

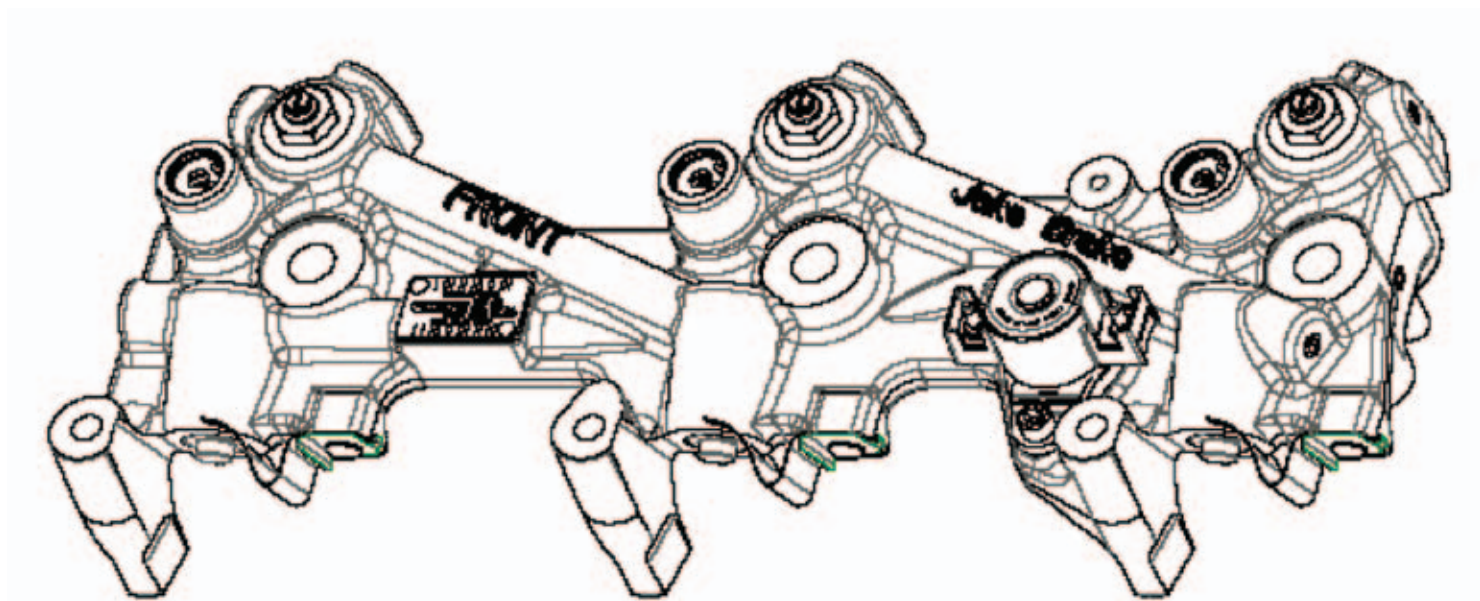


**Jacobs Vehicle Systems®**

# Models 460/2900 Tune-Up Kit

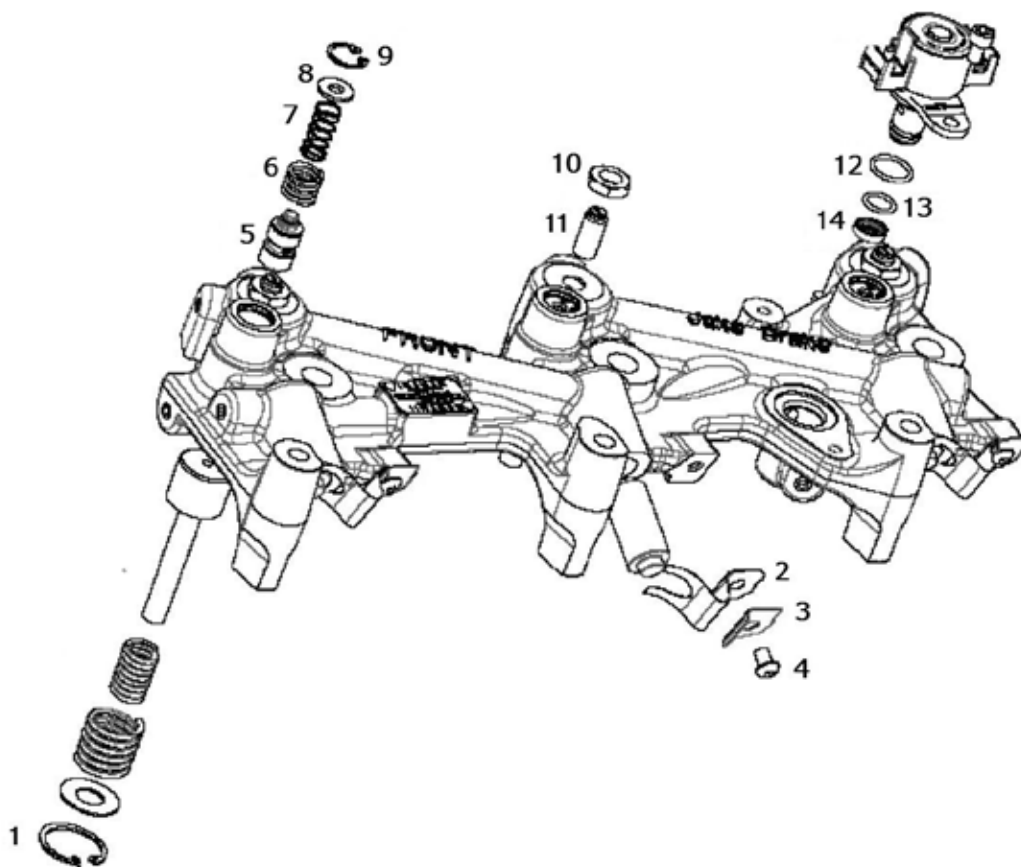
Cummins ISX11.9 P/N 4309201

Jacobs P/N 040350



## Tune-up Kit Contents

Illus. No.	Cummins P/N	Jacobs P/N	Part Name	Quantity Per Kit
1	3871373	011284	Ring Retaining	6
2	4298715	039219	Spring Flat	6
3	4298716	039890	Washer Square	6
4	4299008	033547	Screw, Button Head Socket Cap M6 x 8.0LG	6
5	4299059	039022	Control Valve Assembly	6
6	3871345	007500	Inner Spring Control Valve	6
7	4298708	019632	Outer Spring	6
8	3871445	014928	Control Cover Valve	6
9	3871446	015561	Ring Retaining .625	6
10	2899563	040342	Nut Hex M10 x 1.25	6
11	4298713	039198	Screw, Adjusting M10 x 1.25	6
12	4298247	029421	O-Ring (.614 I.D.)	2
13	4298248	031139	O-Ring(.426 I.D.)	4
14	4298249	039023	Screen - Solenoid	2
NI	N/A	040355	Instructions (5 Pages)	1



THE ILLUSTRATION IS A MODEL 460 HOUSING ASSEMBLY. IT IS APPROPRIATE FOR BOTH THE 460 AND 2900 DUE TO THE SIMILARITY IN INTERNAL COMPONENTS BETWEEN THE MODELS

## General Information

For additional information on Model 460 engine brake, refer to Jacobs Engine Brake Installation Manual, P/N 40359. For additional information on the Model 2900 engine brake, refer to Jacobs Engine Brake Installation Manual, P/N 40360.

Use OSHA-approved cleaning solvent for cleaning parts. Original parts to be reused should be inspected for wear and replaced as required. Wear safety glasses where indicated.

## Safety Precautions

The following symbols in this manual signal conditions potentially dangerous to the mechanic or equipment. Read this manual carefully. Know when these conditions can exist. Then take necessary steps to protect personnel as well as equipment.



THIS SYMBOL WARNS OF POSSIBLE PERSONAL INJURY.



