

Maintenance Manual

Gyroplane Type Cavalon (UK spec only)

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Applicability

Aircraft Registration:	G-
Aircraft serial no.	RSUK/CVLN/
Engine type:	Rotax 912ULS & 914UL
Engine serial No:	
Rotor blade type & diameter:	Autogyro 8.4m RotorSystemII RAO (red cap, black clamp profile) or Autogyro 8.4m RotorSystemII TOPP (blue cap, silver clamp profile)
Propeller type:	HTC 1,73m (with or without spinner), or, IVO-prop DL3-68 in-flight variable pitch (with or without spinner)

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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			4	08.06.15	
1	07.12.12		5	06.04.16	
2	11.03.13		6		
3	12.04.13		7		

Issue	Change summary
1	First issue for flight test
2	DRAFT for review prior to permit release
3	Revised after CAA Review. Greater detail of variances between UK and other configurations in embedded AutoGyro AMM Formal release.
4	Upgrade to 560kg (MC-281) and fitment of IVO-prop (MC-276) recognised. Reformatted (Section 11 was Section 10).
5	TOPP Rotor added, Page 2 amended to show this. Page 8 amended to include this. Page 18 critical parts amended to show this.

The technical content of this document is approved under the authority of the UK CAA design organisation approval reference: DAI/9917/06		
Signature:	Signature:	Signature:
Position: Engineering Manager	Position: Head of Engineering	Position: Head of Airworthiness

List of Effective Pages

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SECTION 2

FOREWORD

1. Applicability

This Schedule is intended for use on the CAVALON Gyroplane only, released on AAN29345 and by addenda released for flight at 560kg MTOW and fitted (optionally) with the IVO-prop DL3-68 in-flight variable pitch propeller

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.

Section	Item	Life	Remarks
62-00-00	Rotor System II (RAO, red end cap)	2500 hrs	Fixed.
62-00-00	Rotor System II (TOPP, blue end cap)	2500 hrs	This (fatigue) life limit of 2,500hrs assumes 2.1 (560Kg MTOW) or 2.8 (500Kg MTOW) ground-air-ground cycles per flight hour on average over the 2,500hr life. Operational use in excess of these values will reduce the safe life of the rotor accordingly. GAG cycles should be recorded in the aircraft logbook.
62-31-00	Rotor main bearing	1500 hrs	Fixed.

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:

<p>PERMIT MAINTENANCE RELEASE Cross refer to workpack ref;</p> <p>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</p> <p>Signed.....Authorisation ref.....Date..... Maintenance Schedule Ref. RSUK0288 Issue</p>	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 F176 from the RSUK website

Intentionally blank

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 forms F175 25hr Service and F176 100hr Service/Annual Inspection Worksheets

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 RSUK0287.

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.

F175 issue 2, 25hr service worksheet

F176 issue 2, 100hr or Annual worksheet

F178 issue 2 Short term storage and return to service

F179 issue 2 Long term storage and return to service

Use these worksheets only within the UK market, not those shown in the AutoGyro MM.

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 (29345, 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-06 @ 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.

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
RSD7222 Coil earthing lead, used to earth the ignition coils should the instrument panel be removed.
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 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:

Composite body.

Connection assemblies joining the rotor head to the body mast.

The rotor assembly and rotor head

The keel, tail and rudder assy

The rudder and rotor control system

The main undercarriage and nose gear

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
BG1841 Rotor Head Upper Assembly	Correct assembly of pitch, roll, main bearing and teeter bolts/nuts and splits pins is essential for safe operation
BG1842 Rotor Head Lower Assembly	Correct assembly of pitch, roll, main bearing and teeter bolts/nuts and splits pins is essential for safe operation
BG3249 Mast welded fabrication	Must be inspected carefully for cracks or other weld problems
BG4836 Rotor assembly RSII BG8946 Rotor Assy RSII TOPP	Correct assembly of the rotor system is essential for safe operation
BG4837 or BG8991 Rotor blade	Damage or fracture of the rotor blade is not permitted.
BT718 Teeter bolt	Must be correctly fitted, with no cracks or damage for safe operation
BT3795 Teeter tower	No cracks or damage permitted for safe operation
BT3796 Main bearing nut	Critical part, must be properly tightened and correctly fitted with a split pin.
BT5957 Main bearing bolt	Critical part, must be properly tightened and correctly fitted with a split pin.
BT5652 Mast box section	Must be inspected carefully for cracks or other fractures
BT5890 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. 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.

Aircraft access for maintenance and inspection

The aircraft is fully enclosed; which means access to the 'workings' is restricted unless access panels are removed.

There are several areas of access.

Cabin area.

1. The general cabin area is accessed via the doors on either side of the aircraft. If required the doors can be removed (see POH).
2. Access to the stick bases is achieved by pulling the gaitor from the base of the stick (held in place by Velcro). Refitment is by reattaching the gaitor to the Velcro all around the gaitor.
3. Access to the control sticks is by removing the access hatches (see those sections) retained by M4 screws. Replacement is by reattaching. There is no loctite required.
4. Access to Circuit breakers is directly on the instrument panel. No tools are required, and the fuse circuit is shown on the CB.
5. Access to the rear of the instrument panel is achieved by removing the M4 screws retaining the panel to the aircraft on the panel front face. The panel may be easily fully removed by disconnecting the harness plugs and hoses, but after re installation a full functional check of all gauges MUST be completed.

Engine bay.

- a) Access to the oil dipstick is via the cover on the right side of the engine cowl, by undoing the 3 push and turn camlock fasteners. This allows access to the standard Rotax oil tank and dipstick. Ensure the filler cap is properly secured before refitting the cover and checking the three fasteners are secured in place.

- b) Access to the top of the engine is achieved by undoing the camlock push and turn fasteners attaching the top cowl to the other cowls. Wriggle them free, and lift off the cowl. Reattachment is the reverse. Ensure all camlocks are securely locked!
- c) Access to the lower engine requires the removal of the upper cowl, and then removal of the lower engine cowl, secured by M4 fastenings. The cowl attachment screws have a nylon washer between the screw head and the cowl, and must be securely tightened.
- d) Access to the battery, fuel filters etc is achieved by removing the firewall panel between the engine and composite body, behind which they are located.

Mast

- a) The rotor head fairing is removed by removing the M4 screws holding it to the body. These to allow the rear fairing to be pulled off forwards. Reattachment is the reverse, with screws securely tightened.

Standard system checks

Pitot and static ports.

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

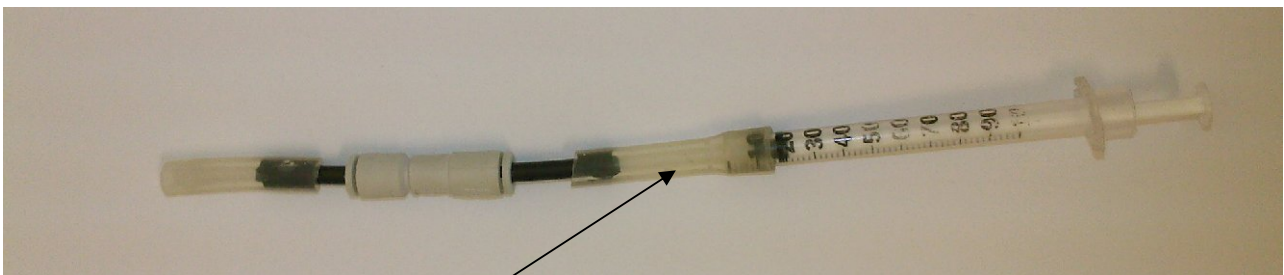
The static ports are located either side of the fuselage under the doors, roughly 2/3rds of the length along, and marked by white rings and black letters saying 'Static port – do not block!' The static port connects to the ASI, Altimeter and VSI where fitted.

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

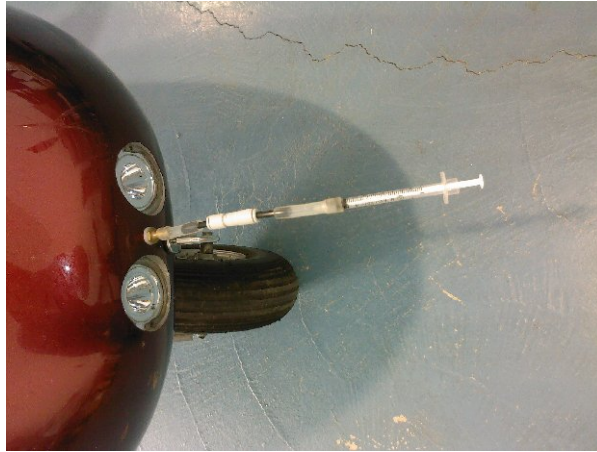
A full system check is undertaken using a Barfield type apparatus (by following the instructions with the test set) which will give a full system calibration. Alternatively a simple system integrity test can be achieved using two 1ml syringes connected to the pitot and static ports, with the second static port blocked. 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 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), block one static port with the bung from test set RSD7180. Set the altimeter to 1013Mb

1. Attach the 1ml syringe with rubber bung to the second 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 pressurised for 10seconds, there should be no noticeable decay.
4. Withdraw the static port syringe and then the static port bung, and the needles must return to their pretest 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 left 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 +/-0.5bar 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 left 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; Landing lights, strobes, navigation lights, 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 or door plexiglass cracks may be repaired as described below provided they are clear of the forward field-of-view of the pilot. They must only be repaired with Acrifix 192 adhesive/filler (available from RSUK or other outlets)

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. Using a suitable powered hand-tool (e.g. Dremel) mill a V-shaped slot into the outer surface of the canopy. The slot should have an inclusive angle 10 to 15degrees and should be progressively deepened until it penetrates the canopy section with a slot 0.5 to 1.0mm wide on the inside surface. If either end of the crack will be made unstable by this slot a suitable jury-rig support should be made using adhesive cloth tape (“gaffer tape”) and soft-wood before making the cut..
3. Thoroughly clean the slot of all swarf, dust and other residues using a scraper, vacuum cleaner, soft bristle brush then a lint-free cloth (or cotton-bud) dampened with Ambersil LO30. This step is important, as any debris will weaken the finished repair.
4. Seal one side of the slot with suitable scotch tape to prevent adhesive leakage during the bonding/filling process.
5. Using an appropriate dosing device (e.g. nozzle or syringe) progressively fill the slot with Acrifix 192. Build-up to give an adhesive bead proud of the surface and take care to avoid introducing any air bubbles into the bead (Bubbles are permitted, but visually detrimental) .
6. Allow the adhesive to cure in ambient light conditions for 12 hours at room temperature. Do not place in bright sunshine or tension changes may cause cracks or crazing the adhesive.
7. When the adhesive has hardened both sides of the bead must be flatted-back to be flush with the adjacent surface using “wet-and-dry” abrasive paper on a suitable shape of softwood block. It is not necessary to minimise the size of this block, indeed a small block may result in a shallow groove in the plexiglass. A block 50-70mm wide would be typical if space permits. The abrasive paper should be used wet (ordinary water) and made progressively finer in grade: 800, then 1500, then 2400, then 3200, then up to 6000 as needed.
8. Thoroughly clean the abraded area of any residue then polish with a suitable powered hand-tool fitted with a stitched polishing mop and “jewellers rouge” or similar proprietary polishing compound.
9. Finally polish with a soft cloth and “Plexus” plastics polish (available from RSUK).
10. If repaired correctly the crack will disappear and there will be little optical disturbance.

HTC Propeller

Basic description

See RSDS7066

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

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.

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, but do not adjust the propeller blade angle to achieve this value - flight test to ensure the engine does not rev higher than the Rotax maximum, and, if then required, adjust to suit. Note that the prop is pitched to not exceed 5,800 in level flight at 100mph. 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 120mph. Red line 100mph, 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.

Engine rpm.

This gauge is unique to RotorSport UK.

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.

This gauge is unique to RotorSport UK. May be checked by connection to a slave sensor immersed in water of known temperature (eg boiling =100degC).

Oil Pressure gauge

This gauge is unique to RotorSport UK, albeit a modified commercial gauge. Check by direct coupling to a pressure gauge and pump.

Cylinder head temp

This gauge is unique to RotorSport UK, albeit a modified commercial gauge. 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.

TRT800H Mode S transponder (where fitted) from Funkwerk

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 either the left or right front seat, accessed via the under seat pockets.

Refer to the Funkwerk installation manual Doc no 03.2123.010.71e.

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.

Bearing and OAT Temperature indicators

These are independent from the main harness, containing their own battery (LR44 or SR44), and directly linked to the rotor bearing temperature sensors. The rotor brg sensor is pushed into the front of the rotor bearing spacer in the rotor head, and is retained with hot melt adhesive. The OAT sensor is located under the body. 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). This compass is used because the standard ball type compasses tend to pick up on rotor vibration and oscillate to an extent that is unreadable. The compass may be panel mounted or remote mounted as required to suit aircraft magnetic fields. Normal fitment is above the instrument panel.

Materials used

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 behind the instrument panel, opposing the transponder antenna.

Special setup instructions

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

Transponder. Follow the Funkwerk 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 Funkwerk setup instructions contained in the Funkwerk handbook 03.2121.010.71e.
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 Funkwerk handbook instructions (ATR500 manual Document-No. 01.1251.010.71e or ATR833 manual Document-No. 01.1402.010.71e).

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 RSD7222 (available from RSUK). 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.

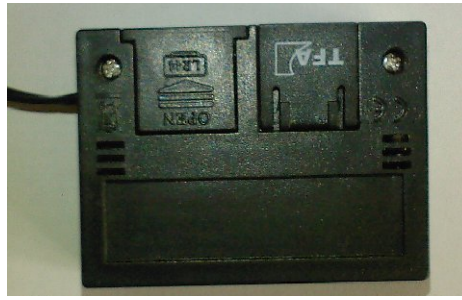
Altimeter. This unit may be adjusted if required to match height indicated to pressure setting. Remove the small screw beside the adjustment knob on the panel. This will allow the knob to be pulled out slightly which will disengage from one scale. Adjust the two scales to suit a calibrated gauge, push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

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

Transponder and radio. Neither unit is user serviceable. Return them to Funkwerk via their aftersales program – see the Funkwerke website.

Antennas and cables may be replaced if faulty or broken.

Bearing temperature indicator. This is bonded to the rear face of the panel, so not easy to remove. The battery can be replaced by sliding the small black cover off on the rear of the unit. This is not mandatory flight equipment, and battery replacement is undertaken when the indication becomes difficult to read or annually (see maintenance schedule).



View of front, prior to panel fitment.
Unit is bonded to panel.

View of rear, showing battery slot for LR44

Switch should be down – this changes the unit between deg C and deg F

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!

Engine idle setup.

Special setup instructions

NOTE! For a 914UL engine first read, understand, and follow setup information contained in the appropriate Rotax manual. This is because the right carburettor contains a position sensor that controls the turbo, and must be set to Rotax requirements.

NOTE! If an IVO-prop variable pitch propeller is fitted keep in fully fine (see Section 10)

Basic carburettor control setup

Assumption: all cables are in place, and basic setup only is needed.

Engine idle required: 1600rpm.

1. Remove the fastenings holding the centre console in place and lift up for access to the throttle idle stop
3. Set the throttle lever to the rearmost (closed) position, and adjust the eccentric idle bush on the throttle lever to stop in this position.
4. Loosen the cables in the carb arms, and hold the lever to the closed throttle stop. Maintain tension and tighten, on both carbs. Adjust as required such that both arms lift simultaneously from the stops.
5. Adjust choke cable so that the lever is fully forwards when the chokes are off. Adjustment may either be by using the adjuster on the end of the cable on the lever, or by adjusting the connection to the carb choke lever. Ensure that both chokes open as simultaneously as practical, and that both return to closed, and go fully open.

Carb idle and balance setup basics.

1. Fit balance kit either to crossover tube or with nipple to manifold points, with gauges visible to aircraft operator. Balance kits are available from RSUK (RSD4534) or Rotax distributor.
2. Ensuring the prop is clear of loose tools or parts, start and warm up engine to 50deg C min.

3. At 2,000rpm confirm carbs are balanced. Adjust on LH carb ONLY if a 914 or either carb if a 912 by adjusting outer cable length at carburettor. Confirm balanced up to max power, and if needed make the best compromise for balance at 5,000 rpm.
4. Bring engine back to idle, and adjust with eccentric idle stop on cockpit throttle lever to achieve 1,600rpm.
5. Screw in carb throttle stop screws to just touch throttle arms - if too much then balance will be affected (check on gauges).
6. Recheck balance, and if OK stop engine, and remove equipment/return to flight condition.
6. After setting run the engine up, and set idle and carb balance. If using the Rotax service sheet record the settings there, if not, record idle setting in logbook or worksheet.

Throttle friction may be adjusted by tightening or loosening the counter nuts on the throttle arm pivot. Ensure the nuts are tightened against each other after adjustment.



Photo 1

Carburettor. Ensure cables clamp nuts are securely tightened, approx 3Nm

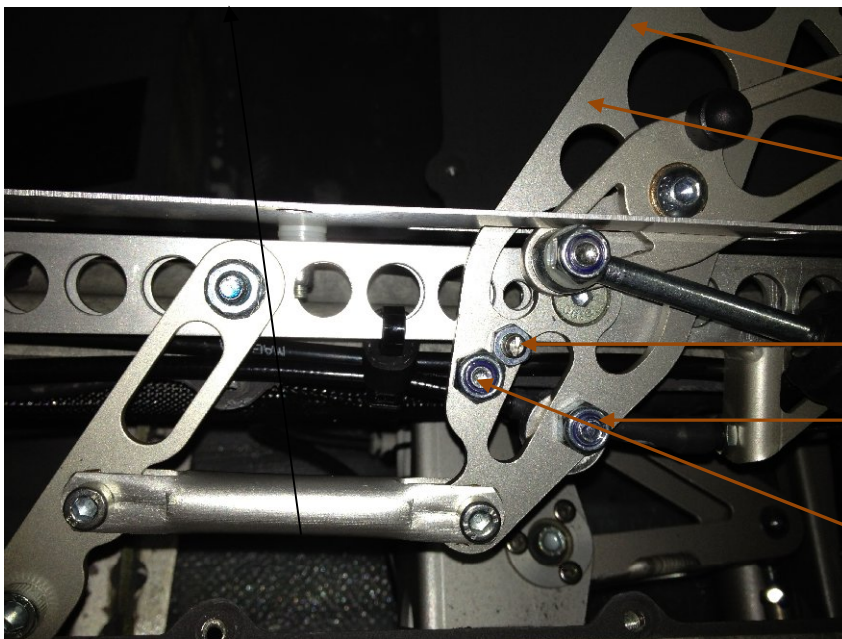


Photo 2, view of mid Console lifted out of the aircraft, right side

Repair notes

Replace worn components.

The throttle lever and brake ratchet must be replaced (as a pair) if any of the teeth of the throttle lever are visibly deformed or protrude less than 1.5mm (may be assessed with a 1.5mm drill bit placed at the root of the tooth form)

SECTION 10 – IVO-PROP IN-FLIGHT VARIABLE PITCH PROPELLER OPTION

Basic description

NOTE! Refer to the propeller manual RSUK0325!

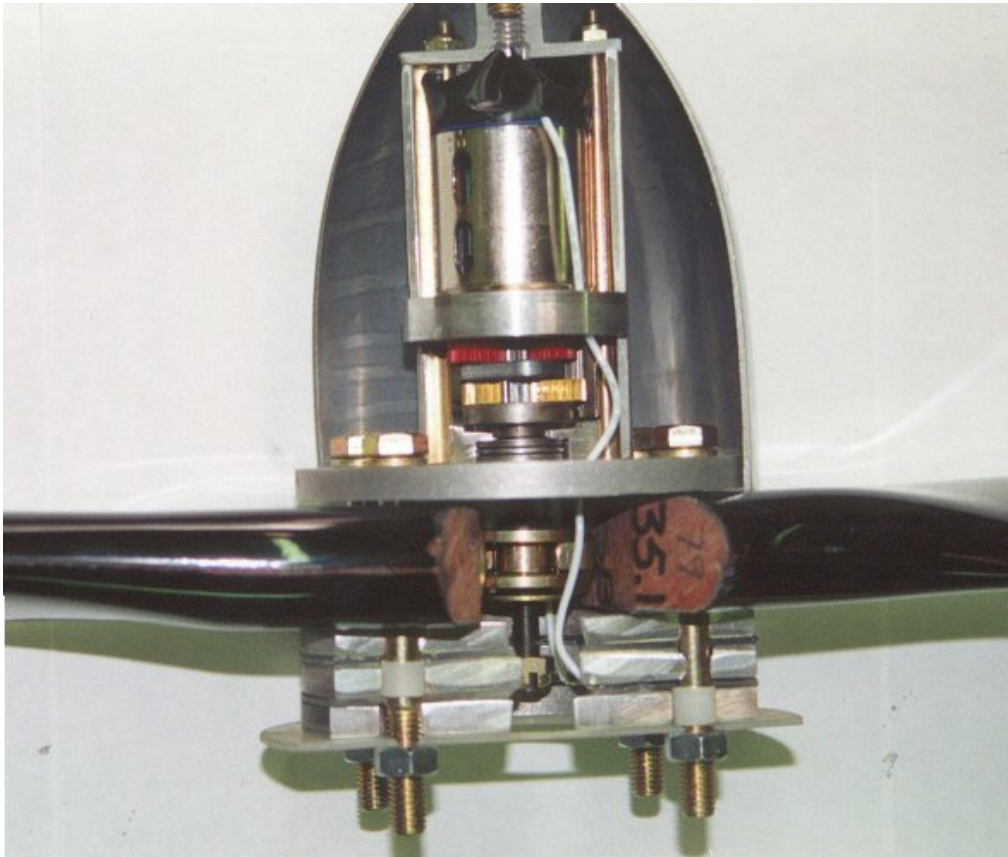
The propeller is a DL3-68" three-blade, specifically designed for the RotorSport application. This means that there are internal designs that make the product unique, and it must not be replaced by a propeller other than the part supplied by RotorSport UK Ltd.

Construction: The blades comprise a resin core, with layers of carbon fibre on top for protection and structural strength. The leading edge is protected on the outboard length by a bonded-on section of stainless-steel foil. Each blade has a substantial flat root area and two 3/8" high-tensile precision bolts are used to attach this to the aluminium hub pieces (the hub is split for assembly). The blades are bolted rigidly to the hub and the change in pitch is effected by twisting each blade along its length (there are no bearing bushes). The twisting torque is produced by a servomotor mounted in the hub and is transmitted through the blade section by an internal torque tube.

The motor unit is covered by a composite spinner, attached to the propeller backplate by 9 screws (Loctited with 243) and nylon washers

The hub is retained to the Rotax gearbox propeller flange by countersunk M8 socket-head screws and the engine torque is transmitted to the propeller by "torque bushes" in the normal way.



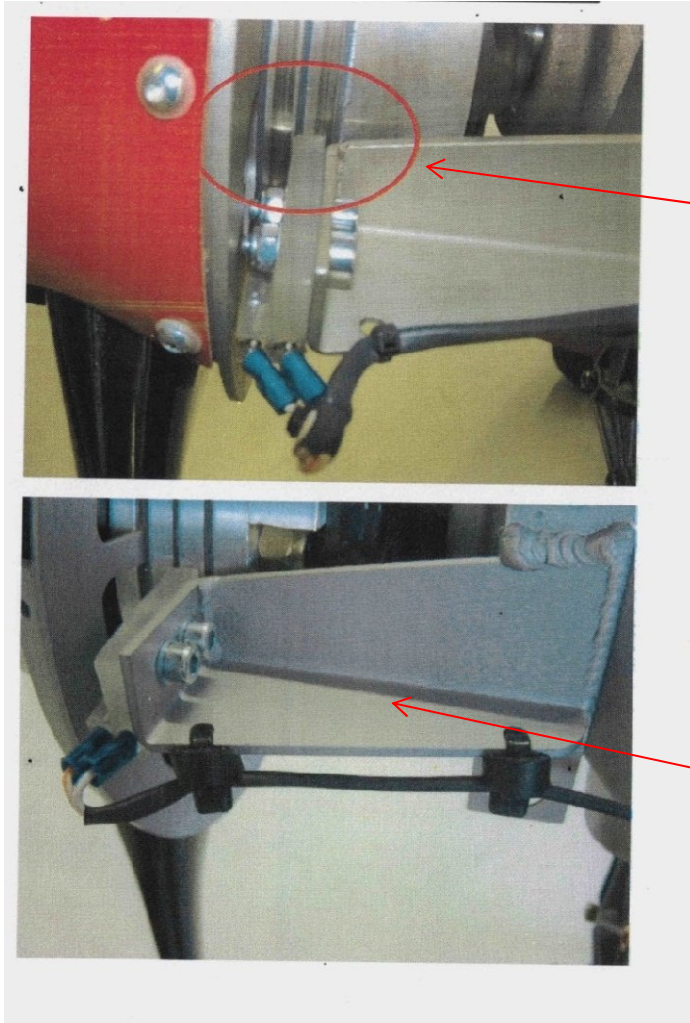


Propeller construction



Propeller mounting flange with "torque-bushes"

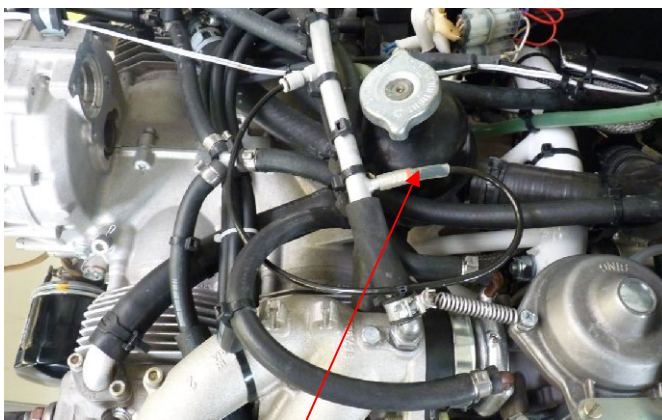
12VDC power is supplied to the propeller by means of two slip-rings in the hub assembly and a brush-box mounted on a fabricated bracket at the rear of the engine.



Slip-rings immediately behind spinner. Carbon brushes protrude from holder by approximately 0.5mm

Brush-box support bracket attached to gearbox casting

The pressure connection is made to a spigot already fitted the carburettor balance pipe on the engine. A 4mm industrial plastic tube is pre-fitted to all aircraft to transfer this pressure from engine to gauge.



Pressure connection

Control: There is no constant-speed controller fitted to the RSUK IVO-prop installations and pitch adjustment is made manually by means of a rocker-switch mounted on the left of the instrument panel. There are no micro-switches to limit blade movement so the control system utilises a bespoke circuit-board (the end position controller) which detects the rapid rise in current and disconnects motor power when each pitch limit is reached. Two amber LED indicators mounted adjacent to the rocker switch provide status information:

Both LEDs off	Propeller is not at an end position and no pitch change command active
Upper LED blinking	Propeller changing pitch to FINE
Lower LED blinking	Propeller changing pitch to COARSE
Upper LED steady ON	End position FINE reached and electronic pitch inhibit FINE activated*
Lower LED steady ON	End position COARSE reached and electronic pitch change inhibit COARSE activated*
Both LEDs flashing fast	Actuating motor does not work despite rocker switch activation. Possible defects, e.g. brushes worn, cable break.**

*Electronic pitch change inhibit is deactivated after selecting pitch change in opposite direction for at least 1 second

**Indication can only be reset by switching the master switch temporarily to OFF and then back to ON. In order to avoid pilot distraction, indication of a possible defect is retriggered after another activation of the rocker switch

Both the end-position controller and the propeller are fed from the same 16A circuit-breaker mounted in the right-hand instrument panel.

The propeller will take up to 10seconds to cycle between fully fine and fully coarse.

Principle of operation:

The propeller assembly is an in-flight variable pitch design. Pitch of the three blades is adjusted simultaneously via a cam system inside the propeller. The cams are driven by a 12v motor. The motor is supplied with current via two slip rings in the propeller assembly and a brush-box mounted on a fabricated bracket at the rear of the engine.

The blade pitch angle is limited by thrust washers (selected for each engine type) and the end-position controller removes electrical power from the motor when the thrust washers reach their end-stop.

The propeller pitch angle relationship to engine rpm is managed manually by the pilot with the aid of a manifold pressure gauge. The characteristics of each engine type (912ULS normally aspirated or 914UL turbocharged) are different, so the Pilots Handbook RSUK0287 is furnished with a look-up table for use by the pilot.

ROTAX 912 ULS

Power setting	Engine RPM	MAP	Fuel flow [ltr/h]
Max. TOP	5800	27.5	27
Max. MCP	5500	27	26
75% MCP	5000	26	20
65% MCP	4800	26	18
55% MCP	4300	24	14

ROTAX 914 UL

Power setting	Engine RPM	MAP	Fuel flow [ltr/h]
Max. TOP	5800	39.9	33
Max. MCP	5500	35.4	26
75% MCP	5000	31	20
65% MCP	4800	29	17.5
55% MCP	4300	28	12.5

MCP – Maximum Continuous Power

TOP – Take-Off Power

MAP – Manifold Absolute Pressure

MAP limits do not apply at engine speeds above 5100 RPM, marked by a yellow triangle at the RPM gauge / engine speed indicator.

NOTE

Above data is valid for standard conditions at sea level. Keep in mind that engine and propeller performance is affected by altitude and temperature. For detailed information refer to the engine manufacturer's and propeller manufacturer's documentation.

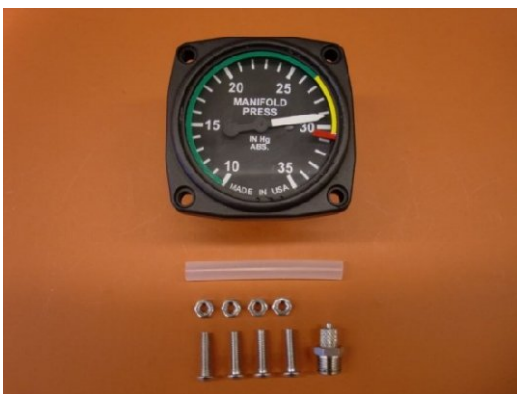
Three types of manifold pressure gauge are available:

- Analogue scale with limit placards for 912ULS normally aspirated engine
- Analogue scale with limit placards for 914UL turbocharged engine

These may be fitted in a the main instrument panel

- Digital combined engine rpm/manifold pressure gauge.

This replaces the analogue engine rpm gauge located in the main instrument panel. It has operational limits pre-programmed into its memory.



Gauge kit for 912ULS



Gauge kit for 914UL



Digital combined gauge

Assembly methods

The propeller-to-gearbox attachment bolts (M8 countersunk) are tightened to 25Nm, and are threadlocked with Loctite 243. The propeller main bolts (3/8" hex-head) with nyloc nuts are tightened (and periodically checked) to 40Nm.

Materials used

No consumable parts required

Special setup instructions

The propeller is electrically actuated via slip rings on the engine face.

WARNING! Cleanliness of this face is important, do NOT apply corrosion preventative substance to the slip rings! It will prevent them from functioning!

When re-assembling the propeller it is very important to check the blades have the same pitch angle, within 1.5deg of each other.

The screws fastening the brush box to the mounting bracket, the bolts fastening the bracket to the gearbox, and the screws retaining the cables to the brush box must be threadlocked with Loctite 243.

The cable crossing the engine is protected with heat resistant sleeving.

After fitment, always check that the propeller pitch direction of operation matches the rocker-switch.

There are no electrical micro-switches to limit the pitch angle as the mechanical limits are determined by thrust washers selected on propeller assembly.

The achieved pitch angles are:

Fine pitch 13.0deg (912ULS) or 14.0deg (914UL).

Coarse pitch 20.0deg (912ULS) or 21.0deg (914UL).

Alternatively verified as correct during flight-test.

Service and Repair methods

Refer to the F189 IVO-prop service worksheet, and to the IVO-prop maintenance manual RSUK0325 for the methods and techniques of disassembly and re-assembly of the propeller, and of the brush assembly.

Section 11

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.

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Document number RSUK0288

<p>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 650769, or email info@rotorsport.org.</p>				
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

Appendix A Compass calibration

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 Cavalon 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 650769

Email: info@rotorsport.org

Maintenance Concept and Eligibility (p7)

All maintenance work on UK-registered Cavalon gyroplanes must be conducted by or under the supervision of an A3-7 approved engineer. See Section 4 (p10,12) above.

02-51-00 Consumable Materials (p9)

All consumable materials listed are available for RotorSport UK Ltd

Chapter 03 – Minimum Equipment Requirement (p10)

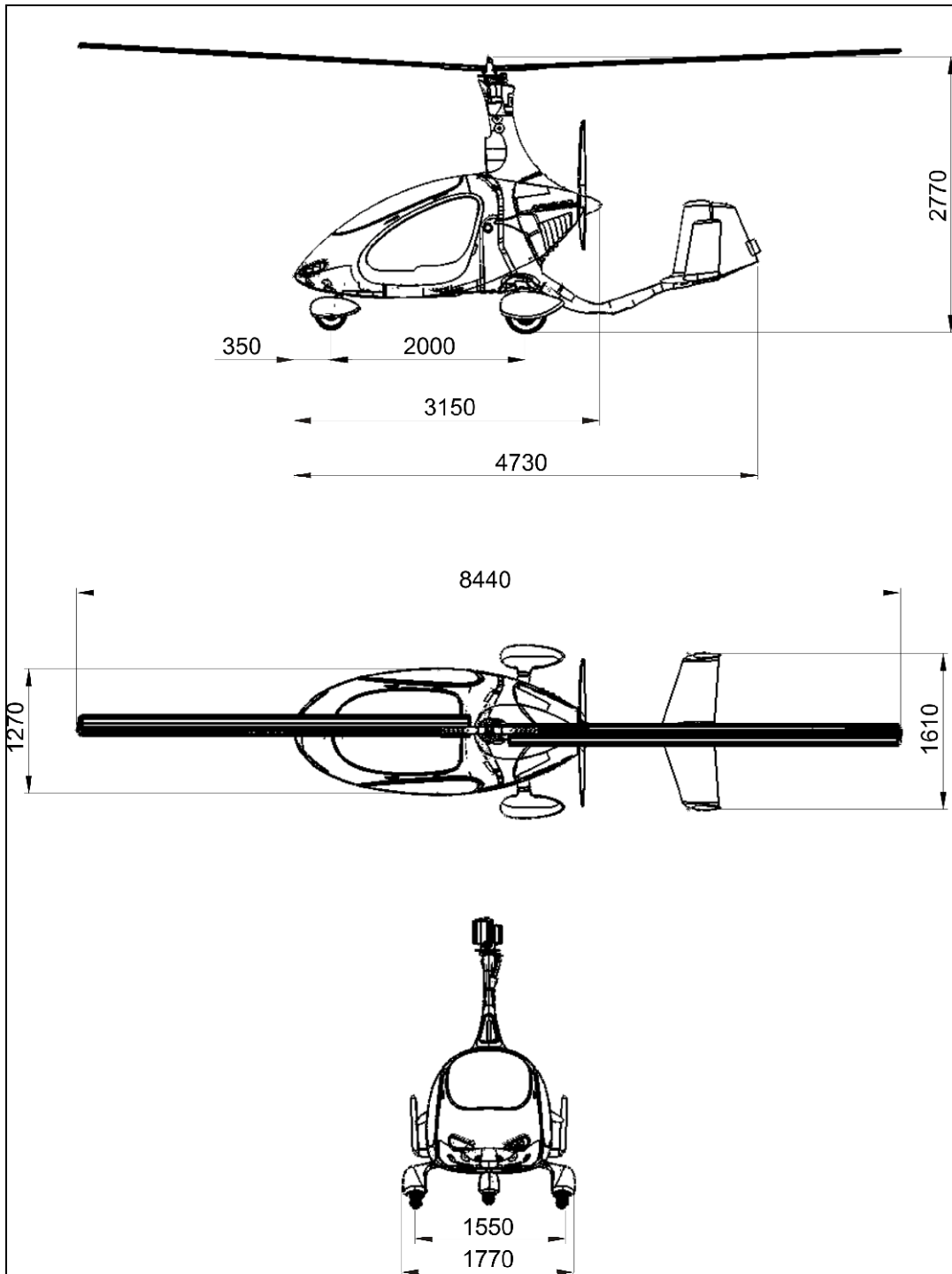
UK-registered aircraft may not be operated without Required Equipment other than a ferry flight authorised by CAA – refer to RotorSport UK for guidance

Chapter 04 Manufacturer Life Limitations (p11)

UK-registered aircraft are not fitted with an ELT device.

Chapter 06 – Dimensions & Areas (P17)

The aircraft version supplied to the UK market conforms to the dimensions below.



Length	4.73 m
Width	1.75 m
Height	2.82 m
Rotor diameter	8.4 m
Rotor disc area	55.4 sqm
Propeller diameter	1.72 m

CHAPTER 10 – PARKING, STORAGE & RETURN TO SERVICE (p18)

RSUK have published specific worksheets for short and long-term storage. These are detailed in Section 7 (p15) above and are available for download from the RSUK website (www.rotorsport.org).

CHAPTER 11 – PLACARDS & MARKINGS (p19)

UK-registered aircraft have different placards to those shown. The placards fitted to UK-registered aircraft may be seen in Section 12 of Cavalon Pilots Handbook RSUK0287 and the CAA-published TADS.

24-60-00 DC Electrical Load Distribution

Air-conditioning is not available for UK-registered aircraft.

At the time of first release under AAN29345 the only authorised electronic device that may be fitted to Cavalon is the Apple iPad. Provision for an electrical load of 35W (2.6A) is made. Note: there are restrictions on the use of this device, these are detailed in Cavalon Pilots Handbook RSUK0287 together with the the placard required to be fitted to the instrument panel of the aircraft.

25-60-00 Emergency (p5)

An ELT is not fitted to UK-registered aircraft.

CHAPTER 31 – INDICATING SYSTEM

31-10-00 (p8), 31-60-00 (p10)

At the time of first release under AAN29345 there are only two instrument panel configurations available for UK-registered aircraft, as shown below:



Standard panel



Standard panel with iPad fitted to holder

The aircraft's card-compass is mounted to the glare-shield on the centre-line of the aircraft, and the slip-string on the outside of the windscreen, as shown below:



Refer to pilots handbook for cockpit instrument and equipment description

CHAPTER 34 - NAVIGATION

34-20-00 Attitude and Direction (p13)

Only the card-compass shown immediately above is fitted to UK-registered aircraft

CHAPTER 51 – 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 55 – STABILIZERS (p15)
and 55-40-00 Rudder (p15)

The tail and rudder of UK-registered aircraft are manufactured from composite materials using both GRP and CFRP in the construction. However they have a high content of CFRP and are generically referred-to as “Carbon” parts.

CHAPTER 61 – PROPELLER (p16)

Simple repairs to the propeller are permitted as described on p25 above (HTC) and p28 (IVO). More complex repairs may be implemented only by RotorSport UK Ltd. Refer to RSUK for further information.

61-20-00 Controlling (p16)

An in-flight variable pitch propeller is now available for UK-registered aircraft.

