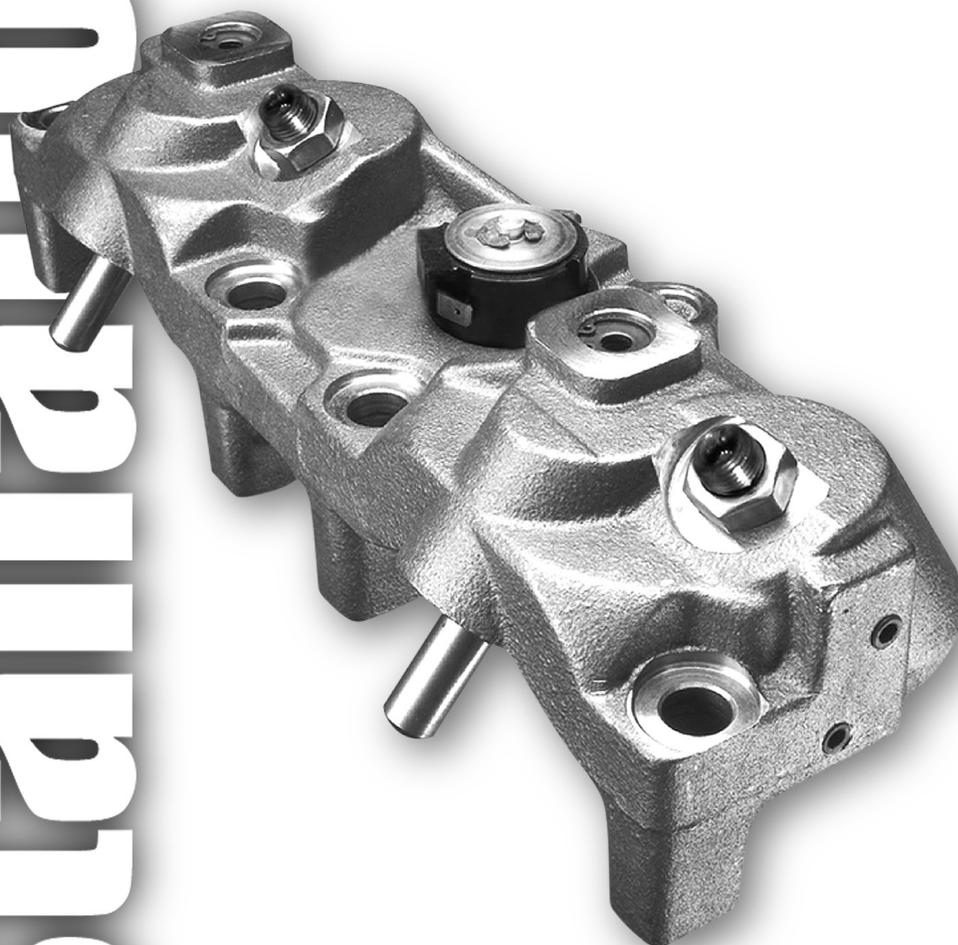


Installation



P-39/P-39A/P-39B/P-39D/P-39E

ENGINE BRAKES

Application:

CATERPILLAR 3406E C-15/C-16 ENGINES

PACBRAKE®

GETTING STARTED

This manual covers the installation and wiring instructions for the Caterpillar 3406E, C-15/C-16 engines.

Engine serial number Prefix H.P	Pacbrake Model	Slave Lash
5EK / 6TS 410 H.P. AND LOWER	P-39 or P-39A	.027"
5EK / 6TS 410 H.P. AND LOWER	P-39B	.033"
5EK / 6TS 435 H.P. AND HIGHER	P-39 or P-39A	.030"
5EK / 6TS 435 H.P. AND HIGHER	P-39B	.033"
1LW / 5DS ALL H.P. RATINGS	P-39 or P-39A	.030"
1LW / 5DS ALL H.P. RATINGS	P-39B	.033"
2WS / 1MM 410 H.P. AND LOWER	P-39 or P-39A	.042"
2WS / 1MM 410 H.P. AND LOWER	P-39B	.033"
2WS / 1MM 435 H.P. AND HIGHER	P-39 or P-39A	.030"
2WS / 1MM 435 H.P. AND HIGHER	P-39B	.033"
7CZ ALL H.P. RATINGS	P-39 or P-39A	.030"
7CZ ALL H.P. RATINGS	P-39B	.033"
6NZ ALL H.P. RATINGS	P-39 or P39A	.030"
6NZ ALL H.P. RATINGS	P-39B	.033"
MBN ALL H.P. RATINGS	P-39D	.038"
BXS ALL H.P. RATINGS C15 only	P-39E	.028"

1

For correct application, identify the engine model by the engine serial number prefix. Consult the application chart above. The **P-39/P-39A/P-39B/P-39D/P-39E** engine brake is designed for Caterpillar 3406E / C-15/C-16 engines.

