



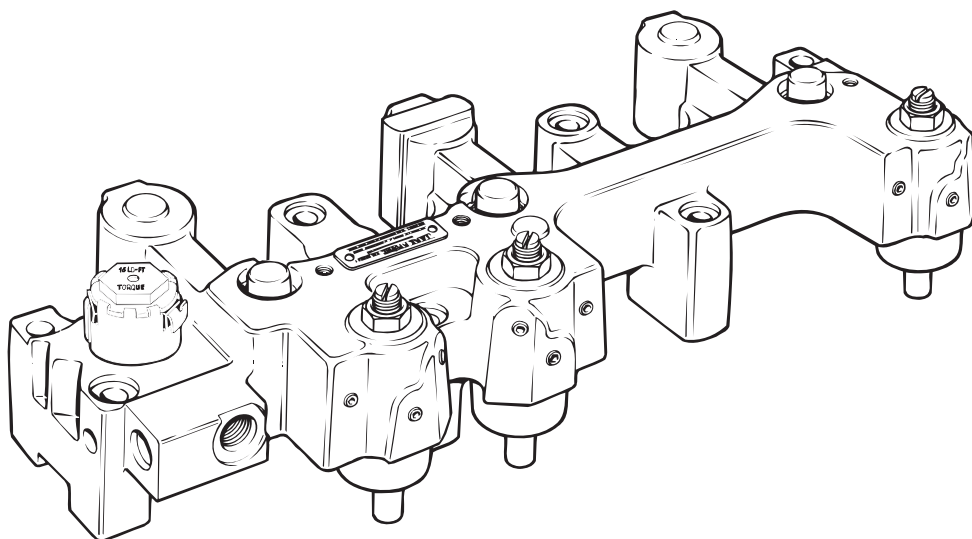
**Jacobs Vehicle Systems™**

# **Jacobs Engine Brake®**

## ***Tune-Up Kit***

***Models  
404D/411,C,D,E***

***P/N 019848***



**TUNE-UP KIT INSTRUCTIONS**

# Tune-up Kit Contents Model 3871580 (Jacobs P/N 19848)

Quantity				Quantity					
Illus.	No.	P/N	Part Name	per kit	Illus.	No.	P/N	Part Name	per kit
	5	011284	Retaining Ring	6		18	020229	Upper seal ring	2
	7	017412	Flat Spring (411)	6		19	001082	Middle seal ring	2
	7	016810	Flat Spring (404D)	6		20	001083	Lower seal ring	2
	8	011545	Plain washer	6		21	001021	Ball	2
	9	011544	Button head screw	6		22	011720	Spring	2
	10	011283	Control valve	6		23	018485	Pipe Plug	2
	11	007500	Inner control valve spring	6		24	017368	Solenoid harness	2
	12	011253	Outer control valve spring	6		NI	019874	Instructions (6 Pages)	1
	13	011251	Control valve collar	6					
	14	011252	Control valve cover	6					

