

# **DYNA 2000**

## **DIGITAL PERFORMANCE IGNITION**

### **for FOUR CYLINDER ENGINES**

#### **KIT NUMBER DDK3-3**

**1986-92 GSXR 1100/750 AIR & OIL COOLED ENGINES**  
**1996-97 BANDIT 1200S AIR & OIL COOLED ENGINES**

## **INSTALLATION GUIDE**

### **DESCRIPTION**

The Dyna 2000 Digital Performance Ignition for four cylinder engines represents a breakthrough in motorcycle ignition flexibility. The Dyna 2000 system consists of a state of the art microprocessor controlled ignition module along with an adjustable Dyna dual sensor crank trigger. For the first time you can actually set the ignition timing to what you want to maximize engine performance. The Dyna 2000 ignition system is programmable to allow you to maximize your performance. A number of different advance curve modes and a broad range rev limiter let you tailor the ignition to your needs. The Dyna 2000 also has the following built-in features:

- \*Fully static timable - You can set the timing accurately to the desired value without having the engine running.
- \*Independent 1/4, 2/3 cylinder timing - The Dyna dual sensor crank trigger uses one sensor for cylinders 1 & 4 and the other sensor for cylinders 2 & 3 allowing you to accurately set the timing for each cylinder pair.
- \*Built-in static timing light - An LED light built in to the Dyna 2000 ignition module allows you to monitor the crank trigger signal status and easily set the ignition timing.
- \*Five different advance curves - You can advance slowly to dial out pinging on high compression motors or bring the advance in quickly on quick revving motors or select a curve in between to maximize the performance of your combination.
- \*Four different retard modes - The Dyna 2000 is an ideal solution for turbo or nitrous applications.
- \*Test mode - System check out and trouble shooting is a breeze with this feature.
- \*Safety interlock input - You can keep your side stand safety switch functional or hook up a theft prevention switch, or activate a shift lever kill for road racing.
- \*Broad range rev limiter - The Dyna 2000 rev limiter is adjustable from 8,500 to 16,000 rpm to let you run in any range you want.
- \*Digital tach output - Your tachometer will run smooth and accurate, even at the rev limit.
- \*High energy - An innovative dwell control scheme maximizes spark energy all the way to 16,000 rpm! The Dyna 2000 can be used with 2.2 ohm or 3 ohm coils.
- \*Easy mounting - The Dyna 2000 ignition module has built in frame saddles to make mounting anywhere a breeze.
- \*Complete wiring harness - The Dyna 2000 kit includes a complete wiring harness to simplify installation.

**\*Low cost! - The Dyna 2000 system in most cases costs less than a stock ignitor box.**

## INSTALLATION

**\*IMPORTANT\*** Refer to the wiring diagram included with these instructions while installing the Dyna 2000.

**\*IMPORTANT\*** This system does not require the stock ignitor box. Remove the stock ignitor box from your bike before installing the Dyna 2000 ignition system.

**\*IMPORTANT\*** It is necessary to use suppression core spark plug wires with the Dyna 2000 ignition system. Spiral core or carbon core spark plug wires are acceptable. The Dyna 2000 can also be used with the stock resistor cap spark plug wires. These have a small resistor located in a cavity in the top of the spark plug boot.

**\*IMPORTANT\*** Thoroughly read these instructions before starting the installation of this system.

**\*IMPORTANT\*** You may need a new ignition cover gasket for your engine during this installation. This is the gasket for the right side engine cover.

1. Ignition module placement - It is important to carefully choose a mounting location for the Dyna 2000 ignition module such that all harness wires will reach their destination. Before you permanently mount the module, go through the following procedure.

1A. Locate the Dyna 2000 ignition module and the six foot long main wiring harness included with your Dyna 2000 kit. Plug the eleven pin connector of the wiring harness into the Dyna 2000 ignition module.

