



Normal Procedures Package

Contents:

- 1) **Abbreviated Checklists** – Print a copy of this 2-page checklist on both sides of one sheet and use them as a study reference and to take along in the aircraft. These are the same checklists you'll find in the Vector Sport Aviation SportCruiser.

- 2) **Introduction to Normal Checklists** – This brief article will introduce you to checklist usage and give you tips on how to learn them.

- 3) **Expanded Checklists** – This is an in-depth look at each item on the Normal Checklists.

- 4) **Limitations and Operating Information** – Airspeeds and systems information from the SportCruiser's Pilot Operating Handbook

- 5) **Maneuvers Kneeboard Cards** – This is an overview of the airborne maneuvers you will perform as a flight student in the SportCruiser. It is sized and formatted to go on your kneeboard for quick reference.

CZAW SportCruiser Normal Checklists

Before Start

Control lockremoved as req'd
Master switchON
Flaps full down
Exterior lightschecked & OFF
Master switchOFF
Canopyinspected & cleaned
Exterior pre-flightcompleted
DocumentsA.R.O.W.L.
Circuit Breakers checked
Hobbs time recorded

Start

Passenger brief completed
 canopy release seat belt use
 radio/intercom use sterile cockpit rules
 motion sickness LSA waiver placard
Pedals & belts adjusted & fastened
Carburetor heatCOLD
Throttle closed
Choke as req'd
Master switch ON
Fuel pump ON
Propeller area "Clear Prop!"
Canopy down & unlocked
Brakes hold
Ignition switch START
Choke **OFF**
Instruments switch ON
Avionics switch ON
Oil pressure **checked**
 green w/in 5 sec. or shut down
Throttle **2000 rpm**
 wait at least 2 min before >2000
Fuel selector fullest tank
Fuel pump OFF
EMS Fuel quantity.....__req'd, __on board
 Minimum 10 gal. fuel req'd
Trim takeoff

CZAW SportCruiser Normal Checklists

Before Taxi

Intercom checked
Garmin 430 GPS/NAV/COM.....AWOS/ATIS
 Then CTAF or GROUND, NAV/GPS as req'd
TransponderSTBY & 1200
Flight instruments checked
Engine set warm-up rpm as req'd
 2500 rpm until oil \geq 120°F, then as req'd
Strobe lights ON
Nav. lights as req'd
Landing lightas req'd
Instrument lightsas req'd
Flight controls set for wind conditions
Flaps 10°
Radio call for taxi - controlled field...as req'd

Taxi

Brakes checked
Flight Instrumentschecked

Before Takeoff

Fuel quantity & balance checked
Engine instruments checked
Throttle 3500 – 4000 rpm
 Ignition checked & BOTH
 max 300 drop, 120 difference
 Carburetor heat checked & COLD
 Oil pressure..... checked
Throttle IDLE
Oil temp..... checked
CHT checked
Voltmeter & Ammeterchecked
Flaps10°
Trim takeoff
Controlsfree & correct
Fuel pump ON
TransponderALT
Takeoff brief completed
Canopy locked
Radio call for takeoffas req'd

WARNING: Use these checklists in accordance with the "Expanded Checklists" available at www.vectorsportaviation.com. Rev. 07/09

CZAW SportCruiser Normal Checklists

Normal Takeoff

Flaps 10°
Throttle full forward
(approx. 4850 static rpm)
Rotate speed 35 – 45 kts
Climb speed 60 – 70 kts
≥ 250' AGL
Flaps UP
Climb speed 60 – 75 kts
Departing Pattern
Fuel pump OFF

Cruise

Engine instruments checked
Fuel quantity & balance checked
Fuel Pump OFF
Exterior lights as req'd

Maneuvers

Fuel pump ON
Fuel selector fullest tank
Pick emergency landing area
Perform clearing turns
Airspeed ≤ V_a (88 kts)

Descent

AWOS/ATIS recorded
Altimeter set
Engine instruments checked
Fuel quantity & balance checked
Approach brief completed

- Pattern entry
- Landing type

SportCruiser "V-Speeds" from POH

V_{so}	32 kts	V_y	65 kts
V_{s1}	39 kts	V_{fe}	75 kts
V_r	32 kts	V_a	88 kts
V_x	60 kts	V_{no}	108 kts
Glide	60 kts	V_{ne}	138 kts

Radio calls - pattern entry/landing... as req'd

CZAW SportCruiser Normal Checklists

Landing

Seat belts fastened
Fuel pump ON
Fuel selector valve fullest tank
Flaps as req'd

After Landing

(When Clear of Runway and Stopped)
Exterior Lights as req'd
Canopy unlocked
Flaps UP
Fuel pump OFF
Transponder STBY

Shut Down

Parking brake..... as req'd
Autopilot switch..... OFF
Exterior lights OFF
Avionics switch OFF
Instruments switch OFF
Ignition sequenced OFF
remove key from ignition-secure as req'd
Master switch OFF
Hobbs time..... recorded
Instrument panel cover installed

Secure

Hangar or tie downs, chocks as req'd
Parking brake released
Gust lock as req'd
Pitot tube cover installed
Canopy closed & latched/locked
Canopy cover as req'd

WARNING: Use these checklists in accordance with the "Expanded Checklists" available at www.vectorsportaviation.com. Rev. 07/09

Introduction to Normal Checklists

By Paul Volle

Learning to fly an aircraft can be a very intimidating experience. There is a lot to know! As a new student, the array of switches and instruments in a modern cockpit is complicated and bewildering. But in every cockpit the checklist is a familiar friend there to teach and guide you. Even for seasoned professional airline pilots, checklists are an essential element of every flight on every aircraft. This article will give you a quick introduction to checklists and get you started using professional techniques which will serve you well and help keep you safe for the rest of your career.

Though checklists are extremely important, they're a very simple tool. For the novice, a checklist is like a To-Do list; a set of written reminders which helps you remember everything you have to do on a flight and helps you do it all in the correct order. Every model of aircraft has a slightly different checklist but all checklists have some features in common. For example, on the left is always an item name and on the right is a related action or condition. Also, there is a separate checklist for each phase of the flight, e.g., starting the engine, taxi, takeoff, and landing checklists. Some checklists are done from memory and others are read each time and still others are a combination of memory items and read items, but the pilot uses the same skills and techniques for all of them.

