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SportStar

Enjoying your new SportStar

Welcome to SportStar ownership! Regularly checked and maintained, your new aircraft should give you many years of reliable service, covering many hundreds if not thousands of flying hours. To help ensure you start off in the right way, here are some guidelines and suggestions. They may seem boring and unnecessary right now – after all, you just want to get out and fly!

*However, please **READ THIS INFORMATION** first and it may save you at least time, and perhaps a lot more!*

1. **Read all the manuals supplied with the aircraft**
   In particular read the Pilot and Maintenance Manuals. There is also a Flight Training Supplement, which gives further information on flying the aircraft. This will help familiarise yourself with your aircraft and its performance. Also, read the radio manual, and (if fitted) the transponder manual and (if fitted) any other equipment operating instructions. These simple actions will help ensure you avoid unnecessary problems.

2. **Complete and return all the warranty forms**
   These are supplied with the aircraft. Look for the Rotax engine warranty, radio warranty, and any other items such as the propeller, transponder, strobe lights, special instruments etc. There is no warranty form for the aircraft itself, the warranty starts automatically the day you take delivery.

   ***Please note** – if the warranty forms are not completed and returned to the respective manufacturers, you may be liable for the cost of any repairs.*

3. **Register with Rotax to receive engine Service Bulletins.**
   Ideally, complete this via the internet so you receive automatic notification and copies of all bulletins which affect your engine number. Go to ***www.rotax-owner.com*** for details and registration.

   You can also check the RAAus website for Rotax service bulletins – see: ***www.raa.asn.au/airworthiness/index.html***

4. **Evektor SportStar service bulletins**
   will be communicated directly to you, if your aircraft is affected. Alternatively, you can make a regular check yourself on either the manufacturer's website at: ***http://www.evektoraircraft.com/en/service-support/list-of-bulletins/sportstar*** or on Evektor Australia's website.

   You can also check the RAAus website for SportStar service bulletins – see: ***www.raa.asn.au/airworthiness/index.html***

Familiarise yourself with the cockpit and controls. Whether you are a new pilot or have years of experience, there will be differences to aircraft you may have already flown. Some particular points to note are:

1. **Throttle (1).**
   The Rotax engine throttle is spring loaded to full open if a cable breaks. This means you can control power with the ignition should a cable failure occur – not easy, but at least you have power!
2. **Throttle (2).**
   The SportStar has a double-action throttle. First, a vernier (twisting action) control, which gives *plenty* of power for taxiing and moderate power increases down final approach. Second, the more traditional push-pull action for full power on take-off or power reduction in descent or in the circuit – push in the centre locking button to operate the push-pull throttle. There is also a friction lock to help hold the throttle at your required power setting.
3. **Choke.**
   There is no mixture control on the Rotax – the carburettors are self-compensating for pressure & altitude. There is a choke for cold starting; set the throttle at idle, pull out choke lever on the panel and operate the starter. As soon as the engine has started, gently return the choke to its 'off' position – increasing the throttle a little if needed – until smooth running is obtained.
4. **Brakes.**
   Note that the park brake should NOT be engaged when starting the engine. Gently use the toe brakes to hold the aircraft until the engine is running smoothly – then apply the park brake if needed.
5. **Headsets.**
   The pilot headset plugs into the left pair of sockets behind the passenger seat and the co-pilot/passenger's set plugs into the right hand pair. The push to talk buttons on the two control sticks work with the corresponding headsets. Ensure that headset wires are not trapped when closing the canopy!
6. **Rudder pedals.**
   The adjustable rudder pedals are connected directly to the nose wheel for steering while on the ground. Avoid moving the pedals when the aircraft is stationary as this can put undue stress on the mechanism.
7. **'Gurgling' the engine.**
   To ensure an accurate oil level for the dipstick, it important to pump the oil from the engine sump into the reservoir before the first flight of the day. Ensure the ignition and master switch are OFF and the oil reservoir cap is removed. Then pull the propeller through by hand a blade at a time until you hear a distinctive 'gurgle' as all the oil finally reaches the reservoir. Then take a reading from the dipstick.

   NEVER turn the Rotax engine backwards (clockwise viewed from the front) as this may allow air to enter the hydraulic valve lifters, causing potential engine problems.

