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IGNITION SYSTEM

NOTE: For additional ignition system checks, see <u>BASIC TESTING</u> article.

CRANK ANGLE SENSOR (DOHC ENGINES)

Test No. 1

- 1. Crank angle sensor is attached to cylinder head, mounted in place of distributor. If checking for no-start condition, ensure crank angle and TDC sensor assembly shaft rotates (indicating timing belt is okay) before checking electrical operation of crank angle and TDC sensor assembly.
- 2. Using an analog (needle-type) voltmeter, connect negative lead to ground. Locate 4-wire connector between crank angle/TDC sensor assembly and main wiring harness. This connector is referred to as "crank angle connector" throughout this testing procedure.
- On Eclipse 2.0L (VIN R and U) and Galant 2.0L (VIN R), connect voltmeter positive lead to crank angle connector terminal No. 4. On Mirage 1.6L, connect voltmeter positive lead to crank angle connector terminal No. 3. See Fig. 24 and Fig. 25.



MONTERC, PICKUP & RAM-50 3.0L

<u>Fig. 24: Identifying Crank Angle & TDC Sensor Assembly Connector Terminals (1 of 2)</u> Courtesy of MITSUBISHI MOTOR SALES OF AMERICA

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<u>Fig. 25: Identifying Crank Angle & TDC Sensor Assembly Connector Terminals (2 of 2)</u> Courtesy of MITSUBISHI MOTOR SALES OF AMERICA

- 4. On all models, to prevent engine from starting and to prevent damage to coils and other electrical system components, disconnect and ground all spark plug wires.
- Crank engine. If voltmeter pulsates between 1.5-2.0 volts, crank angle sensor is okay. If voltmeter remains at 5 volts during cranking, go to <u>TEST NO. 2</u>. If voltmeter remains at 0 volts during cranking, go to <u>TEST NO. 3</u>.

Test No. 2

- 1. Turn ignition on. On Eclipse 2.0L (VIN R and U), Galant 2.0L (VIN R) and Mirage 1.6L, check for battery voltage on crank angle connector terminal No. 2.
- 2. On all models, if battery voltage is present, go to step 3). If battery voltage is not present, repair open condition in supply wire between ignition switch and crank angle connector.
- 3. Turn ignition off. On Eclipse 2.0L (VIN R and U), Galant 2.0L (VIN R) and Mirage 1.6L, connect ohmmeter between ground and crank angle connector terminal No. 1.
- 4. On all models, if there is continuity, go to step 5). If there is no continuity, repair open condition in ground wire between crank angle connector and ground.
- 5. Check pin condition of crank angle connector. If necessary, repair pin connections. If pin condition is okay, remove distributor. Check condition of connector at bottom of distributor. If necessary, repair pin connections. If connector is okay, replace crank angle and TDC sensor assembly.

Test No. 3

- 1. Disconnect crank angle connector. Turn ignition on. Connect voltmeter negative lead to ground.
- 2. On Eclipse 2.0L (VIN R and U) and Galant 2.0L (VIN R), connect voltmeter positive lead to crank angle

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connector terminal No. 4. On Mirage 1.6L, connect voltmeter positive lead to crank angle connector terminal No. 3.

- 3. On all models, if voltmeter reads 5 volts, replace crank angle and TDC sensor assembly. If voltmeter reads 0 volts, turn ignition off. Disconnect 24-pin connector from Engine Control Unit (ECU). Connect one lead of ohmmeter to ground.
- 4. At main harness side of crank angle connector, connect other ohmmeter lead to crank angle connector terminal No. 4 (Eclipse 2.0L VIN R and U, and Galant 2.0L VIN R) or terminal No. 3 (Mirage 1.6L).
- 5. On all models, if there is continuity, repair short to ground in ground wire between crank angle connector and ECU connector. If there is no continuity, replace ECU.

CRANK ANGLE SENSOR (SOHC ENGINES)

Test No. 1

- 1. Crank angle sensor is located inside distributor. If checking no start condition, ensure distributor shaft rotates (indicating timing belt is okay) before checking electrical operation of crank angle and TDC sensor assembly.
- 2. To prevent engine from starting, disconnect coil wire from distributor cap and connect to ground. Using an analog (needle-type) voltmeter, connect negative lead to ground.
- 3. Connect voltmeter positive lead to distributor connector terminal as specified in <u>CRANK ANGLE</u> <u>SENSOR SIGNAL WIRE TERMINAL IDENTIFICATION (SOHC)</u> table. See <u>Fig. 24</u> and <u>Fig. 25</u>.
- 4. Crank engine. If voltmeter pulsates at approximately 2.5 volts, crank angle sensor is okay. If voltmeter remains at 5 volts during cranking, go to **TEST NO. 2**. If voltmeter remains at 0 volts during cranking, go to **TEST NO. 3**.

