

STARTER

1998 Mitsubishi Montero

1998 STARTING & CHARGING SYSTEMS
Mitsubishi - Starters

Diamante, Eclipse, Galant, Mirage, Montero, Montero Sport,
3000GT

DESCRIPTION & OPERATION

Starter is a conventional 12-volt, 4-pole brush-type motor, with direct or gear reduction drive. Starter-mounted solenoid shifts overrunning clutch and pinion into flywheel when starter is energized.

TROUBLE SHOOTING

NOTE: See TROUBLE SHOOTING article in the GENERAL INFORMATION section.

ON-VEHICLE TESTING

TROUBLE SHOOTING

1) If starter motor does not operate at all:

- * Check starter coil.
- * Check electrical connections.
- * Check clutch pedal position switch (M/T).
- * Check starter relay (M/T).
- * Check park/neutral position switch (A/T).

2) If starter motor does not stop, check starter magnetic switch solenoid.

STARTER RELAY

Diamante, Galant & Montero

1) Remove starter relay. See STARTER RELAY LOCATIONS table. With no power supplied to any relay, continuity should exist between relay terminals No. 1 and 2. See WIRING DIAGRAMS.

2) Connect a jumper wire from positive battery terminal to relay terminal No. 1 and another jumper wire from negative battery terminal to relay terminal No. 2. Continuity should exist between relay terminals No. 3 and 4. Replace relay as necessary.

Eclipse (A/T With Theft Alarm)

1) Remove starter relay. See STARTER RELAY LOCATIONS table. With no power supplied to any relay, continuity should exist between relay terminals No. 1 and 2. See WIRING DIAGRAMS.

2) Connect a jumper wire from positive battery terminal to relay terminal No. 1 and another jumper wire from negative battery terminal to relay terminal No. 2. Continuity should exist between relay terminals No. 3 and 4. Replace relay as necessary.

Eclipse (A/T Without Theft Alarm)

1) Remove starter relay. See STARTER RELAY LOCATIONS table. With no power supplied to any relay, continuity should exist between relay terminals No. 1 and 3. See WIRING DIAGRAMS.

2) Connect a jumper wire from positive battery terminal to relay terminal No. 1 and another jumper wire from negative battery

terminal to relay terminal No. 3. Continuity should exist between relay terminals No. 4 and 5. Replace relay as necessary.

Eclipse (M/T With Theft Alarm)

1) Remove starter relay. See STARTER RELAY LOCATIONS table. With no power supplied to any relay, continuity should exist between relay terminals No. 1 and 3. See WIRING DIAGRAMS.

2) Connect a jumper wire from positive battery terminal to relay terminal No. 3 and another jumper wire from negative battery terminal to relay terminal No. 1. Continuity should exist between relay terminals No. 2 and 5. Replace relay as necessary.

Eclipse (M/T Without Theft Alarm)

1) Remove starter relay. See STARTER RELAY LOCATIONS table. With no power supplied to any relay, continuity should exist between relay terminals No. 1 and 2. See WIRING DIAGRAMS.

2) Connect a jumper wire from positive battery terminal to relay terminal No. 1 and another jumper wire from negative battery terminal to relay terminal No. 2. Continuity should exist between relay terminals No. 3 and 4. Replace relay as necessary.

Mirage

1) Remove starter relay. See STARTER RELAY LOCATIONS table. With no power supplied to any relay, continuity should exist between relay terminals No. 1 and 3. See WIRING DIAGRAMS.

2) Connect a jumper wire from positive battery terminal to relay terminal No. 3 and another jumper wire from negative battery terminal to relay terminal No. 1. Continuity should exist between relay terminals No. 2 and 4. Replace relay as necessary.

Montero Sport With A/T

1) Remove starter relay. See STARTER RELAY LOCATIONS table. With no power supplied to any relay, continuity should exist between relay terminals No. 1 and 3. See WIRING DIAGRAMS.

2) Connect a jumper wire from positive battery terminal to relay terminal No. 3 and another jumper wire from negative battery terminal to relay terminal No. 1. Continuity should exist between relay terminals No. 2 and 5. Replace relay as necessary.

Montero Sport With M/T

1) Remove starter relay. See STARTER RELAY LOCATIONS table. With no power supplied to any relay, continuity should exist between relay terminals No. 1 and 3. See WIRING DIAGRAMS.

2) Connect a jumper wire from positive battery terminal to relay terminal No. 1 and another jumper wire from negative battery terminal to relay terminal No. 3. Continuity should exist between relay terminals No. 2 and 4. Replace relay as necessary.

3000GT

1) Remove starter relay. See STARTER RELAY LOCATIONS table. With no power supplied to any relay, continuity should exist between relay terminals No. 1 and 2 and between relay terminals No. 3 and 4. See Fig. 1.

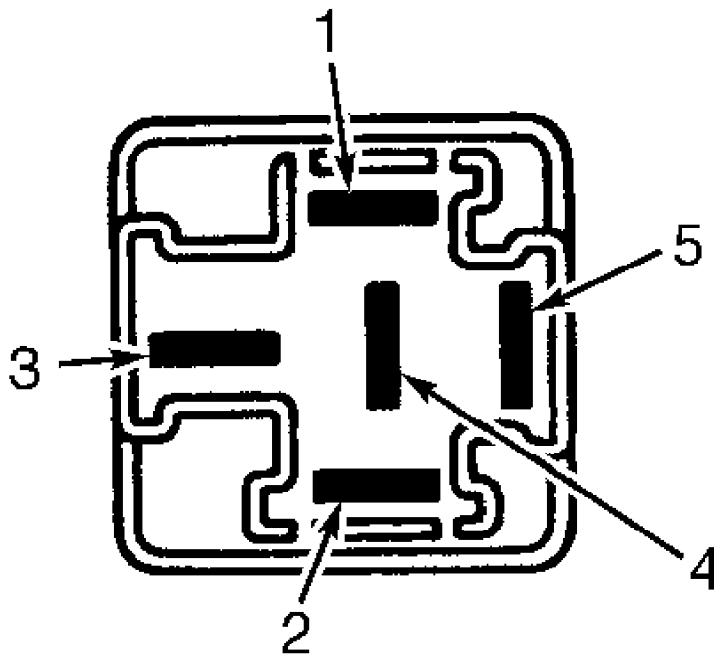
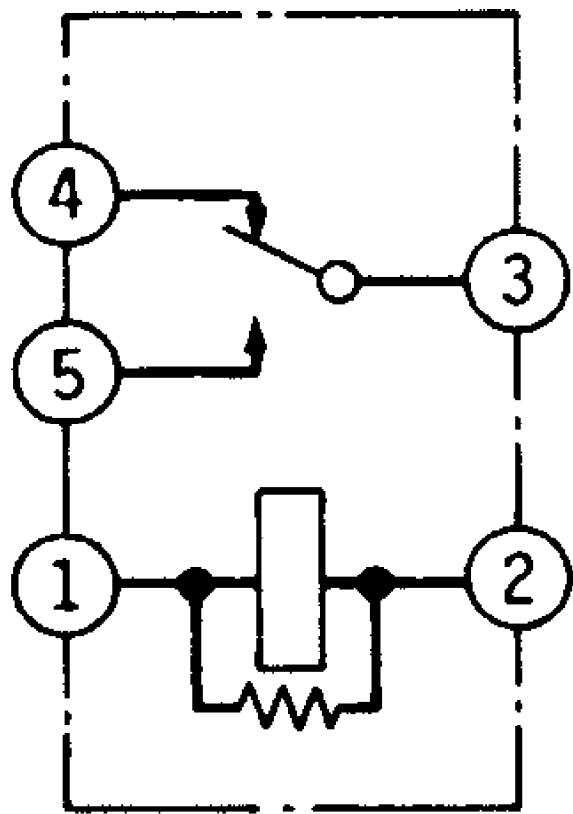
2) Connect a jumper wire from positive battery terminal to relay terminal No. 1 and another jumper wire from negative battery terminal to relay terminal No. 2. Continuity should exist between relay terminals No. 3 and 5. See Fig. 1. Replace relay as necessary.

STARTER RELAY LOCATIONS TABLE

Application	Location
Diamante	At Left Front Fender, Inside Fuse/Relay Block

Eclipse

Without Theft Alarm	Behind Center Of Dash
With Theft Alarm	Under Left Of Instrument Panel, On Relay Box
Galant	Inside Right Front Fender
Mirage	In Left Underhood Fuse/Relay Block
Montero	Behind Center Of Dash
Montero Sport	In Left Underhood Fuse/Relay Block
3000GT	In Right Underhood Fuse/Relay Block



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Fig. 1: Identifying Starter Relay Connector Terminals (3000GT)
Courtesy of Chrysler Corp.

BENCH TESTING

* PLEASE READ THIS FIRST *

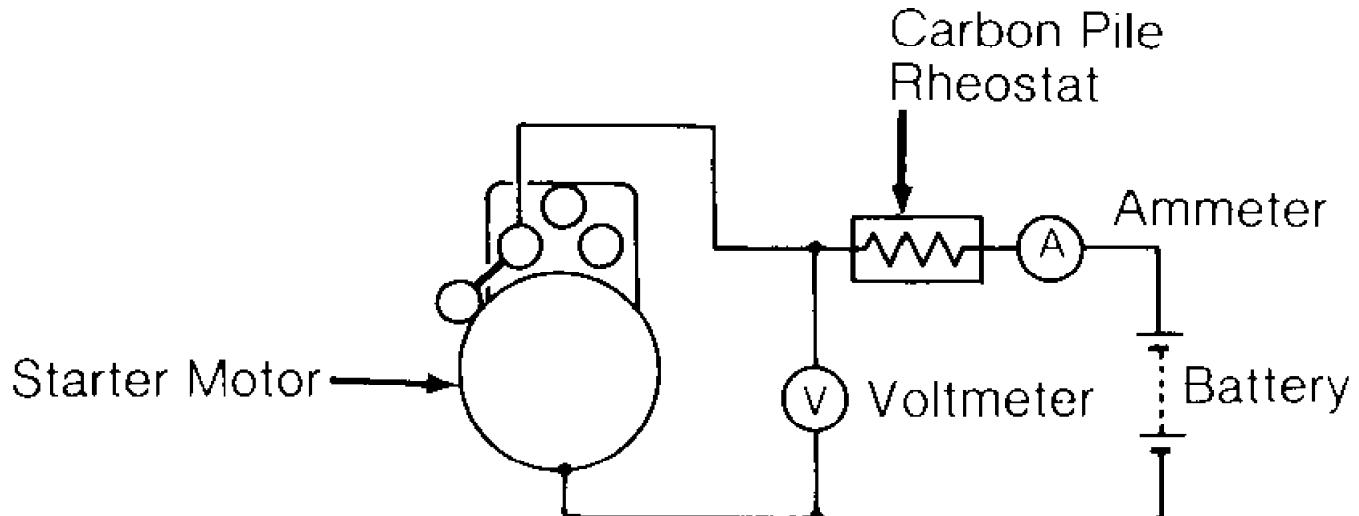
CAUTION: Perform tests in less than 10 seconds to prevent damage to coil.

