

DYNA 2000

DIGITAL PERFORMANCE IGNITION

for FOUR CYLINDER ENGINES

KIT NUMBER DDK2-12C

1998-99 ZX-9R

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.

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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.

1. REMOVE BOTH SEATS.

2. REMOVE BODY FROM RIGHT AND LEFT SIDES OF BIKE.

3. REMOVE GAS TANK.

Remove two bolts at front and two at rear. Turn fuel valve to off, and remove plastic knob. Remove the three hoses at rear of the tank. Place a shop rag under the fuel tank to catch excess gas. Use pliers to move the hose clamp down the main fuel hose. Lift the tank enough to remove the main fuel hose.

4. REMOVE THE STOCK IGNITION AND MOUNT THE DYNA 2000 IGNITION

Unplug the connectors and remove the two mounting bolts that hold the stock ignition in place. 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. Mount the Dyna ignition using the supplied mounting bracket and original bolts.

5. MOUNTING THE DYNA COIL AND BRACKET

The coil bracket should be bolted to the right side of the frame under the carburetors. Use the same two bolts that hold the engine to the frame. Move fuel pump out of way. Install coil bracket. Move fuel pump back. Place coil on bracket. Fasten with washers and locknuts when spark plug wires are cut to length

6. INSTALLING SPARK PLUG WIRES

Remove the air box from above the carburetors. Unplug and remove the coils over the four spark plugs. Cover carburetors with a rag. Blow dust and road dirt out of spark plug cavities and off cylinder head. Remove spark plugs and put a gold tip on each. Reinstall spark plugs. Install a plug wire on cylinder #1. This wire will be used for #1 and #4. Run wire across head and down right side of frame to coil. Cut wire with an extra ½ inch to strip back for end terminal. Strip ½ inch back. Fold center over and crimp on end terminal. Put rubber boot on wire, and connect to coil. Use the rest of the wire for cylinder #4. Repeat cylinder 1-4 wire cutting method for cylinders 2-3.

Three wires are molded into the Dyna coil: yellow, red, and blue. Connect plug wires 1 and 4 to the towers closest to the same end of the coil as the yellow wire. Connect plug wires 2 and 3 to the towers closest to the same end of the coil as the blue wire. Look at the wiring diagram to verify which coil tower connects to which cylinder.

7A. WIRING THE BIKE

Route the wire harness along the left frame rail and up to the carburetors. Connect the wires as shown in the following table.

DYNA wire harness colors	Destination	Function
Red	Cylinder 1 red wire in stock harness, and red wire of Dyna coil.	+12 Volts switched
White	Cylinder 1 red/white wire in stock harness, and yellow wire of Dyna coil.	Runs fuel pump, and fires coil for cylinders 1 and 4.
Blue	Blue wire of Dyna coil.	Fires the coil for cylinders 2 and 3.
Black	Negative battery terminal	-12 Volts
Green	Light blue wire of stock harness connector.	Tachometer output, 2 pulses per revolution.
Yellow	Not used	Tachometer output, 1 pulse per revolution.
4 pin plug	Route to the right side of the engine.	Crank trigger
Orange	Optional	Safety interlock

7B. The 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. Extend both groups along the left frame rail and up to the coil. Plug the coil connectors together. Extend the red and white wires up the right frame rail and over to cylinder #1. Plug into the stock harness labeled #1. 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.

7C. Ignition module ground - Locate the black wire, which extends by itself from the Dyna 2000 module end of the harness. This wire has a 1/4" ring terminal on its free end. Connect the ring terminal directly to the negative post of the battery.

8. 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

9A. CRANK TRIGGER INSTALLATION

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

9B. 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.

