

## APADS™ Kit Installation WC, WG, WI

### APADS™ Kit Installation

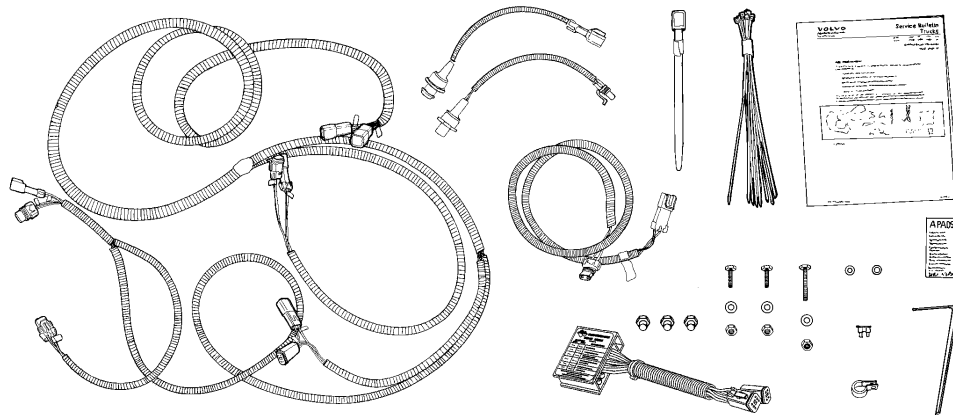
(Effective from April 1996)

APADS reduces air conditioning system maintenance by increasing the life of components and aiding in the diagnosis of system faults.

The APADS Installation Kit is designed for VOLVO trucks that meet the following specifications.

- WC, WG and WI series vehicles
- With a factory installed R134a air conditioning system
- Must have an on/off engine fan (not a viscous fan)
- Without Detroit DDEC III engine equipped with ECM fan control
- Without factory installed APADS

This bulletin contains the installation instructions for the APADS Kit number 3946102, and the kit is available through the VOLVO parts system. The kit is specifically designed for trucks with R134a air conditioning systems that were built before APADS became standard on VOLVO trucks.



W8000817

APADS Kit - Part Number 3946102

Qty	Part #	Description	Qty	Part #	Description
1	3939313	APADS modul	1	3939317	High pressure switch
1	3966805	Low pressure switch	1	3942000	APADS A/C harness
1	3966801	Jumper harness	1	3942401	Module mounting bracket
1	3968798	APADS label	3	8029424	A/C switch port cap
1	8070804	10 amp fuse, blade typ	1	8029485	O-ring, hig side
1	8029479	O-ring, low side	1	99-0180042	1/4" x 1.75" bolt
2	955514	1/4" x 1" bolts	3	8397933	1/4" lock nuts
3	8020240	1/4" flat washers	3	3935628	1/2" cable ties
12	948211	1/4" cable ties	1	874-030	Kit Installation Bulletin

See:

<b>General</b>	“APADS <sub>TM</sub> ” page 3
<b>Specifications</b>	“APADS Pressure Switch Mounting” page 4 “APADS Electrical Specifications” page 4
<b>Design</b>	“APADS <sub>TM</sub> General” page 5
<b>Troubleshooting</b>	“APADS <sub>TM</sub> Fault Codes” page 10 “Blink Code Descriptions” page 11
<b>Service Procedure</b>	“APADS <sub>TM</sub> Kit, Installation” page 13
<b>Wiring Diagram</b>	“Schematic” page 18

## General

### APADS™

See also "APADS™ Kit Installation" page 1.

Extreme vibration and high mileage on class 8 vehicles demand unique design and protection of truck components.

Beginning in mid-May 1995 Volvo Trucks North America began implementation of the Air-conditioning Protection and Diagnostic System, hereafter referred to as APADS into the AERO series. Implementation began in the WG series vehicles in September 1995.

Due to the very positive results of APADS being installed in the AERO and WG series vehicles, a kit for adding APADS to vehicles built before the above dates is now available through the VOLVO parts system. The instructions in this bulletin will make the APADS kit quick and easy to install as well as provide the basic functions of APADS. This bulletin should remain in the Combined Binder Set as a reference for troubleshooting and repairs.

The purpose of APADS is to reduce air conditioning system maintenance by increasing the life of components and aiding in the diagnosis of system faults. APADS will reduce maintenance by protecting the refrigerant compressor and other related components from damage due to the effects of a loss of refrigerant or excessively high system pressure.

APADS will accomplish this by actively monitoring system conditions and by controlling the refrigerant compressor and thermatic engine fan. (APADS DOES NOT HAVE THE ABILITY TO CONTROL VISCOUS TYPE FANS.) APADS will aid in diagnosing air conditioning system problems by communicating to the technician existing or impending problems using "blink" codes.

The APADS components are designed and constructed for reliable use while withstanding vibration, pressure washing and exposure to the environment. Life of the APADS components is expected to exceed 5 years based on 4100 hours of time "on" per year.

## APADS

**THIS VEHICLE HAS  
HAD AN A/C  
PROTECTION  
SYSTEM ADDED  
SEE THE APADS  
CONTROL MODULE  
AT THE SURGE  
TANK MOUNTING  
BRACKET.  
FOR SERVICE  
INFORMATION  
REFER TO THE  
APADS KIT  
INSTALLATION  
BULLETIN IN THE  
VOLVO BINDER SET.  
P/N 3968798**

W8000813

Decal identifying vehicles with APADS Kit Installed.

A yellow decal is included in the kit that is to be installed on the radiator bracket next to the receiver/dryer. This decal will identify vehicles equipped with APADS.

### CAUTION

DO NOT USE TEST LIGHTS for testing circuits or components on APADS. Damage to the system or components could occur. When testing circuits or components on APADS, use only a digital multimeter, such as the Fluke model 87.

# Specifications

## APADS Pressure Switch Mounting

See also "APADS™ Kit Installation" page 1.