Checklist Discipline

This set of skills and techniques for using checklists is called *Checklist Discipline*. Checklist discipline is a habit pattern which you will begin learning on your first flight and develop as you gain experience. Those first several hours in the airplane are critical to establishing the discipline which will keep you safe for years to come so you need to try to do it right the first time. But don't get discouraged; soon you won't have to think about checklist discipline because it will be second nature.

Say it Out Loud!

The first thing to remember as a new pilot is that almost every checklist you perform will be said out loud, even when you're alone in the plane! (Didn't I say this was easy?) I now have over 7,000 flight hours and when I fly an aircraft I *always* say my checklists out loud. Saying the checklists out loud helps you in several ways. First, your instructor must hear your checklists so that she can insure that you're doing them properly. Then, when you solo the plane, you will be distracted by sounds and sensations that you've never noticed before and so you need to keep things as familiar and habitual as possible. Your first solo is a bad time to start doing things differently than you've been doing them, so say your checklists out loud! Still later, when you're flying with another pilot, verbalizing your checklists keeps you both aware of what the other is doing (this is an important part of *crew coordination*). And finally, when I say a checklist out loud, it's just easier to remember what I've done or haven't done. So, in case you've missed it; "Say your checklists out loud."

Announce Your Checklist

So we're talking out loud. Now what do we say? To be safe, you need to develop some professional-style habit patterns. As a professional pilot, the first thing I say when I pick up a checklist is....(drum roll, please) what's on the first line of the checklist! That is, I say the NAME of the checklist. This is so easy, but so easy to mess up until you've developed the correct habit pattern. The first thing you will say when flying most aircraft is "Before Start Checklist." This may not seem important now, but it becomes critical for the professional pilot. One reason is that it's

important that you do the correct checklist and naming the checklist gives you and the pilots flying with you a chance to confirm that you are all doing the correct procedures.

Say It, Do It, Say It

So we're doing the correct checklist. Now how do we do it? Again, it's a simple habit pattern but easy to get wrong, so don't get discouraged when you mess it up. Here's the way it's done: (1) read the line, (2) do the action, and (3) announce the result. You (1) say something, (2) do something, and (3) say something. This actually takes some practice because you will tend to skip part two. For example, the checklist may say "Master Switch.....ON" and most students, sooner or later, will say "Master Switch" and then say "ON" without ever looking at or moving the switch! You may think "This is so easy, I'll never make that mistake!" But when it happens (not if it happens) I hope you'll remember that this article said you would make this mistake and you'll just stop and do it again correctly without getting frustrated with yourself. (1) Read the line, (2) do the action, and (3) announce the result.

If you're just starting out, your instructor should demonstrate the proper way to accomplish a checklist. After you've seen how it's done, you need to devote some time to practicing. You can do this either by getting in an airplane or simulator and going through the checklist pretending to move each switch, or you can follow the time-honored method of chair flying which is the same practice but without the airplane or simulator.

Chair Flying

Chair flying is the way that pilots develop essential habit patterns when they don't have the luxury of sitting in an actual cockpit. All you really need is a checklist and a chair! Just sit down in a quiet place where you don't have many distractions (or on-lookers who may think you're hallucinating) and imagine that you're sitting at the controls of your aircraft. I'm totally serious; this is actually the way it's been done for decades. Read the checklist item aloud and actually reach out and pretend to move the control or switch or look at the place where the control or switch would be in the aircraft. This helps you develop the crucial "muscle memory" on which aviators rely.

Learn On The Ground

I have flown a large number of complex aircraft from WWII bombers to 2-seat jets to modern airliners and I use the same methods to learn a Boeing checklist as I do to learn a Cessna checklist. You can do it the same way. Here's the biggest secret to learning efficiently (read "inexpensively"): most of your learning takes place on the ground. The best way to learn your checklists is go out to your training aircraft and do the procedures over and over. If your training aircraft is unavailable, the next best thing is to put a chair in front of a poster or picture of your cockpit. I recommend that you take your book or notes out to the plane and do the preflight by yourself about 4 times in a row. Then get into the plane if you're allowed, adjust the seat just as you would for a flight, pick up the checklist and begin reading it (out loud, of course.) Pretend to move each switch, moving your hands and eyes just as if you were flying. When you're familiar enough with your cockpit, get your own copy of the checklists and think through your procedures when you're at home. Later, when you're learning more complex flight procedures like stalls and approaches, chair fly them before going to the airport. Remember, you can't learn your checklists by memorizing a list; you have to move your hands and your eyes. The place you learn best is on the ground. Know what you're going to do before you fly and you will learn much more quickly in the air.

Czech Aircraft Works SportCruiser

Expanded Normal Checklists

Version 07/09

These “expanded” checklists were adapted and used with permission by Vector Sport Aviation to complement the abbreviated checklists used in their aircraft. Because there are variations in aircraft and operating environments, these checklists may not be appropriate for aircraft other than those operated by Vector Sport Aviation pilots. For other operators: be critical and careful and use these checklists at their own risk.

The checklists used by Vector Sport Aviation pilots are patterned after those used at airlines and in the military but with content added to help our student pilots. This gives us professional-quality checklists which are familiar and easily learned by professional pilots. More importantly, though, they help our students develop the safe habits and techniques of professionals and transition more easily to larger aircraft.

This document is the “expanded” version of the checklists and is used only for study. In the aircraft are “abbreviated” checklists. You should print your own copy of the abbreviated checklists to reference as you study and to carry with you as a back-up copy when you fly.

Print the abbreviated checklists on both sides of one sheet of paper, then crease it vertically and fold it booklet-style so that it is easily held with one hand while performing tasks in the cockpit. You will notice that the checklists are arranged near the tops and bottoms of the page with white space in the center. This allows you to also fold the page horizontally (into quarters) without having any checklist printed across the crease. Why are some words capitalized and some are not? Named and labeled indicator or control positions are capitalized. Descriptions are lower case.

Both the abbreviated and expanded versions of these checklists are available to

pilots at www.vectorsportaviation.com. We request your constructive criticism to help us improve them.