CHAPTER 63 – ROTOR DRIVE

63-11-00 (p17)

The latest series III Pneumatic clutch/pre-rotation gearbox is fitted to UK-registered Cavalon aircraft (RSUK/CVLN/001 onwards)

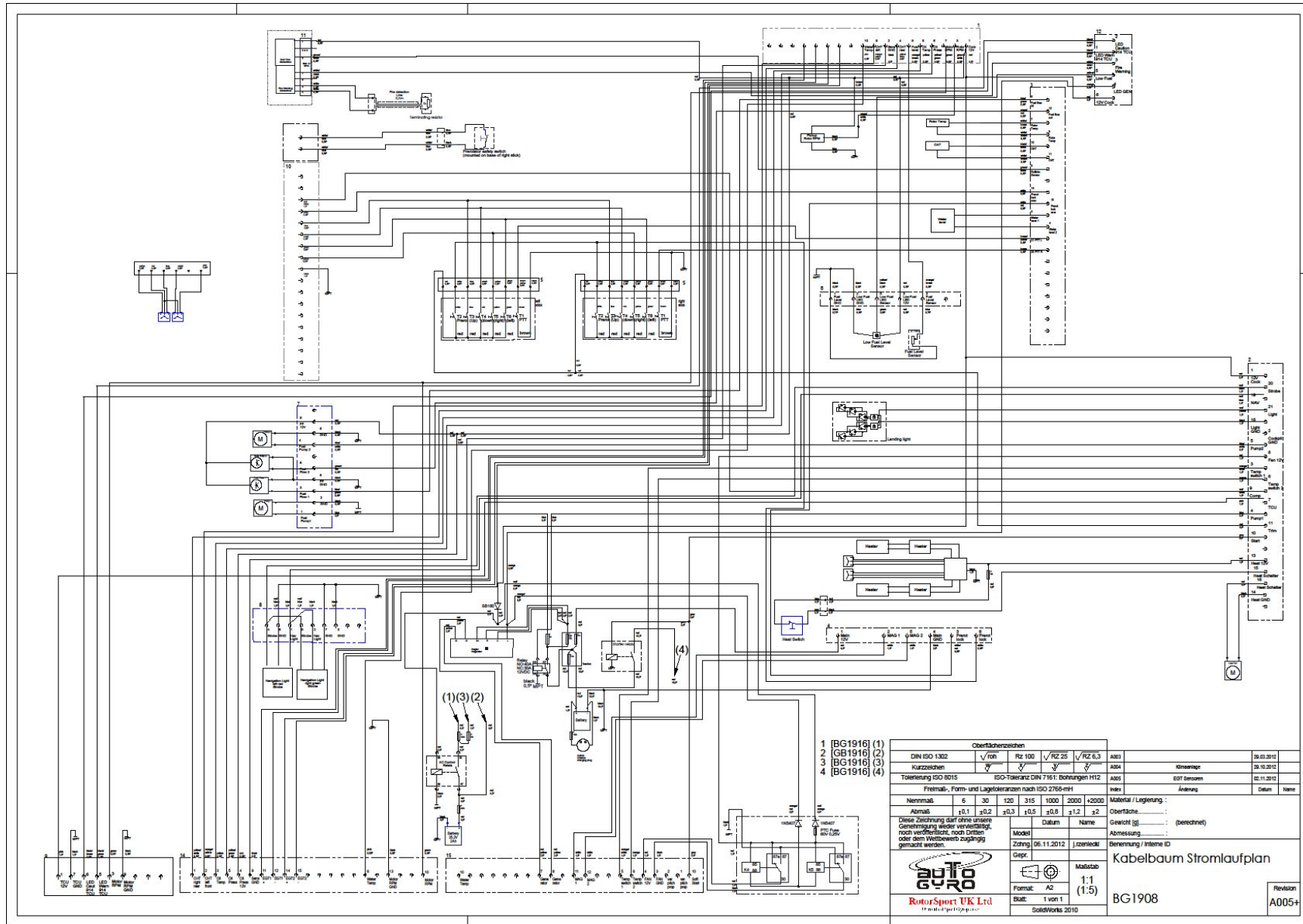
CHAPTER 77 – ENGINE INDICATING

77-10-00 Power p(21)

A manifold pressure gauge is an option for UK-registered aircraft without fitment of an in-flight variable pitch propeller. It is mandatory if a VP-propeller is fitted.

Wiring diagram – Aircraft Wiring Harness (p4)

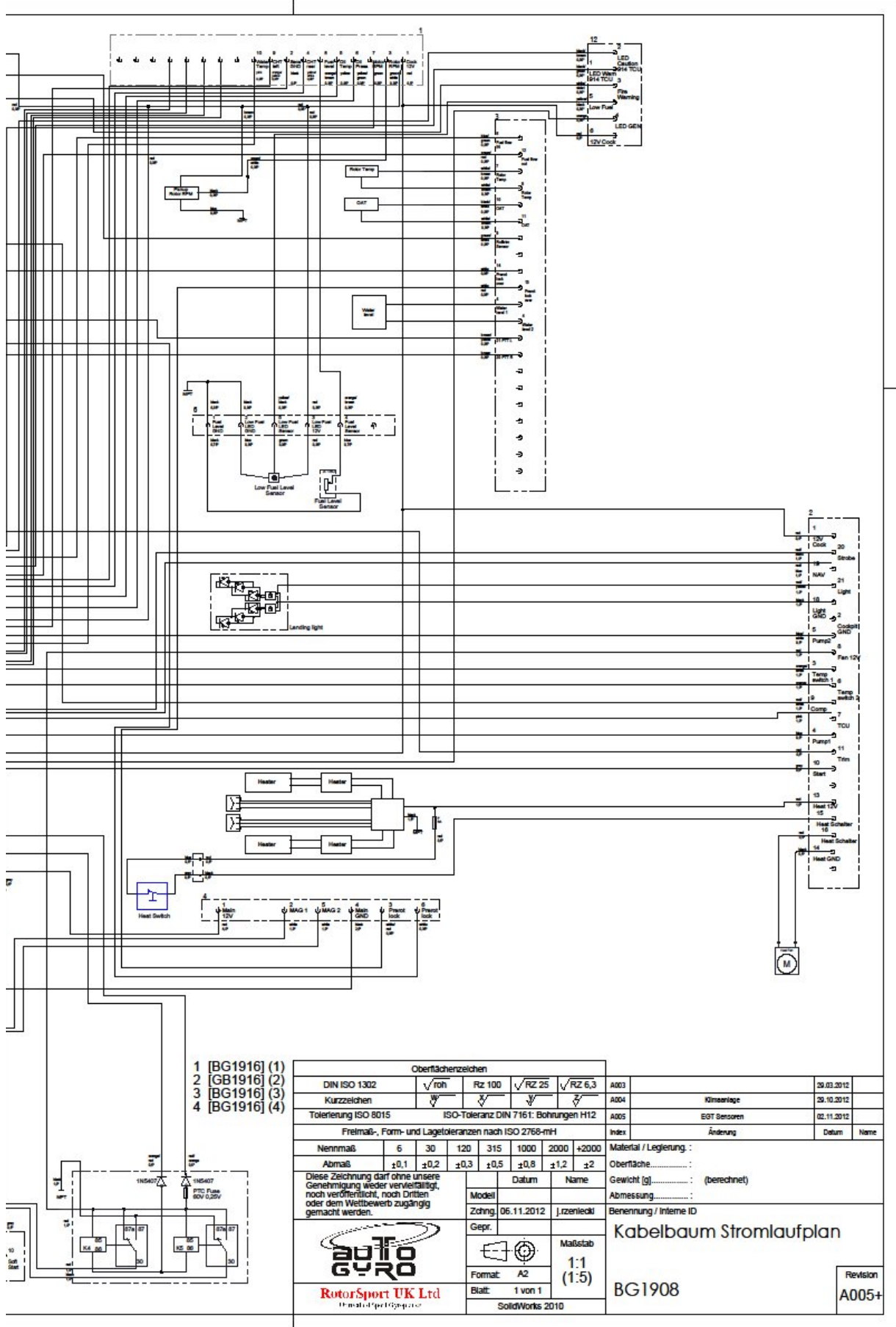
The main wiring harness BG1908 shown in the AutoGyro manual at IssA003 is superseded by IssA005 shown below:



- 1 [BG1916] (1)
- 2 [GB1916] (2)
- 3 [BG1916] (3)
- 4 [BG1916] (4)

Oberflächenzeichen										
DIN ISO 1302	\sqrt{Rz}	$\sqrt{Rz 100}$	$\sqrt{Rz 25}$	$\sqrt{Rz 6,3}$	AK3				08.03.2012	
Kurzzeichen					AK4				06.10.2012	
Tolerierung ISO 8015	ISO-Toleranz DIN 7161: Bohrungen H12				AK5				02.11.2012	
Freimaß-, Form- und Lagetoleranzen nach ISO 2768-mH										
Nennmaß	6	30	120	315	1000	2000	+2000	Material / Legierung :		
Abmaß	$\pm 0,1$	$\pm 0,2$	$\pm 0,3$	$\pm 0,5$	$\pm 0,6$	$\pm 1,2$	± 2	Oberfläche: _____		
Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt, noch veröffentlicht, noch Dritten oder dem Wettbewerb zugänglich gemacht werden.										
Modell	Datum		Name		Gewicht: _____ (berechnet)					
Zwang	06.11.2012	J. Zienicki		Benennung / Interne ID						
Gepr.	Kabelbaum Stromlaufplan									
Format: A2	Maßstab: 1:1 (1:5)		BG1908							Revision
Blatt: 1 von 1	A005+									
SolidWorks 2010										

The other diagrams shown are correct, but note the use of an extension cable RSD7223 to relocate the fuel gauge, the engine rpm gauge and the rotor rpm gauge from the left-hand panel to the main instrument panel of UK-registered aircraft. On the next two pages enlarged views of the diagram are shown.



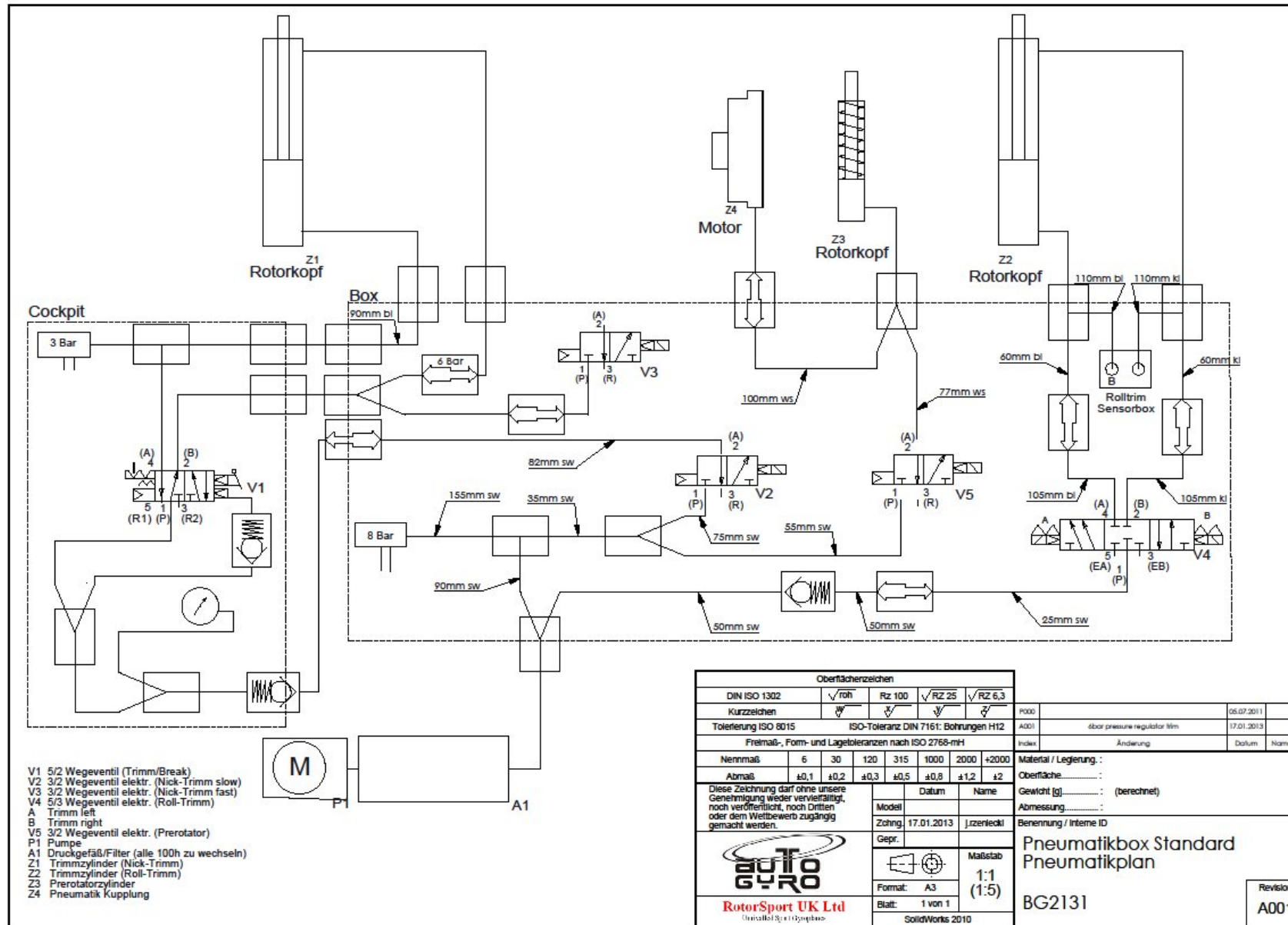
- 1 [BG1916] (1)
- 2 [GB1916] (2)
- 3 [BG1916] (3)
- 4 [BG1916] (4)

Oberflächenzeichen			
DIN ISO 1302	\sqrt{roh}	Rz 100	$\sqrt{RZ 25}$ $\sqrt{RZ 6.3}$
Kurzzeichen	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$
Tolerierung ISO 8015 ISO-Toleranz DIN 7161: Bohrungen H12			
Freimaß-, Form- und Lagetoleranzen nach ISO 2768-mH			
Nennmaß	6	30	120 315 1000 2000 +2000
Abmaß	$\pm 0,1$	$\pm 0,2$	$\pm 0,3$ $\pm 0,5$ $\pm 0,8$ $\pm 1,2$ ± 2
Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt, noch veröffentlicht, noch Dritten oder dem Wettbewerb zugänglich gemacht werden.			
Datum		Name	
Zohng. 06.11.2012		J.izenlekt	
Gepr.		Maßstab	
		1:1 (1:5)	
Format: A2		Blatt: 1 von 1	
SolidWorks 2010			

A003		29.03.2012
A004	Klimerlage	29.10.2012
A005	EOT Sensoren	02.11.2012
Index	Änderung	Datum Name
Material / Legierung :		
Oberfläche.....		
Gewicht [g]..... (berechnet)		
Abmessung.....		
Benennung / Interne ID		
Kabelbaum Stromlaufplan		
BG1908		
Revision		A005+

Pneumatic circuit diagram.

During aircraft flight test a modification to incorporate a 6bar pressure limit valve was made to the pitch trim system. The circuit diagram below reflects the released version with this valve, as fitted to Cavalon RSUK/CVLN/001 onwards.



Oberflächenzeichen				POD	
DIN ISO 1302	√roh	Rz 100	√RZ 25	√RZ 6,3	05.07.2011
Kurzzeichen	√	√	√	√	
Tolerierung ISO 8015				ISO-Toleranz DIN 7161: Bohrungen H12	
Freimaß-, Form- und Lagetoleranzen nach ISO 2768-mH				Index	
Nennmaß	6	30	120	315	1000
Abmaß	±0,1	±0,2	±0,3	±0,5	±1,2
Diese Zeichnung darf ohne unsere Genehmigung weder veröffentlicht, noch veröffentlicht, noch Dritten oder dem Wettbewerb zugänglich gemacht werden.				Material / Legierung: : Oberfläche: : Gewicht [g]: : (berechnet) Abmessung: : Benennung / Interne ID	
Modell		Datum	Name		
Zehng.		17.01.2013	Jizerlecki		
Gepr.		Material			
Format: A3		Maßstab			
Blatt: 1 von 1		1:1 (1:5)			
SolidWorks 2010		Pneumatikbox Standard Pneumatikplan BG2131			
					Revision A001

25-60-00 0-1 DESCRIPTION: EMERGENCY LOCATOR TRANSMITTER (p1)
UK-registered aircraft are not fitted with an ELT

26-00-00 0-1 DESCRIPTION: FIRE INDICATING SYSTEM (p1)

Although functionally the same as the system described in the AutoGyro MMM, the system fitted to UK-registered aircraft has the detector wire extended into the protected compartment between the cockpit bulkhead and the removable fire-resistant panel.

34-10-00 5-1 TEST: PITOT STATIC SYSTEM INTEGRITY (p1)

The 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 p24 above

62-11-00 4-2 DISASSEMBLY: ROTOR - TEETERING PARTS (p1) and ASSEMBLY (p1)

UK-registered aircraft utilise low-profile “Binx” all-metal locking nuts in place of nyloc nuts for retention of the teeter-block to the hub-bars assembly (4-plcs). These Binx nuts should be tightened to 20Nm. The remaining orthodox nyloc nuts should be tightened to 25Nm. UK-registered aircraft use a reduced angle-of-incidence variant of RotorSystem II (part number BG4836 under BOM location V.RK303). The assembly is the same in concept but may be recognised by the black-coloured clamping profile replacing the silver coloured item of the standard assembly.

62-32-00 6-1 INSPECTION: ROTOR GIMBAL HEAD (p1)

UK-registered aircraft have additional large-diameter thrust washers RSD1121 fitted to the roll axis of the gimbal head. Other than ensuring that these are properly located around the head of the flanged bushes fitted into the gimbal block there is no difference to assembly technique.



Pitch/roll block and slotted washer



Slotted washer in place



**Manufacturer Maintenance Manual
for Gyroplane Cavalon**

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 bound by the foregoing terms.

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

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U.S. and foreign patents of AutoGyro AG are used in the Calidus and Cavalon gyroplanes - (US.Pat.No. 8,690,100; US.Pat.No. D699,153)

Every effort has been made to ensure that the information in this manual is accurate. AutoGyro GmbH is not responsible for printing or clerical errors.

1 – INTRODUCTION

This manual provides accepted and recommended maintenance procedures applicable for the Cavalon 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.

Manufacturer Information [Letters] (MI) 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 manufacturer maintenance manual (MMM), Cavalon (CV), Part B could be ‘MMM-CV-B_13-04-20’. Note that the date code is ‘yy-mm-dd’ 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.



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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 of Critical Parts (CP) included)
- Heavy (HVY) Maintenance (Flight Safety Sensitive Maintenance Tasks, handling of CPs)
- 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’.



63-51-00 8-1 REPLACEMENT: ROTOR BRAKE PAD



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 coolant.
LNE	AutoGyro maint. course (and organization approval) ‘Line’	Manufacturer Maint. Manual (MMM) Job Cards ‘LNE’	All tasks to perform a 100 hrs inspection
HVY	AutoGyro maint. course and organization approval ‘Heavy’	Manufacturer Maint. Manual (MMM) Job Cards ‘HVY’	Adj. / replace rotor head, flight controls
SPC	AutoGyro special courses and org. approval ‘Specialized’	MMM Job Cards ‘SPC’ and manufacturer instructions	Main frame overhaul, major mod., repair

Warnings, Caution and Notes

This manual uses **WARNINGS**, **CAUTIONS** and **NOTES** 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:

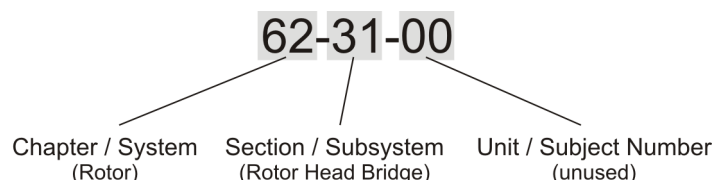
Part	Designation / Content
A	Introduction and Declarations This section. Explains the basic concept, handling of this manual, its structure according to the ATA100 numbering system, abbreviations and acronyms.
B	Master Servicing Manual (ATA Chapters 00 to 20) General description of the aircraft, basic 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 MI 2011-99

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

EFFECTIVITY: MI 2011-99 accomplished

Instructions apply only to those versions where the referenced MI 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.

Parts List Codes – PC / PIT

Parts Lists specify PC (Procurement Code) and PIT (procure item through) for each item (see example). The procurement code may show L0, L1, L2 or L3 as explained below.

L0	Part/Assembly available for purchase for a registered pilot/operator (OPR)
L1	Part/Assembly orderable for individuals/organizations qualified to perform Line Maint.
L2	Part/Assembly orderable for organizations qualified to perform Heavy Maintenance
L3	Part/Assembly orderable for organizations qualified to perform Specialized Level tasks

'PIT' lists the order number of the part, bundle, set, or smallest assembly in which the referred part is contained.

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
1	1	Bushing TEF-MET 13/16/21x30	L0	S.RK13	
1	2	Bushing TEF-MET 13/15/21x5	L2	S.RK13.08	

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
ATA	Air Transport Association
CHT	Cylinder Head Temperature
CP	Critical Part
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
MI	Manufacturer Information [Letter] (dt. Herstellerinformation)
MLL	Manufacturer Life Limit
MMM	Manufacturer Maintenance Manual
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
RBT	Rotor Bearing Temperature
rcv	receive
rec.	recommended
RH	right hand
RPM	Revolutions Per Minute
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)

Manufacturer Information [Letters] (MI) and Airworthiness Directives (AD)

Manufacturer Information [Letters] (MI) (Herstellerinformation) or Airworthiness Directives (AD) will be incorporated into the Maintenance Manual with the next revision

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CHAPTER 00 - INTRODUCTION / AIRCRAFT GENERAL

General

The Cavalon is a 'new generation' gyroplane with 3-bladed push propeller and a 2-blade aluminium main rotor system with swivelling rotor head and split mast with integrated rotor vibration damping. It features monocoque cabin with glazed canopy, stainless steel mast, engine support and keel tube. Cabin, cowlings, covers and stabilizer with rudder are made from glass fibre reinforced (GRP) plastic.

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

Rotor flight control comprises conventional linkage and push-pull control cables.



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: <div style="margin-left: 20px;"> <p>Make sure that the item</p> <ul style="list-style-type: none"> - is complete - is correctly attached - has no loose parts - shows no signs of leaks - is not cracked or damaged - is not worn <p>Make sure that</p> <ul style="list-style-type: none"> - the surface protection is not damaged - all locking devices are installed correctly <p>Make sure that items such as pipes, hoses and cables</p> <ul style="list-style-type: none"> - look serviceable - do not rub against other items <p>For log books and other technical records:</p> <ul style="list-style-type: none"> - find pending faults - make sure they are up-to-date and correctly maintained </div>
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

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!

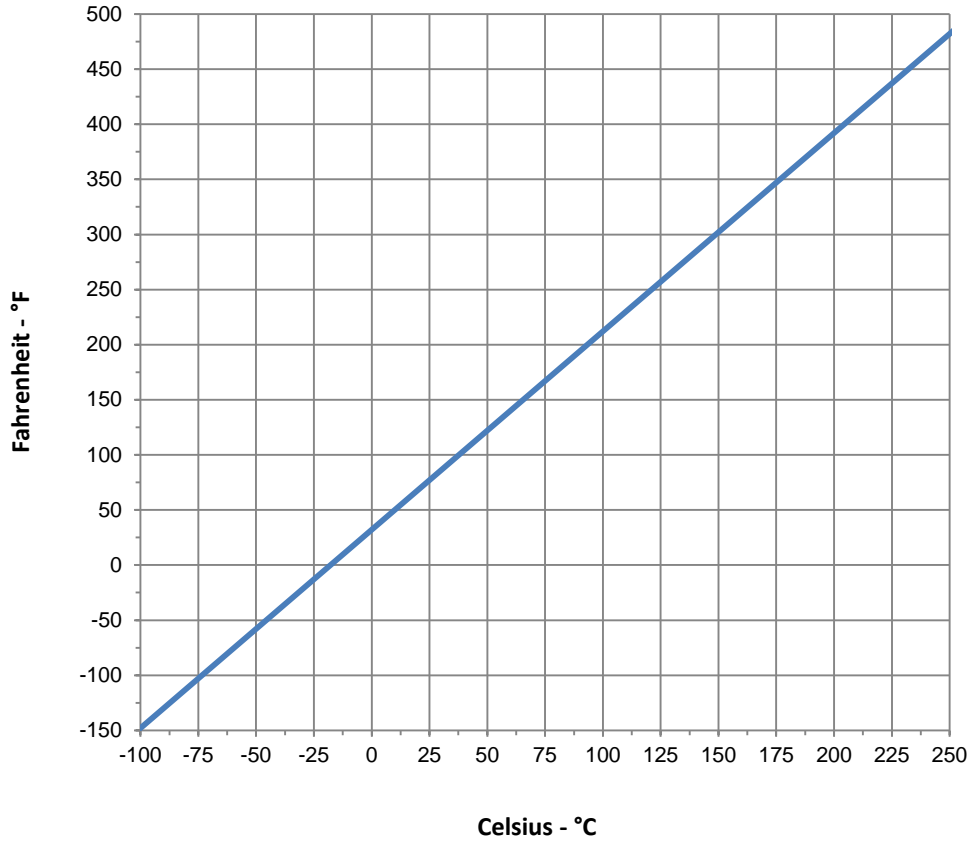
01-21-00 Standard Commercial Tools

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

- Inclinator (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

Consumable Material (CM) referenced throughout this Maintenance Manual is coded AG-XXX-NN where NN is a consecutive number and XXX represents the material code according to the classification listed below:

Class	Description	Class	Description
BAS	BONDING, ADHESIVES AND SEALANTS	LUB	LUBRICANTS
CCM	CHEMICAL CONVERSION MAT.	MSC	MISCELLANEOUS
CLA	CLEANING AGENTS	OIL	OILS
CPA	CORROSION PREVENTIVE AGENTS	PNT	PAINT AND LACQUERS
FUE	FUELS	PRM	PRIMER, PREPARATION FOR PAINTING
GRS	GREASES	PRS	(STORAGE) PRESERVATION
HYF	HYDRAULIC FLUIDS		

The following consumable materials are referenced in the Maintenance Manual:

CM-Item	Material / Description	AutoGyro Order Codes
AG-BAS-01	Loctite 221 red	S.VB6015
AG-BAS-02	Loctite 243 blue	S.VB6011
AG-BAS-03	Loctite 542 red	S.VB6016
AG-BAS-04	Loctite 638 green	S.VB6013
AG-CPS-01	'Hohlraumspray'	S.VB8033
AG-GRS-01	Lagermeister WHS 2002	S.VB6007
AG-LUB-01	Ballistol Öl Universal	S.VB3011, S.VB3012, S.VB6043
AG-LUB-02	Anti-Seize Spray	S.VB6030
AG-LUB-03	Würth HHS2000 Oil Spray	S.VB6006
AG-MSC-01	Talcum powder	S.VB6068
AG-OIL-01	Shell Advance VSX4 10W-40	S.VB8026, S.VB8027

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
- Side Slip Indicator
- Rotor RPM indicator
- Engine instruments (oil pressure, oil temperature, RPM, CHT)
- HOBBS meter
- 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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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
24-30-00	Battery	See manufacturer
25-10-00	Seat belts	10 yrs
25-60-00	ELT Battery	See manufacturer
28-20-00	Fuel filter	200 hrs / 2 yrs
28-20-00	Fuel pumps	5 yrs (R912)
28-20-00	Primary fuel pump	1000 hrs (R914)
32-20-00	Nose gear rubber damper	5 yrs
62-00-00	Rotor System II	2500 hrs
62-31-00	Rotor main bearing	1500 hrs
62-32-00	Gimbal head bolts	1500 hrs / 5 yrs
62-51-00	Mast bolts	1500 hrs / 5 yrs
62-51-00	Mast mounting bushings	1500 hrs / 5 yrs
67-00-00	Push-pull cables	1500 hrs
71-20-00	Engine mounting bushings	1500 hrs / 5 yrs

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.

CHAPTER 05 - TIME LIMITS, INSPECTIONS & CHECKS

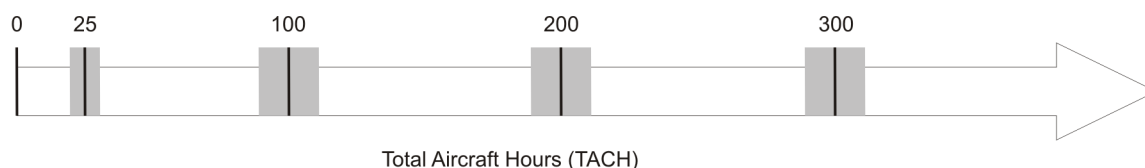
For safe operation and continued airworthiness over the specified lifecycle of the aircraft the following inspection schedule shall apply. Note that specified tolerances must NOT be accumulated!

Task	Interval	Recurrence	Tolerance
<u>Daily / Pre-Flight Check</u>	Before flight / daily	Each	N/A
<u>Complementary / Servicing Tasks</u>	5 hrs (rec.)	Each	N/A
<u>25 hrs Inspection</u>	25 hrs	Once	+/- 5 hrs
<u>100 hrs / Annual Inspection</u>	100 hrs / 1 yr	Each	+/- 10 hrs
<u>Supplemental Inspection</u>	1500 hrs / 5 yrs	Each	-

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 aircraft 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 - Airworthiness Limitations!

Components

ATA/Ref.	Equipment / System	Time Limit
53-00-00	Monocoque structure (incl. keel tube support), keel tube	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 Cavalon 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 <i>Ch. 12 – Servicing</i>)	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-MT) is available for download.

05-21-00 **Temporary Scheduled Inspections & Checks**

Temporary Scheduled Inspections and Checks may be introduced by MIs 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 <u>CHAPTER 18</u>
Propeller vibration	see <u>CHAPTER 18</u>

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	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. 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. As anti-freeze ages, renew the coolant every five years. Read the engine manual for the manufacturer's recommendations.

During winter operations the necessary operating temperature for oil and cooling agent may not be reached. This can be compensated by taping some portion of the coolers. Monitor all engine temperatures closely after having the coolers taped and modify, if necessary.

When using heated clothing be aware of the electrical power demand in regard to the generator performance. Do not exceed the generator output value in order not to drain the battery. A loss of electric power affects avionics and radio communication and can lead to an engine failure in case of ROTAX 914 engine (depending on configuration).

Before each flight inspect all control cables for free and easy movement and sufficient lubrication.

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 obstacle include any rotor strike of the standing 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.

Propeller contact with obstacle or external impact

Refer to engine manufacturer documentation. Perform tap test on propeller blades.

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 is likely to have caused 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-MT) is available for download.

05-70-00 Functional Test Flight

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

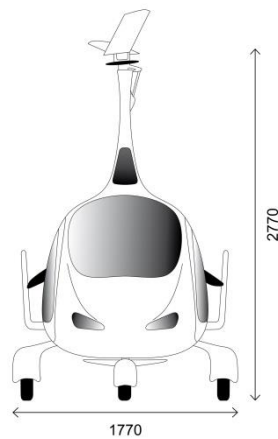
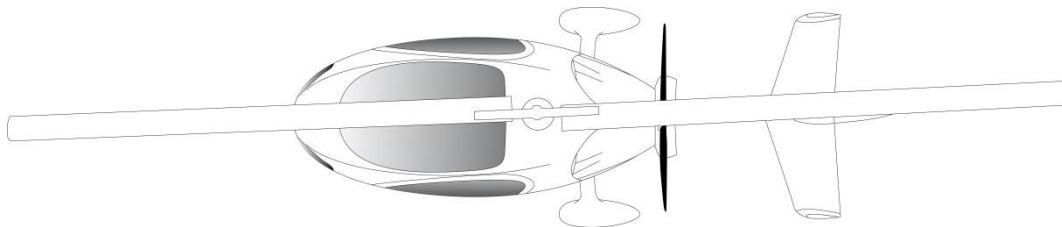
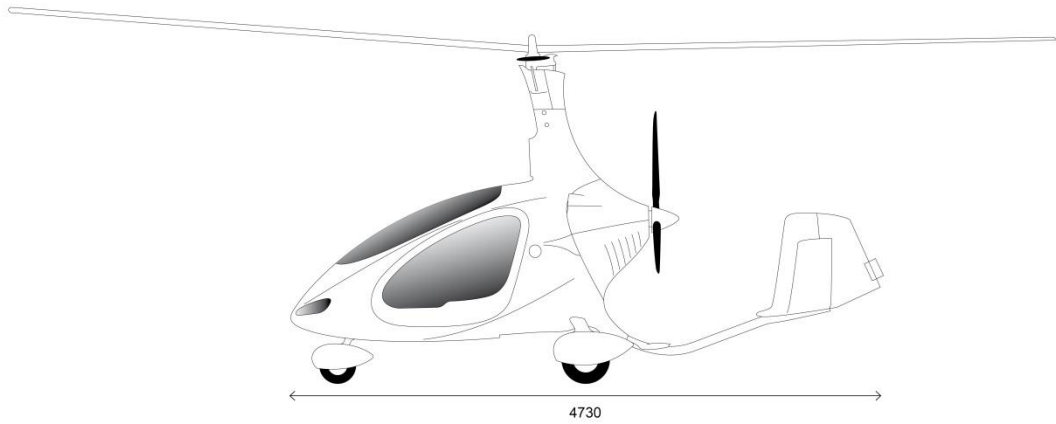
05-90-00 Maintenance Records & Aircraft Logs

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	4.60 m
Width	1.75 m
Height	2.82 m
Rotor diameter	8.4 m
Rotor disc area	55.4 sqm
Propeller diameter	1.72 m

CHAPTER 07 - LIFTING / JACKING / SHORING

See Job Card 07-00-00 2-1 in Part F 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-MT 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

In clear view of the pilot:

Only VFR day is approved
Aerobatic flight prohibited!
Low-G manoeuvres prohibited!
Flight in icing conditions prohibited!
For additional limitations see Flight Manual!

Max. gross weight: _____
Empty weight: _____
Max. useful load: _____

At RH seat:

Max. weight in seat: 110 kg
Min. weight in seat: 60 kg

At LH seat:

Max. weight in seat: 110 kg

Solo from right hand seat only

Occupant warning (front and aft seat):

OCCUPANT WARNING
This aircraft has not been certified
to an international requirement

At each storage compartment behind seats:

**Max. load: 10 kg
W&B must be respected!**

At fuel filler neck:

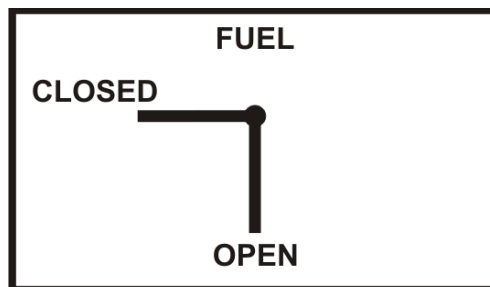
**Min. ROZ 95
AVGAS 100LL**

Tank Capacity 100 litres

At oil filler neck:

**Engine Oil: _____
Approved oil types see engine manual!**

At fuel shut-off valve:



At both static ports:

**Static Port
Do not obstruct!**

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 to the engine, service access ports 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 AG-LUB-03 on coupling sleeve when in extended position in regular intervals, at latest when the sliding surface feels dry or after flight through rain. Mast cover must be removed!

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. Engine cowling must be removed!

12-30-20 **Servicing: Tire Pressure**

Main wheels	1.8 – 2.2 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 gel 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.

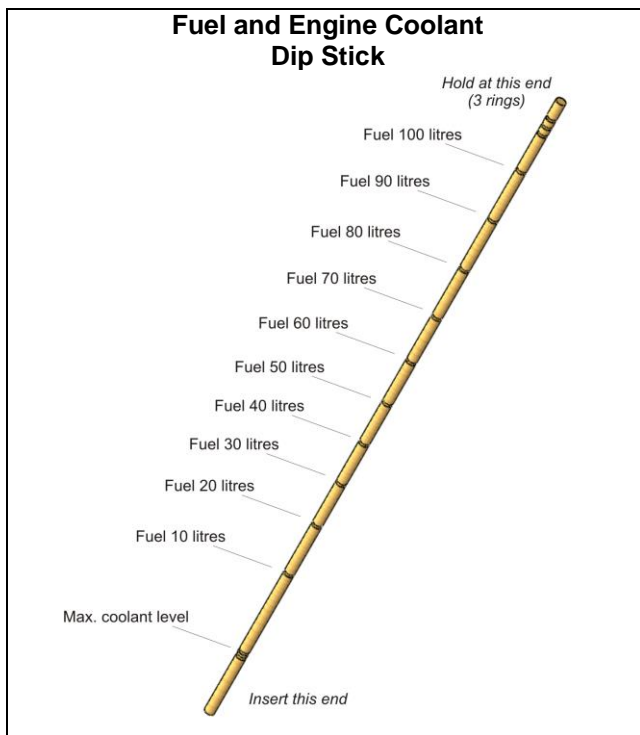
CAUTION: No overwinter survival mode (snowflake) with Ctek charger MXS3.8 for Super B batteries.

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.

If temperatures are expected to fall below protection temperature, drain the coolant, and if required for service, refill with pure antifreeze. As anti-freeze ages, renew the coolant every five years. Read the engine manual for the manufacturer's recommendations.

As a minimum, coolant must be visible in the overflow bottle resp. on the dip stick. The maximum coolant level is defined by the twin rings marking on the Fuel and Engine Coolant Dip Stick with the dip stick held at the side with the triple rings. A larger depiction of the dip stick is provided in the POH.



12-40-00 Replenishing/Replacement of Fluids

Liquid / Fluid	Max. Filling Qty.	Type / Code
Engine coolant	3.8 ltr	as documented
Engine coolant with cabin heating (option) installed	4.2 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.
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.

CHAPTER 19–20 – UNASSIGNED / N/A

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CHAPTER 21 - VENTILATION / HEATING

21-00-00 Ventilation / Heating

Each of the two cabin doors features an adjustable fresh air vent and one sliding window with pivoting vent for ventilation. The sliding window can be used as viewing hatch in case of emergencies and is wide enough to reach through with a hand. For demisting and /or cabin ventilation. open and direct the round air vents and pivoting vents as required. Used air can escape through an outlet at the bottom of the cabin.

Cabin heating (if installed) is controlled by a labelled lever in the centre console. In order to switch cabin heating on, the lever must be moved to the front which will activate the cabin heat blower fan by means of a micro switch. Heat output / temperature can be controlled corresponding to the position of the lever. When activated, an electrical blower fan sucks air from the leg room and blows it through a heat exchanger, which is connected to the engine cooling water circuit. Warm air escapes through outlets at the dashboard below the front window, at two adjustable nozzles, and is redirected to the leg room.

Concerning heating control, see 76-10-00 Power Control / Choke for reference.

CHAPTER 22 - UNASSIGNED / N/A

CHAPTER 23 - COMMUNICATIONS

23-10-00 Speech Communication / Radio

The communication system consists of an integrated airband 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.

23-40-00 Interphone / Intercom

The standard intercom system features standard headset sockets (TRS / Tip Ring Sleeve) with additional XLR-3 socket for active headset power supply. Sockets are provided at the aft console between the crew seats. 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 briefly as a functional check. A steady indication, however, 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 disable the aircraft lights and the 12V power receptacle.

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 located at the rear wall on the LH side behind the removable fire wall. A dedicated charging receptacle is available at the lower LH side of the fuselage, just before the LH engine cowling.

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
21-0	Cabin heat blower fan	32 W
23-1	Radio ATR500	2 W (rcv) / 35 W (xmt)
23-1	Radio ATR833	7 W (rcv) / 35 W (xmt)
25-1	Heated seats (ea)	96 W
28-2	Electrical fuel pump (ea)	21 W
33-4	NAV Lights LED	9 W
33-4	Strobe Lights	28 W
33-4	Landing Light (LED)	10 W
34-7	ATC Transponder TRT800H	max.10W
36-1	Pneumatic compressor	124 W (peak) / 103 W
75-0	Engine cooling fan	194 W (peak) / 97 W
85-21	Air conditioning system	(aux.generator)
85-34	Garmin 296	20 W
85-34	Garmin 496	20 W
85-34	Garmin 696	40 W
85-34	Flymap F7 / Sky-Map T7	5 W
85-34	Flymap L	35 W
85-34	Flymap L (dual screen)	70 W
85-34	Flymap XL	45 W
85-34	AvMap	10 W

CHAPTER 25 - EQUIPMENT / FURNISHINGS

25-10-00 Flight Compartment

The seats consist of seating surface as an integral part of the monocoque structure and adjustable backrest, upholstered with removable cushions. The cushions consist of a foam core covered with an easily cleanable, water-repellent fabric.

The backrest hinges are positioned by 2 countersunk Allen bolts on two seating rails. To suit to different seating positions the backrest hinges can be adjusted by removing the Allen bolts and refitting in a different position on the rails. In addition the backrest angle can be adjusted by modifying the lengths of the telescopic tubes.

For each seat an adjustable four point harness is available.

IMPORTANT NOTE: Seat belts are Manufacturer Life Limited (MLL)!

