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INSTRUMENT CLUSTER

INSTRUMENT PANEL CLUSTER (G2432057)

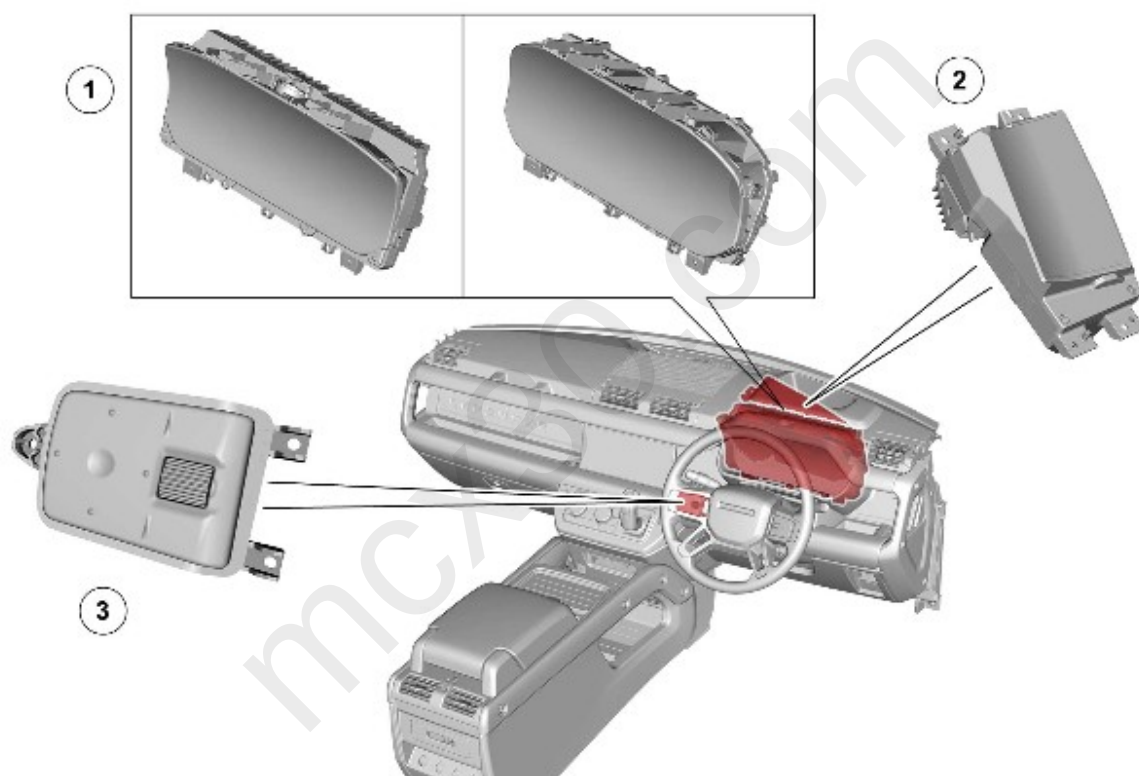
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COMPONENT LOCATION

COMPONENT LOCATION - 1 OF 1

 NOTE:

Right Hand Drive (RHD) vehicle is shown, Left Hand Drive (LHD) vehicle is similar.



E248375

ITEM	DESCRIPTION
1	Instrument Panel Cluster (IPC)
2	Head Up Display (HUD) (if equipped)
3	Left steering wheel switch

INSTRUMENT PANEL CLUSTER – CONVENTIONAL DISPLAY

The IPC conventional display comprises of 2 analog gauges for the speedometer and tachometer. A 7 inch Thin Film Transistor (TFT) message center provides driver information.

The speedometer is located on the left and the tachometer is located on the right of the IPC.

The speedometer is available in 2 market variants:

- Major scale miles per hour (mph)
- Major scale kilometers per hour (km/h).

The tachometer has 2 variants:

- Maximum of 7,000 Revolutions Per Minute (RPM) for petrol variants
- Maximum of 5,000 RPM for diesel variants.

The IPC has 4 market variants.

INSTRUMENT PANEL CLUSTER – VIRTUAL DISPLAY

The IPC is a 12.3 inch High Definition (HD) TFT display.

The IPC is designed to look similar to a conventional IPC for the main display. The display can be continually reconfigured to prioritize and refine the information presented to the driver. All displays are virtual gauges with the speedometer and the tachometer being the dominant features of the display.

HEAD UP DISPLAY (IF EQUIPPED)

The HUD is a transparent display that presents data without the driver requiring to look away from their viewpoint.

