Document number RSUK0395

Maintenance Manual

Gyroplane Type MTOsport 2017 (UK spec only)

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CAA Approval No: DAI/9917/06

Applicability

Aircraft Registration:	**G-**
Aircraft serial no.	**RSUK/MTO2/**
Engine type:	**Rotax 912ULS, 914UL, 914F**
Engine serial No:	
Rotor blade type & diameter:	**Autogyro RSII 8.4m standard (red end caps) or** **AutoGyro RSII 8.4m TOPP (blue end caps) or** **AutoGyro RSII 8.6m TOPP (grey end caps)**
Propeller type:	**HTC 1,73m or Ivoprop DL3-68 with or without spinner.**

CONTENTS AND CHECK LIST OF PAGES

Note! This manual comprises a front section detailing UK specific requirements and information, and then incorporates the AutoGyro Manufacturers Maintenance Manual by way of the pdf document copied into the RotorSport document as Appendix B.

Therefore:

1. **In the event of conflict between RotorSport and AutoGyro instructions, RotorSport instructions take priority.**
2. **The page numbering only covers the primary RotorSport document.**
3. **Take note of errors or specific changes at the start of Appendix B.**
4. **Take note of additional instructions and repair methods shown in Sect 9.**

SECTION 1

AMENDMENTS TO THE SCHEDULE

1. Where & when necessary RotorSport UK Ltd (hereafter referred to as RSUK) will issue updates to this maintenance standard, and will notify known owners to review the changes via the RSUK website with changes appropriately identified by a strike in the margin.
2. Aircraft operators are responsible for ensuring that amendments to their publication are carried out immediately and in accordance with instructions contained in amendment transmittal letters (where issued).

ISSUE NUMBER	DATE	INSERTED BY	ISSUE NUMBER	DATE	INSERTED BY
Initial					
1	04.10.17				
1.1	18.04.18				

Issue	Change summary
1	First issue for flight test
1.1	AAN release

RotorSport UK Ltd approval signatures for the above manual issue.	
Signature: Position: Engineering Manager	Signature: Position: Head of Engineering

List of Effective Pages

Page	Issue	Date		Page	Issue	Date
Page 1	1	18.04.18		Page 33	1	18.04.18
Page 2	1	18.04.18				
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SECTION 2

FOREWORD

1. Applicability

This Schedule is intended for use on the MTOsport 2017 Gyroplane only, released under AAN29471.

2. Guidance

This aircraft may be being flown & operated under a UK Permit to fly, and as such specific rules exist to cover maintenance actions, such as the types of work allowed by owners on Permit aircraft. It is the aircraft operators' responsibility to ensure the aircraft is operated within those rules and regulations.

3. Notes

RSUK provides this maintenance schedule so that, to the best of their knowledge, the operator is able to maintain the aircraft in a manner that will preserve its airworthiness. The manufacturer is unable to predict all operating conditions, and as such it is the operator's ongoing responsibility to assess the schedule for applicability to the environment operated within.

Note; check your Permit to Fly – if compliance to this schedule is stated as required, then non-compliance will invalidate the Permit to Fly.

SECTION 3

OWNER/OPERATOR RESPONSIBILITIES
Operators are responsible for the accomplishment of the maintenance prescribed in the schedule.

CERTIFYING PERSONS RESPONSIBILITIES
Certifying persons must use their engineering skill and judgement in determining the depth of inspection needed and other matters that could affect the airworthiness of the gyroplane. In order to claim any alleviation on subsequent inspections, the gyroplane maintenance records must record the extent of previous inspections upon which the alleviation is based.
Certifying persons are responsible for recording in the appropriate log book or worksheet, any defects, deficiencies or additional maintenance required as a result of implementation of the schedule.

GENERAL INSPECTION STANDARDS
The general inspection standards applied to individual task inspections must meet the recommended standards and practices of RSUK.
In the absence of general inspection standards, refer to CAA CAP 562 Civil Aircraft Airworthiness Information and Procedures (CAAIP) or other CAA recommended standards and practices, and/or the LAA Gyroplane Maintenance manual.
Inspections may be carried out without component removal or dismantling unless considered necessary or where required by the schedule.

AIRWORTHINESS LIFE LIMITATIONS (RETIREMENT/SCRAP LIVES)
Airworthiness life limitations shall be those published by the CAA, state of design and RSUK.
Airworthiness life limitations should be recorded in CAP 543 Time Limited Task Record, or an appropriate equivalent.

The main rotor bearing has a safe life limit of 1500 service hours
AutoGyro Rotorsystem II (all derivatives) has a safe life limit of 2,500hrs**.**
See also Chapt 4 of the AutoGyro manual, 'Manufacturer Life Limitations'.

AIRWORTHINESS DIRECTIVES
All applicable Airworthiness Directives or Mandatory Permit Directives issued by the CAA and the state of design must be complied with. Compliance with AD's or MPD's should be recorded in Part C of CAP'S 398, 399 or 400 (logbooks), or an approved equivalent.

AIRWORTHINESS NOTICES
All applicable mandatory CAA Airworthiness Notices must be complied with. Compliance with CAA Airworthiness Notices should be recorded in Part C of CAP'S 396, 399 or 400 (logbooks), or an approved equivalent.

OVERHAUL AND TEST PERIODS
Overhaul and test periods shall be those shown & recommended by RSUK.
The CAA may vary or mandate overhaul and test periods by the issue of an Airworthiness Directive or Airworthiness Notice.
The overhaul and test periods should be recorded in the appropriate aircraft worksheet

SERVICE INFORMATION

Service information (Service Bulletins, Service Letters, etc) published by RSUK should be formally technically assessed by the Owner/Operator and adopted if required to ensure operational safety and reliability, compliance with service information should be recorded in Part C of CAP 398, 399 or 400 (logbooks), or an approved equivalent.

MODIFICATIONS

Approved modifications which have been carried out to the gyroplane, engine, components and radio after original manufacture, must be recorded in the appropriate log book(s).

Any recurring inspection or maintenance task resulting from approved modifications should be recorded in the aircraft worksheets.

DUPLICATE INSPECTIONS

Following initial assembly or any disturbance of a control system or vital point, the procedures outlined in British Civil Airworthiness Requirements (BCAR) Section A/8, Chapter A6-2/B6-2 and A5-3 shall be applied. Certifications must be recorded in the appropriate worksheet, log book or aircraft technical log. In summary, this procedure requires that all and any such changes be cross checked by either a CAA approved Inspector or Certified or CAA Authorised Engineer prior to first flight, and this cross check shall be as thorough as practical – including physical tests if appropriate. In exceptional circumstances the CAA also allow another qualified gyroplane pilot to cross check modifications – this person must sign the logbooks to certify their actions with their pilots licence no.

SCHEDULED MAINTENANCE WORKSHEETS

Worksheets shown in Section 7 must be issued and the tasks certified for all scheduled maintenance checks. These worksheets become part of the maintenance records required to be kept by the operator.

All maintenance carried out in connection with a particular check should be certified on suitably referenced worksheets (an example available from the RSUK website) and included in the gyroplane records. These worksheets must be cross-referenced in the appropriate log book(s) giving general details of the additional maintenance carried out.

DEFINITIONS

Throughout the schedule the following terms and abbreviations have the stated definitions;

SERVICE/LUBRICATION (SERVICE/LUB):

The term 'Service or Lubrication' requires that a component or system should be serviced and/or replenished as necessary with fuel, oil, grease, water, etc., to the condition specified.

INSPECT (INSP):

An ‘Inspection' is a visual check performed externally or internally in suitable lighting conditions from a distance considered necessary to detect unsatisfactory conditions/discrepancies using, where necessary, inspection aids such as mirrors, torches, magnifying glass etc. Surface cleaning and removal of detachable cowlings, panels, covers and fabric may be required to be able to satisfy the inspection requirements.

OPERATIONAL CHECK (OP/C):

An 'Operational Check' is a test used to determine that a system or component or any function thereof is operating normally.

FUNCTIONAL CHECK (F/C):
A 'Functional Check' is a detailed examination of a complete system, sub-system or component to determine if operating parameters are within limits of range of movement, rate of flow, temperature, pressure, revolutions per minute, degrees of travel, etc., as specified in the appropriate maintenance manual. Measured parameters should be recorded.

CHECK (CHK):
A 'Check' is the verification of compliance with the type design organisation's recommendations.

SECTION 4

PERMIT MAINTENANCE RELEASE

This maintenance certification system is specific in accordance with BCAR A3-7.
Owner operators must ensure their airframe and engine logbooks either contain a sticker with the wording ‘Any reference to a Certificate of Release to service in this logbook shall be construed as a PMR’ & ‘The certification at the top of each page in Part A of this logbook is superseded by the following statement; The work recorded below has been completed to my satisfaction and in that respect the aircraft is considered fit for flight’, or have new logbooks containing this information.

For information on who can issue a PMR see CAP553; BCAR Section A, Chapter A3-7, Paragraph 12.5.

On completion of any check required (‘required’=stated in the Permit to Fly) by the schedule, except pilot maintenance (see section 5) and Check A (see section 6), an entry shall be made in Column 6 of CAP398 Aircraft Log Book, CAP399 Engine Log Book or an approved equivalent as Section 4. The certifying person's signature, authority and date must be made in Column 7 against the relevant category (Airframe, Engine, Radio).
The following is an example of an entry acceptable to the CAA, unless already pre printed on the page:

PERMIT MAINTENANCE RELEASE Cross refer to workpack ref; 25 hr/100 hr/Annual Check (delete as appropriate) has been carried out to my satisfaction at total airframe hours……. and in that respect is considered fit for flight Signed……..Authorisation ref……Date……. Maintenance Schedule Ref. Issue …..	Airframe Engine Radio (Annual check only)

A signed PMR does not expire or is superseded by subsequent PMR's, unless relating to a repeat of the same activity. A PMR remains active as long as the activity it relates to remains part of the aircraft.

Pilot Maintenance
A licensed pilot who is the owner or operator of the gyroplane may carry out certain maintenance tasks prescribed in Air Navigation (General) Regulation 16. The issue of a PMR is not required. The pilot must include his pilot's licence number with his signature in the appropriate log book(s). The permitted pilot maintenance is as below;

PERMITTED PILOT MAINTENANCE
This section defines the type and extent of maintenance that may be carried out and certified by a pilot who is the owner of the aircraft and operates under a CAA Permit to Fly. Refer to CAA CAP 733 for more information. Some of the wording is adjusted to suit gyroplane terminology.

1. Replacement of landing gear tyres.
   (Including removal and replacement of wheels, cleaning and servicing of wheel bearings, application of creep marks, removal and refitting of brake units to the extent required for wheel removal and the removal and the renewal of brake pads/linings when special tools are not required. Replenishment of hydraulic brake system fluid level).
2. Replacement of defective safety wiring or split pins excluding those in engine, transmission, flight control and rotor systems (but including those designed to be pilot maintainable and shown in the pilots handbook, eg teeter bolt split pin).
3. Repairs to upholstery and decorative furnishing of the cabin or cockpit interior when repair does not require dismantling of any structures or operating system or interfere with an operating system or affect the structure of the aircraft.
4. Repairs, not requiring welding, to fairings, non-structural cover plates and cowlings.
5. Replacement of safety belts or safety harness.
6. Replacement of seats or seat parts not involving dismantling of any structure of any operating system.
7. Replacement of bulbs, reflectors, glasses, lenses or lights.
8. Replacement of any cowling not requiring removal of the propeller, rotors or disconnection of engine or flight controls.
9. Replacement of unserviceable sparking plugs.
   (Including removal, cleaning, gapping, testing and refitting of all spark plugs).
10. Replacement of batteries.
    (Including maintenance of lead acid batteries)
11. Replacement of wings (rotors) and tail surfaces and controls, the attachments of which are designed to provide for assembly immediately before each flight and dismantling after each flight.
12. Replacement of main rotor blades that are designed for removal where special tools are not required (as is the case on the MT series).
13. Replacement of VHF communications equipment, only if is not combined with navigation equipment.
14. Manufacture and installation of required cockpit placards and notices.
15. Lubrication of aircraft.
    (Including prior cleaning of hinges)
16. Inspection of engine induction air filter.
    (Including removal, cleaning and refitting (with wirelock)).

17. Inspection of fuel filters.
    (Including removal, cleaning and refitting).
18. Changing of engine oil.
    (Including removal, cleaning/replacement, refitting of oil filter, and wirelock of sump bolt).

Annual Check

The annual check and all associated work must be accomplished under the supervision of a person or organisation appropriately approved by the CAA (eg, CAA Authorised A3-7 engineer or approved organisation).
Use form AG-F-PCA-MT2017 from the RSUK website

SECTION 5

THE MAINTENANCE CHECK CYCLE

Check title	Content	Period
Check A	Check A	Prior to the first flight of the day
First 25 hour check	25 hour check items (one time check, after new build)	Not exceeding 25 flying hours, or 1 year, whichever is the sooner
100 hour check	100 hour check items	Not exceeding 100 flying hours
Annual check	As 100hr check items.	Not exceeding 12 months from previous 100hr or annual check (see Note 5)

Use form AG-F-PCA-M2017 for the 25hr/100hr Service/Annual Inspection Worksheet

PERMITTED VARIATIONS (see Notes)

Tasks controlled by flying hours	Maximum Variation
25 hour	+/- 5hrs
100 hour	+/- 10hrs
Tasks controlled by calendar time	**Maximum Variation**
6 months	1 month
Annual	Prior to Permit renewal (see 5. and 6. below)

Tasks controlled by more than one limit
The more restrictive limit shall be applied

Notes

1. Permitted variations may not be applied to applicable airworthiness life limitations, airworthiness directives or overhaul and test periods.
2. Permitted variations for tasks controlled by flying hours should not be understood to be a maintenance planning tool, but as an exceptional means to allow the operator to fly for a limited period of time until the required maintenance is performed.
3. Any application of a permitted variation to the maintenance check cycle period must be recorded in the appropriate log book(s) together with the reason for the variation by a

person who is authorised to sign the log book entry for that particular check. Details of the permitted variation must be made visible to the pilot.
4. Permitted variations are not required to be deducted from the next scheduled check.
5. The annual check may be anticipated by a maximum period of 62 days without loss of the continuity of the maintenance check cycle. Thus, for example, where the full 62 days is invoked, the following annual check would become due 14 months after the completion of the annual check that was anticipated. The period by which the annual check was anticipated and the date of the next annual check shall be recorded in the appropriate log book(s).
6. Where the aircraft requires an annual inspection, and was supplied new within that preceding year, it is permissible for the 25hr airframe inspection to be accepted in lieu of the annual inspection, provided the service has been undertaken within the 62 days requirement in note 5.

SECTION 6

PILOT'S PRE-FLIGHT CHECK
Pre-flight checks are to be carried out in accordance with the Gyroplane Pilots Handbook RSUK0394.

CHECK A - PRIOR TO FIRST FLIGHT OF THE DAY
For update control and one source of information, this check is not printed here. Refer to the Pilots Handbook.
For all inspection checks reference must be made to RotorSport UK Ltd, either via the website www.rotorsport.org or directly, for the latest schedule.

SECTION 7 - SCHEDULED MAINTENANCE WORKSHEETS
To allow ongoing updates of these service sheets with field service information received, they are located on the RotorSport UK Ltd website www.rotorsport.org.

AG-F-PCA-MT2017

PERMIT RENEWAL
Over and above the annual inspection, the CAA have some specific requirements that must be met/demonstrated during the permit renewal process. These are:

1) Demonstration of compliance with relevant AAN's (29471, downloadable from the CAA website) at applicable issues and with any addendums. See the aircraft Certificate of Conformity for details.

2) Demonstration of compliance with CAA Type Approval data sheet No. -BG-08 @ current Issue (downloadable from CAA website)

3) Demonstration of Compliance with Mandatory Permit Directives - stating relevant MPD's and method of compliance and location/page of certification in log book. Achieved by checking the CAA website, and referencing it on the Annual Inspection worksheet.

4) Demonstration of Compliance with CAP 747 detailing the Revision date/issue and applicable Generic Requirements. Achieved by checking the copy of the latest document on the CAA website, and referencing it on the Annual Inspection worksheet.

5) Demonstration of Compliance with EASA AD's applicable to the Rotax 912/914 engine - claim those for which are covered by mod state and detail those which are not relevant to UL/ULS. Achieved by checking the copy of the latest document on the EASA website, and referencing it on the Annual Inspection worksheet.

6) Demonstration of last completed Scheduled Maintenance check - reference Maintenance Manual, requirements and significant maintenance tasks/repairs completed. Achieved by showing the signed, completed service worksheets, which must be referenced in the aircraft and engine logbooks together with reference back to the manual used.

7) Flight test report - **copy of report required for the CAA**.

8) Permit Flight Release Certificate, if previous Permit expired. **Copy required**.

9) Aircraft weighing report date and C of G schedule - **copy required if changed since last renewal**.

Note! There is no requirement to annually re weigh a gyroplane. If a re-assessment of the aircraft CG is required, please contact RotorSport UK Ltd.

10) Check of Aircraft hours, Engine serial No and Propeller serial number.

11) Pilots Operating handbook Issue No. You will need to show your copy.

12) Logbooks, modifications and service bulletins/MPDs. The aircraft and engine logbooks will be inspected, and MUST be complete and up to date. In addition, they must show any modifications incorporated, both in the white pages and in the back pages showing the mod summary. Service bulletins and MPDs must be shown in either ‘one time requirements’ or ‘Repetitive requirements’ if to be repeated at certain intervals. In the latter case, the repeat checks must have been done.
They must be referenced with either CAA or RSUK mod numbers, and to their worksheets if used to show embodiment – and to be available for review.

A well presented and completed document set as above will make the permit renewal process relatively easy. See the RSUK website for further permit renewal guidance.

SECTION 8 - ANNUAL FLIGHT TEST

Annual Flight Test Schedule – refer to CAA check flight schedule CFS301 or other document as required by the Authorised CAMO.

SECTION 9 – AIRCRAFT SYSTEMS DESCRIPTION AND MAINTENANCE METHODS

General notes;

1. **These instructions are not all encompassing, and should always be used in line with good aircraft engineering practices, and manuals such as AC43.13. Repairs not shown must be approved by either the CAA or RSUK in writing.**
2. **Safety; working on an aircraft brings many hazards. Always wear suitable personal protective equipment such as overalls, safety glasses, safety shoes, gloves etc appropriate for the maintenance task. If possible render the engine inoperable prior to starting work.**
3. **Wherever possible SI units are used**
4. **Always use good quality tools appropriate for the task**
5. **Use of non standard or unauthorised parts or repairs will invalidate the warranty and the Permit to Fly. New parts specifically designed for this aircraft and supplied by RSUK will carry an Approved Certificate (of conformity), which must be kept with the aircraft records.**
6. **Special tools**
   Coil earthing lead, used to earth the ignition coils should the instrument panel be removed. Other as per AutoGyro AMM.
7. **Lubricants. Use engine lubricants only as per Rotax instructions. Shell LM Bearing grease RSD4530 or equivalent is suitable for aircraft grease lubrication points.**
8. **Loctites and sealants. See individual sections.**
9. **General corrosion prevention. Keep the aircraft in a non humid, ventilated area. If humidity is present, protect unplated components such as bolts etc with a proprietary spray such as WD40 or ACF50.**
10. **Help protect our environment by disposing of parts and fluids properly.**
11. **Specific aircraft parts list available separately from RSUK website.**
12. **Remember, maintenance, modification, and bulletin/MPD incorporations must be recorded on suitable worksheets and within the aircraft/engine logbooks – and signed appropriately.**
13. **Refer also to the pilots handbook as well as the drawings quoted and service parts list, all available from the RSUK website.**
14. **Notes on "nyloc" (and metal locking such as BinX) nuts:**
    (i) Ideally a nyloc nut should be used once only. It may be re-used if the thread is undamaged and when fitted to its mating fastener it must only turn with a torque greater than the "Prevailing Torque" listed below (values factored from AC43.13-1B): M6 0.8Nm, M8, 0.8Nm, M10 1.0Nm, M12 1.2Nm
    (ii) Unless specified otherwise the minimum thread protrusion beyond the locking element should be two thread-pitches.

WARNING!
PROPELLERS KILL! WHEN WORKING ON THE AIRCRAFT, UNLESS THERE IS A SPECIFIC REQUIREMENT TO HAVE THE AIRCRAFT LIVE, ENSURE THAT COILS ARE OFF AND KEYSWITCH OFF.
IF POSSIBLE DISCONNECT THE BATTERY, OR REMOVE THE SOLENOID ACTUATOR WIRE FROM THE SOLENOID TO PREVENT POSSIBLE STARTING.

This statement is made here only, to avoid continued repetition. It is the engineer's responsibility to ensure a safe working environment.

Primary and Secondary structure determination:

A primary structural part is one for which the failure would be catastrophic and would prevent continued safe flight and landing.

All other structure can be considered as Secondary, thus failure of a Secondary structural part would not be immediately catastrophic and with due care continued safe flight and/or a safe precautionary landing could still be made.

Because of the simplicity of the aircraft structure some parts have a dual role – such as the steel airframe. The airframe of the aircraft is primary structure, yet it carries attachment point for items not flight critical).
The primary structural elements are considered to be:
Airframe.
Connection assemblies joining the rotor head to the lower mast.
The rotor assembly and rotor head
The tail and rudder assy
The rudder and rotor control system
The main undercarriage and nosegear
Whilst other items may have an effect on flight safety, they are considered secondary to the above. The undercarriage is included, as whilst it does not contribute to safe flight, it is difficult to make a safe landing without it - inevitably an aircraft rollover would result, probably destroying the aircraft.

Critical parts.
The following parts and assemblies have been denoted critical during the design review process, and special care must be taken with them.

Item & pt No.	Reason/comment
Rotor Head Upper Assembly	Correct assembly of pitch, roll, main bearing and teeter bolts/nuts and splits pins is essential for safe operation
Rotor Head Lower Assembly	Correct assembly of pitch, roll, main bearing and teeter bolts/nuts and splits pins is essential for safe operation
Upper Mast welded fabrication	Must be inspected carefully for cracks or other weld problems
Rotor assembly	Correct assembly of the rotor system is essential for safe operation
Rotor blade	Damage or fracture of the rotor blade is not permitted.
Teeter bolt	Must be correctly fitted, with no cracks or damage for safe operation
Teeter tower	No cracks or damage permitted for safe operation
Main bearing nut	Critical part, must be properly tightened and correctly fitted with a split pin.
Main bearing bolt	Critical part, must be properly tightened and correctly fitted with a split pin.
Airframe	Must be inspected carefully for cracks or other fractures
Rotorhead centre	Must be inspected carefully for cracks or other fractures
Rotorhead sideplates	Must be inspected carefully for cracks or other fractures
Gimbal block	Must be free of cracks or fractures for safe operation

General aircraft testing and requirements post maintenance.

1. Aircraft operation. Any engine service will require the operation of the engine, as will any maintenance action requiring adjustment of an engine control or subsystem, or affected system such as removal of the instrument panel. Safely operating an aircraft, even for a ground run, requires training, and should only be undertaken with a pilot or suitably experienced person in the pilot seat. Operation must never be undertaken in a confined space, and always in the open with the propeller wash pointing away from any buildings or anything of value.
   Ensure there are no loose materials in the vicinity that could be sucked into the propeller, leading to expensive damage.
   Ensure the aircraft is chocked to prevent a runaway.
   Ensure there are no persons (especially children) or animals in the vicinity of the aircraft. Any persons required to be present (eg support staff) MUST be suitably trained or briefed of the danger they are in.
2. This aircraft is equipped with a pitot and static port system (venting behind the instrument panel). For safe aircraft operation it is very important that these systems are correctly fitted and checked if disturbed. Any maintenance operation which removes the instrument panel or instrument connected to this system must be properly verified for function prior to flight, as per Pitot System Integrity Test under Standard system checks.
3. Any maintenance action which requires a flight test (eg fitment of an alternative design of propeller) will result in the requirement for a Permit Flight Release Certificate (PFRC) to be issued. This is a simple document, and is not included within the logbooks. It must be retained with the aircraft records.

Standard system checks

Pitot and static ports.

The airspeed indicator pitot is a metal nozzle located at the nose of the aircraft.

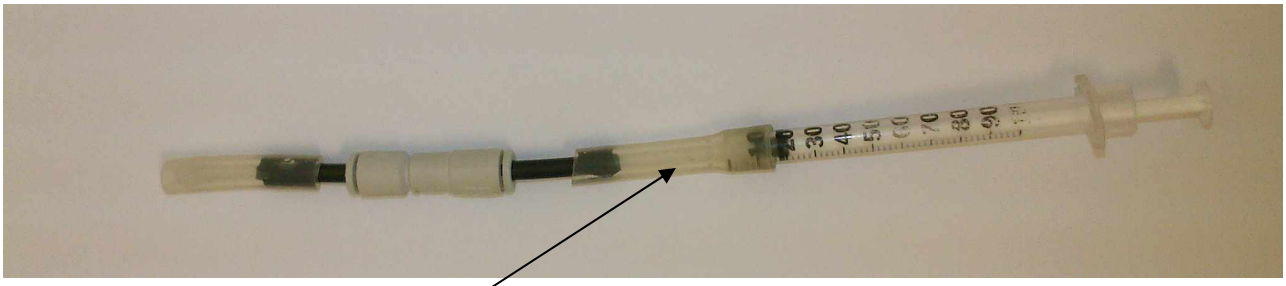
The static port is a single vent behind the instrument panel. The static port connects the front and rear seat ASI, Altimeter and VSI together (where fitted).

The integrity of this system is important, because a) a system leak could result in an under reading ASI, leading to unintended flight speeds beyond Vne, and b) incorrect static port balancing will lead to altimeter and ASI errors

A full system check is undertaken using a Barfield type apparatus (by following the instructions with the test set) which will give a full system calibration. Alternatively a simple system integrity test can be achieved using two 1ml syringes, one each connected to the pitot and to the static port. A full system calibration is normally undertaken in the event of a problem found during the simple integrity test, or in the event of a system rebuild or overhaul.

Pitot system integrity test

Check the ASI function and the integrity of the pitot-tube to ASI connection by use of field test kit RSD7179. This consists of a modified Becton Dickinson D U-100 Insulin hypodermic (or equivalent, and the needle is removed) and a short section of 6mm silicone tube containing a one way valve.



Vent hole here

Unit fitted to Calidus

1. The hypodermic scale is calibrated 0-100 units, this range being equivalent to 1ml of fluid. For both single and dual ASI installations withdraw the plunger to deliver 100 units.

2. Push the silicone tube onto the pitot nozzle at the front of the aircraft.

3. With a finger over the syringe vent hole, slowly depress the plunger to the end-of-stroke, and release.

4. Examine the ASI which should be reading around 70mph. The actual value is not critical and is dependent on the length of pipework installed.

Specifically check that there is no decay of the indicated reading over a period of 10 seconds, this confirms that the system has no significant leaks.
After the test gently ease the tube off the end of the pitot nozzle. Check that the indicators have returned to zero.

Static port integrity:

With the above test in progress (ie the system pressurised and showing 70mph), set the altimeter to 1013Mb.

1. Attach the 1ml syringe with rubber bung to the static port with the syringe fully open.
2. Close the syringe. The Vertical speed Indicator, if fitted, will show an ascent. The ASI will show a reduction in speed. The Altimeter will show a reduction in height. The amount of change will depend on the amount of equipment fitted, ie the length of airline being pressurised
3. Leave the system pressurise for 10seconds, there show be no noticeable decay.
4. Withdraw the static port syringe, and the needles must return to their pre-test positions.
5. Complete remainder of pitot test sequence.

If the needle positions decay, then there is a leak. Locate, repair, and retest.

Pneumatic system check:

1) Turn on aircraft keyswitch.

2) With changeover switch in the ‘Brake’ position, engage brake by depressing brake button on control stick, confirm pump and brake operation, and that function is acceptable. Repeat for rear stick where fitted, if necessary release brake pressure by switching the changeover valve from Brake to Flight and back again.

3) Pressurise to maximum (nominal reading 8bar +/-.5bar on instrument panel pressure gauge) Change to ‘Flight’ – check for 3-8 sec max to release air from brake system.

4) In ‘Flight’ position check that trim goes on and off in same direction as button (inc rear stick switch if fitted), and is indicated so on the instrument panel pressure gauge. The pressure gauge should jump rapidly between 6 and 8bar, indicating the 6bar pressure limit valve is functioning properly.

5) In ‘Flight’ position, stick forward. Depress pre rotator activation button on stick. Ensure cylinder engages by viewing bendix gear rising in the rotor head, and when the stick is pulled back it disengages.

6) Stick to front, release pre rotator and confirm that pump stops

7) In ‘Brake’ position, put 3 bar pressure on and ensure pre rotator does not function. Two bar or more pressure may be needed in the system whilst switching to Brake to enable the changeover valve to function

8) Press the ‘Interlock release button’ and ensure that pre rotator functions (bendix moves) with brake engaged.

9) Press roll left, and then roll right trim buttons. Ensure the indicator on the instrument panel moves in the same direction (to the right with right trim, left with left trim), and the stick is pulled into the same direction. Centre trim indicator, which must return the stick to the middle (ie the stick requires a small force to push for roll left or roll right).

11) Engage rotor brake to maximum pressure, and leave the system pressurised. Monitor for 1 hour minimum, and overnight if possible, for leaks, and address as necessary. Turn off the keyswitch before leaving the aircraft.

Instrument panel function test.

NOTE! The aircraft core functions (eg fuel pumps and engine gauges) have a protection system, such that if the alternator is unable to provide sufficient energy for all aircraft operations, then non essential functions will shut down! This may mean that when the aircraft is turned on the available voltage may be too low to allow these functions to work, so the aircraft may have to be started up first, or charger lead connected. These functions are; strobes, aux socket, seat-heating

1. Aux socket. Aux socket only works if the keyswitch is on, and is limited to 5amps maximum. Centre is positive, outside negative. Can be checked for polarity with a standard electrical meter, or for function by plugging in auxiliary equipment such as a GPS and check for the charging function.
2. Engine gauges. Can only really be checked for normal function by starting the engine and monitoring the gauge response. If a gauge is suspect, see the instrument panel section for checks.
3. Fuel gauge. Ensure gauge level indication is comparable to the fuel tank
4. Low fuel warning lamp. Function can be checked by disconnecting the cable to the sensor. The lamp will come on. Remember to reconnect.
5. Landing lights; turn on and off and check function
6. Navigation and strobe lamps: turn on and off and check function.

Caution!

Strobe light intensity is very high, do not stare at the strobes!

7. Backup (P2) fuel pump: turn on and off, and listen for function (both engine types)
8. P1 electric fuel pump: listen for function with keyswitch on (914UL engine only)

Permitted repairs and maintenance notes
Canopy repairs

Windscreen: Makrolon cracks may be repaired as described below provided they are clear of the forward field-of-view of the pilot.

1. Prevent the crack developing further by drilling a “stop-hole” 1 to 2mm diameter at the extreme end of the crack. Use a drill suitable for plexiglass (drill point angle 30degrees)
2. Replace screen if required

HTC Propeller
(for Ivoprop see RSUK0325)

Basic description

The HTC propeller is fitted as standard. This is a 3 bladed composite design with an aluminium 2 piece hub machined from solid. Each blade is a foam filled wet layup component in carbon and glass fibre. There is a spacer fitted between the propeller and the engine gearbox flange. Between the spacer and the propeller are fitted 6 torque bushes, to transmit the engine torque from the spacer to the propeller. Similarly, there are 6 (Rotax manufactured) flanged nuts fitted to the gearbox flange, into which the propeller bolts are tightened. These carry the torque to the spacer. The function of the six propeller bolts is to clamp the hub to the gearbox flange. In use, they should carry no torque, and if the propeller balance is correct, very little tensile cyclic loading – as the driving force is onto the gearbox flange.

An optional spinner assembly may be fitted. This comprises a composite spinner, an aluminium CNC machined mounting plate, and 9 M4 screws to hold the spinner to the plate (with plastic washers under the heads).

Materials used

1,73m diameter 3 blade HTC composite propeller assembly
Hub assembly (always a pair, and matched marked with numbers)
Blade assy (marked at the root with ‘A’ or ‘B’, and a week no./yr of manufacture. If replacing a blade always ensure the A or B is matched to the original, as this denotes the blade weight.
Hub bolt and washer set
Hub to engine bolt and washer set
Engine flange nut set
Spacer and bush set
Spinner backing plate
Spinner

Assembly methods (HTC propeller)

Bolt torque (M6 and M8) 15Nm. Take care not to overtighten, and pre coat M8 centre bolt threads with loctite 243. Apply paint stripe between the protruding bolts theads and gearbox flange to allow visual check of bolt security.
Spinner screws. Use loctite 243 sparingly and tighten securely. Ensure a nylon washer is fitted to each screw.
912ULS Approx blade angle 19.5 deg, 12” from the end of the blade.
914 Turbo Approx blade angle 20.5 deg, 12” from the end of the blade.
Blades are adjusted to achieve 5400 in the climb at full throttle, 65mph.
Angle measured with respect to the hub face, see photos. Balance propeller after fitting, unless not disassembled and refitted in original location.

After any blade adjustment, ensure all blades have the same angle to within 0.5deg – recheck after tightening the hub. Max ground rpm should be circa 5,400. If adjustment over 1degree is needed, check engine performance! Note that the 914UL engine carries a datalogger, available for interrogation of engine parameters by service engineers (with appropriate equipment).
ALWAYS recheck all the hub bolt torques after first flight after adjustment, and if fitting a new prop or blades, check the bolt torques after the first 25hrs, to compensate for the blades settling into the hub. Failure to do so may lead to cracking of the gelcoat around the blade to hub attachment.

Blade tracking is recommended as no more than 12mm deviation blade to blade, measured at the blade tip, and is reset by slackening the hub bolts and pushing the affected blade forwards or backwards, retightening and rechecking.

Special setup instructions
An RSUK gauge is available to aid blade setting.

Repair methods
Surface damage not tearing through the glass or carbon fibre, or splitting through the mould line (middle of the leading edge along the blade), may be repaired using suitable epoxy resin, or superglue and carbon. The area must be thoroughly cleaned of insect debris and dirt, and abraded to give a good fresh key to bond into. Mix and load the epoxy onto the blade as per the adhesive instructions. Superglue repairs are built up in stages, a small drop of glue followed by a sprinkle of carbon or charcoal (which instantly sets the adhesive). Build up in layers to the height required. Once the adhesive is fully cured, flat back to the original blade profile and polished in for best performance. If the surface is damaged from excess exposure to water (rain) in flight, then use of propeller protection tape fitted to the leading edge may be considered. This must comply with the modification approval MC-090, and may lead to a small performance deterioration. Heat on the tape during fitment will allow easier fitting along the curved edge – see SB-038 for detailed information. If fitted, the integrity of this tape must be examined at each 100hr/Annual inspection. There must be no air-bubbles under the tape, no lifting of any edge, or any deterioration (e.g. splitting) of the tape itself. Should the tape installation be defective it may be replaced (individual blades acceptable). Full instructions are contained in SB-038.

Propeller balance.
A well balanced propeller will significantly improve the engine and ancillary component service life. The Rotax recommended maximum out of balance force on the propeller shaft is 0.1ips.
Mass balance weights may either be washers fitted under the propeller fitment bolts, or self adhesive aluminium wheel balance weights as used on car wheels, fitted inside the propeller hub to a well cleaned, dry, surface. If using washers under the prop bolts, use no more than three 2mm washers extra under each standard prop bolt, unless a minimum of 6 full threads of engagement are obtained between the bolt and the flanged nut (measure by checking the depth of the bolt from the flange –nut depth 9mm max). If more washers are required, and/or there is insufficient thread engagement, fit a longer bolt to suit, and ensure no more than 8mm of thread is protruding beyond the nut flange. For aircraft where the propeller has been dynamically balanced on the aircraft prior to aircraft release to service do not add more than two washers without understanding the cause of the balance change, and consulting RSUK. Otherwise fit no more than 10 x 2mm thick washers.

Aircraft instrumentation

Basic description

Air Speed Indicator (ASI)
0 to 140mph. Red line 120mph, green to 80mph. The gauge is connected to a black 4mm airline via a length of silicon hose, which in turn goes to the pitot port at the front of the aircraft. Never blow into the port to test the gauge! Use the test procedure defined at the start of Section 9. The ASI is also connected to the static port line.

Altitude.
A standard commercial 0 to 20,000ft altimeter is used. This is connected to the static port line. For standard panels a 3 1/8” gauge is used.
Note that electronic ASI and Alt is fitted for the day VFR only aircraft, those fitted for night flight are fitted with standard barometric devices.

Engine rpm.
Standard gauge.

Rotor rpm.
This gauge is unique to RotorSport UK. Operation may be checked by spinning the rotor. Only works with the keyswitch on.

Oil Temp gauge.
May be checked by connection to a slave sensor immersed in water of known temperature (eg boiling =100degC).

Oil Pressure gauge
Check by direct coupling to a pressure gauge and pump.

Coolant temp
May be checked by connection to a slave sensor immersed in water of known temperature (eg boiling =100degC).

Fuel level
This is an electrical fuel sensor system, based on a float around a tube type design fitted inside the left fuel tank. It is not field serviceable.

Pneumatic pressure, 0 to 10bar.
Standard commercial air pressure gauge. Used to indicate trim pressure in flight, or rotor brake pressure when on the ground.

Roll trim indicator.
LED scale used to display trim cylinder differential pressure.

Radio.
The aircraft is fitted with either the Funk 833 or 833 MkII radio.
The antenna is located under the keel for optimum in-flight use.
Refer to the FUNK handbook.

TRT800H Mode S transponder (where fitted) from Funk
This device requires careful management – if used it transmits data about the aircraft, so accuracy is important. There are three key parts –
The transponder panel mount unit.
The rear of transponder mounted dongle – this is where the hex code etc is stored – if the main transponder module goes faulty, it may be replaced without having to reprogram the transponder system.
The antenna, cable and base plate is mounted under the body.

Refer to the Funk installation manual Doc no 03.2123.010.71e or later edition.
Ensure that during Maintenance testing of altitude reporting transponders should be suitably screened to minimise the risk of nuisance traffic or collision resolution advisories in operating aircraft.

Hobbs meter.
Records the engine operational hours.

OAT Temperature indicator
This is mounted through the bottom of the aircraft front body section. Function may be checked using a slave sensor plugged into the head harness connection point, immersed in water of known temp (eg boiling =100degC) or by reference to ambient temperature versus gauge indication

Keyswitch. The keys are all the same across the aircraft.
Ignition switches. Note these always have guards to prevent inadvertent operation.

Vertical speed indicators (VSI). Optional fit, either 2 ¼” or 3 ½” units, and required to be connected to the static port system.

Compass (PAI-700 flat card type). The compass may be panel mounted or remote mounted as required to suit aircraft magnetic fields. Normal fitment is above the instrument panel. .Alternative compasses are available.

<u>Materials used</u>
See AutoGyro manual parts list

Assembly methods
All instruments in the panel are fitted with M4 stainless steel dome head screws, with plain nuts loctited on with 243 – unless specifically supplied with the instruments.
The radio antenna is mounted under the aircraft.

Special setup instructions
ASI should be calibrated as an installed instrument with suitable equipment.

Transponder. Follow the Funk instructions for unit setup. Aircraft hex codes are available from the CAA G-INFO website. After initial setup the unit function must be confirmed using calibrated, proper equipment – transmitting incorrect codes is an offence. A transponder is also a radio transmitter, so should be included on the aircraft radio licence. It is required that the transponder is verified biennially (i.e. every two years) to ensure what the pilot thinks it is doing it actually is, and that the codes transmitted are correct.

Transponder installation verification.
On initial aircraft approval the transponder installation and function was verified in accordance with TGL13. The functional test undertaken is a transponder verification to confirm a) System operation, b) ICAO 24bit address in transmission response and c) Function of system fault detectors (where applicable). Each follow on aircraft has the transponder function verified as part of the release to service for the same features.

Transponder field verification test procedure.
1. Ensure that the correct hexadecimal code has been input by cross checking the code assigned to the aircraft on the CAA G-INFO website to that in the aircraft – follow the Funk setup instructions contained in the Funk handbook.
2. Ensure the aircraft type code is input (1C) and the aircraft registration without gaps. There are normally three blank spaces at the end of the line. So as an example, the code for G-CLDS is '405F461CGCLDS___'
3. The aircraft has no trigger 'ground' switch for indicating that the wheels are off the ground, so this setup option is left de-activated.
4. Follow the instructions of the verification equipment with regard to setup, and of siting of the equipment antenna with respect to the aircraft antenna.
5. The verification must check and verify items a), b) and c) above together with the reported parameter "Pressure altitude" which must be satisfactorily compared with the aircraft altimeter set at 1013mb. It is preferable to print the test data for evidence of test completion.
6. Aircraft condition during test – Engine off, ignition on, transponder on and in 'ACS' mode. No other equipment is required to be on.
7. Follow the verification equipment instructions for test process.
8. When the verification is complete, record on the aircraft worksheet the serial no and calibration date of the equipment used, the serial no of the transponder, and hexadecimal code confirmed correct.

Radio setup – follow Funk handbook instructions (ATR833 manual Document-No. 01.1402.010.71e or latest document).

Trouble shooting and Repair methods

Note: instrument panels are easily and quickly removed by taking out the M4 screws around the outside of the panel, and detaching the loom and airline connections. When refitting always recheck the pitot and static system for correct connections and operation! See standard tests.

The wiring harness is disconnected by pulling the connector plugs apart. The airline fittings are standard types where the collars are compressed into the middle and the lines pulled out. The pitot and static supply to the ASI and fuel gauges are pulled out. The panel can then be removed. Take care with any pneumatic fittings if removed – some contain one way valves and must be replaced correctly orientated.

WARNING!
Once the panel is removed the engine kill switches are deactivated, and if started cannot be stopped easily. Disconnect the battery earth for safety, and, where available, fit Safety Plug (available from RSUK) to earth the ignition coils. Refitting is a reverse of the above. The panel must be fully checked for equipment function (pneumatic, electrical, pressure) after replacement!

Only repair instruments in accordance with manufacturer recommendations.
ASI gauge slow to respond: possibly a kinked pipe. Poor response could be water or other blockage in the pressure feed at or near the nose.
Calibration. The unit cannot be user calibrated. If found to be in error more than 5%, replace.

Altimeter. This unit may be adjusted if required to match height indicated to pressure setting. Remove the small screw beside the adjustment knob on the panel. This will allow the knob to be pulled out slightly which will disengage from one scale. Adjust the two scales to suit a calibrated gauge, push back in and replace the screw. Note the adjustment in the aircraft logbook with an authorised engineer signature!

Note that the electronic ASI and Altimeter have specific setup and calibration instructions. Refer to the device manuals.

RPM and engine gauges. Not user repairable, replace if faulty.

Transponder and radio. Neither unit is user serviceable. Return them to Funk via their aftersales program – see the Funk website.
Antennas and cables may be replaced if faulty or broken.

Compass. Calibrate compass according to the manufacturers instructions, lined with the aircraft keel. – see Appendix A.

GPS units are permissible to be fitted in line with RSUK approved mounting, or via RSUK service bulletins. Be careful when fitting device’s to the instrument panel due to magnetic interference with the compass!

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Section 10

Modifications approved to date

For the listing of all approved modifications see the RotorSport website owners section where they are all listed, or the Type Approval Data sheet (TADS) from the CAA website.

Service Bulletins issued to date

For the listing of all approved service bulletins see the RotorSport website owners section where they are all are listed.

Service Information Letters issued to date

For the listing of all service information letters see the RotorSport website owners section where they are all are listed.

If in doubt about any service instruction, or service method, then refer to RSUK on the form below.

This form is Part 1 of 2. This is the customer request form, Part 2 is the reply

This form is supplied to enable the owner/operator/maintainer to request factory support for a repair not documented in the maintenance manual supplied with the aircraft from RotorSport UK Ltd. Depending on the problem identified, a corrective action is investigated and, if needed, CAA involvement and approval obtained prior to repair authorisation.

The information given is stored on a computer, and is only used within RotorSport UK and the CAA for the above purpose.

Return this form to:
RotorSport UK Ltd, Poplar Farm, Prolley Moor, Wentnor, Bishops Castle, Shropshire, SY9 5EJ. Or email engineering@rotorsport.org

Aircraft type	Aircraft serial No.
Aircraft Registration No.	Aircraft Engine No.
Logbook Aircraft hours	Logbook Engine hours
Owner/operator name & contact detail	Maintenance organisation identified to carry out repair & contact detail

Repair problem description & cause of problem if known

Name and address of contact person for this request Sheet of

Signature & date

Telephone:
Email:

Date entered onto CCAR or REPAIR database: CCAR No.: REPAIR No.:	Acknowledgement sent (date) Final reply sent	Job opened by (name & sig) Job closed by: (name, sig & date)

Form F023 Part 1 of 2

This form (Part 2 of 2) is the response from RotorSport UK Ltd to a Service Repair and Evaluation/Approval request, which specifies the company authorised repair method. Deviation from this method renders the authorisation ineffective.
Upon completion of the repair the repairer must enter details into the logbook/worksheet with the repair number and sign as normal.
If any problems with carrying out the work authorised, contact RSUK immediately on 44(0)1588 505060, or email info@rotorsport.org.

Repair No.:	CCAR No.:	Repair classification: **MAJOR** or **MINOR**
Aircraft type	Aircraft serial No.	

Repair problem description & cause of problem if known

Service repair authorised by RotorSport UK Ltd

Special tools & Health and Safety requirements, and/or components required for repair:

Quality Inspection requirements after repair:

Service repair authorised by: (name, signature, and date of signature)

Quality Conformance Manager	Engineering Manager	Chief Test Pilot (where an effect on flight performance or safety)	Structures (where required)	Civil Aviation Authority (if a major repair)

Document completion date:	Issued to:	When	Issuer name	Signature
	Internal			
	CAA			
	Owners			
	LAA/BMAA Inspectorate			

Form F023 Part 2 of 2

PRECISION AVIATION, INC.
Bulletin IC-102
March 8, 2004

PAI-700
VERTICAL CARD MAGNETIC COMPASS
INSTALLATION AND COMPENSATION

INSTALLATION INFORMATION

For proper operation of the Vertical Card Magnetic Compass, it is important for the installer to understand the basic design differences of the "Wet Magnetic Compass" and the PAI-700 Vertical Card Magnetic Compass.

"WET MAGNETIC COMPASS"

The magnetic sensing element consists of bar magnets attached to a float or other device in such a manner as to create a pendulous assembly which sits on a pivot in a jeweled cup, free to tilt and rotate. The azimuth card is attached to said device in such a manner as to be viewed through the instrument lens.

The complete assembly is submerged in fluid, which acts as a damper, and is free to react to the earth's magnetic lines of force, horizontal and/or vertical, as well as other forces – gravity, kinetic, and centrifugal.

"PAI-700 VERTICAL CARD MAGNETIC COMPASS"

The magnetic sensing element consists of a somewhat more massive magnet with the additional torque required for rotating the vertical azimuth card. The sensing magnet is mounted on a shaft which rotates on jeweled bearings in a vertical housing affixed to the compass case assembly. Thus, the sensing magnet is maintained in a captive plane in relation to the aircraft. The rotation of the sensing magnet is transferred through miter gears and a shaft rotating on jeweled bearings in a horizontal housing to the vertical azimuth card. The design utilizes eddy-current damping (magnetic), and contains no fluid. Overswing is minimized or eliminated.

When level, the sensing magnet reacts to the earth's horizontal lines of force, and when not level, to some product of the earth's horizontal and vertical magnetic lines of force. The reaction of the sensing magnet to the forces present – gravity, kinetic, and centrifugal – is reduced due to the absence of pendulosity.

INSTALLATION

The afore-mentioned design details - shafts, jewels, gears, massive magnet, etc. - make it necessary to install the PAI-700 Vertical Card Magnetic Compass with adequate vibration damping. When installed too solidly, it is possible that a resonant vibration transmitted directly to the compass case may cause undue magnet and dial card movement. The best way to think of the mounting is to "gently" hold the compass in place - as in the palm of your hand.

Panel mounting, in some cases, can be difficult as this area has magnetic interferences.

COMPENSATION INFORMATION

Each aircraft has its own inherent magnetic pattern and no two are alike, even off the same assembly line. The inherent magnetic pattern of an aircraft is a product of magnetic influences, physical presence in ferrous metal used in structure or components, induced, by electrical circuits of varying strength and location, and the earth's magnetic field.

From the above, one realizes that it is highly desirable to have the aircraft as close to flying configuration as possible, or flying, as the compensation procedure is followed. Known magnetic headings may be obtained for ground compensation by the use of a compass rose, master compass, or transit-pelorus. For taking each reading, the engine rpm should be at normal cruise and electrical and radio equipment should be in the flying norm. A directional gyro is a convenient azimuth reference with frequent rechecks of the original known magnetic heading to check possible drift. It is a good policy to confirm all ground compensations in flight.

On a smooth air day the compensation procedure may be followed in flight using the directional gyro azimuth with frequent rechecks of the original known magnetic heading to check possible drift. A known magnetic heading may be from a runway, section lines (with magnetic variation figured), or the "old iron compass" - a railroad.

(CONTINUED ON BACK)

IMPORTANT

The compensator is in neutral when the dots on the adjusting screws are aligned with the dots on the compensator face - NINE O'CLOCK. MAXIMUM compensator correction is attained when the adjusting screw is rotated - clockwise or counter-clockwise - 180°, or to THREE O'CLOCK. DAMAGE to the compensator mechanism will occur if the adjusting screws are forced beyond 180° in either direction.

COMPENSATION PROCEDURE

The poly-plane compensator used on the PAI-700 VC Magnetic Compass has a deviation correction range of approximately plus or minus twenty degrees on the cardinal headings. The readings in quadrants between cardinal headings are products of the adjacent cardinal headings corrective adjustments.

Use a non-magnetic screw driver for making adjustments.

In lieu of aircraft vibration, which is necessary in the next seven steps, this vibration can be provided by tapping the top right hand portion of the case with a wooden pencil three to four times at each heading or by using your forefinger to slightly tap the front glass or upper right hand portion of the case.

1. Starting with the aircraft on a known magnetic heading of North, use the N-S adjusting screw to remove all deviation so the compass indicates North. The N-S adjusting screw is the LH screw on the compensator.
2. Rotate the aircraft to a known magnetic heading of East. Use the E-W adjusting screw to remove all deviation so the compass indicates East. The E-W adjusting screw is the RH screw on the compensator.
3. Rotate the aircraft to a known magnetic heading of South. Note the degrees of deviation. Using the N-S adjusting screw, remove one half of the deviation.
4. Rotate the aircraft to a known magnetic heading of West. Note the degrees of deviation. Using the E-W adjusting screw, remove one half of the deviation.
5. Return the aircraft to the known magnetic heading of North to confirm its relation to South. The deviation should be the same. In some aircraft "fine tuning" adjustments and rechecks are necessary.
6. Return the aircraft to the known magnetic heading of East to confirm its relation to West. The deviation should be the same. In some aircraft "fine tuning" adjustments and rechecks are necessary.
7. On completion of the preceding procedure, the aircraft is rotated to each 30 degree known magnetic heading thru 360 degrees and the deviation is recorded on the compass correction card.
8. The compass correction card should be installed close to the compass and convenient for the pilot to read.

SHOULD the preceding procedure fail to produce satisfactory results, here are some suggestions:

Use a magnet to check hardware in the proximity of the compass. Steel screws and nuts can be replaced with brass or aluminum in some uses. Steel shake-proof lockwashers will hold magnetism.

Some radio navigational instruments with meter movements have been the problem when they have no magnetic shield. This is a physical problem and not an electrical problem.

If the problem is electrical, manipulation of the switches should point out the site. On some rare occasions, it has been necessary to reroute some wiring.

Relocation of the compass is sometimes the answer. Sometimes only slight relocation can be the answer.

PAI MAGNETIC BALANCING BALLS - PART NO. PBB 475

The PAI Magnetic Balancing Balls are additional compensation aids. They are used in some aircraft to overcome compensation problems that resist all else. They are used successfully in many steel frame aircraft -Mooney, Bellanca, etc. Major deviation errors can be adjusted with the PAI Magnetic Balancing Balls and "fine tuning" is accomplished with the poly-plane compensator.

PRECISION AVIATION, INC. • 8124 LOCKHEED • HOUSTON, TEXAS 77061 • (713) 644-7383

Appendix B, AutoGyro MTOsport 2017 Manufacturers Maintenance Manual

Notes on variances to the AutoGyro MMM - the notes below are placed in the same order of presentation as the AutoGyro MMM

(0) PREFACE and (1) INTRODUCTION

For UK-registered aircraft contact should be made with:

RotorSport UK Ltd
Poplar Farm
Prolley Moor
Wentnor
Bishops Castle
SY9 5EJ
England

Tel/Fax: 01588 505060
Email: info@rotorsport.org

Maintenance Concept and Eligibility (p7)
All maintenance work on UK-registered MTOsport 2017 gyroplanes must conducted by or under the supervision of an A3-7 or other authorised CAMO approved engineer. See Section 4 (p10,12) above.

02-51-00 Consumable Materials (p9)
All consumable materials listed are available from RotorSport UK Ltd

Chapter 03 – Minimum Equipment Requirement (p10)
UK-registered aircraft may not be operated without Required Equipment other than a ferry flight authorised by CAA – refer to RotorSport UK for guidance

CHAPTER51 – STANDARD PRACTICES – STRUCTURES
51-00-00 (p14)
Only RotorSport UK Ltd may implement structural repairs to UK-registered aircraft. In the event of structural damage being found consult RSUK at the earliest opportunity and before the next flight.

CHAPTER 61 – PROPELLER (p16)
Simple repairs to the propeller are permitted as described on p24 above. More complex repairs may be implemented only by RotorSport UK Ltd. Refer to RSUK for further information.

34-10-00 5-1 TEST: PITOT STATIC SYSTEM INTEGRITY (p1)
The optional procedure for field testing the pitot-static system of UK-registered aircraft is described on p20 above

61-10-00 4-1 REMOVAL-INSTALLATION: PROPELLER – HTC (p1), ADJUSTMENT (p1) and REPAIR (p1)
Information for UK-registered aircraft is provided at p22 above

AUTO GYRO
Enjoy the difference

MTOsport

Manufacturer Maintenance Manual

MTOsport Model 2017

(Line Maintenance)

www.auto-gyro.com

Aircraft Maintenance Manual
for Gyroplane MTOsport Model 2017

0 – PREFACE

This document contains proprietary information of AutoGyro GmbH, Germany which is provided in confidence and solely for the purpose of supporting aircraft certification and providing applicable information regarding the proper use, maintenance, inspection, repair, servicing and parts application of AutoGyro GmbH products and services, as directed therein. Neither this manual nor any information in it may be disclosed to others, or used for any other purpose, including but not limited to, design, create, develop, reproduce, manufacture or derive any design, part, product, material, process, modification, configuration change or repair, or to obtain airworthiness authorisation's approval to do so.

With the possession and use of this manual the user accepts and agrees to be bound by the foregoing terms.

If a Government agency or Department intends to disclose any information, written notice should be given to:

AutoGyro GmbH
Dornierstraße 14
31137 Hildesheim
GERMANY

Phone: +49 (0) 51 21 / 8 80 56-00
Fax: +49 (0) 51 21 / 8 80 56-19
E-Mail: info@auto-gyro.com

1 – INTRODUCTION

This manual provides accepted and recommended maintenance procedures applicable for the MTOsport Model 2017 gyroplane, designed and manufactured by AutoGyro GmbH, Hildesheim, Germany. The generic term “maintenance” comprises checks, inspections, replacement, repair and other tasks, which are defined in “01-11-00 Definitions and Standard Procedures”. The manual also provides a full description of the aircraft and its systems and troubleshooting (fault isolation) procedures. Where applicable, the manual refers to related manuals, such as the engine manufacturer’s documentation or Component Maintenance Manuals, for example battery, avionics, or optional equipment.

All task descriptions follow aerospace, industry and safety standards or special AutoGyro procedures. The procedures, methods, instructions and parameters specified in this manual must be adhered to by all means. It is not permitted to change procedures or to alter parameters provided herein. Proposed deviations from the procedures, methods and instructions contained in this manual should be directed to:

AutoGyro GmbH
Att.: Technical Publications
Dornierstraße 14
31137 Hildesheim
GERMANY

Fax: +49 (0) 51 21 / 8 80 56-19
E-Mail: info@auto-gyro.com

The manual has been prepared in accordance with ATA Specification No. 100 being a common standard in aviation and for your convenience. The ATA100 numbering system is described under “Organization and Handling of the Manual”.

This manual will be revised as necessary to incorporate changes in design, parts, approved procedures, or parameters. Note that the manual is only valid if available in current version. The use of an out dated manual may render the aircraft in unsafe or even not airworthy condition. The revision service is described below.

Service Information Letters (SIL), Service Bulletins (SB) or Airworthiness Directives (AD) will also be covered by the revision service and incorporated in the maintenance manual.

Revision Service

This manual must always be maintained in current, up-to-date status. The latest version status is available at www.auto-gyro.com. Note that the manual is subdivided into 6 parts which will be revised individually. As an example, the revision index for the aircraft maintenance manual (AMM), MTOsport Model 2017 (M17), Part B could be ‘AMM-M17-B_2017-11’. Note that the date code is ‘yyyy-mm’ so files will sort chronologically.

For the purpose of current status this manual will not be published in paper format. A current personalized copy will be provided by AutoGyro GmbH for all certified and registered service partners on the basis of a subscription service. Registered users will be informed about new revisions. We recommend **not** to keep printouts or paper copies for reference.

Record of Revisions

The manufacturer will keep this manual current as an entire document. After each revision of a part the latest revision index (i.e. list of revision indices for each part) will be published on AutoGyro's web portal and/or by E-Mail to each subscription customer. The document part's revision index can be found in the footer on the left hand side of each page.

Contents

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Maintenance Concept and Eligibility

The maintenance concept of the MTOsport gyroplane is structured into 4 qualification levels:

- Basic operational (OPR) Maintenance / Pilot Checks and Servicing
- Line (LNE) Maintenance – Inspection and general maintenance tasks, Inspection of Critical Parts (CP) included
- Specialized (SPC) Level Tasks - Major Modification, Repair & Overhaul, Special Topics

The respective maintenance level for each maintenance task is printed in right hand position in the header line on each Job Card as three-letter code for quick reference (see red circle in example below) and repeated under 'GENERAL, REFERENCES AND REQUIREMENTS'.

Maintenance tasks may be carried out solely by persons or organizations fulfilling the requirements for personal qualification, infrastructure and required equipment, and only in strict compliance with the documentation and manuals listed in below table. Examples are provided for better illustration:

Level	Qualification	Documentation	Example
OPR	Licensed Pilot or trained/briefed person	Pilot's Operating Handbook and Job Cards marked 'OPR'	Check and replenish engine oil
LNE	AutoGyro maint. course (and organization approval) 'Line'	Aircraft Maintenance. Manual (AMM) Job Cards 'LNE'	All tasks to perform a 100 hrs inspection
SPC	AutoGyro special courses and org. approval 'Specialized'	AMM Job Cards 'SPC' and manufacturer instructions	Main frame overhaul, major mod., repair

Warnings, Caution and Notes

This manual uses **WARNING**s, **CAUTION**s and **NOTE**s in bold italic letters to indicate especially critical and important instructions. The call-outs appear at the top of the Maintenance Job Card if of general nature or applicable for the complete task, or will directly precede the individual Work Step.

The meaning of each call-out is defined below:

WARNING: A warning means that the neglect of the appropriate procedure or condition could result in personal injury or fatal accidents.

CAUTION: A caution means that the neglect of the appropriate procedure or condition could result in damage to or destruction of equipment.

NOTE: A note stresses the attention for a special circumstance, which is essential to emphasize.

Organization and Handling of the Manual

This manual is structured according to ATA100 numbering system. The numbering system will be explained later in more detail.

