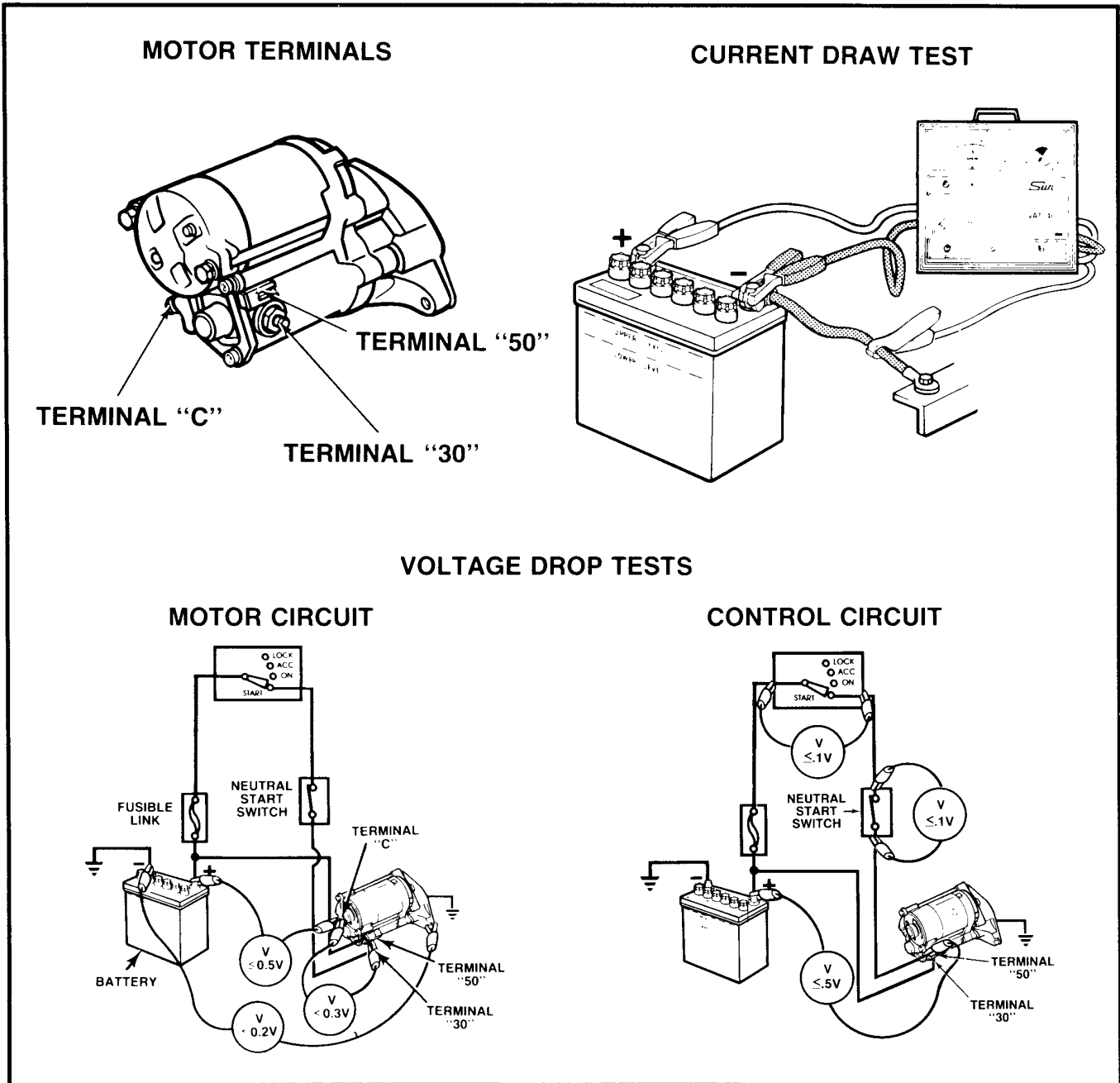
