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MTOsport

Manufacturer Maintenance Manual

(Line Maintenance)

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Manufacturer Maintenance Manual for Gyroplane MTOsport

0 – PREFACE

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1 – INTRODUCTION

This manual provides accepted and recommended maintenance procedures applicable for the MTOsport 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:

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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), MTOsport (MT), Part B could be ‘MMM-MT-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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Contents

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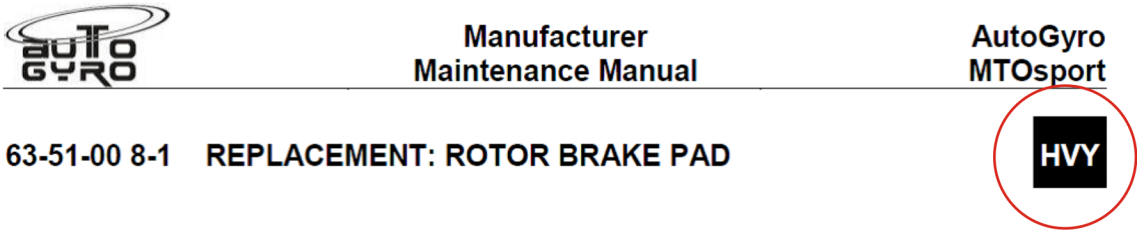
Maintenance Concept and Eligibility

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

- Basic operational (OPR) Maintenance / Pilot Checks and Servicing
- Line (LNE) Maintenance (inspection 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'.



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

The meaning of each call-out is defined below:

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

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

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

Organization and Handling of the Manual

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

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

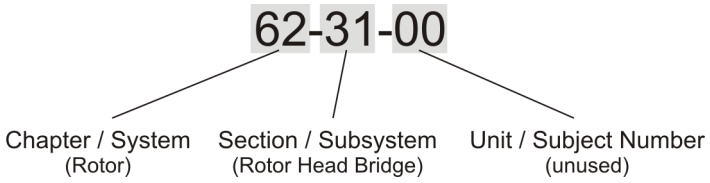
Part	**Designation** / Content
A	**Introduction and Declarations** This section. Explains the basic concept, handling of this manual, its structure according to the ATA100 numbering system, abbreviations and acronyms.
B	**Master Servicing Manual (ATA Chapters 00 to 20)** General description of the aircraft,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

ATA100 Numbering System

ATA100 – Chapter Code

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

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



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

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

Nomenclature and Structure of Maintenance Tasks (Job Cards)

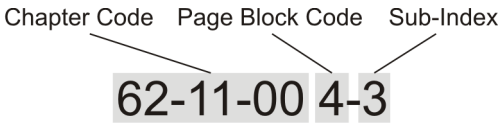
Part E of this manual describes maintenance tasks to be performed by a qualified person in order to check, inspect, replenish, adjust, replace, repair, clean, or to identify malfunctions. Each **Task** is outlined in detail in a **[Maintenance] Job Card**.

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

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

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

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



Page Block Code

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

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

Effectivities

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

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

EFFECTIVITY: Variable Pitch Propeller

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

EFFECTIVITY: up to S/N 0123

The following instructions apply to serial numbers 0123 and before

EFFECTIVITY: S/N 0124 to S/N 0248

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

EFFECTIVITY: S/N 0124 and subsequent

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

EFFECTIVITY: before 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	1-2	Replacement kit rotorhub I bolts	L1	62-00-00-S-33356	(RSI)
1	1-2	Replacement kit rotorhub II bolts	L1	62-00-00-S-33355	

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
SB	Service Bulletin
SoC	Statement of Compliance
sqm	square metre(s)
STP	Stückprüfung (C of A, i.e. conformity of airworthiness)
TADS	Type Approval Data Sheet (dt.: Geräte-Kennblatt)
TBO	Time Between Overhaul
VPP	Variable Pitch Propeller
VSI	Vertical Speed Indicator
xmt	transmit
yr	year(s)

Service Bulletin (SB) and Airworthiness Directives (AD)

Service Bulletin (SB), old designation Manufacturer Information [Letters] (MI) (Herstellerinformationen) or Airworthiness Directives (AD) will be incorporated into the Maintenance Manual with the next revision

Contents

CHAPTER 00 - INTRODUCTION / AIRCRAFT GENERAL

General

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

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

Rotor flight control consists of conventional linkage using push-rods while the rudder is controlled by cables.

CHAPTER 01 - GENERAL

01-11-00 Definitions, Terms and Standard Procedures

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

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

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

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

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

01-12-00 Standard Bolt Torques

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

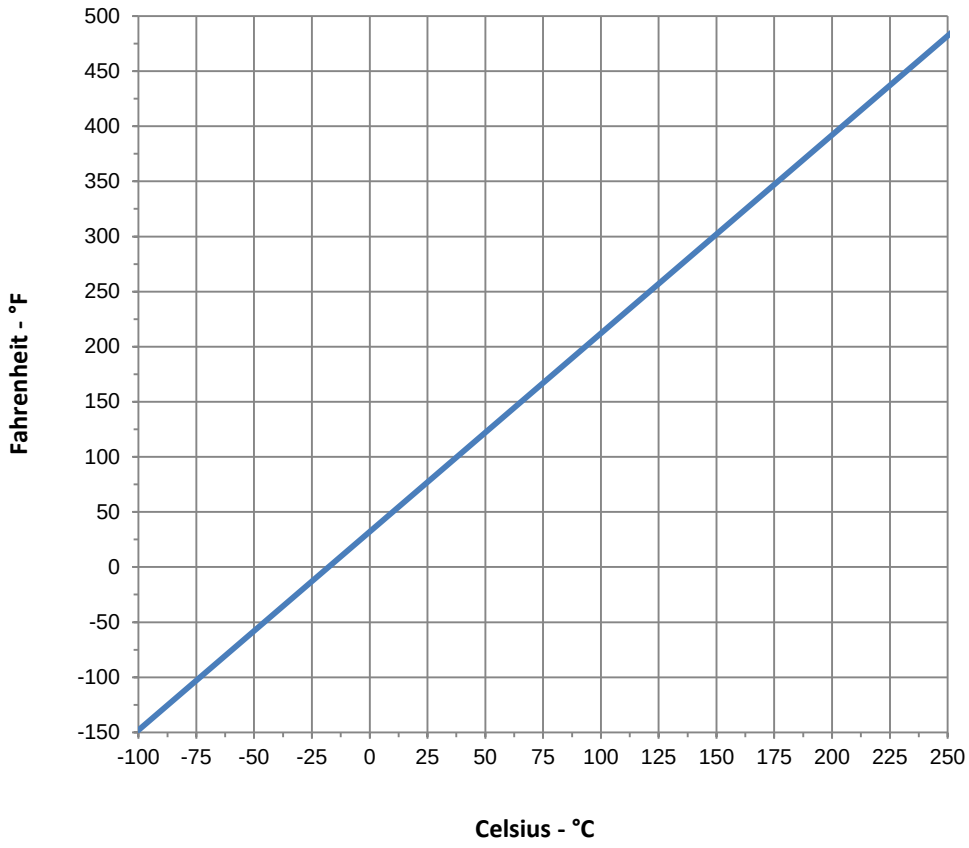
01-21-00 Standard Commercial Tools

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

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

01-91-00 Conversion Tables

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



Celsius-Fahrenheit Conversion Chart

CHAPTER 02 - TOOLS, SPARES AND CONSUMABLE MATERIALS

02-51-00 Consumable Materials

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	88-00-00-S-30487
AG-BAS-02	Loctite 243 blue	88-00-00-S-30483
AG-BAS-03	Loctite 542 red	88-00-00-S-30488
AG-BAS-04	Loctite 638 green	88-00-00-S-30485
AG-CPS-01	'Hohlraumspray'	88-00-00-S-34197
AG-GRS-01	Silicon grease Lagermeister 2002	88-00-00-S-30477
AG-LUB-01	Ballistol Öil Universal	88-00-00-S-31816 (5L can 88-00-00-S-31846 (2ml injection syringe) 88-00-00-S-31847 (5ml injection syringe)
AG-LUB-02	Aluminium Anti-Seize Spray	88-00-00-S-31590
AG-LUB-03	HHS 2000	88-00-00-S-30476
AG-LUB-04	Silicon Spray	88-00-00-S-30490
AG-OIL-01	Öl Shell Advance AX7 10W-40 API SG 1-L	88-00-00-S-31665

CHAPTER 03 - MINIMUM EQUIPMENT REQUIREMENT

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

Air speed indicator
Altimeter
Compass
Rotor RPM indicator
Engine instruments (oil pressure, oil temperature, RPM, 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: • Experienced pilot as sole occupant • Concrete/asphalt runway with a minimum of 5 times the normal required take-off roll distance available • Second briefed person 'handpropping' the rotor while engine/propeller is off • Steady, laminar headwind
Pre-rotator	Malfunction, R-RPM > 120 R-RPM indicator working	Flight to a maintenance facility under the following conditions: • Experienced pilot • Concrete/asphalt runway with a minimum of 3 times the normal required take-off roll distance available • Steady, laminar headwind

CHAPTER 04 – MANUFACTURER LIFE LIMITATIONS

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

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

ATA	Equipment / System	MLL
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)
62-00-00	Rotor System I	1500 hrs
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
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

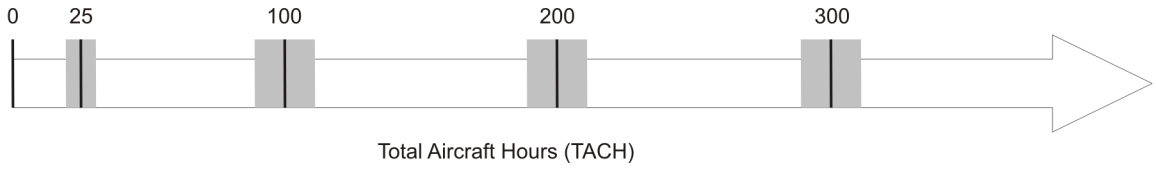
For safe operation and continued airworthiness over the specified lifecycle of the aircraft the following inspection schedule shall apply. Note that specified tolerances must NOT be accumulated!

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

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

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

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



(Total 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	Welded Steel Mainframe	on condition

Liquids and Fluids

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

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

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

05-20-00 Scheduled Inspections & Checks

Daily / Pre-Flight Check

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

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

Complementary / Servicing Tasks

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

Task	Interval	Tolerance
Lubrication: Teeter hinge (see *Ch. 12 – Servicing*)	5 hrs (rec.)	N/A
Lubrication: Pre-rotator drive coupling sleeve	as req.	N/A
Lubrication: Pre-rotator belt and pulleys	as required	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 *CHAPTER 18*
Propeller vibration	see *CHAPTER 18*

If in doubt contact AutoGyro customer support.

05-50-00 Conditional Inspections

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

05-51-00 Inspections - Special Operational Conditions

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

Operation in sand or dust

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

Winter operation

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

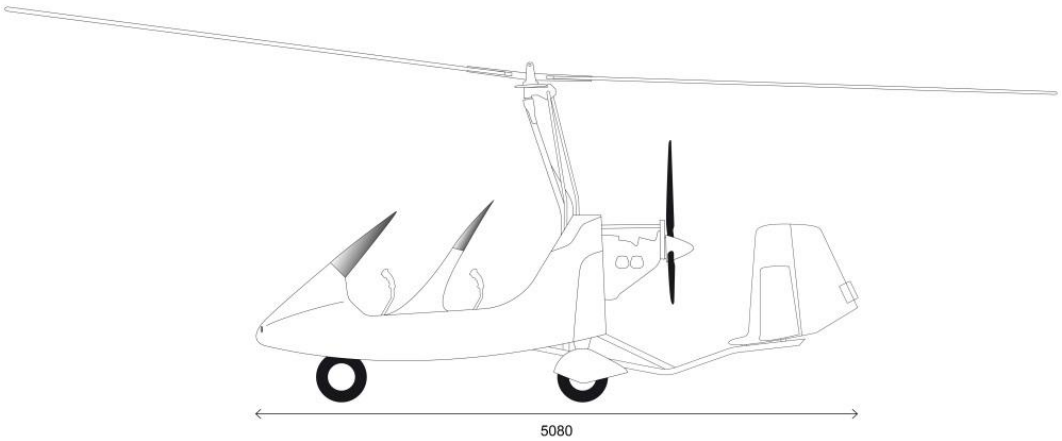
05-90-00 Maintenance Records & Aircraft Logs

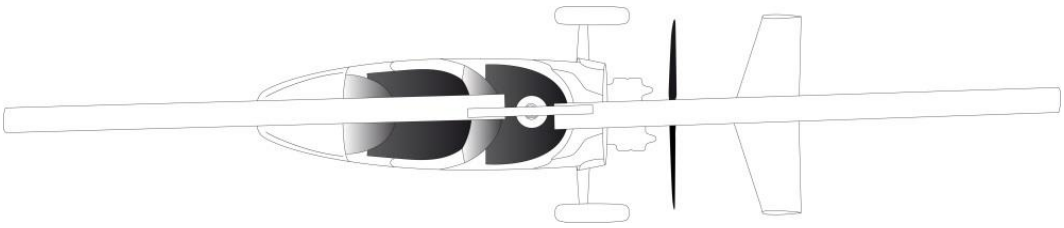
An illustrated 'Parts List' (AutoGyro Parts List) will be compiled individually and delivered with each gyroplane.

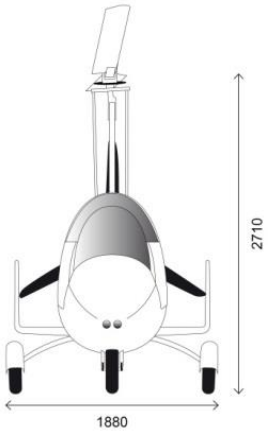
Forms are available for download.

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	5.08 m
Width	1.88 m
Height	2.71 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 E of this manual.

CHAPTER 08 - LEVELING & WEIGHING

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

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

The weighing report AG-F-WRP-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!

In clear view of the pilot:

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

At front seat:

Max. weight in seat:	**125 kg**
Min. weight in seat:	**60 kg**

At aft seat:

Max. weight in seat:	**129 kg**

Solo from front seat only

Occupant warning (front and aft seat):

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

At storage compartment in nose section:

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

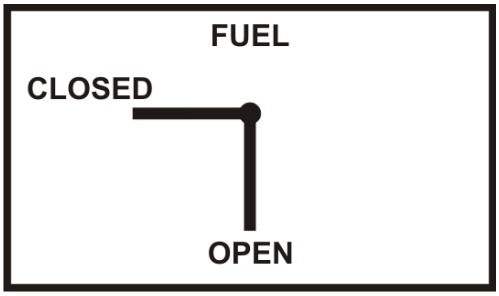
At fuel filler neck:

Min. ROZ 95
AVGAS 100LL

At each fuel tank:

Capacity 34 litres

At fuel shut-off valve (if installed):



At oil filler neck:

Engine Oil: _____
Approved oil types see engine manual!

At both static ports (if installed):

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 of the engine and airspeed indicator should be closed after the flight (insects, birds etc.).

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

12-20-00 Lubrication

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

Lubrication: Pre-rotator belt and pulleys

Spray clutch belt and pulleys with AG-LUB-04 (Silicone Spray) regularly, at latest when the clutch begins to judder!

12-30-10 Servicing: Engine Air Filter

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

12-30-20 Servicing: Tire Pressure

Main wheels	1.8 – 2.2 bar
Nose wheel	1.6 – 2.0 bar

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

12-30-30 Servicing: Battery

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

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

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

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

12-30-40 Servicing: Engine Coolant

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

Verify coolant level in the expansion tank, replenish as required up to the top. Verify coolant level in the overflow bottle. Minimum coolant level (cold engine) in the overflow bottle is marked by the cable tie at about the lower third.