The pressure switches that are required for use with APADS have the same thread (10 mm suction and 12 mm discharge) as used on existing vehicles use an O-ring seal and should be tightened to  $16 \pm 1$  Nm ( $144 \pm 12$  in-lb).

**Note:** Use only O-rings that are compatible with the R134a system. These are usually light green in color.

## APADS Electrical Specifications

See also "APADS™ Kit Installation" page 1.

The APADS control module must be wired into the ignition circuit (not continuously powered) and must be protected by a 10 amp fuse that is wired in series with the power of the module.

Supply voltage, min . . . . .  $11.0 \pm .2$  volts

Supply voltage, typical . . . . . 13.5 volts

Supply voltage, max. continuous . . . . . 16.0 volts

Pressure switch resistance

Switch open . . . . .  $2490 \pm 30$  ohms

Switch closed . . . . . 0 ohms

Compressor clutch resistance

Clutch coil resistance (approx) . . . . . 2.5 to 3.5 ohms

Pressure switch open and close pressures

High pressure switch opens at . . . . . 20.7 bar (300 psi)

High pressure switch closes at . . . . . 17.9 bar (260 psi)

Low pressure switch opens at . . . . . 2.3 bar (34 psi)

Low pressure switch closes at . . . . . .55 bar (8psi)

## Design and Function

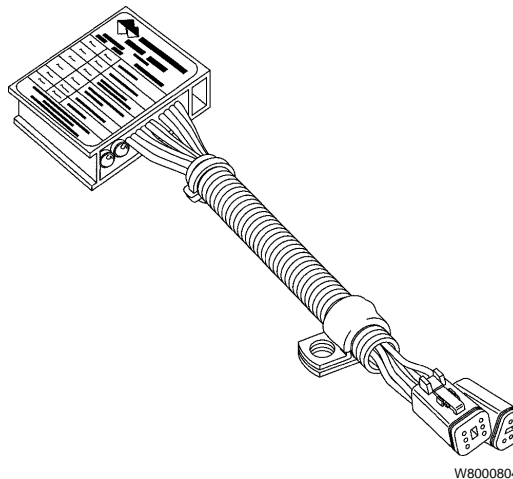
### APADS™ General

See also "APADS™ Kit Installation" page 1.

The APADS™ kit includes an electronic control module and two pressure switches that will be mounted under the vehicle hood. These components work in conjunction with the cold control switch (evaporator thermostat) that is located at the evaporator

**Note:** In the event it is necessary to replace the control module it is imperative that the module is replaced with a module with the exact same part number. This is due to different settings that affect fuel economy and fan run time.

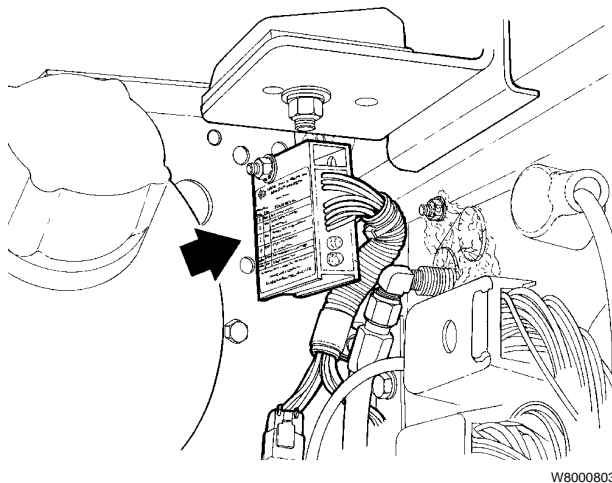
### APADS™ Control Module



The APADS control module

The control module controls all of the APADS functions. It has an internal circuit card that is "potted" for protection. The control module is not serviceable.

It will be installed under the hood on the driver side near the bulkhead secured to the surge tank bracket.



Control module mounted on surge tank bracket

The control module is equipped with two light emitting diodes (LED's). One of these LED's is red and the other is green. While operating normally (green), or if a problem is detected (red) by the APADS control module, a "blink" code is activated to identify the condition.

The control module has a decal located on the front with a brief explanation of the fault code descriptions. A detailed description of the "blink" codes and how to interpret them is included in "Blink Code Descriptions" page 11 section of this bulletin.

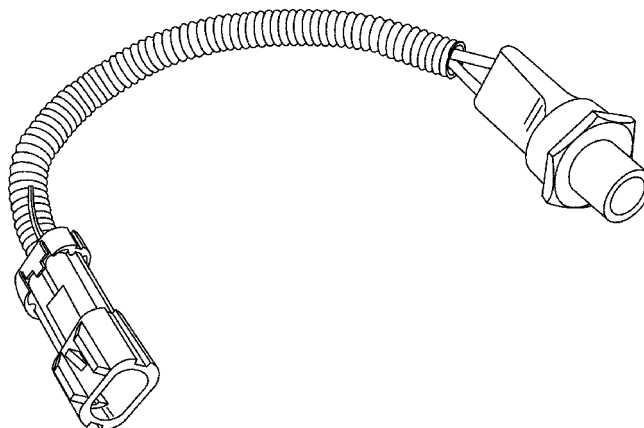
The control module has a built-in temperature sensor that measures ambient temperature around the module at the ignition cycle. The control module also has an internal clamping diode. Connections are made to the control module by two Deutsch weather proof connectors.

One of these connectors is a six-pin connector and the other is a four-pin connector and the other is a four-pin connector that is connected to the pressure switches. Refer to the chart below to identify each pin function.