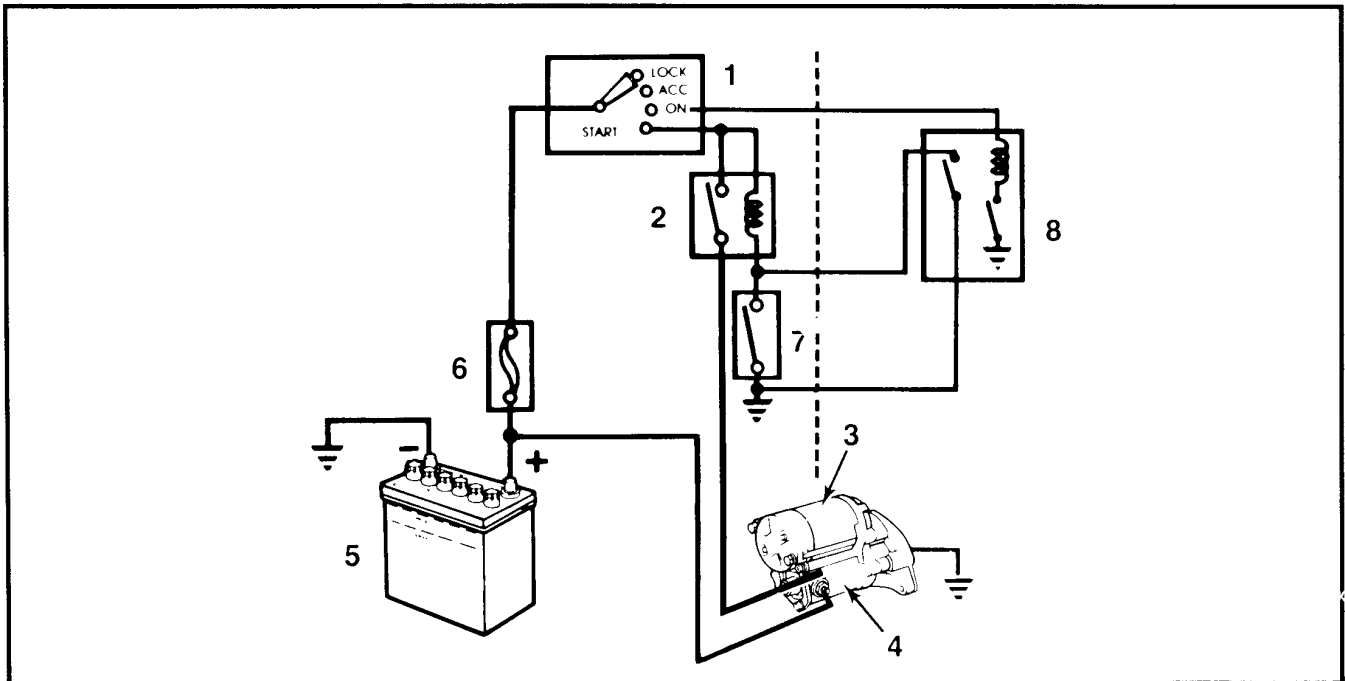


