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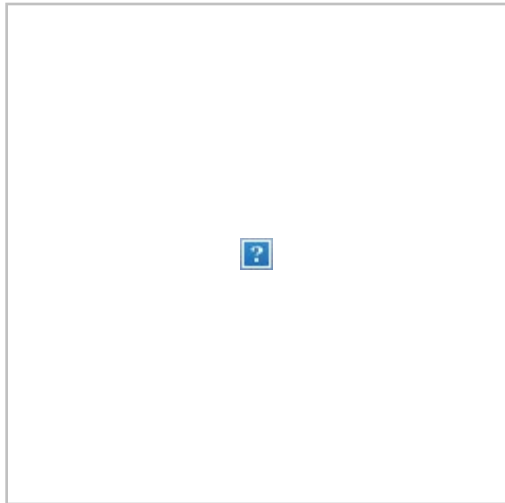
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# Mooney 231/252

The turbocharged M20K is a major step up in performance and complexity over the M20J.

By **estaff** - Published: August 9, 2019



These days there is considerable demand for turbocharging, evident by the sales of the Cirrus SR22T-a model that continues to outsell the normally aspirated SR22. Boy, have times changed. Flash back nearly 40 years when Mooney's M20K arrived in the GA market during a time when turbocharging was relatively new and the demand for high-flying aircraft was

different than now.

The M20K wasn't exactly a slam dunk. Mooney didn't get the airplane's turbocharging system right on the first try and the model developed a reputation as a maintenance hog. At this point that reputation has been mostly burnished and the fact that the M20K bores along between 160 and 200 knots on relatively little fuel has boosted the model's used price. But that turbocharged engine can

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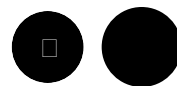
still be a maintenance hog.

The cabin is small and with a single door, can be hard to get into. But it's a Mooney-and its owners love them-because there is a lot of performance to love. If cruising fast yet miserly is your goal, the M20K models-the 231, the 252 and the Encore-are worth a serious look.

## History Lesson



Mooney came into the turbocharging game relatively late compared to other



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*For more than five decades, active and*

manufacturers. In 1966, Cessna pioneered the market with the T210 and made a strong showing in the single-engine, high-altitude market. Beech brought out the V35TC in 1966, but it was never as strong a seller as the A36. Mooney wasn't completely flat-footed during the 1960s, introducing the 310-HP M22 Mustang in 1967, a big brute of an airplane that was as ugly as it was unsuccessful.

Through the 1970s, Mooney did well with efficient airplanes powered by Lycoming four-bangers. Mooney's big breakthrough came in 1977, when the M20J 201 was introduced as the fruit of a clever Roy LoPresti-led aerodynamic cleanup of the venerable F-model. The 201-named for its maximum speed in miles per hour-marked a turning point for Mooney, even if the claimed speed was somewhat optimistic.

As early as 1977, Piper had the Turbo Arrow and Mooney realized it needed to compete in this market. The result appeared in 1979 as the 231-again, named for its top speed-or M20K. It was essentially a 201 with a six-cylinder, 210-HP Continental TSIO-360-GB in place of the 201's 200-HP Lycoming IO-360. The airframe had a lot going for it. It was strongly built of welded 4130 steel, the gear system was all but indestructible and the handling was mannerly, easily flown by a pilot with minimal retract experience. By modern standards, Mooney had a smash hit on its hands. It sold 246 airplanes the first year, outdistancing the 201 by nearly two to one. The fact that the two airplanes were so similar simplified the build process and likely made the project profitable from the first year.

The differences are in minor aerodynamic refinements. The K-model's fuel capacity is 10 gallons more than the J-model, and both empty and gross weights are 160 pounds higher. Design-wise, the 231 was exactly what the buyers were looking for: a turbocharged 201.

But if buyers were hoping for the 201's excellent dispatch rate, they got something less. Problems with the 231's Continental engine were several-fold and hurt the model's initial reputation. The new cowling didn't cool the engine adequately; the fixed-wastegate turbo required constant attention and was easy to

*aircraft owners and pilots have turned to **AVIATION CONSUMER** to answer the important buying questions. This website has many older reviews. Unless otherwise noted, all reviews carry product pricing from the original review.*

mismanage; overboosting and high heat put undue stress on the engine; and it was prone to cracking cylinders and cases. The connecting rods were prone to failure and the original magnetos were unpressurized, and would arc at high altitude. On top of all this, the TBO of the first engines was a miserly 1400 hours, later upped to 1800 hours, where it still stands. Even with all these faults- and they were considerable-some owners achieved impressive maintenance reliability by obsessive attention to operating technique. Specifically, that meant careful leaning and attention to cowl flaps and preventive maintenance of the turbo. But not all owners were so careful and premature engine crumps were common.

