2014 ENGINE

Engine Mechanical - 1.4L (LUV) - Sonic

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Air Conditioning Compressor Bracket Bolts	22 N.m	16 lb ft
Camshaft Actuator	50 N.m + 60 degrees	37 lb ft + 60 degrees
Camshaft Bearing Cap Bolts	8 N.m	71 lb in
Camshaft Cover Bolts	8 N.m	71 lb in
Camshaft Position Actuator Solenoid Valve	8 N.m	71 lb in
Camshaft Position Sensor Bolt	6 N.m	53 lb in
Camshaft Sprocket Bolt	50 N.m + 60 degrees (1)	37 lb ft + 60 degrees (1)
Catalytic Converter Bracket to Cylinder Block	22 N.m	16 lb ft
Catalytic Converter to Bracket	22 N.m	16 lb ft
Catalytic Converter to Turbocharger (V-clamp)	13 N.m	115 lb in
Connecting Rod Bearing Cap	25 N.m + 45 degrees (1)	18 lb ft + 45 degrees (1)
Crankshaft Balancer Bolt	150 N.m + 45 degrees + 15 degrees (1)	111 lb ft + 45 degrees + 15 degrees (1)
Crankshaft Bearing Tie Plate Bolts (M6)	10 N.m + 60 degrees + 15 degrees (1)	89 lb in + 60 degrees + 15 degrees (1)
Crankshaft Bearing Tie Plate Bolts (M8)	25 N.m + 60 degrees + 15 degrees (1)	18 lb ft + 60 degrees + 15 degrees (1)
Crankshaft Position Sensor Bolt	8 N.m	71 lb in
Cylinder Head Bolts	35 N.m + 180 degrees (1)	26 lb ft + 180 degrees (1)
Drive Belt Tensioner Bolt M8	22 N.m	16 lb ft
Drive Belt Tensioner Bolt M10	55 N.m	41 lb ft
Engine Cooling Thermostat Housing Bolts	8 N.m	71 lb in
Engine Front Cover Bolts M10	35 N.m	26 lb ft
Engine Front Cover Bolts M6	8 N.m	71 lb in
Engine Mount Bracket Bolts	60 N.m + 45-60 degrees (1)	44 lb ft + 45-60 degrees (1)
Engine Mount Right Side to Body	62 N.m	46 lb ft
	50 N.m + 60-75	37 lb ft + 60-75

