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New Wires in Old Coils

by Bill Kingson

Photos by Blaine Hoopes
Wire update from Dave Norton
1981 RH coil update from Shane Thomas

THE LIE

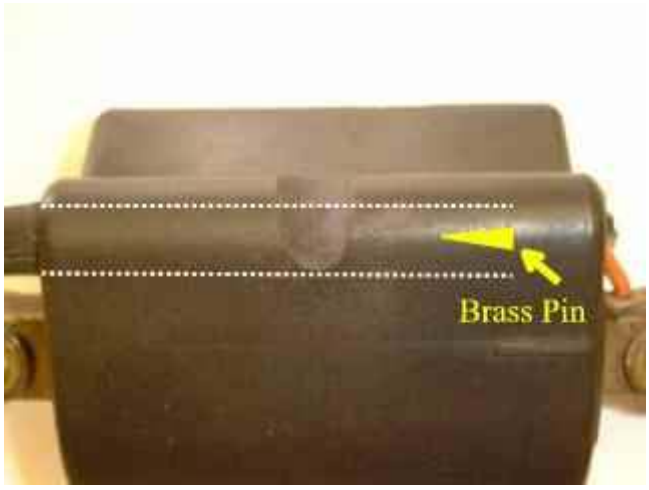
The spark plug wires on the XS 1100 coils are NOT replaceable. The ONLY solution is to replace the entire coil set with a new one from Yamaha or aftermarket sets such as Dyna ($111.99) or Accel ($145.99) (Dennis Kirk).

THE TRUTH

All four spark plug wires and caps CAN be replaced for about $20 with a little patience using only simple tools. It's easy.

THE SECRET

As shown in the wire/pin diagram (below), the wires enter the coil housing and continue almost to the other end the housing. Internally they are pushed on to a sturdy, tapered brass pin at about 1" from the far side of the coil housing. All you have to do is cut away some of the plastic around the wire and it can be removed easily. This tech tip explains how.



THE DISCLAIMER

All XS coils are not identical. The coils shown here were from a 1979 XS1100F. The ones on my 1981 XS1100 SH are a little smaller, but similar in appearance. I imagine they're similar internally, but I haven't tried this procedure on the newer ones. (7/22/00) Shane Thomas has now provided an update for the smaller '81RH coils. There are minor differences which will be noted in the procedure. I wouldn't have tried it if I didn't have spares.
PROCEED AT YOUR OWN RISK.

USE YOUR HEAD

It's hard to describe every nuance of a procedure, but I've done my best. Please read through the entire procedure before beginning to make sure you understand everything. Also, pay attention to the small screws, washers and wires as they come off.

Removal and Testing

1. **Remove Tank**
    1. Turn BOTH fuel valves off. Note: On Standard models select either ON or RES.
    2. Remove seat
    3. Disconnect fuel gauge sending device wire.
    4. Remove the bolt that secures the tank to the frame
    5. Remove tank
2. **Disconnect Coils**
    1. Disconnect spark plug wires from spark plugs
    2. If the spark plug wires are not numbered, tag each one as it is removed
    3. Remove the bolts holding the coils in place
    4. Disconnect the small primary wires. These should be color-coded and need not be tagged.

5. Remove coils
6. After the coils are out, mark the spark plug wire numbers on body of coils.

3. **Test Coil Windings and Spark Plug Caps**
    1. Primary (small) windings

> The Haynes manual (p. 113) states:
> "Set the multimeter to the ohms scale, and connect one probe lead to each of the thin low tension wires.
>
> "Note that it does not matter which probe is connected to which lead. A reading of 1.5 ohms +/- 10% at 20°C (68°F) should be obtained (1.35-1.65 ohms) if the primary windings are in good order."

    2. Remove and Test Spark Plug Caps
        1. Unscrew the caps from the end of the wires
        2. Inspect for corrosion
        3. These are resistor caps and should measure 5k ohms.
    3. Secondary Windings (spark plug wires)

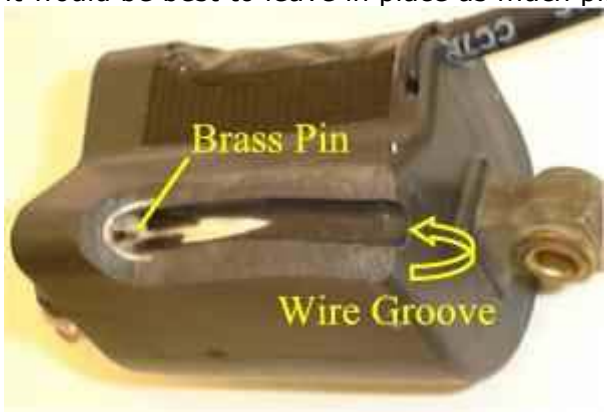
> The Haynes manual (p. 113) continues:
> "Repeat the test for the high tension leads, this

time with the meter set on the K ohms scale. A resistance of 15k ohms +/- 20% (12-18k ohms) at 20°C (68°F) should be indicated."

