5720 and 5820 Self-Propelled Forage Harvesters

JOHN DEERE

TECHNICAL MANUAL

5720 and 5820 Self-Propelled
Forage Harvesters

TM1244 (01DEC84) English

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LITHO IN U.S.A (REVISED)
ENGLISH

5720 and 5820 Self-Propelled Forage Harvesters

Technical Manual TM-1244 (DEC-84)

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0A9; E03;0000 A 010385

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All information, illustrations and specifications contained in this technical manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

E03;0000 C 020385

Section 10
GENERAL

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0A9; E03;1000 A 090383

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0A9; E03;1000 A1 250283

ENGINE

Horsepower:
- 5720 (-630000) ..... 157 kW (210)*
- 5720 (630001-) ..... 168 kW (225)*
- 5820 (-630000) ..... 205 kW (275)*
- 5820 (630001-) ..... 216 kW (290)*

Type ..... 6-cylinder, in-line valve-in-head, diesel, turbo-charged and inter-cooled

Bore and stroke
- 5720 ..... (116 mm x 120 mm) 4.56 in. x 4.75 in.
- 5820 ..... (130 mm x 127 mm) 5.12 in. x 5 in.

Displacement
- 5720 ..... (7636 cm^3) 466 cu in
- 5820 ..... (10143 cm^3) 619 cu in

Compression ratio
- 5720 ..... 14.9 to 1
- 5820 ..... 14.7 to 1

Firing order 1-5-3-6-2-4

Valve clearance ..... Intake-(0.46 mm) 0.018-in.
Exhaust-(0.71 mm) 0.028-in.

Injection pump timing ..... TDC

Engine Speeds
- Working speed ..... 2100 rpm
- Slow idle ..... 800 rpm
- Fast idle (Full load) ..... 2100 rpm
- (No load) ..... 2300 rpm

**Factory observed net horsepower at flywheel less fan measured at (30°C) 85°F, 29.3 in. Hg. operating at 2100 rpm.*

See Section 220 and 225 for dynamometer tests and hp ratings.

0A9; E03;1005 A 250283

ENGINE

Horsepower:	
5720	(157 kW) 210*
5820	(205 kW) 275**
Type	6-cylinder, in-line valve-in-head, diesel, turbo-charged and inter-cooled
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Valve clearance	Intake-(0.46 mm) 0.018-in. Exhaust-(0.71 mm) 0.028-in.
Injection pump timing	TDC
Engine Speeds	
Working speed	2100 rpm
Slow idle	800 rpm
Fast idle (Full load)	2100 rpm
(No load)	2300 rpm

**Factory observed net horsepower at flywheel less fan measured at (30°C) 85°F, 29.3 in. Hg. operating at 2100 rpm.*

***Factory observed net horsepower at cutterhead drive sheave operating engine at 2100 rpm.*

0A9; E0101005 A 260282

LUBRICATION SYSTEM . . . . . Full pressurized with full-flow micronic oil filter, water-cooled oil cooler, and bypass valves for filter and cooler, and bypass engine oil filter 5825 only.

FUEL SYSTEM:

Type . . . . . Direct injection
Filter . . . . . Two-stage with replaceable impregnated paper element.
Injection pump type . . . . . Multiple plunger, in line
Air cleaner . . . . . Dry element with self-cleaning precleaner and safety element

OAW; E03:1905 S 260282

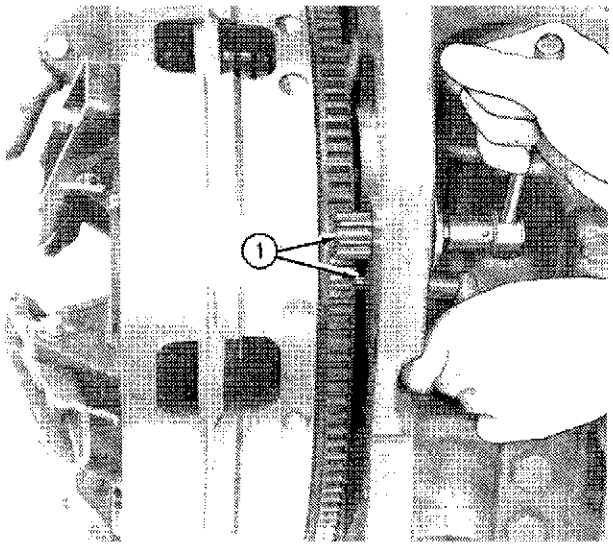
CHECK VALVE CLEARANCE

1. Remove rocker arm cover.

2. Use JDE-81-1 Flywheel Turning Tool and JDE-81-4 Timing Pin (1).

3. Rotate engine until timing pin engages timing hole in flywheel.

If the rocker arms for No. 1 cylinder are loose, the engine is at No. 1 "TDC-Compression." If the rocker arms for No. 6 cylinder are loose, the engine is at No. 6 "TDC-Compression." Rotate the engine one full revolution to No. 1 "TDC-Compression."



A77;RG2720 S11;0401 C 040283

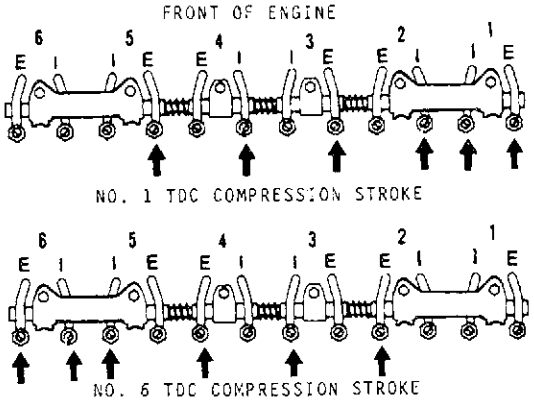
4. Adjust valve clearance on Nos. 1, 3 and 5 exhaust valves and Nos. 1, 2 and 4 intake valves.

VALVE CLEARANCE SPECIFICATIONS

Intake Valves	0.41-0.51 mm (0.016-0.020 in.)
Exhaust Valves	0.66-0.76 mm (0.026-0.030 in.)

