

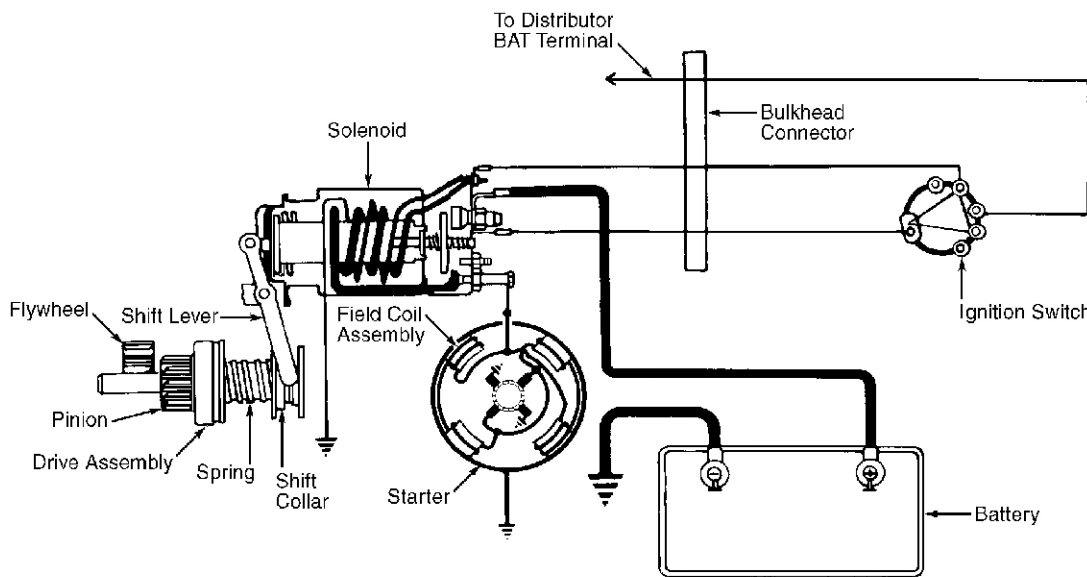
2001 STARTING & CHARGING SYSTEMS

Starters - Catera

DESCRIPTION & OPERATION

WARNING: Vehicles are equipped with air bag supplemental restraint system. Before attempting any repairs involving steering column, instrument panel or related components, see SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM in appropriate AIR BAG RESTRAINT SYSTEMS article.

When ignition switch is turned to START position, battery voltage is applied to Park/Neutral Position (PNP) switch. Shift lever must be in Park or Neutral for voltage to flow to starter solenoid start terminal. When voltage is applied to solenoid windings, this creates movement of solenoid plunger and shift lever, causing drive pinion to engage the flywheel and close solenoid switch contacts. See **Fig. 1**. When solenoid switch contacts close, starter motor energizes and cranks the engine. As engine starts, pinion overrun clutch protects armature from excessive speed until ignition switch is opened and plunger return spring disengages pinion.



G95H13471

Fig. 1: Typical Cranking Circuit Illustration
 Courtesy of GENERAL MOTORS CORP.

STARTER APPLICATION

Engine 3.0L	(1) VIN R	Starter Bosch
(1) Eighth character of Vehicle Identification Number (VIN).		

COMPONENT LOCATIONS

COMPONENT LOCATIONS

Component	Location
Ignition Switch	Mounted On Upper Right Side Of Steering Column
Park/Neutral Position Switch	Mounted To Left Side Of Transaxle
Underhood Fuse Block	Left Front Corner Of Engine Compartment

TROUBLE SHOOTING

NOTE: For information not covered in this article, see **TROUBLE SHOOTING** article in **GENERAL INFORMATION**.

NOTE: Refer to appropriate wiring diagram to verify wire color and connector terminal identification. See **WIRING DIAGRAMS** .

Note condition and operation of SECURITY indicator light. If indicator stays on or flashes continuously, see appropriate ANTI-THEFT SYSTEMS article in ACCESSORIES & EQUIPMENT. Check starter solenoid terminals and battery grounds. Check for proper installation of aftermarket electronic equipment. If fault is found, repair as necessary. If no fault is found, perform self-diagnostics. See **SELF-DIAGNOSTIC SYSTEM** .

