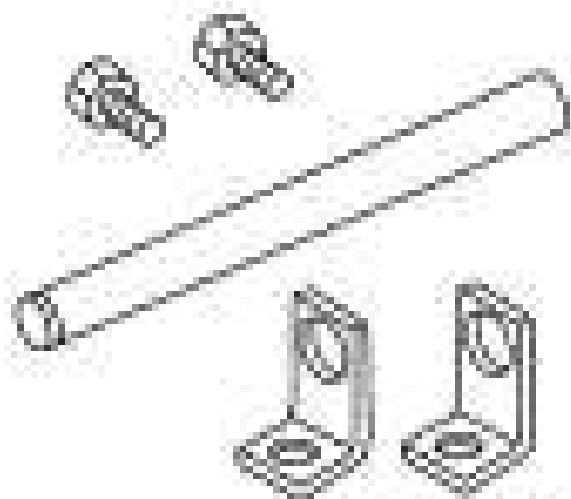


# DISASSEMBLY AND ASSEMBLY OF SUBASSEMBLIES

## CYLINDER HEAD

Special Tool(s)

### SPECIAL TOOL SPECIFICATION



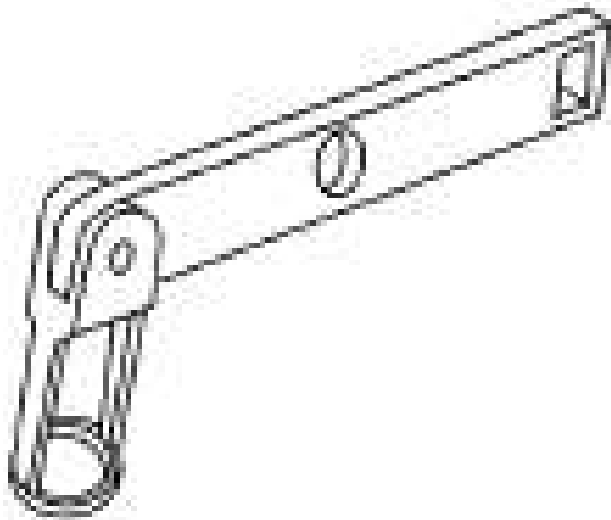
ST1909-A

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



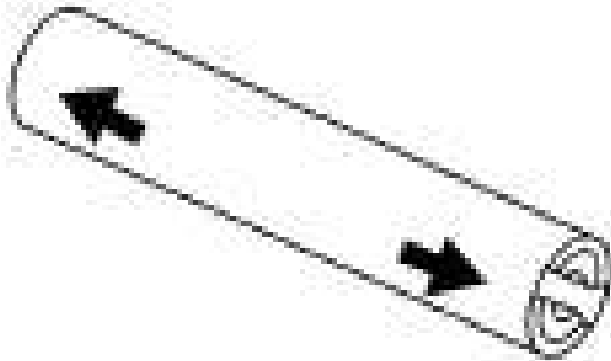
ST1907-A

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



**ST1902-A**

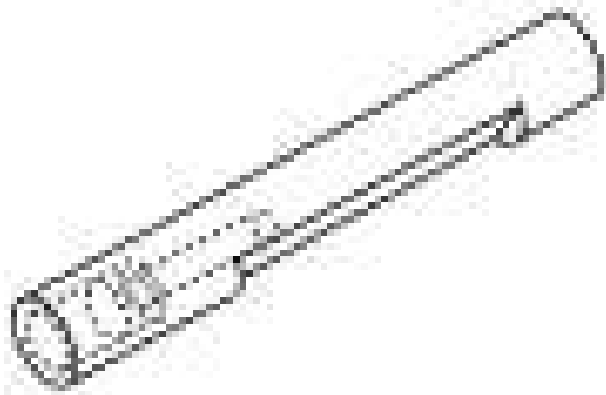
Compressor, Valve Spring  
303-472 (T94P-6565-AH)



**ST1904-A**

Remover, Valve Stem Seal  
303-468 (T94P-6510-AH)

