2.5-3″ GENERIC POSITIVE AIR SHUTOFF

P/N#	1036731
P/N#	1036731-M
P/N#	1036730
P/N#	1036730-M

PLEASE READ ALL INSTRUCTIONS BEFORE INSTALLATION

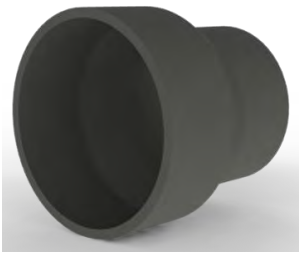
PAS FOR 12 VOLT SYSTEMS ONLY

BD Engine Brake Inc.
Plant Address: 33541 MacLure Rd. Abbotsford, BC, Canada V2S 7W2
U.S. Shipping Address: 88-446 Harrison St, Sumas, WA 98295 U.S. Mailing Address: P.O. Box 231, Sumas, WA 98295
Phone: 604-853-6096 | Fax: 604-853-8749 | Internet: www.bd-power.com

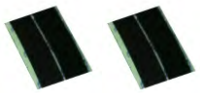
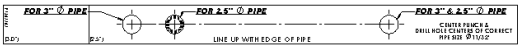
KIT CONTENTS:

Please check to make sure that you have all the parts listed in this kit ***before*** you start the disassembly of your truck.

1036731 (2.5") KIT CONTENTS

1302300	1302248	1302272
		
Air Shutoff Valve	*Wiring Harness*	*2.5-3.25" Silicone Boot*
Qty: 1	**Qty: 1**	**Qty: 2**

1306720	1407030	1405209	1302285
			
Electronic Module	*0350 Clamps*	*0300 Clamps*	*Solder*
Qty: 1	**Qty: 2**	**Qty: 2**	**Qty: 5"**

1800060	1302281	1302282	1301381
			
Velcro strips	*2.5" PAS Bead Ring*	*PAS Drill Template*	*Heat Shrink*
Qty: 2 x 4"	**Qty: 2**	**Qty: 2**	**Qty: 3"**

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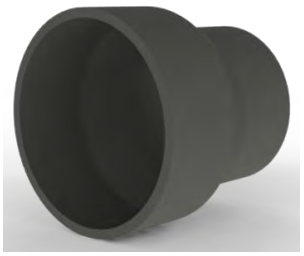
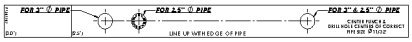
1036731-M (2.5”) KIT CONTENTS

1302300	1302249	1302272
		
Air Shutoff Valve	*Wiring Harness*	*2.5-3.25” Silicone Boot*
Qty: 1	**Qty: 1**	**Qty: 2**

1302281	1302282	1407030	1405209
			
2.5” PAS Bead Ring	*PAS Drill Template*	*0350 Clamps*	*0300 Clamps*
Qty: 2	**Qty: 2**	**Qty: 2**	**Qty: 2**

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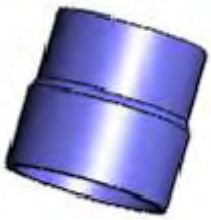
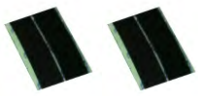
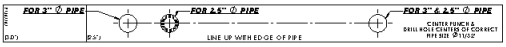
1036730 (3”) KIT CONTENTS

1302300	1302248	1405404
		
Air Shutoff Valve	*Wiring Harness*	*3-3.25” Silicone Boot*
Qty: 1	**Qty: 1**	**Qty: 2**

1306720	1405211	1407030	1302285
			
Electronic Module	*0325 Clamps*	*0350 Clamps*	*Solder*
Qty: 1	**Qty: 2**	**Qty: 2**	**Qty: 5”**

1800060	1302280	1302282	1301381
			
Velcro strips	*3” PAS Bead Ring*	*PAS Drill Template*	*Heat Shrink*
Qty: 2 x 4”	**Qty: 2**	**Qty: 2**	**Qty: 3”**

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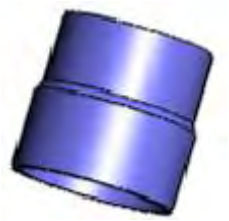
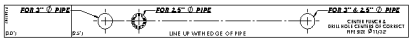
1036730-M (3”) KIT CONTENTS

1302300	1302249	1405404
		
Air Shutoff Valve	*Wiring Harness*	*3-3.25” Silicone Boot*
Qty: 1	**Qty: 1**	**Qty: 2**

1302280	1302282	1405211	1407030
			
3” PAS Bead Ring	*PAS Drill Template*	*0378 Clamps*	*0350 Clamps*
Qty: 2	**Qty: 2**	**Qty: 2**	**Qty: 2**

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WELCOME

Thank you for purchasing a BD positive air shutoff. This manual is divided into different areas to assist you with your installation and operation of your positive air shutoff.

This product is a safety product and should be tested often.

Installation should occur on a vehicle properly secured to prevent rolling.

TABLE OF CONTENTS

REQUIRED TOOLS

- Frequency/Voltmeter (Optional)
- Drill
- 1/8"/ 11/32" Drill Bit
- 1/2" Unibit
- Electrical Tape
- Soldering Iron
- Air or Manual Ratchet
- 7/16", 1/2" Sockets
- Wire Strippers/Cutters
- Wire Crimpers
- Heat Gun
- Rubbing Alcohol

MAINTENANCE

The only maintenance required is to test the valve operation at regular intervals. Please see the testing section later in the manual for the correct procedure.

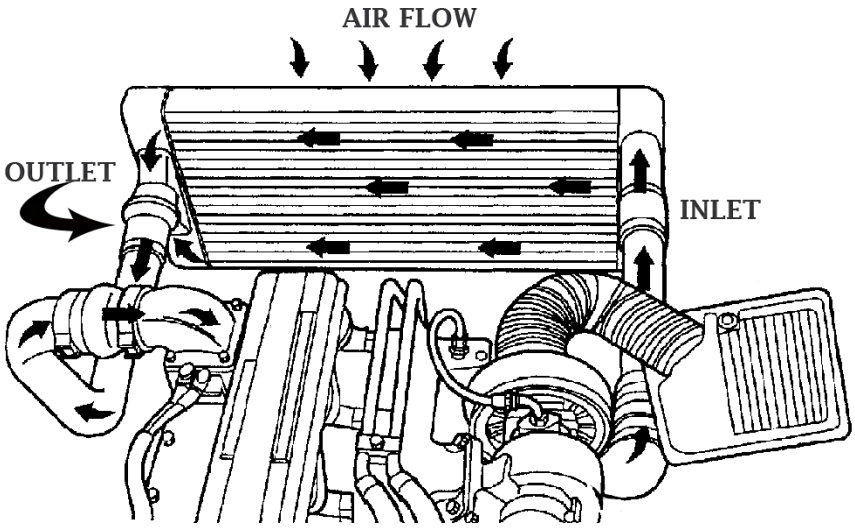
INSTALLATION with OVER SPEED ELECTRONICS (1036730 & 1036731)

VEHCILE SHOULD BE SAFELY SECURED BEFORE INSTALLATION.

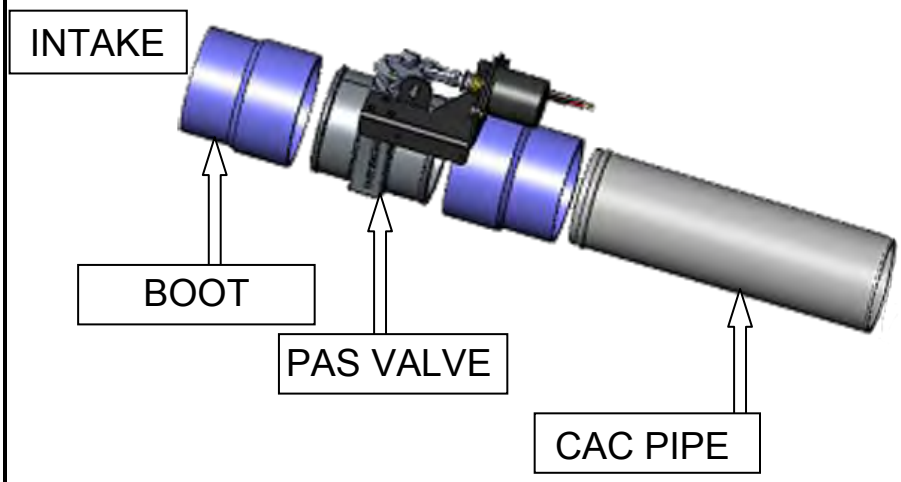
1. Block the wheels of the vehicle to prevent the vehicle from rolling.

   Open the hood.

2. Remove the charge air cooler pipe from the outlet side of the cooler.



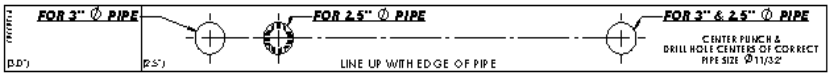
3. You may need to cut down your CAC outlet pipe before installing the bead ring to allow for the installation of the positive air shutoff valve.

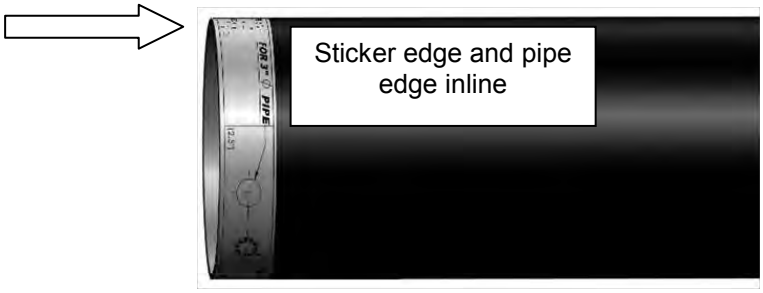


4. Remove backing from drill template sticker and wrap around pipe. The edge of the sticker should line up with the edge of the pipe.

   For a 2.5” pipe the sticker should wrap around the pipe, and end at the 2.5” diameter line on the sticker.

   For a 3” pipe the sticker should wrap perfectly around the pipe, the start of the sticker should meet the end of the sticker.

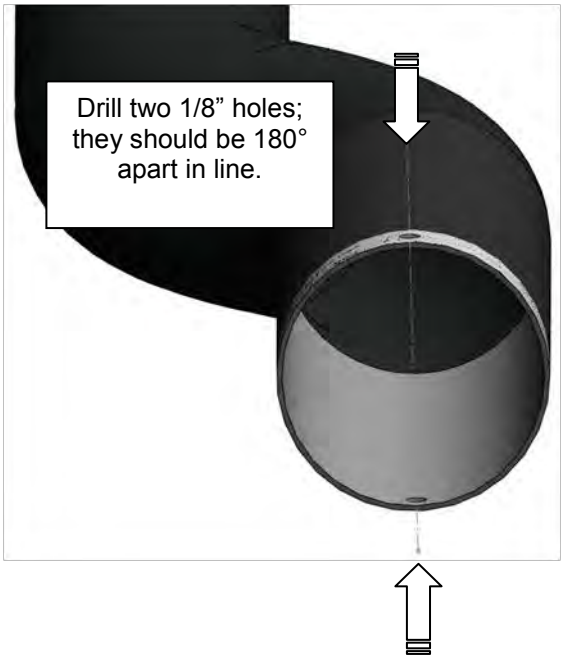




5. With the sticker in place use a center punch and then use a Ø1/8” drill bit and drill a hole in the center of the holes marked for the 2.5” or 3” pipe size.

