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FEATURES

TIGER 50
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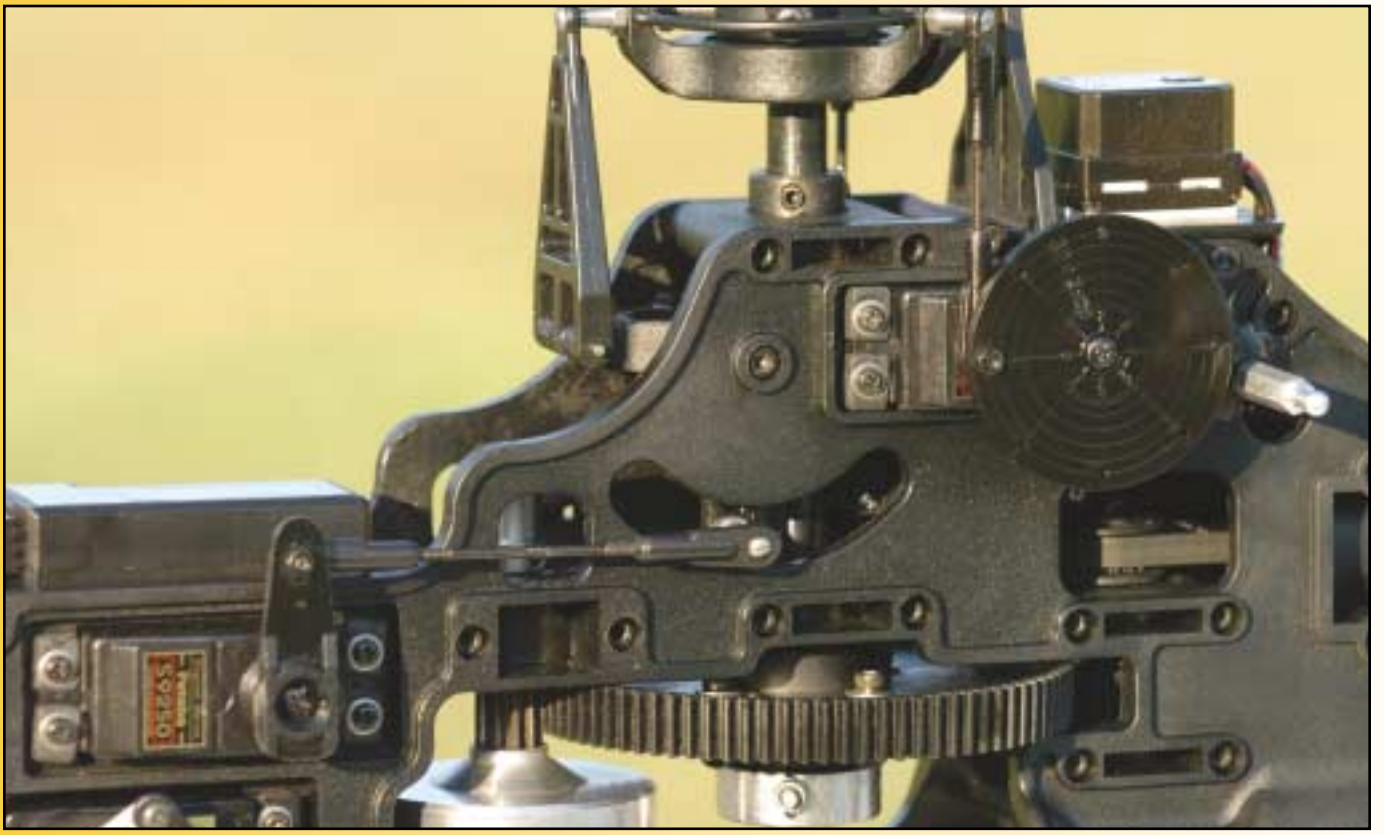
Jeff Stone

TIGER 50

For Myself

I've been at this about five years now and my flying abilities include nose-in hover and some 3D maneuvers. I've flown Raptor 50's and a 90SE. The Tiger 50 is available as an ARF for $299.99 or as a kit for $284.99. While I would have preferred the kit, I ended up with a Tiger 50 ARF. Since I'm a belt and suspenders kind of guy, I immediately proceeded to almost completely disassemble the Tiger 50, then, re-assembled it after I inspected the components. Turns out, thread locker was everywhere it was supposed to be - on the set screws securing the tail rotor hub to the output shaft, on the three set screws securing the collar on the main shaft, and on the set screw for the hex start assembly – plus what is added when you assemble the ARF, i.e. securing the clutch to the hub, the hub to the engine, and the bolts securing the engine to the mount as well as the mount to the frame.

