MAINTENANCE MANUAL

AQUILA AT01 (A210)

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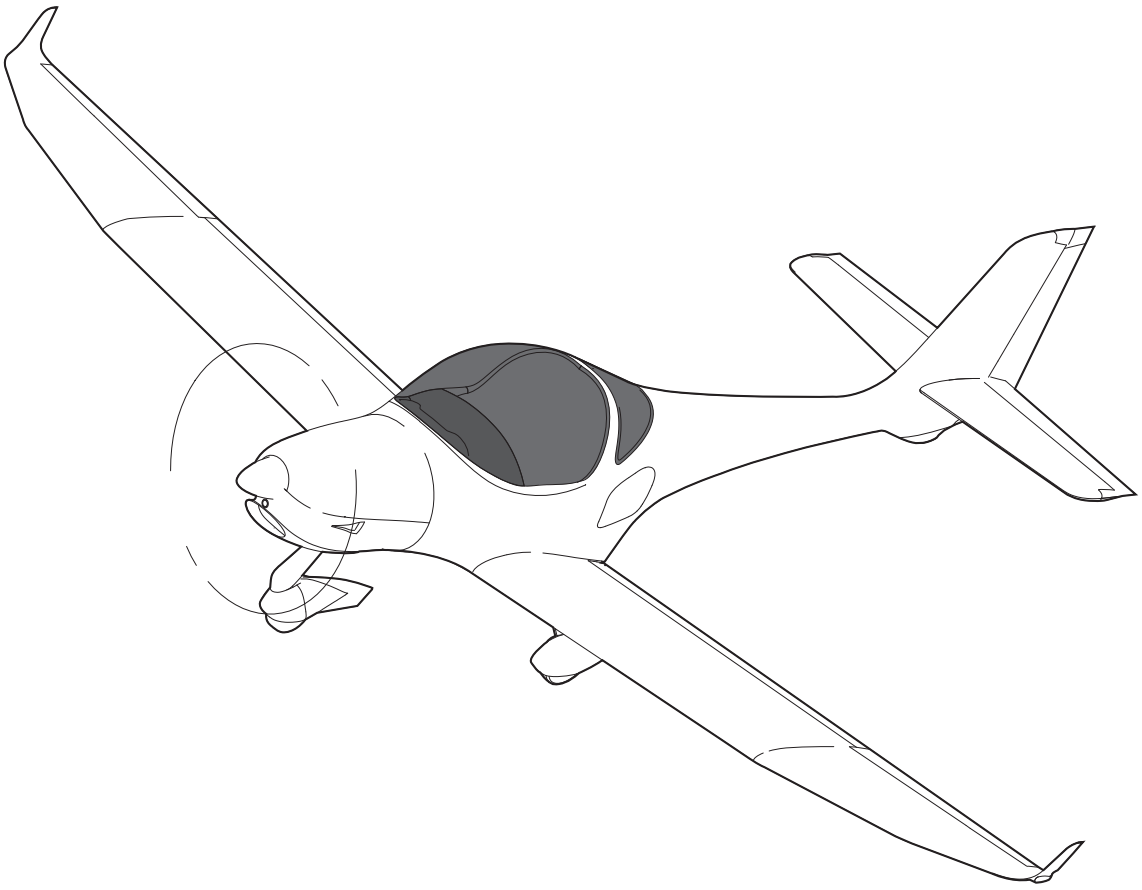

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2	29.10.01			27	21.07.15		
3	05.11.01			28	28.08.15		
4	07.11.01			29	29.02.16		
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6	01.03.02			31	09.10.18		
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8	22.03.02			33	08.06.22		
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Temp. Revision Number	Page	Date of Revision	By	Date Removed	By
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02	05-10-00 p.1 & 2	11.06.14		28.08.15	
03	05-20-00 p.7 76-10-00 p.203 & 204	14.08.14		28.08.15	
04	12-14-00 p.301 & 302 75-10-00 p.201 79-20-00 p.201	27.04.15		08.06.22	

HIGHLIGHTS OF REVISIONS

Revision Number	Date of Revision	Reason for Revision	Revision Number	Date of Revision	Reason for Revision
25	30.10.13	FAA validation: description/maintenance of electrical system, avionics and structures revised; airworthiness limitations;			
26	02.03.15	Life time limit, 6000 hour inspection			
27	21.07.15	“Fuel” revision; fuel indicating system calibration procedures			
28	28.08.15	TBO’s and maintenance checklist revised; Temp. rev. 2 & 3 incorporated			
29	29.02.16	Control surface ply lay-up added; repair procedures revised			
30	10.06.16	6000h check & TBOs added; battery check procedure added			
31	09.10.18	Rotax: new spark plugs			
32	16.09.19	TBO’s and maintenance checklist revised			
33	08.06.22	TBO’s and maintenance checklist revised; Temp. rev. 4 incorporated			
34	27.02.26	TBO’s and maintenance checklist revised; Rotax 912 maintenance manual updates			

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23	Communications	30.10.13
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75	Cooling System	08.06.22
76	Engine Controls	28.08.15
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78	Exhaust	07.11.01
79	Oil	08.06.22
80	Starting	05.11.01
91	Charts and Wiring Diagrams	30.04.08

* The date refers to the issue / revision date of the respective chapter.

The technical content of this document (revision 34) is approved under the authority of DOA ref. EASA.21J.025.

27.02.26

Date, Signature Office of Airworthiness

CHAPTER 5

TIME LIMITS / MAINTENANCE CHECKS

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TIME LIMITS / MAINTENANCE CHECKS - GENERAL

1. Introduction

   A. This chapter provides scheduled and unscheduled maintenance checks and inspections, recommended by the type certificate holder as well as the time limits for service life limited components and parts.

2. General Description

   In the following, a brief description and intended purpose of each section of this chapter is given.

   A. Section 05-00 - Time limits / Maintenance Checks - General. This section provides a general overview of the content and purpose of this chapter.

   B. Section 05-10 - Component Time Limits. This section contains the time limits of all service life limited components and parts and recommended time between overhaul (TBO) for components.

   C. Section 05-20 - Scheduled Maintenance Checks. This section contains information about recommended scheduled maintenance and inspections. The recommended maintenance and inspection program for the systems and components as well as the relevant intervals are embodied in a checklist included in this section.

   D. Section 05-30 - Daily Inspections. In this section pre-flight and post-flight checks are described, that have to be carried out every day the aircraft is in operation.

   E. Section 05-50 - Unscheduled Maintenance Checks. This section specifies checks, which have to be conducted after unusual events and incidences such as hard landings.

COMPONENT TIME LIMITS

1. General

A. Different components and parts of the aircraft are certified for specific service life. When reaching this time limit, the respective item must be replaced or overhauled.
In order to monitor permissible service life the installation or removal of each item must be recorded in the aircraft logbook.
Where an interval is given in both flight time and calendar time, the limit which is reached first must be applied.

2. Component Time Limits

A. Under certain circumstances the replacement or overhaul of components may be required before the time limits listed below are reached.

B. Replacement or overhaul time limits, recommended by the type certificate holder:

Chapter	Component / Part	Replacement Time	Overhaul
24	Ignition lock	6000 h	no
24	Starter relais	2000 h	no
27	Elevator control rods incl. rod ends	6000 h	no
27	Rudder control cables	6000 h	no
27	Control surface plain bearing bushings	6000 h	no
27	Trim switch	1000 h	no
28	Electrical fuel pump	3000 h or 10 years	no
32	Nose landing gear spring package rubber elements	5 years	no
32	Main landing gear struts	no	6000 h
32	Flexible hoses of the brake system	10 years	no
55	Lower rudder hinge bracket	6000 h	no
57	Wing attachment bolts	6000 h	no

Chapter	Component / Part	Replacement Time	Overhaul
71	Flexible teflon hoses of the oil / fuel system[1)]	2000 h or 15 years	no
71	Flexible hoses of the cooling system[1)]	5 years	no
71	AQUILA engine mount and attaching bolts	6000 h	no
71	Engine shock mounts	with engine overhaul	no
76	Engine / propeller control Bowden cable wires	2000 h	no

C. Vendor Established Component Time Limits

Chapter	Component / Part	Replacement Time	Overhaul
25	ELT battery	Note 1	no
26	Fire extinguisher Air Total HAL 1.0	no	10 years Note 4
26	Fire extinguisher H3R RT A400	12 years	no
26	Fire extinguisher H3R A344T	no	6 years Note 4
31	ASPEN internal battery	800 h or 3 years	no
34	KMD 150 MFD/GPS internal battery	10 years (recommended)	no
34	WINTER instruments	no	Note 5
61	Propeller MTV-21-A/175-05	no	2400 h or 6 years Note 2
61	Propeller governor Woodward A210786	no	6 years, with engine Note 6
61	Propeller governor P-410-13	no	2400 h or 6 years Note 2
61	Propeller governor P-850-12	no	2400 h or 6 years Note 2

1) Hoses that are not covered by the engine type certificate (TC).

71	Engine ROTAX 912S	no	2000 h or 15 years, 1500 h or 12 years, 1200 h or 10 years Note 3
71	ROTAX mechanical fuel pump	5 years Note 3	no
71	ROTAX flexible teflon hoses of the fuel system	with engine overhaul Note 3	no
71	ROTAX rubber parts of the engine (V-belt, hoses, carburetor parts)	5 years Note 3	no
71	Spark plugs	400 h Note 3	no

NOTES:

Note 1: Refer to manufacturer instructions for battery replacement time limits.

Note 2: Refer to latest issue of the mt-propeller Service Bulletin No. 1.-( ), and to the mt-Propeller E-124 Operation and Installation Manual.

Note 3: Refer to the latest issues of BRP-Rotax, i.e. Service Bulletins, Service Information and to the ROTAX Aircraft Engines Maintenance Manual for ROTAX Engine Type 912 Series.

Note 4: Refer to manufacturer instruction for overhauling.

Note 5: Though there is no TBO for these instruments, the manufacturer Gebr. Winter GmbH & Co. KG recommends that airspeed indicators and altimeters are subjected to retesting after 5 years.

Note 6: The 6 year calendar time limit applies for units not in continuous service with a minimum of 120 hours per year. Refer to the latest issue of the Woodward Service Bulletin S/B-33580-M.

SCHEDULED MAINTENANCE CHECKS

1. General

   A. The inspection time intervals chart contained in this chapter shows the recommended intervals at which maintenance and maintenance checks should be carried out on the aircraft.

   Annual inspections and 100 hour inspections on the AQUILA AT01 must include all inspection items as required by FAR 43, Appendix D, "Scope and detail of annual/100h inspections". Chapter 4 "Airworthiness Limitations" of this manual defines the inspection intervals for continued airworthiness.

   B. If an aircraft is being operated under unusual environmental conditions, maintenance intervals may be reduced.

2. Inspection Time Intervals Chart

   A. The maintenance and checks listed are to be carried out at the specified intervals and documented appropriately.

   NOTE: For new aircraft and new engines the first check is carried out after 25 hours and should be of the extent of a 100-hour inspection. For new engines only an engine ground run and the checks listed in the "Engine" section have to be carried out.

   NOTE: If more than 30% of operation hours have been flown with leaded fuel (e.g. AVGAS 100LL), an additional 50-hour inspection is necessary (refer to ROTAX Aircraft Engines SI-912-016).

   NOTE: Where an interval is given in both flight time and calendar time, the limit which is reached first must be applied. The next interval starts with the flight time and calendar time of the latest performed maintenance check.

   NOTE: In order to demonstrate continued airworthiness, engines must be inspected after every 100 hours of operation or 12 months. If the aircraft has less than 100 hours of operation during one year a 100 hour check must be carried out. For the annual inspection a tolerance of ±2 months is given.

B. For intervals between maintenance work, the following tolerances must not be exceeded:

Interval	Tolerance
up to and including 100 h	10% of interval
>100 h up to and including 1000 h	5% of interval
>1000 h	50 h
calendar time limits	30 days

These tolerances must not be added up. For example: if the 100-hour inspection was done at 107 h, the next inspection must be done at 200±10 h, not 207±10 h.

If an inspection is carried out earlier than allowed by the specified tolerance, all subsequent inspection intervals are counted from that inspection. For example: If the 100 h inspection was done at 87 h, the next inspection must be done at 187±10 h.

C. Due to recent ROTAX publications the maintenance checks given for the ROTAX engine may not be up to date. Refer to the latest revisions of ROTAX Engine Type 912 Series Maintenance Manual and Service Bulletins.

D. Due to the multiplicity of equipment coming onto the market, no maintenance instructions are given for electronic equipment. For information on a certain component use the documentation provided by the manufacturer of this component.

NOTES:

MML*	Maintenance Manual Line for ROTAX Engine Type 912 Series
MMH*	Maintenance Manual Heavy for ROTAX Engine Type 912 Series
MT*	mt-Propeller E-124 Operation and Installation Manual
TTSN	Total Time Since New
TTSO	Total Time Since Overhaul

E. Inspection Time Intervals Chart:

Aircraft S/N		Operating Hours		Registration Number	
Engine S/N		Operating Hours TTSN / TTSO:		Date	
Propeller S/N		Operating Hours TTSN / TTSO:		Type of Inspection	

No.	Pre-Inspection	Reference	Interval 100h	other	Initials
1.	Check that the following documents are up-to-date and available upon request: - AT01 Maintenance Manual - AT01 Airplane Flight Manual - Aircraft Log Book and required certificates - Engine and Propeller Log Books - Equipment List and Weight and Balance Record - Airworthiness Directives - Service Bulletins and Service Information - Services Time Record	AT01 Maintenance Manual, AT01 Airplane Flight Manual	X		
2.	Airworthiness Directives - Verify all Airworthiness Directives have been complied with.		X		
3.	Service Letters, Service Bulletins, and Service Information - Verify all AQUILA and suppliers Service Letters, Service Bulletins and Service Information have been complied with.		X		
4.	Service time records, equipment list and weight and balance records - Check. Update if necessary.		X		
5.	Aircraft file and technical documentation - Verify complete and in proper order.		X		
6.	Engine and engine compartment - General visual inspection for damage or abnormalities. Clean for leakage check.	MML* 12-20-00	X		
7.	Airframe, power plant, propeller - Do a walk around to detect damages, fluid leaks or other abnormalities.		X		
8.	Fuselage and empennage - Clean.		X		
9.	Aircraft interior - Clean and vacuum.		X		
10.	Record all malfunctions and abnormalities.		X		

No.	Engine Ground Test	Reference	Interval 100h	Interval other	Initials
1.	Perform an engine test run as follows. (RPM in this point are specified as propeller RPM) **Start engine and warm-up** at 820 RPM for approx. 2 minutes, continue at 1030 RPM until oil temperature reaches 50° C. **Rudder pedal brakes and parking brake** - Check for proper operation. **Magneto RPM drop** - Set 1700 RPM. Check that RPM drop is less than 120 RPM while operating on one magneto and no more than a 50 RPM drop difference between left and right magnetos. RPM drop left magneto :_____RPM RPM drop right magneto:_____RPM **Propeller governor** - Set 1700 RPM and monitor manifold pressure. Reduce engine speed by moving the propeller control from START to CRUISE. Repeat three times. RPM should drop by 200±15 RPM and manifold pressure should rise. RPM drop: _____RPM / Man. press. rise :_____in. Hg **Carburetor heat** - Pull knob at 1700 RPM. Propeller RPM should show a drop of at least 20 RPM. RPM drop:_____RPM **Engine full power** - Advance throttle/propeller to full forward. Tachometer should read 2240±15 RPM. Full power RPM:_____RPM **Cool down** engine at 1100 RPM. **Engine instruments** - Check engine parameters. **Engine idle** - Move throttle control lever to full aft. Tachometer should read 750±50 RPM. Idle RPM:_____RPM **Shut down engine**, set the ignition switch and master switch to the OFF position. Remove ignition key from aircraft.	MML* 12-20-00 Airplane Flight Manual 32-40 MT*	X		

No.	Engine	Reference	Interval 100h	Interval other	Initials
1.	Engine cowling - Remove engine cowling. Check for cracks, overheated areas, deformation, loose or missing fasteners. Check condition of fire protect paint and heat resistance shielding.		X		
2.	Engine oil change - Remove oil drain screw from oil tank. Drain old oil and dispose in accordance with environmental regulations.	12-12 MML* 12-20-00	X	50h[1)]	
3.	Oil tank - Check oil tank and clean if contaminated.	MML* 12-20-00	X	50h[1)]	
4.	Oil filter - Remove old oil filter from engine and install new oil filter. Lubricate mating sealing ring of new oil filter with engine oil. Tighten new oil filter by hand. Cut open old oil filter without producing any metal chips and inspect filter mat, filter cover, sealing lip, spring of bypass valve (small) and positioning spring (large) for particles, wear and missing material. Findings:_____	12-12 MML* 12-20-00	X	50h[1)]	
5.	Visual inspection of the magnetic plug for accumulation of chips	MML* 12-20-00	X		
6.	Oil change - Renew gasket ring of drain screw on oil tank. Tighten drain screw to 25 Nm (221 in.lbs). Refill oil tank with approx. 3 liters of oil. For oil quality, see Operators Manual and SI-912-016. Refilled:_____Quantity:_____L CAUTION: DO NOT USE AIRCRAFT ENGINE OIL. Due to the friction clutch and the high stresses in the reduction gear 4-stroke motor cycle oils are recommended. For suitable lubricants and oil change intervals, see ROTAX Operators Manual and latest appropriate ROTAX publications.	12-12 MML* 12-10-00 MML* 12-20-00 SI-912-010 SB-912-040	X	50h[1)]	
7.	Check compression by differential pressure method. Test pressure: 6 bar (appr. 6000 hPa / 87 psi) Pressure drop: max. 25% Cyl. 1 2 3 4 Pressure drop: _____ _____ _____ _____	MML* 12-20-00	X[1)]	200h	
8.	Cooling air ducts, engine baffling and cylinder cooling fins - Check for obstructions, cracks, wear and general condition. Check for signs of abnormal temperatures. Check crankcase for cracks.	MML* 12-20-00 SB-912-029	X		
9.	Leakage bore at the base of the water pump - Check for signs of leakage.	MML* 12-20-00	X		

1) If more than 30% of operation hours have been flown with leaded fuel e.g.: AVGAS 100LL

No.	Engine	Reference	Interval 100h	Interval other	Initials
10.	Cooling system - Renew coolant (conventional coolant only). Flush the cooling system.	12-14 MML* 12-20-00		3 years[3)]	
11.	Coolant hoses and lines - Check for damage, leakage, hardening due to heat, porosity, loose connections and secure attachments. Check routing for kinks and narrow bends.	75-00 MML* 12-20-00	X		
12.	Coolant expansion tank - Check for damage and abnormalities. Inspect rubber protection plate on tank base for secure fit. Check coolant level, replenish as necessary. Check gasket of tank cap, inspect pressure control valve and return valve. The pressure control valve opens at 1,2 bar (18 psi). Check coolant with densimeter or glycol tester.	75-00 MML* 12-10-00 MML* 12-20-00 SB-912-043	X		
13.	Overflow bottle - Inspect for damage and abnormalities. Verify coolant level, replenish as necessary. Inspect venting bore in cap of overflow bottle for clear passage. Check line from exp. tank to overflow bottle for damage, leakage and clear passage.	75-00 MML* 12-10-00 MML* 12-20-00	X		
14.	Oil and coolant radiator - Check for obstructions, leaks and security of attachment. If necessary, clean cooling fins and do a pressure leakage test.	75-00 79-20	X		
15.	Oil lines - Inspect for damage, leakage, hardening due to heat, porosity, security of connections and attachments. Check routing for kinks or narrow bends. Check fire protection shielding.	MML* 12-20-00	X		
16.	Oil tank vent line - Check for proper routing, for obstructions and clear passage		X		
17.	Fuel lines - Check for damage, leakage, hardening due to heat, porosity, secure connections and attachments. Check routing for kinks or narrow bends. Check metal fuel lines for cracks and scuffing marks.	MML* 12-20-00	X		
18.	Fuel selector / shut-off valve - Check for security of attachment. Check that the valve engages noticeable into the positions LEFT, RIGHT and OFF.		X		
19.	Filter element of electrical fuel pump - Inspect and clean.	28-20	X		
20.	Battery - Clean. Check charge. Measure residual capacity [2)]. Capacity (C10) must be at least 19,2 Ah [2)]. If applicable, check acid level and vent case. If necessary, charge/replace battery.	12-17 24-30	X		
21.	Battery tray, terminals and cables - Check for security, corrosion and general condition. Grease battery terminals.	12-22	X		
22.	Starter - Check security of attachment and electrical connections.		X		
23.	External alternator - Check attachment and V-belt tension. Inspect electrical connections.	MML* 12-20-00	X		

2) N/VFR equipped aircraft only.
3) If SB-AT01-025 or SB-AT01-029 (retrofit of a new cooling system) has been carried out.

No.	Engine (Cont.)	Reference	Interval 100h	Interval other	Initials
24.	Spark plugs - Remove all spark plugs, check for spark plug defects (deposits, excessive wear, melting). Clean spark plugs and check electrode gap. Replace as required.	MML* 12-20-00 SI-912-027	X		
25.	Spark plug connectors - Check that resistance spark plug connectors fit tightly on the spark plugs. Minimum pull-off force is 30 N (7 lb).	MML* 12-20-00 SI-912-027		200h	
26.	Spark plugs - Replace spark plugs			400h 200h[1)]	
27.	Wiring harness - Inspect the wiring and its connections for secure fit, damage and signs of wear.	MML* 12-20-00	X		
28.	Sensors - Check for tight fit, condition and security of attachment.		X		
29.	Exhaust system - Check attachment screws and springs for security and fit. Inspect system for damage and missing parts. Visual inspection of the muffler, exaust pipes and mounting flanges for cracks, corrosion and leakage. Check heat shielding for condition.		X		
30.	Cabin heat - Check heat shroud and heat ducts for damage and security of attachment. Check heat control function.		X		
31.	Exhaust muffler - Remove heat shroud from muffler and inspect muffler for condition, corrosion and leakage. WARNING: FAILURE TO INSPECT MUFFLER FOR LEAKS COULD RESULT IN CARBON MONOXIDE ENTERING THE CABIN, LEADING TO SERIOUS INJURY OR DEATH!	78-10		200h	
32.	Propeller gear box - Check the friction torque in free rotation. Actual friction torque is measured: _____Nm	MML* 12-20-00	X		
33.	Propeller gear box - Inspect overload clutch.	MML* 12-20-00 SB-912-033		600h[1,4)] 1000h	
34.	Propeller gear box - Check the propeller gearbox. Check gear set (pittings). Check wear on tooth of overload clutch.	MML* 12-20-00		1000h	
35.	Carburetors - Check carburetor synchronization. Mechanical and pneumatic synchronization.	MML* 12-20-00	X		
36.	Carburetors - Inspect the float chamber assy for contamination and corrosion. Check float weight.	MML* 12-20-00 SI-912-021		200h annual	
37.	Carburetors - Check the ventilation of the float chambers. Any trouble with float chamber ventilation impairs engine and carburetor function and must therefore be avoided. Check that the passage of the ventilation lines is free and that no kinks can arise.			200h annual	

1) If more than 30% of operation hours have been flown with leaded fuel e.g.: AVGAS 100LL
4) Overload clutch without lead drain holes (P/N 996886) only.