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Maintenance tips. The following items are intended to be a brief summary of the main points you may immediately wish to know about your new aircraft. They are not intended to replace the Aircraft Maintenance or Engine Maintenance manuals – which should be the final reference source for any maintenance.

1. **Servicing.**
   On completion of the first 25 flying hours, you and/or a qualified engineer (as appropriate) should carefully inspect the entire aircraft according to the schedule in the Maintenance Manual. At this time, the engine oil and filter should be replaced and the spark plugs checked for any abnormality.

   Although the Rotax and Evektor Maintenance Manuals do not stipulate a further service for 50 more flying hours (75 in total) Evektor Australia suggests a second check and oil & filter change after only a further 25 hours (ie after 50 hours total). This allows you to re-check the spark plugs and oil – it also means all future services are carried out on the 50-hour intervals (100, 150, 200 etc).

2. **Engine.**
   The standard engine powering your SportStar is a Rotax 912ULS 100hp, flat four cylinder, liquid/air cooled unit. The cylinder heads are liquid-cooled, the barrels are air-cooled. It has dual electronic ignition and hydraulic, self-adjusting valve lifters. There is a carburettor heat/de-icing box. Maintenance is quite straightforward, but be sure to read the Rotax maintenance manual – contained on the CD ROM supplied with the aircraft documentation.

   There are a few points to note about your engine:

   a. **Coolant (1).** Your SportStar comes filled with a standard 50:50 coolant/water mix. You can top this up if needed with any high quality automotive anti-freeze, anti-boil coolant suitable for use with aluminium engines. Make sure you keep the mixture 50:50.

   b. **Coolant (2).** If you find that Cylinder Head Temperature (CHT) is regularly too high or too low, you may wish to change to a waterless coolant such as Evans NPG. Although this is quite expensive, a waterless coolant may help to stabilise CHT in the required operating range. Contact Evektor Australia Aviation for details.

   c. **Fuel.** Rotax recommends unleaded fuel rated minimum 95 Octane (premium unleaded in Australia). You can use leaded fuel (minimum 97 octane – Avgas 100LL is suitable) if needed. You can mix leaded and unleaded. If you use leaded fuel, it is very important to change the engine oil and filter at least every 50 hours of operation and every 25 hours if you operate exclusively on Avgas.

   d. **Oil & filter.** You must use one of the Rotax listed oils – for example Aeroshell Sport Plus 4 – which are high quality, semi-synthetic oils with a gear additive (the gearbox is lubricated with the engine oil) suitable for use with both leaded and unleaded fuels. Replacement oil filters are available either via Evektor Australia or from the Australian Rotax agent, Bert Flood Imports in Victoria – contact number 03 9735 5655.

   ***Note** - when you change the oil and filter, you must check the magnetic plug on the front left side of the engine (as per the Rotax Maintenance Manual) for any accumulation of metal. This plug can be very tight and you should use extreme care when removing to ensure there is no damage to the plug – it can very expensive to remove a plug which has become damaged!*

3. **Ignition.**
The firing order of the cylinders is 1,4,2,3, where 1 and 3 are the right (starboard) side cylinders and 2 and 4 are the left (port) side cylinders counting from the front. The Left ignition circuit drives top spark plugs 1&2 and bottom plugs 3&4. The Right ignition circuit drives top spark plugs 3&4 and bottom plugs 1&2. Replacement spark plugs are available via Evektor Australia or from the Australian Rotax agent, Bert Flood Imports in Victoria – contact number 03 9735 5655.

4. **Problems.**
In the rare event you have a running problem with your engine, there is a Rotax engine troubleshooting sheet in the maintenance manual.

5. **Brakes.**
Your SportStar uses automotive DOT4 hydraulic fluid in the brakes. The quantity of fluid in the braking system is quite small – only a few tens of ccs – so it is important to check the level in the system at least every 50 flying hours, or every year if this is sooner. Fresh fluid can be obtained from Evektor Australia or any good automotive supply store facility.

   There is a header reservoir on the firewall in the engine bay and it should be checked and kept topped up with fluid as part of your pre-flight inspection.

