GENERAL SPECIFICATIONS

The general specifications for the Series 50 Engine are listed in Table 1. See Figure 5 for the cylinder designation and firing order.

General Specifications	Engine Family
Total Displacement (L)	8.5
Total Displacement (in.^{3})	518
Type	Four-cycle
Number of Cylinders	4
Bore (in.)	5.12
Bore (mm)	130
Stroke (in.)	6.30
Stroke (mm)	160
Compression Ratio	15.0:1
Number of Main Bearings	5

Table 1 General Specifications for the Series 50 Engine

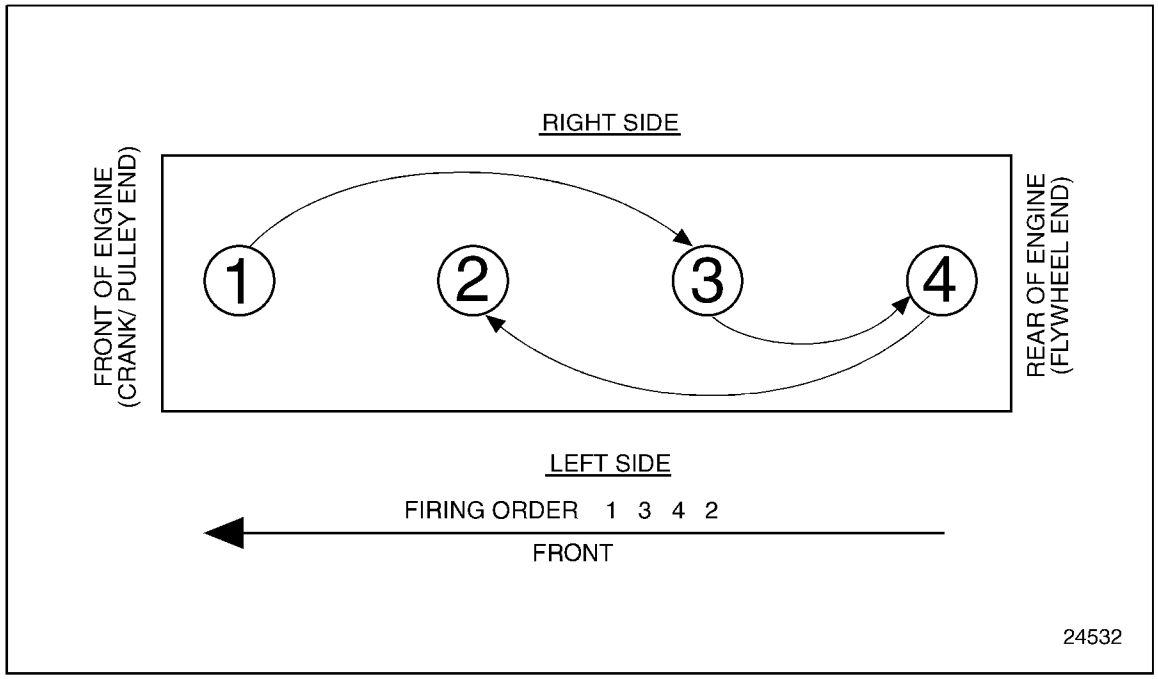

Figure 5 Cylinder Designation and Firing Order

GENERAL SPECIFICATIONS FOR THE SERIES 50G ENGINE

The general specifications for the Series 50G Engine are listed in Table 2. See Figure 6 for cylinder designation and firing order.

General Description	Specification
Total Displacement (L)	8.5
Total Displacement (in.^{3})	518
Type	Four-cycle
Number of Cylinders	4
Bore (in.)	5.12
Bore (mm)	130
Stroke (in.)	6.30
Stroke (mm)	160
Compression Ratio	10:1
Number of Main Bearings	5

