



Service Repair Manual

Models

305E2 CR Mini Hydraulic
Excavator


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Product: MINI HYD EXCAVATOR

Model: 305E2 CR MINI HYD EXCAVATOR PYR

Configuration: 305E2CR Mini Hydraulic Excavator PYR00001-UP (MACHINE) POWERED BY C2.4 Engine

Disassembly and Assembly

C2.4 Tier 4 Final Engines for Caterpillar Built Machines

Media Number -UENR7319-02

Publication Date -01/07/2018

Date Updated -01/08/2018

i06540930

Idler Gear - Remove and Install

SMCS - 1206

Removal Procedure

Table 1

Required Tooling			
Tool	Part Number	Part Description	Qty
A	387-1314	Idler Gear Tool	1

Start By:

- a. Remove front housing.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.



Illustration 1

g06014275

1. Ensure that Timing Marks (X) on the idler gear and the crankshaft gear are aligned.



Illustration 2

g06014283

2. Ensure that Timing Marks (Y) on the idler gear and the camshaft gear are aligned.



Illustration 3

g06014290

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3. Ensure that Timing Marks (Z) on the idler gear and the fuel injection pump gear are aligned.

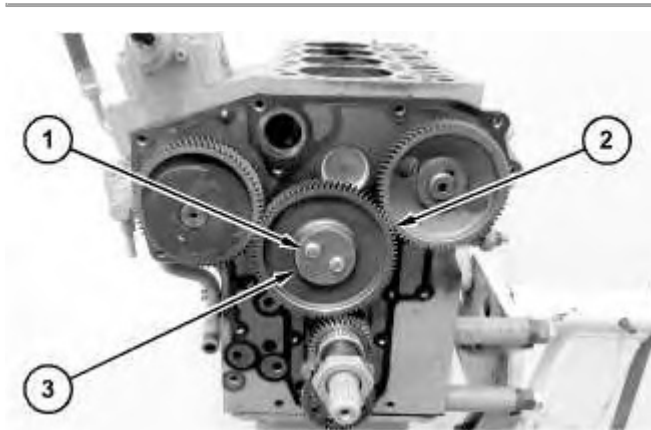


Illustration 4

g06014314

4. Remove bolts (1), gear control collar (3), and idler gear (2).



Illustration 5

g06014318

5. Use Tooling (A) and a suitable press to remove idler gear bearing (4).



Illustration 6

g06014504

Note: Make a temporary mark on the cylinder block in order to show the position of the oil hole.

6. Remove bolts (5) and idler shaft (6).

Installation Procedure

1. Install idler gear (2) in the reverse order of removal.
 - a. Ensure that the gears, cylinder block surface, and idler gear (2) are clean and free from wear or damage. If necessary, replace any components that are worn or damaged
 - b. Lubricate idler shaft (6) with clean engine oil.
 - c. Lubricate idler gear bearing surface (4) with clean engine oil.
 - d. Apply clean engine oil to bolts (5).

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C2.4 Tier 4 Final Engines for Caterpillar Built Machines

Media Number -UENR7319-02

Publication Date -01/07/2018

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i06524408

Housing (Front) - Remove and Install

SMCS - 1151-010

Removal Procedure

Table 1

Required Tooling			
Tool	Part Number	Part Description	Qty
A	—	Loctite Hi-Temp Flange Sealant	—

Start By:

- a. Remove crankshaft pulley.
- b. Remove engine oil cooler.
- c. Remove camshaft position sensor.



