Jacobs Vehicle Systems®

Model 490/490A Tune-Up Kit Instructions

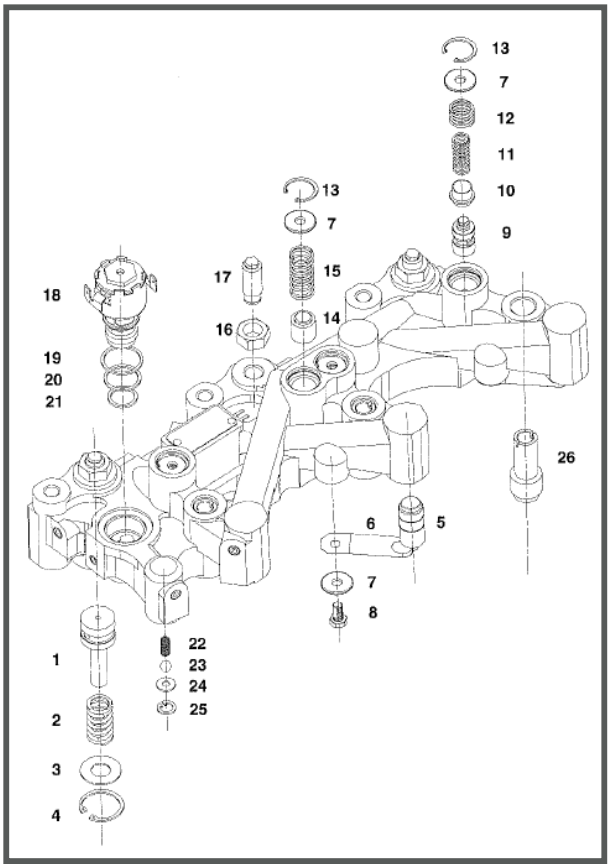
ISL98, ISL03, ISL07, ISC07, ISL 2010, ISC 2010, ISL 2013, L9 2017, L9 2021 Engines

CBRKE By Jacobs®

Tune-up Kit Contents

Ill. No.	Cummins P/N	Jacobs P/N	Description	Qty. Per Kit
6	4024751	00-018722	Flat Spring	6
7	4024752	00-021038	Washer, Retaining	12
8	4024753	00-018730	Screw, Hex Head	6
9	4299058	00-039022	Control Valve	6
10	3871364	00-011251	Collar, Control Valve	6
11	3871345	00-007500	Spring, Inner Control Valve	6
12	4024754	00-011434	Spring, Outer Control Valve	6
13	4024755	00-012291	Ring, Retaining	6
19	3871638	00-020229	Seal Ring, Upper	6
20	4026537	00-001082	Seal Ring, Middle	6
21	3871218	00-001083	Seal Ring, Lower (490 only)	6*
NI	3945326	00-002411	O-ring, Oil Supply Screw	2
NI	5257808		Harness Solenoid	2
NI			Tune-up Kit Instructions	1

NI = Not Illustrated, *Not used in 490A housings



Introduction

For additional information on C Brake by Jacobs® Model 490A engine brakes, refer to the Cummins Installation Manual, Bulletin 3401839 or Cummins Parts Manual, Bulletin 3401838. For technical support, contact Cummins Customer Assistance Center by calling 1-800-DIESELS (1-800-343-7357).

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.

⚠ WARNING THIS SYMBOL WARNS OF POSSIBLE PERSONAL INJURY.

⚠ CAUTION THIS SYMBOL REFERS TO POSSIBLE EQUIPMENT DAMAGE.

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

Instructions

⚠ WARNING NEVER REMOVE ANY ENGINE BRAKE OR COMPONENT WITH THE ENGINE RUNNING.

Access Engine Brake

1. Thoroughly clean engine.

2. Remove valve rocker cover and gasket by removing the five cap screws on the top of the valve cover. The gasket is to be reused.

3. Remove and discard the wire harnesses that connect the engine brake solenoid to the spacer.

4. Loosen slave piston adjusting screws jam nuts and back out the slave piston adjusting screws so that the slave pistons are fully retracted into the housing.

5. Remove six mounting bolts from each housing and lift the housing up straight off of the oil supply screw.

Disassemble Housings

⚠ WARNING WEAR SAFETY GLASSES, REMOVE CONTROL VALVE COVERS CAREFULLY TO AVOID PERSONAL INJURY. COVERS ARE UNDER LOAD FROM CONTROL VALVE SPRINGS (11, 12).