5. Rotate flywheel 360 degrees until No. 6 piston is at "TDC" of its compression stroke.

6. Adjust valve clearance to the same specifications on Nos. 2, 4 and 6 exhaust and Nos. 3, 5 and 6 intake valves.



A77;RG4295 S11;2005 A 101282

CHECK VALVE LIFT

Measuring valve lift can give an indication of wear on cam lobes or cam followers.

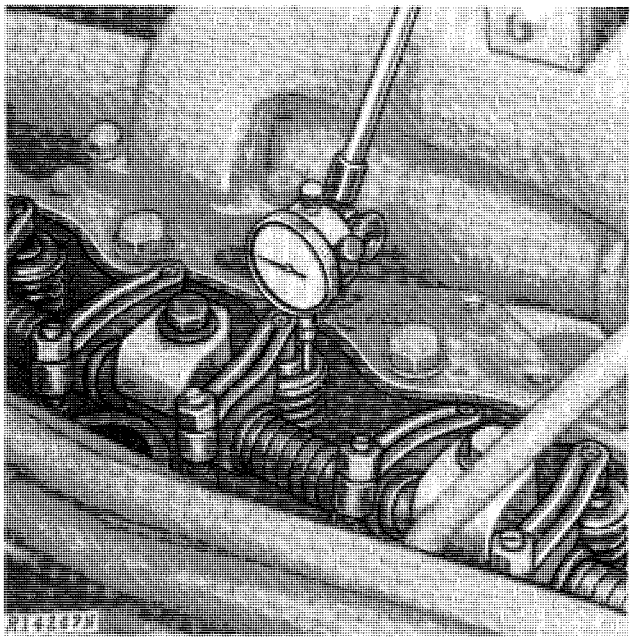
1. Adjust valve clearance to previous specifications.

2. Place dial indicator on valve rotator. Be sure that valve is fully closed and the rocker arm moves freely.

3. Zero dial indicator.

4. Manually turn engine in running direction, using the engine rotation tools previously mentioned.

5. After rocker arm contacts valve wear cap, observe dial indicator reading as valve is moved to fully open position.



VALVE LIFT SPECIFICATIONS

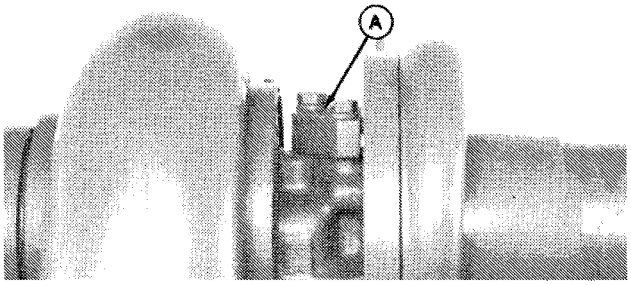
Intake	**10.46-11.23 mm (0.412-0.442 in.)**
Exhaust	**10.5-11.3 mm (0.413-0.444 in.)**

A77;R14247 N S11;2005 B 071083

IMPORTANT: When servicing an engine on a rollover stand, disconnect turbo oil inlet line (A) before overturning engine. Failure to do so may cause a hydraulic lock upon starting the engine. Hydraulic lock may cause possible engine failure.

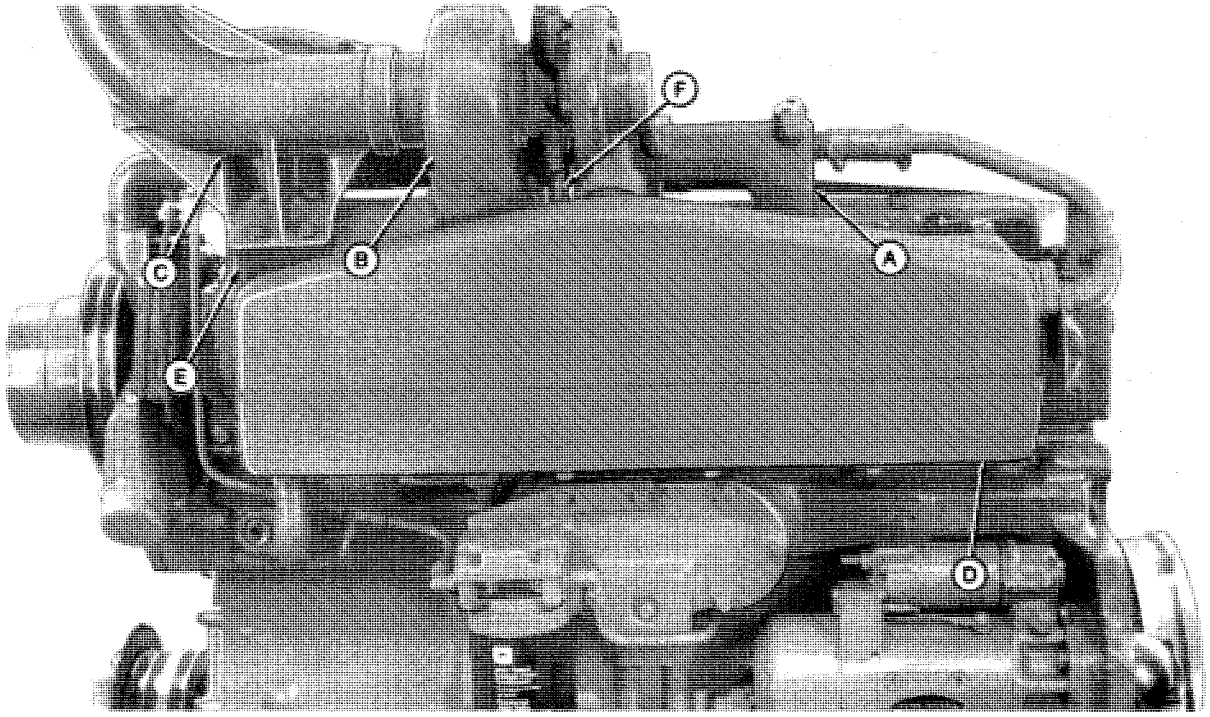
Hydraulic lock occurs when trapped oil in the oil pressure regulating housing drains through the turbocharger, the exhaust and intake manifolds, and then into the cylinder head.

After starting the engine, the trapped oil in the manifold and head is released into the cylinder(s) filling them with oil, causing hydraulic lock and possible engine failure.



