PIPISTREL

AIRCRAFT INFORMATION

Virus SW 100 iS

100 HP (Rotax 912 iS2)

Fuel Injected Engine

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Introduction

This document is published for the purpose of providing general information about the Pipistrel Virus SW 100 iS aircraft with fuel injected engine. Distributors/promoters and customers should familiarize themselves with this document to assist in their evaluation of this aircraft.

Should more information be required, please contact

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This document has been produced to provide general information about the Pipistrel Virus SW 100 iS Aircraft in February 2013. With the ongoing development of the aircraft Pipistrel reserves the right to revise this document whenever occasioned by product improvement, government/authority regulations or any other good cause.

Important note: This document describes the configuration and performance for a Virus SW 100 iS flown at 600kgs. In some markets, like the LSA version for the USA the aircraft is restricted to 550kgs to meet the strict stall requirements.

General description

All information herein applies to the Virus SW 100 iS fitted with Rotax 912 iS2 100 HP engine in both UL and LSA configurations. The Virus SW 100 iS is a pre-molded, composite build, two seat, single engine, high wing, taildragger or tricycle design, high performance, high speed and very economical light aeroplane. The abbreviation **SW** stands for **S**hort **W**ing and although it carries the original Virus name the construction and materials differ considerably to the standard Virus.

Basic Information

Virus	Virus SW 100 iS 100 HP
wing span	10.71 m (35 ft 1 inch)
length	6.5 m (21 ft 3 inch)
wing area	9.51 m^2 (103ft^2)
aspect ratio	11.3
flap positions	-5°, 0°, +9°, +19°

Weights, fuel and centre of gravity

The design maximum take-off weight for the Virus SW 100 iS is 600 kg (1322 lbs) with typically more than 300 kg (661 lbs) useful load and the fuel capacity of 100 liters (26 gallons).

Virus SW 100 iS 100 HP	
standard empty weight	292 kg (644 lbs)
max. take-off mass (MTOM)	600 kg (1322 lbs)
fuel capacity	2 x 50 L (2x13 US gal)
useful fuel (in flight attitudes)	2 x 47 L (2x12.4 US gal)
baggage load (typical, depends on actual aircraft configuration, instruments etc.)	40 kg (88 lbs)
centre of gravity (MAC)	25% - 37%

Design loads

+4 G, -2 G (design and tested safety factory minimum 1.875!)

3-view drawing

Showing the Virus SW 100 iS in Nose Wheel (tricycle) configuration, dimensions are in mm (metric).

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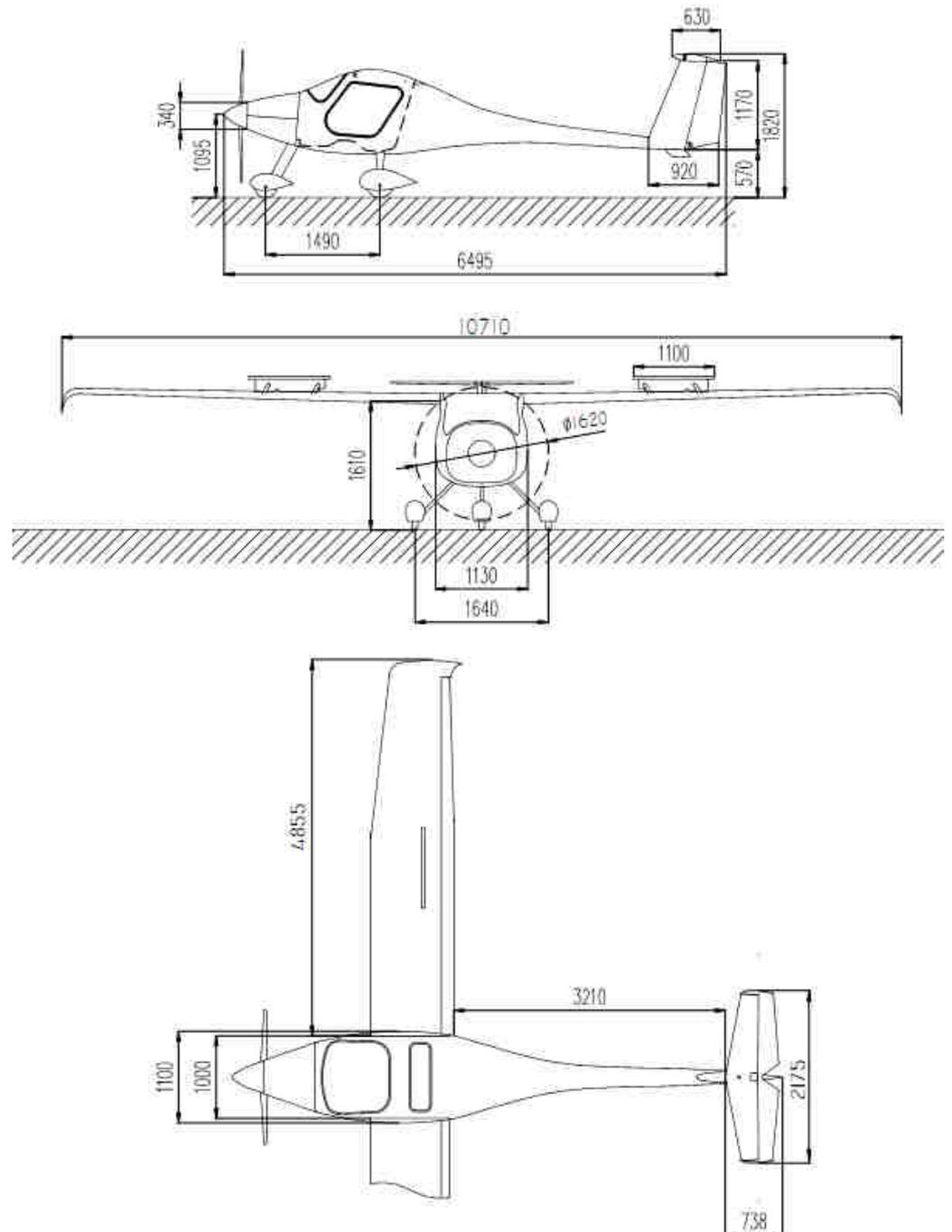
Performance