## THE STARTING SYSTEM

**Start With A Review ...** What you've learned in the classroom is just the start. Here's your chance to show what you know in the shop. To meet your learning objectives, there are five "jobs" to perform on **The Starting System**. This page reviews some key concepts.



Identify Starting System Components And Their Functions



**YOUR JOB** (READ ALL INSTRUCTIONS BEFORE STARTING!)

1. Refer to page 119 in your workbook.

2. Identify the numbered starting system components by placing the correct number next to the component name below.

- |                       |                                |                       |
|-----------------------|--------------------------------|-----------------------|
| _____ Battery         | _____ Starter Relay            | _____ Magnetic Switch |
| _____ Fusible Link    | _____ Clutch Switch            | _____ Starter Motor   |
| _____ Ignition Switch | _____ 4WD Safety Cancel Switch |                       |

3. Then, place the number of the correct component next to the phrase that best describes its function in the starting system.

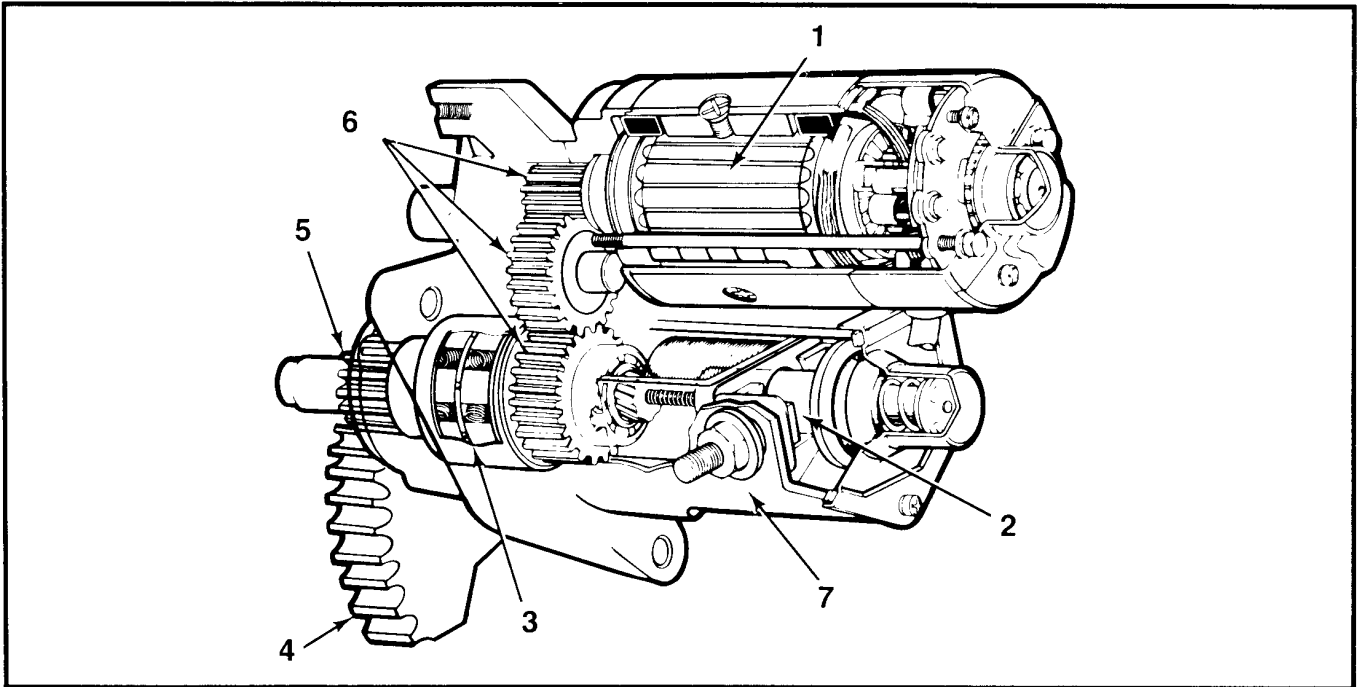
- |   |   |
|---|---|
| _____ Turns the control circuit on and off.               | _____ Drives the flywheel through gears.        |
| _____ Turns the motor circuit on and off.                 | _____ Closes when the clutch switch closes.     |
| _____ Provides energy for the system.                     | _____ Protects the system from overloads.       |
| _____ Prevents cranking when the clutch is not depressed. | _____ Allows starting without clutch depressed. |

4. Complete this job within 5 minutes.

**Stop here and have instructor signoff.**

**Job 1 complete:** \_\_\_\_\_

## Identify Starter Motor Parts And Their Functions



**YOUR JOB** (READ ALL INSTRUCTIONS BEFORE STARTING!)

1. Refer to page 121 in your workbook.
2. Identify the numbered starter motor parts by placing the correct number next to the part name below.
 

<input type="text"/> Magnetic Switch	<input type="text"/> Pinion Gear	<input type="text"/> Over-Running Clutch
<input type="text"/> Plunger	<input type="text"/> Armature	<input type="text"/> Reduction Gear
<input type="text"/> Ring Gear		
3. Then, place the number of the correct part next to the phrase that best describes its function in the starter motor.
 