First, let me say, it's pretty obvious a lot of thought has gone into the Tiger 50. Let's start at the rear of the model. For example, one thing I particularly liked was the location of the tail rotor servo. It's mounted in the aft part of the frame. The manual showed it mounted from outside, but the addendum sheet says mount it from inside the frame. (I tried both locations.) As a result, the tail rotor pushrod makes a nice straight shot to the tail rotor.



Above: Sophisticated yet simple, the Tiger 50 features CCPM. With only 1 linkage and 3 pushrods between the servos and the swashplate, the result is less slop than conventional mixing systems due to fewer pushrods and linkages to wear, or repairs following an accident. Note the use of Allen-head bolts throughout the construction of the Tiger 50 instead of cheesy Phillips-head screws.

Right: Mounted within the side frames, the tail rotor servo gets a straight shot tail pitch link. Replacing the wire pushrod with a carbon fiber pushrod is a natural!

Servicing the tail rotor gearbox is quick and easy because three screws grants ready access for maintenance or repair without removing the belt, the boom, or the gear box itself – sweet!

Ensuring a more accurate response to the tail rotor servo by using dual guide pins to feed the servo's output through the tail slide ring without the cocking, or wasted motion a single point input can have is a feature usually found on more expensive models.

Speaking of the tail rotor assembly, there are some nice features about the Tiger, which I really liked. One is how easy it is to change a bent tail output shaft following an accident. That's because all you do is remove three Allen-head machine screws securing the side plate, which grants immediate access – without having to remove the belt, the boom, or any other part of the tail assembly! Another thing I liked is how the tail pitch control lever uses two points to control the pitch slider instead of one. This is especially important because I use a Futaba GY-401 gyro with the digital servo (which is super fast).

Anyway, inputting motion through two points is smoother than one because it applies the forces evenly so there's never lost motion due to the mechanism cocking. The tail rotor has considerable power when compared to other helis. Equipped with 87 mm blades reminiscent of those from K&S, the Tiger 50 sports a 5.24:1 tail gear ratio vs. the 4.56:1 of my Raptor 50 resulting in fast pirouettes along with sudden and precise stops.

Next, let's look at the how the servos control the swashplate. The Tiger 50 uses CCPM and that's completely new territory for me. First, I must admit to being leery about CCPM because I've read on forums both about it being hard to set up, and about control interactions. Well, I actually found it rather easy to set up, plus I didn't notice any interactions, so I'm not sure where this got started, but here's how I went about setting up the Tiger 50.

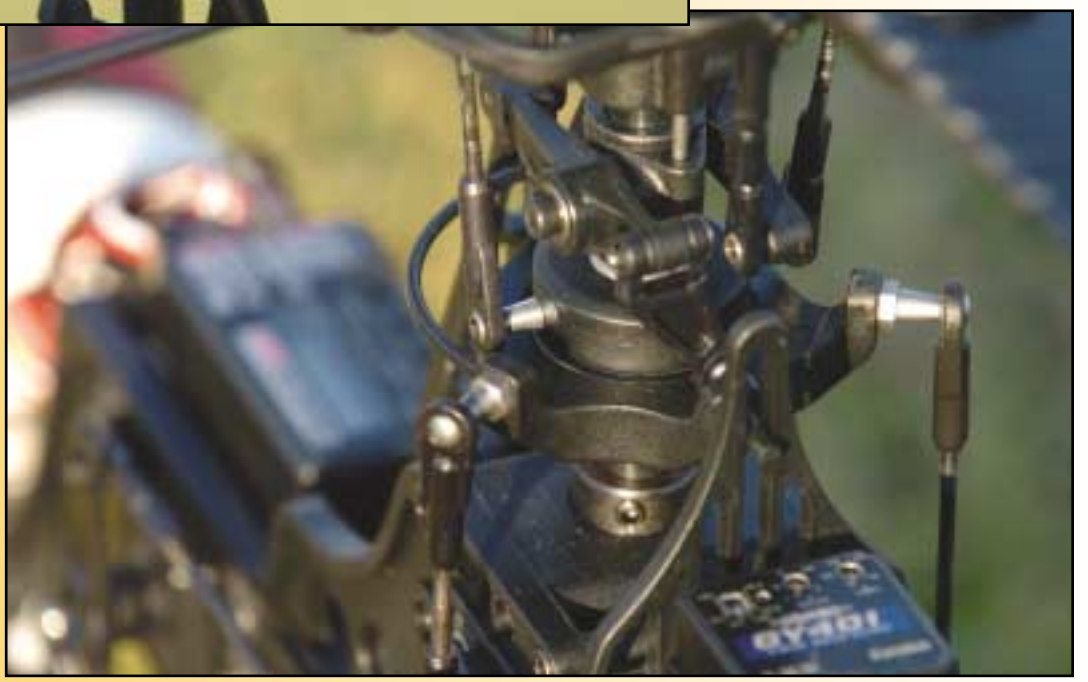
I used servo arms as specified in the manual . . . and speaking of the manual, it's obviously been authored in English, so bonus point apply! There's also an addendum sheet to make it current. Anyway, they specified servo arms 20 mm long for the aileron and pitch servo and 23 mm long for the elevator servo. But actually, since CCPM shares these duties amongst three servos, let's use the manual's terminology; place the ball at 20 mm on the two aft servos (controlling the swashplate) and at 23 mm for the forward most servo (the one operating through a linkage). Speaking of linkages, here's a tremendous difference between my Raptor 50 and the Tiger 50. My Raptor has seven pushrods and five linkages between the servos and the bottom of the swashplate while the Tiger uses only three pushrods and one linkage! This means 1/3 the number of parts to accomplish the same job. This results in less slop and fewer things to adjust or repair. What's more, the linkages were pre-built and result in a perfectly symmetrical setup straight out of the box. I didn't have to turn so much as a single ball link! With ATV at 100%, I ended with the Mas Tech set-up of; -11, 0, +11 in Idle Up 1, plus there's plenty more pitch range available.