Table 2 General Specifications for the Series 50G Engine

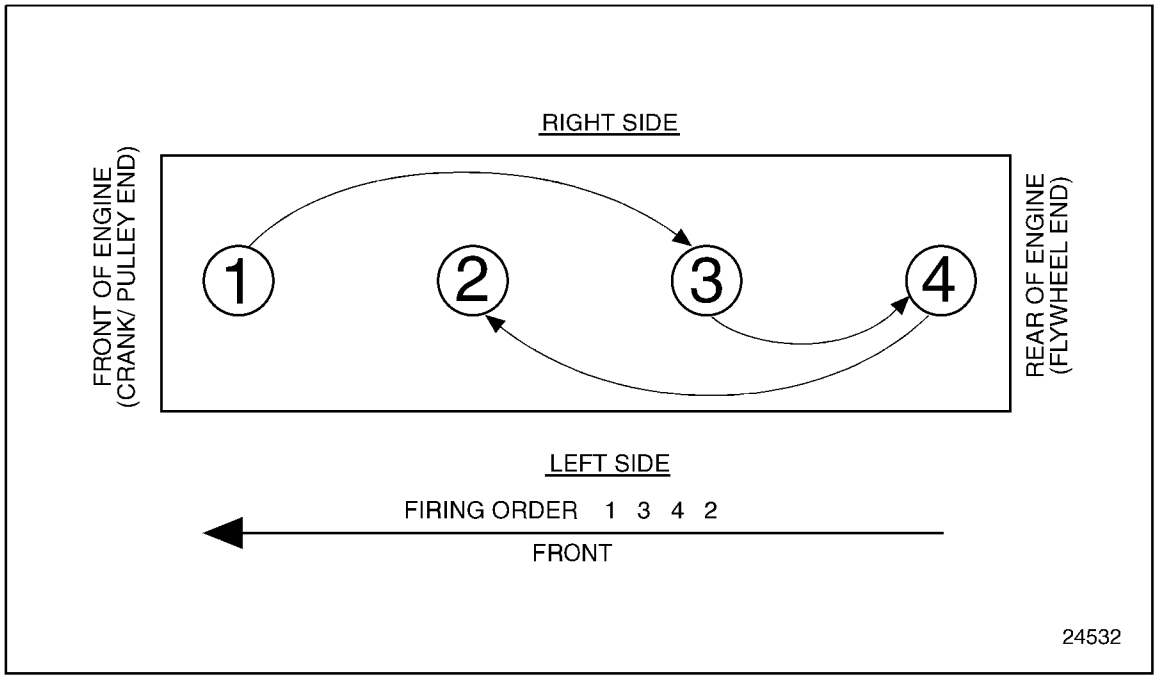

Figure 6 Cylinder Designation and Firing Order for the Series 50G Engine

1.2.5 Installation of Cylinder Head

Perform the following steps for cylinder head installation:

1. Be sure piston domes and the cylinder head and cylinder block firedeck surfaces are clean and free of foreign matter. Inspect the head bolt holes in both block and head for the presence of oil, water, dirt, or damaged threads, and clean or retap as necessary.

NOTE:
Series 50 Engines built after September 2002 will use a new cylinder head gasket. This gasket will be identified with a new part number and date code. This new gasket must be used with the new cylinder head bolts.

2. Position the head gasket on the block and install cylinder head guide studs, J 35784, at front and rear of the block. See Figure 1-40.