NO-LOAD TEST

1) Install starter in soft-jawed vise. Connect starter in series with a fully-charged 12-volt battery. Connect a 100-amp ammeter and carbon pile rheostat in series with positive battery post and starter motor terminal. See Fig. 2.

2) Install voltmeter across starter motor. Adjust carbon pile rheostat to full resistance. Connect cable from starter motor body to negative battery terminal. Adjust carbon pile rheostat to proper test voltage. Ensure maximum amperage is as specified and starter rotates

smoothly. See STARTER NO-LOAD TEST SPECIFICATIONS table.



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Fig. 2: Performing Starter No-Load Test
Courtesy of Mitsubishi Motor Sales of America

STARTER NO-LOAD TEST SPECIFICATIONS TABLE

Application	(1) Starter Type	Test Voltage	Maximum Amps @ Minimum RPM
Diamante	GR	12.0	110 @ 5000
Eclipse			
2.0L Non-Turbo	DD	11.5	(2)
2.0L Turbo & 2.4L	GR	11.0	90 @ 3000
Galant, Montero & 3000GT	GR	11.0	90 @ 3000
Mirage			
1.5L & 1.8L M/T	DD	11.5	60 @ 6000
1.8L A/T & M/T	GR	11.0	90 @ 2800
Montero Sport	GR	12	(2)

(1) - DD indicates direct drive. GR indicates gear reduction.

(2) - Information is not available from manufacturer at time of publication.

PULL-IN COIL TEST

1) Disconnect field coil wire from terminal "M" at starter solenoid. See Fig. 3. Connect jumper wire between positive battery terminal of 12-volt battery and terminal "S" of solenoid.

2) Connect a second jumper wire from negative battery terminal and touch terminal "M" of starter solenoid. If solenoid plunger moves inward, solenoid is good. If solenoid plunger does not move inward, replace solenoid.

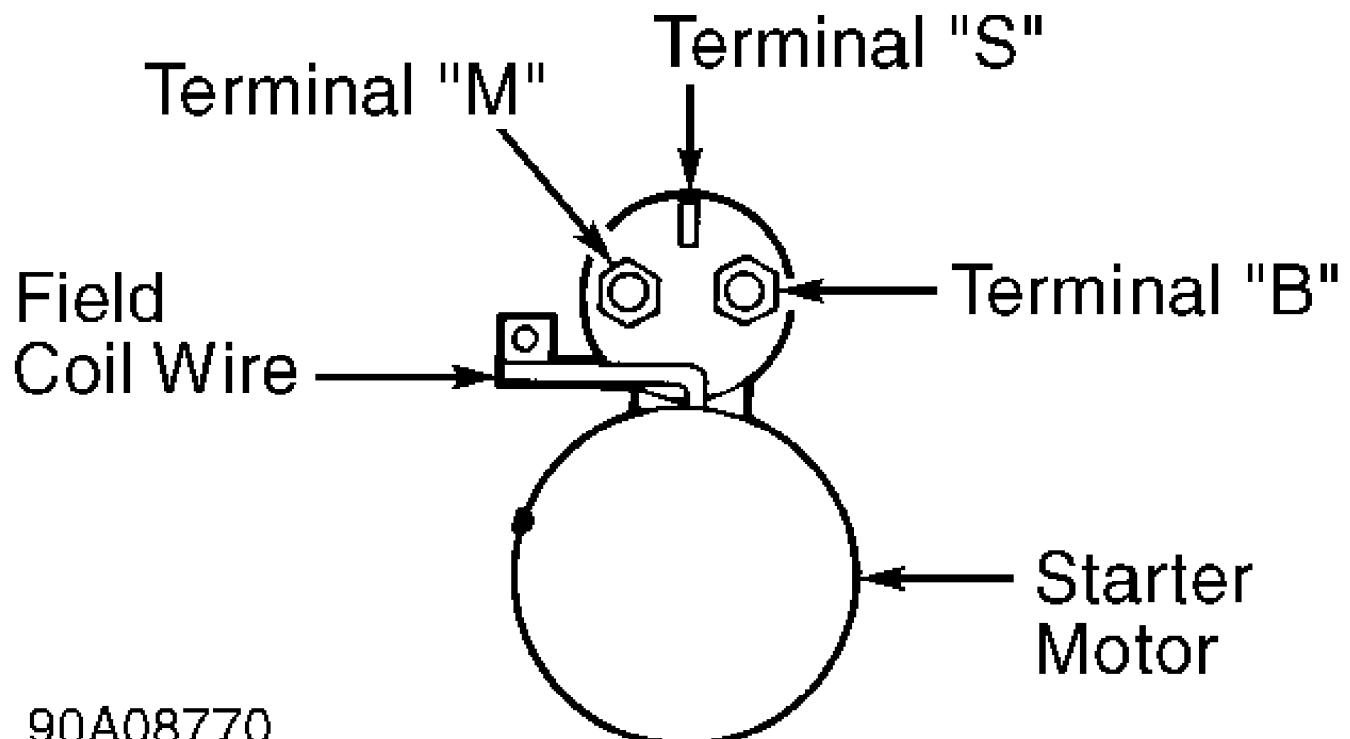


Fig. 3: Identifying Starter Solenoid Terminals
Courtesy of Mitsubishi Motor Sales of America

HOLD-IN COIL TEST

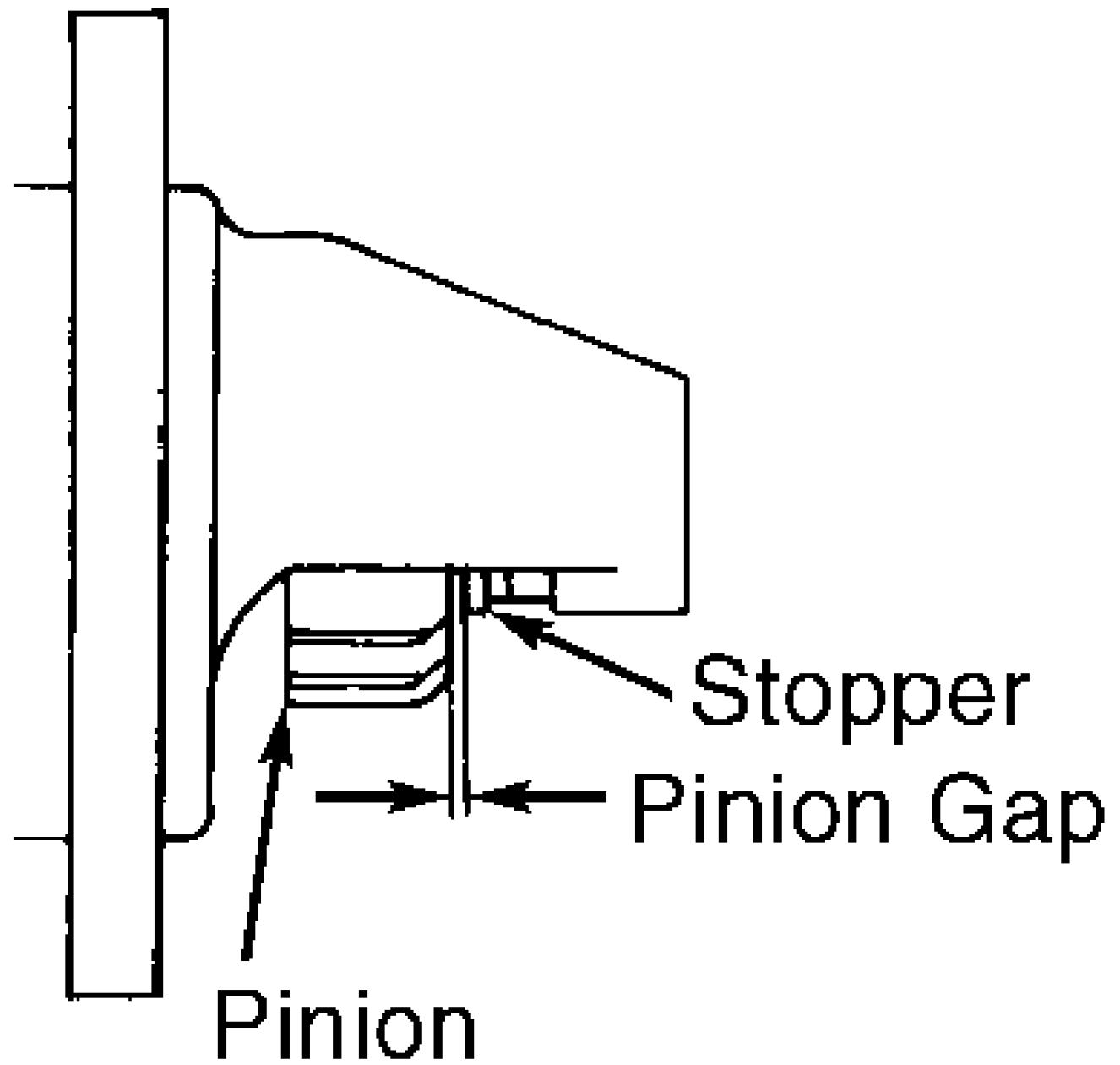
- 1) Disconnect field coil wire from terminal "M" at starter solenoid. See Fig. 3. Connect jumper wire between positive battery terminal of 12-volt battery and terminal "S" of starter solenoid.
- 2) Connect a second jumper wire from negative battery terminal and touch starter case. If solenoid plunger is pulled in, hold-in coil is good. If solenoid plunger is not pulled in, replace solenoid.

PINION RETURN TEST

- 1) Disconnect field coil wire from terminal "M" at starter solenoid. See Fig. 3. Connect jumper wire between positive battery terminal of 12-volt battery and terminal "M" of starter solenoid.
- 2) Connect a second jumper wire from negative battery terminal and touch starter case. Pull pinion outward and release it. Replace solenoid if pinion remains out.

PINION GAP MEASUREMENT

- 1) Disconnect field coil wire from terminal "M" at starter solenoid. See Fig. 3. Connect jumper wire between positive battery terminal of 12-volt battery and terminal "S" of starter solenoid.
- 2) Connect a second jumper wire from negative battery terminal and touch terminal "M" of starter solenoid. Using a feeler gauge, measure clearance between pinion and stopper. See Fig. 4.
- 3) Clearance should be within specification. See STARTER SPECIFICATIONS table. Adjust clearance by adding or removing gaskets between solenoid and front housing.



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Fig. 4: Measuring Pinion Gap
Courtesy of Mitsubishi Motor Sales of America

PINION TEST

While holding pinion housing, rotate pinion. Pinion should rotate smoothly in clockwise direction only. Inspect pinion and ring gear for wear or burrs. If pinion does not rotate as specified or damage is found, replace pinion.

