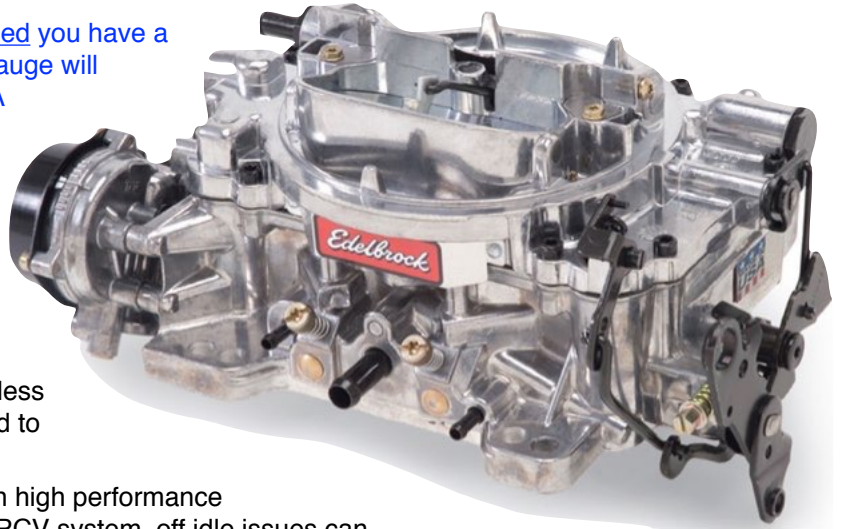


EDELBROCK CARBURETORS (ADVANCED CARBURETOR TUNING, IFR & BIAB)

**This is a compilation of knowledge sourced from experience, automotive industry practices and technics*

For advanced carburetor tuning it is [highly recommended](#) you have a Wideband AFR gauge. The cost of a Wideband AFR gauge will quickly be recovered by the saving in tuning yourself. A Wideband AFR gauge will prove to be a long term asset.

Advanced tuning should only be performed after all maintenance and tuning procedures (including ignition timing) have failed to produced satisfactory results.



Occasionally after jet changes to lean the primary fuel circuit (cruise mode), Edelbrock carburetors will suffer less than desirable off idle performance that will not respond to standard tuning procedures.

While off idle performance issues are more prevalent in high performance motors and motors equipped with a high performance PCV system, off idle issues can also occur with stock motors, especially after metering / jet changes. The problem is caused by the carburetor's transition circuit not supplying enough fuel during slight to moderate throttle changes, resulting in a lean condition and low speed performance issues (hesitation and surges). Using an AFR (air fuel ratio) gauge you can see this, the AFR gauge will show the lean condition just off idle and often up to 2000rpm.

There are a few reasons for this;

1. *The fuel supplied to the idle / transition circuit is provided through the primary metering/jets and when jets or rods are changed to lean the cruise mixture it can also make the idle / transition circuit lean.*
2. *A high performance PCV system that pulls more vapors from the crankcase will increase the air supply into the intake manifold and can cause the idle / transition circuit to operate lean (think of the PCV as a controlled vacuum leak).*
3. *High performance motors usually have lower vacuum at idle and low speeds, the lower vacuum pulls less fuel into the carburetor's idle / transition circuit causing a lean condition.*

The idle mixture screws can usually adjust around these conditions, however the transition circuit is fixed and can't, it often remains lean. Fortunately this is usually a completely curable condition. The culprit is the IFR (idle fuel restrictor, aka the economizer), in conjunction with the BIAB (bypass idle air bleed, aka the 1st idle air bleed).

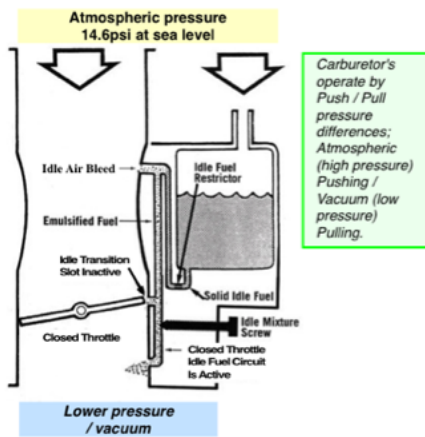
The IFR (idle fuel restrictor) regulates the fuel to the idle / transition circuits, the IFR's orifice size determines the amount of fuel available. The BIAB (bypass idle air bleed) regulates the vacuum (siphon action) to the IJ (idle jet), the BIAB's orifice size introduces more or less air, depending on the size raising or lowering the siphon action pulling the fuel feeding the IFR. With high performance motors along with high performance PCV systems or when the meter/jet have been changed, the factory calibrated IFR / BIAB may not be able to supply the fuel required to keep up with the motor's needs at low speeds. However, unlike the primary and secondary circuits of the carburetor where metering rods and/or jets can be removed and replaced with different sizes to correct fuel mixture ratios, the IFRs and BIABs are fixed.

