IGNITION SYSTEM

SPECIFICATIONS

GENERAL SPECIFICATIONS

M16GB- -

CRANK ANGLE SENSOR

Items	Specifications
Type	Contact pointless type
Identification No.	T1 T4937 1
Part No.	MD1 53464
Advance mechanism	Controlled by engine control unit
Firing order	1 - 2 - 3 4 5 - 6

IGNITION COIL

Items	Specifications
Type	Mold 3-coil
Identification No.	F-536
Part No.	MD1 52648

SPARK PLUG

Items	Specifications
NGK	PFR6J-11
NIPPON DENSO	PK20PR-P11

SERVICE SPECIFICATIONS

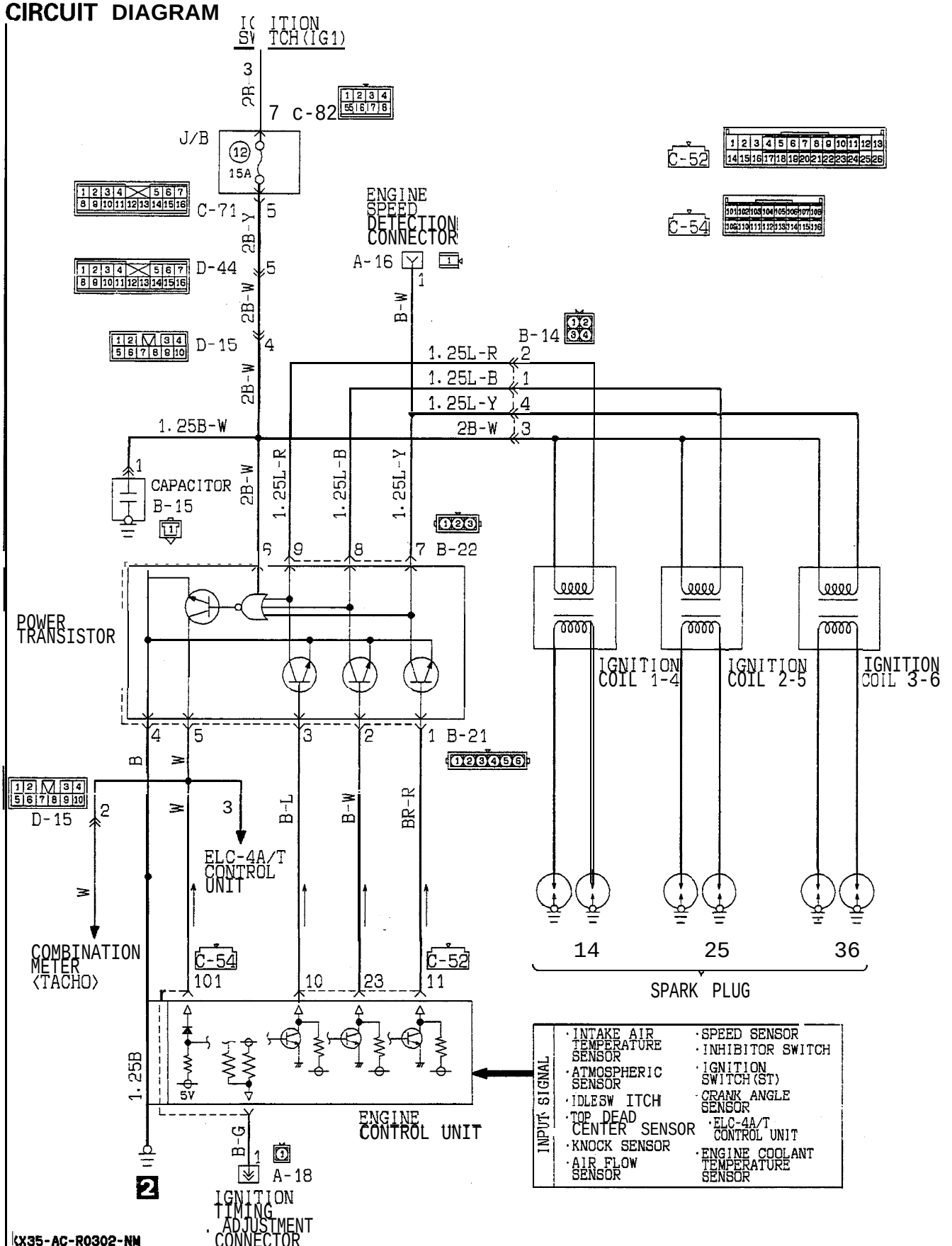
M16GC- -

Items	Specifications
Standarcl value	
Ignition coil	
Primary coil resistance at 20°C (68°F) Ω	0.67 – 0.81
Secondary coil resistance at 20°C (68°F) kΩ	11.31 – 15.30
Spark plug gap mm (in.)	1.0-1.1 (.39 – .43)

