



USER INSTRUCTIONS

DYNA 2000-HD1 Programmable Digital Ignition System For Harley-Davidson Motorcycles

DESCRIPTION

The DYNA 2000-HD1 Digital Ignition system for Harley-Davidson motorcycles is a plug in upgrade to the electronic advance ignition found on late model Harleys. This ignition is micro-computer controlled, generating extremely accurate control over the entire ignition process. The DYNA 2000-HD1 is without question the most sophisticated and capable aftermarket ignition available for Harley-Davidsons.

In addition to providing precise control over the ignition process, the DYNA 2000-HD1 allows you to tailor the advance curve and rev limiter to the specific needs of your particular engine. The DYNA 2000-HD1 has four built in advance curves which have been optimized to cover the needs of stock motors to highly modified motors over a variety of operating conditions. There are also four independent rev limiter choices from 6000 to 7500 RPM, allowing you to set the exact protection level you need.

The DYNA 2000-HD1 is triggered directly from the stock Hall effect pickup found on the camshaft of all late model Harleys. Earlier model bikes without factory electronic ignition can also use the DYNA 2000-HD1 by installing a pickup from any late model bike. The DYNA 2000-HD1 can be used with either one ignition coil (dual fire mode) firing both cylinders, or with two ignition coils (single fire mode), one coil firing each cylinder. No other ignition offers this flexibility.

A separate tach output is included on the DYNA 2000-HD1 to allow correct tach operation during rev limiting and when in single fire mode. A diagnostic LED indicator is included on the back of the ignition module to assist in trouble shooting and static timing.

INSTALLATION

****IMPORTANT**** On any electronic advance ignition such as the DYNA 2000-HD1 or the stock Harley ignition, you must use carbon or graphite core type suppression spark plug wires with a resistance of at least 3000 ohms per foot to reduce radio frequency interference. Use of spiral core type suppression wires or metal core wires may cause malfunction of the ignition due to severe electrical noise generated at the spark plugs. The original wires supplied by Harley-Davidson are acceptable. Suppression wires are also available from DYNATEK.

**** The DYNA 2000-HD1 uses the same 7 pin connector as found on the stock ignition harness used on recently manufactured bikes. If you have a bike that does not have an ignition harness that can be unplugged from the ignition module, use DYNATEK Part No. 1009001 DYNA 2000-HD extension harness to complete the ignition wiring.**

****IMPORTANT **** - The stock pickup assembly consists of two pieces, a sensor plate and a rotating cup attached to the camshaft. The rotating cup used on 1983 and later Harleys has part number 32402-83 stamped on it and is gold in color. This is the correct cup to use with the DYNA 2000-HD1. Pre 1983 electronic ignition bikes have a silver colored cup with different window widths. The DYNA 2000-HD1 advance curves will not work properly with the old cup design. If you have one of these older cups, get a newer cup with the above part number from your Harley dealer.

Any of the sensor plates produced from 1983 on will work with the DYNA 2000-HD1. Bikes originally equipped with points or early electronic ignition (Prestolite) will accept the later model sensor and cup without modification. Sensor plate number 32400-84 is typical.

**** Some 1994 and later model bikes have an 8 pin connector at the ignition module. If you have this eight pin connector on your harness, you will need DYNATEK Part No. 1009002 seven pin to eight pin harness adapter.**

DUAL FIRE INSTALLATION (One coil firing both cylinders)

Recommended Coil: Use one dual output coil with a primary resistance of 2.5 to 3.5 ohms, such as DYNATEK Part No. DC6-1, or DYNATEK Part No. DC1-1, or stock Harley coil, or Screamin' Eagle Harley coil. For dual plug applications, 2 DC2-1 or DC5-1 coils wired in series can be used.

1. Locate the stock ignition module and unbolt it from the bike.
2. If the stock module has a 7 pin plug, unplug the stock module. If there is no main harness plug on your module you will need an extension harness for the DYNA 2000. If you are installing an extension harness, follow the wiring instructions included with the new harness.
3. Plug the DYNA 2000-HD1 into the 7 pin plug on the harness. The blue wire is left unconnected. The green wire is for the tach and its use is optional on dual fire installations (see step 2 under "SINGLE FIRE INSTALLATION). Don't bolt down the DYNA 2000-HD1 yet.
4. Skip to the "Configuring The Mode Switches" section of these instructions.

SINGLE FIRE INSTALLATION (Two coils, one firing each cylinder)

Recommended Coils: Use two single output coils with primary resistance of 2.5 to 3.5 ohms, such as DYNATEK Part No. DC3-1 single output coils, or DYNATEK Part No. DC1-1 or DC6-1 dual output coils for dual plugged heads. Mounting brackets for two coils are available from the major Harley parts distributors.