## Making It Better

With a couple of years of experience under its belt, Mooney undertook some improvements, adding a split rear cargo seat in 1982, while in 1984, a new variant of the engine-the LB1B, which is approved as a replacement for the GB-was introduced with better cooling and overboost protection. Mooney also included some aerodynamic tweaks that added 3 to 5 knots: sealed nosegear doors, a belly pan, a more streamlined tailcone and removal of one of the vent intakes. The alternate air intake system changed to address reports of icing-induced power loss.

While these fixes certainly helped, the improvements were hardly night and day. By 1986, further retooling produced the 252TSE for Turbo Special Edition. The 252, while still an M20K, is significantly different from the 231. Another variant of the engine was fitted, the -MB1. The induction and cooling systems were reworked and a new intercooled, density-controlled, variable wastegate AiResearch turbocharger replaced the original, fixed wastegate Rajay/Rotomaster unit. Other changes included infinitely adjustable electric cowl flaps to replace the original dual manual flaps. There was a vernier throttle control, more elbow room and new-look radiused windows.

The 231's original 60-amp, 14-volt electrical system was upgraded to a 70-amp, 28-volt system. This was much needed, since a fully loaded K-model could max out the electrics long before the days of moving maps. An electrically driven backup vacuum pump was made standard equipment.

The 252 also got further

aerodynamic tweaking in the form of gear doors that fully enclose the wheels when retracted and cover the wells when the gear is extended. The 252 also got an increase in gear-extension speed to 140 knots, up from 132 knots. Maximum speed with gear extended is 165 knots for the 252.

In all, 889 231s were produced between its introduction in 1979 and 1985. The 252, introduced in the middle of the GA slump of the 1980s, is less numerous. Production totaled, ironically, 231 airplanes.

The K-model made a brief resurgence in 1997 as the Encore, when Mooney was going through yet another of its many reorganizations. But it was not to be and the model was dropped again in 1998. Meanwhile, the so-called long-body models, specifically the M20M TLS and later the M20R Ovation and Acclaim, eventually came to dominate the Mooney line.

## Performance

The K-model lives in a league of its own when measured against the narrow market segment of four-place, turbo retractables. At cruise, the 231 outstrips its competitors—the turbo Arrow, the 182 RG and Commander TC—by roughly 20 knots, despite the fact that the 231 MPH (196 knots) top speed isn't reachable under real-world conditions and probably at all.

Realistic max cruise is about 190 knots for the 231, but 170 to 175 knots is more like it. The 252 is about 10 knots faster, thanks to intercooling. Both M20Ks win the altitude battle as well, with a maximum operating altitude of 24,000 feet for the 231 and 28,000 feet for the 252, versus 20,000 feet for the Cessna and Piper. The Mooneys outclimb the others by about 150 FPM.

Due to physiological considerations, however, high teens to low 20s are the airplane's best envelope. At lower altitudes, turbocharged airplanes aren't much faster than their normally aspirated siblings. In fact, the 231 is actually slower than the 201 below 8000 feet, due to cooling drag. The J-model will also outclimb the K-model below 8000 feet.

Many owners operate 252s conservatively. One owner told us that 65 percent

power yields 170 knots at 10,000 feet and 200 knots at FL210, burning 11.5 GPH. The 231's numbers are proportionately lower at high altitudes, although the difference lessens the lower one goes.

With 75.6 gallons of usable fuel, the 252 can climb to FL280 and operate a total of 4.9 hours, or just under 990 nautical miles still-air range with reserves. The 231 has comparable range and endurance, but can't fly as high.

## 231 Versus 252

The improved powerplant installation makes for a significant operational difference between the 231 and 252. The engine still produces 210 HP, but it does so at a markedly lower manifold pressure: 36 inches for the 252 versus 40 inches for the 231, thanks to the improvements in the tuned induction, cooling and

## Turbo Systems.

The 252's induction and cooling air intakes are separate from

one another. Induction air enters through a NACA scoop on the side of the cowling, is turned 90 degrees to minimize induction icing through inertial separation and passes through a larger, less-restrictive air filter. It's then compressed and run through a 42-square-inch intercooler.

