



Performance Ignition with EFI Rev-Extend ***2008+ Yamaha Rhino 700 EFI***

8,000 RPM Limit (stock Rhino 700 = 6,600)

CAUTION: This ignition will increase the engine rev-limiter!

CAUTION: This ignition removes the reverse rev-limiter!

Tools Needed: None

Yamaha Parts: None

Shop Supplies: None 0

Overview

The Black Rhino Performance Digital Ignition-System (**DI-S**) Module for the 2008+ Yamaha Rhino 700efi is a piggyback add-on device that will increase the performance of the stock ignition and modify the fuel injection system to allow for higher engine RPM than the factory Engine Controller allows. This Module is designed to work in conjunction with the stock ECU, and will take complete control of the Ignition Timing while safely extending the fuel injection rev-limit.

An optional Remote Programmer Module is available, which includes PC based programming software, CurveMaker. The Remote Programmer Module is designed to be used from within the vehicle. It can be used to switch between any of 4 pre-programmed ignition curves resident on the DI-S module. It can also be used to tailor EFI fuel maps for the DI-S module. The CurveMaker Software can be used to custom tailor any or all of the 4 onboard pre-programmed ignition curves. It can also adjust the default engine RPM limit, and vehicle speed limits. It can be used to access the various recorded data statistics.

Please take a moment to read these instructions completely before installing the ignition. The installation will only take about thirty minutes, but proper setup for your specific vehicle may take longer

Installation Procedure:

This kit includes: Black Rhino Performance DI-S module, electrical wiring, cable tie-wraps and instruction sheet. This is a complete kit, and includes everything needed to install the ignition. Route all wires carefully. Secure wires using the supplied cable-ties to ensure electrical wires do not chafe or touch anything sharp or hot.

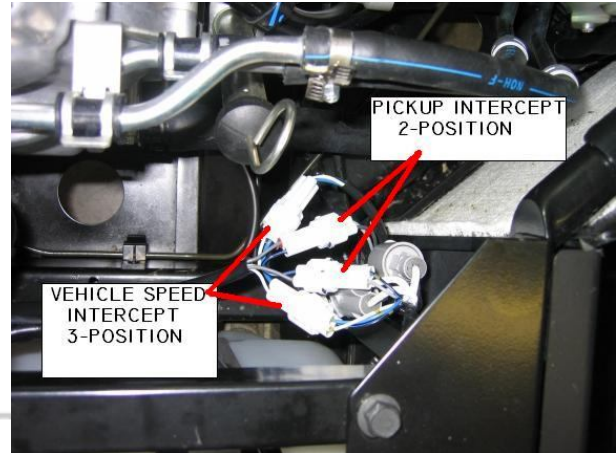
- Turn ignition key off, remove the seats and engine cover. Use the supplied 14" tie-wraps to install the ignition in the preferred location, under the passenger seat (picture 1).
- Connect the Pickup Intercept and Vehicle Speed Intercept (both located near the passenger side of engine, towards the front of the engine compartment and near the floor board) by unplugging the stock connectors and connecting the matching DI-S harness connectors in-line (picture 2).
- Connect the Throttle Position Intercept (passenger side of throttle body) and Fuel Injector Intercept (top of engine) by unplugging the stock connectors and connecting the matching DI-S harness connectors inline. Route the harness carefully using the supplied tie-wraps (picture 3).
- Route the Coil Connections Harness under the intake towards the coil (picture 3). Connect the Ignition Coil Intercept (under the drivers seat) by removing the stock ORANGE wire (coil negative) and connecting it to the DI-S ORANGE wire (picture 4).
- Connect the DI-S Ignition Coil Output ORANGE/BLACK wire to the ignition coil negative input (picture 4).
- Connect the Ignition +12V Piggyback by removing the stock BROWN/RED wire and installing the DI-S piggyback spade connector the coil positive, and then re-connecting the stock +12V lead to the DI-S piggyback terminal. (picture 4).

- Connect the DI-S BLACK GROUND wire under the 8mm bolt at the back of the starter motor, directly under the throttle body. This can be easily seen from the passenger side of the engine (picture 5).
- Finally, tie-wrap the DI-S Accessory Wires away from the engine and away from sharp objects (picture 6).
- Installation is complete! Double-check your wiring and secure all loose wires using tie-wraps.