1. Follow the "Dual Fire Installation Instructions" above, through step 3.
2. Tach signal connection. You must complete this step for single fire installations only if your bike is equipped with a tachometer. If you do not have a tach, leave the green wire on the ignition module unconnected.

Locate the pink wire on the ignition coil that goes to the tach. This wire is normally connected to the minus side of the coil along with another pink wire that goes to the ignition module.

Locate the green extension wire that came with your kit. Connect the bullet connector end of this wire to the matching green wire on the ignition module. Route the green extension wire to the coil area and splice it to the pink wire going to the tach. Do not reconnect the tach wire to the coil or damage to the ignition may result.

****NOTE**** If your bike is equipped with cruise control and you want to run single fire, you will need DYNATEK part number 1404002 Cruise Control Adapter Kit. Call DYNATEK.

2a. Some bikes with a tach have only one pink wire at the ignition coil. If this is the case with your bike you will need to connect the DYNA 2000-HD1 tach output directly to the tach.

Access the back of the tachometer housing and remove the pink wire from the back of the tach. Locate the green tach extension wire included with your ignition kit. Plug the bullet connector end of this wire into the mating connector on the green wire at the DYNA 2000 module. Route the green tach extension wire to the tachometer and connect it where the pink wire was attached. You may need to lengthen the green wire. Put ample electrical tape on the exposed end of the pink wire which was removed. If this end touches anything conductive it will cause the ignition to fail.

3. Remove the original single coil. Note that there should be a white wire from the ignition (or run/stop) switch on one of the coil primary terminals. On the same terminal there should be a white wire going to the ignition module. These wires are the switched +12v supply to the ignition system/coil and the +12v supply wire going to the ignition module. On the other coil primary terminal, you should find a pink wire from the ignition module, this is the coil minus wire from the ignition module. A second pink wire from the tach should have been rerouted in step 2 above. Remove all these wires from the coil, noting their function.

4. Mount the two ignition coils firmly enough that they can withstand normal vehicle vibration without loosening or bracket fatigue.

5. Assign one coil to the front cylinder and one to the rear cylinder. Spark plug wires should be connected accordingly.

6. Locate the 6 inch white jumper wire included in the DYNA 2000-HD1 kit. Connect this jumper wire from one of the primary terminals (terminal marked "+" on DC3-1 coil) on the front cylinder coil to one of the primary terminals on the rear cylinder coil. Locate the original white wires on the bike that are the +12v supply from the ignition switch and the +12v supply to the ignition module (discussed in step 3). Connect both of these original white wires to one of the coil primary terminals with the white jumper wire attached.

7. Locate the original pink wire that goes to the ignition module (the coil minus wire discussed in step 3). Connect this wire to the unconnected primary terminal on the rear cylinder coil.

8. Locate the blue extension wire included in the DYNA 2000-HD1 kit. Plug this wire onto the matching terminal on the DYNA 2000-HD1 ignition module and route the wire to the front cylinder coil. Connect the loose end of the blue wire to the unconnected primary terminal on the front cylinder coil.

Your system is now completely wired. After configuring the mode switches and checking the timing, you will be ready to run.

CONFIGURING THE MODE SWITCHES

There are 5 mode switches located on the back of the DYNA 2000-HD1 ignition module. These switches allow you to custom configure your DYNA 2000-HD1 to match the requirements of your bike. Go through the following list of switch functions and make sure each switch is in the proper position before you start the motor.

Advance Curves

DYNATEK has chosen not to publish graphs of the advance curves produced by this ignition for competitive reasons. But, the following procedure is the only real way to choose the proper curve for your engine. The following procedure and a little common sense will get you dialed right in.

The philosophy behind choosing an advance curve:

There are four advance curves available, curve 1 gives you the most final advance and brings in the advance the earliest (at the lowest RPM), curve 4 gives you the least final advance and brings in the advance the slowest.

In general you should run the lowest number curve you can without causing detonation. A good procedure would be to start with curve 1 or 2, do some driving, and move to curve 3 or 4 if you experience any detonation.