1B. The main wiring harness has two main groups of wires. The group of wires that is three feet long with two connectors at the free end is the crank trigger group. The other group of wires that is six feet long is the coil group. On a sport bike the ignition module is normally mounted under the seat or in the tail section. Temporarily position the Dyna 2000 ignition module in a convenient location under the seat or near the tail section where you think it might fit. Extend the crank trigger wire group toward the rear of the engine. The Dyna 2000 module should be located such that the crank trigger wire group can easily reach the area under the carburetors. This is where the plug on the crank trigger will end up after the crank trigger is installed.

1C. Extend the coil wire group of the harness toward the ignition coil location. You will probably have to remove the gas tank to access the ignition coils.

1D. Now secure the Dyna 2000 ignition module in a position where the main wire harness will reach the above destinations. The Dyna 2000 module has two frame tube mounting saddles on one side that can be used to attach to the motorcycle frame with the included zip ties or a mounting method of your choice can be used.

reach the above destinations. The Dyna 2000 module has two frame tube mounting saddles on one side that can be used to attach to the motorcycle frame with the included zip ties or a mounting method of your choice can be used.

2. Ignition module ground - Locate the 24 inch black wire which extends by itself from the Dyna 2000 module end of the harness. This wire has a 1/4" ring terminal on it's free end. Connect the ring terminal directly to the negative post of the battery.

3. Coil wiring - The coil wire group of the harness contains five wires:

<u>color</u>	<u>destination</u>	<u>function</u>
white	coil 1/4	fires the coil for cylinders 1 and 4
blue	coil 2/3	fires the coil for cylinders 2 and 3
red	+12V	this wire needs switched 12 volts to power the ignition
green	tach	tach output, two pulses per revolution
yellow	tach/2	tach output, one pulse per revolution

**NOTE** - The Dyna 2000 ignition can be used with 2.2 or 3 ohm coils. Most factory coils fall into this range and are compatible with the Dyna 2000. For maximum spark energy use Dynatek part number DC4-1, 2.2 ohm dual output ignition coils.

3A. Remove the gas tank or air box as necessary to expose the ignition coils.

3B. Each ignition coil will have two primary wires or connectors on it. Examine the stock coil wires before you disconnect them. Each coil receives +12 volts from the stock harness. The wire that feeds +12 volts to each coil will be the same color on both coils. On a Suzuki, this wire is usually orange with a white stripe (org/wht). Make note of the wire color that feeds +12 volts to the coils. You will not be disconnecting the +12 volt feed to the coils.

Each coil will have one more primary wire on it. This second wire on each coil will have it's own unique wire color. This wire is called the **NEGATIVE** coil primary wire. Make note of which wire color goes to each coil before you disconnect any of the stock wiring from the coils. On a Suzuki, the negative wire for coil 1/4 is usually white (wht), the wire for coil 2/3 is usually black with a white stripe (blk/wht).

3C. The portion of the Dyna 2000 harness that contains the coil wires should already be routed to the coil area. Locate the red wire in the Dyna 2000 coil harness. Locate the piggy back spade terminal included with the Dyna 2000 kit. This is a female spade terminal with a male spade on it to accept another terminal on top of it. Carefully crimp or solder the piggy back spade terminal onto the red wire in the Dyna 2000 harness (trim the red wire to length if necessary). Now remove the stock +12 volt feed wire from the spade terminal on one of the coils. Attach the piggy back terminal (red wire) to the coil and reattach the stock +12v wire to the piggy back terminal. This connection will provide +12 volts to the ignition module and coils when the ignition key and handle bar run/stop switch are on.

3D. Remove the two remaining primary wires from the coils. These are the ones that are a different color for each coil. Identify which coil feeds cylinders 1 & 4 by looking at the spark

plug wire locations (this is probably a white wire). Locate the white wire on the Dyna 2000 coil harness. Locate one of the female spade terminals included with this kit. Carefully crimp or solder the spade terminal onto the end of the white Dyna 2000 wire (trim the white wire to length if necessary). Connect the Dyna 2000 white wire to the to the coil 1/4 primary terminal which you just disconnected (connect to the coil, not to the bike harness).