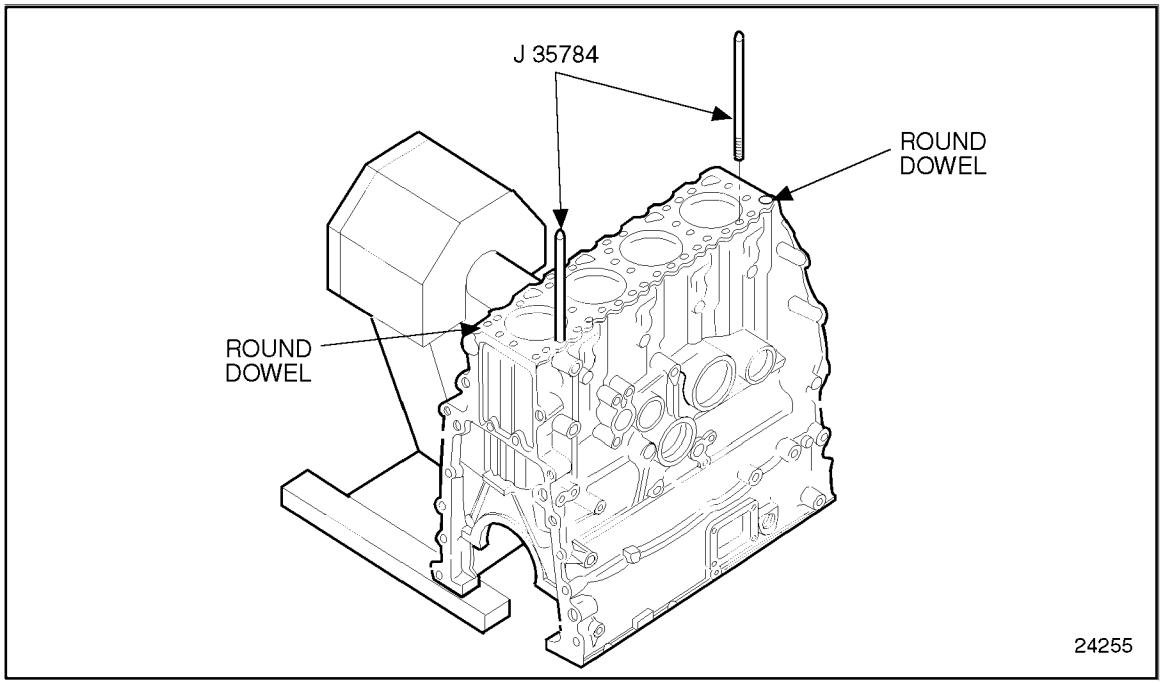

Figure 1-40 Cylinder Head Guide Studs

3. Lift the head into position with lift bracket, J 35641-A. See Figure 1-34. Lower it into place over the guide studs, J 35784, until it seats on the block deck dowels. See Figure 1-40.
4. Remove the guide studs.
5. Install the head bolts with special hardened washers, lubricating the threads and bolt-head contact areas with a small amount of International Compound #2®, or equivalent.

NOTICE:

Cylinder head mounting bolts are considered single-use items and must not be reused.
Failure to install new bolts when replacing a cylinder head may result in improper clamp load, which could cause gasket failure and severe engine damage.

6. Torque the head bolts to 250-285 N·m (185-210 lb·ft) in the following sequence. See Figure 1-41. After September 2002 a new cylinder head bolt will be used for all Series 50 engines. The new bolt will be identified with white paint and groove on top of bolt. See Figure 1-42. Torque the new head bolts to 298 N·m (220 lb·ft). There is no change to the procedure other than the new torque value. The new head bolt can be used with the former cylinder head gaskets, the former head bolts cannot be used with the new head gasket. Former and new bolts must not be mixed.

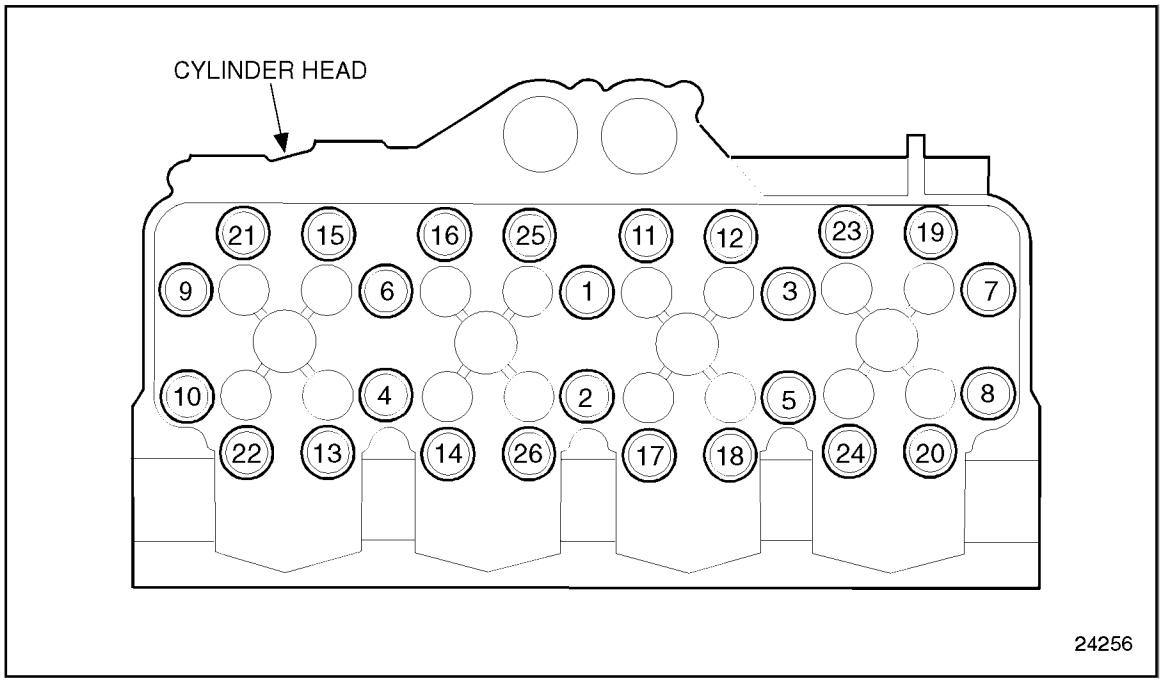

Figure 1-41 Cylinder Head Bolt Tightening Sequence

6. Install the main bearing caps together with lower bearing shells in place. Install the main bearing cap bolt. See Figure 1-118.