No.	Engine (Cont.)	Reference	Interval 100h	Interval other	Initials
38.	Carburetors - Removal/assembly of the two carburetors for carburetor inspection.	MMH* 73-00-00		200h annual	
39.	Carburetors - Check the free movement of the carburetor actuation (throttle lever and starting carburetor). Lubricate carburetor throttle shaft.	MML* 12-20-00 12-22	X		
40.	Carburetor sockets and drip tray - Inspect the carburetor sockets for damage and abnormalities, check for cracks, wear and good condition. Take note of any changes caused by temperature.	MMH* 73-00-00 SB-912-030		200h	
41.	Airbox assy - Check for damage, security of attachment and condition. Inspect connected air hoses for condition and leakage.		X		
42.	Airbox assy - Check air flap actuation of carburetor heat system. Check that the flaps can be moved through their full arc of travel for hot and filtered ram air. Flap for hot air must be fully closed when carb. heat is off.		X		
43.	Throttle control - Check the free movement of the throttle actuation. Check that the Bowden cables allow full travel of the throttle lever from stop to stop. Check Bowden cables for bulging with control lever in the full throttle position. Adjust throttle control if necessary.	76-00	X		
44.	Air filter - Inspect and clean. Renew if necessary. Clean air filter casing. Check the drain hole at the bottom of casing for obstructions or blockage.	MML* 12-20-00	X		
45.	Other external engine accessories - Inspect screws and nuts of all other external engine parts and accessories for tight fit. Inspect safety wiring if applicable, replace as necessary.		X		
46.	Engine mounts (manufactured by ROTAX and AQUILA) - Check mounts for deformation, cracks, corrosion, security and damage from heat. Check mounting bolts for condition and correct torque value. At shock mounts (4 bolts M10): 25 Nm (221 in.lbs) At firewall (4 bolts M10): 30 Nm (266 in.lbs) Inspect shock mounts for deterioration.	MML* 12-20-00 SB-912-028 SB-AT01-022	X		
47.	Engine test run - Attach cowling and perform an engine test run as described above. After engine test run, re-tighten oil filter by hand and examine engine and engine compartment for signs of leakage. Compare results with first engine test run. Check oil level, replenish as necessary.	05-20 MML* 12-20-00	X	50h[1)]	

1) If more than 30% of operation hours have been flown with leaded fuel e.g.: AVGAS 100LL

No.	Propeller	Reference	Interval 100h	Interval other	Initials
1.	Spinner - Remove from aircraft and check for delamination and cracks.	61-10	X		
2.	Spinner plate - Check for cracks and fit.		X		
3.	Blade root and hub area - Examine for oil and grease leaks.		X		
4.	Propeller blades - Check blade play (up to 3 mm [1/8 in.] allowed).		X		
5.	Propeller blades - Check blade angle play. (max. 2°)		X		
6.	Hub - Inspect outside condition of the hub and parts for cracks, corrosion and deterioration.		X		
7.	Check nuts for low pitch - Inspect for tightness and safety wire.		X		
8.	Propeller assy - Check safetying.		X		
9.	Propeller flange stop nuts - Check correct torque value (45 - 47 Nm [398 - 416 in.lbs]).		X		
10.	Propeller blades - Visual inspection for damage, repair if necessary. Attach spinner.	MT* 6.2) - 6.10)	X		
11.	Propeller governor - Visually inspect for signs of oil leakage. Check bolts and nuts are tightened properly and safety wired. Check governor actuation for free movement and bulging.	61-20	X		

No.	Fuselage / Cabin	Reference	Interval 100h	Interval other	Initials
1.	Prepare aircraft for visual checks: Remove cabin carpets and floorboards; Remove glare shield; Remove baggage compartment floorboard; Remove access panel of the baggage compartment bulkhead; Remove access panel 210AB.	06-30	X		
2.	Fuselage shell / structure - Visual inspection for paint coat damage, dents, cracks, holes, distortion and other evidence of failure. All unpainted parts for delamination (white spots). Check frames for delamination, cracks and disbonding.	SB-AT01-038	X		
3.	Lower fin - Inspect fin and lower rudder for signs of breakage. Check skid plate for wear.		X		
4.	Canopy - Examine the acrylic glass for cracking, crazing and general condition. Inspect tubular canopy hinge frame and brackets for cracks, distortion, corrosion, wear, and security of attachment. Check the gas spring strut for sufficient power and evidence of leakage.		X		
5.	Canopy locking - Check the canopy locking mechanism operates correctly. Check wear of parts. Check existence of the locking pin. The pin has to protrude the cover by approx. 2 mm. Cases of lacking locking pins have to be reported to the type certificate holder (contact information: see cover sheet). Check function of the locking pin. The canopy locking mechanism must not be too smooth-running. In the locked position of the latch, a smooth running release of the latch due to in-flight vibrations must not be possible. If necessary, readjust locking pin.	52-10	X		
6.	Lubricate canopy lock assembly.	12-22		annual	
7.	Baggage door - Check door seal, door latching mechanism, and door hinge for defects and condition. Lubricate if needed. Inspect door structure for cracks or other damage.	12-22	X		
8.	ELT - Perform ELT inspection. Check ELT mount and Velcro strap for security of attachment. Replace strap if necessary.	25-62		annual	
9.	Seat belts/harnesses for pilot / co-pilot - Check components for completeness of the label, deformation, cracks, fractures, functioning of moveable parts, corrosion, surface finish condition and security of attachment. Check textile components for damaged stitching, injurious marks, broken fabric threads, chafe marks and fusing. Perform functional check of buckle and inertia reel.		X		
10.	Seats - Check security of attachment of the seat assy to aircraft structure. Check operation of seat adjustment mechanism and seat stops. Inspect gas spring struts for oil leakage or other damage.		X		
11.	Seats - Check ease of movement - if required remove seats, clean and lubricate seat rails.	25-10		annual	

No.	Fuselage / Cabin (Cont.)	Reference	Interval 100h	Interval other	Initials
12.	Center Console - Visually examine the parts of the engine controls, lines and cables, located in the center console.			annual	
13.	Engine and propeller controls - Check for proper function, security of attachment and for evidence of wear. Check Bowden cables for bulging with control levers in the full throttle / high RPM position. Check Bowden cable clamp screws on control levers are freely rotatable.		X		
14.	Parking brake valve - Check for evidence of leakage especially at the brake line connections. Check control assy for damage.		X		
15.	Rudder pedal bearing - Lubricate.	12-22		annual	
16.	Brake master cylinders and brake lines in the cabin area - Check for security, condition and signs of leakage.		X		
17.	Fuel lines - Check for leakage and security.		X		
18.	Main landing gear - Inspect fuselage structure at such points and areas where the main landing gear is attached. Check for stress marks, distortion, disbonding, and delamination. Inspect main landing gear strut brackets for distortion, cracks, corrosion, and security of attachment. Check wear and condition of the polyamide inserts. Check bolts for correct torque.		X		
19.	Flap actuator - Check for wear and damage, for secure mechanical connections and loose or missing lock devices. Check electrical wiring for wear, damage, and proper routing. Inspect electrical connections and switches for security, corrosion and poor condition. Check function of the limit switches and position indicator.		X		
20.	Elevator trim system - Check the actuator and the springs for security, wear and damage. Check safetying. Check electrical wiring for wear, insulation damage, and proper routing. Inspect electrical connections and switches for security, corrosion and poor condition. Perform system test and check the correct function of the position indicator.		X		
21.	Aileron and elevator control - Check the control sticks, the brackets and the control rods for distortion, cracks, chafing, corrosion and security. Examine all bearings for condition and secure fit. Check safetying. Check travel of control surfaces if the control stick is in the full forward /neutral/ aft, and full left /neutral/ right positions. Verify no binding or jumpy movement of the control sticks through their full range of travel.		X		

No.	Fuselage / Cabin (Cont.)	Reference	Interval 100h	Interval other	Initials
22.	Rudder control - Check rudder control weldment and rudder bellcrank for cracks, distortion, chafing and security. Examine rudder control support brackets, rudder pedal pivot brackets and connection of the rudder controls with the nose gear steering tubes for security, condition and correct splintering. Check centering of springs and cables. Inspect control cables, control cable guides, cable connections, turnbuckles and hardware for correct installation, corrosion, wear, safetying and proper operation.		X		
23.	Rudder / aileron control interconnection - Check condition and correct function.		X		
24.	Brake reservoir - Check for leakage and system for trapped air. Inspect the vent valve in the filler cap of the brake reservoir for obstruction and blockage. Make sure the hydraulic brake fluid level is correct and replenish, if necessary. Only use hydraulic brake fluid of the required grade.		X		
25.	Hydraulic brake fluid - Renew.	32-40		3000h 5 years	
26.	Wing main bolts - Inspect for proper fit, condition and correct safetying.	57-10	X		
27.	Wing main bolts - Remove for visual inspection and lubrication. Lube type used: _____	57-10 12-22		500h[5)] 5years[5)] or annual[5)]	
28.	Exterior / interior placards and markings - Check presence, legibility, and security.	11-20 11-30	X		
29.	Fire extinguisher - Check for physical damage, corrosion, leakage or clogged nozzle. Weigh unit to determine fullness. Check for obstructions to access or visibility, safety seal is not broken or missing, HMIS label in place, instructions are legible.			annual	
30.	Elevator control cover - Check that edge protection profile is installed in the baggage compartment.	SB-AT01-039	X		

5) Interval depends on lube type. Refer to 12-22.

No.	Wings, Ailerons, Flaps	Reference	Interval 100h	Interval other	Initials
1.	Wings with winglets, ailerons, and flaps - Visual inspection for paint coat damage, dents, cracks, holes, distortion and other evidence of failure. Examine all unpainted parts for delamination (white spots).		X		
2.	Wing spars in the fuselage belly - Remove spar covering and perform visual inspection of the spar web, the bonding between the spar web and the carbon fiber spar cap strip, as well as the attachment of the root ribs to the spars. Check security and function of control system brackets attached to the spars.			annual	
3.	Drain and vent holes - Check for blockage and suspect appearance of any liquid.		X		
4.	Ailerons - Check aileron hinges, bearings, and hinge brackets for security and excessive play. Check hinge bushings and replace if necessary. Check bolts and nuts for proper safetying. Examine aileron pushrod for correct installation with stop nuts. Check actuation assembly for suspect binding, excessive play.		X		
5.	Aileron hinges - Check play. Maximum play approx.: - Axial ± 1,00 mm (± 0.04 in.) - Radial ± 0,30 mm (± 0.01 in.)		X		
6.	Aileron control system - Measure the play in the aileron control system with the control surface locked. Apply a lateral force of 30 N (6.7 lb) to the control stick - the maximum play allowed on the top of the stick is 10 mm (0.4 in.) for both sides. The play should be measured for both control sticks. If excessive play is detected, investigate cause.		X		
7.	Flaps - Check hinge brackets for damaged paint, cracks and delamination. Check bearings for correct fit and excessive play. Check hinge bushings and replace if necessary. Check correct safetying of all hinge bolts and castle nuts with cotter pins.		X		
8.	Flap hinges - Check play. Maximum play approx.: - Axial ± 0,30 mm (± 0.01 in.) - Radial ± 0,30 mm (± 0.01 in.) Measure the play in the flap control system at the flap trailing edge, at the inboard flap end. Max. play allowed with flaps in take-off and landing positions: ± 5 mm (0.2 in.). No play with flaps retracted.		X		
9.	Flaps and ailerons - Check that the gap between fuselage and flaps, between flaps and ailerons, and at the outboard end of the ailerons is at least 2 mm (0.08 in.).		X		
10.	Stall warning system - Check for condition and proper operation.		X		
11.	For serial numbers from AT01-100 to AT01-126: Bonding between wing spar and upper shell - Check condition.	57-10 SB-AT01-002		annual	

No.	Wings, Ailerons, Flaps (Cont.)	Reference	Interval 100h	Interval other	Initials
12.	Navigation / strobe lights - Check operation, condition of glass, and security of attachments.	33-40	X		
13.	Inner fuel tank ribs - Check connection of fuel and vent lines to the fuel tank and the flange gasket of the fuel level sensors for signs of leakage.	28-10 28-20 28-40		annual	
14.	Fuel vent lines - Check for blockage.		X		
15.	Fuel tank drain valves - Check for correct function and leakage.		X		
16.	Fuel tank outlet strainer - Check for damage. Clean if necessary.			1000h	
17.	Fuel filler caps - Check for proper function and leakage.		X		
18.	Tank inlet and upper wing shell in the fuel tank area - Check sealing of the bore hole in the tank inlet. Check wing skin for bubble formation or bulging.	SB-AT01-027		annual	
19.	Tie-down points - Check thread and structure around the tie-down attach points for any damage.	10-20	X		

No.	Empennage, Elevator, Rudder	Reference	Interval 100h	Interval other	Initials
1.	Empennage - Inspect complete surface of the vertical and horizontal stabilizers, the elevator and the rudder for dents, cracks, holes and delamination.		X		
2.	Rudder hinge, elevator hinge and bellcranks - Check brackets and bellcranks for security of attachment and corrosion. Examine bearings for binding and excessive play. Check hinge bushings and replace if necessary. Check correct safetying of the lower rudder pivot pin with castellated nut and cotter pin.		X		
3.	Hinge play and control surface positioning - Verify clearance between horizontal stabilizer and elevator horns and clearance between vertical stabilizer and rudder horn is at least 1 mm (0.04 in.). Check elevator hinge and rudder hinge play. Maximum play approx.: - Axial ± 0,30 mm (± 0.01 in.) - Radial ± 0,30 mm (± 0.01 in.)			annual	
4.	Elevator control system - Measure the play in the elevator control system with the control surface locked. Apply a force of 50 N (11.2 lb) forwards and then backwards to the control stick - the maximum play allowed on the top of the stick is 10 mm (0.4 in.) for both sides.			annual	
5.	Rudder - Remove rudder if there is noticeable play. Examine the elevator actuation assembly inside the vertical stabilizer. Check for any damage, for correct installation and function and for security and wear. Inspect rudder hinge brackets, rudder yoke and control cable thimble-eyes for security, conditions and wear. Lubricate control cable thimble-eyes as required.	55-40		annual	
6.	Rudder rigging - Set rudder pedals in neutral position. Verify the rudder and the nose landing gear are also in neutral position. Set rudder pedals to fully left and then to full right. The rudder must hit the rudder travel stops and the distance from rudder pedal to firewall must be sufficient to apply the pedal brake. Adjust position of the rudder pedals by varying the length of nose wheel steering tubes. Adjust rudder neutral position and control cable tension by means of the turnbuckles in the cabin area.	27-20	X		

No.	Nose and Main Landing Gear	Reference	Interval 100h	Interval other	Initials
1.	Wheel fairings - Check condition and correct fit. Remove and clean. Check for paint coat damage, cracks, dents and delamination.		X		
2.	Fairing mounts - Inspect for cracks, distortion or other damage.		X		
3.	Nose gear strut mount and wheel fork - Check for deformation, cracks and corrosion. Check nose gear strut journal bearing for proper operation, play and correct safetying.		X		
4.	Nose gear strut and elastomer package - Check strut for deformation, stress marks, and cracks. Inspect correct installation of the nose wheel fork. Inspect elastomer package for wear, deterioration, cracks, correct fit and security. Check journal bearings of the elastomer package for play and condition.		X		
5.	Nose wheel steering - Inspect nose wheel steering tubes for condition, excessive play and correct safetying. Check return springs at nose gear strut for security and verify they are tension-free, when the nose wheel is in neutral position.		X		
6.	Main landing gear - Check main gear struts for deformation, cracks, damage to the paint coat, and corrosion. Inspect wheel axles for security of attachment to struts and for any damage.		X		
7.	Wheels and rims - Clean. Check tires for wear, cuts, foreign matter and deterioration. Inspect rims for security, deformation, cracks and other damage. Examine wheel bearings for excessive play, corrosion and irregular operation. Check tire pressure and proper location of the red slide marks.		X		
8.	Wheel bearings - Clean and lubricate.	12-22		500h annual	
9.	Wheel brakes - Clean. Apply brakes, examine system for leaks. Inspect brake fluid carrying lines at the main landing gear for condition, leakage and security of attachment. Inspect brake discs for cracks, corrosion and wear. Replace brake discs if worn below 4.3mm (0.17 in.). Inspect brake pads for condition and wear. Replace linings when worn to 2.6mm (0.10 in.). Check freedom of movement of the pistons and pressure plates.	32-40	X		
10.	Wheel axles - Clean. Visually inspect for cracks, nicks, corrosion or other damage.			every wheel removal	

No.	Electrical System / Avionics	Reference	Interval 100h	Interval other	Initials
1.	Electrical wiring system - Check the complete electrical wiring system for security, damage, wear and secure fit. Check all cable connections for tight fit, good contact, corrosion and condition.		X	annual	
2.	Tank inlet bonding wires - Check bonding between electric ground (exhaust port) and tank inlet (max. 1Ω).			annual	
3.	Tank inlet bonding wires - Check bonding wires at the airframe ground tube for yellow discoloration.	SB-AT01-027		annual	
4.	Instruments - Check instrument panel mounting brackets for security and condition. Examine instruments for security of attachment. Check electrical cables, hoses and lines for correct installation, condition and proper routing.			annual	
5.	Pitot / static system - Check pitot tube for security of attachment, condition and obstructions. Check pitot and static pressure lines for correct installation, condition, water and proper routing. Check water traps for water.[6)]	34-11	X		
6.	Pitot / static system - Perform pitot / static system leak test.	34-11		2 years	
7.	Pitot heating system - Carefully check pitot tube for heating up with pitot heating switched ON. WARNING: RISK OF SKIN BURNS! DO NOT TOUCH PITOT TUBE WHEN HEATING IS SWITCHED ON!		X[6)]		
8.	Integrated flight system - Check all components and wiring for damage, corrosion, proper operation and security of attachment.	34-25		annual[6)]	
9.	Garmin G500 system - Check bonding.	34-25		2000h[6)] 10 years[6)]	
10.	Aspen EFD1000 system - Check bonding.	34-25		annual[6)]	
11.	Aspen EFD1000 system - Perform capacity check of the internal back-up battery.	34-25		annual[6,7)]	

6) if installed
7) Interval is reduced to 6 months after 3 years from date of battery installation.

No.	Return to Service	Reference	Interval 100h	Interval other	Initials
1.	Install wheel fairings. Install seats (if removed). Install cabin floor boards. Install baggage compartment floorboard. Install access panel of the baggage compartment bulkhead. Install access panel 210AB.	06-30	X		
2.	Flight controls - Check for full range of travel and excessive friction.		X		
3.	Flaps - Operate through full extension and retraction for steady and complete deployment. Check correct limit switches operation at CRUISE, T/O and LDG flap positions. Verify the corresponding flap switch position and the corresponding flap position indicator reading.		X		
4.	Elevator trim - Check for full range of travel and excessive friction. Inspect proper operation of the trim control switch, limit switches, and the trim position indicator. Verify that elevator control forces decrease or increase when operating elevator trim. Measure control force to move stick rearward with full nose-down trim (40 ±5 N).	27-31	X		
5.	Engine and propeller controls - Check full range of motion without any obstruction or excessive friction to travel. Check throttle and propeller control levers friction lock.		X		
6.	Foreign items - Remove any foreign items from the aircraft.		X		

The aircraft is airworthy and meets the condition specified in the aircraft data sheet. All maintenance required by Service Information and Airworthiness Directives and all prescribed scheduled maintenance checks have been carried out.

Service Station:

Next inspection when _____ hours of operation have been reached.

Place, Date

Name, Signature of Mechanic

Name, Signature of Inspector

Stamp

3. 6000-Hour Inspection

A. The airframe of the type AQUILA AT01 is limited to 6.000 hours of flight time (refer to 04-00). An inspection program to reach an extension of replacement time can be obtained from the type certificate holder on request.
For all S/N`s having performed the 6000-hour inspection and possible maintenance actions resulting thereof no further life time limit beyond 6000 operating hours will be established and the composite structure is then considered to have "Safe Life".

B. All inspection items listed in the following table "6000-Hour Inspection Checklist" must be performed within **every 6000 hours of flight time**. The inspection **must be performed in conjunction with a 100-hour inspection including all annual inspection items** listed for the airframe (refer to "Inspection Time Intervals Chart" above).
All items performed, all findings discovered and their follow up corrections have to be recorded in acc. with an approved quality procedures manual.

NOTE: The first 6000-hour inspection is replaced by an inspection program to reach an extension of life time (refer to 04-00). It can be obtained from the type certificate holder on request.

C. The inspection table shows three different types of inspections listed in the column "Method/Inspection":

V	Visual inspection
T	Tap test
F	Functional / fit check

Refer to 51-10 for a description of visual inspection and tap test methods.

D. Prior to inspection all aircraft log-books have to be checked to establish the aircraft data set and the repair history of the aircraft.

Before starting the 6000-hour inspection the following actions are required:
(1) Fix the fuselage on jacks (refer to 07-10).
(2) Remove wing (refer to 57-00).
(3) Remove rudder (refer to 55-40).
(4) Remove elevator (refer to 55-20).
(5) Remove ailerons (refer to 57-50).
(6) Remove flaps (refer to 57-50).
(7) Remove cowling (refer to 71-10).