ARMATURE TEST

Ensure armature is not grounded. Place armature in growler. Hold a thin steel blade parallel and just above armature while slowly rotating armature in growler. A shorted armature will cause blade to vibrate and be attracted to core. Using an ohmmeter, check continuity between armature coil cores and commutator segments (small diameter end of armature). Continuity should not exist. Check for continuity between segments. Continuity should exist. Replace armature as necessary.

BRUSH HOLDER TEST

Using an ohmmeter, check continuity between brush holder plate and brush holder. Continuity should not exist. Replace brush holder as necessary.

REMOVAL & INSTALLATION

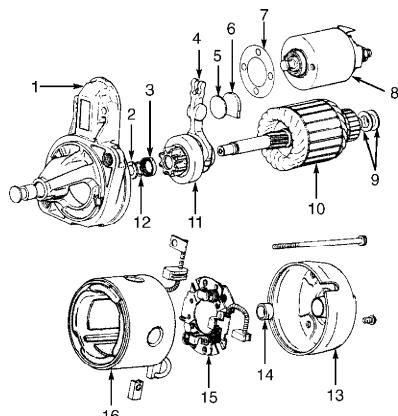
NOTE: On Montero with A/T, it may be necessary to disconnect transmission oil cooler line for starter removal.

Removal & Installation

Disconnect negative battery cable. If necessary, raise vehicle on hoist. Remove starter mounting bolts and starter. To install, reverse removal procedure.

OVERHAUL

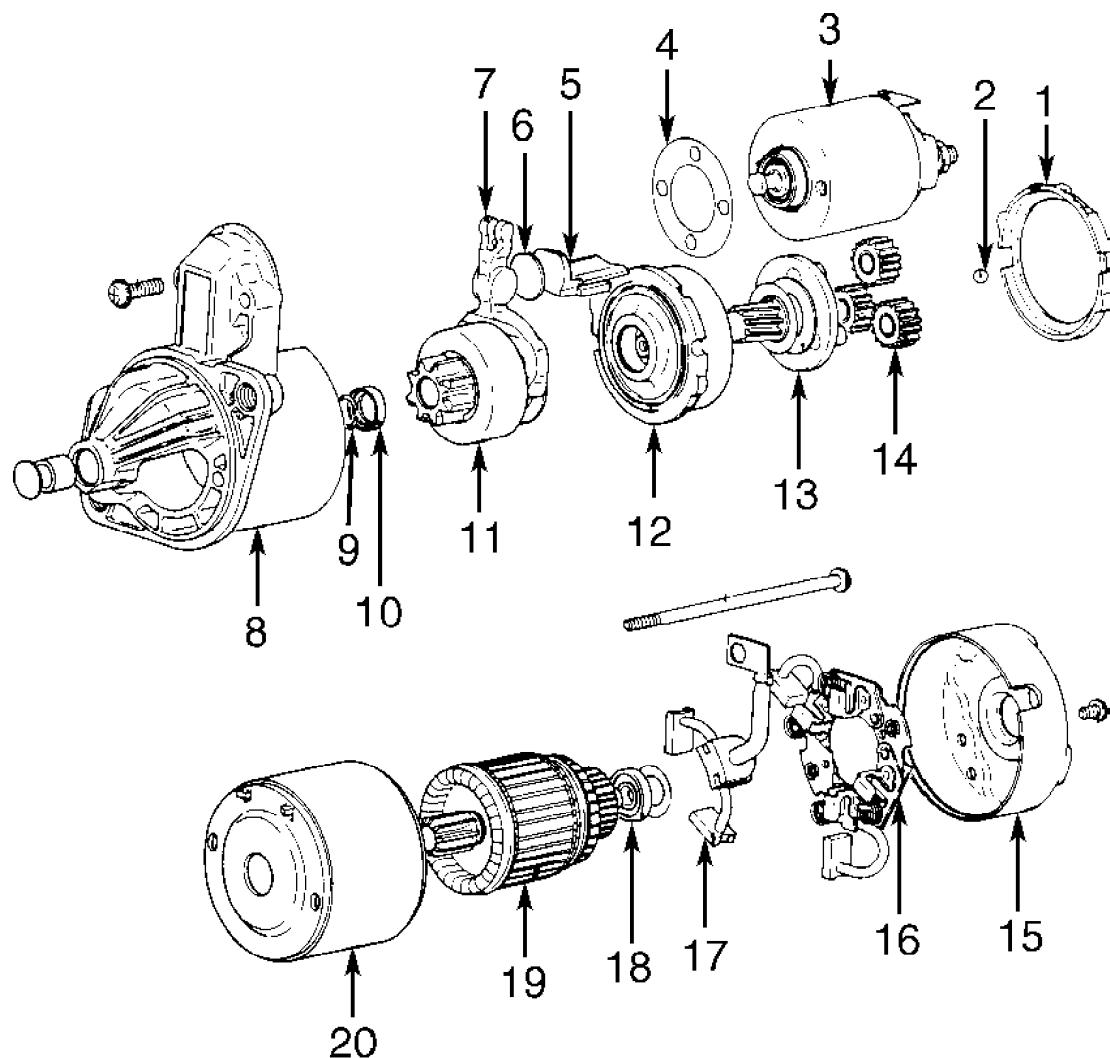
Check commutator for out-of-round and proper amount of undercut. Replace or repair armature if not within specification. See STARTER SPECIFICATIONS table. Ensure brushes are not worn beyond wear line (outer line closest to commutator contact surface). Check pinion gap. See PINION GAP MEASUREMENT under BENCH TESTING. See Figs. 5 and 6.



1. Front Housing	9. Washers
2. Washer	10. Armature
3. Stopper	11. Pinion
4. Lever	12. Snap Ring
5. Plate	13. Rear Housing
6. Packing	14. Rear Bearing
7. Gasket	15. Brush Holder Assembly
8. Starter Solenoid	16. Yoke Assembly

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Fig. 5: Exploded View Of Direct Drive Starter (Typical)
Courtesy of Mitsubishi Motor Sales of America



1. Packing	11. Pinion
2. Ball	12. Internal Gear
3. Starter Solenoid	13. Planetary Gear Holder
4. Gasket	14. Planetary Gear
5. Packing	15. Rear Housing
6. Plate	16. Brush Holder
7. Lever	17. Brush
8. Front Housing	18. Rear Bearing
9. Snap Ring	19. Armature
10. Stopper	20. Yoke Assembly

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Fig. 6: Exploded View Of Gear Reduction Starter (Typical)
Courtesy of Mitsubishi Motor Sales of America

STARTER SPECIFICATIONS

STARTER SPECIFICATIONS TABLE

Application	In. (mm)
Commutator Maximum Runout004 (.10)
Commutator Minimum Diameter	
Diamante	1.23 (31.2)
Eclipse	
Direct Drive Type	(1)
Gear Reduction Type	1.12 (28.4)
Galant	1.12 (28.4)
Mirage	
Direct Drive Type	1.22 (31.4)
Gear Reduction Type	1.12 (28.4)
Montero & Montero Sport	1.13 (28.8)
3000GT	1.12 (28.4)
Commutator Undercut Depth020 (.51)
Pinion Gap020-.079 (.51-2.01)

(1) - Information is not available from manufacturer at time of publication.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

Application	Ft. Lbs. (N.m)
Starter-To-Block Bolts	
Diamante	23 (31)
Eclipse	
2.0L Non-Turbo	40 (54)
2.0L Turbo & 2.4L	22 (30)
Galant	22 (30)
Mirage	36 (49)
Montero & Montero Sport	19-24 (26-33)
3000GT	23 (31)

WIRING DIAGRAMS

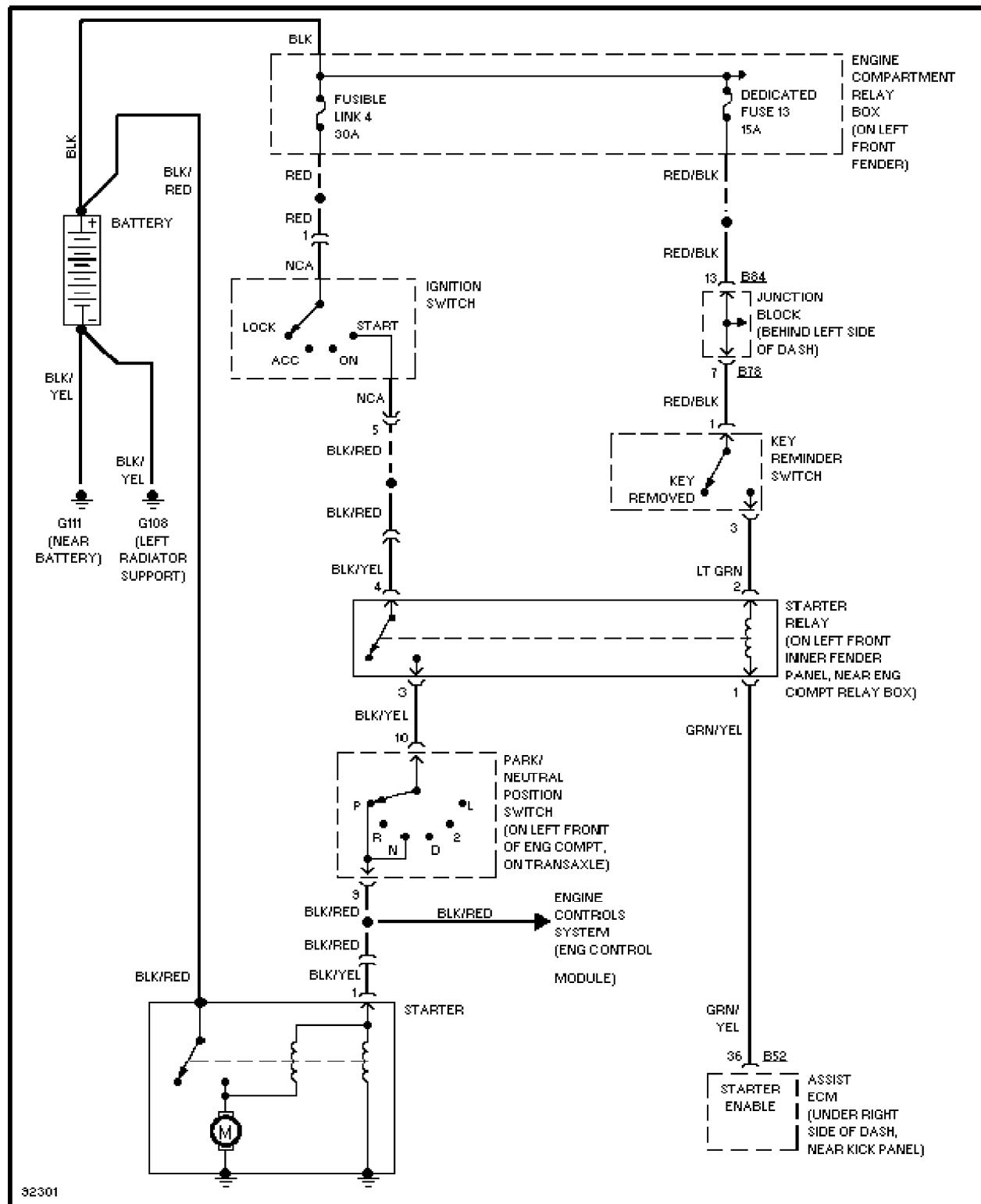


Fig. 7: Starting System Wiring Diagram (Diamante)