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.

12-40-00 Replenishing/Replacement of Fluids

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

Contents

CHAPTER 21-22 - 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 a socket with bayonet coupling on a loose cable to connect a helmet. 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 (if installed) 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, the 12V power receptacle and supply for the heated clothing regulator.

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

24-30-00 DC Generation and Battery

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

24-60-00 DC Electrical Load Distribution

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

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

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

ATA Reference	Equipment / System	Power load
24-3	*Generator*	*(-) 240 W*
23-1	Radio ATR500	2 W (rcv) / 35 W (xmt)
23-1	Radio ATR833	7 W (rcv) / 35 W (xmt)
28-2	Electrical fuel pump (ea)	21 W
33-4	NAV Lights (conventional)	108 W
33-4	Strobe Lights (conventional)	83 W
33-4	Landing Light (conventional)	100 W
33-4	NAV Lights LED	9 W
33-4	Strobe Lights LED	28 W
33-4	Landing Light LED	7 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
85-23	Heated Gloves	max.31 W
85-23	Heated Jacket	max. 100 W
85-23	Heated Pants	max. 62 W
85-23	Heated Soles	max. 9 W
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

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

As an option, an easily cleanable, water-repellent 'sports design' cover is available. The cushions are attached with hook-and-loop tape and press studs. However, if the aft seat is not occupied, the cushions should be removed or properly retained to prevent flutter or loss.

For each seat an adjustable four point harness is available.

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

CHAPTER 26 - N/A

CHAPTER 27 - FLIGHT CONTROLS

27-00-00 Flight Controls

See *CHAPTER 67 – Rotors Flight Control*.

Note: Stabilizers are described in *CHAPTER 55*.

27-20-00 Flight Controls - Rudder

The Rudder is connected to the foot pedals in the aft station using steel cables which are routed horizontally along the main frame. Both pairs of pedals are interconnected by a linkage. The nose wheel steering is directly linked to pedal/rudder control input by control rods.

The tension of the control cables that connect the aft pedals with the rudder can be adjusted by turnbuckles. Tension value and procedure is described in Part E of this manual.

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

CHAPTER 28 - FUEL

28-10-00 Storage

The fuel tanks are located under the rear seat and have a capacity of 34 litres each. In standard version only one tank is installed on the left hand side. As an option an additional tank with the same capacity may be fitted on the right hand side. The tanks are made from PE plastic and feature a ventilation line that is routed above the tank to the rear of the mast.

A drain valve is available in the bottom aft area of each tank that accepts a standard drain tool with pin to open the valve.

In case of two fuel tanks installed, a crossover line connects both to ensure equal level. In order to top-off tanks it is recommended to fill both tanks sequentially as the cross-over flow rate is limited.

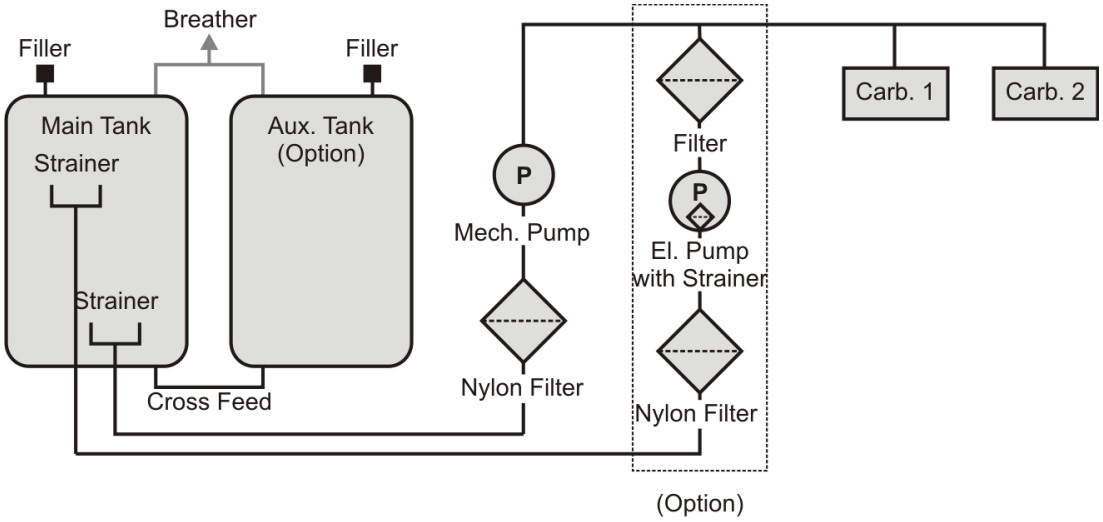
Drain Valve(s)

28-20-00 Distribution

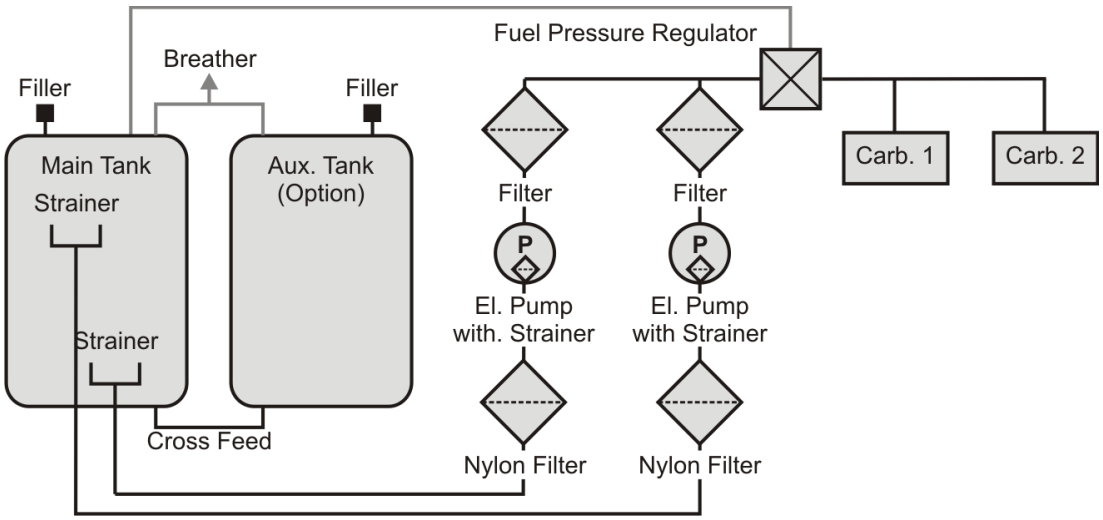
The fuel distribution system comprises fuel hoses, made of fabric-reinforced rubber, a shut-off valve, filters and pumps.

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

Fuel system ROTAX 912:



Fuel system ROTAX 914:



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

28-40-00 Indicating

Markings at the front side of the fuel tanks show fuel quantity in level attitude, using a scale and numerical values for every 5/10 litres. The marking shows fuel tank quantity per tank. If a second fuel tank is installed, the total fuel quantity is the sum of both readings. As an option, a fuel quantity indication may be installed in the cockpit.

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 Landscape
- Moving Map Portrait
- Glass Cockpit

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.

The Glass Cockpit layout is tailored to the integrated flight and navigation suite FlyMap LD. 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 and air speed indicator is provided as backup instrumentation.

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

Panel Layout – Standard

1 – Magnetic compass
2 – Compass (2 ¼" cut-out)
3 – Rotor RPM
4 – Altimeter
5 – Air speed indicator
6 - Cut-out 3 1/8" for optional installations
7 – Oil pressure
8 – End position detection IVO propeller (if installed)
9 – Engine RPM
10 – Pneumatic mode selector
11 – Radio (if installed)
12 – Manifold pressure gauge (if inst.)
13 – ATC transponder (if installed)
14 – Oil temperature
15 – Cylinder head temperature
16 – 12V power receptacle (if installed)
17 – Overdrive push button
18 – ELT remote control (if installed)
19 – Audio In (if installed)
20 – MAG switches
21 – Master/starter switch
22 – GEN and LOW VOLT warning lights
23 – Hour meter
24 – Low fuel warning light (if installed)
25 – BOOST Warn/Caution light (R914)
26 – Trim/brake pressure gauge
27 – Rotor bearing temperature indication
28 – Switches (2nd fuel pump and options)
29 – Fuel level indicator (if installed)

Panel Layout – Moving Map Landscape

1 – Magnetic compass
2 – Engine RPM
3 – Rotor RPM
4 – Oil pressure
5 – Oil temperature
6 – Cylinder head temperature
7 – End position detection IVO propeller (if installed)
8 – 12V power receptacle (if installed)
9 – Overdrive push button
10 – Altimeter
11 – Inst. frame for moving map system
12 – Air speed indicator
13 – Radio (if installed)
14 – ATC transponder (if installed)
15 – ELT remote control (if installed)
16 – Pneumatic mode selector
17 – GEN and LOW VOLT warning lights
18 – Hour meter
19 – Audio In (if installed)
20 – Low fuel warning light (if installed)
21 – BOOST Warn/Caution lights (R914)
22 – Manifold pressure gauge (if inst.)
23 – MAG switches
24 – Master/starter switch
25 – Trim/brake pressure gauge
26 – Rotor bearing temperature indication
27 – Switches (2nd fuel pump and lights)
28 – Fuel level indicator (if installed)

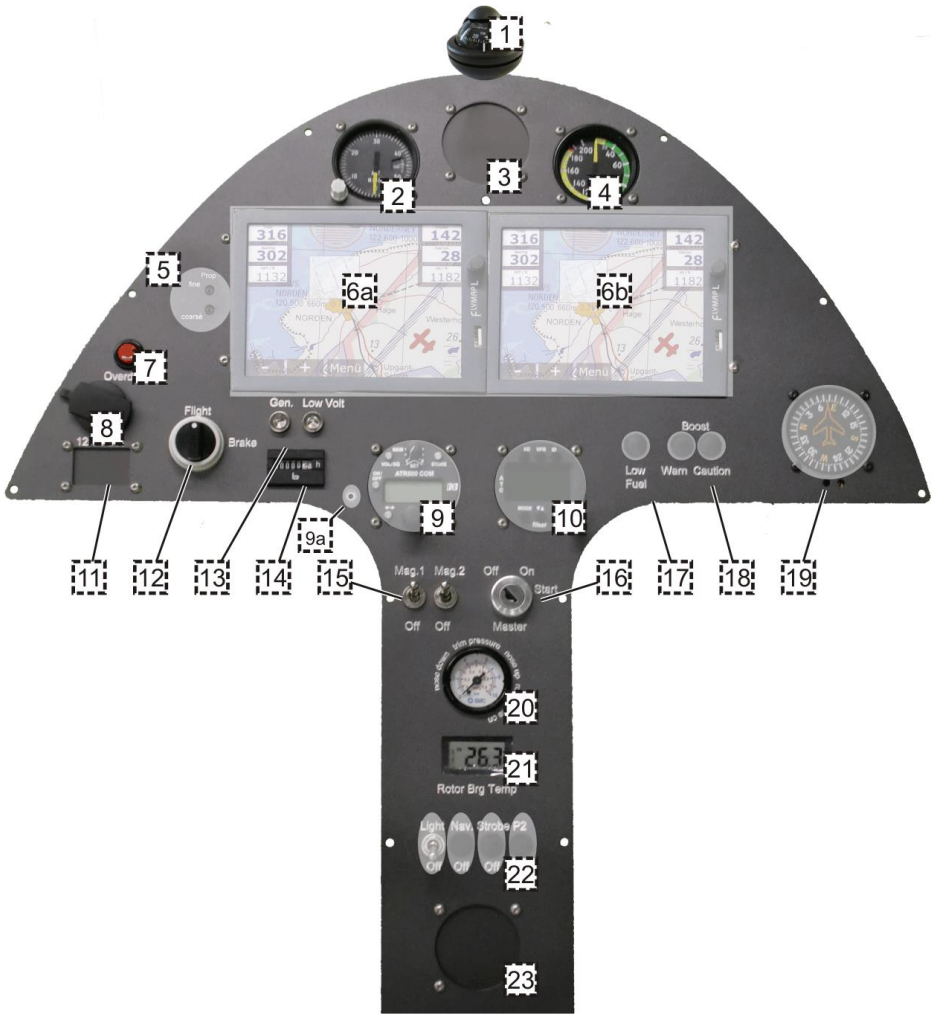
Panel Layout – Moving Map Portrait (Garmin 695)

1 – Magnetic compass
2 – Garmin 695/795
3 – Altimeter
4 – Overdrive push button
5 – End position detection IVO propeller (if installed)
6 – Engine RPM
7 – Rotor RPM
8 – Air speed indicator
9 – Low fuel warning light (if installed)
10 – Vertical compass (if installed)
11 – Fuel level indicator (if installed)
12 – ELT remote control (if installed)
13 – Pneumatic mode selector
14 – Trim/brake pressure gauge
15 – Radio
15a – Audio in (if installed)
16 – MAG switches
17 – Master/starter switch
18 – ATC transponder (if installed)
19 – Oil pressure
20 – Oil temperature
21 – Cylinder head temperature
22 – GEN and LOW VOLT warning lights
23 – BOOST Warn/Caution light (R914)
24 – Cut-out 2 ¼" for optional installations
25 – Switches (2nd fuel pump and lights)
26 – Hour meter
27 – 12V plug
28 – Rotor bearing temperature

31-60-00 Integrated Display Systems

The Glass Cockpit layout is tailored to the integrated flight and navigation suite FlyMap LD. 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 (FlyMap LD)



1 – Magnetic compass
2 – Back-up altimeter
3 – Compass (2 ¼" cut-out)
4 – Back-up air speed indicator
5 – End position detection IVO propeller (if installed)
6a – FlyMap Integrated Display 1
6b – FlyMap Integrated Display 2
7 – Overdrive push button
8 – 12V power receptacle (if installed)
9 – Radio (if installed)
9a – Audio In (if installed)
10 – ATC transponder (if installed)
11 – ELT remote control (if installed)
12 – Pneumatic mode selector
13 – GEN and LOW VOLT warning lights
14 – Hour meter
15 – MAG switches
16 – Master/starter switch
17 – Low fuel warning light (if installed)
18 – BOOST Warn/Caution light (R914)
19 – Vertical compass (if installed)
20 – Trim/brake pressure gauge
21 – Rotor bearing temperature indication
22 – Switches (2nd fuel pump and lights)
23 – Cut-out 2 ¼" for optional installations

CHAPTER 32 - LANDING GEAR

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

32-10-00 Main Gear

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

32-10-00 Nose Gear

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

32-40-00 Wheels and Brakes

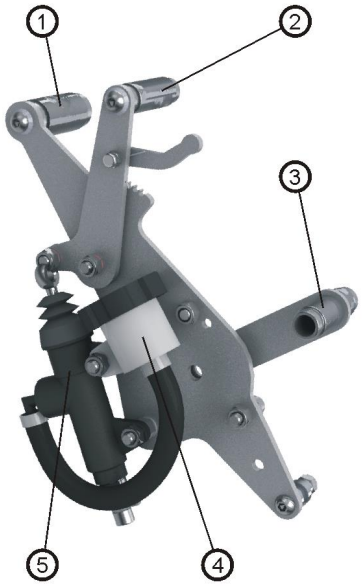
Both main wheels feature hydraulic disc brakes. The hydraulic wheel brake is actuated by pulling the brake lever (2). A locking pawl mechanism allows setting for use as parking brake. In order to release the parking brake pull the brake lever a little further to let the spring-loaded locking pawl disengage,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

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

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

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

Throttle and Brake Quadrant



1 – Throttle lever
2 – Brake lever with locking pawl
3 – Choke control
4 – Brake fluid reservoir
5 – Primary brake cylinder

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 MTOsport:

- 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

Total pressure is picked up by a pitot tube located in the nose section of the fuselage. The tube is connected to the integrated cockpit instruments by a plastic line. Static pressure is measured across two ports, one on either side of the fuselage. In older versions, static pressure is measured through the open ports of the instrumentation, right behind the cockpit panel.

