Auto Repair Source MOTOR DRIVEN

Vehicle: 1994 TOYOTA COROLLA 1.6L L4 (A) 4A-FE-GAS-FI-N

Content: Engine Management >> Ignition Systems

DIAGNOSIS & TESTING

EXCEPT 1994-96 1MZ-FE, 2JZ-GTE & 5VZ-FE ENGINE

Spark Test

1. **On models equipped with external coil,** ensure spark occurs as follows:
   a. Disconnect coil wire at distributor.
   b. Hold end of coil wire approximately 1/2 inch from vehicle body.
   c. Crank engine and check for spark to occur. **To prevent fuel from being injected during testing, limit cranking to 1-2 seconds.**
   d. If spark does not occur, proceed to step 3.
2. **On models equipped with internal coil,** proceed as follows:
   a. Disconnect spark plug wiring, then remove spark plugs.
   b. Connect spark plug wiring to spark plugs.
   c. Ground spark plugs, then while cranking engine, ensure spark jumps spark plug gap. **To prevent fuel from being injected during testing, limit cranking to 1-2 seconds.**
   d. If spark does not occur, proceed to next step.
3. **On all models,** check ignition coil, igniter and distributor wiring connections. If connections are secure, proceed to step 4.
4. Check spark plug wiring resistance values. Refer to " Spark Plug Wire Resistance Test" for procedure.
5. Turn ignition switch on, then check for battery voltage at ignition coil positive (+) terminal. If battery voltage is not present, check wiring between ignition switch to ignition coil and igniter and repair as necessary.

6. Check resistance of ignition coil. Refer to "Ignition Coil Test" for procedure.

7. **On all engines except 1997 5E-FE, 5VZ-FE, and 2JZ-GTE,** check distributor pick-up coil(s) resistance and pick-up coil(s) air gap. Refer to "Pick-Up Coil Test" for procedure.

8. **On 1MZ-FE engine,** proceed as follows:

    a. Measure resistance of crankshaft position sensor. Resistance should be 1630-2740 ohms when cold.

    b. Measure resistance of camshaft position sensor. Resistance should be 835-1400 ohms when cold.

    c. Measure voltage at IGT1, IGT2 and IGT3 terminals of ECM and ground while engine is cranked. Voltage should be .1-4.5 volts.

9. **On 1FZ-FE engine,** measure voltage at terminal IGT of ECM and ground. Voltage should be .1-4.5 volts.

10. **On 1997 5VZ-FE engine** proceed as follows:

    a. Measure resistance of crankshaft position sensor. Resistance should be 1630-2740 ohms when cold.

    b. Measure resistance of camshaft position sensor. Resistance should be 835-1400 ohms when cold.

    c. **On Tacoma models,** measure voltage at IGT1, IGT2 and IGT3 terminals of ECM and ground while engine is cranked. Voltage should be .1-5 volts.

    d. **On 4Runner and T100 models,** measure voltage at IGT1, IGT2 and IGT3 terminals of ECM and ground while engine is cranked. Voltage should be .1-4.5 volts.

11. **On 1997 2RZ-FE engine** proceed as follows:

    a. Measure resistance of crankshaft position sensor. Resistance should be 1630-2740 ohms when cold.

    b. Measure voltage at IGT terminal of ECM and ground while engine is cranked. Voltage should be .1-4.5 volts.

12. **On 1997 1FZ-FE engine,** measure voltage at terminal IGT of ECM and ground while cranking engine. Voltage should be.1-4.5 volts.

13. **On 1997 2JZ-GE engine,** measure voltage at terminal IGT1 of ECM and ground while cranking engine. Voltage should be.1-4.5 volts.

14. **On 1997 2JZ-GTE engine,** proceed as follows:

    a. Measure resistance of camshaft and crankshaft position sensors. Resistance should be 835-1400

ohms.

b. Measure voltage at terminal IGT1-IGT6 while engine is cranked. Voltage should be .1-4.5 volts.

15. **On 1997 3RZ-FE engine,** proceed as follows:

a. Measure resistance of crankshaft position sensor. Resistance should be 1630-2740 ohms when cold.

b. **On Tacoma and 4Runner models,** measure resistance of camshaft position sensor. Resistance should be 835-1400 ohms when cold.

c. **On Tacoma and 4Runner models,** measure voltage at IGT1 and IGT2 terminals of ECM and ground while engine is cranked. Voltage should be .1-4.5 volts.

d. **On T100 models,** measure voltage at IGT1, IGT2, and IGT3 terminals of ECM and ground while engine is cranked. Voltage should be .1-4.5 volts.

16. **On 1997 5S-FE engine,** proceed as follows:

a. Measure resistance of crankshaft position sensor. Resistance should be 985-1600 ohms when cold.

b. **On Camry models,** measure resistance of camshaft position sensor. Resistance should be 835-1400 ohms when cold.

c. **On Celica models,** measure voltage at IGT terminal of ECM and ground while engine is cranked. Voltage should be .1-4.5 volts.

d. **On Camry models,** measure voltage at IGT1 and IGT2 terminals of ECM and ground while engine is cranked. Voltage should be.1-4.5 volts.

17. **On 1997 2TZ-FZE engine,** proceed as follows:

a. Measure resistance of crankshaft position sensor. Resistance should be 1630-2740 ohms when cold.

b. Measure voltage at IGT terminal of ECM and ground while engine is cranked. Voltage should be .1-4.5 volts.

18. **On 1997 3S-FE engine,** proceed as follows:

a. Measure resistance of crankshaft position sensor. Resistance should measure 935-1600 ohms when cold.

b. Check IGT voltage signal from ECM. Measure voltage between IGT of ECM connector and ground while engine is cranked. Measurement should read .1-4.5 volts.

19. **On 1997 Celica with 7A-FE engine,**proceed as follows:

    a. Measure resistance of crankshaft position sensor. Resistance measurement should be 1630-2740 ohms when cold.

    b. Measure IGT voltage signal from ECM while engine is cranked. Voltage should measure .1-4.5 volts.

20. **On 1997 4A-FE and 1997 Corolla with 7A-FE engine,** proceed as follows:

    a. Measure voltage between pin IGT of ECM connector and body ground while engine is cranked. Voltage should be .1-4.5 volts.

    b. If voltage is within specification, check and replace ECM. If voltage is not within specification, measure voltage between terminal 3 of igniter connector and body ground. Place ignition switch to "ON" and "START" position. Voltage should be 9-14 volts.

21. **On 1994-96 5E-FE engine,** check IGT signal from ECU for approximately .5-5.5 volts. If approximately .5-5.5 volts is not present, check wiring between ECU, distributor and igniter and replace as necessary. If wiring is satisfactory, replace ECU.

22. **On 1997 5E-FE engine,** proceed as follows:

    a. Measure resistance of camshaft position sensor. Ensure cold resistance value is 685-1600 ohms. If sensor is within specification, proceed to next step.

    b. Measure resistance of crankshaft position sensor. Ensure cold resistance value is 985-1600 ohms. If sensor is within specification, proceed to next step.

    c. Measure IGT voltage signal from ECM. Voltage between terminals IGT1 and IGT2 of ECM connector and body ground while engine is cranked should be.1-4.5 volts. If voltage is not within specification, check and replace ECM.

23. **On all models,** if component tests performed in previous steps were satisfactory and spark does not occur, replace igniter.

Spark Plug Wire Resistance Test

1. Disconnect spark plug leads from spark plugs.

2. Remove distributor cap with spark plug wires connected.

3. Using suitable ohmmeter, place one lead on distributor cap contact while placing other lead at the end of the corresponding spark plug wire lead.

4. Resistance should not exceed 25,000 ohms. If resistance exceeds specifications, inspect cap contact and

spark plug wire terminals and replace as necessary.

Ignition Coil Test

1. Check primary coil resistance by placing suitable ohmmeter leads between coil primary terminals, **Figs.** 1 **through** 6**.**
2. Resistance should be within specifications shown in chart, **Fig.** 7**.**
3. Check secondary coil resistance by placing ohmmeter leads between coil positive terminal and high tension terminal, **Figs.** 8 **through** 13**.**
4. Resistance should be within specifications shown in chart, **Fig.** 7**.**
5. Inspect coil for cracks, damaged or burned terminals and leakage.
6. If coil resistance is not within specifications, or if coil is damaged, coil should be replaced.

Pick-Up Coil Test

These ignition systems may use up to three pick-up coils.

1. **On models with external coil,** disconnect electrical connector(s) to distributor.
2. **On models with internal coil,** remove distributor cap, rotor and dust shield, if equipped.
3. **On all models,** using an ohmmeter, measure resistance of pick-up coil connector terminal, **Figs.** 14 **through** 22**.**
4. Refer to **Fig.** 23 for pick-up coil resistance specifications.
5. If resistance is not within specifications, pick-up coil, distributor housing or distributor should be replaced.
6. Rotate crankshaft as necessary to align one tooth with pick-up pole piece(s), **Fig.** 24**.** Ensure air gap is .008-.016 inch on all engines except 2TZ-FZE and 2JZ-GE. On 1997 2TZ-FZE and 2JZ-GE engines, air gap is .008-.020. **Use non-magnetic feeler gauge when checking air gap.** Engines may use one, two or three pick-up coils. Check air gap for all coils as outlined.
7. If pick-up coil air gap is incorrect, adjust as necessary. **Some pick-up coils are not adjustable. If air gap is incorrect, the distributor or distributor housing must be replaced.**

1994-96 1MZ-FE, 2JZ-GTE & 5VZ-FE ENGINES

Spark Test

1. Disconnect ignition coil.
2. Remove spark plug.
3. Install spark plug to ignition coil and connect ignition coil connector.
4. Ground spark plug, then crank engine and observe spark plug for spark.

Ignition Coil Test

1. Remove V-bank cover.
2. Disconnect ignition coil connections.
3. Using an ohmmeter, measure the resistance between positive and negative terminals of each ignition coil, **Figs. 2, 3 and 11.**
4. Resistance should be as follows:
    a. **On 2JZ-GTE engine,** resistance should be .54-.84 ohms.
    b. **On 1MZ-FE engine,** primary coil resistance should be .70-.94 ohms and secondary coil resistance should be 10800-14900 ohms.
    c. **On 5VZ-FE engine,** primary coil resistance should be .67-1.05 ohms and secondary coil resistance should be 9300-16000 ohms.
5. If resistance is not as specified, replace coil.

Camshaft Position Sensor Test

1. Disconnect camshaft position sensor connector.
2. Using an ohmmeter, measure resistance between terminals. Resistance should be 835-1400 ohms cold, and 1060-1645 ohms warm.
3. If resistance is not as specified, replace camshaft position sensor.