Illustration 1

g06009327

1. Remove clamp (1). Disconnect hose assembly (2).

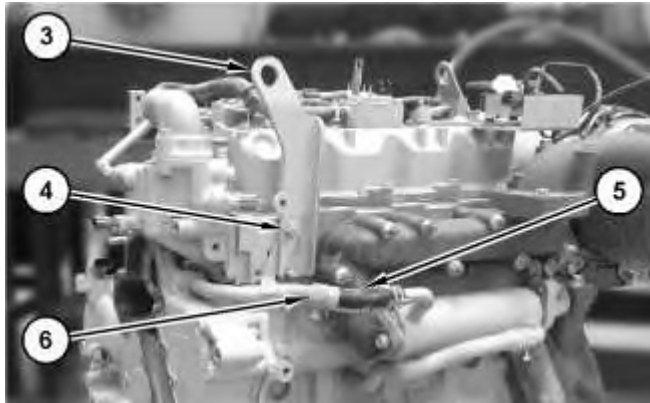


Illustration 2

g06009342

2. Remove nut (4) and lifting plate (3).
3. Remove clamp (6) and disconnect hose assembly (5).

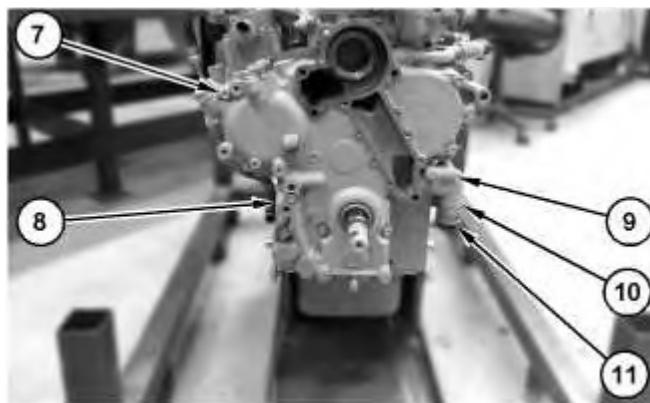


Illustration 3

g06009549

4. Disconnect hose assembly (11) (not shown). Remove bolts (9) and elbow (10).
5. Remove bolts (7), front housing (8), and the gasket.

Installation Procedure

1. Install front housing (8) in the reverse order of removal.
 - a. Apply Tooling (A) to the flange of front housing (8).

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C2.4 Tier 4 Final Engines for Caterpillar Built Machines

Media Number -UENR7319-02

Publication Date -01/07/2018

Date Updated -01/08/2018

i06501570

Valve Mechanism Cover - Remove and Install

SMCS - 1107-010

Removal Procedure

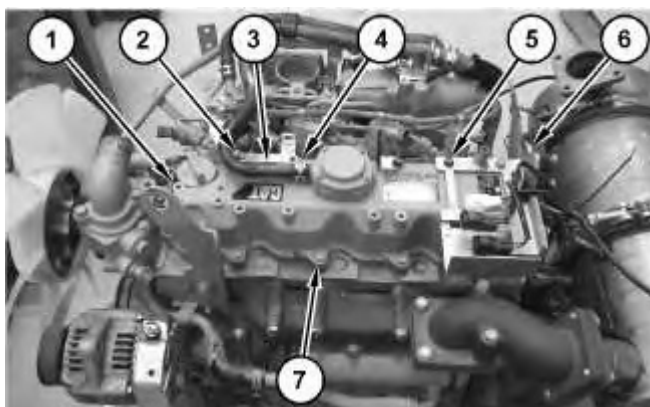


Illustration 1

g06000444

1. Remove bolts (5) and bracket (6).
2. Remove bolt (2), clamp (4), and hose assembly (3).
3. Remove bolts (7), valve mechanism cover (1), and the gasket.

Installation Procedure

1. Install valve mechanism cover (1) in the reverse order of removal.
 - a. Tighten bolts (7) to a torque of 7 N·m to 11 N·m (62 lb in to 97 lb in).

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C2.4 Tier 4 Final Engines for Caterpillar Built Machines

Media Number -UENR7319-02

Publication Date -01/07/2018

Date Updated -01/08/2018

i06546146

Rocker Shaft and Push Rod - Remove and Install

SMCS - 1102-010; 1208-010

Removal Procedure

Start By:

- a. Remove valve mechanism cover.

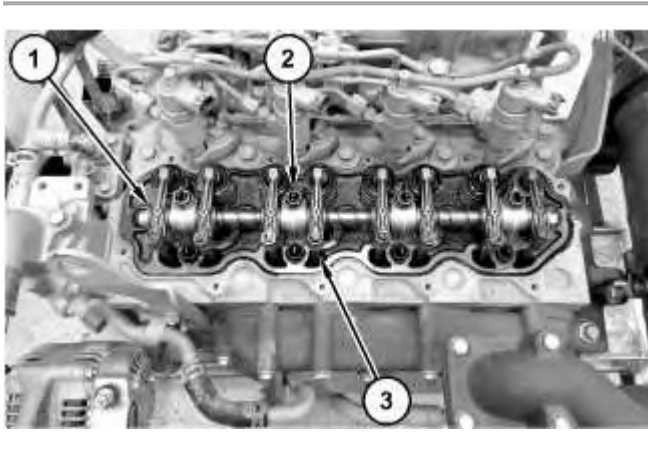


Illustration 1

g06010610

1. Remove bolts (2) and rocker shaft assembly (1).
2. Place an identification mark on pushrods (3) to show the location. Remove pushrods (3).

Note: Identification mark will ensure that the pushrods can be installed in the original positions. Do not interchange the positions of used pushrods.

