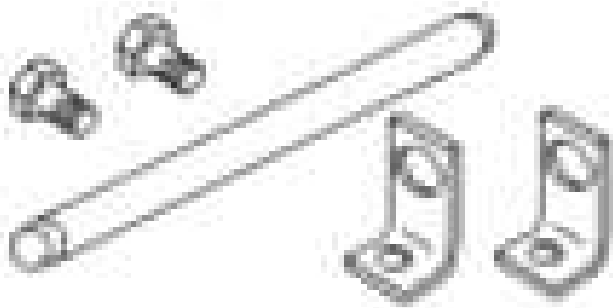


DISASSEMBLY AND ASSEMBLY OF SUBASSEMBLIES

CYLINDER HEAD

Special Tool(s)

CYLINDER HEAD DISASSEMBLY SPECIAL TOOL REFERENCE CHART



ST1981-A

Compressor, Valve Spring
303-300 (T87C-6565-A)



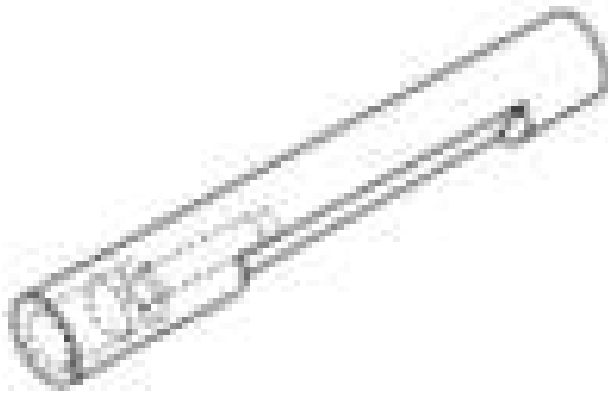
ST1907-A

Compressor, Valve Spring
303-350 (T89P-6565-A)



ST3028-A

Compressor, Valve Spring
303-1249



ST1906-A

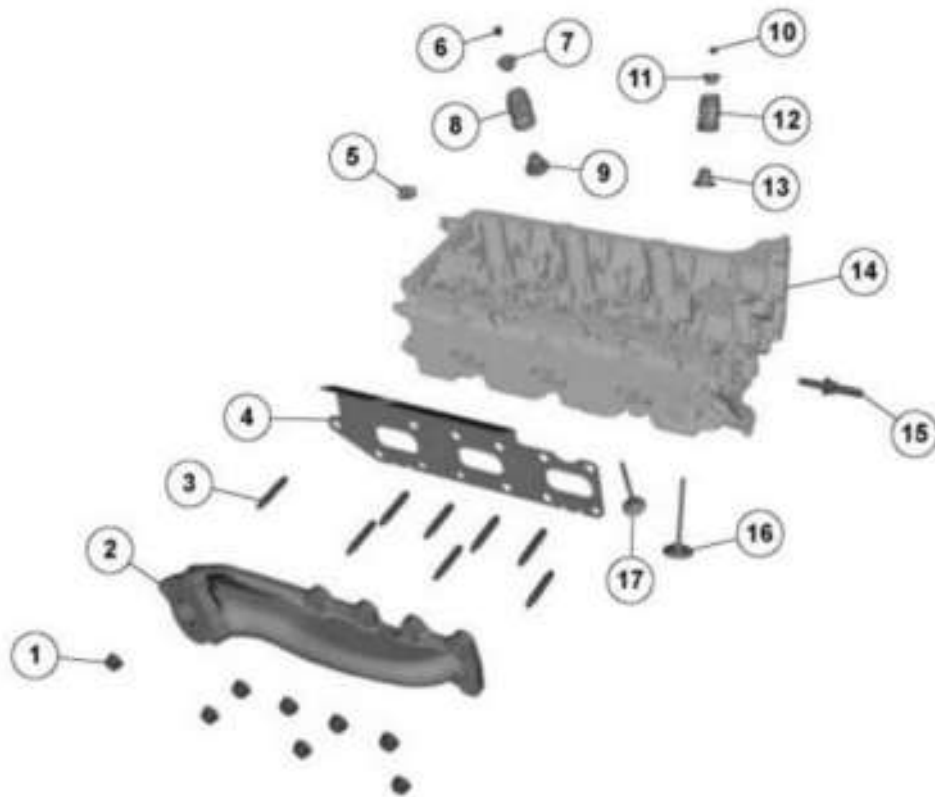
Installer, Valve Stem Oil Seal
303-470 (T94P-6510-CH)