Fig. 1 Ignition coil primary resistance check. 2TZ-FE, 3S-FE & 5S-FE engines except 1997 Camry

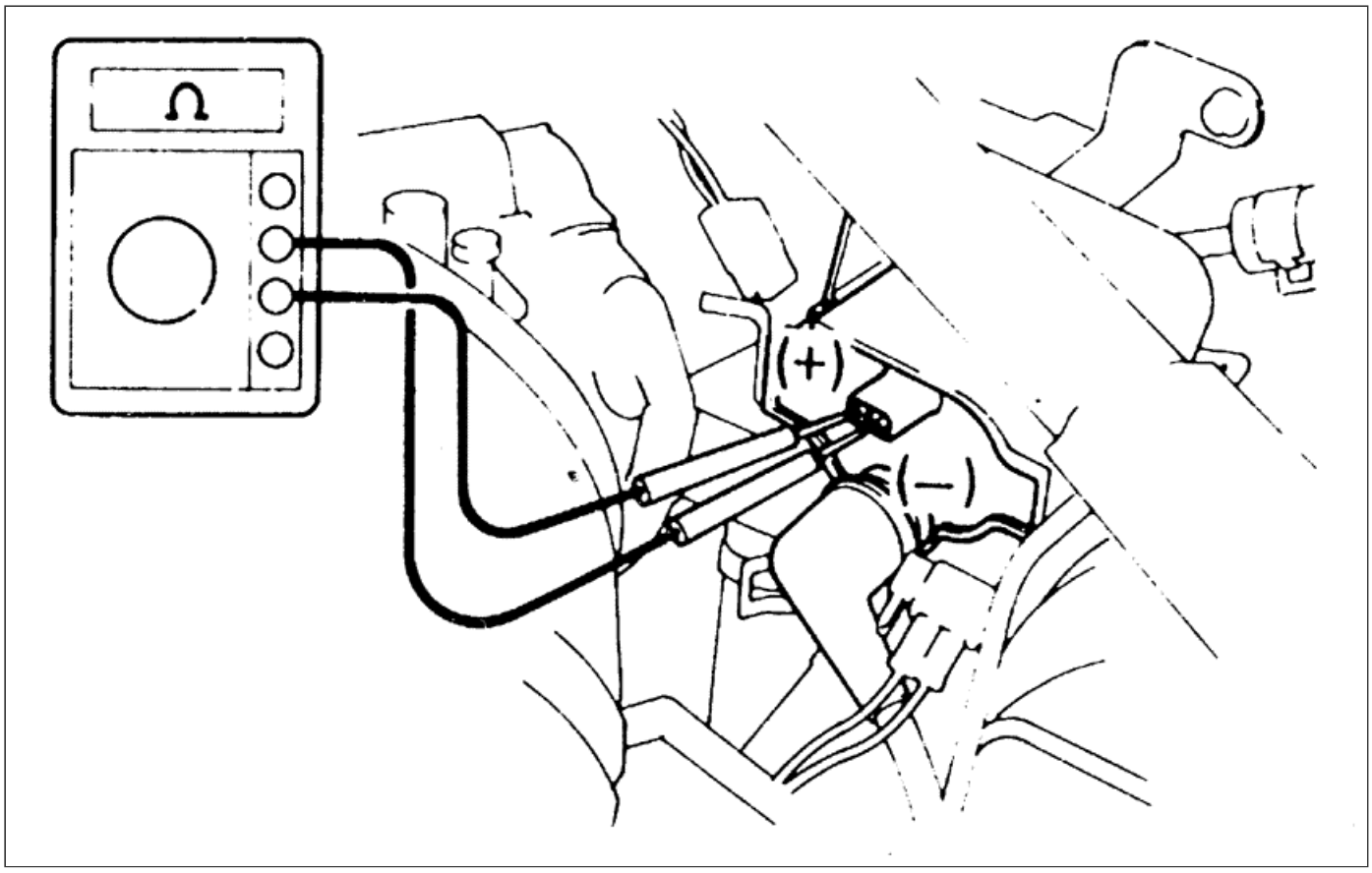

Fig. 2 Ignition coil resistance check. 2JZ-GTE engine

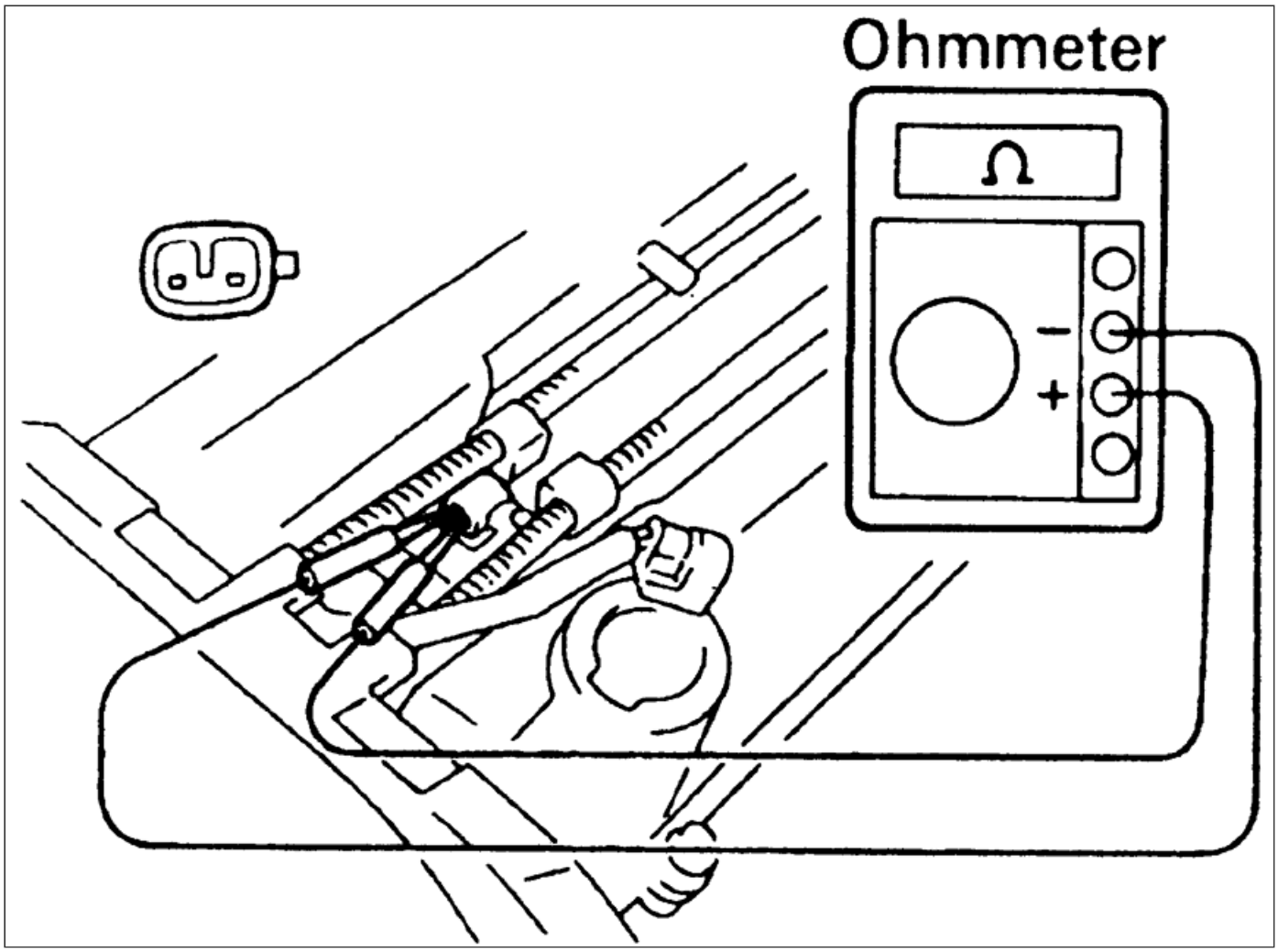

Fig. 3 Ignition primary coil resistance check. 1MZ-FE, 5E-FE, 5VZ-FE, 1995-97 5E-FE, & 1997 3RZ-FE engines

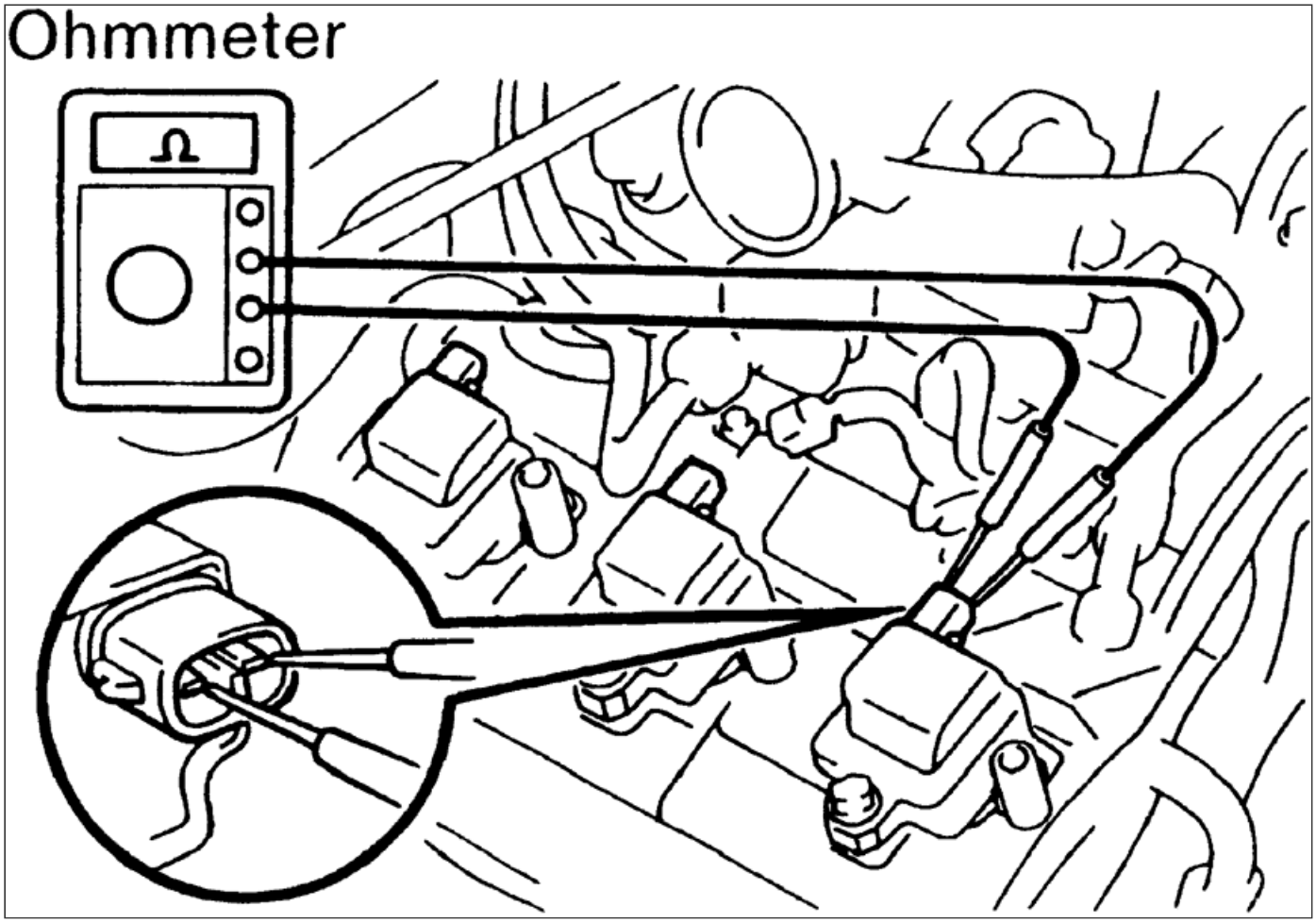

Fig. 4 Ignition coil primary resistance check. 3VZ-E, 1FZ-FE & 1994-96 3RZ-FE engines