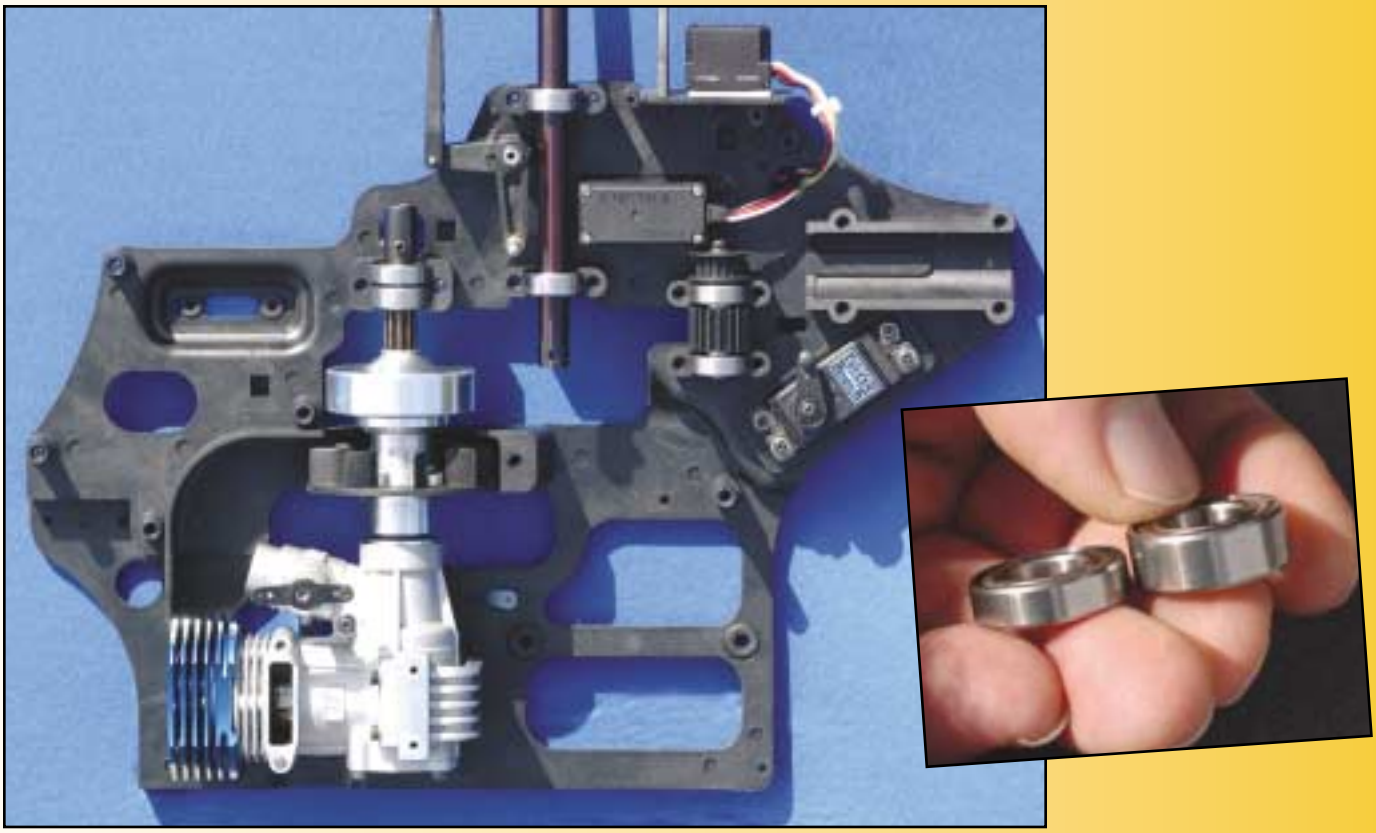
An interesting fact is that with CCPM, the flight loads are shared amongst three servos. This means, you don't have to use strong servos – in fact, I later chatted online with a fellow who is using three S9254 servos for his Tiger 50, which results in extremely rapid cyclic and collective response. I wondered how he could get away with that since while the S9254 servo is extremely fast, it only has 47 ounces-inches of torque? The answer is easy enough because, for example, collective pitch uses all three servos to do the work of one servo in a conventional system! As a result, the torque of three servos is added up and in effect, they work as a team, equivalent to a single 141 ounce-inch servo (47 ounce-

