Contents

PRE-INSTALLATION CHECK LIST

When receiving your Neon TPK you should verify that the following items are all accounted for:

1. Intake Casting Flange
2. OEM DOHC Intake Manifold Gasket
3. Radiator Hose
4. Hilborn Throttle Body Assembly
5. Throttle Body Air Horns, Clamps, Individual Gaskets and Bolts
6. Throttle Cable Bracket Hex Nuts
7. Camshaft Trigger Wheel Shaft Seal Housing or Crank Trigger Bracket
8. Camshaft Trigger Wheel and Shaft or Crank Trigger Wheel and Spacers
9. Oil Dipstick Spacer and EGR Valve Cover
10. TEC II Velcro Strips
11. Vacuum Hose and Accessories
12. Idle Air Control Motor Housing
13. TEC II Neon TPK Computer
14. TEC & HPV 3b Installation Manual
15. TEC Calibration Software(pafb.exe, 87octane.s19, 87octane.bin, 94octane.s19, 94octane.bin)
16. TEC Battery Cable and Crimp Ring Connectors
17. Relay Connectors and Crimp Spade Connectors
18. Injector Wiring Harness
19. Throttle Position Sensor Cable
20. Manifold Absolute Pressure Cable
21. Coolant Temperature Sensor Cable
22. Manifold Air Temperature Cable
23. Exhaust Gas Oxygen Sensor Cable
24. Magnetic Sensor Cable
25. Idle Air Control Motor Cable
26. Chisel (for Cam - Fire) or Round (for Crank - Fire) Point Magnetic Sensor
27. RS-232 Communications Cable
28. Idle Air Control Motor, EGO and Ignition Coil Connectors
29. Connector Pins and Seals
30. Wiring Conduit

31. SOHC Intake Manifold Adapter Plate and Bolts **
32. OEM SOHC Aluminum Intake Manifold Gasket **
33. Coolant Temperature Sensor **

** For SOHC Neon TPK only

TOOLS LIST

These are some of the tools required for installation:

1.	8 mm socket	2.	10 mm socket
3.	13 mm socket	4.	15 mm socket
5.	$^{5}/_{16}$" socket	6.	$^{3}/_{8}$" socket
7.	$^{3}/_{4}$" deep socket	8.	Socket extensions
9.	Socket universals	10.	Straight screwdriver
11.	Pliers	12.	8 mm wrench
13.	10 mm wrench	14.	$^{1}/_{2}$" wrench
15.	$^{3}/_{4}$" wrench	16.	$^{7}/_{64}$" Allen wrench
17.	$^{5}/_{32}$" Allen wrench	18.	$^{3}/_{16}$" Allen wrench
19.	5 mm Allen wrench	20.	T30 Torx wrench
21.	Loctite 242 (Blue)	22.	High temp RTV
23.	Clean container	24.	Antifreeze
25.	Wire ties	26.	Safety razor blades
27.	Electrical tape	28.	Wire strippers
29.	Diagonal cutters	30.	Soldering equipment
31.	Feeler gauges	32.	Inductive timing light

Please note:
The instalation of this kit will take at least 8 hours with an understanding of all that must take place. Without prior knowledge of wiring and of tool usage the length of time could be longer. Also please note that the casting for the intake manifold is rough and should be port matched to the head to assure proper performance.

HARDWARE INSTALLATION

The following hardware disassembly and assembly instructions are written for the installation of a DOHC Neon TPK with a camshaft trigger wheel. If you are installing the SOHC Neon TPK or you are using the crankshaft trigger wheel bolt-on kit, please review the appropriate sections in the back of this manual before proceeding. In any case, please read through all of the instructions before starting your installation remembering from the previous page's note that at least 8 hours should be given for any installation, more

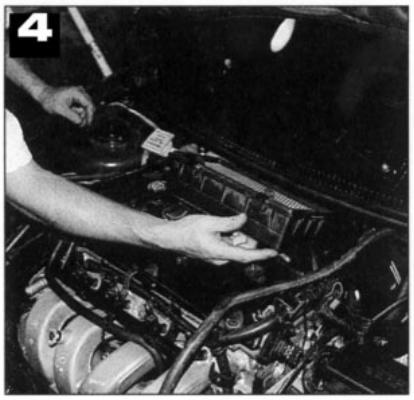
time if you are unfamiliar with some of these instructions.

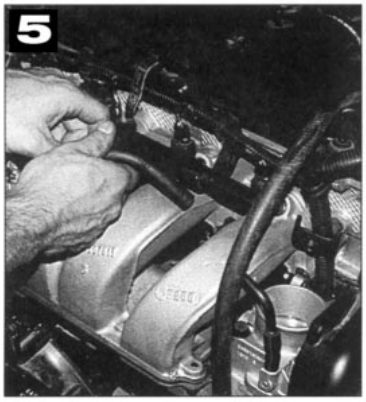
DISASSEMBLY

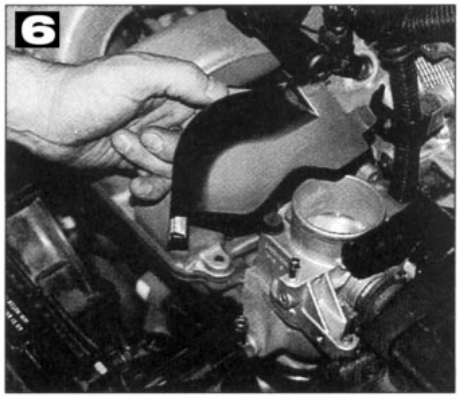
1. Raise the front of the vehicle enough to access the radiator drain and let the engine cool. Disconnect the positive and negative battery connections ($^1/_2$" wrench), covering one or both to prevent a tool from arcing across the terminals. Drain enough coolant to lower the level in the engine below the thermostat passage in the intake manifold, approximately $^1/_2$ gallon. This coolant may be reused if collected in a clean container.

2. Remove the upper radiator hose and disconnect the upper heater hose from the intake manifold only. Remove the thermostat and its housing from the intake manifold (two bolts, 10 mm socket).

3. Loosen the wing nut on the front of the air intake cowl and remove the entire section from the air filter box by lifting up and out. Disconnect the electronic exhaust gas recirculation (EGR) transducer (EET) strap from around the air intake hose leading from the air filter to the intake manifold throttle body. Unhook the crankcase ventilation hose from the cylinder head cover vent on the driver's side (connects to the air intake







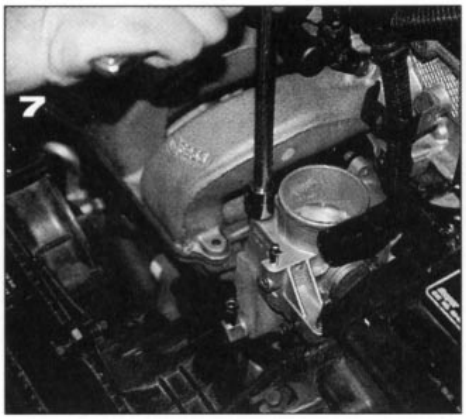
hose).

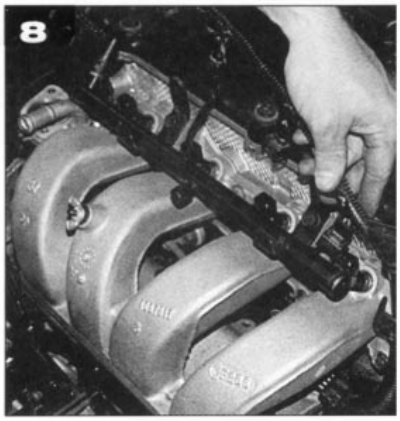
4. Loosen the two hose clamps on the air intake hose ($^5/_{16}$" socket or straight screwdriver) at the throttle body and the air filter box, then remove the hose. Unhook the two air filter box clamps on the top and remove the front half with the air filter. Remove the two bolts mounting the air filter box to the exhaust manifold (13 mm socket). Pull out the remaining half of the air filter box with the attached bracket. Reinstall the two exhaust

manifold bolts carefully, not cross threading the aluminum cylinder head and making sure that the engine-chassis ground strap remains under the passenger side bolt, torquing them to 200 in. lbs. (16.7 ft. lbs).

