DYNA COIL ADAPTER BRACKETS INSTALLATION INSTRUCTIONS FOR YAMAHA XJ-SERIES BIKES

Thank you for purchasing these custom-made Dyna coil mounting adapter brackets for your bike. We think that you will find that these brackets are to your satisfaction, and make your installation easier, safer, and result in a much more professional finished installation.

These instructions cover the following models: all XJ650 models, all XJ750 air-cooled models, all XJ900RK models, and XJ1100 models.

KIT CONTENTS

- 4 x Dyna coil adapter brackets with nuts and lockwashers.
- 1 x Relay holder mounting bracket
- 1 x Instructions



TOOLS YOU'LL NEED



Wire cutters.



Soldering iron and electrical solder.



Wire stripper tool.



Di-electric grease.



Small sections of suitable size shrink-wrap tubing (preferred...)



... or electrical tape (better than nothing).



Assortment of hand wrenches and/or sockets (preferably deep) and ratchet, 3/8" drive for the 1/4" coil-to-bracket mounting bolts and the horizontal bracket-to-frame mounting bolts.



Pair of pliers and/or small vise grips.



ACT MATCH© **UEM COLORS** ACTLY MATCHED RETHANE RESTORATION PAINT HCP7906-SP OEM color code 98 LOW GLOSS BLACK 07-PT-00-1-C H942 APPLICATION HULLED THE THE DEST

A grinder, hacksaw, dremel tool or similar to remove the relay holder tab bracket from the right side lower frame tube. **HCP7906-SP** Black touch-up paint for the frame tube.

- Pen and paper to take notes with.
- Time and patience. Preferably in abundance.

- Paper towels, rags, bandages, cleaning solution, paint, electrically conductive anti-corrosion grease or spray, etc. The so-called "miscellaneous shop supplies".

- Optionally, some 1/4-20 nuts for use in test-fitting the coils and brackets. Available at your local hardware store.

TERMINOLOGY

Throughout these instructions we will refer to the aftermarket **C**oil **A**dapter **B**rackets that you've purchased as CABs. The **O**riginal **C**oil **F**rame **B**rackets, or OCFBs, are the bracket(s) and/or tube that are a part of (welded to) your bike's

frame. The stock coils mount to these.

Just remember the big "O" always refers to the Original coil brackets that are on your frame.

"Left" refers to the clutch lever side of the bike.

"Right" refers to the brake lever side of the bike.

"Front" is towards the headlight.

"Rear" is towards the tail light.

PRE-INSTALLATION

Background and Introduction:

It is **STRONGLY** suggested that you read through these installation instructions **IN FULL** before attempting to install your coils and brackets. Reading through them without having the bike in front of you may be a bit confusing, but it will make sense in the long run when you DO start the install.

Introduction

Factory original coils are durable but once they go bad, they can be difficult and very expensive to replace.

a) Used original coils that you may find are most probably out of electrical spec, meaning that either their primary or secondary resistance is beyond acceptable limits. Depending on where the problem(s) with original coils may be, the condition of used coils may cause poor performance (hard starts, reduced engine output and fuel mileage, etc., especially when cold or wet). They may serve to damage other components in your electrical system, specifically your TCI unit, which is also very time-consuming and expensive to both diagnose and replace.

b) Aftermarket high performance coils, such as the green HCP245 Dyna brand coils that you have purchased, are an excellent replacement for the stock factory coils. They produce a much stronger spark than original coils, and while that may not translate into any greater acceleration or performance, they will ensure that any other problems your engine may have aren't related to spark performance issues.

(Plus they're really cool looking.)

c) The drawback to Dyna coils is that they are quite a bit bigger than the stock coils, **AND** that their central mounting bar has its mounting holes oriented (rotated) 90-degrees from those on the original coils.

These factors, combined with the incredibly tight space that exists where the factory coils are mounted on the XJ series of bikes, means one gets to hack together a custom bracket and tweak everything through trial and error... or save themselves at least some aggravation by purchasing a set of prefabricated mounting brackets, as you have.

