Checking Procedure

General Information

This Checking Procedure contains the diagnosis of the following electronic system:

- GMPT-E15, Z 22 SE

Vehicle Diagnostic Concept:

The main purpose of a vehicle diagnostic concept is locating and eliminating faults in the shortest time possible. Therefore, the following diagnostic strategy has been developed as a guideline that leads technicians straight to the source fault:

Starting point is the vehicle that contains a certain number of electronic systems, e.g. engine management system, airbag, and ABS system.
Each of these electronic systems consists of so - called "functional groups" that are functionally related to each other. A Coolant Temperature Sensor Circuit for example represents such a functional group.
Each of the functional groups consists of several components, such as switches, sensors, wires etc. A Coolant Temperature Sensor Circuit for example is made up of a sensor, a wiring harness, a control unit, and the software of the control unit.
Based on this structure, the first diagnostic step should be the identification and localisation of the defective electronic system, next comes the diagnosis of the corresponding defective functional group, and finally, locate and repair of the defective component within that group.

The Diagnostic System Check (described in table A, Diagnostic System Check) of this checking procedure follows that diagnostic path. Diagnosis of an electronic system according to the above described concept always starts with this Main Check.

The instructions described in the Diagnostic System Check section must be followed closely. Every time a test or test step is passed without fault, the Diagnostic System Check continues with the next step. Some of the tests include references to related functional groups (tables B-x). When there is a fault, the corresponding functional group tests are performed in order to detect the defective functional group. When that group has been identified, the troubleshooting tables (C-x) are used to locate the faulty component. After repair of the fault, the affected functional group (tables B-x) must be rechecked to continue after this test at the appropriate position of the Diagnostic System Check (table A).
When all test steps of the Diagnostic System Check have been completed successfully, the system is fully operational.

Safety Measures

Please take notice of any relevant safety measures for each work operation / step.

The safety measures can be found in the following area of TIS 2000:

- Service Information
- Standard Information
- Select: Model
- Select: Model year
- Select: One or more assembly groups
- Application: Warnings, disclaimers, safety

Electronic System Specific Information

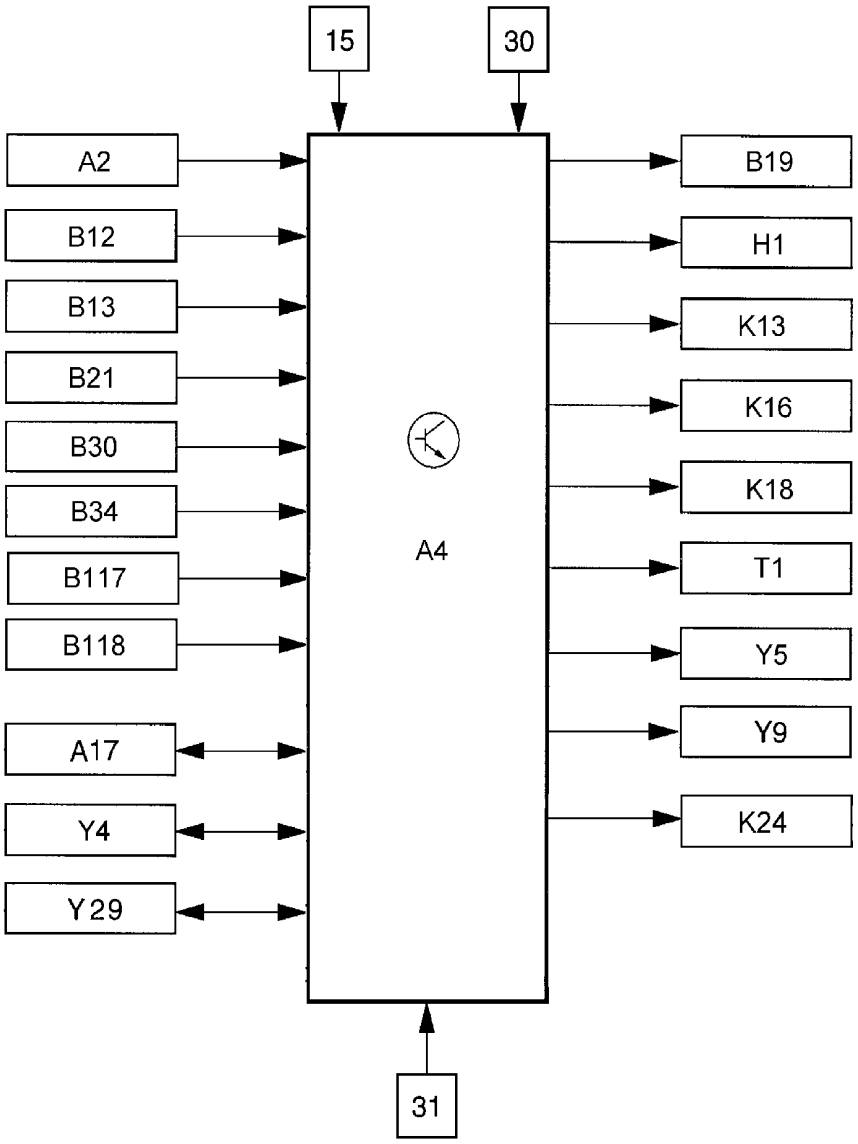
- **Trouble Code Features**
  In a few cases, the diagnostic tester may display a trouble code status or description that looks unfamiliar:

  Trouble Code Status:
  Instead of the known PRESENT, NOT PRESENT (and INTERMITTENT) message, you may read UNKNOWN DTC in the tester display. This tells you that the diagnostic software or control unit contains a piece of incorrect information that is unknown to the diagnostic tester and that it is unable to read or evaluate. Both the trouble code number and the trouble code text are not changed in this case.

  The above mentioned special cases can not be removed by means of a diagnostic tester function.
- **Data List Parameter**
  Depending on the vehicle/system configuration it is possible that some data list parameters or test steps, although they are listed in this checking procedure, are not shown on the diagnostic tester display. In that case, these data list parameters are not valid for this vehicle/system configuration.

Electronic System Picture Information

Block Diagram



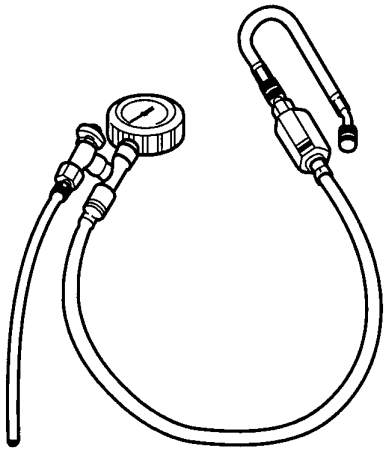
M 1005

Legend	Legend
15 Ignition ON (terminal 15)	B117 Sensor - Oxygen, Exhaust, Heated 1
30 System voltage (terminal 30)	B118 Sensor - Oxygen, Exhaust, Heated 2
31 Ground (terminal 31)	H1 Instrument
A2 Control Unit - Anti Lock Brake System	K13 Relay - Blower, Radiator
A4 Control Unit - Multec	K16 Relay - Fuel pump
A17 Control Unit - Immobiliser	K18 Relay - Engine Control Unit
B12 Sensor - Temperature, Coolant	K24 Relay - Starter
B13 Sensor - Temperature, Intake Air	T1 Ignition Coil - Direct Ignition
B19 Sensor - Pedal Position	Y4 Solenoid Valve - Exhaust Gas Recirculation

B21 Sensor - Absolute Pressure, Intake Manifold	Y5 Solenoid Valve - Tank Ventilation
B30 Sensor - Knocking Control 1	Y9 Injection Valve - Fuel
B34 Impulse Sensor - Crankshaft	Y29 Throttle Valve Positioner

Checking Equipment Engine

I



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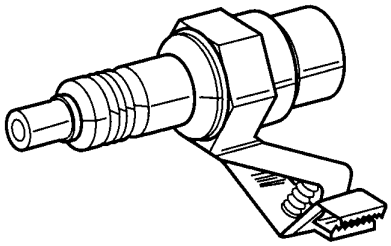
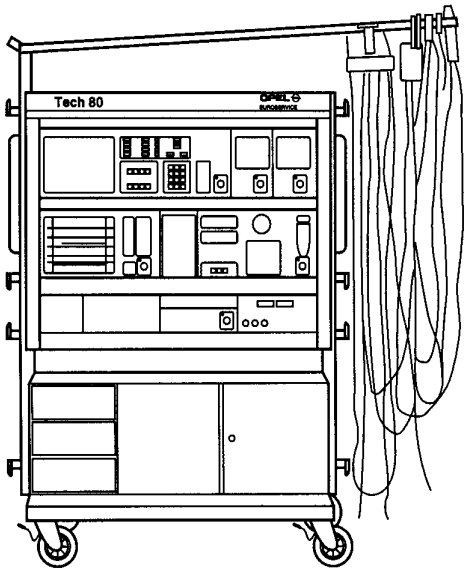


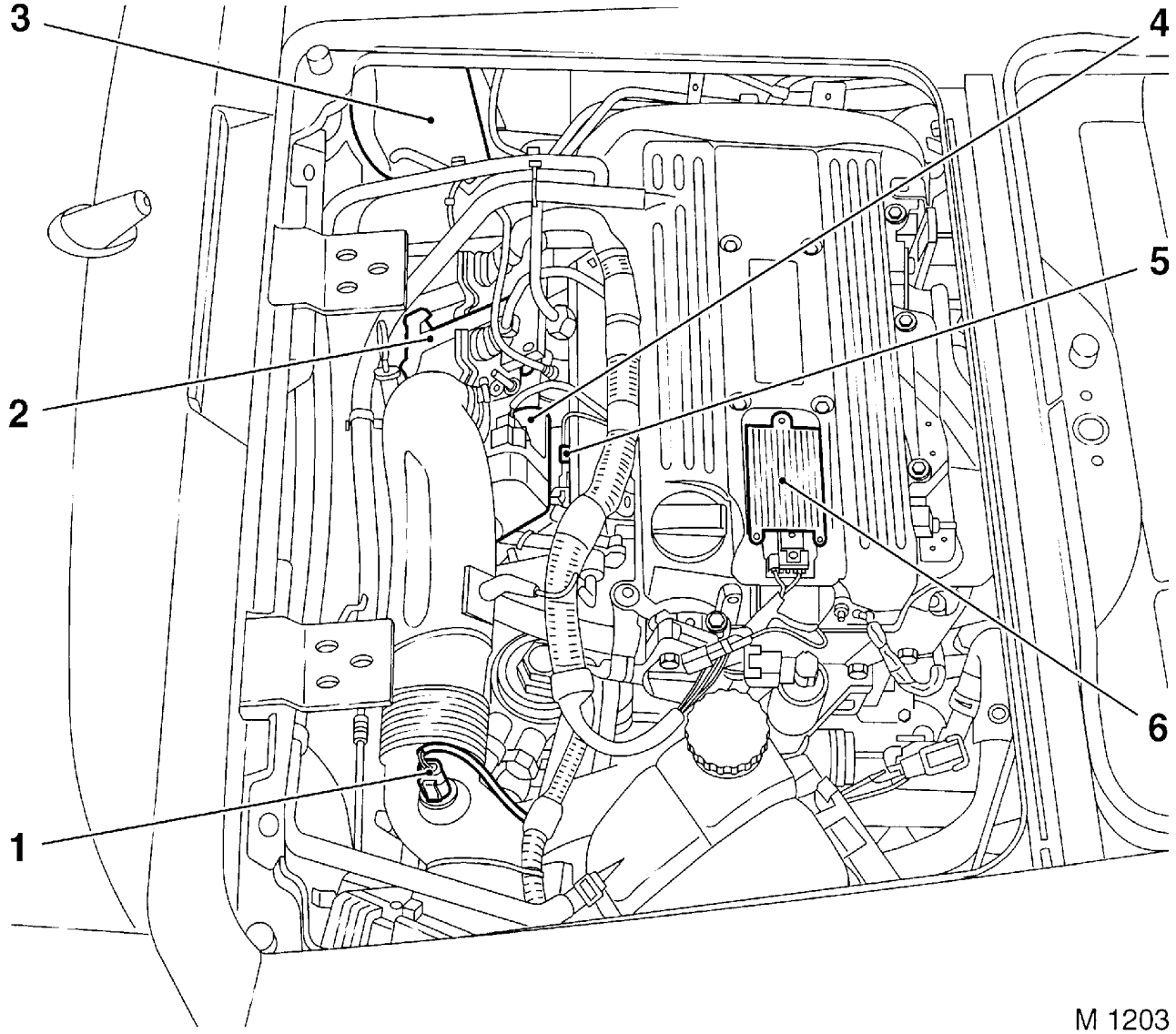
III IV



F 5487

No.	Checking Equipment	No.	Checking Equipment
I	Pressure Manometer KM-J-34730-91	III	Tachometer
II	Test Spark Plugs KM-J-26792	IV	Dwell-Angle Meter

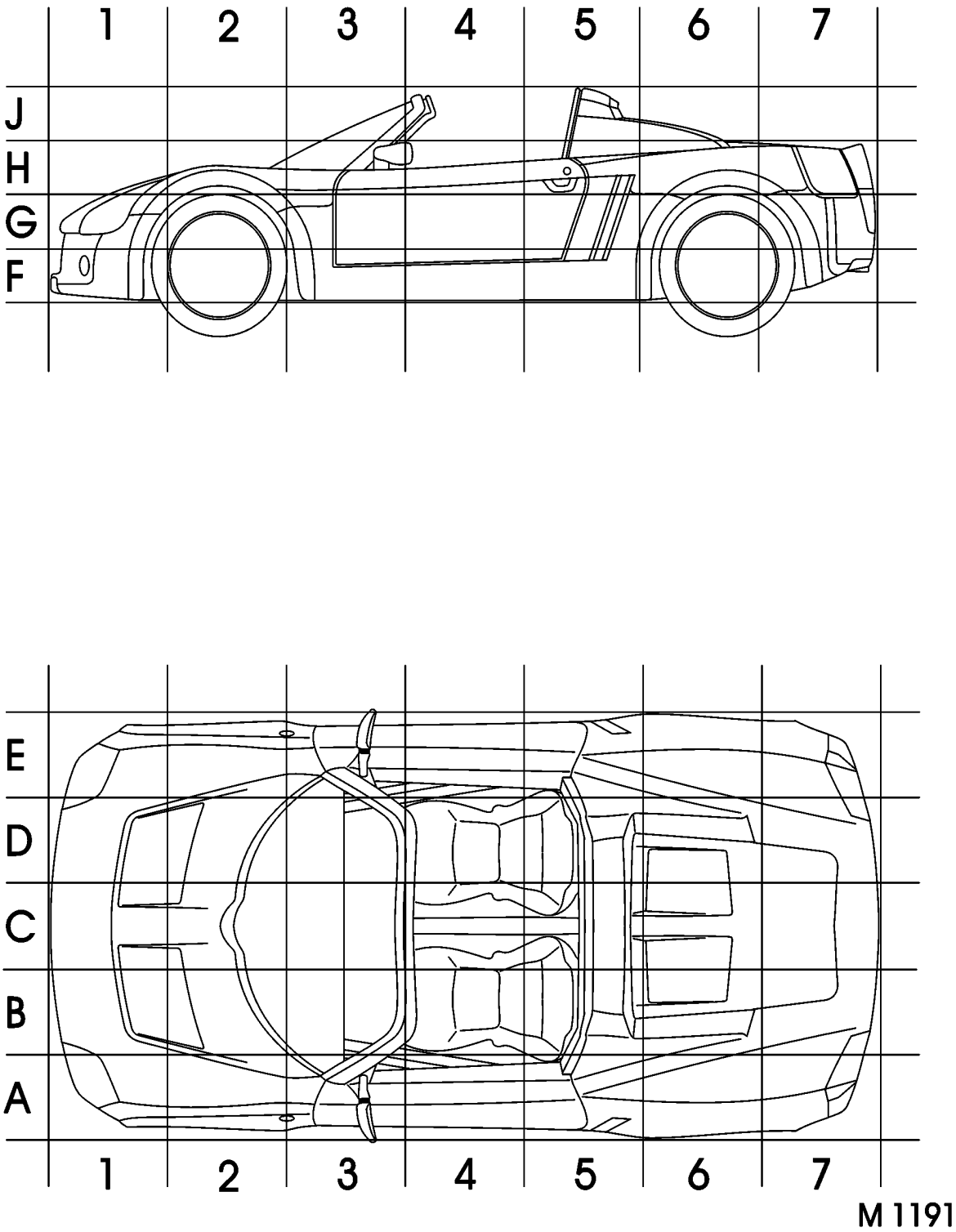
Components



M 1203

No.	Legend	No.	Legend
1	B13 Sensor - Temperature, Intake Air	4	Y29 Throttle Valve Positioner
2	A4 Control Unit - Multec	5	B30 Sensor - Knocking Control 1
3	Y5 Solenoid Valve - Tank Ventilation	6	T1 Ignition Coil - Direct Ignition

Parts Location



Component	LHD	RHD	Location
A1 Control Unit - Airbag	C3H	C3H	behind instrument panel
A2 Control Unit - Anti Lock Brake System	B2H	D2H	at hydraulic unit
A4 Control Unit - Multec	D6H	D6H	at intake manifold

A13 Control Unit - Anti Theft Warning Unit	D3H	B3H	behind instrument panel
A14 Radio	D3G	B3G	instrument panel
A17 Control Unit - Immobiliser	B3G	D3G	behind instrument panel
B12 Sensor - Temperature, Coolant	B6G	B6G	at engine
B13 Sensor - Temperature, Intake Air	B6H	B6H	at engine
B19 Sensor - Pedal Position	B3G	D3G	above foot compartment, driver side
B21 Sensor - Absolute Pressure, Intake Manifold	C6H	C6H	at engine
B30 Sensor - Knocking Control 1	B6F	B6F	at engine
B34 Impulse Sensor - Crankshaft	B6F	B6F	at engine
B117 Sensor - Oxygen, Exhaust, Heated 1	B6G	B6G	at exhaust system
B118 Sensor - Oxygen, Exhaust, Heated 2	A6G	A6G	at exhaust system
C1 Capacitor - Ignition Coil	B6H	B6H	at engine
G1 Battery	D2G	B2G	Body, front
G2 Alternator	D6G	D6G	at engine
H1 Instrument	B3H	D3H	instrument panel
H1.1 Charging Indicator Lamp	B3H	D3H	in the instrument
H1.4 Telltale - Airbag	B3H	D3H	in the instrument
H1.5 Telltale - Anti Lock Brake System	B3H	D3H	in the instrument
H1.6 Telltale - Engine	B3H	D3H	in the instrument
H1.22 Temperature Indicator - Coolant	B3H	D3H	in the instrument
H1.24 Tachometer	B3H	D3H	in the instrument
K13 Relay - Blower, Radiator	D2H	B2H	relay box
K16 Relay - Fuel pump	A7H	A7H	relay box, wheelhouse
K18 Relay - Engine Control Unit	A7H	A7H	relay box, wheelhouse

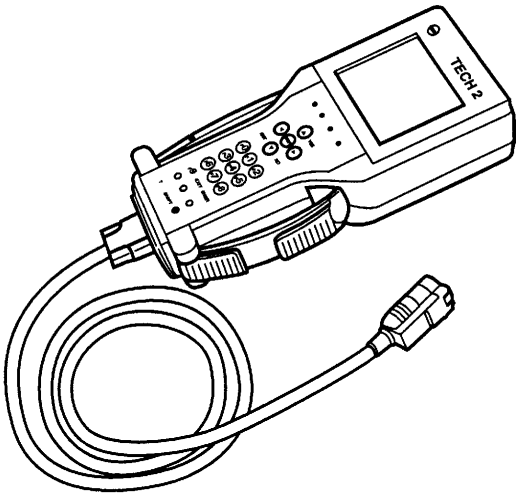
K24 Relay - Starter	A7H	A7H	relay box, wheelhouse
M1 Starter	C6G	C6G	at engine
M19 Motor - Blower, Radiator	C1F	C1F	radiator, left
M21 Pump - Fuel	B5G	B5G	in fuel tank
S1 Switch - Starter	B3H	D3H	at steering column
S4 Switch - Parking Lamp	B3H	D3H	instrument panel
S94 Shock Switch - Fuel Cut-Off	B7G	B7G	at cross member
S124 Switch - Starter Button	C3H	C3H	instrument panel
T1 Ignition Coil - Direct Ignition	B6H	B6H	at engine
X13 Diagnostic Link	D3G	B3G	above foot compartment, front passenger side
Y4 Solenoid Valve - Exhaust Gas Recirculation	B6H	B6H	at engine
Y5 Solenoid Valve - Tank Ventilation	B6H	B6H	at engine
Y9 Injection Valve - Fuel	B6H	B6H	at engine
Y29 Throttle Valve Positioner	B6H	B6H	at engine

Rated Fuse Current of the Fused Jumper Wire

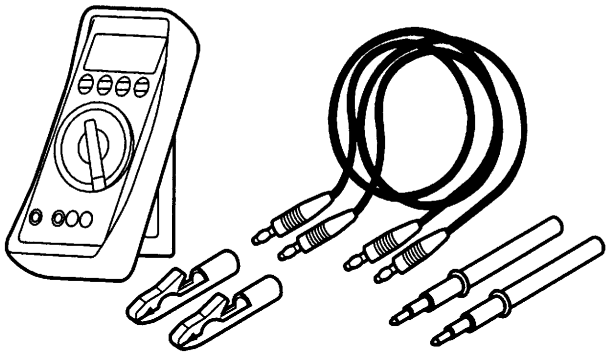
Wire gauge given in mm^2	Rated Fuse Current of the Fused Jumper Wire
0,35	3
0,5	5
0,75	7,5
1,0	10
1,5	15
2,5	2,5
4,0	30
6,0	30

Standard Diagnostic Checking Equipment

I



II



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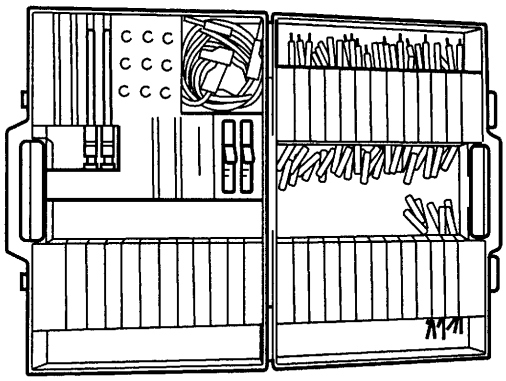

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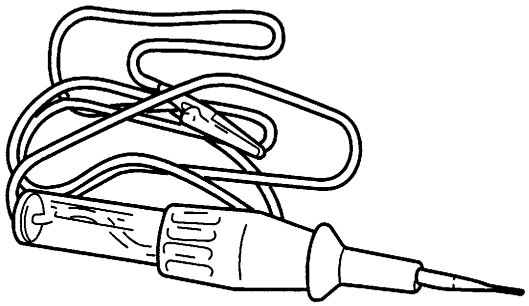
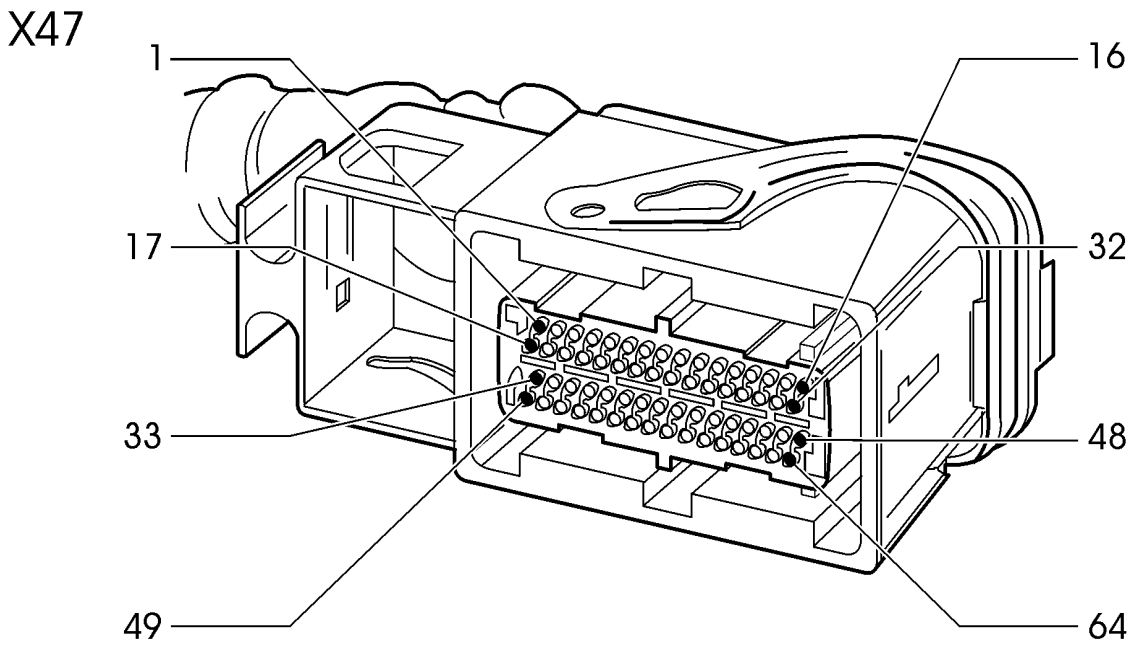


G 2431

No.	Checking Equipment	No.	Checking Equipment
I	TECH 2 Basic Kit and Adapters	III	Electronic Kit KM-609
II	Multimeter MKM-874 or Multimeter MKM-587-A	IV	Test Lamp KM-J-34142-B or Test Lamp KM-602-1

Terminal Assignment Control Unit Wiring Harness Plug X21 (J1)

