

NIPPONDENSO REDUCTION GEAR

Honda
 Accord
 Civic (Exc. Calif.)
 Prelude
Toyota
 Celica

Corolla
 Cressida
 Land Cruiser
 Pickup
 Supra
 Tercel

OVERHAUL

DESCRIPTION

Starter is a 12 volt, 4 brush, solenoid actuated, gear reduction type and is equipped with an overrunning clutch. Brush holder assembly retains brushes and springs in starter housing. Starter may be .8, .9, 1.0 or 1.4 kilowatt rated, however testing and procedures are similar for all models.

NOTE — Brushes and commutator may be on gear end or end away from reduction gear.

APPLICATION

Model	ⓐPart No.
Honda	
Accord & Prelude	31200 689 662
Civic	31200 PAO 671
Toyota	
Celica & Corona	28100 34070
Corolla	28100 26070, 26110
Cressida & Supra	28100 42021, 45033
Land Cruiser	28100 34070
Pickup	28100 34070
Tercel	28100 15011

ⓐ — Vehicle manufacturer part number.

TESTING

PERFORMANCE TESTS

No Load Tests — Connect an ammeter in series with starter motor and 12 volt battery as shown in Fig. 1. Connect voltmeter in parallel with battery and observe readings. Honda Accord and Prelude starter should give approximately 3500 RPM at 90 amps, 11.5 volts. Civic starter should give approximately 3000 RPM. Toyota starter RPM is not specified, however starter should spin smoothly with no more than 90 amps.

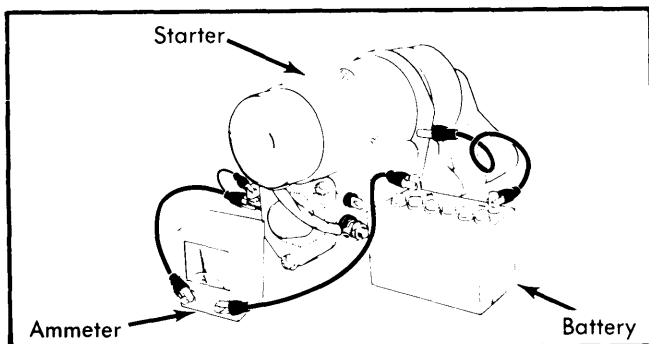


Fig. 1 Ammeter Hook-Up for No Load Test (Toyota Shown)

DISASSEMBLY

1) With starter removed from vehicle, disconnect wire(s) to magnetic switch. Remove bolts and remove field frame with armature from magnetic switch. Remove "O" ring and felt seal.

2) Remove screws and then remove starter gear housing from magnetic switch. Pull out clutch assembly and gears. Remove ball from clutch shaft hole or from magnetic switch. Remove brushes from brush holder then pull armature out of field frame.

3) Use low pressure air and soft bristle brush to clean brush dust from field frame assembly and armature. Use care to prevent dust from contaminating front and rear bearings or it may be necessary to replace them.

NOTE — Complete immersion of starter and/or components in solvent is not recommended.

PARTS REPLACEMENT & TESTING

Brushes & Springs — If brush spring length is less than .33" (8.5 mm) on Honda or .39" (10 mm) on Toyota, replace brushes. Replace brush springs if tension is not between 2.6 lbs. (1.2 kg) and 4.3 lbs. (1.96 kg). Check condition of brush holders, spring clip and insulation between positive and negative brush holders and repair or replace as needed.

Commutator — Inspect commutator for roughness, if surface is pitted or grooved, it should be sanded lightly with a no. 500 emery paper. Also check commutator for being out-of-round. If out-of-round is more than .002" (.05 mm), turn commutator in a lathe until out-of-round is less than .002" (.05 mm). Insulating mica should be undercut to a depth of .024-.035" (.6-.9 mm) if it is less than .008" (.2 mm). Wear or cutting limit of commutator is 1.14" (29 mm).

Armature Coil — Check commutator and armature coil core for continuity, if continuity exists, replace armature. Check armature with an armature tester (growler) for shorts, if shorts exist, replace armature. 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 no continuity between field coil end and end frame, if continuity exists, replace field coil.

Overrunning Clutch Assembly — Inspect gear teeth for wear and damage. Replace gears if damaged. Also, if gears are damaged, check flywheel ring gear. Rotate pinion. Pinion should rotate freely in a clockwise direction and lock up in a counterclockwise direction.

Bearings — Turn each bearing by hand, replace bearings if they stick or have a high resistance to turning.

NIPPONDENSO REDUCTION GEAR (Cont.)

