

# STARTER - REDUCTION GEAR

1988 Toyota Celica

1988 Starters  
MITSUBA & NIPPONDENSO REDUCTION GEAR

Toyota Camry, Celica, Corolla, Cressida,  
Land Cruiser, Pickup, MR2, Supra, Van, 4Runner

## DESCRIPTION

Mitsuba and Nippondenso starters are 12-volt, 4-brush, solenoid-actuated, gear reduction-type, equipped with an overrunning clutch. The brush holder assembly retains brushes and springs in the starter housing.

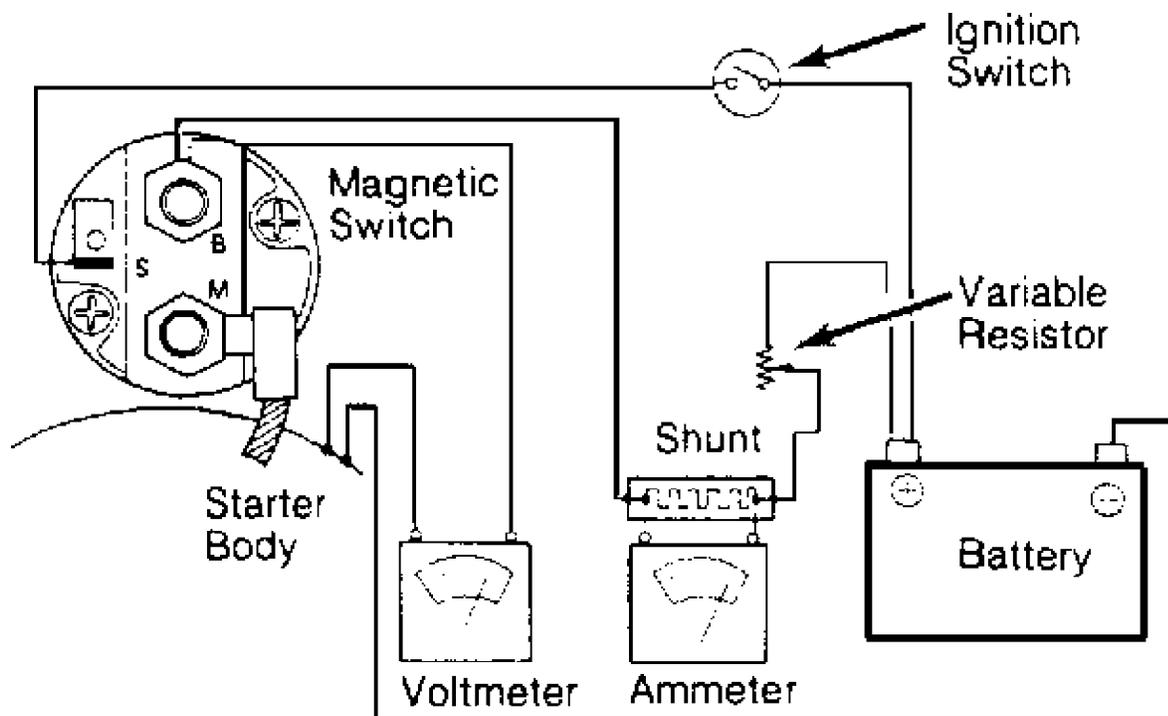
## TESTING

### PERFORMANCE TESTS

No Load Test

1) Remove starter. Connect ammeter in series with starter motor and 12-volt battery. See Fig. 1. Connect voltmeter in parallel with battery and observe readings.

2) Starter should spin smoothly at 3000 RPM or more with current draw less than 90 amps at 11.5 volts.



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Fig. 1: Ammeter & Voltmeter Hook-Up for No Load Test  
Courtesy of Subaru of America, Inc.

## COMPONENT TESTING

### Brushes & Springs

- 1) Check brush length. If less than specification, replace brushes. See MINIMUM BRUSH LENGTH SPECIFICATIONS table.
- 2) Check condition of brush holders, springs, spring clip and insulation between positive and negative holders and repair or replace as needed.

### MINIMUM BRUSH LENGTH SPECIFICATIONS

Application	In. (mm)
Camry & Celica .....	.33 (8.5)
All Others .....	.39 (10.0)

### Commutator

- 1) If out-of-round is more than .002" (.05 mm), turn the commutator on a lathe until out-of-round is within specification.
- 2) Wear or cutting limit of commutator is 1.22" (31.0 mm) for Cressida and Supra, 1.08" (27.5 mm) on Mitsuba starters or 1.14" (29.0 mm) for all others.
- 3) If worn less than .008" (.20 mm), insulating mica should be undercut to a depth of approximately .028-.035" (.71-.89 mm) on Toyota diesel models, or .015-.031" (.40-.80 mm) on all other models.