   Once complete the two holes should be perfectly 180° in line with each other through the pipe.

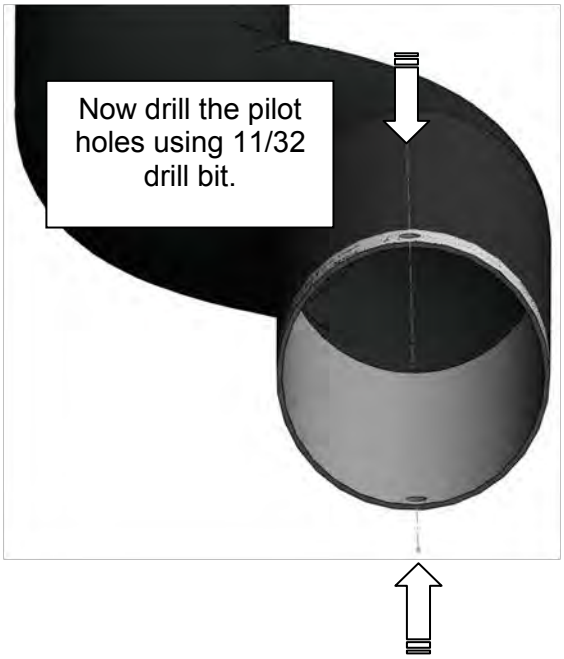
   DO NOT DRILL COMPLETELY THROUGH THE PIPE AND OUT THE OTHER END. YOU WILL NEED TO DRILL ONE SIDE THEN ROTATE, AND THEN DRILL THE OTHER SIDE.



6. Once the pilot holes are drilled you will need to drill a Ø11/32” hole through the pilot holes.

   You can now remove the sticker.

   You must deburr the inside of the drilled holes.



7. Once the holes are drilled, install the ring bead around the pipe. Lock each end of the ring bead into each hole.

   You can use needle nose pliers to tweak or adjust the ring fit slightly.

   Be careful not to bend the ring bead too much as you will weaken it.

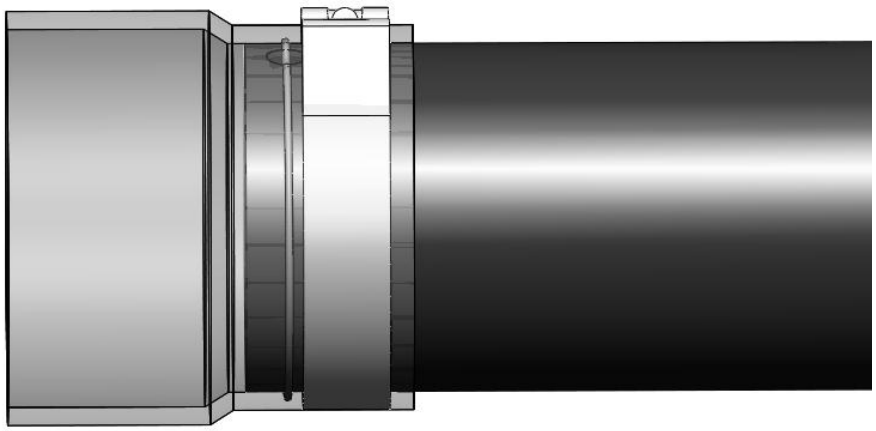
   Note the ring bead does not have to be perfectly tight or snug around the pipe, as we will be installing a silicone boot over top of it.

   With the ring bead in place, you should not be able to pull the ring bead off axially from the tube.

8. Now slip the small side of the boot over the bead ring and pipe assembly.

Secure the boot with the supplied clamp (0300 for a 2.5” pipe) or (0325 for a 3” pipe). Note that there should be about 3/4”-1” of boot material after the bead ring.

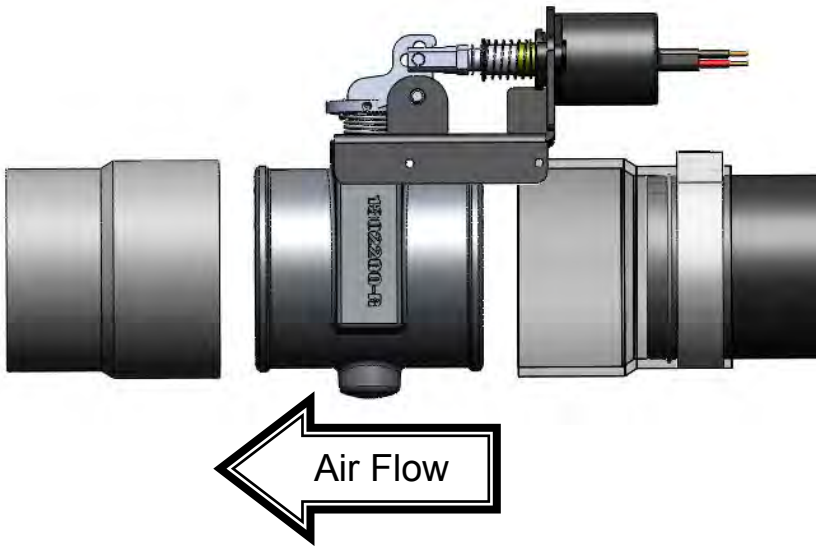
Tighten the clamp till the spring bottoms out.



9. You can now install the valve into the open 3.5” section of the boot. Use the 1407030 (0350) spring clamp to secure this connection.

Install the 2nd 1405404 boot on the other side of the valve. Secure this connection again with the 1407030 (0350) spring clamp.

Tighten all clamps until the spring bottoms out.



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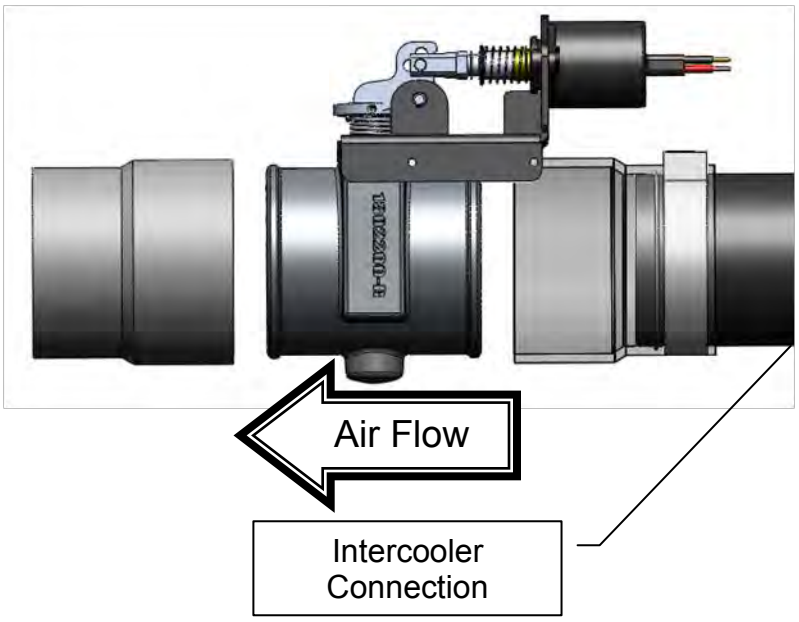
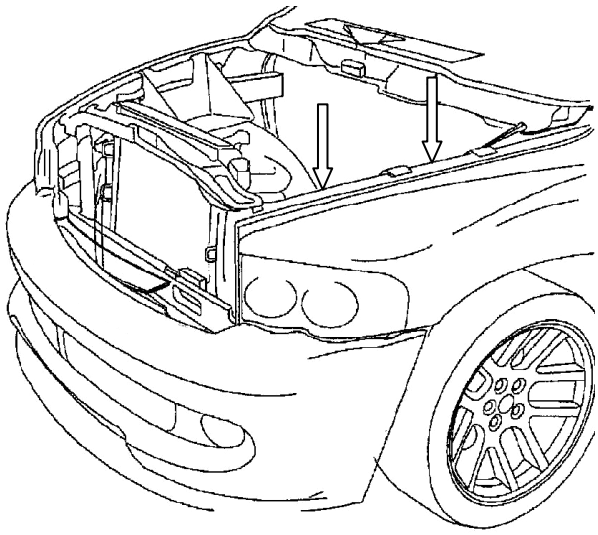
10. Finally, reinstall the PAS and pipe assembly back into the truck; securing the intercooler end first. Then using the supplied clamp secure the intake end.



11. Under the hood locate a mounting position away from any heat source for the electronic module using the supplied Velcro to fasten the module in place.

    Be sure to clean both surfaces with rubbing alcohol before you apply the Velcro.



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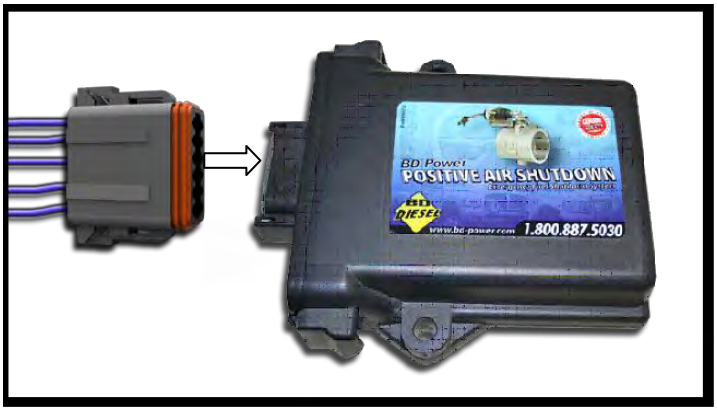
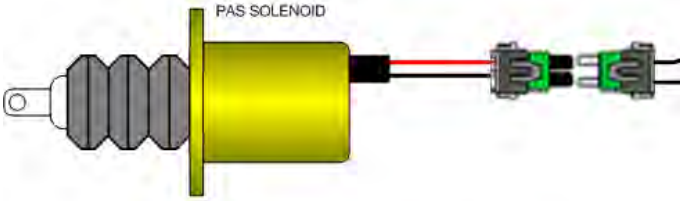
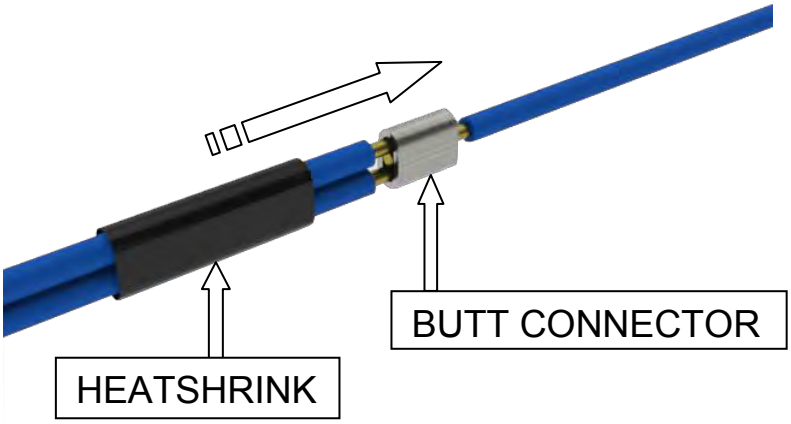
12. Next plug in the harness to the module and lay out the harness over the engine bay and run the violet wire to the solenoid.