9C. PICKUP COIL REMOVAL - Remove the bolts that hold the cover on the right side of the engine. Put a clean shop rag into engine crank opening, so bolts and other objects can not fall into the engine. Remove the pickup coil by taking off the two pickup coil bolts. Find the pickup coil harness connector by following the wires up to the harness. The connector is a 3-pin type. Unplug it to gain access to the wires. Two of the three wires will be removed (Black, and Yellow). Release the yellow and black wires by pushing up on the white plastic tabs that hold the wires inside the connector, and pull the wires out one at a time. Tweezers, a small screwdriver, or a thin metal scribe all work nicely to push the retaining tabs up. Now only the Blue/Red wire is in the connector. Next, pull one wire at a time, from the pickup coil end, through the black tubing. Now the stock pickup coil should be totally removed from the bike. Remember to plug the connectors back together so the oil pressure sensor will work.

9D. MOUNTING THE DYNA CRANK TRIGGER - Caution! - Make sure a clean shop rag is in the engine crank opening, so bolts and other objects can not fall into the engine. Take off the stock rotor by removing the bolt at the end of the crankshaft. An air driven impact gun works well to get this bolt loose. Align Dyna rotor over crankshaft splines and fasten with the supplied washer and bolt. Torque the rotor bolt to 29 ft-lb. and use non-permanent thread lock, like "blue" Loctite. Route the crank trigger wire harness up under the carburetors, and connect it to the four-pin socket in the Dyna harness. The wire colors should match up, i.e. red to red, black to black, white to white and blue to blue. Put the socket head cap screws through a lock washer, flat washer, the pickup plate, and the spacer. Install this assembly in the location where the stock pickup coil mounted. Before tightening, rotate the plate to align the 37° timing marks with the splits in the engine cases. Make sure to maintain equal air gaps between the rotor and both pickups. Using feeler gauges, there should be about 0.020" gap. Torque cap screws to 52 in-lb. and use non-permanent thread lock.

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.

10A. STATIC TIMING INSTRUCTIONS FOR ZX-9R

You may want to remove the spark plugs so the crankshaft will turn easier.

10B. 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.

10C. Adjusting the crank trigger - Both pickups and their plate should be in the middle of their adjustment range.

Pickup 1-4

The plate should be rotated so the 37° timing marks align with the splits in the engine cases. Rotate the engine forward until the 1-4 mark on the rotor is aligned with the long 37° mark on the right side of the plate. Loosen the pickup for cylinders 1-4. (Pickup with 3 wires). Adjust pickup 1-4, until the red LED, on the Dyna ignition, lights up.

Tighten pickup 1-4. Rotate the engine backward until the LED shuts off. Then, rotate the engine forward but stop rotating as soon as the LED lights up. If the rotor 1-4 mark is not aligned with the 37° mark, keep readjusting pickup 1-4 and rotating the engine until the marks align just as the red LED lights up.

Pickup 2-3

Rotate the engine forward until the 2-3 mark on the rotor is aligned with the long 37° mark on the right side of the plate. Loosen the pickup for cylinders 2-3. (Pickup with 7 wires) Adjust pickup 2-3, until the red LED, on the Dyna ignition, lights up.

Tighten pickup 2-3. Rotate the engine backward until the LED shuts off. Then, rotate the engine forward but stop rotating as soon as the LED lights up. If the rotor 2-3 mark is not aligned with the 37° mark, keep readjusting pickup 2-3 and rotating the engine until the marks align just as the red LED lights up. Now the pickups are set 180° apart from each other, and the final timing can be changed from 37° to anything other if so desired. Make sure to maintain equal air gaps between the rotor and both pickups. Using feeler gauges, there should be about 0.020" gap.

10D. Reinstall the spark plugs and engine side cover. Apply silicone sealant around the grommet and on both splits in the engine case. Torque the cover bolt to 104 in-lb.

11. STARTING THE ENGINE

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 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.

12. TACH WIRE CONNECTION

To connect the tachometer you will need to tap into the stock wiring harness. Find the Light Blue wire at the big stock ignition connector. Cut the wire about 1 inch behind the big connector so that there is enough length to put a single connector on each end. Strip the wires back ¼". Crimp the female terminal on the end of the wire coming from the stock harness. Crimp the male terminal on the 1 inch wire hanging from the big connector. Slip the white connector (with two prongs) over the 1-inch wire terminal. Slip the white connector (without two prongs) over the harness terminal. The Green wire from the Dyna harness should now plug into Light Blue wire of the stock harness and get the tach. working properly.