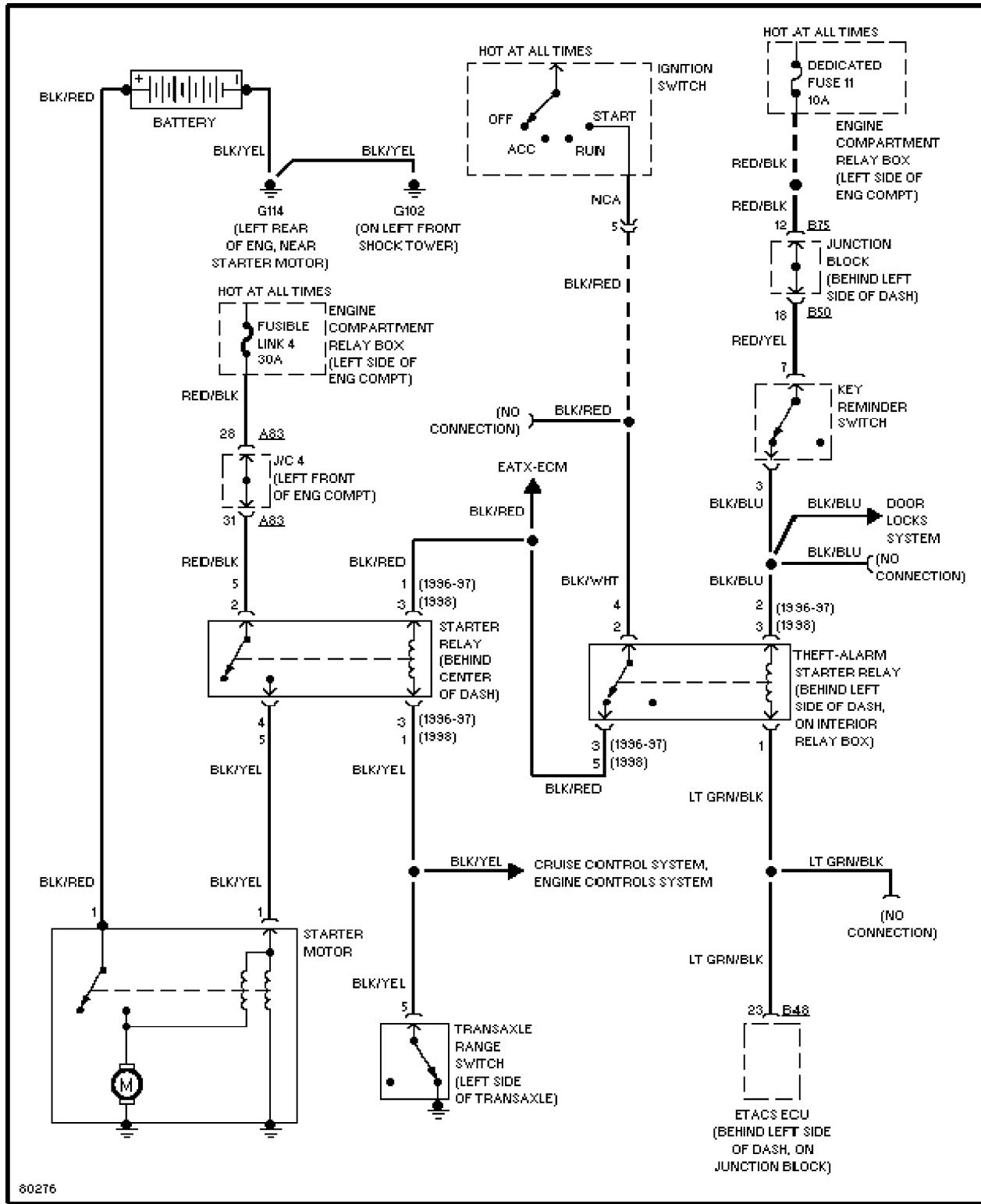


Fig. 8: Starting System Wiring Diagram (Eclipse 2.0L A/T With Anti-Theft)

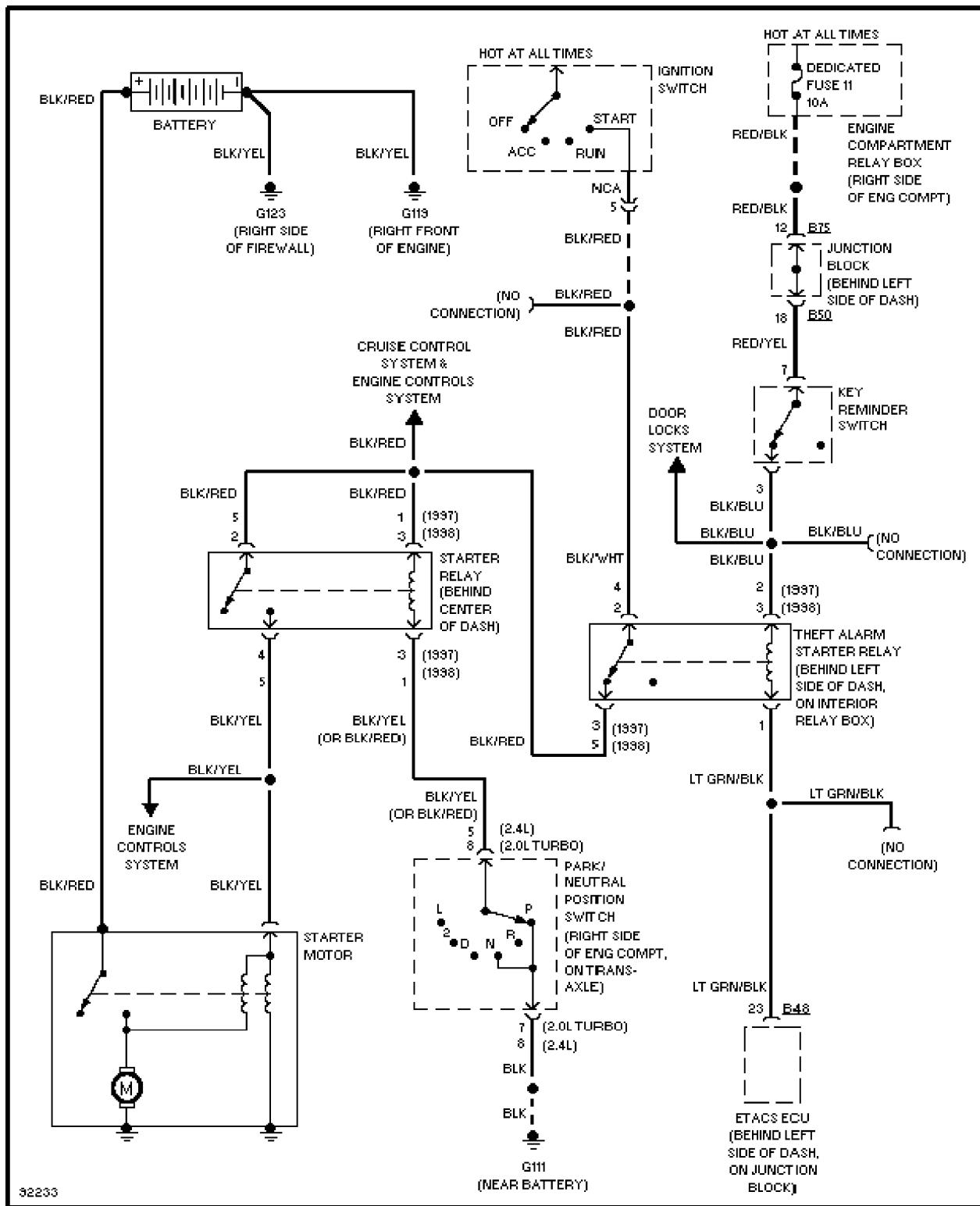


Fig. 9: Starting System Wiring Diagram (Eclipse 2.0L Turbo A/T & 2.4L A/T With Anti-Theft)

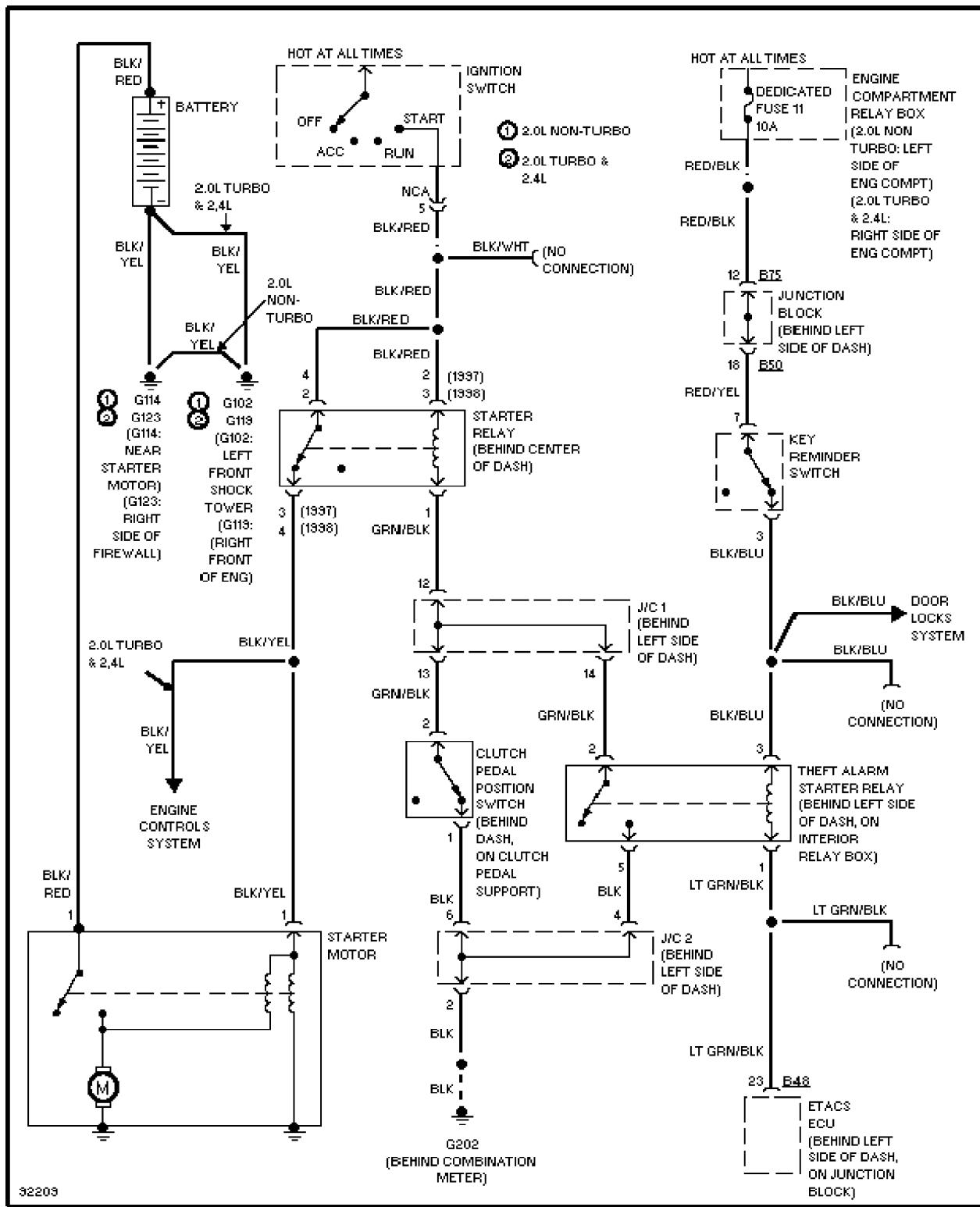


Fig. 10: Starting System Wiring Diagram (Eclipse M/T With Anti-Theft)