<u>Switch 1 & 2</u>	<u>Advance Curve</u>	<u>Description</u>
OFF OFF	Curve 1 -	Stock engine, cool air temperatures, or high octane fuel, this curves brings up the advance earliest and to the highest final value.
ON OFF	Curve 2 -	Slightly modified engine, warmer air temperatures, regular grade fuel, this curve brings up the advance a little slower than curve 1 to prevent detonation on near stock motors.
OFF ON	Curve 3 -	Performance engine, high compression, poor quality fuel, hot air temperatures, this curve is good for built motors that tend to detonate, advance comes in slower than curve 2 and to a lower final value.
ON ON	Curve 4 -	High performance engine, high compression, poor quality fuel, hot air temperatures, this curve should only be used if your motor still detonates using curve 3, advance is brought in still slower and to a lesser final value than curve 3.

<u>Switch 3 & 4</u>	<u>Rev Limit</u>	<u>Application</u>
OFF OFF	6000 RPM	stock motor
ON OFF	6500 RPM	modified street motor
OFF ON	7000 RPM	race motor
ON ON	7500 RPM	race motor (most Harley valve trains don't like to be revved this high)

<u>Switch 5</u>	<u>Firing Mode Select</u>
OFF	Dual fire
ON	Single fire

DIAGNOSTIC LED FUNCTION

A diagnostic LED is located on the back of the DYNA 2000-HD1 ignition module. This LED is useful for verifying system functionality and static timing the motor.

Verifying system functionality with the LED

The LED can be used to determine if the ignition module and pickup are working. When power is turned on to the ignition, the LED should flash on for 1/4 second then turn off. If the pickup is near a firing point, the LED will come on continuously. This "Flash period" indicates that the microprocessor is functioning in the DYNA 2000-HD1 ignition module.

When the ignition power is on and the engine is cranked over, the LED on the back of the DYNA 2000-HD1 will blink on and off. This indicates that the pickup is generating timing pulses and the DYNA 2000-HD1 is receiving them. The pickup is designed such that the LED will come on at about 45 degrees before top dead center and go off at top dead center for each cylinder. This corresponds to the leading edge of the window in the rotating cup (45 BTDC) and the trailing edge (TDC).

STATIC TIMING THE MOTOR WITH THE LED

****IMPORTANT **** THE DYNA 2000-HD1 MUST BE STATICALLY TIMED ACCORDING TO THE PROCEDURE DESCRIBED BELOW. DO NOT ATTEMPT TO TIME IT LIKE A STOCK MODULE OR IMPROPER TIMING WILL RESULT.

IF THE MOTOR WAS TIMED PROPERLY BEFORE INSTALLING THE DYNA 2000-HD1, YOU SHOULDN'T HAVE TO RETIME IT. HOWEVER, IT SHOULD BE CHECKED BY OBSERVING THE TIMING MARKS AS DESCRIBED UNDER "TIMING CHECK".

Static timing is easy with the DYNA 2000-HD1. Remove the timing inspection plug above the primary drive housing on the left side of the motor. Remove the spark plugs to make it easy to turn the crankshaft. With the bike in high gear move the rear wheel to get the crankshaft to top dead center on the compression stroke of the front cylinder (TDC mark aligned in the inspection hole).

Timing Set

Rotate the pickup base plate to cause the DYNA 2000-HD1 LED to turn off and on. Carefully follow this next instruction: find the point where the LED just turns off while rotating the base plate in a clockwise direction. Lock down the pickup base plate at this location. Verify that the crankshaft is still on top dead center. Your base timing should now be set perfectly. Use the different advance curves to dial in the rest of your timing.

Timing Check

For a double check on the timing, while still in gear rotate the rear tire so the engine is before top dead center on the front cylinder compression stroke, then slowly rotate the crankshaft forward to top dead center and observe the LED turn off as the TDC mark on the crank passes the inspection window.

Replace the spark plugs and timing inspection plug and start the engine.

****NOTE**** During cranking the DYNA 2000-HD1 will fire both coils (even when switched to single fire). As soon as the engine reaches idle speed the DYNA 2000-HD1 will fire each coil independently. This feature allows for quicker starting.

