Drivetrain and Front Suspension Cradle Replacement

Special Tools

- EN-45059 Angle Meter
- CH-51034 Pins Pin Through Net

Equivalent regional tools: Special Tools

Removal Procedure

**Caution:** With wheels of the vehicle facing straight ahead, secure the steering wheel utilizing steering column anti-rotation pin, steering column lock, or a strap to prevent rotation. Locking of the steering column will prevent damage and a possible malfunction of the SIR system. The steering wheel must be secured in position before disconnecting the following components:

- The steering column
- The intermediate shaft(s)
- The steering gear

After disconnecting these components, do not rotate the steering wheel or move the front tires and wheels. Failure to follow this procedure may cause the SIR coil assembly to become un-centered and cause possible damage to the SIR coil. If you think the SIR coil has become un-centered, refer to your specific SIR coil’s centering procedure to re-center SIR Coil.

**Caution:** Electrostatic discharge (ESD) can damage many solid-state electrical components. ESD susceptible components may or may not be labeled with the ESD symbol. Handle all electrical components carefully. Use the following precautions in order to avoid ESD damage:

- Touch a metal ground point in order to remove your body's static charge before servicing any electronic component; especially after sliding across the vehicle seat.
- Do not touch exposed terminals. Terminals may connect to circuits susceptible the ESD damage.
- Do not allow tools to contact exposed terminals when servicing connectors.
- Do not remove components from their protective packaging until required to do so.
- Avoid the following actions unless required by the diagnostic procedure:
  - Jumpering or grounding of the components or connectors.
  - Connecting test equipment probes to components or connectors. Connect the ground lead first when using test probes.
- Ground the protective packaging of any component before opening. Do not rest solid-state components on metal workbenches, or on top of TVs, radios, or other electrical devices.

1. Disable the high voltage system. [High Voltage Disabling](#)
2. Disconnect the steering intermediate shaft from the steering gear. [Intermediate Steering Shaft Replacement](#)
3. Remove the front tire and wheel assemblies. [Tire and Wheel Removal and Installation](#)
5. Front Compartment Air Deflector » Remove — Front Compartment Air Deflector Replacement  
6. Front Compartment Splash Shield » Remove — Front Compartment Splash Shield Replacement  
7. Front Underbody Air Deflector » Remove — Front Underbody Air Deflector Replacement  
8. Support the radiator using mechanics wire.  
9. Radiator Air Side Baffle Bolt (1) @ Radiator Air Lower Baffle Bracket (2) » Remove [2x]  
10. Generator Control Module Coolant Pump Bracket (1) » Remove — Generator Control Module Coolant Pump Replacement
11. Heater Water Bypass Valve Bracket Bolt (1) @ Heater Water Bypass Valve Bracket (2) » Remove [2x]

12. Hose Clamp (1) » Remove [2x]

13. Hose Clamp (4) » Remove

14. Remove the hose (2) from the 2 clamps (3)

15. Hose Clip (5) » Remove
16. Drivetrain and Front Suspension Cradle Bolt(3) » Remove[2x]
17. Remove the drivetrain and front suspension brace (2) from the drivetrain and front suspension cradle (1).

18. Exhaust Front Pipe » Remove — Exhaust Front Pipe Replacement

**Note:** Hold against the hex of the threaded stud to release the nuts. Use a suitable tool.

**Note:** Support the front suspension with a hydraulic jack to disconnect the stabilizer shaft links.

19. Stabilizer Shaft Link Nut(2) » Remove[2x]
20. Stabilizer Shaft Link(1) @ Stabilizer Shaft(3) » Disconnect[2x]
**Note:** Support the front suspension under the front lower control arm ball joint with a hydraulic jack to release the nut.

21. Lower Ball Joint Nut(1)»Remove [2x]

22. Separate the steering knuckle (2) from the lower ball joint stud (3).[2x]

23. Disconnect the outer tie rod from the steering knuckle.[2x]—[Steering Linkage Outer Tie Rod Replacement](#)

24. Transmission Mount Strut Bolt(1)@Transmission Mount Strut(2)»Remove and DISCARD
25. Support the drivetrain and front suspension cradle (1) with a suitable hydraulic jack (2).