Adjusting the IFR and BIAB requires restricting or enlarging their orifices to change mixture ratios. To enrich the mixture through the IFR it requires slightly enlarging (drilling) its orifice, this is a slow tedious procedure that requires a lot of patients. However, slightly restricting the BIAB orifice is actually very easy and because it is easy, it is the best place to start for adjustments.

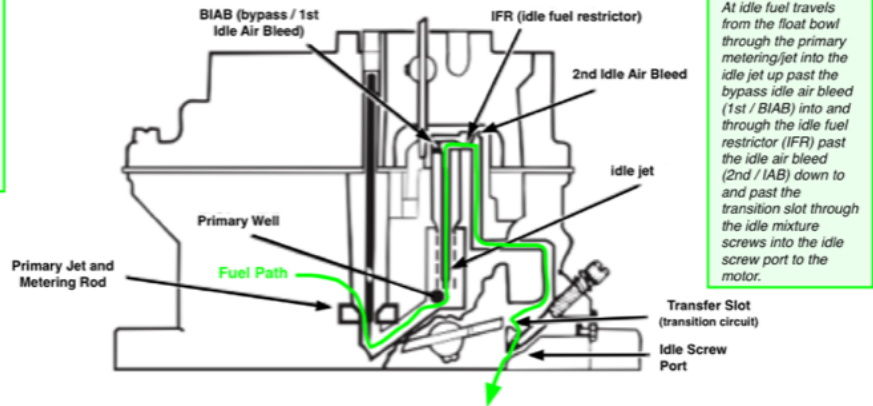
While I'm not normally an advocate of altering air bleeds unless you really understand how they work (a subject for another day), the BIAB it is a little different. What makes this possible is the unique design of the idle / transition circuit used in Edelbrock carburetors. Unlike most other carburetors, Edelbrock places its IFR between two idle air bleeds, the bypass (aka 1st) idle air bleed (BIAB) and the idle (aka 2nd) air bleed (IAB). The BIAB (bypass idle air bleed) oxygenates the fuel just like any other air bleed, however it also regulates the siphon (vacuum) that pulls fuel up through the IJ (idle jet) from the float bowl. This design gives us an additional choice for enrichment at the idle/transition circuit. Plus restricting the BIAB is a non evasive procedure and completely reversible.

Before we start adjusting, lets get a better understanding of how the idle and transition circuits work. Take a look at the illustrations on the next page, follow the fuel paths from the float bowl through the idle and transition circuits into the motor.

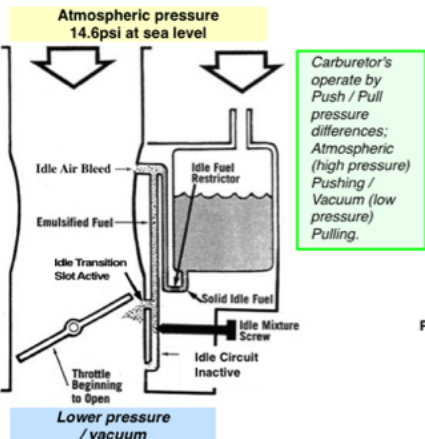
Notice at Idle, fuel comes predominately from the idle mixture screw port.