3E. Locate the blue wire on the Dyna 2000 coil harness. Locate the remaining female spade terminal included with this kit. Carefully crimp or solder the spade terminal onto the end of the blue Dyna 2000 wire (trim the blue wire to length if necessary). Connect the Dyna 2000 blue wire to the to the coil 2/3 primary terminal which you just disconnected (connect to the coil, not to the bike harness).

3F. The two remaining wires on the Dyna 2000 coil harness are the tach output wires. The connection of these wires will be addressed later.

4. Crank trigger harness - The crank trigger portion of the Dyna 2000 harness should be routed to the area under the carburetors. The crank trigger harness contains a four pin plug with wires for the crank trigger. This harness also contains a single pin plug with an orange wire. The orange wire is the safety interlock wire discussed later in these instructions

## 5. CRANK TRIGGER INSTALLATION

5A. Locate the dual sensor crank trigger included with your kit. The crank trigger has a blue anodized base plate with two black sensor modules on it and is prewired with an 18 inch pickup harness.

5B. Locate the black anodized crankshaft rotor included with this kit. The Dyna 2000 crankshaft rotor has one magnet in it. **DO NOT** use a Dyna 4000 crankshaft rotor with this system. The Dyna 4000 rotor is anodized blue and has two magnets in it. The Dyna 4000 rotor **will not** work with the Dyna 2000 ignition system.

5C. Remove the ignition pickup cover on the right side of the engine. Remove the stock ignition pickup plate and the stamped steel crankshaft advancer assembly. Unplug the stock pickup cable from the bike and completely remove the pickup plate assembly. If your Dyna Crank Trigger does not have a grommet on it then use a razor blade to carefully split and remove the rubber grommet from the stock pickup harness.

5D. Modify the stock rubber grommet to fit over the Dyna Crank Trigger cable. You may need to seal around the cable with some silicone sealer before final assembly. Install the Dyna Crank Trigger plate onto the engine case in the stock pickup location. Push the Crank Trigger cable through the engine case hole in front of the alternator where the stock pickup cable went.

The Crank Trigger cable has five terminated wires extending from the loose end of the harness. The green wire with the bullet connector on one end and a small ring terminal on the other end is provided to reconnect the oil pressure sender unit found in the engine under the crank trigger assembly. The remaining four wires (red, black, white, and blue) are the crank trigger wires. On some crank triggers the red wire may be pink. These instructions will refer to this wire as red.

5E. Reconnect the oil pressure sender unit now. Attach the small ring terminal on the green wire to the oil pressure sender unit in the engine. Plug the male bullet connector on the green wire to the bike wiring harness where the original sender wire went.

5F. Locate the white four position plug housing included with this kit. Examine the four pin pickup plug on the DYNA 2000 harness. After the Crank Trigger cable has been installed through the motor and routed to the ignition module harness location, insert the Crank Trigger wires into the four position plug housing such that the Crank Trigger wires will mate to the Dyna 2000 pickup connector with matching colors on both plugs, i.e. red to red, black to black, white to white and blue to blue.

5G. Locate the black aluminum crankshaft rotor supplied with the 2000 kit. Apply some "blue" Locktight to the stock crank shaft bolt and secure the new rotor to the crankshaft and tighten the bolt. **MAKE SURE TO TORQUE DOWN THE CRANKSHAFT BOLT TO FACTORY RECOMMENDATIONS.**

#### **IGNITION MODULE POWER CHECK**

**\*NOTE\*** The crank trigger must be fully plugged into the Dyna 2000 ignition harness for the following test to work.

The Dyna 2000 ignition module has a power check feature when you first turn on ignition power. At this point in the installation, you should have already connected ignition power (+12V) and ground to the ignition module. Turn the ignition key to the ON position. Move the RUN/STOP switch from "off" to "on". When power is first applied to the Dyna 2000 module you should see the LED on the end of the ignition module blink on then off.

If the crank trigger is not plugged in to the harness, the LED will simply stay on when you turn on ignition power.