1. Clean the engine brake with solvent and a brush.

2. Remove solenoid with a 3/4" socket. Discard the three solenoid seals (19, 20, 21).

3. Hold down the control valve cover while removing the retaining ring (13). Remove and discard all control valve parts (9-13 and 7). A magnet may be required to remove the control valve.

NOTE: DO NOT REMOVE THE ACCUMULATOR. THE CAP IS UNDER HIGH SPRING PRESSURE AND IT IS NOT NECESSARY TO REMOVE THE ACCUMULATOR FOR THE COMPLETION OF THIS TUNE-UP.

4. Turn the housing upside down. Remove hex head cap screw, washer, and flat spring. These parts may be discarded. Remove master piston and inspect for wear or damage.

5. Clean housing in an approved cleaning solvent. Dry with compressed air and inspect control valve and master piston bores for wear or damage.

Assemble Housings

1. Clean parts to be reused in an approved cleaning solvent. Dry with compressed air. New parts do not need to be cleaned.

2. Coat all parts to be installed into housings with clean lube oil.

3. Dip lower solenoid seal in clean oil and place in the bottom of the solenoid bore. Oil upper and middle seals and place them on the solenoid. Install solenoid in the housing and tighten with a 3/4 inch socket to 20 Nm [15 lb-ft].

4. Install the new control valve (9), collar (10), springs (11, 12), cover (7) and retaining ring (13). Make sure the retaining ring is installed with the sharp edge up. Using one side of the snap ring pliers rotate the retaining ring to ensure that it is fully seated in the groove.

NOTE: INSTALL THE COLLAR (10) WITH LONG SIDE UP. COLLAR HAS UP MARKED ON LONG SIDE. IF THE COLLAR IS INSTALLED UPSIDE DOWN, THE BRAKE FOR THIS CYLINDER WILL NOT OPERATE.

5. Reinstall slave piston adjusting screws and locknuts. Do not tighten at this time.

6. Reinstall the master piston into the bore. Install new flat spring (6), washer (7), and hex screw (8). Make sure the flat spring is centered on the master piston and torque to 10 Nm [7 lb-ft].

⚠ CAUTION WHEN TIGHTENING THE HEX SCREW, MAKE CERTAIN THE TWO SPRING TABS. DO NOT INTERFERE WITH THE SIDES OF THE MASTER PISTON CENTER RAISED PORTION. FAILURE TO DO THIS COULD CAUSE PREMATURE FLAT SPRING FAILURE. SEE FIGURE 1.

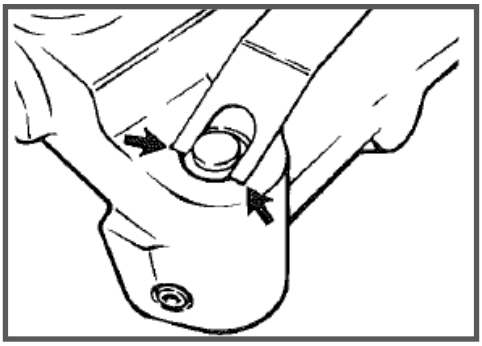


FIGURE 1

Engine Brake Installation

1. Remove o-rings on the oil supply screws and replace with new ones provided in the kit.

2. Back out each housing adjusting sleeve (26) until they are flush with the bottom of the housing.

3. Apply oil to the oil supply screw o-rings and slide housings down and into position.

4. Place three mounting bolts in the mounting bolt holes on the slave piston side of the brake housing (next to slave piston adjusting screws). Tighten the three bolts to 7 Nm [5 ft-lb]. See figure 2.

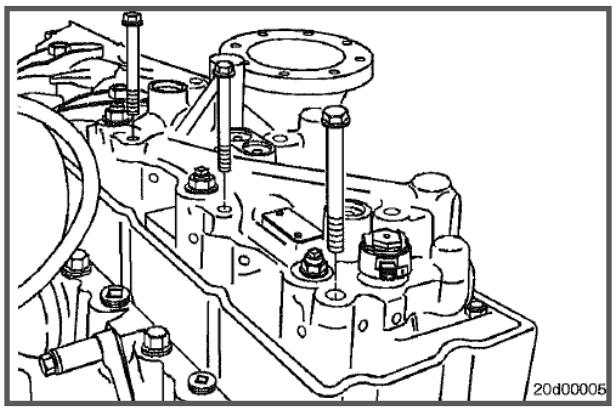


FIGURE 2

5. Screw down the three housing adjusting sleeves (26) until they make contact with the rocker arm pedestals.

6. Place the three remaining mounting bolts in the housing and hand tighten. After the brake housing is seated flat on the cylinder head, torque the six mounting bolts to 32 Nm [23 lb-ft].