A storage compartment is located behind each seat with a maximum capacity of 10 kg each.

25-60-00 Emergency

The gyroplane is embarked and disembarked from each side through hinged, gull-wing type doors, both doors are held open by a gas spring. In case of emergency or a jammed door, the gyroplane can be evacuated through the opposite door, if necessary.

Depending on the customer's configuration, an ELT may be installed below the LH seat. The ELT can be accessed through the service cover below the seat cushion. ELT control panel with mode indicator will be installed in the cockpit panel. If installed, please refer to the manufacturer's documentation for maintenance, time limits and testing. Be aware that the built-in battery has a limited lifetime and needs to be replaced as specified. Replacement date should be placarded in the vicinity of the device or control panel.

CHAPTER 26 - FIRE PROTECTION / FIRE WARNING

Depending on customer's configuration the gyroplane can be equipped with a Fire indicator light to alert the pilot that a certain temperature in the engine compartment has been exceeded (the engine is on fire). The fire indication circuit consists of a cable routed inside the engine compartment. The cable has two integrated wires separated by an insulation layer. At a defined temperature the insulation layer will melt and the embedded wires close contact.

Engine fire (circuit short-closed, low resistance) will be indicated by a flashing/blinking Fire indicator light in the Warning and Caution Panel. During normal operation (circuit closed, 'normal' resistance) the Fire indicator light will be off. A malfunction of the system (circuit open) is indicated by a constantly lit Fire indication. At power-on the system will perform a lamp test consisting of a series of three flashes.

When installing or repairing the fire indication cable make sure not to overtorque the attachment hardware as this might lead to uncontrolled contact of the embedded wires, which might lead to a false Fire indication.

Indicator Light	System Status
OFF	Normal Operation (normal resistance / $R \sim 1 \text{ k}\Omega$)
FLASHING	Fire, abnormal temperature (circuit short-closed / $R \rightarrow 0 \Omega$)
ON	System Malfunction (circuit open / $R \rightarrow \infty \Omega$)

CHAPTER 27 - FLIGHT CONTROLS

27-00-00 Flight Controls

See CHAPTER 67 – Rotors Flight Control.

Note: Stabilizers are described in CHAPTER 55.

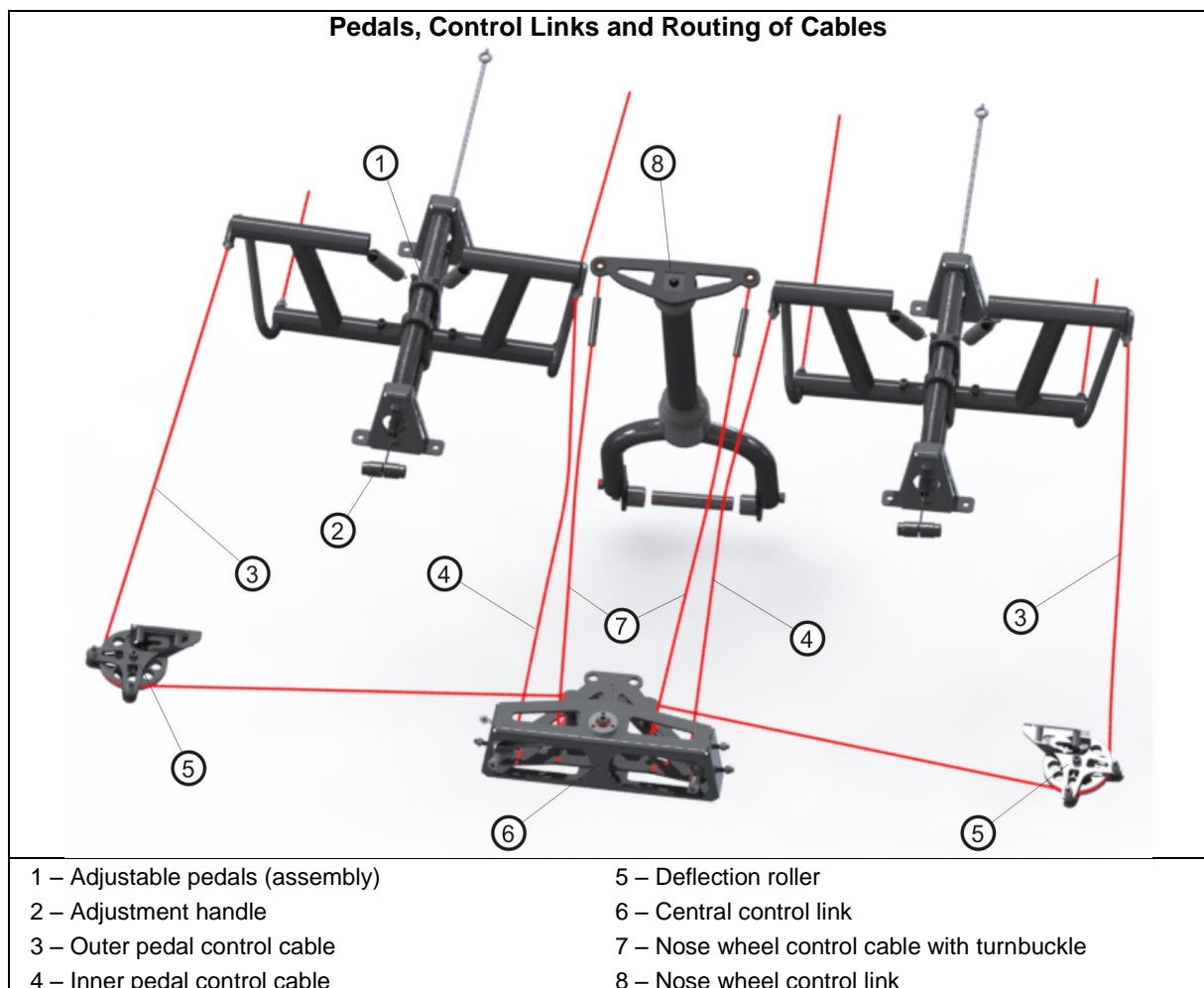
27-20-00 Flight Controls - Rudder

Rudder (Fin) and nose wheel are controlled simultaneously by adjustable foot pedals, control cables, central control link and nose wheel control link. Both pairs of pedals are interconnected and can be adjusted individually to suit different leg lengths. 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.

In order to allow adjustment, the control cables are routed through teflon hoses which are fixated inside the 'S'-tube at the foot pedal. Outer and inner control cables are routed through/below the bottom shell using plastic cable lead-throughs (not shown). The pedal control cables of both pedal units are connected to the central control link. Rudder control is realized by push-pull control cables (not shown) which are connected to the central control link and are routed through bottom shell and keel tube. The schematic drawing shows pedals, control links, and the routing of the cables.

The tension of the control cables that connect central control link with nose wheel control link can be adjusted by turnbuckles. Adjust in a way that there is no freeplay or slack, but do not overtense! In case the tension of the control cables is suddenly low, check nose wheel control link.

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



CHAPTER 28 - FUEL

28-10-00 Storage

The fuel system consists of two tanks permanently connected with a big crossport, a single filler port, fuel and ventilation lines, fuel level indications, and drain. The filler port is located at the left hand side of the gyroplane. In order to open the filler cap, lift, then turn the flap, and pull out. Reverse to close cap.

The tanks are installed behind the seats and have a capacity of 100 litres. Fuel level can be checked visually using a dip stick which has to be inserted diagonally from the fuel filler port.

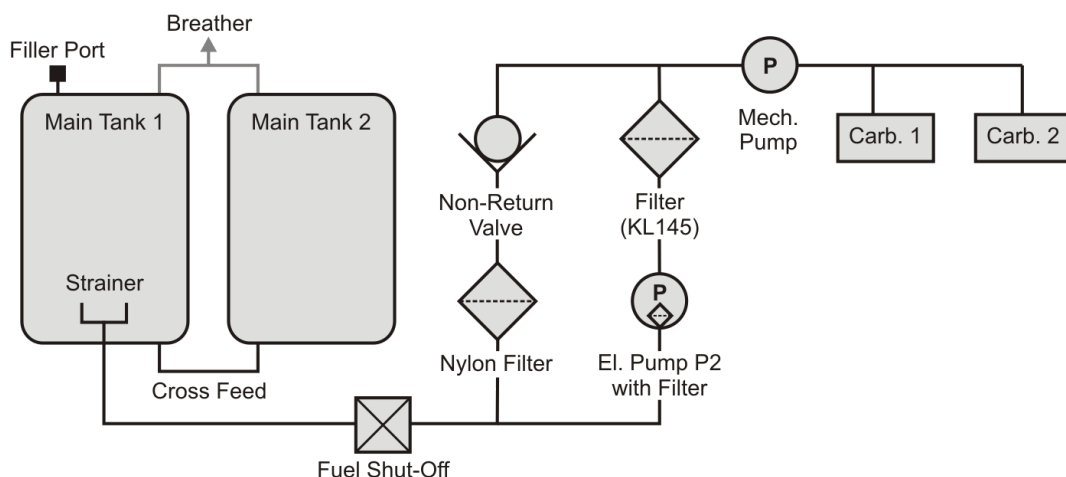
Ventilation is provided by a vent line above the tanks leading through the mid channel directly to the outside.

28-20-00 Distribution

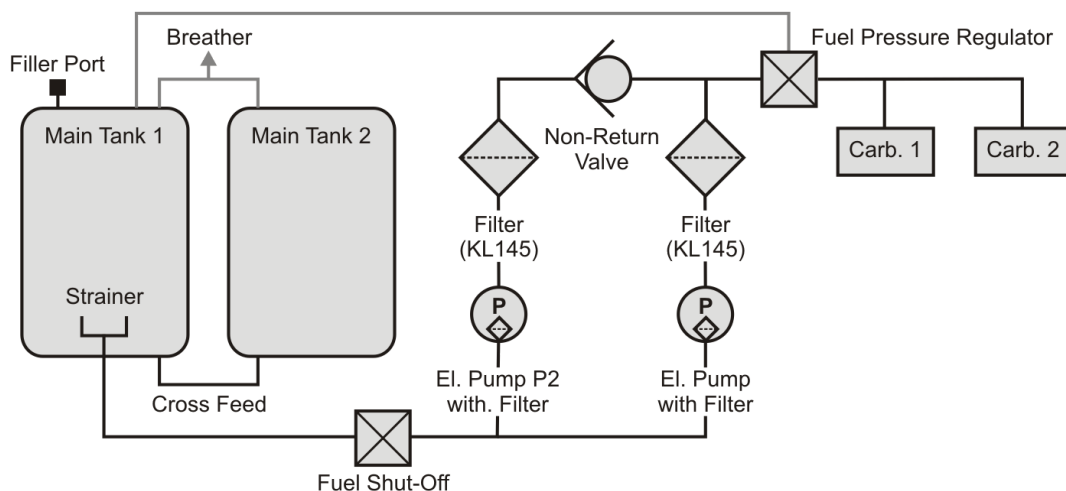
The fuel distribution system comprises fuel hoses, made of fabric-reinforced rubber, a shut-off valve, filters and pumps.

Possible fuel system versions differ with engine model, see schematics below. In case of ROTAX 914 engine variant, the fuel line with the second fuel pump P2 has a non-return valve to prevent flow-back when the second pump is switched off.

Fuel system ROTAX 912:



Fuel system ROTAX 914:



The safeguarded lever of the shut-off valve is located between the pilot and passenger seat below the intercom panel. The actual valve is located in the vicinity of the fuel tanks and is articulated by a torsion bar.

IMPORTANT NOTE: Fuel filters are Manufacturer Life Limited (MLL)!

28-40-00 Indicating

Fuel level can be checked visually using a dip stick which has to be inserted diagonally from the fuel filler port, and also by a fuel quantity indicator in the cockpit. Note that in both cases, fuel level is measured from the left hand tank only. Due to the large crossport the filling level of the second tank will be identical.

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:

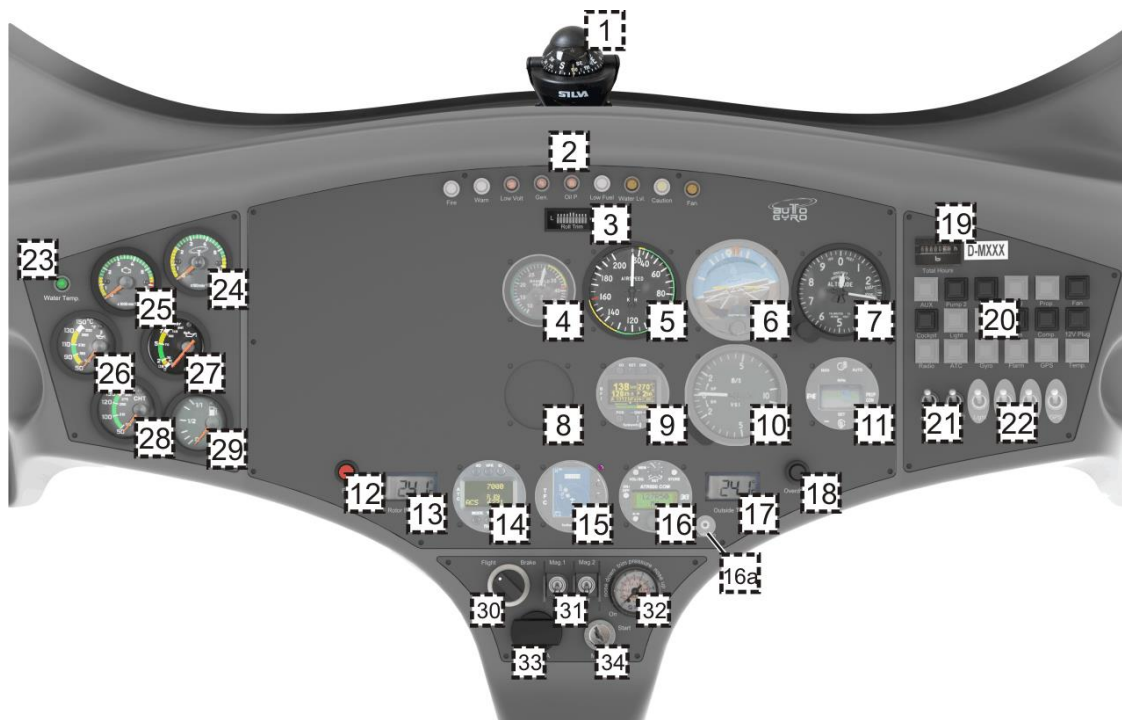
- Standard Layout / Moving Map Portrait
- Glass Cockpit – Single Display
- Glass Cockpit – Dual Display

The standard layout includes all instruments necessary for flight but also installation provisions for additional conventional instrumentation.

The panel layouts Moving Map Landscape or Portrait include all relevant instruments arranged in a way to accept most off-the-shelf moving map navigation devices in the respective format. For detailed user information and instructions concerning the different moving map systems please refer to the manufacturer's documentation.

Depending on the chosen instrumentation and optional equipment, the depicted panels on the following pages may vary. Note that the standard or backup compass is mounted to the glare shield.

Panel Layout – Standard / Moving Map Portrait



- | | |
|---|---|
| 1 – Magnetic compass | 17 – OAT indicator |
| 2 – Warning lights | 18 – Pre-rotator overdrive/override |
| 3 – Lateral trim indicator | 19 – Hour meter |
| 4 – Manifold pressure gauge (if installed) | 20 – Circuit Breaker Panel |
| 5 – Air speed indicator | 21 – Switches (avionic and 2 nd fuel pump) |
| 6 – Attitude Indicator (if installed) | 22 – Switches (options) |
| 7 – Altimeter | 23 – Water temperature indication |
| 8 – Cut-out 57mm / 2 ¼" for optional inst. | 24 – Rotor RPM |
| 9 – Cut-out 57mm / 2 ¼" for optional inst. | 25 – Engine RPM |
| 10 – Vertical Speed Indicator (if installed) | 26 – Oil temperature |
| 11 – VPP control and end position
detection IVO propeller (if installed) | 27 – Oil pressure |
| 12 – Cooling fan manual activation | 28 – Cylinder head temperature |
| 13 – RBT indicator | 29 – Fuel level indicator |
| 14 – ATC transponder (if installed) | 30 – Pneumatic mode selector |
| 15 – Collision Avoidance System (if inst.) | 31 – MAG switches |
| 16 – Radio (if installed) | 32 – Trim/brake pressure gauge |
| 16a – Audio in (if installed) | 33 – 12V power receptacle (if installed) |
| | 34 – Master/starter switch |

31-60-00 Integrated Display Systems

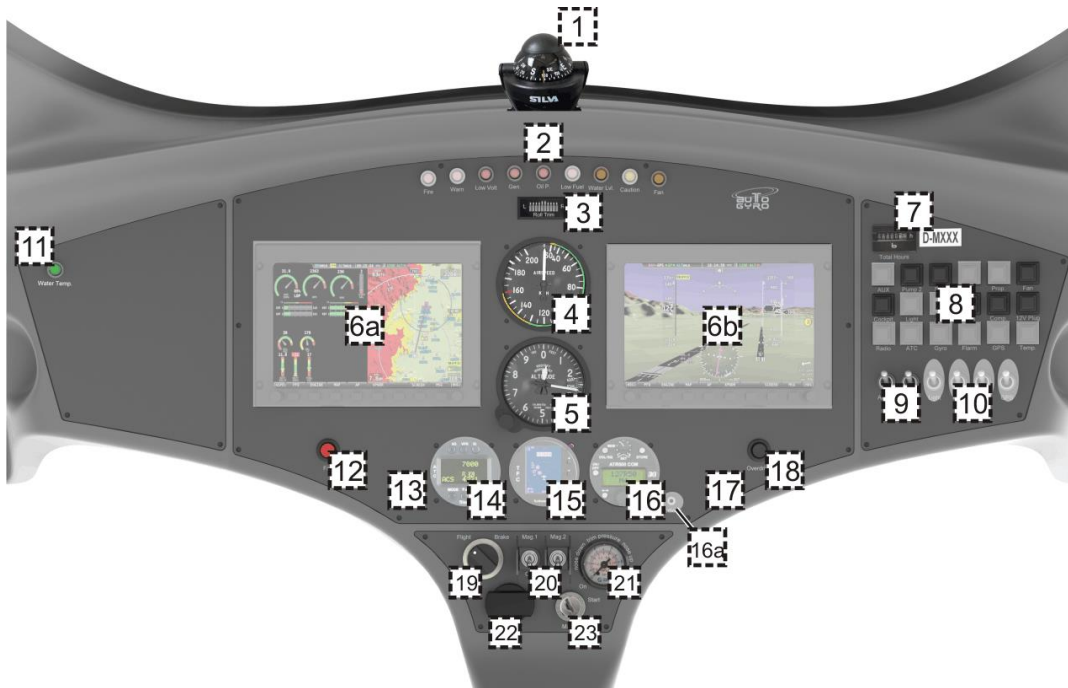
The Glass Cockpit layout is tailored to the integrated flight and navigation suite DYNON AVIONICS SkyView. In addition to navigational and moving map functions, the system provides primary flight data and engine/vehicle monitoring. It is of utmost importance to read and understand the operators manual and to become familiar with the system before operation. In case of a system failure, a 2 ¼” (47mm) altimeter, air speed indicator and rotor speed indicator are provided as backup instrumentation.

Panel Layout – Glass Cockpit - Single Display



- | | |
|--|---|
| 1 – Magnetic compass | 15 – Collision Avoidance System (if inst.) |
| 2 – Warning lights | 16 – Radio (if installed) |
| 3 – Lateral trim indicator | 16a – Audio in (if installed) |
| 4 – Air speed indicator (back-up) | 17 – OAT indicator |
| 5 – Altimeter (back-up) | 18 – Pre-rotator overdrive/override |
| 6 – Glass Cockpit | 19 – Pneumatic mode selector |
| 7 – Hour meter | 20 – MAG switches |
| 8 – Circuit Breaker Panel | 21 – Trim/brake pressure gauge |
| 9 – Switches (avionic and 2 nd fuel pump) | 22 – 12V power receptacle (if installed) |
| 10 – Switches (options) | 23 – Master/starter switch |
| 11 – Water temperature indication | 24 – Cut-out 57mm / 2 ¼” for optional inst. |
| 12 – Cooling fan manual activation | 25 – Cut-out 57mm / 2 ¼” for optional inst. |
| 13 – RBT indicator | 26 – Cut-out 57mm / 2 ¼” for optional inst. |
| 14 – ATC transponder (if installed) | |

Panel Layout – Glass Cockpit - Dual Display



- | | |
|--|--|
| 1 – Magnetic compass | 13 – RBT indicator |
| 2 – Warning lights | 14 – ATC transponder (if installed) |
| 3 – Lateral trim indicator | 15 – Collision Avoidance System (if inst.) |
| 4 – Air speed indicator | 16 – Radio (if installed) |
| 5 – Altimeter | 16a – Audio in (if installed) |
| 6a – Glass Cockpit Display I | 17 – OAT indicator |
| 6b – Glass Cockpit Display II | 18 – Pre-rotator overdrive/override |
| 7 – Hour meter | 19 – Pneumatic mode selector |
| 8 – Circuit Breaker Panel | 20 – MAG switches |
| 9 – Switches (avionic and 2 nd fuel pump) | 21 – Trim/brake pressure gauge |
| 10 – Switches (options) | 22 – 12V power receptacle (if installed) |
| 11 – Water temperature indication | 23 – Master/starter switch |
| 12 – Cooling fan manual activation | |

CHAPTER 32 - LANDING GEAR

The Cavalon 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 the underside of the fuselage. 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

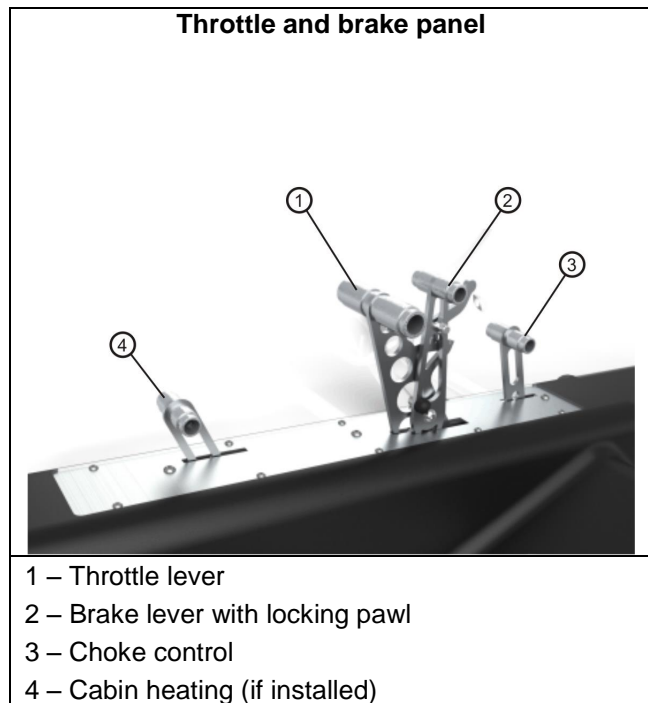
The nose gear consists of a steerable nose wheel in a fork made of stainless steel (CrMo4) tubing with rubber damper (Manufacturer Life Limited!). Wheel and fork are covered by a wheel spat. Nose wheel steering is realized by a linkage to pedal/rudder control input using control cables.

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 panel also supports the brake fluid reservoir with screw cap and fluid level min. and max. markings, as well as the primary brake cylinder (panel must be removed for access).



- 1 – Throttle lever
- 2 – Brake lever with locking pawl
- 3 – Choke control
- 4 – Cabin heating (if installed)

For correct tire pressure see [12-30-20 Servicing: Tire Pressure](#).

CHAPTER 33 - LIGHTS

33-40-00 Exterior

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

- Landing Light
- Position Lights with integrated Strobe Lights

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

The Cavalon features a Pitot-Static System to measure accurate air data. Total pressure is picked up by a pitot type tube located in the nose section of the fuselage. The tube is connected to the integrated cockpit instruments by a plastic line. The static pressure is measured across two ports, one on either side of the fuselage. OAT data is measured by a probe located at the bottom of the fuselage behind the nose gear and displayed in the cockpit as digital value.

34-20-00 Attitude and Direction

As part of minimum equipment, a magnetic compass is installed in the forward area below the windshield in pilot's sight. As an option, a vertical compass may be installed in the instrument panel.

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 and 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, i.e. rotor disc flat / flight control stick forward position (brake mode)
- adjustable longitudinal trim, 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 at the rear wall on the lower RH side behind the removable fire wall. 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, filter/dryer and a pressure compensation vessel. The main pneumatic switching logic is combined in the pneumatic master box which is installed at the rear wall on the lower RH side behind the removable fire wall. 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

The gyroplane is embarked and disembarked from each side while the doors are held open by a gas spring. The gull-winged doors are hinged at the slanted door frame using two hinges with bolts and self-locking nut or alternatively quick release pins. Due to the slant angle the doors can be opened and closed in flight. The door locking mechanism is operated by moving an aluminium lever.

In order to close the door, pull the door close, move/lead the locking lever from 'Open' (aft position) to 'Close' (forward position) and let the lever snap sidewise into its locking detent. Do not pull by reaching through the open sliding window as this will cause the plexiglass to crack. Only use the dedicated grip/recess and operate locking lever with second hand while pulling door close.

Note that canopy windows are described in 56-15-00 Windows.

52-20-00 Emergency Exit

In case one of the doors is jammed or inaccessible, the opposite door is used as emergency exit.

52-40-00 Service Covers and Cowlings

In order to provide convenient access to engine, related components and other systems, service covers, cowlings and fairings must be removed. Location and procedures for removal/installation of service covers, cowlings and fairings are described in dedicated job cards in Part D of this manual.

CHAPTER 53 - FUSELAGE

The load carrying structure of the gyroplane consists of a composite monocoque occupant enclosure which is connected to the rotor tower and keel tube. The composite structure, composite tower and aft extension (keel tube) 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 bolted to the rear of the monocoque enclosure.

The aft extension (keel tube) of the main frame is made of curved aluminium and carries the stabilizer. The keel tube is connected directly to mating counterparts of the monocoque structure by adhesive joint and secured by bolts. Two plastic protection pads are bolted to the underside of the aluminium tubing to protect the bow from abrasion in case of a tail slide (nose too high) during take-off, landing or wheel balance.

The protection pad must be inspected regularly and replaced as necessary in order to protect the aluminium tubing. In case the tubing is abraded, contact AutoGyro for assessment.

CHAPTER 54 - N/A

CHAPTER 55 - STABILIZERS

The stabilizer structure with rudder is made of GRP (or in certain cases CRP) and is bolted to the keel tube. 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 GRP 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 / Canopy

Outside visibility and environmental protection for pilot and occupant is provided by one large undivided front window and a window in each door. The windows are made of formed Plexiglas which is sealed into the door frame.

56-15-00 Canopy Windows

Each door window features an open/closable and adjustable fresh air vent and one sliding window with pivoting vent for ventilation.

CHAPTER 57-60 - UNASSIGNED / N/A

CHAPTER 61 - PROPELLER

In standard configuration a 3-bladed, fixed pitch 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 (country specific).

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.

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) 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. 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 using 6 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. The rotor bearing temperature (RBT) sensor is also allocated to the rotor head bridge, respectively the rotor bearing.

62-32-00 Rotor Gimbal Head

Tilting action or rotor 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 3-4 mm 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.

62-51-00 Rotor Vibration Isolation

A certain level of vibration is inherent to any 2-bladed rotor system. In order to reduce vibration levels to a minimum, a vibration decoupling element in the rotor mast isolates rotor vibration from the fuselage. Vibration isolation is realized by two mast mounting bushings which connect the split mast.

IMPORTANT NOTE: Mast mounting bushings are Manufacturer Life Limited (MLL)!

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 fully forward. 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:

- pneumatic mode selector set to FLIGHT
- control stick in full forward position
- trim pressure less than 3 bar

In this case, the pneumatic clutch is activated and engine torque is transmitted through a 90° gearbox and drive to the pinion which is engaged by another 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. In order to allow necessary changes in length the vertical pre-rotator drive shaft features a sliding sleeve coupling.

NOTE: In order to simplify pre-rotation AutoGyro GmbH has developed a new 90-degree-gearbox with a transmission ratio specially geared to the Cavalon. The new gearbox is factory installed from serial numbers (Werk-Nr.) V00036 on, or may be retrofitted as a unit together with the pneumatic clutch.

The modified transmission ratio allows simpler handling during pre-rotation using a slightly increased clutch speed. The configuration state pneumatic clutch III (new 90-degree-gearbox) is easily discernible by having a black OVERDRIVE push button instead of a red one.

Pneumatic clutches / gearboxes shall be retrofitted to configuration state III.

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. 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 a brake pad 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. At full brake pressure the control stick will be maintained in its full forward position.

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 control tube running horizontally along the bottom of the fuselage, and push-pull control cables (Manufacturer Life Limited!) which are routed vertically along the mast and 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 torsion tube and linkage running below the seats to the base link and from there to the rotor head via push-pull control cables.

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).

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 is available as an option and works accordingly, using a lateral pneumatic trim cylinder installed in addition. With this option installed, lateral trim condition is indicated by a 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.

71-10-00 Engine Cowling

Concerning engine cowlings see CHAPTER 52 - DOORS, COVERS AND COWLINGS.

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 Manuf. Life Limited (MLL)!

71-30-00 Engine Firewalls

An engine fire wall, installed at the rear end of the monocoque fuselage, isolates the engine compartment from equipment installed at the rear wall, fuel tanks and passenger cabin. The engine fire wall consists of a fixed part (inner part) and a removable part which is shaped like a 'u' around the fixed part and overlap with the latter. The removable part actually consists of two parts joint by connecting bolts which, in most cases, do not need to be separated at removal or installation.

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 killing 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

A central engine air intake for cooling and aspiration is provided as ram air inlet in the lower area forward mast cover, just above the cabin. The engine aspirates air from the engine air intake through air filters mounted on each of the carburettors.

71-70-00 Engine Drains

Oil tank breathing is provided by a rubber hose that exits through lower engine cowling to the outside.

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 ram air cooled cylinders and liquid cooled cylinder heads. Therefore, cylinder head temperature (CHT) indication in the cockpit corresponds to water temperature. Sufficient cooling air flow is provided by a ram air duct in the lower portion of the forward mast cover. The water cooling system comprises of engine driven pump, radiator with thermo-activated electrical blower fan, expansion tank / overflow bottle with radiator cap, and hoses.

NOTE: The expansion tank / overflow bottle is located in the ram air duct in the lower portion of the forward mast cover.

A single, large area radiator is mounted above the engine so that cooling air from the ram air duct passes through the cooler, is directed around the engine's cylinders, and finally escapes through gills at the lower engine cowling. Force cooling is ensured by an electrically driven ducted fan controlled by a thermo switch. A push-button in the cockpit allows manual activation temporarily which is typically used to avoid possible heat build-up after shut-down.

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

Oil cooling is described in CHAPTER 79.

CHAPTER 76 - ENGINE CONTROLS

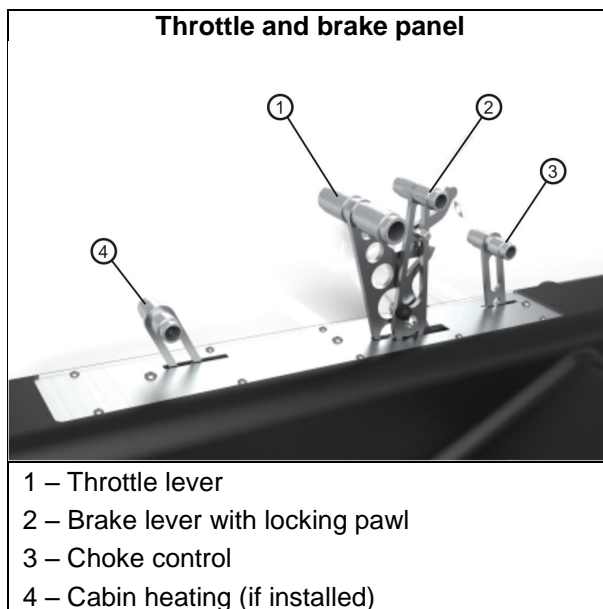
Engine control consists of engine power lever / throttle with choke and related cockpit switches for engine shut-down and test.

76-10-00 Power Control / Choke

Engine power / throttle is controlled by a control column installed in the centre console between the crew seats. 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.



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. The switches are protected against inadvertent operation by sheet metal safety plates.

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, a cylinder head temperature (CHT) gauge is provided. Due to the engine cooling principle (ram-air cooled cylinders with water cooled cylinder heads) the CHT represents water temperature at cylinder 2 head.

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.

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 accessed through a cover on the right hand side of the fuselage. The cover is held by 3 cam lock fasteners which can be locked or unlocked by a quarter turn. 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 fabric reinforced rubber, or steel braided lines in later versions.

79-22-00 Oil Cooler

An oil cooler is fitted to the lower aft end of the fuselage. Oil flow through the cooler is regulated by a thermostat assembly which opens the cooler circuit at approximately 80 – 90 °C

79-30-00 Indicating

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.

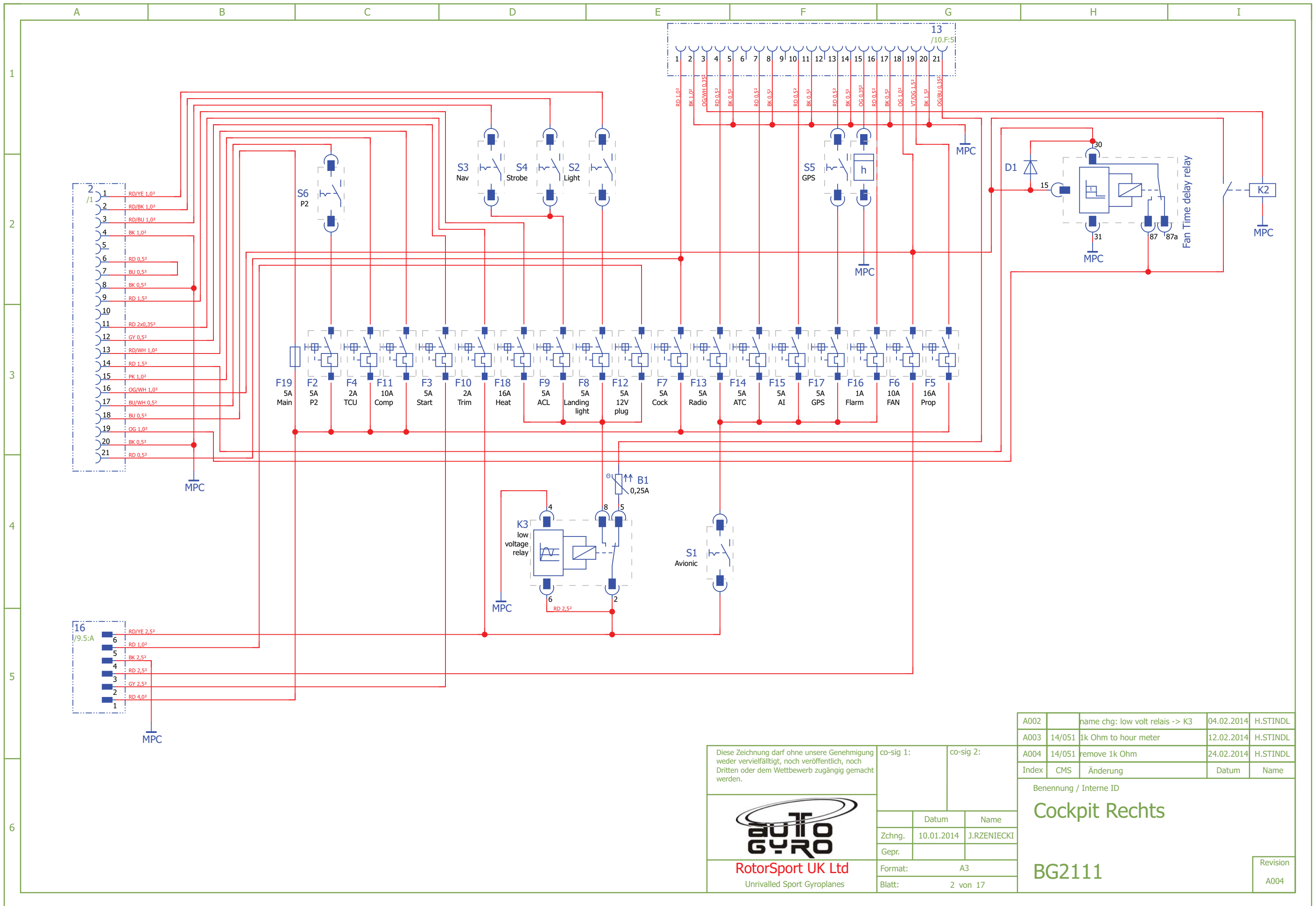
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Wiring Diagram – Aircraft Main Wiring Harness

Wiring Diagram – Cockpit RH



A002		name chg: low volt relais -> K3	04.02.2014	H.STINDL
A003	14/051	1k Ohm to hour meter	12.02.2014	H.STINDL
A004	14/051	remove 1k Ohm	24.02.2014	H.STINDL
Index	CMS	Änderung	Datum	Name

Benennung / Interne ID	
Cockpit Rechts	
BG2111	
Revision	A004

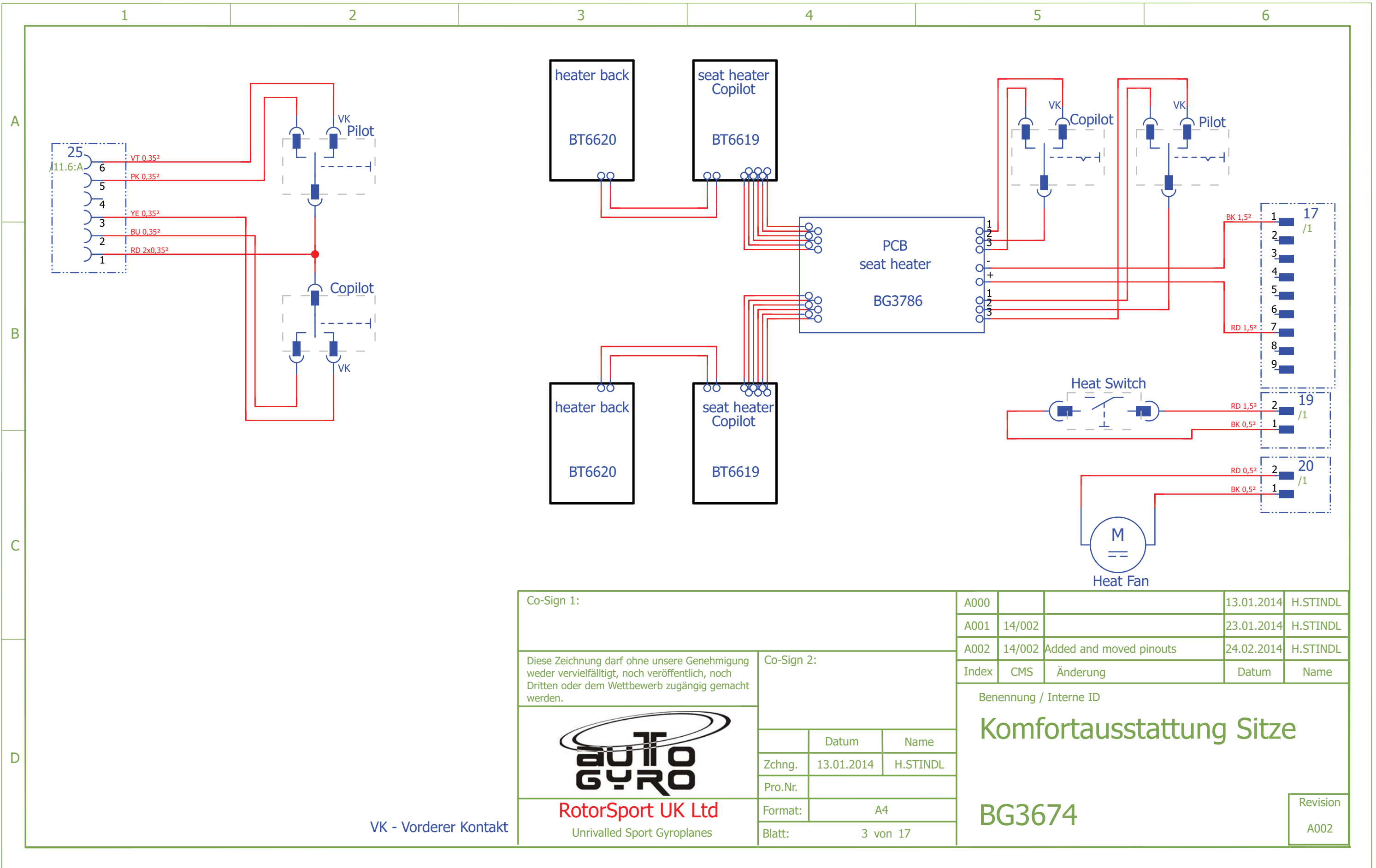
Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt, noch veröffentlicht, noch Dritten oder dem Wettbewerb zugänglich gemacht werden.