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



ST1906-A



ST1187-A

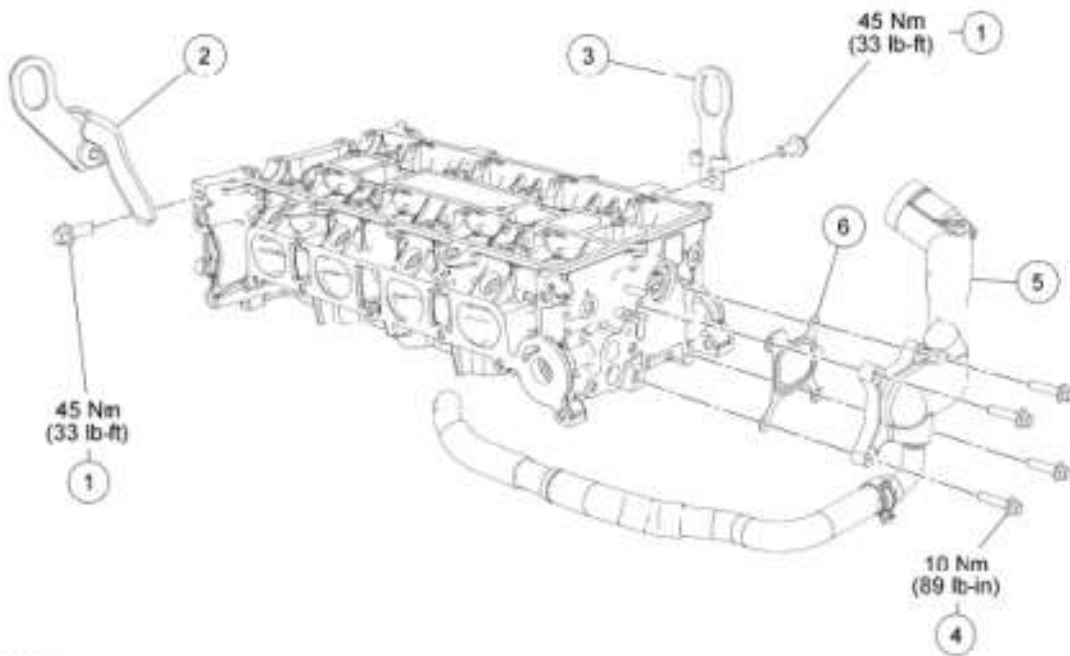
Slide Hammer  
307-005 (T59L-100-B)

**Material**

**MATERIAL SPECIFICATION**

Item	Specification
Motorcraft® SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft® SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS-M2C930-A