A80;RG3488 S11;2505 BC 151281

REMOVE CYLINDER HEAD AND VALVES



A—Water Manifold
B—Turbocharger
C—Exhaust Elbow
D—Intake Manifold Assembly
E—Exhaust Manifold
F—Turbocharger Oil Return Pipe

1. Remove water manifold (A). (See Remove Water Manifold in this section.)

2. Remove turbocharger (B) and exhaust elbow (C). (Remove Intercooler in this section.)

3. Remove cover, intercooler and intake manifold (D). (See Remove Intercooler in this section.)

4. Remove exhaust manifold (E).

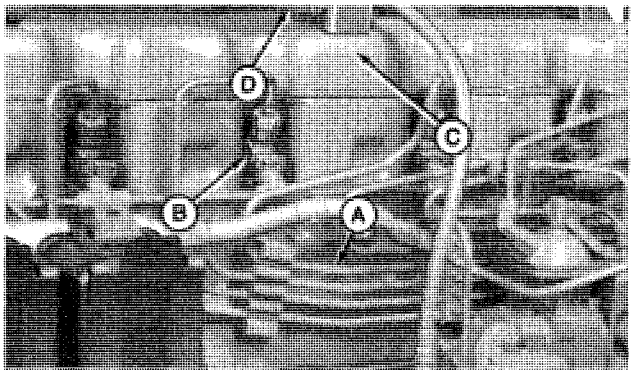
CAUTION: After operating the engine, allow enough time for the exhaust system to cool before removal.

A77;RG4296 S11;2005 C 270984

5. Remove fuel injection lines (A) and nozzles (B). (See Section 30, Group 10.)

6. Remove rocker arm cover (C) with ventilator outlet hose (D) and tube.

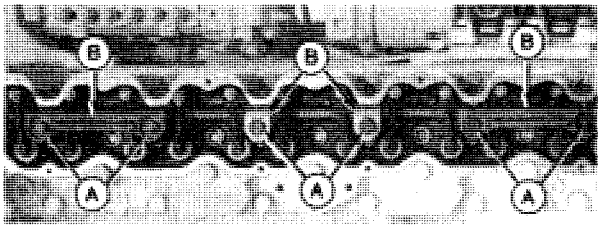
A—Fuel Injection Lines
B—Fuel Injection Nozzles
C—Rocker Arm Cover
D—Ventilator Outlet Hose



A77;RG4297 S11;2005 D 210884

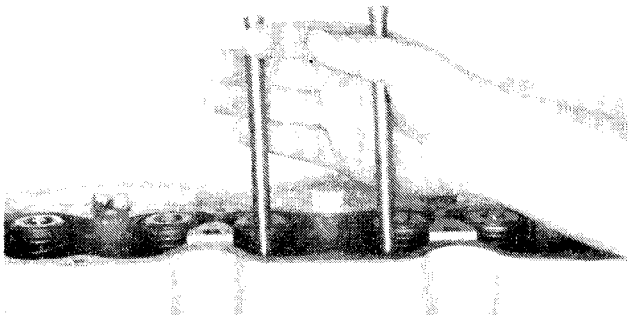
7. Remove six cap screws (A) and remove all clamps (B).

8. Lift rocker arm assembly up and remove.



A77;RG3920 S11;2005 EQ 270482

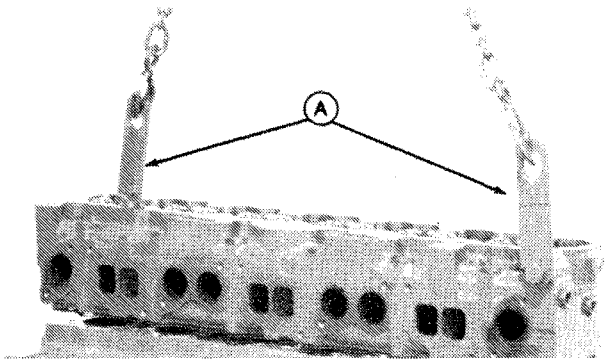
9. Remove push rods and identify for reassembly.



A77;RG2862 S11;2005 DV 170582

10. Remove all 26 cylinder head cap screws.

11. Lift cylinder head from block using lifting eyes (A) and appropriate lifting equipment.

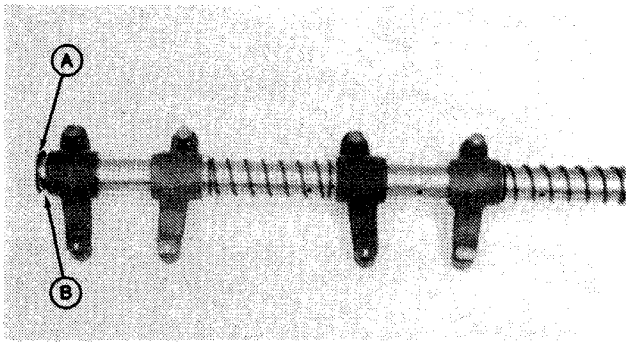


A77;RG3492 S11;2005 DW 050784

DISASSEMBLE AND INSPECT ROCKER ARM ASSEMBLY

1. Remove plugs (A) and washers (B) from ends of rocker arm shaft.

2. Slide parts from shaft and identify for reassembly.



A77;RG3801 S11;0401 L 170582

3. Inspect rocker arm shaft (A) for severe scratching, scoring, or excessive wear at points of rocker arm contact.

NOTE: Wear could indicate weak valve springs, bent push rods, or loose rocker arm shaft clamps.

ROCKER ARM ASSEMBLY SPECIFICATIONS

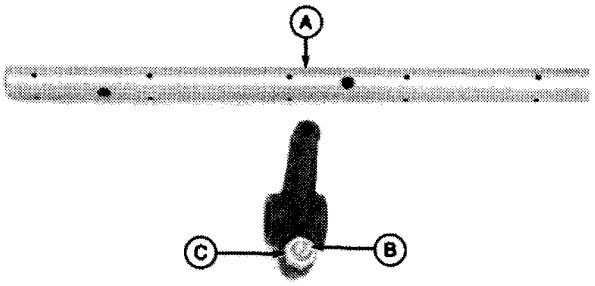
Rocker Arm I.D. ..... 19.06 to 19.09 mm (0.7505 to 0.7525 in.)

