

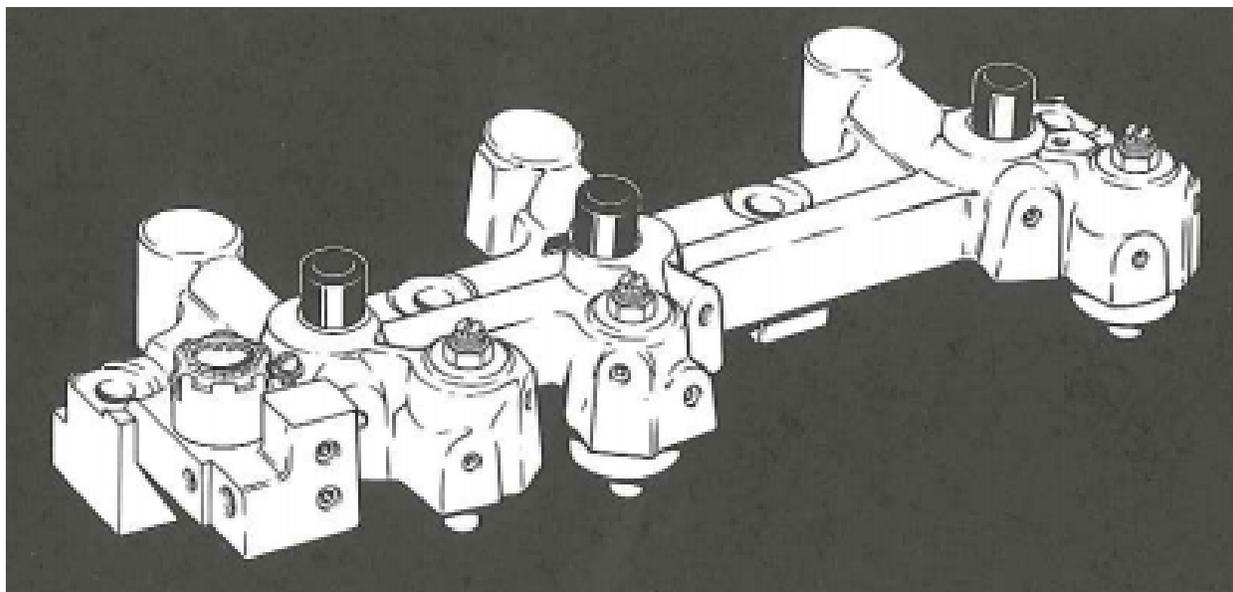


**Jacobs Vehicle Systems®**

# Model 404 & 404B Tune-Up Kit

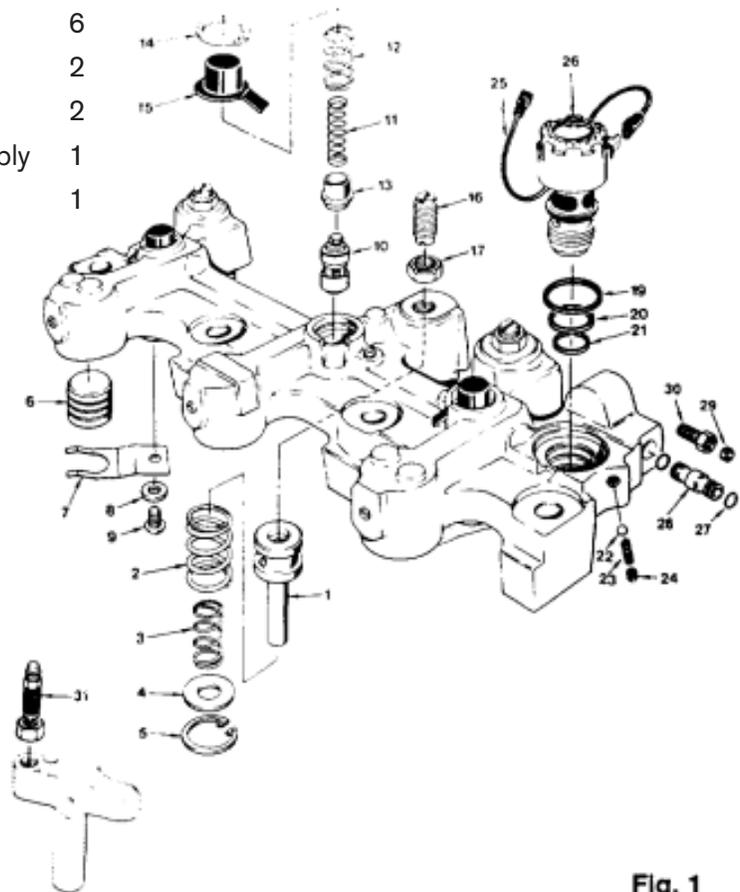
Cummins 404 & 404B

Jacobs P/N 17723



## Tune-up Kit Contents

Illus. No.	Jacobs P/N	Part Name	Qty. Per Kit
7	011841	Flat Spring (404)	6
7	016810	Flat Spring (404B)	6
8	011545	Plain Washer	6
9	011544	Button Head Screw	9
10	039025	Control Valve	6
11	011823	Inner Spring, Control Valve	6
12	011253	Outer Spring, Control Valve	6
13	011251	Control Valve Collar	6
14	011284	Retaining Ring	6
15	011252	Control Valve Cover	6
19	001081	Upper Seal Ring	2
20	001082	Middle Seal Ring	2
21	001083	Lower Seal Ring	2
22	001021	Ball	2
23	001720	Spring	2
24	028317	Pipe Plug	2
25	014619	Harness, Solenoid	2
27	013155	Seal Ring (404B)	2
29	002236	Seal Ring (404)	1
31	014407	Screw and Pin Assy.	6
NI	017657	Terminal Assy. w/ O-ring	2
NI	004490	Terminal	2
NI	011748	Spacer Gasket, Oil Supply	1
NI	017724	Instructions	1



Note: Not for use on models 404BG, C, or D

Fig. 1

## General Information

For additional information on Models 404 and 404B engine brakes, refer to Jacobs Engine Brake Installation Manual, P/N 011948.

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.

**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.

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

**WARNING** 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 electrical connections to spacer.
4. Remove three button head screws that secure oil supply hose to spacer. Separate plates and gasket from spacer. Discard screws and gasket.

**NOTE:** THE HOSE ASSEMBLY MUST BE DISCONNECTED FROM THE FILTER HEAD ASSEMBLY IN ORDER TO REMOVE IT FROM THE HOUSING.

5. Remove the oil hose assembly from the front housing.
6. For housings with threaded oil connector (30) between the housings, loosen the locknut and turn in the connector to provide clearance for housing removal.
7. Remove housing capscrews and housings.
8. Loosen locknut on exhaust valve crossheads; remove screw and pin assemblies (31).

## Disassemble Housings



**WARNING**

CONTROL VALVE COVERS (15) ARE UNDER TENSION FROM CONTROL VALVE SPRINGS (11, 12). REMOVE COVERS CAREFULLY AND WEAR SAFETY GLASSES.

