NIPPONDENSO REDUCTION GEAR

Honda
Accord
Civic
Prelude
Toyota
Celica
Corolla
Cressida
Pickup
Supra

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	①Part No.
Honda	
Accord & Prelude	
Calif.	31200 PC2 661
Others	31200 PC2 671
Civic	
Calif.	31200 PC1 004
Others	31200 PC1 005
Toyota	
Celica	28100 34800, 28100 34053
Corona	28100 34800
Corolla	28100 27050
Cressida & Supra	28100 41060
Pickup (Gas)	28100 34800
Pickup (Diesel)	28100 54090
Tercel	28100 15011

①— Vehicle manufacturer part number.

TESTING

PERFORMANCE TESTS

No Load Test (Toyota)— Connect ammeter in series with starter motor and 12 volt battery as shown in *Fig. 1*. Connect voltmeter in parallel with battery and observe readings. Starter should spin smoothly at no more than 90 amps.

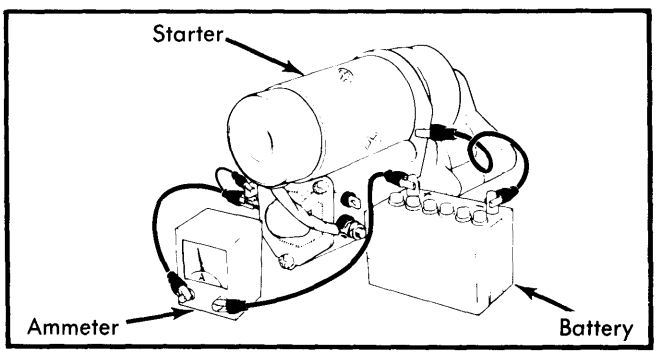

Fig. 1 Ammeter Hook-Up for No Load Test (Toyota Shown)

Cranking Test (Honda) — Hook up voltmeter and ammeter as shown in *Fig. 2*. Disconnect ignition coil secondary wire from coil and ground it. Turn ignition switch to start. Check cranking voltage and current draw. Voltage should be no less than 8.0 volts for Civic, 9.6 volts for Accord and Prelude. Current draw should be no more than 200 amps for Calif. Civics, 230 amps for all other Civics and 160 amps for Accord and Prelude. Cranking speed should be approximately 400 RPM.

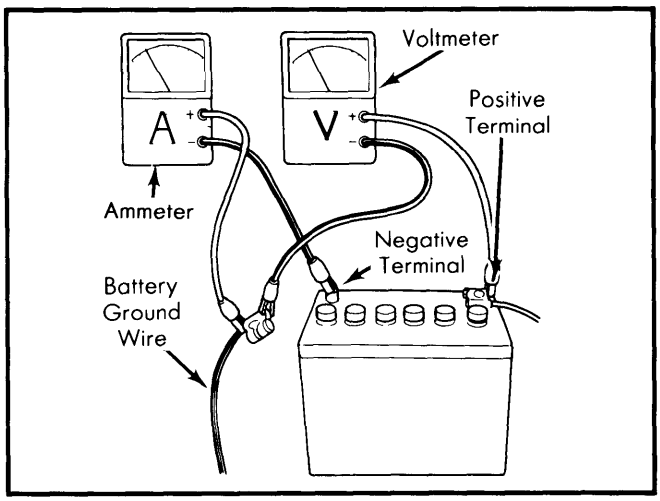

Fig. 2 Cranking Test Hookup

OVERHAUL

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 length is less than .33" (8.5 mm) on Accord and Prelude, or less than .39" (10 mm) on all other models, replace brushes. Replace brush springs if weakened. Check condition of brush holders, spring clip and insulation between positive and negative holders and repair or replace as needed.

Commutator — 1) Inspect commutator for roughness. If surface is pitted or grooved, it should be lightly sanded with No. 500 emery paper. Check commutator for out-of-round. If out-of-round is more than .002" (.05 mm) on Toyota, or

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.001" (.03 mm) on Honda, turn commutator on lathe until out-of-round is within specification.

2) Insulating mica should be undercut to a depth of approximately .015-.031" (.40-.80 mm) if worn to less than .008" (.20 mm). Wear or cutting limit of commutator is 1.22" (31 mm) for Cressida and Supra, 1.26" (26 mm) for Civic, and 1.14" (29 mm) for all others.

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.

