Airplane Maintenance Manual Supplement

Bristell B23-915 model

Doc. N°

ADxC-73-003-AMM Supplement Edition 1.0

Supplementing ADxC-73-001-AMM

The technical content of this document is approved under the authority of the DOA ref. EASA.21J.411

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Amendments

Issue	Date	Revised pages	Description
Edition 1.0	09.12.2021	-	first issue (DC-003)

List of Service Bulletins

SB No	Date	Title	Affected Serial no.'s	AD (EASA)
ADxC-73-SB-011	09.12.2021	Retrofit of air tow hook to B23-915	All SN B23-915	-

List of Effective Pages

Section	Pages	Appr.	Rev.	Date	Section	Pages	Appr.	Rev.	Date
00	1-6		1.0	09.12.2021[1]	28	1-10		1.0	09.12.2021
01	1-4		1.0	09.12.2021	51	1-2		1.0	09.12.2021
03	1-2		1.0	09.12.2021	61	1-4		1.0	09.12.2021
04	1-4	x	1.0	09.12.2021	71	1-4		1.0	09.12.2021
05	1-10		1.0	09.12.2021	72	1-16		1.0	09.12.2021
08	1-2		1.0	09.12.2021	73	1-4		1.0	09.12.2021
11	1-2		1.0	09.12.2021	74	1-2		1.0	09.12.2021
12	1-2		1.0	09.12.2021	77	1-2		1.0	09.12.2021
20	1-2		1.0	09.12.2021	78	1-4		1.0	09.12.2021
21	1-2		1.0	09.12.2021	79	1-4		1.0	09.12.2021
24	1-6		1.0	09.12.2021	80	1-2		1.0	09.12.2021
					91	1-2		1.0	09.12.2021

[1] Reissued with every revision.

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01 Introduction

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01-00 General

BRM Aero, s.r.o., the manufacturer of BRISTELL B23 airplanes, provides in accordance with the CS23 Amdt. 5 (AMC3 - CS-VLA) airworthiness requirements, information necessary to maintain airworthiness of BRISTELL B23-915 model airplanes.

This Maintenance Manual contains technical description of the design change DC-73-003, information on operation, maintenance, and repairs, description of systems and their functions related to the stated design change.

01-20 Related Publications

Information is also contained in the following documents issued by the airplane manufacturer and by manufacturers of equipment installed in individual airplane:[2]

BRM AERO

BRISTELL B23 Aircraft Maintenance Manual (referred to as main manual)
BRISTELL B23 Aircraft Flight Manual
BRISTELL B23-915 Aircraft Flight Manual supplement

ROTAX

- Operator's Manual for ROTAX 915 series engine
  OM-915 i A
- Maintenance Manual (line) for ROTAX 915 series engine
  MML-915 i A
- Maintenance Manual (heavy) for ROTAX 915 series engine
  MMH-915 i A
- Service Instruction for ROTAX 915 series engine: *SI-915 i-001 (Selection of suitable operating fluids for ROTAX Engine Type 912 i, 915 i, 912 and 914 (Series))*

TOST

- Air tow hook: Operating Manual Tow Release E85

K&N

- Air Filter: http://kandn.com/instructions/17152_inst.pdf
  http://kandn.com/instructions/18627C_inst.pdf

[2] Always refer to the latest issue of the corresponding manual/instruction

01-30 Address

BRM AERO, s.r.o.	Address:	Letecká 255 686 04 Kunovice Czech Republic
	Phone:	+ 420 773 984 338
	E-mail 1:	info@brmaero.com
	E-mail 2:	aero.brm@gmail.com
	Web:	http://www.brmaero.com

or for occurrence reporting

Aircraft Design Certification GmbH (DOA)	Address:	Reichensteinstr. 48 69151 Neckargemünd Germany
	Phone:	+49 176 322 69825
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	Web:	http://www.aircraftdc.de

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03 Description

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03-10 Change Description

The goal of the design change DC-73-003 for the Bristell B23 is to implement the more powerful Rotax 915 engine into the B23 airframe. Major modifications to the Bristell B23 type design are following:

- New powerplant installation:
  - New ECU controlled 141hp engine 915iSc3A featuring:
    - Turbocharger
    - Injection
    - Intercooler
    - 2nd water cooler
  - New engine mount to fit the suspensions frame from Rotax
- New upper & lower cowling:
  - New/repositioned openings for air inlet, cooling, exhaust, …
  - Upper cowling featuring two access hatches for oil and coolant level control
- New inspection access hatch on the fuselage belly skin for the main and auxiliary fuel pumps
- New instrument panel layout for Rotax 915 control switches
- Fuel selector “dual valve” type and with remote location
- Additional fuel return line into the RHS tank, to account for the higher return fuel volume
- Optional glider towing system

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04 Airworthiness Limitations

The Airworthiness limitations Section is approved, and variations must also be approved.

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04-10 Life Limited Components

04-10-01 Class I Parts Limitations

The following parts must be replaced or inspected as described below at the intervals specified in Table 1.

Inspection for welded steel components must include dye-penetrant or similar method.

Title	Drawing N°	Defined Interval
Engine Mount		
Tubes	71B510000N	Inspect every 5,000 hours Replace at 18,000 hours
Bolts (to airframe)*	AN5-26A AN5-32A	Replace at 1,000 hours*
Bolts (suspension frame to engine mount)	AN7-42A	Replace at 1,000 hours

Table 1 Class I Parts

* Visual inspection for ovalisation of bracket holes on fuselage side.

04-10-03 Air Tow Hook Limitations *(if installed; optional equipment)*

Air tow hook (TOST E85) time between overhaul is 10000 actuations. This corresponds to a maximum of 2000 take-offs.[3]
For general overhaul and servicing procedures refer to the operating manual referred to in section *01-20Related Publications*.

[3] A general overhaul interval of 4 years is recommended by the tow hook manufacturer

Mandatory Inspection procedure for Class I limited parts as per Table 1

Aircraft S/N.:	.....	**Total flight hours:**	.....
Registration mark:	.....	**No. of takeoffs:**	.....

Prescribed works	Made by	Checked by
Engine Mount		
Tubes 71B510000N - Remove engine cowlings. - Remove the engine with suspension frame and the engine mount. - Inspect the engine mount for deformation/damage. - Remove any paint according ASTM E1417. - Perform dye-penetrant testing according ASTM E1417. - Replace if damaged. - Paint with the materials defined in the main manual if undamaged and reinstall.		
-		

Notes:

Date: ..... Signature: .....

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05 Inspection and Maintenance

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05-00 Standard Practice

For removing/installing the upper cowling:

- Open all camlock quick connector
- Pull up and forward to pass the form-fit of the intercooler air inlet
- The air duct on intercooler is not attached to the engine or airframe and can be removed without tools
- When reinstalling, make sure the form-fit is applied correctly

For removing the lower cowling:

- Disconnect all hoses and connections attached to the lower cowling (including sensor connectors to the inlet airbox and the alternate air Bowden cable)
- After reinstallation verify the correct function of the alternate air Bowden cable/flap.

05-10 Time Limits

For Information about life limitation of installed avionics/equipment not listed herein refer to Chapter *01-20 Related Publications*.

05-10-01 Overhaul Schedule

Items shown here must be overhauled at the times indicated.

Item	Overhaul
Motor ROTAX 915 iSc3A	Refer to Maintenance Manual (Line) 915 Series, latest edition
All other items	On condition or as stated in the respective maintenance/overhaul manual

05-10-02 Replacement Schedule

Items shown here must be replaced at the times indicated.

Item	Replacement
Fuel fine filter	every 100h
Fuel coarse filter	on condition
All other items	On condition or as stated in the respective maintenance/overhaul manual

05-20 Scheduled Maintenance

05-20-01 Lubrication Plan

Unit	Area of lubrication	Every 100 hours	Lubricant
Engine	Throttle control cable on the inlet into terminal (in the engine compartment).	X	Engine oil

If towing system installed:

Unit	Area of lubrication	Every 100 hours	Lubricant
Tow hook	Bowden cable and release mechanism	X	Engine oil

05-20-02 Inspection after the first 25 Flight Hours

Aircraft S/N.:	**……**	**Total flight hours:**	**……**
Registration mark:	**……**	**No. of takeoffs:**	**……**

Prescribed works	Made by	Checked by
Engine and Propeller		
List of performed operations for engine is shown in Maintenance Manual (Line Maintenance) for installed engine		
Inspect and check tightening and securing bolts on the engine brackets, the engine suspension frame and the engine mount.		
Check the engine mount for occurrence of cracks, as well as the engine mount rubber shock absorbers.		
Check the exhaust system (and its attachment) for occurrence of cracks on the exhaust system and welds (see Chapter 78-00 *Check*). Remove heat exchanger for full inspection of the muffler surface.		
Inspect and clean the coarse fuel filter insert.		
Inspect and if needed replace the fine fuel filter.		
Inspect with borescope and if necessary clean the fuel strainers in the fuel tank outlets		

Notes:

Date: ..... Signature: .....

05-20-03 Periodical Inspection after 50 Flight Hours

Aircraft S/N.:	**……**	**Total flight hours:**	**……**
Registration mark:	……	No. of takeoffs:	……

Prescribed works	Made by	Checked by
Engine and Propeller		
Check the exhaust system (and its attachment) for occurrence of cracks on the exhaust system and on welds (see Chapter 78-00 *Check*). Remove heat exchanger for full inspection of the muffler surface.		
Inspect and clean the coarse fuel filter insert.		
Inspect and if required replace the fine fuel filter.		
If installed: Clean and lubricate the tow release system Clean the rear-view camera		

Notes:

Date: ..... Signature: .....

05-20-04 Annual Periodical Inspection or Inspection after 100 Flight Hours

Aircraft S/N.:	.....	**Total flight hours:**	.....
Registration mark:	.....	No. of takeoffs:	.....

Prescribed works	Made by	Checked by
AIRFRAME		
Preparation		
Perform aircraft daily inspection and engine start up, run up and shut down per AFM. Check all related functions. Check function of fuel selector valve. Do NOT shut-off the engine by fuel starvation.		
If glider towing system installed:		
Visually inspect all rivet connections of the tow hook structure to the fuselage structure, especially under the aerodynamic fairing.		
Visually inspect for occurrence of cracks on the tow system steel frame and welds.		
Inspect and check tightening and securing of bolts on the tow hook structure (ref. to the operation manual of the tow hook)		
Check straightness of the Bowden cable holder on the tow hook structure. Restore straightness or replace if necessary.		
Check tension of the Bowden cable manually. If excessive slack is present retighten by use of the Bowden cable terminals.		
Check wear of the Bowden cable and (crimp) connections to both end terminals (release handle in the cockpit and release lever on the hook). Replace cable if necessary		
Verify the function of the tow release system, including check for full opening of the tow hook		
Check clearance between elevator control tube and front bolt attachment of the tow system installation (inside of fuselage)		
Check Bowden cable installation attachments in fuselage		
Fuel System		
Visually check for fuel system tightness.		
Open access hatch to the fuel pump compartment on the belly skin of the front fuselage.		
Drain fuel system by opening the hose between the coarse fuel filter and the fuel pumps assy on the fuel filter side.		
Remove coarse fuel filter and clean it.		

Prescribed works	Made by	Checked by
Check condition and integrity of electrical fuel pumps and hoses in the fuel pump compartment		
Check tightness and condition of fuel pumps for occurrence of cracks on the pump body (see Chapter 28-20-01 *Check*)		
Drain fuel tanks and inspect fuel strainer filter in fuel tank by borescope for dirt and obstructions - **every 5 years only -**. Clean the fuel tank sumps as necessary		
Reinstall the coarse fuel filter.		
Check condition and integrity of fuel hose sleeves in the engine compartment		
Replace fine fuel filter, consider cutting old filter and inspecting components for wear, missing material and/or contamination. If unusual wear, missing material and/or contamination is found contact manufacturer.		
Engine and Propeller		
List of performed operations for the engine according to engine maintenance system, which is contained in Maintenance Manual (Line Maintenance) for installed engine.		
Inspect and check tightening and securing bolts on the engine brackets and between the engine suspension frame and the engine mount.		
Check the engine mount for occurrence of cracks, as well as the engine mount rubber shock absorbers.		
Check the engine bed for occurrence of cracks.		
Check the exhaust system (and its attachment) for occurrence of cracks on the exhaust system and on welds (see Chapter 78 *Check*). Remove heat exchanger for full inspection of the muffler surface.		
Check oil and coolant radiators, as well as intercooler, for attachment, free air passage, damage or chaffing		
Check condition and attachment of fuel, oil, coolant and drain lines as well as electric wiring		
Check condition of mechanical controls for throttle, propeller and alternate air.		
Adjust friction on throttle and propeller control if needed.		
If **glider towing** system installed:		
Tow release system		
Verify the function of the tow release system (incl. cockpit control to release system). Check for full opening of the tow hook.		
Check spring back of lever (after friction adjustment on throttle and propeller control)		

Prescribed works	Made by	Checked by
Finalization		
Close all access hatches, remount fairings and cowling		
Perform ground run and check flight		
Notes: Date: ..... Signature:		

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08 Leveling and Weighing

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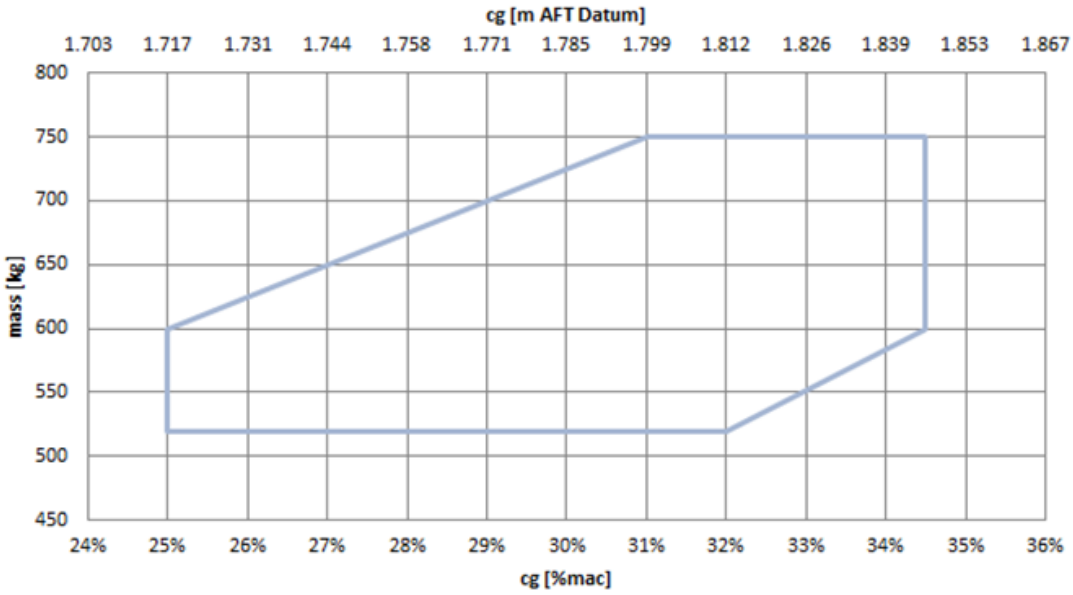
08-10 Weighing and Balancing

The weight and balance limits and procedures of the aircraft is not affected by the change.

08-10-02 Weight and Balance Envelope Limits



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11 Placards and Markings

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11-00 General

Surface paint is not affected by the change.

For placards and markings refer to flight manual ADxC-73-003-AFM.

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12 Servicing

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12-10 Replenishing

12-10-30 Coolant

Refilling Coolant

The expansion tank (spider) is not conforming to the Rotax IPC and B23-915 specific part (71B520020N) is installed. For spare part BRM Aero must be contacted.

Refill coolant into the expansion tank in the engine compartment. In addition to this there is an overflow bottle which collects coolant in case of engine overheating and is attached to the firewall.

For bleeding of the coolant system refer to the ROTAX manuals.

12-30 Unscheduled Servicing

12-30-31 Air Filter

Cleaning

- Disconnect all hoses and connections attached to the lower cowling (including sensor connectors to the inlet airbox and the alternate air Bowden cable)
- Unscrew the 4 self-tapping screws connecting the filter with the airbox
- Take out air filter
- Clean according to K&N instructions (refer to Chapter 01-20).
- Install in reverse order

20 Standard Practices – Airframe

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20-50 Adjustments and Tests

For procedure, instruction and other relevant data refer to basic aircraft Maintenance Manual ADxC-73-001-AMM.

20-50-01 Control Surface Deflections

The control surface deflections are shown in the following table:

Aileron	24° ± 2° up
	16° ± 3° down
Rudder	30° ± 2° right
	30° ± 2° left
Elevator	20° ± 2° up
	13° ± 2° down
Wing flap	0° ± 2°
	10° ± 2°
	25° ± 2°
Difference between L/R flap deflections	- 1.2°
Elevator trim tab	20° ± 2° up
	13° ± 2° down
Aileron trim tab	15° ± 2° up
	20° ± 2° down

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21 Air Conditioning

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21-00 General

Changes to the heating system introduced by DC-003 are described in the following:

21-40 Heating

Cockpit heating is ensured by hot air from the heat exchanger (see Fig. 3). The heat exchanger (3) is located on the muffler (2). Ambient inlet air (1) taken by the muffler is heated in the heat exchanger and supplied through heating flap (6) located on the firewall into the cockpit by air hose (2). Quantity of hot air is regulated by CabinHeat knob (11) on the instrument panel. Behind the firewall a up/down mixture flap (7) is located, which splits hot air flow into the canopy bubble outlet (9) and into the crew legs outlet (8). The mixture flap is controlled by the UP/DOWN knob (10).

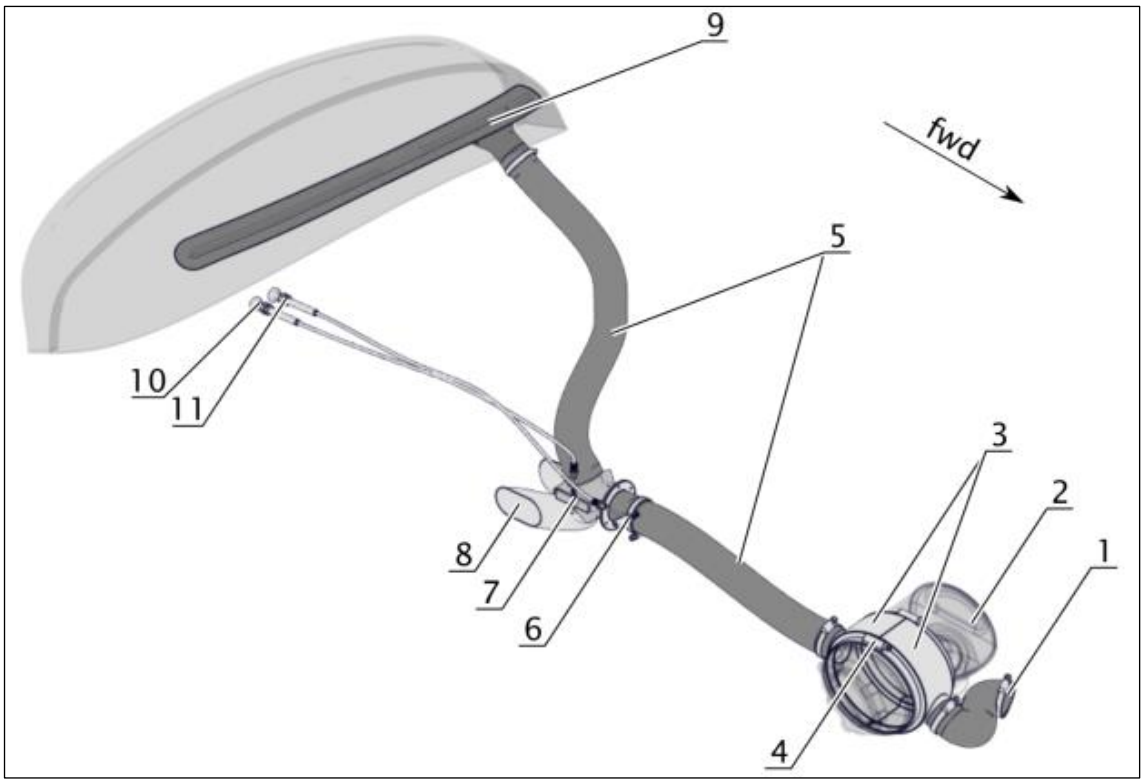

Fig. 3 Heating System

Item	Description	Item	Description
1	Air inlet (cowling connection)	2	Muffler
3	Heat exchanger (front & rear)	4	Clamp
5	Air hoses	6	Heating flap
7	Up/down mixture flap	8	Down outlet (crew legs)
9	Up outlet (canopy bubble)	10	UP/DOWN knob
11	CabinHeat knob		

24 Electrical Power

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24-00 General

The airplane is equipped with 14V DC electrical installations with grounded negative pole. The primary DC electrical sources are two internal AC generators (control only internally by the ECU/EMS) in combination with an external alternator. An additional source of electrical energy is the 12V battery, which is located on the firewall. It is used for starting the engine and in the case of generator/alternator failure as a back-up source of electric energy. An additional backup battery supplies the ADAHRS, PFD and EIS, the glare shield and flap position lights.

DC voltage is distributed to the individual systems by means of the main bus bar. Systems are protected by circuit breakers which are permanently ON and switches-circuit breakers which may be turned to ON as needed. If one of the circuits is overloaded, then the circuit breaker disconnects the circuit.

After switching the MASTER switch ON, activating Lane A and Lane B, switching the main fuel pump ON and by switching and holding the START POWER toggle switch and pressing the START BUTTON the starter is activated. The starter is supplied from the battery before starting the engine. After starting up the engine and reaching the idle RPM, the generator starts supplying current to the electrical network.

Information about voltage in the main bus bar is indicated by caution, warning display on the PFD (and corresponding LED light on the instrument panel).

24-30 DC Generation

24-30-01 Internal Generators

The Rotax 915 iSc3A engine is equipped with two internal generators (GEN A and GEN B) supplying the Engine management System (EMS) and the airframe with power (management of electrical power distribution of GEN A & GEN B is automatically controlled via the EMS). Conversion into DC power is through the fusebox with regulators, feeding nominal ~14V into the system.

24-30-02 Auxiliary Alternator

The auxiliary generator (ALT C) is mounted to the LHS of the engine and supplies electric current through the rectifier. Regulator supplies electric current of ~14V (at max. output power of 30A) to onboard network.

24-60 DC Electrical Load Distribution

24-60-01 Switches and Circuit Breakers

The switches serve for switching ON/OFF individual electrical circuits. There are two kinds of switches:

Switches-Circuit Breakers

- switching ON/OFF and protecting the electrical circuit from overloading together

Switches

- the classical for avionics circuit (no circuit breakers)
- the turn knob for flaps and dimmer
- the buttons for trims

Every switch is marked with a placard with designation of the circuit (see following Table). The switches are located on the instrument panel and on the middle channel. The buttons for aileron and elevator trim are on the grip of control stick. Wiring diagrams are shown in Chapter 91.

Switches		Switch-Breaker
Designation	**Description**	
MAIN PUMP	Electric fuel pump switch	-
LANE-A	LANE-A	-
LANE-B	LANE-B	-
START POWER	Start power toggle switch (spring loaded)	-
ENGINE START	Engine start button	-
MASTER	Main switch	-
GEN A/B	Generator A/B (int. generators)	x
ALT C	Alternator C (ext. alternator)	x
AVIONICS	G3X system, NAV/COM, Transpoder, intercom	x
EFIS	EFIS	x
PITOT H.	Pitot heat	x
STROBE	Strobe light	x
NAV-L	Navigation/position lights	x
LDG | WIGWAG	Landing light and wigwag light	-

AUX PUMP	AUX fuel pump switch	x
DAY/NIGHT	Preset for LED brightness	-
BACK PWR	Alternative power supply for engine via battery & ALTC	-
BCK-BAT	Backup Battery for G3X system and lights	-
Dimmer	Rotating knob dimming int. light	-

24-60-02 Fuses

Fuses serve for protecting individual electrical circuits from overloading. Every fuse is marked by the corresponding placard (see following Table). Fuses are located on the right instrument panel. Wiring diagrams are shown in CHAPTER 91 – WIRING DIAGRAMS.

FUSES		
Designation	**Description**	**Rating**
GEN A/B	Generator A/B (int. generators)	30
GEN A/B CTRL	GEN A/B Overvoltage Protection	5
BCK-BAT	Backup Battery	5
BUS TIE	Connecting GEN A/B and ALT C	20
ALT C	Alternator C (ext. alternator)	30
ALT C CTRL	ALT C Overvoltage Protection	5
BATTERY	Battery	30
BCK-PWR	backup power supply engine	30
PFD	Left hand side G3X screen	5
TRIM	Trim system	2
LDG	Landing Light	5
FLAPS	Flap motor and control	5
ADAHRS	G3X system component	2
NAV	NAV module	5
COM	Radio module	10
USB-1	USB plug (PED power)	3
EIS	Engine data module part of G3X	2
DIMMER	Dimmer	2
IC	Intercom	1
AP	Autopilot control interface	2
AP SERVO	Autopilot servos	5
MFD	Right hand side G3X screen	5
GPS	GPS module of G3X	3

XPDR	Transponder	3
USB-2	USB plug (PED power)	3
HEADSET	Headset power supply (Bose)	1
CAM	Rear view camera	1

28 Fuel

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28-00 General

The fuel system of Bristell B23 airplane consists of the following parts: two fuel tanks, fuel tubing, dual selector valve, main and aux fuel pump (electric), coarse and fine fuel filter, fuel level sensor, fuel pressure sensor and drain valves on the fuel tanks.

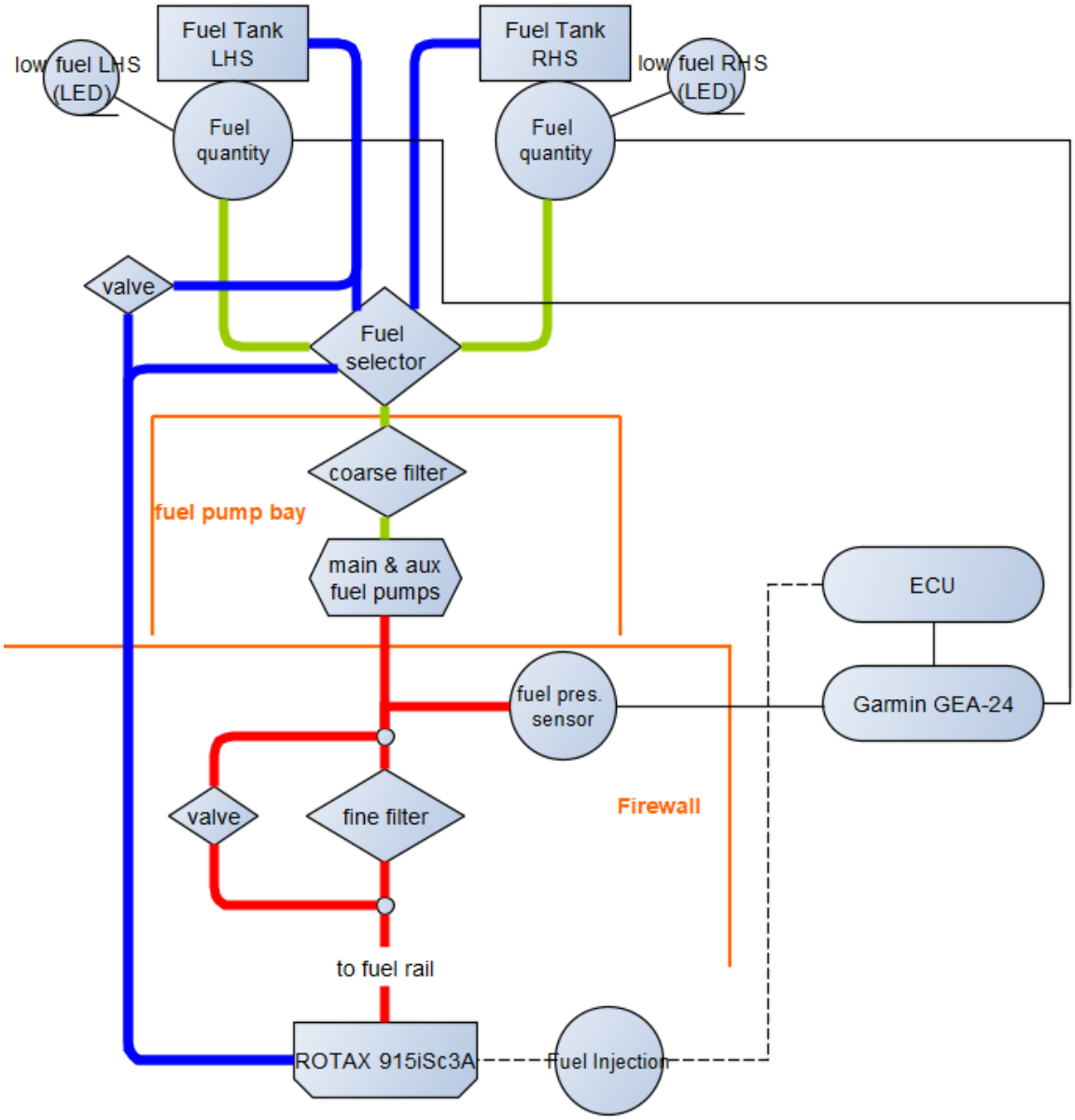

Figure 1 *Fuel System Scheme; green low pressure lines, red high pressure lines, blue return lines*

Checking Fuel System Tightness

NOTE **Tightness is checked by pressurized air or fuel. When performing a specific tightness check, outside temperature fluctuations must not be bigger than ±13°C (8°F). Reseal found out leakage by a suitable method – by tightening, by using a suitable sealing.**

Checking Airplane Fuel System Tightness by Air

⚠ DANGER **Explosion and fire hazard!**

- **Working on the fuel system is only allowed to persons who are fully instructed and familiarized with safety instructions.**
- **Do not work on the fuel system**
  during rain and storm
  in a closed space
  when the engine is operating or
  with electric system switched on.
- **Do not work on the fuel system nor allow any person to stay next to the aircraft, when wearing polyester clothing or any clothing from a material which creates static electricity.**
- **Do not smoke or handle with open fire nor allow any person to do so.**
- **Ensure airplane is grounded.**
- Drain fuel system.
- Disconnect fuel feed line from fuel rail
- Disconnect fuel return line from fuel rail
- Close the fuel return line; the fuel filler neck and the fuel vent line with appropriate plugs

NOTE **For checking the tightness of the LHS tank system additionally block the return bypass to the RHS tank.**

- Choose the correct tank to test and select with the fuel selector valve.
- Pressurize the system at the fuel feed line with 2 psi.
- Shut the air pressure supply. For 15 minutes there must not be any loss in pressure. Find out leakage by listening to and by soap water.
- Fuel selector valve – OFF position.

28-10 Storage

Fuel is stored in airplane in two fuel tanks. The fuel tanks are integrated part of the wing from Aluminum sheet and their volume is standardly 60 liters (15.85 US gal, 13.2 UK gal) each.

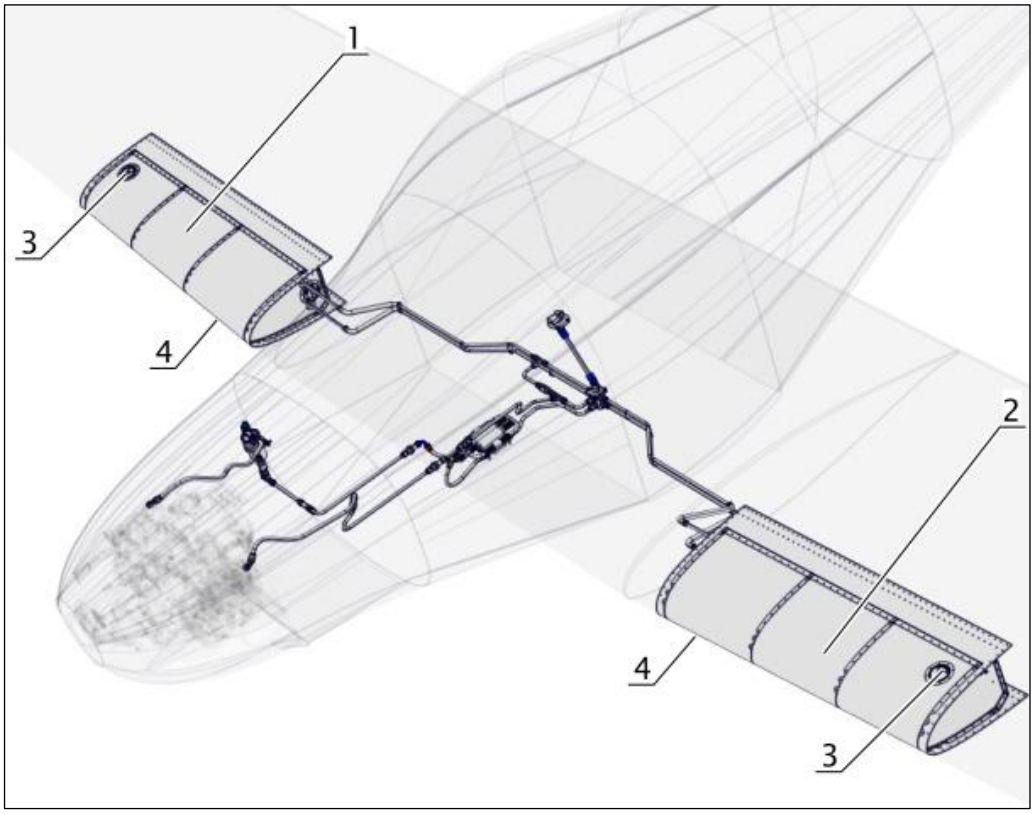

Figure 2 Storage

Item	Description	Item	Description
1	Fuel tank right	2	Fuel tank left
3	Filler caps	4	drain valves *(lower skin; not visible)*

28-10-01 Fuel Tank

The tanks (1 + 2, Figure 2) are located in the outer wings between ribs No.2 and 5 in front of the main spar. Each fuel tank has a filler neck with flush head filler cap (3), fuel level sender (2, Figure 3), venting tube, finger screen (1, Figure 3) and drain valve (4). Fuel is filled into the each tank through the filler neck, which is located on the top skin close to rib No.5. Fuel drain from the tank is possible through the drain valve (4) located in the rear corner of bottom skin close to the root fuel tank rib.

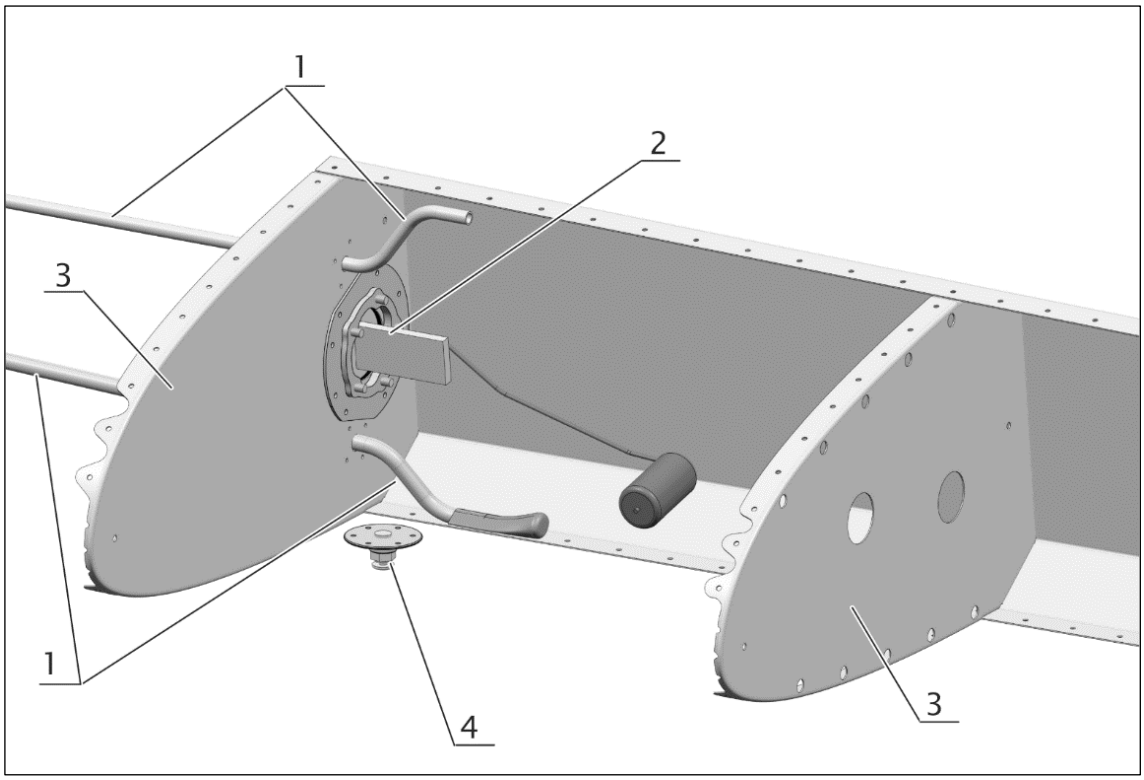

Figure 3 Fuel Tank (left)

Item	Description	Item	Description
1	Pick-up line	2	Fuel level sender
3	Rib	4	Drain valve

28-20 Distribution

Fuel flows from the tanks through the pick-up line (4, Figure 4) and fuel lines to the dual fuel selector valve (3), actuated by the fuel selector handle (1) over the handle extension (2). From the fuel selector valve the fuel is filtered in the coarse fuel filter (5) and led to the fuel pump assy (main and aux; 6) located in the fuel pumps bay. From there it passes the fine fuel filter (9) with an alternative way through the bypass (8) in case of clogged fine fuel filter. Upstream from the fine filter the fuel pressure is measured (7). After the fine filter the fuel is fed (10) into the fuel rail and from there distributed to the fuel injection pumps. The excess fuel is returned through the return line (11) into the chosen tank (left/right; 13). A bypass routing (12) feeds the return flow into the RHS tank to prevent overpressure in the return part of the fuel system with closed fuel selector valve. The fuel selector valve (3) works also for interruption of fuel supply in case of engine fire or for airplane long-time parking. The fuel selector is located on the middle console between the seats in the cockpit.

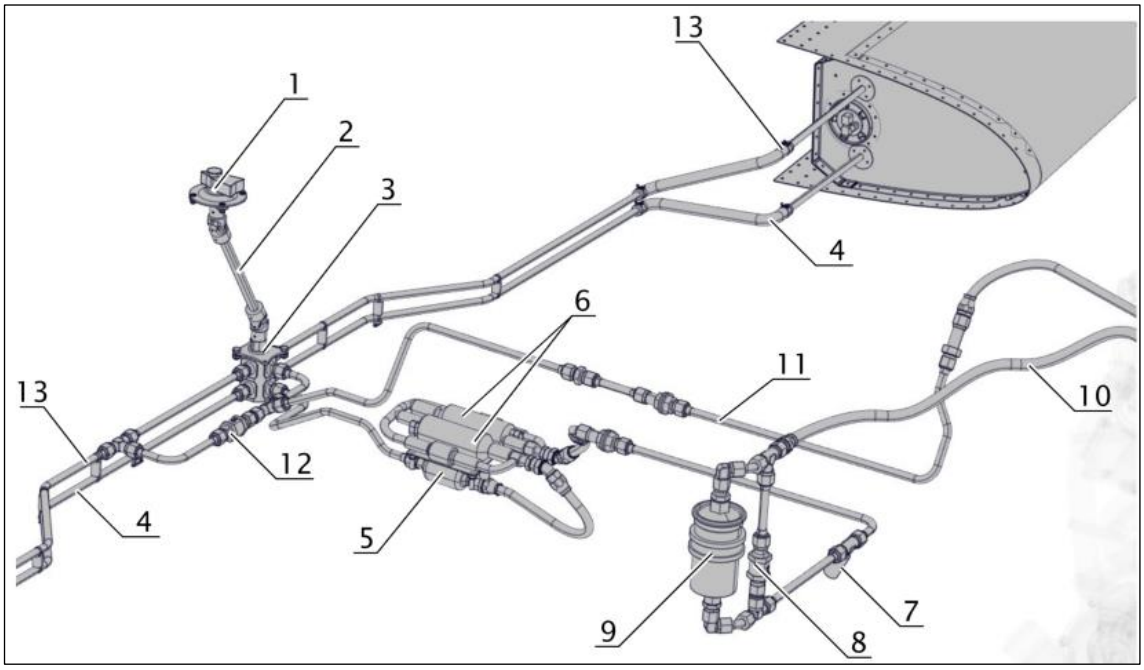

Figure 4 Distribution

Item	Description	Item	Description
1	Fuel selector handle	2	Fuel selector handle extension
3	Dual fuel selector valve	4	Fuel pick-up lines from tank
5	Fuel coarse filter	6	Fuel pumps (main and aux)

7	Fuel pressure sensor	8	Fine filter bypass (w. check valve)
9	Fuel fine filter	10	High pressure fuel feed line
11	Return fuel line (from engine)	12	Fuel return bypass (w. check valve)
13	Fuel return lines to tanks		

28-20-01 Electric Fuel Pump

Check

Check for Cracks

- Open the fuel pumps access hatch on the front fuselage belly skin.
- Check the fuel pump assembly (pump bodies, hoses,etc.) for cracks, especially inlet and the outlet hoses.
- If cracks are detected, immediately exchange the fuel pump assembly.

Checking Fuel Leakage

- Perform fuel system inspection and visually inspect fuel pump (pump bodies, hoses, etc.), especially fuel pump inlet and outlet hose, for fuel leakage (e.g. droplets, “wet-spots”).
- In case of fuel leakage, find out the reason and if necessary, exchange the fuel pump assembly.

28-20-02 Pick-up Line

The pick-up line is located on the feed line on root tank rib. It isn`t removable. For cleaning the fuel sensor can be removed.

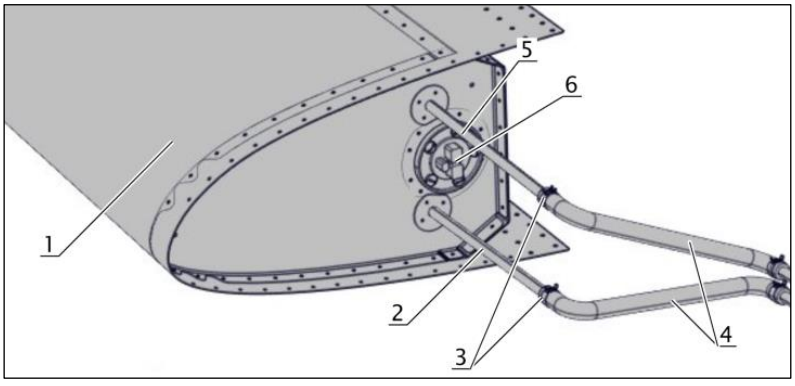

Figure 5 *Pick-up Line*

Item	Description	Item	Description
1	Fuel tank	2	Pickup-line
3	Clamp	4	Fuel hose
5	Return line	6	Fuel level sensor

28-20-03 Fuel Drain

Removal

Tools needed:	wrench size: 1/2 in

- ► Drain the fuel from the tank.
- ► Unscrew the drain valve from the tank and remove it.
- ► Check “O” ring and the spring.

Installation

Tools needed:	wrench size: 1/2 in

- ► Set drain valve in the tank – use LOCTITE 565 or equivalent sealant.
- ► Fill the tank with fuel and check drain valve tightness.

28-40 Indicating

Fuel quantity is measured by the fuel float gauges (also refer to Fig. 3). The float position is converted to an electrical signal and fuel quantity in the tank is indicated on the PFD/MFD screen. The fuel system provides a hard-wired low fuel warning light in the instrument panel (LED).

28-40-01 Fuel Level Sensor

Removal

Tools needed:	screwdriver

- ► Remove the wing (see Chapter 57-20).
- ► Disconnect fuel level sensor wire.

- Unscrew bolts and remove fuel level sender from root fuel tank rib.

Installation

Tools needed:	screwdriver

- Set sealing on the fuel tank flange.
- Set position and length of the fuel level sender lever according to Fig. 5.
- Carefully put the fuel level sender into the tank and attach it using bolts with washers – use LOCTITE 565 or equivalent sealant on bolts thread.
- Connect electrical wires to the fuel level sender (electrical connection – see Chapter 91).
- Install the wing (see Chapter 57-20).
- Check fuel system tightness (see Chapter 28-00).
- Connect the battery, switch on the master and avionics switch
- Check if fuel level is correctly indicated on the Garmin system (red range and additional alert from low fuel level sender) for quantities below 5l.

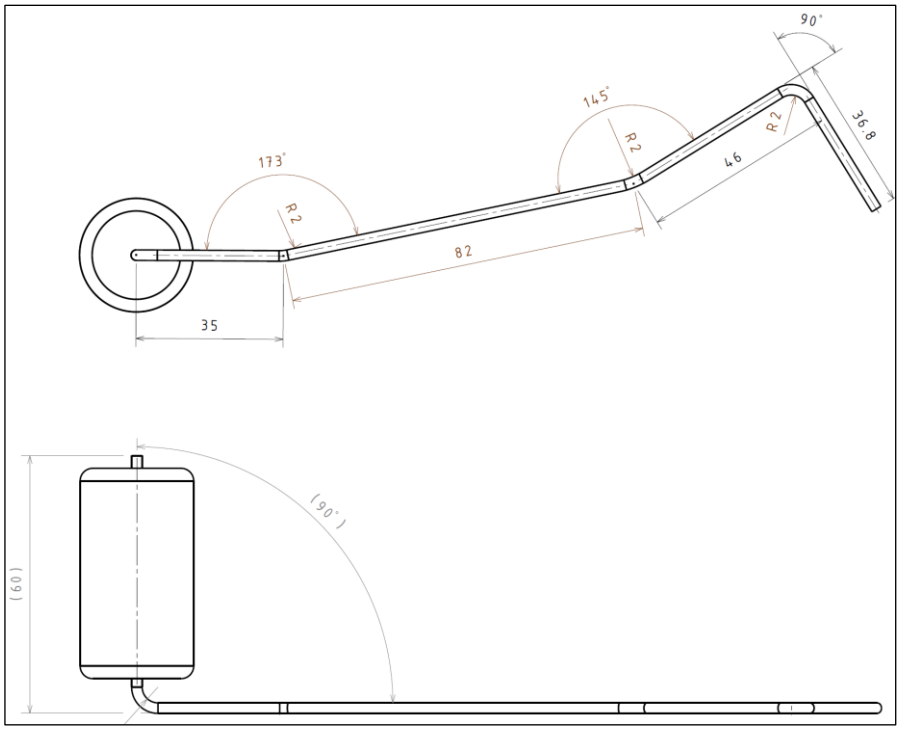

Figure 5 Float Mechanism

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51-00 General

51-00-01 Access Panel Identification

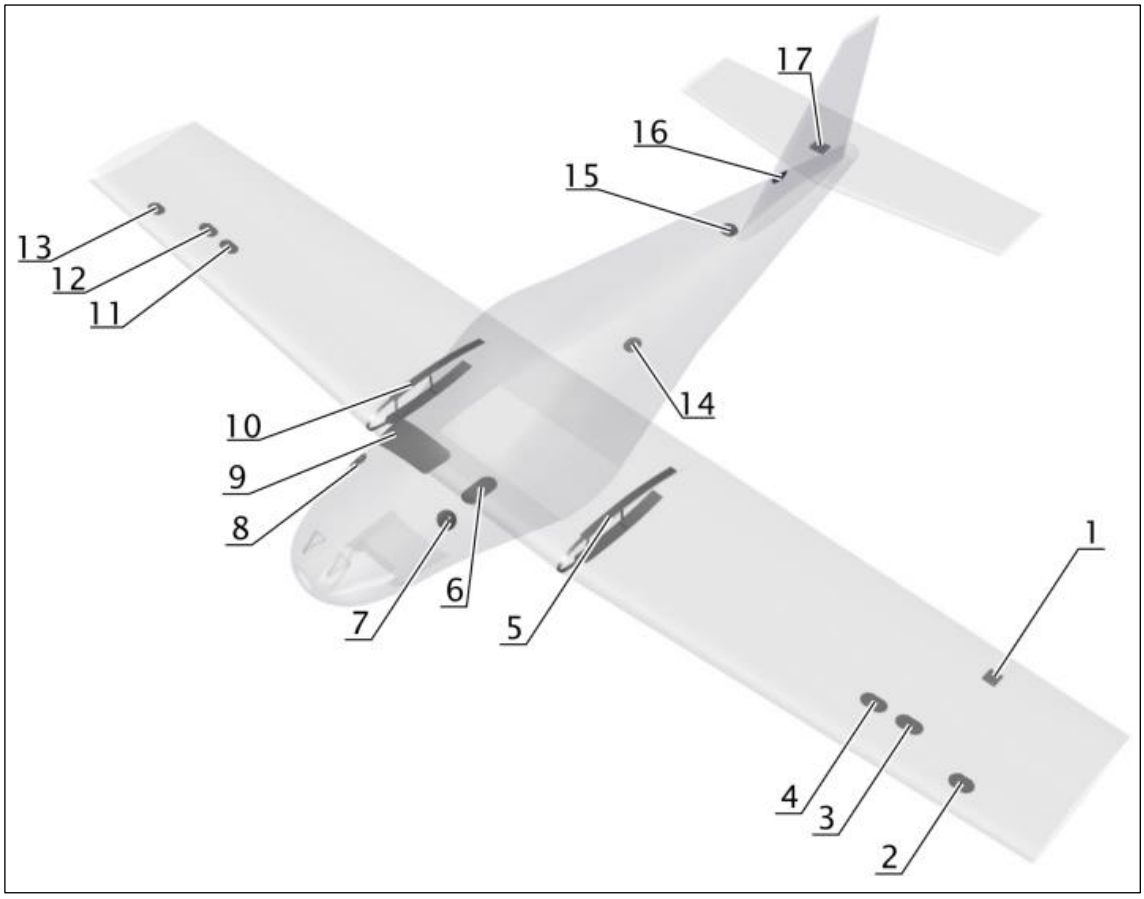

Fig. 1, Sheet 1 Access Panel Identification (outside)

Item	Description	Item	Description
1	Aileron trim access panel	2-4	LH wing access panels
5	LH wing gap cover	6	fuel pump bay access hatch
7	Oil hatch	8	Coolant overflow bottle hatch
9	AEPS (egress) panel	10	RH wing gap cover
11-13	RH wing access panels	14	Bottom fuselage access panel
15	Top fuselage access panel	16	Stabilizer access panel
17	Elevator trim access panel		

Except from the oil and coolant hatch, which have a latching mechanism, all access panels are attached to the aircraft skin by means of AN526C832R8 bolts screwed into MS21047L08 anchor nuts.

The wing gap covers are attached to the wing by means of M4x12 ISO 7380-2 A2 bolts with 5,3 DIN 6798 ZN serrated lock washers screwed into 9407-40300 nuts.

51-80 Electrical Bonding

Refer to the following drawings presented in Chapter 91 Charts:

34B520000N

34B540000N

61 Propeller

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61-00 General

The MTV-34-1-A/175-200 is a high performance, low weight 3 bladed hydraulic constant speed composite propeller for the ROTAX 915 series engine.

The new MTV-34-1-A/175-200 feature the following:

- Low Propeller weight – 9 kg (19,8 lbs) for the 3-blade plus Governor P-110-051/A (1 kg / 2,2 lbs)
- Scimitar blade shape for high performance and noise reduction
- Stainless steel leading edge for all weather operation
- Latest high efficiency airfoils
- Smooth run due to close manufacturing tolerances (CNC machined)
- Vibration approved on the ROTAX 915 series
- EASA certified
- Refer to the documentation supplied with the propeller for more details.

Removal

Tools needed:	wrench size No. 16 (5/8 in)

Refer to Fig. 2.

- ► Disconnect the board battery and remove spark plugs from the engine.
- ► Loosen the bolt (1) from the tension bar (2) and the upper connecting bolt (1) of the external alternator
- ► Remove V-belt (3)
- ► Unscrew the self-locking nuts (4) using nut wrench size 16, remove the washers and take out the propeller along with other parts from the flange.
- ► Put the washers and screw the nuts (4) back on the bolts, securing the pulley carrier (5) and pulley (6) on the propeller flange
- ► Put the protective covers on the propeller blades
- ► Store the propeller on a safe place so that no damage can occur.

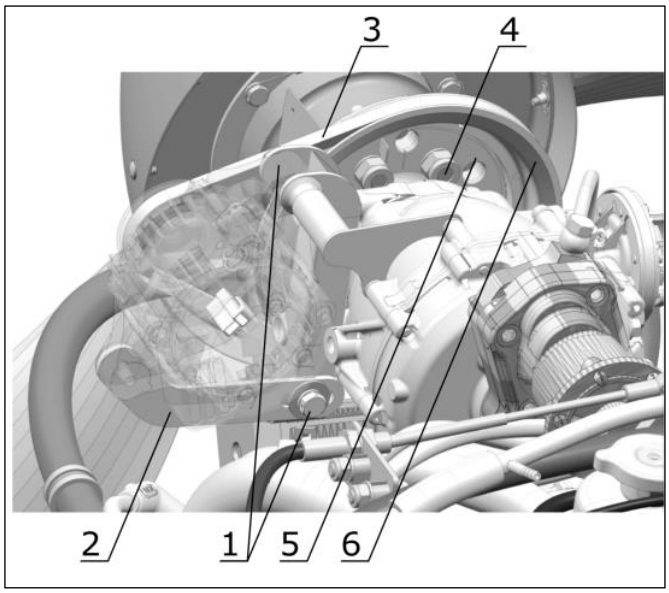

Fig. 2 *Removal/Installation of Propeller*

Item	Description	Item	Description
1	Alternator Bolts	2	Tension bar
3	V-belt	4	Propeller Bolts
5	Pulley carrier	6	Pulley

Installation

Tools needed:	wrench size No. 16 (5/8 in)

NOTE **Follow the instructions in the Operation, Installation, and Maintenance Manual, Section 5. Installation and Operation Instructions to install the MTV propeller.**

61-20 Controlling

MTV-34-1-A/175-200 propeller control lever (1) is located together with the throttle control on a quadrant between seats. Propeller control lever is connected through a Teleflex cable (2) with the propeller hydraulic governor (3). Once an engine rpm is selected it will be held constant at variations of airspeed and power.

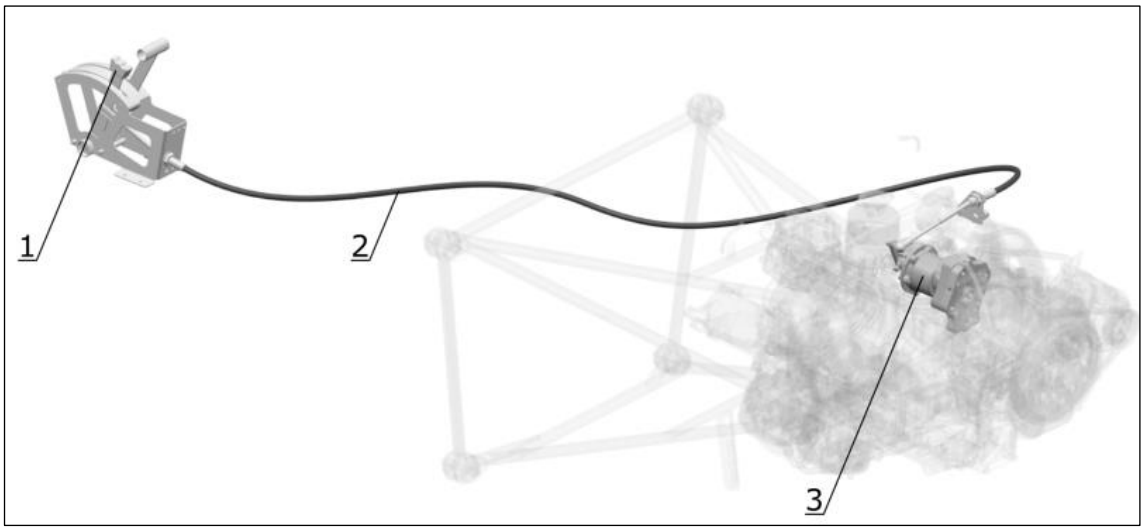

Fig. 3 *Propeller control*

Item	Description	Item	Description
1	Propeller control lever	2	Teleflex cable
3	hydraulic governor		

NOTE **Follow the instructions in the Installation Manual, Chapter 61-00-00 Section 3 for installation and removal.**

71 Power Plant

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71-00 General

Power unit of BRISTELL B23-915 model airplane is the ROTAX 915 iSc3 A engine and MTV 34 1 A/175-200 in flight adjustable 3-blade propeller. Both, engine (EASA-TCDS E.121) and propeller (EASA-TCDS P.049) are certified.

ROTAX 915 iSc3A is a turbocharged 4 stroke, 4 opposed - cylinder engine, central cam shaft and OHV - mechanism with maximal power of 104 kW (141 hp) at 5800 RPM.

71-10 Cowling

Engine cowling (Fig. 1) consists of two parts: upper cowling and lower cowling. The upper cowling (1) is attached by means of quick fasteners – Camlocks (6) to the firewall and to the lower cowling (2). Unlock the quick fasteners by turning the bolt by 90° counter-clockwise. The oil access cover (7) which is located on the upper cowling on the left side in front of the firewall enables to check oil quantity in the oil tank without removing the upper cowling and without the use of tools. The coolant access cover (8) is mirrored on the RHS for preflight check of coolant level in the overflow bottle.

The lower cowling (2) is attached by means of quick fasteners to the firewall and to the upper cowling (1). The front part of the lower cowling features two large openings for: oil radiator (3) and front water cooler (4). Behind these openings a smaller hole supplies the heating system with air (5). A large NACA scoop (9) on top of the upper cowling is the air inlet for the intercooler and the rear water cooler. Two smaller NACA scoops supply a constant airflow into the engine compartment. The outlet consists of a large opening on the lower cowling next to the firewall (12). By means of a “suction lip” a pressure gradient is created, increasing the airflow through the engine compartment.

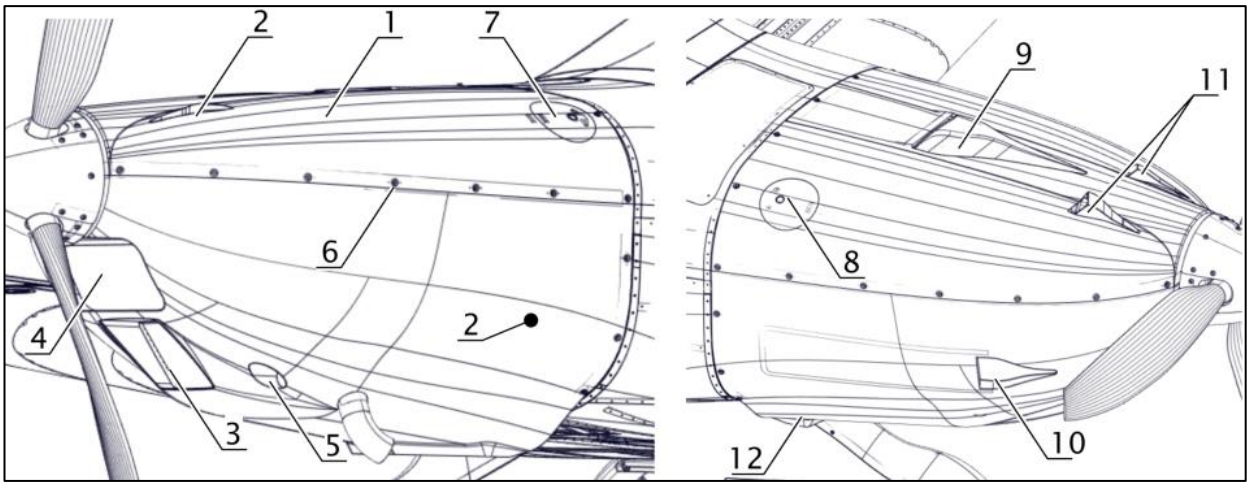

Fig. 1 *Engine Cowling*

Item	Description	Item	Description
1	Engine upper cowling	2	Engine lower cowling
3	Air inlet for oil radiator	4	Front water cooler air inlet
5	Heating air inlet	6	Quick fasteners – Camlocks
7	Access hatch to oil tank	8	Access hatch to coolant overflow bottle
9	Rear water cooler & intercooler air inlet	10	Primary air inlet
11	Engine cooling air inlet	12	Engine compartment air outlet

71-20 Mounts

The engine mount connects the power unit to the airplane. It is welded from 4130 steel tubes and is attached to the firewall on one side and to the engine suspension frame, on the other side, by means of bolts. Between engine mount and suspension frame the connection is by four bolted attachments through rubber shock absorbers as depicted in Fig. 2.

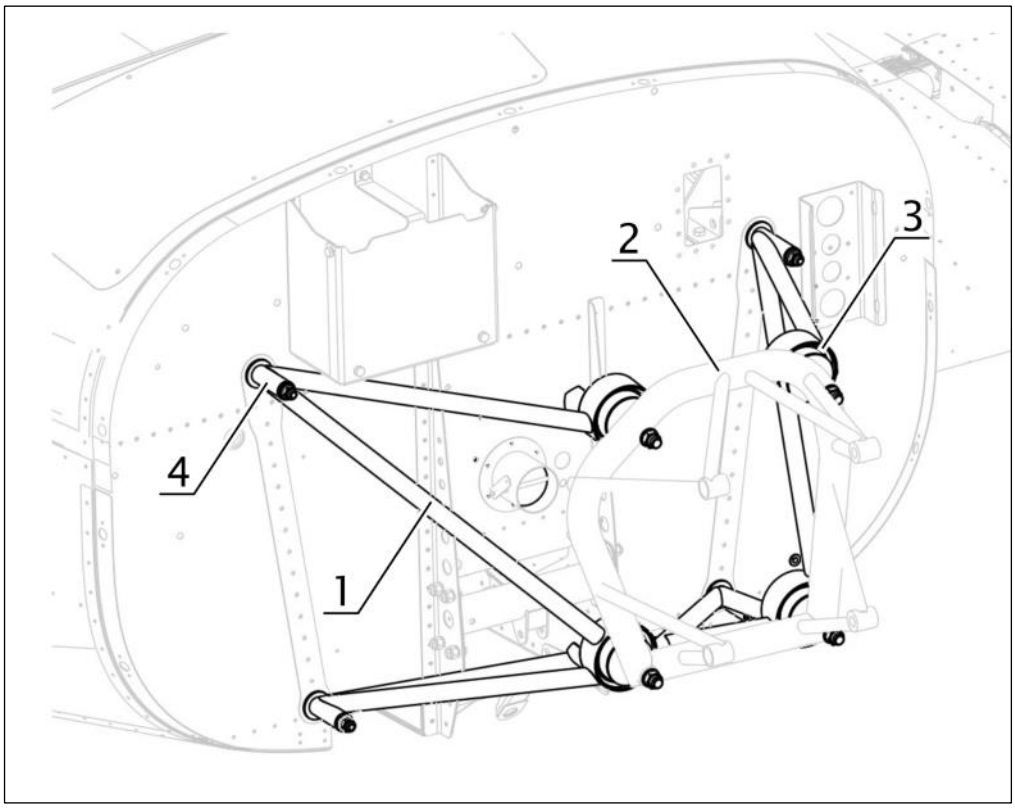

Fig. 2 *Rotax Engine Mount*

Item	Description	Item	Description
1	Engine mount	2	Engine suspension frame
3	Connection bolts with rubber mounts	4	Attachment bolts to firewall

72 Engine

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72-00 General

ROTAX 915 iSc3 A is a turbocharged, four-stroke, four-cylinder, opposed - cylinder engine, central cam shaft and OHV - mechanism with maximal power of 104 kW (141 hp) at 5800 RPM.

Technical Data

Engine Model:		**ROTAX 915 iSc3 A**
Engine Manufacturer:		**Bombardier-Rotax GMBH**
Power	***Max Take-off:***	**141 hp at 5800 rpm, max.5 min.**
	Max. Continuous:	**135 hp at 5500 rpm**
Engine RPM	***Max. Take-off:***	**5800 rpm, max. 5 min.**
	Max. Continuous:	**5500 rpm**
	Idling:	**1800 rpm**
Manifold Air Pressure (MAP)	***Minimum***	***60hPa (1.77 in. HG)***
	Maximum	***1730hPa (51in. HG)***
Coolant temperature (CT)	***Minimum:***	**50 °C (122 °F)**
	Maximum:	**120 °C (248 °F)**
	Optimum:	**80 – 110 °C (176-230 °F)**
Oil temperature	***Minimum:***	**50 °C (122 °F)**
	Maximum:	**130 °C (266 °F)**
	Optimum:	**90 – 110 °C (190-230 °F)**
Oil pressure:	***Minimum:***	**0.8 bar (12 psi) - *below 3500 rpm***
	Maximum:	**7 bar (102 psi) - cold engine start**
	Optimum:	**2 - 5 bar (29 – 73 psi) - *above 3500 rpm***
Fuel pressure	***Minimum:***	***2.9 bar (42 psi), (max 3 sec: 2.5 bar)***
	Maximum:	***3.2 bar (45 psi), (max 3 sec: 3.5 bar)***
Exhaust gases temp.	***Maximum:***	***950 ° C (1742 °F)***
Engine start, operating temperature	***Maximum:***	***50 °C (120 °F) (ambient temperature)***
	Minimum:	***-40 °C (-40 °F) (Oil temperature)***

Coolant Type

Ethylene-glycol based with 50% water dilution acc. current version of Rotax Service Instruction SI-915-001.

NOTICE **The conventional (glycol/water) coolant may not be mixed with coolant concentrate (propylene glycol) or with additives.**

Modified parts

Following parts of Rotax IPC are modified by BRM:

- Expansion tank (ROTAX PN 922664) -> 71B520020N
- Water cooler (ROTAX PN 997086) -> 71B520010N
- Intercooler (ROTAX PN 888962) -> 71B550050N
- Muffler (ROTAX PN 979475) -> 71B540001N

For replacement of these parts contact the manufacturer BRM Aero

NOTICE **Modified parts can not be ordered through ROTAX but are custom BRM parts. Replacement engines must be modified according to BRM information, see Appendix drawing 71B500000N sheet 5/5**

Fuel Type

ATTENTION
Obey the latest edition of Service Instruction SI-915 i-001, for the selection of the correct fuel.

ATTENTION
Use only fuel suitable for the respective climatic zone.

NOTE

Risk of vapour formation if using winter fuel for summer operation.

Antiknock properties

Fuels with following specification can be used:

	Usage/Description
	915 iSc/iS
Anti knock properties	Min. RON 95

NOTE

For fuels according to ASTM D4814 specifications following AKI (Anti Knock Index) value has to be observed: min. AKI 91.

MOGAS

	Usage/Description
MOGAS	915 iSc/iS
European standard	EN 228 super EN 228 super plus

AVGAS

AVGAS 100LL places greater stress on the valve seats due to its high lead content and forms increased deposits in the combustion chamber and lead sediments in the oil system.

	Usage/Description
AVGAS	915 iSc/iS
Aviation Standard	AVGAS 100 LL (ASTM D910)

Oil Type

ATTENTION

Obey the manufacturer's instructions about the lubricants.
If the engine is mainly run on AVGAS more frequent oil changes will be required. See Service Information SI-915 i-001, latest edition.

Oil type

For the selection of suitable lubricants refer to the additional information in the Service Information SI-915 i-001, latest edition.

Oil consumption

Max. 0.06 l/h (0.13 liq pt/h)

Oil specification

- Use only oil with RON 424 classification

NOTE

The ROTAX® Norm 424 (RON 424) is a BRP-Rotax internal standard, which is only available on special request via the ROTAX® authorized distributor and will not be disclosed to third parties without prior consent.

- Due to the high stresses in the reduction gears, oils with gear additives such as high performance motor cycle oils are required.
- Because of the incorporated overload clutch, oils with friction modifier additives are unsuitable as this could result in clutch slippage during normal operation.
- Heavy duty 4-stroke motor cycle oils meet all the requirements. These oils are normally not mineral oils but semi- or full synthetic oils.

- Oils primarily for Diesel engines have **insufficient high temperature properties and additives which favour clutch slipping, and are generally** unsuitable.

Oil viscosity

Use of multi-grade oils is recommended.

NOTE

Multi-viscosity grade oils are less sensitive to temperature variations than single grade oils.
They are suitable for use throughout the seasons, ensure rapid lubrication of all engine components at cold start and get less fluid at higher temperatures.

Type of oil used by aircraft manufacturer is shown in Chap. 12-00-01

Removal

Tools needed:	wrench size 8, 9, 10, 12, 17, 9/16 in Allen wrench size 8 screwdriver cutting pliers, pliers Cobra pliers (for clamps)

- Remove upper cowling
- Remove cooling air inlet duct (for intercooler and rear water cooler)
- Disconnect all hoses and electrical connections to the lower cowling
- Disconnect alternate air flap Bowden cable
- Remove lower cowling
- Disconnect and remove the board battery.
- Remove the propeller (see Chapter 61-00 *Removal*).
- Disconnect all electrical system wires and bondings between engine, engine mount and firewall.
- Close the fuel selector valve (possibly drain fuel from the fuel installation in front of fuel selector by opening hose in front of fuel pump assembly).
- Drain oil from the engine (see Chapter 12-10-20 of the main manual) and cooling liquid (see Chapter 12-10-30).
- Disconnect hoses of the oil and the cooling system.
- Disconnect all air hoses from/to turbocharger and intercooler
- Disconnect water hoses from and to the rear water cooler (below intercooler)
- Remove the oil cooler (see Chapter 79-20-01 *Removal*) and the front radiator Chapter 72-20-11 *Removal*).
- Remove air filter box (see Chapter 72-20 *Removal*).
- Remove the exhaust system (see Chapter 78-00 *Removal*)).
- Blind all the holes on the engine so that no impurity can get into the engine.
- Remove screws attaching the engine mount to the suspension frame.
- Take the engine away from the engine mount by crane or with help of 2 assistants.

- Store the removed engine on a safe place on a suitable support and prevent it from damage and contamination.

To further remove the engine mount from the firewall follow these steps:

- Unscrew nuts and remove washers (engine compartment)
- Remove the bolts from cockpit side of the firewall

Installation

Tools needed:	wrench size 8, 9, 10, 12, 17, 9/16 in Allen wrench size 8 screwdriver cutting pliers, pliers Cobra pliers (for clamps)

If the engine mount itself is removed follow these steps:

- Position the engine mount on the firewall
- Plug the screws through the corresponding holes from the cockpit side of the firewall
- Install washers and nuts

NOTE

USE two washers for the lower connection and only one for the upper connection points

- Tighten up applying torque moment **22±2Nm.**

Install the engine on the engine mount according to Fig. 3:

- Put the engine (mounted on the suspension frame) back on the engine mount by the crane or with 2 assistants and attach it by the screws
- Attach engine suspension frame to the engine mount as depicted in the figure below

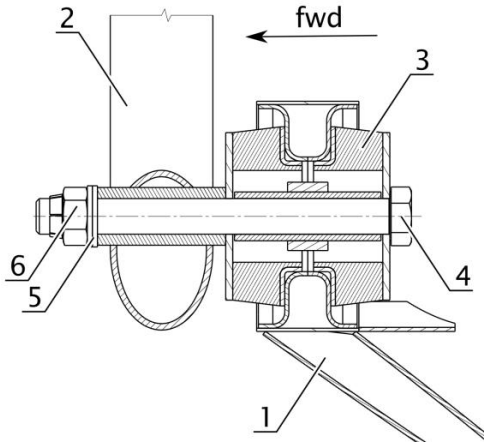

Fig. 3 *Suspension Frame – Engine Mount connection*

Item	Description	Item	Description
1	Engine mount	2	Engine suspension frame
3	Rubber mounts	4	Connection bolts
5	Washers	6	Self-locking nut

NOTE **USE <u>two washers for the upper connection</u> (as depicted) and only <u>one for the lower</u> connection points**

- Tighten up applying torque moment **54±2Nm**. Install the exhaust system (see Chapter 78-00 *Installation*).
- Connect wiring according to the wiring diagrams (see Chapter 78).
- Install oil cooler (see Chapter 79-20-01 *Installation*).
- Install front water cooler (see Chapter 72-20-11 *Installation*).
- Connect and secure oil system hoses.
- Connect and secure fuel system hoses.
- Connect all air hoses from/to turbocharger and intercooler
- Connect water hoses from and to the rear water cooler (below intercooler)
- Install air filter box of the engine (see Chapter 72-20 *Installation*).
- Connect air hose from the heat exchanger for heating of the airplane cockpit.
- Fill the prescribed amount of oil and cooling liquid quantity.

- Check fuel system tightness (see Chapter 28-00 *Checking Fuel System Tightness*).
- Install the propeller (see Chapter 61-00 *Installation*).
- Install and connect the battery.
- Install cooling air inlet duct (for intercooler and rear water cooler)
- Connect Bowden cable of the alternate air flap.
- Install lower engine cowling
- Install all hoses and electrical connections to the lower cowling
- Install upper cowling
- Perform engine test (see *Checks*).

Checks

Engine Check

NOTE

The person performing the engine test must have the corresponding approvals and be familiarized with the aircraft type BRISTELL B23-915.

- Perform the test out of the buildings at the place assigned for performing engine tests in broad daylight.
- Test place must be equipped with extinguisher which is suitable for extinguishing burning liquids and electrical installation.
- Brake the airplane and put chocks under the landing gear wheels.
- Before performing engine test carry out preflight check of the engine and the propeller in the range shown in the AOI of Bristell B23 (Par. 4.3) and Rotax engine Operator's manual (Chapter 10.3).
- Start the engine according to the AFM of Bristell B23-915 (Par. 4.4)
- Activate starter for max.10 sec. only, followed by a cooling period of 2 min.

- As soon as engine runs, adjust throttle to achieved smooth running at approximate 2500 rpm.
- Check if oil pressure has risen within 10 sec. and monitor oil pressure

NOTE **If oil pressure does not rise within 10 sec. above min. pressure 0.8 bar (12 psi), switch off the engine. Admissible max. oil pressure 7 bar (102 psi) for a short period at cold start. Fuel pressure has to be in range from 2.9 – 3.2 bar (42 – 45 psi).**

- Engine warm up according to the AFM of Bristell B23-915 (Par. 4.4)
- As soon as oil pressure will be in range from 2 to 5 bar (29 to 73 psi) start warming up period at 2000 rpm for 2 minutes, continue at 2500 rpm, duration depending on ambient temperature, until oil temperature reaches 50°C (122°F).
- Perform lane check acc. to the AFM of Bristell B23-915 (Par. 4.4).

NOTE **RPM drop with only one LANE running must not exceed 250 RPM. After LANE switch on again wait 3 Seconds until continuing with the next step. Write down results into the engine test report, see Table 1.**

- Perform pump and fuel supply check acc. to the AFM of Bristell B23-915 (Par. 4.4)
- Perform wastegate and prop check acc. to the AFM of Bristell B23-915 (Par. 4.4)

NOTE **Watch engine instruments and record the values of oil pressure, oil temperature and cylinder head temperature into the Engine test report, see Table 1.**

- Test of max. RPM on the ground:

Throttle lever fully forward for maximum power

NOTE **Record max. RPM into the engine test report, see Table 1.**

ENGINE TEST REPORT					
Aircraft	***Bristell B23-915***	**Registration**		**S/N**	
Engine	***ROTAX***	**Type**	***915 iSc3 A***	**S/N**	

	Activity	**Set down values**	**Measured values**
	Starting up the engine		
1.	Min. oil pressure up to 10 sec.	0.8 bar (12 psi)	
2.	Max. oil pressure*	7 bar (102 psi)	
3.	Min. fuel pressure	2.9 bar (42 psi)	
4.	Increase RPM at steady oil pressure >3bar (43.5psi) (min. 2 minutes)	3.1 bar (45 psi)	
5.	Warming up the engine at 2000 – 2500 RPM	smooth running	
6.	Voltage	12 – 15 V	
	Engine test		
7.	Min. oil temperature	50°C (122°F)	
8.	Oil pressure	2–5 bar (29–73 psi)	
9.	Max. Coolant temperature	120°C (248°F)	
10.	RPM drop during LANE CHECK @4700RPM	max. 250 RPM	
11.	Acceleration	2 – 3 sec.	
12.	Max. RPM on the ground	5700 – 5800 RPM	
13.	Idle	Approx. 1800 RPM	
Defects:			
*	During cold start for a short term only		
Conclusion	**Complying – Noncomplying** Complying if the measured values are not out of the range of the prescribed values.		
Elaborated by:		Signature:	Date:
Checked by:		Signature:	Date:

Table 1 Engine Test Report

72-20 Air Inlet Section

Engine air inlet system ensures supply of sufficient air volume to the engine. Air is supplied to the engine through the RHS NACA inlet on the lower cowling leading to the Air filter box (1), in which the air filter (2) is installed. From here the air is routed to the turbocharger (5), where it is compressed. An alternate air flap (3), in case of obstructed air filter, is controlled by a Bowden cable leading to the ALT AIR knob (4) in the cockpit compartment. The compressed (and heated) air is chilled in the intercooler (7), to which air from the central upper NACA inlet in the upper cowling is lead through a duct (8). The engine air rate to the manifold air box (10) is controlled via the throttle control.

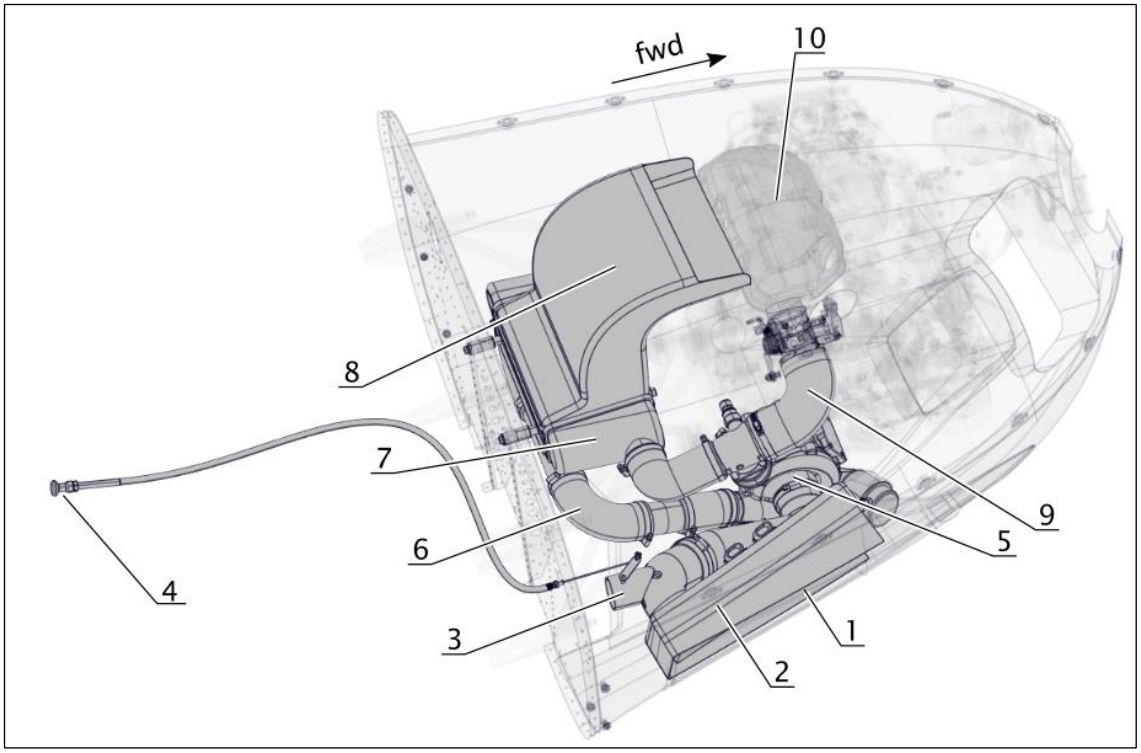

Fig. 4 Removal/Installation of Air Intake System

Item	Description	Item	Description
1	Air filter box (primary air inlet)	2	Air filter element
3	Alternate air (flap)	4	Alternate air control
5	Turbocharger	6	Intercooler air inlet hose (warm)
7	-Intercooler (71B550050N)	8	Cooling air inlet duct
9	Intercooler air outlet hose (cold)	10	Airbox

Removal

Tools needed:	Wrench size 8, 10 Screwdriver

See Fig. 4.

- Remove the upper engine cowling.
- Remove cooling air inlet duct (for intercooler)
- Disconnect all hoses and electrical connections to the lower cowling
- Disconnect alternate air flap Bowden cable
- Remove lower cowling
- Disconnect air hoses From/to turbocharger / intercooler / airbox. Note correct position of hoses.
- Remove mounting strut of intercooler.
- Remove throttle valve.

Installation

Tools needed:	Wrench size 8, 10 Screwdriver

see Fig. 4.

- Attach throttle valve to the airbox (10).
- install intercooler (7)
- Connect air hoses accordingly. Ensure correct position.
- Install alternate air Bowden cable (3)
- Connect all hoses and electrical connections to the lower cowling
- Install cooling air inlet duct (for intercooler)
- Install the upper engine cowling.

72-20-10 Engine Cooling System

Engine cooling is combined, cylinder heads are liquid cooled, cylinders are air cooled. Cooling circuit of cylinder heads is made as a closed system containing the pump, expansion tank with the pressure cap, water coolers and the overflow bottle.

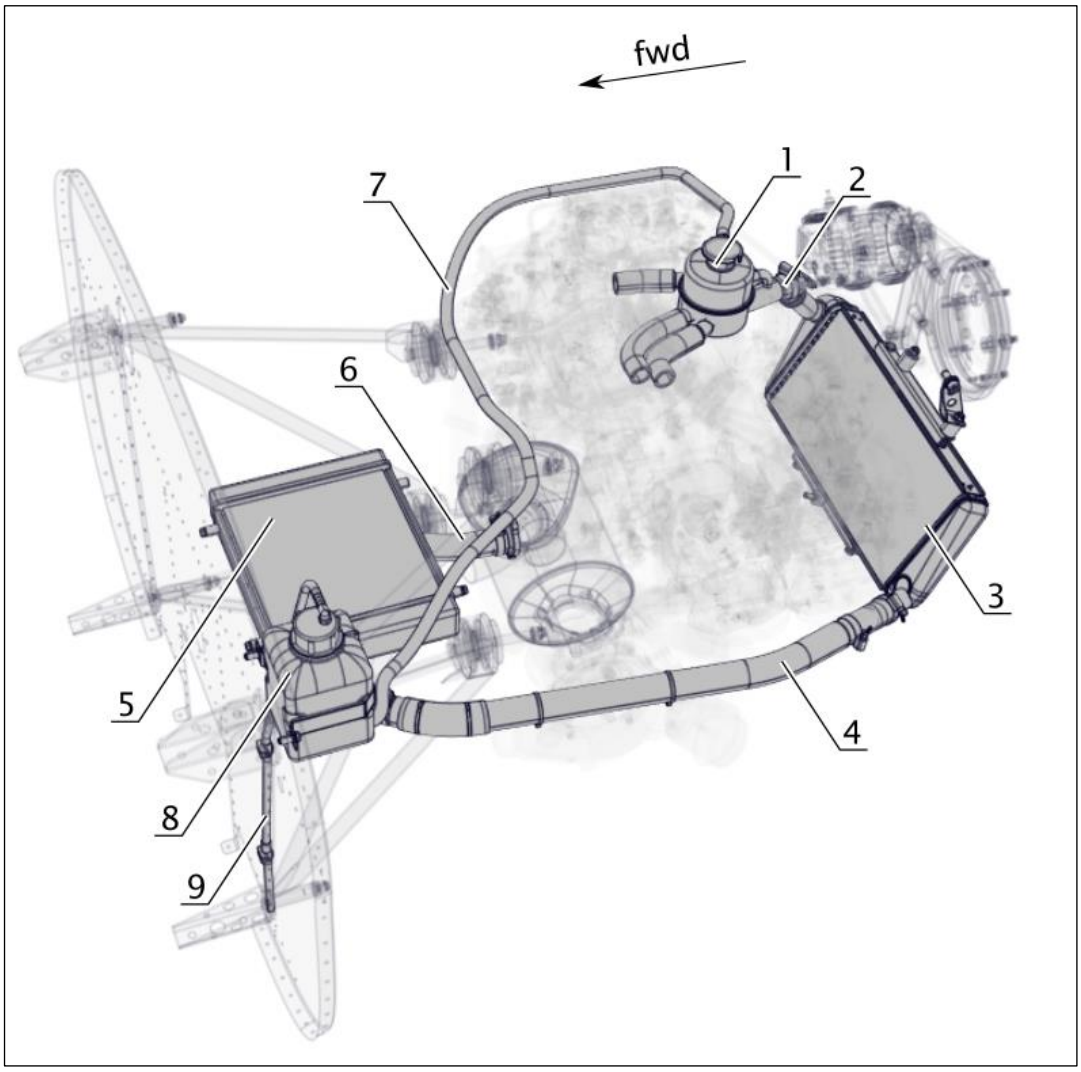

Fig. 5 *Engine Cooling System*

Item	Description	Item	Description
1	Expansion tank (BRM Aero part 71B520020N)	2	Hose (tank – RAD1)
3	Front water radiator	4	Hose (RAD1 – RAD2)
5	Rear water radiator	6	Hose (RAD2 – water pump)
7	Hose (tank – overflow bottle)	8	Overflow bottle
9	Venting line		

72-20-11 Radiator

Removal

Tools needed:	wrench size 10, screwdriver

See Fig. 5.

- Remove the upper and lower engine cowling.
- Drain the cooling liquid from the cooling system (refer to Rotax manual).
- Disconnect hoses from the water cooler outlets.
- Remove four bolts attaching each water cooler brackets.
- Remove the water coolers.

Installation

Tools needed:	wrench size 10, screwdriver

See Fig. 5.

- Install the water coolers on their brackets.
- Install hoses on the outlets from the radiator and secure them with hose fasteners.
- Fill the cooling system with cooling liquid (see Rotax manual) and check system tightness.
- Install the lower and upper engine cowling.

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73 Engine Control and Fuel Indicating-

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73-20 Controlling

Engine power is controlled by means of the THROTTLE control lever which is positioned on the middle channel between the seats and which controls engine power from idle up to max. take-off power. Engine power control lever is mechanically connected (by Bowden cable) to the throttle control valve.

If the control lever is fully pushed, this position corresponds to max. take-off power of the engine. If the control lever is fully pulled, this position corresponds to idle. Changes in the engine power setting can be made by moving of the control lever forwards and backwards.

73-20-01 Throttle Control

Removal

Tools needed:	wrench size 19 Allen wrench size 2,5 Screwdriver Cutting pliers

see Fig. 1.

- ► Remove the cover of the throttle (1) control lever from the middle channel.
- ► Remove the upper engine cowling.
- ► Disconnect the throttle (3) cable from throttle valve lever.
- ► Remove the throttle lever from the middle channel.

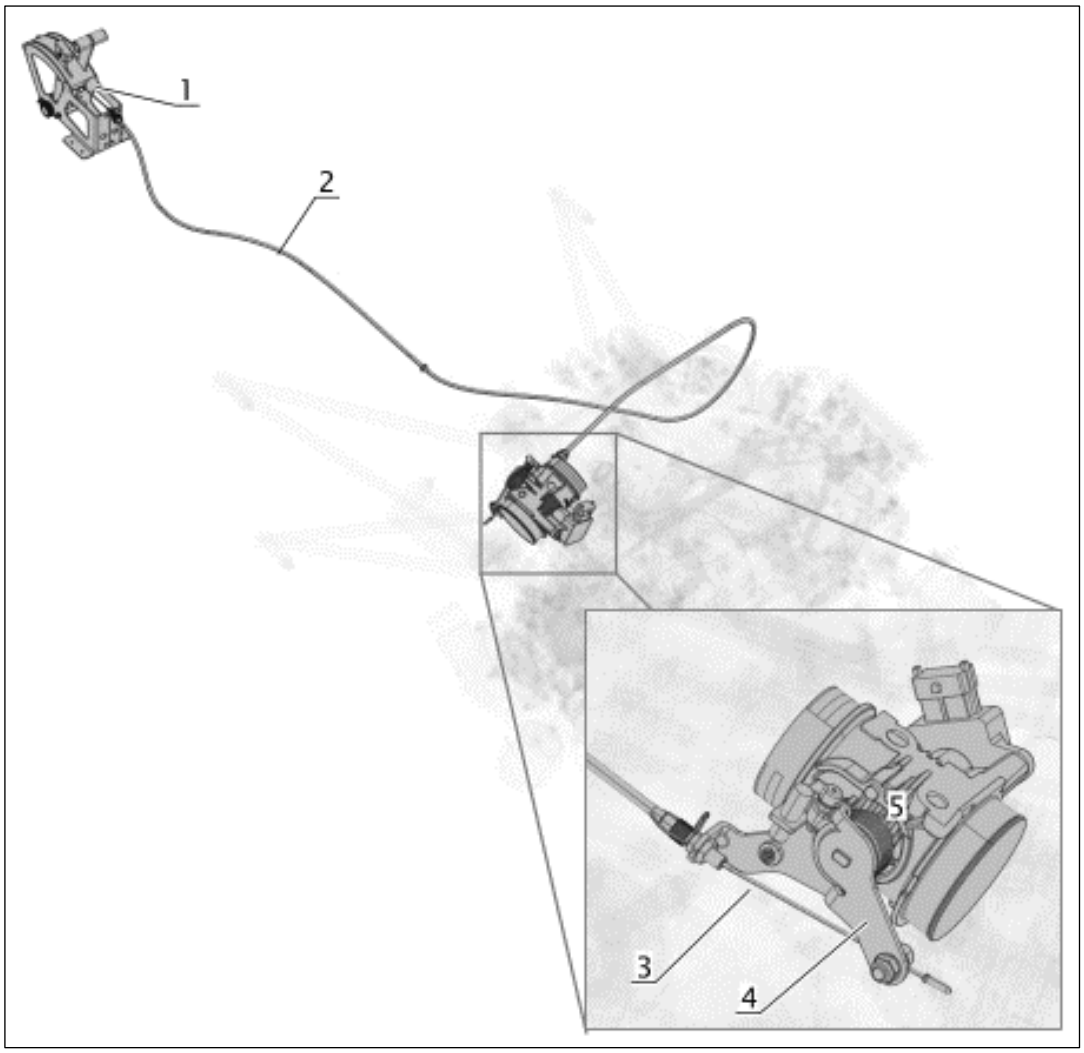

Fig. 1 *Throttle Control Lever*

Item	Description	Item	Description
1	Throttle control lever	2	Throttle cable
3	Bowden cable	4	Throttle flap lever
5	Throttle flap assy		

Installation

Tools needed:	wrench size 14 Allen wrench size 2 Screwdriver Cutting pliers

See Fig. 1.

- ► Install the throttle (1) control lever into the middle channel.

- Connect the throttle (3) cable to the throttle flap lever (4).
- Install the cover of the throttle lever on the middle channel.
- Install the upper engine cowling.
- Check for continuous travel of the throttle control lever.
- Adjust the throttle control (see *Adjustment*).

Adjustment

- Pull the throttle control to the rear stop. The throttle lever (4) on the throttle valve (5) must be on the stop.
- Adjust the nut on the control lever (5) and take up any slack/excessive tensioning on the cable and tighten up the nut or by means of adjustable terminals on Bowden cables by means of the adjustable terminals on Bowden cables.
- To prevent the Bowden cables at the throttle valve from shifting out from the terminals, secure the Bowden cables with locking wire.
- Mark all bolted joints with red paint.

73-30 Indicating

73-30-01 Fuel Quantity

Fuel quantity in the fuel tank is measured by the fuel level sender with float. Float position is converted to the electrical signal and fuel quantity in the tank is indicated on the Garmin System.

73-30-01 Fuel Pressure

Fuel pressure on the outlet from the fuel pump can be checked by the Garmin System. Range of measure is 0 to 5 bar (0 to 72 psi).

74 Ignition

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74-00 General

Engine is equipped with the double contactless ignition system. Every ignition circuit has its source of energy, control unit, 2-ignition coils and 4-spark plugs. It is fully independent on the other circuit. High voltage current is distributed to the spark plugs by means of high voltage cables.

Being equipped with an injection system and a turbocharger the engine is directly controlled by the Engine Control Unit (ECU), handling not only the ignition, but also the injection, power supply, turbo actuation, etc. Being a redundant system both Lanes can be separately activated and are controlled by switches on the instrument panel (LANE A/B).

For correct starting sequence of the engine refer to chapter 4.4.3 of the AFM.

77 Engine Indicating

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77-00 General

The engine is instrumented with the following sensors, of which the stated ones have their values displayed in the Garmin system:

- Boost pressure sensor (redundant; not shown)
  - measured at the wastegate
- EGT sensor (redundant; displayed)
  - measured in the front exhaust pipes
- Oil temperature sensor (displayed)
  - measured behind the oil pump
- Oil pressure sensor (displayed)
  - measured behind the oil pump
- Ambient air and temp. sensor (redundant; not shown)
  - measured in the air filter box
- Manifold air temperature (redundant; displayed)
  - measured in the airbox
- Manifold air pressure (redundant; displayed)
  - measured in the airbox
- Crank position sensor (redundant; displayed as RPM)
  - measured at the crankshaft
- Knock sensor (not shown)
  - measured on top of the engine housing
- Coolant temperature sensor (shown)
  - measured at the LHS rear cylinder
- Throttle lever position (shown)
  - measured at the throttle control valve lever
- Fuel pressure sensor (shown)
  - Measured between fuel pumps and fine filter

All sensor data (except for the fuel pressure sensor) are routed through the ECU, thus the failure of either LANE A or LANE B leads to loss of indication of the sensor indications as follows:

- When Lane A is OFF (lamp ON) Loss of data for:
  - coolant temperature
  - Exhaust gas temperatures from cyl. 2&4
  - Ambient temp
  - Throttle lever position
- When Lane B is OFF (lamp ON) Loss of data for:
  - oil temperature
  - oil pressure
  - Exhaust gas temperatures from cyl. 1&3
  - fuel flow (calculated internally by ECU)

78 Exhaust

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78-00 General

Exhaust system of Bristell B23-915 airplane consists of exhaust pipes (1) from the four cylinders leading the exhaust gases to the turbocharger (3), where a part of the exhaust gas energy is transferred to the air inlet system by compressing (and heating) the engine air. Connected to this exhaust manifold is the muffler (4), working at the same time as a silencer. Exhaust gases lead from there by the exhaust end pipe (6) down the airplane.

Mounted on the muffler is heat exchanger from which is taken warm air for the heating system of the cockpit (see chapter 21-40)

The whole exhaust system is a stainless steel welded design and part of the certified engine.

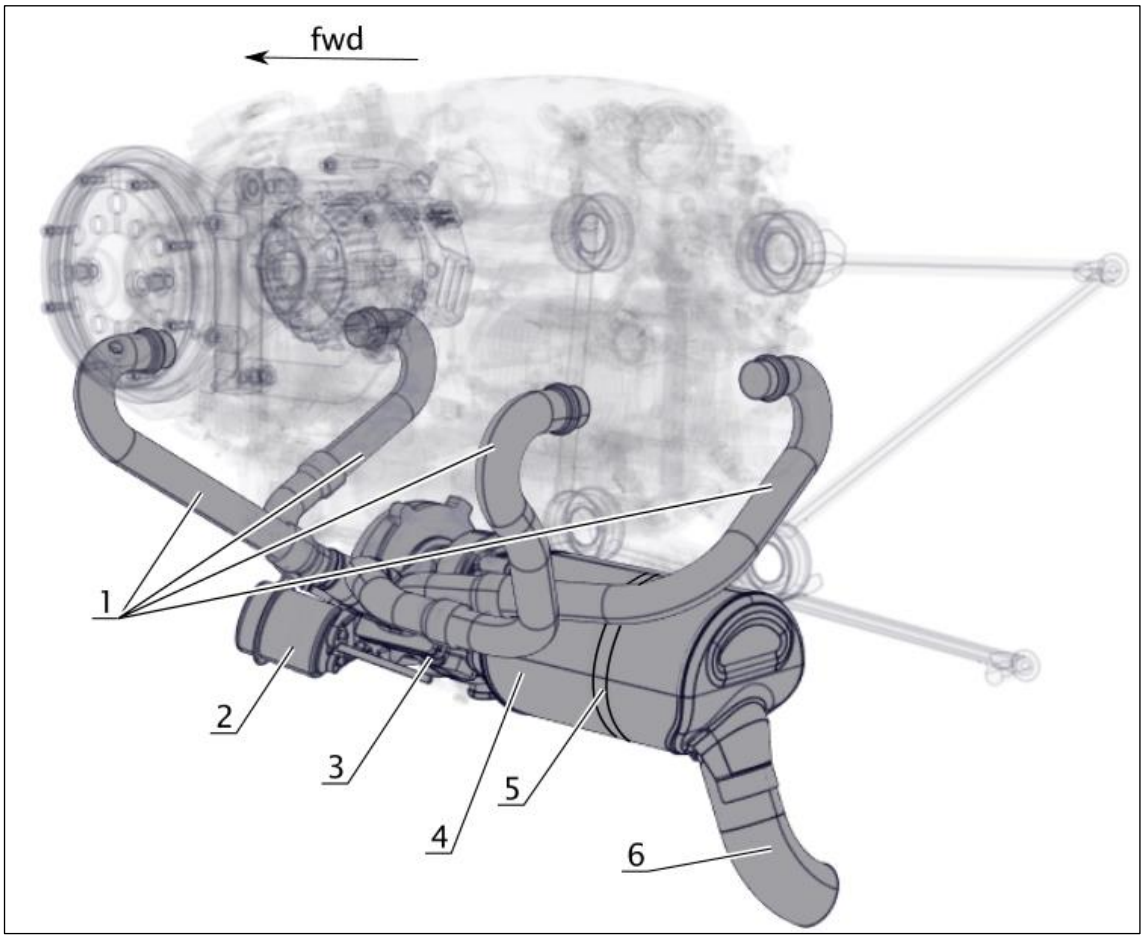

Fig. 1 *Exhaust System*

Item	Description	Item	Description
1	Exhaust pipes	2	Wastegate actuator
3	Turbocharger	4	Muffler
5	Clamp	6	End pipe

Removal

Tools needed:	wrench size 10, 12 pliers

See Fig. 1

- ► Loosen the clamp (5) on the muffler (4)
- ► Remove the muffler by unscrewing from turbocharger (3)

Installation

Tools needed:	wrench size 10, 12 pliers

See Fig. 1.

- ► Install muffler (4) on to the turbocharger (3) by means of bolted connection
- ► Reattach muffler to the clamp (5) and tighten

NOTE **For further removal/installation information regarding the exhaust system (e.g. turbocharger maintenance refer to Rotax manual (heavy maintenance)**

Check

⚠ WARNING **A burst or leaky exhaust can expose the crew to danger presented by carbon monoxide or can result in engine power loss and possibly fire.**

- ► Check the exhaust system very carefully.
- ► Check the exhaust system for cracks. Pay special attention to the following areas:

- muffler in the area of the input and the end pipe
- all welds and their immediate surrounding

- ► Carefully check all areas showing local overheating caused by exhaust gases.

- Remove the heat exchanger and check muffler area located under it.
- Check the whole exhaust pipes between the engine and the muffler including its attachment to the engine.
- Check end pipe from the muffler.

79 Oil

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79-00 General

Engine lubrication system (see Fig. 1) is a dry sump system. Engine lubrication system is equipped with a mechanically driven oil pump (7) which ensures oil supply from the oil tank (1) located on the firewall through the oil cooler (3) and the oil pump (7) with oil filter (8) to the lubricated points on the engine. A separate oil stream lubricates the turbocharger (5;6). The oil pump is equipped with the pressure regulator and with the pressure transmitter. The oil tank is ventilated by the hose (13) which exits the airplane beneath the lower cowling. Oil pressure and temperature are indicated on the Garmin System (see chapter 77-00).

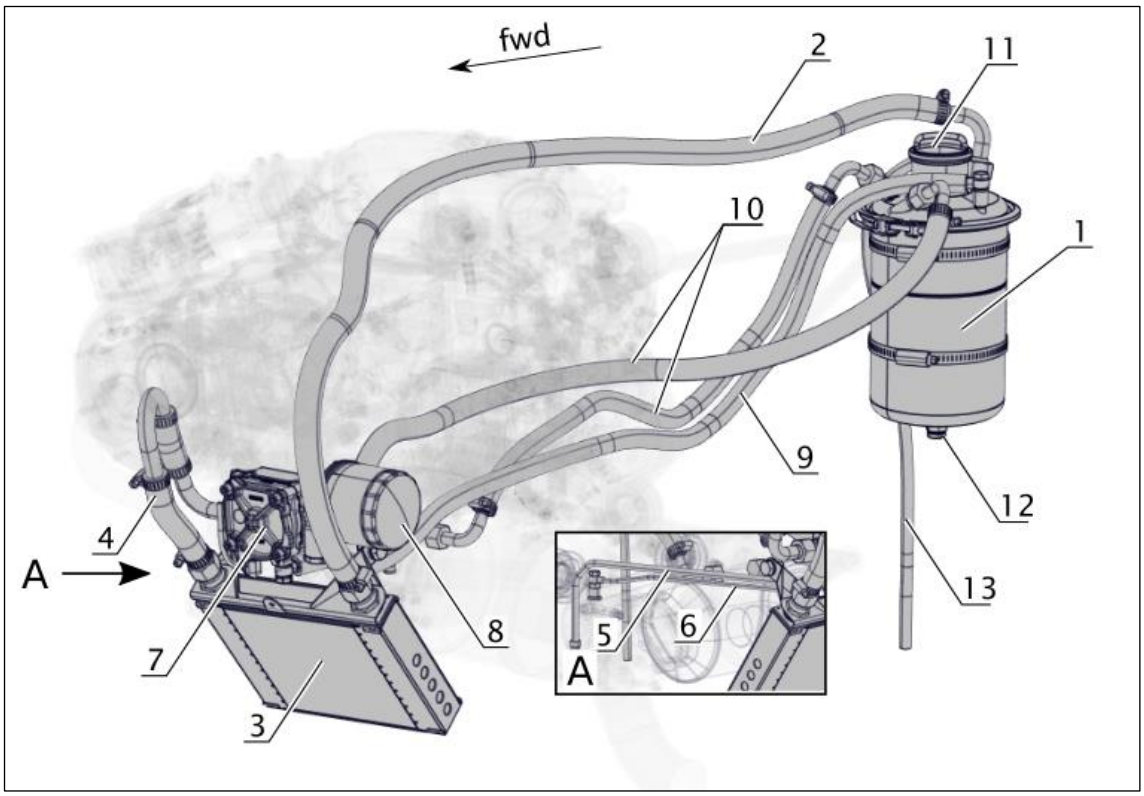

Fig. 1 *Oil Cooling System*

Item	Description	Item	Description
1	Oil tank	2	Oil feed line (to cooler)
3	Oil cooler	4	Oil feed line (to engine)
5	Oil feed line (to turbo)	6	Oil return line (from turbo)
7	Oil pump	8	Oil filter
9	Oil return line (turbo)	10	Oil return lines (oil sump)
11	Oil tank cap & dipstick	12	Oil drain screw
13	Oil tank venting		

79-20 Distribution

79-20-01 Oil Cooler

Removal

Tools needed:	wrench size 22, 30

See Fig. 1.

- ► Remove the upper and lower engine cowling (see Chapter 71-10).
- ► Drain oil from the oil system (see Chapter 12-10-20 of the main manual).

NOTE

It is also possible to pump oil from the cooler to the oil tank. You can do it by manual running the engine by means of the propeller, whereas from the oil tank you will remove the hose leading to the oil cooler. Engine ignition must be switched off!

- ► Remove hose fittings from the oil cooler necks. After that it is possible to remove nuts from the cooler necks attaching the cooler to the brackets on the engine.

Installation

Tools needed:	wrench size 22, 30

See Fig. 1.

- ► Set the oil cooler (3) to the bracket on the engine and gradually install and tight the nuts. Install the fittings with oil hoses, screw the fitting nuts.
- ► Fill the oil system with oil (see Chapter 12-10-20 of the main manual) and check oil system tightness.
- ► Install the lower and upper engine cowling (see Chapter 71-10).

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80 Starting

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80-00 General

Description

The ROTAX engine is equipped with an electric starter.

The airframe mounted electric power supplied system consists of the following parts:

- Lane switch
- Start power toggle switch
- Starter button
- Internal power supply
- ECU as control instance
- related wiring

Refer to the ROTAX documentation for detailed information about starting system (see Chapter 01-20) and cranking.

91 Charts

General

Typical wiring diagrams of BRISTELL B23-915 model airplane systems, navigation and communication means are found here (refer to the Table of Content presented below).

Further wiring diagrams, relating to additional equipment of the airplane are included in the documentation supplied with the airplane. Compass und autopilot are optional equipment.

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