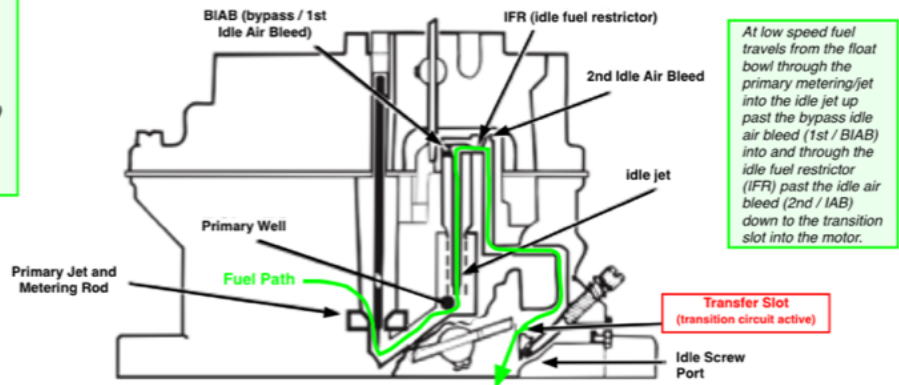
EDELBROCK IDLE / TRANSITION CIRCUITS



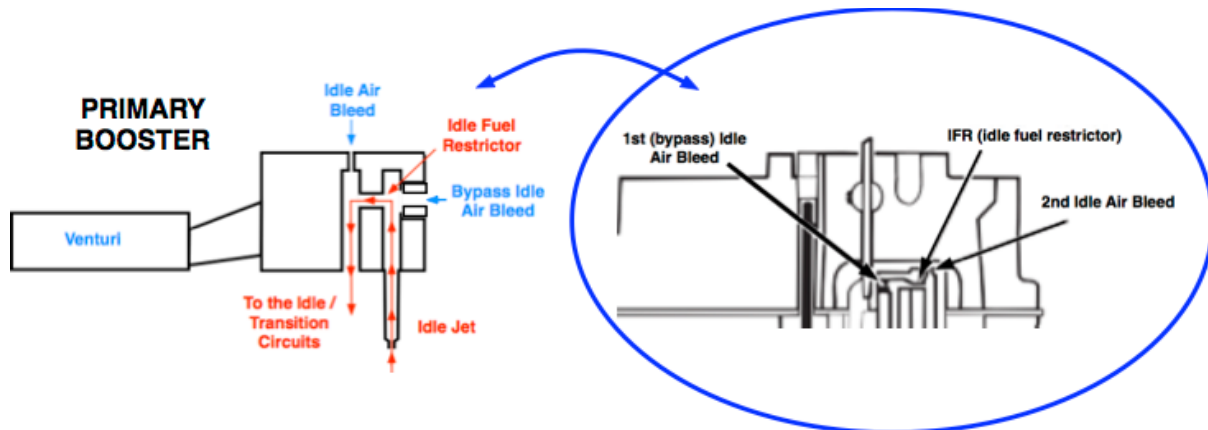
Notice as the throttle opens, the transition slot predominately supplies the fuel to the motor.



EDELBROCK IDLE / TRANSITION CIRCUITS



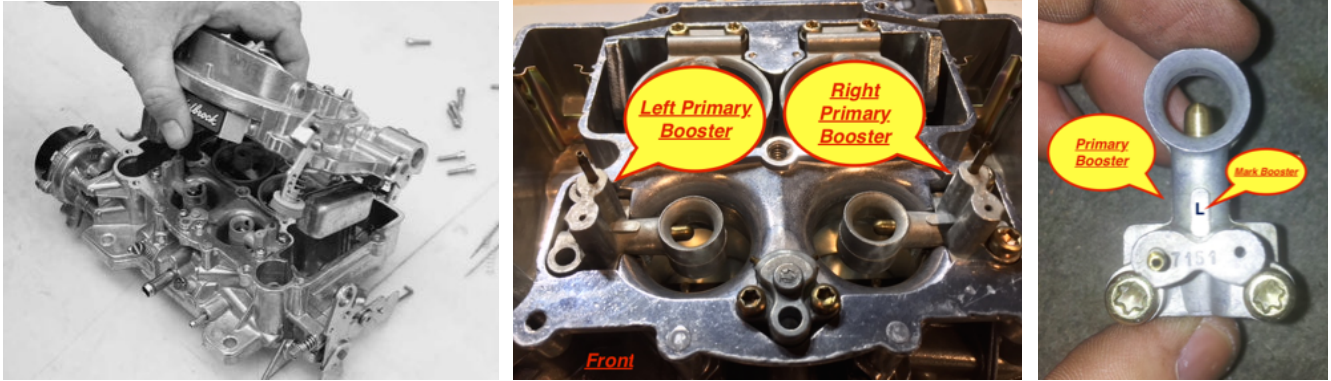
In most carburetors the IFR regulates the fuel to the idle / transition circuits, it operates much like the primary and main jets do in regulating fuel ratios where larger jets enrich the mixture. The normal fix would be to enlarge the IFR's orifice to enrich the transition circuit's fuel ratio. However in the Edelbrock's idle / transition circuit design we have a wild card, the BIAB (bypass idle air bleed), and it allows us to enrich the circuit by restricting the air pulled through it, thus increasing siphon action and pulling in more fuel to the IFR which enriches the idle / transition mixture without any adverse effects.



To restrict the BIAB, simply place a small piece of 28-30 gauge stainless jewelry wire into its orifice. The wire placed in the BIAB orifice obstructs it slightly causing a restriction to the air flow entering which in turn creates more siphon action at the idle jet, bringing more fuel to the IFR and a richer mixture.