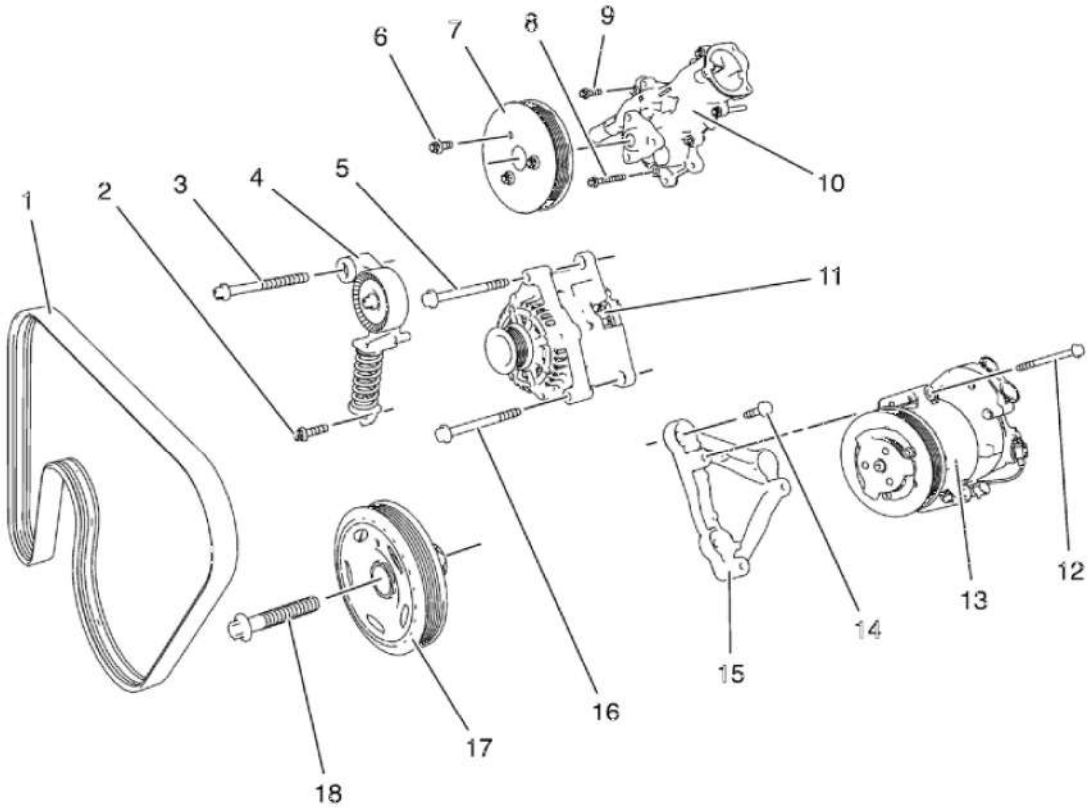


Fig. 1: Locating Accessory Drive Components
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Generator And Air Conditioning Compressor Belt
2	Drive Belt Tensioner Bolt (short)
3	Drive Belt Tensioner Bolt (long)
4	Drive Belt Tensioner
5	Upper Generator Bolt
6	Water Pump Pulley Bolt
7	Water Pump Pulley
8	Water Pump Bolt (Long)
9	Water Pump Bolt (Short)
10	Water Pump
11	Generator
12	Air Conditioning Compressor Bolt