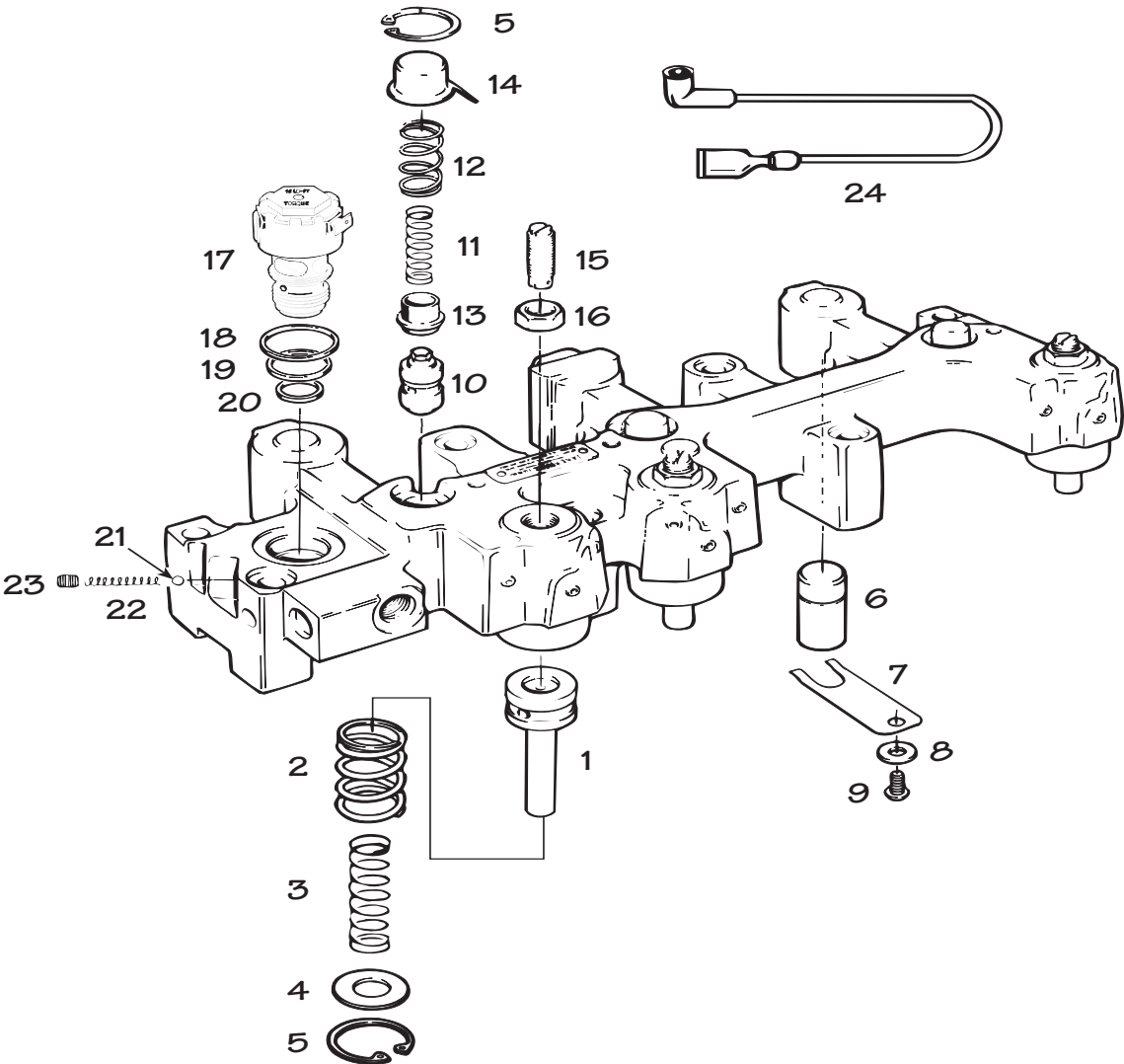


Fig 1

THE ABOVE ILLUSTRATION IS A MODEL 404D HOUSING ASSEMBLY. IT IS APPROPRIATE FOR BOTH THE 404D AND 411 DUE TO THE SIMILARITY IN INTERNAL COMPONENTS BETWEEN THE MODELS.

# General Information

For additional information on the Model 404D engine brake, refer to Jacobs Engine Brake Installation Manual, P/N 017478. For additional information on the Model 411 engine brake, refer to Jacobs Engine Brake Installation Manual, P/N 21474.

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. Disconnect internal oil supply hose from front housing.
5. Remove engine brake from engine.

## Disassemble Housings

1. Remove the solenoid harness (24); discard harness and three seal rings (18,19,20).

 **WARNING**

CONTROL VALVE COVERS (14) ARE UNDER TENSION FROM CONTROL VALVE SPRINGS (11,12). REMOVE COVERS CAREFULLY AND WEAR SAFETY GLASSES.