13. Locate the PAS valve solenoid connector. Then butt connect the violet wires from the switch & solenoid to the violet wire from the module and heat shrink the connection.



NOTE: You will need to slip the heat shrink over the wires before you crimp the butt connection.



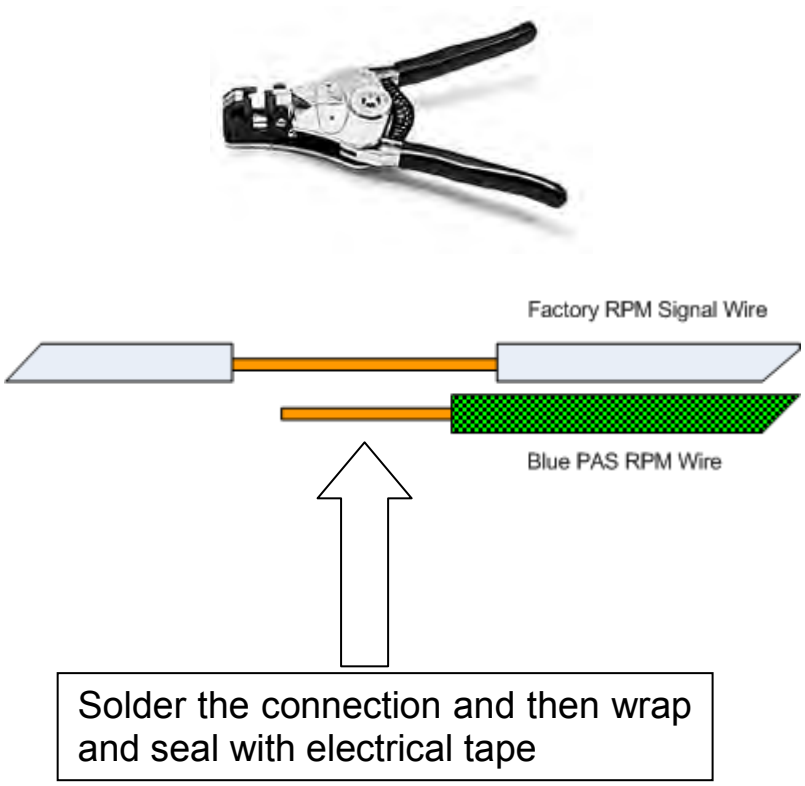
14. Under the hood locate the ECM / PCM / or Crankshaft wire. Being that the RPM signal is critical you will need to solder the connection.

    Using wire strippers create a 1” window/gap in insulation of the wire.

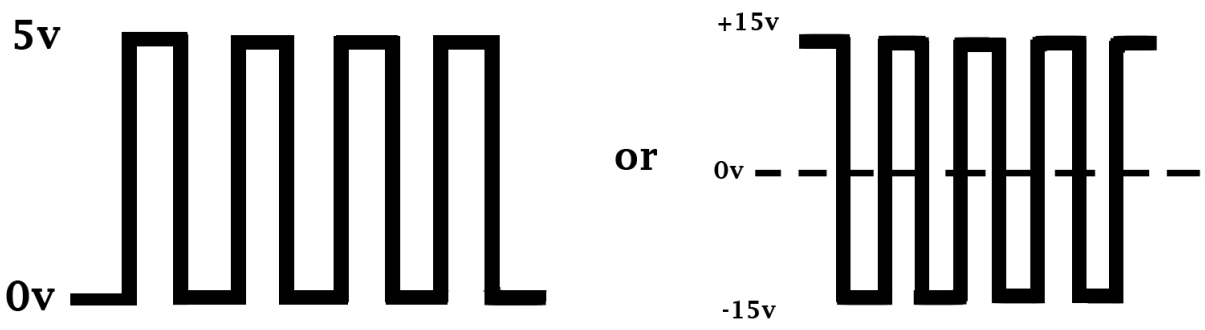
    Then strip about 1” of insulation of the RPM signal wire of the BLUE wire from the PAS wiring harness.

    Wrap the copper wire around the factory RPM signal wire and solder this connection.

    Then use electrical tape to wrap this connection so that it is water tight.You can also cut the factory crank signal wire and use heat shrink tubing if you like.



If you do not know which wire to tap for the crank signal you may check the wires at the crank sensor to determine the signal wire. The sensor will put out an alternating signal as shown below. The signal frequency will increase and decrease according to RPM.
A multi meter which is capable of measuring AC hertz (frequency) will be required to measure the signal frequency.

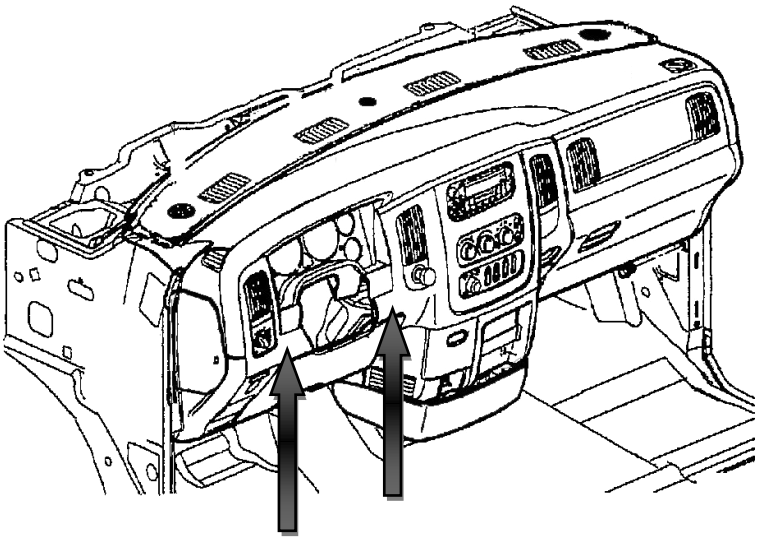


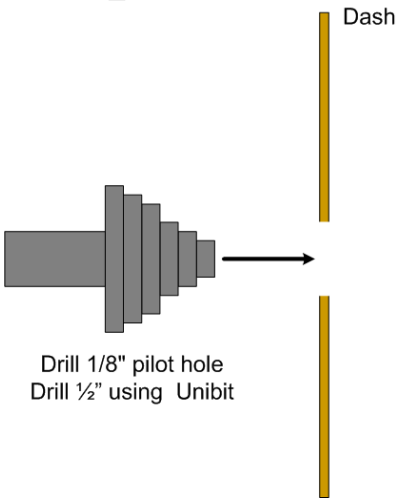
15. Next route the switch wires through the firewall, choosing a highly visible location so the switch is easily accessible by the driver.

NOTE: you may need to trim the switch wires to length once you have located where the switch is to be mounted.

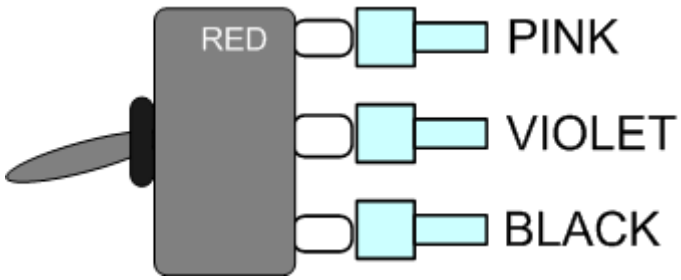
Using a 1/8" drill, drill a pilot hole in the location you have selected for the switch to be mounted.

Finally using a ½" UNIBIT drill bit, drill an exact ½" round hole.





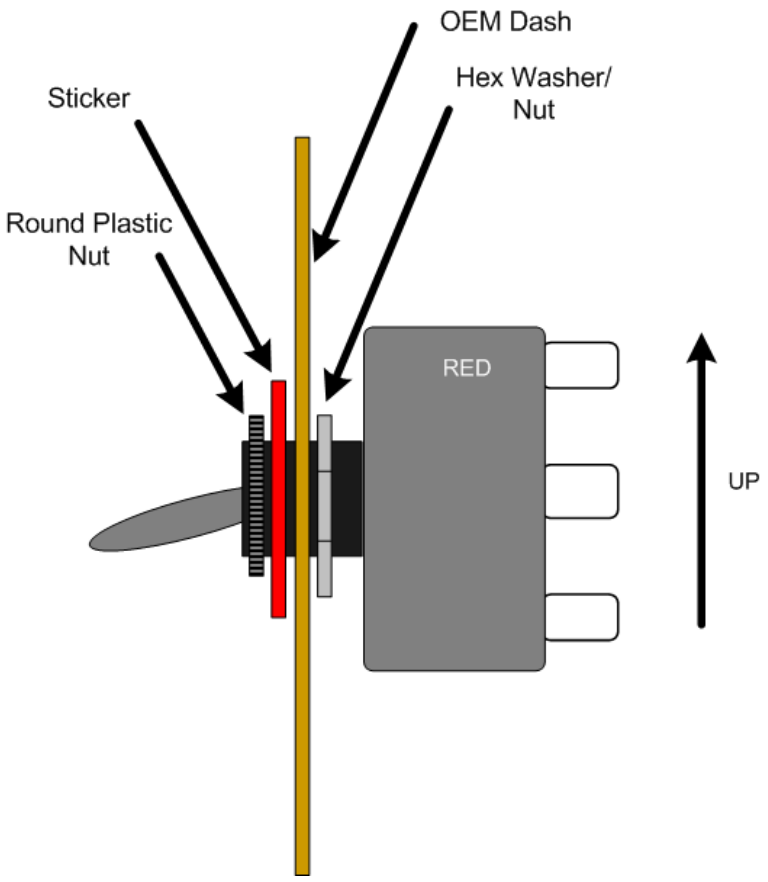
16. Once you have the mounting hole drilled, crimp the switch connectors to the switch wires and install the correct switch wires to the correct switch terminals then insert the switch into the dash from the backside.



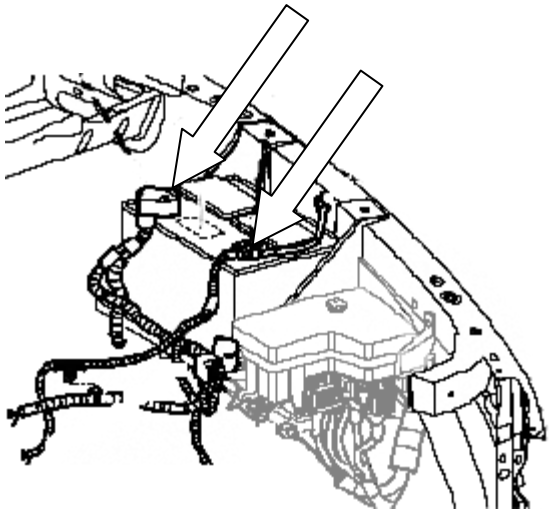
17. Mount the switch so that the groove on the thread boss is facing down.

    Adjust the HEX washer/nut so that the switch threads do not protrude an unsightly amount.

    Then apply the supplied sticker and finally install the round plastic nut.



18. Next locate the black wire from the module and the red wire from the solenoid then trim the wires to length and crimp the ring terminals to the BLACK and RED wires to connect to the respective battery connections.