E. 6000-Hour Inspection Checklist

Aircraft S/N		Operating Hours TTSN		Registration Number	
Engine S/N		Operating Hours TTSN / TTSO		Date	
Propeller S/N		Operating Hours TTSN / TTSO		Date	

No.	Inspection Items Left Wing	Inspection Method	Finding / Condition	Initials
Root Ribs (in front of and behind wing spar)				
1.	Bonding area of ribs to the wing shell - delamination, cracks.	V, T		
2.	Condition of rib laminate, delamination, cracks.	V, T		
3.	Bonding area at the main wing spar web.	V		
4.	Wing attachment bolt bushing - bonding in the rib.	V		
5.	Condition of bushing, wear of bearing area, corrosion.	V		
Inner Flap Hinge Support Rib				
6.	Bonding area of rib to the wing shell - delamination, cracks.	V, T		
7.	Condition of rib laminate, delamination, cracks.	V, T		
8.	Bonding area at the main wing spar web.	V		
9.	Areas around bushing - delamination, cracks.	V		
10.	Condition of ball bearing, wear, corrosion.	V		
Wing Main Spar				
11.	Spar cap between root ribs - bonding to shear web, cracks.	V		
12.	Shear web between root ribs - condition, cracks, delamination.	V		
13.	Spar cap - inspection through openings in root rib and inspection opening in lower wing shell. Bonding to the wing shell (cracks), condition of the main shear web (delamination).	V		
Upper and Lower Wing Shell				
14.	Wing shell - delamination, cracks, scratches in shell surfaces, chipping of paint, UV damage.	V, T		
15.	Wing shell - core damage and dents in sandwich, disbond of shell laminate from core material.	V, T		

No.	Inspection Items Left Wing (Cont.)	Inspection Method	Finding / Condition	Initials
16.	Areas around inspection openings - delamination, cracks.	V		
17.	Wing leading edge bonding area - disbonds, cracks.	V, T		
18.	Area around pitot-static tube opening - delamination, cracks.	V, T		
19.	Area around tie-down fixation point - delamination, cracks.	V, T		
20.	Area around NAV-light opening - delamination, cracks.	V		
21.	Area around winglet root upper wing shell - cracks.	V, T		
22.	Area around ring insert of the tank filler - cracks, disbonding.	V, T		
Trailing Edge Shear Web				
23.	Wing trailing edge, flap area - bonding lower to upper shell, disbond, cracks.	V, T		
24.	Wing trailing edge, flap area - laminate condition, cracks.	V		
25.	Wing trailing edge, aileron area - bonding area shear web to wing shell, disbonds, cracks.	V, T		
26.	Wing trailing edge, aileron area - laminate condition, cracks.	V		
27.	Bonding left an right of hinge levers for flap and aileron.	V, T		
28.	Aileron hinge levers - delamination at bolt area, bolt corrosion.	V		
29.	Flap hinge levers - delamination at bolt area, bolt corrosion.	V		
Tank Rib				
30.	Bonding area of rib to the wing shell - delamination, cracks.	V, T		
31.	Condition of rib laminate, delamination, cracks.	V, T		
32.	Bonding area at the main wing spar web.	V		

No.	Inspection Items Right Wing	Inspection Method	Finding / Condition	Initials
Root Ribs (in front of and behind wing spar)				
1.	Bonding area of ribs to the wing shell - delamination, cracks.	V, T		
2.	Condition of rib laminate, delamination, cracks.	V, T		
3.	Bonding area at the main wing spar web.	V		
4.	Wing attachment bolt bushing - bonding in the rib.	V		
5.	Condition of bushing, wear of bearing area, corrosion.	V		

No.	Inspection Items Right Wing (Cont.)	Inspection Method	Finding / Condition	Initials
Inner Flap Hinge Support Rib				
6.	Bonding area of rib to the wing shell - delamination, cracks.	V, T		
7.	Condition of rib laminate, delamination, cracks.	V, T		
8.	Bonding area at the main wing spar web.	V		
9.	Areas around bushing - delamination, cracks.	V		
10.	Condition of ball bearing, wear, corrosion.	V		
Wing Main Spar				
11.	Spar cap between root ribs - bonding to shear web, cracks.	V		
12.	Shear web between root ribs - condition, cracks, delamination.	V		
13.	Spar cap - inspection through openings in root rib and inspection opening in lower wing shell. Bonding to the wing shell (cracks), condition of the main shear web (delamination).	V		
Upper and Lower Wing Shell				
14.	Wing shell - delamination, cracks, scratches in shell surfaces, chipping of paint, UV damage.	V, T		
15.	Wing shell - core damage and dents in sandwich, disbond of shell laminate from core material.	V, T		
16.	Areas around inspection openings - delamination, cracks.	V		
17.	Wing leading edge bonding area - disbonds, cracks.	V, T		
18.	Area around tie-down fixation point - delamination, cracks.	V, T		
19.	Area around NAV-light opening - delamination, cracks.	V		
20.	Area around winglet root upper wing shell - cracks.	V, T		
21.	Area around ring insert of the tank filler - cracks, disbonding.	V, T		
Trailing Edge Shear Web				
22.	Wing trailing edge, flap area - bonding lower to upper shell, disbond, cracks.	V, T		
23.	Wing trailing edge, flap area - laminate condition, cracks.	V		
24.	Wing trailing edge, aileron area - bonding area shear web to wing shell, disbonds, cracks.	V, T		
25.	Wing trailing edge, aileron area - laminate condition, cracks.	V		
26.	Bonding left an right of hinge levers for flap and aileron.	V, T		
27.	Aileron hinge levers - delamination at bolt area, bolt corrosion.	V		

No.	Inspection Items Right Wing (Cont.)	Inspection Method	Finding / Condition	Initials
28.	Flap hinge levers - delamination at bolt area, bolt corrosion.	V		
Tank Rib				
29.	Bonding area of rib to the wing shell - delamination, cracks.	V, T		
30.	Condition of rib laminate - delamination, cracks.	V, T		
31.	Bonding area at the main wing spar web.	V		

No.	Inspection Items Control Surfaces	Inspection Method	Finding / Condition	Initials
Ailerons				
1.	Aileron surfaces - Check for delamination of shells, scratches.	V, T		
2.	Paint surfaces - Check for condition, scratches, UV damage, chipping of paint.	V		
3.	Damage of core, dents to core, disbond between core and skin.	V, T		
4.	Aileron trailing and leading edges - bonding delamination.	V, T		
5.	Inner and outer aileron ribs - bonding delamination with skin.	V, T		
6.	Check condition of drain holes in inner and outer ribs.	V		
7.	Areas around hinges and aileron control horn fasteners - delamination from skin, cracks.	V		
8.	Condition of control horn bearing, corrosion, play.	V		
9.	Condition of hinges (bushings), corrosion, play.	V		
10.	Inspect for previously performed repairs and repaintings. If so, check aileron mass and static moment to be within specified limits (refer to 57-50).	V		
Flaps				
11.	Flap surfaces - Check for delamination of shells, scratches.	V, T		
12.	Paint surfaces - Check for condition, scratches, UV damage, chipping of paint.	V		
13.	Damage of core, dents to core, disbond between core and skin.	V, T		
14.	Flap trailing and leading edges - bonding delamination.	V, T		
15.	Inner and outer flap ribs - bonding delamination with skin.	V, T		
16.	Check condition of drain holes in inner and outer ribs.	V		

No.	Inspection Items Control Surfaces (Cont.)	Inspection Method	Finding / Condition	Initials
17.	Areas around hinge fasteners - delamination from skin, cracks.	V		
18.	Condition of control horn bearing, corrosion, play.	V		
19.	Condition of hinges (bushings), corrosion, play.	V		
20.	Inspect for previously performed repairs and repaintings. If so, check flap mass and static moment to be within specified limits (refer to 57-50).	V		
Rudder				
21.	Rudder surfaces - Check for delamination of shells, scratches.	V, T		
22.	Paint surfaces - Check for condition, scratches, UV damage, chipping of paint.	V		
23.	Damage of core, dents to core, disbond between core and skin.	V, T		
24.	Rudder trailing and leading edges - bonding delamination.	V, T		
25.	Lower rudder hinge rib - bonding delamination with skin.	V, T		
26.	Check condition of drain hole in lower hinge rib.	V		
27.	Area around upper hinge - delamination from skin, cracks.	V		
28.	Mass balance horn - Check for cracks and delamination.	V, T		
29.	Condition of hinge (bushing), corrosion, play.	V		
30.	Inspect for previously performed repairs and repaintings. If so, check rudder mass and static moment to be within specified limits (refer to 55-40).	V		
31.	Bolts at lower hinge - Check for condition, cracks, corrosion, thread.	V		
Elevator				
32.	Elevator surfaces - Check for delamination of shells, scratches.	V, T		
33.	Paint surfaces - Check for condition, scratches, UV damage, chipping of paint.	V		
34.	Damage of core, dents in core, disbond between core and skin.	V, T		
35.	Elevator trailing and leading edges - bonding delamination.	V, T		
36.	Inner elevator ribs - bonding delamination with skin.	V, T		
37.	Check condition of drain holes in inner ribs.	V		
38.	Areas around hinges - delamination from skin, cracks.	V		
39.	Mass balance horn - Check for cracks and delamination.	V, T		

No.	Inspection Items Control Surfaces (Cont.)	Inspection Method	Finding / Condition	Initials
40.	Condition of hinges (bushings), corrosion, play.	V		
41.	Inspect for previously performed repairs and repaintings. If so, check elevator mass and static moment to be within specified limits (refer to 55-20).	V		
42.	Bolts at inner hinge - Check for condition, cracks, corrosion, thread.	V		

No.	Inspection Items Horizontal Stabilizer	Inspection Method	Finding / Condition	Initials
1.	Stabilizer surfaces - Check for delamination of shells, scratches.	V, T		
2.	Paint surfaces - Check for condition, scratches, UV damage, chipping of paint.	V		
3.	Damage of core, dents in core, disbond between core and skin.	V, T		
4.	Stabilizer leading edges - Check for bonding delamination.	V, T		
5.	Trailing edge spar - Check for cracks and bonding delamination with skin.	V, T		
6.	Areas around hinge supports in trailing edge spar - Check for cracks and delamination.	V		
7.	Condition of hinges (bushings), corrosion, play.	V		

No.	Inspection Items Fuselage	Inspection Method	Finding / Condition	Initials
Fuselage Skin Structure and Vertical Stabilizer Skin				
1.	Skin surfaces - Check for delamination of shells, scratches.	V, T		
2.	Paint surfaces - Check for condition, scratches, UV damage, chipping of paint.	V		
3.	Damage of core, dents in core, disbond between core and skin.	V, T		
4.	Areas near bonding seam at centerline on upper and lower fuselage surfaces - Inspect for cracks in paint.	V, T		
5.	Check condition of drain holes in lower fuselage.	V		
6.	Inspect for previously performed repairs and repaintings.	V		
7.	Areas near bonding seam at connection between horizontal and vertical stabilizer on upper and lower horizontal surfaces - Inspect for cracks in paint.	V		

No.	Inspection Items Fuselage (Cont.)	Inspection Method	Finding / Condition	Initials
Fuselage / Wing Interconnection				
8.	Root ribs and intersection to fuselage - Check for cracks in paint and structure.	V		
9.	Area around wing attachment bolt bushings - Check for cracks and disbonding.	V		
10.	Wing attachment bolt bushings - Check for wear, scratches, corrosion and tightness of fit with the bolt.	V		
11.	Seat bulkhead and forward landing gear bulkhead in spar bridge - Check condition of laminate and bonding areas with the fuselage shell.	V, T		
12.	Forward landing gear bulkhead - Check laminate around fasteners of landing gear supports for cracks and delamination.	V, T		
Bulkheads, Ribs and Hinges in Vertical Stabilizer				
13.	Upper and lower shear web in vertical stabilizer - Check for delamination and cracks.	V		
14.	Upper and lower shear web in vertical stabilizer - Check bonding to the stabilizer shell.	V, T		
15.	Upper hinge plate - check for delamination and cracks.	V		
16.	Bushing in upper hinge plate - wear, corrosion, fit/play.	V		
17.	Lower shear web around fasteners for lower hinge bracket - Check laminate.	V		
18.	Bushing in lower hinge bracket - wear, corrosion, fit/play.	V		
19.	Lower end of the stabilizer (bumper) - delamination, cracks.	V		
20.	Bumper plate at lower end of the stabilizer - Check fixation and condition.	V		
Firewall				
21.	Check firewall bulkhead (from cockpit side) for cracks in the laminate (around cut outs).	V		
22.	Firewall bulkhead - Check bonding to the fuselage skin.	V, T		
23.	Areas around engine brackets - delamination, cracks.	V, T		
24.	Firewall metal shield - condition, wear, corrosion.	V		
25.	Fire resistant firewall sealer around the fire shield - condition, corrosion.	V		
26.	Areas around Camloc fasteners at fuselage cowling support - Check laminate for cracks and delamination.	V		

No.	Inspection Items Fuselage (Cont.)	Inspection Method	Finding / Condition	Initials
27.	Area around pedal control brackets - delamination, cracks.	V		
Cockpit Area and Baggage Compartment				
28.	Front cockpit floor - Check for delamination and cracks. Check bonding area to the fuselage structure for disbonding.	V, T		
29.	Front shear bulkhead - Check for delamination and cracks. Check bonding area to the fuselage structure for disbonding.	V, T		
30.	Front seat bulkhead - Check for delamination and cracks. Check bonding area to the fuselage structure for disbonding.	V, T		
31.	Seat elements and attachments - delamination, cracks.	V, T		
32.	Rear seat bulkhead - Check for delamination and cracks. Check bonding area to the fuselage structure for disbonding.	V, T		
33.	Front landing gear bulkhead - Check for delamination and cracks. Check bonding area to the fuselage structure for disbonding.	V, T		
34.	Rear landing gear bulkhead - Check for delamination and cracks. Check bonding area to the fuselage structure for disbonding.	V, T		
35.	Baggage bulkhead - Check for delamination and cracks. Check bonding area to the fuselage structure for disbonding.	V, T		
36.	Lower lap belt attachments - Check for delamination and cracks. Check bonding area to the fuselage structure for disbonding.	V		
37.	Lower lap belt fitting - Check for wear and corrosion.	V		
38.	Upper lap belt attachments - Check for delamination and cracks at the baggage bulkhead.	V, T		
39.	Baggage compartment floor supports - Check for delamination and cracks. Check bonding area to the fuselage structure for disbonding.	V		
40.	Gas spring supports - Check for delamination and cracks. Check bonding area to the fuselage structure for disbonding.	V		
41.	Composite tube stiffener and attachments - Check for delamination and cracks. Check bonding area to the fuselage structure for disbonding.	V		
42.	Baggage compartment door, doorframe and supports - Check for delamination and cracks. Check bonding area to the fuselage structure for disbonding.	V		
43.	Tailboom bulkheads - Check for delamination and cracks. Check bonding area to the fuselage structure for disbonding.	V		

No.	Inspection Items Fuselage (Cont.)	Inspection Method	Finding / Condition	Initials
44.	Elevator control lever mounting supports on baggage bulkhead - Check for delamination and cracks. Check bonding area to the fuselage structure for disbonding.	V		
45.	Flap actuator mounting supports in middle tunnel - Check for delamination and cracks. Check bonding area to the fuselage structure for disbonding.	V		
46.	Canopy frame (at the fuselage) - Check for delamination and cracks.	V, T		
47.	Step supports - Check for delamination and cracks. Check bonding area to the fuselage structure for disbonding.	V		
48.	Check step component for wear and corrosion.	V		
Canopy				
49.	Canopy frame - Check for delamination and cracks. Check bonding area of Plexiglas to the canopy frame structure for disbonding.	V		
50.	Canopy latching components - corrosion, wear, damage.	V		
51.	Canopy pin and bushing components - Check for corrosion, wear and fit/play.	V		
52.	Canopy Plexiglas including side windows - cracks, damage.	V		

No.	Inspection Items Landing Gear	Inspection Method	Finding / Condition	Initials
Main Landing Gear				
1.	Main landing gear struts - Check condition (distortion, corrosion, wear and paint damages).	V		
2.	Remove main wheels from axles and check axles for distortion, corrosion, wear and damages.	V		
3.	Check inner and outer main brackets for fit of shims, cracks and wear.	V		
Nose Landing Gear and Engine Mount				
4.	Nose landing gear main strut and wheel fork - Check condition (cracks, distortion, corrosion, wear and paint damages).	V		
5.	Nose wheel steering tubes - Check condition (cracks and distortion).	V		
6.	Engine mount - Check the entire tube frame and all welded joints, in particular at the firewall and nose gear suspension, for distortion, wear and cracks.	V		

No.	Inspection Items Landing Gear (Cont.)	Inspection Method	Finding / Condition	Initials
7.	Engine mount attachment bolts - Check for cracks and wear.	V		
8.	Nose wheel axle - Check for cracks and distortion.	V		

The aircraft is airworthy and meets the condition specified in the aircraft data sheet.
All prescribed 6000-hour inspection items and maintenance actions resulting thereof have been carried out.

Service Station:

Place, Date

Name, Signature of Mechanic | Name, Signature of Inspector | Stamp

DAILY INSPECTIONS

1. General

   A. Pre-flight and post-flight checks must be carried out daily when the aircraft is in operation.

2. Pre-Flight Check

   A. This check must be carried out before the first flight of the day. In this way, the general condition of the aircraft and its engine can be ascertained. Pre-flight checks are essential for flight safety as numerous accidents can be traced back to inadequate pre-flight checks.

      The scope of the pre-flight check is listed in the AQUILA AT01 Flight Manual, section 4.

3. Post-Flight Check

   A. This check should be carried out after the final flight of the day. For the most part, it is a visual inspection.

   B. The check should contain all points of the pre-flight check.
      (1) Supplementary measures:
         (a) Re-fuel.
         (b) Check that the aircraft is properly parked (refer to 10-10).
         (c) Check the logbook entries for remarks about faults or defects, and for correct number of landings and flight hours.
         (d) If necessary, moor the aircraft (refer to 10-20).

UNSCHEDULED MAINTENANCE CHECKS

1. General

A. Special checks are to be carried out when an incident has occurred that may have caused damage to the aircraft or impaired airworthiness.

In addition, a 25-hour inspection must be carried out on new aircraft and its engine, on overhauled engines and after extensive airframe repairs.

2. Special Checks

A. 25-Hour Inspection
After the first 25 hours of operation of a new aircraft and its engine or an overhauled engine or after extensive airframe repairs, an inspection of the extent of a 100-hour inspection must be carried out (refer to 05-20).

After the first 25 hours of operation of a new or overhauled engine, the engine and the propeller must be inspected. Refer to ROTAX Aircraft Engines Maintenance Manual for ROTAX Engines Type 912 Series for detailed information on this inspection.

B. Hard Landing
After an excessively hard landing or other unusual loading of the landing gear a thorough inspection of the affected components and their attachments is required. Even if no obvious defects are detectable, a visual inspection must be carried out. Perform the following:

(1) Prepare aircraft for visual checks as follows:
  (a) Remove engine cowling (refer to 71-10).
  (b) Remove landing gear fairings.
  (c) Inside the cabin and baggage compartment - remove carpets and floorboards as required to gain access to the landing gear mounting brackets (refer to 25-12).

(2) Inspect main landing gear.
  (a) Check wheel fairings for cracks, dents and delamination.
  (b) Check fairing mounts for cracks, distortion and other damage.
  (c) Check fuselage structure visually at such points and areas where the main landing gear is attached. Check for stress marks, distortion, disbonding, and delamination. Check main landing gear strut brackets for distortion, cracks and security of attachment. Check condition of the polyamide inserts. Check bolts for correct torque.
  (d) Check main gear struts for deformation and cracks. Examine wheel axles for security of attachment to struts and for any damage.
  (e) Inspect tires for integrity and proper location of the red slide marks.
  (f) Inspect brake fluid carrying lines at the main landing gear for condition, leakage, and security of attachment.

(3) Inspect nose landing gear.
  (a) Check wheel fairing for cracks, dents and delamination.
  (b) Inspect fairing mounts for cracks, distortion and other damage.
  (c) Check nose gear strut mount for deformation and cracks. Check nose gear strut journal bearing for proper operation and play.
  (d) Check strut for deformation, stress marks, and cracks. Check elastomer package for deterioration, cracks, correct fit and security. Check journal bearings of the elastomer package for play and condition.
  (e) Inspect nose wheel steering tubes for condition and excessive play.
  (f) Inspect tire for integrity and proper location of the red slide marks.
(4) Re-mount all items removed during the inspection.
(5) Perform a brake and steering system operational test (refer to 32-40).

C. Engine Fire

After an engine fire, carry out the following:

WARNING: IF IT IS SUSPECTED THAT PARTS OF THE STRUCTURE OR COWLING COULD HAVE BEEN DAMAGED BY HIGH TEMPERATURES (INDICATED BY BLISTERING ON THE PROTECTIVE COATING), THE MANUFACTURER MUST BE CONTACTED FOR DEFECT APPRAISAL BEFORE THE AIRCRAFT IS FLOWN AGAIN.

(1) Remove engine cowling (refer to 71-10).
(2) Examine engine cowling. Check for signs of fire damage.
(3) Disconnect battery (refer to 24-30).
(4) Examine electrical cables for damaged insulation.
(5) Examine fuel lines for damage of the fire-protection sleeves.
(6) Check oil lines for damage of the fire-protection sleeves.
(7) Check air filter element for fire damage.
(8) Examine engine mount and shock mounts for any fire damage.
(9) Check all other hoses and pipes, as well as all gaskets and seals for fire damage.
(10) Replace damaged items.
(11) Re-mount engine cowling (refer to 71-10).
(12) Perform an engine test run (refer to 05-20).

D. Violent Stop of the Engine

In event that the propeller has touched the ground or the engine has been inadvertently stopped violently (shock loading), the propeller gear box must be disassembled and inspected by an authorized workshop. For further information on engine inspections necessary after a propeller ground strike and for more general information, refer to the relevant technical documents and the ROTAX Maintenance Manual.

CAUTION: ONLY QUALIFIED TECHNICIANS (AUTHORIZED BY THE NATIONAL AVIATION AUTHORITY AND AFTER SUCCESSFULLY COMPLETING THE RELEVANT ROTAX TRAINING COURSE) ARE AUTHORIZED TO PERFORM THIS WORK.

Check additional equipment (external alternator, hydraulic governor, ignition unit, coolant and oil hoses) for damage.

CHAPTER 27

FLIGHT CONTROLS

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FLIGHT CONTROLS - GENERAL

1. Introduction

   A. This chapter contains information about the flight controls used to manually control the aircraft in flight. It also includes functional and maintenance information about the flaps.

2. General Description

   A. The conventionally designed flight control system is divided into aileron control, rudder control, elevator control and the wing flaps system. The aircraft is equipped with dual controls. The control stick and rudder pedals are used for control input. Elevator trim can be actuated electrically. Aileron and elevator control motion is transferred to the control surfaces via pushrods and bellcranks. The rudder control system utilizes control cables and bellcranks for rudder actuation. The flaps are operated and fixed in the desired position by an electrical flap actuator.