TROUBLESHOOTING

M16GHAH

CIRCUIT DIAGRAM



TSB Revision

OPERATION

- Turn ignition switch to "ON" position, and battery voltage will be applied to primary winding of ignition coil.
- When crank angle sensor signal is input to engine control unit, engine control unit makes ON-OFF control of power transistors one by one.
- When power transistor is turned on, current flows from ignition coil (primary winding) to ground through power transistor.
- When power transistor A is turned from ON to OFF, the spark plugs of No. 1 and No. 4 cylinders spark. Turning of power transistor B from ON to OFF will produce sparking in spark plugs of No. 2 and No. 5 cylinders. Furthermore, when power transistor C is turned from ON to OFF, sparking is produced in spark plugs of No. 3 and No. 6 cylinders.

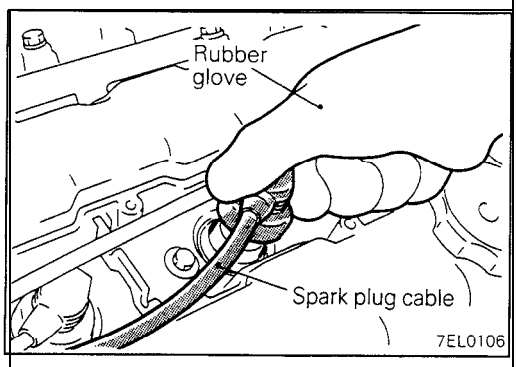
TROUBLESHOOTING HINTS

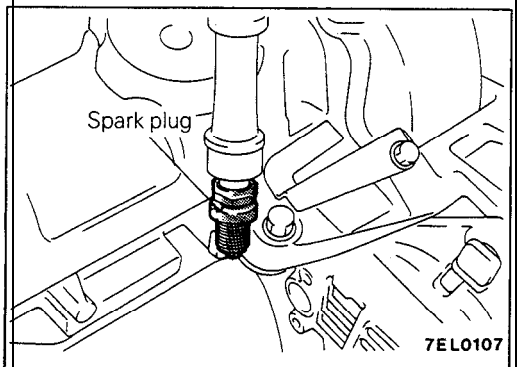
1. Engine cranks, but does not start.
   (1) Spark is insufficient or does not occur at all (on spark plug).
   - Check ignition coil.
   - Check crank angle sensor.
   - Check power transistor.
   - Check spark plugs.
   - Check spark plug cable.

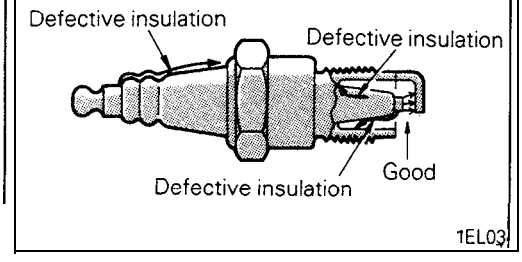
   (2) Spark is good.
   - Check ignition timing.

2. Engine idles roughly or stalls.
   - Check spark plugs.
   - Check ignition timing.
   - Check ignition coil.
   - Check spark plug cable.

3. Poor acceleration
   - Check ignition timing.
   - Check spark plug cable.
   - Check ignition coil.







SERVICE ADJUSTMENT PROCEDURES

SPARK PLUG CABLE TEST M16GIGJ

(1) Disconnect, one at a time, each of the spark plug cables while the engine is idling to check whether the engine's running performance changes or not.

Caution
Wear rubber gloves while doing so.