OAT data can be derived from rotor bearing temperature which is measured by a battery powered (earlier version) or by the on-board supply system (current version) powered temperature at the rotor

34-20-00 Attitude and Direction

As part of minimum equipment, a magnetic compass is installed in the forward station or instrument panel 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, a pressure compensation vessel, solenoid valves, air lines, pneumatic actuators, and the respective cockpit controls.

The pneumatic system controls the following function:

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

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

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

36-11-00 Generation / Compressor

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

36-21-00 Distribution

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

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

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

CHAPTER 37-50 - UNASSIGNED / N/A

CHAPTER 51 - STANDARD PRACTICES - STRUCTURES

51-00-00 Standard Practices - Structures

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

CHAPTER 52 - DOORS, COVERS AND COWLINGS

52-10-00 Passenger / Crew

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

Note that windshields are described in *56-15-00 Windows*.

52-40-00 Service Covers and Cowlings

Pneumatic compressor, dryer cartridge, fuses and cabling is installed behind the cover of the centre panel. In order to access instruments, radios and other avionics equipment, the instrument panel must be removed. Note that some of the instruments/radios can be accessed through the cover of the storage compartment (if installed) in the nose section.

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

CHAPTER 53 – FUSELAGE / MAIN FRAME

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

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

CHAPTER 54 - N/A

CHAPTER 55 - STABILIZERS

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

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

55-40-00 Rudder

The rudder is made of 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 / Windshields

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

CHAPTER 57-60 - UNASSIGNED / N/A

CHAPTER 61 - PROPELLER

In standard configuration a 3-bladed, fixed pitch 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.

IMPORTANT NOTE: Rotor – Teetering Parts has two different effectivities, namely Rotor System I (RSI) and Rotor System II (RSII).

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

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

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

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

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

CHAPTER 63 - ROTOR DRIVE

63-11-00 Pre-rotator

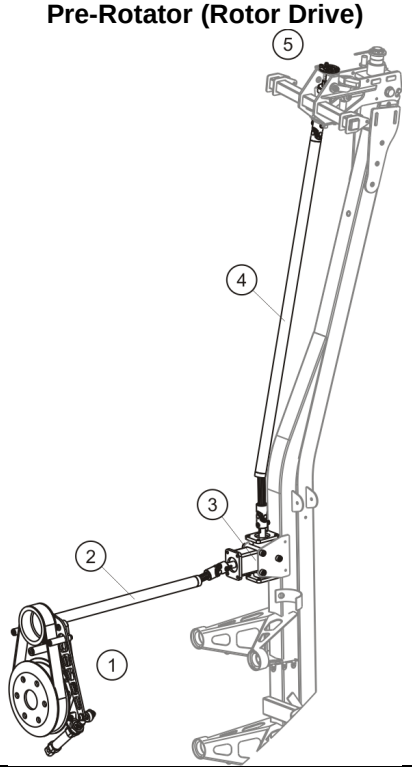
The pre-rotator is used to quickly bring the rotor up to safe RPM for take-off run by the press of a button. Pre-rotation is activated by a push-button on the flight control stick. Because of a safety circuit, activation of the pre-rotator is only possible with the pneumatic mode selector in FLIGHT position 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 actuator at the pre-rotator belt clutch is pressurized, lifting the smaller pulley out of its brake position and tensioning the belt at the same time. Engine torque is then transmitted through the lower pre-rotator drive, a 90° gearbox and upper drive to the pinion which is engaged by another small pneumatic actuator into the geared ring of the rotor head. The drive pinion is sliding on a helical gear to provide automatic lock-out in case of rotor RPM overrun. In order to allow necessary changes in length both pre-rotator drive shafts feature a sliding sleeve coupling.

Pre-Rotator (Rotor Drive)



1 – Lower engagement (belt and pulley clutch)
2 – Lower drive shaft
3 – 90° gearbox
4 – Upper drive shaft
5 – Upper engagement (drive pinion w/ bearing)

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 belt and pulley 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 two drive shafts. The 90-degree gearbox is mounted to the mast. Both pre-rotator drive shafts features cardan joint and a sliding shaft coupling to allow changes in length and alignment due to clutch kinematics and 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 base control unit / tube, flight control base link and control rods (push rods) which are connected to the rotor head bridge.

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

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

Control Stick Head

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

67-05-00 Pitch Trim System / Rotor Brake

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

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

67-06-00 Roll Trim System

Lateral / roll trim input is not active on MTOsport models.

CHAPTER 68-70 - UNASSIGNED / N/A

CHAPTER 71 - POWER PLANT

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

71-20-00 Engine Mounts

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

IMPORTANT NOTE: Engine mounting bushings are Manuf. Life Limited (MLL)!

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

The engine aspirates through air filters mounted on each of the carburettors. As an option, an airbox with one air filter can be installed.

71-70-00 Engine Drains

Oil tank breathing is provided by a rubber hose which is routed down the mast. Oil mist is then collected in a transparent plastic bottle at the bottom of the mast, respectively suspension bow.

CHAPTER 72 TO 74 - ENGINE RELATED

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

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

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

CHAPTER 75 - AIR / ENGINE COOLING

Engine cooling is provided by air cooled cylinders and liquid cooled cylinder heads. Therefore, cylinder head temperature (CHT) indication in the cockpit corresponds to water temperature. The water cooling system comprises of engine driven pump, one or two radiators, expansion tank with radiator cap, transparent overflow bottle with screw cap and vent bore, and hoses.

A single radiator is mounted on rubber isolators and brackets just in front of the propeller. As an option, two radiators may be fitted either side of the enclosure behind air scoops. Hoses from/to the radiator go to the engine water pump and return. Hot water to the carburettor heat jackets is provided via T-pieces.

MTOsport before Serial Number M01150 are not equipped with a thermostat in the water cooling system initially. This can lead to a long warm up time, and cool running when lightly loaded in cold operating conditions. If required the radiator may be blanked off either side with a length of duct tape. Ensure the surface is clean first, and wrap the tape around the radiator such that the ends overlap at least 50mm. Monitor all engine temperatures closely after having the coolers blanked off and modify, if necessary. Remove when the operating conditions allow.

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

Oil cooling is described in *CHAPTER 79*.

CHAPTER 76 - ENGINE CONTROLS

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

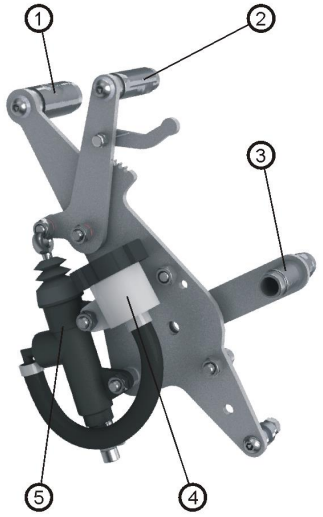
76-10-00 Power Control / Choke

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

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

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

Throttle and Brake Quadrant



1 – Throttle lever
2 – Brake lever with locking pawl
3 – Choke control
4 – Brake fluid reservoir
5 – Primary brake cylinder

76-20-00 Engine Shutdown / Emergency

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

CHAPTER 77 - ENGINE INDICATING

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

77-10-00 Power

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

77-20-00 Temperature

For temperature indication, a cylinder head temperature (CHT) gauge is provided. Due to the engine cooling principle (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 behind the aft seat on the right hand side. Access to the reservoir is provided by unlatching the aft seat and folding it forward. 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. In later versions, braided steel lines are used.

79-22-00 Oil Cooler

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

Contents

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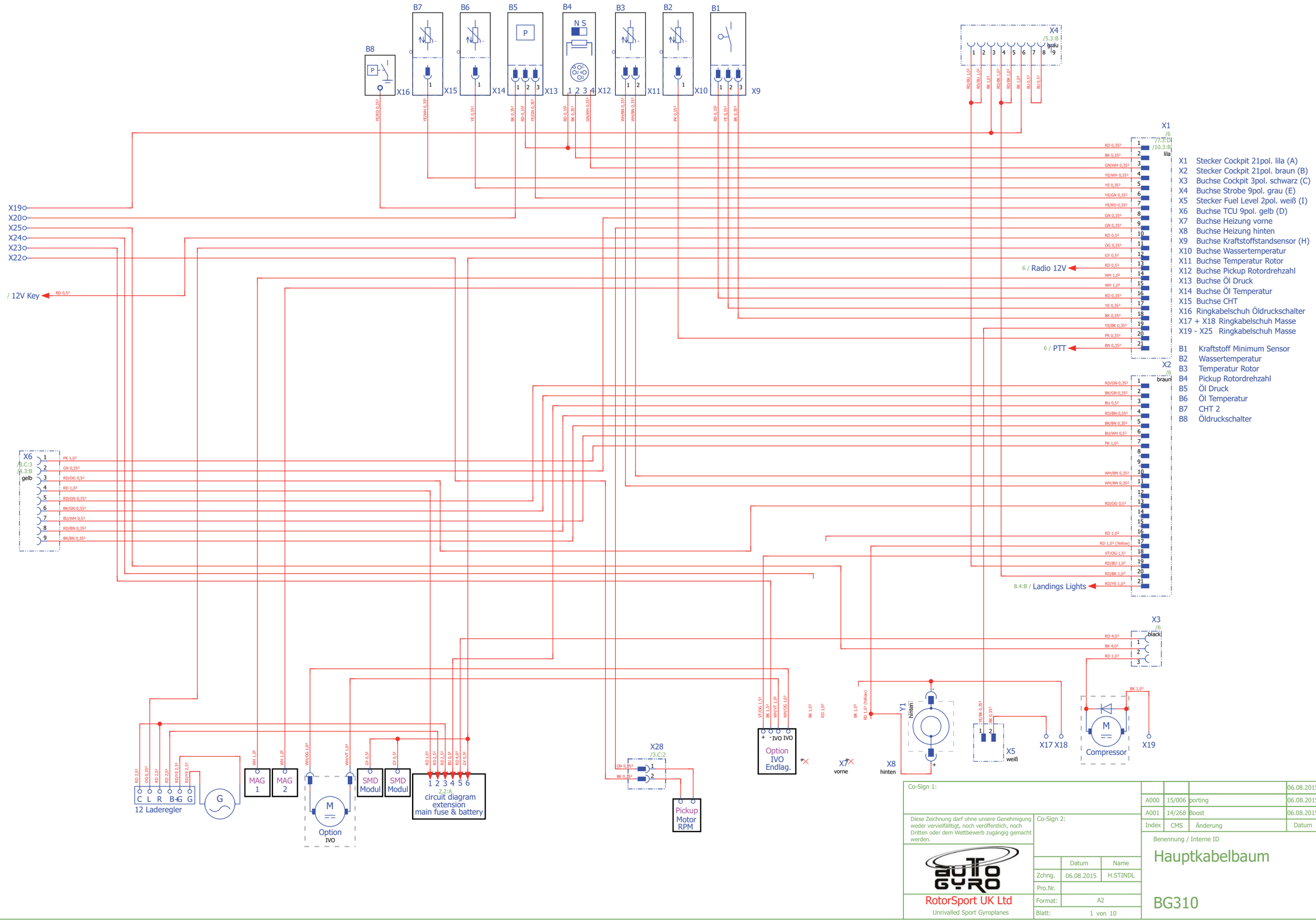
Wiring Diagram – Aircraft Main Wiring Harness



X1 Stecker Cockpit 21pol. lila (A)
X2 Stecker Cockpit 21pol. braun (B)
X3 Buchse Cockpit 3pol. schwarz (C)
X4 Buchse Strobe 9pol. grau (E)
X5 Stecker Fuel Level 2pol. weiß (I)
X6 Buchse TCU 9pol. gelb (D)
X7 Buchse Heizung vorne
X8 Buchse Heizung hinten
X9 Buchse Kraftstoffstandsensor (H)
X10 Buchse Wassertemperatur
X11 Buchse Temperatur Rotor
X12 Buchse Pickup Rotordrehzahl
X13 Buchse Öl Druck
X14 Buchse Öl Temperatur
X15 Buchse CHT
X16 Ringkabelschuh Öldruckschalter
X17 + X18 Ringkabelschuh Masse
X19 - X25 Ringkabelschuh Masse

B1 Kraftstoff Minimum Sensor
B2 Wassertemperatur
B3 Temperatur Rotor
B4 Pickup Rotordrehzahl
B5 Öl Druck
B6 Öl Temperatur
B7 CHT 2
B8 Öldruckschalter

Co-Sign 1:

Co-Sign 2:

RotorSport UK Ltd
Unrivalled Sport Gyroplanes

	Datum	Name
Zchng.	06.08.2015	H.STINDL
Pro.Nr.		
Format:	A2	
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Index	CMS	Änderung	Datum	Name
			06.08.2015	H.STINDL
A000	15/006	porting	06.08.2015	H.STINDL
A001	14/268	Boost	06.08.2015	H.STINDL

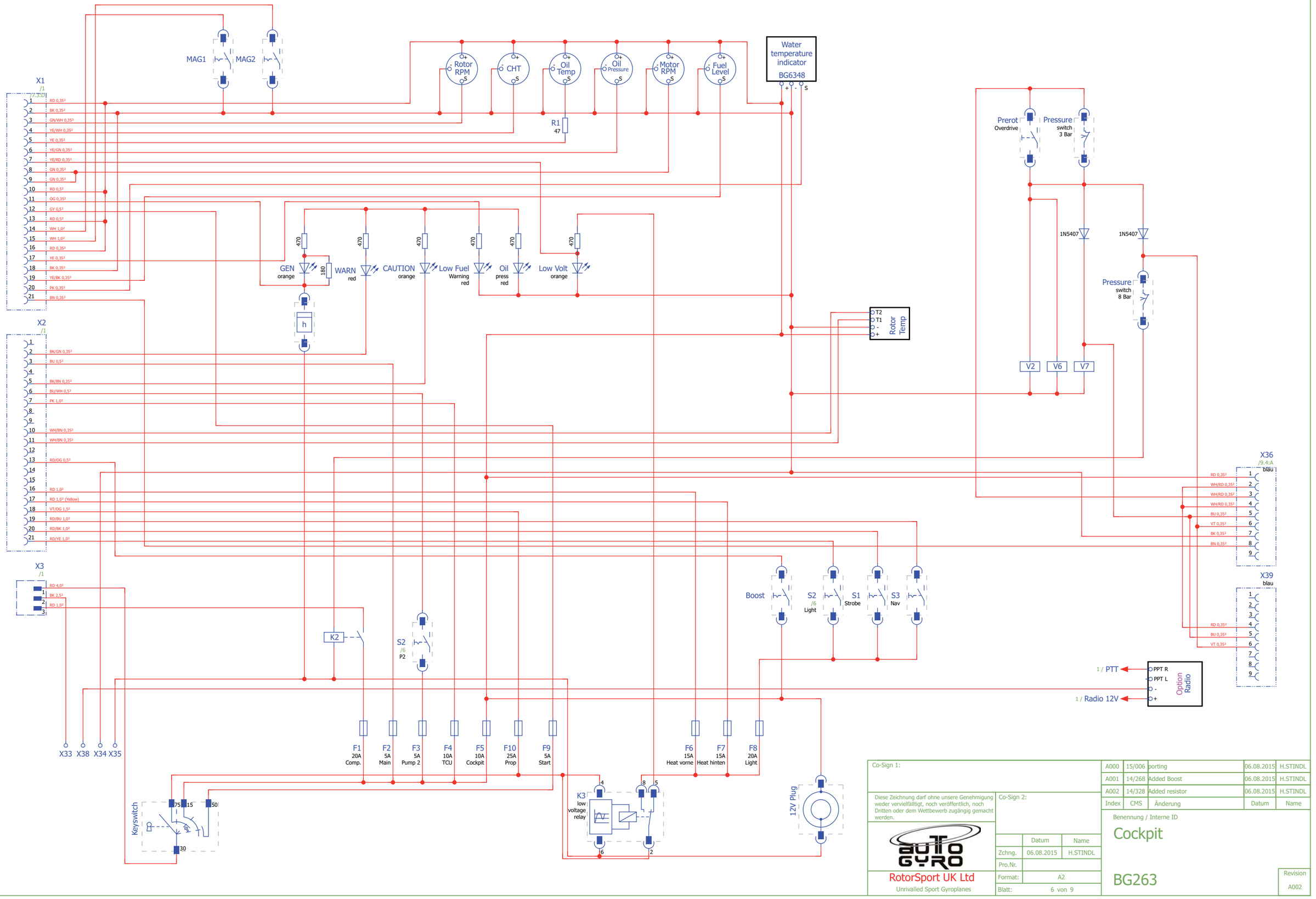
Benennung / Interne ID

Hauptkabelbaum

BG310

Revision A001

Wiring Diagram – Cockpit



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

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Pro.Nr.		
Format:	A2	
Blatt:	6 von 9	