   B. For dimensions, areas and free play tolerances of the control surfaces refer to 06-00.

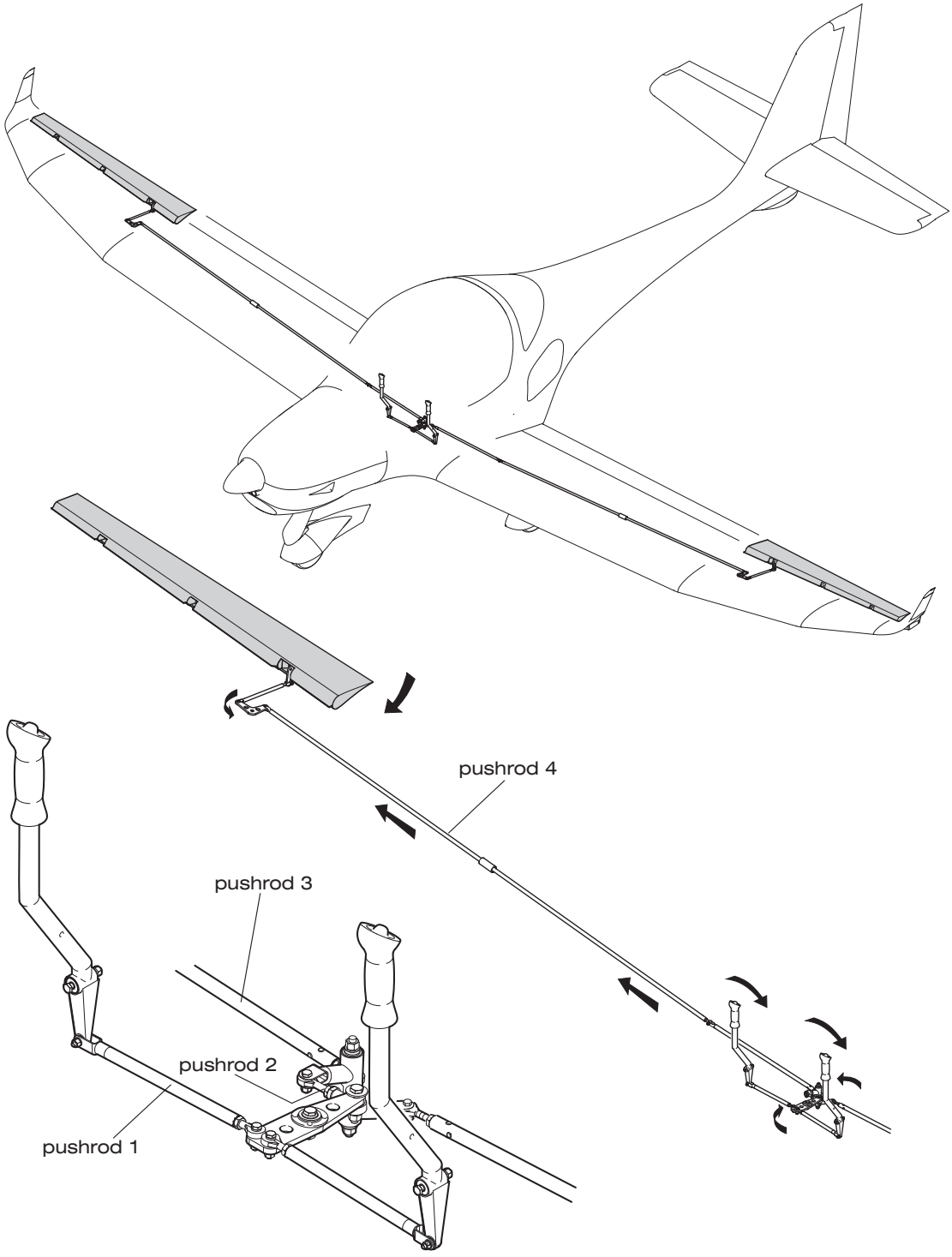
AILERON CONTROL SYSTEM - DESCRIPTION

1. Introduction

   A. This section describes that portion of the flight control system which controls the position and movement of the ailerons. The rigging procedure for the aileron control system is also provided. The ailerons are actuated via pushrods and bellcranks. Each aileron has weight compensation. To correct the tendency to roll precisely, a ground-adjustable trim tab is provided at the leading edge of the left aileron.

2. Description and Operation

   A. For aileron control system design and function refer to figure 1.



Aileron Control System Design and Function
Figure 1

AILERON CONTROL SYSTEM - MAINTENANCE

WARNING: WHEN INSTALLING COMPONENTS OF CONTROL SYSTEM, NEW SELF-LOCKING NUTS SHOULD ALWAYS BE USED. NEVER USE A SELF-LOCKING NUT MORE THAN ONCE.

1. General

   A. For a breakdown of components, refer to figure 201, 202 and 203.

2. Control Stick Removal/Installation

   A. Remove Control Stick
      (1) Remove access panel 211 HL (HR) (refer to 25-12).
      (2) Disconnect electrical cable to the transmission button.
      (3) Disconnect pushrod at control stick base.
      (4) Remove bolt securing control stick to torque tube assembly and remove stick.

   B. Install Control Stick
      (1) Position control stick and secure to torque tube assembly using bolt, washer and nut.
      (2) Connect pushrod to control stick base.
      (3) Reconnect electrical cable to the transmission button.
      (4) Install access panel 211 HL (HR) (refer to 25-12).

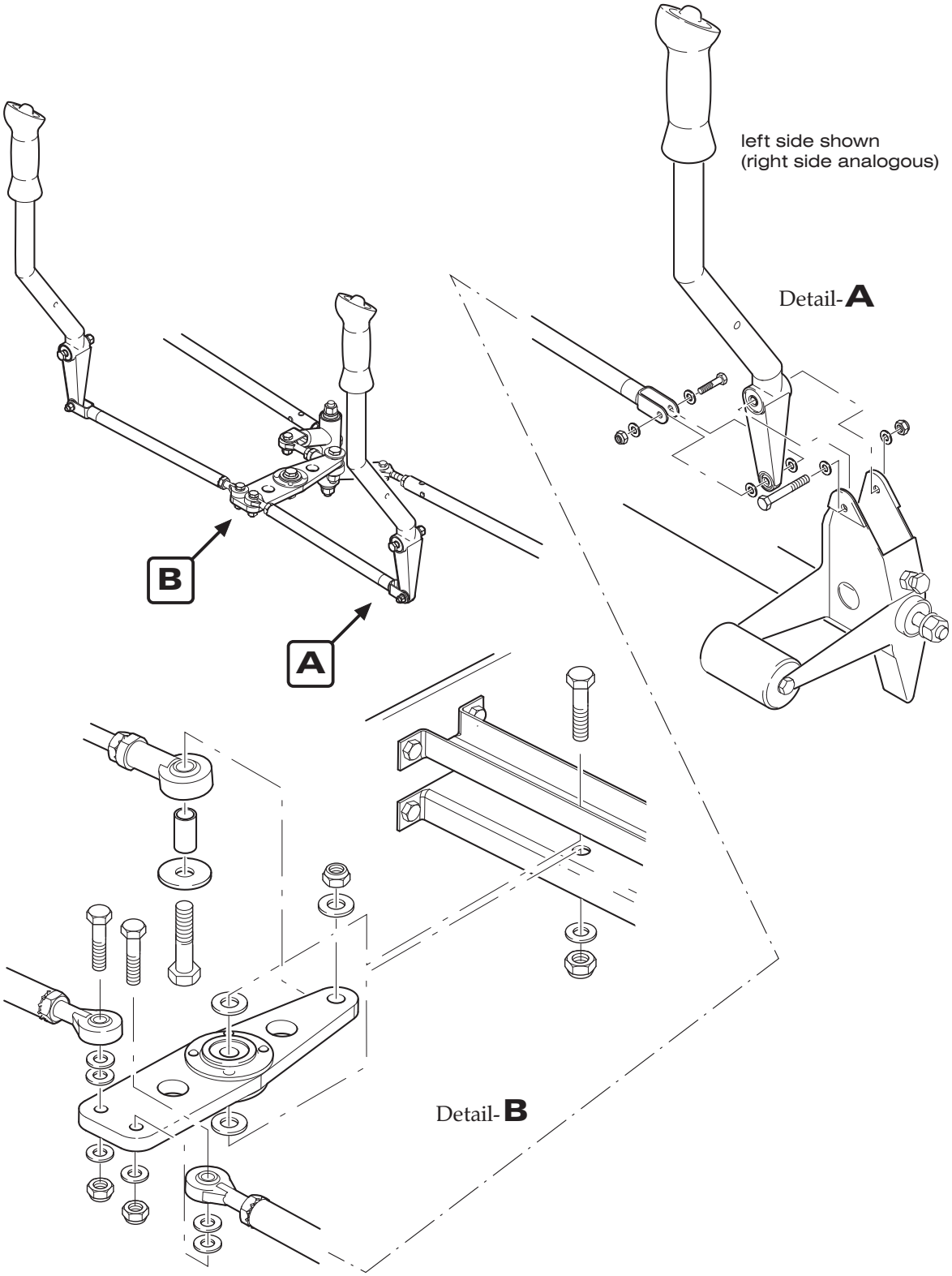
3. Pushrod Removal/Installation

   A. Remove Pushrod 1
      (1) Remove access panel 211 HL (HR) (refer to 25-12).
      (2) Disconnect pushrod at control stick base.
      (3) Disconnect pushrod at front bell crank and remove pushrod.

   B. Install Pushrod 1
      (1) Connect pushrod to front bellcrank and control stick base.
      (2) Perform aileron control system inspection/check (refer to “Inspection/Check” below).
      (3) Install access panel 211 HL (HR) (refer to 25-12).

4. Front Bellcrank Removal/Installation

   A. Remove Front Bellcrank
      (1) Remove access plate 210 AB (refer to 06-30).
      (2) Remove access panel 211 HL and 211 HR (refer to 25-12).
      (3) Disconnect pushrods at front bellcrank.
      (4) Remove pivot bolt securing bellcrank to bellcrank brackets and remove bellcrank.



Component Installation
Figure 201

B. Install Front Bellcrank
   (1) Position front bellcrank between brackets and secure using bolt, washer and nut.
   (2) Connect pushrods to front bellcrank.
   (3) Perform aileron control system inspection/check (refer to “Inspection/Check” below).
   (4) Install access plate 210 AB (refer to 06-30).
   (5) Install access panel 211 HL and 211 HR (refer to 25-12).

5. Pushrod 2 Removal/Installation

A. Remove Pushrod 2
   (1) Remove access plate 210 AB (refer to 06-30).
   (2) Disconnect pushrod at front bellcrank.
   (3) Disconnect pushrod at rear bell crank and remove pushrod.

B. Install Pushrod 2
   (1) Connect pushrod to front bellcrank and rear bellcrank.
   (2) Perform aileron control system inspection/check (refer to “Inspection/Check” below).
   (3) Install access plate 210 AB (refer to 06-30).

6. Rear Bellcrank Removal/Installation

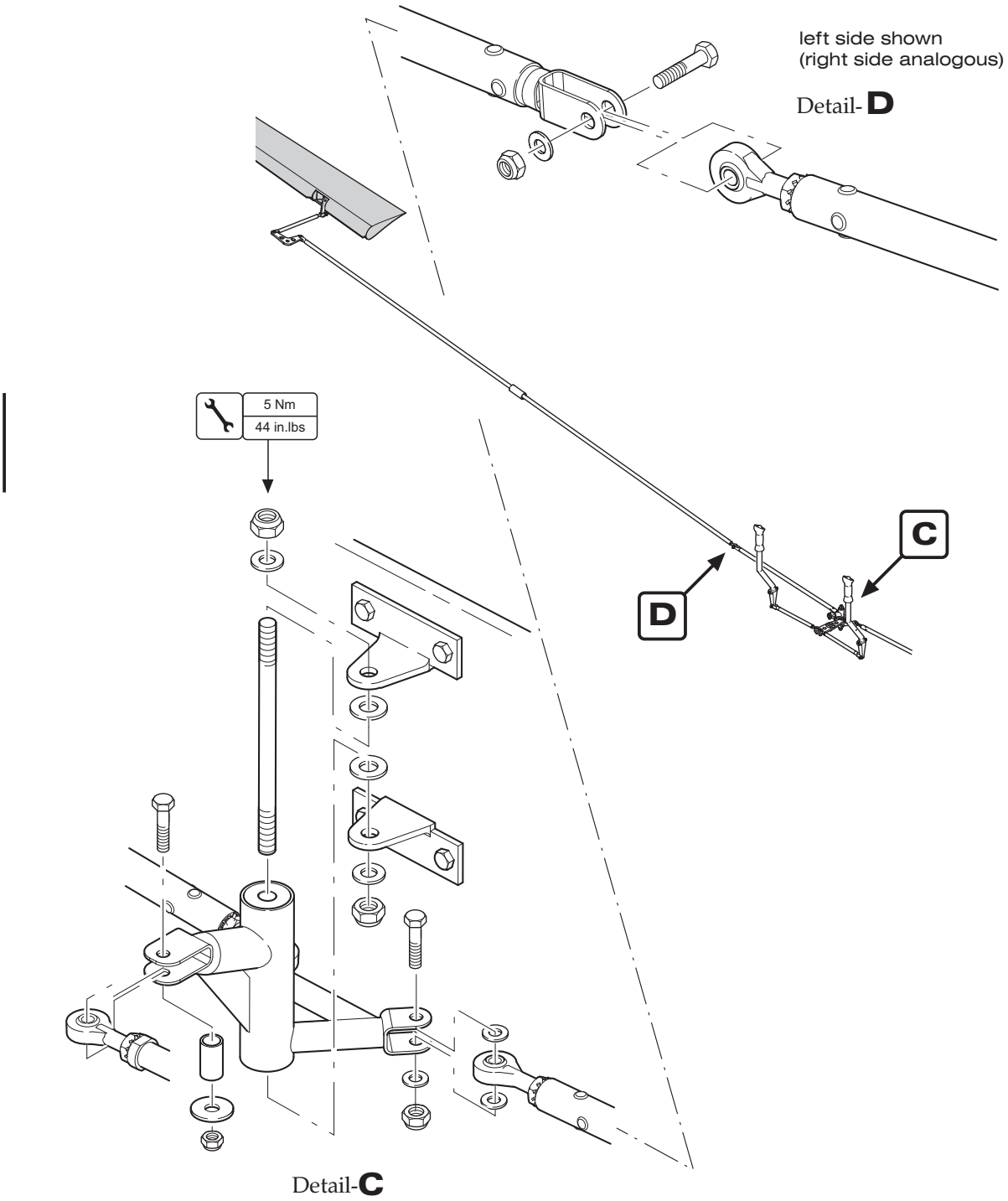
A. Remove Rear Bellcrank
   (1) Remove access plate 210 AB (refer to 06-30).
   (2) Disconnect pushrods at rear bellcrank.
   (3) Remove nuts, washers and bellcrank axle securing bellcrank to bellcrank brackets and remove bellcrank.

B. Install Rear Bellcrank
   (1) Position rear bellcrank between brackets and secure using axle, washers and nuts.
   (2) Attach pushrods to rear bellcrank.
   (3) Perform aileron control system inspection/check (refer to “Inspection/Check” below).
   (4) Install access plate 210 AB (refer to 06-30).

7. Pushrod 3 Removal/Installation

A. Remove Pushrod 3
   (1) Remove access plate 210 AB (refer to 06-30).
   (2) Disconnect pushrod at rear bellcrank.
   (3) Disconnect pushrod at pushrod 4.

B. Install Pushrod 3
   (1) Connect pushrod to rear bellcrank and pushrod 4.
   (2) Perform aileron control system inspection/check (refer to “Inspection/Check” below).
   (3) Install access plate 210 AB (refer to 06-30).



Component Installation
Figure 202

8. Pushrod 4 Removal/Installation

A. Remove Pushrod 4
(1) Remove wing (refer to 57-10).
(2) Open access panel 520 (620) AB (refer to 06-30).
(3) Disconnect pushrod at aileron bellcrank.
(4) Remove rod end bearing.
(5) Cautiously withdraw pushrod from wing.

B. Install Pushrod 4
(1) Position pushrod into the wing.
(2) Install rod end bearing.
(3) Attach pushrod to aileron bellcrank.
(4) Install wing (refer to 57-10).
(5) Connect pushrod 4 to pushrod 3.
(6) Re-rig aileron control system (refer to "Adjustment/Test" below).
(7) Perform aileron control system inspection/check (refer to "Inspection/Check" below).
(8) Close access panel 520 (620) AB (refer to 06-30).

9. Aileron Bellcrank Removal/Installation

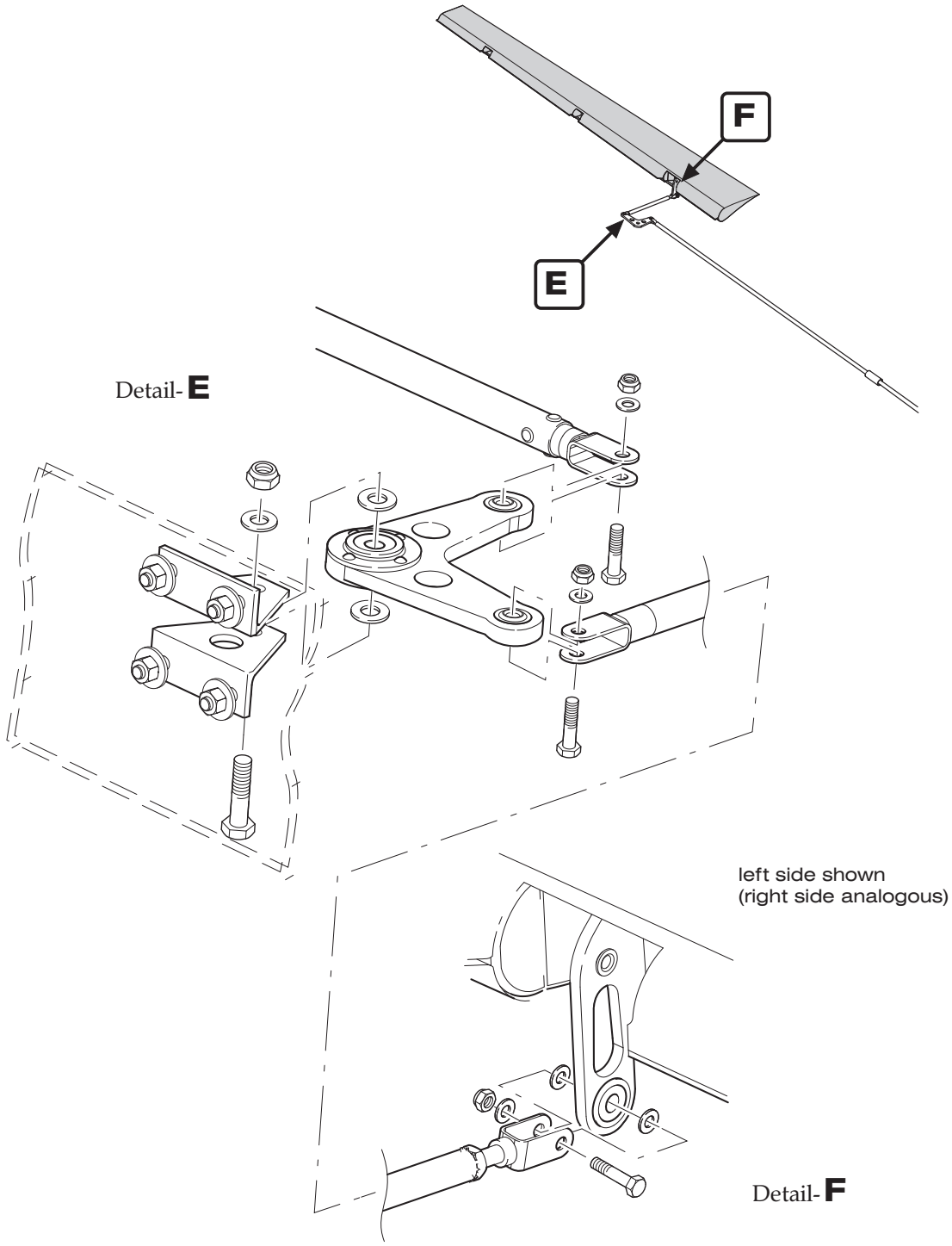
A. Remove Aileron Bellcrank
(1) Open access plate 520 (620) AB (refer to 06-30).
(2) Disconnect pushrods at aileron bellcrank.
(3) Remove pivot bolt securing bellcrank to bellcrank bracket assembly. Remove bellcrank and washers through access plate.

B. Install Aileron Bellcrank
(1) Attach bellcrank to structure using pivot bolt, ensuring required washers are in place. Torque nuts to 5 Nm (44 in.lbs).
(2) Reconnect aileron pushrod to bellcrank.
(4) Reconnect pushrod 4 to the bellcrank.
(5) Perform aileron control system inspection/check (refer to "Inspection/Check" below).
(6) Close inspection/access plate 520 (620) AB (refer to 06-30).

10. Inspection/Check

A. Inspection/Check
(1) Perform a visual inspection of the aileron control system. Check all components for proper installation and security. No signs of excessive play.

NOTE: The maximum permissible value of aileron play at the hinge pins is 1,0 mm (0.04 in.) axial play and 0,3 mm (0.01 in.) radial play. The maximum control circuit backlash is 10 mm (0.4 in.).
In case of excessive play of the control surfaces in their hinges, replace worn hinge bushings (refer also to 57-50).



Aileron Bellcrank Installation
Figure 203

(2) Verify minimum rod end thread engagement of 8 mm (0.312 in.).
(3) Verify ailerons can be moved smoothly through the full travel. No grinding is audible.
(4) Check ailerons for correct travel using an inclinometer. If necessary perform aileron control system adjustment/test (refer to "Adjustment/Test" below).

NOTE: For aileron rigging specifications, refer to chapter 6 „Dimensions and Areas".

(5) Install all items removed for access.