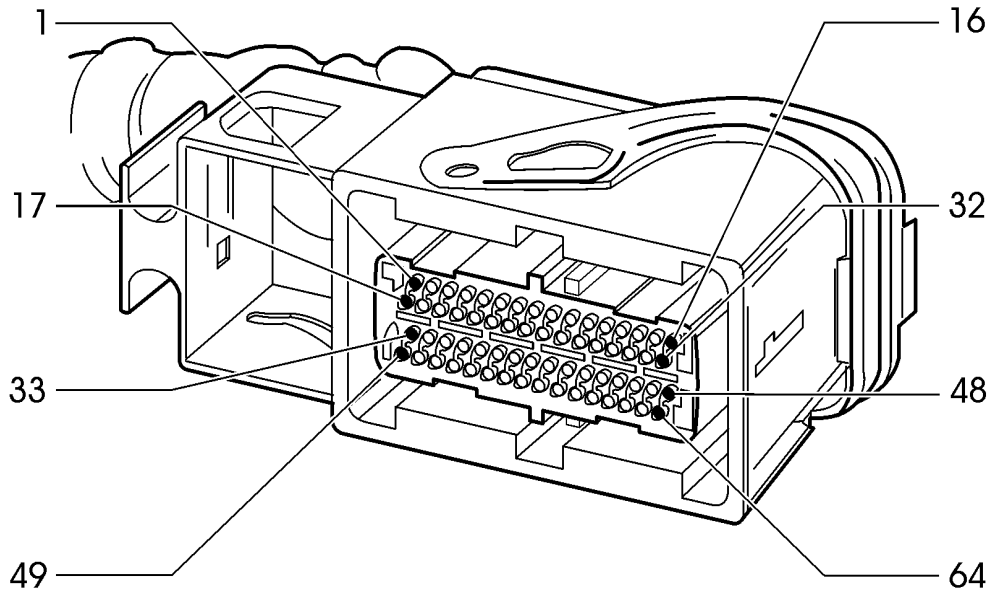


M 0817

No.	Legend	No.	Legend
9	H1.24 Tachometer	30	K18 Relay - Engine Control Unit
13	K13 Relay - Blower, Radiator	31	B19 Sensor - Pedal Position
18	A2 Control Unit - Anti Lock Brake System	49	B19 Sensor - Pedal Position
19	S1 Switch - Starter	53	B19 Sensor - Pedal Position
20	G1 Battery	59	A17 Control Unit - Immobiliser
21	B19 Sensor - Pedal Position	61	B19 Sensor - Pedal Position
25	H1.22 Temperature Indicator - Coolant	63	H1.6 Telltale - Engine
29	K16 Relay - Fuel pump	64	B19 Sensor - Pedal Position

Terminal Assignment Control Unit Wiring Harness Plug X22 (J2)

X46

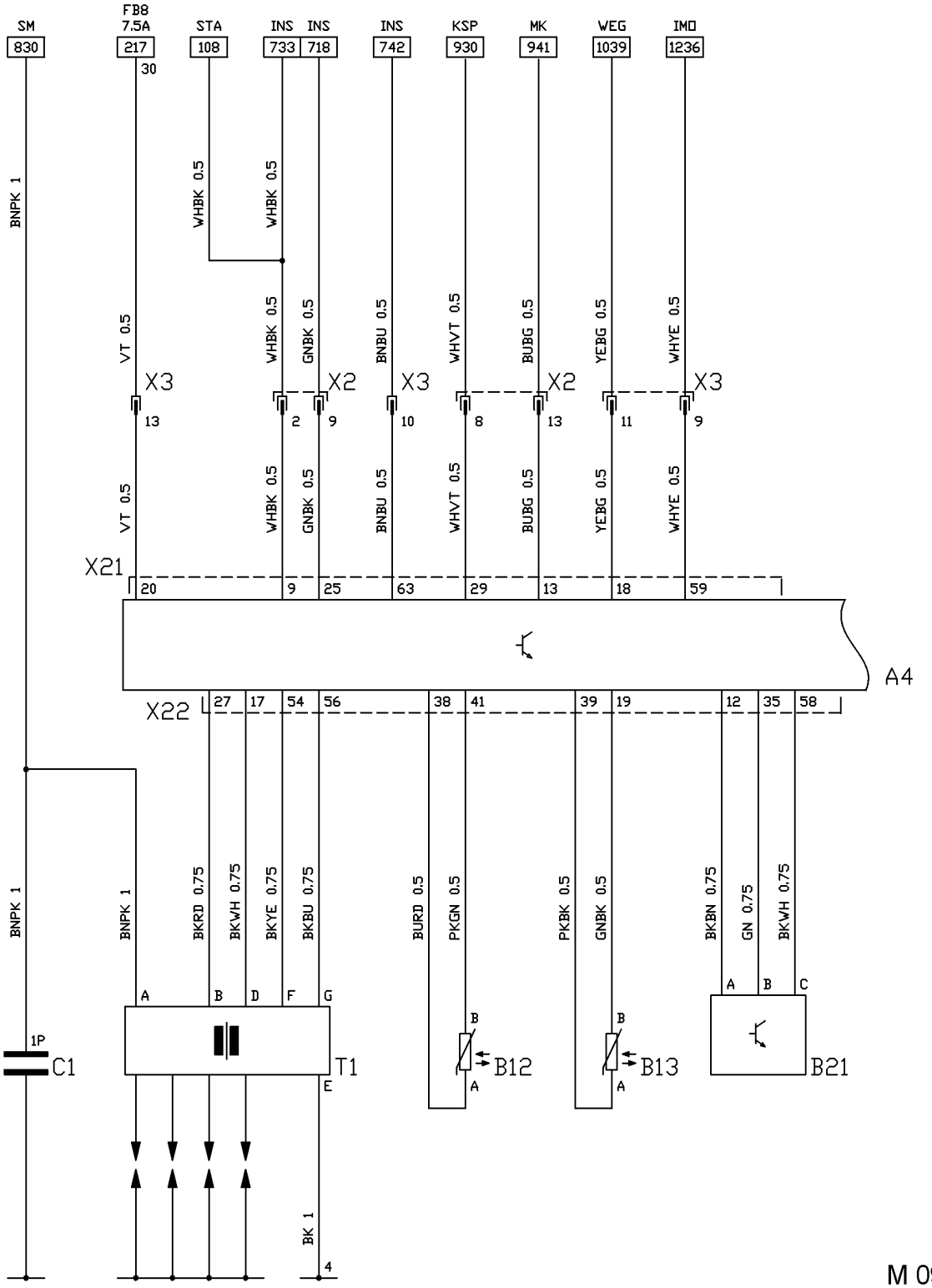


M 0818

No.	Legend	No.	Legend
1	B34 Impulse Sensor - Crankshaft	35	B21 Sensor - Absolute Pressure, Intake Manifold
2	B34 Impulse Sensor - Crankshaft	36	Y29 Throttle Valve Positioner
3	Y9.4 Injection Valve Cylinder - 4	38	B12 Sensor - Temperature, Coolant
7	Y9.1 Injection Valve - Cylinder - 1	39	B13 Sensor - Temperature, Intake Air
9	Y5 Solenoid Valve - Tank Ventilation	40	Y4 Solenoid Valve - Exhaust Gas Recirculation
10	Y9.3 Injection Valve Cylinder - 3	41	B12 Sensor - Temperature, Coolant
11	Y4 Solenoid Valve - Exhaust Gas Recirculation	43	Y29 Throttle Valve Positioner
12	B21 Sensor - Absolute Pressure, Intake Manifold	44	B118 Sensor - Oxygen, Exhaust, Heated 2
13	Y29 Throttle Valve Positioner	45	Y29 Throttle Valve Positioner
14	Y29 Throttle Valve Positioner	46	Y4 Solenoid Valve - Exhaust Gas Recirculation
15	Y29 Throttle Valve Positioner	49	B117 Sensor - Oxygen, Exhaust, Heated 1
16	Y29 Throttle Valve Positioner	50	B117 Sensor - Oxygen, Exhaust, Heated 1

17	T1 Ignition Coil - Direct Ignition	51	B118 Sensor - Oxygen, Exhaust, Heated 2
18	B30 Sensor - Knocking Control 1	52	B118 Sensor - Oxygen, Exhaust, Heated 2
19	B13 Sensor - Temperature, Intake Air	54	T1 Ignition Coil - Direct Ignition
21	B117 Sensor - Oxygen, Exhaust, Heated 1	55	Y29 Throttle Valve Positioner
22	B30 Sensor - Knocking Control 1	56	T1 Ignition Coil - Direct Ignition
26	Y29 Throttle Valve Positioner	57	Y29 Throttle Valve Positioner
27	T1 Ignition Coil - Direct Ignition	58	B21 Sensor - Absolute Pressure, Intake Manifold
32	Y4 Solenoid Valve - Exhaust Gas Recirculation	63	K18 Relay - Engine Control Unit (power supply)
33	Shielding of signal leads	64	K18 Relay - Engine Control Unit (power supply)
34	Y9.2 Injection Valve - Cylinder - 2		

Wiring Schematic Diagram 1

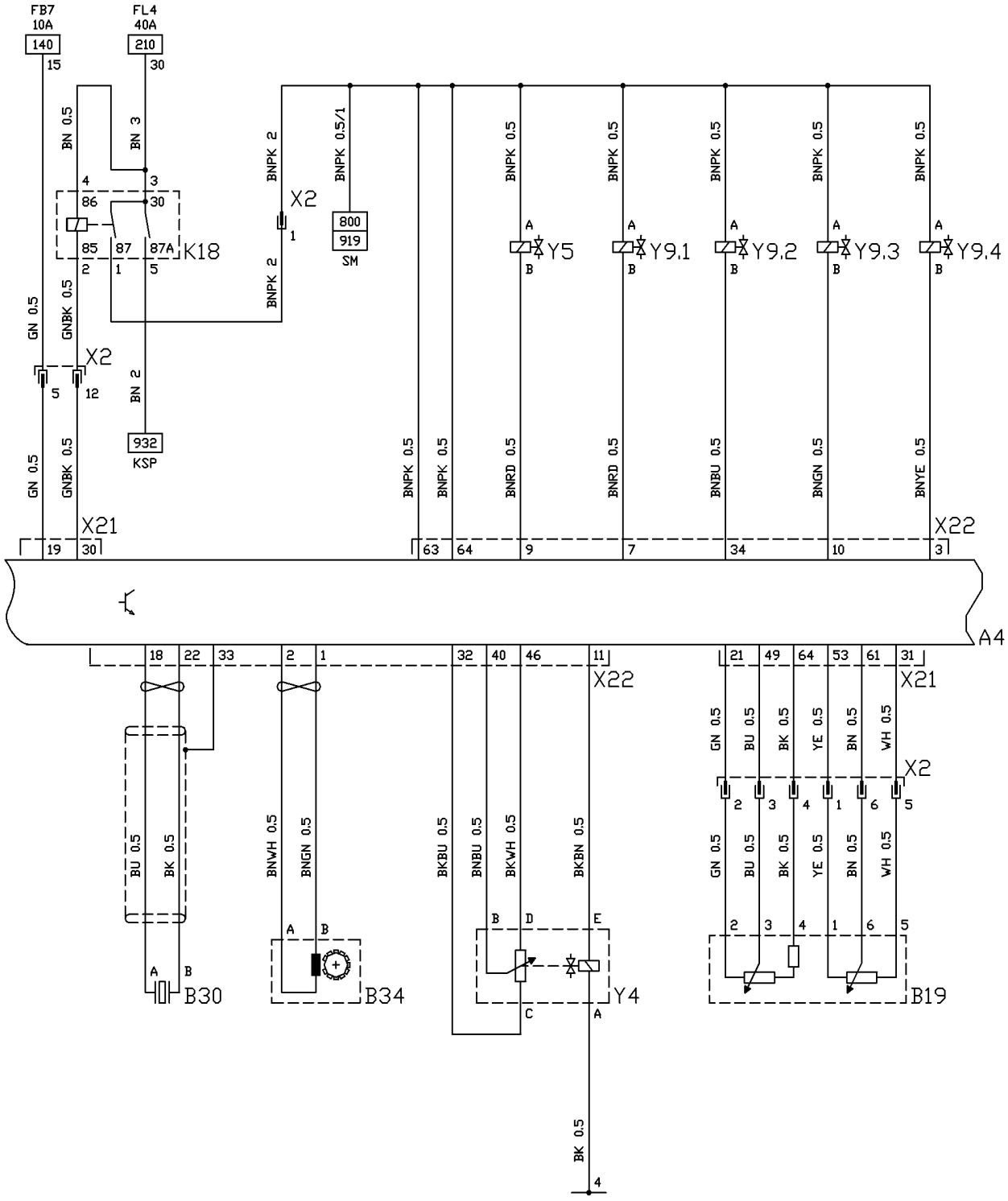


M 0925

Legend	Legend
A4 Control Unit - Multec	B13 Sensor - Temperature, Intake Air
B12 Sensor - Temperature, Coolant	B21 Sensor - Absolute Pressure, Intake Manifold
Abbreviations:	
IMO = Immobiliser	MK = Engine Cooling

INS = Instrument	STA = Ignition switch signal (position II)
KSP = Fuel Pump	WEG = Distance Signal (Impulse from ABS)

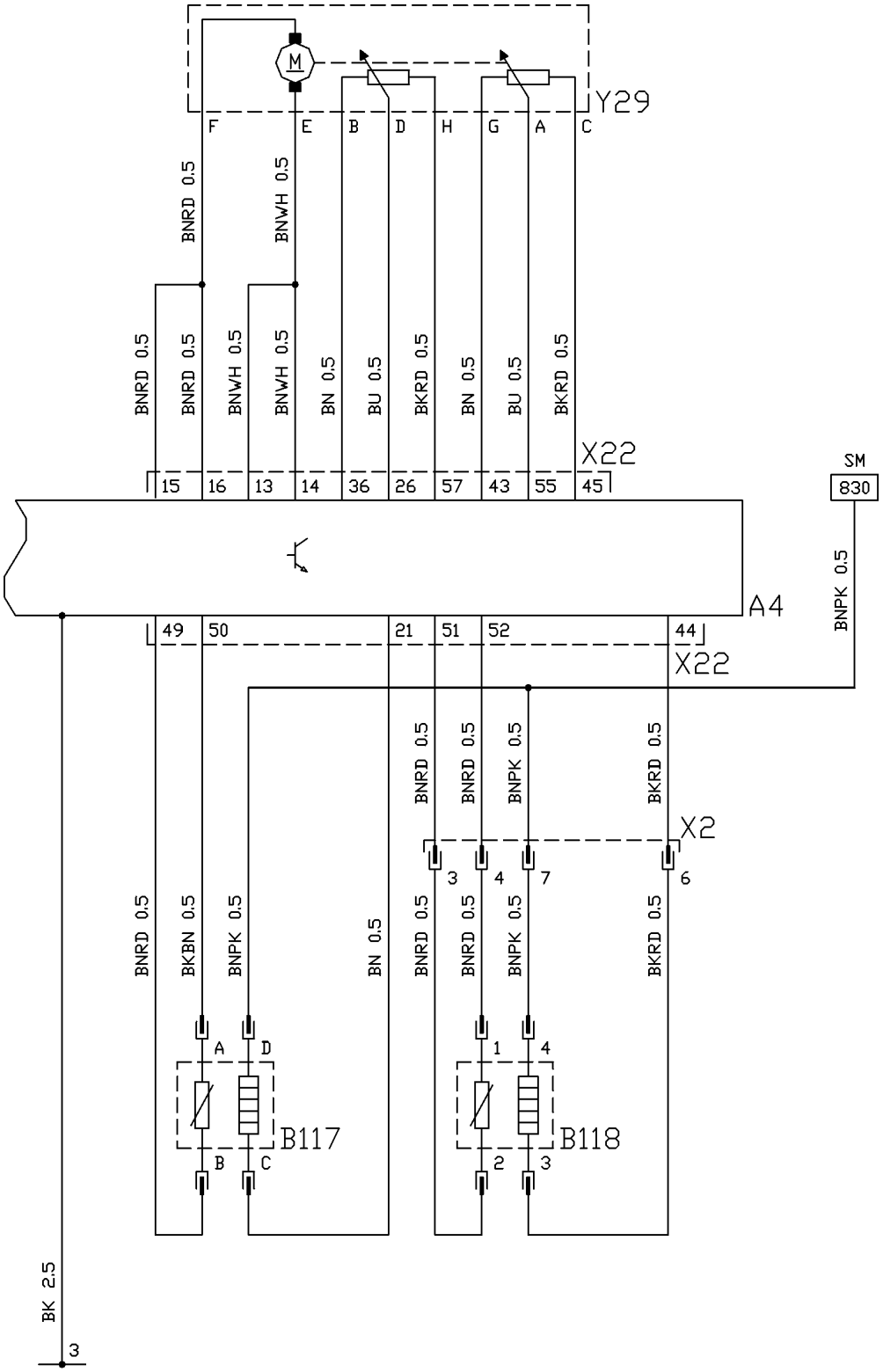
Wiring Schematic Diagram 2



M 0926

Legend	Legend
A4 Control Unit - Multec	K18 Relay - Engine Control Unit
B19 Sensor - Pedal Position	Y4 Solenoid Valve - Exhaust Gas Recirculation
B30 Sensor - Knocking Control 1	Y5 Solenoid Valve - Tank Ventilation
B34 Impulse Sensor - Crankshaft	Y9 Injection Valve - Fuel
Abbreviations:	
KSP = Fuel Pump	SM = Control Unit Engine

Wiring Schematic Diagram 3



M 0927

Legend	Legend
A4 Control Unit - Multec	B118 Sensor - Oxygen, Exhaust, Heated 2
B117 Sensor - Oxygen, Exhaust, Heated 1	Y29 Throttle Valve Positioner
Abbreviations:	
SM = Control Unit Engine	

A - Diagnostic System Check

T01 - Checking Procedure Validity

Work Order Description	Nominal Value
GMPT-E15, Z 22 SE This Checking Procedure is valid for the following vehicles: • Opel/Vauxhall Speedster/VX220 2001 Production dependent vehicle modifications of other model years are not covered by this Checking Procedure. This might lead to improper diagnosis.	

Yes:T02

T02 - Customer Complaint Validation

Work Order Description	Nominal Value
• Record customer complaint for later use • Verify, validate and understand the customer complaint **Note:** Record the information by using the Protocol-Function of the TIS 2000 Checking Procedure Application.	Is the malfunction reproducible?

Yes:T03	No:T12

T03 - System Operation as Designed

Work Order Description	Nominal Value
• Check if the customer complaint is a normal system behaviour and if the customer operates the system properly. **Note:** Refer to the operating manual of the system / the vehicle	System okay?

Yes:T04	No:T05

Yes:

T04 - Inform the Customer

Work Order Description	Nominal Value
• Please inform the customer, that the system behaviour is normal system operation respectively that the complaint can not be reproduced.	

T05 - Preliminary Diagnostic Check (Visual Inspection)

Work Order Description	Nominal Value
• Perform a visual check of all accessible components of the concerned system using the recorded customer complaint (this should take a maximum of 2 minutes) • All consumers turned off • Verify battery condition • Check the following fuses for proper operation: FL1, FL4, FB7, FB8 Fuse • Check if all ground connections are clean, tight and installed properly • Check if all connections and plugs of the concerned system are clean, tight / correctly installed and have no damages. • Check vacuum hoses and connectors for condition, leaking and secure fitting. • Check hose connectors and fittings on intake system / vacuum system • After successful test/fault repair proceed to the next test step **Note:** The battery must not be disconnected at this point of the Diagnostic System Check, as the control units of the vehicle could otherwise lose stored diagnostic information. If the system operates correctly after replacing a defective fuse, the switched circuits, which are supplied by this fuse, should be checked for short circuit to ground.	

Yes:T06

T06 - Check: Other system

Work Order Description	Nominal Value

Check the following system / signal for proper operation: • Immobiliser Signal Refer to Table B-04 Immobiliser Check • After successful test/fault repair proceed to the next test step	
Yes:T07	
T07 - Connect Diagnostic Tester and Establish Communication	
Work Order Description	**Nominal Value**
Before connecting the diagnostic tester, observe the instructions of the diagnostic tester operators manual • Connect diagnostic tester, select concerned Electronic System, establish communication and verify, that the correct control unit is installed: Refer to Table B-05 Connect Diagnostic Tester and Establish Communication • Check the following system / signal for proper operation: Refer to Table B-06 Immobiliser Signal Check • Verify programming of the control unit: Refer to Table B-07 PROGRAMMING • After successful test/fault repair proceed to the next test step	
Yes:T08	
T08 - Diagnostic Trouble Codes	
Work Order Description	**Nominal Value**
Important: Trouble codes are only a reference on faults in a subgroup of the system. Trouble codes are not a direct reference on a defective component. Trouble codes are not updated as long as the diagnostic tester communicates with the control unit. • Read and record diagnostic trouble codes including status	

• Delete trouble codes • The trouble code status PRESENT only exists under certain conditions. • Operate the vehicle over an appropriate distance at various engine speed / load conditions, until the trouble code is PRESENT. • If a trouble code with status present is stored: Refer to Table B-01 DIAGNOSTIC TROUBLE CODE • After successful test/fault repair proceed to the next test step **Note:** If a trouble code is set, check for newest Technical Information TI regarding the trouble code before proceeding with the diagnostic procedure.	
Yes:T09	
T09 - Check: Symptom/Customer Complaint	
Work Order Description	**Nominal Value**
If a defect has been found in previous test steps, the following test can be skipped (follow result "YES"). • Evaluate customer complaint: Refer to Table B-08 Symptom Chart/Customer Complaints • After successful test/fault repair proceed to the next test step **Note:** Refer to the newest Technical Information TI regarding the symptom/customer complaint before proceeding with the diagnostic procedure.	
Yes:T10	
T10 - No Matching Customer Complaint	
Work Order Description	**Nominal Value**
If a defect has been found in previous test steps, the following test can be skipped (follow result	

"YES"). • Perform the following evaluation: Refer to Table B-12 No Matching Customer Complaint • After successful test/fault repair proceed to the next test step	
Yes:T11	
Yes:	
T11 - System / Function End Test	
Work Order Description	**Nominal Value**
• Check if the customer complaint is repaired and the concerned system is fully operational. • **Note:** • Drive the vehicle in different driving conditions (engine speed and engine load conditions) over a considerable distance. Pay attention to unusual noise and other system irregularities. • Turn ignition OFF and ON • Delete trouble codes **Note:** Read the trouble codes again after the test drive and check for symptoms / customer complaints. If a complaint still exists, restart the diagnostic session for a second time. If the problem can not be solved in the second diagnostic session, contact the local support centre.	
T12 - Intermittent System Operation	
Work Order Description	**Nominal Value**
Most intermittent problems are caused by faulty electrical connectors, faulty ground connections, broken wiring, temperature problems or radio interference. Intermittent faults can be traced either by using INTERMITTENT/NOT PRESENT trouble codes or the snapshot function of the diagnostic tester in combination with the following tests:	

• Perform the following evaluation: Refer to Table B-16 Check: Intermittent Faults • After successful test/fault repair proceed to the next test step	

Yes:T11

B-01 - DIAGNOSTIC TROUBLE CODE

P0105 - Manifold absolute pressure/barometric pressure circuit range/performance problem

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 12, 35, 58

Refer to test step :C-08

Refer to test step :C-08

P0107 - Manifold absolute pressure/barometric pressure circuit low input

- Engine speed is less than 1000 rpm
- Intake manifold absolute pressure sensor voltage is less than 0.08 V

or

- Engine speed is greater than 1000 rpm
- Throttle valve opening is greater than 21.9 %
- Intake manifold absolute pressure sensor voltage is less than 0.08 V

Concerned Terminals:
X22: 12, 35, 58

Refer to test step :C-08

P0108 - Manifold absolute pressure/barometric pressure circuit high input

- 40 s elapsed time since engine start
- Throttle valve opening is less than 12 %
- Vehicle speed is less than 2 km/h (1 mph)
- Intake manifold absolute pressure sensor voltage is greater than 3.80 V

Concerned Terminals:
X22: 12, 35, 58

P0112 - Intake Air Temperature Sensor Circuit Low Input

- 320 s elapsed time since engine start
- Intake air temperature is greater than 128 °C (262 °F) (Short circuit to ground)

Concerned Terminals:
X22: 19, 39

Refer to test step :C-10

Refer to test step :C-10

P0113 - Intake Air temperature Sensor Circuit High Input

- 320 s elapsed time since engine start
- Coolant temperature is greater than -40 °C (-40 °F)
- Intake air temperature is less than -57 °C (-71 °F)

Concerned Terminals:
X22: 19, 39

P0117 - Engine Coolant Temperature Circuit Low Input

- Coolant temperature is greater than 142 °C (288 °F)
  Above condition must be fulfilled for at least 0.5 s .

Concerned Terminals:
X22: 38, 41

Refer to test step :C-09

Refer to test step :C-09

P0118 - Engine Coolant Temperature Circuit High Input

- Coolant temperature is less than -71 °C (-96 °F)
  Above condition must be fulfilled for at least 0.5 s .

