Introduction to Rolls-Royce and Bentley Motor Cars from VIN 30001 Major Changes

FOREWORD

This workbook is for use with the Rolls-Royce Mastertech Video Programme **'Introduction to Rolls-Royce and Bentley Motor Cars from VIN 30001, Major Changes'.**

It contains additional information describing the new features introduced on Rolls-Royce and Bentley Motor Cars from VIN 30001 and explains appropriate service procedures and use of new test boxes.

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Introduction

From a distance, a Rolls-Royce or Bentley motor car from VIN 30001 may appear virtually identical to its predecessors. In fact, the alloy wheels, new headlamp washer assemblies and new badge are the only external indications that a Silver Spur is one of a new generation of motor cars leaving Crewe.

Only the new headlamp washer assemblies identify a Post-VIN 30001 Bentley Turbo R from a Pre-VIN 30001 Bentley Turbo R.

However, even a cursory examination of the interior, facia, underbonnet and underneath the car reveals many significant changes, particularly to the electrical system.

The following new names are introduced for Rolls-Royce motor cars:

Rolls-Royce Silver Spirit II
Rolls-Royce Silver Spur II
Rolls-Royce Corniche III

There are no new names for Bentley motor cars, the following names being retained:

Bentley 8
Bentley Turbo R
Bentley Mulsanne S
Bentley Continental

Major changes have been made to the following systems:

Engine Management
K-Motronic Fuel Injection and Ignition is fitted to all motor cars.

Electrical System
Introduction of new, fuseboards, relays and switches.

Instrumentation and Controls
Introduction of new instruments and controls. Instruments and controls relocated on facia and centre console.

Suspension
Introduction of automatic ride control.

Central Door Locking
Introduction of remote locking and anti-theft alarm.

Seats
Introduction of seat heaters, adjustable lumbar support on front seats. Adjustable rear seat fitted on long wheelbase motor cars.

Passive Restraint
Introduction of driver's air bag passive restraint system on motor cars built to North American Specifications.

Publications
The following new technical manuals applicable to Rolls-Royce and Bentley Motor Cars from VIN 30001 have been published:

Workshop Manual	**TSD 5000**
Workshop Manual - Engine Management Systems	**TSD 5001**
Workshop Manual - Electrical	**TSD 5002**
Service Schedule Manual	**TSD 5003**
Workshop Tools Manual	**TSD 5004**

Test Instruments
Four new test instruments have been introduced to test the new systems introduced on motor cars from VIN 30001.

Anti-theft alarm	**RH12415**
Driver's Information panel	**RH12416**
Electric seat memory	**RH12417**
Automatic ride control system	**RH12418**

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Vehicle Identification Numbers (VIN)

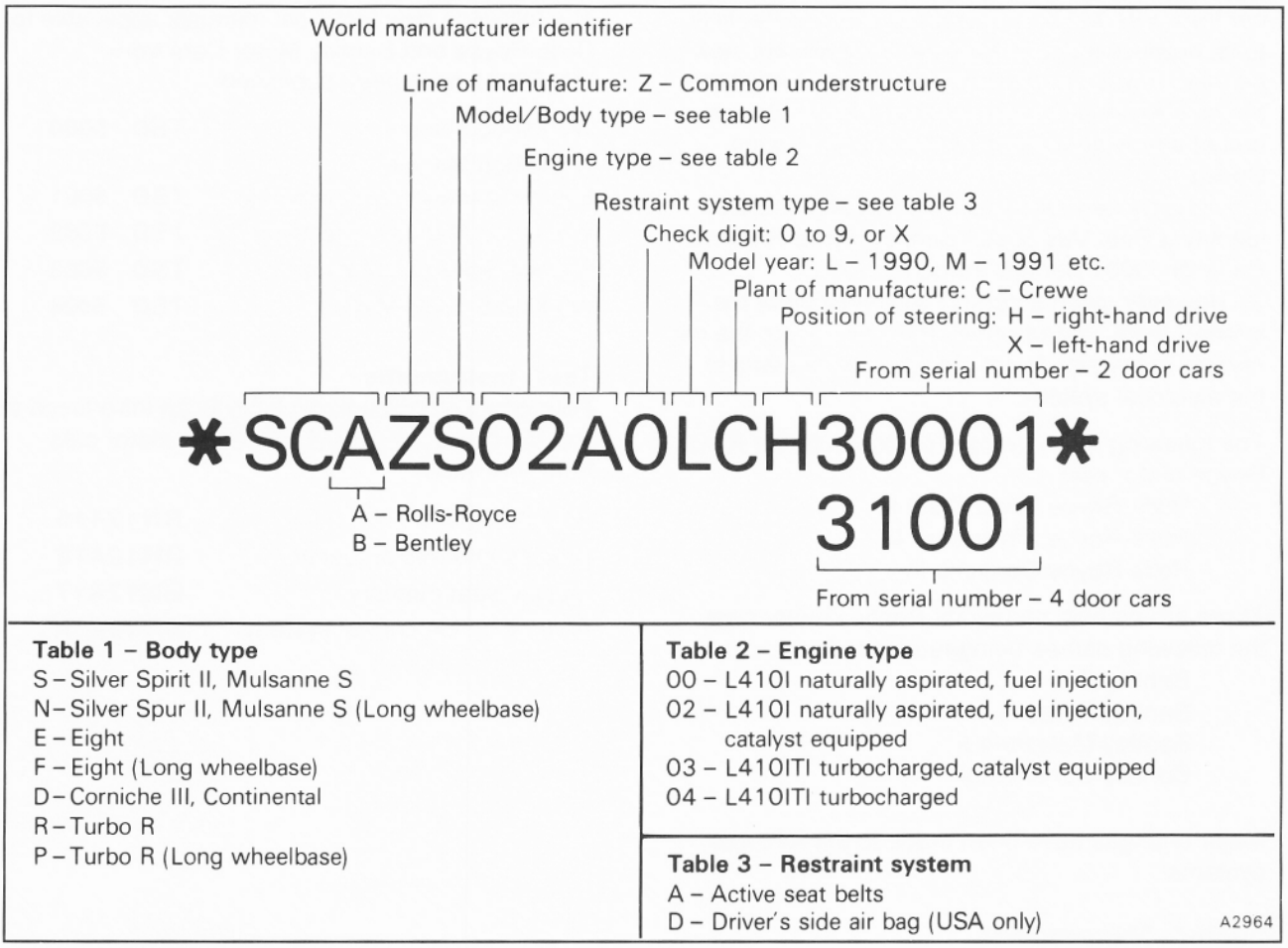

Fig.1 Vehicle identification number

Vehicle Identification Numbers from 30001

Vehicle Identification Numbers from 30001 identify Rolls-Royce and Bentley two-door motor cars built to 1990 model year specifications:

Rolls-Royce Corniche III:	UK	RHD	VIN SCAZD00AXLCH30001
Bentley Continental:	Eur 2	LHD	VIN SCBZD02A4LCX30002

Vehicle Identification Numbers from 31001

Vehicle Identification Numbers from 31001 identify Rolls-Royce and Bentley four-door motor cars built to 1990 model year specifications:

Rolls-Royce Silver Spirit II:	UK	RHD	VIN SCAZS00A7LCH31001
Rolls-Royce Silver Spur II:	Eur 2	LHD	VIN SCAZN02A7LCX31002
Bentley 8:	UK	RHD	VIN SCBZE00A6LCH31008
Bentley Mulsanne S:	Eur 1	LHD	VIN SCBZS00A5LCX31006
Bentley Turbo R:	USA	LHD	VIN SCBZR03D8LCX31004

VIN Bar Code Labels

All motor cars from VIN 30001 destined for USA have an additional record of the VIN number in the form of a machine readable bar code label which is attached to the left hand side B post.

Precautions

It is important that all personnel read, understand and observe all the precautions stated in chapter A of the Workshop Manual TSD 5000 before commencing any repairs or maintenance on cars from VIN 30001.

Important Notes:

1 Driver's Air Bag Passive Restraint System
All Rolls-Royce and Bentley motor cars built to North American Specifications are fitted with a Driver's Air Bag Passive Restraint System.

It is most important to observe the additional precautions when working on motor cars fitted with this system:

Disconnect the battery and wait for at least 30 minutes before carrying out any service procedures on the car.

2 Battery Master Switch
Some electrical circuits are connected directly to the battery through a fusebox located in the luggage compartment. These circuits are not controlled by the battery master switch.

The battery must be disconnected to electrically isolate the car. Turning the battery master switch to 'OFF' will not isolate the electrical systems connected to the luggage compartment fusebox.

Specification

For details of specifications of motor cars from VIN 30001 refer to chapter A of the Workshop Manual TSD 5000.

Data

For details of data applicable to motor cars from VIN 30001 refer to chapter A of the Workshop Manual TSD 5000.

Lubricants

For details of lubricants recommended for motor cars from VIN 30001 refer to chapter D of the Workshop Manual TSD 5000.

