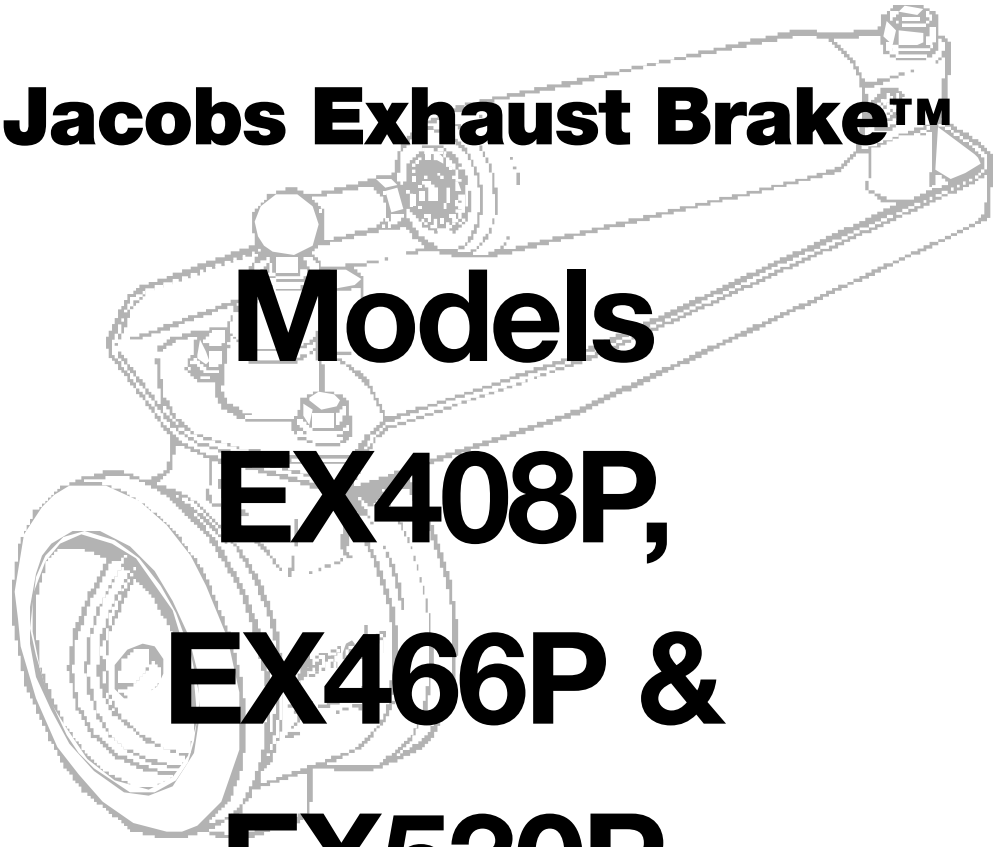
Jacobs Vehicle Systems™

Jacobs Exhaust Brake™



Models EX408P, EX466P & EX530P

INTERNATIONAL®

INSTALLATION

P/N 020193D

Rev. 9/98

Table of Contents

Application Notes

A. For applications on vehicles equipped with hydraulic brakes: Refer to the instructions included in the Pneumatic Group, P/N J19482, for parts and installation information.

B. Refer to Jacobs Service Letters and instructional literature for specific application information. Information in this manual was current at the time of printing and is subject to change without notice or liability.

C. Vehicles with Allison Transmissions: When installing the Jacobs Exhaust Brake™ on vehicles equipped with an Allison transmission, refer to Application Note 93-1, PN 021163, for detailed information.

Safety Precautions

The following symbols in this manual signal potentially dangerous conditions 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 a compression brake. Always use correct tools and proper procedures as outlined in this manual.