Material

CYLINDER HEAD MATERIALS SPECIFICATIONS CHART

Item	Specification
Motorcraft® SAE 5W-30 Premium Synthetic Blend Motor Oil (US); Motorcraft® SAE 5W-30 Super Premium Motor Oil (Canada) XO-5W30-QSP (US); CXO-5W30-LSP12 (Canada)	WSSM2C946-A

NOTE: RH cylinder head shown in the figure below, LH cylinder head similar.



N0132237

Fig. 634: Exploded View Of Cylinder Head
 Courtesy of FORD MOTOR CO.

CYLINDER HEAD DISASSEMBLY ITEM DESCRIPTION CHART

Item	Part Number	Description
1	W701706	RH exhaust manifold nut (8 required)
2	9430	RH exhaust manifold
3	W712244	RH exhaust manifold stud (8 required)
4	9448	RH exhaust manifold gasket
5	6A968	Turbocharger coolant return fitting
6	6518	Intake valve spring retainer key (12 required)
7	6514	Intake valve spring retainer (6 required)
8	6513	Intake valve spring (6 required)
9	6571	Intake valve stem seal (6 required)
10	6518	Exhaust valve spring retainer key (12 required)
11	6514	Exhaust valve spring retainer (6 required)
12	6513	Exhaust valve spring (6 required)
13	6571	Exhaust valve stem seal (6 required)
14	6049	RH cylinder head
15	W714090	Timing chain tensioner arm pin
16	6507	Intake valve (6 required)
17	6505	Exhaust valve (6 required)

Disassembly

All cylinder heads

1. Remove the 8 nuts and the exhaust manifold.
 - Discard the nuts and gasket.
2. Clean and inspect the exhaust manifold. For additional information, refer to ENGINE SYSTEM - GENERAL INFORMATION.
3. Remove and discard the 8 exhaust manifold studs.
4. Remove the timing chain guide pin.
5. Remove the turbocharger coolant return fitting.

NOTE: If the components are to be reinstalled, they must be installed in the same positions. Mark the components for installation into their original locations.

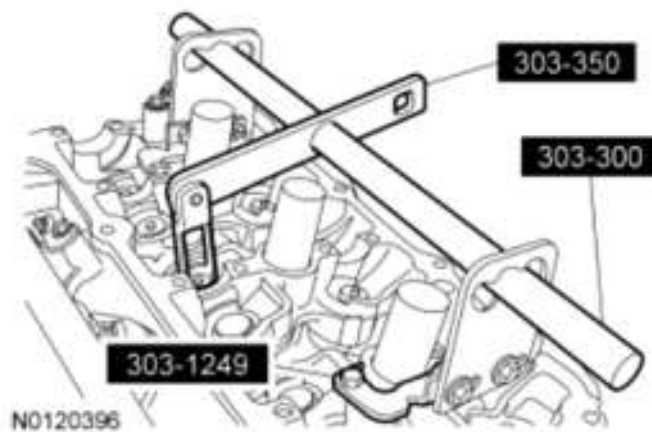


Fig. 635: Removing Keys, Retainer And Spring Using Valve Spring Compressors
Courtesy of FORD MOTOR CO.

6. Using the Valve Spring Compressors, remove the keys, retainer and spring.
7. Remove the valve from the cylinder head.
8. Remove and discard the valve stem seal.
9. Repeat the above steps for each valve.

RH cylinder head

10. Remove the timing chain tensioner arm pin.

Assembly

All cylinder heads

NOTE: If the components are to be reinstalled, they must be installed into their original location.

NOTE: Lubricate the valve stem and valve stem seal with clean engine oil prior to installation.