Storage and recommissioning

It is important that all personnel read, understand and observe all the procedures and precautions stated in chapter B of the Workshop Manual TSD 5000 before preparing for storage and recommissioning motor cars from VIN 30001.

Important Note:
All Rolls-Royce and Bentley motor cars built to North American Specifications are fitted with a Driver's Air Bag Passive Restraint System.

It is most important to observe the additional precautions when working on motor cars fitted with this system.

Shipping

It is important that all personnel read, understand and observe all the procedures and precautions stated in chapter B of the Workshop Manual TSD 5000 before shipping motor cars from VIN 30001.

Important Note:
All Rolls-Royce and Bentley motor cars built to North American Specifications are fitted with a Driver's Air Bag Passive Restraint System.

It is most important to observe the additional precautions when working on motor cars fitted with this system.

Torque tightening figures

For details of general torque tightening figures applicable to motor cars from VIN 30001 refer to chapter P of the Workshop Manual TSD 5000.

For details of torque tightening figures applicable to specific systems or components fitted to motor cars from VIN 30001 refer to the specific section of the Workshop Manuals TSD 5000, TSD 5001 or TSD 5002 dealing with the system or component.

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Summary of Changes Introduced on Rolls-Royce and Bentley Motor Cars from VIN 30001

Note:

The following summary lists the 1990 model year changes introduced on Rolls-Royce and Bentley Motor Cars from VIN 30001.

The changes are listed in the order used for the Workshop Manual, Workshop Manual - Electrical and Engine Management Systems Manual.

Information may be duplicated where relevant to more than one section.

Where these changes are described in greater detail elsewhere in this work book, reference is made to the relevant page number.

Where further explanations are not included elsewhere in this workbook, the summary has been expanded to provide useful information.

Summary of Mechanical and Body Changes

Air conditioning system

(See page 11 for further details)

1 New air conditioning system switches have been introduced.
2 New air conditioning system temperature control wheels have been introduced.
3 Air conditioning switches and temperature control wheels are located on a panel fitted in the centre console or hanging console.
4 The air conditioning system temperature control wheels now feature 'Full Heat' and 'Full Cold' manual override positions.
5 Two additional 'Bulls-Eye' vents are mounted at the outermost ends of the upper facia.
6 The facia vent control knobs have been redesigned.
7 Escutcheons are fitted to the facia vent control knobs. These retain the facia trim panel in place.
8 A new central duct and control has been introduced. It is located in the hanging console or through console.
9 A new micro-processor board is introduced.

Engine

1 K Motronic Fuel Injection and Ignition System is fitted to all motor cars from VIN 30001.
2 All cars fitted with a K-Motronic onboard diagnostics button.
3 The air pressure transducer is not fitted to naturally aspirated cars.
4 Two new air pressure transducers are fitted to turbocharged motor cars. They are located underneath the right hand front wing panel.
5 All engines fitted to motor cars from VIN 30001 are tuned for using unleaded fuel and leaded fuel, unless a catalytic converter is fitted. Unleaded fuel only must be used on motor cars fitted with catalytic converters.
6 The compression ratio for all types of engine has been standardized to 8:1.
7 All motor cars are fitted with an inertia type fuel cut-off system.
8 A new air injection pump and clutch, similar to those introduced on turbocharged, catalyst equipped motor cars from VIN 24513, is fitted to naturally aspirated motor cars equipped with catalytic converters.

Hydraulic systems

1 Hydraulic system accumulators on all cars are now mounted on the left hand side of the engine, when viewed from the rear, in a similar configuration to turbocharged motor cars from VIN 24513 to VIN 30001. Pipe-work and its routing has been adapted to suit this configuration.

Brake system

1 An electrically released foot operated parking brake release has been introduced.

Height control system

1 All four door motor cars from VIN 30001 are fitted with an automatic ride control system.

Automatic ride control

(See page 34 for further details)

1 All four door Rolls-Royce and Bentley motor cars from VIN 30001 are fitted with an electronically controlled, electrically operated automatic ride control system. This system enables the damping characteristics of the suspension dampers to be changed to provide suspension characteristics appropriate to the manner in which the car is being driven.

Steering column

(See page 49 for further details)

1 A new three-piece steering column with a sliding joint which collapses in the event of an accident is introduced.
2 A steering wheel velocity transducer which provides information to the automatic ride control system is attached to the steering column.
3 All motor cars built to North American and Canadian Specification have a driver's airbag assembly fitted to the steering wheel.
4 All motor cars built to North American and Canadian Specification, have a contact coil assembly for the air bag system fitted in the steering wheel assembly.

Summary of Mechanical and Body Changes (Continued)

Exhaust systems

1 The exhaust systems fitted to all motor cars from VIN 30001 are a similar configuration to that fitted to turbocharged cars from VIN 24513.

Exhaust gases from the 'B' bank cylinders pass through a split manifold and transfer pipe to a junction with the 'A' bank manifold.

2 All motor cars are fitted with new exhaust mountings with improved isolation of noise transmission.

3 All catalyst equipped motor cars from VIN 30001 are fitted with starter catalyst (pre-converter, warm-up catalytic converter) similar to those introduced on turbocharged, catalyst equipped cars from VIN 24513.

Wheels and Tyres

1 All Rolls-Royce motor cars from VIN 30001 are fitted with new 15 spoke 15" diameter aluminium alloy wheels and lockable stainless steel trims.

There are two styles of wheel trim, one for Silver Spirit II and one for Silver Spur II and Corniche III models.

Body

Facia trim

1 The wood trim is held in place by the escutcheons of the air conditioning system facia vent control knobs. The escutcheons have a bayonet fitting into sockets in the instrument board.

2 New wood trim designs have been introduced on Rolls-Royce motor cars.

Front seat heaters
(See page 24 for further details)

1 Both front seats of all motor cars have thermostatically controlled electrical seat heater elements fitted in the seat squabs and cushions.

2 These heaters are operated by three position switches located in the minor controls panel in the central console.

The switches have three settings:

Low (35±2 °C), Off and High (40±2 °C).

Front seats lumbar support system
(See page 24 for further details)

1 An adjustable lumbar support system is fitted to the squabs of each of the front seats.

2 The system is controlled by two three-way switches located on the outer trim of each seat below the seat cushion.

Driver's seat memory

1 The positions of both external mirrors are included in the memory function for the driver's seat.

2 A test box has been introduced to check the operation of the front seat memories.

External mirrors

1 New external mirrors contain mechanisms with feedback potentiometers to enable the ECU to establish the mirrors positions in relation to datum points memorised by the ECU during the reference position calibration procedure.

Rear seats

1 The rear seats on all four-door motor cars incorporate recessed 'pocketed' stowage points for the rear seat belt buckles.

2 The 'heel board' interior lamps are repositioned into the front of the rear seat cushion.

Adjustable rear seats
(See page 25 for further details)

1 Adjustable rear seats are now a standard fitment on Silver Spur II motor cars.

2 An opening box centre arm rest is fitted with adjustable rear seats.

3 A new rear parcel shelf is fitted with adjustable rear seats.

Sun visors

1 Vanity mirrors are fitted to both front sun visors on all four door motor cars.

2 Wooden sliding covers are fitted to the vanity mirrors in the sun visors on all motor cars.

Luggage compartment tray

The rear panel in the luggage compartment which covers the fuel tank is now hinged at its base and used as a mounting point for in-car entertainment equipment.

Drivers air bag passive restraint system
(See page 26 for further details)

1 All Rolls-Royce and Bentley motor cars built to North American Specifications are fitted with a Drivers Air bag Passive Restraint System.

Its purpose is to protect the drivers head and torso during any head on accident which occurs at a speed in excess of 15 mph.

2 An energy absorbing driver's knee bolster is incorporated in the driver's knee roll to provide extra protection.

3 The driver's seat belt incorporates a section of tear webbing.

4 The air bag system has its own separate wiring looms to ensure electrical integrity. These are tied to the main loom.

5 At the steering wheel, a contact coil assembly ensures a good electrical connection to the air bag.

Gear range selector lever

1 The mechanical gear range selector indicator has been deleted. It is replaced by an indicator incorporated in the new driver information panel.

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Summary of Engine Management System Changes

Fuel injection system
(See page 44 for further details)

1 K Motronic Fuel Injection and Ignition System is fitted to all motor cars from VIN 30001.
2 All cars are fitted with a K-Motronic diagnostic button.
3 The air pressure transducer is not fitted to naturally aspirated cars.
4 A new air pressure transducer is fitted to turbocharged motor cars. It is located underneath the right hand front wing panel.
5 All engines fitted to motor cars from VIN 30001 are tuned for using unleaded fuel and leaded fuel, unless a catalytic converter is fitted. Unleaded fuel only must be used on motor cars fitted with catalytic converters.
6 The compression ratio for all types of engine has been standardized to 8:1.
7 All motor cars are fitted with an inertia type fuel cut-off system.