Optional 3D Main Rotor Grips available from Pro Modeler for the Tiger 50. Featuring leading edge blade control, these made no difference in the flying of the Tiger 50 but were created in response to customers desiring a 6 mm spindle shaft. Look closely at where the seesaw arm bolts to the seesaw and you'll see another mounting position – for the 1:1 Bell-Hiller mix.

Equipped with an aluminum head block as standard, this feature is usually found on more expensive helicopters, or as an upgrade in the 50-class. This ensures the Tiger 50 has the right stuff for aggressive 3D flight straight out of the box.

A neat feature of the Tiger 50 are the many tuning adjustments possible. The aluminum cone-shape swashball extension increases direct Bell input through the seesaw arms.





Beefy side frame features thick 7 mm bearings, spreading the flight loads to prevent the seats from prematurely wearing and exhibiting excess play. Also note how installing the servos directly in the side frames means they're protected in a crash.

inches x 3 = 141 ounce-inches). Combine this with the fast transit time of 0.06 seconds and he explained how maneuvers like "snakes" are easier to perform. Anyway, I used S9252 servos and discovered there's a very "connected" feel when flying the Tiger 50. I'm sorry, but I can't describe it better than this.

I'm using my Futaba 9C with the Tiger 50. Setup is a little different with CCPM, only because you first must select the swashplate mode from the menu before doing anything else (otherwise, anything you've done prior to this, i.e. Normal/Reverse, or even naming the model gets reset). Naturally, I picked the best servo arms to center as perfectly as possible at mid-stick so that all linkages are exact 90-degree to the arms. I also used a little bit of sub-trim to get things perfect. Other than that, the only other place things were different was that I maxed out cyclic throw in the Swashplate AFR menu instead of using ATV as I usually would. Then I held the aileron stick hard over (at mid-stick in Idle Up) and increased the percentage on AIL until the bottom of the swashplate almost touched the main shaft (check both directions). I did the same for fore-aft and ended up with 85% for both AIL and ELE. I have my governor turn on with the throttle stick because I don't like complicating my life with another switch. Similarly, the GY-401 is in Heading Hold mode all the time, though I have a switch to turn it to normal (though I never do).

The frames were particularly interesting. They're both beefy in appearance and in practice quite strong (ask me how I know). For example, the bearings supporting the main shaft are 7 mm wide vs. 5 mm in my Raptor. This is a hugely beefier bearing. This means the fit will last longer without developing slop. I am impressed with the size of the bearings throughout the Tiger 50.

My friend Andy (who is into scale helicopters) pointed out another interesting thing. He mentioned that since the servos are located in the frame itself, the forward radio platform could be left off completely (of interest when fitting the mechanics into a scale fuselage). Thus, because the radio platform only serves to support the receiver and battery (which can be readily relocated within the fuse) this results in plenty of space to detail a cockpit area without interference from the mechanics!