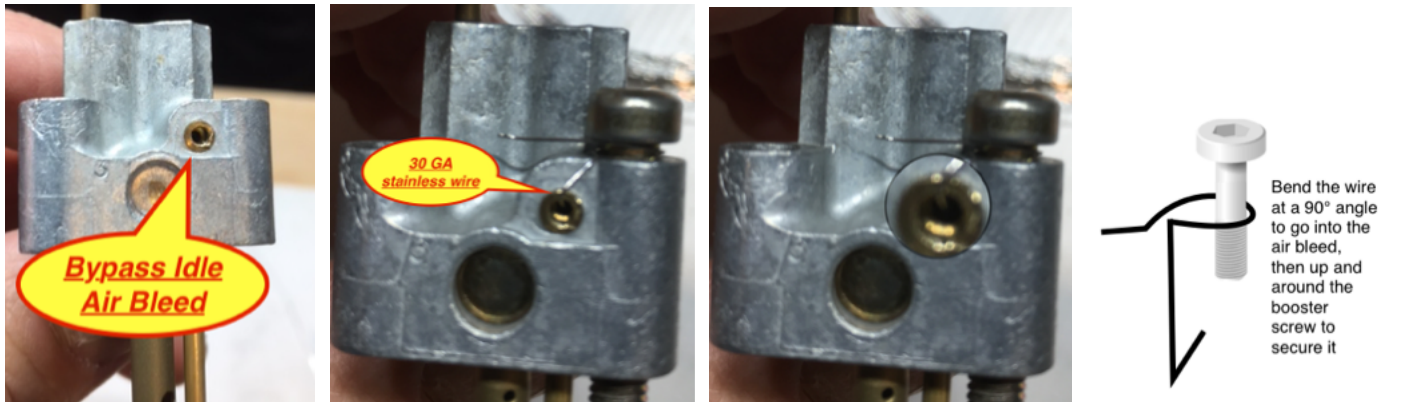
The idle mixture screws will require re-adjusting to compensate for the additional fuel. But other than that, the idle circuit will not be effected.

Remove the top of the carb (always take out the metering rods before removing or installing the top). Using a sharpie pen, mark the right and left primary boosters (boosters are right and left hand orientated, do not confuse their placement). Always do one booster at a time and always the same adjustments on both.



TIP; Clean your carburetor before you start, dirt and grime are a carburetor's enemy. A clean uncluttered workspace with plenty of room, good lighting and ventilation is essential, as are a couple of magnetic parts dishes handy for holding screws and small parts, and a small magnet to catch small carburetor clips.

The BIAB is the small brass plug on the back of the primary booster. Install the wire into the BIAB orifice (small wire sizes make big differences here), bend and form the wire tight to the booster body up to the closest booster screw and wrapping the wire around the booster screw (the screw will hold it in place when tightened). Watch the wire as you re-install the booster, make sure it remains in the BIAB, check it again after tightening the booster. *TIP; use a thin knife blade to hold the wire in place during assembly (if the booster gasket is damaged, replace it).*



Put the carburetor back together. Warm the motor up completely (motor must be completely at operating temperatures and the choke off), re-adjust idle mixture screws (this is necessary due to the increased fuel supply). Take it for a test drive, noting air fuel ratios and performance changes in transition circuit at off idle up to 2000rpm (in gear on the road). Keep a log of all changes and their outcomes.

If it is still lean, increase the diameter of the wire slightly (.002 max at a time) and test it again. Remember, small changes here make big differences. Adjust up to 5 wire diameters larger (.010 total). The off idle transition circuit usually performs best at 13.5 - 13.8 AFR.

AWG # (gauge)	Diameter (inch)	Diameter (mm)	Area (kcmil)	Area (mm ²)
25	0.0179	0.4547	0.3204	0.1624
26	0.0159	0.4049	0.2541	0.1288
27	0.0142	0.3606	0.2015	0.1021
28	0.0126	0.3211	0.1598	0.0810
29	0.0113	0.2859	0.1267	0.0642
30	0.0100	0.2546	0.1005	0.0509

TIP; Occasionally I find a booster milling plug is loose, it is important that these plugs be secure and sealed (if the plug is loose, secure it by gently tapping the center of the plug with a drift pin). After checking the plugs to ensure they are tightly

in place, brush a couple coats of aluminum paint around their edges to further ensure a seal (aluminum paint acts as a sealant at the plugs), also check and seal the secondary booster's plugs and replace any damaged booster gaskets. Vacuum leaks at the boosters will cause performance issues and endless headaches / head scratching trying to figure out what's wrong.

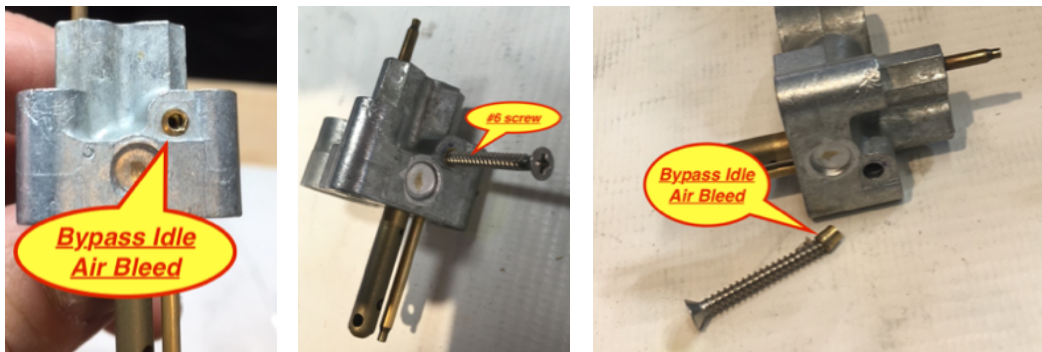


Still too lean? Sometimes, even after restricting the BIAB a lean condition persists and requires the IFR to be adjusted.