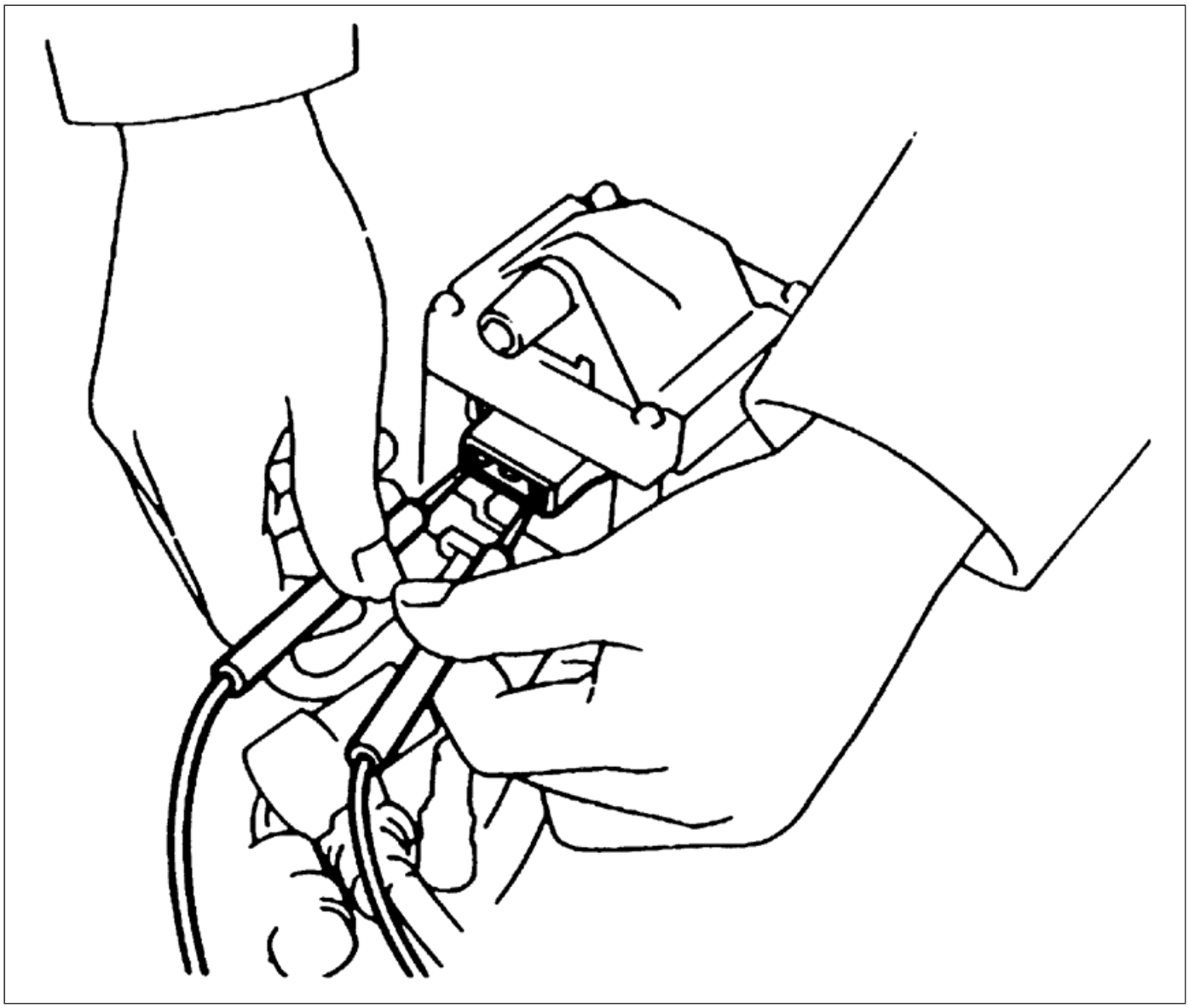

Fig. 5 Ignition coil primary resistance check. Models w/internal coil

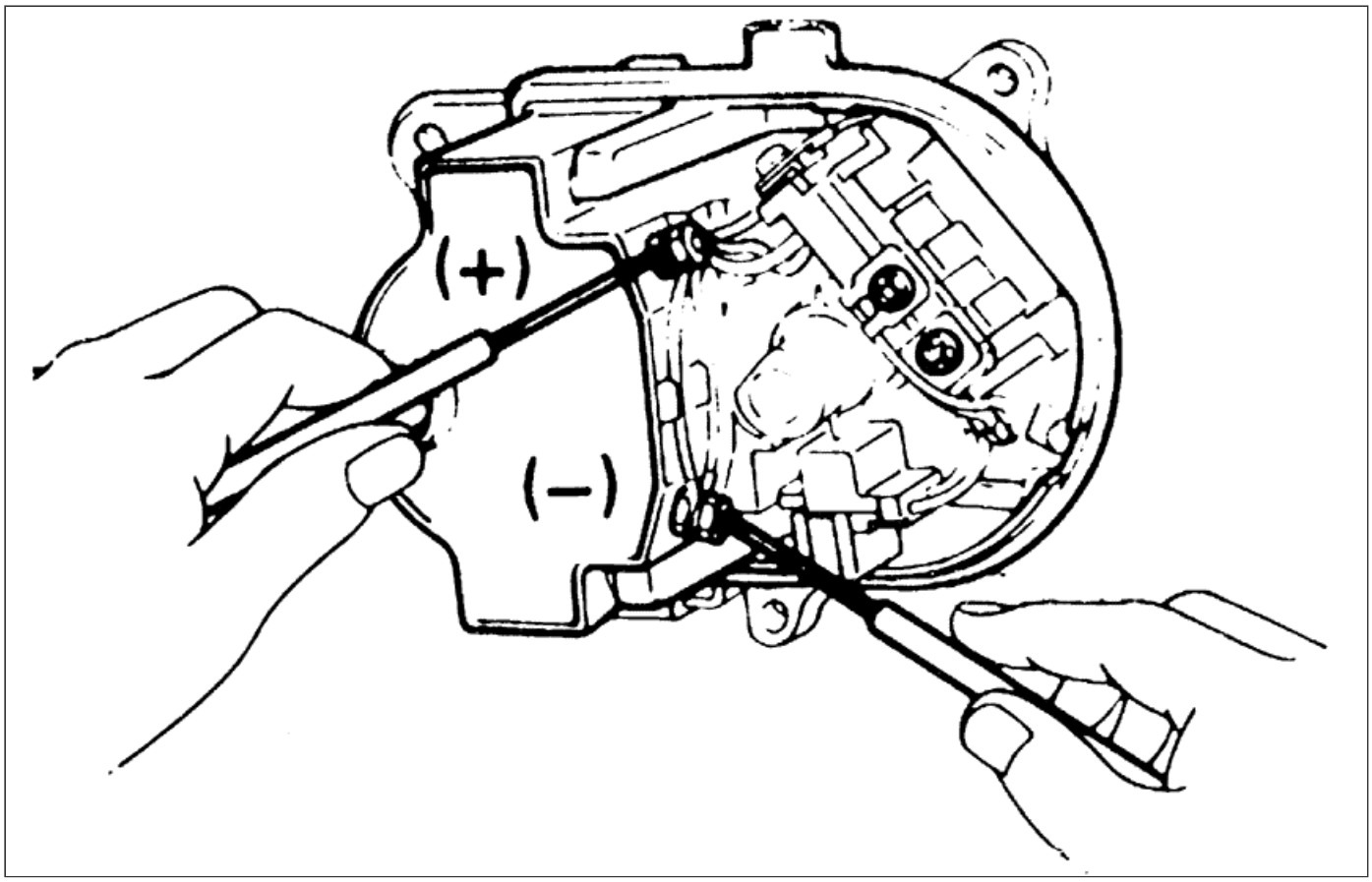

Fig. 6 Ignition coil primary resistance check. 2RZ-FE & 3RZ-FE engines

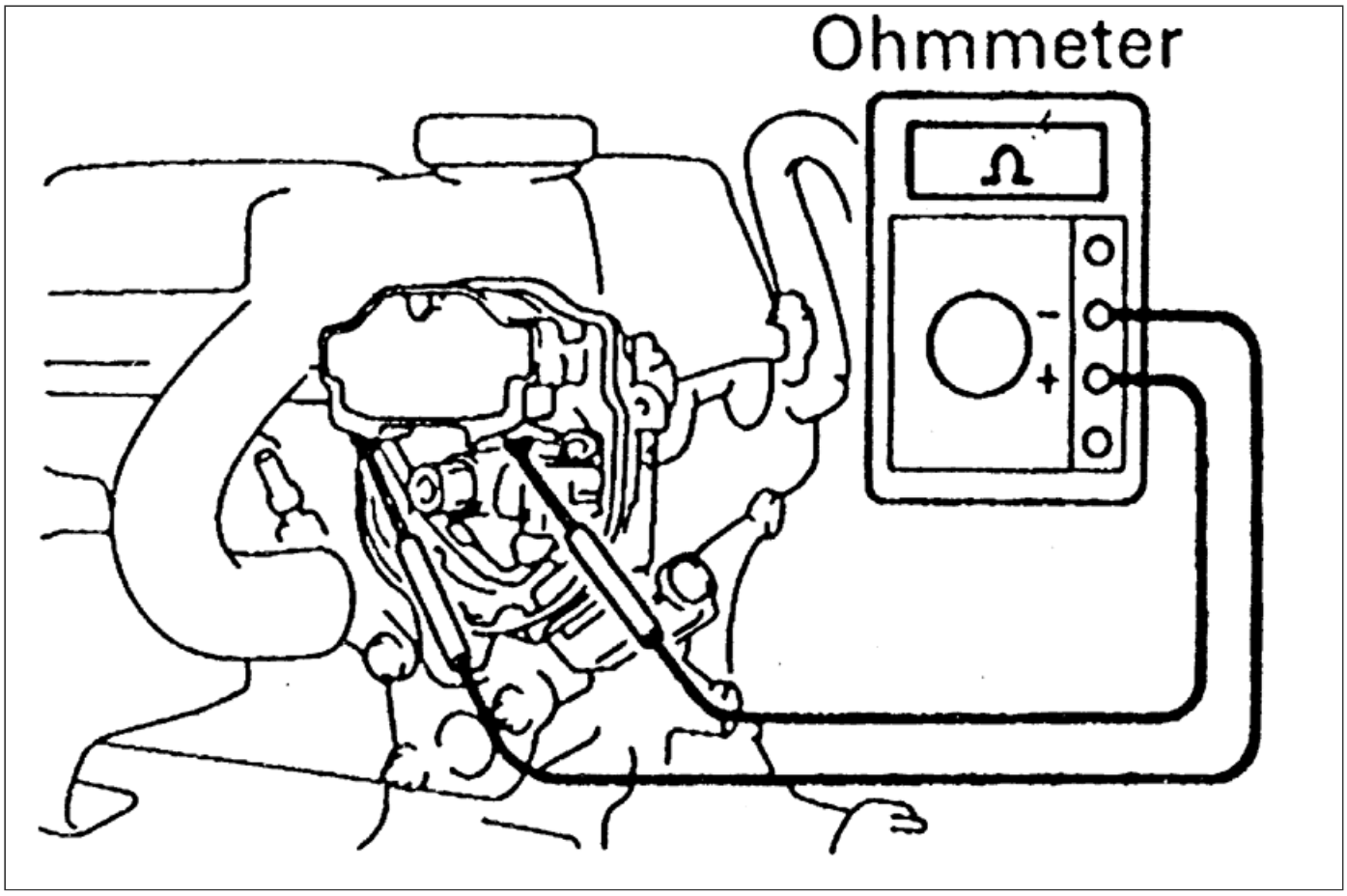

Fig. 7 Ignition coil resistance specifications (Part 1 of 3). Models w/distributor ignition

Fig. 7 Ignition coil resistance specifications (Part 2 of 3). Models w/distributor ignition

Fig. 7 Ignition coil resistance specifications (Part 3 of 3).