13. SAFETY INTERLOCK INPUT

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.

14. REV LIMITER

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.

15. ADVANCE MODES

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.

16. 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.

17. 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.

18A. 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.

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 voltmeter 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.

18B. 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.

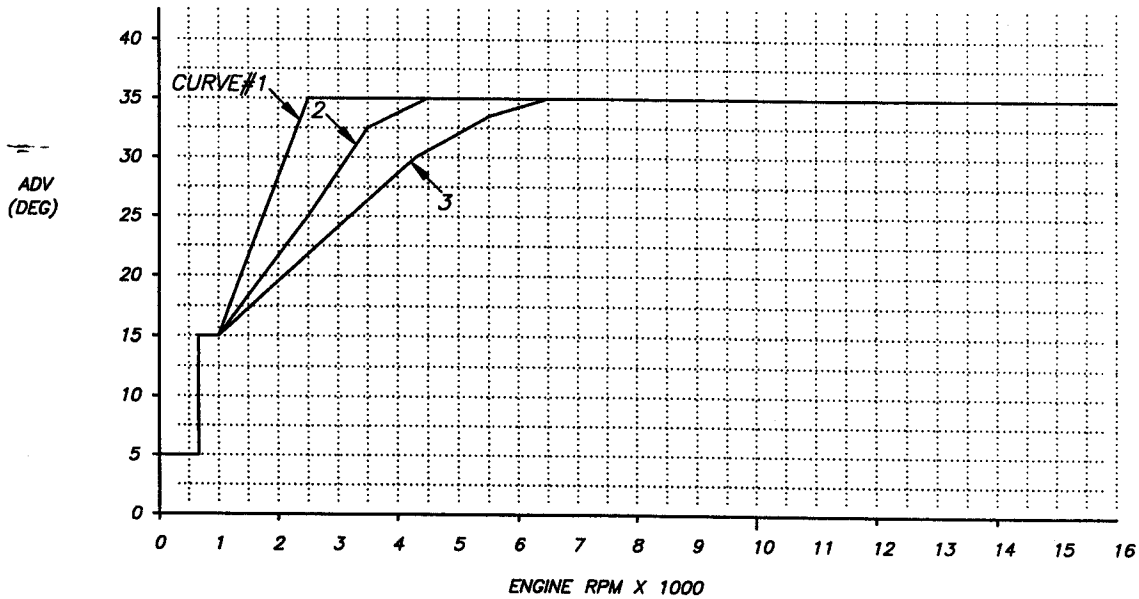
18C. If the Crank Trigger operation is correct and the ignition module LED responds properly, you may have a problem with an ignition coil. With primary wires disconnected from a coil, you can measure if the coil is internally shorted by using a digital ohmmeter. Measuring from one primary terminal of 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.

18D. 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.

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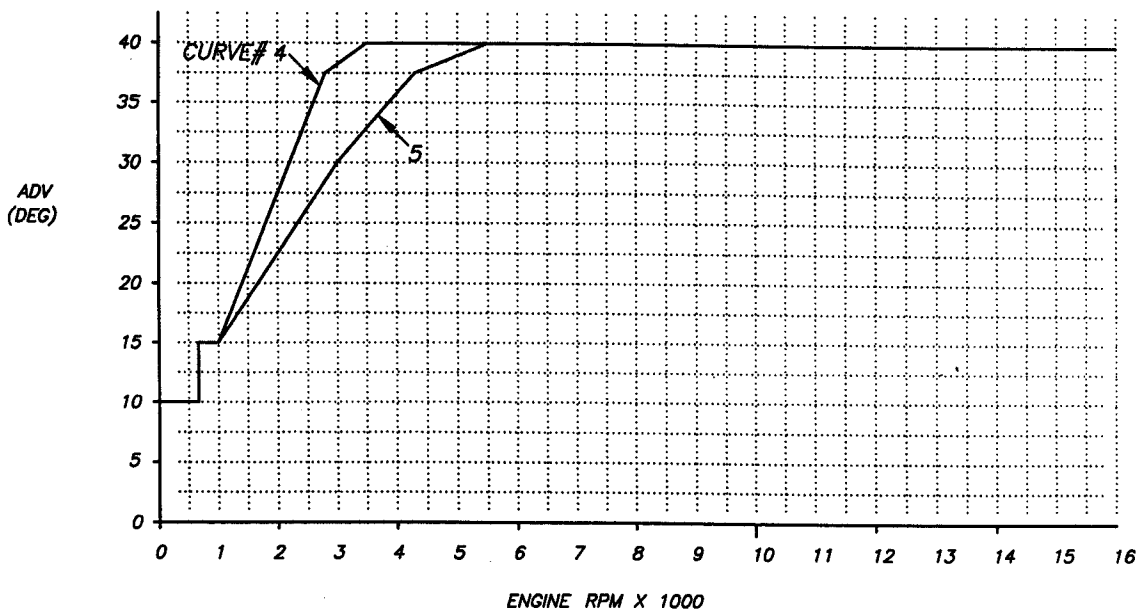
DD2000-4 ADVANCE CURVES