26. Wiring Harness @ Drivetrain and Front Suspension Cradle » Disconnect as necessary

27. Wiring Harness @ Drivetrain and Front Suspension Crossmember Extension » Disconnect as necessary

28. Wiring Harness @ Electric Belt Drive Rack and Pinion Steering Gear » Disconnect as necessary

29. Drivetrain and Front Suspension Crossmember Extension » Remove — Drivetrain and Front Suspension Crossmember Extension Replacement

30. Drivetrain and Front Suspension Cradle Bolt (2) @ Drivetrain and Front Suspension Cradle (1) » Remove and DISCARD[6x]

31. Carefully lower the drivetrain and front suspension cradle as far as necessary to disconnect the wiring harness.
**Note:** Wiring harness routing is critical. Note the exact routing of the steering gear wiring harness before repositioning it.

32. Electrical Connector(1)@Power Steering Assist Motor(2)»Disconnect
33. Electrical Connector(3)@Power Steering Assist Motor(2)»Disconnect
34. Carefully lower the drivetrain and front suspension cradle.

35. Stabilizer Shaft Bracket Bolt(1)»Remove and DISCARD[4x]
36. Stabilizer Shaft(2)»Remove
37. Steering Gear Bolt(4)@Electric Belt Drive Rack and Pinion Steering Gear(3)»Remove and DISCARD[3x]
38. Steering Gear Nut(1)@Electric Belt Drive Rack and Pinion Steering Gear(3)»Remove[3x]
39. Remove the 3 washers (2) from the electric belt drive rack and pinion steering gear.
40. Electric Belt Drive Rack and Pinion Steering Gear(3)»Remove

41. Front Lower Control Arm Bushing Bolt(1)»Remove and DISCARD[4x]
42. Front Lower Control Arm Rear Bushing Bolt(3)»Remove and DISCARD[4x]
43. Front Lower Control Arm Rear Bushing Nut(2)»Remove and DISCARD[4x]
44. Front Lower Control Arm(4)»Remove[2x]
45. Transmission Mount Strut Bolt(2) » Remove and DISCARD
46. Transmission Mount Strut(1) » Remove
47. Transfer components as necessary.

**Installation Procedure**

1. Transmission Mount Strut(1) » Install
   - **Warning:** Torque-to-Yield Fastener Warning
   - **Caution:** Fastener Caution
2. Transmission Mount Strut Bolt(2) » Install NEW — Transmission Mount Strut Replacement
3. Front Lower Control Arm (4) » Install [2x]

**Warning:** Torque-to-Yield Fastener Warning

4. Front Lower Control Arm Rear Bushing Bolt (3) » Install NEW [4x] — Lower Control Arm Replacement

5. Front Lower Control Arm Rear Bushing Nut (1) » Install NEW [4x] — Lower Control Arm Replacement

**Warning:** Torque-to-Yield Fastener Warning

6. Front Lower Control Arm Bushing Bolt (1) » Install NEW [4x] — Lower Control Arm Replacement

7. Electric Belt Drive Rack and Pinion Steering Gear (3) » Install

8. Install the 3 washers (2) to the electric belt drive rack and pinion steering gear.

9. Steering Gear Nut (1) @ Electric Belt Drive Rack and Pinion Steering Gear » Install [3x]

10. Steering Gear Bolt (4) @ Electric Belt Drive Rack and Pinion Steering Gear (3) » Install NEW [3x] — Electric Belt Drive Rack and Pinion Steering Gear Replacement
10.1. Stabilizer Shaft(2) » Install

10.2. Stabilizer Shaft Bracket Bolt(1) » Install and tighten the NEW bolt. [4x] — Stabilizer Shaft Replacement

11. Make sure the notch in the steering column dash outer seal (1) is still correctly aligned to the nose on the electric belt drive rack and pinion steering gear.