WARNING THE JACOBS EXHAUST BRAKE IS A VEHICLE SLOWING DEVICE, NOT A VEHICLE STOPPING DEVICE. IT IS NOT A SUBSTITUTE FOR THE SERVICE BRAKING SYSTEM. THE VEHICLE'S SERVICE BRAKES MUST BE USED TO BRING THE VEHICLE TO A COMPLETE STOP.

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Section 1: Installation in the Exhaust Pipe

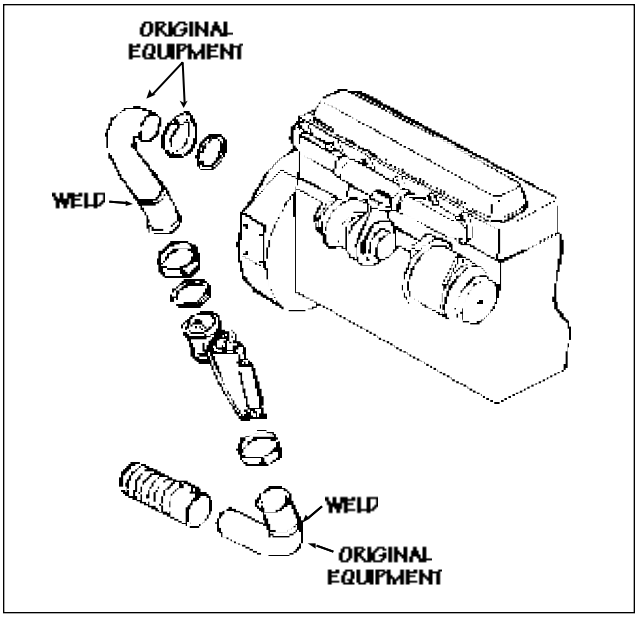

FIG. 1

Fig. 1 indicates a typical arrangement of the Jacobs Exhaust Brake™ and mounting hardware.

Loosen the "V" clamps holding the original exhaust pipe arrangement in place. Remove the exhaust pipe, and inspect for any sign of rust or damage. Replace if necessary.

Mark on the exhaust pipe the section to be removed (Fig. 2). Cut out the necessary section (approximately 5" in length) and weld the sleeves to the two exhaust pipe lengths.

NOTE: WELD THE SLEEVES TO THE PIPE CAREFULLY. THE WELDED JOINT BETWEEN THE TURBO AND THE EXHAUST BRAKE HOUSING WILL BE SUBJECTED TO HIGH INTERNAL PRESSURE. ANY EXHAUST GAS LEAKAGE WILL CAUSE A SIGNIFICANT LOSS OF PERFORMANCE. REFER TO SAE SPECIFICATIONS J1147 AND J830A FOR WELDING INFORMATION.

Important Notes on the Positioning of the exhaust brake

Exhaust pipe arrangements vary from vehicle to vehicle. Where possible, install the exhaust brake in a near vertical orientation with the exhaust brake air cylinder facing the front of the vehicle. This will ensure a flow of air over the cylinder.

Do not position the exhaust brake in such a way that the actuating cylinder is directly below the main housing.

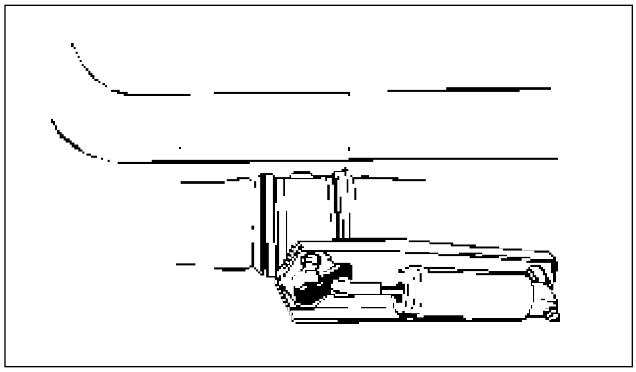

FIG. 2

CAUTION THE DISTANCE OF THE EXHAUST BRAKE FROM THE TURBOCHARGER IS LIMITED BY THE THERMAL CAPABILITY OF THE AIR CYLINDER (390° F./200° C.). MOUNT THE EXHAUST BRAKE AS CLOSE AS POSSIBLE TO THE TURBO, WHILE STILL MAINTAINING A MINIMUM 8"DISTANCE BETWEEN THE EXHAUST BRAKE AND THE TURBOCHARGER.