5. Remove the PVC hose, making sure to keep the PVC valve installed on the cylinder head cover. Remove the brake booster vacuum hose. Remove the vacuum hose from the evaporative (EVAP) fuel purge solenoid and the intake manifold (EVAP solenoid located on the passenger side next to the engine's timing belt cover). Disconnect the EVAP fuel purge solenoid from the wiring harness.

6. Remove the bolt below throttle cable cover (10 mm socket) and lift out the cover by pulling it toward the front of the vehicle. Disconnect the accelerator cable at the throttle body, then disconnect the cable housing





from its bracket by squeezing together the top and bottom clips. Perform same procedure for the cruise control cable if so equipped.

7. Loosen the two bolts (13 mm socket) attaching the throttle body to the intake manifold. Partially lift out the throttle body to disconnect the throttle position sensor (TPS - 3 wires) and the idle air control motor (IAC - 4 wires). Be sure to remove and save the reusable o-ring beneath the throttle body at this time. Remove the IAC motor from the throttle body, but screw the two bolts (8 mm socket) back into the throttle body, they will not be used later.

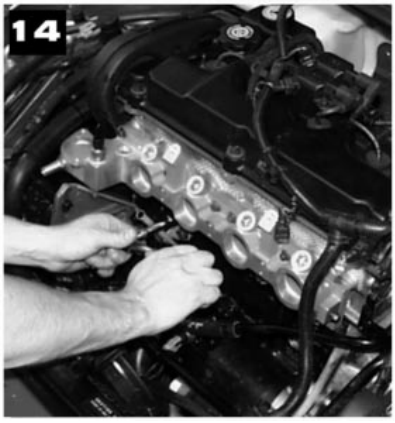
8. Remove the bolt (10 mm socket) beneath the intake manifold plenum which secures the rigid heater hose line. Unplug the fuel injector connectors, manifold air pressure / intake air temperature (MAP/IAT) sensor connector (between #2 and #3 intake manifold runners on the plenum), and coolant temperature sensor connector (next to the thermostat housing). Disconnect the ignition coil pack electrical connector (3 wire, driver's side). Disconnect the wiring harness from the two fuel rail tabs by squeezing together the clips on the backside toward the engine.

9. Making sure all injector retaining clips are in place, remove the two fuel rail bolts (13 mm socket) and pull the fuel rail, injectors attached, straight out of the intake manifold. Take care not to twist the rail while removing it because you could damage an injector or its o-ring, resulting in a major fire hazard from the pressurized fuel in the rail. The fuel may be depressurized using the Schraedder valve in the center of the fuel rail. If the fuel is depressurized, catch all fuel coming out of the Schraedder valve in an appropriate container and use all relevant safety precautions and safety equipment. Lay the fuel rail and injector assembly to the side of the engine compartment, taking care not to crack, twist or otherwise

damage any of these parts.

10. Remove the coolant temperature sensor ($^3/_4$" deep socket or wrench). Remove the EGR tube from the EGR valve (beneath the exhaust valve camshaft) and the intake manifold (beneath the throttle body). A total of four bolts attach the EGR tube (8 mm socket).

11. Remove the seven bolts and two nuts (10 mm socket) attaching the intake manifold to the cylinder head. Slide the intake manifold forward off the two studs, tilt the bottom back toward the engine, slide it toward the passenger side slightly to clear the power steering pump, then lift up and out. Remove the fuel injector wiring harness from its retainer beside cylinder #4's intake port, then remove the bolt (13 mm socket) and



retainer.

12. Remove the camshaft position sensor from the end of the intake camshaft on the driver's side, two bolts (10 mm socket). Remove the camshaft position target magnet and bolt (Torx T30 Allen wrench) now exposed at the end of the camshaft. Clean the cylinder head o-ring mating surface of any residual oil.

ASSEMBLY

13. Loosen the bolt (15 mm socket) securing the oil dipstick tube to the engine block. While performing the next action, be sure that the dipstick tube is inserted completely into the engine block. Pulling out on the dipstick tube near the bolt location, install the supplied thick, aluminium washer behind the tube's mounting tab and retighten the bolt.

14. Clean off any intake manifold gasket residue left on the cylinder head with a safety razor blade. Clean and dry all cylinder head gasket surfaces, ensuring especially that it is dry around the coolant passage. Line

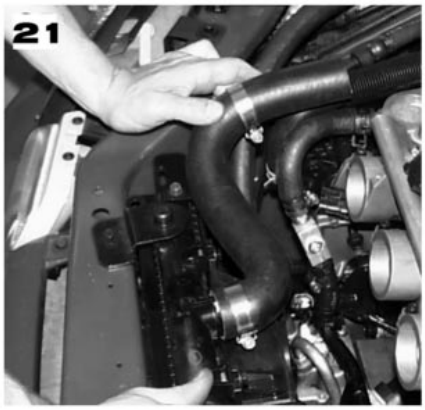
up the supplied intake manifold gasket and the new intake manifold flange with the cylinder head intake ports using the two original nuts (10 mm socket) to snug the pieces in place. The Chrysler fuel injector wiring harness should rest on the outside of the new flange just to the right of cylinder #4's port/runner. Fasten down the intake manifold flange using the remaining seven original bolts (10 mm socket), tightening all fasteners to 250 in. lbs. (20.8 ft. lbs.).

15. Install the supplied EGR valve block off plate with the original gasket using the two original EGR bolts (8 mm socket) torqued to 95 in. lbs. (7.9 ft. lbs.). Install the Chrysler coolant temperature sensor ($^3/_4$" deep socket) into the intake manifold flange using some high temperature RTV sealant on the threads.

16. Lubricate the fuel injector o-rings with a light oil (clean 30w motor oil) and press the fuel injectors into the intake manifold flange, applying even pressure across the rail. Bolt down the fuel rail using the two original bolts (13 mm socket) torqued to 200 in. lbs. (16.7 ft. lbs.).

17. Remove the black painted throttle cable bracket from the original throttle body, two bolts (10 mm socket). Attach the original throttle cable bracket to the new throttle cable support bracket using the original bolts along with two supplied nuts, tightened to 50 in. lbs. (4.2 ft. lbs.).

18. At this point the throttle bodies must be removed from the manifold. Apply a light coat of high temperature RTV sealant to one side of the four supplied round cork gaskets that seal the throttle bodies to the manifold. Slip the gaskets onto the new throttle bodies, RTV down, and apply a light coat of RTV to the remaining side. Make sure that the RTV covers both sides of the gaskets so that they will seal against the throttle bodies as well as the manifold. Remove the single bolt ($^3/_8$" socket) from the driver's side of the



intake manifold flange. Slide the new Hilborn throttle body assembly into the intake manifold flange, and bolt it on loosely with the throttle body clamps ($^5/_{32}$" Allen wrench) using a little Loctite 242 (blue) on the bolt threads.

19. If not already properly adjusted, slide the new throttle cable support bracket toward the passenger side until it makes contact with the new intake manifold flange, reapplying Loctite 242 to the four bolts under cylinder #4's throttle ($^7/_{64}$" Allen wrench). Reinstall the bolt removed from the driver's side of the intake manifold flange, applying a light coat of Loctite 242. Alternate tightening the throttle body clamps and the driver's side bolt to no more than 50 in. lbs. (4.2 ft. lbs.). Insure that the throttle shaft is not binding, allowing the throttle blades to close properly to the throttle stop adjustment screw. Insure that the throttle stop screw is adjusted such that the throttle blades are slightly open. If throttle binding occurs try readjusting the throttle bodies on the intake manifold. This can be done by loosening all screws holding the throttle

bodies to the manifold and pushing on the throttle bodies evenly on each individual body and then retighten the screws. A throttle return spring should be used for best results.