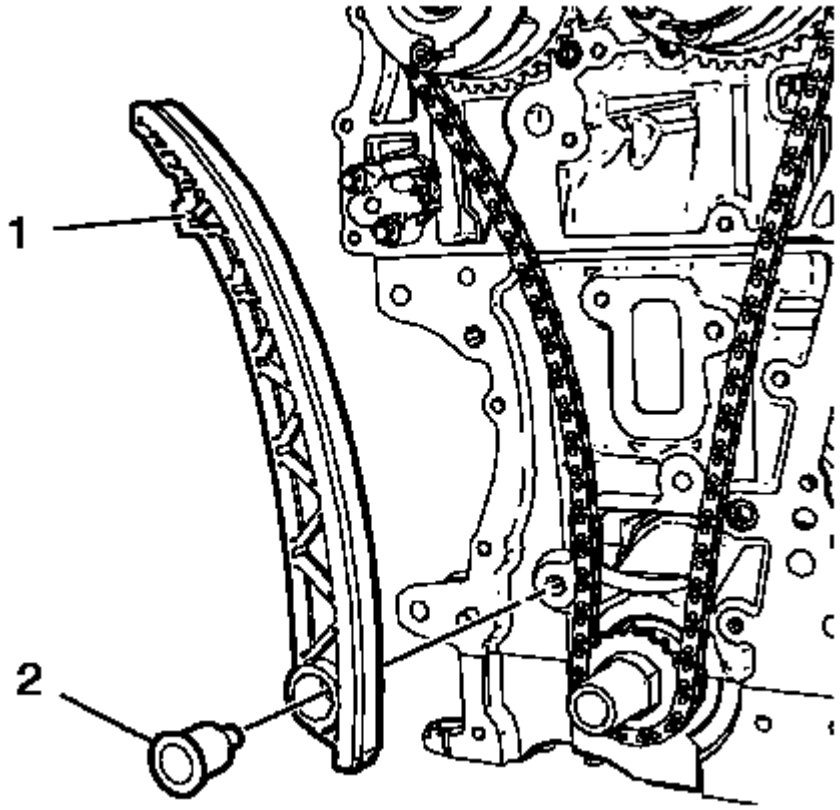


Fig. 48: Timing Chain Tensioner Shoe And Bolt
Courtesy of GENERAL MOTORS COMPANY

7. Remove the timing chain tensioner shoe bolt (2).
8. Remove the timing chain tensioner shoe (1).

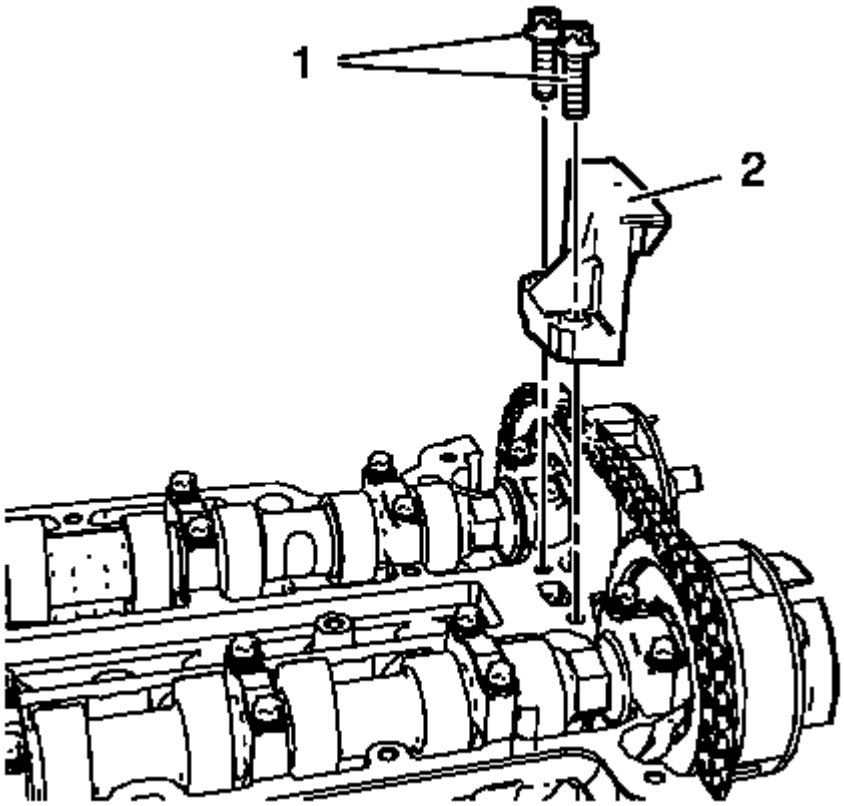


Fig. 94: Upper Timing Chain Guide And Bolts
Courtesy of GENERAL MOTORS COMPANY

33. Install the upper timing chain guide (2).
34. Install the upper timing chain guide bolts (1) and tighten to 8 N.m (71 lb in).

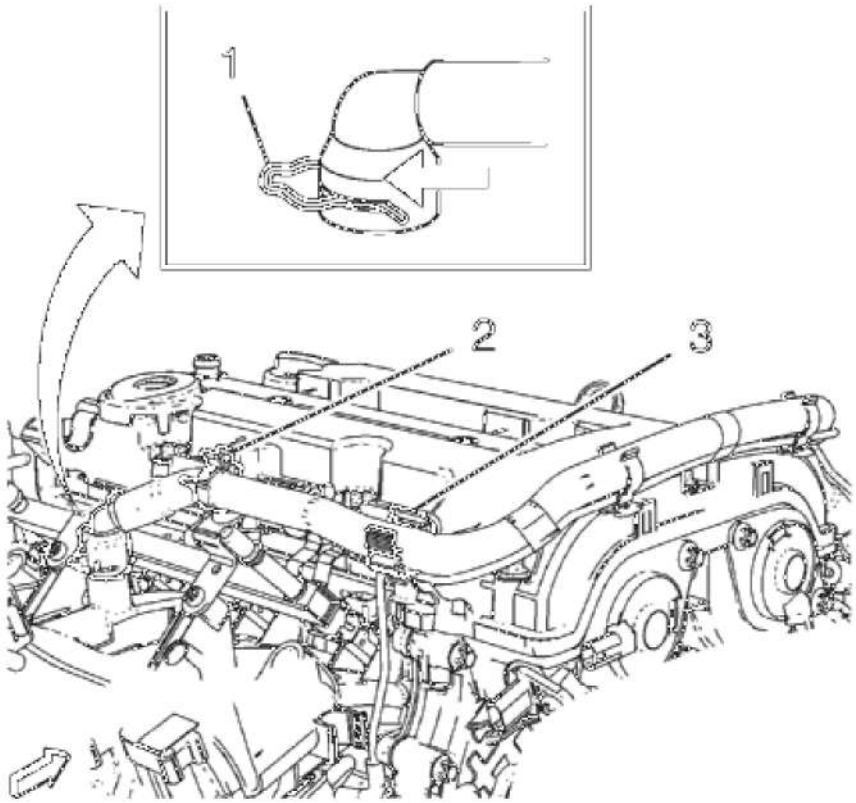


Fig. 124: Positive Crankcase Ventilation Pipe Retainer Clips And Clamp
Courtesy of GENERAL MOTORS COMPANY

6. Install the positive crankcase ventilation pipe to the intake manifold and fix with retainer clamp (1).
7. Clip in the positive crankcase ventilation pipe to the 2 retainer clips (2) and (3).
8. Install the air cleaner outlet duct. Refer to **Air Cleaner Outlet Duct Replacement** .

