RCU Review: Super Tigre GS-40

Back

More On This Product
- Discussions on this Product
- Show user ratings
- Check for Retailers

Contributed by: Fly RC Magazine | **Published:** October 2004 | **Views:** 113276 | Email this Article | PDF

This review appears courtesy of Fly RC Magazine.

Article by: Andrew Coholic

SuperTigre, a respected name in model engines, has been churning out engines for more than 50 years—and until now the engine has always been manufactured in Italy. After a brief hiatus, these popular sport engines are back in hobby shops. All production and tooling have moved to a plant in China to become more competitive in the world market. The GS40 R/C is a .40 cubic inch displacement, ringed piston engine with the large ST quiet muffler. The new engines appear to be essentially identical to the previous Italian-made versions I have owned.

SPECIFICATIONS

ENGINE: SuperTigre GS40 R/C

MANUFACTURER: SuperTigre

DISTRIBUTOR: Great Planes Model Distributors

Displacement: .40 ci

Weight: 18.30 oz.

Type: Schneurle ported, single conventional ringed aluminum piston running in a hardened steel sleeve, with ball bearing supported crankshaft

Prop range: 9x6 - 11x6

Recommended prop: 10x5 - 10x6 for sport use

Price: $75

SUMMARY
This is a well constructed, quality-made

INITIAL IMPRESSIONS
I first noticed the excellent packaging. The large box was brightly colored with the ST emblem, and the model number clearly stated - while on the inside, the engine, muffler, carburetor and miscellaneous screws and nuts were neatly packaged in separate sealed bags, and nested in foam padding. Also included was a glow plug (not always included today) the instruction booklet, an exploded view of the engine and carburetor, the warranty card and a nice set of peel and stick decals. The stated weight including the muffler is 19.08 ounces. Measuring the engine complete with all screws, glow plug and muffler, on my digital scale gave a reading of 18.30 ounces. It's always nice to be under the claimed weight rather than over!

RUNNING THE ENGINE
The operating instructions are excellent, and are targeted towards the beginner. To break in the engine, I used an APC 10x5 prop and the supplied glow plug. SuperTigre recommends a fuel with 18 to 20% oil for break in. I used fuel with 5% nitro and an 18% 30/70

sport engine that should be very long lasting. This type of engine (ringed) is more tolerant of ingesting small amounts of dirt than a ringless lapped engine. It has a minor tendency to load up in a prolonged idle while on the ground, so you'll want to adjust your transmitter idle setting accordingly. Overall, I rate the machine work and appearance as excellent. The instructions, written for the newcomer pilot, are exceptionally good. At $75, it's a good value for your dollar.

castor/synthetic oil blend, as castor offers excellent protection to the newly machined parts while they are running in.

During break-in, I measured the engine rpm, the exhaust gas temperature and the cylinder head temperature with the RCATS ground based data gathering unit. This system displays the data monitored on my laptop computer, and is really handy for tracking the engine's performance. I did the test runs outdoors, and it was quite cool (53 degrees F).

The first run was five minutes long, at an rpm of 8,500 to 9,000 (with the carb opened fully). At this very rich setting, the cylinder temperature and exhaust temperature were only 120 F. A good amount of oil was coming out the muffler exhaust, telling me that the engine components were receiving adequate lubrication (unlike an ABC, this type of engine can safely be broken in on the rich side).

After the initial run of five minutes, and a short cooling off period, I ran the engine in five minute intervals, slightly leaning the high speed needle after each minute of run time. The engine was allowed to cool between runs (every five minutes or so). By the end of the second 10 ounce tank of fuel, I had run the engine between 15 and 20 minutes total, and the 10x5 prop was running a steady 13,100 rpm without sagging, while the cylinder head temperature and the exhaust gas temps were up to 275 F.

INITIAL RUN				
Propeller	Max RPM	EGT	CHT	Idle RPM
9x7	13,400	297	292	3,400
10x5	13,100	252	262	3,200
10x6	12,150	263	265	2,950
10x7	11,600	238	228	2,950
11x4	12,100	242	226	2,800
11x5	11,100	245	243	2,400
11x6	9,800	264	256	2,400

Without disturbing the factory set low speed needle, I recorded an idle rpm of 3,600—fairly steady but there was a tendency for the engine to load up (incomplete combustion accompanied by reduced rpm) after more than 20 to 30 seconds. The transition from low to mid range was rough, but the engine would keep running. Hot and cold starts were immediate when using the electric starter—hand starts were possible with a healthy prime and a strong flip.