Technique vs. Procedure

There is wide latitude in the methods pilots use to safely operate an aircraft. Everyone has their own way of doing things and different situations often require different approaches. Among pilots, personal preferences, methods, and habits are called “*techniques*” and are understood to be *optional*. You can choose to use techniques or not use them depending on how well they work for you. *Mandatory* methods and processes which are used to promote safety through standardization are called “*procedures*.”

It will take experience to be able to distinguish techniques from procedures so you should generally consider the methods you are taught to be *procedures*. If you are uncertain which category a particular method falls into, don’t hesitate to ask your instructor.

At Vector Sport Aviation; whether you’re a student, instructor, or licensed renter; you’re part of a community of pilots working together to be as safe as we can be. We think critically about what we’re doing and consider how to do it more safely and professionally. We expect you to contribute by critically studying *your* procedures discussing them with other members, and proposing improvements to help us all operate more safely.

Checklist Discipline

The *techniques* used by professional pilots to perform, or “run,” checklists are known as “checklist discipline.” Below are a few guidelines for establishing good checklist discipline. More in-depth instruction on checklist discipline is available at www.vectorsportaviation.com.

Always say the checklist OUT LOUD.

Announce the checklist – Start by saying the name of the checklist rather than starting with the first item. For example, say “Before Start Checklist” as you begin reading the Before Start Checklist.

Each item on the checklist is a three-step process: you always (1) say something, (2) do something, and (3) say something.

1) Read the action or condition on the left side of the page. As a student, your instructor may require you to read the entire line before performing the item. When you are more experienced and familiar with the checklist you may read only the item name on the left.

2) Perform the action or verify the condition required. Be careful to **do** this step. A pilot who is hurrying or distracted will often read through an item without actually performing it.

3) Announce the result – The desired result is normally, but not always, the condition stated on the right side of the page.

Before Start

The Before Start checklist prepares the aircraft for operation. It is designed so that, should you have a passenger or other issue to handle, you can prepare the aircraft for the flight and then leave the plane briefly before returning to get in and accomplish the Start checklist. If you leave the plane unattended, ensure that it is properly chocked and that the instrument panel is protected from excessive sunlight (see the Shutdown Checklist for more on the dangers of sunlight).

As a result of feedback from our pilots, this checklist is arranged so that you only have to get into the aircraft once. Many pilots can stand in front of the wing and reach inside to perform the first five items, then clean the canopy and perform the exterior

preflight inspection before climbing inside.

Control lock removed

When the aircraft is not in use (and not hangared), the controls are held stationary by fastening a seat belt around either control stick. This is a common method used in light aircraft to prevent damage from wind gusts.

Master switchON

This switch connects the battery to the main electrical bus. Turning it off removes power to all electrical equipment on the aircraft but does not affect operation of the engine when it is running.

Flapsfull down

Check smooth operation of the flaps throughout their full range of operation.

Exterior lights checked & OFF

Verify operation of the lights which are required for your flight by turning them on and walking around the aircraft to look at them, then turning them OFF. “Navigation lights” or “position lights” are required to be ON from sunset to sunrise according to FAR 91.209. Use the strobe lights whenever the engine is running.

Master switch OFF

Canopy inspected & cleaned

Inspect the canopy and supports for damage and security. The canopy is a composite material and easily scratched. Use only the cleaners and cloths stored in the aircraft/hangar. Use a liberal amount of water or cleanser and very gently wipe in the direction of airflow. Never rub the canopy in a circular motion and **never scrape ice or frost** from the canopy. The best way to remove a light frost is to move the aircraft so that it is facing the sun.

Exterior preflight completed

Circling the aircraft clockwise during a preflight inspection is only a *technique*; you can go either direction. The steps are presented here in a clockwise manner because they are presented that way in the

manufacturer's Pilot Operating Handbook. Cessna and some other small aircraft manufacturers present their exterior inspections in a counter-clockwise sequence but most larger aircraft inspections are done in a counterclockwise pattern. It doesn't matter which way you go or what order you do it in as long as you are consistent and don't miss anything.

Nose

- Oil level –
 - Remove oil reservoir cap and put it where you will not forget it!
 - Turn the prop by hand in the direction of normal rotation (counter-clockwise) until the reservoir "burps." This gurgling sound means that all the oil in the crankcase has been transferred to the reservoir.
 - Check the oil quantity and add oil if required.
 - Replace the reservoir cap.

CAUTION: The placards on the oil reservoir access door and on the reservoir indicate that the aircraft uses synthetic oil, but that is the case only when using unleaded automotive fuel. When 100LL aviation fuel is primarily used, a mineral oil or mineral/synthetic blend must be used.

- Cowling fasteners – Secure. When fastened, screw heads are always aligned with the edge of the cowling.
- Propeller & spinner – Secure. Check for nicks and cracks.
- Air intakes & baffles –
 - Intakes Clear – cooling air on top, combustion intake on pilot's side, oil and coolant radiators below.
 - Baffles – The radiators for the engine coolant and oil have baffles that you may install prior to flight in cold weather to help maintain engine operating temperature. This is the time to decide whether you want to use them. If they are installed, check

the mounting screws for tightness.

- Nose wheel – Check for tread condition and inflation, cotter key in castellated nut on nose wheel.
- Fuel sump – Check for color, contaminants, and water.

Note: Fuel must be checked at all three sump points

- before the first flight of the day
- after each refueling

If the engine hasn't run recently then the engine fuel sump may not have any fuel in the gascolator bowl. In this case, turn on the electric pump briefly then recheck.

Right Wing

- Wing locker – Secure. Screw heads should be parallel to the edge of the locker door.
- Fuel sump – Check for color, contaminants, and water.
- Wheel/Tire – Check brake pads, tire condition and inflation. If any tire has cord showing, a significant cut in the sidewall, or a groove worn off all the way around; it must be replaced. Brake pads must be approximately the thickness of a nickel. If in doubt, don't fly with it.
- Leading edge and wing surfaces – Undamaged.
- Fuel quantity – visually inspect and note quantity for comparison to quantity indicated on the gauges. With 5 gallons in a tank, fuel should be visible under the filler cap. Note that parking the airplane on sloping ground will affect the apparent quantity of fuel in the tanks.
- Tie down – Removed
- Fuel tank vent – Unobstructed
- Wing tip – Check for surface damage to wing tip and strobe/navigation light.
- Wing surfaces – the wing tip is the best vantage point from which to detect signs of wing overstress. Look along the top and bottom surfaces for wrinkles in the skin.
- Aileron – Check two hinge bolts, actuator bolt, and pin in trim tab actuator rod.