ENGINE OIL HEATER REPLACEMENT

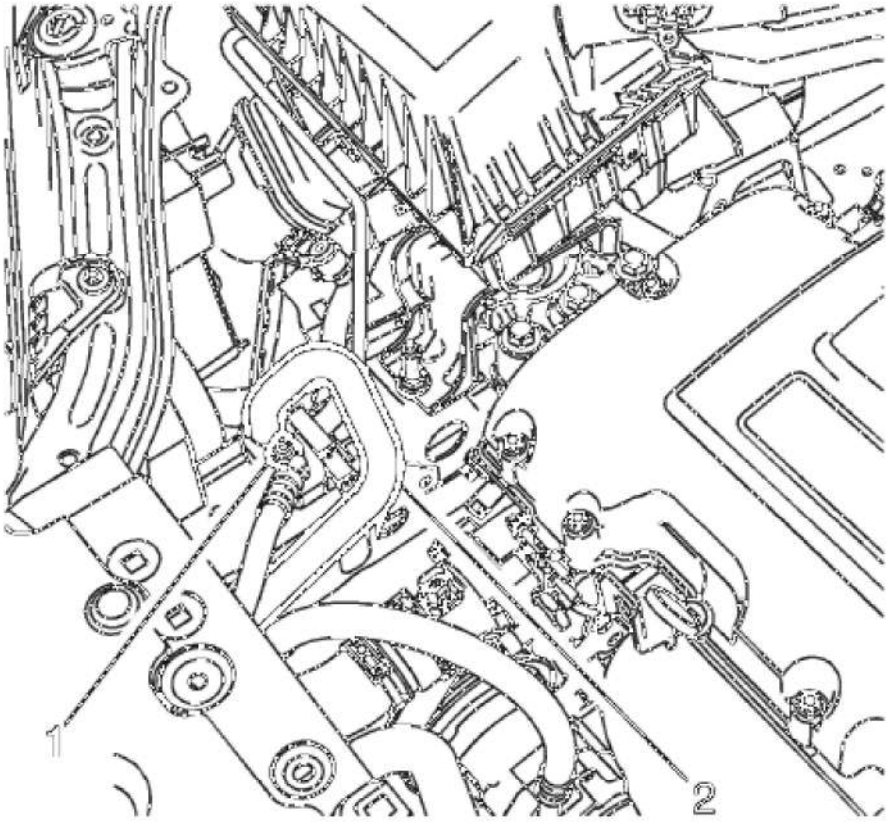


Fig. 155: A/C Compressor And Condenser Hose
Courtesy of GENERAL MOTORS COMPANY

31. Remove air conditioning compressor and condenser hose nut (1).
32. Remove air conditioning compressor and condenser hose (2) from refrigerant hose.