11. Adjustment/Test

A. Adjustment/Test
(1) Remove access plate 210 AB (refer to 06-30).
(2) Remove access plate 620 AB and 520 AB (refer to 06-30).
(3) Remove access plate 211 HL and HR (refer to 06-30).
(4) Adjust pushrod 2 until:
(a) front and rear bellcrank are parallel to each other.
(b) both bellcranks are perpendicular to the wing spar.
(5) Fix bellcranks in a suitable manner.
(6) Adjust pushrod 3 for each aileron so the aileron bellcrank is in neutral position (line between bellcrank pivot bolt and aileron pushrod attach bolt is parallel to the wing spar).
(7) Adjust each aileron pushrod until the control surface is neutral with reference to wing trailing edge.
(8) Adjust pushrod 1 for each control stick until the control stick is in neutral position.
(9) Set free the front and rear bellcrank.
(10) Fasten inclinometer to left aileron and set at 0°.
(11) Adjust aileron stop bolts at control yoke assembly to allow up and down aileron travel specified in 06-10.
(12) Perform an aileron control system inspection/check (refer to "Inspection/Check" above).
(13) Install all items removed for access.

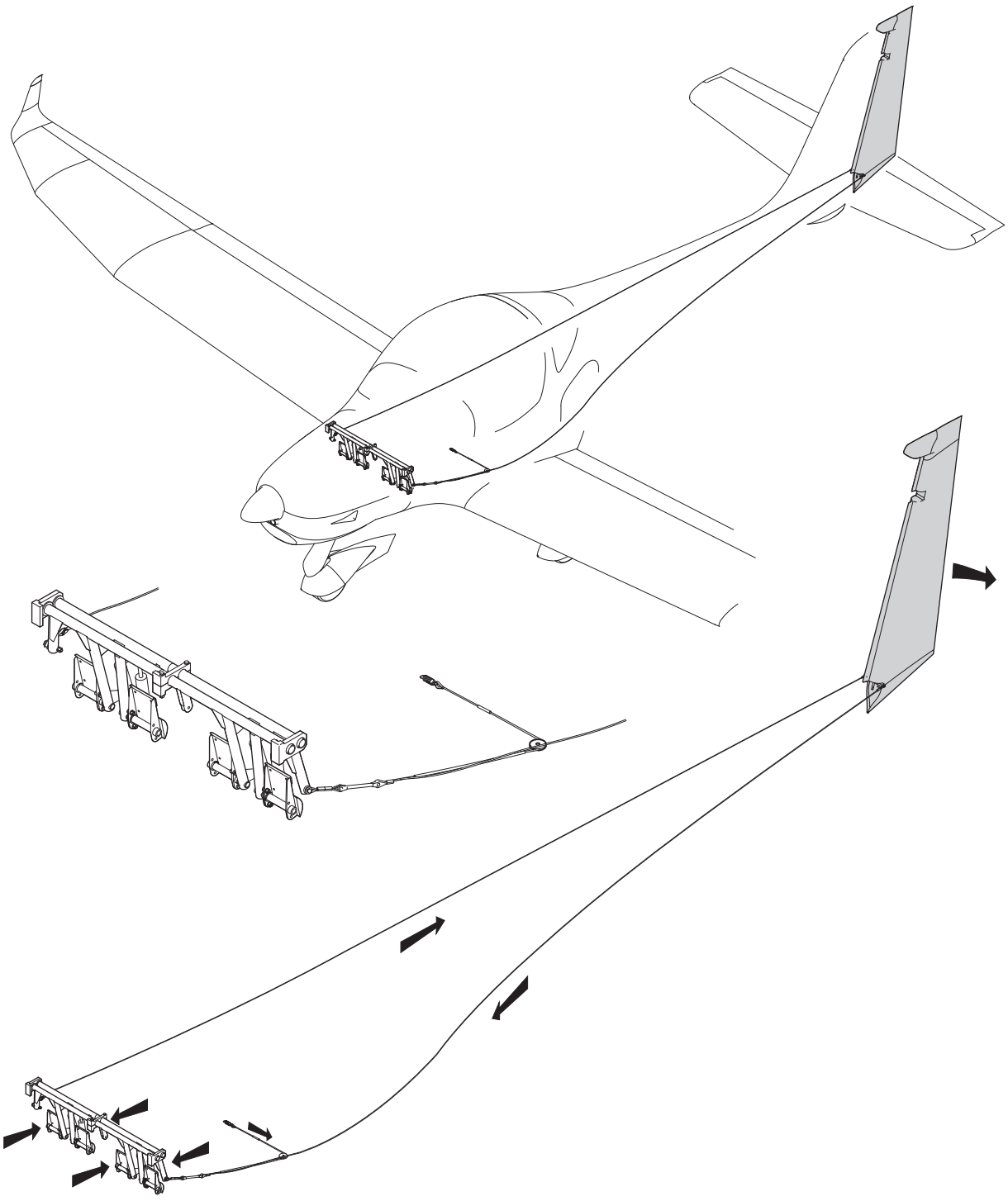
RUDDER CONTROL SYSTEM - DESCRIPTION

1. Introduction

   A. This section describes that portion of the flight control system which controls the position and movement of the rudder. The rigging procedure for the rudder control system is also provided. The rudder control system consists of conventional rudder pedals, cables and pulleys.

2. Description and Operation

   A. For rudder control system design and function refer to figure 1.



Rudder Control Design and Function
Figure 1

RUDDER CONTROL SYSTEM - MAINTENANCE

WARNING: WHEN INSTALLING COMPONENTS OF THE CONTROL SYSTEM, NEW SELF-LOCKING NUTS SHOULD ALWAYS BE USED. NEVER USE A SELF-LOCKING NUT MORE THAN ONCE.

A SYSTEM RIGGING AND INSPECTION/CHECK MUST BE PERFORMED AFTER LOOSENING ANY FLIGHT CONTROL CABLE TO ENSURE PROPER CONTROL SURFACE OPERATION.

1. General

   A. For a breakdown of the components, refer to figure 201 and 202.

2. Control Cables

   A. The maintenance of the control cables is important for the precise and safe functioning of the rudder control system. Control cables should be regularly checked for mechanical damage and damage caused by corrosion.

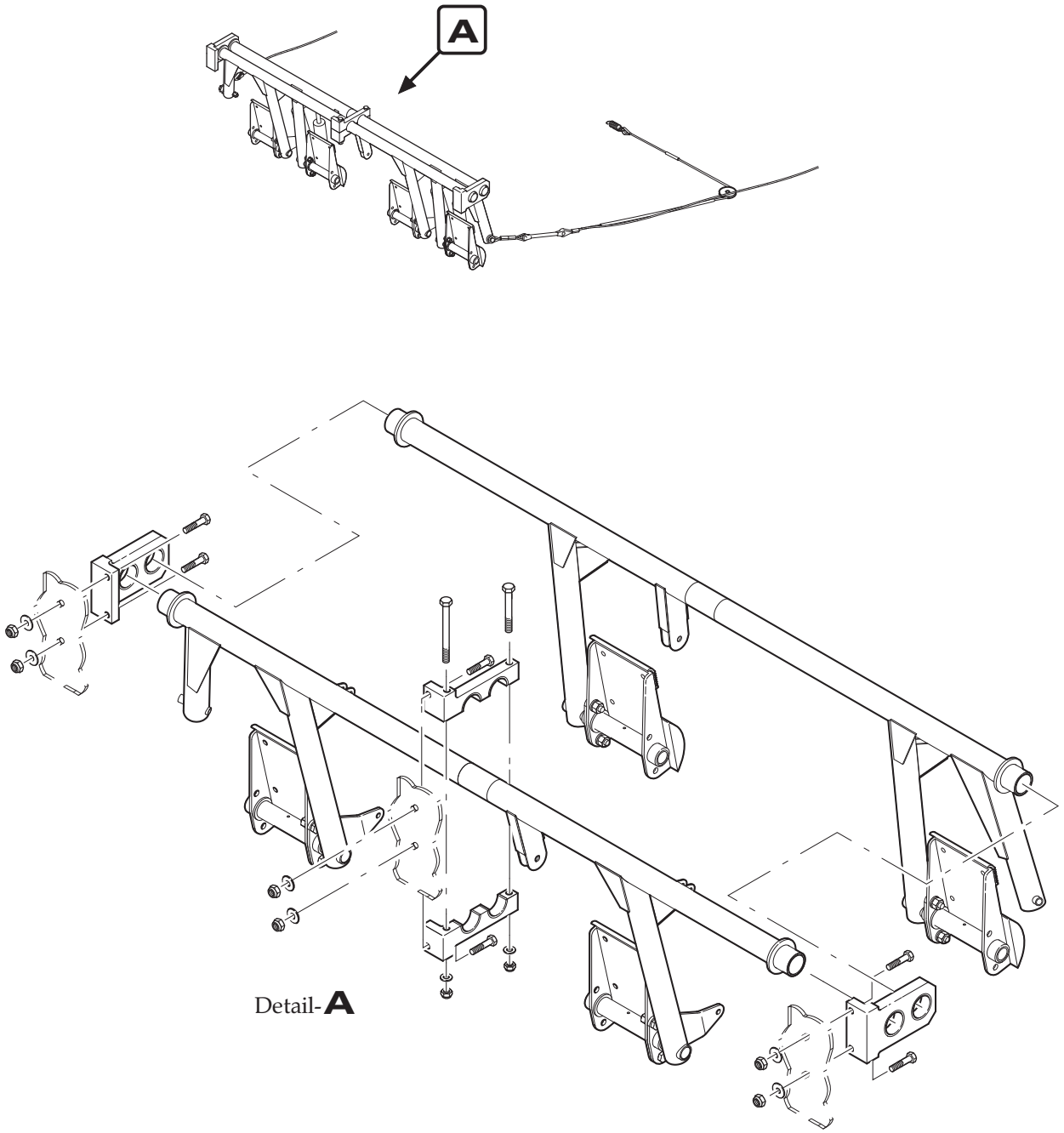
      (1) Broken Wire Check
      Check cables for broken strands of wire by passing a cloth along length of cable. The cloth will snag at such places. If broken wires are found, the affected control cable must be examined in more detail and removed if necessary. If a broken single wire is found, the control cable must be replaced. The procedures for control cable removal and installation are described below.

      (2) Corrosion Check
      External corrosion can be detected by a careful visual examination of the cables. Finding internal corrosion is more difficult. If internal corrosion is suspected, remove cable from the aircraft and examine more closely, especially in areas with broken wires.

3. Rudder Pedal Assembly Removal/Installation

   A. Remove Rudder Pedal Assembly
      (1) Slacken control cables of rudder control.
      (2) Disconnect control cables from rudder control actuator arms.
      (4) Disconnect brake master cylinders at rudder pedal assembly.
      (5) Disconnect steering tubes at rudder bars.
      (6) Remove bolts securing lower half of the middle bearing block to upper half and remove lower bearing block half.
      (7) Remove bolts attaching left and right bearing blocks to firewall and work rudder bars out of area below instrument panel.

   B. Install Rudder Pedal Assembly
      (1) Position rudder bars in left and right bearing blocks and secure bearing blocks to firewall using bolts.



Rudder Control Installation
Figure 201

(2) Reinstall lower half of middle bearing block.
(3) Reconnect steering tubes to rudder bars.
(4) Reconnect master cylinders to the rudder pedal assembly.
(5) Reconnect control cables to rudder control actuator arms and re-rig system (refer to "Adjustment/Test" below).
(6) Check correct operation of the rudder control system (refer to "Inspection/Check" below).

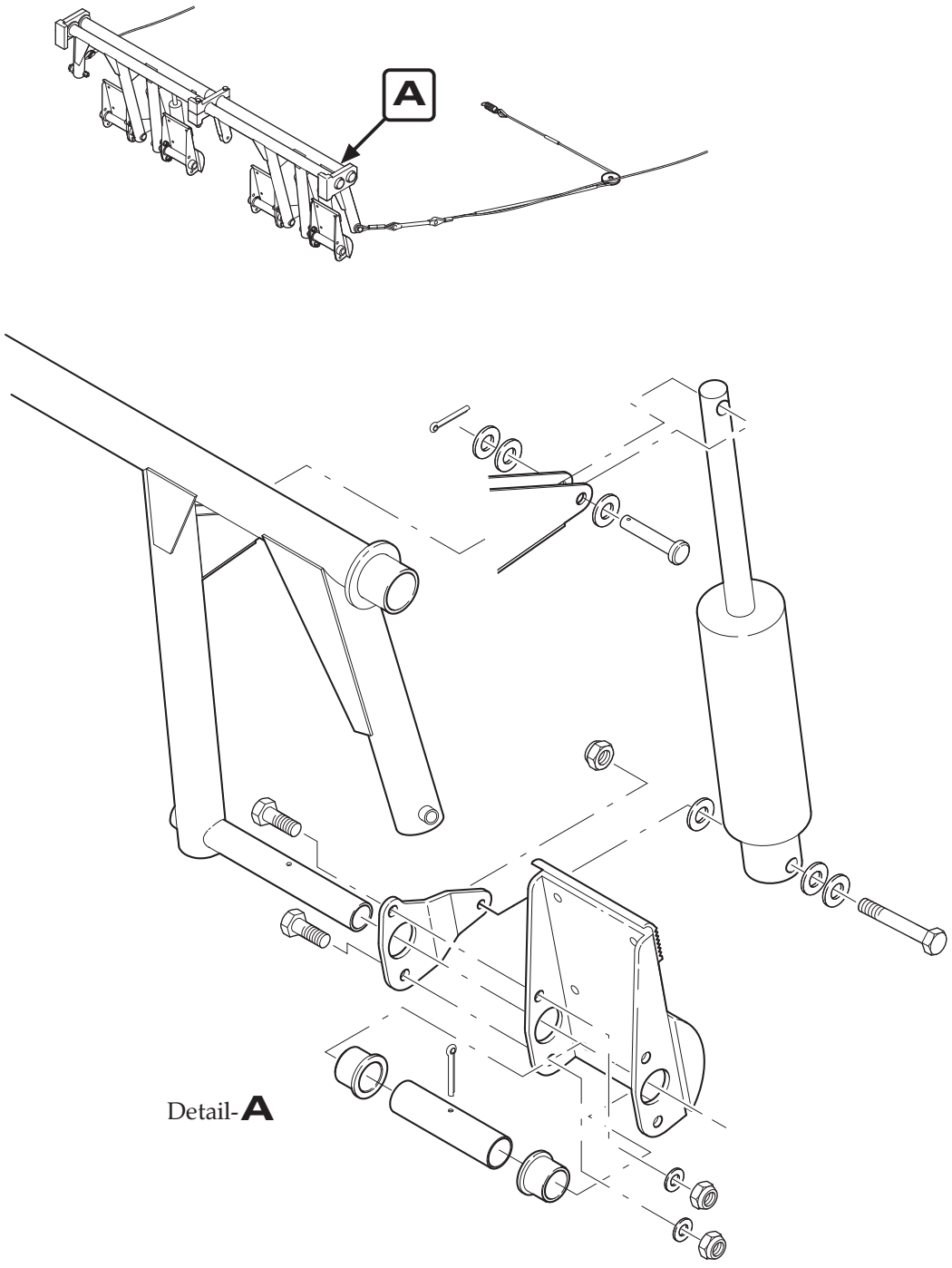
4. Control Cable Removal/Installation

A. Remove a Control Cable
(1) Relieve cable tension at turnbuckle.
(2) Disconnect control cable at the turnbuckle.
(3) Disconnect control cable at the rudder.
(4) Cut the eye-end from the control cable which is to be removed at the turnbuckle end.
(5) Withdraw control cable from the aircraft.

B. Install a Control Cable

WARNING: THE CONTROL CABLE EYE-ENDS SHOULD BE INSTALLED BY TRAINED AND AUTHORIZED PERSONNEL ONLY. IF THE EYE-ENDS ARE NOT INSTALLED PROPERLY; A RUDDER CONTROL SYSTEM FAILURE MAY OCCUR.
USE CABLES TO SPECIFICATION LN9374 OR ISO 2020 OR MIL-DTL-83420, STRECHED TO 60% MBS (DIAMETER 3,2 MM [1/8 IN.]).

(1) Prepare a new control cable with the required length and one eye-end.
(2) Push that control cable through the tube from the rudder side.
(3) Install the second eye-end at the turnbuckle end.
(4) Reconnect the control cable to the rudder using bolt, washer and nut.
(5) Reconnect the control cable to the turnbuckle using bolt , washer and nut.
(6) Rig rudder control cable including cables of the aileron-rudder interconnect and check correct operation of rudder control system / aileron-rudder interconnect (refer to "Adjustment/Test" and "Inspection/Check" below).



Rudder Pedal / Master Cylinder Installation
Figure 202

5. Inspection/Check

A. Inspection/Check

(1) Perform a visual inspection of the rudder control system. Check all components for proper installation and security. No signs of excessive play.

NOTE: The maximum permissible value of rudder play at hinge pins is 1,0 mm (0.04 in.) axial play and 0,3 mm (0.01 in.) radial play.
In case of excessive play of the control surface in its hinges, replace worn hinge bushings (refer also to 57-50).

(2) Examine control cables for broken wires and corrosion.
(3) Verify rudder can be moved smoothly through full travel. No grinding is audible.
(4) Check rudder for correct travel using an inclinometer, if necessary perform rudder control system adjustment/test (refer to "Adjustment/Test" below).

NOTE: For rudder rigging specifications, refer to chapter 6 "Dimensions and Areas".

(5) Install all items removed for access.

6. Adjustment/Test

A. Adjustment/Test

(1) Remove engine cowling (refer to 71-10).
(2) Slacken control cables of rudder control.
(3) Tie down or weight tail to raise nose wheel off the ground.
(4) Set the rudder pedals to neutral and fix in suitable manner.
(5) Fix the rudder in neutral position with reference to vertical stabilizer.
(6) Tension the control cables with the turnbuckles until the control system is free of clearance at room temperature.
(7) Adjust nose wheel steering tubes so the nose wheel is streamlined.
(8) Set the rudder control system free.
(9) Adjust secondary stops on the nose wheel strut so that for full right and left rudder deflection:
  (a) the rudder stops contact before secondary stops.
  (b) secondary stops show a 0,5 mm (0.02 in.) gap between stop bolt and nose wheel assembly.
(10) Tighten jam nuts.
(11) Verify rudder pedals are free for the full range of movement.
(12) Perform a rudder control system inspection/check (refer to "Inspection/Check" above).
(13) Install engine cowling (refer to 71-10) and lower nose wheel.

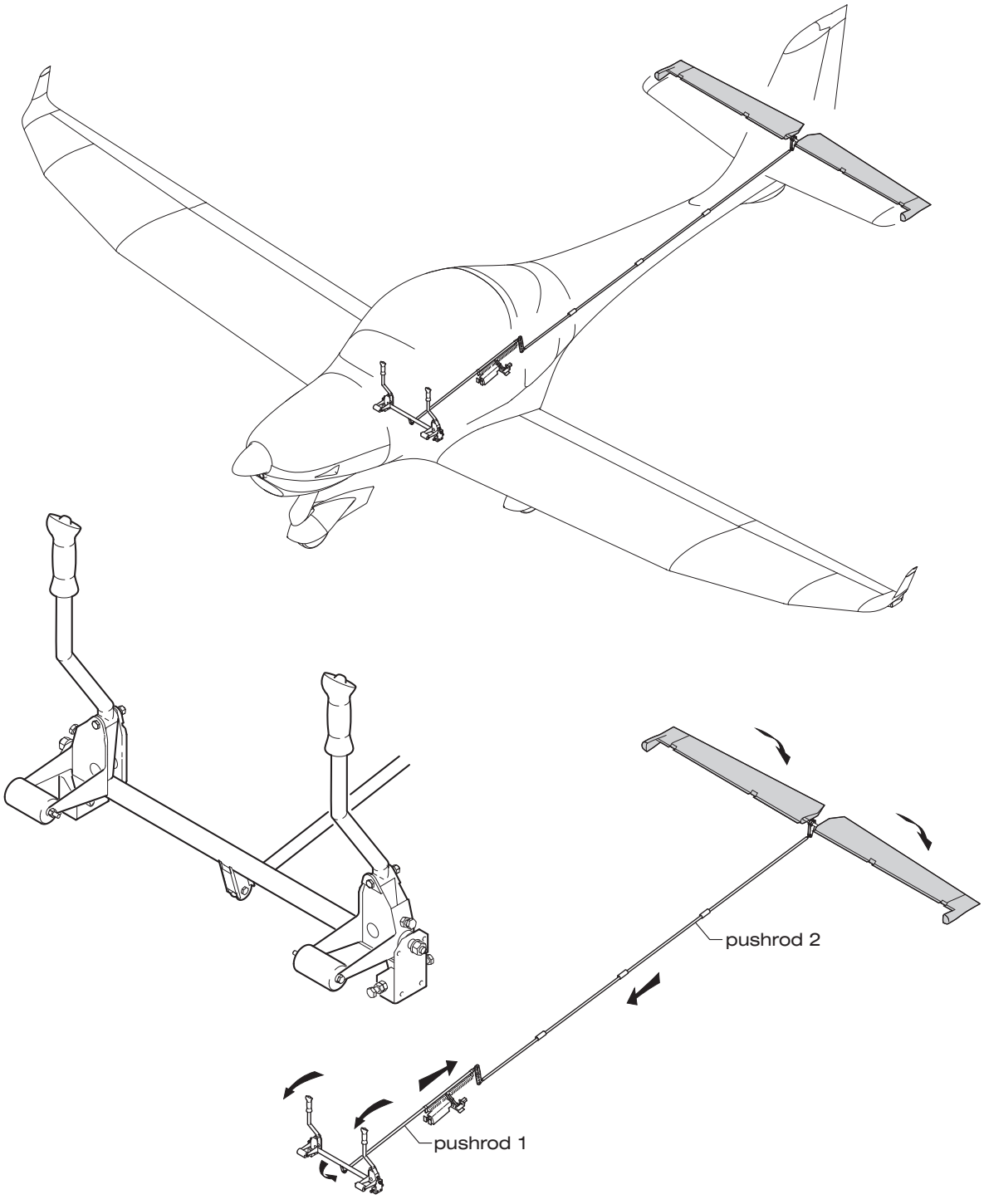
ELEVATOR CONTROL SYSTEM - DESCRIPTION

1. Introduction

   A. This section describes that portion of the flight control system which controls the position and movement of the elevator. The rigging procedure for the elevator control system is also provided. The system consists of control sticks, elevator torque tube assembly, pushrods and the elevator bellcrank.
   The aircraft is equipped with an electrical spring-force elevator trim system.

2. Description and Operation

   A. For elevator control system design and function refer to figure 1.



Elevator Control System Design and Function
Figure 1

ELEVATOR CONTROL SYSTEM - MAINTENANCE

WARNING: WHEN INSTALLING COMPONENTS OF THE CONTROL SYSTEM NEW SELF-LOCKING NUTS SHOULD ALWAYS BE USED. NEVER USE A SELF-LOCKING NUT MORE THAN ONCE.

1. General

   A. For a breakdown of the components, refer to figure 201 and 202.

2. Elevator Torque Tube Assy Removal/Installation

   A. Remove Elevator Torque Tube Assy
      (1) Remove seats (refer to 25-10).
      (2) Remove control sticks (refer to 27-10).
      (3) Disconnect pushrod 1 from elevator actuation arm.
      (4) Remove pivot bolt, washers and nut from both ends of the torque tube with which the torque tube is attached to the support bracket.
      (5) Remove torque tube from aircraft.

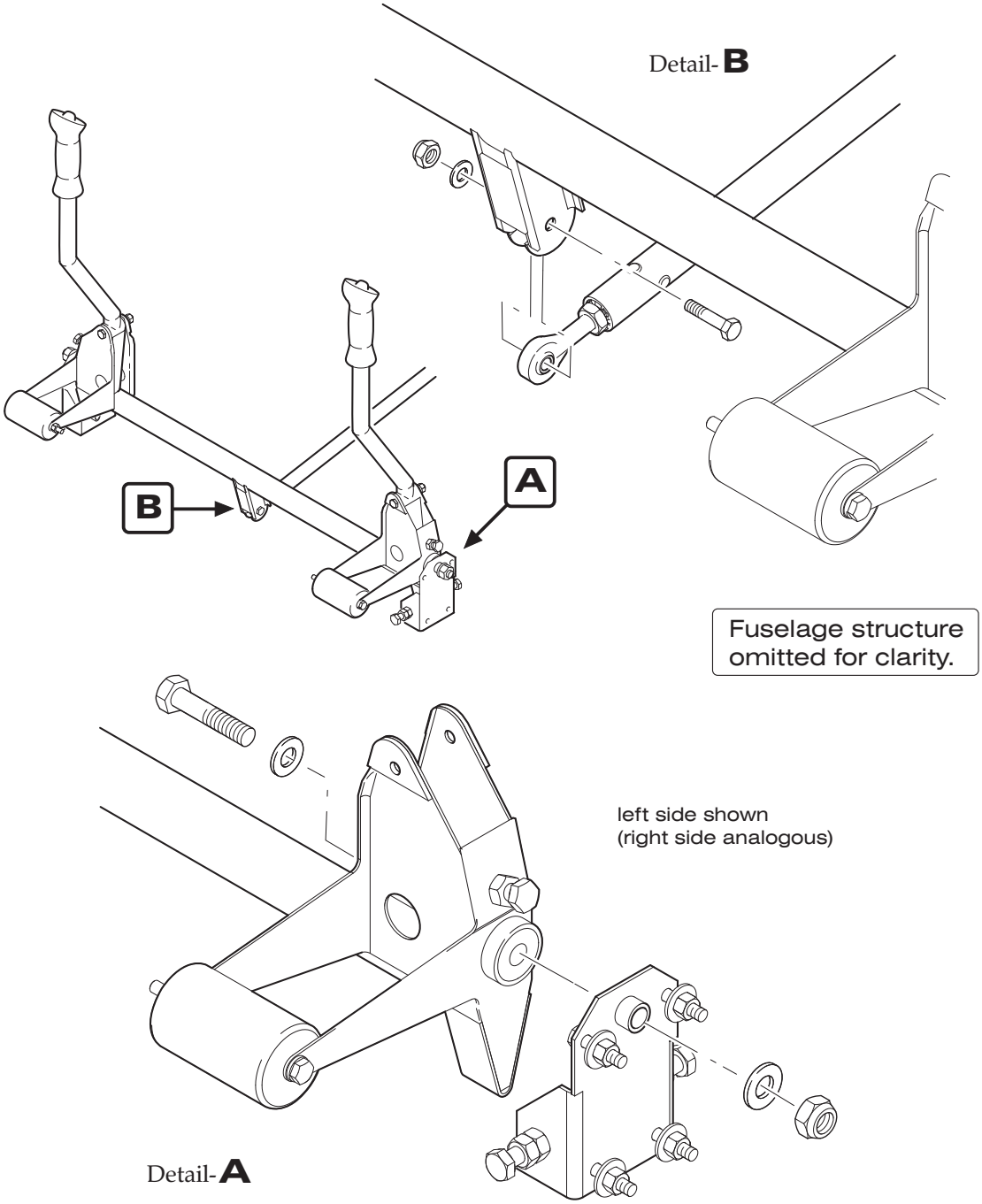
   B. Install Elevator Torque Tube Assy
      (1) Position torque tube between support brackets.
      (2) Attach pivot bolt, washers and nut to both ends of the torque tube with which the torque tube is attached to the support bracket.
      (3) Connect pushrod 1 to elevator actuation arm.
      (4) Install control sticks (refer to 27-10).
      (5) Check elevator and aileron control for proper operation and rig if necessary (refer to “Aileron Control System Maintenance“ and „Adjustment/Test“ below).

3. Pushrod 1 Removal/Installation

   A. Remove Pushrod 1
      (1) Remove seats (refer to 25-10).
      (2) Remove baggage compartment floor panel (refer to 25-12).
      (3) Disconnect trim system springs from pushrod.
      (4) Disconnect pushrod at elevator actuation arm.
      (5) Disconnect pushrod at elevator bellcrank.
      (6) Remove pushrod from aircraft.

   B. Install Pushrod 1
      (1) Position pushrod and connect to elevator bellcrank.
      (2) Connect pushrod to elevator actuation arm.
      (3) Connect springs of trim system to pushrod.

      NOTE: If spring attachment clamps have been removed, refer to 27-31 for their correct position.



Component Installation
Figure 201

(4) Check elevator control system and elevator trim system for proper operation and rig if necessary (refer to 27-30 and 27-31).
(5) Install baggage compartment floor panel (refer to 25-12).
(6) Install seats (refer to 25-10).

4. Elevator Bellcrank Removal/Installation

A. Remove Elevator Bellcrank
(1) Remove baggage compartment floor panel (refer to 25-12).
(2) Disconnect pushrods from elevator bellcrank.
(3) Remove pivot bolt securing elevator bellcrank to support brackets.
(4) Remove elevator bellcrank.

B. Install Elevator Bellcrank
(1) Mount bellcrank to structure using pivot bolt, nut and washer. Ensure spacers are placed correctly.
(2) Reconnect pushrods to bellcrank.
(3) Check elevator control system and elevator trim system for proper operation and rig if necessary (refer to 27-30 and 27-31).
(4) Install baggage compartment floor panel (refer to 25-12).

5. Inspection/Check

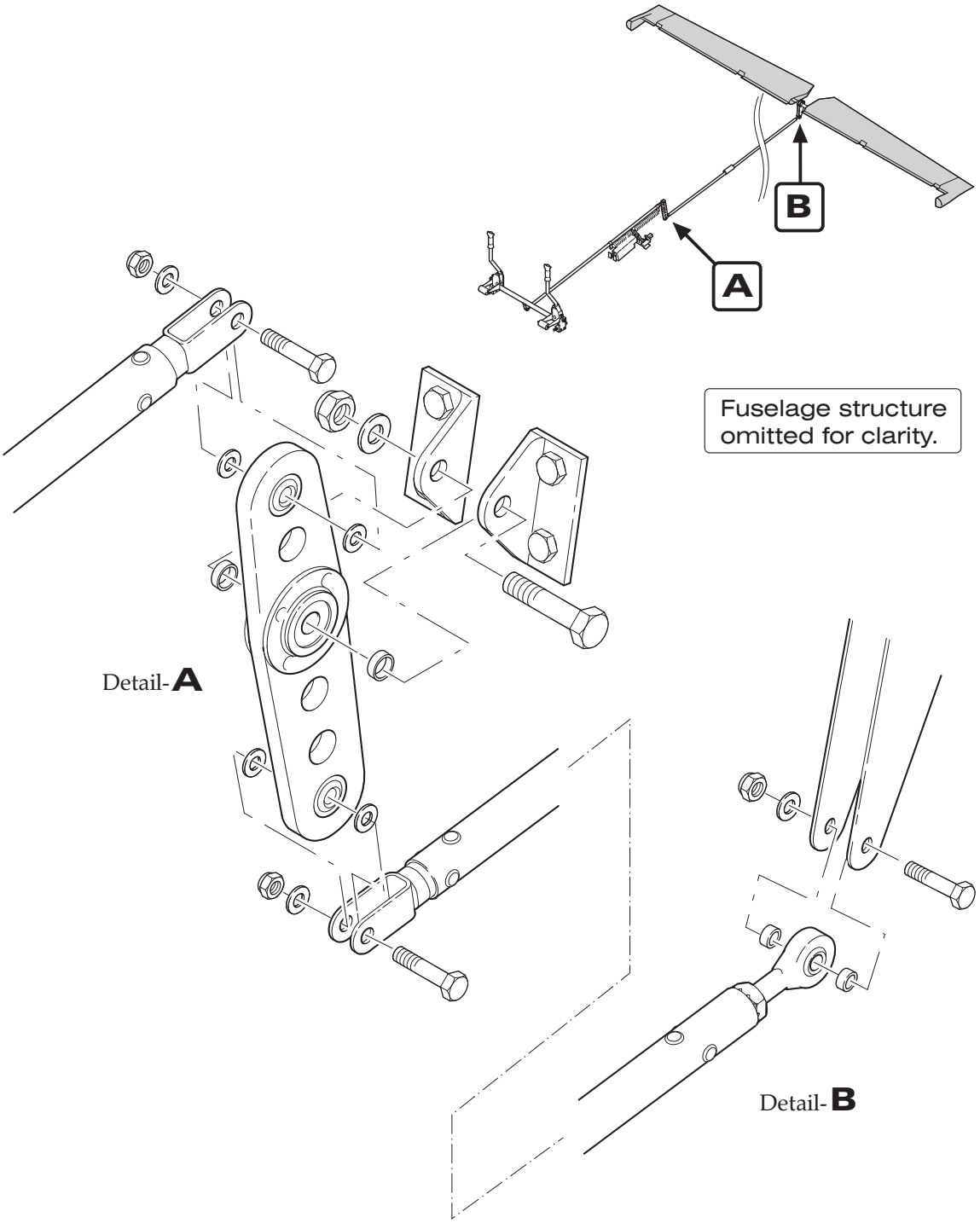
A. Inspection/Check
(1) Perform a visual inspection of elevator control system. Check all components for proper installation and security. No signs off excessive play.

NOTE: The maximum permissible value of elevator play at hinge pins is 1,0 mm (0.04 in.) axial play and 0,3 mm (0.01 in.) radial play. The maximum control circuit backlash is 10 mm (0.4 in.).
In case of excessive play of the control surfaces in their hinges, replace worn hinge bushings (refer also to 57-50).

(2) Verify minimum rod end thread engagement of 8 mm (0.312 in.).
(3) Verify elevator can be moved smoothly through full travel. No grinding is audible.
(4) Verify both sticks are free for the full range of movement and maximum up and down elevator travel is achieved.
(5) Check elevator for correct travel using an inclinometer, if necessary perform elevator control system adjustment/test (refer to "Adjustment/Test" below).

NOTE: For elevator rigging specifications, refer to chapter 6 "Dimensions and Areas".

(6) Install all items removed for access.



Component Installation
Figure 202

6. Adjustment/Test

A. Adjustment/Test

(1) Remove baggage compartment floor panel (refer to 25-12).
(2) Remove access plate 211 HL and HR (refer to 25-12).
(3) Lock elevator bellcrank in neutral position in a suitable manner (the line between pushrod attach points on bellcrank is perpendicular to the pushrod 2).
(4) Streamline elevator to neutral with horizontal stabilizer by adjusting elevator pushrod (pushrod 2).
(5) Adjust pushrod 1 until the control yoke assembly is in neutral position.

NOTE: For elevator rigging specifications, refer to Chapter 6, „Dimensions and Areas".

(6) Mount an inclinometer on elevator and set to 0°.
(7) Unlock the elevator control system at elevator bellcrank.
(8) Adjust travel stop bolts at control yoke mounts to allow up and down elevator travel specified in 06-10.
(9) Tighten jam nuts.
(10) Install all items removed for access.

ELEVATOR TRIM CONTROL - DESCRIPTION

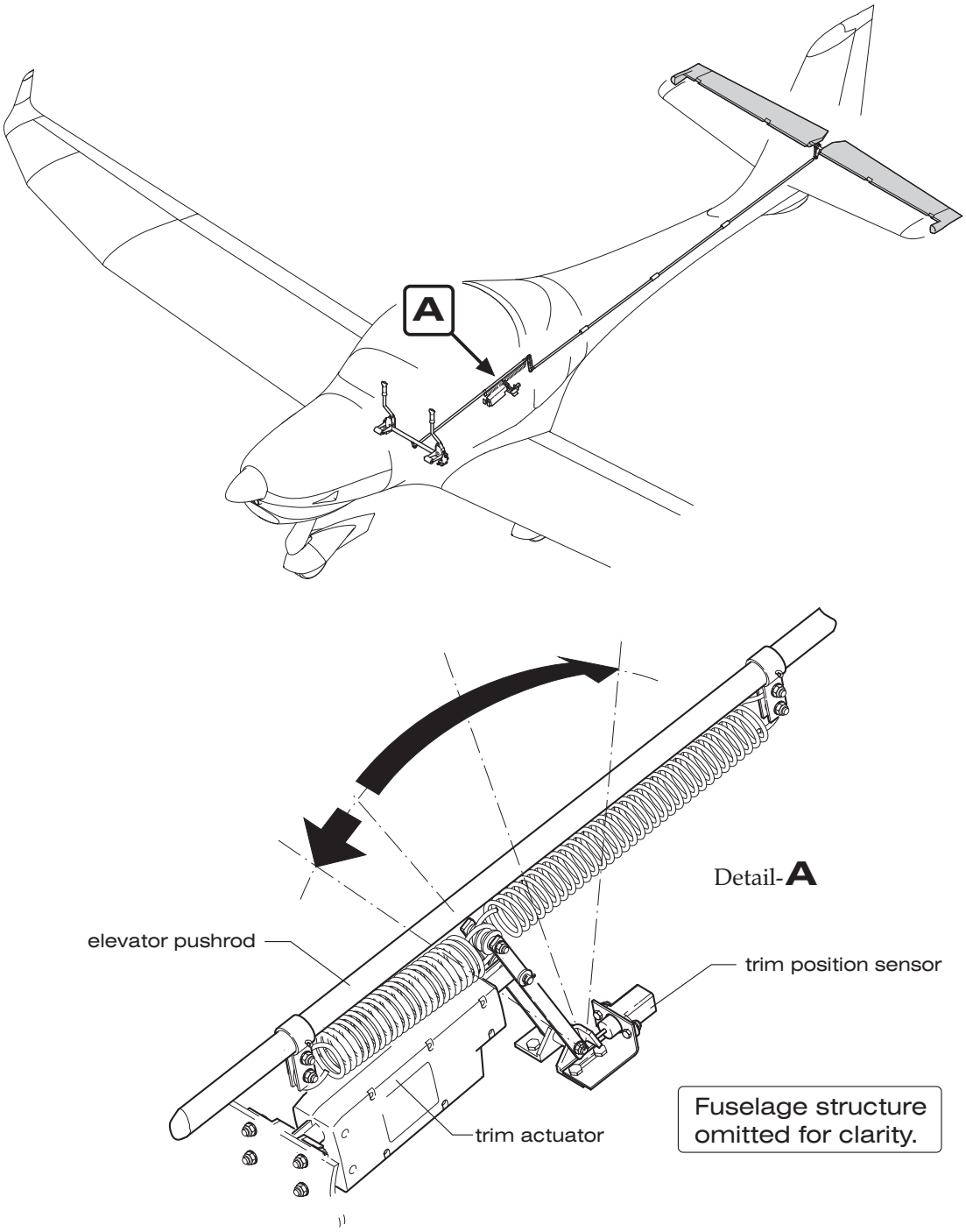
1. Introduction

   A. The aircraft isequipped with an electrical spring-force trim system. An electrical trim actuator changes the pre-load of a pair of springs that applies a defined force to the elevator pushrod.

2. Description and Operation

   A. For an illustration of elevator trim control design and function refer to figure 1.

   B. The trim system is controlled by a rocker switch located on the rear portion of the middle console. Pressing the forward side of the switch will trim nose down; pressing the rear side of the switch will trim nose up.
   The switch operates an electrical trim actuator that is mounted under the baggage compartment floor panel, parallel to the elevator pushrod.
   The electrical circuit of the trim system is protected by a circuit breaker that can be pulled in the event of a trim system malfunction.



Elevator Trim System Design and Function
Figure 1

ELEVATOR TRIM CONTROL - MAINTENANCE

1. General

   A. For a breakdown of the components, refer to figure 201.

2. Trim Actuator Removal/Installation

   A. Remove Trim Actuator
      (1) Set the elevator trim system to neutral.
      (2) Ensure electrical power to aircraft is OFF.
      (3) Remove baggage compartment floor panel (refer to 25-12).
      (4) Disconnect trim actuator electrical wires at connector.
      (5) Disconnect the springs at trim system actuation arm.
      (6) Disconnect trim actuator push rod at trim system actuation arm.
      (7) Remove bolts securing trim actuator to fuselage structure and remove trim actuator.

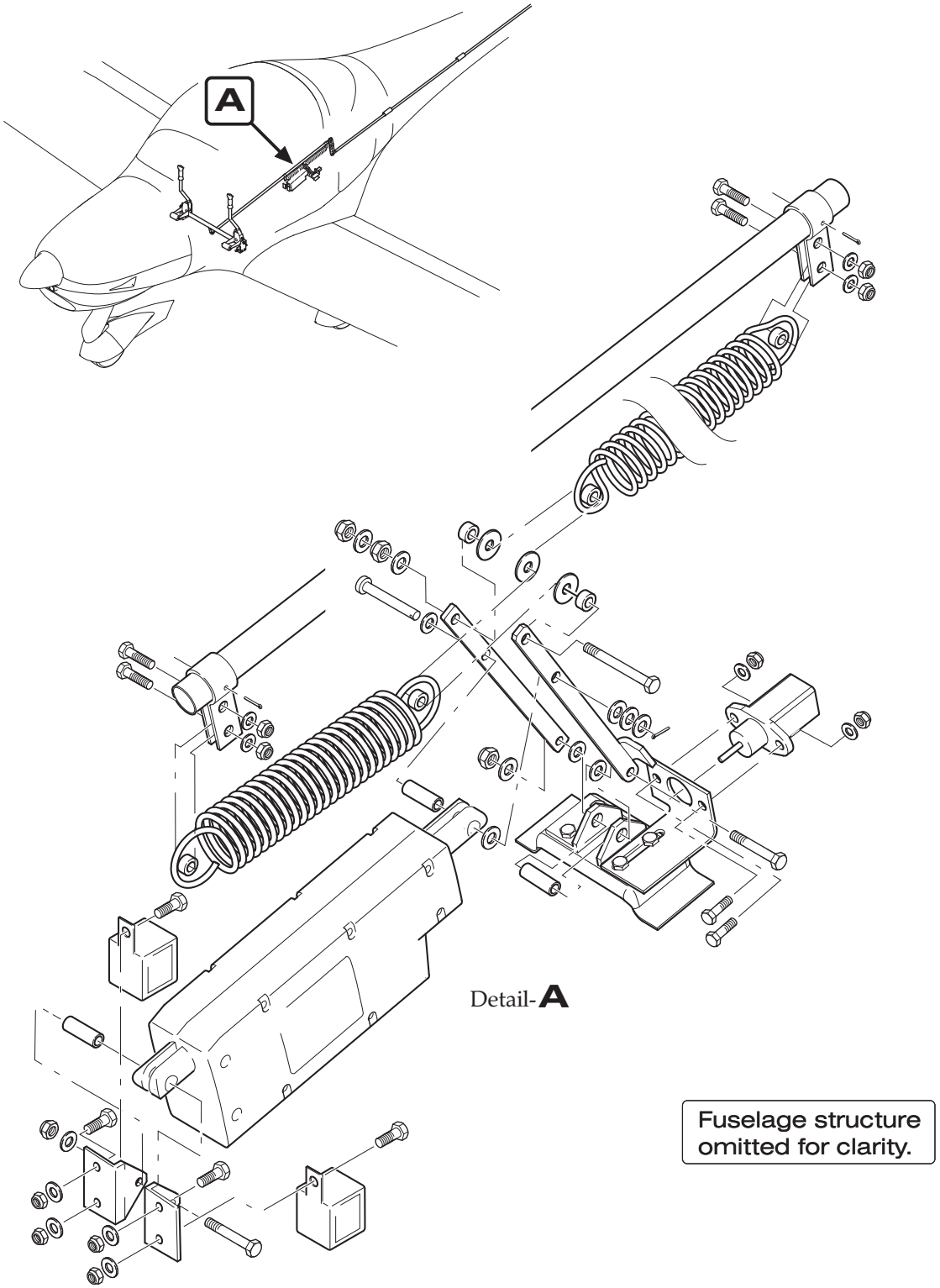
   B. Install Trim Actuator
      (1) Attach trim actuator to fuselage structure with bolts, washers and nuts.
      (2) Reconnect trim actuator push rod to trim system actuation arm using hardware.
      (3) Reconnect springs to trim system actuation arm.

      NOTE: There are two different types of springs used in the trim system. The spring on the forward side is black colored, the spring on the rear side is silver colored.

      (4) Connect trim actuator electrical connection.
      (5) Check elevator trim control for proper function (refer to "Inspection/Check" below).
      (6) Install baggage compartment floor panel (refer to 25-12).

3. Inspection/Check

   A. Inspection/Check
      (1) Perform a visual inspection of elevator trim system. Check all components for proper installation and security. No signs off excessive play.
      (2) Verify distance between rear edge of rear pipe bracket (securing rear spring to elevator pushrod) and connecting bore of rear fork head. Nominal value: 55 ± 2 mm (2.17 ± 0.08 in.)
      (3) Place BAT switch in ON position.
      (4) Keep hands away from control stick and run trim actuator to full nose-down trim position until travel is stopped by limit switch.
      (5) Check forward movement of the control stick. Verify proper trim position indicator reading.
      (6) With full nose-down trim: Measure control force by means of a spring balance. Attach balance n upper third of grip piece and pull rearward until control stick moves from stop. Control force nominal value: 40 ± 5 N (9 ± 1.1 lbs)
      (7) Keep hands away from control stick and run trim actuator to full nose-up trim position until travel is stopped by limit switch.
      (8) Check backward movement of the control stick. Verify proper trim position indicator reading.
      (9) Set the elevator trim to neutral and place BAT switch in OFF position.
      (10) Install all items removed for access.