**Cylinder Head - Coolant Connection and Lifting Eyes**



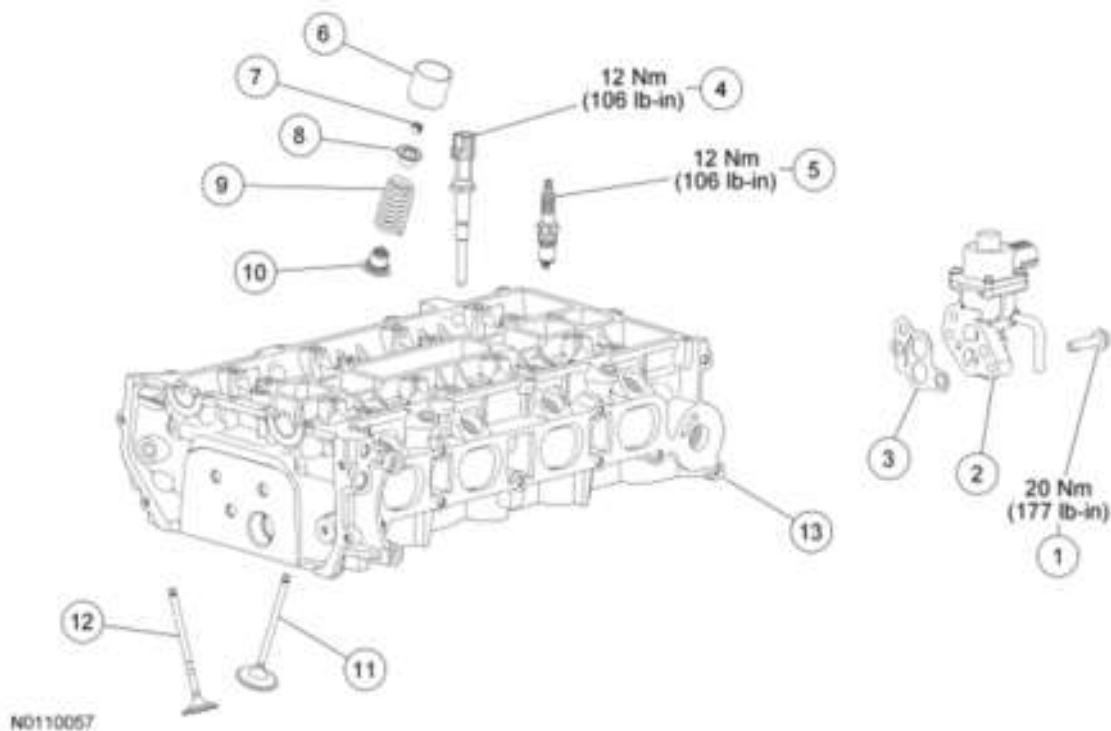
N0071900

**Fig. 218: Identifying Coolant Connection And Lifting Eyes With Torque Specifications**  
 Courtesy of FORD MOTOR CO.

**PART NUMBER REFERENCE**

Item	Part Number	Description
1	W500033	Engine lifting eye bolts (2 required)
2	17K077	Front engine lifting eye
3	17K004	Rear engine lifting eye
4	W500015	Coolant outlet pipe bolt (4 required)
5	9B321	Coolant outlet pipe
6	8255	Coolant outlet pipe gasket

**Cylinder Head - EGR Valve, Spark Plugs, Cylinder Head Temperature (CHT) Sensor and Valves**



**Fig. 219: Identifying EGR Valve, Spark Plugs, Cylinder Head Temperature (CHT) Sensor And Valves With Torque Specifications**  
 Courtesy of FORD MOTOR CO.

**PART NUMBER REFERENCE**

Item	Part Number	Description
1	W500225	EGR valve bolt (2 required)
2	9D475	EGR valve
3	9D476	EGR valve gasket
4	6G004	Cylinder Head Temperature (CHT) sensor
5	12405	Spark plug (4 required)
6	6500	Valve tappet (16 required)
7	6518	Valve spring retainer key (16 required)
8	6514	Valve spring retainer (16 required)
9	6513	Valve spring (16 required)
10	6517	Valve seal (16 required)
11	6505	Intake valve (8 required)
12	6507	Exhaust valve (8 required)
13	6049	Cylinder head

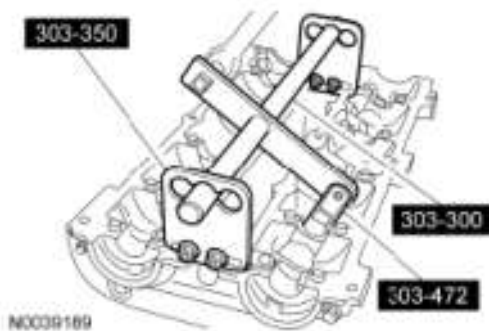
**Disassembly**

1. Remove the 2 bolts and the engine lifting eyes.
2. Remove the Cylinder Head Temperature (CHT) sensor.
3. Remove the 4 bolts and the coolant outlet pipe.
  - Discard the gasket.
4. Remove the 2 bolts and the EGR valve.

- Discard the EGR valve gasket.
5. Remove and discard the 4 spark plugs.
  6. **NOTE:**       **Note location of the tappets prior to removal.**

Remove the 16 valve tappets.

7. Using the 3 Valve Spring Compressors, compress the valve spring and remove the valve spring retainer keys, the valve spring retainers and the valve springs.