20. Snap the accelerator cable housing into it's original location of the throttle cable bracket (driver's side). Connect the accelerator cable by rotating the new throttle cable linkage to the wide open position and sliding the cable barrel in the through hole of the throttle cable linkage. Allowing the throttles to close, the accelerator cable should rotate freely in its slot. Perform same procedure for the cruise control cable if so equipped. Check to be sure the throttles close fully and open fully using the accelerator pedal. If not, use a $^{7}/_{64}$" Allen wrench to loosen the throttle cable linkage and rotate it to a position where full throttle travel is observed. Retighten insuring the cable and its housing are aligned closely, left to right.

21. Attach the loose end of the heater hose to the $^{5}/_{8}$" hose barb on the intake manifold flange. Attach the new top radiator hose to the radiator only. It is recommended that you cut 1" to 2" off the end attached to the radiator. While elevating the hose's free end, replace as much engine coolant by pouring it into the open thermostat pocket. Install the original thermostat and thermostat housing, using the original bolts torqued to 200 in. lbs. (16.7 ft. lbs.). Connect the top radiator hose to the thermostat housing and reconnect the coolant reservoir hose to the thermostat housing. Continue adding engine coolant until the fluid level is maintained at the bottom of the reservoir outlet on the thermostat housing, which may require slightly more coolant than drained.

22. Connect the supplied vacuum hose to the brake booster using the hose clamps that are supplied. Route the hose up over the driver's side of the cylinder head through the retaining clips. Cut the hose so that a 90° bend can be made, attaching it to the vacuum rail hose barb with a supplied hose clamp. Attach the remaining length of vacuum hose to the PCV valve and route it along the backside of the cylinder head to intersect the first piece. Cut the first piece and insert a supplied tee to attach the PCV hose, cutting it to length. Use the remaining length of vacuum hose, clamp, tee, and elbows for plumbing the idle air control motor housing into the vacuum lines at an appropriate junction. Find a suitable location for the idle air control motor housing in the engine bay first, and install the original Neon idle air control motor into it (50 in. lbs. or 4.2 ft. lbs.), taking care not to damage the o-ring ($^{5}/_{32}$" Allen wrench).

23. Remove the bolt (10 mm socket) securing the wiring harness clip above the intake camshaft, driver's side. Bolt the wiring harness clip removed during disassembly at this location along with the clip originally there. The "new" clip should be positioned to hold a wiring harness above the valve cover toward the passenger side.

WIRING SUGGESTIONS

** For the following steps, refer to TEC & HPV 3b Installation Manual wiring diagrams and the Neon TPK supplemental wiring diagram found in this installation manual.

*** While routing wires to the TEC II computer, it is recommended to label the ends of the wires at the TEC as they are added into a wiring harness bundle so that connections made to the TEC after the harness is complete are correct.

24. Connect the fuel injector wiring harness and route the wires loosely over to the stock engine management computer (below the windshield washer fill access). The wires might be arranged such that they bend back over the valve cover on the driver's side through the retaining clip added in the assembly procedure. Near the back of the valve cover, the wires would bend toward the driver's side behind the power distribution center (fuse box), then route forward to the engine management computer. The wire colors for the injectors are as follows, #1 cylinder (closest to passenger side) is red and white. #2 directly next to number one is blue and red. #3 is also blue and red and is directly next to #2. The last injector (farthest on the drivers side) should be white and red. The way it should look is from left to right looking into the engine compartment from the front of the car is, white red, blue red, blue red, white red.

25. Connect the throttle position sensor (TPS) (located on the end of the throttle shaft next to the thermostat housing) cable and the manifold absolute pressure (MAP) (Located on the vacuum rail on the throttle bodies) cable to their respective sensors and loosely route the wire with the fuel injector harness. Since both of these sensors share the +5V terminal on the TEC II, the red wires should be spliced together with only one wire returning to the TEC, which will be placed on top of the engine management computer.

26. Connect the coolant temperature (CLT) (Located in the cast manifold's thermostat housing) cable, black connector, yellow and black wires, and route it along the fuel injector harness as well. Similar to the TPS/ MAP +5V splice, the CLT and MAP share their signal grounds, so the black wire of the CLT and MAP should be spliced together with only one wire returning to the TEC. If you find it easier then just tape the two black wires together with a piece of tape, label them and then run both of them back to the TEC terminal #2 on the signal side. Either approach is fine and will not cause a problem as long as all wires are in the correct location.

27. Connect the manifold air temperature (MAT) cable, gray connector, gray and black wires, and route it along the fuel injector harness. The MAT sensor is located at the end of the vacuum rail on the throttle bodies on a small bracket, it has a corresponding grey connector and brass threads.

28. Bolt the camshaft trigger wheel shaft seal housing onto the cylinder head with the magnetic sensor bracket toward the front of the car and the chisel point magnetic sensor installed (only a temporary placement of the housing). Connect the magnetic sensor cable and route the wire with the fuel injector harness.

29. Disconnect the Neon wiring harness from the oxygen sensor nearest the engine (sensor hidden beneath the heat shield on the exhaust manifold, connector snapped on a bracket, driver's side of the exhaust manifold). Connect the exhaust gas oxygen (EGO) sensor cable and route the wire with the fuel injector harness. The black wire in the EGO cable should eventually be connected to chassis ground or the battery's negative terminal. The red wire can be connected to the SW BAT terminal of the TEC since it is a switched +12V.(Note this red wire can be connected to any switch battery output.)

30. Remove the cover of the power distribution center and remove the relays identified as the FUEL PUMP relay and the automatic shutdown (AUTO S/DOWN) relay. Insert the relays into the relay connectors provided. Cut the red (not used) (Pin 87a), blue (Pin 30), and yellow (Pin 87) wires to appropriate lengths, referring to the supplemental wiring diagram. Crimp and solder the provided spade terminals such that they can then be inserted into the slots indicated in the diagram with the relays lying in the power distribution

center on their sides. As shown in the diagram, the white (Pin 86) and black wires (Pin 85) of the relay connectors should be spliced together respectively with one white wire routing over to the TEC terminal number 5 on the power side, (14 pin connector, green) and one black wire routing to the negative terminal of the battery. All pin numbers are visible on the plug side of the relay. A small notch or two should be cut into the cover of the power distribution center cover for the wires to exit. If the cut plastic has sharp edges, cover with a few layers of electrical tape so it doesn't cut through the wire insulation. In some cases the tabs that the relay fastens into in the power distribution box need to be adjusted so that the spade terminals will fit snugly. Check to make sure that the metal tabs in the stock location of the relays are pressed together so that the spade terminals make a good connection.

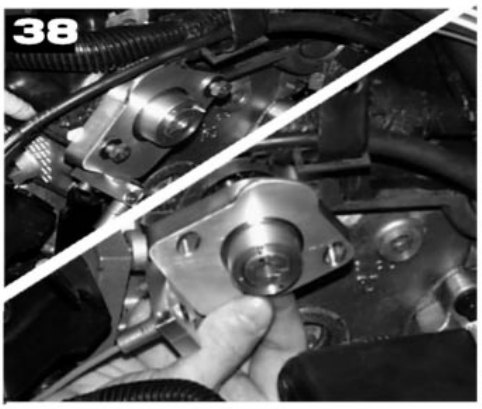
31. Referring to the supplemental wiring diagram, cut the stock wiring harness to the ignition coil pack and the idle air control motor with enough wire to put the supplied connectors on each end. Be sure to use the single male connector (female pins) on the side nearest the components (as shown in the diagram). Use a female connector (male pins) on the wires leading back to the TEC, and also on the wires leading back to the Chrysler engine management computer, if so desired (the system can then be switched be to stock easily). If a connector is not placed on the wires leading back to the Chrysler engine management computer, separate the wires and isolate them with electrical tape to prevent an unintentional short. Follow the color codes given in the supplemental wiring diagram for the ignition and IAC motor connections back to the TEC. Be sure to solder all pin connections to insure continuity. Use the two large tabs on the ends of the pins to crimp the rubber seals in place, which should be around the wire insulation before crimping any parts of the pins.

32. Route any additional wires for the TEC's operation (i.e. tach, check engine, etc.). Use wire ties to begin to collect the wires loosely into a harness. Remove the windshield washer fluid filler neck from the driver's side fender wall. Place a cover over it if inclined. Position the TEC computer on top of the Chrysler engine management computer using the supplied Velcro with the ignition and power wires toward the passenger side with the stickers up. Be sure adequate room remains for the signal and power wiring to be routed.