ON-VEHICLE TESTING

CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See **COMPUTER RELEARN PROCEDURES** article in **GENERAL INFORMATION** before disconnecting battery.

NOTE: Before making electrical checks, visually inspect all terminals for clean, tight connections. Ensure all starting system related fuses are okay. Ensure battery is in good condition prior to testing charging system. Ensure charging system is okay. See **GENERATORS & REGULATORS - CATERA** article.

BATTERY TESTING & INSPECTION

NOTE: Manufacturer recommends using Battery Tester (J-42000) for testing battery. Follow instructions provided with tester.

1. Inspect battery for a cracked, broken or damaged case. If battery case is okay, go to next step. If battery case is not okay, go to step 19 .
2. Compare battery cold cranking amperage and reserve capacity rating to specifications. See **BATTERY SPECIFICATIONS** table. If battery meets or exceeds specifications, go to next step. If battery does not meet or exceed specifications, go to step 19 .

BATTERY SPECIFICATIONS

Application	Specification
Cold Cranking Amps	600
Reserve Capacity Rating	100 Minutes

3. Inspect battery hydrometer display. If hydrometer display shows a Yellow dot, go to next step. If hydrometer display does not show a Yellow dot, go to step 5 .
4. Using a small screwdriver, tap top of hydrometer display to dislodge any air bubbles inside. If hydrometer display still shows a Yellow dot, go to step 19 . If hydrometer display does not show a Yellow dot, go to next step.
5. Turn ignition switch to OFF position. Attempt to rotate negative battery cable connector clockwise with light finger pressure. If negative connector rotates, go to next step. If negative connector does not rotate, go to step 7 .
6. Using an INCH lb. torque wrench, record torque value while loosening negative battery cable bolt. If torque is equal to or greater than 88 INCH lbs. (10 N.m), go to step 8 . If torque is less than 88 INCH lbs. (10 N.m),

go to next step.

7. Disconnect negative battery cable and go to step 9 .
8. Disconnect negative battery cable. Inspect battery and cable terminals for corrosion and defects. If problem exists, repair as necessary. After repair, go to next step.
9. Attempt to rotate positive battery cable connector clockwise with light finger pressure. If battery cable rotates, go to next step. If battery cable does not rotate, go to step [11](#) .
10. Using an INCH lb. torque wrench, record torque value while loosening positive battery cable bolt. If torque is equal to or greater than 89 INCH lbs. (10 N.m), go to step 12 . If torque is below 89 INCH lbs. (10 N.m), go to next step.
11. Disconnect positive battery cable and go to step 13 .
12. Disconnect positive battery cable. Inspect battery and cable terminals for corrosion and defects. If problem exists, repair as necessary. After repair, go to next step.
13. Clean and wire brush lead face of both battery terminals and metal contact surfaces on both cable connectors. Remove bolts from both battery cable connectors and inspect for corrosion and defects. If problem exists, repair as necessary. If battery and cables terminals are clean and in good condition, go to next step.
14. Connect positive battery cable to battery, tighten bolt to 11 ft. lbs. (15 N.m), then go to next step.
15. Connect negative battery cable to battery, tighten bolt to 11 ft. lbs. (15 N.m), then go to next step.
16. Ensure all electrical loads are off. Follow manufacturers instructions and install Battery Tester (J-42000) to vehicle battery. Follow any instructions displayed on Battery Tester. If Battery Tester passed battery, go to next step. If Battery Tester does not pass battery, go to step 18 .
17. Press CODE button on Battery Tester. Record displayed code on vehicle repair order for warranty purposes. Battery is okay.
18. Press CODE button on Battery Tester. Record displayed code on vehicle repair order for warranty purposes. Battery is okay.
19. Replace battery.

SELF-DIAGNOSTIC SYSTEM

NOTE: Diagnostic trouble code tests are written specifically for use with GM Tech I or Tech II scan tools. Generic scan tool can be used but may have limited functions. This article only covers the portion of those systems which relates to starting system diagnosis. For further information, see appropriate SELF-DIAGNOSTICS article in ENGINE PERFORMANCE.

