

STARTING SYSTEMS

TABLE OF CONTENTS

	page		page
REMOVAL AND INSTALLATION		SPECIFICATIONS	
STARTER — LHD (DIESEL)	1	STARTING SYSTEM	3
STARTER — RHD (DIESEL).....	2	TORQUE SPECIFICATIONS.....	4
STARTER RELAY	3		

REMOVAL AND INSTALLATION

STARTER — LHD (DIESEL)

Removal

- (1) Disconnect the negative battery cable.
- (2) Remove the innercooler inlet hose from turbo-charger and position it out of the way (Fig. 1).

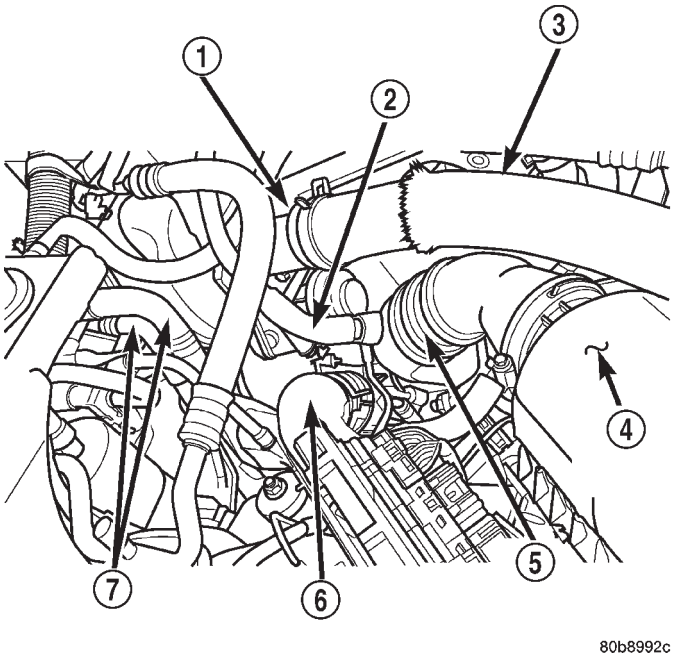


Fig. 1 LHD Engine Compartment — Diesel

- 1 - INTAKE MANIFOLD ELBOW
- 2 - BREATHER HOSE
- 3 - INNERCOOLER OUTLET HOSE
- 4 - AIR FILTER COVER
- 5 - AIR FILTER OUTLET (FRESH AIR) HOSE
- 6 - INNERCOOLER INLET HOSE
- 7 - HEATER CORE COOLANT SUPPLY HOSES

- (3) Remove the (2) right engine mount upper sill plate nuts.
- (4) Raise the vehicle on a hoist.

- (5) Remove the turbocharger oil return hose from engine block and plug (Fig. 2).

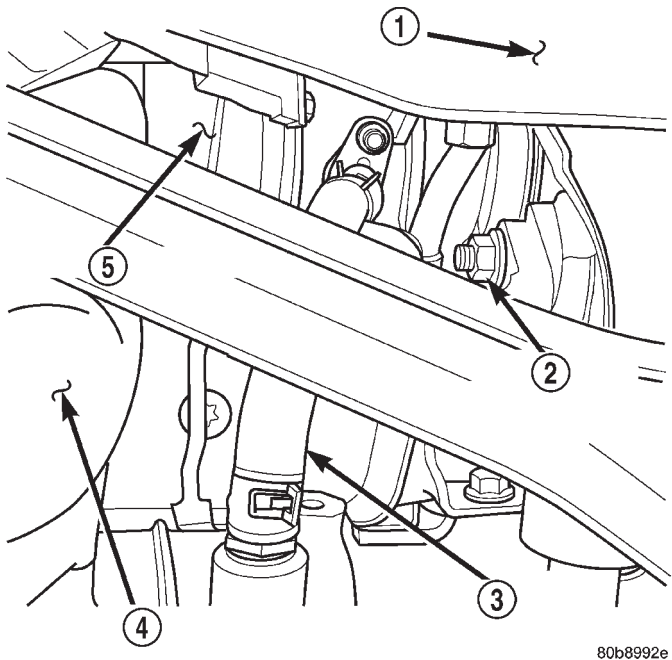


Fig. 2 Turbocharger Oil Return Hose — Position & Orientation

- 1 - VEHICLE UNDERBODY
- 2 - RIGHT ENGINE MOUNT THROUGHBOLT NUT
- 3 - TURBOCHARGER OIL RETURN HOSE
- 4 - EXHAUST MANIFOLD DOWNPIPE
- 5 - TURBOCHARGER

- (6) Remove the right engine mount through bolt nut only (Fig. 2). Do not remove the bolt at this time.
- (7) Position a jack stand and raise the weight off the right engine mount.
- (8) Remove the (2) right engine mount lower sill plate bolts.
- (9) Remove the (4) right engine mount bracket to engine block retaining bolts.
- (10) Remove the engine mount throughbolt.
- (11) Remove the engine mount and the engine mount bracket from the vehicle.