RotorSport UK Ltd
Unrivalled Sport Gyroplanes

co-sig 1:	co-sig 2:
Datum	Name
Zchng.	10.01.2014 J.RZENIECKI
Gepr.	
Format:	A3
Blatt:	2 von 17

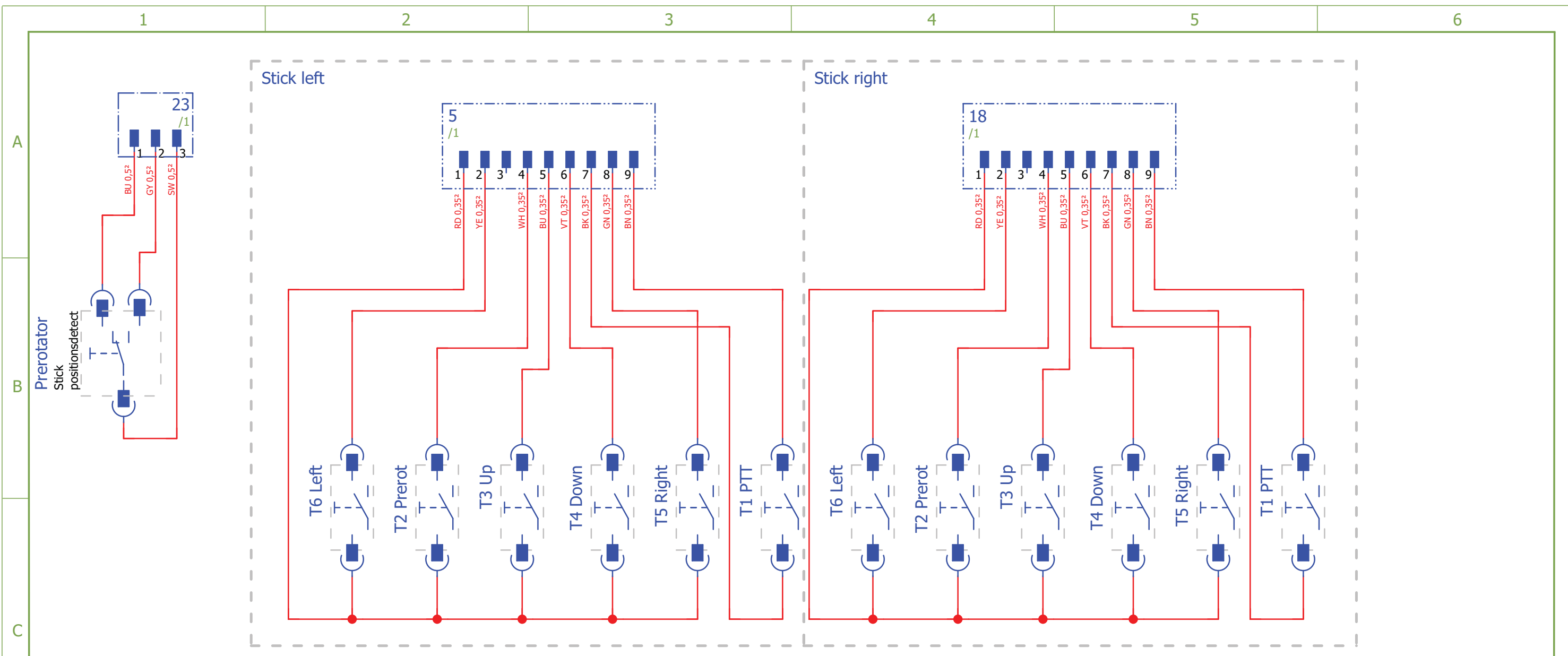
Wiring Diagram – Optional Comfort Features Seats



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		A001	14/002	23.01.2014	H.STINDL
		A002	14/002	24.02.2014	H.STINDL
Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt, noch veröffentlicht, noch Dritten oder dem Wettbewerb zugänglich gemacht werden.		Co-Sign 2:		Index	CMS
				Änderung	
		Zchnng.	Datum	Name	
RotorSport UK Ltd Unrivalled Sport Gyroplanes				Datum	
				Name	
		Zchnng.		13.01.2014	
		Pro.Nr.			
		Format:		A4	
		Blatt:		3 von 17	
		Benennung / Interne ID		Komfortausstattung Sitze	
				BG3674	
				Revision	
				A002	

VK - Vorderer Kontakt

Wiring Diagram – Flight Control Sticks



Co-Sign 1:		A002	14/002	Added pinouts	24.02.2014	H.STINDL
		A003	14/078	Changed plug 23	25.02.2014	H.STINDL
		A004	14/078	Changed plug to socket (23)	25.02.2014	H.STINDL
		Index	CMS	Änderung	Datum	Name
		Benennung / Interne ID				
		Sticks				
		BG3265				
		Revision				
		A004				

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Co-Sign 2:		
	Datum	Name
Zchnng.	14.01.2014	H.STINDL
Pro.Nr.		
Format:	A4	
Blatt:	4 von 17	

Wiring Diagram – Landing Lights

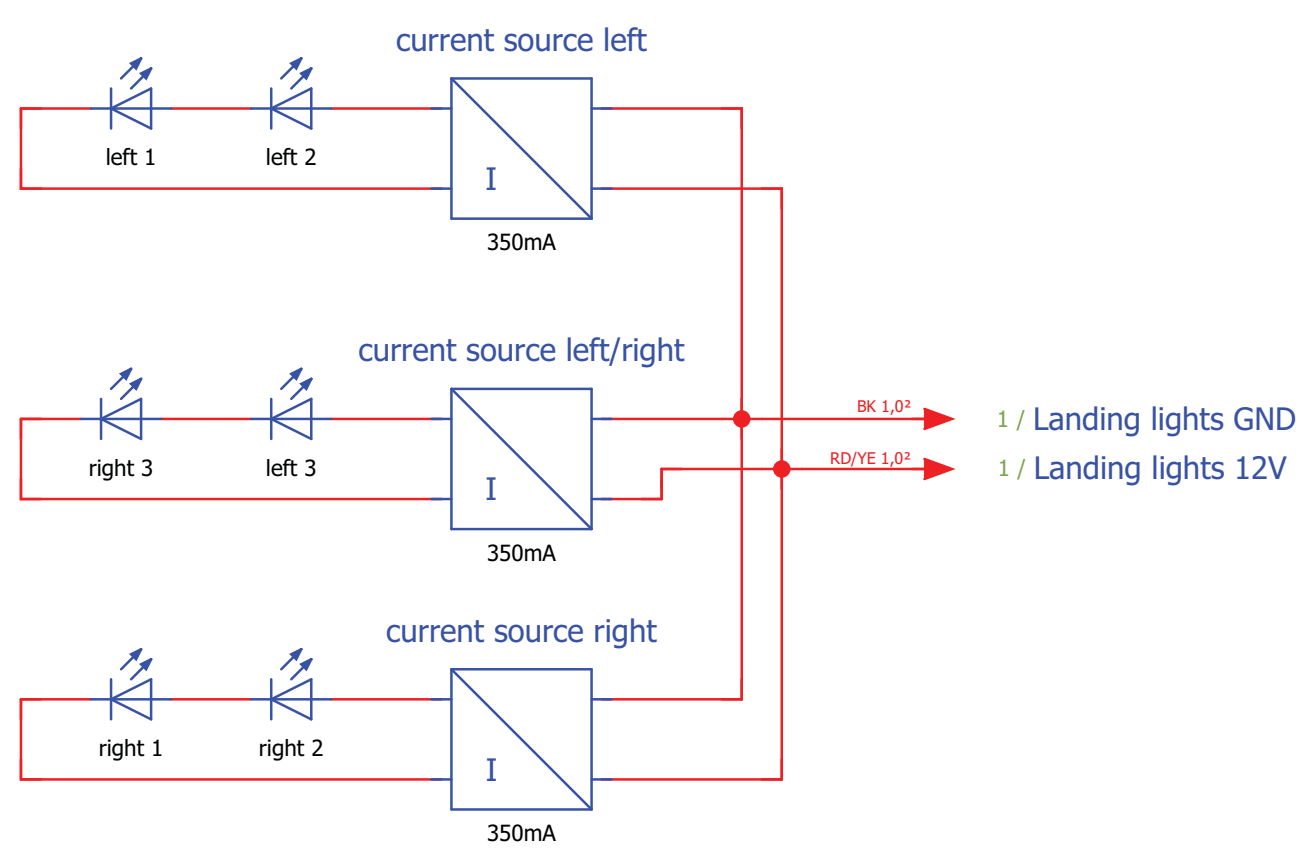
1 2 3 4 5 6


A

B

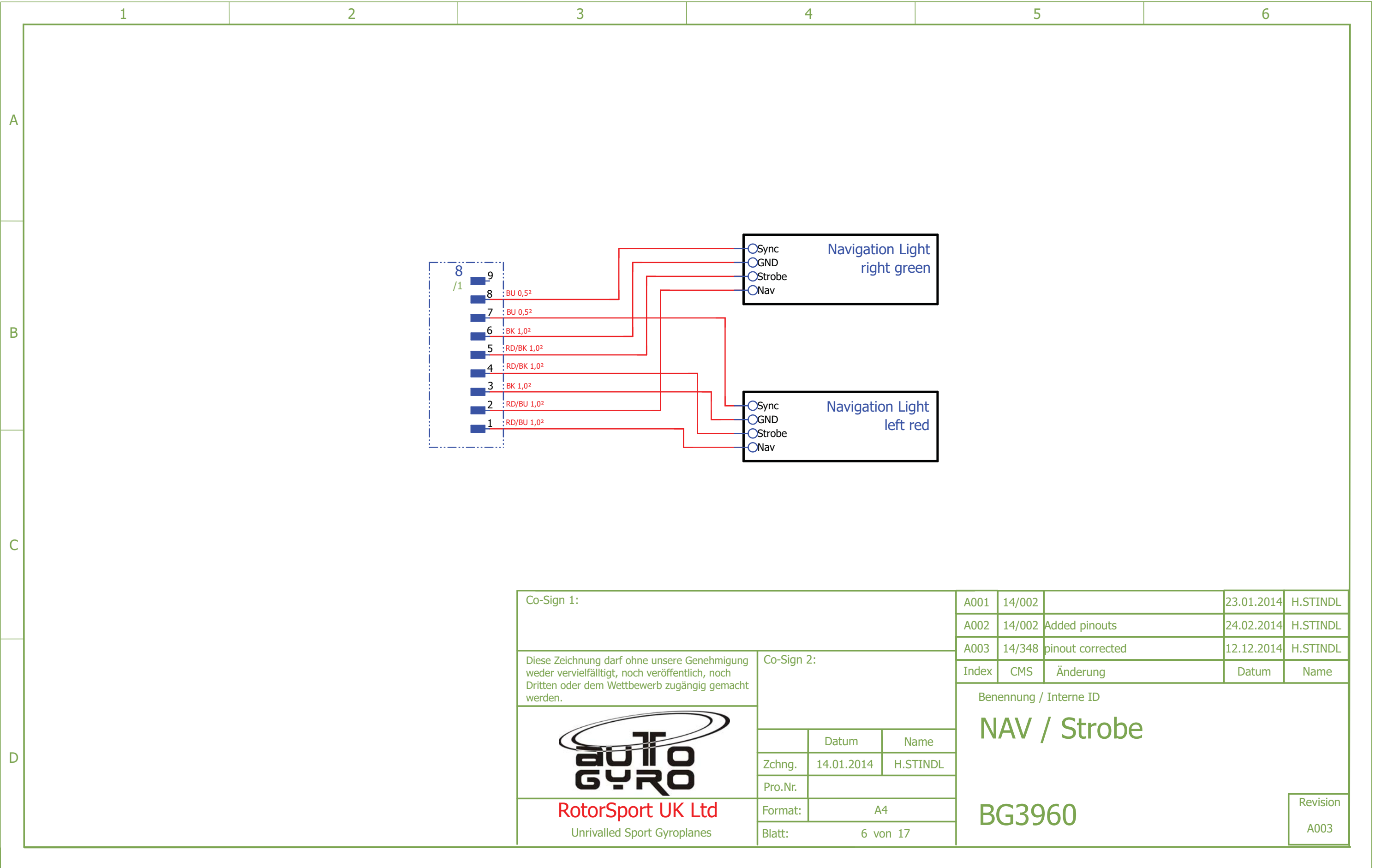
C


D



Co-Sign 1:		A001	14/002		23.01.2014	H.STINDL	
		A002	14/301	change wiring	26.11.2014	H.STINDL	
		A003	14/301	change labeling	07.01.2015	H.STINDL	
		Index	CMS	Änderung	Datum	Name	
Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt, noch veröffentlicht, noch Dritten oder dem Wettbewerb zugänglich gemacht werden.		Co-Sign 2:					
 RotorSport UK Ltd Unrivalled Sport Gyroplanes			Datum	Name		Benennung / Interne ID Landescheinwerfer BG2150	
		Zchnng.	14.01.2014	H.STINDL			
		Pro.Nr.					
		Format:	A4				
		Blatt:	5 von 17			Revision A003	

Wiring Diagram – NAV / Strobe Lights



Co-Sign 1:		A001	14/002		23.01.2014	H.STINDL
Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt, noch veröffentlicht, noch Dritten oder dem Wettbewerb zugänglich gemacht werden.		A002	14/002	Added pinouts	24.02.2014	H.STINDL
		A003	14/348	pinout corrected	12.12.2014	H.STINDL
		Index	CMS	Änderung	Datum	Name
 RotorSport UK Ltd Unrivalled Sport Gyroplanes		Co-Sign 2:		Benennung / Interne ID		
		Zchng.	Datum	Name	<h1>NAV / Strobe</h1> <h2>BG3960</h2>	
Pro.Nr.	14.01.2014	H.STINDL	<div style="border: 1px solid black; padding: 2px;">Revision A003</div>			
Format:		A4				
Blatt:		6 von 17				

Wiring Diagram – Cockpit LH (Standard)

1

2

3

4

5

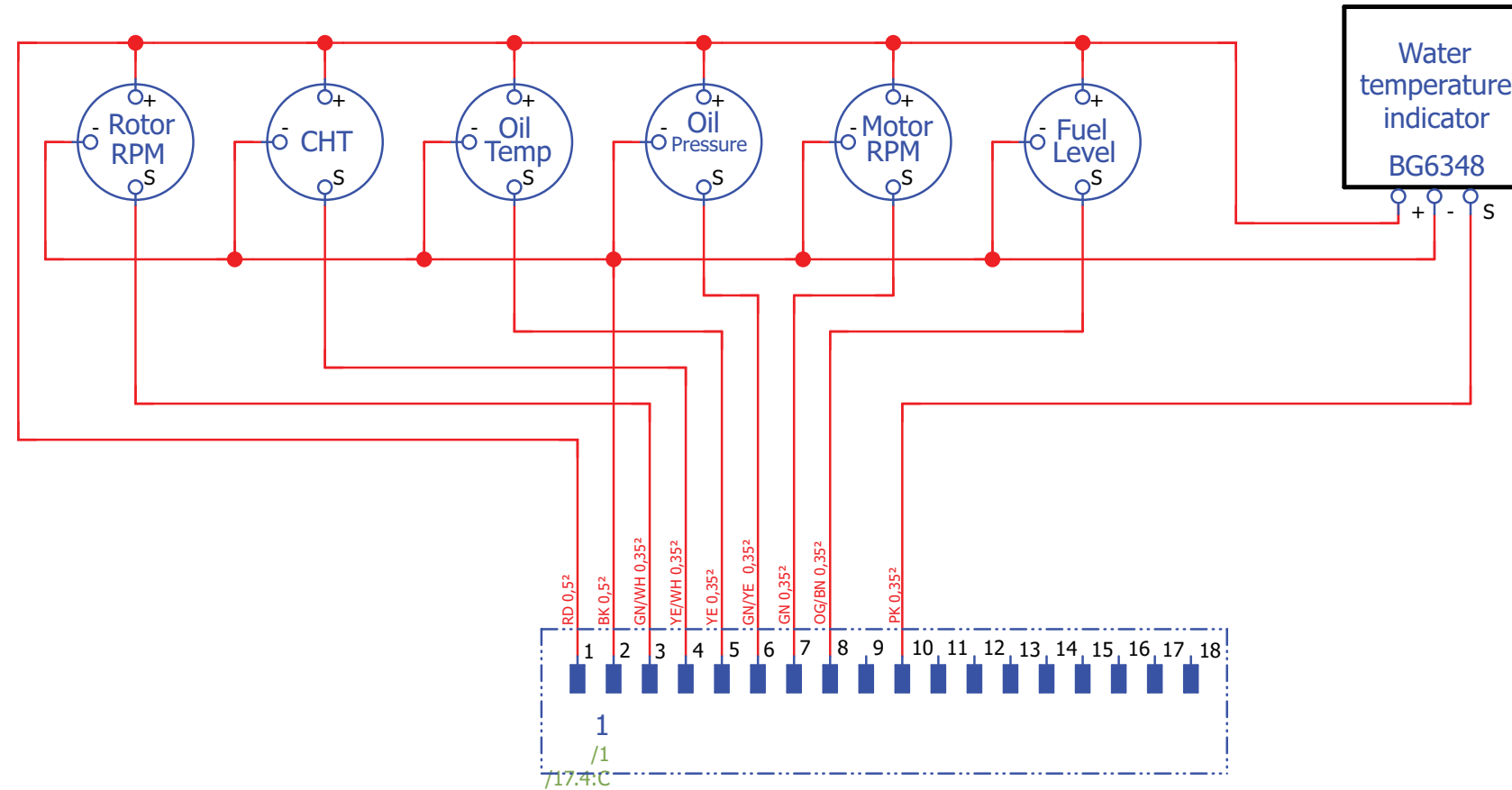
6

A


B

C

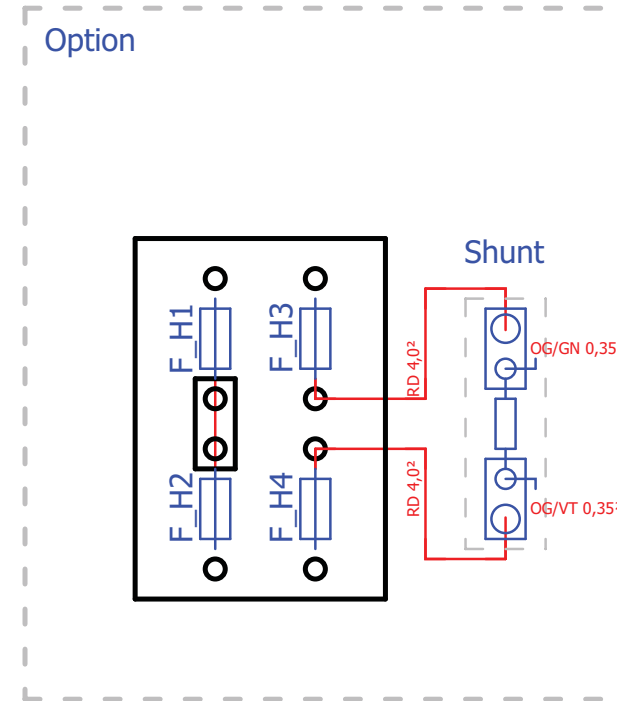
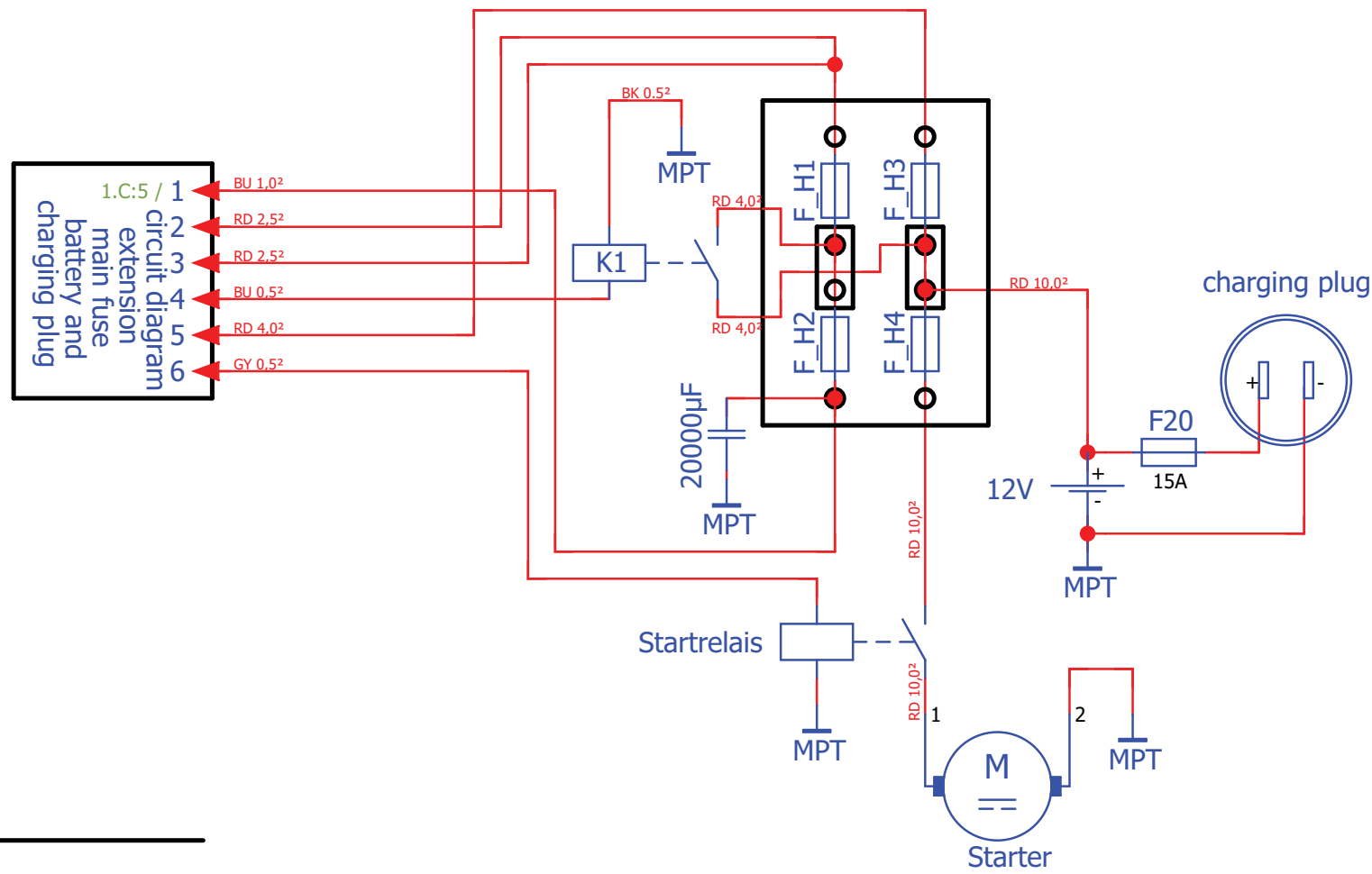
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Co-Sign 1:					
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		Name			
		Benennung / Interne ID			
		Cockpit links standard			
		BG2108			
		Revision			
		A001			

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		Zchng.	14.01.2014 H.STINDL
RotorSport UK Ltd Unrivalled Sport Gyroplanes		Pro.Nr.	
		Format:	A4
		Blatt:	7 von 17

Wiring Diagram – Main Fuse / Battery



1	Pumpe 1
2	Laderegler B+
3	Laderegler R/C
4	Geschaltete Leitung
5	Schlüsselschalter Dauer +
6	Start (Anlasser)

F_H1	30A (UK 25A)
F_H2	10A
F_H3	40A
F_H4	125A (UK 100A)

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Gepr.			
Format:	A4		
Blatt:	8 von 16		

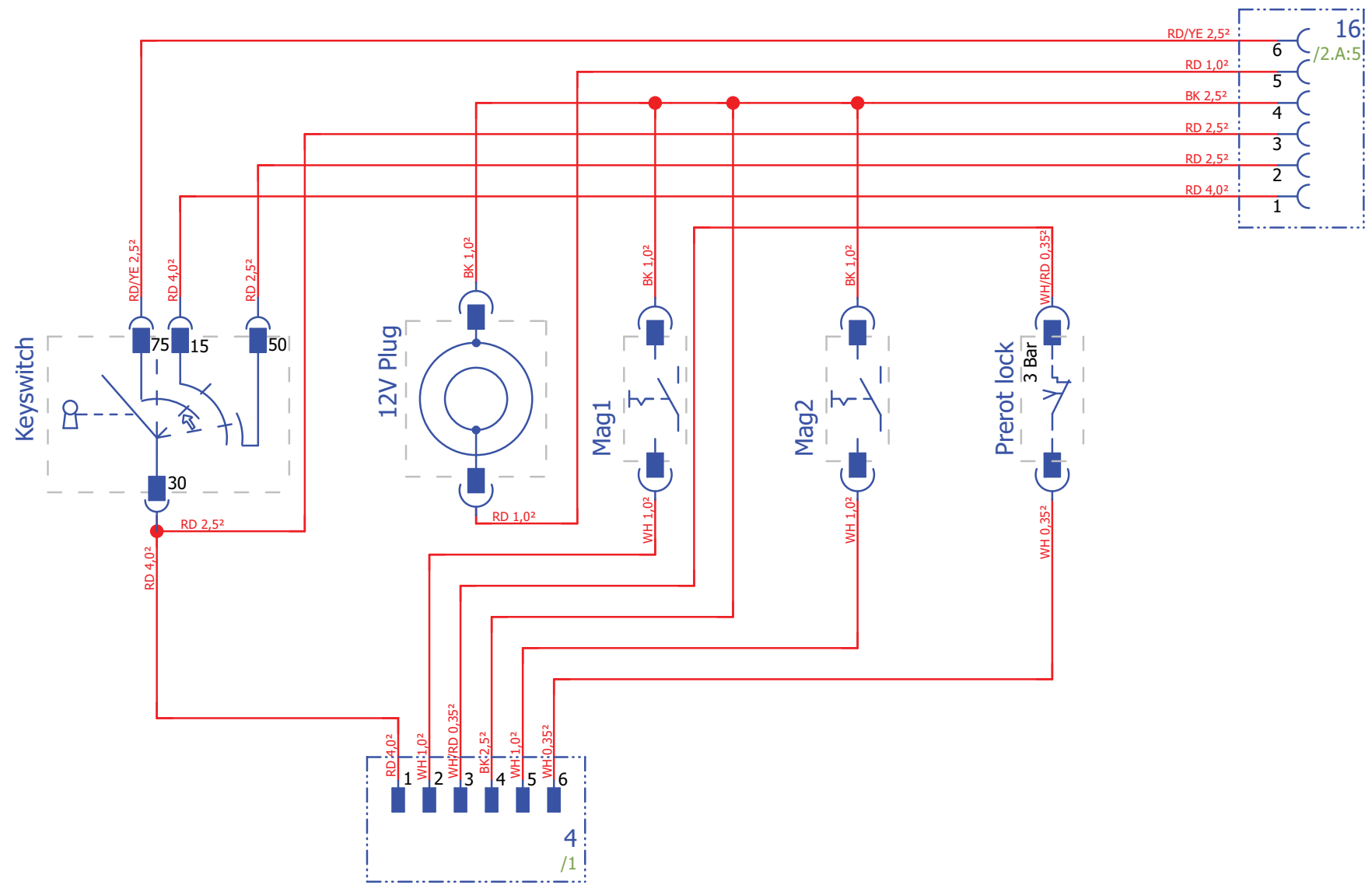
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A005	14/002	added wire colors	21.02.2014	H.STINDL
A006	14/002	UK fuses	24.02.2014	H.STINDL
Index	CMS	Änderung	Datum	Name

Benennung / Interne ID
Hauptsicherung/Batterie

BG2148

Revision
A006

Wiring Diagram – Cockpit Centre



Co-Sign 1:

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	Datum	Name
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Pro.Nr.		
Format:	A4	
Blatt:	9 von 17	

A001	14/002		23.01.2014	H.STINDL
A002	14/002	Added pinouts	24.02.2014	H.STINDL
A003		shifted drawing	08.08.2014	H.STINDL
Index	CMS	Änderung	Datum	Name

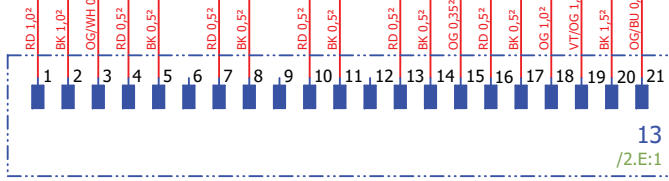
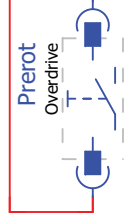
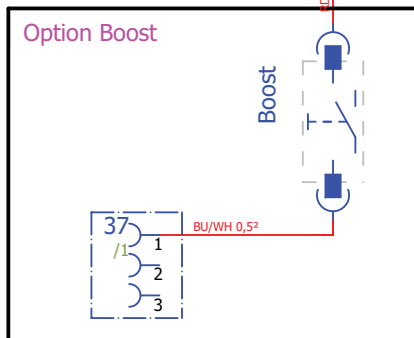
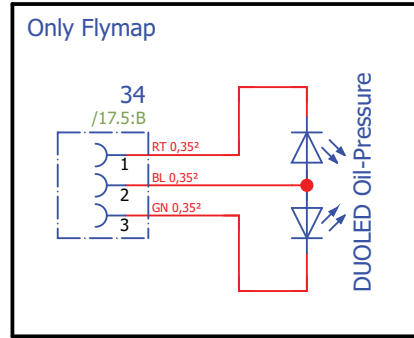
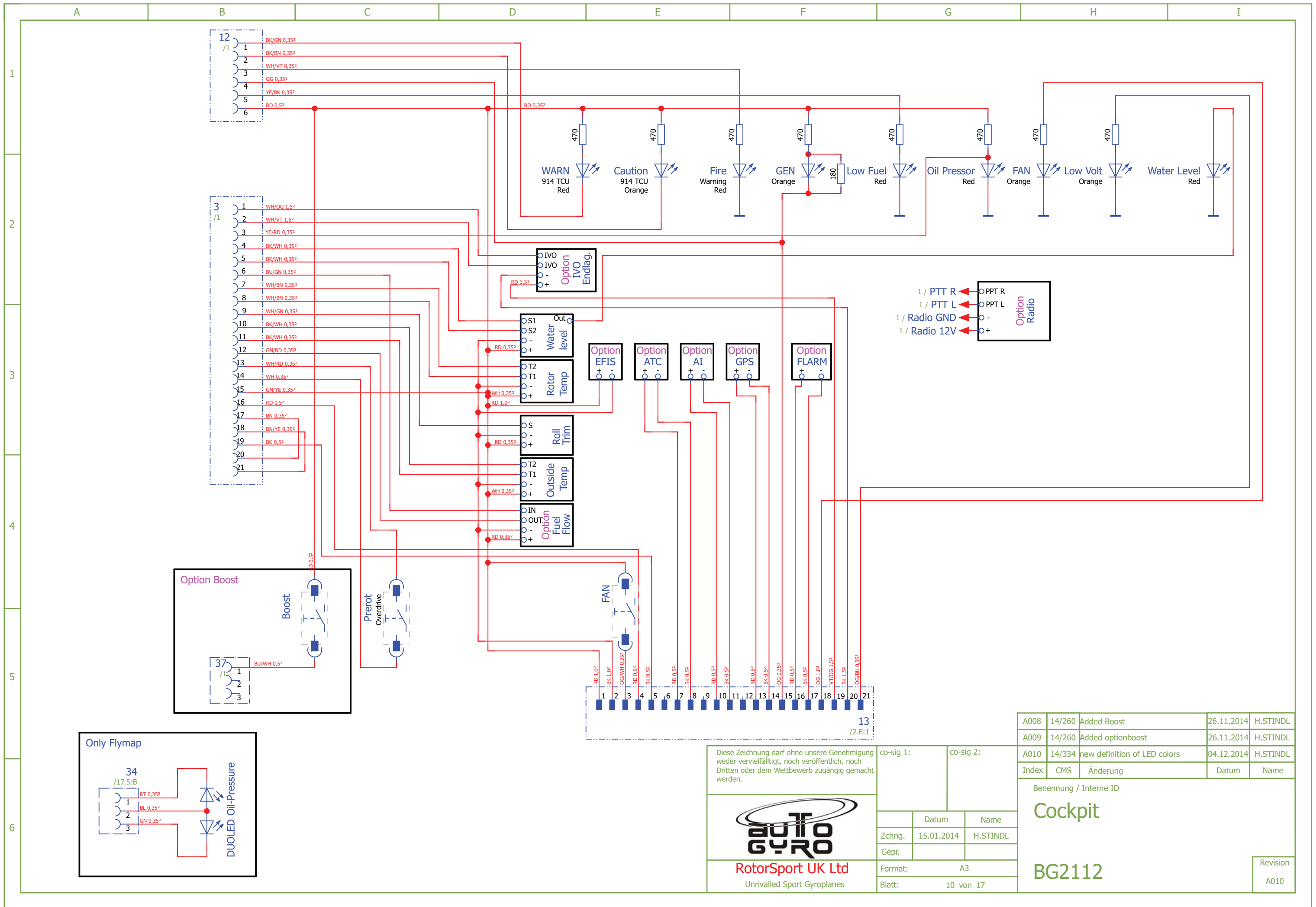
Benennung / Interne ID

Stromlaufplan Cockpit mitte

BG2107

Revision	A003
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Wiring Diagram – Cockpit (General)



Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt, noch veröffentlicht, noch Dritten oder dem Wettbewerb zugänglich gemacht werden.



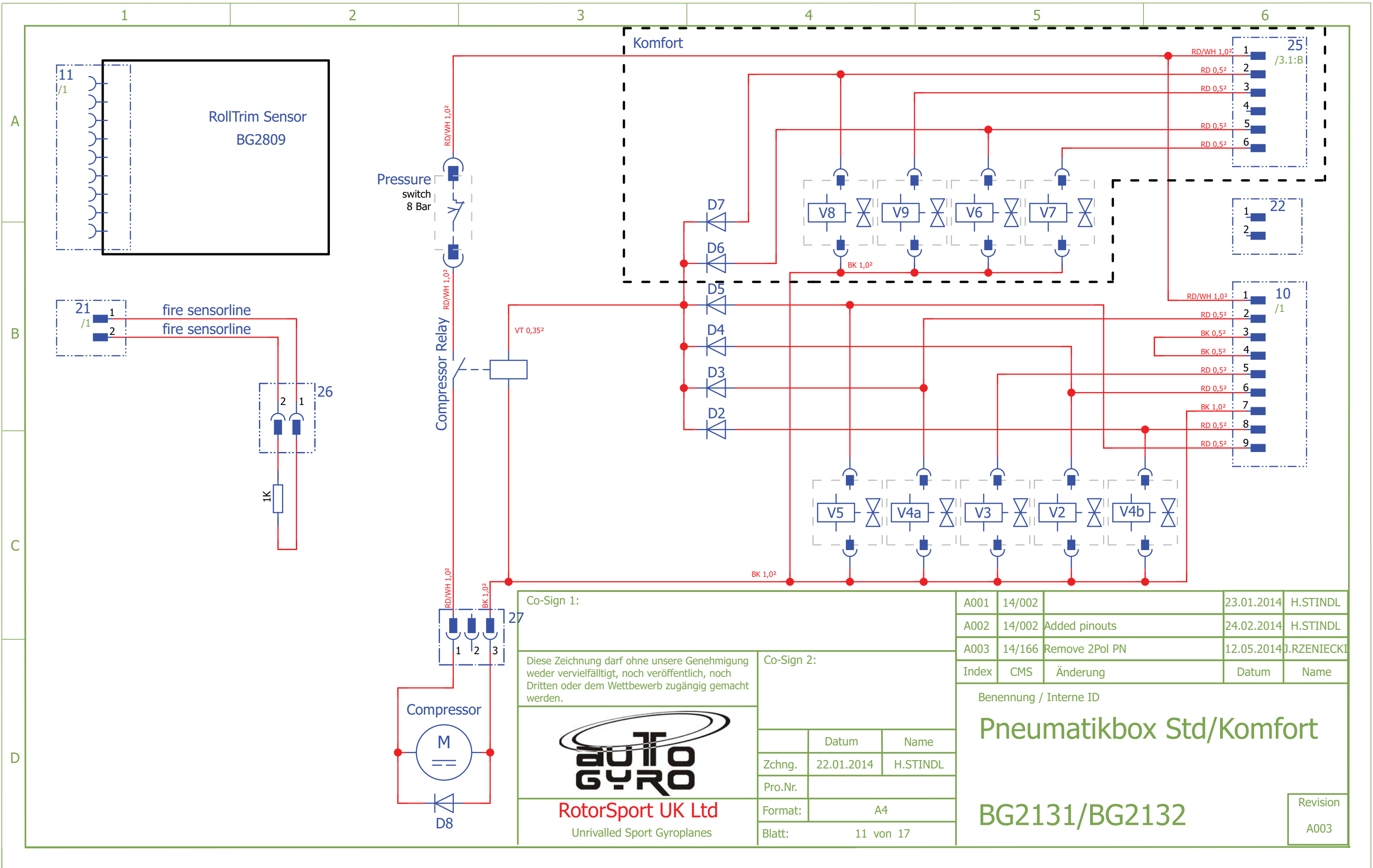
RotorSport UK Ltd
Unrivalled Sport Gyroplanes

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Gepr.			
Format:	A3		
Blatt:	10 von 17		

A008	14/260	Added Boost	26.11.2014	H.STINDL
A009	14/260	Added optionboost	26.11.2014	H.STINDL
A010	14/334	new definition of LED colors	04.12.2014	H.STINDL
Index	CMS	Änderung	Datum	Name

Benennung / Interne ID	
Cockpit	
BG2112	
Revision	A010

Wiring Diagram – Pneumatic System (Standard / Comfort)



Co-Sign 1:

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Co-Sign 2:

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Pro.Nr.		
Format:	A4	
Blatt:	11 von 17	

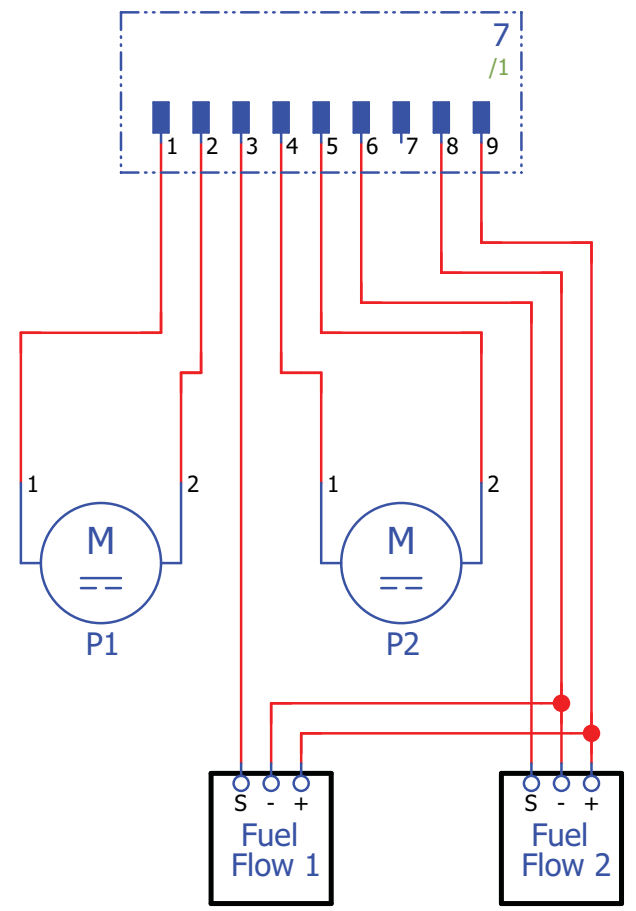
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A002	14/002	Added pinouts	24.02.2014	H.STINDL
A003	14/166	Remove 2Pol PN	12.05.2014	J.RZENIECKI
Index	CMS	Änderung	Datum	Name

Benennung / Interne ID
Pneumatikbox Std/Komfort

BG2131/BG2132

Revision	A003
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Wiring Diagram – Fuel Pumps



Co-Sign 1:

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RotorSport UK Ltd
Unrivalled Sport Gyroplanes

Co-Sign 2:

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Pro.Nr.		
Format:	A4	
Blatt:	12 von 17	

A000			22.01.2014	H.STINDL
A001	14/002		23.01.2014	H.STINDL
A002		shifted drawing	08.08.2014	H.STINDL
Index	CMS	Änderung	Datum	Name

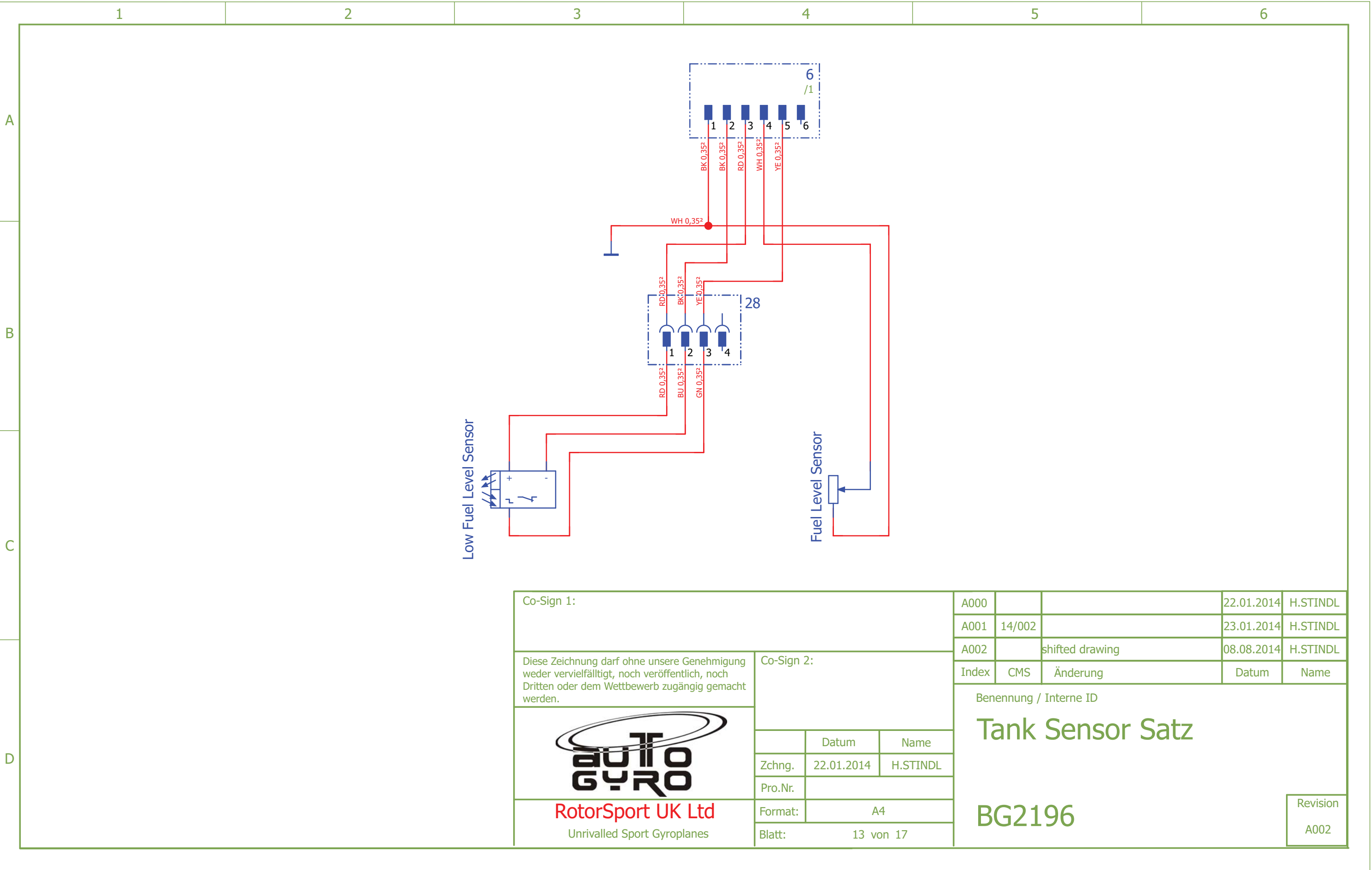
Benennung / Interne ID

Benzinpumpen


BG2180

Revision
A002

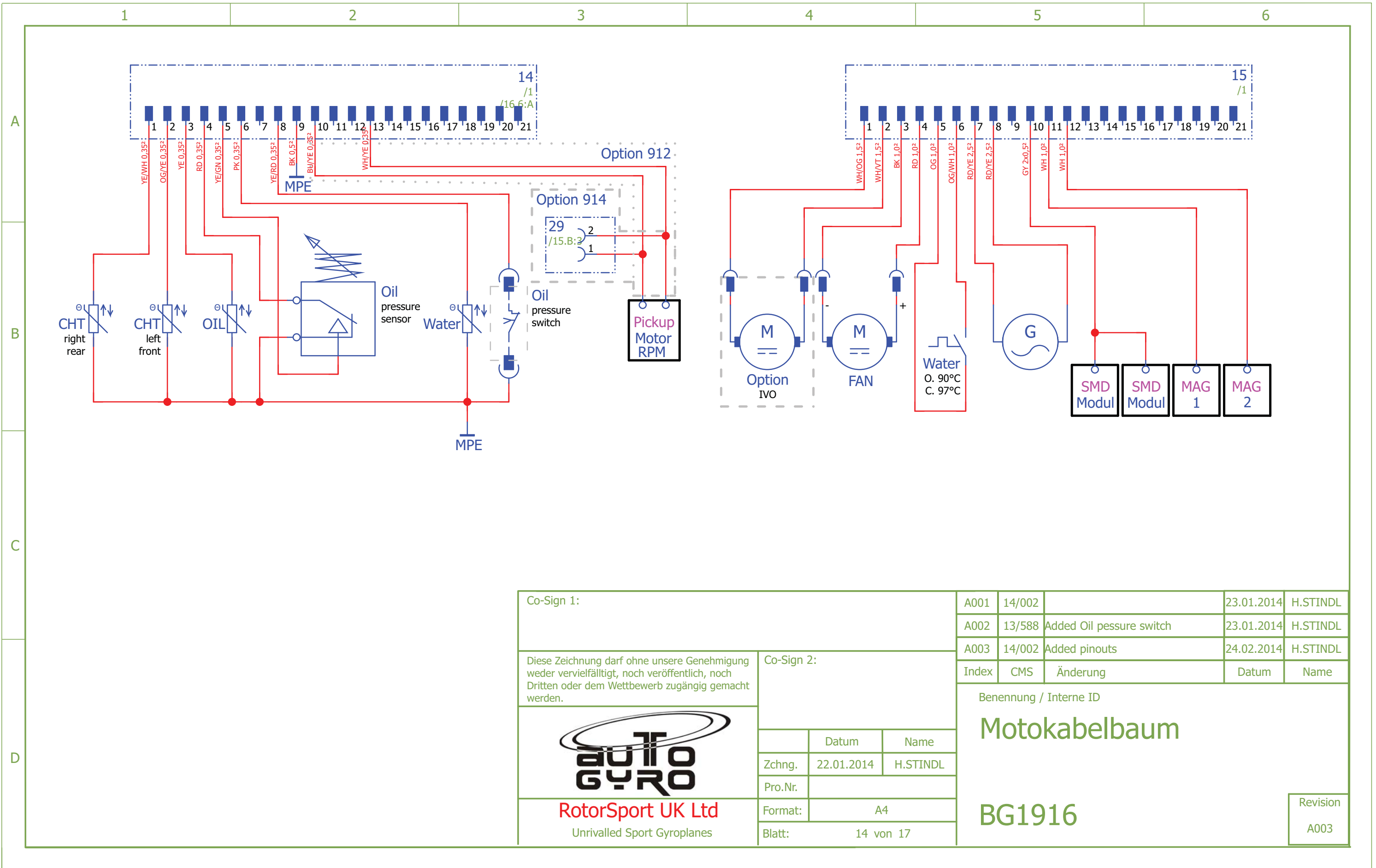
Wiring Diagram – Fuel Level and Low Level Sensors




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		A001	14/002	23.01.2014	H.STINDL
		A002	shifted drawing	08.08.2014	H.STINDL
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		Tank Sensor Satz			
		BG2196			
		Revision			
		A002			

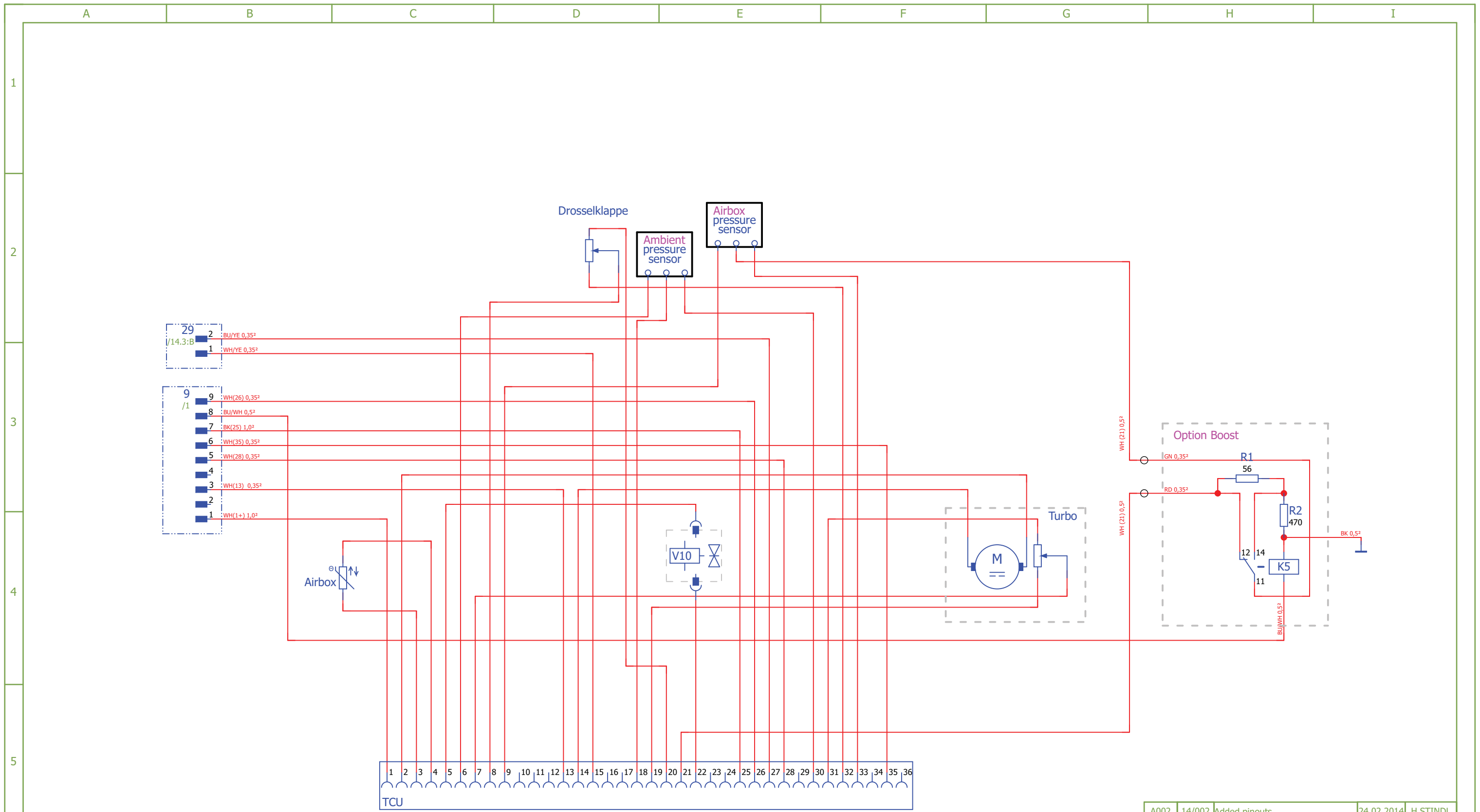
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		Zchnng.	22.01.2014 H.STINDL
		Pro.Nr.	
		Format:	A4
		Blatt:	13 von 17

Wiring Diagram – Engine Wiring Harness

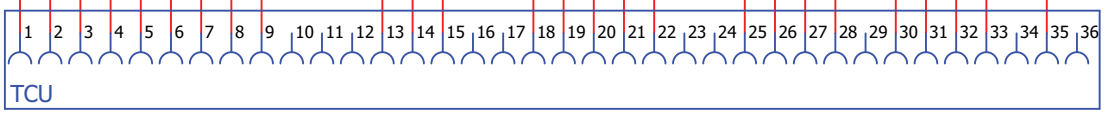


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		A002	13/588	Added Oil pessure switch	23.01.2014	H.STINDL		
		A003	14/002	Added pinouts	24.02.2014	H.STINDL		
Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt, noch veröffentlicht, noch Dritten oder dem Wettbewerb zugänglich gemacht werden.		Co-Sign 2:		Index	CMS	Änderung	Datum	Name
		Benennung / Interne ID						
		<h1>Motokabelbaum</h1>						
 RotorSport UK Ltd Unrivalled Sport Gyroplanes			Datum	Name		<h1>BG1916</h1>		
		Zchnng.	22.01.2014	H.STINDL				
		Pro.Nr.						
		Format:	A4					
Blatt:		14 von 17		Revision			A003	

Wiring Diagram – Engine Turbo Control Unit (TCU) Wiring Harness



- 29 /14.3:B
 - 2 :BU/YE 0,35²
 - 1 :WH/YE 0,35²
- 9 /1
 - 9 :WH(26) 0,35²
 - 8 :BU/WH 0,5²
 - 7 :BK(25) 1,0²
 - 6 :WH(35) 0,35²
 - 5 :WH(28) 0,35²
 - 4
 - 3 :WH(13) 0,35²
 - 2
 - 1 :WH(1+) 1,0²



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co-sig 1:		co-sig 2:	
	Datum	Name	
Zchng.	22.01.2014	H.STINDL	
Gepr.			
Format:	A3		
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A002	14/002	Added pinouts	24.02.2014	H.STINDL
A003	14/260	Added boost	21.11.2014	H.STINDL
A004	14/260	Added Optionboost	26.11.2014	H.STINDL
Index	CMS	Änderung	Datum	Name

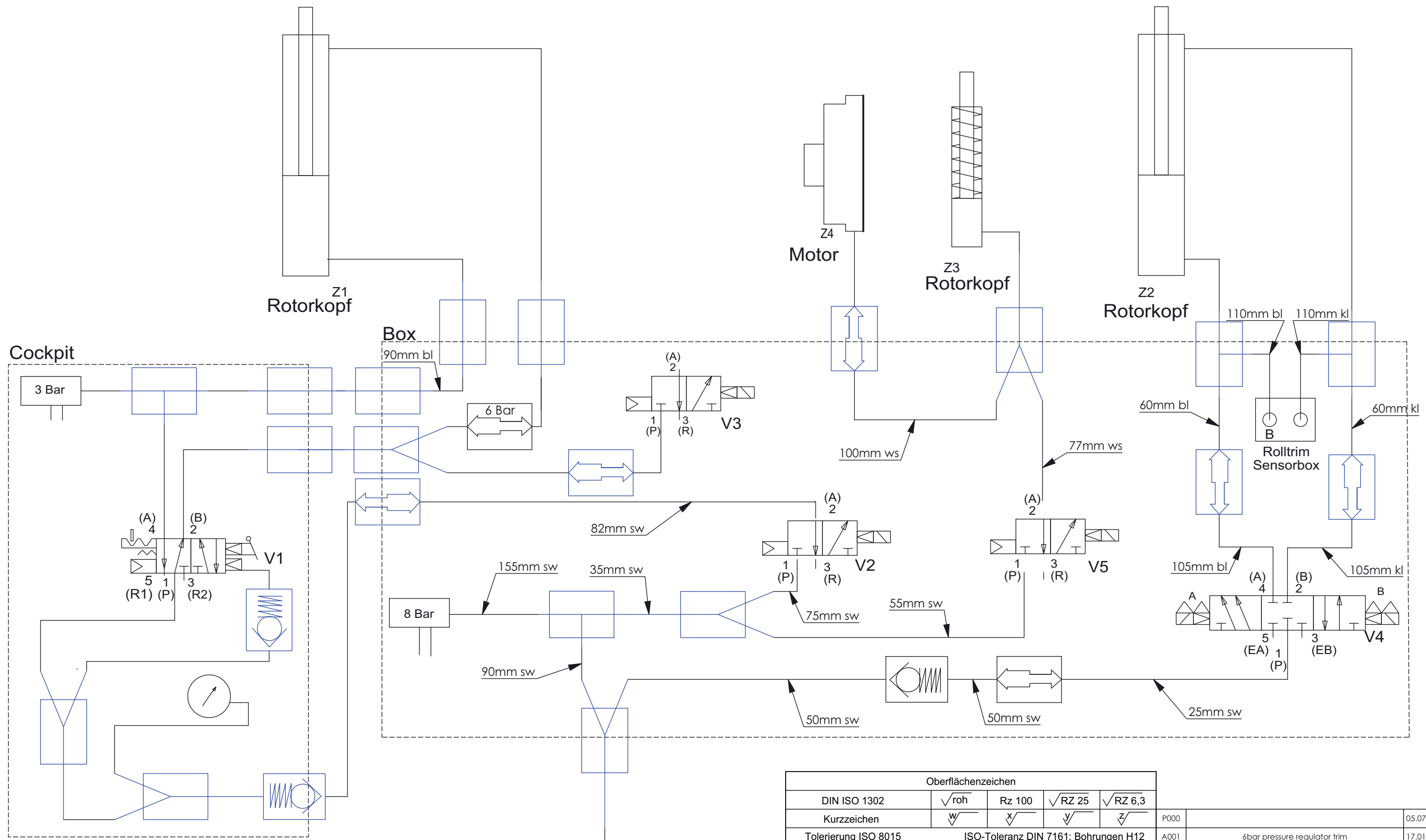
Benennung / Interne ID

TCU Kabelbaum

BG3210

Revision
A004

Pneumatic Scheme - Standard

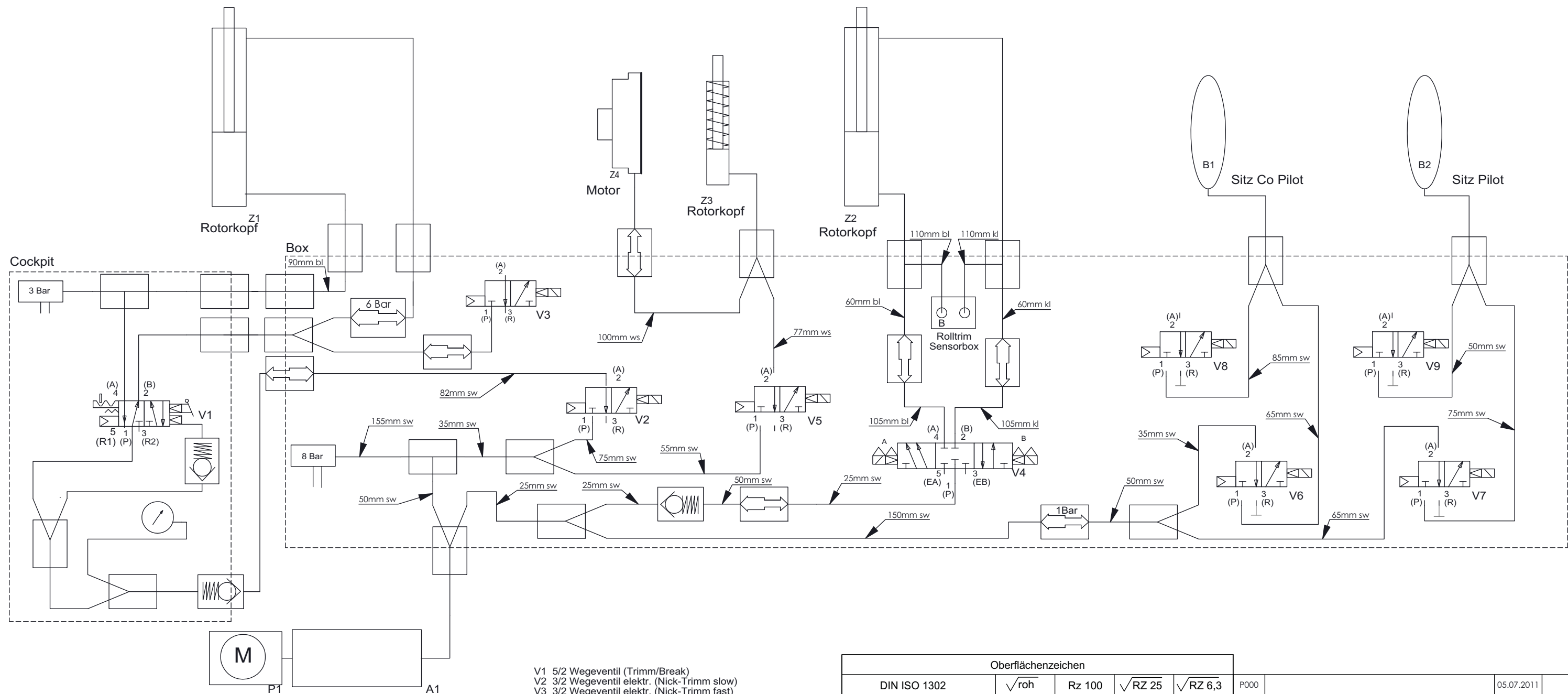


- V1 5/2 Wegeventil (Trimm/Break)
- V2 3/2 Wegeventil elektr. (Nick-Trimm slow)
- V3 3/2 Wegeventil elektr. (Nick-Trimm fast)
- V4 5/3 Wegeventil elektr. (Roll-Trimm)
- A Trimm left
- B Trimm right
- V5 3/2 Wegeventil elektr. (Prerotator)
- P1 Pumpe
- A1 Druckgefäß/Filter (alle 100h zu wechseln)
- Z1 Trimmzylinder (Nick-Trimm)
- Z2 Trimmzylinder (Roll-Trimm)
- Z3 Prerotatorzylinder
- Z4 Pneumatik Kupplung

Oberflächenzeichen								
DIN ISO 1302	\sqrt{roh}	Rz 100	$\sqrt{RZ 25}$	$\sqrt{RZ 6,3}$				
Kurzzeichen	\sqrt{w}	\sqrt{v}	\sqrt{z}	\sqrt{z}				
Tolerierung ISO 8015	ISO-Toleranz DIN 7161: Bohrungen H12							
Freimaß-, Form- und Lagetoleranzen nach ISO 2768-mH								
Nennmaß	6	30	120	315	1000	2000	+2000	
Abmaß	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2	
Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt, noch veröffentlicht, noch Dritten oder dem Wettbewerb zugänglich gemacht werden.					Datum	Name		
					Modell			
					Zchnng.	17.01.2013	j.rzeniecki	
					Gepr.			
					Format:	A3		
					Blatt:	1 von 1		
					Maßstab		1:1 (1:5)	
					SolidWorks 2010			
					Material / Legierung. :			
					Oberfläche..... :			
					Gewicht [g]..... :		(berechnet)	
					Abmessung..... :			
					Benennung / Interne ID		Pneumatikbox Standard Pneumatikplan	
					Revision		A001	

Pneumatikbox Standard
Pneumatikplan
 BG2131

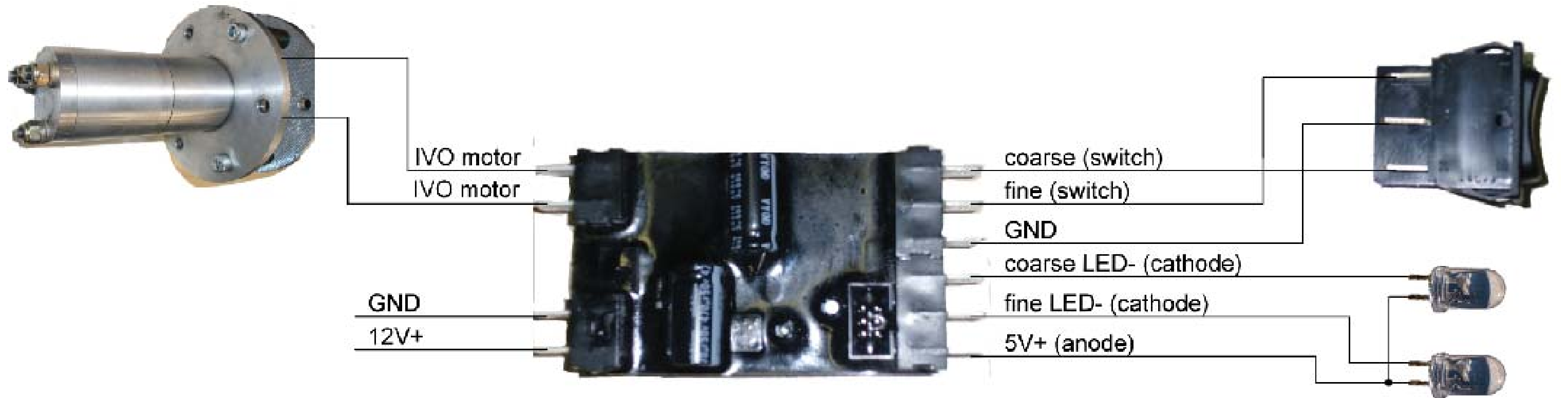
Pneumatic Scheme - Comfort



- V1 5/2 Wegeventil (Trim/Break)
- V2 3/2 Wegeventil elektr. (Nick-Trim slow)
- V3 3/2 Wegeventil elektr. (Nick-Trim fast)
- V4 5/3 Wegeventil elektr. (Roll-Trim)
- A Trimm left
- B Trimm right
- V5 3/2 Wegeventil elektr. (Prerotator)
- V6 3/2 Wegeventil elektr. "R" geschlossen (Aufblasen)
- V7 3/2 Wegeventil elektr. "R" geschlossen (Ablassen)
- V8 3/2 Wegeventil elektr. "R" geschlossen (Aufblasen)
- V9 3/2 Wegeventil elektr. "R" geschlossen (Ablassen)
- P1 Pumpe
- A1 Druckgefäß/Filter (alle 100h zu wechseln)
- Z1 Trimmzylinder (Nick-Trim)
- Z2 Trimmzylinder (Roll-Trim)
- Z3 Prerotatorzylinder
- Z4 Pneumatik Kupplung
- B1 Luftkissen
- B2 Luftkissen

Oberflächenzeichen								
DIN ISO 1302	\sqrt{roh}	Rz 100	$\sqrt{RZ 25}$	$\sqrt{RZ 6,3}$	P000		05.07.2011	
Kurzzeichen	\sqrt{w}	\sqrt{v}	\sqrt{z}	\sqrt{z}	P001		19.07.2011	
Tolerierung ISO 8015	ISO-Toleranz DIN 7161: Bohrungen H12				A001	6bar pressure regulator trim	17.01.2013	
Freimaß-, Form- und Lagetoleranzen nach ISO 2768-mH					Index	Änderung	Datum Name	
Nennmaß	6	30	120	315	1000	2000	+2000	
Abmaß	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2	
Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt, noch veröffentlicht, noch Dritten oder dem Wettbewerb zugänglich gemacht werden.				Datum	Name			
				Modell				
				Zchnng.	17.01.2013	j.rzeniecki		
				Gepr.				
				Format:	A3			
				Blatt:	1 von 1			
				SolidWorks 2010				
Material / Legierung. :					Oberfläche..... :			
Gewicht [g]..... :					(berechnet)			
Abmessung..... :					Benennung / Interne ID			
Pneumatikbox Komfort					Pneumatikplan			
BG2132					Revision			
					A001			

Retrofit: End Position Detection IVO Propeller



Oberflächenzeichen							
DIN ISO 1302	$\sqrt{\text{roh}}$	Rz 100	$\sqrt{\text{RZ 25}}$	$\sqrt{\text{RZ 6,3}}$			
Kurzzeichen	$\sqrt{\text{w}}$	$\sqrt{\text{x}}$	$\sqrt{\text{y}}$	$\sqrt{\text{z}}$			
Tolerierung ISO 8015		ISO-Toleranz DIN 7161: Bohrungen H12					
Freimaß-, Form- und Lagetoleranzen nach ISO 2768-mH							
Nennmaß	6	30	120	315	1000	2000	+2000
Abmaß	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt, noch veröffentlicht, noch Dritten oder dem Wettbewerb zugänglich gemacht werden.				Datum		Name	
				Modell			
				Zchnng.	17.04.2013	h.stindl	
				Gepr.			
						Maßstab	
				Format: A3		1:1	
				Blatt: 1 von 1		(1:5)	
RotorSport UK Ltd Unrivalled Sport Gyroplanes				SolidWorks 2010			

A000	\$PRPS HEET:{ CMS}		17.04.2013	h.stindl
Index	CMS	Änderung	Datum	Name
Material / Legierung. :				
Oberfläche..... :				
Gewicht [g]..... : (berechnet)				
Abmessung..... :				
Benennung / Interne ID				
IVO-Steuerungsplatine - Schematische Darstellung				
BG4652				Revision
				A000

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REMOVAL-INSTALLATION: FIRE WALL

[75-00-00 8-2](#)

MODIFICATION: RECONFIGURE FAN REVERSE

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 do '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

- 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.

CAUTION: Do not use a chain or any lifting gear that could damage the surface of the teeter bolt

ILLUSTRATIONS



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 do '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

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

Unload nose gear

- 1 In order to unload the nose gear lift at the jacking point at the fuselage belly right behind nose wheel, using a soft non-slip lining.

Unload main gear

- 2 In order to unload one of the main wheels carefully lift at the main gear suspension spar. Use a soft non-slip lining and chose lifting point close to the centre, but on the side of the affected wheel.
- 3 Continue to jack slowly and let the gyroplane rest stable on nose wheel, one main wheel and jack. Weights may be used on the opposite side of the suspension spar.

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.

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](#)

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

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

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.*

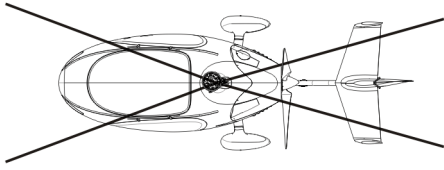
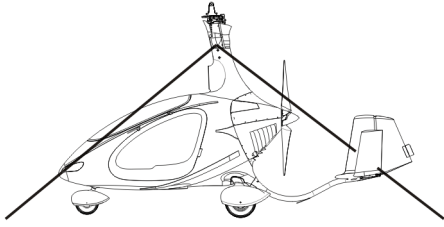
- 1 Restrain main wheels (blocks/chocks). For container transport replace main wheels with wooden blocks to provide safe stand.
- 2 Put a wooden block below the lowest point of the keel tube and lash keel tube against wooden block. The block should be dimensioned so that the main wheels (if installed) 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.

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
		shipping attachment mast	V.WZ9001	

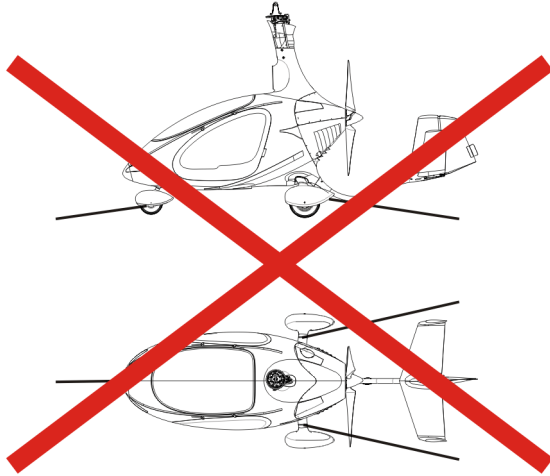
ILLUSTRATIONS

YES



Lash-down mast top (kit available)

NO!



Never strap/tighten suspension bow in any longitudinal direction!

Fig. 1 - Lash-down methods of gyroplane

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 do '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

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

Measurement of Stabilizer Alignment

- 1 Measure distance from the edge of the stabilizer fin to the door handle recess (see Fig. 1). Note values for RH and LH side.
- 2 RH dimension must be equal or less LH dimension. If in doubt contact AutoGyro customer support.

ILLUSTRATIONS



Fig. 1 - Measurement of Stabilizer Alignment (RH side shown)

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 do 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

Engine cowlings must be removed, see [52-00-00 4-1](#)

Fire wall must be removed, see [71-30-00 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: Electrical shortcuts on the battery will produce high current with the risk of personal injury and damage to equipment!

PROCEDURES

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

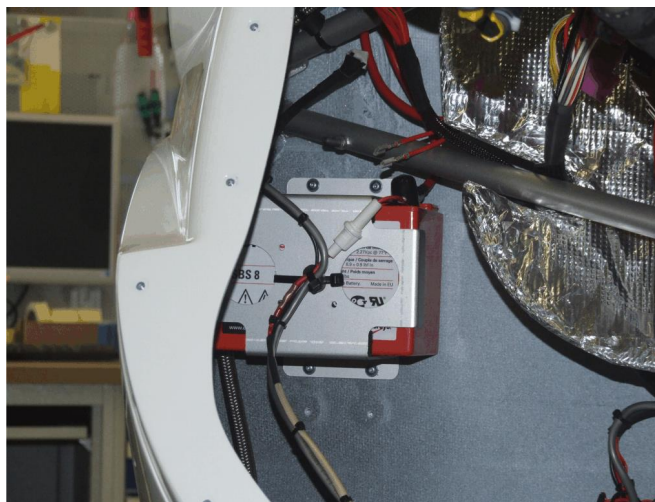


Fig. 1 - Installation Position Battery

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 do 'Line Maintenance'!
Secure gyroplane against unauthorized or unintended operation!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

NOTE: Measure points are aft rudder edge and left/right radius between stabilizer and vertical outer fins.

- 1 Adjust pedals in neutral position

Note that the nose wheel should be pointed 3° to the left with pedals neutral.

- 2 Check/adjust N1 = 900 mm (+/- 10 mm) and N2 = 840 mm (+/- 10 mm). See Fig. 1 for reference.
- 3 Press full left pedal (with nose wheel slightly unloaded for ease of movement) and check/adjust L = 630 mm (+/- 50 mm). See Fig. 1 for reference.
- 4 Press full right pedal (with nose wheel slightly unloaded for ease of movement) and check/adjust R = 530 mm (+/- 50 mm). See Fig. 1 for reference.
- 5 Check push-pull control cables (threaded articulation rods) tight and secure.

ILLUSTRATIONS

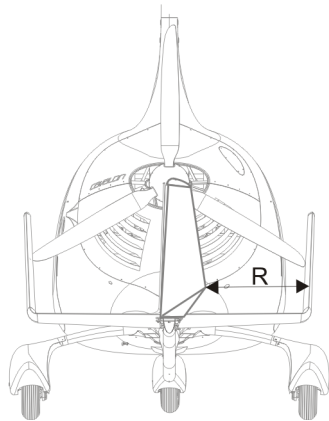
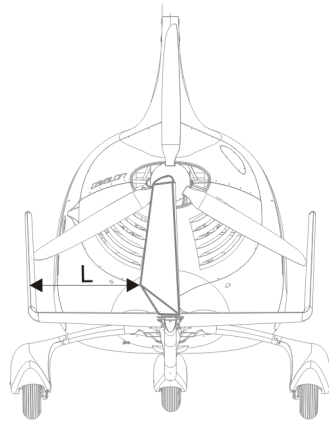
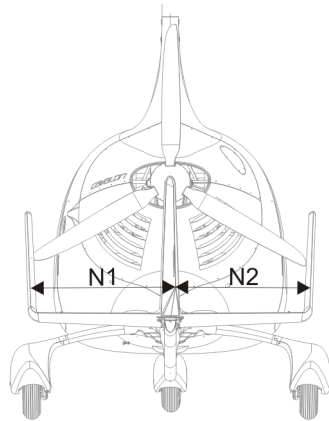


Fig. 1 - Rudder control angle setting



Fig. 2 - Measurement Procedure (example)

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 do 'Line Maintenance'!

Engine cowlings must be removed, see [52-00-00 4-1](#)

Fire wall must be removed, see [71-30-00 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 vapors 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

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

- 1 Perform a visual inspect on nylon filter.
- 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 (KL145) downstream

- 3 Perform a visual inspect on nylon filter.
- 4 If contamination is found or in case of scheduled replacement, nylon fuel filter AND KL145 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 preceded by a filter (KL145) 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

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
1	1	Nylon fuel filter KL 23	L1 V.BE201.23.05	
1	2	Filter KL 145	L1 V.BE201.23.06	
1	3	Fuel Pump 912	L1 S.BE02	
1	4	fuel pump 914 serialised	L1 S.BE03	

ILLUSTRATIONS

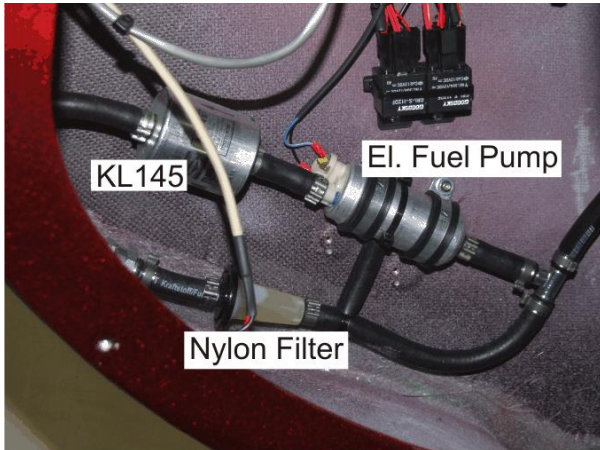


Fig. 1 - Fuel pumps and filters (detail)

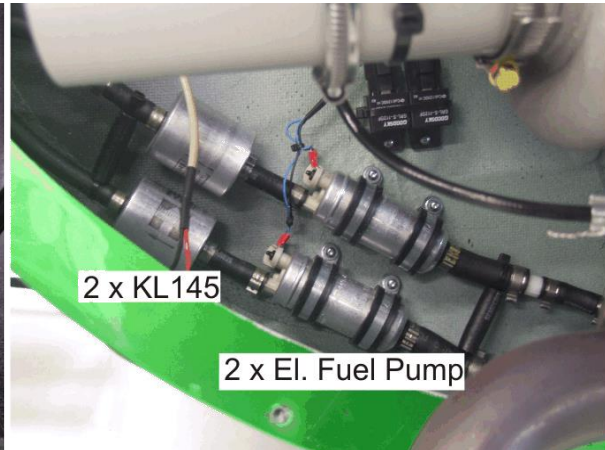


Fig. 2 - Fuel pumps and filters (detail)

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 do 'Line Maintenance'!

Engine cowlings must be removed, see [52-00-00 4-1](#)

Fire wall must be removed, see [71-30-00 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 vapors are HAZARDOUS MATERIAL, must be treated and handled accordingly, and constitute a danger to health and hardware!

PROCEDURES

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 KL145

- 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.