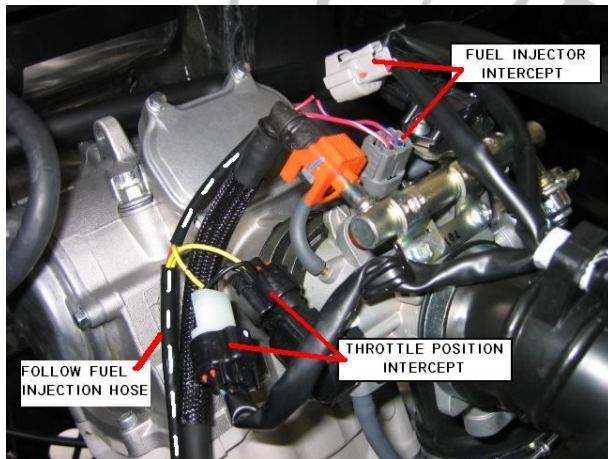
Picture 1:



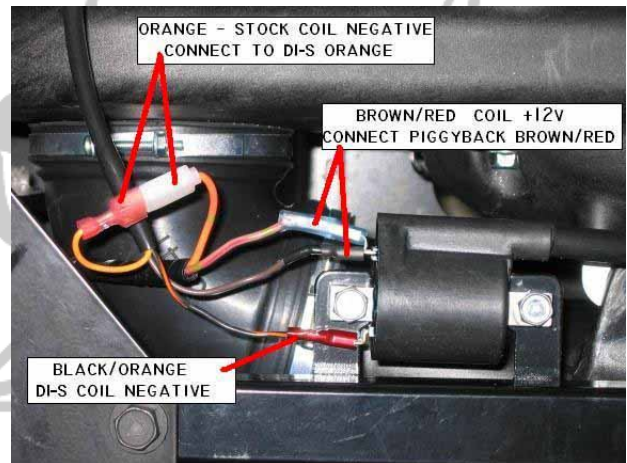
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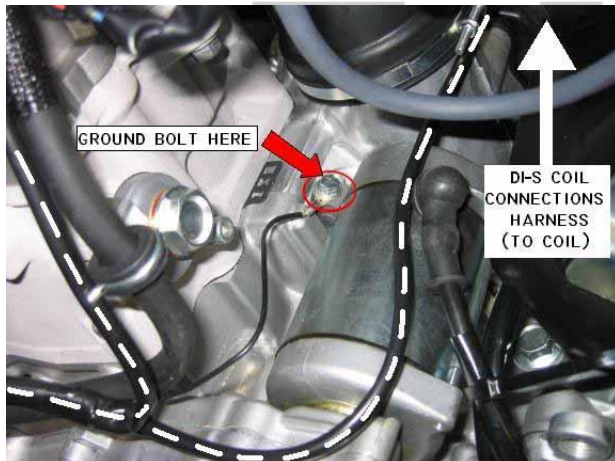
Picture 3:



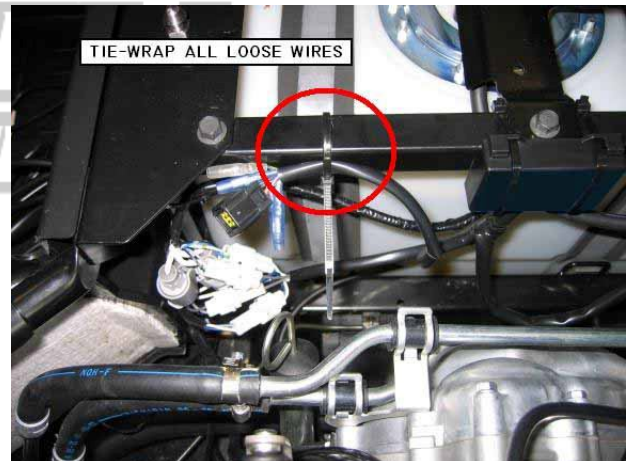
Picture 4:



Picture 5:



Picture 6:



Calibration

The Black Rhino Performance DI-S is pre-programmed with a single performance advance curve, +4° over stock, and an 8,000 RPM rev-limit. A quicker throttle response and increased power over the stock curve is achieved. For other advance curve information, see the attached Advance Chart. This ignition will allow the engine to rev to a higher RPM, and is adjustable to 10,000 RPM max by using optional CurveMaker programming software. Because the rev limit is increased, the performance limits of other engine parts (valve train or piston for example) may be found. It may be necessary to replace these parts for best engine performance. The DI-S is shipped from Black Rhino Performance with 0% adjustments to all of the fuel injection settings. For more information on fuel settings, see the section on Using the Black Rhino Performance Remote Programmer.

Using the Black Rhino Performance Remote Programmer

The Black Rhino Performance Remote Programmer (sold separately) for the Rhino 700 is a plug-in programmer for adjusting the fuel injection and ignition advance curves. Simply plug the Remote Programmer into the DI-S harness and mount the Remote to the vehicle's dashboard for easy access. The Remote allows adjustment to the stock fuel injections signal in multiple stages.

NOTE: It is HIGHLY RECOMMENDED to use a wide band oxygen sensor and quality gauge (such as Dynojet's Wide Band Commander) when tuning the fuel injection. Without a gauge, the air/fuel ratio cannot be determined and possible engine damage can occur.

FUEL BASE – this setting will adjust the entire fuel map: 1 = 0% 2 = +5% 3 = +10% 4 = -5%

FUEL LOW – this setting will adjust fuel from 0 rpm to 3,000 rpm, in the ranges of: -17.5% to 0% to +20%

FUEL MID – this setting will adjust fuel from 3,001 rpm to 6,000 rpm, in the ranges of: -17.5% to 0% to +20%

FUEL HIGH – this setting will adjust fuel from 6,001 rpm to 10,000 rpm, in the ranges of: -17.5% to 0% to +20%

IGN CURVE – this setting will adjust the Ignition Curve, up to 4 selectable and all can be custom programmed using the CurveMaker Software. (see attached Curve Chart)

NOTE: The Remote Programmer can be removed after adjusting the settings, and the DI-S Module will keep the settings even with the battery disconnected. If the LED on the Remote does not turn on, or the LED flashes continuously after 10 seconds, then the ignition and Remote should be returned to Black Rhino Performance for testing.

Additional Features

The DI-S for the Rhino 700 has many additional features. These are pre-programmed and they all can be accessed using the CurveMaker Software (not supplied with the ignition). The DI-S ignition for the Yamaha Rhino 700 has a Vehicle Speed Limit set to 100 MPH. This vehicle speed limiter is independent from the 8,000 RPM engine speed (RPM) limiter, and is adjustable in the CurveMaker Software from 5 to 199 MPH. This limiter will be activated every time the vehicle speed matches this number while in Forward Lo, in Forward Hi or in Reverse gear. In addition to the vehicle speed limiter, there is a Safety Vehicle Speed Limiter that can be activated by grounding one of the additional leads (see below). By default this speed limit is set at 15 MPH and can be adjusted using the CurveMaker Software.

The DI-S ignition for the Yamaha Rhino 700 is shipped with additional leads coming out of the ignition. These leads allow the ignition to control other features. To program these features, follow the instructions in the programming kit.

PURPLE/WHITE – Programmable Safety Vehicle Speed Limit. Ground this wire to activate, preset at 15 MPH (5-199 MPH adjustable using CurveMaker software)

BLACK/YELLOW – Programmable Launch Limiter. Ground this wire to activate, preset at 3,200 RPM (0-10,000 RPM adjustable using CurveMaker software)

BLUE – Optional 2-amp RPM window activated switch to ground, referenced as "RPM Switch 1" in PC Software.

WHITE/BLUE – Optional 2-amp RPM window activated switch to ground, referenced as "RPM Switch 2" in PC Software.

The Blue and White/Blue wires are 2-amp switches that can be used to activate a solenoid or relay. Connect the relay with hot +12v wired to one side of the relay coil, and the other side connected to Blue

or White/Blue. When the rpm activates the switch, it will be grounded inside the ignition box, causing current to flow through the relay coil. DO NOT connect any device which requires more than 2 Amps (Amps=Volts/Resistance). See attached wiring diagram for wiring the relay.

