

SPE

40cc

by Jason Pickering

The first time I saw this engine was some time ago. It was an early production model, and while it had the promise of some real potential it did have some room for improvement. Well as I was to discover SPE, an innovative company and the makers of this 40cc gasser, took that potential and gave it a squeeze. What came out is a better, smoother, and more reliable engine that shows some good engineering and manufacturing techniques.

There is no doubt in my mind that there are two classes of engines, on the one hand you have your top line well proven brands which maintain their place in the market for good reasons, and for those that want them it is money well spent. On the other hand, for the average consumer the ideal combination is an economically priced engine that also has a good measure of quality and other ancillary features as well as the reliability and longevity that you should be able to expect.

THE ENGINE

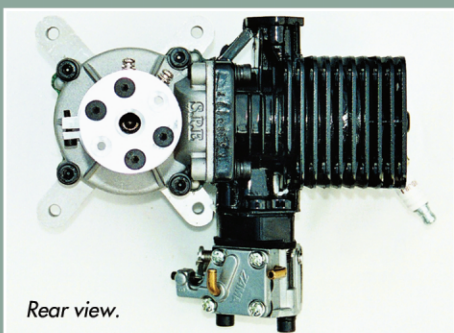
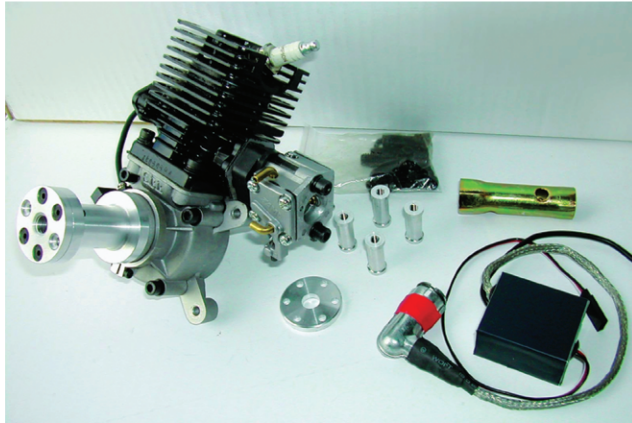
Enter the SPE 40cc gas engine. The guys at Precision Aerobatics have been working directly with the manufacturers through the development of this motor for some time, and have moulded it to their specifications. The review engine turned up in a well packaged box with all the required mounting stand off brackets, backing plate, ignition system and bolts required for installation. The most surprising inclusion was the muffler as this is usually an additional and sometimes expensive purchase. The crankcase is cast alloy and the cylinder is nicely machined and houses a ringed piston. No surprises there.

The ignition is a self (auto) advanced CDI unit and runs off a 4.8v to 6v power source. The manufacturer recommends the 4.8v and testing proved there was plenty of spark with that size pack. The CDI uses a magnetic insert in the shaft with a proximity pickup mounted off the crankcase. This is easily rotated to adjust ignition timing, and then locks into place with a 3mm cap screw.

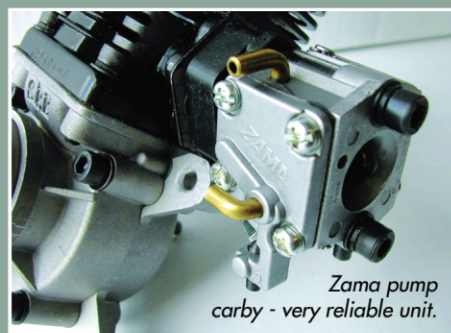
The carburettor is made by ZAMA, the world's largest manufacturer of two stroke diaphragm carbs. They have made 90,000,000 carbys to date and boast some high performance and reliability. I suppose they would have it right after making that many units. The carb company is Japanese so the quality is certainly there as well as the know how. The carb supplied on the engine does not have a choke, but a quick search on the internet revealed that they are available as a bolt on unit from ZAMA if required.

INSTALLATION

Well I'm no Airborne 'Engin-Ear' so I ain't pulling this motor apart, or I might have to enlist Brian's help to get it back together. Instead, I'll do what I do best - strap it to the pointy end of a 'plane and fly it. The lucky plane was my trusty 27% Edge 540 (also from Precision Aerobatics) that had logged over 300 flights. The installation was very simple and standard. With the standoff brackets bolted directly to the mounting feet on the motor. I chose to leave the alloy plate off as I didn't see the need for it and it seemed to be additional weight with no pay off in this particular instal-



Rear view.



Zama pump carb - very reliable unit.



Hall sensor and magnet.

lation. If weight was not an issue, then using the backing plate would possibly making the installation of vibration dampers easier, but again in my view, completely unnecessary here.

With this particular installation I decided to go for a slightly different method for the throttle linkage, one I have seen used by some giant scale IMAC guys. Rather than a push - pull rod, I used a pull cable that pulls against the spring that closes the butterfly. I am not necessarily recommending this set up, as I am yet to be convinced of its merits but it certainly worked okay for me, so I can't discredit its functionality. In order to achieve this I had to make a small arm out of carbon fibre to reverse the action of the butterfly lever. From there the pull cable went straight back to the throttle servo and connected both ends with ball links. The ignition system was much the same as any other to installation, foam was used to isolate the unit from vibration and all the electrics were kept as far from the Rx electrics as possible. A heavy duty switch harness with charge jack was installed and a 1200mAh 4.8v Ni-Cad battery pack was used for power. As usual, Loctite thread compound was used on all the bolts and where possible, Nylock nuts with spring washers.