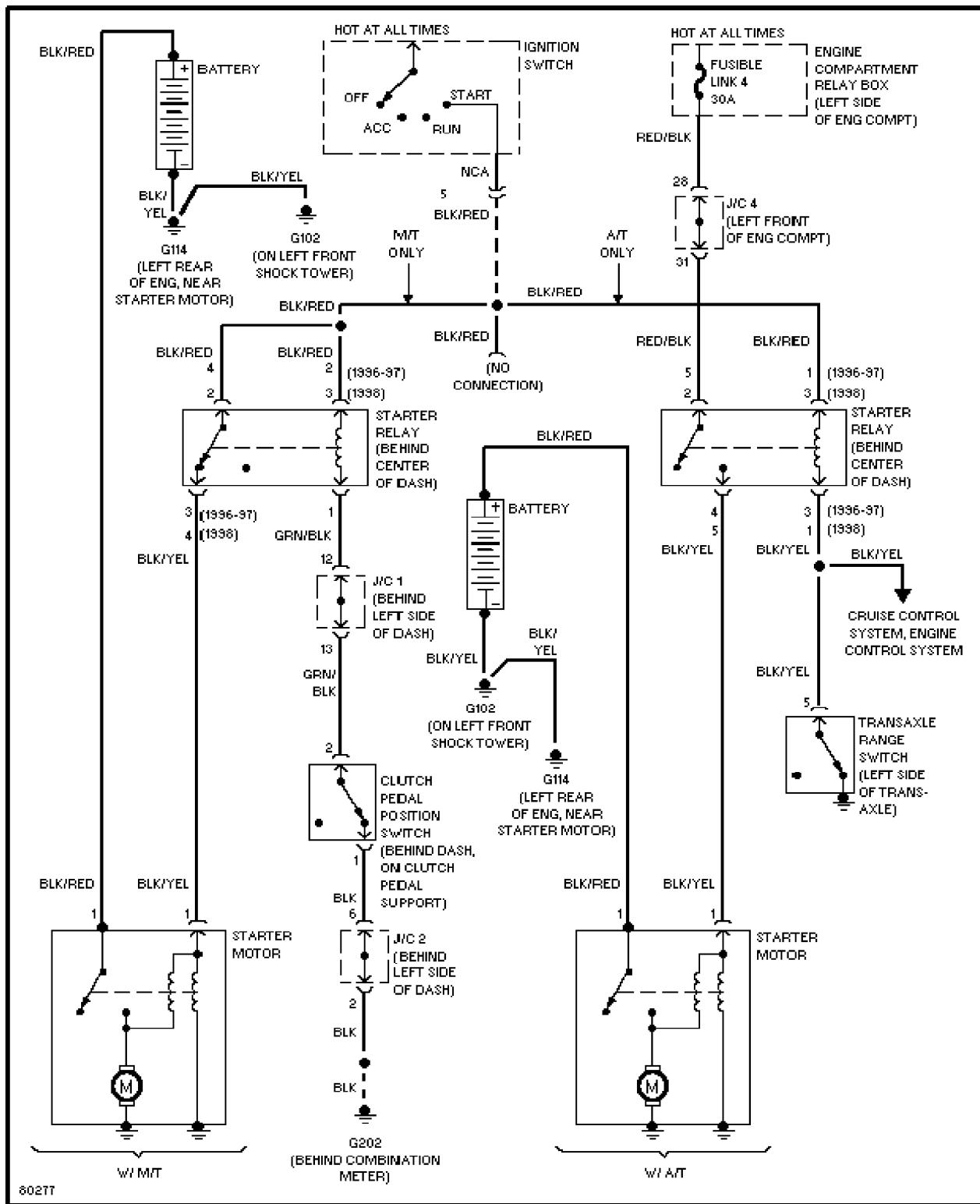


Fig. 11: Starting System Wiring Diagram (Eclipse 2.0L Without Anti-Theft)

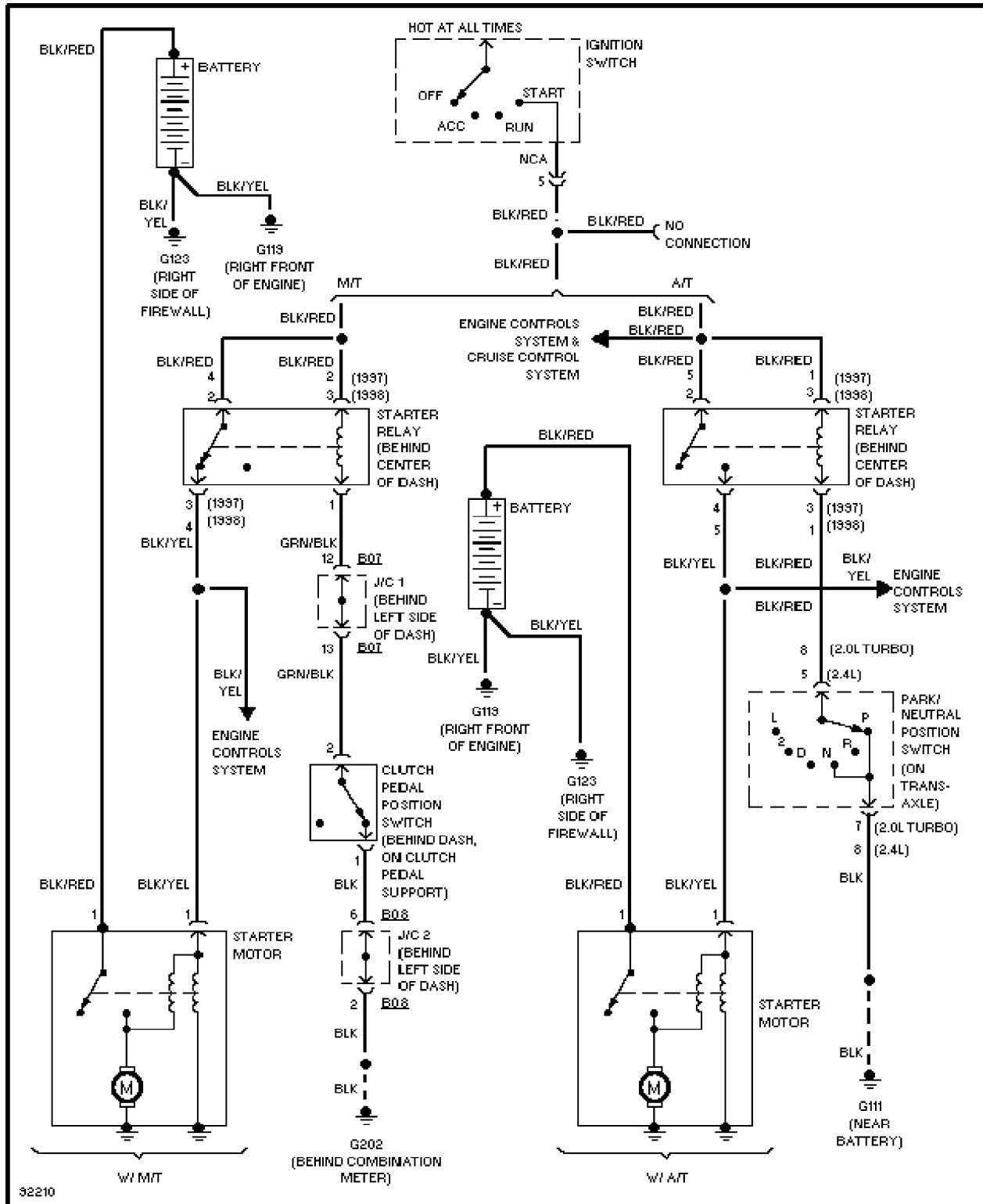


Fig. 12: Starting System Wiring Diagram (Eclipse 2.0L Turbo & 2.4L Without Anti-Theft)

