Information Pack - TL 2000 Sting Carbon and TL 3000 Sirius Aircraft

The TL 2000 Sting Carbon and the TL 3000 Sirius manufactured by TL Ultralight Company in the Czech Republic are probably the most exciting light aircraft to enter the Sport Aviation market in many years.

Manufactured as type certified light sport aircraft (LSA) they enjoy freedoms around the world which come from this level of certification and acceptance. There are several ways to register the aircraft and In Australia the TL 2000 Sting Carbon and the TL 3000 Sirius can be registered with the RAA as a factory built aircraft or as a LSA aircraft and with CASA as a LSA aircraft which means the aircraft can be used for training, private hire or private operations..

The TL Ultralight Company has achieved unprecedented success with more than 800 of their aircraft successfully flying the skies around the world. The TL 2000 Sting Carbon model has also achieved several world records with the FAI in the Microlight and aircraft up to 500 kg (C1a) categories further reinforcing the capabilities of these unique aircraft.

From the moment you sit in the cockpit of the TL 2000 Sting Carbon you feel there is something special about this aircraft. The cockpit is ergonomically designed and every control is right where you expect it. The pedals are adjustable and the cockpit comfortably seats persons with varying heights from over 6'3" down to around 5'. The large canopy offers superb views in nearly every direction and the aircraft utilises the 80, 100 or the 115hp turbocharged engines by Rotax. Fitted with these reliable engines the TL 2000 Sting Carbon provides outstanding takeoff, climb and cruise performance especially when matched to the in-flight adjustable constant speed propeller.

The TL 2000 Sting Carbon and the TL 3000 Sirius are supplied with a complete selection of instruments as standard from the factory but any additional equipment can be supplied locally after delivery by your dealer or can be factory fitted during manufacture. Our highly competent dealers are there to help you with every aspect of the delivery of your aircraft including your conversion and familiarisation flights. When the aircraft arrives, your dealer will assemble, test fly and provide up to five hours of familiarisation before setting you free to take to the skies in an aircraft which handles just like your own little fighter jet.

If on-field or hanger storage is unavailable, then the wings can easily be removed by two people in less than 15 minutes and the aircraft can be stored in either a 20 foot shipping container or a trailer for storage at home.

The TL 2000 Sting Carbon and the TL 3000 Sirius are constructed almost entirely from carbon fibre.

I just can't stress enough how fantastic these dynamic aircraft are! The comfortable, spacious cockpit makes you believe you're flying a much larger aircraft and the sleek, aerodynamic look not only turns heads at every airport, but they also make the aircraft one of the quietest available. The low noise levels reduce fatigue and make this a 1,000 mile per day tourer. The optional long range tanks

provide over eight hours endurance which is more than enough to get to your destination (supplied standard on the TL 300 Sirius).

The cabin heater keeps the pilot and passenger comfortable in even the coldest weather and also keeps the canopy clear in conditions which would normally make it fog up.

I invite you to peruse the following pages and check out our web site; please direct any questions to either myself or your nearest dealer for prompt follow-up. We look forward to helping with the most important decision of which aircraft will fit your needs as we move into one of the most exciting times in aviation.

Safe flying

Michael Coates X-Air Australia

Quick Side-by-side Comparison

The TL 2000 Sting Carbon

The TL 3000 Sirius

We are always getting asked the main differences between the two models, please find following some basic details listing the major differences for your comparison

- **Sting is manufactured from about 95% carbon fibre**
- **Sting has 'splitter' flaps**
- **Sting has conventional horizontal stabilizer and elevator**
- **Sting is Low Wing**
- **Sting has more 'aggressive' handling and sporty performance**
- **Sting wings have the trailing edge swept forward**
- **Sting comes standard with carbon dash and armrests**
- **Sting is available in retractable**

- **Sirius is manufactured from about 95% carbon fibre**
- **Sirius has conventional flaps**
- **Sirius has conventional horizontal stabilizer and elevator**
- **Sirius is an ideal training aircraft with forgiving performance in the hands of students and a strong and forgiving undercarriage**
- **Sirius has large doors and EASY entry**
- **Sirius is a High Wing offering good sun protection**

TL Ultralight Company History

X-Air Australia is proud to be associated with the TL Ultralight Company from the Czech Republic since 2001; following is a brief introduction and background to the manufacturers of the TL 2000 Sting Carbon and the TL 3000 Sirius aircraft.

The TL Ultralight Company was established in 1990 in the Czech Republic city of Hradec Kralove which is about 100 kms east of the capital Prague. The initial interest for TL Ultralights was the development and manufacture of gliders, but more recently they have started producing their own unique aircraft.

The company started with production of the TL 1 and TL 2 gliders which were very successful and are still sold around the world to this day.

