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Mikuni Carb article

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oldeerslayer

Registered

Joined Nov 27, 2012
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Discussion Starter · #1 · Dec 3, 2012

While researching my idle problems I ran across a superb article on how Mikuni CV carbs work. It would be applicable to all 91 up 250 & 300 (280) Suzuki engines. The article was written for a Virago motorcycle forum, but it details everything you want to know about how Mikunis operate. It is some pretty heavy reading, but if you can absorb it, you will understand much better how these carbs work.

[CV Carburetors](#)

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oldeerslayer

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Discussion Starter · #2 · Dec 4, 2012

Here is good diagram of these carbs.

[Carburetor \(Model L/M/N/P/R/S\) Suzuki LT-4WD Quad Runner 250 \(P\) 1993 OEM Parts - Cheap Cycle Parts](#)

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JustRandy

Registered

Joined Oct 19, 2012
72 Posts

#3 · Dec 4, 2012

That is a nice article, though I don't know how much I agree that the regular simple carbs go lean on sudden throttle openings. If they do, its so fast that I never notice... and it certainly doesn't "stumble". If it does, then the carb is too big for the engine.

I think the best thing to say about cv carbs is they automatically compensate for air pressure changes. Other than that, I'm pretty sure they're the devil lol. I like regular simple slide carbs and have a box full of cv carbs I've taken off engines because I never could get them tuned right. Its much easier to get a simple carb than it is to figure out the complexities of a cv. If altitude changes are an issue, the dial-a-jet takes care of that pretty well.

What idle problems are you having?

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oldeerslayer

Registered

Joined Nov 27, 2012
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Discussion Starter · #4 · Dec 4, 2012

It's a 93 LT-4WD 250 Quadrunner with the Mikuni BST31SS carb. Stock 31MM CV carb. I've had it off and apart every day for the last week and a half. It starts right up in our current 40-60 degree weather. No "choke" or gas, just hit the start button. Then after it starts to warm up, it loads up and stalls. Have to hold the throttle half open and crank for anything from 15 to 60 seconds to clear it out before it will restart. Getting gas in the oil and once it starts stalling, it won't idle unless you set the idle speed screw pretty high. Once it cleans itself out it races and I start turning the idle back down. Then it stalls. I've checked and cleaned everything inside the carb, to no avail. It only has 1200 miles on it and the carb was spotless inside, the first time I disassembled it.

Being a retired GM tech who was raised on Rochester 2GC's and Quadrajets, I thought i understood carbs pretty well. My guess is that there is a crack or pin hole somewhere in the body of the carb. One of my other ATV's is an identical 93 LT-4WD that I bought new in 94. It has roughly twice the mileage and has had a couple carb issues since new. That was usually the "choke" or "starter" cable working it's way out and resulting in a similiar situation. I bought this one assuming the problem was the same, but it's not. First thing I did was make sure the starter circuit plunger was fully seated. Guess I'll either drop \$400 for a new carb or part it out. Tough choice on a clean low miles bike. Doesn't even have any cracks in the plastic yet.

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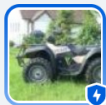
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JustRandy

Registered

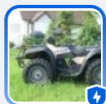
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ajl719

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JustRandy

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#5 · Dec 4, 2012

31 is too big for that engine anyway. In 2000 they changed the 31 to a 29 for the 280cc king. You have a 246cc. I've found a 28mm is about right for a 250cc with mods for high rpm. You're not turning high rpm. You should have less than 28 ideally. But all that aside... it sounds like you have a broken diaphragm in the petcock which is dumping gas into the intake and then into the oil. Plug the vacuum line on both ends with a bolt or something and put the petcock on "prime". It should run fine after that. Don't forget to change the oil lol

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#6 · Dec 4, 2012

I beg to differ about one of your things Randy, i have a 2000 Suzuki King Quad 300 4x4 (280cc) and i know it has the Mikuni BST31SS carb in it. It specifically says so in the owners manual within the specs. I do however agree with you on the fuel petcock, sounds exactly like the problem i had last fall with it. Wouldn't stay running without throttle, backfired, lack of power, hesitation, etc. Only thing i got away with on mine was it didn't contaminate the oil.

