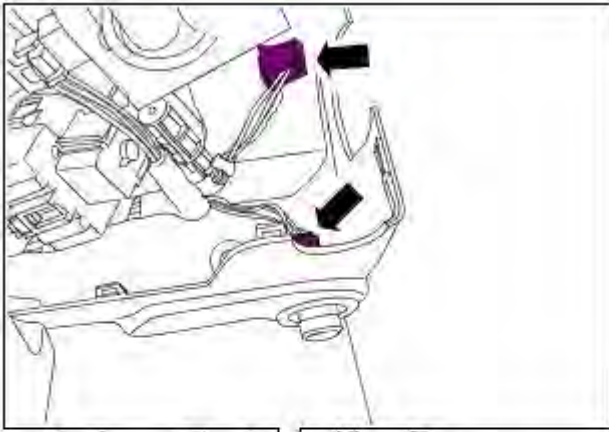
- NOTE: Some variation in the illustrations may occur, but the essential information is always correct.

1. Fully extend the steering column for access.
2. Disconnect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-01 Battery, Mounting and Cables, Specifications).
3. Remove the steering wheel.
For additional information, refer to: [Steering Wheel](#) (211-04 Steering Column, Removal and Installation).
4. Remove the driver side register trim panel.
For additional information, refer to: [Driver Side Register Trim Panel](#) (412-01 Air Distribution and Filtering, Removal and Installation).
5. Remove the instrument panel access panel.
 - Release the 2 clips.



7. Remove the steering column lower shroud.

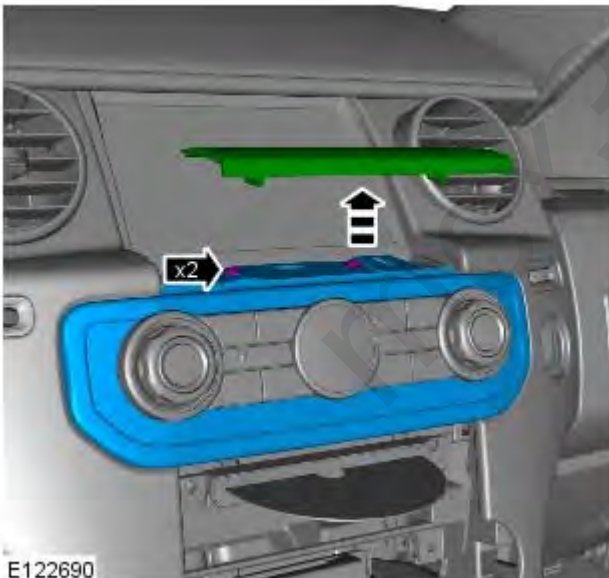
- Remove the 3 Torx screws.
- Disconnect the electrical connectors.



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8. Remove the audio unit control trim panel.

- Remove the 2 retaining screws.



E122690

9. NOTE: Remove in the sequence shown.

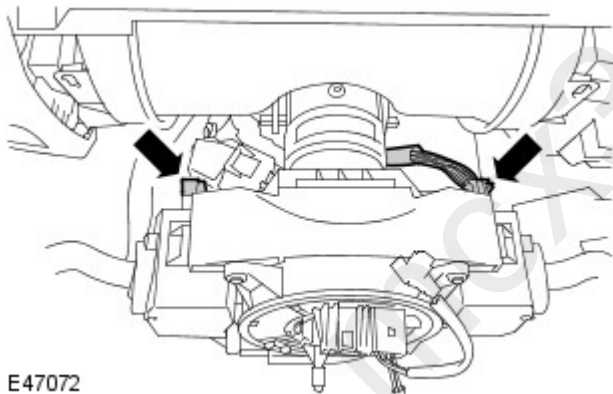
Remove the steering column side trim panel.

- Release the clips.
- Disconnect the electrical connector.



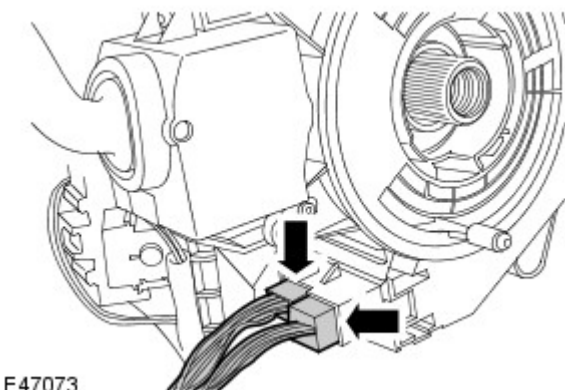
E122691

10. Disconnect the 2 electrical connectors from the steering column multifunction switches.



E47072

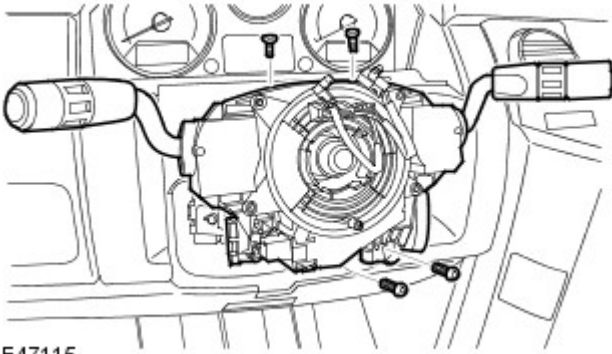
11. Disconnect the 2 electrical connectors from the clockspring.