Concerned Terminals:
X22: 38, 41

P0122 - Throttle Position Sensor Circuit Low Input

- The voltage at control unit terminal 49 (X22) is less than 0.10 V
  (Short circuit to ground or circuit interruption)

Concerned Terminals:
X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64

Refer to test step :C-07

Refer to test step :C-07

P0123 - Throttle Position Sensor Circuit High Input

- The voltage at the control unit input (terminal 49 (X22)) is greater than 3.91 V .
  (Short circuit to voltage)

Concerned Terminals:
X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64

P0125 - Insufficient coolant temperature for closed loop fuel control

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
-

Refer to test step :C-25

Refer to test step :C-09

P0128 - Engine Coolant Temperature Below Thermostat Regulating Temperature

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 38, 41

P0130 - O2 sensor circuit malfunction (Bank 1 Sensor 1)

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 49, 50

Refer to test step :C-19

Refer to test step :C-19

P0131 - O2 sensor lean exhaust or power enrichment lean (Bank 1 Sensor 1)

- Coolant temperature is greater than 70 °C (158 °F)
- Mass air flow sensor signal is greater than 10.8 kg/h
- Throttle valve angle between 10.2 % and 50.2 %
- Above conditions must be fulfilled for at least 10 s .
- Oxygen sensor voltage is less than 8.6 mV

Concerned Terminals:
X22: 49, 50

Refer to test step :C-19

P0132 - O2 sensor rich exhaust or deceleration fuel cutoff rich (Bank 1 Sensor 1)

- Coolant temperature is greater than 70 °C (158 °F)
- Mass air flow sensor signal is greater than 10.8 kg/h
- Throttle valve angle between 10.2 % and 50.2 %
- Above conditions must be fulfilled for at least 10 s .
- Oxygen sensor voltage is greater than 0.951 V

Concerned Terminals:
X22: 49, 50

P0133 - O2 Sensor Circuit Slow Response (Bank 1 Sensor 1)

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 49, 50

Refer to test step :C-19

P0134 - O2 Sensor Circuit Open (Bank 1 Sensor 1)

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 49, 50

Refer to test step :C-19

P0135 - O2 sensor heater circuit malfunction (Bank 1 Sensor 1)

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 21

Refer to test step :C-18

P0137 - O2 Sensor 2 Lean Exhaust

- Coolant temperature is greater than 40 °C (104 °F)
- Mass air flow sensor signal is greater than 19.8 kg/h
- Throttle valve angle between 10.2 % and 50.2 %
- Above conditions must be fulfilled for at least 140 s .
- Oxygen sensor voltage is less than 34.7 mV

Concerned Terminals:
X22: 51, 52

Refer to test step :C-21

Refer to test step :C-21

P0138 - O2 Sensor 2 Rich Exhaust

- Coolant temperature is greater than 40 °C (104 °F)
- Mass air flow sensor signal is greater than 19.8 kg/h
- Throttle valve angle between 10.2 % and 50.2 %
- Above conditions must be fulfilled for at least 140 s .
- Oxygen sensor voltage is greater than 0.900 V

Concerned Terminals:
X22: 51, 52

Refer to test step :C-21

P0140 - O2 Sensor Circuit Open (Bank 1 Sensor 2)

- Coolant temperature is greater than 40 °C (104 °F)
- Mass air flow sensor signal is greater than 19.8 kg/h
- Throttle valve angle between 8 % and 56 %
- Above conditions must be fulfilled for at least 140 s .
- Oxygen sensor voltage is in the range of 425 mV to 460 mV (Circuit interruption, oxygen sensor defective)

Concerned Terminals:
X22: 51, 52

P0141 - O2 sensor heater circuit malfunction (Bank 1 Sensor 2)

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 44

Refer to test step :C-20

P0171 - System too lean (Bank 1)

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 49, 50

Refer to test step :C-19

P0172 - System too rich (Bank 1)

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 49, 50

Refer to test step :C-19

P0201 - Cylinder 1 - injector circuit malfunction

- Engine running
- Final stage diagnosis in control unit

Concerned Terminals:
X22: 7

Refer to test step :C-11

P0202 - Cylinder 2 - injector circuit malfunction

- Engine running
- Final stage diagnosis in control unit

Concerned Terminals:
X22: 34

Refer to test step :C-12

P0203 - Cylinder 3 - injector circuit malfunction

- Engine running
- Final stage diagnosis in control unit

Concerned Terminals:
X22: 10

Refer to test step :C-13

P0204 - Cylinder 4 - injector circuit malfunction

- Engine running
- Final stage diagnosis in control unit

Concerned Terminals:
X22: 3

Refer to test step :C-14

Refer to test step :C-09

P0217 - Engine overtemperature condition

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 38, 41

P0300 - Random/multiple cylinder misfire detected

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 17, 27, 54, 56

Refer to test step :C-26

P0301 - Random/multiple cylinder misfire detected

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 17, 27, 54, 56

Refer to test step :C-26

P0302 - Random/multiple cylinder misfire detected

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 17, 27, 54, 56

Refer to test step :C-26

P0303 - Random/multiple cylinder misfire detected

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 17, 27, 54, 56

Refer to test step :C-26

P0304 - Random/multiple cylinder misfire detected

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 17, 27, 54, 56

Refer to test step :C-26

P0325 - Knock sensor 1 circuit malfunction (Bank 1 or single sensor)

- Knock sensor voltage is evaluated and produces an implausible resulting value.

Concerned Terminals:
X22: 18, 22, 33

Refer to test step :C-15

P0336 - Crankshaft position sensor "A" circuit range/performance

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 1, 2

Refer to test step :C-04

P0340 - Camshaft position sensor circuit malfunction

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 17, 27, 54, 56

Refer to test step :C-26

P0341 - Camshaft Position Sensor Circuit Range/Performance

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 17, 27, 54, 56

Refer to test step :C-26

P0404 - Exhaust Gas Recirculation Circuit Range/Performance (Open Valve)

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 11, 32, 40, 46

Refer to test step :C-16

P0405 - Exhaust gas recirculation sensor "A" circuit low

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 11, 32, 40, 46

Refer to test step :C-16

Refer to test step :C-21

P0420 - Catalyst System Efficiency Below Threshold (Bank 1)

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 51, 52

P0443 - Evaporative emission control system purge control valve circuit malfunction

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 9

Refer to test step :C-17

P0480 - Cooling fan 1 control circuit malfunction

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X21: 13

Refer to test step :C-22

Refer to test step :C-07

P0506 - Idle control system RPM lower than expected

- The desired idle speed is not in nominal range; the deviation is more than 100 rpm.

Concerned Terminals:
X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64

Refer to test step :C-07

P0507 - Idle control system RPM higher than expected

- The desired idle speed is not in nominal range; the deviation is more than 60 rpm.

Concerned Terminals:
X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64

P0562 - System Voltage Low

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X21: 19, 30

Refer to test step :C-03

P0563 - System Voltage High

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X21: 19, 30

Refer to test step :C-03

P0601 - Internal Control Module Memory Checksum Error

- Self-test of program memory:
  The check sum calculated by the control unit and the number stored in the program memory (EPROM) do not match.
  or
  The program memory identification number read by the control unit is not correct.
- The fault is stored directly on recognition.

Effect:

- The engine does not start.

Concerned Terminals:
-

Refer to test step :C-02

P0602 - Control Module Programming Error

- Control unit recognises programming error

or

- Control unit not programmed

Concerned Terminals:
-

Refer to test step :C-02

P0604 - Internal control module random access memory (RAM) error

- Control unit hardware failure (EPROM, EEPROM, RAM, ROM defective)

Concerned Terminals:
-

Refer to test step :C-02

P0606 - Powertrain control module processor fault

- Control unit hardware failure

Concerned Terminals:
-

Refer to test step :C-02

Refer to test step :C-07

P0607 - Electronic Throttle Control Motor Failure

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64

Refer to test step :C-07

P1120 - Throttle Position Sensor

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64

P1125 - Accelerator Sensor

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X21: 21, 31, 49, 53, 61, 64

Refer to test step :C-06

P1133 - O2 Sensor - Transition Switch Time Ratio (Bank 1 Sensor 1)

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 49, 50

Refer to test step :C-19

Refer to test step :C-21

P1137 - O2 sensor power enrichment lean (Bank 1 Sensor 2)

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 51, 52

Refer to test step :C-21

P1138 - O2 sensor deceleration fuel cutoff rich (Bank 1 Sensor 2)

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 51, 52

P1171 - Fuel Supply System Lean During Power Enrichment

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X21: 29

Refer to test step :C-05

Refer to test step :C-07

P1220 - Throttle Position Sensor 2 Circuit

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64

Refer to test step :C-07

P1221 - Throttle Position Sensor 1-2 Circuit Performance

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64

P1271 - Accelerator Pedal Position Sensor 1-2 Correlation

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X21: 21, 31, 49, 53, 61, 64

Refer to test step :C-06

P1275 - Accelerator Pedal Position Sensor 1 Circuit

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X21: 21, 31, 49, 53, 61, 64

Refer to test step :C-06

P1276 - Accelerator Pedal Position Sensor 1-3 Correlation

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X21: 21, 31, 49, 53, 61, 64

Refer to test step :C-06

P1280 - Accelerator Pedal Position Sensor 2 Circuit

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X21: 21, 31, 49, 53, 61, 64

Refer to test step :C-06

P1336 - Crankshaft Position System Variation Not Learned

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
-

Refer to test step :C-02

P1345 - Crankshaft/Camshaft Correlation

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 1, 2

Refer to test step :C-04

P1380 - ABS Rough Road/Misfire Diagnostic Prevented

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
-

Refer to test step :C-25

P1404 - Exhaust Gas Recirculation Circuit Range/Performance (Closed Valve)

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 11, 32, 40, 46

Refer to test step :C-16

Refer to test step :C-07

P1512 - Throttle Position Adaption Error

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64

P1514 - Electronic Throttle Control Malfunction

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 12, 35, 58

Refer to test step :C-08

Refer to test step :C-07

P1515 - Commanded versus Actual Throttle Position Correlation

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64

Refer to test step :C-07

P1516 - Throttle Actuator Control Position Performance

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64

Refer to test step :C-07

P1523 - Throttle Actuator Control Return Performance

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64

P1599 - Engine Stall Detected

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
-

Refer to test step :C-25

P1610 - Immobiliser Function not Programmed

- The engine control unit is in reset state.

Effect:

- The engine telltale is triggered (flashing).
- Approximately 5 s after ignition ON, the injection function is blocked and the fuel pump is switched off.

Concerned Terminals:
X21: 59

Refer to test step :Immobiliser C-02

Refer to test step :Immobiliser C-02

P1611 - Wrong Security Code Entered

- Entered security code is not valid for the actual vehicle

Effect:

- The engine telltale is triggered (flashing).
- Approximately 5 s after ignition ON, the injection function is blocked and the fuel pump is switched off.

Concerned Terminals:
X21: 59

P1612 - Immobiliser No Or Wrong Signal

- Communication error between immobiliser control unit and engine control unit.

Effect:

- The engine telltale is triggered (flashing).
- Approximately 5 s after ignition ON, the injection function is blocked and the fuel pump is switched off.

Concerned Terminals:
X21: 59

Refer to test step :Immobiliser C-05

P1613 - Immobiliser No Or Wrong Signal

- Communication error between immobiliser control unit and engine control unit.

Effect:

- The engine telltale is triggered (flashing).
- Approximately 5 s after ignition ON, the injection function is blocked and the fuel pump is switched off.

Concerned Terminals:
X21: 59

Refer to test step :Immobiliser C-05

P1614 - Wrong Transponder Key

- Wrong transponder response received.

Effect:

- The engine telltale is triggered (flashing).
- Approximately 5 s after ignition ON, the injection function is blocked and the fuel pump is switched off.

Concerned Terminals:
X21: 59

Refer to test step :Immobiliser C-06

P1621 - EEPROM Failure

- Control unit hardware failure (EPROM, EEPROM, RAM, ROM defective)

Concerned Terminals:
-

Refer to test step :C-02

P1633 - Ignition Circuit

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 17, 27, 54, 56

Refer to test step :C-26

P1635 - 5V Reference #1 Circuit

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X21: 21, 31, 49, 53, 61, 64

Refer to test step :C-06

P1639 - 5V Reference #2 Circuit

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X21: 21, 31, 49, 53, 61, 64

Refer to test step :C-06

P1680 - Accelerator Sensor Voltage Low

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X21: 21, 31, 49, 53, 61, 64

Refer to test step :C-06

Refer to test step :C-07

P1681 - TPS Monitoring Fault (Throttle Position Sensor)

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:
X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64

Refer to test step :C-07

P1682 - Electronic Throttle Control Malfunction

- The control unit recognises the malfunction of the circuit via an internal evaluation logic.

Concerned Terminals:

X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64

B-02 - DATA LIST

T01 - Tester Display Battery Voltage

Work Order Description	Nominal Value
• Ignition ON • Engine OFF • All consumers turned off	11 ... 13.5 V
• Engine starting	greater than 8 V
• Engine running at idle speed, operating temperature • All consumers turned off • Accelerator pedal not actuated	12 ... 15 V
Concerned Terminals: X21: 19, 30	

Yes:T02	No:C-03

T02 - Tester Display Main Relay

Work Order Description	Nominal Value
• Ignition ON • Engine OFF • All consumers turned off	Active
Concerned Terminals: X21: 19, 30	

Yes:T03	No:C-03

T03 - Tester Display Fuel Pump Relay

Work Order Description	Nominal Value
• Ignition ON • Engine OFF • All consumers turned off	Inactive
• Engine running at idle speed, operating temperature • Accelerator pedal not actuated	Active
Concerned Terminals: X21: 29	

Yes:T04	No:C-05

T04 - Tester Display APP Sensor 1 (Accelerator Pedal Position)

Work Order Description	Nominal Value
• Ignition ON • Engine OFF • All consumers turned off • Accelerator pedal not actuated	less than 1 V
• Accelerator pedal slightly actuated	1 ... 3.8 V
• Accelerator pedal actuated to full load stop	greater than 3.8 V
Concerned Terminals: X21: 21, 31, 49, 53, 61, 64	

Yes:T05	No:C-06

T05 - Tester Display APP Sensor 2 (Accelerator Pedal Position)

Work Order Description	Nominal Value
• Ignition ON • Engine OFF • All consumers turned off • Accelerator pedal not actuated	greater than 4.2 V
• Accelerator pedal slightly actuated	3.2 ... 4.2 V
• Accelerator pedal actuated to full load stop	less than 3.2 V
Concerned Terminals: X21: 21, 31, 49, 53, 61, 64	

Yes:T06	No:C-06

T06 - Tester Display Calculated Pedal Position

Work Order Description	Nominal Value
• Ignition ON • Engine OFF • All consumers turned off • Accelerator pedal not actuated	0 %
• Accelerator pedal actuated to full load stop	greater than 95 %
Concerned Terminals: X21: 21, 31, 49, 53, 61, 64	

Yes:T07	No:C-06

T07 - Tester Display APP at Idle Position (Accelerator Pedal Position)

Work Order Description	Nominal Value
• Ignition ON	Active

• Engine OFF • All consumers turned off • Accelerator pedal not actuated	
• Accelerator pedal slightly actuated	Inactive
Concerned Terminals: X21: 21, 31, 49, 53, 61, 64	

Yes:T08	**No:C-06**

T08 - Tester Display TP Sensor 1 (Throttle Position)

Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off • Accelerator pedal not actuated • Wait time: minimum 10 s	greater than 3.0 V
• Accelerator pedal actuated to full load stop	less than 0.7 V
Concerned Terminals: X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64	

Yes:T09	**No:C-07**

T09 - Tester Display TP Sensor 2 (Throttle Position)

Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off • Accelerator pedal not actuated • Wait time: minimum 10 s	less than 2.0 V
• Accelerator pedal actuated to full load stop	greater than 4.2 V
Concerned Terminals: X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64	

Yes:T10	**No:C-07**

T10 - Tester Display Calculated Throttle Position

Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off • Accelerator pedal not actuated	less than 30 %

• Accelerator pedal actuated to full load stop	100 %
Concerned Terminals: X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64	
Yes:T11	**No:C-07**

T11 - Tester Display Throttle Position	
Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off • Accelerator pedal not actuated	Idle
• Accelerator pedal slightly actuated	Partial Load
• Accelerator pedal actuated to full load stop	Full Load
Concerned Terminals: X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64	
Yes:T12	**No:C-07**

T12 - Tester Display Engine Speed	
Work Order Description	**Nominal Value**
• Engine starting	greater than 60 RPM.
Concerned Terminals: X22: 1, 2	
Yes:T13	**No:C-04**

T13 - Tester Display MAP Sensor (Manifold Absolute Pressure)	
Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off	100 kPa 4.8 V Diagnostic tester display is nearly identical to outside-air pressure
• Engine running at idle speed, operating temperature • Accelerator pedal not actuated	greater than 30 kPa greater than 1.15 V
Concerned Terminals: X22: 12, 35, 58	
Yes:T14	**No:C-08**

T14 - Tester Display Coolant Temperature	

Work Order Description	Nominal Value
• Engine running at idle speed, operating temperature • All consumers turned off • Accelerator pedal not actuated	greater than 80 °C greater than 176 °F less than 2.4 V
Concerned Terminals: X22: 38, 41	

Yes:T15	No:C-09

T15 - Tester Display Intake Air Temperature

Work Order Description	Nominal Value
• Engine running at idle speed, operating temperature • All consumers turned off • Accelerator pedal not actuated	10 ... 40 °C 50 ... 104 °F 2.9 ... 1.4 V
Concerned Terminals: X22: 19, 39	

Yes:T16	No:C-10

T16 - Tester Display Vehicle Speed

Work Order Description	Nominal Value
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	30 km/h 19 mph Diagnostic tester display converges to speedometer display
Concerned Terminals: X21: 18	

Yes:T17	No:B-17

T17 - Tester Display EGR Valve (Exhaust-Gas Recirculation)

Work Order Description	Nominal Value
• Engine running at idle speed, operating temperature • All consumers turned off • Accelerator pedal not actuated	Inactive
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	Active
Concerned Terminals:	

X22: 11, 32, 40, 46	
Yes:T18	**No:C-16**

T18 - Tester Display EGR Position Command (Exhaust- Gas Recirculation)

Work Order Description	**Nominal Value**
• Engine running at idle speed, operating temperature • All consumers turned off • Accelerator pedal not actuated	0 %
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	greater than 0 %
Concerned Terminals: X22: 11, 32, 40, 46	

Yes:T19	**No:C-16**

T19 - Tester Display EGR Position Feedback (Exhaust Gas Recirculation)

Work Order Description	**Nominal Value**
• Engine running at idle speed, operating temperature • All consumers turned off • Accelerator pedal not actuated	less than 1.2 V
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	greater than 2.0 V
Concerned Terminals: X22: 11, 32, 40, 46	

Yes:T20	**No:C-16**

T20 - Tester Display Fuel Tank Ventilation Valve

Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off • Accelerator pedal not actuated	0 %
• Engine running at idle speed, operating temperature • Accelerator pedal briefly actuated to full load stop **Note:**	greater than 0 %

Even if the instructions given in the checking procedure are followed closely, the diagnostic tester may not indicate a signal change.	
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	greater than 0 %
Concerned Terminals: X22: 9	

Yes:T21	No:C-17

T21 - Tester Display Knock Control

Work Order Description	Nominal Value
• Ignition ON • Engine OFF • All consumers turned off	Inactive
• Engine running at idle speed, operating temperature • Accelerator pedal not actuated	Inactive
• Accelerator pedal briefly actuated to full load stop **Note:** Even if the instructions given in the checking procedure are followed closely, the diagnostic tester may not indicate a signal change.	Active Value changing briefly
Concerned Terminals: X22: 18, 22, 33	

Yes:T22	No:C-15

T22 - Tester Display B1S1 O2 Sensor Heater (Bank 1 Sensor 1)

Work Order Description	Nominal Value
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	Active Value changing briefly
Concerned Terminals: X22: 21	

Yes:T23	No:C-18

T23 - Tester Display B1S1 O2 Sensor (Bank 1 Sensor 1)

Work Order Description	Nominal Value
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	50 ... 950 mV
Concerned Terminals: X22: 49, 50	

Yes:T24	No:C-19

T24 - Tester Display B1S1 Air/Fuel Ratio (Bank 1 Sensor 1)

Work Order Description	Nominal Value
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	LEAN and RICH Value changing briefly
Concerned Terminals: X22: 49, 50	

Yes:T25	No:C-19

T25 - Tester Display B1S2 O2 Sensor Heater (Bank 1 Sensor 2)

Work Order Description	Nominal Value
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	Active Value changing briefly
Concerned Terminals: X22: 44	

Yes:T26	No:C-20

T26 - Tester Display B1S2 O2 Sensor (Bank 1 Sensor 2)

Work Order Description	Nominal Value
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	50 ... 950 mV
Concerned Terminals: X22: 51, 52	

Yes:T27	No:C-21

T27 - Tester Display B1S2 Air/Fuel Ratio (Bank 1 Sensor 2)

Work Order Description	Nominal Value
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	Lean
Concerned Terminals: X22: 51, 52	

Yes:T28	No:C-21

T28 - Tester Display Long Term Fuel Trim	
Work Order Description	**Nominal Value**
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	-12 ... 12 %
Concerned Terminals: X22: 49, 50	

Yes:T29	No:C-19

T29 - Tester Display B1 Short Term Fuel Trim (Bank 1)	
Work Order Description	**Nominal Value**
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	-12 ... 12 %
Concerned Terminals: X22: 49, 50	

Yes:T30	No:C-19

T30 - Tester Display Fan Relay 1	
Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off • Coolant temperature is less than 60 °C (140 °F)	Inactive
• Engine running • Coolant temperature is greater than 110 °C (230 °F)	Active
Concerned Terminals: X21: 13	

Yes:T31	No:C-22

T31 - Tester Display Malfunction Indicator (MI)	
Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • All consumers turned off	On
• Engine running at idle speed, operating temperature • Accelerator pedal not actuated	Off

Concerned Terminals: X21: 63	

No:C-24

B-03 - EXHAUST GAS TEST

T14 - Tester Display Coolant Temperature

Work Order Description	**Nominal Value**
• Engine running at idle speed, operating temperature • All consumers turned off • Accelerator pedal not actuated	greater than 80 °C greater than 176 °F less than 2.4 V
Concerned Terminals: X22: 38, 41	

Yes:T23	**No:C-09**

T23 - Tester Display B1S1 O2 Sensor (Bank 1 Sensor 1)

Work Order Description	**Nominal Value**
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	50 ... 950 mV
Concerned Terminals: X22: 49, 50	

Yes:T24	**No:C-19**

T24 - Tester Display B1S1 Air/Fuel Ratio (Bank 1 Sensor 1)

Work Order Description	**Nominal Value**
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	LEAN and RICH Value changing briefly
Concerned Terminals: X22: 49, 50	

Yes:T26	**No:C-19**

T26 - Tester Display B1S2 O2 Sensor (Bank 1 Sensor 2)

Work Order Description	**Nominal Value**
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	50 ... 950 mV
Concerned Terminals: X22: 51, 52	

Yes:T27	**No:C-21**

T27 - Tester Display B1S2 Air/Fuel Ratio (Bank 1 Sensor 2)

Work Order Description	Nominal Value
• Vehicle travelling (constant speed, approximately 30 km/h (19 mph))	Lean
Concerned Terminals: X22: 51, 52	

No:C-21

Yes:

B-04 - Immobiliser Check

T01 - Check: Other system

Work Order Description	Nominal Value
Before connecting the diagnostic tester, observe the instructions of the diagnostic tester operators manual • Connect diagnostic tester, select concerned Electronic System, establish communication and verify, that the correct control unit is installed: Immobiliser Refer to Immobiliser Table B-03 Connect Diagnostic Tester and Establish Communication • If a trouble code with status present is stored: Refer to Immobiliser Table B-05 Trouble Codes • Check the following Data List Parameters: Refer to Immobiliser Table B-02 DATA LIST T01 Ignition Status Refer to Immobiliser Table B-02 DATA LIST T09 Immobiliser Signal • After successful test/fault repair proceed to the next test step	

B-05 - Connect Diagnostic Tester and Establish Communication

T01 - Connect Diagnostic Tester and Establish Communication

Work Order Description	Nominal Value
Before connecting the diagnostic tester, observe the instructions of the diagnostic tester operators	Communication established?

manual Connect diagnostic tester: • Ignition OFF • Connect the diagnostic tester with the required adapter to the diagnostic link • Ignition ON Select concerned electronic system and establish communication: • Select diagnostics • Select model year: 2001 • Select model: Speedster/VX220 • Select electronic system group: Electronic engine system • Select electronic system or engine: GMPT-E15, Z 22 SE • Diagnostic tester now establishes communication with the selected Electronic System.	

Yes:	No:T02

T02 - Check: Fault Location

Work Order Description	Nominal Value
• Communication with control unit is interrupted • Does one of the following messages appear on the Diagnostic Tester display? Selected System Existing ECU Mismatch! or Mismatch between selected engine and existing engine ECU! or Unknown ECU!	-

Yes:T03	No:C-01

T03 - Check: Programming

Work Order Description	Nominal Value
• Are you using the latest version of diagnostic software?	-

Note: Refer to information about the current software version in the menu point - TIS 2000 News	

Yes:T04	No:T05

Yes:

T04 - Program Software

Work Order Description	Nominal Value
• Perform service programming (SPS) to download the latest version of control unit software into the control unit.	

Yes:

T05 - Program Software

Work Order Description	Nominal Value
• Program Software: Download the latest version of diagnostic software into the diagnostic tester.	

B-06 - Immobiliser Signal Check

T01 - Additional Functions

Work Order Description	Nominal Value
• Ignition ON • Press corresponding key in the system main menu to call up Additional Functions, select the following test and confirm with ENTER : Additional Functions Display Immobiliser Status • Follow the instructions in the diagnostic tester display and perform the following evaluation: Immobiliser Function Programmed • After successful test/fault repair proceed to the next test step **Note:** If this parameter deviates from the nominal value, a programming malfunction of the engine control unit is present. During the programming of the immobiliser, a wrong security code has	Parameter has to display the following nominal value: YES

been entered. This results in a lock out of the programming for a certain time, which depends on the number of wrong programming cycles. A new programming is possible when the lock out time has expired.	

Yes:T02	No:Immobiliser B-09 T01

T02 - Additional Functions

Work Order Description	Nominal Value
• Perform the following evaluation: Security Wait Time **Note:** If this parameter deviates from the nominal value, a programming malfunction of the engine control unit is present. During the programming of the immobiliser, a wrong security code has been entered. This results in a lock out of the programming for a certain time, which depends on the number of wrong programming cycles. A new programming is possible when the lock out time has expired.	Parameter has to display the following nominal value: INACTIVE

Yes:	No:Immobiliser B-09 T01

B-07 - PROGRAMMING

T01 - Tester Display Program Variant Configuration

Work Order Description	Nominal Value
• Ignition ON • Press corresponding key in the system main menu to call up Programming functions, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display.	Programming okay?
Concerned Terminals: -	

Yes:T02	No:C-02

T02 - Tester Display Program CAN Configuration

Work Order Description	Nominal Value
• Ignition ON • Press corresponding key in the system	Programming okay?

main menu to call up Programming functions, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display.	
Concerned Terminals: -	

Yes:T03	No:C-02

T03 - Tester Display Reset O2-Loop Block Learn Map

Work Order Description	Nominal Value
• Ignition ON • Press corresponding key in the system main menu to call up Additional Functions, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display.	Adjustment okay?
Concerned Terminals: -	

Yes:T04	No:C-02

T04 - Tester Display Learn Crank Angle Sensing Error

Work Order Description	Nominal Value
• Ignition ON • Press corresponding key in the system main menu to call up Programming functions, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display.	Programming okay?
Concerned Terminals: -	

No:C-02

Yes:

B-08 - Symptom Chart/Customer Complaints

T01 - Check: Symptom / Customer Complaint Match

Work Order Description	Nominal Value
• Select the suitable symptom group, which fits the complaint. Refer to Table B-09 Complaint: Engine Start	

B-09 - Complaint: Engine Start

- Customer complaint Remedy

Customer complaint	Remedy
Engine does not start, starter runs normal	Perform the following tests in the given order until a defective component is found. • Refer to Table B-10 Fuel System • Refer to Table B-11 Mechanical Function Check

- Customer complaint Remedy

Customer complaint	Remedy
Engine does not start, starter slow / does not turn	Refer to Table C-27 Starter Circuit

B-10 - Fuel System

T01 - Check: Fuel Reserve

Work Order Description	Nominal Value
• Check fuel reserve • Check fuel tank for correct fuel sort content **Note:** The fuel reserve must be greater than 5 L	

Yes:T02

T02 - Actuator Test

Work Order Description	Nominal Value
• Ignition ON • Select and enable diagnostic tester actuator test: Actuator Test Fuel Pump Relay	Test okay?