On document level, the manual is subdivided into 6 parts, named A to F. The designation and content of each part is listed below:

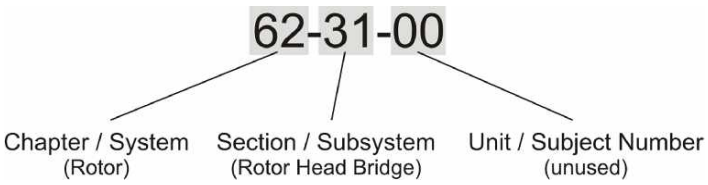
Part	**Designation** / Content
A	**Introduction and Declarations** This section. Explains the basic concept, handling of this manual, its structure according to the ATA100 numbering system, abbreviations and acronyms.
B	**Master Servicing Manual (ATA Chapters 00 to 20)** General description of the aircraft, basic definitions and standard procedures, tools, spares, airworthiness limitations, time limits, inspections and checks. Briefly, part B describes 'what is to be done, and when'.
C	**System Description Section (ATA Chapters 21 to 90)** Part C describes all aircraft systems, following the ATA100 numbering system.
D	**Diagrams and Charts** Part D contains diagrams and charts, if necessary in special sizes or as fold-outs.
E	**Maintenance Job Cards** [Maintenance] Job Cards are collected in Part E. Note that the footer of Part E does not spell out to the part's designation, but just shows part and the job index of the referred maintenance task according to the ATA100 numbering system. Briefly, Part E describes 'how something has to be done'.
(F)	**Protocols and Forms** Protocols and forms, such as maintenance check lists, are available for download.

ATA100 Numbering System

ATA100 – Chapter Code

The Air Transport Association (ATA) Standard 100 numbering system is a widely accepted standard that provides a 6 digit numbering system to identify aircraft systems, subsystems and individual components in a structured, hierarchical approach.

The first or leftmost pair of digits defines the Chapter, respectively system. The next pair of digits refers to the subsystem. The third pair of digits specifies a unit. Only complex systems use unit numbers. In case of simple systems, all information is contained in the main chapter and there is no subsystem or unit breakdown.



The ATA100 numbering system and the corresponding system designations were adopted where ever possible and rational. In some cases the wording and nomenclature was adapted to match the design specifics of a gyroplane in best possible way. Due to its high degree of system integration, some systems cannot clearly be assigned to a single function. In this case the system or component was categorized by its main function. Example: the pneumatic trim cylinder also acts as brake in its secondary function.

Chapter 02 has been modified to contain "TOOLS, SPARES AND CONSUMABLE MATERIALS".

Nomenclature and Structure of Maintenance Tasks (Job Cards)

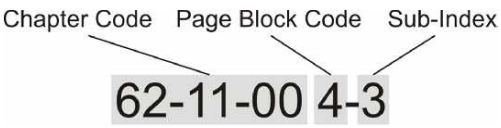
Part E of this manual describes maintenance tasks to be performed by a qualified person in order to check, inspect, replenish, adjust, replace, repair, clean, or to identify malfunctions. Each **Task** is outlined in detail in a **[Maintenance] Job Card**.

Each **[Maintenance] Job Card** (sometimes referred to as Task Card) consists of

- **Task Description** (header, descriptive text) with task level in most right position
- a section referring to GENERAL, REFERENCES AND REQUIREMENTS
- a section listing SPECIAL TOOLS AND CONSUMABLE MATERIALS
- a section pointing out PRECAUTIONS AND SAFETY MEASURES
- a section called PROCEDURES, which lists all **Work Steps** to be performed subsequently
- a PARTS LIST listing part numbers and associated information, and
- explanatory GRAPHICS, such as explosion drawings or photographs

For ease of navigation each page in Part E shows a unique job index in the page footer consisting of 3 elements:

- **Chapter Code**
  (acc. to ATA100, see explanation below)
- **Page Block Code**
  (distinct index/number per type of maintenance action, see explanation below)
- **Sub-Index**



Page Block Code

The pages within a chapter are structured and numbered according to the page block numbering system as specified below:

Subject	Code
Introduction / Description and Operation	0
Fault Isolation / Trouble Shooting	1
Maintenance Procedures	2
Servicing	3
Removal / Installation / Disassembly / Assembly	4
Adjustment / Test	5
Inspection	6
Cleaning / Painting	7
Repair / Replacement / Retrofit / Modification	8
Storage	9

Effectivities

A job card may contain information relating to different versions of the referred aircraft. This may be stipulated by optional equipment installed, by different design states (Serial Number driven), or modification (MI, AD).

The keyword **EFFECTIVITY**, followed by a term describing its applicability, marks the start of instructions that apply exclusively to a specified version. Examples:

EFFECTIVITY: Variable Pitch Propeller

The following instructions must be performed and are applicable only if a Variable Pitch Propeller is installed

EFFECTIVITY: up to S/N 0123

The following instructions apply to serial numbers 0123 and before

EFFECTIVITY: S/N 0124 to S/N 0248

The following instructions refer only to serial numbers 0124 up to, and including, 0248

EFFECTIVITY: S/N 0124 and subsequent

The following instructions must be performed for serial numbers starting 0124 and subsequent

EFFECTIVITY: before SB 2011-99

Instructions refer to modification state before/without the referenced SB implemented

EFFECTIVITY: SB 2011-99 accomplished

Instructions apply only to those versions where the referenced SB has been accomplished

The end of the range of validity is marked by the term **EFFECTIVITY – END**

In case the effectivity solely comprises of the subsequent work step, or another effectivity statement is introduced, the term **EFFECTIVITY – END** will be omitted.

Instructions outside of **EFFECTIVITY** statements apply to the standard model, respectively to all versions.

Abbreviations and Acronyms

In this manual, a minimum number of abbreviations are used. Where possible the abbreviations and acronyms used correspond with regulations and common standards.

AD	Airworthiness Directive
AMM	Aircraft Maintenance Manual
ATA	Air Transport Association
CHT	Cylinder Head Temperature
CP	Critical Part
CT	(Engine) Coolant Temperature
CRP	Carbon Reinforced Plastic
DOM	Date of Manufacture
ELT	Emergency Locator Transmitter
FOD	Foreign Object Damage (Debris)
GRP	Glass Reinforced Plastic
hrs	hours
i.f.d.	in flight direction
JNP	Jahresnachprüfung (annual inspection, annual airworthiness review)
LED	Light Emitting Diode
LH	left hand
LR	Limited reusability (Parts or components that can be used only once or a limited number of times, such as self-locking nuts, split pins, …)
LTA	Lufttüchtigkeitsanweisung (AD, issued by the Airworthiness Authority)
MAP	Manifold Absolute Pressure
MLL	Manufacturer Life Limit
N/A	not applicable
NPI	non procurable item
OAT	Outside Air Temperature
PC	Procurement Code
PIT	procure item through
POH	Pilot's Operating Handbook
Qty.	Quantity
rcv	receive
rec.	recommended
RH	right hand
RPM	Revolutions Per Minute
SB	Service Bulletin
SIL	Service Information Letter
SoC	Statement of Compliance
sqm	square metre(s)
STP	Stückprüfung (C of A, i.e. conformity of airworthiness)
TADS	Type Approval Data Sheet (dt.: Geräte-Kennblatt)
TBO	Time Between Overhaul
VPP	Variable Pitch Propeller
VSI	Vertical Speed Indicator
xmt	transmit
yr	year(s)

Service Bulletins (SB) and Airworthiness Directives (AD)

Service Bulletins (SB) (formerly 'Herstellerinformationen'), published by the manufacturer, or Airworthiness Directives (AD), issued by the Authority, will be incorporated into the Maintenance Manual with the next revision

The following list covers the Service Bulletins applicable to the MTOsport Model 2017. The statement "No Effect" means that the service bulletin has been reviewed to the revision number stated and is considered to have no effect on the text or the illustrations of the manual.

At publishing date, no Service Bulletins have been issued for the MTOsport Model 2017.

Contents

CHAPTER 00 - INTRODUCTION / AIRCRAFT GENERAL

General

The MTOsport Model 2017 is a ‘new generation’ gyroplane with 3-bladed push propeller and a 2-blade aluminium main rotor system with swivelling rotor head. It features an open-cockpit fuselage with two seats in tandem configuration. The load carrying frame consists of inert-gas welded stainless steel square tubing. Fuselage and stabilizer with rudder are made from carbon fibre reinforced (CRP) plastic.

The tricycle gear with GRP (glass fibre reinforced plastic) suspension bow features a steerable nose gear.

Rotor flight control consists of conventional linkage using push-rods while the rudder is controlled by cables to allow adjustment of both pairs of pedals and push-pull-cables, routed inside the aft frame extension.

CHAPTER 01 - GENERAL

01-11-00 Definitions, Terms and Standard Procedures

The following definitions, procedures and words with special meanings are used in this manual:

adjust	To put in specified position or condition, usually using tools or devices ***Example***: Adjust the clearance to 1 mm
Check (noun)	A set of check items to be performed. Example: pre-flight check
check (verb)	To make sure that the item is present and/or a given requirement is fulfilled. No tools are required. ***Example***: Warning Lights…Check NONE
Critical Part (CP)	"Critical Parts" are those parts whose failure during ground or flight operation could have a disastrous effect on the gyroplane.
dent	Depression in a surface having area and depth with no sharp edges (see also 'nick')
discard	Put away in order to exclude inadvertent or intentional re-use of the item. Comply with FOD procedures.
dispose of	Discard item or substance while employing strict procedures, such as environmental or legal requirements.
hand-tighten	Use the bare hand without any tools, gloves or extra efforts
inspect / examine	To look carefully at an item and compare with its standard or specification. Tools or devices may be needed. The condition may be explicitly specified (example: no corrosion). Generally, or if not otherwise stated, inspect/examine means: Make sure that the item - is complete - is correctly attached - has no loose parts - shows no signs of leaks - is not cracked or damaged - is not worn Make sure that - the surface protection is not damaged - all locking devices are installed correctly Make sure that items such as pipes, hoses and cables - look serviceable - do not rub against other items For log books and other technical records: - find pending faults - make sure they are up-to-date and correctly maintained
Inspection	Maintenance procedure to be performed as described in this manual. ***Example***: 100 hrs / Annual Inspection
maintenance	Any one or combination of overhaul, repair, inspection, replacement, modification or defect rectification of an aircraft or component, with the exception of pre-flight inspection

measure	To find out dimensions, capacity or quantity of something. Except for counting of smaller numbers, calibrated measurement devices are needed.
monitor	To watch a parameter or item over a certain period of time in order to read an exact value, derive a trend or identify a change caused by an event. ***Example***: monitor rotor speed indication, monitor RPM drop, …
nick	A dent with sharp edges (see also 'dent)
re-torque	Refer to procedure 'torque-tighten'. In contrary to procedure 'torque check' attachment hardware may rotate during re-torquing.
Record (noun)	Technical name for a documentation that shows the accomplishment of maintenance tasks or other activities, usually stating the responsible person's name and date of compliance.
record (verb)	To make an (official) entry in a maintenance record.
remove securing hardware	Cut open and remove split pins, lock wire, and such. Wear eye protection. Hold securing hardware with other hand to prevent particles from darting around. Collect all splinters and particles of securing hardware and discard.
replace	To remove an unserviceable item and install a serviceable in the same location
servicing	Simple tasks such as lubrication and cleaning, checking and adjusting of air tire pressure, replenishing of fluids
set	To change (or verify) status of equipment to a given parameter, condition or mode. ***Example***: set altimeter sub-scale to 1013 hPa
torque-check	Refer to procedure 'torque-tighten'. Check with the (minimum) torque value supplied. Attachment hardware must NOT turn! If rotation of attachment hardware was noticeable the torque check FAILED. Refer to procedure described in Job Card.
torque-tighten	Use a calibrated tool with the correct range and handle properly and carefully. Set tool to minimum torque (if min. and max. torque values are provided). Use stretched fingers at the long end of the tool and counterhold directly at the pivot point. Click-Type: Stop upon the first clicking. If multiple clicking is heard or further rotation is suspected, open/unscrew and repeat. Replace attachment hardware if appropriate. In order to align attachment hardware (for example in case of a split pin) adjust tool to the maximum allowed torque and tighten carefully until hardware aligns. NO clicking must be heard! If clicking was heard, redo the complete procedure while trying different attachment hardware and/or in different installation position.
verify	Check that a certain dimension or condition, or set of these, is in-line with given specifications. In order to do so, a special (measurement) procedure will be required and the reference to comply with will be specified.

If not otherwise stated the following standards are based on aeronautical regulations and recommendations (AC43.13-1B), industry and safety standards, and general practices, and shall be applicable throughout this manual. Examples are:

- Torquing
- Securing (handling of lockwire and other securing hardware)
- Removal of securing hardware
- FOD (foreign object damage) protection
- Discard and disposal procedures
- Handling of hazardous material
- Workplace safety

Notes on "nyloc" (and metal locking such as BinX) nuts:

Ideally a nyloc nut should be used once only. It may be re-used if the thread is undamaged and when fitted to its mating fastener it must only turn with a torque greater than the “Prevailing Torque” listed (values factored from AC43.13-1B):

M6 0.8Nm, M8, 0.8Nm, M10 1.0Nm, M12 1.2Nm.

01-12-00 Standard Bolt Torques

Standard torques are M4 2-3 Nm, M5 5-6 Nm, M6 11 +/-1 Nm, M8 25 +/-3Nm, M10 35 +/-4Nm. Always assess the joint to be tightened and use engineering judgement – do not overtighten plastic or unsupported tube joints!

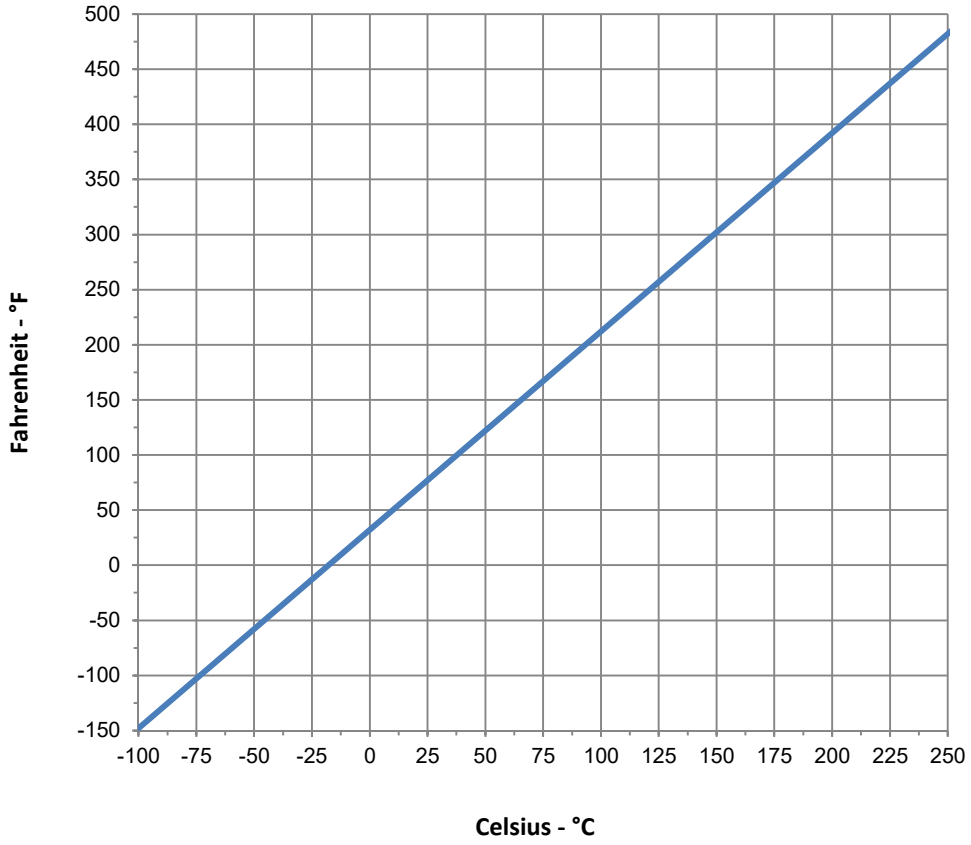
01-21-00 Standard Commercial Tools

Most maintenance tasks on the MTOsport can be conducted using standard, commercially available metric tools. In addition, the following standard commercial tools are required:

- Inclinometer (digital) / Digital spirit level with angle gauge
- Spring balance / Dynamometer
- Tensiometer (to measure cable tension)
- 1m aluminium ruler
- Fuel hose clamp
- Torque wrench (in required torque ranges)
- Multimeter
- 3 m-tape measure
- Torch light
- Tyre pressure gauge / tyre filling device

01-91-00 Conversion Tables

LENGTH / DISTANCE				
Multiply	**by**	**to obtain / Multiply**	**by**	**to obtain**
m (metre)	3.28	ft (feet)	0.305	m
mm (millimetre)	0.039	in (inch)	25.4	mm
km (kilometre)	0.54	nm (nautical mile)	1.852	km
SPEED				
Multiply	**by**	**to obtain / Multiply**	**by**	**to obtain**
m/s (metre per second)	196.85	ft/min (feet per minute)	0.0051	m/s
km/h (kilometre per hour)	0.54	kts (knots)	1.852	km/h
km/h (kilometre per hour)	0.62	mph (miles per hour)	1.61	km/h
PRESSURE				
Multiply	**by**	**to obtain / Multiply**	**by**	**to obtain**
hPa (hectopascal)	1.0	mbar (millibar)	0.0001	bar
bar (Bar)	14.50	psi (lb per square inch)	0.0689	bar
bar (Bar)	0.0295	inHg (inch mercury)	33.864	bar
FORCE / WEIGHT				
Multiply	**by**	**to obtain / Multiply**	**by**	**to obtain**
N (Newton)	2.205	lbf (pound force)	0.4536	N
N (Newton)	0.1019	(respective force of 1 kg)	9.81	N
MASS (WEIGHT)				
Multiply	**by**	**to obtain / Multiply**	**by**	**to obtain**
kg (kilogram)	2.2046	lb (pound)	0.4536	kg
VOLUME				
Multiply	**by**	**to obtain / Multiply**	**by**	**to obtain**
l [or ltr] (Litre)	0.2642	US gal (US gallons)	3.7854	l/ltr
l [or ltr] (Litre)	1.057	US qts (US quarts)	0.946	l/ltr
l [or ltr] (Litre)	0.0164	in^3 (cubic inch)	0.946	l/ltr
TORQUE				
Multiply	**by**	**to obtain / Multiply**	**by**	**to obtain**
Nm (Newton metre)	0.738	lbf.ft. (pound-foot)	1.3558	Nm
Nm (Newton metre)	0.113	lbf.in. (pound-inch)	8.851	Nm
kgmm	0.0098	Nm	101.94	kgmm



Celsius-Fahrenheit Conversion Chart

CHAPTER 02 - TOOLS, SPARES AND CONSUMABLE MATERIALS

02-51-00 Consumable Materials

The following consumable materials are referenced in the Maintenance Manual:

Material / Description	AutoGyro Order Codes
Loctite 221 red	30487
Loctite 243 blue	30483
Loctite 542 red	30488
Loctite 638 green	30485
'Hohlraumspray'	34197
WHS 2002	30477
Ballistol Öil Universal	31816, 31846, 31847
Anti-Seize Spray	31590
Würth HHS2000 Oil Spray	30476
Silicone Spray	30490
Talcum powder	34089
Shell Advance VSX4 10W-40	43082, 31629

CHAPTER 03 - MINIMUM EQUIPMENT REQUIREMENT

In accordance with the Pilot's Operating Handbook (POH) Section 2.11 the following equipment must be operative for flight

Air speed indicator
Altimeter
Compass
Rotor RPM indicator
Engine instruments (oil pressure, oil temperature, RPM, engine coolant temperature/CT)
Pre-rotator

Depending on the equipment state or relevant condition a limited or restricted operation may be granted to facilitate maintenance efforts and operability.

Equipment / System	Condition	Limitation/Restriction
Compass	Defective	Local flights within the traffic pattern and with ground reference.
Rotor RPM indicator	Defective	Flight to a maintenance facility.
Pre-rotator	Defective / No function R-RPM indicator working	Flight to a maintenance facility under the following conditions: • Experienced pilot as sole occupant • Concrete/asphalt runway with a minimum of 5 times the normal required take-off roll distance available • Second briefed person 'handpropping' the rotor while engine/propeller is off • Steady, laminar headwind
Pre-rotator	Malfunction, R-RPM > 120 R-RPM indicator working	Flight to a maintenance facility under the following conditions: • Experienced pilot • Concrete/asphalt runway with a minimum of 3 times the normal required take-off roll distance available • Steady, laminar headwind

CHAPTER 04 – MANUFACTURER LIFE LIMITATIONS

For the safe operation over the specified lifecycle of the aircraft and liability reasons the following manufacturer limitations shall apply. In case the component has an operating hours and calendric time limit the first limit shall apply.

Note that at expiration of the specified manufacturer life limit (MLL) the component shall be replaced for your own safety, independent of its condition.

ATA	Equipment / System	MLL
62-00-00	Rotor System II (RSII) Standard	2500 hrs
	Rotor System II (RSII) TOPP 8.4 m	2500 hrs
	Rotor System II (RSII) TOPP 8.6 m	2500 hrs
62-31-00	Rotor main bearing	1500 hrs

Note that the Rotor main bearing is only supplied pre-assembled into the teeter tower.

Status and lifetimes of components, liquids and fluids is listed in the Event and Configuration Log (AG-F-ECL) form. The initial Event and Configuration Log is delivered with the gyroplane by AutoGyro. An empty form is provided for download on the AutoGyro web site.

Primary and Secondary structure determination:

A primary structural part is one for which the failure would be catastrophic and would prevent continued safe flight and landing.

All other structure can be considered as Secondary, thus failure of a Secondary structural part would not be immediately catastrophic and with due care continued safe flight and/or a safe precautionary landing could still be made.

Because of the simplicity of the aircraft structure some parts have a dual role – such as the composite body. As an example, the composite body of the aircraft is primary structure, yet it carries attachment point for items not flight critical.
The primary structural elements are considered to be:
Airframe
Upper mast
Connection assemblies joining the rotor head to the mast, and mast to airframe.
The rotor assembly and rotor head
The tail and rudder assembly
The rudder and rotor control system
The main undercarriage and nosegear
Whilst other items may have an effect on flight safety, they are considered secondary to the above. The undercarriage is included, as whilst it does not contribute to safe flight, it is difficult to make a safe landing without it – inevitably an aircraft rollover would result, probably destroying the aircraft.

Critical parts.
The following parts and assemblies have been denoted critical during the design review process, and special care must be taken with them during storage, handling and installation.

Item & pt No.	Reason/comment
Assemblies	
Rotor Head Upper Assembly	Correct assembly of pitch, roll, main bearing and teeter bolts/nuts and splits pins is essential for safe operation
Mast welded fabrication	Must be inspected carefully for cracks or other weld problems
Airframe assembly	Must be inspected carefully for cracks and integrity of welded-on brackets, especially mast and keel tube

Rotor assembly RSII 8.4m Rotor Assy RSII TOPP 8.4 and 8.6m	Correct assembly of the rotor system is essential for safe operation Life limited and serialised assembly
Rotor Head assembly	Comprising combination of Rotor Head upper and lower assemblies
Parts	
Teeter bolt	Must be correctly fitted, with no cracks or damage for safe operation
Teeter tower (assembly)	No cracks or damage permitted for safe operation, and free spinning bearing without any poor feel. Life limited and serialised assembly because it carries the bearing.
Main bearing nut	Must be properly tightened and correctly fitted with a split pin.
Rotor blade assembly	Damage or fracture of the rotor blade is not permitted.
Mast box section	Must be inspected carefully for cracks or other fractures
Gimbal block	Must be free of cracks or fractures for safe operation
Main bearing bolt	Must be properly tightened and correctly fitted with a split pin.
Pitch and roll bolts	Must be correctly fitted, with no cracks or damage for safe operation

CHAPTER 05 - TIME LIMITS, INSPECTIONS & CHECKS

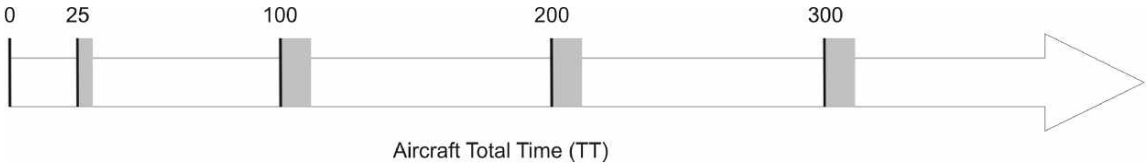
For safe operation and continued airworthiness over the specified lifecycle of the aircraft the following inspection schedule shall apply. Note that specified tolerances must NOT be accumulated!

Task	Interval	Recurrence	Tolerance
Daily / Pre-Flight Check	Before flight / daily	Each	N/A
Complementary / Servicing Tasks	5 hrs (rec.)	Each	N/A
25 hrs Inspection	25 hrs	Once	5 hrs
100 hrs / Annual Inspection	100 hrs / 1 yr	Each	10 hrs

The 25 hrs inspection has to be performed once, within the specified tolerance.

The 100 hrs inspection has to be performed every 100 hours, within the specified tolerance, at latest within 12 months, counted from issue of the aircraft's Statement of Compliance (Stückprüfung) or Annual Inspection (JNP).

Note that tolerances do not accumulate! However, a preponed (earlier) inspection outside the tolerance will reduce the next inspection due cycle accordingly.



(Total time in hours, counted from engine start to engine shut-down, i.e. HOBBS meter)

05-10-00 Time Limits

In addition to time limits for inspection items and checks the following time limits for inspection or overhaul of respective components or replacement of liquids and fluids apply. Please refer also to the engine manufacturer's manual and time limits specified herein, as well as *CHAPTER 04 – Manufacturer Life Limitations*!

Components

ATA/Ref.	Equipment / System	Time Limit
53-00-00	Welded Steel Mainframe	on condition

Liquids and Fluids

ATA/Ref.	Equipment / System	Time Limit
75-00-00	Engine coolant (acc. to coolant manufacturer)	at latest 5 years
79-00-00	Engine oil (acc. to engine manufacturer)	at latest 100 hrs

Refer to *CHAPTER 12* concerning replenishing/replacement procedures and types of liquids and fluids.

Status and lifetimes of components, liquids and fluids is listed in the Event and Configuration Log (AG-F-ECL) form. It is the obligation of the maintenance facility to keep this form current. An empty form is provided for download on the AutoGyro web site.

05-20-00 Scheduled Inspections & Checks

Daily / Pre-Flight Check

All daily or pre-flight check list items consist of visual checks and do not replace professional mechanical inspection and maintenance. The **Daily / Pre-Flight Checklist** for the standard MTOsport Model 2017 gyroplane is provided in the current Pilot's Operating Handbook.

Note that there is no 'post-flight' inspection mentioned. It is reasonable, however, to perform parts of the pre-flight inspection after the last flight of the day in order to take maintenance action in advance, if necessary.

Complementary / Servicing Tasks

The following tasks have to be performed in-between 100hrs inspections and may be performed on an operational level by the pilot or a trained person.

Task	Interval	Tolerance
Lubrication: Teeter hinge (see *Ch. 12 – Servicing*)	5 hrs (rec.)	N/A
Lubrication: Pre-rotator drive coupling sleeve	as req.	N/A
Cleaning/replacement: Engine air filter	as req.	N/A

25 hrs Inspection (one-time / non-recurrent)

The inspection items of the 25 hrs inspection are covered within the 100 hrs inspection protocol, which is available for download.

100 hrs / Annual Inspection

The maintenance protocol of the 100 hrs / Annual Inspection (AG-F-PCA-MTO2017) is available for download.

05-21-00 Temporary Scheduled Inspections & Checks

Temporary Scheduled Inspections and Checks may be introduced by SBs or AD's (if any). Notice of, and compliance with ADs is mandatory. If necessary, AutoGyro GmbH will point out the existence of such information and will provide detailed procedures to registered service partners and owners.

Important Note: Temporary scheduled inspections introduced by the engine/powerplant manufacturer will not be covered by process. As a contribution to fleet safety, AutoGyro may point out the existence of such information, if possible.

05-30-00 Unscheduled Inspections

In case of the following events or occurrences, unscheduled inspections have to be performed.

Event / Occurrence / Unusual Condition	Action / Reference
Rotor vibration	see *CHAPTER 18*
Propeller vibration	see *CHAPTER 18*

If in doubt contact AutoGyro customer support.

05-50-00 Conditional Inspections

Depending on the conditions the gyroplane is operated in or special operational incident the following conditional inspection may apply:

05-51-00 Inspections - Special Operational Conditions

Condition	Action / Reference
Operation in sand or dust	see below
AVGAS	see Pilot Operating Handbook and engine manufacturer documentation
Winter operation	see below

Operation in sand or dust

- Refer to engine manufacturer documentation
- Inspect/change air filter regularly
- Reduce 100 hrs inspection interval to 50 hrs
- Apply propeller leading edge protection strip
- Operation with keel tube fin (recommended)

Winter operation

The cooling system for the cylinder heads of the engine is filled with a mixture of anti-freeze and water, which gives freezing protection down to -20°C. Using a hydrometer, check protection temperature of the coolant and add anti-freeze, if necessary. If temperatures are expected to fall below protection temperature, drain the coolant, and if required for service, refill with pure antifreeze (see *12-30-40 Servicing: Engine Coolant).*

CAUTION

Pure antifreeze is not as good an engine coolant as a 50/50 mix with water. Take care that engine coolant limits are not exceeded. As soon as ambient temperatures permit, drain and refill with the normal coolant mix.

Because the oil and coolant system contain a thermostat, operation in winter does not require part-blocking of the radiators to maintain temperatures

05-55-00 Inspections - Special Operational Incident

Event / Occurrence / Unusual Condition	Action / Reference
Suspected hard landing	see below
Rotor contact with obstacle	see below
Propeller contact with obstacle or external impact	see below
Birdstrike	see below
Lightning strike	see below

Suspected hard landing

In case of a suspected hard landing perform the following checks:

- Inspect nose gear, attachment, fork, linkage and wheel bearing
- Inspect main gear axles and attachment
- Examine possible rotor / propeller strike → see 'Rotor / propeller contact with obstacle'
- CRITICAL: Inspect main gear suspension bow (body attachment and both axle attachments ok, no cracks)
- CRITICAL: Inspect fuselage, frame and attachment point for possible deformation or cracks. Perform levelling procedure (see JobCard *08-20-00 2-1*)
- CRITICAL: Inspect engine mounting and propeller to frame clearance approx. 5 cm
- CRITICAL: Perform a rotor alignment check

Defective components must be replaced. In case one or more of the items marked 'CRITICAL' are found defective or out of tolerance, contact AutoGyro customer support.

Rotor contact with obstacle

Rotor contact with an obstacle including any rotor strike of a stationary or turning rotor with an obstacle, including propeller and fuselage structures. In case of rotor contact with obstacle:

- Perform a rotor alignment check and adjust, if necessary
- Examine damage of aluminium rotor profile:
  → allowed damage: dent with max. depth of 1 mm
  → CRITICAL damage: nick(s)
- In case the turning rotor hit the stabilizer/rudder, a detailed inspection of the affected components must be performed.

In case CRITICAL damage is found, the rotor system must be replaced. Contact AutoGyro customer support.
It always recommended to replace the main rotor bearing in case of a strike, because the torque reaction of the impact can cause brinelling of the bearing and rough operation.

Propeller contact with obstacle or external impact

Refer to engine manufacturer documentation. If there is no visible damage, then perform tap test on propeller blades to assess for invisible damage. Replace damaged parts.

Birdstrike

- Perform detailed inspection of all affected component
- If rotor blades are affected, proceed according to 'Rotor contact with obstacle'
- If propeller is affected, proceed according to 'Propeller contact with obstacle or external impact'

Lightning strike

A lightning strike is likely to cause invisible damage to many components, especially the main rotor bearing. The aircraft must not be flown until satisfactory inspection has been undertaken and any rectification has been completed.

05-60-00 Ground Test Run

The maintenance protocol of the Ground Test Run (AG-F-PGR-Generic) is available for download.

05-70-00 Functional Test Flight

The maintenance protocol of the Functional Test Flight (AG-F-PTF-MTO2017) is available for download.

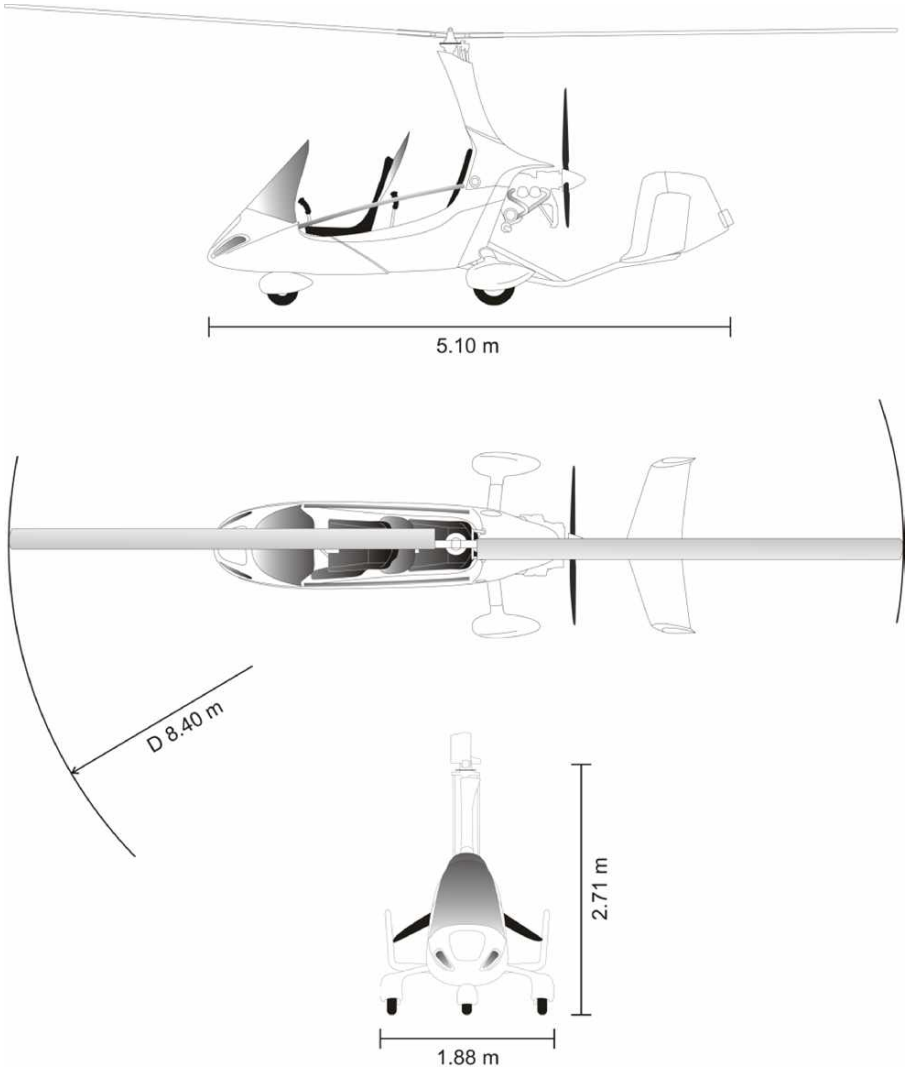
05-90-00 Maintenance Records & Aircraft Logs

An illustrated 'Parts List' (AutoGyro Parts List) will be compiled individually and delivered with each gyroplane.

Forms are available for download.

An 'Event and Configuration Log' (ECL) is delivered with the aircraft by AutoGyro and shall be kept current by the maintenance facility. An empty form (AG-F-ECL) is provided for download.

CHAPTER 06 - DIMENSIONS & AREAS



Length	5.10 m
Width	1.88 m
Height	2.71 m
Rotor diameter	8.4 m (or 8.6m)
Rotor disc area	55.4 sqm (or 58.1sqm)
Propeller diameter	1.72 m

CHAPTER 07 - LIFTING / JACKING / SHORING

See Job Card 07-00-00 2-1 in Part E of this manual.

CHAPTER 08 - LEVELING & WEIGHING

Weighing shall be performed in a draft-free hangar on level ground, with the aircraft defueled to minimum useable fuel.

Make sure each wheel of the gyroplane is located centred on the scales.

The weighing report AG-F-WRP-M17 is available for download.

CHAPTER 09 - TOWING & TAXIING

Experience shows that aircraft may be exposed to much higher loads when operated on ground, than when in flight. Such loads caused by rumbling on rough terrain, or bouncing the aircraft over the hangar threshold may easily exceed the design load in peak.

Use caution when handling the gyroplane on ground. Care must be taken when pushing at the rudder or at the outer stabilizers. Avoid excessive swing of the rotor blades as repeated bending ultimately leads to fatigue or damage.

CHAPTER 10 - PARKING, STORAGE & RETURN TO SERVICE

Parking up to 6 months

No special measures need to be taken.

NOTE Don´t let E10 remain in the fuel system for unnecessary long time or for long-term storage!

Parking more than 6 months

- Refer to engine manufacturer documentation
- Maintain battery charged

CAUTION No overwinter survival mode (snowflake) with Ctek charger MXS3.8 for Super B batteries.

- Unload wheel gear
- Cover aircraft with a light plastic tarpaulin or cloth

Long-term Storage

Contact AutoGyro

Return to Service

Perform a 100 hrs Inspection.

CHAPTER 11 - PLACARDS & MARKINGS

To avoid duplication and error, placards are shown in the pilot operating handbook (POH).

CHAPTER 12 - SERVICING

12-10-00 Cleaning

Care and regular cleaning of engine, propeller, rotor system and fuselage is the basic foundation for airworthiness and reliability. Therefore, the gyroplane should be cleaned after every last flight of the day or more often, if environmental conditions dictate.

In order to protect the gyroplane against dirt, dust, bird soil, and sunlight, the aircraft should be covered with a light plastic tarpaulin or cloth. Openings of the engine and airspeed indicator should be closed after the flight (insects, birds etc.).

Contamination can be cleaned with clean water, possibly with mild cleaning additives. To clean the rotor it is best to soak contamination with a cloth or towel, wipe with soft or micro-fibre cloth, and rinse thoroughly with water.

12-20-00 Lubrication

Component	Application	Reference
Lubrication: Teeter hinge	5 hrs (recomm.)	see below
Lubrication: Pre-rotator drive coupling sleeve	as required	see below

See *CHAPTER 05* for respective time limits.

Lubrication: Teeter hinge

The teeter hinge consists of a steel bolt running in special Teflon coated bushings. In order to provide proper bearing action and to avoid wear and bearing play, which will cause rotor vibration in consequence, regular lubrication is essential. In order to do so, the best practise is to perform work steps 5 to 7 from Job Card 62-11-00 6-1 INSPECTION: ROTOR – TEETERING PARTS. Make sure to apply grease also on the outer (secondary) bearings inside the teeter tower.

Lubrication: Pre-rotator drive coupling sleeve

Apply a thin layer of lubricant Liquid Moly LM 47 MoS2- grease (45506) on coupling sleeve when in extended position in regular intervals, at latest when the sliding surface feels dry or after flight through rain.

12-30-10 Servicing: Engine Air Filter

The air intake filters need to be replaced or cleaned according to the manufacturer‘s recommendation. Depending on environmental conditions, such as dust, sand, or pollution the recommended rate of maintenance should be increased as required.

12-30-20 Servicing: Tire Pressure

Main wheels	1.8 – 2.3 bar
Nose wheel	2.0 – 2.4 bar

NOTE: Green valve caps are used when the tire is filled with nitrogen.

12-30-30 Servicing: Battery

The aircraft is fitted with a maintenance-free electrolyte battery. Maintenance is therefore limited to outside soundness, correct attachment, and cleaning. Check integrity of the battery as leaking fluid contains corrosive sulphuric acid which would lead to extensive damage when contacting the framework and attachments.

Charge the battery only with a charging device which is suitable for gel electrolyte batteries.

CAUTION: The battery must never be deep discharged, as it will be damaged. If so, it might need to be replaced.

CAUTION: No overwinter survival mode (snowflake) with Ctek charger MXS3.8 for Super B batteries.

12-30-40 Servicing: Engine Coolant

The cooling system for the cylinder heads of the engine is filled with a mixture of anti-freeze and water, which gives freezing protection down to -20°C. Check protection temperature of the coolant and add anti-freeze, if necessary.

Verify coolant level in the aluminium expansion tank, replenish as required. Minimum cooling fluid level can be read from a sight glass with a cold engine.

In case no cooling fluid is visible through the sight glass a technical defect is most probable. Have engine inspected before the next flight.

If temperatures are expected to fall below protection temperature, refer to *05-51-00 Winter operation*.

12-40-00 Replenishing/Replacement of Fluids

Liquid / Fluid	Max. Filling Qty.	Type / Code
Engine coolant (50/50 water and EthyleneGlycol antifreeze suitable for aluminium engines)	3.4 ltr	as documented
Engine Oil	3.4 ltr	as documented

See *CHAPTER 05* for respective time limits.

CHAPTER 13-17 – UNASSIGNED / N/A

CHAPTER 18 – VIBRATION & NOISE ANALYSIS

Vibration may be induced by the rotor system, the propeller or even the engine. Finding out the cause for vibration and its proper cure requires experience and special equipment. This is why vibration analysis and related maintenance can only be performed by specialized service partners (maintenance level 'S'), or AutoGyro GmbH, Germany directly.

The following tests or fault isolation procedures should be performed in order to exclude systematic errors in case of rotor vibration:

- rotor system cleanliness
- check/verify correct installation position of the shim washers relative to teeter block and teeter tower (one or two dot markings on block, shim washer and teeter tower must align)
- check for possible play in teeter bearing in axial or radial direction
- check rotor system alignment (see Job Card *62-11-00 5-1*)
- check for possible play in rotor bearing
- adjust (increase) rotor control friction (see Job Card *62-32-00 5-1*)

In case of unusual vibration, contact AutoGyro or an AutoGyro specialized service partner. If possible, try to describe the type of vibration as precise as possible as this will help to save time to reproduce and troubleshoot, or even allow a first remote assessment. The following table provides a basic classification.

Vibration appearance / sensation / parameter
Lateral (left-right / back-forth) vibration with approximately 6 per second amplitude
Vertical (up-down) vibration with approximately 12 per second amplitude
Free-stick movement – carefully release control stick (if possible/safe) and describe path and displacement of control stick head
Flight condition (weight, speed) with highest vibration level
Rotor RPM
Higher frequency vibration (around 50 Hz, like an electric razor), changing with RPM
Higher frequency vibration, frequency and amplitude significantly changing with power setting, possibly irregular or erratic
RPM or power setting with highest vibration levels

Noise is mainly created by the propeller. Engine and muffler play a secondary role in noise emission, as long as intact. Any deficiencies could be easily identified by a visual inspection or tap test. A defective muffler can be refilled with insulating material. Repair as necessary.

Propeller noise is emitted by the fast turning blade tips and usually increases exponentially with RPM and speed due to interaction of air disturbances with the blade tips.

As noise is a subjective perception, only measurement will provide reliable data. However, the following table provides elements and countermeasure to troubleshoot and cure in case of unusual noise emission.

Possible causes for noise / countermeasures
Check propeller condition (cleanliness, erosion, damaged or splintered blade tips). Clean or repair propeller.
Check propeller RPM during take-off (full throttle) or cruise. Adjust/reduce if required.
Check/adjust propeller pitch. Check pitch setting of individual blades and adjust so that they are the same.
Check leading edge of propeller and leading edge protection strip (if installed). A damaged leading edge protection strip (loose or sticking out end) may change noise signature significantly. Replace as necessary.
Check airfilter condition and installation condition.
Check exhaust system for soundness and correct orientation of the aftermuffler exit.

CHAPTER 19–20 – UNASSIGNED / N/A

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Contents

CHAPTER 21-22 - UNASSIGNED / N/A

CHAPTER 23 - COMMUNICATIONS

23-10-00 Speech Communication / Radio

The optional communication system consists of an integrated VHF radio system installed in the instrument panel. Different versions may be possible. Please refer to the manufacturer's specifications and manuals for reference. Wiring diagrams are provided in Part D of this document. Different possible cockpit layouts are described in *31-10-00 Instruments & Control Panels*.

At the time of writing, the radio approved by AutoGyro is the Funk ATR833.

23-40-00 Interphone / Intercom

The intercom system features sockets with PJ coupling installed in a panel to the left of the seat to connect a helmet or headset. The intercom amplifier and VOX control is integrated in the respective radio. See manufacturer's manual for additional information.

As the intercom function is an integral part of the radio system, please refer to *23-10-00 Speech Comm. / Radio.*

CHAPTER 24 - ELECTRICAL POWER

The 12V DC electrical system consists of an engine driven electrical generator, a battery, master switch, indicators, switches, electrical consumers, and cabling. With the ROTAX 914 UL engine an electrical power supply is vital for continued engine operation as this engine variant solely relies on electrically driven fuel pumps (depending on configuration).

Turning the master switch to the ON position closes the battery contact and energizes the gyroplane's electrical system. The red LOW VOLT warning light will illuminate. A steady indication warns the pilot that the voltage of the system has dropped below a safe value. In this case a safety circuit (load shedding relay) will automatically disconnect nonessential consumers, such as the 12V power receptacle and supply for the heated clothing regulator. It is normal for this lamp to be on when the engine is not running.

A red GEN warning light is installed to indicate that the battery is not being charged.

24-30-00 DC Generation and Battery

Direct current is provided by an engine-integrated AC generator with external rectifier-regulator (12V 20 A DC). The battery is mounted in a bracket at the rear of the lower mast frame.

24-60-00 DC Electrical Load Distribution

The DC electrical load distribution system includes cockpit switches, control electronics (relays and logic components), fuses, electrical harnesses and cabling, and electrical consumers.

Electrical schematics are provided in *Part D - Diagrams and Charts* of this manual.

The power demand for various consumers is provided in the following table:

ATA Reference	Equipment / System	Power load
24-3	*Generator*	*(-) 240 W*
23-1	Radio ATR833 (if inst.)	7 W (receive) / 39 W (transmit)
25-1	Seat heating (if inst.)	100 W
28-2	Electrical fuel pump (ea)	41 W
33-4	NAV/Pos lights (LED)	8 W
33-4	Strobe lights	46 W
33-4	Landing light (LED)	36 W
34-1	Digital ALT and ASI	6 W / (20 W when charging backup batt.)
34-7	ATC Transp.TRT800H (if inst.)	max. 10 W
36-1	Pneumatic compressor	103 W / (280 W peak)
61-2	IVO propeller (if inst.)	30 W / (140 W peak)
85-23	Heated gloves (if conn.)	30 W
85-23	Heated pants (if conn.)	50 W
85-23	Heated jacket (if conn.)	88 W
85-23	Heated soles (if conn.)	17 W
85-34	Aspen (if inst.)	70 W
85-34	Garmin 695 / 795 (if inst.)	40 W
85-34	Garmin area 500 (if inst.)	5 W (charging)
85-34	Garmin G3X (if inst.)	30 W
85-34	Dynon 10 (if inst.)	48 W
85-34	FlyMap L (if inst.)	35 W
85-34	FlyMap XL (if inst.)	46 W

Fuses together with their values and application are listed below:

Fuse / Name	Value	Application
Gen. 1	5 A	Generator / Alternator
Gen. 2	5 A	Generator 2 (if installed)
Compressor	15 A	Electric Compressor
Pump 2	5 A	Secondary Fuel Pump (if inst.)
TCU	10 A	Engine Turbo Control Unit (if inst.)
Cockpit	5 A	
Avionic	10 A	
ACL	10 A	Strobes
Start	5 A	Engine Starter Relay
Taxi light	10 A	
Landing light	10 A	
Prop.	15 A	Propeller Adjustment (if inst.)
Trim.	3 A	Trim and Rotor Brake Control
Sensor	3 A	
Heater pilot	15 A	Seat Heating Front Seat (if inst.)
Heater copilot	15 A	Seat Heating Rear Seat (if inst.)
12 V plug	5 A	12 V Power Outlet
Rear cockpit	10 A	
At the battery		
Regulator	30 A	
Cockpit	50 A	
Aux. generator	50 A	
Starter	125 A	

CHAPTER 25 - EQUIPMENT / FURNISHINGS

25-10-00 Flight Compartment

Forward and aft seat are adjustable to suit different pilots and consist of a GRP bowl which is fastened to the frame structure. Basic upholstering consists of seat and backrest cushions with foam core and a fabric covering.

As an option, an easily cleanable, water-repellent 'sports design' cover is available. The cushions are attached with hook-and-loop tape and press studs.

For each seat an adjustable four point harness is available.

IMPORTANT NOTE: Seat belts have a manufacturer recommended life of 10 years. Continued service is at the discretion of the Servicing Engineer.

CHAPTER 26 - N/A

CHAPTER 27 - FLIGHT CONTROLS

27-00-00 Flight Controls

See *CHAPTER 67 – Rotors Flight Control*.

Note: Stabilizers are described in *CHAPTER 55*.

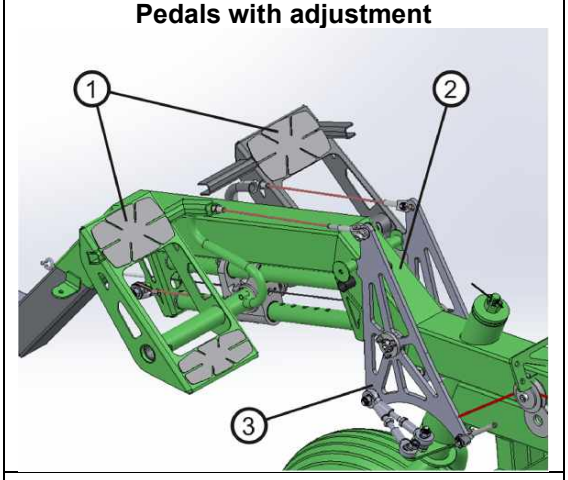
27-20-00 Flight Controls - Rudder

The rudder is connected to the adjustable foot pedals with two push-pull control cables with are routed through the horizontal frame, steel cables and two bell crank levers. Nose wheel steering is directly linked to pedal/rudder control input by the two bell crank levers and control rods. The pair of aft pedals is interconnected in parallel with the nose wheel control path.

Both pairs of pedals are individually adjustable to suit pilot's comfort. A shorter adjustment is achieved by pulling the handle which moves the pedals closer. Pulling the handle while pushing with both feet gently against the pedals allows longer adjustment.

The rudder fin is described in *55-40-00 Rudder*.

Pedals with adjustment



1 – Pedals
2 – Adjustment handle
3 – Nose wheel and rudder control

CHAPTER 28 - FUEL

28-10-00 Storage

Two fuel tanks are located under the rear seat and have a total capacity of 94 litres. Tanks are made from PE plastic and feature a ventilation line that is routed under the aircraft body. A drain valve is available in the bottom aft area of each tank that accepts a standard drain tool with pin to open the valve.

A large crossover port connects both tanks to ensure quick equalization.

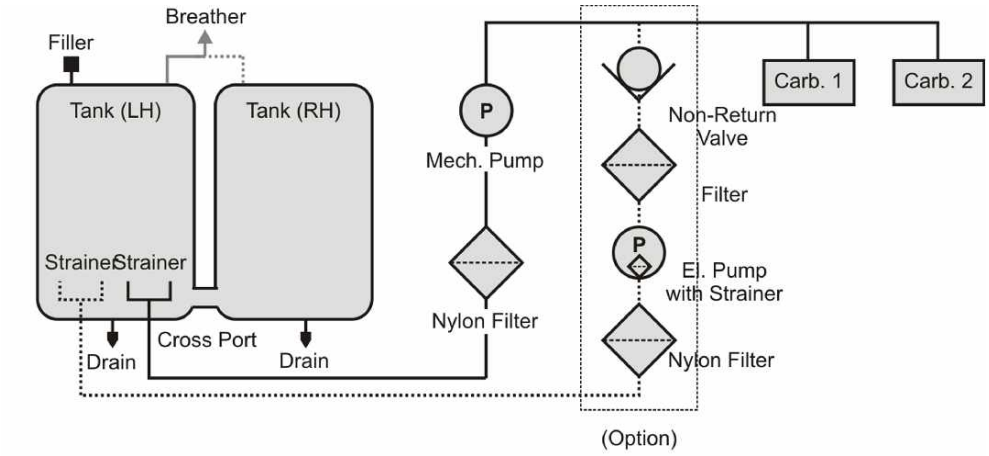
Drain Valve(s)

28-20-00 Distribution

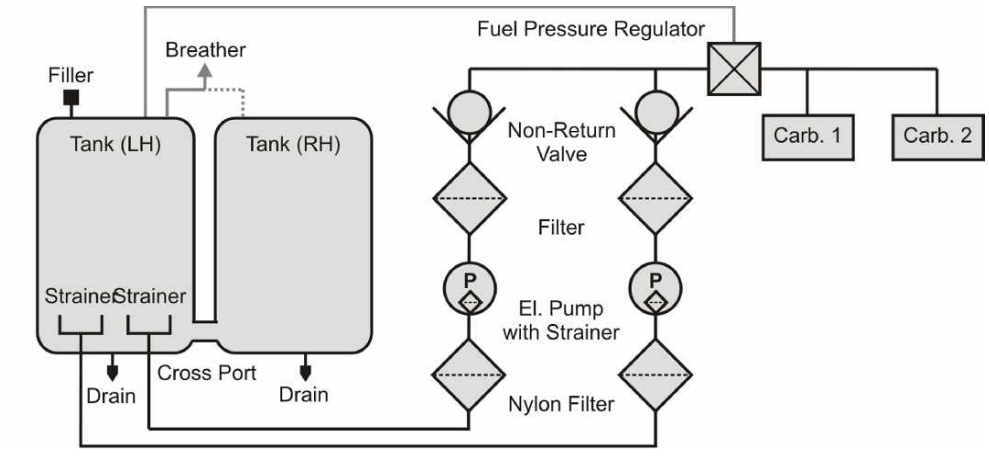
The fuel distribution system comprises fuel hoses, made of fabric-reinforced rubber, filters and pumps.

Possible fuel system versions differ with engine model, see schematics below. In case of ROTAX 912 engine variant, a secondary electrical pump (P2) with filter can be configured as an option.

Fuel system ROTAX 912:



Fuel system ROTAX 914:



28-40-00 Indicating

An electronic fuel level gauge with integrated and independent low fuel sensor is provided in the cockpit. The LOW FUEL warning light is triggered as soon as 7.5 litres or less of usable fuel remain in the tanks. On ground, fuel quantity can be determined by a transparent line positioned at the rear end of the tanks.

Additionally, and optionally, a low fuel pressure warning LED (FUEL P.) may be fitted to the panel. This lamp indicates when the fuel pressure downstream of the fuel pumps is less than 0.15bar. The pressure sensor is located in the fuel supply hose between the pump filters and the fuel pressure regulators on 914UL engines.

CHAPTER 29-30 - N/A

CHAPTER 31 – INDICATING SYSTEM

Note: The hour meter / HOBBS meter is described in *CHAPTER 77 - ENGINE INDICATING*.

31-10-00 Instruments & Control Panels

Different instrument panel layouts are available. The basic instrumentation arrangements include:

- GPS Layout
- EFIS Layout
- Night VFR

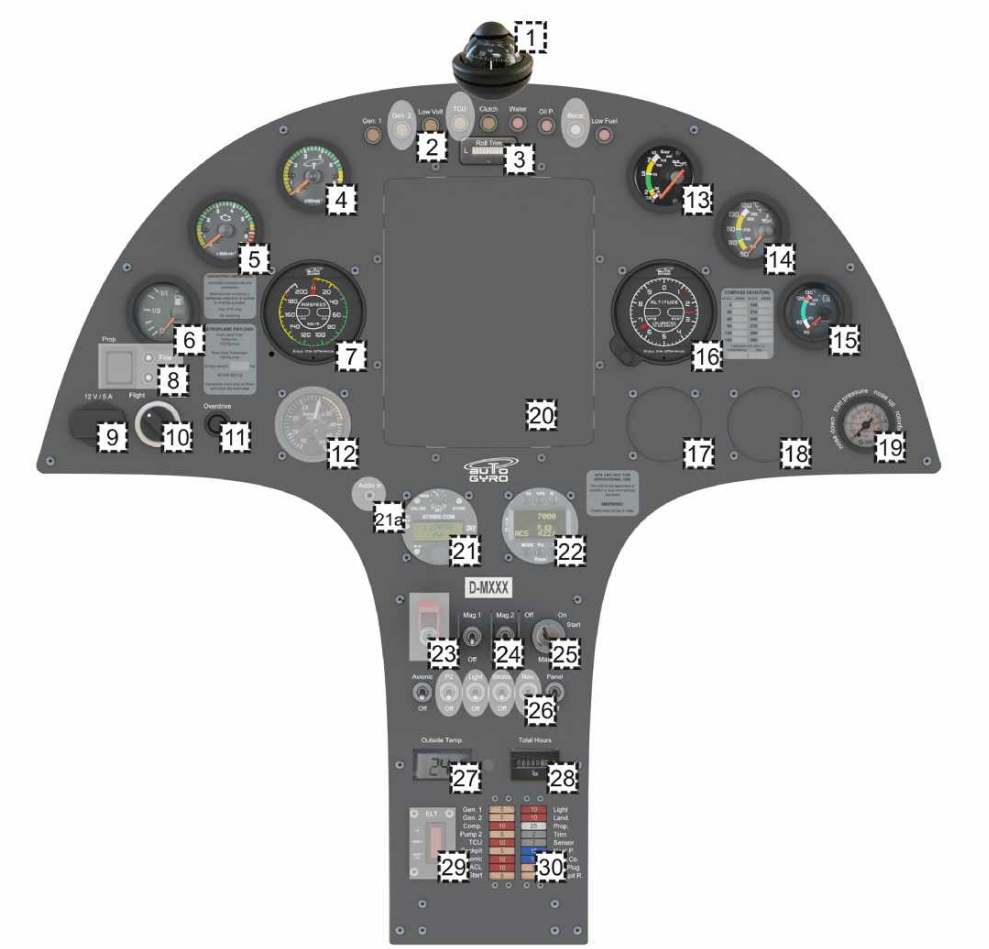
The panel layout “GPS” includes all relevant instruments arranged in a way to accept most off-the-shelf moving map navigation devices in the respective format. Alternatively, the area in the centre of the panel may be used to install a map holder or attach checklists and/or maps.

Some hand held GPS units and antennas emit magnetic fields that vary with respect to time and/or levels of battery charge. These may change your compass deviations, so always cross check between the compass headings with your GPS installed and placard accordingly if required.

All EFIS layouts are tailored to the integrated flight and navigation suite of the respective manufacturer. In addition to navigational and moving map functions, the system provides primary flight data and engine/vehicle monitoring. It is of utmost importance to read and understand the operators’ manual and to become familiar with the system before operation. In case of a system failure, altimeter and air speed indicator are provided as back-up.

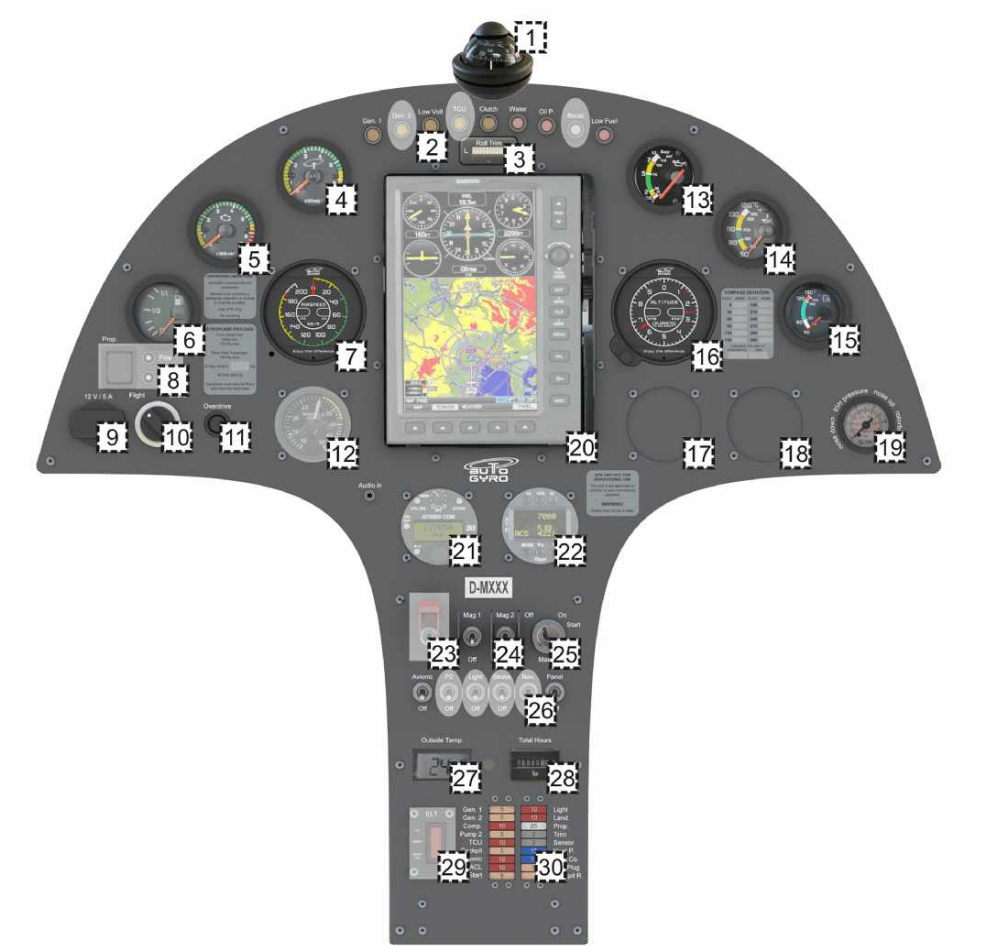
Depending on the chosen instrumentation and optional equipment, the depicted panels on the following pages may vary.