NOTE: This value is for the coil and wires only. For testing with both caps connected add 10k ohms.

4. Wire Removal and Replacement

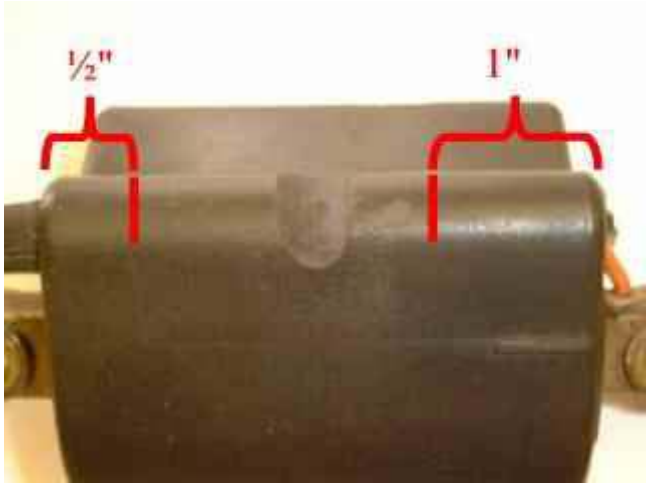
5. Blaine and I went about this step in different ways. On my original set of coils I removed plastic from where the spark plug wire enters the coil housing to the tip of the brass pin.
6. See the cutaway photo (below). This provides for the easiest removal and replacement of the wires. However, this method also requires that the new wire be secured with RTV and/or a zip tie. Blaine figured that it would be best to leave in place as much plastic as possible.



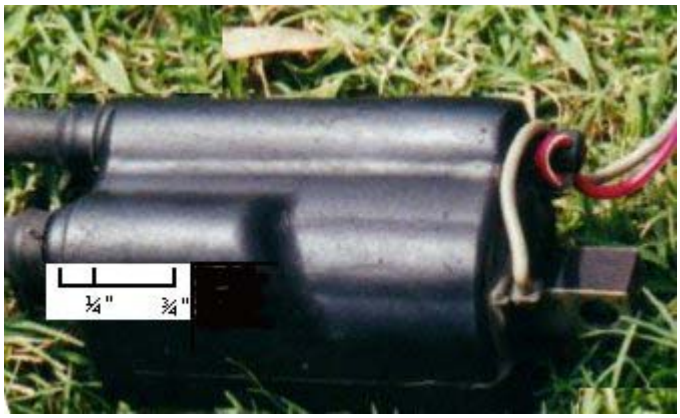
7. This is arguably more secure, but also more difficult. In discussing the relative benefits we agreed that some combination of the two techniques would be best. That combination is what is shown below.

8. **1981 RH coils (and similar)**
   The photo below of the '81 RH coil shows the differences.

9. 
10. Looking from the high tension wire end, you can see that the left side of the coil is the same as the older coils but the other side is very different. The right side wire repair will be described separately and will be referred to as the "right side wire".
11. **Mark the Cuts on the Coil Housing**
    1. Make a mark on the housing ½" from where the spark plug wire enters the tunnel
    2. Make a second mark 1" from the opposite end (small wire side)



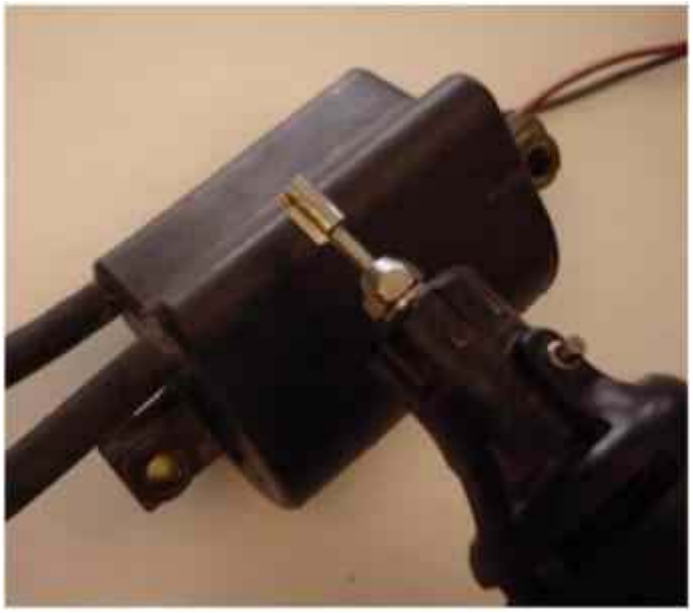
1981 RH coils (and similar)
For the right side wire:
Make marks at ¼" and ¾" (6mm and 19mm) from where the high tension wire enters the body of the coil.