And you can run the petcock that way, but i would personally replace the petcock to a new one if that's the issue.

2000 Suzuki King Quad 300 4x4: (14,000 + Km/s), K&N Air Filter, Differential Lock Mod, Kenda Bear Claws (25x10-12 - 24X9-11)

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#7 · Dec 4, 2012

And oldeerslayer, to test the fuel petcock pull the vacuum line off the petcock (Smaller Line), if there is fuel present in the line or fuel comes out the port where the line was connected then the fuel petcock is bad. Then you can chose whether you want to modify it the way Randy suggested or just buy a whole new fuel petcock. They will run you about \$120 to \$140 for a new one form the dealership, though you can probably find one on Ebay or Craigslist for cheaper.

2000 Suzuki King Quad 300 4x4: (14,000 + Km/s), K&N Air Filter, Differential Lock Mod, Kenda Bear Claws (25x10-12 - 24X9-11)

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#8 · Dec 4, 2012

Beg all you want lol

LT-F300Y/300FY (2000-MODEL) 9-8

OIL TEMP. THERMO-SWITCH

ITEM	STANDARD		NOTE
Oil temp. indicator light thermo-switch operating temperature	OFF→ON	Approx. 160°C (320°F)	E-03, 28, 33
	ON→OFF	Approx. 140°C (284°F)	
Cooling fan thermo-switch operating temperature	OFF→ON	Approx. 120°C (248°F)	E-17, 24
	ON→OFF	Approx. 110°C (230°F)	

CARBURETOR

LT-F300F

ITEM	SPECIFICATION		
	E-03, 24, 28	E-17	E-33
Carburetor type	*MIKUNI BSR29SS	*←	*←
Bore size	*29 mm	*←	*←
I.D. No.	*39D2	*39D3	*39D4
Idle r/min.	1 500 ± 100 r/min.	←	←
Float height	13.0 ± 0.5 mm (0.51 ± 0.02 in)	←	←
Main jet (M.J.)	*#117.5	*←	*#117.5
Jet needle (J.N.)	*5D112-2nd	*←	*5D115
Needle jet (N.J.)	*P-0M	*←	*P-0M
Throttle valve (Th.V.)	*#105	*←	*←
Pilot jet (P.J.)	*#15	*←	*#15
Starter jet (G.S.)	*#70	*←	*←
Pilot screw (P.S.)	*2¼ turns back	*←	PRE-SET
Pilot air jet (P.A.J.)	*#160	*←	*←
Throttle cable play	1 - 3 mm (0.04 - 0.12 in)	←	←
Choke cable play	0.5 - 1.0 mm (0.02 - 0.04 in)	←	←

ELECTRICAL

Unit: mm (in)

ITEM	SPECIFICATION		NOTE
	Type	NGK: DR7EA DENSO: X22ESR-U	
Spark plug	Gap	0.6 - 0.7 (0.024 - 0.028)	
Over 8 (0.3) at 1 atm.			
Ignition coil resistance	Primary	0.1 - 0.5 Ω	Terminal - Ground
	Secondary	12 - 20 kΩ	Plug cap -

	Secondary	Primary	Ground
Ignition coil primary peak voltage		More than 100 V	
Generator coil resistance	Pick-up	90 – 140 Ω	B/Y – G/W
	Charging	0.1 – 1.0 Ω	Y – Y
Pick-up coil peak voltage		More than 2.5 V	
Generator no-load voltage (When engine is cold)		More than 60 V (AC)	

The asterisks mean it was changed that year. My friend has the 2001 and his is 29mm. I have the 1998 and mine was 31.