Elevator Trim System Installation
Figure 201

FLAP CONTROL SYSTEM - DESCRIPTION

1. Introduction

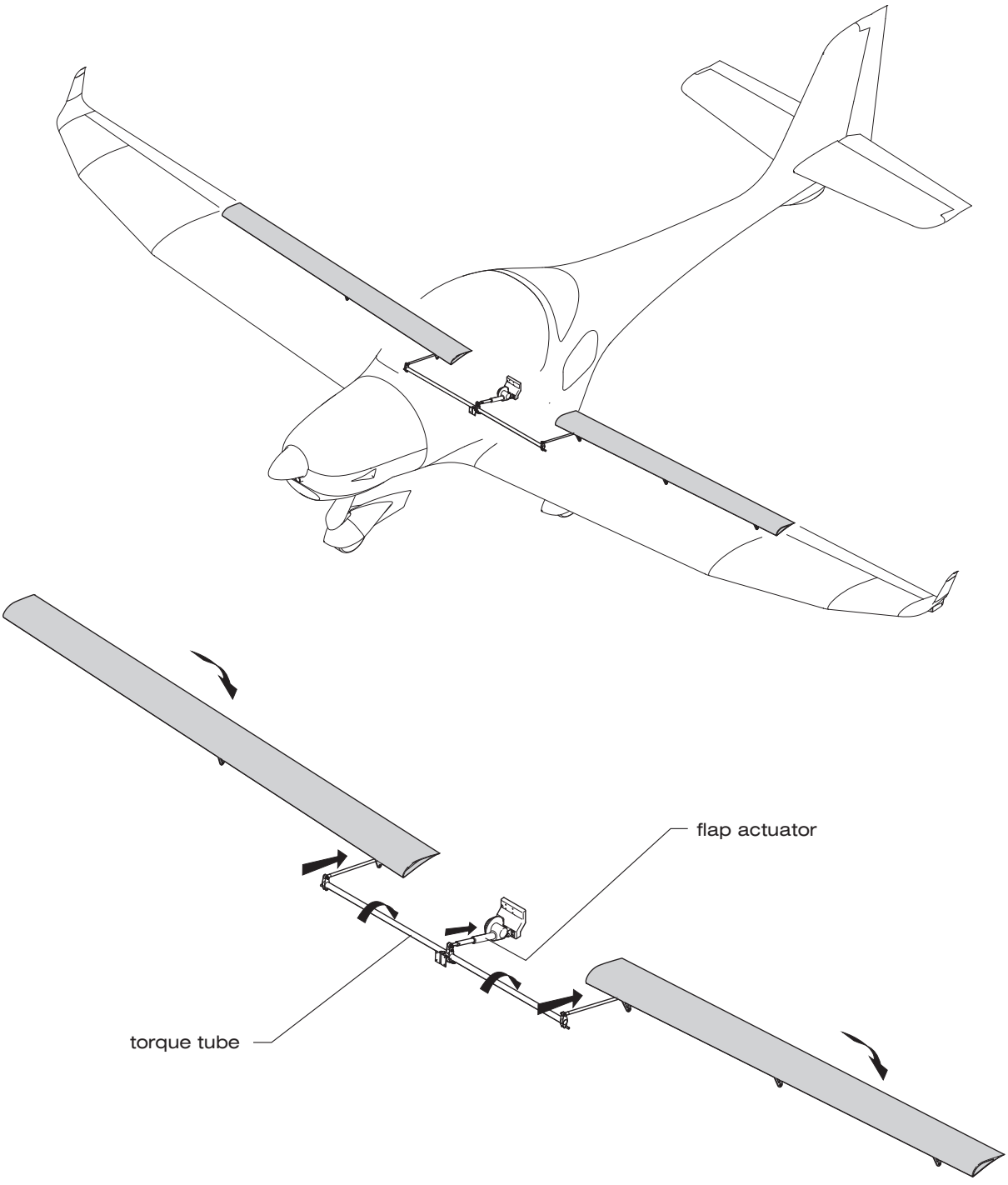
   A. This section describes that portion of the flight control system which controls the position and movement of the flaps. The rigging procedure forthe flap control system is also provided. The aircraft is equipped with electrically actuated flaps. They are operated and fixed in the desired position by an electrical flap actuator.

2. Description and Operation

   A. The wing flaps system consists of a three-position selector switch which is incorporated in the instrument panel, a LED flap position indicator near the three-position selector switch, the electric flap actuator, located under the baggage floor, a torque tube, pushrods and the flaps on each wing.

   B. The linear flap actuator drives the torque tube interconnected between the left and right flaps. Limit switches are attached to the flap actuator. They identify flap position and surface travel, and turn off the actuator once the desired position is reached, i.e: 17° or 35°.
   The flap actuator has a slip coupling to prevent mechanical damage if a restriction occurs. In the event of a failure in the electric flap control circuit, torque tube/actuator geometry prevents the flaps from causing an uncontrollable flight condition.

   C. For an illustration of flap control system design and function refer to figure 1.



Flap Control System Design and Function
Figure 1

FLAP CONTROL SYSTEM - MAINTENANCE

1. General

A. This section provides instructions for removal and installation of components and instruction for flap control system rigging.

B. For a breakdown of the components, refer to figure 201, 202, 203, and 204.

2. Flap Actuator Assembly Removal/Installation

A. Remove Flap Actuator Assembly
(1) Ensure electrical power to aircraft is OFF.
(2) Remove baggage compartment floor panel (refer to 25-12).
(3) Disconnect flap actuator electrical wires at connector.
(4) Disconnect flap actuator from torque tube coupler.
(5) Remove nut, bolt and washers securing the flap actuator assembly to the actuator bracket and remove flap actuator assembly from aircraft.

B. Install Flap Actuator Assembly
(1) Place flap actuator assembly in the actuator bracket and attach using washers and bolt.
(2) Attach washers, bolt and nut securing the flap actuator pushrod to the torque tube coupler.
(3) Connect flap actuator electrical wires at connector.
(4) Perform flap control system inspection/check and rig system, if necessary (refer to "Inspection/Test" and "Adjustment/Test" below).
(5) Install baggage compartment floor panel (refer to 25-12).

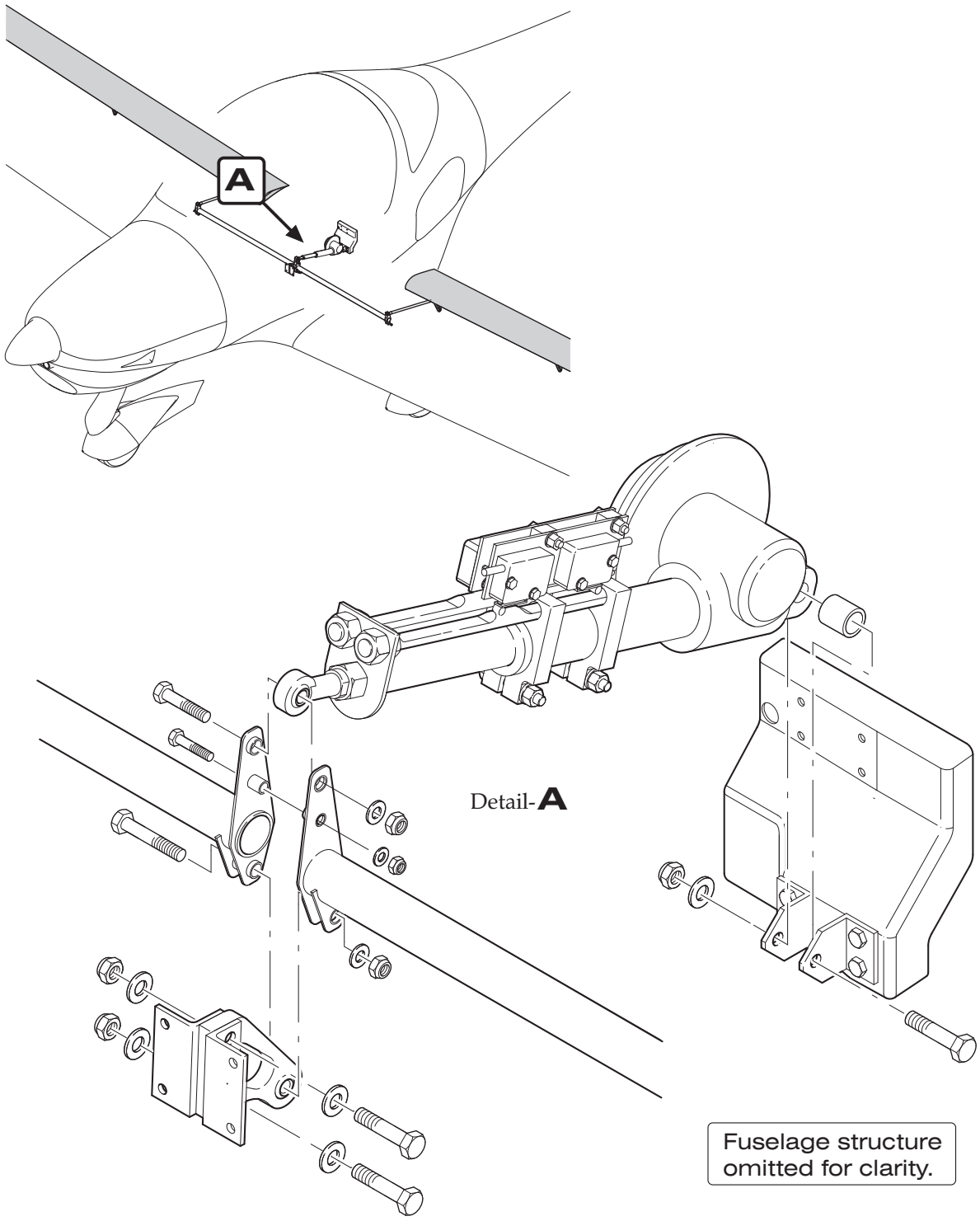
3. Torque Tube Assembly Removal/Installation

A. Remove Torque Tube Assembly
(1) Remove access plate 210 AB (refer to 06-30).
(2) Remove access plate 610 AB and 510 AB (refer to 06-30).
(3) Disconnect flap pushrod from torque tube assembly at each flap.
(4) Disconnect flap actuator pushrod from torque tube assembly.
(5) Remove bolt connecting torque tube halves.
(6) Remove bolt securing torque tube halves to pivot bracket.
(7) Withdraw right and left torque tube halves from inside the wing.

B. Install Torque Tube Assembly
(1) Position torque tube halves inserting pivot pin located at outer end into the bearing inside the wing.

CAUTION: ENSURE THE LONG EDGE OF THE COUPLER IS FACING TOWARDS THE WING SPAR.

(2) Secure both halves to pivot bracket using bolt, washer and nut.



Flap Control System Installation
Figure 201

(3) Install spacer and bolt, washer and nut connecting halves.
(4) Connect torque tube assembly to flap actuator pushrod.
(5) Perform flap control system inspection/check and rig system, if necessary (refer to "Inspection/Check" and "Adjustment/Test" below).

4. Flap Pushrod Removal/Installation

NOTE: Left and right flap pushrod removal/installation is analogous.

A. Remove Flap Pushrod
(1) Remove wing access plate 610 AB (510 AB)(refer to 06-30).

CAUTION! WHEN DISCONNECTING FLAP PUSHROD FROM FLAP HORN, EXERCISE CAUTION TO PREVENT THE FLAP FROM INADVERTENT SWINGING DOWNWARD.

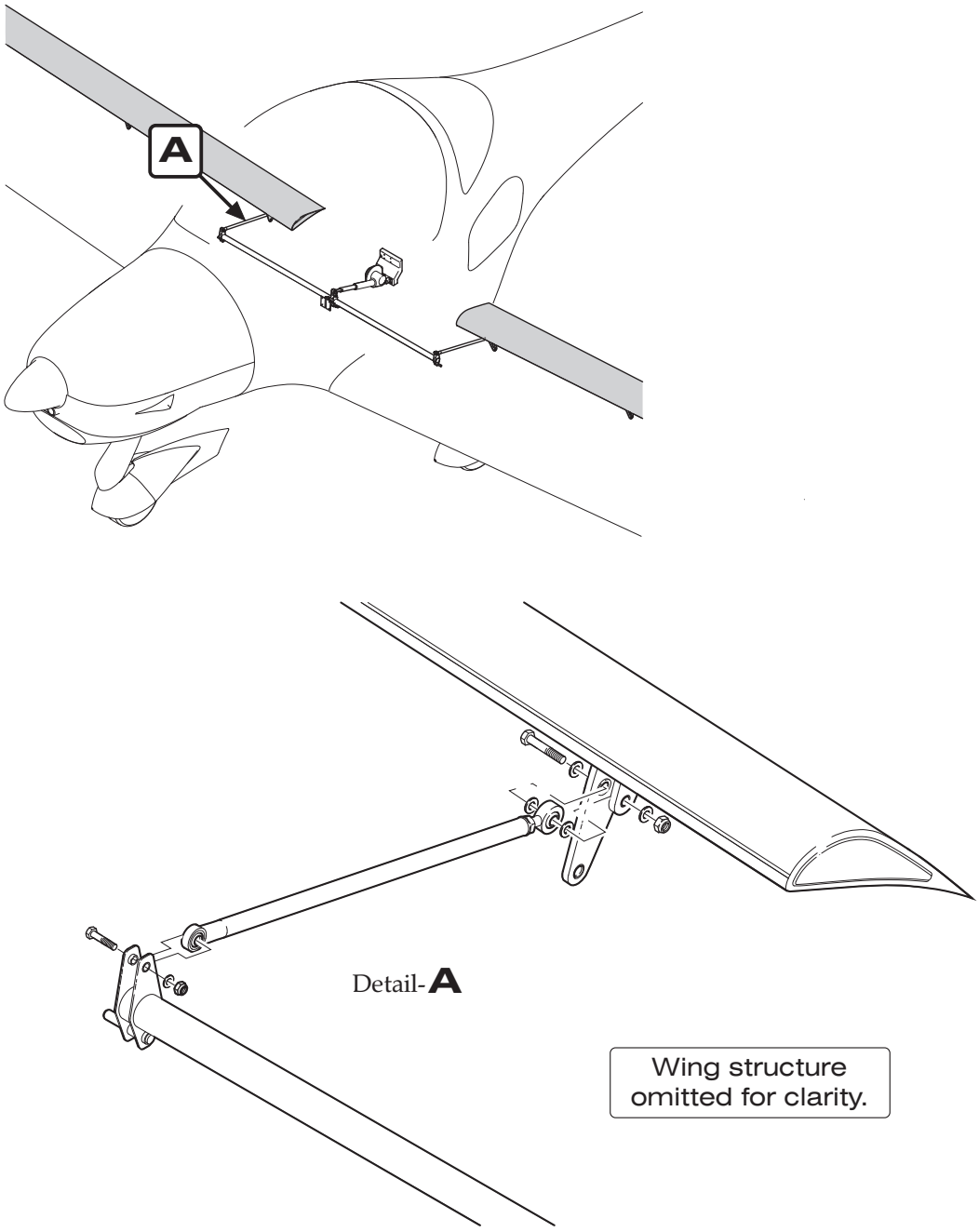
(2) Supporting the flap, disconnect flap pushrod at the flap horn.
(3) Disconnect flap pushrod from torque tube assembly and remove pushrod from wing.

B. Install Flap Pushrod
(1) Position and connect flap pushrod to torque tube assembly.
(2) Connect flap pushrod at flap horn.
(3) Re-rig flap control system and perform inspection/check (refer to "Inspection/Check" and "Adjustment/Test" below).
(4) Install all items removed for access.

5. Inspection/Check

A. Inspection/Check
(1) Prepare inspection.
(a) Remove baggage compartment floor panel.
(b) Remove fuselage access panel 210 AB (refer to 06-30).
(c) Remove access panel 610 AB and 510 AB (refer to 06-30).
(2) Inspect flap control system visually.
(a) Verify proper installation and safetying of all items in the entire flap control system.
(b) Check electrical connections.
(c) Examine limit switches for security and condition.
(d) Verify minimum rod end thread engagement of 8 mm (0.312 in.).
(e) Verify no excessive play of control surfaces at hinge pins. Check the control circuit backlash.

NOTE: The maximum permissible value of control surface play at hinge pins is 1,0 mm (0.04 in.) axial play and 0,3 mm (0.01 in.) radial play. The maximum control circuit backlash is 5 mm (0.2 in.).
In case of excessive play of the control surfaces in their hinges, replace worn hinge bushings (refer also to 57-50).



Flap Control System Installation
Figure 201

(3) Perform operational check of the flap control system.
  (a) Operate flaps through their full range of travel, observing for uneven travel or jumpy motion and binding.
  (b) Check correct flap full UP position. Rig if necessary (refer to "Adjustment/Test" below).
  (c) With flap full UP, fasten an inclinometer to inboard side of left flap and set to 0°.
  (d) Lower flap to T/O and then to LDG positions and check flap angles as specified in 06-10.
  (e) Repeat check on right flap.

  NOTE: If the results of inspection do not fall within the tolerance specified in 06-10, contact AQUILA Aviation for disposition.

(4) Install all items removed for access.

6. Adjustment/Test

A. Adjustment/Test
(1) Remove access plate 210 AB (refer to 06-30).
(2) With BAT switch in ON position turn flap control switch to CRUISE.
(3) Turn BAT switch OFF.
(4) Adjust push rod at flap actuator so that the flap torque tube assembly is in neutral position (refer to figure 201).
(5) Adjust pushrods at each flap until the control surfaces are neutral with reference to wing trailing edge at root area.
(6) Perform an flap control system inspection/check (refer to "Inspection/Check" above).
(7) Install all items removed for access.

CHAPTER 61

PROPELLER

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PROPELLER - GENERAL

1. Introduction

   A. This chapter describes the propeller. Maintenance information is provided.

   B. Revs given in this chapter are propeller speeds.

2. General Description

   A. The aircraft uses a MT-Propeller MTV-21-A/175-05 variable pitch, two blade wood-composite propeller. The propeller has a governor which controls propeller pitch hydraulically. The governor keeps the pre-selected propeller speed at a constant value, regardless of manifold pressure and airspeed.

PROPELLER - TROUBLESHOOTING

1. General

A. The following chart lists some of the more common troubles which may occur with the propeller, their probable causes and remedies.

2. Troubleshooting Chart

Trouble	Probable Cause	Remedy
Static rpm too low	Propeller limits engine speed.	Reduce pitch with the check nuts on the piston guide. Turning loose nut by ¼ turn will increase rpm by approx. 100 rpm.
	Governor limits engine speed.	Increase governor rpm by unscrewing the stop screw. One turn on screw will change rpm by approx. 25 rpm. Ensure the control is long enough to be able to touch the stop. Secure screw with safety wire.
Rpm in flight too high	Governor allows overspeed.	Adjust rpm to the desired value in flight and turn the stop screw after landing until it touches the governor lever. Do not change position of the rpm control during final approach. Secure screw with safety wire.
Blade shake (Fore and aft movement)	Blade bearing loose.	If more than 3 mm, return propeller to the factory or any approved repair station to correct the pre-load of the blade retention bearing.
Blade shake (Blade angle play)	Blade loose due to blade bearing setting and/or increased play through wear in the pitch change mechanism (pitch change pin, pitch change block).	If more than 2°, return propeller to the factory or any approved repair station.
Sluggish rpm change	1. Oil is cold. 2. Excessive friction.	Run engine until oil temperature is in the green arc. Move blades by turning them by hand within the angular play. If excessive friction exists, the blade retention system has to be inspected, contact factory.

2. Troubleshooting Chart (Cont.)

Trouble	Probable Cause	Remedy
Surging rpm	1. Trapped air in propeller piston.	Move propeller control at least twice before flying at about 1800 rpm with a drop of about 500 rpm.
	2. Sludge deposit.	Clean oil tubes in the motor, in the propeller piston and eventually in the governor (only possible at the manufacturer).
	3. Wrong speeder spring in in the governor.	Check that the governor part number corresponds to the aircraft data sheet. If the rpm does not stabilize after 5 periods this is an indication for a wrong speeder spring, contact factory.
	4. Wrong pitch stops in the propeller.	Compare pitch values to those of the data sheet. Note static rotational speed.
	5. Abrupt movement of of propeller or throttle control.	Move the controls carefully and slowly.
	6. Wrong carburetor setting.	Correct as specified in the engine manual.
	7. Oscillating tachometer.	Check tachometer and transmitter.
Rpm variations (more than ±50 rpm) between climb, cruise, and descent at identical propeller setting.	1. Excessive friction in the hub.	Contact manufacturer.
	2. Excessive friction in the governor.	Contact manufacturer.
	3. Worn rpm tachometer.	Replace/repair instrument.
Rpm increase during normal operation without change of propeller lever position.	1. Oil leakage or hot oil.	Check for oil leaks, replace gaskets, decrease oil temperature with higher air speed.
	2. Worn oil transfer causes a decrease in blade angle of attack.	If the system works with cold oil and fails at high oil temperature, this indicates high leakage in the oil transfer system on the propeller shaft. Repair engine.
	3. Internal leakage in the propeller.	Contact manufacturer
	4. Governor drive failure or broken relief valve spring.	Check governor drive and governor on the test bench. If sudden oil leakage occurs, move power lever back until the rpm decreases. In this condition the propeller goes back to the low pitch stop automatically and no oil pressure is needed. Adjust the propeller control for take off position. Apply enough

2. Troubleshooting Chart (Cont.)

Trouble	Probable Cause	Remedy
		power to remain about 100 rpm below take-off rpm. Note that propeller rpm should be always lower than adjusted with the propeller control. This will hold the governor in an underspeed condition and no oil pressure will be transferred from the governor to the propeller.
Rpm decrease during normal operation without change of propeller lever position.	1. Speeder spring in the governor broken. 2. Dirt in the fuel system or carburetor. 3. Control inoperative.	Check governor on the test bench. Clean or repair. Check free movement and positive stop contact. If the cause cannot be found in the fuel system the flight may be continued when throttle setting is reduced, avoiding excessive manifold pressure and overheating of the engine. The rpm will remain low because the propeller pitch is on the high pitch stop.
Extremely slow pitch change or no pitch change on ground (rpm changes with airspeed like a fixed pitch propeller)	1. Blocked oil line. 2. Sludge deposit in propeller (This does not occur suddenly but slowly worsens over time.). 3. Damaged pitch change mechanism. 4. Corrosion in the blade bearings.	Check engine. Clean propeller and crankshaft. Contact manufacturer. This error may appear suddenly. Repair propeller.
Oil leakage (visible outside or hidden inside)	Damaged gasket.	Replace gaskets or repair propeller.
Rough running engine, possibly in limited rpm range only	1. Bad static balance. 2. Bad dynamic balance. 3. Operation in restricted rpm range.	Re-balance statically, mount balance weights to forward spinner bulkhead. Re-balance dynamically, mount balance to rear spinner bulkhead. Refer to airplane flight manual. Check rpm gauge for correct reading. Repair or replace if necessary.