12. **Filing, Grinding, Filing and Cutting**

In order to remove the old wire it is first necessary to remove some of the plastic between the marks made in Step 4.

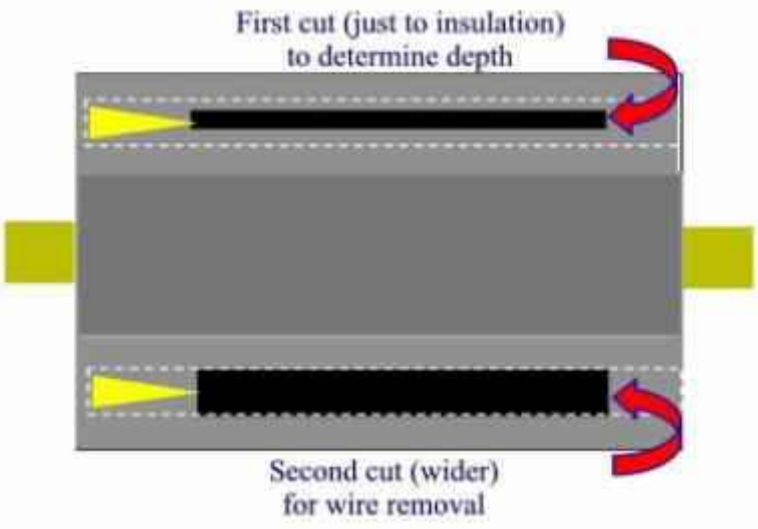
I did this with a die grinder and 36 grit paper. Once I knew what to grind I was able to do each wire in about five minutes. Blaine had good results with both a Dremel and a rat-tail file. Any coarse file or sander should do fine.



The plastic that surrounds the wire is about 3/16” thick. Most of the plastic is black, but you may see some white plastic as you get near the brass pin.

Initially you have to grind it to a depth where you can just see the wire insulation.

This grind should continue along the length of the coil between the marks. Then, widen the opening to expose more of the wire insulation. See diagram.

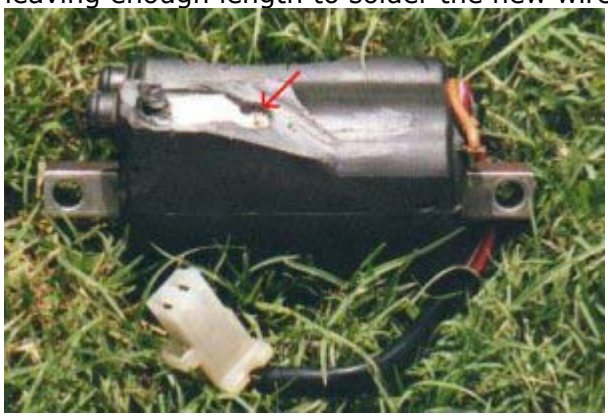


1981 RH coils (and similar)
Between the marks (¼"/¾", 6mm/19mm), grind (or file) to a depth where you can just see the wire insulation. At that depth, continue to grind toward the middle of the coil until you reach the end of the wire, where in turns inward.

Then widen the cut adequately to allow the wire to be removed. STOP. Before trying to remove the wire, cut it off where it enters the coil.

For the next step it is important to LEAVE THE WIRE CONNECTED. Gently lift the wire out from the free side (the side you just cut), leaving the internal connection intact. Then clip the wire connection.

leaving enough length to solder the new wire.



13. **Removing the Old Wires**
    At this point you should be able to pull out the wire.

    Pry gently along the exposed area to loosen the wire and slide it off the brass pin. Once the wire is out, clean up the edges of the wire groove. Also, roughen the groove to improve RTV bonding when you put in the new wires.

    Note: Don't remove more plastic than necessary to get the wire out. With more plastic in place, the new wire will be more secure. Repeat the process for the other three wires.

    Note: The coil should be retested from pin to pin according to the instructions in the secondary windings section.