<input type="text"/> Final drive gear.	<input type="text"/> Increases starter motor torque.
<input type="text"/> Driven gear, connected to flywheel.	<input type="text"/> Turns the motor on and off.
<input type="text"/> Prevents engine from destroying the starter motor.	<input type="text"/> Produces mechanical energy.
<input type="text"/> Causes the drive gear to mesh with the flywheel gear.	
4. Complete this job within 5 minutes.

**Stop here and have instructor signoff.**

**Job 2 complete:** \_\_\_\_\_



## Perform A Starter Current-Draw Test

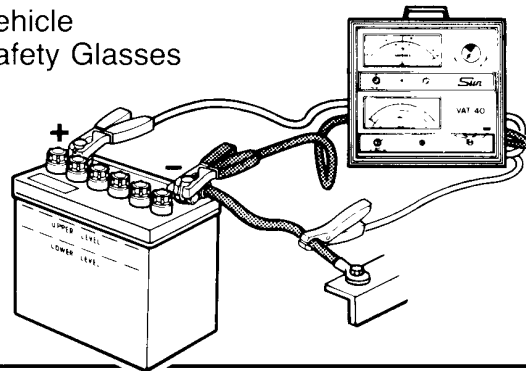
**CAUTION: Wear safety glasses while doing this job.**

**YOUR JOB** (READ ALL INSTRUCTIONS BEFORE STARTING!)

1. Measure the starter current draw on the vehicle assigned.
  - Follow the Performance Procedures.
  - Record your findings as indicated.
2. Refer to page 127 in your workbook.
3. Refer to the proper Toyota Repair Manual for specifications.
4. Complete this job within 15 minutes.

### TOOLS/EQUIPMENT

1. VAT-40 Tester
2. Vehicle
3. Safety Glasses



### PERFORMANCE PROCEDURES

1. Insure that engine is at operating temperature.
2. Insure that battery is serviceable (at least 50% charged).
3. Insure that all lights and accessories are off. (Doors closed.)
4. Prepare VAT-40 tester according to manufacturer's instructions.
5. Connect test leads to battery terminals. [Red to (+) and Black to (-).]
6. "Zero" ammeter; connect amps pickup clamp **around** battery ground cable.
7. Set Test Selector switch to "Starting" position.
8. Disable ignition. (Disconnect "IIA" plug or plug to remote igniter.)
9. Crank engine and note voltmeter and ammeter readings; record readings.
10. Disconnect VAT-40 and connect ignition plug.

### SPECIFICATIONS

**Vehicle:** \_\_\_\_\_ **Starter Motor:** \_\_\_\_\_ Conventional \_\_\_\_\_ Gear Reduction  
**Current Draw:** \_\_\_\_\_ amps **Cranking Voltage:** \_\_\_\_\_ volts **Cranking Speed:** \_\_\_\_\_ rpm

### TEST RESULTS

**Current Draw:** \_\_\_\_\_ amps **Cranking Voltage:** \_\_\_\_\_ volts **Cranking Speed:** \_\_\_\_\_ rpm

**RECOMMENDATIONS:** \_\_\_\_\_ Test within specs, starter is OK.  
 \_\_\_\_\_ Test outside specs, replace starter motor.  
 \_\_\_\_\_ Test outside specs, further testing required.  
 Explain: \_\_\_\_\_