Data published for take-off weight of 600 kg (1322 lbs), ISA conditions at sea level. LSA aircraft have fixed pitch propellers and are limited to a full power, maximum straight and level speed of 120 knots as required by the FAA. UL and experimental aircraft don't have these speed or propeller limitations.

Aircraft	Virus SW 100 iS 100 HP	Virus SW 100 iS LSA 100 HP
VS0 (stall with full flaps)	40 kts (74 km/h)	40 kts (74 km/h)
VS1 (stall in clean configuration)	45 kts (84 km/h)	45 kts (84 km/h)
Vx (best climb angle)	52 kts (97 km/h)	52 kts (97 km/h)
Vy (best climb speed)	80 kts (148 km/h)	80 kts (148 km/h)
Va (maneuvering speed)	93 kts (174 km/h)	93 kts (174 km/h)
Vb (rough air speed)	135 kts (240 km/h)	135 kts (250 km/h)
75% cruise speed	147 kts (273 km/h)	118 kts (219 km/h)
Vh (max. horizontal speed)	153 kts (283 km/h)	120 kts (222 km/h)
VNE	163 kts (302 km/h)	163 kts (302 km/h)
best climb rate	1680 fpm (8.4 m/s)	1020 fpm (5.1 m/s)
best L/D at	64 kts (118 km/h)	64 kts (118 km/h)
best L/D	1:15	1:15
take off run	310 ft (95 m)	410 ft (125 m)
take-off over 15 m (50 ft) obstacle	575 ft (175 m)	790 ft (240 m)
service ceiling (estimate)	22,300 ft (6800 m)	17,900 ft (5450 m)
45°-45° roll time	1.6 sec	1.6 sec
fuel consumption (75% cruise)	15.7 lph (4.2 gph)	12.1 lph (3.2 gph)
endurance (75% cruise)	5.8 hours	7.6 hours
range (75% cruise)	840 NM (1550 km)	885 NM (1639 km)

What is new?

At Pipistrel we see the Virus SW 100 iS as the third generation of the original Virus 912. This section will, for the most part, compare the Virus SW 100 iS to the "normal" Virus 912 with 12.46 m (41 ft) wingspan.

Fuel injected engine

The Rotax 912 iS engine is the newest generation or the proven and reliable Rotax 912 engine family. The 912iS engine is fuel injected, with dual redundant sets of fuel injectors, ignition systems, engine computers and electrical generators. Fuel consumption is up to 21% lower when compared to the carbureted 912 ULS engine, thanks to the mixture constantly being regulated to optimum.

Fuel System

The fuel system now features dual header tanks and the fuel selector with dual fuel returns.

Skyview avionics

Skyview SV-700 advanced EFIS/EMS with GPS is standard!

Electric Trim

Electric elevator trim is now standard, with electronic indicator and link to Skyview.

Improved cockpit heating

Cockpit heat system has been reworked and is greatly improved in its efficiency.