Panel Layout – GPS Panel



1 – Magnetic compass
2 – Warning lights
3 – Lateral/roll trim indicator
4 – Rotor RPM
5 – Engine RPM
6 – Fuel level indicator
7 – Air speed indicator
8 – Variable pitch propeller / VPP (if inst.)
9 – 12V power receptacle (if installed)
10 – Pneumatic mode selector
11 – Pre-rotator overdrive
12 – Manifold pressure gauge (if inst.)
13 – Oil pressure
14 – Oil temperature
15 – Engine Coolant Temperature / CT
16 – Altimeter
17 – Cut-out 57mm / 2 ¼" for optional inst.
18 – Cut-out 57mm / 2 ¼" for optional inst.
19 – Trim/brake pressure gauge
20 – Installation provisions
21 – Radio (if installed)
22 – ATC Transponder (if inst.)
23 – Boost guarded switch– only R914
24 – MAG switches
25 – Master/starter switch
26 – Switches (Avionics, P2, Lights, Opt.)
27 – Outside air temperature / OAT
28 – Hour meter
29 – ELT control (if inst.)
30 – Fuses

Panel Layout – GPS Rack for Garmin 695



1 – Magnetic compass
2 – Warning lights
3 – Lateral/roll trim indicator
4 – Rotor RPM
5 – Engine RPM
6 – Fuel level indicator
7 – Air speed indicator
8 – Variable pitch propeller / VPP (if inst.)
9 – 12V power receptacle (if installed)
10 – Pneumatic mode selector
11 – Pre-rotator overdrive
12 – Manifold pressure gauge (if inst.)
13 – Oil pressure
14 – Oil temperature
15 – Engine Coolant Temperature / CT
16 – Altimeter
17 – Cut-out 57mm / 2 ¼" for optional inst.
18 – Cut-out 57mm / 2 ¼" for optional inst.
19 – Trim/brake pressure gauge
20 – Option GPS Rack for Garmin 695
21 – Radio (if installed)
22 – ATC Transponder (if inst.)
23 – Boost guarded switch– only R914
24 – MAG switches
25 – Master/starter switch
26 – Switches (Avionics, P2, Lights, Opt.)
27 – Outside air temperature / OAT
28 – Hour meter
29 – ELT control (if inst.)
30 – Fuses

Panel Layout – GPS Rack for Garmin 795

1 – Magnetic compass
2 – Warning lights
3 – Lateral/roll trim indicator
4 – Rotor RPM
5 – Engine RPM
6 – Fuel level indicator
7 – Air speed indicator
8 – Variable pitch propeller / VPP (if inst.)
9 – 12V power receptacle (if installed)
10 – Pneumatic mode selector
11 – Pre-rotator overdrive
12 – Manifold pressure gauge (if inst.)
13 – Oil pressure
14 – Oil temperature
15 – Engine Coolant Temperature / CT
16 – Altimeter
17 – Cut-out 57mm / 2 ¼" for optional inst.
18 – Cut-out 57mm / 2 ¼" for optional inst.
19 – Trim/brake pressure gauge
20 – Option GPS Rack for Garmin 795
21 – Radio (if installed)
22 – ATC Transponder (if inst.)
23 – Boost guarded switch– only R914
24 – MAG switches
25 – Master/starter switch
26 – Switches (Avionics, P2, Lights, Opt.)
27 – Outside air temperature / OAT
28 – Hour meter
29 – ELT control (if inst.)
30 – Fuses

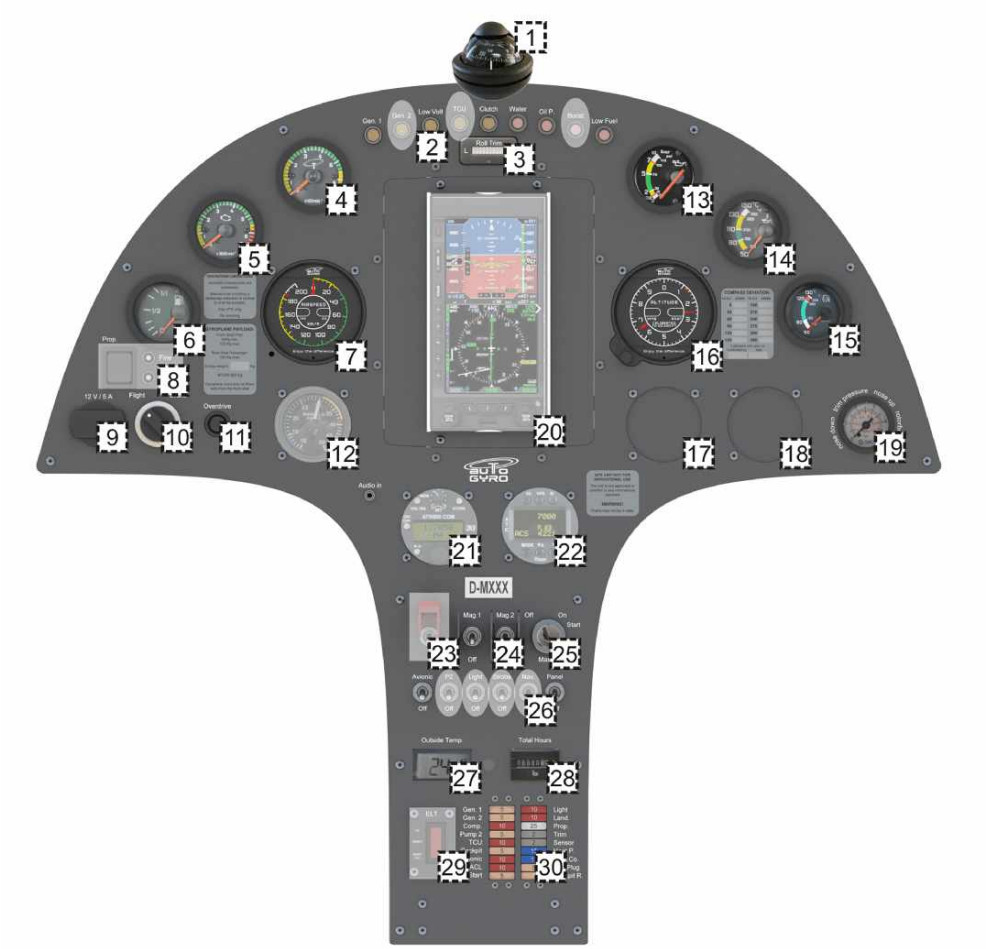
Panel Layout – GPS Rack for I Pad mini 1,2,3

1 – Magnetic compass
2 – Warning lights
3 – Lateral/roll trim indicator
4 – Rotor RPM
5 – Engine RPM
6 – Fuel level indicator
7 – Air speed indicator
8 – Variable pitch propeller / VPP (if inst.)
9 – 12V power receptacle (if installed)
10 – Pneumatic mode selector
11 – Pre-rotator overdrive
12 – Manifold pressure gauge (if inst.)
13 – Oil pressure
14 – Oil temperature
15 – Engine Coolant Temperature / CT
16 – Altimeter
17 – Cut-out 57mm / 2 ¼" for optional inst.
18 – Cut-out 57mm / 2 ¼" for optional inst.
19 – Trim/brake pressure gauge
20 – Option GPS Rack for I Pad mini 1,2,3
21 – Radio (if installed)
22 – ATC Transponder (if inst.)
23 – Boost guarded switch– only R914
24 – MAG switches
25 – Master/starter switch
26 – Switches (Avionics, P2, Lights, Opt.)
27 – Outside air temperature / OAT
28 – Hour meter
29 – ELT control (if inst.)
30 – Fuses

Panel Layout – GPS Rack for I Pad mini 4

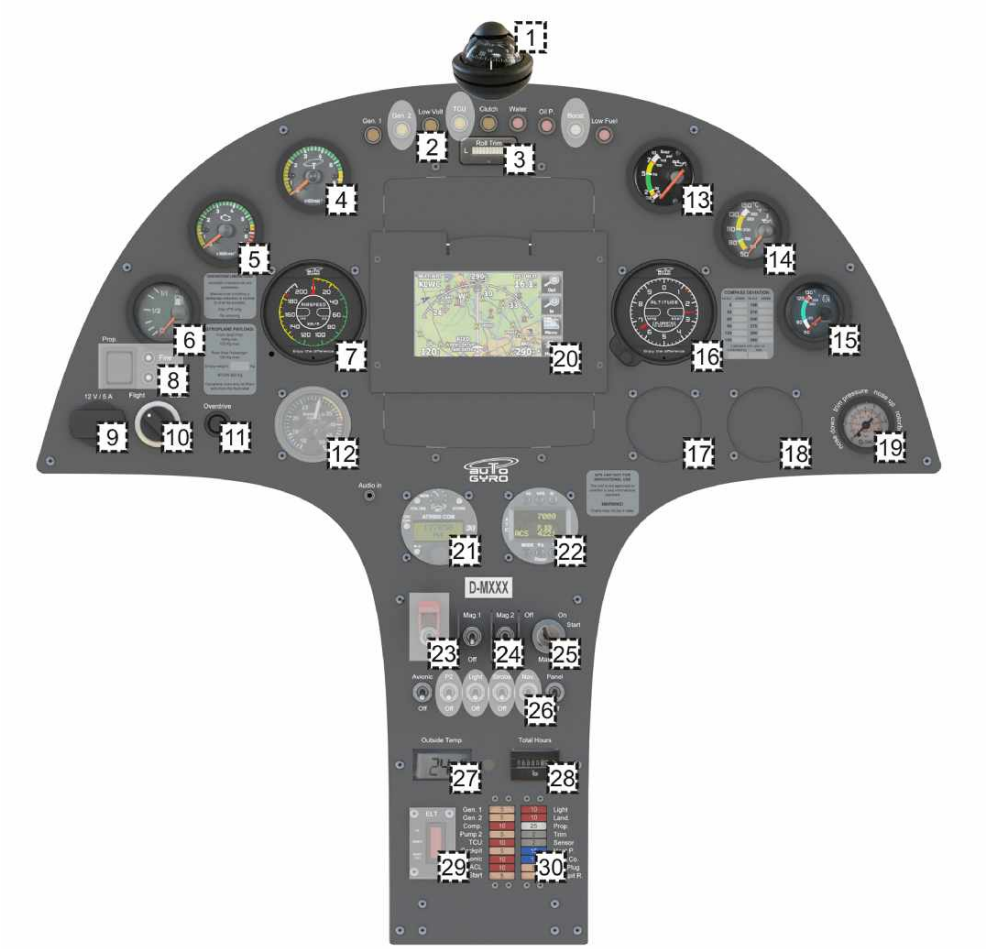
1 – Magnetic compass
2 – Warning lights
3 – Lateral/roll trim indicator
4 – Rotor RPM
5 – Engine RPM
6 – Fuel level indicator
7 – Air speed indicator
8 – Variable pitch propeller / VPP (if inst.)
9 – 12V power receptacle (if installed)
10 – Pneumatic mode selector
11 – Pre-rotator overdrive
12 – Manifold pressure gauge (if inst.)
13 – Oil pressure
14 – Oil temperature
15 – Engine Coolant Temperature / CT
16 – Altimeter
17 – Cut-out 57mm / 2 ¼" for optional inst.
18 – Cut-out 57mm / 2 ¼" for optional inst.
19 – Trim/brake pressure gauge
20 – Option GPS Rack for I Pad mini 4
21 – Radio (if installed)
22 – ATC Transponder (if inst.)
23 – Boost guarded switch– only R914
24 – MAG switches
25 – Master/starter switch
26 – Switches (Avionics, P2, Lights, Opt.)
27 – Outside air temperature / OAT
28 – Hour meter
29 – ELT control (if inst.)
30 – Fuses

Panel Layout – GPS Insert for Aspen



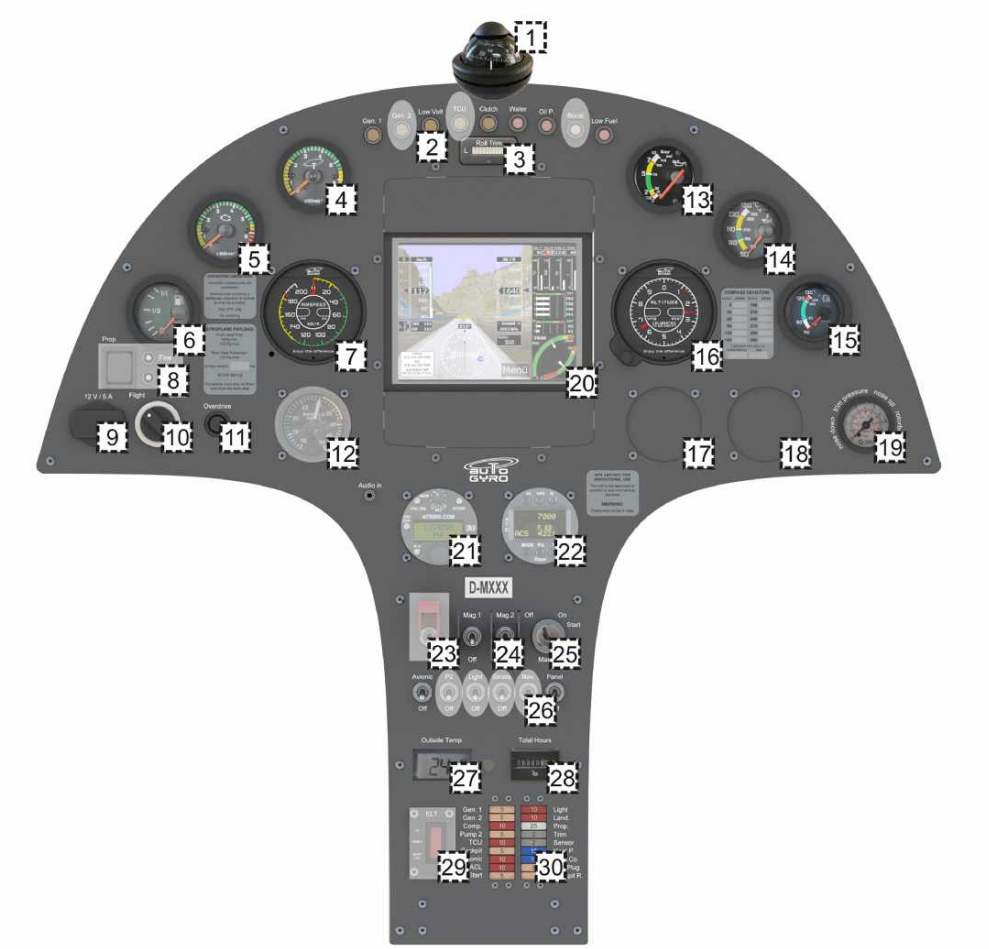
1 – Magnetic compass
2 – Warning lights
3 – Lateral/roll trim indicator
4 – Rotor RPM
5 – Engine RPM
6 – Fuel level indicator
7 – Air speed indicator
8 – Variable pitch propeller / VPP (if inst.)
9 – 12V power receptacle (if installed)
10 – Pneumatic mode selector
11 – Pre-rotator overdrive
12 – Manifold pressure gauge (if inst.)
13 – Oil pressure
14 – Oil temperature
15 – Engine Coolant Temperature / CT
16 – Altimeter
17 – Cut-out 57mm / 2 ¼" for optional inst.
18 – Cut-out 57mm / 2 ¼" for optional inst.
19 – Trim/brake pressure gauge
20 – Option GPS Insert for Aspen
21 – Radio (if installed)
22 – ATC Transponder (if inst.)
23 – Boost guarded switch– only R914
24 – MAG switches
25 – Master/starter switch
26 – Switches (Avionics, P2, Lights, Opt.)
27 – Outside air temperature / OAT
28 – Hour meter
29 – ELT control (if inst.)
30 – Fuses

Panel Layout – GPS Insert for Area 500



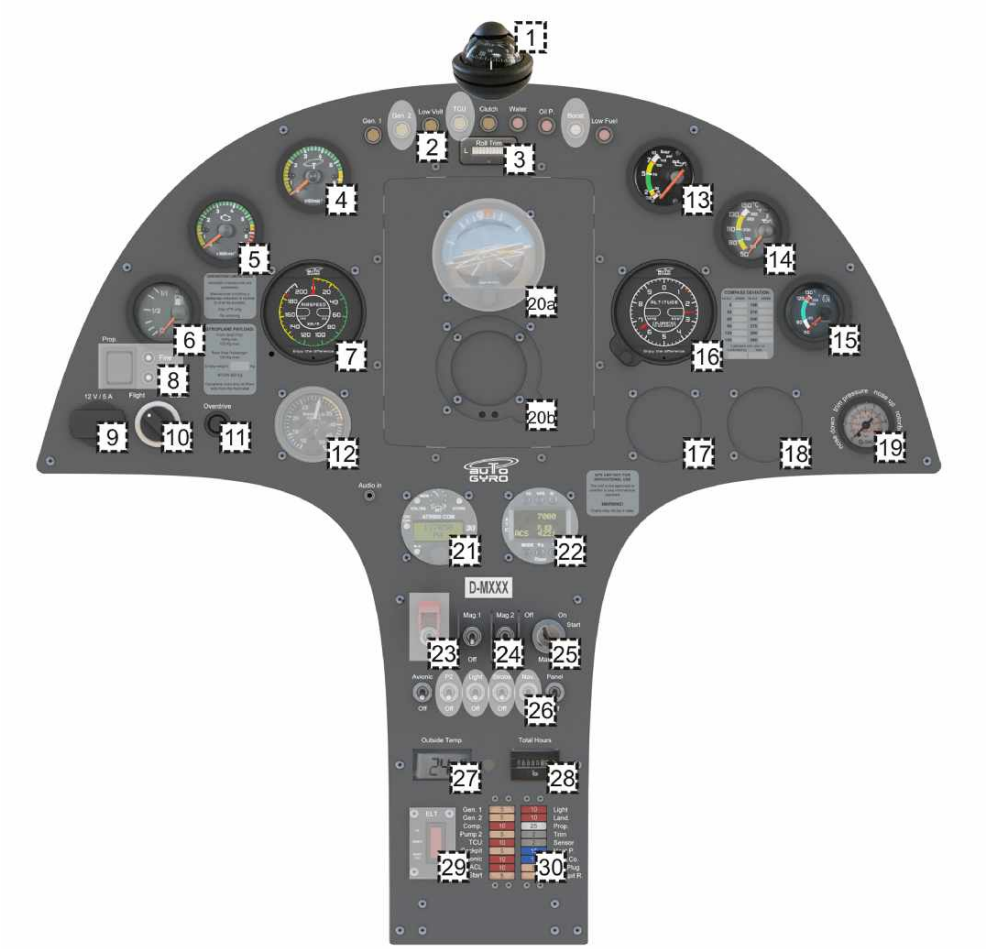
1 – Magnetic compass
2 – Warning lights
3 – Lateral/roll trim indicator
4 – Rotor RPM
5 – Engine RPM
6 – Fuel level indicator
7 – Air speed indicator
8 – Variable pitch propeller / VPP (if inst.)
9 – 12V power receptacle (if installed)
10 – Pneumatic mode selector
11 – Pre-rotator overdrive
12 – Manifold pressure gauge (if inst.)
13 – Oil pressure
14 – Oil temperature
15 – Engine Coolant Temperature / CT
16 – Altimeter
17 – Cut-out 57mm / 2 ¼" for optional inst.
18 – Cut-out 57mm / 2 ¼" for optional inst.
19 – Trim/brake pressure gauge
20 – Option GPS Insert for Area 500
21 – Radio (if installed)
22 – ATC Transponder (if inst.)
23 – Boost guarded switch– only R914
24 – MAG switches
25 – Master/starter switch
26 – Switches (Avionics, P2, Lights, Opt.)
27 – Outside air temperature / OAT
28 – Hour meter
29 – ELT control (if inst.)
30 – Fuses

Panel Layout – GPS Insert for Flymap 7"



1 – Magnetic compass
2 – Warning lights
3 – Lateral/roll trim indicator
4 – Rotor RPM
5 – Engine RPM
6 – Fuel level indicator
7 – Air speed indicator
8 – Variable pitch propeller / VPP (if inst.)
9 – 12V power receptacle (if installed)
10 – Pneumatic mode selector
11 – Pre-rotator overdrive
12 – Manifold pressure gauge (if inst.)
13 – Oil pressure
14 – Oil temperature
15 – Engine Coolant Temperature / CT
16 – Altimeter
17 – Cut-out 57mm / 2 ¼" for optional inst.
18 – Cut-out 57mm / 2 ¼" for optional inst.
19 – Trim/brake pressure gauge
20 – Option GPS Insert for Flymap 7"
21 – Radio (if installed)
22 – ATC Transponder (if inst.)
23 – Boost guarded switch– only R914
24 – MAG switches
25 – Master/starter switch
26 – Switches (Avionics, P2, Lights, Opt.)
27 – Outside air temperature / OAT
28 – Hour meter
29 – ELT control (if inst.)
30 – Fuses

Panel Layout – GPS Insert basic T



1 – Magnetic compass
2 – Warning lights
3 – Lateral/roll trim indicator
4 – Rotor RPM
5 – Engine RPM
6 – Fuel level indicator
7 – Air speed indicator
8 – Variable pitch propeller / VPP (if inst.)
9 – 12V power receptacle (if installed)
10 – Pneumatic mode selector
11 – Pre-rotator overdrive
12 – Manifold pressure gauge (if inst.)
13 – Oil pressure
14 – Oil temperature
15 – Engine Coolant Temperature / CT
16 – Altimeter
17 – Cut-out 57mm / 2 ¼" for optional inst.
18 – Cut-out 57mm / 2 ¼" for optional inst.
19 – Trim/brake pressure gauge
20 – 2 x Cut-out 80mm for opt. installation
21 – Radio (if installed)
22 – ATC Transponder (if inst.)
23 – Boost guarded switch– only R914
24 – MAG switches
25 – Master/starter switch
26 – Switches (Avionics, P2, Lights, Opt.)
27 – Outside air temperature / OAT
28 – Hour meter
29 – ELT control (if inst.)
30 – Fuses

31-60-00 Integrated Display Systems

Different Integrated Display Systems are available as an option, and described in the following. In addition to navigational and moving map functions, the systems provide primary flight data and engine/vehicle monitoring. It is of utmost importance to read and understand the operators manual and to become familiar with the system before operation. In case of a system failure, a 2 ¼" (47mm) altimeter, air speed indicator and rotor speed indicator are provided as backup instrumentation.

Panel Layout – EFIS Insert Garmin G3X 10"

1 – Magnetic compass
2 – Warning lights
3 – Lateral/roll trim indicator
4 – Rotor RPM
5 – Variable pitch propeller / VPP (if inst.)
6 – Air speed indicator
7 – 12V power receptacle (if installed)
8 – Pneumatic mode selector
9 – Pre-rotator overdrive
10 – Option EFIS Insert Garmin G3X 10"
11 – Manifold pressure gauge (if inst.)
12 – Altimeter
13 – Trim/brake pressure gauge
14 – Radio (if installed)
15 – ATC Transponder (if inst.)
16 – Boost guarded switch– only R914
17 – MAG switches
18 – Master/starter switch
19 – Switches (Avionics, P2, Lights, Opt.)
20 – Outside air temperature / OAT
21 – Hour meter
22 – ELT control (if inst.)
23 – Fuses

Panel Layout – EFIS Insert Skyview 10"

1 – Magnetic compass
2 – Warning lights
3 – Lateral/roll trim indicator
4 – Rotor RPM
5 – Variable pitch propeller / VPP (if inst.)
6 – Air speed indicator
7 – 12V power receptacle (if installed)
8 – Pneumatic mode selector
9 – Pre-rotator overdrive
10 – Option EFIS Insert Skyview 10"
11 – Manifold pressure gauge (if inst.)
12 – Altimeter
13 – Trim/brake pressure gauge
14 – Radio (if installed)
15 – ATC Transponder (if inst.)
16 – Boost guarded switch– only R914
17 – MAG switches
18 – Master/starter switch
19 – Switches (Avionics, P2, Lights, Opt.)
20 – Outside air temperature / OAT
21 – Hour meter
22 – ELT control (if inst.)
23 – Fuses

Panel Layout – EFIS Insert Flymap 10"

1 – Magnetic compass
2 – Warning lights
3 – Lateral/roll trim indicator
4 – Rotor RPM
5 – Variable pitch propeller / VPP (if inst.)
6 – Air speed indicator
7 – 12V power receptacle (if installed)
8 – Pneumatic mode selector
9 – Pre-rotator overdrive
10 – Option EFIS Insert Flymap 10"
11 – Manifold pressure gauge (if inst.)
12 – Altimeter
13 – Trim/brake pressure gauge
14 – Radio (if installed)
15 – ATC Transponder (if inst.)
16 – Boost guarded switch– only R914
17 – MAG switches
18 – Master/starter switch
19 – Switches (Avionics, P2, Lights, Opt.)
20 – Outside air temperature / OAT
21 – Hour meter
22 – ELT control (if inst.)
23 – Fuses

CHAPTER 32 - LANDING GEAR

The MTOsport Model 2017 has a conventional tricycle gear with GRP (glass fibre reinforced plastic) suspension bow and a steerable nose gear.

32-10-00 Main Gear

The main gear consists of a GRP suspension bow which is bolted to a support frame at the bottom of the mast and main frame. The spar is designed to absorb even higher than normal landing loads in case of a hard landing or crash.

32-10-00 Nose Gear

The nose gear consists of a steerable nose wheel in a fork made of stainless steel tubing. Nose wheel steering is realized by cables and a linkage to pedal/rudder control input.

32-40-00 Wheels and Brakes

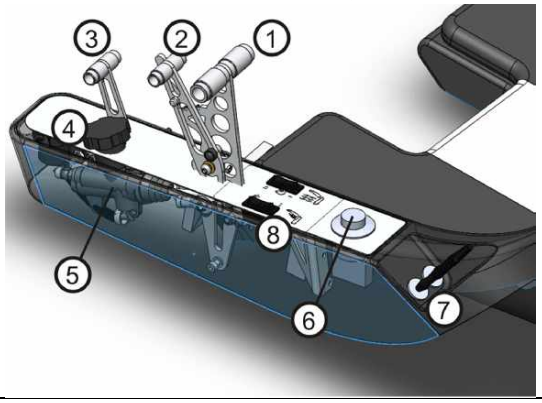
Both main wheels feature hydraulic disc brakes. The hydraulic wheel brake is actuated by pulling the brake lever (2). A locking pawl mechanism allows setting for use as parking brake. In order to release the parking brake pull the brake lever a little further to let the spring-loaded locking pawl disengage, and then release wheel brake.

Do not try to disengage the locking pawl by pressing the small release lever without pulling the brake lever at the same time. Releasing the pawl using the small release lever only will lead to premature deterioration of the teeth. If the teeth are worn the function of the parking brake will be compromised!

The throttle and brake quadrant also supports the brake fluid reservoir (4) with screw cap and fluid level minimum and maximum markings, as well as the primary brake cylinder (5).

For correct tire pressure see *12-30-20 Servicing: Tire Pressure*.

Throttle and Brake Quadrant



1 – Throttle lever
2 – Brake lever with locking pawl
3 – Choke control
4 – Brake fluid reservoir
5 – Primary brake cylinder
6 – Seat adjustment control push button
7 – Headset / helmet connectors
8 – Seat heating control (if installed)

CHAPTER 33 - LIGHTS

33-40-00 Exterior

The basic aircraft is approved for day VFR operation only. As an option the following lights can be configured on the MTOsport Model 2017:

- Landing Light
- Position Lights with integrated Strobe Lights on both outer vertical stabilizers (Either AutoGyro or Aveo Ultra Galactica (certified) devices)
- Belly landing light
- Dimmable instrument panel lighting for front and rear seats

Electrical schematics / wiring diagrams are provided in *Part D - Diagrams and Charts* of this manual.

Power consumption figures are listed in *24-60-00 DC Electrical Load Distribution*.

CHAPTER 34 - NAVIGATION

34-10-00 Flight Environment Data

Total pressure is picked up by a pitot tube located in the nose section of the fuselage. The tube is connected to the integrated cockpit instruments by a plastic line. Static pressure is measured behind the cockpit panel.

Outside air temperature (OAT) is measured by a thermocouple located at the fuselage belly above the nose wheel.

34-20-00 Attitude and Direction

As part of minimum equipment, a magnetic compass is installed on top of the instrument panel, under the windshield.

34-70-00 ATC Transponder

An ATC Transponder may be installed as an option. Possible installation positions in the instrument panel are described in *CHAPTER 31*. Please refer to the manufacturer's documentation for reference.

CHAPTER 35 - N/A

CHAPTER 36 - PNEUMATIC

Aircraft trim, rotor brake and activation of the pre-rotator is controlled by a pneumatic system, consisting of an electrically driven air compressor with filter/dryer, a pressure gauge in the cockpit, a pressure compensation vessel, solenoid valves, air lines, pneumatic actuators, and the respective cockpit controls.

The pneumatic system controls the following function:

- rotor brake ON, effects i.e. rotor disc flat / flight control stick forward position (brake mode)
- adjustable longitudinal trim, effects i.e. rotor disc/stick pulled aft (flight mode)
- engagement of the pre-rotator, i.e. activation of the clutch and upper engagement (only in flight mode or in brake mode with overdrive/override button)

The aforementioned functions are described in more detail in the dedicated chapters.

A schematic drawing of the pneumatic system is provided in *Part D - Diagrams and Charts* of this manual.

36-11-00 Generation / Compressor

The electrically driven compressor and filter/dryer is located behind the instrument panel. The wiring diagram is provided in *Part D - Diagrams and Charts* of this manual.

36-21-00 Distribution

Air distribution comprises of hoses, valves (solenoids), (cockpit) controls and switches, (pressure) sensors and a pressure compensation vessel. The main pneumatic switching logic is combined in the pneumatic control which is installed behind the instrument panel. See *Part D - Diagrams and Charts* for schematics.

Note that the pneumatics actuators (cylinders) are not described in this ATA Chapter, but assigned to their mechanical main function.

Example: the brake/trim cylinder is described in *67-05-00 Pitch Trim System / Rotor Brake*.

CHAPTER 37-50 - UNASSIGNED / N/A

CHAPTER 51 - STANDARD PRACTICES - STRUCTURES

51-00-00 Standard Practices - Structures

Structural repair of composite structures or the welded steel frame is limited to AutoGyro GmbH or its specialized service partners (job cards labelled 'SPC').

CHAPTER 52 - DOORS, COVERS AND COWLINGS

52-10-00 Passenger / Crew

This gyroplane is designed as an open cockpit aircraft and features no doors. Two windshields from break-proof polycarbonate protect the crew against the air stream, insects, and direct rain. Access and exit is provided over the sillboard on the right hand side.

Note that windshields are described in *56-10-00 Flight Compartment / Windshields*.

52-40-00 Service Covers and Cowlings

The pneumatic control box is installed behind the cover of the centre panel. Note that some of the pneumatic pump and air dryer can be accessed through the cover of the storage compartment in the nose section.

Access for maintenance and inspection is described in a dedicated job card 52-40-00 2-1 in Part D of this manual.

CHAPTER 53 – FUSELAGE / MAIN FRAME

The load carrying structure of the gyroplane consists of an inert-gas welded stainless steel square tube framework and includes mast, forward extension, and aft extension. The main frame carries all loads induced by the crew stations, engine, rotor, undercarriage, stabilizer, and serves as installation platform for additional equipment. Attachment points for the engine installation are provided by a steel tube ring mount at the rear of the mast, which also supports the rotor at its top end.

The fuselage enclosure including its two crew stations is made of glass fibre reinforced plastic. It is mounted to the forward extension of the main frame and is not designed as a load carrying structure.

CHAPTER 54 - N/A

CHAPTER 55 - STABILIZERS

The stabilizer structure with rudder is made of carbon reinforced plastic (CRP) and is bolted to the keel tube (aft extension) of the main frame. Presence and function of the stabilizer plays a vital part in flight stability and safety. Inspect carefully all attachment points and the integrity of the composite component.

In order to assess the integrity of the stabilizer, carefully pull the fin tips in lateral direction (left/right) with a maximum of 150 N. A 'linear' resistance must be felt. In case mechanical noises are heard/felt, contact AutoGyro.

55-40-00 Rudder

The rudder is made of CRP and is hinged to the central fin of stabilizer. An aluminium trim tab is provided to eliminate constant pedal input during cruise flight and to provide a pre-defined rudder setting in case of a control failure. The trim tab should be adjusted to allow pedal-off cruise flight. Adjust according to the following table:

Pedal input (for straight and level flight, slip indic./ball centred)	**Corrective action** (seen from behind, i.e. in flight direction)
Constant right pedal required	Bend trim tab to the left
Constant left pedal required	Bend trim tab to the right

Avoid unnecessary bending as the tab may break at its perforation. A misadjusted or broken tab may change flight characteristics significantly and in case of a rudder control failure, the gyroplane may render difficult to control. Replace trim tab if it feels soft or if fissures at the perforated part are visible.

CHAPTER 56 - WINDOWS

56-10-00 Flight Compartment / Windshields

Environmental protection for pilot and occupant against the air stream, insects, and direct rain is provided by large windshields in each station. The windshields are made of break-proof polycarbonate (Makrolon) and bolted to the gyroplane enclosure.

CHAPTER 57-60 - UNASSIGNED / N/A

CHAPTER 61 - PROPELLER

In standard configuration a 3-bladed, fixed pitch 'HTC' propeller with GRP propeller blades is installed. Depending on customer configuration a spinner may be installed. As an option, a variable pitch propeller may be available, either the Woodcomp KW31 or the Ivoprop DL3-68. The Woodcomp KW 31 is an EASA certified propeller and should ('MUST' in the case of a certified version of the aircraft) be maintained in accordance with the Woodcomp issued MM.

Ivoprop do not issue an MM for their propeller, so the propeller is maintained iaw with RotorSport Ivoprop maintenance manual RSUK0325, and AutoGyro Service Bulletin AG-SB-2017-05-B-EN IVO-prop gearbox overhaul.

Adjustment of the fixed pitch propeller is described in a dedicated Job Card in Part E of this manual. The mechanical end stops of the variable pitch propeller are pre-adjusted by AutoGyro. In case, re-adjustment should be necessary on the variable pitch propeller, please refer to the manufacturer's documentation or contact AutoGyro. It is essential that the propeller pitch adjustment does not prevent the aircraft from achieving a minimum climb rate in full coarse of 250fpm at MaxTOW, or allow over-revving in the climb at full fine. Nominal engine rpm at full fine in the climb is 5500, max 5700.

In certain cases, damaged propeller blades can be repaired (specialized / SPC maintenance task). Concerning repair limits and allowable damage contact AutoGyro GmbH. Provide a precise description of the damage, dimensions and preferably photos of the affected area.

61-10-00 Propeller assembly

The propeller assembly comprises propeller blades, hub and related attachment hardware.

61-20-00 Controlling

In case of a variable pitch propeller (VPP) refer to the manufacturer's (IVO DL3-68 or Woodcomp KW31) documentation and respective wiring diagrams in Part D of this manual.

CHAPTER 62 - ROTOR

The two-bladed, semi-rigid, teetering rotor system comprises high-strength aluminium extruded rotor blades, a hub bar, and a common teeter hinge assembly.

Due to their working principle, every two-bladed teetering rotor system induces a certain amount of vibration, depending on flight condition (speed) and disc loading. AutoGyro optimizes each rotor system at a medium disc loading and speed before delivery. However, if the rotor system shall be tuned to a different flight condition or reveals undue vibration, contact AutoGyro or a specialized service partners (maintenance level 'S').

IMPORTANT NOTE: Rotor Systems are Manufacturer Life Limited (MLL)!

Some guidelines to Vibration and Noise Analysis and classification schemes are provided in *CHAPTER 18* (Part B) of this manual.

62-11-00 Rotor – Teetering Parts

The teetering parts of the rotor system consist of teeter bolt, teeter block, rotor hub (bar), and rotor blades.

IMPORTANT NOTE: Only rotor system 8.4m standard or TOPP, or 8.6m TOPP is released for use with the Sport 2017.

The rotor blades feature an aerodynamic profile especially suitable for rotorcraft which, in combination with its relative centre of gravity, provides aerodynamic stability by eliminating negative blade pitching moments and flutter tendency. The hollow blade profile is sealed at both ends by plastic blade caps.

The aluminium rotor hub bar is pre-coned to the natural coning angle of the blades and connects the blades firmly to each side with fitting bolts and a clamping profile. In order to compensate for asymmetric air flow in forward flight the blades are free to teeter. The hinge assembly consists of teeter tower, teeter bolt and teeter block.

The teeter bolt runs in a long Teflon coated bushing in the teeter block (main bearing action), as well as two shorter bushings in the teeter tower (emergency bearing action). The main bearing action is supported by special grease which is applied through a grease nipple on top of the teeter block. Servicing is described in *CHAPTER 05* (Part B) of this manual.

62-31-00 Rotor Head Bridge, Bearing and Teeter Tower

The rotor head bridge is made of welded stainless steel. Rotor bearing (Manufacturer Life Limited!) and teeter tower represent one integrated component.

62-32-00 Rotor Gimbal Head

Tilting action or flight control of the rotor is facilitated by the rotor gimbal head. The gimbal head is sometimes also referred to as ‘hang point’ and represents a cardan hinge.

62-41-00 Rotor RPM Monitoring

Rotor RPM monitoring is realized by an inductive pick-up which is installed with a gap of 2-3mm at the sprocket wheel. The sensor counts the (10) holes in the sprocket disc. Rotor RPM is indicated in the cockpit in an analogue-type instrument which also houses the control electronic. The system requires power supply.

CHAPTER 63 - ROTOR DRIVE

63-11-00 Pre-rotator

The pre-rotator is used to quickly bring the rotor up to safe RPM for take-off run by the press of a button. Pre-rotation is activated by a push-button on the flight control stick. Because of a safety circuit, activation of the pre-rotator is only possible with the pneumatic mode selector in FLIGHT position and the control stick in forward position. This prevents inadvertent activation of the pre-rotator during flight or in BRAKE mode.

The pre-rotator is activated as long as the respective push-button on the control stick head is depressed, provided the following pre-conditions are met:

- bar (if installed) down and locked
- pneumatic mode selector set to FLIGHT
- control stick in forward position (controlled by a micro switch)
- trim pressure less than 3 bar

In this case, the pneumatic clutch is pressurized. Engine torque is then transmitted through the pre-rotator drive, a 90° gearbox and upper drive to the pinion which is engaged by another small pneumatic actuator into the geared ring of the rotor head. The drive pinion is sliding on a helical gear to provide automatic lock-out in case of rotor RPM overrun. In order to allow necessary changes in length both pre-rotator drive shafts feature a sliding sleeve coupling.

The pre-rotator can be activated in BRAKE position to park the rotor blades fore-aft for taxi. To do so, the pre-rotator push-button and the overdrive/override switch in the cockpit panel have to be pressed simultaneously. Prolonged activation of the pre-rotator with rotor brake engaged should be avoided.

63-11-10 Pre-rotator Lower Engagement

Pre-rotator lower engagement consists of the pneumatically activated clutch.

For pneumatic control of the clutch refer to *CHAPTER 36 - PNEUMATIC*.

63-11-20 Pre-rotator Drive

Power flow is realized through a 90-degree gearbox and drive shafts. The 90-degree gearbox is mounted directly to the disc clutch. The pre-rotator drive shaft features a cardan joint right after the 90-degree gearbox and a sliding shaft coupling in the upper area to allow changes in length due to the tilt of the rotor head.

63-11-30 Pre-rotator Upper Engagement

The pre-rotator upper engagement comprises a drive pinion with bearing, which is engaged by a small pneumatic actuator into the geared ring / sprocket wheel of the rotor head. The drive pinion is sliding on a helical gear to provide automatic lock-out in case of rotor RPM overrun.

63-51-00 Rotor Brake System

The rotor brake system consists of a brake pad mounted to a bracket which is hinged to the rotor head bridge. A second brake pad is mounted in forward position which will contact the sprocket wheel only when in full flat / level (stick fully forward) position. With the pneumatic mode selector in BRAKE position the operation of the pneumatic trim actuator is reversed so that increased pressure causes the actuator to push the rotor head up (or level) and presses the brake pads against the rotor head disc. In order to increase brake pressure, move the 4-way trim switch to aft. Note that this action will also push the control stick forward which will push the sprocket wheel against the forward brake pad. At full brake pressure the control stick will be maintained in its full forward position while aft and forward brake pads provide braking action.

Due to its main function the pneumatic brake/trim actuator/cylinder itself is allocated *to 67-05-00 Pitch Trim*.

CHAPTER 64-66 - N/A

CHAPTER 67 - ROTOR FLIGHT CONTROL

Rotor flight control comprises of control stick, a base control unit / tube, flight control base link and control rods (push rods) which are connected to the rotor head bridge.

Pitch and roll of the gyroplane is controlled by tilting the complete rotor head by means of the control stick. Control input is transferred via a base control unit / tube running horizontally along the forward extension of the main frame (below the seats) to the base link and from there to the rotor head via control rods (push rods). The control rods with ball joints at both ends are supported by a bell crank about half way up the mast.

The control stick head is ergonomically shaped to fit the pilot's right hand and features control buttons for radio transmission (1), a four-way trim function (2), and activation of the pre-rotator (3).

Control Stick Head

1 – Radio transmission
2 – Trim switch
3 – Pre-rotator

67-05-00 Pitch Trim System / Rotor Brake

The Pitch Trim System comprises of a 4-way beep trim switch (2) / "Chinese Hat" at the flight control stick and the pitch trim / brake pneumatic actuator. Pneumatic control is allocated to and described in *CHAPTER 36*. Components related to the rotor brake are allocated to *63-51-00 Rotor Brake System*.

Trimming is effected by varying trim pressure in the pneumatic trim actuator which is installed in parallel with the rotor head tilt for pitch control. Aft or nose-up trimming activates the electrical compressor and increases trim pressure, causing the actuator to contract, and tilting the rotor disc aft. Forward trimming opens the pressure relief valve to reduce trim pressure and allows the rotor disc to flatten, due to the spindle head offset and the gyroplane's weight. The actual trim condition is indicated on the trim/brake pressure gauge in the centre panel of the cockpit.

67-06-00 Roll Trim System

Lateral/roll trim works accordingly, using a lateral pneumatic trim cylinder. Lateral trim condition is indicated by a self-dimming LED bar on the instrument panel.

CHAPTER 68-70 - UNASSIGNED / N/A

CHAPTER 71 - POWER PLANT

Power plant comprises aircraft provisions, installations and systems related to the core engine. The engine itself is allocated to *CHAPTER 72 – 74*.

71-20-00 Engine Mounts

Attachment points for the engine installation are provided by a steel tube ring mount at the rear of the mast. To provide vibration isolation, the engine is connected to the ring frame by 4 rubber mounting bushings. The engine mounting bushings have to be inspected regularly and have to be replaced, if torn or porous. Defective rubber bushing can also cause undue engine/propeller vibration.

IMPORTANT NOTE: Engine mounting bushings are recommended to be changed at a minimum of every 5years.

71-50-00 Engine Electrical Harness

The engine electrical harness includes wiring, cables and cockpit switches for starting, energizing and grounding of the dual breakerless capacitor discharge ignition circuits (including instructor mag switches, if installed), and engine indication. A wiring diagram is provided in Part D of this manual. Also refer to the engine manufacturer's documentation.

71-60-00 Engine Air Intakes

The engine aspirates through air filters mounted on each of the carburettors, or in the case of the 914UL engine, via a filter located on the turbocharger.

71-70-00 Engine Drains

Oil tank breathing is provided by a rubber hose which is routed down into the mast.

CHAPTER 72 TO 74 - ENGINE RELATED

For the (core) engine refer to the engine manufacturer's documentation in its latest revision.

Concerning fuel system (Filter, Pumps, Shut-off valve) see *CHAPTER 28*.

Engine cowlings are described in *CHAPTER 52*. For removal and installation see the dedicated Job Card in Part E of this manual.

CHAPTER 75 - AIR / ENGINE COOLING

Engine cooling is provided by air cooled cylinders and liquid cooled cylinder heads. The sensors are mounted in the cylinder heads, into the coolant. Therefore, coolant temperature (CT) indication in the cockpit corresponds to actual coolant temperature. The water cooling system comprises of engine driven pump, one radiator, an aluminium expansion tank with radiator cap and sight glass, thermostat and hoses.

The radiator is mounted on rubber isolators and brackets just in front of the propeller. Hoses from/to the radiator go to the engine water pump and return. Hot water to the carburettor heat jackets is provided via T-pieces.

For the relevant checking and replenishing procedures, refer to engine manufacturer's manual.

Oil cooling is described in *CHAPTER 79*.

CHAPTER 76 - ENGINE CONTROLS

Engine control consists of engine power lever / throttle with choke and related cockpit switches for engine shut-down and test.

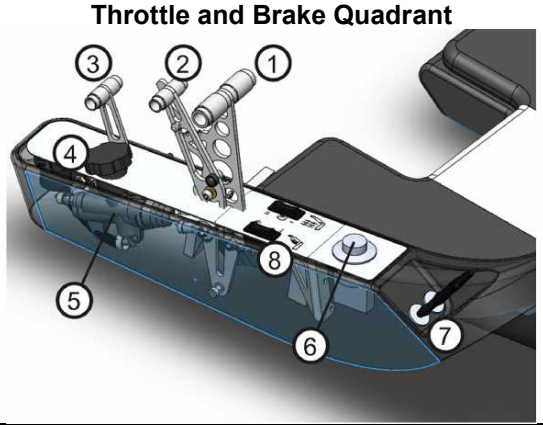
76-10-00 Power Control / Choke

Engine power / throttle is controlled by a control column located on the left side of the pilot station. The unit combines a choke control (3) as well as a lever for activation of the wheel brake.

Throttle control (1) is conventional with IDLE in aft (or pulled) and full throttle in most forward position. With the ROTAX 914 UL engine the boost range is entered by overcoming a small resistance to the front. The throttle lever is linked with cable controls to the carburettors. A mechanical spring applies tension to the control cables and brings the carburettors to full throttle in case of a cable break. The throttle lever has a pre-set friction brake which holds the throttle in the selected position.

Choke (3) is used start a cold engine. In order to do so, pull the choke lever fully to the rear or ON position and be sure to have the throttle in idle position. After starting the engine and a short warm-up, the choke can be slowly disengaged by moving the lever into its forward or OFF position.

Throttle and Brake Quadrant



1 – Throttle lever
2 – Brake lever with locking pawl
3 – Choke control
4 – Brake fluid reservoir
5 – Primary brake cylinder
6 – Seat adjustment control push button
7 – Headset / helmet connectors
8 – Seat heating control (if installed)

76-20-00 Engine Shutdown / Emergency

For normal and emergency shutdown, a pair of magneto switches (MAG 1 + MAG 2) is installed in the cockpit centre panel. The magneto switches are also used for testing the individual ignition circuits.

CHAPTER 77 - ENGINE INDICATING

All relevant engine parameters are displayed in the cockpit, using analogue-type instruments in standard version. In case of integrated cockpit systems (option), engine data may be displayed in the integrated instrumentation system (glass cockpit). An hour meter (Hobbs Meter) is installed in the cockpit to count engine operating time with an accuracy of two decimals (1/100 hrs). Although the 'engine operating time' is also used for total aircraft hours counting, the hour meter is allocated to this chapter as the main function.

77-10-00 Power

With a piston engine with fixed pitch propeller, engine power indication solely consists of an engine RPM indicator. In case a variable pitch propeller is installed, a manifold absolute pressure (MAP) indicator is provided in addition. See *CHAPTER 31* for different cockpit layouts.

77-20-00 Temperature

For temperature indication, an engine coolant temperature (CT) gauge is provided. Due to the engine cooling principle (air cooled cylinders with water cooled cylinder heads) the CT represents cylinder head coolant temperature.

Oil temperature indication is described in *CHAPTER 79 – OIL SYSTEM*.

77-40-00 Integrated Engine Instrument Systems

Integrated display systems (glass cockpit) are described in *31-60-00 Integrated Display Systems*.

CHAPTER 78 - EXHAUST

78-00-00 Exhaust

The basic exhaust system including manifold and turbo charger with waste gate (only ROTAX 914) is part of the core engine. Refer to the engine manufacturer's documentation. The exhaust system is supplemented by a silencer/muffler supplied by AutoGyro, venting to the right side of the aircraft and pointing at 45° backwards and up towards the propeller where required for noise reduction. This configuration meets the noise test requirements of Germany.

CHAPTER 79 - OIL SYSTEM

The dry sump forced lubrication comprises oil pump, separate oil tank with dip stick, oil cooler, hoses, as well as oil temperature and oil pressure indication.

79-11-00 Storage / Oil tank

The oil reservoir with dipstick is behind the aft seat and can be easily reached through an access door on the right hand side of the fuselage. The oil tank is made of stainless steel with oil filler cap. The cap can be unscrewed / tightened by a quarter rotation in order to check the oil level using a dip stick or for replenishing of engine oil.

The type of lubrication system requires a special procedure for accurate oil level checking and to prevent overfilling. Refer to the engine manufacturer documentation for detail and procedures.

79-20-00 Distribution and Cooling

Oil distribution and cooling is provided by a separate oil cooler, which is connected to the oil circuit by oil hoses and a thermostat assembly.

79-21-00 Oil Hoses and Lines

Oil hoses are made of PTFE hoses, protected by braided stainless steel.

79-22-00 Oil Cooler

An oil cooler is fitted to the lower aft end of the fuselage / enclosure, below the central section of the main gear suspension bow. Oil flow through the cooler is regulated by a thermostat assembly which opens the cooler circuit at approximately 90 °C.

Do not attempt to block the oil cooler to increase the oil temperature, as this could cause overheating on a hot day. The oil reaches at least 90 °C before the oil can transit through the cooler.

79-30-00 Indicating

Oil temperature is measured in the oil feed line at the thermostat, between the oil cooler and the engine. The oil in this pipe is drawn from the oil sump, where the hot oil from the engine is delivered and mixes. When the gauge indicates 50 °C then the engine oil leaving the engine will exceed that value.

When the oil temperature reaches 90 °C the thermostat will open, allowing the oil to pass through the oil cooler matrix. Having been cooled, the oil then passes the same sensor, which will now indicate a lower temperature than 90 °C – subject to the incoming oil temp and OAT.

Indicators of Oil Pressure (Oil-P) and Oil Temperature (Oil-T) are provided in the cockpit as analogue-type instruments in standard version. See *CHAPTER 31* for different cockpit layouts.

