

# DX/STD to ZC DPFI to MPFI Wiring

## INSTRUCTIONS

### Things you will need:

1. Injector Resistor Box – Sometimes, this will come with your engine, usually not. You will probably have to make a trip to your local salvage yard to get it (located on driver's side, top of strut tower, next to firewall). One from any Honda with Multi Point Fuel Injection will work, but one from the 88-91 CRX/Civic Si or HF is preferred since it bolts correctly into the right location. The CRX/Civic Injector Resistor Box looks like this:



2. When you get the Injector Resistor Box, be sure to get the connector that plugs into it (the green connector in the picture), just in case your ZC harness has the connector cut off. This connector will have five (5) wires coming out of it – one yellow with a black stripe and four (4) red with a black stripe. Get as much length of these wires as you can.
3. Four (4) fuel injector plugs – you can use the ones from the harness that comes on your ZC.
4. 18 ga. A.W.G. wire.
5. Soldering gun and solder.
6. Electrical tape and heat shrink tubing.
7. Tiny screwdriver (one that comes in an eyeglasses repair kit available at your local Walgreens, etc. works great) or large needle, for removing pins in connectors.
8. DO NOT use cheap crimp-on wire connectors for making any of the connections. Crimped and soldered connections are the best if you have the proper crimping tools and connectors to accomplish this – most people don't. Solder all splices and use heat shrink tubing to help support and protect the splice.
9. Plan on spending about 3 hours to do the wiring changes. Take your time and do it right, so you don't have to do it again.

## Connector Pins – Removing and Installing

1. When making the wiring changes, you will end up with a cleaner and more reliable installation if you de-pin and re-pin the wires into the connectors at the ECU, where possible, rather than cutting and splicing them.
2. You can find very good step by step instructions, with pictures, for de-pinning the connectors at the FourthGenHatch website:

<http://www.fourthgenhatch.net/depin.html>

3. You will need a few extra pins with a 4-5 inch length of wire on them in order to make the changes. You can get these from the ZC harness and will give you a chance to practice removing the pins.

Now that we have this out of the way, you should be ready to start making the wiring changes. Follow instructions below – do not try to short-cut something because it looks like it might work, it probably won't.

## WIRING HARNESS

You must use the engine harness that was on your DX, and modify it, as required below – you cannot use the harness that comes with the ZC engine and you cannot use a HF or Si harness – none of the harnesses are interchangeable – you must use the DX. We are asked all the time, “Why do I need to use my DX engine harness?” The main reason you need to use the DX harness is that, it mates up to the chassis harness that is in the car, which runs from the Electronic Control Unit (ECU) to the engine bay. All of the engine harnesses have connectors that plug into the chassis harness at the firewall. The wires in these connectors are in the same location on each side of the connector, in order to provide continuity from the engine to the ECU. The DX engine harness has a round 14 wire connector at the firewall on the driver's side. The 88 Si has a square 6 wire connector at this location. The 89-91 Si and 88-91 HF have a round 8 wire connector. The 8 wire connectors on the HF and the Si are the same connector, but, the wires in the connectors are in different locations, which means that if you were to plug the HF engine harness into the Si chassis harness, there would not be continuity from the engine to the ECU. The DX engine is Dual Point Fuel Injection (DPFI) which has two (2) fuel injectors, a Main Injector and an Auxiliary Injector. The Main Injector supplies fuel constantly into the intake manifold through the throttle body. The auxiliary Injector supplies additional fuel as needed. The DX chassis harness, that the engine harness connects to, as well as the DX engine harness, only have wiring for these two (2) fuel injectors. The ZC engine utilizes Multi Point Fuel Injection (MPFI) which has four (4) fuel injectors, one at each cylinder. These injectors are not firing constantly like the DPFI, but are firing individually for each cylinder, at the proper

time. The ECU determines, through readings from sensors on the engine, the proper time to fire each injector. In order to work properly, these injectors also require the use of an Injector Resistor Box to control the voltage supplied to them. Since there are four (4) injectors on the MPFI system, there needs to be four (4) wires from the ECU, and they are not there on the DX. Although the engine harness needs to be modified for the four (4) injectors, the bigger concern is adding wiring that the chassis harness doesn't have. Besides the absence of the needed injector wiring, the DX engine and chassis harnesses do not have wires for the Cylinder Position Sensor, which the ECU reads in order to tell the injectors when to fire. The DX does not need a Cylinder Position Sensor, since it is not firing the injectors sequentially, and therefore doesn't have one and also doesn't have wiring for it. The added injector wiring from the ECU, the added Cylinder Position Sensor wiring from the ECU and the resultant changes to the engine harness are what make up the DPFI to MPFI wiring changes.