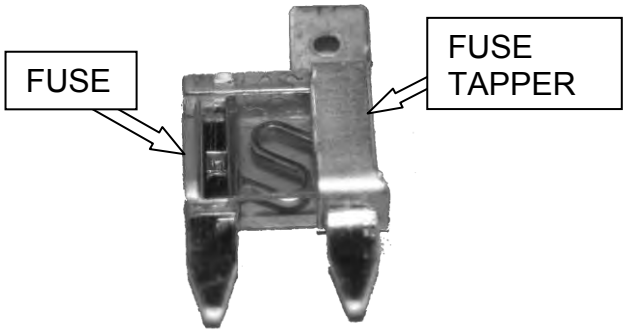
19. For the last connection you will need to locate the vehicles ignition power. This will power the automatic over speed control box LED switch. Note that the unit can still be activated manually with the switch at any time.

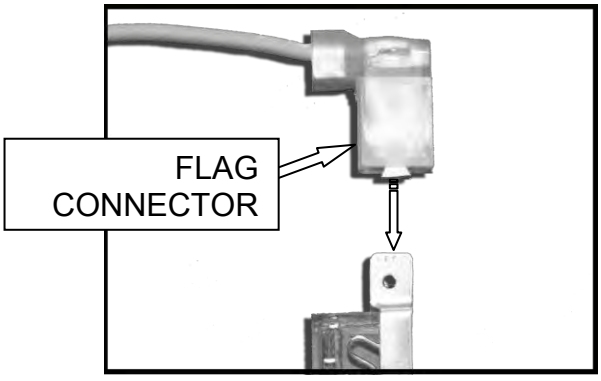
    Locate the fuse panel. Remove the cover.

    Locate the appropriate 10 amp fused ignition power circuit, and install the fuse tapper on to the 10 amp fuse, and reinstall fuse (*Important* : Ensure the tapper is installed on the hot side of the circuit). Trim the yellow wire to length and crimp the flag connector to the wire and connect the yellow lead wire with flag connector to this new connection. Route wire out of fuse box and close lid.

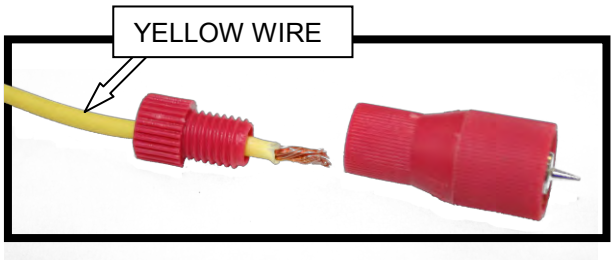
    If you are unable to access the desired fuse use the supplied positap in place of the fuse tapper. Trim the yellow wire to length then strip the end to connect to the small side of the positap then with the large side tap into the desired 10 amp circuit. **Important* the positap is <u>not</u> water proof.

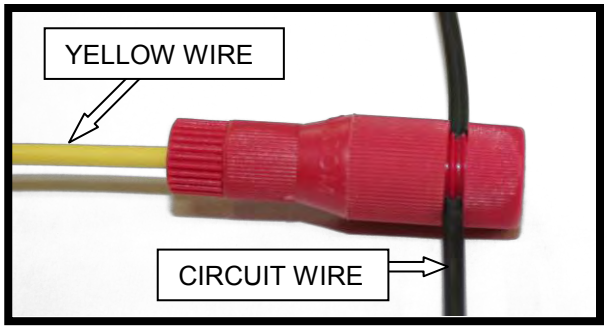
<u>Fuse tapper installed on the fuse</u>



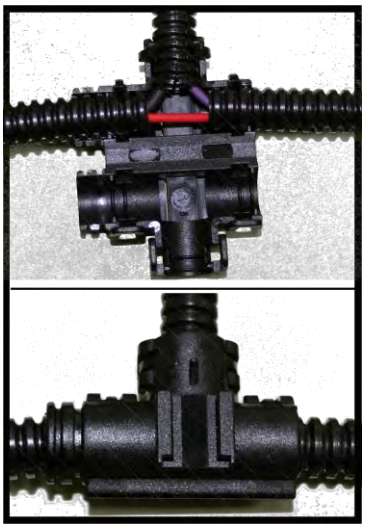


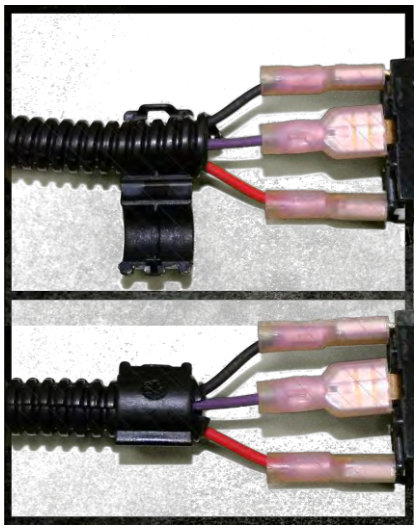
<u>Positap installed on the 10 amp circuit</u>





20. Double check all wiring connections and ensure wires are routed away from any heat sources and moving parts. Then install the loom with the supplied tee connector and clips for the loom ends and continue to the Setup, Testing and Verification with Over Speed Electronics section in this manual.





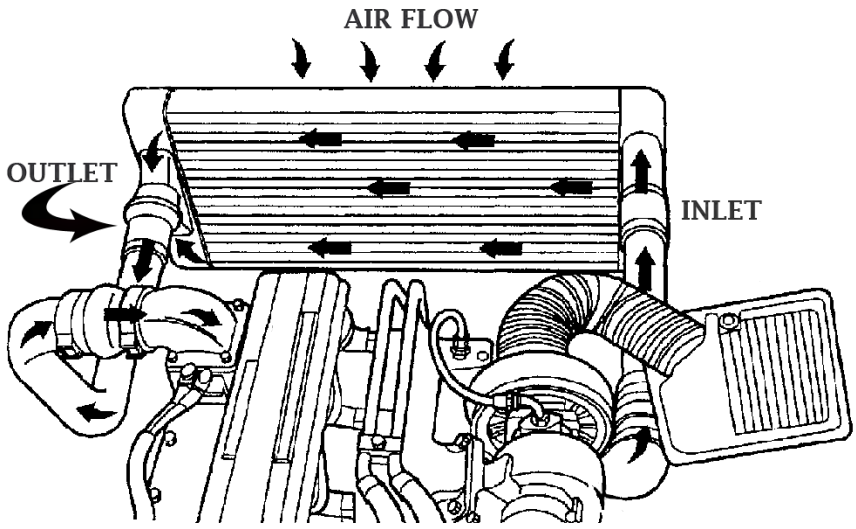
INSTALLATION without OVER SPEED ELECTRONICS (1036730-M & 1036731-M)

VEHCILE SHOULD BE SAFELY SECURED BEFORE INSTALLATION.

1. Block the wheels of the vehicle to prevent the vehicle from rolling.

   Open the hood.

2. Remove the charge air cooler pipe from the outlet side of the cooler.



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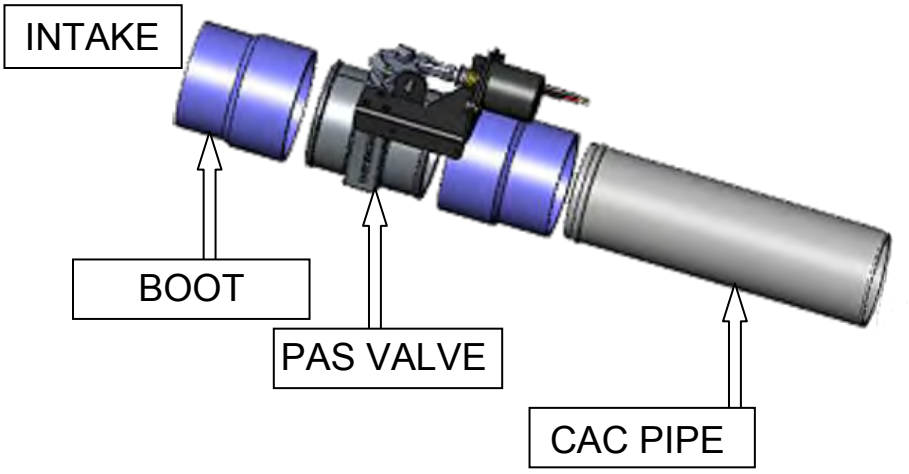
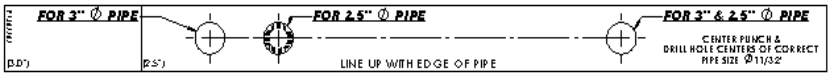
3. You may need to cut down your CAC outlet pipe before installing the bead ring to allow for the installation of the positive air shutoff valve.

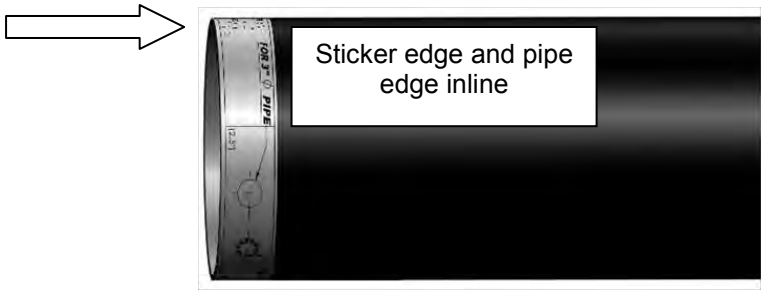


4. Remove backing from drill template sticker and wrap around pipe. The edge of the sticker should line up with the edge of the pipe.

   For a 2.5” pipe the sticker should wrap around the pipe, and end at the 2.5” diameter line on the sticker.

   For a 3” pipe the sticker should wrap perfectly around the pipe, the start of the sticker should meet the end of the sticker.

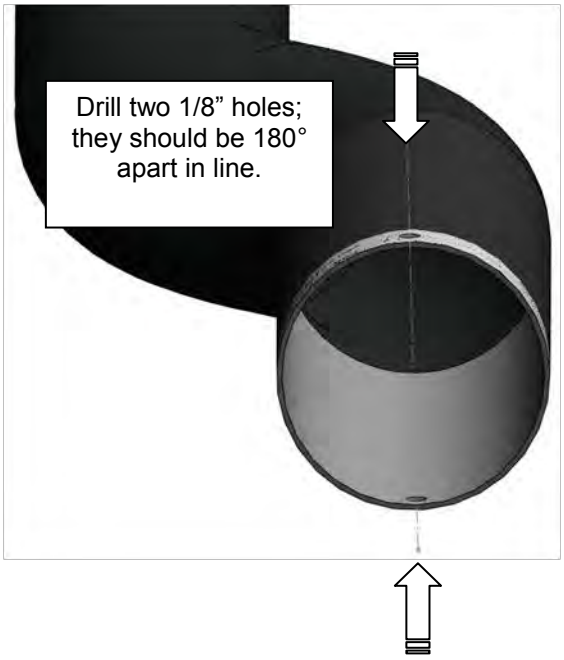




5. With the sticker in place use a center punch and then use a Ø1/8” drill bit and drill a hole in the center of the holes marked “For 3Ø”.

   Once complete the two holes should be perfectly 180° in line with each other through the pipe.