Contents

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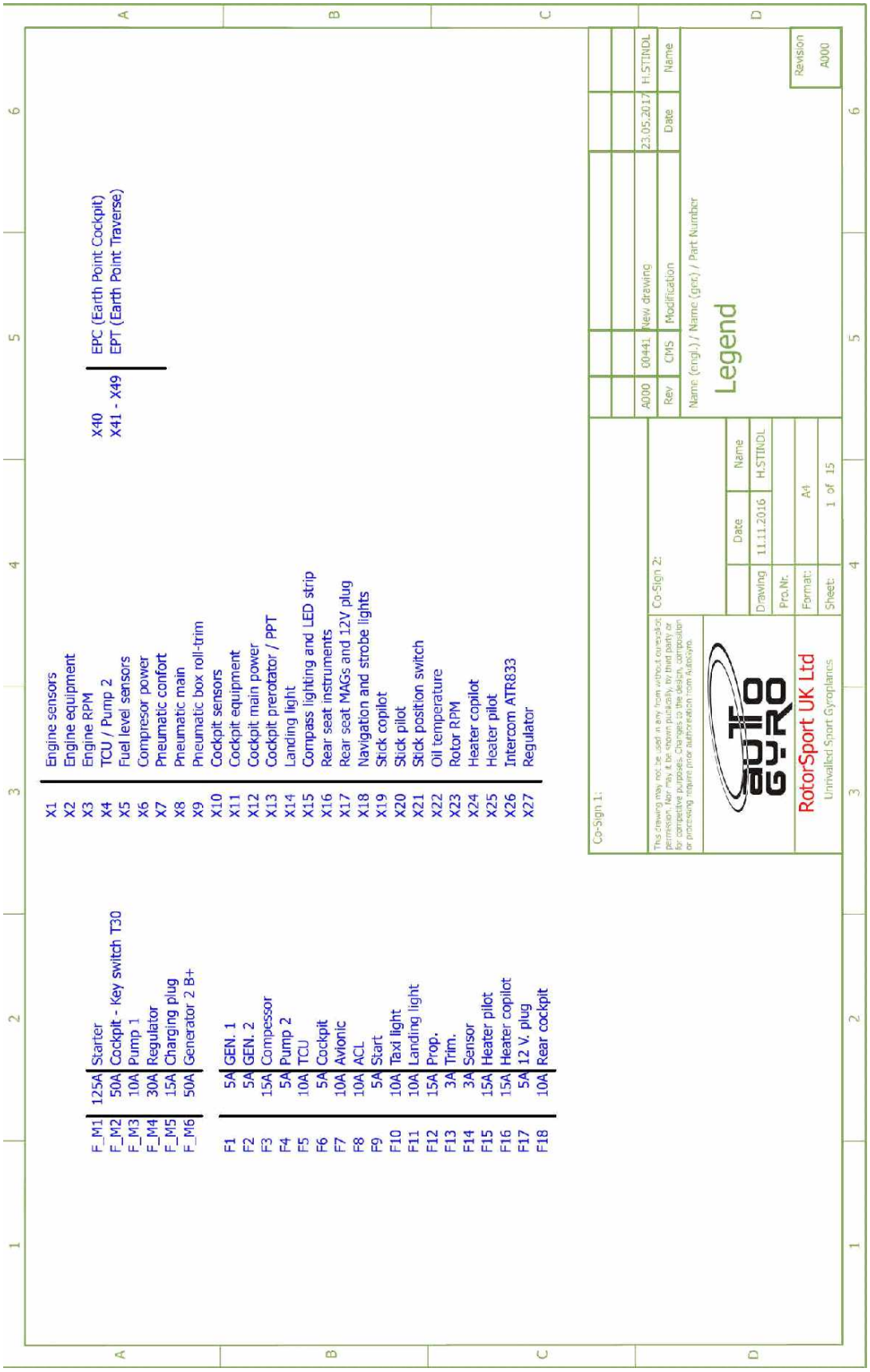
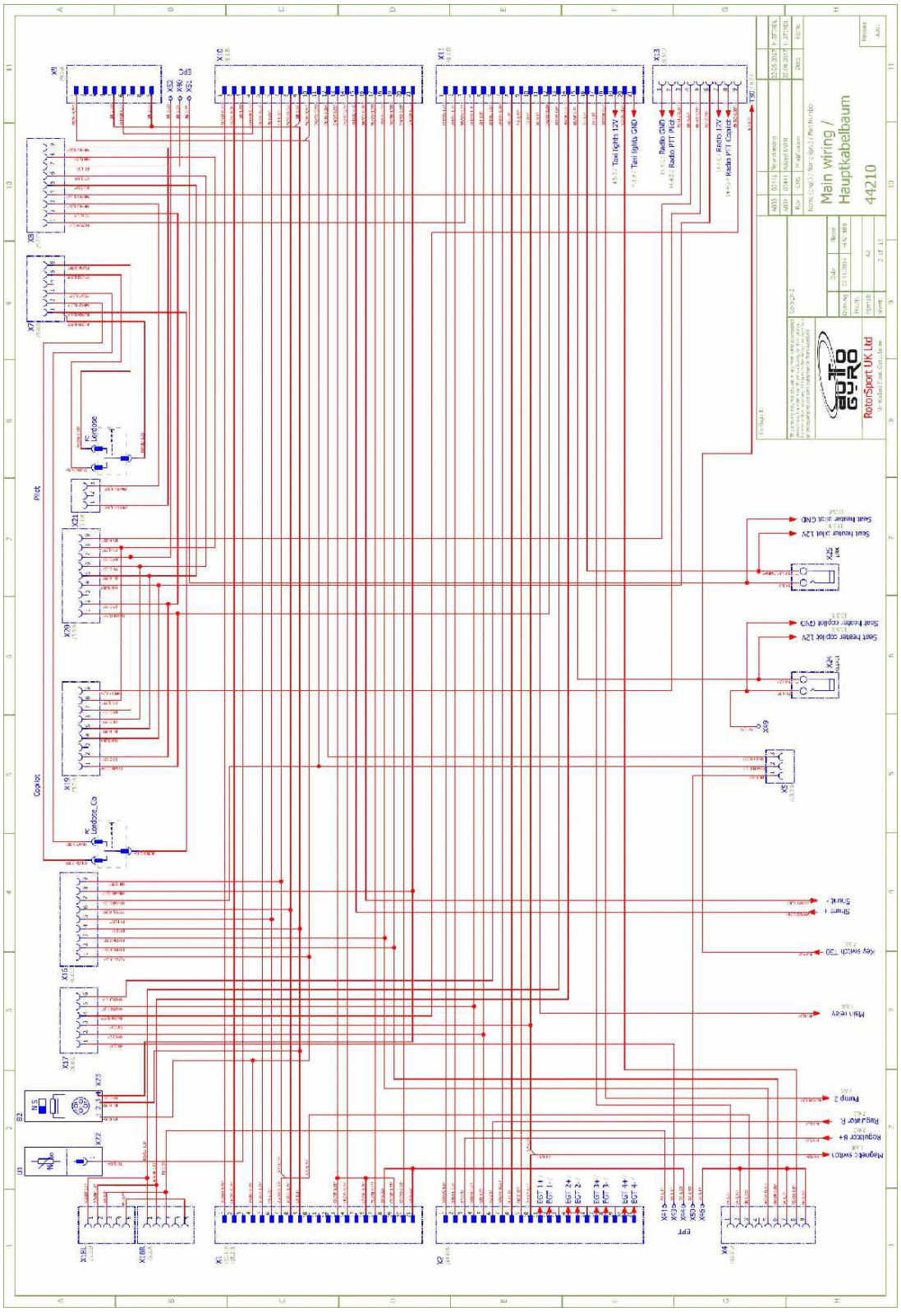
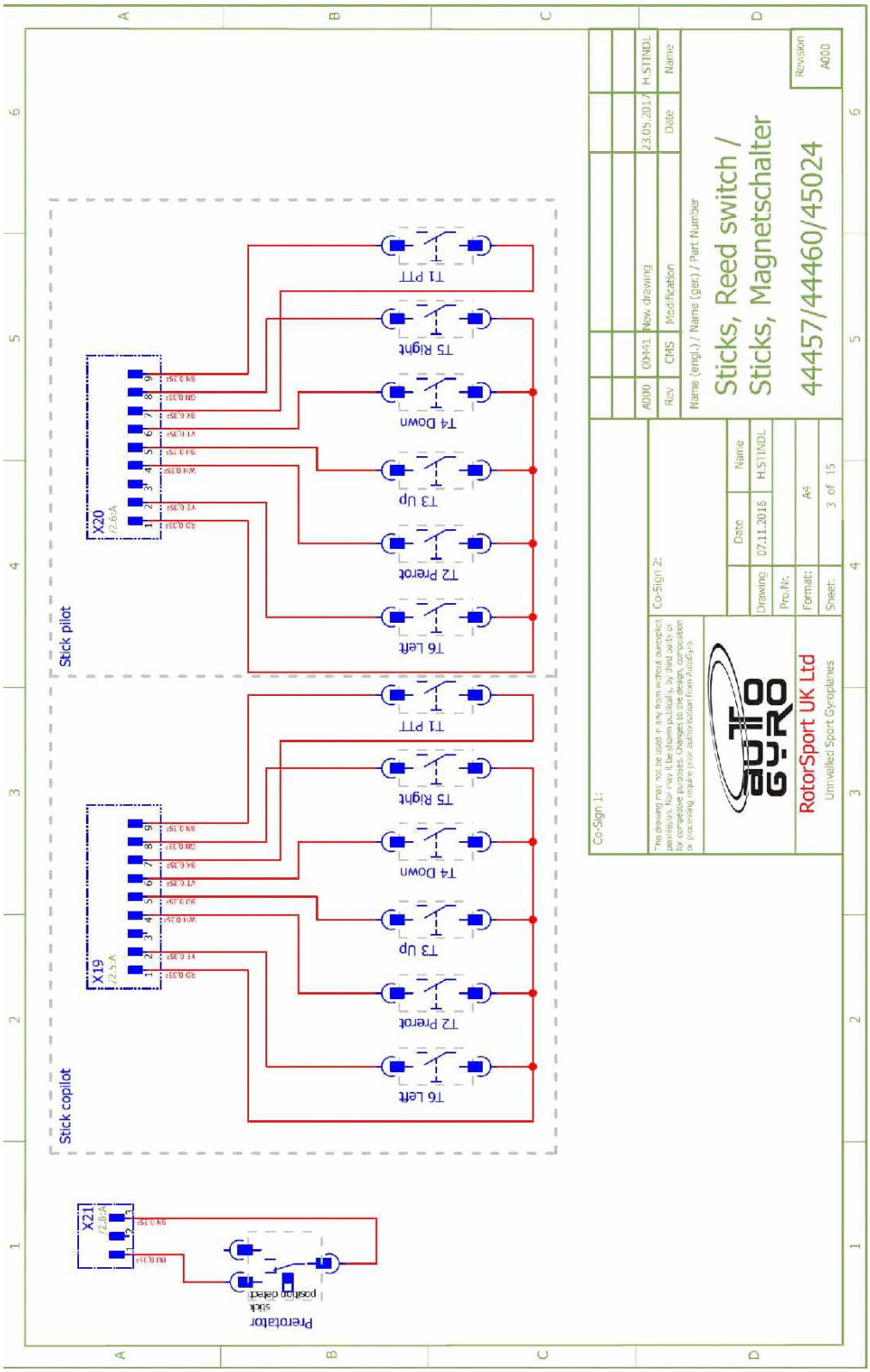
Legend

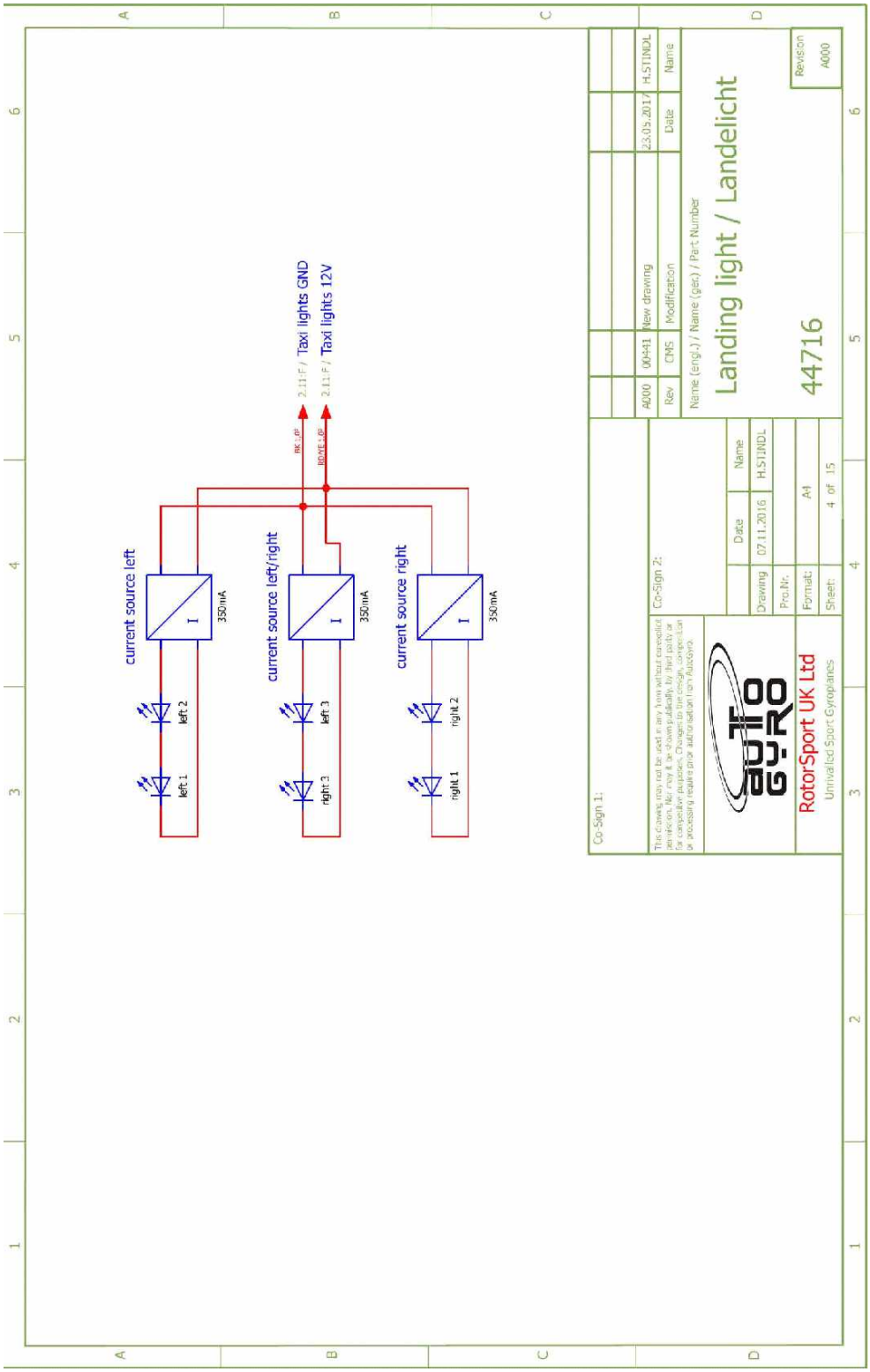

Legend
RotorSport UK Ltd
Unrivalled Sport Gyroplanes
X1 Engine sensors
X2 Engine equipment
X3 Engine RPM
X4 TCU / Pump 2
X5 Fuel level sensors
X6 Compresor power
X7 Pneumatic confort
X8 Pneumatic main
X9 Pneumatic box roll-trim
X10 Cockpit sensors
X11 Cockpit equipment
X12 Cockpit main power
X13 Cockpit prerotator / PPT
X14 Landing light
X15 Compass lighting and LED strip
X16 Rear seat instruments
X17 Rear seat MAGs and 12V plug
X18 Navigation and strobe lights
X19 Stick copilot
X20 Stick pilot
X21 Stick position switch
X22 Oil temperature
X23 Rotor RPM
X24 Heater copilot
X25 Heater pilot
X26 Intercom ATR833
X27 Regulator
X40 EPC (Earth Point Cockpit)
X41 - X49 EPT (Earth Point Traverse)
F_M1 125A Starter
F_M2 50A Cockpit - Key switch T30
F_M3 10A Pump 1
F_M4 30A Regulator
F_M5 15A Charging plug
F_M6 50A Generator 2 B+
F1 5A GEN. 1
F2 5A GEN. 2
F3 15A Compessor
F4 5A Pump 2
F5 10A TCU
F6 5A Cockpit
F7 10A Avionic
F8 10A ACL
F9 5A Start
F10 10A Taxi light
F11 10A Landing light
F12 15A Prop.
F13 3A Trim.
F14 3A Sensor
F15 15A Heater pilot
F16 15A Heater copilot
F17 5A 12 V. plug
F18 10A Rear cockpit
A000 00441 New drawing 23.05.2017 H.STINDL
Rev CMS Modification Date Name
Name (engl.) / Name (ger.) / Part Number
Co-Sign 1:
Co-Sign 2:
Date Name
Drawing 11.11.2016 H.STINDL
Pro.Nr.
Format: A4
Sheet: 1 of 15
Revision A000



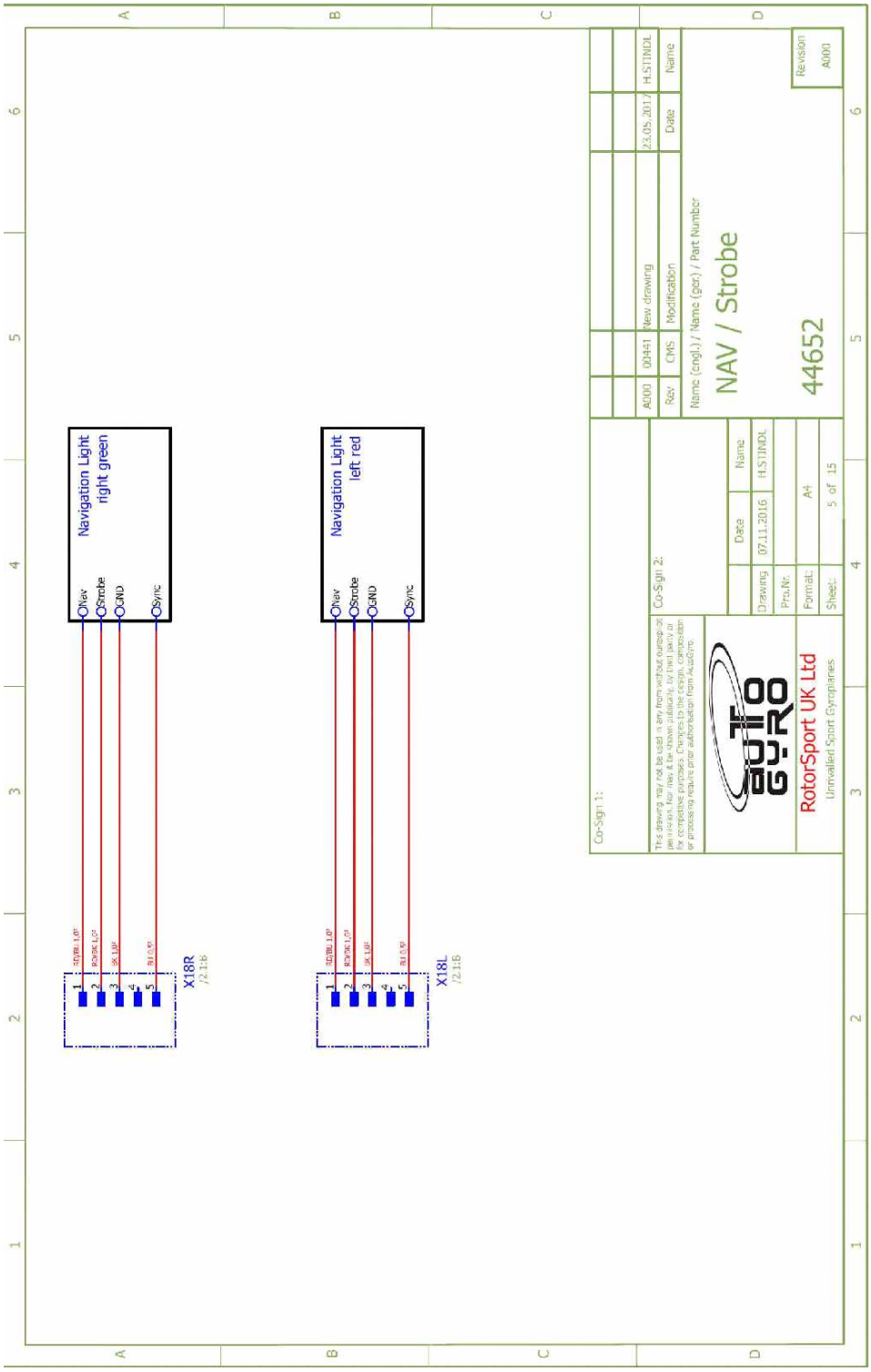
Wiring Diagram – Main Wiring



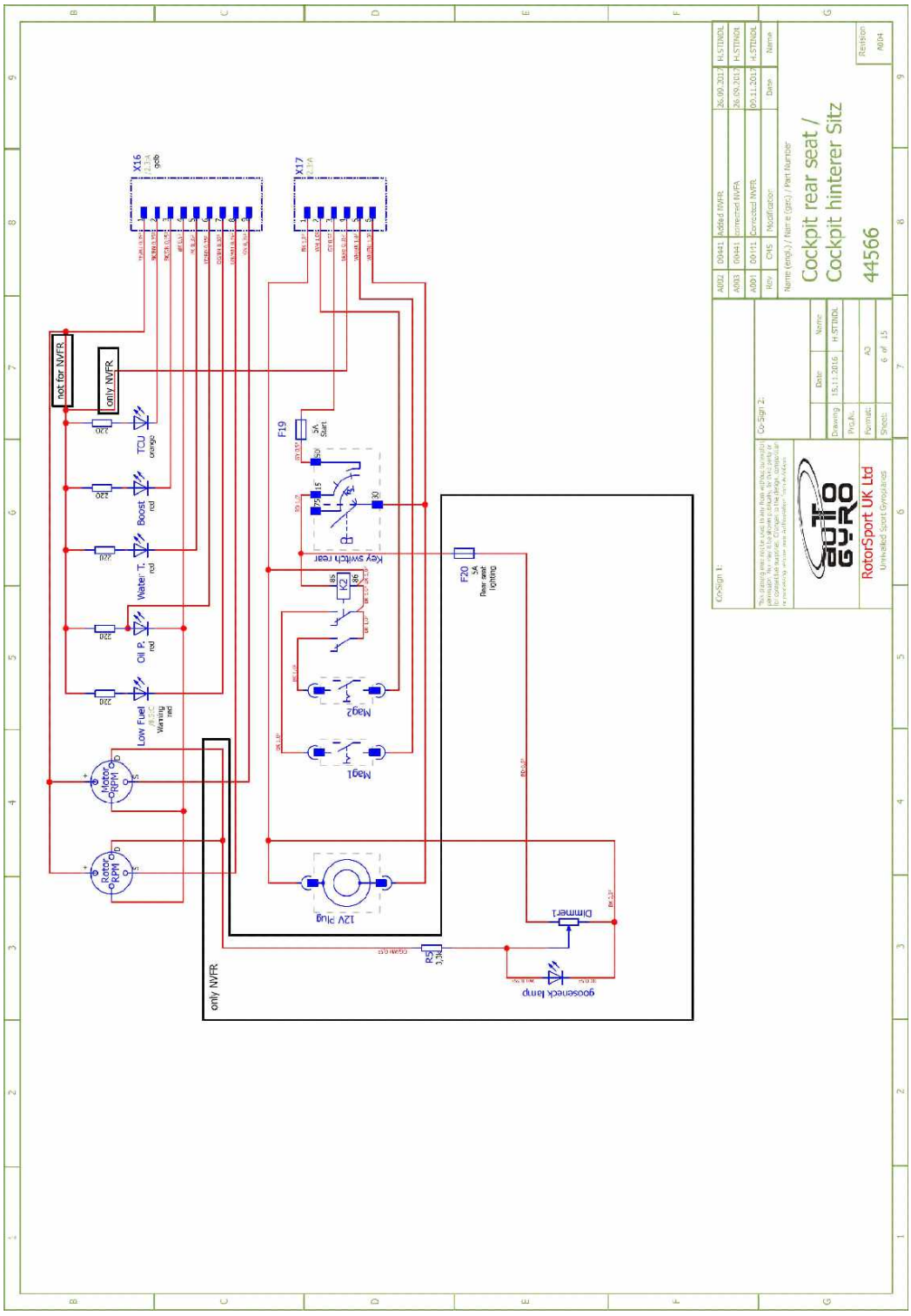
Wiring Diagram – Sticks, Reed switch



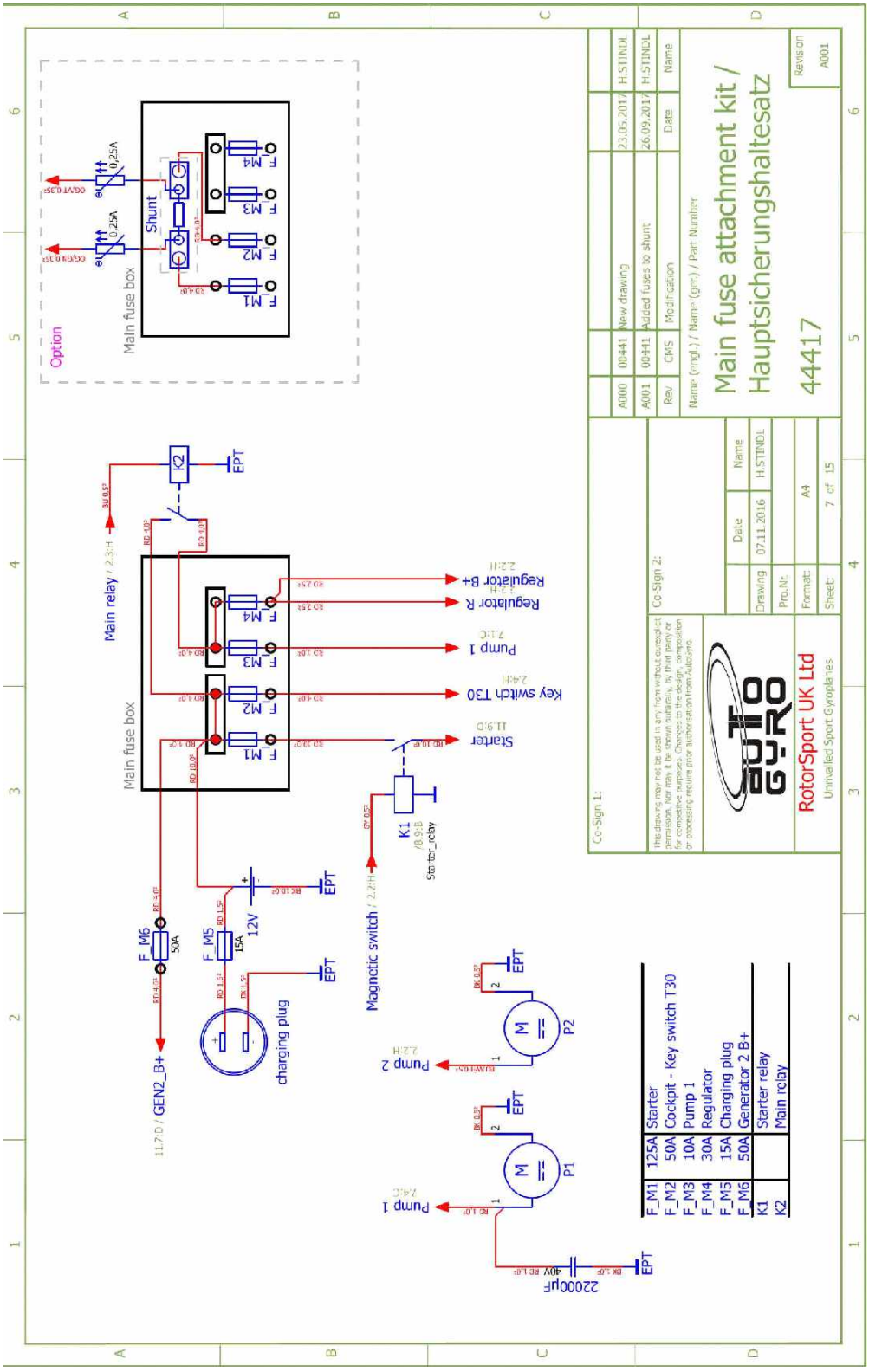
Wiring Diagram – Landing light



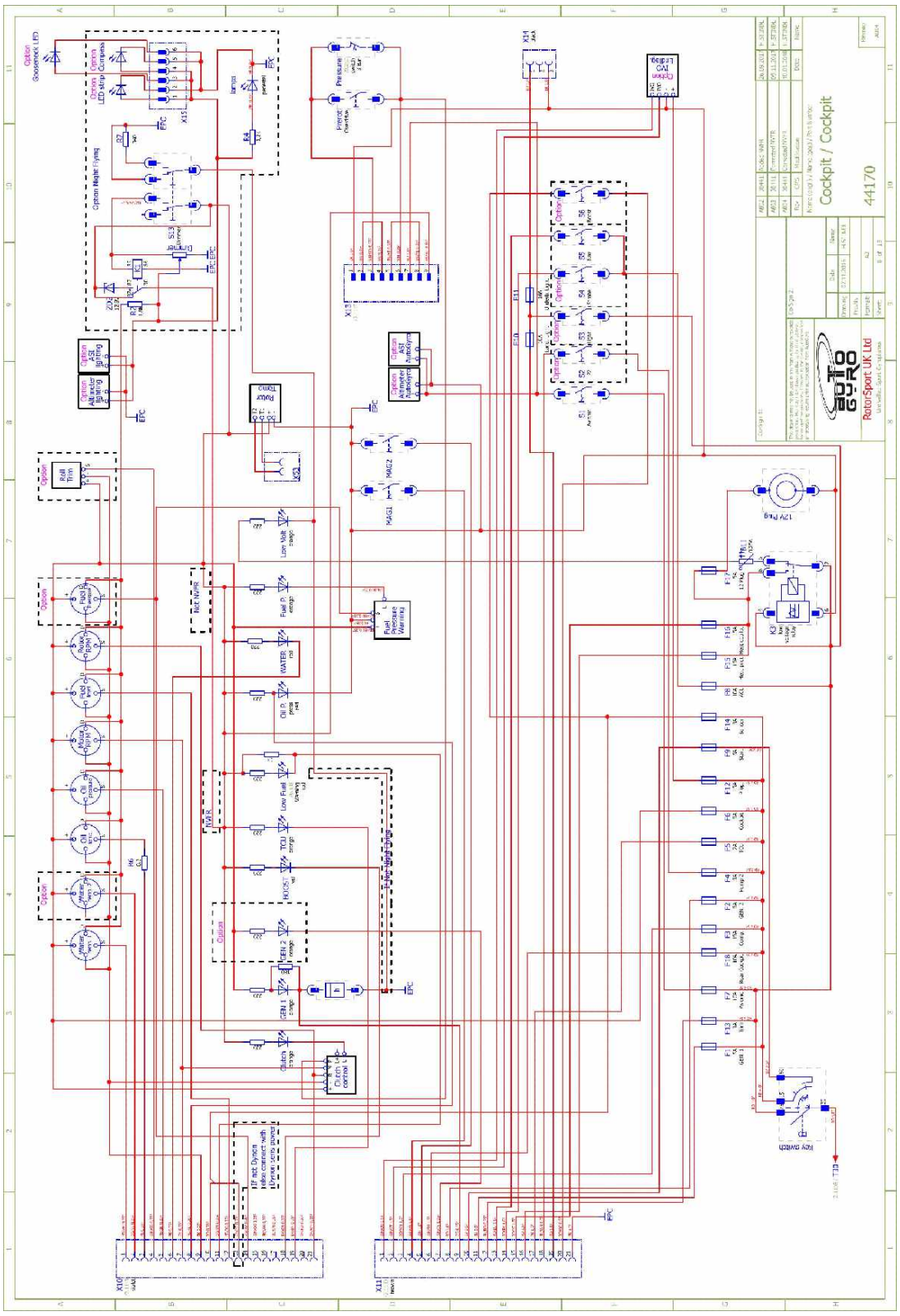
Wiring Diagram – NAV / Strobe



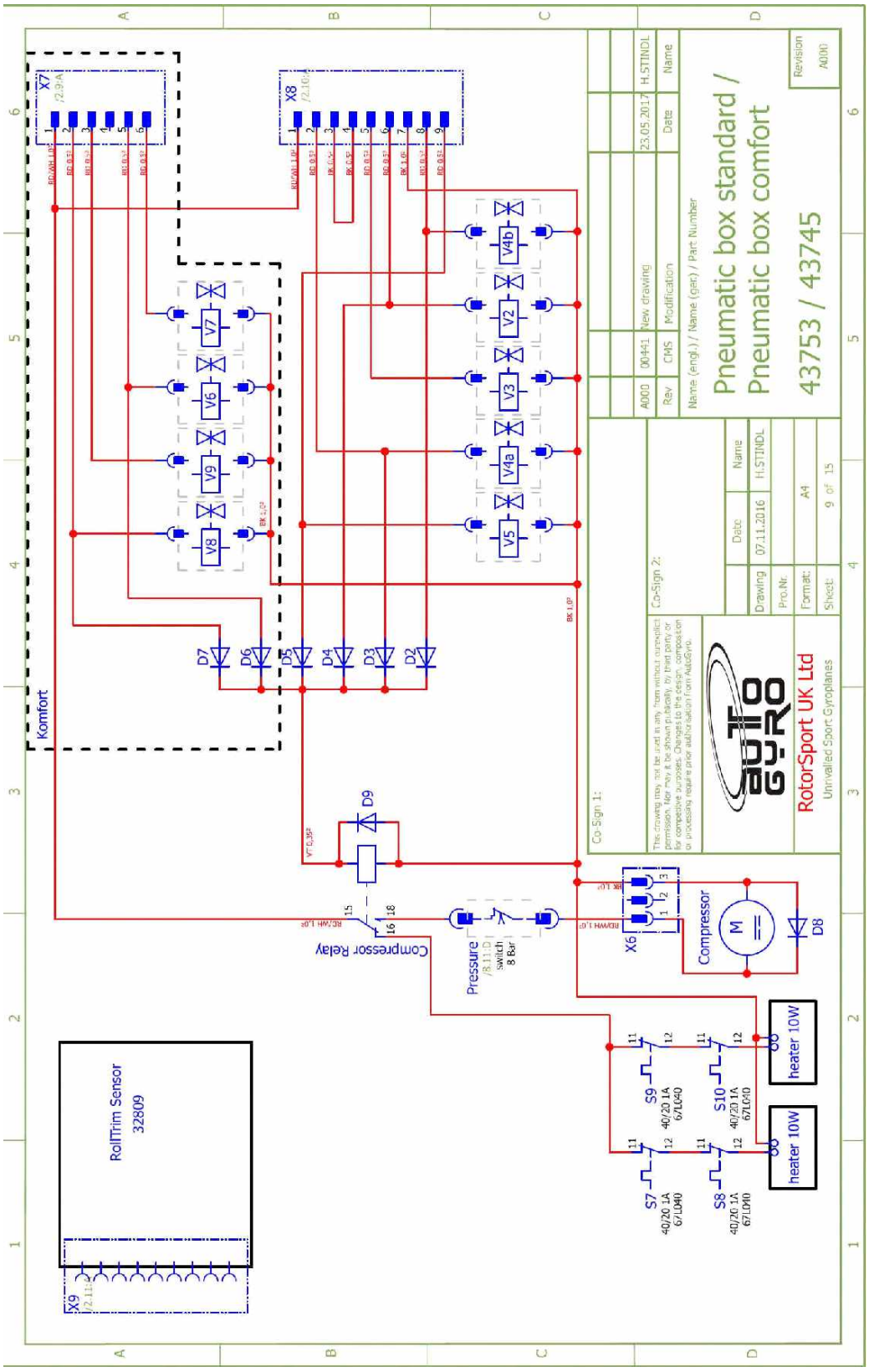
Wiring Diagram – Cockpit rear seat



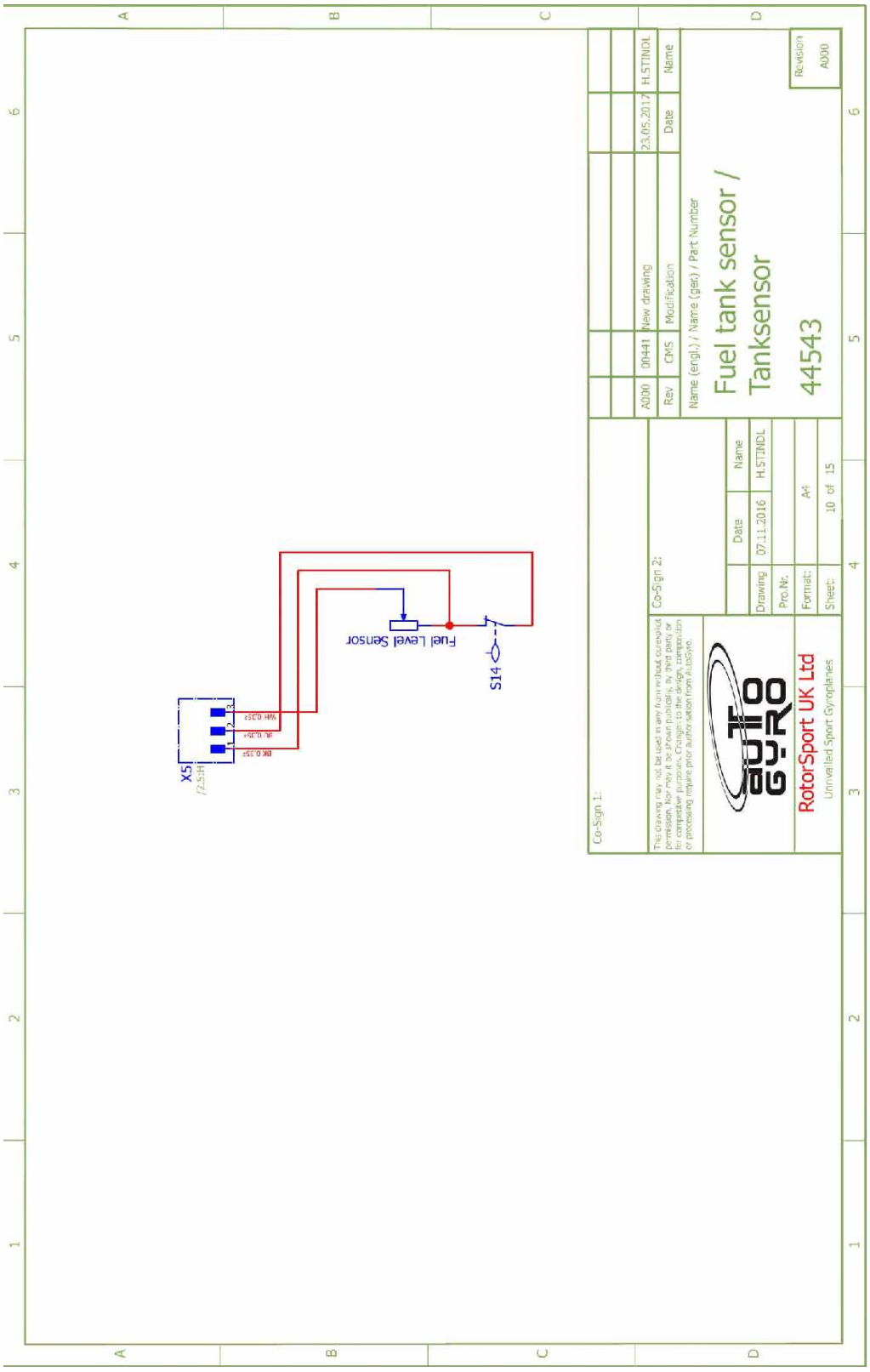
Wiring Diagram – Main fuse attachment kit



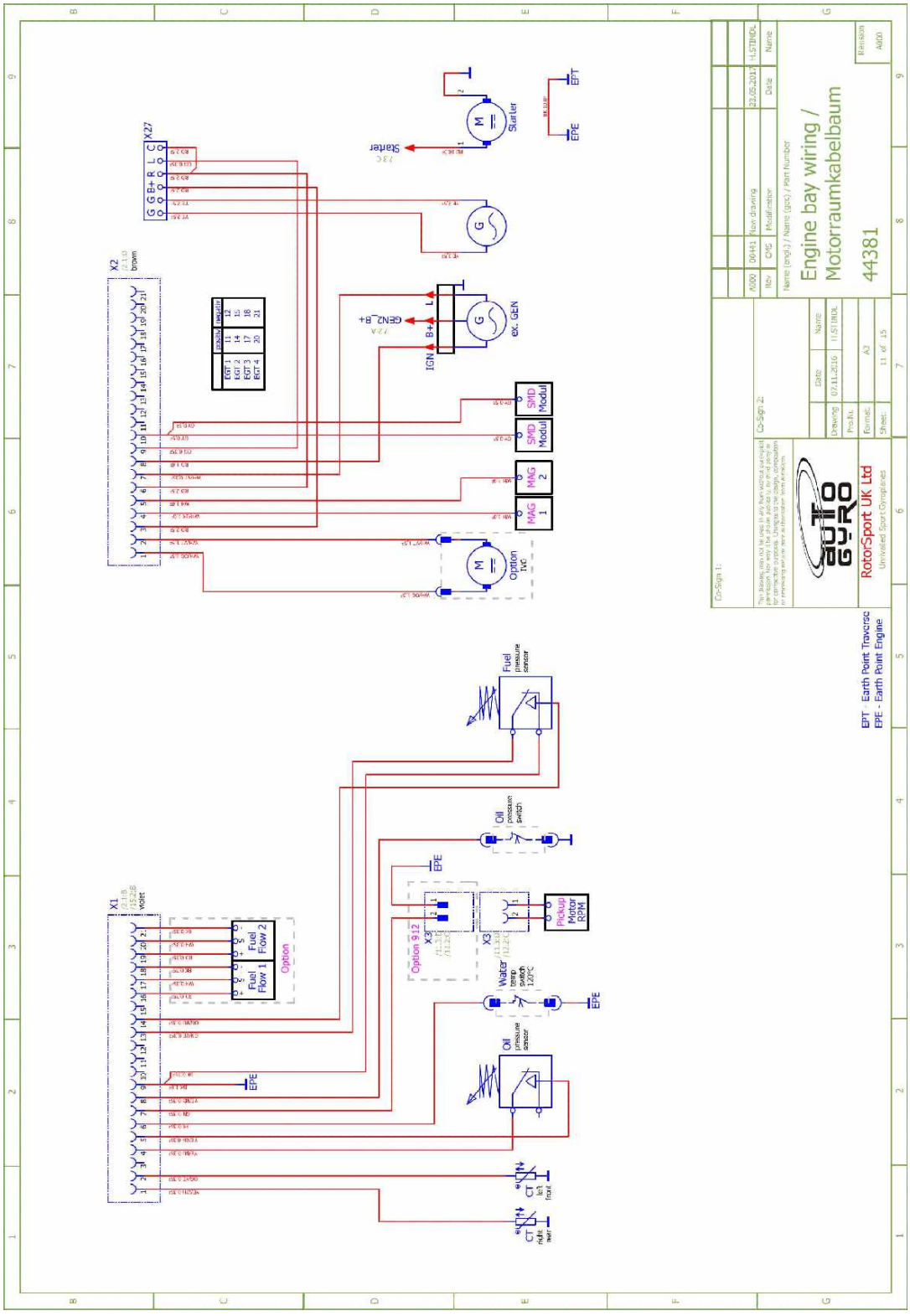
Wiring Diagram - Cockpit



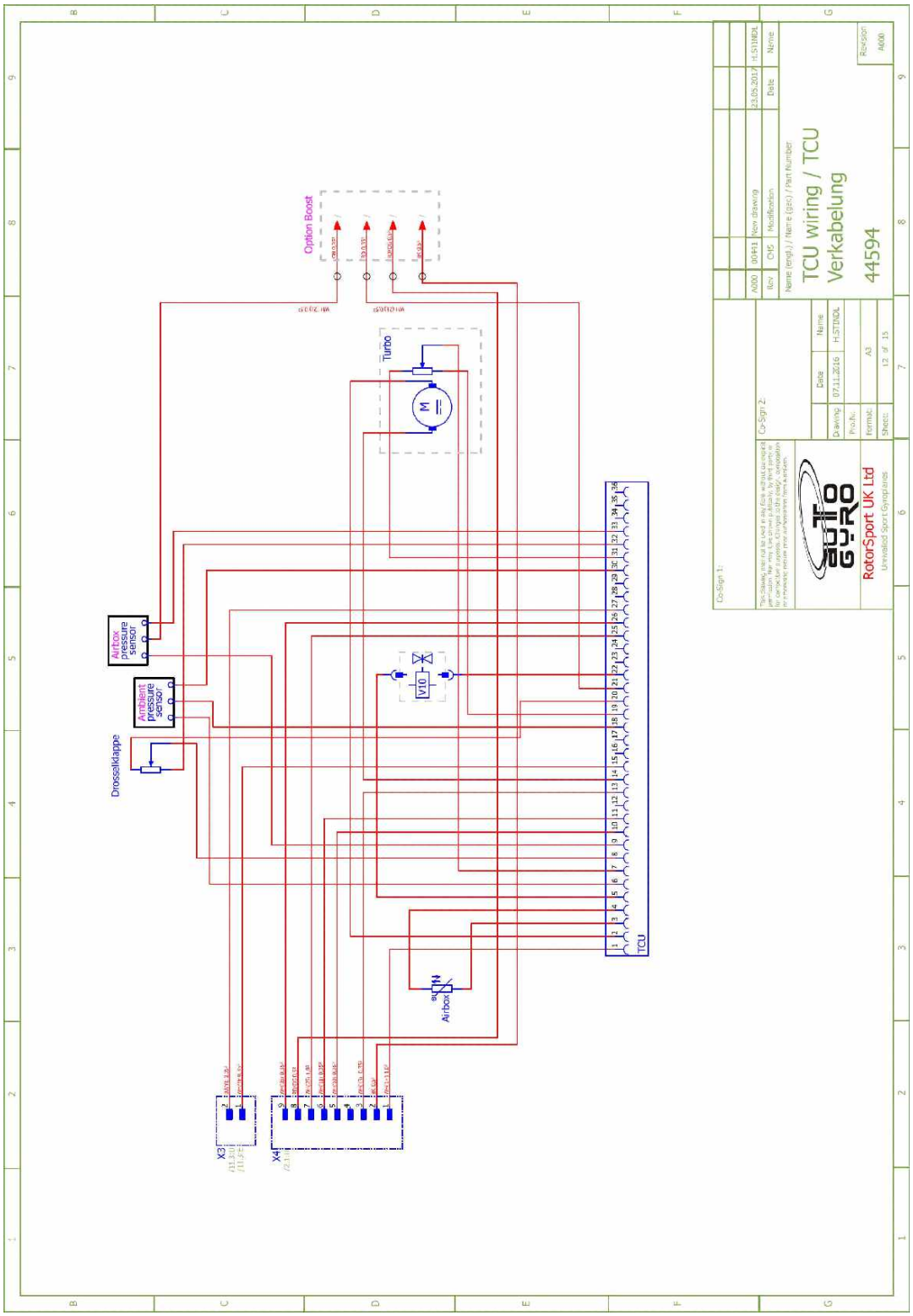
Wiring Diagram – Pneumatic box standard



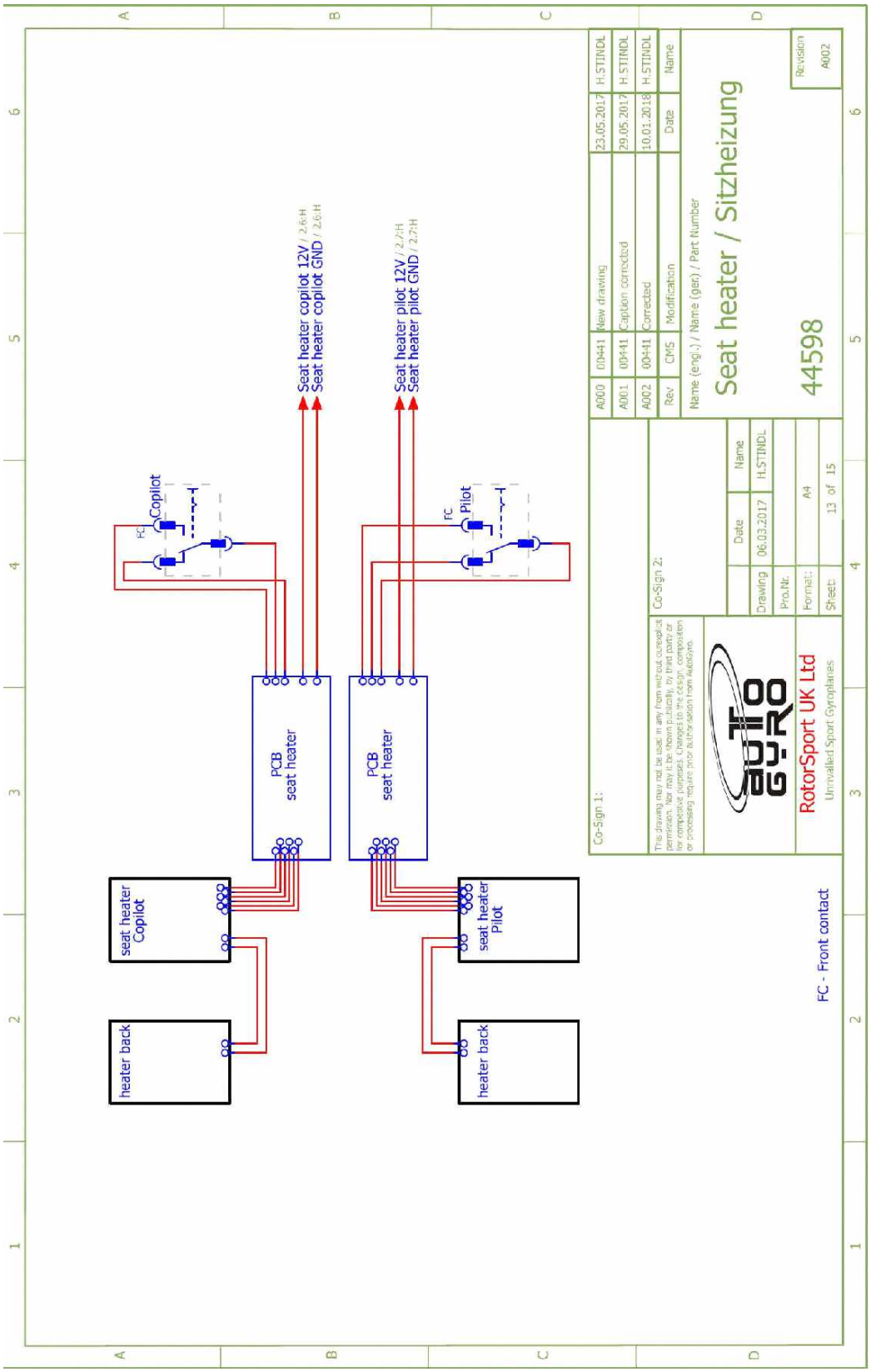
Wiring Diagram – Fuel tank sensor



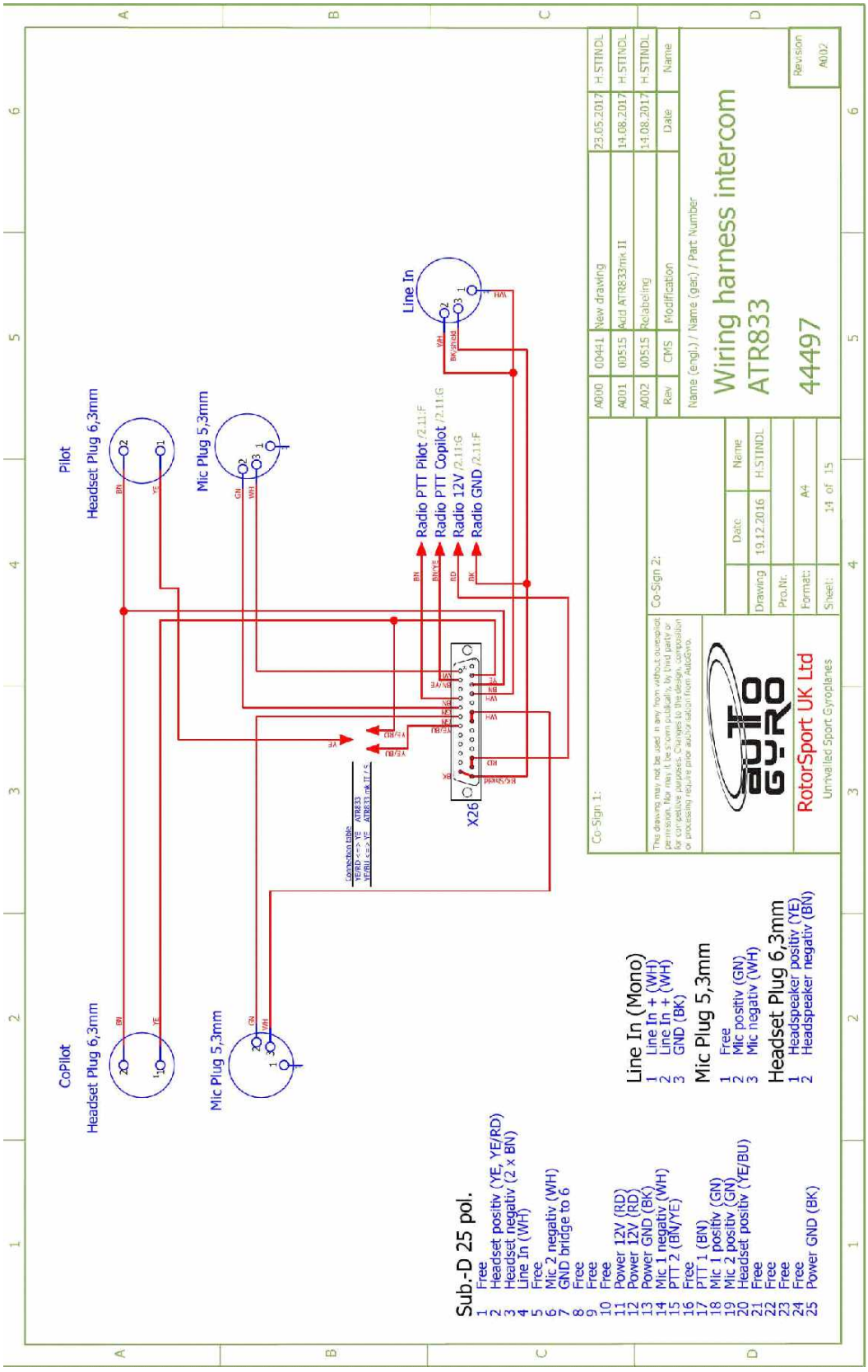
Wiring Diagram – Engine bay wiring



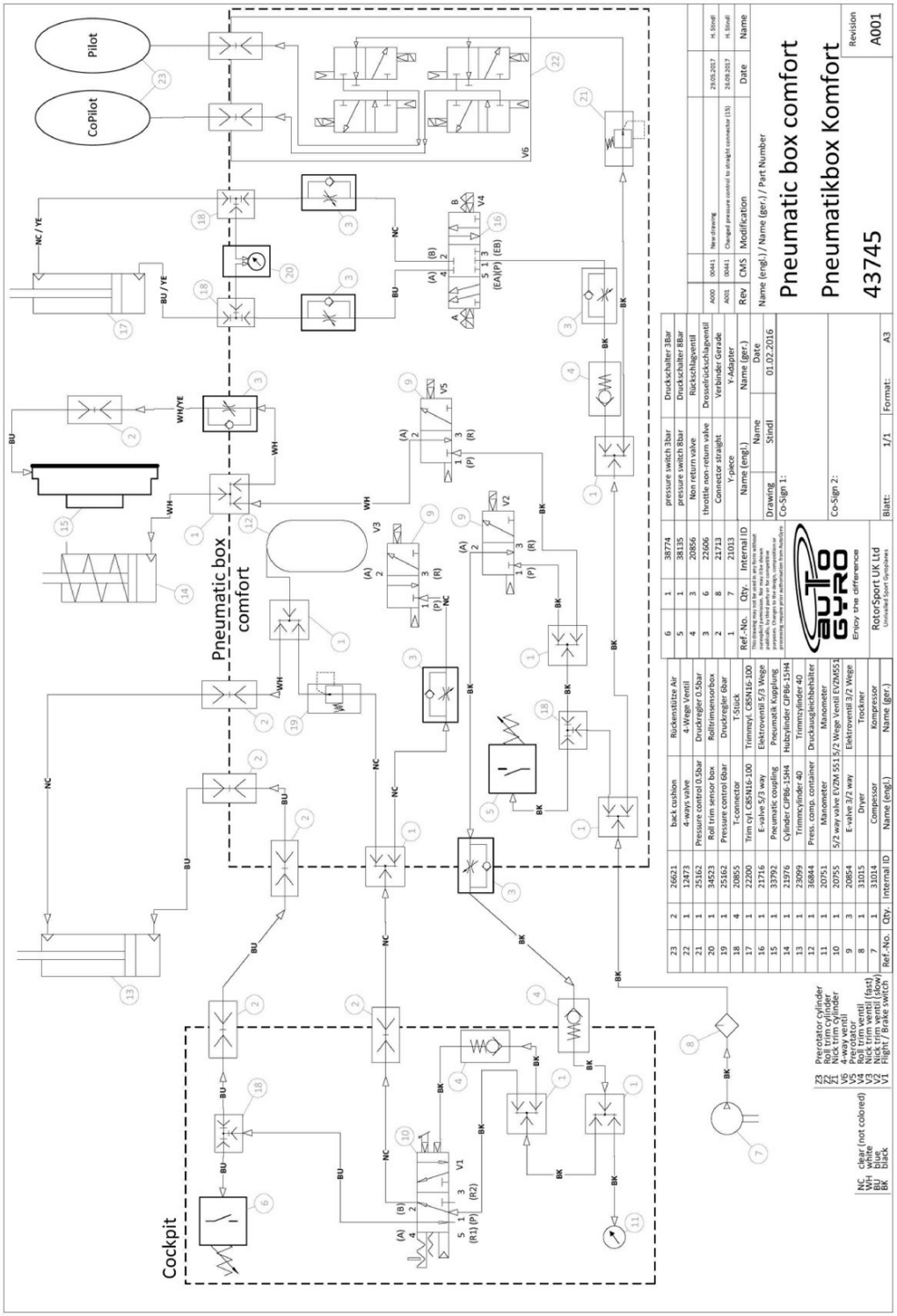
Wiring Diagram – TCU wiring



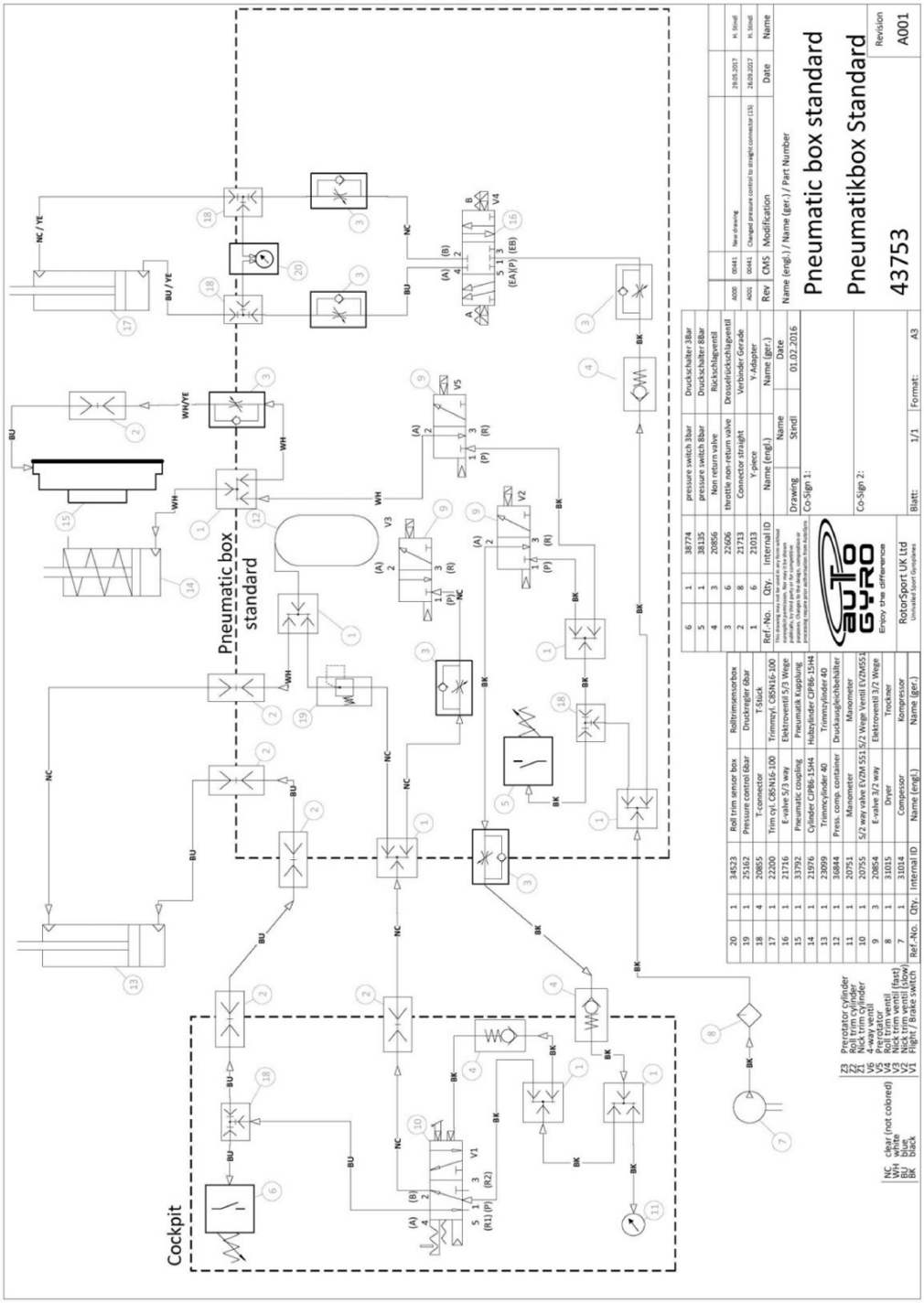
Wiring Diagram – Seat heater



Wiring Diagram – Wiring harness intercom ATR833



Pneumatic Scheme – comfort package



Pneumatic Scheme – Standard package

Contents

07-00-00 2-1 LIFTING OF THE GYROPLANE

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

Rotor system must be removed, see 62-11-00 4-1!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

WARNING: Object is heavy! Inadequate handling could cause injury. Use proper lifting techniques or assistance!

WARNING: When working with cranes or other lifting equipment the general safety regulations have to be respected at all times!

CAUTION: Never attempt to lift gyroplane with rotor system attached!

PROCEDURES/DESCRIPTION

1 Re-install teeter bolt, hand-tighten castellated nut and secure castellated nut adequately.

2 Loop a lifting belt around the teeter bolt and carefully lift the gyroplane.

ILLUSTRATIONS

Fig. 1 - Lifting belt looped around teeter bolt

07-00-00 2-2 JACKING OF THE GYROPLANE

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

Gyroplane must be placed on level ground and restrained (blocks, chocks)

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PROCEDURES/DESCRIPTION

Unload and lift nose gear

1 In order to unload the nose gear, load or lash-down keel tube in most aft position until gyroplane rests safely on both main wheels and keel tube.

Lift main gear

2 In order to unload one of the main wheels carefully jack the gyroplane under the keel tube, taking care not to damage the keel tube fin (where fitted)

3 Let the gyroplane tip to the desired side and continue to jack slowly until the gyroplane rests stable on nose wheel, one main wheel and jack.

NOTE: Sand bags or load may be used to add additional weight on the desired side.

4 Secure gyroplane adequately before commencing work and do not leave unattended in jacked position.

Do not work under the aircraft unless the aircraft is properly and safely supported.

07-00-00 2-3 SHORING OF THE GYROPLANE

OPR

GENERAL, REFERENCES AND REQUIREMENTS

Basic operational task, which can be performed by a licensed pilot or instructed personnel!

Rotor system must be removed, see 62-11-00 4-1!

PRECAUTIONS AND SAFETY MEASURES

CAUTION: Never use tie-down equipment or lashing straps in a way that would exert unsupported stress or high momentum on the structure of the gyroplane!

CAUTION: The suspension bow is not designed to take up high longitudinal forces!

PROCEDURES/DESCRIPTION

Shoring, road transport or container transport

> ***WARNING: The rotor system must be removed, disassembled and carefully packed for road transport.***
>
> ***CAUTION: When wrapping the gyroplane make sure that foil or stretch does not cover the painted surface directly. Put a soft layer in between for damage protection and let plastic components breathe. Do not expose wrapped gyroplane or parts to sun radiation or heat in order to avoid paint damage.***

1 Restrain main wheels (blocks/chocks). For container transport replace main wheels with wooden blocks to provide safe stand.

2 Put a wooden block below the lowest point of the keel tube and lash keel tube against wooden block. The block should be dimensioned so that the main wheels (if installed) are half way unloaded.

3 Lash-down both main wheels through the lashing lugs (use rims/axles alternatively) and/or the mast tie-down kit (option).

4 Lash-down nose wheel through its axle.

5 For container transport or shipping, use the mast tie-down kit (option) and consider folding the mast.

ILLUSTRATIONS

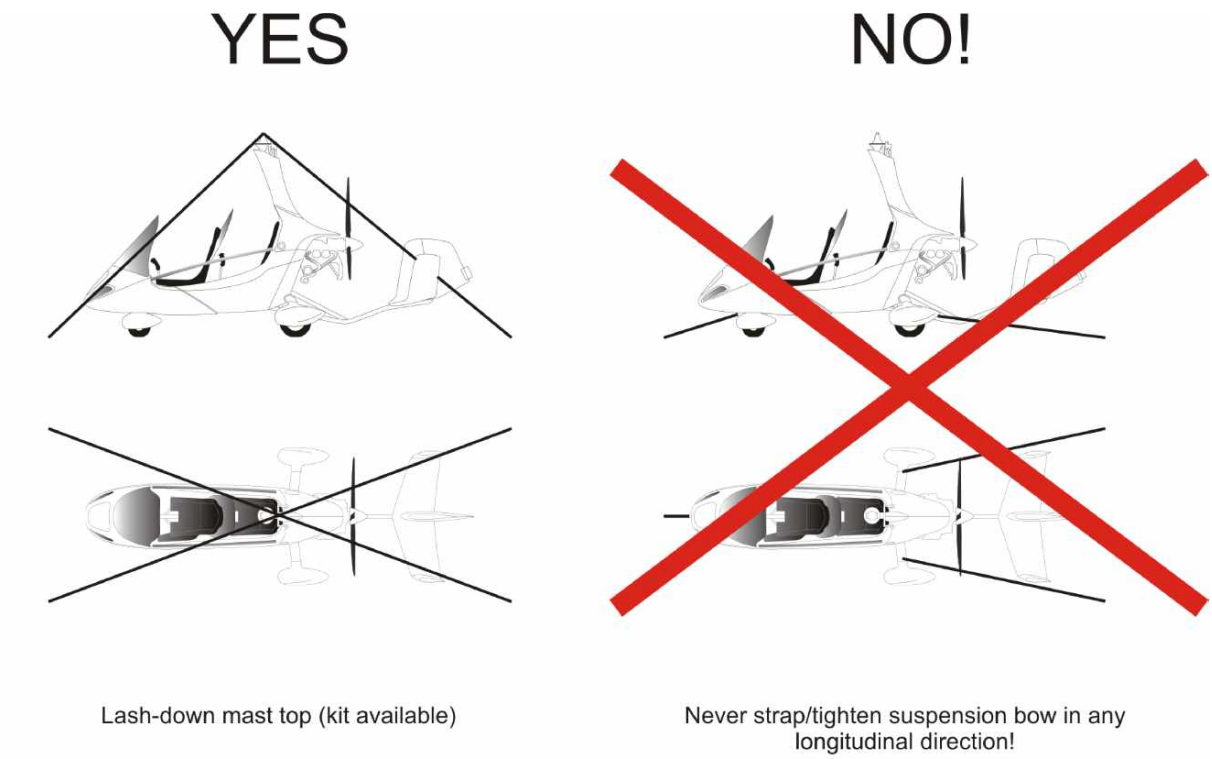


Fig. 1 - Lash-down methods of gyroplane

08-10-00 2-1 WEIGHING OF THE GYROPLANE

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

PROCEDURES/DESCRIPTION

NOTE:
Weighing is performed by measuring the weight below each wheel with level datum (keel tube between front and rear seat) 5° down. Horizontal datum is main wheel axis vertical plane.
AutoGyro weighing form AG-F-WRP-M17should be used.