IMPORTANT NOTES:

Pacbrake model P-39D is for use solely on engine prefix MBN. Misapplication may cause engine damage.

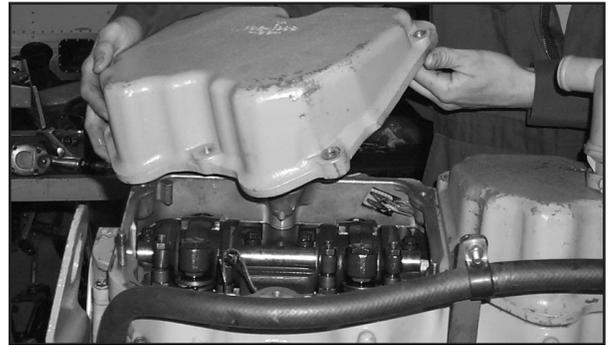
Pacbrake model P-39E is for use solely on engine prefix BXS. Misapplication may cause damage.



2

Thoroughly clean the top of the engine and remove all three rocker covers.

NOTE: Some C-15/C-16 engines with serial number prefix 6NZ and 7CZ may have a capscrew on the underside of the breather that may interfere with the engine brake solenoid. If this capscrew is present it should be removed and the hole filled with Caterpillar 8T-9022 sealant.



3

Using air pressure, remove oil trapped in 3 rear cylinder head stud holes in locations as shown.

CAUTION: Eye protection must be worn.

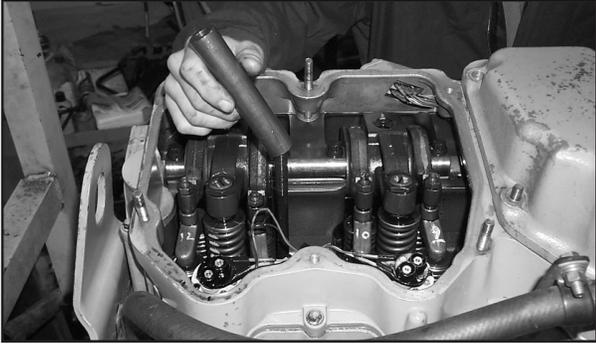
Using a suitable driver, install the 3 studs with the blue marked end at the top and torque to **65 lbs.ft. (88 N•m)**.



4

Install the support tubes over the studs as shown.

NOTE: Earlier production brakes used two studs and a single pedestal which should be installed with the number on the casting facing toward the exhaust manifold side of the engine.

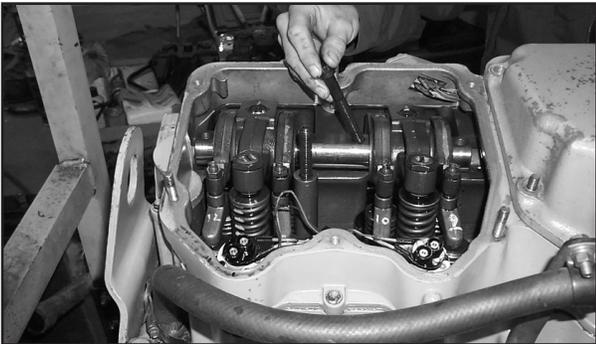


5

Remove the four capscrews from each of the three rocker shaft assemblies and discard.

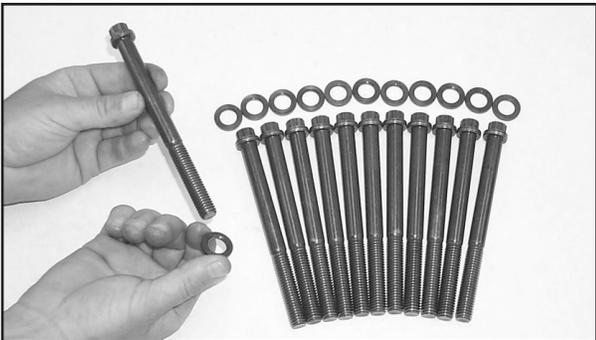
Using air pressure, remove oil trapped in the holes.