The IFR (idle fuel restrictor) will require drilling to slightly enlarge its orifice size, allowing more fuel to flow to the idle / transition circuits (enrich). Drilling the IFRs is a slow tedious procedure that requires a lot of patients.

Unless you are really skilled with power tools, I do not recommend using a power drill for drilling IFRs / BIABs. Nor do I recommend drilling IFRs / BIABs more than one numbered drill bit size at a time without testing. This is a slow process, please allocate plenty of time, do not get overzealous and try to jump up several sizes of drill bits at once to save time, you could miss your target and/or break a drill bit requiring an even more tedious procedure to fix it. When adjusting the IFRs / BIABs small increments make big differences, patients and small adjustments are required to get it right. A small numbered (#1 thru #60) drill bit set (\$20.00+/-) and a pin vise (\$10.00+/-) are recommended.

The IFR is hidden behind the BIAB (small brass plug) on the back of the primary booster. Use a #6 wood screw with the tip slightly filed flat to remove the air bleed. Insert the screw slightly and gently into the brass air bleed, the screw only needs to slightly snag the sides of the brass (careful to not damage the plug you'll be re-installing it), once the screw's threads have snagged the BIAB, gently pull it straight out.

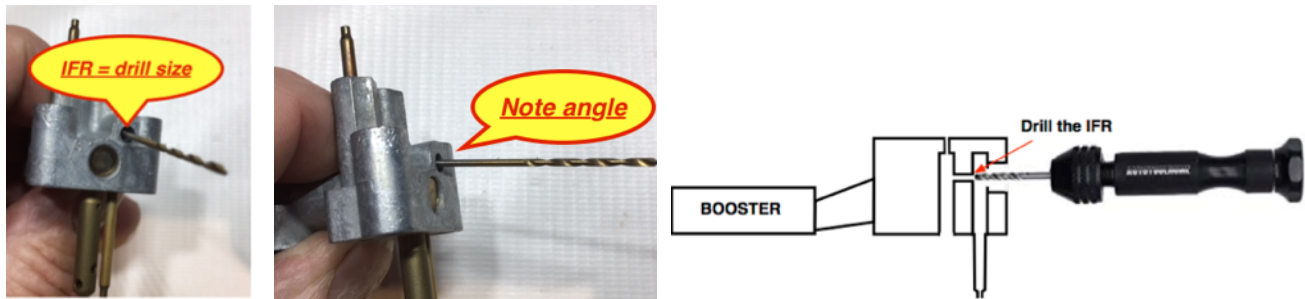


With the plug removed you'll be able to see a small hole inside behind where the air bleed was, the small hole inside is the IFR (idle fuel restrictor). The IFR is the channel between the idle jet and the idle/transition passage (see illustration).



Before you start drilling it is important to determine the size of the IFR in your carburetor first. This is done by using a numbered drill bit set. It is important to use numbered drill bits, numbered drill bits are smaller than standard bits and their incremental sizing is much closer together. Start with a #55 bit and gently insert the drill bit's shank (non drilling end of the bit) into the IFR hole, increase / decrease the drill bit size until it fits the hole exactly and document the size.

With the size of the IFR determined and documented, you can start enlarging the IFR by hand using a pin vise, one numbered drill bit size at a time larger, testing after each enlargement (note; IFR is on an upward angle when drilling). IFR drilling is done by hand using a pin vise to ensure control and not damage other passages, go slow and easy, while the IFR material is soft the small drill bits break easily.



After drilling, spray carburetor cleaner liberally through the IFR and air bleed passages followed with compressed air to remove any drilling debris.

Reinstall the brass air bleed by gently pushing it into place using the flat edge of you pliers until it's completely seated in its hole.

Put the carburetor back together. Warm the motor up completely (motor must be completely at operating temperatures and the choke off), re-adjust idle mixture screws (this is necessary due to the increased fuel supply). Take it for a test drive, noting air fuel ratios and performance changes in transition circuit at off idle up to 2000rpm (in gear on the road). Keep a log of all changes and their outcomes.

Drill up to 5 numbered bit sizes larger as needed until air fuel ratios and performance is improved. The off idle transition circuit usually performs best at 13.5 - 13.8 AFR. Be patient, this is an extremely time consuming process that must be done in small steps, testing the results at each step. Do not get in a hurry, allocate plenty of time.

OK, now you know how to enrich the idle / transition circuit, what if it needs to be leaner? Is there something that can be done to lean the idle and transition circuits?