   In prolonged hot weather, the fluid can evaporate through the breather surprisingly quickly. However, note that the level of the fluid will also reduce normally as the brake pads wear.

6. **Lubrication.**
Every 50 flying hours, use small squirts of Inox/Lanox or a similar oil on all the hinges and moving parts in the engine bay, control surfaces and inside the wing and fuselage on the bell-crank bearings. This helps to keep bearings clean and generally repels dust and water.

7. **Cleaning.**
When washing your aircraft DO NOT use high pressure sprays as these can force water into the aircraft interior, fuel tanks, pitot-static and electrical systems. Although the paint is extremely robust, it is not intended to resist the power of a pressure washer!

   You can use any good quality automotive polish/wax to shine and protect the paint – *but do not use automotive or furniture cleaning products on the canopy glazing as this can damage the polycarbonate/lexan.*

   When cleaning the cabin plastic canopy transparency, use a product such as 'Vuplex' or 'Plexus' which are designed for the job and which will fill any minute scratches. Use a one-way polishing motion (up/down or side-to-side) – do not polish in circles, as this can leave cumulative patterns in the transparency which can become distracting in certain lighting conditions – such as strong sunlight.

Flying tips. The SportStar is a very forgiving aircraft to fly, having no nasty flight characteristics to worry about. It stalls cleanly with no real tendency for a wing drop. Take-offs and landings are quite straightforward. The following tips are therefore intended as a guide to getting the best from your SportStar – check in the Pilot Manual and Flight Training Supplement for more information.

1. **Flaps.**
   The SportStar has 'split' flaps with three settings – 15, 30 and 50 degrees. For take-off, normally use either no flap or the 15 degree setting. For landing, normally use the 30 degree setting. The full 50 degree setting can be used for very steep, controlled approaches at IAS 50-55 knots, making side-slips completely unnecessary. Steep approaches like this are excellent for terrain and other obstacle clearance. However, do not let your speed drop below IAS 50 knots with 50 degrees of flap. When flaring to land, a small twist of the vernier throttle can make a big difference!

2. **Electric elevator & aileron trim.**
   Although this is an option, most SportStars are fitted with electric trim. A couple of points to note – in the cruise the elevator trim is very powerful. Just 'tap' the buttons on the stick to achieve the desired trim. With flap, you will probably need all the nose-up trim – however, be prepared for quite large trim changes with power, for example if you need to go around.

3. **Fuel management.**
   The SportStar has two wing tanks. An excess fuel/vapour return line feeds unused fuel back to the LEFT tank.
   It is therefore essential when taking off with a full left tank to ONLY USE THE SUPPLY FROM THE LEFT TANK for the first 30-40 minutes of the flight. This ensures that unused fuel is not simply pumped overboard via the left tank vent/overflow pipe!

4. **Take-off.**
   Apply full throttle over a count of about 1-2-3-4-5 and gently pull back on the control stick at about 30-35 knots until the nose wheel is maintained about 6-9 inches off the ground. The aircraft will take off in this attitude at about 40-45 knots. This technique helps in two main ways – it helps get the propeller clear of loose stones etc which may be on the runway and also lifts the nose wheel out of harm's way on bumpy strips.

5. **Engine failure on take-off.**
   First, read the SportStar pilot manual on this subject! Second, even at maximum weight, it is safe in a SportStar to turn back and land on the departure runway if you have reached at least 450 feet of height above ground level. GET THE NOSE DOWN AND THE SPEED UP to at least IAS 60 knots in the turn! With your instructor's agreement, practice the manoeuvre starting from above 1,000 feet at first, then gradually reducing 'failure' height as you gain experience. However, if in doubt – LAND AHEAD, TURNING MAXIMUM 30 DEGREES either side of track!

6. **Climb.**
   Best climb is at about IAS 60 knots with full power at about 5,150-5,250 rpm (fixed pitch prop). The SportStar will climb at engine speeds as low as 4,500 rpm, although at this speed performance is marginal.

7. **Cruise.**
   Depending on the pitch setting of the propeller, you will be able to cruise at any speed up to about TAS 120 knots. The factory setting on the fixed pitch prop gives TAS 107 knots at 5,200 rpm – if you want mainly to cruise, the prop can be pitched a little coarser. Some mustering pilots pitch the prop finer to give more power for shorter take-offs and steeper climbs.