We must warn you, though: although the use of these custom-made brackets will **GREATLY** simplify the installation of the Dyna coils into your bike, **BY NO MEANS** does this imply that it will be a "simple" installation. In particular, you will most likely have to relocate one (or more) of the electrical relay mounting "tab brackets" that are spot-welded to your frame tubes in various positions. These tab brackets were positioned to fit around your original coils, and due to the much larger size and mounting configuration of the Dyna coils, there may or probably will be interference problems.

We suggest that you take the following issues into account:

i) The Dyna coils should be installed with the angled spark plug outlet towers facing towards the **REAR** of the bike, pointed downwards.

ii) Any relocated relay tab brackets should be positioned so that the relay that attaches to it is **NOT** in contact with **ANY** other object, such as the frame rail. They also need to be positioned so that the factory wiring harness lead wires and terminal will still reach the relay in its new position and that any electrical terminals, etc. will not be in close proximity to **ANY** metal objects. *THESE ARE CRITICAL ISSUES*. It is much wiser, electrically speaking, to **NOT** have to splice or add wiring length whenever possible – doing so adds unwanted resistance to the circuit. The proper place to relocate a relay and its associated tab brackets is a trial and error process on **each** different model!

If things are super tight, it may be possible to very slightly (and carefully!) cut open the main wire harness "wrap tape", where the relay lead wires exit the main harness wrap, to allow the relay harness lead wires a small additional bit of length to reach a relay that has been relocated further away.

Your coil adapter bracket kit comes with one (1) relay holder tab bracket which can be attached to the coil adapter bracket holder bolts or welded to a frame tube, and will allow the mounting of one relay holder (and its relay). Where and how the bracket is mounted will vary by model.

iii) Although the coils themselves do not require an electrical ground path (that is done through the spark plugs), it is normal, on some models, to find one or more small black ground wire(s) from the main wire harness attached via a ring terminal to one of the original coil bracket mounting bolts, or at the coil mounting bracket on the frame. (Highlighted in yellow below.)



You should **ALWAYS** re-attach these ground wire(s). The lack of proper electrical grounding in any DC voltage vehicle can be responsible for a variety of difficult-to-diagnose and potentially damaging electrical problems.

HINT: It is an exceptional idea to take a few moments, while the coils are out of the bike, to carefully sand away any rust or corrosion that is present where this ground wire ring terminal will contact the frame... even removing the paint in that area down to bare metal. Then coat the frame area and the ring terminal with a waterproof, electrically conductive grease or other protective material to ensure both good electrical contact and future corrosion protection.

INSTALLATION

You should expect this job to take a full 2-3 hours for installation, depending on your bike model, and your level of skill and experience at this kind of task.

Also, as is common when working in very cramped quarters with numerous sharp metal objects close by, you might incur some physical injuries to your hands and/or other body parts, so be very careful!

Also, it is **HIGHLY** recommended that you have a pen and paper handy when you start this process, as it will be helpful to take notes and/or make simple sketch diagrams as to what goes where when you start taking things apart. (Which wire pair goes to which coil is a good example.) If you have to start unplugging things to move them around, you'll be glad you took notes.

For the purposes of illustration, we will be using a ratty-looking 1982 750J Maxim.

STEPS TO INSTALL DYNA COILS USING THE CABs (COIL ADAPTER BRACKETS)

1) **DISCONNECT THE BATTERY**. Do it! I realize many people feel that they are "extra careful" and it won't matter, because they won't ground anything, the key is off, etc. Just do it!

The TCI box you save may be your own.



2) Remove the seat.





3) Remove the rear bolt from the gas tank, and on models with an in-tank fuel sender, disconnect the sender wiring harness lead from the main engine harness.





Disconnect the fuel and vacuum lines from the petcock, making sure that the fuel petcock is in an "off" position (on many XJ models this means the petcock selector lever is set to the RES or ON position). Lift up on the rear of the tank, then slide backwards.

Set the gas tank far out of harm's way!