33. Connect the battery cable to the TEC's connector and route the wires to the battery, including any other wires that need battery ground (EGO ground, relay ground). Crimp and solder the yellow ring terminals to the battery cable, etc. Disconnect the TEC from the battery before continuing.

34. Disconnect the stock positive connection to the battery. Unhook the power distribution box from the battery case (two clips). Remove the bottom of the power distribution box (four clips). Splice into one of the two green/white wires (white stripe) to obtain a switched +12V (start-run). Route this wire to the harness to be used for the TEC's SWBAT final position will be pin 9 on the TEC computer on the power side. The color of the wire may different in some conditions so to be sure of a switched 12V supply check to make sure that the wire being spliced into has at least 12 volts when key is on and no volts when the key is off. This may be done using a test light or a multimeter.

35. Begin cutting, striping, and tinning the wires of the harness into the TEC's 14-pin connectors, following the wiring diagrams in both installation manuals. Connect the communications cable to the TEC (red - RXD, white - TXD, black - GND) and have a computer operating with the programming software. Establish communications with the TEC once the ignition switch of the car is in the RUN position and confirm that there are no failures (lower right part of the monitor screen). If no failures are shown, turn off the TEC,



disconnect the battery and recheck for any loose connections. If no computer is available then make sure that all connections have been made accordingly with a multimeter. Setting the Timing

36. Gather together in one location the new shaft/cover assembly, the two supplied cam cover bolts (10 mm socket) and washers, the new 120 tooth trigger wheel, and the supplied extra long trigger wheel bolt. These pieces will be installed last in order to set the timing correctly with a running engine. Therefore, be sure that all other parts are properly assembled on the engine and that communications with the TEC computer have been established.

37. Remove the trigger wheel shaft housing from the cylinder head. Insert the new trigger wheel shaft into the opening. Rotate the trigger wheel shaft until the locating pin seats into one of the two offset holes formerly used by the camshaft position target magnet.

38. Apply a thin coat of RTV sealant to the trigger wheel shaft housing on the side of the oil seal. Checking that some grease is in the oil seal groove of the trigger wheel shaft housing, slide the housing over the trigger wheel shaft with the magnetic sensor bracket toward the front of the vehicle as described before. Screw in the bolts (with washers) for the trigger wheel base snugly, but the housing should be able to be rotated with some applied force. Center the bolts in the housing slots.

39. Remove the magnetic sensor from its bracket. Press the trigger wheel on using your hand, being very careful to line up the spring pin and the center hole with the trigger wheel shaft. Bolt the trigger wheel on with the extra long cap screw bolt (5 mm Allen wrench) and oversize washer, checking that the wheel is seated flat on the shaft and that the shaft is seated squarely on the camshaft. This may be tested by turning the engine over with the starter and observing if the wheel runs true, without the magnetic sensor installed. Be sure that the TEC computer is completely unplugged when turning over the starter.

40. Remove the inspection access cover on the timing belt cover (8 mm socket). Find the timing marks on the intake and exhaust camshafts and align them (see the picture). This can be accomplished either by turning the crankshaft (17 mm socket, remove front passenger wheel and weather guard) or turning the engine over with the starter until the marks are visible. Then put the car in first gear and rock it back and forth until they are aligned. Clearly mark them so they are distinct when using a timing light. The trigger wheel should be rotated now such that the missing teeth are nearly vertical.

41. Reinstall the magnetic sensor, gapping it to approximately 0.015” and making sure the chisel point is parallel to the teeth edges (line up the mark on the sensor with the slot cut in the bracket). Counting clockwise (looking from the driver’s side) from the two missing teeth nearest the magnetic sensor (the

bottom gap), rotate the housing until the sensor point aligns with the trailing edge (most clockwise) of the 11th tooth. Check that the housing bolts are snug. Connect all of the wires of the TEC, establish communications on the monitor screen, check that there are no failures, and start the engine. When the engine has warmed up (idling), press 1 on the computer keyboard to set zero ignition advance while the engine is running. Using the timing light connected to cylinder #1, rotate the trigger wheel shaft housing until the timing marks line up to your satisfaction. Turn the engine off and tighten the housing bolts. Recheck the timing if desired, making sure to reestablish communications and setting the ignition advance to zero. Replace the timing belt inspection cover.

42. Tape together the wiring harness (remove the wire ties) and put on the provided wiring conduit. Cut the air horns to your desired length for maximum performance. Using a pipe chain cutter may obtain the best results since any deformation of the air horns will prevent their insertion. We suggest obtaining filters for the air horns and the crankcase ventilation on the valve cover (see the Replacement Parts section). Recheck the engine coolant level when the engine has cooled. Be sure to put the oil dipstick back into its tube or insert a rubber cap that can be purchased at most automotive parts stores. Once the engine has been warmed up to normal operating temperature again, adjust the closed throttle position by opening the throttles until the engine speed is 1100 RPM, then closing them until 950 RPM is reached (the pre-programmed target RPM).

43. Read through the TEC II programming manual before making any edits to the software, which should be backed up for future reference. Your installation of Electromotive's Neon TPK should now be complete!

NEON TPK INSTALLATION CHANGES FOR SOHC ENGINES

Installation of the Neon TPK for the SOHC engine requires only a few minor changes. The most significant difference to the previous instructions perhaps is that the camshaft trigger wheel assembly will not work with the SOHC, therefore, installation of a crankshaft trigger wheel must be performed following the instructions given in the section *Installing the Crankshaft Trigger Wheel Bolt-on Kit*. The information below will hopefully note any other installation differences between the SOHC and DOHC kits, but your particular vehicle/engine combination may require some of its own customization. Some parts of the SOHC engine may be in slightly different locations compared to the DOHC, but essentially, all of the conversion steps need to be taken. Before you begin installing the SOHC Neon TPK, you may want to have on hand two important parts that are required in the SOHC kit but not the DOHC kit: a DOHC fuel rail (may be purchased from a Chrysler dealership) and a crankshaft pulley ready to accept the 7-1/4" trigger wheel (an Unorthodox underdrive pulley works with the included parts). Until you have these parts, you will not be able to start your engine with the new TPK intake manifold and TEC II computer.

1. As you will notice, the SOHC Neon TPK casting flange does not have a thermostat housing like the one integrated in the DOHC casting flange. Instead, the original, separate thermostat housing is used, so only remove the upper radiator hose from the thermostat housing in step 2 of *Disassembly*. The upper heater hose that attaches to the thermostat housing should be out of the way during installation of the intake, but if it looks like it will interfere, disconnect it as well.

2. Referring to steps 8 and 10 of *Disassembly*, you will not need to remove the coolant temperature sensor since it is not screwed into the SOHC intake manifold. You will need to find a 3/8" NPT threaded hole into the engine's water jacket in order to install the loose TEC II coolant temperature sensor in step 15 of *Assembly*. Alternatives for installing the TEC II CLT sensor if you cannot find a threaded hole already in the

engine are to remove the stock coolant sensor and replace it with the TEC II's (this will disable the instrument panel's temperature gauge) or make an in-line fitting for the TEC II sensor that can be fit into the heater hose lines.

3. Step 12 of *Disassembly* can be skipped altogether since a crankshaft trigger wheel assembly must be used on the SOHC engine.

4. In step 14 of *Assembly*, you will need to install the SOHC adapter plate preceding installation of the casting flange. Be sure to line up the supplied OEM SOHC intake manifold gasket with your intake ports as the adapter plate is bolted. Use the ten supplied bolts and washers to attach the adapter plate to the cylinder head (10 mm socket), tightening them to 200 in. lbs. (16.7 ft. lbs.). The ten original intake manifold bolts will not be reused. Before attaching the casting flange to the adapter plate, the OEM DOHC intake manifold gasket must be modified. In order to eliminate bolt interference, the lower far left and far right bolt holes of the casting flange were moved from their original DOHC locations. To use the DOHC gasket, refer to the figure near the end of the manual that illustrates how to cut the gasket for use with the SOHC casting flange. The lower far left and far right gasket holes that have been cut out need to be used with the rest of the gasket to keep the casting flange flat against the cylinder head. Use the eight bolts supplied with the kit to attach the casting flange to the adapter plate, tightening them to 250 in. lbs. (20.8 ft. lbs.). To hold the modified DOHC gasket and pieces in place while fitting the casting flange, try using a light coat of high temperature RTV in a few places.

