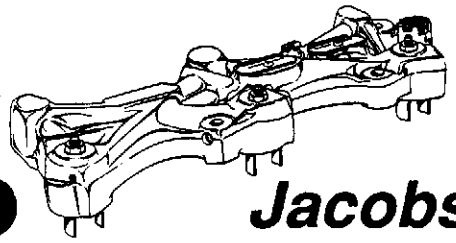


INSTRUCTIONS FOR *Jacobs*® 3406 PEEC RETARDER CONTROL

This manual contains instructions for installing, servicing and operating the *Jacobs* electronic control system on Caterpillar series 3406 "PEEC" engines (Programmable Electronic Engine Control) that are equipped with *Jacobs* Models C346B/C346C/346D/349A Engine Brakes.

The PEEC retarder control group, P/N 17375, replaces the engine brake electrical control system of the above models when used on the Caterpillar 3406 "PEEC" engines. The fuel pump switch is replaced by the Accelerator Low Idle Position Sensor (ALIPS).

The instructions contained in this manual should be used in conjunction with the appropriate Jacobs installation manual.

ACCELERATOR LOW IDLE POSITION SENSOR (ALIPS) INSTALLATION INSTRUCTIONS

1. Install the sensor bracket by removing the nut or bolt that retains the APS unit (see illustration). Place the two star washers and the bracket on the boss of the APS; replace the fastener. Insure that the centerline of the threaded hole in the sensor bracket is in line with the centerline of the magnet on the actuating key assembly.

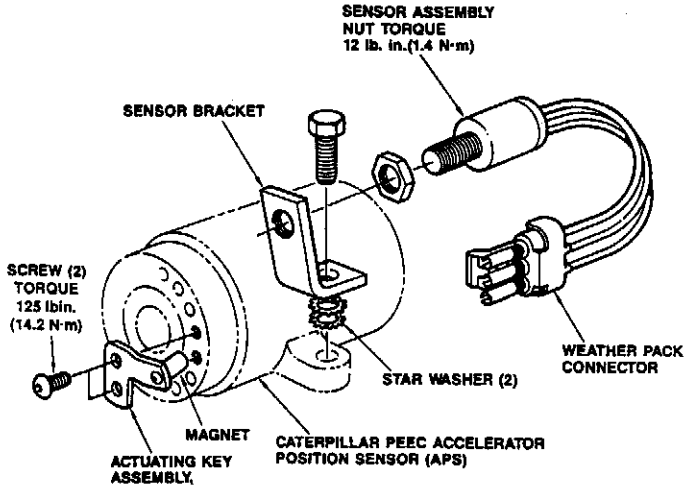
2. The actuating key assembly is attached to the face of Caterpillar's accelerator position sensor (APS). With the APS in the idle position install the key as indicated in the illustration below. Mount with the 1/4-20 UNC button head fasteners provided. Torque the fasteners to 125 lbin. (14.2 N•m).

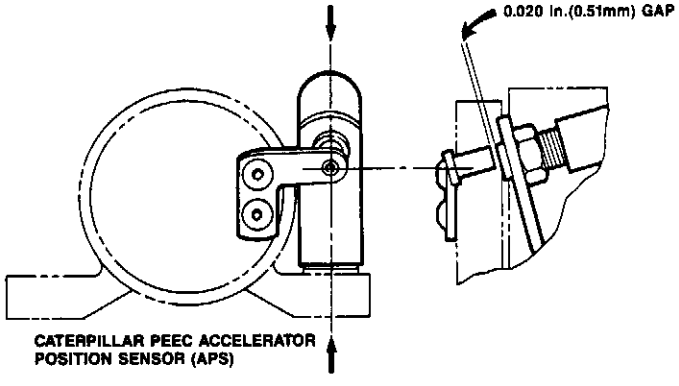
   NOTE:

   Put both star washers under the sensor bracket. This will prevent movement of the bracket when tightening the fastener. Torque the fastener to Caterpillar specifications.

3. Insure that the APS linkage is at the low idle position. Thread the sensor assembly into the sensor bracket to set a gap between the magnet and sensor. Pull out on the rotating disc of the APS to remove end play, while using a 0.020 in. (0.51 mm) feeler gauge between the magnet and sensor. Torque the sensor locknut against the bracket to 12 lbin. (1.4 N•m). Actuate the accelerator linkage and release to insure that the proper gap is maintained.