4) Remove the original spark plug boots/caps and wires from the spark plugs. They pull or "twist" off the threaded stud on top of the spark plug.

For future reference, one coil will have spark plug wires that go to cylinders 1 and 4, and the other coil will have spark plug wires that go to cylinders 2 and 3. It does **NOT** matter which coil fires which set of cylinders, as long as the wires are going to the proper cylinders.

From this point forward, we will refer to the coil that fires the #1 and #4 cylinder plugs as the "1-4 Coil" and the coil that fires the #2 and #3 cylinder plugs as the "2-3 Coil".



Cylinders are numbered sequentially as 1, 2, 3, and 4. The #1 cylinder is the far left side cylinder (left meaning the clutch lever side of the bike). The #4 cylinder is the far right side cylinder (near the throttle and front brake lever).

5) **NOTE** the color code of the wires running to each coil, and make a note of which color pair of wires runs to which coil. For most XJ model bikes, one set of coil primary lead wires is a solid Orange wire and a Red wire with a white tracer stripe; these are the leads that go to the 1-4 coil. The other coil primary lead wires are a solid Gray wire and Red wire with a white tracer stripe, and these go to the 2-3 coil.

Detach the coil wiring leads and their plastic terminal connectors from their corresponding main wiring harness plastic connectors. Label them.





6) Remove the original coil mounting bolts from the bike. There will be two M6x80 bolts (6mm, 80mm long), that hold the coils in place. The front one goes through a "tube", and the rear goes through an open bracket.





Set the coils aside; you will need to remove (cut off) and re-use the original factory coil primary lead wires with the attached plug-in terminal.

Set the two mounting bolts, washers, and nuts aside as well; you will re-use these with your new coil adapter brackets. Now is a good time to clean any rust or corrosion from these bolts, and spray paint them with a light coat of paint if necessary.

7) Now we start on the new coils.

a) Cut off the coil primary (input) wires from your original coils as close to the coil as possible. Write down which color pair of wires goes to which coil as explained previously (subtle hint: write it down. Not-So-Subtle hint: **WRITE IT DOWN!**). Another good idea is to mark the plastic terminal connector with some type of permanent marking method as to which is which, i.e. "1-4" and "2-3".



b) Install the ring terminals that come with the Dyna coils onto the cut-off ends of these wire pairs. We strongly recommend soldering the wires to the terminals, as well as crimping, followed by coating with di-electric grease and **THEN** covered by heat shrink wrap. (A word of advice: don't forget to put on the heat shrink *before* you crimp and solder the wire. Works much better that way.)

The preferred procedure illustrated:





First, strip about 1/4" off the ends of the (18ga) cut wires. Second, slip on your section of heat shrink tubing and twist. Make sure the wire is shiny for better soldering.



Insert the wire into the terminal and **TIGHTLY** crimp. it in place.



After crimping, heat up your trusty soldering iron and get to work.



Let the solder cool, then slather your work in dielectric grease.

Ease the heat shrink over the connection and hit it up with a lighter or a heat gun, if you have one.

Remember, corrosion is the #1 Enemy of your electrical system!



c) Install the primary wiring leads to the Dyna coils using the hardware supplied with the coils. You want these connections to be tight, but be careful not to over-tighten and strip the fine threaded brass inserts out of the coil bodies!

NOTE: For each set of primary input wires, it does **NOT** matter which color wire goes to which terminal on an individual coil – the primary input of a coil has no "positive" nor "ground" orientation.

d) Now, back to the brackets. First up: removing the existing flasher relay mount, highlighted here in red.





Leaving this in place is not an option; the new coils will bump up against it.



Captain Obvious says, "Take the relay off the mounting bracket first!"



There's no set procedure for doing this, but one suggestion might be to weaken the weld, then grab the bracket as close to the frame as possible with a crescent wrench and twist back and forth. Either way, get as much as you can off,

THEN GRIND THE REST FLUSH.

If you don't, depending on which model you have, the bump might still get in the way of the coil.