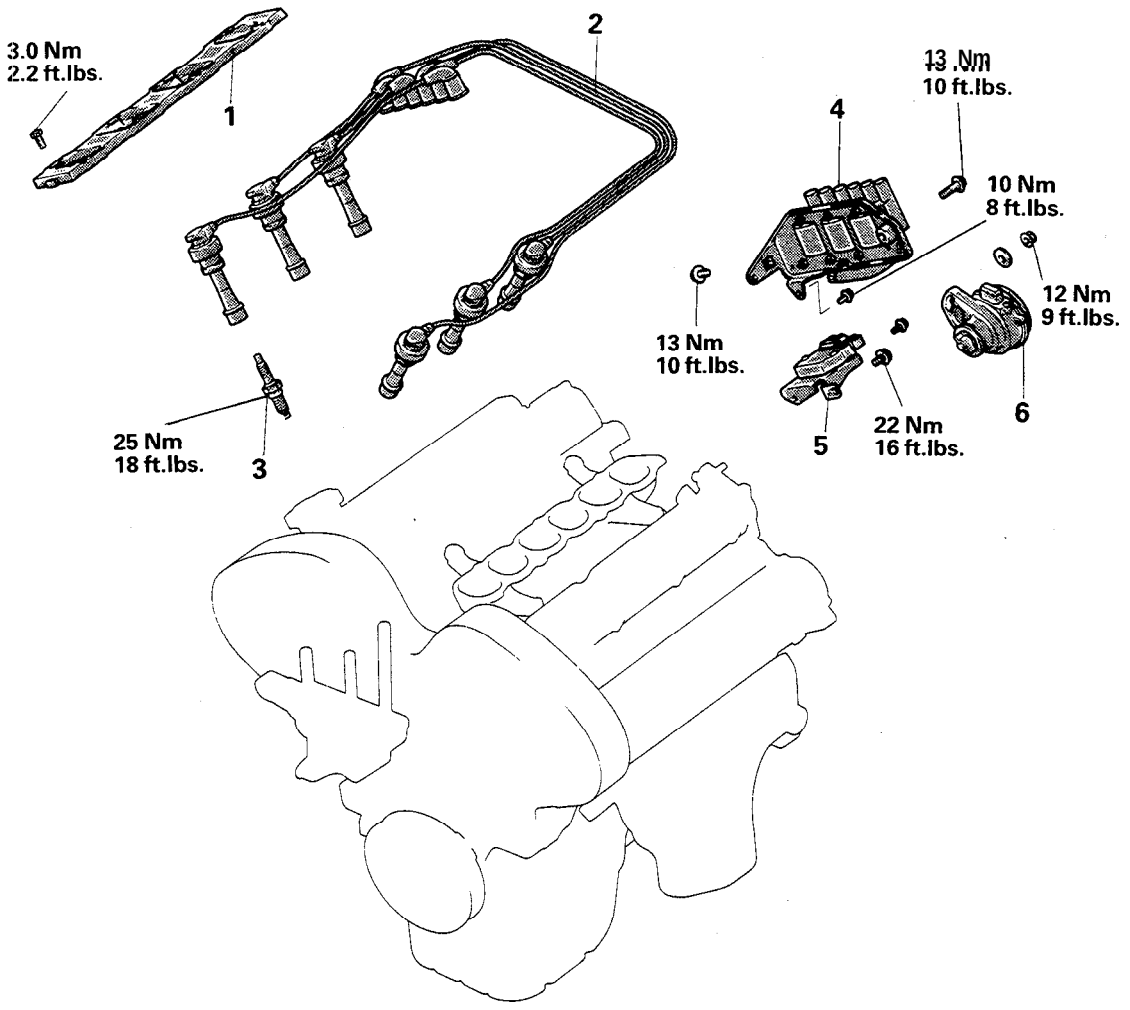
(2) If the engine performance does not change, check the resistance of the spark plug cable, and check the spark plug itself.

SPARK PLUG TEST

(1) Remove the spark plug and connect to the spark plug cable.
(2) Ground the spark plug outer electrode (body), and crank the engine.
Check to be sure that there is an electrical discharge between the electrodes at this time.