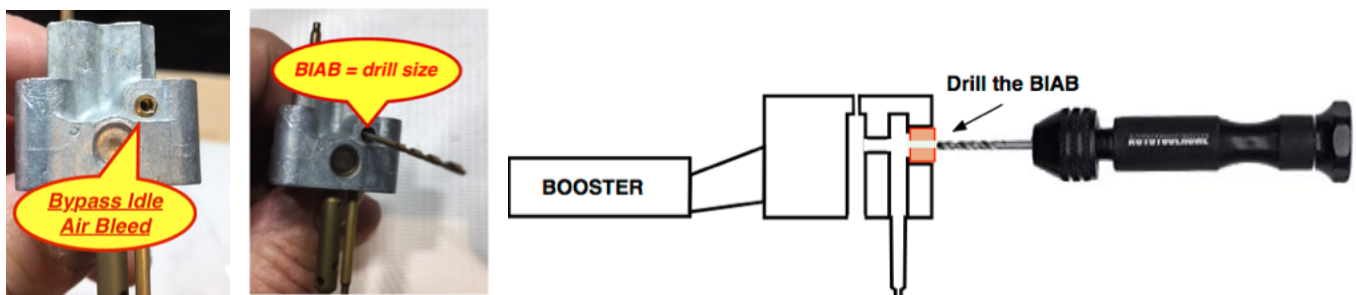
Yes, but it also is a slow tedious procedure that requires lots of patients.

Again because of Edelbrock's unique idle/transition circuit design we have two areas to work with. However, both are slow tedious procedures that require a lot of patients.

To lean the off idle transition circuit we need to make the BIAB slightly larger or the IFR slightly smaller.

Enlarging the BIAB orifice is the easiest so we'll start with it.

Slightly enlarging the BIAB orifice will add more air decreasing the siphon action at the IJ and lessen the fuel supplied to the IFR, in turn leaning the circuit's mixture. First measure the size of the BIAB in your carburetor using a numbered drill bit set. Start with a #55 bit and gently insert the drill bit's shank (non drilling end of the bit) into the BIAB hole, increase / decrease the drill bit size until it fits the hole exactly and document the size. With the size of the BIAB determined and documented, you can start enlarging the BIAB by hand using a pin vise with one numbered drill bit size larger at a time, testing after each enlargement. BIAB drilling is done by hand using a pin vise to ensure control, go slow and easy, while the BIAB material is soft the small drill bits break easily. **Remember, small changes make big differences.**



After drilling, spray carburetor cleaner liberally through the IFR and air bleed passages followed with compressed air to remove any drilling debris. Put the carburetor back together and test.

Drill up to 5 numbered bit sizes larger as needed (testing at each step) until air fuel ratios and performance is improved.

**You can replace the BIAB using a brass set screw, but it's a little more complicated and a subject for another day.*

Still too rich? The IFR size will need to be decreased.

BONUS: If you drilled you're IFR too large, the following procedure will fix it.

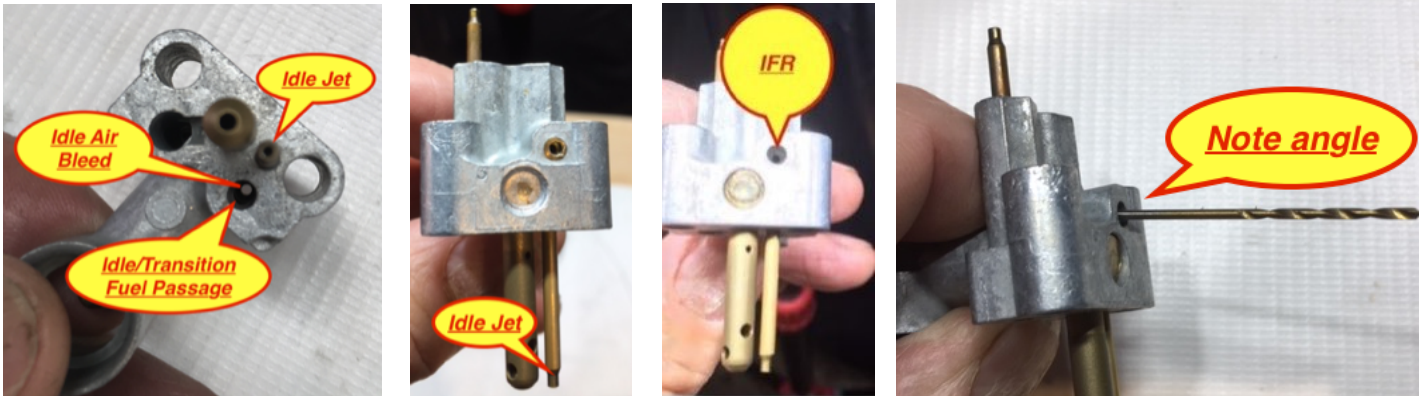
Decreasing the size of the IFR involves drilling and sleeving the IFR channel. This is a very tedious procedure that must be done slowly and accurately, do not get overzealous, have patients and go slow!

A procedure very similar to increasing the IFR orifice size. This procedure requires a sleeve made from brass tubing (\$3.00+/-). Again all drilling is by hand with a pin vise. Occasionally depending on how lean the transition needs to be adjusted, this procedure may also require a smaller numbered drill bit set #61 - 80 (\$10.00+/-).