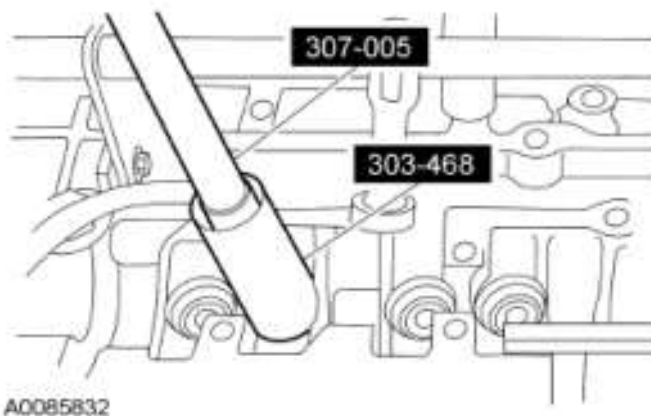
**Fig. 220: Compressing Valve Spring**  
Courtesy of FORD MOTOR CO.

8. Inspect the valve spring, valve spring retainer and valve spring retainer key. For additional information, refer to **ENGINE SYSTEM - GENERAL INFORMATION** . Install new parts as necessary.
9. **NOTE:**       **Note the location of the valves if they are to be reused.**

**NOTE:**       **Mark each valve if the original valves are to be used.**

Remove the valves.

10. Using the Valve Stem Seal Remover and the Slide Hammer, remove and discard the valve stem seals.



**Fig. 221: Removing Valve Seal**  
Courtesy of FORD MOTOR CO.

11. Inspect the valves. For additional information, refer to **ENGINE SYSTEM - GENERAL INFORMATION** . Install new parts as necessary.

## Assembly

**NOTE:** If installing the original valves, make sure the valves are installed in the same position from which they were removed. Coat the valve stems with clean engine oil prior to installation.

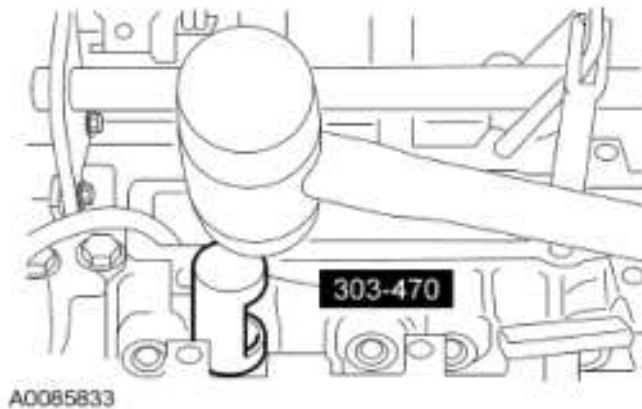
1.

Install the valves.

**NOTE:** Use the protector provided with the replacement kit to prevent damage to the valve seals.

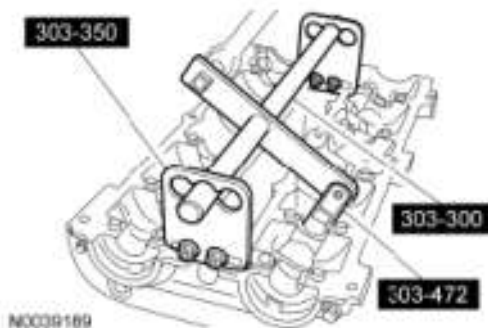
2.

Lubricate the valve stems and guides with clean engine oil and, using the Valve Stem Seal Replacer, install the valve seals onto the cylinder head valve guides.



**Fig. 222: Tapping Valve Seal**  
Courtesy of FORD MOTOR CO.

3. Place the valve spring in position over the valve and install the valve spring retainer.
4. Using the 3 Valve Spring Compressors, compress the valve spring and install the valve spring retainer keys.



**Fig. 223: Compressing Valve Spring**  
Courtesy of FORD MOTOR CO.

**NOTE:** Be sure to install the tappets in the same location as they were removed from.

5.