1. Remove the solenoid harness (25) and valve (26); discard harness and three seal rings (19, 20, 21).
2. Hold down control valve cover while removing the retaining ring (14). Remove and discard collars (13), springs, covers and control valves (10).



**WARNING**

SLAVE PISTONS (1) ARE RETAINED BY HEAVY SPRINGS. (2, 3) TO AVOID INJURY WHEN REMOVING THE SLAVE PISTON, USE PROPER TOOL AND WEAR SAFETY GLASSES.

3. Remove master piston (6); discard flat spring (7), washer (8) and capscrew (9). Save the master piston.
4. Remove locknut (17) from slave piston adjusting screw (reset) (16); back out screw until the slave piston is fully retracted.

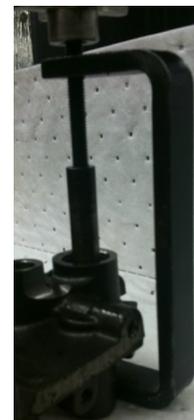


Fig. 2

5. Install the slave piston tool, P/N 017397, (Fig. 2) with the slave piston adjusting screw fitted into the hole in the tool.
6. Compress the slave piston springs; remove retaining ring (5).

- Remove retainer (4), springs, slave piston and adjusting screw.

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

- Remove pipe plug, spring and ball (24, 23, 22) located near the solenoid valve. Discard parts.

## Assemble Housings

- Clean housing and all parts in an approved cleaning solvent. Dry with compressed air.
- Coat all parts to be installed into housings with clean lube oil.
- Install the original slave piston, reversing the removal procedure.
- Remove the fixture and install the adjusting screw locknut.
- Install new control valves, collars, springs, covers and retaining rings.

**NOTE:** INSTALL THE COLLAR (13) WITH THE STAMPED SLEEVE UP. IF THE COLLAR IS INSTALLED UPSIDE DOWN, THIS BRAKE CYLINDER WILL NOT OPERATE.

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

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

- Install the lower (smallest) solenoid seal ring in the bottom of the solenoid valve bore and the upper and center seal rings on the solenoid valve. Insert the solenoid valve into the bore. Tighten to 5 lbft. or 60 lbin. (7 N-m).
- Install new ball, spring and pipe plug (22, 23, 24).