There are also some small touches I thought were particularly smart. For example, the model has molded guides for routing the servo and gyro wires, which results in a tidy installation. Another thing I liked was the use of rubber grommets in the radio on-off switch mounting plate, which serve to help isolate it from harmful engine vibrations. I also like the keyhole fuel shut off incorporated into the side frame because it lets me easily run the engine dry at the end of the day without my pulling the fuel line off the carb. However, a bigger deal for me is fuel tank capacity. The Tiger 50 has a large 440 cc fuel tank. I'm getting 11-minute

flights that absolutely eclipse the 8 minutes I was getting from my Raptor 50. In addition, the Tiger 50 mounts the fuel tank via four soft rubber dampers thus keeping the frame from wearing a hole through the tank.

Another thing I noticed was the use of Allen-head machine screws and nylock nuts throughout the entire frame assembly – there's not a cheesy Phillips-head screw to be found in the mechanics. Furthermore, there are two safety set screws, which secure the tail boom to the model after the four 38 mm Allen-head bolts have been used to tighten the boom, which I thought was just plain smart!

Let's examine the head. It differs from that of the Raptor largely because it features an underslung flybar. This is the same style used by Miniature Aircraft, Hirobo, and others, plus there's also a rotor head button incorporated into the head (complete with ridges for increased friction). Another thing, which immediately drew my eye, is how the Tiger 50 incorporates an aluminum head block as standard.

There's more than a few ways to fine-tune, or make flight adjustments on the Tiger 50. For example, it's pretty common to find 2-position adjustments for the mixing arms on most helis – use the outer holes for experienced fliers and the inner holes if you're learning to hover – the Tiger has these as well. However, the Tiger 50 also comes with special lead weights and plugs for inserting into the leading edge of the Hiller paddles. If you are learning to hover, these will tame the Tiger down considerable, especially when used in conjunction with the inner holes of the washout arms.

But there's more. For example, what if you want a wilder state of tune for your Tiger? That's easy too. The Tiger 50 is unique because it comes standard with an adjustment for the swashplate itself (speaking of which, the swashplate incorporates an anti-rotation guide pin). However, if you look at the upper-star of the swashplate, you'll see there are the two balls, which connect to the Bell-Hiller arms. These are shorter than the two operating the mixers. If you want to speed the cyclic performance up a little, remove the balls, add the supplied F3C spacers, and replace the balls. In effect, this is like installing a longer servo arm to get more throw. Alternatively, if 3D is what you have in mind, add the optional 3D Swashball kit PDR0069 (longer still) and really speed up the cyclic performance!

Furthermore, the Tiger is equipped with adjustable Bell-Hiller mixing ratios; both a 1:1 and a 0.7:1 mix are available. Anyway, I left the ball in the outer hole (1:1 ratio) for the first couple of gallons, while I broke the engine in. The Tiger 50 was very smooth in the hover and aerobatic flight like loops, rolls, and stall turns were easy. Later, I moved the ball to the inner hole (0.7:1 ratio), which changed the personality of the Tiger 50. It now flips and tumbles with greater authority!

In addition, there are some optional parts available for when you are interested in aggressive 3D flight. First up are the urethane dampers, part number PDR0071. These bright yellow dampers stiffen the head considerably and with them, I'm quite comfortable performing maneuvers like piro-flips, tick-tocks, etc. without fear of cutting the tail off. Other options include the 3D Paddles and 3D Flybar. The 3D Paddles are white and perform similar to the bright-green paddles I added to my Raptor, but what's really nice is they're free by just filling out the registration card and mailing it back.

