



Tune-up Kit Instructions For N14 Plus Engines

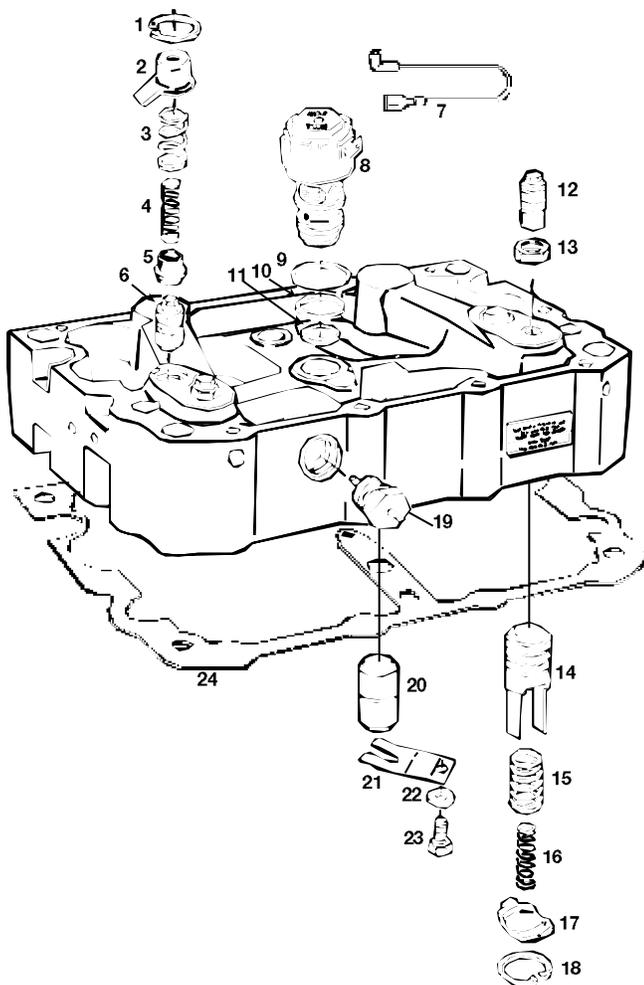


Tune-up Kit Contents

III. Cummins

No.	P/N	Description	Quantity
1	3871373	Control valve retain. ring	6
2	3412330	Control valve cover	6
3	3871366	Outer cont. valve spring	6
4	3871345	Inner cont. valve spring	6
5	3871364	Control valve collar	6
6	3871393	Control valve spool assy.	6
7	3871634	Solenoid harness	3
9	3871638	Upper seal ring	3
10	3871217	Center seal ring	3
11	3871218	Lower seal ring	3
21	3871561	Flat spring	6
22	3871208	Plain washer	6
23	3871248	Hex head cap screw	6
24	3871481	Gasket, brake housing	3
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NI Not Illustrated



Instructions

For additional information on CBrake by Jacobs™ Models 455B and 455C engine brakes, refer to Cummins Installation Manual, Bulletin 3698823. Previous Model 455A has been discontinued. Model 455A can be upgraded to Model 455B by using current Robo-Lash™, P/N 3871699.

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.

Access Engine Brake



NEVER REMOVE ANY ENGINE BRAKE COMPONENT WHILE THE ENGINE IS RUNNING. PERSONAL INJURY MAY RESULT.

1. Thoroughly clean the engine and brake housings.
2. Disconnect the wire harnesses at the engine brake housings (3 places).
3. Remove parts in this order: rocker lever covers, cover gaskets, housing mounting screws, engine brake housings.
4. Remove and discard the engine brake housing gaskets (24).

Disassemble Housings

1. Remove the solenoid harness (7) and valve (8); discard the harness and three seal rings (9, 10, 11).



CONTROL VALVE COVERS (2) ARE UNDER TENSION FROM THE CONTROL VALVE SPRINGS (3, 4). REMOVE THE COVERS CAREFULLY AND WEAR SAFETY GLASSES.

2. Press down on the control valve cover to relieve spring pressure. Remove the retaining ring (1) using retaining ring pliers. Remove and discard the cover (2), springs (3, 4), collar (5), control valve (6) and retaining ring (1).
3. Remove the master piston (20) using needle-nose pliers; discard the flat spring (21), washer (22) and capscrew (23). Save the master piston.



WEAR SAFETY GLASSES. THE SLAVE PISTON (14) IS RETAINED BY SPRINGS (15, 16) THAT ARE UNDER HEAVY COMPRESSION. IF THESE INSTRUCTIONS ARE NOT FOLLOWED AND PROPER TOOLS NOT USED, THE SPRING COULD BE DISCHARGED WITH ENOUGH FORCE TO CAUSE PERSONAL INJURY.