Yes:T03	No:C-05

T03 - Check: Fuel Pressure

Work Order Description	Nominal Value

• Ignition OFF • Connect fuel pressure manometer KM-J-34730-91 to fuel feed line • Ignition ON • Select and enable diagnostic tester actuator test: Actuator Test Fuel Pump Relay • Pressure value okay?	3800 hPa (3.8 bar)

Yes:	No:T04

Yes:

T04 - Check: Fuel Pipes and Fuel Filter

Work Order Description	Nominal Value
• Check the following component for proper operation: Fuel pipes and fuel filter **Note:** Plugging, leakage, air or water in fuel system	

B-11 - Mechanical Function Check

T01 - Mechanical Function Check

Work Order Description	Nominal Value
• Check the following functional group for proper operation: Spark plugs	

Yes:T02

T02 - Mechanical Function Check

Work Order Description	Nominal Value
• Check the following functional group for proper operation: Engine-compression	

Yes:T03

Yes:

T03 - Mechanical Function Check

Work Order Description	Nominal Value
• Check the following functional group for proper operation: Valve timing	

Yes:	
B-12 - No Matching Customer Complaint **T01 - No Matching Customer Complaint**	
Work Order Description	**Nominal Value**
The following test steps may or may not be helpful, they are only a proposal. Diagnostic Trouble Codes • Read and record diagnostic trouble codes including status • Check for trouble codes with status INTERMITTENT or NOT PRESENT. If a trouble code is stored this may indicate the circuit which has the intermittent condition. • Use the following table to obtain the concerned functional group and perform the following additional test steps, while performing the troubleshooting in the C-x tables. Refer to Table B-01 DIAGNOSTIC TROUBLE CODE • Move the related connectors, wiring harness and components in order to find the failure. Switch on all electric consumers by turns, because this can cause an electromagnetic interference in a circuit. Use the TECH 31 or an oscilloscope to observe the wiring harness for disturbances. Operate the system under different conditions over a considerable time. Quick Check • Perform the following evaluation: Refer to Table B-02 DATA LIST Refer to Table B-13 ACTUATOR TEST Refer to Table B-15 CONTROL TEST Check Additional Information • Refer to Table B-03 EXHAUST GAS TEST Refer to Table B-14 ADDITIONAL FUNCTIONS	

• Compare the SPS software number in the control unit with the version on TIS/TIS 2000 . If there is a newer version on TIS/TIS 2000 , perform the SPS programming. After successful test/fault repair proceed to the next test step	

B-13 - ACTUATOR TEST

T01 - Tester Display Fuel Pump Relay Test

Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • Press corresponding key in the system main menu to call up Actuator-Test functions, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display.	
• Press soft key INACTIVE	
• Press soft key ACTIVE	Clicking noise from the relay and Fuel pump running
Note: The test is completed after a maximum of 30 s .	
Concerned Terminals: X21: 29	

Yes:T02	**No:C-05**

T02 - Tester Display Fuel Tank Ventilation Valve Test

Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • Press corresponding key in the system main menu to call up Actuator-Test functions, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display.	

• Press soft key INACTIVE	Diagnostic tester display: Inactive
• Press soft key ACTIVE	Diagnostic tester display: Active Noise check: Clicking noise from the valve and from the relay
Note: The test is completed after a maximum of 30 s .	
Concerned Terminals: X22: 9	

Yes:T03	**No:C-17**

T03 - Tester Display Electronic Throttle Control Test

Work Order Description	**Nominal Value**
• Ignition OFF • Remove intake hose from throttle valve positioner • Ignition ON • Engine OFF • Press corresponding key in the system main menu to call up Actuator-Test functions, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display.	
• Press soft key INACTIVE	Throttle valve closed
• Press soft key ACTIVE	Throttle valve completely open
Concerned Terminals: X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64	

Yes:T04	**No:C-07**

T04 - Tester Display Fan Relay 1 Test

Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF	

• Press corresponding key in the system main menu to call up Actuator-Test functions, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display.	
• Press soft key INACTIVE	All cooling fans are switched off
• Press soft key ACTIVE	Following cooling fans run at low speed: M19 Motor - Blower, Radiator
Note: The test is completed after a maximum of 30 s .	
Concerned Terminals: X21: 13	

Yes:T05	**No:C-22**

T05 - Tester Display Malfunction Indicator (MI) Test

Work Order Description	**Nominal Value**
• Ignition ON • Engine OFF • Press corresponding key in the system main menu to call up Actuator-Test functions, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display.	
• Press soft key INACTIVE	System telltale OFF
• Press soft key ACTIVE	System telltale ON
Note: The test is completed after a maximum of 30 s .	
Concerned Terminals: X21: 63	

No:C-24

B-14 - ADDITIONAL FUNCTIONS

T01 - Tester Display Read ECU Identification

Work Order Description	Nominal Value
• Ignition ON • Press corresponding key in the system main menu to call up Additional Functions, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display.	Displayed value okay?
Concerned Terminals: -	

No:C-02

B-15 - CONTROL TEST

T01 - Tester Display EGR Control

Work Order Description	Nominal Value
• Engine running at idle speed, operating temperature • Accelerator pedal not actuated • Vehicle stationary • Press corresponding key in the system main menu to call up ECU Control Tests, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display. • After the test is started, the corresponding component can be actuated using the soft keys. **Note:** The behaviour of the engine at various different exhaust gas recirculation rates may tell you if the exhaust gas recirculation valve is working properly. Depending on the opening of the exhaust gas recirculation valve a certain amount of exhaust gas flows back into the intake system, enters the cylinders with the next opening of the intake valve, and is included in the next combustion cycle. If a high amount of exhaust gas is recirculated, the engine will not have enough oxygen for proper combustion (the oxygen sensor recognises lean combustion, injection time is increased). The engine will start to jerk. Recirculation rates of more than 15 % will cause clearly noticeable engine jerk which	Test okay?

will increase in proportion to the amount of recirculated exhaust gas. The engine will stall if the recirculation rate is greater than 75 % .	
Concerned Terminals: X22: 11, 32, 40, 46	

Yes:T02	No:C-16

T02 - Tester Display Fuel Tank Ventilation Control

Work Order Description	Nominal Value
• Engine running at idle speed, operating temperature • Accelerator pedal not actuated • Vehicle stationary • Press corresponding key in the system main menu to call up ECU Control Tests, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display. • After the test is started, the corresponding component can be actuated using the soft keys.	Test okay?
Concerned Terminals: X22: 9	

Yes:T03	No:C-17

T03 - Tester Display Electronic Throttle Control

Work Order Description	Nominal Value
• Ignition ON • Engine OFF • Press corresponding key in the system main menu to call up ECU Control Tests, select the desired test and confirm with ENTER . Follow the instructions in the diagnostic tester display. • After the test is started, the corresponding component can be actuated using the soft keys.	Test okay?
Concerned Terminals: X22: 13,14,15,16, 26, 36, 43, 45, 55, 57, 63, 64	

No:C-07

Yes:

B-16 - Check: Intermittent Faults

T01 - Intermittent System Operation

Work Order Description	Nominal Value
The following test steps may or may not be helpful, they are only a proposal. Check Additional Information • Check the newest Technical Information TI for tips regarding the appeared intermittent problems before proceeding with the diagnostic procedure. Preliminary diagnostic check (visual inspection) • Check all sensors, actuators and the wiring harness of the system for corrosion and damages. • Check all connectors of the system for corrosion and for damaged terminals. • Check all ground connections of the system for corrosion and damages • Check if the fault was recognised in an area of strong electromagnetic sources e.g. near radio stations Diagnostic Trouble Codes • Read and record trouble codes • Check for trouble codes with status INTERMITTENT or NOT PRESENT. If a trouble code is stored this may indicate the circuit which has the intermittent condition. INTERMITTENT and NOT PRESENT trouble codes are leading to an intermittent problem. This trouble codes refer to a related functional group. To find the defective component the following test steps may be helpful. • Use the following table to obtain the concerned functional group and perform the following additional test steps, while performing the troubleshooting in the C-x tables. Refer to Table B-01 DIAGNOSTIC TROUBLE CODE	

Move the related connectors, wiring harness and components in order to find the failure. Switch on all electric consumers by turns, because this can cause an electromagnetic interference in a circuit. Use the TECH 31 or an oscilloscope to observe the wiring harness for disturbances. Operate the system under different conditions over a considerable time.

Snapshot function of the Diagnostic tester and TIS 2000

- Select the snapshot function of the Diagnostic Tester. Set the Diagnostic Tester to trigger on ANY CODE/CENTER and try to recreate the conditions that may cause the intermittent trouble code to be set (use the customer complaint information). Use the Diagnostic tester or TIS/TIS 2000 application to analyse the related data list parameters.
  The disturbances in the signal can be observed at the trigger point where the trouble code is set.
- Use the following table to obtain the concerned functional group and perform the following additional test steps, while performing the troubleshooting in the C-x tables.
  Refer to Table B-01 DIAGNOSTIC TROUBLE CODE
  Refer to Table B-02 DATA LIST
  Move the related connectors, wiring harness and components in order to find the failure. Switch on all electric consumers by turns, because this can cause an electromagnetic interference in a circuit. Use the TECH 31 or an oscilloscope to observe the wiring harness for disturbances. Operate the system under different conditions over a considerable time.

Symptoms / Customer Complaints

• Check if one of the symptoms in the following table match the previously recorded customer complaint and perform the following additional test steps, while performing the troubleshooting in the C-x tables. Refer to Table B-08 Symptom Chart/Customer Complaints Move the related connectors, wiring harness and components in order to find the failure. Switch on all electric consumers by turns, because this can cause an electromagnetic interference in a circuit. Use the TECH 31 or an oscilloscope to observe the wiring harness for disturbances. Operate the system under different conditions over a considerable time. After successful test/fault repair proceed to the next test step	

Yes:

B-17 - Distance Signal Check

T01 - Check: Other system

Work Order Description	Nominal Value
Perform the following tests in the given order until a defective component is found. Before connecting the diagnostic tester, observe the instructions of the diagnostic tester operators manual • Connect diagnostic tester, select concerned Electronic System, establish communication and verify, that the correct control unit is installed: Refer to ABS 430 Anti-Lock Brake System Table B-03 Connect Diagnostic Tester and Establish Communication • Read and record diagnostic trouble codes including status • If a trouble code is stored: Refer to ABS 430 Anti-Lock Brake System Table B-01 DIAGNOSTIC TROUBLE	

CODE • Check the following parameters for correct status: Diagnostic Tester Data List Parameter Refer to ABS 430 Anti-Lock Brake System Table B-02 DATA LIST T03 RL Wheel Speed (Rear Left) Refer to Table C-23 Vehicle Speed Input Signal Circuit	

C-01 - No Communication between Diagnostic Tester and Control Unit

T01 - Check: Short to Ground/Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Detach diagnostic tester from diagnostic connector. • All consumers turned off • Disconnect wiring harness connector from: A4 Control Unit - Multec • Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 20 (X21) & Ground	greater than 11 V

Yes:T02	No:T18

T02 - Check: Short to Voltage of Voltage Supply Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 19 (X21) & Ground	less than 0.3 V

Yes:T03	No:T14

T03 - Check: Short to Ground/Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition ON • Measure voltage between the following	greater than 11 V

terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 19 (X21) & Ground	

Yes:T04	No:T06

T04 - Check: Transition Resistance of Ground Circuit

Work Order Description	Nominal Value
• Check all ground connections of the system for corrosion and damages	Is the ground connection okay?

Yes:T05	No:E03

T05 - Check: Short to Ground/Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 59 (X21) & Ground	greater than 11 V

Yes:E01	No:E02

T06 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Remove electrical component from socket: FL1 Fuse • Check the following component for proper operation: FL1 Fuse	Test okay?

Yes:T07	No:T12

T07 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Measure voltage between the following terminals: FL1 Fuse Input contact &	greater than 11 V

Ground	

Yes:T08	No:E09

T08 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: S1 Switch - Starter • Connect fused jumper wire to: S1 Switch - Starter Wiring harness connector (wiring harness side) terminal 15 & Battery voltage • Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 19 (X21) & Ground	greater than 11 V

Yes:E04	No:T09

T09 - Check: Short to Ground/Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Remove electrical component from socket: FB7 Fuse • Check the following component for proper operation: FB7 Fuse	Test okay?

Yes:E05	No:T10

T10 - Check: Component

Work Order Description	Nominal Value
• Remove fused jumper wire • Connect fused jumper wire to: FB7 Fuse Output contact & Battery voltage • Check the following component for proper operation: • Fuse of the fused jumper wire	Test okay?

Yes:E06	No:T11

T11 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: A17 Control Unit - Immobiliser • Insert new fuse into the socket of the fused jumper wire and then check this fuse for proper operation. • Disconnect each of the following components/control units from the wiring harness consecutively and check the fuse of the fused jumper wire for proper operation each time: A14 Radio S4 Switch - Parking Lamp K24 Relay - Starter H1 Instrument	Test okay?

Yes:E07	No:E08

T12 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: S1 Switch - Starter • Connect fused jumper wire to: S1 Switch - Starter Wiring harness connector (wiring harness side) terminal 15A & Battery voltage • Check the following component for proper operation: Fuse of the fused jumper wire	Test okay?

Yes:T13	No:E12

T13 - Check: Component

Work Order Description	Nominal Value
• Remove fused jumper wire • Connect fused jumper wire to: S1 Switch - Starter Wiring harness connector (wiring harness side) terminal 15 & Battery voltage • Check the following component for proper operation:	Test okay?

Fuse of the fused jumper wire	

Yes:E10	No:E11

T14 - Check: Short to Voltage of Voltage Supply Circuit

Work Order Description	Nominal Value
• Remove electrical component from socket: FB2 Fuse • Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 19 (X21) & Ground • Disconnect each of the following components/control units consecutively from the wiring harness and repeat the measurement each time: FB5 Fuse FB6 Fuse FB22 Fuse	less than 0.3 V

Yes:E13	No:T15

T15 - Check: Short to Voltage of Voltage Supply Circuit

Work Order Description	Nominal Value
• Remove electrical component from socket: FB7 Fuse • Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 19 (X21) & Ground	less than 0.3 V

Yes:T16	No:T17

T16 - Check: Short to Voltage of Voltage Supply Circuit

Work Order Description	Nominal Value
• Before working on the pyrotechnical system: Ignition off Disconnect and mask battery negative terminal Wait 1 min until the capacitor in the control	less than 0.3 V

unit has discharged. • Disconnect wiring harness connector from: A1 Control Unit - Airbag • Connect battery negative terminal • Measure voltage between the following terminals: FB7 Fuse Input contact & Ground	

Yes:E14	No:E15

T17 - Check: Short to Voltage of Voltage Supply Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: A17 Control Unit - Immobiliser • Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 19 (X21) & Ground • Disconnect each of the following components/control units consecutively from the wiring harness and repeat the measurement each time: S4 Switch - Parking Lamp K24 Relay - Starter A14 Radio H1 Instrument	less than 0.3 V

Yes:E16	No:E17

T18 - Check: Short to Ground/Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Remove electrical component from socket: FB8 Fuse • Check the following component for proper operation: FB8 Fuse	Test okay?

Yes:E18	No:T19

T19 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value

• Connect fused jumper wire to: FB8 Fuse Output contact & Battery voltage • Check the following component for proper operation: Fuse of the fused jumper wire	Test okay?

Yes:E19	No:T20

T20 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: A17 Control Unit - Immobiliser • Insert new fuse into the socket of the fused jumper wire and then check this fuse for proper operation. • Disconnect each of the following components/control units from the wiring harness consecutively and check the fuse of the fused jumper wire for proper operation each time: A13 Control Unit - Anti Theft Warning Unit H1 Instrument	Test okay?

Yes:E20	No:E21

E01 - Result: Short to Ground

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 59 (X21)
  &
  A17 Control Unit - Immobiliser
  Wiring harness connector (wiring harness side) terminal 7

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E02 - Result: Short to Ground/Interruption

- Short circuit to ground/interruption of circuit between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 59 (X21)
  &
  A17 Control Unit - Immobiliser
  Wiring harness connector (wiring harness side) terminal 7

or

- Defective component:
  A17 Control Unit - Immobiliser

Note:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E03 - Result: Interruption

- Bad ground connection

E04 - Result: Interruption

- Circuit interruption between:
  FL1 Fuse
  Output contact
  &
  S1 Switch - Starter
  Wiring harness connector (wiring harness side) terminal 30

or

- Defective component:
  S1 Switch - Starter

E05 - Result: Interruption

- Circuit interruption between:
  S1 Switch - Starter
  Wiring harness connector (wiring harness side) terminal 15
  &
  FB7 Fuse
  Input contact

or

- Circuit interruption between:
  FB7 Fuse
  Output contact
  &
  A4 Control Unit - Multec

Wiring harness connector (wiring harness side) terminal 19 (X21)

E06 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E07 - Result: Defective Component

- If the nominal value is reached during one of the measurements, the component/control unit that has been disconnected immediately before that measurement is defective.

E08 - Result: Short to Ground

- Short circuit to ground between:
  FB7 Fuse
  Output contact
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 19 (X21)
  &
  A14 Radio
  Wiring harness connector (wiring harness side) terminal 8
  &
  A17 Control Unit - Immobiliser
  Wiring harness connector (wiring harness side) terminal 5
  &
  H1 Instrument
  Wiring harness connector (wiring harness side) terminal A3
  &
  K24 Relay - Starter
  Socket connector colour GN
  &
  S4 Switch - Parking Lamp
  Wiring harness connector (wiring harness side) terminal 4

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E09 - Result: Interruption

- Circuit interruption between:

G1 Battery
Wiring harness connector (wiring harness side) terminal 30
&
FL1 Fuse
Input contact

E10 - Result: Short to Ground

- Short circuit to ground between:
  FL1 Fuse
  Output contact
  &
  S1 Switch - Starter
  Wiring harness connector (wiring harness side) terminal 30

or

- Defective component:
  S1 Switch - Starter

E11 - Result: Short to Ground

- Short circuit to ground between:
  S1 Switch - Starter
  Wiring harness connector (wiring harness side) terminal 15
  &
  A1 Control Unit - Airbag
  Wiring harness connector (wiring harness side) terminal 5
  &
  FB2/FB5/FB6/FB7/FB22 Fuse
  Input contact

or

- Defective component:
  A1 Control Unit - Airbag

E12 - Result: Short to Ground

- Short circuit to ground between:
  S1 Switch - Starter
  Wiring harness connector (wiring harness side) terminal 15A
  &
  FB3/FB4 Fuse
  Input contact

E13 - Result: Short to Voltage

- If the nominal value is reached during one of the measurements, the circuit behind the fuse that was last removed is defective.

E14 - Result: Defective Component

- Defective component:
  A1 Control Unit - Airbag

E15 - Result: Short to Voltage

- Short circuit to voltage between:
  S1 Switch - Starter
  Wiring harness connector (wiring harness side) terminal 15
  &
  A1 Control Unit - Airbag
  Wiring harness connector (wiring harness side) terminal 5
  &
  FB2/FB5/FB6/FB7/FB22 Fuse
  Input contact

or

- Defective component:
  S1 Switch - Starter

E16 - Result: Defective Component

- If the nominal value is reached during one of the measurements, the component/control unit that has been disconnected immediately before that measurement is defective.

Note:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E17 - Result: Short to Voltage

- Short circuit to voltage between:
  FB7 Fuse
  Output contact
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 19 (X21)
  &
  A14 Radio
  Wiring harness connector (wiring harness side) terminal 8
  &
  A17 Control Unit - Immobiliser
  Wiring harness connector (wiring harness side) terminal 5
  &
  H1 Instrument
  Wiring harness connector (wiring harness side) terminal A3
  &
  K24 Relay - Starter
  Socket connector colour GN
  &
  S4 Switch - Parking Lamp
  Wiring harness connector (wiring harness side) terminal 4

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E18 - Result: Interruption

- Circuit interruption between:
  G1 Battery
  Wiring harness connector (wiring harness side) terminal 30
  &
  FB8 Fuse
  Input contact

or

- Circuit interruption between:
  FB8 Fuse
  Output contact
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 20 (X21)

E19 - Result: Defective Component

- Defective component:
  Diagnostic tester
  or
  A4 Control Unit - Multec

Note:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E20 - Result: Defective Component

- If the nominal value is reached during one of the measurements, the component/control unit that has been disconnected immediately before that measurement is defective.

E21 - Result: Defective Component

- Short circuit to ground between:
  FB8 Fuse
  Output contact
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 20 (X21)
  &

A13 Control Unit - Anti Theft Warning Unit
Wiring harness connector (wiring harness side) terminal 7 (X23)
&
A17 Control Unit - Immobiliser
Wiring harness connector (wiring harness side) terminal 9
&
H1 Instrument
Wiring harness connector (wiring harness side) terminal A1
&
X13 Diagnostic Link
Wiring harness connector (wiring harness side) terminal 16

C-02 - Control Unit Hard- and Software

T01 - Check: Diagnostic Trouble Code stored

Work Order Description	Nominal Value
Is the following Diagnostic Trouble Code stored? P0601 Internal Control Module Memory Checksum Error P0604 Internal control module random access memory (RAM) error P1621 EEPROM Failure	

Yes:E01	No:T02

T02 - Check: Component

Work Order Description	Nominal Value
• Ignition ON • Repeat programming	Programming okay?

Yes:E02	No:E01

E01 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec

Note:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the

corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E02 - Result: Programming

- Previous programming was faulty

C-03 - Power Supply Circuit

T01 - Check: Short to Ground/Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: Diagnostic tester • Engine running • Increase engine speed to 3000 rpm • Measure voltage between the following terminals: G1 Battery Wiring harness connector (component side) terminal 30 & Ground	13 ... 15 V

Yes:T02	No:E05

T02 - Check: Short to Ground/Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Measure voltage between the following terminals: G1 Battery Wiring harness connector (component side) terminal 30 & Ground	greater than 11 V

Yes:T03	No:E04

T03 - Check: Transition Resistance of Voltage Supply Circuit

Work Order Description	Nominal Value
• All consumers turned off • Disconnect wiring harness connector from: A4 Control Unit - Multec • Ignition ON • Connect test lamp (10 W) and multimeter in parallel and measure voltage between the following terminals:	greater than 11 V

A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 19 (X21) & Ground	

Yes:T04	No:E03

T04 - Check: Transition Resistance of Voltage Supply Circuit

Work Order Description	Nominal Value
• Connect test lamp (10 W) and multimeter in parallel and measure voltage between the following terminals: Battery voltage & A4 Control Unit - Multec Ground	greater than 11 V

Yes:E01	No:E02

E01 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E02 - Result: High Transition Resistance

- High transition resistance between:
  G1 Battery
  Wiring harness connector (wiring harness side) terminal 31
  &
  A4 Control Unit - Multec
  Ground

E03 - Result: High Transition Resistance

- High transition resistance between:
  G1 Battery
  Wiring harness connector (wiring harness side) terminal 30
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 19 (X21)

E04 - Result: Defective Component

- Check the following component for proper operation:
  G1 Battery

and/or
G2 Alternator
and/or
M1 Starter

and/or

- Check the following circuit for proper operation:
  Terminal 31/30/15

E05 - Result: Defective Component

- Defective component:
  G2 Alternator

C-04 - Crankshaft Sensor Circuit

T01 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec (Wiring Harness Connector X22) • Ignition ON • Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 1 (X22) & Ground	less than 0.3 V

Yes:T02	No:E07

T02 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 1 (X22) & Ground	greater than 500 kOhm

Yes:T03	No:E06

T03 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value

• Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 2 (X22) & A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 1 (X22)	600 ... 800 Ohm

Yes:T04	No:T06

T04 - Check: Component

Work Order Description	Nominal Value
• Engine starting • Switch multimeter to alternating-current voltage measurement. • Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 2 (X22) & A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 1 (X22)	greater than 0.8 V

Yes:T05	No:E03

T05 - Check: Adjustment

Work Order Description	Nominal Value
• Check the following component for proper operation: B34 Impulse Sensor - Crankshaft (intermittent problems, missing teeth, wrong reference point, incorrect gap position, etc.)	Test okay?

Yes:E01	No:E02

T06 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 2 (X22) &	greater than 800 Ohm

A4 Control Unit - Multec
Wiring harness connector (wiring harness side) terminal 1 (X22)

Yes:E04	No:E05

E01 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E02 - Result: Repair other system

- Repair the concerned circuit/component.

E03 - Result: Defective Component

- Defective component:
  B34 Impulse Sensor - Crankshaft

E04 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 1 (X22)
  &
  B34 Impulse Sensor - Crankshaft
  Wiring harness connector (wiring harness side) terminal B
  or
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 2 (X22)
  &
  B34 Impulse Sensor - Crankshaft
  Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  B34 Impulse Sensor - Crankshaft

E05 - Result: Short Circuit in Wiring Harness

- Short circuit in wiring harness between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 2 (X22)
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 1 (X22)

or

- Defective component:
  B34 Impulse Sensor - Crankshaft

E06 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 1 (X22)
  &
  B34 Impulse Sensor - Crankshaft
  Wiring harness connector (wiring harness side) terminal B
  or
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 2 (X22)
  &
  B34 Impulse Sensor - Crankshaft
  Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  B34 Impulse Sensor - Crankshaft

E07 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 1 (X22)
  &
  B34 Impulse Sensor - Crankshaft
  Wiring harness connector (wiring harness side) terminal B
  or
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 2 (X22)
  &
  B34 Impulse Sensor - Crankshaft
  Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  B34 Impulse Sensor - Crankshaft

C-05 - Fuel Pump Circuit

T01 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF	greater than 11 V

• Remove electrical component from socket: K18 Relay - Engine Control Unit • Measure voltage between the following terminals: K18 Relay - Engine Control Unit Socket connector colour BN Wire gauge: 3 mm^2 & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T02	No:T21

T02 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: K18 Relay - Engine Control Unit Socket connector colour BN Wire gauge: 0.5 mm^2 & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	greater than 11 V

Yes:T03	No:E20

T03 - Check: Short to Voltage of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition ON • Measure voltage between the following terminals: K18 Relay - Engine Control Unit Socket connector colour BN	less than 0.3 V

Wire gauge: 2 mm^2 & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T04	No:T19

T04 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: K18 Relay - Engine Control Unit Socket connector colour GNGY & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 0.3 V

Yes:T05	No:E16

T05 - Check: Circuit Interruption of Ground Circuit

Work Order Description	Nominal Value
• Ignition OFF • Remove electrical component from socket: K16 Relay - Fuel pump • Measure resistance between the following terminals: K16 Relay - Fuel pump Socket connector colour BK & Ground **Note:**	less than 5 Ohm

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T06	No:E15

T06 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Connect test light to: K16 Relay - Fuel pump Socket connector colour WHVT Wire gauge: 0.5 mm^2 & K16 Relay - Fuel pump Socket connector colour BK • Ignition ON • Select and enable diagnostic tester actuator test: Fuel Pump Relay Test • Press soft key INACTIVE **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	Test light OFF?