At this point, I felt the engine was sufficiently broken in to try experimenting with some different size propellers. Using the supplied glow plug and the same 5% fuel, I ran the ST GS40 on seven different props, from 9x7 through to an 11x6. The following chart shows the results:

For each of the test props, I let the engine warm up, reset the high speed needle and allowed the temps to stabilize. To check the idle I tried to get as low an rpm reading that would still allow the engine to run steadily, without quitting. In all cases the transitions were quite good, considering I had not yet adjusted the low speed needle, and the engine was far from being completely broken in. Starts were again immediate when bumping the spinner with the electric starter. Hand starts were somewhat difficult, yet possible hot or cold. I preferred to use the starter.

For the next series of runs, I changed to a 15% nitro fuel with 18% synthetic oil. I was careful to make sure and richen up the high speed needle before each prop charge/run, and re-tune for just off peak rpm. I still used the supplied glow plug, which, by the way, held up great throughout the test runs. The results:

As you can see, the rpm across the entire range of propellers was slightly higher. The temperature readings, both exhaust gas temp (EGT) and cylinder head temp (CHT) were very close, and to be honest I couldn't see much of a performance between this fuel and the fuel used for initial break in. The transition with the 15% seemed a bit better, and I had at this point also begun to adjust (lean) the low speed needle

FINAL BENCH TEST				
Propeller	Max RPM	EGT	CHT	Idle RPM
9x7	14,030	280	290	3,400
10x5	13,200	272	273	3,400
10x6	12,450	266	249	3,200
10x7	11,700	251	229	2,950
11x4	12,700	267	278	2,400
11x5	11,850	232	248	2,400
11x6	10,450	235	246	2,400

somewhat. I found the factory set position to be very close to the proper position. I ended up turning the idle needle in about 1/3 of a turn, to lean it a bit to prevent loading up. More than that and it was too lean on the bottom end.

GLOW PLUG TIPS

The last test I performed on the bench, was to try a few different glow plugs, other than the supplied one. I did a series of runs with a K&B 1L, and also with one of the Tower Hobbies plugs that closely resembles an O.S #8. Surprisingly, using both of these other plugs gave a 200 rpm increase, and also the transition and idle was noticeably better than with the supplied ST plug. I imagine the plug that was provided is a bit on the cold side for this engine and the fuel I am running, especially in the cooler temperatures the day I was testing. For my test flights I chose to use the Tower Hobbies plug, which I thought performed the best on the test stand.

TEST FLYING THE ST GS40

I installed the engine into a SIG Four Star 40 ARF. This is a sport aerobatic plane weighing five pounds and one ounce. How did it fly? Very well! I performed all test flights with 15% and an APC 10x6 prop. I had the idle set so the plane would sit stationary on the grass strip. The throttle had to be advanced slowly in order for it to "clean itself out" after a prolonged idle, but it was acceptable for an engine with relatively low run time, and a bit of tweaking left on the low speed needle valve.

The Tigre ran like a champ - from slow speed to high, transitioning up and down, the engine never hesitated, nor did it hiccup or sputter. I put the plane through many aerobatic maneuvers such as inside and outside snaps. Extended vertical climbs (during which the engine again ran steady, without any signs of trouble) took the five pound plane up many hundreds of feet easily.

Try as I might to find a fault, the engine ran great during all attitudes and maneuvers. Throttling back to land, it dropped down into a steady idle and remained there until I landed and taxied back to the pit area. Other than having to remember not to advance the throttle too quickly from idle (only on the runway while waiting to take off - in the air the engine didn't seem to have the tendency to load up) this engine outperformed my expectations.

WISH LIST

The "soft" compression makes hand starting somewhat difficult—this will improve with more run time. There is also a tendency for the muffler to "stick" to the exhaust manifold after a while. Not unique to the SuperTigre engine, tightening down the cast aluminum muffler onto the aluminum manifold tends to cause it to gall or adhere. When this happens, you need to ease the muffler off, not muscle it off, whenever you remove the muffler.