ENGINE ELECTRICAL DIAGNOSTIC SYSTEM CHECK

1. Perform battery inspection test. See **BATTERY TESTING & INSPECTION** under ON-VEHICLE TESTING, then go to next step.
2. Install scan tool to Data Link Connector (DLC). DLC is located below left side of instrument panel, to right of steering column. Turn ignition switch to RUN position. If scan tool powers up, go to step 4 . If scan tool does not power up, perform TEST A: SCAN TOOL DOES NOT POWER UP under SYSTEM TESTS in BODY CONTROL MODULES - CATERA article in ACCESSORIES & EQUIPMENT.
3. Turn ignition switch to RUN position. Using scan tool, attempt to communicate with Body Control Module (BCM), Instrument Panel Module (IPM), Memory Seat Module (MSM), OnStar(R), radio and Powertrain Control Module (PCM). If scan tool communicates with BCM, IPM, MSM OnStar(R), radio and PCM, go to next step. If scan tool does not communicate with BCM, IPM, MSM OnStar(R), radio and PCM, perform TEST B: SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE under SYSTEM TESTS in BODY CONTROL MODULES - CATERA article in ACCESSORIES & EQUIPMENT.
4. Using scan tool, select DISPLAY DTCs function for BCM, IPM, MSM OnStar(R), radio and PCM. If scan tool displays any DTCs, go to next step. If scan tool does not display any DTCs, repair starting system by

symptom. See **SYMPTOM INDEX** table under SYSTEM TESTS.

5. If scan tool does not display any DTCs which begin with "U", go to next step. If scan tool displays any DTCs which begin with "U", perform TEST B: SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE under SYSTEM TESTS in BODY CONTROL MODULES - CATERA article in ACCESSORIES & EQUIPMENT.
6. If scan tool displays DTCs 055, B1556 or B1558, perform appropriate test in accordance with DTC retrieved. See BODY CONTROL MODULES - CATERA article in ACCESSORIES & EQUIPMENT. If scan tool does not display DTCs 055, B1556 or B1558, repair by symptom. See **SYMPTOM INDEX** table under SYSTEM TESTS.

SYSTEM TESTS

NOTE: The following tests assume that engine and battery are operating normally and are at operating temperature, battery is charged, there are no engine problems that would cause a no-start condition, and no diagnostic trouble codes are present.

SYMPTOM INDEX

Symptom	Perform Test
Starter Solenoid Does Not Click	<u>A</u>
Solenoid Clicks, Engine Does Not Crank	<u>B</u>
Engine Cranks Slowly	<u>C</u>
Starter Motor Noise Diagnosis	<u>D</u>

