

2001 STARTING & CHARGING SYSTEMS

Starters - Except Pickup

DESCRIPTION & OPERATION

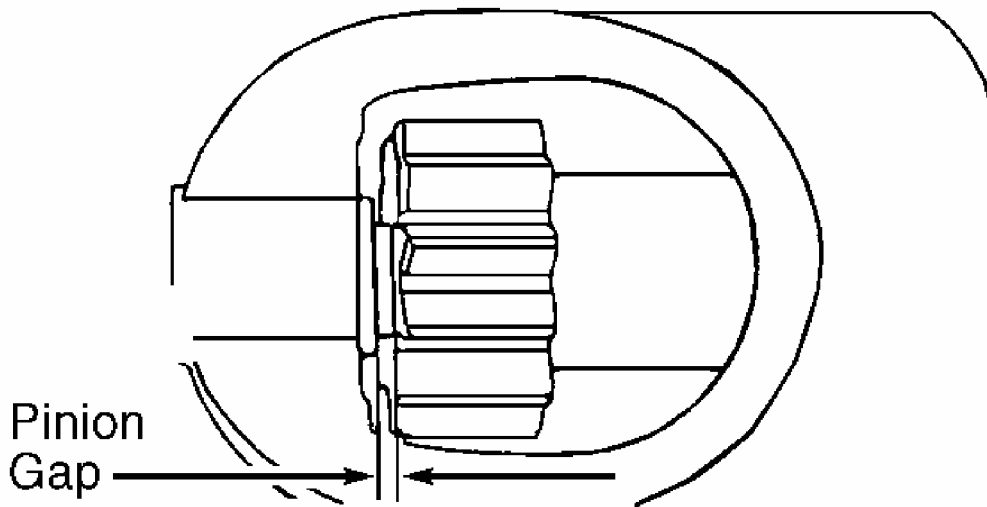
Starter is a conventional 12-volt, 4-pole, brush-type starter. The integral solenoid is attached to the drive housing.

ADJUSTMENTS

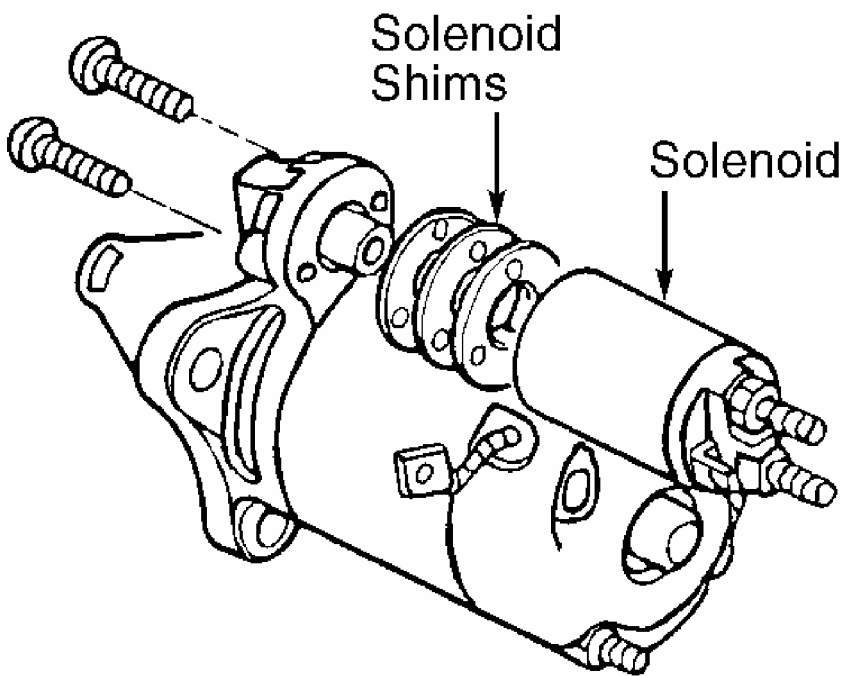
PINION GAP

MVP & MX-5 Miata

1. Disconnect field lead ("M" terminal wire) at solenoid. See **Fig. 2** . Connect positive battery lead to solenoid "S" terminal and negative battery lead to starter body. Starter pinion drive gear should extend outward and stop.
2. Quickly measure pinion gap between end of pinion drive and circlip retainer. See **Fig. 1** . DO NOT operate starter solenoid for more than 10 seconds. On MX-5 Miata, pinion gap should be .02-.08" (0.5-2.0 mm). On MPV, pinion gap should be 0" (0 mm).
3. If pinion gap is not within specification, adjust by increasing or decreasing thickness of solenoid shims located between solenoid and drive housing.



CHECKING PINION GAP



ADJUSTING PINION GAP

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Fig. 1: Checking & Adjusting Pinion Gap (Typical)
Courtesy of MAZDA MOTORS CORP.

TROUBLE SHOOTING

NOTE: See **TROUBLE SHOOTING** article in **GENERAL INFORMATION**.

ON-VEHICLE TESTING

NOTE: On models with anti-theft system, obtain code number and deactivate audio anti-theft system before disconnecting battery.