Data Recording

The DI-S for the Rhino 700 will continuously record important engine operating parameters. This information can only be accessed through the CurveMaker Software (sold separately) in the Diagnostics Tab of the software. The recorded data includes:

Number of Engine Starts (recorded after 2.25min of run time)
Total Time Engine at WOT (hours)
Total Operating Time (hours)
Longest Continuous WOT Operation (seconds)
Histogram Barchart of Engine Speed VS. Time
Maximum Engine Speed
Time Near Rev Limit
Programmed Rev Limit

Updates

Due to the rapid addition of new applications, the CD included with this kit may not have the latest Curve Maker updates on it. Please go to <http://www.dynaonline.com/skins/downloads/> for the latest updates.

Troubleshooting

Troubleshooting the Performance Ignition is simple. If the dashboard "Check Engine Light" is ON, or the vehicle will not start or run at all, follow these 3 steps:

- 1) Disconnect the Fuel Injector Intercept connectors and reconnect the stock connector to the fuel injector,
- 2) DI- Disconnect the BROWN/RED piggyback lead at the ignition coil, and reconnect the stock +12v BROWN/RED lead to the coil positive (this removes +12v source from the DI-S),
- 3) DI- Disconnect the DI-S ORANGE/BLACK coil negative wire, and reconnect the stock ORANGE wire back to the ignition coil negative.

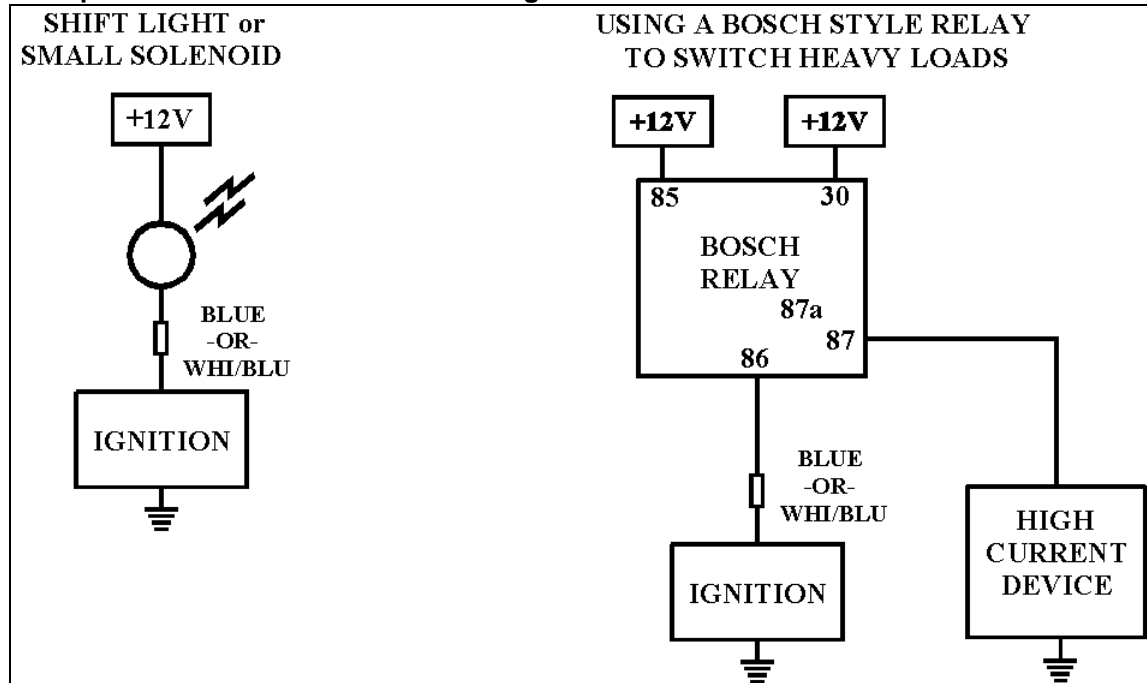
If this fixes the problem, then the DI-S ignition should be returned to Black Rhino Performance for testing. If this does not fix the problem, then the problem is somewhere else on the engine or vehicle. Follow the troubleshooting procedures outlined in your vehicle shop manual.