CLOSER INSPECTION

The engine differs slightly from the previous model manufactured in Italy. The engine now has "made in China" cast into the backplate and crankcase castings. The screws holding the back cover and head on as well as the single muffler clamp screw are now Allen head cap screws instead of the traditional slot head screws. Allen head screws are much easier to remove and torque down without damaging either the engine or the screws. The engine and muffler appear to have a glass-bead blasted finish. It gives the engine a shiny and nicely finished look.

Disassembly of the engine revealed a quality die cast crankcase, nicely machined inside and out. The back cover is also a die casting, and has a groove and rubber O-ring that provides a leak-free seal without the need for a paper gasket. The connecting rod is machined from bar stock aluminum alloy, and has been bronze bushed at both the lower and upper end, always a nice touch. Two lubrication holes are drilled into the bottom end of the rod to allow a good supply of oil to lubricate the crank pin. The die cast piston appears to have been honed to finished size, and has a cross hatched surface texture. The single expansion type ring is pinned to prevent rotation and eliminate the chance of catching a port.

The wrist pin is blind bored, and held in the piston with C-clips at either end. The piston has a small area relieved to allow you to get at the edge of the C-clip, again, a nice feature when it is time to overhaul the engine. The crankshaft is a single-piece steel machined unit, ground to finished size, and is supported in the crankcase by two ball bearings. The thread is the standard American 1/4-28, although the crankshaft diameter immediately in front of the die cast drive washer (which is held on by a split collet) is slightly larger at 7mm, and may require the spinner backplate or propeller to be reamed to fit.

HEAT TREATED STEEL SLEEVE—The un-plated, heat treated steel sleeve is quite robust, with a wall thickness of 60 thousandths of an inch. The sleeve has been honed to a straight cylinder, without any taper. The sleeve is a tight press-fit into the crank case, and in order to remove and reinstall it, the case had to be warmed up, expanding it enough to loosen up the fit. This type of close fit will make heat transfer from the cylinder liner to the crankcase fins more efficient, and although working on the engine is a little more difficult, it makes for better cooling.

HEAD AND CARB—The head again is a die casting, with an integral brass insert cast into the center where the glow plug threads in. Always a plus, it prevents the plug seizing in the head, especially after a hot run. The head shape consists of a wide squish band (0.165 in. wide) with a bowl shaped combustion chamber.

The carburetor is of the two needle type, and is held to the case with a draw bar and nut. The carb barrel is sealed to the carb body with a rubber boot, and the high speed needle also has an O-ring to seal it. There is also an O-ring seal between the carb neck and the crank case. Little chance of air leakage anywhere! The carb felt smooth and without play. I have always liked the Super Tigre carbs, sometimes even fitting them to other manufacturer's engines.

CLEARANCES—I measured the parts while disassembled with a digital vernier caliper, and found all parts to have textbook fits and clearances. However, the lower end of the connecting rod was fit with a 0.0025 in. clearance, with a little noticeable play, although still within accepted limits. I like to see this fit with a little less clearance on a 40-size sport engine because a slightly tighter clearance can be associated with better wearing characteristics. This is a personal opinion and is not something that would stop me from buying this engine.

The muffler is also a casting, and appears to have some sort of baffling inside. It cannot be taken apart, so I couldn't see exactly what was done. The manifold is also a casting, and the arrangement allows the muffler to be swung around to any angle required for your specific installation.

Overall, I rate the machine work and appearance as excellent.

CONCLUSION

The SuperTigre GS40 is targeted towards the flyer looking for a durable, dependable and strong running engine that will provide years of use. It is a well made sport engine that is very easy to tune and handle. The ringed piston design will be more tolerant of dirt ingestion than the many non-ringed ABC/ABN designs that are so prominent today. The three year warranty is as good as any other in the industry. The supplied muffler is very quiet, and the ability to rotate the exhaust to suit the installation is a big plus. It can be hand-started but this was not the easiest thing to do, so I relied mainly on my electric starter.

During bench testing I ran about half a gallon of fuel through the engine, and have consumed a similar amount in flight testing. A ringed engine such as the GS40 will require a longer break-in than a non-ringed (e.g., ABC) engine in most cases. This engine shows good performance and will most likely continue to show performance increases over the next few gallons of fuel as the break-in process continues. The quality and good running of the Tigre lives on!