Yes:T07	No:E14

T07 - Check: Component

Work Order Description	Nominal Value
• Press soft key ACTIVE	Test light ON?

Yes:T08	No:E13

T08 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Remove electrical component from socket: FR2 Fuse • Check the following component for proper operation: FR2 Fuse	Test okay?

Yes:T09	No:T16

T09 - Check: Short to Voltage of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition ON • Measure voltage between the following terminals: K16 Relay - Fuel pump Socket connector colour BNGY & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 0.3 V

Yes:T10	No:E08

T10 - Check: Component

Work Order Description	Nominal Value
• Connect fused jumper wire to: K16 Relay - Fuel pump Socket connector colour BNGY & Battery voltage **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	Is the fuel pump running?

Yes:T11	No:T15

T11 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Measure resistance between the following terminals: K16 Relay - Fuel pump Socket connector colour WHVT	less than 5 Ohm

Wire gauge: 2 mm^2 & FR2 Fuse Output contact **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T12	No:T14

T12 - Check: Short to Ground/Interruption of Signal Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: A4 Control Unit - Multec • Connect fused jumper wire to: K18 Relay - Engine Control Unit Socket connector colour GNGY & Battery voltage • Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 30 (X21) & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	greater than 11 V

Yes:T13	No:E03

T13 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Remove fused jumper wire • Insert electrical component in socket: K18 Relay - Engine Control Unit	greater than 11 V

• Connect fused jumper wire to: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 30 (X21) & Ground • Ignition ON • Measure voltage between the following terminals: FR2 Fuse Input contact & Ground	

Yes:E01	No:E02

T14 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: S94 Shock Switch - Fuel Cut-Off • Measure resistance between the following terminals: S94 Shock Switch - Fuel Cut-Off Wiring harness connector (wiring harness side) terminal 1 & K16 Relay - Fuel pump Socket connector colour WHVT Wire gauge: 2 mm^2 **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 5 Ohm

Yes:E04	No:E05

T15 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: M21 Pump - Fuel • Measure voltage between the following terminals: M21 Pump - Fuel	greater than 11 V

Wiring harness connector (wiring harness side) terminal A & • Ground	
Yes:E06	**No:E07**

T16 - Check: Short to Ground of Voltage Supply Circuit	
Work Order Description	**Nominal Value**
• Insert new fuse FR2 and then check the fuse for proper operation.	Test okay?
Yes:T17	**No:T18**

T17 - Check: Short to Ground of Voltage Supply Circuit	
Work Order Description	**Nominal Value**
• Connect fused jumper wire to: K16 Relay - Fuel pump Socket connector colour BNGY & Battery voltage • Check the following component for proper operation: Fuse of the fused jumper wire **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	Test okay?
Yes:E09	**No:E10**

T18 - Check: Short to Ground of Voltage Supply Circuit	
Work Order Description	**Nominal Value**
• Disconnect wiring harness connector from: S94 Shock Switch - Fuel Cut-Off • Insert new fuse FR2 and then check the fuse for proper operation.	Test okay?
Yes:E11	**No:E12**

T19 - Check: Short to Voltage of Voltage Supply Circuit	
Work Order Description	**Nominal Value**
• Remove electrical component from socket:	less than 0.3 V

FR2 Fuse • Measure voltage between the following terminals: K18 Relay - Engine Control Unit Socket connector colour BN Wire gauge: 2 mm^2 & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T20	No:E19

T20 - Check: Component

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: S94 Shock Switch - Fuel Cut-Off • Ignition ON • Measure voltage between the following terminals: S94 Shock Switch - Fuel Cut-Off Wiring harness connector (wiring harness side) terminal 3 & Ground	less than 0.3 V

Yes:E17	No:E18

T21 - Check: Component

Work Order Description	Nominal Value
• Remove electrical component from socket: FL4 Fuse • Check the following component for proper operation: FL4 Fuse	Test okay?

Yes:E21	No:T22

T22 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value

• Insert new fuse FL4 and then check the fuse for proper operation.	Test okay?
Yes:T23	**No:E26**

T23 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Connect fused jumper wire to: K18 Relay - Engine Control Unit Socket connector colour BN Wire gauge: 2 mm^2 & Battery voltage • Check the following component for proper operation: Fuse of the fused jumper wire **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	Test okay?
Yes:T24	**No:E25**

T24 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Remove fused jumper wire • Connect fused jumper wire to: K18 Relay - Engine Control Unit Socket connector colour BNPK & Battery voltage • Check the following component for proper operation: Fuse of the fused jumper wire **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	Test okay?
Yes:E22	**No:T25**

T25 - Check: Component

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: A4 Control Unit - Multec • Insert new fuse into the socket of the fused jumper wire and then check this fuse for proper operation. • Disconnect each of the following components/control units consecutively from the wiring harness and repeat the check each time: B117 Sensor - Oxygen, Exhaust, Heated 1 B118 Sensor - Oxygen, Exhaust, Heated 2 C1 Capacitor - Ignition Coil T1 Ignition Coil - Direct Ignition Y5 Solenoid Valve - Tank Ventilation Y9.1 Injection Valve - Cylinder - 1 Y9.2 Injection Valve - Cylinder - 2 Y9.3 Injection Valve Cylinder - 3 Y9.4 Injection Valve Cylinder - 4	Test okay?

Yes:E23	No:E24

E01 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec
  or
  K16 Relay - Fuel pump

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E02 - Result: Interruption

- Circuit interruption between:
  K18 Relay - Engine Control Unit
  Socket connector colour BN
  Wire gauge: 2 mm^2
  &
  FR2 Fuse
  Input contact

or

- Defective component:

K18 Relay - Engine Control Unit

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E03 - Result: Short to Ground/Interruption

- Short circuit to ground/interruption of circuit between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 30 (X21)
  &
  K18 Relay - Engine Control Unit
  Socket connector colour GNGY

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E04 - Result: Defective Component

- Circuit interruption between:
  FR2 Fuse
  Output contact
  &
  S94 Shock Switch - Fuel Cut-Off
  Wiring harness connector (wiring harness side) terminal 3

or

- Defective component:
  S94 Shock Switch - Fuel Cut-Off

E05 - Result: Interruption

- Circuit interruption between:
  S94 Shock Switch - Fuel Cut-Off
  Wiring harness connector (wiring harness side) terminal 1
  &
  K16 Relay - Fuel pump
  Socket connector colour WHVT
  Wire gauge: 2 mm^2

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise,

VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E06 - Result: Defective Component

- Circuit interruption between:
  M21 Pump - Fuel
  Wiring harness connector (wiring harness side) terminal B
  &
  Ground

or

- Defective component:
  M21 Pump - Fuel

E07 - Result: Interruption

- Circuit interruption between:
  K16 Relay - Fuel pump
  Socket connector colour BNGY
  &
  M21 Pump - Fuel
  Wiring harness connector (wiring harness side) terminal A

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green,
GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise,
VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E08 - Result: Short to Voltage

- Short circuit to voltage between:
  K16 Relay - Fuel pump
  Socket connector colour BNGY
  &
  M21 Pump - Fuel
  Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  M21 Pump - Fuel

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green,
GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise,
VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E09 - Result: Defective Component

- Defective component:
  K16 Relay - Fuel pump

E10 - Result: Defective Component

- Short circuit to ground between:
  K16 Relay - Fuel pump
  Socket connector colour BNGY
  &
  M21 Pump - Fuel
  Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  M21 Pump - Fuel

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E11 - Result: Short to Ground

- Short circuit to ground between:
  K16 Relay - Fuel pump
  Socket connector colour WHVT
  Wire gauge: 2 mm^2
  &
  S94 Shock Switch - Fuel Cut-Off
  Wiring harness connector (wiring harness side) terminal 1

or

- Defective component:
  S94 Shock Switch - Fuel Cut-Off

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E12 - Result: Short to Ground

- Short circuit to ground between:
  FR2 Fuse
  Output contact
  &
  S94 Shock Switch - Fuel Cut-Off

Wiring harness connector (wiring harness side) terminal 3

E13 - Result: Interruption

- Short circuit to ground/interruption of circuit between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 29 (X21)
  &
  K16 Relay - Fuel pump
  Socket connector colour WHVT
  Wire gauge: 0.5 mm^2

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E14 - Result: Short to Ground

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 29 (X21)
  &
  K16 Relay - Fuel pump
  Socket connector colour WHVT
  Wire gauge: 0.5 mm^2

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E15 - Result: Interruption

- Circuit interruption between:
  K16 Relay - Fuel pump
  Socket connector colour BK
  &
  Ground

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E16 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 30 (X21)
  &
  K18 Relay - Engine Control Unit
  Socket connector colour GNGY

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E17 - Result: Short to Voltage

- Short circuit to voltage between:
  S94 Shock Switch - Fuel Cut-Off
  Wiring harness connector (wiring harness side) terminal 1
  &
  K16 Relay - Fuel pump
  Socket connector colour WHVT

or

- Defective component:
  K16 Relay - Fuel pump

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E18 - Result: Defective Component

- Short circuit to voltage between:
  FR2 Fuse
  Output contact
  &
  S94 Shock Switch - Fuel Cut-Off
  Wiring harness connector (wiring harness side) terminal 3

or

- Defective component:
  S94 Shock Switch - Fuel Cut-Off

E19 - Result: Short to Voltage

- Short circuit to voltage between:
  K18 Relay - Engine Control Unit
  Socket connector colour BN
  Wire gauge: 2 mm^2
  &
  FR2 Fuse
  Input contact

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E20 - Result: Interruption

- Circuit interruption between:

FL4 Fuse
Output contact
&
K18 Relay - Engine Control Unit
Socket connector colour BN
Wire gauge: 0.5 mm^2

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E21 - Result: Interruption

- Circuit interruption between:
  G1 Battery
  Wiring harness connector (wiring harness side) terminal 30
  &
  FL4 Fuse
  Input contact

or

- Circuit interruption between:
  FL4 Fuse
  Output contact
  &
  K18 Relay - Engine Control Unit
  Socket connector colour BN
  Wire gauge: 3 mm^2

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E22 - Result: Short to Ground

- Short circuit to ground between:
  K24 Relay - Starter
  Socket connector colour BNRD
  &
  M1 Starter
  Wiring harness connector (wiring harness side) terminal 50

or

- Defective component:
  M1 Starter
  or
  K18 Relay - Engine Control Unit

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E23 - Result: Defective Component

- If the nominal value is reached during one of the measurements, the component/control unit that has been disconnected immediately before that measurement is defective.

E24 - Result: Short to Ground

- Short circuit to ground between:
  K18 Relay - Engine Control Unit
  Socket connector colour BNPK
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 63 (X22), 64 (X22)
  &
  B117 Sensor - Oxygen, Exhaust, Heated 1
  Wiring harness connector (wiring harness side) terminal D
  &
  B118 Sensor - Oxygen, Exhaust, Heated 2
  Wiring harness connector (wiring harness side) terminal 4
  &
  C1 Capacitor - Ignition Coil
  Wiring harness connector (wiring harness side) wiring colour BNPK
  &
  T1 Ignition Coil - Direct Ignition
  Wiring harness connector (wiring harness side) terminal A
  &
  Y5 Solenoid Valve - Tank Ventilation
  Wiring harness connector (wiring harness side) terminal A
  &
  Y9.1 Injection Valve - Cylinder - 1
  Wiring harness connector (wiring harness side) terminal A
  &
  Y9.2 Injection Valve - Cylinder - 2
  Wiring harness connector (wiring harness side) terminal A
  &
  Y9.3 Injection Valve Cylinder - 3
  Wiring harness connector (wiring harness side) terminal A
  &

Y9.4 Injection Valve Cylinder - 4
Wiring harness connector (wiring harness side) terminal A

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E25 - Result: Short to Ground

- Short circuit to ground between:
  K18 Relay - Engine Control Unit
  Socket connector colour BN
  Wire gauge: 2 mm^2
  &
  FR2 Fuse
  Input contact

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E26 - Result: Short to Ground

- Short circuit to ground between:
  FL4 Fuse
  Output contact
  &
  K18 Relay - Engine Control Unit
  Socket connector colour BN
  Wire gauge: 0.5 mm^2
  &
  K18 Relay - Engine Control Unit
  Socket connector colour BN
  Wire gauge: 3 mm^2
  &
  K24 Relay - Starter
  Socket connector colour BN
  Wire gauge: 3 mm^2
  &
  FR1 Fuse
  Input contact

or

- Defective component:

K24 Relay - Starter

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

C-06 - Pedal Position Sensor Circuit

T01 - Check: Short to Voltage/Ground/Interruption of Voltage Supply

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: B19 Sensor - Pedal Position • Ignition ON • Measure voltage between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour WH & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	4.8 ... 5.2 V

Yes:T02	No:T30

T02 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Diagnostic Tester Data List Parameter APP Sensor 2 (Accelerator Pedal Position)	less than 0.3 V

Yes:T03	No:E28

T03 - Check: Short to Ground/Interruption of Signal Circuit

Work Order Description	Nominal Value
• Connect fused jumper wire to: B19 Sensor - Pedal Position Wiring harness connector (wiring harness	4.8 ... 5.2 V

side) wiring colour WH & B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour BN • Diagnostic Tester Data List Parameter APP Sensor 2 (Accelerator Pedal Position) **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T04	No:E27

T04 - Check: Short to Voltage of Ground Circuit

Work Order Description	Nominal Value
• Remove fused jumper wire • Connect fused jumper wire to: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour BN & B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour YE • Diagnostic Tester Data List Parameter APP Sensor 2 (Accelerator Pedal Position) **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 0.3 V

Yes:T05	No:E26

T05 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Remove fused jumper wire • Disconnect wiring harness connector from:	greater than 500 kOhm

A4 Control Unit - Multec • Measure resistance between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour YE & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T06	No:E25

T06 - Check: Circuit Interruption of Ground Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour YE & A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 53 (X21) **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 5 Ohm

Yes:T07	No:E24

T07 - Check: Short to Voltage/Ground/Interruption of Voltage Supply

Work Order Description	Nominal Value
• Connect wiring harness connector to: A4 Control Unit - Multec • Ignition ON • Measure voltage between the following	4.8 ... 5.2 V

terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour GN & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T08	No:T16

T08 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec • Ignition ON • Measure voltage between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour BU & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 0.3 V

Yes:T09	No:E08

T09 - Check: Short to Voltage of Ground Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness	less than 0.3 V

side) wiring colour BK & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T10	No:E07

T10 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF Measure resistance between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour BK & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	greater than 500 kOhm

Yes:T11	No:E06

T11 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour BU & Ground **Note:**	greater than 500 kOhm

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T12	No:E05

T12 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour BU & A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 49 (X21) **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 5 Ohm

Yes:T13	No:E04

T13 - Check: Circuit Interruption of Ground Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour BK & A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 64 (X21) **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise,	less than 5 Ohm

VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T14	No:E03

T14 - Check: Component

Work Order Description	Nominal Value
• Connect wiring harness connector to: A4 Control Unit - Multec • Connect fused jumper wire to: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour BK & B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour BU • Ignition ON • Diagnostic Tester Data List Parameter APP Sensor 1 (Accelerator Pedal Position) **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 0.3 V

Yes:T15	No:E02

T15 - Check: Component

Work Order Description	Nominal Value
• Remove fused jumper wire • Connect fused jumper wire to: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour BU & B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour GN • Diagnostic Tester Data List Parameter APP Sensor 2 (Accelerator Pedal Position) **Note:**	4.8 ... 5.2 V

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:E01	No:E02

T16 - Check: Short to Voltage/Ground/Interruption of Voltage Supply

Work Order Description	Nominal Value
• Connect wiring harness connector to: A4 Control Unit - Multec • Ignition ON • Measure voltage between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour GN & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 4.8 V

Yes:T17	No:T22

T17 - Check: Component

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: Y29 Throttle Valve Positioner • Ignition ON • Measure voltage between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour GN & Ground **Note:**	4.8 ... 5.2 V

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:E09	No:T18

T18 - Check: Component

Work Order Description	Nominal Value
• Ignition OFF Disconnect wiring harness connector from: Y4 Solenoid Valve - Exhaust Gas Recirculation • Ignition ON • Measure voltage between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour GN & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	4.8 ... 5.2 V

Yes:E10	No:T19

T19 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec • Measure resistance between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour GN & Ground **Note:**	greater than 500 kOhm

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T20	No:E14

T20 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour GN & A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 21 (X21) **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 5 Ohm

Yes:T21	No:E13

T21 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal C & Ground	greater than 500 kOhm

Yes:E11	No:E12

T22 - Check: Component

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: Y29 Throttle Valve Positioner	4.8 ... 5.2 V

• Ignition ON • Measure voltage between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour GN & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T23	No:T25

T23 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal A & Ground	less than 0.3 V

Yes:T24	No:E17

T24 - Check: Short to Voltage of Ground Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal G & Ground	less than 0.3 V

Yes:E15	No:E16

T25 - Check: Component

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from:	4.8 ... 5.2 V

Y4 Solenoid Valve - Exhaust Gas Recirculation • Ignition ON • Measure voltage between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour GN & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T26	No:T28

T26 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec • Ignition ON • Measure voltage between the following terminals: Y4 Solenoid Valve - Exhaust Gas Recirculation Wiring harness connector (wiring harness side) terminal B & Ground	less than 0.3 V

Yes:T27	No:E20

T27 - Check: Short to Voltage of Ground Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: Y4 Solenoid Valve - Exhaust Gas Recirculation Wiring harness connector (wiring harness side) terminal C &	less than 0.3 V

Ground	

Yes:E18	No:E19

T28 - Check: Short to Voltage of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec • Ignition ON • Measure voltage between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour GN & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 0.3 V

Yes:T29	No:E23

T29 - Check: Short to Voltage of Voltage Supply Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: Y4 Solenoid Valve - Exhaust Gas Recirculation Wiring harness connector (wiring harness side) terminal D & Ground	less than 0.3 V

Yes:E21	No:E22

T30 - Check: Short to Voltage/Ground/Interruption of Voltage Supply

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: B19 Sensor - Pedal Position • Ignition ON	less than 4.8 V

• Measure voltage between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour WH & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T31	No:T36

T31 - Check: Component

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: Y29 Throttle Valve Positioner • Ignition ON • Measure voltage between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour WH & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	4.8 ... 5.2 V

Yes:E29	No:T32

T32 - Check: Component

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: B21 Sensor - Absolute Pressure, Intake	4.8 ... 5.2 V

Manifold • Ignition ON • Measure voltage between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour WH & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:E30	No:T33

T33 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec • Measure resistance between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour WH & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	greater than 500 kOhm

Yes:T34	No:E34

T34 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals:	less than 5 Ohm

B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour WH & A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 31 (X21) **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T35	No:E33

T35 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal H & Ground	greater than 500 kOhm

Yes:E31	No:E32

T36 - Check: Component

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: Y29 Throttle Valve Positioner • Ignition ON • Measure voltage between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour WH & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue,	4.8 ... 5.2 V

GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T37	No:T39

T37 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec • Ignition ON • Measure voltage between the following terminals: Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal D & Ground	less than 0.3 V

Yes:T38	No:E37

T38 - Check: Short to Voltage of Ground Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal B & Ground	less than 0.3 V

Yes:E35	No:E36

T39 - Check: Component

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: B21 Sensor - Absolute Pressure, Intake Manifold • Ignition ON • Measure voltage between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour WH	4.8 ... 5.2 V

& Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T40	No:T42

T40 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec • Ignition ON • Measure voltage between the following terminals: B21 Sensor - Absolute Pressure, Intake Manifold Wiring harness connector (wiring harness side) terminal B & Ground	less than 0.3 V

Yes:T41	No:E40

T41 - Check: Short to Voltage of Ground Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: B21 Sensor - Absolute Pressure, Intake Manifold Wiring harness connector (wiring harness side) terminal A & Ground	less than 0.3 V

Yes:E38	No:E39

T42 - Check: Short to Voltage of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from:	less than 0.3 V

A4 Control Unit - Multec • Ignition ON • Measure voltage between the following terminals: B19 Sensor - Pedal Position Wiring harness connector (wiring harness side) wiring colour WH & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T43	No:E43

T43 - Check: Short to Voltage of Voltage Supply Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: B21 Sensor - Absolute Pressure, Intake Manifold Wiring harness connector (wiring harness side) terminal C & Ground	less than 0.3 V

Yes:E41	No:E42

E01 - Result: Defective Component

- Defective component:
  B19 Sensor - Pedal Position

E02 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E03 - Result: Interruption

- Circuit interruption between:

A4 Control Unit - Multec
Wiring harness connector (wiring harness side) terminal 64 (X21)
&
B19 Sensor - Pedal Position
Wiring harness connector (wiring harness side) wiring colour BK

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E04 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 49 (X21)
  &
  B19 Sensor - Pedal Position
  Wiring harness connector (wiring harness side) wiring colour BU

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E05 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 49 (X21)
  &
  B19 Sensor - Pedal Position
  Wiring harness connector (wiring harness side) wiring colour BU

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E06 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 64 (X21)
  &
  B19 Sensor - Pedal Position
  Wiring harness connector (wiring harness side) wiring colour BK

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E07 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 64 (X21)
  &
  B19 Sensor - Pedal Position
  Wiring harness connector (wiring harness side) wiring colour BK

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E08 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 49 (X21)
  &
  B19 Sensor - Pedal Position
  Wiring harness connector (wiring harness side) wiring colour BU

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E09 - Result: Defective Component

- Defective component:
  Y29 Throttle Valve Positioner

E10 - Result: Defective Component

- Defective component:
  Y4 Solenoid Valve - Exhaust Gas Recirculation

E11 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 46 (X22)
  &
  Y4 Solenoid Valve - Exhaust Gas Recirculation

Wiring harness connector (wiring harness side) terminal D

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E12 - Result: Short to Ground

- Short circuit to ground:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 45 (X22)
  &
  Y29 Throttle Valve Positioner
  Wiring harness connector (wiring harness side) terminal C

E13 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 21 (X21)
  &
  B19 Sensor - Pedal Position
  Wiring harness connector (wiring harness side) wiring colour GN

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E14 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 21 (X21)
  &
  B19 Sensor - Pedal Position
  Wiring harness connector (wiring harness side) wiring colour GN

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,

L=Light, D=Dark

E15 - Result: Defective Component

- Defective component:
  Y29 Throttle Valve Positioner
  or
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E16 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 43 (X22)
  &
  Y29 Throttle Valve Positioner
  Wiring harness connector (wiring harness side) terminal G

E17 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 55 (X22)
  &
  Y29 Throttle Valve Positioner
  Wiring harness connector (wiring harness side) terminal A

E18 - Result: Defective Component

- Defective component:
  Y4 Solenoid Valve - Exhaust Gas Recirculation
  or
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E19 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 32 (X22)
  &
  Y4 Solenoid Valve - Exhaust Gas Recirculation
  Wiring harness connector (wiring harness side) terminal C

E20 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 40 (X22)
  &
  Y4 Solenoid Valve - Exhaust Gas Recirculation
  Wiring harness connector (wiring harness side) terminal B

E21 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 45 (X22)
  &
  Y29 Throttle Valve Positioner
  Wiring harness connector (wiring harness side) terminal C

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E22 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 46 (X78)
  &
  Y4 Solenoid Valve - Exhaust Gas Recirculation
  Wiring harness connector (wiring harness side) terminal D

E23 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 21 (X21)
  &
  B19 Sensor - Pedal Position
  Wiring harness connector (wiring harness side) wiring colour GN

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E24 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 53 (X21)
  &
  B19 Sensor - Pedal Position
  Wiring harness connector (wiring harness side) wiring colour YE

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E25 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 53 (X21)
  &
  B19 Sensor - Pedal Position
  Wiring harness connector (wiring harness side) wiring colour YE

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E26 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 53 (X21)
  &
  B19 Sensor - Pedal Position
  Wiring harness connector (wiring harness side) wiring colour YE

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E27 - Result: Short to Ground/Interruption

- Short circuit to ground/interruption of circuit between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 61 (X21)
  &
  B19 Sensor - Pedal Position
  Wiring harness connector (wiring harness side) wiring colour BN

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E28 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 61 (X21)
  &
  B19 Sensor - Pedal Position
  Wiring harness connector (wiring harness side) wiring colour BN

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic

tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E29 - Result: Defective Component

- Defective component:
  Y29 Throttle Valve Positioner

E30 - Result: Defective Component

- Defective component:
  B21 Sensor - Absolute Pressure, Intake Manifold

E31 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 58 (X22)
  &
  B21 Sensor - Absolute Pressure, Intake Manifold
  Wiring harness connector (wiring harness side) terminal C

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E32 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 57 (X22)
  &
  Y29 Throttle Valve Positioner
  Wiring harness connector (wiring harness side) terminal H

E33 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 31 (X21)

&
B19 Sensor - Pedal Position
Wiring harness connector (wiring harness side) wiring colour WH

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E34 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 31(X21)
  &
  B19 Sensor - Pedal Position
  Wiring harness connector (wiring harness side) wiring colour WH

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E35 - Result: Defective Component

- Defective component:
  Y29 Throttle Valve Positioner
  or
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E36 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 36 (X22)
  &
  Y29 Throttle Valve Positioner
  Wiring harness connector (wiring harness side) terminal B

E37 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 26 (X22)

&
Y29 Throttle Valve Positioner
Wiring harness connector (wiring harness side) terminal D

E38 - Result: Defective Component

- Defective component:
  B21 Sensor - Absolute Pressure, Intake Manifold
  or
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E39 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 12 (X22)
  &
  B21 Sensor - Absolute Pressure, Intake Manifold
  Wiring harness connector (wiring harness side) terminal A

E40 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 35 (X22)
  &
  B21 Sensor - Absolute Pressure, Intake Manifold
  Wiring harness connector (wiring harness side) terminal B

E41 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 57 (X22)
  &
  Y29 Throttle Valve Positioner
  Wiring harness connector (wiring harness side) terminal H

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both

control units are never reset and replaced at the same time.