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
1	1	Nylon fuel filter KL 23	L1 V.BE201.23.05	
1	2	Filter KL 145	L1 V.BE201.23.06	
1	3	Fuel Pump 912	L1 S.BE02	
1	4	fuel pump 914 serialised	L1 S.BE03	

ILLUSTRATIONS

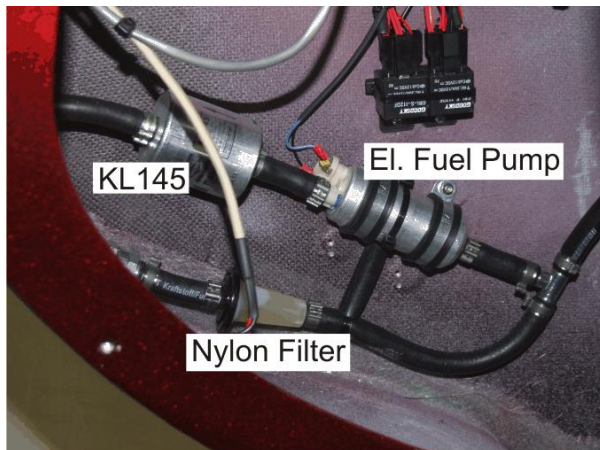


Fig. 1 - Fuel pumps and filters (detail)

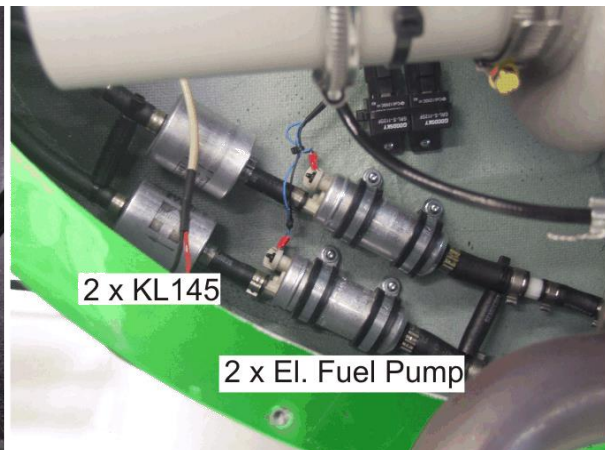


Fig. 2 - Fuel pumps and filters (detail)

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 do 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

Engine cowlings must be removed, see [52-00-00 4-1](#)

Fire wall must be removed, see [71-30-00 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 vapors are HAZARDOUS MATERIAL, must be treated and handled accordingly, and constitute a danger to health and hardware!

PROCEDURES

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 attachment hardware and replace fuel pump.
- 5 Install new fuel pump and tighten attachment hardware.

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.
- 8 Remove clamps from fuel hoses.
- 9 Activate respective fuel pump and check function and proper fuel line connection (no leaks, dry).

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
1	1	Fuel Pump 912	L1 S.BE02	ROTAX 912
1	2	fuel pump 914	L1 S.BE04	ROTAX 914

ILLUSTRATIONS

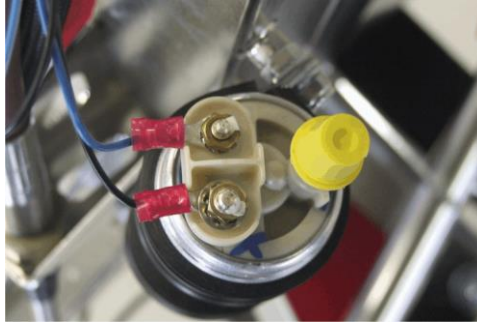


Fig. 1 - El. fuel pump terminal (detail)

32-20-00 8-1 REPLACEMENT: NOSE GEAR RUBBER DAMPER

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to do 'Line Maintenance!'
Gyroplane must be jacked, see [07-00-00 2-2](#)

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-02 Loctite 243 blue (S.VB6011)
AG-GRS-01 Lagermeister WHS 2002 Grease (S.VB6007)

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

- 1 Remove bolt (1) and washer (2).
- 2 Pull control linkage (3) from square shaft. Caution: Hold wheel assembly and prevent from falling out. Discard O-ring (4)!
- 3 Pull out front wheel assembly. Note that bushings (5) and (7) remain in the fuselage.
- 4 Remove rubber damper (8).
- 5 Install new rubber damper.
- 6 Apply AG-GRS-01 on the tube, but not on the threads. Install nose wheel assembly in reverse order. Make sure wheel assembly is installed so that angled fork faces forward, i.e. extends to the front.
- 7 Install new O-ring (4).
- 8 Install control linkage (3) and washer (2).
- 9 Apply AG-BAS-02 to inner threads of nose gear assembly and install bolt (1).
- 10 Torque-tighten bolt (1) with 40 Nm.

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
1	1	M10x20	NPI	
1	2	U11x34x3	NPI	
1	3	nose wheel steering	NPI	
1	4	O-Ring 30x5	NPI	
1	5	steering bush	L2 V.FA201.38	
1	6	nosewheel fork long welded	NPI	
1	7	steering bush	L2 V.FA201.38	
1	8	shock absorber 2,5	NPI	
1	9	Nose wheel spat nosewheel painted	L1 V.KU209	
1	10	M6x12 round head	NPI	
1	11	U6/18	NPI	
1	12	M10, Si	NPI	
1	13	U10	NPI	
1	14	Nosewheel axle M10x155 DIN 912	NPI	
1	15		V.FA201.19	

ILLUSTRATIONS

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 do 'Line Maintenance'
Gyroplane must be jacked, see [07-00-00 2-2](#)

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-02 Loctite 243 blue (S.VB6011)

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

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

Nose wheel - Removal

NOTE: If no assembly hole is present in wheel spat it is recommended to drill a hole through which the bolt can be removed. Otherwise, the wheel spat must be removed.

- 1 Unscrew and remove nut (Fig.1, 12) and washer (Fig.1, 13). Discard nut.
- 2 Pull out and remove bolt (Fig.1, 14) with washer (Fig.1, 13) and remove wheel. Maintain spacers (Fig.1, 15)!

Nose wheel - Installation

- 3 Install wheel with spacers (Fig.1, 15) in place, bolt (Fig.1, 14) with washers (Fig.1, 13) in reverse order.
- 4 Install new self-locking nut (Fig.1, 12) and torque-tighten with 35 Nm.
- 5 Install plug in assembly hole, if required.

Main wheel - Removal

- 6 Remove wheel spat (if installed).
- 7 Remove and discard split pin (Fig. 3, 5) and unscrew the castellated nut (Fig.3, 18). Discard split pin (Fig. 3, 5).
- 8 Unscrew and remove 4 x bolt (Fig. 3, 3) with serrated washer (Fig. 3, 4). Mind limited reusability of serrated washer!
- 9 Remove wheel from axle assembly (Fig. 3, 7/9).

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	1	M10x20	NPI	
1	2	U11x34x3	NPI	

1	3	nose wheel steering	NPI
1	4	O-Ring 30x5	NPI
1	5	steering bush	L2 V.FA201.38
1	6	nosewheel fork long welded	NPI
1	7	steering bush	L2 V.FA201.38
1	8	shock absorber 2,5	NPI
1	9	Nose wheel spat nosewheel painted	L1 V.KU209
1	10	M6x12 round head	NPI
1	11	U6/18	NPI
1	12	M10, Si	NPI
1	13	U10	NPI
1	14	Nosewheel axle M10x155 DIN 912	NPI
1	15		V.FA201.19
3	1		V.KU408.06
3	2		V.KU408.04
3	3	M6x12 round head	L1 V.FA301
3	4	Safety washer M6	L1 V.FA301
3	5	Split pin 3.2x40	L1 V.FA01
3	6	spacer 26-5/20,2	L1 V.FA01
3	7	wheel axis welded	L1 V.FA01
3	8	Stop nut M6	L1 V.FA01
3	9	brake caliper bracket installed	L1 V.FA01
3	10	M6x25 counter sunk	L1 V.FA01
3	11	Brake caliber	NPI
3	12	Brake pad outer (small)	L2 V.FA302.03
3	13	Brake Disc	L1 V.FA301
3	14	Cylinder bushing 22x10x6	NPI
3	15	Brake pad inner (big)	L2 V.FA302.07
3	16	Safety washer M6	NPI
3	17	M6x40	NPI
3	18	castle nut M18x1	L1 V.FA01
3	19	Alu bush Prerotator brake	L1 V.KU408
3	20	U6/25 Big washer	L1 V.KU408
3	21	M6x60 rounded head	L1 V.KU408
4	1	Roller bearing 6204 ZRS	L2 V.FA205.08.02
4	2	Tube standard	L0 V.FA202.05.02
4	3	Tyre standard	L0 V.FA202.05.01
4	4	Rimm installed	L1 V.FA204
4	5	Spacer wheel	L1 V.FA204
4	6	Roller bearing 6204 ZRS	L2 V.FA205.08.02

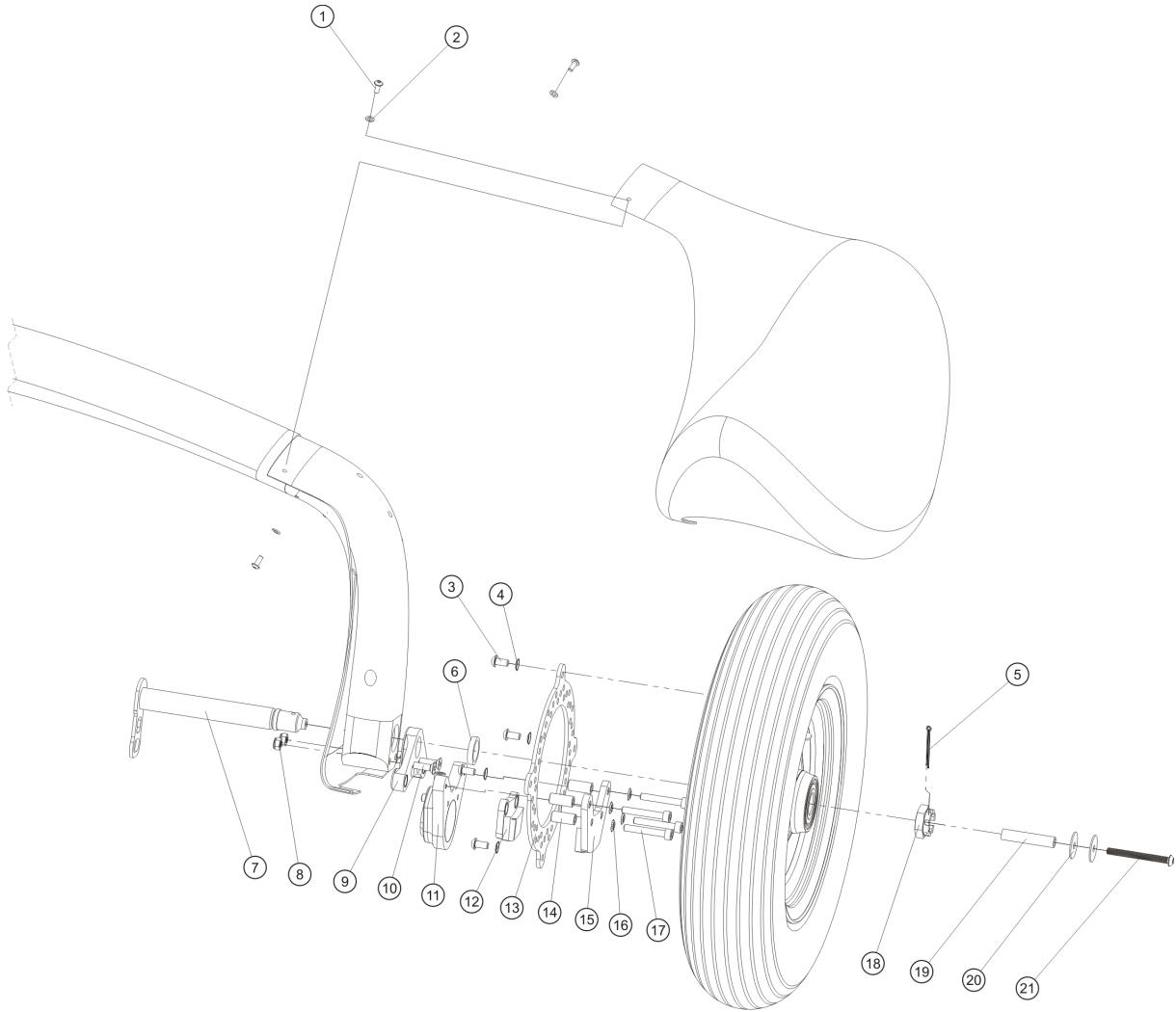


Fig. 3 - Main gear assembly

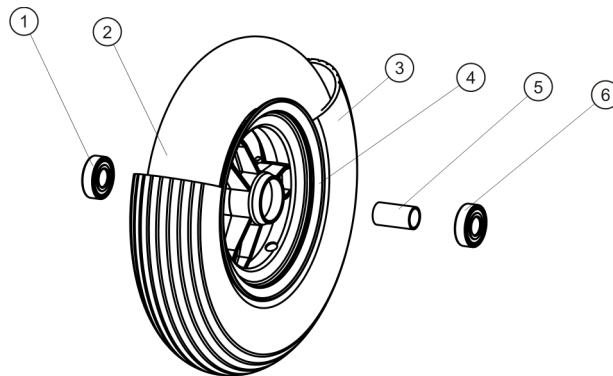


Fig. 4 - Main wheel

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 do '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 (S.VB6018)
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

- 1 Pull out brake disc (13) between brake pads.
- 2 Remove 4 x shaft bolt (17) with serrated washer (16).
- 3 Remove brake pad (12) and (15). Dispose of properly!
- 4 Clean 4 x guide sleeves of axle assembly (14) 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 (12) onto lower guide sleeves.
- 7 Fit new brake pad (15) onto upper guide sleeves.
- 8 Insert 4 x shaft bolt (17) with serrated washers (16) and torque-tighten with 10 Nm. Make sure that brake caliper and pad moves easily about the running 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		V.KU408.06	
1	2		V.KU408.04	
1	3	M6x12 round head	L1 V.FA301	
1	4	Safety washer M6	L1 V.FA301	
1	5	Split pin 3.2x40	L1 V.FA01	
1	6	spacer 26-5/20,2	L1 V.FA01	
1	7	wheel axis welded	L1 V.FA01	
1	8	Stop nut M6	L1 V.FA01	
1	9	brake caliper bracket installed	L1 V.FA01	
1	10	M6x25 counter sunk	L1 V.FA01	
1	11	Brake caliper	NPI	
1	12	Brake pad outer (small)	L2 V.FA302.03	

1	13	Brake Disc	L1	V.FA301
1	14	Cylinder bushing 22x10x6		NPI
1	15	Brake pad inner (big)	L2	V.FA302.07
1	16	Safety washer M6		NPI
1	17	M6x40		NPI
1	18	castle nut M18x1	L1	V.FA01
1	19	Alu bush Prerotator brake	L1	V.KU408
1	20	U6/25 Big washer	L1	V.KU408
1	21	M6x60 rounded head	L1	V.KU408

ILLUSTRATIONS

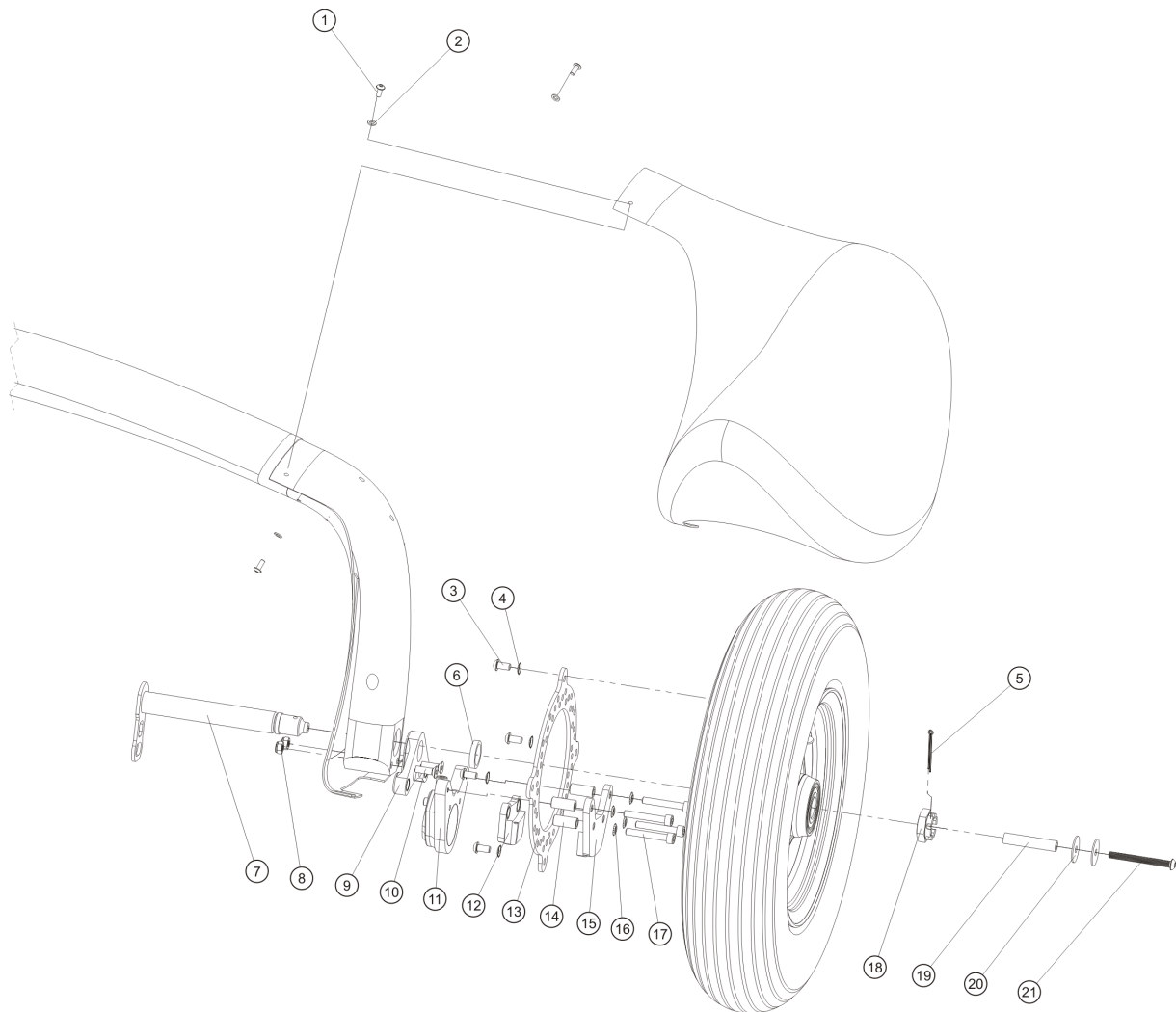


Fig. 1 - Main wheel with brake

34-10-00 5-1 TEST: PITOT STATIC SYSTEM INTEGRITY

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

ContactAG For special tools or assistance contact AutoGyro customer support

PRECAUTIONS AND SAFETY MEASURES

CAUTION: Instruments can easily be damaged if test is performed improperly. Manipulate test equipment slowly and carefully. Monitor indicators and make sure that indication is always within normal indication range!

PROCEDURES

Pitot System Test

- 1 Pull-out plunger of test equipment for the pitot nozzle (long silicone tube) to read 2 ml.
- 2 Attach test equipment to pitot nozzle.
- 3 Slowly depress plunger to read 1 ml. Airspeed indication must increase significantly.
NOTE: The actual value will depend on the length and cross-section of the pipework installed.
- 4 Leave set-up unchanged and check decay over 10 seconds. Decay should be less than 10% per 10 seconds.
- 5 Gently ease tube off the pitot nozzle. Airspeed indicator(s) must return to zero.
- 6 If any of the preceding tests has failed, have system inspected and repaired.

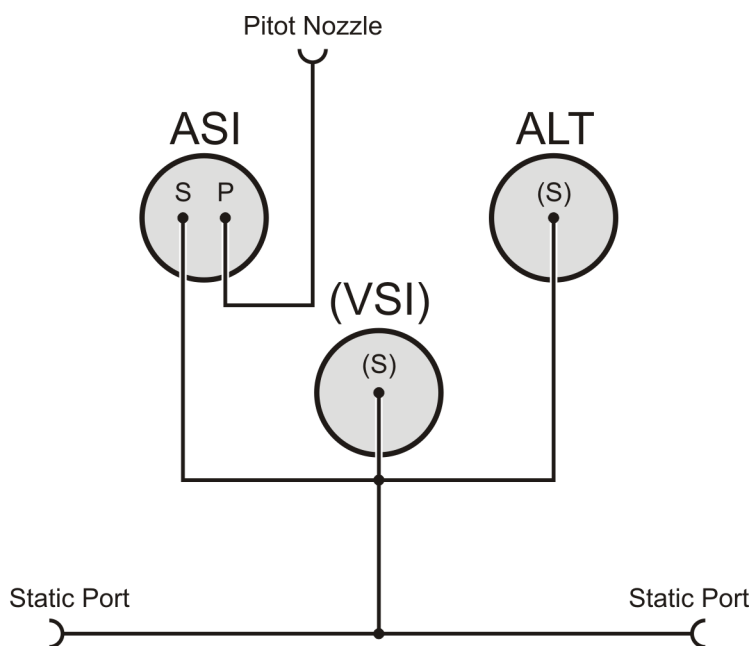
Static System Test (if installed)

- 7 Block one static port with a strip of tape.
NOTE: Do not use transparent tape as this may be overlooked and forgotten. It is recommended to use red insulating tape with a relatively large extending end.
- 8 Press in plunger of test equipment for the static port (short silicone adapter) completely.
- 9 Press and hold test equipment to the open static port tight to the hole.
- 10 Pull plunger slowly about 3 ml.
- 11 Indicated altitude and airspeed indication must increase.
- 12 If installed, VSI indication must increase momentarily and will slowly fade to zero.
- 13 Leave set-up unchanged and check decay over 10 seconds. There shall be no noticeable decay (except VSI).
- 14 Remove silicone adapter from static port. Altitude must return to initial indication.
- 15 If any of the preceding tests has failed, have system inspected and repaired.

ILLUSTRATIONS



Fig. 1 - Pitot Static Integrity Test Equipment



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

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 do 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

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

- 1 Disconnect all instruments from pitot and static lines. These are altimeter, airspeed, but also VSI and integrated display systems, if installed.
 - NOTE: In most cases it is not necessary to remove the instrument panel.**
- 2 With the help of compressed air clean all pitot and static 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.
- 4 Re-connect all instruments and perform Pitot Static System Integrity Test, see [34-10-00 5-1](#).

ILLUSTRATIONS

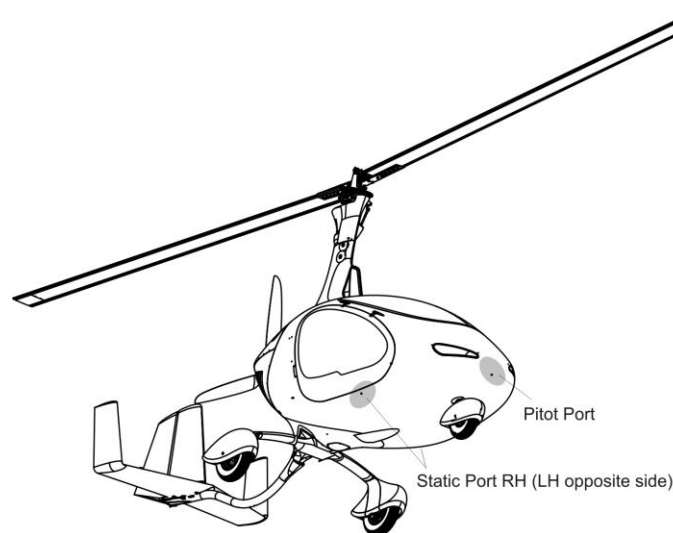
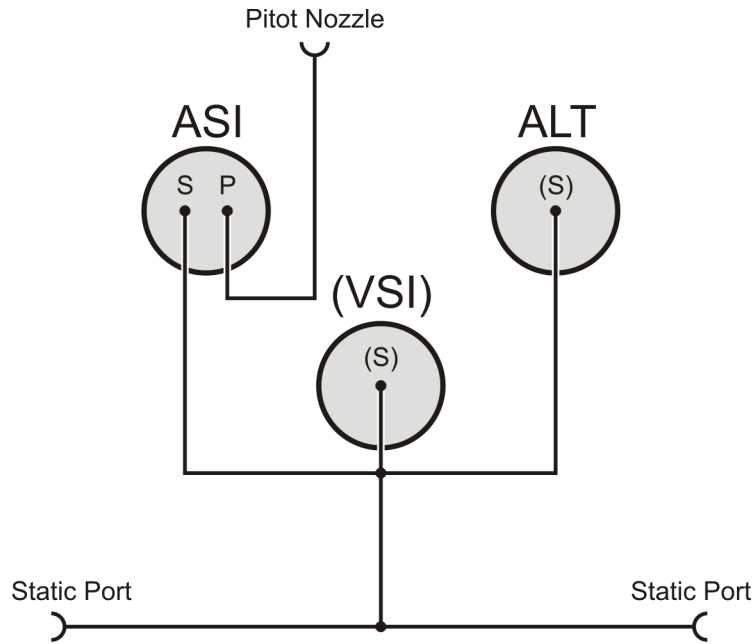


Fig. 1 - Static ports (2 x) and pitot port



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 do 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

Engine cowlings must be removed, see [52-00-00 4-1](#)

Fire wall must be removed, see [71-30-00 4-1](#)

SPECIAL TOOLS AND CONSUMABLE MATERIALS

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

- 1 Unscrew inlet and outlet connection and discard old seal ring (compressor side only).
- 2 Replace filter/dryer with new one and make sure cartridge is tightened safely to rear wall. Install new seal ring.
- 3 Re-connect and tighten inlet and outlet connection with moderate torque.

ILLUSTRATIONS

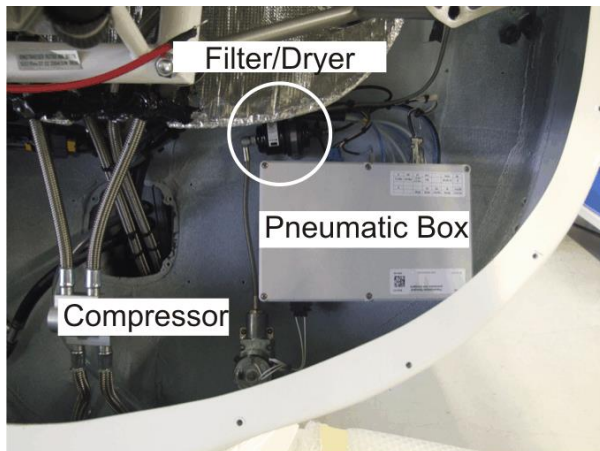


Fig. 1 - Rear wall (installation wall)



Fig. 2 - Filter/dryer

52-00-00 4-1 REMOVAL-INSTALLATION: COWLINGS

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

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

Upper engine cowling (1) - Removal

- 1 Open all quick lock fasteners using a PH2 screw driver.
- 2 With help of a second person carefully remove upper engine cowling to the top.

Upper engine cowling (1) - Installation

- 3 With the help of a second person bring engine cowling into position.
- 4 Fasten all quick locks fasteners using a PH2 screw driver.

Lower engine cowling (2) - Removal

- 5 Upper engine cowling must be removed!
- 6 Remove all linse head bolts with poly washers and maintain. Make sure not to lose poly washers. The cowling should be held by a second person.
- 7 With the help of a second person remove cowling. Make sure not to damage engine drain hoses.

Lower engine cowling (2) - Installation

- 8 Upper engine cowling must be removed!
- 9 With the help of a second person bring cowling into position. Make sure to insert drain hoses without damage.
- 10 Insert linse head bolts with poly washers and screw in without tightening, preferably working from top to bottom.
- 11 Fasten all bolts with 3 Nm.

Mast cover (3) - Removal

- 12 Remove and maintain linse head bolts with poly washers and remove mast cover.
- 13 Carefully bend open mast cover and slide over the mast to the front.

Mast cover (3) - Installation

- 25 Install mast cover in reverse order (work steps 13 - 12).
- 26 Fasten all bolts with 3 Nm.

ILLUSTRATIONS

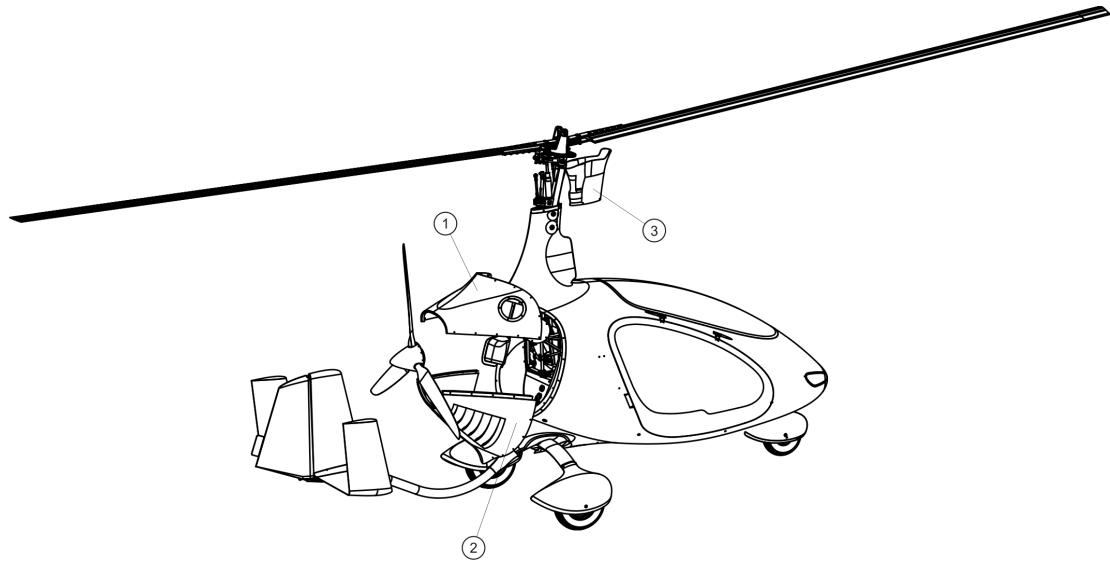


Fig. 1 - Cowling and mast cover

52-40-00 0-1 DESCRIPTION: SERVICE COVERS IN COCKPIT SHELL

LNE

GENERAL, REFERENCES AND REQUIREMENTS

SPECIAL TOOLS AND CONSUMABLE MATERIALS

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

ILLUSTRATIONS



Fig. 1 - Service covers below seats ('Equipment Cover')



Fig. 2 - Service cover for control linkage (LH) and below seat (RH)

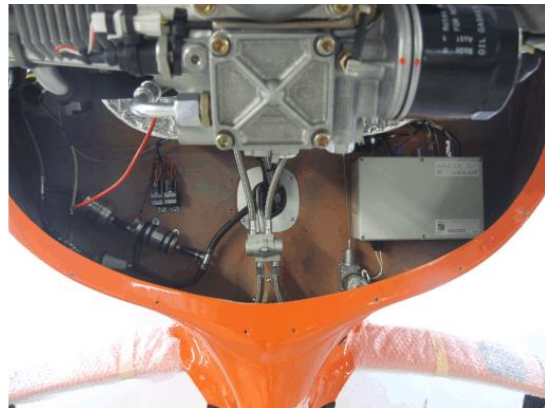


Fig. 3 - Rear Wall 'Installation Wall' (Fire Wall removed)

55-00-00 8-1 REPLACEMENT: KEEL TUBE PROTECTION PAD

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-01 Loctite 221 red (S.VB6015)

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

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

- 1 Remove 2 x bolt and replace protection pad.
- 2 Apply AG-BAS-01 on threads of bolts and tighten.

ILLUSTRATIONS

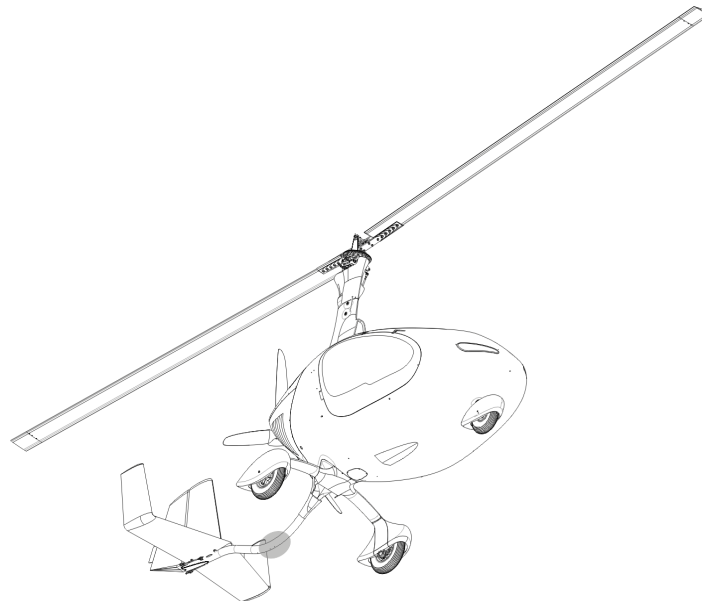


Fig. 1 - Installation position of keel tube protection pad

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 do 'Line Maintenance'
Secure gyroplane against unauthorized or unintended operation!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-02 Loctite 243 blue (S.VB6011)

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

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 bolts (9) with AG-BAS-02 and torque-tighten with 3 Nm in crosswise sequence.

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
1	1	spinner HTC3B, painted	L2 V.KU211	
1	2	M8x110	NPI	
1	3	U8/24	NPI	
1	4	M6x40	NPI	ROTAX 914
1	4	M6x40	NPI	ROTAX 912
1	5	Propeller hub rear	L3 V.KU501.03	ROTAX 912
1	5	Propeller hub front	L3 V.KU502.03	ROTAX 914
1	6		V.KU501.06	ROTAX 912
1	6		V.KU502.05	ROTAX 914
1	7	Propeller hub rear	L3 V.KU502.02	ROTAX 914
1	7	Propeller hub front	L3 V.KU501.02	ROTAX 912
1	8	Spinner Plate	NPI	
1	9		V.MO05.05	
1	10	U4, Poly	NPI	
1	11	torque bush spacer	NPI	
1	12	spacer propeller	NPI	

ILLUSTRATIONS

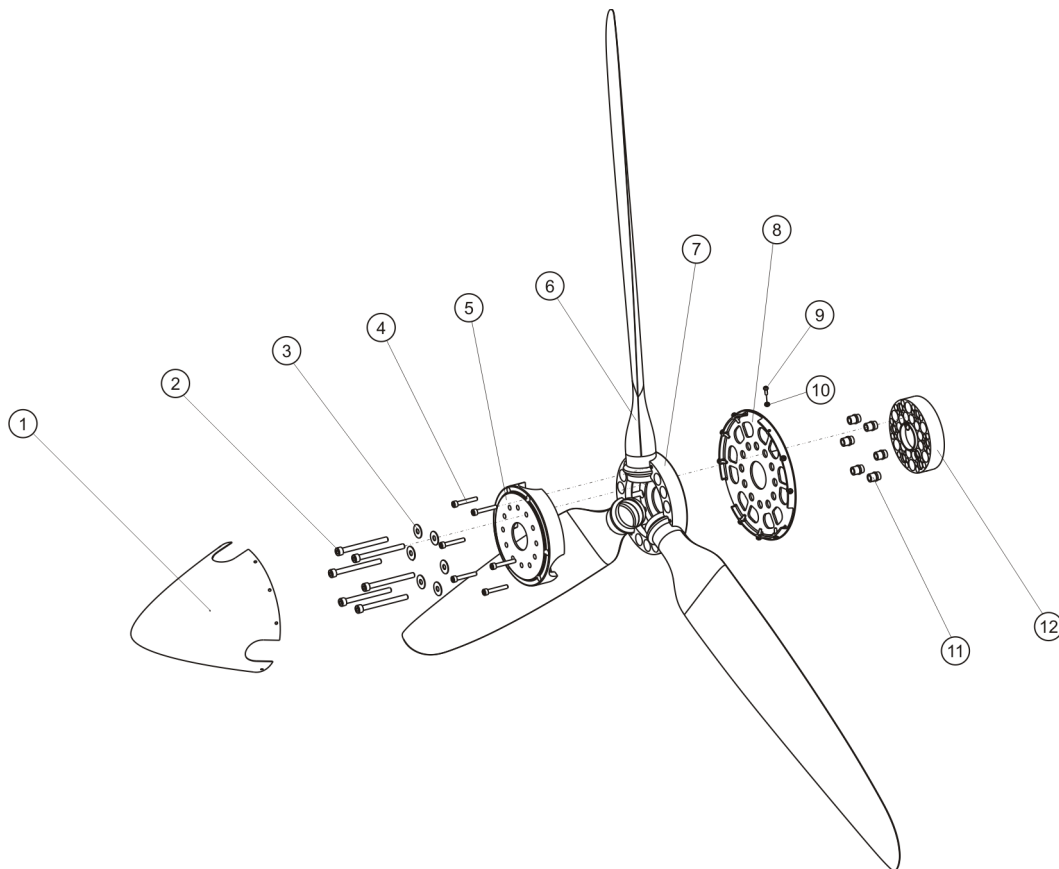


Fig. 1 - Propeller HTC

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 do 'Line Maintenance'!

Propeller must be removed, see [61-10-00 4-1](#)

SPECIAL TOOLS AND CONSUMABLE MATERIALS

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

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.

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
1	1	spinner HTC3B, painted	L2 V.KU211	
1	2	M8x110	NPI	
1	3	U8/24	NPI	
1	4	M6x40	NPI	ROTAX 912
1	4	M6x40	NPI	ROTAX 914
1	5	Propeller hub front	L3 V.KU502.03	ROTAX 914
1	5	Propeller hub rear	L3 V.KU501.03	ROTAX 912
1	6		V.KU501.06	ROTAX 912
1	6		V.KU502.05	ROTAX 914
1	7	Propeller hub rear	L3 V.KU502.02	ROTAX 914
1	7	Propeller hub front	L3 V.KU501.02	ROTAX 912
1	8	Spinner Plate	NPI	
1	9		V.MO05.05	
1	10	U4, Poly	NPI	
1	11	torque bush spacer	NPI	
1	12	spacer propeller	NPI	

ILLUSTRATIONS

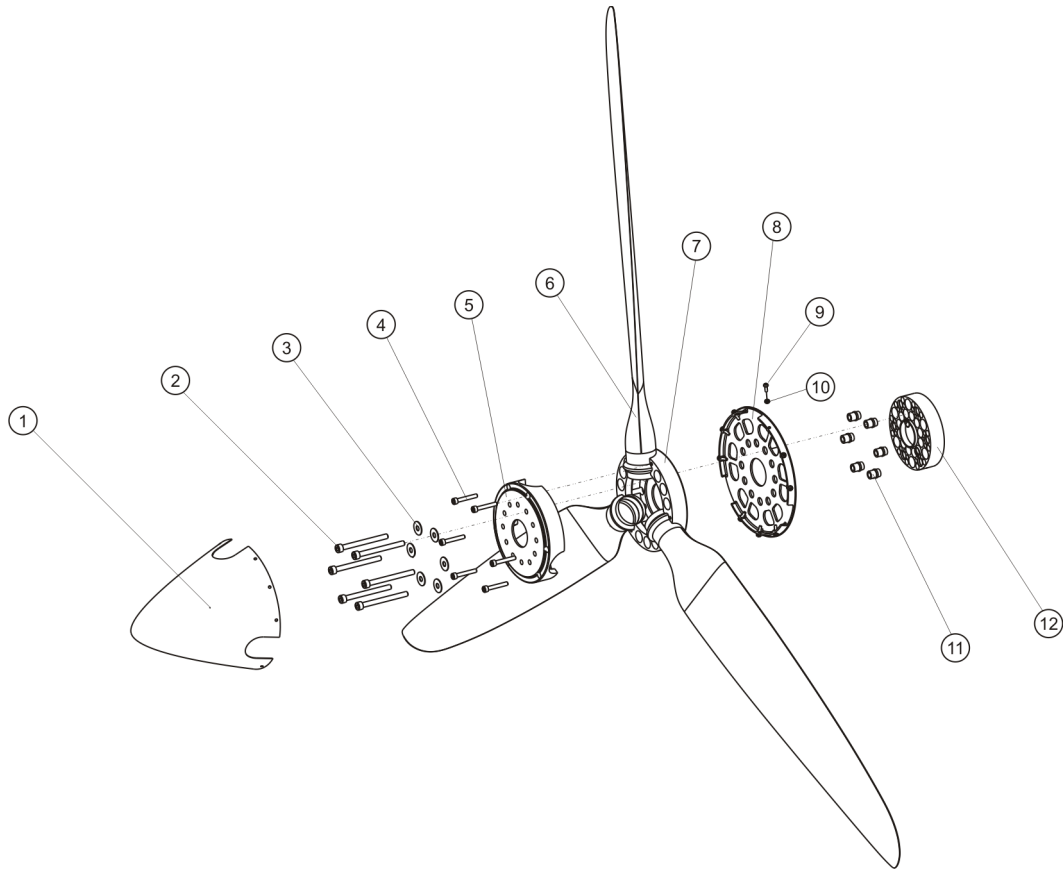


Fig. 1 - Propeller HTC

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 do 'Line Maintenance'!