4. Remove the locknut (13) from the slave piston adjusting screw (Robo-Lash™) (12) and back out the screw until the slave piston is fully retracted (screw is loose).
5. Install the slave piston tool, Cummins P/N 3871654, (Fig. 2), with the adjusting screw fitted into the hole in the tool.

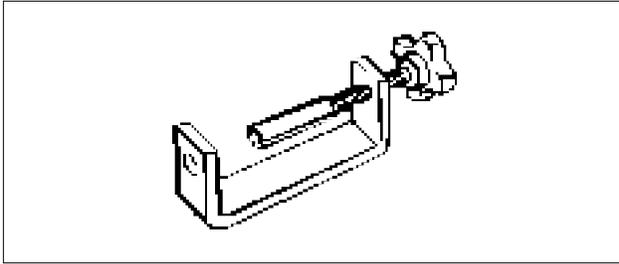


FIG. 2

6. Turn the handle slowly until the retainer is depressed about 0.040" (1 mm), relieving the pressure against the retaining ring (18).
7. Back out the tool until the springs are loose. Remove the slave piston tool and then remove the retainer (17), springs (15, 16), slave piston (14) and adjusting screw (12).

Assemble Housings

1. Clean the housing and all parts in cleaning solvent. Dry with compressed air.
2. Coat all parts to be installed into the housings with clean lube oil.

3. Install the original slave piston, reversing the removal procedure. Use the slave piston tool. Be sure the retaining ring is placed on the retainer before screwing the tool down over the slave piston.



BEFORE REMOVING THE SLAVE PISTON TOOL, ROTATE THE RETAINING RING 90° FROM THE SLOT IN THE HOUSING. DO NOT LEAVE THE OPEN PORTION OF THE RETAINING RING ALIGNED WITH THE OPENING IN THE HOUSING AS THIS WILL PERMIT THE SPRING RETAINER TO BECOME LOOSE DURING ENGINE BRAKE OPERATION. SERIOUS ENGINE DAMAGE WILL RESULT.

4. Remove the slave piston tool and install the adjusting screw locknut (do not compress the slave piston and springs).
5. Install new control valves, collars (note "UP" position), springs, covers and retaining rings. Rotate the retaining ring at least 90° from the slot in the housing.

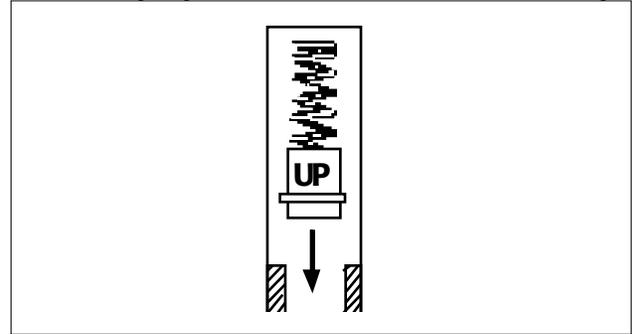


FIG. 3

6. Install the original master pistons with new flat springs, washers and capscrews.

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

7. Install the lower (smallest) solenoid seal ring (11) in the bottom of the solenoid valve bore and the upper (9) and center (10) seal rings on the solenoid valve. Be sure the seals are seated properly and carefully screw the solenoid into the housing without unseating the seals. Torque the valve to 15 lb.-ft. (20 N•m). Be careful not to twist the seals while installing.
8. Connect the new solenoid harness from the solenoid valve to the electrical connector.

Engine Brake Operational Check

The CBrake by Jacobs™ tune-up kit installation is now complete. Reconnect and test the retarder using the procedures listed below.

1. Connect the wire harnesses to the electrical connector on the engine brake housings.



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

2. To bleed the brake units and check their operation, start the engine and allow to run for 5 to 10 minutes.
 3. With the engine brake switch off, accelerate the engine to approximately 1800 RPM.
 4. Release the throttle and manually depress each solenoid disk at the top of the solenoid.
 5. Repeat this procedure five or six times to permit engine oil to fill the brake housings.
 6. To check the electrical system on CELECT™ engines, leave the engine running. Put the selector switch in position 1 and turn the ON/OFF switch to ON. The CELECT™ low-speed shut off prevents the engine brake from coming on at idle. Accelerate the engine to approximately 1800 RPM and release the throttle. In position 1, the center solenoid should operate. Repeat this procedure for positions 2 and 3. In position 2, the front and rear solenoids should operate; in position 3, all three solenoids should operate. Shut down the engine.
 7. Reinstall the Cummins rocker lever cover gaskets. Be sure the word "TOP" is facing up. Replace the rocker covers and all previously removed parts. Torque the capscrews to 9 lb.-ft. (12 N•m).
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Install Housings