APC Propellers, distributed by Landing Products
www.apcprop.com
(530) 661-0399

Great Planes Model Distributors
(800) 682-8948

K&B Model Products
www.modelengine.com
(626) 359-9527

RCAT Systems
www.rcatsystems.com
(408) 292-9794

SIG Manufacturing
www.sigmfg.com
(800) 247-5008

Super Tigre
Distributed Exclusively in the U.S.A. and Canada by:
Great Planes Model Distributors
www.supertigre.com

Tower Hobbies
www.towerhobbies.com
(800) 682-8948.

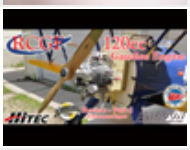
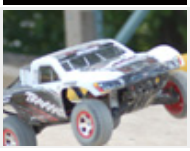
Comments on RCU Review: Super Tigre GS-40

Posted by: MARCO TAMAYO **on 03/21/2011** Profile
Gracias por sus comentarios, me han sido muy útiles.

Posted by: BrightGarden **on 07/18/2014** Profile
Thanks for the thorough testing and article - I am buying two of these for a twin and your info will prove helpful, I am sure.

EMAIL THIS ARTICLE OR CHECK OUT THESE OTHER GREAT REVIEWS!

Photo		Manufacturer	Product	Summary	Reviewed
	**MOTIV**	**"M-Code" Brushless RC Moto**		Ok, enough about Paul because this article is about the MOTIV line of "M-Code" line of motors. The "M-Code" motors come in ma...	12/06/2015
	**Trinity**	**D4 1S**		In late June, 2014, Trinity released the D4 motor to replace the D3.5. Since that time, the D4 has powered cars to 8 ROAR Nat...	12/06/2015

	**Matt Lemay**	**Airbrushing – Take Your Painting To**	I've decided to create a series of articles dedicated to helping the average hobbyist get into, or at least consider whether ...	12/06/2015
	**Tamiya**	**Amarok Custom Lift**	As an official vehicle of the 2014 Sochi Olympics, Volkswagen built specialized polar edition custom lifted Amarok vehicles u...	11/24/2015
	**RCGF**	**21cc Twin Cylinder Gasoline Engine**	RCGF, a Chinese manufacturer of gasoline engines, designs and manufactures engines specifically for 'the RC aircraft market. ...	11/23/2015
	**RCGF**	**120cc Twin Cylinder Gasoline Engine**	RCGF, a Chinese manufacturer of gasoline engines, designs and manufactures engines specifically for the RC aircraft market. T...	11/23/2015
	**Traxxas**	**Slash VXL Brushless with OBA**	In June, I tested and wrote about the Traxxas Slash w/ OBA and how much I enjoyed what the Slash offers. It's been a goto veh...	11/23/2015
	**Tower Hobbies**	**J-3 Cub**	With its distinctive looks, it is probably safe to say that the J-3 Cub is one of the most recognized and known airplanes in ...	11/23/2015
	**Seagull Models**	**Maule Super Rocket 10-15cc ARF**	When Seagull Models announced that they were going to produce not just a model, but an ARF of the Super Rocket, I just had to...	11/22/2015
	**Flitework**	**Edge 540**	The Flitework Edge 540 is an electric only ARF airframe with a generous wing span of 66.9" and also beautifully dressed up in...	11/21/2015
	**Seagull Models**	**Steen Super Skybolt 15cc ARF**	Seagull Models introduced this biplane early on in 2015, and SIG mfg. had a pre-production sample at the Toledo Expo. That pr...	11/20/2015
	**ST Model**	**Salto**	ST model brings us a fun aerobatic glider with the H101 Salto. The self-launch electric glider has no bad tendency and will b...	11/19/2015
	**RCGF**	**10cc Gasoline Engine**	RCGF, a Chinese manufacturer of gasoline engines, designs and manufactures engines specifically for 'the RC aircraft market. ...	11/17/2015
	**Seagull Models**	**Funky Cub 10-15cc ARF**	The new Funky Cub has some really cool attributes, borrowed from scale aircraft, that should add up to make it a great flying...	11/16/2015
	**RCGF**	**20cc Gasoline Engine**	RCGF, a Chinese manufacturer of gasoline engines, designs and manufactures engines specifically for 'the RC aircraft market. ...	11/15/2015

Return to Magazine Homepage