

HITACHI & MITSUBISHI

Chrysler Corp. Imports	Pickup
Arrow Pickup	Honda
Champ	Civic (Calif.)
Challenger	Isuzu
Colt	I-Mark
Ram-50 Pickup	P'UP
Datsun	LUV
200SX	Mazda
210	626
280ZX	GLC
310	RX7
510	B2000 Pickup
810	

DESCRIPTION

Starter is a conventional 12-volt, 4-pole brush type motor. May be either direct or reduction gear drive. Solenoid mounted on starter shifts overrunning clutch and pinion to flywheel when starter is energized.

APPLICATION

Hitachi

Model	Type or Part No. (Man. Trans.)	Type or Part No. (Auto. Trans.)
Datsun		
200SX	S114-229F	S114-180F
210	S114-163E	S114-160F
280ZX	S114-254D	S1140254D
310	S114-161F	
510	S114-229F	S114-295
810		
(Gas)	S114-254D	S114-254D
(Diesel)	512-50A	512-50A
Pickup		
(Gas)	S114-229F	S114-180F
(Diesel)	S12-68B	
Isuzu (Gasoline)		
I-Mark	①8-94222-688-0	①8-94222-688-0
P'UP	①8-94222-688-0	①8-94222-688-0
LUV	②S114-271	②S114-271

Mitsubishi

Model	Type or Part No. (Man. Trans.)	Type or Part No. (Auto. Trans.)
Chrysler Corp. Imports		
Champ & Colt	MD034120	MD27400
Challenger & Sapporo	MD027400	MD27382
Arrow & Ram-50	MD607284	MD07413
Mazda		
626	8088 18 400R	8964 18 400R
RX7	1757 18 400R	N202 18 400
GLC	8131 18 400R	0324 18 400R
B2000 Pickup	8088 18 400R	

- ① - Manufacturers part number.
- ② - GM part number 94204438.

TESTING

STARTER PERFORMANCE TESTS

No Load Tests - Connect starter in series with a 12 volt battery and an ammeter capable of at least a 1000 ampere reading. Connect voltmeter as shown in Fig. 1 and compare readings with Starter Performance Specifications as shown.

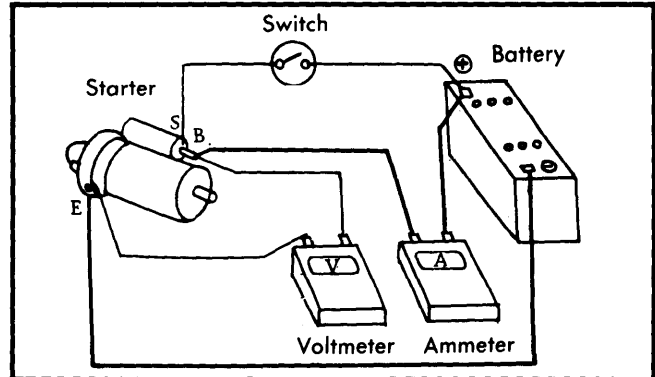


Fig. 1 Connections for No Load Test

Lock (Torque) Test - Mount starter in a test stand to perform torque measurement test. Follow manufacturer's instructions for test stand operation. With voltage adjusted, ammeter reading and torque should be within specifications.

SOLENOID TESTS

NOTE - Make tests with solenoid removed from starter or remove solenoid lead to starter before testing. Ensure that solenoid plunger and sleeve are clean and dry before performing tests.

Pull-In Coil Test - Connect jumper between negative post of 12 volt battery and "S" terminal. Connect a second jumper to positive battery terminal and touch "M" (MT) terminal. Plunger should pull in immediately.