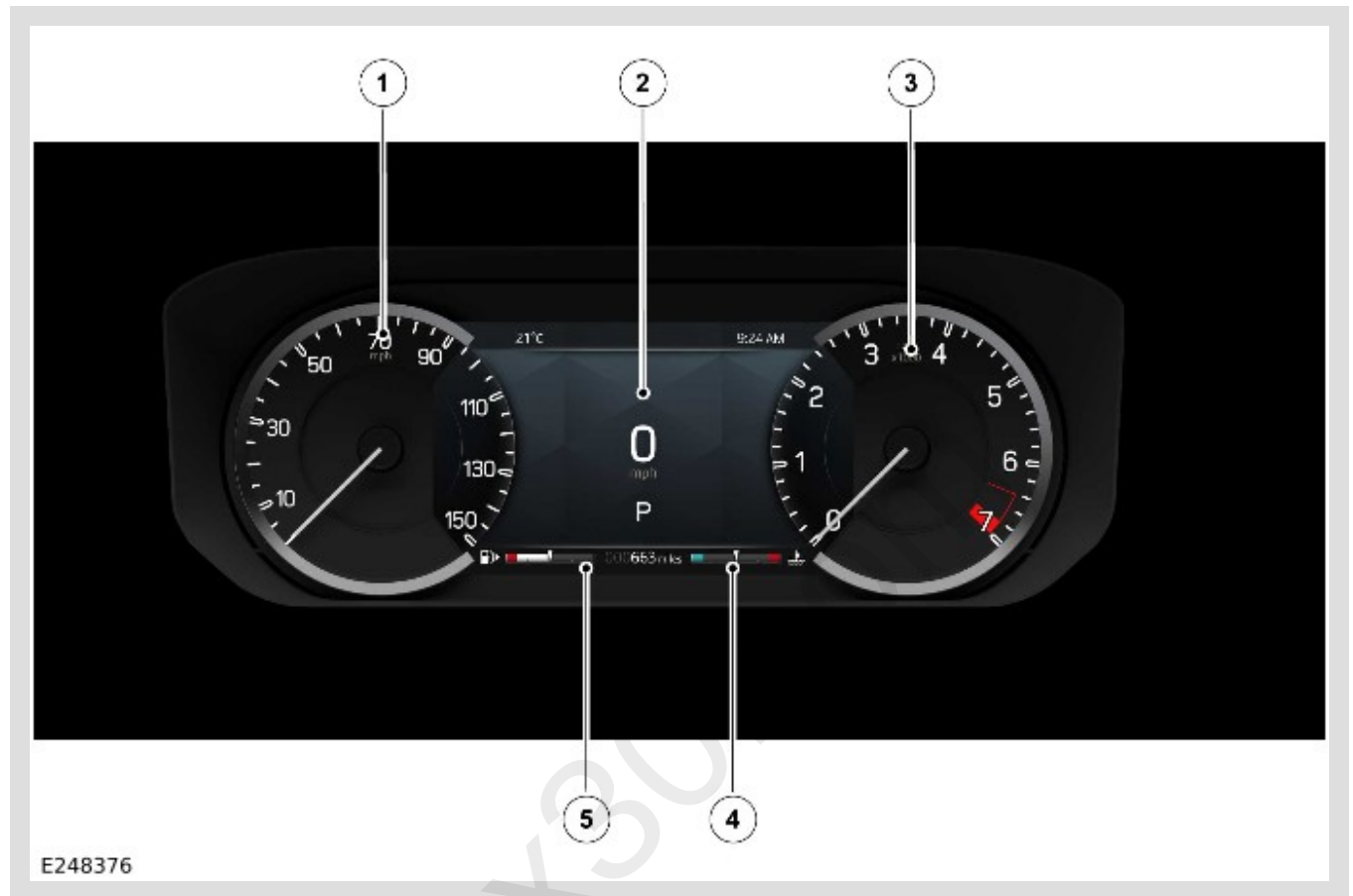
A virtual image is displayed on the windshield which appears at a distance of approximately 2 meters. This gives the impression that the image appears around the end of the hood.

This function is designed to provide an increase in safety and convenience by concentrating on the road condition.

The HUD is designed to work with a specially designed windshield, which is formed to prevent double images and achieve the best display performance.

DESCRIPTION

INSTRUMENT PANEL CLUSTER – CONVENTIONAL DISPLAY



ITEM	DESCRIPTION
1	Speedometer
2	Message center
3	Tachometer
4	Engine coolant temperature gauge
5	Fuel gauge

The IPC is located in the instrument panel. The IPC comprises 2 analog gauges, the speedometer and tachometer. Between the analog gauges, a 7 inch TFT display is provided for driver information.

The analog speedometer and tachometer are located in the IPC. The speedometer and tachometer are each driven by an electronic stepper motor. The characteristics of this type of motor produce damping of the pointer needle. Both of the gauges return to their respective zero positions when the ignition is switched OFF.

INSTRUMENT PANEL CLUSTER – VIRTUAL DISPLAY



ITEM	DESCRIPTION
1	Speedometer
2	Message center
3	Tachometer
4	Engine coolant temperature gauge
5	Fuel gauge

The IPC comprises a 12.3 inch HD TFT with a multilayered virtual display. The IPC has a high level of graphic presentation and interactive functionality. These features give the driver advanced levels of control and set-up using interactive graphic menu features.

The IPC combines a virtual representation of virtual analog instruments, graphic information, digital information and warning signals.

The virtual instrument panel can be configured using the steering wheel controls to meet personal preference.