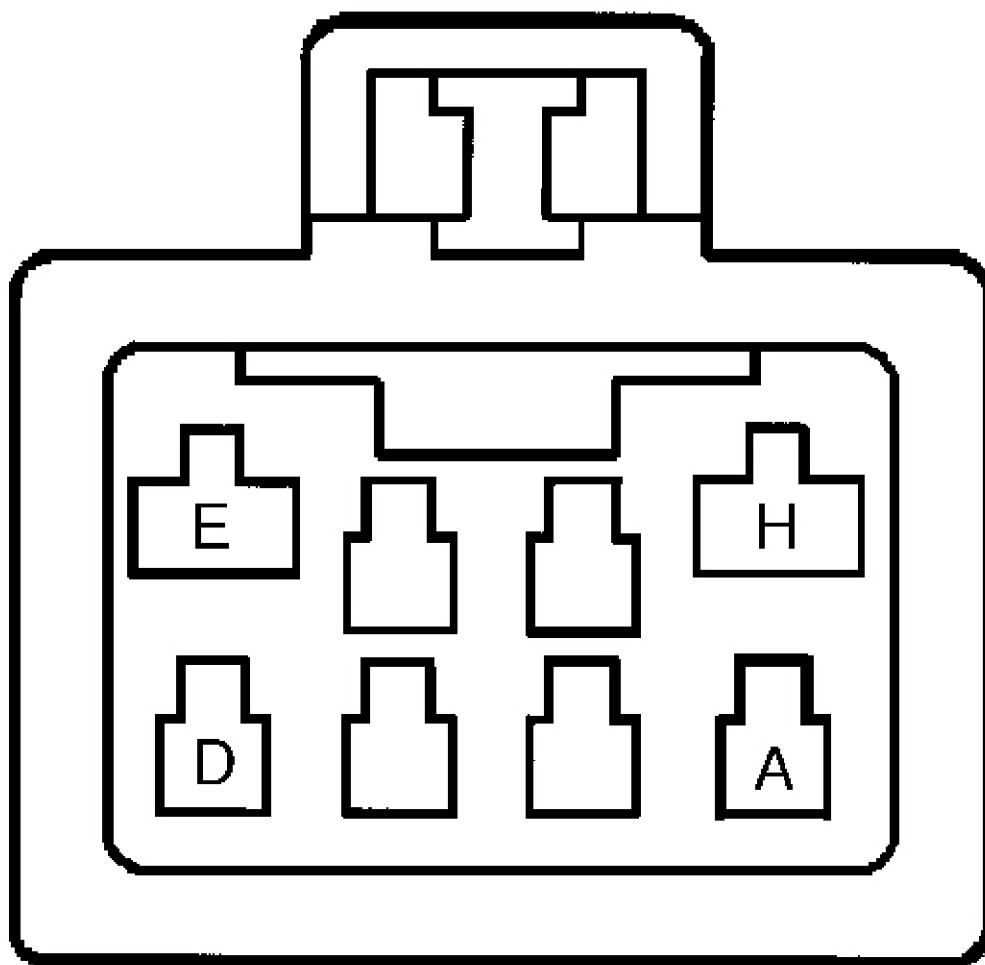
TEST A: STARTER SOLENOID DOES NOT CLICK

1. If diagnostic system check was not performed, perform **ENGINE ELECTRICAL DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM. If diagnostic system check was performed, go to next step.
2. Turn ignition switch to START position. If starter relay "clicks" when ignition switch is turned to START, check wiring system for intermittent or poor connections. See **TROUBLE SHOOTING**. If starter relay does not "click" when ignition switch is turned to START, go to next step.
3. Turn ignition switch to OFF position. Disconnect starter solenoid harness connector. Connect a test light between ground and starter solenoid harness connector Black/Red wire terminal. Turn ignition switch to START position. If test light illuminates, go to step 7. If test light does not illuminate, go to next step.

NOTE: Ensure to use a minimum of 10 gauge wire for fused jumper wire.

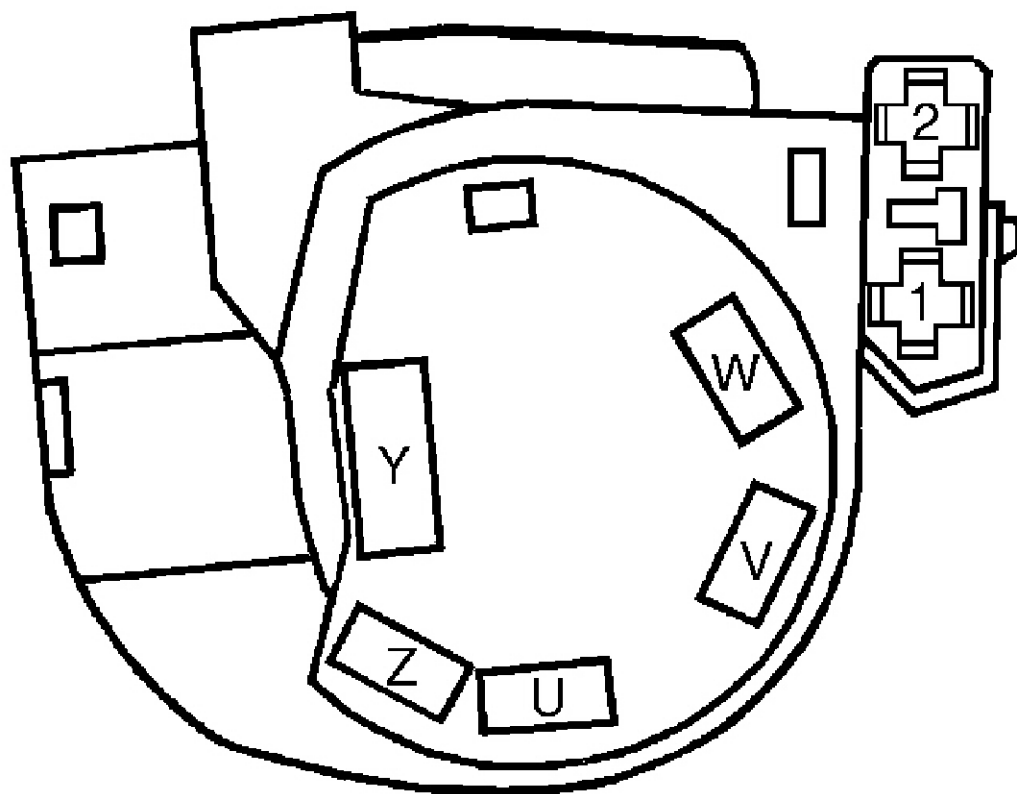
4. Turn ignition switch to OFF position. Disconnect Park/Neutral Position (PNP) switch harness connector. Connect a 20-amp fused jumper between PNP harness connector terminals "E" and "H" (both Black/Red wires). See **Fig. 2**. Turn ignition switch to START position. If test light illuminates, go to step 8. If test light does not illuminate, go to next step.
5. Connect a test light between ground and PNP harness connector terminal "H" (Black/Red wire). Turn ignition switch to START position. If test light illuminates, go to step 11. If test light does not illuminate, go to next step.
6. Inspect Black/Red wire for an open or high resistance between starter solenoid and PNP harness connector terminal "H" and ignition switch harness connector terminal "Z". See **Fig. 2** and **Fig. 3**. If problem does not exist, go to step 10. If problem exists, repair Black/Red wire as necessary. After repair, go to step 15.
7. Inspect starter solenoid for poor connections. If poor connections are found, go to step 15. If poor connection are not found, go to step 12.