PROPELLER ASSEMBLY - MAINTENANCE

1. General

A. The aircraft is equipped with a MT-Propeller MTV-21-A/175-05 variable pitch, two blade wood-composite propeller.

B. For more detailed information on the installed propeller, refer to MT-Propeller E-124 operation and installation manual for hydraulically controlled variable pitch propeller, latest revision.

2. Tools, Equipment and Material

	Quantity	Equipment	Parts No.	Manufacturer
4.B.	1	O-ring	AT01-7310-104	AQUILA Aviation

3. Description

A. The variable pitch propeller consists of the following main groups: hub with blade bearings and pitch change mechanism, blades and spinner.

Hub

The one-piece hub is made from forged or milled aluminum alloy with the outer surface shot-peened and anodized. The blade bearings are specially designed ball bearings where the ball acts as a split retainer in order to hold the blades in the hub, creating an increased safety factor against blade loss. The outer bearing race is made as one-piece and is pressed into the hub, while the inner race is split and installed on the blade ferrule. The blade preload is adjusted by the thickness of plastic shims. Blade and bearing are held in the hub by a retention ring.
Blade pitch change is achieved via a pin in the blade root. A plastic block connects the blade with the piston and the axial movement of the servo piston turns the blades. The return spring and the sleeve, which acts as high (low) pitch stop, are installed on the front piston.
There are two check nuts outside the hub with which the low (high) pitch stop can be adjusted.
The inner part of the hub is used as the cylinder for the pressure oil. This arrangement allows a simple and light-weight design. Balance wieghts are installed in the front spinner support.

Blades

The propeller has wood-composite (natural composite) blades, using high compressed wood in the root and lightweight wood in the remaining body. Epoxy fiberglass covers the entire blade surface and is painted with acryl varnish. The outer portion is protected against erosion by a stainless steel erosion sheath bonded to the blade edge. The inner portion of the blade is protected by a self-adhesive PU-strip. The blade ferrule is attached with special lag screws to the blade root and is additionally bonded with epoxy resin.

Spinner

The spinner dome is a one-piece part made from fiber reinforced composite. The bulkhead is truncated aluminum alloy. Filler plates increase the stiffness of the dome on the cutouts for the blades. The dome is mounted to the bulkhead by means of screws.

4. Propeller Removal/Installation

A. Remove Propeller
(1) Ensure ALT/BAT and ignition switches are OFF and the throttle is closed.
(2) Remove upper engine cowling (refer to 71-10).
(3) Remove screws securing spinner dome to spinner bulkhead and remove spinner.
(4) Remove alternator belt from alternator pulley (refer to 24-20).
(5) Position a hoist and lifting sling in front of the aircraft and attach sling to propeller.
(6) Place a drain pan beneath propeller to catch oil spillage.
(7) Loosen and remove nuts and washers attaching propeller to engine flange.
(8) Remove propeller from aircraft.

CAUTION: DO NOT STORE PROPELLER ON IT'S TIPS!

B. Install Propeller
(1) Clean engine and propeller flange with a suitable cleaning agent.
(2) Apply a light coat of engine oil to new O-ring and insert O-ring into groove inside hub at flange mounting. Check correct position of O-ring in propeller flange.
(3) Place alternator belt around V-belt pulley.

CAUTION: CARE MUST BE TAKEN WHEN INSTALLING THE PROPELLER. THE PROPELLER SHOULD NOT BE PULLED ON TO THE ENGINE FLANGE WITH THE NUTS IN ORDER TO AVOID DAMAGE TO THE HUB AND TO AVOID SHEARING OFF MATERIAL CAUSING OIL LEAKS ON THE O-RING.

(4) Using hoist and sling, put propeller in position to engine mounting flange.
(5) Put V-belt pulley with carriers in position to engine mounting flange.

CAUTION: STOP NUTS WITH WASHERS SHOULD BE TIGHTENED CROSSWISE WITH EQUAL FORCE TO AVOID HUB DAMAGE.

(6) Install washers and nuts securing propeller assembly to engine flange. Torque nuts to 45 - 47 Nm (398 - 416 in.lbs).
(7) Check track of blades (max. 3mm [1/8 in.] measured approx. 10 cm [4 in.] from the tip on the trailing edge).
(8) Install spinner dome on bulkhead observing mating marks. Torque screws with plastic washers 4 - 5 Nm (35 - 44 in.lbs). Check runout of the dome. Max. 2 mm (0.08 in.) permissible.
(9) Install alternator belt and adjust belt tension (refer to 24-20).
(10) Install upper engine cowling (refer to 71-10).
(11) Carry out a functional test (refer to 61-20).

5. Inspection/Check

A. Inspection/Check
(1) Remove screws securing spinner dome to spinner bulkhead and remove spinner.
(2) Check spinner for cracks and other damage.
(3) Perform a visual inspection of the propeller blades.
(a) Check for critical cracks (refer to MT-Propeller E-124 operation and installation manual for hydraulically controlled variable pitch propeller)
(b) Inspect for notches, dents, nicks or other damage. Repair as required (refer to 61-10).
(c) Check that the metal erosion sheath is not loose.
(d) Check that proper PU-strip is in place.
(4) Check blade shake, max. 3 mm (1/8 in.).
(5) Check blade angle play, max. 2°.
(6) Check track of blades (max. 3mm [1/8 in.] measured approx. 10 cm [4 in.] from the tip on the trailing edge).
(7) Inspect outside condition of the hub and parts for cracks, corrosion, deterioration.
(8) Inspect check nut for low pitch stop for tightness.
(9) Check safety wiring.
(10) Check flange stopnuts for tightness.
(11) Inspect blade root and hub for oil and grease leaks.

B. Overspeed
If up to 110 % take-off rpm of the approved engine/propeller combination is experienced, immediately perform a 100 hrs inspection (refer to MT-Propeller E-124 operation and installation manual for hydraulically controlled variable pitch propeller). A factory overhaul is required if overspeeds between 111 % and 120 % are experienced. A ferry flight can be undertaken after performing a 100-hours inspection. If more than 121 % is experienced, the propeller may not be used again and must be returned to the factory for investigation.

6. Cleaning

A. Clean propeller if necessary with any car wash solution or equivalent.

7. Repairs

CAUTION: IT IS IMPORTANT TO AVOID MOISTURE PENETRATING INTO THE WOODEN CORE OF THE PROPELLER BLADES. IF IN DOUBT, CONSULT AN AIRCRAFT INSPECTOR FOR FINAL DECISION ON REPAIR.

A. Normal stone nicks are unimportant as long as the plastic protection of the wood core exists. Air bubbles with a maximum diameter of 15 mm (0.6 in.) are also unimportant as long as their size does not increase during use.

Scratches and nicks should be protected during routine maintenance with a coating of water resistant varnish.

B. Trailing edge splitting can arise from a stone hit. If the split is not longer than 40 mm (1.5 in.), it can be glued with epoxy cement. If some wood is missing (not deeper than 8 mm [0.25 in.]), fill damaged area with epoxy, let it harden, grind surface smooth and cover with water-resistant varnish, preferably polyurethane.

C. Small surface scratches and nicks can be repaired by filling them with epoxy resin and covering them with polyurethane varnish.

D. The manufacturer can repair broken blade tips if more than 7/8 of the blade still exists without cracks. Blade tipping can be replaced. Damaged trailing edges can be repaired.

E. Damaged or missing PU strips on the leading edge must be replaced by new ones.

PROPELLER CONTROL - MAINTENANCE

1. General

   A. The aircraft is equipped with a constant speed propeller. A MT-Propeller P-850-12 governor controls the blade pitch.

   B For more detailed information on the installed governor, refer to MT-Propeller E-1048 operation and installation manual for hydraulically constant speed governor P-8( )( )-( ), latest revision.

2. Tools, Equipment and Material

	Quantity	Equipment	Parts No.	Manufacturer
4.B.	1	gasket	AT01-7080-012	AQUILA Aviation

3. Description

   A. The necessary pressure to adjust the propeller is achieved by a gear pump in the governor which increases engine oil pressure. A flyweight and a speeder spring move a valve, allowing oil flow to and from the piston in the propeller. In on-speed condition there is no oil flow. A speed-adjusting lever changes the pre-load of the speeder spring which finally results in a change in engine speed. The propeller has a single-acting piston to increase pitch, whereas the natural twisting forces of the blades reduce propeller pitch. The governor produces oil pressure to increase pitch. The relief valve pressure should be set to 310 ±10 psi.

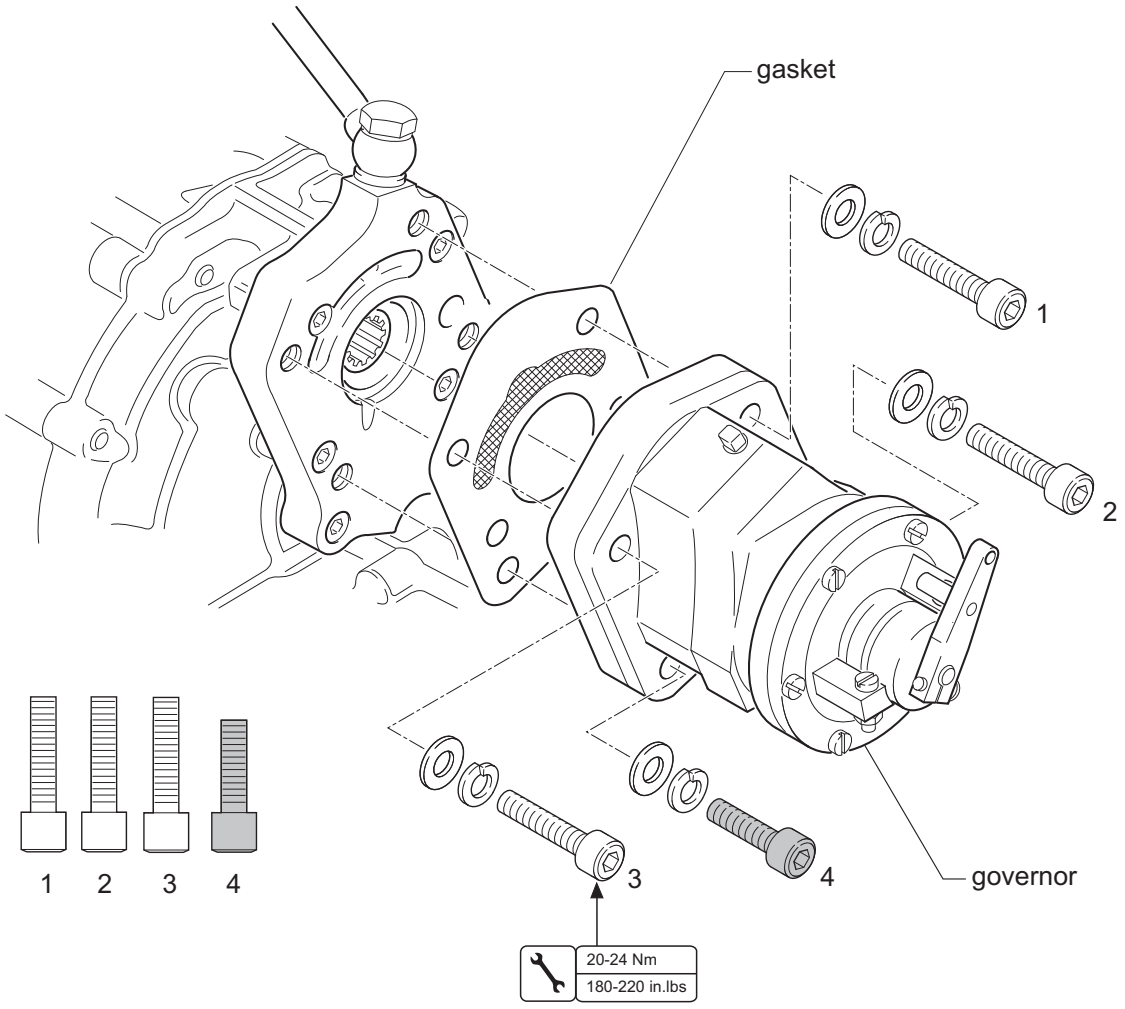
4. Governor Removal/Installation (Ref. Fig. 201)

   CAUTION: TO PREVENT FOREIGN MATERIAL ENTERING THE SYSTEM, INSTALL COVER TO GOVERNOR MOUNTING PAD.

   A. Remove Governor
      (1) Remove upper engine cowling (refer to 71-10).
      (2) Disconnect governor control cable end from governor control arm.
      (3) Remove screws, washers and lockwashers securing governor to crankcase and remove governor from engine.
      (4) Remove and discard gasket.

   B. Install Governor
      (1) Clean engine pad and mounting hardware before installing new mounting gasket. Ensure governor drive spline mates correctly with engine accessory drive spline.
      (2) Position new gasket coated with engine oil or equivalent on engine mounting pad.
      (3) Install governor on gasket using srews, washers and lockwashers.
      Torque to 20 - 24 Nm (180 - 220 in.lbs).
      (4) Install governor control cable to governor control arm.

(5) Adjust governor (refer to "Adjustment/Test" below).
(6) Install upper engine cowling (refer to 71-10).
(7) Carry out a functional test (refer to "Adjustment/Test" below).



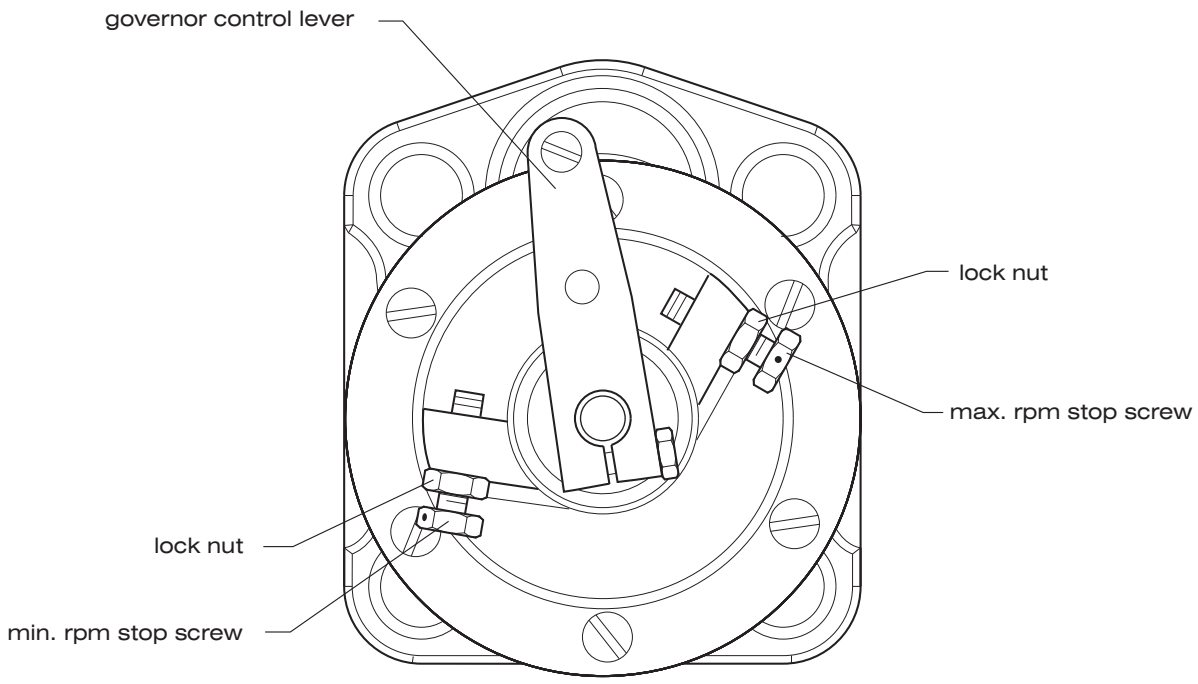
Governor Installation
Figure 201

5. Inspection/Check

A. Perform the following inspections frequently and in particular after any maintenance on the propeller / governor:
(1) Remove upper engine cowling (refer to 71-10).
(2) Move the propeller lever in the cabin between max. rpm and min. rpm. Verify the lever moves freely without restrictions trough full range.
(3) Ensure the propeller lever has positive clearance to the console slot in both the full forward and full aft positions (at least 3 mm [0.125 in.]).

WARNING: NO OIL LEAKAGE IS PERMITTED.

(4) Visually inspect governor and installation for any signs of oil leakage.
(5) Check all screws, bolts and nuts are tightened properly and safety wired, as required.
(6) Install upper engine cowling (refer to 71-10).



Governor Front View
Figure 202

6. Adjustment/Test

CAUTION: ENGINE TEST RUN MAY BE PERFORMED BY AUTHORIZED PERSONNEL ONLY.

CAUTION: AVOID PROLONGED OPERATION OF THE ENGINE WITH HIGH RPM ON THE GROUND BECAUSE IT CAN RESULT IN EXCESSIVE ENGINE TEMPERATURE AND BLADE DAMAGE.

NOTE: Precise results for propeller rpm setting can only be obtained in flight-tests.
As a general rule, engine redline rpm cannot be reached during a full power static run-up. The governor is not controlling the propeller at this time, the propeller is against its low pitch stop. Attempting to increase propeller static run-up rpm by adjusting the governor high rpm screw will have no effect and will probably result in a propeller overspeed during the take-off roll. The procedure outlined below sets maximum rpm in a limited range only.

NOTE: Always measure propeller speed with an optical revolution counter!

A. Adjustment
(1) Remove upper engine cowling (refer to 71-10).
(2) Remove access panels 211 FT, 211 FB and 211 EC (refer to 25-12).
(3) Remove safety wire from low pitch / high rpm stop screw on governor and unscrew for max. propeller speed. Lock stop screw in that position.

CAUTION: AFTER ADJUSTMENT THE STOP SCREW MUST OVERLAP THE STOP SCREW SUPPORT BY AT LEAST 2 MM (0.08 IN.).

CAUTION: CHECK POSITION OF CONTROL SHAFT WITH CONTROL LEVER AT THE MAX. RPM STOP. ENSURE THAT THE SPLINES ARE NOT BEYOND THE GOVERNOR CASING, OTHERWISE THE O-RING COULD BE DAMAGED. THIS WILL RESULT IN AN OIL LEAKAGE WHICH IS NOT ACCEPTABLE.

(4) Adjust governor control cable on governor control lever jam nut so that governor control arm touches the governor max. rpm control arm stop when the propeller control lever is in max. rpm position.
(5) Continue with step (14) if the propeller is already set up correctly.
(6) Remove spinner and plates from spinner bulkhead (refer to 61-10).
(7) Start and warm up engine.
(8) Slowly increase propeller speed with power lever (propeller lever in max. rpm position) until max. propeller speed is reached.

CAUTION: DO NOT EXCEED A MAX. PROPELLER SPEED OF 2385 RPM!

NOTE: Only the propeller limits the engine speed in this step. Engine speed is not controlled by the governor.

(9) Shut down engine after short cool down period.

(10) Loosen check nuts on propeller hub and mark their position. Adjust max. propeller speed by adjusting the nuts. Turning loose by ¼ turn will increase the propeller speed by approx. 100 rpm. Secure nuts again.

NOTE: The max. static propeller speed on ground should be approx. 2240 rpm.

(11) Repeat steps (7) thru (10) until max. propeller speed is set up correctly.
(12) Safety wire check nuts on propeller hub.
(13) Re-install spinner and plates to spinner bulkhead (refer to 61-10).
(14) Start and warm up engine.
(15) Place power and propeller levers in full forward position for max. propeller speed.
(16) Slowly move propeller lever back until governor starts reducing propeller speed. Leave propeller lever in that position.
(17) Shut down engine after short cool down period.
(18) Adjust low pitch / high rpm stop screw on governor to current position of governor control arm. Safety wire stop screw.
(19) Push propeller lever full forward and pull slightly back again by approx. 2 mm (0.08 in.).
(20) Adjust governor control cable on governor control arm so that governor control arm touches the governor max. rpm control arm stop with the propeller lever in it's current position.
(21) Start and warm up engine.
(22) Adjust power lever for approx. 1700 rpm (propeller lever in max. rpm position).
(23) Pull back propeller lever until the propeller speed drops by 200 rpm.
(24) Pull back power lever in idle position.
(25) Adjust propeller lever low rpm stop screw to the current propeller lever position.
(26) Repeat steps (22) thru (25) until drop of propeller speed is 200 rpm.
(27) Perform a test-flight. At 130-140 kts with propeller and power levers full forward propeller speed should be max. 2260 rpm. Slowly move propeller lever forward. If popeller speed is max. 2260 rpm with propeller lever in full forward position governor adjustment is finished. If propeller speed would exceed the given value, mark the position of the propeller lever where propeller speed is 2260 rpm and continue with step (28).
(28) After landing move propeller lever to the position that has been marked during test-flight.
(29) Repeat steps (18) to (27) until max. propeller speed in flight is adjusted.

B. Functional Test
(1) Start and warm up engine.
(2) Adjust power lever for approx. 1700 rpm with propeller lever full forward. Pull propeller lever back to the low rpm stop. Propeller speed should drop by 200 rpm. Push propeller lever full forward and observe rpm increase. Decrease and increase of propeller speed should have about the same time. Cycle three times to bleed air out of the system.
(3) Adjust power lever at approx. 2200 rpm now. Pull propeller lever back until rpm drops about 100 rpm. When the rpm is stabilized, increase manifold pressure by about 3 in.Hg and observe the governor function. Propeller speed must stabilize.
(4) Watch for a clean ground surface to avoid blade damage and advance power lever and propeller lever for take-off power and rpm. The static rpm must be limited by the propeller and should be approx. 2240 rpm.
(5) Perform a test-flight. At 130-140 kts with propeller and power levers full forward propeller speed should be max. 2260 rpm.