If you are using non stock spark plug, or stator, replace them with OEM units. Then follow the procedures in the calibration section to set the DI-S ignition up to work with your vehicle. If calibration doesn't fix the problem, the ignition should be returned for testing. If the problem persists when using the stock ignition then the problem is external to the DI-S ignition.

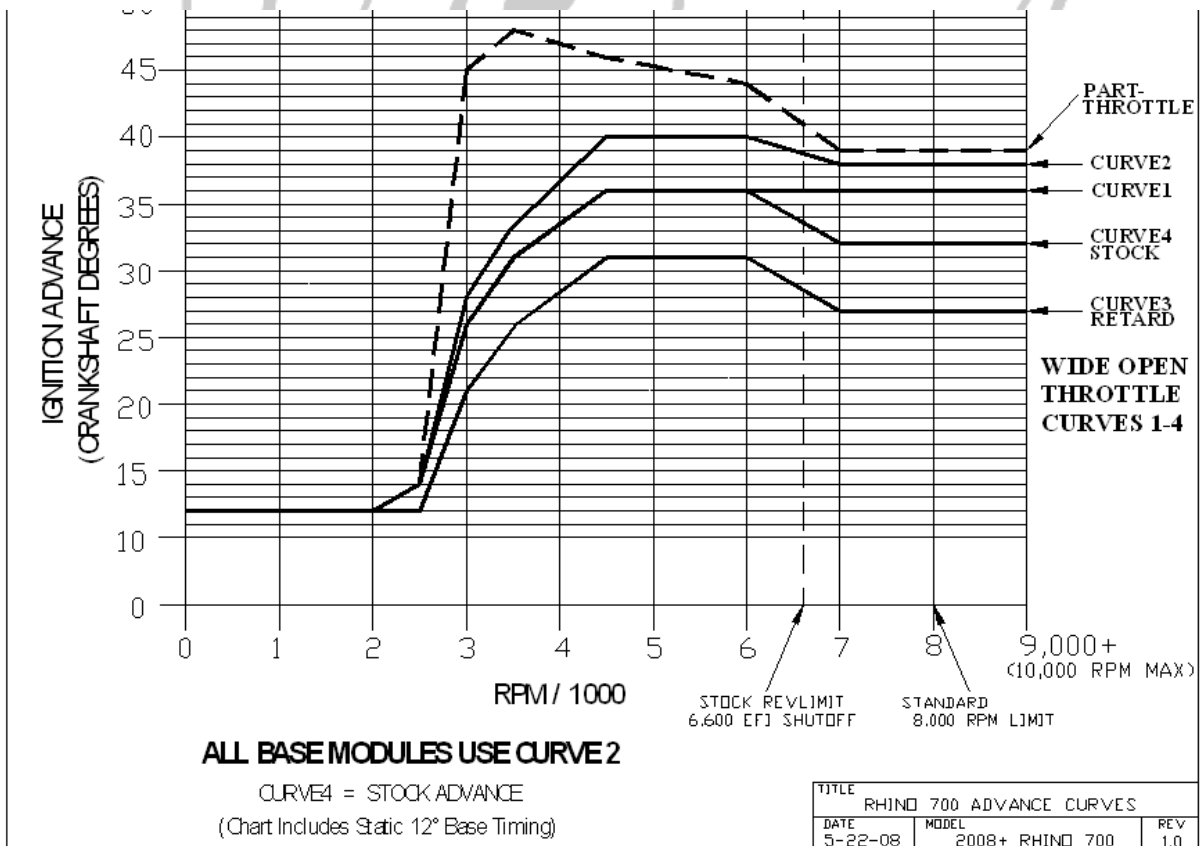


**Black Rhino
Performance**

Examples of RPM Activated Switch wiring:



Performance DI-S Ignition Onboard Pre-Programmed Ignition Curves



As always, if you have any questions, concerns, or suggestions please call us at 619-561-5000 or drop us an email at CustomerServices@BlackRhinoPerformance.com.

Thank you for choosing Black Rhino Performance!