#### **6. STATIC TIMING INSTRUCTIONS FOR GSXR**

6A. Remove the spark plugs so the crankshaft will turn easily.

6B. Locate the stamped aluminum timing indicator included with this kit ('T' shaped piece with '20', '30', and '40' stamped into it). Using two of the engine side cover bolts and the aluminum standoffs packaged with the timing indicator, temporarily mount the timing indicator to the engine case using the engine case timing cover bolt locations at the top and at the top right. The standoffs should be installed between the timing indicator and the engine case. Mount the indicator such that the degree markings of the timing indicator point toward the Dyna magnet rotor that you installed onto the crankshaft.

6C. Keep the following in mind when timing the Dyna 2000: The final timing (high rpm) firing point for either cylinder pair is established by the leading edge of the magnet as it approaches a Dyna crank trigger sensor when the crankshaft is turned in its normal forward direction. The LED lamp on the end of the Dyna 2000 module will light whenever either magnet is in front of a Dyna crank trigger sensor, when ignition power is on.

#### 6D. Timing cylinders 2 and 3

Rotate the crankshaft in its normal forward direction until the magnet on the crankshaft rotor nears the sensor bump on the inside radius of the smaller (right) Dyna crank trigger sensor. Notice that one of the small round timing marks on the top of the Dyna magnet rotor is nearing the timing indicator scale. Simply turn the crankshaft until the timing mark on the Dyna magnet rotor aligns with the full ignition timing that you want (stock compression motors will run well with 40 degrees total timing), as indicated by the scale on the timing indicator. The indicator is marked in degrees before top dead center. The crankshaft is now set to the proper firing angle. Now with ignition power on, watch the red LED on the Dyna 2000 module. Rotate the crank trigger baseplate until you find the point where the LED switches on while rotating the baseplate counterclockwise. Now lock down the crank trigger baseplate in this position. For a double check on the timing, now rotate the crankshaft 360 degrees in a clockwise direction until the same timing mark on the magnet rotor again approaches the timing scale. Now gently bump the crankshaft forward to the point where the LED on the Dyna 2000 first comes on and read your timing on the scale. Readjust the crank trigger baseplate if necessary.

#### 6E. Timing cylinders 1 and 4

Rotate the crankshaft in the normal forward direction (clockwise) until the magnet approaches the larger (left) Dyna crank trigger sensor. Note the crank angle shown on the timing indicator at which the LED just turns on as the magnet comes near the sensor bump on the inside of the module. If this angle is different than the timing on cylinders 1 and 4 then loosen the 4-40 screws that secure the larger crank trigger sensor and adjust the sensor to achieve the desired timing. Tighten the sensor screws and baseplate screws when the timing is correct.

6F. Remove the timing indicator and standoffs. Reinstall the engine side cover and spark plugs.

### STARTING THE ENGINE

7. After the crank trigger has been installed and timed you should be able to start the engine. Use the following procedure:

- A. Temporarily reinstall the gas tank if it has been removed so the carbs will have gas.
- B. On the Dyna 2000 module turn the advance curve mode knob to curve 1.
- C. On the Dyna 2000 module turn the rev limiter knob to the rev limit appropriate for your bike.
- D. Turn on your ignition key switch.
- E. Set your handle bar run/stop switch to the run position. - You should be able to see the red LED on the Dyna 2000 module blink on then off when the module receives power from the bike.
- F. Start the bike as you normally would. The engine should start easily. If the engine will not start, refer to the trouble shooting section of these instructions.

### TACH WIRE CONNECTION

8. To connect the tachometer on GSXR's you will need to remove the front fairing to expose the back of the tachometer. The tachometer may have a couple of two wire lamp circuits going into it. It should also have a three wire circuit going into it. The three wire circuit is the tach drive circuit. One of the wires on the tach drive circuit should be black with a red stripe (blk/red). This is the tach signal input wire. Splice the green wire on the Dyna 2000 coil harness to the blk/red wire going into the tachometer. This should get the tach working properly.

8A. The following is a general tach connection procedure. If you were successful with step 8 above, then skip the rest of the tach hook instructions (skip to step 9).