Now reinstall the exhaust pipe section to the turbocharger using the gasket. Ensure that the gasket is centered correctly. Orient the pipe and torque the clamp sufficiently to hold the parts in place.

Next, install the exhaust brake at the other end of this section of pipe using the gasket and the "V" clamp. Orient the exhaust brake so that the arrow located on the exhaust brake housing is in the direction of the gas flow. Make sure that the gasket is installed on the locating pilot on the exhaust brake inlet. Install the "V" clamp and tighten enough so that the parts are held in place.

Install the second section of exhaust pipe with the sleeve attached and clamp to the exhaust brake outlet using the "V" clamp. No gasket is needed between the exhaust brake and this pipe section.

Make the connection to the muffler using the parts removed when the installation began. At this point, with the clamps still loose, align the exhaust system. Ensure that there is proper clearance between the exhaust system, including the exhaust brake and the engine and chassis. Now torque all the "V" clamps to 70 - 80 lb.-in. (8 - 9 N•m).

NOTE: MAKE SURE THAT THE GASKETS ARE INSTALLED BETWEEN THE TURBO OUTPUT AND THE EXHAUST PIPE AND BETWEEN THE EXHAUST PIPE AND THE EXHAUST BRAKE INLET.FAILURE TO CORRECTLY INSTALL THESE GASKETS WILL RESULT IN A LOSS OF RETARDING PERFORMANCE.

Section 2: Pneumatic Group Installation

An illustration of the pneumatic group is shown in Fig. 3. Use this as a guide in performing this installation.

