

HITACHI & MITSUBISHI

Chrysler Corp. Imports
Arrow, Champ, Challenger, Colt & Sapporo
Arrow & D50 Pickups
Datsun
Honda
Civic & Calif. Civic CVCC
LUV
Mazda
Opel

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	Part No. (M/T)	Part No. (A/T)
Datsun		
210	S114 160B	①S114 163E
310	②S114 161E	
510	S114 170E	③S114 180F
200SX	S114 170E	S114 180F
810	S114 254B	S114 254B
Pickup	S114 170E	S114 180F
280ZX	S114 254B	S114 254B
Honda	④657 005	④657 005
LUV and Opel	S114 202	S114 202

- ① - S114 253 Optional.
- ② - S114 208E Optional.
- ③ - S114 254B Optional.
- ④ - Honda number preceded by 6251 31200.

Mitsubishi

Model	Part No. (M/T)	Part No. (A/T)
Chrysler Corp. Imports		
1400cc	M3T12572	M3T12572
1600cc	M3T12572	M3T25781①
2000cc	M3T25781	M4T14771
2600cc	M3T25781	M4T14771
Mazda②		
626 & B2000	8088 18 400A	8964 18 400
RX7	1757 18 400D	8872 18 400A
GLC	0324 18 400B	8131 18 400
B1800	0426 18 400A	0426 18 400B

- ① - M3T12572 used on front wheel drive models.
- ② - Mazda part numbers shown.

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.

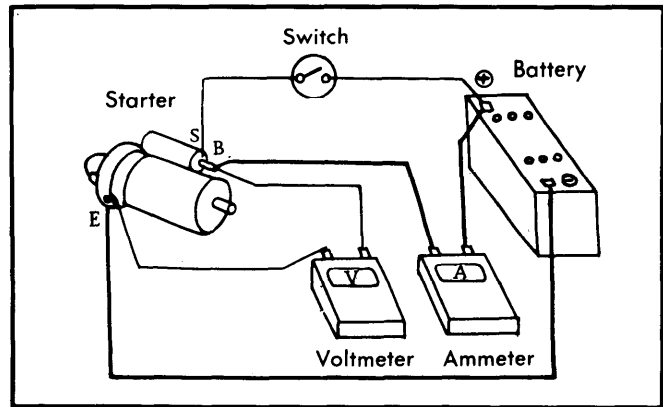


Fig. 1 Connections for No Load Test

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.

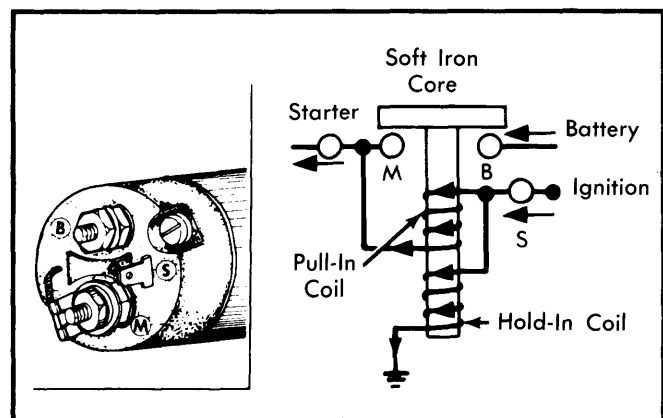


Fig. 2 Starting Circuit Diagram and Solenoid Terminals

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.

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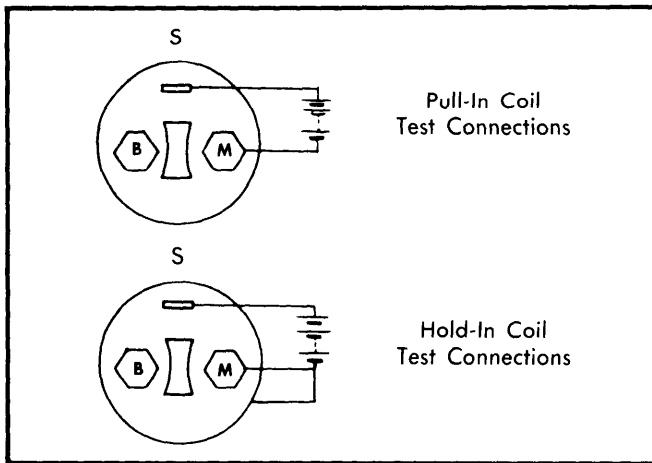


Fig. 3 Test Connections for Pull-In Coil and Hold-In Coil

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 Opel, 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.

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	①3.1-4.0 (1.4-1.8)
Honda, LUV, Mazda, Opel	3.5 (1.6)

① – Reduction gear starter brush spring tension should be 3.5-4.4 lbs. (1.6-2.0 kg).

Brush Length (Minimum)

Application	In. (mm)
Chrysler Corp. Imports & Mazda .....	.45 (11.5)
Datsun	①.47 (12.0)
Honda .....	.16 (4.0)
LUV, Opel .....	.47 (12.0)

① – Reduction gear starter minimum brush length should be .043" (11.0 mm).