REMOVAL AND INSTALLATION (Continued)

- (12) Remove the starter motor support bracket.
- (13) Disconnect the starter motor electrical connectors.

CAUTION: Heatshields are very sharp. Wear gloves to prevent injury.

- (14) Remove the starter heatshield.
- (15) Remove the (3) starter motor retaining bolts.
- (16) Remove the starter motor from the vehicle.

Installation

- (1) Position the starter motor and install retaining bolts. Torque bolts to 27 N·m (20 ft. lbs.).
- (2) Connect the starter motor electrical. Torque (B+) nut to 27 N·m (20 ft. lbs.).

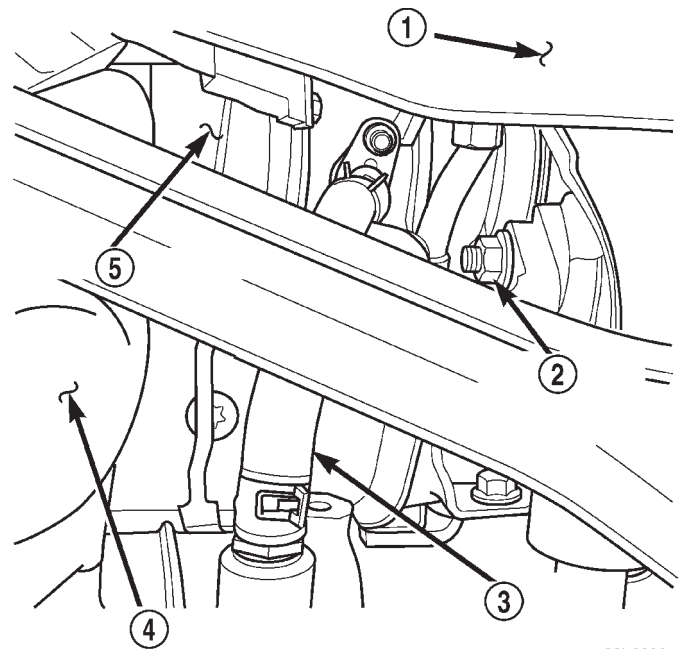
CAUTION: Heatshields are very sharp. Wear gloves to prevent injury.

- (3) Install the starter heatshield.
- (4) Install the starter motor support bracket. Torque nuts to 10 N·m (90 in. lbs.).
- (5) Install the engine mount and engine mount bracket in the vehicle, making sure sill plate studs are through engine mount.
- (6) Install the engine mount throughbolt and nut leaving them loose at this time.
- (7) Install the (4) engine mount bracket to engine block bolts. Torque bolts to 61 N·m (45 ft. lbs.).
- (8) Tighten, but do not torque (2) right engine mount lower bolts.
- (9) Remove the jack stand.
- (10) Torque the (2) lower engine mount bolts to 54 N·m (40 ft. lbs.).
- (11) Torque throughbolt nut to 65 N·m (48 ft. lbs.).
- (12) Install the oil return line on the engine block nipple.
- (13) Lower the vehicle from the hoist.
- (14) Install the (2) engine mount upper sill plate nuts. Torque nuts to 41 N·m (30 ft. lbs.).
- (15) Install the innercooler inlet hose on turbocharger.
- (16) Connect the negative battery cable.

STARTER — RHD (DIESEL)

REMOVAL

- (1) Disconnect the negative battery cable.
- (2) Make sure steering wheel is in the unlocked position.
- (3) Raise the vehicle on a hoist.
- (4) Rotate the front wheels to access and remove the steering shaft pinch bolt, slide shaft straight off gearbox input shaft and position steering shaft aside.
- (5) Remove the turbocharger oil return line from engine block and plug (Fig. 3).