8B. Remove the gas tank again to expose the ignition coils. Locate the two tach wires extending from the Dyna 2000 harness. One wire is green, the other wire is yellow. Take the green tach wire and connect it to one of the original coil primary wires that are in the stock harness that you disconnected from the coils earlier. On many bikes the tachometer gets it's signal from one of these coil primary wires. DO NOT connect these wires back to the ignition coil. Re start the bike and see if the tachometer responds. If the tach does not respond, try hooking the green tach wire to the other primary wire in the stock harness. Then restart the engine again to see if the tach works.

8C. If this fails you will have to connect the green tach wire from the Dyna 2000 to the signal wire at the back of the tachometer. Nearly all electronic tachometers have three wires going into them. One wire is +12 volts to power the tach, one wire is ground, and the third wire is the signal input. If you are not sure which wire is the signal input. You can try connecting the green wire from the Dyna 2000 to one wire at a time going into the tach until the tach works. You will not hurt the Dyna 2000 or the tach if you try the wrong connection. Do not disconnect any of the wires between the bike and the tach to try this. Simply make a temporary connection of the green tach wire from the Dyna 2000 to each of the bike tach wires as the bike is running until the tach responds.

Once you get the tach working, if it reads double speed or half speed, try using the other tach output wire from the Dyna 2000. The green wire from the Dyna 2000 is a one pulse per revolution output and the yellow tach wire from the Dyna 2000 is a two pulse per revolution output.

#### SAFETY INTERLOCK INPUT

9. The Dyna 2000 ignition has a safety interlock feature that allows you to use your side stand safety switch, or hook up a theft prevention switch, or implement a road race shift kill off the shift lever.

The safety interlock input is only active if you are using advance curve 1 through 5 on the Dyna 2000 module. If you are using one of the retard modes, the safety input acts as the ignition retard trigger input, not as a safety input.

When using one of the advance modes, the safety input will kill the ignition if it is shorted to ground. This is how most side stand switches work. When the side stand is down and the transmission is in gear, a wire is shorted to ground to kill the ignition. Refer to the wiring diagram in your repair manual to locate the wire which is grounded under these conditions. Connect the orange safety wire of the Dyna 2000 into this system to maintain this function.

Another alternative is to use the safety input as a theft prevention switch. Simply connect the orange safety wire to one side of a toggle switch and connect the other side of the toggle switch to chassis ground. When the toggle switch contacts are closed, the orange wire will be grounded and the ignition will not run.

Some road race bikes use a shift kill switch connected to the shift lever. Shift kill switches are available from a number of different companies. If you are using a shift kill system, you can hook the orange wire of the Dyna 2000 to the shift kill device to momentarily kill the engine during upshifts to allow full throttle shifts.

### REV LIMITER

10. The Dyna 2000 includes an extremely accurate broad range rev limiter that is adjustable between sixteen different settings from 8,500 rpm to 16,000 rpm. The rev limiter is adjusted by turning the rev limit knob on the end of the Dyna 2000 module to the desired position.

### ADVANCE MODES

11. The Dyna 2000 ignition module allows selection between five different advance modes and four different retard modes. The advance modes are as follows:

curve#	span	full timing at	application
1	20 deg	2,500 rpm	4 valve stock
2	20 deg	4,500 rpm	4 valve increased compression
3	20 deg	6,500 rpm	4 valve high compression
4	25 deg	3,500 rpm	2 valve stock
5	25 deg	6,500 rpm	2 valve high compression

The total ignition timing that your motor will see at high rpm is dictated by where you set the crank trigger. Most modern 4 valve sport bikes run best with 35 to 40 degrees total ignition timing. Older 2 valve motors will run well with about 40 degrees total timing. The Dyna 2000 ignition will generate an advance curve based upon the total timing that you set with the crank trigger.

Curves 1,2, and 3 generate a curve that changes a total of 20 degrees from idle to high rpm. This means that if you set the crank trigger to 35 degrees, at idle you will have 20 degrees less than this or 15 degrees advance.