8. **Rough air.**
   On any aircraft, the airframe takes the most punishment in rough air. On the SportStar, slow down to below TAS 103 knots in rough air – particularly at higher weights.

9. **Descending.**
   The SportStar has a high Vne (never exceed speed) of IAS 146 knots, so you can descend quickly by throttling to idle and allowing the nose to drop. Best glide without flap is around IAS 57 knots – trim for this speed no flap, hands off.

10. **Landing.**
    Normal approach speed down final should be no more than IAS 60 knots. Reduce to IAS 55 knots over the threshold and hold off at about 1 foot altitude until the aircraft gently settles – MAIN WHEELS FIRST – on to the runway. Gently hold the nose wheel off until it settles of its own accord.

    A common fault is too high a speed on approach – IAS 65 or even 70 knots. Remember, the SportStar has a high-lift wing, stalling in the high 30's knots, which will keep you flying all the way into the hedge at the far end of the runway!

    The correct approach speed is 1.33 x stall speed in landing configuration – ie about 50 knots.

11. **Cross winds.**
    The demonstrated cross wind limit of the SportStar is 21 knots – by an experienced Evektor factory pilot on a FLAPLESS landing. The factory recommended maximum crosswind for a pilot of 'average' skill, using FULL FLAP is 11 knots. Whenever possible, land directly into wind. If you can't, adopt the technique your instructor taught you and/or whichever you are most comfortable with. Make sure the nose wheel is pointing in the direction of travel when you lower it on to the runway.

12. **Braking.**
    The SportStar is a relatively light aircraft – even fully loaded. Once bedded-in, the brakes are more than up to the job of stopping the aircraft quickly. Beware of locking the brakes on wet grass and other slippery surfaces – and make sure the PARK BRAKE is OFF as part of your downwind pre-landing checks!

13. **Tie-downs.**
    Your SportStar comes with a set of three tie-down screws and straps. The tie-down points are under the wing tips and fuselage tail. In some circumstances you may wish to tie down round the nose leg too.

14. **Finally...**
    It is always best to chock the wheels rather than leave the park brake set for any length of time – particularly overnight.

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Other helpful tips.

1. **Useful things to carry**
   - a can of self-sealer and an electric pump to treat punctures when away from base;
   - dedicated good quality leather for the canopy (don't be tempted to use it on the rest of the aircraft or you'll end up scratching the screen!);
   - a can of 'Plexus' or similar and a soft cloth for polishing the Lexan; NEVER use 'Mr Sheen', 'Windex' or any other automotive or household cleaner on the polycarbonate as this can cause irreparable damage!
   - small cushions for small passengers;
   - elastic bungee cord to lock the control stick when parked. Ideally have one long enough to hook round the left rudder pedal, then looped round the control stick (holding it forward) then hook to the right rudder pedal;
2. **Rain.**
   The SportStar is designed and intended as a strictly VFR fair weather aircraft. However, there may be times when you have to park your aircraft outside in poor weather. Please note – it is not totally waterproof! Heavy rain can leak into the cabin area – particularly when you open the canopy after rain; the water drains forward and some will enter the cockpit. However, water will drain out of the wings, tail and fuselage via the drain holes. The best protection against the weather is the supplied CANOPY COVER – this is completely waterproof and will also protect the canopy in the event of hail.
3. **Small scratches/paint chips.**
   There are specific RAL paint references for the SportStar paint colours. However, the actual colour you get from your friendly local automotive paint shop can vary a lot depending on who operates the mixer etc. Therefore, if you need some touch-up paint, we recommend you take a part of your aircraft (eg the prop spinner or a wheel spat) and ask the paint shop to match it. This way you really should get a correct match!
4. **Security.**
   It is a criminal offence to leave your aircraft parked unattended without a suitable locking device to prevent it being flown away. The canopy lock alone is not deemed enough! You have 2 choices with your SportStar – either a cable or chain lock round the propeller (use a plastic coated device to protect the prop and your paint) or a locking plate over the throttle. Please contact Evektor Australia if you want details.

Happy flying! Please let us know of any omissions – or any additions you would like included in these notes.

Peter Harlow
Evektor Australia