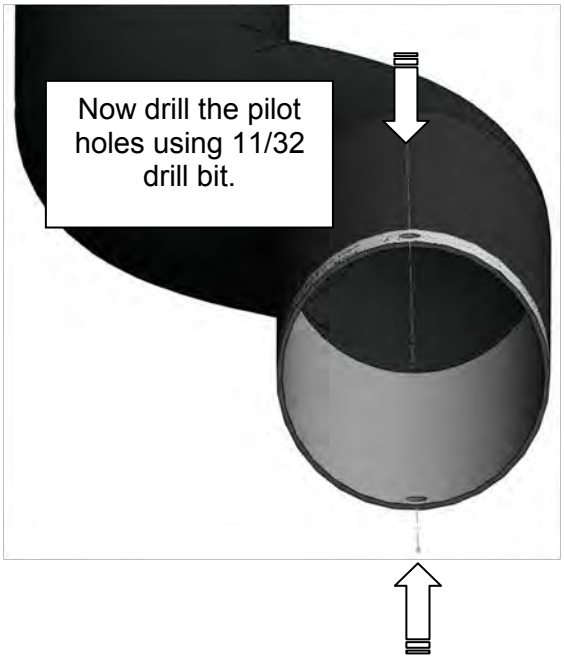
   DO NOT DRILL COMPLETELY THROUGH THE PIPE AND OUT THE OTHER END. YOU WILL NEED TO DRILL ONE SIDE THEN ROTATE, AND THEN DRILL THE OTHER SIDE.



6. Once the pilot holes are drilled you will need to drill a Ø11/32” hole through the pilot holes.

   You can now remove the sticker.

   You must deburr the inside of the drilled holes.

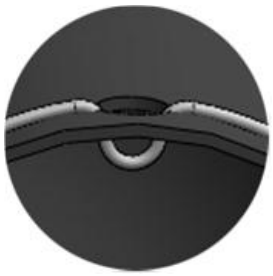


7. Once the holes are drilled, install the ring bead around the pipe. Lock each end of the ring bead into each hole.

   You can use needle nose pliers to tweak or adjust the ring fit slightly.

   Be careful not to bend the ring bead too much as you will weaken it.

Note: The ring bead does not have to be perfectly tight or snug around the pipe, as we will be installing a silicone boot over top of it.

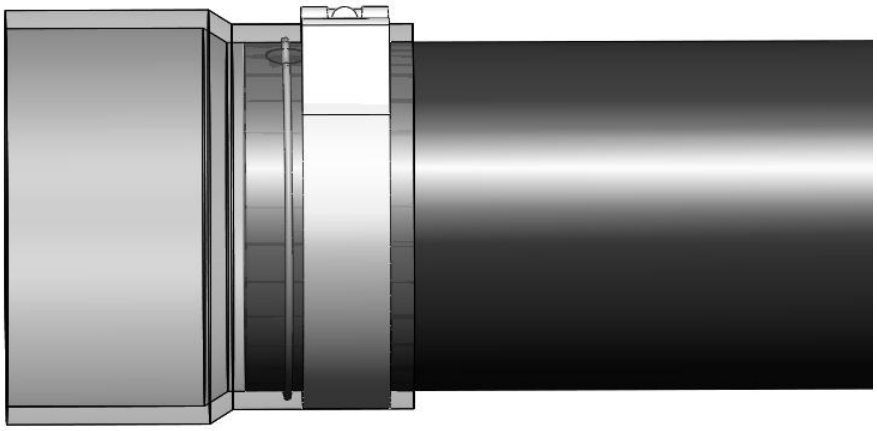


With the ring bead in place, you should not be able to pull the ring bead off axially from the tube.

8. Now slip the small side of the boot over the bead ring and pipe assembly.

Secure the boot with the supplied clamp (0300 for a 2.5” pipe) or (0325 for a 3” pipe). Note that there should be about 3/4”-1” of boot material after the bead ring.

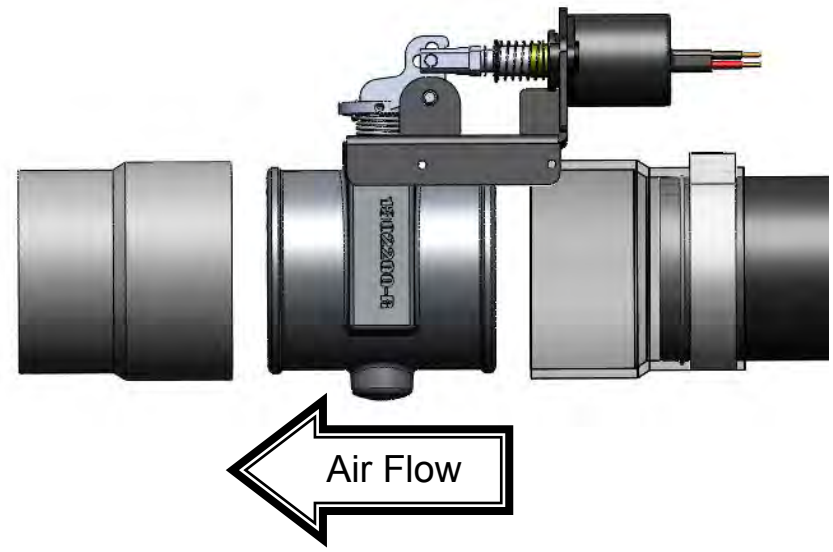
Tighten the clamp till the spring bottoms out.

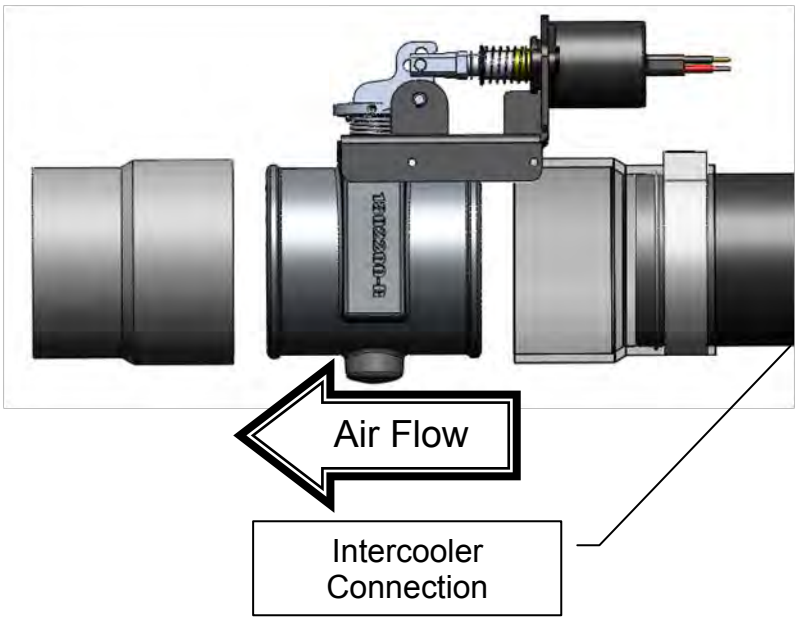
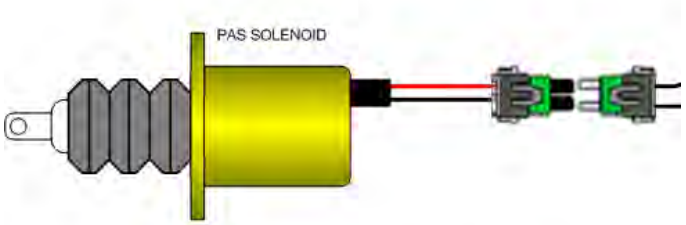


9. You can now install the valve into the open 3.5” section of the boot. Use the 1407030 (0350) spring clamp to secure this connection.

Install the 2nd 1405404 boot on the other side of the valve. Secure this connection again with the 1407030 (0350) spring clamp.

Tighten all clamps until the spring bottoms out.



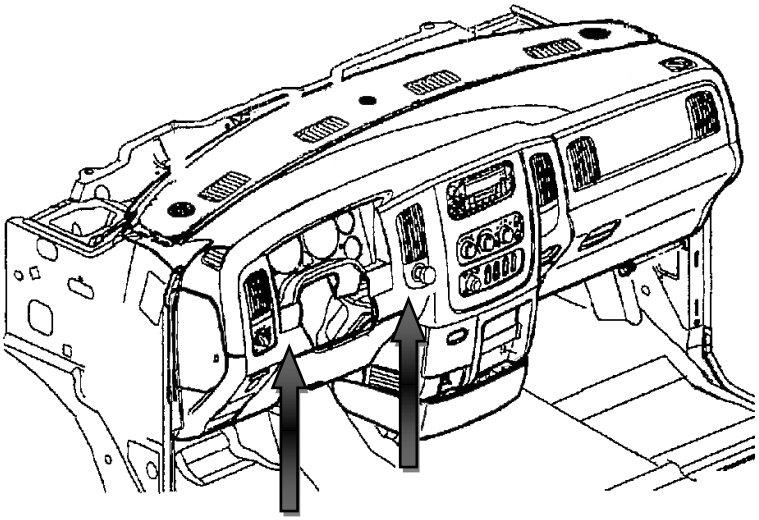
10. Finally, reinstall the PAS and pipe assembly back into the truck; securing the intercooler end first using. Then using the supplied clamp secure the intake end.	
11. Locate the weather pack connector on the solenoid and connect the wiring harness solenoid plug and lay out the harness over the engine bay.	

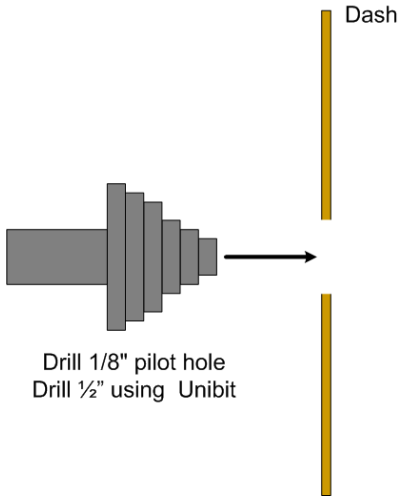
12. You will then need to route the switch wires through the firewall, choosing a highly visible location for the switch and mount it to the dash.

NOTE: you may need to trim the violet wire to length once you have located where the switch is to be mounted.

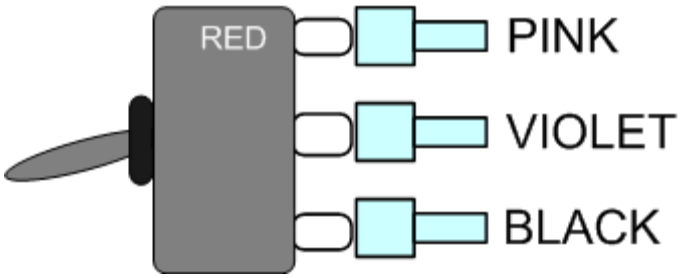
Using a 1/8" drill, drill a pilot hole in the location you have selected for the switch to be mounted.

Finally using a 1/2" UNIBIT drill bit, drill an exact 1/2" round hole.