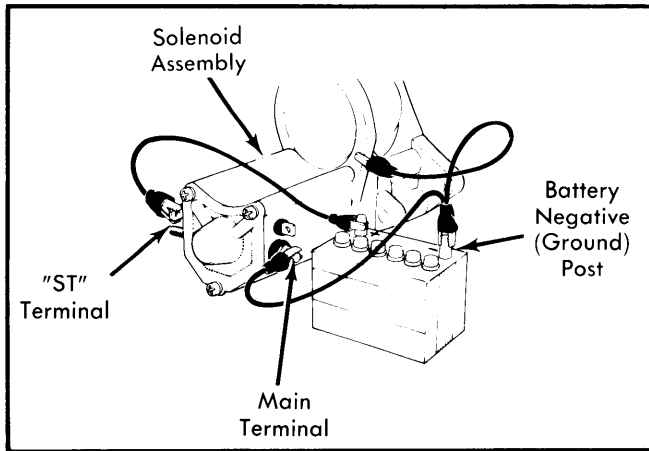


Fig. 2 Solenoid Pull-In Coil Test

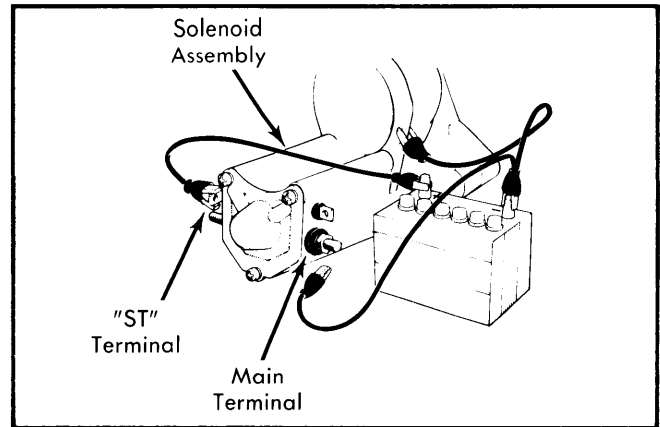


Fig. 3 Solenoid Hold-In Coil Test

Solenoid Assembly – Connect a 12 volt battery to solenoid "ST" terminal, main terminal and ground (Fig. 2). Plunger should extend firmly. If not, replace solenoid. Next, disconnect battery from main terminal (Fig. 3). Plunger should remain extended. If not, replace solenoid.

REASSEMBLY

To reassemble, reverse disassembly procedures and note the following: Coat all sliding or moving surfaces of shaft splines, bushings and solenoid with multi-purpose grease. Apply grease to clutch assembly cavity to retain steel ball when assembling.

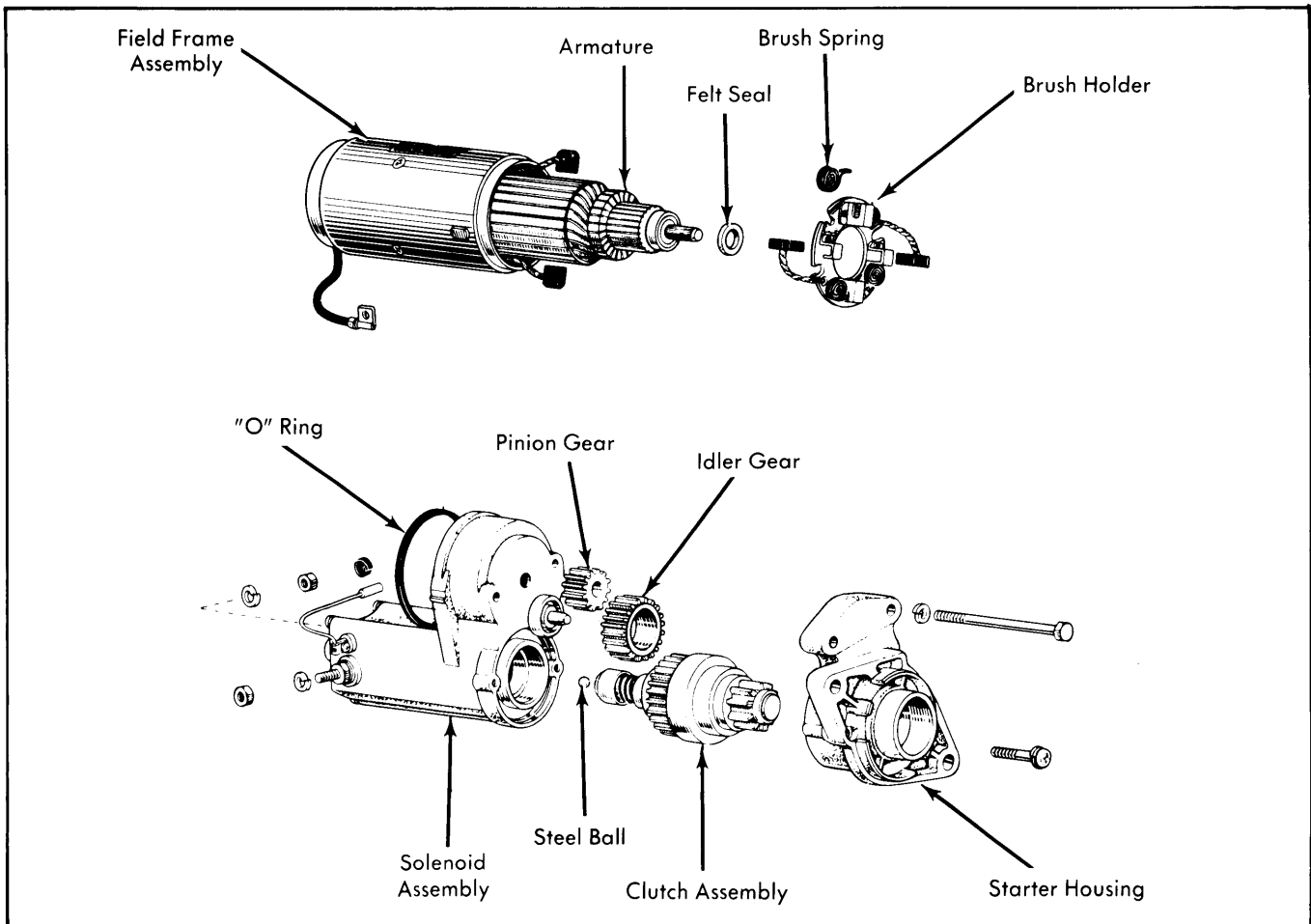


Fig. 4 Exploded View of Nippondenso Reduction Gear Starter