Running on air Grob 109B

The original, super-efficient, super-capable 'glass' motor glider is now available second-hand for a very modest price. Forget any 'niche market' idea – this is the ultimate sports flying aircraft! By Philip Whiteman

Motor gliders have always enjoyed a peculiar postion in flying. Years ago, when the Motor Falke was the standard, there cannot have been many people who flew motor gliders for pleasure, and their real use – in the UK at least – was as rather unloved tools for teaching sprog glider pilots the art of field landing. It wan't so much that the Motor Falke had any short-field performance (I am sure it kicked off the old 'curvature of the earth' joke) but it could be flown around from site to site on the engine, then made to behave like a (rather dud) glider by shutting down or throttling back the motor, depending on the instructor's degree of faith in the recoil starter.

There were some fancier machines around, even 30 years ago, but these were not the preserve of ordinary gliding club members. Instead, they seemed belong to older – and considerably more wealthy – glider pilots who could afford to buy independence from the endless waiting around typical of normal aerotowing and winch-launching operations.

The Grob 109 did not appear on the scene until 1981, four years after the last entry in my own gliding log book. Like many of you, I've been aware of the new generation of motor gliders the Grob represented, and had an idea that they performed rather better than the dreaded Falke – but, until this flight test, I must admit I had not flown one in earnest.

At the time of its introduction, the 109 was not an inexpensive machine. Nor were competitors like the Hoffman Dimona – which evolved into the Diamond Super Dimona – and Aeromot Ximango/Super Xiamango. Non gliding people may not realise quite how far sailplanes may travel without consuming energy – instead, *exploiting* the energy locked up in the atmosphere – but it should be obvious that any of these aircraft offered the prospect of touring very cheaply indeed. The trouble is that you had to have gliding experience to a) even be aware of the potential of a motor glider in the first place, b) have some idea of the differences in handling – airbrakes and all that – and c) know enough about soaring to be able to fly engine-off and *really* travel for free.

Given price of the equipment new, and the experience required to operate it, it is not surprising that private motor glider flying has long existed as almost a niche within a niche in general aviation.

Which is a crying bloody shame, because, when I came to get my hands on the Grob, I found it an absolute delight to fly: frankly, its simple and very safe handling, fantastic field landing capabilities and general sportiness makes the average light aeroplane look a total snore…

Tim Dews

Tim became a Grob and 'glass' motor glider/sailplane specialist after he rebuilt a storm-damaged 109B. Today, his Wiltshire based company, Airbourne Composites, maintains Grobs and carries out repair work a range of composite light aircraft. *www.airbournecomposites.co.uk*

Grob – funny name, very serious company

Founded in 1928 and only becoming involved in aviation activities in 1971, German company Burkhart Grob Flugzeugbau first appeared on the gliding scene, when successful licence production of 200 Standard Cirrus gliders was followed by in-house designs – the single-seat Astir and the two-seat Twin Astir. The Astir became a common sight at British gliding clubs and won fame when one was flown to 49,500 feet, taking the world altitude record for gliders.

The Twin Astir was followed by the fully aerobatic Twin III Acro. Later the Twin III SL, a self-launching two-seat glider powered by a retractable engine, completed the glider line-up.

In 1981 Grob produced the world's first all-composite self-launching motor glider, when it launched the G 109, later developed into the G 109B. Over 470 have been produced and sold worldwide, including 53 operated by the British Royal Air Force as the Vigilant T.Mk.1.

The G 109B was also the first composite motor glider in the world to receive FAA certification.

Grob has produced a series of conventional light aircraft, the most common in British skies being the G 115 Tutor, which in 1998 was selected to replace the Bulldog as the basic trainer for military pilots.

The company has long been involved in the development of unconventional aircraft, from the four-seat GF 200 pusher (which did not make it into production, despite making 200 knots on 270 hp) to the extraordinary and in many ways rather mysterious Egrett and Strato 2C high-altitude research aircraft.

Designed to perform missions for 'communications monitoring, geophysical research, pollution and weather observation', the turboprop Egrett, also known as the Strato 1, could reach 53,500 feet.

Taking over where the Egrett/Strato 1 left off, the twin-engine Strato 2C boasts the world's largest all-composite wing – its 56.5 m dwarfs the 109's 17.4 m – and is designed to fly for up to 48 hours at 59,000 ft.

Current models produced by what is now Grob Aerospace range from the G 115, which continues in production, through the Ranger G 160 – a four/five-passenger turboprop single with an unusually large, roomy and luxurious cabin, to the twin-engine SPn bizjet. The latter was brought to airworthy prototype form in complete secrecy and is claimed to be capable of operation from the kind of unimproved runways that hitherto have been the exclusive preserve of turboprops.


