

# DYNA 4000 SUPER PRO HIGH ENERGY IGNITION SYSTEM FOR TOP FUEL HARLEY-DAVIDSON ENGINES

## (QUAD OUTPUT MODEL DP4000-HDTF, FOR DUAL PLUGGED HEADS)

This ignition is a quad output model for use with dual plugged heads. This DP4000-HDTF module may also be used with single plug heads if the three wires that normally go to the second Twinfire coil are simply left unplugged from the second coil (see wiring diagram).

### DESCRIPTION

The Dyna 4000 Super Pro is the next generation drag race ignition for motorcycles. The Super Pro is a refinement of the venerable Dyna 4000 Pro. The Super Pro maintains all the excellent features of the Dyna 4000 Pro with the following enhancements:

- \* Substantially increased electrical noise immunity.
- \* Improved wire harnessing to insure bulletproof operation under all conditions.

The DYNA 4000 Super Pro Ignition is a high energy inductive ignition designed to meet the needs of the professional drag racer. The DYNA 4000 includes a built-in two stage rev limiter that is used for launch control and over rev protection.

The best ignition imaginable for a high rpm, high horsepower engine would have a long spark duration and deliver high spark energy. This is exactly what the DYNA 4000 has been designed to accomplish. By using specially designed coils, and special microprocessor based control circuitry to manage the high currents that these coils draw, the DYNA 4000 can deliver four times the spark energy of the most popular CD booster all the way up to 17,000 rpm! These high energy sparks also have the desirable long duration characteristics of inductive ignitions. This translates directly into better engine performance across the board.

The DYNA 4000 Super Pro Top Fuel ignition has been designed to maximize reliability for this volatile engine environment. The SP Top Fuel contains only those functions necessary to make powerful ignition sparks to make sure your motor keeps the plugs lit. All rev limit functions, clutch switch functions, and shift kill functions that are found on other DYNA 4000 ignitions have been removed from this design to ensure that nothing can get in the way of continuous high energy ignition operation.

The DYNA 4000 is not just an improvement in available ignition technology for drag racing, it sets a new standard of performance and quality.

**DYNATEK**

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## INSTALLATION

**\*\*IMPORTANT\*\*** On all vehicles, you must always have a heavy gauge ground wire attached from the battery negative post to the engine case. This ground wire should be a 6 gauge wire (1/4" conductor) or larger.

**\*\*IMPORTANT\*\*** With any microprocessor based engine system, such as the DYNA 4000, you must use carbon core type suppression spark plug wires with a resistance of at least 3000 ohms per foot to reduce radio frequency interference caused by ignition sparks. Use of copper or spiral core wires may cause malfunction of this ignition system due to severe electrical noise.

**\*\*** The DYNA 4000-HDTF Super Pro ignition uses the DYNA Crank Trigger, part number DCT-HD, as a pickup signal source. On Harley-Davidson motors, the Crank Trigger mounts on the camshaft in the standard ignition pickup location.

**\*\*** The DYNA 4000 must be used with DYNATEK #DC9-2, or DC9-3, 0.7 ohm Twinfire coils or DYNA #DC9-1, 0.7 ohm, blue ignition coils. The DYNA 4000 will not work properly with other coils.

## SINGLE FIRE/DUAL FIRE CONSIDERATIONS

A Harley ignition can take two basic forms, dual fire or single fire. In a dual fire system with dual plugged heads, two dual output ignition coils are used. The outputs of one coil are connected to spark plugs of both cylinders. In dual fire mode, each ignition coil always fires into both cylinders at the same time. At the time a spark is made one cylinder is under compression with a fresh air/fuel mixture and the other cylinder is in its exhaust stroke. Very high voltage is required to jump the gap of the spark plug under compression and fairly low voltage is required to jump the gap of the spark plug in the exhaust stroke on the other cylinder. The result of this difference in gap voltages of the spark plugs connected to one coil is that most of the available ignition energy is delivered to the plug under compression. In other words, in a dual fire system, the cylinder that needs its fuel ignited gets the majority of the energy that has been stored in the coil even though the coil is connected to both cylinders. Now, with dual plugged heads and a dual fire ignition, you have two coils hooked to both cylinders. Again the plugs under compression get most of the ignition energy. Since two coils are used, when the spark plugs are fired, the cylinder under compression receives two coils worth of energy to ignite the fuel.