The following options are available:

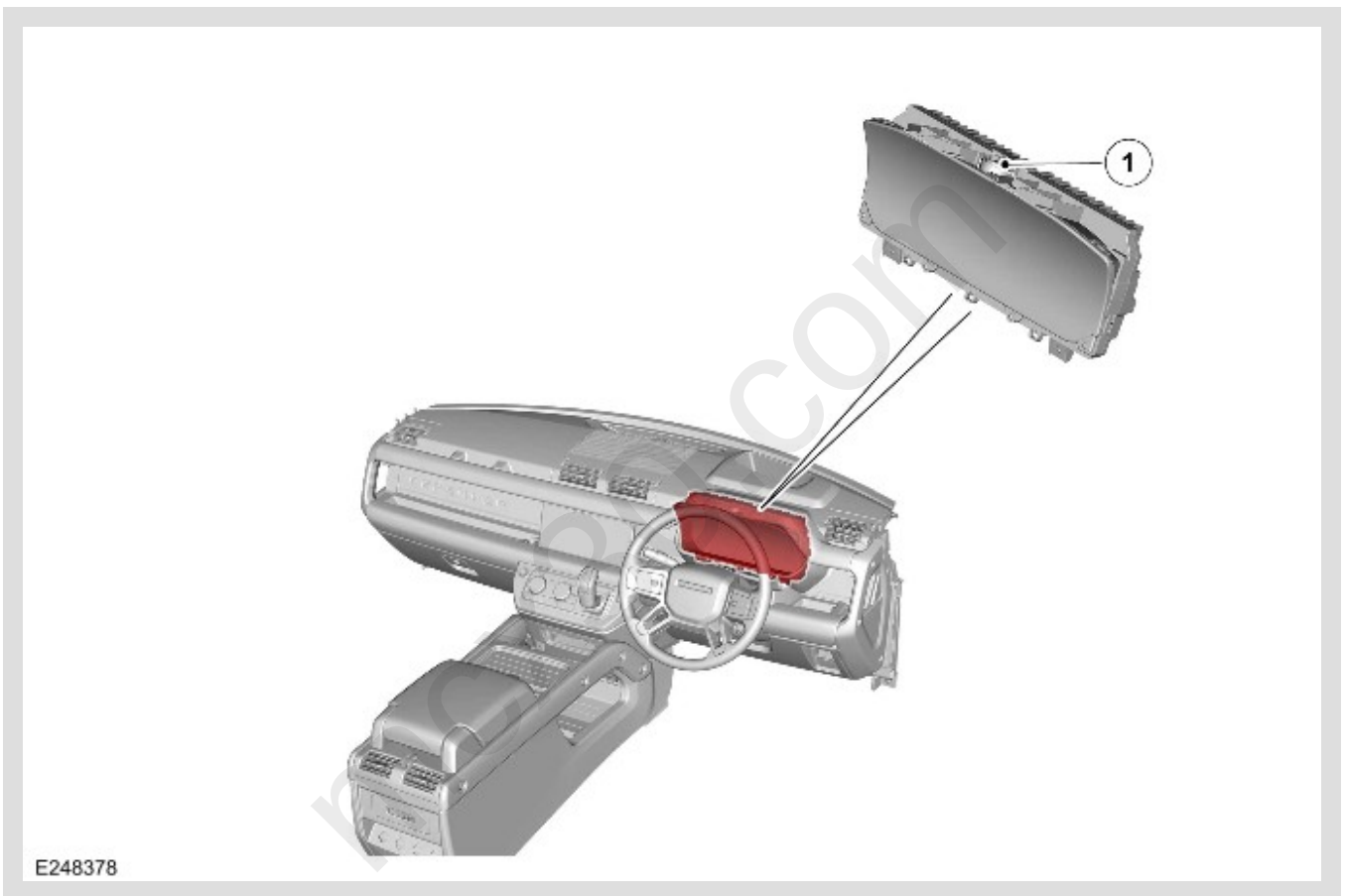
- 2 dial - Display the speedometer and power gauge either side of the information panel.

- 1 dial - Display 2 information panels either side of a central power gauge.
- Full map - Display the navigation system information over the entire instrument panel.
- Media - Display the current media source information over the entire instrument panel.
- Driver assistance - Display the current enabled driver assistance features over the entire instrument panel.

ADDITIONAL INSTRUMENT CLUSTER FEATURES – ONLY VIRTUAL DISPLAY

NOTE:

Right Hand Drive (RHD) vehicle is shown, Left Hand Drive (LHD) vehicle is similar.



ITEM	DESCRIPTION
1	Speaker - IPC

A speaker is installed on the top of the IPC casing. The speaker chimes audible warnings and is controlled by a generator within the IPC. The speaker cannot be replaced separately.

The IPC is integrated into the vehicle start authorization process as it includes encoded data exchange information as part of the distributed start authorization strategy.

INSTRUMENT PANEL CLUSTER – GENERAL INFORMATION

The driver can set up a number of features and find out essential information about the vehicle in the IPC display menu which consists of the following sections:

- Phone - Contains a list of recent phone contacts, when a smartphone is paired and contacted.
- Media - Displays information on the current media source
- Trip - Displays trip meter information and settings.
- Info panel (conventional display) - Contains sub-menus and settings to allow the driver to configure the instrument panel's display.
- Display (virtual display) - Contains sub-menus and settings to allow the driver to configure the instrument panel's display.
- HUD (if equipped) - HUD sub-meuns and settings.
- Vehicle - Contains sub-menus and settings for the Tire Pressure Monitoring System (TPMS) and passenger airbag.