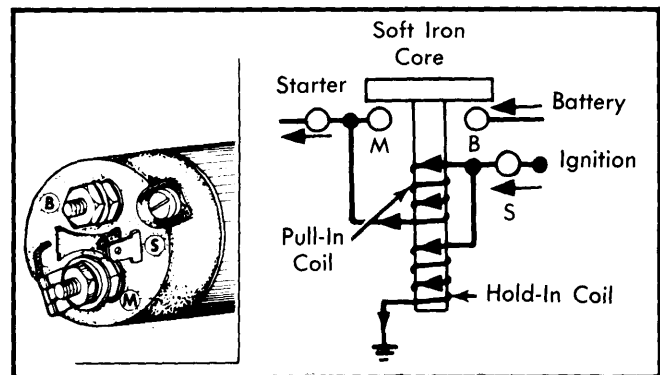


Fig. 2 Starting Circuit Diagram and Solenoid Terminals

Hold-In Coil Test - Connect a ground lead between the "M" (MT) terminal and the solenoid case. Apply 8 volts to the "S" terminal to pull in the plunger. Disconnect lead to "M" (MT) terminal and plunger should remain in.

Return Test - Push plunger into solenoid body by hand. Apply 12 volts between "M" (MT) terminal and the solenoid case. If the case is short circuited, the plunger will be attracted. If nothing happens, the solenoid is satisfactory.

HITACHI & MITSUBISHI (Cont.)

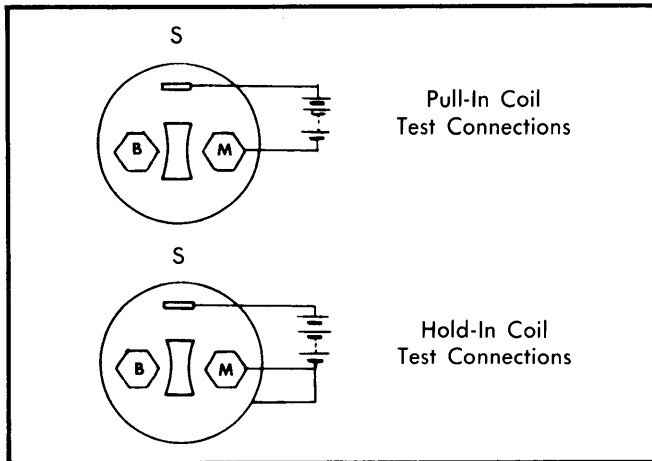


Fig. 3 Test Connections for Pull-In Coil and Hold-In Coil

OVERHAUL

DISASSEMBLY

- 1) Loosen nut securing connecting plate to magnetic switch "M" terminal. Remove screws securing magnetic switch and remove switch (solenoid) assembly. Remove through bolts and brush cover assembly, then tap yoke assembly loose with wooden mallet. Remove yoke, armature assembly and pinion shift lever.
- 2) Remove pinion stop ring from end of armature shaft by pushing stop ring to clutch side. Remove snap ring and overrunning clutch assembly from armature shaft.

PARTS REPLACEMENT & TESTING

Brushes & Springs — Check brush spring tension using a suitable spring scale. Check brush contact surface condition and brush length. Check lead clip and wire connections and condition of brush holders. Replace as required. See *Brush Spring Tension and Brush Length (Minimum)*.

Brush Spring Tension	
Application	Lbs. (kg)
Chrysler Corp. Imports	3.3 (1.5)
Datsun	
200SX & 810	3.5-4.4 (1.6-2.0)
All Other Models	3.1-4.0 (1.4-1.8)
Honda, Isuzu, LUV & Mazda	3.5 (1.6)

Brush Length (Minimum)	
Application	In. (mm)
Chrysler Corp. Imports & Mazda .....	.45 (11.5)
Datsun, Honda, Isuzu & LUV .....	.47 (12.0)

Armature — Check external condition of armature for scoring or other damage. Measure shaft distortion with dial indicator. Replace armature if shaft bend exceeds .003" (.08 mm) on Datsun, .006" (.15 mm) on LUV, and .004" (.10 mm) on all other models.