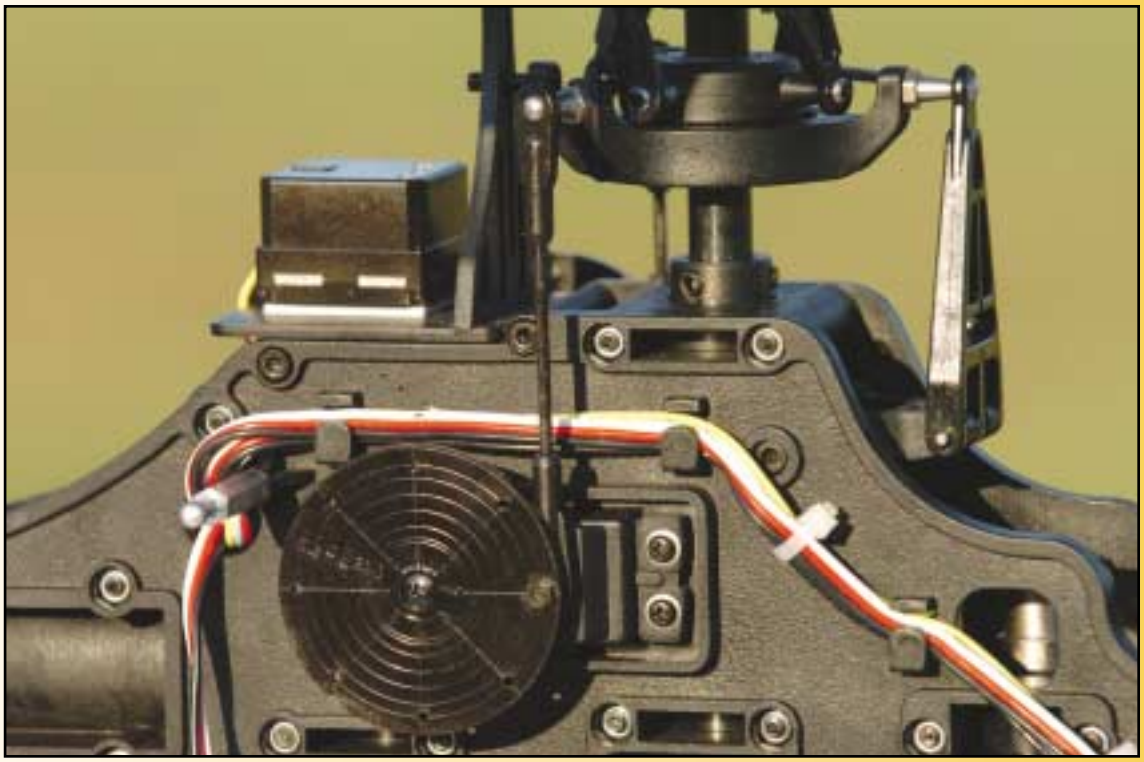
I installed an OS Max 50SX Hyper in the Tiger 50 along with a Futaba GV-1 Governor. The Tiger 50 sports an 8.9:1 gear ratio (which the governor needs to know to maintain the correct rotor-disk RPM). I run 1910 RPM in Idle Up 1 and 2000 RPM in Idle Up 2. As usual, the Hyper is an awesome beast that delivers smooth power. I use an OS #8 glow plug and I'm burning Wildcat 30% fuel and I have no complaints because it's a great combination in both my Raptor 50 and the Tiger 50.

The ProMuffler lets the Hyper really breathe, plus it's no louder than the Thunder Tiger muffler. As expected, it makes more power on the Tiger 50 also. It's Pro Modeler's part number PDR0053, and not only is the ProMuffler great, but it comes with a 35-degree exhaust deflector, that's usually an extra 7 bucks! The ProMuffler works very well – but without the grief of a tuned pipe, or the expense of the Hatori SB-50HP!

After tracking the blades – I confess, I ditched the supplied woodies in favor of what I usually prefer, a set of 600 mm V-Blades – I spent some time getting to know the model. For the first couple of flights, I just hovered and did a few slow circuits of the field. I had installed the lead weights into the leading edge of the standard flybar paddles, and had moved the ball to the inner hole of the mixing arms. I also was using the standard 1:1 Bell-Hiller mix ratio, and didn't install any spacers under the balls on the inner ring of the swashplate, i.e. without any increases to the direct Bell input to the seesaw arms. Tuned this way, the Tiger 50 is so dull I couldn't stand it . . . but it is perfect for a beginner because there's plenty of time to correct for wind since it just sits there and hovers pretty much hands off. In forward flight, I performed a roll, but because it took about three seconds, I decided not to try that again! Like I said, perfect for learning to hover, but it needs tuning before I would attempt aerobatic flight again!