Once that's done, prep the area, take your trusty can of X-Act Match paint, and make it look all nice and purdy.

e) We're about ready for a test fit. You can do this one of two ways. First:

The adapter brackets will be installed with the threaded stud pointing downwards. Slide one CAB onto the 80mm mounting bolt, through the front tube, then slide another CAB onto the bolt from the other side. Reinstall the nut finger tight. Do the same for the rear mounting bolt. You should have all four CABs hanging downwards.



The coil slides onto the threaded stud, followed by the lockwasher and the nylon locknut. For the purposes of the test fit, you can set aside the lockwasher and locknut and use standard 1/4-20 nuts.



The second method would be to mount the CABs to the coil first, then slide the bolts through the cabs and frame brackets.



Did you forget to reinstall any ground wire that was there to begin with? If so, do it now!

During this trial installation, you will be looking for any fit or interference problems that may occur between the coils and **ANYTHING ELSE** on the bike, including the aforementioned relay mounting tab brackets.

This is where you find out what, if anything, needs to be moved, where to move it to, and even how you plan to move it. Chances are, you'll be fine with removing the one mounting tab and maybe moving some wires out of the way. If you do find it necessary to start moving things around, be **VERY** sure that you don't tug on anything and create a loose connection.



WE **<u>STRONGLY</u>** SUGGEST THAT YOU TAKE YOUR TIME DURING THIS PHASE OF THE OVERALL INSTALLATION PROCESS. You've heard the phrase "measure twice and saw once"? Measure two, three, even five times if you have to. Make sure that you account for original relay lead wire harness length and reach to your new proposed locations.

It's crowded under there, and you have to be careful to not move pieces to where they will bump into something else! Remember that the gas tank will fit down very tightly, and in very close proximity to the central and side rail frame tubes. ANYTHING OUTSIDE THE SLIGHTLY CURVED GEOMETRIC "PLANE" DEFINED BY THE OUTSIDE EDGE OF THE TOP FRAME TUBE, LEADING TO THE OUTSIDE EDGE OF THE BOTTOM SIDE FRAME TUBES, IS OFF LIMITS AS FAR AS A SUITABLE RE-LOCATION AREA, AS THE GAS TANK WILL NOT CLEAR!





In other words, anywhere **INSIDE** the triangle defined by the masking tape can be considered fair game.



OUTSIDE the triangle...

...not so much.



f) Now install the coils onto the FRONT CAB with the supplied 1/4" bolts, flat washers, and lock washers. It is normally easiest to install the front of the coils onto/under the front adapter bracket first, and then mount the rear of the coils to the rear adapter bracket.

As you can see from the lower left-hand picture on page 12, the threaded stud on the CAB fits through the mounting hole on the coil body, and is held in place by the lockwasher and locknut.

Again, ideally we're using spare 1/4-20 nuts for the test fit; for maximum holding power, the locknuts should only be tightened down once. Repeated removal and reinstallation weakens the grip of the nylon insert. Finger tighten all of the coil-to-adapter bracket mounting bolts. Allow the coils to remain a bit loose!

Once the two coils are in place, gently put the tank back on and make sure nothing is rubbing. If not, remove the tank and go to the next step – adding the mounting bracket for the flasher relay.

g) As mentioned before, each model of bike is different. Each model has the relay wires exit the wrap at different places, so there's no given spot to put the new tab bracket. You may need to fiddle with it, bend it some more, flatten it out... it doesn't matter where it goes as long as there is **NO** interference with the tank (or anything else), and <u>NO</u> chance of a connection shorting to the frame.

h) Now, recheck all clearances. Here's where you're on your own, as it differs per bike, and sometimes per year per bike. The factory wasn't always "spot on" in their placement of the original relay tab brackets anyway. Relocate any conflicting pieces to their new locations as needed.

NOTE: it is always advised that any relays, when they are relocated, be kept as far away from the engine as is possible, as heat kills.

TRIPLE NOTE: if welding is to performed on the bike chassis in order to relocate any tab brackets, then make sure that the battery is **<u>COMPLETELY DISCONNECTED</u>** from the bike's electrical system.