**Stop here and have instructor signoff.**  
**Job 3 complete:** \_\_\_\_\_

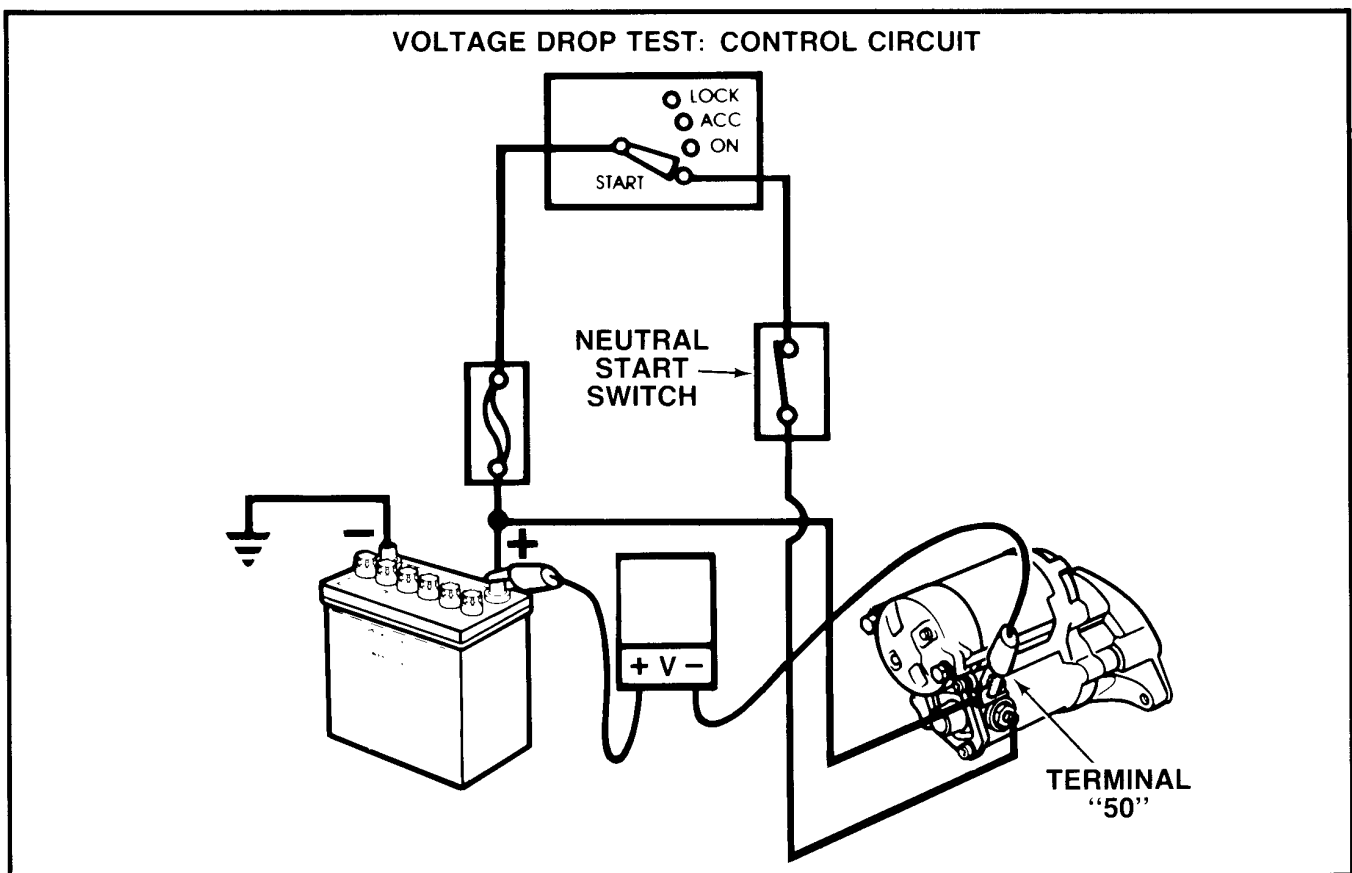


## Motor Circuit – Continued

**RECOMMENDATIONS:** \_\_\_\_\_ Test within specs.  
 \_\_\_\_\_ Test outside specs, further testing required.  
 Explain: \_\_\_\_\_

### Control Circuit:

4. With the ignition disabled (disconnect "IIA" plug or plug to remote igniter), connect the voltmeter as shown in the diagram.
5. Crank engine and note the voltage reading on the meter face in the diagram.
6. Fill in the blanks in "Test Results."



### TEST RESULTS

1. Voltage During Cranking: \_\_\_\_\_ v

**RECOMMENDATIONS:** \_\_\_\_\_ Test within specs.  
 \_\_\_\_\_ Test outside specs, further testing required.  
 Explain: \_\_\_\_\_

**Stop here and have instructor signoff.**

**Job 4 complete:** \_\_\_\_\_