Turbocharging system
1 A new air pressure transducer is fitted to turbocharged motor cars. It is located underneath the right hand front wing panel.
2 The dump valve solenoid and dump valve vacuum switch have been deleted.

Ignition system
1 The ignition warning lamp and engine oil low pressure warning lamp have been deleted.
2 The ignition switch and headlamp switch have been repositioned to a side by side configuration.

The assembly has been relocated in the lower facia panel outboard of the steering wheel in the position originally taken by the wiper switch.
3 K-Motronic Fuel Injection and Ignition System is fitted to all motor cars from VIN 30001.
4 All cars are fitted with a K-Motronic diagnostic button.
5 An air pressure transducer is not fitted to naturally aspirated motor cars.
6 A new air pressure transducer is fitted to turbocharged motor cars. It is located underneath the right hand front wing panel.
7 All engines fitted to motor cars from VIN 30001 are tuned for using unleaded fuel and leaded fuel, unless a catalytic converter is fitted. Unleaded fuel only must be used on motor cars fitted with catalytic converters.
8 The compression ratio for all types of engine has been standardized to 8:1.

Exhaust emission control system

Air injection system
1 A new air injection pump and clutch is fitted to naturally aspirated motor cars equipped with catalytic converters. This is the same as the one fitted to turbocharged motor cars equipped with catalytic converters from VIN 24513 to VIN 30001.

Catalytic converter
1 All naturally aspirated, catalyst equipped cars from VIN 30001 are fitted with starter catalyst (pre-converter, warm-up catalytic converter) similar to those introduced on turbocharged, catalyst equipped motor cars from VIN 24513 to VIN 30001.

Fuel evaporative emission control system
1 All naturally aspirated, motor cars from VIN 30001 destined for markets requiring the fitment of fuel evaporative emission control system are fitted with the fuel evaporative emission control system fitted to turbocharged engines from VIN 24513 to VIN 30001.

The system's operation is controlled by the K-Motronic engine management system ECU which operates an electrical purge valve.

Crankcase emission control system
1 All engines fitted to motor cars from VIN 30001 are fitted with the crankcase emission control system fitted to turbocharged engines from VIN 24513 to VIN 30001.

Fuel system pressure checks

The 10 Bar fuel pressure gauge RH 9612 can be fitted to the cold start injector fuel delivery port in the fuel distributor to check:

Fuel system primary system pressure when the engine is running.

Accumulator pressure when the engine is switched off.

Accumulator leak down rate.

The same gauge can be fitted to the test point in the differential pressure valve lower chamber circuit. In this position it shows the fuel pressure in the lower chambers of the differential pressure valves and enables the action of the electro-hydraulic actuator to be observed.

The earlier 6 Bar type gauge under the same part number should not be used on Turbocharged motor cars from VIN 24513 as the fuel pressure exceeds 6 Bar.

Fuel Pressure

Nominal fuel pressure is 6.3 Bar ± 0.1 Bar.

The differential pressure valve lower chamber pressure varies in accordance with engine coolant temperature, engine load and engine speed. It also varies directly in proportion to the actual system's pressure.

For example, if the system pressure is 6.2 Bar, the differential pressure valve lower chamber pressure will be correspondingly lower. If the system pressure is 6.4 Bar, the differential pressure valve lower chamber pressure will be correspondingly higher. Therefore, it is important not to use the pressure figures obtained from one car as a standard for another car.

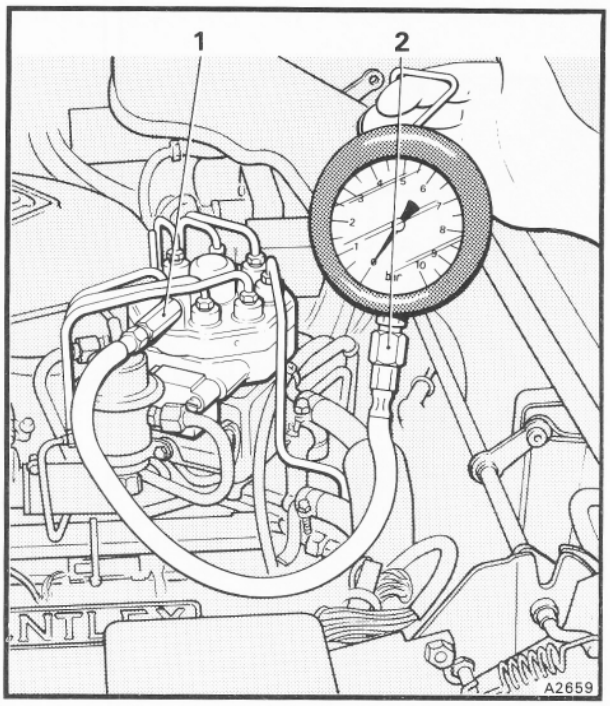


Fig.9 Pressure gauge RH 9612 connected to the cold start injector outlet.

1 Pressure gauge RH 9612
2 Special adaptor RH 9881

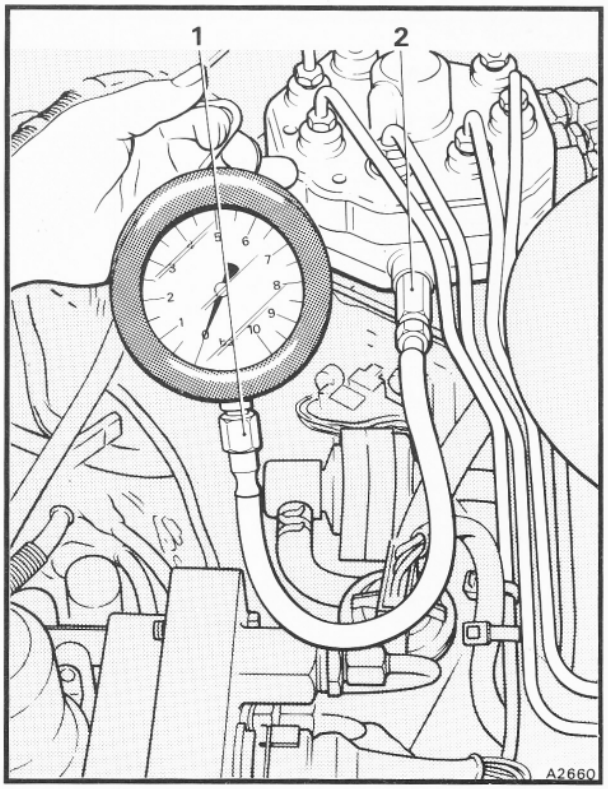


Fig.10 Pressure gauge RH 9612 connected to the differential pressure valve lower chamber test point

1 Pressure gauge RH 9612
2 Special adaptor RH 9881

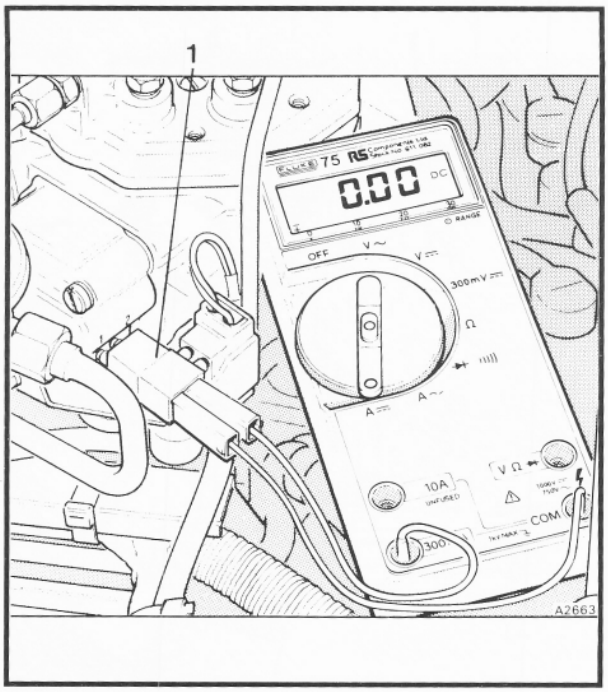


Fig.11 Digital multimeter connected as a milliammeter in series with the electro-hydraulic actuator
1 Special adaptor RH 9893

Digital Multimeter

The Electro-hydraulic Actuator

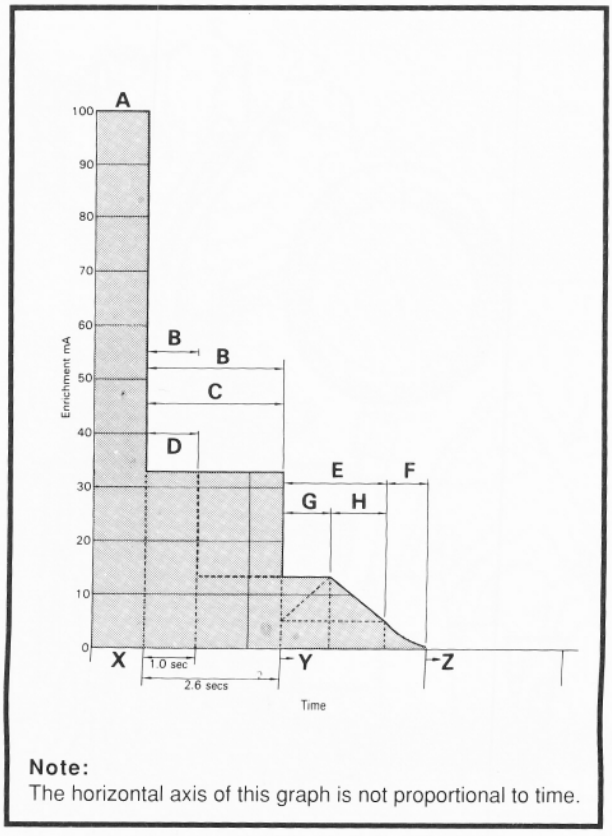
When checking the operation of the fuel injection system, a digital multimeter is used to observe the current drawn by the electro-hydraulic actuator which shows what mixture enrichment or weakening is taking place while the engine is running.