Rocker Arm Shaft O.D. ..... 19.01 to 19.05 mm (0.7484 to 0.7500 in.)

4. Check rocker arm adjusting nut (C) and screw (B) for damage. Replace if necessary.

NOTE: Be sure all oil holes in rocker arm shaft are clean and open.

5. Clean all rocker arm parts with clean solvent. Dry with compressed air.



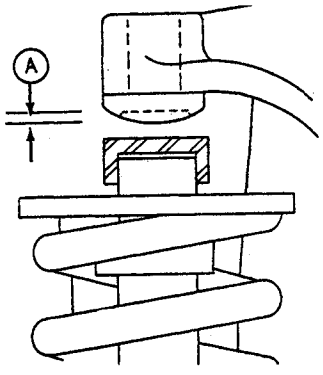
A77;RG3802 S11;0401 M 100784

6. Check for cups or concave wear (A) on ends of rocker arms where they contact valve tips.

7. Examine spacer springs on shaft between rocker arms. Be sure they are strong enough to exert a positive pressure on rocker arms.

NOTE: If the rocker arm has been damaged by a valve failure, replace it and the push rods when replacing valves.

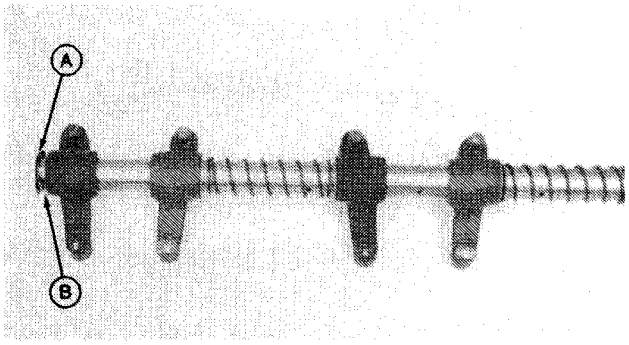
8. Roll rocker arm shaft and push rods on a flat surface to check for bends or distortion. Replace parts as necessary.



A77;R26131 S11;0401 N 190782

9. Assemble parts on rocker arm shaft opposite removal procedure.

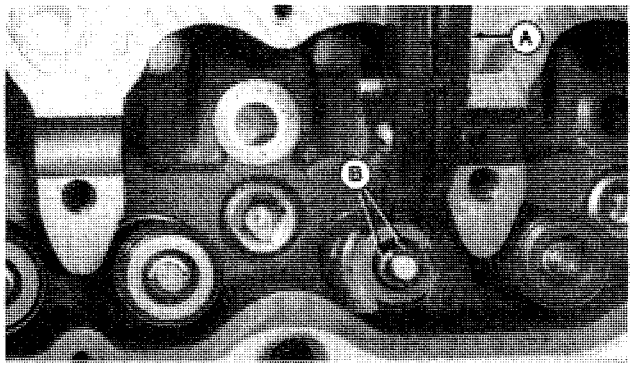
Make sure rocker arm shaft end plugs (A) are firmly seated against end of shaft, and washers (B) are installed on shaft.



A77;RG3801 S11;0401 O 230482

REMOVE VALVE ASSEMBLY

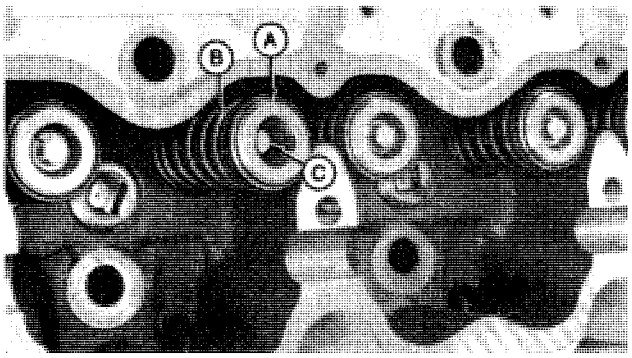
1. Compress valve spring compressor (A) over valve.
2. Remove retaining locks (B).
3. Remove valve spring compressor.



A77;RG3803 S11;0401 Q 230482

4. Remove valve rotators (A).
5. Remove valve springs (B).
6. Remove valves (C).

NOTE: Identify all parts for proper reassembly.



A77;RG3804 S11;0401 R 230482

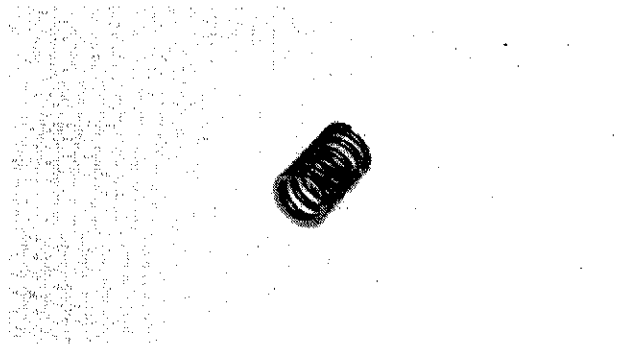
INSPECT VALVE SPRINGS

1. Inspect valve springs for alignment, wear and damage.

2. Place springs on a flat surface to see that they are square and parallel.

3. Check valve spring tension using D-01168AA Spring Compression Tester.

NOTE: Free length of springs differ slightly, but compressed height must be the same.



VALVE SPRING SPECIFICATIONS

Compression	Height
240 - 276 N	46 mm
(54 - 62 lb force)	(1.81 in.)
591 - 680 N	34.5 mm
(133 - 153 lb force)	(1.36 in.)

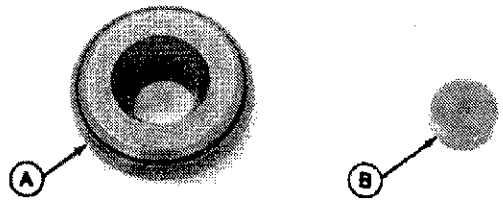
A77;RG2732 S11;0401 S 131083

INSPECT VALVES ROTATORS AND WEAR CAPS

1. Insure that valve rotators (A) will turn freely. Replace if defective.

2. Replace valve wear caps (B) if pitted or worn.

3. Visually check valve face and stem for wear or damage.



A77;RG3491 S11;0401 T 170582

CLEAN VALVES

1. Hold each valve firmly against a soft wire wheel on a bench grinder.

2. Make sure all carbon is removed from valve head, face and unplated portion of stem.

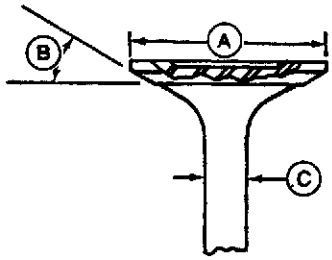
IMPORTANT: Any carbon left on the stem will affect alignment in valve refacer if valves need to be refaced.