## Install Engine Brake Housings

- Install six new screw and pin assemblies with original locknuts into the exhaust valve crossheads. Adjust crossheads as follows:
  - With the exhaust valves in the closed position (crossheads loose), hold down on the center pad of the crosshead.
  - Turn the adjusting screw in until it contacts the valve stem.
  - Hold the adjusting screw in this position and tighten the locknut to 25 lbft. (35 Nm).
  - Continue adjustments on crossheads with the exhaust valves closed. Rotate the crankshaft to complete adjustments.
- Install two new o-rings (27) on oil supply tube (28); insert tube into front housing.

**NOTE:** ON HOUSINGS WITH THREADED OIL CONNECTORS (30), INSERT CONNECTOR IN FRONT HOUSING ALL THE WAY. INSTALL THE SEAL RING (29) INTO COUNTERBORE OF REAR HOUSING.

- Install rear housing on rocker pedestals; install four capscrews but do not tighten.
- Set the front housing in place so that oil connector enters hole in the rear housing.

**NOTE:** ON HOUSINGS WITH THREADED OIL CONNECTOR, ALIGN THE CONNECTOR WITH HOLE IN REAR HOUSING.

- Install four capscrews but do not tighten.
- The engine brake housings must now be aligned according to instructions in models 404 and 404B installation manual P/N 011948.
  - After completion of engine brake alignment, tighten housing capscrews in three steps to 95 lbft. (130 Nm.): first tighten the two middle capscrews of each housing; then tighten each of the two outside capscrews.
  - With threaded oil connectors, back out the screw until it compresses seal ring and makes contact with rear housing. Back off connector screw approximately one hex to establish working clearance. Hold screw and tighten locknut.

## Slave Piston Adjustment

1. The engine must be stopped and cold (water temperature 140° F or lower). Exhaust valves on cylinder to be adjusted must be closed. All Model 404 and 404B housings are adjusted to 0.015" (0.380mm).
2. Insert the correct feeler gage between the actuating pin in the crosshead and the slave piston. Turn in the slave piston adjusting screw (reset) until a slight drag is felt on the feeler gage. Hold the screw in this position; tighten the locknut to 25 lbft. (35 N-m). Do not over-tighten.

## Finish Installation

1. Adjust the intake and exhaust valves and injectors in accordance with Cummins procedures.
2. Reinstall the oil supply hose to the front housing; attach the plate with the new gasket to the spacer using three new button head screws. Tighten the screws to 80 lbin. (9 N-m). Reinstall the other end of the hose to the filter head; install the hose clamp.
3. Remove the two terminal assemblies from the spacer; replace with new ones from the kit. Use a six-point, box-end wrench to tighten.
4. Install the new solenoid harness.

**NOTE:** IF THE SOLENOID CONNECTION IS NOT THE CORRECT TYPE, REPLACE IT WITH THE ONE FROM THE KIT.

5. Remove the old gasket and replace with a new one (not included in the kit).
6. Install the cover capscrews and tighten to 130 lbin. (15 N-m). Start tightening from the center, then proceed alternately to front and rear.
7. Connect the electrical harness to the terminal leadouts in the spacer.

## Jacobs Engine Brake Replacement Parts Limited Warranty

Jacobs engine brake replacement parts, products of Jacobs Vehicle Systems, are sold with the following warranty:

Jacobs engine brake replacement parts are warranted to be free of defects in construction and operation under normal use and service for the warranty coverage periods set forth below.

THERE ARE NO REPRESENTATIONS OR WARRANTIES WHICH EXTEND BEYOND THE TERMS HEREOF OR THE DESCRIPTION OF THE PRODUCT CONTAINED IN THE CONTRACT FOR SALE.

### Warranty Coverage:

Replacement parts are warranted for 1 year/100,000 miles, whichever shall first occur. Replacement parts installed during the original warranty coverage period for a Jacobs engine brake are warranted as stated in the Jacobs engine brake warranty.

Under this warranty, our factory is obligated to replace, without charge, any part returned to us which our examination discloses to our satisfaction to have been defective within the Warranty coverage period measured from the date of delivery of the product in question to the original user.

Jacobs will also pay for all repairs to damaged engine components in which Jacobs replacement parts have been properly installed, provided the damage is shown to be a direct result of a defect of Jacobs replacement parts occurring under normal operation during the warranty coverage periods specified above.

This warranty will not apply to any part or parts which have been altered or repaired outside of our factory or authorized Jacobs distributor service centers, nor to parts which have been subjected to misuse, abuse, neglect or accident, nor to parts which have been improperly applied or installed. Improper installation or application, or substitution of parts not manufactured or approved by us, shall void this warranty.

JACOBS' SOLE LIABILITY AND YOUR EXCLUSIVE REMEDY IS LIMITED TO THE OBLIGATIONS SET FORTH HEREIN, AND JACOBS SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES.