

PIPISTREL



AIRCRAFT MAINTENANCE MANUAL

VIRUS SW 121

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Aircraft Maintenance Manual



Virus SW 121

Authority: Verified and approved under the authority of DOA No.: EASA.21J.524

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**The airplane must be operated in compliance with
information and limitations contained herein.**

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AIRCRAFT DESCRIPTION

Pipistrel's Virus SW 121 is a two-seat, all-composite, high wing monoplane with cantilevered wings, conventional empennage (T-tail) and tricycle landing gear. The airplane is arranged as a high wing mono-plane with cantilevered wings and a conventional empennage with a T-tail. The main landing gear strut is made of basalt fiber and has two parallel elements that produce a semi-redundant structure that allows for predictable stress point locations. The strut is composed by two parallel elements producing a semi-redundant structure and allowing for predictable locations of stress points. The nose landing gear is integrated into the engine mount. It's steerable, connected to the pedals and incorporates an oil-spring damper element.

The load-bearing structure of the airplane is made of carbon fiber composite material, the components of which, epoxy resin as well as carbon fiber materials, are in compliance with EASA aviation specifications. The proven low-pressure wet lay-up method from sail plain industry is used to build the airplane structure

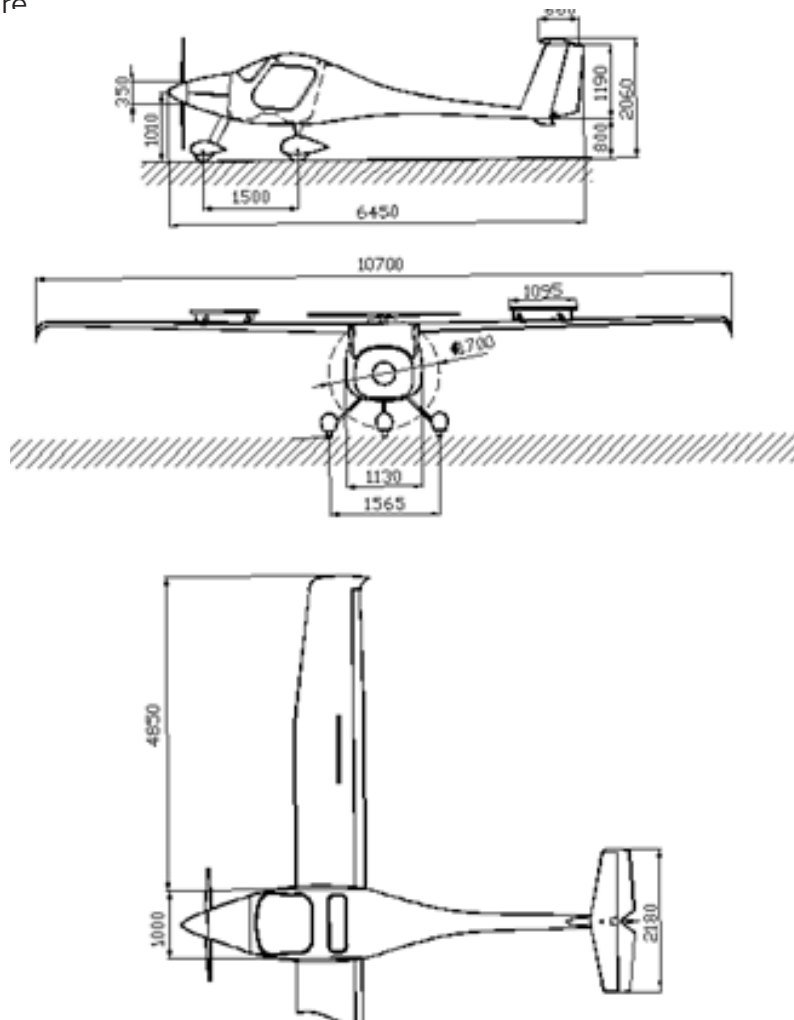


Figure 01-001
Virus SW 121

SCOPE

This Virus SW 121 aircraft maintenance manual (AMM) was prepared by Pipistrel d.o.o Ajdovščina for trained aviation mechanics. It contains a wealth of information about how to successfully clean, inspect, service, remove/install equipment on and operationally inspect the Virus SW 121. It does not, however, contain everything needed to keep the aircraft in airworthy condition. This manual must be used in conjunction with the installation/user/maintenance manuals pertaining to the components/equipment found on the Virus SW 121. Moreover, all airworthiness directives (AD) issued by the NAA in the country where the aircraft is registered, as well as all EASA AD's, must be adhered to. Lastly, this manual covers the as-delivered configuration and contains very little information regarding part numbers. For ordering information and part numbers please refer to the Virus SW 121 illustrated parts catalogue (IPC).

USING THIS MANUAL

This manual's structure is consistent with the standard chapter numbering system ATA 100. It's chapters also correlate to those listed in ASTM F2483-12, standard practice for maintenance and the development of maintenance manuals for light sport aircraft, thus proving compliance to CS-LSA REV 1 (See APPENDIX 99-A). The header on each page clearly displays the chapter number and chapter name. The page number and page revision number are displayed in the footer of each page.

The following warnings, cautions and notes can be found throughout this manual. They provide additional information about particular procedures and makes the owner/operator/mechanic aware of any safety hazards.

WARNING: These provide crucial information about things that may cause bodily harm.

CAUTION: These provide information about things that may component damage.

NOTE: These provide information such as tips and hints that aid the mechanic when carrying out a specific procedure.

List of abbreviations

Abbreviation	Description
MM	Maintenance manual
OM	Operator's manual
POH	Pilot operating handbook
MLG	Main landing gear
IPC	Illustrated parts catalogue
OEM	Original equipment manufacturer
ELT	Emergency locator transmitter
SB	Service bulletin
SL	Service letter
AD	Airworthiness directives
FH	Flight hours

List of applicable documents

The following is a list of OEM documents that should be on hand whenever the aircraft is being serviced or maintenance procedures are being performed. They're referred to frequently throughout this manual by a number in square brackets.

NOTE: Only the latest version/revision of the documents listed below should be used.

NOTE: Please refer to SB-121-00-80-001 for the current status of all Pipistrel documents that apply to the Virus SW 121.

Reference	OEM Document
[1]	Rotax 912 series MM
[2]	MT propeller MTV 33-series MM
[3]	MT governor P-8 series MM
[4]	Beringer wheel/brake system MM
[5]	Kannad 406 AF compact ELT MM
[6]	Mikrotechna Praha a.s. operating/installation instructions for the LUN 1128 altimeter
[7]	Mikrotechna Praha a.s. operating/installation instructions for the LUN 1116 airspeed indicator
[8]	Garmin G3X installation manual
[9]	Garmin GTX 328 transponder installation manual
[10]	Garmin GTR 225/GNC 255 TSO installation manual
[11]	TOST GmbH operating manual for tow releases (series E22)

List of applicable SBs, SIs and ADs

Please refer to Service Bulletin SB-121-00-80-000 for a list of applicable SBs, SIs and Ads. The owner/operator is required to acquaint themselves, or any maintenance staff, with their content before performing any maintenance procedures.

04

CHAPTER 04 – AIRWORTHINESS LIMITATIONS

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SECTION	SUBJECT	PAGE NUMBER
04-00	General Maintenance limitations Structural limitations	04-03

04-00 GENERAL

EUROPEAN AVIATION SAFETY AGENCY (EASA) approves the Airworthiness Limitations chapter in accordance with the applicable certification procedures and the type certification basis.

This airplane maintenance manual chapter 04-00 (Airworthiness Limitations) is approved with EASA approval No.TCDS A.573.

Service bulletins or other documents revising this chapter, which contain a statement that the document is EUROPEAN AVIATION SAFETY AGENCY (EASA) approved.

This chapter is approved and shows the mandatory limitations which were established as a result of the certification process of the Virus SW 121. It outlines the maximum replacement intervals and/or maintenance requirements for aircraft components, systems, and structures determined to be life limited and/or require monitoring through scheduled maintenance.

Where an interval is given in both flight time and calendar years, the limit that is reached first must be applied.

The time limits given in chapter 04 must be applied to ensure continued airworthiness of the Virus SW 121.

NOTE: Regular inspections of the airplane including replacement and overhaul of certain components are required to ensure continued airworthiness of the Virus SW 121.

The following airworthiness limitations and requirements are separated into groups as described below.

Maintenance Limitations - Component and system checks required to be performed during airplane scheduled maintenance.

Structural Limitations – Listing of any limitations associated with the aircraft's structure.

04-00
AIRWORTHINESS
LIMITATIONS**1. Maintenance limitations**

The scheduled maintenance requirements listed below must be adhered to:

- **Paint**

Areas exposed to direct sunlight must remain in original white color. No other color is permitted. Only certain areas which are defined in chapter 51-00 of this manual (for example, registration markings, placards and warning markings) may have a different color. The color for registration markings is (grey, red, blue).

- **Paint Finish**

Allowable paint on the wing will have an absorptivity not greater than 0.4, with an emissivity of at least 0.9.

The maximum allowable paint on the fuselage will have an absorptivity not greater than 0.6, with an emissivity of at least 0.7.

2. Structural limitations

The certification requirements require that the composite airframe structure, cabin, wing, empennage, their carry-through and attaching structure, whose failure would be catastrophic, must be designed to safe life cycle.

Pipistrel Virus SW 121 has been designed and tested for a selected airframe life of 10,000 flight hours with no special structural limitations or inspections.

The structural inspections given in chapter 05-00 cover all required structure checks.

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05

CHAPTER 05 – TIME LIMITS AND MAINTENANCE CHECKS**TABLE OF CONTENTS**

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05-50	UNSCHEDULED MAINTENANCE	05-16

05-00 GENERAL

It is the aircraft owner's responsibility to keep the Virus SW 121 in good, airworthy condition at all times and this chapter provides information on how to do it. It covers topics such as recommended intervals for the overhaul/replacement of components, scheduled/unscheduled maintenance for the Virus SW121 and general maintenance hints/tips. The time intervals mentioned in this chapter are those recommended by the manufacturer, Pipistrel d.o.o Ajdovščina, and should be considered the minimum required to keep the airplane in good operating condition.

It should be noted, however, that the NAA in the country where the aircraft is registered may have different requirements regarding time limits and maintenance checks. Its requirements must be adhered to at all times, including any directives or bulletins it issues. The requirements found in this manual DO NOT override those of the NAA.

All of the intervals and checks outlined in this manual were established based on test data taken in moderate conditions on grass runways. If the aircraft is operated in extreme conditions, such as those with drastically high/low temperatures, sandy environments and/or air with a higher than normal salt content, shortening the recommended intervals is advisable.

CAUTION: The NAA of the country where the aircraft is registered may, if deemed necessary, choose to shorten and/or lengthen the time limit/inspection intervals in this chapter. The aircraft owner/operator is required to acquaint themselves with NAA alterations/changes before maintaining/servicing the aircraft.

NOTE: Pipistrel reserves the right to change the contents of this manual, including maintenance intervals, and all/any changes will be published in the form of a revision.

NOTE: Only qualified aircraft mechanics with the appropriate rating are permitted to carry out the maintenance procedures outlined in this maintenance manual.

05-10
TIME LIMITS**05-10 TIME LIMITS**

Certain components installed on the Virus SW 121 have time limits which dictate when they're supposed to be overhauled or replaced. This chapter provides information about these limits. Pipistrel recommends the following items be overhauled or replaced at the following intervals or "On Condition" (O/C). O/C items must be overhauled or replaced when, upon inspection, it's determined that they're faulty, have incurred damage, are unserviceable or in bad condition.

CAUTION: All of the time limits outlined in Table 05-001 must be considered when performing the 100 hour/Annual inspection. Removal or overhaul of any these items must be entered into the aircraft technical log book.

CAUTION: If a components time limit is to occur before the next planned inspection, it must be included in the current inspection.

NOTE: The limits mentioned in Table 05-001 DO NOT indicate product lifetime and must not be interpreted as such.

NOTE: The date on the "EASA FORM 52", which is issued with a new Virus SW 121, is to be used as the basis for all inspected components listed in the following schedule.

Item No.	Description	Interval		Maintenance		Notes/Reference
		HRS	YRS	OH	RPLC	
1	Beringer wheel assembly	1000*	10*	X**		*Whichever comes first ** See maintenance procedures in [4]
2	Beringer brake assembly	2500*	5*	X**		*Whichever comes first ** See maintenance procedures in [4]
3	Beringer wheel assembly	10000*	20*	X**		*Whichever comes first ** See overhaul procedure in [4]
4	Beringer brake assembly	10000*	20*	X**		*Whichever comes first ** See overhaul procedure in [4]
5	ELT battery	1*			X	* After one hour of real transmission or before/on the battery expiration date. See [5]
6	ELT system		6*			* Various tests, inspection and replacements. See [5]
7	Propeller governor	2000		X		See MT propeller SB No. 1 R1 and [3]
8	Propeller	1000		X		See MT propeller SB No. 1 R1 and [2]
9	Engine Fuel Pump		5		X	See [1]
10	Muffler	2000			X	See 78-20
11	Engine	2000	15	X		See [1]—Extending or exceeding the TBO by %5 or 6 months is allowed, whichever comes first
12	Coolant		5		X	Or during overhaul at the latest or when the engine is replaced, whichever comes first
13	Nose gear shock absorber	2000			X	See 32-20
14	All flexible fuel lines except for ROTAX Teflon fuel hoses		5		X	
15	Flexible oil lines		5		X	
16	Flexible vent lines		5		X	
17	Rubber coolant hoses		5		X	
18	Gascolator O-ring				X	Upon reassembly, always
19	Hydraulic brake oil		5		X	
20	GRS ballistic parachute rescue system		6*			*Rescue system needs to be removed and sent to OEM for repacking. See 95-00
21	Engine mount rubber isolators		5*		X	*Replace earlier if required. See [1]
22	GRS ballistic parachute rescue system		30		X	*Rescue system needs to be removed, sent to OEM and replaced. See 95-00
23	TOST tow release mechanism	*	*	X		*2000 takeoffs (equivalent to 10000 actuations/releases). See [11]

Table 05-001
Virus SW 121 Time Limits

NOTE: The aircraft owner/operator and/or the person maintaining/servicing the aircraft is required to acquaint themselves with and implement the time limits listed in the various maintenance manuals referred to in Table 05-001.

05-20
SCHEDULED
MAINTENANCE**05-20 SCHEDULED MAINTENANCE**

The inspection schedule outlined in this chapter is what the manufacturer of the Virus SW 121, Pipistrel d.o.o Ajdovščina, regards as the minimum, in order to keep the aircraft in airworthy condition. The owner/operator is responsible for keeping the aircraft in airworthy condition and shall use this chapter as a guide. It is not, however, by any means the only guide that should be used. The NAA airworthiness directives in the country the aircraft is registered in MUST be adhered to, as well as those issued by EASA. Maintenance/service personnel is chosen by the aircraft owner/operator and thus it is also his/her responsibility to ensure they are qualified.

CAUTION: The owner/operator must give any personnel carrying out maintenance/servicing procedures on the aircraft access to records of any past maintenance, as well as all of the aircraft's documentation.

VISUAL INSPECTION

The most common task found in the Virus SW 121's inspection schedule is the visual inspection. This is essentially an inspection to determine the general state of a component and typically does not require disassembly/removal of any other assemblies/equipment nearby. It is to be performed according to the following criteria and with any/all aids deemed necessary:

Metal Parts – discolouration due to heat exposure, distortion, wear/cracks due to fatigue, corrosion, weld damage, cleanliness and any other forms of damage.

Moving Components – Proper and unhindered operation, alignment, sufficient sealing, cleanliness, sufficient lubrication, travel, general condition, fastening material secured, signs of excessive wear, cracking, corrosion, deformation, and any other forms of damage.

Fuel, Air, and Oil Lines – Kinks, deterioration, chafing, poor flexibility, obstruction, bend radius, cleanliness, sufficiently secured/fastened and any other forms of damage.

Fastening Material - corrosion, wear, damage, loosening (paint marker) and safety wiring intact.

Composite Components – general condition, cleanliness, deformation, dents, warpage, cracks, scratches and any other forms of damage/wear. Composite surfaces that are bare, therefore, not painted, can also be checked for signs of delamination, fluid saturation and wear.

NOTE: If any composite component damage is found, a tap test should be performed to determine how extensive it is. Refer to 51-10 for additional guidelines on how to properly perform a visual inspection and/or tap test on composite components.

Electrical Installations - loose, corroded, or broken terminals/connectors; chafed, broken, or worn insulation; fastening material intact, heat deterioration, deformation, hardening, and any other forms of damage.

Filters and Screens - contamination, obstructions, signs of wear/damage.

Areas with Liquids - Evidence of leaks, sealant condition, signs of bacteria growth, cleanliness, corrosion, delamination, separation of bond, and structural fatigue.

OPERATIONAL INSPECTION

The second most common task found in the Virus SW 121's inspection schedule is the operational inspection. This is essentially an inspection to determine whether the component/part/assembly functions properly and does what it's supposed to do. Operational inspections of control surfaces must include a positive check, which is where one person holds the control surface steady, while the other moves the flight controls in both directions. This check confirms that movement of the flight controls results in movement of the control surface.

NOTE: It is expected that whenever a specific part or component is inspected, the inspection will include observation and evaluation of the component's surrounding area.

SCHEDULED MAINTENANCE PROGRAMS AND REQUIREMENTS

All airplanes of EU registry must undergo a complete "a 100 Hour Inspection Program" each 12 calendar months and additional requirements of the NAA of the country where the airplane is registered.

The 100 Hour Inspection Program is required, in addition to a complete Annual Inspection, for all airplanes of EU registry.

Inspection Program Intervals

Annual Inspection Time Intervals

The inspection interval to the next Annual Inspection may not exceed twelve calendar months. For Example: If an inspection were signed off on 14 June 2005, the next Annual Inspection would be due and must be accomplished no later than 29 June 2006. All subsequent Annual Inspections will be due in June unless the schedule is reset by performing an Annual Inspection early.

100 Hour Inspection Time Intervals

The interval between 100 Hour Inspections should never be exceeded by more than 10 hours, and then only if additional time is required to reach a place where the inspection can be satisfactorily accomplished. Additionally, the time the interval was exceeded must be included as flight hours in the next interval. For example: If a 100 Hour Inspection was due at 650 flight hours and was actually signed-off at 658 flight hours, the next 100 Hour Inspection is due at 750 flight hours, not 758 flight hours. Inspection tolerances cannot be accumulated.

05-20

SCHEDULED MAINTENANCE

Airplane Operational and Functional Checks

Operational and Functional Checks must be performed before and after Scheduled Maintenance Inspections to detect any airplane abnormalities or malfunctions. These inspections are listed in chapter 05-30, Airplane Operational and Functional Checks. (See 05-30).

Unscheduled Maintenance Checks

Abnormal airplane operations require special maintenance checks. Definitions and inspection procedures for hard/overweight landings, exceeded speed limit, severe air turbulence, lightning strike, high drag/side loads due to ground handling, and ground gusts are listed in chapter 05-50, Unscheduled Maintenance Checks.

SCHEDULED INSPECTION REPORT

All references to “05-20” under the “ATA Ref” reference column are to be understood as reference to Visual Inspection criteria defined above under Inspection Groups and Criteria.

Recommended Overhaul and Replacement Times

Recommended overhaul and replacement times are listed in chapter 05-10, Time Limits. These maintenance items must be incorporated into the 100 Hour or Annual Inspections as applicable.

Special Inspections

Special Inspections are highlighted in red and always denoted with a bracketed asterisk [*]. Those special inspections beginning with the word “And” indicate that the special inspection is to be performed IN ADDITION TO the regularly scheduled interval. For example, the following inspection states that in addition to changing engine oil every 50 Hours, the oil should be changed after the first 25 hours of operation as well.

Engine Group	ATA Ref	50 Hr	Annual/ 100 Hr
Engine Oil - Drain and change oil.	12-10	[x]	[]
*Special Inspection: And after first 25 hours			

If the special inspection includes the word “Only”, this means that the it’s to be performed ONLY at the specified time interval. For example, the following inspection states that the Cabin Air Control Assembly Inspection/Check should only be performed every 500 hours or every 5 years, whichever occurs first.

Cabin Group	ATA Ref	50 Hr	Annual/ 100 Hr
*Special Inspection: Only every 500 hours or 5 years whichever first.	21-10	[]	[]

Major Inspections

Major Inspections are also highlighted in red and accompanied by the word “and” or “only” (see Special Inspections). They are thorough, in-depth inspections that determine whether or not the load-bearing components have incurred any wear/damage that may affect the airworthiness of the aircraft.

Scheduled Inspection Report			
Make: PIPISTREL VIRUS SW	Model: 121	Serial Number:	Registration Number:
Owner:	Date:	Place:	
Type of Inspection: [] 50 Hour [] 100 Hour	[] Annual [] 200 Hour [] 500 Hour [] 1000 Hour [] 10000 Hour	Operating Time: Flight Hours: Landings:	

Item No.	Pre-Inspection	ATA Ref	50 Hr	Annual/ 100 Hr	200 Hr	500 Hr	1000 Hr	10000 Hr
1	Wash and clean the aircraft fully (external and internal)	12-20: 2.6.	[]	[x]	[]	[]	[]	[]
2	Operational/Functional Check Perform an airplane run-up in accordance with Operational Check in 05-30. Record of all abnormalities during the inspection. After completing the Operational Check, perform a walk around to detect fluid leaks or other abnormalities.	05-30	[]	[x]	[]	[]	[]	[]
3	Review compliance status with current EASA / NAA Aviation Regulations. This includes inspection of the following: - Aircraft Log Book - Registration Certificate - Certificate of Airworthiness - Weight and Balance Record - EASA and NAA Airworthiness Directives - Virus Design Service Documents - POH NOTE: Please refer to SB-121-00-80-001 for the current status of all Pipistrel documents that apply to the Virus SW 121.	-	[]	[x]	[]	[]	[]	[]

05-20

SCHEDULED MAINTENANCE

Item No.	Engine Group	ATA Ref	50 Hr	Annual/ 100 Hr	200 Hr	500 Hr	1000 Hr	10000 Hr
1	25 Hour Inspection On new, rebuilt, or overhauled engine, perform complete 100-Hour Engine Inspection in accordance with the manufacturer's approved Instructions for Continued Airworthiness, see [1]; *Special Inspection: Only first 25 hours,	05-20		[]	[]	[]	[]	[]
2	Perform 100-Hour Engine Inspection in accordance with the manufacturer's approved Instructions for Continued Airworthiness, see [1] chapter 05-20-00 *Special inspection: and if more than 30% of AV-GAS is used.	05-20	[*]	[x]	[]	[]	[]	[]
3	Engine Cowling - Perform visual Inspection Perform operational inspection of oil filler door.	05-20	[]	[x]	[]	[]	[]	[]
4	Foam baffling/seals - Visual Inspection, replace if necessary	05-20 71-00	[]	[x]	[]	[]	[]	[]
5	Throttle, choke and propeller cable connections on hot side of firewall - Visual Inspection + lubrication	05-20 12-20 76-00: 2.11.	[]	[x]	[]	[]	[]	[]
6	Gascolator - Visual inspection and cleaning	05-20 28-20: 2.1.3.	[]	[x]	[]	[]	[]	[]
7	Exhaust System Visual Inspection for soot, distortion, general condition.	05-20	[]	[x]	[]	[]	[]	[]
8	Engine cooling air inlet and diffuser - Visual Inspection	05-20	[]	[]	[x]	[]	[]	[]
9	Exhaust System Perform inspection/check	78-20: 2.1.4.	[]	[]	[]	[x]	[]	[]
10	Ventilation system - Visual Inspection	05-20	[]	[x]	[]	[]	[]	[]
11	Engine mount and mounting fixture - Perform inspections/checks	71-10: 2.11.	[]	[x]	[]	[]	[]	[]
12	Firewall - Visual Inspection	53-30	[]	[]	[]	[]	[x]	[]
13	Propeller Governor - Visual Inspection for leaks, see [3] Operational inspection	05-20	[]	[x]	[]	[]	[]	[]
14	Battery cables - Visual inspection	05-20	[]	[x]	[]	[]	[]	[]

Item No.	Propeller Group	ATA Ref	50 Hr	Annual/ 100 Hr	200 Hr	500 Hr	1000 Hr	10000 Hr
1	Spinner * See [2]		[]	[x]	[]	[]	[]	[]
2	Blades * See [2]		[]	[x]	[]	[]	[]	[]
3	Propeller Hub * See [2]		[]	[x]	[]	[]	[]	[]

Item No.	Cabin Group	ATA Ref	50 Hr	Annual/ 100 Hr	200 Hr	500 Hr	1000 Hr	10000 Hr
1	Cabin windows and windshield - Visual Inspection for cracking, crazing, and general condition. Perform inspections/checks	05-20 56-00	[]	[X]	[]	[]	[]	[]
2	Magnetic Compass - Visual Inspection	05-20	[]	[X]	[]	[]	[]	[]
3	Placards and Instrument Markings - Visual Inspection for conformity, security, and condition. Replace if necessary.	05-20 11-20	[]	[X]	[]	[]	[]	[]
4	Upholstery - Visual Inspection	05-20	[]	[]	[]	[X]	[]	[]
5	Seats Visual operational inspection	05-20	[]	[X]	[]	[]	[]	[]
6	Seats - Operational inspection: pneumatic pump/backrest bladder	05-20	[]	[]	[]	[X]	[]	[]
7	Safety harnesses Visual and operational inspection	05-20	[]	[X]	[]	[]	[]	[]
8	Instrument Panel Visual Inspection	05-20	[]	[X]	[]	[]	[]	[]
9	Avionics + Switch panel Visual and operational inspection	31-10: 2.1.	[]	[]	[X]	[]	[]	[]
10	Control stick + control stick drive - Perform inspections/checks *Major Inspection: Only every 3000 Hr (see 27-30: 2.4.2. and 27-30: 2.5.2.).	27-30: 2.4.1. 27-30: 2.5.1.	[]	[X]	[]	[]	[]	[]
11	Ignition Switch Disconnect battery and carry out operational inspection.	05-20	[]	[]	[X]	[]	[]	[]
12	Wiring behind the instrument and switch panel – Remove instrument panel cover and perform visual inspection for any loose/damaged wires	05-20 31-10	[]	[]	[]	[X]	[]	[]
13	Rudder Control System - Perform inspections/checks	27-20: 2.1.3. 27-20: 2.3.	[]	[X]	[]	[]	[]	[]
14	Brake Master Cylinders - Visual Inspection	05-20	[]	[]	[X]	[]	[]	[]
15	Flexible Brake Hoses - Visual Inspection -	05-20	[]	[]	[X]	[]	[]	[]
16	Parking brake handle - Visual and operational inspection.	05-20	[]	[X]	[]	[]	[]	[]
17	Fuel Lines - Remove control stick boots/luggage compartment and perform visual inspection	05-20 25-10: 2.3. 25-50	[]	[]	[X]	[]	[]	[]
18	Cabin Doors - Perform inspection/check	52-10: 2.1.3.	[]	[X]	[]	[]	[]	[]
19	Wing spar fastening material – Remove wings and perform visual inspection of wings spar pins/bolt	05-20 57-10	[]	[]	[X]	[]	[]	[]

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SCHEDULED MAINTENANCE

Item No.	Cabin Group	ATA Ref	50 Hr	Annual/ 100 Hr	200 Hr	500 Hr	1000 Hr	10000 Hr
20	Rudder Control System - Perform inspections/checks	27-20: 2.1.2.	[]	[]	[X]	[]	[]	[]
21	Autopilot pitch and roll servo motors - Perform inspections/checks	22-10:2.2.	[]	[]	[X]	[]	[]	[]
22	Ventilation system – Visual and operational inspection	05-20	[]	[]	[X]	[]	[]	[]
23	GRS ballistic parachute rescue system activation handle - Perform inspection/check	95-00: 2.1.1.	[]	[]	[]	[X]	[]	[]
24	Magnetometer - Visual inspection	05-20	[]	[]	[X]	[]	[]	[]
25	ELT - Visual inspection	05-20	[]	[]	[X]	[]	[]	[]
26	ELT - *Special Inspection in accordance with NAA: Only every 24 months or earlier if required by NAA where the aircraft is registered. See [5] and contact NAA	-	[]	[]	[]	[]	[]	[]
27	Transponder - *Special Inspection in accordance with NAA: Only every 24 months or earlier if required by NAA where the aircraft is registered. See [9] and contact NAA	-	[]	[]	[]	[]	[]	[]
28	ADAHRS – Visual inspection	05-20	[]	[]	[X]	[]	[]	[]
29	Altimeter/Airspeed indicator/ADAHRS - *Special Inspection: operational inspection, airtightness failure test and readings check only every 24 months or earlier if so required by the NAA where the aircraft is registered. See [6], [7] and [8] and contact NAA	-	[]	[]	[]	[]	[]	[]
30	NAV/COMM radio GTR 255 (or GNC 255) - *Special Inspection in accordance with NAA: Only every 24 months or earlier if required by NAA where the aircraft is registered. See [10] and contact NAA	-	[]	[]	[]	[]	[]	[]
31	Battery installation – Visual inspection of mounting bracket, cables, terminals	05-20	[]	[X]	[]	[]	[]	[]
32	Battery installation – Perform inspection/check	24:30: 2.1.2.	[]	[]	[X]	[]	[]	[]
33	Flaperon control system - Perform inspections/checks *Major Inspection: Only every 3000 FH (see 27-50: 2.4.2.).	27-50	[]	[]	[X]	[]	[]	[]
34	Brake system hydraulic fluid Check and replenish if necessary	12-10: 2.5.	[]	[X]	[]	[]	[]	[]
35	Cabin floor - Perform inspection/check + tap test	53-20: 2.1.1.	[]	[]	[]	[X]	[]	[]
36	Elevator control system - Perform inspections/checks *Major Inspection: Only every 3000 FH (see 27-30: 2.2.2.).	27-30: 2.2.1.	[]	[]	[X]	[]	[]	[]
37	Air-brake control system - Perform inspections/checks	27-60: 2.1.1.	[]	[]	[X]	[]	[]	[]

Item No.	Fuselage and Empennage Group	ATA Ref	50 Hr	Annual/ 100 Hr	200 Hr	500 Hr	1000 Hr	10000 Hr
1	Exterior Placards Visual Inspection for conformity, security, and condition. Replace if necessary.	05-20 11-10	[]	[X]	[]	[]	[]	[]
2	Fuselage skin/shell - Perform inspection/check + major bonding lines tap test *Major Inspection: Only every 2000 FH (see 53-10: 2.1.)	53-10: 2.1. 51-10: 2.2.	[]	[X]	[]	[]	[]	[]
3	GRS ballistic parachute rescue system - Visual Inspection of hatch and rocket exhaust hole	05-20	[]	[X]	[]	[]	[]	[]
4	Vertical Stabilizer and Rudder Surfaces – Visual Inspection + vertical stabilizer major bonding line tap test	05-20 51-10: 2.2.	[]	[X]	[]	[]	[]	[]
5	Rudder Control System – Perform inspections/checks.	27-20: 2.1.1. **	[]	[X]	[]	[]	[]	[]
6	Rudder Control System – Perform inspections/checks	27-20: 2.1.1. 27-20: 2.4.1. 27-20: 2.4.3.	[]	[]	[X]	[]	[]	[]
7	Horizontal Stabilizer and Elevator Surfaces - Visual Inspection + horizontal stabilizer major bonding line tap test	05-20 51-10: 2.2.	[]	[X]	[]	[]	[]	[]
8	Horizontal Stabilizer and Elevator Surfaces - Perform inspection/check	55-20: 2.1.3.	[]	[]	[X]	[]	[]	[]
9	Vertical/horizontal stabilizer – Perform inspections/checks	55-30: 2.1.1. 55-10: 2.1.3.	[]	[X]	[]	[]	[]	[]
10	Vertical stabilizer – Perform inspections/checks + tap test	55-30: 2.1.2.	[]	[]	[]	[X]	[]	[]
11	Elevator Control System Perform inspections/checks	27-30: 2.4. 27-30: 2.5.	[]	[X]	[]	[]	[]	[]
12	Elevator Control System Perform inspections/checks *Major Inspection: Only every 2000 FH (see 27-30: 2.6.2.)	27-30	[]	[]	[X]	[]	[]	[]
13	Fuselage Vent/Drain Holes Visual Inspection for obstructions or blockage.	APPENDIX 99-E	[]	[X]	[]	[]	[]	[]
14	Antennas - Visual inspection	05-20	[]	[X]	[]	[]	[]	[]
15	Baggage compartment bulkhead - Visual Inspection of composite around safety harness attachment points	05-20	[]	[]	[]	[X]	[]	[]
16	Control Surface and Stabilizer Vent/Drain Holes - Visual Inspection for obstructions or blockage.	APPENDIX 99-E	[]	[]	[X]	[]	[]	[]

**perform without removing the rudder (2.1.1.3) for the 100-hour check, just move rudder to one side and inspect/check. Perform with rudder removed every 200 hours.

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SCHEDULED MAINTENANCE

Item No.	Wing Group	ATA Ref	50 Hr	Annual/ 100 Hr	200 Hr	500 Hr	1000 Hr	10000 Hr
1	Wing surface - Visual Inspection for general condition, deterioration, delamination, distortion, cracks, paint condition, and other evidence of failure. *Major Inspection: Only every 2000 FH (see 57-10: 2.1.3.).	05-20	[]	[X]	[]	[]	[]	[]
2	Wing Leading Edge Visual Inspection for foreign matter and debris + leading edge bonding line tap test	05-20 51-10: 2.2.	[]	[X]	[]	[]	[]	[]
3	Flaperon Surfaces - Visual Inspection	05-20	[]	[X]	[]	[]	[]	[]
4	Flaperon system free play- Perform inspection/check	27-50: 2.1.3. 27-30: 2.1.4.	[]	[]	[X]	[]	[]	[]
5	Flaperon surfaces- Perform inspection/check	57-50: 2.1.2.	[]	[]	[X]	[]	[]	[]
6	Pitot tube - Visual inspection	05-20	[]	[X]	[]	[]	[]	[]
7	Fuel Tank Cap / Vents - Perform inspection/check	28-10: 2.4.1.	[]	[X]	[]	[]	[]	[]
8	Wing Vent/Drain Holes - Visual Inspection for obstructions or blockage.	APPENDIX 99-E	[]	[X]	[]	[]	[]	[]
9	Air brakes - Perform inspections/checks	57-70: 2.1. 57-70: 2.2.	[]	[]	[X]	[]	[]	[]

Item No.	Landing Gear Group	ATA Ref	50 Hr	Annual/ 100 Hr	200 Hr	500 Hr	1000 Hr	10000 Hr
1	Main Landing Gear Fairings - Visual inspection	05-20	[]	[X]	[]	[]	[]	[]
2	Nose Landing Gear Fairing - Visual inspection	05-20 51-10: 2.2.	[]	[X]	[]	[]	[]	[]
3	Tires - Visual inspection and check/replenish tire pressure	05-20	[]	[X]	[]	[]	[]	[]
4	Brake pads and discs - Perform inspection/check	27-50: 2.1.3. 27-30: 2.1.4.	[]	[]	[X]	[]	[]	[]
5	Brake lines - Visual Inspection for leaks, chafing, security, and condition. See [4]	57-50: 2.1.2.	[]	[]	[X]	[]	[]	[]
6	Wheels - Visual Inspection for cracks, corrosion, and broken bolts. See[4]	05-20	[]	[X]	[]	[]	[]	[]
7	Nose gear - Perform Inspection/Check	28-10: 2.4.1.	[]	[X]	[]	[]	[]	[]
8	Main landing gear strut - Perform inspection/check. *Major Inspection: Only every 2000 FH (see 32-10: 2.1.2.) or after a hard landing (see 05-50: 2.2.)	APPENDIX 99-E	[]	[X]	[]	[]	[]	[]

05-30 AIRPLANE OPERATIONAL AND FUNCTIONAL CHECK

The following check must be performed before and after the Scheduled Maintenance Inspection to detect any airplane abnormalities or malfunctions. A portion of the check is accomplished with the engine running and warmed up.

WARNING: In order to perform the following check, the engine must be operating. Do not stand or let anyone else stand close to the arc of the airplane’s propeller while conducting this check.

CAUTION: During all engine operations outlined in this check, exercise caution to avoid harm or damage to personnel and equipment due to propeller blast and rotating propeller blades.

CAUTION: Excessive engine temperatures must be avoided since run-up temperatures must closely parallel in-flight temperatures.

Item No.	Operational Inspection Report	Check	Notes
1	Flight Controls Check for full range of travel and excessive friction. Visual Inspection for obstructions.		
2	Engine Controls Check full range of motion without any obstruction or excessive friction to travel.		
3	MASTER witch + AVIONICS switch When switches are toggled ON the following should occur: – Garmin MFD turns on and runs with no indication of any errors. – Garmin MFD indicates at least 12 volts on battery. – Radio and transponder turn on.		
4	Engine – Start engine (see POH chapter 4). – Check that starter spins propeller without slipping or dragging. – Set engine speed to 2500 RPM and wait till oil temperature reaches green arc (50°C). – Check that the oil pressure is in the green arc within 30 seconds. – Check that the fuel pressure is in the green arc. – Check voltage. – Set engine to 4000 RPM and carry out magneto check as per latest version of Rotax 912 series MM. – Throttle full forward for 5 seconds. Engine RPM should indicate between 5600 and 5800. – Check that brakes hold aircraft stationary at full power with no slipping. – Set engine to idle. Engine should cease when ignition key set to magneto OFF position. – Shut down (see POH chapter 4).		

05-50
UNSCHEDULED
MAINTENANCE

05-50 UNSCHEDULED MAINTENANCE

1. Description

The following describes those maintenance checks and inspections on the aircraft which are dictated by special or unusual conditions which are not related to the time limits specified in 05-10, Scheduled Maintenance Checks.

These includes inspections and checks for wing strike, hard/overweight landing, exceeded speed limit, severe air turbulence, lightning strike, high drag/side loads, ground gusts, operation in harsh environmental conditions, and operation on unimproved runway surfaces.

2. Maintenance practices

05-50: 2.1. Wing strike

05-50: 2.1.1. Fuselage

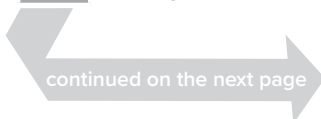
Step	Action	Required parts, materials and tools	Reference
1	Aft Floor Structure – Area around and under the wing attach points and overhead seat areas, inspect for delamination, cracking, whitening, and any other evidence of structural damage.		

05-50: 2.2. Hard landing

NOTE: A hard landing is any landing made at what is believed to be an excessive sink rate. An overweight landing is defined as landing the airplane at any gross weight which exceeds the maximum take-off weight as specified in the Pilot’s Operating Handbook. If the hard/overweight landing is combined with high drag/side loads, additional checks are required.

05-50: 2.2.1. Fuselage

Step	Action	Required parts, materials and tools	Reference
1	Aft Floor Structure – Inspect for delamination, cracking, whitening, and any other evidence of structural damage.		
2	Main landing gear strut - Inspect for security of attachment, permanent deformation, delamination, and cracking or splintering of strut.		32-10: 2.1.2.
3	Main gear attachments and supporting structure - Inspect for security loose or failed fasteners, permanent deformation, damage to fairings, tire damage, and any other evidence of structural damage.		



Step	Action	Required parts, materials and tools	Reference
4	Nose gear and attaching structure - Inspect for security, loose or failed fasteners, permanent deformation of strut or axle, strut weld cracks, puck delamination and cracks, puck pan weld cracks, engine mount weld cracks, damage to fairing, tire damage, and any other evidence of structural damage.		
5	Wings surface - Inspect for skin cracks, loose or failed fasteners, and any evidence of structural damage.		
6	Trailing edge - Inspect for any deformation effecting normal flaperon operation.		

05-50: 2.3. Exceeded speed limit

An exceeded speed limit inspection must be performed anytime the airplane has exceeded one or both of the following:

- exceeding placard speed limits of flaps.
- exceeding design speeds.

05-50: 2.3.1. Fuselage

Step	Action	Required parts, materials and tools	Reference
1	Landing gear - Main gear axle and fittings - Inspect for cracks, security, and evidence of structural damage. Tires - Inspect tires for flat spots, excessive wear, and tire slippage on the wheel rim.		
2	Fuselage - Windshield and windows - Inspect for buckling, dents, loose or failed fasteners, and any evidence of structural damage.		
3	Cowling - Inspect for buckling, cracks, loose or failed fasteners, and indications of structural damage.		
4	Stabilizers - Inspect skins, hinges and attachments, movable surfaces, mass balance weights, and attaching structure for cracks, dents, buckling, loose or failed fasteners, and evidence of structural damage.		
5	Wings - Flaps - Inspect for skin buckling, cracks, loose or failed fasteners, attachments and structural damage.		

05-50 UNSCHEDULED MAINTENANCE

05-50: 2.3.2. Severe turbulence and/or maneuvers

Atmospheric conditions producing violent buffeting of airplane. Severe maneuvers can be defined as any maneuvers exceeding the Pilot's Operating Handbook and the airplane's flight limits.

Step	Action	Required parts, materials and tools	Reference
1	Horizontal stabilizer, hinge fittings, and fittings - Inspect for security, loose or failed fasteners, and any evidence of structural damage.		
2	Vertical stabilizer - Inspect for evidence of structural damage, and damage to hinges and fittings.		
3	Elevator and rudder balance weight supporting structure - Inspect for security, loose or failed fasteners, and evidence of structural damage.		
4	Wing to body fittings and supporting structure - Inspect for security, loose or failed fasteners, and evidence of structural damage.		
5	Wing trailing Edge - Inspect for and deformation affecting normal operation of flap and aileron.		

05-50: 2.4. Lightning strike

If flown through a region of the atmosphere where electrical discharge is occurring, the airplane may become part of the discharge path. During a lightning strike, the current enters the airplane at one point and exits another, usually at opposite extremities. It is in these entrance and exit points where damage is most likely to occur. Burning and/or eroding of small surface areas of the skin and structure may be detected during inspection. In most cases, the damage is obvious. In some cases, however, hidden damage may result. In the case of lightning strike, this inspection must be accomplished before returning it to service.

05-50: 2.4.1. Communications

Step	Action	Required parts, materials and tools	Reference
1	Antennas - Inspect all antennas for evidence of burning or eroding. If damage is noted, call PIPISTREL for disposition. Any component connected to the antenna may need to be returned to manufacturer for servicing.		

05-50: 2.4.2. Navigation

Step	Action	Required parts, materials and tools	Reference
1	Compass should be considered serviceable if the corrected heading is within plus or minus 10 degrees of heading indicated by the remote compass system. If remote compass is not within tolerance, remove, repair, or replace.		

05-50: 2.4.3. Fuselage

Step	Action	Required parts, materials and tools	Reference
1	Skin - Inspect surface of fuselage skin for evidence of damage.		

05-50: 2.4.4. Stabilizers

Step	Action	Required parts, materials and tools	Reference
1	Inspect surfaces of stabilizers for evidence of damage.		

05-50: 2.4.5. Wings

Step	Action	Required parts, materials and tools	Reference
1	Skin - Inspect for evidence of burning and eroding.		
2	Wing tips - Inspect for evidence of burning and pitting.		
3	Flight surfaces and hinging mechanisms - Inspect for burning and pitting.		

05-50: 2.4.6. Landing gear/wheels

Step	Action	Required parts, materials and tools	Reference
1	Landing gear attach fittings and axles - Inspect for evidence of pitting and damage.		
2	Wheels - Inspect for evidence of pitting and damage.		
3	Wheel pants and fairings - Inspect fasteners for pitting and damage.		
4	Brake lines - Inspect for evidence of pitting, damage, or hydraulic fluid leaks.		

05-50: 2.4.7. Propeller

Step	Action	Required parts, materials and tools	Reference
1	Propeller - Inspect surfaces of stabilizers for evidence of damage. If damage is noted, remove from service and have inspected at an authorized repair station.		

05-50: 2.4.8. Power plant

Step	Action	Required parts, materials and tools	Reference
1	Engine - See the manufacturer's approved Instructions For Continued Airworthiness.		

05-50 UNSCHEDULED MAINTENANCE

05-50: 2.5. High drag/side loads due to ground handling

A high drag/side load condition is defined as situations when the airplane skids or overruns from a prepared surface onto an unprepared surface. This condition can also be met due to landings short of prepared surfaces, landings which cause the blowing of tires, or skidding conditions where the safety of the airplane was in question. This covers takeoffs, landings, or unusual taxi conditions.

05-50: 2.5.1. Landing gear

Step	Action	Required parts, materials and tools	Reference
1	Main gear and fairings - Inspect for loose or failed fasteners, buckling, security, cracks, and evidence of structural damage.		
2	Nose gear and fairing - Inspect for loose or failed fasteners, cracks, security, buckling, and evidence of structural damage.		

05-50: 2.5.2. Wings

Step	Action	Required parts, materials and tools	Reference
1	Wing to fuselage fittings and attaching structure - Inspect for security, loose or failed fasteners, and evidence of structural failure.		

05-50: 2.6. Ground gusts

Ground gusts are defined as conditions where a parked or taxiing airplane is exposed to side, aft quartering, or aft wind gusts exceeding 40 knots. Such conditions can cause control system damage due to rapid oscillation and/or slamming of the control surfaces against system stops.

05-50: 2.6.1. Rudder

Step	Action	Required parts, materials and tools	Reference
1	Hinges - Inspect for loose or failed fasteners, deformation, cracks, evidence of structural damage, and for any other evidence of damage or premature wear.		
2	Attaching structure - Inspect for loose or failed fasteners, delaminating, cracks, evidence of structural damage, punctures, scratches, and for any other evidence of damage or premature wear.		
3	Skin - Inspect for buckling, dents, misalignment, punctures, scratches, and for any other evidence of damage or premature wear.		
4	Attaching hardware - Inspect for loose or failed fasteners, deformation, cracks, security of mass balance weights, balance weight supporting structure and for any other evidence of damage or premature wear.		
5	Bellcrank - Inspect for failed fasteners, cracks and deformation.		

05-50: 2.6.2. Elevator

Step	Action	Required parts, materials and tools	Reference
1	Hinges - Inspect for loose or failed fasteners, deformation, cracks, evidence of structural damage, and for any other evidence of damage or premature wear.		
2	Attaching structure - Inspect for loose or failed fasteners, delaminating, cracks, evidence of structural damage, punctures, scratches, and for any other evidence of damage or premature wear.		
3	Skin - Inspect for buckling, dents, misalignment, punctures, scratches, and for any other evidence of damage or premature wear.		
4	Bellcrank - Inspect for failed fasteners, cracks and deformation.		

05-50: 2.6.3. Flaperons

Step	Action	Required parts, materials and tools	Reference
1	Hinges - Inspect for loose or failed fasteners, deformation, cracks, evidence of structural damage, and for any other evidence of damage or premature wear.		
2	Attaching structure - Inspect for loose or failed fasteners, delaminating, cracks, evidence of structural damage, punctures, scratches, and for any other evidence of damage or premature wear.		
3	Skin - Inspect for buckling, dents, misalignment, punctures, scratches, and for any other evidence of damage or premature wear.		

05-50: 2.7. Operation on unimproved runway surfaces

Operation on unimproved runway surfaces will cause additional wear and may require additional maintenance or inspection.

05-50: 2.8. Operation in humid areas

In humid areas, special care should be taken to keep engine, accessories, and airframe clean to prevent oxidation. Fuel and oil should be checked frequently and drained of condensation to prevent corrosion. Visually inspect flight control surfaces, nose landing gear and control systems for corrosion in accordance with best aviation maintenance practice.

PIPISTREL

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06

CHAPTER 06- DIMENSIONS AND AREAS**TABLE OF CONTENTS**

SECTION	SUBJECT	PAGE NUMBER
06-00	DIMENSIONS AND AREAS General Airplane dimensions and areas Control surface travel and deflection angles	06-03

06-00 GENERAL

This chapter outlines the basic dimensions/areas of the Virus SW 121 and the control surface travel/deflections.

1. Airplane dimensions and areas

Basic Dimensions	Metric	Imperial
Length	6.45 m	21.16 ft
Span	10.70 m	35.6 ft
Height	2.06 m	6.75 ft
Wing		
Area	9,51 m ²	102,4 ft ²
Span	10,71 m	35,10 ft
Mean wing chord	0,898 m	2,95 ft
Horizontal Tail		
Area	1.02 m ²	10.9 ft ²
Span	2.18 m	7.15 ft
Vertical Tail		
Area	1.24 m ²	13.3 ft ²
Height	1.19 m	3.90 ft

06-00
DIMENSIONS AND AREAS

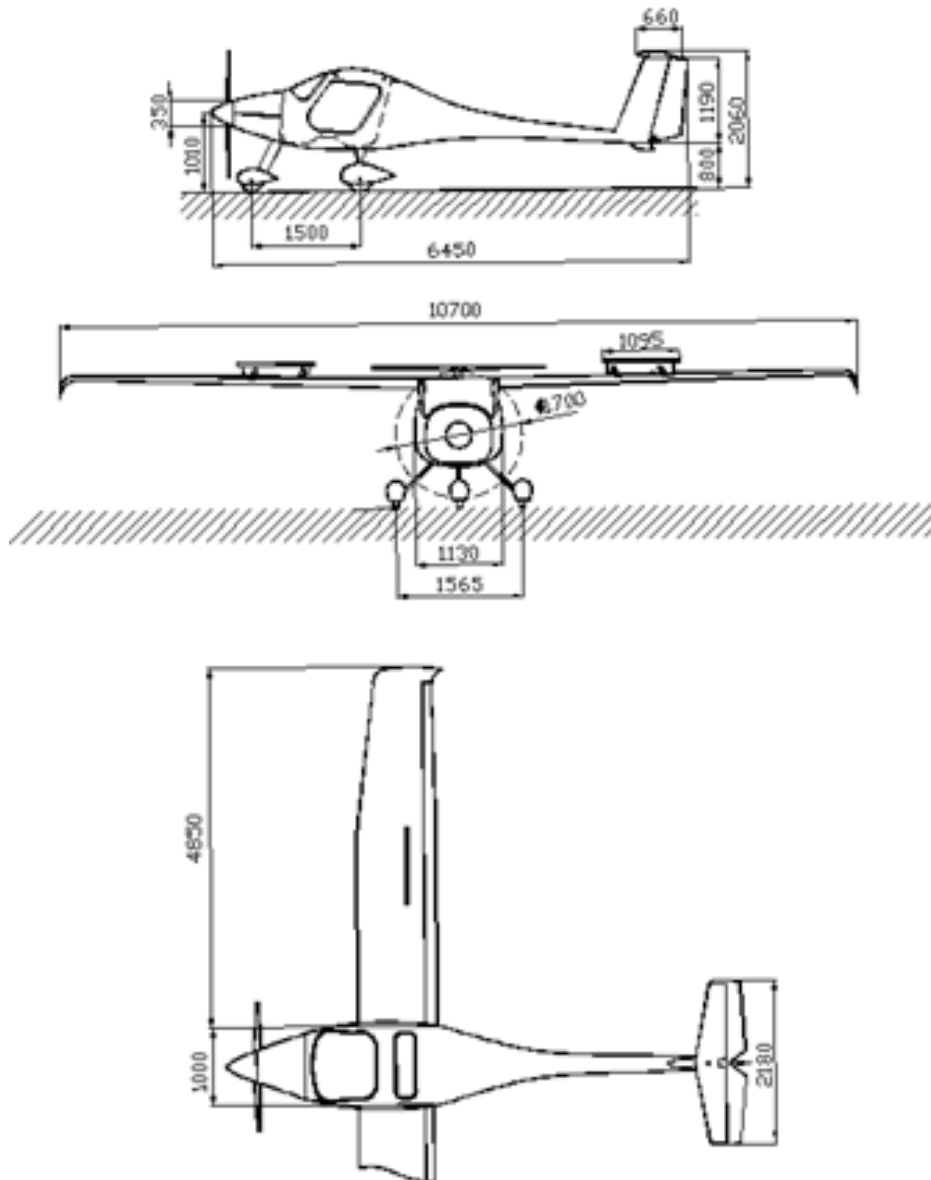


Figure 06-001
Virus SW 121 three view drawing

2. Control surface travel and deflection angles

Please refer to the latest revision of Virus SW 121's weight and balance report (WBR 121-08-10-001) for all control surface travel and deflection angle data.

07

CHAPTER 07 – LIFTING AND SHORING**TABLE OF CONTENTS**

SECTION	SUBJECT	PAGE NUMBER
07-00	LIFTING AND SHORING General	07- 03
07-10	JACKING Description Maintenance Practices	07- 04
07-20	SHORING Description Maintenance Practices	07- 06

07-00 GENERAL

This chapter covers the materials and procedures that apply to lifting and shoring the Virus SW 121. The procedures outlined in this chapter mainly apply to situations where the aircrafts landing gear needs to be attended to, serviced and/or removed.

07-10
JACKING

07-10 JACKING

1. Description

Particular maintenance procedures require propping certain parts of the aircraft up. Removing the main landing gear wheel, for example, requires propping up the landing gear strut. Removing the nose landing gear wheel, on the other hand, requires propping up the front end of the aircraft. A description of how to carry this out and the materials needed is outlined in this chapter.

2. Maintenance Practices

07-10: 2.1. Main landing gear strut

NOTE: Two people are required to carry out this procedure.

07-10: 2.1.1. Propping up one side

Step	Action	Required parts, materials and tools	Reference
1	Position the aircraft on a surface that is flat and hard.	- Landing gear stand (P/N 1190264) - Torx screwdriver set - T-handle hex head screwdriver set	
2	Remove the main wheel fairing.		see 32-10
3	Lift the wing.		Figure 07-001
4	Place landing gear stand under landing gear strut.		Figure 07-002
5	Slowly lower wing so that the landing gear strut rests on the stand.		



Figure 07-001
Lifting the wing



Figure 07-002
Landing gear stand placement

NOTE: If necessary, the landing gear strut can be propped up on both sides using the same stand and following the same procedure as outlined above.

07-10: 2.2. Nose landing gear

07-10: 2.2.1. Propping up

Step	Action	Required parts, materials and tools	Reference
1	Position the aircraft on a surface that is flat and hard.	- tail cone counterweight (oblong bean bag)	Figure 07-003
2	Slowly place counterweight on tail cone.		

CAUTION: Position the aircraft so it's front end is clear of all other objects. Make sure the propeller and/or engine cowlings won't hit anything when the front end is propped up.



Figure 07-003
Tail cone counterweight

07-20 SHORING

07-20 SHORING

1. Description

Shoring/hoisting the aircraft is only necessary in a few instances, such as when the landing gear has failed or the aircraft's fuselage is badly damaged. This chapter describes the equipment needed and procedure that needs to be followed in order to shore/hoist the aircraft.

2. Maintenance Practice

07-20: 2.1. Hoisting the fuselage

CAUTION: Before lifting/hoisting the airframe always clear the immediate area of people and equipment.

07-20: 2.1.1. Hoisting the fuselage

Reference: IPC 121-53-00-000

Step	Action	Required parts, materials and tools	Reference
1	Remove the main wheel fairings.	- Hoisting rod set	see 32-10
2	Remove the wings.		see 57-10
3	Slide both hoisting rods through the fuselage's cabin support strut assembly and secure them so they can't shift or move.		
4	Use chains or some heavy-duty nylon straps to fasten the hoisting rods to a crane or hoist.		
5	Use the crane/hoist to slowly lift the airframe from it's position. Adjust the hoisting rods, straps or chains if necessary.		
6	Prop the airframe up with some padded trestles.		

08

CHAPTER 08 – LEVELING AND WEIGHING**TABLE OF CONTENTS**

SECTION	SUBJECT	PAGE NUMBER
08-00	LEVELING AND WEIGHING General	08-03
08-10	LEVELING Description Maintenance Practices	08-04
08-20	WEIGHING Description Maintenance Practices	08-05

08-00 GENERAL

This chapter provides all the information needed to level and weigh the airplane properly. If the aircraft is not operated in the right center of gravity envelope, flight performance and safety may be compromised. The Virus SW 121 must be weighed and the center of gravity calculated/checked every time a modification is carried out that could affect these characteristics.

08-10
LEVELING

08-10 LEVELING

1. Description

This chapter describes how to level the airplane for any maintenance procedures which may be necessary.

2. Maintenance practices

08-10: 2.1. Leveling

08-10: 2.1.1. Leveling the airplane

Reference: POH-121-00-40-001, APPENDIX 99-D

Step	Action	Required parts, materials and tools	Reference
1	Inflate tires.	- aircraft leveling kit (P/N 1190460)	see 12-10
2	Prop up starboard MLG wheel by pulling the port wing down and place MLG balance block under wheel. Do the same for the port MLG wheel by lifting the port wing.		
3	Prop up nose wheel by weighing down the tail cone. Place nose wheel wedge under wheel.		
4	Fit the tail cone with the leveling tool and place spirit level on it.		Figure 08-001
5	Adjust nose wheel wedge until the spirit level reads 0°.		



Figure 08-001
Leveling tool and spirit level setup

08-20 WEIGHING

1. Description

This chapter describes how to properly weigh the Virus SW 121. Expected flight performance and safety can only be achieved if the Virus SW 121 is operated in the approved center of gravity envelope. If the aircraft is modified in any way, the center of gravity and weight must be recalculated and verified as acceptable.

2. Maintenance practices

08-20: 2.1. Weighing

08-20: 2.1.1. Preparation

Reference: POH-121-00-40-001, APPENDIX 99-D

Step	Action	Required parts, materials and tools	Reference
1	Replenish the brake fluid reservoir.	- three scales (one with minimum scale capacity of 250 kg, two with 500 kg)	see 12-10
2	Drain fuel system.		
3	Replenish the engine oil.		
4	Close the doors, set the flaps to 0° and retract the air brakes.		
5	Check/verify equipment list.		
6	Level aircraft and place a scale under each of the MLG balance blocks and the nose wheel wedge.		see 08-10

Note: The two scales used under the MLG wheels must be equal in height and placed as outboard as possible.

08-20: 2.1.2 Measuring

Reference: POH-121-00-40-001, APPENDIX 99-D

Step	Action	Required parts, materials and tools	Reference
1	Drop a plump bob from datum (each wing root leading edge at root) and stretch a line between the plump bobs and mark the position of the line at the airplane center line.	- plump bob - string - measuring tape	Figure 08-002
2	Stretch a line between the main wheel centers and mark the position of the line at the airplane center line.		Figure 08-003

continued on the next page

08-20
WEIGHING

Step	Action	Required parts, materials and tools	Reference
3	Measure the distance between the position of the wing root leading edge and the position of the MLG wheel centers horizontally along the airplane center line. Obtain value 'b'.		
4	Measure the distance between the position of the wing root leading edge and the position of the nose wheel center horizontally along the airplane center line. Obtain value 'a'.		Figure 08-004
5	Remove the level/leveling fixture and record the weight values show on the scales.		



Figure 08-002
Plumb bob from wing leading edge



Figure 08-003
Plum bob from center of the MLG wheels

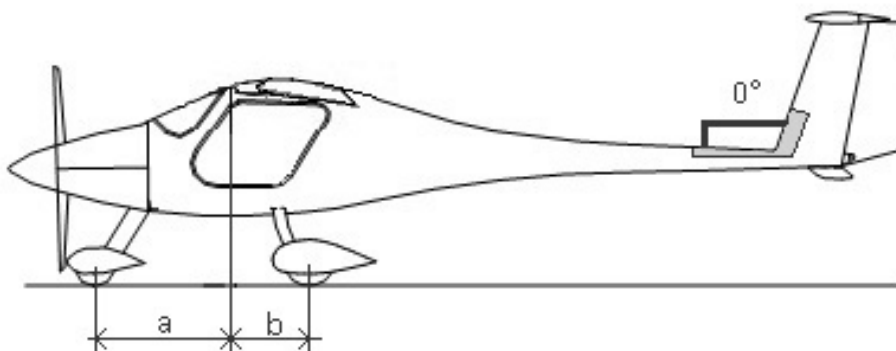


Figure 08-004
Weight and Balance measurements

NOTE: For center of gravity calculation, weight & balance record and equipment list please see chapter 6 in the pilot operating handbook (POH-121-00-40-001).

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09

CHAPTER 09 – TOWING AND TAXIING**TABLE OF CONTENTS**

SECTION	SUBJECT	PAGE NUMBER
09-00	TOWING AND TAXIING General	09-03
09-10	TOWING Description Maintenance Practices	09-04
09-20	TAXIING Description Maintenance Practices	09-05

09-00 GENERAL

This chapter describes how to properly tow and taxi the Virus SW 121 along the ground.

09-10 TOWING

09-10 TOWING

1. Description

One person can easily tow the Virus SW 121 by him/herself along smooth, hard terrain by pulling/pushing it. Turning is made easier by propping up the front end of the aircraft while simultaneously pushing/pulling it. The following procedures describe how to properly tow the Virus SW 121.

2. Maintenance practices

CAUTION: Never push or pull the aircraft using its control surfaces.

09-10: 2.1. Towing

09-10: 2.1.1. Backwards

Step	Action	Required parts, materials and tools	Reference
1	Remove wheel chocks.		
2	Check that there is nothing obstructing the way or any hazards in the vicinity.		
3	Push the aircraft backwards using the point halfway up the vertical stabilizers as a push point.		
4	Place wheel chocks under wheels.		

09-10: 2.1.2. Forwards

Step	Action	Required parts, materials and tools	Reference
1	Remove wheel chocks.		
2	Check that there is nothing obstructing the way or any hazards in the vicinity.		
3	Push the aircraft forwards using the point on the fuselage halfway between the wing's trailing edge and the vertical stabilizer as a push point.		
4	Place wheel chocks under wheels.		

09-10: 2.1.3. Turning

Step	Action	Required parts, materials and tools	Reference
1	Check that there is nothing obstructing the way or any hazards in the vicinity.		
2	Prop the front end of the aircraft up slightly by pushing down on the tail cone while simultaneously pushing the aircraft in the desired direction.		

09-20 TAXIING

1. Description

This chapter provides instructions necessary to taxi the Virus SW 121. The thrust needed to taxi it is supplied by the propeller, while turning/steering is done by foot pressure on the rudder pedals. The immediate area around the aircraft must be inspected for any obstructions/safety hazards and cleared if necessary.

2. Maintenance practices

09-20: 2.1. Taxiing

CAUTION: Excessive braking can lead to worn brake pads/discs. The area must be cleared of all/any personnel before taxiing ensues. All potholes and rough terrain should be avoided if possible. Refer to the POH for all other procedures/checks pertaining to taxiing.

09-20: 2.1.1. Taxiing the airplane

Reference: POH-121-00-40-001, chapter 4 in POH

Step	Action	Required parts, materials and tools	Reference
1	Remove wheel chocks.		
2	Start the engine.		
3	Gradually throttle up until taxiing ensues and then immediately check that the brakes work.		
4	Taxi the aircraft to the desired location.		
5	Shut the aircraft down.		
6	Place wheel chocks until wheels.		

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10

CHAPTER 10 – PARKING, MOORING AND STORAGE**TABLE OF CONTENTS**

SECTION	SUBJECT	PAGE NUMBER
10-00	PARKING, MOORING AND STORAGE General	10-03
10-10	PARKING Description Maintenance Practices	10-04
10-20	MOORING Description Maintenance Practices	10-05
10-30	STORAGE Description Maintenance Practices	10-06

10-00 GENERAL

This chapter describes how to park, moor and store the Virus SW 121 properly. Mooring is typically required when the aircraft is left outside for longer periods of time and may be exposed to windy conditions. The recommended storage measures outlined in this chapter should be implemented in order to prevent wear/deterioration of the Virus SW 121's structure/systems.

10-10 PARKING

10-10 PARKING

1. Description

This chapter describes how to park the Virus SW 121 properly. It outlines measures that should be for long term parking and parking in abnormal conditions.

2. Maintenance Practice

10-10: 2.1. Parking

10-10: 2.1.1. Temporary (< 10 days)

Reference: chapter 4 of POH

Step	Action	Required parts, materials and tools	Reference
1	Engage the parking brake.	- wheel chocks	see 10-20
2	Set the fuel selector to OFF.		
3	Leave air-brake handle unlocked, hanging down freely, to unload the plate springs.		
4	Check that the rescue system activation handle pin is inserted.		
5	Place wheel chocks under wheels.		
6	Close all the cabins windows/openings if wet weather is expected.		
7	Moor the aircraft if windy weather is expected.		

10-10: 2.1.2. Long term (> 10 days)

Follow the same procedure outlined above for temporary parking, however, consider the storage measures outlined in 10-30.

10-20 MOORING

1. Description

This chapter describes how to moor the Virus SW 121 properly. Each wing has a fixed mooring point built into its bottom surface. The tail skid has a hole that can be used as the third tie down point. These points can be used to fasten the aircraft to the ground.

2. Maintenance Practice

10-20: 1.1. Mooring

10-20: 1.1.1. Mooring the airplane

Reference: IPC 121-57-10-300

Step	Action	Required parts, materials and tools	Reference
1	Park the aircraft.	- wheel chocks - mooring rings (P/N 1190014) - tie down straps (synthetic)	see 10-10
2	Retract the flaps fully.		
3	Remove the mooring point caps.		
4	Install the mooring rings.		
5	Run tie down straps through the rings and secure them to the ground.		
6	Run a tie down strap through the tail skid hole and secure it to the ground.		

NOTE: Refer to chapter 10-30 for additional storage measures/procedures.

10-30 STORAGE

10-30 STORAGE

1. Description

This chapter describes all of the measures necessary to store the airplane for temporary or long-term storage.

2. Maintenance practices

10-30: 2.1. Storage

10-30: 2.1.1. Temporary storage (10-60 days)

Reference: POH

Step	Action	Required parts, materials and tools	Reference
1	Park the aircraft on a dry, level surface that is not exposed to sunlight, but do not engage parking brake.		see 10-10
2	Moor if necessary.		see 10-20
3	Cover the pitot tube.		
4	Check main and nose landing gear tire pressure on a weekly basis and replenish if necessary.		see 12-10
5	Turn each wheel by a quarter turn once a week to avoid warping/damage.		
6	Disconnect the battery (pull the battery disconnect ring) and consider all maintenance and shelf-life measures recommended by the battery manufacturer.		
7	Clean all aircraft surfaces and remove bugs/dirt.		
8	Clean entire propeller and remove bugs/dirt.		
9	Cover windshield and sunroof with a cotton sheet.		
10	Replenish the fuel system so that the fuel tanks are full.		see 12-10
11	Implement the engine storage/preservation measures found in the latest version of Rotax's 912 OM and MM.		

CAUTION: If the wings must be disassembled (see 57-10) due to hangar space limitations, the fuel system must be drained (see 12-20) and wings stored in a dry, cool space with no sunlight, and covered with a cotton sheet.

CAUTION: If fuel with any alcohol content is used, the fuel system must be drained (see 12-20).

10-30: 2.1.2. Long term storage (> 60 days)

Reference: POH

Step	Action	Required parts, materials and tools	Reference
1	Park the aircraft on a dry, level surface that is not exposed to sunlight, but do not engage parking brake.		see 10-10
2	Moor if necessary.		see 10-20
3	Cover the pitot tube.		
4	Check main and nose landing gear tire pressure on a weekly basis and replenish if necessary.		see 12-10
5	Turn each wheel by a quarter turn once a week to avoid warping/damage.		
6	Disconnect the battery (pull the battery disconnect ring) and consider all maintenance and shelf-life measures recommended by the battery manufacturer.		
7	Clean all aircraft surfaces and remove bugs/dirt.		
8	Clean entire propeller and remove bugs/dirt. Refer to the latest revision of the propeller manufacturer's OM and MM for additional long term storage/preservation measures.		
9	Cover windshield and sunroof with a cotton sheet.		
10	Implement the engine storage/preservation measures found in the latest version of Rotax's 912 OM and MM.		
11	Drain fuel system.		see 12-20

CAUTION: If the wings must be disassembled (see 57-10) due to hangar space limitations, the fuel system must be drained (see 12-20) and wings stored in a dry, cool space with no sunlight, and covered with a cotton sheet.

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11

CHAPTER 11 – REQUIRED PLACARDS**TABLE OF CONTENTS**

SECTION	SUBJECT	PAGE NUMBER
11-00	REQUIRED PLACARDS General	11-03
11-10	EXTERIOR PLACARDS Description Maintenance Practices	11-04
10-20	INTERIOR PLACARDS Description Maintenance Practices	11-07

11-00 GENERAL

There are various placards located throughout the Virus SW 121 that provide pilots, occupants and first responders with very important information. They identify safety precautions, provide service instructions, indicated command direction/movements and provide operating instructions. Those with a white background are made from polymeric stabilized PVC film and have a permanent opaque acrylic adhesive on the back face. Those with a black background are made from translucent polymeric stabilized, cadmium-free vinyl film and have an acrylic solvent-based adhesive. Those listed as Night VFR are made of a phosphorescent material that is easily visible in the dark.

11-10
EXTERIOR PLACARDS

11-10 EXTERIOR PLACARDS

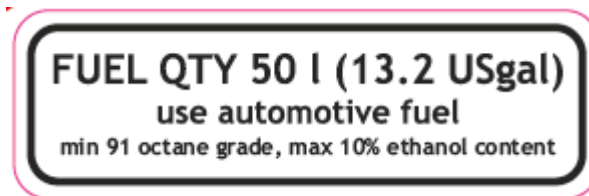
1. Description

This chapter describes the maintenance practices which apply to those placards located on the exterior of the Virus SW w121, including: Door; Open & Close, Baggage Door Location, ELT Location, BPRS Location, Oil-Door Location, Fuel Filler Location, Gnd Power Receptacle Location, No-Step, No Push, and Rescue Instruction.

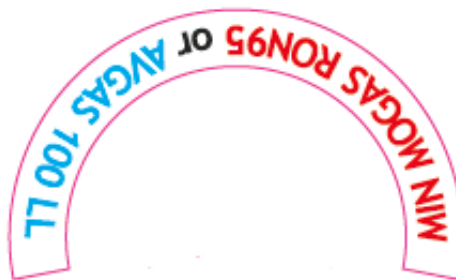
NOTE: Exterior placard illustrations are available in the Pipistrel Virus 121 IPC under chapter 11, Placards and Markings.

11-10: 1.1. Placards (External)

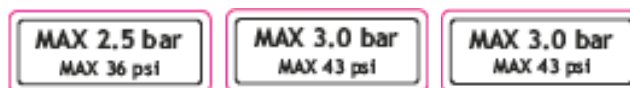
Next to each wing`s fuel tank filler neck:



Next to each wing`s fuel tank filler neck:



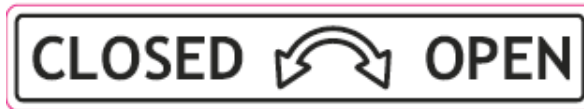
Next to wheels:



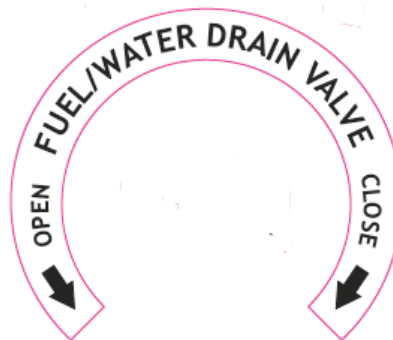
On each main landing gear wheel fairing:



Next to door opening latches:



Next to fuel drain:



2. Maintenance Practice

11-10: 2.1. Exterior Placard

11-10: 2.1.1. Removal

Step	Action	Required parts, materials and tools	Reference
1	Peel placard away from surface. If it doesn't peel away easily, apply heat with heat gun and try again.	- heat gun	
CAUTION: Be careful when using the heat gun. Do not allow the surface temperature to exceed 54°C (129° F), as this may cause structural damage.			
2	Once removed, clean the surface with pure acetone to remove residual adhesive.	- acetone (pure)	see 20-30

11-10

EXTERIOR PLACARDS

11-10: 2.1.2. Installation

Follow the same procedure outlined above for temporary parking, however, consider the storage measures outlined in 10-30.

Step	Action	Required parts, materials and tools	Reference
1	Wash/wipe the surface down with water and clean white cotton cloth.	<ul style="list-style-type: none"> - water - acetone (pure) - clean white cotton cloth - paper towel 	see 20-30
2	Clean the surface with pure acetone.		
3	Allow to air dry.		
4	Remove placard from protective foil.		
5	Apply placard to surface. Avoid creating wrinkles by applying one edge of the placard first and then running your finger along it until it's completely adhered.		

11-20 INTERIOR PLACARDS

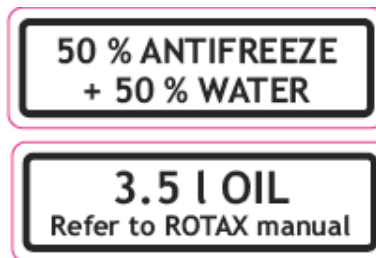
1. Description

This chapter describes the maintenance practices which apply to those placards located on the interior of the Virus SW 121, including:
BPRS Handle Cover, Engine Control Panel, Circuit Breaker Panel, Bolster Switch Panel, Instrument Panel, Audio Panel, Yoke Grip Switch Plate, Baggage Door, ELT Location, Alternate Induction Air, and Parking Brake Release.

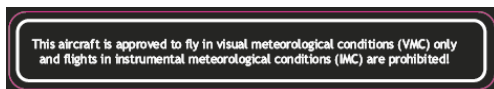
NOTE: Interior placard illustrations are available in the Pipistrel Virus 121 Illustrated Parts Catalog under **chapter 11, Placards And Markings**.

11-20: 1.1. Placards (Engine Compartment)

On water overflow bottle, oil tank:



11-20: 1.2. Placards (Instrument Panel)



EAW	kg
MTOW	600 kg
CREW WT	min. 54 kg
LUGGAGE WT	25 kg

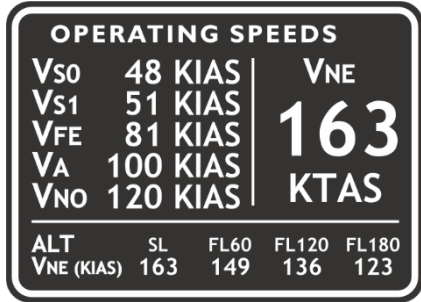


For Night-VFR:



11-20
INTERIOR PLACARDS

11-20: 1.3. Placards (Port Side Console)



Next to propeller lever:



Next to choke and throttle levers:



On flap lever (2x):



Next to cabin-air control lever:

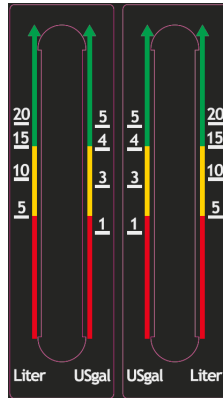


Next to parking brake lever:

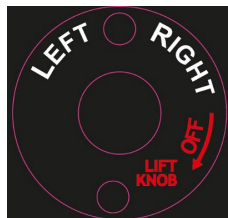


11-20: 1.4. Placards (Cabin)

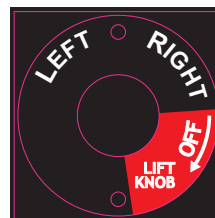
Next to fuel level indicators:



Fuel selector:



Fuel selector Night-VFR:



Next to microphone jacks:



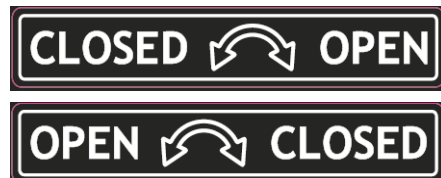
Next to headphone jacks:



In front of control sticks (rudder pedal adjustment, 2x):



Below each door, depict door handle operation:



11-20
INTERIOR PLACARDS

On upper tube in front of pilot or for Night-VFR, on center of the console above autopilot console:



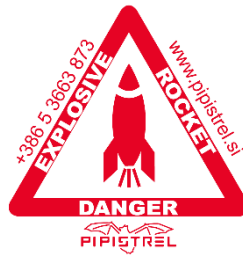
On inside of luggage compartment door:



On inside and outside luggage compartment lock:



1.5. Placards (Ballistic Parachute Rescue System)



Next to doors:



Next to rocket exhaust (bottom of fuselage):



Next to activation handle (cockpit):



2. Maintenance Practice

11-20: 2.1. Interior Placard

11-20: 2.1.1. Removal

Step	Action	Required parts, materials and tools	Reference
1	Peel placard11-11 away from surface. If it doesn't peel away easily, apply heat with heat gun and try again.	- heat gun	
CAUTION: Be careful when using the heat gun. Do not allow the surface temperature to exceed 54°C (129° F), as this may cause structural damage.			
2	Once removed, clean the surface with pure acetone to remove residual adhesive.	- acetone (pure)	see 20-30

11-20: 2.1.2. Installation on non-composite and/or paint-coated composite surfaces

Step	Action	Required parts, materials and tools	Reference
1	Wash/wipe the surface down with water and clean white cotton cloth.	- water	
2	Clean the surface with pure acetone.	- acetone (pure)	see 20-30
3	Allow to air dry.	- clean white cotton cloth	
4	Remove placard from protective foil.	- paper towel	
5	Apply placard to surface. Avoid creating wrinkles by applying one edge of the placard first and then running your finger along it until it's completely adhered.		

11-20: 2.1.3. Installation on bare composite surfaces

Step	Action	Required parts, materials and tools	Reference
1	Clean the surface with pure acetone.	- acetone (pure)	see 20-30
2	Allow to air dry.	- paper towel	
3	Remove placard from protective foil.	- spray glue (Extra strong, Tesa)	
4	Spray some glue on the back surface of the placard and apply it to the surface. Avoid creating wrinkles by applying one edge of the placard first and then running your finger along it until it's completely adhered.		

PIPISTREL

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12

CHAPTER 12 – SERVICING**TABLE OF CONTENTS**

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12-00 GENERAL

This chapter clearly outlines all of the procedures/practices involved in properly servicing the Virus SW 121. Procedures such as replenishing operating fuels, lubricating various components and keeping the aircraft clean, are key to ensuring the aircraft remains in good condition, safe and airworthy.

The maintenance/servicing intervals specified in chapter 05-00 are those recommended by Pipistrel and shall be considered adequate in normal operating conditions. If the aircraft is operated in abnormal conditions, such as salt water environments, extremely humid areas and dusty environments, or if it's operated any unusual conditions, it shall be considered prudent to shorten the intervals in chapter 05-00.

CAUTION: Not adhering to the warning and cautions outlined in this chapter can cause damage to the aircraft, harm to the aircrafts operator and possibly harm to others. Only those operating fluids mentioned in this manual are permitted to be used. Mixing various fluids, using non-recommended brands or using contaminated fluids is not permitted and can lead to aircraft damage or harm to its operators/occupants.

12-10 REPLENISHING

12-10 REPLENISHING

1. Description

This chapter outlines the maintenance procedures that pertain to replenishing the Virus SW 121's operating fluids. For servicing intervals refer to chapter 05-00. Table 12-001 contains information about approved operating fluids and their capacity.

Description	P/N or Spec.	Capacity
Fuel	AVGAS, MOGAS or car fuel (min RON 95; EN228 Premium or Premium plus with max. 10% ethanol). Refer to latest revision of ROTAX Service Instruction No. SI-912-016 Selection of Suitable Operating Fluids	Total Tank Capacity: 100.0 Lit (26.4 Gal) total wing, or 50.0 Lit (13.2 gal. each wing) Total unusable fuel: 1.0 Lit.
Engine Oil	Refer to ROTAX Service Instruction No. SI-912-016 Selection of Suitable Operating Fluids for Rotax® Engine Type 912 I, 912 and 914 Series	3.5 L (3.7 US Quarts) (min. oil required marked on dipstick)
Engine Coolant	Referring to the latest revision of ROTAX Service Instruction No. SI-912-016 Selection of Suitable Operating Fluids for Rotax® Engine Type 912 I, 912 and 914 Series	3 L (max and min coolant levels marked on overflow bottle)
Brakes	DOT 4 Hydraulic Fluid	0,20L
Nose Tire (Size 4.00 X 4")	Dry Compressed Air	1.8-2.2 bar (2.5 bar max).
Main Tires (Size 4.00 X 6")	Dry Compressed Air	2.2-2.8 bar (3.0 bar max).

Table 12-001
Approved operating fluids and capacities

2. Maintenance practices

12-10: 2.1. Fuel system

WARNING: All electrical equipment, or any equipment that could produce a spark, must be disabled before refueling and/or defueling.

WARNING: Smoking is not permitted within 30 meters of the aircraft while refueling/defueling. Nor is the presence of an open flame.

WARNING: The battery must be disabled before refueling/defueling.

WARNING: A fire extinguisher must be present at all times while refueling/defueling.

WARNING: The aircraft's exhaust tailpipe and all fuel servicing equipment must be grounded during all/any refueling/defueling procedures.

12-10: 2.1.1. Refueling

Step	Action	Required parts, materials and tools	Reference
1	Locate the fuel filler on the wing and place fire extinguisher near it.	- approved fuel (see 12-10), - fire extinguisher, - grounding cables	chapter 8.5.5 in POH
2	Use grounding cables to attach the nozzle to the aircraft's exhaust tailpipe, the tailpipe to the fuel truck/cart and the fuel truck/cart to an earth ground.		
3	Remove the fuel filler cap.		
4	Place nozzle in the fuel filler.		

CAUTION: Do not touch the wing's surface, the filler's rim or the inner surface of the fuel tank with the fuel nozzle as this could cause damage.

5	Refuel to desired level.	- approved fuel (see 12-10), - fire extinguisher, - grounding cables	chapter 8.5.5 in POH
6	Install fuel filler cap.		
7	Repeat steps 2.1.1.3 to 2.1.1.8 for the other wing's fuel tank.		
8	Disconnect all of the grounding cables.		

12-10: 2.2. Oil system

CAUTION: Always ensure that the oil level is within the limits indicated on the dipstick before flying.

CAUTION: The aircraft must be level before checking/replenishing oil levels.

12-10: 2.2.1. Replenishing the oil system

Reference: IPC 121-79-00-000, POH

Step	Action	Required parts, materials and tools	Reference
1	Master switch OFF, ignition OFF.	- flathead screwdriver, - approved oil (see 12-10)	(see 71-10)
2	Remove engine cowlings.		
3	Remove oil tank cap.		
4	Rotate propeller in normal direction until a gurgling noise is heard. This is evidence that the oil has been pumped through the system and has settled in the sump.		
5	Replenish oil system until dipstick reading is within the marked limits.		
6	Reinstall dipstick and oil tank cap.		
7	Install engine cowlings.		

12-10 REPLENISHING

12-10: 2.3. Cooling system

12-10: 2.3.1. Replenishing the coolant

Reference: IPC 121-82-00-000

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings. (see 71-10)	- flathead screw-driver, - approved coolant, (see 12-10)	(see 71-10)
2	Locate water cooler and remove cap.		
3	Replenish coolant level in water cooler until it's completely full.		
4	Reinstall water cooler cap.		
5	Locate cooling system's overflow bottle.		
6	Remove overflow bottle cap.		
7	Replenish cooling system until level is within the limits marked on the overflow bottle.		
8	Install overflow bottle cap.		
9	Install engine cowlings.		(see 71-10)

12-10: 2.4. Tires

12-10: 2.4.1. Check/replenish tire air pressure

Reference: chapter 8.5.1 in POH

Step	Action	Required parts, materials and tools	Reference
1	Remove tire pressure inspection plug from wheel fairing.	- compressed air - pressure gauge (P/N 5610132)	(see Table 12-001)
2	Roll aircraft a backwards or forwards a little until the tire's valve stem lines up with the opening in the fairing.		
3	Remove tire valve cap.		
4	Measure tire air pressure.		
5	Replenish if necessary with compressed air to the required pressure.		
6	Release pressure from the tire if it is already overinflated.		
7	Install tire valve cap.		
8	Install tire pressure inspection plug.		

12-10: 2.5. Brake system hydraulic fluid

3. Battery System

The Virus SW 121's battery can be found in the cabin, fastened to the firewall, just behind the switch panel. It is maintenance free and doesn't require any replenishing of operating fluids.

12-20 SCHEDULED SERVICING

1. Description

This chapter describes the regular servicing requirements of the Virus SW 121. Systems and components such as fuel, oil, the brakes and the tires, need be serviced regularly in order to keep the aircraft in good operating condition. How to clean the aircraft and its various components/assemblies is also covered.

2. Maintenance practices

12-20: 2.1. Fuel system

WARNING: All electrical equipment, or any equipment that could produce a spark, must be disabled before refueling and/or defueling.

WARNING: Smoking is not permitted within 30 meters of the aircraft while refueling/defueling. Nor is the presence of an open flame.

WARNING: The battery must be disabled before refueling/defueling

WARNING: A fire extinguisher must be present at all times while refueling/defueling.

WARNING: The aircraft's exhaust tailpipe and all fuel servicing equipment must be grounded during all/any refueling/defueling procedures.

12-20: 2.1.1. Defueling (gravity driven)

Reference: IPC 121-28-20-100

Step	Action	Required parts, materials and tools	Reference
1	Place jerry can, canister or fuel tray under the gascolator.	- jerry can, - canister or fuel tray, - grounding cables	
2	Make sure the fire extinguisher is within arm's reach.		
3	Ground the container to the aircraft's exhaust tailpipe and the aircraft to an earth ground.		
4	Turn the fuel selector to the tank to be drained.		
5	Locate valve below gascolator, open it and drain.		
6	Turn the fuel selector to the opposite tank and repeat steps 2 to 5.		

NOTE: A fuel hose (inner diameter 6 mm or 1/4 inch) can be attached to the gascolator's valve and led to the container to avoid splashing.

12-20
SCHEDULED SERVICING

12-20: 2.1.2. Defueling (electric fuel pump if available)

Reference: IPC 121-28-20-100

Step	Action	Required parts, materials and tools	Reference
1	Place jerry can, canister or fuel tray under the gascolator	- jerry can, - canister or fuel tray, - grounding cables - electric fuel pump	
2	Make sure the fire extinguisher is within arm's reach		
3	Ground the container to the aircraft's exhaust tailpipe and the aircraft to an earth ground		
4	Turn the fuel selector to the tank to be drained		
5	Run a fuel hose (inner diameter 6 mm or 1/4 inch) from the gascolator's valve to the electric fuel pump and another from the electric fuel pump to the container		
6	Locate valve below the gascolator, open it and activate the electric fuel pump		
7	Turn the fuel selector to the opposite tank and repeat steps 2 to 6.		

12-20: 2.2. Oil system

12-20: 2.2.1. Oil level check

Reference: IPC 121-79-00-000

Step	Action	Required parts, materials and tools	Reference
1	Master OFF, ignition OFF.	- paper towel	
2	Open the upper cowling's oil check door.		
3	Remove oil tank cap.		
4	Slowly rotate the propeller in clockwise direction (when looking in the direction of flight) until a gurgling sound is heard coming from the oil tank.		
5	Remove dipstick and wipe clean with paper towel.		
6	Place the dipstick back in the oil tank .		
7	Remove it again and take oil level reading.		
CAUTION: The oil level must be kept between the dipstick's min and max markings at all times.			
8	Replenish if necessary.		(see 12-10)
9	Install oil tank cap.		
10	Close the upper cowling's oil check door.		

For all other oil system servicing procedures, including how to change the oil filter, how to inspect it and how to change the oil (i.e drain the system), refer to chapter 11 of chapter 12-20 in the latest revision of Rotax's maintenance manual.

12-20: 2.3. Cooling system

12-20: 2.3.1. Draining the system

Reference: the latest revision of Rotax's maintenance manual.

Step	Action	Required parts, materials and tools	Reference
1	Remove the engine cowlings.	- spring clamp pliers - jerry can - canister or fuel tray	(see 71-10)
2	Locate cylinder #1's coolant outlet fitting and the hose attached to it.		
3	Place jerry can, canister or fuel tray under cylinder #1 .		
4	Roll the orange fire sleeve back to expose the spring clamp securing the coolant hose to the outlet fitting.		
5	Loosen the spring clamp and slide it off the outlet fitting.		
6	Slowly slide the coolant hose off the outlet fitting and allow the coolant to drain into the jerry can, canister or fuel tray.		

12-20: 2.4. Tires and wheels

Tire and wheel servicing procedures are covered in 12-10: 2.4.

Refer to 32-40 for tire and wheel removal instructions.

12-20 SCHEDULED SERVICING

12-20: 2.5. Lubrication

The Virus SW 121 has a number of components and assemblies that must be kept well lubricated in order to avoid premature wear, deterioration and possible ceasing. The table below, Table 12-002, shall be used as a lubrication guide. It clearly indicates what needs to be lubricated, how often and what it should be lubricated with. All the joints in Table 12-002 must be cleaned first with some paper towel before fresh lubricant is applied.

Group	Component	Interval (hrs)	Recommended lubricant
Engine	Joint between throttle control cable and carburetor lever	100	SKF LGMT 2/0.2 multipurpose grease
Engine	Joint between choke control cable and carburetor lever	100	SKF LGMT 2/0.2 multipurpose grease
Engine	Joint between governor control cable and governor lever	100	SKF LGMT 2/0.2 multipurpose grease
Cabin	Battery terminals	200	SKF LGMT 2/0.2 multipurpose grease
Cabin	All rod end bearings accessible from the cabin floor control stick openings	100	Wurth HHS Lube
Cabin	Control stick drive end bearings	100	Wurth HHS Lube
Cabin	All rod end bearings located between the cabin and bagg. compartment bulkheads	200	Wurth HHS Lube
Cabin	Joints between cables and t-shaped bellcranks	200	SKF LGMT 2/0.2 multipurpose grease
Fuselage	Door hinges	100	Wurth white assembly paste
Fuselage	Elevator hinge pins	200*	SKF LGMT 2/0.2 multipurpose grease
Fuselage	Upper rudder hinge pin	200*	Wurth white assembly paste
Fuselage	Upper rudder bushing	200*	Wurth white assembly paste
Fuselage	Horizontal stabilizer T-fixation plate pins	100	Wurth white assembly paste
Fuselage	Horizontal stabilizer att. bolt assembly	100	Wurth white assembly paste
Fuselage	Vertical stabilizer bushings	100	Wurth white assembly paste
Fuselage	Rudder cable bellcrank	200	Wurth white assembly paste
Fuselage	Wing shear pin bushings	200*	Wurth white assembly paste
Fuselage	Upper flaperon bellcrank clutch	200	Wurth white assembly paste
Fuselage	Air brake lever clutch	200	Wurth white assembly paste
Fuselage	Vertical elevator push rod end bearings and aft horizontal elevator push rod end bearing	200	Wurth HHS Lube
Wings	Flaperon pins/bushings	200*	SKF LGMT 2/0.2 multipurpose grease
Wings	Wings spar pins	200	SKF LGMT 2/0.2 multipurpose grease
Wings	Shear pins	200*	Wurth white assembly paste
Wings	Wing spar bushings	200	SKF LGMT 2/0.2 multipurpose grease
Wings	Fuel tank cap thread	200	SKF LGMT 2/0.2 multipurpose grease
Wings	Air brake relief pins/bushings	200	SKF LGMT 2/0.2 multipurpose grease
Wings	Air brake rod end bearing	200	Wurth HHS Lube

*Shortening service interval is recommended for all aircraft that operate in unusual/abnormal environments (i.e. high humidity, salt water, dusty conditions, extreme temperatures, etc.).

Table 12-002
Lubrication guide

12-20: 2.6. Cleaning

In order for the Virus SW 121 to perform the way it should, all of the airframe's surfaces must be cleaned on a regular basis. This is especially true for the wing's leading edges, which can seriously affect performance if left dirty. Cleaning must be carried out carefully, so that the aircraft's composite surfaces don't incur any damage.

CAUTION: Rubbing any of the aircraft's surfaces aggressively or polishing any of them is not permitted and, if necessary, can only be carried out by an approved maintenance organization.

CAUTION: Avoid the use of ALL aggressive cleaning solutions and organic solvents whenever possible, including window cleaning spray, benzene, aggressive shampoos etc.

CAUTION: When flying in regions with a lot of bugs in the air the leading edges of the airframe (propeller, wings, tail) need to be protected before flight with antistatic furniture spray cleaner such as Pronto (transparent, manufacturer: Johnson Wax), or something equivalent. When using such spray, do not apply it directly onto the wing but onto a soft cloth instead (old T-shirts are best).

CAUTION: After having finished with flight activity for the day, clean the leading edges of the airframe as soon as possible with a lot of water and a drying towel (chamois, artificial leather skin). This will be very easy to do if the leading edge was sprayed with an anti-static spray cleaner before flight.

After-flight wash down

Bugs, which represent the most of the dirt to be found on the airframe, are to be removed with clean water and a soft cloth (this can also be done using a drying towel, chamois or artificial leather skin). Begin by soaking all the leading edges of the airframe first. Then wipe the aircraft's entire surface until it is completely dry. Clean the propeller and remove any grease spots separately using a mild car shampoo with a wax.

CAUTION: Do not, under any circumstances attempt to use aggressive cleaning solutions, as you will severely damage the lacquer, which is the only protective layer before the structural laminate.

When using the aircraft in difficult atmospheric conditions (intense sunshine, dusty winds, coastline, acid rains etc.) make sure to clean the outer surface more thoroughly.

CAUTION! Do not, under any circumstances attempt to remove such bug-spots with abrasive sponges and/or rough polishing pastes.

Periodical cleaning of all outer surfaces with car shampoo

It is recommended the aircraft be cleaned from top to bottom using a soft sponge. Be careful not to use a sponge that is contaminated with any fine particles, such as those found in mud and sand, as this could abrade/damage the surface. While cleaning, soak the surface and the sponge many, many times. Use a separate sponge to clean the bottom of the fuselage, as it is usually greasier

12-20 SCHEDULED SERVICING

than the rest of the airframe. When pouring water over the airframe, be careful not to direct it over the fuel reservoir caps, wing-fuselage joining chapter, parachute rescue system straps and cover, pitot tube, tail static probe and/or engine cowlings.

Always rinse the shampooed surfaces again before they dry, then just wipe the whole aircraft dry using a drying towel, chamois or artificial leather skin. Also, clean the control surface gap seals on the wing and empennage. Lift the seals gently and insert ONE layer of cloth underneath, then move along the whole span of the seal.

Cleaning the Lexan transparent surfaces

All the of the Virus SW 121's window surfaces are made of Lexan. Cleaning Lexan is not the same as cleaning Plexiglas. It is really important to only use clean water (no cleaning solutions are necessary) when cleaning and a really clean drying towel.

CAUTION: Do not use the towel that was used to dry the airframe's surfaces to dry the window surfaces. Use another unused towel for the window surfaces.

Should the window surfaces be dusty, remove the dust first by pouring water (not spraying!) and gliding your hand over the surface. Glide the drying towel over the surface, squeeze it out and soak it before touching the glass again. If there are bugs on the windshield, soak them with plenty of water first, so less wiping is necessary. After drying the window surface, apply some anti-static furniture spray cleaner such as Pronto (transparent, manufacturer: Johnson Wax), or something similar and wipe the surface clean with a separate soft cotton cloth.

12-40 DISPOSABLE REPLACEMENT PARTS**1. Description**

Table 12-003 contains a list of disposable parts found on the Virus SW 121. These parts can be ordered directly from Pipistrel d.o.o Ajdovščina. Please refer to the Virus SW 121 IPC for more information.

DISPOSABLE REPLACEMENT PARTS	
Item	Pipistrel P/N
In-line fuel filter	1350164
Tires	5050010
Air filter	1150082
Oil filter	5411465

Table 12-003
Disposable Replacement Parts

PIPISTREL

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CHAPTER 20 – STANDARD PRACTICES – AIRFRAME**TABLE OF CONTENTS**

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20-00 GENERAL

This chapter contains information about the standard practices that shall be followed when carrying out any maintenance procedures on the Virus SW 121. It covers topics such as fastening hardware, torque values, approved thread locking fluids, sealants and adhesives.

20-10 SEALANTS AND LUBRICANTS

20-10 SEALANTS AND LUBRICANTS

1. Description

Table 20-001 outlines the sealants and lubricants that are approved for use on the Virus SW 121.

Approved Sealants and Lubricants			
Item	Supplier	Specification	Pipistrel P/N
SKF general purpose grease	SKF group	LGMT 2/0.2	5092004
Würth white assembly paste	Adolf Würth GmbH & Co. KG	0893 1041	5092021
Super Impact grease	Xintex	502001	5092008
Krown Rust Inhibitor	Krown rust control systems	KL 73	5092020
Tekasil neutral profi white silicone	TKK Srpenica d.d.	-	5093024
Termosil 300°C neutral black silicone	TKK Srpenica d.d.	-	5093017
Termosil N6	TKK Srpenica d.d.	-	5093018
Loctite 577 thread sealant	Loctite Corp.	-	5091033
Akrapovič ceramic anti-seize grease	Akrapovič d.d.	-	5092002
Akrapovič copper anti-seize grease	Akrapovič d.d.	-	5092001

Table 20-001
Approved sealants and lubricants

NOTE: Please refer to the latest revision of the Virus SW 121's IPC for additional information as to where the sealants/lubricants listed in Table 20-001 are used.

CAUTION: When using the sealants and lubricants listed in Table 20-001 always refer to the supplier's instructions for information about how to store them properly, how to use them properly and any safety precautions.

WARNING: Don't use any sealants or lubricants that have expired.

20-20 THREAD-LOCKING FLUIDS

1. Description

Table 20-002 outlines the thread-locking fluids that are approved for use on the Virus SW 121.

Approved Thread-Locking Fluids			
Item	Supplier	Specification	Pipistrel P/N
Loctite 243	Loctite Corp.	-	5091023
Loctite 262	Loctite Corp.	-	5091024
Loctite 270	Loctite Corp.	-	5091025

Table 20-002
Approved thread-locking fluids

NOTE: Please refer to the latest revision of the Virus SW 121's IPC for additional information as to where the thread-locking fluids listed in Table 20-002 are used.

CAUTION: When using the thread-locking fluids listed in Table 20-002 always refer to the supplier's instructions for information about how to store them properly, how to use them properly and any safety precautions.

WARNING: Don't use any thread-locking fluids that have expired.

WARNING: All of the Virus SW 121's bolted joints requiring thread-locking fluids are labeled in the latest revision of its IPC. Failure to apply thread-locking fluids to the aforementioned bolted joints can cause them to loosen and possibly a safety hazard.

20-30**FASTENER INFORMATION AND
TORQUE VALUES****20-30 FASTENER INFORMATION AND TORQUE VALUES****1. Description**

Information about the fastening material used on the Virus SW 121 can be found in the latest revision of the Virus SW 121's IPC. The large majority of bolts used adhere to the DIN ("Deutsche Industrie Norm) standard. Any bolted joints that require special torqueing are labeled in the Virus SW 121 IPC. All other bolted joints that are otherwise not labeled with a specific torque, must be torqued to the values found in Table 20-003.

Fastener	Torque (Nm) based on bolt grade		
	8.8	10.9	12.9
M4	2.8	4.1	4.8
M5	5.5	8.1	9.5
M6	9.5	14.0	16.5
M8	23.0	34.0	40.0
M10	46.0	68.0	79.0
M12	79.0	117.0	135.0
M14	125.0	185.0	215.0

Table 20-003
Standard torque values for the Virus SW 121

WARNING: Bolts on the Virus SW 121 are only permitted to be replaced by equal or better grade bolts.

CAUTION: When fastening bolted joints always torque the nuts whenever possible.

20-40 FASTENER/HARDWARE GENERAL REQUIREMENTS

1. Description

This chapter outlines the standard practices that apply to fastening material and hardware found on the Virus SW 121. It covers the maintenance practices that apply to torque marking, proper use of locknuts and fittings with tapered thread.

2. Maintenance Practices

20-40: 2.1. Torque marking

Torque marking refers to act of marking a bolt joint after it's been torqued (see Figure 20-001). This allows for any loosening that may occur to be detected visually.

NOTE: All bolted joints on the Virus SW 121 must be torque marked after being torqued to ensure easy detection of any loosening.

CAUTION: The fastening material of any bolted joint that has loosened must be removed and replaced.

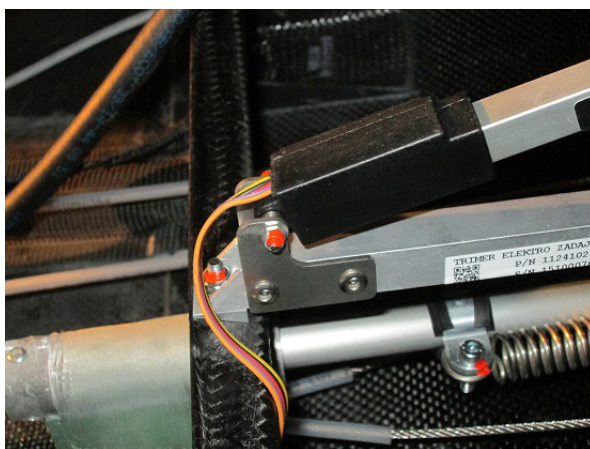


Figure 20-001
Example of torque marked bolted joints

20-40: 2.2. Locknuts

Locknuts are used throughout the Virus SW 121 because they resist loosening. Their plastic lining creates additional friction between it and the bolt.

CAUTION: Reusing locknuts is not permitted on the Virus SW 121.

20-40**FASTENER /HARDWARE GENERAL
REQUIREMENTS****20-40: 2.3. Fitting with tapered thread**

Some of the components found on the Virus SW 121 have tapered NPT thread and thus require special attention when removing/installing them. All of the aforementioned components can be found in the latest revision of the Virus SW 121 IPC. The following points must be adhered to when working with tapered thread on the Virus SW 121:

- An approved thread sealant (Loctite 577) must be applied to the external thread before fastening. This will ensure a leak-free seal.
- The component must be tightened by hand first and then tightened an additional two (2) turns with a wrench, so that the thread deforms and creates the seal.

CAUTION: Any components or fastening material with tapered thread, once removed, are not permitted to be reused and must be replaced with new ones.

20-50 ADHESIVES**1. Description**

Table 20-004 outlines the adhesives that are approved for use on the Virus SW 121.

Approved Sealants and Lubricants			
Item	Supplier	Specification	Pipistrel P/N
Tesa professional spray glue	Tesa SE	60022	5091063
Pattex universal classic contact adhesive	Henkel	-	5091011
Würth window adhesive classic plus	Adolf Würth GmbH & Co. KG	0890023701	5091018
Scotchmount primer	3M Deutschland GmbH	4297	5095009

Table 20-004
Approved adhesives

CAUTION: When using the adhesives listed in Table 20-004 always refer to the supplier's instructions for information about how to store them properly, how to use them properly and any safety precautions.

WARNING: Don't use any adhesives that have expired.

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CHAPTER 21 – ENVIRONMENTAL SYSTEMS**TABLE OF CONTENTS**

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21-00 GENERAL

The chapter covers all of the systems that control/regulate air flow and temperature in the Virus SW 121.

21-10 VENTILATION SYSTEMS

21-10 VENTILATION SYSTEMS

1. Description

The Virus SW 121's primary ventilation system consists of a set of sliding windows and adjustable vents that direct fresh ram air into the cockpit. The starboard door has a sliding window (1), while the port door has an adjustable circular vent (2). An additional circular vent is built into the sun roof.

(See Figure 21-001)

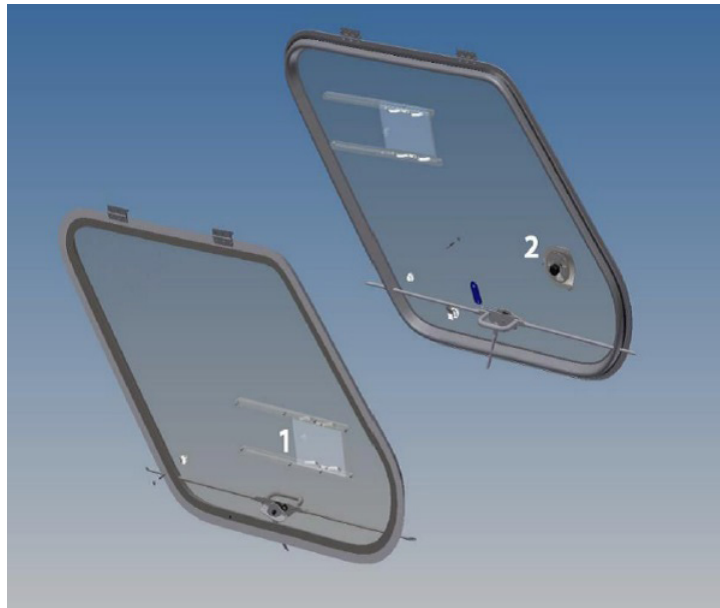


Figure 21-001
Primary ventilations system

A NACA inlet, located in the upper engine cowling, is used as a secondary fresh air source. The fresh air is routed from the NACA inlet to the composite defrost vent in the cabin, just below the windshield (see Figure 21-002).

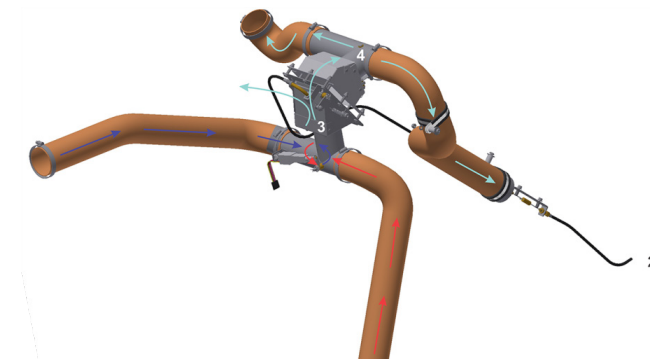


Figure 21-002
Secondary ventilation system

2. Maintenance practices

21-10: 2.1. Primary ventilation system

21-10: 2.1.1. Inspection/check

Reference: IPC 121-52-10-300

Step	Action	Required parts, materials and tools	Reference
1	Inspect the starboard door's sliding window for free, unhindered movement. Check for signs of damage and/or wear.		
2	Ensure the sliding window's springs are in good operating condition.		
3	Inspect the port door's adjustable circular vent for free, unhindered movement. Check for signs of damage and/or wear.		
4	Inspect the sunroof's adjustable circular vent for free, unhindered movement. Check for signs of damage and/or wear.		

21-10: 2.2. Secondary ventilation system

21-10: 2.2.1. Inspection/check

Reference: IPC 121-52-10-300

Step	Action	Required parts, materials and tools	Reference
1	Inspect the upper cowling's NACA inlet for signs of wear and/or damage. The NACA must be kept free of all debris and foreign matter. It's water drainage hole must be unclogged.		
2	Remove the upper engine cowling.		(see 71-10)
3	Inspect scat tubing for any signs of wear and/or damage.		
4	Inspect the air-box for any signs of corrosion and conduct an operational check of the actuator.		

21-40 HEATING SYSTEMS

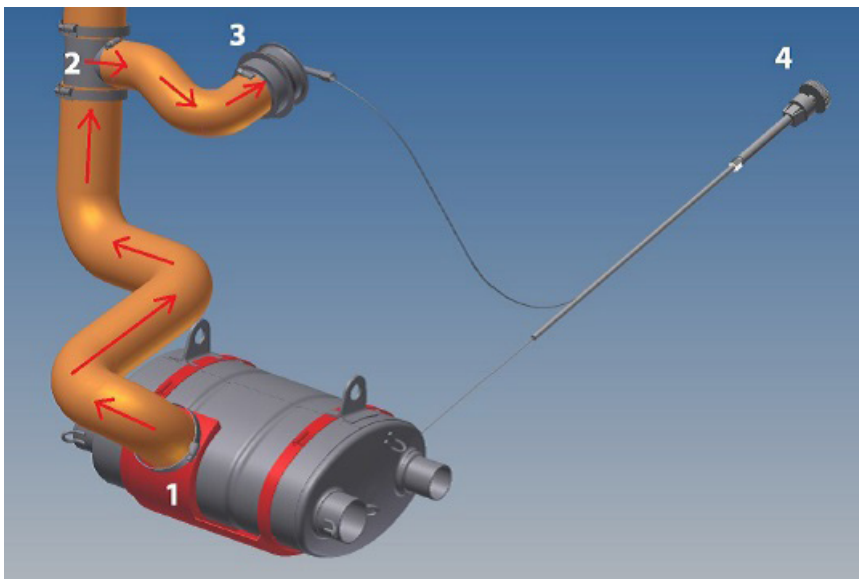
21-40 HEATING SYSTEMS

1. Description

Virus SW 121 aircraft is optionally equipped with an advanced heating and ventilation system, which performs three functions: cabin heat, windshield defrost and cabin ventilation.

21-40: 1.1. Cabin heat

A stainless steel heat muff fastened to the exhaust system muffler serves as the system's source of hot air (See Figure 21-003). Fresh enters the engine bay from the oil cooler and is directed into the heat muff (1). Hot air leaving the heat muff is then directed through scat ducting to a T-piece (2) and onwards to the lower control valve (3) fastened to the aircraft's firewall. A lockable Bowden cable (4), fastened to the switch panel in the cabin and connected to the lower control valve, gives the pilot complete control over how much hot air flows into the cabin and the ability to close it if a fire were to occur in the engine bay.



(1) Heat muff; (2) T-piece; (3) Lower control valve; (4) Lockable Bowden cable

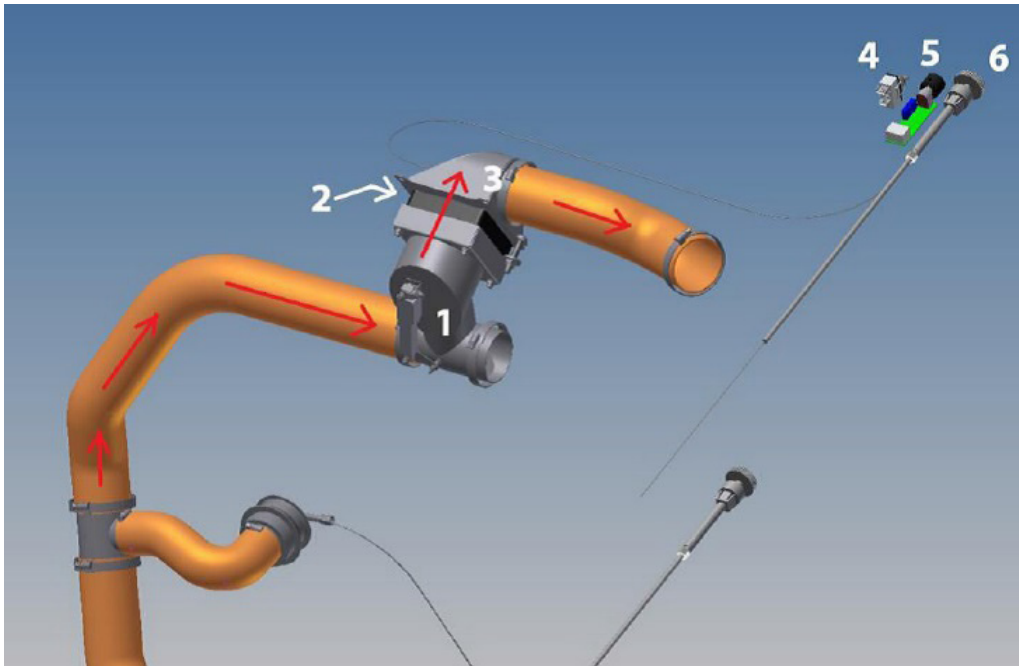
Figure 21-003
Cabin heat

21-40: 1.2. Windshield defrost

Hot air from the T-piece is directed into the composite defrost vent built into the bottom part of the windshield frame. This vent has holes in it that direct the hot air upwards and uniformly distributes it along the windshield.

Windshield defrost air is routed from the upper control valve (3), operated by the Bowden cable (6), to the mixture valve (1), controlled by the “Air Temp” knob (5), and “defrost fan” (2), operated by a fan switch (4).

All defrost controls, as well as those for all venting and heating systems, are integrated into the cockpit instrument panel (See Figure 21-004).



(1) Mixture valve; (2) Fan; (3) Upper control valve; (4) Fan switch; (5) Air temp knob; (6) Bowden cable

Figure 21-004
Windshield Defrost

2. Maintenance practices

21-40: 2.1. Heating system

21-40: 2.1.1. Inspection/check

Reference: IPC 121-21-00-000

Step	Action	Required parts, materials and tools	Reference
1	Carry out visual inspection of all the heating system's components.		(see 05-20)
2	Carry out operational inspection of upper and lower control valve.		

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CHAPTER 22 – AUTOPILOT SYSTEM**TABLE OF CONTENTS**

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22-00	AUTOPILOT SYSTEM General	22-03
22-10	GARMIN G3X AUTOPILOT SYSTEM Description Maintenance Practices	22-04

22-00 GENERAL

Virus SW 121 is equipped with two GSA 28 autopilot servos, one that controls pitch and one that controls roll. They are operated using the Garmin G3X MFD and offer a means of automatically or manually controlling the flight path of the aircraft. The Virus SW 121 also has an elevator trim assembly allows the pilot to control pitch without having to exert constant pressure on the pitch control system.

22-10 GARMIN G3X AUTOPILOT SYSTEM

22-10 GARMIN G3X AUTOPILOT SYSTEM

1. Description

The G3X Autopilot system is a dual axis autopilot system that provides roll stability, heading hold, NAV/ GPS tracking capabilities, and altitude hold capabilities controlled via the roll-trim cartridge and pitch servo.

G3X Autopilot System Garmin system includes automatic trim functionality, automatic speed scheduling and two actuators (servo motors). It's an integrated autopilot with standalone operation in the event of GMC 305 autopilot control panel display outage (See Figures 22-001 and Figure 22-002).



Figure 22-001
Autopilot Pitch and Roll Installation

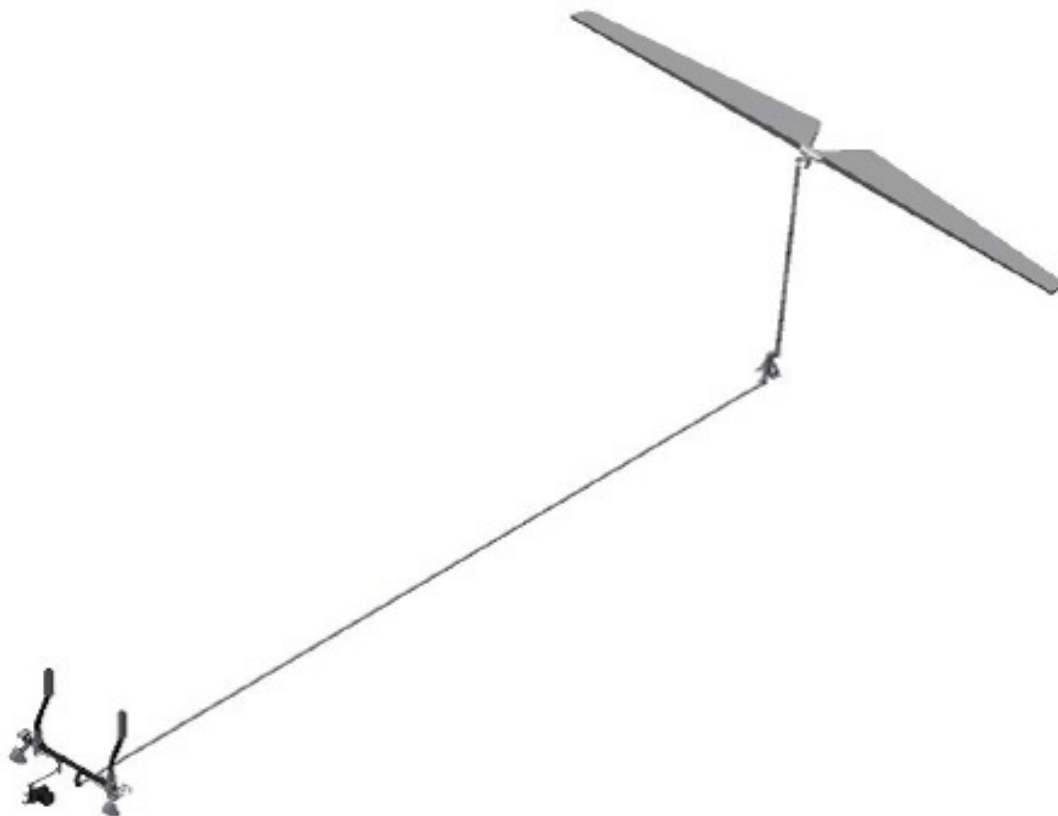


Figure 22-002
Autopilot Pitch Installation

The separate GMC 305 selector panel will integrate with both Garmin display formats. The GMC 305 control panel, is added as a separate autopilot control panel for dedicated mode selection as well as access to additional autopilot modes including Indicated Airspeed Hold (IAS), Level recovery (LVL), Yaw Damper (YD), and Flight Director (FD).

G3X Autopilot System touch offers access to these advanced functions directly from GDU 370 touchscreen displays; however, only basic autopilot functions can be accessed from the original G3X 7" soft key displays.

A control wheel integrated into the GMC 305 makes for easier pitch, vertical speed and airspeed adjustments and additional LVL mode button commands the autopilot to help restore the aircraft to straight-and-level flight.

Spring type elevator trim is activated by a linear servo motor assembly located behind the luggage compartment. The motion of the linear servo is controlled through a cockpit switch and an integral position sensor. Trim position is indicated with discrete steps on a dedicated LED display adjacent to the trim switch as well as a gauge in the G3X PFD (See Figure 22-002).

22-10
GARMIN G3X AUTOPILOT SYSTEM



Figure 22-003
 Elevator Trim Installation

Installation of the system is simple and straightforward, with industry standard available servo mounting kit.

NOTE: For all G3X software loading, configuration, locking and unlocking procedures please see 31-60.

2. Maintenance practices

22-10: 2.1. Removal/installation

For removal and installation, apply standard practices described in chapter 20-00 of this manual. For all other maintenance procedures, including testing and troubleshooting, refer to the Garmin GX3 and GSA 28 operation manual/service publications.

22-10: 2.2. Inspection/check

22-10: 2.2.1. Pitch autopilot controls system

Reference: IPC 121-27-33-000

Step	Action	Required parts, materials and tools	Reference
1	Remove the control stick boots.		(see 25-10)
2	Carry out visual inspection.		(see 05-20)
3	Lubricate rod end bearings.		(see 12-20)
4	Install control stick boots.		(see 25-10)

22-10: 2.2.2. Roll autopilot control system

Reference: IPC 121-27-14-000

Step	Action	Required parts, materials and tools	Reference
1	Remove the crew seats.		(see 25-10)
2	Remove the baggage compartment.		(see 25-50)
3	Carry out visual inspection.		(see 05-20)
4	Lubricate rod end bearings.		(see 12-20)
5	Install the baggage compartment.		(see 25-50)
6	Install the crew seats.		(see 25-10)

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CHAPTER 23 – COMMUNICATIONS**TABLE OF CONTENTS**

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23-10	SPEECH COMMUNICATIONS Description Maintenance Practices	23-04
23-50	AUDIO INTEGRATING Description Maintenance Practices	23-05

23-00 GENERAL

This chapter describes the systems, units, components which provide a means of communicating from one part of the airplane to another and between the airplane and other airplanes or ground stations. Included are voice and continuous wave communicating components and intercom.

23-10 SPEECH COMMUNICATIONS

23-10 SPEECH COMMUNICATIONS

1. Description

This chapter covers the systems which utilize the voice to transmit and/or receive messages from air-to-air or air-to-ground.

Transceivers

A VHF communication (COM) transceiver is installed to provide VHF communication. The transceivers and integrated controls are mounted in the Garmin GTR 225 or GNC 255 (option) units. The transceivers receive all narrow- and wide-band VHF communication transmissions transmitted within range of the selected frequency. The antennas pick up the signals and route the communication signals to the transceivers, which digitize the audible communication signal. The digitized audio is then routed to the audio control unit for distribution to the speakers or headphones.

The Garmin GTR 225 or GNC 255 (optional) is designated as COM. COM provides transceiver active and standby frequency indication, frequency memory storage, and knob operated frequency selection. The COM transceiver provides either 720-channel (25 kHz spacing) or 2140-channel (8.33 kHz spacing) operation in a frequency range from 118.000 to 136.975 MHz. The COM antenna is located on top of fuselage behind the cabin. 12 VDC for COM transceiver operation is controlled through the Avionics Switch and supplied through the COM circuit breaker on the Avionics Bus

The airplane is equipped with a VOX intercom system as part of the COM unit. A separate designated intercom ON/OFF switch is provided below the Transponder on the central part of the instrument panel.

Transponder

The airplane is equipped with a single Garmin GTX 328 ATC Mode S (identification and altitude) transponder with squawk capability. The transponder system consists of the integrated receiver/transmitter control unit, an antenna, and an altitude encoder. The receiver/transmitter receives interrogations from a ground-based secondary radar transmitter and then transmits to the interrogating Air Traffic Control Center. Digitized altitude information, provided by the altitude encoder, is plumbed into the airplane static system. The transponder and integrated controls are mounted in the center console. The transponder control provides active code display, code selection, IDENT button, and test functions. A FUNC (function) key allows for selection of pressure altitude, flight time, count-up timer and countdown timer modes. The display is daylight readable and dimming is operator controlled through the INST lights control on the instrument panel bolster. The transponder antenna is mounted on the underside of the fuselage just aft of the firewall. 12 VDC for transponder operation is controlled through the Avionics Switch. 12 VDC for receiver, transmitter, and altitude encoder operation is supplied through the XPDR circuit breaker on the Avionics Bus.

2. Maintenance practices

Please apply the standard practices outlined in chapter 20-00.

For all other servicing/maintenance refer to the instrument manufacturers installation/maintenance manual.

23-50
AUDIO INTEGRATING**23-50 AUDIO INTEGRATING****1. Description**

This chapter covers the portion of the system which controls the output of the communications and navigation receivers into the flight crew headphones and speakers, and the output of the flight crew microphones into the communications transmitters. Included are the audio control panel, audio jacks, cockpit loud speaker, and Push-To-Talk (PTT) switch.

Headset/Microphone/Push-to-Talk Installation

The airplane is equipped with provisions for two headsets with integrated microphones. The microphone-headsets use remote Push-To-Talk (PTT) switches located on the top of the associated control stick grip. The microphone (MIC) and headset jacks for the pilots are located on the upper part of the back cockpit wall. The volume is controlled via the COM unit and intercom function via the dedicated intercom switch.

2. Maintenance practices

Please apply the standard practices outlined in chapter 20-00.

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CHAPTER 24 – ELECTRICAL POWER**TABLE OF CONTENTS**

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24-30	DC GENERATION Description Maintenance Practices	24-04
24-40	EXTERNAL POWER Description Maintenance Practices	24-06
24-60	DC ELECTRICAL LOAD DISTRIBUTION Description Maintenance Practices	24-07

24-00 GENERAL

The Virus SW 121 is equipped with a single-generator, single-battery, 14-volt direct current (VDC) electrical system designed to reduce the risk of electrical system faults. The system provides uninterrupted power for avionics, flight instrumentation, lighting, and other electrically operated and controlled systems during normal operation.

24-30
DC GENERATION

24-30 DC GENERATION

1. Description

The electrical system is a 12-Volt DC system. Power is supplied by an integrated generator with approximately 250W AC output at 5800 RPM and rectified with an electronic full-wave rectifier regulator (RU 912). The generator system is capable of delivering max. 18A at 14V which feeds the onboard battery (12V, 11Ah – see Figure 24-001). In case of emergency, the battery will supply reduced number of necessary direct-current loads with power for 30 minutes. The electrical system is controlled by means of switches/fuses, which are arranged in one row on the upper half of the switch panel under the instrument panel.

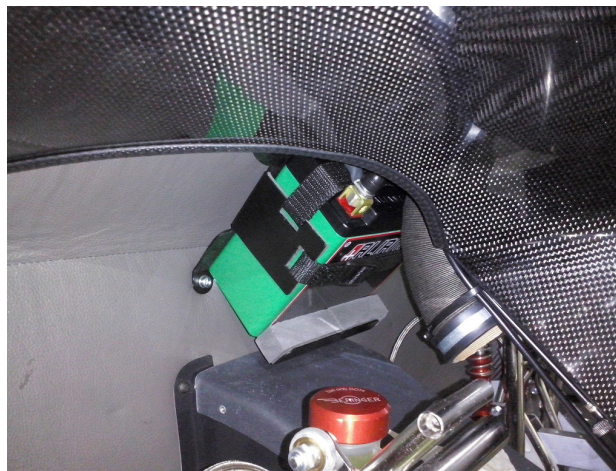


Figure 24-001
Battery installation

2. Maintenance Practices

24-30: 2.1. Battery

24:30: 2.1.1. Removal

Reference: IPC 121-24-00-000

Step	Action	Required parts, materials and tools	Reference
1	MASTER switch off, AVIONICS switch off.	Metric ratchet/ socket set	
2	Disconnect the battery.		
3	Remove the straps securing it in place.		
4	Remove terminal bolt caps.		
5	Loosen/remove the terminal bolts.		
6	Disconnect the cables.		
7	Remove the battery.		

24:30: 2.1.2. Inspection/check

Reference: IPC 121-24-00-000

Step	Action	Required parts, materials and tools	Reference
1	Carry out visual inspection of the battery. Inspect its terminals for any signs of oxidation. If necessary, remove the battery and remove oxidation.		(see 05-20) (see Figure 24-002) (see 24:30: 2.1.1.)
2	Wipe away any residual lubricant on the terminals and re-apply lubricant.		(see 12-20)



Figure 24-002
Example of battery terminal oxidation

24:30: 2.1.3. Installation

Reference: IPC 121-24-00-000

Step	Action	Required parts, materials and tools	Reference
1	Position battery in mounting bracket and secure with straps.	Metric ratchet/ socket set	
2	Connect cables and secure them using bolts.		
3	Install terminal bolt caps.		
4	Connect battery.		

24-40
EXTERNAL POWER**24-40 EXTERNAL POWER****1. Description**

If the engine doesn't start an auxiliary power supply can be used to jump start it. Refer to chapter 8 of the POH for detailed information about how to jump start the Virus SW 121.

24-60 DC ELECTRICAL LOAD DISTRIBUTION

1. Description

The electrical system is controlled by means of switches/fuses, which are arranged in one row on the upper half of the switch panel under the instrument panel. The circuit breakers (CB) are located under the switch panel's switches/fuses. An ammeter and a voltmeter are integrated into the Garmin G3X system and they are displayed on the EMS mode display to monitor electrical system operating. Generator failure is indicated by a warning red LED light on the Switch panel (top, left).

The Master relay connects the battery with the main bus. The main bus supplies the avionics relay which delivers power to the switch panel and circuit breakers. Both 12V sockets are connected via switch/fuse directly to the main battery.

The 22000uF/25V capacitor provides a continuous control voltage for the regulator/rectifier in the event of momentary interruption of battery voltage. This is necessary as generator output voltage is variable with RPM and may increase to as much as 240V AC.

The avionics bus covers all avionics loads and electrically operated instruments. The electrical system's harnesses run from the engine through the firewall and connect to the electrical panel, as well as other systems. The electrical system is divided into three main subsystems (engine harness, main electrical board and switch panel) which are connected to all equipment/devices.

Power from the generator/battery is distributed to the following:

Garmin G3X avionics system which includes dual display GDU37x (PFD,MFD), GEA24 (EIS), GMC305 (AP PNL), 2x GSA28 (Servo motors), 2x GSU25 (ADAHRS), GMU22 (Magnetometer), GTP59 (OAT sensor), and GAP26 (Pitot tube). Total consumption of all these items is max 8.63A at 14V.

Garmin GTR225 transceiver consumption is typical 0,5A and max 4.2A at 14V, optionally can be installed GNC255 transceiver.

Garmin GTX328ES transponder consumption is typical 1.1A and max 3.1A at 14V.

Landing light consumption is 5A at 14V.

Nav lights consumption is 0.27A at 14V.

Strobe lights consumption is 0.44A at 14V.

Cockpit illumination and dimming is 0.4A at 14V.

Electrical trim consumption is 0.3A at 14V.

2. Maintenance Practices

Refer to chapter 91-00 of this manual for wiring diagrams of the various electrical loads on the Virus SW 121.

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CHAPTER 25 – EQUIPMENT AND FURNISHING**TABLE OF CONTENTS**

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25-50	BAGGAGE COMPARTMENT Description Maintenance Practices	25-07
25-60	EMERGENCY Description Maintenance Practices	25-08

25-00 GENERAL

This chapter describes all of the equipment and furnishings found in cabin and baggage compartment of the Virus SW 121. It covers everything from the seats and three-point seat safety harnesses to the upholstery and control stick boots.

25-10 FLIGHT COMPARTMENT

25-10 FLIGHT COMPARTMENT

1. Description

This chapter describes all of the equipment and furnishings found in the cabin and outlines the maintenance practices that apply to them.

Crew seats

The crew seats are comprised of a bottom cushion, hard padded back rest and a head rest. The backrest and head rest are attached to the aft cabin bulkhead, while the bottom cushion is attached to the seat shell. All of the seats' components are secured in place by means of Velcro patches. The seats' position cannot be adjusted, nor can they be reclined, however the backrest features a manual pneumatic pump to adjust the size of the lumbar bladder and consequently the amount of back support.

Safety harnesses

The harness is a 3-point restraint system with quick release buckle. The lap straps are attached to the composite seat shell with M8 bolts in an area that is locally reinforced. The shoulder straps are attached to the bottom of the rear baggage compartment bulkhead with M8 bolts. The attachment point is also locally reinforced.

Control stick boots

Each control stick is equipped with a leather boot that protects the stick and prevents any dirt/debris from entering the area beneath the cabin floor.

2. Maintenance practices

25-10: 2.1. Crew seats

25-10: 2.1.1. Removal

Reference: IPC 121-25-10-000

Step	Action	Required parts, materials and tools	Reference
1	Tear head rest away from Velcro patches and remove it.		
2	Tear backrest away from Velcro patches, slide shoulder straps around it and remove it.		
3	Tear bottom cushion away from Velcro patches and remove it.		
4	Carry out visual inspection.		(see 05-20)

25-10: 2.1.2. Installation

Reference: IPC 121-25-10-000

Step	Action	Required parts, materials and tools	Reference
1	Position bottom cushion in seat shell and press it up against the Velcro patches on the seat shell.		
2	Position the backrest behind the shoulder straps and press it up against the Velcro patches on the aft cabin bulkhead.		
3	Position the head rest so that it's bottom flap rests behind the backrest and then press it up against Velcro patches on the aft cabin bulkhead.		

25-10: 2.2. Safety harnesses

25-10: 2.2.1. Removal

Step	Action	Required parts, materials and tools	Reference
1	Remove crew seats.	T-handle socket screwdriver set	(see 25-10)
2	Remove baggage compartment.		(see 25-50)
3	Remove fastening material securing the harnesses to their attachment points.		
4	Remove safety harnesses.		
5	Carry out visual inspection.		(see 05-20)

25-10: 2.2.2. Installation

Step	Action	Required parts, materials and tools	Reference
1	Apply Loctite 243 to the fastening material thread.	- T-handle socket screwdriver set, - Loctite 243	
2	Fasten the safety harnesses to their attachment points.		
3	Install baggage compartment.		(see 25-50)
4	Install crew seats.		(see 25-10)
5	Carry out operational inspection of seats.		(see 05-20)

25-10**FLIGHT COMPARTMENT****25-10: 2.3. Control stick boot****25-10: 2.3.1. Removal**

Step	Action	Required parts, materials and tools	Reference
1	Remove the self-tapping screws securing the base of the boot in place.	Phillips screwdriver	(see 05-20)
2	Release the strap at the top of the boot.		
3	Remove the boot by sliding it off the control stick.		
4	Carry out visual inspection.		

25-10: 2.3.2. Installation

Step	Action	Required parts, materials and tools	Reference
1	Slide the boot over the control stick and position it on the cabin floor	Phillips screwdriver	(see 05-20)
2	Fasten it to the cabin floor using the self-tapping screws		
3	Fasten the strap at the top of the boot		
4	Carry out operational inspection of the control stick.		

25-50 BAGGAGE COMPARTMENT

1. Description

The baggage compartment is behind the seats and accessible via a dedicated baggage door on the port side of the aircraft, just behind the cabin. All of its components are manufactured from CFRP and, aside from supporting baggage, they also act as a barrier between it and the control rods nearby, so that luggage cannot interfere with them.

2. Maintenance practices

25-50: 2.1. Baggage compartment

25-50: 2.1.1. Removal

Reference: IPC 121-50-10-000

Step	Action	Required parts, materials and tools	Reference	
1	Remove crew seats.	-T-handle hex head screwdriver set, -metric wrench set, -metric ratchet and socket set	(see 25-10)	
2	Remove the fastening material securing the bulkhead cover in place.			
3	Remove the bulkhead cover.			
4	Remove the fastening material securing the floor board in place.			
5	Remove the fastening material securing the vertical flaperon push-rod protective cover in place.			
6	Reach through the protective cover's access hole on the starboard side and remove the locknut securing the roll servo's pushrod to the flaperon bellcrank assembly.			
7	Slide the pushrod of the assembly and remove the protective cover.			
8	Remove the fastening material securing the floor board support to the fuselage.			
9	Remove the floor board support.			
10	Carry out visual inspection baggage compartment components.			(see 05-20)
11	Install crew seats.			(see 25-10)

25-60 EMERGENCY

25-60 EMERGENCY

1. Description

Emergency locator transmitter (ELT)

Virus SW 121 is equipped with a self-contained compact Kannad 406 AF ELT with remote control panel (RCP). The ELT transmitter is installed immediately aft of the cabin bulkhead. The ELT is mounted slightly to the right of the airplane centerline. The transmitter is accessible through the baggage compartment, while the ELT antenna is located on the top of the cockpit.

ELT RCP

The Kannad 406 AF Compact ELT has a remote control panel (RCP) Kannad RC200, installed on the instrument panel for easy access and checking of system's proper functionality.

WARNING: ELT and RCP batteries must be inspected in accordance with the requirements of the replacement schedule in chapter 5. The ELT and RCPI batteries must be replaced upon reaching the date stamped on the batteries or whenever the batteries have been in use for one cumulative hour.

NOTE: Electrical equipment and electrically powered instruments are individually protected by means of circuit breakers, except the ELT which is separate from electrical system of the aircraft.

For additional information of the ELT, refer to the Kannad 406 AF Compact ELT Installation and Operation Manual.

2. Maintenance practices

25-60: 2.1. Emergency locator transmitter (ELT)

25-60: 2.1.1. Removal

Step	Action	Required parts, materials and tools	Reference
1	Remove crew seats.		(see 25-10)
2	Locate ELT behind passenger seat.		
3	Disconnect both cables.		
4	Release strap.		
5	Remove ELT.		
6	Carry out visual inspection.		(see 05-20)

25-60: 2.1.2. Installation

Step	Action	Required parts, materials and tools	Reference
1	Position ELT in composite mounting brace.		
2	Secure using Velcro strap.		
3	Connect it's two cables.		
4	Install crew seats.		(see 25-10)

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CHAPTER 27 – FLIGHT CONTROLS**TABLE OF CONTENTS**

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27-30	ELEVATOR Description Maintenance Practices	27-14
27-50	FLAPERONS Description Maintenance Practices	27-21
27-60	AIR BRAKE LEVER Description Maintenance Practices	27-27

27-00 GENERAL

1. Description

This chapter describes the Virus SW 121's control system and the maintenance procedures that pertain to it.

The Virus SW 121's control system consists of various push/pull rods, bellcranks, cables and pulleys. An elevator attached to the horizontal stabilizer gives longitudinal control, while a rudder, which is attached to the vertical stabilizer, provides yaw control. The wings have flaperons attached to their trailing edge which provide lateral control, as well as extra lift for landing and taking off.

The Virus SW 121 has a control stick for each pilot. The elevator can be trimmed using a trim knob found in the center console, just between the two seats.

Each pilot has a rudder pedal assembly that is attached to the cabin floor and allows for complete yaw control as well as nose wheel steering. The rudder pedal assembly's position is adjustable.

2. Maintenance Practices

27-00: 2.1. Push/pull rods

27-00: 2.1.1. Adjusting length

Reference: IPC 121-27-50-000

Step	Action	Required parts, materials and tools	Reference
1	Loosen jam nut.	- metric ratchet/socket set, - metric combination wrench set	(see 05-20)
2	Remove fastening material securing the rod end to the stud/brace.		
3	Slide rod end off stud/brace.		
4	Rotate rod end bearing clockwise to shorten the push/pull rod or counterclockwise to lengthen it.		
5	Slide rod end back onto stud/brace.		
6	Fasten rod to stud/brace. Torque and apply Loctite if necessary (see pull/push rod assembly in IPC).		
7	Carry out operational inspection.		

27-20
RUDDER**27-20 RUDDER****1. Description**

Rudder pedals are available for each pilot and are adjustable in flight in the fore-aft direction. Metal cables in Teflon-coated protective sleeves run from the individual pedal to bellcranks located behind the seats and below the cargo compartment floor. Single cables run from the bellcranks backwards and are attached directly to the rudder. Rudder cable tension can be adjusted using turnbuckles and rudder neutralization is achieved by means of two retaining springs.

The nose wheel is part of the yaw control system and moves whenever the pedal is pressed. The cables that allow for nose wheel steering run from the aft bellcranks to the nose wheel bellcrank, which has an anti-shimmy damper connected to it.

**2. Maintenance Practices**

27-20: 2.1. Rudder cables

27-20: 2.1.1. Inspection/check near the rudder

Reference: IPC 121-27-20-000

Step	Action	Required parts, materials and tools	Reference
1	Remove rudder.	- metric ratchet/socket set	(see 55-40)
2	Carry out visual inspection of rudder cables in the vicinity of the rudder cable bellcrank.		(see 05-20)
NOTE: Pay special attention to the cables' individual strands, as if even one damaged strand requires complete cable replacement. Also inspect their thimbles and sleeves for any signs of damage or wear.			
3	Carry out operational inspection of the rudder cables in the vicinity of the rudder cable bellcrank.		(see 05-20)
4	Install the rudder.		(see 55-40)

27-20: 2.1.2. Inspection/check in the fuselage aft of the cabin

Reference: IPC 121-27-20-000

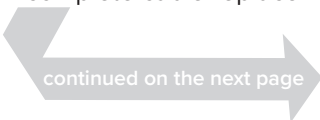
Step	Action	Required parts, materials and tools	Reference
1	Remove the baggage compartment	- metric ratchet/socket set - T-handle hex head screwdriver set	(see 25-50)
2	Carry out visual inspection of rudder cables behind the cabin and in the fuselage tail cone.		(see 05-20)
NOTE: Pay special attention to the cables' individual strands, as if even one damaged strand requires complete cable replacement.			
3	Carry out operational inspection of the rudder cables behind the cabin and in the fuselage tail cone.		(see 05-20)
4	Install the baggage compartment.		(see 25-50)

27-20: 2.1.3. Inspection/check in the cabin

Reference: IPC 121-27-00-000, IPC 121-27-21-451

Step	Action	Required parts, materials and tools	Reference
1	Carry out visual inspection of rudder cables in the cabin near the rudder pedals.		(see 05-20)

NOTE: Pay special attention to the cables' individual strands, as if even one damaged strand requires complete cable replacement.



27-20
RUDDER

Step	Action	Required parts, materials and tools	Reference
2	Carry out operational inspection of the rudder cables in the cabin.		(see 05-20)
3	Detach the rudder pedal return springs to access to the bottom end of the S-shaped tube.		

NOTE: Pay special attention to the area where the cables enter and exit the pedals' S-shaped tube (see Figure 27-002).



Figure 27-002
Upper pedal-rudder cable joint

4	Reattach the rudder pedal return springs.		
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27-20: 2.1.4. Aft rudder cable tension check/adjustment

Reference: IPC 121-27-20-000, IPC 121-27-25-000

Step	Action	Required parts, materials and tools	Reference
1	Remove the crew seats.		(see 25-10)
2	Remove the baggage compartment.		(see 25-50)
3	Locate the unprotected length of cable between the T-shaped rudder bellcrank assembly and the baggage compartment bulkhead.		
4	Ensure that the cable tension is 9.1 kg +/- 0.5 kg (20 lbs +/- 1 lbs). If necessary, adjust using aft turn-buckles.	- cable tension gauge (P/N 5610664), - T-handle hex head screwdriver set, - allen key set	

2.1.5. Forward rudder cable tension check/adjustment

Reference: IPC 121-27-20-000, IPC 121-27-25-000, IPC 121-32-20-300

Step	Action	Required parts, materials and tools	Reference
1	Remove M4 screws securing steering mechanism housing's cover	- cable tension gauge (P/N 5610664), - T-handle hex head screwdriver set, - allen key set	
2	Remove steering mechanism housing's cover		
3	Locate the unprotected length of cable and measure cable tension using cable tension gauge.		
4	Ensure that the cable tension is 18.2 kg +/- 0.9 kg (40 lbs +/- 2 lbs). If necessary, adjust using forward turnbuckles.		

27-20: 2.2. Rudder pedals

27-20: 2.2.1. Inspection/check

Reference: IPC 121-27-21-000

Step	Action	Required parts, materials and tools	Reference
1	Carry out visual inspection of rudder pedals.		(see 05-20)
2	Carry out operational inspection of rudder pedals.		(see 05-20)

27-20: 2.3. Rudder pedal return springs

27-20: 2.3.1. Inspection/check

Step	Action	Required parts, materials and tools	Reference
1	Carry out visual inspection of the springs. Pay special attention to the springs' end hooks and check for any signs of deformation.	Rudder deflection verification template (P/N 1190345)	(see 05-20)
2	Fit the aircraft with the rudder deflection verification template.		
3	Align the rudder with the template's center mark.		
4	Verify that the rudder pedals are parallel to each other.		

CAUTION: Damaged or deformed rudder pedal return springs can cause unexpected/odd yaw behavior. Replace them if necessary (see 27-20).

5	Remove the rudder deflection verification template.		
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27-20

RUDDER

27-20: 2.3.2. Removal/installation

Step	Action	Required parts, materials and tools	Reference
1	Unhook the springs from the pedals.	- Vernier caliper - needle nose pliers - rudder deflection verification template (P/N 1190345)	(see 27-20)
2	Install new springs		
3	Check that the rudder pedals are parallel to each other with the rudder centered.		
4	Carry out operational inspection of the rudder pedal return springs.		

27-20: 2.4. Rudder

27-20: 2.4.1. Inspect/check

Reference: IPC 121-27-24-050

Step	Action	Required parts, materials and tools	Reference
1	Remove rudder.		(see 55-40)
2	Inspect the paint marker on the threaded stopper pins. If they have loosened/shifted, adjust the deflection angle.		(see 20-40: 2.1.) (see 27-20: 2.4.2.)
3	Wipe clean and lubricate upper rudder bushing.		(see 12-20)

27-20: 2.4.2. Deflection angle adjustment

Reference: APPENDIX 99-D, IPC 121-27-24-052

Step	Action	Required parts, materials and tools	Reference
1	Position and fasten the rudder deflection template to the fuselage.	- rudder deflection verification template (P/N 1190345)	(see 05-20)
3	Verify that rudder's deflections angles are within tolerance using markings on template.		
4	If necessary, adjust deflection angles by screwing/unscrewing threaded stopper pins on lower rudder hinge.		

CAUTION: Rudder deflection angles that don't adhere to those in APPENDIX 99-D can result in unexpected/odd yaw behavior.

27-20: 2.4.3. Radial free play check

Reference: Figure 27-004

Step	Action	Required parts, materials and tools	Reference
1	Remove the horizontal stabilizer.	- Vernier caliper	(see 53-10)
2	Place Vernier caliper between rudder and the elevator retainer and, while moving the rudder back and forth in the radial direction, measure the free play.		
CAUTION: The maximum permissible amount of radial rudder free play is 0.5 mm.			
3	Install the horizontal stabilizer.		(see 53-10)



Figure 27-004
Rudder radial free play check

27-20: 2.4.4. Axial free play check

Reference: Figure 27-005

Step	Action	Required parts, materials and tools	Reference
1	Remove the horizontal stabilizer.	- Vernier caliper	(see 55-10)
2	Place Vernier caliper as shown in Figure 27-005 and, while moving the rudder back and forth in the axial direction, measure the free play.		
CAUTION: The maximum permissible amount of radial rudder free play is 0.1 mm.			
3	Install the horizontal stabilizer.		(see 55-10)

27-20
RUDDER



Figure 27-005
Rudder axial free play check

27-20: 2.5. Upper rudder hinge

27-20: 2.5.1. Inspection/check

Reference: IPC 121-27-24-000

Step	Action	Required parts, materials and tools	Reference
1	Remove rudder.	- metric ratchet/socket set - torque wrench - paper towel	(see 55-40)
2	Carry out visual inspection of upper rudder hinge.		(see 05-20)
3	Inspect paint marker.		(see 20-40: 2.1.)
4	Clean hinge pin with paper towel and lubricate it.		(see 12-20)
5	Install rudder.		(see 55-40)

27-20: 2.6. Lower rudder hinge

27-20: 2.6.1. Inspection/check

Reference: IPC 121-27-24-052, 121-27-22-000

Step	Action	Required parts, materials and tools	Reference
1	Remove rudder.	- metric ratchet/socket set - torque wrench - paper towel	(see 55-40)
2	Carry out visual inspection of lower rudder hinge.		(see 05-20)
3	Inspect paint marker.		(see 20-40: 2.1.)
4	Clean hinge pin with paper towel and lubricate it.		(see 12-20)
5	Install rudder.		(see 55-40)

27-20: 2.7. Rudder cable bellcrank

27-20: 2.7.1. Inspection/check

Reference: IPC 121-27-22-000

Step	Action	Required parts, materials and tools	Reference
1	Remove rudder.		(see 55-40)
2	Carry out visual inspection of rudder cable bellcrank.		(see 05-20)
3	Clean it with paper towel and lubricate it.		(see 12-20)
4	Inspect paint marker.		(see 20-40: 2.1.)
5	Carry out operational inspection of the rudder cable bellcrank.		(see 05-20)
6	Install rudder.		(see 55-40)

27-20: 2.8. T-shaped bellcrank

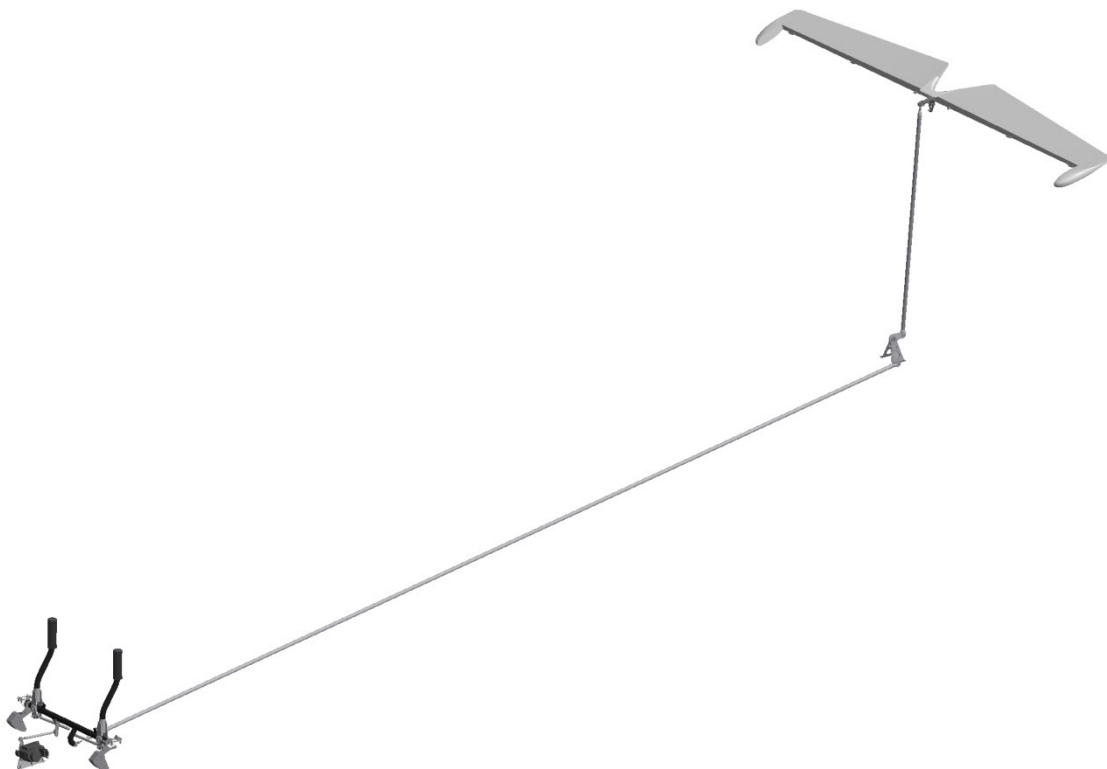
27-20: 2.8.1. Inspection/check

Reference: IPC 121-27-14-000

Step	Action	Required parts, materials and tools	Reference
1	Remove the crew seats.		(see 25-10)
2	Remove the baggage compartment.		(see 25-50)
3	Carry out visual inspection.		(see 05-20)
4	Lubricate joint between cables and bellcranks.		(see 12-20)
5	Install the baggage compartment.		(see 25-50)
6	Install the crew seats.		(see 25-10)

27-30
ELEVATOR**27-30 ELEVATOR****1. Description**

The Virus SW 121's elevator is fastened to the horizontal stabilizer and is operated using the pilot control sticks (see Figure 27-006). The sticks are mounted on a common lateral drive assembly, which actuates the horizontal elevator pushrod that runs along the entire length of the fuselage. A bellcrank is located on the bottom side of the vertical stabilizer and can be inspected through a provision in the vertical stabilizer end-rib. The hook-up to the elevator is via a composite U-shaped retainer which conforms to the shape of the elevator. Upon removal of the horizontal stabilizer/elevator, the U-member remains attached to the fuselage. The pitch control system does not include any cables. The autopilot pitch servo is connected to the main lateral push-rod via a dedicated rod. Control stops are integrated into the lateral drive assembly for elevator deflection control.



Elevator control system

A spring-based elevator trim is activated by a linear servo motor assembly located behind the baggage compartment (see Figure 27-007). The motion of the linear servo is controlled through a cockpit switch and an integral position sensor. Trim position is indicated with discrete steps on a dedicated LED display adjacent to the trim switch as well as a gauge in the G3X PFD.



Figure 27-007
Elevator trim system and cockpit switch/display

2. Maintenance Practices

27-30: 2.1. Elevator

27-30: 2.1.1. Inspection/check

Reference: IPC 121-27-24-050, IPC 121-27-32-002

Step	Action	Required parts, materials and tools	Reference
1	Remove the port control stick boot.		(see 25-10)
2	Inspect the paint marker on the threaded stopper pins at port end of the control stick drive. If they have loosened/shifted, adjust the deflection angle.		(see 27-30: 2.1.2.)

27-30
ELEVATOR

27-30: 2.1.2. Deflection angle adjustment

(if required after performing inspection/check in 27-30: 2.1.1. Inspection/check)

Reference: APPENDIX 99-D, IPC 121-55-20-000, IPC 121-27-30-000

Step	Action	Required parts, materials and tools	Reference
1	Fit elevator deflection measurement tool on trailing edge of elevator.	- elevator deflection measurement kit (P/N 1190464)	(see Figure 27-016)
2	Put elevator in neutral position by aligning it with horizontal stabilizer. Set inclinometer to 0°.		
4	Verify the elevator's deflection angles adhere to those found in the Virus SW 121's Weight and Balance Report (see APPENDIX 99-D).		(see APPENDIX 99-D)
5	Adjust the deflection angles by screwing/unscrewing the control sticks' longitudinal threaded stopper pins.		(see 05-20)

CAUTION: Elevator deflection angles that don't adhere to those in APPENDIX 99-D can result in unexpected/odd pitch behavior.



Figure 27-0016
Elevator deflection angle adjustment

27-30: 2.1.3. Axial free play check

Reference: Figure 27-008

Step	Action	Required parts, materials and tools	Reference
1	Lower the tail chapter to the ground.	- Vernier caliper	
2	Place Vernier caliper between elevator and horizontal stabilizer, while moving the rudder back and forth in the axial direction, measure the free play.		(see Figure 27-008)

CAUTION: The maximum permissible amount of axial elevator free play is 0.5 mm



Figure 27-008
Elevator axial free play check

27-30: 2.1.4. Radial free play check

Reference: Figure 27-005

Step	Action	Required parts, materials and tools	Reference
1	Lower the tail chapter to the ground	- Vernier caliper	(see Figure 27-009)
2	Place Vernier caliper between elevator and horizontal stabilizer, while moving the rudder back and forth in the radial direction, measure the free play.		
CAUTION: The maximum permissible amount of radial rudder free play is 0.5 mm.			
3	Install the horizontal stabilizer.		(see 55-10)



Figure 27-009
Elevator radial free play check

27-30
ELEVATOR

2.2. Horizontal elevator pushrod

27-30: 2.2.1. Inspection/check

Reference: IPC 121-27-30-000

Step	Action	Required parts, materials and tools	Reference
1	Remove the crew seats.		(see 25-10)
2	Remove the baggage compartment.		(see 25-50)
3	Carry out visual inspection of horizontal elevator pushrod. Inspect the push rod's surface where it travels through the bearings. Surface discoloration is acceptable, however, gouges and surface deformations are not.		(see 05-20) (see Figure 27-010) (see Figure 27-011)

CAUTION: Surface damage and/or gouges in the horizontal elevator pushrod deeper than 0.15 mm are a safety hazard and require pushrod replacement.

4	Carry out operational inspection of horizontal elevator pushrod.		(see 05-20)
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Figure 27-010
Horizontal elevator pushrod surface discoloration



Figure 27-011
Horizontal elevator pushrod surface gouges

27-30: 2.2.2. Major inspection

Reference: IPC 121-27-30-000

Step	Action	Required parts, materials and tools	Reference
1	Remove the control stick boots.	Phillips screwdriver	(see 25-10)
2	Remove the crew seats.		(see 25-50)
3	Remove the baggage compartment.		(see 05-20)
4	Use borescope to carry out visual inspection of the horizontal elevator push rod under the cabin floor.		(see 25-50)
5	Install the baggage compartment.		(see 25-10)
6	Install the crew seats.		
7	Install control stick book.		

27-30: 2.3. Elevator trim assembly

27-30: 2.3.1. Inspection/check

Reference: IPC 121-27-30-150

Step	Action	Required parts, materials and tools	Reference
1	Remove the crew seats	- Vernier caliper, - measuring tape	(see 25-10)
2	Remove the baggage compartment		(see 25-50)
3	Carry out visual inspection of elevator trim assembly. Inspect its springs for any signs of damage. Check that the fastening material securing them to the assembly hasn't loosened. Make sure their end hooks aren't deformed. Replace if necessary.		(see 05-20) (see Figure 27-012)
4	Carry out operational inspection of elevator trim assembly, including the elevator trim knob.		(see 05-20)
5	Verify that the hose clamps, securing the elevator trim assembly's springs to the horizontal elevator push-rod, haven't shifted in position. With the elevator and control sticks fixed in the neutral position, they must adhere to the following dimensions: Fore hose clamp: 60 mm between hose clamp and bearing housing. Aft hose clamp: 3 mm between hose clamp and bearing housing.		
6	Install the baggage compartment.		(see 25-50)
7	Install the crew seats.		(see 25-10)

27-30
ELEVATOR

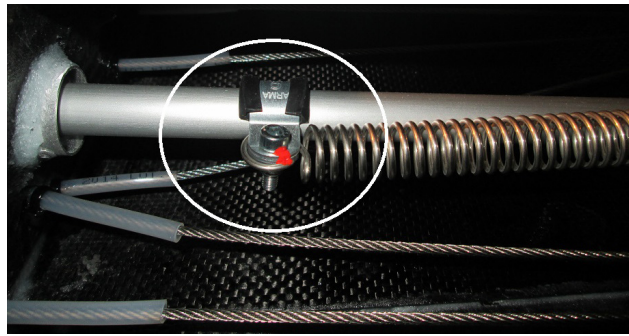


Figure 27-012
Elevator trim assembly spring fastening material

27-30: 2.4. Control sticks

27-30: 2.4.1. Inspection/check

Reference: IPC 121-27-31-001

Step	Action	Required parts, materials and tools	Reference
1	Remove the control stick boots.	Phillips screwdriver	(see 25-10)
2	Carry out visual inspection of the control sticks.		(see 05-20)
3	Carry out operational inspection of the control sticks.		
4	Secure one control stick so that it can't move and move the other back and forth laterally. Measure the amount of free play.		
CAUTION: More than 8 mm of control stick free play is unacceptable and must be attended to immediately.			
5	Carry out the same free play check for the other control stick.		
6	Install the control stick boots.		(see 25-10)

27-30: 2.4.2. Major inspection

Reference: IPC 121-27-31-001

Step	Action	Required parts, materials and tools	Reference
1	Remove the control stick boots.	Phillips screwdriver	(see 25-10)
2	Use borescope to carry out visual inspection of the control sticks.		(see 05-20)
3	Install the control stick boots.		(see 25-10)

27-30: 2.5. Control stick drive

27-30: 2.5.1. Inspection/check

Reference: IPC 121-27-32-001

Step	Action	Required parts, materials and tools	Reference
1	Remove the control stick boots.	Phillips screwdriver	(see 25-10)
2	Carry out visual inspection of the control stick drive.		(see 05-20)
3	Carry out operational inspection of the control stick drive.		
4	Lubricate drive's end bearings and all adjacent rod end bearings.		(see 12-20)
5	Install the control stick boots.		(see 25-10)

27-30: 2.5.2. Major inspection

Reference: IPC 121-27-32-001

Step	Action	Required parts, materials and tools	Reference
1	Remove the control stick boots.	Phillips screwdriver	(see 25-10)
2	Use borescope to carry out visual inspection of the control stick drive assembly.		(see 05-20)
3	Install the control stick boots.		(see 25-10)

27-30: 2.6. Vertical elevator push rod

27-30: 2.6.1. Inspection/check

Reference: IPC 121-27-30-000, IPC 121-27-35-000

Step	Action	Required parts, materials and tools	Reference
1	Remove the horizontal stabilizer.	Phillips screwdriver	(see 55-10: 2.1.)
2	Remove rudder.		(see 55-40: 2.1.)
3	Carry out visual inspection of the vertical elevator push rod.		(see 05-20)
4	Carry out operational inspection of the vertical elevator push rod.		
5	Lubricate push rod end bearings and aft horizontal elevator push rod end bearing.		(see 12-20)

27-30: 2.6.2. Major inspection

Reference: IPC 121-27-30-000

Step	Action	Required parts, materials and tools	Reference
1	Remove the horizontal stabilizer.	Phillips screwdriver	(see 55-10: 2.1.)
2	Remove rudder.		(see 55-40: 2.1.)
3	Use borescope to carry out visual inspection of the vertical elevator push rod from the opening in the lower rudder hinge.		(see 05-20)

**27-50
FLAPERONS****27-50 FLAPERONS****1. Description**

Roll control of the Virus SW 121 is accomplished via symmetric deflection of the flaperons. The flaperon control system consists of various bellcranks, push/pull rods and torque tubes (see Figure 27-013). The pilots can change the flaperon deflection angle using a lever located between the seats. The lever's handle is spring-locked and has 4 positions corresponding to flap deflections of -5° (marked -), 0° (marked 0), $+9,5^\circ$ (marked +1), $+20^\circ$ (marked +2). The thumb-lock button prevents inadvertent lever movement. The aft end of the flap lever connects to the main flaperon bellcrank.



Figure 27-013
Flaperon control system

2. Maintenance Practices

27-50: 2.1. Flaperons

27-50: 2.1.1. Inspection/check

Reference: IPC 121-27-32-002

Step	Action	Required parts, materials and tools	Reference
1	Remove the control stick boots.		(see 25-10)
2	Inspect the paint marker on both stopper bolts found on the top of the control stick drive. If they have loosened/shifted, adjust the flaperon deflection angle.		(see 27-50: 2.1.2.)

27-50: 2.1.2. Deflection angle adjustment

(if required after performing inspection/check 27-50: 2.1.1.)

Reference: APPENDIX 99-D, IPC 121-27-50-000

Step	Action	Required parts, materials and tools	Reference
1	Fit flaperon deflection measurement tool to trailing edge of verification template.	- flaperon deflection measurement kit (P/N 1190463)	(see Figure 27-0017)
2	Put flaperon in neutral position by aligning it with wing. Set inclinometer to 0°.		
3	Verify that the deflection angles of both flaperons adhere to those found in the Virus SW 121's Weight and Balance Report in all of the different flaperon handle positions.		(see APPENDIX 99-D)
4	Adjust the deflection angles by screwing/unscrewing the control sticks' lateral threaded stopper pins.		

CAUTION: Flaperon deflection angles that don't adhere to those in APPENDIX 99-D can result in unexpected/odd roll behavior.



Figure 27-0017
Flaperon deflection angle adjustment

27-50
FLAPERONS

27-50: 2.1.3. Axial free play check

Reference: Figure 27-014

Step	Action	Required parts, materials and tools	Reference
1	Remove the wings.	Vernier caliper	(see 57-10)
2	Place Vernier caliper between flaperon and the wingtip and, while moving the flaperon back and forth in the axial direction, measure the free play.		(see Figure 27-014)

CAUTION: The maximum permissible amount of axial flaperon free play is 0.5 mm.



Figure 27-014
Flaperon axial free play check

27-50: 2.1.4. Radial free play check

Reference: Figure 27-015

Step	Action	Required parts, materials and tools	Reference
1	Remove the wings.	Vernier caliper	(see 57-10)
2	Place Vernier caliper between flaperon and the wingtip and, while moving the flaperon back and forth in the radial direction, measure the free play.		(see Figure 27-015)

CAUTION: The maximum permissible amount of radial rudder free play is 0.5 mm.

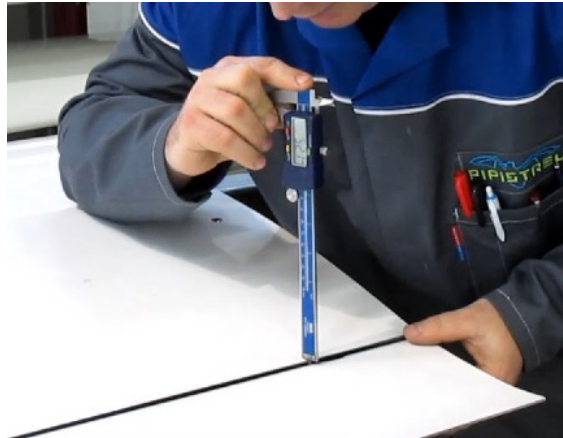


Figure 27-015
Flaperon radial free play check

27-50: 2.2. Vertical flaperon pushrods

27-50: 2.2.1. Inspection/check

Reference: IPC 121-27-50-000

Step	Action	Required parts, materials and tools	Reference
1	Remove the crew seats.		(see 25-10)
2	Remove the baggage compartment.		(see 25-50)
3	Carry out visual inspection of the vertical flaperon pushrods.		(see 05-20)
4	Carry out operational inspection of the vertical flaperon pushrods.		(see 05-20)
5	Lubricate pushrod bearings.		(see 12-20)
6	Install the baggage compartment.		(see 25-50)
7	Install the crew seats.		(see 25-10)

27-50: 2.3. Upper flaperon bellcranks

27-50: 2.3.1. Inspection/check

Reference: IPC 121-27-50-000, IPC 121-27-50-440

Step	Action	Required parts, materials and tools	Reference
1	Carry out visual inspection of the upper flaperon bellcranks.		(see 05-20)
2	Carry out operational inspection of the upper flaperon bellcranks.		(see 05-20)

27-50 FLAPERONS

27-50: 2.3.2. Inspection/check

Reference: IPC 121-27-50-000, IPC 121-27-50-440

Step	Action	Required parts, materials and tools	Reference
1	Remove wings.		(see 57-10: 2.11.)
2	Carry out visual inspection of the upper flaperon bellcrank clutch.		(see 05-20)
3	Clean and lubricate the upper flaperon bellcrank clutch.		(see 12-20)
4	Install wings.		(see 57-10: 2.1.2.)
5	Carry out operational inspection of the flaperons.		(see 05-20)

27-50: 2.4. Flaperon bellcrank assembly

27-50: 2.4.1. Inspection/check

Reference: IPC 121-27-50-000, IPC 121-27-50-050

Step	Action	Required parts, materials and tools	Reference
1	Remove the crew seats.		(see 25-10)
2	Remove the baggage compartment.		(see 25-50)
3	Remove control stick boot.		(see 25-10)
4	Carry out visual inspection of the flaperon bellcrank assembly.		(see 05-20)
5	Carry out operational inspection of the flaperon bellcrank assembly.		
6	Lubricate bearings.		(see 12-20)
7	Install the baggage compartment.		(see 25-50)
8	Install the crew seats.		(see 25-10)
9	Install control stick book.		

27-50: 2.4.2. Major inspection

Reference: IPC 121-27-31-001

Step	Action	Required parts, materials and tools	Reference
1	Remove the control stick boots.	Phillips screw-driver	(see 25-10)
2	Remove the crew seats.		
3	Remove the baggage compartment.		(see 25-50)
4	Use borescope to carry out visual inspection of the flaperon bellcrank assembly sticks.		(see 05-20)
5	Install the baggage compartment.		(see 25-50)
6	Install the crew seats.		(see 25-10)
7	Install control stick book.		

27-50: 2.5. Flaperon handle assembly

27-50: 2.5.1. Inspection/check

Reference: IPC 121-27-50-000, IPC 121-27-50-050

Step	Action	Required parts, materials and tools	Reference
1	Remove the crew seats.	Phillips screwdriver	(see 25-10)
2	Remove the baggage compartment.		(see 25-50)
3	Carry out visual inspection of the flaperon handle assembly.		(see 05-20)
4	Carry out operational inspection of the flaperon handle assembly.		
5	Lubricate bearing.		(see 12-20)
6	Install the baggage compartment.		(see 25-50)
7	Install the crew seats.		(see 25-10)

27-60
AIR BRAKE LEVER**27-60 AIR BRAKE LEVER****1. Description**

A Schempp-Hirth style air brake system is incorporated into the wings of the Virus SW 121 and is activated by a ceiling mounted pull-lever in the cabin. The lever is connected to the air brake control system in the wings via a self-fitting coupling mechanism. The pull-lever has a step-control mechanism that allows the pilot to leave the lever in certain positions. The pull-lever can only be used once a thumb-trigger lock is released.

2. Maintenance practices

27-60: 2.1. Air brake lever

27-60: 2.1.1. Inspection/check

Reference: IPC 121-27-60-000

Step	Action	Required parts, materials and tools	Reference
1	Carry out visual inspection of the air brake lever.		(see 05-20)
2	Carry out operational inspection of the air brake lever.		
3	Lubricate the air brake lever's clutches.		(see 12-20)

27-60: 2.2. Air brake step control

27-60: 2.2.1. Inspection/check

Reference: IPC 121-27-60-100

Step	Action	Required parts, materials and tools	Reference
1	Carry out visual inspection of the air brake step control mechanism.		(see 05-20)
2	Carry out operational inspection of the air brake step control mechanism.		

PIPISTREL

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28

CHAPTER 28 – FUEL**TABLE OF CONTENTS**

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28-00 GENERAL

The airplane has two integral fuel tanks, one in each wing. The maximum usable fuel quantity is 75 kg or 100 L (Avgas or Mogas, see chapter Limitations for applicable fuel grades). Two (left and right) transparent vertical tubes, which are visible from the pilot position and connected to the highest and lowest points of each respective tank, serve as a visual indicator of the fuel quantity available. Each tank has a strainer at the fuel outlet that prevents any debris and/or foreign material from making its way towards the engine. Venting of the fuel tanks is through the fuel caps.

There is a 1.5 L stainless steel collector tank (left and right) located just downstream from each fuel tank. It serves as a reserve fuel supply and prevents engine starvation from occurring due to prolonged flight in side slip. After leaving the collector tank the fuel goes through a drain valve (one per tank), located on the bottom-side of the fuselage behind the baggage compartment. Thereafter fuel enters the centrally-located fuel selector switch, which has three different positions: LEFT, RIGHT, and OFF. When the LEFT position is selected the engine is fed fuel from the left fuel tank and excess fuel is returned to the LEFT fuel tank. When the RIGHT fuel position is selected the engine is fed fuel from the right tank and the excess fuel is returned to the RIGHT fuel tank. When the OFF position is selected the fuel selector switch shuts off both the feed and return line. Once the fuel leaves the fuel selector it is fed through a gascolator, which has a drain valve. The gascolator removes water that may be in the fuel and filters out any debris/foreign material larger than 60 microns. Two fuel flow sensors are used to measure flow in feed and return lines and calculate fuel flow which is displayed on the MFD.

Because of aircraft's high wing configuration, the fuel system is completely gravity-fed, always ensuring adequate fuel pressure. Fuel system venting is essential to system operation. Blockage of the system will result in decreasing of fuel flow and eventual engine fuel starvation and stoppage

28-00
GENERAL

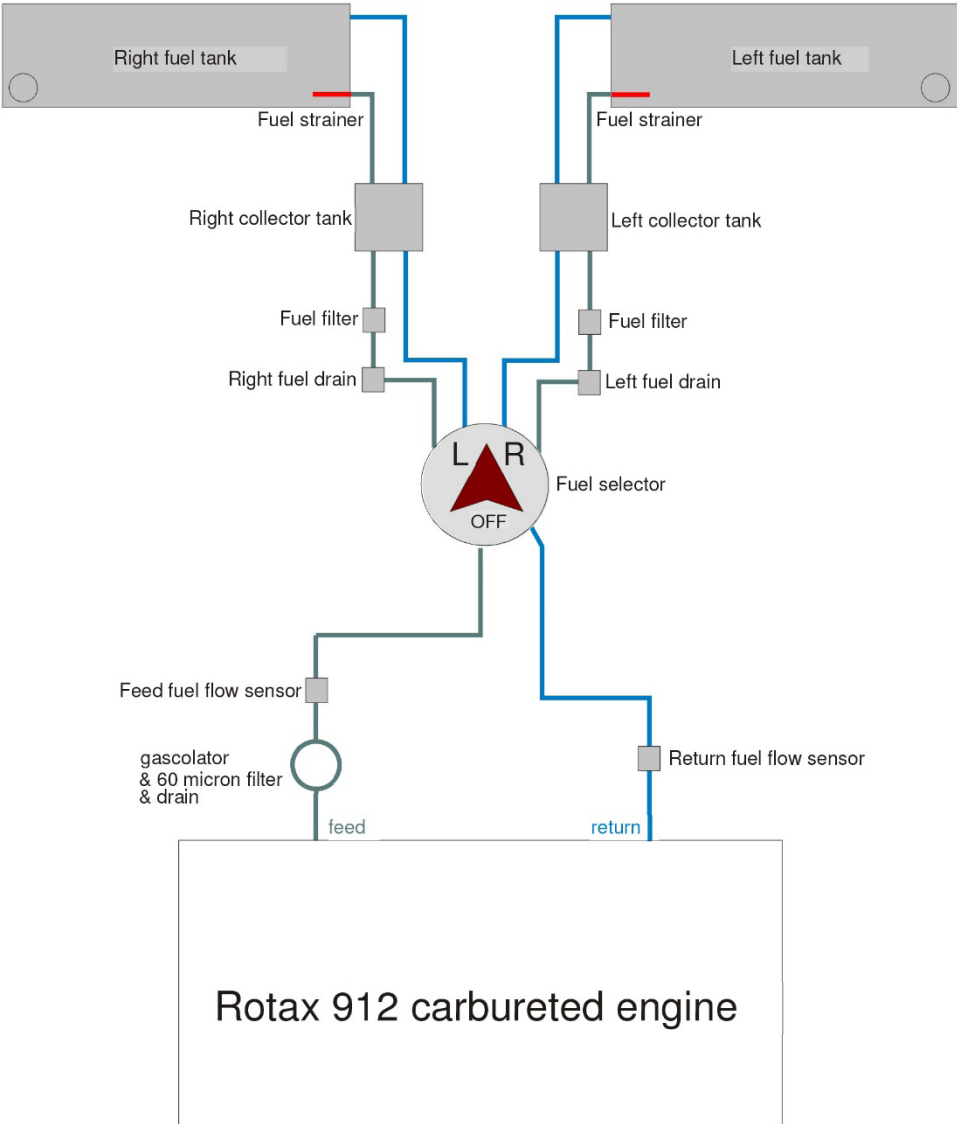


Figure 28-001
Fuel System

28-10 STORAGE

1. Description

Virus SW 121 has fuel stored in two 50 liter, semi-integrated fuel tanks, vented through a refueling aperture on the top of the wings. They are made of GFRP and their inner surface is coated with alcohol resistant coating. The maximum usable fuel quantity is 75 kg or 100L of AVGAS 100LL or MOGAS minimum 95 octane. Each tank has a strainer at the fuel outlet that prevents any debris and/or foreign material from making its way towards the engine. Two stainless steel collector tanks, located just downstream from the fuel tanks, provide an additional 3 liters of fuel storage. Any water that may build up in the fuel system can be purged using either of the two drains located just downstream from the collector tanks.

2. Maintenance Practices

28-10: 2.1. Fuel tank

28-10: 2.1.1. Leak inspection

Step	Action	Required parts, materials and tools	Reference
1	Locate the two wing drainage holes located at the base of the wing on its bottom surface.		(see Figure 28-002)
2	Check for any signs of fuel. Any fuel or fuel residue, found near the holes, must be reported to the local Pipistrel distributor. If the fuel tank is leaking profusely, purge the system of fuel before contacting the local Pipistrel distributor .		(see 12-20)



Figure 28-002
Wing drainage holes

28-10 STORAGE

28-10: 2.2. Collector tank

28-10: 2.2.1. Removal

Reference: IPC 121-28-20-000

Step	Action	Required parts, materials and tools	Reference
1	Drain the fuel system.	- flathead screwdriver - Allen key #4 - combination wrench #8	(see 12-20)
2	Loosen the hose clamps and disconnect all of the fuel lines		
3	Locate the stainless steel mounting strap and remove its fastening material		
4	Remove the collector tank.		

28-10: 2.2.2. Installation

Reference: IPC 121-28-20-000

Step	Action	Required parts, materials and tools	Reference
1	Apply Loctite 243 to the bolts threads and fasten the collector tank to the composite housing.	- flathead screwdriver - Allen key #4 - combination wrench #8 - Loctite 243 - liquid paint marker	(see 20-40)
2	Torque mark.		
3	Connect all of the fuel lines and fasten them in place using hose clamps.		
4	Torque mark.		(see 20-40)
5	Replenish the fuel system and carry out visual inspection.		(see 12-10) (see 05-20)

28-10: 2.3. Aft fuel drains

28-10: 2.3.1. Removal

Reference: IPC 121-28-20-409

Step	Action	Required parts, materials and tools	Reference
1	Drain the fuel system.	- 7/16 in. T-handle socket wrench	(see 12-20)
2	Loosen, unscrew and remove the drain valve from its housing.		

28-10: 2.3.2. Inspection/check

Reference: IPC 121-28-20-409

Step	Action	Required parts, materials and tools	Reference
1	Check that the drain valve opens and closes properly, and that its movement is not hindered in any way.		

28-10: 2.3.3. Installation

Reference: IPC 121-28-20-409

CAUTION: Never reassemble drain valve P/N 1558027 after disassembling it, as its thread may be damaged/deformed. Always replace it with a new one.

Step	Action	Required parts, materials and tools	Reference
1	Apply Loctite 577 to the drains threads and screw it into boss following the standard NPT fastening practices.	- 7/16 in. T-handle socket wrench, - Loctite 577,	(see 20-40)
2	Replenish the fuel system and carry out visual inspection.	- fuel drain (P/N 1558027)	(see 05-20)

28-10: 2.4. Vented fuel cap

28-10: 2.4.1. Inspection/check

Reference: IPC 121-57-10-200, IPC 121-57-10-203

Step	Action	Required parts, materials and tools	Reference
1	Remove vented fuel cap.		
2	Inspect the breather tube. Check for any signs of wear and make sure that it's not blocked/clogged.		
3	Inspect the cap. Check for any signs of damage/wear.		
4	Inspect the fuel cap's o-ring. Check for any signs of damage/wear. Replace if necessary.		
5	Lubricate cap's thread.		(see 12-20)
6	Install vented fuel cap.		

28-20

DISTRIBUTION

28-20 DISTRIBUTION

1. Description

The Virus SW 121's fuel distribution system consists of thermoplastic polyurethane fuel hoses in the fuselage and rubber hoses in the engine compartment. The latter are protected with either a certified glass-teflon coating or heat resistant sleeve.

The system features a fuel return circuit, fixed/quick-release fittings and a gascolator that's located on the bottom port side of the engine bay and is equipped with a fuel/water drain valve.

2. Maintenance Practices

28-20: 2.1. Gascolator

28-20: 2.1.1. Removal

Reference: IPC 121-28-20-100

Step	Action	Required parts, materials and tools	Reference
1	Put the fuel selector in the OFF position.	- flathead screwdriver, - 11/16 in. combination wrench	(see 12-20)
2	Drain the fuel system.		
3	Disconnect the AN nut coupling from the banjo bolt at the gascolator's outlet.		
4	Loosen the hose clamp at the gascolator's inlet and disconnect the fuel hose.		
5	Loosen and remove the two M5 socket head bolts securing the gascolator's mounting brace to the two hose clamps.		
6	Remove the gascolator.		

28-20: 2.1.2. Installation

Reference: IPC 121-28-20-100

Step	Action	Required parts, materials and tools	Reference
1	Apply Loctite 243 to the M5 bolts' threads and fasten the gascolator tank to the two mounting hose clamps on the engine mount.	- flathead screwdriver, - 11/16 in. combination wrench - liquid paint marker	(see 20-40)
2	Mark the two M5 bolts with paint marker.		
3	Connect the feed fuel line and fasten it in place with hose clamp.		
4	Torque mark.		

continued on the next page

Step	Action	Required parts, materials and tools	Reference
5	Connect fuel line at gascolator outlet and secure with hose clamp.		
6	Torque mark.		(see 20-40)
7	Check that red plug, at the top of the gascolator, and the bowl mounting nut are still secured with safety wire.		(see Figures 28-003 and 28-004)
8	Replenish the fuel system and carry out visual inspection.		(see 12-10) (see 05-20)

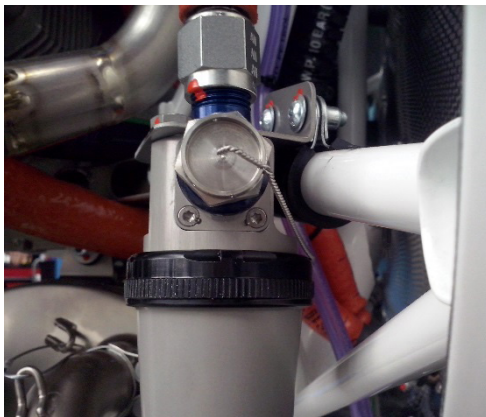


Figure 28-003
Bowl mounting nut safety wire

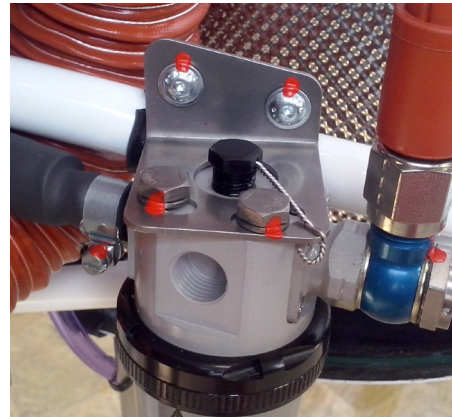


Figure 28-004
Red plug safety wire

28-20: 2.1.3. Inspection/Cleaning

Reference: IPC 121-28-20-100

Step	Action	Required parts, materials and tools	Reference
1	Remove the safety wire preventing the bowl mounting nut from loosening.	- safety wire twist pliers	
2	Unscrew the bowl mounting nut and remove the bowl.	- water	
3	Remove the o-ring and carry out a visual inspection.	- compressed air	(see 05-20)
4	Replace the o-ring if necessary.		
5	Unscrew, remove and carry out a visual inspection of the filter screen.		(see 05-20)

CAUTION: When removing the filter screen be sure to grab it as close to it's thread as possible, as you could damage it by applying too much torque to the other end of it.

6	Clean with water and compressed air.		
7	Reassemble the gascolator so that the arrow on the side of the bowl lines up with the line etched into the gascolator's housing.		(see Figure 28-005)
8	Secure in place using safety wire.		(see Figure 28-003)

28-20
DISTRIBUTION



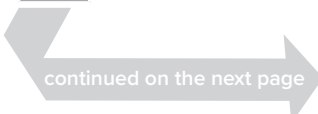
Figure 28-005
Bowl arrow aligned with etched line

28-20: 2.2. Fuel selector

28-20: 2.2.1. Removal

Reference: IPC 121-28-20-000, IPC 121-28-20-050

Step	Action	Required parts, materials and tools	Reference
1	Drain the fuel system.	- flathead screwdriver - 2.5 mm T-handle hex-head screwdriver - cutting nippers - 2 mm T-handle hex-head screwdriver	(see 12-20)
2	Access the area where the fuel selector is installed by temporarily detaching the control stick drive's mounting bracket (P/N 1125027).		
3	Disconnect both fuel feed lines from the aft fuel drains.		
4	Disconnect both fuel return lines from the collector tanks.		
5	Loosen/Remove the hose clamp holding both of the fuel lines fore of the selector to the surface of the fuselage.		
6	Disconnect the fuel lines from the side of the fuel flow sensors closest to the control stick opening in the cabin floor.		
7	Lift the fuel selector's spring-loaded safety pin and unscrew the bolt holding the lever in place.		
8	Remove the lever.		



Step	Action	Required parts, materials and tools	Reference
9	Unscrew both M4 bolts holding the fuel selector in place.		
10	Take the fuel selector, along with the accompanying fuel lines, out from under the cabin floor.		
11	Disconnect all the fuel lines from the fuel selector.		

28-20: 2.2.2. Installation

Reference: IPC 121-28-20-000, IPC 121-28-20-050

Step	Action	Required parts, materials and tools	Reference	
1	Access the area where the fuel selector is installed by temporarily detaching the control stick drive's mounting bracket (P/N 1125027).	- flathead screwdriver - 2.5 mm T-handle hex-head screwdriver - cutting nippers - 2 mm T-handle hex-head screwdriver		
2	Connect all of the fuel lines to the fuel selector using plastic ties.			
3	Slide the fuel selector, along with the accompanying fuel lines, through the control stick opening.			
4	Run all of the aft fuel lines down the central conduit, through their respective composite braces.			
5	Fasten the fuel selector to the cabin floor using two M4 bolts.			
6	Apply liquid paint marker.			
7	Fit the selector with its red lever.			
8	Carry out operational check.			(see 05-20)
9	Connect the fuel feed lines to the aft fuel drains.			
10	Apply liquid paint marker to the hose clamps.			
11	Connect the fuel return lines to the collector tanks.			
12	Apply liquid paint marker to the hose clamps.			
13	Connect the two fore fuel lines to their respective fuel flow sensors.			
14	Apply liquid paint marker.			
15	Refasten the two fore fuel lines to fuselage's surface using hose clamp.			
16	Replenish the fuel system and carry out visual inspection.			(see 12-10 and 05-20)
17	Refasten the control stick drive's mounting bracket (P/N 1125027) to the cabin floor.			

28-20

DISTRIBUTION

28-20: 2.3. Fuel filter

28-20: 2.3.1. Removal

Reference: IPC 121-28-20-000

Step	Action	Required parts, materials and tools	Reference
1	Drain the fuel system.	- flathead screwdriver	(see 12-20)
2	Disconnect the two fuel lines that are attached to the fuel filter.		
3	Carry out visual inspection and replace if necessary.		(see 05-20)

28-20: 2.3.2. Installation

Reference: IPC 121-28-20-000

Step	Action	Required parts, materials and tools	Reference
1	Connect the two fuel lines to the filter.	- flathead screwdriver - liquid paint marker	
CAUTION: When reinstalling the fuel filter be sure to position it properly. An arrow on the side of it's housing shows the flow direction.			
2	Torque mark the hose clamps.		(see 20-40)
3	Replenish the fuel system and carry out visual inspection.		(see 12-10 and 05-20)

28-40 INDICATING

1. Description

A fuel level sight gauge for each fuel tank is visible from the pilot position and serves as a visual indicator of the fuel quantity available. It's marked in Liters and color coded with RED showing the unusable fuel quantity. It also has a backlight which illuminates the fuel quantity in the dark.

2. Maintenance Practices

28-40: 2.1. Fuel level sight gauge

28-40: 2.1.1. Inspection/check

Reference: Figure 28-006

Step	Action	Required parts, materials and tools	Reference
1	Carry out visual inspection of the fuel level sight gauge.		(see 05-20)



Figure 28-006
Fuel level sight gauge

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31

CHAPTER 31 – INDICATING/RECORDING SYSTEMS

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31-00 GENERAL

This chapter describes the Virus SW 121's indicating/recording system. The Garmin G3X is discussed in detail as it both the MFD and PFD in the Virus SW 121. The instrument panel and the caution/warning system are also covered in this chapter.

31-10 INSTRUMENT AND CONTROL PANELS

31-10 INSTRUMENT AND CONTROL PANELS

1. Description

The instrument panel is designed for glare-free use in all flight conditions. It is designed so that it can easily be used from both the left and right pilot seat. Its central pedestal houses a switch panel where all of the circuit breakers, fuses and switches, required for smooth operation, can be found. There are two centrally-located analog back-up instruments on the instrument panel, an airspeed indicator and an altimeter indicator, which provide basic flying information in case of electrical failure. The Primary Flight Display (PFD) are located on LH side of panel, while the Multi-Function Display (MFD) is located on the RH side of panel. Both displays are interchangeable. The parking brake lever is mounted on the port side of the console.



Figure 31-001
Instrument panel layout

2. Maintenance Practices

31-10: 2.1. Front panel

31-10: 2.1.1. Inspection/check

Reference: IPC 121-31-10-000

Step	Action	Required parts, materials and tools	Reference
1	Carry out visual inspection of the panel's structure.		(see 05-20)
2	MASTER switch off, AVIONICS switch off.		
3	Disconnect the battery.		
4	Carry out visual and operational inspection of all the panel's instruments/knobs. Check for any damage or wear.		(see 05-20)
5	Connect the battery.		

31-10: 2.2. Instrument panel cover

31-10: 2.2.1. Removal

Reference: IPC 121-31-10-000

Step	Action	Required parts, materials and tools	Reference
1	MASTER switch off, AVIONICS switch off.		
2	Disconnect the battery.		
3	Unscrew/remove all of the torx and self-tapping screws securing the cover to the instrument panel/fuselage.		
4	Lift cover and disconnect the Garmin G26C gps antenna and the compass' lighting cable.		
5	Remove the instrument panel cover.	- torx screwdriver set - Phillips screwdriver (standard + stubby)	

31-10: 2.2.2. Installation

Reference: IPC 121-31-10-000

Step	Action	Required parts, materials and tools	Reference
1	Position the cover on the instrument panel.		
2	Lift cover and connect the Garmin G26C gps antenna and the compass' lighting cable.		
3	Fasten the cover to the instrument panel/fuselage using the torx and self-tapping screws .		
4	Carry out visual inspection.		(see 05-20)
5	Carry out operational inspection of the Garmin G26C gps antenna and the compass light.		
6	Connect the battery.		

31-10 INSTRUMENT AND CONTROL PANELS

31-10: 2.3. Switch panel

31-10: 2.3.1. Removal

Reference: IPC 121-31-10-000

Step	Action	Required parts, materials and tools	Reference
1	MASTER switch off, AVIONICS switch off.	- torx screwdriver set	
2	Remove all of the torx screws securing the switch panel to the instrument panel pedestal.		
3	Carefully dislodge the panel and move it away from the pedestal.		

31-10: 2.3.2. Installation

Reference: IPC 121-31-10-000

Step	Action	Required parts, materials and tools	Reference
1	MASTER switch off, AVIONICS switch off.	- torx screwdriver set	
2	Carefully slide the panel into place on the pedestal.		
3	Fasten it to the pedestal using torx screws.		

31-20 INDEPENDENT INSTRUMENTS

1. Description

The Virus SW 121 does not have any independent instruments.

31-30
RECORDERS**31-30 RECORDERS****1. Description**

The Virus SW 121's hour meter, the device that measures the time the aircraft is in use, is integrated into the PFD/MFD.

31-50 INDICATING/RECORDING SYSTEMS

1. Description

The Virus SW 121 does not have a stand-alone annunciator unit that warns the pilot of any issues. Instead it's pilot alerting system, which issues both aural and visual warnings, is integrated into the PFD/MFD Garmin displays.

NOTE: Some warning signals on the Virus SW 121 come in the form of blinking lights found on the switch panel.

2. Maintenance practices

For more information regarding Garmin G3X's alerting system please refer to GARMIN G3X Pilots Guide, revision M, Part Number 190/01115/00.

31-60 CENTRAL DISPLAY SYSTEMS

31-60 CENTRAL DISPLAY SYSTEMS

1. Description

The Virus SW 121's is equipped with two Garmin G3X (GDU 370) displays (see Figure 31-002), which serve as the central display system. The PFD (left) is a 7" portrait-oriented display intended to be the primary display of primary flight parameter information (attitude, airspeed, heading, and altitude). The PFD accepts data from a variety of sources, including the GPS sensors, GNC255 (VOR, optional), the G3X autopilot, and serves as the heading source for the MFD (right).

The PFD presents manifold pressure and RPM the upper left area of the display in horizontal tape format and as text immediately nearby. Other parameters are continuously displayed in the engine data block located in the to the right of the MFD. A dedicated full page indication is also available upon pilot's selection.

NOTE: The information presented above is just general information about the Virus SW 121's central display system. More information regarding this can be found in the Virus SW 121 POH and in chapter 92, which includes all of the aircraft's wiring diagrams.



Figure 31-002
PFD interface

2. Maintenance Practices

For detailed information about the maintenance practices that pertain to the central display system of the Virus SW 121 please refer to the Garmin G3X operational and installation manual

NOTE: Version 10.20 is the default Garmin G3X software version on the Virus SW 121. Please refer to service bulletin number SB-121-00-81-999 for information regarding possible updates.

NOTE: Before performing any of the procedures in this chapter, authorized personnel needs to contact Pipistrel and obtain an updated configuration file in accordance with latest approved version of Type Design Data based on applicable Continued Airworthiness Documentation.

NOTE: One technician needs about 25 minutes to update the software and configuration data on the G3X. A personal computer with SD card reader and SD card with at least 20MB of free space is required.

31-60: 2.1 Procedures

31-60: 2.1.1. Loading procedure

If PFD or MFD unit were replaced, software version needs to be set-up. Configuration settings remain saved.

If software version needs to be updated install "GDU37xCockpitDisplay_MicrosoftWindowsInstaller_XXXX.exe" file on personal computer (PC) with Windows operating system. Install software on PC and insert SD card in reader. Software will ask to choose SD card location and after that will create software update file on SD card.

31-60: 2.1.2. Unlocking procedure

Step	Action
1	Insert SD card with unlocking file in first GDU370 display (PFD).
2	Power up PFD and go to "file" page in configuration mode.
3	Select file and press "ent".
4	When prompted for confirmation, press "ent" again.

31-60

CENTRAL DISPLAY SYSTEMS

31-60: 2.1.3. System software loading procedure (if needed)

Step	Action
1	Insert SD card with software update in first GDU370 display (PFD).
2	Power up the unit while pressing in the display knob (configuration mode).
3	Hold knob in and the unit will load software update from SD card.
4	Repeat procedure for the second GDU370 display (MFD).

NOTE: Verify that the Software version is per latest approved version of Type Design Data.

31-60: 2.1.4. Configuration file loading procedure (iif needed)

Step	Action
1	Create folder named "Garmin" on the root of the SD card to be used to load the configuration. Within the Garmin folder create a folder named "config".
2	Within the folder named Config, place Virus_SW_G3X_Base_Config.gca file.
3	Place SD card in the PFD and power up unit while pressing in the display knob (configuration mode).
4	Navigate on the display on the "Config File" page. Select file and then press "Yes" when prompted to load the file.

31-60: 2.1.5. Post configuration loading procedures (if needed)

Procedures listed in this chapter needs to be conducted for every aircraft manually and are not part of Configuration file. Regardless this manual procedure, all settings will be saved on configuration module in connector of PFD unit. This procedures are performed by instructions from Garmin G3X Installation Manual Revision T.

Update weight and balance configuration page.

Perform:

- GSU 25 unit orientation
- Magnetometer interface check.
- Auto pilot setup and calibration.
- Compass calibration.
- Engine run-up vibration test
- AOA calibration

31-60: 2.1.6. Locking procedure

Step	Action
1	Insert SD card with locking file in PFD.
2	Power up PFD and go to “file” page in configuration mode.
3	Select file and press “ent”.
4	When prompted for confirmation, press “ent” again.

NOTE: Due to the need to easily resolve possible problems on G3X system, GDU370 displays contain memory card slot on front side of the unit. Insertion of memory card is performed after carrying out locking procedure of G3X system. Memory cards are inserted in PFD and MFD displays of G3X system. No other procedures are required.

Type of memory card: Sandisk SD card, at least 8GB of memory.

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32

CHAPTER 32 – LANDING GEAR

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32-00 GENERAL

This chapter describes those units and components which furnish a means of supporting and steering the airplane. The tricycle-type landing gear consists of a composite, basalt fiber strut that's bolted to the airframe structure and provides adequate shock absorption, as well as a steerable nose gear strut, which is of tubular aluminum construction, has an oleo shock absorber and is integrated into the engine mount.

The main wheels have hydraulically operated, dual-piston type brakes actuated by pressing the toe brakes at each crew position. The nose landing gear is steerable, connected to the pedals and incorporates an oil-spring damper element. All wheels are equipped with aerodynamic fairings made of CFRP. The brake system consists of a single disc brake assembly on each main landing gear wheel, master cylinder for each rudder pedal, hydraulic fluid reservoir, parking brake, and associated hydraulic plumbing (See Figure 32-001).



Figure 32-001
Landing Gear

32-10 MAIN GEAR

32-10 MAIN GEAR

1. Description

The main landing gear strut is made of basalt fiber and has two parallel elements that produce a semi-redundant structure that allows for predictable stress point locations. The strut is composed by two parallel elements producing a semi-redundant structure and allowing for predictable locations of stress points. During normal landing and taxi operations, the main gear legs act as primary shock absorbing units and provide support for majority of aircraft weight. The strut is directly attached to the bottom side of the cabin floor by four bolts and additionally supported by two composite reinforcements (see Figure 32-002).



Figure 32-002
Main Landing Gear Installation

2. Maintenance Practices

32-10: 2.1. Main landing gear strut

32-10: 2.1.1. Inspection/check

Reference: Figure 32-003, IPC 121-32-10-000

Step	Action	Required parts, materials and tools	Reference
1	Remove the main wheel fairings.		(see 32-10)
2	Carefully inspect the entire strut for any signs of damage. Pay particular attention to where the strut is in contact with the fuselage and where the wheels are fastened to it. Look for any wear, chips, signs of delamination or cracks similar to the one in Figure.		(see Figure 32-003)
CAUTION: Any damage incurred by the main landing gear strut can be a safety hazard and must be reported to Pipistrel.			
3	Install main landing gear strut cover.		
4	Install main wheel fairings.		(see 32-10)



Figure 32-003
Example of a damaged main landing gear strut

32-10 MAIN GEAR

32-10: 2.1.2. Major inspection

Reference: Figures 32-004 through 32-006

Step	Action	Required parts, materials and tools	Reference
1	Locate the MLG strut access patches.		(see Figure 32-004)
2	Peel away access patch.		
3	Inspect structure of strut for any signs of damage such as delamination and fiber/matrix debonding. Look for any internal "whitening", which is a clear indication of internal structural damage. Figure 32-005 depicts a strut that is in good condition. Figure 32-006 shows a strut that has suffered extreme damage and requires immediate attention.		
<p>NOTE: Not all cases of internal MLG strut damage require immediate attention. It depends on the severity. Contact Pipistrel d.o.o Ajdovščina to get any cases of internal MLG strut damage assessed.</p>			
4	Apply new access patch.		
5	Repeat procedure for access patch on the other side of the MLG strut.		



Figure 32-004
MLG access patch location

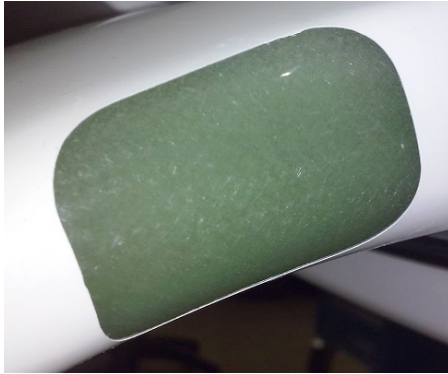


Figure 32-005
Example of a MLG in good condition
(no internal whitening)



Figure 32-006
Example of a MLG in very bad condition
(severe internal whitening)

32-10: 2.2. MLG fairings

32-10: 2.2.1. Removal

Reference: IPC 121-32-10-000, IPC 121-32-10-100

Step	Action	Required parts, materials and tools	Reference
1	Remove the hex head bolt securing the fairing to the fairing spacer.	- T-handle hex head screwdriver set, - Torx screwdriver set	
2	Remove the six screws securing the fairing to the fairing plate.		
3	Remove fairing.		

32-10: 2.2.2. Installation

Reference: IPC 121-32-10-000, IPC 121-32-10-100

Step	Action	Required parts, materials and tools	Reference
1	Position the spacer over the wheel and main landing gear strut.	- T-handle hex head screwdriver set, - Torx screwdriver set - Loctite 243	
2	Apply Loctite to the hex head bolt's thread.		
3	Install fastening material to finger tight.		

NOTE: Make sure there is adequate clearance between the fairing and other landing gear components.

4	Tighten fastening material.		
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32-20
NOSE GEAR

32-20 NOSE GEAR

1. Description

The nose gear strut assembly consists of a tubular strut attached to the engine mount. The free castering nose wheel's maximum turning arc is 45 degrees either side of center. Shock absorption is provided by a nitrogen and hydraulic fluid filled oleo-pneumatic strut in which compression of a piston rod reacts against the engine mount.

2. Maintenance Practices

32-20: 2.1. Nose landing gear fairing

32-20: 2.1.1. Removal

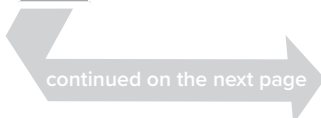
Reference: IPC 121-32-20-000, IPC 121-32-20-200, IPC 121-32-40-100

Step	Action	Required parts, materials and tools	Reference
1	Prop the nose landing gear up by weighing down the tail cone.	- metric wrench set - T-handle hex head screw-driver set - T-handle socket wrench set	(see 07-20)
2	Remove white tape securing fairing cover to fairing.		
3	Remove fairing cover.		
4	Remove the fastening material securing the fairing/wheel to nose landing gear.		
5	Remove nose wheel.		
6	Remove fastening material securing the fairing/nose wheel fork to the nose landing gear.		
7	Remove fairing.		

32-20: 2.1.2. Installation

Reference: IPC 121-32-20-000, IPC 121-32-20-200, IPC 121-32-40-100

Step	Action	Required parts, materials and tools	Reference
1	Prop the nose landing gear up by weighing down the tail cone.	- metric wrench set - T-handle hex head screw-driver set - T-handle socket wrench set - Loctite 243	(see 07-10)
2	Position the nose wheel fork and fairing on the nose landing gear.		
3	Apply Loctite 243 to the locknuts.		
4	Fasten the nose wheel fork and fairing to the nose landing gear.		
5	Position nose wheel in fairing/fork.		
6	Apply Loctite 243 to nose wheel axle nut.		
7	Fasten nose wheel in place and tighten nut.		



Step	Action	Required parts, materials and tools	Reference
NOTE: After installing the wheel make sure there is adequate clearance between it and the other nose gear components. Make sure that the wheel turns freely and isn't hindered by anything.			
8	Install nose landing gear fairing cover.		
9	Apply tape to secure cover.		
10	Remove counterweight from tail cone and lower front end of aircraft.		

32-20: 2.2. Nose landing gear

32-20: 2.2.1. Inspection/check

Reference: IPC 121-32-20-000, IPC 121-32-20-200, IPC 121-32-40-100

Step	Action	Required parts, materials and tools	Reference
1	Remove the nose landing gear fairing.	- metric wrench set, - T-handle hex head screwdriver set, - T-handle socket wrench set - Loctite 243	(see 32-20)
2	Inspect nose landing gear strut for any signs of damage, such as deformation, cracks or corrosion.		
3	Inspect the nose landing gear fork for any signs of damage, such as deformation, cracks or corrosion.		
4	Grab the propeller with both hands, block the nose wheel with your foot and lean back. Inspect the movement of the nose landing gear's shock absorber. Make sure it's movement is smooth and unhindered.		
5	Inspect the shock absorber for any signs of impact damage or wear.		
6	Inspect the nose landing gear's turning range. Confirm that it's movement is unhindered and smooth. Also confirm that the nose landing gear's bellcrank is in good working condition and moves freely.		
7	Install nose landing gear fairing.		(see 32-20)

32-40

WHEELS AND BRAKES

32-40 WHEELS AND BRAKES

General

This chapter describes the Virus SW 121's wheel and brakes system. This system allows is what allows the aircraft to roll along the ground while taxiing and stop when needed.

32-41 WHEELS

1. Description

Beringer Wheel assembly and Tires

The main wheels on the Virus SW121 are 6 inches in diameter, tubeless and manufactured by Beringer. They are made from high strength aluminum alloy, machined solid on CNC and anodized for optimal corrosion resistance. The wheel is secured to the axle with a nut, and cotter pin.

Nose Wheel and Tire

The nose wheel is of aluminum construction and designed for tires with inner tubes. The 4.00 x 4 wheels use a 6-ply-rated tube tire and rotate on two bearings protected against contamination by grease seals. The free caster wheel is installed on an independent axle and is used to steer the airplane on the ground by means of differential brake application.

2. Maintenance Practices

32-41: 2.1. Main landing gear wheels

32-41: 2.1.1. Removal

Reference: IPC 121-32-10-100

Step	Action	Required parts, materials and tools	Reference
1	Remove main landing gear fairings.	- metric wrench set	(see 32-10)
2	Remove fairing spacer.	- cutting nippers	
3	Prop MLG strut up with landing gear stand.	- M25 slotted nut key (P/N 1190113)	(see 07-10: 2.1.1.)
4	Cut/remove wheel locking wire.	- landing gear stand (P/N 1190264)	
5	Remove M25 slotted nut.		
6	Slide wheel off axle.		

32-41 WHEELS

32-41: 2.1.2. Installation

Reference: IPC 121-32-10-100

Step	Action	Required parts, materials and tools	Reference
1	Position wheel on axle and brake disc.		
2	Fasten wheel to axle using M25 slotted locknut. Tighten until the nut comes into contact with the wheel's bearing. Torqueing is NOT required!	- metric wrench set, - 1 mm locking wire, - M25 slotted nut key (P/N 1190113)	
WARNING: Never reuse this, or any other locknut after removing it. Always replace it with a new one!			
WARNING: After installing the wheel make sure there is no play between it and the axle. Make sure that the wheel turns freely and isn't hindered by anything.			
3	Positive lock the brake disc with locking wire.	- landing gear stand (P/N 1190264)	
4	Remove landing gear stand.		
5	Install main landing gear fairings.		(see 32-10)

32-41: 2.1.3. Inspection/check

Please refer to [4].

32-41: 2.1.4. MLG Tire removal

Reference: IPC 121-32-40-000

Step	Action	Required parts, materials and tools	Reference
1	Remove MLG wheel.		(see 32-41: 2.1.1.)
2	Deflate tire pressure to zero.		
3	Remove M6 bolts securing wheel half.		
4	Remove O-ring.		
5	Slide tire off wheel.		

32-41: 2.1.5. MLG Tire installation

Reference: IPC 121-32-40-000

Step	Action	Required parts, materials and tools	Reference
1	Slide new tire on wheel.		
2	Install new O-ring.		
3	Secure wheel half using M6 bolts.	- metric wrench set - cutting nippers - M25 slotted nut key (P/N 1190113)	
4	Replenish with compressed air to the required pressure.	- Landing gear stand (P/N 1190264)	(see Table 12-001)
5	Install MLG wheel.		(see 32-41: 2.1.2.)

2.2. Nose landing gear wheel

32-41: 2.2.1. Removal/installation – see 32-20

32-41: 2.2.2. Tire/inner tube change

Reference: IPC 121-32-40-100

Step	Action	Required parts, materials and tools	Reference
1	Remove nose landing gear fairing/wheel.	- metric wrench + socket set - T-handle hex head screwdriver set - Loctite 243	(see 32-20)
2	Deflate tire/tube.		
3	Remove the fastening material holding the wheel's two halves together.		
4	Remove both halves of the wheel.		
5	Pull inner tube out of tire.		
6	Inspect both the tire and tube for any signs of damage/wear. Replace if necessary.		
7	Reassemble following the steps above in the reverse order. Apply Loctite 243 to the nuts' thread before torquing.		
8	Replenish tire air.		(see 12-10)

32-42 BRAKES

32-42 BRAKES

1. Description

The brake system consists of a dual piston single disc brake assembly on each main landing gear wheel, master cylinder for each rudder pedal, hydraulic fluid reservoir, parking brake, and associated hydraulic plumbing.

The hydraulically operated brakes are individually activated by floor mounted toe pedals located at both pilot stations. The master cylinders are located forward of the pilot's rudder pedals. The reservoir is serviced with DOT 3 or DOT 4 hydraulic fluid.

The parking brake mechanism holds induced hydraulic pressure on the disc brakes for parking. It's control lever can be found on the cabin floor, on the port side of the instrument panel's pedestal.

2. Maintenance Practices

32-42: 2.1. Hydraulic brake lines

32-42: 2.1.1. Assembly/disassembly

Please refer to [4].

32-42: 2.1.2. Inspection/check

Reference: IPC 121-32-40-200

Step	Action	Required parts, materials and tools	Reference
1	Remove the main wheel fairings.	- T-handle hex head screwdriver set - Torx screwdriver set	(see 32-10)
2	Inspect brake lines where they exit the main landing gear strut and attach to the brake system. Check for signs of chafing, wear and damage.		
3	Do the same for all of the hydraulic brake lines that are accessible in the cabin.		

32-42: 2.2. Brake pads

32-42: 2.2.1. Inspection/check

Reference: IPC 121-32-40-100

Step	Action	Required parts, materials and tools	Reference
1	Remove main landing gear fairing.		(see 32-10)
2	Remove main landing gear wheel.		(see 32-41)
3	Inspect brake pads for signs of wear, scoring and/or overheating.		
4	Measure brake pad thickness and compare it to the maximum permissible wear found in [4].		

32-42: 2.2.2. Removal/installation

Please refer to [4].

32-42: 2.3. Brake discs**32-42: 2.3.1. Inspection/check**

Reference: IPC 121-32-40-100

Step	Action	Required parts, materials and tools	Reference
1	Remove main landing gear fairing.		(see 32-10)
2	Remove main landing gear wheel.		(see 32-41)
3	Inspect brake discs for signs of wear, scoring and/or over-heating.		
4	Measure brake disc thickness and compare it to the maximum permissible wear found in [4].		

32-42: 2.3.2. Removal/installation

Please refer to [4].

32-50
STEERING**32-50 STEERING****1. Description**

The nose gear is steerable. It is connected to the rudder pedal control system by a bellcrank and a set of cables/springs (see Figure 32-007).

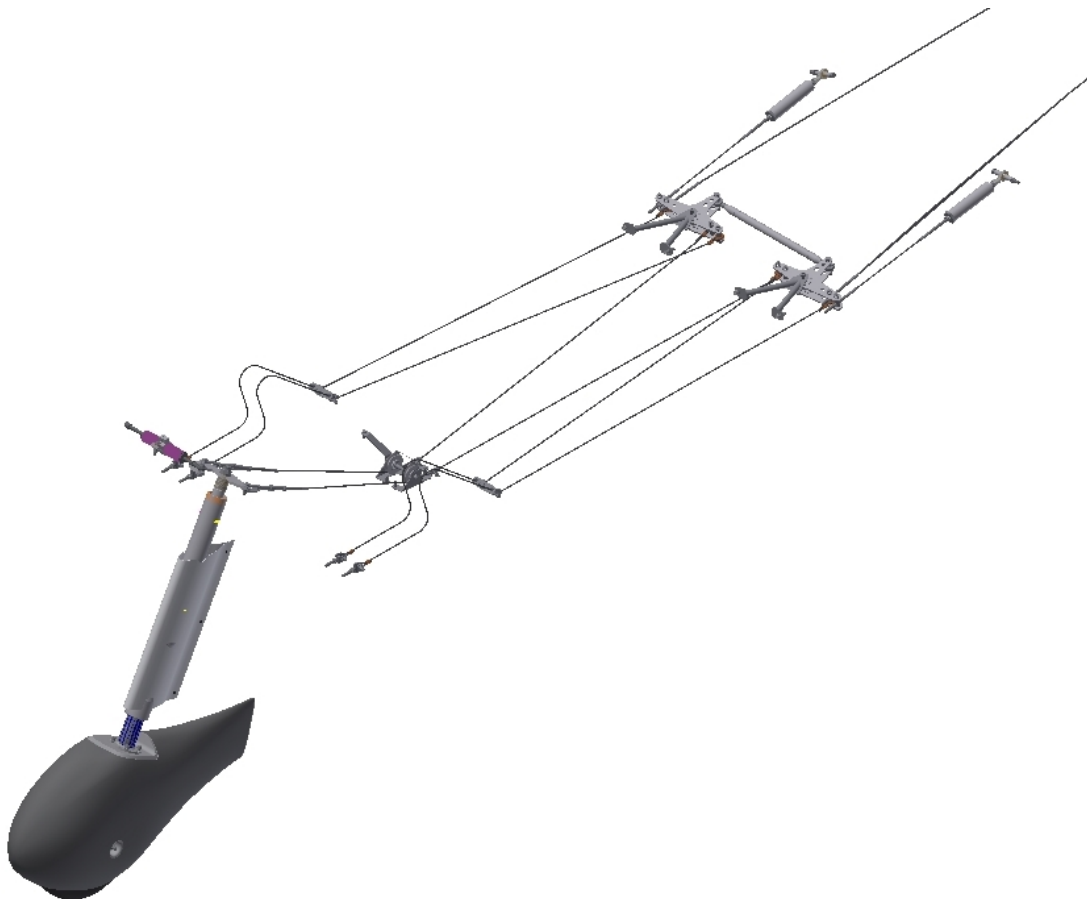


Figure 32-007
Steering System

2. Maintenance Practices

32-50: 2.1. Steering bellcrank

32-50: 2.1.1. Inspection/check

Reference: Figure 32-004, IPC 121-32-20-000

Step	Action	Required parts, materials and tools	Reference
1	Remove the nose landing gear fairing.		(see 32-20)
2	Inspect the nose landing gear's turning range. Confirm that it's movement is unhindered and smooth.		
3	Confirm that the nose landing gear's bellcrank is in good working condition and moves freely.		
4	Confirm that the nose landing gear's oil-spring damping element is in good working condition and moves freely.		
5	Install nose landing gear fairing.		(see 32-20)

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CHAPTER 33 – LIGHTS**TABLE OF CONTENTS**

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33-00	LIGHTS General	33-03
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33-40	EXTERIOR LIGHTING Description Maintenance Practices	33-05

33-00 GENERAL

This chapter contains information about the interior and exterior lighting systems used on the Virus SW 121. Exterior lighting consists of standard wing tip navigation lights with integral anti-collision strobe lights. The separately controlled landing light, which also serves as the taxi light, is located on the bottom engine cowling. All lights incorporate LED technology.

Interior lighting consists of a separately controlled, incandescent overhead light for general cabin lighting, individual lights for the pilots and dimmable panel floodlights. The flight instruments and avionics equipment are dimmable. The instrument panel and fuel level indicators are equipped with UV LED lights for night VFR operation.

33-10 FLIGHT COMPARTMENT

33-10 FLIGHT COMPARTMENT

1. Description

A cabin flood-light is present and illuminates the master electrical panel and circuit breakers. The fuel level indicator tubes are illuminated individually with dedicated LED elements. Illumination intensity is synchronized and controlled by the SmartDim night light, either reacting to ambient light conditions automatically or manually set by the pilot as well. Primary analogue instruments, such as the airspeed indicator and the altimeter, are TSO'd and internally illuminated. Other instrumentation has backlit dimmable LCD displays and illuminated buttons.

2. Maintenance practices

33-10: 2.1. Flight compartment

33-10: 2.1.1. Inspection/check

Reference: IPC 121-33-10-000

Step	Action	Required parts, materials and tools	Reference
1	Carry out visual inspection of all the flight compartment lights.		(see 05-20)
2	Carry out operational inspection of all the flight compartment lights.		(see 05-20)
3	Replace if necessary.		

NOTE: Refer to chapter 91-00 for the wiring diagrams that pertain to all of the flight compartment lights.

33-10: 2.2. Night VFR shield assembly

33-10: 2.2.1. Removal

Reference: chapter 33 in IPC

Step	Action	Required parts, materials and tools	Reference
1	Remove instrument panel cover.		
2	Disconnect night VFR shield assembly cable from connector.		
3	Remove night VFR shield assembly.	- torx screwdriver set - Phillips screwdriver (standard + stubby)	(see 31-10: 2.2.1.)

33-10: 2.2.2. Installation

Reference: chapter 33 in IPC

Step	Action	Required parts, materials and tools	Reference
1	Slide night VFR shield assembly onto front edge of instrument panel cover	- Torx screwdriver set - Loctite 243	
2	Connect night VFR shield assembly connector.		
3	Install instrument panel cover.		(see 31-10: 2.2.2.)
4	Carry out operational inspection of Night VFR shield assembly's LED lights.		(see 05-20)

33-10: 2.3. UV LED switch panel lights

33-10: 2.3.1. Removal

Reference: chapter 33 in IPC

Step	Action	Required parts, materials and tools	Reference
1	Remove switch panel cover.	- torx screwdriver set - Molex extraction tool	(see 31-10: 2.3.1.)
2	Disconnect UV LED lights connector.		
3	Remove wires from UV LED lights connector		
4	Remove UV LED switch panel lights		

33-10: 2.3.2. Installation

Reference: chapter 33 in IPC

Step	Action	Required parts, materials and tools	Reference
1	Slide UV LED switch panel light's cable through holes in side of instrument panel pedestal.	- Torx screwdriver set	
2	Insert cable wires into connector.		
3	Connect UV LED lights connector.		
4	Position UV LED switch panel lights on instrument panel pedestal and secure in place by installing switch panel		(see 31-10: 2.3.1.)
5	Carry out operational inspection of UV LED switch panel lights.		(see 05-20)

33-40 EXTERIOR LIGHTING

33-40 EXTERIOR LIGHTING

1. Description

The Virus SW 121 comes equipped with NAV/STROBE lights located on the wingtips and a LED landing light fastened to the bottom engine cowling.

Navigation Lights

These lights are controlled by the NAV/STROBE light switch on the switch panel. 12 VDC for navigation light operation is supplied through the NAV/STROBE light switch, which includes a resettable circuit breaker element (see Figure 33-001).

Strobe Light

Anti-collision strobe lights are integrated into the standard navigation light and controlled by the same switch.

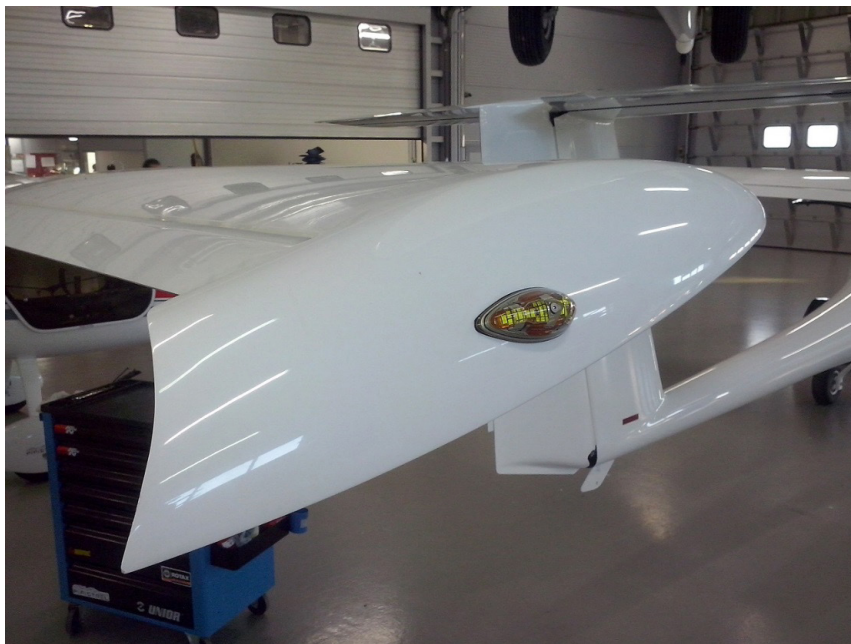


Figure 33-001
NAV/STROBE light installation

Landing Light

A High Intensity LED landing light is mounted in the lower engine cowl. The landing light is controlled through the LDG light switch on the switch panel. 12 VDC for navigation light operation is supplied through the LDG light switch, which includes a resettable circuit breaker element. The landing light has thermal protection built in and its operation is not time limited (see Figure 33-002).



Figure 33-002
Landing light installation

2. Maintenance Practices

33-40: 2.1. NAV/STROBE lights

33-40: 2.1.1. Inspection/check

Reference: Figure 33-001

Step	Action	Required parts, materials and tools	Reference
1	Carry out visual inspection of the NAV/STROBE lights.		(see 05-20)
2	Carry out operational inspection of the NAV/STROBE lights.		
3	Replace if necessary.		

33-40: 2.2. NAV/STROBE lights

33-40: 2.2.1. Inspection/check

Reference: IPC 121-33-40-050

Step	Action	Required parts, materials and tools	Reference
1	Carry out visual inspection of the landing light.		(see 05-20)
2	Carry out operational inspection of the landing light.		
3	Replace if necessary.		

NOTE: Refer to chapter 91-00 for the wiring diagrams that pertain to all of the external lights.

33-40
EXTERIOR
LIGHTING

33-40: 2.3. LANDING light

33-40: 2.3.1. Removal

Step	Action	Required parts, materials and tools	Reference
1	Locate landing light on lower cowling.	- Torx screwdriver set	
2	Disconnect landing light cable from connector.		
3	Remove screws and washers connecting landing light to lower cowling.		
4	Disconnect and remove the old landing light.		

33-40: 2.3.2. Installation

Step	Action	Required parts, materials and tools	Reference
1	Position new landing light into lower cowling.	- Torx screwdriver set - Loctite 243	
2	Run the new landing light cable through the hole in the fuselage.		
3	Apply Loctite 243 to the bolts' thread.		
4	Tighten screws and washers connecting landing light to lower cowling.		
5	Fasten the new landing light to the fuselage.		
6	Fit connector to cable.		
NOTE: white wire is "+", white with blue stripe is "-".			
7	Connect landing light to existent wire harness.		
8	Adjust landing light position. The angle between the light axes and the lower cowling is 20°.		(see Figure 33-003)

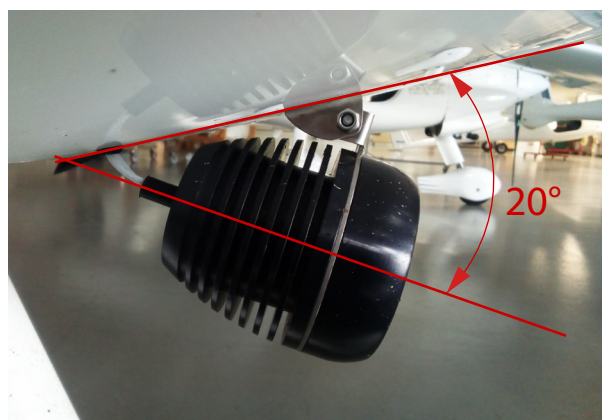


Figure 33-003
 Landing light adjustment

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CHAPTER 34 – NAVIGATION AND PITOT-STATIC SYSTEMS**TABLE OF CONTENTS**

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34-00 GENERAL

The chapter describes the navigation systems used on the Virus SW 121. It covers components such as the pitot-static system, indicators, positioning systems and landing aids.

34-10 FLIGHT ENVIRONMENTAL SYSTEMS

34-10 FLIGHT ENVIRONMENTAL SYSTEMS

1. Description

This chapter discusses all of the equipment/instruments on the Virus SW 121 that collect data from the environment and convert it into usable information for the pilot. This includes the pitot-static system, outside air temperature sensor, vertical speed indicator, altimeter and airspeed indicator.

Pitot-Static system

The pitot-static system consists of a single pitot tube mounted on the starboard wing, approximately 3 meters from fuselage and dual static ports mounted in the fuselage just below the baggage compartment (see Figure 34-001). The lines from the static ports join together and then drive the static pressure to both Garmin ADAHRS units as well as the mechanical airspeed indicator and altimeter. The pitot tube also has a AOA sensing port.



Figure 34-001
Pitot tube installation

Outside Air Temperature

The outside air temperature sensor (OAT) is mounted to the fuselage just aft of the port side wing (see Figure 34-002). It provides the PFD/MFD with data in degrees Celsius (oC).



Figure 34-002
OAT sensor installation

Airspeed indicator

Indicated airspeed is shown on an internally lit precision airspeed indicator installed on the pilot's instrument panel. The instrument measures the difference between static and Pitot pressure, and displays the result in knots on an airspeed scale.

Altimeter

Airplane altitude is depicted on a conventional, three-pointer, internally-lit barometric altimeter. The instrument senses the local barometric pressure adjusted for altimeter setting and displays the result on the instrument in feet. The altimeter is calibrated for operation between -1000 and 20,000 feet altitude. The scale is marked from 0 to 10 in increments of 2. The long pointer indicates hundreds of feet and sweeps the scale every 1000 feet (each increment equals 20 feet). The short, wide pointer indicates thousands of feet and sweeps the scale every 10,000 feet (each increment equals 200 feet). The short narrow pointer indicates tens of thousands feet and sweeps from 0 (zero) to 2 (20,000 feet with each increment equal to 2000 feet). Barometric windows on the instrument's face allow barometric calibrations in either inches of mercury (in.Hg) or millibars (mb). The barometric altimeter settings are input through the barometric adjustment knob at the lower left of the instrument.

34-10
FLIGHT ENVIRONMENTAL
SYSTEMS

2. Maintenance Practices

34-10: 2.1. Pitot tube

34-10: 2.1.1. Inspection/check

Reference: Figure 34-001

Step	Action	Required parts, materials and tools	Reference
1	Locate the pitot tube fastened to the bottom surface of the starboard wing.		
2	Carry out visual inspection. Make sure the wing's composite structure around the tube's mounting flange hasn't incurred any damage.		(see 05-20)

34-10: 2.1.2. Removal

Reference: Figure 34-001

Step	Action	Required parts, materials and tools	Reference
1	Locate the pitot tube fastened to the bottom surface of the starboard wing.	- T-handle hex head screwdriver set	(see 05-20)
2	Unscrew/remove the screws securing the Pitot tube to the wing.		
3	Pull the Pitot tube away from the wing slightly to access the hose ports.		
4	Disconnect the Pitot and AOA hoses from the tube.		
5	Remove the Pitot tube.		
6	Carry out visual inspection of the Pitot tube and hoses.		

34-10: 2.1.3. Installation

Reference: Figure 34-001

Step	Action	Required parts, materials and tools	Reference
1	Attach the Pitot and AOA hoses to the Pitot tube.	- T-handle hex head screwdriver set	
2	Position the Pitot tube on the wing's bottom surface.		
3	Fasten the Pitot tube to the wing.		

CAUTION: Install the Pitot tube so that it's parallel to the aircraft's longitudinal axis, therefore, pointing in the direction of flight. The readings given by navigation instruments on the Virus SW 121 will not be accurate if it's installed at an angle.

WARNING: Do not blow into the Pitot tubes entry ports as this could easily damage the instruments.

34-20 ATTITUDE AND DIRECTION

1. Description

This chapter contains information about all of the components on the Virus SW 121 that provide the pilot with navigation data using magnetic, inertia or gyroscopic forces. It covers components such as the magnetic compass, magnetometer and air data/attitude and heading reference system (ADAHRS).

Magnetic Compass

A conventional liquid filled, magnetic compass is installed on top of the instrument panel so it can be seen by the pilot at all times (see Figure 34-003). Its correction card is installed in the compass itself.



Figure 34-003
ADAHRS unit

Magnetometer

The Virus SW 121's magnetometer provides the ADAHRS with magnetic field data, which is then used to determine the aircraft's magnetic heading. It is installed in the aircraft's tail cone in a custom-designed composite housing.

Air data/attitude and heading reference system (ADAHRS)

An integral air data/attitude and heading reference system (ADAHRS) uses a 3-axis solid state gyro and accelerometer system and the magnetometer to replace the vertical and directional gyros (see Figure 34-004). It also provides roll, pitch, heading data and outside air temperature (OAT) data and continually updates the winds aloft and true airspeed (TAS) indications on the PFD. There are two GSU 25 ADAHRS units installed in the Virus SW 121. They are fastened to the aft surface of the baggage compartment bulkhead.

34-20 ATTITUDE AND DIRECTION



Figure 34-004
ADAHRS unit

Mechanical instruments for attitude and altitude are mounted in the upper segment of the instrument panel and do not require electrical power to function.

2. Maintenance Practices

Please refer to the components' installation/user manuals for maintenance.

34-30 LANDING AIDS

1. Description

The only landing aid on the Virus SW 121 is the Garmin GNC 255 NAV/COM radio, which is optional equipment. When installed, it allows the pilot to land in poor visual conditions via an instrument landing system (ILS).

2. Maintenance Practices

Please refer to the Garmin GNC 255 installation/user manuals for detailed maintenance practices information.

34-40 INDEPENDENT POSITION DETERMINING

34-40 INDEPENDENT POSITION DETERMINING

1. Description

This chapter describes all of the navigation equipment on the Virus SW 121 that acquires positioning data from sources other than ground stations. It includes the GPS antennas, the PFD/MFD, the COM transceiver and the COM antenna.

GPS antennas

Both the GA 26C antenna and the GA 56 antenna, manufactured by Garmin, are installed in the Virus SW 121. The GA 56 is centered between the wings on the top surface of the fuselage, just under the flaperon vertical pushrod composite cover (see Figure 34-006). The GA 26C is fastened to the instrument panel cover (see Figures 34-005, Figure 34-011 and Figure 34-012).



Figure 34-005
GA 26C GPS antenna installation

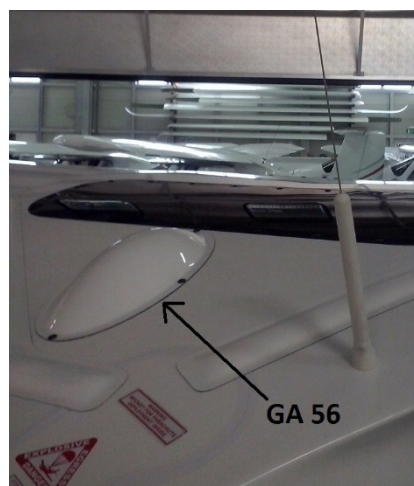


Figure 34-006
GA56 GPS antenna installation

PFD/MFD units

Two GDU 370 displays (see Figure 34-007), manufactured by Garmin, are installed in the Virus SW 121. They're fastened to the instrument panel.

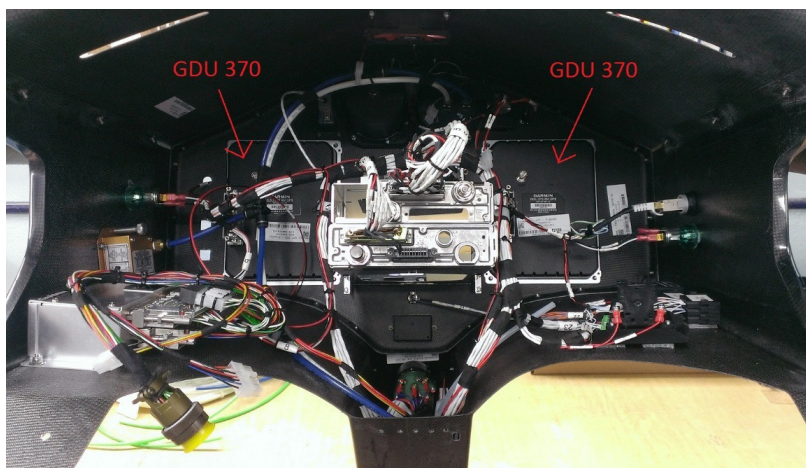


Figure 34-007
GA 26C GPS antenna installation

COM Transceiver

The GTR 225 VHF com radio, manufactured by Garmin, fastened to the instrument panel in the Virus SW 121. It receives all narrow- and wide-band VHF communication transmissions transmitted within range of the selected frequency.

COM Antenna

The CI-121 com antenna, manufactured by Comant, is installed on the top surface of the fuselage, just between the wings on the port side (see Figures 34-008, Figure 34-011 and Figure 34-012). The antenna's wide base plate guarantees it is fastened rigidly to the fuselage. The inside surface of the fuselage is covered with a thin layer of aluminum foil to minimize interference.



Figure 34-008
COM antenna installation

34-40
INDEPENDENT POSITION
DETERMINING

2. Maintenance Practices

Please refer to the components' installation/user manuals for maintenance practices information.

34-50 DEPENDENT POSITION DETERMINING

1. Description

This chapter describes all of the navigation equipment on the Virus SW 121 that acquires positioning data from ground stations. It includes the GTX 328 transponder, transponder antenna and the NAV antenna.

Transponder

The airplane is equipped with a single Garmin GTX 328 ATC Mode S (identification and altitude) transponder with squawk capability. The transponder system consists of the integrated receiver/transmitter control unit, an antenna, and an altitude encoder. The transponder and integrated controls are mounted in the center of the instrument panel.

Transponder antenna

The XPDR transponder antenna, manufactured by Pipistrel, is installed on the belly of the fuselage and centered (see Figure 34-009). The antenna's wide base plate guarantees it is fastened rigidly to the fuselage.



Figure 34-009
XPDR transponder antenna installation

34-50
DEPENDENT POSITION
DETERMINING

NAV antenna

The CI-157P VOR/LOC/GS NAV antenna, manufactured by Comant, is installed in the Virus SW 121. It's fastened to a composite brace that is bonded to the vertical stabilizer (see Figure 34-012).



Figure 34-010
 NAV antenna installation

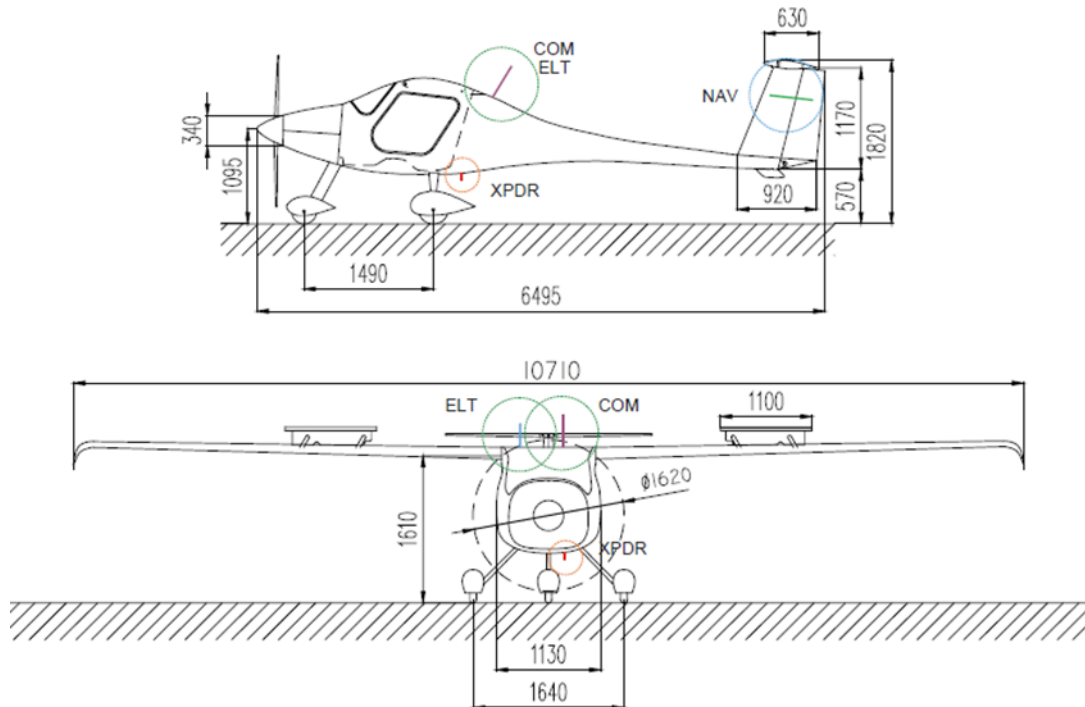


Figure 34-011
 Antenna locations – side view

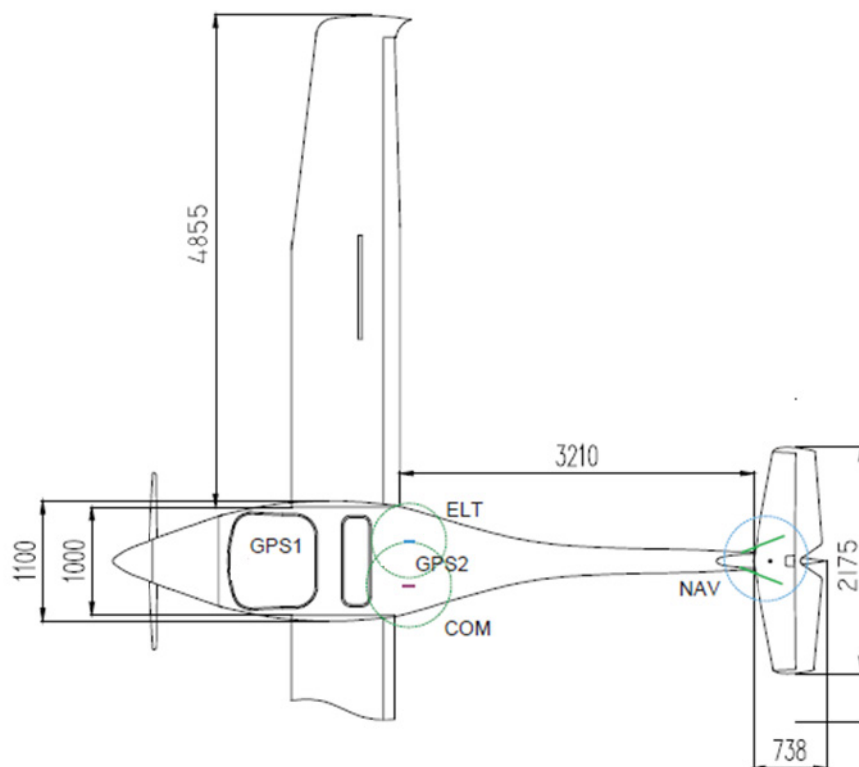


Figure 34-012
Antenna locations – top view

2. Maintenance Practices

Please refer to the components' installation/user manuals for maintenance practices information.

PIPISTREL

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CHAPTER 51 – STANDARD PRACTICES - STRUCTURES**TABLE OF CONTENTS**

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51-00 GENERAL

This chapter covers all the maintenance procedures that pertain to the Virus SW 121's structure. The airframe is a complex composite structure that needs to be checked periodically for signs of wear and damage. Damage to composite components can be difficult to detect, but some simple techniques can make it easier.

51-10
DETECTING/ASSESSING
COMPOSITE DAMAGE**51-10 DETECTING/ASSESSING COMPOSITE DAMAGE****1. Description**

Composite damage comes in many forms and is sometimes difficult to detect. The most common is impact damage, such as dents or punctures. These, as well as scratches and gouges, can usually be detected by visually inspecting the component. Other types of damage however, such as delamination, which are sometimes just as critical as other forms of damage, can go easily go undetected. That is why thorough inspection of the Virus SW 121's airframe is advisable and needed in order to keep the aircraft in good working condition and its occupants safe.

2. Maintenance Practices**51-10: 2.1. Visual inspection of composite components**

Light is an excellent visual inspection aid. Place the composite component, whether big or small, in a well lit space and move it slowly so that the light reflects off it at different angles. Any bends, warping and/or dents should be detectable by using this technique. Once detected, the extent of the components damage needs to be assessed.

51-10: 2.2. Tap test

Composite components are known for mechanical strong and robust, yet very light. Their underlying structure must remain intact in order to ensure good mechanical properties. Any damage that it incurs, however, can easily go undetected, because it's not visible.

One way of a detecting interior composite damage, or determining the extent of damage already incurred, is a tap test. This is to be carried out with a hard, metallic object, such as a coin. To avoid damaging the composite test specimen, be sure to use an object that isn't sharp or pointed. Simply tap the surface of the composite component with the blunt, metallic object and listen to the sound this produces. Areas that are undamaged typically sound sharp and clear, whereas areas that have suffered delamination or disband, sound hollow and/or flat.

Any damage to the major bonding lines of the Virus SW 121's structural components can also be detected by the tap test described above. The following bonding lines, clearly depicted in Figures 51-001 to 51-004, are to be considered major:

- Upper fuselage/vertical stabilizer bonding line
- Lower fuselage bonding line
- Wing leading edge bonding line
- Horizontal stabilizer leading edge bonding line

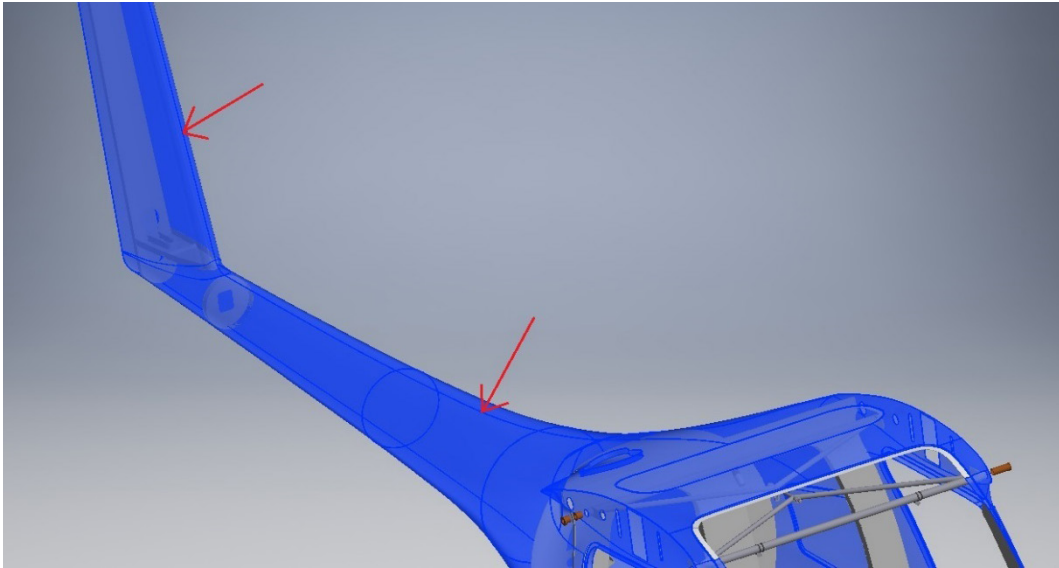


Figure 51-001
Upper fuselage/vertical stabilizer bonding line

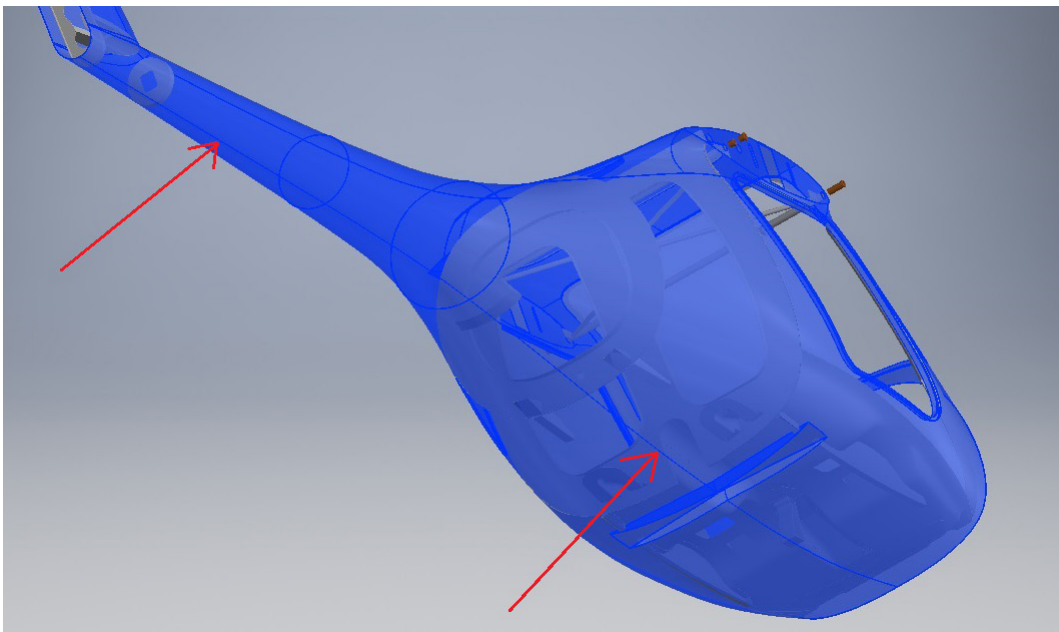


Figure 51-002
Lower fuselage bonding line

51-10
DETECTING/ASSESSING
COMPOSITE DAMAGE

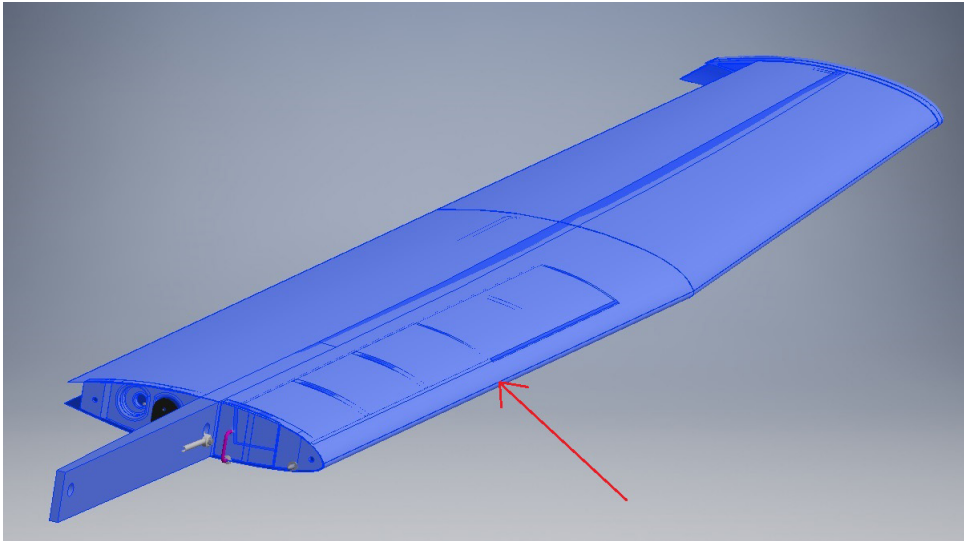


Figure 51-003
Wing leading edge bonding line



Figure 51-004
Horizontal stabilizer leading edge bonding line

51-60 CONTROL SURFACE BALANCING

All of the control surfaces on the Virus SW 121 must be balanced at all times to ensure the safety of its occupants. They can, however, become unbalanced if altered or modified (i.e. damaged, repainted, repaired, etc.).

WARNING: If altered in any way, control surfaces must be rebalanced following the Procedure for Mass Balances PI-121-15-10-001 (see APPENDIX 99-F)

**51-70
REPAIRS****51-70 REPAIRS**

Please refer to EASA document CS-STAN, which outlines the acceptable methods, techniques and practices for carrying out and identifying standard changes and standard repairs as permitted in Part-21. If the repair/change in question is covered by CS-STAN, then no further assistance is required from Pipistrel d.o.o Ajdovščina and the repair/change can be carried out by a qualified mechanic/repair station. If the repair/change in question is not covered by CS-STAN, then Pipistrel d.o.o Ajdovščina must be contacted for further assistance.

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CHAPTER 52 – DOORS**TABLE OF CONTENTS**

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52-10	DETECTING/ASSESSING COMPOSITE DAMAGE Description Maintenance Practices	52-04
52-20	CONTROL SURFACE BALANCING REPAIRS	52-05

52-00 GENERAL

This chapter describes the Virus SW 121's doors. The windshield, upper window and door windows are made from Lexan shatter-resistant polycarbonate. The fuselage has two cabin doors made out of CFRP frames and one independent luggage compartment door on the left side. Doors are locked in the closed position via 3 locking pins operated simultaneously by rotating a common central handle.

The baggage compartment door provides access to the baggage compartment and can be locked to prevent it from opening during aircraft operation.

52-10

PASSENGER AND CREW DOORS

52-10 PASSENGER AND CREW DOORS

1. Description

The two crew/passenger doors are fastened to the aircraft by hinges. They incorporate a flush-mounted, outer door handle and a conventional inner door handle. The door latch handle is centered at the bottom of the door window and actuates three latching pins that extend downwards/outwards into the fuselage.

2. Maintenance practices

52-10: 2.1.1. Removal

Reference: IPC 121-52-10-000

Step	Action	Required parts, materials and tools	Reference
1	Put the door handle in the locked position.	- 2.5 mm T-handle hex head screwdriver, - rubber hammer	
2	Push the hinge pins out of the door's hinges using the T-handle hex head screwdriver and rubber hammer.		
3	Unlock the door handle and remove the door.		

52-10: 2.1.2. Installation

Reference: IPC 121-52-10-000

Step	Action	Required parts, materials and tools	Reference
1	Position door on the airframe and put door handle in locked position	- 2.5 mm T-handle hex head screwdriver, - rubber hammer	(see 12-20)
2	Lubricate hinge pin.		
3	Slide hinge pin into hinge and center it.		
4	Unlock door handle and carry out operational check.		

52-10: 2.1.3. Inspection/check

Reference: IPC 121-52-10-000

Step	Action	Required parts, materials and tools	Reference
1	Carry out visual inspection of doors.	- 2.5 mm T-handle hex head screwdriver, - rubber hammer	(see 05-20)
2	Position door on the airframe and put door handle in locked position.		
3	Use T-handle hex head screwdriver and rubber hammer to remove the doors hinge pins.		
4	Wipe the hinge pins clean with paper towel.		
5	Lubricate hinge pin.		
6	Slide hinge pin into hinge and center it.		
7	Unlock door handle and carry out operational check.		

52-20 BAGGAGE DOOR

1. Description

The baggage compartment door, located on the port side of the fuselage aft of the door, provides access to the baggage compartment. The baggage door is hinged on the forward edge and latched on the rear edge. The door is locked from the outside with a key lock. The same key can be used to open and close the cabine doors.

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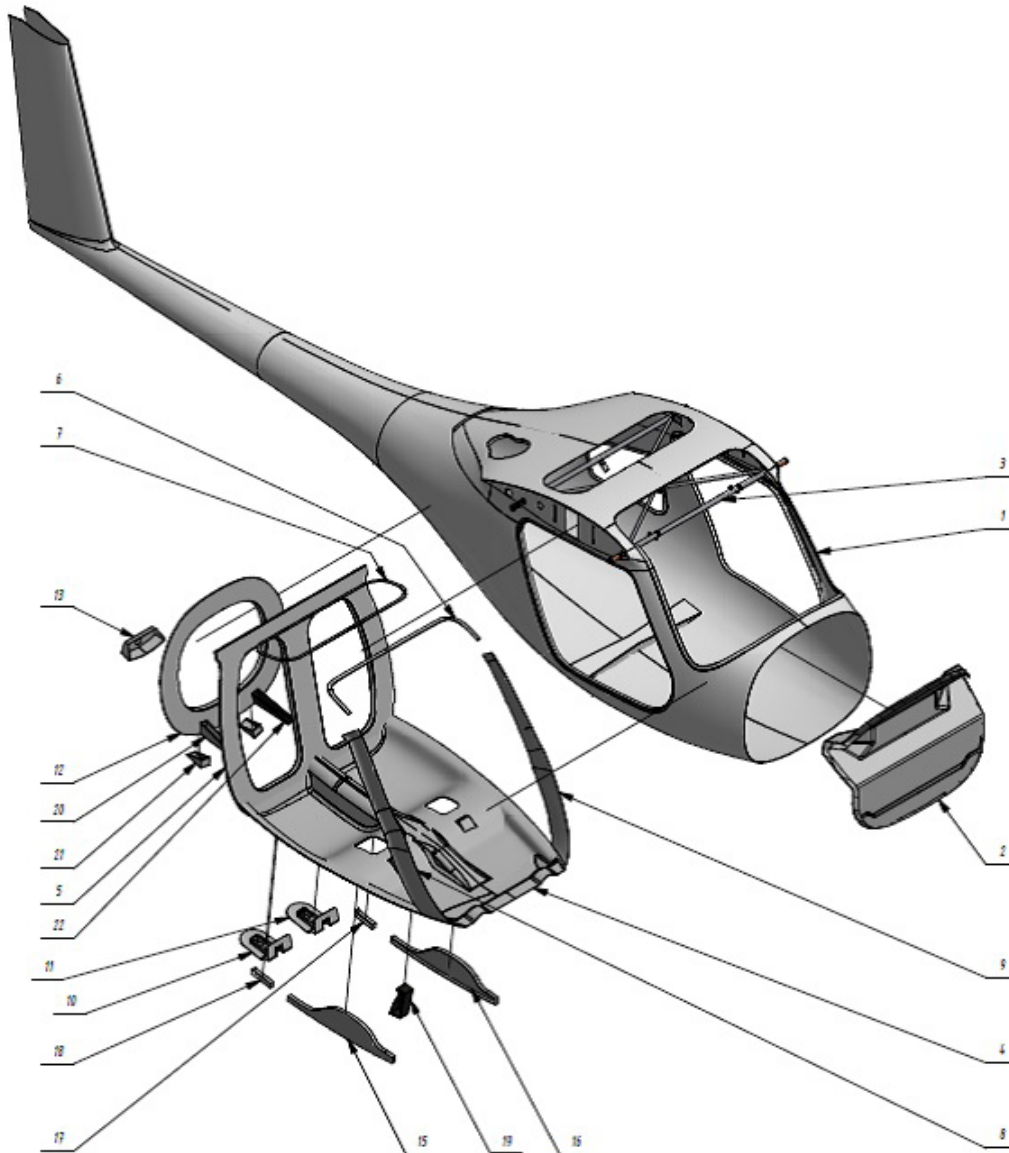
CHAPTER 53 – FUSELAGE**TABLE OF CONTENTS**

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53-00	FUSELAGE General	53-03
53-10	MAIN FRAME Description Maintenance Practices	53-06
53-20	CABIN FLOOR Description Maintenance Practices	53-07
53-30	FIREWALL Description Maintenance Practices	53-08

53-00 GENERAL

The Virus SW 121's fuselage incorporates a carbon fiber, honeycomb-sandwich main frame, reinforced with various bulkheads and longerons. This chapter describes all of the main fuselage elements and the maintenance practices that pertain to them.

53-00
GENERAL



1	Main frame	7	Sunroof frame	13	Trim ass. bulkhead	19	Cabin floor support beam
2	Firewall	8	Port roll cage beam	14	-	20	Frwrd safety harness reinforcement
3	Cabin support strut	9	Strbrd roll cage beam	15	Strbrd fore longeron	21	Aft safety harness reinforcement
4	Cabin floor	10	Frwrd Rudder cable bellcrank mount	16	Port fore longeron	22	Frwrd safety harness reinforcement
5	Cabin bulkhead	11	Frwrd Rudder cable bellcrank mount	17	Port aft longeron		
6	Windshield frame	12	Baggage comp. bulkhead	18	Strbrd aft longeron		

53-10 MAIN FRAME

1. Description

The fuselage is designed as a carbon fiber honeycomb-sandwich construction that uses aramid fibers as inner laminate in the cockpit area. The external structure is covered by a protective acrylic paint coating, which has already been applied in the mold.

2. Maintenance practices

53-10: 2.1. Main frame

53-10: 2.1.1. Inspection/check

Reference: IPC 121-53-10-000

Step	Action	Required parts, materials and tools	Reference
1	Carry out visual inspection of the fuselage main frame.		(see 51-10)
2	Carry out visual inspection of the area where the main landing gear strut is attached to the main frame. Check for any signs of damage, such as cracks, delamination or deformation.		(see Figure 53-001)

WARNING: Any damage incurred by the fuselage's main frame is a safety hazard and must be repaired immediately by an authorized maintenance/composite repair organization.



Figure 53-001
Example of fuselage main frame damage

53-20
CABIN FLOOR

53-20 CABIN FLOOR

1. Description

The cabin floor supports the crew seats and is made primarily out of CFRP. Some areas of the cabin floor are reinforced with aramid fibers. It's supported by two longerons and a central beam. The passenger safety harness lap belts are fastened to the cabin floor.

2. Maintenance practices

53-20: 2.1.1. Inspection/check + tap test

Reference: IPC 121-53-40-300

Step	Action	Required parts, materials and tools	Reference
1	Remove the crew seats.		(see 25-10)
2	Carry out visual inspection of the cabin floor. Pay special attention to the area around the safety harnesses attachment points. Check for any signs of damage, such as cracks, delamination or deformation.		(see 05-20 and Figure 53-001)
3	Carry out tap test in area adjacent to undercarriage strut bolt attachment points.		(see 51-10)
4	Install the crew seats.		(see 25-10)

WARNING: Any damage incurred by the fuselage's cabin floor requires immediate repair and must be carried out by an authorized maintenance/composite repair organization.



Figure 53-002
 Safety harness attachment point on the cabin floor

53-30 FIREWALL

1. Description

The firewall is designed to separate the engine compartment from the rest of the fuselage and support various airplane components on both the forward and aft side. The firewall, constructed of a CFRP prepreg honeycomb sandwich, includes metal fittings that support the engine mount and reinforced points that support various engine components. Fire protection is provided by a layer of ceramic insulation covered by a sheet of stainless steel.

2. Maintenance practices

53-30: 2.1.1. Inspection/check

Reference: IPC 121-53-30-001

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings.		(see 71-10)
2	Carry out visual inspection of the firewall. Check for any signs of deformation due to high temperatures, such as deformation, charring or scorching. Check the area around the engine mount attachment points for signs of damage.		(see 05-20)
3	Install the engine cowlings.		(see 71-10)

WARNING: Any damage incurred by the fuselage’s firewall requires immediate attention and must be repaired out by an authorized maintenance/composite repair organization.

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CHAPTER 55 – STABILIZERS**TABLE OF CONTENTS**

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55-10	HORIZONTAL STABILIZER Description Maintenance Practices	55-04
55-20	ELEVATOR Description Maintenance Practices	55-08
55-30	VERTICAL STABILIZER Description Maintenance Practices	55-
55-40	RUDDER Description Maintenance Practices	55-

55-00 GENERAL

The stabilizers consist of a detachable horizontal stabilizer, a single piece elevator, a fixed vertical stabilizer and a detachable rudder. All of the empennage components are conventional spar (shear web), rib, and skin construction. This chapter describes the maintenance practices that pertain to the aforementioned components.

NOTE: The COG of the aircraft must be recalculated/verified following any stabilizer/control surface repairs.

55-10
HORIZONTAL
STABILIZER

55-10 HORIZONTAL STABILIZER

1. Description

The horizontal stabilizer is attached to an aluminum bracket that is fastened to the vertical stabilizer and can be removed. The design of the horizontal tail's shell incorporates CFRP sandwich material.

2. Maintenance practices

55-10: 2.1. Horizontal stabilizer

55-10: 2.1.1. Removal

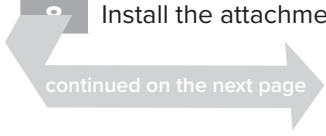
Reference: IPC 121-55-10-000

Step	Action	Required parts, materials and tools	Reference
1	Weigh the tail cone down to access the horizontal stabilizer.	- 14 mm spark plug socket wrench (P/N 1190003), - flathead screwdriver	(see 07-10: 2.2.1.)
2	Remove the attachment bolt's black cap.		
3	Slide screwdriver perpendicularly through 14 mm socket wrench and use it to unscrew/remove the horizontal stabilizers' attachment bolt assembly.		
4	Lightly jolt the elevator's trailing edge, so that the horizontal stabilizer pops out of place.		
5	Remove it and set it on a dry, padded surface.		
6	Remove tail cone counterweight.		

55-10: 2.1.2. Installation

Reference: IPC 121-55-10-000

Step	Action	Required parts, materials and tools	Reference
1	Weigh the tail cone down to access the horizontal stabilizer .	- 14 mm spark plug socket wrench (P/N 1190003), - flathead screwdriver	(see 07-10: 2.2.1.)
2	Lubricate horizontal stabilizer pins and bushings.		(see 12-20)
3	Lubricate horizontal stabilizer attachment bolt assembly		(see 12-20)
4	Position the horizontal stabilizer so that it's pins slide into their respective bushings.		
5	Use 14 mm socket wrench to fasten the horizontal stabilizer to the aircraft while simultaneously pushing down on the bolt with the screwdriver.		(see Figure 55-001)
6	Orient the bolt's head so that slides into the spring-loaded locking mechanism.		(see Figure 55-002)
7	Shake stabilizer a little to ensure it is secured to the aircraft.		
8	Install the attachment bolt assembly's black cap.		



Step	Action	Required parts, materials and tools	Reference
9	Carry out operational inspection of the elevator.		(see 05-20)
10	Check elevator deflection angles.		(see 27-30)

55-10: 2.1.3. Inspection/check

Reference: IPC 121-55-10-000

Step	Action	Required parts, materials and tools	Reference
1	Remove horizontal stabilizer.	Retainer ring pliers	(see 55-10: 2.1. Horizontal stabilizer)
2	Remove attachment bolt retainer ring.		
3	Remove attachment bolt assembly.		
4	Carry out visual inspection of attachment bolt assembly.		(see 05-20)
5	Clean and lubricate attachment bolt assembly.		(see 12-20)
6	Install attachment bolt assembly.		
7	Carry out operational inspection of attachment bolt assembly.		(see 05-20)



Figure 55-001
Attachment bolt installation



Figure 55-002
Attachment bolt assembly head orientation

55-20 ELEVATOR

55-20 ELEVATOR

1. Description

The elevator is designed as a bottom surface supported hinged flap. The elevator is actuated using a pushrod, which is connected to the elevator control bracket. The elevator shell is designed as a 1-cell CFRP sandwich shell. The elevator is hinged in maintenance-free bushings mounted on stainless steel brackets at the stabilizer rear spar and bottom shell. Counterbalance weights are integrated into the elevator tips.

2. Maintenance practices

55-20: 2.1. Elevator

55-20: 2.1.1. Removal

Reference: IPC 121-55-20-000

Step	Action	Required parts, materials and tools	Reference
1	Remove horizontal stabilizer.	Metric ratchet/ socket set	(see 55-10)
2	Flip it upside down on a dry, padded surface.		
3	Remove the fastening material from the first port-side hinge securing the elevator to the horizontal stabilizer.		
4	Slightly wiggle the elevator up and down while simultaneously sliding it off its hinges.		
5	Remove and place on a dry, padded surface.		

55-20: 2.1.2. Installation

Reference: IPC 121-55-20-000

Step	Action	Required parts, materials and tools	Reference
1	Slide elevator into position on the horizontal stabilizer and fasten it in place.	Metric ratchet/ socket set	(see 05-20)
2	Carry out operational inspection of the elevator.		
3	Install horizontal stabilizer.		
4	Check elevator deflection angles.		

55-20: 2.1.3. Inspection/check

Reference: IPC 121-55-20-000

Step	Action	Required parts, materials and tools	Reference
1	Remove elevator.	Metric ratchet/ socket set	(see 55-10: 2.1. Horizontal stabilizer)
2	Carry out visual inspection of the elevator.		(see 05-20)
3	Lubricate elevator hinge pins.		(see 12-20)
4	Install elevator.		(see 55-10: 2.1.2. Installation)

55-30 VERTICAL STABILIZER

55-30 VERTICAL STABILIZER

1. Description

The vertical stabilizer is designed to be one part with the tail fuselage, made of carbon honeycomb sandwich with carbon spars. The bending moment is carried by one C-type spar which is reinforced by CFRP tapes at the flanges.

2. Maintenance practices

55-30: 2.1. Vertical stabilizer

55-30: 2.1.1. Inspection/check

Reference: IPC 121-53-64-000

Step	Action	Required parts, materials and tools	Reference
1	Remove horizontal stabilizer.		(see 55-10: 2.1.)
2	Carry out visual inspection of vertical stabilizer bushings for wear.		(see 05-20)
3	Clean and lubricate vertical stabilizer bushings.		
4	Clean and lubricate horizontal stabilizer T-fixation plate pins.		(see 12-20)
5	Install horizontal stabilizer.		(see 55-10: 2.1.2.)

55-30: 2.1.2. Inspection/check + tap test

Reference: IPC 121-53-64-000

Step	Action	Required parts, materials and tools	Reference
1	Remove horizontal stabilizer.		(see 55-10: 2.1.)
2	Carry out tap test around the vertical stabilizer bushings.		(see 51-10)
3	Install horizontal stabilizer.		(see 55-10: 2.1.2.)

55-40 RUDDER

1. Description

The rudder is a single-cell GFRP sandwich shell that's designed like centrally supported hinged flap. It's rotation is attributed to two maintenance-free spherical plain bearings. Balancing weights are mounted on the front end of the rudder.

2. Maintenance practices

55-40: 2.1. Rudder

55-40: 2.1.1. Removal

Reference: IPC 121-27-22-000, IPC 121-27-20-001

Step	Action	Required parts, materials and tools	Reference
1	Remove the fastening material securing the rudder's two bottom studs to the rudder cable bellcrank.	Metric ratchet/ socket set	
2	Support the rudder with both hands and give it a jolt upwards. It should slide of its hinges.		
3	Place it on a dry, padded surface.		
4	Carry out visual inspection of the rudder.		
			(see 05-20 and 51-10)

55-40: 2.1.2. Installation

Reference: IPC 121-27-22-000, IPC 121-27-20-001

Step	Action	Required parts, materials and tools	Reference
1	Lubricate the upper rudder hinge pin.	Metric ratchet/ socket set	(see 12-20)
2	Slide the rudder's upper bushing over its upper hinge pin while simultaneously sliding its two bottom studs into the cable bellcrank.		
3	Fasten it in place and torque nuts.		
4	Carry out operational inspection.		
5	Check the rudder deflection angles.		
			(see 05-20)
			(see 27-20)

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CHAPTER 56 – WINDOWS**TABLE OF CONTENTS**

SECTION	SUBJECT	PAGE NUMBER
56-00	WINDOWS General Description Maintenance practices	56-03

56-00 GENERAL

1. Description

The Virus SW 121 is equipped with a windshield, cabin door windows and a sunroof. All of the aforementioned windows are made from Lexan shatter-resistant polycarbonate and bonded/fastened to the fuselage or door structure using adhesive and rivets. All the windows are fixed in place and cannot be opened, the exception being the doors which have sliding windows for direct fresh ram air into the cabin.

2. Maintenance practices

NOTE: The following maintenance practices apply to all of the Virus SW 121's window surfaces (i.e. windshield, sunroof and door).

56-00: 2.1. Windows

56-00: 2.1.1. Surface inspection/check

Reference: IPC 121-56-00-000, IPC 121-52-10-000

Step	Action	Required parts, materials and tools	Reference
1	Carry out visual inspection of the window.		(see 51-10)
	Inspect the window for any signs of damage such as cracks, scratches, chips or smudges.		(see Figure 56-001)
	Inspect the windows clarity: objects should appear clear and hazy or fuzzy.		(see Figure 56-002 and Figure 56-003)



Figure 56-001
Cracked windshield

56-00
GENERAL



Figure 56-002
Example of adequate window clarity



Figure 56-003
Example of inadequate window clarity

WARNING: Damaged windows that impede pilot visibility are a safety hazard and must be replaced.

56-00: 2.1.2. Rivet inspection/check

Reference: IPC 121-56-00-000, IPC 121-52-10-000

Step	Action	Required parts, materials and tools	Reference
1	Carry out visual inspection of the window rivets.		(see 05-20)
	Make sure that none of them have loosened and/or gone missing. They should all be flush with the window's surface.		(see Figure 56-004)



Figure 56-004
Example of loosened window rivet

CAUTION: Any damaged and/or loosened window rivets must be replaced with new ones.

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CHAPTER 57 – WINGS**TABLE OF CONTENTS**

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57-40	ATTACH FITTINGS Description	57-07
57-50	FLIGHT SURFACES Description Maintenance Practices	57-08
57-70	AIR BRAKES Description Maintenance Practices	57-09

57-00 GENERAL

The detachable wing is a single spar cantilever wing. The left and right wing are connected by two pins through the spar ends. The wing structure is made mostly from CFRP, while the main spar shear web and the root ribs are made from GFRP. This is for visual inspection and easier damage detection reasons. The spar caps are produced using carbon roving. The wing spar is designed as double T-type spar. Lateral loads and twisting moments are conventionally transferred to the fuselage through root ribs and lateral-force bolts.

57-10
WING STRUCTURE

57-10 WING STRUCTURE

1. Description

The wing shell is designed as a 2-cell CFRP sandwich shell which is closed by a rear shear web which the flaperons are attached to. The wings are fastened together the same way classic gliders are - two spar ends connected with two spar pins. There is also a middle bolt which mates the wings to the fuselage and provides torsional stiffness. The wing roots have pins that slide into bushings in the fuselage and thus allow the wings to be easily positioned/fitted. Each wing half has glider type air brakes and one (1) 50 liters semi-integrated fuel tank made of GFRP. The fuel tank is coated with alcohol resistant coating.

2. Maintenance practices

CAUTION: Installing and removing the Virus SW 121's wings must be carried out in a space where the temperature is equal to or lower than 20°C, as temperature higher than this could make certain parts very difficult to assemble.

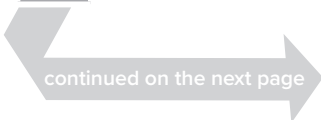
57-10: 2.1. Wing structure

57-10: 2.1.1. Wing removal

NOTE: A minimum of three people are required to carry out this task.

Reference: IPC 121-57-10-000, IPC 121-53-40-000

Step	Action	Required parts, materials and tools	Reference
1	Engage the parking brake.	Metric ratchet and socket set, T-handle hex head screwdriver set	
2	Place wheel chocks under main landing gear wheels.		
3	Remove white wing-fuselage joint seal.		
4	Remove pitot tube.		(see 34-10)
5	Enter the cabin and disconnect all fuel lines, static/pitot lines and electrical cables from the wing roots.		
6	Support each wing at the wingtip.		(see Figure 57-001)
7	Remove central wing spar bolt.		
8	With both wings supported at their ends, remove the two spar pins.		
	NOTE: Moving the wingtips up and down slightly makes spar pin removal easier.		
9	With one person at each end of the wing, slowly remove one of the wings from the fuselage.		
10	Place it in wing cart or on any dry, padded surface.		



Step	Action	Required parts, materials and tools	Reference
11	With one person at each end of the wing, slowly remove the other wing from the fuselage.		
12	Place it in wing cart or on any dry, padded surface.		
13	Disengage parking brake.		
14	Remove wheel chocks.		
15	Carry out visual inspection of the wings.		(see 05-20)



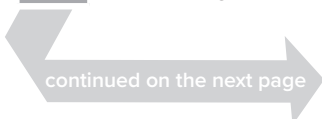
Figure 57-001
Support the wings

57-10: 2.1.2. Wing installation

NOTE: A minimum of three people are required to carry out this task.

Reference: IPC 121-57-10-000, 121-53-40-000

Step	Action	Required parts, materials and tools	Reference
1	Clean spar pins, wing positioning pins/bushings and wing spar bushings with a piece of paper towel and lubricate them.	- metric ratchet and socket set, - T-handle hex head screwdriver set, - paper towel, white wing-fuselage joint seal (P/N 5230014)	(see 12-20)
2	Engage the parking brake.		
3	Place wheel chocks under main landing gear wheels.		
4	Support one wing at both ends and slide its spar into the fuselage. When the wing root is about 10 cm away from the fuselage all/any electrical cables and fuel lines through their respective openings in the fuselage. Slide the wing into its final position using the wing positioning pins as a guide. Continue to support the wingtip as the spar rests against the fuselage.		



57-10
WING STRUCTURE

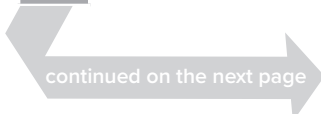
Step	Action	Required parts, materials and tools	Reference
5	Support the other wing at both ends and slide its spar into the fuselage. When the wing root is about 10 cm away from the fuselage all/any electrical cables and fuel lines through their respective openings in the fuselage. Slide the wing into its final position using the wing positioning pins as a guide. Continue to support the wingtip as the spar rests against the fuselage. CAUTION: While pushing the wings into their final position make sure that the flaperon and air brake control controls have engaged properly.		
6	With the wings supported at their wingtips, slide the spar pins through the wing spar bushings and fasten them in place. CAUTION: If at this point the spar pins are properly inserted and the wings are secured, it is no longer necessary to support the wingtips.		
7	Install central spar bolt and fasten it in place.		
8	Carry out operational check of the flaperon control system.		(see 05-20)
9	Carry out operational check of the air brakes.		(see 05-20)
10	Connect all fuel lines, electrical cables and pitot/static lines. CAUTION: The pitot and static lines are marked in the cabin and on the lines themselves with a P and S respectively.		
11	Install pitot tube.		
12	Carry out operational check of the pitot tube.		(see 05-20)
13	Apply white wing-fuselage joint seal.		

57-10: 2.1.3. Major inspection

NOTE: A minimum of three people are required to carry out this task.

Reference: IPC 121-57-10-000, IPC 121-57-70-300

Step	Action	Required parts, materials and tools	Reference
1	Remove the wings.		(see 57-10: 2.1.)
2	Remove flaperons.		(see 57-10: 2.1.)
3	Remove vented fuel cap and use borescope to carry out an internal visual inspection of the fuel tanks.		(see 05-20)
4	Install vented fuel cap.		
5	Remove wing access panel.	Metric ratchet and socket set, T-handle hex head screwdriver set	



Step	Action	Required parts, materials and tools	Reference
6	Use borescope to carry out visual inspection of wing's internal structure and air brake drive mechanism. Lubricate rod end bearings.		(see Table 12-002)
7	Install flaperons.		(see 57-50: 2.3.)

**57-40
ATTACH
FITTINGS****57-40 ATTACH FITTINGS****1. Description**

The Virus SW 121's wings mate to the fuselage using two pins in the wing root that slide into bushings bonded into the fuselage. Once mated to the fuselage the wings are then fastened together using two spar pins and again to the cabin support strut assembly using an M10 bolt.

57-50 FLIGHT SURFACES

1. Description

Roll on the Virus SW 121 is controlled using flaperons that are activated using pushrod mechanisms. A flap handle can be found in the cabin that allows the pilot to symmetrically displace the flaperons. This chapter describes the maintenance practices that apply to the apply to the flaperons.

2. Maintenance practices

57-50: 2.1. Flight surfaces

57-50: 2.1.1. Removal

Reference: IPC 121-57-50-000

Step	Action	Required parts, materials and tools	Reference
1	Remove the wings.	Metric combination wrench set	(see 57-10)
2	Place the wing upside down on a dry, padded surface.		
3	Locate the flange hinge opening closest to the wing root, remove cotter pin and castellated nut securing the flaperon to the wing.		
4	Slide the flaperon off its hinges by pushing it towards the wing root.		
5	Carry out visual inspection of the flaperon.		(see 05-20)

57-50: 2.1.2. Inspection/check

Reference: IPC 121-57-50-000

Step	Action	Required parts, materials and tools	Reference
1	Remove the flaperon.	Paper towel, Phillips screwdriver	(see 57-50)
2	Check flaperon and its hing pins for any signs of damage, wear or corrosion.		
3	Clean hinge bushings and hinge pins with a paper towel.		
4	Check that the hinge pins have not come loose by sliding a screwdriver through them and applying a bit of torque.		
5	Lubricate the hinge bushings and pins.		(see 12-20)

57-50
FLIGHT
SURFACES

57-50: 2.1.3. Installation

Reference: IPC 121-57-50-000

Step	Action	Required parts, materials and tools	Reference
1	Fit the flaperon to the wing by sliding its hing pins into the hinge bushings on the wing.	Metric combination wrench set, Loctite 243	(see 05-20)
2	Install castellated nut and cotter pin.		
3	Carry out operational check of the flaperon.		

CAUTION: After being installed the flaperon must move completely unhindered. If this is not the case the castellated nut may have been tightened too much. If this is the case, unscrew the castellated nut a little, reinstall the cotter pin and carry out the operational check again.

57-70 AIR BRAKES

1. Description

A Schempp-Hirth Style air brake system is incorporated into the wings of the Virus SW 121 and is activated by a ceiling mounted pull-lever in the cabin. It's control system consists of a pushrod and bellcrank fitted into the wing just aft of the main spar near the root-rib, which convert rotary motion, introduced by the aforementioned pull-lever, into translational motion required to open and close the air brakes.

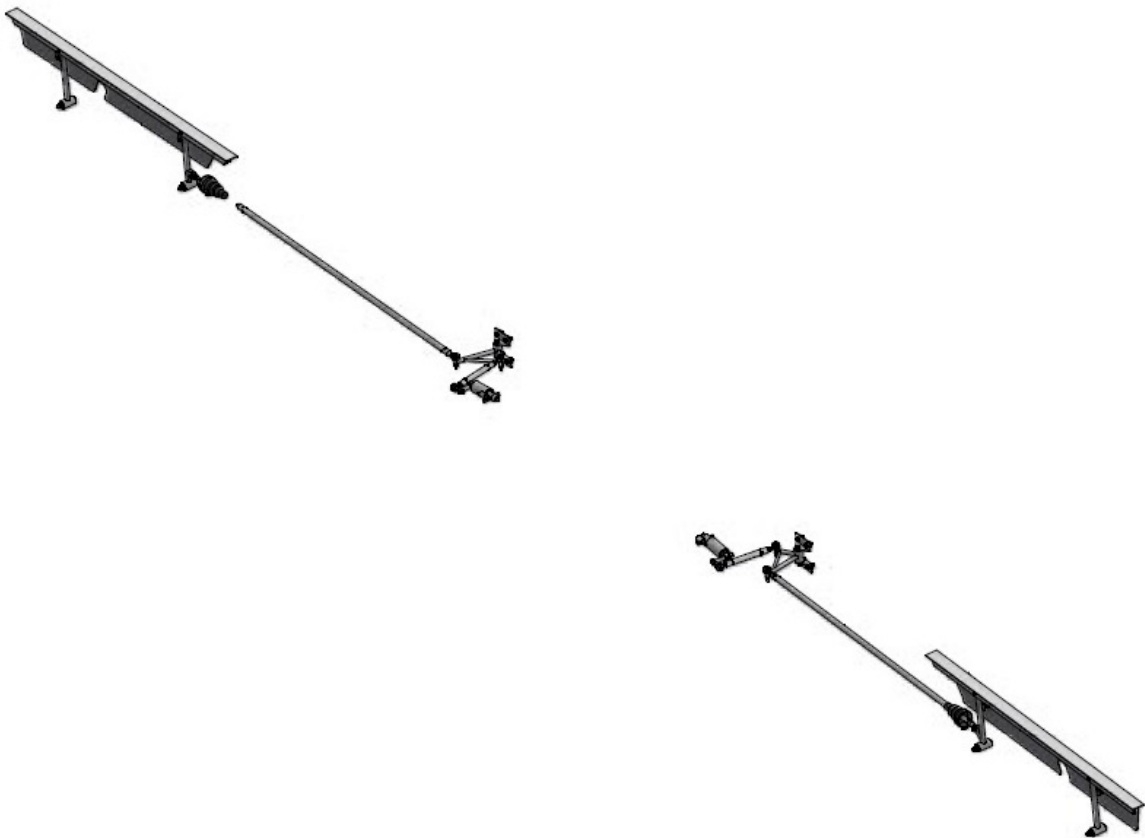


Figure 57-001
Air brakes and control system

57-70

AIR BRAKES

2. Maintenance practices

57-70: 2.1. Air brakes

57-70: 2.1.1. Inspection/check

Reference: IPC 121-57-70-100

Step	Action	Required parts, materials and tools	Reference
1	Remove wings.		(see 57-10: 2.1.)
2	Carry out visual inspection of the air brake.		(see 05-20)
3	Carry out operational inspection of the air brake.		(see 05-20)
4	Inspect paint marker on the air brake's fastening material.		(see 20-40: 2.1.)
5	Clean and lubricate the air brake's relief pins/bushings.		(see 12-20 and Figure 57-002)
6	Lubricate the air brake's rod end bearing.		(see 12-20 and Figure Figure 57-003)
7	Retract air brakes and install wings.		(see 57-10: 2.1.2.)

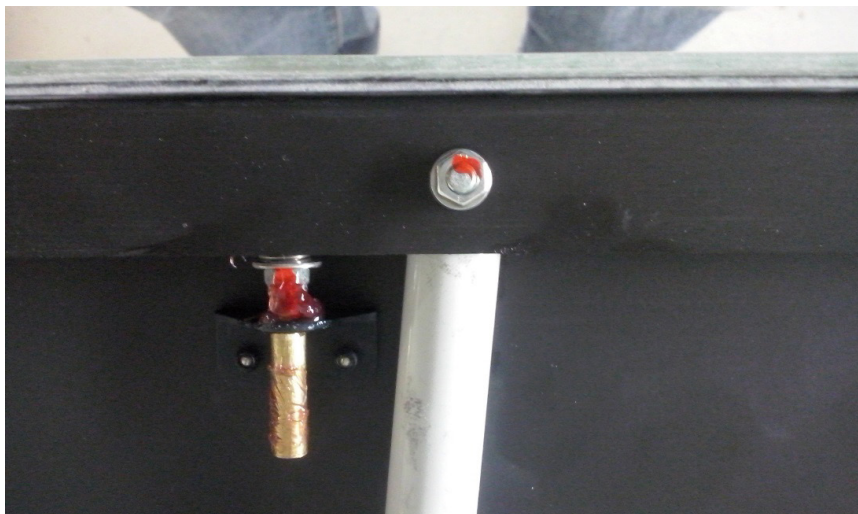
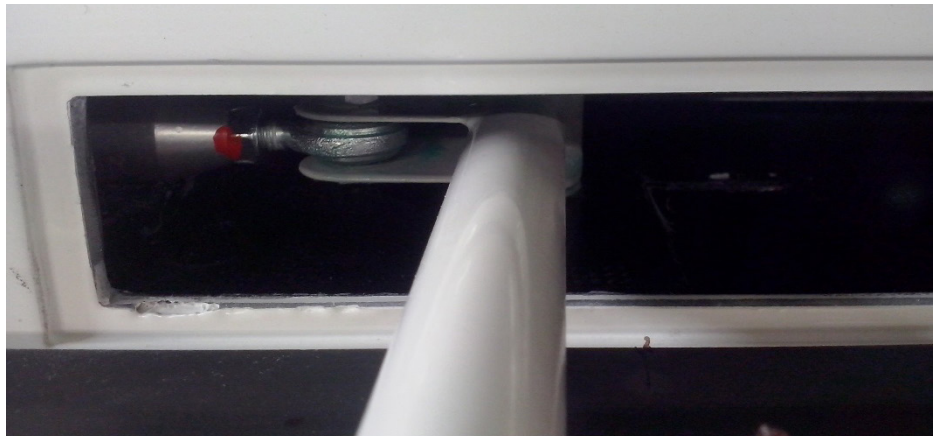


Figure 57-002
Air brake relief pins/bushings



57-70: 2.2. Air brake control system

57-70: 2.2.1. Closing moment check

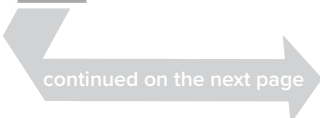
Reference: Figure 57-005

Step	Action	Required parts, materials and tools	Reference
1	Remove wings.	- airbrake moment measurement kit (P/N 1190459)	(see 57-70: 2.1.)
2	Position the wings on a flat surface.		
3	Extract the air brake with the torque wrench and the air brake coupling key.		(see Figure 57-004)
4	Measure the torque required to retract (i.e. close) the air brake completely. Adjust the closing moment if not within the 8-10 Nm range.		(see 57-70: 2.2.2.)
5	Install wings.		(see 57-10: 2.1.2.)

57-70: 2.2.2. Closing moment adjustment

Reference: Figure 57-004 and Figure 57-005

Step	Action	Required parts, materials and tools	Reference
1	Remove wings.	- Wrench set, paint marker, - airbrake moment measurement kit (P/N 1190459) - Loctite 243	(see 57-70: 2.1.)
2	Extract air brake.		
3	Locate the pushrod end bearing and remove fastening material.		(see Figure 57-003)
4	Loosen its jam nut.		



57-70

AIR BRAKES

Step	Action	Required parts, materials and tools	Reference
5	Increase the air brake's closing moment by shortening the pushrod (i.e. screwing the rod end bearing inwards). Decrease the air brake's closing moment by lengthening the pushrod (i.e. unscrewing the rod end bearing).		
6	Tighten the jam nut and check closing moment.		(see 57-70: 2.2.1.)
7	When satisfactory closing moment is attained, mark nut/ bearing with paint marker.		
8	Fasten pushrod to air brake using new locknut. Apply Loctite 243.		
9	Retract air brake.		
10	Install wings.		(see 55-10: 2.1.2.)

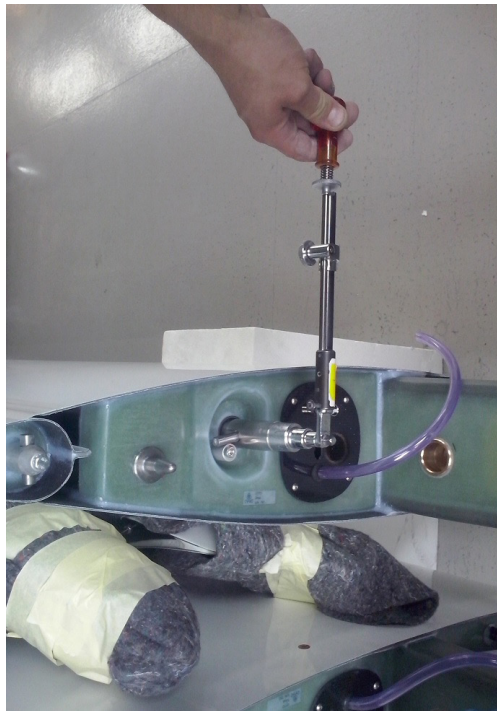


Figure 57-004
Air brake relief pins/bushings

61

CHAPTER 61 – PROPELLER**TABLE OF CONTENTS**

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61-10	PROPELLER ASSEMBLY Description Maintenance Practices	61-04
61-20	PROPELLER CONTROL Description Maintenance Practices	61-08

61-00 GENERAL

The Virus SW 121 is equipped with a 2 blade, hydraulically-variable pitch propeller MTV-33-1-A/170-200. This chapter describes the propeller assembly in detail and discusses the maintenance practices involved.

61-10 PROPELLER ASSEMBLY

61-10 PROPELLER ASSEMBLY

1. Description

The Virus SW 121's propeller assembly consists of the following components:

- A hub with blade bearings and pitch change mechanism
- Two blades
- A Spinner
- A propeller governor

The propeller's composite blades, covered with fiber-reinforced epoxy, and its metal-protected leading edge minimize weight and maximize safety, by preventing fatigue fractures due to vibrations. Pitch is controlled by a propeller governor meaning, once an engine rotational speed is selected, it will be held constant at variations of airspeed and power. If oil pressure is drops the blades simply return automatically to low pitch or, if counterweights are installed, to high pitch, enabling the pilot to continue flying. The oil pressure is single acting.

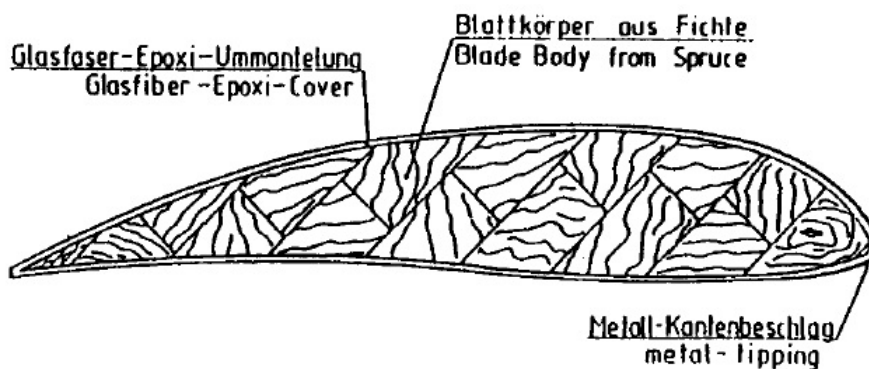


Figure 61-001 (courtesy of MT propeller)
Propeller blade cross chapter

NOTE: For More information about Virus SW 121's propeller assembly please refer to the latest revision of MT-propeller's operation, installation and maintenance manual for all MT-33 series propellers.

2. Maintenance practices

CAUTION: Prior to servicing the propeller the area around the aircraft must be cleared and barricade tape put up, to warn passersby of the possible hazard.

WARNING: Turn the **MASTER** and **AVIONICS** switches off, remove the ignition key and disconnect the battery prior to conducting any work on the propeller assembly.

NOTE: The removal/installation information below is to be used in addition to the information found in the latest revision of MT-propeller's operation, installation and maintenance manual for all MT-33 series propellers. Consult with the aforementioned manual before removing or installing the Virus SW 121's propeller assembly.

61-10: 2.1. Propeller assembly

61-10: 2.1.1. Removal

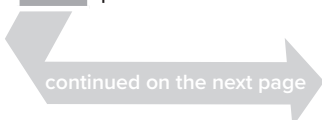
Reference: IPC 121-61-00-000, The latest revision of MT-propeller's operation, installation and maintenance manual for all MT-33 series propellers.

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings. CAUTION: Mark the propeller shaft/flange with a reference line so that it can be reinstalled in the same position.	- Oil pan, imperial wrench set, - T-handle hex head screwdriver set.	(see 71-10)
2	Place oil pan under propeller assembly to catch any spilled oil.		
3	Remove the locknuts and washers securing the propeller assembly to the propeller flange.		
4	Remove propeller assembly.		
5	Plug the governor oil port.		
6	Set propeller assembly down on a dry, padded surface.		

61-10: 2.1.2. Installation

Reference: IPC 121-61-00-000, The latest revision of MT-propeller's operation, installation and maintenance manual for all MT-33 series propellers.

Step	Action	Required parts, materials and tools	Reference
1	Place oil pan under propeller assembly to catch any spilled oil.	- Oil pan, imperial wrench set, - T-handle hex head screwdriver set.	
2	Unplug governor oil port.		
3	Position propeller according to previously-marked reference line.		
4	Fasten the propeller assembly to the propeller flange in crosswise fashion using the washers and new locknuts provided.		



**61-10
PROPELLER
ASSEMBLY**

Step	Action	Required parts, materials and tools	Reference
5	Torque nuts to 45-47 Nm (33-35 ft.lbs).		(see 71-10)
6	Install engine cowlings.		
7	Carry out functional test according to the latest revision of MT-propeller's operation, installation and maintenance manual for all MT-33 series propellers.		

61-10: 2.1.3. Inspection/check

Reference: IPC 121-61-00-000, The latest revision of MT-propeller's operation, installation and maintenance manual for all MT-33 series propellers.

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings.		see 71-10
2	Carry out visual inspection of the propeller assembly. Check for any cracks or dents.		see 05-20 and Figures 61-002, 61-003
3	Carry out visual inspection according to the latest revision of MT-propeller's operation, installation and maintenance manual for all MT-33 series propellers.		



Figure 61-002
Example of cracked propeller blade



Figure 61-003
Example of dented propeller blade

NOTE: For all other maintenance practices information, such as cleaning, balancing and troubleshooting, please refer to the latest revision of MT-propeller's operation, installation and maintenance manual for all MT-33 series propellers.

61-20 PROPELLER CONTROL

1. Description

The propeller governor is located on the top of the engine, on the port side of the crank shaft. Pressurized engine oil is directed to the propeller hydraulic cylinder or released from the hydraulic cylinder in response to engine RPM change. The change in oil volume in the hydraulic cylinder changes the blade angle and returns the propeller system RPM to the set value.

2. Maintenance Practices

For all maintenance practices information pertaining to the Virus SW 121's propeller governor, please refer to the latest revision of MT-propeller's operation, installation and maintenance manual for all MT-33 series propellers.

PIPISTREL

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71

CHAPTER 71 – POWER PLANT**TABLE OF CONTENTS**

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	Description Maintenance Practices	
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71-00 POWER PLANT

1. Description

This chapter covers all the maintenance practices involved with the following components: engine, baffling, cowling, mount, attach fittings, electrical harnesses, air intake, and engine drains.

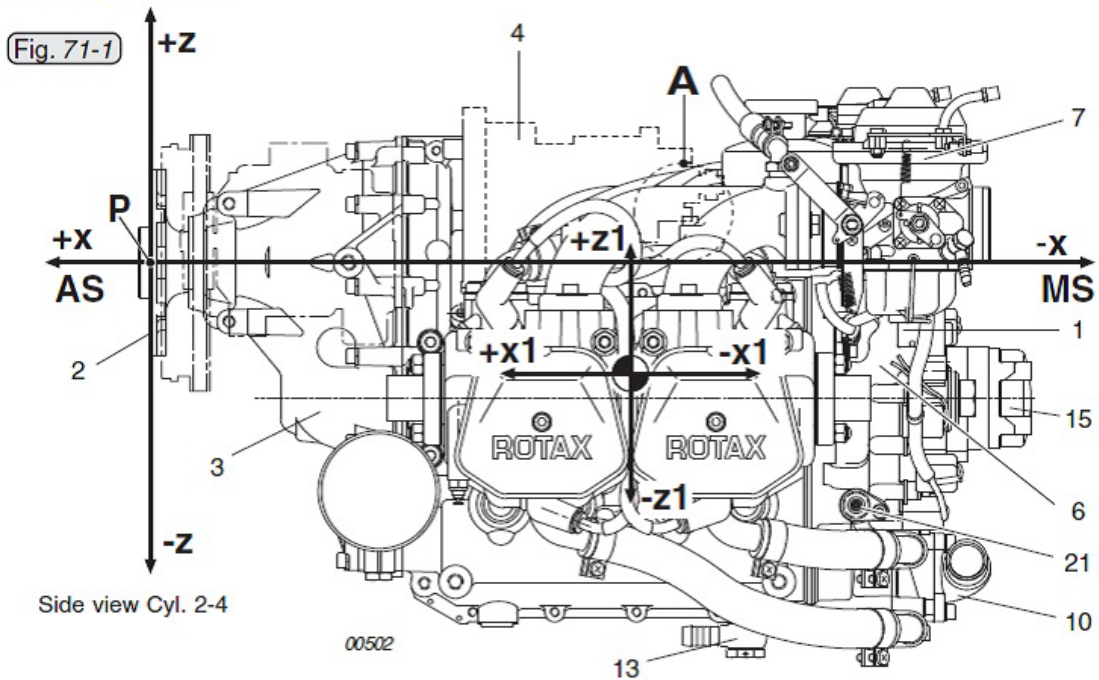
2. Maintenance Practices

71-00: 2.1. Engine

Virus SW 121 is powered by a Rotax 912 S3 four cylinder, normally aspirated air & water cooled, engine rated to 73,5 kW (100 HP) at 5800 RPM, with dual breaker less capacitor discharge ignition. (See Figure 71-001)

71-00 POWER PLANT

912 Series



- | | |
|--|--|
| 1) Engine number | (13) Connection for oil return line (engine) |
| 2) Propeller flange | (14) Oil filter |
| 3) Propeller gearbox | (15) Electric starter |
| 4) Vacuum pump or hydraulically controlled constant speed propeller governor | (16) Electronic module |
| 5) Intake manifold | (17) Compensation tube |
| 6) Ignition housing | (18) Oil pressure sensor |
| 7) Constant depression carburetor | (19) Oil temperature sensor |
| 8) Airbox (optional) | (20) 2x sensor for cylinder head temperature |
| 9) Engine suspension frame (optional) | (21) Connection for mechanical rev counter |
| 10) Coolant pump | (22) Oil tank |
| 11) Expansion tank | (23) External alternator |
| 12) Oil pump | (24) Magnetic plug |
| | (25) Fuel pump |

Figure 71-001
Rotax 912 S3 (courtesy of Rotax)

71-00: 2.2. Baffling

The baffling of the Virus SW 121 consists of a carbon composite air intake (see IPC 121-75-20-002), a carbon composite diffuser (see IPC 121-75-20-001) and various foam seals. The former two ensure that all ram air, needed to cool the engine, is uniformly distributed over the engine's cylinders. The latter rest between the engine's cowlings and various components in the engine compartment, and ensure optimum airflow needed for oil/water cooling.



Figure 71-002
Upper oil cooler seal



Figure 71-003
Ram cooling air intake



Figure 71-004
Lower oil cooler seal



Figure 71-005
Water cooler seal

71-00 POWER PLANT

3. Maintenance practices

71-00: 3.1. Engine baffle foam seals

71-00: 3.1.1. Removal

Reference: Figure 71-002 through Figure 71-005

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings.	- Silicone remover (Non-aggressive and solvent-based), - box cutter	(see 71-10)
2	Tear seal away by hand. Use box cutter if necessary, being careful not to damage the component the seal bonded to.		
3	Apply some silicone remover to any residual silicone that is difficult to remove.		

71-00: 3.1.2. Installation

Reference: Figure 71-002 through Figure 71-005

Step	Action	Required parts, materials and tools	Reference
1	Clean the surface with pure acetone and wait for the surface to dry.	- Silicone (neutral, permanently elastic, one-component, permanent exposure 250°C, temporary exposure 300°C), - Primer (3m 4297), - Acetone (pure)	(see 71-10)
2	Apply primer.		
3	Remove protective foil from back of foam.		
4	Apply foam.		
5	Seal gap between foam and component using silicone.		
6	Install engine cowlings.		

71-10 COWLINGS

1. Description

The Virus SW 121 comes equipped with two tight-fitting, all-composite engine cowlings that protect the engine and ensure superb engine cooling. They're attached to the fuselage and to each other by quick-release cowling fasteners that allow the user to install and remove them easily.

2. Maintenance Practices

71-10: 2.1. Cowlings

71-10: 2.1.1. Removal

NOTE: Installing and removing the engine cowlings, although it can be done by one person alone, is much easier to carry out with the help of someone else. This will also decrease the chances of any components getting scratched or damaged.

Reference: IPC 121-71-00-000, IPC 121-21-00-000, IPC 121-33-00-000

Step	Action	Required parts, materials and tools	Reference
1	Open the oil check door and disconnect the cold air ventilation line from the upper cowling's NACA inlet.	- Flathead screwdriver, - T-handle hex-head screwdriver set	
2	Unscrew all of the upper cowling's quick-release fasteners.		
3	Remove the upper cowling and, while doing so, make sure it's front end doesn't rub up against the spinner.		
4	Locate the landing light cable and disconnect it.		
5	Remove all of the bottom cowling's M4 screw EXCEPT for the last one at the top on each side.		
6	Remove all of the bottom M4 screws.		
7	Remove the last two quick-release fasteners while simultaneously supporting the bottom cowling.		
8	Slowly slide the bottom cowling down and out from under the engine, while making sure it doesn't rub up against the spinner, exhaust tailpipes and/or the nose wheel strut guard.		

71-10 COWLINGS

71-10: 2.1.2. Installation

Reference: IPC 121-71-00-000, IPC 121-21-00-000, IPC 121-33-00-000

Step	Action	Required parts, materials and tools	Reference
1	Slowly slide the bottom cowling over the exhaust tailpipes and up against the fuselage, while making sure it doesn't rub up against the spinner.	- Flathead screwdriver, - T-handle hex-head screwdriver set	
2	Fasten it to the fuselage using M4 screws.		
3	Locate and connect the landing light cable.		
4	Secure the upper cowling to the lower cowling and the fuselage using quick-release fasteners.		
5	Open the oil check door and connect the cold air ventilation line to the upper cowling's NACA inlet.		

71-20 MOUNTS

1. Description

The Virus SW 121's engine is attached to the airframe by several tubular steel weldments, one of which incorporates four conventional elastomeric isolators for vibration damping. The engine mount is bolted to the composite firewall in five locations. The firewall attachment points are structurally reinforced with gusset-type attachments that transfer thrust and bending loads into the fuselage shell.

2. Maintenance Practices

71-20: 2.1. Engine mount/Mounting fixture/Lower engine block mount

71-20: 2.1.1. Inspection/check

Reference: IPC 121-71-20-030, IPC 121-71-20-050, IPC 121-71-20-090

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings.	- Torque wrench	(see 71-10)
2	Inspect entire mount for any signs of wear, such as cracks and/or deformation. Particular attention needs to be paid to the mount's joints, where two tubes meet and are welded together.		
3	Inspect fastening material paint marker. Check if any bolts have loosened. Verify torque using torque wrench.		(see 20-30)
4	Install engine cowlings.		(see 71-10)

71-20: 2.2. Vibration damping isolators

71-20: 2.2.1. Inspection/check

Reference: IPC 121-71-20-033, IPC 121-71-20-030

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings.		(see 71-10)
2	Inspect isolators for any signs of wear, such as cracks, deformation, tears, etc. Replace if necessary.		
3	Install engine cowlings.		(see 71-10)

71-50
ELECTRICAL
HARNESSES

71-50 ELECTRICAL HARNESSES

1. Description

The Virus SW 121's power plant has two main electrical harnesses. Please refer to chapter 92 for the wiring diagrams pertaining to them.

71-60 INDUCTION AIR INTAKES

1. Description

Each of the engines carburetors is equipped with an air intake filter that ensures the induction air is free of any foreign particles/debris. The induction air is pulled directly from behind the water cooler, eliminating the need for any carb heat.

2. Maintenance Practices

71-60: 2.1. Induction air filter

71-60: 2.1.1. Removal

Reference: IPC 121-71-00-050

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings.	Flathead screwdriver	(see 71-10)
2	Loosen the hose clamp holding the air filter in place.		
3	Remove air filter.		
4	Cover carburetor intake with plastic cap.		

71-60: 2.1.2. Installation

Reference: IPC 121-71-00-050

Step	Action	Required parts, materials and tools	Reference
1	Remove plastic cap from carburetor intake.	Flathead screwdriver	
2	Slide air filter onto the carburetor intake's flange.		
3	Fasten in place by tightening hose clamp.		
4	Install engine cowlings.		(see 71-10)

71-60: 2.1.3. Inspection/Cleaning

Reference: Rotax 912 maintenance manual, chapter 2.1 in 12-20-00

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings.	- Flathead screwdriver, - K&N air filter cleaner, - K&N air filter oil, - water	(see 71-10)
2	Follow steps in the referenced manual.		
3	Install engine cowlings.		(see 71-10)

71-70 ENGINE DRAINS

71-70 ENGINE DRAINS

1. Description

The Virus SW 121's engine comes with a drip collector for each carburetor and an oil reservoir breather. The following chapter describes the maintenance practices that pertain to the aforementioned components.

2. Maintenance Practices

71-70: 2.1. Carburetor drip collector line

71-70: 2.1.1. Removal

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings.	Cutting nippers	(see 71-10)
2	Cut all of the plastic ties holding the tube in place.		
3	Remove the tube.		
4	If replacing, measure the length of the tube as a reference for the new tube.		

71-70: 2.1.2. Installation

Step	Action	Required parts, materials and tools	Reference
1	Fit the tube to the drip collector's hose fitting.	- Cable tie gun, - pliers, - cutting nippers	(see 71-10)
2	Run it down to the firewall's bottom edge.		
3	Fasten in place using cable ties.		
4	Cut away excess cable tie ends.		
5	Install engine cowlings.		

71-70: 2.1.3. Inspection/check

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings.		(see 71-10)
2	Check tube for any signs of damage and/or wear.		
3	Check tube for any kinks.		
4	Check that the tube is still firmly fastened in place by plastic ties.		
5	Make sure the tube's opening is not blocked by anything.		
6	Install engine cowlings.		

71-70: 2.2. Oil reservoir breather line

71-70: 2.2.1. Removal

Reference: IPC 121-79-00-000

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings.	Cutting nippers	(see 71-10)
2	Cut all of the plastic ties holding the tube in place.		
3	Remove the tube.		
4	If replacing, measure the length of the tube as a reference for the new tube.		

71-70: 2.2.2. Installation

Reference: IPC 121-79-00-000

Step	Action	Required parts, materials and tools	Reference
1	Fit the tube the oil reservoir's breather fitting.	- Cable tie gun, - pliers, - cutting nippers	(see 71-10)
2	Run it down to the firewall's bottom edge.		
3	Fasten in place using cable ties.		
4	Cut away excess cable tie ends.		
5	Install engine cowlings.		

71-70: 2.2.3. Inspection/check

Reference: IPC 121-79-00-000

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings.		(see 71-10)
2	Check tube for any signs of damage and/or wear.		
3	Check tube for any kinks.		
4	Check that the tube is still firmly fastened in place by plastic ties.		
5	Make sure the tube's opening is not blocked by anything.		
6	Install engine cowlings.		(see 71-10)

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CHAPTER 72 – ENGINE**TABLE OF CONTENTS**

SECTION	SUBJECT	PAGE NUMBER
72-00	ENGINE	72-03

72-00 ENGINE

The Rotax 912 S3 engine is installed on the Virus SW 121 (see Figure 72-001). For information pertaining to this chapter such as maintenance practices, limits, and procedures for teardown, cleaning, inspection, assembly, testing, etc., refer to the manufacturer's approved Instructions For Continued Airworthiness (Rotax 912 Series Installation manual and Line Maintenance Manual). The engine's technical specifications can be found in Table 72-001.

Specification	Metric Value	Imperial Value
Bore	84 mm	3.31 in
Stroke	61 mm	2.40 in
Displacement	1352 cm ³	82.5 cu.in
Compression ratio	10.8:1	
Gear ratio (crankshaft:propeller shaft)	2.4286:1	
Overall length	590 mm	23.23 in
Overall height	375 mm	14.76 in
Overall width	576 mm	22.68 in
Dry weight	61 kg	134 lbs.
Max. continuous performance at sea level pressure altitude	69 kW @ 5500 rpm	-
Take-off performance rpm (max. 5 min) at sea level pressure altitude	73.5 @ 5800 rpm	-

Table 72-001
Rotax 912 S3 engine specifications

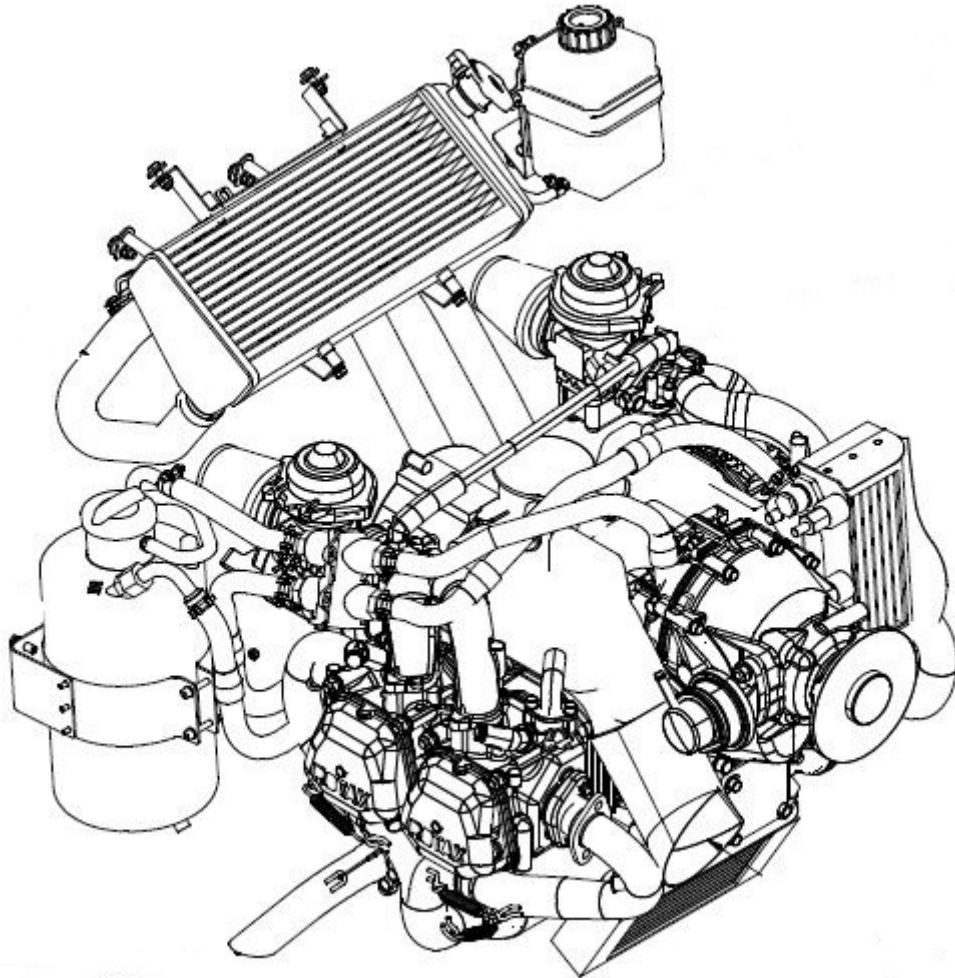


Figure 72-001
Rotax 912 S3 engine

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CHAPTER 73 – ENGINE FUEL**TABLE OF CONTENTS**

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73-00 GENERAL

This chapter describes the fuel system components integrated into the Rotax 912 series engine. It also covers those components on the Virus SW 121 that measure fuel and air flow needed for proper engine operation. Refer to chapter 28-00 for more data on the airplane fuel system.

73-10 DISTRIBUTION

73-10 DISTRIBUTION

1. Description

Figure 73-001 shows a diagram of the Rotax 912 fuel system. Gravity-fed fuel runs through the mechanical fuel pump to the top of the engine where a distributor is located. This is where the fuel is distributed to the carburetors. It's also where the fuel pressure is measured. Any excess fuel is returned to the collector tanks.

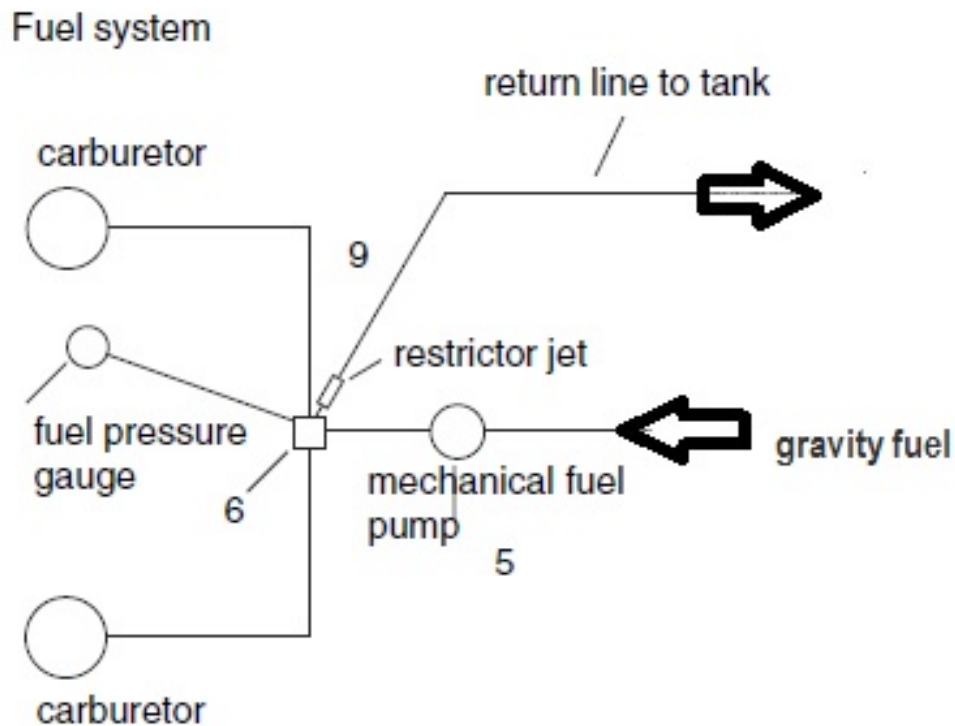


Figure 73-001
Rotax 912 fuel system (courtesy of Rotax)

Induction air enters the engine compartment through the water cooler and is sucked through the air filters into the carburetors, after which, the manifold pressure is measured.

73-30 INDICATING

1. Description

The feed and return fuel lines both have a fuel flow sensor installed that provide the pilot with a very accurate fuel consumption reading. See chapter 28 for more information about the fuel system. The manifold pressure is measured using a Kavlico type sensor that is fastened to the engine mount. The fuel pressure is also measured by a Kavlico type sensor, which is screwed into the fuel distributor.

2. Maintenance practices

73-30: 2.1. Fuel flow sensor

73-30: 2.1.1. Removal

Reference: IPC 121-28-20-000, IPC 121-28-20-100, IPC 121-27-32-001

Step	Action	Required parts, materials and tools	Reference
1	Drain the fuel system.	- Flathead screwdriver, - 3 mm T-handle hex-head screwdriver, - 2.5 mm Allen key, - cutting nippers, - side jaw ear clamp pin-cers	(see 12-20)
2	Access the fuel flow sensor by temporarily detaching the control stick drive's mounting bracket (1125027X?).		
3	Disconnect the fuel flow sensors cable.		
4	Loosen/Remove the hose clamp holding both of the fuel lines fore of the selector to the surface of the fuselage.		
5	Detach the sensor from the fuselage's surface by separating the two strips of Velcro .		
6	Remove the M4 bolts securing the firewall pass-through fuel fitting to the firewall.		
7	Pull the firewall pass-through fuel fitting away from the firewall a little and disconnect the fuel line from the back of it by cutting/removing the ear hose clamp.		
8	Disconnect the fuel line from the side of the sensor closest to the control stick opening in the cabin floor.		
9	Remove the sensor, along with the fuel line still attached to it, out from underneath the cabin floor.		
10	Disconnect the fuel line by loosening the hose clamp.		

73-30 INDICATING

73-30: 2.1.2. Installation

Reference: IPC 121-28-20-000, IPC 121-28-20-100, IPC 121-27-32-001

Step	Action	Required parts, materials and tools	Reference
1	Connect the fuel line that runs between the fuel flow sensor and the firewall pass-through fuel fitting to the sensor. CAUTION: When reinstalling the fuel flow sensor be sure to position it properly. An arrow on the side of it's housing shows the flow direction.	- Flathead screwdriver, - 3 mm T-handle hex-head screwdriver, - 2.5 mm Allen key, - liquid paint marker, - side jaw ear clamp pincers	
2	Fasten the fuel flow sensor to the fuselage's surface using Velcro strips.		
3	Connect the fuel line to the firewall pass-through fuel fitting using a new ear hose clamp.		
4	Apply paint marker to the hose clamp.		
5	Fasten the firewall pass-through fuel fitting to the firewall.		
6	Apply paint marker to the two M4 bolts.		
7	Connect the other fuel line to the fuel sensor.		
8	Apply paint marker to the hose clamp.		
9	Connect the fuel flow sensor's cable.		
10	Replenish the fuel system and carry out visual inspection.		

73-30: 2.2. Fuel pressure sensor

73-30: 2.2.1. Removal

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings.	- Metric wrench set	(see 71-10)
2	Locate the fuel pressure sensor.		
3	Remove the fuel pressure sensor by unscrewing it.		
4	Disconnect it from its instrument/connector.		
5	Install engine cowlings.		(see 71-10)
6	Carry out visual inspection of sensor.		(see 05-20)

73-30: 2.2.2. Installation

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings.	- Metric wrench set, - Loctite 577	(see 71-10)
2	Apply Loctite 577 to sensor thread.		
3	Install sensor into fuel distributor and tighten.		
4	Connect it to its instrument/connector.		
5	Install engine cowlings.		(see 71-10)
6	Carry out functional inspection of fuel pressure sensor.		(see 05-20)

73-30: 2.3. Manifold pressure sensor

73-30: 2.3.1. Removal

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings.	- Metric wrench set	(see 71-10)
2	Locate the manifold pressure sensor.		
3	Remove the fuel pressure sensor by unscrewing it from barbed fitting.		
4	Disconnect it from its instrument/connector.		
5	Install engine cowlings .		(see 71-10)
6	Carry out visual inspection of sensor.		(see 05-20)

73-30: 2.3.2. Installation

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings.	- Metric wrench set, - Loctite 577	(see 71-10)
2	Apply Loctite 577 to sensor thread.		
3	Install sensor into barbed fitting and tighten.		
4	Connect it to its instrument/connector.		
5	Install engine cowlings.		(see 71-10)
6	Carry out functional inspection of sensor.		(see 05-20)

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CHAPTER 74 – IGNITION**TABLE OF CONTENTS**

SECTION	SUBJECT	PAGE NUMBER
74-00	IGNITION General Description Maintenance Practices	74-03

74-00 GENERAL

1. Description

This chapter describes the components that provide the spark needed to ignite the fuel-air mixture in the engine cylinders.

The Virus SW 121 has a dual, self-powered electronic ignition system that is connected to two spark plugs in each cylinder. The system is denominated as Magnetos, as it mimics the typical functionality of mechanical magnetos. Both magnetos are used during normal aircraft operation as this results in a more complete burning of the fuel-air mixture.

A rotary-type key switch, located on the main switch panel, controls ignition and starter operation. The switch is labeled OFF-R-L- BOTH-START. In the OFF position, the starter is electrically isolated, the ignition systems ("magnetos") are grounded and will not operate. Normally, the engine is operated on both magnetos (switch in BOTH position) except for magneto checks and emergency operations. The R and L positions are used for individual magneto checks and for single magneto operation when required. When the master switch ON, rotating the switch to the spring loaded START position energizes the starter and activates both magnetos. The switch automatically returns to the BOTH position when released.

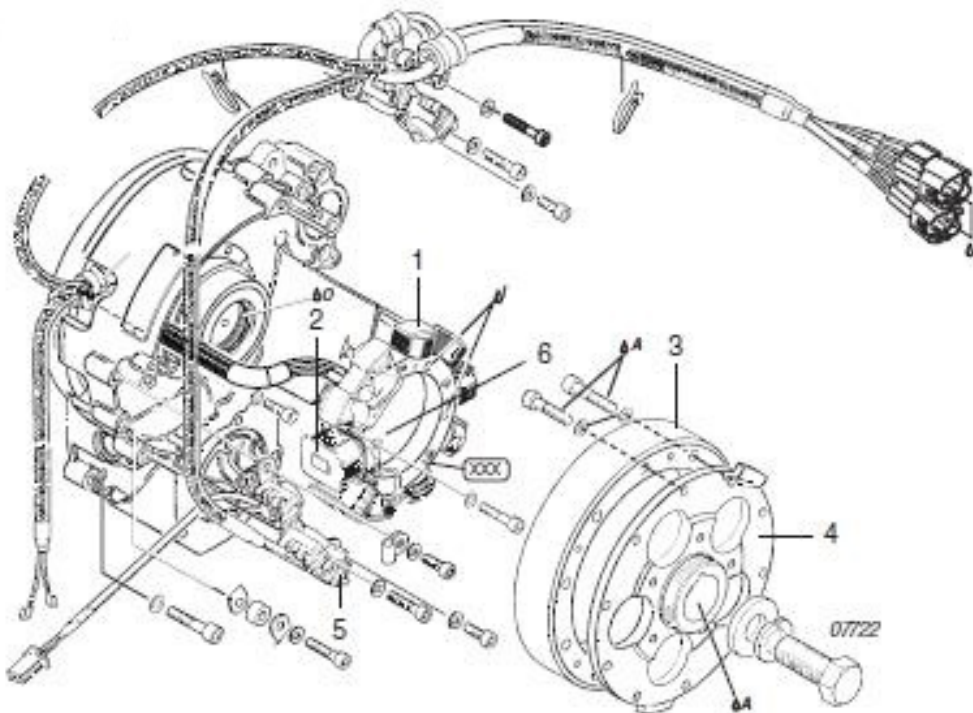


Figure 74-001
Ignition system

2. Maintenance practices

For additional maintenance practices information about the engines ignition system please refer to the latest revision of ROTAX's maintenance manual.

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CHAPTER 75 – ENGINE COOLING**TABLE OF CONTENTS**

SECTION	SUBJECT	PAGE NUMBER
75-00	ENGINE COOLING General	75-03
75-10	AIR COOLING Description Maintenance Practices	75-04
75-20	LIQUID COOLING Description Maintenance Practices	75-05

75-00 GENERAL

This chapter describes the engine cooling system incorporated into the Virus SW 121 and the maintenance practices that pertain to it.

75-10
AIR COOLING**75-10 AIR COOLING****1. Description**

The Virus SW 121's engine is equipped with a carbon-composite diffuser and inlet that direct all cooling air over the engine cylinders (see Figure 75-001). The diffuser's inlet is coupled with a hole in the engine cowlings on the starboard side.

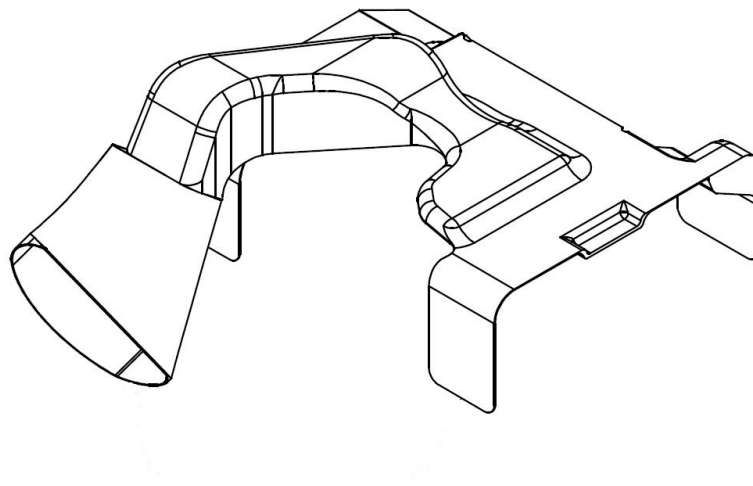


Figure 75-001
Engine cooling air diffuser

2. Maintenance Practices

The carbon-composite diffuser doesn't require any maintenance and/or servicing. Refer to chapter 71-00 for more information about the maintenance practices that pertain to the foam seal that rests between the diffuser and the engine cowlings.

75-20 LIQUID COOLING

1. Description

The Virus SW 121's engine is both air and liquid cooled. The liquid cooling system consists of a cooler that receives ram air, an engine-driven mechanical pump and an overflow bottle (see Figure 75-002). For more information about approved operating fluids, including the engine coolant, please refer to the latest revision of ROTAX Service Instruction No. SI-912-016 Selection of Suitable Operating Fluids for Rotax® Engine Type 912 I, 912 and 914 Series.

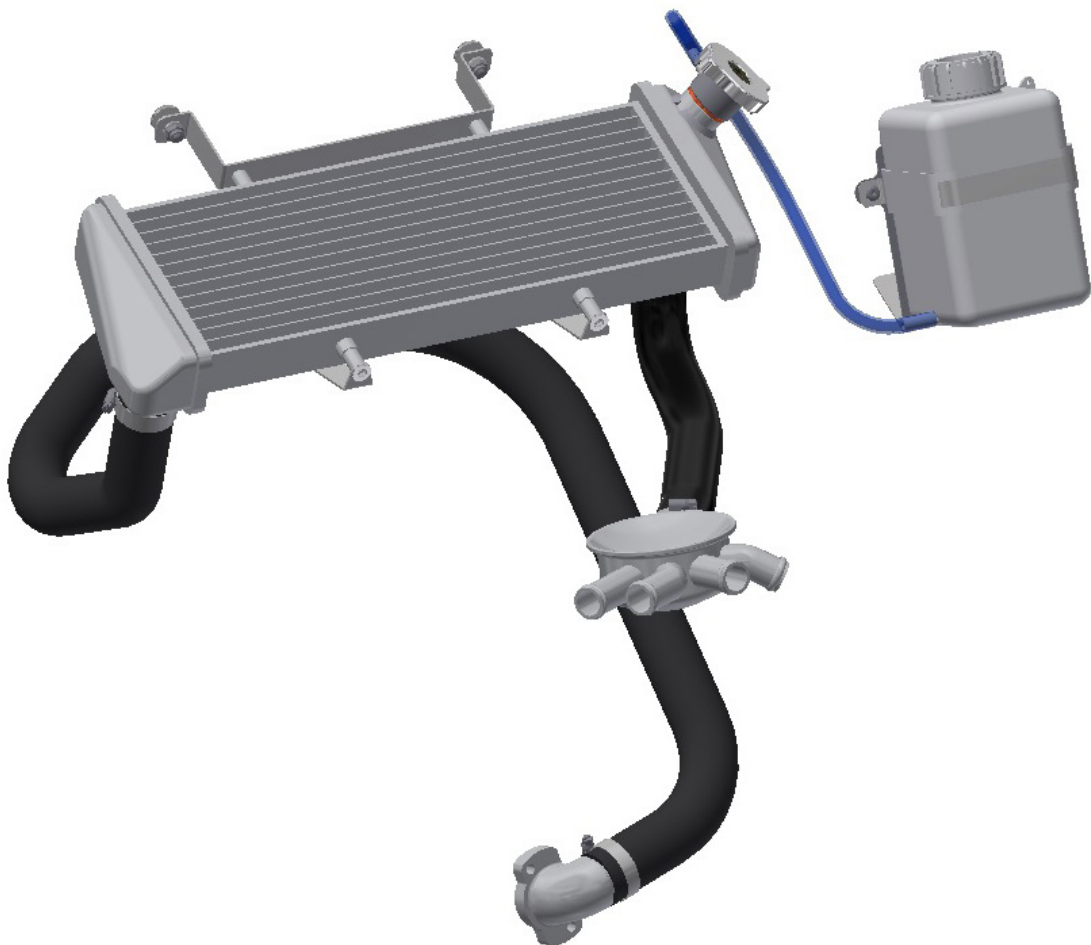


Figure 75-002
Engine liquid cooling system

75-20
LIQUID COOLING

2. Maintenance Practices

For information about how to replenish the liquid cooling system please refer to chapter 12-00.

For additional maintenance practices information about the engines liquid cooling system please refer to the latest revision of ROTAX's maintenance manual.

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CHAPTER 76 – ENGINE CONTROLS**TABLE OF CONTENTS**

SECTION	SUBJECT	PAGE NUMBER
76-00	ENGINE CONTROLS General Description Maintenance Practices	76-03

76-00 GENERAL

1. Description

This chapter describes the Virus SW 121's engine control assembly, the system that the pilot uses to operate the engine. Incorporating a standard control quadrant design, the engine control system consists of a single-lever power (throttle) control, a propeller control lever and a choke lever. The throttle lever controls the throttle valve in the carburetor, by two separate Bowden type cables working synchronously. The propeller governor Bowden type control cable is connected to the propeller governor control lever. The choke lever actuates the choke shaft of both carburetors synchronously, which provides assistance with cold starts. All three levers are easily accessible to both pilots, as their housing is fastened to the cabin floor between the two crew seats (see Figure 76-001). All three Bowden cables run from the control quadrant under the cabin floor, up through the instrument panel, through firewall grommets and to the carburetor control levers.



Figure 76-001
Engine control quadrant

76-00 GENERAL

2. Maintenance practices

76-00: 2.1. Engine control cables

CAUTION: The joints where the engine control cables are attached to their respective control levers in the engine compartment must be lubricated on a regular basis (see 12-20).

76-00: 2.1.1. Inspection/check

Reference: IPC 121-49-60-000, IPC 121-49-00-000

Step	Action	Required parts, materials and tools	Reference
1	Remove the engine cowlings.	- Phillips screwdriver, - T-handle hex head screwdriver set	(see 71-10)
2	Carry out visual inspection of the engine control cables.		(see 05-20)
3	Clean joints between control cables and levers.		
4	Lubricate joints between control cables and levers.		(see 12-20)
5	Carry out operational inspection of the engine control cables.		(see 05-20)
6	Remove control stick boots.		(see 25-10)
7	Carry out visual inspection of the engine control cables under the cabin floor.		(see 05-20)
8	Remove instrument panel cover.		(see 31-10)
9	Carry out visual inspection of the engine control cables behind the instrument panel.		(see 05-20)

CAUTION: The engine control cables must be kept in good working condition. Any wear or damaged incurred could lead to loss of engine control and consequently a safety hazard. Attend to and amend any issues immediately after noticing them.

76-00: 2.2. Engine control levers

76-00: 2.2.1. Inspection/check

Reference: IPC 121-49-60-000

Step	Action	Required parts, materials and tools	Reference
1	Carry out visual inspection of the engine control cables.		(see 05-20)
2	Carry out operational inspection of the engine control cables.		

76-00: 2.2.2. Movement adjustment

Reference: IPC 121-49-60-000

Step	Action	Required parts, materials and tools	Reference
1	Remove the decorative nut cap.	- Flathead screwdriver - metric wrench set	
2	Tighten or loosen friction adjustment nut depending on whether the levers movement is too slack or too stiff.		

CAUTION: The engine control cables are attached to spring-loaded levers at the carburetors. If any of the control quadrant levers shift towards the full-forward position by themselves this means the friction adjustment nut needs to be adjusted for stiffer movement.

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CHAPTER 77 – ENGINE INDICATING**TABLE OF CONTENTS**

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77-00	ENGINE INDICATING General	77-03
77-10	POWER Description Maintenance Practices	77-04
77-20	TEMPERATURE Description Maintenance Practices	77-06

77-00 GENERAL

This chapter describes the various sensors installed on the Virus SW 121 that provide the pilot with engine power and temperature information. All of the data supplied by these sensors is displayed on the PFD/MFD.

77-10
POWER**77-10 POWER****1. Description**

RPM on the Virus SW 121's engine is measured via ignition system pulses. There is no remote tachometer. The PFD presents manifold pressure and RPM the upper left area of the display in horizontal tape format and beside it as text.

The manifold pressure reading is taken from the compensating tube assembly between the two intake manifolds and measured by a sensor installed on the engine mount (see Figure 77-001).



Figure 77-001
Manifold pressure sensor installation

2. Maintenance Practices

CAUTION: When removing any sensors in the engine compartment be sure insulate/plug any and all openings in order prevent the ingress of dirt or debris.

77-10: 2.1. Manifold pressure sensor

77-10: 2.1.1. Removal

Reference: Figure 77-001, IPC 121-77-00-001

Step	Action	Required parts, materials and tools	Reference
1	Remove the engine cowlings.	- T-handle ball head screwdriver set, - cutting nippers, metric wrench set, - pin extraction tools (M81969/17-03 and M81969/17-04)	(see 71-10)
2	Locate the starboard firewall connector.		
3	Extract the manifold pressure sensor pins.		
4	Cut/remove all the zip ties securing the sensor's cable in place.		
5	Locate the barbed fitting the sensor is fastened to.		
6	Remove the hose clamp securing it.		
7	Unscrew/remove the sensor.		
8	Carry out visual inspection of the sensor.		(see 05-20)

77-10: 2.1.2. Installation

Reference: Figure 77-001, IPC 121-77-00-001

Step	Action	Required parts, materials and tools	Reference	
1	Apply Loctite 577 to the sensors thread.	- T-handle ball head screwdriver set, - metric wrench set, - Loctite 577, - pin insertion tools (M81969/19-01 and M81969/19-01)	(see 20-40)	
2	Install the sensor in the barbed fitting.			
3	Fasten the barbed fitting in place.			
4	Torque mark the hose clamps bolt.			
5	Run the sensors cable to the starboard firewall connector.			
6	Fasten it in place using zip ties.			
7	Insert the sensors pins.			
8	Carry out operational inspection of the sensor.		(see 05-20)	
9	Install engine cowlings.		(see 71-10)	

77-20 TEMPERATURE

77-20 TEMPERATURE

1. Description

Four exhaust gas temperature (EGT) sensors are installed on the Virus SW 121, one for each cylinder. They are fastened to a port in the exhaust headers, just downstream from where the gases exit the cylinders (see Figure 77-002).

Two coolant temperature (CT) sensors are installed on the Virus SW 121, one for cylinder #2 and one for cylinder #3 (see Figure 77-003). The former is designated as CT1 in the PFD/MFD and the latter as CT2. These sensors provide the pilot with temperature data of the coolant running through the cylinder heads during operation.

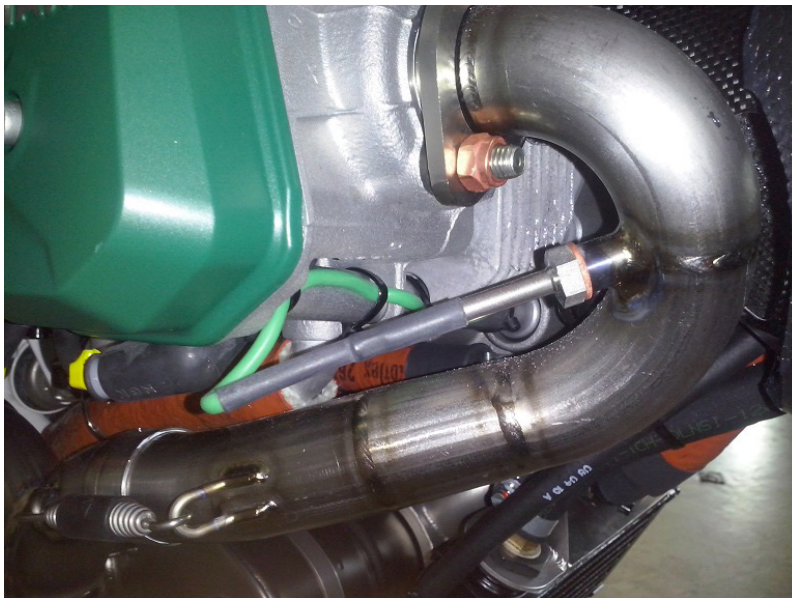


Figure 77-002
EGT sensor installation

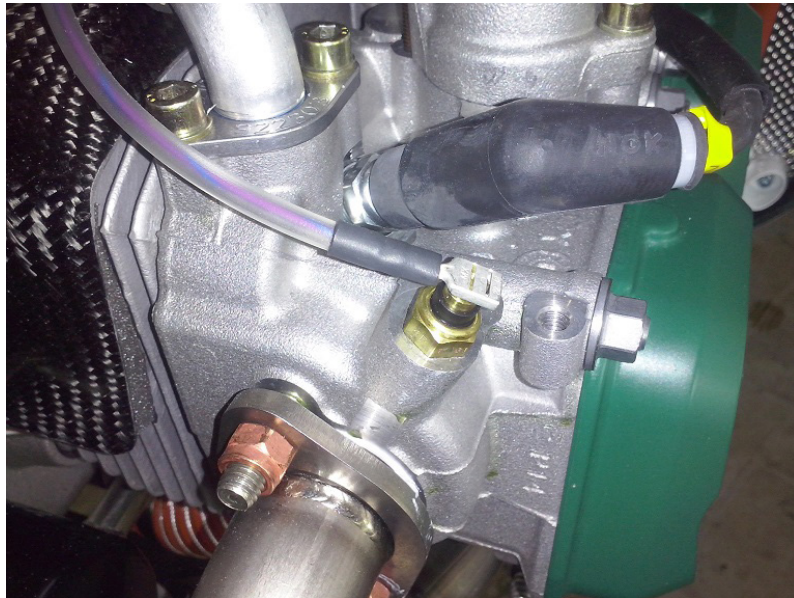


Figure 77-003
CT sensor installation

2. Maintenance Practices

CAUTION: When removing any sensors in the engine compartment be sure insulate/plug any and all openings in order prevent the ingress of dirt or debris

77-20: 2.1. EGT sensor

77-20: 2.1.1. Removal

Reference: Figure 77-002

Step	Action	Required parts, materials and tools	Reference
1	Remove the engine cowlings.	- cutting nippers, - metric wrench set, - pin extraction tools (M81969/17-03 and M81969/17-04)	(see 71-10)
2	Locate the starboard firewall connector.		
3	Extract the EGT sensor pins.		
4	Cut/remove all the zip ties securing the sensor's cable in place.		
5	Locate the EGT sensor.		
6	Unscrew/remove the sensor.		
7	Carry out visual inspection of the EGT sensor.		(see 05-20)

77-20
TEMPERATURE

PIPISTREL

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CHAPTER 78 – EXHAUST**TABLE OF CONTENTS**

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78-00	EXHAUST General	78-03
78-10	COLLECTOR Description Maintenance Practices	78-06
78-20	NOISE SUPPRESSOR Description Maintenance Practices	78-08

78-00 GENERAL

Virus SW 121 is equipped with all-titanium, Akrapovič exhaust system that expels exhaust gases from the aircraft via two tail pipes that protrude out of the bottom surface of the lower engine cowling.

The system is a tuned design, meaning each of the four headers are the same size and the overall length sized to provide optimum scavenging which results in maximum horsepower and engine durability. All exhaust gas components are fabricated from titanium, making it very light weight, and stainless hardware is used in all areas subject to high heat. The engine exhaust system consists of exhaust headers, Y-pipe collectors, an exhaust muffler with optional built-in heat exchanger, dual tailpipes and associated joints/fasteners.

Each engine cylinder, on port and starboard side of the engine, is equipped with an exhaust header that leads down to a Y collector that joins the two. The exhaust gases then leave the Y-collector and enter the exhaust muffler, finally exiting the exhaust system via two tailpipes.

The two tailpipes are directed downwards at a 45° angle to the aircraft's roll axis, thus decreasing the chances of any CO₂ finding its way into the cabin. Joints are employed to allow movement due to heat expansion and normal operating loads at the pipes connections.

77-00
GENERAL

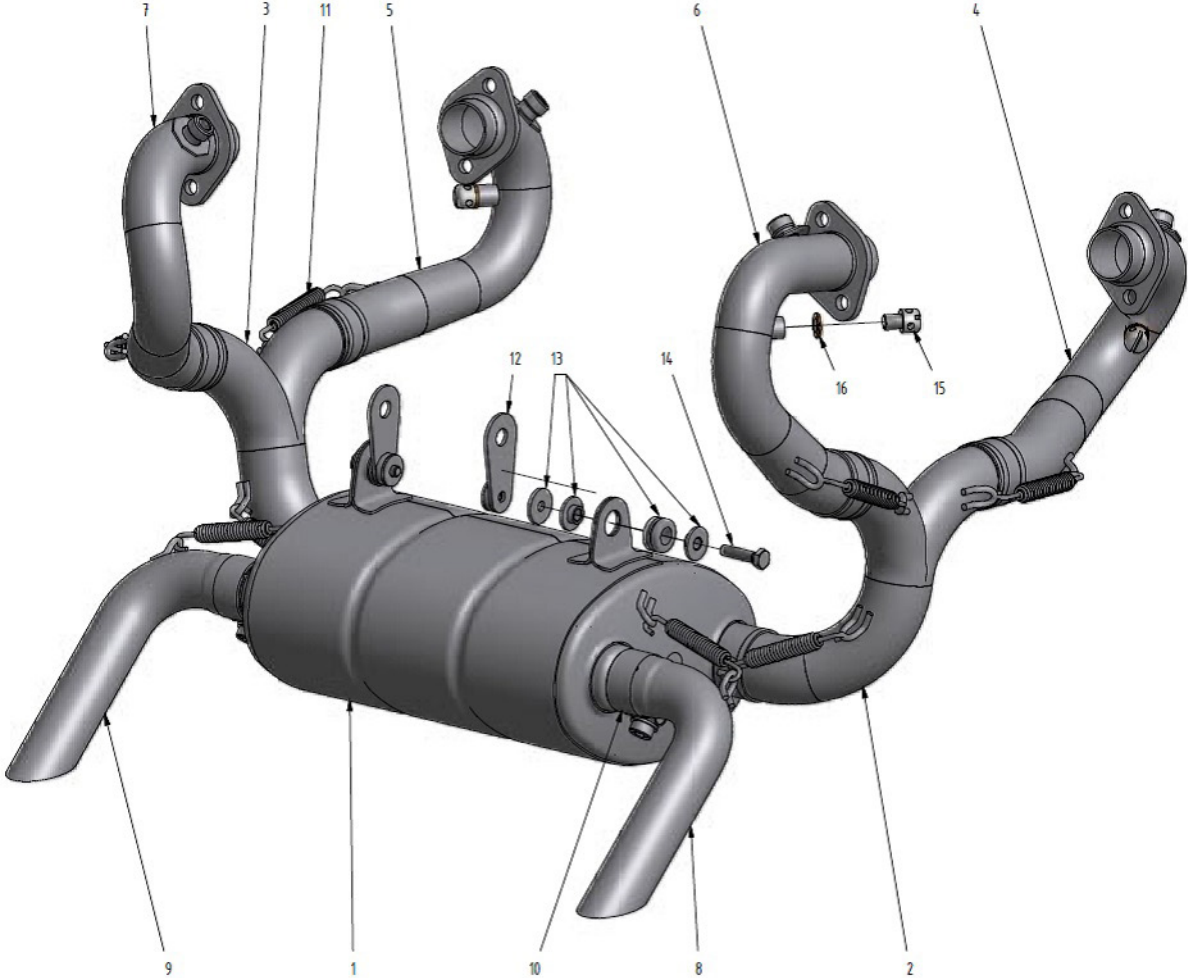


Figure 78-001
Titanium exhaust system

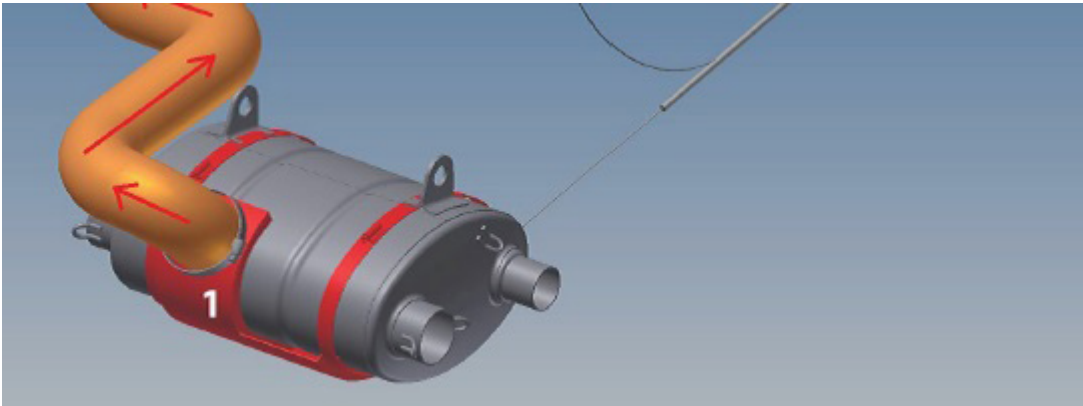


Figure 78-002
Optional heat exchanger

78-10 COLLECTOR

1. Description

This chapter describes the portion of the exhaust system which collects the exhaust gases from the cylinder and dumps them overboard. Exhaust headers and collector weldments combine to form the exhaust header assemblies.

Each of the four headers are connected to the engine by nuts screwed onto threaded studs. The two headers on each side of the engine are connected to a Y-pipe collector weldment through a slip joint and a spring to allow for contraction and expansion as well as engine movement. This Y-pipe collector combines the 2 header pipes on each side of the engine into one pipe (per side). A slip joint connects the Y-pipe collectors which takes the exhaust gas across to the LH and RH side of the engine and then aft to the exhaust muffler with or without built-in heat exchanger. Slip joints are employed to allow movement due to heat expansion and normal operating loads. See Figure 78-001 and Figure 78-002

2. Maintenance Practices

78-00: 2.1. Tailpipes

78-00: 2.1.1. Removal

Reference: Figure 78-001

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings.	-T-handle ball-ended hex screwdriver set, - cutting nippers	(see 71-10)
2	Cut/remove safety wire.		
3	Loosen the tailpipe clamp.		
4	Slide tailpipe out of muffler.		
5	Carry out visual inspection. Replace any components if deemed necessary.		(see 05-20)

78-00 COLLECTOR

78-00: 2.1.2. Installation

Reference: Figure 78-001

Step	Action	Required parts, materials and tools	Reference
1	Clean tailpipe mating surface with paper towel so that it's free of all grease/anti-seize residue and burrs.	<ul style="list-style-type: none"> - T-handle ball-ended hex screwdriver set, - ceramic anti-seize grease (Akrapovič), - copper anti-seize grease (Akrapovič), - exhaust spring puller, - paper towel 	(see 71-10)
2	Apply a thin layer of ceramic anti-size grease to the tailpipe's mating surface.		
3	Slide tailpipe into muffler's mating joint.		
4	Position tailpipe so that it makes a 45° (approx.) angle with the aircrafts horizontal axis.		
5	Apply copper anti-seize grease to the clamps bolt and tighten it.		
6	Positive lock the tailpipe using safety wire and swage sleeves.		
7	Install engine cowlings.		

NOTE: Reset the angle of the tailpipe if installing the engine cowlings proves to be difficult.

2.2. Headers and Y-collector

78-00: 2.2.1. Removal

Reference: Figure 78-001, IPC 121-71-00-050

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings.	<ul style="list-style-type: none"> - T-handle ball-ended hex screwdriver set, - metric wrench set, - Phillips screwdriver, - exhaust spring puller 	(see 71-10)
2	Remove upper two Y-collector springs.		(see 77-20)
3	Remove the EGT sensor from the fore exhaust header.		(see 77-20)
4	Remove the fore exhaust header nuts.		
5	Remove the fore exhaust header.		
6	Loosen carburetor clamp.		
7	Remove both hex head bolts holding the carburetor drip collector in place.		
8	Shift the carburetor assembly backwards so that the aft exhaust header can be accessed		
9	Remove the EGT sensor from the aft exhaust header.		(see 77-20)
10	Remove the aft exhaust header nuts.		
11	Remove the aft exhaust header.		
12	Remove lower two Y-collector springs.		
13	Remove Y-collector.		
14	Carry out visual inspection of all components. Replace any if deemed necessary.		(see 05-20)

78-00: 2.2.2. Installation

Reference: Figure 78-001, IPC 121-71-00-050

Step	Action	Required parts, materials and tools	Reference
1	Clean all mating surfaces with paper towel so that they're free of all grease/anti-seize residue and burrs.	- T-handle ball-ended hex screwdriver set, - ceramic anti-seize grease (Akrapovič), - copper anti-seize grease (Akrapovič), - paper towel	
2	Apply a thin layer of ceramic anti-size grease to all mating surfaces.		
3	Slide Y-collector into muffler's mating joint and fasten in place using exhaust springs.		
4	Install EGT sensor.		(see 77-20)
5	Slide aft header onto engine studs and Y-collector.		
6	Apply copper anti-seize grease to header nuts and install finger tight.		
7	Fasten aft header to Y-collector using exhaust spring.		
8	Reattach carburetor assembly to engine.		
9	Install EGT sensor.		(see 77-20)
10	Slide fore header onto engine studs and Y-collector.		
11	Apply copper anti-seize grease to header nuts and install finger tight.		
12	Fasten fore header to Y-collector using exhaust spring.		
13	Torque header nuts.		(see 20-30)
14	Install engine cowlings.		(see 71-10)

78-20 NOISE SUPPRESSOR

78-20 NOISE SUPPRESSOR

1. Description

The Virus SW 121's exhaust system incorporates a muffler that suppresses all/any noise the system generates and dumps all exhaust gases overboard. It's attached to the engine block by two brackets and attached to the exhaust collector/headers by a slip joint. The muffler also comes with a heat exchanger or "heat muff" that provides hot air for cabin heat purposes.

2. Maintenance Practices

78-20: 2.1. Muffler

78-20: 2.1.1. Removal

Reference: Figure 78-001

Step	Action	Required parts, materials and tools	Reference
1	Remove engine cowlings.	- T-handle ball-ended hex screwdriver set, - Flathead screwdriver	(see 71-10)
2	Disconnect scat ducting from heat muff.		(see 78-10)
3	Remove collectors/headers.		
4	Unscrew the two inbus bolts securing the muffler to its support brackets.		
5	Remove muffler.		

78-20: 2.1.2. Heat muff disassembly

Reference: Figure 78-001, IPC 121-21-00-000

Step	Action	Required parts, materials and tools	Reference
1	Loosen clamps and remove heat muff	- Phillips screwdriver	(see 05-00)
2	Carry out visual inspection.		

78-20: 2.1.3. Heat muff assembly

Reference: Figure 78-001, IPC 121-21-00-000

Step	Action	Required parts, materials and tools	Reference
1	Position heat muff on muffler and fasten it in place using clamps.	- Phillips screwdriver	(see 05-20)
2	Carry out visual inspection to make sure the muff is firmly fastened to the muffler.		

78-20: 2.1.4. Inspection/check

Reference: Figure 78-001

Step	Action	Required parts, materials and tools	Reference
1	Remove the muffler.		(see 78-20)
2	Disassemble the heat muff.		
3	Conduct visual inspection. Check all seams and welds for signs of wear or damage.		(see 05-20)
4	Shake the muffler and listen for a clinking noise. Any loose debris in the muffler indicates that the muffler has incurred internal damage.		

WARNING: Any serious exhaust system damage is a safety hazard and must be repaired immediately.

78-20: 2.1.5. Installation

Reference: Figure 78-001

Step	Action	Required parts, materials and tools	Reference
1	Clean all of the muffler's mating surfaces with paper towel so that it's free of all grease/anti-seize residue and burrs. Do the same for the two inbus bolts.	- T-handle ball-ended hex screwdriver set, - ceramic anti-seize grease (Akrapovič), - copper anti-seize grease (Akrapovič), - exhaust spring puller, - paper towel	(see 71-10)
2	Apply copper anti-seize grease to the muffler's fastening bolts and install to finger tight.		
3	Apply a thin layer of ceramic anti-size grease to the muffler's mating surfaces.		
4	Install collectors/headers.		(see 78-10)
5	Connect scat ducting to heat muff.		
6	Install engine cowlings.		(see 71-10)

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CHAPTER 91 – WIRING DIAGRAMS

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91-00 GENERAL

This chapter contains all of the wiring diagrams that apply to the Virus SW 121.

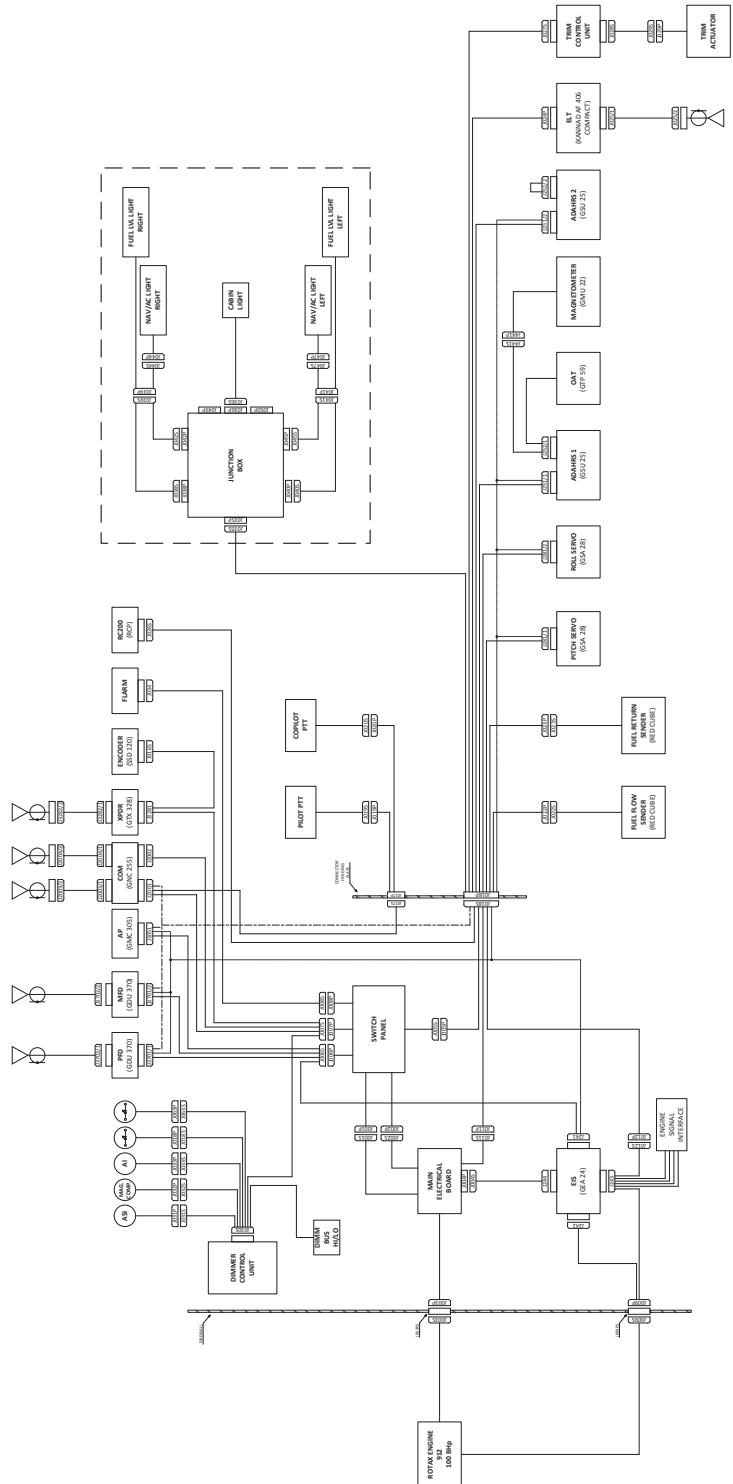


Figure 00-000 System installation

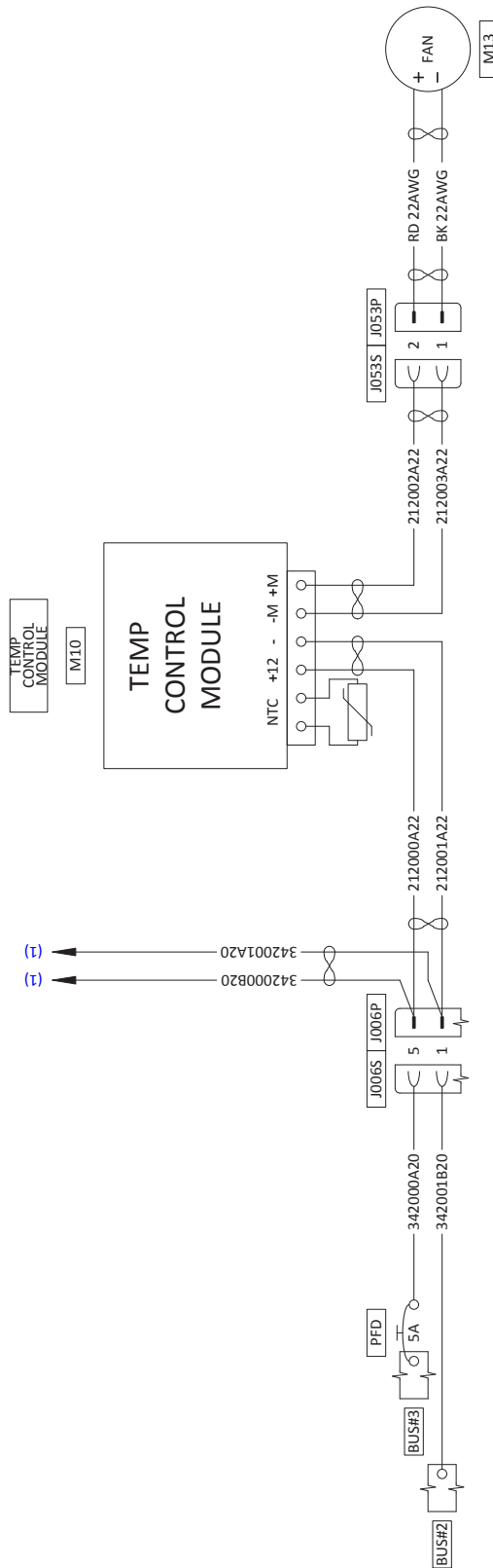


Figure 21-200
Avionics cooling

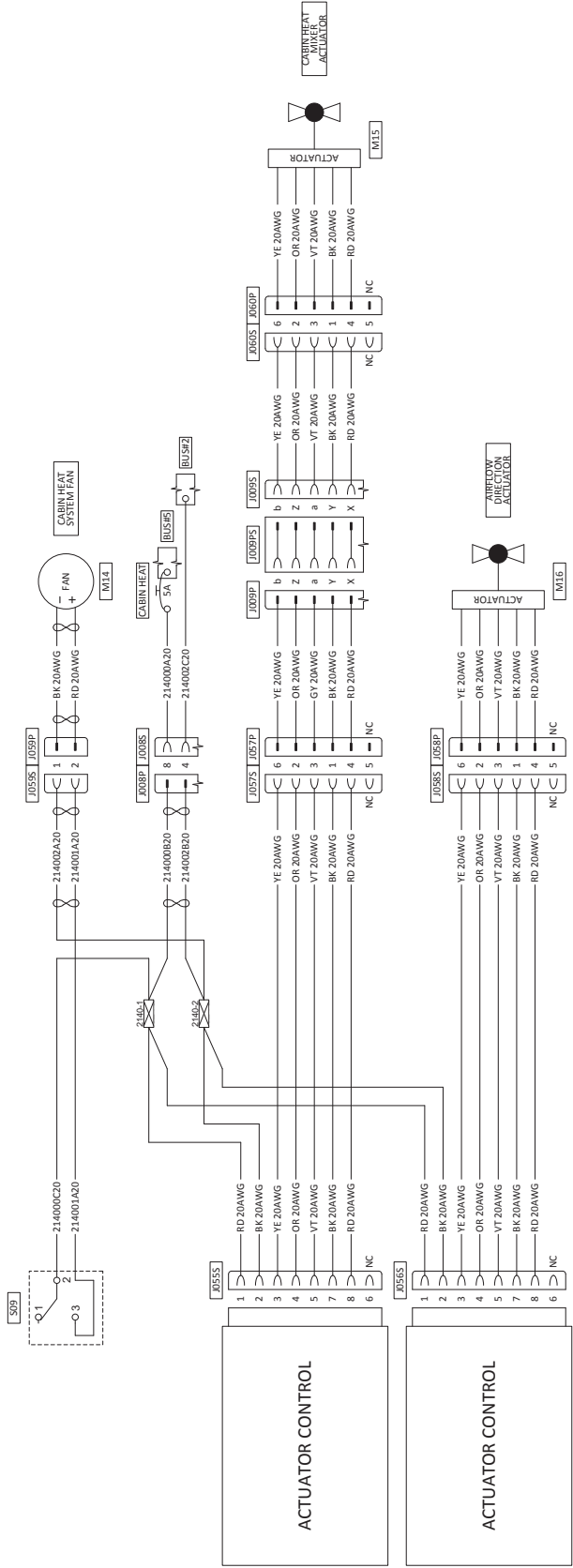


Figure 21-400 Cabin heat system panel

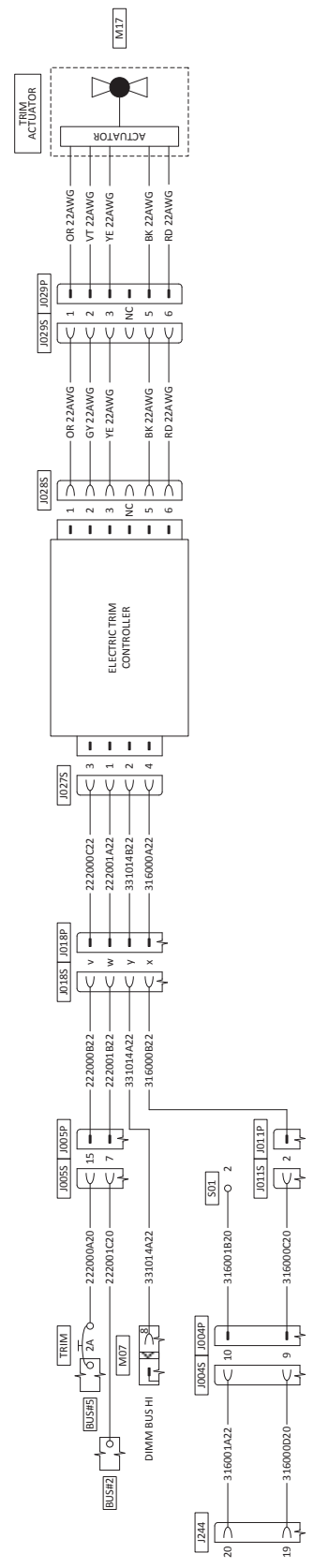
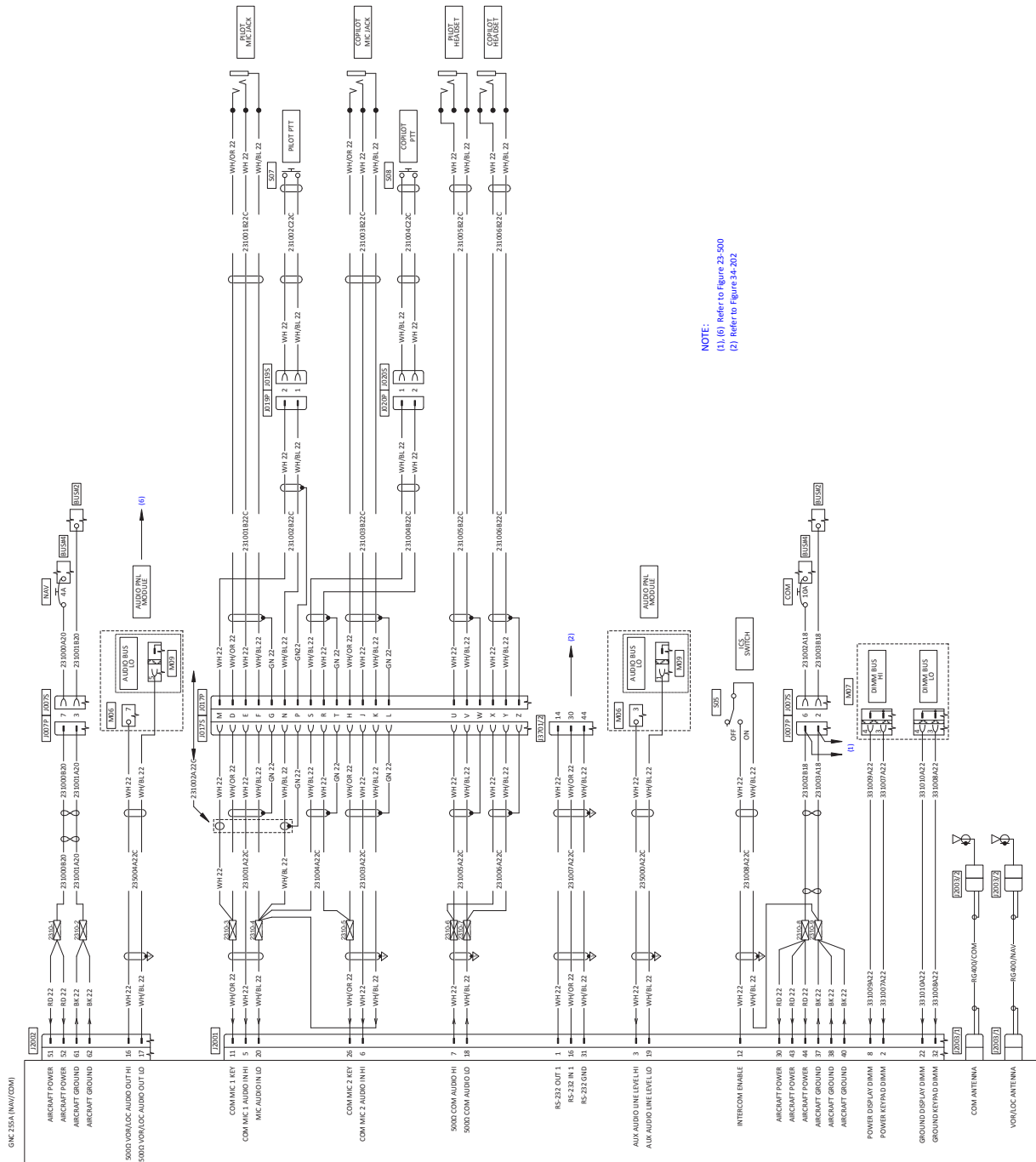


Figure 22-200 Electrical trim control actuator



NOTE:
 (1), (6) Refer to Figure 23-500
 (2) Refer to Figure 34-202

Figure 23-100
 COM wiring

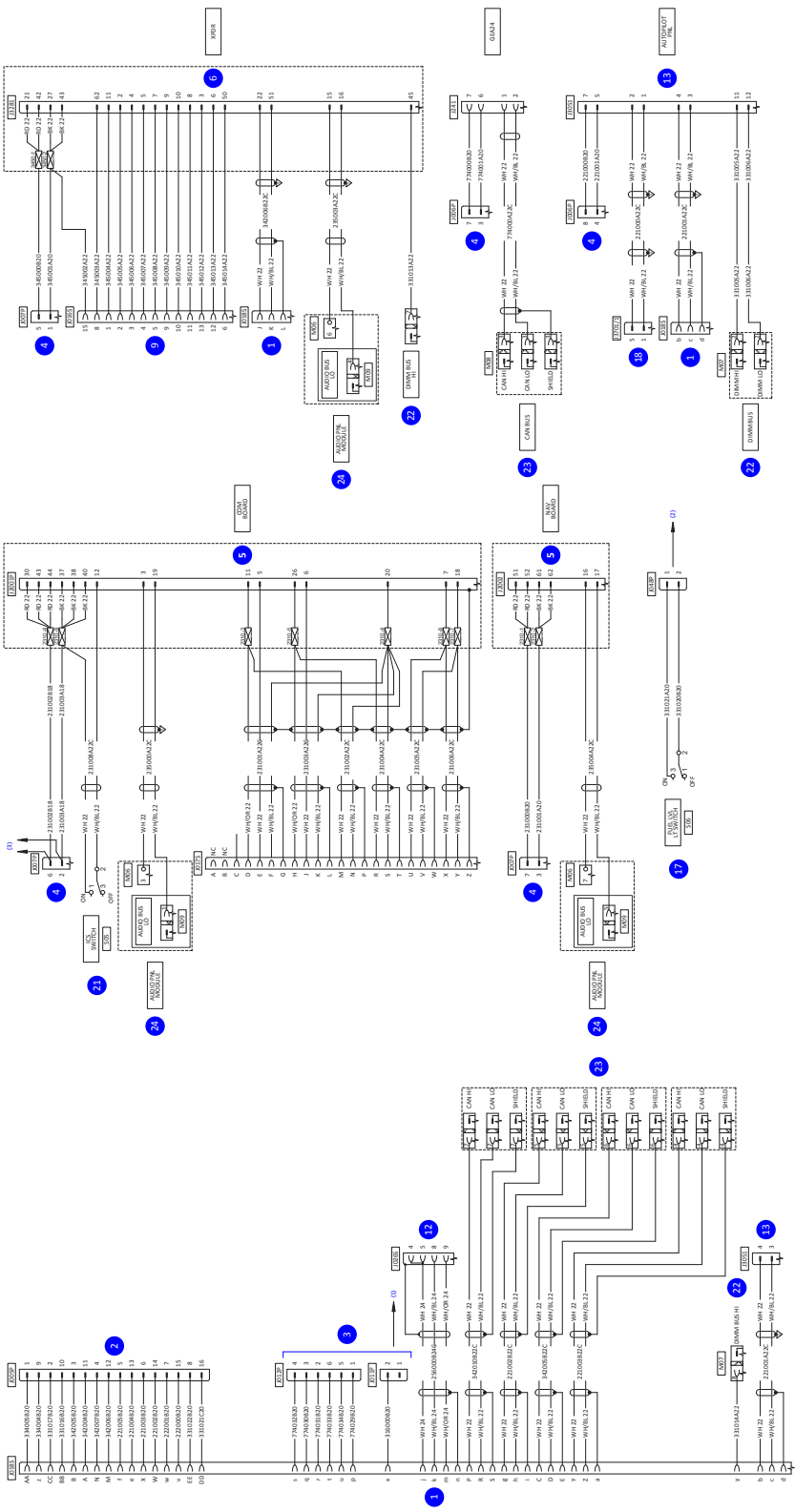


Figure 24-001 Cable tree 1

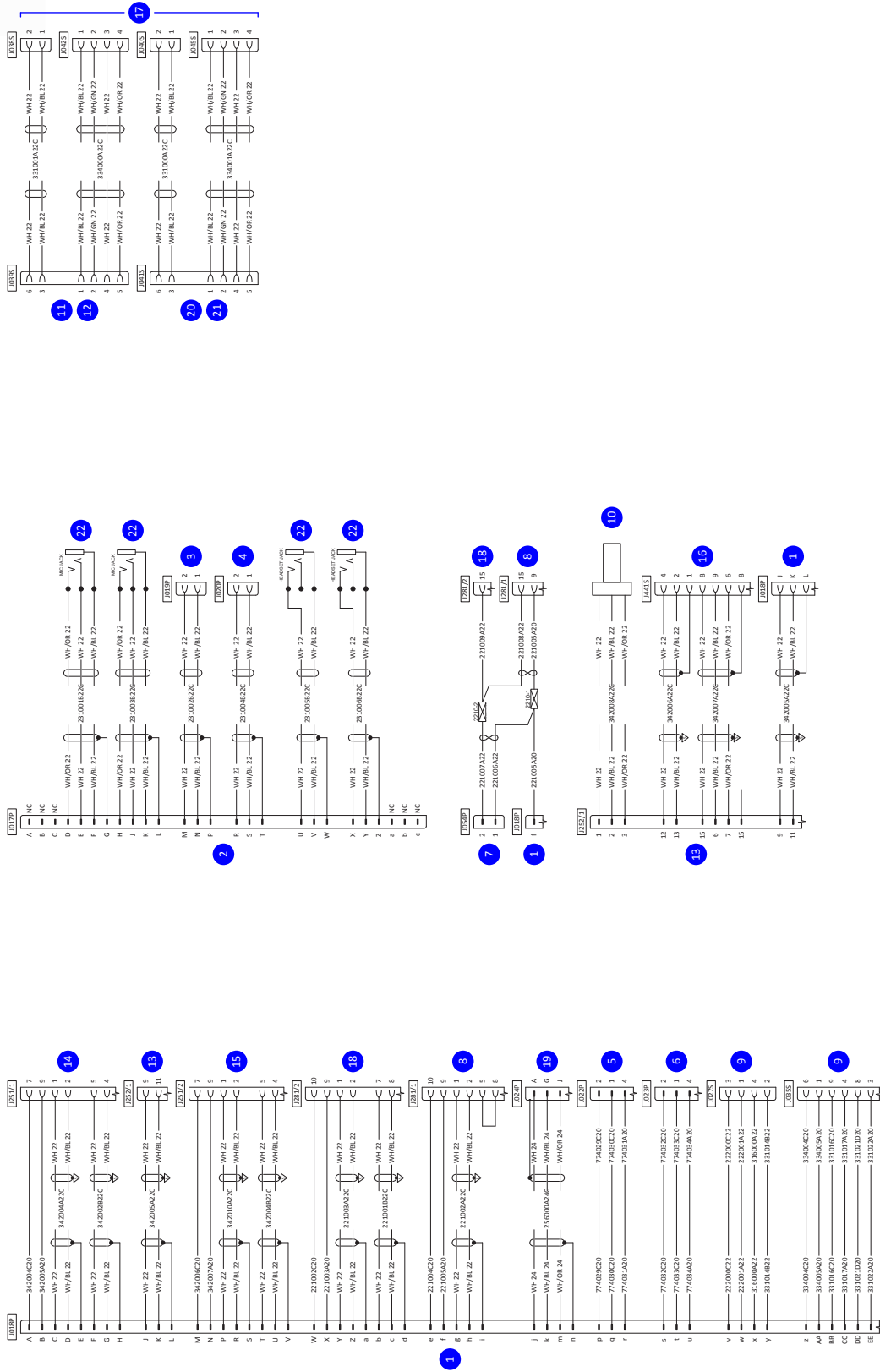


Figure 24-002
Cable tree 2

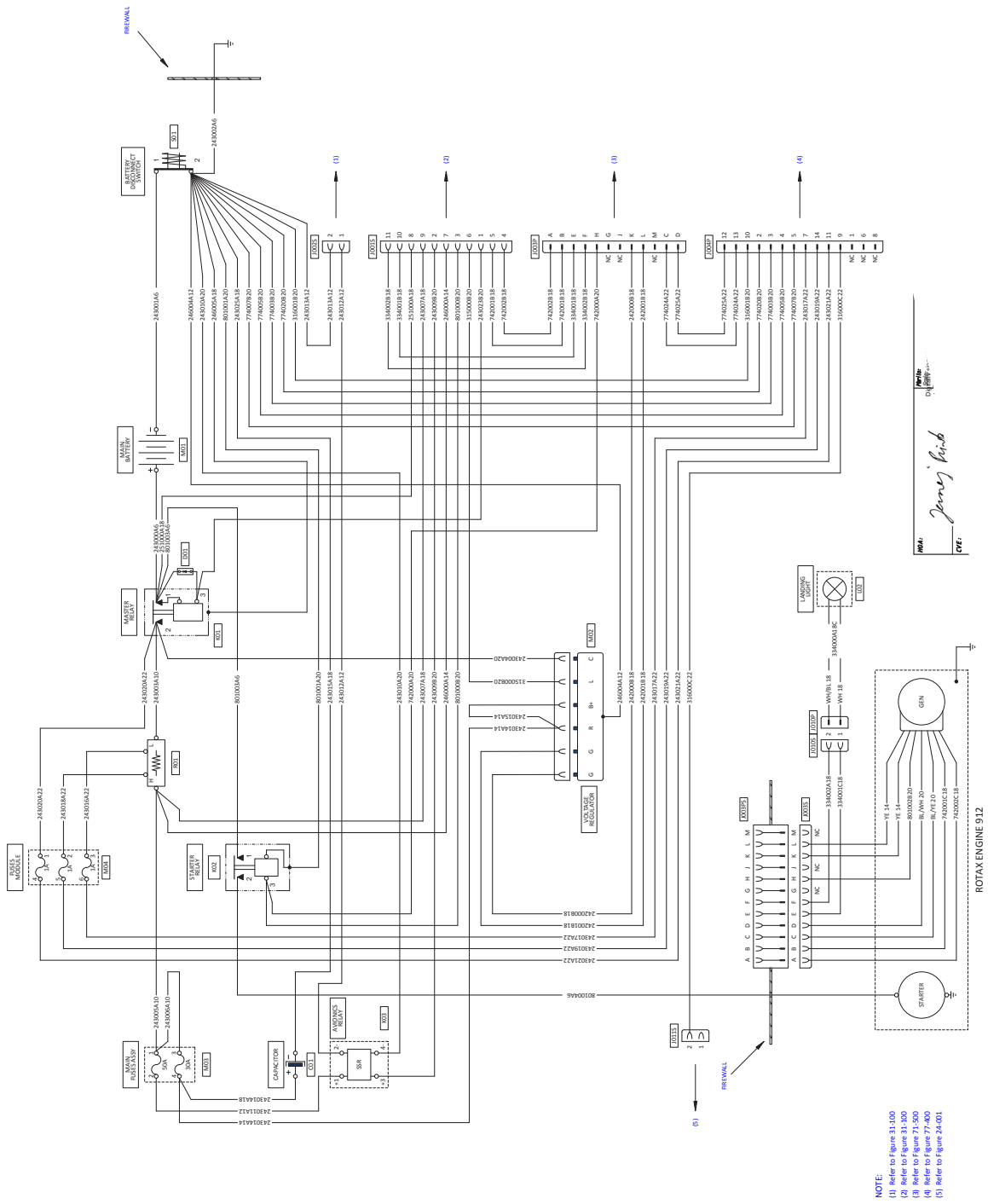


Figure 24-300
Audio panel

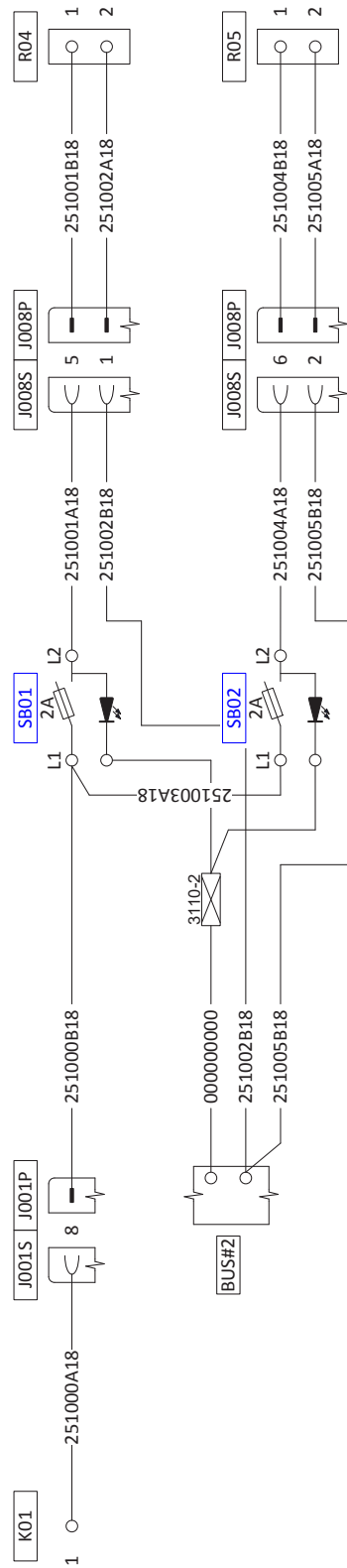


Figure 25-100
AUX sockets

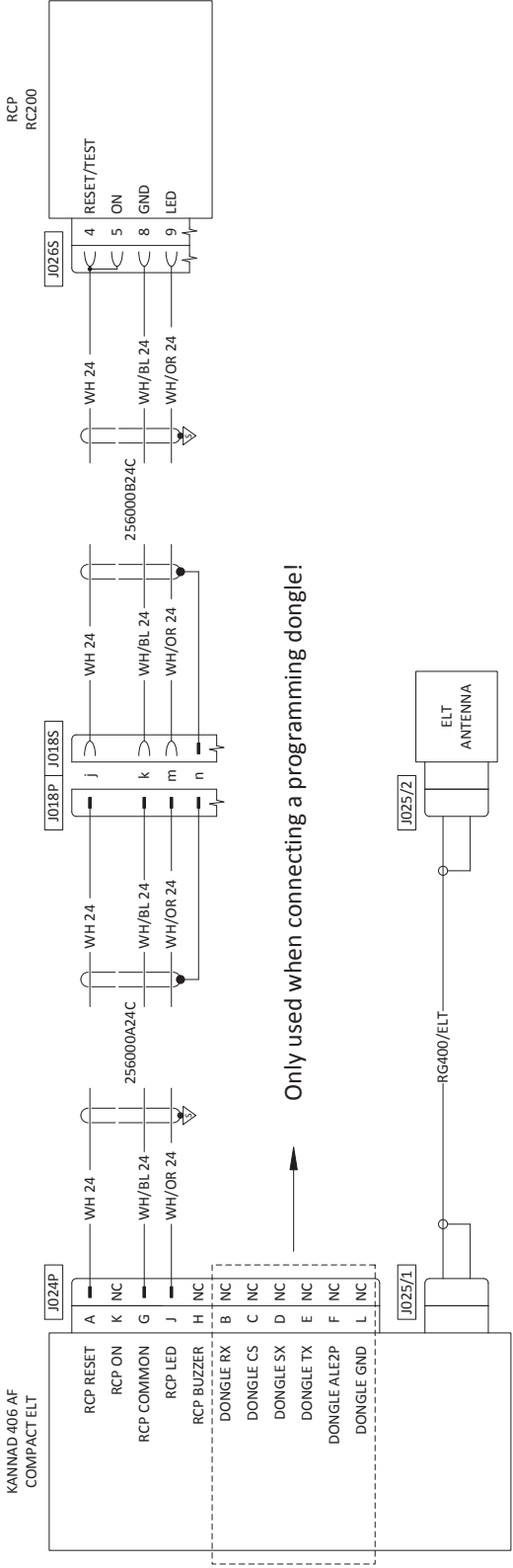


Figure 25-600
ELT wiring

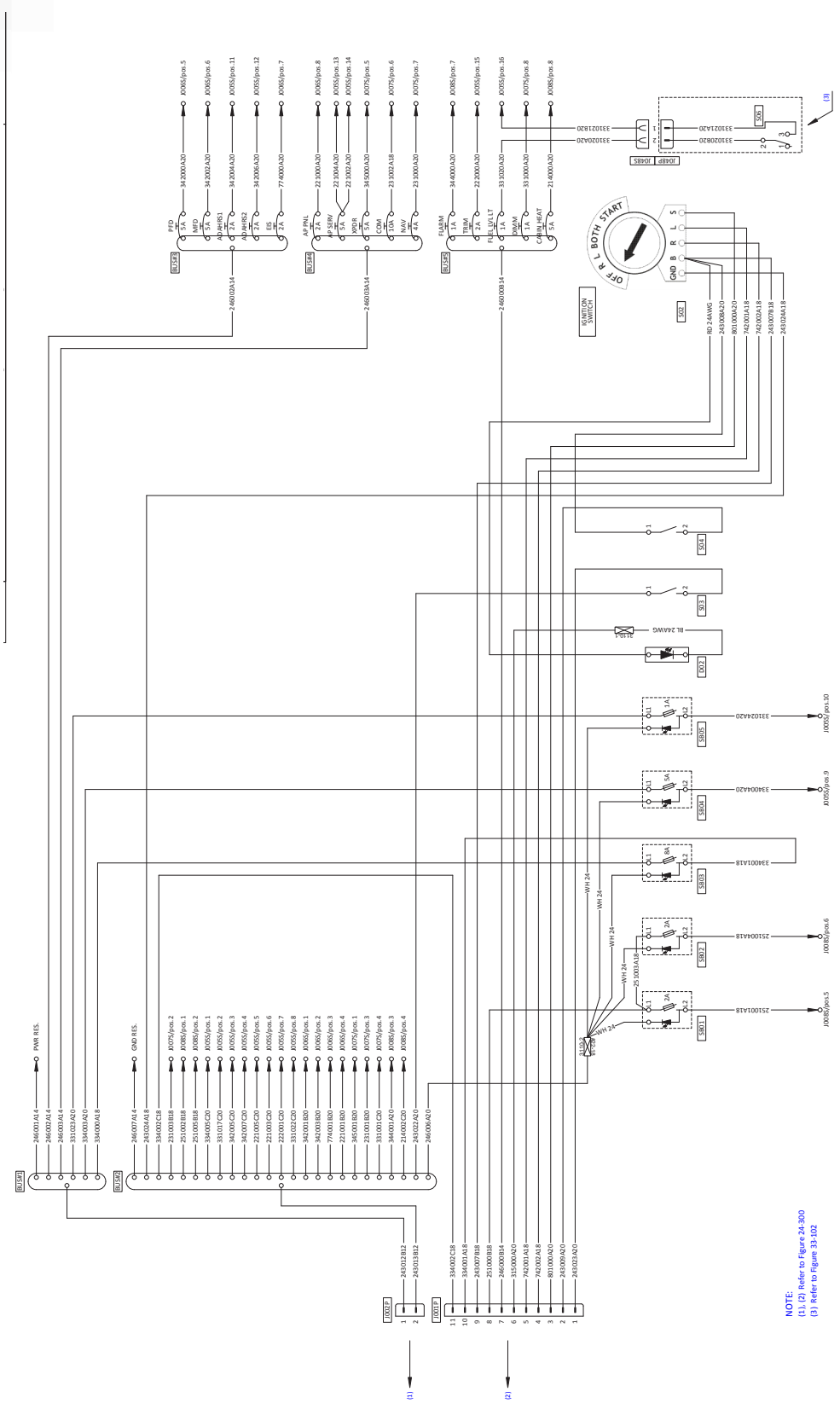


Figure 31-100
Switch panel

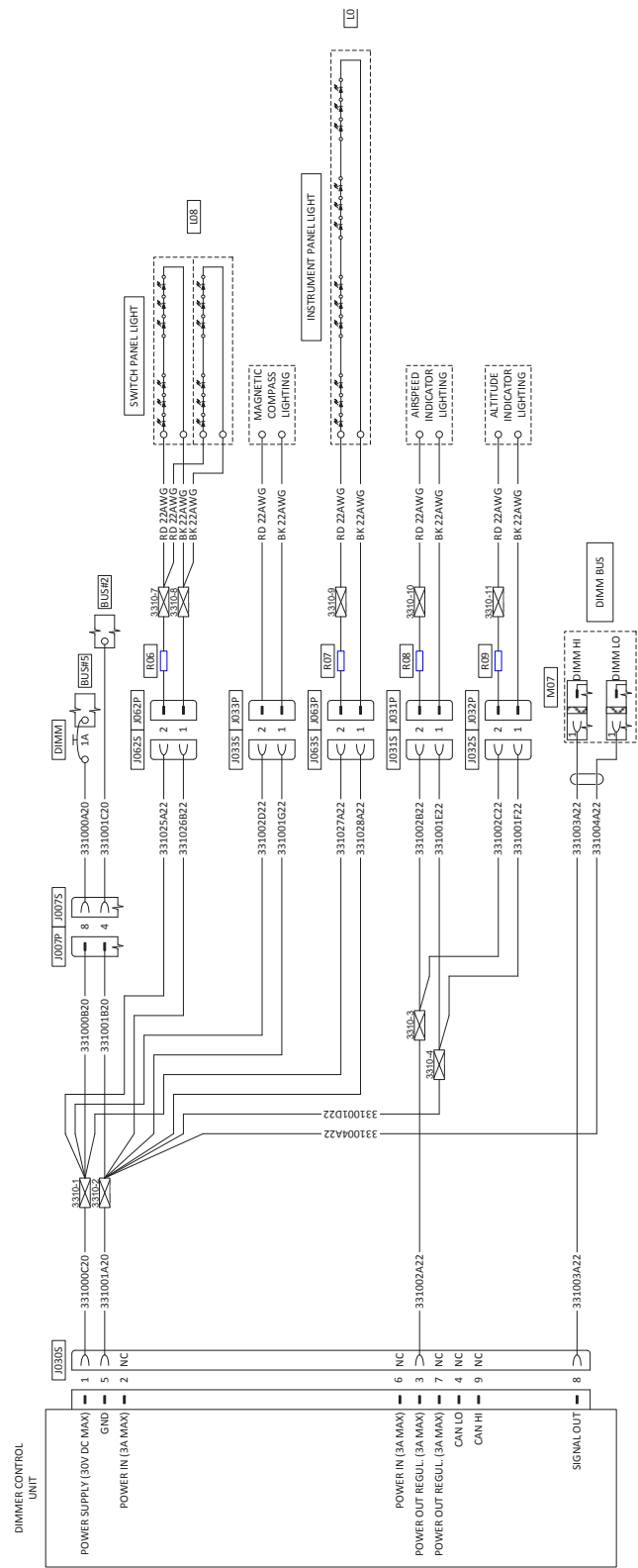


Figure 33-100
Dimmer control unit

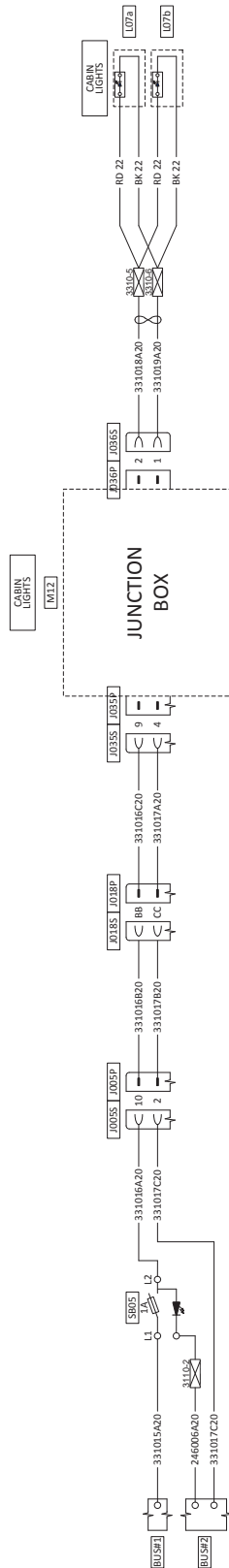
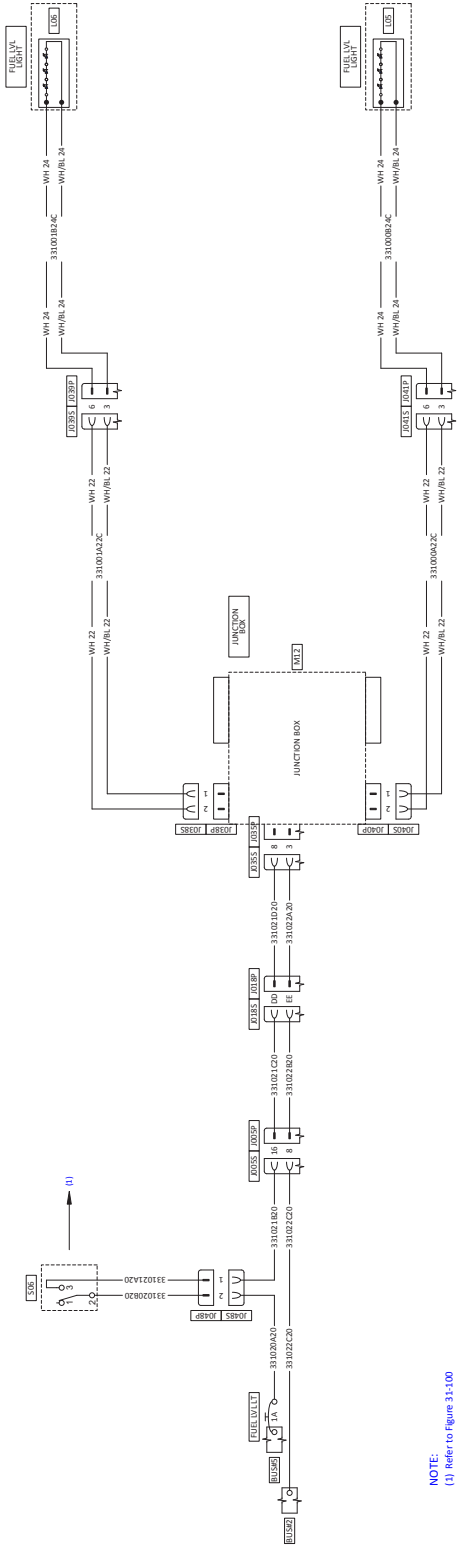


Figure 33-101
Cabin light



NOTE:
(1) Refer to Figure 31-100

Figure 33-102
Fuel level backlights

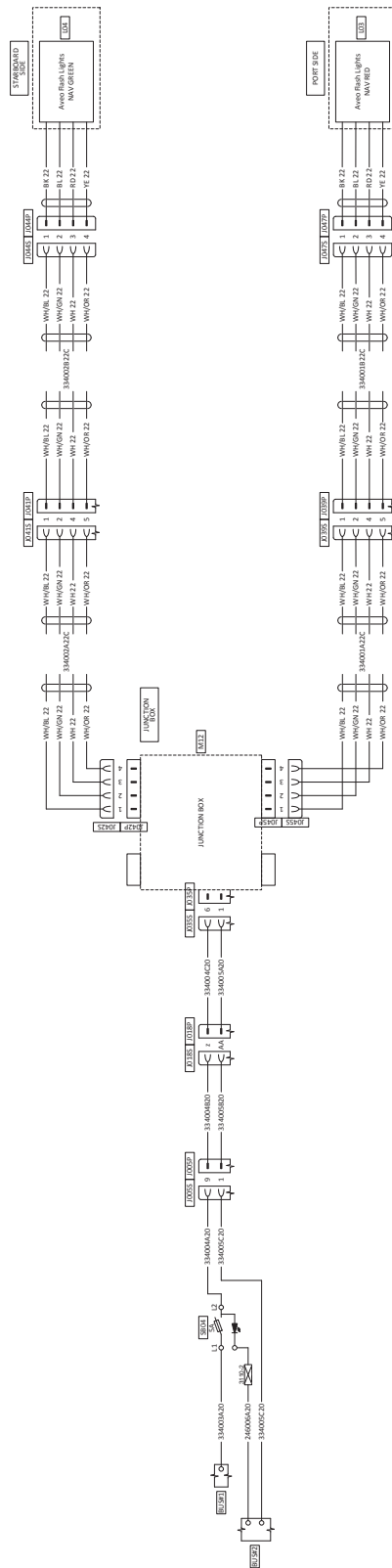


Figure 33-400
NAV/Strobe lights

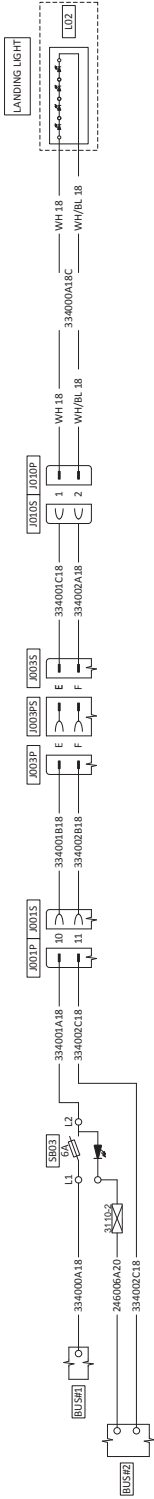


Figure 33-401
Landing light

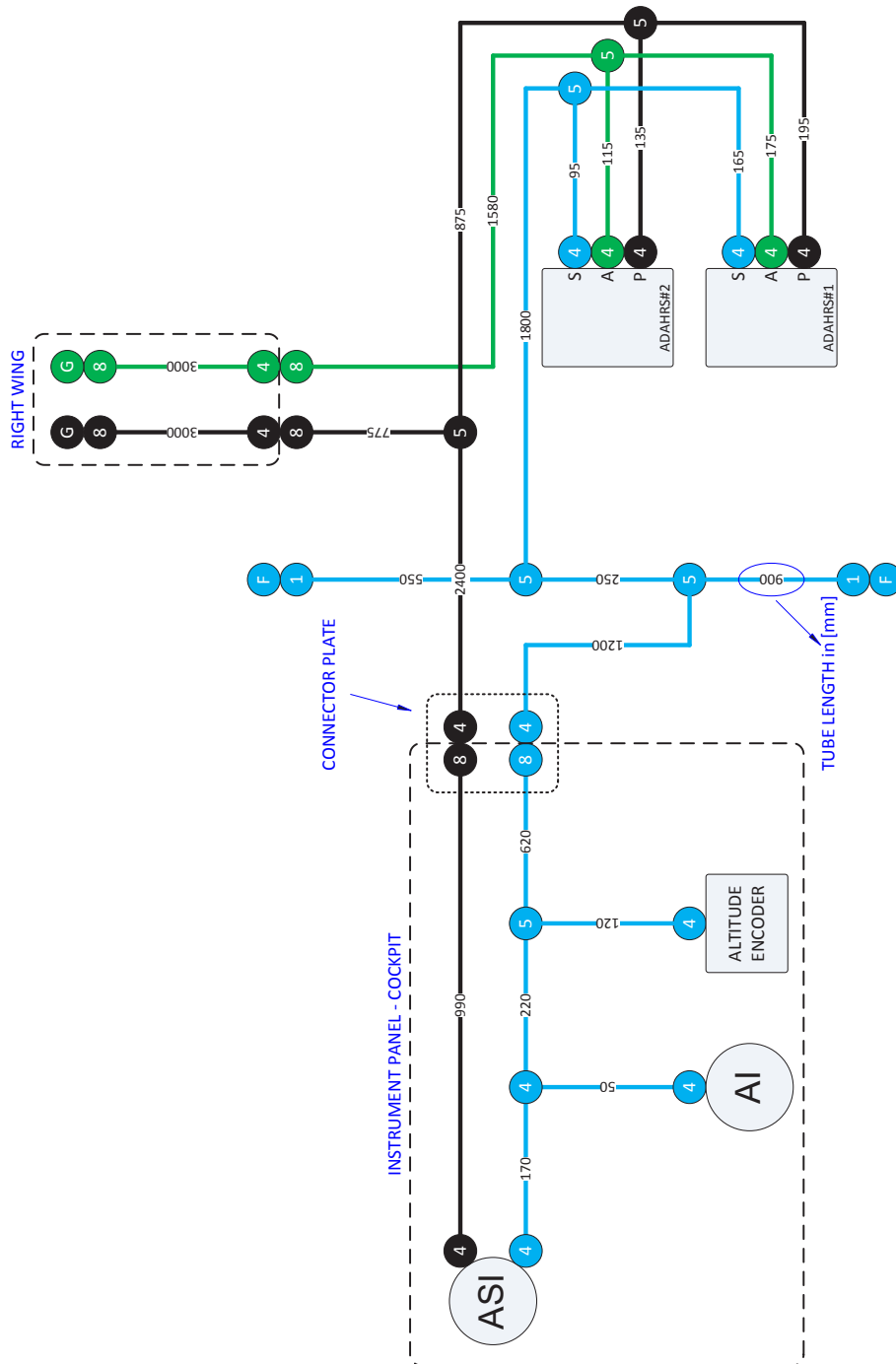
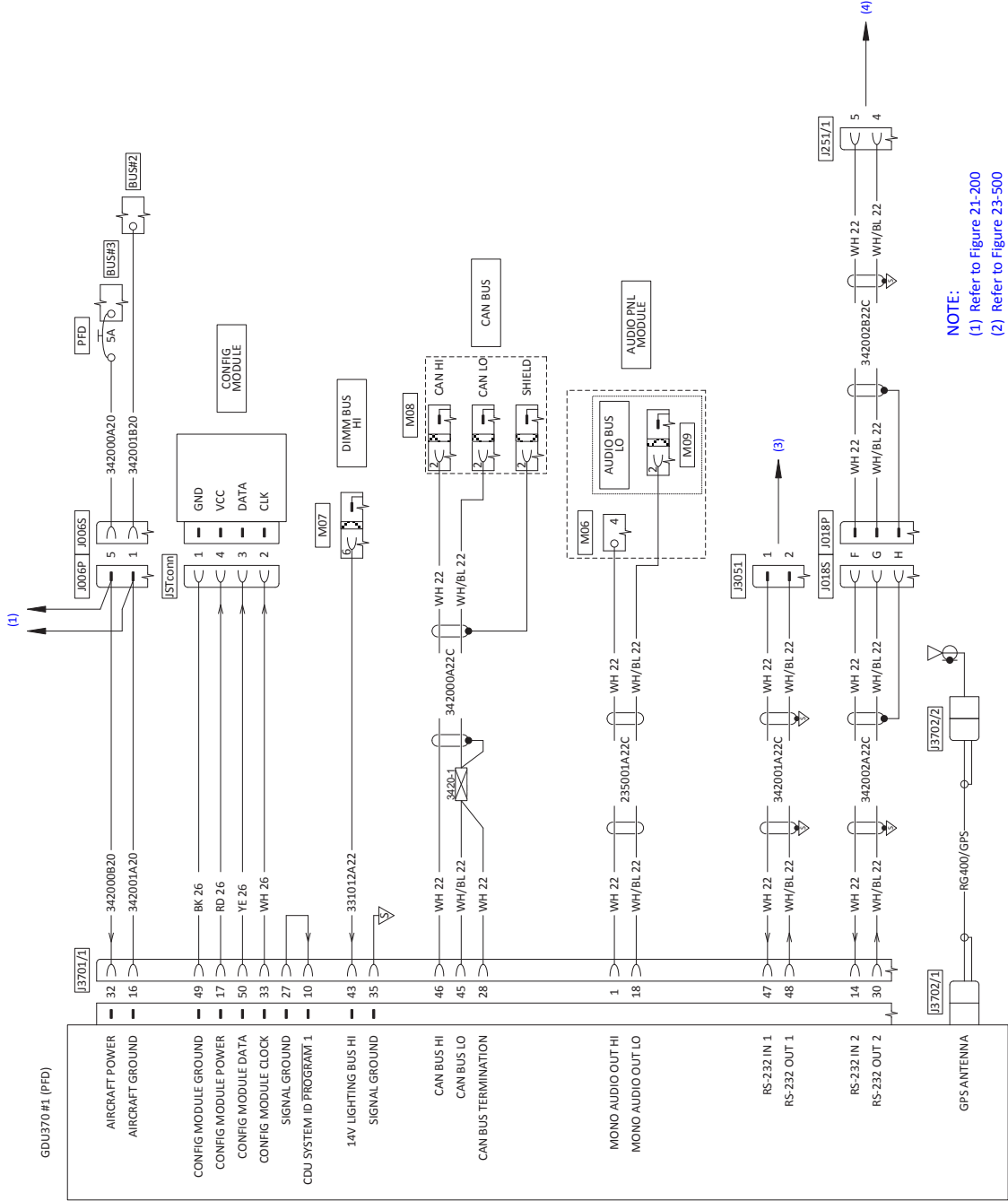
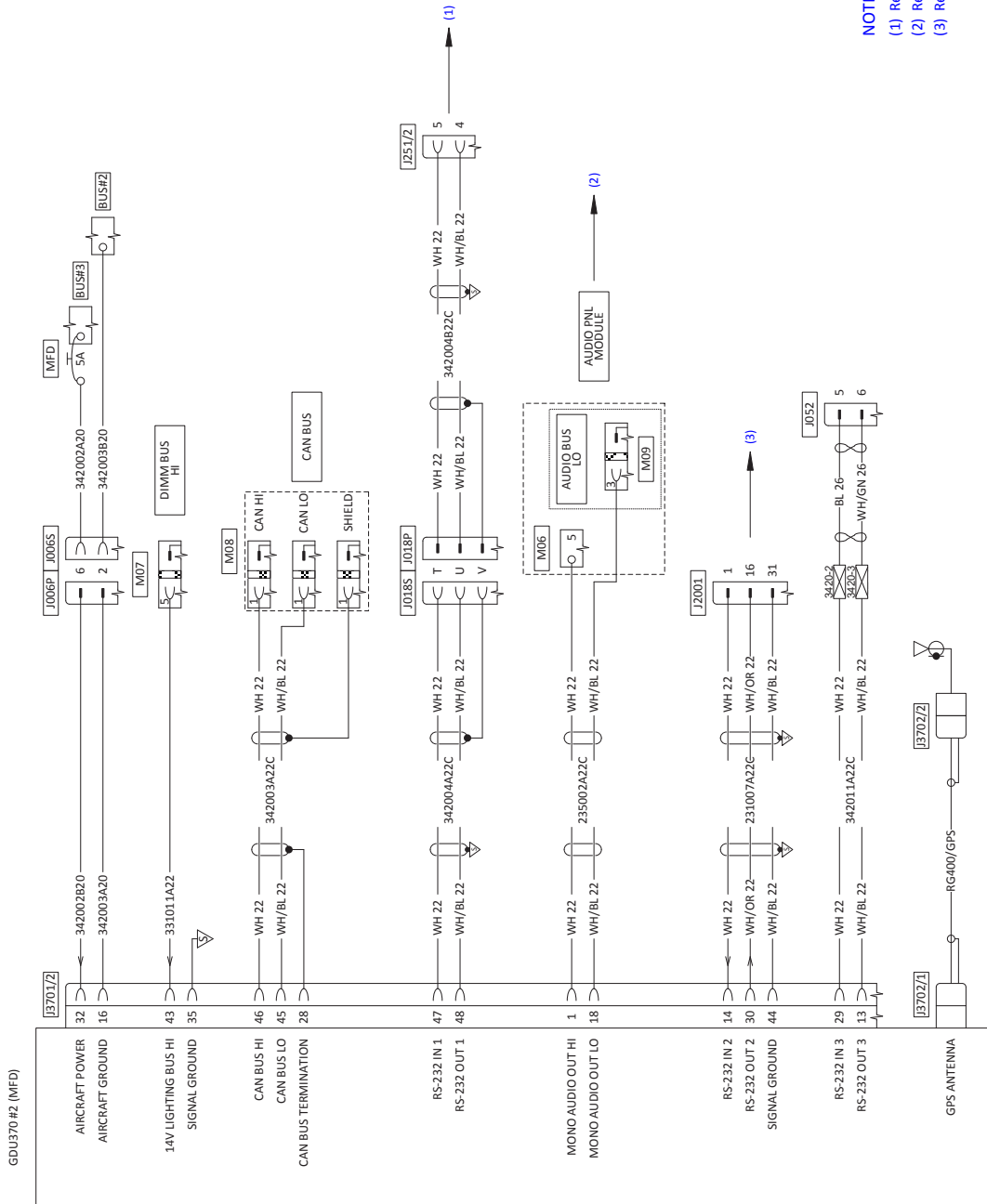


Figure 34-100
Pitot-Static schematic



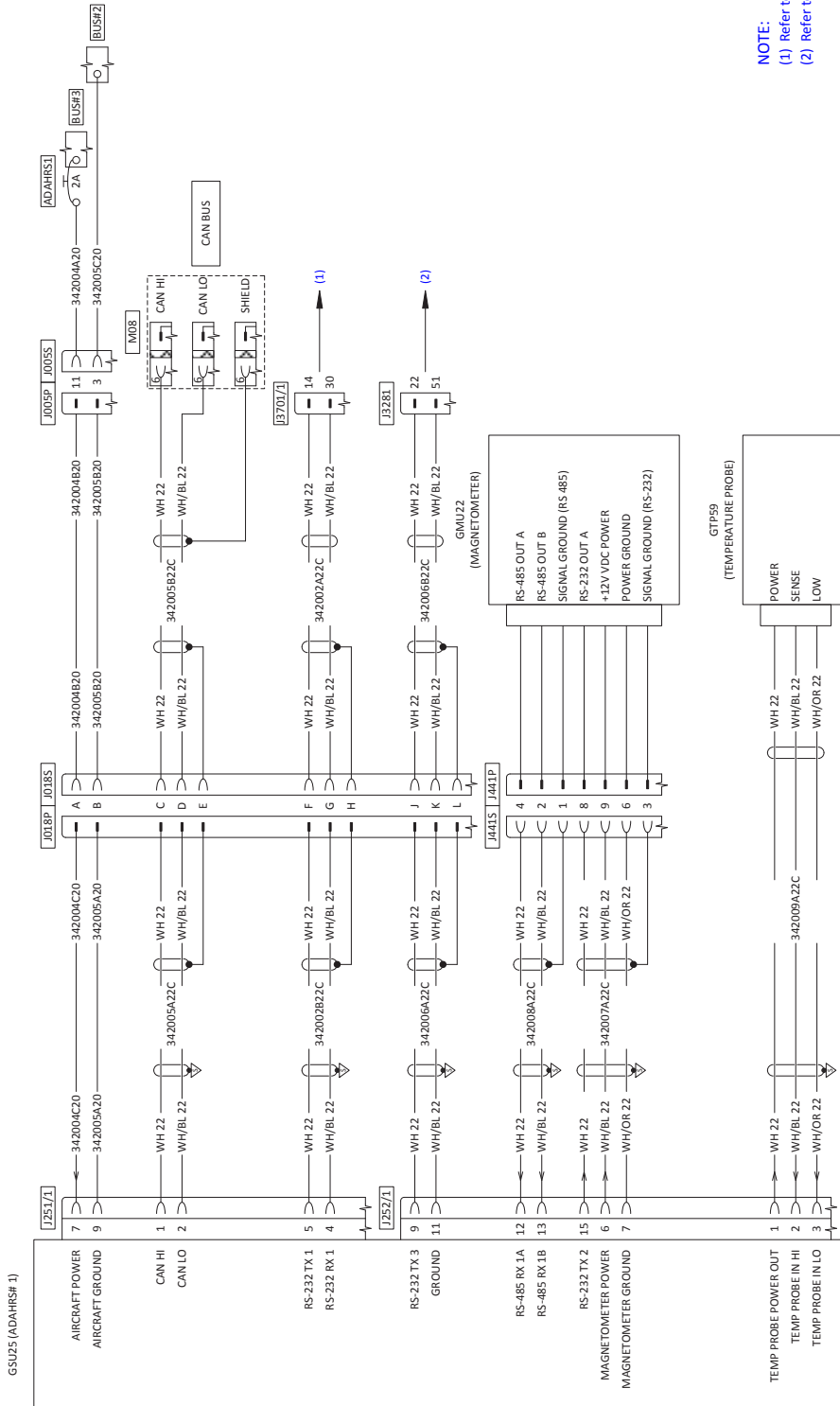
NOTE:
 (1) Refer to Figure 21-200
 (2) Refer to Figure 23-500
 (3) Refer to Figure 22-100
 (4) Refer to Figure 34-203

Figure 34-201
PFD Wiring



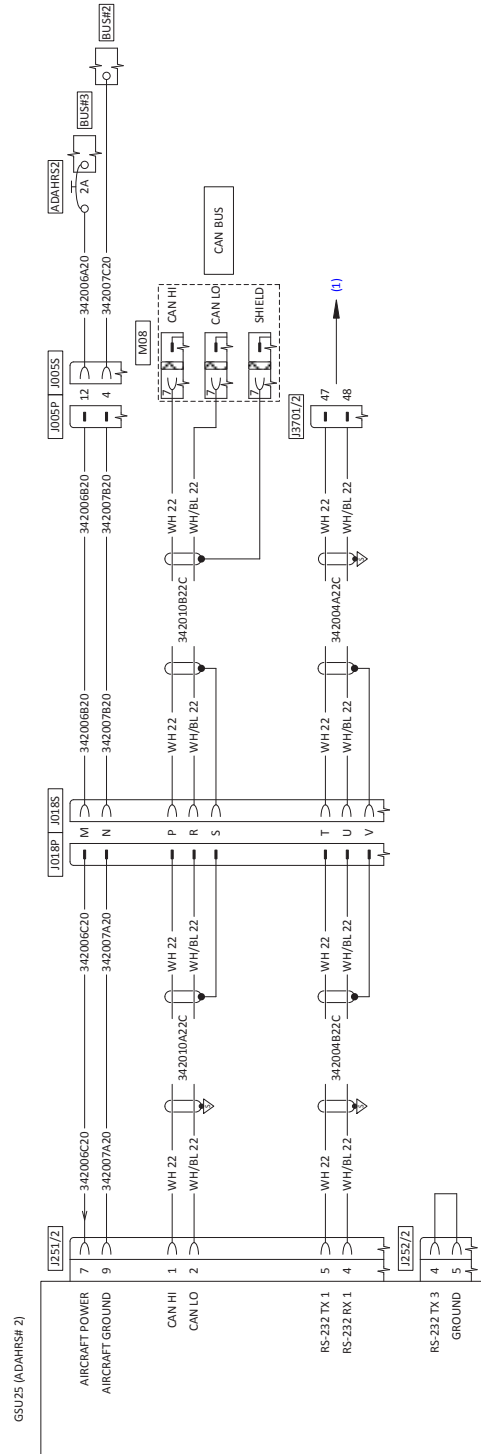
NOTE:
 (1) Refer to Figure 34-204
 (2) Refer to Figure 23-500
 (3) Refer to Figure 23-100

Figure 34-202
MFD wiring



NOTE:
 (1) Refer to Figure 34-201
 (2) Refer to Figure 34-500

Figure 34-203
 ADAHRIS1 wiring



NOTE:
(1) Refer to Figure 34-202

Figure 34-204
ADAHRS2 wiring

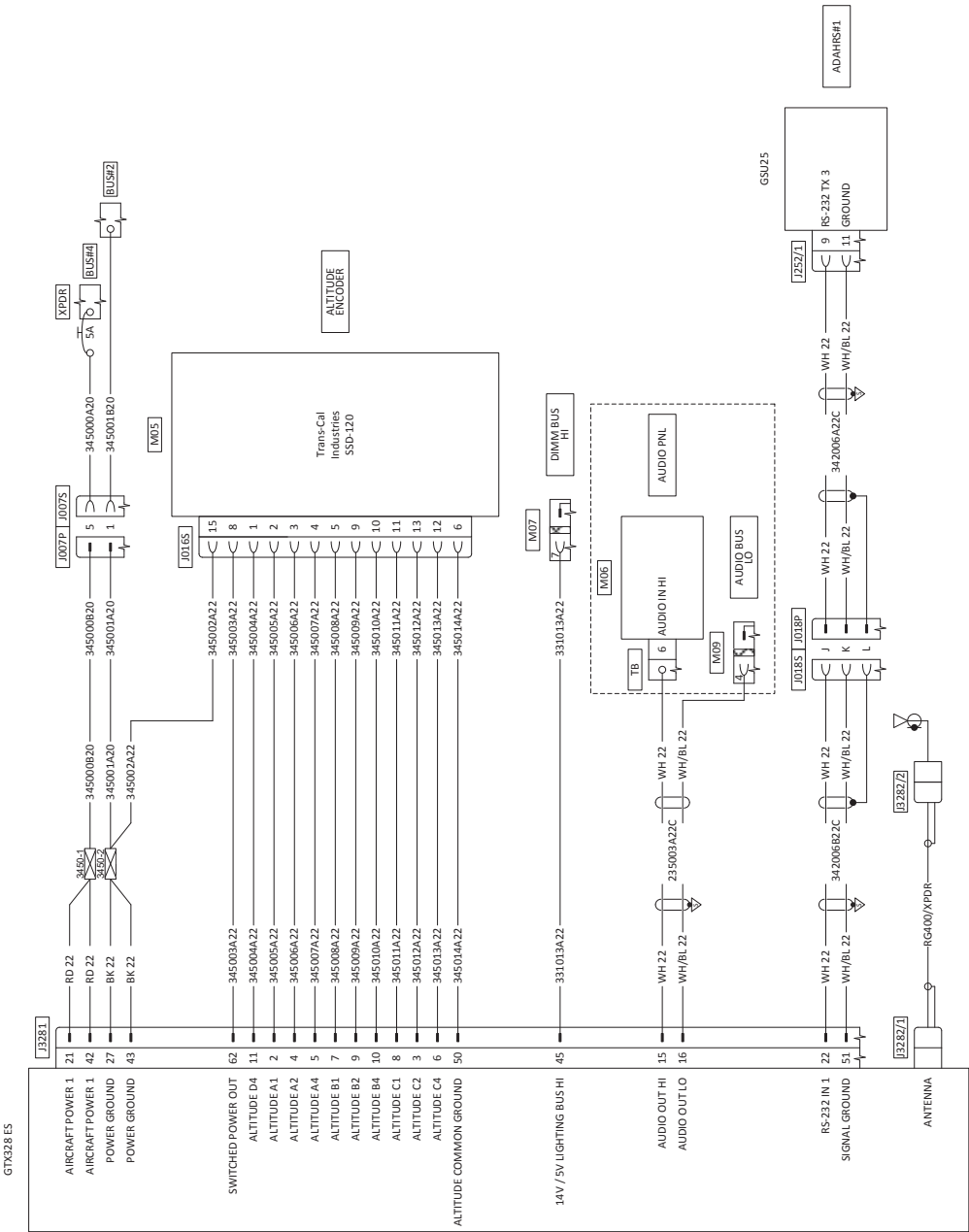
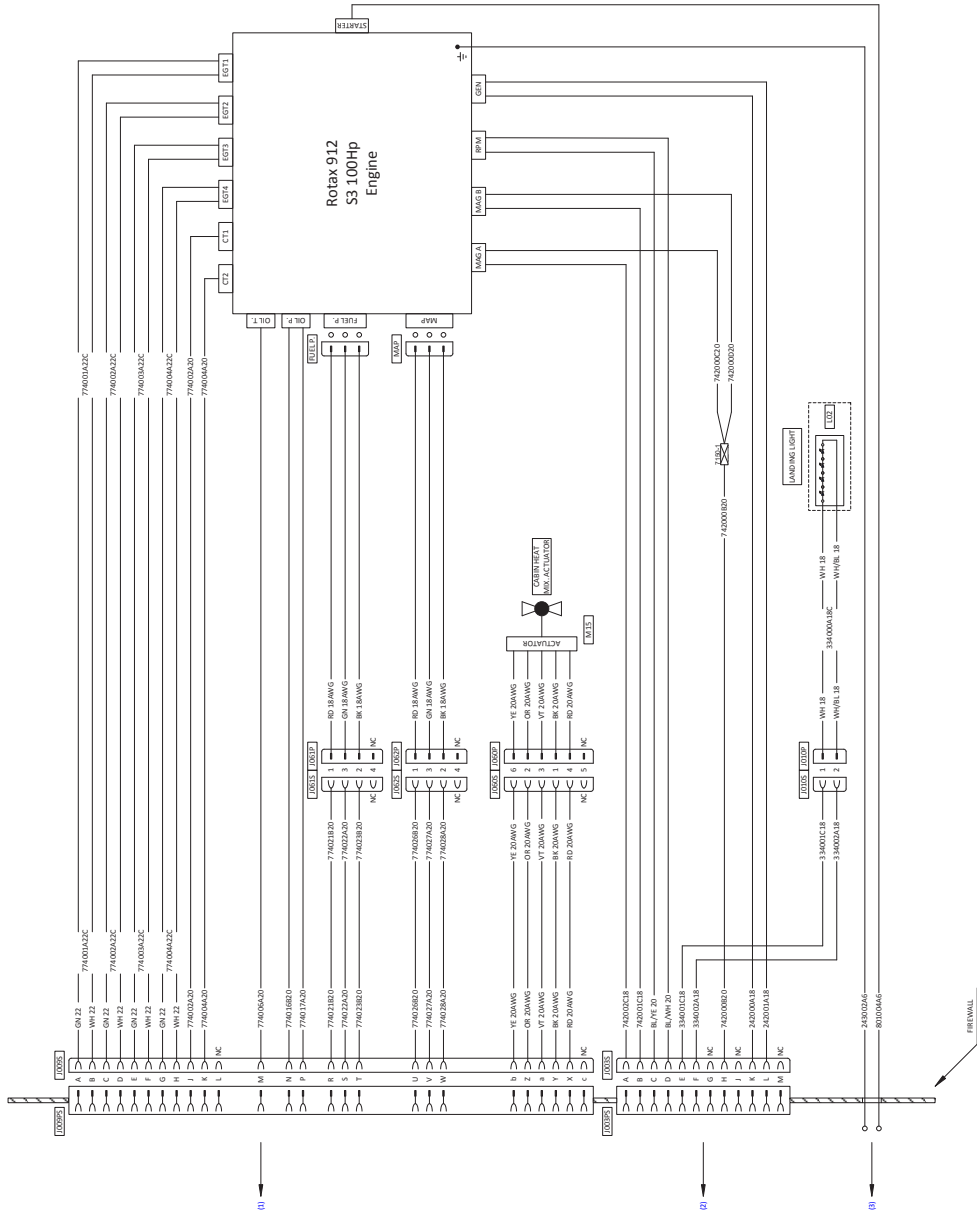


Figure 34-500
XPDR wiring



NOTE:
(U) Refer to figure 77-400
(C),(E) Refer to figure 24-300

Figure 71-500
Engine wiring

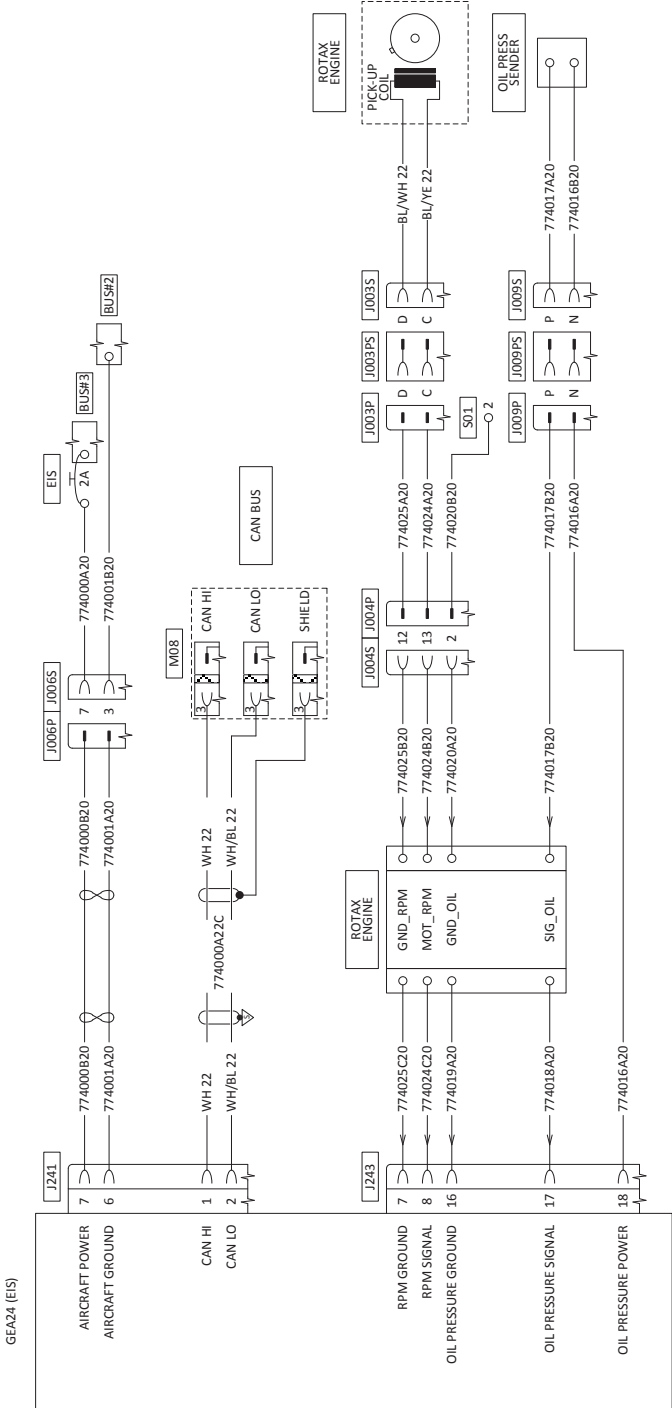


Figure 77-100 RPM indicating

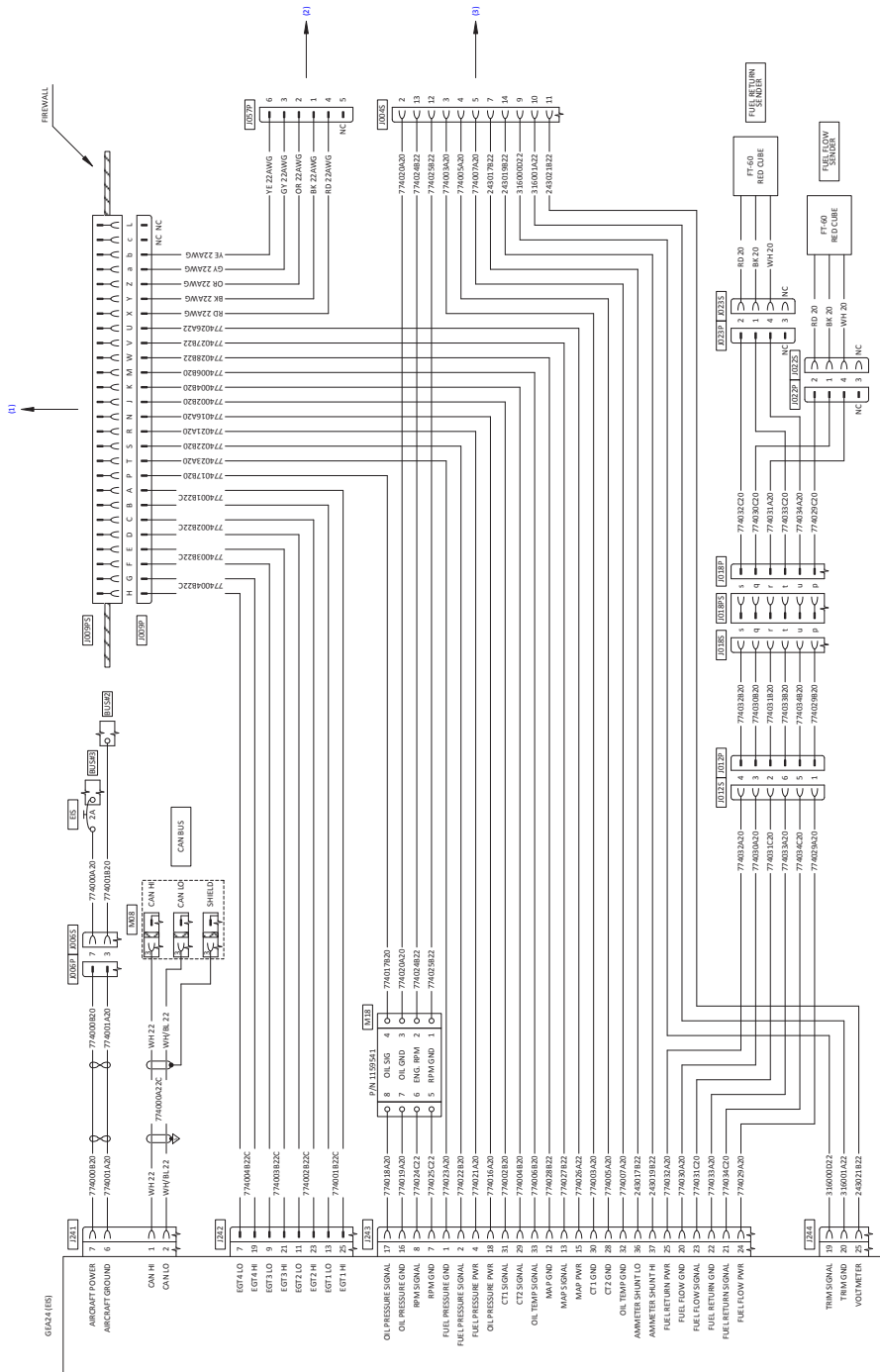


Figure 77-400
EIS wiring

PIPISTREL

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CHAPTER 95 – SPECIAL PURPOSE EQUIPMENT**TABLE OF CONTENTS**

SECTION	SUBJECT	PAGE NUMBER
95-00	SPECIAL PURPOSE EQUIPMENT General Description Maintenance Practices	95-03

95-00 GENERAL

1. Description

This chapter describes the special purpose equipment on the Virus SW 121. It covers the Galaxy Rescue System GRS 6/600 SD SPEEDY, installed as serial equipment on the Virus SW 121. The system is not accounted for in the sense of “alternative level of safety”. It is considered a true “second chance” beyond what is required by the certification standard.

The system is placed inside a durable cylinder mounted on the right hand side of the baggage compartment. The parachute, which is stored inside a deployment bag with a rocket engine underneath, is installed in the aforementioned cylinder. Its brand new design presents a canopy that safely opens after 0,4 to 0,7 seconds in distance of 15-18 metres above the aircraft. It is launched in a special deployment bag, which decreases the risk of aircraft debris breaching the canopy. The parachute rescue system is activated manually, by pulling the activation handle mounted on the cabin bulkhead. After being activated, the main canopy opens and fully inflates within 3,2 seconds.

WARNING! The activation handle safety pin should be inserted when the aircraft is parked or hangered to prevent accidental deployment. The safety pin **MUST** be removed before operating the Virus SW 121.

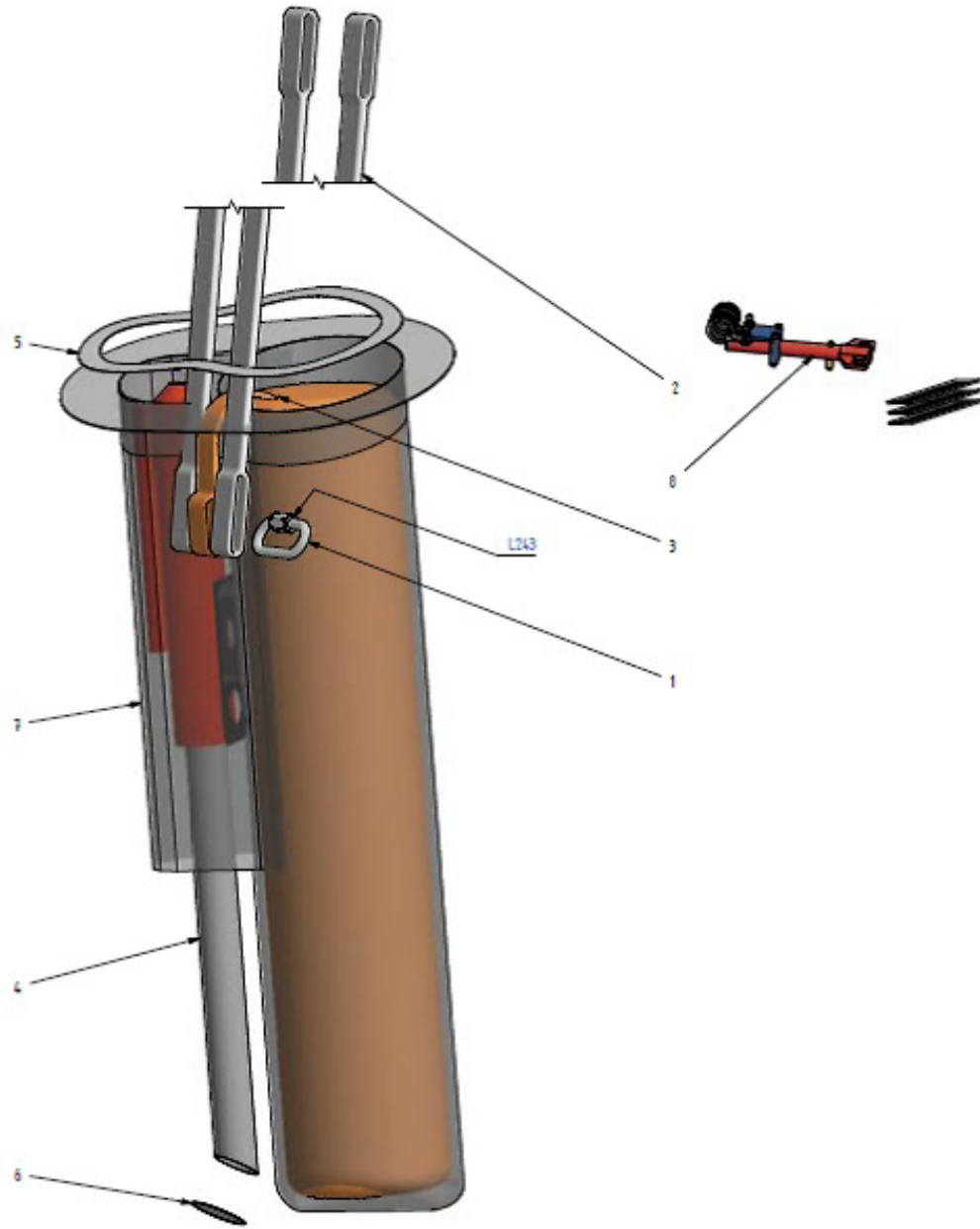


Figure 95-001
GRS rocket charged parachute
rescue system

- | | |
|--|--|
| <p>1 Carbiner</p> <p>2 Kevlar belt</p> <p>3 GRS Rescue system GRS 6-600</p> <p>4 Rocket blast tube</p> | <p>5 Container cover mask</p> <p>6 Adhesive label</p> <p>7 Parachute container assembly</p> <p>8 Parachute release handle fastening material</p> |
|--|--|

2. Maintenance practices

WARNING: The Virus SW 121’s rescue system incorporates a ballistic rocket that can cause serious injuries and bodily harm if not dealt with carefully.

WARNING: DO NOT, IN ANY CIRCUMSTANCES, ACTIVATE THE RESCUE SYSTEM ON THE GROUND. People in the vicinity of the aircraft may be injured and the aircraft will be rendered out of service until repaired.

WARNING: Operating the Virus SW 121 is NOT PERMITTED if the rescue system is not in good working condition (i.e. functional). The Virus SW 121 is NOT AIRWORTHY if the rescue system is inoperative.

95-00: 2.1. Activation handle

95-00: 2.1.1. Inspection/check

Reference: Figure 95-001, latest revision of IPC 121-25-61-100

Step	Action	Required parts, materials and tools	Reference
1	Locate the activation handle in the cabin		
2	Carry out visual inspection of the handle.		(see 05-20)
3	Remove the safety pin. Rotate the handle to determine whether it moves unhindered and hasn’t incurred any damage. DO NOT PULL THE HANDLE! JUST LEAVE IT IN ITS HOUSING AND ROTATE IT.		
4	Install the safety pin.		

95-00: 2.2. Rescue system hatch

95-00: 2.2.1. Inspection/check

Reference: latest revision of IPC 121-25-61-000

Step	Action	Required parts, materials and tools	Reference
1	Locate the rescue system hatch on the top of the fuselage, just behind the sunroof.		
2	Carry out visual inspection of the rescue system hatch. Make sure it’s not obstructed by anything.		(see 05-20)

95-00 GENERAL

95-00: 2.3. Rocket exhaust hatch

95-00: 2.3.1. Inspection/check

Reference: latest revision of IPC 121-25-61-000

Step	Action	Required parts, materials and tools	Reference
1	Locate the pitot tube fastened to the bottom surface of the starboard wing.		
2	Carry out visual inspection. Make sure the wing's composite structure around the tube's mounting flange hasn't incurred any damage.		(see 05-20)

WARNING: The Virus SW 121's rescue system must be repacked every 6 years and replaced every 30. The repacking date is indicated on the parachute canister. REMOVAL AND INSTALLATION MUST BE CARRIED OUT FOLLOWING PIPISTREL'S INSTRUCTIONS AND ONLY BY A CERTIFIED AVIATION MECHANIC. ONLY GALAXY HOLDING s.r.o. IS PERMITTED TO REPACK THE RESCUE SYSTEM. ONCE THE SYSTEM IS REMOVED FROM THE AIRCRAFT, IT IS THE OWNER/OPERATOR'S RESPONSIBILITY TO CONTACT GALAXY HODLING s.r.o. AND ARRANGE FOR IT TO BE REPACKED OR REPLACED.

To get the rescue system repacked, please contact:

GALAXY HOLDING s.r.o.
Třída 1. máje 24a
460 01 Liberec 3
Czech Republic
tel./fax: ++420 48 510 44 92
mobil: ++420 777 55 00 91

NOTE: Refer to PI-121-25-61-002_A00 Parachute Repacking Instructions

To get the rescue system replaced, please contact:

PIPISTREL d.o.o. Ajdovščina
GORIŠKA CESTA 50a
SI-5270 AJDOVŠČINA
SLOVENIA
tel.: +386 5 36 63 873
fax.: +386 5 36 61 263

NOTE: Refer to PI-121-25-61-001_A02 Parachute Installation Manual

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CHAPTER 99 – APPENDICES**TABLE OF CONTENTS**

APPENDIX	SUBJECT	PAGE NUMBER
APPENDIX	ASTM F2483 CROSS-REFERENCE CHART	3
APPENDIX	EQUIPMENT LIST	5
APPENDIX	FAULT-MALFUNCTION REPORT (FDO-0010-342)	8
APPENDIX	WEIGHT AND BALANCE REPORT (WBR-121-08-10-001)	12
APPENDIX	VENT/DRAIN HOLE LOCATIONS	15
APPENDIX	PROCEDURE FOR MASS BALANCES	17

APPENDIX 99-A

ASTM F2483-12 CROSS-REFERENCE CHART

ASTM F2483-12	CORRESPONDING CHAPTER IN THIS MANUAL
5.1.1.1	Appendix 99-B
5.1.1.2	TBD
5.1.1.3	12-40
5.1.1.4	72-00
5.1.1.5	08-10, 08-20
5.1.1.6	12-10
5.1.1.7	12-10
5.1.1.8	20-30
5.1.1.9	INTRO, 04-00, 05-00, 20-00
5.1.1.10	Appendix 99-C
5.1.2	05-00
5.1.3.1	51-00, 57-00
5.1.3.2	51-00, 55-00
5.1.3.3	32-00
5.1.3.4	51-00, 55-00
5.1.4	72-00
5.1.5	28-00
5.1.6	61-00
5.1.7	21-00
5.1.8	31-00, 34-00
5.1.9	92-00
5.1.10	51-00
5.1.11	04-00
5.1.12	INTRO
5.1.13	Appendix 99-C

APPENDIX 99-B

EQUIPMENT LIST

POWER PLANT		AIRFRAME EQUIPMENT	
Item	Pipistrel P/N	Item	Pipistrel P/N
Engine	-	Nose landing gear	1242018
Carburetors	5412195	Nose landing gear tyre	5050007
Gearbox	5415029	Nose landing gear wheel	5440060
Propeller assembly	1253027	Nose landing gear fairings	1241050
Propeller governor	1253028	Main landing gear (strut)	1139009
Propeller spinner	1253060	Main landing Gear Wheels with Brakes (2x)	6025021
Oil cooler	5411716	Main landing gear fairings (2x)	1210016/1210017
Oil cooler	5411713	Main landing gear tyres (2x)	5050010
Oil thermostat	1150123	Ballistic safety parachute	1243001
Oil filter	5411465	Tow-hook	1190057
Water cooler	1157041		
Exhaust system	6025102		
Engine cowling upper	1155068		
Engine cowling lower	1155086		
Air filter incl. housing	1150082		
Gascolator	1158149		
Fuel drain (2x)	1158177/ 1158178		
Fuel selector valve	1558165		

SPECIAL EQUIPMENT		CABIN EQUIPMENT	
Item	Pipistrel P/N	Item	Pipistrel P/N
Radio COM	5060226	Seats (2x)	1121246/1121249
Radio COM (alternative to GTR 225)	5060082	Seat belts (2x) TSO	1124031
COM Antenna	5060075	Headrest (2x)	1121243
VOR Antenna (if used GNC 255)	5066167	Cabin hot air intake	6025006
Transponder	5061024	Baggage net	1190348
Transponder Antenna	1159160	Fuel cap key	1190003
ELT	5069066		
ELT Antenna	5069067		
GPS Antenna	5060233		
Autopilot panel	5067029		
Autopilot pitch & roll servo	5067025		

ELECTRICAL EQUIPMENT		INSTRUMENTS	
Item	Pipistrel P/N	Item	Pipistrel P/N
Landing and Taxi lights	1159515	Display EFIS (x2)	5066292
Position + Strobe lights	1159177	ADHARS	5066293
Battery	5048025	EIS	5066295
Battery relay (master switch)	5046181	Magneto METER	5066298
Starter relay	5414083	Temperature Probe	5066297
Avionics relay	5046177	Altimeter 80mm (0-20.000 ft) TSO	5064024
Voltage regulator	5414133	ASI 80 mm (0-200 Kts), TSO	5063098
Generator failure warning light	5049062	Pitot tube – AOA – non heated	1180174
Fuel flow sensor	1159316	Side-slip indicator (slipball)	5069006
12V socket	5043126	Visual fuel level indicator	6020077
Elevator trim console	1124101		
Elevator trim actuator	1124102		
Keylock incl. Magneto switches	5046128		

PLACARDS	
Item	Pipistrel P/N
Placard set Virus SW 121	1111122
Intercom placard	1159390
Fuel tank level light (on/off)	1159436

PIPISTREL

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APPENDIX 99-C

APPENDIX 99-C

Pipistrel
Mail: maintenance@pipistrel.si

Fax-No.: +386-5-366 1263

In case of many malfunction or severe occurrences:
 Pipistrel phone-No. +386-5-365 8160, at sun- and holidays: 00386-5-366 1263


Owner/user/holder:			
Address:		Present position of aircraft:	
Phone:			
Fax:			
e-mail:			
A/C Registration:		A/C Serial-No.:	
When / where did the malfunction happened?			
Date:		Location:	
Description of the malfunction:			
Date:	Time:	Location:	
Failure description (photos, sketches):			

The Occurrence after malfunction induced to:		
Accident with	Personal injury	Damage to property
Was the occurrence reported to local aviation authority/ accident investigation branch?		
YES	NO	
Is the aircraft still in operation?		
YES	NO	Restricted
Unsafe condition:		
Did warning / safety-systems function properly?		
YES	NO	
Immediate action (if required):		
Internal distribution: HOA HDO		
Date:	Head of Airworthiness:	

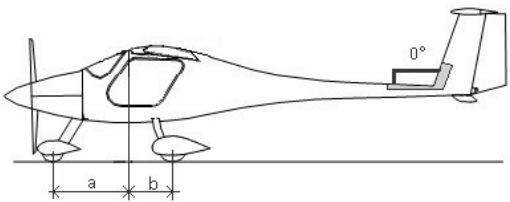
PIPISTREL

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APPENDIX 99-D

 DOA No.: EASA.21J.524	Virus SW 121 Weight & Balance Aircraft dimensions Controls deflections	Document-No: WBR-121-08-10-001 Issue: A01 Page 1 of 2
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Aircraft Information	
Serial N.	Customer:

Weight & Balance	
	Procedure: 1) Check: tires pressure, doors closed, flaps 0°, ABKS in. 2) Turn on the scales and tare 3) Position the aircraft on the scales and level it → tail tool at 0° 4) Measure: Distance between Nose wheel and leading edge= a Distance between Left wheel and leading edge = b_L Distance between Right wheel and leading edge= b_R 5) Compute average main undercarriage distance b = (b_L+b_R) / 2 6) <u>Remove the tail tool</u> and read the scales
a =	mm Leading Edge – Nose Wheel
b _L =	mm Leading Edge – Left Wheel
b _R =	mm Leading Edge – Right Wheel
b =	mm b = (b _L + b _R) / 2

G _L =	Kg	Left Wheel	(G ₁ + G ₂) = G _{TOT} = Kg Total Aircraft Empty Weight Kg <small>Includes the weight of the airframe, powerplant, required equipment, optional or special equipment if listed, fixed ballast, hydraulic fluid, coolant, engine oil and unusable fuel.</small>
G _R =	Kg	Right Wheel	
G ₁ =	Kg	Main Gear (G _L + G _R)	
G ₂ =	Kg	Front Wheel	


See document EG-121-00-00-001 Equipment List, latest revision for aircraft configuration.

Summary (Weights)

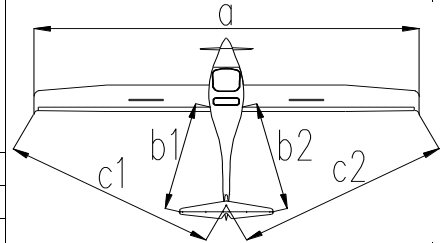
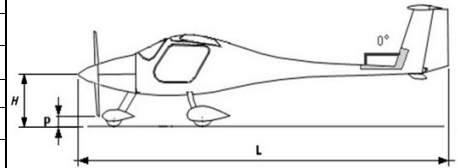
Max Take-off Weight MTOW	= 600 Kg	
Aircraft Empty Weight G _{TOT}	= Kg	
Full fuel weight G _F	= Kg	100lt = 72 Kg
Max payload with full fuel G_{PL}	= Kg	G _{PL} = MTOW – G _{TOT} – G _F

Balance

MAC=	897 mm	Mean Aerodynamic Chord
R=	43 mm	Wing Root Leading Edge to MAC Leading Edge distance
$CG_{mm} = \frac{G_1 * b - G_2 * a}{G_{TOT}} = \frac{(\dots) * (\dots) - (\dots) * (\dots)}{(\dots)} = \dots mm$		
$CG_{\%MAC} = \frac{CG_{mm} - R_{mm}}{MAC_{mm}} = \frac{\dots - 43}{897} * 100 = \dots \% MAC$		

 <p>DOA No.: EASA.21J.524</p>	<p>Virus SW 121</p> <p>Weight & Balance Aircraft dimensions Controls deflections</p>	<p>Document-No: WBR-121-08-10-001</p>
		<p>Issue: A01</p> <p>Page 2 of 2</p>

Aircraft Measurements				
	Measured		Design	
Length of aircraft L	=	cm	639-641	cm
Height of aircraft H	=	cm	100-105	cm
Diameter of propeller	=	cm	170	cm
Prop clearance P	=	mm	174-185	mm
Main landing gear track	=	cm	156-159	cm
Wheel base (first-main gear)	=	mm	1500 ± 10	mm
Wingtip to ground clearance R	=	cm	150 ± 5	cm
Wingtip to ground clearance L	=	cm	150 ± 5	cm
Procedure: 1) Measure distance between L wingtip and R wingtip a 2) Measure distance between stab. tip and L wing root trailing edge b1 3) Measure distance between stab. tip and R wing root trailing edge b2 4) Compute the difference b1-b2 5) Measure distances between L wingtip and stabilizer ref. point c1 6) Measure distances between R wingtip and stabilizer ref. point c2 7) Compute the difference c1-c2				
	Measured		Design	
Wingspan a	=	mm	10700	mm
Difference (B1 - B2)	=	mm	Max 20	mm
Difference (C1 - C2)	=	mm	Max 20	mm



Control Deflections (mm)						
	Neutral		Up		Down	
	Measured	Design	Measured	Design	Measured	Design
Flaperon left (at flaps 0°)		0°		13° ± 1°		10° ± 1°
Flaperon right (at flaps 0°)		0°		13° ± 1°		10° ± 1°
Flaperon left (at flaps - or -5°)		5° ± 1°		18° ± 1,5°		5° ± 1°
Flaperon right (at flaps - or -5°)		5° ± 1°		18° ± 1,5°		5° ± 1°
Flaperon left (at flaps +1 or +9,5°)		9,5° ± 1°		3° ± 1°		21° ± 1,5°
Flaperon right (at flaps +1 or +9,5°)		9,5° ± 1°		3° ± 1°		21° ± 1,5°
Flaperon left (at flaps +2 or +20°)		20° ± 1,5°		6,2° ± 1°		31° ± 2°
Flaperon right (at flaps +2 or +20°)		20° ± 1,5°		6,2° ± 1°		31° ± 2°
Elevator		0°		25° ± 2°		15° ± 1,5°
	Neutral		Left		Right	
	Measured	Design	Measured	Design	Measured	Design
Rudder		0°		25°		25°

I declare the information on this document to be correct					
Measured by	Name Surname	Date		Signature	
Production Manager	Name Surname	Date		Signature	
I confirm acceptance of this document:					
Test pilot	Name Surname	Date		Signature	

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APPENDIX 99-E

APPENDIX 99-E**VENT/DRAIN HOLE LOCATIONS**

1. Two on the bottom surface of the wing at the wing root
2. One at each end of the air brake bay
3. One at each end of the flaperons
4. One at the bottom of the rudder
5. One near the horizontal stabilizer's hinges
6. One on the elevator
7. One on the bottom surface of the fuselage just aft of the undercarriage strut
8. One on the bottom surface of the fuselage near the control sticks

APPENDIX 99-F

1. Introduction

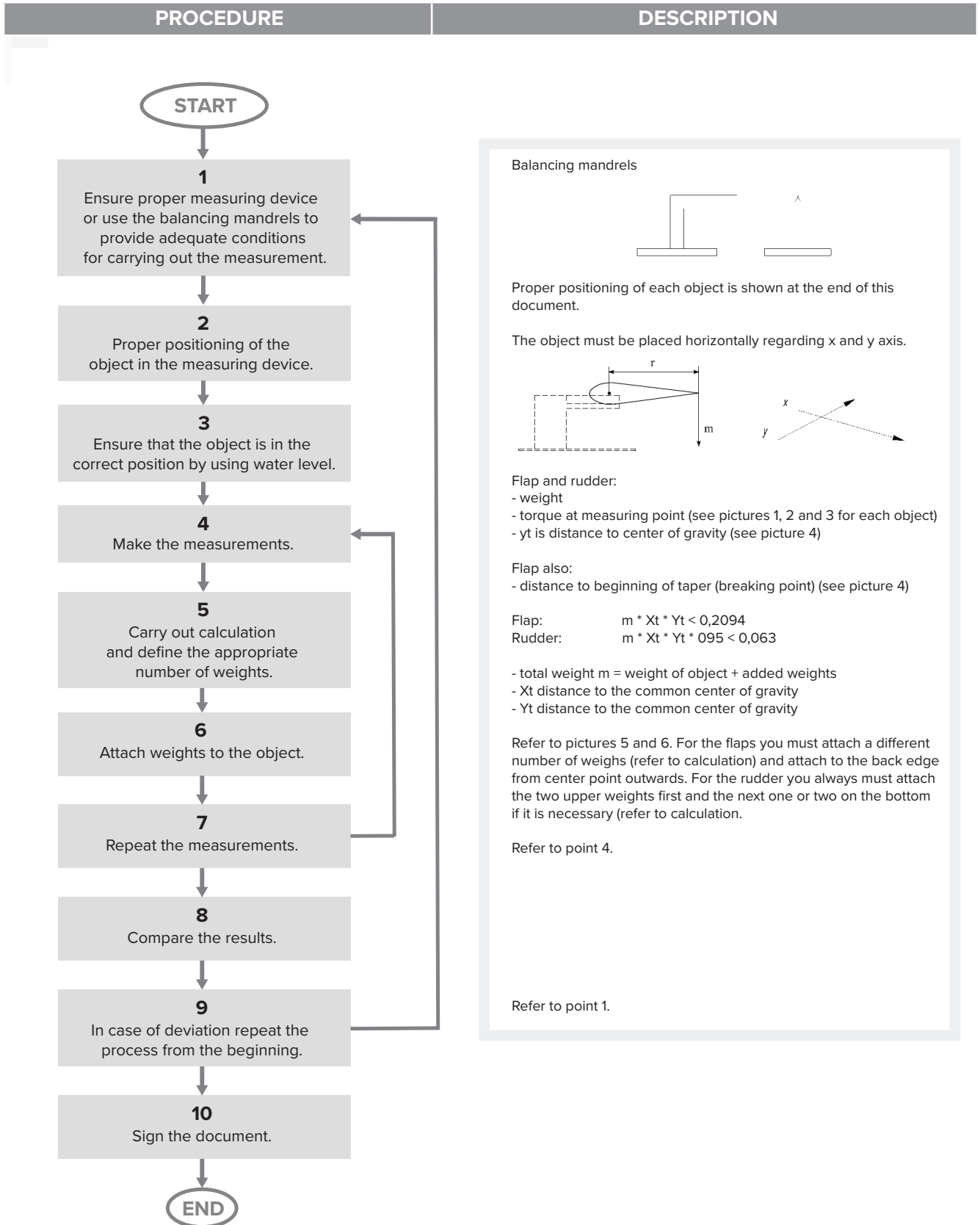
This is document, the procedure for mass balances, is to be used as a guide when balancing the Virus SW 121's wing flap, rudder and elevator. In the end, the goal is to balance all three control surfaces, which is essential to flight safety.

WARNING: This process must be carried out every time a control surface is in anyway altered (repainted, repaired, etc.), as this could affect its weight or balance.

2. Definition of production process related to scope of work for production

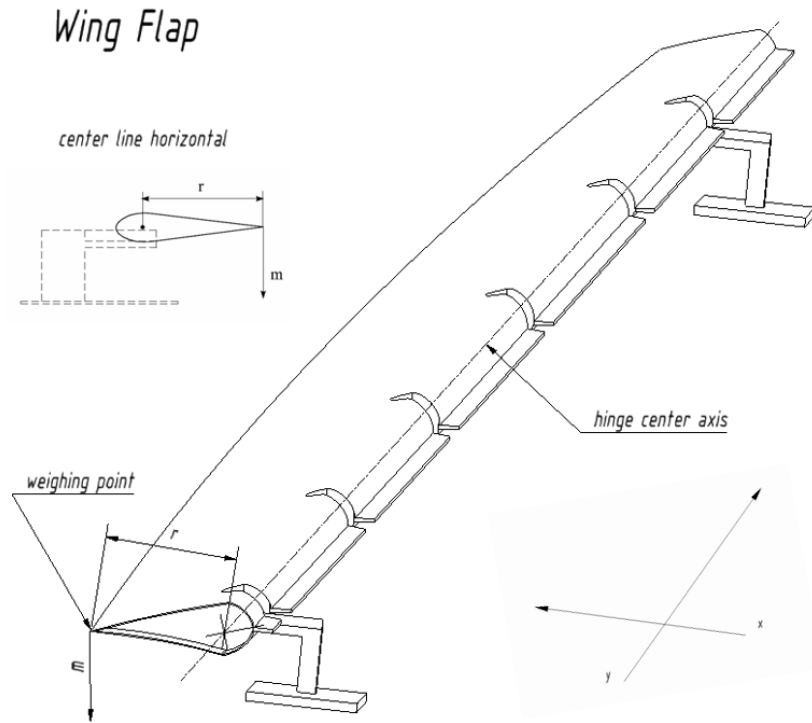
The contents of the documents shall be used to compare the complete installation of control surface mass balances on manufactured aircraft to the corresponding certification data.

3. Flow chart of procedure for mass balances

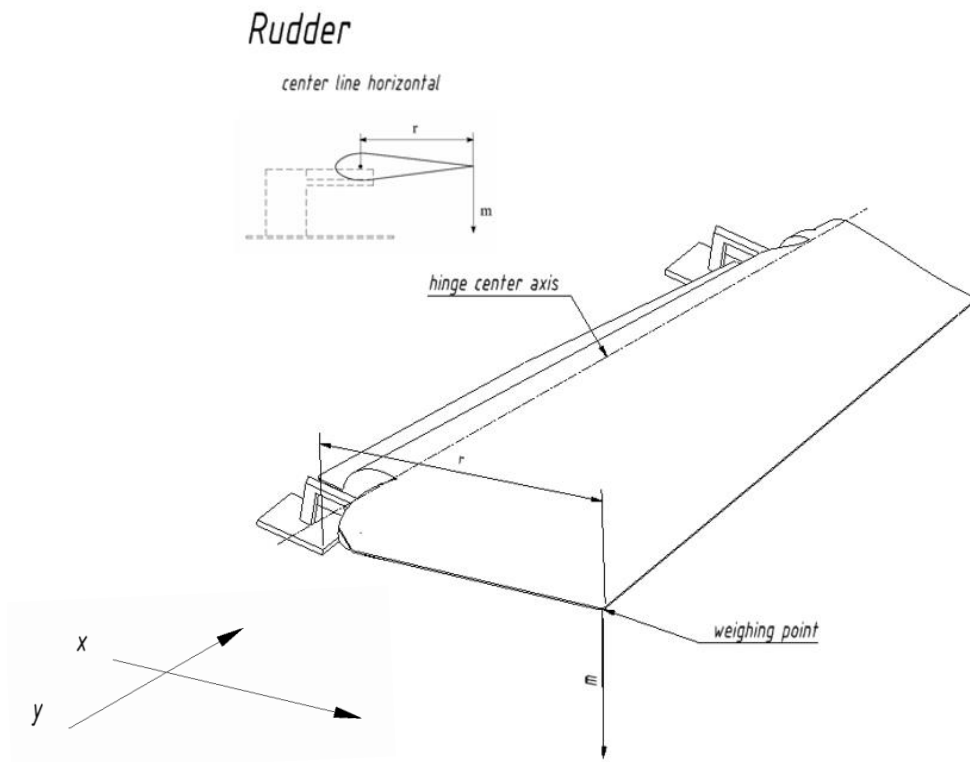


4. Corresponding pictures

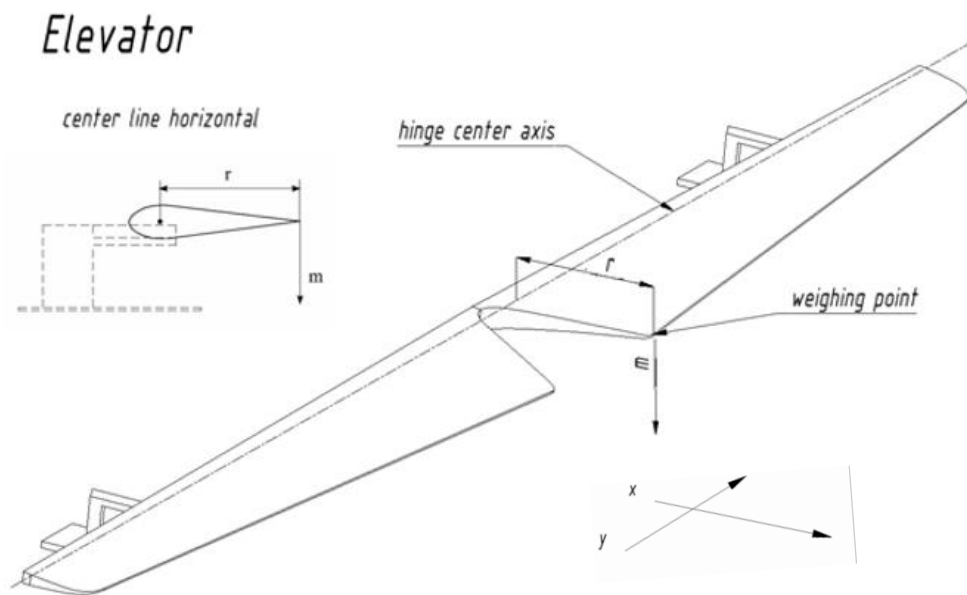
Picture 1:



Picture 2:

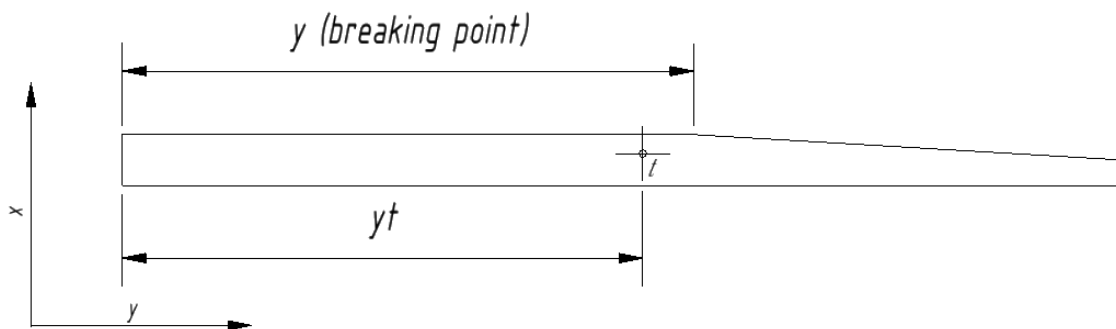


Picture 3:

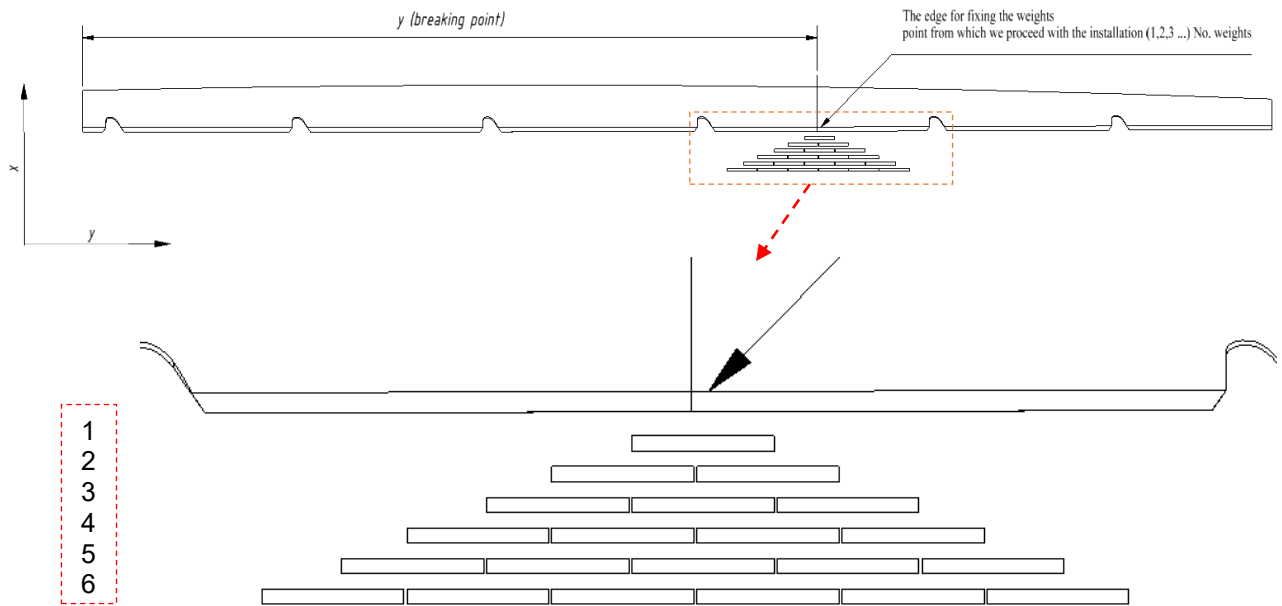


Picture 4:

- yt is distance to the center of gravity
- y distance to beginning of taper (breaking point)



Picture 5:



Picture 6:

Three different ways how to fix the weights - depends on the calculation.