A77; S11:0401 L 231182

MEASURE VALVES

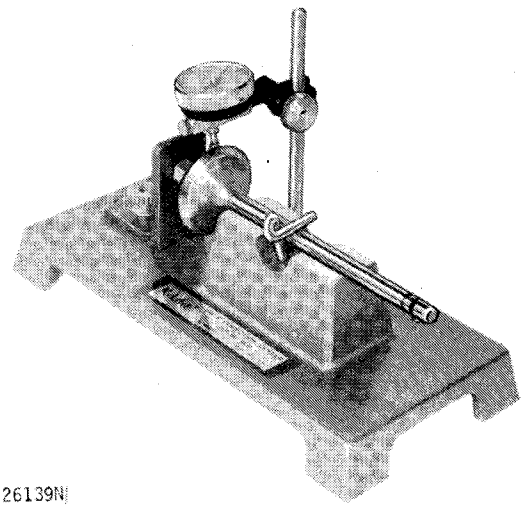
1. Compare valve stem O.D. with guide I.D. to determine stem-to-guide clearance.

A—43.43-43.69 mm (1.710-1.720 in.)
B—29.5°
C—9.436-9.462 mm (0.3715-0.3725 in.)



A77;RG3311 S11;2005 ER 270482

2. Use D-05058ST Valve Inspection Center to determine if valves are out of round, bent or warped.



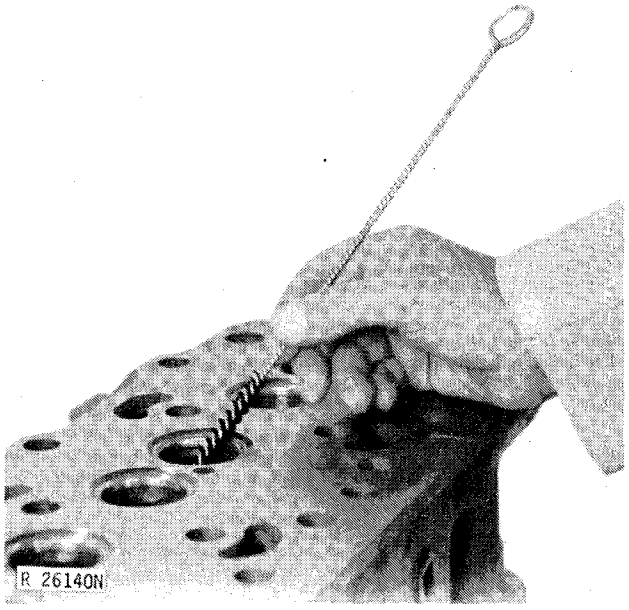
R 26139N

A77;R26139 N 511;0401 W 151281

CLEAN VALVE GUIDES

1. Use a D-17011BR Valve Guide Cleaning Brush to clean valve guides before inspection or repair.

NOTE: A few drops of light oil or kerosene will help to fully clean the guide.

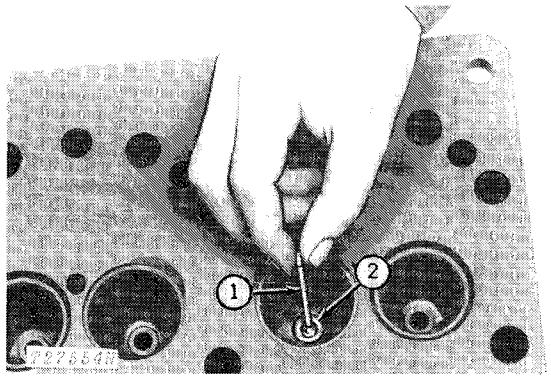


R 26140N

A77;R26140N 511;0401 X 101180

MEASURE VALVE GUIDES

1. Measure valve guides (2) for wear using a telescope gauge (1).



VALVE GUIDE SPECIFICATIONS

I.D. Guide in a New Head ..... (9.51 to 9.54 mm)
0.3745 to 0.3755 in.

New Guide-to-Valve Stem
Clearance ..... (0.051 to 0.102 mm)
0.0020 to 0.0040 in.

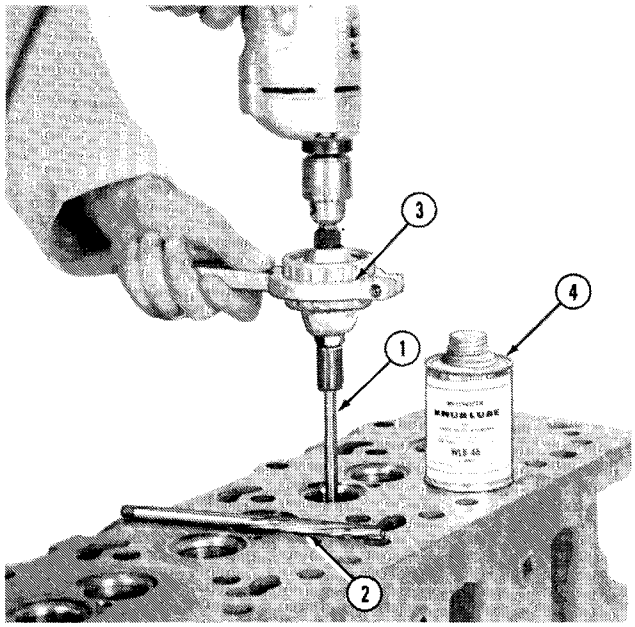
NOTE: Worn guides can allow a clearance of (0.15 mm) 0.006 in. and still be acceptable. Worn guides may be knurled to return them to specified clearance if valve-to-guide clearance is (0.25 mm) 0.010 in. or less. If clearance exceeds (0.25 mm) 0.010 in., install oversize valves.