E42 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 58 (X22)
  &
  B21 Sensor - Absolute Pressure, Intake Manifold
  Wiring harness connector (wiring harness side) terminal C

E43 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 31 (X21)
  &
  B19 Sensor - Pedal Position
  Wiring harness connector (wiring harness side) wiring colour WH

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

C-07 - Throttle Valve Positioner Circuit

T01 - Check: Short to Ground/Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • All consumers turned off • Remove electrical component from socket: K18 Relay - Engine Control Unit • Measure voltage between the following terminals: K18 Relay - Engine Control Unit Socket connector colour BN Wire gauge: 3 mm^2 & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	greater than 11 V

Yes:T02	No:T23

T02 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: K18 Relay - Engine Control Unit Socket connector colour BN Wire gauge: 0.5 mm^2 & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	greater than 11 V

Yes:T03	No:E21

T03 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec • Measure resistance between the following terminals: K18 Relay - Engine Control Unit Socket connector colour BNPK & A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 63 (X22), 64 (X22) **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 5 Ohm

Yes:T04	No:E20

T04 - Check: Short to Voltage of Voltage Supply Circuit

Work Order Description	Nominal Value

• Ignition ON • Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 30 (X21) & Ground	less than 0.3 V

Yes:T05	No:E19

T05 - Check: Short to Ground/Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Install following component: K18 Relay - Engine Control Unit • Connect fused jumper wire to: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 30 (X21) & Ground • Ignition ON • Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 63 (X22), 64 (X22) & Ground	greater than 11 V

Yes:T06	No:E18

T06 - Check: Short to Voltage of Voltage Supply Circuit

Work Order Description	Nominal Value
• Remove fused jumper wire • Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 13 (X22) & Ground	less than 0.3 V

Yes:T07	No:T22

T07 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value

• Ignition OFF • Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 13 (X22) & Ground	greater than 500 kOhm

Yes:T08	No:T21

T08 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: Y29 Throttle Valve Positioner • Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 13 (X22), 14 (X22) & Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal E	less than 5 Ohm

Yes:T09	No:E13

T09 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 15 (X22), 16 (X22) & Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal F	less than 5 Ohm

Yes:T10	No:E12

T10 - Check: Short to Voltage of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition ON • Measure voltage between the following terminals: A4 Control Unit - Multec	less than 0.3 V

Wiring harness connector (wiring harness side) terminal 36 (X22) & Ground	
Yes:T11	**No:E11**

T11 - Check: Circuit Interruption of Ground Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 36 (X22) & Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal B	less than 5 Ohm
Yes:T12	**No:E10**

T12 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 36 (X22) & Ground	greater than 500 kOhm
Yes:T13	**No:E09**

T13 - Check: Circuit Interruption of Ground Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 43 (X22) & Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal G	less than 5 Ohm
Yes:T14	**No:E08**

T14 - Check: Short to Ground of Voltage Supply Circuit	
Work Order Description	**Nominal Value**
• Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 43 (X22) & Ground	greater than 500 kOhm
Yes:T15	**No:E07**

T15 - Check: Short to Voltage of Voltage Supply Circuit	
Work Order Description	**Nominal Value**
• Connect wiring harness connector to: A4 Control Unit - Multec • Ignition ON • Measure voltage between the following terminals: Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal H & Ground	4.8 ... 5.2 V
Yes:T16	**No:E06**

T16 - Check: Interruption of Voltage Supply Circuit	
Work Order Description	**Nominal Value**
• Measure voltage between the following terminals: Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal C & Ground	4.8 ... 5.2 V
Yes:T17	**No:E05**

T17 - Check: Short to Ground/Interruption of Signal Circuit	
Work Order Description	**Nominal Value**
• Connect fused jumper wire to: Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal C &	4.8 ... 5.2 V

Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal A • Diagnostic Tester Data List Parameter TP Sensor 1 (Throttle Position)	

Yes:T18	No:E04

T18 - Check: Short to Ground/Interruption of Signal Circuit

Work Order Description	Nominal Value
• Remove fused jumper wire • Connect fused jumper wire to: Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal H & Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal D • Diagnostic Tester Data List Parameter TP Sensor 2 (Throttle Position)	4.8 ... 5.2 V

Yes:T19	No:E03

T19 - Check: Component

Work Order Description	Nominal Value
• Remove fused jumper wire • Connect fused jumper wire to: Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal B & Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal D • Diagnostic Tester Data List Parameter TP Sensor 2 (Throttle Position)	less than 0.3 V

Yes:T20	No:E02

T20 - Check: Component

Work Order Description	Nominal Value
• Remove fused jumper wire • Connect fused jumper wire to: Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal A	less than 0.3 V

& Y29 Throttle Valve Positioner Wiring harness connector (wiring harness side) terminal G • Diagnostic Tester Data List Parameter TP Sensor 1 (Throttle Position)	

Yes:E01	No:E02

T21 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: Y29 Throttle Valve Positioner • Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 13 (X22) & Ground	greater than 500 kOhm

Yes:E14	No:E15

T22 - Check: Short to Voltage of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: Y29 Throttle Valve Positioner • Ignition ON • Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 13 (X22) & Ground	less than 0.3 V

Yes:E16	No:E17

T23 - Check: Component

Work Order Description	Nominal Value
• Remove electrical component from socket: FL4 Fuse • Check the following component for proper operation: FL4 Fuse	Test okay?

Yes:E22	No:T24

T24 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Connect fused jumper wire to: FL4 Fuse Output contact & Battery voltage • Check the following component for proper operation: Fuse of the fused jumper wire	Test okay?

Yes:T25	No:E27

T25 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Remove fused jumper wire • Connect fused jumper wire to: K18 Relay - Engine Control Unit Socket connector colour BNPK & Ground • Check the following component for proper operation: Fuse of the fused jumper wire **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	Test okay?

Yes:T26	No:T27

T26 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Remove fused jumper wire • Connect fused jumper wire to: K18 Relay - Engine Control Unit Socket connector colour BN Wire gauge: 2 mm^2 & Battery voltage • Check the following component for proper operation:	Test okay?

Fuse of the fused jumper wire **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:E23	No:E24

T27 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: A4 Control Unit - Multec • Insert new fuse into the socket of the fused jumper wire and then check this fuse for proper operation. • Disconnect each of the following components/control units consecutively from the wiring harness and repeat the measurement each time: B117 Sensor - Oxygen, Exhaust, Heated 1 B118 Sensor - Oxygen, Exhaust, Heated 2 C1 Capacitor - Ignition Coil T1 Ignition Coil - Direct Ignition Y5 Solenoid Valve - Tank Ventilation Y9.1 Injection Valve - Cylinder - 1 Y9.2 Injection Valve - Cylinder - 2 Y9.3 Injection Valve Cylinder - 3 Y9.4 Injection Valve Cylinder - 4	Test okay?

Yes:E25	No:E26

E01 - Result: Defective Component

- Defective component:
  Y29 Throttle Valve Positioner

E02 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E03 - Result: Short to Ground/Interruption

- Short circuit to ground/interruption of circuit between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 26 (X22)
  &
  Y29 Throttle Valve Positioner
  Wiring harness connector (wiring harness side) terminal D

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E04 - Result: Short to Ground/Interruption

- Short circuit to ground/interruption of circuit between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 55 (X22)
  &
  Y29 Throttle Valve Positioner
  Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E05 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 45 (X22)
  &
  Y29 Throttle Valve Positioner
  Wiring harness connector (wiring harness side) terminal C

E06 - Result: Interruption

- Circuit interruption between:

A4 Control Unit - Multec
Wiring harness connector (wiring harness side) terminal 57 (X22)
&
Y29 Throttle Valve Positioner
Wiring harness connector (wiring harness side) terminal H

E07 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 43 (X22)
  &
  Y29 Throttle Valve Positioner
  Wiring harness connector (wiring harness side) terminal G

E08 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 43 (X22)
  &
  Y29 Throttle Valve Positioner
  Wiring harness connector (wiring harness side) terminal G

E09 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 36 (X22)
  &
  Y29 Throttle Valve Positioner
  Wiring harness connector (wiring harness side) terminal B

E10 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 36 (X22)
  &
  Y29 Throttle Valve Positioner
  Wiring harness connector (wiring harness side) terminal B

E11 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 36 (X22)
  &
  Y29 Throttle Valve Positioner
  Wiring harness connector (wiring harness side) terminal B

E12 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 15 (X22), 16 (X22)
  &

Y29 Throttle Valve Positioner
Wiring harness connector (wiring harness side) terminal F

E13 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 13 (X22), 14 (X22)
  &
  Y29 Throttle Valve Positioner
  Wiring harness connector (wiring harness side) terminal E

E14 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 15 (X22), 16 (X22)
  &
  Y29 Throttle Valve Positioner
  Wiring harness connector (wiring harness side) terminal F

or

- Defective component:
  Y29 Throttle Valve Positioner

E15 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 13 (X22), 14 (X22)
  &
  Y29 Throttle Valve Positioner
  Wiring harness connector (wiring harness side) terminal E

E16 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 15 (X22), 16 (X22)
  &
  Y29 Throttle Valve Positioner
  Wiring harness connector (wiring harness side) terminal F

or

- Defective component:
  Y29 Throttle Valve Positioner

E17 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 13 (X22), 14 (X22)
  &
  Y29 Throttle Valve Positioner

Wiring harness connector (wiring harness side) terminal E

E18 - Result: Short to Ground/Interruption

- Short circuit to ground/interruption of circuit between:
  K18 Relay - Engine Control Unit
  Socket connector colour GNGY
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 30 (X21)

or

- Defective component:
  K18 Relay - Engine Control Unit

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E19 - Result: Short to Voltage

- Short circuit to voltage between:
  K18 Relay - Engine Control Unit
  Socket connector colour GNGY
  &
  A4 Control Unit - Multec
- Wiring harness connector (wiring harness side) terminal 30 (X21)

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E20 - Result: Interruption

- Circuit interruption between:
  K18 Relay - Engine Control Unit
  Socket connector colour BNPK
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 63 (X22), 64 (X22)

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,

L=Light, D=Dark

E21 - Result: Interruption

- Circuit interruption between:
  FL4 Fuse
  Output contact
  &
  K18 Relay - Engine Control Unit
  Socket connector colour BN
  Wire gauge: 0.5 mm^2

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E22 - Result: Interruption

- Circuit interruption between:
  G1 Battery
  Wiring harness connector (wiring harness side) terminal 30
  &
  FL4 Fuse
  Input contact
  or
  FL4 Fuse
  Output contact
  &
  K18 Relay - Engine Control Unit
  Socket connector colour BN
  Wire gauge: 3 mm^2

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E23 - Result: Defective Component

- Short circuit to ground between:
  K24 Relay - Starter
  Socket connector colour BNRD
  &
  M1 Starter
  Wiring harness connector (wiring harness side) terminal 50

or

- Defective component:
  M1 Starter

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E24 - Result: Short to Ground

- Short circuit to ground between:
  K18 Relay - Engine Control Unit
  Socket connector colour BN
  Wire gauge: 2 mm^2
  &
  FR2 Fuse
  Input contact

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E25 - Result: Defective Component

- If the nominal value is reached during one of the measurements, the component/control unit that has been disconnected immediately before that measurement is defective.

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E26 - Result: Short to Ground

- Short circuit to ground between:
  K18 Relay - Engine Control Unit
  Socket connector colour BNPK
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 63 (X22), 64 (X22)
  &
  B117 Sensor - Oxygen, Exhaust, Heated 1
  Wiring harness connector (wiring harness side) terminal D
  &
  B118 Sensor - Oxygen, Exhaust, Heated 2

Wiring harness connector (wiring harness side) terminal 4
&
C1 Capacitor - Ignition Coil
Wiring harness connector (wiring harness side) wiring colour BNPK
&
T1 Ignition Coil - Direct Ignition
Wiring harness connector (wiring harness side) terminal A
&
Y5 Solenoid Valve - Tank Ventilation
Wiring harness connector (wiring harness side) terminal A
&
Y9.1 Injection Valve - Cylinder - 1
Wiring harness connector (wiring harness side) terminal A
&
Y9.2 Injection Valve - Cylinder - 2
Wiring harness connector (wiring harness side) terminal A
&
Y9.3 Injection Valve Cylinder - 3
Wiring harness connector (wiring harness side) terminal A
&
Y9.4 Injection Valve Cylinder - 4
Wiring harness connector (wiring harness side) terminal A

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E27 - Result: Short to Ground

- Short circuit to ground between:
  FL4 Fuse
  Output contact
  &
  K18 Relay - Engine Control Unit
  Socket connector colour BN
  Wire gauge: 0.5 mm^2
  &
  K18 Relay - Engine Control Unit
  Socket connector colour BN
  Wire gauge: 3 mm^2
  &
  K24 Relay - Starter
  Socket connector colour BN
  &
  FR1 Fuse
  Input contact

or

- Defective component:
  K24 Relay - Starter

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

C-08 - Manifold Absolute Pressure Sensor Circuit

T01 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: B21 Sensor - Absolute Pressure, Intake Manifold Ignition ON • Measure voltage between the following terminals: B21 Sensor - Absolute Pressure, Intake Manifold Wiring harness connector (wiring harness side) terminal C & Ground	4.8 ... 5.2 V

Yes:T02	No:E08

T02 - Check: Short to Voltage of Ground Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: B21 Sensor - Absolute Pressure, Intake Manifold Wiring harness connector (wiring harness side) terminal A & Ground	less than 0.3 V

Yes:T03	No:E07

T03 - Check: Short to Voltage/Ground/Interruption of Signal Circuit

Work Order Description	Nominal Value

• Measure voltage between the following terminals: B21 Sensor - Absolute Pressure, Intake Manifold Wiring harness connector (wiring harness side) terminal B & Ground	less than 0.3 V

Yes:T04	No:E06

T04 - Check: Circuit Interruption of Ground Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec • Measure resistance between the following terminals: B21 Sensor - Absolute Pressure, Intake Manifold Wiring harness connector (wiring harness side) terminal A & A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 12 (X22)	less than 5 Ohm

Yes:T05	No:E05

T05 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: B21 Sensor - Absolute Pressure, Intake Manifold Wiring harness connector (wiring harness side) terminal A & Ground	greater than 500 kOhm

Yes:T06	No:E04

T06 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: B21 Sensor - Absolute Pressure, Intake	greater than 500 kOhm

Manifold Wiring harness connector (wiring harness side) terminal B & Ground	

Yes:T07	No:E03

T07 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 35 (X22) & B21 Sensor - Absolute Pressure, Intake Manifold Wiring harness connector (wiring harness side) terminal B	less than 5 Ohm

Yes:E01	No:E02

E01 - Result: Defective Component

- Defective component:
  B21 Sensor - Absolute Pressure, Intake Manifold
  or
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E02 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 35 (X22)
  &
  B21 Sensor - Absolute Pressure, Intake Manifold
  Wiring harness connector (wiring harness side) terminal B

E03 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 35 (X22)
  &
  B21 Sensor - Absolute Pressure, Intake Manifold

Wiring harness connector (wiring harness side) terminal B

E04 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 12 (X22)
  &
  B21 Sensor - Absolute Pressure, Intake Manifold
  Wiring harness connector (wiring harness side) terminal A

E05 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 12 (X22)
  &
  B21 Sensor - Absolute Pressure, Intake Manifold
  Wiring harness connector (wiring harness side) terminal A

E06 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 35 (X22)
  &
  B21 Sensor - Absolute Pressure, Intake Manifold
  Wiring harness connector (wiring harness side) terminal B

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E07 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 12 (X22)
  &
  B21 Sensor - Absolute Pressure, Intake Manifold
  Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E08 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 58 (X22)
  &
  B21 Sensor - Absolute Pressure, Intake Manifold
  Wiring harness connector (wiring harness side) terminal C

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

C-09 - Engine Coolant Temperature Sensor Circuit

T01 - Check: Short to Voltage/Ground/Interruption of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: B12 Sensor - Temperature, Coolant • Ignition ON • Measure voltage between the following terminals: B12 Sensor - Temperature, Coolant Wiring harness connector (wiring harness side) terminal B & Ground	4.8 ... 5.2 V

Yes:T02	No:T04

T02 - Check: Component

Work Order Description	Nominal Value
• Diagnostic Tester Data List Parameter	greater than 4.8 V

Coolant Temperature	
Yes:T03	**No:E03**

T03 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Connect fused jumper wire to: B12 Sensor - Temperature, Coolant Wiring harness connector (wiring harness side) terminal A & B12 Sensor - Temperature, Coolant Wiring harness connector (wiring harness side) terminal B • Ignition ON • Diagnostic Tester Data List Parameter Coolant Temperature	less than 0.3 V
Yes:E01	**No:E02**

T04 - Check: Short to Voltage/Ground/Interruption of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: B12 Sensor - Temperature, Coolant • Ignition ON • Measure voltage between the following terminals: B12 Sensor - Temperature, Coolant Wiring harness connector (wiring harness side) terminal B & Ground	greater than 5.2 V
Yes:E04	**No:E05**

E01 - Result: Defective Component

- Defective component:
  B12 Sensor - Temperature, Coolant

E02 - Result: Interruption

- Short circuit to voltage/interruption of circuit between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 38 (X22)
  &
  B12 Sensor - Temperature, Coolant
  Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E03 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E04 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 41 (X22)
  &
  B12 Sensor - Temperature, Coolant
  Wiring harness connector (wiring harness side) terminal B

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E05 - Result: Short to Ground/Interruption

- Short circuit to ground/interruption of circuit between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 41 (X22)
  &
  B12 Sensor - Temperature, Coolant
  Wiring harness connector (wiring harness side) terminal B

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

C-10 - Intake Air Temperature Sensor Circuit

T01 - Check: Short to Voltage/Ground/Interruption of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: B13 Sensor - Temperature, Intake Air • Ignition ON • Measure voltage between the following terminals: B13 Sensor - Temperature, Intake Air Wiring harness connector (wiring harness side) terminal B & Ground	4.8 ... 5.2 V

Yes:T02	No:T04

T02 - Check: Component

Work Order Description	Nominal Value
• Diagnostic Tester Data List Parameter Intake Air Temperature	greater than 4.8 V

Yes:T03	No:E03

T03 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Connect fused jumper wire to: B13 Sensor - Temperature, Intake Air Wiring harness connector (wiring harness side) terminal A & B13 Sensor - Temperature, Intake Air Wiring harness connector (wiring harness	less than 0.3 V

side) terminal B • Ignition ON • Diagnostic Tester Data List Parameter Intake Air Temperature	

Yes:E01	No:E02

T04 - Check: Short to Voltage/Ground/Interruption of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: B13 Sensor - Temperature, Intake Air • Ignition ON • Measure voltage between the following terminals: B13 Sensor - Temperature, Intake Air Wiring harness connector (wiring harness side) terminal B & Ground	greater than 5.2 V

Yes:E04	No:E05

E01 - Result: Defective Component

- Defective component:
  B13 Sensor - Temperature, Intake Air

E02 - Result: Interruption

- Short circuit to voltage/interruption of circuit between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 39 (X22)
  &
  B13 Sensor - Temperature, Intake Air
  Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E03 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E04 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 19 (X22)
  &
  B13 Sensor - Temperature, Intake Air
  Wiring harness connector (wiring harness side) terminal B

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E05 - Result: Short to Ground/Interruption

- Short circuit to ground/interruption of circuit between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 19 (X22)
  &
  B13 Sensor - Temperature, Intake Air
  Wiring harness connector (wiring harness side) terminal B

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

C-11 - Cylinder 1 Injector Circuit

T01 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • All consumers turned off • Disconnect wiring harness connector from: Y9.1 Injection Valve - Cylinder - 1 • Ignition ON • Measure voltage between the following terminals: Y9.1 Injection Valve - Cylinder - 1 Wiring harness connector (wiring harness side) wiring colour BNRD & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 0.3 V

Yes:T02	No:E06

T02 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec (Wiring Harness Connector X22) • Measure resistance between the following terminals: Y9.1 Injection Valve - Cylinder - 1 Wiring harness connector (wiring harness side) wiring colour BNRD & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	greater than 500 kOhm

Yes:T03	No:E05

T03 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 7 (X22) & Y9.1 Injection Valve - Cylinder - 1 Wiring harness connector (wiring harness side) wiring colour BNRD **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 5 Ohm

Yes:T04	No:E04

T04 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Remove electrical component from socket: K18 Relay - Engine Control Unit Connect fused jumper wire to: K18 Relay - Engine Control Unit Socket connector colour BN Wire gauge: 3 mm^2 & K18 Relay - Engine Control Unit Socket connector colour BNPK • Measure voltage between the following terminals: Y9.1 Injection Valve - Cylinder - 1 Wiring harness connector (wiring harness side) wiring colour BNPK & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise,	greater than 11 V

VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T05	No:E03

T05 - Check: Component

Work Order Description	Nominal Value
• Connect wiring harness connector to: Y9.1 Injection Valve - Cylinder - 1 • Ignition ON • Contact fused jumper wire once to: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 7 (X22) & Ground	Clicking noise from the valve

Yes:E01	No:E02

E01 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E02 - Result: Defective Component

- Defective component:
  Y9.1 Injection Valve - Cylinder - 1

E03 - Result: Interruption

- Circuit interruption between:
  K18 Relay - Engine Control Unit
  Socket connector colour BNPK
  &
  Y9.1 Injection Valve - Cylinder - 1
  Wiring harness connector (wiring harness side) wiring colour BNPK

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E04 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 7 (X22)
  &
  Y9.1 Injection Valve - Cylinder - 1
  Wiring harness connector (wiring harness side) wiring colour BNRD

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E05 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 7 (X22)
  &
  Y9.1 Injection Valve - Cylinder - 1
  Wiring harness connector (wiring harness side) wiring colour BNRD

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E06 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 7 (X22)
  &
  Y9.1 Injection Valve - Cylinder - 1
  Wiring harness connector (wiring harness side) wiring colour BNRD

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

C-12 - Cylinder 2 Injector Circuit

T01 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • All consumers turned off • Disconnect wiring harness connector from: Y9.2 Injection Valve - Cylinder - 2 • Ignition ON • Measure voltage between the following terminals: Y9.2 Injection Valve - Cylinder - 2 Wiring harness connector (wiring harness side) wiring colour BNBU & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 0.3 V

Yes:T02	No:E06

T02 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec (Wiring Harness Connector X22) • Measure resistance between the following terminals: Y9.2 Injection Valve - Cylinder - 2 Wiring harness connector (wiring harness side) wiring colour BNBU & Ground	greater than 500 kOhm

Note: Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T03	No:E05

T03 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 34 (X22) & Y9.2 Injection Valve - Cylinder - 2 Wiring harness connector (wiring harness side) wiring colour BNBU **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 5 Ohm

Yes:T04	No:E04

T04 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Remove electrical component from socket: K18 Relay - Engine Control Unit Connect fused jumper wire to: K18 Relay - Engine Control Unit Socket connector colour BN Wire gauge: 3 mm^2 & K18 Relay - Engine Control Unit Socket connector colour BNPK • Measure voltage between the following terminals: Y9.2 Injection Valve - Cylinder - 2 Wiring harness connector (wiring harness	greater than 11 V

side) wiring colour BNPK & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T05	No:E03

T05 - Check: Component

Work Order Description	Nominal Value
• Connect wiring harness connector to: Y9.2 Injection Valve - Cylinder - 2 • Ignition ON • Contact fused jumper wire once to: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 34 (X22) & Ground	Clicking noise from the valve

Yes:E01	No:E02

E01 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E02 - Result: Defective Component

- Defective component:
  Y9.2 Injection Valve - Cylinder - 2

E03 - Result: Interruption

- Circuit interruption between:
  K18 Relay - Engine Control Unit
  Socket connector colour BNPK
  &
  Y9.2 Injection Valve - Cylinder - 2
  Wiring harness connector (wiring harness side) wiring colour BNPK

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E04 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 34 (X22)
  &
  Y9.2 Injection Valve - Cylinder - 2
  Wiring harness connector (wiring harness side) wiring colour BNBU

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E05 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 34 (X22)
  &
  Y9.2 Injection Valve - Cylinder - 2
  Wiring harness connector (wiring harness side) wiring colour BNBU

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E06 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 34 (X22)
  &
  Y9.2 Injection Valve - Cylinder - 2
  Wiring harness connector (wiring harness side) wiring colour BNBU

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

C-13 - Cylinder 3 Injector Circuit

T01 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • All consumers turned off • Disconnect wiring harness connector from: Y9.3 Injection Valve Cylinder - 3 • Ignition ON • Measure voltage between the following terminals: Y9.3 Injection Valve Cylinder - 3 Wiring harness connector (wiring harness side) wiring colour BNGN & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 0.3 V

Yes:T02	No:E06

T02 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec (Wiring Harness Connector X22)	greater than 500 kOhm

• Measure resistance between the following terminals: Y9.3 Injection Valve Cylinder - 3 Wiring harness connector (wiring harness side) wiring colour BNGN & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T03	No:E05

T03 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 10 (X22) & Y9.3 Injection Valve Cylinder - 3 Wiring harness connector (wiring harness side) wiring colour BNGN **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 5 Ohm

Yes:T04	No:E04

T04 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Remove electrical component from socket: K18 Relay - Engine Control Unit Connect fused jumper wire to: K18 Relay - Engine Control Unit Socket connector colour BN	greater than 11 V

Wire gauge: 3 mm^2
&
K18 Relay - Engine Control Unit
Socket connector colour BNPK

- Measure voltage between the following terminals:
  Y9.3 Injection Valve Cylinder - 3
  Wiring harness connector (wiring harness side) wiring colour BNPK
  &
  Ground

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark

Yes:T05	No:E03

T05 - Check: Component

Work Order Description	Nominal Value
• Connect wiring harness connector to: Y9.3 Injection Valve Cylinder - 3 • Ignition ON • Contact fused jumper wire once to: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 10 (X22) & Ground	Clicking noise from the valve

Yes:E01	No:E02

E01 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E02 - Result: Defective Component

- Defective component:

Y9.3 Injection Valve Cylinder - 3

E03 - Result: Interruption

- Circuit interruption between:
  K18 Relay - Engine Control Unit
  Socket connector colour BNPK
  &
  Y9.3 Injection Valve Cylinder - 3
  Wiring harness connector (wiring harness side) wiring colour BNPK

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E04 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 10 (X22)
  &
  Y9.3 Injection Valve Cylinder - 3
  Wiring harness connector (wiring harness side) wiring colour BNGN

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E05 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 10 (X22)
  &
  Y9.3 Injection Valve Cylinder - 3
  Wiring harness connector (wiring harness side) wiring colour BNGN

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E06 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 10 (X22)

&
Y9.3 Injection Valve Cylinder - 3
Wiring harness connector (wiring harness side) wiring colour BNGN