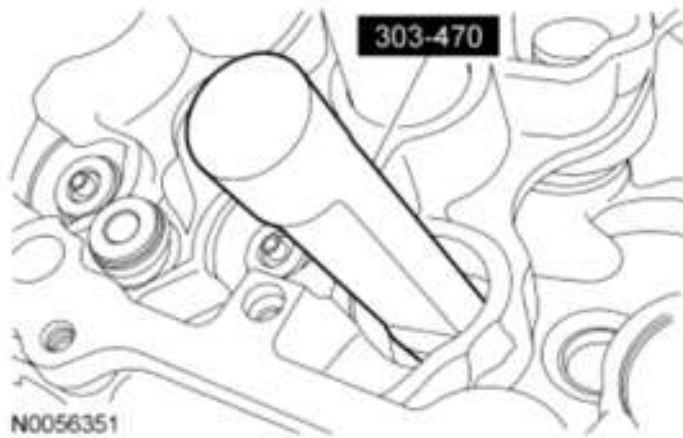


Fig. 636: Installing Valve Stem Seal
 Courtesy of FORD MOTOR CO.

1. Using the Valve Stem Oil Seal Installer, install a new valve stem seal.
2. Install the valve.
3. Using the Valve Spring Compressors, install the valve spring, retainer and key.

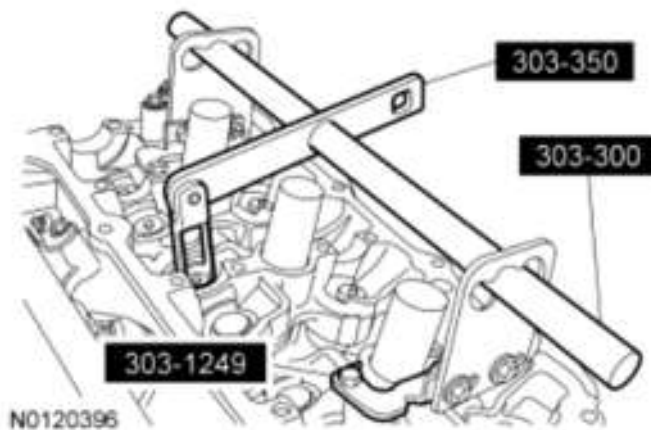


Fig. 637: Installing Keys, Retainer And Spring Using Valve Spring Compressors
 Courtesy of FORD MOTOR CO.

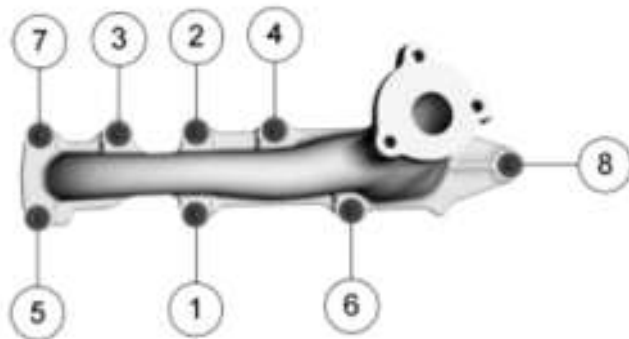
4. Repeat the above steps for each valve.
5. Install the timing chain guide pin and tighten in 2 stages.
 - Stage 1: Tighten to 20 Nm (177 lb-in).
 - Stage 2: Tighten an additional 60 degrees.
6. Install the turbocharger coolant return fitting.
 - Tighten to 18 Nm (159 lb-in).

LH cylinder head

7. Install the timing chain tensioner arm pin and tighten in 2 stages.
 - Stage 1: Tighten to 20 Nm (177 lb-in).
 - Stage 2: Tighten an additional 60 degrees.
8. Install 8 new LH exhaust manifold studs.

- Tighten to 12 Nm (106 lb-in).

NOTE: Failure to tighten the exhaust manifold nuts to specification a second time will cause the exhaust manifold to develop an exhaust leak.



N0124243

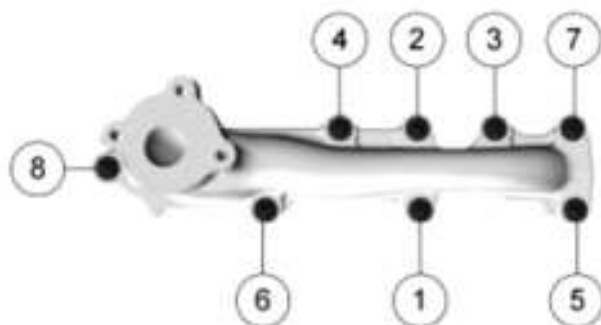
Fig. 638: Identifying LH Exhaust Manifold Nuts Tightening Sequence
 Courtesy of FORD MOTOR CO.