A77;T27554N S11;0401 Y 101180

KNURL GUIDES

1. Use No. D-20002WI Knurling Tool Set to knurl valve guides.

NOTE: Use tool set exactly as directed by the manufacturer.



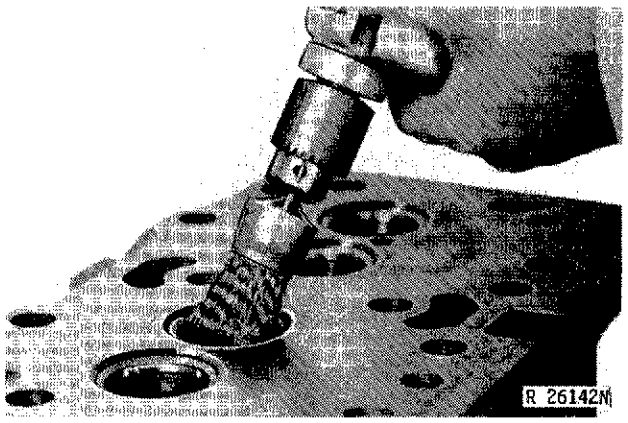
1—Knurler
2—Reamer
3—Speed Reducer
4—Lubricant

A77;RG2734 S11;0401 Z 101180

CLEAN VALVE SEATS

1. Use an electric hand drill with D-17024BR Wire Cleaning Brush to remove all carbon on valve seats.

2. Check seats for cracks, pits or excessive wear.



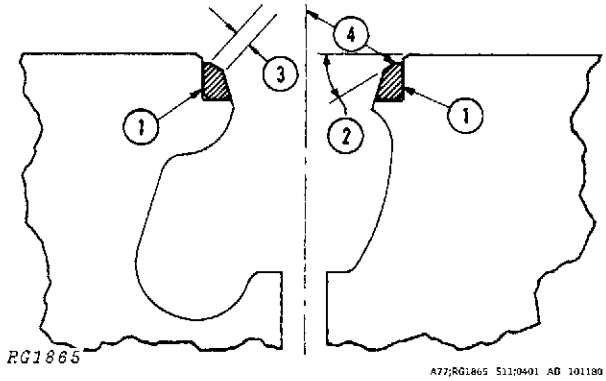
A77;R26142N S11;0401 AA 101180

MEASURE VALVE SEATS

1. Measure valve seats for proper specifications.

2. Recondition valve seat by grinding.

1—Valve Seat Insert
2—Valve Seat Angle ..... 30°
3—Valve Seat Width ..... (2.108 to 2.362 mm) 0.0830 to 0.0930 in.
4—Valve Seat Runout ..... No more than (0.051 mm) 0.0020 in.



A77;RG1865 S11;0401 AB 101180

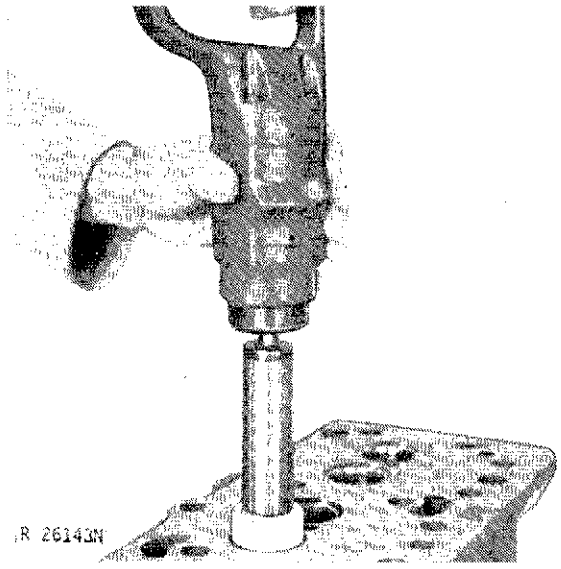
GRIND VALVE SEATS

1. If valve seats need grinding, do not grind too long. Only a few seconds are required to recondition the average valve seat. Avoid the tendency to grind off too much.

2. Do not use too much pressure. While grinding, support the weight of the driver to avoid excessive pressure on the stone.

NOTE: Keep the work area clean.

Check the seat width and contact pattern between the seat and valve with bluing.



A77;R26143N S11;0401 AC 101180

CHECK VALVE HEIGHT

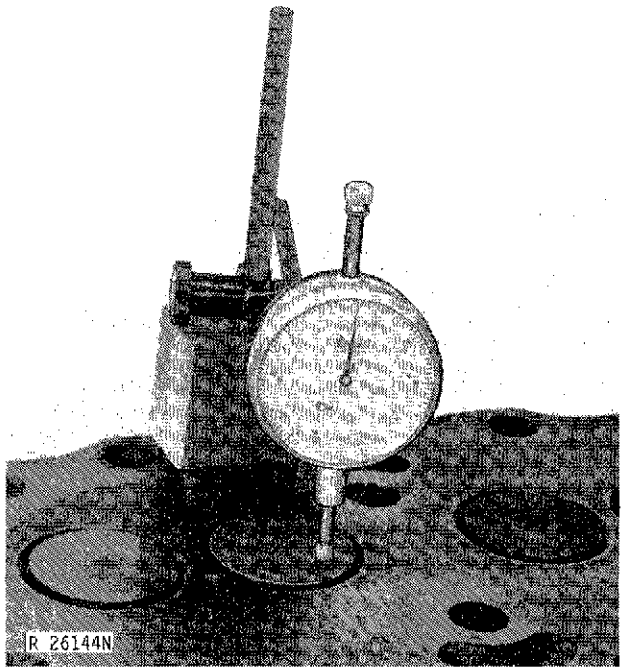
1. Install valves after grinding.

2. Use a dial indicator to check valve height.

VALVE HEIGHT SPECIFICATIONS

Valve Height Above Cylinder Head Surface	(0.61 to 0.97 mm) 0.024 to 0.038 in.
Maximum Valve Recess	(0.15 mm) 0.006 in.

NOTE: If measurement does not meet specifications, install either new valves, inserts, or both to obtain proper valve height.