It is essential to use a digital multimeter for this check to ensure accuracy of readings and also to cater for the reverse polarity which occurs during idling on cars fitted with catalytic converters.

Key to figs 12 & 13 (See Page 11 for additional explanation)

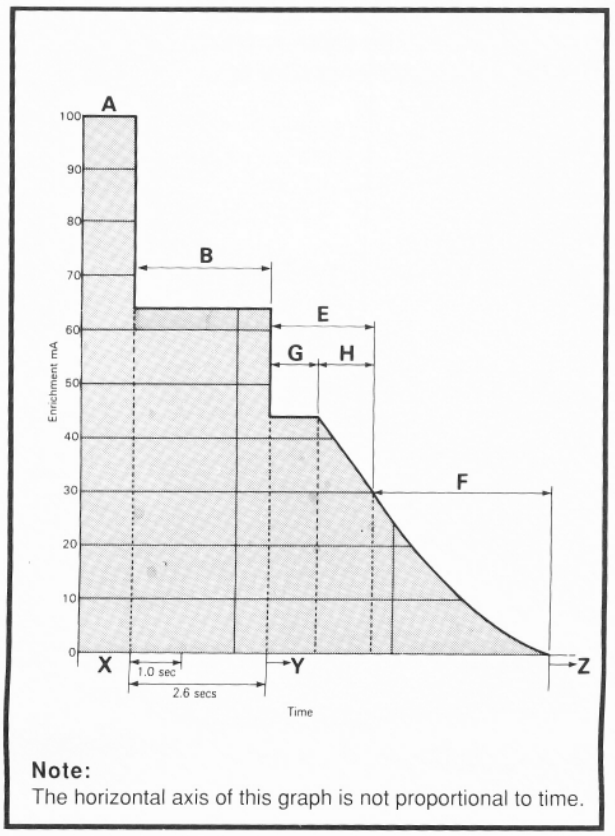
A	Stand current	E	After start enrichment
B	Start enrichment	F	Warm-up enrichment
C	Throttle plates open	G	Plateau time
D	Throttle plates closed	H	Decontrol time

X Time period dependent upon length of time ignition is switched on.
Y Enrichment functions beyond this point are solely coolant temperature dependent.
Z **'Closed -loop'** operation for cars fitted with catalytic converters.
'Open-loop' operation with basic compensation of 0 mA for cars not fitted with catalytic converters.



Note:
The horizontal axis of this graph is not proportional to time.

Fig.12 Typical electro-hydraulic actuator current consumption, from engine start at 20°C (68°F)



Note:
The horizontal axis of this graph is not proportional to time.

Fig.13 Typical electro-hydraulic actuator current consumption, from engine start at 0°C (32°F)

Summary of Electrical System Changes (Continued)

Front seat heaters
(See page 24 for further details)

1 Both front seats of all motor cars have thermostatically controlled electrical seat heater elements fitted in the seat squabs and cushions.

2 These heaters are operated by three position switches located in the minor controls panel in the central console.

The switches have three settings:

Low (35±2 °C), Off and High (40±2 °C).

Front seats lumbar support system
(See page 24 for further details)

1 An adjustable lumbar support system is fitted to the squabs of each of the front seats.

2 The system is controlled by two three-way switches located on the outer trim of each seat below the seat cushion.

Driver's seat memory

1 The positions of both external mirrors are included in the memory function for the driver's seat.

2 A test box has been introduced to check the operation of the front seat memories.

External mirrors

1 New external mirrors contain mechanisms with feedback potentiometers to enable the ECU to establish the mirrors positions in relation to datum points memorised by the ECU during the reference position calibration procedure.

Adjustable rear seats
(See page 25 for further details)

1 Adjustable rear seats are introduced as a standard fitment on Silver Spur II motor cars.

'Heel board' interior lamps

1 The 'heel board' interior lamps are repositioned into the front of the rear seat cushion.

Cellular telephone

New equipment has been fitted with repositioned microphone and an individual loudspeaker.

In-car entertainment

New equipment has been introduced.