CIRCUIT TEST

Ensure battery is fully charged, battery cables and terminals are clean and tight, and engine grounds are okay. If starter does not operate, measure voltage at starter "S" terminal (Black/Red wire) with ignition switch in START position (ensure clutch is depressed on M/T or gear selector in Park on A/T). If voltage is greater than 8 volts and vehicle does not crank, repair or replace starter as required. If voltage is 8 volts or less, check ignition switch, park/neutral switch (A/T), starter interlock (clutch start) switch (M/T) and wiring.

STARTER INTERLOCK SWITCH (M/T)

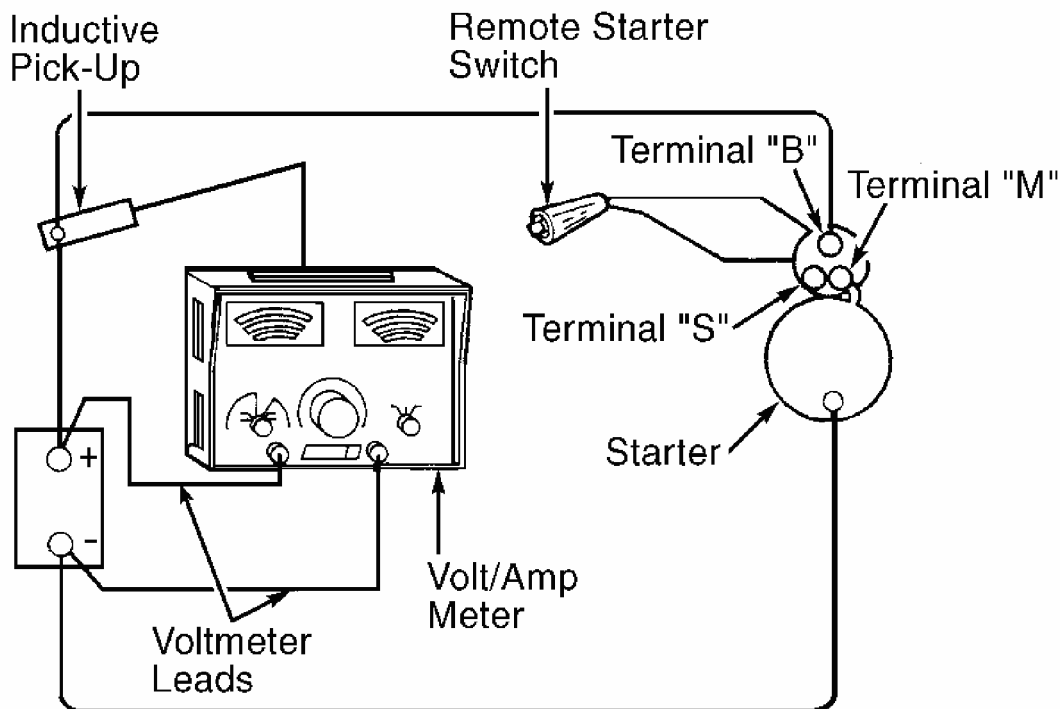
Starter interlock (clutch start) switch is mounted on bracket near top front of clutch pedal. Disconnect interlock switch wiring connector. Using ohmmeter, ensure continuity exists between interlock switch connector terminals when clutch pedal is depressed and no continuity exists when clutch pedal is released. If continuity is not as described, adjust or replace interlock switch.

NO-LOAD TEST

Remove starter. Connect fully-charged 12-volt battery, voltmeter and ammeter to starter. See **Fig. 2**. Using remote starter wires or jumper, engage solenoid. Starter should spin smoothly. Compare readings with specifications. See **NO-LOAD TEST SPECIFICATIONS** table. If voltage is less than specified or amperage is more than specified, repair or replace starter as necessary.

NO-LOAD TEST SPECIFICATIONS

Application	Specification
Millenia, MVP, MX-5 Miata, Protege & 626	
Voltage (Minimum)	11
Amperage (Maximum)	90



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Fig. 2: Checking Starter Current Draw
 Courtesy of MAZDA MOTORS CORP.

BENCH TESTING

NOTE: Testing information for all models is not available from manufacturer.

ARMATURE TEST

MVP & MX-5 Miata

1. Place armature in growler. Turn on growler and hold a piece of hacksaw blade over armature. Slowly rotate armature. If hacksaw blade is attracted to core or if it vibrates, replace armature.
2. Remove armature from growler. Using an ohmmeter, check continuity between commutator and core. If continuity exists, replace armature.
3. Check continuity between commutator and shaft. If continuity exists, replace armature. Check continuity between each commutator segment. If an open exists between any two segments, replace armature.

COMMUTATOR TEST

MVP & MX-5 Miata

1. Clean surface and polish with No. 400 sandpaper if required. If surface is scored, out of round or pitted, turn commutator in a lathe. Maximum commutator runout and minimum diameter of commutator must not exceed specification after turning on lathe.
2. Standard commutator mica undercut depth is .020" (.50 mm). Minimum mica undercut depth is .008" (.20 mm). If undercut is not within specification, undercut to standard depth.