APADS six-pin connector (APA) pin out		
Pin #	Function	Wire #
APA "1"	12 V to A/C compressor	301
APA "2"	12 V from ignition switch	307
APA "3"	Switched grd to thermatic fan	682
APA "4"	Grd to module	OR
APA "5"	Input from cold control switch	303
APA "6"	None	-

APADS four-pin connector (APB) pin out		
Pin #	Function	Wire #
APB "1"	Low pressure switch	692
APB "2"	Low pressure switch	693/680
APB "3"	High pressure switch	693
APB "4"	High pressure switch	681

## APADS™ Pressure Switches



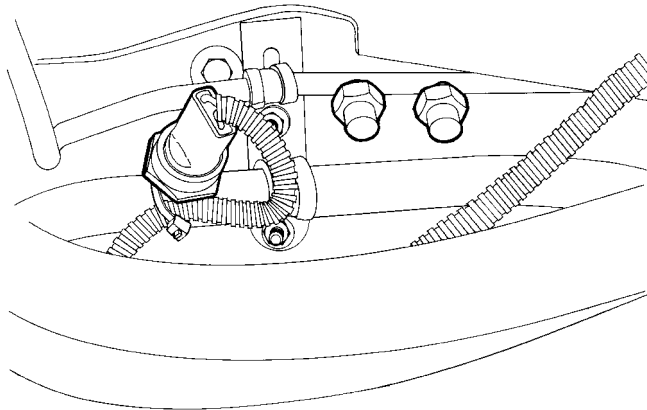
W8000805

The APADS pressure switch

The APADS “semi-smart” pressure switch is normally a closed pressure switch. The “semi-smart” pressure switch has an internal resistor installed in parallel with the electrical contacts that will allow the control module to detect the difference between a switch that is open but functioning properly and a circuit that is open due to a faulty switch or broken wire.

Physically the high pressure switch and the low pressure switch look almost identical. However, there are several ways to distinguish between them. The switches have different connector ends to prevent improper connection and different thread sizes to prevent incorrect installation. Also the open and close pressures are stamped into the metal base of the switch just above the wrench flats.

## Low Pressure Switch Function



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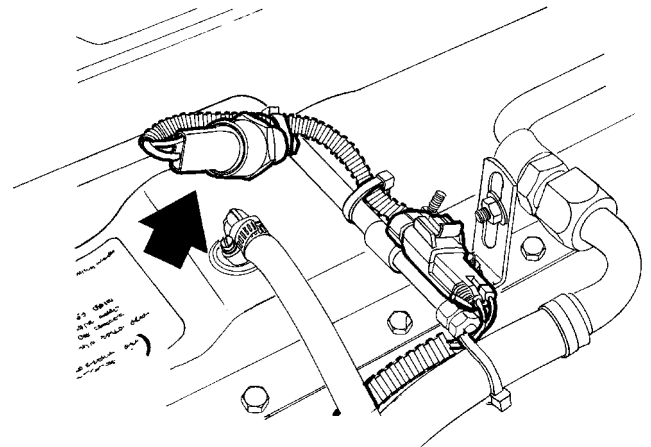
Low pressure switch location (typ)

**Note:** Low pressure switch location as shown is behind the passenger side front wheel in the wheel well areas.

The low side pressure switch is mounted behind the passenger side front wheel in the wheel well area on the suction side (low side) steel tube of the air conditioning system.

This is a normally closed pressure switch. When this switch opens, the control module detects  $2490 \pm 30$  ohms of resistance. This built in resistance signals to the control module that the system has sufficient pressure to operate normally. Should the switch wiring harness become "open" from damage or loss of connection, the control module will not detect the expected resistance and will show a fault using the appropriate red "blink" code.

## High Pressure Switch Function



W8000802

High pressure switch location (typ)

**Note:** High pressure switch location as shown above is over the radiator.

The high side pressure switch is mounted near the top center of the radiator on the discharge side (high side) steel tube of the air conditioning system. This is also a normally closed switch. When this switch opens due to high pressure the control module detects  $2490 \pm 30$  ohms of resistance. This built in resistance signals to the control module that the high pressure switch is operating properly and there are no wiring problems. It also signals the control module that the discharge pressure has reached the predetermined limit so the control module can send a signal to the start engine fan and shut down the voltage to the refrigerant compressor if needed.

## How APADS™ Works

Each time the vehicle is started and the ambient temperature is above the specified limit, APADS goes through several routines.

During one of these routines, APADS will not allow the refrigerant compressor to come on for the first 15 seconds after the ignition switch is turned on even if air conditioning is selected. This allows the engine RPM to stabilize and the batteries to recover to ensure the refrigerant compressor clutch has sufficient voltage.

Immediately after this delay, the refrigerant compressor is engaged for 15 seconds whether air conditioning is selected or not. This allows APADS to perform a diagnostic test on the air conditioning system and to circulate refrigerant and oil in the system to prevent the seals from drying out.

Under normal operation with air conditioning selected, APADS controls the refrigerant compressor and the fan function to regulate high pressure.

The low pressure switch, which is normally closed, opens to the built-in resistance when it is installed on an air conditioning system that is properly charged. In the event that the suction (low side) pressure drops below .55 bar (8 psi), the switch will close and the control module will sense the low pressure signal and interrupt the voltage to the refrigerant compressor clutch.

**Note:** There is a major difference between the low pressure switch and the high pressure switch other than the open and close pressures. The APADS control module recognizes low pressure when the low pressure switch closes. The APADS control module recognizes high pressure when the high pressure switch opens.

The high pressure switch is also normally closed and continues to remain closed until the discharge (high side) pressure exceeds 20.7 bar (300 psi). At this time the switch opens to the  $2490 \pm 30$  ohms of resistance. This signals the control module that the pressure has become too high. At this time the APADS control module activates the TE-742 fan temperature timer. Once the fan is activated the discharge pressure should begin decreasing. If the discharge pressure does not fall below 17.9 bar (260 psi) within 10 seconds, APADS will shut down the refrigerant compressor. The compressor will remain off until the discharge pressure is below 17.9 bar (260 psi). The fan will continue to run for a variable period of time which is determined by the fan temperature timer.

APADS controls the functions and prevents the refrigerant compressor from activating more than four times per minute. This is to prevent damage to the refrigerant compressor due to rapid clutch cycling.