Its beside the point though... the fact is that carb is too big for that engine size.... and especially a torquey engine! The honda 250ex has a 22mm. The 220 bayou has a 24mm. The 230 and 250 quadsports came with 26mms... and they're sports! So they put a 31 on a ute??? Silly

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JustRandy

Registered

Joined Oct 19, 2012
72 Posts

#9 · Dec 4, 2012

I wouldn't spend the money on the new petcock... especially since I'm adding a 5gal flat tank to my front rack. Why have one tank vacuum controlled while the other isn't? I don't know why they did that anyway... its just something else to break with severe consequences (gas in oil or worse... a fire).

I pulled the petcock out, discovered how it worked, plugged the "run" gas passage so that to turn the petcock off, I select the "run" position. To turn it on, I select the "prime" position. Reserve is never used since prime and reserve both draw from the tank's bottom. The reason I used "run" to be the off is that mine was missing the long straw with the filter. I think I threw the busted diaphragm in the trash.

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oldeerslayer

Registered

Joined Nov 27, 2012
1,091 Posts

Discussion Starter · #10 · Dec 4, 2012

Since it is a CV carb isn't the effective size controlled by engine vacuum? The diaphragm will only lift the slide as high as needed. In effect opening the throttle butterfly decreases the vacuum until the rpms increase. At which time the diaphragm raises the slide and main needle as needed. So if the main butterfly is too big for the engine, there will be less vacuum. Resulting in the slide only rising as high as the engine requires? At least that's how I picture it. Same as vacuum secondaries on a 4 barrel. The purpose being to prevent over carburetion. I think Suzuki did it to just make one carb for both the 246 and 280. (granted they are probably jetted different).

Regarding the petcock, the only vacuum line I see running off the carb goes to the fuel pump and it is dry inside. The petcock on both my 93's appears to only have the 1/4" fuel line running from it. As I understand it, by vacuum controlling the fuel pump the same function is performed. Preventing gas draining when there is no vacuum. The pump squirts in pulses if you pull the line off the carb and crank it. So it appears to be working and there is no fuel in the vacuum line.

The carb needle valve also appears to be sealing because I can blow into a hose attached to the fuel inlet with just the needle sitting in the seat. With the float removed no air passes the needle, just from it's own weight. I've tried slight changes in float height with no effect. Right now it is set at .500 off the base, which I think is spec.

I even checked the fuel level in the chamber by using a clear hose attached to the bowl drain. It stops allowing gas in when the level is just below the gasket. Had the carb level in a vise and gravity feed the inlet until it stopped.

That's why I'm looking for another carb. I've flat run out of things to check. Charging system is 13.8 volts, new sparkplug with good spark when removed and cranking, fresh gas. Plug is light tan when it is running good, black when it's not. 140# compression (hot or cold). Valve lash .003 intake, .005 exhaust.

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oldeerslayer

Registered

Joined Nov 27, 2012
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Discussion Starter · #11 · Dec 4, 2012

93 LT-4WD Petcock

Here's a pic I downloaded of the petcock:

Attachments



Untitled-1 copy.jpg
28.2 KB Views: 697

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JustRandy

Registered

Joined Oct 19, 2012
72 Posts

#12 · Dec 4, 2012

Would you put a 650 double pumper on a 300 I6 and only open the throttle half way? The throttle opening may be determined by vacuum, but to operate correctly would mean, by design, the throttle could never open 100%. Half-throttle would really be 1/4 throttle or something similar. I doubt its designed this way. Why do you think the jets are so big? 37.5 pilot?!? You see on the pic I posted on the 29mm the pilot went down to 15. The 31 is so big, vacuum is so low, that the jets needed to be huge to fix it. I don't know why suzuki did that. I guess they had a good deal on 31s. The 37.5 pilot I harvested from the carb is the biggest in my collection.

It must just be the 300s that have the vacuum operated petcocks. I just assumed... Anyway, you have gas in the oil for some other reason. Maybe the floats didn't seal the gas flow and it drained in the crankcase? Are you in the habit of turning the gas off after each ride? Maybe the choke (fuel enrichment circuit) is leaking gas into the mix?

13.8 volts is low. Mine is 14.4. Is your battery charged? Will it read 14.4 when you rev it?

Compression doesn't matter. I've seen these engines run with the intake valve having negative lash and completely worn rings. Not only will it run, it will run dang good like that!