WARNING: Always hold the aileron with one hand while checking hinge bolts with the other. The surface may be unexpectedly moved by wind or by someone moving the control stick or opposite aileron.

Checking Bolts with Locknuts – When checking any bolt secured by a locknut, verify by sight or touch that the bolt has threads projecting beyond the nut. If there is no thread projecting, the bolt is not secure and requires maintenance before flight.

- Flap – Check two hinge bolts and actuator lever bolt.

Antenna Locations

Just aft of the wing is a good place from which to see all the antennas. They are discussed here to help you learn them.

Transponder – bottom of the fuselage near the right flap. It is the small antenna with a ball on the end.

VHF Communications – Bottom of the aircraft. A single wire angled backwards.

VOR – Top of the vertical stabilizer. V-shaped.

ELI (Emergency Locator Beacon) – Top of the empennage.

Empennage

- Right side
 - Surface undamaged, antennas secure.
 - Vertical and horizontal stabilizers secure and leading edges undamaged.
- Aft
 - Rudder – Upper hinge bolt secure.
 - Elevator – Freedom of movement, two hinge bolt nuts secured with cotter keys. Actuator rod secured with locknut.
 - Trim tab – Piano hinge secure. Actuator rod secured with pin.
 - Horizontal stabilizer – two mounting bolts located under the rudder, secured with locknuts.

- Electrical connection under the rudder secure (for the elevator trim tab motor).
- Rudder – Freedom of movement
- Tie-down – Removed
- Left side of empennage – Same as right side.

Left Wing

Same procedure as the right wing except add:

- Pitot tube – Clear and cover removed. Note the presence of static ports on the sides of the pitot tube.

Documents A.R.O.W.L.

The following documents are required by Federal Aviation Regulations (FARs) to be on-board:

- **Airworthiness certificate** – This is required to be displayed so that it is visible to passengers. It is a certificate saying that the aircraft was manufactured according to standards.
- **Registration** – Also displayed in a visible location. This is much like the registration in your car which specifies the owner of the aircraft.
- **Operating Handbook** – The “Pilot Operating Handbook,” or POH, is the official manual from the aircraft manufacturer.
- **Weight and Balance information** – This is contained in the Operating Handbook so it is not actually a separately checked item *in light sport aircraft*. However, in most aircraft the weight and balance data is separate from the Operating Handbook and FAA regulations (FAR's) require that you confirm it is on board.
- **Limitations** – This document is required *only on light sport aircraft*. It specifies operating limitations peculiar to the Light Sport category of aircraft and must be accessible to the pilot in flight.

Circuit Breakers **IN**
All circuit breakers are arranged under the EMS.

Hobbs time..... **recorded**
The mechanical Hobbs Meter is displayed on the right side of the panel next to the EMS. The Hobbs meter is used to calculate aircraft rental time and for scheduling maintenance. The Hobbs Meter is to be used to record and calculate your flight time.

Start

Passenger brief..... **completed**
Ensure that your passenger is familiar with the following items:

- **LSA waiver placard** – Read the LSA placard to your passenger. LSA are not certified by the FAA under “standard” airworthiness rules but instead are “ASTM compliant.” This means that LSA comply with standards developed by the industry through the American Society for Testing & Materials.
- **Canopy release** – Explain how to operate the canopy and how to get out of the aircraft in an emergency. The canopy should be locked when airborne and unlocked on the ground.
- **Seat belt use** – Explain FAA requirements for seat belt use and proper fit of the belts. Always tighten the lap belt before the shoulder belts.
- **Radio & ICS use** – Explain radio call sign and use of the intercom.
- **Sterile cockpit policy** – Allow no unnecessary talking during takeoff and landing or high-workload periods.
- **Motion sickness** – Explain the location and use of sick bags. Encourage your passengers to tell you when they feel sick. Helpful strategies include keeping your eyes outside the cockpit and directing cool airflow on your face.

Pedals & belts **adjusted & fastened**
The lap belt must be tightened before the shoulder belt.

Carburetor heat **COLD**

Throttle..... **closed**
“Closed” means pulled fully aft, i.e. power off. Do *not* open the throttle partially to start the engine. Moving the throttle forward will disable the choke and make the engine more difficult to start when cold.

Choke **as req’d**
This lever should be moved fully ON (aft) to start a cold engine and fully OFF (forward) for a warm engine.

Master switch **ON**

Fuel pump **ON**
This auxiliary electric fuel pump delivers fuel under pressure to the engine-driven mechanical fuel pump. The engine-driven pump operates at all times. The electric fuel pump must be ON for:

- engine start
- takeoff
- landing
- switching fuel tanks when airborne

Propeller area **“Clear Prop!”**
It is important to loudly yell “Clear Prop!” so that anyone nearby will be able to hear you. Do this whether or not you see anyone nearby as you may not be aware of someone’s presence.

- Warns others of danger from your propeller and wind blast
- Gives others an opportunity to alert you to any dangers such as chocks or tow bars which could damage your aircraft. Help others to help you.

Canopy **down & unlocked**
You may prop the back of the canopy

open for better cooling on the ground. Always leave the canopy unlocked while on the ground so that you will be better able to egress in case of emergency. The canopy will be closed and locked during the Before Takeoff checklist.

Brakes **hold**

Ignition switch **START**

The Rotax engine normally starts within 1 – 2 seconds, similar to a car engine. Release the starter when the engine catches.

Warning: Do not engage the starter for more than 10 seconds at a time. If the engine does not start, release the switch and allow the starter to cool for at least 2 minutes before attempting another start.

CHOKE **ease off**

Slowly bring the lever to the full OFF (forward) position. Turning it too quickly will cause the engine to run roughly.

Instruments switch..... **ON**

This switch connects power from the main bus to the engine monitoring system (EMS) which is the flat-panel display located on the right side of the instrument panel.

After switching on the Instruments switch, Immediately watch the oil pressure indicator for movement!