08-20-00 2-1 LEVELING OF THE GYROPLANE

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

Gyroplane must be placed on level ground and restrained (blocks, chocks)

Mast fairing must be removed, see 52-00-00 4-1

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PROCEDURES/DESCRIPTION

Measurement of Dimension D1

1 Use a tape measure and measure distance between mast reference point and fuselage reference point. See Fig. 1 for reference.

NOTE:
Where no visible reference mark provided, mast reference point is defined as the inner edge of the upper mast end.
Fuselage reference point is defined as the outer top edge of the ball joint.

2 Contact AutoGyro for reference values.

Measurement of Stabilizer Alignment

NOTE:
The stabilizer is mounted with a slight left (or CCW) rotation relative to longitudinal axis to compensate for propeller swirl. The correct alignment is measured as described below.

3 Mark two reference points with 600mm offset from the inner edge of the central fin (see Fig. 2).

4 Measure left and right distance (DL and DR) from offset reference points to the central reference point at belly seam at the underside of the fuselage (see Fig. 2).

5 Verify that DL is 10 +/- 2mm longer than DR.

Measurement of relative angles

NOTE:
The datum plane for the aircraft is the keel tube between the front and rear seat (see Fig. 3)

6 Use an inclinometer / digital spirit level and measure thrust line angle (see Fig. 4) relative to datum plane (Fig. 3).

7 Use an inclinometer / digital spirit level and measure stabilizer incident angle (see Fig. 5) relative to datum plane (Fig. 3). Perform measurement in the straight area about 30 cm above the upper surface of the horizontal stabilizer.

ILLUSTRATIONS

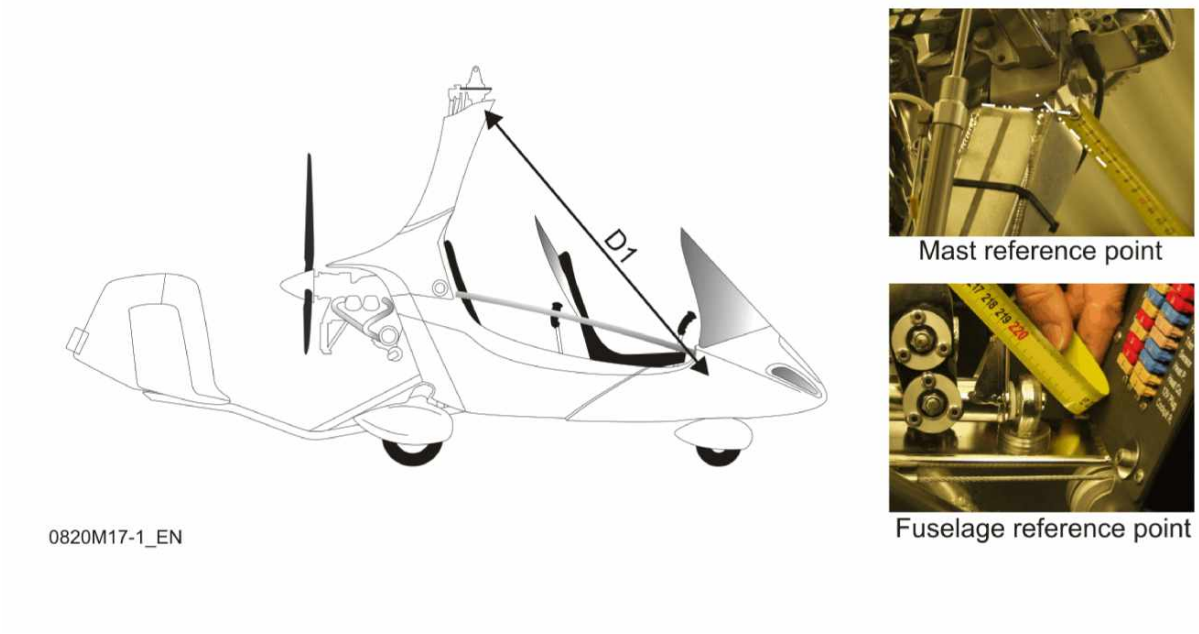


Fig. 1 - Measurement of Dimension D1

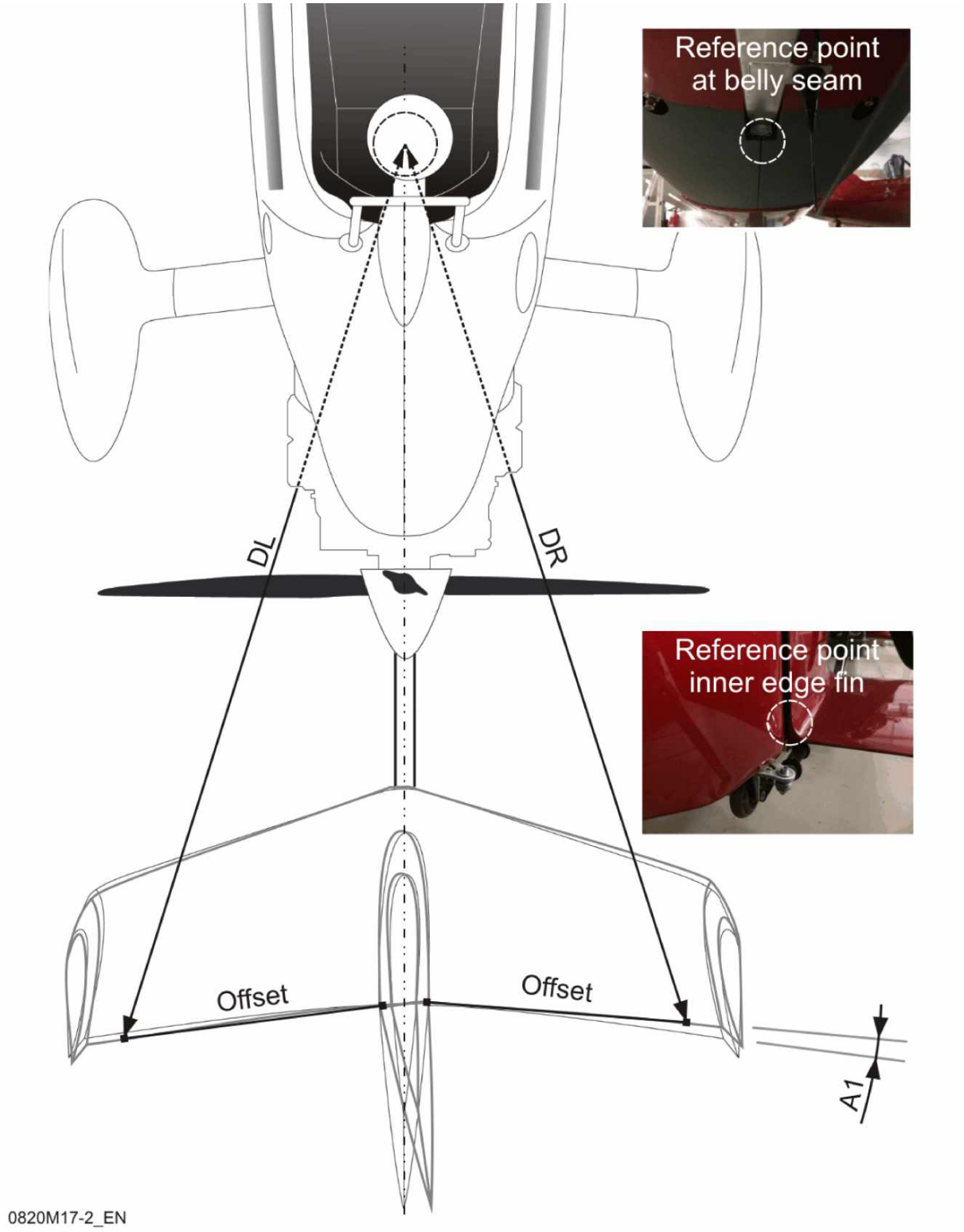


Fig. 2 - Measurement of Stabilizer Alignment

Fig. 3 - Measurement of reference zero

Fig. 4 - Measurement of thrust line angle

Fig. 5 - Measurement of stabilizer incident

24-30-00 4-1 REMOVAL-INSTALLATION: BATTERY

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

WARNING: Electrical shorting of the battery will produce high current with the risk of personal injury and damage to equipment!

PROCEDURES/DESCRIPTION

Removal

WARNING: Be careful to avoid electrical short cuts at all means.

1 Remove ground (L-) connection at the frame and isolate metallic cable shoe.

2 Remove hot (L+) cable at the battery.

3 Untighten battery retainer and remove battery.

Installation

4 Install battery in reverse order (work steps 3 to 1).

ILLUSTRATIONS

Fig. 1 - Installation Position Battery and fuse box (top photo)

27-20-00 0-1 DESCRIPTION: FLIGHT CONTROL - RUDDER OPR

PROCEDURES/DESCRIPTION

The rudder is connected to the adjustable foot pedals with two push-pull control cables with are routed through the horizontal frame, steel cables and two bell crank levers. Nose wheel steering is directly linked to pedal/rudder control input by the two bell crank levers and control rods. The pair of aft pedals is interconnected in parallel with the nose wheel control path.

Both pairs of pedals are individually adjustable to suit pilot's comfort. A shorter adjustment is achieved by pulling the handle which moves the pedals closer. Pulling the handle while pushing with both feet gently against the pedals allows longer adjustment.

The rudder is fitted with a trim tab. This is normally biased to the left, and may be adjusted by the operator to trim the aircraft for straight flight at a desired speed, feet off the pedals.

The rudder is additionally centered by return springs mounted under the tail. These align the rudder in the straight ahead position, such that should a cable fail – or the occupants be unable to control the rudder – then the aircraft will continue to fly reasonably straight.

ILLUSTRATIONS

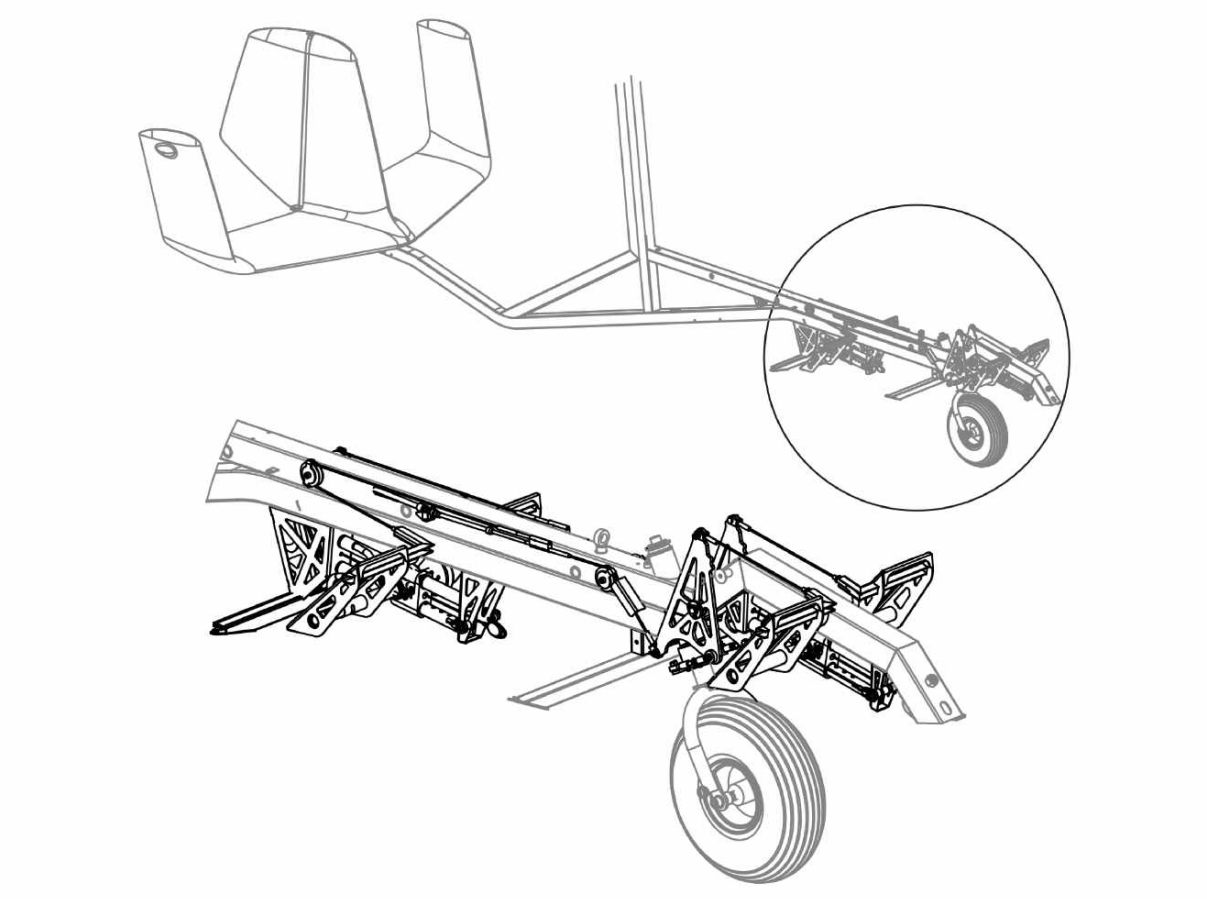


Fig. 1 - Flight control - Rudder (fwd area)

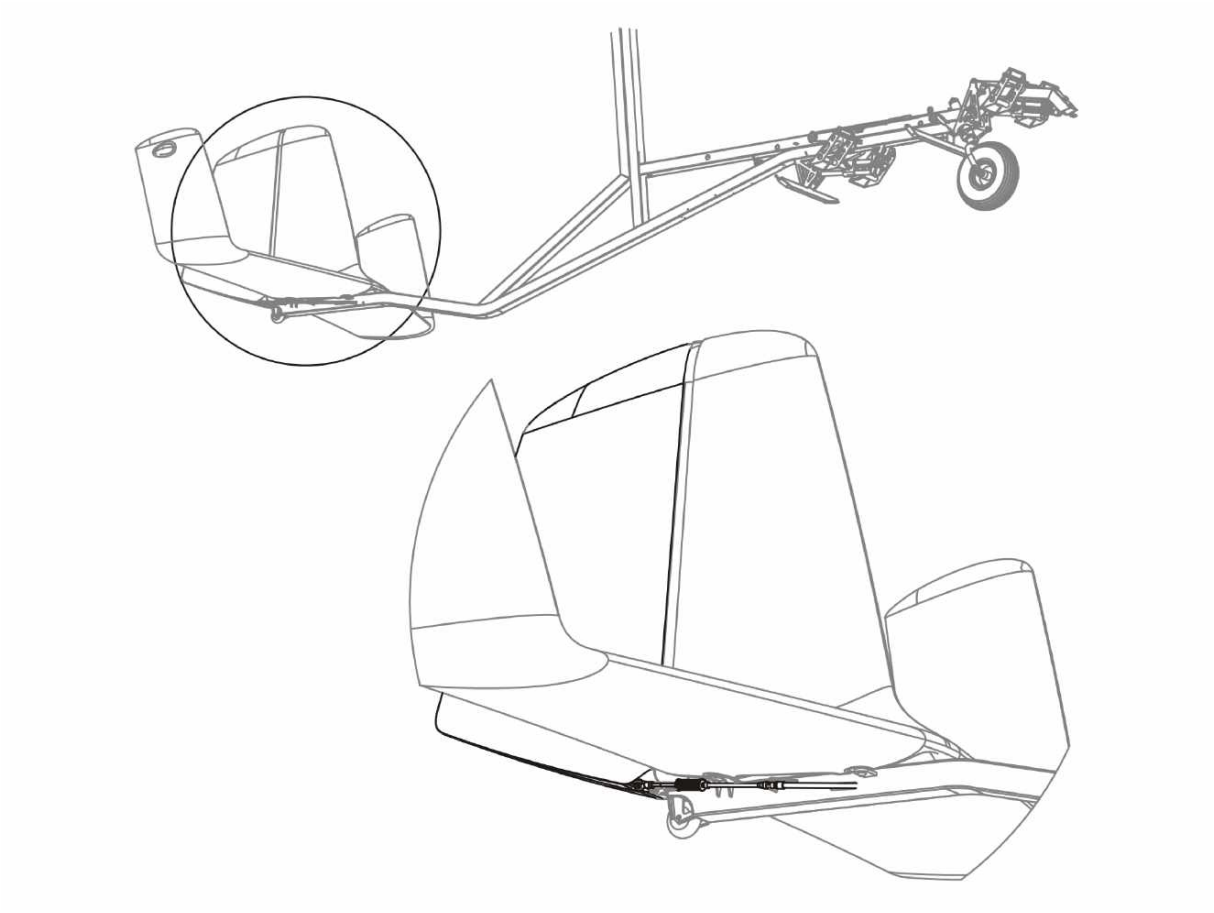


Fig. 2 - Flight control - Rudder (aft area)

Fig. 3 - Flight control - Rudder control horn, note that the horn is offset so that the cables are equal length with the rudder offset 7.5deg to the right)

27-20-00 5-1 CHECK-ADJUSTMENT: RUDDER CONTROL ANGLES

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

S.WZ3002 Inclinometer / Digital Spirit Level

PROCEDURES/DESCRIPTION

PROCEDURE: Check/adjust neutral setting

1 Adjust forward pair of pedals neutral/parallel with nose wheel unloaded. In order to simplify measurement and to avoid errors, unload nose wheel until reference plane becomes horizontal.

2 Verify angle A1 is 35 +/-3° when measured against a plane perpendicular to the reference plane (see Fig. 1).

3 Verify angle A2 is 53 +/-3° when measured against a plane perpendicular to the reference plane (see Fig. 1).

4 Verify left and right distance DL and DR of the control links are 80 +/- 2mm (see Fig. 1) .

NOTE:
Do NOT measure rudder deflection against the stabilizer or the central fin as both are slightly twisted by design. Refer to 08-20-00 2-1 for further information and levelling procedure.

5 With pedals neutral, verify rudder deflection AN is 7.5° to the right when measured against aircraft longitudinal axis.

PROCEDURE: Check left and right control stop and corresponding rudder deflection

6 Press RH control pedal until control stop is reached (see Fig. 1). With cantilever in the mechanical end stop make sure that no other mechanical stop within the complete control path is reached.

7 Verify full RH rudder deflection AR is 32 +4/-2°.

8 Repeat step 6 with pedal in the LH control stop.

9 Verify full LH rudder deflection AL is 27 +4/-2°.

ADJUSTMENT POSSIBILITIES

IMPORTANT NOTE:
All components of the rudder control system are manufactured with minimum possible tolerances and pre-adjusted to suit the aircraft configuration. In case of misalignment or out-of-tolerance values, contact AutoGyro support.

ILLUSTRATIONS

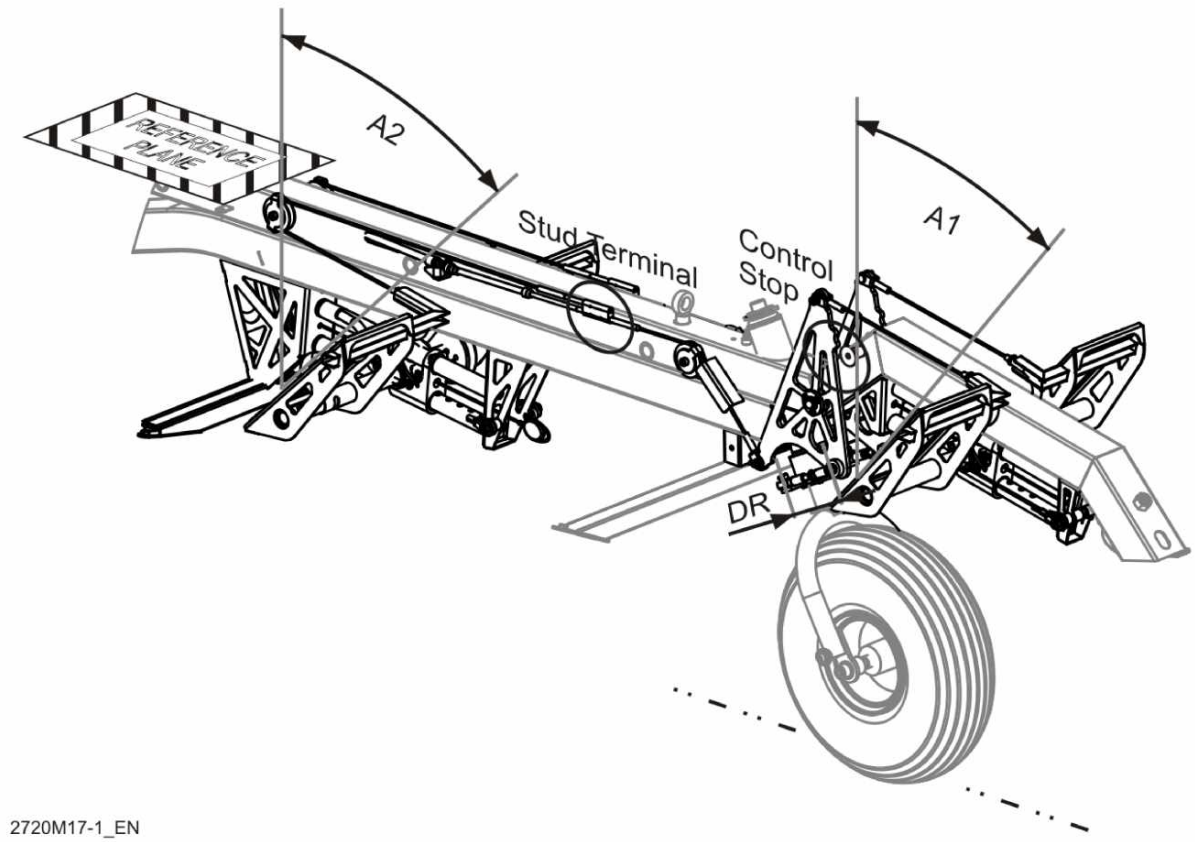
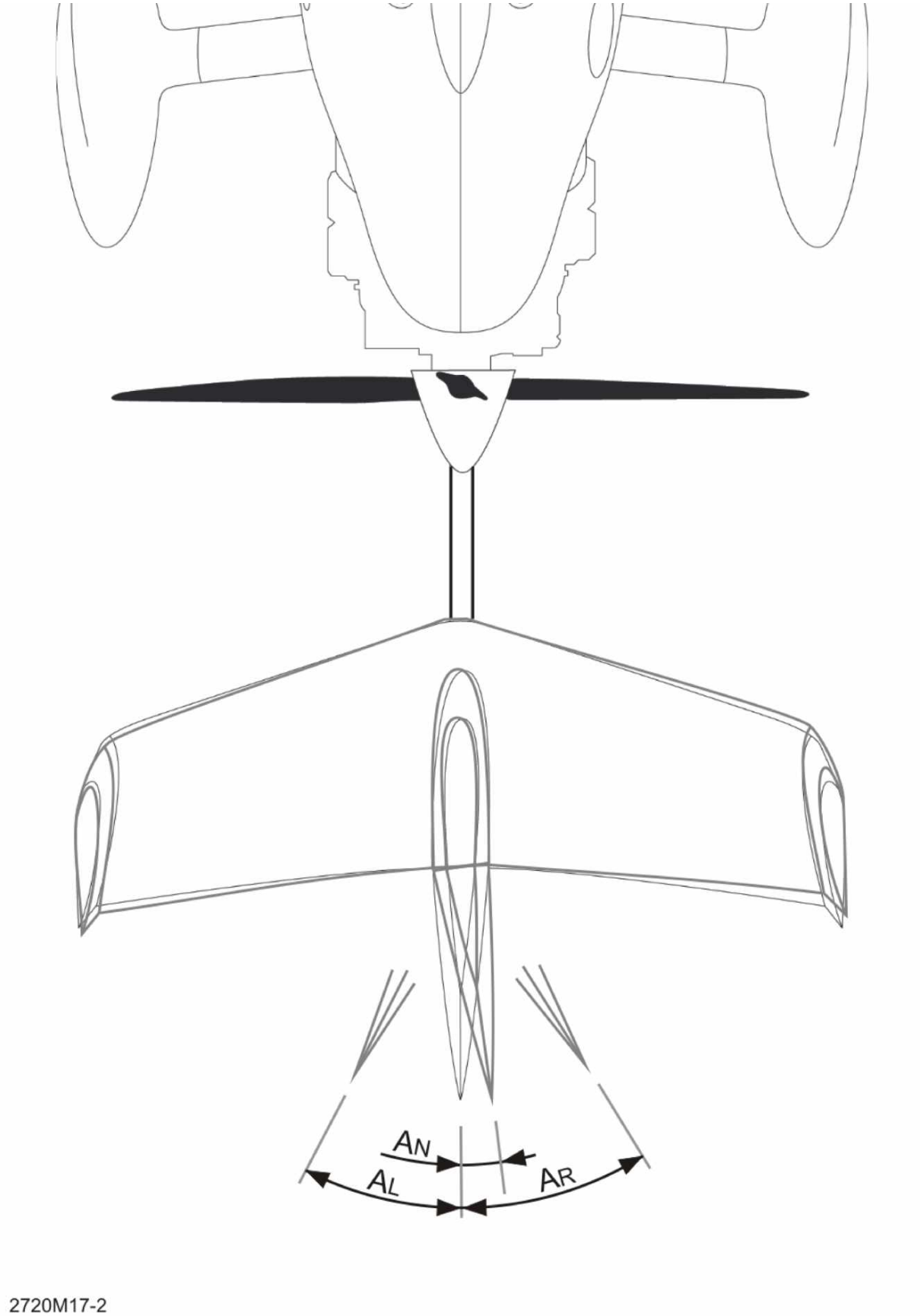


Fig. 1 - Rudder control - Pedals angle setting



2720M17-2

Fig. 2 - Rudder control - Rudder angle setting

28-20-00 6-1 INSPECTION: FUEL FILTER

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Battery must be removed, see 24-30-00 4-1

SPECIAL TOOLS AND CONSUMABLE MATERIALS

SP IMPORTANT NOTE: Procedure involves spare parts. Check parts list below for ordering details of affected components!

PRECAUTIONS AND SAFETY MEASURES

WARNING: Fuel and fuel vapours are HAZARDOUS MATERIAL, must be treated and handled accordingly, and constitute a danger to health and hardware!

IMPORTANT NOTE: Depending on engine variant and optional equipment, number and type of installed fuel filters may differ!

PROCEDURES/DESCRIPTION

EFFECTIVITY: Engine variant ROTAX 912 (without second fuel pump P2)

1 Inspect nylon filter (use a flashlight if appropriate).

2 If contamination is found, nylon fuel filter must be replaced, see 28-20-00 8-1.

EFFECTIVITY - END

EFFECTIVITY: Engine variant ROTAX 912 with second fuel pump P2

NOTE: Fuel system consists of one nylon filter upstream of the mechanical fuel pump, a (secondary) electrical fuel pump with built-in strainer and another filter (F5273) downstream.

3 Inspect nylon filter (use a flashlight if appropriate).

4 If contamination is found or in case of scheduled replacement, nylon fuel filter AND filter F 5273 must be replaced, see 28-20-00 8-1 and strainer in electrical fuel pump must be inspected.

5 In order to do so, clamp both fuel lines to prevent fuel from spilling and disconnect incoming (lower) fuel line.

6 Carefully remove strainer from electrical fuel pump and inspect.

7 Clean strainer if necessary. Use brake cleaner and compressed air applied from the outside.

8 In case of residual contamination or damage, strainer has to be replaced, see 28-20-00 8-1.

EFFECTIVITY - END

EFFECTIVITY: Engine variant ROTAX 914

NOTE: Fuel system consists of two electrical fuel pumps with built-in strainer. Each pump has a preceding nylon filter and another filter (F 5273) downstream.

9 Inspect strainer for both electrical fuel pumps. In order to do so, refer to 28-20-00 8-1.

10 In case of residual contamination or damage, strainer has to be replaced, see 28-20-00 8-1.

11 In any case, both KL145 filters must be replaced, see 28-20-00 8-1.

EFFECTIVITY - END

ILLUSTRATIONS

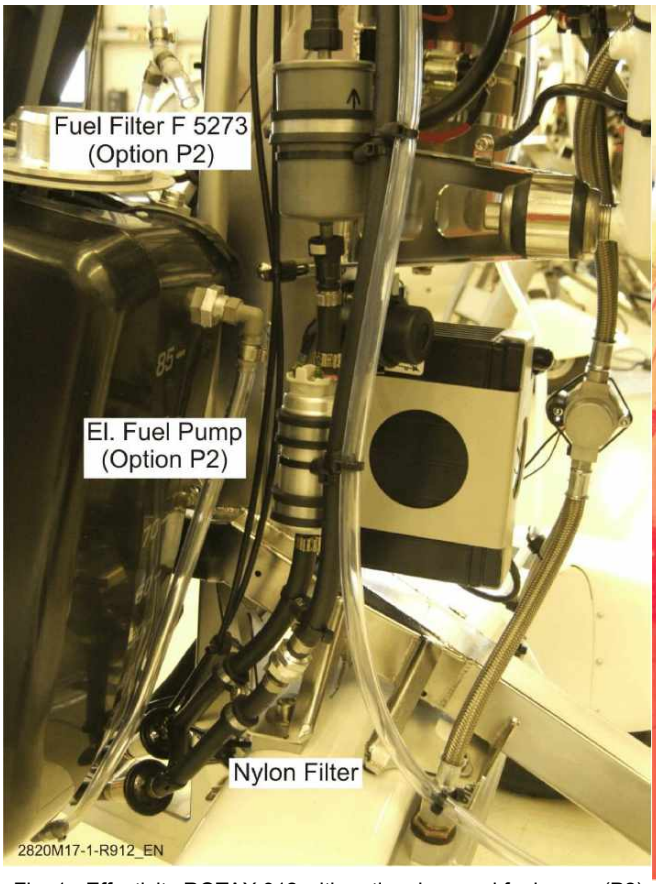


Fig. 1 - Effectivity ROTAX 912 with optional second fuel pump (P2) installed

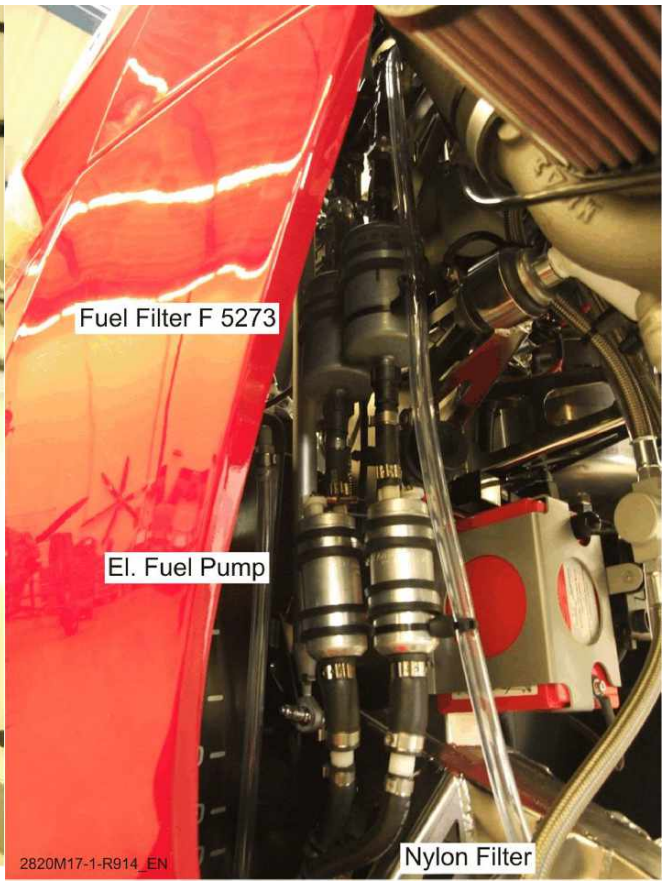


Fig. 2 - Effectivity ROTAX 914

28-20-00 8-1 REPLACEMENT: FUEL FILTER

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

Battery must be removed, see 24-30-00 4-1

SPECIAL TOOLS AND CONSUMABLE MATERIALS

SP IMPORTANT NOTE: Procedure involves spare parts. Check parts list below for ordering details of affected components!

PRECAUTIONS AND SAFETY MEASURES

WARNING: Fuel and fuel vapours are HAZARDOUS MATERIAL, must be treated and handled accordingly, and constitute a danger to health and hardware!

PROCEDURES/DESCRIPTION

NOTE: Depending on engine variant and optional equipment, number/type of installed fuel filters may differ

1 CAUTION: Before disconnecting any fuel lines, clamp respective hoses to prevent fuel spillage.

Applicable to Nylon Filter and F 5273

2 Disconnect filter and replace with new filter.

3 Re-connect hoses to filter and make sure tight fit (no leaks, dry).

4 Remove clamps from fuel hoses.

ILLUSTRATIONS

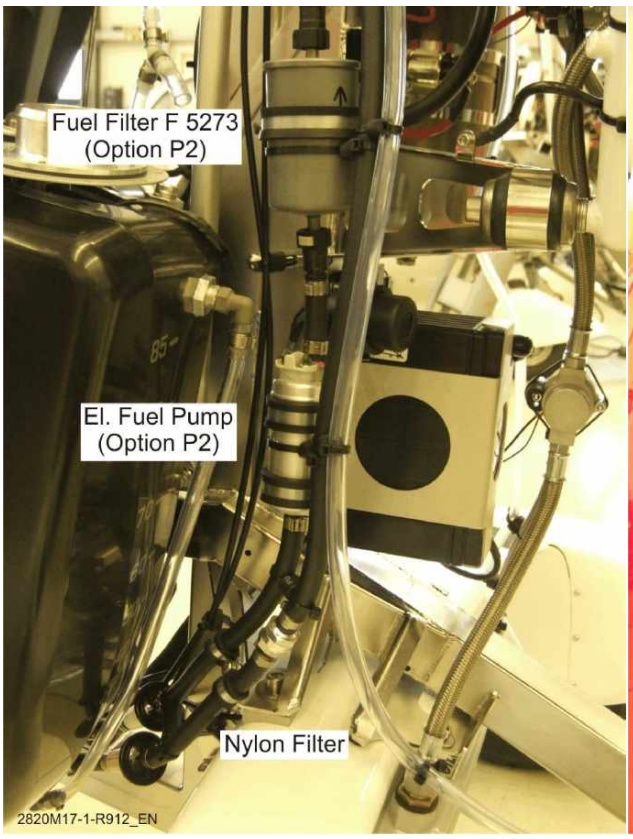


Fig. 1 - Effectivity ROTAX 912 with optional second fuel pump (P2) installed

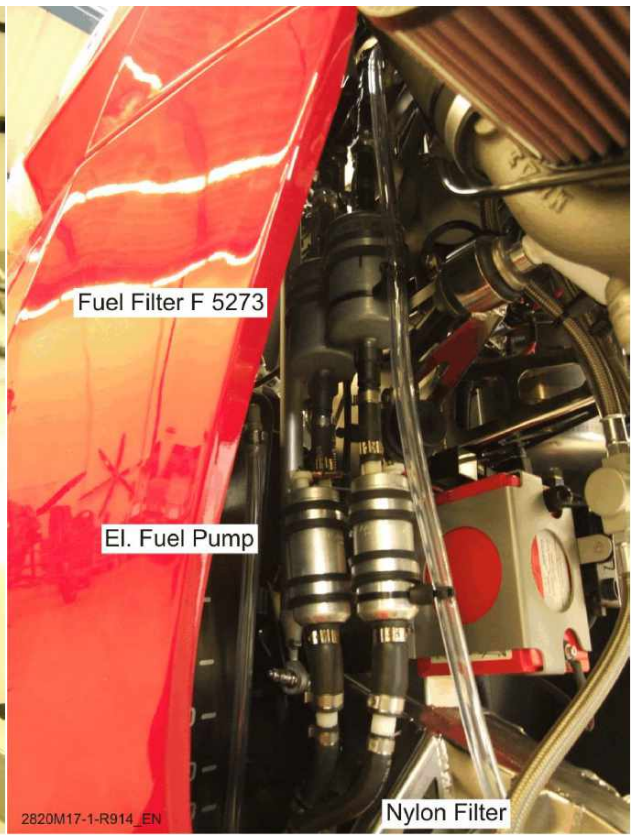


Fig. 2 - Effectivity ROTAX 914

28-20-00 8-2 REPLACEMENT: ELECTRICAL FUEL PUMPS

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

Battery must be removed, see 24-30-00 4-1

SPECIAL TOOLS AND CONSUMABLE MATERIALS

SP IMPORTANT NOTE: Procedure involves spare parts. Check parts list below for ordering details of affected components!

PRECAUTIONS AND SAFETY MEASURES

WARNING: Fuel and fuel vapours are HAZARDOUS MATERIAL, must be treated and handled accordingly, and constitute a danger to health and hardware!

PROCEDURES/DESCRIPTION

WARNING: Make sure the electrical system is switched off and protected against unintended activation

1 Clamp respective hoses to prevent fuel spillage.

2 Unscrew both terminal nuts and disconnect both ring-eye cable connectors. Isolate blank connectors to prevent electrical short-cut.

3 Disconnect fuel lines from pump.

4 Untighten clamp and replace fuel pump.

5 Install new fuel pump and tighten clamp.

IMPORTANT NOTE: The electrical terminals of the pump and the ring-eye cable connectors have different diameters to ensure correct polarization

6 Re-connect electrical cable connectors and tighten terminal nuts. Secure terminal nuts with securing paint.

7 Re-connect hoses to pump and make sure tight fit. Use securing paint on nuts and threads.

8 Remove clamps from fuel hoses.

9 Activate respective fuel pump and check function and proper fuel line connection (no leaks, dry).

Description	PIT	Remark
Fuel pump 914	73-00-00-S-31393	ROTAX 914
Fuel Pump 912	73-00-00-S-30199	ROTAX 912

ILLUSTRATIONS

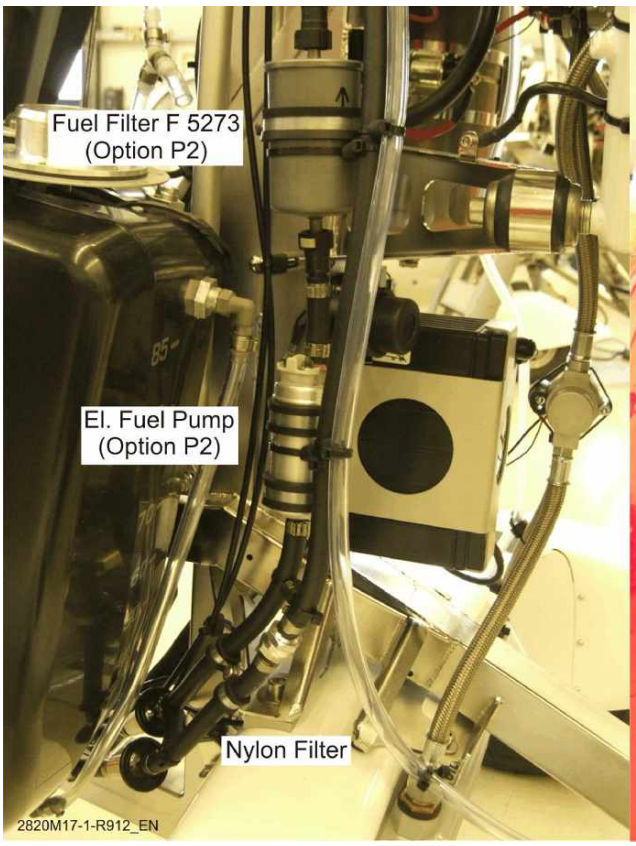


Fig. 1 - Effectivity ROTAX 912 with optional second fuel pump (P2) installed

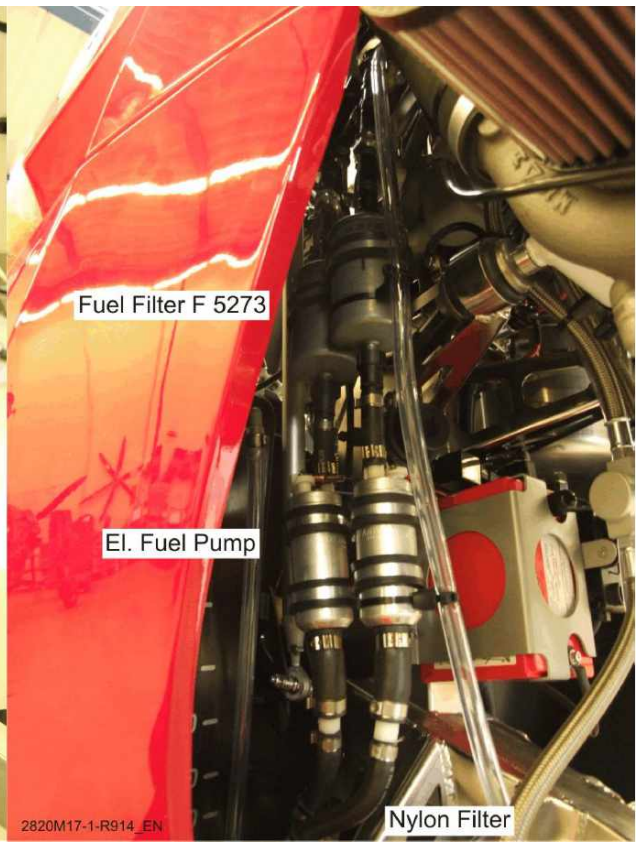


Fig. 2 - Effectivity ROTAX 914

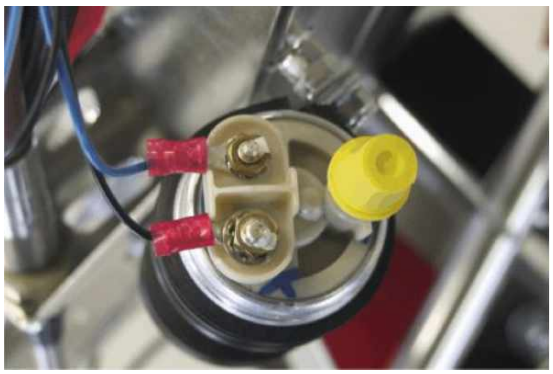


Fig. 5 - El. fuel pump terminal

32-40-00 4-1 REMOVAL-INSTALLATION: WHEELS

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Gyroplane must be jacked, see 07-00-00 2-2

SPECIAL TOOLS AND CONSUMABLE MATERIALS

LR IMPORTANT NOTE: Procedure involves parts with limited reusability. Check parts list below before starting job!

PROCEDURES/DESCRIPTION

Nose wheel - Removal

1 Unscrew and remove nut (Fig. 1, 8) and washer (Fig. 1, 9). Discard nut.

2 Pull out and remove bolt (Fig. 1, 11) with washer (Fig. 1, 10) and remove wheel.

Nose wheel - Installation

3 Install wheel with items (Fig. 1, 12) and (Fig. 1, 13) in place, bolt (Fig. 1, 11) with washer (Fig. 1, 10) and washer (Fig. 1, 9) in reverse order.

4 Install new self-locking nut (Fig. 1, 12) and torque-tighten with 40 Nm.

Main wheel - Removal

5 Remove wheel spat (if installed).

6 Remove split pin, unscrew and remove nut (Fig. 2, 13). Discard pin.

7 Unscrew and remove 4 x bolt (Fig. 2, 1) with serrated washer (Fig. 2, 2). Mind limited reusability of serrated washer!

8 Remove wheel from axle assembly (Fig. 2, 6).

Main wheel – Installation

10 Insert main wheel on axle assembly (Fig. 3, 7/9).

11 Insert 4 x bolt (Fig. 3, 3) with new serrated washer (Fig. 3, 4) and attach brake disc to main wheel.

12 Torque-tighten bolts (Fig. 3, 3) with 10 Nm in crosswise sequence.

13 Install castellated nut (Fig. 3, 18) and torque-tighten nut with 35 Nm.

14 Install split pin (Fig. 3, 5).

15 Check free rotation of wheel, radial run-out and braking action.

16 Install wheel spat, if required.

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
1	4, 5	steering bush	L2	32-00-00-V-22169	
1	6	M10, Si		NPI	
1	2, 5	U10		NPI	
1	1	Nosewheel axle M10x155 DIN 912		NPI	
2	1			53-00-00-	
2	2			53-00-00-	

2	3	M6x12 round head	L1	32-40-00-
2	4	Safety washer M6	L1	32-40-00-
2	5	Split pin 3.2x40	L1	32-00-00-
2	6	spacer 26-5/20,2	L1	32-00-00-
2	7	wheel axis welded	L1	32-00-00-
2	8	Stop nut M6	L1	32-00-00-
2	9	brake caliper bracket installed	L1	32-00-00-
2	10	M6x25 counter sunk	L1	32-00-00-
2	11	Brake caliber		NPI
2	12	Brake pad outer (small)	L2	32-40-00-
2	13	Brake Disc	L1	32-40-00-
2	14	Cylinder bushing 22x10x6		NPI
2	15	Brake pad inner (big)	L2	32-40-00-
2	16	Safety washer M6		NPI
2	17	M6x40		NPI
2	18	castle nut M18x1	L1	32-00-00-
2	19	Alu bush Prerotator brake	L1	53-00-00-
2	20	U6/25 Big washer	L1	53-00-00-
2	21	M6x60 rounded head	L1	53-00-00-

ILLUSTRATIONS

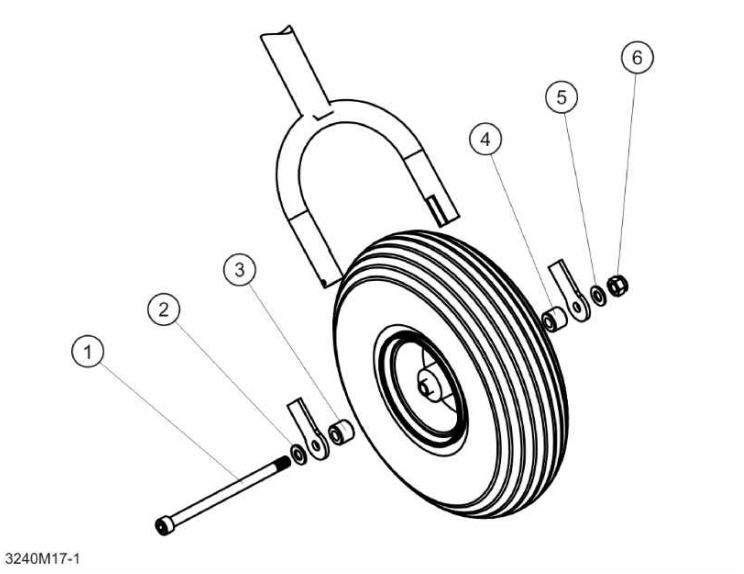


Fig. 1 - Nose gear with wheel

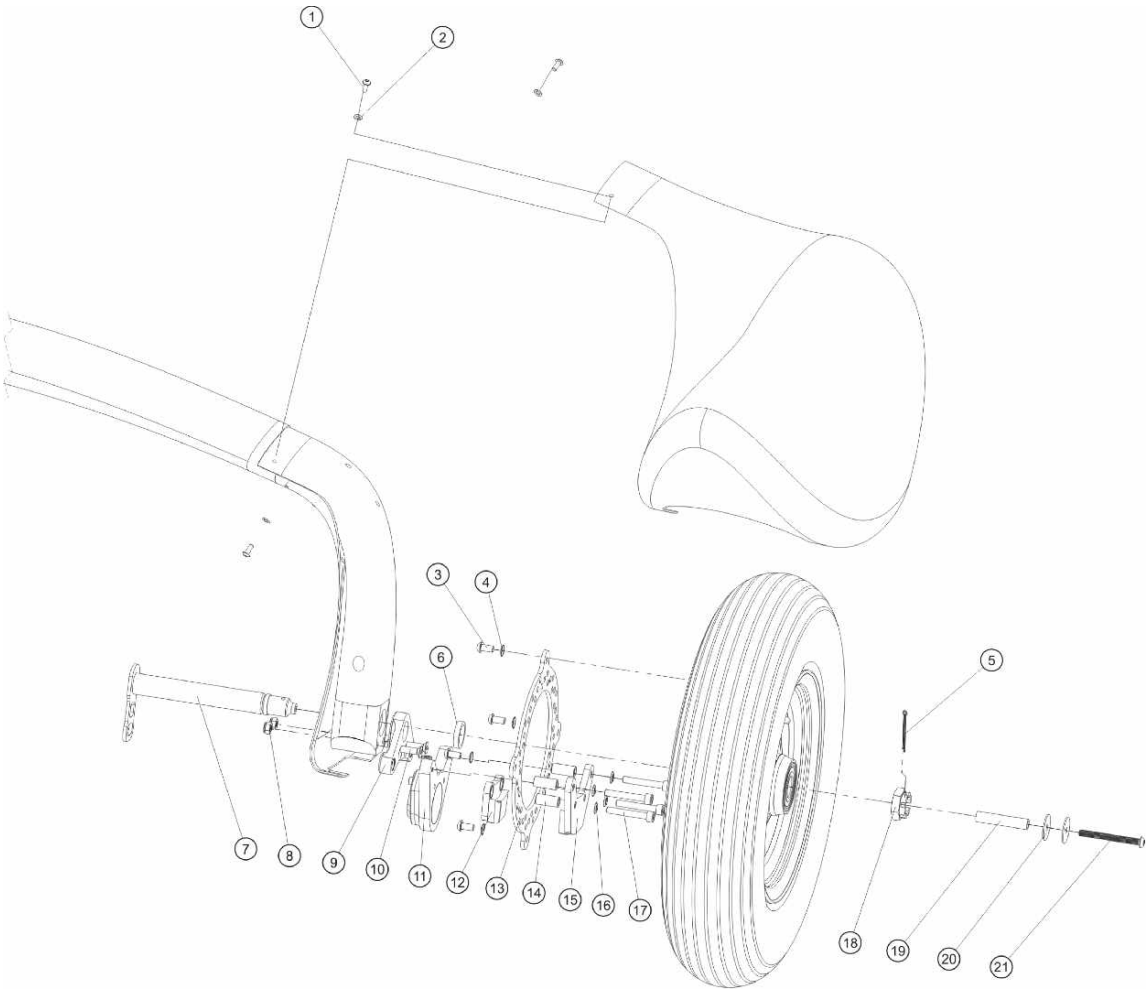


Fig. 2 - Main gear, wheel and brake

32-40-00 8-2 REPLACEMENT: MAIN WHEEL BRAKE PADS

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Gyroplane must be jacked, see 07-00-00 2-2

Affected wheel must be removed, see 32-40-00 4-1

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-LUB-04	Silicone Spray
LR	IMPORTANT NOTE: Procedure involves parts with limited reusability. Check parts list below before starting job!
SP	IMPORTANT NOTE: Procedure involves spare parts. Check parts list below for ordering details of affected components!

PRECAUTIONS AND SAFETY MEASURES

IMPORTANT NOTE: Procedure involves handling and disposal of special materials. For your health and environmental aspects respect all applicable regulations!

PROCEDURES/DESCRIPTION

1 Pull out brake disc (8) between brake pads.

2 Remove 4 x shaft bolt (11) with serrated washer (10).

3 Remove brake pad (7) and (9). Dispose of properly!

4 Clean 4 x guide sleeves of axle assembly (5) and inspect for damage, scores or run-in grooves.

5 Apply a thin layer of silicone spray on guide sleeves of axle assembly.

6 Fit new brake pad (7) onto lower guide sleeves.

7 Fit new brake pad (9) onto upper guide sleeves.

8 Insert 4 x shaft bolt (11) with serrated washers (10) and torque-tighten with 10 Nm. Make sure that brake calliper and pad moves easily about the guide sleeve.

9 Insert brake disc between brake pads.

10 In order to re-install wheel continue with 32-40-00 4-1.

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
1	1			53-00-00-M-	
1	2			53-00-00-M-	
1	3	M6x12 round head	L1	32-40-00-M-	
1	4	Safety washer M6	L1	32-40-00-M-	
1	5	Split pin 3.2x40	L1	32-00-00-M-	
1	6	spacer 26-5/20,2	L1	32-00-00-M-	
1	7	wheel axis welded	L1	32-00-00-M-	
1	8	Stop nut M6	L1	32-00-00-M-	
1	9	brake caliper bracket installed	L1	32-00-00-M-	
1	10	M6x25 counter sunk	L1	32-00-00-M-	
1	11	Brake caliber		NPI	

1	12	Brake pad outer (small)	L2	32-40-00-M-
1	13	Brake Disc	L1	32-40-00-M-
1	14	Cylinder bushing 22x10x6		NPI
1	15	Brake pad inner (big)	L2	32-40-00-M-
1	16	Safety washer M6		NPI
1	17	M6x40		NPI
1	18	castle nut M18x1	L1	32-00-00-M-
1	19	Alu bush Prerotator brake	L1	53-00-00-
1	20	U6/25 Big washer	L1	53-00-00-M-
1	21	M6x60 rounded head	L1	53-00-00-M-

ILLUSTRATIONS

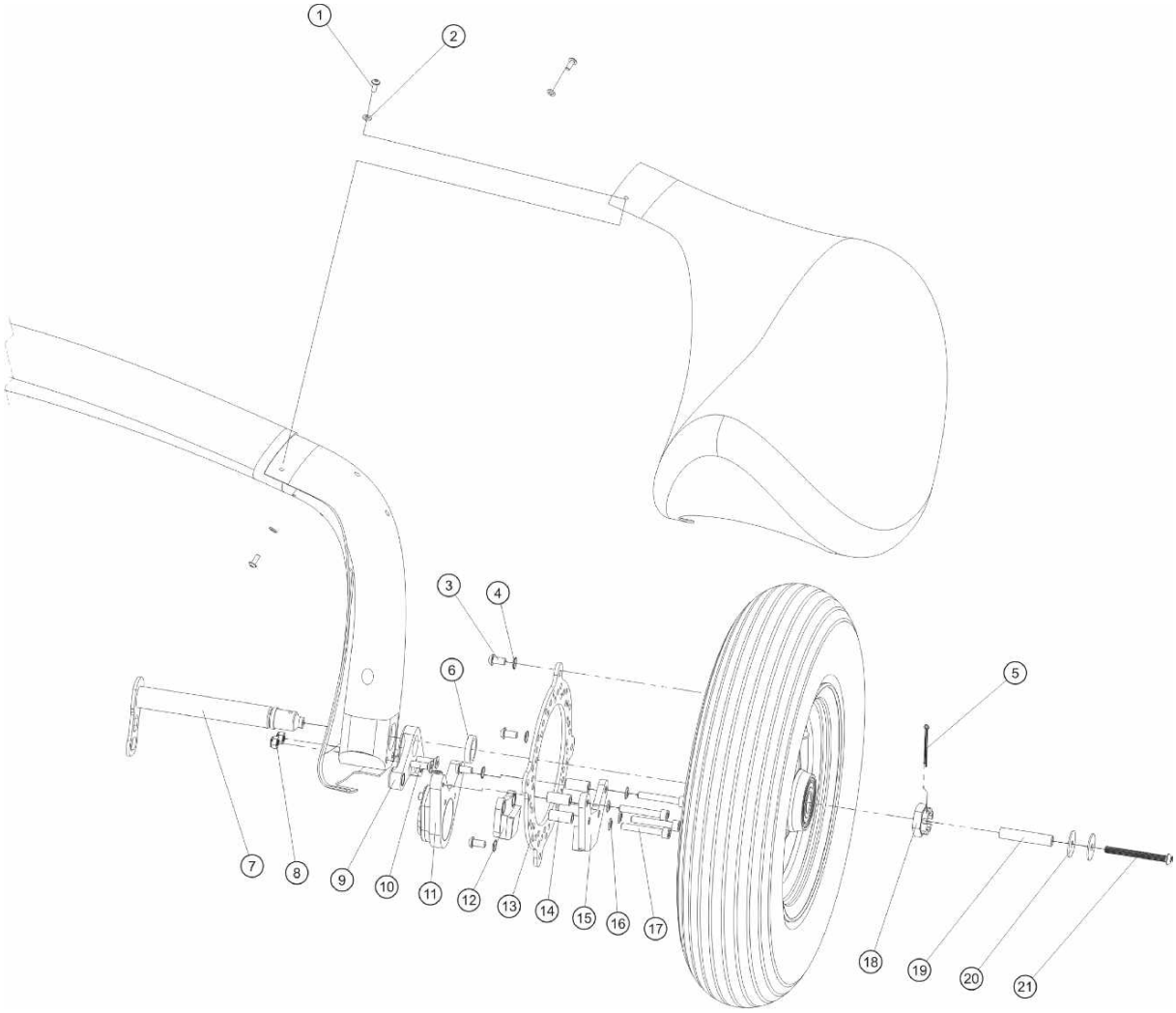


Fig. 1 - Main wheel with brake

32-40-00 8-3 REPLACEMENT: MAIN WHEEL BEARING

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization trained and entitled to carry out 'Line Maintenance'!

Gyroplane must be jacked, see 07-00-00 2-2

Affected wheel must be removed, see 32-40-00 4-1

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-04	Loctite 638 green
Contact AG	For special tools or assistance contact AutoGyro customer support

PROCEDURES/DESCRIPTION

1 Remove old bearings.

2 Degrease new bearing and dry-off with paper towel.

3 Apply AG-BAS-04 on outer surface of first bearing and press in bearing.

4 Install spacer. Use of a tool may be appropriate.

5 Apply AG-BAS-04 on outer surface of second bearing and press in bearing.

6 Spacer must be held by both inner bearing rings. Re-position and press as necessary.

7 Check easy run of bearings.

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
1	1	Ball bearing 6204 ZRS	L2	32-00-00-	
1	2	Spacer wheel	L1	32-00-00-	
1	3	Ball bearing 6204 ZRS	L2	32-00-00-	

ILLUSTRATIONS

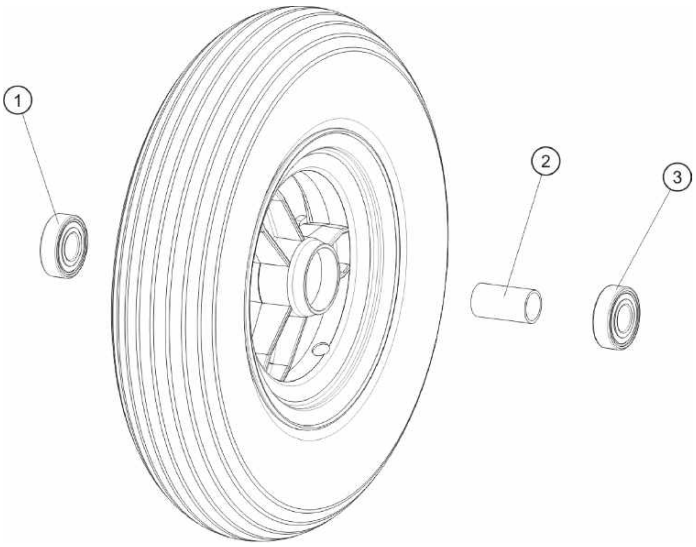


Fig. 1 – Nose and Main wheel and bearing

34-10-00 7-1 CLEANING: PITOT STATIC SYSTEM

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

PRECAUTIONS AND SAFETY MEASURES

CAUTION: Make sure all pitot and static lines are disconnected from any instruments before blowing through the lines!

CAUTION: Do not blow with the mouth directly into pitot or static ports. This will introduce moisture and may damage instruments!

PROCEDURES/DESCRIPTION

1 Disconnect all instruments from pitot line. These are airspeed, and optionally integrated display systems, if installed. The static line is vented via a filter behind the instrument panel and should never need cleaning.

NOTE: In most cases it is not necessary to remove the instrument panel.