8. Inspect PNP switch for proper operation. See appropriate AUTOMATIC TRANSMISSION SERVICING article in TRANSMISSIONS. If problem exists, perform repairs or adjustments as necessary, go to step 15 . If problem does not exist, go to next step.
9. Inspect PNP switch for poor connections. If poor connections are found, repair as necessary. After repair, go to step 15 . If poor connections are not found, go to step 13 .
10. Inspect ignition switch harness connector for poor connections. If poor connections are found, repair as necessary. After repair, go to step 15 . If poor connections are not found, go to step 14 .
11. Repair high resistance or open in Black/Red wire. After repair, go to step 15 .
12. Replace starter. See **STARTER** under REMOVAL & INSTALLATION. After repair, go to step 15 . After repair, go to step 15 .
13. Replace PNP switch. See appropriate AUTOMATIC TRANSMISSION OVERHAUL article in TRANSMISSIONS.
14. Replace ignition switch. See STEERING COLUMN SWITCHES - CATERA article in ACCESSORIES & EQUIPMENT. After repair, go to next step.
15. Operate system to verify repair. If system is not operating correctly, repeat test beginning at step 2 .



G00012134

Fig. 2: Identifying Park/Neutral Position Switch Harness Connector Terminals
Courtesy of GENERAL MOTORS CORP.



G00012135

Fig. 3: Identifying Ignition Switch Harness Connector Terminals
 Courtesy of **GENERAL MOTORS CORP.**

TEST B: SOLENOID CLICKS, ENGINE DOES NOT CRANK

1. If diagnostic system check was not performed, perform **ENGINE ELECTRICAL DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM. If diagnostic system check was performed, go to next step.
2. Turn ignition switch to START position. If starter solenoid clicks, go to next step. If starter solenoid does not click, perform **TEST A: STARTER SOLENOID DOES NOT CLICK** .
3. Inspect engine and drive belt system for mechanical binding. If problem exists, repair as necessary. See appropriate 3.0L DOHC V6 article in ENGINES. If problem does not exist, go to next step.
4. Inspect battery positive cable for high resistance between battery and starter solenoid. If problem exists, repair as necessary. After repair, go to step 8 . If problem does not exist, go to next step.
5. Inspect battery grounds and starter motor for high resistance. If problem exists, repair as necessary. After repair, go to step 8 . If problem does not exist, go to next step.
6. Inspect starter for poor connections. If problem exists, repair as necessary. After repair, go to step 8 . If problem does not exist, go to next step.
7. Replace starter. See **STARTER** under REMOVAL & INSTALLATION. After repair, go to next step.
8. Operate system to verify repair. If system is not operating correctly, repeat test beginning at step 2 .