IGNITION SYSTEM

REMOVAL AND INSTALLATION



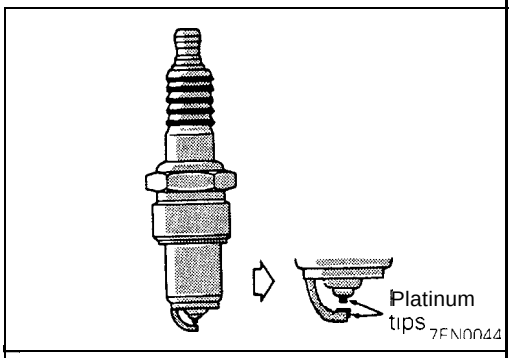
Removal steps

1. Center cover
- 1 2. Spark plug cable
3. Spark plug
4. Ignition coil
5. Power transistor
- 6. Crank angle sensor

Pre-removal and Post-installation Operation
- Removal and Installation of Surge Tank (Refer to GROUP 15-Intake Manifold.)

7EL0110

TSB Revision



INSPECTION

SPARK PLUG

Check the plug gap and replace if the limit is exceeded.

Standard value: 1.0 – 1.1 mm (.039 – .043 in.)
Limit: 1.3 mm (.051 in.)

Caution

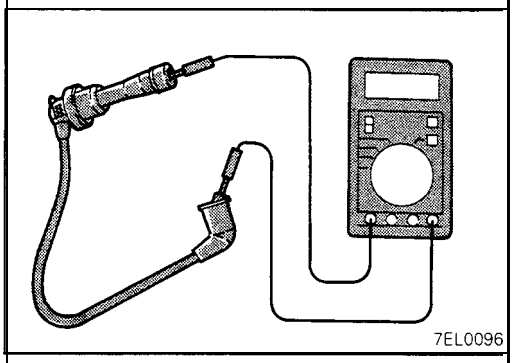
1. **Do not attempt to adjust the gap of the platinum plug.**
2. **Cleaning of the platinum plug may result damage the platinum tip. Therefore, if carbon deposits must be removed, use a plug cleaner and complete cleaning within 20 seconds for protection of the electrode. Do not use wire brushes.**

SPARK PLUG CABLE

(1) Check cap and coating for cracks.
(2) Measure resistance.

Unit: kΩ

Spark plug cable					
No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
8.6	13.9	6.4	11.5	4.5	11.7



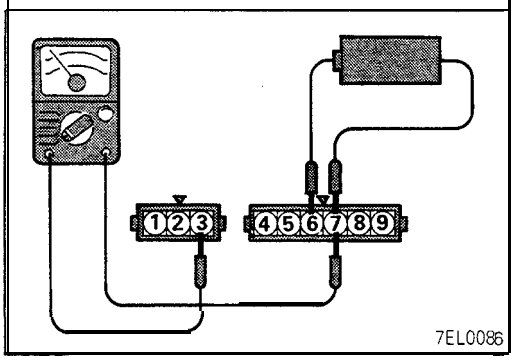
POWER TRANSISTOR

NOTE
An analog-type circuit tester should be used.

No. 1 – No. 4 coil side

(1) Connect the negative (–) terminal of the 1.5V power supply to terminal ⑦ of the power transistor; then check whether there is continuity between terminal ③ and terminal ⑦ when terminal ⑥ and the positive (+) terminal are connected and disconnected.

NOTE
Connect the (-) probe of the circuit tester to terminal ③.



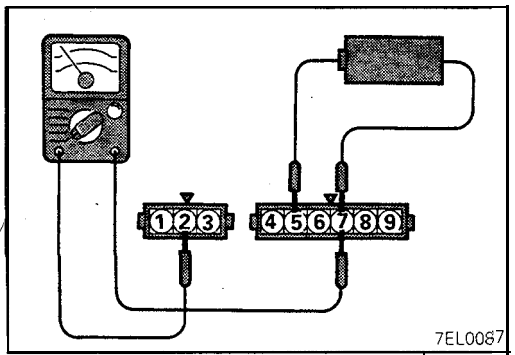
Terminal ⑥ and (+) terminal	Terminal ③ and terminal ⑦
Connected	Continuity
Unconnected	No continuity

(2) Replace the power transistor if there is a malfunction.