G160 Ranger


Strato 2C


G 109B

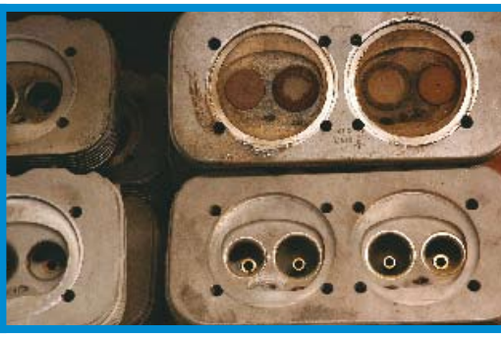

SPn


Twin III Acro


This is the Korff turbo conversion, distinguished by dual ignition switches and yellow tow-cable release pull on the centre console (yes; it's a glider tug too!)

Wing pins are quickly an easily operated with a concealed lever. Controls auto-connect

The robust tailwheel uses rubber block suspension, is steered with the rudder and breaks out to castor 360°



Aviation Composites holds the 2500's Porsche-derived cylinder heads in stock

But I'm getting ahead of myself. Let's try to tell the story in some kind of logical sequence: when it hit the scene in 1981, the 109 had a single-piece, glider-style canopy and non-folding (but de-riggable) wings of a thick section that proved to be very susceptible to rain droplets, washing out the glide performance if you flew into precipitation.

Power came from a 2 litre/80 hp Limbach, based on the Volkswagen 'Type 4' engine – the aircooled motor you'd originally have found under the rear luggage compartment of the 411 (remember them?) or more expensive versions of the VW camper van. This gave the 109 just about enough performance, but Grob always wanted more. When Limbach failed to come up with the goods, Grob home-brewed the 2500 – a big-bore, 2.5 litre stretch of the VW engine that uses heads from Volkswagen partner Porsche's hotter version of the Type 4 to give 95 horsepower at a reasonably propeller-friendly 3,500 rpm.

Grob's hopped-up engine, together with thinner, folding wing that worked well in the wet, plus a number of other tweaks based on owner feedback – like separate doors and toe brakes – went into the much-improved 109B. The UK's major customer for this aircraft was the RAF, who called it the Vigilant T.Mk.1 (just, as R J Mitchell might have commented, the sort of bloody silly name they would give it).

Depending on whose figures you believe – the figures quoted by Grob and posted on the company's website do not tally – something like 470 109/109Bs were built, 53 of which went to the RAF.

Now that Grob is now concentrating on far more expensive aircraft and its motor glider is long out of production, the 109B has a new lease of life as a second-hand buy and a sporting aircraft than can be operated at very low cost – which is why I am sat absorbing all this information from arch 109B enthusiast and exponent, Tim Dews.

Tim's company, Airbourne Composites, was founded on the demand for his services following the rebuild of a 109B wrecked in the storms of 1990. Airbourne Composites looks after pretty much every privately owned 109B in the UK – there are now twenty or so of them – and Tim continues to import more, as the demand grows.

Come on chaps! can a constant-speed unit really be that funny?

In-flight glider conversion, step one: switch the ignition off…

Step two: grasp firmly the prop feathering handle and pull…

Step three: lock the propeller in the feathered position. That's it!

Why the 109B, I ask Tim?

"Well, the Dimona – which came out at much the same time as the 109 – is a nice aircraft, but Hoffman was slow to include modifications requested by pilots and, in my experience, the structure is not as robust as the Grob's.

"The Ximango doesn't glide as well and, with its retractable gear, is both heavy and unecessarily complex. We did a direct comparison one day, when I was flying a 109B and being followed back to our strip by a guy in a Ximango. We both shut down, ten miles out: I glided all the way in; the other guy had to restart his engine, a couple of miles short."

Let's try one for size

When the late September rain clouds finally parted, our first 109B flight was in the aircraft illustrated; a Korff 130 hp turbo conversion Tim is currently demonstrating around the country. ▸

There's a knack for springing into the Grob from ahead of the wing. Done properly, it's a fluid movement. Done like Ian Seager (I am told) it involves falling over and looking like an arse. I don't mind making a fool of myself in private, but Seager's there with his camera to make sure any stumble appears on the public record – so I clamber up the trailing edge in unambitious fashion. From the wing, it's not easy to get in without standing on the seat cushions, although I'd at least mastered this by the time I flew Tim's standard 109B a couple of days later.

Shutting the gull-wing doors – held open by rather weak gas struts – calls for a bit of care, if they are not to blow out of your hand: the trick is to reach up and grasp the rear edge of the door with one hand then, having pulled it nearly shut, take the latch lever with the other, getting your first hand out the way before it's pinched in the jamb, and pull the door to.