BRUSH TEST

MVP & MX-5 Miata

1. Connect one ohmmeter lead to positive brush holder and other lead to negative brush holder. If continuity exists, replace brush holder assembly.
2. Check brush length. Minimum brush length is .28" (7.0 mm). If brush length is less than specified, replace brushes.

OVERRUNNING CLUTCH PINION DRIVE

Hold overrunning clutch housing and turn pinion gear by hand. If pinion turns in both directions or does not turn at all, clutch is faulty. Replace clutch.

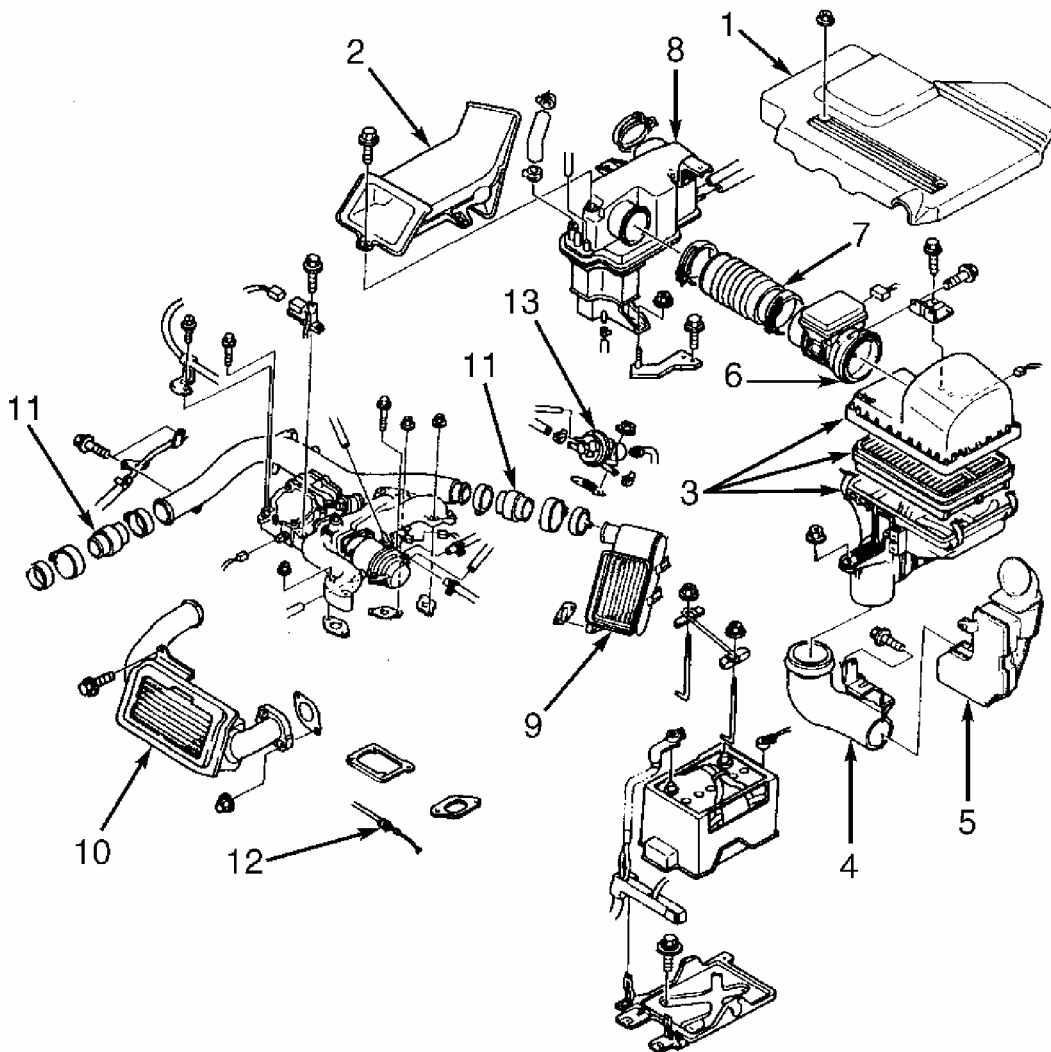
REMOVAL & INSTALLATION

NOTE: On models with anti-theft system, obtain code number and deactivate audio anti-theft system before disconnecting battery.

STARTER

Removal & Installation (Millenia)

1. Disconnect battery cables. Remove battery, battery tray and cable bracket. On Millenia S, remove air cleaner assembly, intake air ducting and charge air cooler. See **Fig. 3** . On all models, remove shift selector cable, if necessary. Disconnect wiring from starter. Remove starter mounting bolts and starter.
2. To install, reverse removal procedure. Tighten starter mounting bolts to specification. See **TORQUE SPECIFICATIONS** .



- | | |
|--------------------------|-------------------------------|
| 1. Dynamic Chamber Cover | 8. Resonator |
| 2. Charge Air Cooler | 9. Charge Air Cooler (Rear) |
| 3. Air Cleaner Assembly | 10. Charge Air Cooler (Front) |
| 4. Air Duct | 11. Coupler |
| 5. Fresh Air Assembly | 12. Accelerator Cable |
| 6. Mass Airflow Sensor | 13. EGR Valve |
| 7. Air Intake Hose | |

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Fig. 3: Exploded View Of Intake Air System Components (Millenia S)
 Courtesy of MAZDA MOTORS CORP.

Removal & Installation (MVP)

Disconnect negative battery cable. Remove air cleaner assembly and associated ducting. Disconnect wiring from starter. Remove starter mounting bolts and starter. To install, reverse removal procedure. Tighten starter mounting bolts to specification. See **TORQUE**

SPECIFICATIONS

Removal & Installation (MX-5 Miata)

Disconnect negative battery cable. Remove intake manifold bracket. On models with A/T, remove transmission oil filler pipe. Disconnect wiring from starter. Remove starter mounting bolts and starter. To install, reverse removal procedure. Tighten starter mounting bolts to specification. See **TORQUE SPECIFICATIONS** .

Removal & Installation (Protege)

Disconnect negative battery cable. Remove air cleaner assembly and associated ducting. Remove intake manifold bracket. Remove 3-way catalyst if necessary. Disconnect wiring from starter. Remove starter mounting bolts and starter. To install, reverse removal procedure. Tighten starter mounting bolts to specification. See **TORQUE SPECIFICATIONS** .

Removal & Installation (626 - 2.0L & 2.5L M/T)

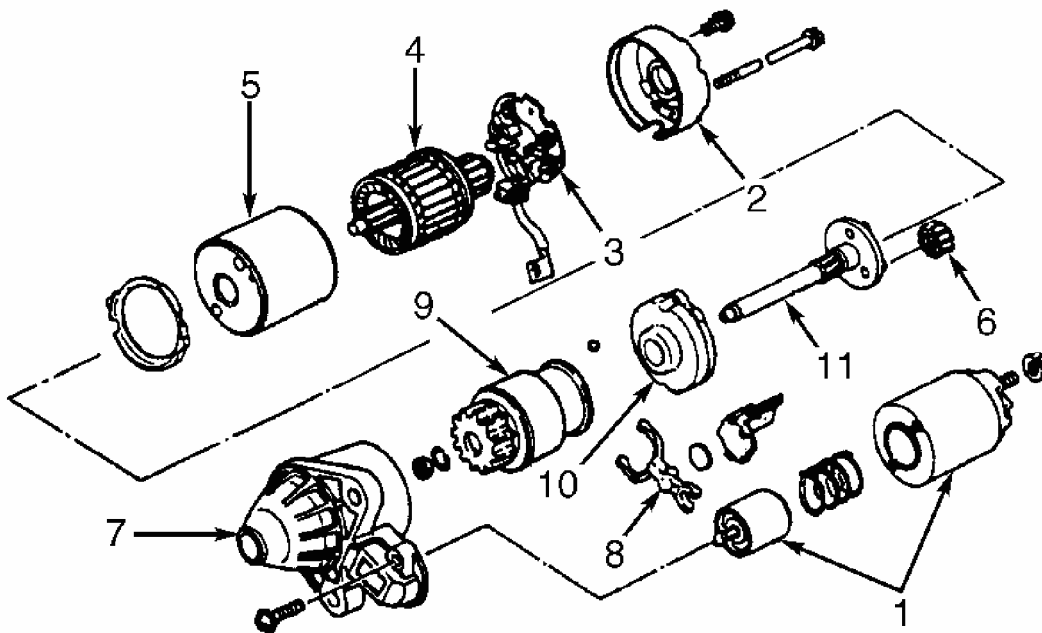
1. Disconnect negative battery cable. Remove intake air duct and air cleaner housing. Remove transverse member. On 2.0L models, remove intake manifold bracket. On all models, disconnect wiring from starter. Remove starter mounting bolts and starter.
2. To install, reverse removal procedure. Tighten starter mounting bolts to specification. See **TORQUE SPECIFICATIONS** .

Removal & Installation (626 - 2.5L A/T)

1. Release fuel pressure from fuel system. Drain coolant. Disconnect negative battery cable. Remove intake air duct and air cleaner housing. If necessary, disconnect accelerator cable from throttle body and remove throttle body.
2. Disconnect A/T cooler line. Disconnect fuel line with filter attached and position aside. Disconnect shift cable from transaxle. Remove shift cable bracket. Remove starter bracket. Disconnect wiring from starter. Remove starter mounting bolts and starter.
3. To install, reverse removal procedure. Tighten starter mounting bolts to specification. See **TORQUE SPECIFICATIONS** .

OVERHAUL

See **Fig. 4** for starter overhaul.



- | | |
|-------------------------|-------------------|
| 1. Solenoid | 7. Front Cover |
| 2. Rear Housing | 8. Lever |
| 3. Brush & Brush Holder | 9. Drive Pinion |
| 4. Armature | 10. Internal Gear |
| 5. Yoke | 11. Drive Shaft |
| 6. Planetary Gear | |

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Fig. 4: Exploded View Of Gear Reduction Type Starter (MX-5 Miata; MPV Is Similar)
 Courtesy of MAZDA MOTORS CORP.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Air Cleaner Housing Bolt (626)	12-16 (16-22)
Starter Mounting Bolts	28-38 (38-51)
	INCH Lbs. (N.m)
Battery Cable Nut (Solenoid Terminal "B")	80-115 (9-13)
Battery Cable Nut (Solenoid Terminal "B" - MVP)	87-104 (9.8 - 11.7)
Charge Air Cooler Duct Bolt (Millenia)	70-95 (7-10)
Intake Air Duct Nut (626)	71-97 (8-11)

WIRING DIAGRAMS

2001 Mazda MX-5 Miata

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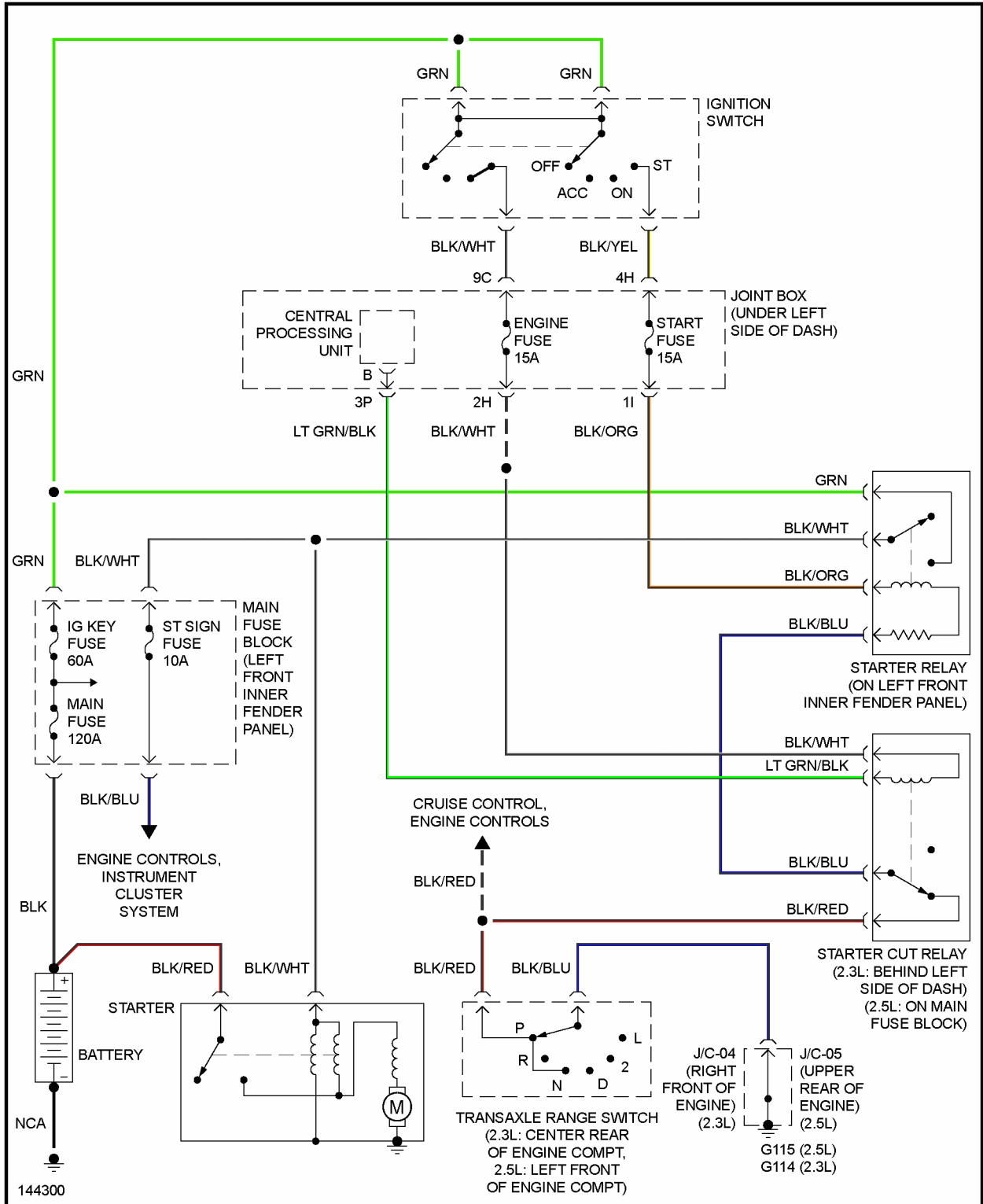


Fig. 5: Starting System Wiring Diagram (Millenia)

2001 Mazda MX-5 Miata

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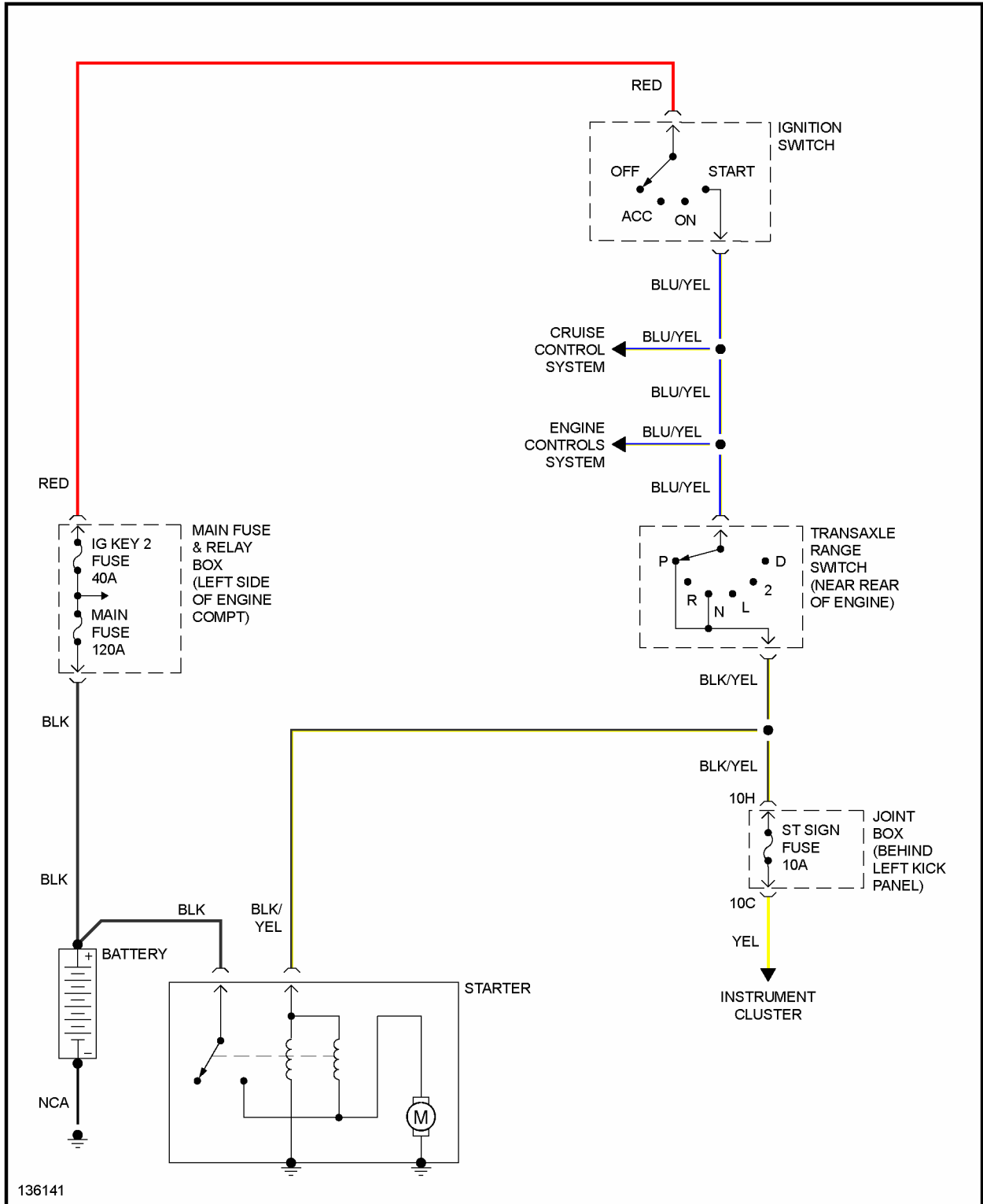


Fig. 6: Starting System Wiring Diagram (MPV)