Commutator — Inspect commutator for roughness, grooves, burns or pitting. Sand lightly with 500 grit sandpaper if necessary. Check commutator for out-of-round and mica insulators undercut to a depth of .020-.031" (.5-.8 mm). If necessary, commutator may be turned less than .04" (1 mm) from original size and mica undercut. Replace if excessively worn.

Field Coil — Check field coil continuity by connecting test probe of circuit tester or an ohmmeter to the field coil positive terminal and brush holder. If circuit is open, replace field coil. Check for grounding of field coils by placing one probe of circuit tester on starter housing and other probe to field coil positive terminal. If little or no resistance, field coil is grounded and must be replaced.

Overrunning Clutch Assembly — Inspect pinion assembly and sleeve. Sleeve should slide freely on armature shaft and spline. If damage or resistance is noted, replace assembly. Check pinion and flywheel teeth for excessive rubbing or damaged teeth. Replace as required.

Pinion Gear Clearance — The clearance between the pinion gear and stop collar should be .012-.059" (.30-1.52 mm) on Hitachi and .02-.08" (.51-2.03 mm) on Mitsubishi when solenoid is engaged. Adjust as necessary by changing shims between solenoid and starter yoke. See Fig. 4.

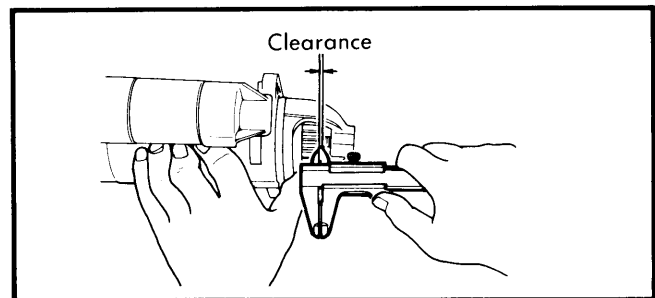


Fig. 4 Measuring Pinion Edge-to-Pinion Stopper Clearance

Pinion Case Bearing — Inspect bearing for wear and check side play. If clearance exceeds .008" (.2 mm), replace bearing. New bearing clearance should be .001-.004" (.025-.10 mm) for Hitachi or .002-.004" (.05-.10 mm) for Mitsubishi starters.

NOTE — Ensure that bearing is installed so that end of bearing is flush with gear case end.

CLEANING & INSPECTION

Clean all disassembled parts. Do not use grease dissolving solvent on overrunning clutch, armature assembly, solenoid assembly or field coils due to possible damage. Inspect all parts for damage or wear and replace as required.

REASSEMBLY

To reassemble, reverse disassembly procedure. **Fill rear case on reduction gear models with grease. Lightly oil pinion and all bearing surfaces.**

Starters

HITACHI & MITSUBISHI (Cont.)