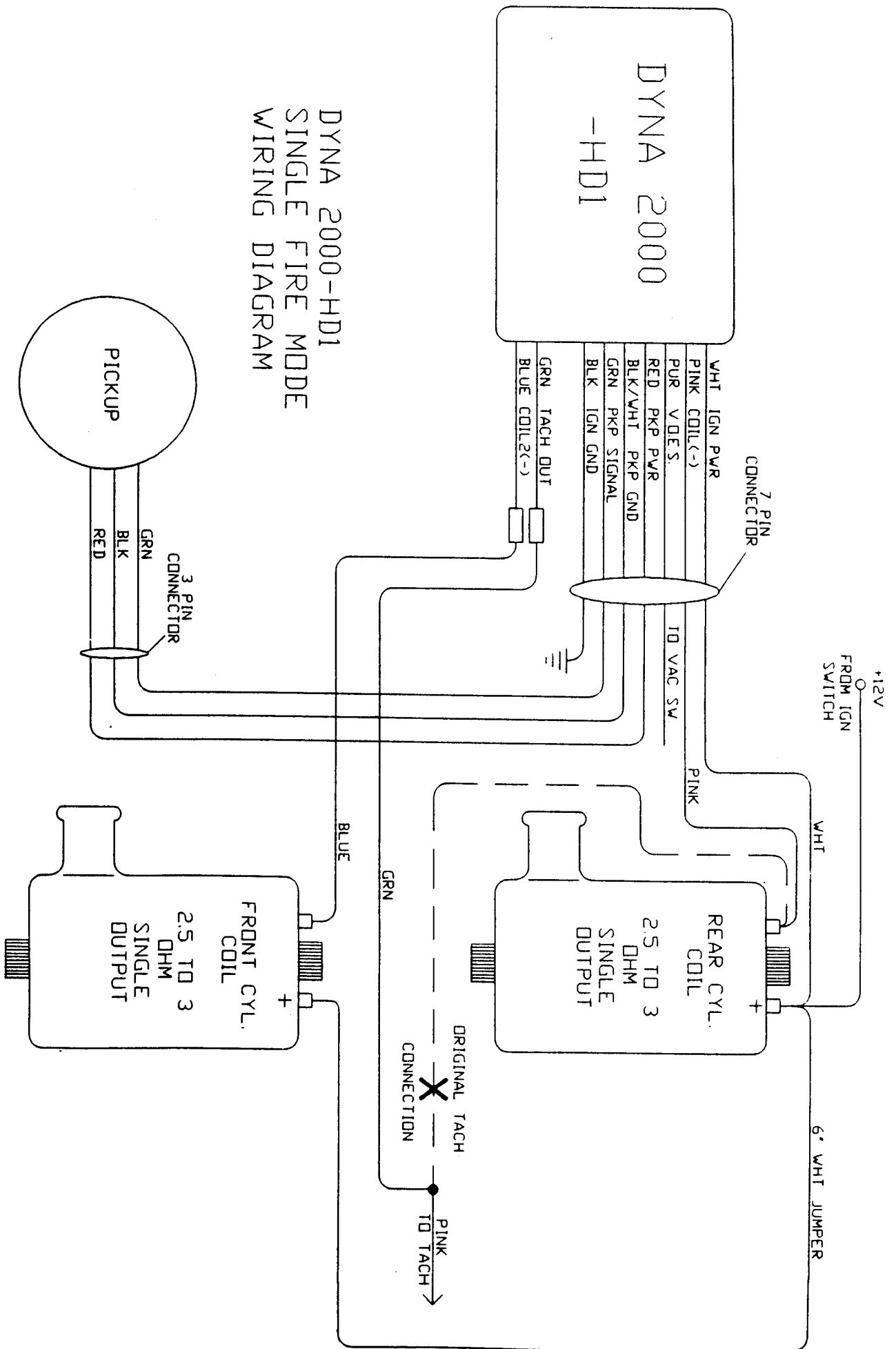
Vacuum Operated Electric Switch (V.O.E.S.)

Most Harley-Davidson engines are equipped with a V.O.E.S. switch in the intake manifold. The normal function of this switch is to sense light load part throttle conditions during vehicle operation. When this condition exists, The V.O.E.S. switch sends a signal to the stock ignition module which causes the ignition to go to full advance instead of following the normal advance curve.

When everything works properly this is an acceptable action. But, if the V.O.E.S. switch is faulty or the manifold vacuum is different because of a change in carb or manifold (or even exhaust pipe) the V.O.E.S. switch can falsely force the engine to full ignition advance at the wrong time. This can cause catastrophic results, like holes in pistons due to detonation.