I know what you're going through and its why I threw my cv carb in a box with all the other cv carbs I couldn't tune.

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oldeerslayer

Registered

Joined Nov 27, 2012
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Discussion Starter · #13 · Dec 4, 2012 (Edited)

Yes, it will go over 14 volts if I rev it. 13.8 at or slightly above idle just tells me it's charging. Just making sure it wasn't an electrical problem.

Thanks for mentioning the "choke" circuit. I haven't really dug into that system yet. Is it possible the cable is hanging up? The thumb lever appears to be up where it should be and if I push down on it the engine does load up. If I don't push it back up quickly, it stalls. So it feels like it is working OK. But you got me thinking that something might be holding the plunger out a bit. When I first looked at it the cable was pulled out of the plastic collar on the carb and I assumed that was the cause of the idle problem. When I got it home I re-inserted it figuring I had fixed the problem. WRONG.

Another thought I had, is it possible the main needle has worn the orifice it rides in and out of. You know, the hole it rides in across the bore from the slide. I thought I saw a few minature droplet coming out of there at idle. But only once in a while. Maybe I'll try raising the the e clip a notch to lower the needle. I kinda doubt that will do anything since there is almost no taper near the end. Since there is almost no room to fit any other carb in that sardine can, I'm kinda stuck with a stock one. onlinecyclepart.com has the correct one for \$407 shipped. Some places were over \$500. Makes me wish I still believed in Santa.

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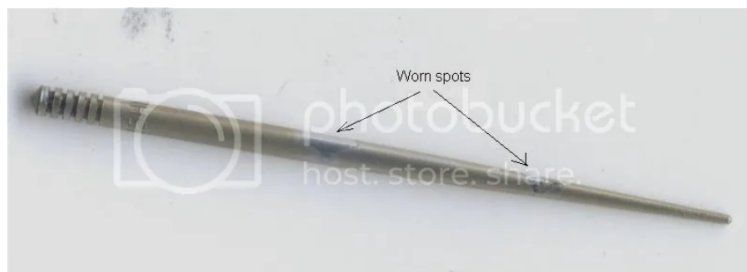
JustRandy

Registered

Joined Oct 19, 2012
72 Posts

#14 · Dec 5, 2012

Oh yes, needles do wear from the vibration



There shouldn't be anything coming out at idle though. You could take the needle out completely and still should be able to idle it. If you're idling off the needle circuit, your idle speed is too high.

The needle is called the jet-needle. The hole the needle goes in is called the needle-jet. They both wear and come in a whole slew of different sizes.

The area between the idle circuit and the needle circuit is the hardest to manipulate. Its controlled by the slide cutout and the straight part of the needle versus the size of the needle-jet. Also there are airjets that let metered air into the needle-jet. All this works together to form a smooth transition from idle to mid-throttle. I hate it when a carb works great everywhere except when I barely touch the throttle. And I feel like I accomplished something huge when I get it all tuned perfectly and sometimes just ride around working that throttle area all proud of myself lol.

I've put needles in drills and used sandpaper to sand them down a bit before. I've used dremel tools to cut out the slide cutout more. I have all the wire-size drill bits for drilling out jets. Its an art!

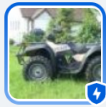
I'm looking for a 28mm off of something on ebay. I have a 32 on it now, just because I had one laying around I wasn't using.

This is what I rigged up. I don't have any pics of it mounted though, Maybe I should take one.