Avionics switch **ON**

This switch turns on the pilot’s flight instruments (EFIS) and the instruments in the center of the panel:

- EFIS
- Garmin 430W GPS/NAV/COM radio
- Transponder
- Intercom system

OIL PRESSURE **checked**

Without oil pressure the \$20,000 engine will be ruined very quickly, so check the oil pressure indicator *immediately* after the

engine starts and Instrument switch is on! Oil pressure must be “in the green” (at least 12 psi) **within 5 seconds of start**. If oil pressure is not within limits, immediately turn off the ignition switch. The engine will require maintenance.

Normal oil pressure is:

- < 3500 rpm – **minimum 12 psi**
- > 3500 rpm – **22 – 73 psi**.

THROTTLE **2000 rpm**

After checking for oil pressure, set engine speed to 2,000 rpm and wait at least 2 minutes before increasing the speed further.

Fuel selector..... **fullest tank**

Fuel pump **OFF**

Fuel quantity **__req’d, __on board**

Fuel quantity is on the EMS page initially displayed.

Decide how much fuel is “Required” for your flight and compare it to how much is “On Board.” Confirm that you have enough fuel for your flight and verify that the gauges are working correctly.

- FAR’s require that you plan to land with no less than 30 minutes of fuel on board for daylight operations and 45 minutes at night. The SportCruiser uses so little fuel that you cannot reliably gauge 30 minutes worth. Therefore, you should always land with not less than 1 hour of fuel remaining.
- Vector Sport Aviation requires that you start with no less than 10 gallons of fuel.
- Verify operation of the gauges by comparing the indicated quantity to the quantity you saw in the tanks on the external preflight inspection.

Trim **takeoff**

Adjust the trim tabs to the takeoff position.

Before Taxi

Intercom checked

Put on your headset and say "ICS check." You should be able to hear yourself. When you hear others say "ICS check," tell them whether they are "loud and clear." Adjust the volume and squelch.

Garmin 430W GPS/NAV/COM.....AWOS/ATIS Then CTAF or GROUND as req'd

If you are on a controlled field:

1) Switch the Garmin 430W communications radio to the ATIS (or AWOS) frequency and write down the ATIS ID letter, weather, and airport information.

2) Switch to the Ground Control frequency or the CTAF.

...GPS as req'd

If you need to put a route into the GPS, it should be done before taxi to the run-up area.

Transponder STBY & 1200

Turn the transponder on by pressing the STBY (Standby) button then set "1200" for flight under VFR (Visual Flight Rules.)

Flight instruments set & checked Set:

- Altimeter

Check proper indication of:

- ball – centered or displaced slightly downhill
- airspeed – zero
- heading – approximate aircraft heading
- altitude – approximate field elevation
- attitude – level with horizon

There is no "right" way to check these, but to help you remember these items, they are listed here in a counterclockwise flow around the EFIS.

Engine set warm-up rpm

If it has been at least 2 minutes since engine start and the oil temperature is still below 120°F (not in the green band,) you may set 2500 rpm until the oil is at least 120°F/green,

then use power as required. Power may be momentarily above 2500 rpm to move the aircraft, but under no circumstances should you set run-up or takeoff power until the engine is warm (oil temp in the green.)

Strobe lights ON

The strobe lights are the flashing white lights located on the wing tips. They should be ON any time the engine is operating unless their operation compromises safety (such as when you would blind another pilot or degrade your own night vision).

Navigation lightsas req'd

Navigation lights are the steady red, green, and white lights located on the wing tips. These are required to be ON from sunset to sunrise.

Landing light as req'd

The landing light **may** be used for night-time ground operations. Be careful not to shine the landing light into anyone else's eyes at night.

Instrument lights as req'd

The instrument lights switch controls only the standby airspeed and altimeter indicator lighting.

Flight controlsset for wind conditions

Radio Call for Taxi.....as req'd

At a controlled field, the radio call for taxi should be made before crossing the "non-movement area" line separating the ramp area from the taxiways.

A general format for this call is:

1. controller's call sign
2. your call sign
3. your location
4. your intentions
5. the ATIS code

Example: " ____ Tower, SportCruiser 642 Juliet Bravo on the ____ ramp, taxi for takeoff VFR to the northwest with information Alpha."

See www.vectorsportaviation.com for a radio calls "cheat sheet" you can carry on your kneeboard.

Taxi

Brakes checked

When the aircraft first begins to roll forward, gently press both brakes at the same time. The aircraft should slow down tracking straight ahead.

If a brake fails then the aircraft will swerve to one side. If this happens, pull the power to idle and turn off the ignition switch.

Flight Instruments checked

These instruments are checked during taxi because they are gyroscopic instruments and it may not be evident that they are malfunctioning unless you are turning.

- Attitude indicator – Should stay level in turns
- Ball – The ball at the bottom of the screen will move opposite your direction of turn.
- Heading Indicator – Should track with your heading. The heading trend indicator, a magenta line below the heading indicator, will extend in the direction of your turn.

Before Takeoff

Three items on this checklist; Fuel quantity & balance, Flaps, and Trim have been accomplished on previous checklists but are repeated here to accommodate “full stop and taxi back” training operations.

Fuel quantity & balance check

Ensure that you have adequate fuel for your flight and consider switching tanks if they are unbalanced.

Engine instruments checked

The most critical engine instruments are:

- Oil pressure
- Oil temperature
- Cylinder head temperature (CHT)

These must be “in the green” during all phases of flight.

Caution: Do not proceed with this checklist until engine temperatures are “green.” If the engine is not yet warm, set 2,500 rpm and wait for the engine to warm up.

Throttle..... 3500 – 4000 rpm

Ignitionchecked & BOTH

Check both sets of electronic ignition systems and spark plugs by moving the ignition switch to select each set of spark plugs individually and then reselecting “BOTH.”

The typical procedure is:

- While watching the tachometer, move the ignition switch one position to the left and pause. The engine should continue to run smoothly and you should see the engine speed drop by no more than **300 rpm**.
- Move the ignition switch one position back to the right (to the “BOTH” setting) and the engine should return to its original RPM.
- Now move the ignition switch two positions to the left and pause. The engine should continue to run smoothly and you should see the engine speed drop by no more than **300 rpm**. The RPM difference between the two ignition systems should be no more than **120 rpm**.