In 1991 TL Ultralight started with serial production of the TL 32 typhoon, this Ultralight aircraft became popular for recreational flying and a total of 195 aircraft were sold all around Europe and some even made it to the USA.

After the typhoon came the TL 132 Condor. The Condor aircraft is certified and built to the strict requirements of the many flying schools which use the aircraft, following the TL 132 Condor came the TL 232 Condor. The Condor Ultralight has been certified in Germany, France, Holland and Spain with a total of 135 aircraft being produced over recent years, the Condor continues to be a good seller.

Another interesting aircraft and very successful in sales for the TL Ultralight company is the TL 22 duo trike.

In 1996 the TL Ultralight Company developed a completely new type of aircraft the TL 96 STAR. The STAR'S evolution took 2 years and the design features many examples of new technology using composite materials, the STAR is certified in several countries including Germany, Spain, Italy and Belgium , the STAR was joined by the TL 2000 STING CARBON in 2000 which has now replaced the STAR as the companies biggest selling aircraft.

2009 sees the introduction of the new high wing TL 3000 Sirius giving TL Ultralight a complete stable of aircraft in high and low wing configuration.

The TL Ultralight Company currently produces around 8 aircraft per month to the satisfaction of eager new owners.

Technical Data, Performance and Specifications

At all performance figures and specifications are at a maximum takeoff weight of 544 kg as permitted by Australian RAA regulations, the aircraft however is approved for operations up to 600 kg in the LSA category.

Technical Data	TL 2000 Sting Carbon	TL 2000 Sting Carbon RG
Basic information and dimensions		
Engine options	Rotax 912, 80, 100 or 115 hp	Rotax 912, 80, 100 or 115 hp
Propeller	3 blade Woodcomp propeller available in fixed pitch, variable pitch or constant speed	3 blade Woodcomp propeller available in fixed pitch, variable pitch or constant speed
Length	5.93 m	5.93 m
Height	2.3 m	2.1 m
Cabin width - shoulder height	1.25 m	1.25 m
Main wheel-spacing	1.65 m	1.65 m
Wheelbase	1.63 m	1.63 m
Tyre pressure	25 PSI	25 PSI
Brakes	Hydraulic disk brakes	Hydraulic disk brakes
Suspension main undercarriage	Tyres, flexibility of undercarriage	Tyres, flexibility of undercarriage
Suspension front wheel	Coil spring	Rubber Cushion
Tyre sires all wheels	14 x 4 (350 x 100)	10 x 4
Wing		
Centre of gravity limits	22 - 34% MAC	22 - 34% MAC
Wing profile	MS (1)-0313	MS (1)-0313
Wingspan	8.44 m	8.44 m
Wing area	9.85 m2	9.85 m2
Aspect ratio	7.26	7.26
Wing loading	55.5 kg/m2 MTOW	55.5 kg/m2 MTOW
Design load limit	+6 G and -4G	+6 G and -4G
Tested load limit	+12 G and -9G	+12 G and -9G
Aileron span	865 mm	865 mm
Flap area	1.72 m2	1.72 m2

Flap span	**5.28 m**	**4.94 m**
Aileron deflection down	**15°**	**15°**
Aileron deflection up	**30°**	**30°**
Flap deflection take off	**15°**	**15°**
Flap deflection landing	**30°**	**30°**
Elevator		
Elevator span	**2.68 m**	**2.68 m**
Elevator area	**0.75 m2**	**0.75 m2**
Elevator deflection up	**30°**	**30°**
Elevator deflection down	**30°**	**30°**
Rudder		
Rudder span	**1.09 m**	**1.09 m**
Rudder area	**0.64 m2**	**0.64 m2**
Rudder deflection left	**30°**	**30°**
Rudder deflection right	**30°**	**30°**
Weights		
Weight of empty aircraft	**285 kg**	**290 kg**
Maximum takeoff weight	**544 kg (560 kg)**	**544 kg (560 kg)**
Maximum payload – people, fuel luggage etc	**275 kg**	**280 kg**
Maximum weight of baggage	**15 kg**	**15 kg**
Fuel		
Fuel capacity standard	**69 L or 80 L**	**69 L or 80 L**
Fuel capacity long range	**120 L or 150 L**	**120 L or 150 L**