CAUTION: Eye protection must be worn.



6

Place a special Pacbrake washer on each of the 12 pt. flange capscrews provided.



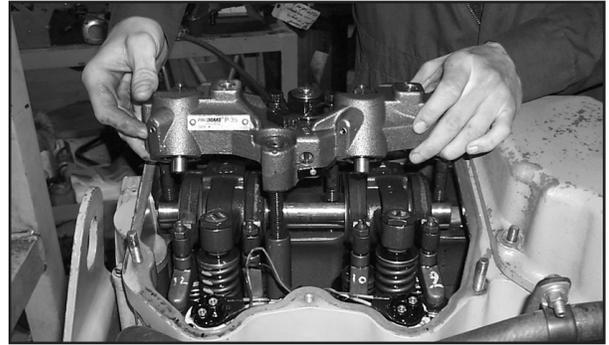
7

Install the three brake housings over the stud support tubes to rest on the machined portion of the rocker shaft.

Install the capscrews with washer through each housing and rocker shaft assembly.

Ensure that each master piston link is seated in its rocker arm socket.

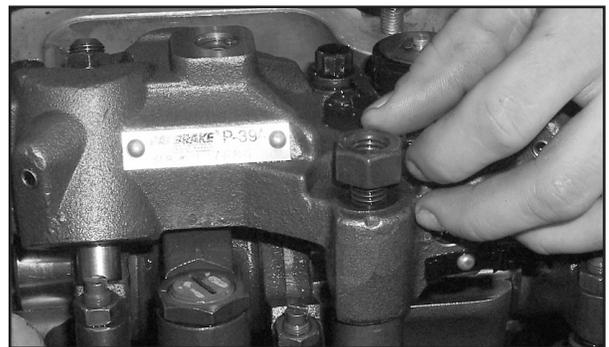
NOTE: Be sure all Cat® bridges are properly located.



8

Install the 3 large hex nuts on the mounting studs without washers making sure the machined nut faces are against the housing.

NOTE: Housing serial numbers 007477 and earlier will have a smaller hex nut and require bearing washers.



Brake Housing fastener installation.

Thread each of the capscrews into the cylinder head by hand.

Starting with the two center capscrews and stud nut then progressing to the outside capscrews, tighten all until snug. Repeat on the remaining two housings.

Starting with the two center capscrews and then the stud nut, torque to **40 lbs.ft. (54 N•m)**. Now torque the outer two capscrews to **40 lbs.ft. (54 N•m)**. Repeat on the other two housings.

In the same sequence torque the capscrews and nuts to **80 lbs.ft. (109 N•m)**. Double check all fasteners for correct torque before proceeding.



NOTE: ALL MODELS. The correct feeler gage must be inserted between the slave piston link and the exhaust rocker arm. DO NOT insert the gage between the crosshead and the foot of the adjusting screw, as improper lash will result and engine damage will occur.

10 SLAVE PISTON ADJUSTMENT P-39 AND P-39A ONLY

Consult application chart on page 2.

NOTE: Do not use this adjustment procedure for **P-39B** (identified by "P" on top of the hex adjusting screw)

During the check and/or reset of valves and injectors, the slave piston adjustment can be done on cylinders with closed exhaust valves. Select the correct feeler gage according to engine horsepower.



Turn in the adjusting screw beyond the contact point to squeeze out trapped oil. Back out the screw, then turn in again until a slight drag is felt on the feeler gage. Torque the locknut to **25 lbs.ft. (34 N•m)**. Repeat this procedure on the remaining cylinders with closed exhaust valves. Rotate the crankshaft to the next valve set position to adjust the remaining cylinders. Double check torque on the locknuts.
DO NOT EXCEED **25 lbs.ft. (34 N•m)** torque.



12 SLAVE PISTON ADJUSTMENT P-39B AND P-39E ONLY

Consult application chart on page 2.

Slave piston lash is critical and must be done with extreme care. This procedure must be followed exactly as written in order to obtain the best performance.

ALL P-39B MODELS HAVE A .033" SLAVE LASH, REGARDLESS OF THE ENGINE YEAR OR H.P. RATING.

ALL P-39E MODELS HAVE A .028" SLAVE LASH REGARDLESS OF THE ENGINE YEAR OR H.P. RATING.

During the check and/or reset of valves and injectors, the slave piston adjustment can be done on cylinders with closed exhaust valves. Select the correct feeler gage according to engine horsepower.