4. Snap the weather pack connector from the sensor assembly to its mating harness. Secure the harness so that it will not interfere with any moving parts on the vehicle.





INSTALLATION INSTRUCTIONS FOR JACOBS ELECTRONIC CONTROL SYSTEM ON CATERPILLAR 3406 "PEEC" ENGINES

⚠ CAUTION

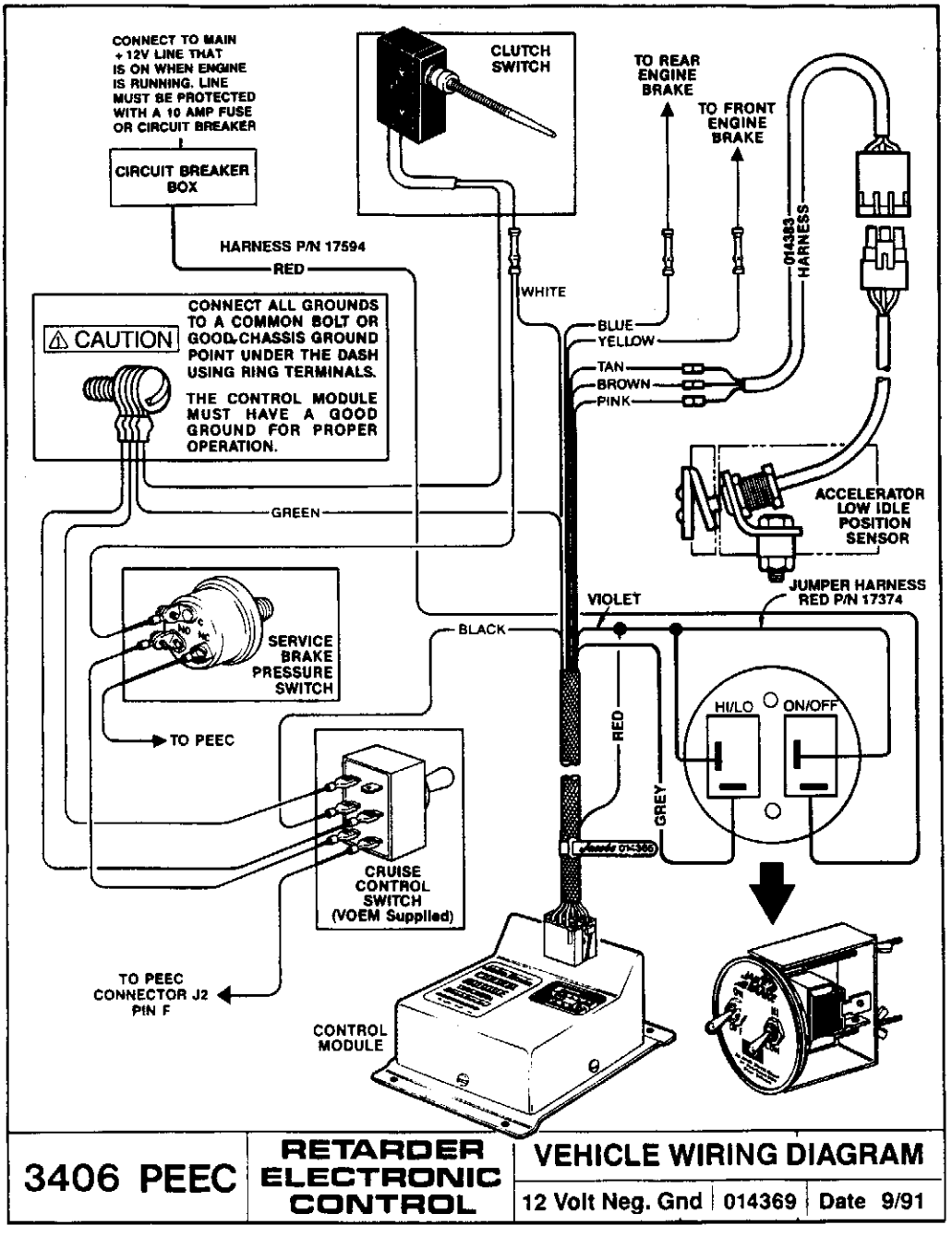
All electrical connections should be made before applying any power, as damage to unit may otherwise result.

Find an appropriate location under the dash and mount the control module, P/N 014367, using the four (4) screws provided. Install the mode selector switch, P/N 003586, in a location convenient to the operator. Install the brake pressure switch, P/N 014376, in place of the existing PEEC brake pressure switch in the air brake pressure line. The switch has a 1/8 in. N.P.T. fitting.