Installation Procedure

1. Install pushrods (3) and rocker shaft assembly (1) in the reverse order of removal.

- a. Tighten bolts (2) to a torque of 24 N·m to 27 N·m (212 lb in to 239 lb in).

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C2.4 Tier 4 Final Engines for Caterpillar Built Machines

Media Number -UENR7319-02

Publication Date -01/07/2018

Date Updated -01/08/2018

i06547684

Rocker Shaft - Disassemble

SMCS - 1102-015

Disassembly Procedure

Start By:

- a. Remove the rocker shaft and pushrods.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Make an identification mark on each rocker arm assembly to show the location.

Note: The components must be reinstalled in the original location. Do not interchange components.

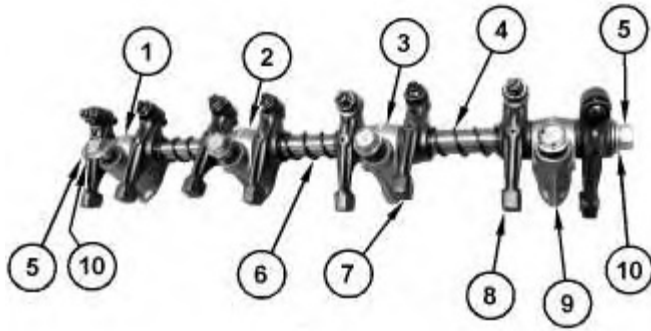


Illustration 1

g06045046

⚠ WARNING

Personal injury can result from being struck by parts propelled by a released spring force.

Make sure to wear all necessary protective equipment.

Follow the recommended procedure and use all recommended tooling to release the spring force.

2. On the left end of rocker shaft (6), remove bolts (5) and three washers (10).
3. Remove rocker arm assembly (7) for the inlet valve from rocker shaft (6). Remove support (1). Remove rocker arm assembly (8) for the exhaust valve from rocker shaft (6). Remove spring (4).
4. Remove rocker arm assembly (8) for the inlet valve from rocker shaft (6). Remove support (2). Remove rocker arm assembly (7) for the exhaust valve from rocker shaft (6). Remove spring (4).
5. Remove rocker arm assembly (8) for the inlet valve from rocker shaft (6). Remove support (3). Remove rocker arm assembly (7) for the exhaust valve from rocker shaft (6). Remove spring (4).
6. Remove rocker arm assembly (8) for the inlet valve from rocker shaft (6).
7. On the right end of rocker shaft (6), remove bolt (5) and three washers (10).
8. Remove rocker arm assembly (8) for the exhaust valve and support (9) from right side of rocker shaft (6).

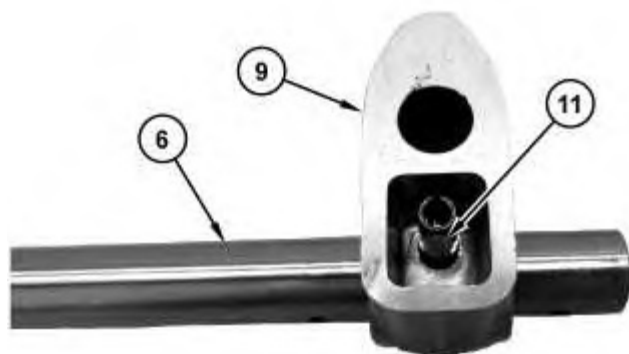


Illustration 2

g02725468

9. Rotate rocker arm shaft (6) and support (9). Remove pin (11). Remove support (9).

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Disassembly and Assembly

C2.4 Tier 4 Final Engines for Caterpillar Built Machines

Media Number -UENR7319-02

Publication Date -01/07/2018

Date Updated -01/08/2018

i06547686

Rocker Shaft - Assemble

SMCS - 1102-016

Assembly Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: The components must be reinstalled in the original location. Do not interchange components.