5. In step 16 of *Assembly*, you will need to remove the fuel injectors from the SOHC fuel rail and put them in the DOHC fuel rail you acquired. Follow the safety precautions in step 9 of *Disassembly* to depressurize the fuel system. As mentioned, use a light coat of clean oil when installing the fuel injectors so the o-rings won't tear.

6. The wire routings described in the *Wiring Suggestions* section will typically work for the SOHC engine as well. Most of the wiring can be routed along the fuel rail, back the driver's side of the cylinder head, and behind the power distribution center to the TEC II. Some adaptation may need to be made for the PCV valve vacuum hose since its location on the valve cover is slightly different than the DOHC engine's.

Following these minor changes to the Neon TPK installation instructions for your SOHC engine, you should be running your "new" engine to its maximum performance with a few TEC II program calibration adjustments.

REPLACEMENT PARTS

The following parts may be purchased as needed for maintenance or otherwise:

1. DOHC Intake Manifold Gasket - Chrysler Parts Distributor - P/N 4667539
2. SOHC Aluminum Intake Manifold Gasket - Chrysler Parts Distributor - P/N 4648623
3. Radiator Hose - Trak Auto - P/N (B) 70938

   Napa Parts Distributor - P/N 7600

   Gates Hose Distributor - P/N 20873
4. Individual Throttle Body Gasket Material - Fel-Pro Distributor - P/N 3018
5. DOHC Fuel Rail - Chrysler Parts Distributor - P/N 4773166 (for SOHC kits)
6. Accessory Belts Underdrive Pulley - Unorthodox Racing - P/N 01014
7. Crankshaft 60 Tooth Trigger Wheel - Electromotive, Inc. - P/N 72725
8. Crankshaft Trigger Wheel "Centering Ring" and Spacers - Electromotive, Inc. - P/N 72551
9. Crankshaft Magnetic Sensor Bracket - xx - P/N 72550

CALIBRATION SOFTWARE

Your TEC-II for the neon is pre loaded with a calibration for 87 octane pump gas. You will note, that on your software diskette, there are two different calibrations, one for 87 octane and one for 94 octane, please refer to your copy of the TEC calibration manual for making adjustments to both the advance table and the volumetric efficiency table when running other grades of fuel.

Since the TEC II is now controlling the engine operation, the vehicle speed limiter is disabled. The only restriction on the vehicle's performance now is the programmable Rev Limiter, your engine calibrations, and your engine.

INSTRUMENT PANEL OPERATION

Even though the TEC II is now operating the engine independent of the Chrysler engine management computer, the Chrysler computer is still carrying out some critical vehicle functions and still monitors its own sensors. Since some stock sensors have been removed or disconnected during the TPK installation, the Chrysler computer may illuminate the "Service Engine Soon" light on the instrument panel. Any number of "failures" could cause this, and a few are listed below using the Malfunction Indicator Lamp's (MIL) Diagnostic Trouble Codes (DTC). These codes can be read by cycling the key On - Off - On - Off - On within five seconds. Count the number of times the MIL (service engine light) flashes on and off. A slight pause is evident between the first and second digits of the code with a longer pause between codes. A five-five DTC indicates the end of all stored codes. For the DTC to be cleared from memory, the MIL must be Off and the vehicle must complete 40 to 80 warm-up cycles without a repeat occurrence.

NOTE: The Speed limiter is no longer operational.

Malfunction Indicator Lamp (MIL) Codes

12 - Battery Disconnect

13 - No Change in MAP

14 - MAP Out of Range

21 - Oxygen Sensor Failure

23 - Intake Air Temperature Sensor Out of Range

24 - Throttle Position Sensor Voltage Low

27 - Injector Output Driver Not Responding

43 - Multiple Cylinder Misfire

51 - Lean Fuel System

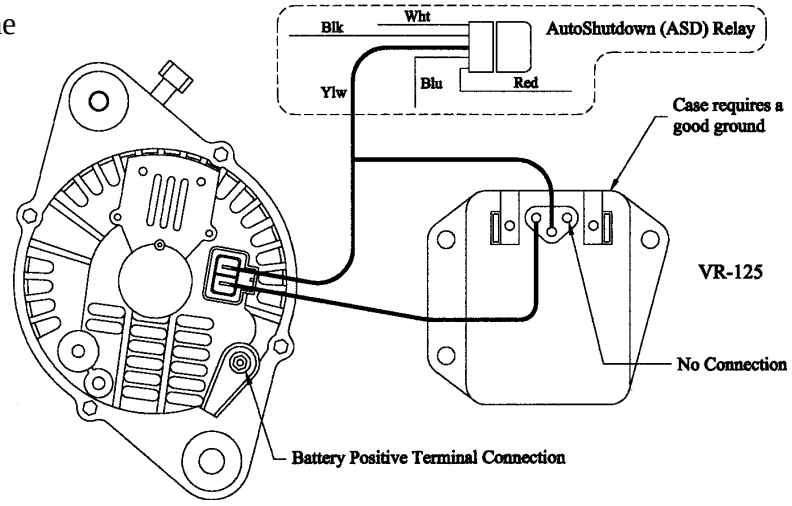
54 - No Cam Signal

55 - Fault Code Display Completed

TIPS IN REMOVING THE NEON'S STOCK ENGINE MANAGEMENT COMPUTER

For those interested in completely removing the Neon's stock computer, here is a description of how to keep the alternator working (the alternator's field excitation voltage is normally controlled by the stock computer which you want to remove). An external voltage regulator for the alternator is available through any Chrysler dealer and most auto parts distributors. The Chrysler P/N is 4379100 while the standard and SAE P/N is VR-125. The regulator is an original equipment replacement for a 1986 Dodge Omni 2.2L, which may help in ordering from some dealers and distributors.

To use the external regulator on your Neon, first you must ground the case of the regulator to the vehicle chassis. Simply using sheet metal screws into the firewall will accomplish this (be sure metal to metal contact is made, paint is an insulator). The voltage regulator must be connected to the alternator and battery next. Looking at the regulator connector, the wire in the center location is the battery voltage reference. This wire needs to be connected to the switched 12V side of the Auto Shutdown relay, the yellow wire shown in the Neon TPK Wiring Diagram. The lower terminal on the alternator connector (this is the right terminal with the clip at the top) needs to be connected directly to and only to the remaining wire on the external voltage regulator. This serves as the field regulating voltage. Typically, this is a solid green wire. Insulate (tape-off) the stock computer side of this wire so it can't short to ground. Don't modify the remaining wire connected to the alternator,typically green with a red stripe. This wire is also connected to the ASD relay. Connected this way, the alternator charge the accessory battery.



The stock computer also normally sends the tachometer signal to the instrument panel. This function can be bypassed simply by connecting the TACH output of the TEC II computer to the same wire that runs into the instrument panel, typically a gray/light blue wire coming out of terminal 73 on the stock computer. Referring

to other instrument operations, the vehicle speed sensor signal and fuel level sensor signal wires typically split and are sent to both the computer and instrument panel. Generally, the fuel wire is dark blue (terminal 23) and the vehicle speed wire is white/orange (terminal 66). Additionally, the stock coolant temperature sensor wire is required of the instrument panel, although its violet/yellow wire is not routed to the engine management computer, only to the instrument panel.

The OEM computer also controls the radiator fan relay. If the OEM computer is removed, use a thermostatic switch in the coolant lines. A good switch to chose for this engine would typically close at 100°C (212°F) and reopen at 94°C (201°F). The OEM computer normally controls the radiator fan relay's coil ground side. You may find this wire at pin terminal 18 of the OEM computer (light green wire) or under the engine bay fuse box with either a dark green wire or a dark blue/pink wire. Measure both sides of the radiator fan relay's coil connections in the top side of the fuse box. One should measure +12V with the battery connected, the other a floating voltage (no continuity). Test continuity of this relay connection with the wire you believe is the OEM's radiator fan relay control. With continuity confirmed, wire this to one side of the thermostatic switch you've installed into the engine's coolant with the other side of the switch connected to ground.