The result is dramatically lower temperatures for the induction air, from 60 degrees F at lower altitudes to 120 degrees F up high. That means more power at higher altitudes and a wider detonation margin. The 231's critical altitude is only 14,000 feet, while the 252's critical altitude is 24,000 feet. In practical terms, this means that the 252 can continue to climb at about 1000 FPM into the mid-20s, can fly higher and is faster once up there.

The most important difference between the 231 and 252 lies in engine management. The revised powerplant installation in the 252 made an enormous difference and makes the 252 a more desirable airplane. Because the 231 has a fixed wastegate, the pilot must constantly monitor manifold pressure and fiddle with the throttle to keep it within limits. Bootstrapping and overboosting are constant worries. Thanks to its automatic wastegate, the 252 doesn't suffer these

foibles.

## Handling

The 231/252 series handle like typical Mooneys: relatively heavy in roll and pitch, with good stability. The K-models have greater pitch authority, thanks to a slightly larger elevator, and the longer engine makes it somewhat nose heavy. That can make flaring a challenge with a forward CG, but nothing like, say, a Cessna 182.

Pitch change with gear extension/retraction is slight, but flap extension produces a nose-down moment. Transition from full flaps to trimmed for go-around takes heavy pressure on the yoke and fast action on the trim. Using the electric trim, anticipation of configuration changes helps reduce pilot effort.

Speed control is essential when approaching and landing any Mooney.

Approach too fast and the K-model will float. Try to plant it on the ground and it will fight back, porpoising vigorously and striking the prop if uncorrected.

This is a common accident for all Mooneys, not just the K-model.

Because of its ability to fly fast, some owners say the best addition ever devised for Mooneys is speedbrakes. These are especially useful for the 231, which doesn't have the 252's higher gear limits. (Speedbrakes are standard on 252s.)

Ground handling isn't great. The airplane is low slung and the Mooney's stretched-out seating position hinders visibility on the ground. It also makes gaining purchase on the brakes difficult. The wingspan (36 feet, 1 inch), combined with the wide turning radius of 41 feet, makes negotiating a crowded ramp challenging. One other caution: Many Mooneys suffer damage to the nosegear trunion when towing turn limits are exceeded via power towing.

Owners learn to watch the ramp rats carefully.

## Cabin, Payload

On paper, the 231 and 252 have the same loading characteristics. In reality, however, the typical 252 weighs more, simply because it has more equipment. Neither airplane is a stellar load-hauler. Gross weight is 2900 pounds and basic

empty weight is 1800 pounds, usually more. Real-world, full-fuel payloads are on the order of 400 to 500 pounds, making the M20K a useful two-place airplane, with generous baggage. Thanks to its fuel efficiency and good endurance, however, there's flexibility built into the load-carrying equation.

The latest M20K, the Encore, has about 200 pounds of additional load, thanks to beefed-up landing gear. Staying within the CG is easy and there's no worry of aft-tending CG as fuel is burned off.

The baggage compartment is large, with a capacity of 120 pounds, although the high sill door makes it difficult to wrestle large objects into the airplane. Baggage capacity can be increased by folding the rear seatbacks down together or individually.

Mooneys are fast and efficient because they have low-drag airframes with a small frontal area. That translates into cramped quarters.

The seating position is quite different from that of most airplanes. It's more of a sports-car posture than an upright seating regime. There's plenty of legroom fore-and-aft, but less lateral room. Those of below-average height may find that they can't reach the rudder pedals without a booster cushion behind their backs or pedal extensions.

Early Mooneys tended to be spartan in interior arrangements. But by the time the 231/252 appeared, Mooney recognized the need for more modern if not luxurious appointments. Thanks to a bit more elbow room and somewhat plusher finish, the 252 is arguably more comfortable than the 231. The 252 is also quieter and many feel it's the quietest of all Mooneys, thanks in part to the induction system and the fact that things quiet down the higher you fly.

The panel layout is quite good, with one seemingly obvious feature that has probably averted many incidents: The gear selector is located high in the middle of the panel so it's hard to miss. The flap switch is located low on the center console, along with the trim/flap indicators and, in the 252, cowl flap controls. The power gauges are on the far right and angled toward the pilot. Engine gauges are well-placed, right under the glareshield in front of the pilot. The panel also has a good selection of annunciator lights at the top of the radio



stack.