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Fig. 3 Turbocharger Oil Return Line

- 1 - VEHICLE UNDERBODY
- 2 - RIGHT ENGINE MOUNT THROUGHBOLT NUT
- 3 - TURBOCHARGER OIL RETURN HOSE
- 4 - EXHAUST MANIFOLD DOWNPIPE
- 5 - TURBOCHARGER

- (6) Remove the right engine mount through bolt nut only (Fig. 3). Do not remove the bolt at this time.
- (7) Remove the engine mount upper sill plate nuts.
- (8) Position a jack stand and raise weight off right engine mount.
- (9) Remove the track bar support bracket retaining bolts and remove bracket.
- (10) Remove the remaining lower engine mount bolt from the sill plate.
- (11) Remove the (4) engine mount bracket bolts.
- (12) Remove the engine mount throughbolt.
- (13) Remove the engine mount and engine mount bracket from the vehicle.
- (14) Remove the starter motor support bracket.

CAUTION: Heatshield is very sharp. Wear gloves to prevent injury.

- (15) Remove the starter heat shield.
- (16) Disconnect the starter motor electrical connectors.
- (17) Remove the (3) stater motor retaining bolts.
- (18) Remove the starter motor from the vehicle.

Installation

- (1) Position the starter motor. Torque retaining bolts to 27 N·m (20 ft. lbs.).

REMOVAL AND INSTALLATION (Continued)

(2) Reconnect the starter motor electrical. Torque (B+) nut to 27 N·m (20 ft. lbs.).

CAUTION: Heatshield is very sharp. Wear gloves to prevent injury.

(3) Install the starter heat shield.

(4) Install the starter motor support bracket. Torque bolt to 47 N·m (35 ft. lbs.). Torque nuts to 10 N·m (90 in. lbs.).

(5) Install the engine mount and engine mount bracket in the vehicle.

(6) Install the engine mount throughbolt and nut leaving them loose at this time.

(7) Install, but do not torque the engine mount and track bar support bracket bolts

(8) Install the (4) engine mount bracket to engine block bolts. Torque bolts to 61 N·m (45 ft. lbs.).

(9) Remove the jack stand.

(10) Install and torque the upper engine mount sill plate nuts to 41 N·m (30 ft. lbs.).

(11) Torque the lower engine mount retaining bolts to 54 N·m (40 ft. lbs.).

(12) Torque the larger track bar support bracket bolts to 125 N·m (92 ft. lbs.).

(13) Torque the engine mount throughbolt nut to 65 N·m (48 ft. lbs.).

(14) Install the oil return line on the engine block nipple.

(15) Install steering shaft pinch bolt. Torque to 49 N·m (36 ft. lbs.).

(16) Lower the vehicle from the hoist.

(17) Connect the negative battery cable.

STARTER RELAY

(1) Disconnect and isolate the battery negative cable.

(2) Remove the cover from the Power Distribution Center (PDC).

(3) Refer to the label on the PDC for starter relay identification and location.

(4) Unplug the starter relay from the PDC.

(5) Install the starter relay by aligning the relay terminals with the cavities in the PDC and pushing the relay firmly into place.

(6) Install the PDC cover.

(7) Connect the battery negative cable.

(8) Test the relay operation.

SPECIFICATIONS

STARTING SYSTEM

Starter and Solenoid	
Engine Application	2.5L Diesel
Power Rating	2.2 Kilowatt
Voltage	12 Volts
Number of Fields	4
Number of Poles	4
Number of Brushes	4
Drive Type	Planetary Gear Reduction
Free Running Test Voltage	11.5 Volts
Free Running Test Maximum Amperage Draw	160 Amperes
Free Running Test Minimum Speed	5500 rpm
Solenoid Closing Maximum Voltage	7.8 Volts
*Cranking Amperage Draw test	350 Amperes
*Test at operating temperature. Cold engine, tight (new) engine, or heavy oil will increase starter amperage draw.	

TORQUE SPECIFICATIONS

DESCRIPTION	TORQUE
Engine Mount Throughbolt	65 N·m (48 ft. lbs.)
Engine Mount Upper Sill Plate Nuts	41 N·m (30 ft. lbs.)
Engine Mount to Engine Mounting Bolts . .	61 N·m (45 ft. lbs.)
Lower Engine Mount Bolts	54 N·m (40 ft. lbs.)
Stater Motor (B+) Terminal	27 N·m (20 ft. lbs.)
Starter Motor Retaining Bolts . .	27 N·m (20 ft. lbs.)
Starter Motor Support Bracket Nuts	10 N·m (90 in. lbs.)
Steering Shaft Pinch Bolt	49 N·m (36 ft. lbs.)
Track Bar Support Bracket Bolts	125 N·m (92 ft. lbs.)