## Control and Diagnostic Functions

### APADS Control Rules

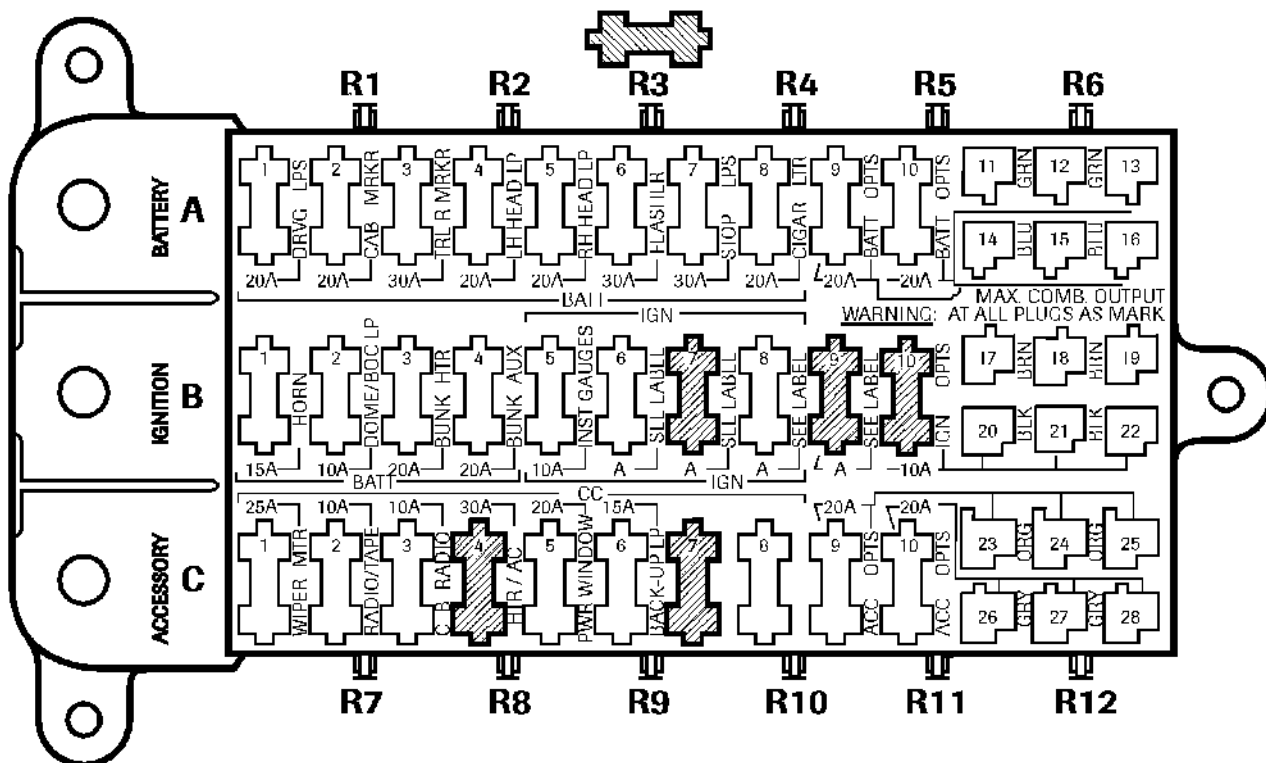
- 1 The air conditioning compressor is not allowed to run under any circumstances for the first 15 seconds after the ignition is switched on with the ambient temperature above  $-12^{\circ}\text{C}$  ( $10^{\circ}\text{F}$ ).
- 2 Cold control switch input is ignored and the air conditioning compressor is turned on for 15 seconds immediately after rule 1 has been completed. If the high or low pressure switches indicate out of limits or fault conditions, the compressor is turned off.
- 3 All three inputs (cold control switch, high pressure switch and low pressure switch) that can control the air conditioning compressor are governed by control logic that limits the maximum compressor cycle rate of four times per minute.
- 4 The cold control switch is the primary control input. The air conditioning compressor will cycle at the frequency governed by the cold control switch, but is limited to a maximum of four cycles per minute. See rule 3 above.
- 5 When the high pressure switch indicates a high pressure condition, the refrigerant compressor is allowed to stay on for a variable period of time no greater than 10 seconds. The compressor is allowed to turn back on after the high pressure switch resets and rule 3 is satisfied.
- 6 When the low pressure switch indicates a low pressure condition, the refrigerant compressor is shut down. The compressor is allowed to restart after the low pressure switch resets and rule 3 is satisfied.
- 7 If the supply voltage drops below  $11.0 \pm .2$  volts, the compressor is shut down. The compressor is allowed to restart again after there has been a sufficient rise in the system voltage.
- 8 The refrigerant compressor is latched off until the next ignition cycle if the high pressure fault occurs. The high pressure fault occurs when the high pressure switch cycles the compressor eight consecutive times during one fan cycle.

### Engine Fan Control

APADS signals the TE-742 temperature timer on the engines with solenoid operated engine fans. This capability allows APADS to keep the air conditioning discharge pressure low. APADS cannot control the fan on engines equipped with viscous fans.



## APADS Fuse Locations



W8000815

APADS Fuse Locations		
Location	Amperage	Function
C4	30	Heater
C7	7.5	Air conditioning

List of possible thermatic fuse locations			
Location	Amperage (Existing)	Amperage New	Function
B7	2 amp	10 amp	On/off fan control
B9	2 amp	10 amp	Combi relay & VE D12 Thermostatic fan or CAT, Cummins fan stat
B10	2 amp	10	Unlisted
R3	2 amp	10	Unlisted

**Note:** Fuse location for the thermatic fan can be identified by the "307" wire. The existing fuse to the "307" wire is to be replaced with a 10 amp fuse. Fuse should be at one of the locations shown in the chart above.

**Note:** If the fuse to the "307" wire is blown, it will be indicated on the APADS control module by a very fast, very faint flashing green LED. See the Troubleshooting section of this bulletin under Green LED — Blinking rapidly.

# Troubleshooting

## APADS™ Fault Codes

See also “APADS™ Kit Installation” page 1.