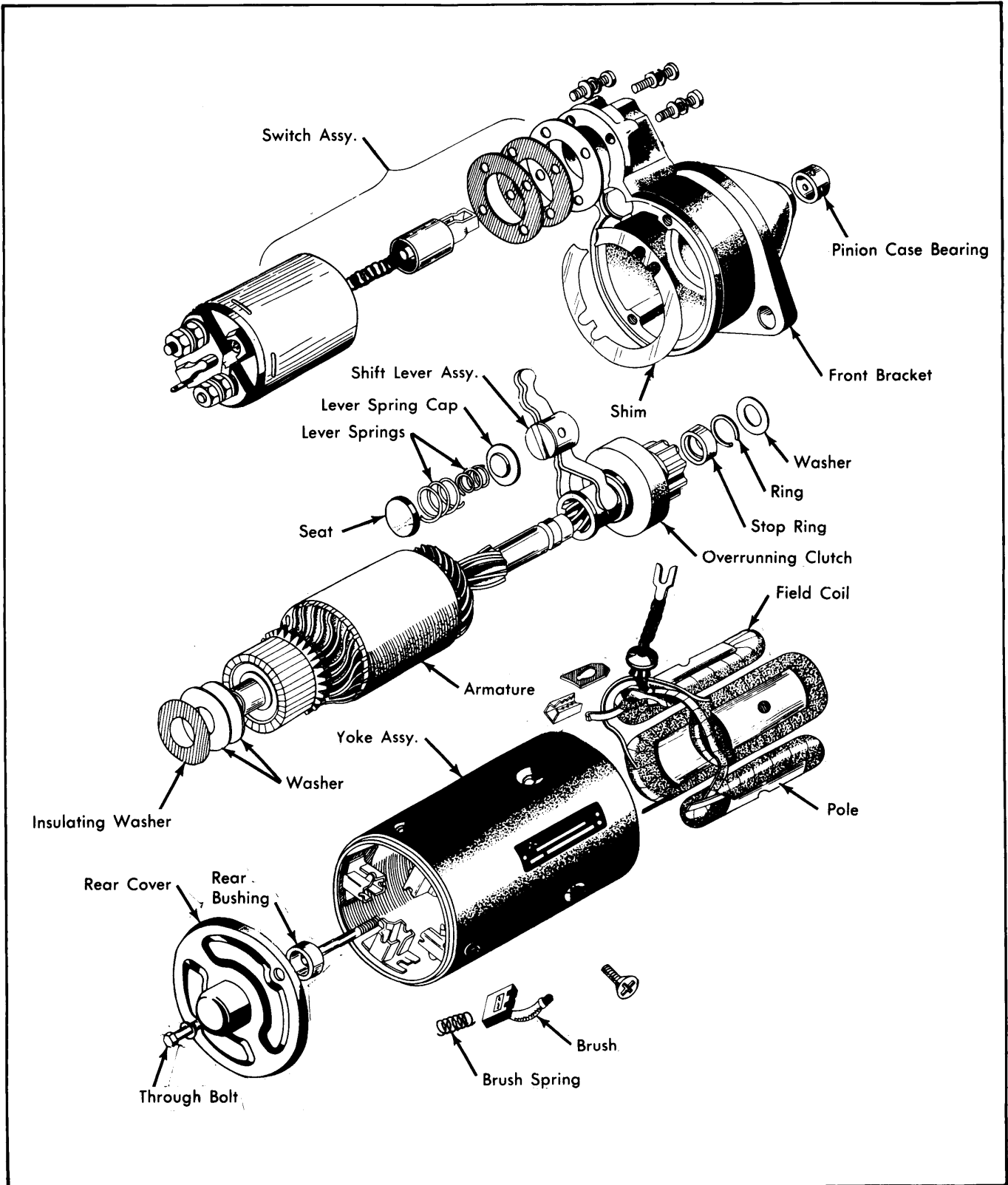


Fig. 5 Disassembled View of Typical Mitsubishi Starter

HITACHI & MITSUBISHI (Cont.)

STARTER PERFORMANCE SPECIFICATIONS					
Type or Part No.	No Load Test		Load Test		
	Amps. (Maximum)	RPM	Amps. (Maximum)	Volts	Torque (Ft. Lbs.) (Maximum)
HITACHI					
S114-160B	60	7000	.....	.....	.....
S114-161F	60	7000	.....	.....	.....
S114-163F	60	7000	.....	.....	.....
S114-170E	60	7000	.....	.....	.....
S114-180F	60	6000	.....	.....	.....
S114-202	60	6000	350	5.0	5.8
S114-229F	60	7000	.....	.....	.....
S114-254D	100	3900	.....	.....	.....
31200PB1-935	70	6000	200	8.0	3.3
MITSUBISHI					
MD034120	50	.....	.....	.....	.....
MD027400	60	.....	.....	.....	.....
MD027382	90	.....	.....	.....	.....
MD027382	60	.....	.....	.....	.....
MD607413	62	.....	.....	.....	.....
O32418400R	53	6800	310	5.0	5.4
1757 18 400R	50	5600	600	5.0	6.9
8088 14 400R	53	6800	310	8.0	5.4
8131 18 400R	93	6800	310	5.0	5.4
8964 18 400R	60	6600	500	5.0	8.3