Before you remove the harness from the DX engine, label both sides of all connectors so that you will know what goes where on the ZC engine. Use a small piece of masking tape on each side of the connector and using a felt tip pen, write a different number on each connector with the same number occurring on each half of each connector. Where connectors just plug onto a sensor, wrap one piece of the tape around the sensor itself and number it. Unless indicated below, all connectors and sensors are in the same location on both engines. By marking where the connectors are located, you eliminate any chance of plugging the wrong connector into a sensor when you install the harness on the ZC engine.

You will find it easier to do most of the changes to the engine wiring harness with the engine out of the car. Before you remove the ZC engine harness that came on the ZC engine, locate the four (4) fuel injector connectors. Cut the tape and remove the black plastic wire looming from the injector wiring part of the harness. Follow the wires up to the connector that plugs into the chassis harness. There are two (2) wires from each fuel injector connector. One from each goes to the chassis harness connector and the other from each goes to the connector for the injector resistor box. Cut the four (4) Fuel Injector wires that go to the chassis connector. Should have Brown, Light Blue, Red and Yellow. Leave the other four (4) wires from the injectors to the Green resistor box connector intact. If for some reason, your ZC harness doesn't have this connector, you will need to add it. Cut the Yellow with Black stripe wire back a ways from the Green connector. Remove the remaining ZC harness and set it aside. You will need to rob some connectors from it later on. Install the DX engine harness onto the ZC engine and plug in all the connectors. Once it is on the engine, you will notice that a couple of the sensors are in different locations on the ZC than they were on the

DX and the connectors don't reach the sensors. This should only happen at two (2) locations:

1. EACV (Electronic Air Control Valve) – The ZC EACV is located on the back of the intake manifold at passenger side end and is closer to the passenger side on the ZC than it was on the DX – Wires for the connector will need to be extended. Wire colors are Blue/Yellow stripe and Black/Yellow stripe - Extend the wires by cutting and adding a short piece to each, so that they will reach the EACV.
2. TPS (Throttle Position Sensor) – The TPS connector is located on the back of the throttle body, is also closer to the passenger side and wires to the connector will also need to be extended – Wire colors are Yellow/White stripe, Green/White stripe and Red/Blue stripe - when you are extending it, switch the position of the Yellow/White and Green/White wires so that the Yellow/White from the harness is connected to the Green/White on the plug and the Green/White from the harness is connected to the Yellow/White on the plug (This is because the TPS rotates in the opposite direction on the DX). Red/Blue stays Red/Blue.

### **Fuel Injector wiring:**

The Fuel Injector reference numbers are the same as the Cylinder numbers – 1 thru 4 – with #1 being closest to the timing belt and #4 closest to the distributor,

When adding and splicing the fuel injector wires, adjust the lengths of the wires by cutting them to the correct length before splicing, so that all the wires run next to each other and follow the other engine harness wires up to the round 14 pin connector. You can open up the engine harness at this location by cutting the tape that is around the black plastic wire looming (the looming is split from one end to the other) and slipping the wires into the looming and retaping it. Looks like it was made that way!

1. Cut the Main and Auxiliary injector connectors (Brown with Red and Yellow/Black wires and Green with Yellow and Yellow/Black wires) from the DX harness, as close to the connector as you can.
2. Connect the Yellow wire from the Auxiliary Injector (not the yellow with black stripe) to the Brown wire from Injector #1.
3. Connect the Red wire from the Main Injector to the Light Blue wire from Injector #3.
4. Find the connector on the DX engine harness that went to the Tandem Control Valve (ZC doesn't have Tandem Control Valve). The connector is white in color (turns kind of yellowish with age) and has two (2) wires, one Orange and one Black with Yellow stripe. Cut this connector off the DX harness. Cut the Black/Yellow wire back to where it goes into the harness