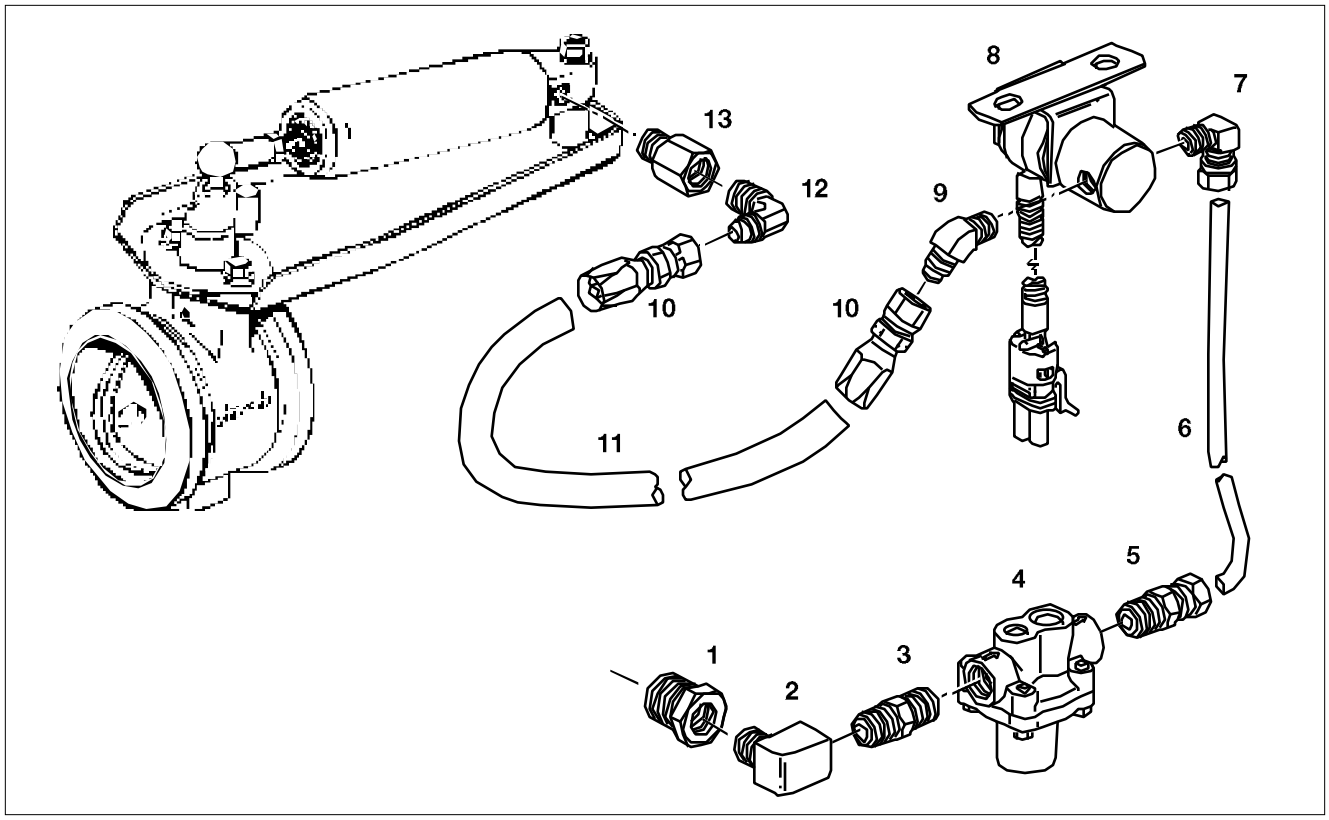

FIG. 3

Ill. No.	Description	Qty./ Group
1	Bushing	1
2	90° street elbow, 1/4 NPT	1
3	Hex nipple	1
4	Protection valve	1
5	Compression fit. assy.	1
6	Air brake tube	1
7	Compression fit. assy.	1
8	Solenoid valve assembly	1
9	45° flared 45° elbow, 1/8 NPT	1

Ill. No.	Description	Qty./ Group
10	Hose fitting assembly	2
11	Air brake hose	1
12	45° flared 90° elbow, 1/4 NPT	1
13	Adapter	1
NI	Support clamp	5
NI	1/4 - 20 x 1 hex bolt	5
NI	1/4 - 20 hex nut	5
NI	Plain washer	5
NI	Lock washer	5

Important Guidelines

WARNING USE THE VEHICLE'S EXISTING AIR TANK INSTALLED ON THE VEHICLE. BE SURE TO BLEED THE AIR TANK OF THE VEHICLE BEFORE STARTING THIS INSTALLATION.

Install the protection valve at the outlet of the air tank using the proper pipe fittings. Use of the protection valve will maintain the integrity of the original pneumatic system.

CAUTION IF A FITTING IS NOT AVAILABLE ON THE AIR TANK AND A "TEE" FITTING IS EMPLOYED TO TAP INTO THE ORIGINAL PNEUMATIC CONNECTIONS, ENSURE THAT THE ORIGINAL AIR CONNECTIONS ARE CORRECTLY RETORQUED.

Install the solenoid valve on the inside of the right-hand side chassis rail. Use the same bolts that hold the bracket for the heating hose. If this location is not available, install the solenoid valve in a similar manner using the fasteners available.

Connect the solenoid port marked "1" or "p" to the air tank using the air tubing.

Connect port "2" or "A" to the exhaust brake air cylinder using the air hose.

Use the 1/4 - 18 NPT compression fittings for the tubing connection from the air tank to the solenoid valve.

To protect the air tubing from the exhaust piping heat, you must route the air tubing along the left-hand side chassis rail to the front of the engine. Next, cross to the right-hand side chassis rail where the solenoid valve is installed. Clamp using the clamps provided. Avoid tight bends and ensure there is no possibility of abrasion through contact with chassis components.