No. 2 – No. 5 coil side

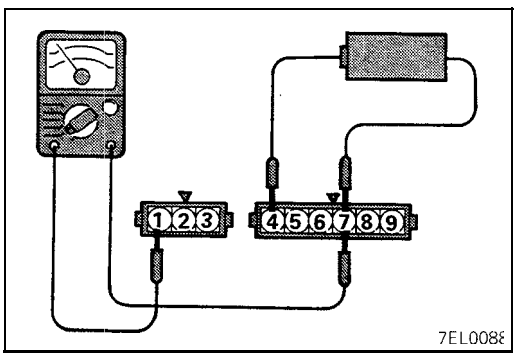
(1) Connect the negative (-) terminal of the 1.5V power supply to terminal ⑦ of the power transistor; then check whether there is continuity between terminal ② and terminal ⑦ when terminal ⑤ and the positive (+) terminal are connected and disconnected.

NOTE
Connect the (-) probe of the circuit tester to terminal ②.



Terminal ⑤ and (+) terminal	Terminal ② and terminal ⑦
Connected	Continuity
Unconnected	No continuity

(2) Replace the power transistor if there is a malfunction.



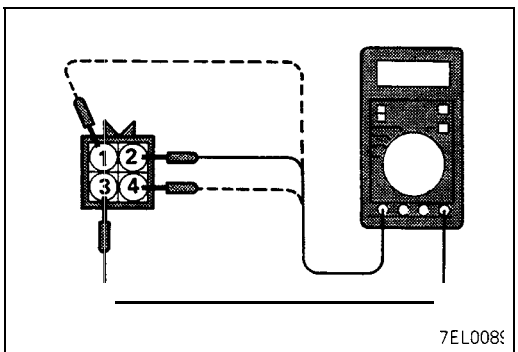
No. 3 – No. 6 coil side

(1) Connect the negative (-) terminal of the 1.5V power supply to terminal ⑦ of the power transistor; then check whether there is continuity between terminal ① and terminal ⑦ when terminal ④ and the positive (+) terminal are connected and disconnected.

NOTE
Connect the (–) probe of the circuit tester to terminal ①.

Terminal ④ and (+) terminal	Terminal ① and terminal ⑦
Connected	Continuity
Unconnected	No continuity

(2) Replace the power transistor if there is a malfunction.



IGNITION COIL

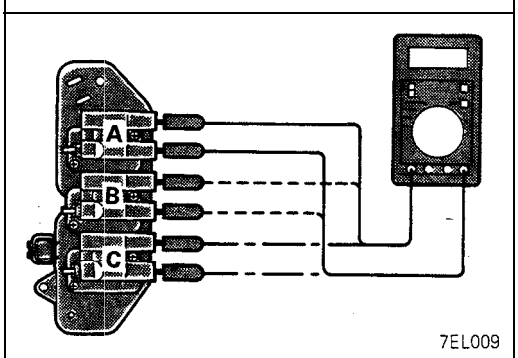
Primary Coil Resistance

Measure the resistance between connector terminal ③ (power) and each coil terminal.

Measuring point:

Coil A (No. 1 – No. 4 cylinder side coil) ..... ② – ③
Coil B (No. 2 – No. 5 cylinder side coil) ..... ① – ③
Coil C (No. 3 – No. 6 cylinder side coil) ..... ④ – ③

Standard value: 0.67 – 0.81 Ω



Secondary Coil Resistance

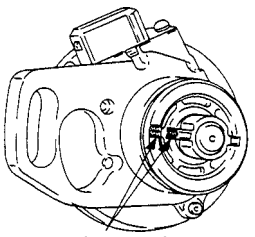
Measure the resistance between each coil high voltage terminals.

Measuring point:

Coil A (No. 1 – No. 4 cylinder side coil)
Coil B (No. 2 – No. 5 cylinder side coil)
Coil C (No. 3 – No. 6 cylinder side coil)

Standard value: 11.3 – 15.3 kΩ

TSB Revision



SERVICE POINTS OF INSTALLATION

6. INSTALLATION OF CRANK ANGLE SENSOR

(1) Turn the crankshaft so that the No. 1 cylinder is at compression top dead center.