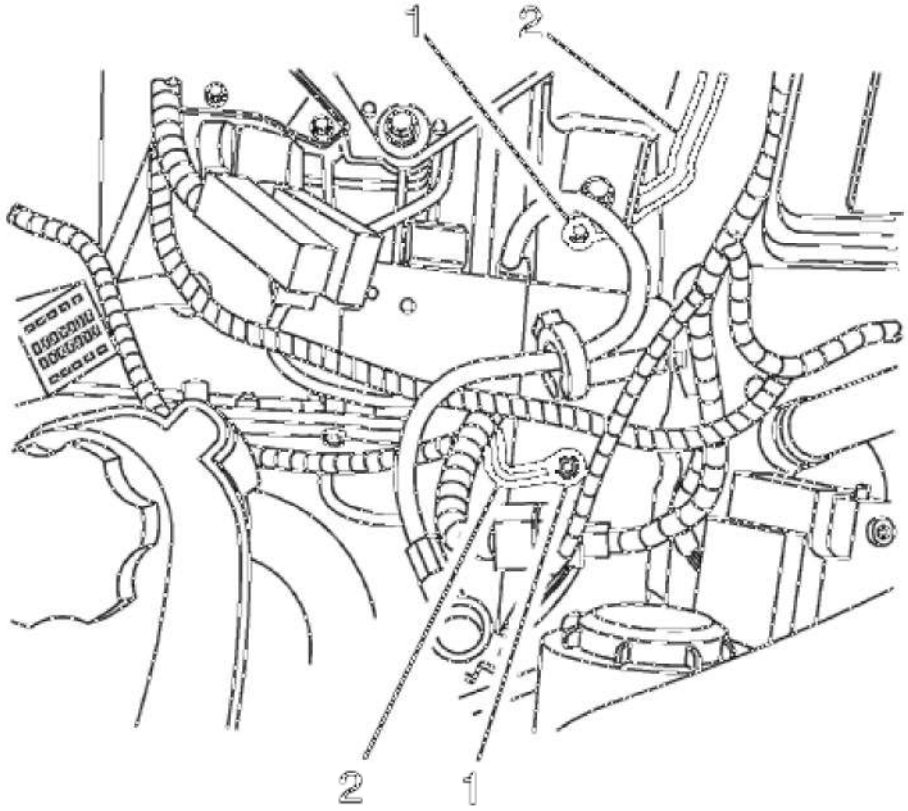


Fig. 187: Wiring Harness And Ground Nuts
Courtesy of GENERAL MOTORS COMPANY

37. Install the ground nuts (1) and wiring harness (2).

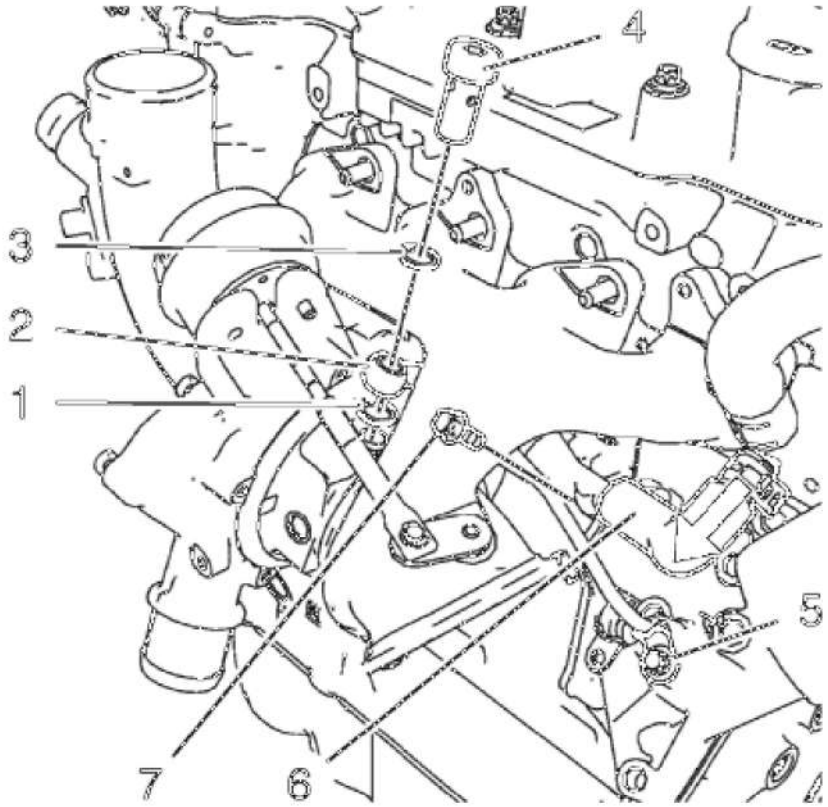


Fig. 215: Turbocharger Oil Feed Pipe Components
Courtesy of GENERAL MOTORS COMPANY

16. Install the turbocharger coolant return pipe bolt (7) and tighten to 8 N.m (71 lb in).
17. Install the turbocharger coolant return hose (6) to the oil cooler inlet pipe.
18. Install the turbocharger coolant return hose clamp.
19. Install the turbocharger oil feed pipe (2) to the oil cooler and the turbocharger.
20. Install the turbocharger oil feed pipe bolt (5).
21. Install the turbocharger oil feed pipe hollow screw (4) along with the 2 NEW seal rings (1) and (3) and tighten to 30 N.m (22 lb ft).
22. Tighten the turbocharger oil feed pipe bolt to 10 N.m (89 lb in).