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

- 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.
- 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.

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
1	1	spinner HTC3B, painted	L2 V.KU211	
1	2	M8x110	NPI	
1	3	U8/24	NPI	
1	4	M6x40	NPI	ROTAX 914
1	4	M6x40	NPI	ROTAX 912
1	5	Propeller hub front	L3 V.KU502.03	ROTAX 914
1	5	Propeller hub rear	L3 V.KU501.03	ROTAX 912
1	6		V.KU502.05	ROTAX 914
1	6		V.KU501.06	ROTAX 912
1	7	Propeller hub rear	L3 V.KU502.02	ROTAX 914
1	7	Propeller hub front	L3 V.KU501.02	ROTAX 912
1	8	Spinner Plate	NPI	
1	9		V.MO05.05	
1	10	U4, Poly	NPI	
1	11	torque bush spacer	NPI	
1	12	spacer propeller	NPI	

ILLUSTRATIONS

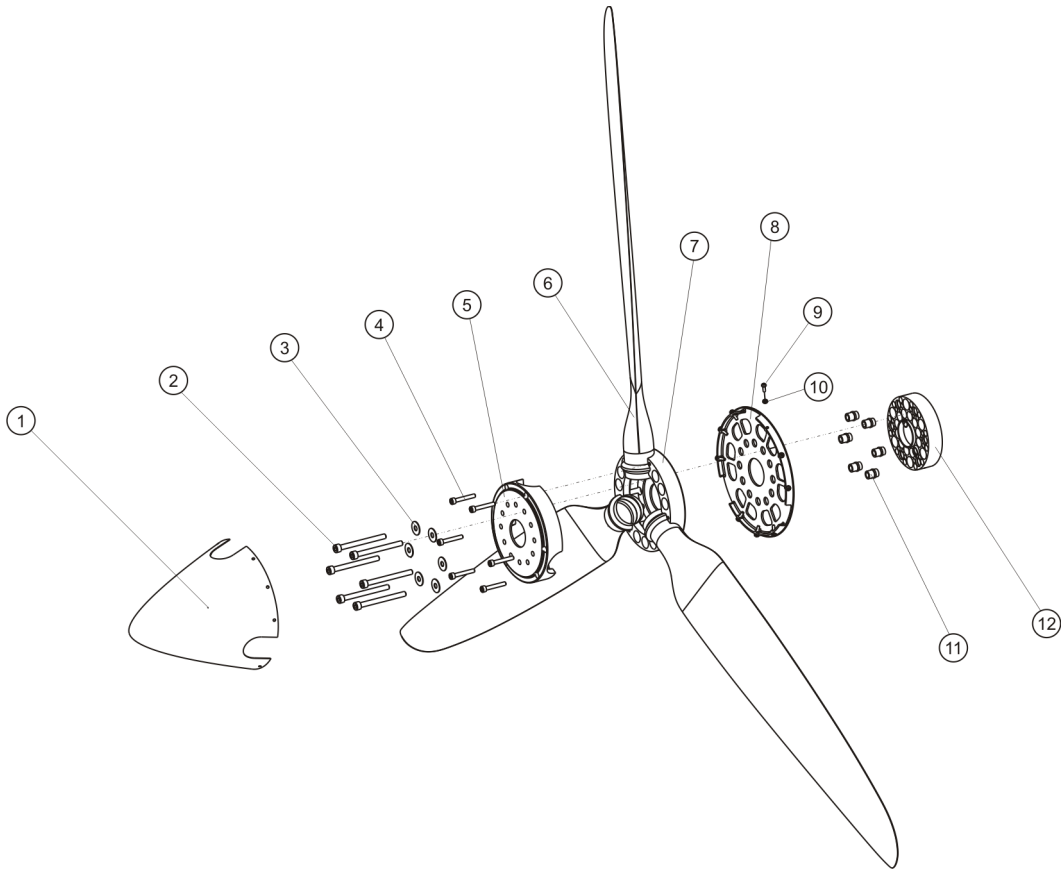


Fig. 1 - Propeller HTC

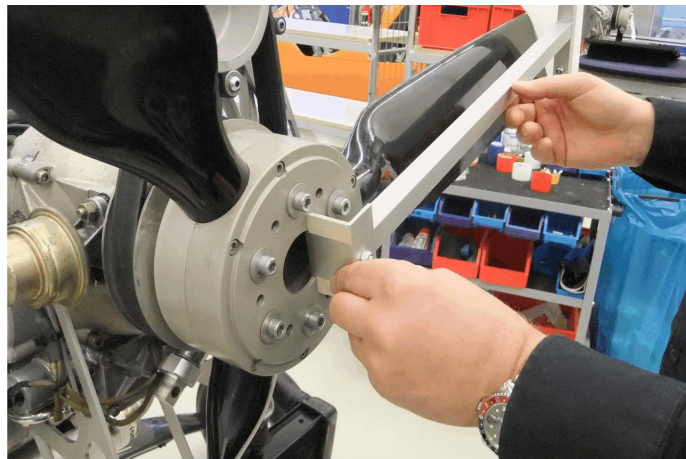


Fig. 2 - Propeller pitch adjustment and tool

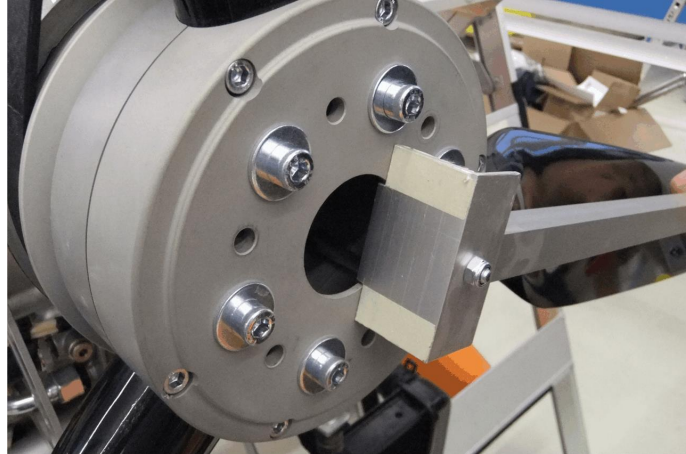


Fig. 3 - Detail hub

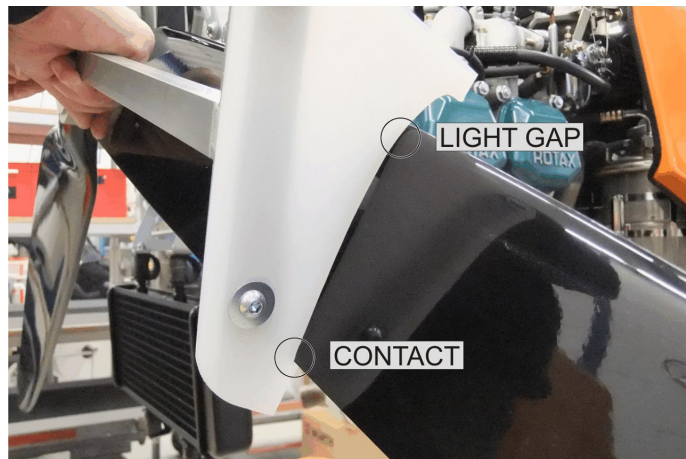


Fig. 4 - Detail blade

61-10-00 8-2 RETROFIT: END POSITION DETECTION IVO PROPELLER 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

PRECAUTIONS AND SAFETY MEASURES

CAUTION: Failure to comply with this instruction will cause the loss of warranty referred and/or related components.

PROCEDURES

- 1 Contents of the kit (Fig. 1):
 - 1) **IVO-Control** with pin assignment
 - 2) **2 x Shrinking Hose** to isolate unused connectors
 - 3) **2 x LED-Mount** for 5mm Status LEDs
 - 4) **3 x Cable Ties** to fixate cables and installation
 - 5) **Blind Plug** to cover installation bore of removed thermo switch

- 2 Pin assignment of wiring harness - top to bottom (Fig. 2):
 - green/white
 - orange/white
 - black
 - green
 - orange
 - red

- 3 Remove all connectors from rocker switch (see Fig. 3)
 Remove resistor pack (if installed) and discard
 Remove thermo switch and close bore with blind plug

- 4 The black ground cable has an extension with a second connector (see Fig. 4).
 Isolate this second connector with the supplied shrinking hose. Squeeze extending hot hose with pliers.

CAUTION: Do not push (or pull) at the LED cables. Use proper tools at LED socket.

- 5 Drill two 8mm holes right hand from the rocker switch (see Fig. 5)
 Deburr holes
 Insert LEDs without mounting ring and fastening nut.

- 6 Fixate LED with mounting ring and nut from behind (see Fig. 6)

CAUTION: Do not mismatch electrical connectors as control board can be destroyed!

- 7 Connect cockpit controls to control board (see Fig. 7, note condensers facing up):
 - white/orange (IVO)
 - white/violett (IVO)
 - black (GND)
 - violett/orange (12V+)

- 8 Connect control board with rocker switch:
 - Switch/position '1a' (top): green/white
 - Switch/position '1' (middle): black
 - Switch/position '1b' (bottom): orange/white

- 9 Insert LEDs in mount (use pliers, if needed)
 LED with cable color orange goes in upper position, green in bottom position
 Check switching and indication logic (Master switch 'ON'):
Press rocker switch 'fine' position
 upper LED must blink, propeller must adjust to fine (take-off)
Press rocker switch 'coarse' pos.

lower LED must blink, propeller must adjust to coarse (cruise)

- 10 Fixate cables and control board with cable ties
- 11 Perform functional check

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
		I/O-end position indicator	L1 V.EL301	

ILLUSTRATIONS

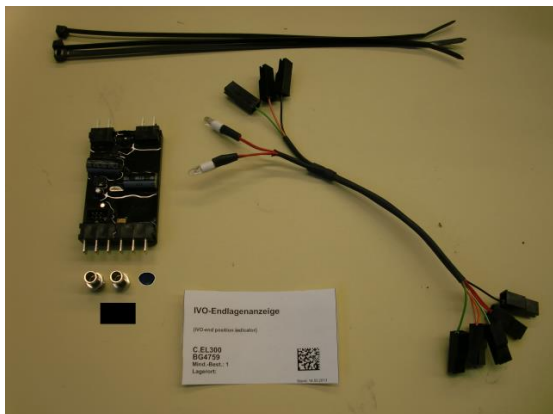


Fig. 1 - Contents of the Kit

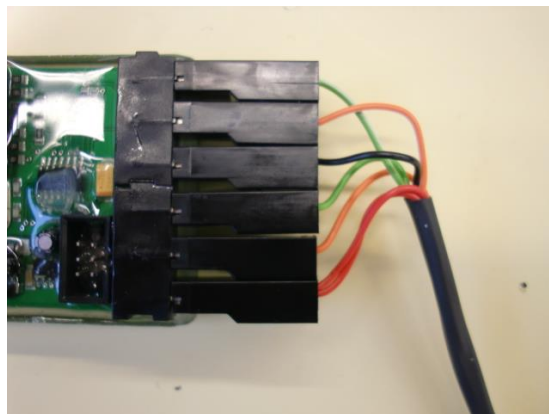


Fig. 2 - Pin assignment of wiring harness

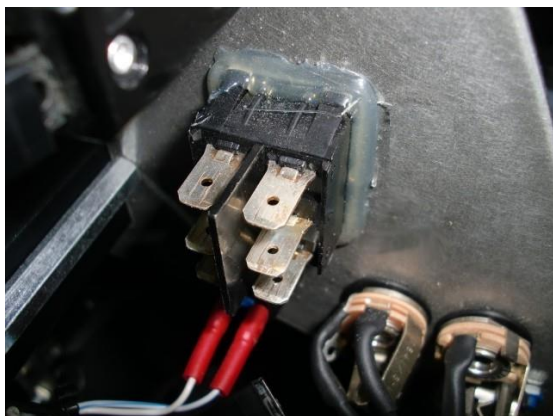


Fig. 3 - Rocker Switch - seen from behind



Fig. 4 - Isolation of cable end



Fig. 5 - Rocker Switch and LED mounting position

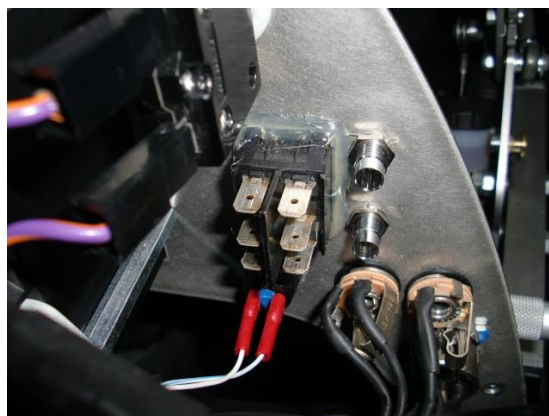


Fig. 6 - Rocker Switch - seen from behind

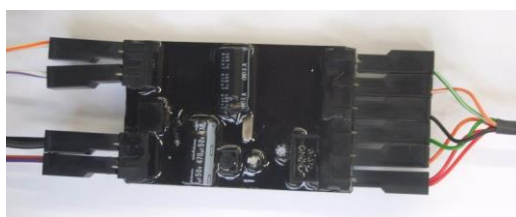


Fig. 7 - Control Board

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 shortcuts on 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

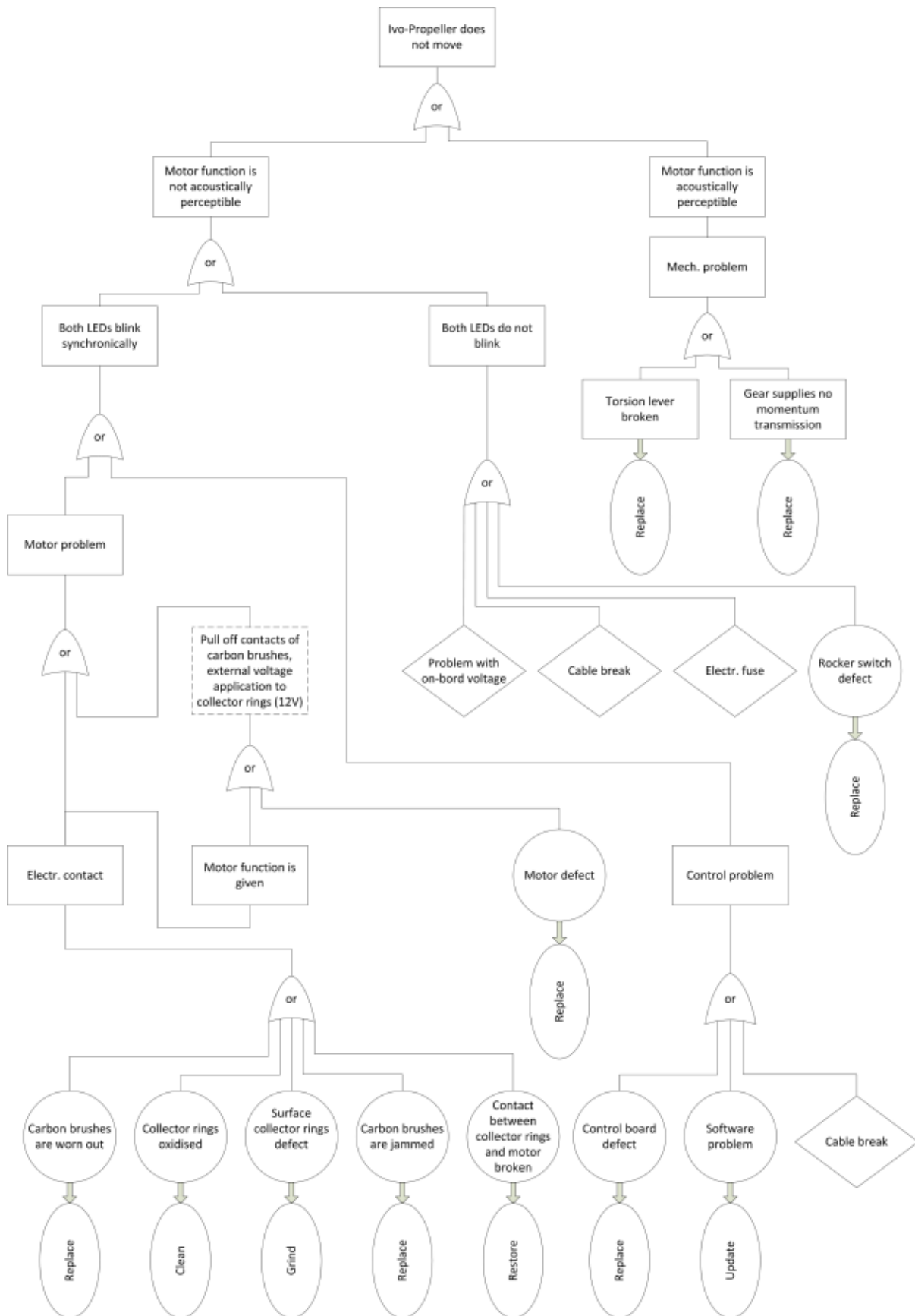


Fig. 1 – Fault Tree IVO Variable Pitch Propeller

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 (S.VB6015)

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

- 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 S.RK13	
1	2	Chimm washer 3,5	L0 S.RK07	
1	3	U13	L0 S.RK13	
1	4	M12 castle nut	L0 S.RK13	
1	5	Split pin 3.2x40	L0 S.RK13	
1	6	Rotor head II compl.	L2 V.RK204	

ILLUSTRATIONS

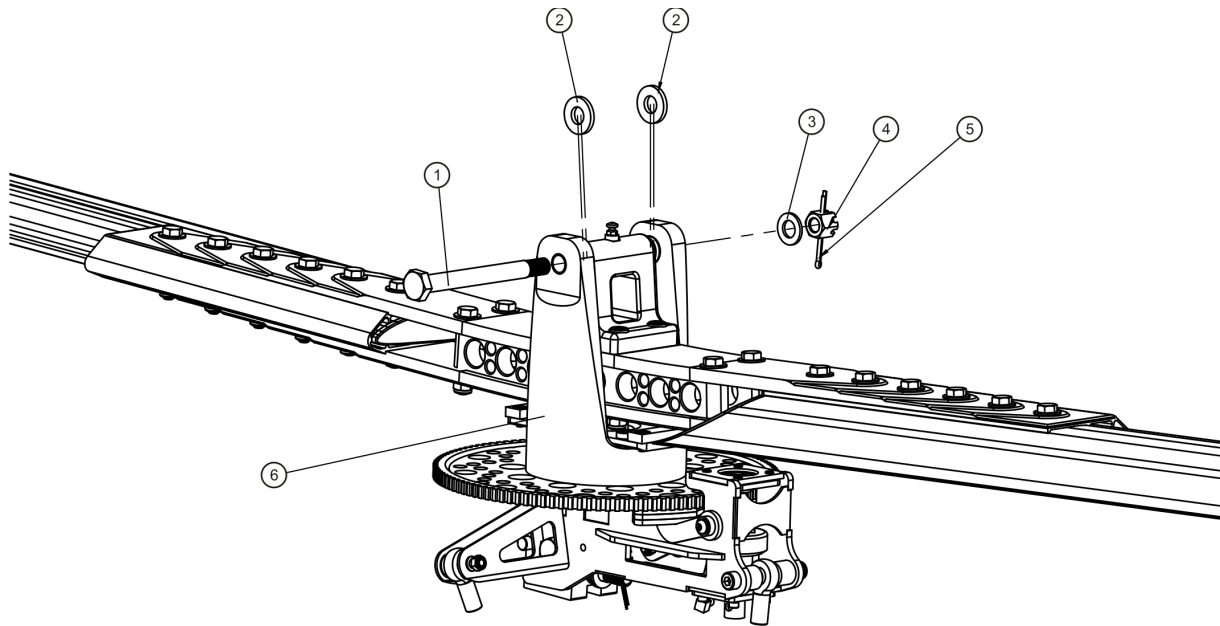


Fig. 1 - Removal rotor - teetering parts (Effectivity: RS II)

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

- 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 Unscrew 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.*

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
1	1	shoulder bolt M8 37/12	L0	S.RK29	
1	1-5	M8x60 Rotor blade bolt 8.8 DIN 610	L0	S.RK30.01	
1	2	shoulder bolt M8 40/12	L0	S.RK29	
1	3	shoulder bolt M8 43/12	L0	S.RK29	
1	4	shoulder bolt M8 46/12	L0	S.RK29	
1	5	M8x60 Rotor blade bolt 8.8 DIN 610	L0	S.RK29.05	
1	6	U9/20	L0	S.RK29	
1	7	Rotorhub II	L1	V.RK301	
1	8	U8	L0	S.RK29	
1	9	M8 Si	L0	S.RK29	
1	10	Clamping profile blade	L1	V.RK301	

ILLUSTRATIONS

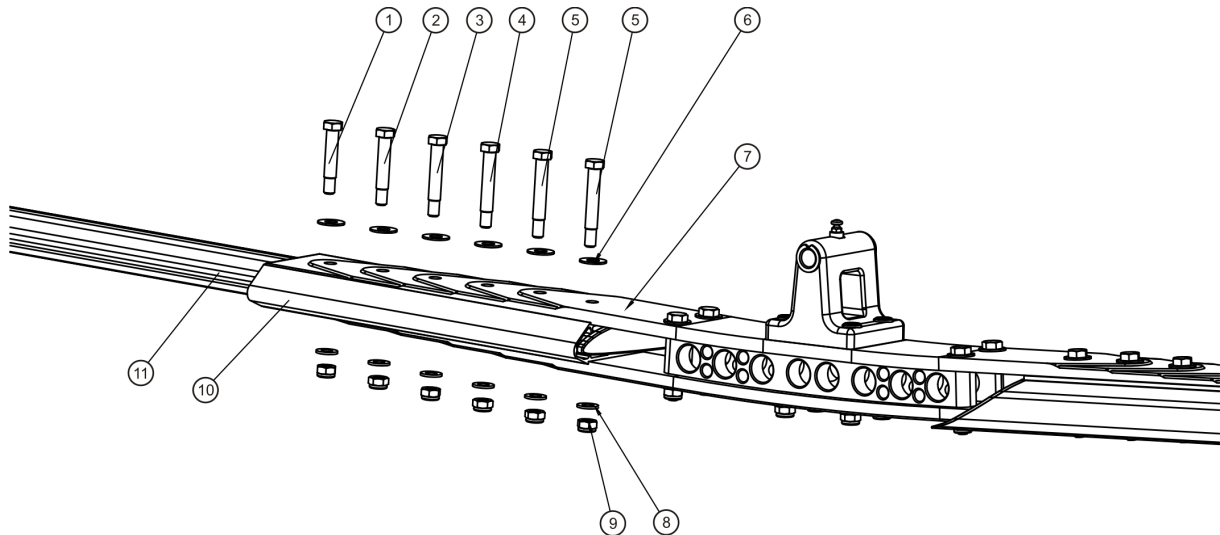


Fig. 1 - Disassembly rotor - teetering parts (Effectivity: RS II)

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

- 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 15 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.

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
1	1	shoulder bolt M8 37/12	L0 S.RK29	
1	1-5	M8x60 Rotor blade bolt 8.8 DIN 610	L0 S.RK30.01	
1	2	shoulder bolt M8 40/12	L0 S.RK29	
1	3	shoulder bolt M8 43/12	L0 S.RK29	
1	4	shoulder bolt M8 46/12	L0 S.RK29	
1	5	M8x60 Rotor blade bolt 8.8 DIN 610	L0 S.RK29.05	
1	6	U9/20	L0 S.RK29	
1	7	Rotorhub II	L1 V.RK301	
1	8	U8	L0 S.RK29	
1	9	M8 Si	L0 S.RK29	
1	10	Clamping profile blade	L1 V.RK301	

ILLUSTRATIONS

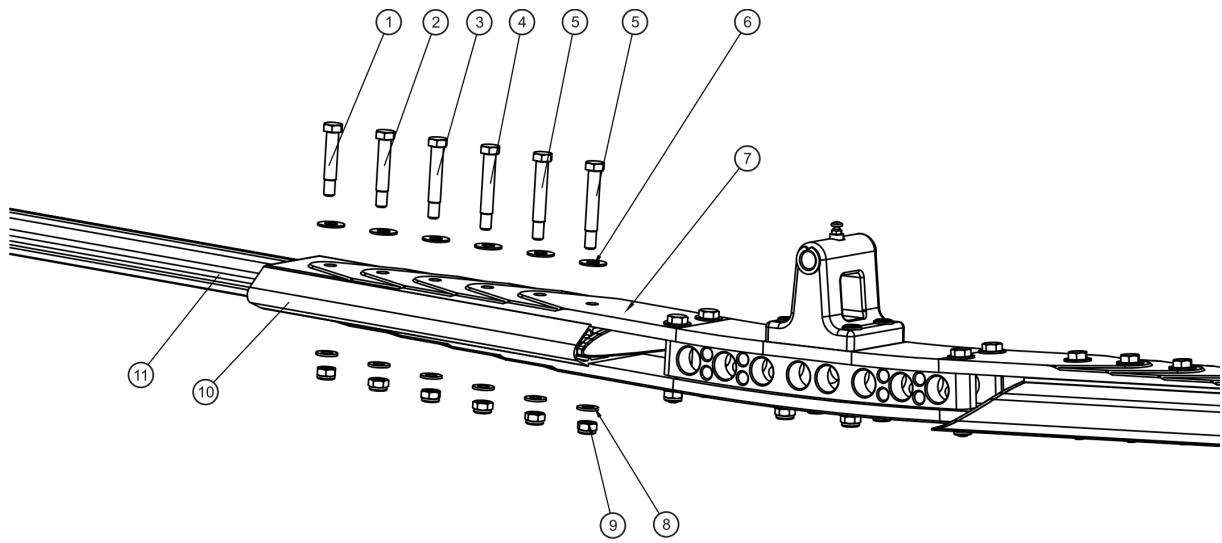


Fig. 1 - Assembly rotor - teetering parts (Effectivity: RS II)

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 Lagermeister WHS 2002 Grease (S.VB6007)

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

- 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.
- 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.

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
1	1	Teeterbolt	L0 S.RK13	
1	2	Chimm washer 3,5	L0 S.RK07	
1	3	U13	L0 S.RK13	
1	4	M12 castle nut	L0 S.RK13	
1	5	Split pin 3.2x40	L0 S.RK13	
1	6	Rotor head II compl.	L2 V.RK204	

ILLUSTRATIONS

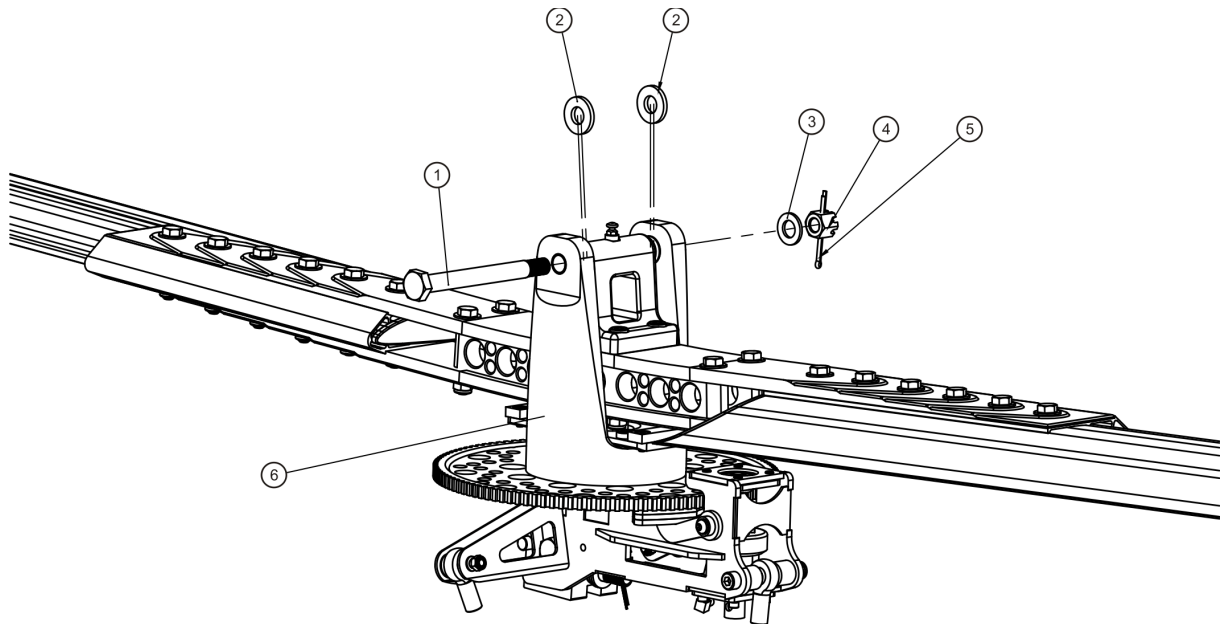


Fig. 1 - Installation rotor - teetering parts (Effectivity: RS II)

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 do '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

- 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).
- 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 15 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.
- 8 Perform final linearity/alignment check. If necessary, repeat procedure from step 5 on.

ILLUSTRATIONS

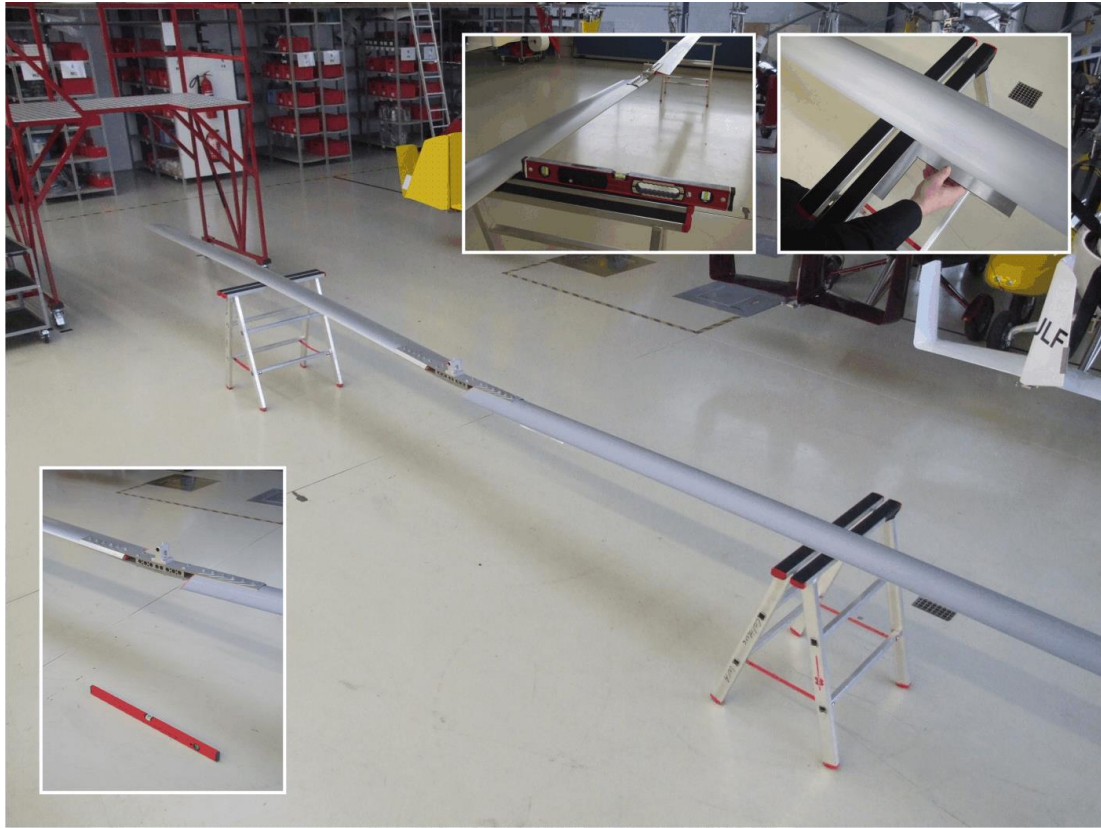


Fig. 1 - Rotor system placed on stands

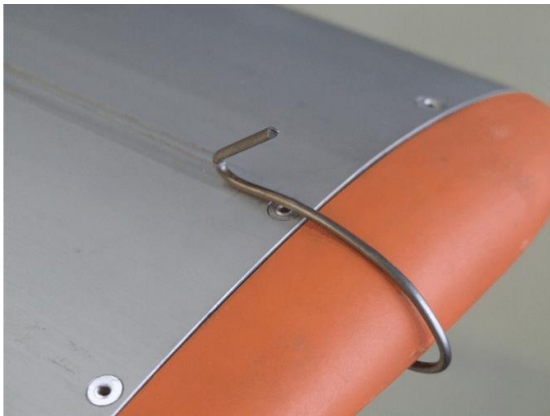


Fig. 2 - Positioning of measuring cord

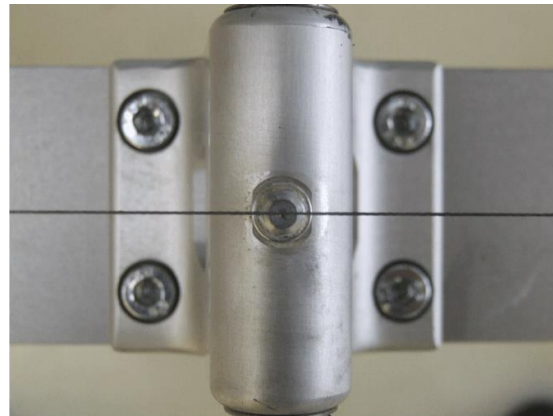


Fig. 3 - Reference point at grease nipple

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 do 'Line Maintenance'!

Rotor system must be removed, see [62-11-00 4-1](#)

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-GRS-01 Lagermeister WHS 2002 Grease (S.VB6007)

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

- 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](#).

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
1	1	Bushing TEF-MET 13/16/21x30	L0 S.RK13	
1	2	Bushing TEF-MET 13/15/21x5	L2 S.RK13.06	
		Teeterbolt kit	L0 S.RK13	

ILLUSTRATIONS

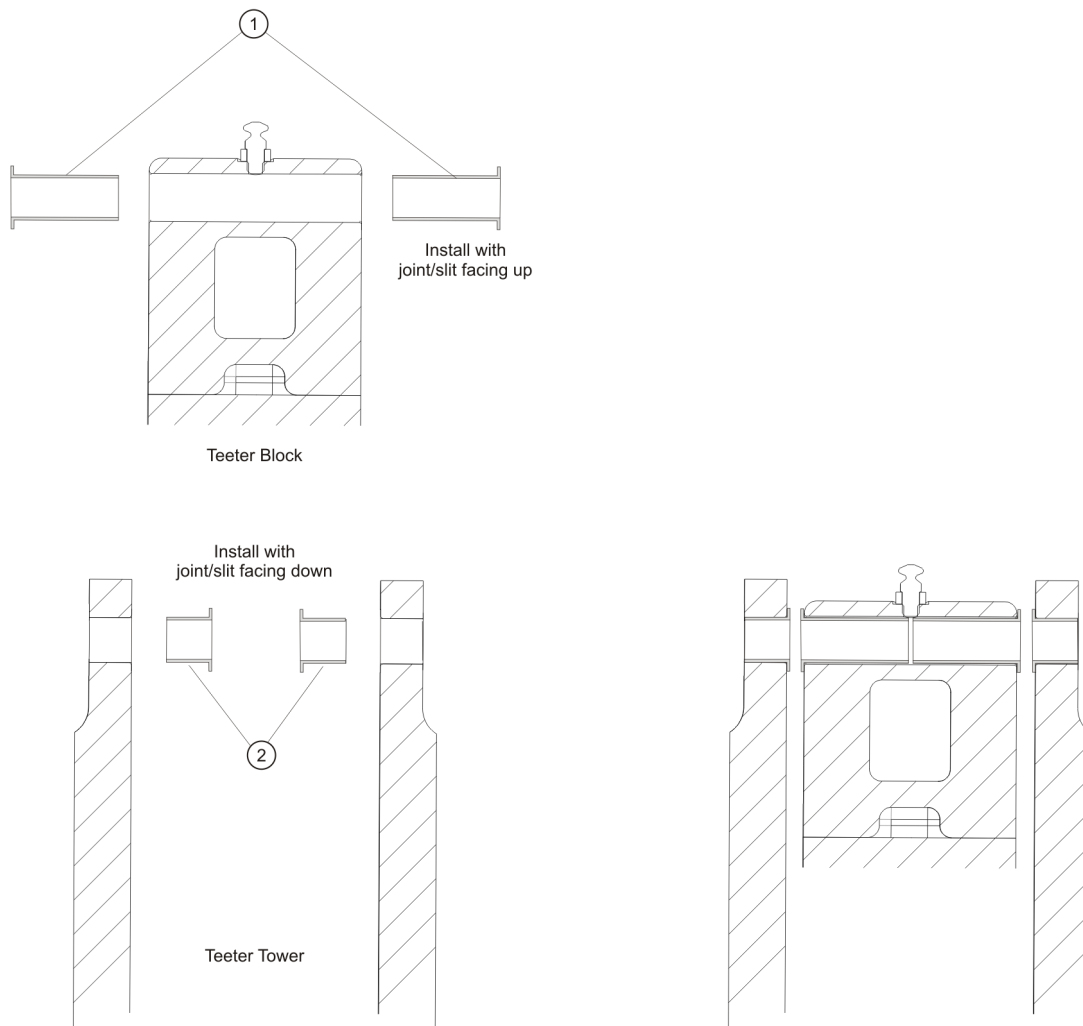
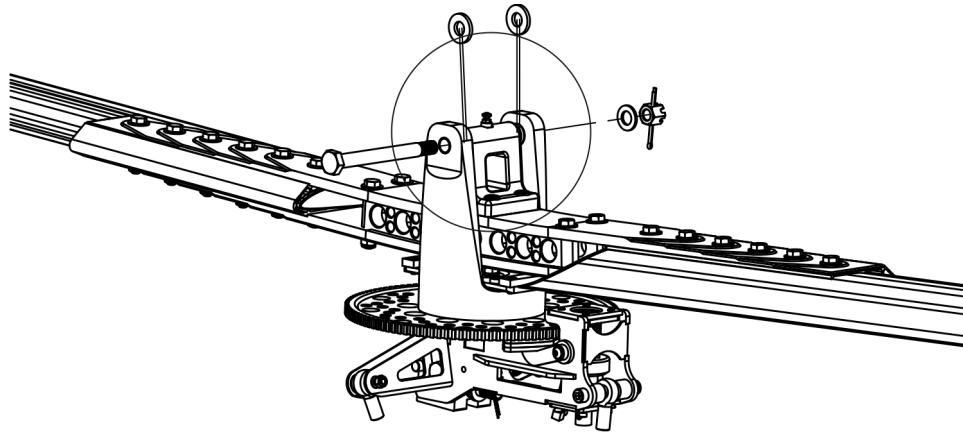


Fig. 1 - Teeter bushings, block and tower - cross section view

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

- 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

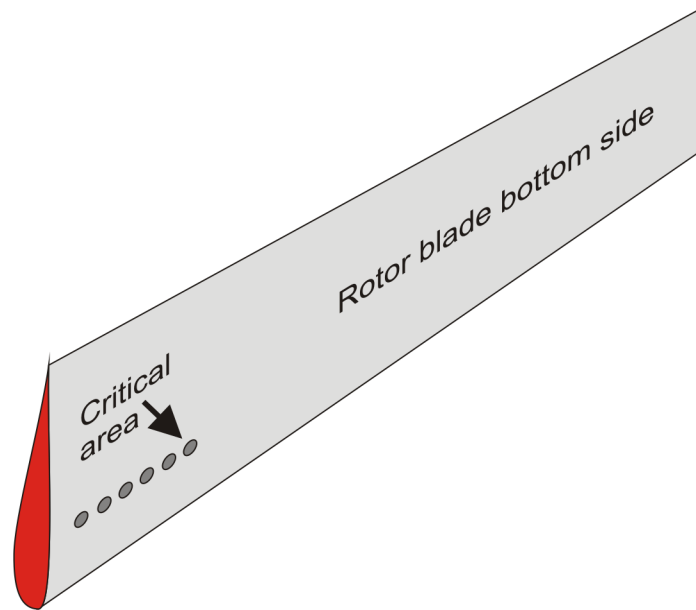


Fig. 1 - Critical blade area

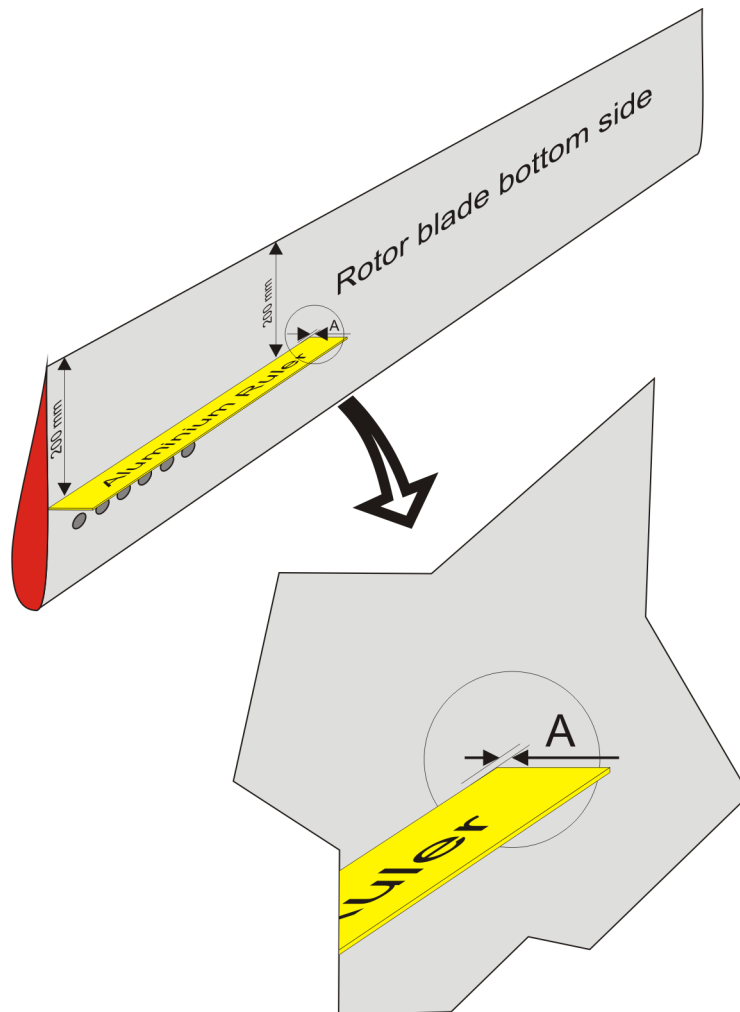


Fig. 2 - Measurement of blade root linearity

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 do '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 Lagermeister WHS 2002 Grease (S.VB6007)

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

- 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.