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

C-14 - Cylinder 4 Injector Circuit

T01 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • All consumers turned off • Disconnect wiring harness connector from: Y9.4 Injection Valve Cylinder - 4 • Ignition ON • Measure voltage between the following terminals: Y9.4 Injection Valve Cylinder - 4 Wiring harness connector (wiring harness side) wiring colour BNYE & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 0.3 V

Yes:T02	No:E06

T02 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec (Wiring Harness Connector X22) • Measure resistance between the following terminals: Y9.4 Injection Valve Cylinder - 4 Wiring harness connector (wiring harness side) wiring colour BNYE & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	greater than 500 kOhm

Yes:T03	No:E05

T03 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 3 (X22) & Y9.4 Injection Valve Cylinder - 4 Wiring harness connector (wiring harness side) wiring colour BNYE **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 5 Ohm

Yes:T04	No:E04

T04 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Remove electrical component from socket: K18 Relay - Engine Control Unit Connect fused jumper wire to: K18 Relay - Engine Control Unit Socket connector colour BN Wire gauge: 3 mm^2 & K18 Relay - Engine Control Unit Socket connector colour BNPK • Measure voltage between the following terminals: Y9.4 Injection Valve Cylinder - 4 Wiring harness connector (wiring harness side) wiring colour BNPK & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	greater than 11 V

Yes:T05	No:E03

T05 - Check: Component

Work Order Description	Nominal Value
• Connect wiring harness connector to: Y9.4 Injection Valve Cylinder - 4 • Ignition ON • Contact fused jumper wire once to: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 3 (X22) & Ground	Clicking noise from the valve

Yes:E01	No:E02

E01 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E02 - Result: Defective Component

- Defective component:
  Y9.4 Injection Valve Cylinder - 4

E03 - Result: Interruption

- Circuit interruption between:
  K18 Relay - Engine Control Unit
  Socket connector colour BNPK
  &
  Y9.4 Injection Valve Cylinder - 4
  Wiring harness connector (wiring harness side) wiring colour BNPK

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E04 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 3 (X22)
  &
  Y9.4 Injection Valve Cylinder - 4
  Wiring harness connector (wiring harness side) wiring colour BNYE

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E05 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 3 (X22)
  &
  Y9.4 Injection Valve Cylinder - 4
  Wiring harness connector (wiring harness side) wiring colour BNYE

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise,

VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E06 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 3 (X22)
  &
  Y9.4 Injection Valve Cylinder - 4
  Wiring harness connector (wiring harness side) wiring colour BNYE

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

C-15 - Knock Sensor Signal Circuit

T01 - Check: Component

Work Order Description	Nominal Value
• Check cable shielding of following component: B30 Sensor - Knocking Control 1	Test okay?
Yes:T02	**No:E09**

T02 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec & B30 Sensor - Knocking Control 1 • Ignition ON	less than 0.3 V

• Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 18 (X22) & Ground	

Yes:T03	No:E08

T03 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 22 (X22) & Ground	less than 0.3 V

Yes:T04	No:E07

T04 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 22 (X22) & B30 Sensor - Knocking Control 1 Wiring harness connector (wiring harness side) terminal B	less than 5 Ohm

Yes:T05	No:E06

T05 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 18 (X22) & B30 Sensor - Knocking Control 1 Wiring harness connector (wiring harness	less than 5 Ohm

side) terminal A	

Yes:T06	No:E05

T06 - Check: Short Circuit in Wiring Harness

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 18 (X22) & A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 22 (X22)	greater than 500 kOhm

Yes:T07	No:E04

T07 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 18 (X22) & Ground	greater than 500 kOhm

Yes:T08	No:E03

T08 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 22 (X22) & Ground	greater than 500 kOhm

Yes:E01	No:E02

E01 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec
  or
  B30 Sensor - Knocking Control 1

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E02 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 22 (X22)
  &
  B30 Sensor - Knocking Control 1
  Wiring harness connector (wiring harness side) terminal B

E03 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 18 (X22)
  &
  B30 Sensor - Knocking Control 1
  Wiring harness connector (wiring harness side) terminal A

E04 - Result: Short Circuit in Wiring Harness

- Short circuit in wiring harness between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 18 (X22)
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 22 (X22)

E05 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 18 (X22)
  &
  B30 Sensor - Knocking Control 1
  Wiring harness connector (wiring harness side) terminal A

E06 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 22 (X22)
  &
  B30 Sensor - Knocking Control 1
  Wiring harness connector (wiring harness side) terminal B

E07 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 22 (X22)

&
B30 Sensor - Knocking Control 1
Wiring harness connector (wiring harness side) terminal B

E08 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 18 (X22)
  &
  B30 Sensor - Knocking Control 1
  Wiring harness connector (wiring harness side) terminal A

E09 - Result: Defective Component

- Defective component:
  Shielding of signal leads

C-16 - Linear Exhaust Gas Recirculation System Circuit

T01 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: Y4 Solenoid Valve - Exhaust Gas Recirculation • Ignition ON • Measure voltage between the following terminals: Y4 Solenoid Valve - Exhaust Gas Recirculation Wiring harness connector (wiring harness side) terminal E & Ground	greater than 11 V

Yes:T02	No:E10

T02 - Check: Circuit Interruption of Ground Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: Y4 Solenoid Valve - Exhaust Gas Recirculation Wiring harness connector (wiring harness side) terminal E & Y4 Solenoid Valve - Exhaust Gas Recirculation Wiring harness connector (wiring harness	greater than 11 V

side) terminal A	

Yes:T03	No:E09

T03 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: Y4 Solenoid Valve - Exhaust Gas Recirculation Wiring harness connector (wiring harness side) terminal D & Ground	4.8 ... 5.2 V

Yes:T04	No:E08

T04 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Diagnostic Tester Data List Parameter EGR Position Feedback (Exhaust Gas Recirculation)	0 V

Yes:T05	No:E07

T05 - Check: Short to Ground/Interruption of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Connect fused jumper wire to: Y4 Solenoid Valve - Exhaust Gas Recirculation Wiring harness connector (wiring harness side) terminal D & Y4 Solenoid Valve - Exhaust Gas Recirculation Wiring harness connector (wiring harness side) terminal B • Ignition ON • Diagnostic Tester Data List Parameter EGR Position Feedback (Exhaust Gas Recirculation)	4.8 ... 5.2 V

Yes:T06	No:E06

T06 - Check: Short to Voltage of Ground Circuit

Work Order Description	Nominal Value

• Ignition OFF • Remove fused jumper wire • Disconnect wiring harness connector from: A4 Control Unit - Multec • Ignition ON • Measure voltage between the following terminals: Y4 Solenoid Valve - Exhaust Gas Recirculation Wiring harness connector (wiring harness side) terminal C & Ground	less than 0.3 V

Yes:T07	No:E05

T07 - Check: Short to Voltage of Voltage Supply Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: Y4 Solenoid Valve - Exhaust Gas Recirculation Wiring harness connector (wiring harness side) terminal E & Ground	less than 0.3 V

Yes:T08	No:E04

T08 - Check: Short to Ground of Voltage Supply Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: Y4 Solenoid Valve - Exhaust Gas Recirculation Wiring harness connector (wiring harness side) terminal C & Ground	greater than 500 kOhm

Yes:T09	No:E03

T09 - Check: Circuit Interruption of Ground Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A4 Control Unit - Multec	less than 5 Ohm

Wiring harness connector (wiring harness side) terminal 32 (X22) & Y4 Solenoid Valve - Exhaust Gas Recirculation Wiring harness connector (wiring harness side) terminal C	

Yes:E01	No:E02

E01 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec
  or
  Y4 Solenoid Valve - Exhaust Gas Recirculation

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E02 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 32 (X22)
  &
  Y4 Solenoid Valve - Exhaust Gas Recirculation
  Wiring harness connector (wiring harness side) terminal C

E03 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 32 (X22)
  &
  Y4 Solenoid Valve - Exhaust Gas Recirculation
  Wiring harness connector (wiring harness side) terminal C

E04 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 46 (X22)
  &
  Y4 Solenoid Valve - Exhaust Gas Recirculation
  Wiring harness connector (wiring harness side) terminal D

E05 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 32 (X22)

&
Y4 Solenoid Valve - Exhaust Gas Recirculation
Wiring harness connector (wiring harness side) terminal C

E06 - Result: Short to Ground/Interruption

- Short circuit to ground/interruption of circuit between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 40 (X22)
  &
  Y4 Solenoid Valve - Exhaust Gas Recirculation
  Wiring harness connector (wiring harness side) terminal B

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E07 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 40 (X22)
  &
  Y4 Solenoid Valve - Exhaust Gas Recirculation
  Wiring harness connector (wiring harness side) terminal B

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E08 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 46 (X22)
  &
  Y4 Solenoid Valve - Exhaust Gas Recirculation

Wiring harness connector (wiring harness side) terminal D

E09 - Result: Interruption

- Circuit interruption between:
  Y4 Solenoid Valve - Exhaust Gas Recirculation
  Wiring harness connector (wiring harness side) terminal A
  &
  Ground

E10 - Result: Short to Ground/Interruption

- Short circuit to ground/interruption of circuit between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 11 (X22)
  &
  Y4 Solenoid Valve - Exhaust Gas Recirculation
  Wiring harness connector (wiring harness side) terminal E

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

C-17 - Charcoal Canister Purge Valve Circuit

T01 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: Y5 Solenoid Valve - Tank Ventilation • Ignition ON • Measure voltage between the following terminals: Y5 Solenoid Valve - Tank Ventilation Wiring harness connector (wiring harness side) terminal A & Ground	greater than 11 V

Yes:T02	No:E06

T02 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value

• Ignition ON • Measure voltage between the following terminals: Y5 Solenoid Valve - Tank Ventilation Wiring harness connector (wiring harness side) terminal B & Ground	less than 0.3 V

Yes:T03	No:E05

T03 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec (Wiring Harness Connector X22) • Measure resistance between the following terminals: Y5 Solenoid Valve - Tank Ventilation Wiring harness connector (wiring harness side) terminal B & Ground	greater than 500 kOhm

Yes:T04	No:E04

T04 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 9 (X22) & Y5 Solenoid Valve - Tank Ventilation Wiring harness connector (wiring harness side) terminal B	less than 5 Ohm

Yes:T05	No:E03

T05 - Check: Component

Work Order Description	Nominal Value
• Connect wiring harness connector to: A4 Control Unit - Multec (Wiring Harness Connector X22) • Connect test light (1 W) to:	Test light OFF?

Y5 Solenoid Valve - Tank Ventilation Wiring harness connector (wiring harness side) terminal B & Y5 Solenoid Valve - Tank Ventilation Wiring harness connector (wiring harness side) terminal A • Ignition ON • Select and enable diagnostic tester actuator test: Fuel Tank Ventilation Valve Test • Press soft key INACTIVE	

Yes:T06	No:E02

T06 - Check: Component

Work Order Description	Nominal Value
• Press soft key ACTIVE	Test light ON?

Yes:E01	No:E02

E01 - Result: Defective Component

- Defective component:
  Y5 Solenoid Valve - Tank Ventilation

E02 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E03 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 9 (X22)
  &
  Y5 Solenoid Valve - Tank Ventilation
  Wiring harness connector (wiring harness side) terminal B

E04 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 9 (X22)
  &
  Y5 Solenoid Valve - Tank Ventilation

Wiring harness connector (wiring harness side) terminal B

E05 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 9 (X22)
  &
  Y5 Solenoid Valve - Tank Ventilation
  Wiring harness connector (wiring harness side) terminal B

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E06 - Result: Interruption

- Circuit interruption between:
  K18 Relay - Engine Control Unit
  Socket connector colour BNPK
  &
  Y5 Solenoid Valve - Tank Ventilation
  Wiring harness connector (wiring harness side) terminal A

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

C-18 - O2 Sensor Heater Circuit (Before Catalyst)

T01 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: B117 Sensor - Oxygen, Exhaust, Heated 1 • Remove electrical component from socket: K18 Relay - Engine Control Unit • Connect fused jumper wire to: K18 Relay - Engine Control Unit	greater than 11 V

Socket connector colour BNPK & Battery voltage • Measure voltage between the following terminals: B117 Sensor - Oxygen, Exhaust, Heated 1 Wiring harness connector (wiring harness side) terminal D & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T02	No:E06

T02 - Check: Short to Voltage of Ground Circuit

Work Order Description	Nominal Value
• Remove fused jumper wire • Disconnect wiring harness connector from: A4 Control Unit - Multec (Wiring Harness Connector X22) • Ignition ON • Measure voltage between the following terminals: B117 Sensor - Oxygen, Exhaust, Heated 1 Wiring harness connector (wiring harness side) terminal C & Ground	less than 0.3 V

Yes:T03	No:E05

T03 - Check: Component

Work Order Description	Nominal Value
• Ignition OFF • Measure resistance between the following terminals: B117 Sensor - Oxygen, Exhaust, Heated 1 Wiring harness connector (component side) terminal D &	5 ... 20 Ohm

B117 Sensor - Oxygen, Exhaust, Heated 1 Wiring harness connector (component side) terminal C	

Yes:T04	No:T05

T04 - Check: Component

Work Order Description	Nominal Value
• Measure resistance between the following terminals: B117 Sensor - Oxygen, Exhaust, Heated 1 Wiring harness connector (component side) terminal D & Ground	greater than 500 kOhm

Yes:E01	No:E02

T05 - Check: Component

Work Order Description	Nominal Value
• Ignition OFF • Measure resistance between the following terminals: B117 Sensor - Oxygen, Exhaust, Heated 1 Wiring harness connector (component side) terminal D & B117 Sensor - Oxygen, Exhaust, Heated 1 Wiring harness connector (component side) terminal C	greater than 20 Ohm

Yes:E03	No:E04

E01 - Result: Short to Ground/Interruption

- Short circuit to ground/interruption of circuit between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 21 (X22)
  &
  B117 Sensor - Oxygen, Exhaust, Heated 1
  Wiring harness connector (wiring harness side) terminal C

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic

tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E02 - Result: Short to Ground

- Short circuit to ground between:
  B117 Sensor - Oxygen, Exhaust, Heated 1
  Wiring harness connector (component side) terminal D
  &
  B117 Sensor - Oxygen, Exhaust, Heated 1
  Wiring harness connector (component side) terminal C

or

- Defective component:
  B117 Sensor - Oxygen, Exhaust, Heated 1

E03 - Result: Interruption

- Circuit interruption between:
  B117 Sensor - Oxygen, Exhaust, Heated 1
  Wiring harness connector (component side) terminal D
  &
  B117 Sensor - Oxygen, Exhaust, Heated 1
  Wiring harness connector (component side) terminal C

or

- Defective component:
  B117 Sensor - Oxygen, Exhaust, Heated 1

E04 - Result: Short Circuit in Wiring Harness

- Short circuit in wiring harness between:
  B117 Sensor - Oxygen, Exhaust, Heated 1
  Wiring harness connector (component side) terminal D
  &
  B117 Sensor - Oxygen, Exhaust, Heated 1
  Wiring harness connector (component side) terminal C

or

- Defective component:
  B117 Sensor - Oxygen, Exhaust, Heated 1

E05 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 21 (X22)
  &
  B117 Sensor - Oxygen, Exhaust, Heated 1
  Wiring harness connector (wiring harness side) terminal C

E06 - Result: Interruption

- Circuit interruption between:
  K18 Relay - Engine Control Unit
  Socket connector colour BNPK
  &
  B117 Sensor - Oxygen, Exhaust, Heated 1
  Wiring harness connector (wiring harness side) terminal D

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

C-19 - O2 Sensor Circuit (Before Catalyst)

T01 - Check: Short to Voltage/Interruption of Ground Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec (Wiring Harness Connector X22) B117 Sensor - Oxygen, Exhaust, Heated 1 • Ignition ON • Measure voltage between the following terminals: B117 Sensor - Oxygen, Exhaust, Heated 1 Wiring harness connector (wiring harness side) terminal A & Ground	less than 0.3 V

Yes:T02	No:E07

T02 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Measure resistance between the following terminals: B117 Sensor - Oxygen, Exhaust, Heated 1 Wiring harness connector (wiring harness side) terminal A & Ground	greater than 500 kOhm

Yes:T03	No:E06

T03 - Check: Circuit Interruption of Ground Circuit	
Work Order Description	**Nominal Value**
• Measure resistance between the following terminals: B117 Sensor - Oxygen, Exhaust, Heated 1 Wiring harness connector (wiring harness side) terminal A & A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 50 (X22)	less than 5 Ohm
Yes:T04	**No:E05**

T04 - Check: Short to Voltage/Ground/Interruption of Signal Circuit	
Work Order Description	**Nominal Value**
• Ignition OFF • Connect wiring harness connector to: A4 Control Unit - Multec • Ignition ON • Measure voltage between the following terminals: B117 Sensor - Oxygen, Exhaust, Heated 1 Wiring harness connector (wiring harness side) terminal B & B117 Sensor - Oxygen, Exhaust, Heated 1 Wiring harness connector (wiring harness side) terminal A	350 ... 550 mV
Yes:T05	**No:T06**

T05 - Check: Mechanical Functionality	
Work Order Description	**Nominal Value**
• Check mechanical functionality of the following components and all attached parts: Exhaust system Intake system Injection valves Fuel pressure	Test okay?
Yes:E01	**No:E02**

T06 - Check: Short to Voltage/Ground/Interruption of Signal Circuit	
Work Order Description	**Nominal Value**

• Ignition OFF • Connect wiring harness connector to: A4 Control Unit - Multec • Ignition ON • Measure voltage between the following terminals: B117 Sensor - Oxygen, Exhaust, Heated 1 Wiring harness connector (wiring harness side) terminal B & B117 Sensor - Oxygen, Exhaust, Heated 1 Wiring harness connector (wiring harness side) terminal A	less than 350 mV

Yes:E03	No:E04

E01 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec
  or
  B117 Sensor - Oxygen, Exhaust, Heated 1

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E02 - Result: Defective Component

- Repair the concerned circuit/component.

E03 - Result: Short to Ground/Interruption

- Short circuit to ground/interruption of circuit between:
  B117 Sensor - Oxygen, Exhaust, Heated 1
  Wiring harness connector (wiring harness side) terminal B
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 49 (X22)

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both

control units are never reset and replaced at the same time.

E04 - Result: Short to Voltage

- Short circuit to voltage between:
  B117 Sensor - Oxygen, Exhaust, Heated 1
  Wiring harness connector (wiring harness side) terminal B
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 49 (X22)

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E05 - Result: Interruption

- Circuit interruption between:
  B117 Sensor - Oxygen, Exhaust, Heated 1
  Wiring harness connector (wiring harness side) terminal A
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 50 (X22)

E06 - Result: Short to Ground

- Short circuit to ground between:
  B117 Sensor - Oxygen, Exhaust, Heated 1
  Wiring harness connector (wiring harness side) terminal A
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 50 (X22)

E07 - Result: Short to Voltage

- Short circuit to voltage between:
  B117 Sensor - Oxygen, Exhaust, Heated 1
  Wiring harness connector (wiring harness side) terminal A
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 50 (X22)

C-20 - O2 Sensor Heater Circuit (Behind Catalyst)

T01 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value

• Ignition OFF • Disconnect wiring harness connector from: B118 Sensor - Oxygen, Exhaust, Heated 2 • Remove electrical component from socket: K18 Relay - Engine Control Unit • Connect fused jumper wire to: K18 Relay - Engine Control Unit Socket connector colour BNPK & Battery voltage • Measure voltage between the following terminals: B118 Sensor - Oxygen, Exhaust, Heated 2 Wiring harness connector (wiring harness side) terminal 4 & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	greater than 11 V

Yes:T02	No:E06

T02 - Check: Short to Voltage of Ground Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: A4 Control Unit - Multec (Wiring Harness Connector X22) • Ignition ON • Measure voltage between the following terminals: B118 Sensor - Oxygen, Exhaust, Heated 2 Wiring harness connector (wiring harness side) terminal 3 & Ground	less than 0.3 V

Yes:T03	No:E05

T03 - Check: Component

Work Order Description	Nominal Value
• Ignition OFF	5 ... 20 Ohm

• Measure resistance between the following terminals: B118 Sensor - Oxygen, Exhaust, Heated 2 Wiring harness connector (component side) terminal 4 & B118 Sensor - Oxygen, Exhaust, Heated 2 Wiring harness connector (component side) terminal 3	

Yes:T04	No:T05

T04 - Check: Component

Work Order Description	Nominal Value
• Measure resistance between the following terminals: B118 Sensor - Oxygen, Exhaust, Heated 2 Wiring harness connector (component side) terminal 4 & Ground	greater than 500 kOhm

Yes:E01	No:E02

T05 - Check: Component

Work Order Description	Nominal Value
• Ignition OFF • Measure resistance between the following terminals: B118 Sensor - Oxygen, Exhaust, Heated 2 Wiring harness connector (component side) terminal 4 & B118 Sensor - Oxygen, Exhaust, Heated 2 Wiring harness connector (component side) terminal 3	greater than 20 Ohm

Yes:E03	No:E04

E01 - Result: Short to Ground/Interruption

- Short circuit to ground/interruption of circuit between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 44 (X22)
  &
  B118 Sensor - Oxygen, Exhaust, Heated 2
  Wiring harness connector (wiring harness side) terminal 3

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E02 - Result: Short to Ground

- Short circuit to ground between:
  B118 Sensor - Oxygen, Exhaust, Heated 2
  Wiring harness connector (component side) terminal 4
  &
  B118 Sensor - Oxygen, Exhaust, Heated 2
  Wiring harness connector (component side) terminal 3

or

- Defective component:
  B118 Sensor - Oxygen, Exhaust, Heated 2

E03 - Result: Interruption

- Circuit interruption between:
  B118 Sensor - Oxygen, Exhaust, Heated 2
  Wiring harness connector (component side) terminal 4
  &
  B118 Sensor - Oxygen, Exhaust, Heated 2
  Wiring harness connector (component side) terminal 3

or

- Defective component:
  B118 Sensor - Oxygen, Exhaust, Heated 2

E04 - Result: Short Circuit in Wiring Harness

- Short circuit in wiring harness between:
  B118 Sensor - Oxygen, Exhaust, Heated 2
  Wiring harness connector (component side) terminal 4
  &
  B118 Sensor - Oxygen, Exhaust, Heated 2
  Wiring harness connector (component side) terminal 3

or

- Defective component:
  B118 Sensor - Oxygen, Exhaust, Heated 2

E05 - Result: Short to Voltage

- Short circuit to voltage between:

A4 Control Unit - Multec
Wiring harness connector (wiring harness side) terminal 44 (X22)
&
B118 Sensor - Oxygen, Exhaust, Heated 2
Wiring harness connector (wiring harness side) terminal 3

E06 - Result: Interruption

- Circuit interruption between:
  K18 Relay - Engine Control Unit
  Socket connector colour BNPK
  &
  B118 Sensor - Oxygen, Exhaust, Heated 2
  Wiring harness connector (wiring harness side) terminal 4

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

C-21 - O2 Sensor Circuit (Behind Catalyst)

T01 - Check: Short to Voltage/Interruption of Ground Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec (Wiring Harness Connector X22) B118 Sensor - Oxygen, Exhaust, Heated 2 • Ignition ON • Measure voltage between the following terminals: B118 Sensor - Oxygen, Exhaust, Heated 2 Wiring harness connector (wiring harness side) terminal 1 & Ground	less than 0.3 V

Yes:T02	No:E09

T02 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Measure resistance between the following terminals: B118 Sensor - Oxygen, Exhaust, Heated 2 Wiring harness connector (wiring harness	greater than 500 kOhm

side) terminal 1 & Ground	

Yes:T03	No:E08

T03 - Check: Circuit Interruption of Ground Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: B118 Sensor - Oxygen, Exhaust, Heated 2 Wiring harness connector (wiring harness side) terminal 1 & A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 52 (X22)	less than 5 Ohm

Yes:T04	No:E07

T04 - Check: Short to Voltage/Ground/Interruption of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Connect wiring harness connector to: A4 Control Unit - Multec • Ignition ON • Measure voltage between the following terminals: B118 Sensor - Oxygen, Exhaust, Heated 2 Wiring harness connector (wiring harness side) terminal 2 & B118 Sensor - Oxygen, Exhaust, Heated 2 Wiring harness connector (wiring harness side) terminal 1	350 ... 550 mV

Yes:T05	No:T08

T05 - Check: Mechanical Functionality

Work Order Description	Nominal Value
• Check mechanical functionality of the following components and all attached parts: Intake system Injection valves Fuel pressure	Test okay?

Yes:T06	No:E04

T06 - Check: Tightness

Work Order Description	Nominal Value
• Check the following components for tightness: Exhaust system	Test okay?

Yes:T07	No:E03

T07 - Check: Mechanical Functionality

Work Order Description	Nominal Value
• Check the catalytic converter for mechanical damages (Tears in the outer case, damages of the internal catalyst bed)	Test okay?

Yes:E01	No:E02

T08 - Check: Short to Voltage/Ground/Interruption of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Connect wiring harness connector to: A4 Control Unit - Multec • Ignition ON • Measure voltage between the following terminals: B118 Sensor - Oxygen, Exhaust, Heated 2 Wiring harness connector (wiring harness side) terminal 2 & B118 Sensor - Oxygen, Exhaust, Heated 2 Wiring harness connector (wiring harness side) terminal 1	less than 350 mV

Yes:E05	No:E06

E01 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec
  or
  B118 Sensor - Oxygen, Exhaust, Heated 2

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E02 - Result: Mechanical Fault

- Defective component:
  Catalytic Converter

E03 - Result: Defective Component

- Following system/component is faulty:
  Exhaust system

E04 - Result: Defective Component

- Repair the concerned circuit/component.