The IPC menu can be accessed by using the left steering wheel switch located on the left side of the steering wheel.

The message center displays vehicle related information to the driver. The fuel gauge and temperature gauge are located in the message center.

The low fuel warning indicator is located next to the fuel gauge, the engine temperature warning indicator is located next to the temperature gauge.

Warning indicators and the gear position status are also displayed in the message center.

Driver information is also displayed, for example:

- Navigation turn-by-turn information
- Trip computer information
- Off-road information
- Driver Assistance information
- Basic audio details.

For additional information, refer to: [Message Center](#) (413-08 Message Center, Description and Operation).

WARNING INDICATORS



E263872

ITEM	DESCRIPTION
1	Malfunction Indicator Lamp (MIL) warning indicator (amber)

ITEM	DESCRIPTION
2	Trailer turn signal warning indicator (green)
3	Tire Pressure Monitoring System Control Module (TPM) warning indicator (amber)
4	Follow mode warning indicator (amber)
5	Lane departure warning (green)
6	External temperature warning (amber)
7	Auto stop/start warning indicator
8	Grass gravel snow
9	Traffic sign speed
10	Seatbelt warning indicator (green)
11	Access mode indicator
12	Critical warning indicator (red)
13	Valid parking spaces on both sides
14	Auto light
15	Turn signal indicator active (green)
16	Rear fog lamps active warning indicator (amber)
17	Anti-Lock Brake System Control Module (ABS) warning indicator (amber)
18	Side lamps active warning indicator (green)
19	Seatbelt warning indicator (red)
20	Dynamic Stability Control (DSC) OFF warning indicator (amber)
21	Auto High Beam (AHB) active warning indicator (blue)
22	Range change selection
23	Low traction launch
24	Diesel Exhaust Fluid (DEF) (red)
25	Brake system warning indicator (red)
26	Electric Park Brake (EPB) system warning indicator (red)
27	Steering assist active (green)
28	DSC active warning indicator (amber)
29	Turn signal indicator active (green)
30	Airbag warning indicator (amber)
31	Front fog lamps active warning indicator (green)

ITEM	DESCRIPTION
32	Oil pressure warning indicator (red)
33	Charge warning indicator (red)

The IPC features a number of warning indicators. The warning indicators are located in various positions in the IPC. The warning indicators illuminate in 1 of 5 colors which indicate at the level of importance of the warning as follows:

- Red = Warning
- Yellow = Caution
- Green = System operative
- Blue = Headlamp high beam operative
- White = Information.

The warning indicators are mainly located in 3 groups:

- In the speedometer display
- In the tachometer display
- In a central position at the top of the message center.

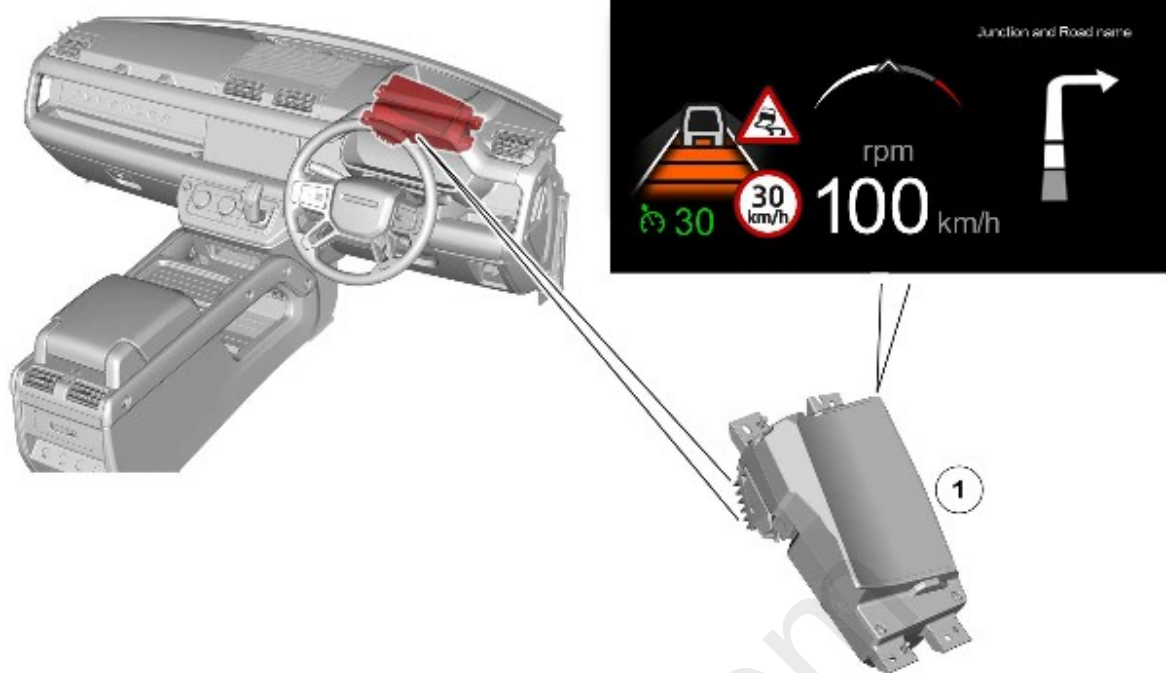
The IPC illuminates the warning indicators through signals from other system control modules and sensors. These signals are received by the IPC on the High Speed (HS) Controller Area Network (CAN) Human Machine Interface (HMI) systems bus. Some indicators are activated by an external system control module but the IPC contains the control logic.