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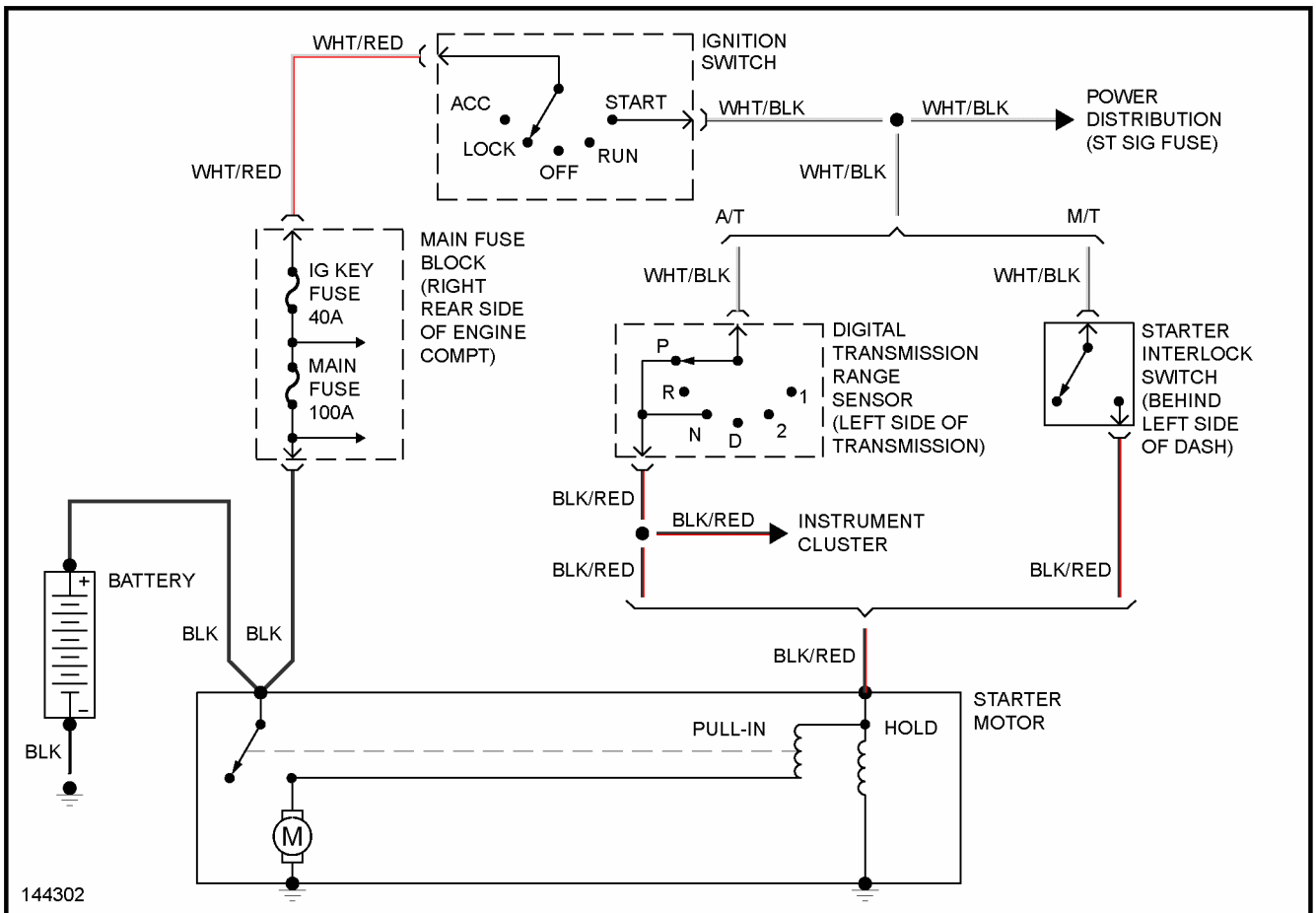


Fig. 7: Starting System Wiring Diagram (MX-5 Miata)

2001 Mazda MX-5 Miata

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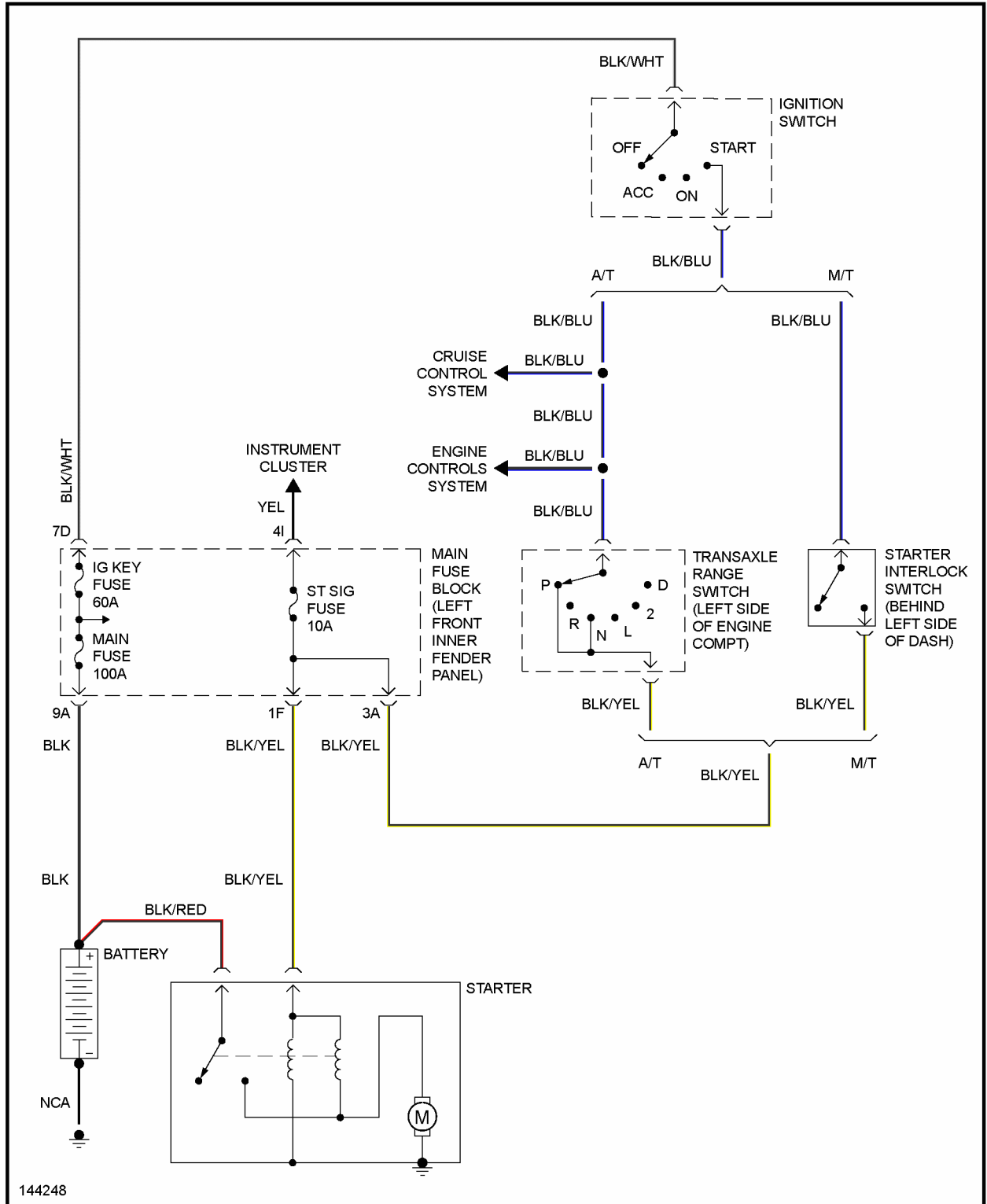