All necessary fittings and fasteners are included in the kit to complete the installation.

Compression Fitting Assembly Instructions

Cut the tubing ends squarely.

Insert the tubing into the fitting until it bottoms on seat. Tighten nut with wrench until one thread remains visible on the fitting.

Hose Assembly Instructions

Shorten the hose to the required length. Ensure that the minimum bend radius is 2" (51 mm). Install the end fittings on both ends of the hose according to the following steps:

1. Cut the hose squarely with a fine tooth hacksaw or cut-off wheel.
2. Put the socket in vise.
3. Screw hose counter-clockwise into socket until it bottoms.
4. Back off 1/4 turn.
5. Lubricate the nipple thread and inside of the hose liberally with a heavy oil or Aeroquip hose assembly lube Aeroquip, P/N 222070.
6. Screw nipple clockwise into socket and hose. Leave 1/32" (0.8 mm) to 1/16" (1.6 mm) clearance between the nipple hex and socket.

Section 3: Installation of the Controls

Install the dash switch in a convenient location on the dashboard.

Install the clutch switch using the instructions included in the kit.

Fuel Pump Switch Installation

Attach the switch to the bracket using the hardware provided (see Fig. 4). Torque the two mounting screws 10 to 14 lb.-in. (1.2 to 1.6 N•m). Make sure that the diode is positioned correctly (see Fig. 5).

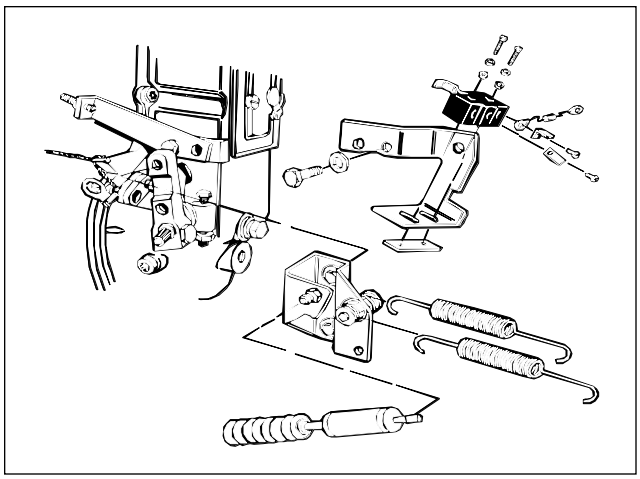

FIG. 4

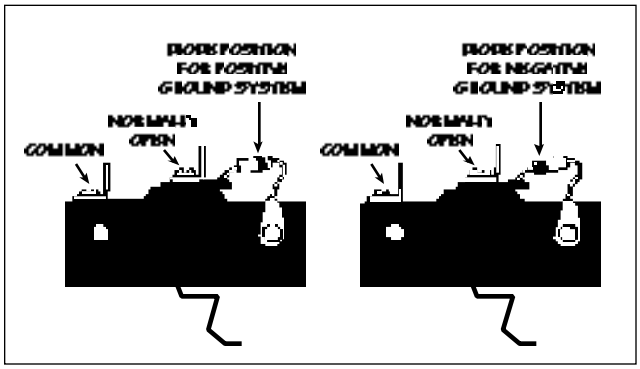

FIG. 5

The fuel pump switch bracket assembly is mounted to the rear end of the pump, between the pump housing and the stop bracket, using the two hex-head M6 bolts that hold in place the stop bracket (Fig. 6).