In single fire mode one coil is connected to the plug(s) of one cylinder only. Each cylinder receives sparks independently and only at the firing point in the compression stroke. On street engines with dual plugged heads, a common way to set up a single fire ignition is to take two dual output coils, and connect both outputs of a single coil to the spark plugs of a single cylinder. This works with low compression engines. For racing there are two inherent problems with this setup. First, only one coil worth of energy is delivered to the fuel mixture at the firing point since only one coil is connected to a cylinder, unlike the dual fire setup discussed above where two coils worth of energy is delivered to the compressed cylinder. Secondly, the ignition coil must generate twice the usual firing voltage to get across two spark plug gaps under compression at the same time. This can cause internal arcing in the coil which can degrade ignition performance and eventually cause coil failure. The only solution to the single fire, dual plugged head problem on a racing engine is to use four ignition coils. One coil driving each spark plug. Using one coil per spark plug allows you to have a true single fire ignition and deliver two coils worth of energy to the cylinder at the firing point. This setup also puts a reasonable load on the coils that will not degrade their performance. In order to accomplish this setup you need a quad (four) output ignition that can drive the four ignition coils such as the DYNA DP4000-HD2S ignition.

## COILS

For single fire w/dual plugged heads you need two DC9-3 Twinfire (dual tower) coils; for dual fire w/dual plugged heads you need one DC9-2 Twinfire (four tower) coil.

1. Choose a mounting place for the DYNA 4000 that is well away from the ignition coils and spark plug wires. The coils are a source of intense magnetic interference which can cause erratic operation of sensitive electronics. The most common ignition placement is under the seat near the rear tire. Mount the module using the four 10-32 screws on the bottom of the module. If you do not use the 10-32 screws for mounting purposes, leave them in the module.

2. Locate the main wiring harness included with this kit. Plug the 21 position white harness connector into the 4000 SP module.

For dual fire installation skip down to step DF 3 ('DUAL FIRE INSTALLATION').

### SINGLE FIRE INSTALLATION (separate coils for each cylinder)

NOTE The DC9-3 Twinfire coil contains two separate ignition coils in one easy to mount package. Each coil within the DC9-3 has one spark plug tower outlet.

SF 3. Mount the two DC9-3 Twinfire coils close to the spark plugs to minimize spark plug wire length. On each Twinfire one of the coil spark plug wire towers will feed the front cylinder and the other tower will feed the rear cylinder (refer to the wiring diagram). Connect carbon core spark plug wires from the output towers of the coils to the spark plugs.

\*\*\*Refer to the included system wiring diagram during the following steps

SF 4. Locate the six wire unterminated leg of the main harness that contains white, blue, yellow, purple, and two red wires. This is the coil wire group. Extend these coil wires from the ignition module up to the coil mounting location. It is best to route these wires away from other vehicle wires since they carry high voltage pulses. Locate the three spade terminals and three position black connector housing that came with each Twinfire coil. A red, white, and blue wire will go to one Twinfire. A red, yellow, and blue wire will go to the second Twinfire. Trim the 4000 wires to length and install the spade terminals onto the ends of the six coil wires. Insert the two pairs of three terminated wires into the black plug housings such that the colors will match across the plug that will connect to the first Twinfire coil, i.e. red to red, white to white, and blue to blue; and the colors across the plug for the second Twinfire are red to red, yellow to white, and purple to blue as shown in the wiring diagram. Connect the plugs to the coils.

Skip to 'SINGLE OR DUAL FIRE CONTINUED'

### DUAL FIRE INSTALLATION (one coil for both cylinders)

DF 3. Mount the DC9-2 Twinfire coil close to the spark plugs to minimize spark plug wire length. Connect carbon core spark plug wires from the output towers of the coil to the spark plugs as shown in the wiring diagram. It is very important that each coil section within the Twinfire feed both front and rear cylinder as shown in the wiring diagram.