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
1	1	M8x60 Rotor blade bolt 8.8 DIN 610	L0 S.RK31.02	
1	2	U9/20	L1 S.RK31	
1	3	U8	L1 S.RK31	
1	4	M8 Si	L1 S.RK31	

ILLUSTRATIONS

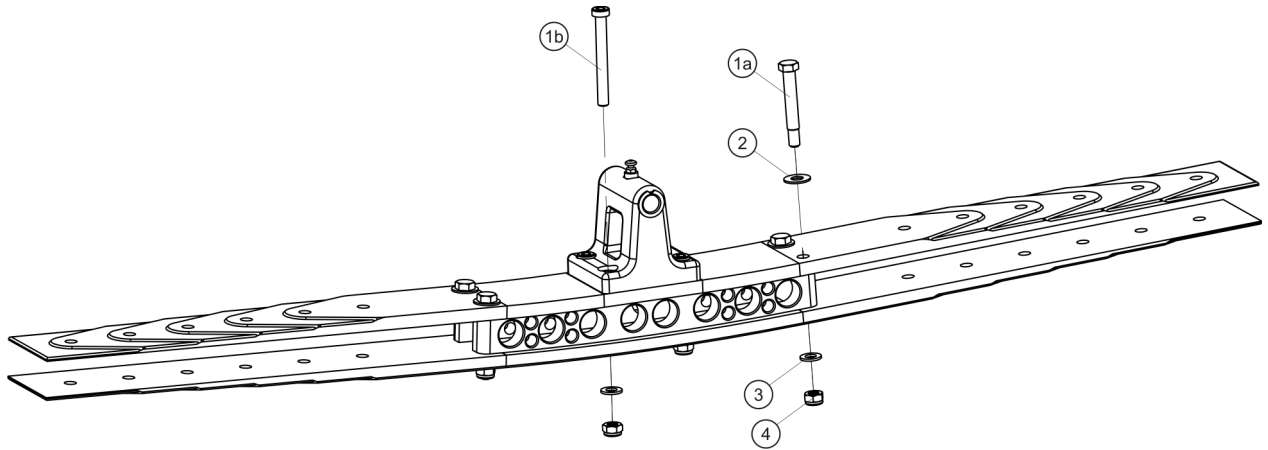


Fig. 1 - Rotor hub

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 do 'Line Maintenance'!

Mast cover must be removed, see [52-00-00 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: Wear eye protection and mind FOD when removing attachment hardware!

PROCEDURES

- 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 teeter stops (4) for correct attachment and condition.
- 3 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.
- 4 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 S.RK14	
1	2	M20 castle nut flat	NPI	
1	3		V.RK204.11.01	
1	4		V.RK204.11.03	
1	5	Rotorhub bottom mounted	NPI	
1	6	M20x1_5x73,8	NPI	

ILLUSTRATIONS

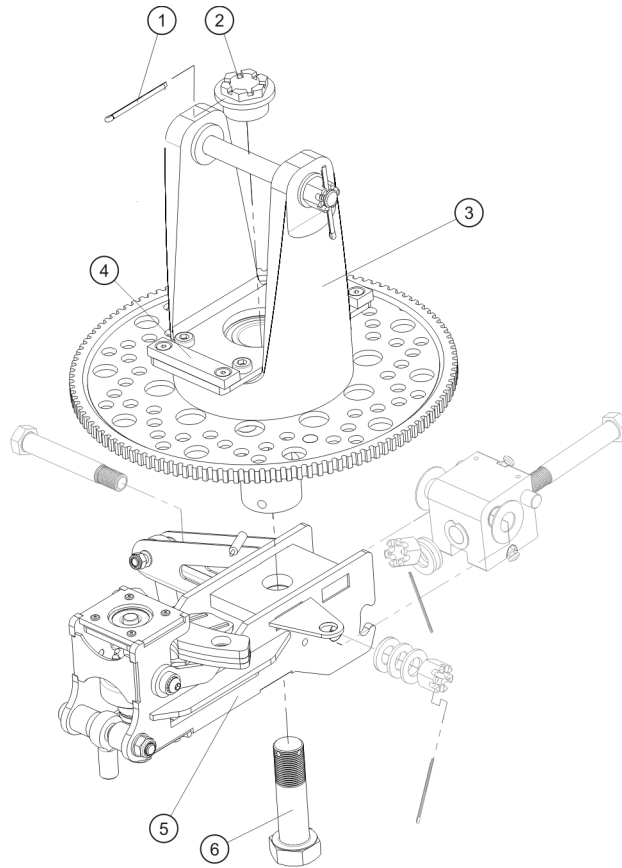


Fig. 1 - Rotor head bridge, bearing and teeter tower

62-32-00 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 do 'Line Maintenance'!

Rotor system must be removed, see [62-11-00 4-1](#)

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-GRS-01 Lagermeister WHS 2002 Grease (S.VB6007)

S.WZ3002 Inklinometer / Digital Spirit Level

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

- 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 centre console horizontal.
- 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.

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
1	1	ROLL/PITCH BOLT	L2 V.RK204.17	
1	2	axial bushing 14	NPI	
1	3	disc spring 12,2X25,0X0,9 drilled 14,5	NPI	
1	4	Gimbal head II	L2 V.RK204.26	
1	5	U13	NPI	
1	6	M12 castle nut	NPI	
1	7	Split pin 3.2x50	NPI	
1	8	ROLL/PITCH BOLT	L2 V.RK204.17	
1	9	U13	NPI	
1	10	M12 castle nut	NPI	
1	11	Split pin 3.2x50	NPI	

ILLUSTRATIONS

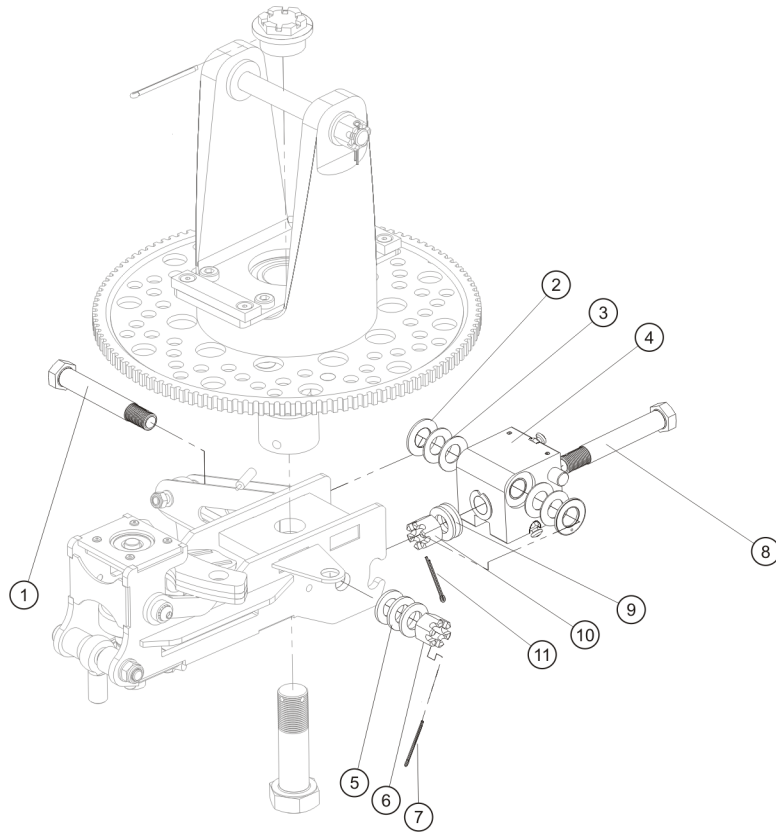


Fig. 1 - Rotor gimbal head - Version II

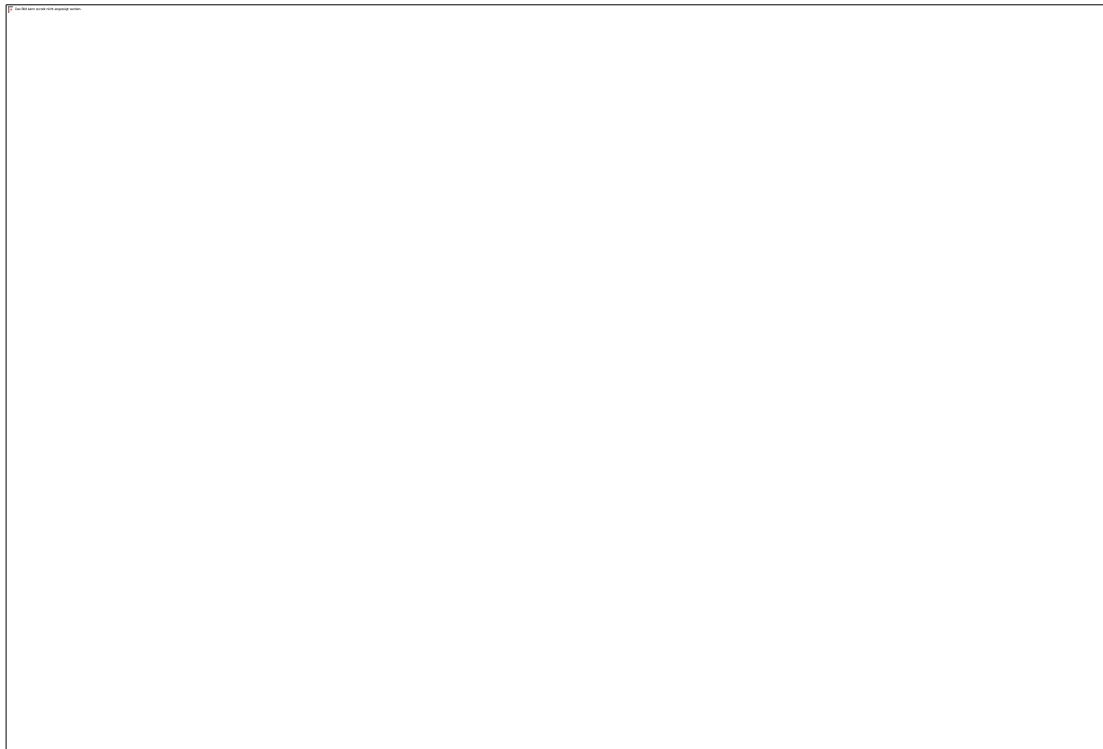


Fig. 2 - Arrangement of spring washers on gimbal head - Version II

62-51-00 6-1 INSPECTION: MAST MOUNTING BUSHINGS

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Rotor system must be removed, see [62-11-00 4-1](#)

Secure gyroplane against unauthorized or unintended operation!

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

A suitable stand should be used if possible!

Work should be performed with the aid of a second briefed person!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

S.WZ6008 Spring balance / Dynamometer

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

- 1 Neutral mast position, no force applied: Measure diagonal distance from mast reference point to fuselage reference point (see illustrations in Fig. 1) and record value 'A' in protocol.
- 2 Repeat measurement with 150 N, applied horizontally in flight direction (see Fig. 1). Record value 'B' in protocol.
- 3 Calculate deflection value 'A-B' and record in protocol. If deflection 'A-B' exceeds 5 mm, contact AutoGyro customer support.
- 4 If advised by AutoGyro, repeat measurement with 150 N, applied against flight direction (see Fig. 1).

ILLUSTRATIONS

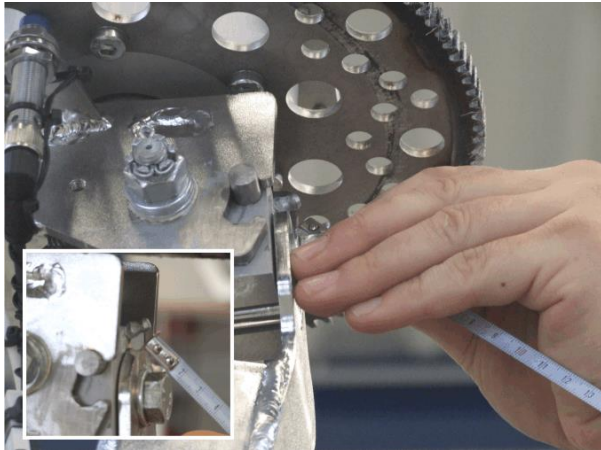


Fig. 1 - Mast reference point



Fig. 2 - Fuselage reference point



Fig. 3 - Force applied in flight direction

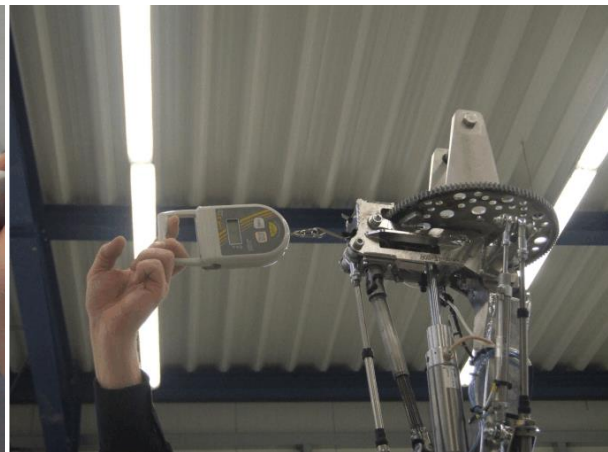


Fig. 3 - Force applied against flight direction

63-11-10 5-1 CHECK-ADJUSTMENT: PRE_ROTATOR CLUTCH

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

Rotor system must be removed, see [62-11-00 4-1](#)

Engine cowlings must be removed, see [52-00-00 4-1](#)

Mast cover must be removed, see [52-00-00 4-1](#)

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-LUB-03	Würth HHS2000 Oil Spray (S.VB6006)
V.WZ3021	Adjusting Tool Pre-Rotator (CV)
V.WZ3025	Adjusting Scale Pre-Rotator Clutch (CV)
V.WZ3028	Thread Pin M8x50

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

- 1 Remove shear bolt between Bendix shaft and upper pre-rotator drive (Fig. 1), remove upper pre-rotator drive.
- 2 Remove M8x20 screw plug 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 V.WZ3028 (Fig. 2) so that the crankshaft is blocked.
- 3 Connect check valve to pressure reducer (see Fig. 3), free flow through check valve in direction to pressure reducer.
- 4 Install pressure gauge with T-piece between pre-rotator clutch and pressure reducer (Fig. 4).
- 5 Switch pneumatic mode selector to FLIGHT, activate and hold pre-rotator until compressor stops working. The pressure gauge connected between the pre-rotator clutch and the pressure reducer must display about 5 bar.

IMPORTANT NOTE: For the following measurement, ensure that pre-rotator spline shaft is in a vertical position and that scale and adjusting lever form a right angle.

- 6 Slide adjusting lever on the pre-rotator spline shaft, hook scale in adjusting lever and pull scale until the clutch slips noticeably (Fig. 5). Scale must display a breakout force of 80 N \pm 5 N (or a breakout torque on the spline shaft of 40 Nm \pm 2.5 Nm)
- 7 If necessary adjust pre-rotator clutch via knurled nut on the pressure reducer (Fig. 6) until a breakaway force of 80 N \pm 5 N is achieved on the adjusting lever. Secure adjustment with knurled nut. Upon finalisation a pressure between 5 and 7 bar should be readable on the pressure gauge. If the given values are not achieved execute [63-11-10 6-1](#).
- 8 Remove all adjustment tools and auxiliary devices from the gyroplane, reconnect pneumatic hoses to the pressure reducer (Fig. 6).
- 9 Switch pneumatic mode selector to BRAKE.
- 10 Remove thread pin V.WZ3028. Install screw plug with new copper seal ring and tighten with a torque of 15 Nm. For checking, carefully turn propeller by hand.
- 11 Lubricate pre-rotator spline shaft with AG-LUB-03, insert upper pre-rotator drive, install shear bolt between Bendix shaft and upper pre-rotator drive (Fig. 1).

ILLUSTRATIONS



Fig. 1 - Upper pre-rotator drive connected to Bendix shaft



Fig. 2 - Thread Pin M8x50



Fig. 3 - Connection of check valve to pressure reducer



Fig. 4 - Connection between clutch and pressure reducer

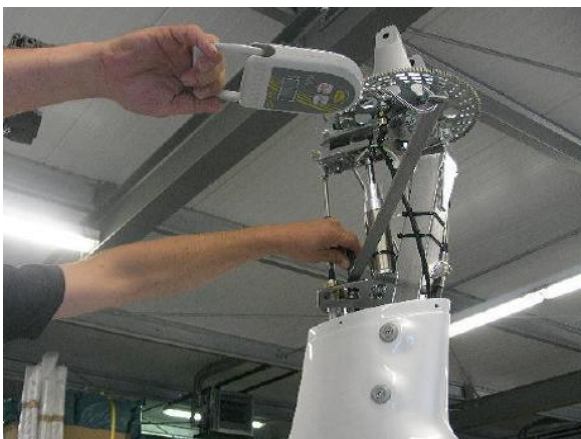


Fig. 5 - Measurement of breakout torque



Fig. 6 - Pressure reducer

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 do '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

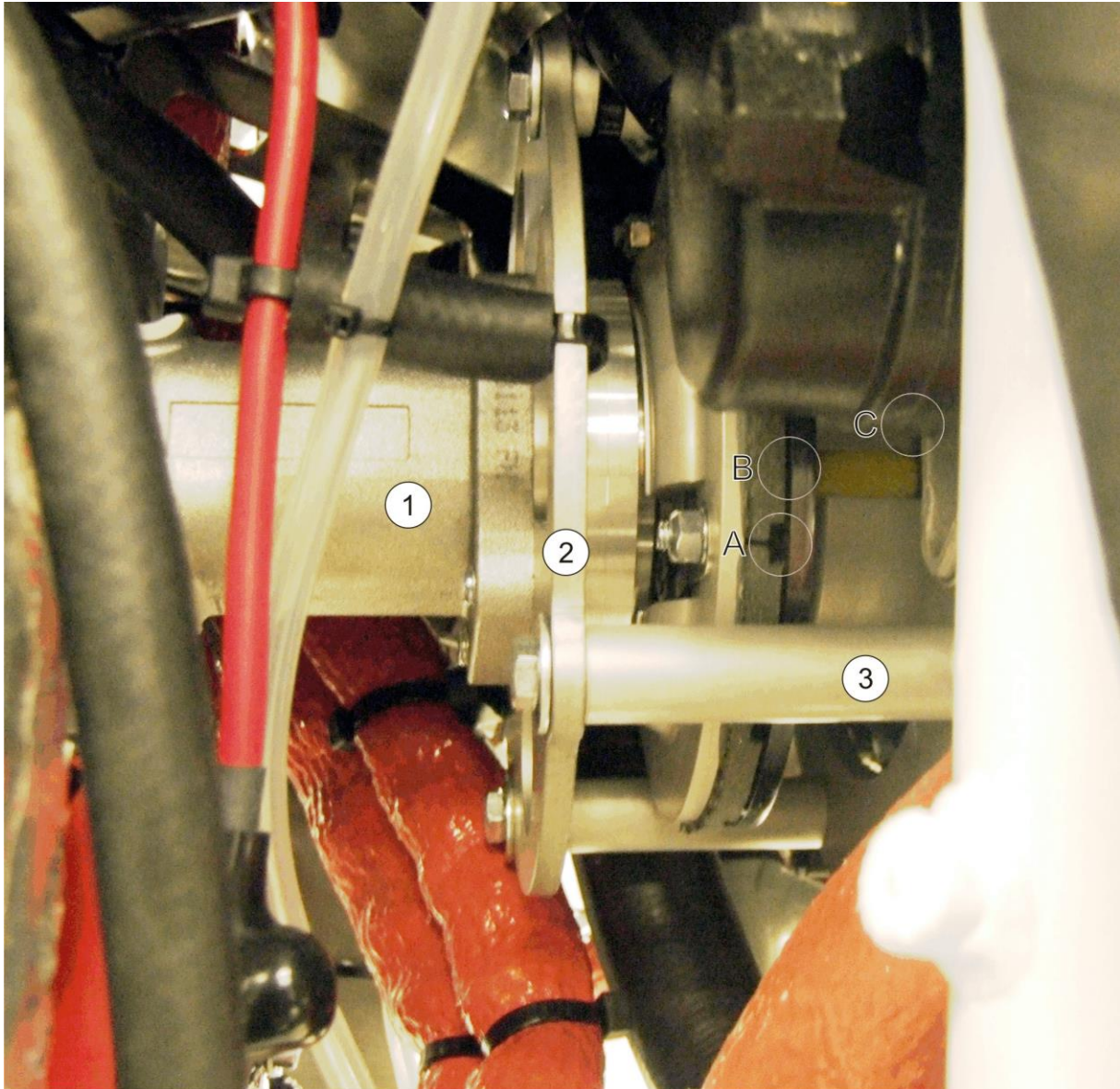


Fig. 1 - Pre-rotator clutch with attach ring

63-11-30 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 do '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 Lagermeister WHS 2002 Grease (S.VB6007)

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](#).
IMPORTANT NOTE: adjustment job is classified as heavy maintenance (HVY)!
- 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](#).
IMPORTANT NOTE: adjustment job is classified as heavy maintenance (HVY)!
- 5 Grease with AG-GRS-01.

ILLUSTRATIONS

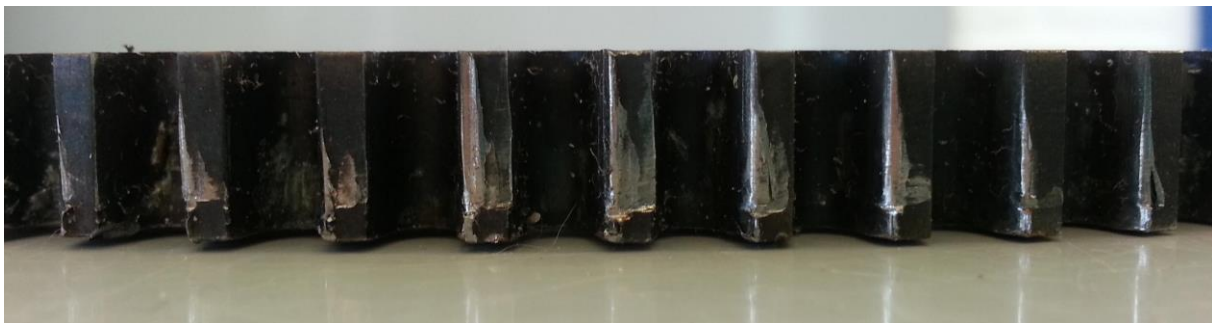


Fig. 1 - Wear Pattern (uneven)

63-51-00 8-1 REPLACEMENT: ROTOR BRAKE PAD

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to do '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-BAS-02 Loctite 243 blue (S.VB6011)

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

NOTE: Brake pad can be replaced without disassembly of the rotor head.

- 1 Turn rotor so that bolts (1) can be accessed through the holes in the pre-rotator sprocket disc.
- 2 Unscrew bolts (1) and replace brake pad (2). Dispose of properly!
- 3 Install new brake pad.
- 4 Apply AG-BAS-02 on threads, install bolts (1) and tighten.

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
1	1	M6x8 Countersunk	NPI	
1	2	Brake pad assembly	L1 V.RK204.25.11.07	
1	3	brake pad ground plate	NPI	
1	4	M6 35/8	NPI	
1	6	Spacer 13-5,5/10-6/6	NPI	

ILLUSTRATIONS

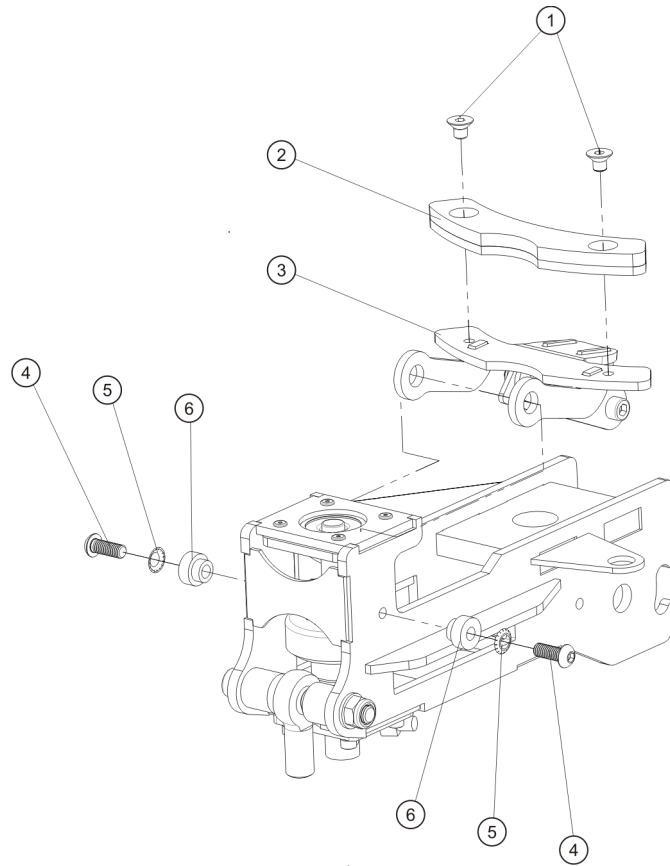


Fig. 1 - Rotor bridge with brake pad

67-00-00 6-1 INSPECTION: FLIGHT CONTROL PUSH-PULL CABLES

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

Mast cover must be removed, see [52-00-00 4-1](#)

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

- 1 Inspect upper attachment points of pitch and roll control push-pull cables. Check firm installation, colour seal intact. Check condition of rubber seal.
- 2 Inspect lower attachment point of pitch control push-pull cable. Check firm installation, colour seal intact.
- 3 Inspect lower attachment point of roll control push-pull cable. Check firm installation, colour seal intact.
- 4 Check free play of the pitch control push-pull cable. In order to do so, modify the rotor head stop using the shaft of a drill or similar (see Fig. 1) and apply a minimum of 8 bar of brake pressure. Measure free play / dead travel of flight control stick as depicted in Fig. 1.
- 5 Check free play of the roll control push-pull cable. Measure lateral free play / dead travel of flight control stick against the natural friction of the gimbal head.
- 6 If free play in any control axis exceeds 8 mm at control stick head contact AutoGyro customer support.

ILLUSTRATIONS



Fig. 1 - Pitch and Roll - upper attachment

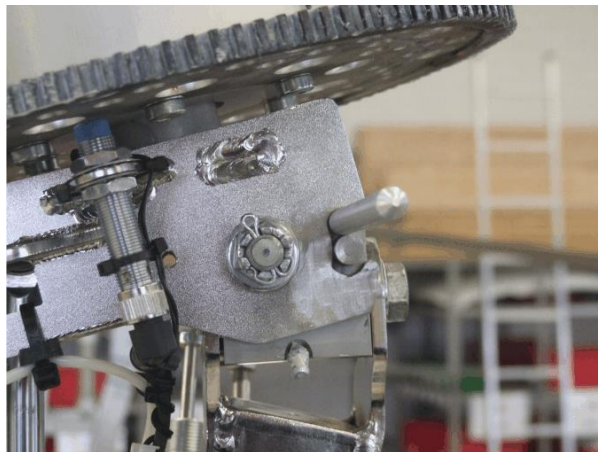


Fig. 2 - Modification of rotor head stop



Fig. 3 - Measurement of freeplay

67-10-00 4-1 REMOVAL-INSTALLATION: CENTRE CONSOLE

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to do 'Line Maintenance'!
Secure gyroplane against unauthorized or unintended operation!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

Removal

- 1 Untighten the 3 central bolts by about 5 revolutions.
- 2 Unscrew and remove the 10 circumference bolts.
EFFECTIVITY: Cabin heating installed
- 3 Remove dummy plug and unscrew bolt in order to detach heating control lever from heating control valve (use a 2.5 mm round head Allen key).
- 4 Apply tape at the surrounding areas as surface protection.
- 5 Pull console aft and slip-out brake fluid reservoir (front).

Installation

- 6 Re-install in reverse order (work steps 5 to 1)

**NOTE: The heating control lever is connected to the valve by a force-type connection.
Ensure correct installation and operation!**

ILLUSTRATIONS

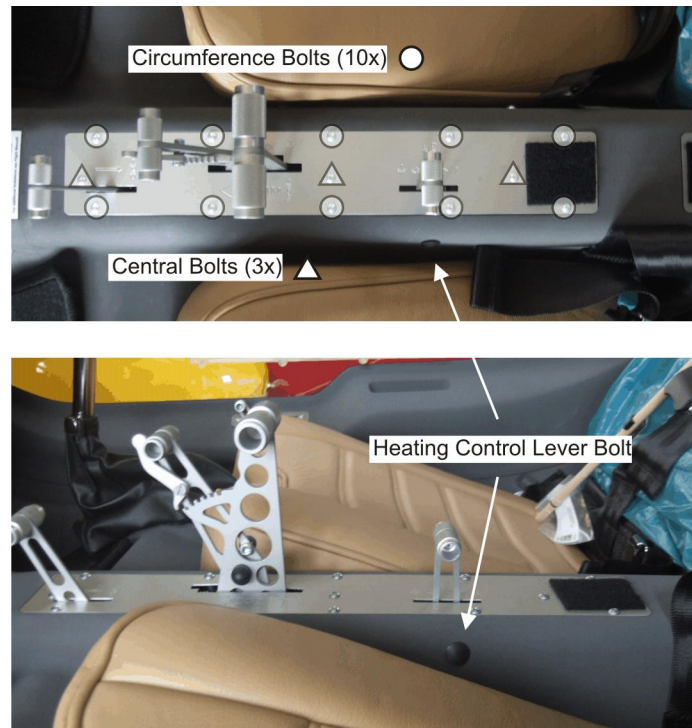


Fig. 1 - Centre Console

71-20-00 6-1 INSPECTION: CLEARANCE ENGINE INSTALLATION (R914) **LNE**

GENERAL, REFERENCES AND REQUIREMENTS

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

Engine cowlings must be removed, see [52-00-00 4-1](#)

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

NOTE: A clearance of less than 3 mm between airbox and engine support and/or wear marks may indicate worn-out engine mounting bushings. If the following work steps do not corrects the situation the engine mounting bushings must be replaced [71-20-00 8-1](#).

- 1 Untighten the connection couplings (see markings in Fig. 1).
- 2 Adjust clearance of at least 5 mm.
- 3 Tighten the connection couplings.

ILLUSTRATIONS



Fig. 1 - Clearance airbox to engine mounting frame (R914)

71-30-00 4-1 REMOVAL-INSTALLATION: FIRE WALL

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to do 'Line Maintenance'!
Engine cowlings must be removed, see [52-00-00 4-1](#)

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

Removal

NOTE: The removable part actually consists of two parts joint by connecting bolts which, in most cases, do not need to be separated at removal or installation.

- 1 Remove air intake box.
- 2 Remove 24 x attachment bolt with plastic washer.
- 3 Carefully pull out fire wall - removable part(s).

Installation

- 5 Install fire wall in reverse order (work steps 3 to 1) using moderate torque.

ILLUSTRATIONS

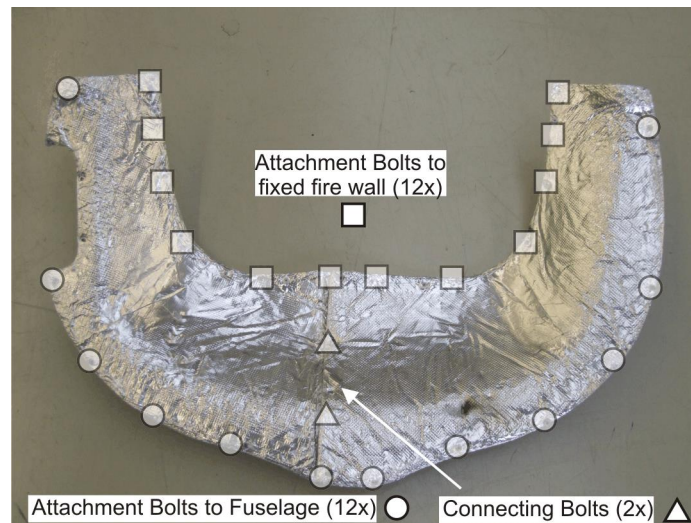


Fig. 1 - Fire Wall - removable part(s)

75-00-00 8-2 MODIFICATION: RECONFIGURE FAN REVERSE

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

Engine cowlings must be removed, see [52-00-00 4-1](#)

Fire wall must be removed, see [71-30-00 4-1](#)

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

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

PROCEDURES

- 1 Disconnect battery according to [24-30-00 4-1](#), work steps 1 - 2.
- 2 Detach fan reverse control unit (Fig. 1) from rear wall, cut fan reverse cable (Fig. 2) and remove fan reverse control unit.
- 3 Isolate red wire 0,5 mm² and black wire 0,5 mm² with shrinking hoses and remove insulation of all 1,5 mm² wires (Fig. 2).
- 4 Crimp isolated butt connectors to wires and connect red/red and black/black (Fig. 3). Make sure connectors are properly isolated to avoid shortcut.
- 5 Secure cable and connectors with cable ties according to Fig. 4.
- 6 Re-connect battery according to [24-30-00 4-1](#), work steps 2 - 1.
- 7 Perform functional check.

PARTS LIST

Fig. Pos. Description	PC PIT	Remark
Replacement set Mast Attachment	L2 V.RA09	

ILLUSTRATIONS



Fig. 1 - Fan reverse control unit

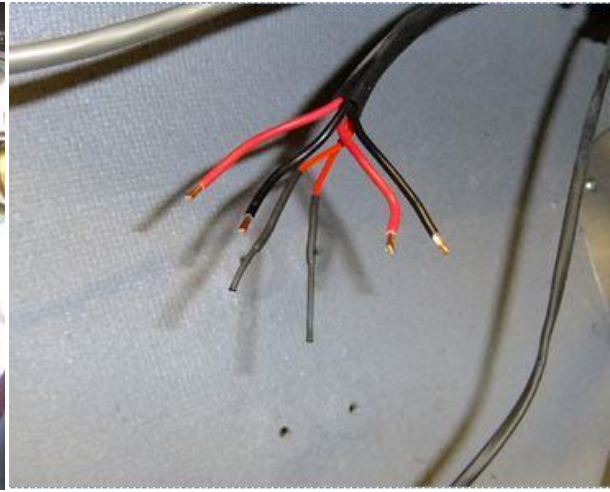


Fig. 2 - Fan reverse cable - detached

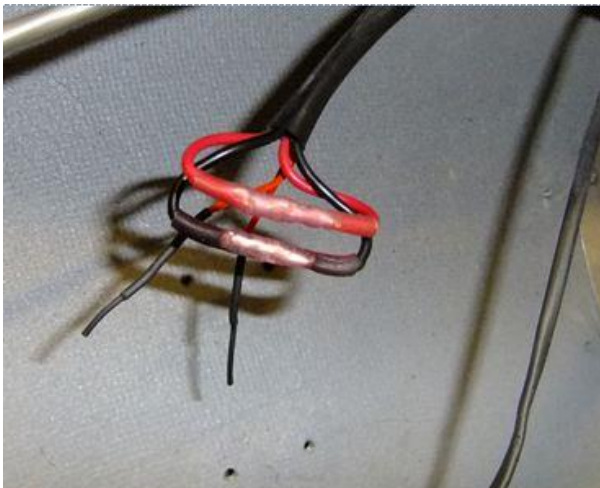


Fig. 3 - Fan reverse cable - modified

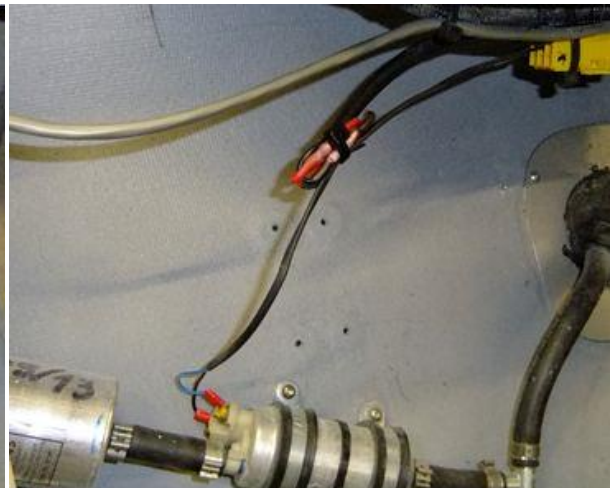


Fig. 4 - Fan reverse cable - secured