THIS SYMBOL REFERS TO POSSIBLE EQUIPMENT DAMAGE.

### NOTE:

INDICATES AN OPERATION, PROCEDURE OR INSTRUCTION THAT IS IMPORTANT FOR CORRECT SERVICE.

Fuels, electrical equipment, exhaust gases and moving engine parts present potential hazards that could result in personal injury. Take care when installing equipment or parts. Always wear safety glasses. Always use correct tools and follow proper procedures as outlined in this manual.

## Instructions



NEVER REMOVE OR ADJUST ANY ENGINE BRAKE OR COMPONENT WITH THE ENGINE RUNNING.

### Access Engine Brake

1. Thoroughly clean engine.
2. Remove valve cover and gasket
3. Disconnect the solenoid power and ground wires from the solenoid terminal.
4. Remove engine brake from engine.

## Disassemble Housings



CONTROL VALVE COVERS (8) ARE UNDER TENSION FROM CONTROL VALVE SPRINGS (6, 7). REMOVE COVERS CAREFULLY AND WEAR SAFETY GLASSES.

1. Hold down the control valve cover while removing the retaining ring (9). Remove and discard springs, covers and control valves (5).
2. Remove master piston; discard flat spring (2), square washer (3) and button head screw (4). Save the master pistons.



SLAVE PISTONS ARE RETAINED BY HEAVY SPRINGS. TO AVOID INJURY WHEN REMOVING THE SLAVE PISTON, USE PROPER TOOL AND WEAR SAFETY GLASSES.

3. Remove hex nut from slave piston adjusting screw and back out screw until the slave piston is fully retracted.
4. Install the slave piston tool, P/N 017397, with the slave piston adjusting screw fitted into the hole in the tool.



5. After removing retaining ring, slowly release spring tension with slave piston removal tool in order to safely remove the remainder of the slave piston parts.
6. Remove the retainer, springs, slave piston and adjusting screw (11).
7. Remove solenoid from its bore and discard .614 I.D. O-Ring (12), .426 I.D. O-Ring (13) and solenoid screen (14). If the solenoid screen is not attached to the solenoid remove the screen from the solenoid bore and discard. Save the socket head cap screw for continued use.

INSPECT COMPONENTS FOR ANY  
**NOTE:** CONCERNING SIGNS OF WEAR AND FATIGUE SUCH AS CRACKS.

## Assemble Housings

1. Clean housing and all parts in an approved cleaning solvent. Dry with compressed air.
2. Coat all parts to be installed into housings with clean lube oil.
3. Reinstall the original slave pistons and components, reversing the removal procedure. All the slave pistons components should be reused except for the retaining ring which is in the tune-up kit. Ensure the sharp side of the retaining ring and washer are oriented to face out of the bore.

**SLAVE PISTON INSTALLATION TOOL**  
**INSTRUCTIONS:** PLACE THE ADJUSTING SCREW INTO THE HOLE IN THE BASE OF THE SLAVE PISTON ADJUSTMENT TOOL TO ALIGN THE TOOL WITH THE SLAVE PISTON. THE SHAFT OF THE TOOL WILL SLIDE OVER THE SLAVE PISTON STEM. ROTATE THE KNOB UNTIL THE SHAFT HAS COMPRESSED THE WASHER AND SPRINGS PASS THE CLIP RING GROOVE. INSTALL THE CLIP RING INTO THE GROOVE AND ROTATE THE CLIP RING TO ENSURE THAT IT IS SEATED PROPERLY. THEN SLOWLY BACK OFF THE TOOL UNTIL THE SPRINGS AND WASHER ARE AT REST ON THE CLIP RING. LASTLY, BACK OFF THE SHAFT COMPLETELY TO REMOVE THE TOOL.

4. Remove the fixture and install the adjusting screw hex nut (10).
5. Install new control valves (5), springs (6, 7), covers (8) and retaining rings (9). Ensure the sharp side of the retaining ring and washer are oriented to face out of the bore.

6. Install original master pistons with new flat springs (2), square washers (3) and button head screws, torque 71 in-lb. (8 N-m) (9).