First, remove the two hex-head M6 bolts and washers that hold the stop bracket in place. Then remove and discard the two spacers. Place the switch bracket

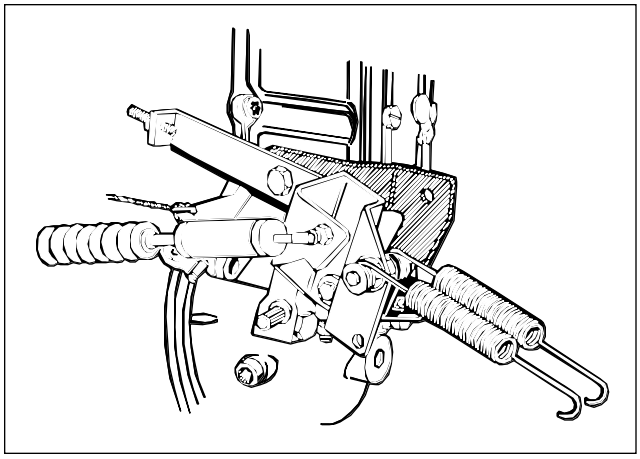

FIG. 6

between the pump housing and the stop bracket. Attach using the two hex-head M6 bolts and washers. Torque the two M6 bolts to 45 to 60 lb.-in. (5 to 7 N•m). The arm of the switch is activated by the fuel pump throttle lever.

Having the engine idling, position the switch so that it closes at 900 ±50 RPM and below (stationary position, no engine load). The switch position must not alter the engine idle speed.

NOTE: ADJUST (IF NECESSARY) THE LOW IDLE RPM ACCORDING TO THE ENGINE SHOP MANUAL. NOTE THAT EVERY IDLE SPEED ADJUSTMENT WILL REQUIRE A FUEL PUMP SWITCH POSITION ADJUSTMENT.

Avoid switch lever rubbing the inner side of Bracket A (see Fig. 7). If necessary, adjustments can be made by carefully bending the two end segments of the lever.

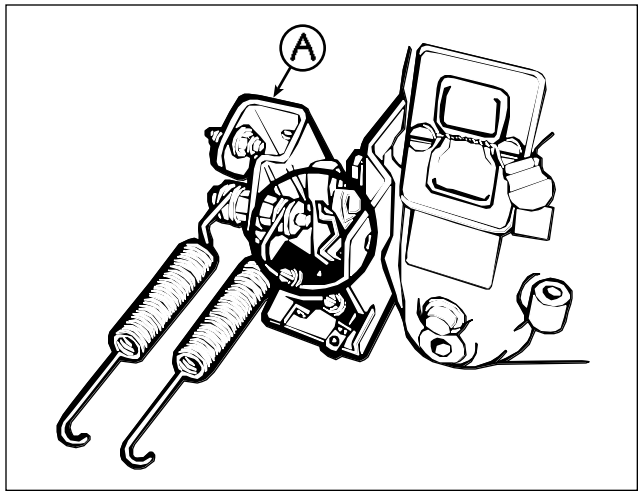

FIG. 7

Wire Harness Installation

Use the harness supplied and follow the wiring schematic shown in Fig. 8.