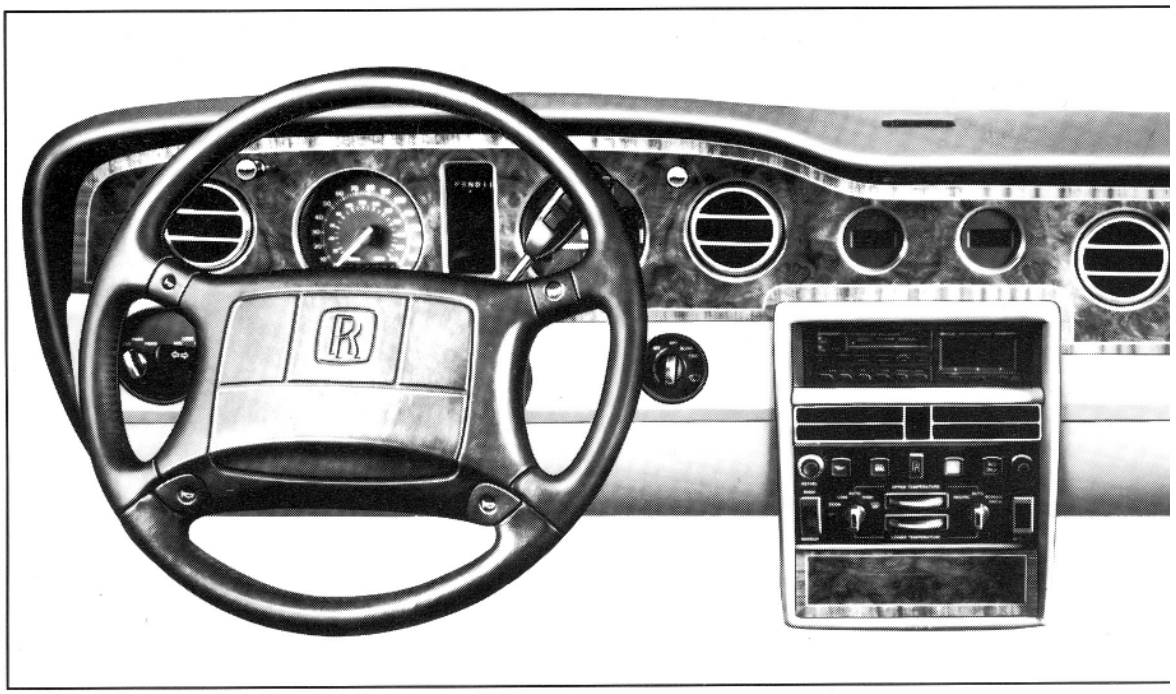


Fig. 2 Facia – Rolls-Royce built to North American specifications

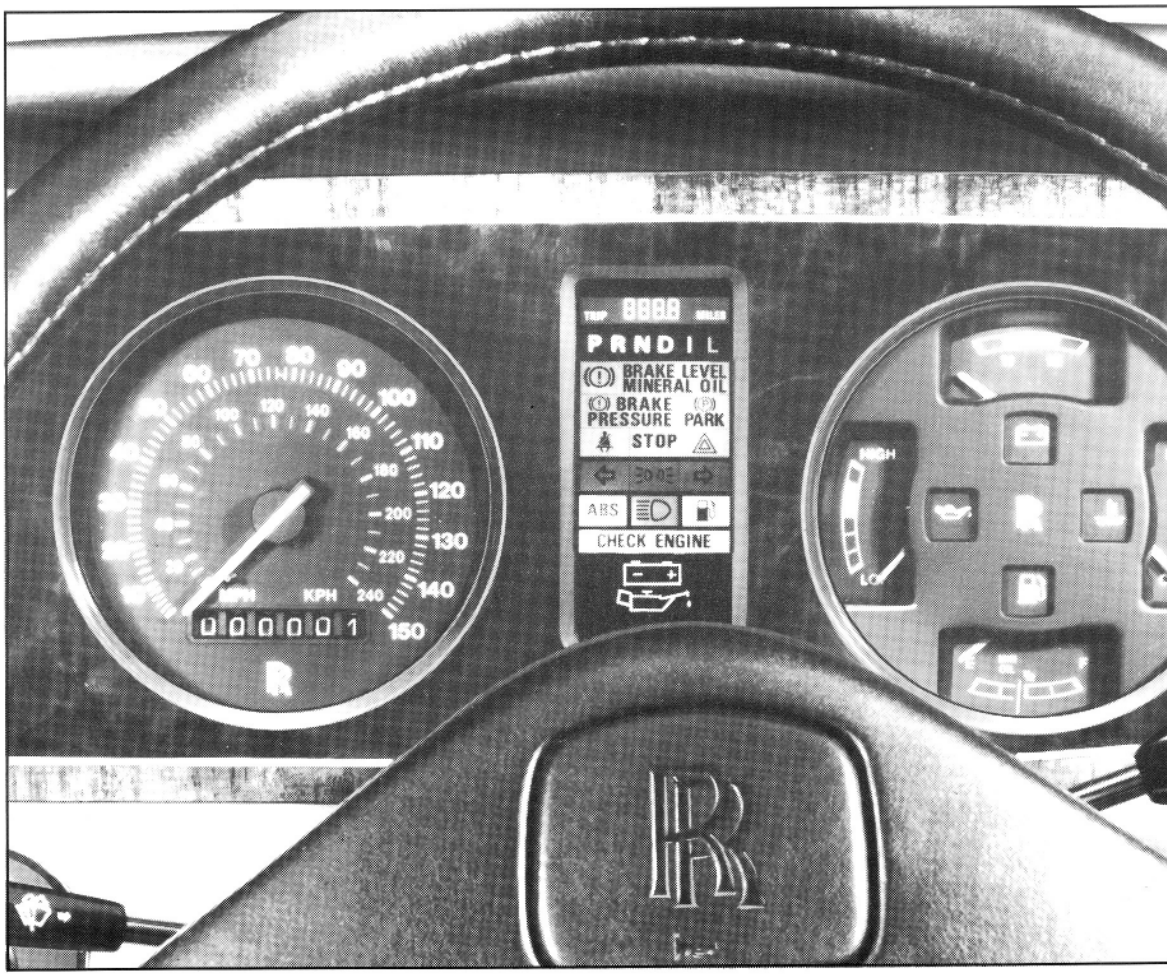


Fig. 3 Speedometer, driver's information panel and four-in-one instrument

Instruments, Switches and Controls

Instruments, switches and controls have been relocated to enable two additional ACU 'bulls-eye facia vents to be fitted. New smaller lower capacity wafer switches have been introduced. New push-push switches have been introduced for minor controls.

Modular instrumentation

Dependent on marque, the speedometer, four-in one instrument or tachometer and a new driver information panel are combined into a single new modular central instrument. The assembly features film type circuitry, plug in bulbs and its functions are controlled by an internal microprocessor.

Four-in-one instrument

This instrument has been redesigned and incorporated in a new modular instrument panel.

Drivers information panel
(See page 12 for further information)

This is a new instrument which consists of 4 elements:

A digital trip-odometer which is switchable from the facia

The gear selector indicator

A bank of warning lights

A dot matrix sequential panel which enables various warnings to be displayed.

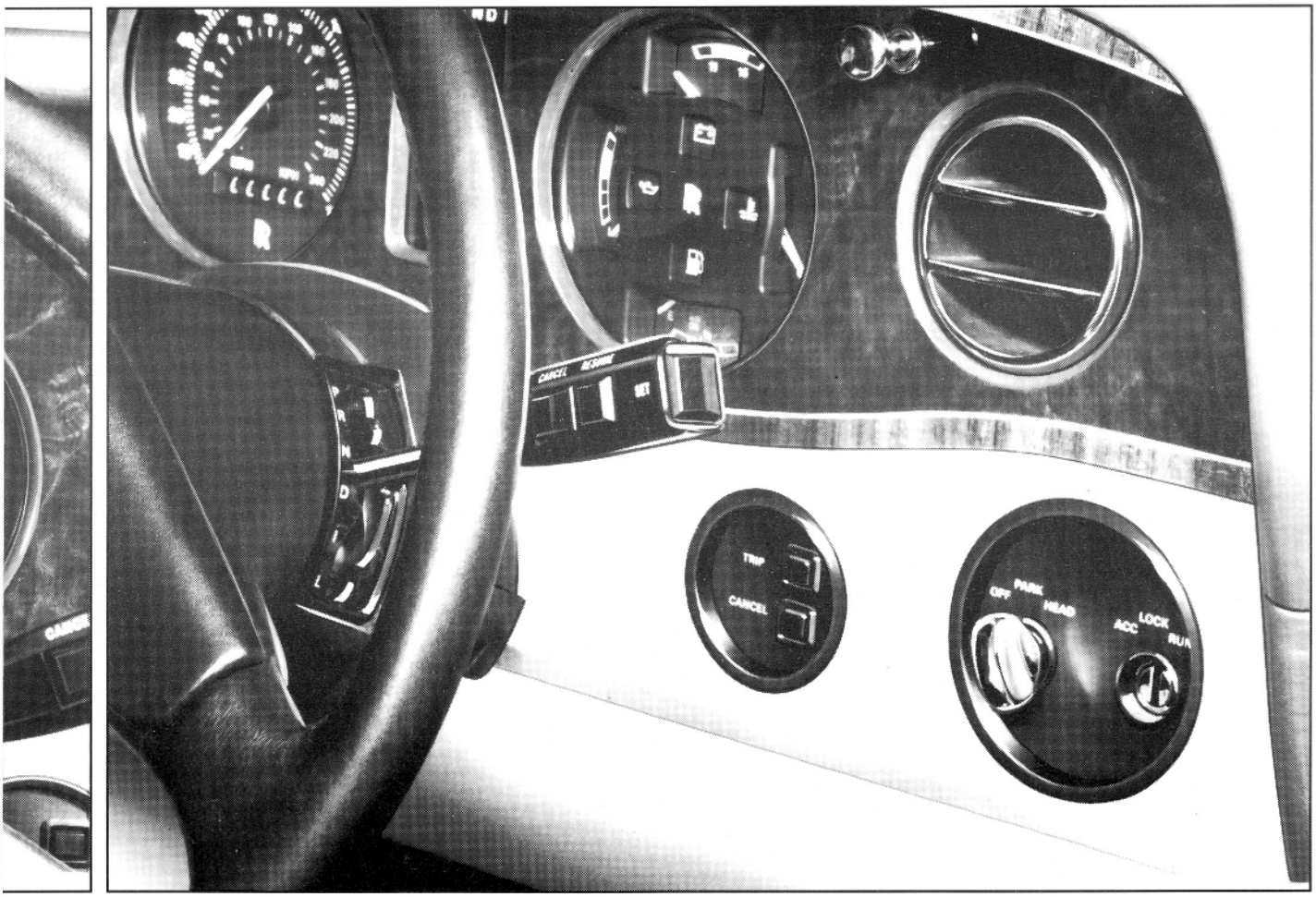
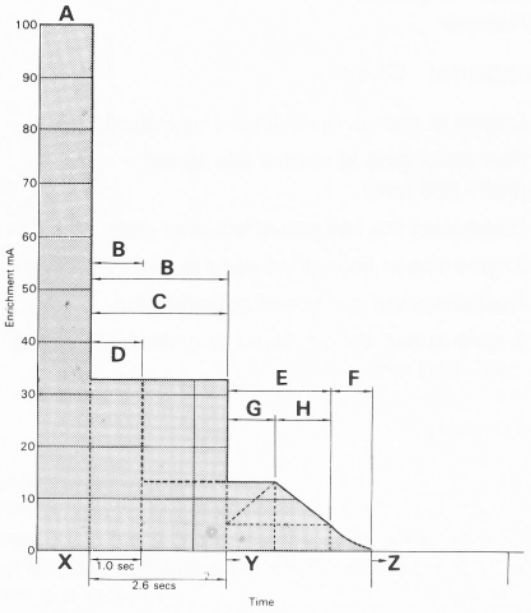
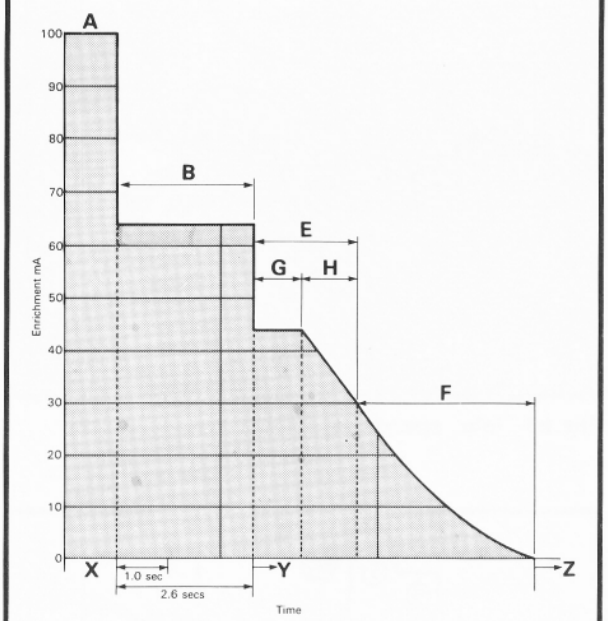


Fig. 4 Ignition switch, headlamps switch, trip and cancel switches



Note:
The horizontal axis of this graph is not proportional to time.