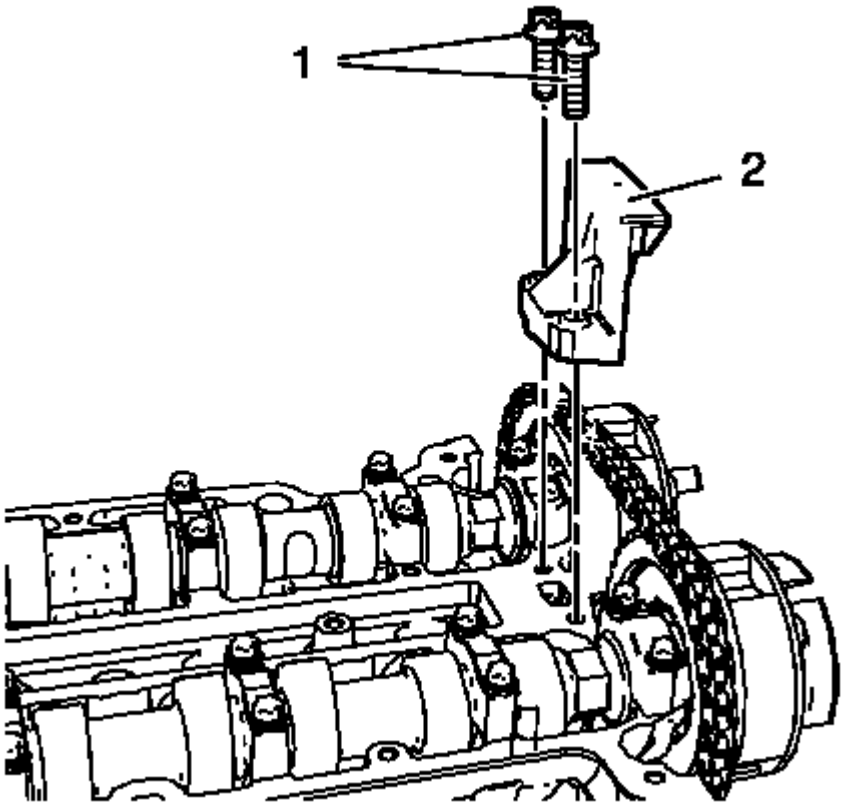


Fig. 244: Upper Timing Chain Guide And Bolts
Courtesy of GENERAL MOTORS COMPANY

11. Remove the 2 upper timing chain guide bolts (1).
12. Remove the upper timing chain guide (2).

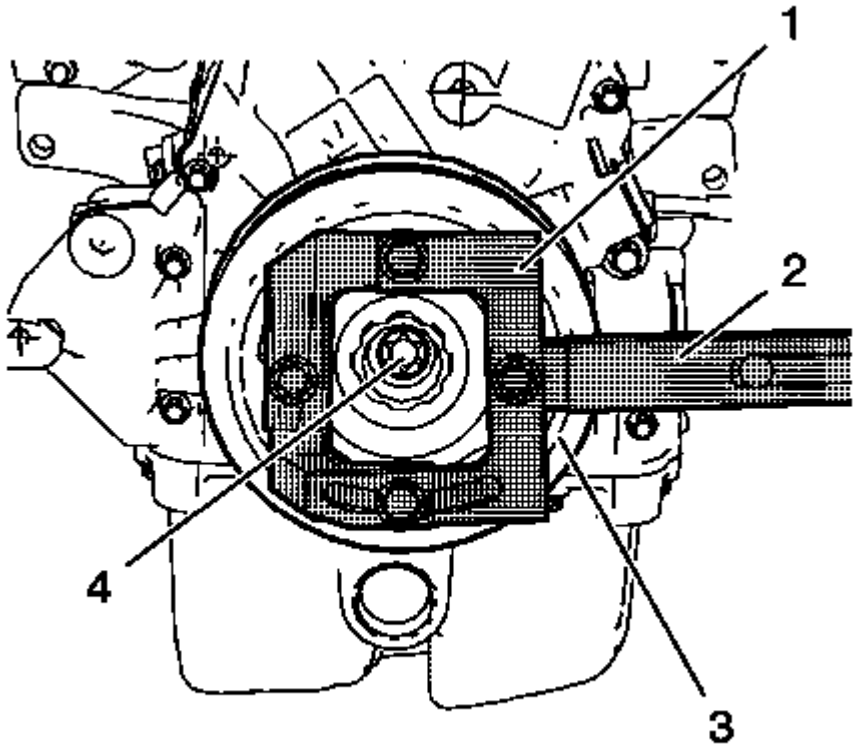


Fig. 267: Crankshaft Balancer, Retainer And Extension
Courtesy of GENERAL MOTORS COMPANY

NOTE: The crankshaft balancer can be incorrectly installed 180° from the required position. Be sure to note the location of the alignment hole on the crankshaft balancer prior to removing the crankshaft balancer from the engine.

2. Loosen the crankshaft balancer bolt (4) while fixing the crankshaft balancer (3) with **EN-49979** retainer (1) and **EN-956-1** extension (2).

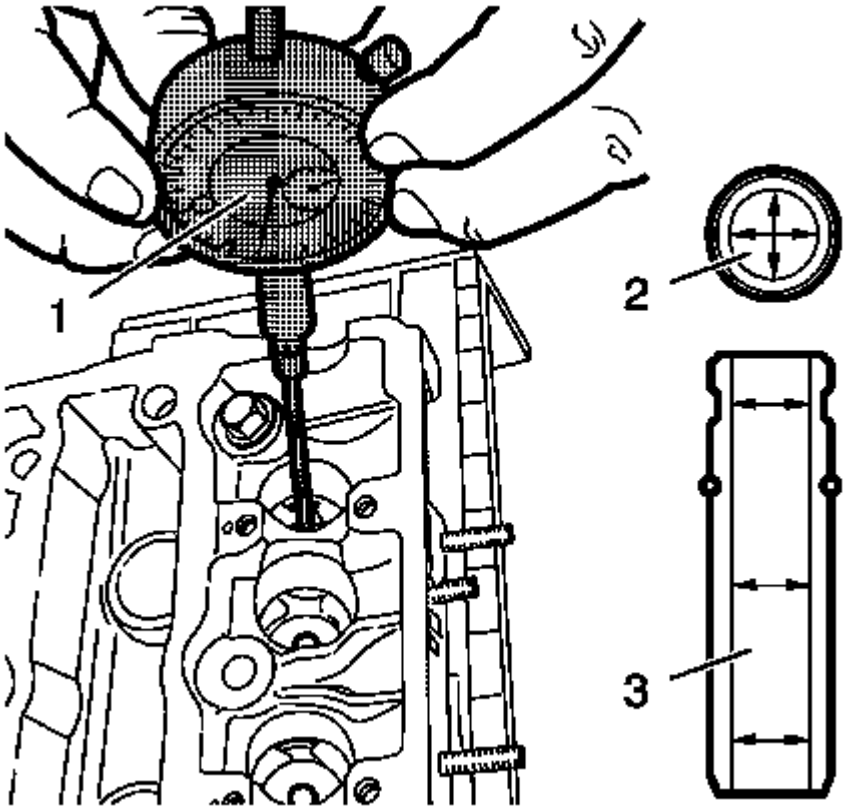


Fig. 323: Measuring Valve Guide Inner Diameter
Courtesy of GENERAL MOTORS COMPANY

3. Measure the valve guide inner diameter (2) as shown in different areas (3). Use **EN-6216** gauge (1) and gauge instruments. Note the measurement results. Refer to **Engine Mechanical Specifications** to find the permitted values.
4. Substract the valve stem diameter from valve guide inner diameter to calculate the valve stem to guide clearance. Refer to **Engine Mechanical Specifications** to find the permitted values.
5. Turn the cylinder head upside down.