1. Ensure that all components are clean and free from wear and damage. Refer to Specifications, "Rocker Shaft" for more information. If necessary, replace any components that are worn or damaged.
 2. Lubricate all the bores of rocker arm assemblies (7) for the inlet valve and rocker arm assemblies (8) for the exhaust valve with clean engine oil. Lubricate rocker shaft (6) with clean engine oil.
-

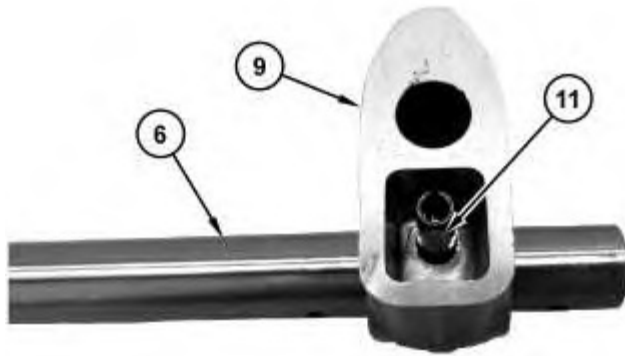


Illustration 1

g02725468

3. Position support (9) on the right end of rocker arm shaft (6) and install pin (11).

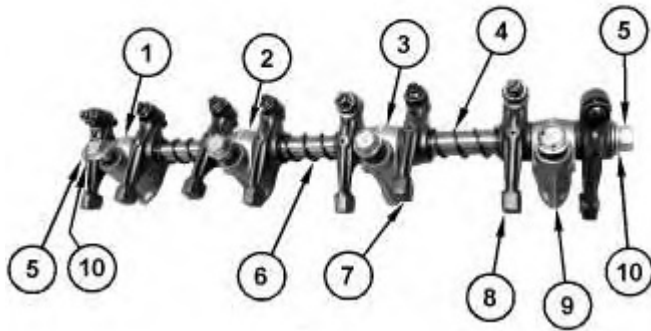


Illustration 2

g06045046

⚠ WARNING

Improper assembly of parts that are spring loaded can cause bodily injury.

To prevent possible injury, follow the established assembly procedure and wear protective equipment.

4. Install rocker arm assembly (7) for the exhaust valve and support (9) on the right side of the rocker arm shaft (6).
5. Install retaining washer (10) on the right end of rocker arm shaft (6). Install the two washers and bolt (5).
6. Install rocker arm assembly (8) for the inlet valve on the left side of the rocker arm shaft (6).
7. Install spring (4). Install rocker arm assembly (7) for exhaust valve on rocker shaft (6). Install support (3). Install rocker arm assembly (8) for inlet valve to rocker shaft (6).

8. Install spring (4). Install rocker arm assembly (7) for exhaust valve on rocker shaft (6).
Install support (2). Install rocker arm assembly (8) for inlet valve to rocker shaft (6).
9. Install spring (4). Install rocker arm assembly (7) for exhaust valve on rocker shaft (6).
Install support (1). Install rocker arm assembly (8) for inlet valve to rocker shaft (6).
10. Install retaining washers (10) on the left end of rocker arm shaft (6). Install the two washers
(10) and bolt (5).

End By:

- a. Install the rocker shaft and pushrods.

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Disassembly and Assembly

C2.4 Tier 4 Final Engines for Caterpillar Built Machines

Media Number -UENR7319-02

Publication Date -01/07/2018

Date Updated -01/08/2018

i06546310

Cylinder Head - Remove and Install

SMCS - 1100-010

Removal Procedure

Start By:

- a. Remove rocker arm shaft and pushrods.
- b. Remove inlet manifold.
- c. Remove exhaust manifold.
- d. Remove electronic unit injectors.
- e. Remove front housing.
- f. Remove glow plugs.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers

before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.

1. Drain the coolant. Refer to Operation and Maintenance Manual, "Cooling System Coolant - Change" for the correct draining and filling procedures.

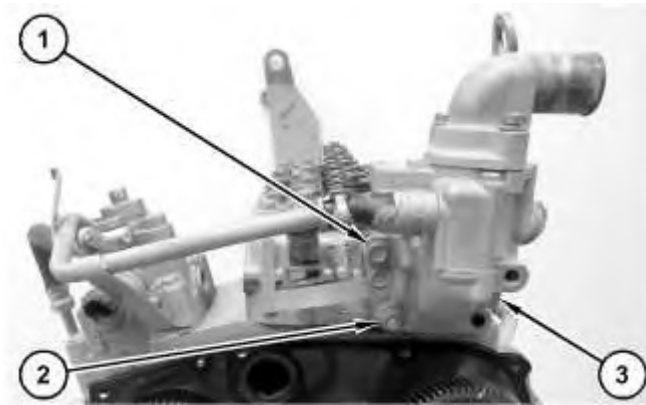


Illustration 1

g06013147

2. Remove bolts (1), nut (2), and flange assembly (3).



Illustration 2

g06013167

3. Use a suitable lifting device to remove cylinder head (5). The weight of cylinder head (5) is approximately 28 kg (61 lb).
4. Remove bolts (4), cylinder head (5), and the cylinder head gasket.