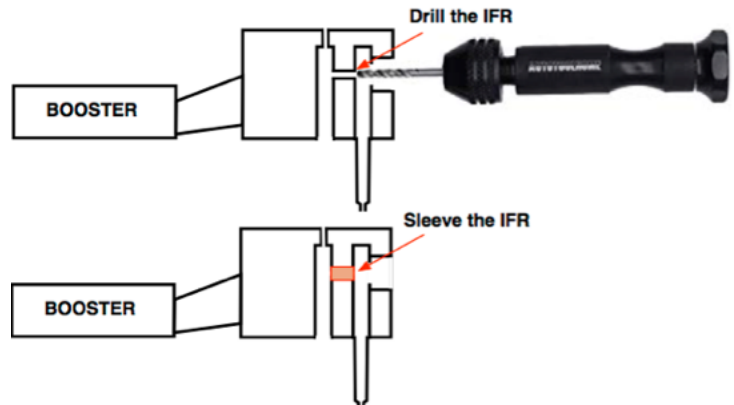
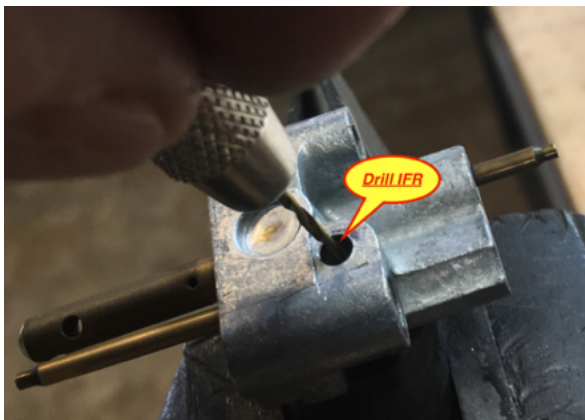
Drill	Inch	mm	Drill	Inch	mm
80	0.0135	0.34	70	0.028	0.71
79	0.0145	0.37	69	0.029	0.74
78	0.016	0.41	68	0.031	0.79
77	0.018	0.46	67	0.032	0.81
76	0.020	0.51	66	0.033	0.84
75	0.021	0.53	65	0.035	0.89
74	0.0225	0.57	64	0.036	0.91
73	0.024	0.61	63	0.037	0.94
72	0.025	0.64	62	0.038	0.97
71	0.026	0.66	61	0.039	0.99



First you have to determine the existing size of the IFR in your carburetor using numbered drill bits (see page 4). As an example, we'll use a #55 numbered drill bit as our existing IFR size, this procedure will decrease the IFR size by as much as ten numbered bit sizes. The #55 numbered drill bit size = .052, the closest brass tubing to this size is 1/16", it has a .0625 outside diameter. If we make the IFR bushing from 1/16" tubing with a .014 wall (available at hobby and hardware stores) it has an inside diameter of .035 and will allow plenty of headroom for drilling larger if needed to adjust fuel ratios. Looking at the underside of the booster with the venturi facing you, on the upper right is the Idle Jet, fuel is pulled up from the float bowl by the Idle Jet, fuel then goes through the IFR and down the Idle/Transition passage to the Idle/Transition circuits. **It is important to know these passage ways.**

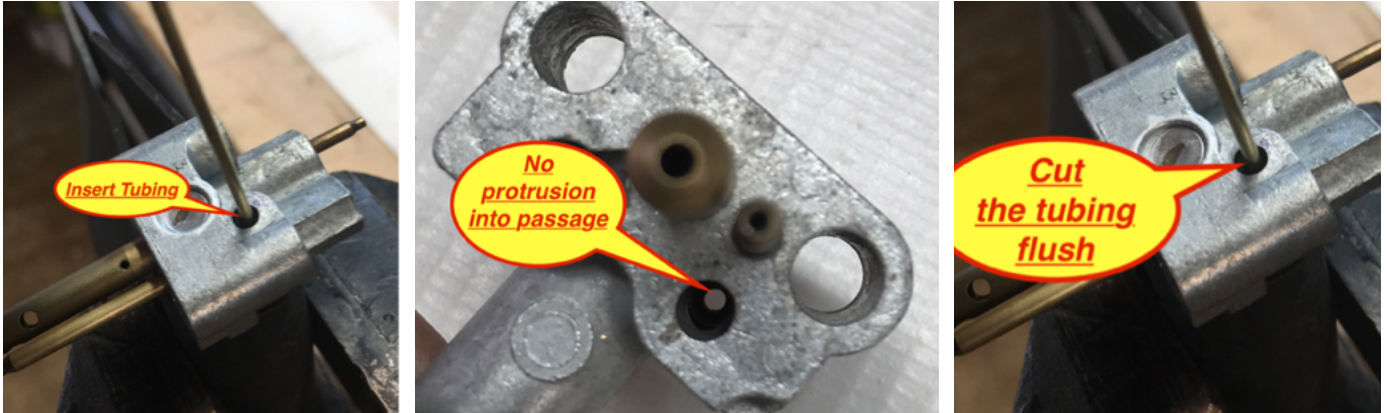


The IFR will need to be drilled to exceed the tubing, select a drill bit slightly smaller than the tubing (needs to be a tight fit). Using our example IFR size above, we'll drill it with a #53 bit increasing the IFR size to .0595, slightly smaller than the 1/16" tubing's outside diameter .0625). Using a #50 drill bit slightly chamfer the IFR opening to allow the tubing to insert.