Solenoid Assembly — Connect a 12 volt battery to solenoid "ST" terminal, main terminal and ground. Plunger should extend firmly. If not, replace solenoid. Disconnect battery from main terminal. Plunger should remain extended. If not, replace solenoid. *See Figs. 3 and 4.*

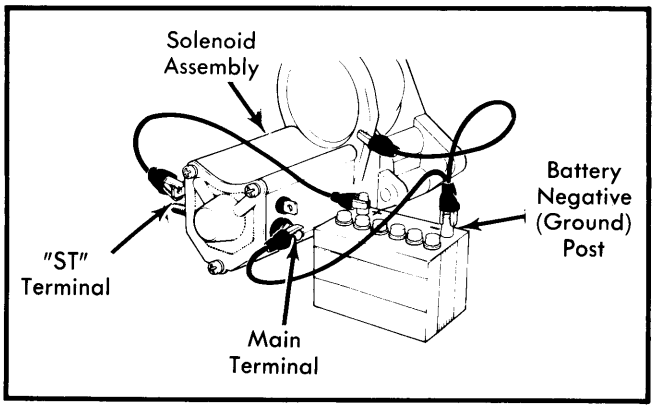

Fig. 3 Solenoid Pull-In Coil Test

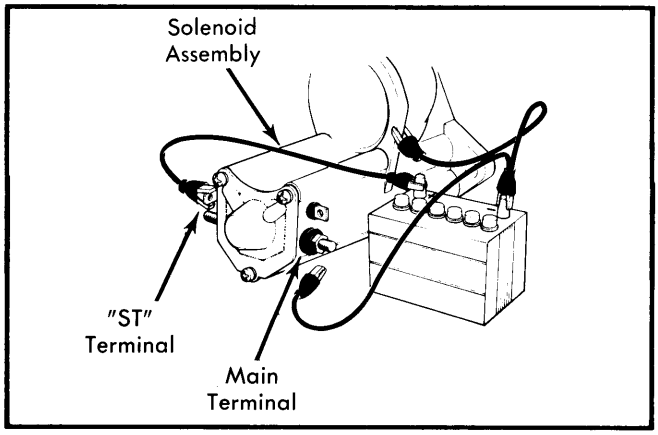

Fig. 4 Solenoid Hold-In Coil Test

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.

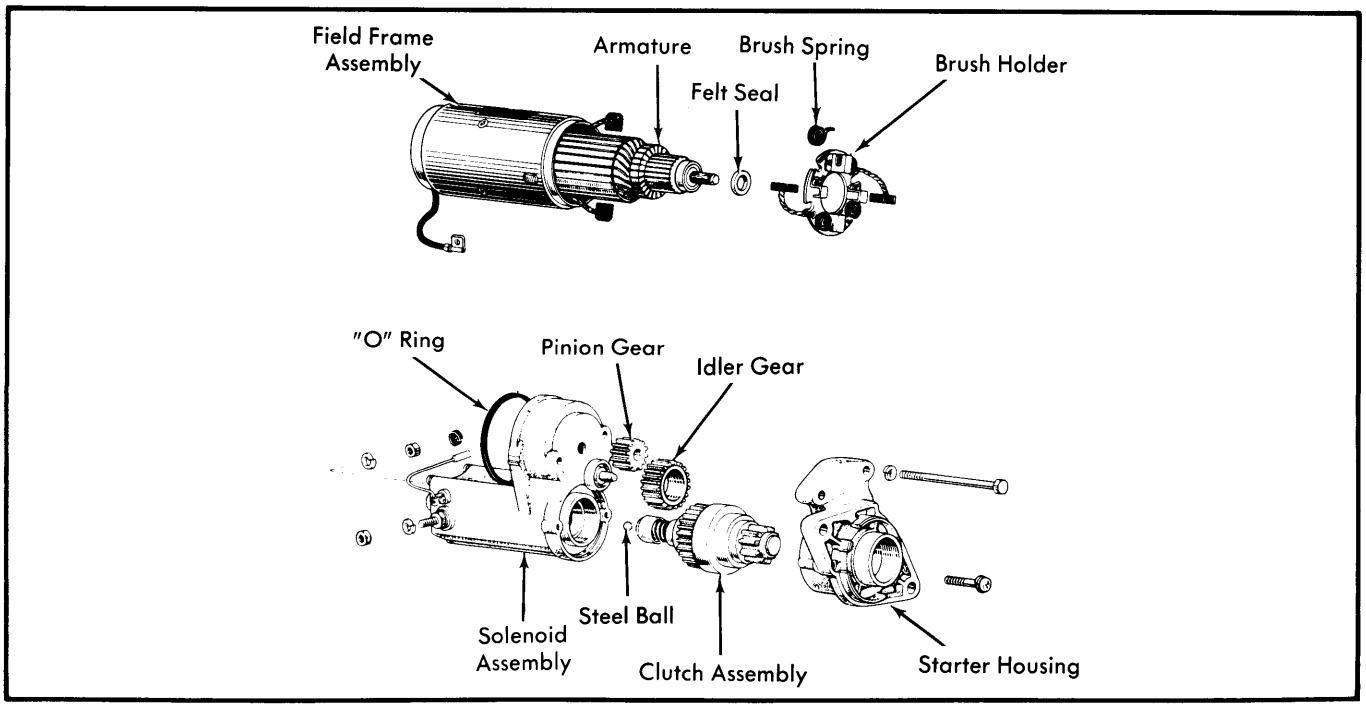

Fig. 5 Exploded View of Nippondenso Reduction Gear Starter.