RotorSport UK Ltd
Unrivalled Sport Gyroplanes

Index	CMS	Änderung	Datum	Name
A000	15/006	porting	06.08.2015	H.STINDL
A001	14/268	Added Boost	06.08.2015	H.STINDL
A002	14/328	Added resistor	06.08.2015	H.STINDL

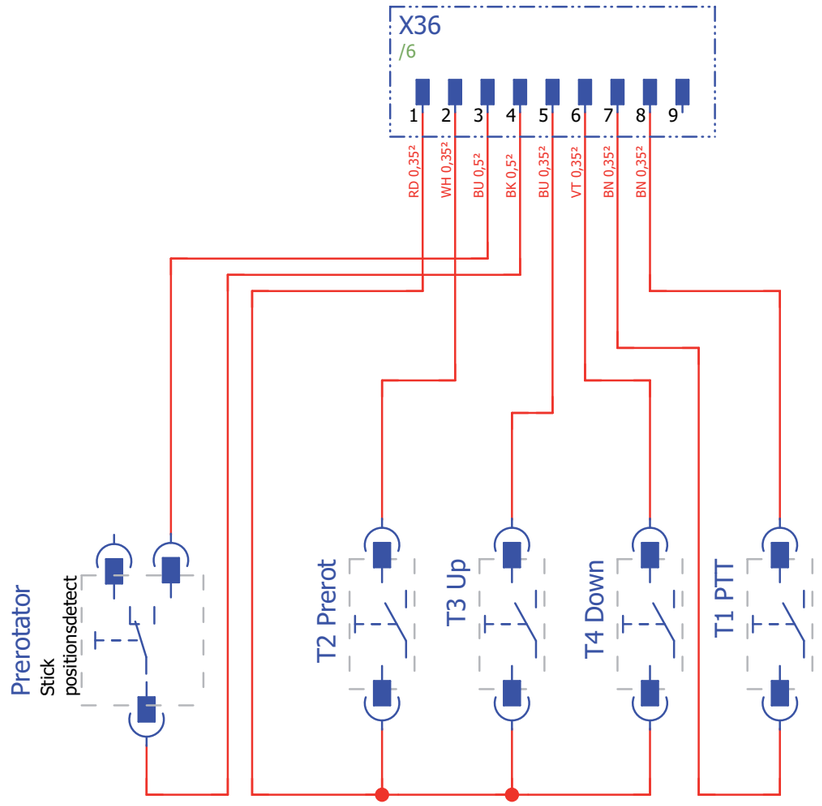
Benennung / Interne ID

Cockpit

BG263

Revision A002

Wiring Diagram – Flight Control Stick



Co-Sign 1:

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Co-Sign 2:

	Datum	Name
Zchng.	06.08.2015	H.STINDL
Pro.Nr.		
Format:	A4	
Blatt:	9 von 10	

RotorSport UK Ltd

Unrivalled Sport Gyroplanes

Index	CMS	Änderung	Datum	Name
			06.08.2015	H.STINDL
A000	15/006	porting	06.08.2015	H.STINDL

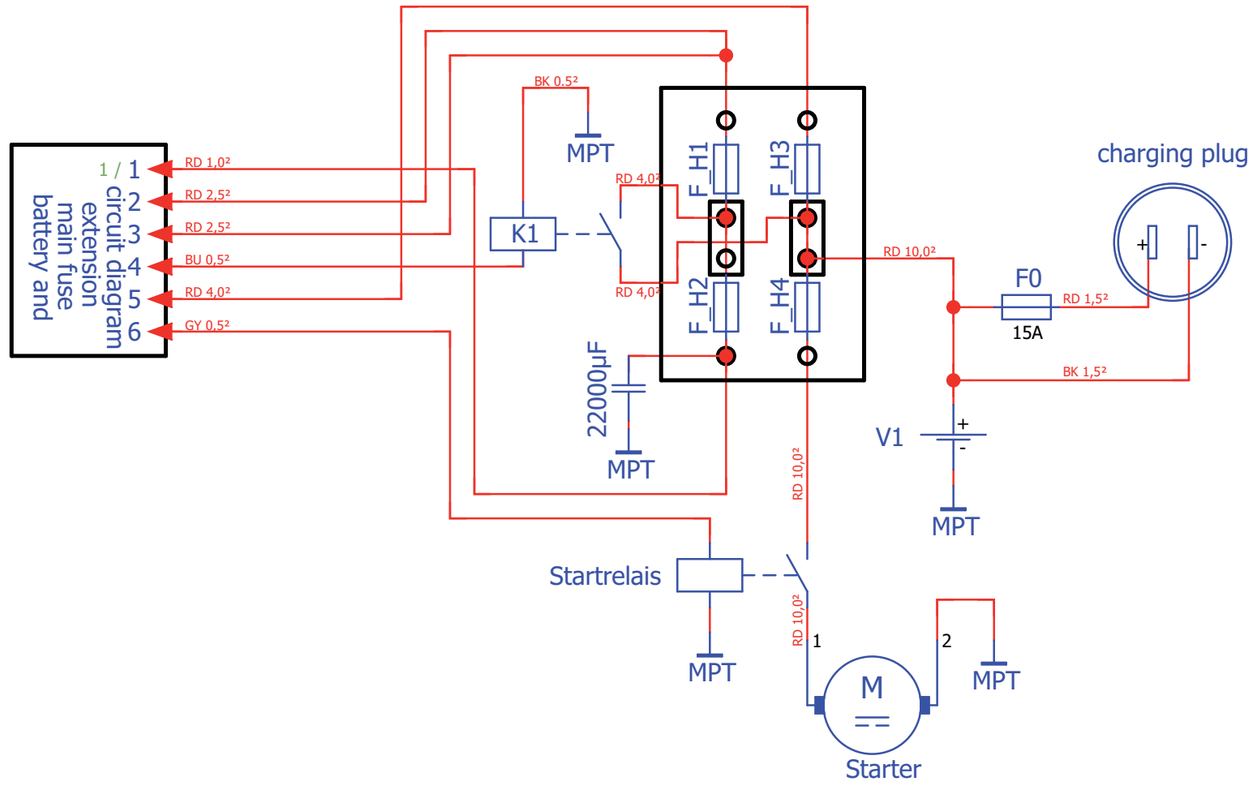
Benennung / Interne ID

Stick pilot

BG107

Revision A000

Wiring Diagram – Main Fuse / Battery



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

F_H1	50A
F_H2	10A
F_H3	30A
F_H4	125A (UK 100A)

Co-Sign 1:

Co-Sign 2:

RotorSport UK Ltd

Unrivalled Sport Gyroplanes

	Datum	Name
Zchng.	06.08.2015	H.STINDL
Pro.Nr.		
Format:	A4	
Blatt:	2 von 10	

Index	CMS	Änderung	Datum	Name
			06.08.2015	H.STINDL
A000	15/006	porting	06.08.2015	H.STINDL

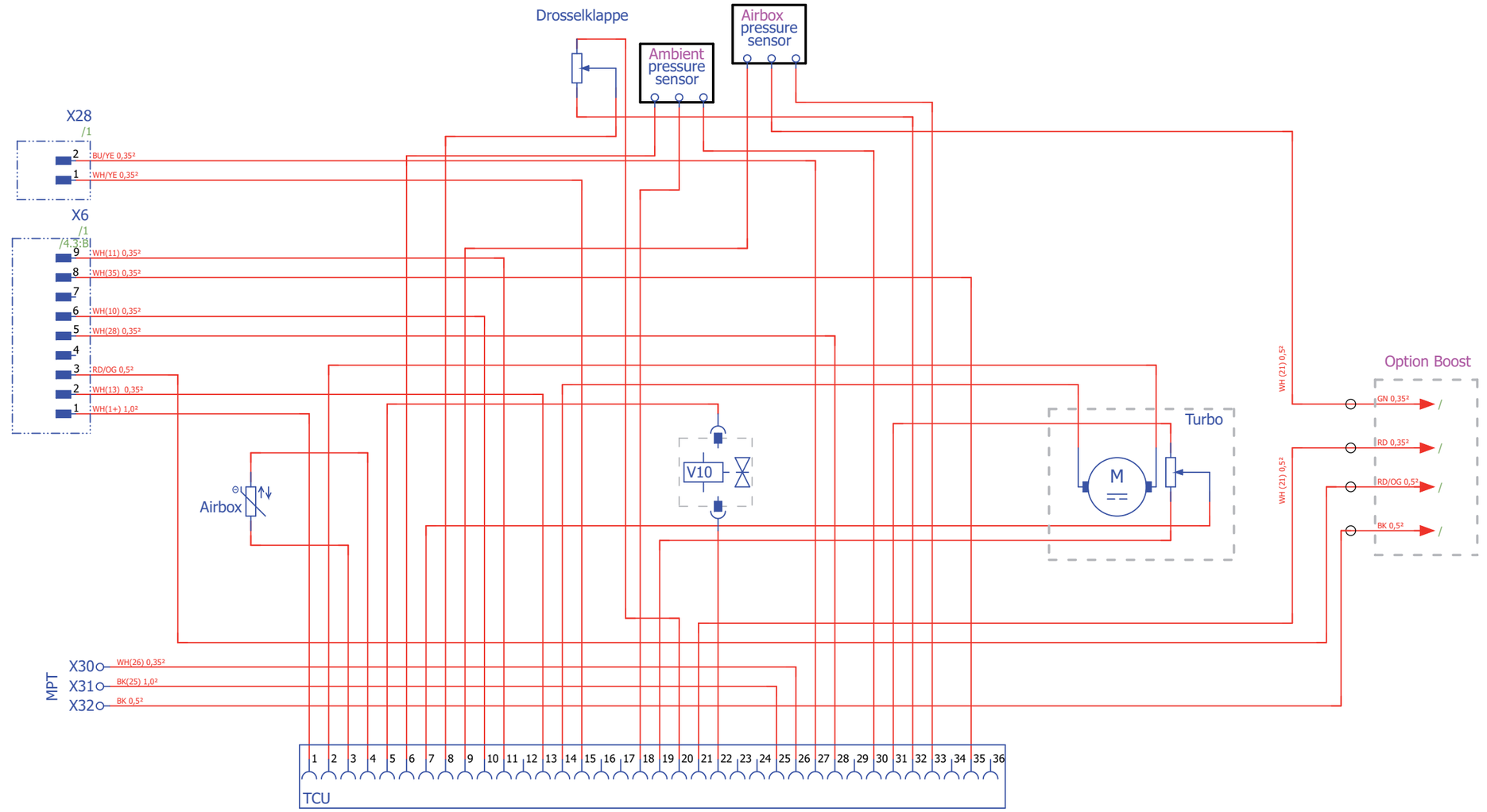
Benennung / Interne ID

Hauptsicherungshaltesatz / Batterie

BG6795

Revision A000

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



Co-Sign 1:

Co-Sign 2:

	Datum	Name
Zchng.	06.08.2015	H.STINDL
Pro.Nr.		
Format:	A3	
Blatt:	3 von 10	

RotorSport UK Ltd

Unrivalled Sport Gyroplanes

Index	CMS	Änderung	Datum	Name
A001	14/268	Added Boost	06.08.2015	H.STINDL
A002	14/268	changed cable color boost	06.08.2015	H.STINDL
A003	14/268	relabeling boost wiring	20.08.2015	H.STINDL

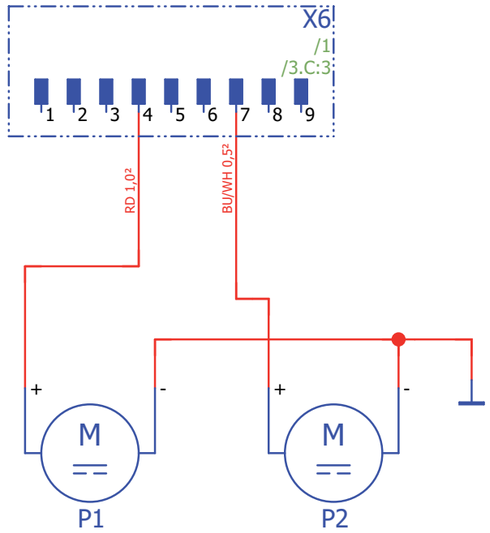
Benennung / Interne ID

TCU Kabelbaum

BG7887

Revision A003

Wiring Diagram – Fuel Pumps



Co-Sign 1:

Co-Sign 2:

RotorSport UK Ltd

Unrivalled Sport Gyroplanes

	Datum	Name
Zchng.	06.08.2015	H.STINDL
Pro.Nr.		
Format:	A4	
Blatt:	4 von 10	

Index	CMS	Änderung	Datum	Name
			06.08.2015	H.STINDL
A000	15/006	porting	06.08.2015	H.STINDL

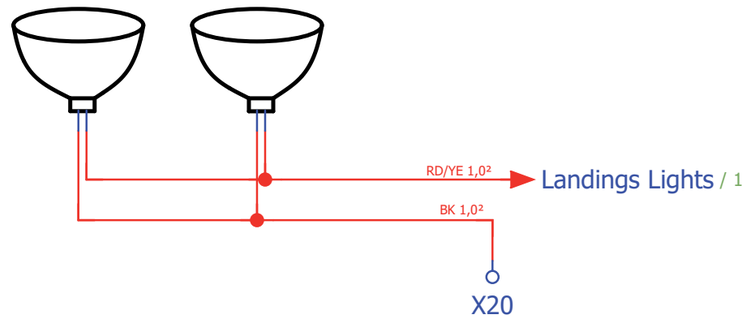
Benennung / Interne ID

Benzinpumpen

BG308

Revision A000

Wiring Diagram – Landing Lights



Co-Sign 1:

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Co-Sign 2:

	Datum	Name
Zchng.	05.08.2015	H.STINDL
Pro.Nr.		
Format:	A4	
Blatt:	8 von 10	

RotorSport UK Ltd

Unrivalled Sport Gyroplanes

Index	CMS	Änderung	Datum	Name
			05.08.2015	H.STINDL
A000	15/006	porting	06.08.2015	H.STINDL

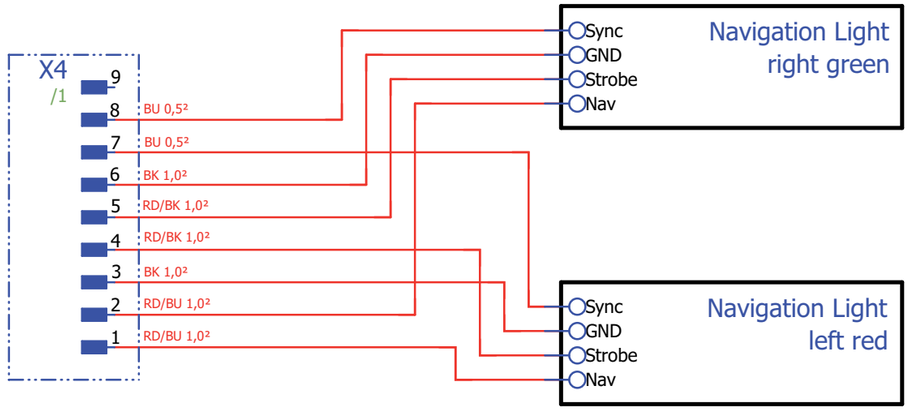
Benennung / Interne ID

Landescheinwerfer

BG1460

Revision A000

Wiring Diagram – NAV / Strobe Lights



Co-Sign 1:

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

Co-Sign 2:

	Datum	Name
Zchng.	06.08.2015	H.STINDL
Pro.Nr.		
Format:	A4	
Blatt:	5 von 10	

RotorSport UK Ltd

Unrivalled Sport Gyroplanes

Index	CMS	Änderung	Datum	Name
			06.08.2015	H.STINDL
A000	15/006	porting	06.08.2015	H.STINDL

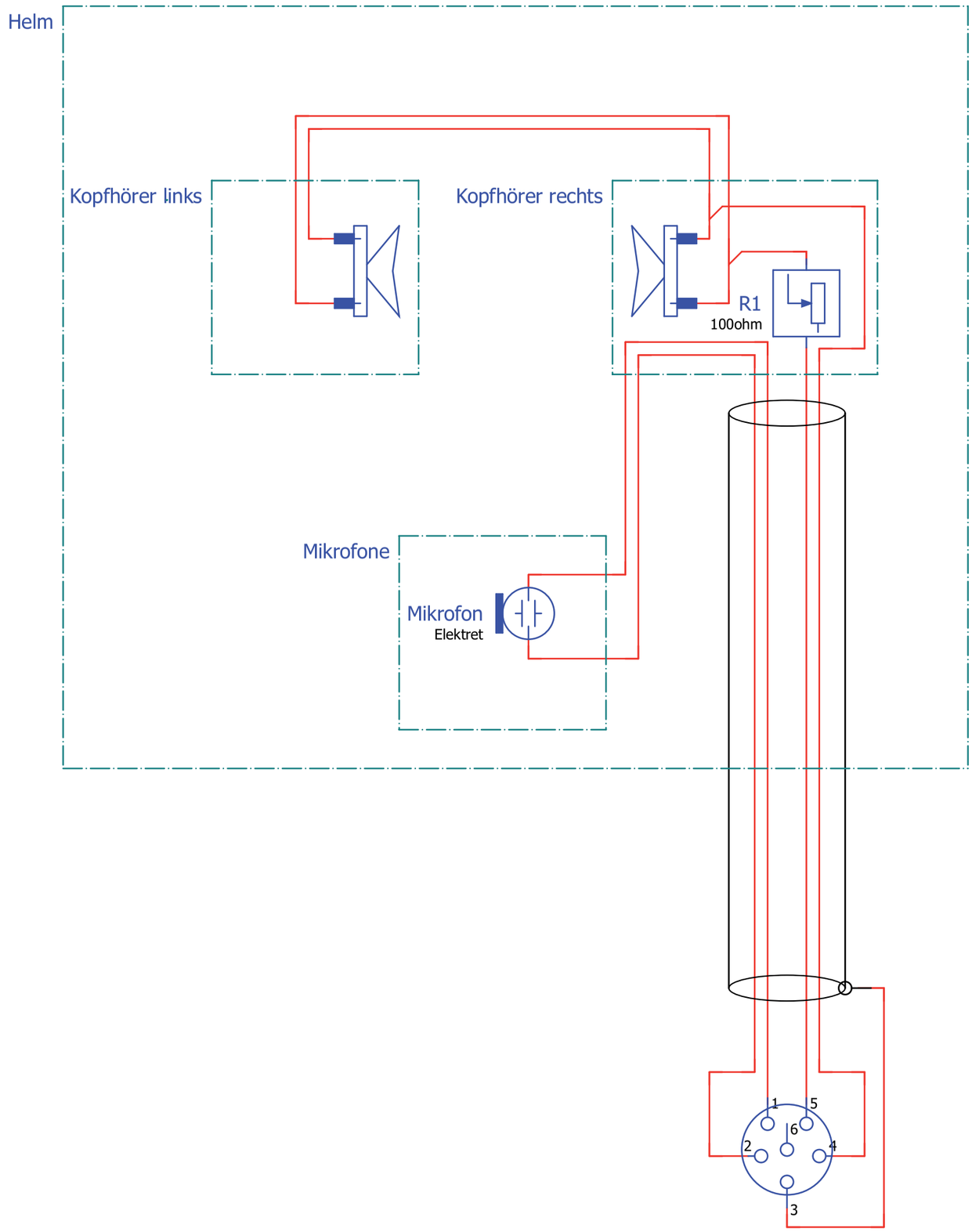
Benennung / Interne ID

NAV / Strobe

BG3960

Revision A000

Wiring Diagram – Helmet



			24.04.2014	J.RZENIECKI
			12.06.2015	H.STINDL
A000	15/006	porting	06.08.2015	H.STINDL
Index	CMS	Änderung	Datum	Name

co-sig 1:

co-sig 2:

	Datum	Name
Zchng.	12.06.2015	H.STINDL
Gepr.		

RotorSport UK Ltd

Unrivalled Sport Gyroplanes

Format: A4

Blatt: 7 von 10

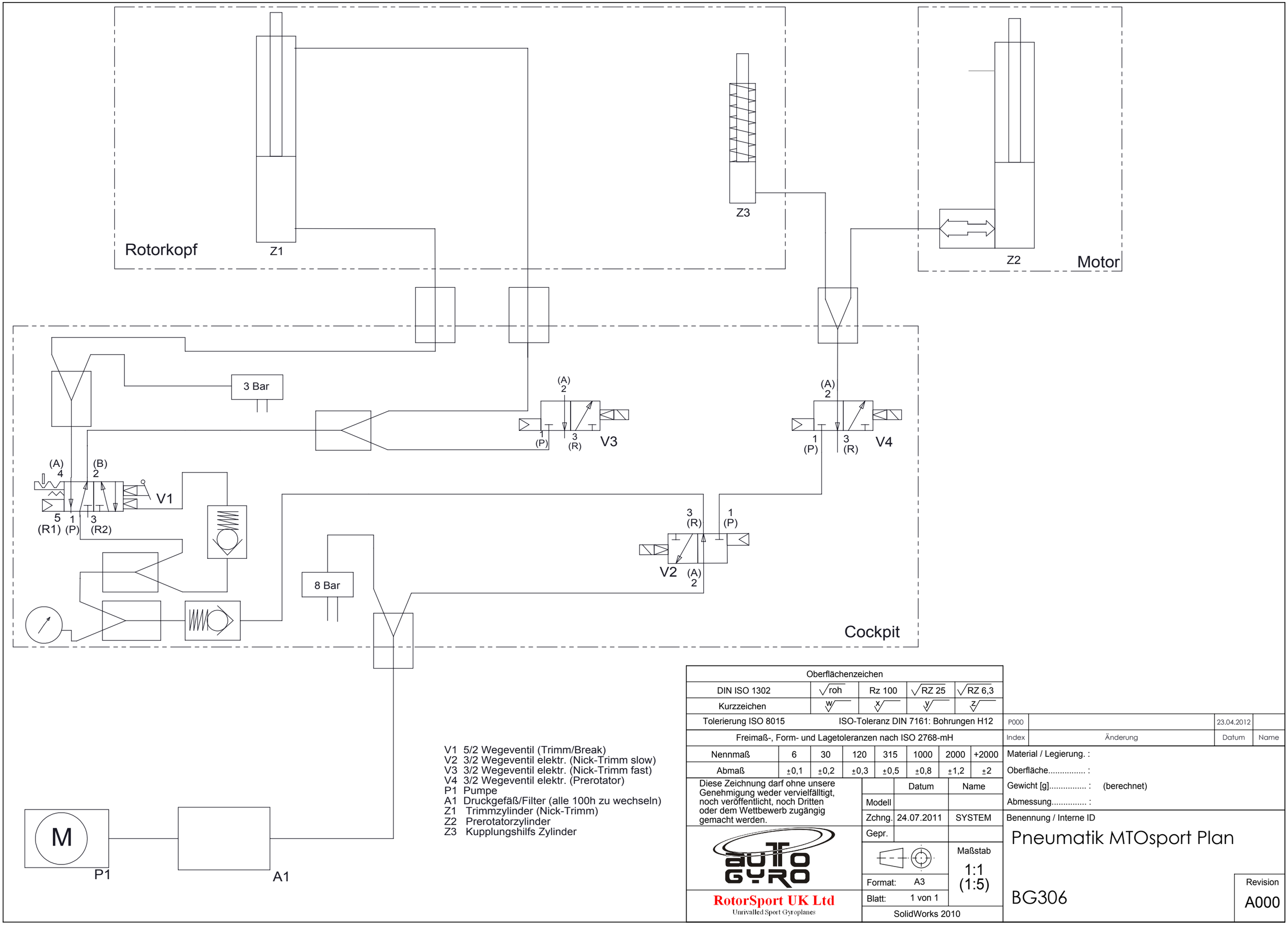
Benennung / Interne ID

Helm

BG507

Revision A000

Pneumatic Scheme



V1 5/2 Wegeventil (Trimm/Break)
V2 3/2 Wegeventil elektr. (Nick-Trimm slow)
V3 3/2 Wegeventil elektr. (Nick-Trimm fast)
V4 3/2 Wegeventil elektr. (Prerotator)
P1 Pumpe
A1 Druckgefäß/Filter (alle 100h zu wechseln)
Z1 Trimmzylinder (Nick-Trimm)
Z2 Prerotatorzylinder
Z3 Kupplungshilfs Zylinder

Oberflächenzeichen				
DIN ISO 1302	roh	Rz 100	RZ 25	RZ 6,3
Kurzzeichen	w	x	y	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

	Datum	Name
Modell		
Zchng.	24.07.2011	SYSTEM
Gepr.		

Maßstab 1:1 (1:5)

Format: A3

Blatt: 1 von 1

SolidWorks 2010

RotorSport UK Ltd
Unrivalled Sport Gyroplanes

Index	Änderung	Datum	Name
P000		23.04.2012	

Material / Legierung. :

Oberfläche..... :

Gewicht [g]..... : (berechnet)

Abmessung..... :

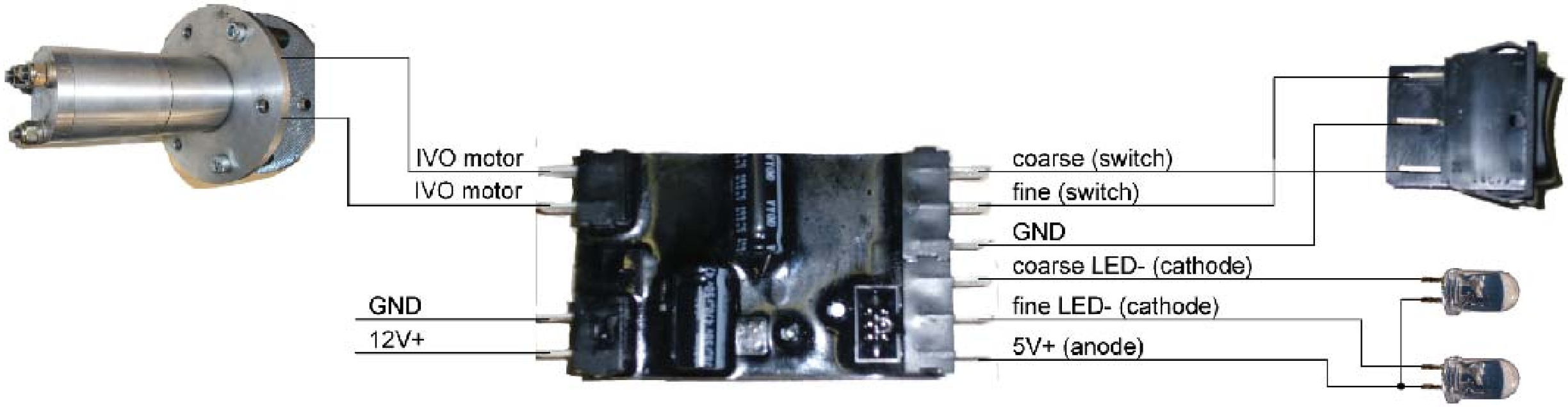
Benennung / Interne ID

Pneumatik MTOsport Plan

BG306

Revision A000

Retrofit: End Position Detection IVO Propeller



Oberflächenzeichen				
DIN ISO 1302	√ roh	Rz 100	√ RZ 25	√ RZ 6,3
Kurzzeichen	w	x	y	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

	Datum	Name
Modell		
Zchng.	17.04.2013	h.stindl
Gepr.		

Format: A3

Blatt: 1 von 1

Maßstab 1:1 (1:5)

SolidWorks 2010

RotorSport UK Ltd
Unrivalled Sport Gyroplanes

Index	CMS	Änderung	Datum	Name
A000	$PRPSHEET:{CMS}		17.04.2013	h.stindl

Material / Legierung. :

Oberfläche..... :

Gewicht [g]..... : (berechnet)

Abmessung..... :

Benennung / Interne ID

IVO-Steuerungsplatine - Schematische Darstellung

BG4652

Revision A000

Contents

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to 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

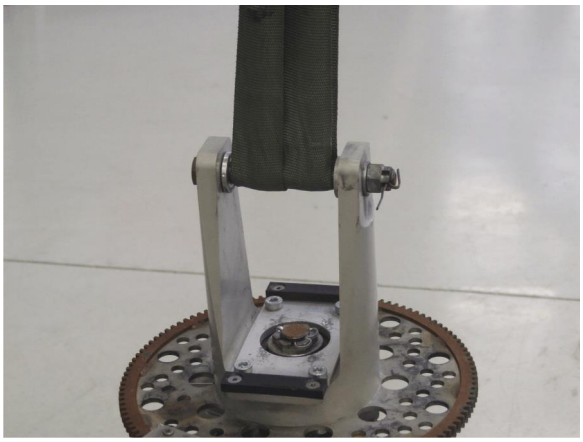


Fig. 1 - Lifting belt looped around teeter bolt

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to 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, load or lash-down keel tube in most aft position until gyroplane rests safely on both main wheels and keel tube.

Unload main gear

2 In order to unload one of the main wheels carefully jack the gyroplane at the keel tube.

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

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

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

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

PRECAUTIONS AND SAFETY MEASURES

CAUTION: Never use tie-down equipment or lashing straps in a way that would excert 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).

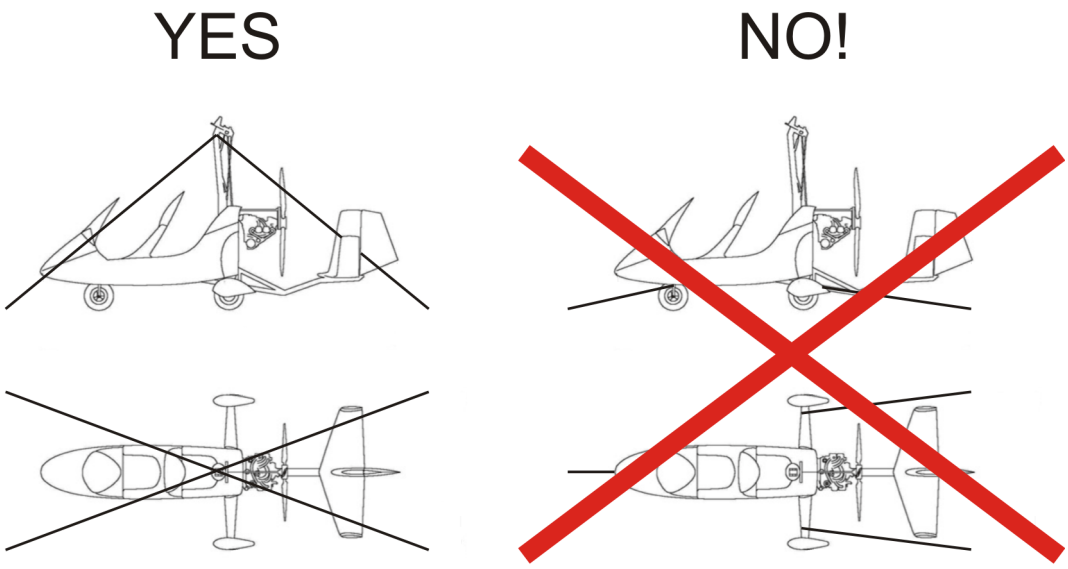
4 Lash-down nose wheel through its axle.

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	L0	85-00-00-M-33492	

ILLUSTRATIONS



Lash-down mast top (kit available)

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

Measure Dimension D1

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

NOTE:
Mast reference point is defined as the inner edge of the upper mast end.
Fuselage reference point is defined as the outer top edge of the ball joint.

2 Contact AutoGyro for reference values.

ILLUSTRATIONS

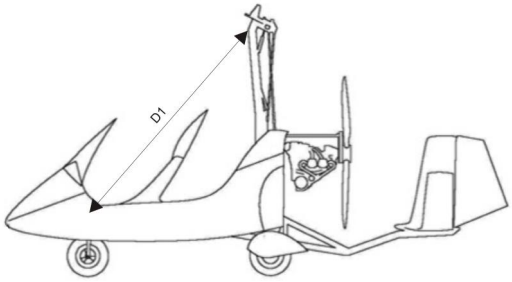


Fig. 1 - Dimension D1

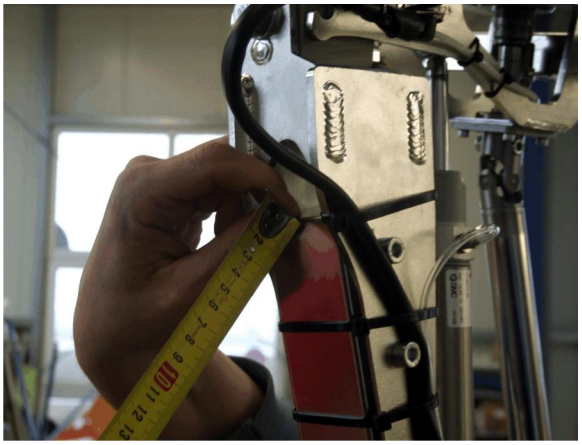


Fig. 2 - Mast reference point

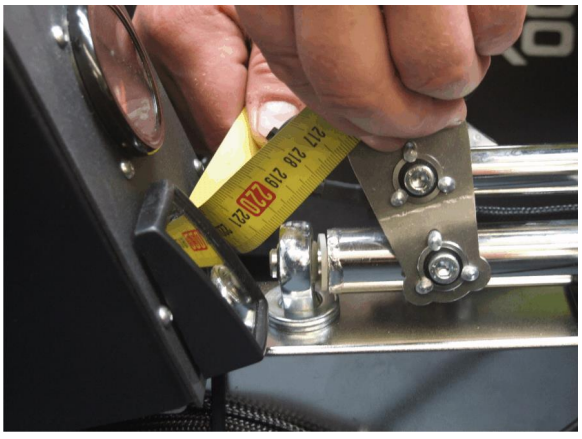


Fig. 3 - Fuselage reference point

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!

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

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

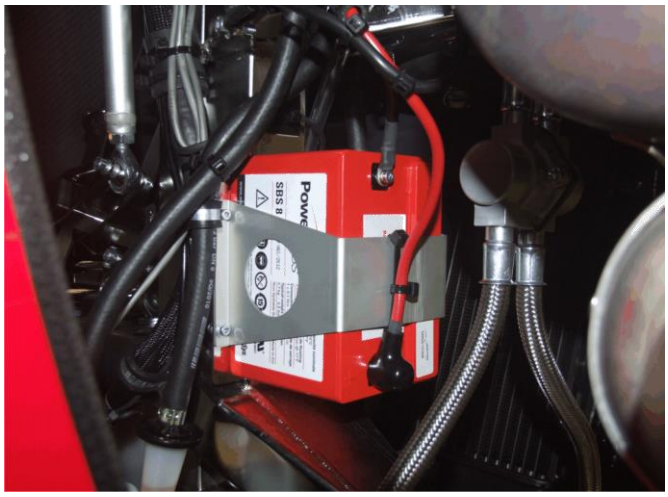


Fig. 1 - Installation Position Battery

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

GENERAL, REFERENCES AND REQUIREMENTS

SPECIAL TOOLS AND CONSUMABLE MATERIALS

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

ILLUSTRATIONS

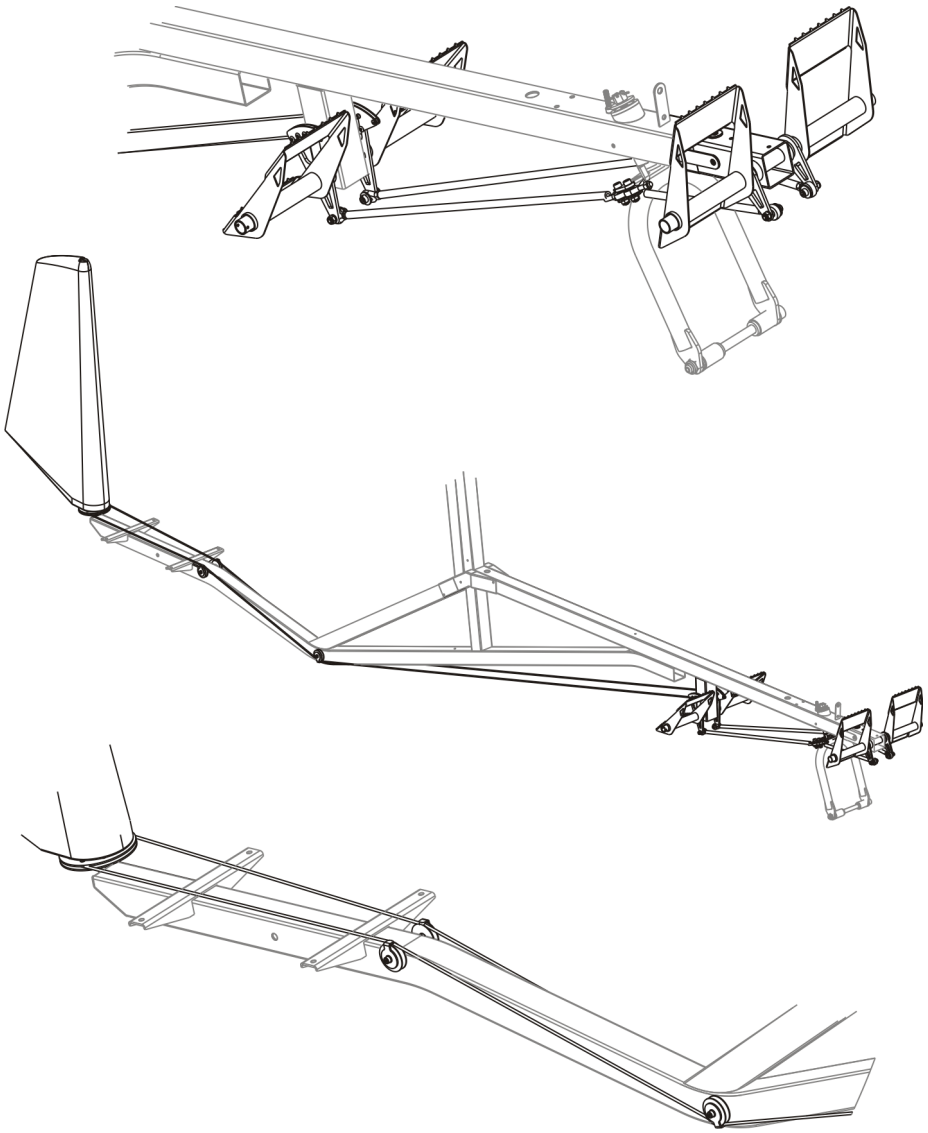


Fig. 1 - Flight control - Rudder

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

None

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

PROCEDURE: Measure from the aft rudder edge horizontally to the trailing edge of the stabilizer vertical fins.

1 Adjust nose wheel point straight.

2 Check/adjust pedals neutral.

3 Check/adjust N2 = 860 mm (+/- 10 mm). See Fig. 1 for reference.

4 Check control rods and control cables tight and secure.

ILLUSTRATIONS

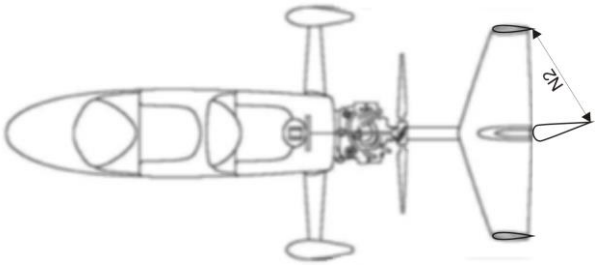


Fig. 1 - Rudder control angle setting

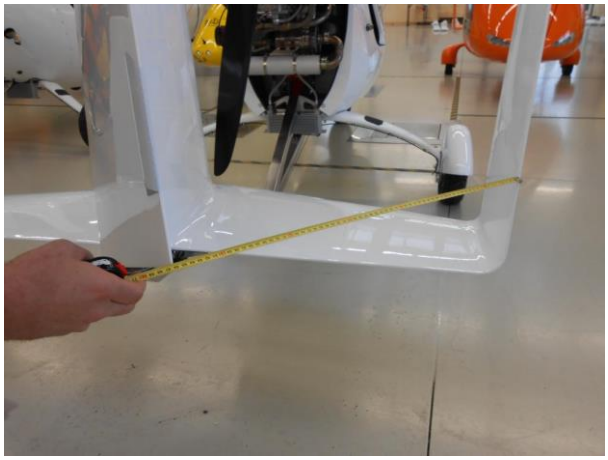


Fig. 2 - Measurement Procedure (example)

27-20-00 5-2 CHECK-ADJUSTMENT: RUDDER CONTROL CABLE TENSION

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

85-00-00-S-30472 Tensiometer

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

1 Adjust pedals neutral/parallel with nose wheel unloaded.

2 With a tensiometer measure rudder control cable tension.

Cable tension values:
20 lbs (+/- 5 lbs)
DOM 11/2009 and later: 35 lbs +/- 5 lbs

3 In case cable tension is lower, inspect main frame (especially keel tube) and complete pedal/rudder control linkage for possible deformation.

ILLUSTRATIONS

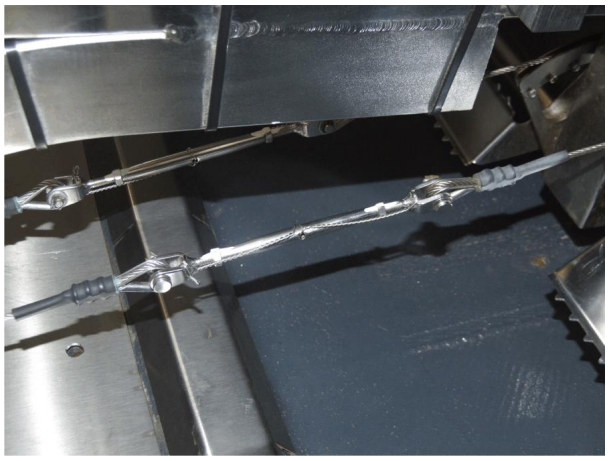


Fig. 1 - Version: Safety wire

Fig. 2 - Version: Shrining Hose

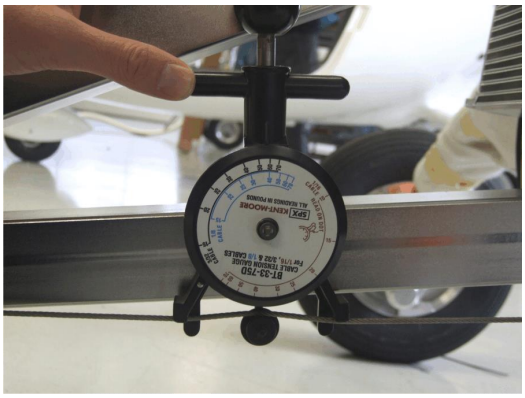


Fig. 3 - Measurement of control cable tension

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'!

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 Inspect nylon filter (use a flashlight if appropriate).

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

EFFECTIVITY - END

EFFECTIVITY: Engine variant ROTAX 912 with second fuel pump P2

NOTE: Fuel system consists of one nylon filter upstream of the mechanical fuel pump, a (secondary) electrical fuel pump with built-in strainer and another filter (KL145) downstream.