Soaring flight, especially in thermals – where you can find yourself circling in close company with any number of other aircraft – puts a premium on being able to see out the cockpit properly. The Grob is excels in this respect, with transparancies behind the seats, and even at rudder-pedal level, offering a superb all-round view. The side effect is that, even on a grey and drizzly day like this, the cabin environment is bright and airy.

Flight instruments – a pretty much standard round-dial fit – fill the left hand side of the panel, radio and GPS, the centre and the engine instruments and propeller controls are to the right. Your everyday Grob 109B is blessed with a simple, manually-operated, three-position propeller that, through an ingenious centrifugal latching mechanism, starts off in fine pitch for takeoff, is set and locked in coarse pitch for the cruise by pulling on a T handle and allows instant feathering through hauling out a large, black parking brake-style lever mounted in the centre of the panel. The prop automatically returns to fine pitch for restarting.

As I was to discover, you gain bags of performance with the turbo conversion, whose rather more sophisticated, electrically-operated prop constant-speeds, but the downside is that it takes an agonising 90 seconds to fully feather the thing ("Discouraging you from shutting down to scratch around for lift at 500 feet," as Tim observes).

Starting is straightforward enough – no flamin' recoil starter in a sophisticated motor glider of this vintage – and, with the electric prop, one essential item is selecting in turn and checking 3,000 – 2,000 and 2,600 rpm. For all the time the prop takes to feather, the rapidity with which it cycles – and accuracy with which it maintains speed – is impressive. In the standard 109B, you simply check that the propeller is in fine pitch for takeoff by opening the throttle and confirming you get 3,000 rpm

From the outside, you can intimidate yourself into thinking that taxying this willowy 17-and-a-half-metre span machine on the average airfield is going to be like driving an airliner around. I have to report that it is actually, if not quite child's play, quite easy – although you do have to pay attention to those distant (but easily visible) wing tips. The toe-brakes and steerable tailwheel are effective and, as I found when we taxyied back in, the Grob can easily pirouette around one wheel when you need to.

I must admit I was happy to leave takeoff number one to Tim – insisting on trying your hand in an unfamiliar aeroplane from a 500 metre strip in a brisk 90° crosswind seems to be pushing one's luck…

Interestingly, he did not hold on any into-wind aileron and held the 109 low, before turning hard before the end of the strip to climb into wind. Layers of cloud made nonsense of trying to time accurately our climb, but this was an impressive short field departure, and the VSI sat firmly at a credible 800 fpm.

By contrast, the standard 109B (which I can report I *did* fly from the right seat – and I flew several takeoffs and landings in) needed careful technique to get off from the same runway. The trick is to keep the tail low, exploiting the ground effect and unloading the mainwheels as much as possible. Even so, the ground run was 350 metres or so – exceeding the manufacturer's claimed distance to clear 50 ft.

There are two ways you can look at the Grob's handling. If you've trained on the Cessnas and Pipers that still predominate in the club training environment, the stick-and-rudder thing

Can I fly it on my PPL?

Despite what it may say on CAA PPLs issued years ago, If you want to fly a motor glider you now need to add a rating to your UK or JAA licence. It's called a TMG (Touring Motor Glider) rating and is added by taking a skills test in – you've guessed it – a TMG.

Depending on your experience and ability the training will probably take between three and five hours. Once you have successfully completed the skills test you have the pleasure of paying the CAA £76 (soon to go up to £78).

Hours flown in a TMG or SEP can both be counted towards the twelve hours necessary as part of the 'revalidation by experience' route. The hours can be combined, or flown solely in either TMG or SEP aircraft, for revalidation of your SEP and TMG rating.

There is an NPPL SLMG (Self Launching Motor Glider) route: if you have a UK or JAA PPL you can present it, along with your medical certificate (or NPPL medical declaration) and evidence of the appropriate differences training in order to get an NPPL SSE/SLMG, which is valid for life.

This licence, being an NPPL, is revalidated by the 'five hours in thirteen months' route. It is important to note that although the aeroplane being flown may be exactly the same, if you are flying it on your NPPL licence – rather than your UK or JAA licence with TMG rating added – the hours will *not* count towards the hours required for revalidation of your UK or JAA licence.

To further complicate matters, there are training credits for existing licence holders (NPPL Microlights for example) – see NPPL website *www.nppl.uk.com* for full details.

(in the Grob's case, stick-and-quite-a-lot-of-rudder) is first going to be a mild challenge and quickly afterwards, I would suggest, a revelation to you. If you are one of the increasing number of people who've learned on some kind of three-axis microlight or VLA, or you've experienced the classic flight controls in some other way, you'll find the 109 feels 'right' from the off – the control forces are both nicely weighted and well harmonised.

The long span does, as you would expect, have its effect on the rate of roll and decent shove on the rudder is needed to keep the ball in the middle. This makes the Grob feel more like a high-wing aircraft than one of the new generation, low-wing VLAs.