Fig. 8: Starting System Wiring Diagram (Protege)

2001 Mazda MX-5 Miata

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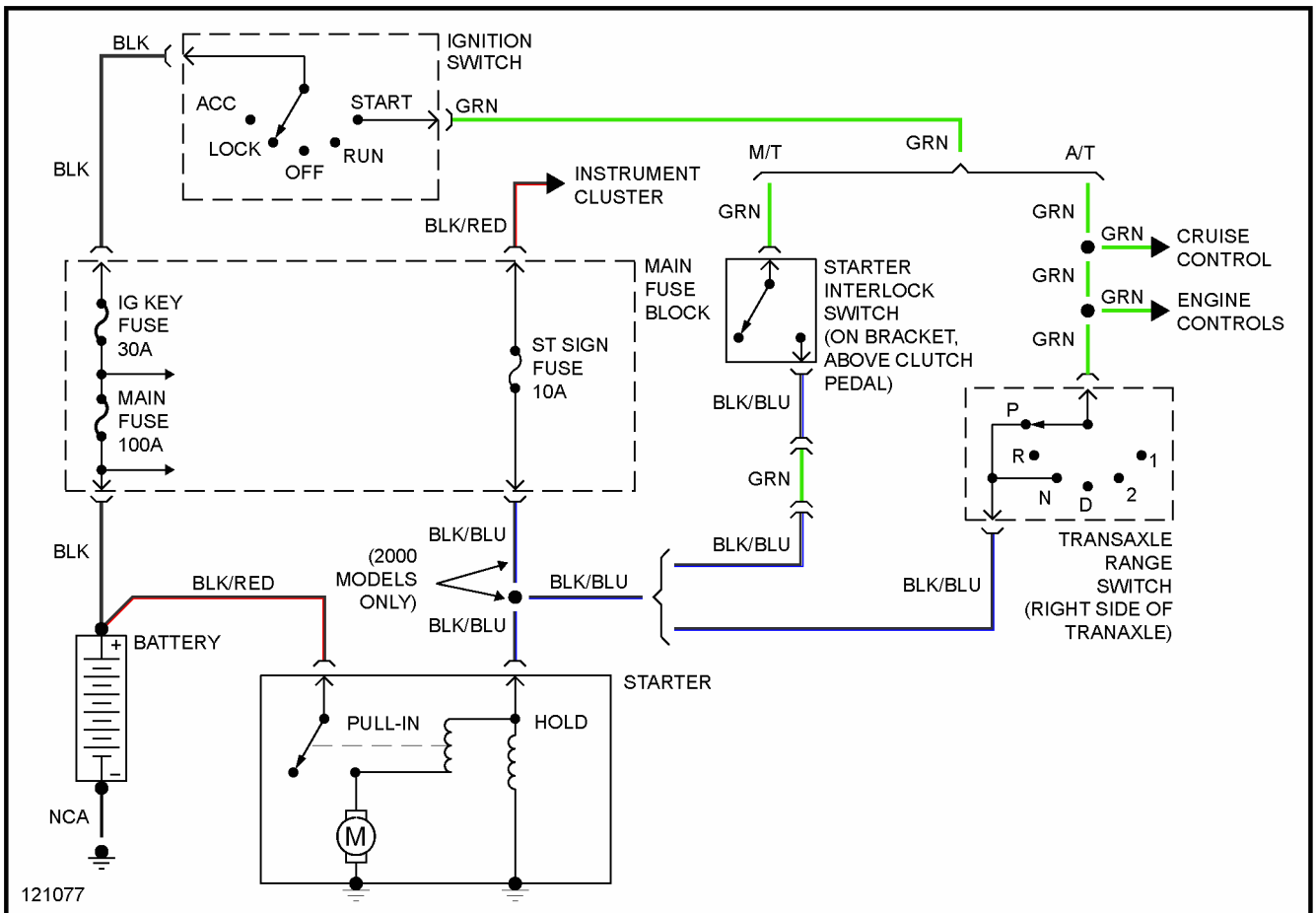


Fig. 9: Starting System Wiring Diagram (626)