### Armature Coil

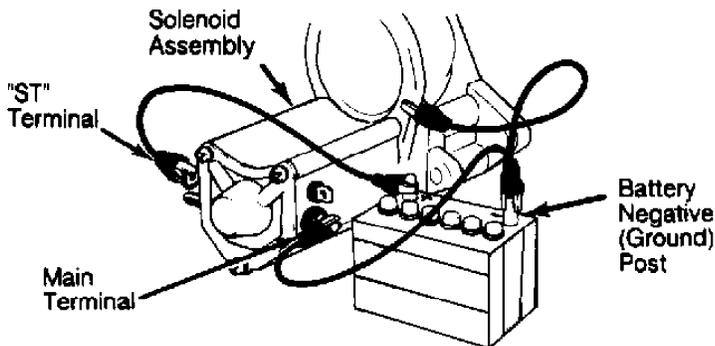
- 1) Check commutator and armature coil core for continuity. If continuity exists, replace armature. Check armature with a growler for shorts. Replace if shorted.
- 2) Check for continuity between segments on commutator. If no continuity exists, replace armature.

### Field Coil

Check field coil for open circuits. There should be continuity between lead wire and field coil brush lead. If not, replace field coil. Check for continuity between field coils and end frame. If continuity exists, replace field coil.

### Solenoid Pull-In Coil Test

Connect 2 battery negative leads to main terminal ("C") and ground. Connect a 12-volt battery positive lead to solenoid "ST" terminal (terminal "50"). See Fig. 2. Plunger should extend firmly. If not, replace solenoid.



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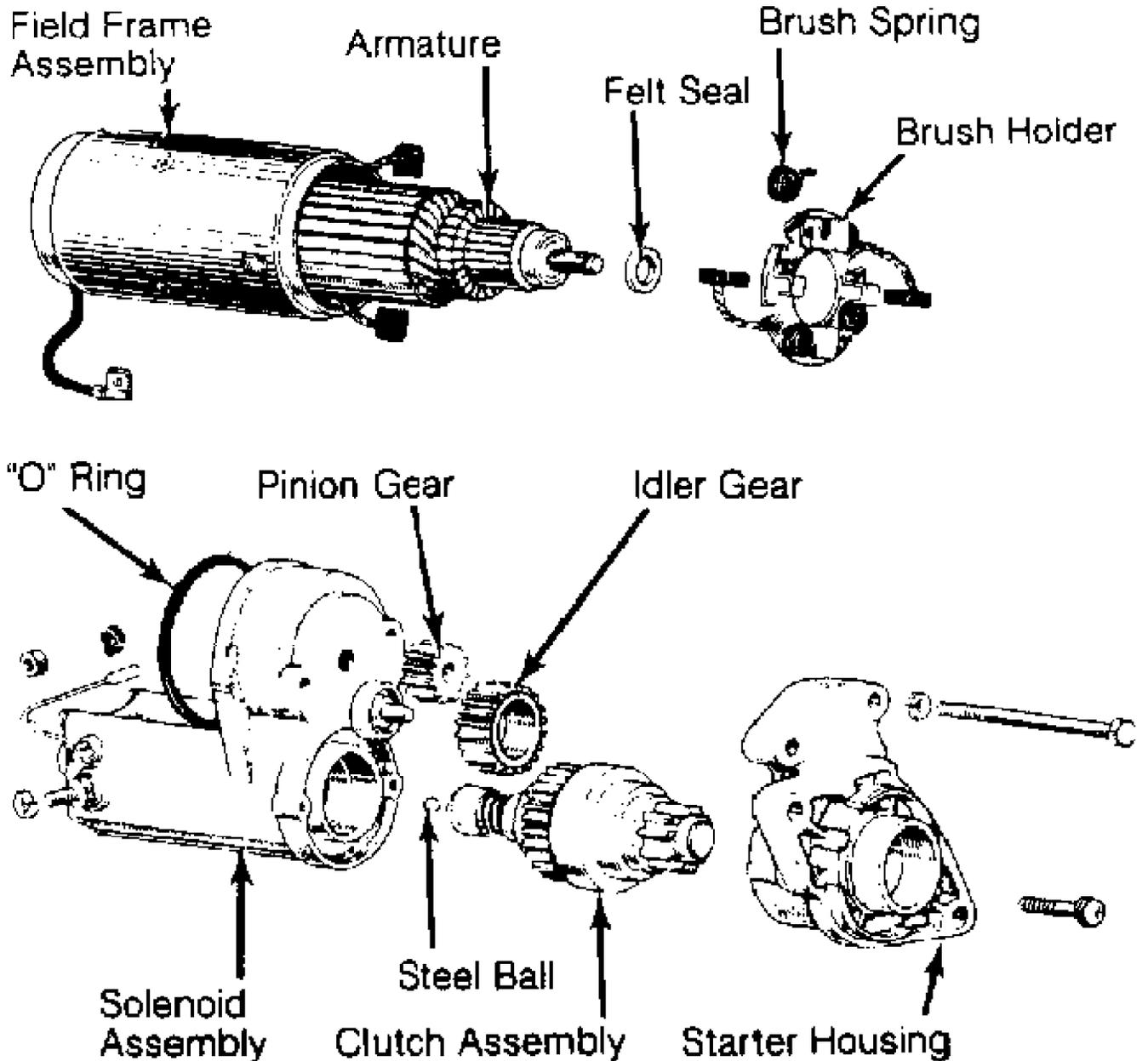
Fig. 2: Solenoid Pull-In Coil Test  
Courtesy of Toyota Motor Sales, USA, Inc.