Test No. 2

- Turn ignition on. Check for battery voltage on distributor connector terminal as specified in <u>CRANK</u> <u>ANGLE & TDC SENSOR SUPPLY WIRE TERMINAL IDENTIFICATION (SOHC)</u> table. See <u>Fig. 24</u> and <u>Fig. 25</u>.
- 2. If battery voltage is not present, repair supply wire between ignition switch and distributor connector. If battery voltage is present, connect one lead of ohmmeter to ground and go to step 3).
- 3. Connect other ohmmeter lead to distributor connector terminal as specified in <u>CRANK ANGLE & TDC</u> <u>SENSOR GROUND WIRE TERMINAL IDENTIFICATION (SOHC)</u> table.
- 4. If there is continuity, go to step 5). If there is no continuity, repair ground wire between distributor connector and ECU.
- 5. Check pin condition of distributor connector. If necessary, repair pin connections. If pin condition is okay, remove distributor. Check condition of connector at bottom of distributor. If necessary, repair pin connections. If connector is okay, replace crank angle and TDC sensor assembly.

Test No. 3

 Disconnect distributor connector. Connect voltmeter negative lead to ground. Connect voltmeter positive lead to distributor connector terminal as specified in <u>CRANK ANGLE SENSOR SIGNAL WIRE</u> <u>TERMINAL IDENTIFICATION (SOHC)</u> table. See <u>Fig. 24</u> and <u>Fig. 25</u>.

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- 2. If voltmeter reads 5 volts, replace crank angle and TDC sensor assembly. If voltmeter reads 0 volts turn ignition off. Disconnect 24-pin connector from Engine Control Unit (ECU). Connect one lead of ohmmeter to ground.
- 3. Connect other ohmmeter lead to distributor connector terminal as specified in <u>CRANK ANGLE & TDC</u> <u>SENSOR GROUND WIRE TERMINAL IDENTIFICATION (SOHC)</u> table.
- 4. If there is continuity, repair short to ground in ground wire between distributor connector and ECU connector. If there is no continuity, check pin condition of ground wire terminal at ECU connector. If pin condition is okay, replace ECU.

CRANK ANGLE SENSOR SIGNAL WIRE TERMINAL IDENTIFICATION (SOHC)

Application	Terminal No.
Eclipse & Mirage	1
Montero, Pickup 2.4L, Ram-50 2.4L, Sigma &	2
Van/Wagon	
Galant	4
Pickup & Ram-50 3.0L	3

CRANK ANGLE & TDC SENSOR SUPPLY WIRE TERMINAL IDENTIFICATION (SOHC)

Application	Terminal No.
Eclipse, Galant & Mirage	3
Montero, Pickup 2.4L, Ram-50 2.4L, Sigma &	4
Van/Wagon	
Pickup & Ram-50 3.0L	2

CRANK ANGLE & TDC SENSOR GROUND WIRE TERMINAL IDENTIFICATION (SOHC)

Application	Terminal No.
Eclipse, Galant & Mirage	2
Pickup, Precis, Ram-50, Sigma & Van/Wagon	1
Montero	3

TDC SENSOR (DOHC ENGINES)

Test No. 1

- 1. TDC sensor is a component part of crank angle sensor and is attached to cylinder head, mounted in place of distributor. If checking for no-start condition, ensure crank angle and TDC sensor assembly shaft rotates (indicating timing belt is okay) before checking electrical operation of crank angle and TDC sensor assembly.
- 2. Using an analog (needle-type) voltmeter, connect negative lead to ground. Locate 4-wire connector between crank angle/TDC sensor assembly and main wiring harness. This connector is referred to as "crank angle connector" throughout this testing procedure.
- On Mirage 1.6L, connect voltmeter positive lead to crank angle connector terminal No. 4. On Eclipse 2.0L (VIN R and U) and Galant 2.0L (VIN R), connect voltmeter positive lead to crank angle connector terminal No. 3. See <u>Fig. 24</u> and <u>Fig. 25</u>.

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- 4. On all models, to prevent engine from starting and to prevent damage to oils and other electrical system components, disconnect and ground all spark plug wires.
- Crank engine. If voltmeter pulsates between 1.5-2.0 volts, crank angle sensor is okay. If voltmeter remains at 5 volts during cranking, go to <u>TEST NO. 2</u>. If voltmeter remains at 0 volts during cranking, go to <u>TEST NO. 3</u>.

Test No. 2

- 1. Turn ignition on. On Eclipse 2.0L (VIN R and U), Galant 2.0L (VIN R) and Mirage 1.6L, check for battery voltage on crank angle connector terminal No. 2.
- 2. On all models, if battery voltage is present, go to step 3). If battery voltage is not present, repair open condition in supply wire between ignition switch and crank angle connector.
- 3. Turn ignition switch off. On Eclipse 2.0L (VIN R and U), Galant 2.0L (VIN R) and Mirage 1.6L, connect ohmmeter between ground and crank angle connector terminal No. 1.
- 4. On all models, if there is continuity, go to step 5). If there is no continuity, repair open condition in ground wire between crank angle connector and ground.
- 5. Check pin condition of crank angle connector. If necessary, repair pin connections. If pin condition is okay, remove distributor. Check condition of connector at bottom of distributor. If necessary, repair pin connections, If connector is okay, replace crank angle and TDC sensor assembly.