2 With the help of compressed air clean all pitot lines by blowing from the inside (cockpit panel side) to the outside.

3 Make sure to clean/check each branch of a line by closing the other open ends.

ILLUSTRATIONS

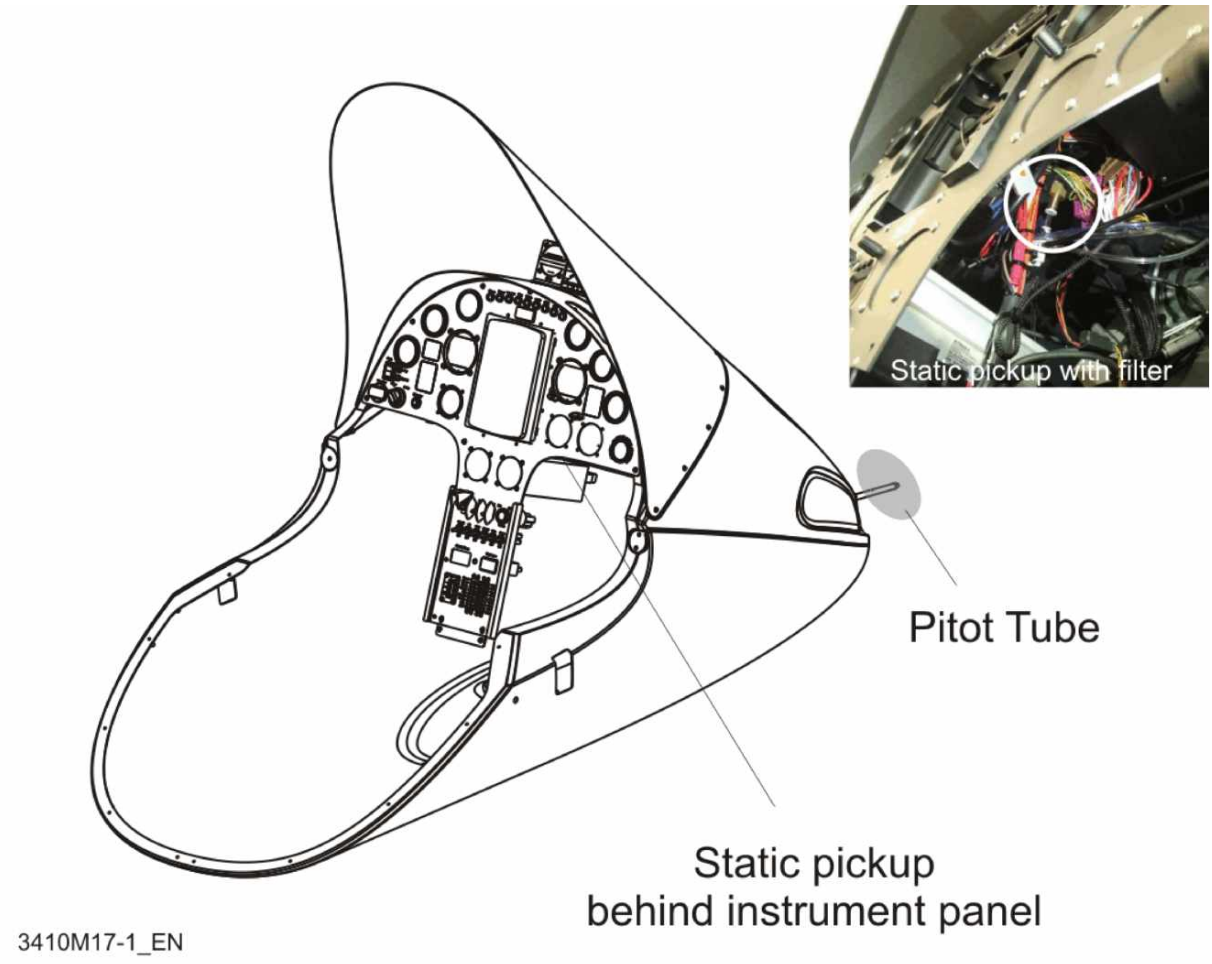
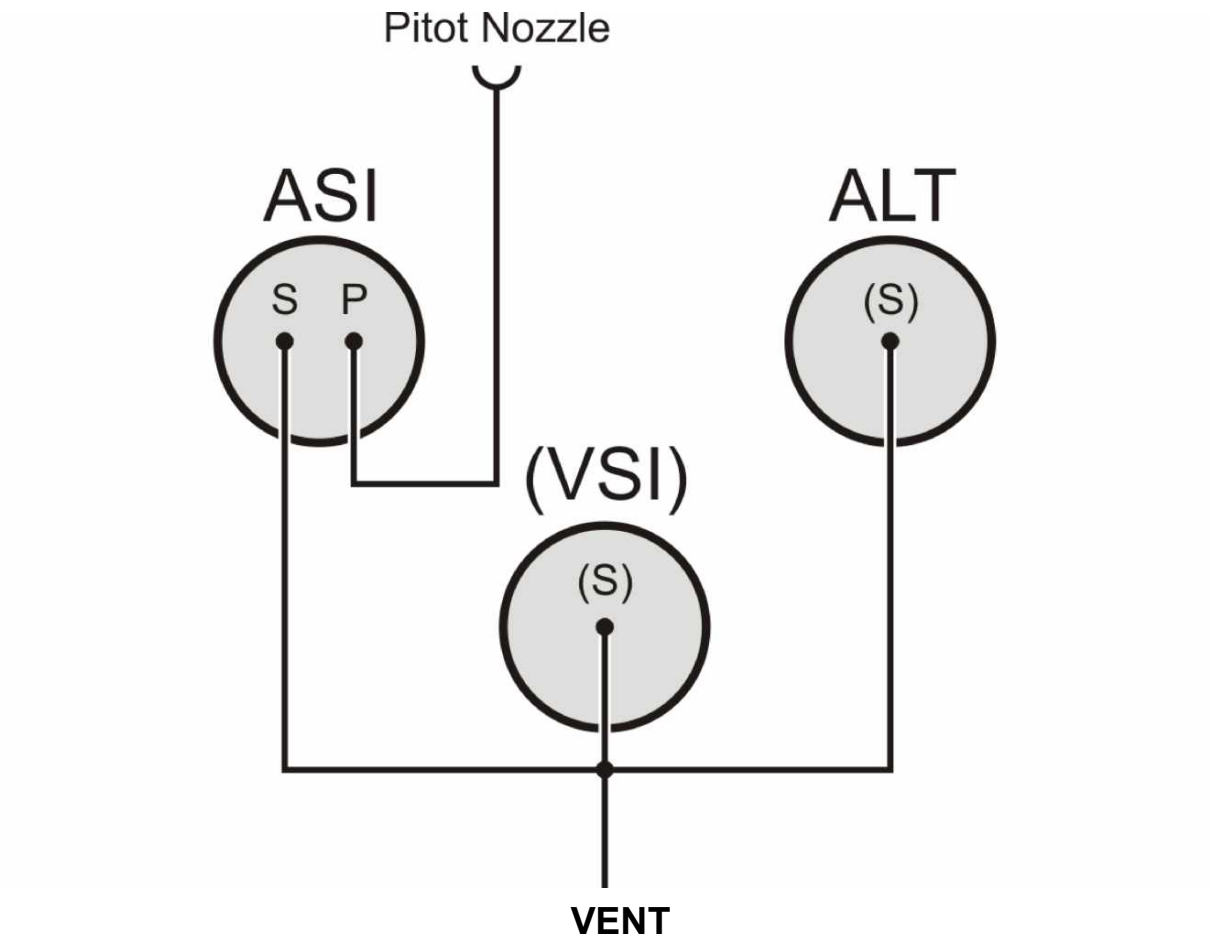


Fig. 1 - Static pickup and pitot tube



ALT: Altitude Indicator
ASI: Airspeed Indicator
VSI: Vertical Speed Indicator (if installed)
Note:
Integrated Instruments (Glass Cockpit) and backup instruments are also connected, if installed.

Fig. 2 - Pitot Static Instruments Connecting Diagram

36-21-00 8-1 REPLACEMENT: FILTER/DRYER

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

Preparation work: Service covers / maintenance access accomplished, see 52-40-00 2-1

PROCEDURES/DESCRIPTION

1 Perform "PREP. WORK: SERVICE COVERS / MAINTENANCE ACCESS", see 52-40-00 2-1.

2 Unscrew inlet and outlet connection and discard old seal ring (compressor side only).

3 Replace filter/dryer with new one and make sure cartridge is tightened safely to airframe. Install new seal ring.

4 Re-connect and tighten inlet and outlet connection with moderate torque.

ILLUSTRATIONS

Fig. 1 - Access to dryer / nose compartment closed

Fig. 1 - Access to dryer / nose compartment opened

52-00-00 4-1 REMOVAL-INSTALLATION: COWLINGS AND FAIRINGS OPR

GENERAL, REFERENCES AND REQUIREMENTS

Basic operational task, which can be performed by a licensed pilot or instructed personnel!

Secure gyroplane against unauthorized or unintended operation!

PROCEDURES/DESCRIPTION

Mast fairing (1/2) - Removal

1 Remove and retain pan head bolts with poly washers of forward mast fairing (Fig. 1, marked with a circle) and remove forward mast fairing.

2 Remove and retain pan head bolts with poly washers of aft mast fairing (Fig. 1, marked with a triangle) and remove forward aft fairing.

Fuselage fairing (3) - Removal

4 Mast fairing and side bars must be removed (see previous procedure and Fig. 3).

5 Remove the bolt from the rear of the right side bar and strengthening strut, if fitted (Fig. 4).

6 Remove the bolts from the front and rear of the left side bar, if fitted (Fig. 4 & 5).

7 Loosen the upper clamp of the tank connecting hose and disconnect the hose (Fig. 6).

8 Remove the lower bolts of the left and right upper push/pull rods and disconnect from the bell-cranks (Fig. 7).

9 Loosen the 2 bolts attaching the upper fairings to the forward mast - do not remove (Fig. 8).

10 Remove the 2 screws securing the upper fairings to the rear of the mast (Fig. 9).

11 Remove the 3 screws securing the cowlings to each other along the upper rear joint over the engine (Fig. 10).

12 Remove the 4 fastening bolts securing the lower fairings to the mast root (Fig. 11 & 12).

13 Remove all bolts from the lower centre joint of the left and right fairings, and left and right fairings to forward fairing attachments (Fig. 13, 14 & 15).

14 Remove the 2 previously loosened bolts from the upper fairings to the forward mast attachment one at a time and remove the appropriate fairing, ensuring that it does not foul on the tank drain (Fig. 8 & 16).

Fuselage fairing (3) - Installation

15 The fairings are assembled in the reverse order of disassembly described above.

Mast fairing (1/2) - Installation

16 Install mast fairing in reverse order (work steps 2 - 1).

17 Fasten all bolts with 3 Nm.

ILLUSTRATIONS

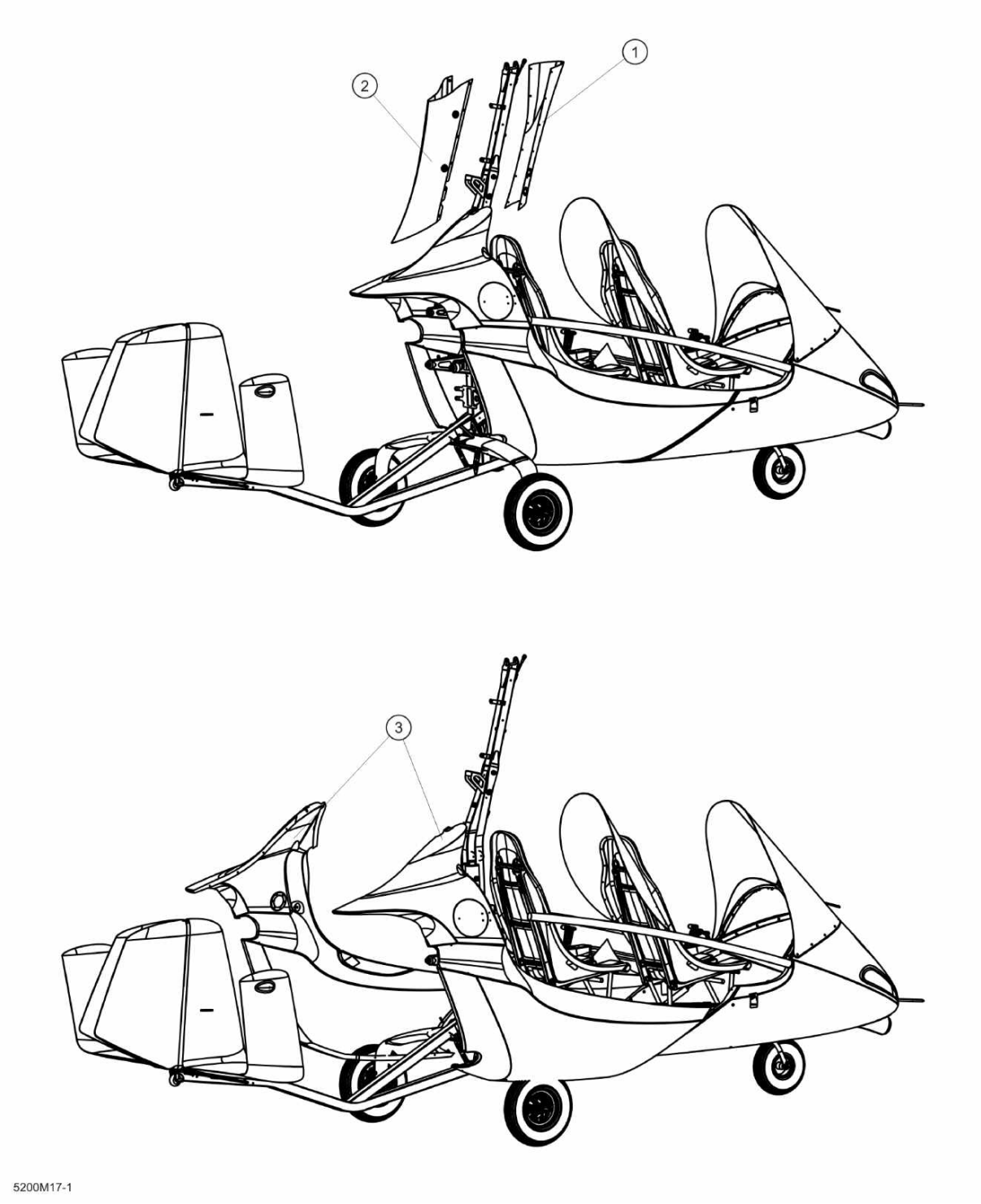


Fig. 1 - Mast fairing and fuselage fairing

Fig. 2 - Mast fairing

Fig. 9 -

Fig. 3 -

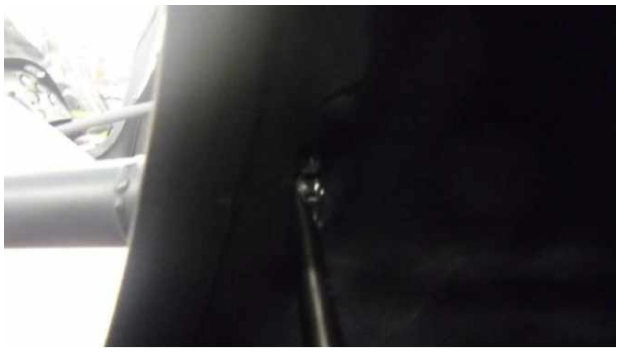


Fig. 4 -

Fig. 5 -

Fig. 6 -

Fig. 8 -

Fig. 16 -

Fig. 10 -

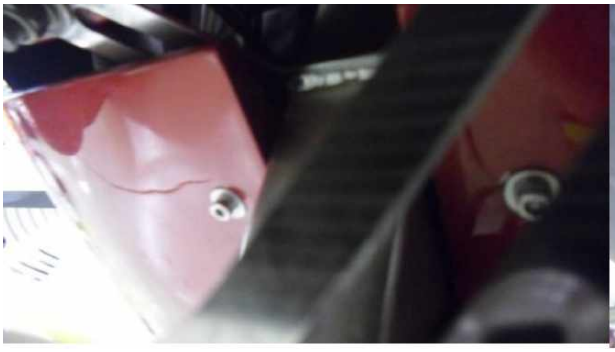


Fig. 11 -

Fig. 12 -

Fig. 13 -

Fig. 14 -

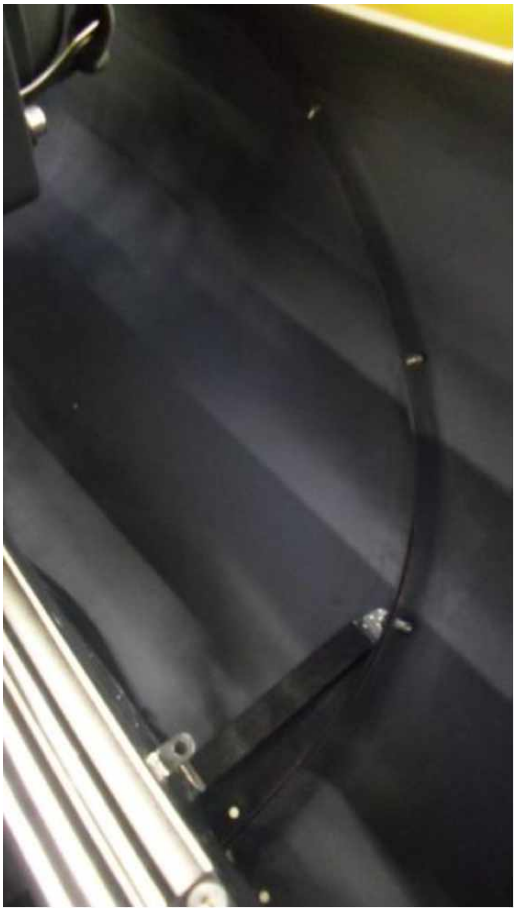


Fig. 15 -

Fig. 7 -

52-40-00 2-1 PREP. WORK: SERVICE COVERS / MAINTENANCE ACCESS

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

PROCEDURES/DESCRIPTION

Access to fuses and cabling (Fig. 1 / 2)

Fuses are accessible without removing any covers; they are mounted onto the instrument panel and labelled accordingly.

Instrument panel - Removal (Fig. 3)

6 Remove rotor system or secure.

7 Release brake pressure and bring stick in most aft position.

8 Unscrew and remove panel bolts (13 x).

IMPORTANT NOTE: Protect panel and instruments using a soft layer of cloth

9 Remove panel and lean against flight control stick. Use caution and do not damage tubing, cables and connectors. Disconnect as required.

Instrument panel - Installation

10 Bring panel into position so that bores and threaded inserts align. If needed let a second person support the nose.

Reconnect any disconnected cables

NOTE: In order to do so, support nose / lower belly using a jack with a soft cover.

11 Tighten bolts. Use engineering judgement and do not overtorque.

If any system has been disconnected, then test that system for proper function (eg pitot disconnection means apply suitable pressure to the pitot tube to prove it is connected properly by noting the airspeed indication on the ASI(

ILLUSTRATIONS

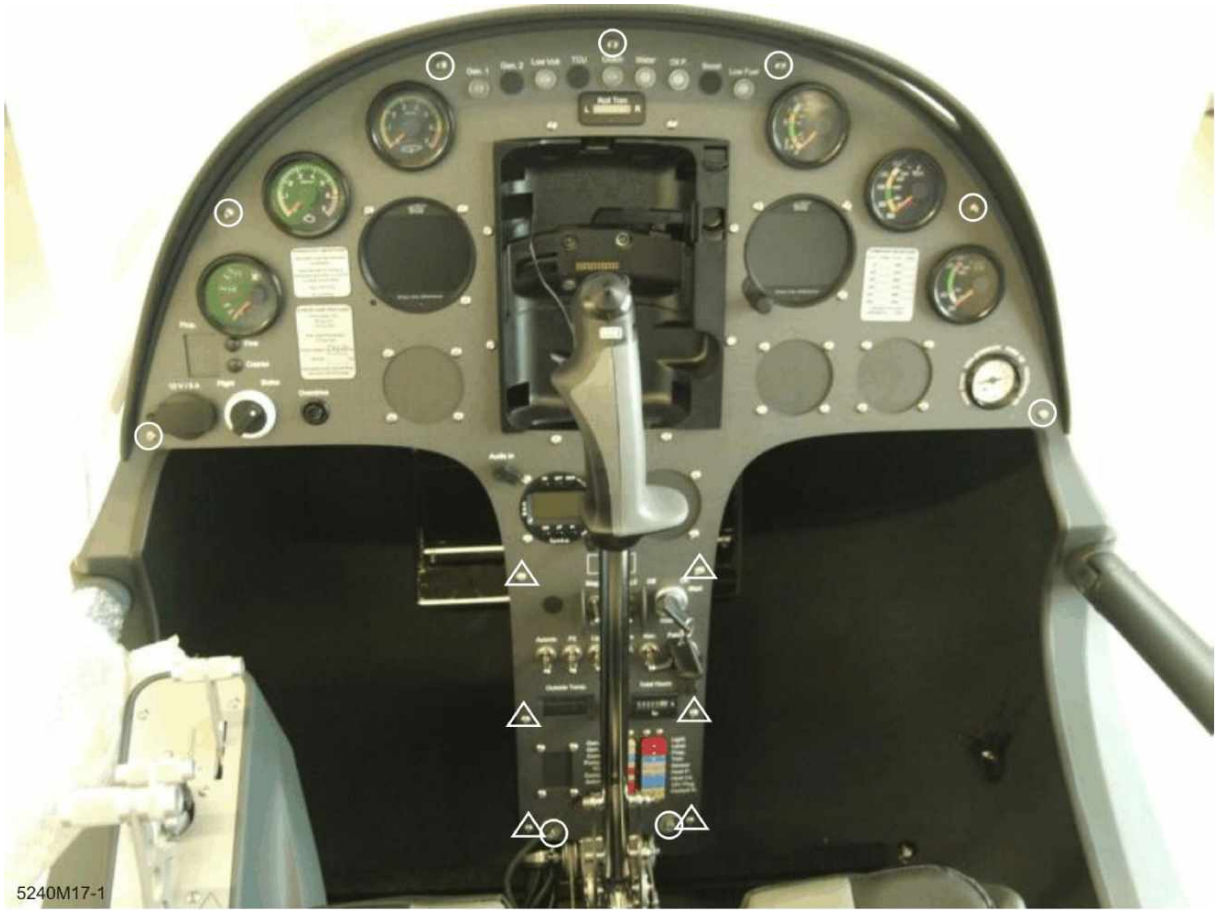


Fig. 1 - Instrument Panel with attachment bolts

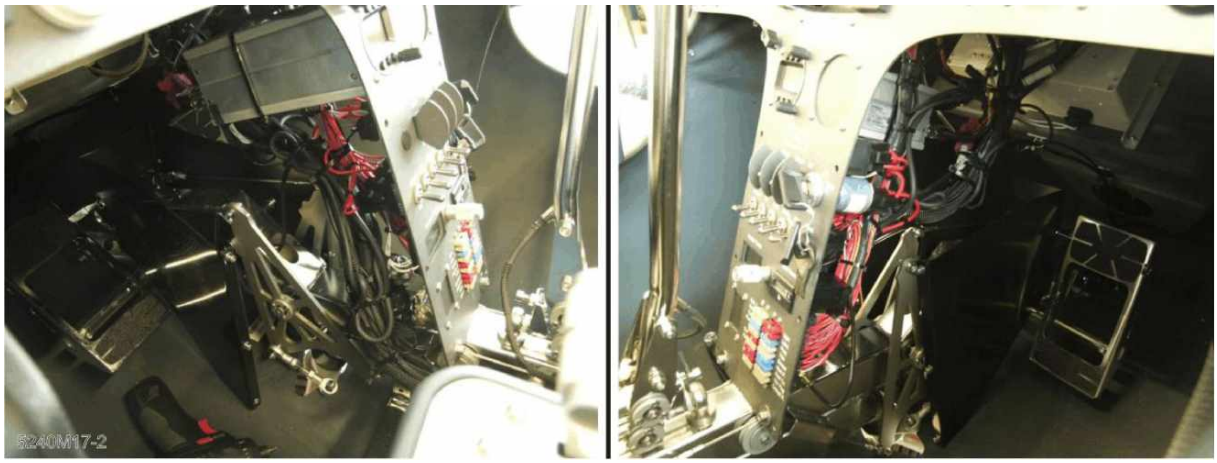


Fig. 2 - Access to fuses and cabling

61-10-00 4-1 REMOVAL-INSTALLATION: PROPELLER - HTC

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

Battery must be removed, see 24-30-00 4-1

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-02 Loctite 243 blue

PRECAUTIONS AND SAFETY MEASURES

CAUTION: When removing or disassembling make sure to mark all parts so that each and every part of the component is re-assembled and installed in exactly the same location and orientation!

PROCEDURES/DESCRIPTION

Removal

1 Before removing the spinner (optional equipment) check marking (filed notch) is available on spinner (1) and spinner base plate (8). If not, the installation position has to be marked accordingly.

2 Unscrew and remove bolts (9) with poly washers (10) and remove spinner.

3 Mark installation position of propeller hub, engine flange and spinner base plate (if installed) relative to each other.

4 Release torque on each bolt (4) by turning bolt half a revolution in counter-clockwise direction. Do not untighten or unscrew bolts (4)!

5 Unscrew and remove bolts (2) and washers (3).

Installation

6 Install propeller hub, bolts (2) with washers (3) in its original installation position.

7 Torque-tighten bolts (2) with 15 Nm in crosswise sequence.

8 Torque-tighten bolts (4) with 10 Nm in crosswise sequence.

9 Install spinner (1), spinner bolts (9) with poly washers (10). Make sure spinner is in correct installation position relative to spinner base plate. Check marking.

10 Secure spinner screws (9) with AG-BAS-02 and torque-tighten with 3 Nm in crosswise sequence. Use Loctite 243 on these screws

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
1	1	spinner HTC3B, painted	L2	53-00-00-C-30587	
1	2	M8x70		NPI	
1	3	U8/24		NPI	
1	4	M6x40		NPI	
1	4	M6x40		NPI	
1	5	Propeller hub front	L3	61-00-00-	
1	6	Propeller blade (3)	L3	61-00-00-	
1	7	Propeller hub rear	L3	61-00-00-	
1	8	Spinner Plate		NPI	
1	9	Screw		71-00-00-	
1	10	U4, Poly		NPI	

ILLUSTRATIONS

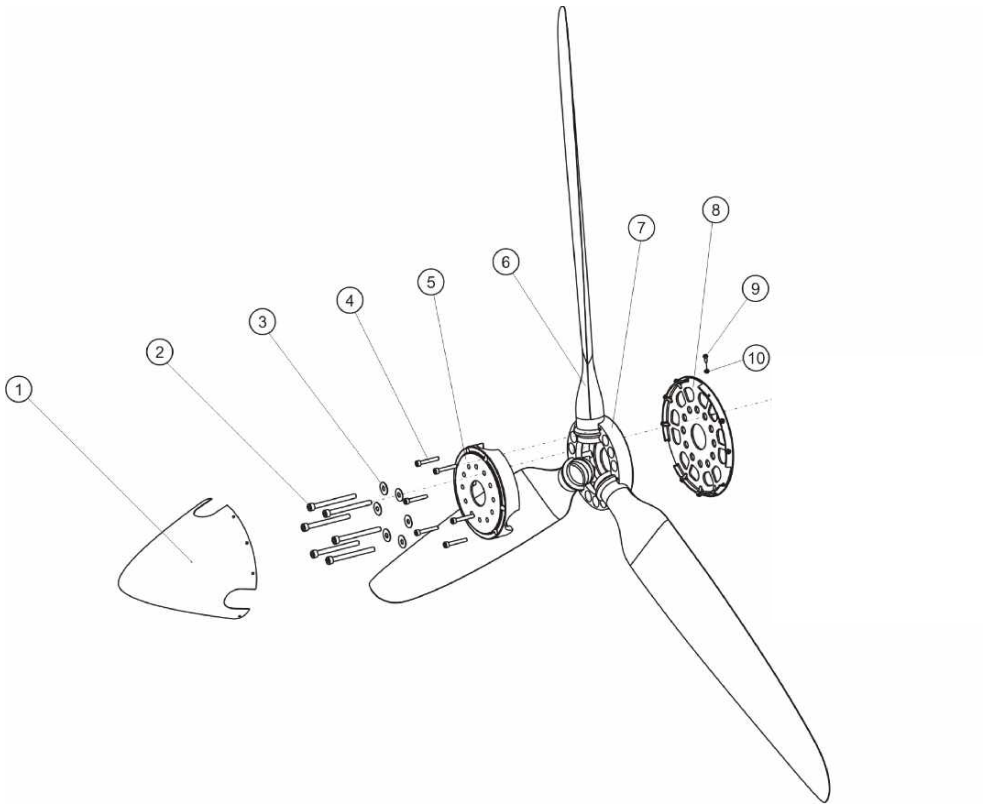


Fig. 1 - Propeller HTC

Note that the propeller blades may be purchased separately, or as a complete propeller with preset blade pitch to suit the engine variant required.
The blades and hub (front and rear as a pair) carry serial identification.

61-10-00 4-2 DISASSEMBLY-ASSEMBLY: PROPELLER - HTC

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Propeller must be removed, see 61-10-00 4-1

PROCEDURES/DESCRIPTION

Disassembly

1 Mark inner and outer propeller hub to indicate relative installation position.

2 Place propeller assembly on a horizontal and clean surface and support propeller hub so that assembly does not lie on propeller blades.

3 Unscrew and remove bolts (4).

4 Remove outer propeller hub and remove individual blades.

Assembly

5 Place inner propeller hub on horizontal and clean surface and support propeller hub.

6 Insert individual blades in correct position.

7 Attach outer propeller hub, insert bolts (4) and hand-tighten.

8 Torque-tighten bolts (4) with 10 Nm in crosswise sequence.

ILLUSTRATIONS

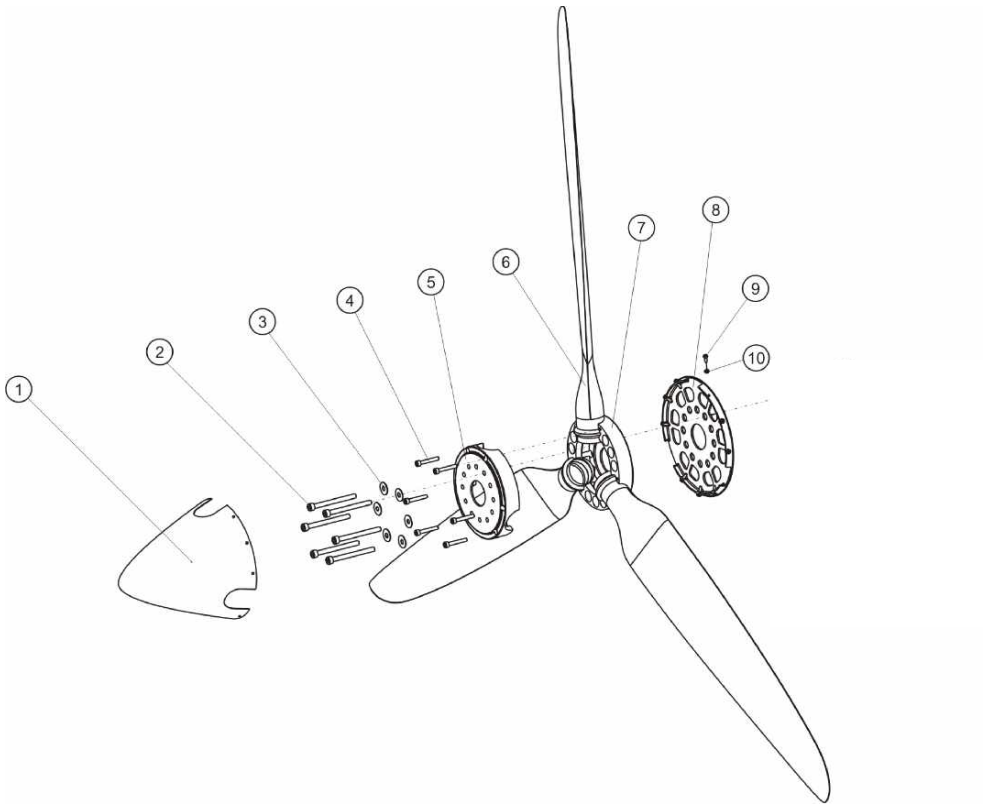


Fig. 1 - Propeller HTC

61-10-00 5-1 ADJUSTMENT: PROPELLER PITCH - HTC

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Spinner (if installed) must be removed, see 61-10-00 4-1

Battery must be removed, see 24-30-00 4-1

SPECIAL TOOLS AND CONSUMABLE MATERIALS

M.WZ26 Propeller Pitch Adjustment Tool (MT)

PROCEDURES/DESCRIPTION

1 Untighten bolts (Fig. 1, 4) so that bolt heads does not contact outer propeller hub.

2 Unscrew bolts (Fig. 1, 2) about 2 revolutions.

3 Position propeller pitch adjustment tool with the inner side on outer propeller hub and profiled section on the propeller blade.

4 Carefully adjust blade pitch by tapping with a 200 g rubber hammer in the area of the blade's nose section so that blade pitch increases or decreases. Never use hammer on trailing edge as the blade may be damaged that way.

5 In order to read the correct setting it is advisable to let the blade's trailing edge rest in (touch) the tool while allowing a small light gap between blade's back and the tool's profiled section.

6 Repeat work steps 3 to 5 for the remaining blades.

7 Hand-tighten bolts (Fig. 1, 2) and (Fig. 1, 4) and check blade pitch setting for all blades. If necessary, untighten bolts and re-do from step 1. Ensure the three blades have the same pitch.

8 Torque-tighten bolts (Fig. 1, 2) with 15 Nm in crosswise sequence.

9 Torque-tighten bolts (Fig. 1, 4) with 10 Nm in crosswise sequence.

10 Perform torque-check after first flight or ground run.

Flight test should indicate 5400 engine rpm in 60mph (100km/h) climb.

In the absence of a gauge, the propeller is set with an inclinometer measuring the angle of the blade chord to the thrust line at ¾ blade radius, with the blade set horizontally.

ILLUSTRATIONS

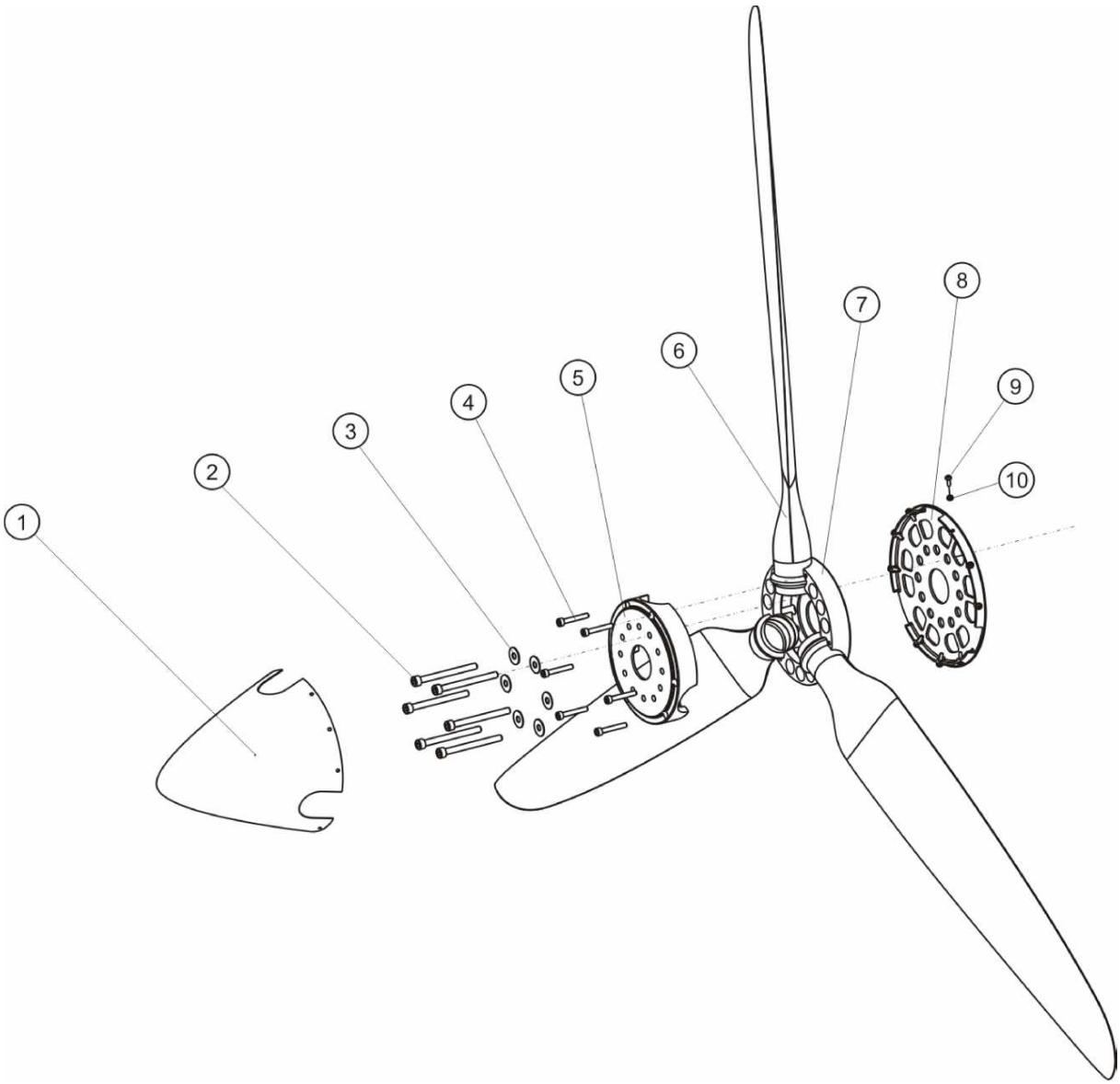


Fig. 1 - Propeller HTC

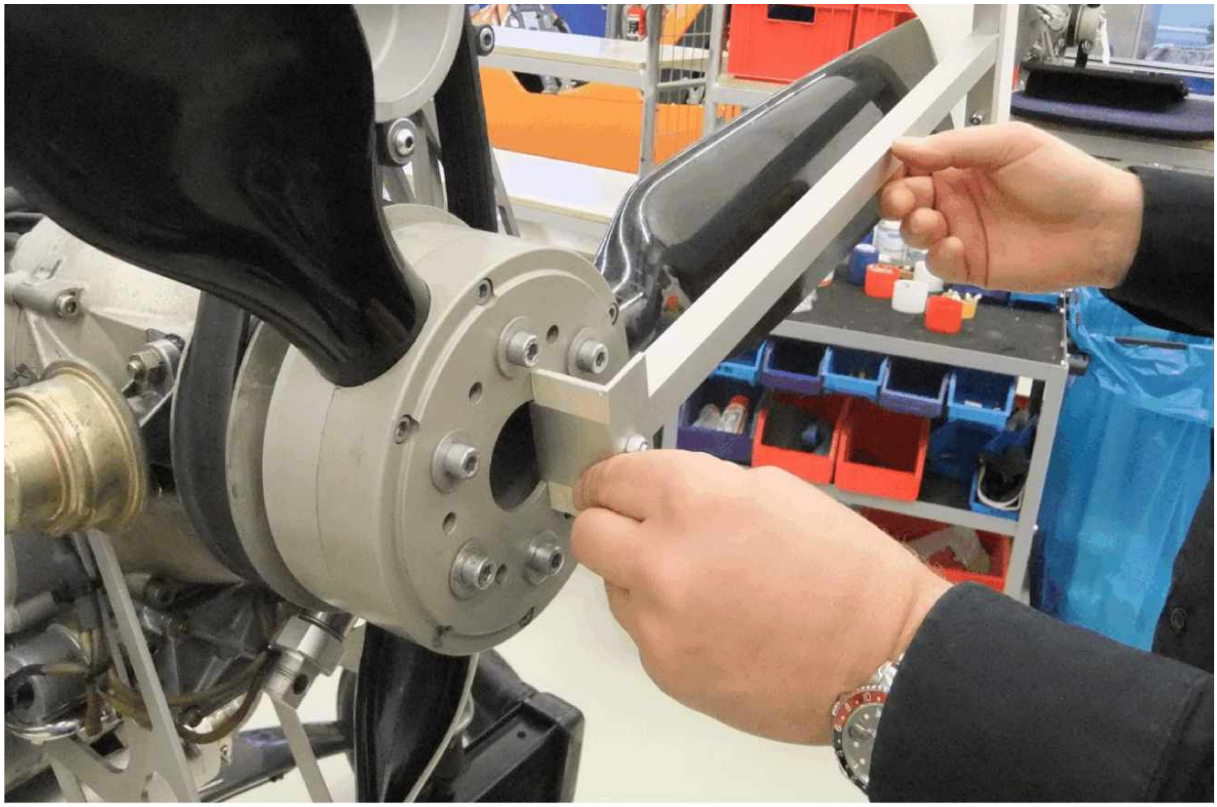


Fig. 2 - Propeller pitch adjustment and tool

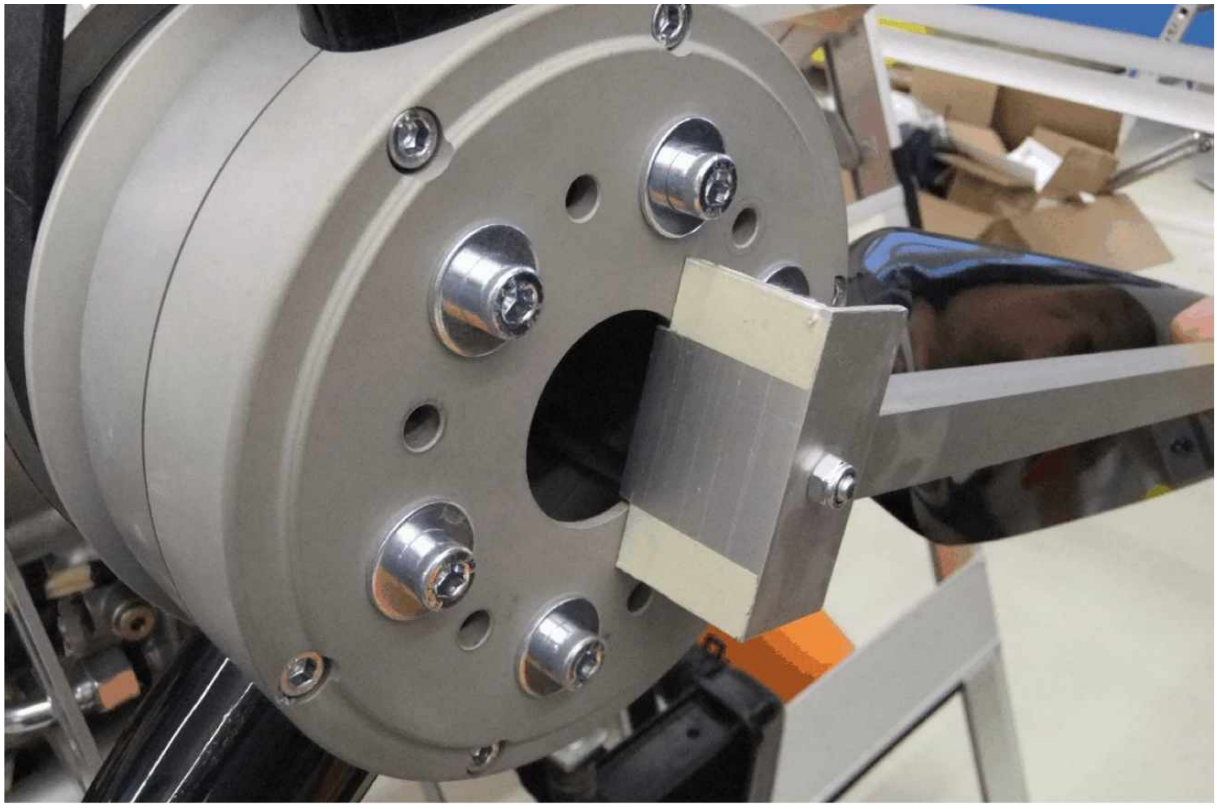


Fig. 3 - Detail hub

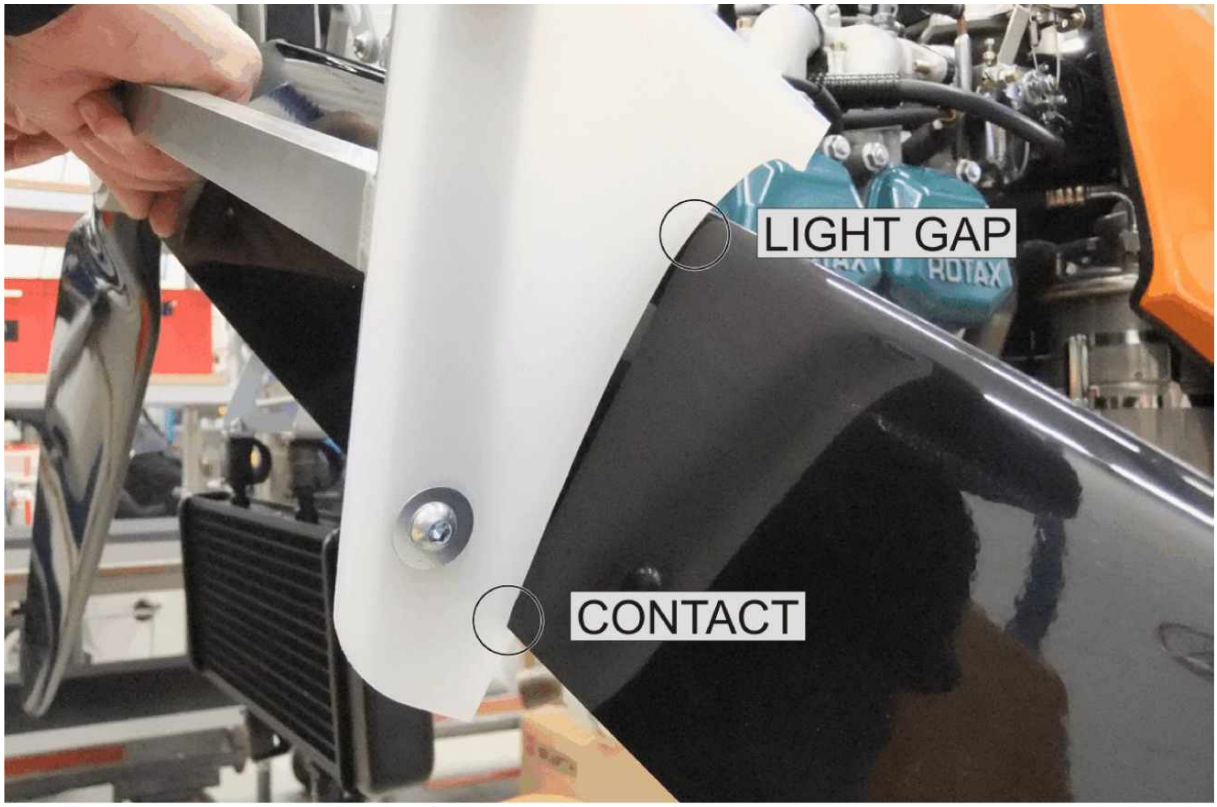


Fig. 4 - Detail blade

61-20-00 1-1 TROUBLE-SHOOTING: IVO-VARIABLE PITCH PROPELLER LNE

GENERAL, REFERENCES AND REQUIREMENTS

SPECIAL TOOLS AND CONSUMABLE MATERIALS

PRECAUTIONS AND SAFETY MEASURES

WARNING: Electrical shorting of the battery will produce high current with the risk of personal injury and damage to equipment!

NOTE If it is necessary to connect the collector rings directly to electrical power within the fault tree analysis pull off contacts from carbon brushes.

PROCEDURES

1 Inspect wear of carbon brushes, replace if necessary

2 Insulating disk may not protrude between collector rings, if necessary remove using a bevelled-edge chisel

3 Polish collector rings with non-woven web, so that collector rings are blank-surfaced

4 Perform ground test run immediately after the foregoing step

5 Do not clean collector rings from carbon abrasion debris (protection against oxidisation)

6 Execute fault tree analysis (Fig. 1)

ILLUSTRATIONS

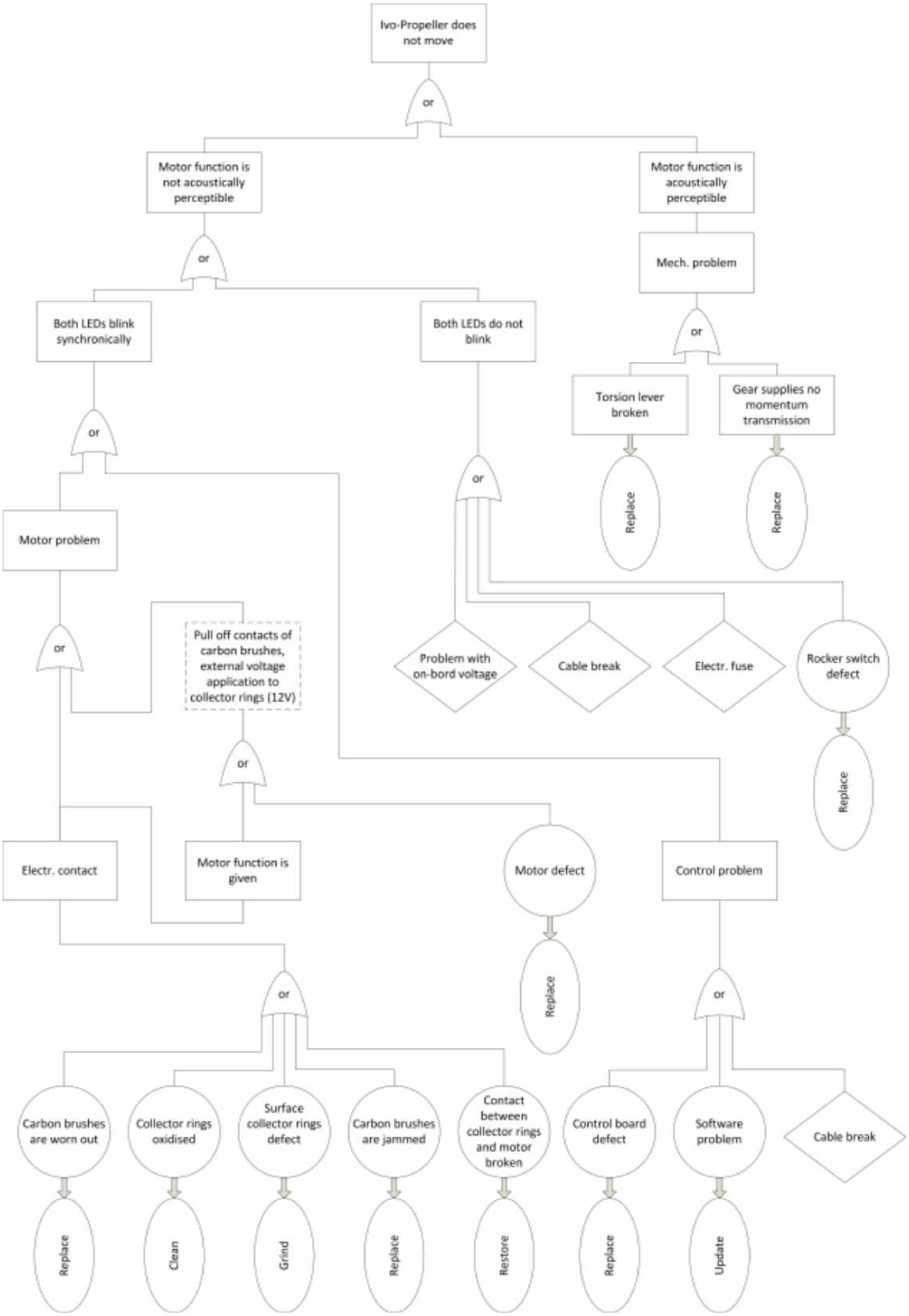


Fig. 1 – Fault Tree IVO Variable Pitch Propeller

62-11-00 4-1 REMOVAL: ROTOR - TEETERING PARTS OPR

GENERAL, REFERENCES AND REQUIREMENTS

Basic operational task, which can be performed by a licensed pilot or instructed personnel!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-01	Loctite 221 red
LR	IMPORTANT NOTE: Procedure involves parts with limited reusability. Check parts list below before starting job!

PRECAUTIONS AND SAFETY MEASURES

WARNING: Wear eye protection and mind FOD when removing attachment hardware!

WARNING: Object is heavy! Inadequate handling could cause injury. Use proper lifting techniques or assistance!

WARNING: Never place the rotor system on a dirty or grainy surface and avoid bending moments at the blade attachments!

WARNING: When handled incorrectly the rotor system can be damaged irreparably. If undetected this may have catastrophic consequences!

CAUTION: When removing or disassembling make sure to mark all parts so that each and every part of the component is re-assembled and installed in exactly the same location and orientation!

IMPORTANT NOTE: Some rotor blades have loose washers in them which are required as balance weights. Do not remove or restrain if present!

PROCEDURES/DESCRIPTION

1 Secure the gyroplane on level ground by engaging the parking brake, adjust the rotor system lengthwise and pump up the rotor brake to its maximum.

2 Remove and discard split pin and unscrew the castellated nut (4). The rotor system has to be tilted onto the black rotor teeter stop.

3 The teeter bolt (1) has to be extracted by using only the hand, not a hammer. If needed tilt the rotor blades carefully onto the teeter stop, in order to prevent the bolt from jamming. Make sure that the rotor stays level in the teeter axis, if not the teeter bolt will damage the Teflon coated bushes, while being pushed out.

4 A supervised second person has to hold the rotor system in flying direction.

5 Lift the rotor system carefully out of the teeter tower and be aware of the position of the shim washers (2). Their thicknesses may differ and it is essential that they are reinstalled on the correct side! They are marked with dots to identify the correct side.

6 Remove the rotor system to one side by letting it rest on your shoulder and take care not to collide with stabilizer or propeller.

7 The shim washers and the teeter block in the hub are marked on each side with one or two engraved dots. Directly after the disassembly the shim washers need to be fixed on their respective side with cable ties.

8 If possible, handle with two persons while holding approximately in the middle of each blade. When supporting the system use two stands each positioned in about 2 metres distance from the hub.

9 The rotor system must not be placed on a dirty or grainy surface, as the blades can scratch and damage easily. The best way is to place the rotor blades centrally onto two stands, supporting the rotor at approximately 2 m distance from the hub.

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
1	1	Teeterbolt	L0	27-30-00-S-30256	
1	2	Chimm washer 3,5	L0	62-00-00-S-31706	
1	3	U13	L0	27-30-00-S-30256	
1	4	M12 castle nut	L0	27-30-00-S-30256	
1	5	Split pin 3.2x40	L0	27-30-00-S-30256	
1	6	Rotor head II compl.	L2	27-30-00-	

ILLUSTRATIONS

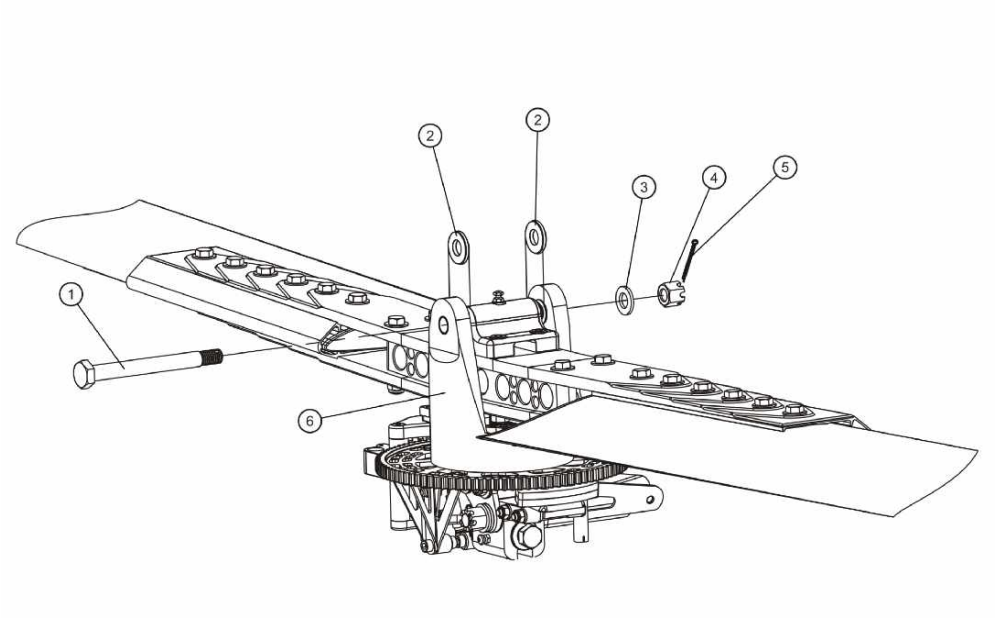


Fig. 1 - Removal rotor - teetering parts

62-11-00 4-2 DISASSEMBLY: ROTOR - TEETERING PARTS OPR

GENERAL, REFERENCES AND REQUIREMENTS

Basic operational task, which can be performed by a licensed pilot or instructed personnel!

Rotor system must be removed, see 62-11-00 4-1!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

LR IMPORTANT NOTE: Procedure involves parts with limited reusability. Check parts list below before starting job!

PRECAUTIONS AND SAFETY MEASURES

WARNING: When handled incorrectly the rotor system can be damaged irreparably. If undetected this may have catastrophic consequences!

CAUTION: The rotor hub must never be disassembled!

CAUTION: When removing or disassembling make sure to mark all parts so that each and every part of the component is re-assembled and installed in exactly the same location and orientation!

PROCEDURES/DESCRIPTION

1 To disassemble the rotor system, place it upside down onto a clean surface or stands to support the rotor at approximately 2 m from the hub.

2 Untighten and discard self-locking nuts (9) on the first blade by counter-holding the corresponding bolt head to prevent it from turning.

3 Push out all shoulder bolts (1 - 5) without any force, but use no more than a gentle tapping if necessary. Tilt the rotor blade up and down to support easy removal of the bolt.

4 Carefully pull the rotor blade out of the hub (7) in radial direction and take off the clamping profile (10).

5 Repeat step 2 to 4 on second rotor blade.

IMPORTANT NOTE: Do not disassemble the rotor hub!

6 Place rotor blades, clamping profile and rotor hub in a suitable way to prevent bending or surface damage.

IMPORTANT NOTE: Do not lift or support the rotor system at its blade tips as the bending moment due to the weight of the hub assembly may overstress the blade roots. If possible, handle with two persons while holding approximately in the middle of each blade. When supporting the system use two stands each positioned in about 2 metres distance from the hub.

ILLUSTRATIONS

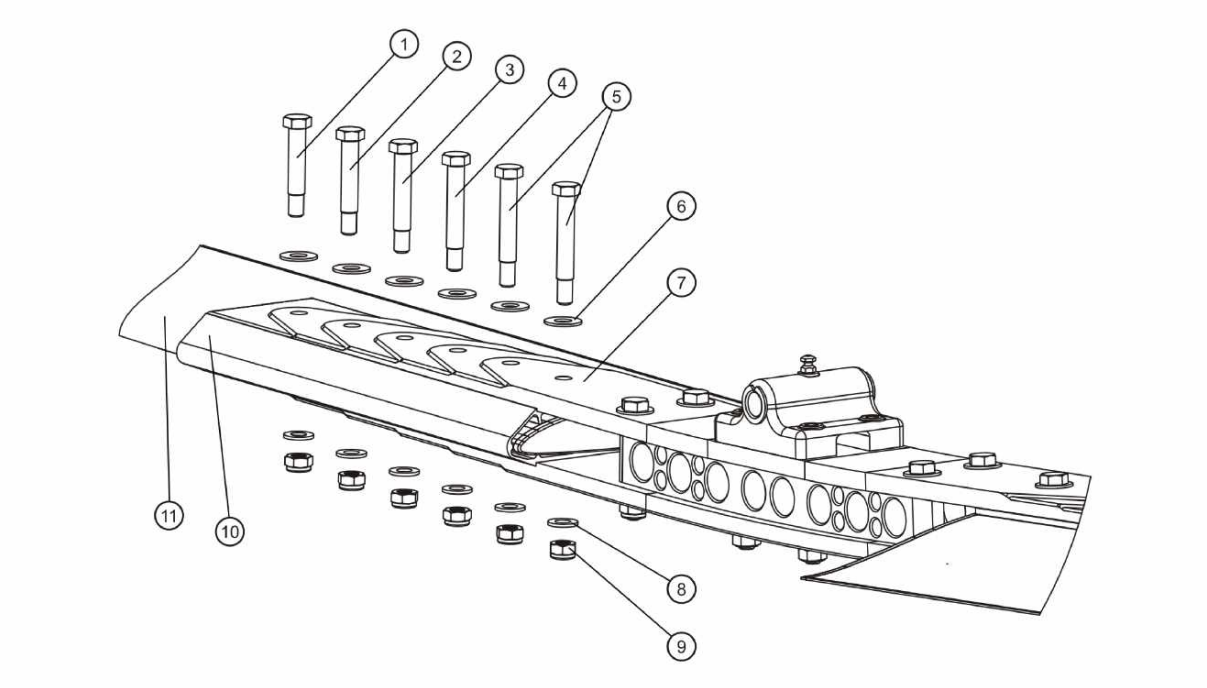


Fig. 1 - Disassembly rotor - teetering parts

PARTS LIST

Fig.	Pos.	Description	PIT	Remark
1	1	shoulder bolt M8 37/12	62-00-00-S-33324	RS II
1	1-5	M8x60 Rotor blade bolt 8.8 DIN 610	62-00-00-M-20661	RS I
1	2	shoulder bolt M8 40/12	62-00-00-S-33324	RS II
1	3	shoulder bolt M8 43/12	62-00-00-S-33324	RS II
1	4	shoulder bolt M8 46/12	62-00-00-S-33324	RS II
1	5	M8x60 Rotor blade bolt 8.8 DIN 610	62-00-00-M-20661	RS II
1	6	U9/20	62-00-00-S-33324	RS II
1	7	Rotorhub III	01-00-00-	
1	8	U8	62-00-00-S-33324	RS II
1	9	M8 Si	62-00-00-S-33324	RS II
1	10	Clamping profile blade	01-00-00-M-31793	

62-11-00 4-3 ASSEMBLY: ROTOR - TEETERING PARTS OPR

GENERAL, REFERENCES AND REQUIREMENTS

Basic operational task, which can be performed by a licensed pilot or instructed personnel!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

LR IMPORTANT NOTE: Procedure involves parts with limited reusability. Check parts list below before starting job!