In summary; while watching the tachometer, move the ignition switch:

- 1 click left
- 1 click right
- 2 clicks left
- 2 clicks right

Maximum **300 rpm drop**

Maximum **120 rpm difference**

Carburetor heatchecked & COLD

While still watching the tachometer, pull the carburetor heat control knob all the way out to turn it ON. If it is working properly, you will see the engine RPM decrease slightly. Push the knob all the way back in to the COLD setting and the engine speed will increase to its original setting.

Oil pressure checked

Indicator should be in the green band.

Throttle..... IDLE

Oil temp checked

CHT checked

Voltmeter & Ammeter Checked

Indicators should be in the green bands.

Operation of electrical equipment normally

causes fluctuations of the voltmeter and ammeter.

Flaps 10°

Trim **takeoff**

Reference the EMS to set aileron and elevator trim for takeoff.

Controls..... **free & correct**

Move each control surface to full deflection in both directions to confirm that there is no binding or restriction of the controls and that they move in the correct direction. When you move the stick toward a control surface, the surface RISES.

Fuel pump**ON**

The electric fuel pump must be ON for engine start, takeoff, landing, and switching fuel tanks when airborne.

Transponder **ALT**

On this setting, the transponder transmits your altitude to radar air traffic controllers.

Takeoff brief **complete**

Recommended items:

- type of takeoff and procedures
- winds
- subsequent landing or departure from the traffic pattern.
- threats (“We need to be careful about...”)

Canopy **locked**

After locking canopy, check that canopy lock is engaged by pushing hand up against the top of the canopy. The canopy should be secure and not lift up when pushed against.

Radio Call for Takeoff.....**as req'd**

At a controlled field, you must get clearance to takeoff before you cross the runway hold-short line. Since you communicated your intentions on your previous call to the ground controller, you should only need to tell the tower that you’re holding short of the runway.

Example: “ ___Tower, SportCruiser 642 Juliet Bravo, holding short, runway 12.”

When the tower can tell you:

- Hold short

- Position and Hold
- Cleared for Takeoff

When the tower gives you these instructions, *you must read them back*.

*At non-controlled airfields such as Chandler, you will self-announce to other pilots on a given COMM (CTAF) Frequency, by keying the microphone on the control stick. After listening and visually scanning for pattern traffic announce:

“**Chandler Traffic** (who you are talking to), **SportCruiser 642 Juliet Bravo** (who you are), **departing Three Zero** (runway number) for **left closed traffic** (intention), **Chandler**” (end with who you are talking to).

When taking the runway, the following are recommended *techniques*:

- **Time** – It is a good habit to write down the time before taxiing onto the runway. This will be important for cross-county navigation.
- **Landing light** – Turn on the landing light before taxiing onto the runway and leave it on while in the airport traffic area.
- **Heading** – On the runway, check the heading indicator against the runway number.
- **Engine** – Check the engine gauges in the green one more time before adding power.

Normal Takeoff

Note: This checklist is not meant to be read before each takeoff but is included for reference. You may wish to review it during the Takeoff Brief in the Before Takeoff checklist.

Flaps**10°**

Our normal flap setting for takeoff is 10 degrees. The SportCruiser does not require extended flaps to get airborne but they are used to shorten ground roll.

Throttle **full forward**

With the throttle full forward, the engine RPM should be approximately 4850 rpm. The RPM will increase as your aircraft speed increases.

Maximum Takeoff RPM – **5,800 rpm for 5 minutes**

Maximum Continuous RPM – **5,500 rpm**

Normal Cruise RPM – 4,800 – 5,300 rpm

Rotate speed 35 – 40 kts

Climb speed 60 – 75 kts

≥ 250' AGL

Flaps UP

Departing Pattern

Fuel pump OFF

It is not necessary to turn the fuel pump off between landings in the traffic pattern.

Cruise

Complete the Cruise checklist upon leveling off at cruise altitude and repeat it approximately every 15 minutes of flight or between sets of maneuvers.

Engine instruments checked

All instruments “in the green.” Pay particular attention to these important engine instruments:

- Oil pressure
- Oil temperature
- Cylinder head temperature

Fuel quantity & balance checked

- Ask yourself: “Do I have enough fuel to land at my destination with adequate reserves?”
- Set fuel selector to fullest tank. To change tanks:
 - o turn the fuel pump ON
 - o move the fuel selector valve
 - o turn the fuel pump OFF

Fuel pump OFF

This is included in case you forgot to turn it off departing the pattern or after maneuvers.

Exterior lights as req'd

- Turn the landing light OFF.
- At night or within ½ hour of sunset, turn the navigation lights and instrument lights ON.

Maneuvers

Perform this checklist before performing “high work” maneuvers (slow flight, stalls, steep turns, lazy eights, & chandelles).

Fuel pump ON

Fuel selector fullest tank

Pick emergency landing area

Perform clearing turns

Check for traffic by performing one or two turns totaling at least 180°.

Airspeed ≤V_a (88 kts)

Note: At V_a or below, full deflection of the stick cannot overstress the aircraft.

Descent

AWOS/ATIS recorded

Altimeter set

Engine instruments checked

All instruments “in the green.”

Caution: When descending in cooler ambient temperatures, the oil temperature and cylinder head temperature can easily fall below the normal operating range. The primary method for keeping temperatures high enough in cold weather is installation of inlet air baffles before flight. However, if you are airborne and having trouble with engine over-cooling, you may consider these strategies for maintaining normal engine temperatures:

- Maintain a higher cruise airspeed.
- Descending in rough air, begin your descent early enough to allow periodic level-off to increase power.
- Descending in smooth air, use a cruise power descent at higher airspeeds to maintain higher engine temperatures.
- Use a forward slip to descend quickly so that the engine has less time to cool.

Fuel quantity & balance checked

With how much fuel will you land? Do you have enough for practice landings? Switch tanks as necessary.

Approach brief complete

- Pattern entry plan
- Type of landing

- Threats – Think “Where am I most likely to get in trouble?” and state the most likely source of trouble.

Radio calls - pattern entry/landing...as req'd

Make radio calls prior to pattern entry and landing as required/appropriate for towered or non-towered field.