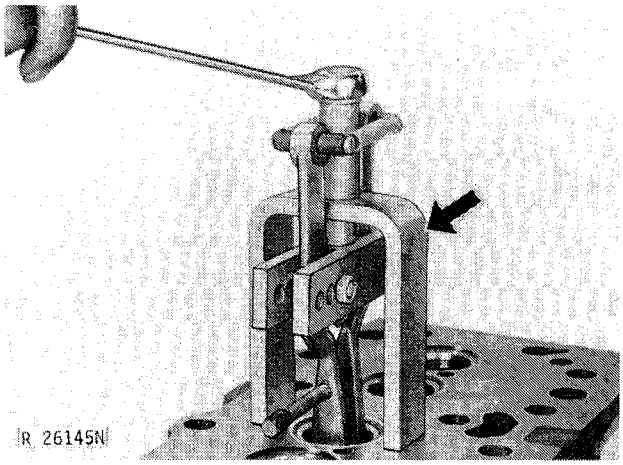


A77;R26144N S11;0401 AC 101180

REPLACE VALVE INSERTS

1. Remove valve seat (if needed) with JDE-41296 Valve Seat Puller (arrow).

NOTE: Be careful not to damage cylinder head when removing seats.



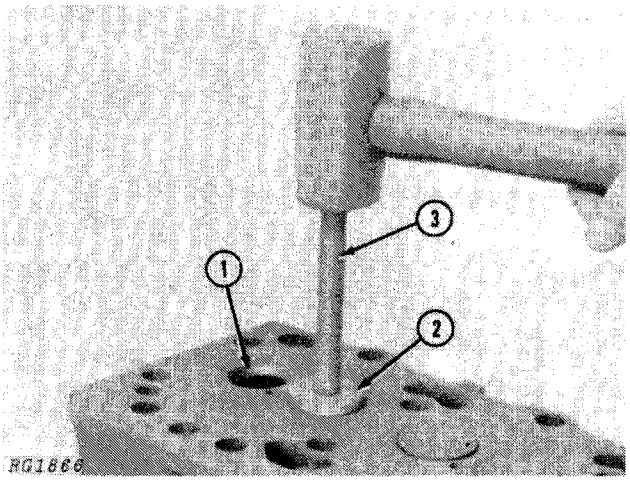
A77;R26145N S11;0401 AE 101180

2. Chill both new seat insert (1) replacement ring (2), and JDE-7 Driver (3) to (-29°C) -20°F in dry ice before installing.

NOTE: Use JDE-66 Replacement Ring on intake valve seats, and JDE-79 Replacement Ring on exhaust valve seats.

Use JDE-7 Driver (3) and Replacement Ring to drive inserts into place.

3. Grind valve seats. Do not over-grind valve seat.



A77;RG1866 S11;0401 AF 101180

INSTALL OVERSIZE INSERTS

In some cases the inside diameter of the valve seat bore may become damaged and require machining. In this case, oversize inserts are available in 0.25 mm (0.010 in.) oversize only.

1. Remove valve seats with JDE-41296 Valve Seat Puller.

2. Machine both intake and exhaust valve seat bores to 44.67-44.69 mm (1.7585-1.7595 in.).

3. Replace inserts as previously indicated.

A77; S11;0401 AG 080383

INSPECT AND CLEAN CYLINDER HEAD

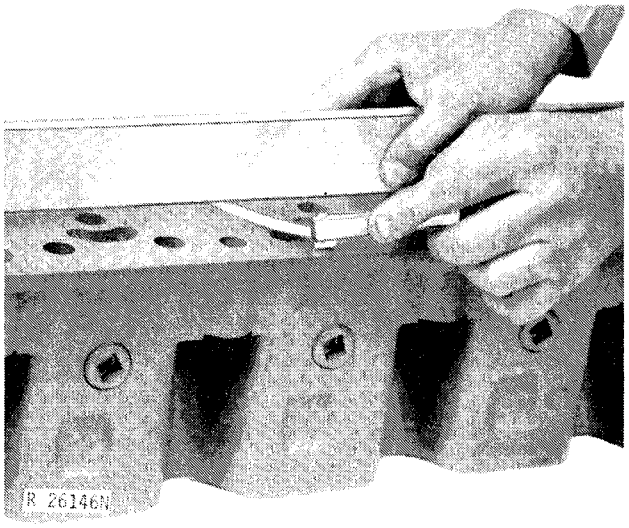
1. Thoroughly clean cylinder head in clean solvent. Clean all valve guides with valve guide cleaning brush.

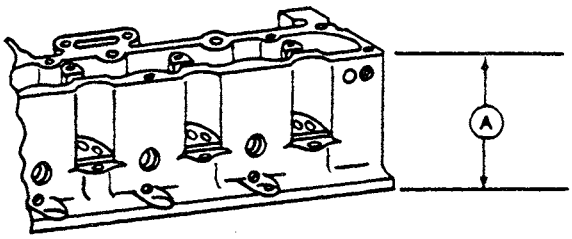
2. Dry with compressed air.

3. Use a straight edge to check the head for flatness.

Warpage should not exceed 0.02 mm (0.001 in.) for every 127 mm (5 in.) of head length. If necessary to resurface head, a maximum of 0.762 mm (0.030 in.) can be removed from new part dimension (A).

NOTE: To determine if head has been resurfaced previously, measure distance from valve cover gasket rail-to-combustion face (A). The new part dimension is 155.45—155.71 mm (6.120—6.130 in.)