APADS Faul Code Quic Reference Table		
LED blinks	Fault code name	Faul description
1 red	Low refrigerant pressure	Partial or complete loss of refrigerant charge
2 red	High refrigerant pressure	Overcharge, restriction on high side or low air flow through condenser
3 red	Compressor clutch circuit	Compressor clutch/wiring open or shorted
4 red	Pressure switch wiring	Open wire to high or low pressure switch
No LED lights	Power supply	Fuse blown, no electrical connection to APADS module or faulty APADS module
Rapid green	Low voltage	Low voltage to APADS control module
Red off Slow green blink	No faults	No faults detected Control module functional

## Introduction

APADS senses and warns of faults in the air conditioning system. These faults are indicated by “blink” codes from the red and green LED’s located on the APADS control module. By using the Fault Code Quick Reference Table above, the “blink” codes can be interpreted into fault identification. The information below will allow the technician to identify and correct a problem, should it occur.

**Note:** When using an ohm meter to test for resistance, the ignition switch must be off. When testing for voltage, the ignition switch must be on.

## Fan Runs Continuously

The fan requires source voltage and a ground to the fan solenoid to shut the fan off. To start the fan APADS must interrupt the ground or the TE-742 fan temperature timer switch must interrupt the source voltage to the solenoid. If the fan remains on continuously, check the following:

- Fuse “B7,” “B9,” “B10,” or “R3”
- TE-742 temperature control switch
- Wiring and connections
- Thematic fan solenoid
- Air supply
- Fan clutch

## Blink Code Descriptions

See also “APADS<sub>TM</sub> Kit Installation” page 1.

The ignition switch must be on the observe all diagnostic messages. The green LED may remain illuminated constantly for the first 30 seconds of operation

## No LED Lights with Ignition Switch On

- No voltage to APADS control module
- CAT/Cummins/Detroit check fuse at “B7” (See note below)
- VOLVO check fuse at “R3” (See note below)
- Check for voltage at pin 2 on the six-pin connector
- Check for ground at pin 4 on the six-pin connector

**Note:** If the “B7,” “B9,” “B10,” or “R3” fuse is bad, the thermatic fan will run continuously.

## Green LED — Blinking Slowly

- No faults have been detected
- APADS control module is receiving sufficient voltage
- Blinking slowly means green LED “on” about 2 seconds the “off” momentarily

**Note:** If the ambient temperature sensed by the APADS control module is below  $-12^{\circ}\text{C}$  ( $10^{\circ}\text{F}$ ), the APADS control module will prevent the refrigerant compressor from engaging. This is to prevent compressor damage due to a lack of proper in colder temperatures.

If the green LED is blinking slowly, the fan is on continuously and the compressor will not engage, the high pressure switch may be stuck in the open position. Verify the pressure reading on the high side below 17.9 bar (260 psi). Refer to the R134a manual. If pressure is within limit, test the switch with an ohm meter. Refer to the wiring diagrams and the specifications for proper readings.

If the green LED is blinking slowly but the compressor doesn't engage, check the two fuses “C4” and “C7.” If the fuses are good, the APADS control module may not be receiving the required battery voltage from the cold control input. Refer to the appropriate wiring diagram with this bulletin.

If pin 5 of the six-pin connector is receiving battery voltage and the compressor still doesn't engage, the APADS control module may be defective.

## Green LED — Blinking Rapidly

- Low voltage
- Blinking rapidly means the green LED will flash “on” and “off” about twice per second
- The APADS control module is not receiving the minimum  $11.0 \pm .2$  ignition voltage at pin 2 or resistance is present at pin 4 at the six-pin connector. Refer to the wiring diagram.

**Note:** A very fast, very faint flashing green LED is an indication of a blown fuse at the APADS module power supply. Check for proper voltage at the “307” wire that supplies power to the APADS control module. This condition should not be confused with the Green LED — Blinking rapidly fault code that is described above.

## Red LED — One Blink

- Low refrigerant pressure
- Rapid low pressure switch cycling
- Low pressure switch closed for extended time

When the air conditioning system exhibits conditions that indicate a loss of refrigerant, the low pressure fault is activated and the red LED blinks. This fault code may be displayed if APADS monitors rapid low pressure switch cycling, which is a symptom of a partial loss of refrigerant. A minimum of 40 consecutive cycles within a programmed period of time during one ignition cycle are required for this fault to be activated.

Another way this fault may be displayed is if the APADS control module monitors a closed low pressure switch for an extended period of time. This would indicate a complete loss of refrigerant. In both instances, low pressure is detected and the compressor is prevented from engagement. Air conditioning pressure gauges should be installed and the pressure observed. Refer to the R134a service manual for proper gauge readings, component diagnosis, leak detection procedures and repair methods. If the test pressure observed on the low side remains above 2.3 bar (34 psi) but the compressor will still not engage, test the low pressure switch with an ohm meter. Refer to the “Schematic” page 18 and “APADS Pressure Switch Mounting” page 4 in this bulletin for proper readings.

## Red LED — Two Blinks

- Excessively high pressure
- Fan failing to engage
- Restriction exists
- Condenser air flow restricted
- Refrigerant overcharge

This code may be displayed if the APADS control module monitors high pressure switch rapid cycling while the thermatic fan is engaged. This fault may be displayed if the fan fails to engage, if a restriction exists, if the condenser air flow is restricted or if the system has been overcharged with refrigerant. Verify pressures. Refer to the R134a manual. If fan is inoperative, refer to the wiring diagrams.

## Red LED — Three Blinks

- Excessive current flow to the compressor clutch
- Open circuit to the compressor clutch
- This code may be displayed when the APADS control module senses excessive current flow to the compressor clutch or an open circuit to the clutch. This code will only be activated if the problem exists when the control module engages the compressor clutch. If the problem occurs while the compressor is engaged, the APADS control module WILL NOT detect the fault. This may be caused by certain intermittent wiring or connection problems. Check wiring and connectors for “opens” or “shorts” to ground between the APADS the APADS control module and the air conditioning clutch. Refer to the wiring diagrams. Be certain not to overlook any ground wiring or connections. If no faults are found, use an ohm meter to test the resistance of the clutch coil. Resistance should be between 2.5 and 3.5 ohms (approx). Replace the compressor clutch if required.