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ajl719

Administrator

Joined Jan 11, 2010
9,625 Posts

#15 · Dec 5, 2012 (Edited)

If it were changed that year then that would explain it. Because i bought mine in '99 when the 2000 models came out. So since your buddy has a '01 model then they would have changed it as you said in '00. So i wasn't saying you were a liar or anything, i was just going from what i read in my owners manual. Here's a thread i created with the exact specs from my manual if you interested, lol. (<http://www.suzukiatvforums.com/forums/repair-maintenance/3317-specifications-lt-f300f.html>)

2000 Suzuki King Quad 300 4x4: (14,000 + Km/s), K&N Air Filter, Differential Lock Mod, Kenda Bear Claws (25x10-12 - 24X9-11)

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JustRandy

Registered

Joined Oct 19, 2012
72 Posts

#16 · Dec 5, 2012

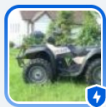
I guess the only way to know for sure is to stick a ruler to the carb lol

I know his is MUCH different than mine. He has round headlight and mine are rectangle. His plastics are brittle, mine are tough. I could get around the neutral start only thing by just grounding one wire, on his I had to ground the same wire plus a wire on the cdi which was there to keep the quad from running once the engine was turned off (in other words, you couldn't just push the quad down hill to start it. It HAD to be in neutral to start). His front rack is different. Just seems to be a lot more different than what you would think from looking at the specs. I don't care much for the 2001 model. If the 2002 has disk brakes, then that would probably be the best thing I could say about it lol.

It would be a heck of a quad to take the rear end off a cat (dual a-arms and cv joints) and the front end off a 2002! If these are king quads, then that would be the god quad 😄

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ajl719

Administrator

Joined Jan 11, 2010
9,625 Posts

#17 · Dec 5, 2012

Yeah mine has the round headlights too. And i do believe some '02 models had disk brakes, there were to different models i think, I believe the K1 had front drum brakes were the K2 model had front disk brakes. Either way i love my quad except for the exception of the rear mechanical drum brakes that don't seem to ever work on my quad. The front hydraulic drum brakes work great, never had to touch them or get them serviced and i have 12,000 + km/s on my ride.

2000 Suzuki King Quad 300 4x4: (14,000 + Km/s), K&N Air Filter, Differential Lock Mod, Kenda Bear Claws (25x10-12 - 24X9-11)

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JustRandy

Registered

Joined Oct 19, 2012
72 Posts

#18 · Dec 5, 2012

My back ones work ok I guess, but they won't hold me on a hill. The fronts work much better, but neither are as good as disks. I start freaking out on hills sometimes because of the lack of braking power. Luckily in 4x4, the front brakes hold the back wheels. If not for that, I would have slid off a mountain already lol. I need to get in there and see if there anything I can do to boost the stopping power. My friend is coming over today to replace his brakes, so I'll know more tonight maybe.

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oldeerslayer

Registered

Joined Nov 27, 2012

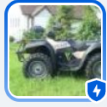
Discussion Starter · #19 · Dec 7, 2012

Making progress

:yeahbaby01:

Well I think I made some real progress today on my idle problem. The ATV has been sitting undisturbed in the shop for two days. I decided to pull the carb again. As I started to remove it I noticed one sitting in the air cleaner side of the throat. I put a clear 3/16 line on the drain and bent it

1,091 Posts



aji719

Administrator

Joined Jan 11, 2010

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noticed gas sitting in the air cleaner side of the throat. I put a clear 3/16 line on the drain and bent it up next to the carb and opened the drain. The fuel level was 1/2" above the bowl gasket and level with the bottom of the throat. Gas has to be leaking past the needle valve somehow. I have bench tested the needle valve and it had appeared to be working. There is no fuel in the pump vacuum line so the needle is the only place it can get in.

I ordered a new needle valve set, o-ring, hold down screw, and float. That's every piece associated with the valve.

The only thing that bothers me is that I thought the pump wasn't supposed to let fuel throw unless it had vacuum. Maybe I'm wrong. I know the Suzuki's equipped with the vacuum petcock aren't supposed to let fuel drain down, but maybe the ones with vacuum fuel pump do and the vacuum is just there to operate the pump.:huh:

Well if my theory is correct I should know when brown gets here next week.

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#20 · Dec 8, 2012



The Suzuki's equipped with a vacuum operated fuel petcock aren't suppose to let fuel drain down, but if the diaphragm goes bad then it is possible for it to be the cause. Did you pull the vacuum line off the petcock and see if there was any fuel in the line or if fuel came out the vacuum port on the petcock..?

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