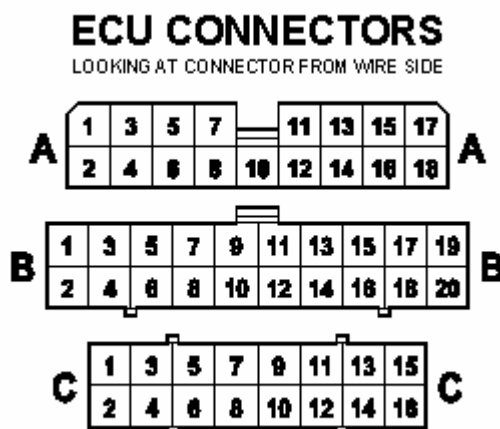
and tape it up securely, as it is “hot” with ignition on. Connect the Orange wire to the Red wire from Injector #2.

5. Take a long piece of wire – it has to be long enough to follow the harness wiring all the way to the ECU, once the engine is in the car – make sure it is long enough, as you can cut it off later – and connect it to the Yellow wire from Injector #4. Place a piece of masking tape around the other end and mark it A7. It will connect to ECU later on, once engine is in.
6. Find the Yellow with Black stripe wires that went to the two (2) DX injectors. Connect both of these wires to the Yellow with Black stripe wire that you cut at the Green Injector Resistor Box connector.

This completes the wiring changes to the engine harness itself and is all you can do until the engine is in the car.

## AFTER ENGINE IS INSTALLED

### ECU Wiring Changes



See ECU pin-out diagram above.

**Connector “A” is the largest. Connector “C” is the smallest.**

1. De-pin the Orange wire at ECU pin C1 and insert it into ECU pin B10
2. De-pin the White wire at ECU pin C2 and insert it into ECU pin B12 (if there is wire already at B12, disconnect it)
3. Cut the Yellow wire from ECU pin A3 a few inches back from the connector and leave the portion remaining in the harness unconnected (it won’t be used)
4. Cut the Orange wire coming from ECU pin B2 and connect the portion in the harness to the portion of the Yellow wire remaining at ECU pin A3.
5. Cut the Red wire at ECU pin A7 a few inches back from the connector. Connect and solder the new wire, labeled A7 that was added and connected to Injector #4 on the engine harness, to the portion still in the connector.

6. Add two (2) new wires, with pins, at ECU pins C1 and C2 and run them out into the engine bay (make them long enough to reach the end of the exhaust camshaft) and label them "C1" and "C2". Easiest to run them thru the firewall with the harness on the passenger side, just above the ECU.

## **UNDER THE HOOD**

1. Locate the two (2) new wires labeled "C1" and "C2". Incorporate them into the harness, or just tape them to the harness, all the way up to where the distributor connector comes out of the harness.
2. While you are in this area, check to make sure that the ground wire – short wire coming out of the side of the engine harness with a round eye end – is connected to the bolt on the thermostat housing. This is the ground for the ECU and most of the sensors and the car will not start if it is not connected. Make sure the connection is clean and secure.

## **Cylinder Position Sensor (CPS)**

1. The Cylinder Position Sensor is located on the end of the exhaust camshaft on the DOHC ZC engine.
2. On the ZC harness, locate the connector for the Cylinder Position Sensor – it comes off the harness next to the distributor connectors – it is a Green square 2-wire connector with a Blue with Green stripe wire and a Blue with Yellow stripe wire. Cut this connector from the ZC harness back by the distributor plugs.
3. Connect the wire that you ran from ECU pin C1 to the Blue/Green wire at the Green plug on the CPS.
4. Connect the wire that you ran from ECU pin C2 to the Blue/Yellow wire at the Green plug on the CPS.

## **Injector Resistor Box**

Install Injector Resistor Box on the driver's side shock tower next to the firewall. Plug the Green connector into the Resistor Box.

**All other connectors on your DX harness will plug right into the sensors and connectors on the ZC. Be sure you don't switch the EACV (Electronic Air Control Valve) connector with the TA (Intake Air Temperature) connector. The EACV connector has a Blue with Yellow stripe wire and a Black with Yellow stripe wire. The TA connector has a Red with Yellow stripe wire and a Green with White stripe wire.**