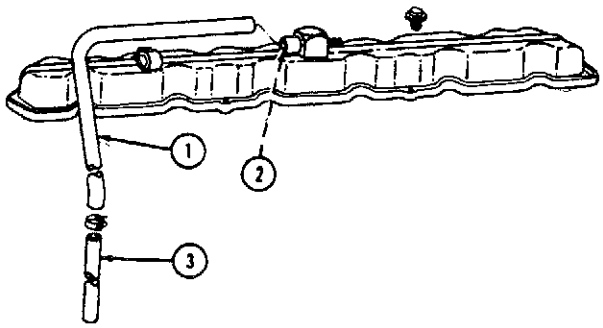
A77;R26146 N, RG4421 S11;0401 AH 040184

INSPECT AND CLEAN VENTILATOR OUTLET HOSE

1. Check ventilator outlet hose (1) on rocker arm cover for bent or damaged condition. Replace if necessary.

2. Clean ventilator hose and tube (3) if they are restricted.

3. Check condition of O-ring (2) in rocker arm cover. If any damage or deterioration is noted, replace the O-ring.



A77;RG2938 S11;0010 D 100981

INSPECT AND CLEAN EXHAUST MANIFOLD

1. Remove all residue and gasket material from gasket surfaces.

2. Thoroughly clean passages in exhaust manifold and exhaust elbow.

3. Inspect entire exhaust manifold for cracks or damage and replace parts as necessary.

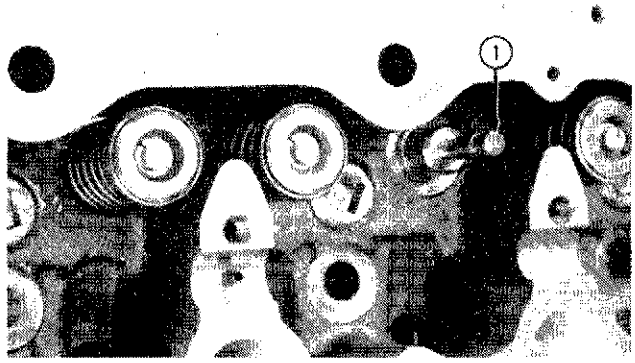
A77; S11;0401 AJ 101180

ASSEMBLE VALVE ASSEMBLY

1. Apply AR44402 Valve Stem Lubricant or its equivalent to valve stems and guides.

2. Install valves (1) in guides from which they were removed.

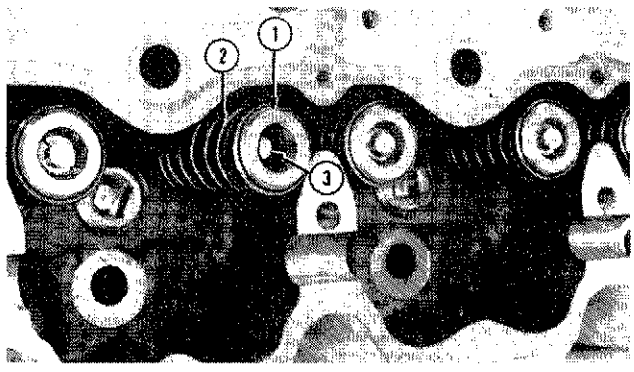
NOTE: Valves must move freely and seat properly.



A77;RG2736 S11;0401 AK 101180

3. Install valve springs (2) making certain that cylinder head end of spring is located correctly in machined counterbore of head.

4. Install valve rotators (1) on springs and valves (3).

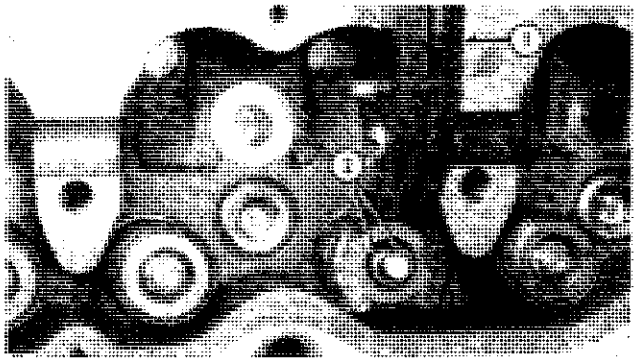


A77;RG2730 S11;0401 AL 101180

5. Compress valve springs with valve spring compressor (1).

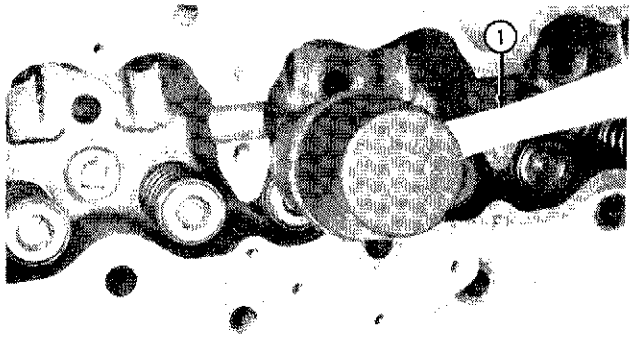
6. Install retainer locks (2).

7. Release valve spring compressor.



A77;RG2729 S11;0401 AM 101180

8. Strike end of each valve with a soft mallet (1) three or four times to insure proper seating of the retainer locks.

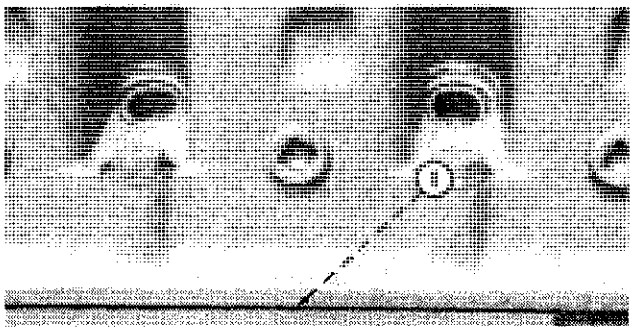


A77;RG2736 S11;0401 AM 101180

INSTALL CYLINDER HEAD

1. Install cylinder head gasket (1) dry.

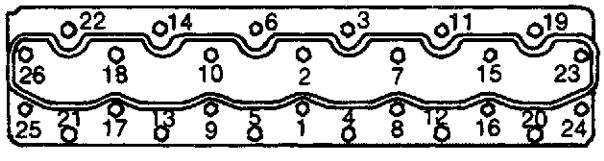
2. Place cylinder head in correct position on block with appropriate lifting equipment.



A77;RG2077 S11;2010 E 100281

3. Dip cap screws and washers in clean engine oil.

CAP SCREW LENGTH	LOCATION ON CYLINDER HEAD
(85.9 mm) 3.38 in.	22, 14, 6, 3, 11, 19
(136.7 mm) 5.38 in.	18, 10, 2, 7, 15
(162.1 mm) 6.38 in.	26, 21, 13, 5, 4, 12, 20, 23
(190.5 mm) 7.50 in.	25, 17, 9, 1, 8, 16, 24



A77;RG3080 S11;0401 AP 101180