E47073

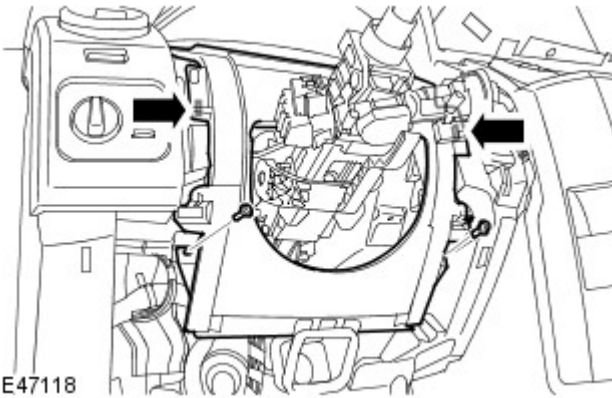
12. Remove the steering column switch assembly.

- Remove the 4 Torx bolts.



13. Remove the steering column gaiter panel.

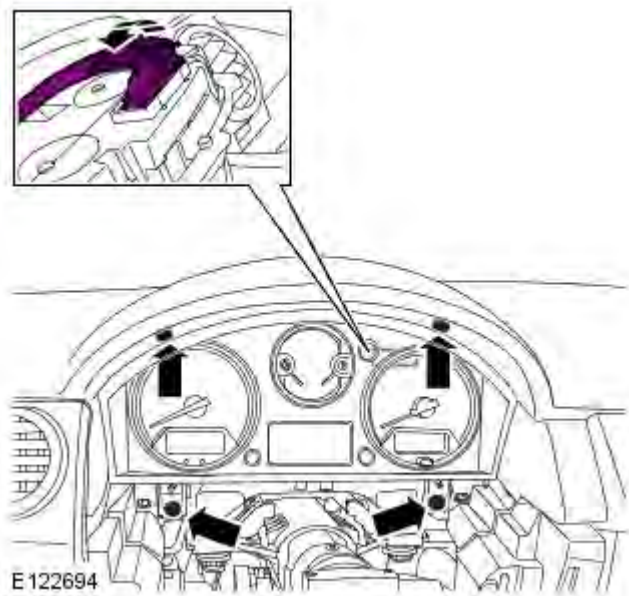
- Remove the 2 Torx screws.
- Release the 2 clips.



14. Remove the instrument cluster trim panel.

- Release the 2 clips.





15. Remove the instrument cluster.

- Remove the 2 Torx screws.
- Remove the 2 retaining screws.
- Disconnect the electrical connector.

Installation

1. Install the instrument cluster.

- Connect the electrical connector.
- Tighten the screws.

2. Install the instrument cluster trim panel.

- Secure the 2 clips.

3. Install the steering column gaiter panel.

- Secure with the clips.
- Tighten the Torx screws.

4. Install the steering column switch assembly.

- Tighten the Torx bolts to 3 Nm (2 lb.ft).

5. Connect the clockspring and multifunction switch electrical connectors.

6.  CAUTION: When installing the lower locating tang of the trim panel, make sure the floor console is not damaged. If necessary protect the surrounding areas using masking tape.

● **NOTE:** To install, reverse the removal sequence.

● **NOTE:** Make sure that all the clips are correctly installed.

Install the steering column side trim panel.

- Connect the electrical connector.
- Secure with the clip.

7. Install the audio unit control trim panel.

- Install the 2 retaining screws.

8. Install the steering column shrouds.

- Tighten the Torx screws.

9. Install the instrument panel access panel.

- Secure with the clips.

10. Install the driver side register trim panel.

For additional information, refer to: [Driver Side Register Trim Panel](#) (412-01 Air Distribution and Filtering, Removal and

Installation).

11. Install the steering wheel.

For additional information, refer to: [Steering Wheel](#) (211-04 Steering Column, Removal and Installation).

12. Connect the battery ground cable.

For additional information, refer to: [Specifications](#) (414-01 Battery, Mounting and Cables, Specifications).

13. Using the diagnostic tool, configure the instrument cluster.

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