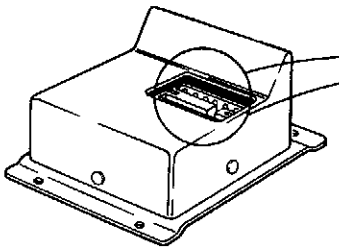
⚠ WARNING

Insure that the integrity of the air brake system is maintained. Use an appropriate thread sealing compound as specified by the truck manufacturer.

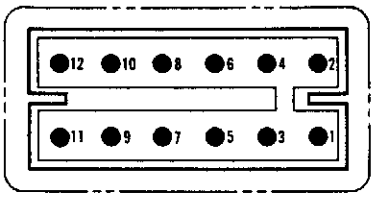
If no clutch switch exists, install the clutch switch in accordance with the engine brake installation manual. Finally, install the ALIPS sensor group in accordance with its specific instructions.



Pin No.	Function	Color Code
1	12 Volt Vehicle Supply	Red
2	Vehicle Ground	Green
3	Mode Selector SW. (Low)	Violet
4	Mode Selector SW. (High)	Grey
5	Engine Brake Housing, Rear	Blue
6	Engine Brake Housing, Front	Yellow
7	Clutch Switch	White
8	Cruise Control SW. (On/Off)	Black
9	ALIPS (+5 V Power)	Tan
10	ALIPS (Ground)	Brown
11	ALIPS (Output)	Pink
12	Not used	



CONTROL MODULE
Part No. 014367



PIN LOCATION

Insert the connector for the main harness, P/N 014365, into the header on the control module, P/N 014367. Insert the three (3) terminal weather pack connectors of ALIPS to main harness, P/N 014383, into the mating weather pack connector on the ALIPS sensor assembly, P/N 014370.

Make the following main harness, P/N 014365, connections:

1. Tan wire to tan wire in ALIPS to main harness, P/N 014383.
2. Brown wire to brown wire in ALIPS to main harness, P/N 014383.
3. Pink wire to pink wire in ALIPS to main harness, P/N 014383.
4. Grey wire to the HI terminal on the mode selector switch, P/N 003586.
5. Violet wire to the LO terminal on the mode selector switch, P/N 003586.
6. White wire to the white wire of the clutch switch cable. Splice into this connection an AWG #16 wire which is connected to the common (C) terminal on the service brake pressure switch.
7. Yellow to the front retarder solenoid.
8. Blue to the rear retarder solenoid.
9. Red to a supply voltage (+12 volts) terminal in the fuse or circuit breaker box which is energized when the engine is running.

⚠CAUTION

Do not engergize the retarder system until all connections have been made.

10. Green to a common ground point. Other wires will be grounded at this common point.
11. Black to one of the common terminals on the DPDT cruise control On/Off switch.

Make the following connections using AWG #16 wire which conforms to SAE J1128 SXL specification:

- The "OFF" terminal of the cruise control On/Off switch to which the black wire was attached (Step 11 above) to the common ground terminal.
- The "ON" terminal of this same cruise control switch to the normally open (N.O.) terminal of the service brake pressure switch. Connect the normally closed (N.C.) terminal of the service brake pressure switch to PEEC brake/clutch input. The common terminal of the other pole of the cruise control On/Off switch to the common ground terminal. The "ON" terminal of this pole to PEEC On/Off input.
- The common terminal of the mode selector switch, P/N 003586 to the same supply voltage (+12 volts) terminal to which the red wire was attached (see step 9).
- The remaining black wire of the clutch switch cable to the common ground terminal.

This completes the installation of the 3406 PEEC retarder electronic control.

The system may now be energized and tested.

Jacobs 3406 PEEC Retarder Control Operational Check

After completing the installation of the Models C-346B/ C-346C/346D engine brake and 3406 PEEC retarder electronic control system, the following operational checks should be made:

NOTE: Be sure that all electrical connections have been properly made and are secure. Pay special attention to the common ground. A secure ground is absolutely essential for proper operation of the electronic control system. Leave the engine valve covers off to observe the engine brake solenoid operation. Where appropriate, sufficient brake air pressure will be needed to operate the brake pressure switch. Be sure main truck power is on.