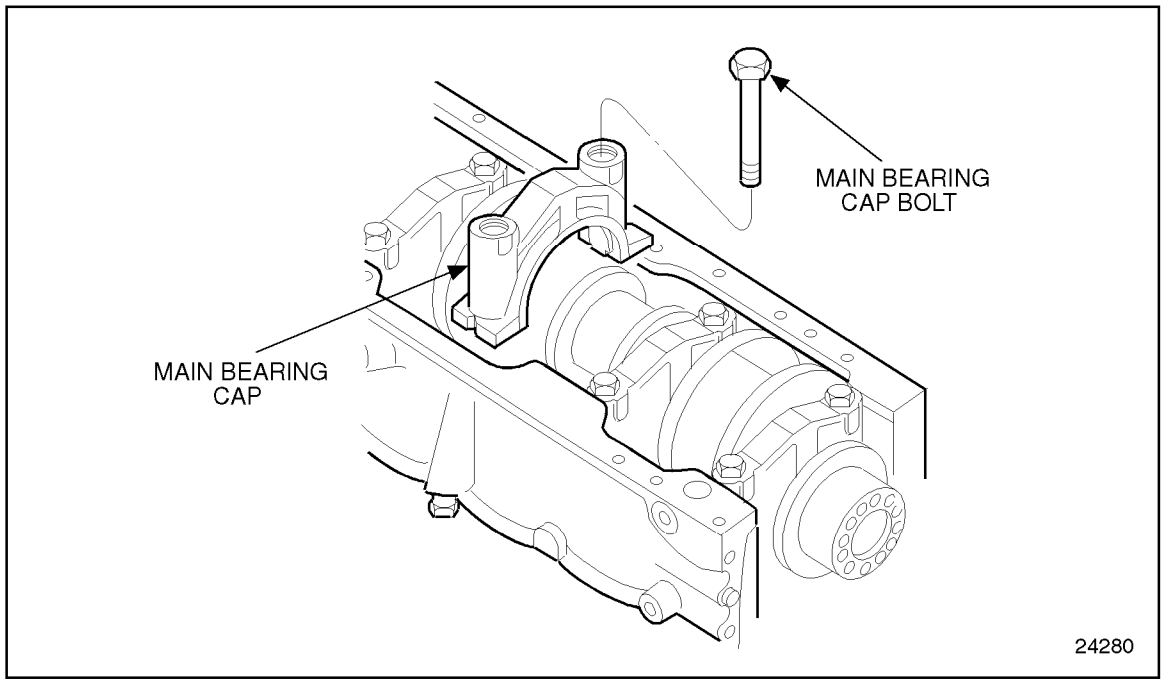

Figure 1-118 No. 4 Main Bearing Cap Installation

7. Apply a small quantity of International Compound #2® (or equivalent) to the bolt threads and underside of the bolt heads. Install the main bearing cap bolts and draw them up snug. Rap the main bearing caps sharply with a fiber mallet or plastic hammer to insure the caps are fully seated.

NOTE:
If the bearings have been installed properly, the crankshaft will turn freely with all of the main bearing cap bolts drawn to the specified torque.

8. Torque all of the main bearing cap bolts to 470-530 N·m (347-391 lb·ft). Begin at the center caps and work progressively toward each end. Tighten the bolts to half the specified torque and then repeat the tightening sequence to the torque limit.
9. Install a dial indicator to the cylinder block. See Figure 1-119.
10. Check the crankshaft end by moving the crankshaft toward the gage with a small (less than 12 in., 0.3 m) pry bar. See Figure 1-119. Keep a constant pressure on the pry bar and zero the pointer on the dial indicator. Then, remove and insert the pry bar on the other side of the bearing cap. Force the crankshaft in the opposite direction and note the amount of end play on the dial. The end play should be 0.097-0.419 mm (0.004-0.017 in.). Insufficient

NOTICE:
Be sure the connecting rod bolt has not turned in the connected rod before torque is applied to the nut.