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

4 If contamination is found or in case of scheduled replacement, nylon fuel filter AND 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 pump has a preceding nylon filter and another 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
		Nylon fuel filter KL 23	L1 71-00-00-M-20575	

ILLUSTRATIONS

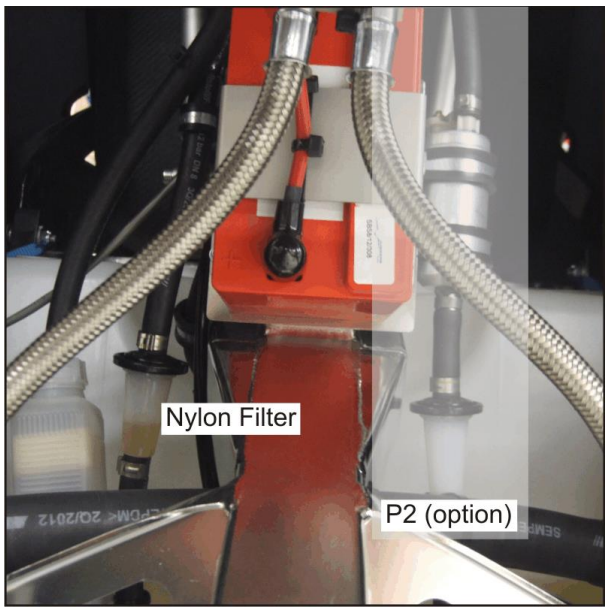


Fig. 1 - Effectivity ROTAX 912

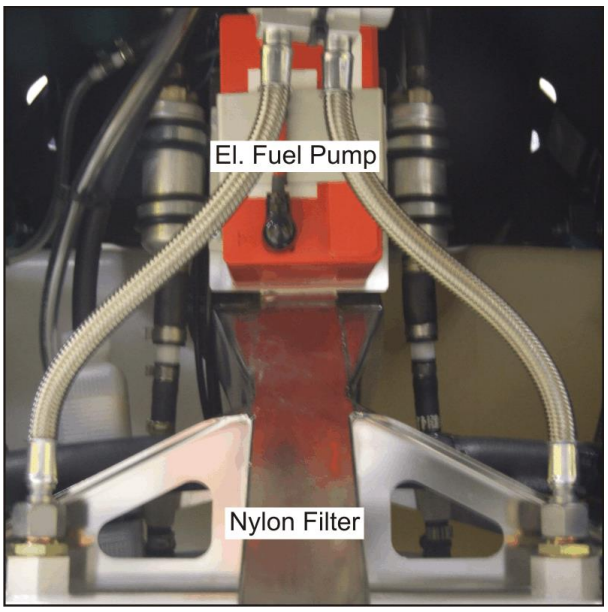


Fig. 2 - Effectivity ROTAX 914

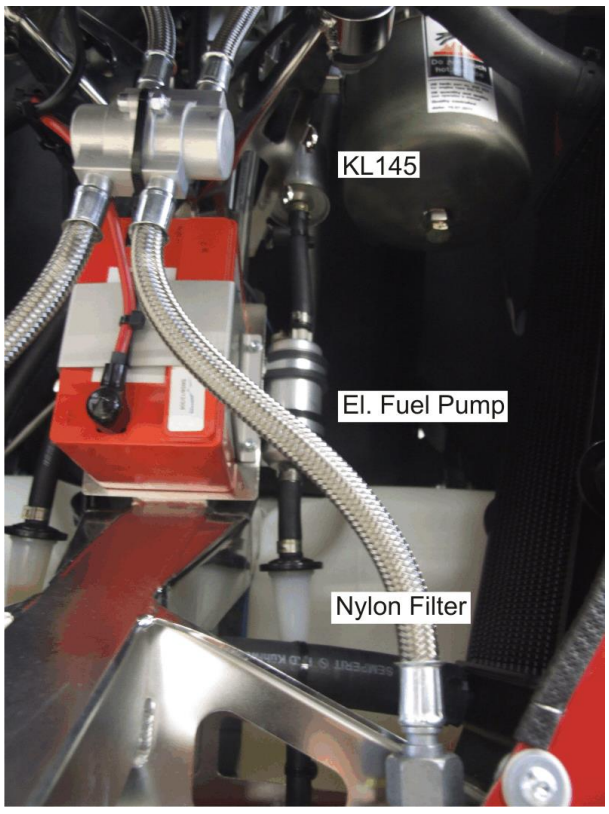


Fig. 3 - Effectivity ROTAX 912 with optional second fuel pump (P2) installed

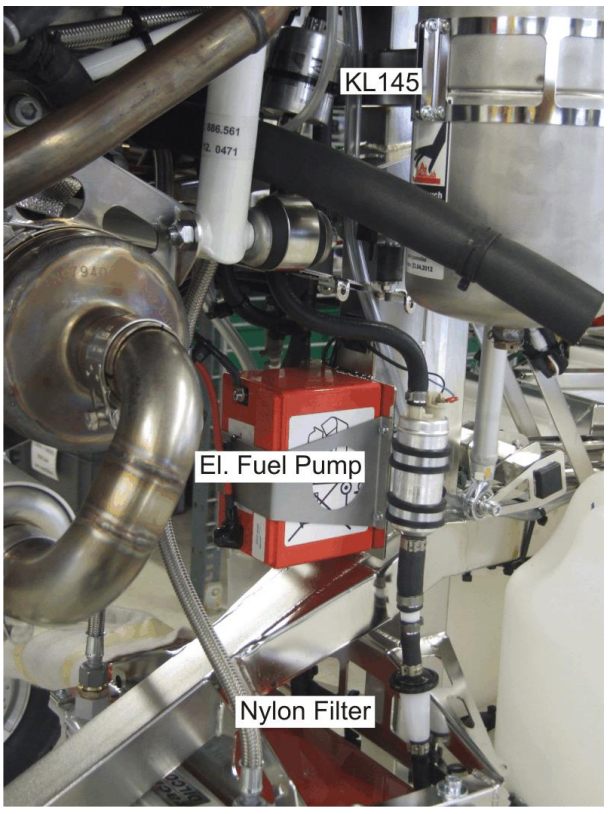


Fig. 4 - Effectivity ROTAX 914

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

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
		Nylon fuel filter KL 23	L1	71-00-00-M-20575	

ILLUSTRATIONS

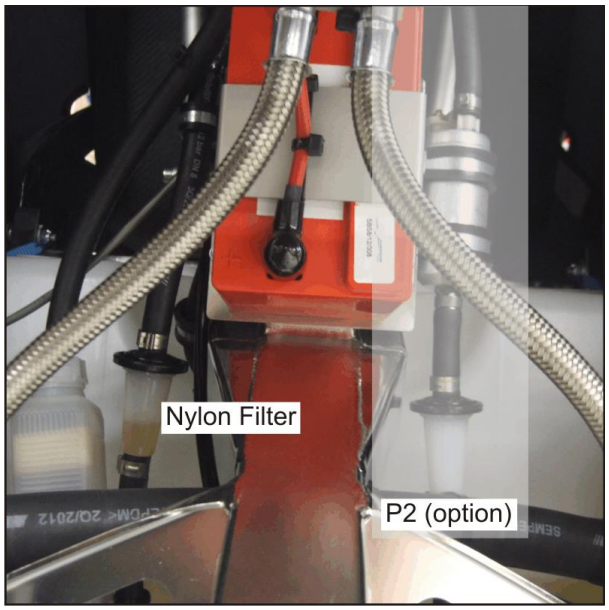


Fig. 1 - Effectivity ROTAX 912

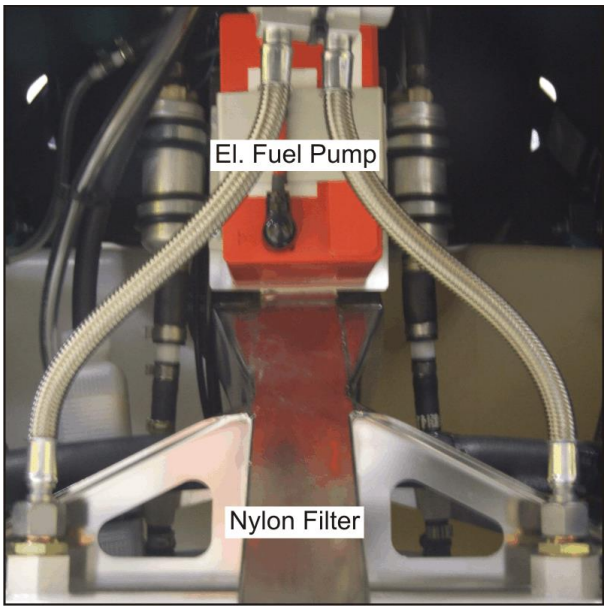


Fig. 2 - Effectivity ROTAX 914

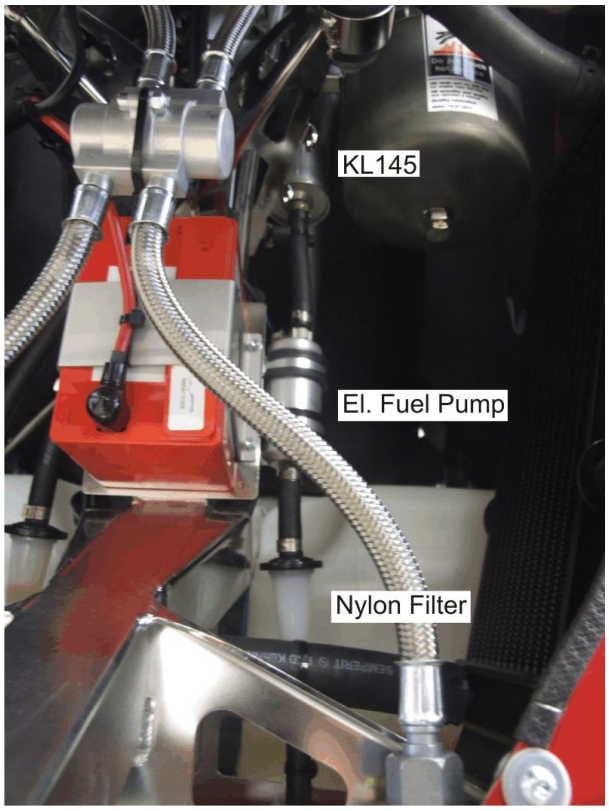


Fig. 3 - Effectivity ROTAX 912 with optional second fuel pump (P2) installed

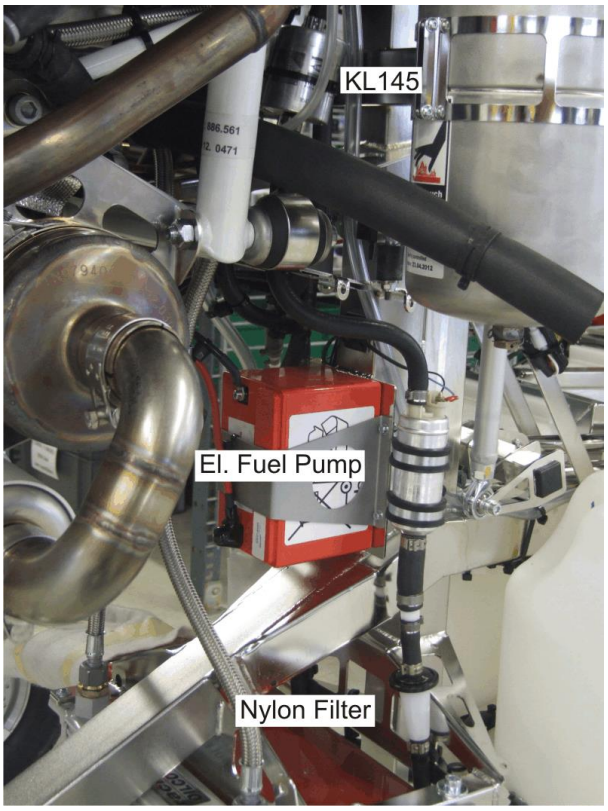


Fig. 4 - Effectivity ROTAX 914

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

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 clamp and replace fuel pump.

5 Install new fuel pump and tighten clamp.

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

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

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

8 Remove clamps from fuel hoses.

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

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
		Fuel pump 914	L1	73-00-00-S-31393	ROTAX 914
		Fuel Pump 912	L1	73-00-00-S-30199	ROTAX 912