Geometry

Main differences from the "normal" Virus 912 are the new 10.71 m (35 ft) wingspan and the all new horizontal tailplane (much smaller span, reduced by 80 cm/31.5 inch).

Structure

The entire structure on the Virus SW 100 iS is completely new from ground up. Reinforced fuselage, reinforced tail, reinforced wings, everything is modified to provide the correct strength required for higher speed safety. Pipistrel managed to produce an aircraft almost 2 times stronger than the original Virus, using advanced honeycomb techniques and other special approaches to composite building.

Optimized for SPEED with SAFETY in mind

Maneuvering speed was raised from 76kts (140 km/h) to 93 kts (174 km/h), turbulence penetration speed (green arc) was raised from 76kts (140 km/h) to 130kts (240 km/h) and the VNE from 135kts (249 km/h) to 163kts (302 km/h).

This means that you can cruise through heavy turbulence at speeds which were before beyond red-line speeds for the original Virus. The new Virus SW 100 iS has the largest flight safety margins in its category and is normally equipped with the total rescue system, which can be deployed even at maximum speeds and close to the terrain.

Slow flying performance and behavior however stays the same as with other Pipistrel aircraft. The Virus SW 100 iS remains stable and conforms to the microlight/ultralight rules in Europe (stall speed 64 km/h at 472.5 kg). The Virus SW 100 iS also conforms to LSA rules for stall performance (below 45 KCAS).

All control surfaces are balanced to prevent any kind of flutter. This includes a completely new approach to elevator balancing (integrated balancing weights to reduce drag), rudder balancing (integrated weights + added ventral fin for stability) and ailerons which of course are balanced with a large safety margin as well.
Test flights have demonstrated that the Virus SW 100 iS indeed flutter free throughout the operational envelope up to Vd.

Part of the 'going-the-speed' game are also reinforced door frames and front windshield. The front Lexan is now thicker and supported with double support bars, giving the aircraft an even sportier look while not obstructing the view.

Balanced controls
Primary flight controls (ailerons, elevator and rudder) have been harmonized to give the best possible pilot-feel even at super-high speeds. The elevator is no longer sensitive in the yellow-arc and the aircraft handles like a little jet fighter! Also, what is very important to people not flying gliders, the required rudder input has been reduced to the bare minimum and there is no apparent adverse yaw even with full flaps.

New standard outfit – standard equipment
As the Virus SW 100 iS targets at a different set of pilots (not glider pilots but more so "power" pilots who want speed and economy), there are also different expectations these pilots have. Take your time to review the standard equipment options for the Virus SW 100 iS as these are completely different to the standard Sinus/Virus line.

Livery and tinted glass

Pipistrel wants to clearly differentiate the Virus SW 100 iS from the existing Sinus and Virus products and this is why the aircraft carries a whole new decal design.

The top and bottom stripes are sterling (metallic) silver while the middle stripe is wine-red. The color of the middle stripe can be matched to the color of leather seats if applicable.

Alongside the new livery each aircraft carries the NASA logo with Victory titles (in front of left side-door).

All glass surfaces are tinted lexan giving a sporty, yet luxurious appearance.

Frequently Asked Questions

This section is an attempt to sum up various questions people may have about the Virus SW 100 iS. Please take your time and review them, they will be helpful in learning more about the Virus SW 100 iS.

NASA Challenges

What are NASA Challenges and what exactly did the Virus SW win in 2007 and 2008? See the links below and search for CAFE Challenge…

http://www.pipistrel.si

http://www.pipistrel-usa.com

Can I do aerobatics, spins in the Virus SW 100 iS?

The design foundations for the Virus SW 100 iS follow the strictest EASA CS-22, CS-VLA and CS-23 (sections) certification standards, as well as their FAA FAR counterparts. More than a year of ground structural and vibration tests went by without a glitch, followed by an extensive flight test program with more than 100 hours cumulative tests. The Virus SW 100 iS a high-performance airplane but it is not suitable for aerobatics, despite the +4 G, -2 G allowable loads. Pipistrel cannot prevent people doing aerobatic maneuvers in the Virus SW 100 iS, but we do not approve it – the reason is in aerodynamics. The Virus SW 100 iS has so little drag that it picks up speed MUCH quicker than other aircraft. This can be dangerous in aerobatic maneuvers (also spins, which are completely recoverable) and an average pilot can very quickly overstress the airframe because of high airspeed. The aircraft can reach 350 km/h (190 kts) in a dive in 3 seconds!