Fig.18 Typical electro-hydraulic actuator current consumption, from engine start at 20°C (68°F)



Note:
The horizontal axis of this graph is not proportional to time.

Fig.19 Typical electro-hydraulic actuator current consumption, from engine start at 0°C (32°F)

Key to figs 18 & 19

A	Stand current	E	After start enrichment
B	Start enrichment	F	Warm-up enrichment
C	Throttle plates open	G	Plateau time
D	Throttle plates closed	H	Decontrol time

X Time period dependent upon length of time ignition is switched on.

Y Enrichment functions beyond this point are solely coolant temperature dependent.

Z **'Closed -loop'** operation for cars fitted with catalytic converters.
'Open-loop' operation with basic compensation of 0 mA for cars not fitted with catalytic converters.

Stand current (pre-cranking)
Whenever the ignition is switched on and the engine speed is below 30 rev/min, the K-Motronic electronic control unit supplies the electro-hydraulic actuator with a constant current of 100±2 mA. This function is not temperature dependent.

Start enrichment
Start enrichment is present during cranking and continues until:

a the engine speed exceeds 430 rev/min.
b a period of 1 second is exceeded with the throttle plates closed.
c a period of 2.6 seconds is exceeded with the throttle plates open.

This function is temperature dependent.

After start enrichment
As soon as the engine speed exceeds 430 rev/min or the appropriate time period has elapsed for the start enrichment period, the K-Motronic engine management system selects the after start enrichment function. This provides smooth engine running during the initial fuel injector stabilization period. The magnitude and duration of this enrichment function is temperature dependent and can be divided into two elements:

a Plateau time when the enrichment current remains constant.
b Decontrol time when the enrichment current decays propotionally with time.

Warm-up enrichment
This final enrichment function, provides mixture enrichment from the completion of the after start enrichment phase until the engine has reached normal operating temperature. It is temperature dependent and decays as the coolant temperature increases.

A table detailing the above enrichment factors will be found in Appendix A (Page 47).

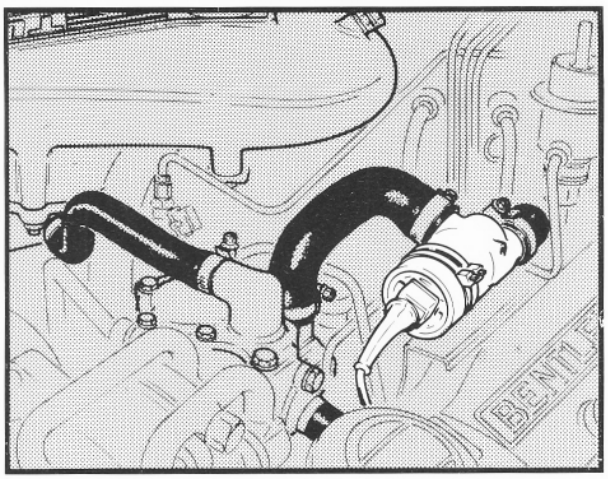


Fig.20 Idle speed actuator

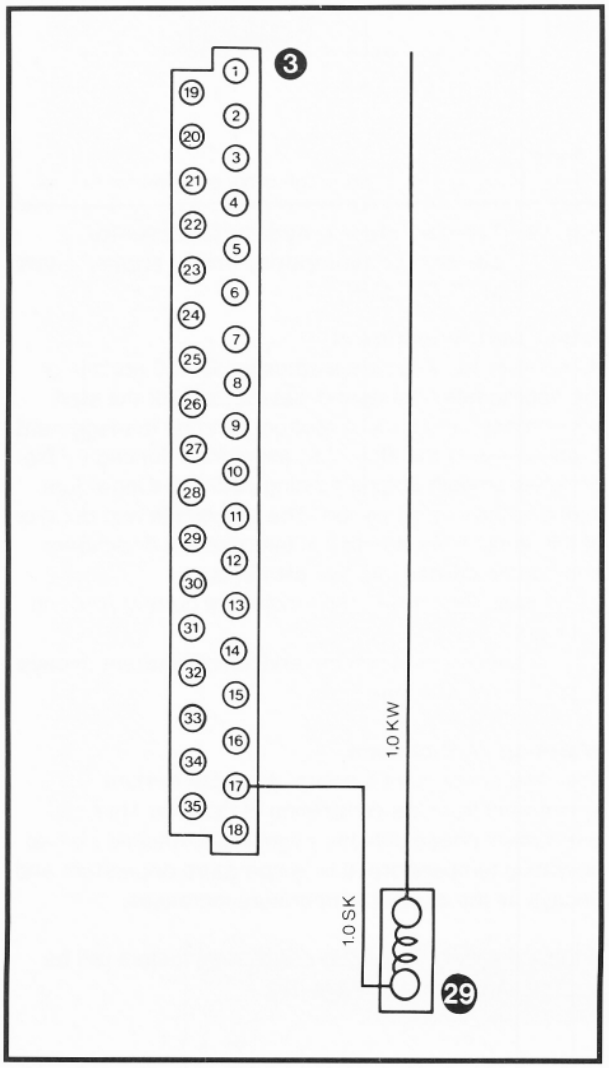


Fig.21 Idle speed actuator wiring diagram

Idle Speed Actuator

Tools Required

Tachometer

Functional Check

1 Engine at normal operating temperature.

2 Run the engine at normal idle speed (580 - 620 rpm).

3 Disconnect the idle speed actuator plug.

4 Engine speed should increase to 820 - 860 rpm.

5 Reconnect the idle speed actuator plug.

6 Engine speed should return to normal idle speed (580 - 620 rpm).

Comments

The act of disconnecting the electrical supply to the idle speed actuator effectively mimics the electronic control unit operating the idle speed actuator in the limp home mode. In this condition there is no electrical feed to turn the armature to the closed position. Therefore the spring pulls the armature back to its rest position, in which the valve is slightly open.

Incorrect Operation

If the idle speed remains at 580 - 620 rpm when you disconnect the plug, then there is either a restriction in the idle by-pass pipe or the idle speed actuator is stuck.

If the idle speed increases to 820 - 860 rpm when the plug is disconnected but fails to return to 580 - 620 rpm when you reconnect the plug, then there is a fault in the positive feed to the idle speed actuator or in the negative control wire from the K-Motronic electronic control unit.

If problems are experienced with idle speeds that are uneven or higher than the accepted norm, the throttle position switch (TPS) integrity and adjustment should be verified, as the K-Motronic ECU will only effectively control the idle speed when it is informed by the throttle position switch that the throttles are in the idle position.

Priority two messages

Priority two warnings are reserved for warnings or information concerning functions which are required whilst driving.

They include front foglamps on, rear foglamps on, low battery charge, ice warning, automatic ride control and low washer fluid.

Like the priority one messages, the second order warnings will be displayed whenever the ignition is switched on or the engine is running until the fault is cleared or the function such as the rear fog lamps is switched off.

If a number of priority two messages are present while driving, they will appear for 15 seconds when they first occur, and then cycle with a four second period on each.

Unlike the priority one warnings, the priority two warnings can be cancelled and recalled by the driver pressing the CANCEL button in the switch panel beside the ignition switch.

If the priority two messages have been cancelled and a further priority two warning develops, this will be displayed and the display will cycle with all the other priority two messages until the CANCEL button is pressed once more.

Priority one messages

The highest priority, priority one is reserved for warnings critical to the safety of the occupants or the engine.

These warnings include engine coolant, air bag, catalyst overheat, oil pressure and oil pressure and battery charge.

Priority one warnings will be displayed if a fault occurs in the appropriate system, for example low engine oil pressure and will remain illuminated whenever the ignition is switched on or the engine is running until the fault is cleared.

If more than one message is present, the messages will be cycled regularly with a period of 4 seconds for each message.

If a priority two warning occurs while a priority one message is being displayed, the priority two message will be displayed for 15 seconds. It will then self cancel and be replaced by the priority one message which will incorporate the downward arrow symbol.

If a new priority one warning occurs during this 15 second period, the appropriate new message will be displayed 4 seconds, after which the priority two message will be displayed for a new period of 15 seconds, if the input is still valid.

Pressing the CANCEL button at any time while one or more priority one messages are being displayed will cause the display to page through the priority two messages with a period of 4 seconds for each message.