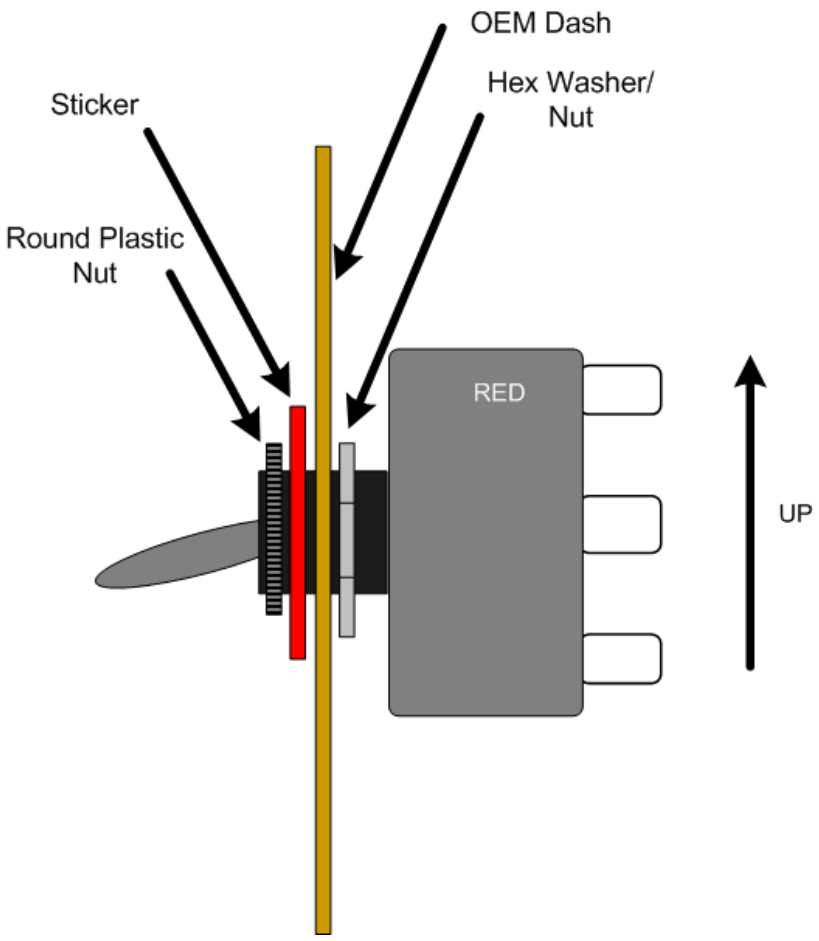
13. Once you have the mounting hole drilled, crimp the switch connectors to the switch wires and install the correct switch wires to the correct switch terminals then insert the switch into the dash from the backside.



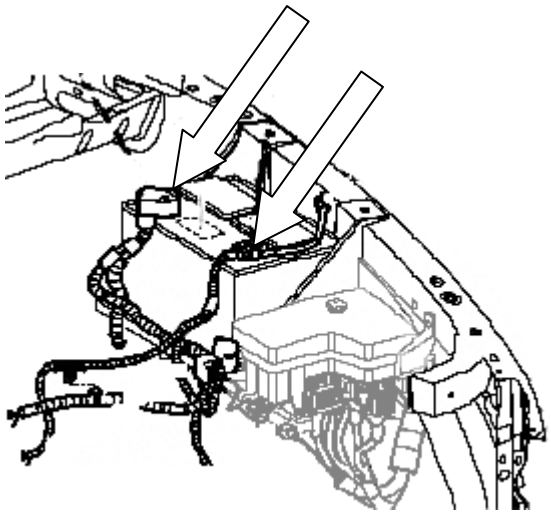
14. Mount the switch so that the groove on the thread boss is facing down.

    Adjust the HEX washer/nut so that the switch threads do not protrude an unsightly amount.

    Then apply the supplied sticker and finally install the round plastic nut.



15. Next locate the black wire from the switch and the red wire from the solenoid then trim the wires to length and crimp the ring terminals to the BLACK and RED wires to connect to the respective battery connections.



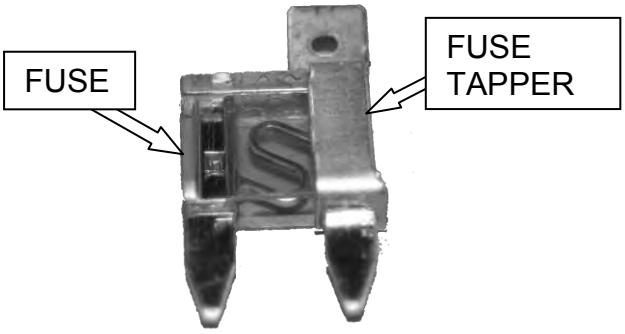
16. For the last connection you will need to locate the vehicles ignition power.

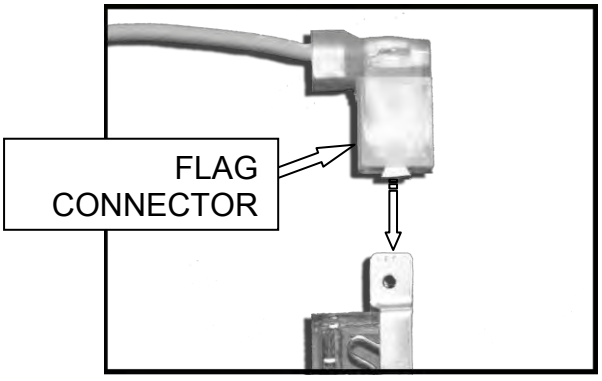
Locate the fuse panel. Remove the cover.

Locate the appropriate 10 amp fused ignition power circuit, and install the fuse tapper on to the 10 amp fuse, and reinstall fuse (*Important* : Ensure the tapper is installed on the hot side of the circuit). Trim the pink wire to length and crimp the flag connector to the wire and connect the pink lead wire with flag connector to this new connection. Route wire out of fuse box and close lid.

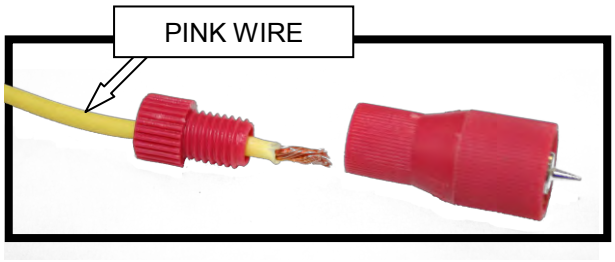
If you are unable to access the desired fuse use the supplied positap in place of the fuse tapper. Trim the pink wire to length then strip the end to connect to the small side of the positap then with the large side tap into the desired 10 amp circuit. ***Important*** the positap is not water proof.

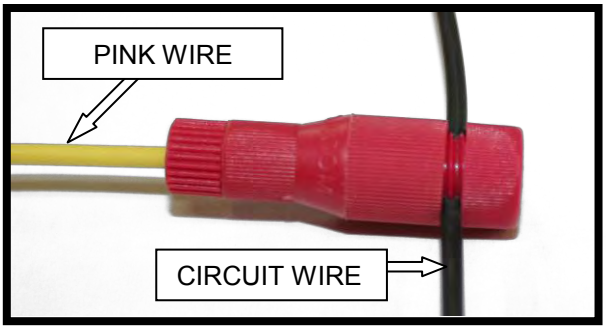
Fuse tapper installed on the fuse





Positap installed on the 10 amp circuit





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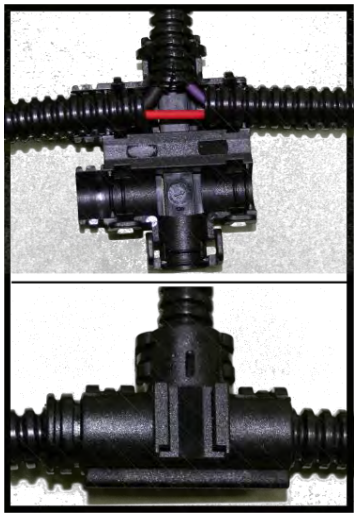
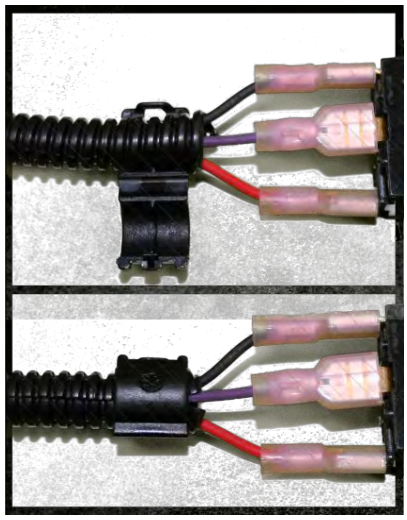
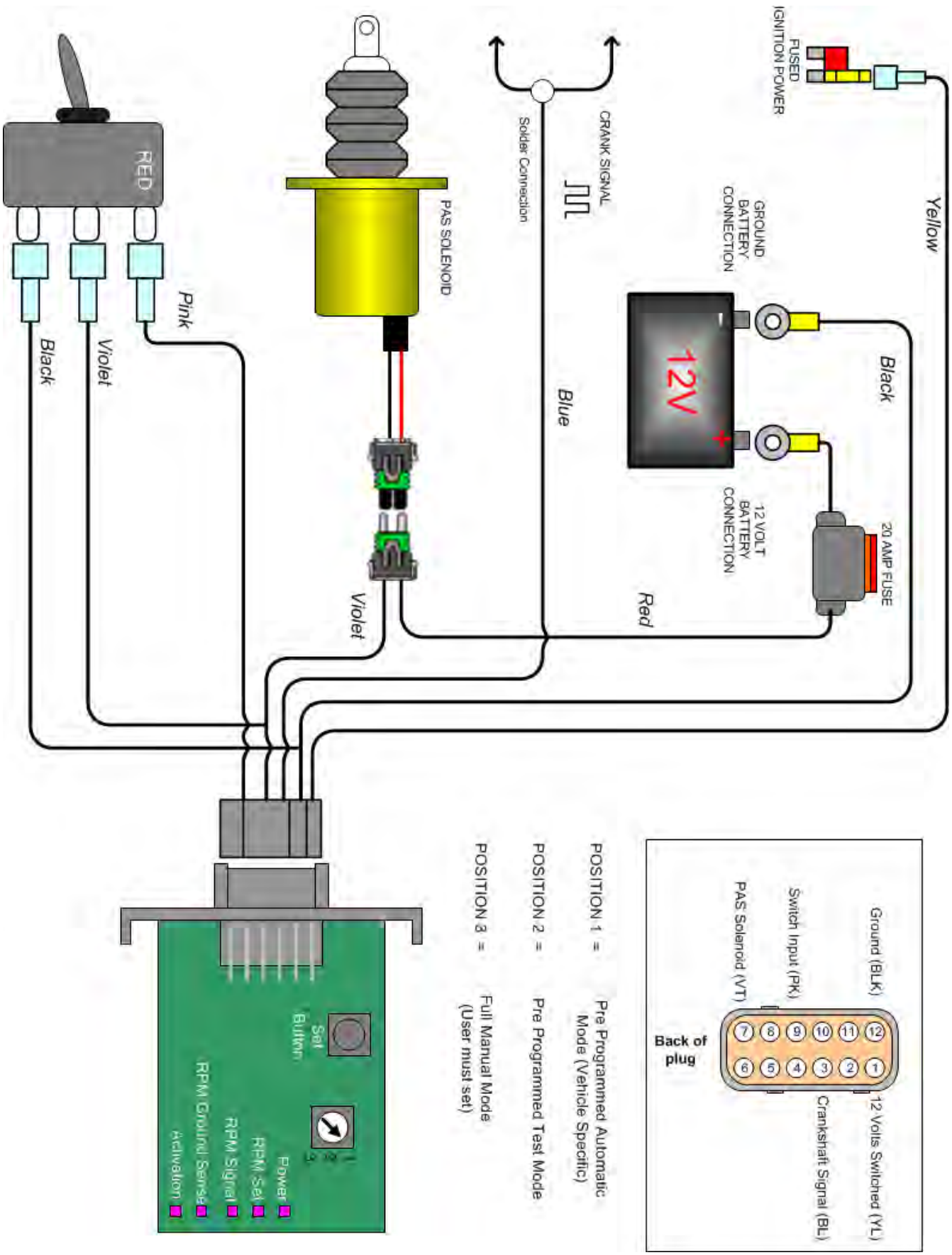
17. Double check all wiring connections and ensure wires are routed away from any heat sources and moving parts. Then install the loom with the supplied tee connector and clips for the loom ends and continue to the testing flow chart without over speed electronics in this manual.