Fig. 8 Ignition coil secondary resistance check. Models w/external coil except 2TZ-FE & 5S-FE engines

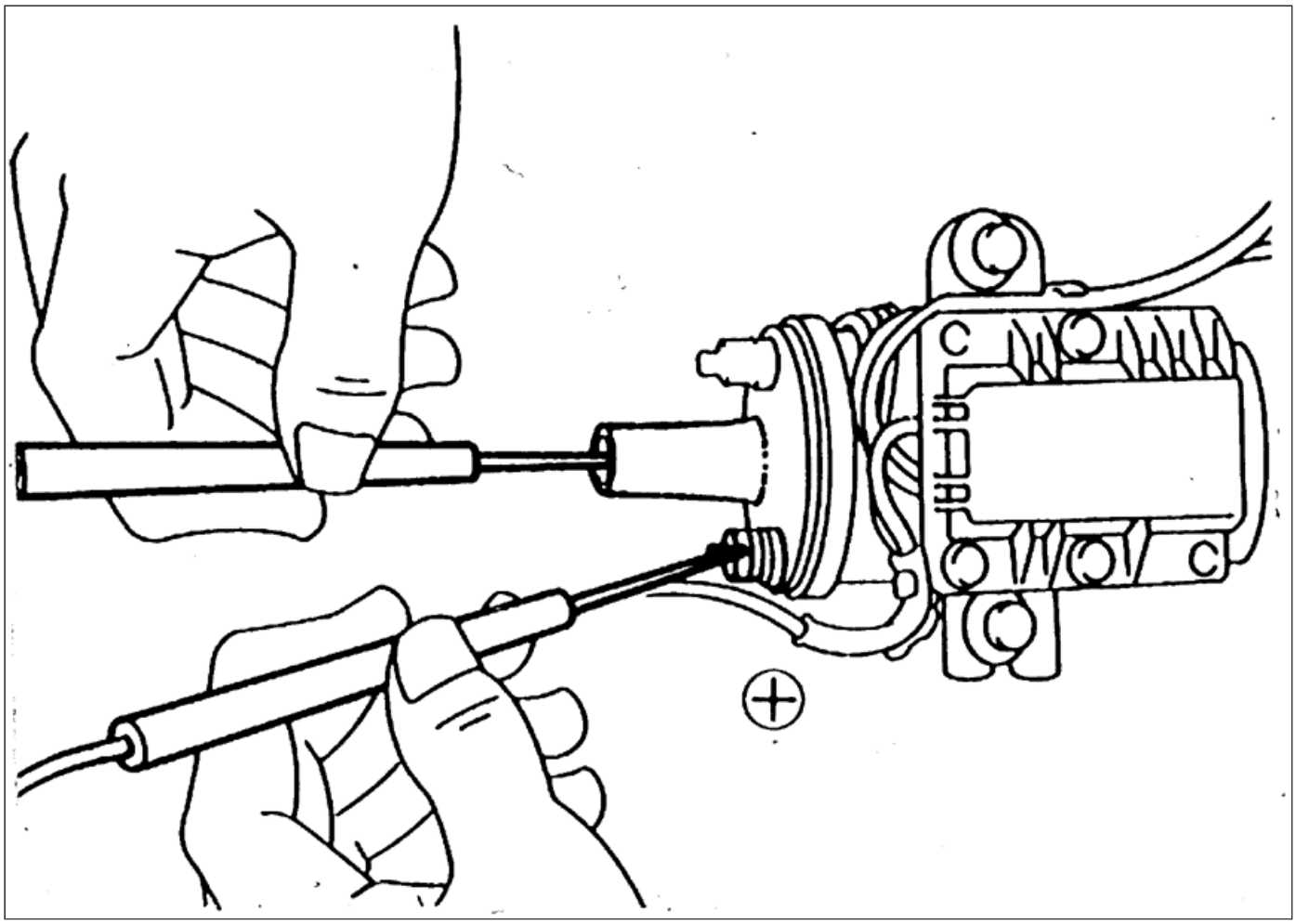

Fig. 9 Ignition coil secondary resistance check. 2TZ-FE & 5S-FE engines except 1997 Camry

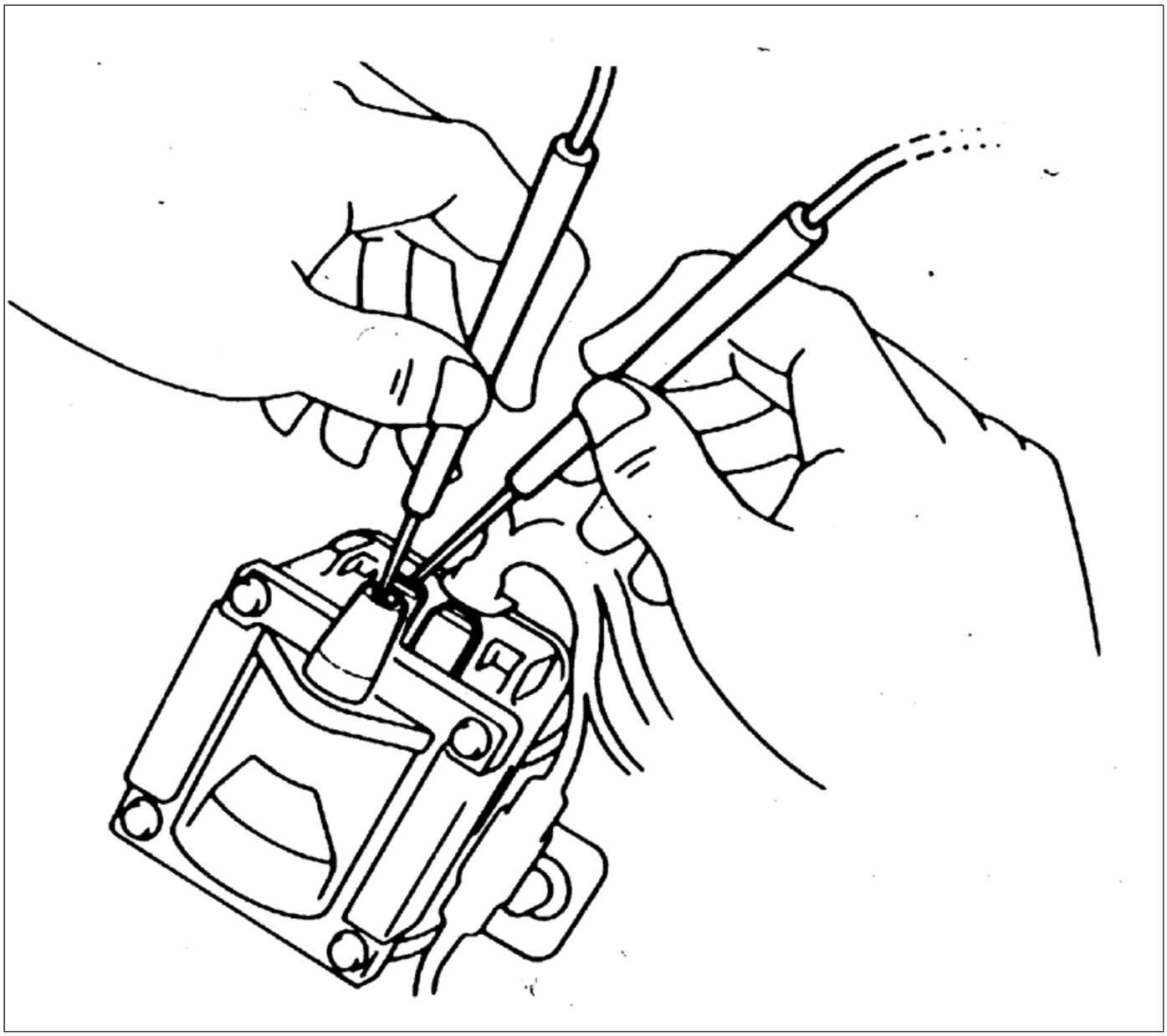

Fig. 10 Ignition coil secondary resistance check. 1997 Camry w/5S-FE& 1997 Tacoma & 4Runner w/3RZ-FE engines