CYLINDER HEAD ASSEMBLE

Special Tools

- **EN-958** Valve Stem Seal Installer
- **EN-8062** Valve Spring Compressor
- **EN-8062-5** Adapter
- **EN-50717-2** Compressor Assembly of **EN-50717** Kit

For equivalent regional tools, refer to **Special Tools**.

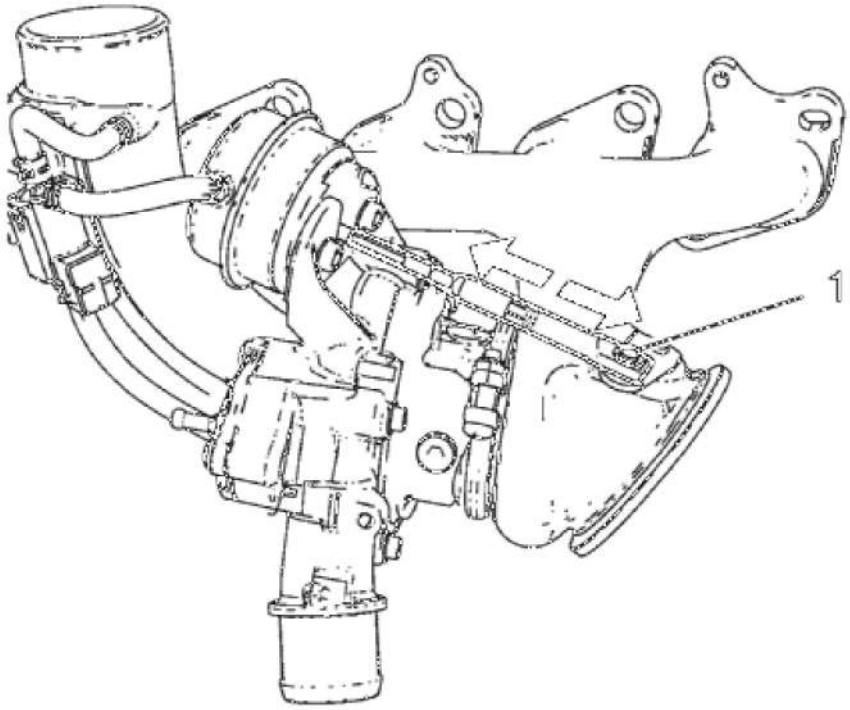


Fig. 373: Wastegate Regulator Mechanism
Courtesy of GENERAL MOTORS COMPANY

1. Inspect the wastegate regulator mechanism (1) for functionality.
2. Inspect the turbine blades for damage or foreign material.
3. Inspect the turbocharger wastegate regulator vacuum hoses for damage.
4. Inspect the exhaust manifold and the turbocharger for cracks or other damage.
5. Inspect the exhaust manifold mating surface for flatness.

TURBOCHARGER ASSEMBLE

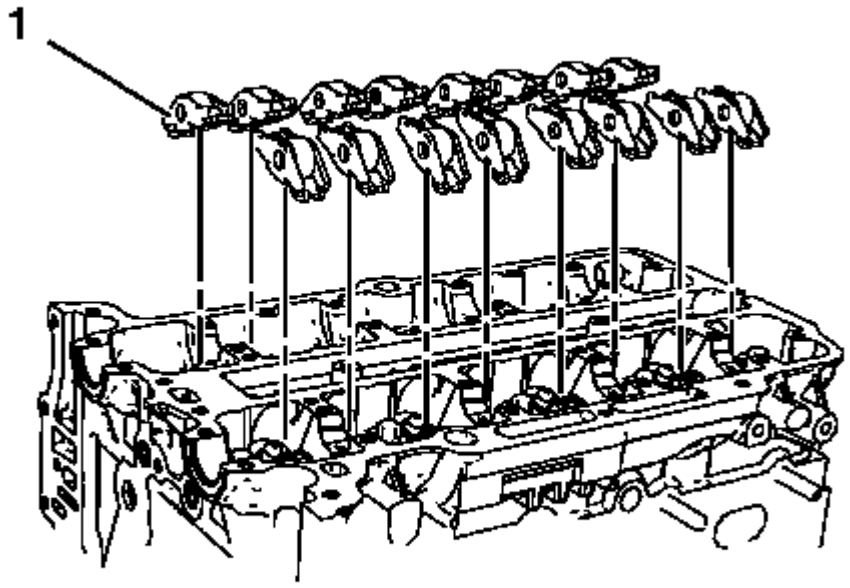


Fig. 402: Hydraulic Valve Lash Adjuster Arms
Courtesy of GENERAL MOTORS COMPANY

NOTE: Hydraulic valve lash adjuster arms should be installed in their original position.