Landing

Seat belts fastened

Fuel pump ON

Fuel selector valve fullest tank

Flaps as required

After Landing

Warning: Do not accomplish any checklist item before taxiing clear of the active runway (all parts of the aircraft beyond the hold-short line) and stopping the aircraft.

Exterior Lights as req'd

Turn the landing light OFF during daylight hours or to avoid shining it in others' eyes.

Canopy unlocked

Flaps UP

Fuel pump OFF

Transponder STBY

On this setting the transponder remains powered but does not respond to radar interrogations.

Shut Down

CAUTION: It is important to turn off electrical equipment prior to engine shutdown to prevent voltage spikes from harming the instruments.

Parking brake as req'd

Autopilot switch..... OFF

Removes power from the autopilot. Turn off if req'd.

Exterior lights..... OFF

Turn off Landing light (LDG-L), Navigation

lights (NAV-L), and Strobe light (STROBE) switches as req'd.

Avionics switch OFF

Removes power from aircraft avionics systems.

Instruments switch..... OFF

Removes power from the engine monitoring system (EMS).

Ignition sequence OFF

Turn the ignition switch counterclockwise one click at a time, pausing to check the operation of each ignition system. Rotax engine ignition system problems are normally found during shutdown.

Remove key from ignition and secure as req'd.

Master switch OFF

This removes power from all aircraft electrical equipment. All switches in front of the pilot should now be OFF. The Dynon EFIS will run on battery and turn off in specified number of seconds if left untouched. Should the EFIS not power off after 20 seconds, you may manually power it off by pressing and holding the left most button on the EFIS.

Hobbs time record

Record mechanical Hobbs Meter time.

Instrument panel cover.....installed

If you will be securing the aircraft or leaving the canopy open with the sun aft of the aircraft then you must install the panel cover.

CAUTION: The canopy acts as a parabolic mirror which can concentrate the sun's rays on a small point and burn a hole through the top of the instrument panel.

Secure

This checklist is for securing the aircraft overnight. Secure the aircraft if another pilot is not present to take responsibility for it.

Hangar or tie downs, chocks as req'd

Chock both main wheels. Chocking the nose wheel is not effective because the wheel is free-castering and can pivot to the side.

Parking brake released

The parking brake should not be left engaged for long periods, especially when the brakes are hot.

Gust lock..... as req'd

Place a seat belt around a control stick and tighten the belt to immobilize the stick. This "gust lock" helps prevent damage to the controls from winds, propwash, or jet exhaust. This is not necessary when parked in hangar.

Pitot tube cover installed

Canopy closed & latched/locked

It is much easier to get the canopy aligned with the latches when you hold the canopy near the center of the aft bow when lowering it. Leave latched when parked in hangar. If not hangared, lock canopy when left unattended.

Canopy cover as req'd

WARNING: Use these checklists in accordance with the "Expanded Checklists" available at www.vectorsportaviation.com. Rev. 07/09

CZAW SportCruiser Operating Information & Limitations:

“V-Speeds” – The “V” stands for velocity. These are standard terms for airspeeds pilots use to safely operate their aircraft. They are generated by the manufacturer from flight testing and are revised over time as the aircraft are changed.

Definitions for these speeds are found in the Federal Aviation Regulations, Part 1, Section 1.2:

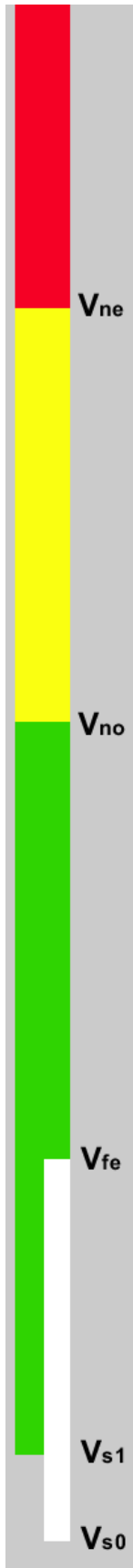
Abbreviations and symbols. The speeds themselves are found in the Pilot Operating Handbook (POH) on the page specified.

What you must memorize are:

- Speeds which are not on the airspeed indicator: V_x , V_y , V_a , and the best glide speed.
- The meanings of the white, green, yellow, and red colored bands on the airspeed indicator.

Warning: The following information is from the Pilot Operating Handbook of SportCruiser serial #08SC243 (N642JB) and may not apply to other aircraft.

Symbol	Speed (knots)	Definition	POH Section
V_{ne}	138	Never-exceed speed. This is the top of the yellow band and the bottom of the red band on the airspeed indicator.	3.4
V_{no}	108	Maximum structural cruising speed; the maximum speed in turbulent air. This is the top of the green band and the bottom of the yellow band on the airspeed indicator.	3.5
V_a	88	Maximum maneuvering speed. At or below this speed, full control stick deflection cannot over-stress the airplane structure.	3.3
V_{fe}	75	Maximum flap extension speed. Do not extend flaps, or fly above this speed while the flaps are extended. This is the top of the white band on the airspeed indicator.	3.2
V_y	65	Best rate-of-climb speed. Use this as your climb speed after takeoff and after you are above all obstacles.	7.5.2
Glide	60	Best engine-out glide speed. Being above or below this speed will shorten your glide.	7.7
V_x	60	Best angle-of-climb speed. Use this speed when you are climbing above obstacles, then transition to V_y .	7.5.1
V_r	32	Takeoff rotation speed. The nose wheel will rise at 32 knots and the aircraft will get airborne at 42 knots. Most pilots rotate at slightly higher speeds (about 35 – 45 kts.), especially in windy conditions.	7.4.2
V_{s1}	39	Stalling speed with flaps up at maximum takeoff weight of #1320. This is the bottom of the green band on the airspeed indicator.	3.1
V_{s0}	32	Stalling speed in the landing configuration (flaps full down) at maximum takeoff weight of #1320. This is the bottom of the white band on the airspeed indicator.	3.1



Winds: Maximum "demonstrated" capability for takeoff and landing

Headwind 24 knots
crosswind 12 knots

Load Factors (G's), maximum

Positive +4 G
Negative -2 G

Engine

Oil Pressure

At engine start pressure indicated within 5 seconds
<3500 rpm 12 psi minimum (Above Red band)
>3500 rpm
 Caution 12 – 28 psi (Yellow band)
 Normal 29 – 73 psi (Green band)
 Caution 73 – 102 psi (Yellow band)

Oil Temperature 122 – 266° F (Green band)

Cylinder Head Temperature

Minimum 122° F (Red band)
Normal 167 – 230° F (Green band)
Caution 230 – 275° F (Yellow band)
Limit 275° F (Red band)

RPM, maximum

Takeoff 5,800 rpm for 5 minutes
Continuous 5,500 rpm
Normal Cruise 4,800 – 5,300 rpm
Cruiser using 100LL 5,000 – 5,300 rpm

Ignition system check

Drop 300 rpm, max.
Difference 120 rpm (maximum difference between drops on left and right ignition checks)

Starter Duty Cycle

ON 10 seconds
OFF 2 minutes

Caution: Engine normally starts within 1-2 seconds. If it takes long three seconds, discontinue the start and try a different choke setting.