WIRING DIAGRAM with OVER SPEED ELECTRONICS (1036730 & 1036731)



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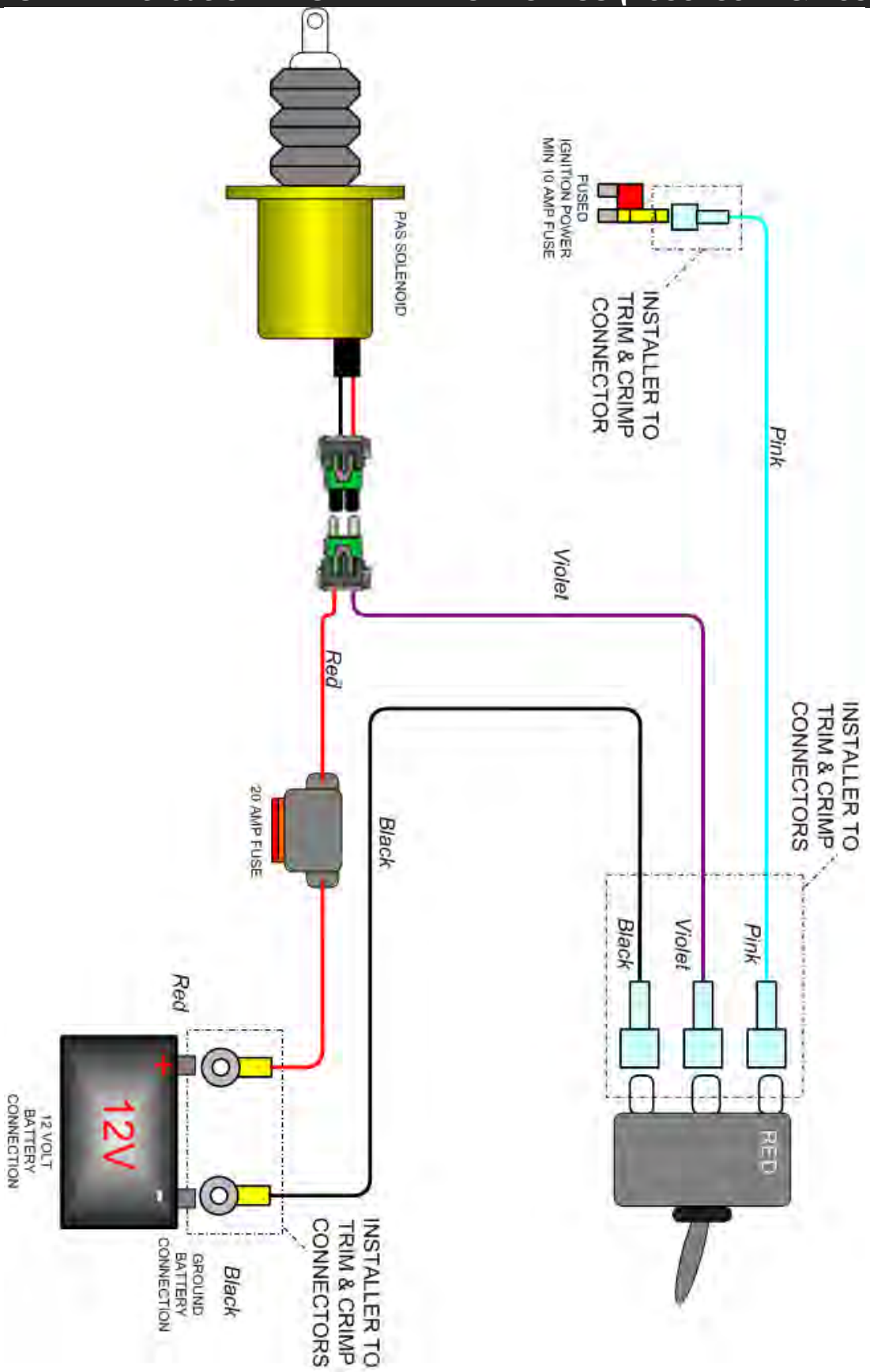
WIRING DIAGRAM without OVER SPEED ELECTRONICS (1036730-M & 1036731-M)



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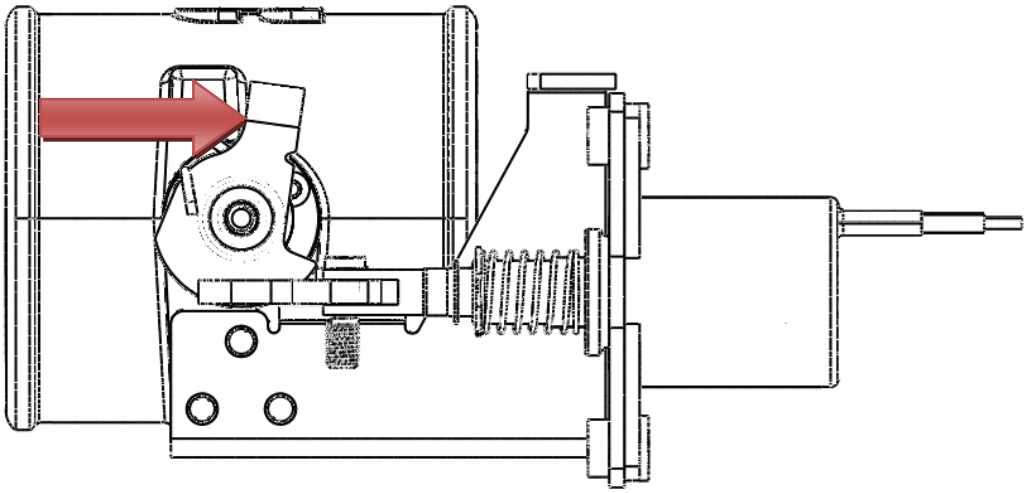
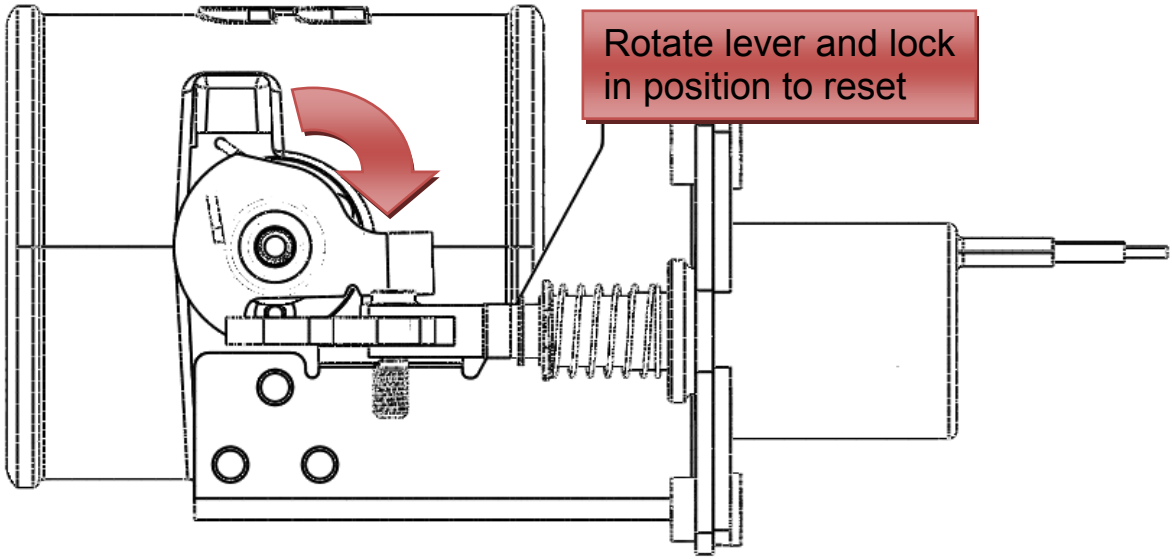
RESETTING THE VALVE

Valve Activated (Closed)



Valve Reset (Open)



SETUP, TESTING AND VERIFICATION with OVER SPEED ELECTRONICS

Each unit will need to be specifically configured for each model of vehicle. As in the case of different model years and makes the engine RPM frequency is different.	You must be in position 3

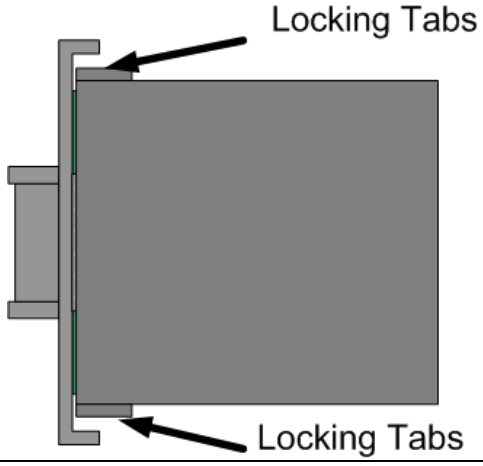
Generic 2.5″ - 3″	Activation RPM	Activation Freq. (Hz)
PAS Switch Position #1 (Automatic Mode)	Do Not Use	Do Not Use
PAS Switch Position #2 (Test Mode)	Do Not Use	Do Not Use
PAS Switch Position #3 (Manual Mode)	User Configured	User Configured

Manual Mode (User Configured RPM)

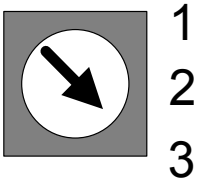
Setup

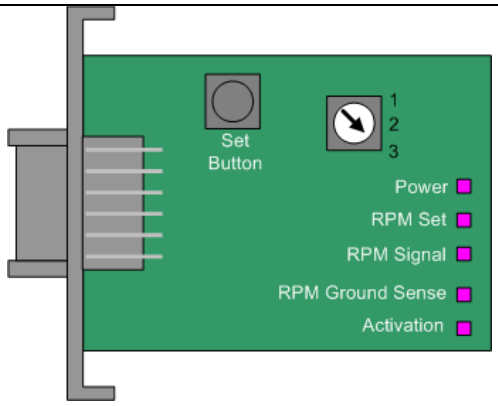
With the control unit, the user/installer has the ability to set their own activation RPM. It is necessary that you choose a low activation RPM first to test that the unit is operating correctly. Once it is, you will need to set the high limit RPM activation.

Note: When you press the Set button the module will add 25% to the set speed.

1. Open electronic enclosure, by releasing the two locking tabs on the side of the unit.	

2. Adjust the position switch to position #3.





3. Start the engine.

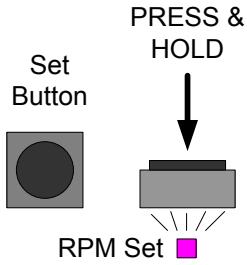
4. Press and hold the RPM SET button.