Test No. 3

- 1. Disconnect crank angle connector. Turn ignition on. Connect voltmeter negative lead to ground.
- 2. On Eclipse 2.0L (VIN R and U) and Galant 2.0L (VIN R), connect voltmeter positive lead to crank angle connector terminal No. 4. On Mirage 1.6L, connect voltmeter positive lead to crank angle connector terminal No. 3.
- 3. On all models, if voltmeter reads 5 volts, replace crank angle and TDC sensor assembly. If voltmeter reads 0 volts, turn ignition off. Disconnect 24-pin connector from Engine Control Unit (ECU). Connect one lead of ohmmeter to ground.
- 4. At main harness side of crank angle connector, connect other ohmmeter lead to crank angle connector terminal No. 4 (Eclipse 2.0L VIN R and U, and Galant 2.0L VIN R) or terminal No. 3 (Mirage 1.6L).
- 5. On all models, if there is continuity, repair short to ground in ground wire between crank angle connector and ECU connector. If there is no continuity, replace ECU.

TDC SENSOR (SOHC ENGINES)

NOTE: On SOHC engines, inoperative TDC sensor will NOT cause a no start condition.

Test No. 1

- 1. TDC sensor is a component part of crank angle sensor and is located inside distributor. If checking no start condition, ensure distributor shaft rotates (indicating timing belt is okay) before checking electrical operation of crank angle and TDC sensor assembly.
- 2. To prevent engine from starting, disconnect coil wire from distributor cap and connect to ground. Using an analog (needle-type) voltmeter, connect negative lead to ground.

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- 3. Connect voltmeter positive lead to distributor connector terminal as specified in <u>TDC SENSOR</u> <u>SIGNAL WIRE TERMINAL IDENTIFICATION (SOHC)</u> table. See <u>Fig. 24</u> and <u>Fig. 25</u>.
- 4. Crank engine. If voltmeter pulsates at approximately .5-1.5 volts, crank angle sensor is okay. If voltmeter remains at 5 volts during cranking, go to <u>TEST NO. 2</u>. If voltmeter remains at 0 volts during cranking, go to <u>TEST NO. 3</u>.

Test No. 2

- Turn ignition on. Check for battery voltage on distributor connector terminal as specified in <u>CRANK</u> <u>ANGLE & TDC SENSOR SUPPLY WIRE TERMINAL IDENTIFICATION (SOHC)</u> table. See <u>Fig. 24</u> and <u>Fig. 25</u>.
- 2. If battery voltage is not present, repair supply wire between ignition switch and distributor connector. If battery voltage is present, connect one lead of ohmmeter to ground and go to step 3).
- 3. Connect other ohmmeter lead to distributor connector terminal as specified in <u>CRANK ANGLE & TDC</u> <u>SENSOR GROUND WIRE TERMINAL IDENTIFICATION (SOHC)</u> table.
- 4. If there is continuity, go to step 5). If there is no continuity, repair ground wire between distributor connector and ECU.
- 5. Check pin condition of distributor connector. If necessary, repair pin connections. If pin condition is okay, remove distributor. If necessary, repair pin connections. If connector is okay, replace crank angle and TDC sensor assembly.

Test No. 3

- Disconnect distributor connector. Connect voltmeter negative lead to ground. Connect voltmeter positive lead to distributor connector terminal as specified in <u>CRANK ANGLE SENSOR SIGNAL WIRE</u> <u>TERMINAL IDENTIFICATION (SOHC)</u> table. See <u>Fig. 24</u> and <u>Fig. 25</u>.
- 2. If voltmeter reads 5 volts, replace crank angle and TDC sensor assembly. If voltmeter reads 0 volts, turn ignition off. Disconnect 24-pin connector from Engine Control Unit (ECU). Connect one lead of ohmmeter to ground.
- 3. Connect other ohmmeter lead to distributor connector terminal as specified in <u>CRANK ANGLE & TDC</u> <u>SENSOR GROUND WIRE TERMINAL IDENTIFICATION (SOHC)</u> table.
- 4. If there is continuity, repair short to ground in ground wire between distributor connector and ECU connector. If there is no continuity, check pin condition of ground wire terminal at ECU connector. If pin condition is okay, replace ECU.

Application	Terminal No.	
Eclipse, Mirage, Pickup & Ram-50 3.0L	4	
Sigma, Van/Wagon, Pickup & Ram-50 2.4L	3	
Galant & Montero	1	

TDC SENSOR SIGNAL WIRE TERMINAL IDENTIFICATION (SOHC)