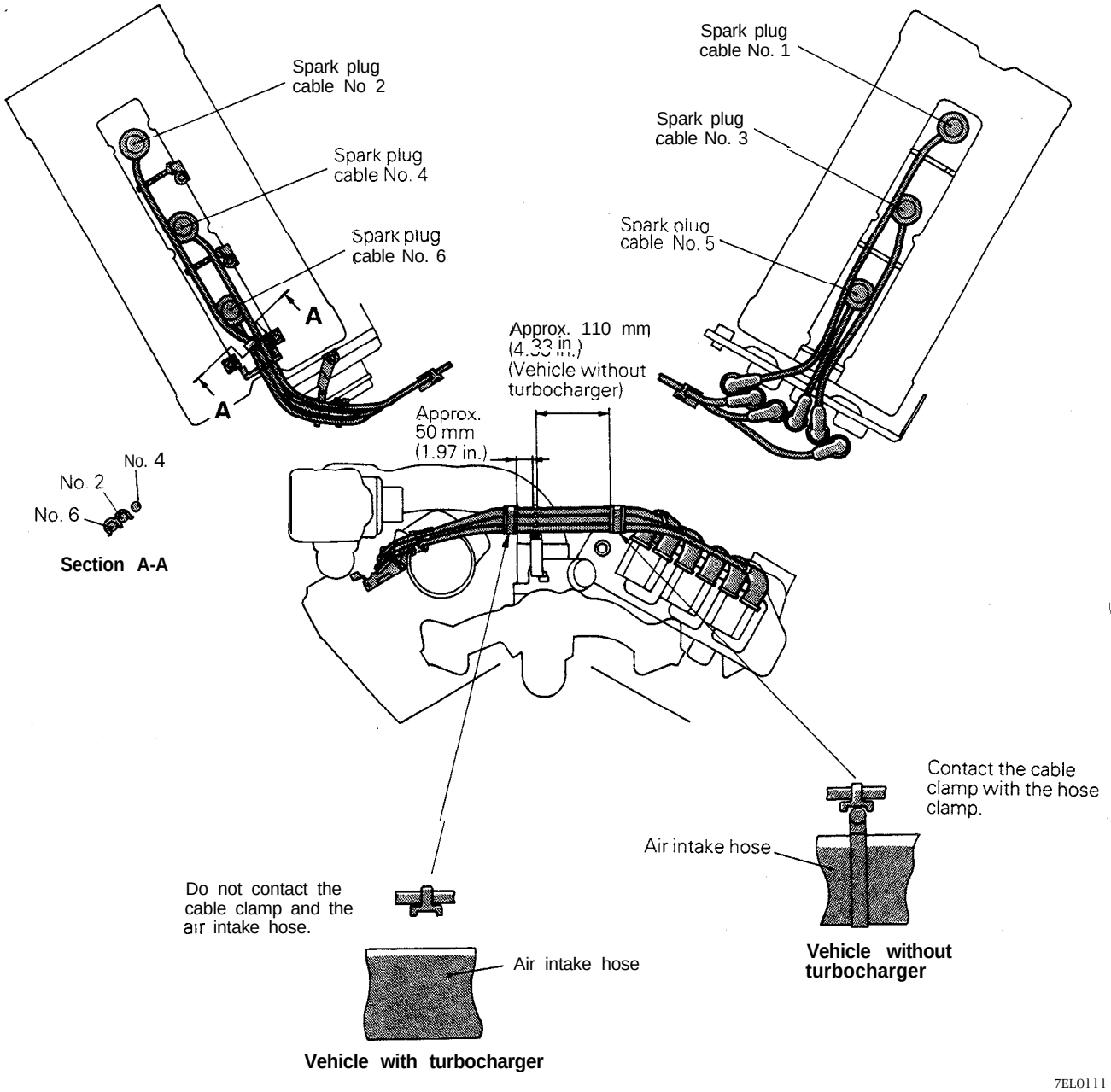
Caution
Be careful not to turn it to the No. 4 cylinder compression top dead center by mistake.

(2) Install, lining up the matchmarks on the crank angle sensor housing and the coupling.

2. INSTALLATION OF SPARK PLUG CABLE

Improper arrangement of spark plug cables will induce voltage between the cables, causing miss firing and developing a surge at acceleration in high-speed operation. Therefore, be careful to arrange the spark plug cables properly by the following procedure.

1. Install the spark plug cable clamps as shown in the illustration.
2. The numerals on the support and clamp indicate the spark 'plug cable No.
3. Pay attention to the following items when the spark plug cables are installed.
   (1) Install the cables securely to avoid possible contact with metal parts.
   (2) Install the cables neatly, ensuring they are not too tight, loose, twisted or kinked.



TSB Revision