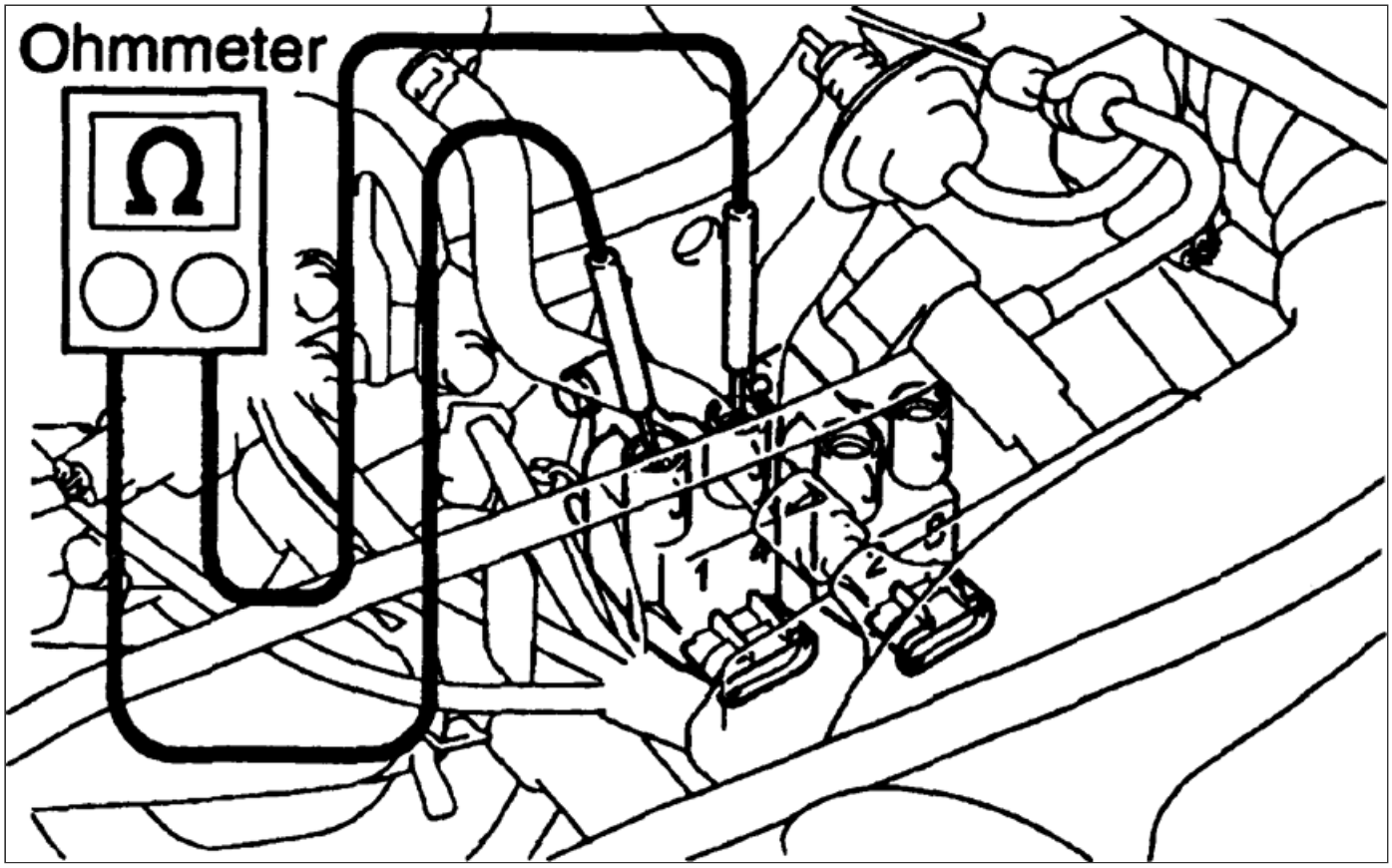

Fig. 11 Ignition secondary coil resistance check. 1MZ-FE, 5E-FE & 5VZ-FE engines

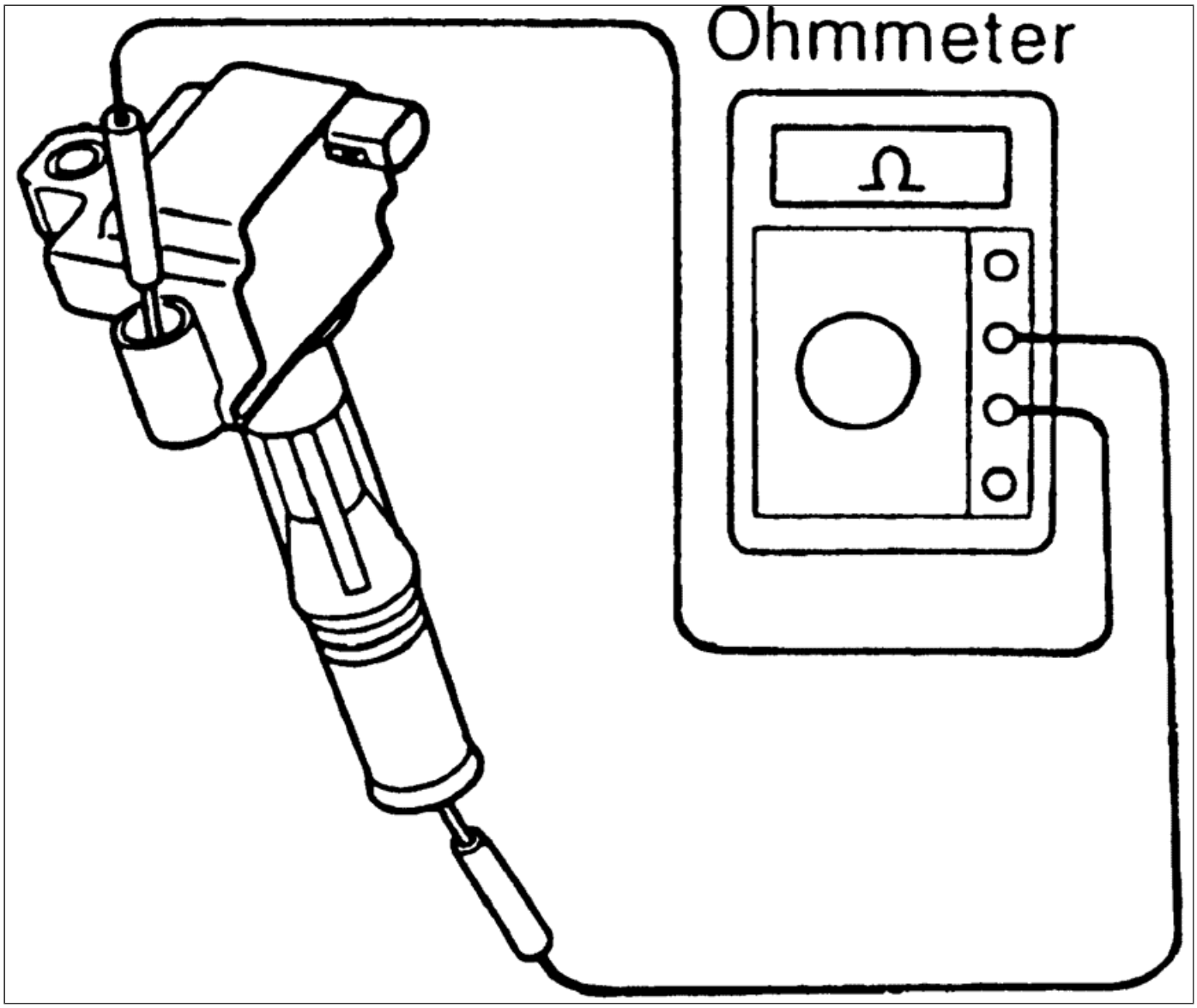

Fig. 12 Ignition coil secondary resistance check. Models w/internal coil except 3VZ-E, 3S-FE & 1FZ-FE engines