## Red LED — Four Blinks

- Pressure switches or circuit
- Unseated wiring connector
- Open in the wiring harness
- Defective switch
- Wrong switch

**Note:** APADS requires “semi-smart” pressure switches with a built in resistor. No other switches may be substituted.

This fault is displayed any time the APADS control module detects an open circuit to either the low or high pressure switch. This may be caused by an unseated wiring connector, a break in the wiring harness, a defective switch or an incorrect switch installed.

Visually check for damaged wiring, damaged connectors and loose connectors.

Use an ohm meter to check the low pressure switch while the switch is still installed on the system. Resistance should be  $2490 \pm 30$  ohms.

Test the high pressure switch with an ohm meter. Resistance should be 0 ohms.

If both switches test within the specifications, these test should be repeated through the Deutsch four-pin connector to verify the wiring condition. Refer to the “Schematic” page 18 included in this bulletin. If no faults are found to this point, a faulty resistor in the high pressure switch may be the cause. Clear the coded and operate the air conditioning while observing the air conditioning pressures. If the code resets and the compressor disengages at approximately 20.7 bar (300 psi), the high pressure switch is the cause and must be replaced.

## Service Procedures

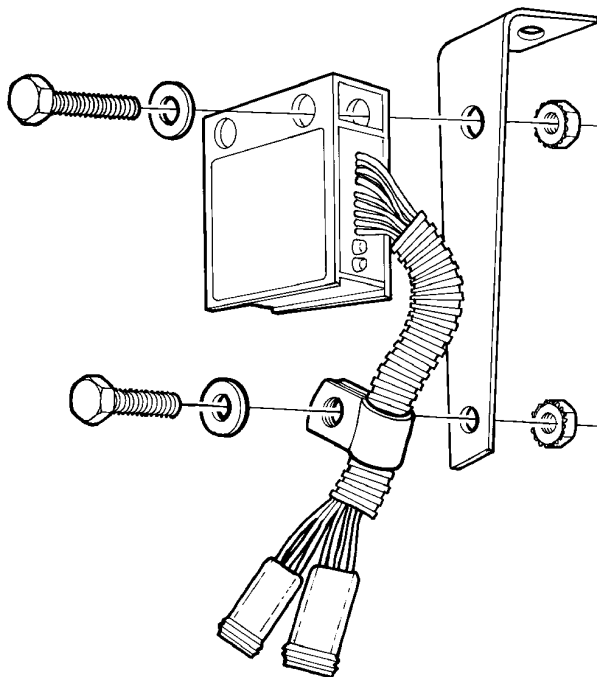
### APADS™ Kit, Installation

See also "APADS™ Kit Installation" page 1.

**Note:** Be sure the ignition switch is in the "OFF" position before beginning the APADS kit installation.

**Note:** The air conditioning system should be in good working order and any necessary repairs are made before installing the APADS kit.

1



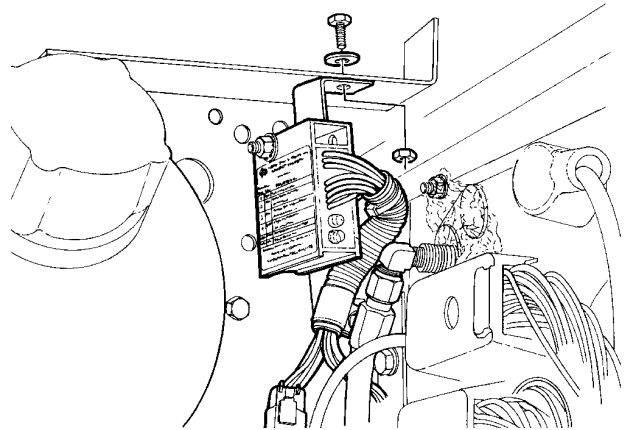
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Install the APADS module to the mounting bracket using the provided 1/4 inch x 1-3/4 inch long bolt, flat washer, star washer and nut. See the illustration above.

2

Use the rubberized wire clamp to attach the wiring harness to the mounting bracket using a 1/4 inch x 1 inch long bolt, flat washer, star washer and nut. See the illustration in Step 1 above.

3



W8000816

Using a 1/4 inch x 1 inch long bolt, flat washer, star washer and nut, install the APADS module and bracket assembly to the surge tank bracket.

**Note:** The APADS module and bracket assembly should be rotated slightly so the LED's and the blink code descriptions can be seen easily.

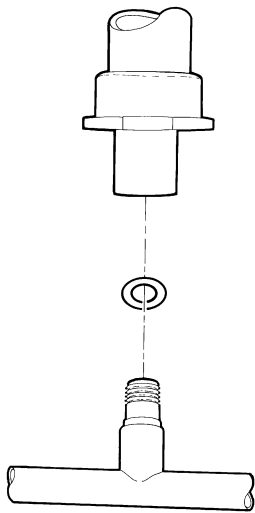
**Note:** Be sure the APADS module is not contacting the hood support. It may be necessary to carefully bend the APADS mounting bracket slightly to prevent contact.

4

Locate the high pressure switch. This is the pressure switch that is located between the air conditioning compressor and the condenser. Unplug the pressure switch from the truck wiring harness. Then remove the pressure switch and the O-ring.

**Note:** If there is more than one switch port on the pipe between the refrigerant compressor and the condenser, install the APADS high pressure switch on the port nearest the condenser. Use one of the port caps included in the kit cap the remaining port.

5



W8000818

Install a new HNBR O-ring and the new APADS high pressure switch. Using an inch pound torque wrench and a 1-3/16 inch crowfoot, torque the pressure switch to  $16 \pm 1$  Nm ( $144 \pm 12$  in-lb). Leave the wire connector loose at this time.