\*\*\*Refer to the included system wiring diagram during the following steps

DF 4. Locate the six wire unterminated leg of the main harness that contains white, blue, yellow, purple, and two red wires. This is the coil wire group. Extend these coil wires from the ignition module up to the coil mounting location. It is best to route these wires away from other vehicle wires since they carry high voltage pulses. Trim the harness wires to length so they will reach the coil. Using the three spade terminals and three position black plug housing that are supplied with the Twinfire coil, connect the white and blue wires together in one terminal, connect the yellow and purple wires together in one terminal, and connect the two red wires

together in one terminal, as shown in the wiring diagram.

Now insert the harness wires into the three position black plug housing such that the red harness wires will plug into the red Twinfire wire, the white and blue harness wires will plug into the white Twinfire wire, and the yellow and purple harness wires will plug into the blue Twinfire wire as shown in the wiring diagram.

#### SINGLE OR DUAL FIRE CONTINUED

5. Find the four wire leg of the main harness that has red/black, black/white, blue/black, and white/black wires going to a flat four position plug. This is the crank trigger group. Route this leg of the harness toward the crank trigger location on the engine. Connect these wires to the Crank Trigger plug.

6. Find the unterminated two wire leg of the main harness that has a green and brown wire at the loose end. The green wire is a one pulse per revolution tach output which can be used to trigger a tach, data recording computer, shift light etc. The brown wire is the ignition enable wire. 12 volts from the ignition switch must be connected to the brown wire to enable ignition operation. The 4000 Super Pro has been designed such that if you have a faulty ignition switch which experiences contact bounce while you go down the track the ignition will not miss a beat. The ignition switch contacts must be open for more than 1/3 of a second for the ignition to actually be disabled.

7. Locate the black and red 12 gauge power wires that extend directly from the Dyna 4000 Super Pro module. These wires must be connected directly to the battery using the included pigtail. Connect red to the positive post of the battery and black to the negative post. Trim the power wires to length and install the included 1/4" ring terminals onto the wires such that they can be installed onto the battery terminals.

8. Whether you are using a Dyna S ignition as a pickup or using a Dyna Crank Trigger make sure you have installed the special blue two magnet rotor on the crankshaft or the Dyna 4000 will not work properly. The extra magnet is located 90 degrees ahead of the normal firing magnet as seen by the pickups when the camshaft is rotating. There should be a mark on the top of the special rotor indicating its type:

HP = Harley-Davidson 4000 rotor

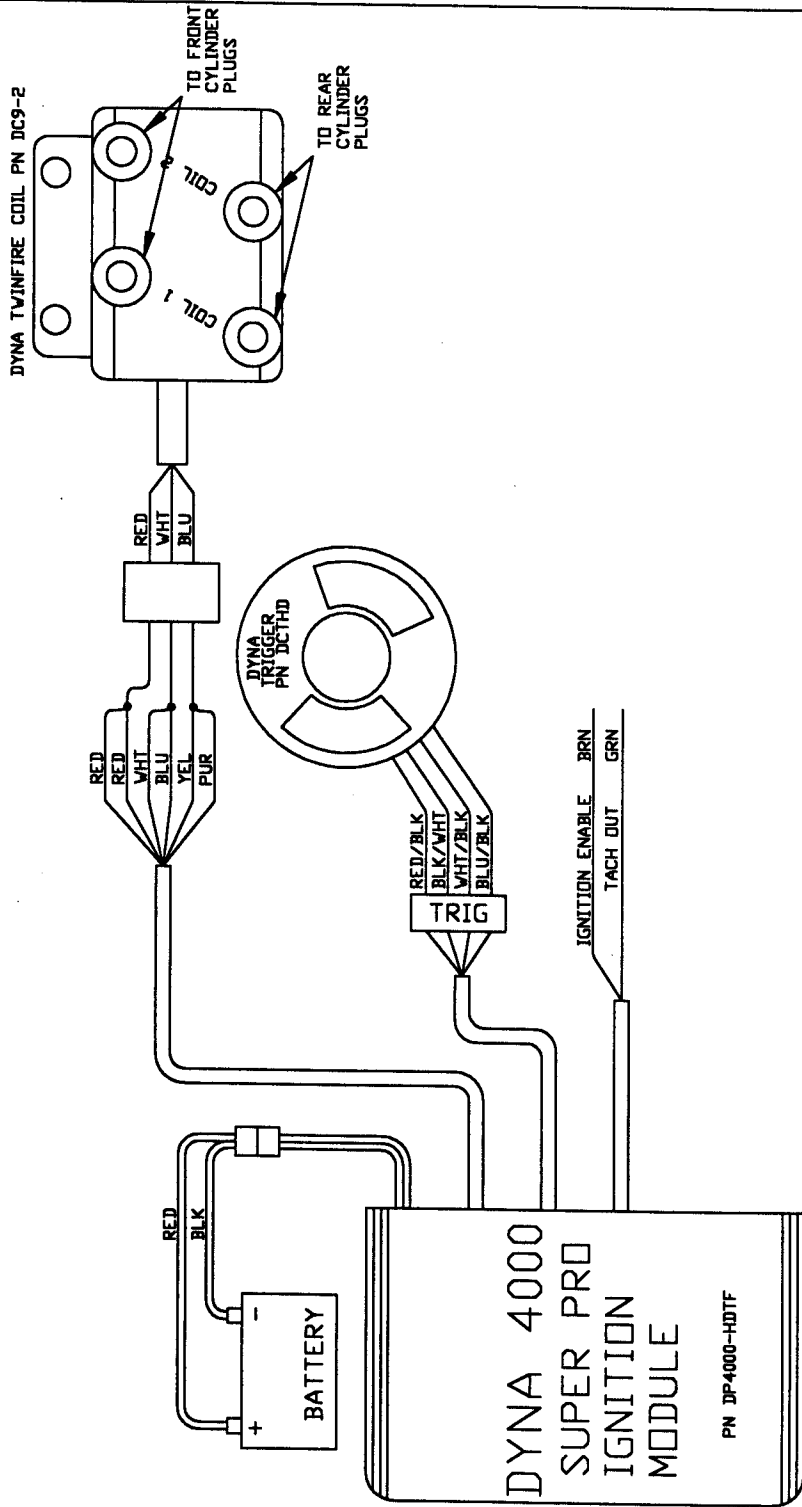
9. After the main harness has been installed and the Crank Trigger and two magnet camshaft rotor are in place and the 0.7 ohm coil has been installed, you are ready to static time the motor. Apply +12V power to the DYNA 4000 by turning on the ignition switch. While slowly turning the crankshaft in its normal forward direction with a wrench, watch the red LED lamp located on the end of the DYNA 4000. When either magnet of the Crank Trigger rotor passes in front of one of the sensor modules, the red LED will light. This indicates the switching action of the pickup. When the crankshaft is turned in its normal forward direction, the first magnet to pass a Crank Trigger sensor is the 90 degree lead magnet. Do not static time off this magnet. Static timing must be checked when the second magnet comes near the sensor, at the point where the LED first comes on.

11. You should be able to start the motor at this point. If the motor will not start, check that you are getting +12V to the red wire at the coil and to the brown ignition enable wire and check all other wiring.