- Using a new gasket, install the LH exhaust manifold and 8 new nuts. Tighten in 2 stages in the sequence shown in the figure below:
 - Stage 1: Tighten to 19 Nm (168 lb-in).
 - Stage 2: Tighten to 25 Nm (18 lb-ft).

RH cylinder head

- Install 8 new RH exhaust manifold studs.
 - Tighten to 12 Nm (106 lb-in).

NOTE: Failure to tighten the exhaust manifold nuts to specification a second time will cause the exhaust manifold to develop an exhaust leak.



N0124244

Fig. 639: Identifying RH Exhaust Manifold Nuts Tightening Sequence
 Courtesy of FORD MOTOR CO.

- Using a new gasket, install the RH exhaust manifold and 8 new nuts. Tighten in 2 stages in the

sequence shown in the figure below:

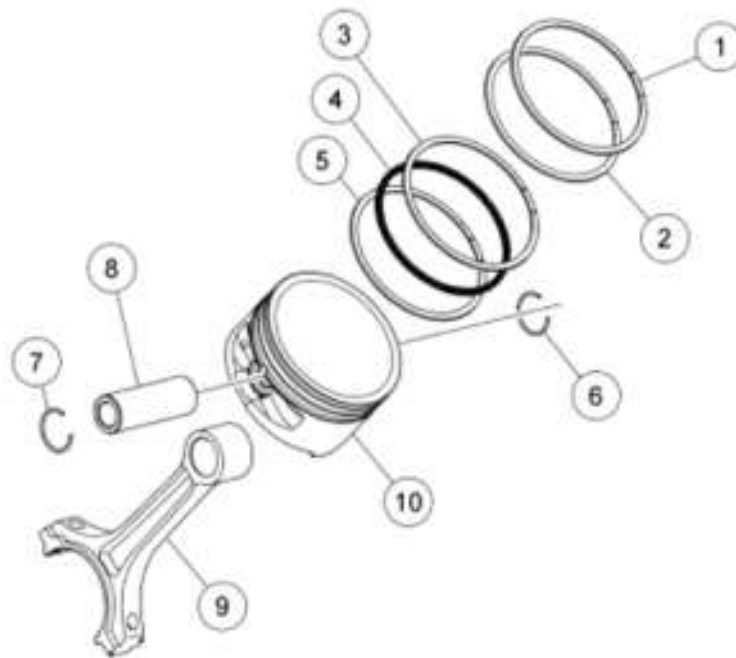
- Stage 1: Tighten to 19 Nm (168 lb-in).
- Stage 2: Tighten to 25 Nm (18 lb-ft).

PISTON

Material

PISTON MATERIAL SPECIFICATIONS CHART

Item	Specification
Motorcraft® SAE 5W-20 Premium Synthetic Blend Motor Oil (US); Motorcraft® SAE 5W-20 Super Premium Motor Oil (Canada) XO-5W20-QSP (US); CXO-5W20-LSP12 (Canada)	WSSM2C945-A



N0010114

Fig. 640: Exploded View Of Piston
 Courtesy of FORD MOTOR CO.

PISTON ITEM DESCRIPTION CHART

Item	Part Number	Description
1	-	Piston compression upper ring (part of 6148)
2	-	Piston compression lower ring (part of 6148)
3	-	Piston oil control upper segment ring (part of 6148)
4	-	Piston oil control spacer (part of 6148)
5	-	Piston oil control lower segment ring (part of 6148)
6	6140	Piston pin retainer clip
7	6140	Piston pin retainer clip

8	6135	Piston pin
9	6200	Connecting rod
10	6110	Piston

Disassembly

1. Remove the piston rings from the piston.
 - Discard the piston rings.
2. Remove the 2 piston pin retainers and the piston pin.
 - Discard the 2 piston pin retainer clips.

NOTE: If the piston and/or connecting rod are being installed new, the piston rod orientation marks and the arrow on the top of the dome of the piston should be facing toward the front of the engine block.