Performance Specifications	TL 2000 Sting Carbon	TL 2000 Sting Carbon RG
Performance information figures are based on a standard model with Rotax 100 hp 912 engine, in-flight adjustable propeller and takeoff weight of 544 kg		
Takeoff rotation speed	41 kn	41 kn
Climb speed	66 kn	70 kn
Cruise speed 65% at 5000 RPM	127 kn TAS	132 kn
Cruise speed 75% at 5200 rpm	135 kn TAS	143 kn
Fuel consumption 75% power	19.5 L per hour	19.5 L per hour
Fuel consumption 65% power	15.6 L per hour	15.6 L per hour
Fuel consumption 55% power	12.4 L per hour	12.4 L per hour
Maximum speed horizontal flight	142 kn	155 kn
Touchdown speed	35 kn	35 kn
Final approach speed	66 kn	66 kn
Velocity never exceed VNE	165 kn	180 kn
Va	132 kn	132 kn
Vx	68 kn	68 kn
Vy	75 kn	75 kn
Initial rate of climb at sea level	1150 feet per minute	1150 feet per minute
Service ceiling	18,000 feet	18,000 feet
Maximum speed in turbulence	115 kn	115 kn
Stalling speed with no flaps Vs1	44 kn CAS	44 kn CAS
Stalling speed with flaps 35° Vso	35 kn CAS	35 kn CAS
Maximum speed first grade flaps Vfe	15° @ 77 kn	15° @ 77 kn
Maximum speed second grade flaps Vfe	30° @ 66 kn	30° @ 66 kn
Glide ratio engine at idle	16.8:1	16.8:1
Glide ratio propeller stopped	15.2:1	15.2:1
Takeoff ground roll - short dry grass	75 m	75 m
Take off over 15 meter screen - still air from rest	220 m	220 m
Maximum cross wind	15 kn	15 kn
Landing ground roll - short dry grass	100 m	100 m
Landing distance to full stop - over 15 meter screen still air	200 m	200 m

Taxi

The TL 2000 Sting Carbon aircraft offers superb visibility in all directions and allows for clear and confident manoeuvring in the taxi area.

Taxi speed should be low at just above a brisk walk however the aircraft is extremely stable even when doing high-speed taxis. Even at idle power the aircraft will roll and accelerate so throttle is not often required to taxi the aircraft once it is actually rolling. The nose wheel is directly connected to the rudder pedals and as such offers perfect control and stability on the ground, there is no excuse for allowing your aircraft to wander off the centerline.

The toe operated hydraulic disk brakes are extremely strong and positive and at taxi speeds the aircraft will be brought to a halt in only a few metres.

Finding an area free from any stones or other runway debris it is necessary to warm the engine temperatures up before checking the ignition. I recommend to reach 50°C on the oil gauge before doing the ignition checks. Run the power up to 4000 RPM and quickly switch off and back on each ignition switch, the power drop should be barely noticeable. Immediately after doing the ignition checks reduce the power back to idle. Don't spend a long time at high power settings doing ignition checks because in hot temperatures it may be possible to overheat your engine.
Complete your pre-take-off checks and confirm that the canopy is securely fastened, the seat belts are done up, you have sufficient fuel for the flight and the safety pin has been removed from the ballistic parachute (if fitted).
You are now ready to enter the runway.

Take off

Checking that the runway is clear and no aircraft are on approach make your departure radio calls and taxi to align with the centerline of the runway. Check for any cross wind components and position flaps to 15° (take off setting), if fitted with a variable pitch propeller make sure you are in fine pitch or in the climb setting. Do a last visual check of all instruments and slowly advance to full power keeping the aircraft aligned with the runway, ensuring that the Tacho RPM remains below 5600 rpm and that the engine is performing as it should.

Ground roll on the TL 2000 Sting Carbon aircraft is surprisingly short and once the aircraft reaches an indicated speed of 40 kn slowly pull back on the stick to lift weight of the nose wheel. At around 50 kn the aircraft will actually leave the ground by itself, allow the speed to build to around 60 kn for climb.

Climb

The best climb speed is an extremely steep angle which can limit your vision over the nose, it is my recommendation that passing 100 feet the flaps are retracted to the zero setting and the nose slightly lowered to give a cruise climb between 70 and 80 kn for good visual clearance in all directions. Even at this speed the Sting's

climb rate should be around 1000 feet per minute. Keep a check on your temperature gauges and a visual scan for other traffic.

Cruise

Level off and allow the plane to accelerate to cruise speed, if fitted with a variable pitch or constant speed propeller adjust the settings to suit. It will take approximately 60 seconds for the aircraft to come out of its climb configuration and to accelerate into cruise configuration. The TL 2000 Sting Carbon aircraft with its laminar flow wing has a step phenomenon which can be used to great advantage to give the aircraft a high cruising speed.

It is our recommendation to climb slightly higher than your desired cruising altitude and slowly descend back down to the desired level while making any adjustments necessary on the propeller and to trim the aircraft. The aircraft will respond with an increase in speed which can then be maintained for the duration of the flight. It is our recommendation to use this method of getting on the step to get the best performance from your aircraft. If you level off at your desired altitude and try to get on the step using throttle alone it will take a few minutes to actually build up the required speed to stay there, it is much easier to fly higher then descend using gravity and momentum to assist you on to the step.