NOTICE:
Do not over torque the connecting rod bolt nuts. Over torque may permanently distort the connecting rod cap.

3. Torque the bolt nuts to 160-185 N·m (118-137 lb·ft).

1.19.4.1 Inspection of Assembled Connecting Rod

Measure the connecting rod bearing diameter at five locations. See Figure 1-255.

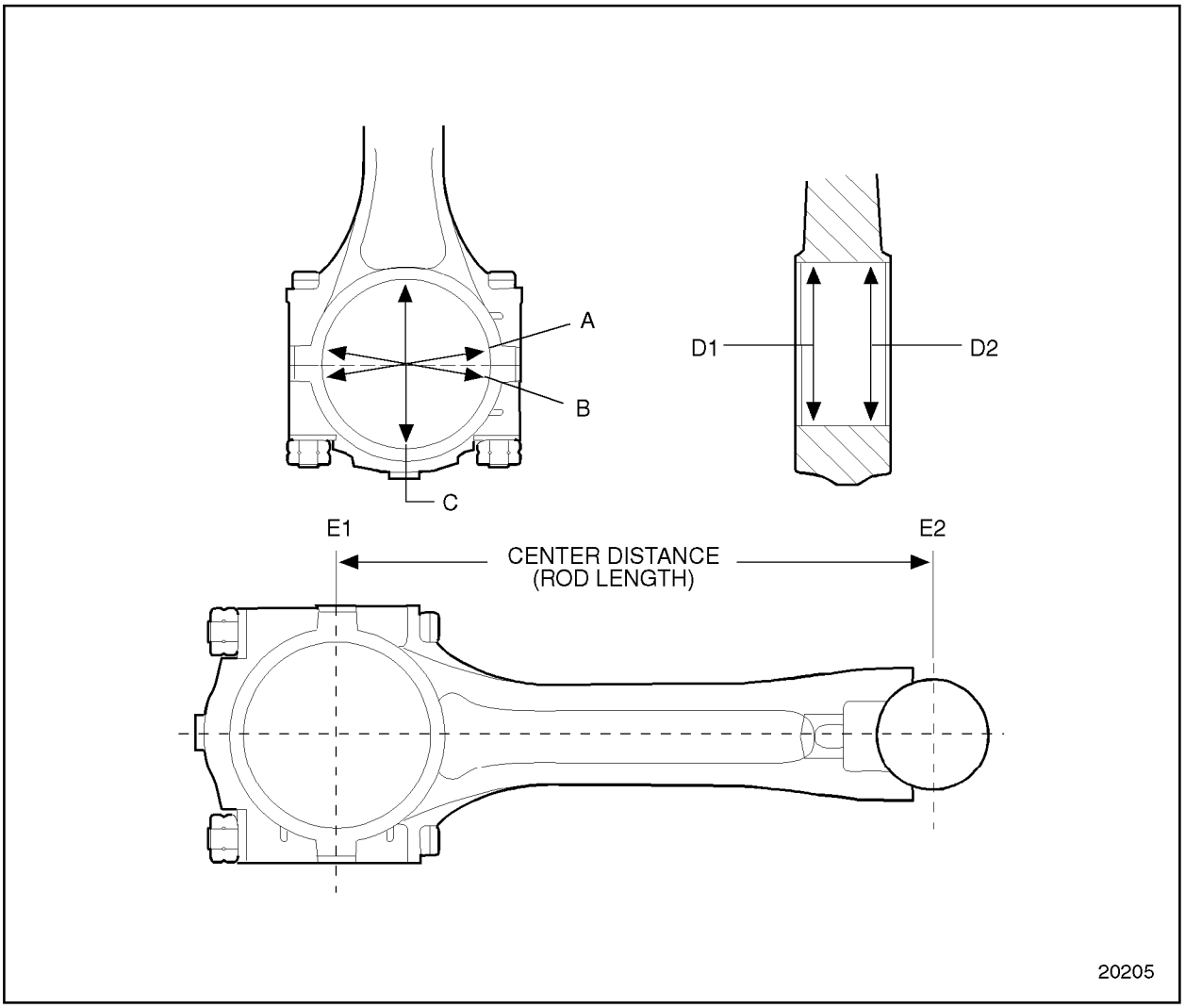

Figure 1-255 Dimensional Inspection of Cross-head Piston Connecting Rods