Combination of messages

Where a combination of priority one and two messages exist, the priority one messages will take precedence and 'Down Arrow' display will indicate the presence of priority two messages. These can be accessed by pressing the CANCEL button.

Special messages

Other messages are displayed when the engine is switched off or when switching the ignition on, to provide warnings such as side lamps illuminated.

Audible warnings

In addition to the visual display some markets require certain warnings, the sidelights reminder, seat belt warning, key warning and overspeed warning, to be accompanied by audible warnings.

The warning tones for these functions are generated by a piezo device mounted on the panel's microprocessor.

'Driver Demonstration' facility

An easy way to familiarise yourself with a panel and its display is to select park, turn the ignition to the accessory position and then press the CANCEL button until the display changes.

This action initiates the 'Driver Demonstration' facility which is programmed into the panel control unit to assist sales-people in demonstrating this feature to owners. The panel will then page through all the warnings programmed for that particular car showing each message for approximately four seconds.

The gearchange fuse, B1 on fuseboard 1, must be fitted in its holder for this function to operate.

If the interior lamps fuse, A1 on fuseboard 2, is fitted in its holder, all the doors must be closed for this function to operate.

Dot matrix sequential panel display of K-Motronic fault (blink) codes

The driver's information has a diagnostic function which enables it to display blink codes stored by intelligent electronic control units, currently the K-Motronic engine management ECU and, when fitted, the ECU for the Air bag passive restraint system which is described on page 26.

In the case of the K-Motronic engine management system, fault codes are displayed using the CHECK ENGINE warning lamp and additional messages displayed on the dot matrix panel.

This is described in detail on page 46.

Dot matrix sequential panel display of Air bag fault (blink) codes

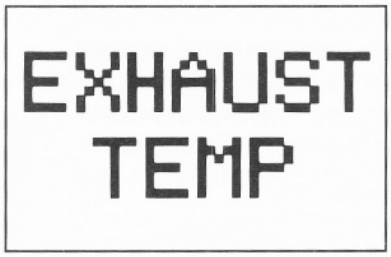
Fault codes for the air bag system when fitted are displayed using the dot matrix display only.

This is described in detail on page 32.

Driver's Information Panel – Priority 1 Dot Matrix Display Messages

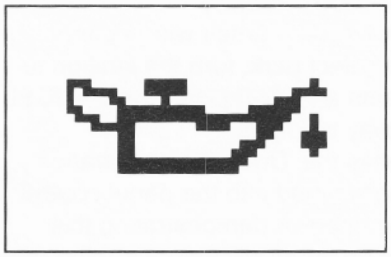
AIR BAG Legend

Colour: Red
Audible Warning: None
Markets: USA/Canada Only
Priority Level: 1
Warning: Fault in driver's air bag passive restraint system



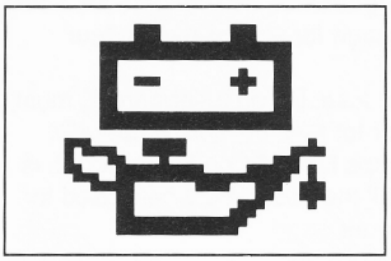
EXHAUST TEMP Legend

Colour: Red
Audible Warning: None
Markets: Japan only
Priority Level: 1
Warning: Catalytic converter overheating
Note: The CHECK ENGINE warning lamp is illuminated when this message is displayed.



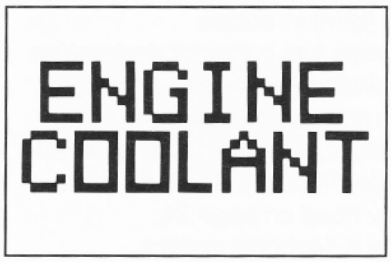
Oil Pressure Symbol

Colour: Red
Audible Warning: None
Markets: All markets
Priority Level: 1
Warning: Low oil pressure



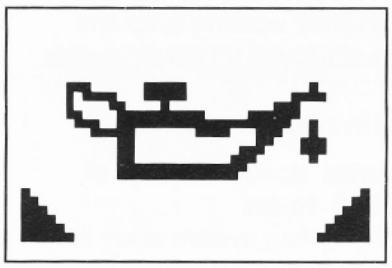
Battery and Oil Symbol

Colour: Red
Audible Warning: None
Markets: All markets
Priority Level: 1
Warning: Low battery charge and low oil pressure



ENGINE COOLANT Legend

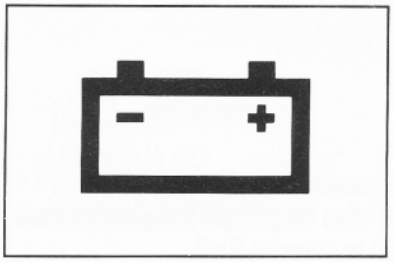
Colour: Amber
Audible Warning: None
Markets: All markets
Priority Level: 1
Warning: Low engine coolant



Down Arrow Symbol

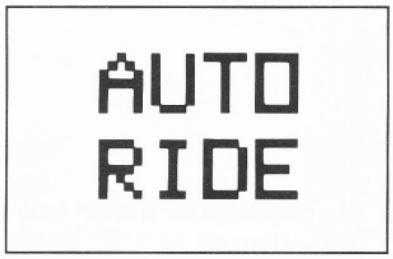
Colour: Green
Audible Warning: None
Markets: All markets
Priority Level: Special
Warning: Reminder that priority 2 messages exist which have been cancelled. This message is superimposed on the priority one message, for example the oil pressure symbol, being displayed.

Driver's Information Panel – Priority 2 Dot Matrix Display Messages



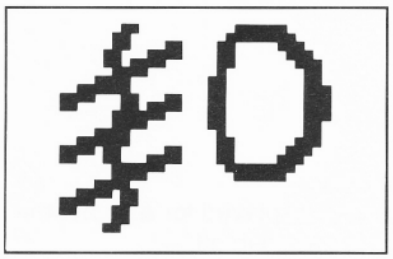
Battery Symbol

Colour: Red
Audible Warning: None
Markets: All markets
Priority Level: 2
Warning: Low battery charge
Note: This message is also displayed with the ignition key in the accessory position



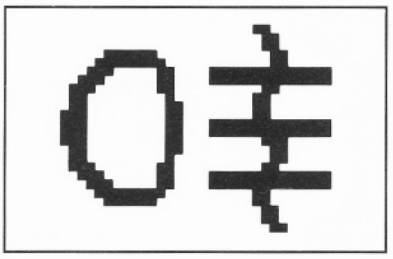
AUTO RIDE Legend

Colour: Amber
Audible Warning: None
Markets: All markets. Four-door cars only.
Priority Level: 2
Warning: Fault exists in automatic ride control system.



Front Fog lamp Symbol

Colour: Green
Audible Warning: None
Markets: Japan + Customer Option
Priority Level: 2
Warning: Front fog lamps are switched on.



Rear Fog lamp Symbol

Colour: Amber
Audible Warning: None
Markets: UK, Europe and Middle East + Customer Option
Priority Level: 2
Warning: Rear fog lamps are switched on.

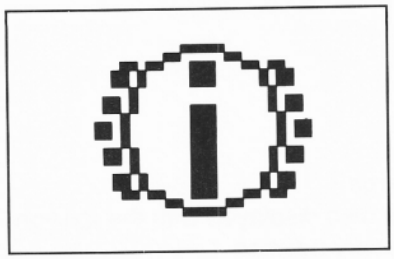
ICE Legend

Colour: Amber
Audible Warning: None
Markets: All markets
Priority Level: 2
Warning: Ambient air ice warning

WASHER FLUID Legend

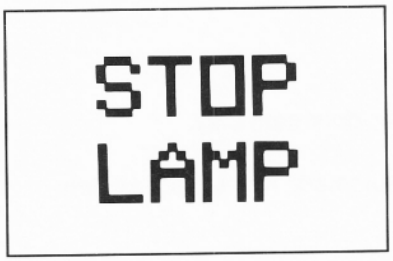
Colour: Amber
Audible Warning: None
Markets: All markets
Priority Level: 2
Warning: Low washer fluid level
Note: This message is also displayed with the ignition key in the off position

Driver's Information Panel – Priority 3 Dot Matrix Display Messages



Brake Pad Wear Symbol

Colour:	Amber
Audible Warning:	None
Markets:	All markets
Priority Level:	3
Warning:	Brake pad wear reminder
Note:	This message is also displayed for a short time when the ignition is switched off.



STOP LAMP Legend

Colour:	Red
Audible Warning:	None
Markets:	All markets.
Priority Level:	3
Warning:	Brake lamp failure
Note:	This message is also displayed for a short time when the ignition is switched off.

WASHER FLUID Legend

Colour:	Amber
Audible Warning:	None
Markets:	All markets
Priority Level:	3
Warning:	Low washer fluid level
Note:	This message is also displayed for a short time when the ignition is switched off.