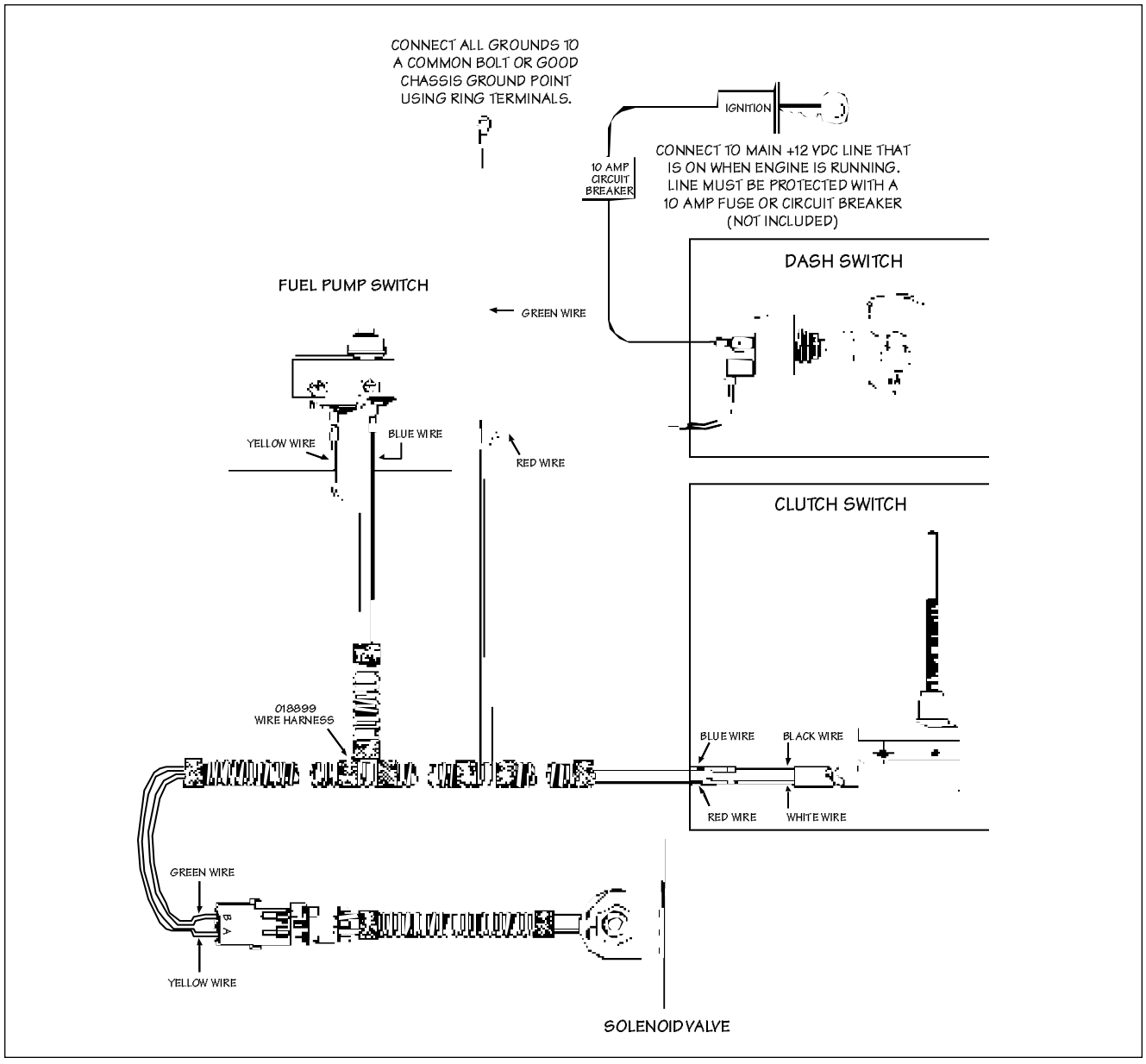

FIG. 8

Final Test

Start the engine and run at low idle speed with the transmission in neutral and the parking brake set.

Turn on the dash switch. The Jacobs Exhaust Brake™ should come on within 0.25 seconds. Step on the accelerator pedal and increase engine speed. The exhaust brake must turn off at 900 ± 50 RPM. Take your foot off the pedal and the exhaust brake should turn on again within 0.25 seconds.

With the engine at idle, step on the clutch pedal. Again, the exhaust brake must turn off immediately. Take your foot off the clutch pedal and the exhaust brake should turn on again.

Check for exhaust gas leakage around the “V” clamps at the turbo outlet and exhaust brake inlet. No leakage is allowed as this will reduce the effectiveness of the exhaust brake’s retarding performance.

Under normal operating conditions, do not use the exhaust brake at idle engine speed.

Before returning the vehicle to service, make a final check of wiring and air tubing/hose routing to make sure that it does not run against hot surfaces or is abraded or kinked. Take the vehicle out for a road test to ensure that the system is functioning correctly.