Descent

Because the TL 2000 Sting Carbon is a fast aircraft your approach to the airport needs to be planned ahead of arrival. Even with the engine running at idle and the aircraft descending at around 500 feet per minute you will still have more than 100 kn on the airspeed indicator. The best method is to actually slow the aircraft ahead of time by reducing power and slightly pulling the nose up to reduce speed, if fitted with a constant speed or in-flight adjustable propeller now is the time to go back to fine pitch. Once you have your speed under control at around 90 kn it is easy to maintain this speed throughout the circuit pattern.

On downwind reduce your power to idle and hold your altitude to allow the airspeed to decay to around 75 kn. Complete your pre-landing checklist and once turned base with an air speed of around 60 kn engage first stage of flap 15°. Using back trim the aircraft can usually be configured with the engine at idle and one stage of flap to descend at around 450 feet per minute with no stick pressure.

The aircraft is extremely controllable in this configuration and it is extremely easy to land, it is our recommendation that only one stage of flap is required for a normal landing. Should you require short field performance it is then possible to use second stage of flap to 30° but it is generally not necessary. As the aircraft nears the ground reduce power completely to idle and hold off in ground effect when the aircraft has settled to around 50 kn, just keep holding off until the aircraft gently touches down on the runway with minimal descent speed.

Landing

The TL 2000 Sting Carbon aircraft is extremely controllable at typical landing speeds and is our recommendation to land on the rear wheels and continue to let

the speed decay until gently letting the nose wheel come in contact with the ground at around 35 knots.

You have now completed your flight in the TL 2000 Sting Carbon aircraft, turn off the runway and taxi to the tie down area. Using only idle power will allow the engine enough time to cool down, run through the parking checklist to complete your flight.

Two sting aircraft being test flown at the factory before shipping to Australia

Sting aircraft can be successfully operated of snow skis

Woodcomp manufacture all the propellers used on sting aircraft

Each aircraft has already being test flown in the Czech Republic and is securely fitted into a container for the delivery voyage

Comfortable bucket seats firmly hold the pilot and passenger in the aircraft

Flush mounted fuel filler caps eliminate problems with drag

Integrated landing light, strobe and navigation beacon can be fitted to each wing tip

The dash panel can be as basic or as complicated as necessary

The sting is a mature design, here is the external battery connection if you ever need to jumpstart your aircraft

Another Australian owner taking off for his trip home

The sting retractable offers outstanding performance and fuel economy

The sting aircraft in cruise configuration, 125 kn for around 15 L per hour

Aircraft Price List

The sting aircraft is sold to our customers in Euro currency. It is necessary to contact us for details about how to pay in Euro currency and how to achieve the best exchange rate.

Please always refer to our website for more information on the pricing of each aircraft and options chosen.

The web site link is **http://www.mcp.com.au/sting/price-list/price-list.html**

The prices do not include freight and delivery from the Czech Republic, GST or local registration and inspection fees. These are detailed fully when you request more information.

TL 2000 Sting Carbon & TL 3000 Sirius Aircraft Operational Costs

Since aircraft utilization and operational costs can vary widely from owner to owner there is really no "one size fits all" figure that can be applied to all owners; however the information below is worked out for an average aircraft.

In this comparison we have estimated a 10,000 hour airframe life and have written off the aircraft in this period, although the manufacturer states that the total airframe life is 30,000 hours with 10,000 between factory inspection and overhaul.

Manufacturers who quote unlimited airframe life for Sport Aircraft are not being realistic; make sure other comparisons have this figure included as it adds another $10 to the hourly amount.

The following table details the basic lifetime running costs for the Sting or Sirius.

Item	Period of Cost (Hours)	Overall Cost	Hourly Cost
Airframe	10,000	$100,000	$10
Engine Servicing	100	$80	$1
Engine Overhaul	1500	$8,000	$5
Fuel – 15lph	$1.00 per litre	$15	$15
Oil	50	$38	$1
Total Hourly Costs			$32

The above figures have been overestimated. For example, the normal oil change is at 100 hours but I sometimes run Avgas and therefore change my oil at every 50 hours. Engine servicing at every 100 hours primarily consists of replacing the oil, spark plugs and oil filter but other components may need repair so I have allocated an average of $80. A full engine overhaul at 1500 hours ranges from $6000 to $8000 so I have included the higher amount in the calculations.

Most people would not keep an aircraft for the full 10,000 hours so the actual airframe costs may differ however, this will depend on the resale value achieved and the tax benefits, if any, realized over the effective life of the aircraft. As a result, I have only calculated total life costs.

Overall, although the initial cost of purchasing a Sting or a Sirius may seem high when compared to a 30 year old Cessna, the actual hourly cost of flying this aircraft is still very cheap at around $32 Australian dollars per hour.