HEAD UP DISPLAY (IF EQUIPPED)



NOTE:

Right Hand Drive (RHD) vehicle is shown, Left Hand Drive (LHD) vehicle is similar.



E248379

ITEM	DESCRIPTION
1	HUD

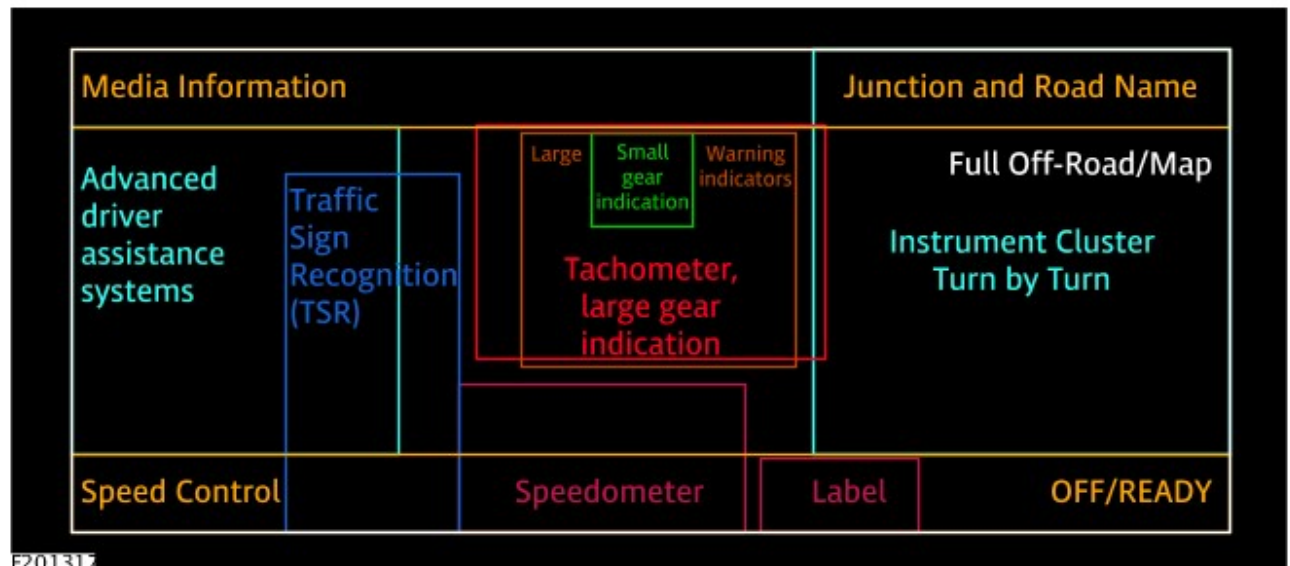
The HUD is located inside the instrument panel behind the IPC.

The HUD features a full color TFT display which is video capable. This option requires the IPC virtual display installed.

HEAD UP DISPLAY - ZONE LAYOUT

NOTE:

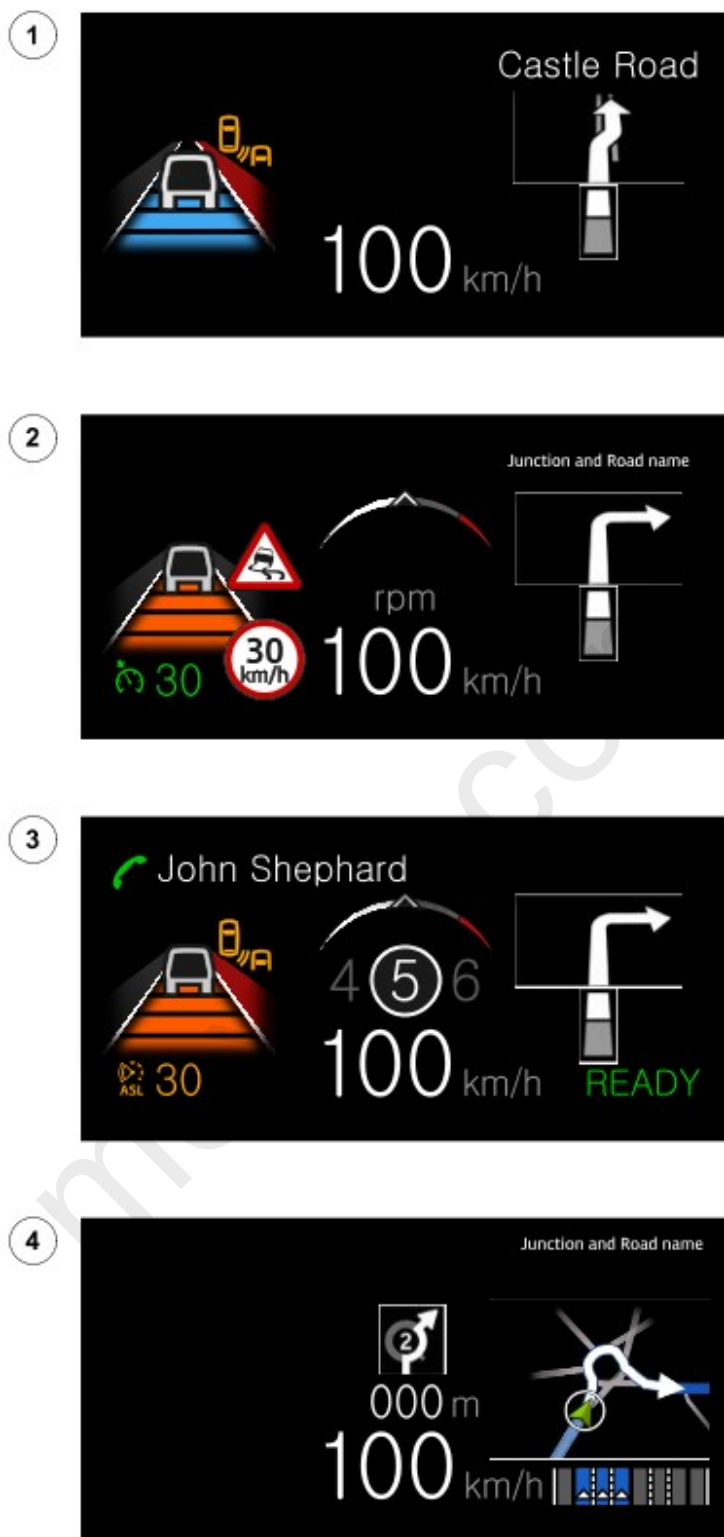
Not all the information below will be displayed at the same time, zone displays will be shown based on prioritization and/or boundary overlap.