If your Neon came equipped with cruise control and you would still like to retain it's function, unfortunately there is some bad news. The OEM computer is dedicated to managing the cruise control vacuum servo circuit, so if the computer is disconnected or turns off, the cruise control will be disabled. The OEM computer is capable of turning itself off due to a lack of appropriate signal inputs, so it is suggested that the cruise control function of the OEM computer not be used even if it is left connected to the OEM wiring harness.

** These connections can also be made to simply bypass the stock computer if it tends to turn itself off from time to time because of a lack of appropriate signal inputs.

INSTALLING THE CRANKSHAFT TRIGGER WHEEL BOLT-ON KIT

The Neon Crankshaft Trigger Wheel Bolt-on Kit is designed especially for very high performance engines requiring very accurate, high energy ignition timing. It only differs from the standard Neon TPK DOHC camshaft trigger assembly by its location, directly on the crankshaft, not in any of its design purpose or operation. However, this location of the high resolution trigger wheel assembly benefits very high performance engines by not including in the sensor signal any backlash or oscillations between the crankshaft and camshafts due to the indirect drive of the timing belt. An included benefit of this trigger assembly is the reduced horsepower losses of the power steering pump by using an underdrive pulley. Due to the position of the camshaft position sensor on the cylinder head in the SOHC engine (close to wiring and heater hose routing), the Crankshaft Trigger Wheel Bolt-on Kit is required to use a Neon TEC-II computer on the SOHC engine.

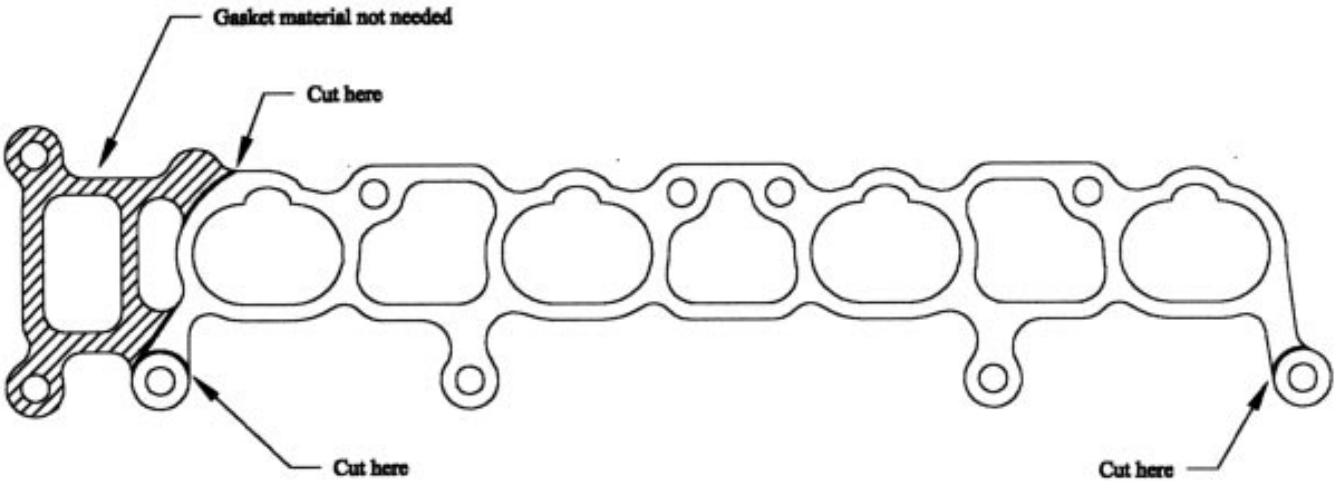
1. Remove the front passenger wheel and the plastic accessory belt cover behind the wheel. Note the accessory belts tension in order to correctly set the new belts' tension. Remove the accessory belts by loosening the two adjustment nuts on the power steering pump then the one adjustment nut on the alternator along with its adjustment bolt (both alternator parts shown in figure). Bring the engine to TDC of cylinder #1 by aligning the camshaft gear marks as described in instruction #40 of the TPK installation. Remove the crankshaft pulley bolt (impact air hammer recommended) and the pulley using a three finger gear puller.

2. Remove the two alternator pivot bracket bolts and install the Electromotive supplied magnetic sensor bracket using the two new bolts supplied in the kit (the original bolts are too short to reinstall). Remove the

three bolts and lock washers from the Unorthodox Racing underdrive pulley. Using those lock washers along with the offset spacers, longer bolts, and plat washers, bolt the 60 (-2) tooth wheel onto the underdrive pulley. Use the centering piece included with the kit to center the trigger wheel onto the pulley while tightening the bolts in the center of the trigger wheel slots; remove the centering piece. Identify the trailing edge of the 11th tooth after the two missing teeth (count counterclockwise and refer to figure) and mark the wheel at this location by scratching the surface, permanant magic marker, or otherwise. Install the magnetic sensor in its bracket with plenty of clearance between its tip and the trigger wheel (used only to reference the 11th tooth position when installing the pulley)

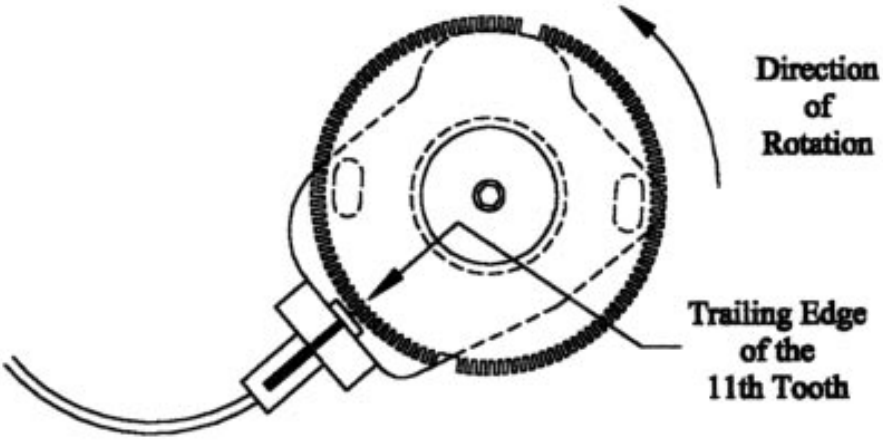
.3. Follow the Unorthodox Racing installation instructions to heat the underdrive pulley (with the trigger wheel attached) at 350°F for 20 minutes. When installing the hot underdrive pulley/trigger wheel assembly onto the crankshaft snout, pay careful attention to position the 11th tooth (previously marked) as close as possible to the magnetic sensor tip. Following the Unorthodox Racing instructions, tighten the crankshaft pulley bolt to 30 ft-lb while hot to seat the pulley on the crankshaft snout fully. Allow the pulley to cool for at least 15 minutes then tighten the crankshaft bolt to 105 ft-lb. Examine the position of the magnetic sensor tip to make sure it is exactly in the center of the trigger wheel teeth, not to the left or right. If it is not in the center of the teeth, remove the bracket and adjust it by installing a shim or removing material. Once the magnetic sensor is aligned with the trigger wheel, set the air gap on the magnetic sensor to 0.030" with feeler gauges. Replace the accessory belts with new, shorter ones (P/N suggestions given in the figure) and retension them according to your observations at the start of this installation.

4. Confirm the position of the 11th tooth of the trigger wheel as described in instruction #41 of the TPK installation. If the adjustment of the trigger wheel position is necessary, remove the crankshaft pulley bolt and temporarily install the kit's centering piece before loosening the three pulley bolts. If the trigger wheel was installed with the bolts in the center of the wheel slots, the wheel can be rotated one full tooth and a gap (6°) in either direction without having to remove the underdrive pulley. If more adjustment is necessary, repeat this installation procedure from the beginning. Once the wheel has been adjusted to your satisfaction, remember to remove the centering piece and reinstall the crankshaft bolt, torqued to 105 ft-lb. Before replacing the accessory belt cover and wheel, route the magnetic sensor cable so you can secure it to some place on the engine block as close to the sensor as possible. Repeated movement of the wire near the sensor base, even normal idling vibrations, due to not securing this wire or securing it to the frame of the vehicle will cause fatigue in the wires and sensor failure, solved only by sensor replacement. Replace the accessory belt cover and wheel.