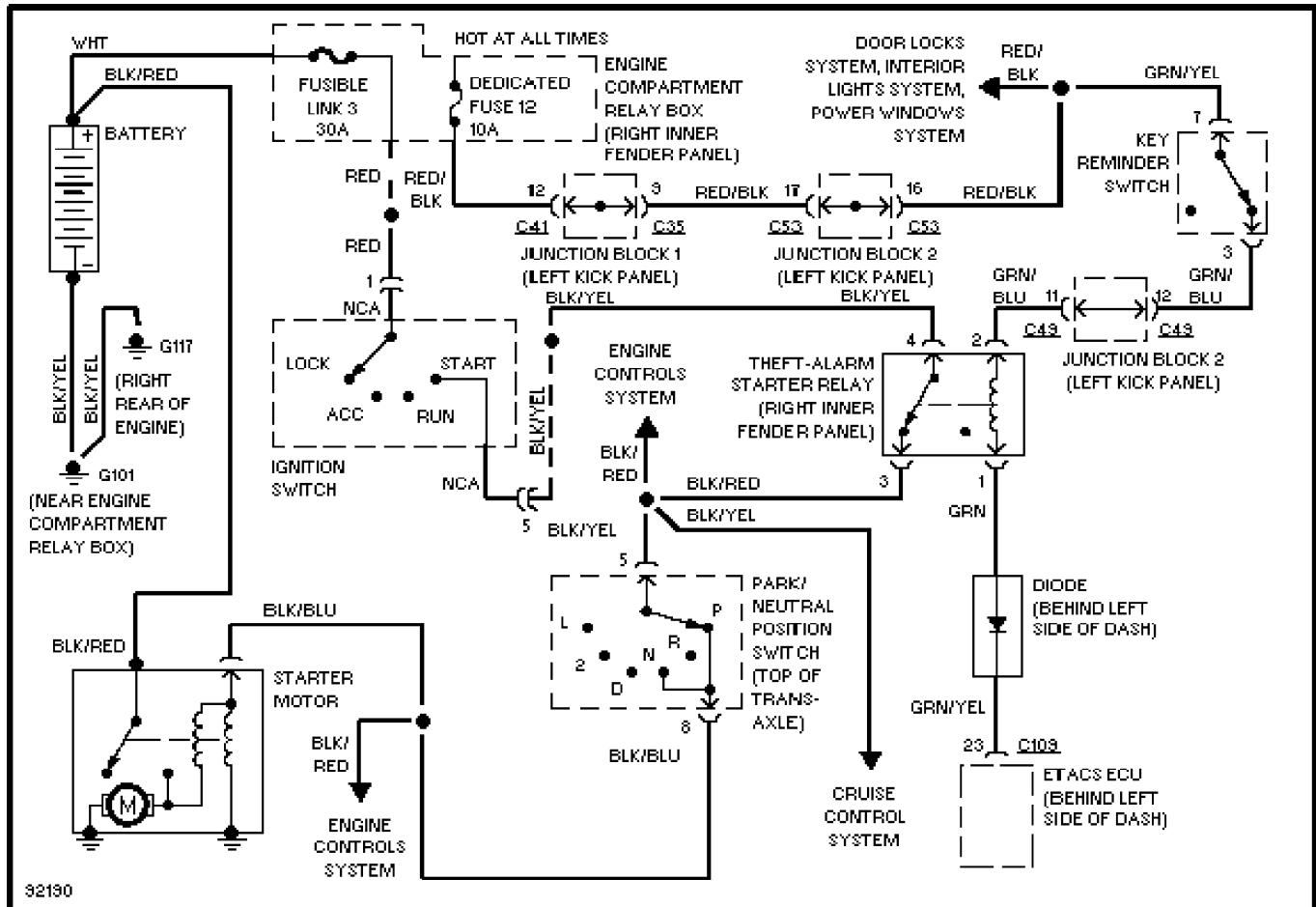


Fig. 13: Starting System Wiring Diagram (Galant With Anti-Theft)

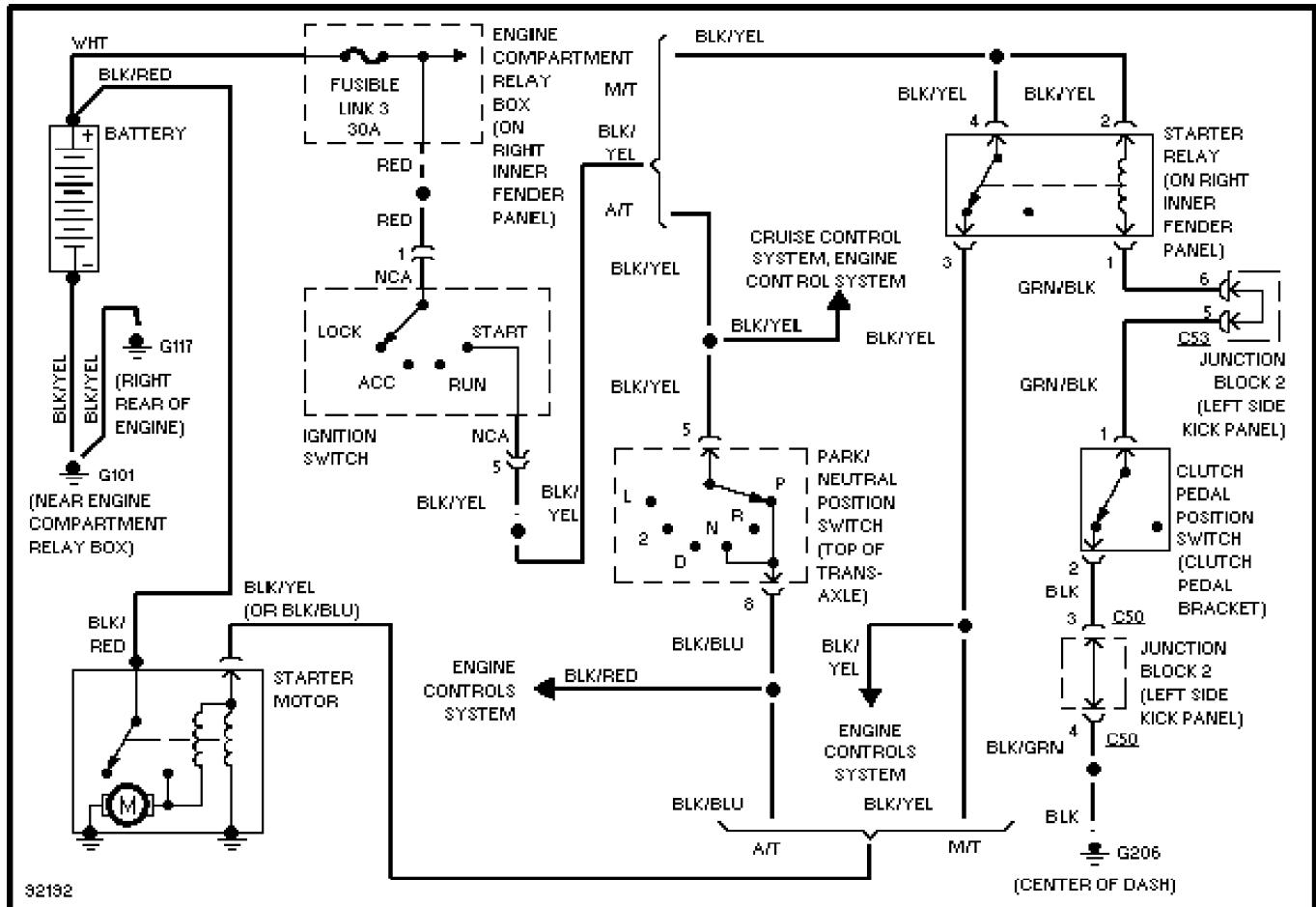


Fig. 14: Starting System Wiring Diagram (Galant Without Anti-Theft)

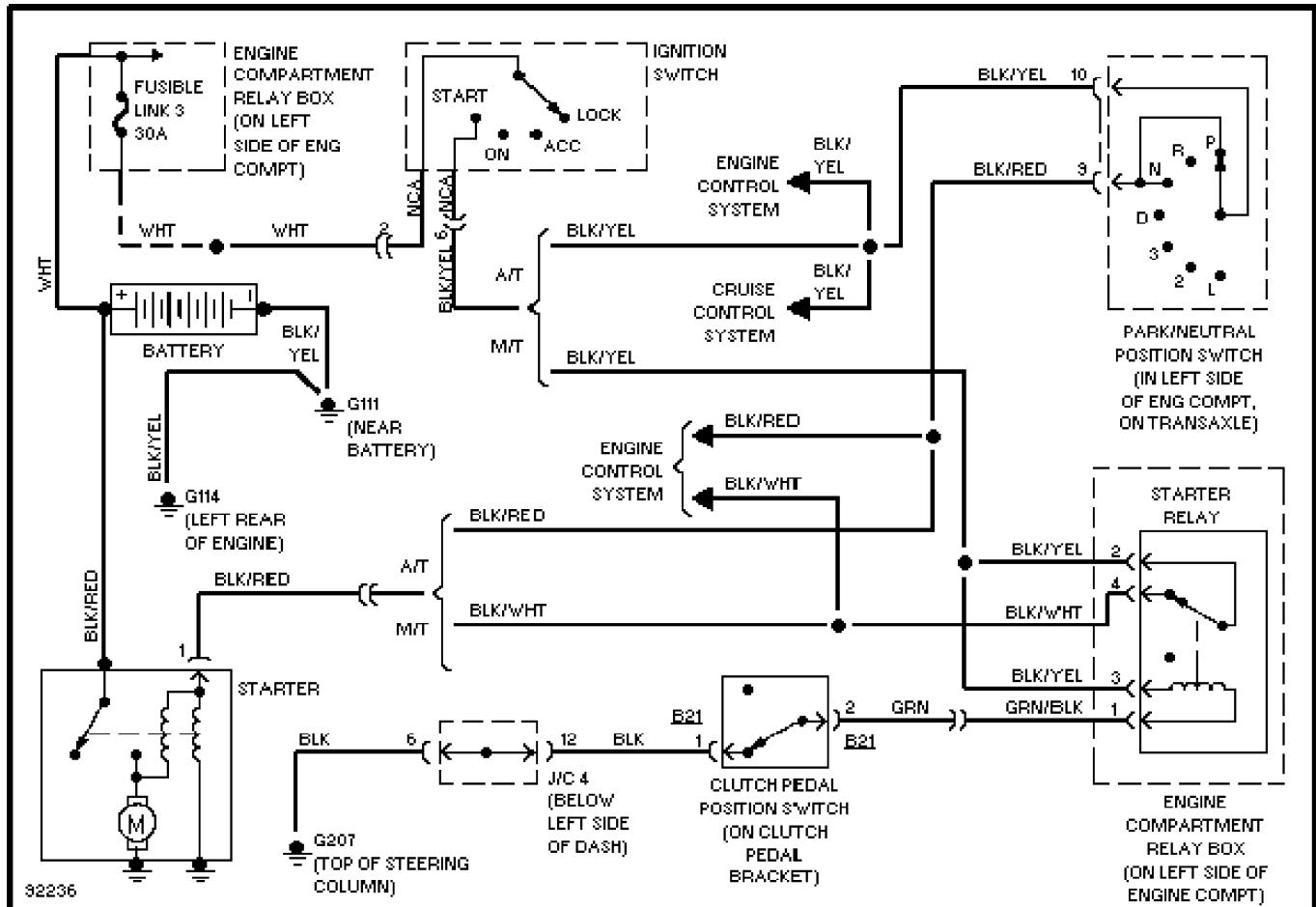


Fig. 15: Starting System Wiring Diagram (Mirage)