E05 - Result: Short to Ground/Interruption

- Short circuit to ground/interruption of circuit between:
  B118 Sensor - Oxygen, Exhaust, Heated 2
  Wiring harness connector (wiring harness side) terminal 2
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 51 (X22)

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E06 - Result: Short to Voltage

- Short circuit to voltage between:
  B118 Sensor - Oxygen, Exhaust, Heated 2
  Wiring harness connector (wiring harness side) terminal 2
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 51 (X22)

or

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E07 - Result: Interruption

- Circuit interruption between:
  B118 Sensor - Oxygen, Exhaust, Heated 2
  Wiring harness connector (wiring harness side) terminal 1
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 52 (X22)

E08 - Result: Short to Ground

- Short circuit to ground between:
  B118 Sensor - Oxygen, Exhaust, Heated 2
  Wiring harness connector (wiring harness side) terminal 1
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 52 (X22)

E09 - Result: Short to Voltage

- Short circuit to voltage between:
  B118 Sensor - Oxygen, Exhaust, Heated 2
  Wiring harness connector (wiring harness side) terminal 1
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 52 (X22)

C-22 - Fan Circuit

T01 - Check: Short to Voltage/Ground/Interruption of Voltage Supply

Work Order Description	Nominal Value
• Ignition OFF • Remove electrical component from socket: K13 Relay - Blower, Radiator • Measure voltage between the following terminals: K13 Relay - Blower, Radiator Socket connector colour BKBN Wire gauge: 0.5 mm^2 & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	greater than 11 V

Yes:T02	No:T11

T02 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: K13 Relay - Blower, Radiator Socket connector colour BKBN Wire gauge: 3 mm^2 & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	greater than 11 V

Yes:T03	No:E10

T03 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Ignition ON • Measure voltage between the following terminals: K13 Relay - Blower, Radiator Socket connector colour BKGN & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 0.3 V

Yes:T04	No:E09

T04 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: K13 Relay - Blower, Radiator Socket connector colour BUGY &	less than 0.3 V

Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T05	No:E08

T05 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec • Measure resistance between the following terminals: K13 Relay - Blower, Radiator Socket connector colour BUGY & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	greater than 500 kOhm

Yes:T06	No:E07

T06 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: K13 Relay - Blower, Radiator Socket connector colour BUGY & A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 13 (X21) **Note:**	less than 5 Ohm

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T07	No:E06

T07 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: M19 Motor - Blower, Radiator • Connect fused jumper wire to: K13 Relay - Blower, Radiator Socket connector colour BKGN & Battery voltage • Measure voltage between the following terminals: M19 Motor - Blower, Radiator Wiring harness connector (wiring harness side) terminal A & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	greater than 11 V

Yes:T08	No:E05

T08 - Check: Circuit Interruption of Ground Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: M19 Motor - Blower, Radiator Wiring harness connector (wiring harness side) terminal B & Ground	less than 5 Ohm

Yes:T09	No:E04

T09 - Check: Component

Work Order Description	Nominal Value
• Remove fused jumper wire • Insert electrical component in socket: K13 Relay - Blower, Radiator • Connect wiring harness connector to: M19 Motor - Blower, Radiator • Ignition ON	Is cooling fan M19 running at low speed?

Yes:E01	No:T10

T10 - Check: Component

Work Order Description	Nominal Value
• Connect fused jumper wire to: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 13 (X21) & Ground	Is cooling fan M19 running at high speed? and Clicking noise from the relay

Yes:E02	No:E03

T11 - Check: Component

Work Order Description	Nominal Value
• Remove electrical component from socket: FB12 Fuse • Check the following component for proper operation: FB12 Fuse	Test okay?

Yes:T12	No:T13

T12 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: FB12 Fuse Input contact & Ground	greater than 11 V

Yes:E11	No:E12

T13 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Connect fused jumper wire to: K13 Relay - Blower, Radiator	Test okay?

Socket connector colour BKGN
&
Battery voltage

- Check the following component for proper operation:
  Fuse of the fused jumper wire

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark

Yes:E13	No:E14

E01 - Result: Defective Component

- Defective component:
  K13 Relay - Blower, Radiator

E02 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E03 - Result: Defective Component

- Defective component:
  M19 Motor - Blower, Radiator
  or
  K13 Relay - Blower, Radiator

E04 - Result: Interruption

- Circuit interruption between:
  M19 Motor - Blower, Radiator
  Wiring harness connector (wiring harness side) terminal B
  &
  Ground

E05 - Result: Interruption

- Circuit interruption between:
  K13 Relay - Blower, Radiator
  Socket connector colour BKGN
  &
  M19 Motor - Blower, Radiator

Wiring harness connector (wiring harness side) terminal A

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E06 - Result: Interruption

- Circuit interruption between:
  K13 Relay - Blower, Radiator
  Socket connector colour BUGY
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 13 (X21)

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E07 - Result: Short to Ground

- Short circuit to ground between:
  K13 Relay - Blower, Radiator
  Socket connector colour BUGY
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 13 (X21)

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E08 - Result: Short to Voltage

- Short circuit to voltage between:
  K13 Relay - Blower, Radiator
  Socket connector colour BUGY
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 13 (X21)

or

- Defective component:

A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E09 - Result: Short to Voltage

- Short circuit to voltage between:
  K13 Relay - Blower, Radiator
  Socket connector colour BKGN
  &
  M19 Motor - Blower, Radiator
  Wiring harness connector (wiring harness side) terminal A
  or

or

- Defective component:
  M19 Motor - Blower, Radiator

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E10 - Result: Interruption

- Circuit interruption between:
  FB12 Fuse
  Output contact
  &
  K13 Relay - Blower, Radiator
  Socket connector colour BKBN
  Wire gauge: 3 mm^2

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise,

VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E11 - Result: Interruption

- Circuit interruption between:
  Output contact
  FB12 Fuse
  &
  K13 Relay - Blower, Radiator
  Socket connector colour BKBN
  Wire gauge: 0.5 mm^2

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green,
GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise,
VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E12 - Result: Interruption

- Circuit interruption between:
  G1 Battery
  Wiring harness connector (wiring harness side) terminal 30
  &
  FB12 Fuse
  Input contact

E13 - Result: Short to Ground

- Short circuit to ground between:
  FB12 Fuse
  Output contact
  &
  K13 Relay - Blower, Radiator
  Socket connector colour BKBN
  Wire gauge: 0.5; 3 mm^2

or

- Defective component:
  K13 Relay - Blower, Radiator

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green,
GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise,
VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E14 - Result: Short to Ground

- Short circuit to ground between:
  K13 Relay - Blower, Radiator

Socket connector colour BKGN
&
M19 Motor - Blower, Radiator
Wiring harness connector (wiring harness side) terminal A

or

- Defective component:
  M19 Motor - Blower, Radiator

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

C-23 - Vehicle Speed Input Signal Circuit

T01 - Check: Component

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec • Vehicle jacked-up and rear left wheel slowly turned by hand • Ignition ON • Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 18 (X21) & Battery voltage • Disconnect each of the following components/control units consecutively from the wiring harness and repeat the measurement each time: H1 Instrument	The value alternates between less than 6 V and greater than 10 V

Yes:E01	No:T02

T02 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A2 Control Unit - Anti Lock Brake System	less than 0.3 V

• Ignition ON • Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 18 (X21) & Ground	

Yes:T03	No:E04

T03 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Measure resistance between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 18 (X21) & Ground	greater than 500 kOhm

Yes:E02	No:E03

E01 - Result: Defective Component

- If the nominal value is reached during one of the measurements, the component/control unit that has been disconnected immediately before that measurement is defective.

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

Reset control unit D3, D4 with diagnostic tester before replacing. Select the system of the master control unit A14 in the diagnostic tester and call up the corresponding function from the PROGRAMMING menu.

E02 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 18 (X21)
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 3

or

- Defective component:
  A2 Control Unit - Anti Lock Brake System

E03 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 18 (X21)
  &
  H1 Instrument
  Wiring harness connector (wiring harness side) terminal A5
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 3

E04 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 18 (X21)
  &
  A2 Control Unit - Anti Lock Brake System
  Wiring harness connector (wiring harness side) terminal 3
  &
  H1 Instrument
  Wiring harness connector (wiring harness side) terminal A5

C-24 - Malfunction Indication Lamp (MI) Circuit

T01 - Check: Short to Voltage/Ground/Interruption of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Ignition ON • Is at least one of the following telltales ON? H1.4 Telltale - Airbag H1.5 Telltale - Anti Lock Brake System	Test okay?

Yes:T02	No:E06

T02 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A4 Control Unit - Multec • Ignition ON • Is the following telltale OFF? H1.6 Telltale - Engine	Test okay?

Yes:T03	No:T06

T03 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Remove electrical component from socket: FB7 Fuse • Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 63 (X21) & Ground	less than 0.3 V

Yes:T04	No:T05

T04 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Insert electrical component in socket: FB7 Fuse • Connect fused jumper wire to: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 63 (X21) & Ground • Ignition ON • Is the following telltale ON? H1.6 Telltale - Engine	Test okay?

Yes:E01	No:E02

T05 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A17 Control Unit - Immobiliser • Ignition ON • Measure voltage between the following terminals: A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 63 (X21) & Ground	less than 0.3 V

Yes:E03	No:E04

T06 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: A17 Control Unit - Immobiliser • Ignition ON • Is the following telltale OFF? H1.6 Telltale - Engine	Test okay?
Yes:E03	**No:E05**

E01 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E02 - Result: Interruption

- Defective component:
  H1 Instrument
  or
  H1.6 Telltale - Engine

or

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 63 (X21)
  &
  H1 Instrument
  Wiring harness connector (wiring harness side) terminal B5

E03 - Result: Defective Component

- Defective component:
  A17 Control Unit - Immobiliser

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E04 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec

Wiring harness connector (wiring harness side) terminal 63 (X21)
&
H1 Instrument
Wiring harness connector (wiring harness side) terminal B5
&
A17 Control Unit - Immobiliser
Wiring harness connector (wiring harness side) terminal 2

or

- Defective component:
  H1 Instrument

E05 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 63 (X21)
  &
  H1 Instrument
  Wiring harness connector (wiring harness side) terminal B5
  &
  A17 Control Unit - Immobiliser
  Wiring harness connector (wiring harness side) terminal 2

or

- Defective component:
  H1 Instrument

E06 - Result: Interruption

- Circuit interruption between:
  FC7 Fuse
  Output contact
  &
  H1 Instrument
  Wiring harness connector (wiring harness side) terminal A3

or

- Defective component:
  H1 Instrument

C-25 - System Status Information

E01 - Result: Defective Component

- The information/functions (data list parameter) described within this functional group are internal values of the system and are listed for information only. If all remaining diagnostic tests are passed and there are no additional customer complaints, the control unit should only be replaced in agreement with the customer.

C-26 - Misfire Detection

T01 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • All consumers turned off • Disconnect wiring harness connector from: T1 Ignition Coil - Direct Ignition • Ignition ON • Measure voltage between the following terminals: T1 Ignition Coil - Direct Ignition Wiring harness connector (wiring harness side) terminal A & Ground	greater than 11 V

Yes:T02	No:E16

T02 - Check: Circuit Interruption of Ground Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: T1 Ignition Coil - Direct Ignition Wiring harness connector (wiring harness side) terminal A & T1 Ignition Coil - Direct Ignition Wiring harness connector (wiring harness side) terminal E	greater than 11 V

Yes:T03	No:E15

T03 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: A4 Control Unit - Multec (Wiring Harness Connector X22) • Ignition ON • Measure voltage between the following terminals: T1 Ignition Coil - Direct Ignition Wiring harness connector (wiring harness side) terminal B & Ground	less than 0.3 V

Yes:T04	No:E14

T04 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: T1 Ignition Coil - Direct Ignition Wiring harness connector (wiring harness side) terminal D & Ground	less than 0.3 V

Yes:T05	No:E13

T05 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: T1 Ignition Coil - Direct Ignition Wiring harness connector (wiring harness side) terminal F & Ground	less than 0.3 V

Yes:T06	No:E12

T06 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Measure voltage between the following terminals: T1 Ignition Coil - Direct Ignition Wiring harness connector (wiring harness side) terminal G & Ground	less than 0.3 V

Yes:T07	No:E11

T07 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Measure resistance between the following terminals: T1 Ignition Coil - Direct Ignition Wiring harness connector (wiring harness side) terminal G &	greater than 500 kOhm

Ground	

Yes:T08	No:E10

T08 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: T1 Ignition Coil - Direct Ignition Wiring harness connector (wiring harness side) terminal F & Ground	greater than 500 kOhm

Yes:T09	No:E09

T09 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: T1 Ignition Coil - Direct Ignition Wiring harness connector (wiring harness side) terminal D & Ground	greater than 500 kOhm

Yes:T10	No:E08

T10 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: T1 Ignition Coil - Direct Ignition Wiring harness connector (wiring harness side) terminal B & Ground	greater than 500 kOhm

Yes:T11	No:E07

T11 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: T1 Ignition Coil - Direct Ignition Wiring harness connector (wiring harness side) terminal B	less than 5 Ohm

& A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 27 (X22)	
Yes:T12	**No:E06**

T12 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: T1 Ignition Coil - Direct Ignition Wiring harness connector (wiring harness side) terminal D & A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 17 (X22)	less than 5 Ohm
Yes:T13	**No:E05**

T13 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: T1 Ignition Coil - Direct Ignition Wiring harness connector (wiring harness side) terminal F & A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 54 (X22)	less than 5 Ohm
Yes:T14	**No:E04**

T14 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following terminals: T1 Ignition Coil - Direct Ignition Wiring harness connector (wiring harness side) terminal G & A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 56 (X22)	less than 5 Ohm
Yes:T15	**No:E03**

T15 - Check: Component

Work Order Description	Nominal Value
• Check the following component for proper operation: Engine-compression Fuel pressure Fuel pipes and fuel filter Plugging, leakage, air or water in fuel system Spark plugs Spark plug connectors Check intake system/charge air hoses for leaks (secondary air, porosity and blockages) Tightness of the line connections Check vacuum hoses for splits, kinks, leaks and proper connections. Perform visual check of all exhaust related components for completeness, leakage and damage. Check the exhaust system for leakage, installation and the condition of the rubber suspension.	Test okay?

Yes:E01	No:E02

E01 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec
  or
  T1 Ignition Coil - Direct Ignition

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E02 - Result: Repair other system

- Repair the concerned circuit/component.

E03 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 56 (X22)
  &
  T1 Ignition Coil - Direct Ignition
  Wiring harness connector (wiring harness side) terminal G

E04 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 54 (X22)
  &
  T1 Ignition Coil - Direct Ignition
  Wiring harness connector (wiring harness side) terminal F

E05 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 17 (X22)
  &
  T1 Ignition Coil - Direct Ignition
  Wiring harness connector (wiring harness side) terminal D

E06 - Result: Interruption

- Circuit interruption between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 27 (X22)
  &
  T1 Ignition Coil - Direct Ignition
  Wiring harness connector (wiring harness side) terminal B

E07 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 27 (X22)
  &
  T1 Ignition Coil - Direct Ignition
  Wiring harness connector (wiring harness side) terminal B

E08 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 17 (X22)
  &
  T1 Ignition Coil - Direct Ignition
  Wiring harness connector (wiring harness side) terminal D

E09 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 54 (X22)
  &
  T1 Ignition Coil - Direct Ignition
  Wiring harness connector (wiring harness side) terminal F

E10 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec

Wiring harness connector (wiring harness side) terminal 56 (X22)
&
T1 Ignition Coil - Direct Ignition
Wiring harness connector (wiring harness side) terminal G

E11 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 56 (X22)
  &
  T1 Ignition Coil - Direct Ignition
  Wiring harness connector (wiring harness side) terminal G

E12 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 54 (X22)
  &
  T1 Ignition Coil - Direct Ignition
  Wiring harness connector (wiring harness side) terminal F

E13 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 17 (X22)
  &
  T1 Ignition Coil - Direct Ignition
  Wiring harness connector (wiring harness side) terminal D

E14 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 27 (X22)
  &
  T1 Ignition Coil - Direct Ignition
  Wiring harness connector (wiring harness side) terminal B

E15 - Result: Interruption

- Circuit interruption between:
  T1 Ignition Coil - Direct Ignition
  Wiring harness connector (wiring harness side) terminal E
  &
  Ground

E16 - Result: Interruption

- Circuit interruption between:
  K18 Relay - Engine Control Unit
  Socket connector colour BNPK
  &
  T1 Ignition Coil - Direct Ignition
  Wiring harness connector (wiring harness side) terminal A

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

C-27 - Starter Circuit

T01 - Check: Component

Work Order Description	Nominal Value
• Ignition OFF • Connect loaded battery parallel to the battery in the vehicle • Ignition ON • Actuate the following component: S124 Switch - Starter Button	Does the starter crank?

Yes:T02	No:T13

T02 - Check: Component

Work Order Description	Nominal Value
• Start engine	Does the engine start?

Yes:T03	No:T09

T03 - Check: Wiring Harness

Work Order Description	Nominal Value
• Ignition OFF • All consumers turned off • Charge or replace battery • Disconnect wiring harness connector from: G1 Battery Terminal 31 • Measure current between the following terminals: G1 Battery Wiring harness connector (component side) terminal 31 & G1 Battery Wiring harness connector (wiring harness side) terminal 31 **Note:** All car systems must be switched OFF during	less than 60 mA

these tests. Doors and trunk / tailgate must be closed, engine compartment lighting must be disconnected.	
Yes:T04	**No:E06**

T04 - Check: Battery Voltage

Work Order Description	Nominal Value
• Connect wiring harness connector to: G1 Battery Terminal 31 • Engine running • Turn all electrical consumers ON • Increase engine speed to 3000 rpm • Measure voltage between the following terminals: G1 Battery Wiring harness connector (wiring harness side) terminal 30 & G1 Battery Wiring harness connector (wiring harness side) terminal 31	greater than 12.5 V
Yes:E01	**No:T05**

T05 - Check: Charging Indicator Lamp Circuit

Work Order Description	Nominal Value
• Ignition OFF • Ignition ON	Is the following telltale ON? H1.1 Charging Indicator Lamp
Yes:T06	**No:T08**

T06 - Check: Charging Indicator Lamp Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: G2 Alternator Terminal 61 • Ignition ON	Is the following telltale OFF? H1.1 Charging Indicator Lamp
Yes:T07	**No:E04**

T07 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value

• Ignition OFF • Measure voltage between the following terminals: G2 Alternator Wiring harness connector (wiring harness side) terminal B+ & Ground	greater than 11 V

Yes:E02	No:E03

T08 - Check: Charging Indicator Lamp Circuit

Work Order Description	Nominal Value
• Ignition OFF • Disconnect wiring harness connector from: G2 Alternator • Connect fused jumper wire to: G2 Alternator Wiring harness connector (wiring harness side) terminal D+ & Ground • Ignition ON	Is the following telltale ON? H1.1 Charging Indicator Lamp

Yes:E05	No:E04

T09 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Start engine • Measure voltage between the following terminals: M1 Starter Wiring harness connector (component side) terminal 50 & G1 Battery Wiring harness connector (wiring harness side) terminal 31	greater than 11 V

Yes:T10	No:E11

T10 - Check: Transition Resistance of Voltage Supply Circuit

Work Order Description	Nominal Value
• Start engine • Measure voltage between the following terminals: M1 Starter	less than 0.75 V

Wiring harness connector (component side) terminal 30 & G1 Battery Wiring harness connector (wiring harness side) terminal 30	

Yes:T11	No:E10

T11 - Check: Transition Resistance of Ground Circuit

Work Order Description	Nominal Value
• Start engine • Measure voltage between the following terminals: M1 Starter Wiring harness connector (component side) terminal 31 & G1 Battery Wiring harness connector (wiring harness side) terminal 31	less than 0.75 V

Yes:T12	No:E09

T12 - Check: Component

Work Order Description	Nominal Value
• Ignition OFF • Check engine mechanic	Test okay?

Yes:E07	No:E08

T13 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition OFF • All consumers turned off • Remove electrical component from socket: K24 Relay - Starter • Measure voltage between the following terminals: K24 Relay - Starter Socket connector colour BN & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue,	greater than 11 V

GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T14	No:E23

T14 - Check: Interruption of Voltage Supply Circuit

Work Order Description	Nominal Value
• Ignition ON • Measure voltage between the following terminals: K24 Relay - Starter Socket connector colour GN & Ground **Note:** **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	greater than 11 V

Yes:T15	No:E22

T15 - Check: Component

Work Order Description	Nominal Value
• Ignition OFF • Connect fused jumper wire to: K24 Relay - Starter Socket connector colour BNRD & Battery voltage **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	Does the starter crank?

Yes:T16	No:E21

T16 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Remove fused jumper wire • Ignition ON • Measure voltage between the following terminals: K24 Relay - Starter Socket connector colour WHRD & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 0.3 V

Yes:T17	No:E20

T17 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Connect test light to: K24 Relay - Starter Socket connector colour WHRD & Battery voltage **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	Test light OFF?

Yes:T18	No:E19

T18 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Actuate the following component: S124 Switch - Starter Button	Test light ON?

Yes:T19	No:T23

T19 - Check: Short to Voltage of Signal Circuit

Work Order Description	Nominal Value
• Remove test light • Disconnect wiring harness connector from: A4 Control Unit - Multec H1 Instrument • Ignition ON • Measure voltage between the following terminals: K24 Relay - Starter Socket connector colour WHBK & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	less than 0.3 V

Yes:T20	No:E16

T20 - Check: Short to Ground of Signal Circuit

Work Order Description	Nominal Value
• Ignition OFF • Measure resistance between the following terminals: K24 Relay - Starter Socket connector colour WHBK & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	greater than 500 kOhm

Yes:T21	No:E15

T21 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Measure resistance between the following	less than 5 Ohm

terminals: K24 Relay - Starter Socket connector colour WHBK & A4 Control Unit - Multec Wiring harness connector (wiring harness side) terminal 9 (X21) **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	

Yes:T22	No:E14

T22 - Check: Component

Work Order Description	Nominal Value
• Insert electrical component in socket: K24 Relay - Starter • Connect wiring harness connector to: A4 Control Unit - Multec • Ignition ON • Actuate the following component: S124 Switch - Starter Button	Does the starter crank?

Yes:E12	No:E13

T23 - Check: Interruption of Signal Circuit

Work Order Description	Nominal Value
• Disconnect wiring harness connector from: S124 Switch - Starter Button • Measure voltage between the following terminals: S124 Switch - Starter Button Wiring harness connector (wiring harness side) wiring colour WHRD & Ground **Note:** Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise,	greater than 11 V

VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark	
Yes:E17	**No:E18**

E01 - Result: Defective Component

- Defective component:
  G1 Battery

E02 - Result: Defective Component

- High transition resistance between:
  G2 Alternator
  Wiring harness connector (wiring harness side) terminal B+
  &
  G1 Battery
  Wiring harness connector (wiring harness side) terminal 30

or

- Defective component:
  G2 Alternator

E03 - Result: Interruption

- Circuit interruption between:
  G2 Alternator
  Wiring harness connector (wiring harness side) terminal B+
  &
  G1 Battery
  Wiring harness connector (wiring harness side) terminal 30

E04 - Result: Short to Ground/Interruption

- Check the following component for proper operation:
  H1 Instrument

and/or

- Check the following circuit for proper operation:
  Terminal D+

E05 - Result: Defective Component

- Defective component:
  G2 Alternator

E06 - Result: Defective Component

- Stall current of one or more consumers is too high

Note:

During fault searching in the wiring harness, the sections of the wiring harness can be separated at the assigned connectors. When the stall current changes to the permissible value after separating a section, the fault is located in the concerning section of the wiring harness.

E07 - Result: Defective Component

- Defective component:
  M1 Starter

E08 - Result: Defective Component

- Repair the concerned mechanical component

E09 - Result: High Transition Resistance

- High transition resistance between:
  M1 Starter
  Wiring harness connector (component side) terminal 31
  &
  G1 Battery
  Wiring harness connector (wiring harness side) terminal 31

Note:

Check if all ground connections are clean, tight and installed properly

E10 - Result: High Transition Resistance

- High transition resistance between:
  M1 Starter
  Wiring harness connector (component side) terminal 30
  &
  G1 Battery
  Wiring harness connector (wiring harness side) terminal 30

E11 - Result: Short to Ground/Interruption

- Check the following component for proper operation:
  S1 Switch - Starter

and/or

- Check the following circuit for proper operation:
  Terminal 50

E12 - Result: Defective Component

- Defective component:
  H1 Instrument

E13 - Result: Defective Component

- Defective component:
  A4 Control Unit - Multec
  or
  K24 Relay - Starter

Important:

Reset concerned control unit (engine or immobiliser control unit) with diagnostic tester before replacing. Select immobiliser in the diagnostic tester and call up the corresponding test in the menu ADDITIONAL FUNCTIONS. Ensure that both control units are never reset and replaced at the same time.

E14 - Result: Interruption

- Circuit interruption between:
  K24 Relay - Starter
  Socket connector colour WHBK
  &
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 9 (X21)

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E15 - Result: Short to Ground

- Short circuit to ground between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 9 (X21)
  &
  K24 Relay - Starter
  Socket connector colour WHBK
  &
  H1 Instrument
  Wiring harness connector (wiring harness side) terminal A4

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E16 - Result: Short to Voltage

- Short circuit to voltage between:
  A4 Control Unit - Multec
  Wiring harness connector (wiring harness side) terminal 9 (X21)
  &
  K24 Relay - Starter
  Socket connector colour WHBK
  &
  H1 Instrument
  Wiring harness connector (wiring harness side) terminal A4

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,

L=Light, D=Dark

E17 - Result: Defective Component

- Circuit interruption between:
  S124 Switch - Starter Button
  Wiring harness connector (wiring harness side) wiring colour BK
  &
  Ground

or

- Defective component:
  S124 Switch - Starter Button

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E18 - Result: Interruption

- Circuit interruption between:
  K24 Relay - Starter
  Socket connector colour WHRD
  &
  S124 Switch - Starter Button
  Wiring harness connector (wiring harness side) wiring colour WHRD

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E19 - Result: Short to Ground

- Short circuit to ground between:
  K24 Relay - Starter
  Socket connector colour WHRD
  &
  S124 Switch - Starter Button
  Wiring harness connector (wiring harness side) wiring colour WHRD

or

- Defective component:
  S124 Switch - Starter Button

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark

E20 - Result: Short to Voltage

- Short circuit to voltage between:
  K24 Relay - Starter
  Socket connector colour WHRD
  &
  S124 Switch - Starter Button
  Wiring harness connector (wiring harness side) wiring colour WHRD

or

- Defective component:
  S124 Switch - Starter Button

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark

E21 - Result: Interruption

- Circuit interruption between:
  K24 Relay - Starter
  Socket connector colour BNRD
  &
  M1 Starter
  Wiring harness connector (wiring harness side) terminal 50

or

- Defective component:
  M1 Starter

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow, L=Light, D=Dark

E22 - Result: Interruption

- Circuit interruption between:
  FB7 Fuse
  Output contact
  &

K24 Relay - Starter
Socket connector colour GN

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark

E23 - Result: Interruption

- Circuit interruption between:
  FL4 Fuse
  Output contact
  &
  K24 Relay - Starter
  Socket connector colour BN

Note:

Wiring colours: BK=Black, BN=Brown, BU=Blue, GD=Gold, GN=Green, GY=Grey, OG=Orange, PK=Pink, RD=Red, SR=Silver, TQ=Turquoise, VT=Violet, WH=White, YE=Yellow,
L=Light, D=Dark