The plumbing set up was much the same as any other gasser, the fuel pickup in the tank went straight to the carby via a tee branch to a standard fuel dot and a gas proof filter, all run with 1/8" gas line and a small zip tie wrapped around every connection to ensure a leak proof joint. I no longer go for the flashy check stop valved fuelling connectors as a simple tee and fuel dot work just as well and add less complication to the system. The vent line was run from the top front on the inside of the tank to the bottom rear on the outside of the tank to prevent spillage and siphoning then exited out the bottom of the plane. On a new tank set up, I give it a small pressure test to ensure no nasty surprises!

I always run a motor up prior to fitting the cowl to allow tuning and timing adjustments and in fact often leave the cowl off for the first few flights so I can readily see if there are any problems developing. Sometimes this can help catch leads or cables rubbing on things that they shouldn't or things going astray that you wouldn't see with the cowl on. The propeller I went for on the initial test runs and flight was a JXF 21x 8 wooden prop (also imported exclusively by Precision Aerobatics). The hub connection for the prop was a little different than

Specifications

Capacity:	40cc
Configuration:	2C single cylinder air cooled
Carburettor:	ZAMA pump
Ignition:	CDI auto advance ignition
Power Supply:	4.8-6.0V
Weight:	1420g including ignition & muffler
Maximum Output:	2.5KW/3.4 BHP
Maximum RPM:	9000
Idle RPM:	200 RPM
Petrol/Gasoline:	Unleaded 2 stroke 30:1-50:1
Oil:	2 stroke (synthetic recommended)
Mix:	1:30 to 1:50
Recommended Oil:	2C racing oil & mix 1:50
Prop Selection:	18 X 10 - 22 X 6
Static Thrust:	21 X 8 prop >9kg

what I've seen previously, with a centre bolt providing the primary connection and two of the six circumferential bolts intended to go through the prop to provide protection against rotation. I elected to use four of the six bolts for this purpose, but care was required to prevent over tightening and damaging the internal thread. The propeller was drilled to suit the above configuration, balanced both ways, and fitted along with the spinner. Lastly the feather weight muffler was fitted using the two bolts supplied.

STARTING

A standard mineral based two stroke oil/petrol mix was used at a ratio of 32:1. A mineral oil doesn't burn off as much as synthetic and while being less efficient, does help to carry out excess metal that comes off during the break in period. At this point I must say I

missed having a choke. Nothing drags fuel into a carby quite as effectively as blocking off the air intake. That being said, it was no real problem for me to put my finger over the hole and turn it a few times (with the ignition off!!) to wet it up a little. From there it was only a matter turning the ignition on, half a dozen flips and she was away. The sound was quite respectable, not that chain saw noise that some tend to turn on, and with only a small adjustment to the timing a smooth idle was achieved. I was quite impressed with the low amount of vibration and this was typical at all RPM. On the initial run, a top RPM of 6210 was achieved with this prop.

FLYING

I ran several tanks through with the engine on the rich side before leaning it out a little and sending her skyward. With all systems proven, and the review preamble complete, the Edge was taxied out to the flight line and the throttle pushed forward. The engine performed surprisingly well in the air, lugging this 84 inch through a vertical, and over the top quite well. Hover was achieved at about half throttle or so and pushing the stick forward would pull it out even if a little sedately. If anyone was considering this as a combo option, and kept everything as light as possible (i.e. Li-Po pack, mini servo on the throttle, simple plumbing etc), they would have even better results. The good thing I found with this combination is that I could throw the plane into any manoeuvre with high rates and full power and not break it. This would make it ideal for anyone who was looking for a good first gasser - giant scale combination. My Edge weighs at a little less than 14lbs and the motors all up weight is similar to an O.S.160 two stroke to give you more of an idea. As for me, I will be keeping this motor in the edge 540 as the pros out weigh the cons. I believe that Precision Aerobatics will be offering this plane with the 40cc as a combination for a little over \$1200 which is an awesome deal for any one needing the plane and power plant combination.

CONCLUSION

Around six years ago, I purchased a cheap Ryobi weed eater with a 23cc two stroke for \$150 and have used it around my lawns nearly every weekend since. In that time I have had to re tune it twice and change the sparkplug once. Every time I go to use it, it starts, and doesn't quit till I turn it off. My point? Even some of the more economically priced engines can prove to be sturdy and reliable and in this case you have the other benefit of the fact that spare parts will be accessible through PA. While this particular engine is not an expensive big brand motor, there is no reason why it wouldn't serve you for some years to come given the right attention and care, and when you consider it is priced considerably less than some comparable engines, it is definitely worth a look. The vibration levels were very low and throttle advance nice and smooth. All in all I was more than just a little impressed by the beastie and I'm sure you will be to. This engine (and plane) is available from Precision Aerobatics, Sydney, www.precisionaerobatics.com

Oh yes, its 26cc baby brother is due for release about the time this goes to print.

Disbtributed by
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Hits

- Very light
- Easy to install
- Reliable
- Easy to start
- Comes complete
- Very well priced

Misses

I miss having a choke,
but could live without it