2. Hold down the control valve cover while removing the retaining ring (5). Remove and discard collars (13), springs, covers and control valves (10).
3. Remove master piston (6); discard flat spring (7), washer (8) and button head screw (9). Save the master pistons.

 **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.

4. Remove locknut from slave piston adjusting screw (reset) and back out screw until the slave piston is fully retracted.
5. Install the slave piston tool, P/N 017397, with the slave piston adjusting screw fitted into the hole in the tool.

6. Compress the slave piston springs and remove the retaining ring (5).
7. Remove the retainer (4), springs, slave piston and adjusting screw.

## 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 (1), reversing the removal procedure.
4. Remove the fixture and install the adjusting screw locknut.
5. Install new control valves (10), collars (13), springs (11,12), covers (14) and retaining rings (5).

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

6. Install original master pistons (6) with new flat springs (7), washers (8) and capscrews (9).

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

7. 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 15 lb-in (20 N·m)
8. Install new ball, spring and pipe plug (21, 22, 23)

## Install Engine Brake Housings

1. Install two new o-rings (27) on oil supply tube; insert the tube into the front housing.
2. Install rear housing on rocker pedestals, install the capscrews (4 for model 404D, 8 for model 411) but do not tighten.

3. Set the front housing in place so that the oil connector enters the hole in the rear housing. Install the capscrews (4 for model 404D, 8 for model 411) but do not tighten.
4. The engine brake housing must now be aligned according to the instructions in the respective installation manual.
5. After completion of the engine brake alignment, tighten the housing capscrews.

**Model 404D:** First tighten the two middle capscrews of each housing to 95 lb·ft. (130 N·m) then tighten each of the two outside capscrews also to 95 lb·ft. (130 N·m). Repeat on other housing.

**Model 411:** Install the capscrews in the (8) locations and hand tighten following the sequence in Fig. 2 below. Complete the sequence by tightening the capscrews to 60 lb·ft. (81 N·m). Repeat on the other housing.

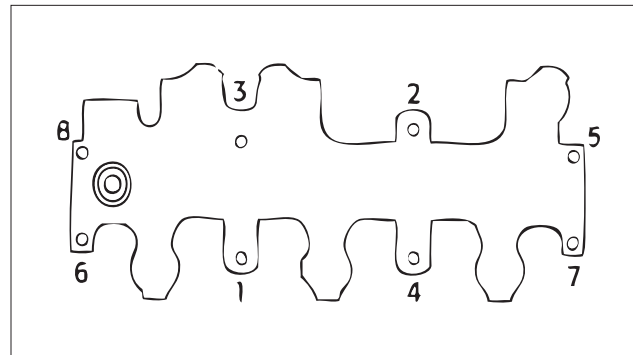


Fig 2

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## Slave Piston Adjustment

1. The engine must be stopped and cold (water temperature 140° or lower). Exhaust valves on cylinder to be adjusted must be closed. All model 404D and 411 housings are adjusted to 0.015" (0.380mm). Model 411E housings are adjusted to 0.027" (0.68mm).
2. Insert the correct feeler gage between the actuating pin in the crosshead and the slave piston. Turn the slave piston adjusting screw (reset) until a slight drag is felt on the feeler gage. Hold the screw in this position and tighten the locknut to 25 lb·ft (35 N·m). Do not over-tighten.

## Finish Installation

**NOTE:** IF TUNING UP A JAKE BRAKE MODEL 411 FOR THE CUMMINS M11 ENGINE, OMIT STEP 1 BELOW AND PROCEED TO STEP 2.

1. Adjust the intake and exhaust valves and injectors in accordance with Cummins procedures.
2. Reinstall the oil supply hose to the front housing.
3. Install the new solenoid harness and connect (24) to the terminal leadouts inside the spacer.
4. Remove the old gasket and inspect for damage.