Exterior paint

The paint used is a special acrylic based pigment, which is applied during the molding process. Pipistrel aeroplanes are not after-painted like most other aeroplanes – instead, paint is applied onto/into the structure while molding. This makes the paint much more durable and resistant to UV light and environmental contaminants. Recommendations for care and cleaning of the aircraft can be found in the Flight manual and Maintenance manual, section Handling and Maintenance, chapter Keeping your aircraft in perfect shape.

Wheels/Tires

Standard wheels have 4.00 x6 4-ply tires, which are adequate for use on grass/gravel and light use on hard (asphalt, tarmac, etc.) runways. If you anticipate using the aircraft on asphalt only, consider ordering tires with more plies. Pipistrel offers tires with 4, 6, 8 or 10 plies.

Certification

The Pipistrel Virus SW 100 iS is certified and approved around the globe, please contact your local dealer for full details.

Leather seats and colors

People often ask – is the leather upholstery offered as optional equipment truly leather? Yes, we use 100% genuine NAPA leather with Bovine texture in choice of colors which are published on our website (see Gallery). The customer can choose the color of the seats and surrounding upholstery (side carpets, firewall, instrument panel pockets etc.) separately. Up to two different colors per aircraft can be selected, for example: Red seats with Vanilla interior.

The middle stripe in the Virus SW 100 iS decals can be colour matched to the color of the leather seats if requested.

Real life performance

Pipistrel publish real/true performance data for all their aircraft and the Virus SW 100 iS is no different. All performance figures are accurate and acquired from test flights.

Based on experience, you can for a hot summer day expect the cruise speed figures to be a maximum 10 km/h (5 kts) less than those in ISA Sea Level and take-off performance degraded by maximum 20%. Regardless, Virus SW 100 iS the best performing light aircraft on the market.

Glass cockpit

Standard instrumentation is the highly regarded Dynon Skyview (7" single screen EFIS + EMS) or the Dynon SkyView 10" system for an additional price (see price lists). Other instrumentation packages are also possible and can be customized to your requirements including auto pilot, long range fuel etc..

Tinted glass – choice of colors

We have tested blue-tinted glass, green-tinted glass and brownish tinted glass. Finally we have selected brown tint for all lexan transparent surfaces – not only because of the looks but also because of performance. Brown is the only color of tint which does not degrade visual performance. This means that you have the same unobstructed view and the same contrast looking out of the cabin in bright sunshine as on an overcast day.

Baggage allowance

Baggage is stored in the solid luggage compartment behind the seats, which is easily accessible through the optional side access door or through the seats. Baggage allowance varies on the level of installed equipment and can be calculated for each individual aircraft using the formulas in Flight manual and Maintenance manual, Section Weight and Balance. Typical baggage allowance for the Virus SW 100 iS 40 kgs (88 lbs).

Is it possible to buy an extra pair of wings for the Virus SW 100 iS?

People sometimes ask….   is it possible to buy an extra pair of wings for the Virus SW 100 iS, for example the Virus SW 100 iS + long (Sinus 15 m - 49 ft) wings?

NO, this is not possible due to structure of both wings. The Virus SW 100 iS is only available with 10.71 m wings and the whole structure and geometry is based on this design to be optimized for speed, safety and comfort.

Is it possible to have Rotax 914 Turbo with the Virus SW 100 iS?

No. Not for the moment at least. The Virus SW 100 iS with 100 HP is already the fastest cruiser (75%) in its class, so the wish for the 914 is slightly redundant and it's a much more expensive engine with more maintenance and a more complicated installation.

Propeller

The propeller is variable pitch, but NOT featherable on the Virus SW. It can be controlled manually by knob and cable just like the Sinus and Virus models or it can be supplied with the optional electronic constant speed controller for easy use.

Why are airbrakes not part of standard equipment?

Based on two facts we have decided not to include airbrakes in the standard equipment of the Virus SW 100 iS.

a) The aircraft has shorter wings and has more sink with full flaps at landing speeds.
b) There are a considerable number of pilots who primarily fly on long runways.

Our recommendation would be to install airbrakes on the aircraft if you intend to operate from runways shorter than 500 m (1700 ft) in length or from runways which require a steep approach.

Manuals and documentation

The Flight and Maintenance manuals are published on our websites. There are different manuals for different markets because of the varying maximum takeoff weights in use around the world and also the different registration categories.

Manuals can be downloaded in the following configurations….

- LSA manuals, maximum takeoff weight 600 kilograms.
- Ultralight manuals, maximum takeoff weight 450-472.5 kilograms
- Experimental manuals, maximum takeoff weight 600 kilograms
- as well as several other manuals specifically for different markets

Manuals can be downloaded from the following two websites.

http://www.pipistrel-usa.com

http://www.pipistrel.si

Photos

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