I With the cruise control switch "off":

A. Clutch Engaged (Clutch Switch Closed)

B. Throttle Pedal "Idle" (ALIPS Switch Closed)

C. Mode Selector Switch "off" (Switch Open)

D. Brake Pedal "off" (Brake Switch Open)

- With above conditions set, the engine brake solenoids will be "off".
- Move the mode selector switch to position "Lo"; only the rear solenoid should activate.
- Move the mode selector switch to "Hi"position; both solenoids should activate.
- With mode selector in "Hi" position, depress the clutch only; solenoids should shut off.
- With mode selector in "Hi" position, depress the accelerator only ; solenoids should shut off.

II With cruise control switch "on":

A. Clutch engaged

B. Throttle pedal idle

C. Mode selector switch "Hi"

D. Brake pedal "off"

- With above conditions set, the engine brake solenoids should be "off".
- Depress brake pedal (need sufficient air pressure); brake solenoids should operate with about 1/3 second delay.

If above conditions are not met, refer to the troubleshooting section of these instructions.

JACOBS 3406 PEEC RETARDER CONTROL TROUBLESHOOTING GUIDE

The Jacobs Electronic Control Module and ALIPS (Accelerator Low Idle Position Sensor) are sealed electronic devices and are not user serviceable. To determine if these devices require replacement, the following checks should be made in the order listed. Refer to wiring diagram 14369 for these tests.

Equipment Required:

1. (1) VOM or DVM with 20,000 ohm/volt input impedance, min.
2. (3) Clip leads.

PROCEDURE:

1. Check that all wiring and harness connections are good.
2. Check that the circuit breaker is not tripped or fuse not blown for the power feed to the system. This may be confirmed by connecting the VOM from the common terminal on the HI/LO selector switch to the common ground and reading +12V with the system energized.
3. Insure that all the grounds (4 in number) are made to a common point and that the connections are tight. A good ground is essential to proper operation of the electronic control system.
4. Deenergize the system and disconnect the tan, brown and pink leads from the main wire harness, P/N 014365, to the ALIPS harness, P/N 014383. Remake these connections using the three clip leads. Energize the system and with the clutch engaged, check for +5 volts between the tan wire and the brown wire. If this does not read +5 volts, replace the control module. If it does read +5 volts, reconnect the positive voltmeter lead to the pink wire.

   With the accelerator in the low idle position, the voltmeter should read 0 volts. If the volt meter does not read 0 volts, check the clearance between the sensor assembly and magnet; readjust, if necessary. If the voltmeter still does not read 0 volts, replace the ALIPS sensor assembly. With the accelerator depressed from the idle position, the reading should be +5 volts. If it does not read +5 volts, replace the ALIPS sensor assembly, P/N 014370.
5. If the ALIPS sensor functions properly as outlined in steps 1 through 4, remove the clip leads and reconnect the harnesses.
6. Connect the common (ground) lead of the voltmeter to the common ground point. Connect the positive voltage lead to the white lead in the main harness. Energize the system. With the clutch fully engaged (clutch pedal completely up/clutch switch activated), the meter should read 0 volts. Disengaging the clutch (depressing clutch pedal/deactivating clutch switch) should cause a meter reading of +5 volts when the system is activated. If these readings are not obtained, replace the clutch switch.
7. Remove the positive voltage lead of the voltmeter from the white lead and connect it to the normally open (N.O.) contact on the service brake pressure switch. Insure that the cruise control switch is in the "on" position and the clutch is fully engaged (clutch pedal completely up/clutch switch activated). With the system activated and sufficient air pressure to activate the service brake pressure switch, depress the service brake pedal sufficiently to activate the service brake pressure switch. The voltmeter should read 0 volts. With the brake pedal released (brake pressure switch deactivated) the voltmeter should read +5 volts. Replace the service brake pressure switch, if the above readings are not obtained.
8. If all the above tests are passed, disconnect the blue and yellow leads to the retarder solenoids. With the mode selector in the "HI" position, the accelerator in the low idle position, the cruise control switch in the "ON" position, the service brake pedal depressed (service brake pressure switch activated) and the clutch fully engaged (clutch pedal fully up), both blue and yellow leads should read +12 volts to common ground. Depressing the clutch pedal sufficiently to deactivate the clutch switch should cause the voltage on the blue and yellow leads to drop to zero (0). If this action does not occur, replace the control module.
9. If the above procedures do not locate the problem, then the engine retarder solenoid harness, solenoids or the engine retarder should be checked. Refer to Jacobs troubleshooting manual, P/N 13680, to determine proper service requirements.