The following zones can be displayed in the HUD:

- Speedometer zone - Vehicle speed value
- Label zone - Speed units
- Large warnings zone - Forward alert, driver intervene
- Advanced driver assistance systems zone:
 - Lane Departure Warning (LDW)/Lane Keep Assist (LKA) tracking
 - LDW/LKA alert
 - LDW/LKA idle/OFF
 - Adaptive speed control gap setting and follow mode
 - Steering control
 - Side swipe (side obstacle detection system function)
 - Traffic jam assist/integrated cruise assist.
- Set speed info zone - Speed control and auto speed limiter.
- Junction and road name zone - Navigation next road name.
- Turn by turn zone - Navigation display, navigation video display.
- The Traffic Sign Recognition (TSR) and the TSR zone - Warning signs, vehicle speed units/value, overtake, speed text and sign type.
- Small gear display zone - gear state.
- Tachometer and large gear display zone - Large gear position, gear upshift indicator.
- Full off road/map zone - Full screen 4x4i.

When selected the HUD feature projects the following driver information display onto the inside of the windshield:



E201318

ITEM	DESCRIPTION
1	LDW/vehicle speed/navigation next road name
2	Auto speed limiter, TSR/vehicle speed and navigation

ITEM	DESCRIPTION
3	Speed limiter/ vehicle speed/ gear position
4	Junction and road name zone

OPERATION

INSTRUMENT PANEL CLUSTER

The IPC receives a permanent power supply from the startup battery through the Passenger Junction Box (PJB). A hardwired Light Emitting Diode (LED) security system status indicator is connected to the IPC from the Body Control Module (BCM)/ Gateway Control Module (GWM).

The speedometer is driven by square wave signals derived from the wheel speed sensors which is hardwired to the ABS. The ABS transmits the signal to the BCM/ GWM through the HS CAN Underbody (UN) systems bus. The IPC receives the signal from the BCM/ GWM through the HS CAN HMI systems bus.

The tachometer is driven by an engine speed signal from the crankshaft position sensor (CKP) which is hardwired to the Powertrain Control Module (PCM). The PCM transmits the signal from the CKP sensor to the BCM/ GWM through the FlexRay. The IPC receives the signal from the BCM/ GWM through HS CAN HMI systems bus.

The Electric Steering Column Lock Control Module (VIM) is connected directly to the IPC on a hardwired connection. The IPC provides a controlled ground for the VIM. The Steering Wheel Switch inputs are sent to the IPC through the Local Interconnect Network (LIN) connection.

For additional information, refer to: [Steering Column](#) (211-04 Steering Column, Description and Operation).

The Front Infotainment Control Module (IGM / ICCM) and the HUD are connected to the IPC by:

- Automotive Pixel Link 2 (APIX2) connection
- HS CAN HMI systems bus.

Other vehicle sensors are connected to the BCM/ GWM which processes the signals from the sensors. The processed signals are delivered to the IPC on the HS CAN HMI systems bus. The IPC communicates with the vehicle infotainment system on the HS CAN HMI systems bus.

HEAD UP DISPLAY

The HUD receives a permanent battery voltage supply through the PJB. A HS CAN HMI systems bus connection allows the HUD to communicate with other modules. The IPC virtual display is also connected to the HUD through APIX2.

The HUD is controlled from the message center menu.

When selected, the menu offers the following options:

- Selecting the position of the display on the windshield.
- Selecting the brightness of the display.
- Selecting which information is displayed on the HUD.