Fuel Quantity

Preflight planning & Before Start Checklist

FAR limits Plan to land with ≥ 30 minutes
VSA limits Takeoff with ≥ 10 gallons. Normal takeoff fuel for local training is 14 – 20 gallons.
Land with ≥ 6 gallons.

Airborne

Minimum Fuel 6 gallons: Land at nearest field with fuel services.
Emergency Fuel 4 gallons: Declare an emergency and land at the nearest suitable field without regard to destination or services available.

Required Documents

Airworthiness certificate
Registration
Operating Handbook
Weight and Balance (in POH)
Limitations

Prohibited Manuevers:

Intentional spins
Aerobatics

Allowed manuevers include:

Lazy eights, chandelles
steep turns up to 60° angle of bank stalls, except whip stalls

CZAW SportCruiser PATTERN WORK

Crosswind Takeoff

- On runway
 - Aileron into wind
 - Anticipate opposite rudder
- During acceleration
 - reduce aileron & rudder input
- Rotation
 - Slightly higher rotate speed
 - Normal pitch rate (Slow rotation → skid sideways)
- After trimming to climb attitude
 - Crab into wind
 - Technique: GPS track indicator on runway heading

Short Field Takeoff

- Flaps 10°
- Use all the runway
- Hold brakes and apply full power
- Check static RPM ≅ 4850
- Full right rudder
- Release brakes
- Reduce rudder as speed increases
- 55 kts - Rotate to 60 knot climb attitude
- Above obstacles → Normal climb
- 200' AGL → Flaps UP
- Pattern altitude → Fuel pump OFF

Soft Field Takeoff

- Flaps 10°
- Taxi with full aft stick. Keep moving. Don't stop on runway.
- Full power, right rudder, full aft stick
- When airborne, lower nose to accelerate in ground effect
- 65 knots → Set climb attitude
- 200' AGL → Flaps UP

Crosswind Landing

- Add 5 knots + headwind gust component to final approach speed
- On Final, cross-control
 - Aileron controls drift
 - Rudder keeps nose aligned with runway
- Upwind main wheel touches down first

Short Field Landing

- Set up a power-on approach: 3° glideslope
- Final Approach
 - Flaps 30
 - Trim for 50 - 60 knots
 - Aim point on threshold
- Field made → Power IDLE
- Normal flare & touchdown
- After nose gear touches down
 - Brake gently - Don't skid
 - Full aft stick - Nose wheel stays on ground

Soft Field Landing

- Normal approach & landing
- After touchdown
 - Ease stick full aft to keep weight off nose
 - Minimum braking
 - Do not stop on soft surface until necessary

Go-Around (from flaps 30 approach)

- Full power
- Set 65 knot attitude
 - TRIM for 65
- Flaps 20
 - TRIM for 65
- Flaps 10
 - TRIM for 65
- Flaps UP
 - TRIM for 70 - 80

CZAW SportCruiser "HIGH WORK"

Power-On Stall – Simulates stall during climb-out after takeoff

- $\geq 1,500'$ AGL
- Maneuvers Checklist
- Power 3,000 rpm & maintain altitude while slowing
- At 50 knots, simultaneously:
 - Full power (increase right rudder to keep ball centered)
 - Increase back stick pressure/pitch attitude to induce stall

Stall Recovery – At first buffet or uncommanded pitch or yaw

- Reduce back-stick pressure to lower nose to level flight attitude
- Accelerate to 65 knots
- Set climb attitude to return to initial altitude

Power-Off Stall – Simulates landing pattern & stall during approach

- $\geq 2,500'$ AGL
- Maneuvers Checklist
- Power 4,000 rpm
- Landing Checklist
- Power IDLE & maintain altitude

At 75 knots:

- Flaps 10, trim to 65 knot glide (about 3 clicks nose up)
- Flaps 20, trim to 65
- Flaps 30, trim to 65
- Level at current altitude to induce stall

Stall Recovery – At first buffet or uncommanded pitch or yaw

- Simultaneously:
 - Ease back-stick pressure to lower nose
 - Full power
 - Right rudder to keep ball centered
- Flaps 20, trim 60 - 70 knots
- Flaps 10, trim 60 - 70 knots
- Flaps UP; level aircraft, reduce power & trim

Slow Flight

- $\geq 1,500'$ AGL
- Maneuvers Checklist
- Power 3,000 rpm

At 75 knots:

- Flaps 30
- Maintain level flight at 40 knots
 - Stick controls speed
 - Power controls altitude
 - Keep ball centered with rudder
- Perform shallow turns
 - Keep ball centered with rudder

Recovery

- Full power (keep ball centered with rudder)
- Accelerate in level flight
- Raise flaps in stages (flaps, trim, flaps, trim, ...)

CAUTION: Do not accelerate above 75 knots until flaps are fully retracted. You may need to reduce power while raising the flaps to slow your acceleration.

Steep Turns - Two 360° turns at 45° AOB

- Maneuvers Checklist
- Establish level flight around $\equiv 85$ knots (not $>V_a$)
- Choose reference point on horizon
- Set 45° AOB attitude and increase power slightly
- Maintain 45° AOB level turn at 85 knots

Approaching initial heading:

- Smoothly reverse turn and perform 360° turn in opposite direction.
- Roll out on initial heading and altitude

SportCruiser Power-Off Approach Technique