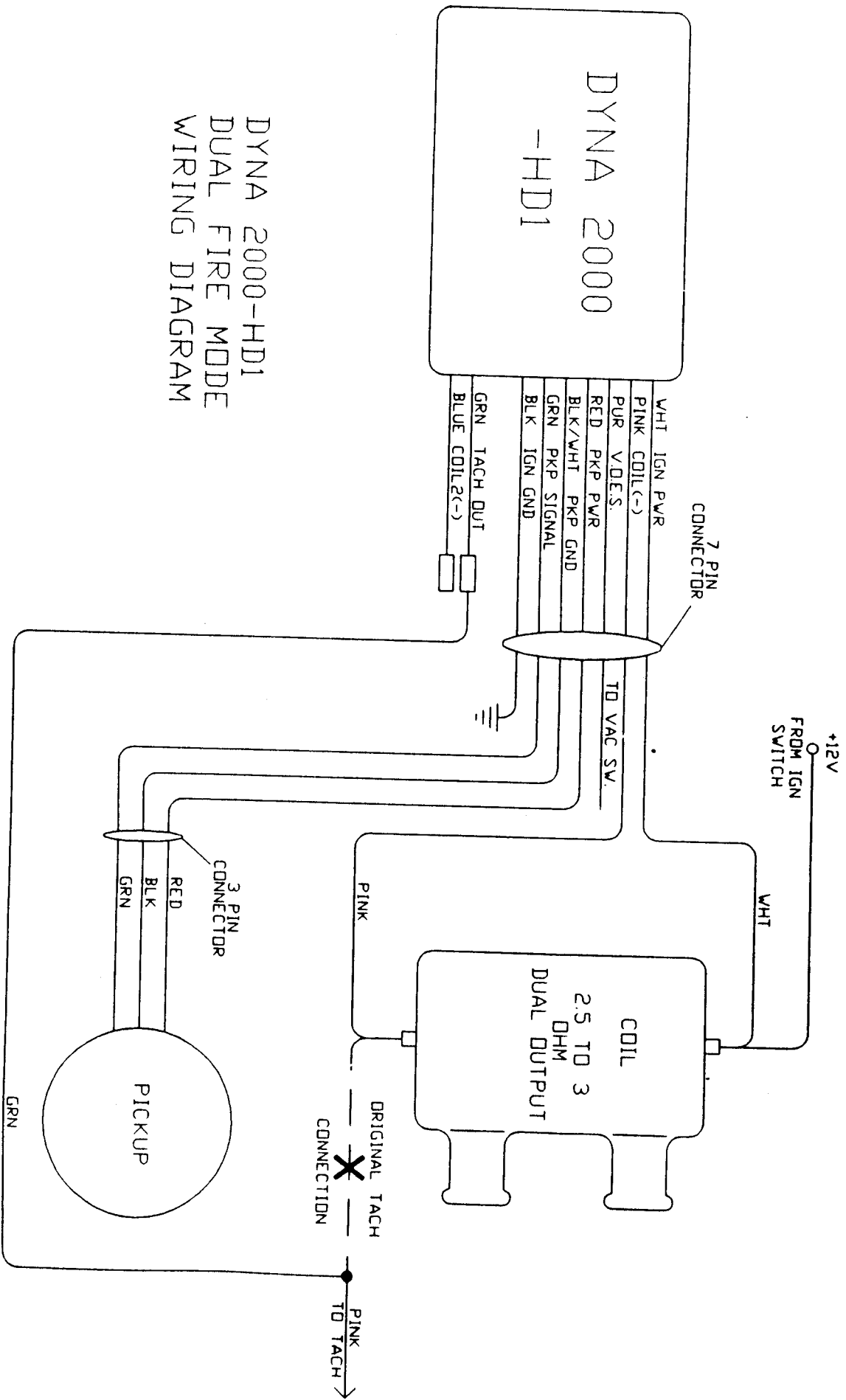
For this reason, the V.O.E.S. switch function is not implemented in the DYNA 2000-HD1 ignition. Your DYNA 2000-HD1 will always produce the preset advance curve regardless of the state of the V.O.E.S. switch. This means you can leave the V.O.E.S. wired up and installed, or you can remove it and plug the hole in the manifold. Either way it will not affect the operation of the DYNA 2000-HD1. This will insure your engine always performs at its best .

DYNA 2000-HD1 SINGLE FIRE MODE WIRING DIAGRAM



****NOTE** RECOMMENDED COIL: USE TWO SINGLE OUTPUT COILS WITH 2.5 TO 3 OHM PRIMARY RESISTANCE, SUCH AS DYNATEK PART NO. DC3-1. FOR DUAL PLUGGED HEADS USE TWO DUAL OUTPUT COILS SUCH AS DYNATEK PART NO. DC1-1 AND CONNECT BOTH SPARK PLUGS OF A CYLINDER TO ONE COIL.**

DYNA 2000-HD1
 DUAL FIRE MODE
 WIRING DIAGRAM



NOTE RECOMMENDED COIL: USE ONE DUAL OUTPUT COIL WITH 2.5 TO 3 OHMS PRIMARY RESISTANCE, SUCH AS DYNATEK PART NO. DC6-1 OR DYNATEK PART NO. DC1-1.