7. Install new solenoid harnesses connecting the solenoid to the electrical connector in the spacer.

8. Repeat steps 1-7 for other housing.

Slave Piston Adjustment

NOTE: ADJUST THE SLAVE PISTON CLEARANCE WITH THE ENGINE STOPPED AND COLD. STABILIZED WATER TEMPERATURE OF 140° F. (60° C.) OR BELOW. EXHAUST VALVES, ON THE CYLINDER TO BE ADJUSTED, MUST BE IN THE CLOSED POSITION.

1. Remove the plastic pump drive cover located on the front of the engine. This will expose the fuel pump gears and timing marks. See figure 3.

2. Using the barring tool, Part No. 5299073, rotate the crankshaft to align the mark on the fuel pump gear with the top dead center mark on the gear cover (12 o'clock). See Figure 4.

3. When the engine is in the top dead center position, Slave Piston Lash can be set on cylinders 1, 3, and 5.

4. Insert the appropriate brake lash feeler gauge (P/N 3163681 (0.090") or 5572956 (0.067") for L9 2021 engines) between the brake slave piston and exhaust head pin on cylinder one (1). See Figure 5.

5. Using the 6-in-lb torque wrench, P/N 3376592, tighten the adjusting screw until the torque wrench "clicks" or until drag is felt on the feeler gage.

6. Remove the feeler gage, and using two wrenches, hold the adjusting screw and tighten the locknut to 34 Nm [25 ft-lb]. See Figure 6.