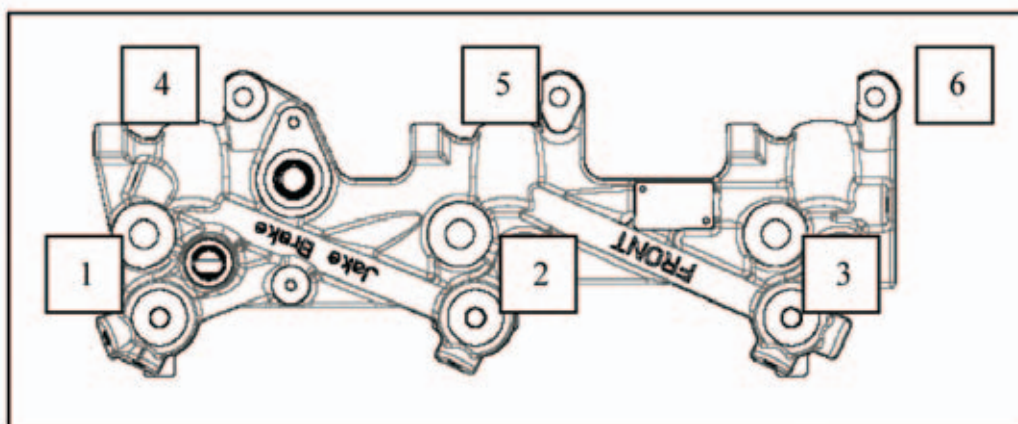
**NOTE:** WHEN TIGHTENING SCREW, BE SURE THAT THE SPRING LEGS ARE CENTERED AROUND THE MASTER PISTON BOSS.

7. Install new screen (14), upper (12) and lower O-rings (13) on the solenoid valve. Insert the solenoid valve into the bore. Using the original socket head cap screw tighten the screw to 95 lb-in (12.5 N-m).

## Install Engine Brake Housings

1. Replace the Oil Supply O-Ring (13), one O-Ring per housing.
2. Install rear housing on rocker pedestals, install and tighten the flange hex nuts on the M12 studs in holes 1-3.
3. Next install and tighten M8 cap screws in holes 4-6. Repeat for the front housing.

**Model 460/2900:** First tighten the middle flange hex nut of the front housing (mounting boss 2) to 82 lb-ft (111 N-m) then tighten each of the two outside flange hex nuts to the same torque. Next tighten the middle M8 cap screw of the front housing (mounting boss 5) to 24 lb-ft (33 N-m) then tighten each of the two outside cap screws to the same torque. Repeat on the other housing.



## Slave Piston Adjustment

1. The engine must be stopped and cooled off (water temperature 140° F or lower). Loosen the jam nuts on the slave piston adjusting screws. Rotate the engine to the desired position marked on the front engine damper.

Position of Damper	Corresponding Cylinder to Adjust
A	1 and 6
B	2 and 5
C	3 and 4

2. Use Cummins service tool, Part Number 4919693 to adjust the brake lash for the corresponding cylinders to 0.150" (3.8 mm) of clearance. Model 2900 housings are adjusted to 0.126" (3.2 mm). Insert the correct feeler gage between the actuating pin in the crosshead and the slave piston. Turn the slave piston adjusting screw until a slight drag is felt on the feeler gage. Hold the screw in this position and torque the hex nut to 20 lb-ft (27 N-m) for the short 17 mm nut or 30 lb-ft for the tall 14 mm nut. Do not over tighten. After the jam nut is tightened to the correct torque valve, check the lash clearance with the feeler guage again. Repeat steps 1 and 2 until lash has been set on all cylinders.

## Finish Installation

1. Adjust the intake valves, exhaust valves and injectors in accordance with Cummins procedures.
2. Connect the solenoid power and ground wires to the solenoid terminals and tighten to 15 lb-in (1.5 N-m).
3. Inspect the current valve cover gasket for any damage and if necessary replace the valve cover gasket (2869891).