**Note:** Use a small amount of mineral oil to lubricate the HNBR O-ring prior to installation.

6

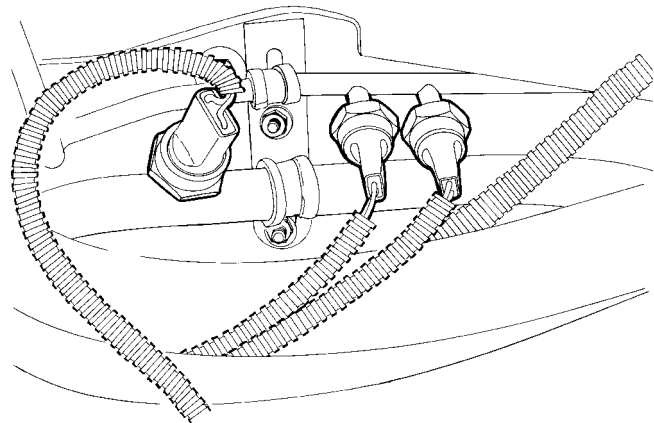
Remove the cover that is over the switches behind the passenger side front wheel in the wheel well area.

**Note:** Switch cover may be metal or plastic

7

Remove the existing clamps and plastic ties holding the wiring connectors and switches.

8



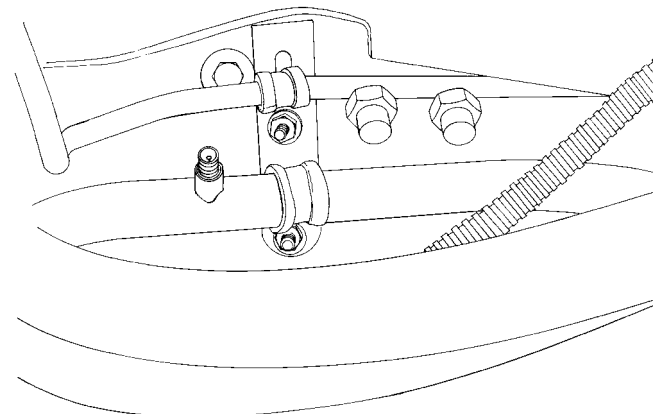
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Disconnect the connectors from the pressure switches to the wiring harness and remove all three pressure switches.

9

Use a plastic tie strap and tie the two-pin Deutsch connector up to the wiring harness. It will no longer be used. The two remaining connectors will be used later.

10

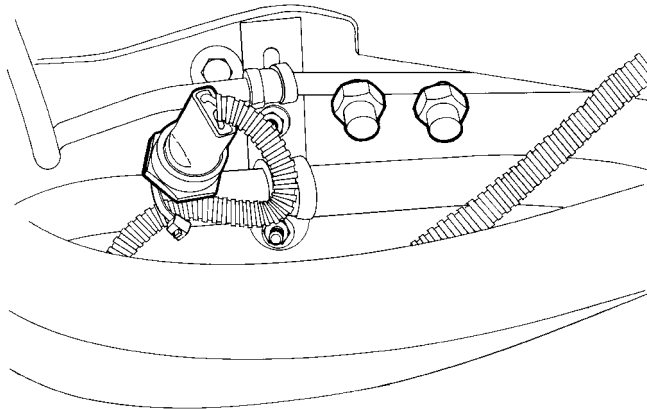


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Install the port caps on the two high pressure ports. These are the two ports on the high pressure pipe at the fender well area where the high pressure switches were removed in step 8.

**Note:** Use a small amount of mineral oil to lubricate the O-rings before installing the port caps.

11

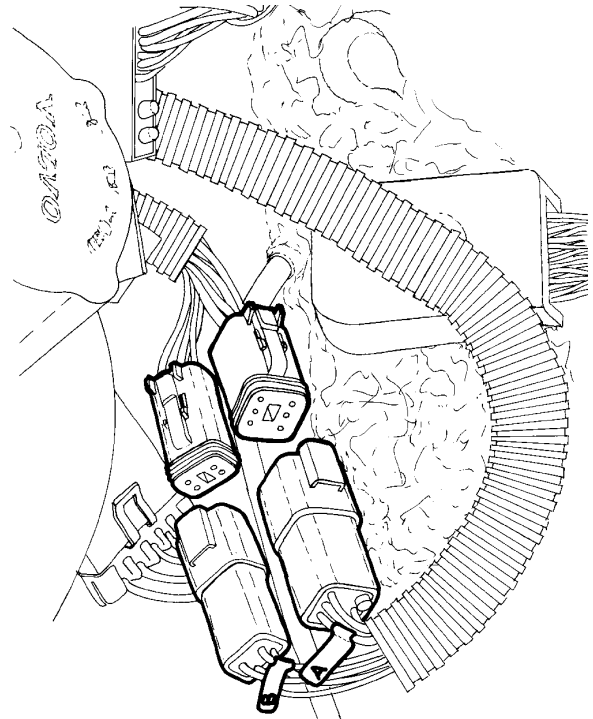


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Install a new O-ring and the APADS low pressure switch on the low pressure port. This is the port on the low pressure pipe at the fenderwell area. Torque the low pressure switch to  $16 \pm 1$  Nm ( $144 \pm 12$  in-lb) using an inch pound torque wrench and a 1-3/16 inch crowfoot.

**Note:** Use a small amount of mineral oil to lubricate the HNBR O-ring prior to installation.

12



W8000808

Begin installing the wiring harness by finding the connectors labeled "A" and "B." Route these connectors behind the surge tank bracket and up to the APADS module. Plug connector "A" into the six-pin Deutsch connector at the APADS module. Then plug the connector labeled "B" into the four-pin Deutsch connector at the APADS module.

**Note: VOLVO engines**

When installing the APADS kit on a vehicle with a VOLVO engine, the wiring harness is to be routed along the drivers' side frame rail. Install the clamps and tie straps as necessary to secure the wiring harness and prevent it from being damaged. The wiring harness should then be routed up along the fan shroud to make the connection with the APADS high pressure switch.