Control of the display brightness can be adjusted in 3 different ways:

- As listed above, manually, from within the HUD selection of the 'Main Menu' in the message center.
- When the vehicle lighting is switched on, the HUD display adjusts simultaneously with the manual adjustment of the IPC dimmer.
- Automatic brightness, controlled using data from the rain/light sensor.

The HUD showroom mode is controlled from the IPC service menu and displays example images on the windshield when the vehicle is stationary.

Prior to selecting the HUD windshield position the user should select their desired seating position. The steering wheel controls are used to set the horizontal position of the windshield display. When set, the information can be saved in the seat memory control system, storing the selected preferences.

LEFT STEERING WHEEL SWITCH

The left steering wheel switch has LIN connection to the:

- IPC
- IGM / ICCM.

The left steering wheel switch and the right steering wheel switch contain capacitive sensors and microcontrollers.

The switch assembly contains a control module. The steering wheel switch microcontroller reads the capacitive sensor to detect the selected switch function. The function confirmation is through a central microswitch.

The control module converts this information into a LIN message which is passed through the Steering Wheel Module (SWM) to the IPC.

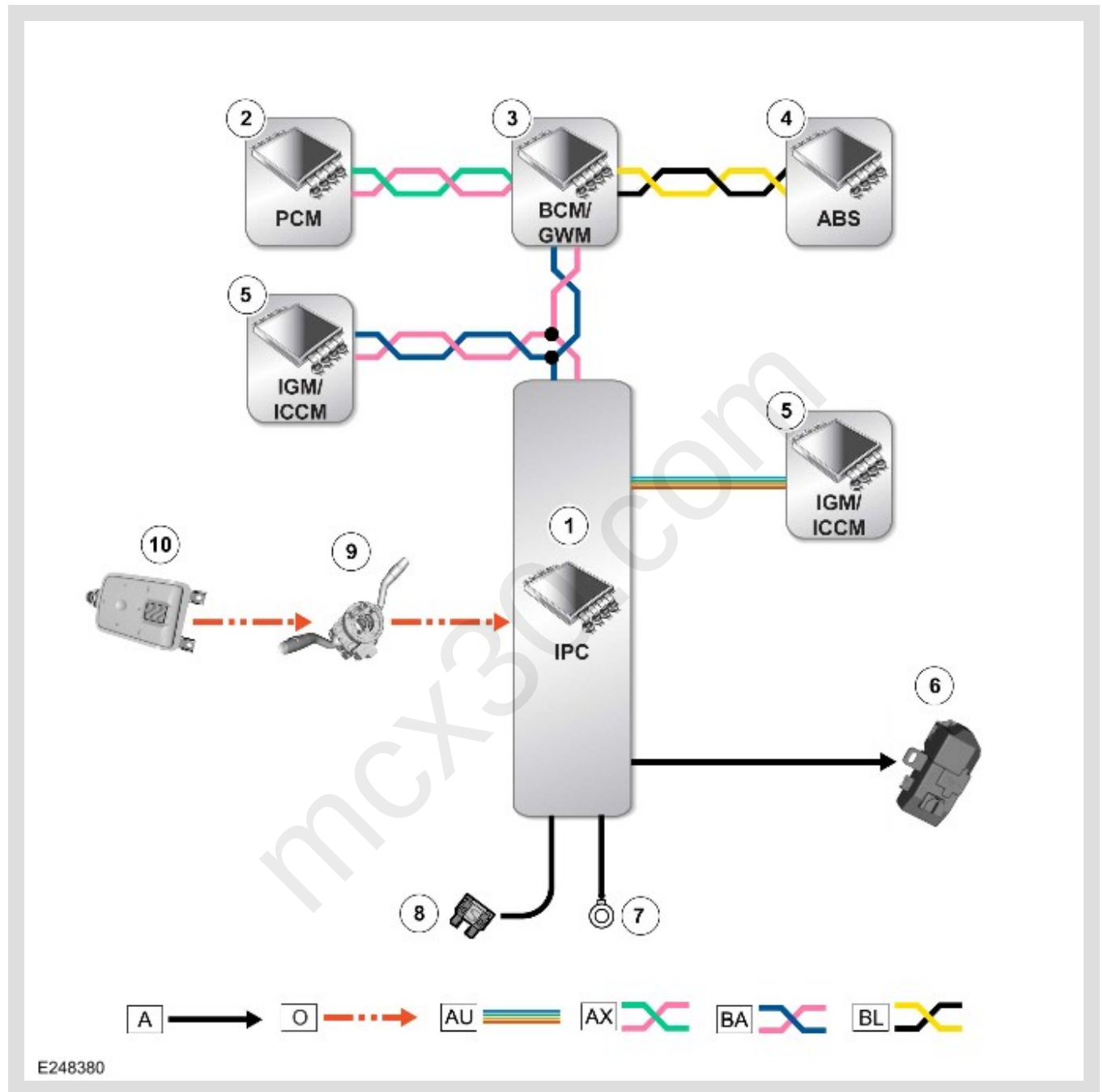
DIAGNOSTICS

The IPC records any Diagnostic Trouble Code(s) (DTC) and related data. The DTC and related data are read using the Jaguar Land Rover (JLR) approved diagnostic equipment.