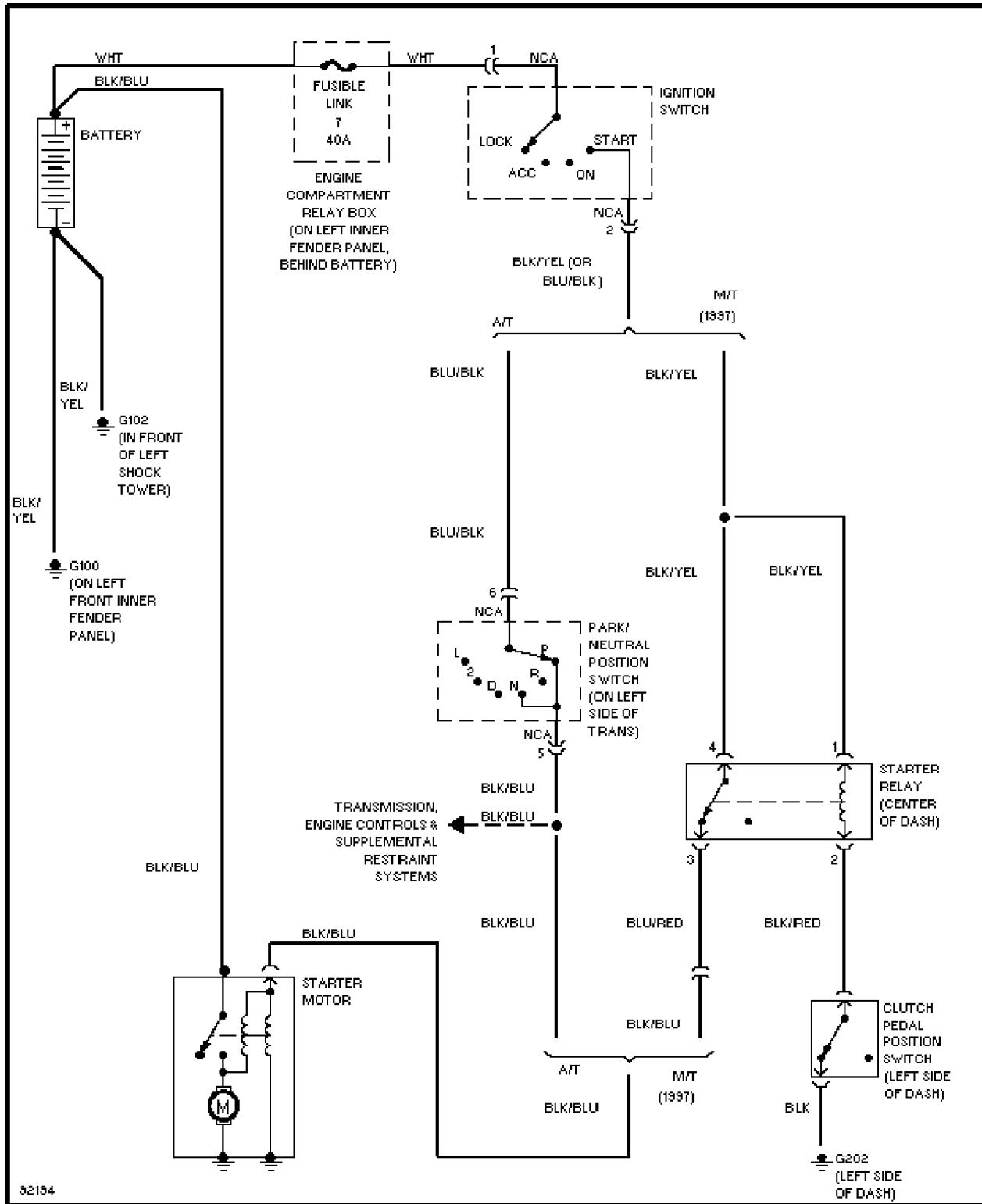


Fig. 16: Starting System Wiring Diagram (Montero)

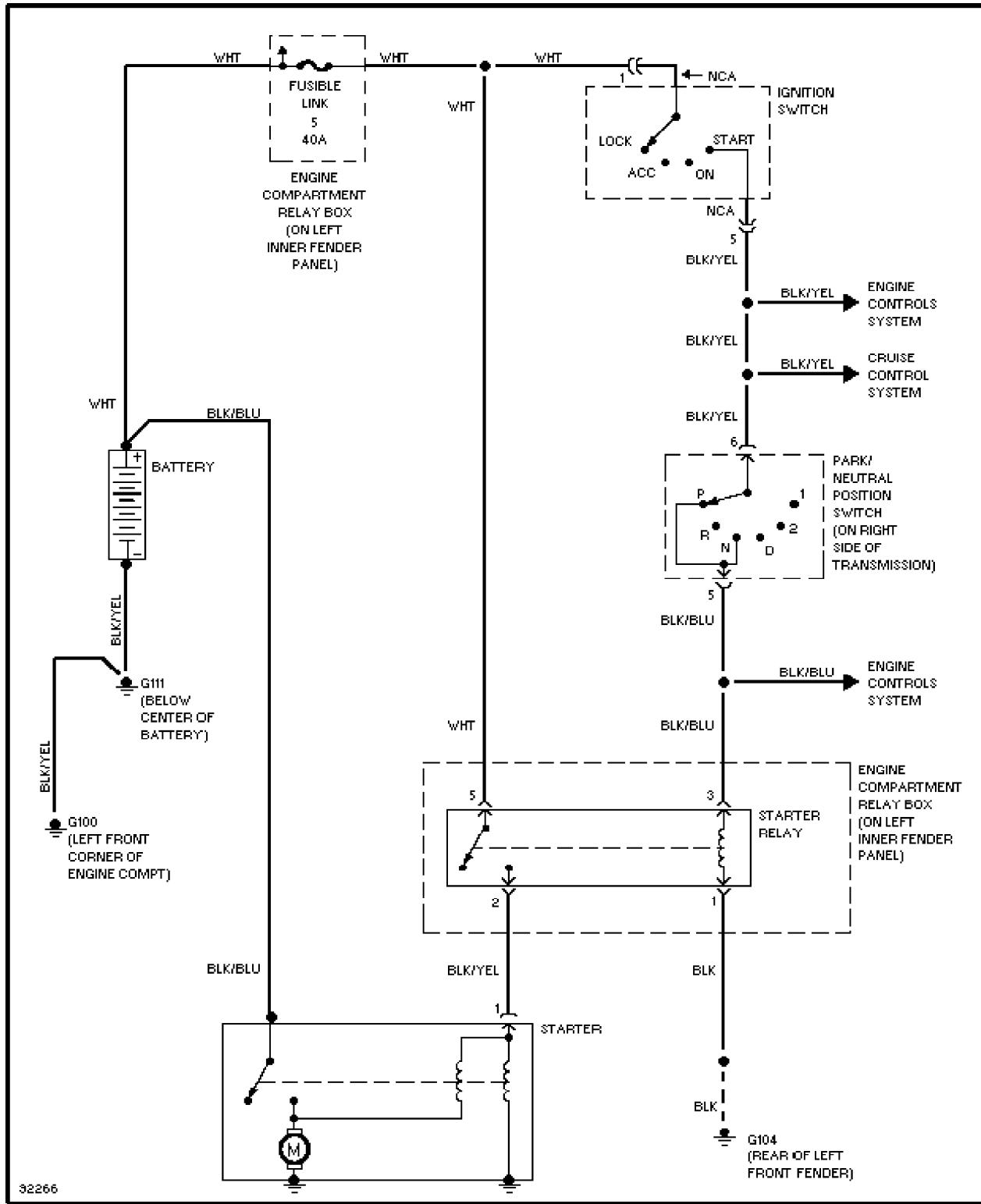


Fig. 17: Starting System Wiring Diagram (Montero Sport A/T)

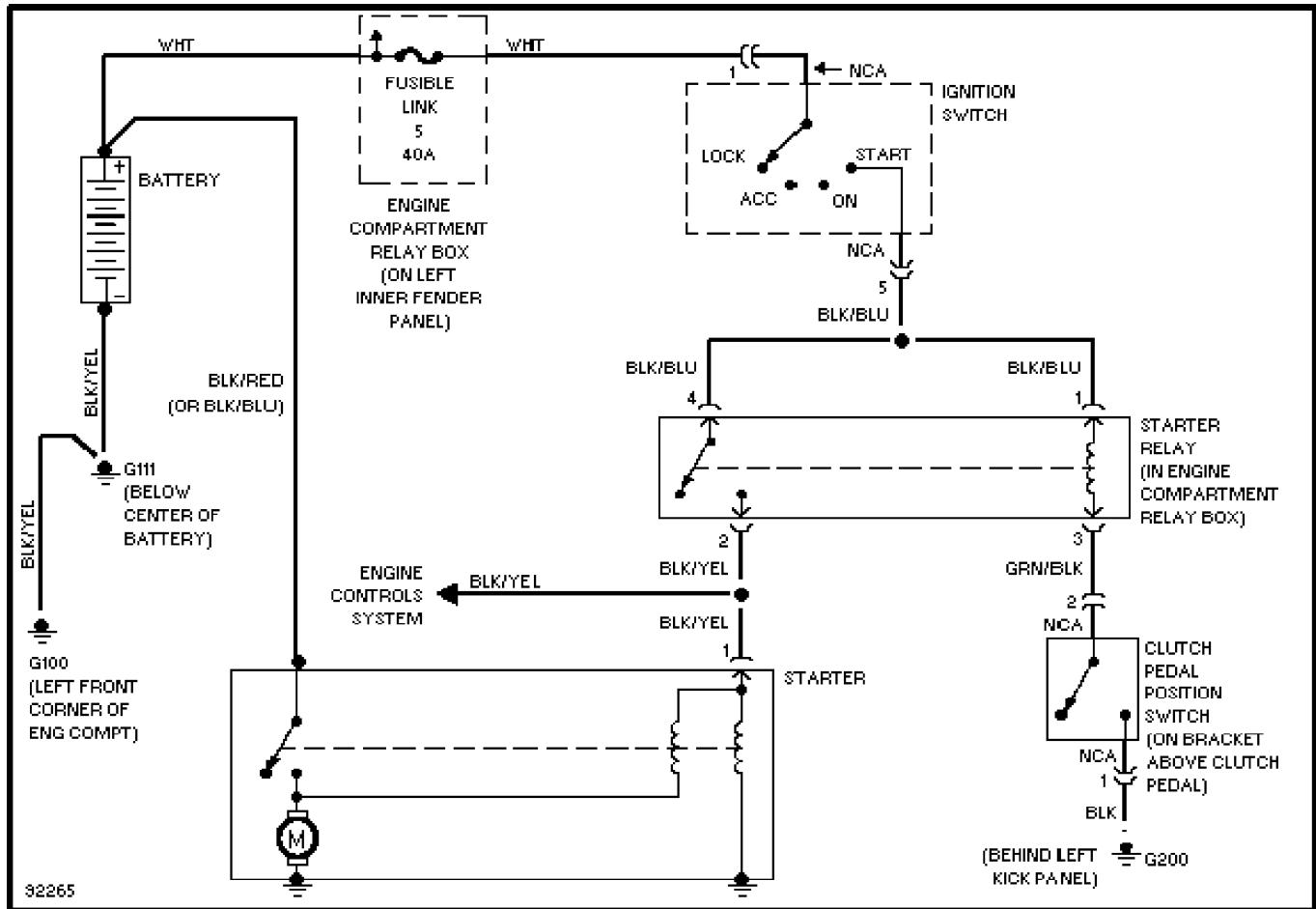


Fig. 18: Starting System Wiring Diagram (Montero Sport M/T)

