

Honda 225 Intake Air Bypass (IAB)

BF 225 IAB Maintenance Item not in the Helm Shop manual

RE: *Helm Shop Manual page 18-15.*

I had to replace the Intake Air Bypass (IAB) on my BF 225. So I disassembled the old one to see why it failed. The short answer is salt water corrosion in one difficult-to-access location. See below.

This should be a routine maintenance procedure that is not in the shop manual. If you are operating in saltwater, I believe this is an essential item to check regularly. If the IAB is not working properly you will experience less than optimal engine performance, especially at the high end – above 3950 rpm. You may also experience some surging in the 4000 to 4500 rpm range.

To check your IAB for proper operation, the next time you change out the high pressure fuel filter, check the IAB first.

- Open up both sides of the upper cowling by first removing the two bolts under the cover at the rear of the engine – those two below the exhaust outlet.
- Remove the six or so bolts on each half of the top of the cowling.
- Peel back each side of the cowling so it clears the exhaust outlets.
- (This is the same as you would do to get access to the HP fuel filter to change it out.)

There sitting in front of the HP fuel filter you will see the IAB control diaphragm. Disconnect the vacuum hose to the diaphragm. The diaphragm is held in place by two Phillips head screws that you typically remove to get to the HP fuel filter. Remove those two screws, swinging the diaphragm aside. Grab the lever coming out of the diaphragm and pull on it as if the diaphragm was being activated. It should move until the spring arm engages (or nearly engages) the “stop” adjustment screw. Then let go and it should pop right back in place. **If so, the IAB is operating as intended.**

Before you re-install the diaphragm, hold it in your hand, gently push the arm back into the diaphragm, and hold your finger over the opening in the tube that the vacuum hose attaches too. When you let go of the arm, it should come out a little bit and stay there until you remove your finger. If so, then the diaphragm is operating correctly. If not, the diaphragm is leaking air and must be replaced. Unfortunately, it looks like a replacement is not available, since that diaphragm is part of the entire IAB assembly. However, I suspect that if you search around a bit, you should be able to find a replacement for this fairly standard part.

Also, if you have access to a good hardware store, it would be a good idea to replace those two metric-threaded Phillips head screws with matching hex head screws. It will make it a lot easier to remove them the next time you change out the high pressure fuel filter.

If you can't move the IAB shaft, or if it does not pop right back in place, then you need to remove the IAB and clean and lubricate the shaft to the IAB bevels. Spend some time with a good penetrating oil like PB Blaster and keep trying to work the shaft to loosen it up. Let it soak in oil overnight. Be careful to not bend or hit the baffle plates inside the IAB.

Note that apparently Honda does not consider this a serviceable item, so from here on, you are on your own. The worst case scenario is that you cannot fix it and will need to fork out about \$343 to get a new one from www.boats.net. Part number 17130-ZY3-003ZA.

- First, carefully use a flat blade screwdriver to pop the diaphragm arm off its nylon pivot, remove the diaphragm and set it aside.
- Remove the 10 mm bolts at each end of the frame piece on the back of the engine that the cowlings bolt to. This will allow you to pull down on that frame piece an inch or so in order get to the bottom two bolts of the IAB and remove it.
- Remove the ten 8mm bolts holding the IAB in place

- Grab the loose IAB in one hand and pull back on the cowling frame with the other hand to allow you to pull the IAB up and out.
- Remove the two Phillips head screws holding the base of the spring mechanism in place.
- Use a flat blade scraper to gently separate the base of the spring mechanism from the IAB metal base. It will only move about 1/8th of an inch or so.

All of the corrosion will be behind that spring base plate. There is a rubber seal in there that prevents water and crude from getting further up the shaft. Above the rubber seal there is a metal and a nylon washer, all held in place by the half circle clip. I would recommend using a right- angle pick to carefully remove as much corrosion as possible and then use PB blaster and/or WD-40 to clean and lubricate as much as possible. Compressed air will also be helpful in cleaning it out. Work the shaft back and forth to the point where it is relatively easy to move by hand. It will still be a bit tight, by design, but if you can move it with finger strength, then the vacuum diaphragm will also move it. Work at it as long as necessary – remember, you are saving some serious money if you can get it operating correctly.

Then re-install, reversing the disassembly procedure.

Background. Recently, I went to change my HP fuel filter. When I tried to remove the two Phillips head screws that hold the IAB diaphragm in place, I found that the last person that changed out the HP fuel filter had seriously messed up the heads on those screws to the point where I could not remove them with the diaphragm was in place.

So I ended up removing the entire IAB as described above. Once I had it off the engine, I realized that the spring-loaded shaft to the IAB baffles would not budge. After I removed the diaphragm using a head grabber on those two messed-up Phillips head screws, I spent two days lubricating and trying to loosen up the shaft of the IAB to no avail. Apparently, it had not been operable for a long time and was beyond recovery. So I ended up ordering a new IAB, which includes the entire assembly, including the vacuum diaphragm. Once the new IAB was installed, I then disassembled the old IAB.

What does the IAB do?

The IAB has a set of baffles that mount on top of the engine air intake. At low rpm's, the baffles remain parallel to the base, allowing for what engineers call resonance charging of the intake manifold and combustion chambers. However, when the engine reaches 3950 rpm, the ECU activates the IAB Control solenoid that opens intake manifold vacuum coming from the vacuum tank to the IAB diaphragm, which in turn, moves the baffles to a 45-degree angle. When rpm's drop below 3750 rpm, the ECU turns off the vacuum, and the baffles (hopefully) return to their parallel state. Technically, what the IAB does when activated at 3950 rpm is initiate an inertia charging effect which draws a higher volume of air under more pressure into the combustion chambers under higher rpm's. The details of why that works gets very complicated – whole books are written about it.

After I had been running my BF 225 for about two years (2008 - 2010) I started noticing a surging of about 100 to 150 rpm in the 4000 to 4500 rpm range. I was told by several folks, including two maintenance shops, that this was the result of the VTEC system trying to decide whether to get into VTEC mode or not. **However, once I replaced the IAB the surging problem has totally disappeared.**

The bottom line, as implied above, if the IAB is not working properly, you will not get top efficiency from your engine at higher rpm's. One indicator that the IAB is not working properly is the surging effect in the 4000 to 4500 rpm range.

So, check the damn thing every time you change the high pressure fuel filter.

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