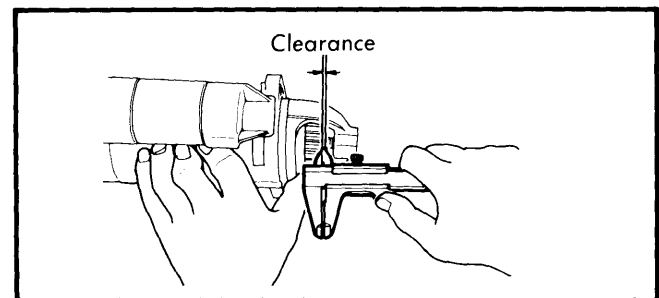


Fig. 4 Measuring Pinion Edge-to-Pinion Stopper Clearance

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.

HITACHI & MITSUBISHI (Cont.)

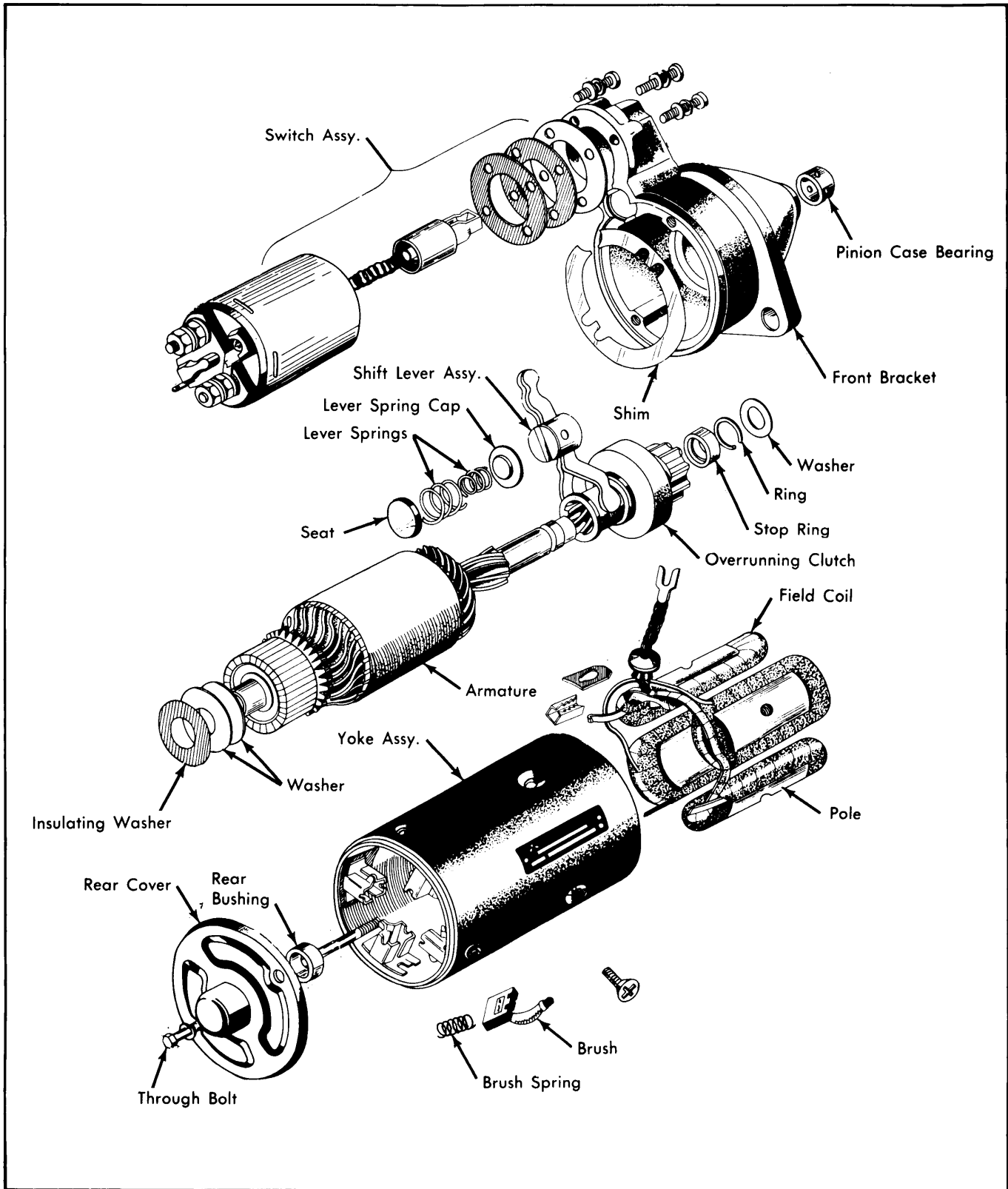


Fig. 5 Disassembled View of Typical Mitsubishi Starter

Starters

HITACHI & MITSUBISHI (Cont.)