1. Before installing the housings, make sure the slave piston adjusting screws (Robo-Lash™) is backed out, allowing the slave piston to bottom in the housing bore (screw is loose).
2. Position the three gaskets on the rocker lever housings.
3. Install the three engine brake housings on the rocker lever housings. Install the six mounting screws into each housing. Tighten the screws in steps, following the pattern illustrated in Fig. 3. First tighten to 35 lb.-ft. (48 N•m), then to 70 lb.-ft. (95 N•m).

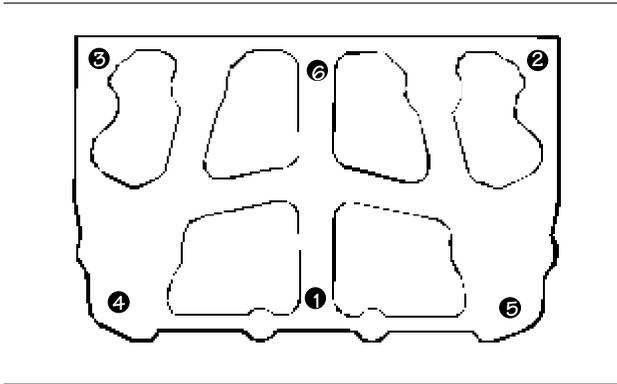


FIG. 4

Slave Piston Adjustment



SLAVE PISTON ADJUSTMENT MUST BE MADE WITH THE FEELER GAGE POSITIONED UNDER BOTH FEET OF THE SLAVE PISTON. INCORRECT ADJUSTMENT CAN CAUSE ENGINE DAMAGE.

1. 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.

2. The feeler gage (Cummins P/N 3871534) has 0.023" feeler stock on both ends. One end can be used on cylinders 1, 3 and 5; the other end can be used for cylinders 2, 4 and 6 (see Figs. 5 and 6).

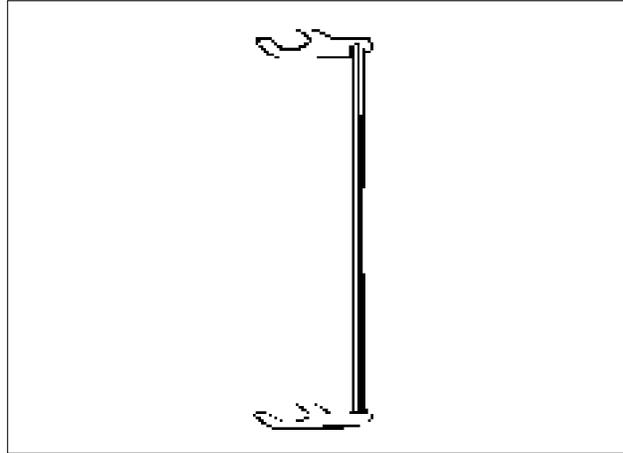


FIG. 5

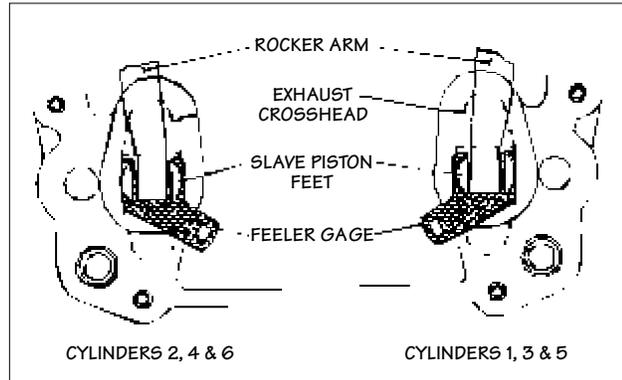


FIG. 6

3. On cylinders with the exhaust valves closed (cross-heads loose), install one end of the feeler gage under both feet of the slave piston. Turn the slave piston adjusting screw (Robo-Lash™) clockwise until a slight drag is felt on the feeler gage. Hold the adjusting screw and tighten the locknut to 25 lb.-ft. (34 N•m).
4. Continue to adjust the remaining slave pistons where the exhaust valves are closed. Rotate the engine crankshaft about 180° to adjust the remaining slave pistons.



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