**Note: CAT, Cummins and Detroit engines**

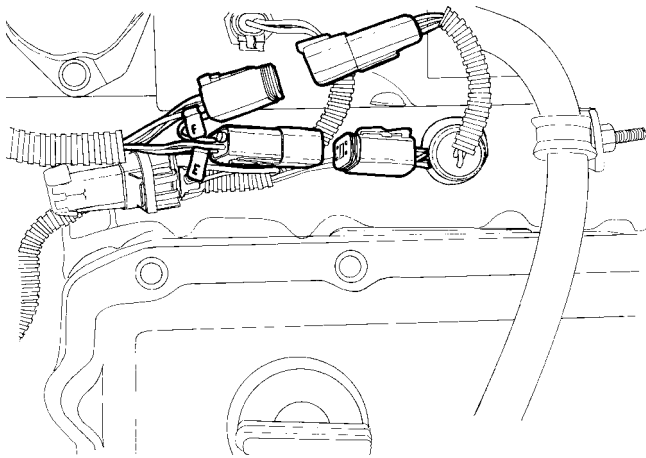
When installing the APADS kit on a vehicle with a CAT, Cummins or Detroit engine, the APADS wiring harness should be routed to follow the main engine harness along the engine and out to the fan shroud. Use tie straps and clamps to properly secure the APADS wiring harness.

**13**

Locate the connectors on the wiring harness labeled "C" and "D." Plug the APADS high pressure switch connector into connector "C." Then plug connector "D" into the truck wiring harness connector left open when the high pressure switch was removed.

**Note:** Depending on the engine variation, it may be necessary to use the jumper harness provided in the kit.

**14**

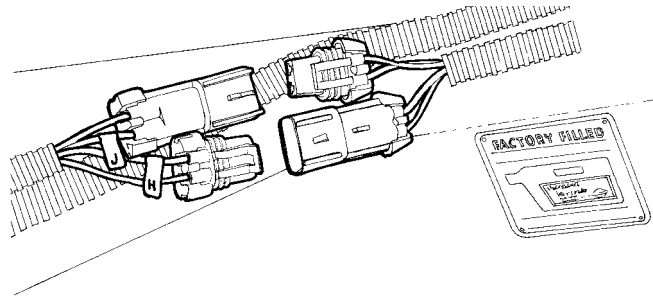


Disconnect the four-pin Deutsch connector at the on/off fan temperature timer switch. Locate the connectors on the wiring harness labeled "E" and "F." Plug the connector labeled "E" together with the existing male connector in the truck harness that was disconnected previously. Then plug the connector labeled "F" into the connector coming from the temperature timer switch.

**15**

Locate the connector on the wiring harness labeled "G." Plug this connector together with the connector from the APADS low pressure switch.

**16**



Locate the connectors labeled "H" and "J." Plug connectors "H" and "J" into the connectors that were left open when they were unplugged from the switches in Step 8.

**17**

Secure the wiring harness using the tie straps and clamps as necessary to keep it protected.

**Note:** On some applications it may be necessary to double the wiring harness to take up some of the extra wire.

**18**

Reinstall the cover over the APADS low pressure switch at the passenger side wheel well area.

**19**

Locate the "307" wire in the fuse panel and change the 2 amp fuse to a 10 amp fuse.

**Note:** Refer to the APADS fuse location charts on Page 8.

**20**

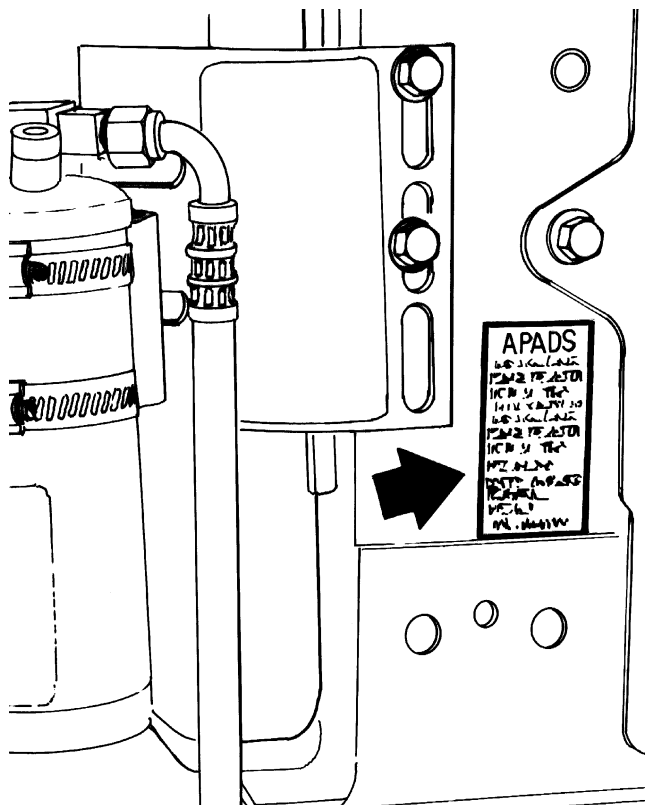
Turn the ignition switch to the "on" position, wait approximately 30 seconds and listen for the air conditioning clutch to engage. Check the LED on the APADS module. It should have a slow green blink — approximately 2 seconds "on" and then "off" momentarily.



**21**

Start the engine, turn the air conditioning on maximum and allow the engine to run at least until the first fan cycle. Check to be sure there are no red "blink" codes and no rapid ("on" and "off" about twice per second) green "blink" codes. If only the slow green LED is blinking the APADS is working properly.

**22**



W8000814

Install the APADS decal that is included in the kit. This decal is to be installed on the radiator bracket near the receiver/dryer. It should be installed on a clean surface that is free of dust, dirt, grease, oil and solvents.

# Schematic

See also "APADS™ Kit Installation" page 1.