## Maintaining It

From an airframe standpoint, Mooneys are relatively trouble-free. Long-standing caveats include the potential for corrosion of the cabin frame tubes-particularly if the windows develop leaks-and the typical fuel tank leaks that plague all Mooneys. Keep it hangared-and covered when outside-to keep the trouble to a minimum. But the systems in general are simple and robust. The steel gear legs gear have no oleo struts, relying instead on rubber donuts for shock absorption. These need to be replaced periodically. There's no complex electrohydraulic system driving the gear as is found on Cessnas-Mooneys are electromechanical. The flaps, too, are electric; both are relatively trouble-free.

The powerplant, however, is another matter. Difficulties fall into several categories: magnetos, con rods, cylinders and turbos. Most airplanes have been retrofitted with pressurized mags but check any used model to be sure. The same applies to connecting rods. The suspect rods are Continental part number 626119 and have a C logo with a circle around it. Only a barn dweller would still have the old ones.

Many turbocharged models encounter mid-run cylinder problems of some sort and the K-model is no different. These include the full litany: worn valves and guides, broken rings and cracked jugs. Midtime turbo and magneto replacements aren't uncommon, but they aren't a sure bet, either. The 231's fixed wastegate means the turbo is working constantly and the engine is susceptible to overboosting.

The 252 doesn't suffer these problems, although it had trouble with cracked tubes in the induction system before Continental came up with flexible tubing. Even though the 252's engine installation is less troublesome than the 231's, temperatures and stresses on turbocharged engines are greater than on normally aspirated engines. Regular inspections and proactive maintenance are a must for reliable dispatch rates.

## Avionics, Clubs and Mods

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The 231/252 is worthy of modern avionics and a market scan shows some owners go to town with major upgrades—we're talking packages that near \$100,000 including all-in-one digital engine monitors and new panel fabrication. Others make do with original King Silver Crown radios.

At press time Garmin announced an STC for the new GFC500 autopilot in the M20K, and there's also the G3X Touch integrated avionics. If you're considering a 231/252 and don't plan to upgrade the autopilot, pay close attention to the performance of the existing system, which is likely the King KFC150. Earlier servos are extinct and flat-rate repair for the system components is hefty. S-TEC has a multitude of STC approvals for the M20K and you might find one with an S-TEC 55 series. Again, pay attention to the performance during the prebuy.

There are fewer speed mods for the K-model than for earlier Mooney types, such as the C, F and J models. Single-piece belly skins, minor speed mods, rudder and elevator hinge covers and oversized bushing kits for the nose gear are available from Lake Aero Style and Repair ([www.lasar.com](http://www.lasar.com), 800-954-5619). The company, an FAA repair station, also advertises that it does ADS-B retrofits for Mooney models.

LoPresti Aviation ([www.loprestiaviation.com](http://www.loprestiaviation.com)) has an HID landing light for the K-model and hubcaps with filler valve access holes, while Precise Flight ([www.preciseflight.com](http://www.preciseflight.com)) has speedbrakes and the Pulselite system.

A big-dollar mod, the Rocket conversion, replaces the TSIO-360 with a 305-HP Continental TSIO-520-NB, yielding 220-knot-plus cruise speeds. Although the conversion is discontinued, these turn up on the used market.

Perhaps the most desirable mod for a 231 that makes it more like a 252 is an intercooler. One system—the Turboplus—has been highly recommended by M20K owners and it comes from Turboplus Aircraft Systems ([www.tuboplus.com](http://www.tuboplus.com)) in Gig Harbor, Washington. Turbo-plus says it was the first company to bring intercooling for GA singles and twins in the early 1980s and there are thousands of Turboplus intercoolers and induction systems in use today.

The company says its M20K intercooler kit can yield a max speed of 241 MPH at 24,000 feet, and 170 knots true airspeed at 10,000 feet and 65 percent power, with the added benefit of lower cylinder head temperatures. The STC'd kit for the Mooney M20K is \$5995 and the estimated installation labor is around 18 hours.

“My conclusion is that the Turboplus intercooler provides much improved intake manifold cooling and an increase of 3 inches in available manifold pressure at altitudes above the 13,500-foot critical altitude, while providing significant performance benefits across the board to the hot-running, non-intercooled engine in the 231 M20K,” reader Geoff Lee said of the system.

He's documented the installation in a well-written tech guide that's available at [tinyurl.com/y4a6ahga](https://tinyurl.com/y4a6ahga). That's a link to *The Mooney Flyer* ([www.themooneyflyer.com](http://www.themooneyflyer.com)), the official magazine of the Mooney community.