Install the 16 valve tappets.

6. Install the **CHT** sensor.

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

7. Install 4 new spark plugs.

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

8. Using a new gasket, install the EGR valve and the 2 bolts.

- Tighten to 20 Nm (177 lb-in).

9. Using a new gasket, install the coolant outlet pipe and the 4 bolts.

- Tighten to 10 Nm (89 lb-in).

10. Install the engine lifting eyes and the 2 bolts.

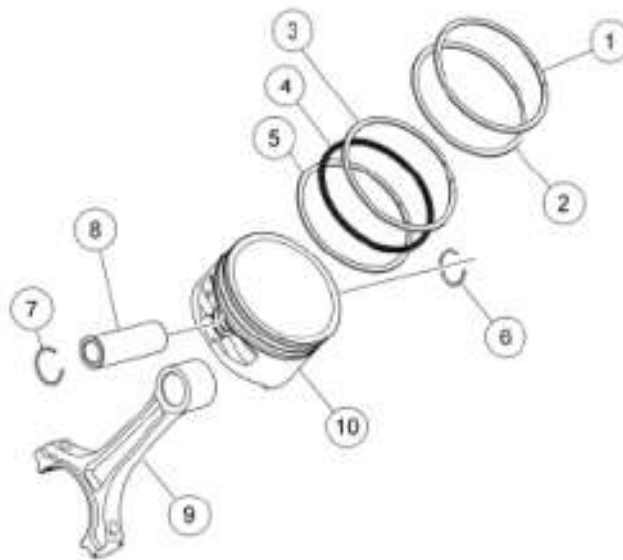
- Tighten to 45 Nm (33 lb-ft).

## PISTON

### Material

### MATERIAL SPECIFICATION

Item	Specification
Motorcraft® SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft® SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS-M2C930-A



N0010114

**Fig. 224: Exploded View Of Piston**  
Courtesy of FORD MOTOR CO.



## PART NUMBER REFERENCE

Item	Part Number	Description
1	6150	Piston compression upper ring
2	6152	Piston compression lower ring
3	6159	Piston oil control upper segment ring
4	6161	Piston oil control spacer
5	6159	Piston oil control lower segment ring
6	6140	Piston pin retainer
7	6140	Piston pin retainer
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.

**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.

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

**NOTE:** The arrow on the top of the piston points towards the front of the engine.

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 piston pin retaining clips in the piston.
5. Lubricate the piston and the new piston rings with clean engine oil.

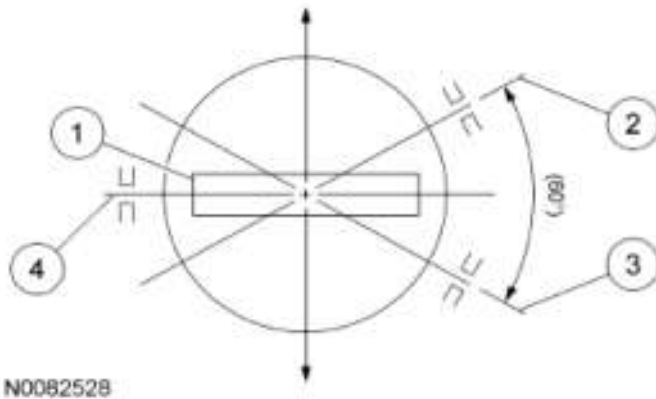
**NOTE:** The piston compression upper and lower ring should be installed with the paint mark on the outside diameter circumference of the ring to be positioned on the right side of the ring gap. The lower compression ring can also be installed with the undercut side downward.

6.

**NOTE:** The upper and lower compression ring gaps are not controlled for installation.

Install the piston rings onto the piston as shown in illustration.

1. Piston pin
2. Upper oil control ring gap location
3. Lower oil control ring gap location
4. Center line of the piston pin bore and the expander gap



**Fig. 225: Identifying Piston Ring Position**  
Courtesy of FORD MOTOR CO.