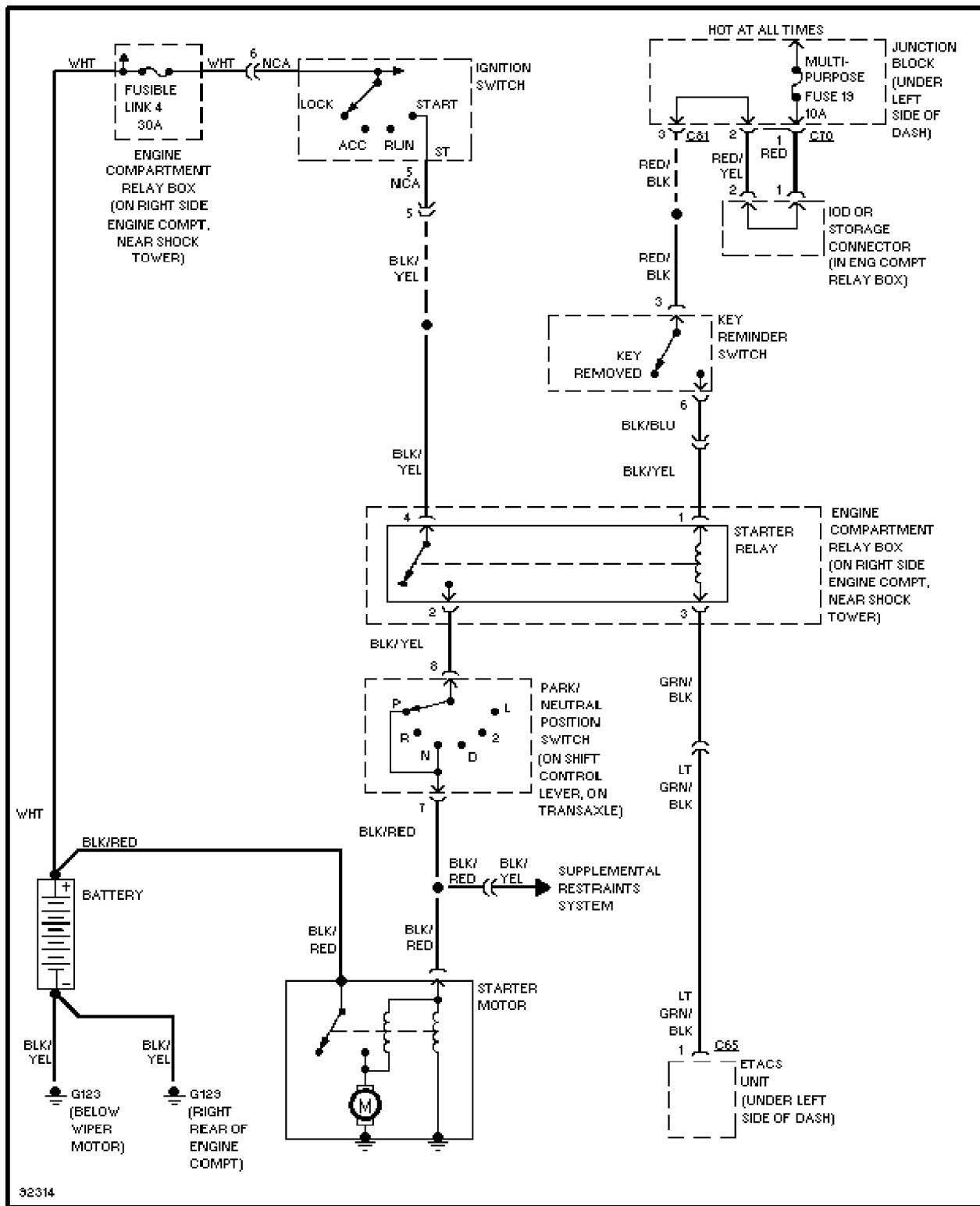


Fig. 19: Starting System Wiring Diagram (3000GT A/T With Anti-Theft)

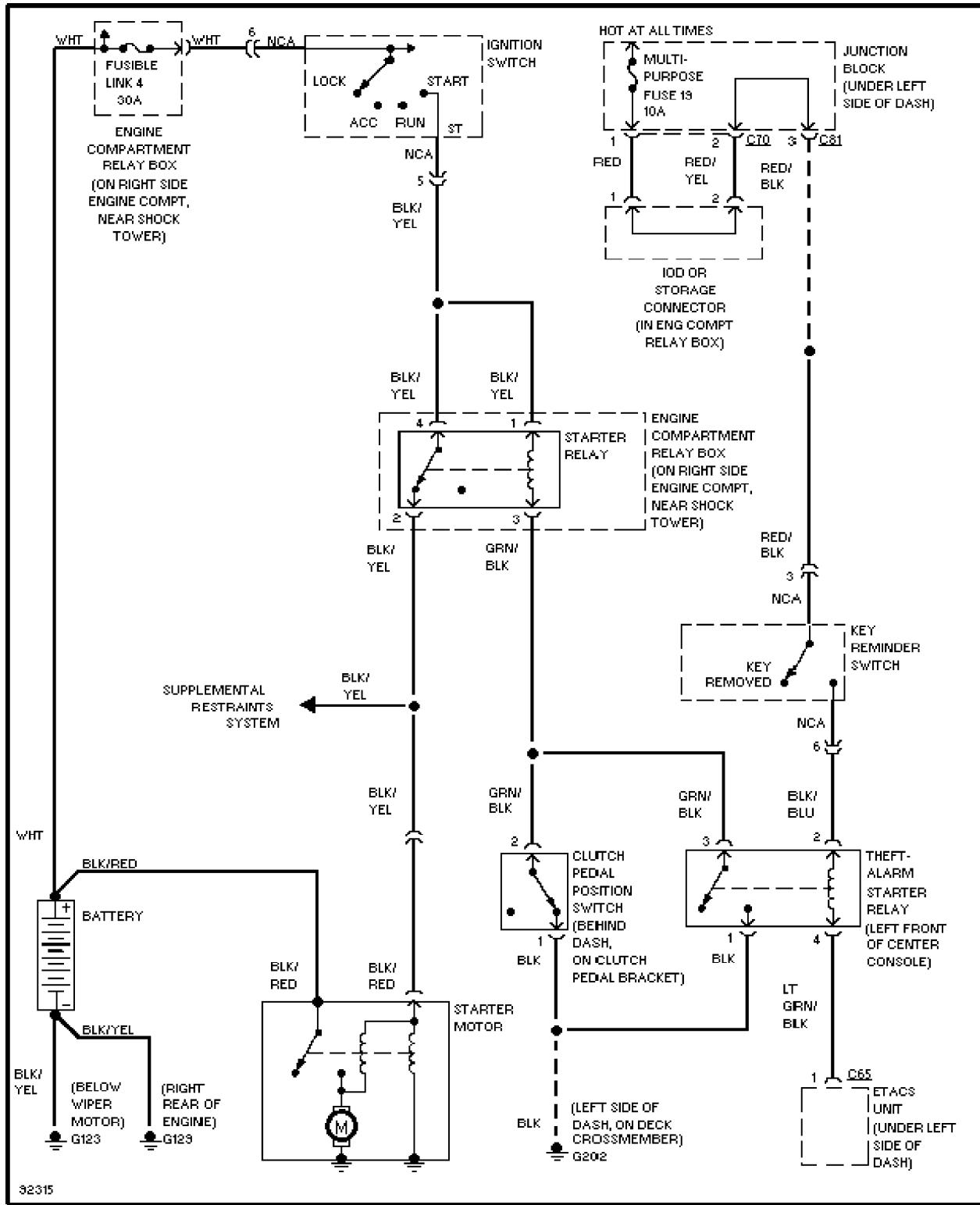


Fig. 20: Starting System Wiring Diagram (3000GT M/T With Anti-Theft)

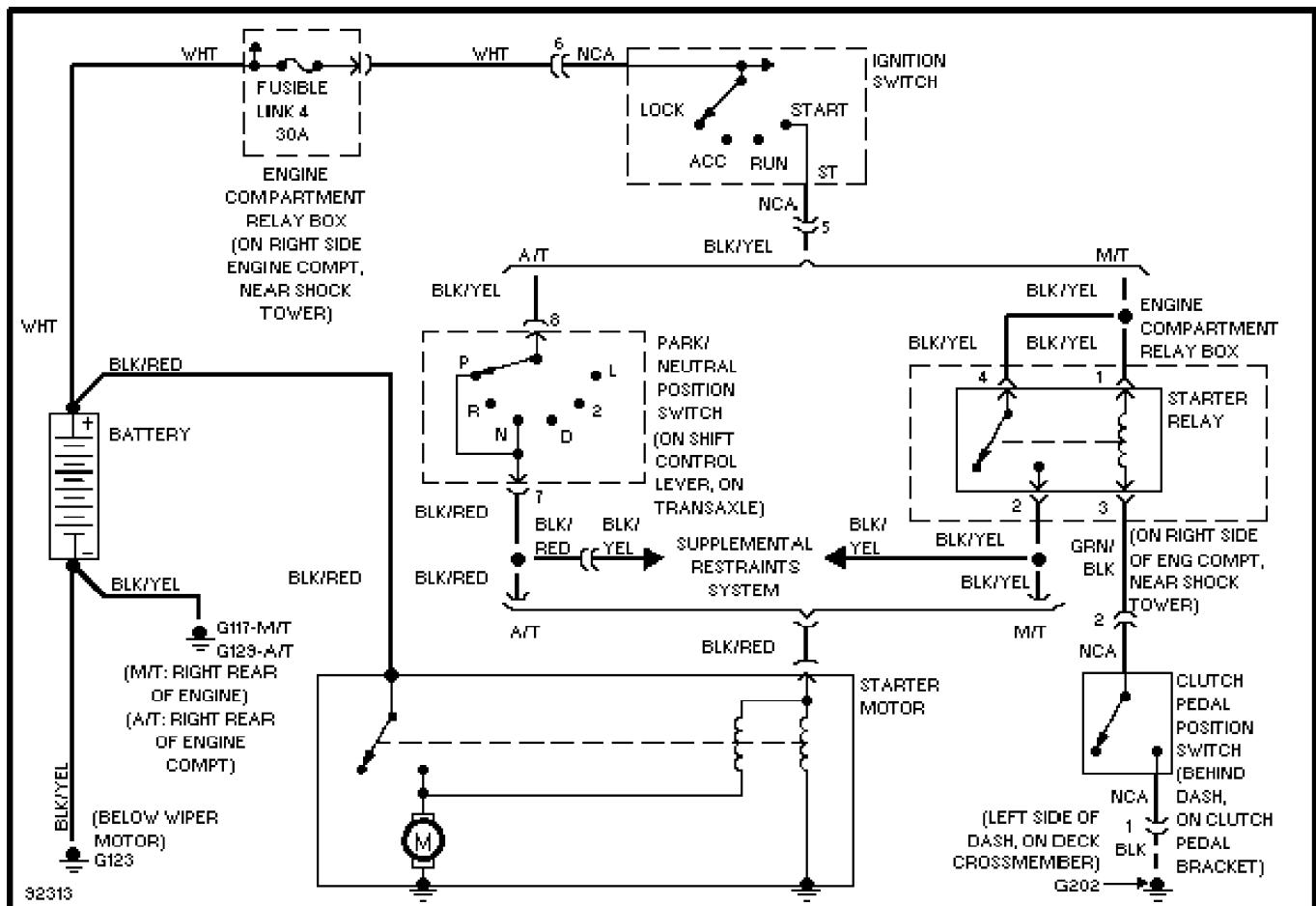


Fig. 21: Starting System Wiring Diagram (3000GT Without Anti-Theft)