Speaking of the Mooney community, there are a some good Mooney associations and forums, including the Mooney Aircraft Pilots Association. It has good membership benefits, technical support and magazines. Contact MAPA at [www.mooneypilots.com](http://www.mooneypilots.com). There is also [www.mooneyspace.com](http://www.mooneyspace.com), which has a linked club directory, plus active forums and blogs. There's also [www.themooneyflyer.com](http://www.themooneyflyer.com). If there are others that offer accurate tech data and resources, we want to know about them.

## Owner Comments

I recently bought my M20K 252 after previously owning four M20Cs, two M20Js and an M20R. So, I thought I would try a turbo Mooney. This K-model just came out of annual inspection by Don Maxwell in Longview, Texas, who is a well-respected Mooney service tech. It was being brokered by Jimmy Garrison-also a highly respected Mooney dealer in Spring Branch, Texas, and I believe there was no prebuy necessary, which is rare in the used aircraft world.

My very first impression of the M20K Mooney was its terrible useful load allows only two lightweight people and a couple of overnight bags if you fill it with fuel. My second impression is what a ground-hogging “dog” it is when taking off at gross weight. Those two things alone are quite different from any

of my previous Mooney models.

Mine has been beautifully retrofitted with a full Garmin avionics suite including G500 PFD, GTN750 and GTN650 touchscreen navigators, a GTX 330 transponder and GDL88 ADS-B. The suite is interfaced with a King KFC150 autopilot and the cabin has power plug-in connections for the fine Bose A20 headsets-what a spectacular IFR panel.

Topping it all off is new paint and leather interior. This is essentially a new Mooney at a fraction of the cost of a 2019 model.

Even with the aforementioned weak points, I am happy with this Mooney. I am considering the Encore gross weight increase mod, but the cost is around \$14,000. Of course, then you need a longer runway to get that heavy slug airborne. I'm still mulling that over.

Bill Pearson

San Antonio, Texas

## Mooney M20 K Mishaps: Engine

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The first thing that struck us in our review of the 100 most recent Mooney M20K accidents was the virtual absence of runway loss of control (RLOC) events. We found only three pilots who lost control of the airplane during rollout-a startlingly low number and impressive evidence of the good ground handling of the Mooney 231 and 252 series airplanes.

Overall, we observed a lower landing-related rate of accidents than we expect for a high-performance, nosewheel airplane. Eight pilots either hit hard or set up a pilot-induced oscillation after touchdown and damaged their airplanes. A few pilots managed to get the airplane sideways to the runway, initiate a go-around and then either hit something on climbout or stick a wingtip into an obstruction-although at a rate less than we expect to see.

The fuel-related accident rate was about average for airplanes where the pilot has to keep track of fuel in two tanks. The majority of the 14 accidents involved simply running out of fuel; however, there were three accidents in which the pilot ran a tank dry and didn't switch to the other tank-which had plenty of fuel. One pilot somehow selected the "off" position just prior to takeoff and one put the selector between tanks.

We somehow feel for the pilot who put his airplane in the shop to have one fuel tank resealed. When he got it back, it had only a small amount of fuel in that tank. You guessed it-that's the tank he selected for takeoff. He never did move the selector to the fuller tank before returning to earth.

Water contamination brought down three airplanes; one had not been flown in years and the owner resisted a maintenance technician's offer to fully drain the tanks when the owner kept getting water in his fuel samples prior to start up. One pilot knew he had some water in the system but couldn't seem to get it all drained. He took off anyway and climbed high into sub-zero temperatures. He came back down when the water in the system froze and stopped fuel flow.

There were 21 engine power loss events. In about half of the accidents, the post-crash evaluation could not determine why the engine wouldn't reciprocate. The vast majority of the remainder were due to improper or neglected maintenance.

Mooneys are slippery, so we were on the lookout for accidents involving loss of control resulting in a diving spiral and inflight breakup. We saw none that resulted in airframe separation, although one pilot, upon emerging from the clouds in a diving spiral, pulled so hard that he bent the airframe.

The same couldn't be said for the IFR pilot smoking along in IMC who decided to descend to the altitude to which he'd been cleared by stuffing the nose down far enough to take the airplane well past  $V_{ne}$ . The elevators went into flutter and departed, inducing an inflight breakup.

The M20K is not a short-field airplane. One owner/mechanic discovered that after he made a forced landing following engine problems. He fixed the engine and tried to take off. Belatedly realizing there wasn't enough room, he aborted but slid into the trees at the end of the field.