#### USING YOUR DYNA 4000 SYSTEM

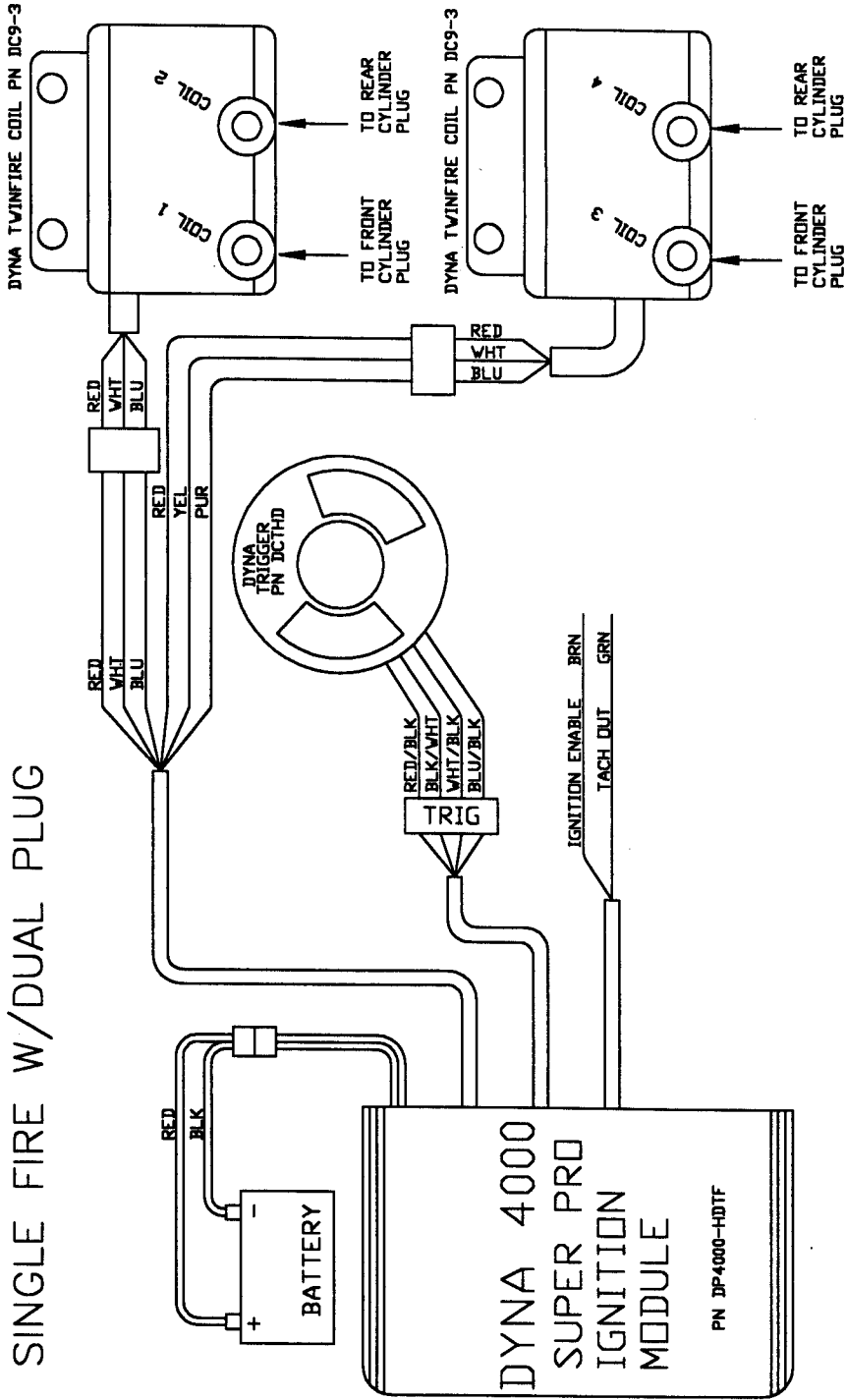
You should have your system completely installed at this point, and the motor timed and ready to run.

# DYNA 4000 SUPER PRO -- TOP FUEL -- SYSTEM WIRING DUAL FIRE W/DUAL PLUG



DYNATEK	
164 S. VALENCIA ST., GLENDALE, CA 91741 (909)952-1659	
TITLE	DYNA 4000 PRO SYSTEM WIRING
DATE	1-14-98
DRAWING NO.	D4K-HD-TOP FUEL
REV	3.1

# DYNA 4000 SUPER PRO - TOP FUEL - SYSTEM WIRING SINGLE FIRE W/DUAL PLUG



DYNATEK 164 S. VALENCIA ST., GLENDALE, CA 91741 (818)953-1669	
TITLE DYNA 4000 PRO SYSTEM WIRING	
DATE 1-14-98	REV 3.1
DRAWING NO. D4K-HDTF-SF	