Installation Procedure

1. Install cylinder head (5) in the reverse order of removal.

Table 1

--	--

Gasket Dimension (Number)	Piston Protrusion
15	0.475 ± 0.525 mm (0.0187 ± 0.0207 inch)
20	0.525 ± 0.575 mm (0.0207 ± 0.0226 inch)
25	0.575 ± 0.625 mm (0.0226 ± 0.0246 inch)
30	0.625 ± 0.675 mm (0.0246 ± 0.0266 inch)
35	0.675 ± 0.725 mm (0.0266 ± 0.0285 inch)



Illustration 3

g06045526

- a. Select the cylinder head gasket based on piston protrusion if:
- the piston, piston pin, small end bushing, connecting rod, or crankpin bearings have been replaced.
 - cylinder head or block have been machined.

If none of the above were done, then install a new cylinder head gasket with the same mark. Refer to illustration 3 and table 1.

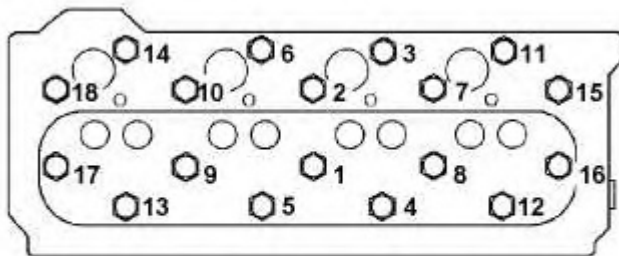


Illustration 4

g06013250

- b. Apply clean engine oil to the threads of bolts (4).

- c. Tighten bolts (4) in numerical sequence shown in illustration 4 to a torque of 93 N·m to 98 N·m (69 lb ft to 72 lb ft)

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C2.4 Tier 4 Final Engines for Caterpillar Built Machines

Media Number -UENR7319-02

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i06541348

Camshaft - Remove and Install

SMCS - 1210-010

Removal Procedure

Start By:

- a. Remove cylinder head.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

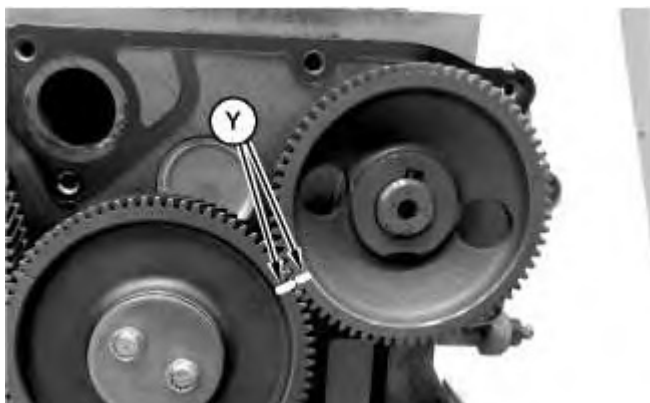


Illustration 1

g06014635

1. Ensure that Timing Marks (Y) on the idler gear and the camshaft gear are aligned.



Illustration 2

g06014606

2. Remove lifters (1).

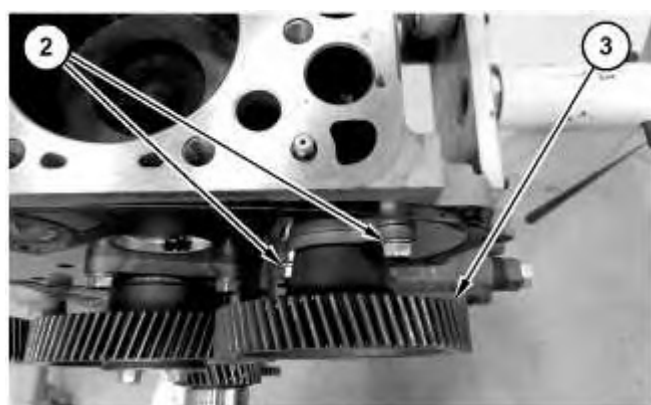


Illustration 3

g06014643

3. Remove bolts (2) and camshaft (3).

Installation Procedure

1. Install camshaft (3) in the reverse order of removal.
 - a. Tighten bolts (2) to a torque of 24 N·m to 27 N·m (212 lb in to 239 lb in).

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Media Number -UENR7319-02

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i06547544

Camshaft Gear - Remove and Install

SMCS - 1210-010-GE

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-0510	Driver Group	1
B	8B-7551	Puller Assembly	1

Start By:

- a. Remove the camshaft.

NOTICE

Keep all parts clean from contaminants.

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NOTICE

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