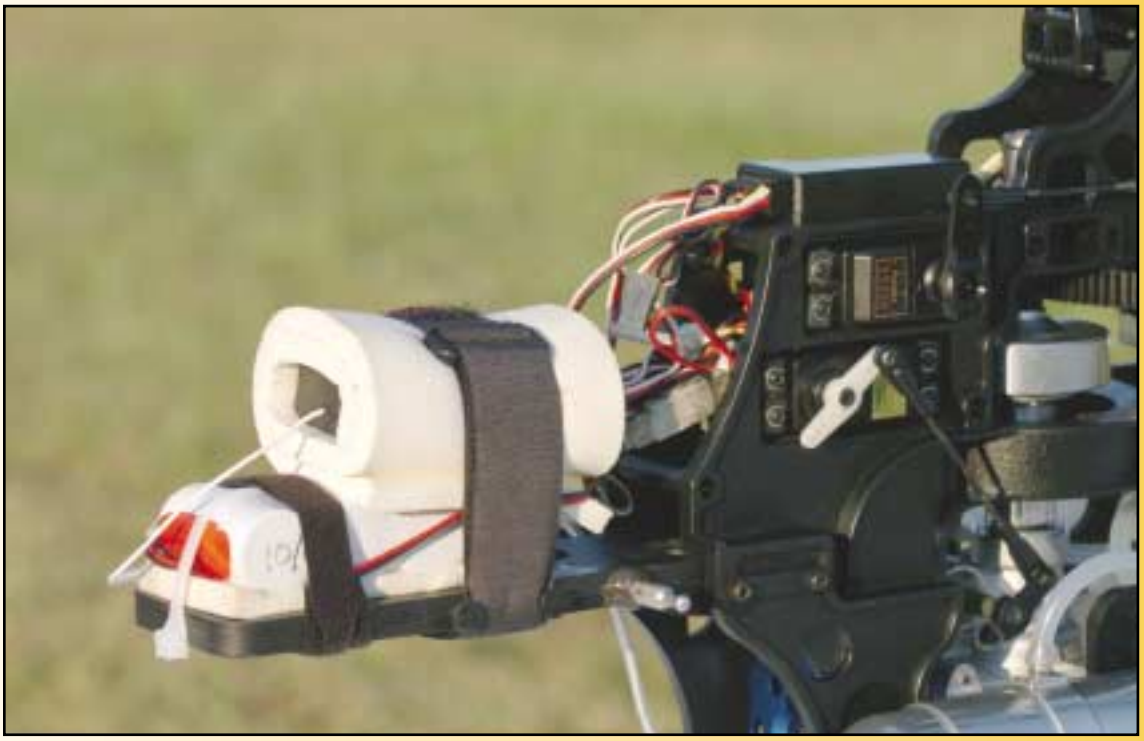
Next, I removed the lead from the paddles. But let me tell you, this was easier said than done! Ultimately, I resorted to drilling a small hole in the lead weight and inserting a servo screw to give me something to grab hold of. This worked perfectly. Then I moved the ball on the mixing arms to the outer hole, and added the supplied F3C spacer to the swashplate balls. What a difference! The Tiger immediately transforms into a sport model. Now loops, rolls, and stall turns are just beautiful. The Tiger 50 tracks nicely in forward flight with no noticeable tuck-and-dive tendencies.

By the end of the second gallon, the engine was really turning on,

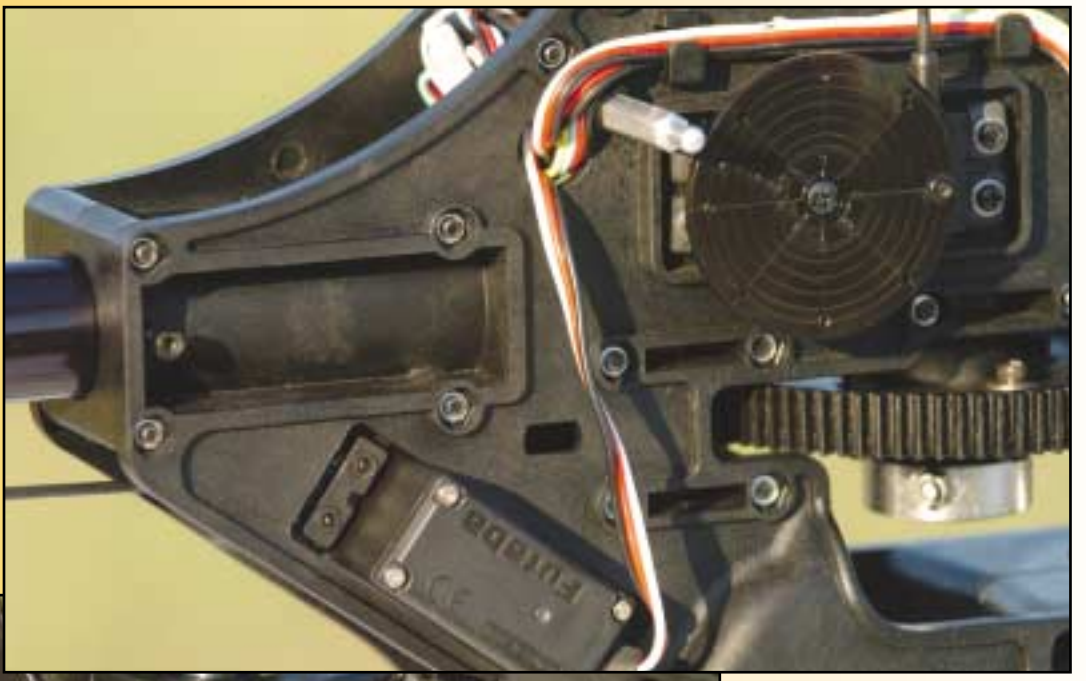


Nicely thought out guides for the servo and gyro wires means an organized wiring harness isn't an afterthought, but a feature that's designed into the Tiger 50.