7. Repeat steps 4-6 for cylinders 3 and 5.

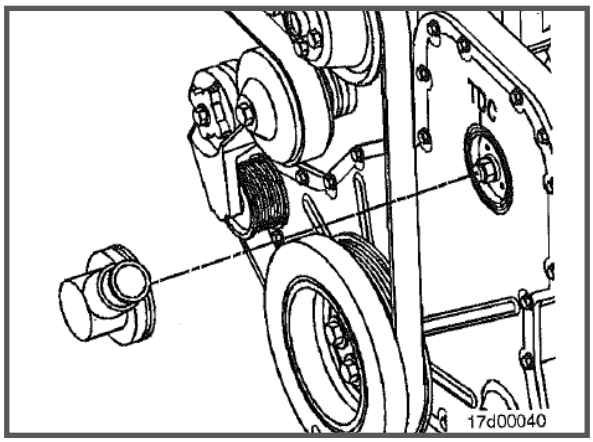


FIGURE 3

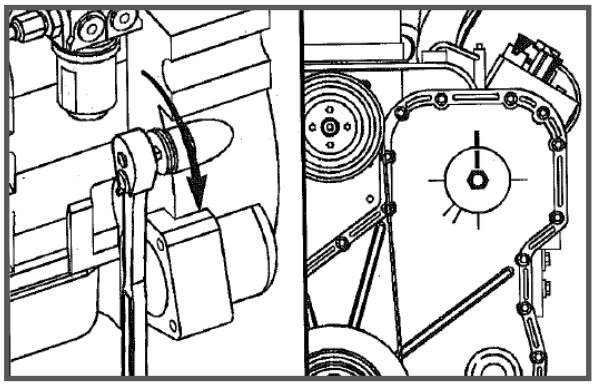


FIGURE 4

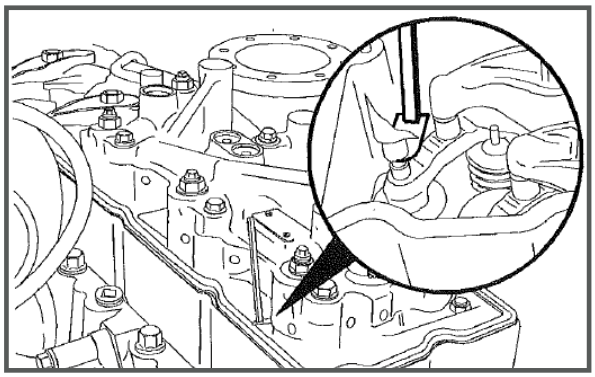


FIGURE 5

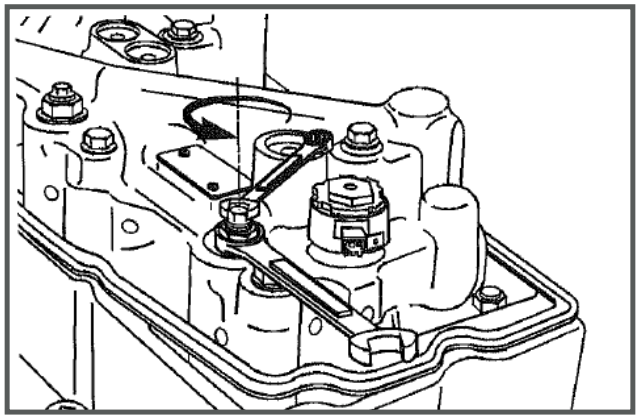


FIGURE 6

8. Using the engine barring tool, rotate the crankshaft 360 degrees to align the mark on the fuel pump gear with the mark on the gear cover that is 180 degrees away from top dead center (6 o'clock). See Figure 7.

9. When the engine is in this position slave piston lash can be set on cylinders 2, 4, and 6.

10. Repeat steps 4-6 for cylinders 2, 4, and 6.

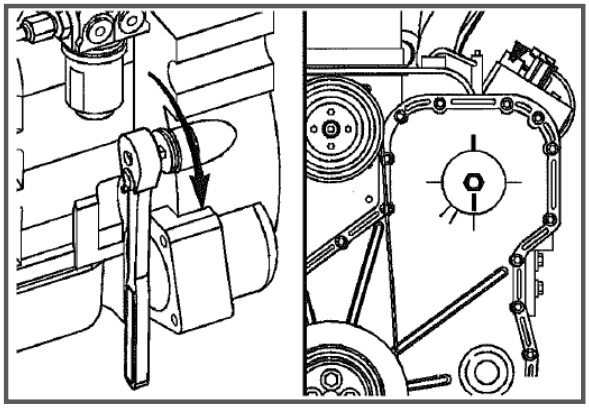


FIGURE 7

Engine Brake Operational Check

⚠ WARNING

WEAR EYE PROTECTION AND DO NOT EXPOSE YOUR FACE OVER ENGINE AREA. TAKE PRECAUTIONS TO PREVENT OIL LEAKAGE DOWN ENGINE. WHEN ENGINE IS RUNNING AND VALVE COVERS ARE REMOVED, OIL SPLASHING IN THE ENGINE BRAKE AREA COULD CAUSE PERSONAL INJURY.

1. Assure that the control wires are connected to the terminal assemblies in the engine spacers.

2. Bleed brake housing and check their operation. Start engine and allow to run 5 to 10 minutes. Put dash switch in "LO". Accelerate engine to approximately 1800 RPM and release the throttle. Only one solenoid valve should operate.

3. Repeating this procedure for position "HI", both solenoids should operate. Repeat this procedure several times to bleed brake housing for immediate operation.

Replace Rocker Lever Cover

1. Reinstall the rocker arm cover and gasket. See Engine Manual for procedure and torque settings. See Figure 8.

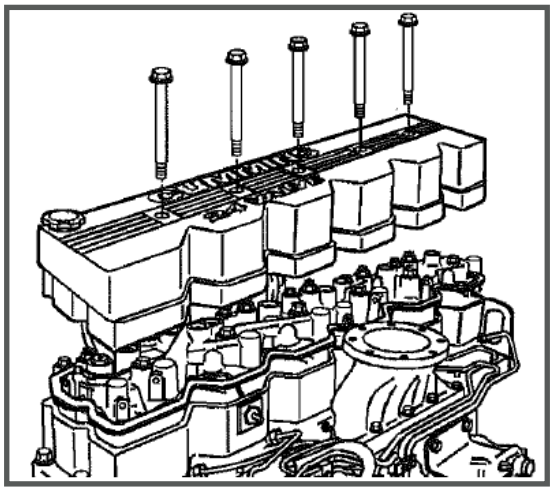


FIGURE 8

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