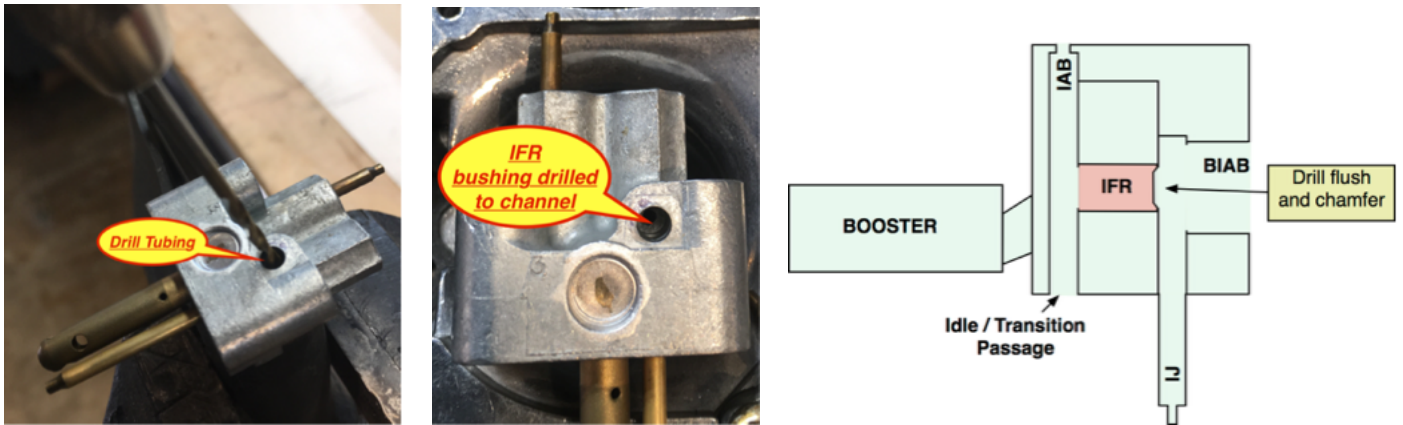


*Note: tubing sizes used for IFR sleeves are determined by the carburetor's actual IFR size and may be different from the example used above. *You can replace the IFR using a brass set screw, but it's a little more complicated and a subject for another day.*

Cut a piece of tubing about three inches (3") long (use a micro saw or knife edged file to cut the tubing). At the factory end of the tubing slightly chamfer its outside edge using a flat file or 320 grit sand paper (the chamfer allows the tubing to go into the IFR channel), apply a very light film of "Permatex 56521" gasoline compatible sealant (or equivalent) inside the IFR channel and to the outside of the tubing, wipe any excess sealant away (the sealant acts as lubricant during installation and locks the bushing in place when dry). Insert the tubing into the IFR channel and gently tap while supporting the tubing between thumb and finger to prevent it from bending, if the tubing bends, straighten and continue taping the tubing into the IFR's channel while watching through the idle/transition passage until the tubing is seated in place just short of entering into the idle/transition passage (if the tubing protrudes into the passage, pull it back until it is a little less than flush and not protruding into the passage). Once the tubing is in place, cut the excess end of the tubing flush with the booster housing. Spray carburetor cleaner through the tubing, IFR passage and through the air bleeds followed with compressed air to remove excess sealant. Let the sealant dry for 24hours.



Using a drill bit slightly larger than the tubing, drill the tubing down through the bypass air bleed hole until the tubing is flush to the IFR channel watching frequently while drilling to prevent drilling into the IFR channel. Once drilled flush to the channel, continue drilling a little more to slightly chamfer the tubing's inside edge into channel (allows a smooth fuel flow).



Spray carburetor cleaner through the IFR passage and through the air bleeds followed with compressed air to clean out any drill shaving or debris.

Re-install the BIAB and put the carburetor back together. Test it (careful this may be too lean now), if the new IFR bushing makes the idle/transition circuit too lean, drill it larger until the correct mixture is achieved.

Using one or all of the technics above, you should be able to correct any idle / transition circuit mixture ratios and be on your way to great performance from your Edelbrock carburetor. The results are usually well worth the efforts and can literally make your carburetor perform like a custom one costing more than twice as much. And yes, you can do this yourself.

Stay tuned Boyz, there's more horsepower Under the Hood!

Enjoy!