Curves 4 and 5 generate a curve that changes a total of 25 degrees from idle to high rpm. This means that if you set the crank trigger to 40 degrees, at idle you will have 25 degrees less than this or 15 degrees advance.

Refer to the advance curve graphs included with these instructions to see how this works.

### 12. RETARD MODES

The Dyna 2000 has four ignition retard modes built-in. These modes are labeled 4, 8, 12, and 16 on the Dyna 2000 module. When a retard mode is selected with the knob on the Dyna 2000 module the orange wire that is available at the end of the crank trigger harness wire group functions as a retard activation input. The orange wire no longer serves as a safety interlock when a retard mode is selected.

If you are using a retard mode, the retard activation line (orange wire) needs to be grounded to activate ignition retard. If you have selected retard mode 4 then you will get 4 degrees of retard



whenever you ground the orange wire. If you are using retard mode 8 you will get 8 degrees of retard when you ground the orange wire. Modes 12 and 16 work the same with 12 and 16 degrees ignition retard for each of those modes.

The orange wire could be grounded along with nitrous solenoids to provide retard when nitrous is activated. The orange wire could be grounded with a boost switch (Dynatek part no. PPS-75) to activate retard above a preset boost level on turbocharged vehicles.

Refer to the timing curve diagrams to see what the retard curves look like. When the retard line is not grounded, the ignition curve is the same as advance curve 1.

### 13. TEST MODE

The Dyna 2000 ignition system includes a Test Mode which allows easy inspection of ignition operation without running the engine. Test Mode is selected by turning the mode knob on the end of the Dyna 2000 ignition module to the Test Mode position.

**\*WARNING\*** Do not try to start the engine with the ignition set to Test Mode. The engine will not run properly.

In Test Mode, if you slowly turn the engine with a wrench, with ignition power turned on, the Dyna 2000 module creates a spark from each coil as the magnet on the crankshaft rotor reaches the firing point for each cylinder pair. This allows you to easily determine that each Crank Trigger sensor is working, that each coil is working, and which coil is being controlled by which Crank Trigger sensor.

When the magnet in the crankshaft rotor reaches the sensor for cylinders 1/4, the coil for cylinders 1/4 should make a spark. When the magnet in the crankshaft rotor reaches the sensor for cylinders 2/3, the coil for cylinders 2/3 should make a spark.

### 14. TROUBLE SHOOTING TIPS

You should experience trouble free operation of your Dyna 2000 ignition system. If you are having a problem the following questions should help you narrow down the source of your trouble.

14A. When you first turn on ignition power with the ignition key and run/stop switch, does the LED on the 2000 module blink? If not check the +12V and ground wire connections to the Dyna 2000. Use a volt meter if necessary to verify that +12V is getting to the red wire of the 2000 harness. Check your battery voltage. The battery should measure about +12.5 volts when the engine is not running. Check that the main battery ground cable goes to an engine case bolt.