ADVANCE CURVES 1, 2, AND 3

FOR 4 VALVE PER CYLINDER MOTORS

NOTE - THE ADVANCE VALUES SHOWN ARE FOR STATIC PICKUP TIMING SET AT 35° BTDC.

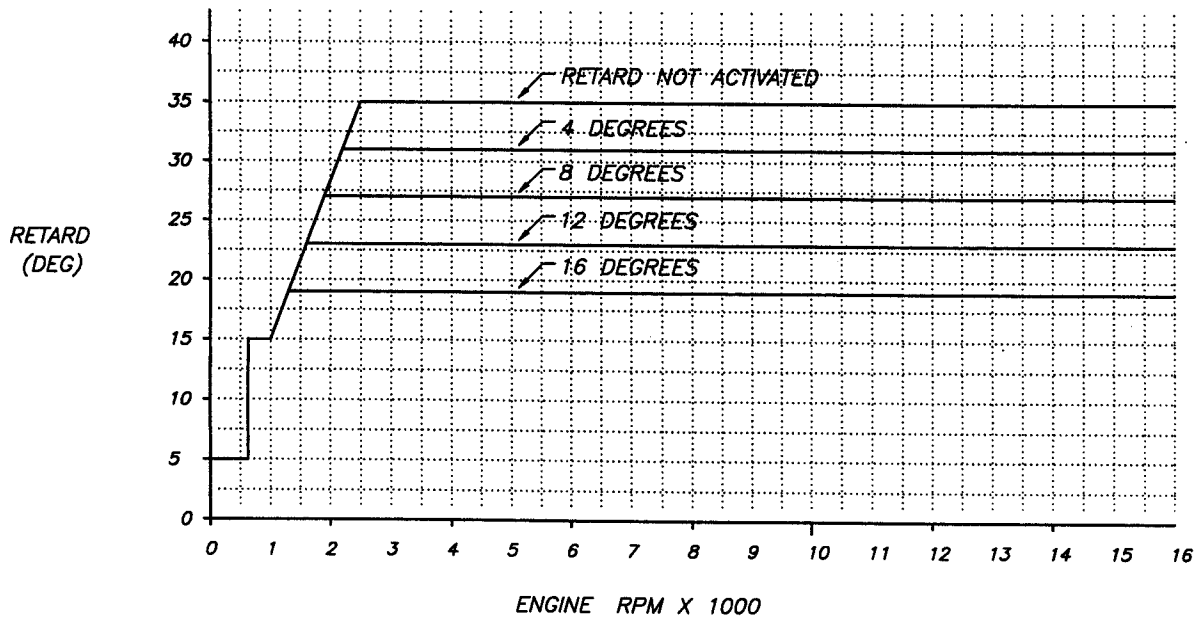


ADVANCE CURVES 4 AND 5

FOR 2 VALVE PER CYLINDER MOTORS