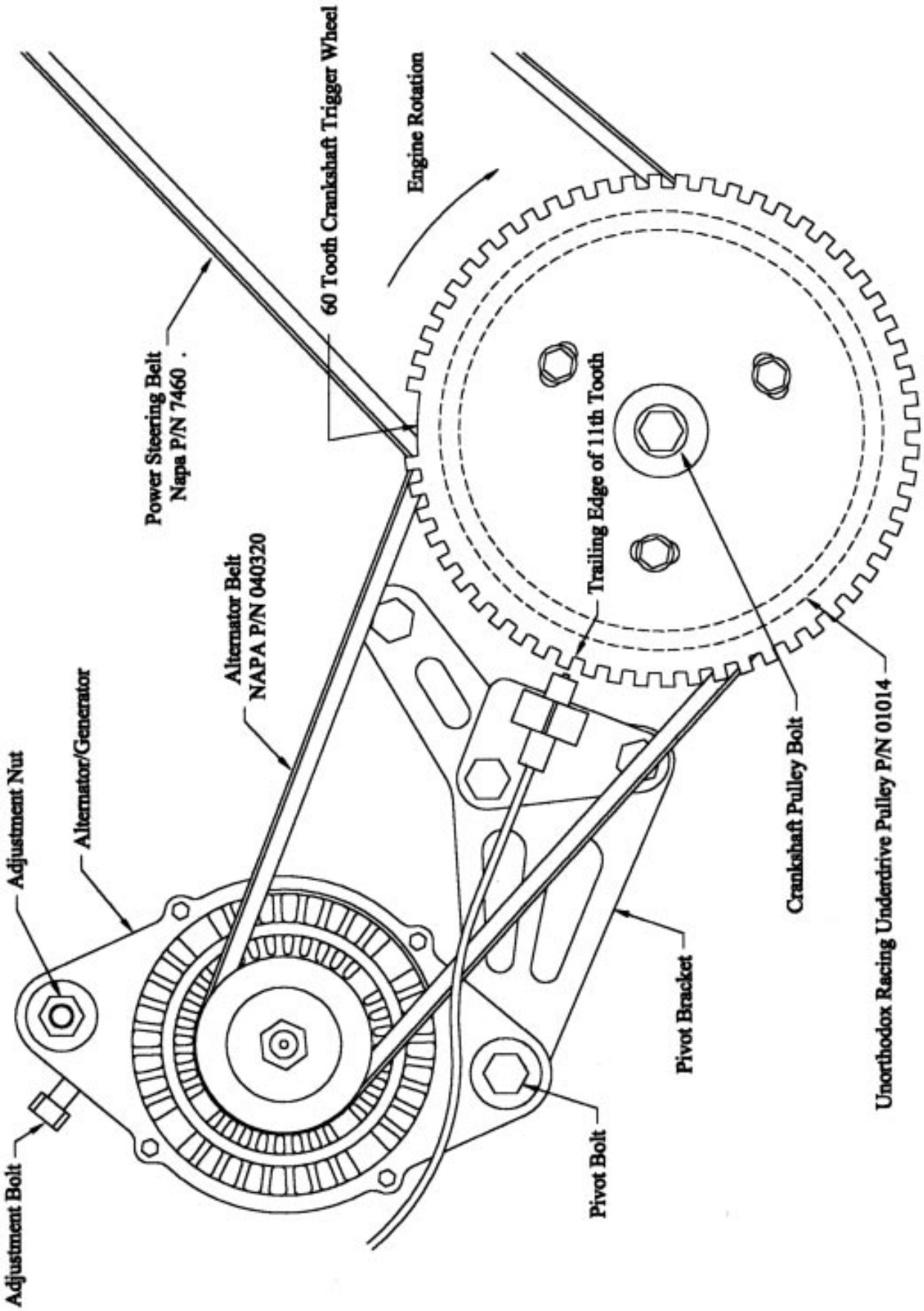


DOHC INTAKE MANIFOLD GASKET MODIFICATIONS

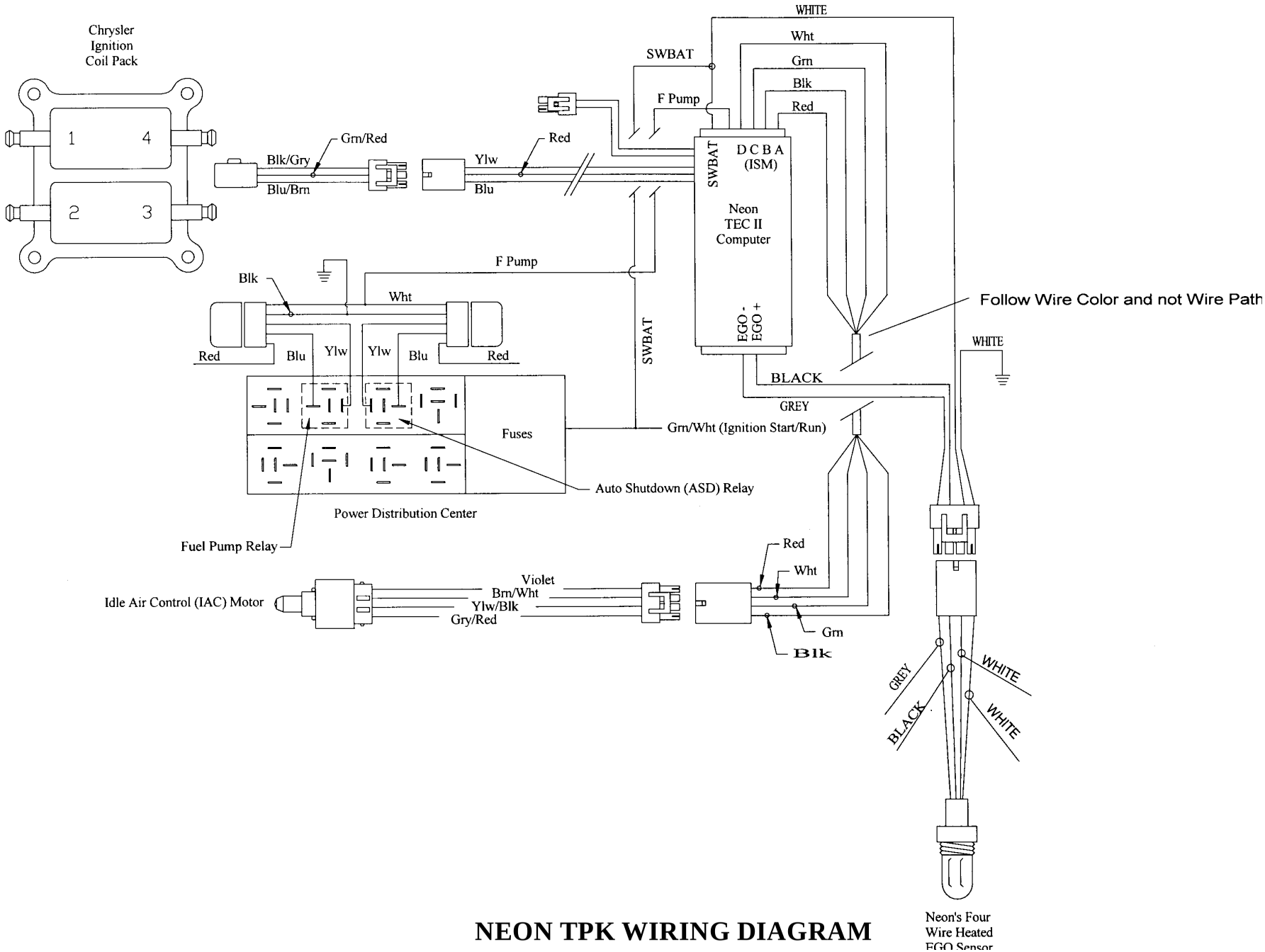
(Allowing it to be used on SOHC engines)