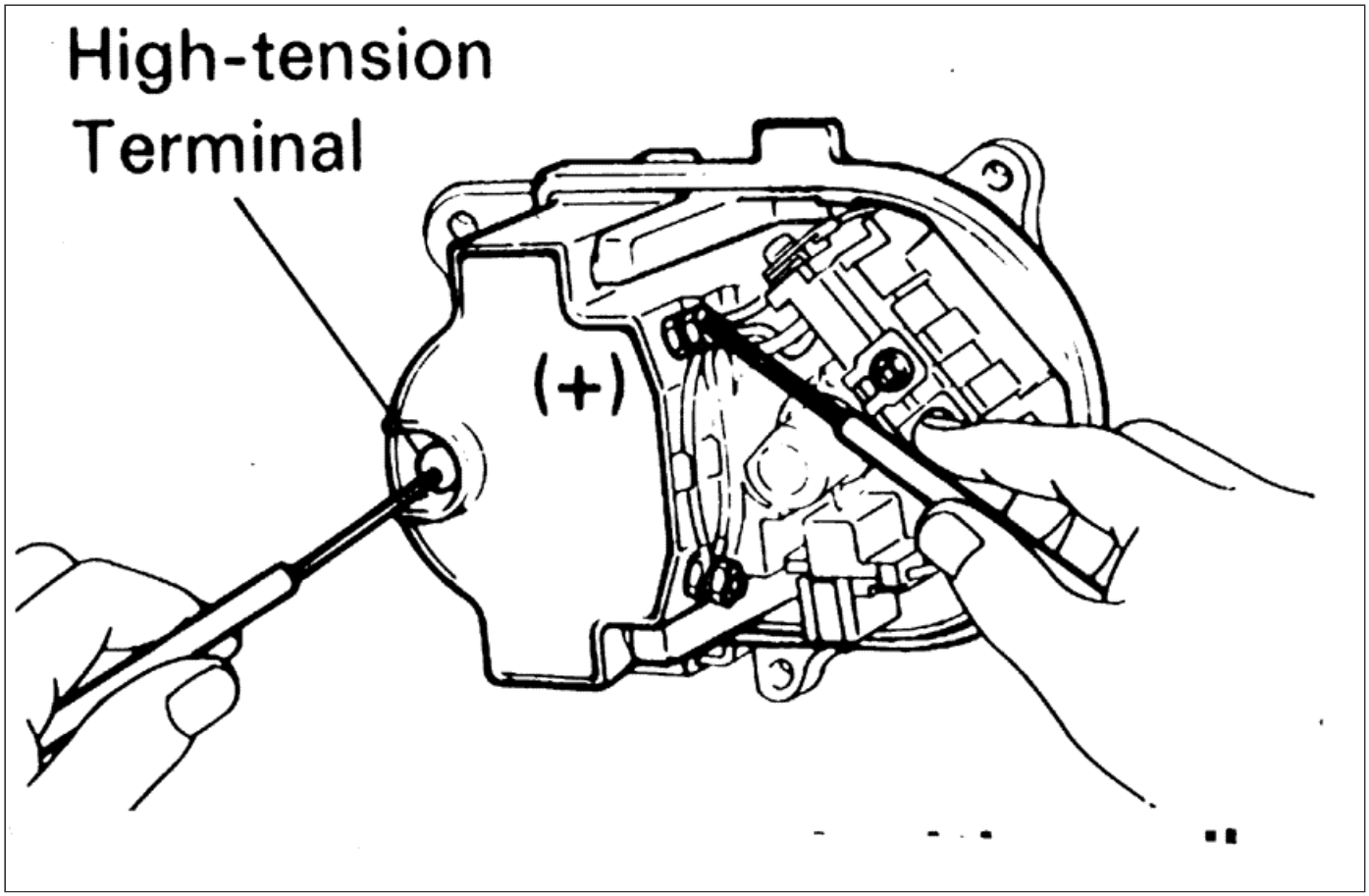

Fig. 13 Ignition coil secondary resistance check. 3VZ-E, 3S-FE & 1FZ-FE engines

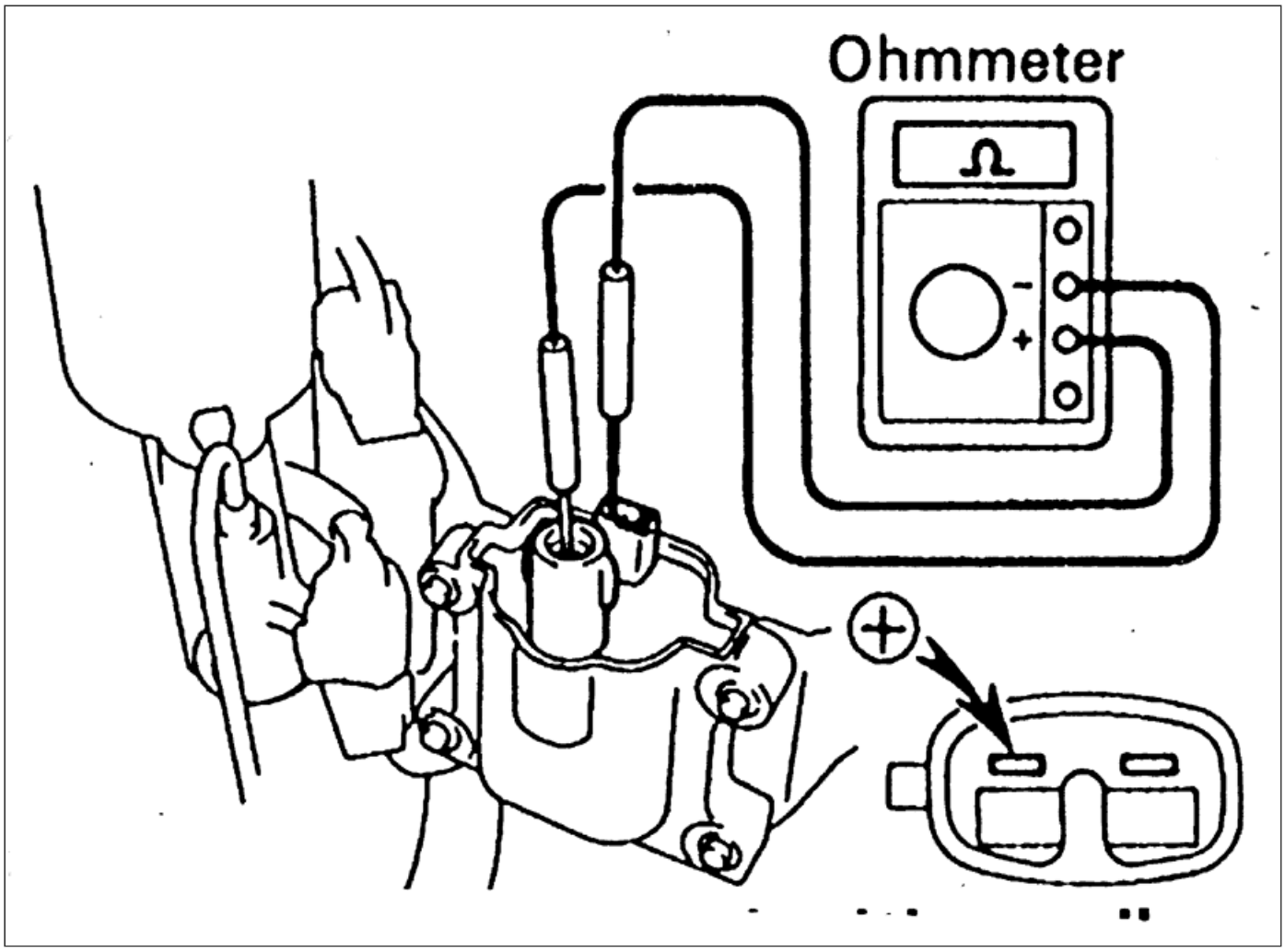

Fig. 14 Pick-up coil connector terminal identification. 5E-FE engine

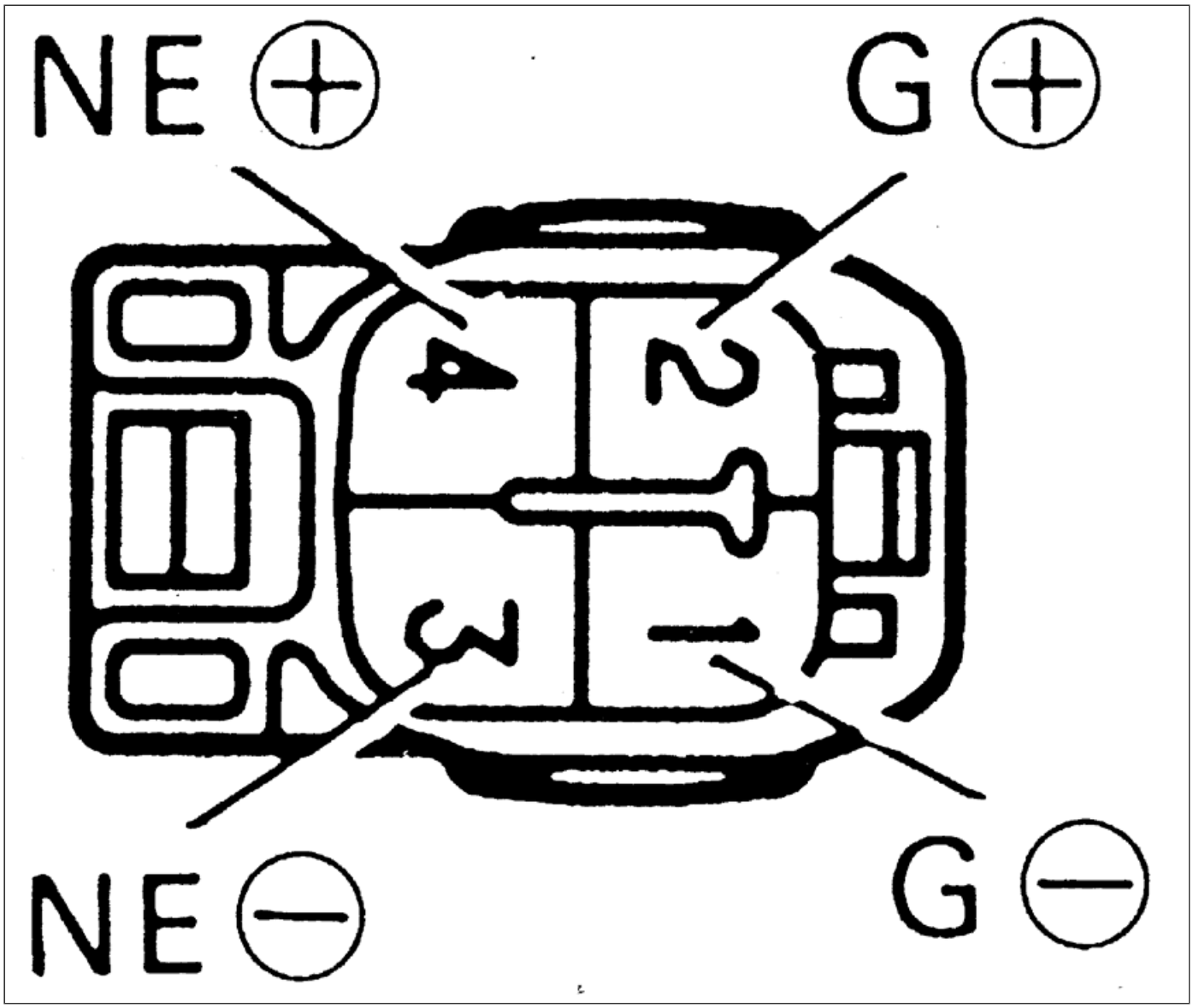

Fig. 15 Pick-up coil connector terminal identification. 2RZ-FE & 3RZ-FE engine

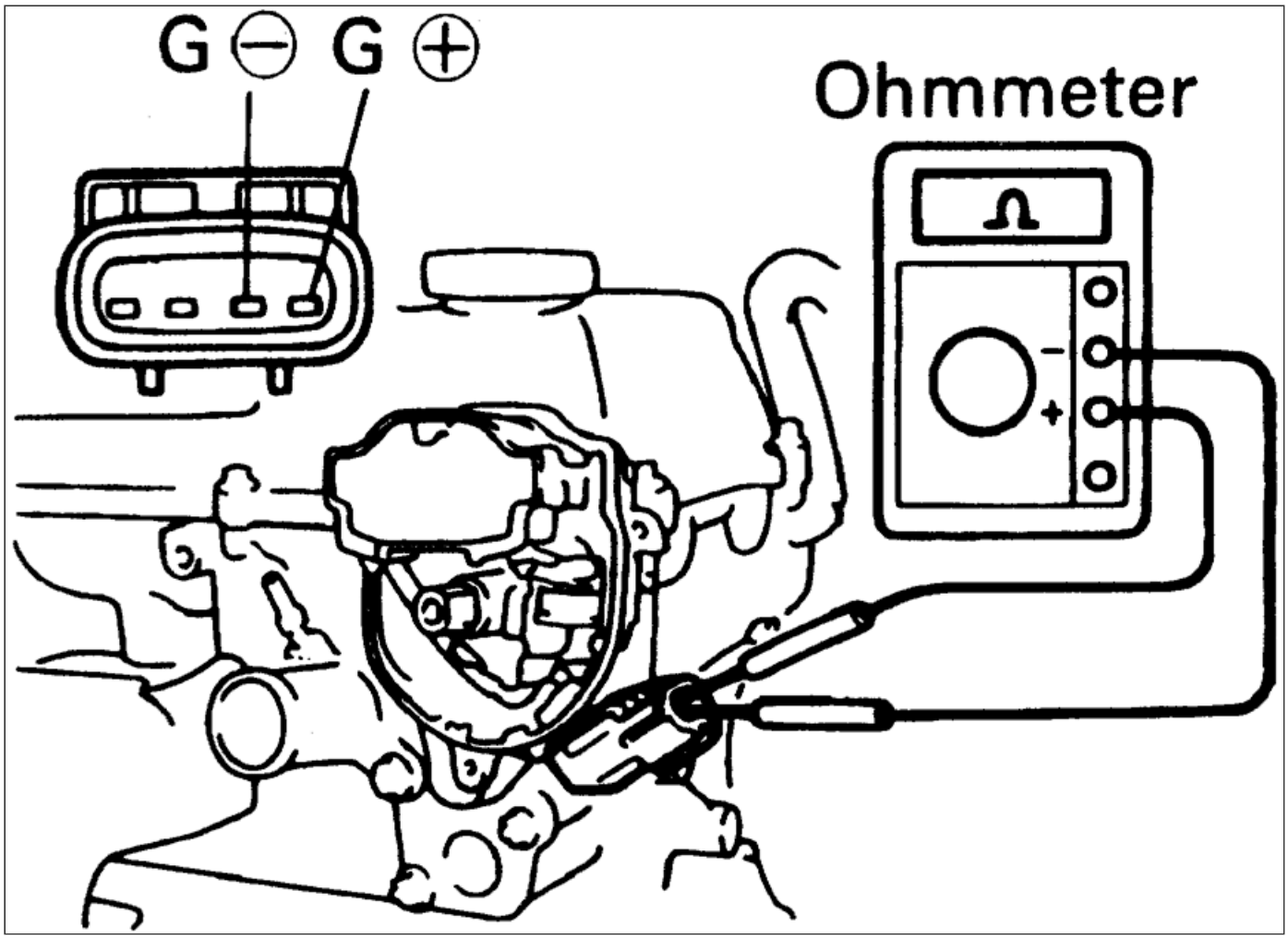

Fig. 16 Pick-up coil connector terminal identification. 2TZ-FE, 3S-GTE & 2JZ-GE engines