### Solenoid Hold-In Coil Test

After pull-in testing, disconnect battery negative lead from

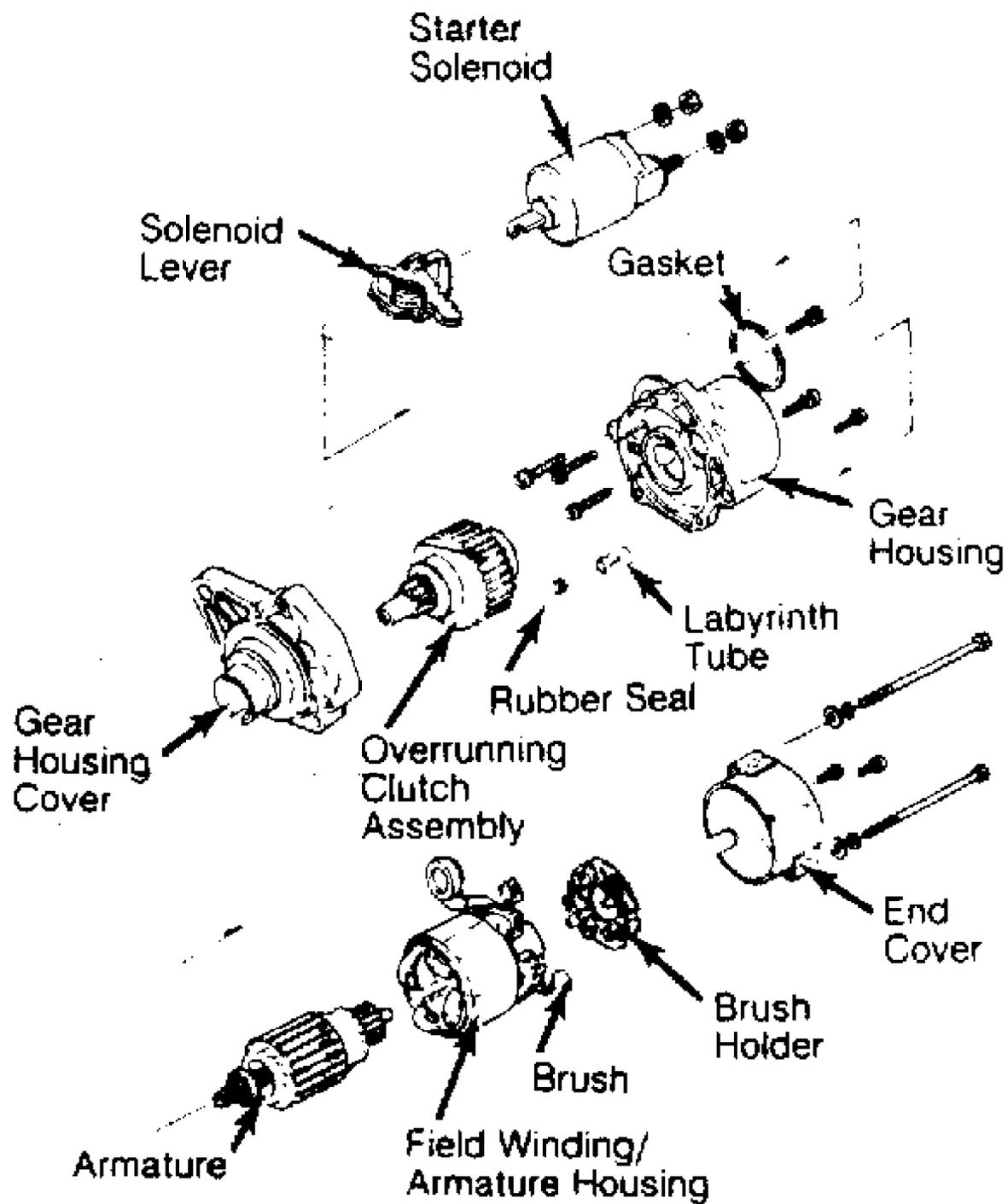
main terminal ("C"). Plunger should remain extended. If not, replace solenoid. See Fig. 2.

### OVERHAUL



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Fig. 3: View of Nippondenso Reduction Gear Starter  
Courtesy of Toyota Motor Sales, USA, Inc.



Courtesy of American Honda Motor Co., Inc.

Fig. 4: View of Mitsuba Reduction Gear Starter  
 Courtesy of American Honda Motor Co., Inc.