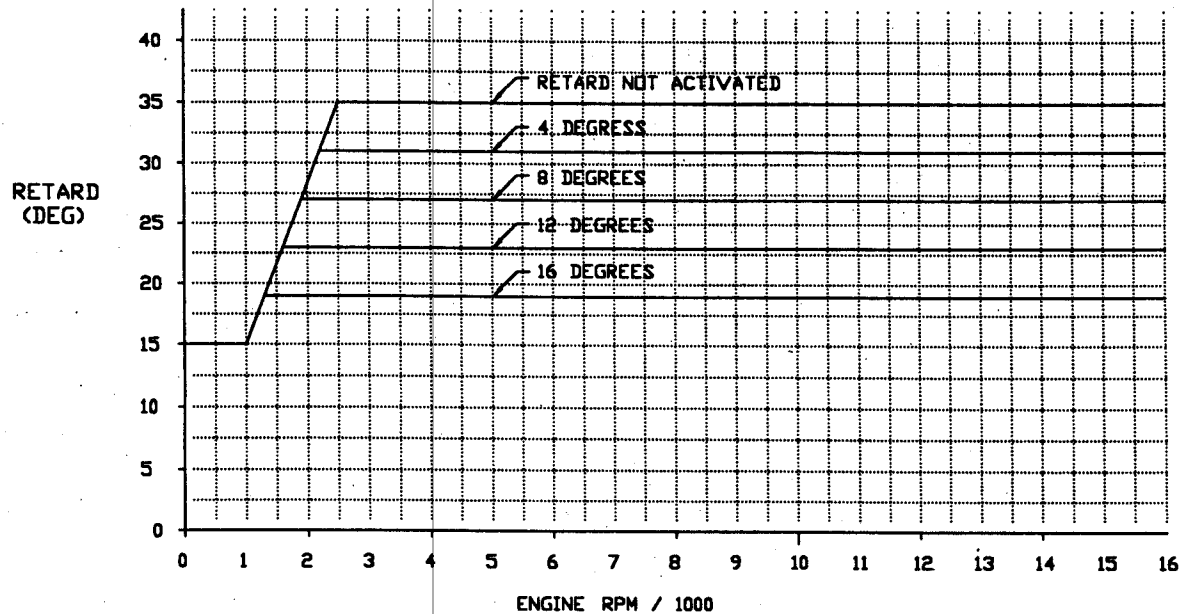
14B. When you have ignition power on, and you turn the engine over slowly with a wrench, does the LED on the 2000 module come on when the magnet on the crankshaft rotor passes each Crank Trigger sensor module? If not you may have a bad connection on one of the Crank Trigger wires. With ignition power on, measure the voltage on each Crank Trigger wire. The red wire should have +12 volts on it, the black wire should have 0 volts on it. The white wire and the blue wire should switch from 0 to +12 volts as you turn the crankshaft. When the magnet on the

crankshaft rotor is in front of a sensor, the output wire for that sensor (white or blue wire) should have +12 volts on it. When the magnet is away from that sensor, it's output wire should have 0 volts on it.

14C. If the Crank Trigger operation is correct and the ignition module LED responds properly, you may have a problem with an ignition coil. With primary wires disconnected from a coil, you can measure if the coil is internally shorted by using a digital ohm meter. Measuring from one primary terminal of the coil to the other primary terminal of the same coil, you should see 2.2 to 3 ohms resistance. If you measure the resistance from one spark plug tower to another you can check the secondary of the coil. The secondary resistance should be more than 10,000 ohms (10K ohms). If the coil has a shorted or open winding, it must be replaced.

14D. If the ignition module and coils check out OK, take a close look at your spark plug wires. Inspect for damage or breakage of the internal conductor.