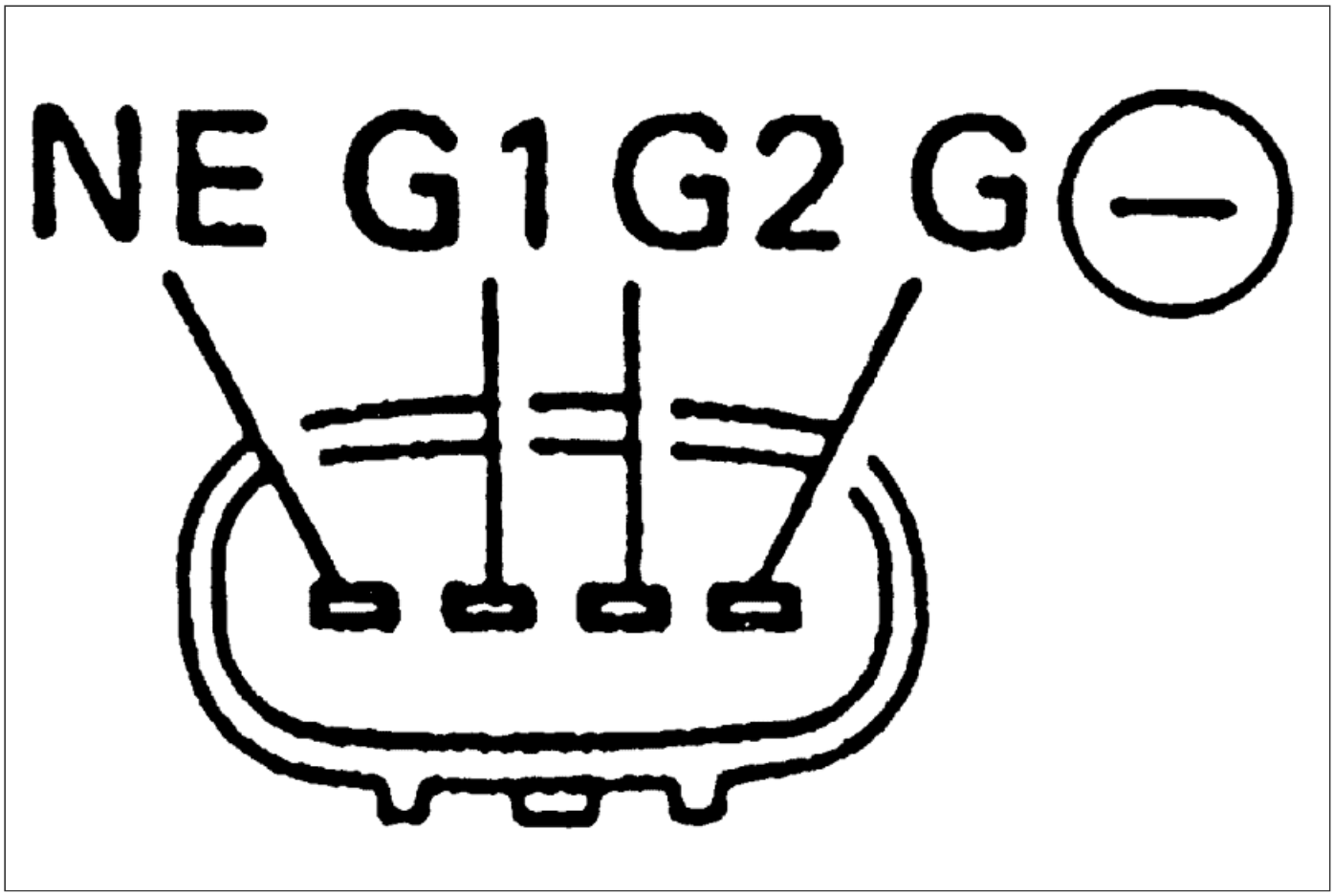

Fig. 17 Pick-up coil connector terminal identification. 1994-95 5S-FE engine

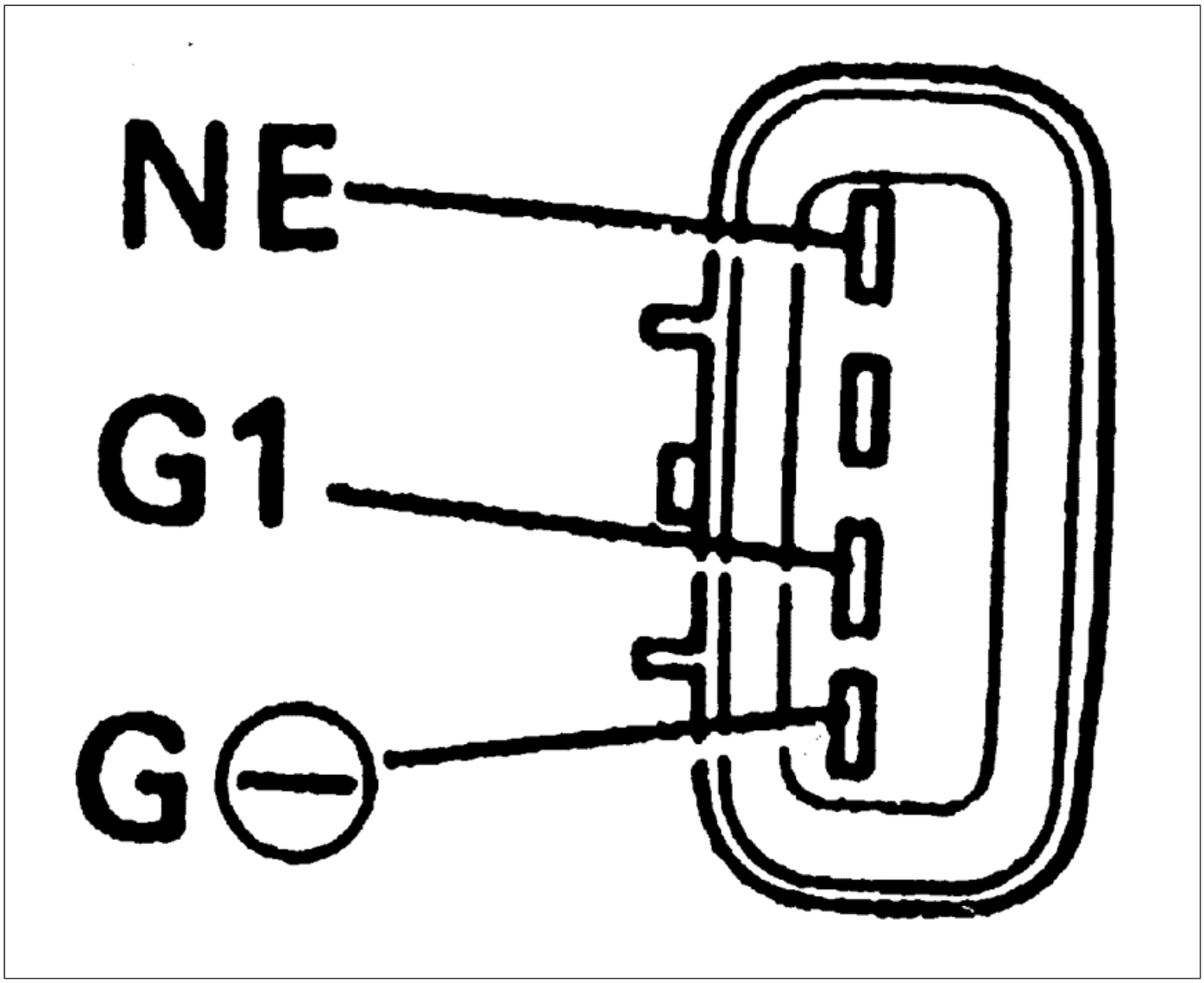

Fig. 18 Pick-up coil connector terminal identification. 3S-FE, 2TZ-FZE& 1996 5S-FE engines

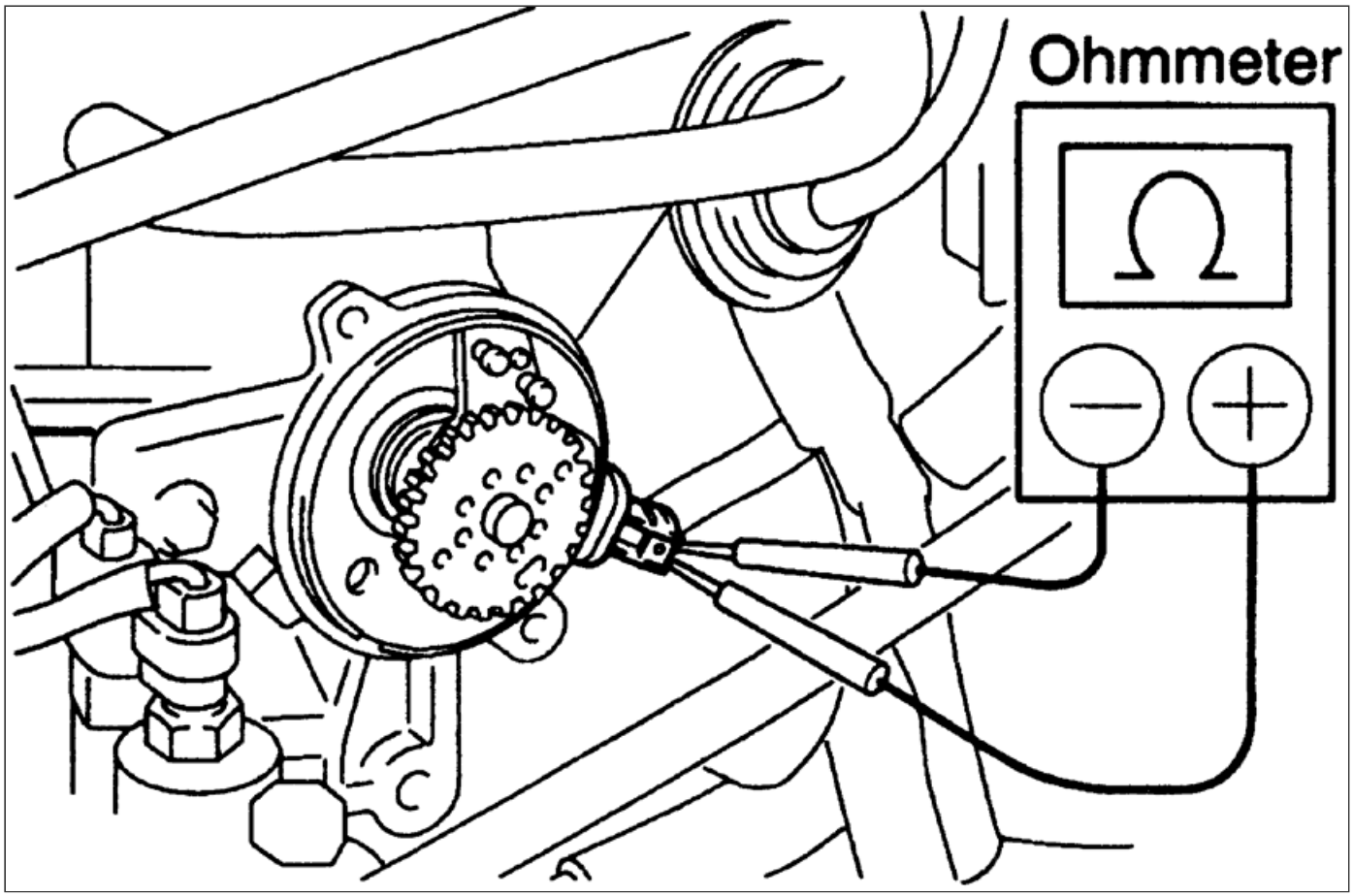

Fig. 19 Pick-up coil connector terminal identification. 1994-96 4A-FE& 7A-FE engines

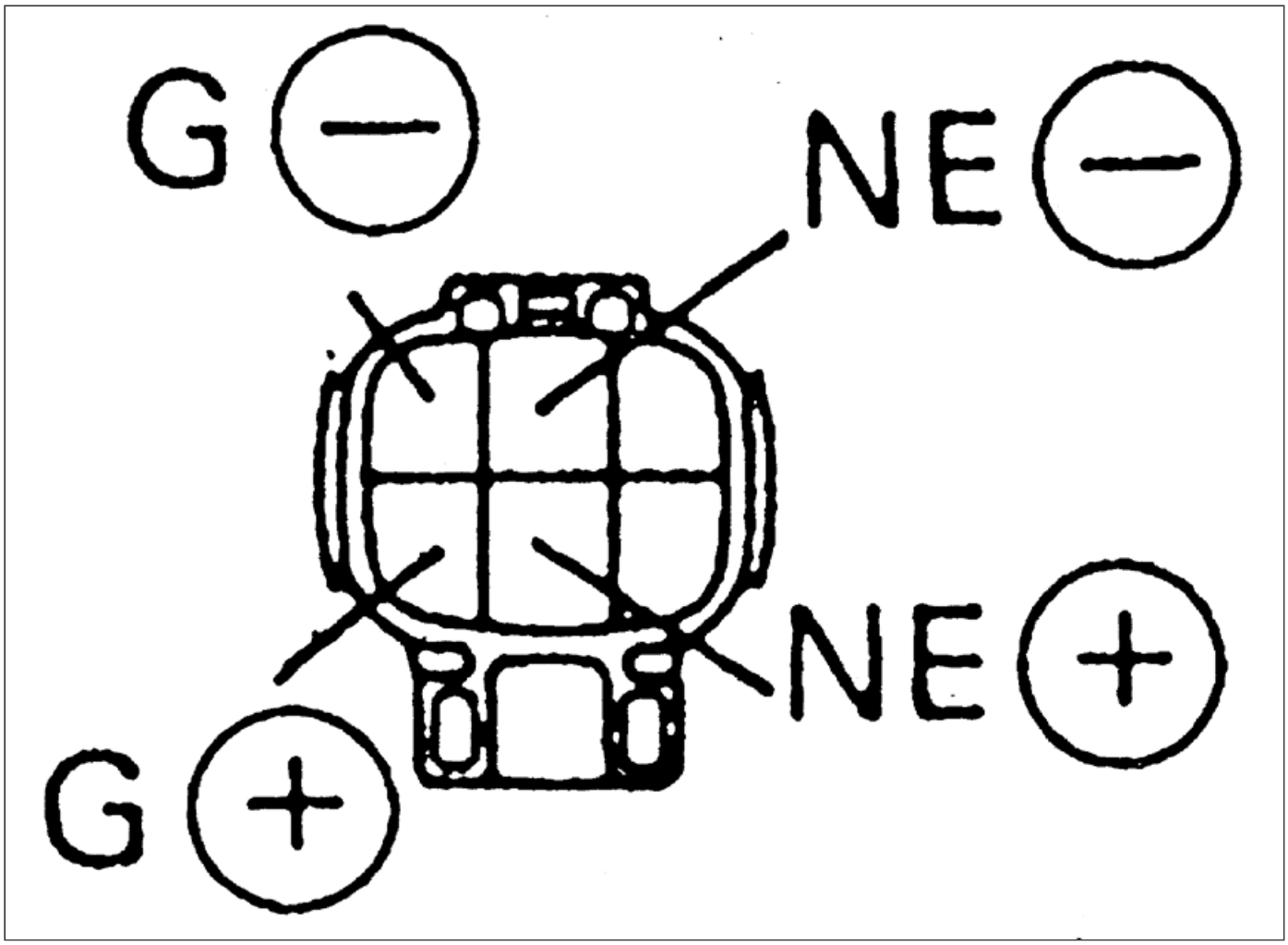

Fig. 20 Pick-up coil connector terminal identification. 1997 4A-FE& 7A-FE engines