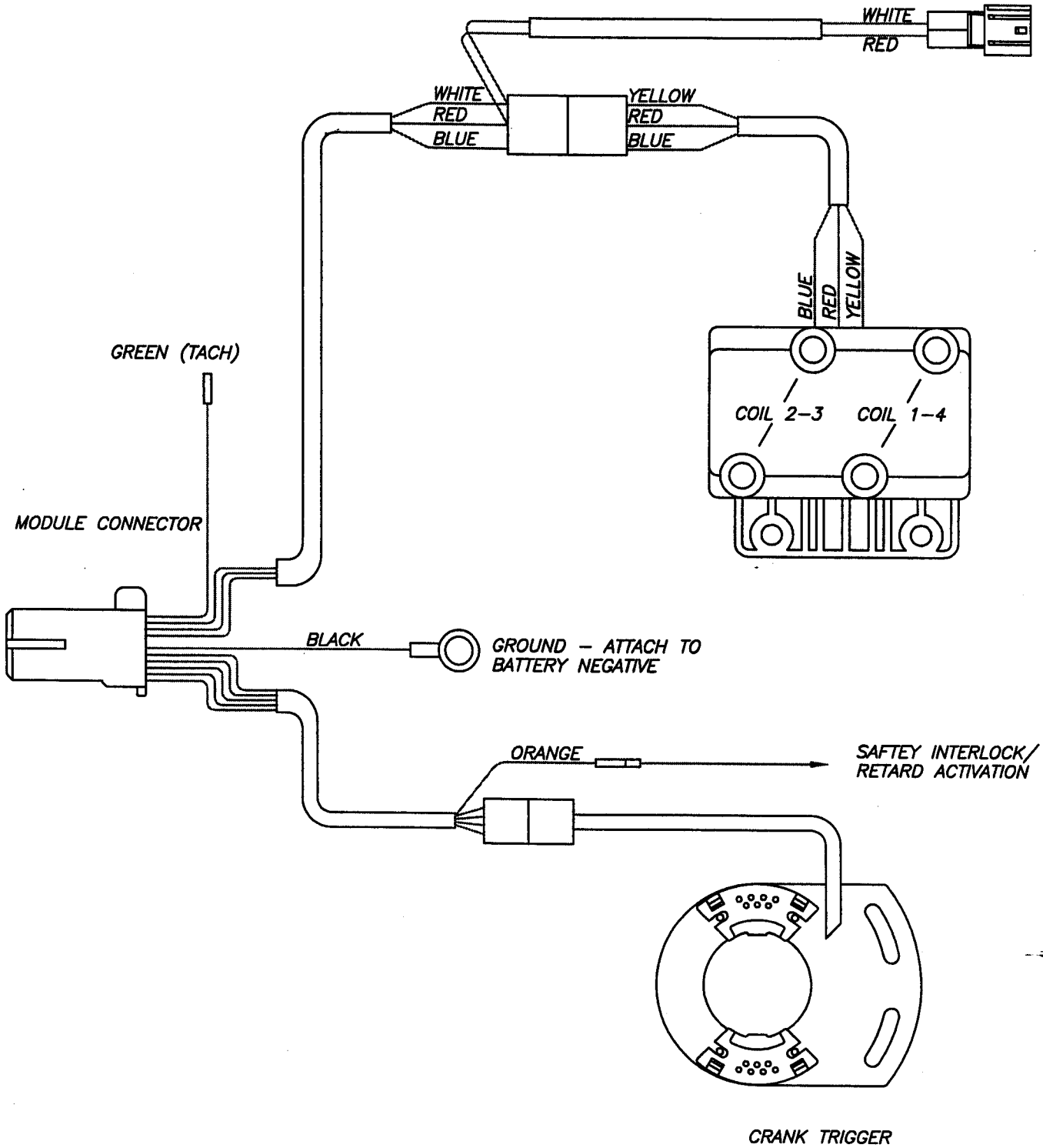
NOTE - THE ADVANCE VALUES SHOWN ARE FOR STATIC PICKUP TIMING SET AT 40° BTDC.

DD2000-4 RETARD MODE CURVES



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

DD2000-4 WIRING DIAGRAM - TYPICAL



DD2000-4 WIRING DIAGRAM - TYPICAL