It is also strongly recommended that both plugs to your bike's TCI "Ignitor" unit – the black box "brain" of your ignition system – be disconnected from the main wiring harness during the welding process. Same goes for the regulator/rectifier unit. The TCI unit can become damaged in any number of ways by even the smallest of voltage surges, and damage to this unit can cause an incredible variety of irregular, difficult-to-diagnose problems of various sorts if it doesn't get fried outright.

i) Once all brackets, relays, etc. are relocated, repositioned, and installed via whatever means necessary, recheck all electrical connections and tighten down all the nuts and bolts.

Then re-check them again. Paranoia pays.

A suggestion: before you mount the CABs and new relay tab bracket for the last time, paint them with your X-act Match paint to guard against corrosion.



j) Although you may have marked the coil primary lead wire terminals as to which is which ("1-4" and "2-3"), it is strongly suggested that also mark each coil **BODY** in the same way, in a manner that is highly and easily visible.

k) Now you will need to install the spark plug wires that you have selected onto the coils, and route them to the appropriate plugs.

BUILDING YOUR PLUG WIRES

At this point, you have three options.

First, if you've purchased pre-made plug wires from Dyna, you can skip this section and go straight to page 17.

You can cut/remove the existing plug wires from your old coils, and add the appropriate terminals to plug into the Dyna coils – skip ahead to page 18.

For the purposes of illustration we will go with option three and build new wires from scratch. The parts/part numbers shown will vary with your given application (depending on which option you go with).

Before we begin, a brief note. The wire sections we supply are 18 inches long, which will be too long for the task at hand, more often than not. You may want to consider measuring the length before beginning the build; another option would be to build the coil end of the cables, install them, and **then** measure and trim the wire lengths to suit.

You will need:





(4) **HCP10671** plug wire sections

(4) HCP9746 180-degree coil terminals



(4) HCP9742 coil boots



(2) HCP1304 90-degree NGK plug caps



(2) HCP1300 180-degree NGK plug caps



(1) HCP9739 plug wire crimping tool

Strongly recommended:



(1) HCP7528 Dielectric grease



(1) HCP9740 Clip-on wire markers



A set of these "helping hands" won't hurt, either... or a friend if you can manage it.

Got everything? Good. Let's get started.



To make things easier, we'll put on the coil boots first. Take your dielectric grease and lightly coat the first few inches of the wire – without the grease, sliding the boot up and down the wire will be a real bear. Put the boot on the wire as shown.





Step One: Strip the insulation off the end of the wire. To do this, use the middle hole on the crimping tool as shown above.



Put the wire in the tool so that about an inch extends past the beveled side of the cutting blades, then squeeze the handle until it ratchets. Once it starts clicking, you're pretty much committed. Squeeze until it stops clicking, then hold; twist the long part of the wire with the other hand, then pull with the tool.

Step Two: Untwist the exposed wire core and fan it out a bit. This will help the wire lay flatter when we solder and crimp. Then bend a section of it over.

Step Three: Heat up your trusty soldering iron. While it's warming up, set up your terminal and wire (use a friend if necessary). The bend in the wire should be placed about halfway up the terminal, which is about where the cut end of the insulation will wind up as well. Any more than that, and the wire will have trouble plugging into the coil tower.

We're soldering the wire for two reasons: to promote good conductivity between the terminal and the wire core, and to supplement the strength of the connection between the terminal and the wire as a whole.

Once the iron is nice and hot, press the wires down with the tip onto the terminal body, hold it for a few seconds to heat up the wires and terminal, and solder the wires in place. Let the piece cool, then fold the plug wire down into the terminal. The cut end of the insulation should just barely extend past the tabs.

Step Four: Place the terminal in the crimper so that the little arms are pointed up into the little "W" shaped bit. Gently squeeze the handle, making sure the terminal stays put, until you hear the first click. Once you hear that, go ahead and squeeze as hard as you can until the tool unlatches and lets go.