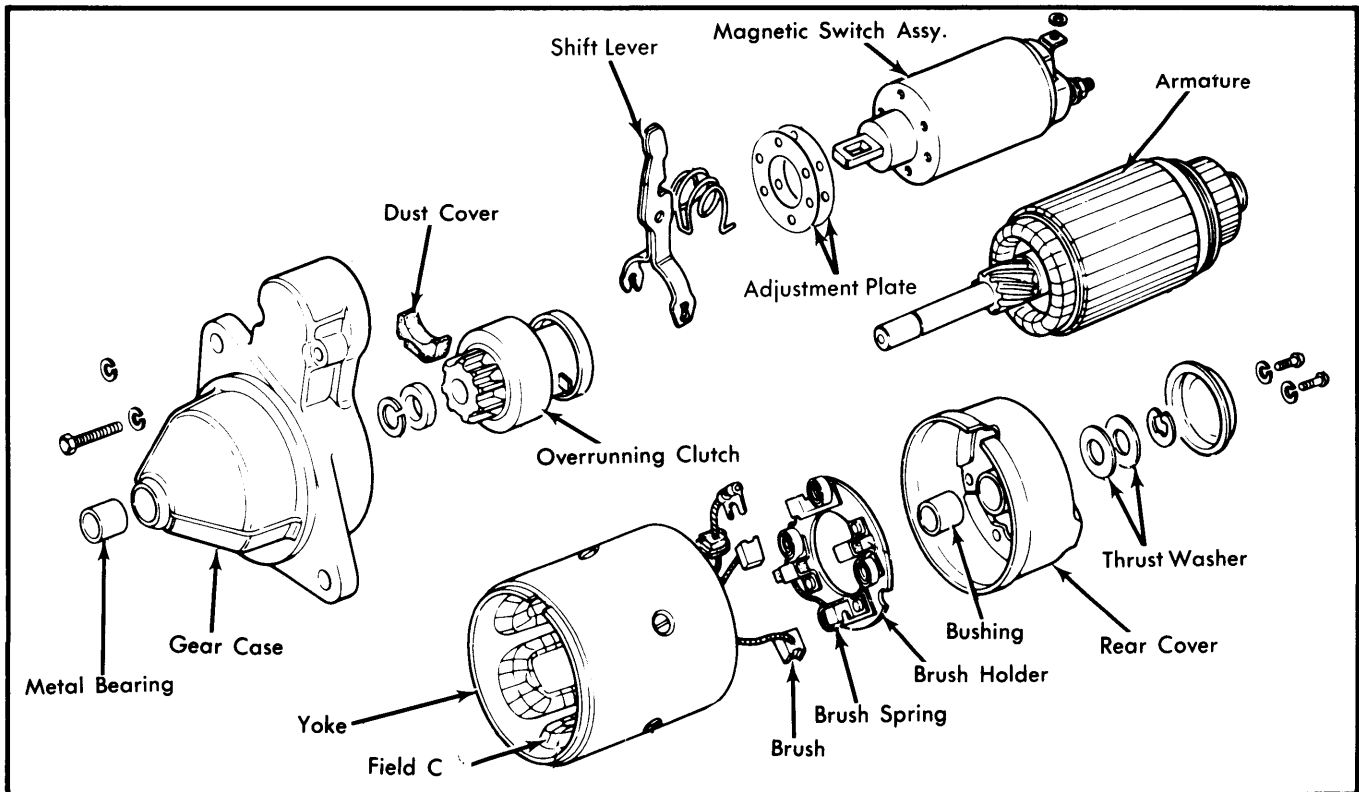


Fig. 6 Disassembled View of a Typical Hitachi Starter