Where the 109B could still teach some 2006 designers a lesson is in the excellent pitch trimmer. At the pilot's end, this takes the form of a simple T lever, operating in a quadrant on the centre console. The friction, gearing and effectiveness of this control is spot-on, and it is very easy to fly the aircraft at an accurate, trimmed speed.

Setting 26 inches manifold pressure/2,600 rpm gave around 85 knots in the turbo, and Tim reckons to burn 12 litres per hour at this power setting. (In far better conditions, the standard aircraft made 90 knots at the same engine speed.) So; not a scorching cruise speed, but 85 to 90 knots at the equivalent of just under 2¾ gallons per hour is pretty good going, by most standards. Converting this to statute miles per gallon, we have a still air figure of 34 mpg – and remember; this is just the starting point, because engine-off flying can extend that figure enormously. In fact. Tim has one customer who reckons to spend only half his flying time with the engine of his 109 running, suggesting an overall 6 lph/70 mpg is quite possible. You don't get fuel costs much lower than that!

Emphasising the 'glider' bit of the 109's parentage, we end up having to dodge some cloud (my, the weather's going off again) by descending with the airbrakes out. These are operated by a man-size handle and, just like I remember them doing on Ka-13 sailplanes, tend to self-open on the initial pull.

If you are unfamiliar with airbrakes – or spoilers, as they are otherwise known – they work like flaps, in that they increase drag and steepen the approach angle. However, unlike the flaps fitted to most GA types, the airbrakes you'll find on gliders and motor gliders like the 109B are speed limiting. In the case of the Grob, the brakes will prevent the aircraft exceeding its 130-knot VNE at any dive angle up to 45 degrees.

Having sat patiently through my practice approach to a nearby – and vacant – gliding site (see; the 109 can be driven around gently just like any other light aeroplane) Tim takes the controls to demonstrate quite how effective those airbrakes can be. Taking us back over the field, he neatly positions us just off the end of the runway, at 90° to its axis and a good 1,000 feet above its elevation – *way* too high to get in, wouldn't you think…

Whacking on full airbrake, Tim plunges us into a Stuka-like dive, banking sharply onto the runway axis. I am confident that he's not going to kill us, but this manouevre certainly grabs my full attention. "Don't forget the drag increases as a square of the speed," he raises his voice over the roar of the airflow. He's right of course; the impossible approach angle rapidly resolves into something that first looks do-able – and then a plain cinch. We round out to a gentle touch down and then, brakes snapped in, transition into a smooth climb to clear the trees at the runway's end with almost contemptuous ease.

Once you've seen this, there's no doubting the claim that you can land a 109 almost anywhere. And it's all so easy: unlike flaps, there's no trim change with airbrake deployment: the 'brakes have a huge effect on approach angle and the effect can be infinitely and instantly modulated.

On our return to Tim's base, I reflect on the sheer fun factor in operating this capable machine. For around £40,000, you get a comfortable two-seat tourer with a decent amount of luggage space, pleasant, safe handling and an outstanding view for pilot and passenger. It's at home on farm strips, meaning you can drop in anywhere you fancy. You can glide whenever you want and it's also stressed for basic aerobatics. Finally, the wings can quickly be folded to take up minimal hangar space – or, being glass, you can keep it outside. What other aircraft can offer such amazing flexibility? ■

GROB G 109B

CURRENT S/H PRICE APPROX £40,000

DIMENSIONS

Wing span	17.4 m
Length	8.1 m
Height	1.7 m

WEIGHTS AND CAPACITIES

Max takeoff weight	850 kg
Max payload	230 kg
Fuel	72 kg (100 lit)

PERFORMANCE

VNE	130 kt
Normal cruise	103 kt
Stall speed	40 kt
Takeoff run to 50 ft	320 m
Max rate of climb at S/L	650 fpm
Max range	970 nm

GLIDING PERFORMANCE

Best gliding ratio	1:28 at 62 kt
Min sink rate	217 fpm at 58 kt

POWERPLANT/PROPELLER

95 hp Grob 2500 driving a fully feathering, variable-pitch Hoffmann HO-V 62 R/L 160 BT propeller

MANUFACTURER/UK DEALER

Grob Aerospace, Lettenbachstr. 9, 86874 Tussenhausen-Mattsies, Germany
www.grob-aerospace.de

UK service/repair/used aircraft importer: Airbourne Composites, The Hangar, Wing farm Longbridge Deverill, Warminster, Wiltshire BA12 7DD, Tel: 01985 840981
web: *www.airbournecomposites.co.uk*

We like ✔
- **overall efficiency**
- **being able to go soaring at will**
- **short field capability – especially the turbo's**

We don't like ✘
- **Standard 109B's takeoff performance**