Radio platform provides ample space for even the largest battery pack.



Note the boss molded in the recess of the tail boom clamp area in the aft part of the side frame expressly for safety set screws. This unique feature ensures the boom is locked in place; but it's a good idea to fly the Tiger once or twice to ensure the belt is broken in before engaging the screws. Also, the set screws have been replaced by M3x10 mm Allen-head machine bolts.



Perfectly suited to the OS Max 50SX Hyper, the ProMuffler isn't merely a re-labeled 46-class muffler but a true 50-class exhaust system. Featuring a nice throaty rasp, it lets the Hyper sing its song, i.e. deliver the goods, without excessive noise.

The Tiger 50 has a large 440 cc fuel tank. In addition, the fuel tank mounts via four soft rubber dampers thus keeping the frame from wearing a hole through the tank.

but I now had a problem with blade tracking. I disassembled the blade grips thinking maybe one of the thrust bearings was installed backwards, but it wasn't. Frustrated, I called Audacity Models. Anyway, he explained how they had a few customers experience this and that they had learned of an easy solution. Next, he asked if maybe I had an early addendum sheet (from before the solution), and I'm a little embarrassed to admit it, but I had overlooked it. Anyway, he said there was a still newer one available and I could download it off their website at www.audacitymodels.com (the complete manual is there as well, also in PDF format), but then he immediately suggested it might be easier for me if he just e-mailed it instead. Anyway, the solution is pretty simple; just wiggle the seesaw arms on the shaft, which the bearings ride on and check for excess play. The first one felt fine but rotating the head and checking the other revealed the second was actually a little bit tighter! After going back and forth I could definitely feel that one was just a little bit looser than the other, but it was a fine difference. Next, per the addendum's instructions, I used a small jeweler's file and removed about 2 thousandths off the shaft and re-installed the arm. This is called blueprinting and after that, the play in both arms felt perfect. Also, while I was at it, I checked the mixing arms just in case, but they were fine.

While I had the Tiger 50 down for maintenance, I lubed the thrust bearings. They were oily, but I added grease (and compounding my embarrassment, this too is mentioned in the addendum). Because I like 3D maneuvers, I also took this opportunity to swap out the standard dampers in favor of the stiffer urethane dampers. I also moved the balls inward on the seesaw arms for the 0.7:1 Bell-Hiller mix ratio, which favors 3D flight. While I was at it, I also replaced the flybar and standard paddles with the 3D paddles and flybar that I'd received for free from the manufacturer. The last thing I did was to remove the F3C swashball extenders and replace them with the PDR0069 3D Swashball kit.

These are the changes specified for 3D performance, and let me tell you, the Tiger really came alive! Now I can flick the Tiger 50 into hurricanes, pirouetting flips, tick-tocks, and pretty much anything I'm capable of. By the way, there are some impressive videos of the Tiger performing on the Audacity Models website, including some rather well known pilots.

At the field, some of my friends think I'm crazy (because I've raved about my Raptors forever - or so it seems), but I let them fly it and they quit teasing me. The simple fact is the Tiger 50 is a really nice handling helicopter with a solid feel. I won't go so far as to say it's better than my Raptor 50, but it's got a solid in the groove kind of feeling that makes me look better than I really am – you just have to try it to understand.

The Tiger 50 is also a great deal . . . and I, like most guys, love a deal. For example, I'm not locked into a muffler or blades deal I don't care for. Add to this the fact that for $299.99, the Tiger 50 is an ARF (which saves time), but for my money, I'd opt for the kit because it's only $284.99 because I like building my own heli.

In closing, the Tiger 50 is both inexpensive, plus it's quick to fix (with fewer linkages to maintain, repair or lose following a crash), and more importantly, it flies great! Finally, and this is a little hard to express, but sometimes it's nice to stand out. With the Tiger 50, I don't just blend in anymore! RM

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