Driver's Information Panel – Programming

The same display panel and control unit is used for all cars irrespective of market, model and customer option.

Individual characteristics are programmed into the unit during assembly at Crewe. When replacing a driver's information panel it will be necessary to programme the panel according to the motor car's specification.

It may also be necessary to reprogramme the panel when an additional feature, for example front fog lamps, is fitted at the customer's request after the car has been built.

To programme the panel, select the diagnostic mode by pressing theTRIP and CANCEL buttons until the dot matrix display extinguishes and the CHECK ENGINE and ABS warning lamps illuminate.

Release and press the buttons again until the control unit in the panel enters the option select mode. This is indicated by a trip-odometer display changing to show the vertical elements of the digital display and the words TRIP and either KM or MILES. The display will depend on the specification programmed into the panel's microprocessor.

Each vertical segment, and the words at either end of the display, TRIP and KM or MILES indicates a display function.

The presence of a tall " ¦ " as a vertical element indicates that the function is switched on.

The presence of a short " ˌ " indicates that the function is switched off.

The illumination of the legend KM indicates that the Trip-odometer will display readings in kilometres. Illumination of the legend MILES indicates that the Trip-odometer will display readings in miles.

During programming, the TRIP button is pressed to select a particular function. When the button is pressed for the first time, the TRIP legend will flash. Further presses of the TRIP button will cause each individual vertical element to flash indicating that the particular element can be reprogrammed.

When the relevant function requiring reprogramming has been selected using the trip button, the CANCEL button is pressed to change the display for that function.

If a selected function shows a tall " ¦ " (function switched on), pressing the CANCEL button will change the display to a short " ˌ ' (function switched off). Pressing the CANCEL button again will change the display for that element back to a tall " ı " (function switched on).

Fuel Gauge Calibration

The Low Fuel level warning is sensitive to the electrical resistance of the circuit.

During assembly this function is calibrated to minimise errors caused by the voltage drop in the cables and the change in the resistance of the meter coil between cold and normal operating conditions.

If either the driver's information panel or fuel gauge is changed in service, then it will be necessary to recalibrate the control unit.

To recalibrate the control unit, connect the test box RH 12416 and switch it on. Switch on the ignition.

Press the TRIP and CANCEL Buttons simultaneously for two consecutive periods to select the option select mode.

Then press the TRIP button for six seconds or until the calibration tone is heard. Calibration will now take place over the following five minute period during which the fuel gauge reaches a predetermined operating temperature when the processor in the cluster reads and stores a voltage corresponding to a low level.

The calibration tone will repeat at 10 second intervals while calibration is taking place.

As soon as the process is complete, the instrument panel emits a continuous tone. Switch off the test box and disconnect it.

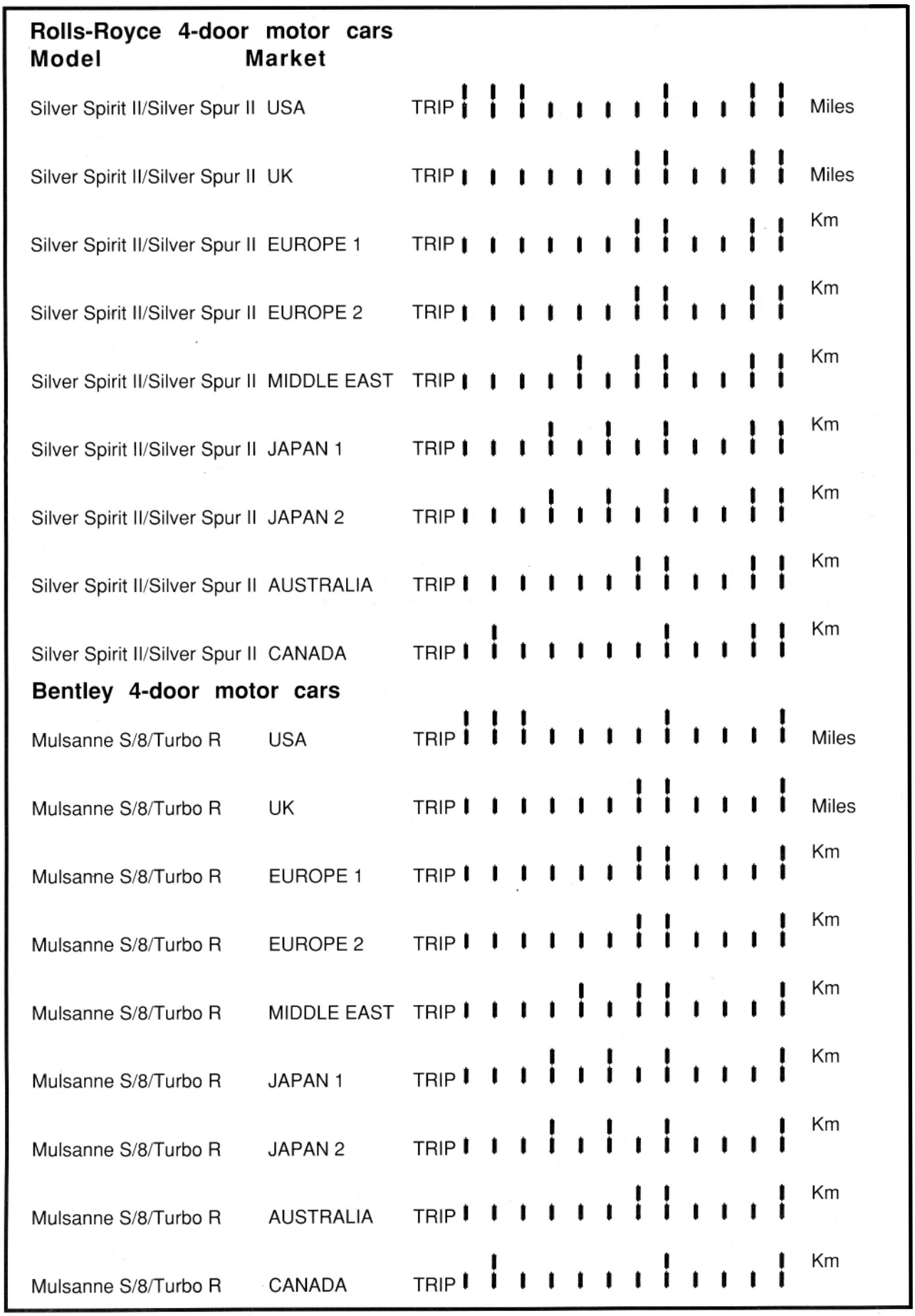


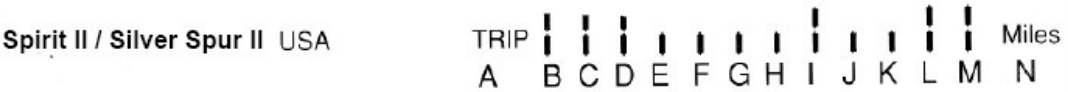
Fig. 10 Driver's Information Panel – Model/Market Selection Chart

9/89
Printed in England

Rolls-Royce and Bentley Two Door Cars

Model	Market		
Corniche III / Continental	USA	TRIP	Miles
Corniche III / Continental	UK	TRIP	Miles
Corniche III / Continental	EUROPE 1	TRIP	Km
Corniche III / Continental	EUROPE 2	TRIP	Km
Corniche III / Continental	MIDDLE EAST	TRIP	Km
Corniche III / Continental	JAPAN 1	TRIP	Km
Corniche III / Continental	JAPAN 2	TRIP	Km
Corniche III / Continental	CANADA	TRIP	Km

Fig. 10 Driver's Information Panel - Mode/Market Chart - Select Option Code on Trip/Odometer Display



▌ = Feature 'selected' ▌ = Feature 'not selected'

Feature	Notes
Odometer and/or Trip Meter Selection	TRIP 'selected' for all motor cars
Airbag	Feature 'selected' on USA motor cars only
Key Warning	Feature 'selected' on USA/Canada motor cars only
Digital Outside Air Temperature Gauge Display °F or °C	°F when feature 'selected', °C when feature 'not selected'
Catalyst Overheat Warning	Feature 'selected' on Japan motor cars only
Overspeed Warning	Feature 'selected' on Middle East motor cars only
Front Fog Lamps	
Rear Fog Lamps	
Automatic Ride Control	Feature 'selected' on all 4-Door motor cars only
Not Used	Features 'not selected' on all motor cars
Rolls-Royce/Bentley Digital Output Control For Digital Instrumentation	Rolls-Royce with digital clock and outside air temperature gauge when feature 'selected', Bentley with analogue clock and outside air temperature gauge when feature 'not selected', All Corniche III cars are fitted with analogue clock and outside air temperature gauge and, therefore, are programmed as Bentley – feature 'not selected'
Not Used	Feature 'selected' on all motor cars
Odometer/Trip Meter Display Km or MILES	MILES 'selected' on UK/USA motor cars only