(When I say "squeeze hard", I mean <u>HARD</u>. This is your **primary** means of making sure the connector stays on the wire, so crank down on that puppy. Don't Scrimp On The Crimp.)

Success! Now do the same with the other three wires.

Step Five: Now we do the other end of the wires. Two of them (for the #2 and #3 wires) will use the HCP1300 180-degree caps.

Peel off the boot from the skinny end of the plug cap. Again, lightly grease the last few inches of the plug wire and slide on the boot.

The new cap is similar to the stock caps in that they screw onto the wire. Once the cap is screwed all the way on, lightly grease the outer surface of the cap, then slide the boot back into place.

The other two wires (for #1 and #4) take the HCP1304 90-degree caps. The installation procedure is the same, except that the boot that fits around the spark plug itself needs to be installed on the cap.

And don't forget, after all is done, to put a multimeter probe on each end of your new wire to check for a good connection. Set your meter to the 1K scale. Without the caps installed, it should read close to zero. With the caps, it should be 5K ohms.

If you bought our **HCP9740** wire markers, clip them onto the appropriate wires, preferably near the plug cap. Having these will help if you decide to start pulling plug wires off later, and forget what goes where.

Again, just as with the primary input wires to the coil, the individual plug output towers (where the spark plug wires connect into the coils) do not "know" (or care, for that matter) which plug wire is plugged into them. The #1 or #4 plug wire can go to either output tower on the #1-4 Coil, and similar logic applies to the #2 or #3 plug wire on the #2-3 coil. Why doesn't the coil care? Because the #1 and #4 plugs both fire at the same time, as do the #2 and #3 plugs (but not at the same time as the #1 and #4 plugs, of course). This is the concept known as "wasted spark".

Next, we install the wires into the coil towers. It's going to be a tight fit, so grab the dielectric grease and stick a grunch of it in the hole. Not only does this help you get the wire in there, it will also help protect the connection once it's installed.

If you can't get the terminal all the way in by hand, use a flat blade screwdriver to push it in the rest of the way. The edge of the terminal should end up right about at the edge of the coil tower.

Here's where the dielectric grease on the wire comes in handy. Slide the boot up and over the coil tower.

Then repeat the process with the other three. (sniff) Isn't it beautiful? (wipes a tear)

Now, we triple-check our connections before we put everything back on. (Remember, Paranoia Pays.) Grab your meter and measure from cap to cap. The secondary winding on the Dyna coils has a resistance of 14K ohms as opposed to the 11K for the stock coils, so if we add that to the resistance for a pair of 5K plug caps, we get 5 + 5 + 14 = 24K ohms.

We're pretty much down to final assembly at this point. Put the CABs and the tab mounting bracket onto the coils, and **LOOSELY** put the lockwashers and locknuts on. Do not tighten anything yet.

Mount the CAB/coil assemblies onto the bike with the existing mounting bolts that you removed earlier. Once the coils are in place, snug down the mounting bolts, then do the same with the locknuts on the CABs. Install the flasher relay onto the tab mounting bracket.

Honey, do these wires make my butt look fat?

I) You're basically done. I would like to suggest that you temporarily test your installation work by re-installing the battery cables and anything else that has been disconnected (coil primary leads, TCI unit, relays, etc.) and test-crank the bike. (Come on, you know you want to anyway.) There should be enough fuel in the bowls to fire the bike off. If not, then either hook up an auxiliary fuel tank or carefully reinstall your main tank and try starting the bike. Again, at this point in time you merely want to confirm that the installation of the new coils has been successful enough to get spark to the plugs, and if the bike starts and runs for even a few seconds, that is proof that your install has been performed properly, from an electrical standpoint.

m) Now go out and ride with a newfound confidence and power! But do so carefully! While having new Dyna coils can give you self-confidence, inspire awe amongst people and allow you to leap tall buildings at a single bound, you can also end up that much more of an attraction for careless, reckless, or inattentive motorists.

n) Optional: drink heavily and bandage, or re-bandage, your now bleeding hands... :-)

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