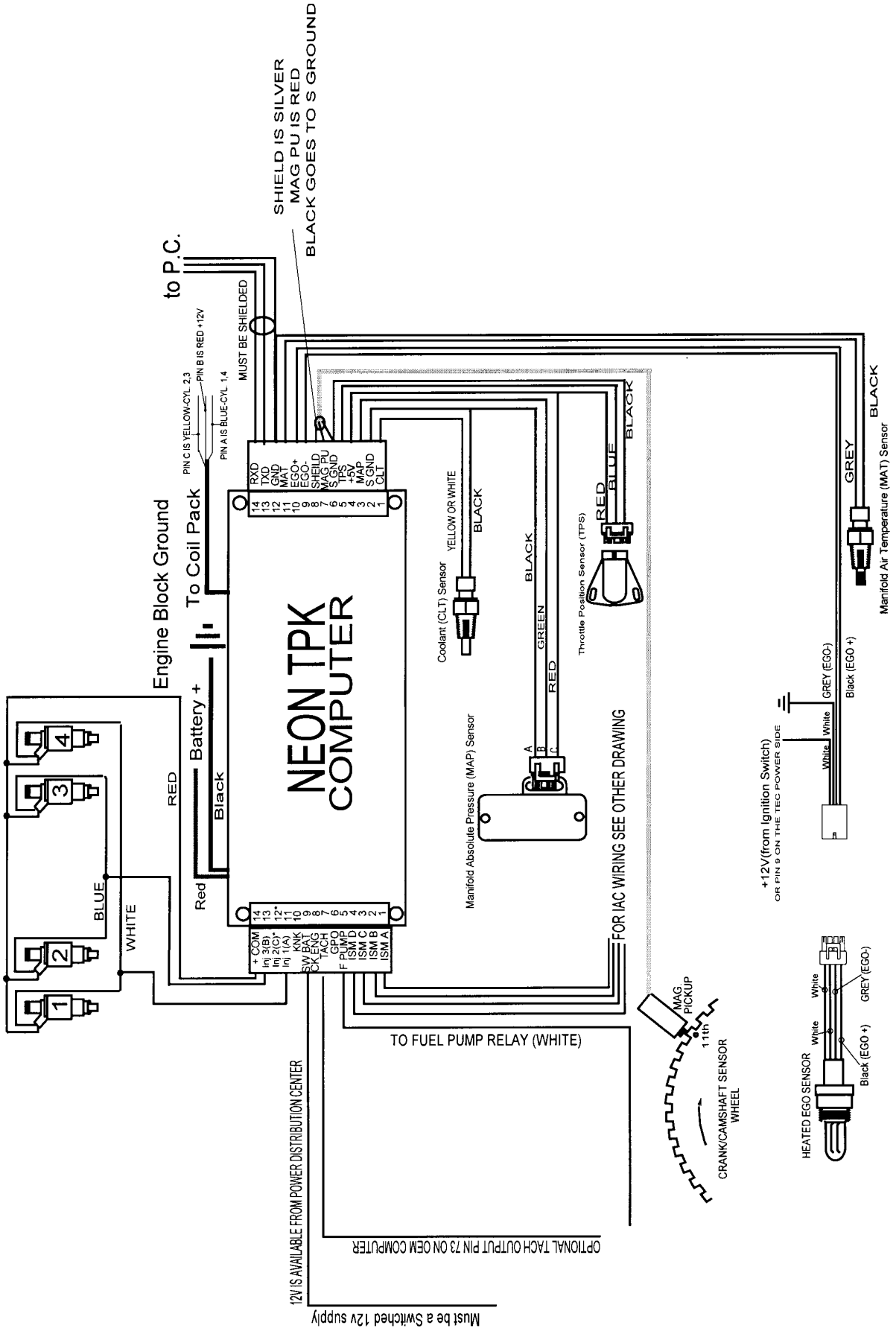
CAMSHAFT TRIGGER ASSEMBLY



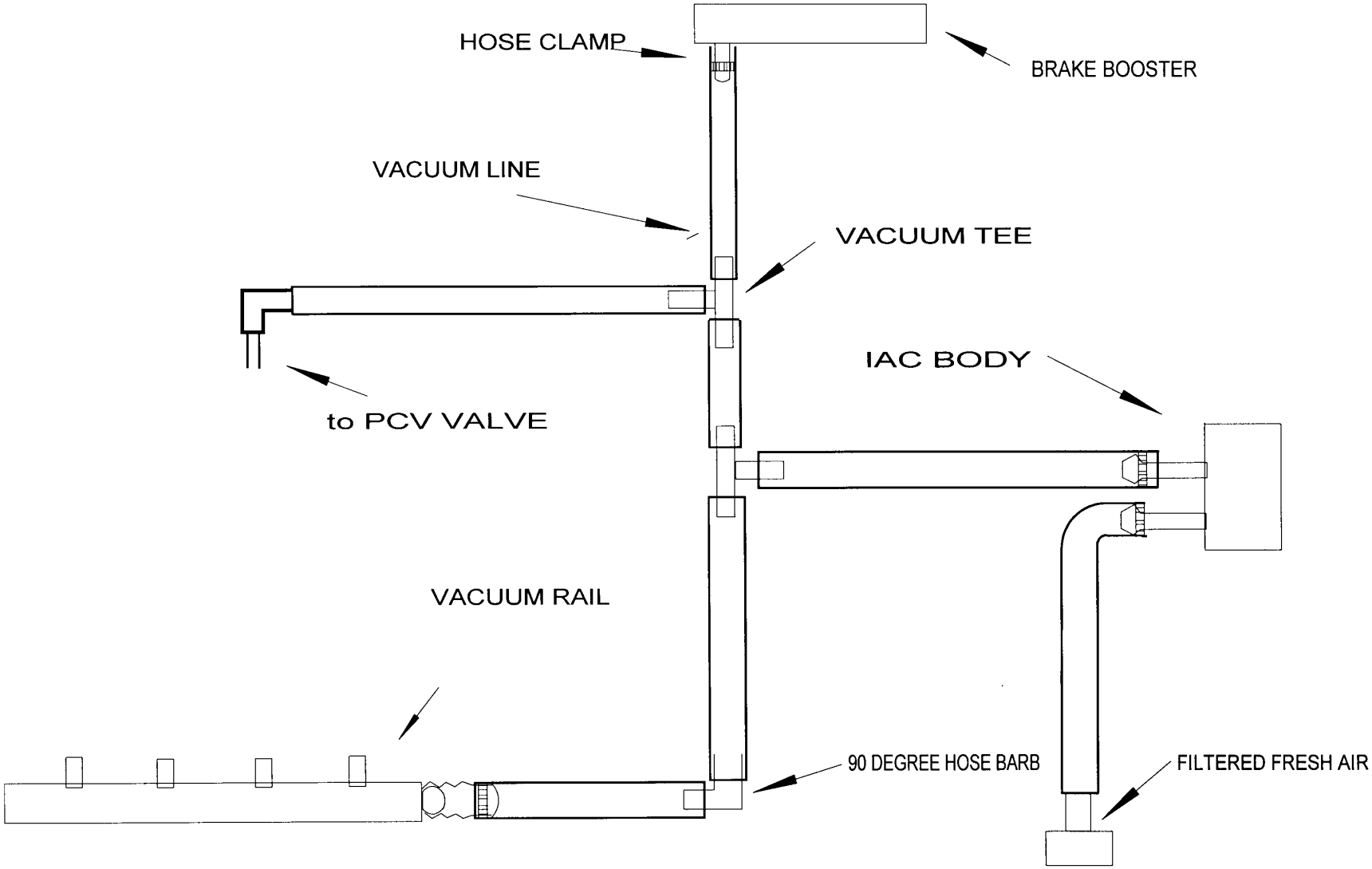
CRANKFIRE ASSEMBLY



NEON TPK WIRING DIAGRAM



TEC-II NEON WIRING DIAGRAM



VACUUM DIAGRAMM