NOTE: If the piston and connecting rod are to be reinstalled, they must be assembled in the same orientation. Mark the piston orientation to the connecting rod for reassembly.

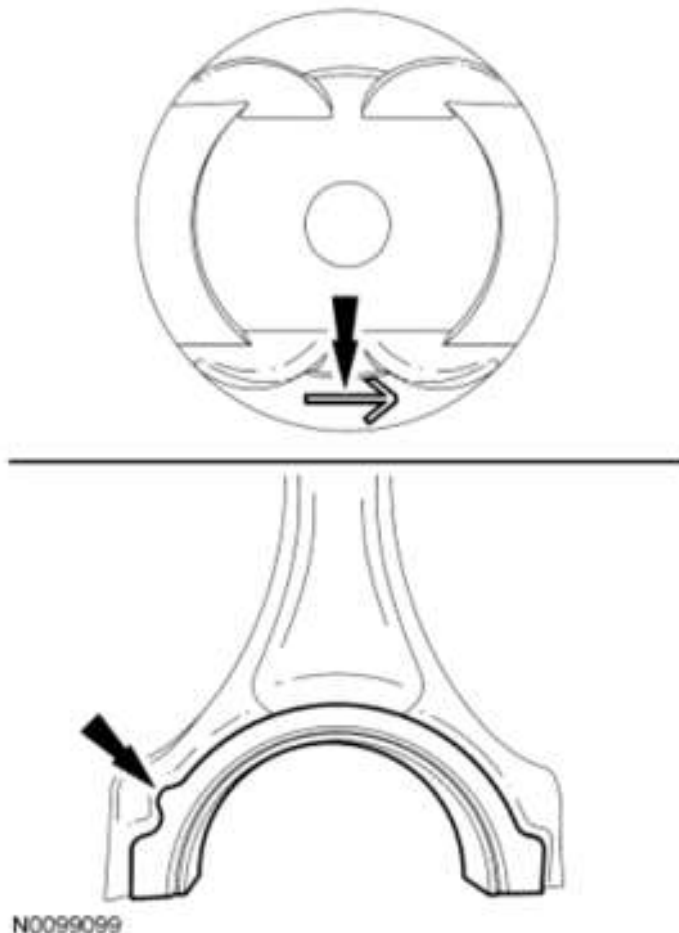


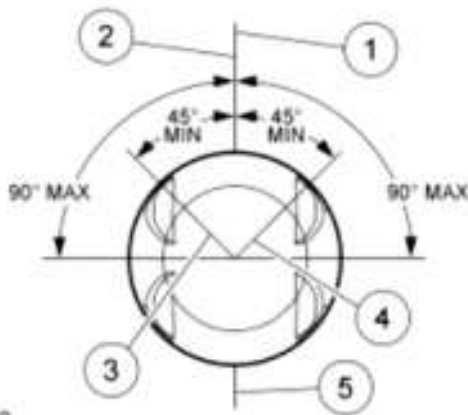
Fig. 641: Locating Piston Rod Orientation Marks
 Courtesy of FORD MOTOR CO.

3. Separate the piston from the connecting rod.
4. Clean and inspect the piston and connecting rod. For additional information, refer to **ENGINE SYSTEM - GENERAL INFORMATION**.

Assembly

1. Align the piston-to-connecting rod orientation marks and position the connecting rod in the piston.
2. Lubricate the piston pin and pin bore with clean engine oil.
3. Install the piston pin in the piston and connecting rod assembly.
4. Install the new piston pin retaining clips in the piston.
 - The piston pin retaining clip gap orientation must be toward the top or dome of piston.
5. Lubricate the piston and the new piston rings with clean engine oil.

NOTE: The piston compression upper and lower ring should be installed with the "O" mark on the ring face pointing up toward the top of the piston.



N0082432

Fig. 642: Identifying Piston Rings Installation Position
 Courtesy of FORD MOTOR CO.

6. Install the piston rings onto the piston as shown in the figure below.
 1. Center line of the piston parallel to the wrist pin bore
 2. Upper compression ring gap location
 3. Upper oil control segment ring gap location
 4. Lower oil control segment ring gap location
 5. Expander ring and lower compression ring gap location