The JLR approved diagnostic equipment enables certain components to be activated and also read live data.

CONTROL DIAGRAM

CONTROL DIAGRAM - 1 OF 2 - INSTRUMENT PANEL CLUSTER



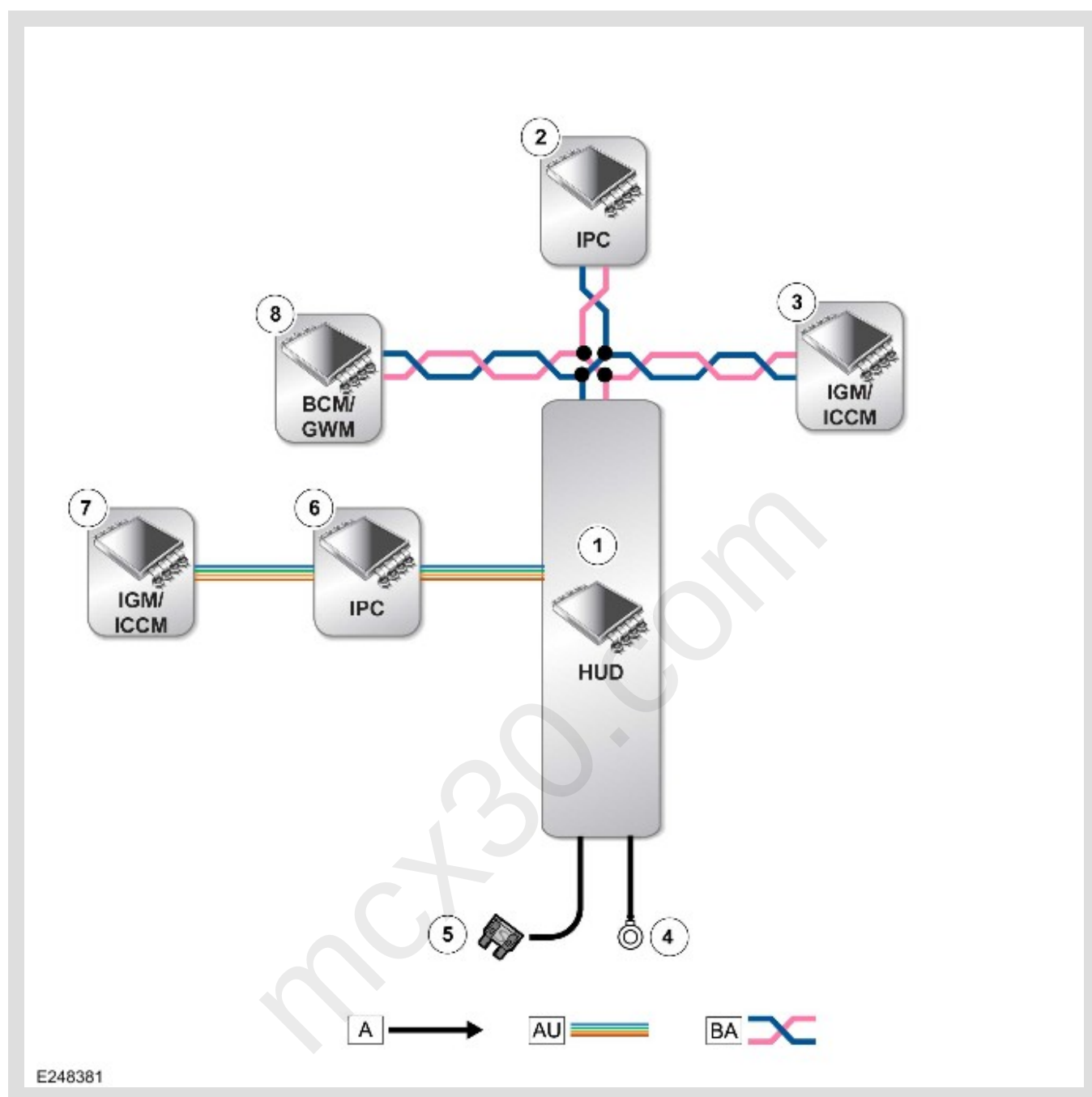
A = HARDWIRED: O = LIN: AU = APIX2: AX = FLEXRAY: BA = HS CAN HMI SYSTEMS BUS: BL = HS CAN UN SYSTEMS BUS.

ITEM	DESCRIPTION
1	IPC
2	PCM

ITEM	DESCRIPTION
3	BCM/ GWM
4	ABS
5	IGM / ICCM
6	VIM
7	Ground
8	Power supply
9	SWM
10	Left steering wheel switch

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CONTROL DIAGRAM – 2 OF 2 – HEAD UP DISPLAY



A = HARDWIRED: AU = APIX2: BA = HS CAN HMI SYSTEMS BUS.

ITEM	DESCRIPTION
1	HUD
2	IPC
3	IGM / ICCM
4	Ground
5	Power supply

ITEM	DESCRIPTION
6	IPC
7	IGM / ICCM
8	BCM/ GWM

cmIjaGFyZG1vcnRvbjsyMDIwLTA5LTE4VDA2OjMyOjE4LjA2M1o7OTAuMTk5LjEyMS4xMTc7

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