PRECAUTIONS AND SAFETY MEASURES

WARNING: When handled incorrectly the rotor system can be damaged irreparably. If undetected this may have catastrophic consequences!

CAUTION: When removing or disassembling make sure to mark all parts so that each and every part of the component is re-assembled and installed in exactly the same location and orientation!

PROCEDURES/DESCRIPTION

1 The rotor blades (11), clamping profile (10) and rotor hub (7) are each labelled with an engraved serial number.

2 Insert the first rotor blade carefully into the clamping profile. Make sure that all serial numbers match.

IMPORTANT NOTE: Grease shaft with AG-LUB-03, but do not allow AG-LUB-03 to come into contact with threads at any time!

3 Fit the rotor hub side with the according serial number to clamping profile (7) and blade (11). Insert 6 x shoulder bolts (1-5) and corresponding washers (6) without using force so that the bolt end is on top when the rotor system is installed. For re-identification and correct installation position the shaft length is provided in the figure above. Example: 40/12 means shaft length 40mm.

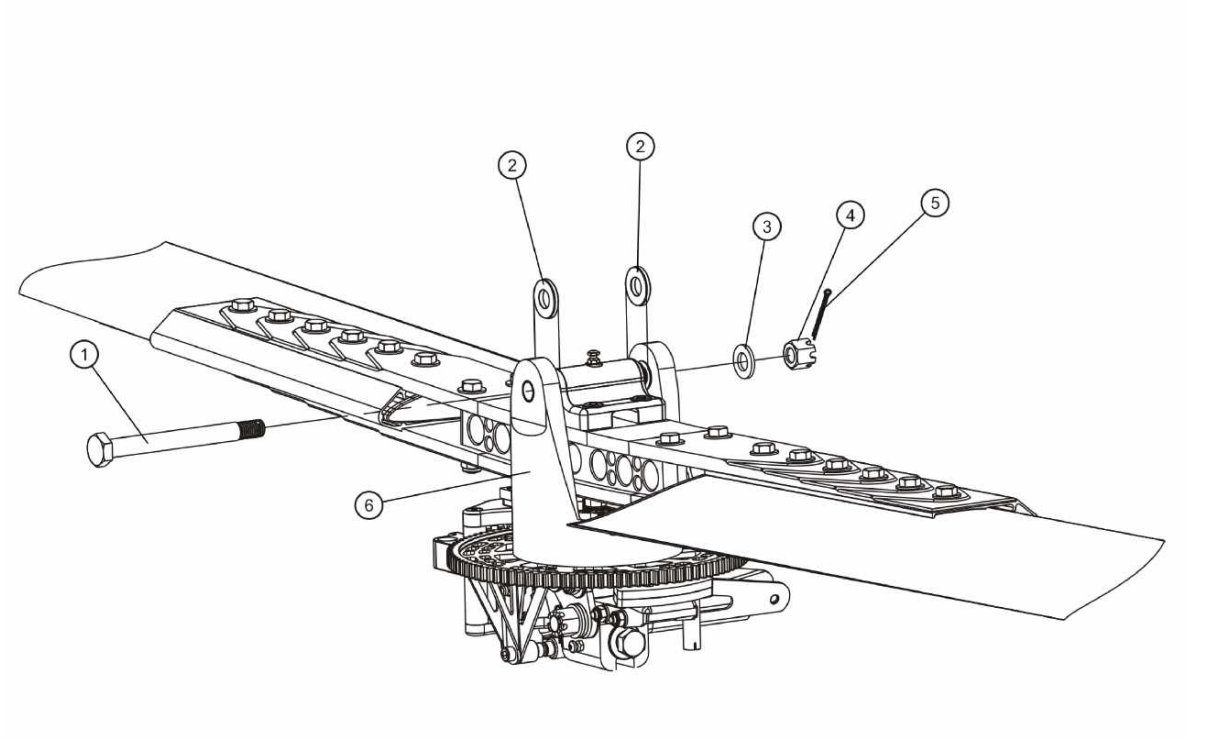
4 Position the washers (8) and the self-locking nuts (9) and hand-tighten.

5 Torque-tighten nuts (9) with 20 +/- 5 Nm from the inside to the outside. When doing so, counter-hold bolts (5) to prevent any damage to the hub and blade holes.

6 Repeat work steps 2 to 5 for the second rotor blade.

7 Check rotor system alignment according to 62-11-00 5-1 and adjust, if necessary.

ILLUSTRATIONS



62-11-00 4-4 INSTALLATION: ROTOR - TEETERING PARTS OPR

GENERAL, REFERENCES AND REQUIREMENTS

Basic operational task, which can be performed by a licensed pilot or instructed personnel!

Secure gyroplane against unauthorized or unintended operation!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-GRS-01	WHS 2002 Grease
LR	IMPORTANT NOTE: Procedure involves parts with limited reusability. Check parts list below before starting job!

PRECAUTIONS AND SAFETY MEASURES

WARNING: Object is heavy! Inadequate handling could cause injury. Use proper lifting techniques or assistance!

WARNING: When handled incorrectly the rotor system can be damaged irreparably. If undetected this may have catastrophic consequences!

PROCEDURES/DESCRIPTION

1 Secure the gyroplane on level ground by engaging parking brake, adjust the rotor head or teeter tower corresponding to fore-aft and pressurize the rotor brake up to maximum.

2 Check correct matching of parts: The rotor hub and the teeter tower are marked with two dots according to the orientation for installation.

3 Lift the rotor blade with a second briefed person (one person standing aft, one person standing directly in front of the hub).

4 Approach with the rotor system from the side to the gyroplane and make sure not to collide with propeller or stabilizer. Insert the rotor system into the hub from above while standing on a ladder or the rear seat.

5 The second person can let go, as soon as it is resting centrally in the teeter tower on the teeter stops.

6 Apply a thin layer of AG-GRS-01 on teeter bolt (using a lint-free cloth).

7 Insert teeter bolt by hand in the same orientation as it was before (bolt head should be at that side of the teeter block which is marked with one dot) while matching the shim washers with the corresponding installation positions. Insert teeter bolt by hand in the same orientation as it was before (bolt head should be at that side of the teeter block which is marked with one dot) while matching the shim washers with the corresponding installation positions.

8 Check direction of assembly and shim washers: rotor hub, teeter tower and shim washers are marked on each side either with one or two engraved dots.

9 If the teeter bolt cannot be inserted, tilt the rotor blade along the teeter axis with the free hand.

10 Install washer and castellated nut. Hand-tighten only and secure with a new split pin. Use split pins only once. Make sure that the teeter bolt can be turned easily by hand.

11 Grease nipple in teeter block.

ILLUSTRATIONS

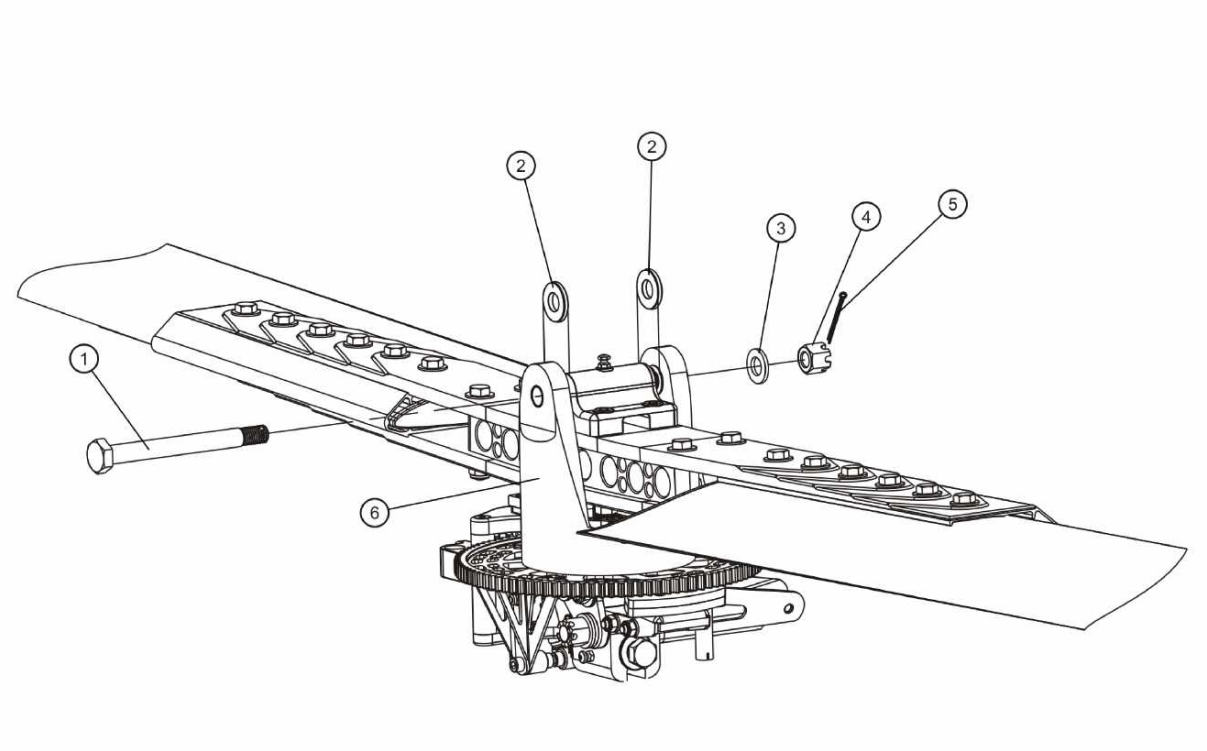


Fig. 1 - Installation rotor - teetering parts

PARTS LIST

Fig.	Pos.	Description	PIT	Remark
1	1	Teeterbolt	27-30-00-S-30256	RS II
1	2	Shim washer 3,5	62-00-00-S-31706	RS II
1	3	U13	27-30-00-S-30256	RS II
1	4	M12 castle nut	27-30-00-S-30256	RS II
1	5	Split pin 3.2x40	27-30-00-S-30256	RS II
1	6	Rotor head III compl.	27-30-00-M-	RS II

62-11-00 5-1 CHECK-ADJUSTMENT: ROTOR SYSTEM ALIGNMENT

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Rotor system must be removed, see 62-11-00 4-1!

Rotor system must be placed on suitable supports to avoid scratching of the blades or bending moments at the blade attachment

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

WARNING: Object is heavy! Inadequate handling could cause injury. Use proper lifting techniques or assistance!

WARNING: Do not lift or support the rotor system at its blade tips as the bending moment due to the weight of the hub assembly may overstress the blade roots!

WARNING: Never place the rotor system on a dirty or grainy surface and avoid bending moments at the blade attachments!

WARNING: When handled incorrectly the rotor system can be damaged irreparably. If undetected this may have catastrophic consequences!

PROCEDURES/DESCRIPTION

1 Place rotor system on suitable stands on level ground. Make sure stand surface is level and stand is oriented exactly 90 degrees to rotor blade (see Fig. 1).The stands should be approx. 4.2m apart so that the rotor blades are supported at their centres of gravity.

2 String measuring cord between both outer blade tips. Position at rivet as depicted in Fig. 2 'Positioning of measuring cord'.

3 Adjust distance of stand carefully so that measuring cord is strung slightly above the central grease nipple. Verify centre position of grease nipple (Fig. 3).

4 In case the measuring cord deviates by more than 2 mm from centre position (i.e. grease nipple inner bore), adjust rotor system linearity. To do so perform the following work steps:

5 Untighten the self-locking nuts of the blade attachment bolts, except for the most inner bolt(s). Counter-hold bolt head to prevent it from turning.

6 Adjust linearity/alignment of rotor system and tighten nuts. Perform alignment check. If necessary, repeat procedure from step 5 on.

7 Torque-tighten nuts with 20 +/- 5 Nm from the inside to the outside. When doing so, counter-hold bolts to prevent any damage to the hub and blade holes.

8 Perform final linearity/alignment check. If necessary, repeat procedure from step 5 on.

IMPORTANT NOTE: In case of any adjustment, a functional test flight must be performed!

ILLUSTRATIONS

Fig. 1 - Rotor system placed on stands

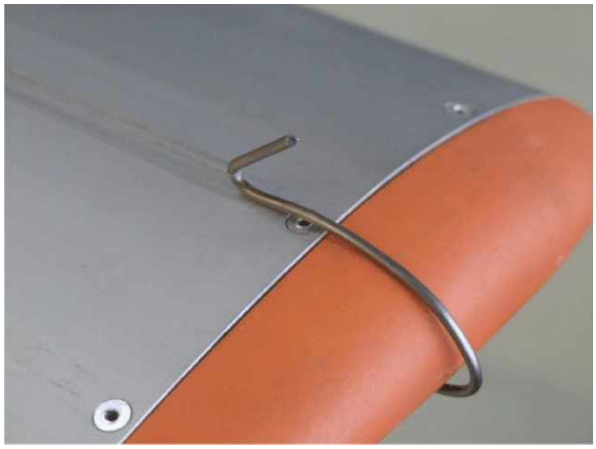


Fig. 2 - Positioning of measuring cord

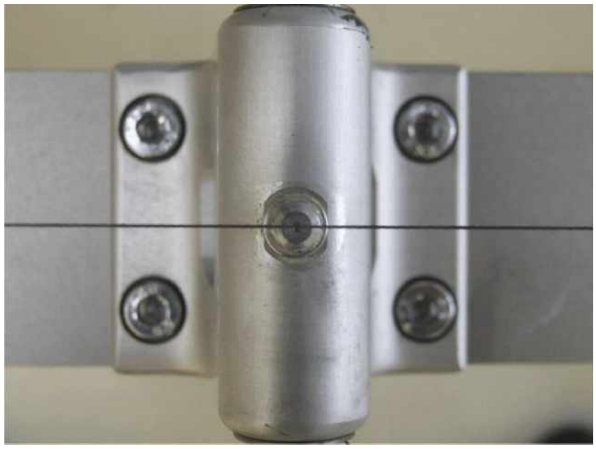


Fig. 3 - Reference point at grease nipple

62-11-00 6-1 INSPECTION: ROTOR - TEETERING PARTS

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Rotor system must be removed, see 62-11-00 4-1!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-GRS-01 WHS 2002 Grease

PRECAUTIONS AND SAFETY MEASURES

WARNING: Never place the rotor system on a dirty or grainy surface and avoid bending moments at the blade attachments!

WARNING: When handled incorrectly the rotor system can be damaged irreparably. If undetected this may have catastrophic consequences!

PROCEDURES/DESCRIPTION

1 Check inner and outer blade caps for tight fit and general condition. Visible insets or score marks may indicate contact with obstacles with possible damage to the rotor system.

2 Perform visual inspection of clamping profile.

3 Perform visual inspection of rotor hub.

4 Perform visual inspection of grease nipple and check tight fit

5 Check rotor system alignment 62-11-00 5-1, i.e. work steps 1 to 3 for trend monitoring purposes.

6 Inspect teeter bolt. In order to do so, clean with lint-free cloth and inspect for wear marks and corrosion. If corrosion or wear marks are evident (fingernail test), the teeter bolt must be discarded and replaced.

7 Apply a thin layer of AG-GRS-01 on teeter bolt (using a lint-free cloth).

8 Inspect bushings in teeter block and teeter tower for correct seating (see Fig. 1 for positions of slits) and secure installation (must not be possible to turn by hand). Otherwise, bushings must be replaced, see 62-11-00 8-1.

9 Insert teeter bolt in teeter block and inspect for play. If any bearing play is evident, try with new teeter bolt. If play is still evident, replace teeter block bushing, see 62-11-00 8-1.

10 Insert teeter bolt in teeter tower and inspect for play. If any bearing play is evident, try with new teeter bolt. If play is still evident, replace teeter tower bushings, see 62-11-00 8-1.

ILLUSTRATIONS

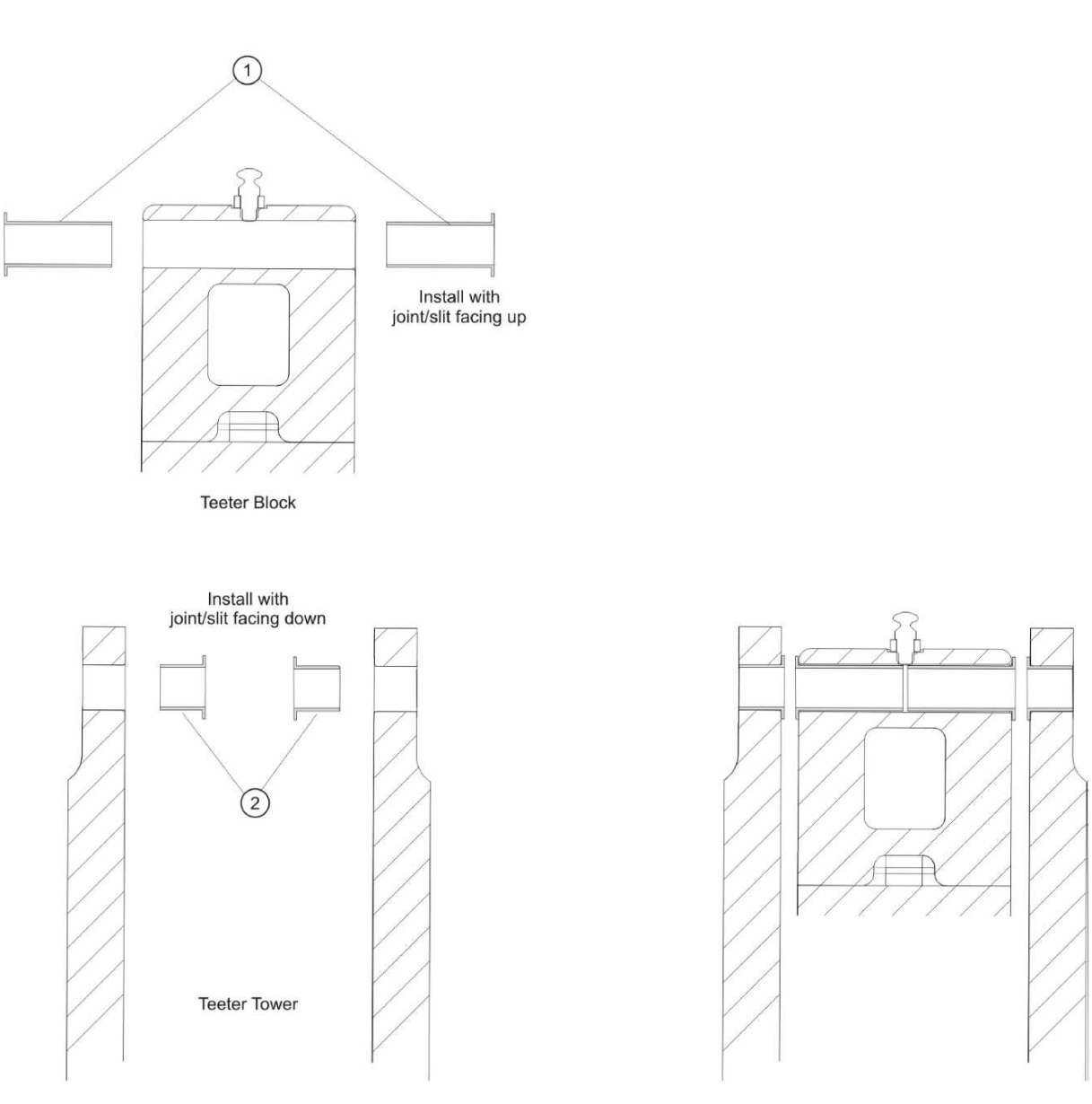


Fig. 1 - Teeter bushings, block and tower

62-11-00 6-2 INSPECTION: ROTOR BLADES

OPR

GENERAL, REFERENCES AND REQUIREMENTS

Basic operational task, which can be performed by a licensed pilot or instructed personnel!

Rotor system must be disassembled, see 62-11-00 4-2

SPECIAL TOOLS AND CONSUMABLE MATERIALS

S.WZ9001 Aluminium ruler 1000mm

PRECAUTIONS AND SAFETY MEASURES

WARNING: Do not use permanent marker on anodized (eloxated) parts!

CAUTION: Do not use sticky labels on aluminium or composite parts as they may be difficult to remove!

PROCEDURES/DESCRIPTION

1 Inspect for cracks in the blade root area, especially in the area of the inner attachment bore (see Fig. 1 "Critical Area"). In case of any cracks the complete rotor system must be replaced.

2 Check each rotor blade in its root section for linearity. In order to do place each rotor blade with the nose section facing down on the support stands and measure gap with an aluminium ruler in 1 m distance from the inner end (see Fig. 2). Maximum allowed gap (dimension A) is 0.5 mm (LTA DULV-2010-004).

IMPORTANT NOTE: In order to avoid measuring errors draw a straight and parallel line 200 mm from the trailing edge. Use a lead pencil. Do not use permanent marker on anodized (eloxated) parts!

ILLUSTRATIONS

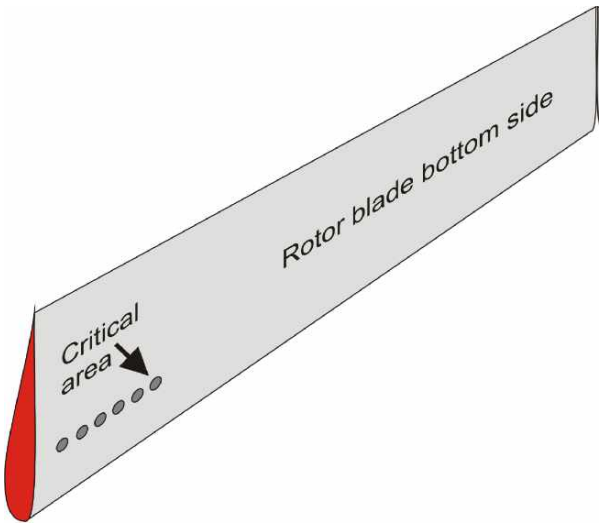


Fig. 1 - Critical blade area

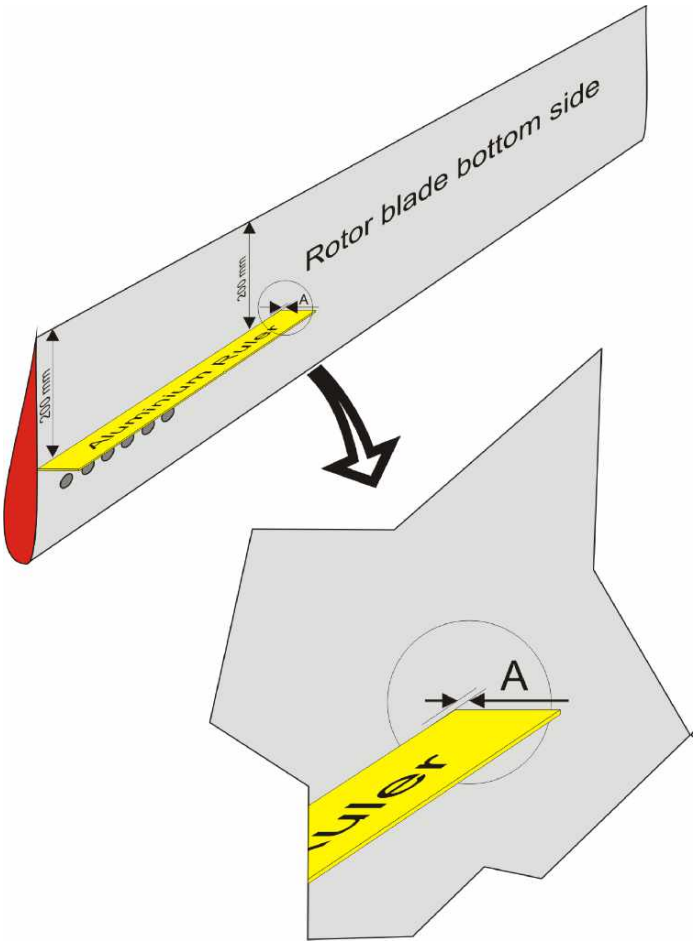


Fig. 2 - Measurement of blade root linearity

62-11-00 6-3 INSPECTION: ROTOR HUB BOLTS

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Rotor system must be removed, see 62-11-00 4-1!

Rotor system must be placed on suitable supports to avoid scratching of the blades or bending moments at the blade attachment

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-GRS-01	WHS 2002 Grease
LR	IMPORTANT NOTE: Procedure involves parts with limited reusability. Check parts list below before starting job!

PRECAUTIONS AND SAFETY MEASURES

CAUTION: Remove and re-install only one bolt at a time. Never remove more than one bolt of the installation!

PROCEDURES/DESCRIPTION

1 Remove first Rotor Hub Bolt and discard self-locking nut. If necessary use a mandrel and a hammer and tap carefully. Use caution not to damage the threads or the surface of the bore.

2 Inspect Rotor Hub Bolt for corrosion. In case of any signs of corrosion the bolt must be replaced.

3 Apply a thin layer of AG-GRS-01 on shaft, but NOT on the thread.

4 Re-install bolt with a slow turning motion and moderate pressure.

5 Install new self-locking nut and pre-torque to approximately 10 Nm.

6 Repeat work steps 1 to 5 for the remaining bolts.

7 Torque-tighten all Rotor Hub Bolts to the final torque of 25 Nm in opposing/crosswise sequence.

ILLUSTRATIONS

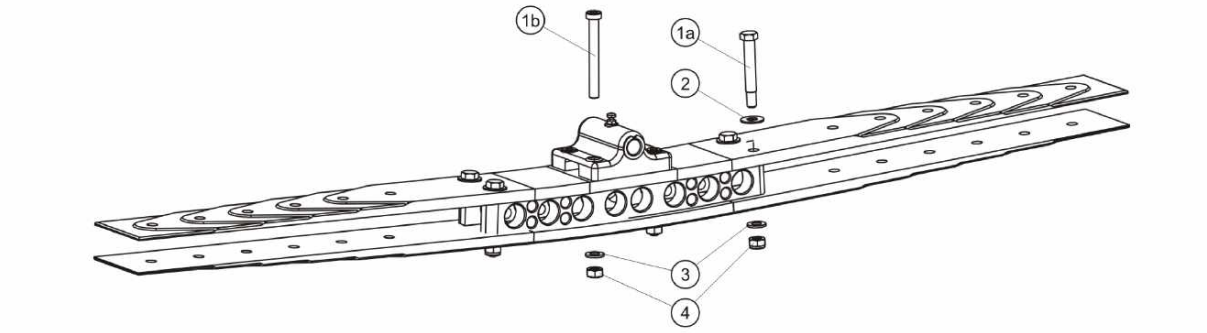


Fig. 1 - Rotor hub

62-11-00 8-1 REPLACEMENT: TEETER BUSHINGS

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Rotor system must be removed, see 62-11-00 4-1!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-04	Loctite 638 green
S.WZ6010	Puller bushing teeterblock

PRECAUTIONS AND SAFETY MEASURES

CAUTION: When removing or disassembling make sure to mark all parts so that each and every part of the component is re-assembled and installed in exactly the same location and orientation!

PROCEDURES/DESCRIPTION

Removal

CAUTION: It is advisable to heat up the teeter block in an oven. When removing the teeter block marks all parts or use cable ties so that each and every part of the component is re-assembled and installed in exactly the same location and orientation! This is especially important for the shim plates between teeter block and hub bar.

WARNING: Affected aluminium parts must not become warmer than 160 °C.

1 Remove bushings from teeter block. In order to do so warm up teeter block to 120 °C, preferably in an oven.

2 Use appropriate tools to drive out bushings. Be careful not to damage the surface of bore.

3 Remove bushings from pre-heated teeter tower.

4 Use appropriate tools to drive out bushings. Be careful not to damage the surface of bore.

Installation

5 Clean bushing seatings / bores from bonding residues and de-grease.

6 Teeter block: Apply a thin layer of AG-BAS-04 to bore.

7 Press in first bushing (1) with joint/slit facing up. Use a bench vice and press carefully until bushing flange is flush.

8 Clean off excessive Loctite, if necessary.

9 Repeat step 6 to 8 for second bushing.

10 Teeter tower: Apply a thin layer of AG-BAS-04 to bore.

11 Press in first bushing (2) with joint/slit facing down. Pull in bushing until flange is flush. Use thick washers on both sides to protect teeter tower and bushing flange from damage.

12 Clean off excessive Loctite, if necessary.

13 Repeat step 10 to 12 for second bushing.

14 If necessary rework inner diameter of bushings in teeter tower with a reamer 13H7.

ILLUSTRATIONS

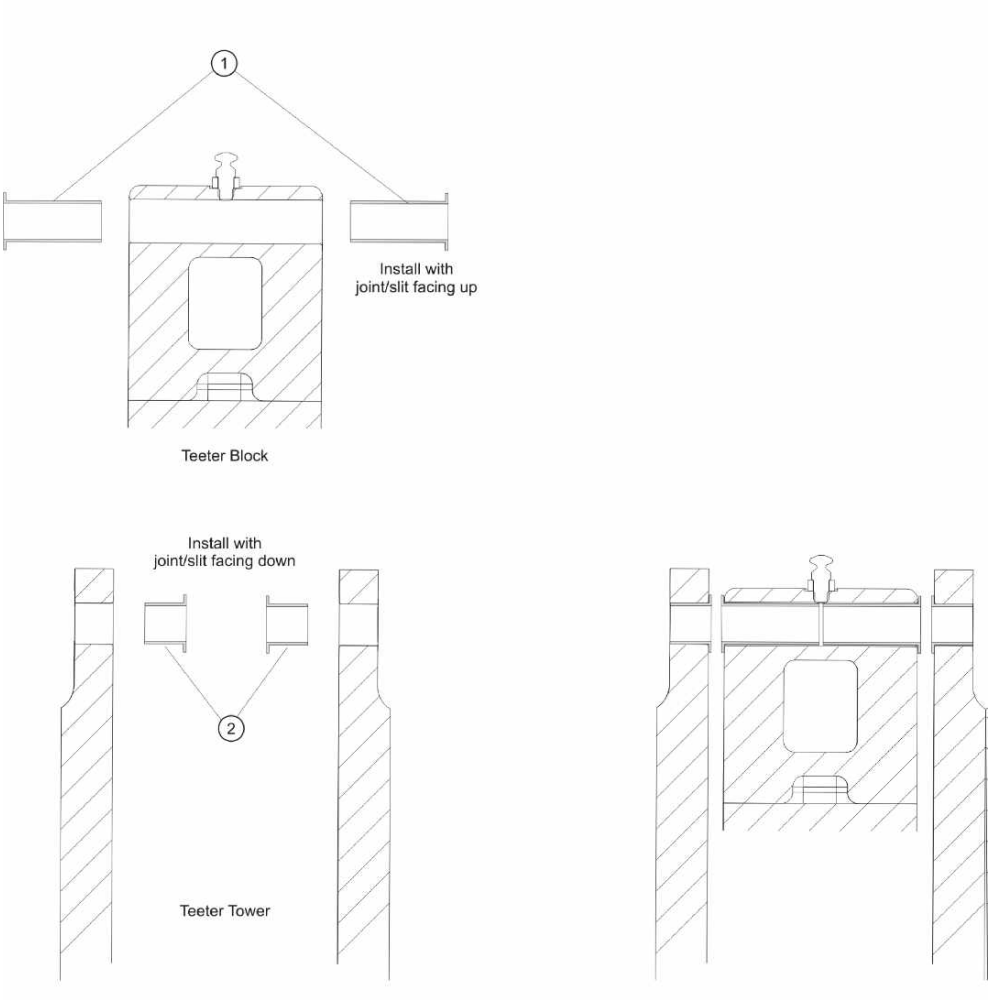


Fig. 1 - Teeter bushings, block and tower - cross section view

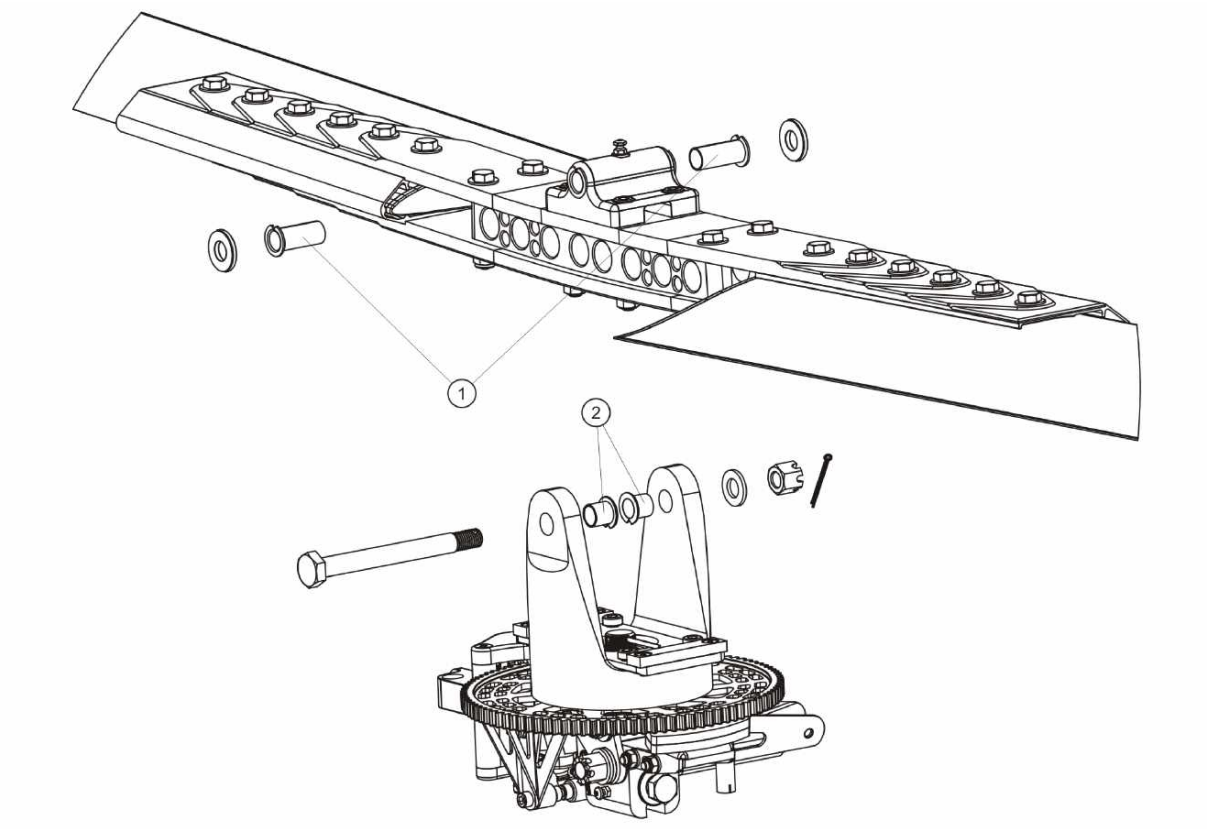


Fig. 2 - Teeter bushings, block and tower - exploded view

62-20-00 8-1 REPLACEMENT: DRIVE GEAR

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

Gyroplane must be placed on level ground and restrained (blocks, chocks)

Rotor system must be removed, see 62-11-00 4-1!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-02	Loctite 243 blue
LR	IMPORTANT NOTE: Procedure involves parts with limited reusability. Check parts list below before starting job!

PRECAUTIONS AND SAFETY MEASURES

CAUTION: When removing or disassembling make sure to mark all parts so that each and every part of the component is re-assembled and installed in exactly the same location and orientation!

PROCEDURES

1 Switch pneumatic mode selector to BRAKE.

2 Remove and dispose the split pin (1) (Fig.1 and 2).

WARNING: Wear eye protection when removing attachment hardware!

3 Undo the castle nut (2) (Fig.1 and 2).

4 Switch pneumatic mode selector to FLIGHT.

5 Remove the castle nut (2) (Fig.1 and 2).

6 Remove the teeter tower with the drive gear. Fix the teeter tower in a bench vise carefully.

7 Remove and dispose the 6 screws and 6 washers of the drive gear. Remove the drive gear.

8 Put new drive gear on teeter tower.

9 Apply Loctite 243 to the six screws and six washers of the drive gear. Tighten the screws with a torque of 25 Nm.

10 Rotate rotor head so that rotor blades (removed!) would point exactly in flight direction.

11 Put teeter tower with new drive gear on the rotor head.

12 Align the hole or magnet to the 7 o´clock position in flight direction (Fig.4).

13 Tighten castle nut (2) with a torque value enough to fix the adjustment and of the main bolt.

14 Inspect backlash of pre-rotator upper engagement. Backlash should be as tight as possible, but also wide enough to allow easy engagement of the pinion into the sprocket wheel in any position.

15 Torque-tighten castle nut (2) with final torque of 120 Nm and re-check position. Apply further torque until the split pin can be inserted.

16 Insert and secure new split pin (1). Make sure that ends do not contact rotating parts (Fig.2).

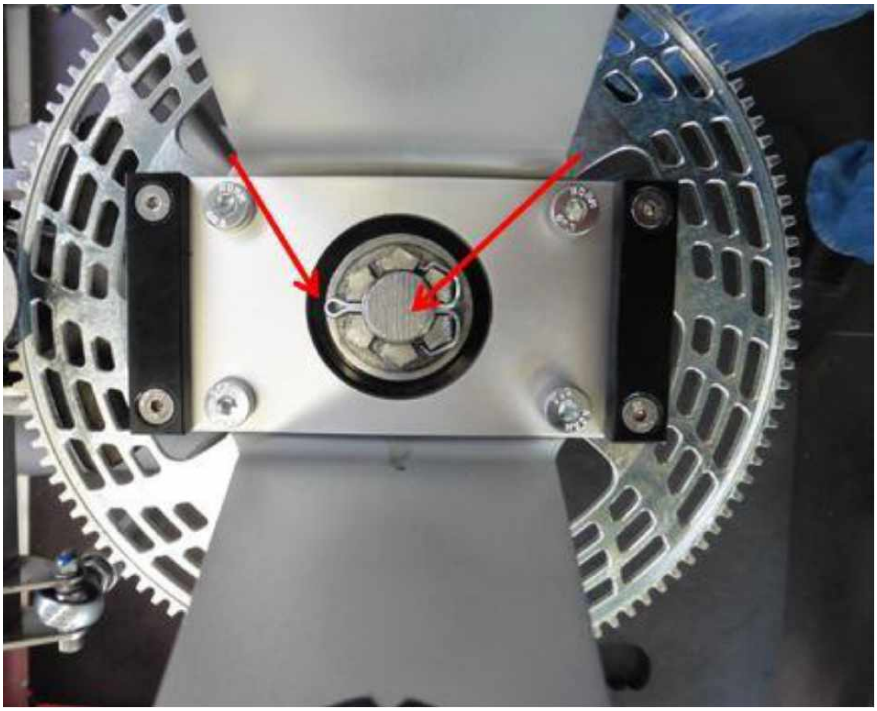
17 Inspect backlash of pre-rotator upper engagement again. Backlash should be as tight as possible, but also wide enough to allow easy engagement of the pinion into the sprocket wheel in any position.

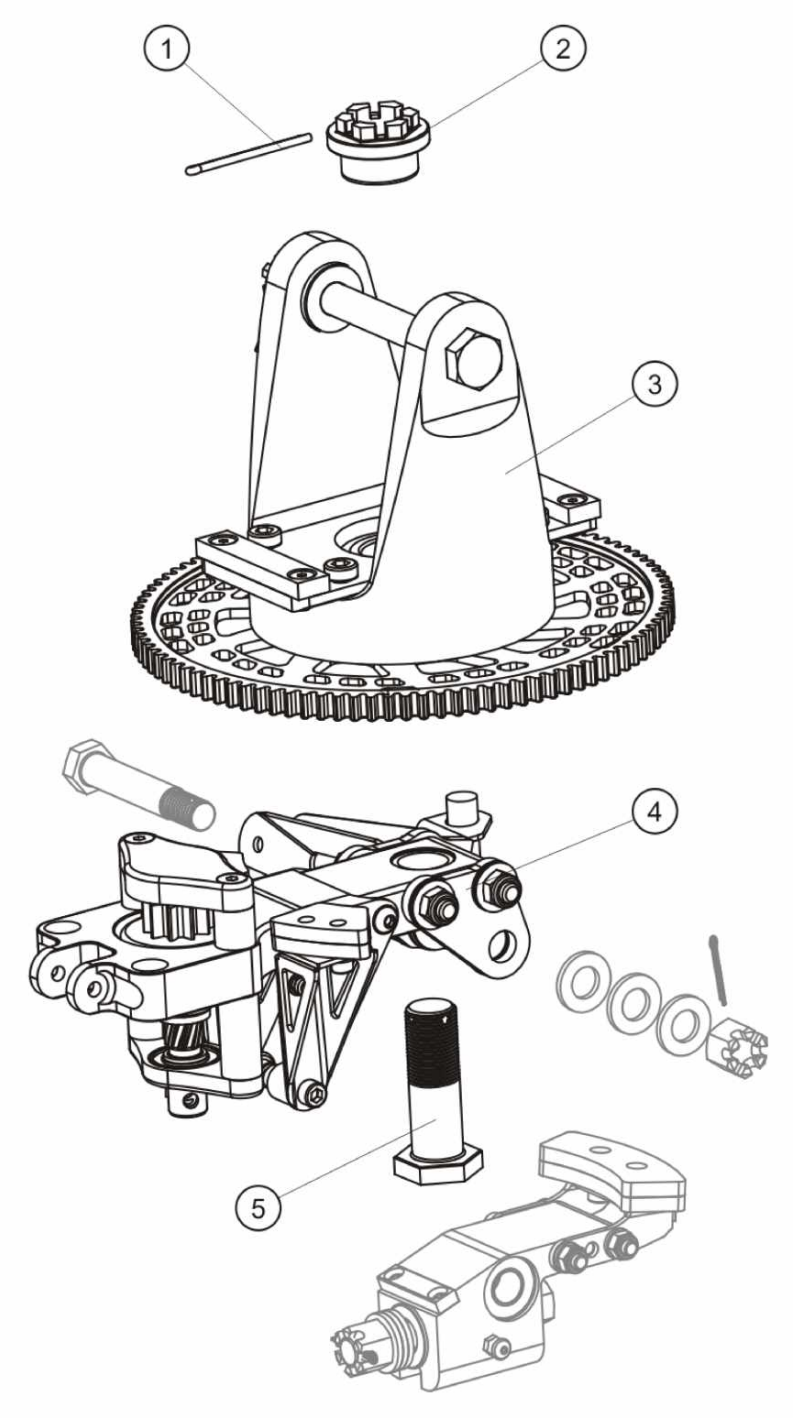
18 Install the rotor system, according to 62-11-00 4-4.

19 Perform jobcard 63-11-30 6-1 "INSPECTION: PRE-ROTATOR UPPER ENGAGEMENT".

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
		Splitpins, 10 pieces	L0 27-30-00-S-30261	
		Rotor sprocket mounted		
		Kit – Rotor sprocket		




1
2
3
4
5

62-31-00 6-1 INSPECTION: ROTOR HEAD BRIDGE, BEARING AND TEETER TOWER

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

LR IMPORTANT NOTE: Procedure involves parts with limited reusability. Check parts list below before starting job!

PRECAUTIONS AND SAFETY MEASURES

WARNING: Wear eye protection and mind FOD when removing attachment hardware!

PROCEDURES/DESCRIPTION

1 Inspect rotor head bridge (5) function and condition, i.e. no misalignment, dents, nicks, corrosion, or cracks. In case of any of the aforementioned is evident or suspected contact AutoGyro customer support.

2 Inspect, whether the upper bearing shield Bendix shaft is welded on inner bottom side to the rotor head side plates; if not contact AutoGyro customer support.

3 Inspect teeter stops (4) for correct attachment and condition.

4 Inspect teeter tower (3) for correct attachment and condition, i.e. no cracks. In case of cracks or unusual condition or appearance contact AutoGyro customer support.

5 Perform torque-check on main bolt nut (2). In order to do so, remove and discard split pin (1) and torque-check castle nut with 120 Nm.

6 If torque-check fails mark component / gyroplane unserviceable and contact AutoGyro customer support.

7 Insert new split pin (1) and secure. Make sure that ends do not contact rotating parts.

WARNING: Do not fly gyroplane in case torque-check failed. Clearly mark as unserviceable and prevent from use until resolved.

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
1	1	Splitpins, 10 pieces	L0	27-30-00-S-30261	
1	2	M20 castle nut flat		NPI	
1	3	Teeter tower			
1	4	Teeter stop			
1	5	Rotorhub bottom mounted		NPI	
1	6	M20x1_5x73,8		NPI	

ILLUSTRATIONS

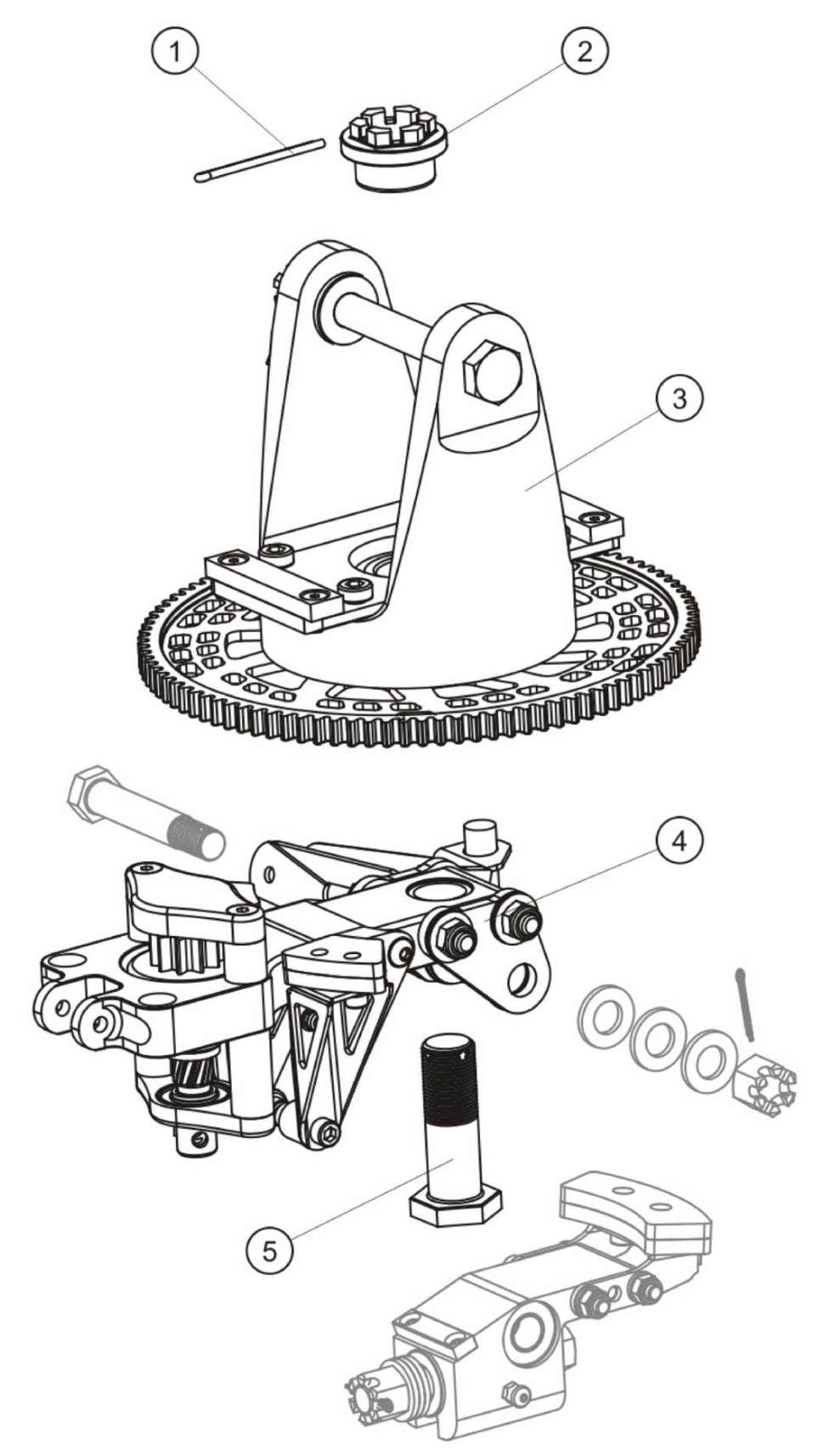


Fig. 1 - Rotor head bridge, bearing and teeter tower

62-32-00 5-1 CHECK-ADJUSTMENT: ROTOR CONTROL FRICTION

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Rotor head bridge / gimbal head configuration state must conform to version II

Rotor system must be removed, see 62-11-00 4-1!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

S.WZ6008 Spring balance / Dynamometer

PROCEDURES/DESCRIPTION

1 Switch pneumatic mode selector to FLIGHT and release trim pressure completely. If necessary, switch repeatedly!

2 Attach spring balance / dynamometer as shown in Fig. 1 and pull carefully until control stick starts to move. Note maximum value (breakout force).

WARNING: Job includes work at critical flight controls. Duplicate inspection must be performed after completion!

3 Breakout force can be adjusted by tightening the gimbal head pitch bolt. If the bore pin drill of the gimbal head pitch bolt is covered by the castle nut, place shim washers between the washers (Pos. 3 & 6). Note: 0.1 mm shim washer equates approximately 20° nut rotating angle.

4 Rotor vibration levels will decrease with higher control friction, but handling qualities will suffer, if control friction is too high. Friction should not exceed 10 N, with an absolute maximum of 15 N!

5 After completion, switch pneumatic mode selector to BRAKE, apply brake pressure and secure rotor system.

Fig. 1 - Measurement of rotor control friction

ILLUSTRATIONS

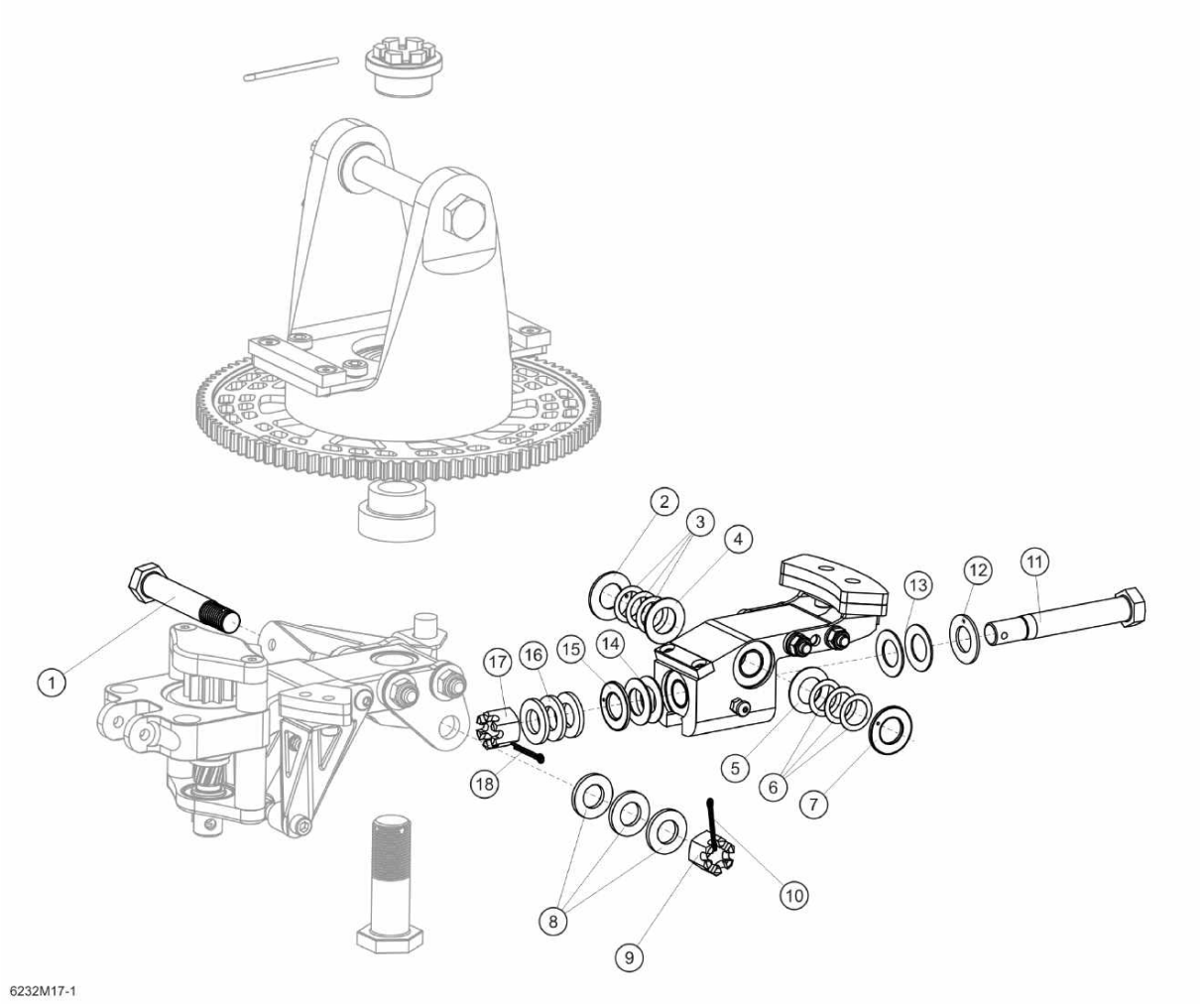


Fig. 2 - Gimbal head assembly, Rotor System III (with spring washers)

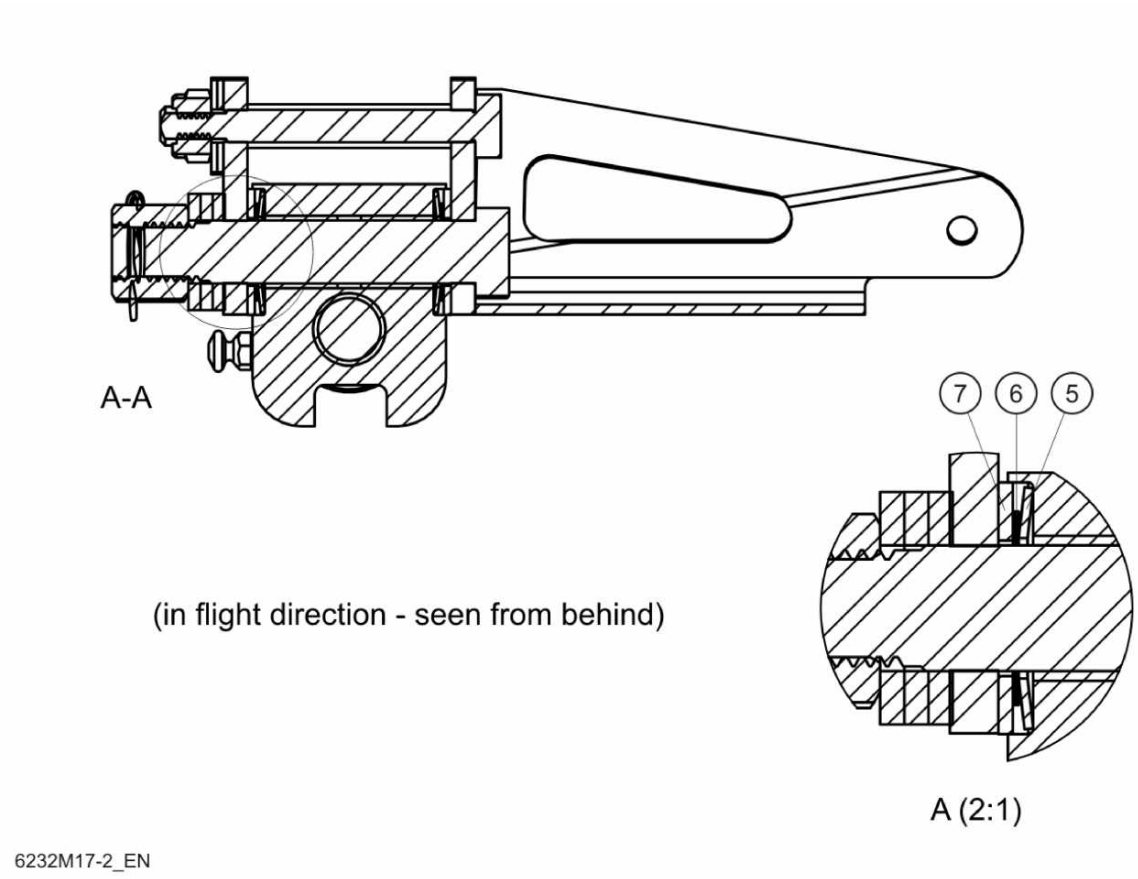


Fig. 3 - Arrangement of spring and shim washers on gimbal head - Version III

62-32-00 6-1 INSPECTION: ROTOR GIMBAL HEAD

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Rotor system must be removed, see 62-11-00 4-1!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-GRS-01	WHS 2002 Grease
S.WZ3002	Inclinometer / Digital Spirit Level

PROCEDURES/DESCRIPTION

1 Inspect gimbal head (4) for correct function and condition, i.e. check split pin (7) and (11) is installed and no play at the hinge points is evident.

2 Verify angles of gimbal head mechanical end stops. In order to do so perform the following work steps:

3 Place gyroplane on level ground with zero roll attitude and lower mast section vertical.

4 Rotate rotor head so that rotor blades (removed!) would point exactly fore-aft. Place inclinometer on top of teeter tower and measure RH and LH end stop angle. Make sure that mechanical stops are reached. Record values.

5 Rotate rotor head so that rotor blades (removed!) would point exactly left-right. Place inclinometer on top of teeter tower and measure FORE and AFT end stop angle. Make sure that mechanical stops are reached. Record values.

6 Verify measured angles comply with the values specified in the corresponding type certificate data sheet. If any of the values differs by more than 1° from the specified value mark component unserviceable and contact AutoGyro customer support.