1. Insert a feeler gage (.033" feeler gage on **P-39B** and a .028" feeler gage for a **P-39E**) between the slave piston link and the rocker arm. Turn the adjusting screw clockwise until the feeler gage is tight, then turn the adjusting screw one additional turn and wait one full minute. This will allow the oil to be purged from the internal workings of the adjustment screw and allow the plunger time to compress.
2. Once the time has lapsed, slowly turn the adjusting screw counter clockwise until a slight drag is felt on the feeler gage. Try not to back the adjustment screw off too much or the plunger may try and extend causing a lash in excess of .033" on the **P-39B** and .028" on the **P-39E**. This is very important to maintain the correct lash.

IMPORTANT TORQUE PROCEDURE

3. Hold the screw and torque the locknut to **25 lbs.ft. (34 N•m)**. Recheck clearance and readjust if a slight drag is not felt on the feeler gage. **DO NOT TORQUE** adjusting screws more than **25 lbs.ft. (34 N•m)** failure of the screw or housing will result.
4. Repeat on the remaining cylinders with closed exhaust valves.
5. Rotate the crankshaft 360°, then adjust the remaining cylinders.
6. Double check all locknuts for correct torque.

P-39B requires that a service information decal be applied to the valve cover spacer near the engine specifications decal. Thoroughly clean the dirt and oil from the area where the decal is to be affixed and apply the decal. This is important to ensure any future adjustments are done to the new specifications.

13 SLAVE PISTON ADJUSTMENT P-39D ONLY

Consult application chart on page 2.

Slave piston lash is critical and must be done with extreme care. This procedure must be followed exactly as written in order to obtain the best performance.

ALL P-39D MODELS HAVE A .038" SLAVE LASH, AND CAN ONLY BE INSTALLED ON ENGINES WITH A PREFIX OF MBN.

During the check and/or reset of valves and injectors, the slave piston adjustment can be done on cylinders with closed exhaust valves. Select the correct feeler gage according to engine horsepower.

1. Insert a **.038"** feeler gage between the slave piston link and the rocker arm. Turn the adjusting screw clockwise until the feeler gage is tight, then turn the adjusting screw one additional turn and wait one full minute. This will allow the oil to be purged from the internal workings of the slave piston to and allow the plunger time to compress.
2. Once the time has lapsed, slowly turn the adjusting screw counter clockwise until a slight drag is felt on the feeler gage.

IMPORTANT TORQUE PROCEDURE

3. Hold the screw and torque the locknut to **25 lbs.ft. (34N•m)**. Recheck clearance and readjust if a slight drag is not felt on the feeler gage. **DO NOT TORQUE** adjusting screws more than **25 lbs.ft. (34N•m)**, failure of the screw or housing will result.
4. Repeat on the remaining cylinders with closed exhaust valves.
5. Rotate the crankshaft 360°, then adjust the remaining cylinders.
6. Double check all locknuts for correct torque.

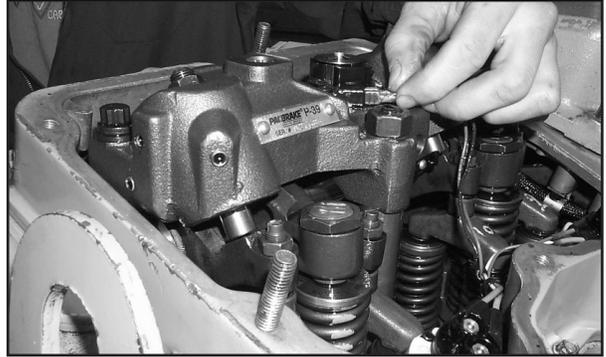
14

Locate the Caterpillar dedicated engine brake wires which are attached to the electronic unit injector harness.



15

Connect these wires to the solenoid terminals (any order). Secure the wires in the clip provided, on the side of the housing near the hold down stud. Using the plastic ties provided, secure the wires to the E.U.I. harness maintaining clearance around moving engine parts.



16

We recommend that you double-check your installation to this point, then start the engine and idle 5 to 10 minutes.

With the engine idling, hold a clean rag over the control valves (located on the engine brake housing) to catch oil spray. Depress the solenoid 5 or 6 times to purge the air from the engine brake housing.

Replace valve covers and install capscrews.

Torque to **13 lbs.ft. (18 N•m)**.

This kit does not contain wiring or switches.

Consult vehicle manufacturer's wiring information for type of switches required and location of engine brake dedicated wires behind the dash.



NEED TO KNOW MORE ... 800-663-0096 WWW.PACBRAKE.COM

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