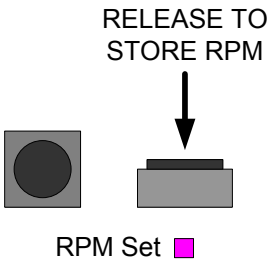
   When you push the SET RPM button will see the “RPM Set” LED illuminate.

5. With another person helping you, have them step on the accelerator with the vehicle in park. Raise the engine RPM to 1200 RPM.

6. Release the SET RPM button.

   Upon releasing the button the unit will store the RPM + 25%. So for this example the unit has stored 1200RPM + 25% = 1500RPM.





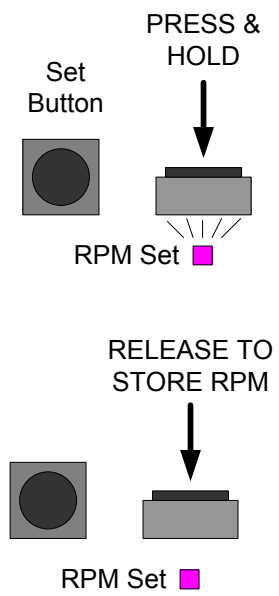
You should see the RPM signal flash proportionally to engine RPM.

7. Now increase the RPM of the engine to test the activation circuit is working correctly. As in this example the valve should activate at 1500RPM.

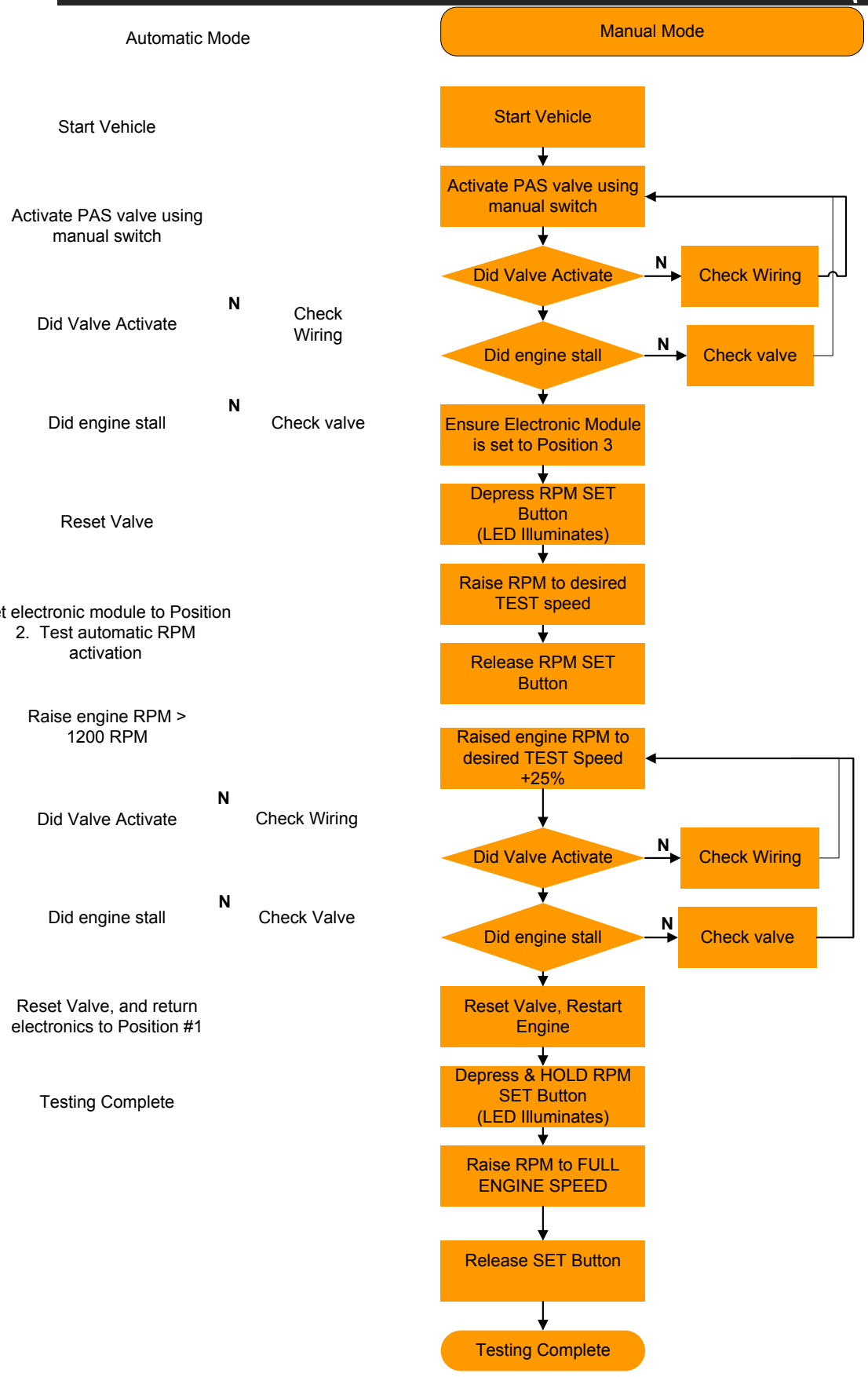
You should see the ACTIVATION LED flash ON/OFF on activation.

If the valve does not activate check the wiring.

If the valve activates but the engine does not stall, ensure nothing has contacted the valve linkage.

8. With the valve activated the engine should die. Reset the valve and restart the engine.	
9. Press and hold the RPM SET button. When you push the SET RPM button will see the “RPM Set” LED illuminate. 10. With another person helping you, have them step on the accelerator with the vehicle in park. Raise the engine RPM to MAXIMUM engine RPM. 11. Release the SET RPM button. Upon releasing the button the unit will store the RPM + 25%. So for this example the unit has stored MAXIMUM engine RPM + 25%.	
12. You can now put the electronic enclosure back together and secure it to the predetermined enclosure mount.	
13. With the engine running you will need to test to make sure the manual activation switch is functioning correctly. 14. With the engine running, lift the activation switch and the engine should die. 15. Reset the valve and you are now complete.	If valve does not activate check the wiring. If the valve activates and the engine does not die ensure nothing has contacted the linkage.
You have now completed the installation, please be sure to complete the test once a year to make sure the unit is functioning correctly.	

TESTING FLOW CHART with OVER SPEED ELECTRONICS (1036730 & 731)



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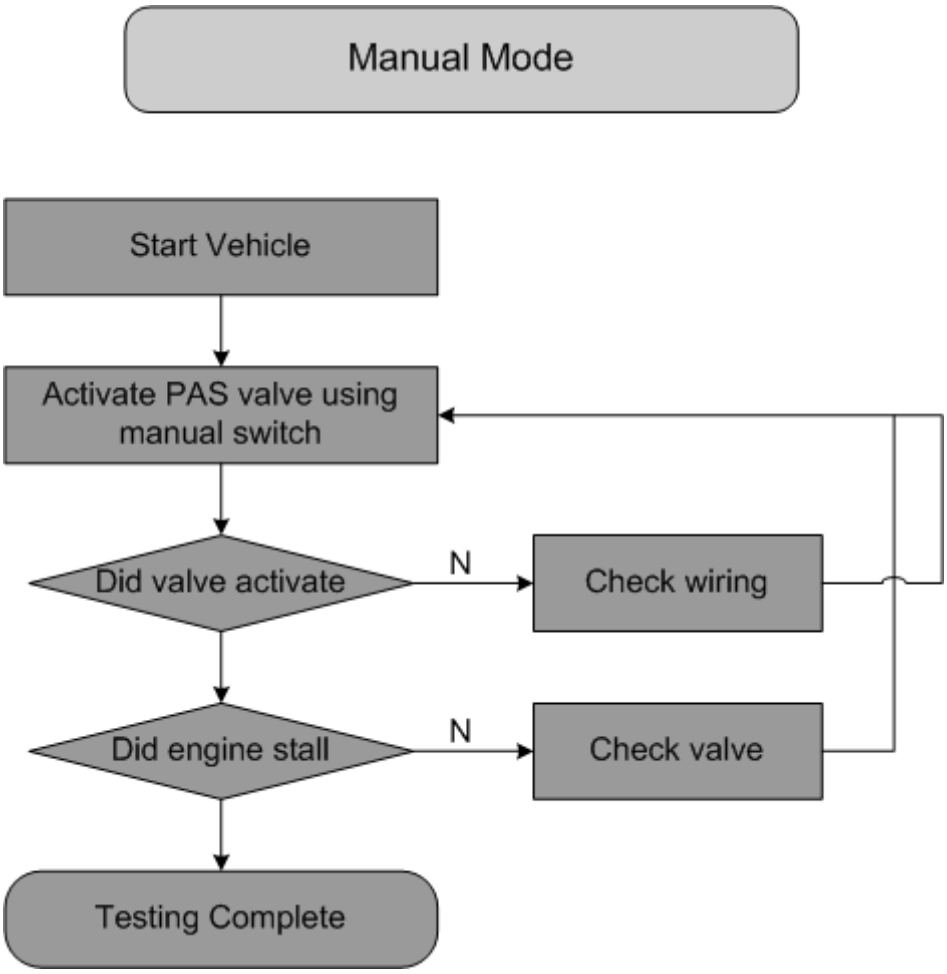
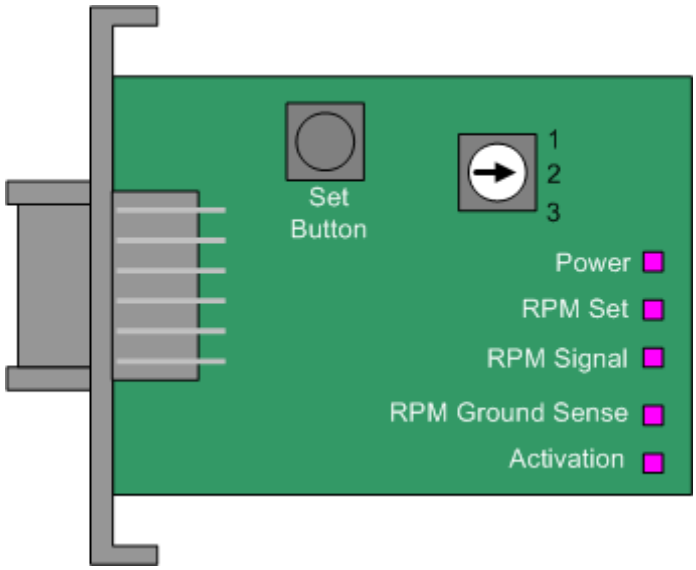
TESTING FLOW CHART without OVER SPEED ELECTRONICS (1036730-M &731-M)



LED OPERATION



LED	Description
POWER	Illuminates when unit is POWERED
RPM SET	Illuminates when SET Button is Pressed
RPM Signal	Flashes proportional to Engine RPM
Ground Sense	Illuminates when a GROUND signal is sensed on the activation line
Activation	Flashes when a valve activation is commanded manually (switch) or automatically
Toggle Switch LED	The LED will flash indicating either a problem with the system (Loss of RPM or Power) or valve activation.

If you have any technical difficulties, concerns, comments, or complaints, please phone our Technical Support hotline at (800) 887-5030 between 8:30am-5:00pm PST (Pacific Standard Time) Monday to Friday, or post a message on the BD Discussion Forums located at:
http://forum.bd-power.com/