12. Raise the drivetrain and front suspension cradle to the vehicle.
13. Electrical Connector(1)@Power Steering Assist Motor(2)»Connect
14. Electrical Connector(3)@Power Steering Assist Motor(2)»Connect

15. Install the 2 CH-51034 alignment pins (1, 3) to arrange the drivetrain and front suspension cradle during tightening.
16. Make sure that the drivetrain and front suspension cradle (2) fits closely to the vehicle.
17. Make sure that the 2 CH-51034 alignment pins fit closely to the drivetrain and front suspension cradle (2).
18. Make sure the steering column dash outer seal (3) fits correctly on the electric belt drive rack and pinion steering gear (2). See arrows.
19. Make sure the steering column dash outer seal (3) fits correctly on the dash panel front lower cross bar (1). See arrows.
20. Wiring Harness@Drivetrain and Front Suspension Cradle»Connect as necessary
21. Wiring Harness@Drivetrain and Front Suspension Crossmember Extension»Connect as necessary
22. Wiring Harness@Electric Belt Drive Rack and Pinion Steering Gear»Connect as necessary

23. Transmission Mount Strut Bolt(1)@Transmission Mount Strut(2)»Install NEW bolts.—Do NOT tighten.—[Transmission Mount Strut Replacement]
**Warning: Torque-to-Yield Fastener Warning**

24. Drivetrain and Front Suspension Cradle Bolt (1) » Install NEW[6x]

**Tighten:**
24.1. First Pass: **70 N•m (52 lb ft)**
24.2. Final Pass: **45 - 60 degrees**, use the EN-45059 meter

25. Drivetrain and Front Suspension Crossmember Extension » Install — [Drivetrain and Front Suspension Crossmember Extension Replacement](#)

**Warning: Torque-to-Yield Fastener Warning**

26. Transmission Mount Strut Bolt(1) @ Transmission Mount Strut(2) » Install NEW — [Transmission Mount Strut Replacement](#)
**Note:** Hold against the hex of the threaded stud to tighten the nuts. Use a suitable tool.

**Note:** Support the front suspension with a hydraulic jack to connect the stabilizer shaft links.

27. Stabilizer Shaft Link(1)@Stabilizer Shaft(3) » Connect[2x]

28. Stabilizer Shaft Link Nut(2)@Stabilizer Shaft Link(1) » Install and tighten the nut [2x]—Steering Linkage Outer Tie Rod Replacement

29. Connect the outer tie rod to the steering knuckle.[2x]—Steering Linkage Outer Tie Rod Replacement

**Note:** Support the lower control arm under the ball joint with a hydraulic jack to tighten the nut.

30. Install the lower ball joint stud (3) to the steering knuckle (2).

**Warning:** Torque-to-Yield Fastener Warning

31. Lower Ball Joint Nut(1) » Install[2x]—Lower Control Arm Replacement
32. Radiator Air Side Baffle Bolt(1)@Radiator Air Lower Baffle Bracket (2) »Install and tighten[2x]— Radiator Air Lower Baffle and Deflector Replacement

33. Generator Control Module Coolant Pump Bracket(1) »Install— Generator Control Module Coolant Pump Replacement
34. Heater Water Bypass Valve Bracket Bolt (1) @ Heater Water Bypass Valve Bracket (2) » Install and tighten [2x] — **Heater Water Shutoff Valve Replacement**

35. Hose Clamp (1) » Install [2x]
36. Hose Clamp (4) » Install
37. Install the hose (2) to the 2 clamps (3)
38. Hose Clip (5) » Install
39. Exhaust Front Pipe » Install — **Exhaust Front Pipe Replacement**
40. Install the drivetrain and front suspension brace (2) to the drivetrain and front suspension cradle (1).

41. Drivetrain and Front Suspension Cradle Bolt(3)»Tighten[2x]58N·m (43 lb ft)

42. Remove the mechanics wire supporting the radiator.

43. Front Underbody Air Deflector »Install— Front Underbody Air Deflector Replacement

44. Front Compartment Splash Shield»Install— Front Compartment Splash Shield Replacement

45. Front Compartment Air Deflector »Install— Front Compartment Air Deflector Replacement

46. Front Wheelhouse Liner»Install[2x]— Front Wheelhouse Liner Replacement

47. Connect the steering intermediate shaft to the steering gear. Intermediate Steering Shaft Replacement

48. Enable the high voltage system. High Voltage Enabling

49. Check the steering wheel angle sensor centering. Steering Wheel Angle Sensor Centering

50. Check the wheel alignment. Wheel Alignment Measurement