TEST C: ENGINE CRANKS SLOWLY

1. Ensure battery is in good condition. See **BATTERY TESTING & INSPECTION** under ON-VEHICLE TESTING. If problem exists, go to next step.
2. Inspect wiring for damage or poor connections at starter motor, solenoid battery and all grounds. If problem

exists, repair as necessary. If problem does not exist, go to next step.

3. Inspect engine and belt drive system for mechanical binding. If engine moves freely, go to next step. If engine does not move freely, repair as necessary.
4. Replace starter motor. See **STARTER** under REMOVAL & INSTALLATION.

TEST D: STARTER MOTOR NOISE DIAGNOSIS

1. If diagnostic system check was not performed, perform **ENGINE ELECTRICAL DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM. If diagnostic system check was performed, go to next step.
2. Start engine. If starter operates normally, inspect for intermittents. See **TROUBLE SHOOTING**. If starter does not operate normally, go to next step.
3. Start engine while listening to starter motor turn. If a loud "whoop" sound is heard, go to step 6. If a loud "whoop" sound is not heard, go to next step.
4. If a "rumble", "growl", or "knock" sound is heard as starter is slowing down to a stop after starting engine, go to step 7. If a "rumble", "growl", or "knock" sound is not heard as starter is slowing down to a stop after starting engine, go to next step.
5. If a high pitched "whine" sound is heard after engine cranks and starts normally, go to step 8. If a high pitched "whine" sound is not heard after engine cranks and starts normally, go to step 7.
6. Inspect flywheel ring gear for chipped, missing, or milled gear teeth and/or if flywheel is bent. If problems exist, go to step 9. If problem does not exist, go to step 10.
7. Remove starter motor. See **STARTER** under REMOVAL & INSTALLATION. Inspect starter motor bushings and clutch gear. Inspect for chipped or milled teeth or worn bushings. If problem exists, go to step 10. If problem does not exist, go to step 9.
8. Shim starter motor away from flywheel by adding shims, individually between engine block and starter motor. After repair, go to step 11.
9. Replace flywheel. See appropriate AUTOMATIC TRANSMISSION REMOVAL article in TRANSMISSIONS. After repair, go to step 11.
10. Replace starter motor. See **STARTER** under REMOVAL & INSTALLATION. After repair, go to next step.
11. Operate system to verify repair. If system is not operating correctly, repeat test beginning at step 3.

BENCH TESTING

NOTE: Information is not available from manufacturer.

REMOVAL & INSTALLATION

WARNING: Vehicles are equipped with air bag supplemental restraint system. Before attempting any repairs involving steering column, instrument panel or related components, see SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM in appropriate AIR BAG RESTRAINT SYSTEMS article.

CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See COMPUTER RELEARN PROCEDURES article in GENERAL INFORMATION before disconnecting battery.

2001 Cadillac Catera

2001 STARTING & CHARGING SYSTEMS Starters - Catera

Removal & Installation

Disconnect negative battery cable. Raise and support vehicle. Disconnect starter solenoid wiring. Remove starter mounting bolts. Remove starter assembly. Install starter assembly and mounting bolts. Tighten starter mounting bolts to specification. See **TORQUE SPECIFICATIONS**.

OVERHAUL

NOTE: Information is not available from manufacturer.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Starter Mounting Bolts	44 (60)
	INCH Lbs. (N.m)
Negative Battery Cable-To-Battery Bolt	53 (6.0)
Positive Battery Cable-To-Battery Bolt	53 (6.0)
Positive Battery Cable-To-Solenoid Nut	115 (13)
Solenoid Start Terminal Nut	35 (4.0)

WIRING DIAGRAMS

2001 Cadillac Catera

2001 STARTING & CHARGING SYSTEMS Starters - Catera

Fig. 4: Starting System Wiring Diagram (Catera)

2001 Cadillac Catera

2001 STARTING & CHARGING SYSTEMS Starters - Catera

2001 Cadillac Catera

2001 STARTING & CHARGING SYSTEMS Starters - Catera

2001 Cadillac Catera

2001 STARTING & CHARGING SYSTEMS Starters - Catera

2001 Cadillac Catera

2001 STARTING & CHARGING SYSTEMS Starters - Catera

2001 Cadillac Catera

2001 STARTING & CHARGING SYSTEMS Starters - Catera