ILLUSTRATIONS

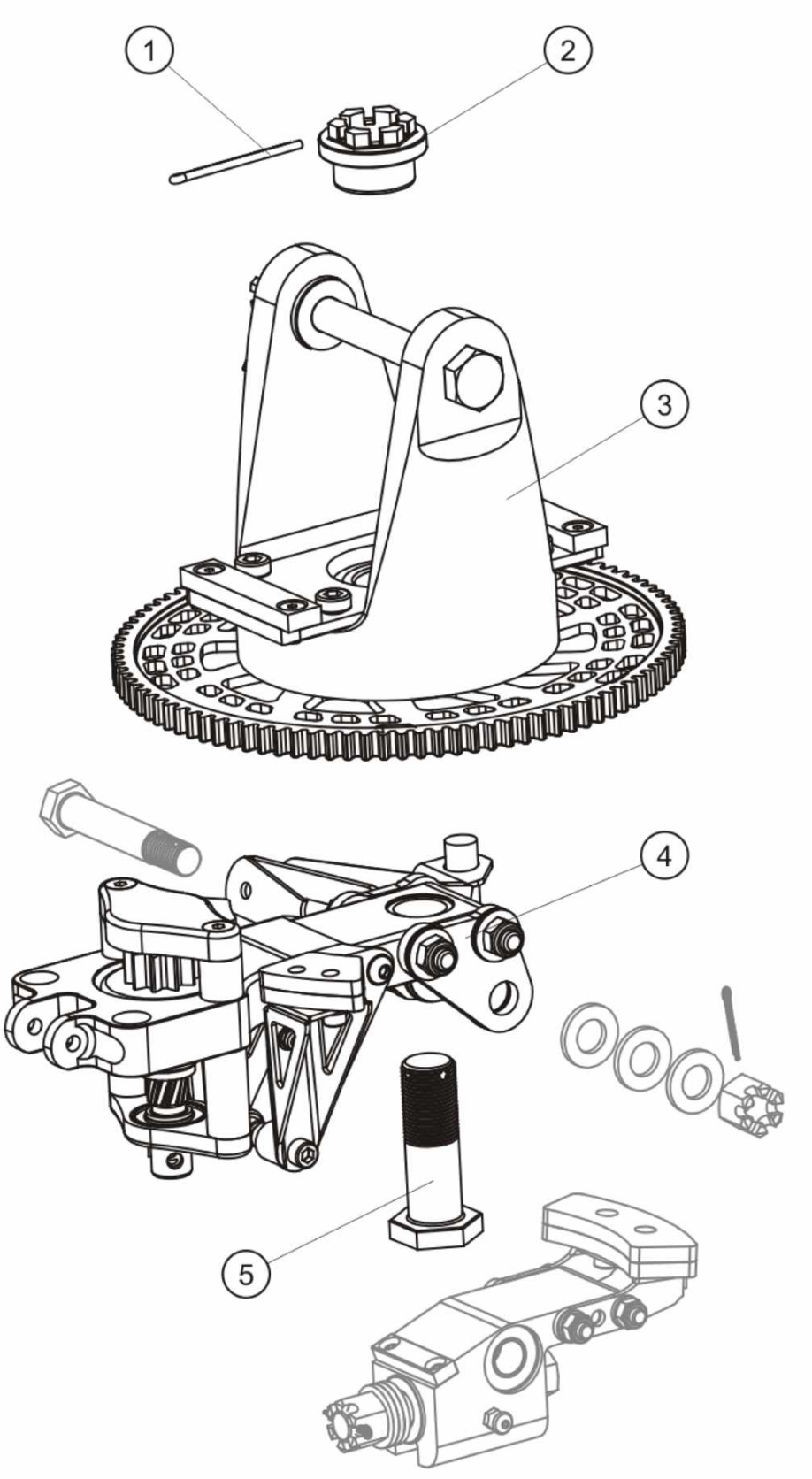


Fig. 1 - Gimbal head assembly

63-11-10 4-1 REMOVAL-INSTALLATION: PRE-ROTATOR CLUTCH

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization trained and entitled to carry out Maintenance!

Secure gyroplane against unauthorized or unintended operation!

Engine cowlings must be removed, see 52-00-00 4-1

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-02	Loctite 243 blue (88-00-00-S-30483)
LR	IMPORTANT NOTE: Procedure involves parts with limited reusability. Check parts list below before starting job!

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

Removal (Assumes aircraft side panels are already removed)

1 Remove hoses from oil reservoir and seal open ends against contamination.

2 Remove oil reservoir.

3 Loop a lifting belt around the propeller/gearbox shaft and take the load off the engine mounts using appropriate lifting equipment.

NOTE: Both engine mounts in the LH side remain in place.

4 Unscrew and remove 2 x attachment hardware of engine mounts on RH side. Discard self-locking nuts.

5 With the engine weight unloaded, tilt engine around remaining LH engine mounts as far as necessary (do not overstretch rubber bushings) in order to get access to the pneumatic clutch.

6 Disconnect pneumatic hose at quick connect coupling.

7 Cut open and discard affected cable ties.

8 Unscrew and remove 4 x M6 bolts and remove pneumatic clutch with attach ring.

NOTE: Do not separate attach ring from clutch and let adapter frame remain on engine.

9 Remove pneumatic clutch by pulling apart sliding shaft coupling.

Installation

10 Insert sliding shaft coupling and position pneumatic clutch with attach ring on adapter frame.

11 Apply AG-BAS-02 on threads and torque-tighten 4 x M6 bolts with 10 Nm.

12 Check that vertical pre-rotator drive can be easily turned by hand.

13 Re-connect pneumatic hose at quick connect coupling. Make sure flow control valve is in place and installed in correct flow direction (blue line to clutch, white line to pneumatic box).

14 Perform functional check (engine off) and monitor clutch actuation.

15 Re-install engine mounts. Use new self-locking nuts and torque-tighten.

16 Remove lifting belt.

17 Install oil reservoir.

18 Remove seals and re-connect oil hoses to reservoir.

63-11-10 6-1 INSPECTION: PRE-ROTATOR CLUTCH

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

Engine cowlings must be removed, see 52-00-00 4-1

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

1 Check wear state of clutch lining. Wear mark (groove in the lining) must be recognizable. See Fig. 1, dimension A. Replace clutch if necessary.

2 Measure clearance between clutch lining and clutch plate. See Fig. 1, dimension B. Clearance must be between 1.0 - 1.5 mm. In case clearance is less than 1 mm or more than 1.5 mm contact AutoGyro customer support.

3 Measure clearance between inner (engine side) drive star disc and outer (clutch side) drive star claws. See Fig. 1, dimension C. Clearance must be between 1.0 - 1.5 mm. In case clearance is less than 1 mm or more than 1.5 mm contact AutoGyro customer support.

ILLUSTRATIONS

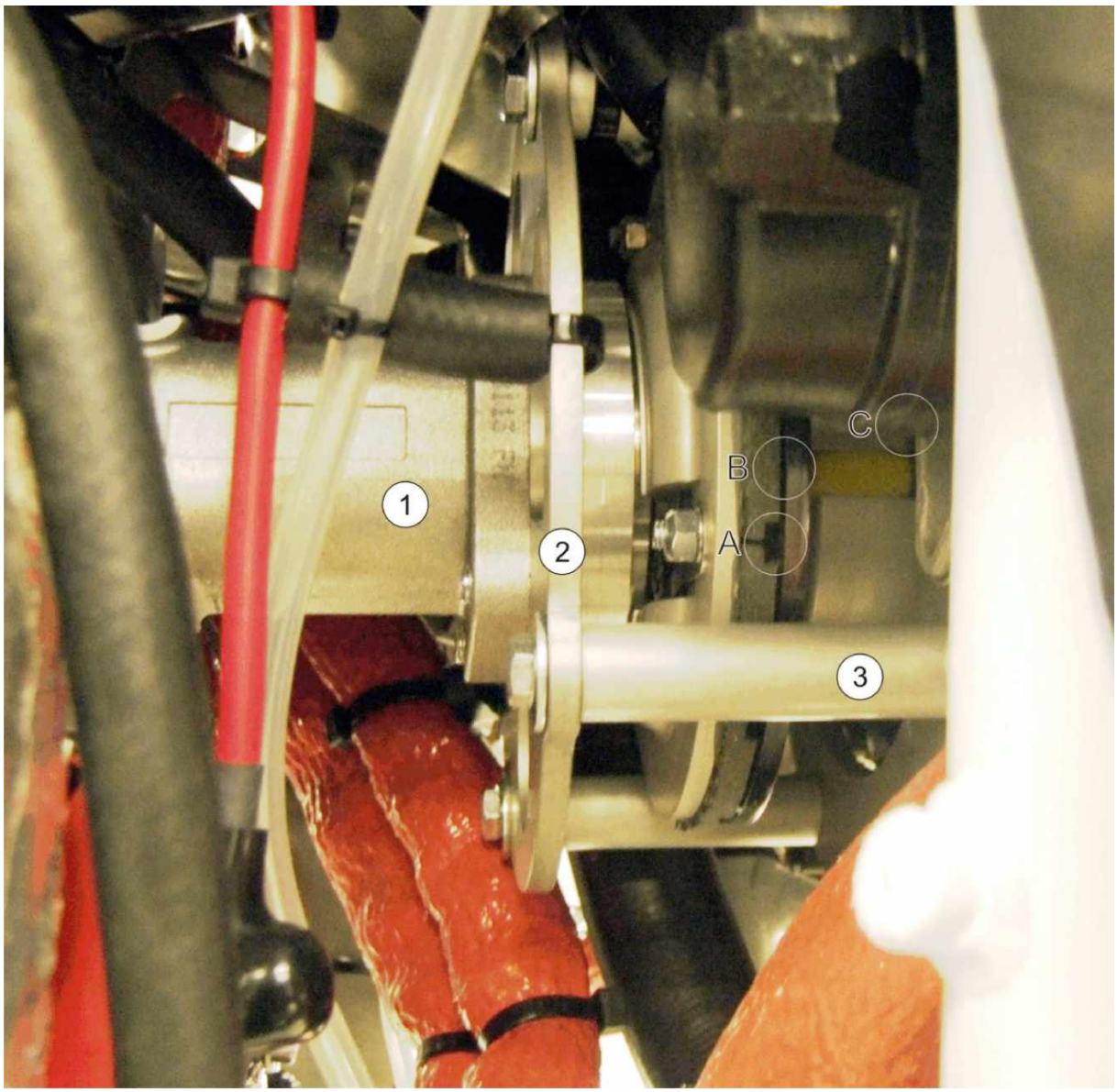


Fig. 1 - Pre-rotator clutch with attach ring

63-11-10 8-1 REPLACEMENT: PRE-ROTATOR CLUTCH LINING

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

Engine cowlings must be removed, see 52-00-00 4-1

SPECIAL TOOLS AND CONSUMABLE MATERIALS

88-00-00-S-35915 Loctite 7063 Super Clean

88-00-00-S-31023 Loctite 648

88-00-00-S-35790 Installation Aid Dog Gear

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

1 Disconnect battery according to 24-30-00 4-1, work steps 1 - 2.

2 Remove M8x20 screw plug (Fig. 2) with seal ring from the crankcase. Turn the crankshaft by propeller into top dead centre (TDC) position of cylinder 1 and 2. TDC can be checked with the aid of a lamp through the opening of the removed screw. When the crankshaft is in correct position screw thread pin M8x50 (Fig. 3) so that the crankshaft is blocked.

3 Remove pre-rotator clutch according to 63-11-10 4-1, work steps 1 - 9

4 Replace clutch liner
In order to do so, untighten central screw. Should it not be possible untighten central screw bore out bolt head and remove remaining screw thread with pliers. Pull friction plate off the drive shaft axially. Place spare part and fix it with new central screw.

5 Remove clutch dog gear with ‘Installation Aid Dog Gear’

6 Thoroughly clean the crankshaft and the driver stud with Loctite 7063

CAUTION: For the following work step, use Loctite 648 only! The use of other brands or alternative products will prevent correct functioning.

7 Apply Loctite 648 on inner and outer thread in sufficient quantity (Fig.4)

CAUTION: For the following work step, the clutch dog gear must be easily screwable (floating) up to the stop!

8 Screw dog clutch gear onto the thread and remove excess Loctite

9 Tighten dog clutch gear using ‘Installation Aid Dog Gear’ with a torque of 140 Nm (Fig. 5). Clean driver free of Loctite residues.

10 Check with feeler gauge 0.05 mm whether dog clutch gear is contacted with the flywheel. Feeler gauge 0.05 mm must not be able to stick in between dog clutch gear and flywheel (Fig. 6).

11 Remove thread pin M8x50. Mount M8x20 screw plug with new copper seal ring and tighten with a torque of 15 Nm. For checking, turn carefully the propeller by hand.

12 Re-connect battery according to 24-30-00 4-1, work steps 2 - 1.

13 Re-install pre-rotator clutch according to 63-11-10 4-1, work steps 10 - 19

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
		Replacement set friction plate PK II / III	L1	61-00-00-S-33383	

ILLUSTRATIONS

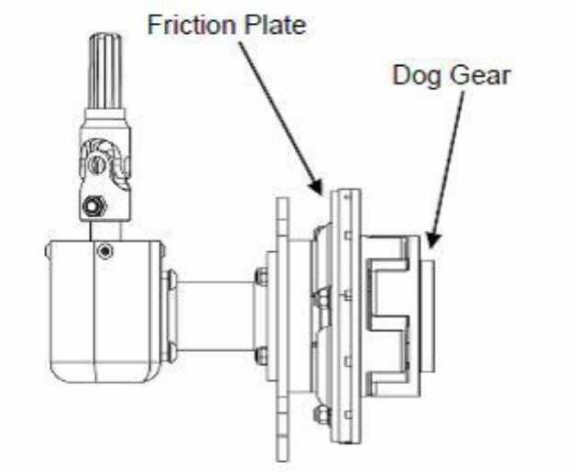


Fig. 1 - Pneumatic Clutch III

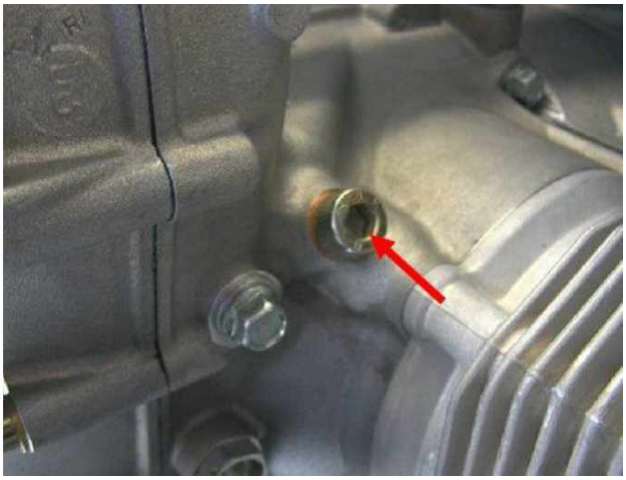


Fig. 2 - M8x20 screw plug

Fig. 3 - Thread Pin M8x50

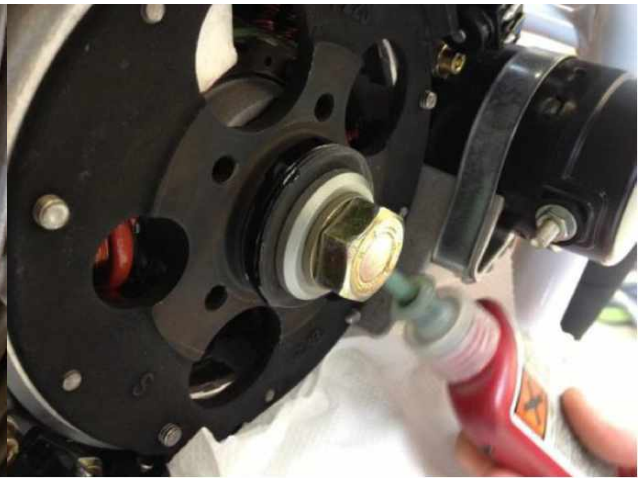


Fig. 4 - Loctite 648 on inner and outer thread

Fig. 5 - Torque dog gear with 140 Nm

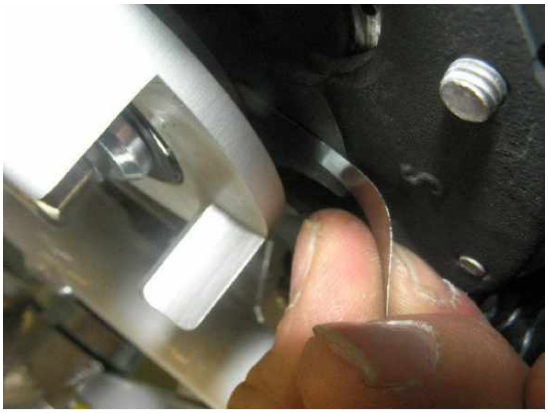


Fig. 6 - Correct mounting position

63-11-10 8-2 REPLACEMENT: PRE-ROTATOR CLUTCH DOG GEAR

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

Engine cowlings must be removed, see 52-00-00 4-1

SPECIAL TOOLS AND CONSUMABLE MATERIALS

88-00-00-S-35915 Loctite 7063 Super Clean

88-00-00-S-31023 Loctite 648

85-00-00-S-35790 Installation Aid Dog Gear

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

1 Disconnect battery according to 24-30-00 4-1, work steps 1 - 2.

2 Remove M8x20 screw plug (Fig. 1) with seal ring from the crankcase. Turn the crankshaft by propeller into top dead centre (TDC) position of cylinder 1 and 2. TDC can be checked with the aid of a lamp through the opening of the removed screw. When the crankshaft is in correct position screw in thread pin M8x50 (Fig. 2) so that the crankshaft is blocked (for further information see Rotax Maintenance Manual 12-20-00).

3 Remove pre-rotator clutch according to 63-11-10 4-1, work steps 1 - 9

4 Remove clutch dog gear with ‘Installation Aid Dog Gear’

5 Thoroughly clean the crankshaft and the driver stud with Loctite 7063.

CAUTION: For the following work step, use Loctite 648 only! The use of other brands or alternative products will prevent correct functioning.

6 Apply Loctite 648 on inner and outer thread in sufficient quantity (Fig.4)

CAUTION: For the following work step, the clutch dog gear must be easily screwable (floating) up to the stop!

7 Screw dog clutch gear onto the thread and remove excess Loctite

8 Tighten dog clutch gear using ‘Installation Aid Dog Gear’ with a torque of 140 Nm (Fig. 5). Clean driver free of Loctite residues.

9 Check with feeler gauge 0.05 mm whether dog clutch gear is contacted with the flywheel. Feeler gauge 0.05 mm must not be able to stick in between dog clutch gear and flywheel (Fig. 6).

10 Remove thread pin M8x50. Install M8x20 screw plug with new copper seal ring and tighten with a torque of 15 Nm. For checking, carefully turn propeller by hand.

11 Re-connect battery according to 24-30-00 4-1, work steps 2 - 1

12 Re-install pre-rotator clutch according to 63-11-10 4-1, work steps 10 - 19.

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
		pressure plate rear	L1	61-00-00-V-33792	

ILLUSTRATIONS

Fig. 1 - M8x20 screw plug

Fig. 2 - Thread Pin M8x50

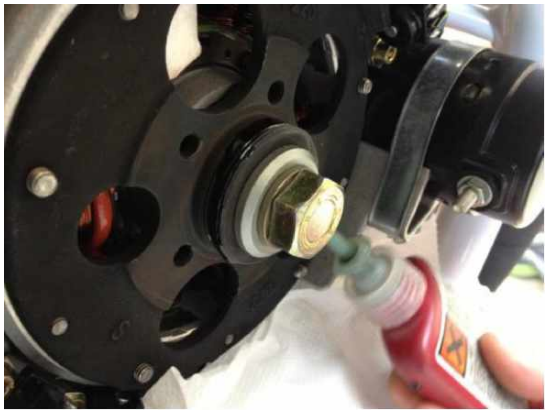


Fig. 3 - Loctite 648 on inner and outer thread

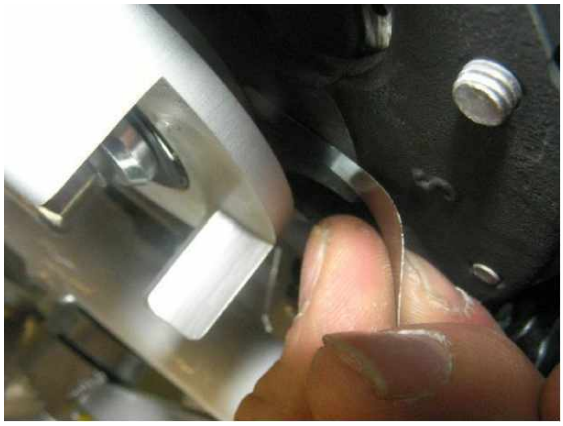


Fig. 4 - Correct mounting position

63-11-30 6-1 INSPECTION: PRE-ROTATOR UPPER ENGAGEMENT

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

Gyroplane must be placed on level ground and restrained (blocks, chocks)

Mast cover must be removed, see 52-00-00 4-1

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-GRS-01 WHS 2002 Grease (88-00-00-S-30477)

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

1 Inspect wear pattern and gear mesh of pre-rotator upper engagement. If in doubt, contact AutoGyro customer support.

2 If the wear pattern is uneven (see Fig. 1), e.g. due to dynamic skew, the pre-rotator upper engagement / Bendix shaft must be repaired acc. to 63-11-30 8-2.

3 Inspect backlash of pre-rotator upper engagement. Backlash should be as tight as possible, but also wide enough to allow easy engagement of the pinion into the sprocket in any position.

4 If necessary, have backlash adjusted 62-31-00 5-1.

5 Grease with AG-GRS-01.

ILLUSTRATIONS

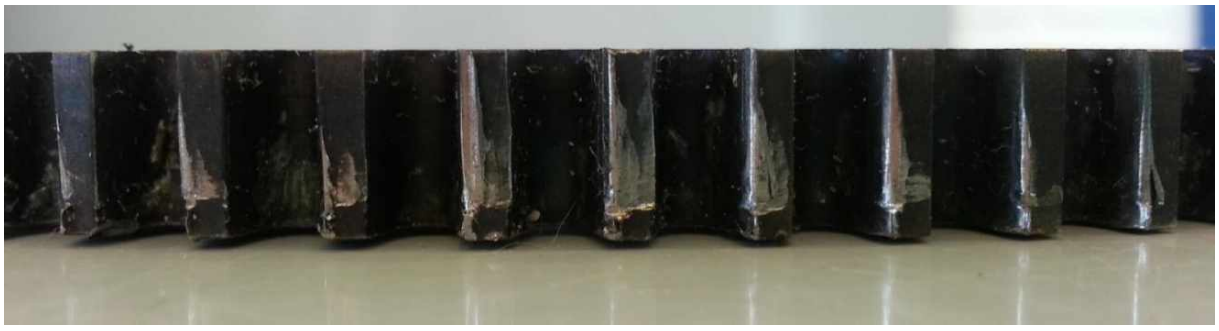


Fig. 1 - Wear Pattern (uneven)

63-51-00 8-1 REPLACEMENT: ROTOR BRAKE PADS

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

Gyroplane must be placed on level ground and restrained (blocks, chocks)

Rotor system must be removed, see 62-11-00 4-1!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-02	Loctite 243 blue
SP	IMPORTANT NOTE: Procedure involves spare parts. Check parts list below for ordering details of affected components!

PRECAUTIONS AND SAFETY MEASURES

IMPORTANT NOTE: Procedure involves handling and disposal of special materials. For your health and environmental aspects respect all applicable regulations!

PROCEDURES/DESCRIPTION

1 Unscrew and remove hexagon socket screws (1) with washers (2) of affected brake pad.

2 Replace integrated rotor brake pad assembly (3/4) with new component.

3 Apply Loctite 243 (blue) on screws, re-install hexagon socket screws (1) with washers (2) and torque-tighten.

4 After replacing the front pad, check that the head stops onto the pad before the stick reaches the forward limit stop. Adjust limit stop as required,

ILLUSTRATIONS

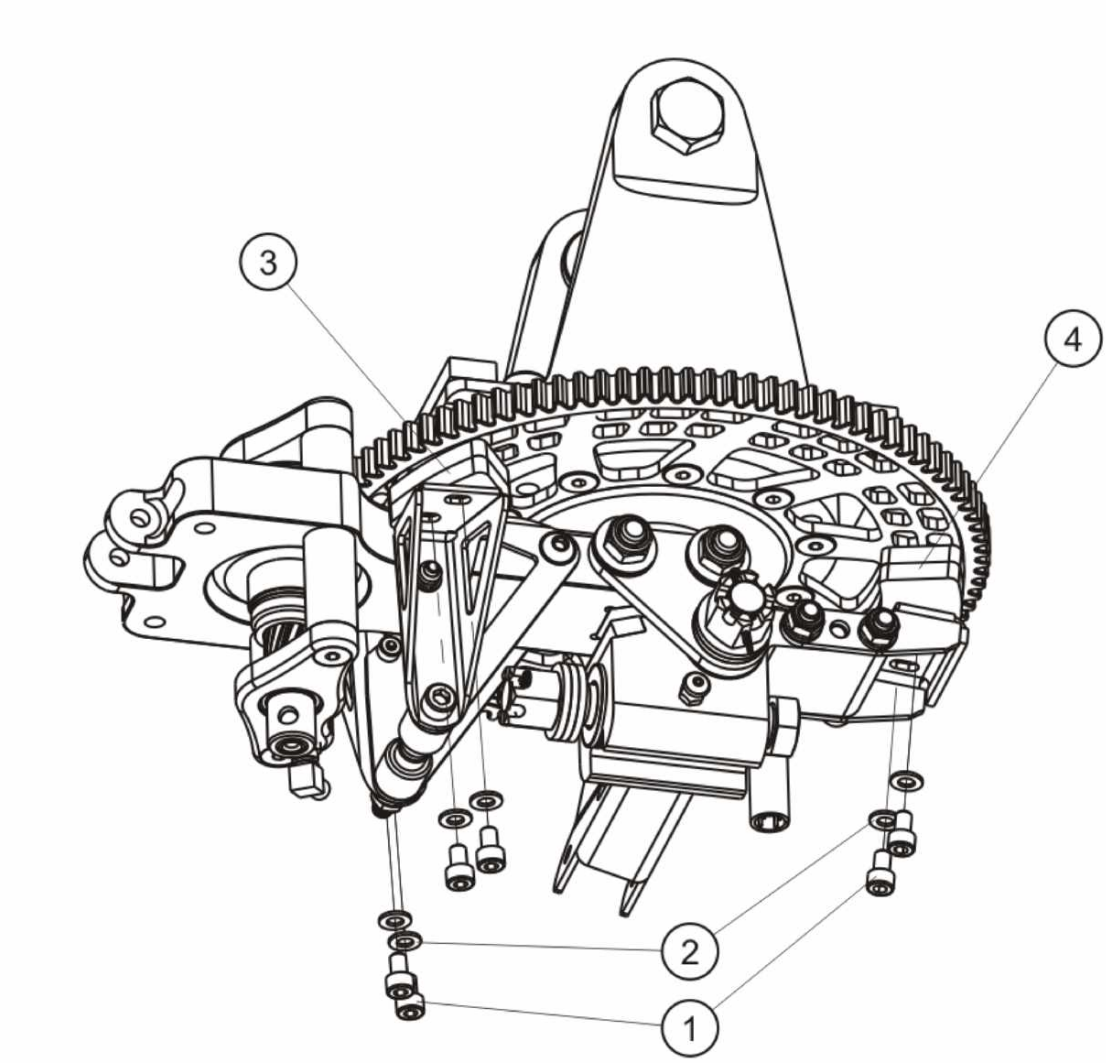


Fig. 1 - Rotor bridge with brake pads

67-00-00 0-1 DESCRIPTION: ROTOR FLIGHT CONTROL OPR

PROCEDURES/DESCRIPTION

Rotor flight control comprises of control stick, a base control unit / tube, flight control base link and control rods (push rods) which are connected to the rotor head bridge.

Pitch and roll of the gyroplane is controlled by tilting the complete rotor head by means of the control stick. Control input is transferred via a base control unit / tube running horizontally along the forward extension of the main frame (below the seats) to the base link and from there to the rotor head via control rods (push rods). The control rods with ball joints at both ends are supported by a bell crank about half way up the mast.

ILLUSTRATIONS

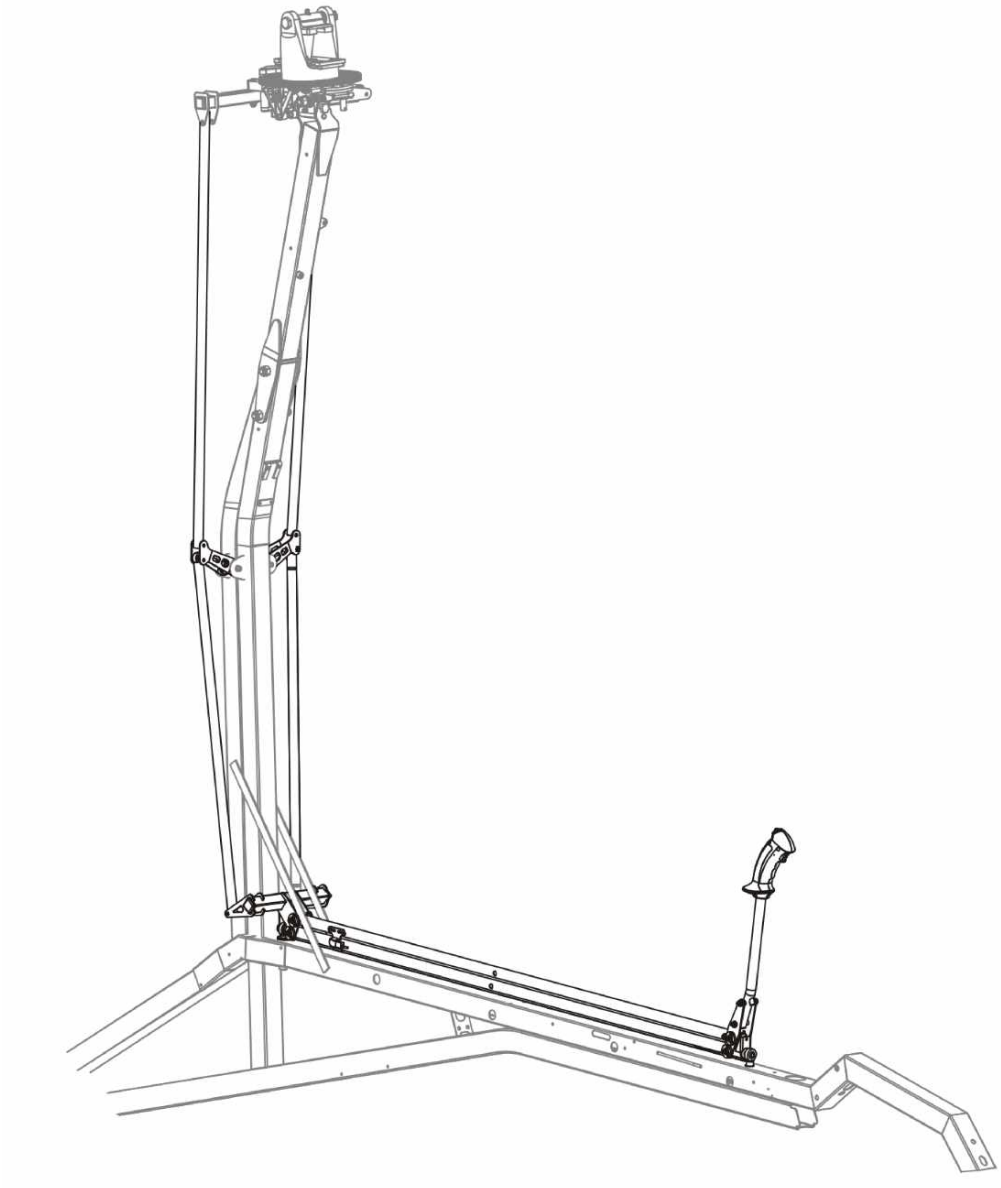


Fig. 1 - Rotor flight control

67-00-00 6-1 INSPECTION: ROTOR FLIGHT CONTROL

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

Work should be performed with the aid of a second briefed person!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PROCEDURES/DESCRIPTION

1 Pump up the rotor brake to its maximum.

2 Carefully move forward flight control stick forward and aft to determine free play. Touch each joint and assess relative motion of joint elements using tactile sense, if necessary with help of a second person.

3 A 5 mm free play, measured at the top end of the control stick, is considered within limits as long as the free play is only a result of equal play in the ball joints.

CAUTION: Control base link and ball bearing must be free of play!

4 If a ball joint exhibits above average play the respective ball joint must be replaced.

5 If control base link or ball bearings exhibit play, or the total play from the ball joints results in play more than 10 mm, measured at the control stick, affected components must be replaced.

6 Move forward and aft flight control stick relative to each other (push one forward while pulling the other one back, and vice versa). No play must be evident. If play is evident, investigate and replace component(s).

67-00-00 6-2 INSPECTION: FLIGHT CONTROL BASE LINK

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Rotor system must be removed, see 62-11-00 4-1!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

WARNING: Job includes work at critical flight controls. Duplicate inspection must be performed after completion!

PROCEDURES/DESCRIPTION

NOTE: The procedure ensures necessary clearance of the flight control base link when flight control stick is in full aft position.

1 Switch pneumatic mode selector to FLIGHT and allow control stick to move to most aft position.

2 Make sure that gimbal head rests in its aft mechanical stops.

3 Disconnect upper ball joint of lower RH flight control rod from bell crank (see picture). Let gimbal head rest in aft mechanical stops while flight control stick is in full aft position, laterally centred.

NOTE: The bar of the flight control base link now contacts the ball joint of base control unit.

4 The resulting offset must be between 6.5 mm (outer diameter of spacer aligns with bore centre of bell crank) and 9.5 mm (spacer barely visible through bore in bell crank). Adjust and secure control rod, if necessary. Torque-tighten with 25Nm.

5 Re-connect ball joint to bell crank and secure.

6 Perform duplicate inspection and functional check.

7 After completion, switch pneumatic mode selector to BRAKE and apply brake pressure.

ILLUSTRATIONS

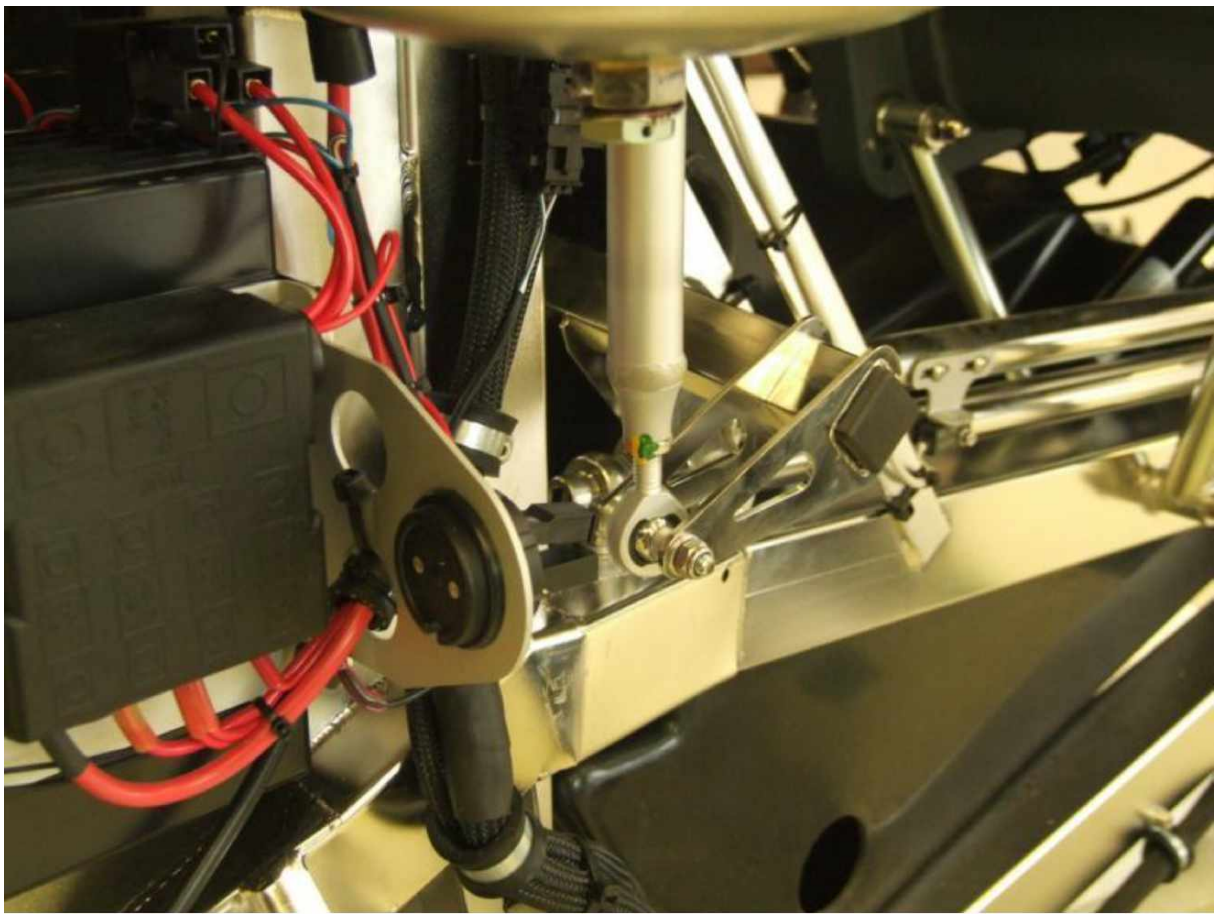


Fig. 1 - Clearance in flight control base link

Fig. 2 - Connection of upper ball joint of lower RH flight control rod with bell crank(step3/5)

Fig. 3 - Offset measurement

67-05-00 8-1 REPLACEMENT: PITCH TRIM/BRAKE PNEUMATIC SEAL

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-02	Loctite 243 blue
SP	IMPORTANT NOTE: Procedure involves spare parts. Check parts list below for ordering details of affected components!

PROCEDURES/DESCRIPTION

1 Disconnect upper cardan joint.

2 Install rotor lash bag to support rotor system.

3 Switch pneumatic mode selector to FLIGHT and release trim pressure completely. If necessary, switch repeatedly!

4 Disconnect rod end from ball joint (Fig. 1).

5 Retract cylinder (pneumatic mode selector to FLIGHT and trim aft).

6 Remove circlip / snap ring with appropriate tool (Fig. 2).

7 Tilt pneumatic cylinder to the side and move out piston completely. In order to do so, switch pneumatic mode selector to BRAKE and apply brake pressure.

NOTE: The servo-valve requires a certain system pressure to switch-over to BRAKE mode. If brake pressure is not built-up during compressor activation, switch to FLIGHT, run the compressor (trim AFT) for some seconds and switch-over to BRAKE mode with the compressor engaged.

8 Remove old seal ring and discard. Install new seal ring using the special grease provided in the package (Fig. 3).

9 Re-install piston and re-assemble pneumatic cylinder. Re-install circlip / snap ring.

10 Apply AG-BAS-02 on threads, install ball head and tighten.

11 Re-connect upper cardan joint. Use AG-BAS-02 on threads to secure nut (Fig. 4).

PARTS LIST

Description	PIT
Pneumatic cylinder brake/trim repair kit	27-30-00-S-30259

ILLUSTRATIONS. Note that these photos show the operation on the sport 2010. The process is the same.

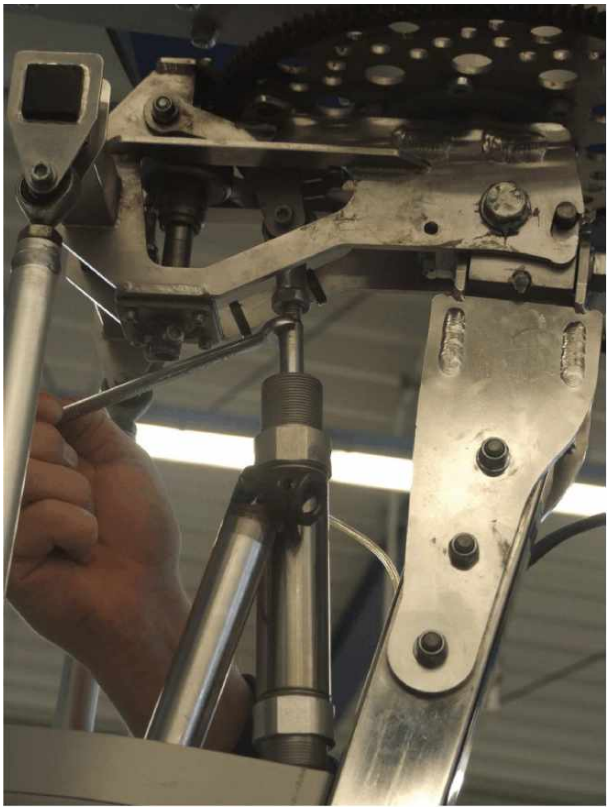


Fig. 1 - Disconnect rod end from ball joint (step 4)

Fig. 2 - Remove circlip / snap rind (step 6)

Fig. 3 - New seal rind installed with special grease (step 8)

Fig. 4 - Re-connect ball joint and upper cardan hinge

71-20-00 8-1 REPLACEMENT: ENGINE MOUNTING BUSHINGS

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

Battery must be removed, see 24-30-00 4-1

Fuselage fairing must be removed, see 52-00-00 4-1!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PROCEDURES/DESCRIPTION

1 Loop a lifting belt around the intake manifold of the engine and unload weight of the engine with a crane or appropriate lifting device.

2 Start with lower mounting bushings and replace engine mounting bushings one-by-one.

3 Check correct seating of mounting bushing prior to torquing.

PARTS LIST

Description	PIT
Engine Mounting Kit	71-00-00-M-30052

76-10-00 8-1 REPLACEMENT: THROTTLE CONTROL WITH BRAKE

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!
Secure gyroplane against unauthorized or unintended operation!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PROCEDURES/DESCRIPTION

ILLUSTRATIONS

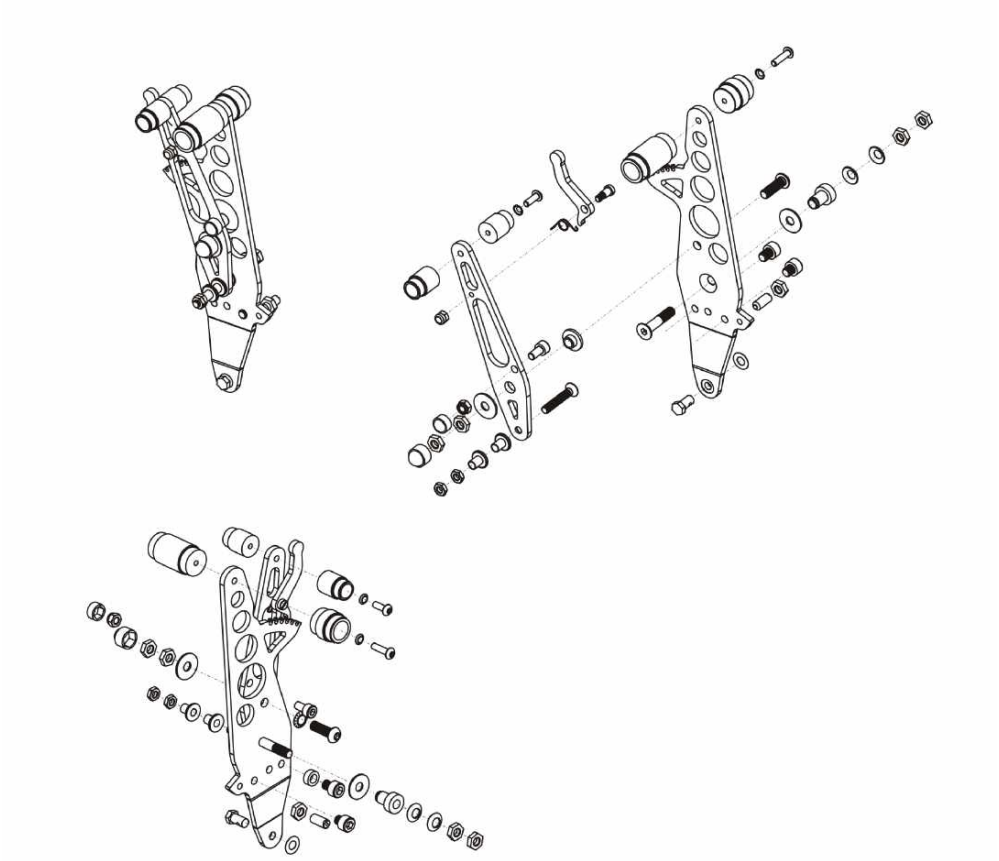


Fig. 1 - Throttle control and brake lever

78-20-00 3-1 SERVICING: LUBRICATION OF EXHAUST SYSTEM JOINTS OPR

GENERAL, REFERENCES AND REQUIREMENTS

Basic operational task, which can be performed by a licensed pilot or instructed personnel!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-LUB-02 Anti-Seize 31590

PROCEDURES/DESCRIPTION

Apply Aluminium Anti-Seize 31590 to all exhaust system joints. See Fig. 1/2 for reference. Use a small brush, if appropriate.

ILLUSTRATIONS

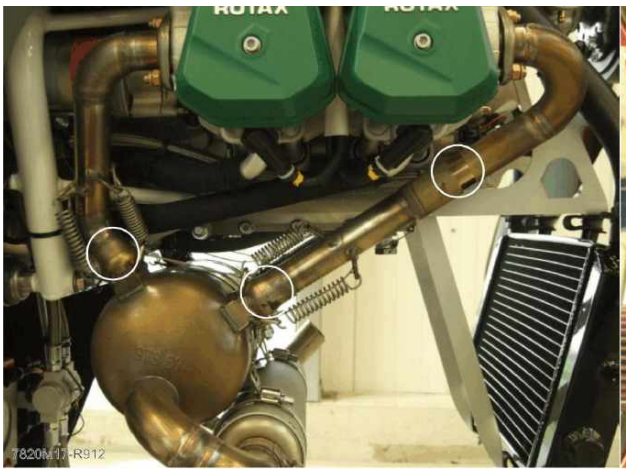


Fig. 1 - Effectivity ROTAX 912

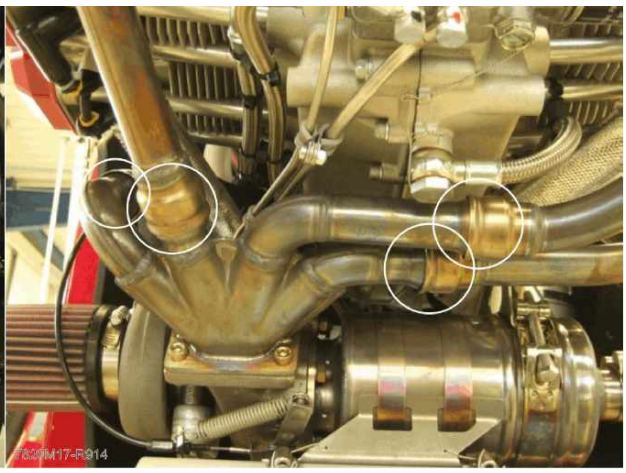


Fig. 2 - Effectivity ROTAX 914

78-20-00 8-1 REPLACEMENT: WOOL OF MUFFLER TUBE

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

Execute procedure only in cold engine condition!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

LR	IMPORTANT NOTE: Procedure involves parts with limited reusability. Check parts list below before starting job!
SP	IMPORTANT NOTE: Procedure involves spare parts. Check parts list below for ordering details of affected components!

PRECAUTIONS AND SAFETY MEASURES

WARNING: Risk of severe burns and scalds! Hot engine parts! Always allow engine to cool down to ambient temperature before start any work!

WARNING: Wear eye protection and mind FOD when removing attachment hardware!

CAUTION: When removing or disassembling make sure to mark all parts so that each and every part of the component is re-assembled and installed in exactly the same location and orientation!

PROCEDURES/DESCRIPTION

1 Remove and dispose the locking wire of the hose clamps.

2 Loosen the hinge pin clamp (Fig.1).

3 Before replacing the muffler tube, mark the position so that the muffler tube can be exactly installed in the same location and orientation.

4 Remove the hose clamps and keep them for the installation procedure (Fig.2). Inspect the hose clamps for possible damage.

5 Remove and clamp muffler tube in bench vice carefully.

6 Use appropriate tools to drive out the riveting mandrels.

7 Drill out the rivet pin (Fig.3). Then, use appropriate tool to tap out the pin of the rivet.

8 Remove outer shell.

9 Remove the rivet mandrel and rivet heads from the wool if it is left in place. Make sure any metal swarf is removed.

10 Check the wool. If it is visibly burnt, remove it completely.

11 Install the whole new wool with tension tightly around the pipe (Fig.4).

12 Install the outer shell. Make sure that the rivets holes of muffler tube and the steel tube are perfectly lined up (Fig.6).

13 Insert the four rivets into the hole and install them with a rivet gun (Fig.6).

14 Set and tighten the muffler tube into the correct position with hose clamps and hinge pin clamp (Fig.7).

15 Secure the screws of hose clamps with locking wire (Fig.8).

ILLUSTRATIONS

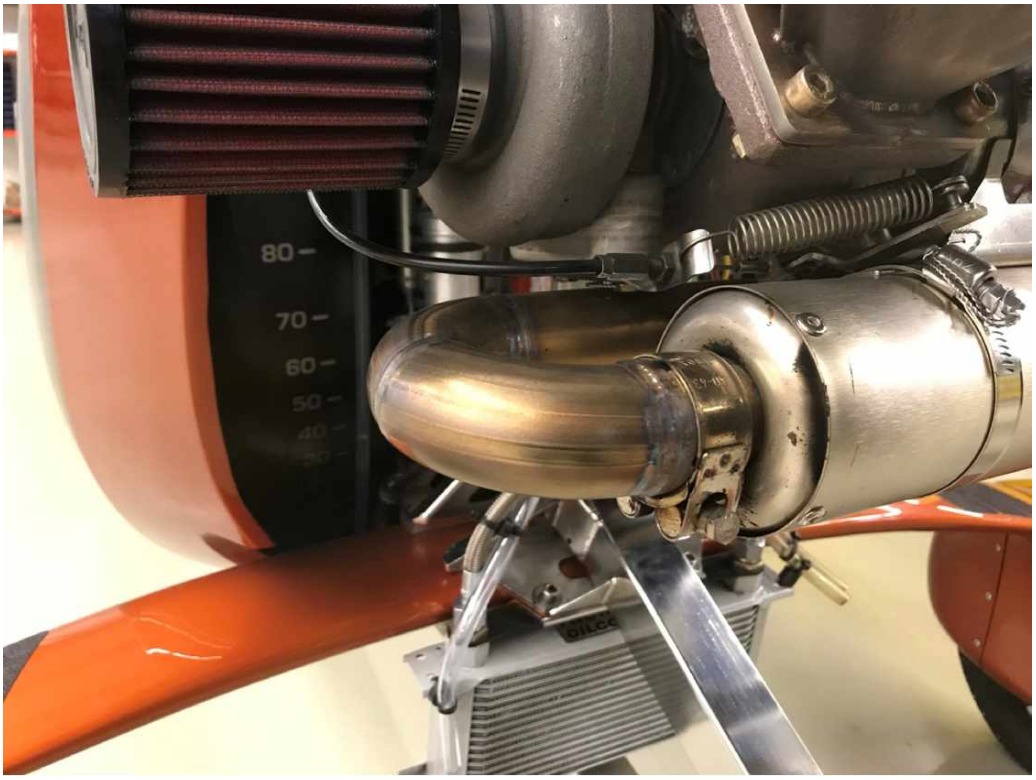


Fig. 1 - Rivets at the hot end and hinge pin clamp (914)

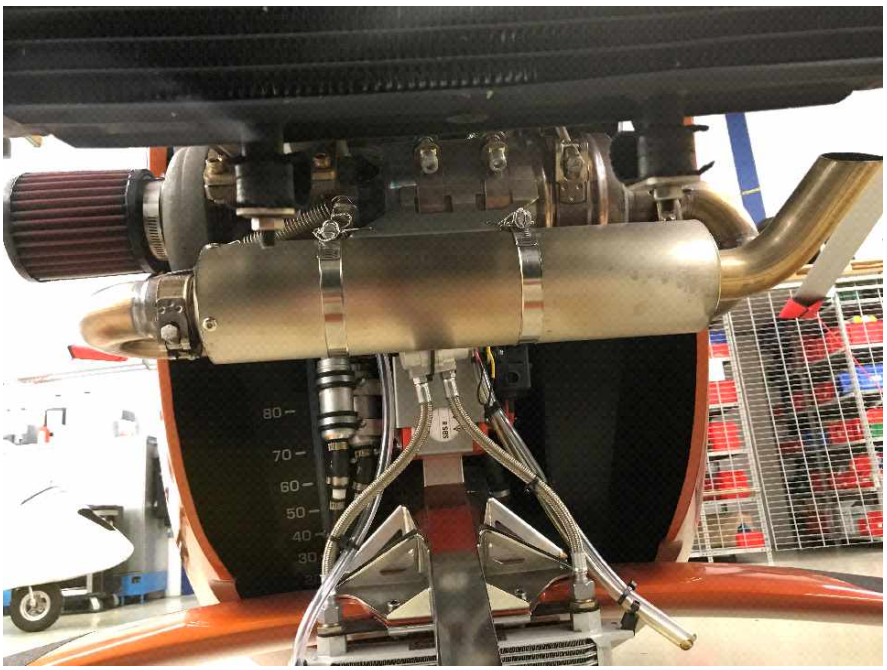


Fig. 2 - Hose clamps

Fig. 3 - Drill out the rivet pin

Fig. 4 - Installation of wool

Fig. 5 - Rivets at the cold end of muffler tube

Fig. 6 - Riveting of the outer shell

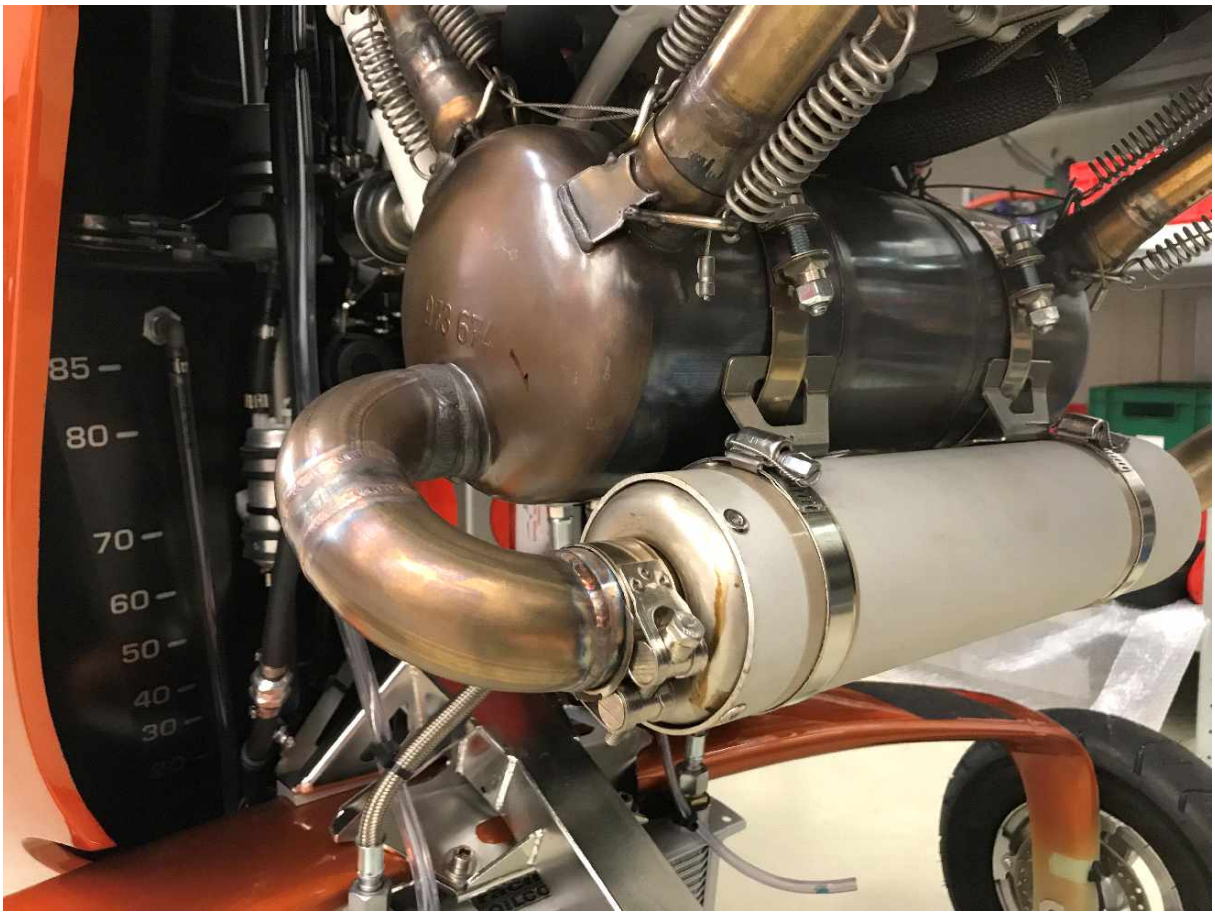


Fig. 7 - Installation of hose clamps and hinge pin clamp (912)

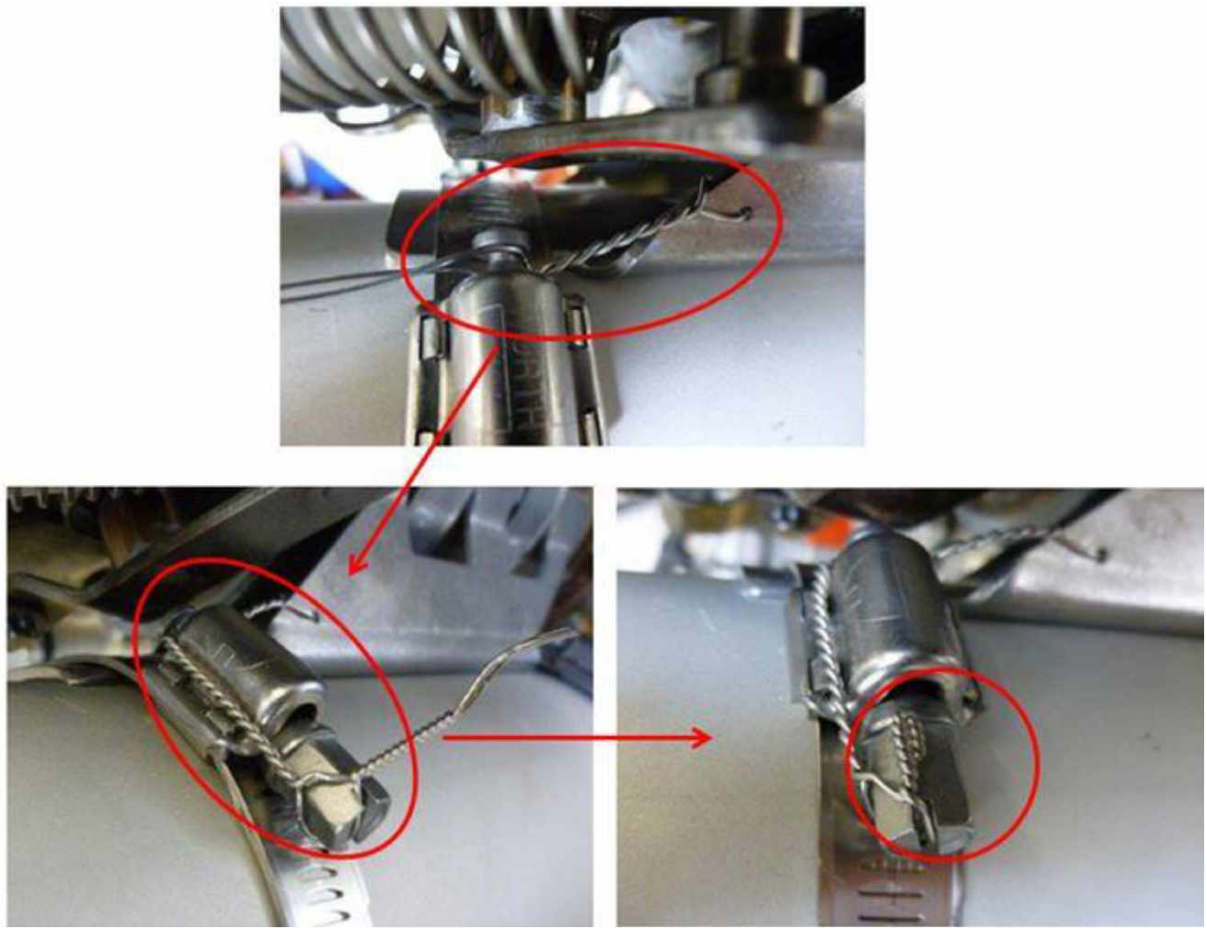


Fig. 8 - Installation of locking wire

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