1. Lubricate the hydraulic valve lash adjuster arms with engine oil.
2. Install the 16 hydraulic valve lash adjuster arms (1).

INTAKE CAMSHAFT INSTALLATION

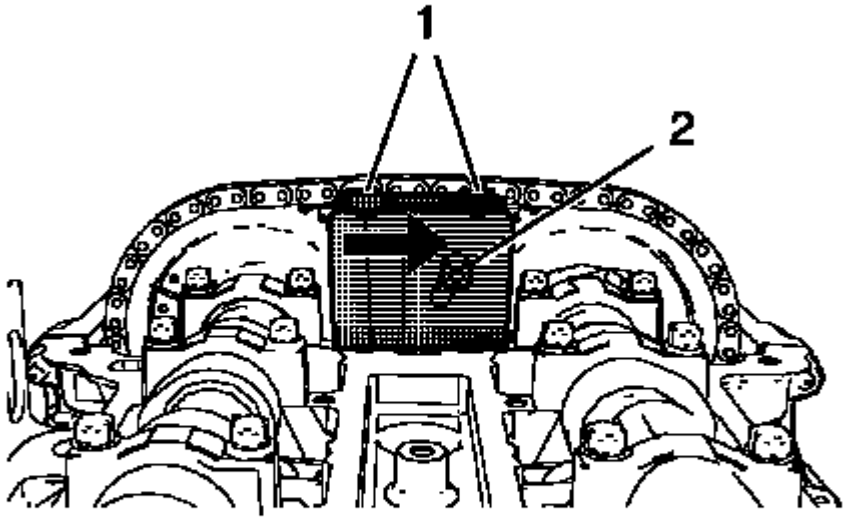


Fig. 417: Adjuster Bolt And Fastening Bolts
Courtesy of GENERAL MOTORS COMPANY

2. Tighten the 2 fastening bolts (1) of **EN-49977-200** fixing tool while pushing the fixing tool in direction of the arrow.
3. Tighten the adjuster bolt (2).

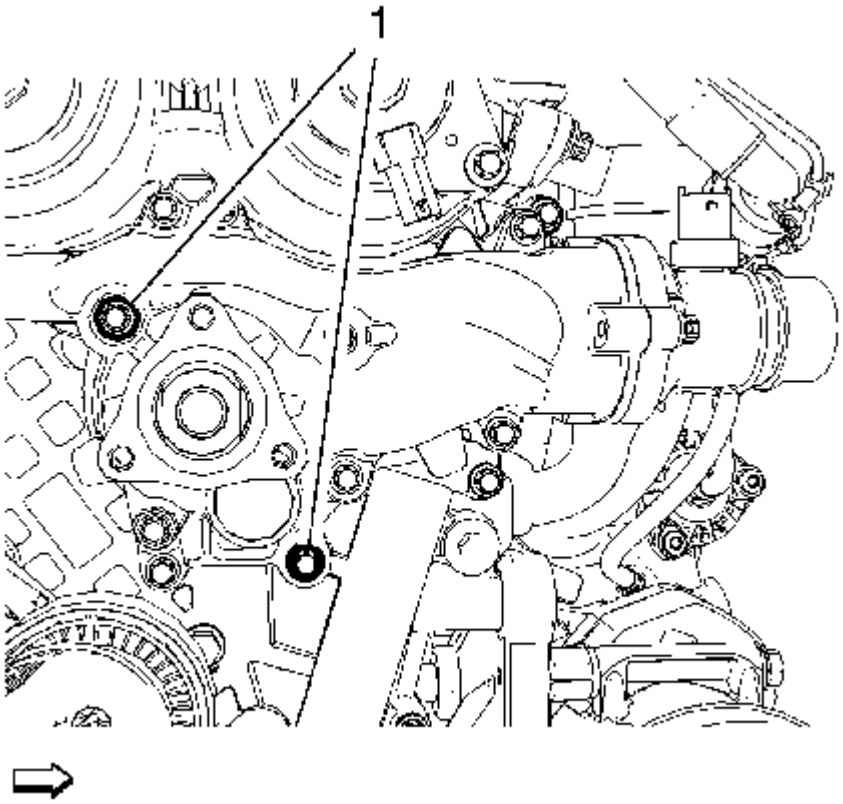


Fig. 443: Identifying Water Pump Bolts
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Torque-to-Yield Fastener Caution .

6. Tighten the 2 water pump bolts (1) to an additional 30 degrees, using the **EN-45059** meter

CRANKSHAFT BALANCER INSTALLATION

Special Tools

- **EN-470-B** Angular Torque Wrench
- **EN-956-1** Extension
- **EN-49979** Crankshaft Shock Mount Retainer

For equivalent regional tools, refer to **Special Tools**.