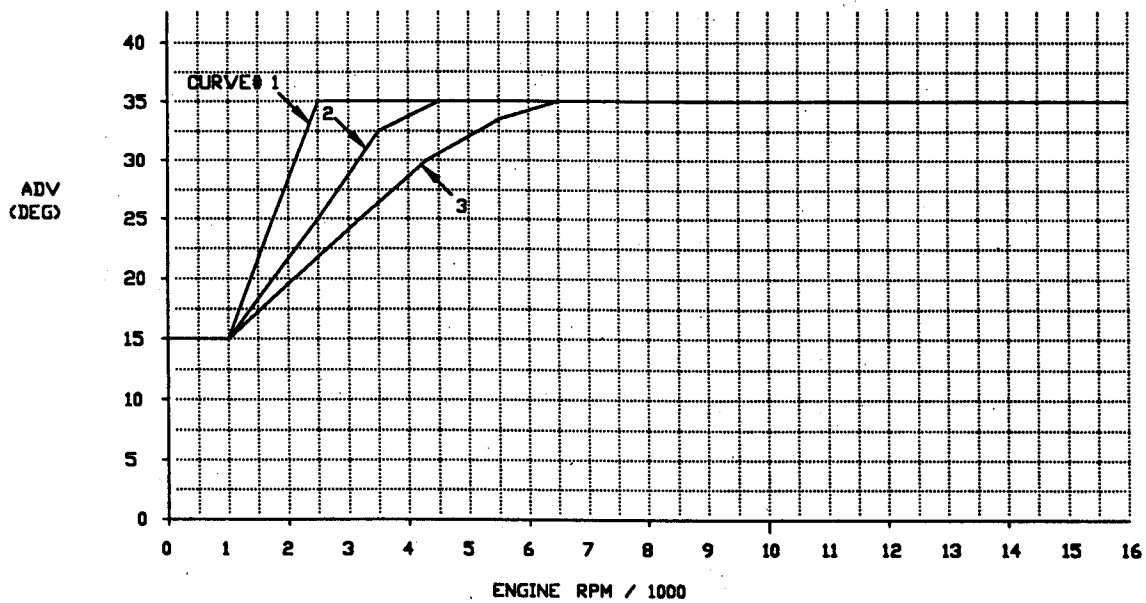
### DD2000-4C RETARD MODE CURVES



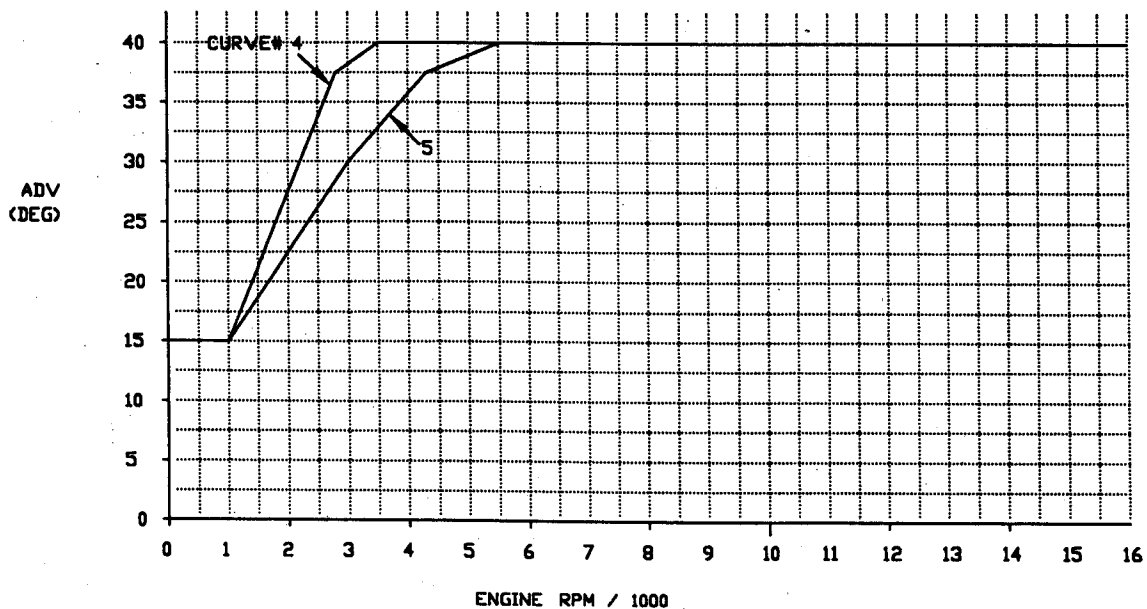
RETARD CURVES SHOWN WITH STATIC TIMING SET AT 35 DEGREES BTDC.

# DD2000-4C ADVANCE CURVES

ADVANCE CURVES 1, 2, AND 3  
FOR FOUR VALVE PER CYLINDER MOTORS  
NOTE - THE ADVANCE VALUES SHOWN ARE FOR STATIC PICKUP TIMING SET AT 35 DEGREES



ADVANCE CURVES 4 AND 5  
FOR TWO VALVE PER CYLINDER MOTORS  
NOTE - THE ADVANCE VALUES SHOWN ARE FOR STATIC PICKUP TIMING SET AT 40 DEGREES



DD2000-4C WIRING DIAGRAM - TYPICAL