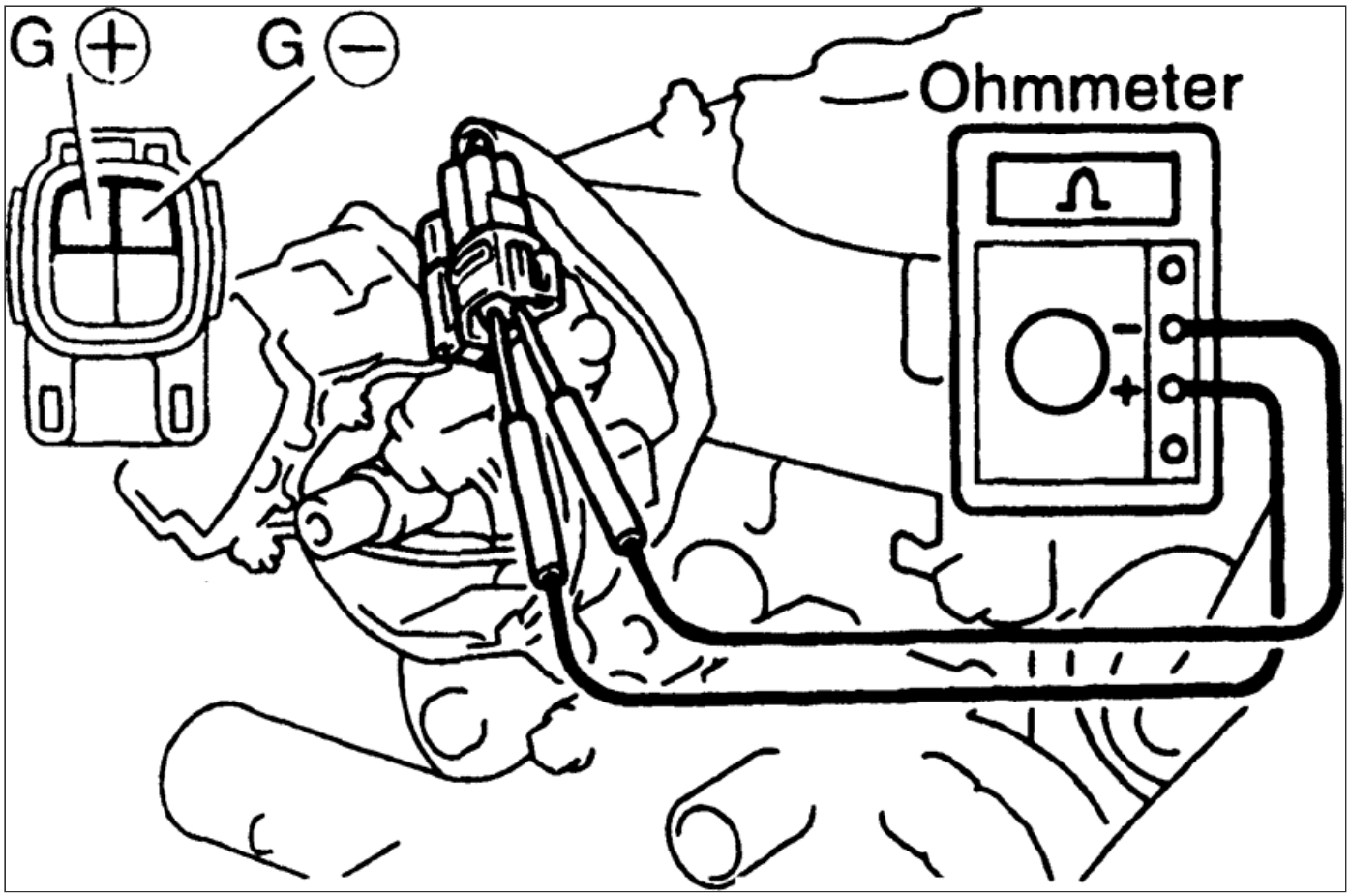

Fig. 21 Pick-up coil connector terminal identification. 22R-E engine

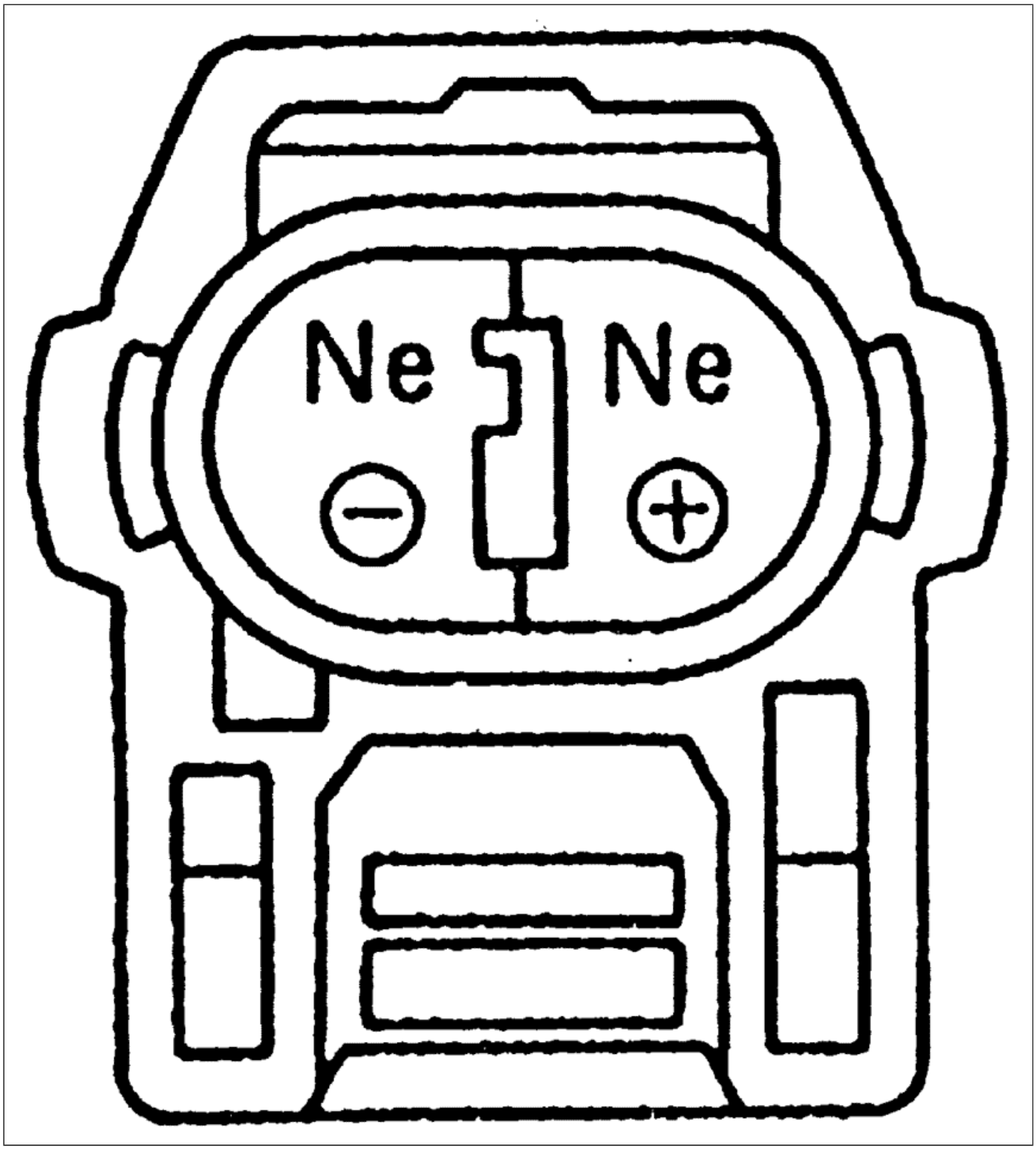

Fig. 22 Pick-up coil connector terminal identification. 3VZ-E & 1FZ-FE engines

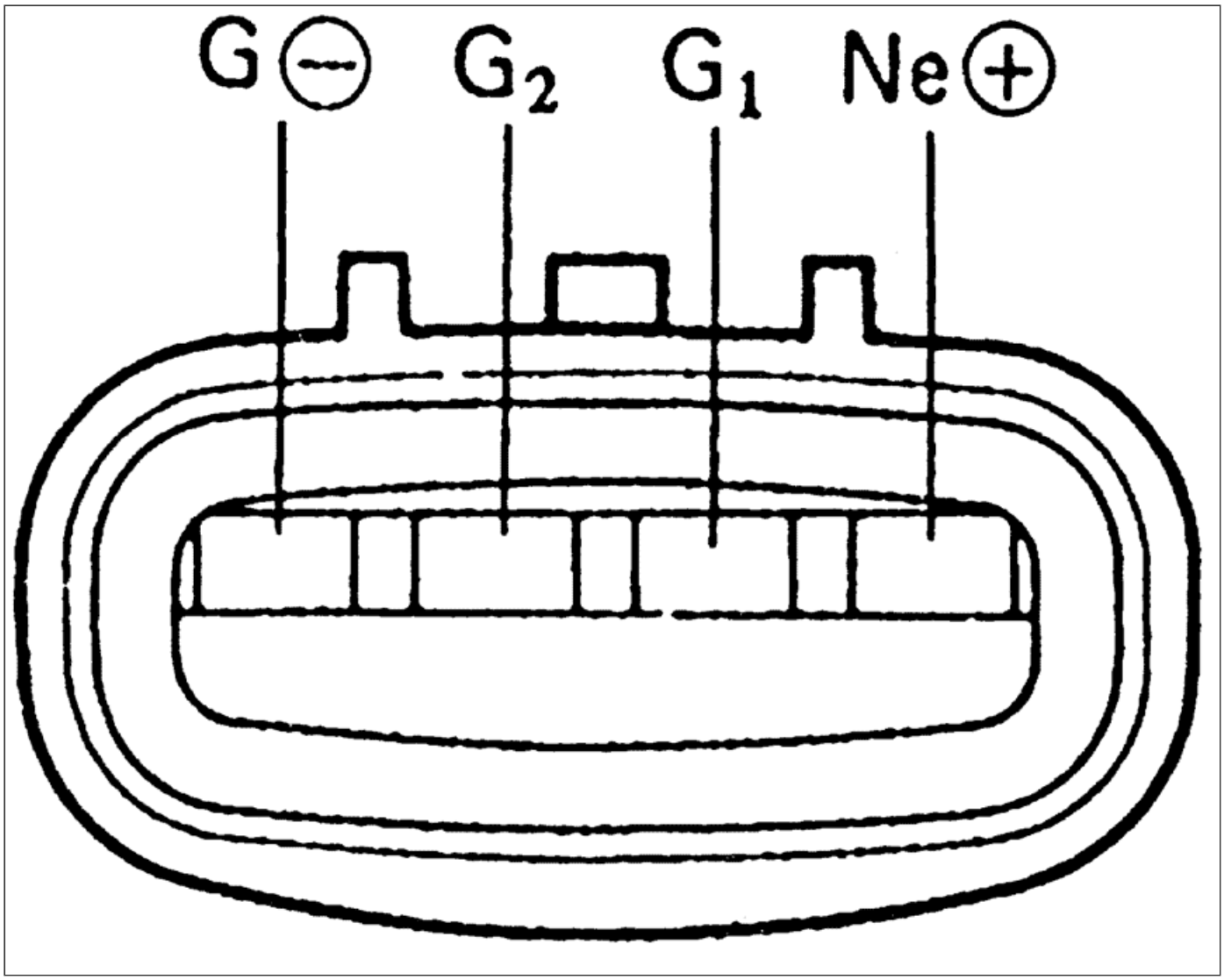

Fig. 23 Pick-up coil resistance specifications

Fig. 24 Pick-up coil air gap check