STARTER PERFORMANCE SPECIFICATIONS					
Part No.	No Load Test		Lock Test		
	Amps. (Maximum)	RPM	Amps. (Maximum)	Volts	Torque (Fr. Lbs.) (Minimum)
HITACHI					
S114-160B	60	7000	.....	.....	.....
S114-161E	60	7000	.....	.....	.....
S114-163E	60	7000	.....	.....	.....
S114-170E	60	7000	.....	.....	.....
S114-180F	60	6000	.....	.....	.....
S114-202	60	6000	330	5.0	5.8
S114-208E	60	7000	.....	.....	.....
S114-253	100	3900	.....	.....	.....
S114-254B	100	3900	.....	.....	.....
31200-657-005①	70	6000	380	5.5	6.15
MITSUBISHI					
M3T12572	53	5000	400	6.0	6.7
M3T14771	62	4500	730	6.0	18.0
M3T25781	60	6600	.....	.....	.....
0324 18 400B	53	6800	310	5.0	5.4
0426 18 400A & B	53	6800	310	5.0	5.4
1757 18 400D	50	5600	600	5.0	6.9
8088 14 400A	53	6800	310	5.0	5.4
8131 18 400	53	6800	310	5.0	5.4
8872 18 400A	100	6600	1050	5.0	15.9
8964 18 400	60	6600	500	5.0	8.3

① - Honda part number.

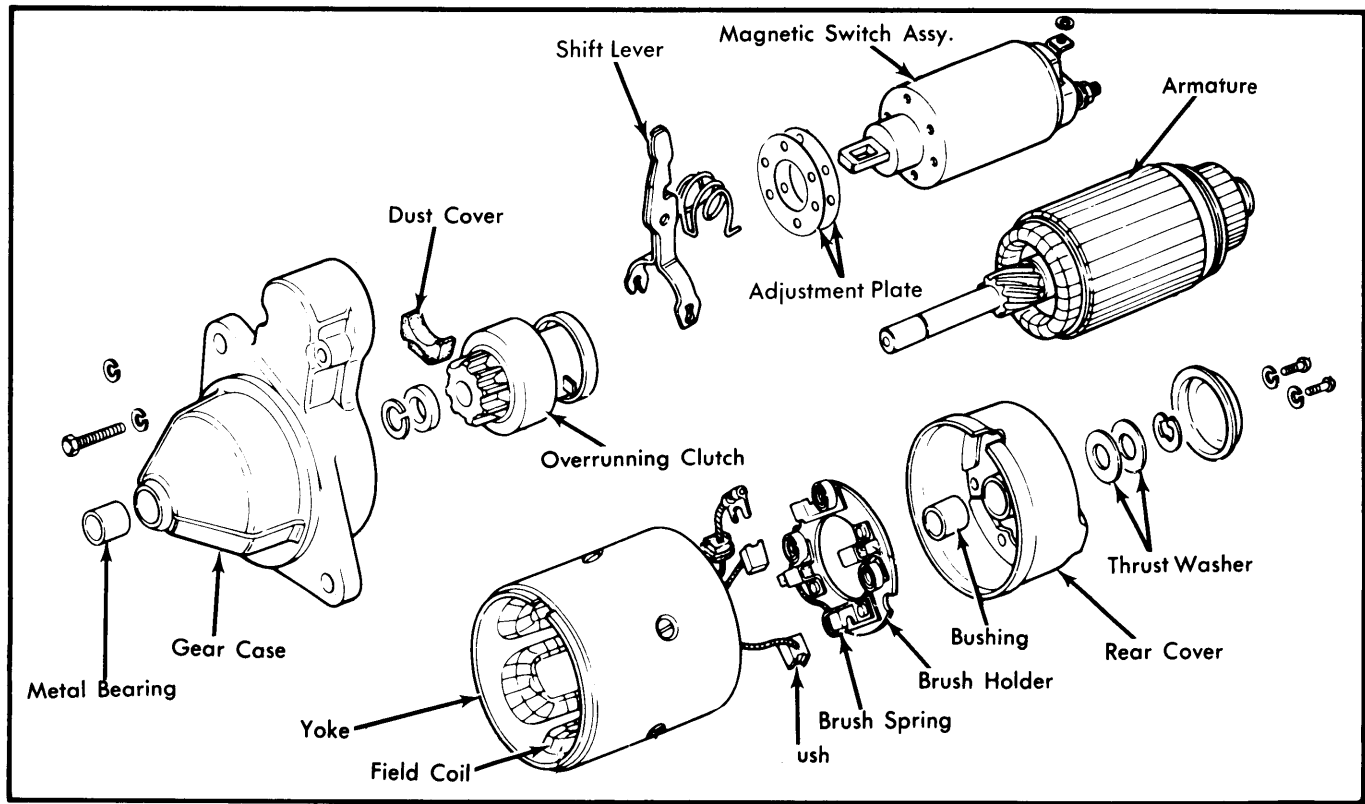


Fig. 6 Disassembled View of a Typical Hitachi Starter