14. **Installing the New Wires**
    1. Inspect the tapered brass pin for corrosion. Clean as needed with a fine abrasive or contact cleaner.
    2. Cut each new wire to size, using the originals as templates. Number the wires.

       Note: Be sure to use copper core wire. Some copper core wire comes tinned and has a silver color. This is important because Blaine showed my silver-colored wire to a Honda dealer and was told, "It's aluminum".

(If you're using a prefabricated wire set as Dave Norton did, you can ignore the next step).

3. Install spark plug caps on the wires. Be sure to put the long and short caps on the correct wires.

   Note: Blaine recommends using dielectric tune-up grease around the wire to seal connection from moisture.

   It's pricey, but will ensure the longevity of the connection. I checked with several sources and they all agree that it's a great product anywhere connections are made. My friend Joel uses it routinely in his work as a truck and heavy machinery mechanic.

   However, if cost is a consideration, then the coils can be assembled without it and still work well.

4. Install the new wire on the coil by pushing the end on to the tapered brass pin. Be sure it is all the way on.

1981 RH coils (and similar)
Solder the copper core wire to the small copper wire spike.

15. **Securing the Wires**
    Gently lift the wire and apply a small amount of RTV into the wire groove and press the wire back into the groove.

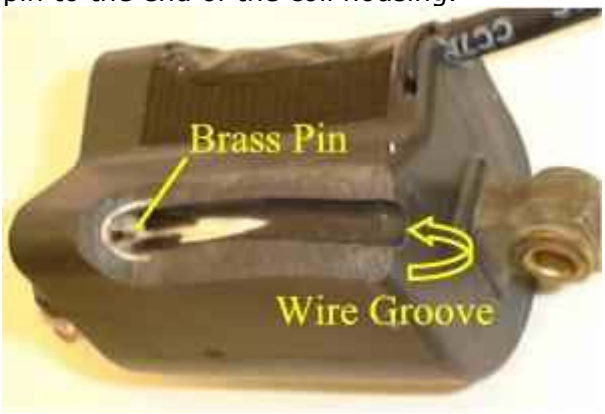
    Then apply a thin coat of RTV over the top of the wire and the edges

on either side. "Allow 24 hours for full cure and maximum strength". (Permatex)

CAUTION: After installing and gluing the new wires I put a piece of duct tape over everything to hold it in place. This is NOT a good idea because it doesn't allow the RTV to cure. It does add a nice touch AFTER the RTV is cured.

Note: Blaine elected NOT to use RTV. He used dielectric grease along the length of the coil and secured the coil wires with a large zip tie around the middle of the coil housing.

Note: On my prototypes I ground away everything from the tip of the pin to the end of the coil housing.



This made it very easy to remove and replace the wires. However, it required cross-drilling the end of the coil in order to secure the loose end of the wires with small zip ties.

16. **Install the coils**

    Installation is the reverse of Steps 1 and 2.

THUS ENDS THE PROCEDURE

Observations and Additions

Dave Norton - 1/18/00

I found that solid wire core plug wires are almost impossible to find and very expensive! I also figured lots of you are running radios, radar detectors, etc. and ignition interference could be a problem, so.....

I went to my local Checker Auto or whatever store is handy and replaced the solid core wires with composite resistance core wires. To avoid too much resistance or bad plug caps, I used the moulded on plug caps that came with the set (use whatever is cheap, just be sure the plug caps are right angle or 45 degree angle caps). The preferred wire is 7mm OD but 8mm will work with

a bit of effort.

Now get a set of resistor spark plugs, my manual calls for Champion N8Y, again hard to find so I used the Champion RN9YC which are the same thread, reach and almost the same heat range as the N8Y (the Champion book calls for the RN9YC, not the RN8YC). Everything works fine, the bike runs perfectly and the replacement wires and plugs are available at any auto store.

Also see comments on Accel Spark Plug Wires

Tools

- Multimeter (ohm meter) - Digital is best but analog is cheaper and good enough
- Coarse sander or file
- 1/8" drill (optional)

Materials	Approximate cost
RTV silicone adhesive sealant	$3.00
6 feet of 7mm copper core spark plug wire This will leave a little extra	$2.99 (DK number 20-21)
Spark plug caps – resistor type 90° short ones for cylinders 1 & 4 102° long ones for cylinders 2 & 3	 $2.25 (DK number 20-51) $3.05 (DK number 20-305)
Prefabricated wire set may be substituted for wires & caps. See Dave Norton's observations.	
Optional	
2 large zip ties – Used on Blaine's technique 4 small zip ties – Used on Cross-drilled prototypes Tricky, but effective.	
Dilectric tune-up grease (.33 ounces)	$10.00