ILLUSTRATIONS

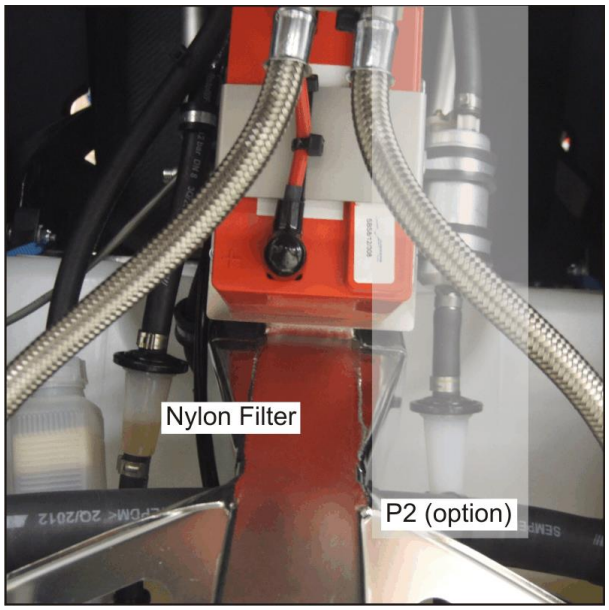


Fig. 1 - Effectivity ROTAX 912

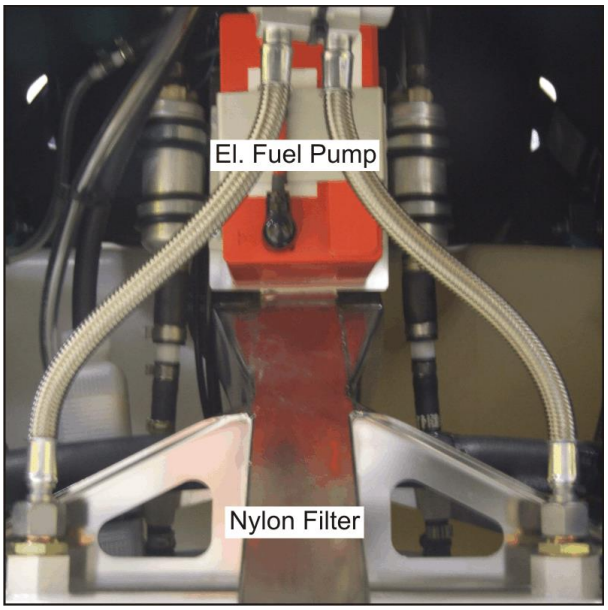


Fig. 2 - Effectivity ROTAX 914

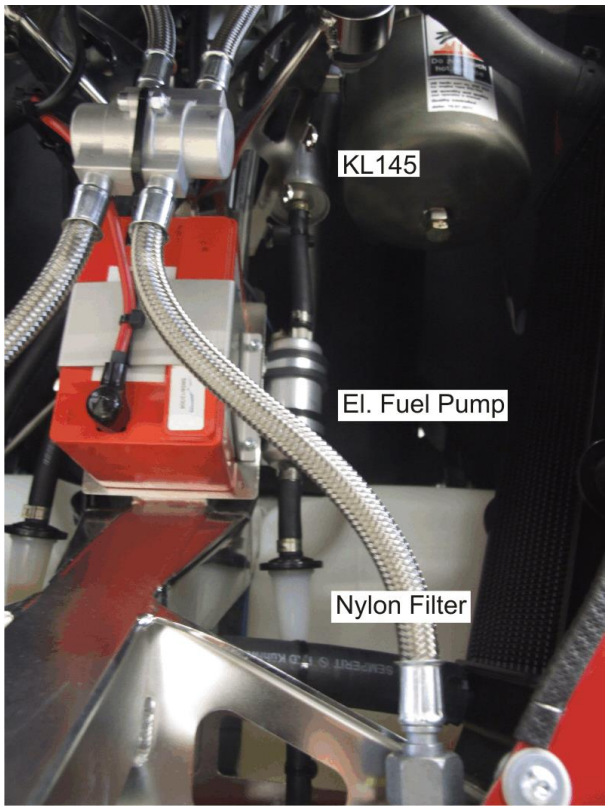


Fig. 3 - Effectivity ROTAX 912 with optional second fuel pump (P2) installed

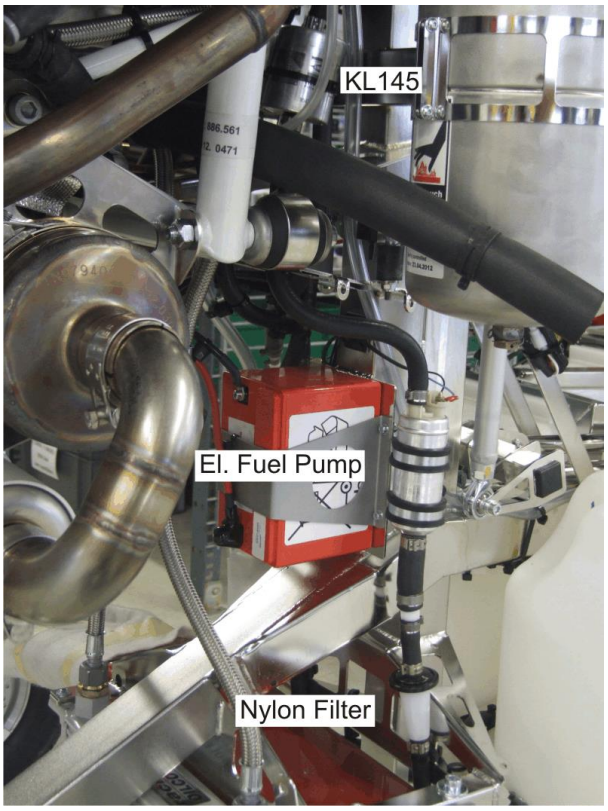


Fig. 4 - Effectivity ROTAX 914

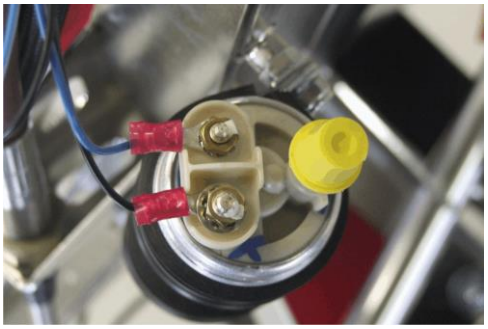


Fig. 5 - El. fuel pump terminal

32-40-00 2-1 MAINT. PROCEDURE: FREE STICKING BRAKE CALIPERS 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

None

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

1 Press out piston (max. 10 mm).

2 Clean and use silicon grease or spray on the running surface of the piston.

3 Re-install brake and wheel.

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

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

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

Nose wheel - Removal

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

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

Nose wheel - Installation

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

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

Main wheel - Removal

5 Remove wheel spat (if installed).

6 Unscrew and remove nut (Fig. 2, 13) and washer (Fig. 2, 12). Discard nut.

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

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

Main wheel - Installation

9 Insert main wheel on axle assembly (Fig. 2, 6).

10 Insert 4 x bolt (Fig. 2, 1) with new serrated washer (Fig. 2, 2) and attach brake disc to main wheel.

11 Torque-tighten bolts (Fig. 2, 1) with 10 Nm in crosswise sequence.

12 Install new self-locking nut (Fig. 2, 13) with washer (Fig. 2, 12) and torque-tighten with 50 Nm.

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

14 Install wheel spat, if required.

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
1	1-7	Nosewheel Assembly World	L2	32-20-00-M-30019	
1	8-13	Front Axis	L2	32-20-00-M-30018	
2	3	Axis rear wheel with inner thread 12x160	L2	32-00-00-M-20001	
2	5	Wheelspat bracket kit	L1	32-00-00-M-30003	
2	6	Rearaxis	L1	32-00-00-M-30002	incl. 3, 4, 12, 13
2	7	Brake pad inner (big)	L2	32-40-00-M-30511	
2	8	Brake Disc Set	L1	32-40-00-M-30004	incl. 1, 2
2	9	Brake pad outer (small)	L2	32-40-00-M-30512	

ILLUSTRATIONS

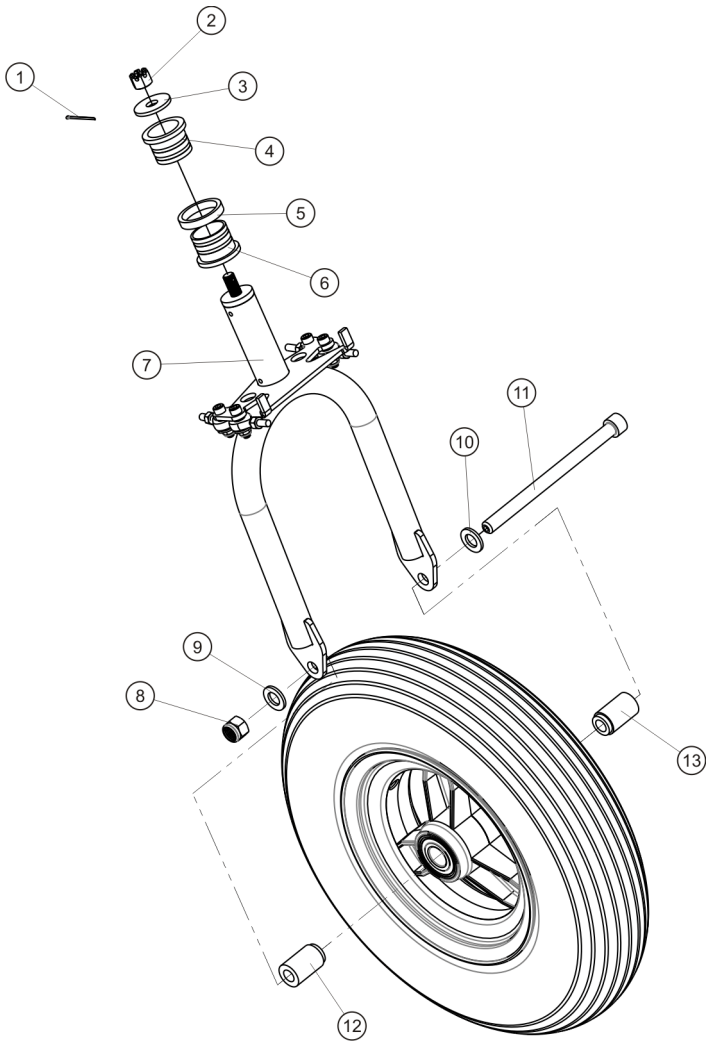


Fig. 1 - Nose gear with wheel

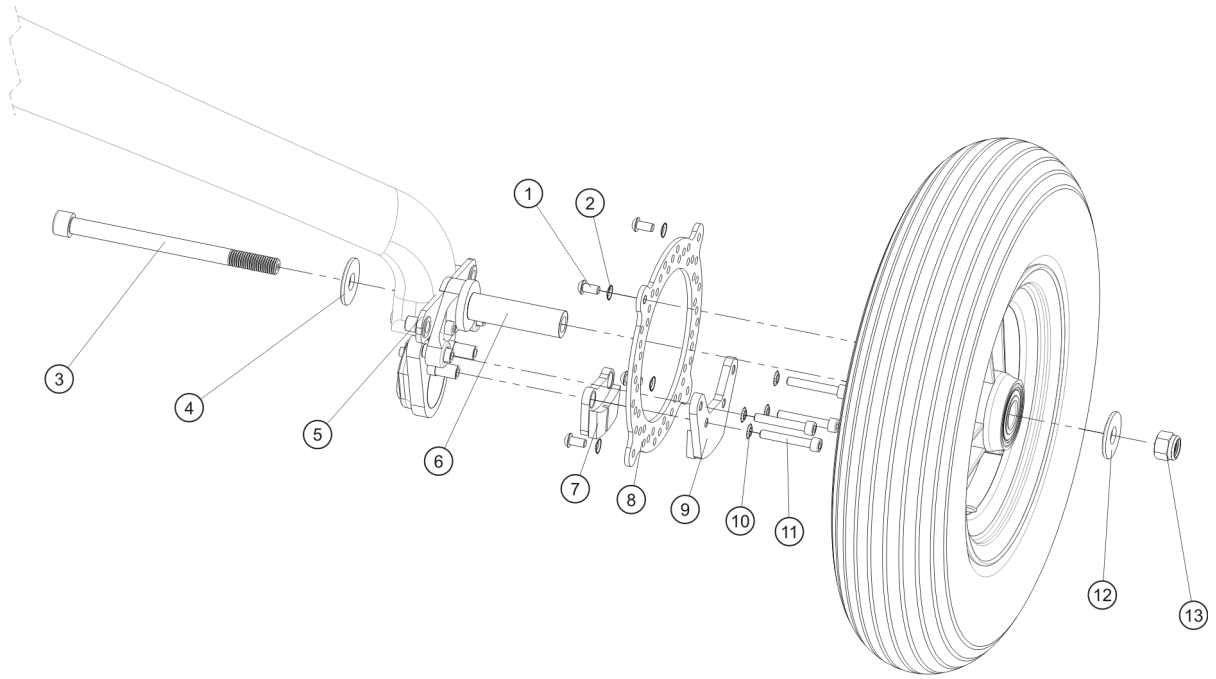


Fig. 2 - Main gear, wheel and brake

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to 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 (8) between brake pads.

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

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

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

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

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

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

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

9 Insert brake disc between brake pads.

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

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
1	3	Axis rear wheel with inner thread 12x160	L2	32-00-00-M-20001	
1	5	Wheelspat bracket kit	L1	32-00-00-M-30003	
1	6	Rearaxis	L1	32-00-00-M-30002	incl. 3, 4, 12, 13
1	7	Brake pad inner (big)	L2	32-40-00-M-30511	
1	8	Brake Disc Set	L1	32-40-00-M-30004	incl. 1, 2
1	9	Brake pad outer (small)	L2	32-40-00-M-30512	

ILLUSTRATIONS

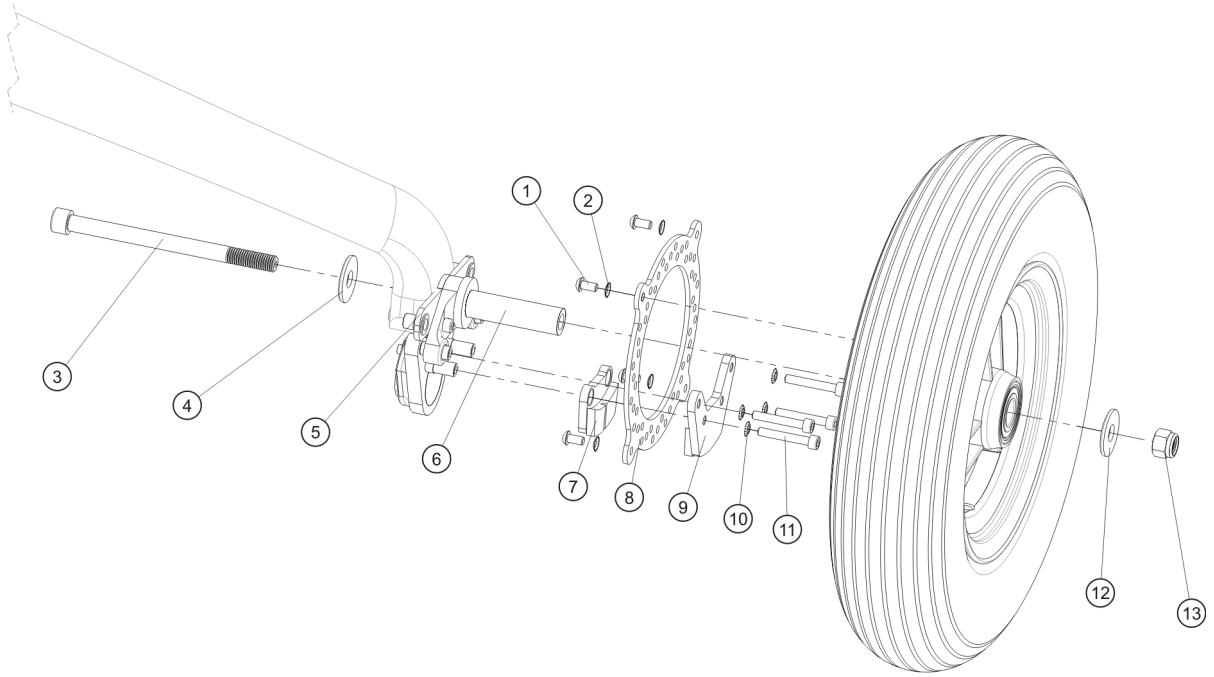


Fig. 1 - Main wheel with brake

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.

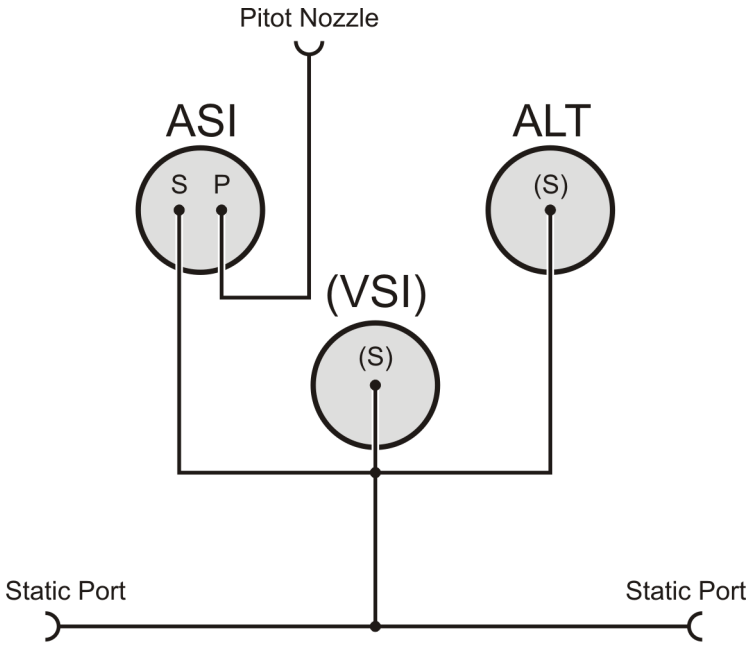
13 Leave set-up unchanged and check decay over 10 seconds. There shall be no noticeable decay (except VSI).

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

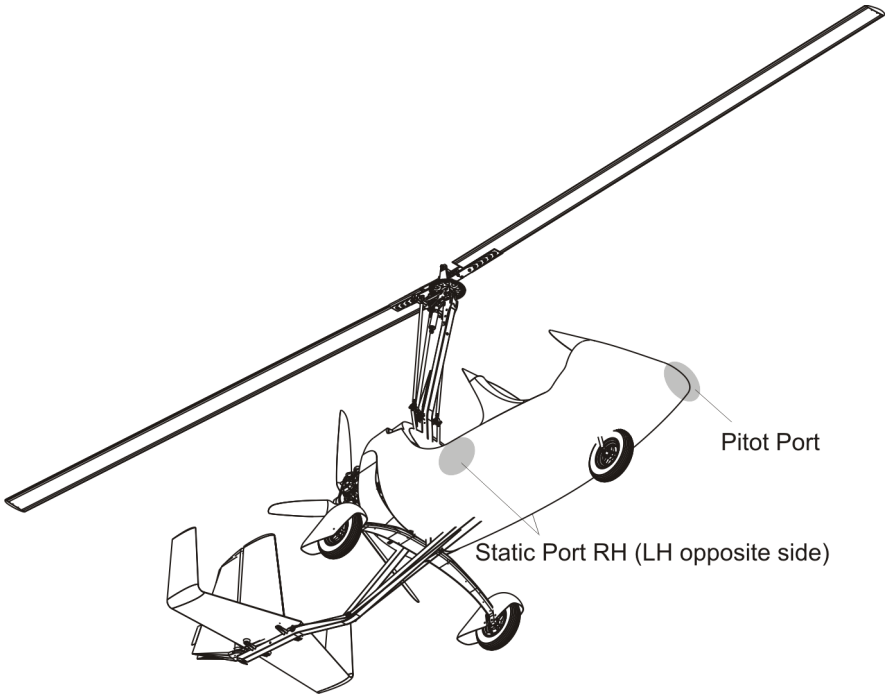
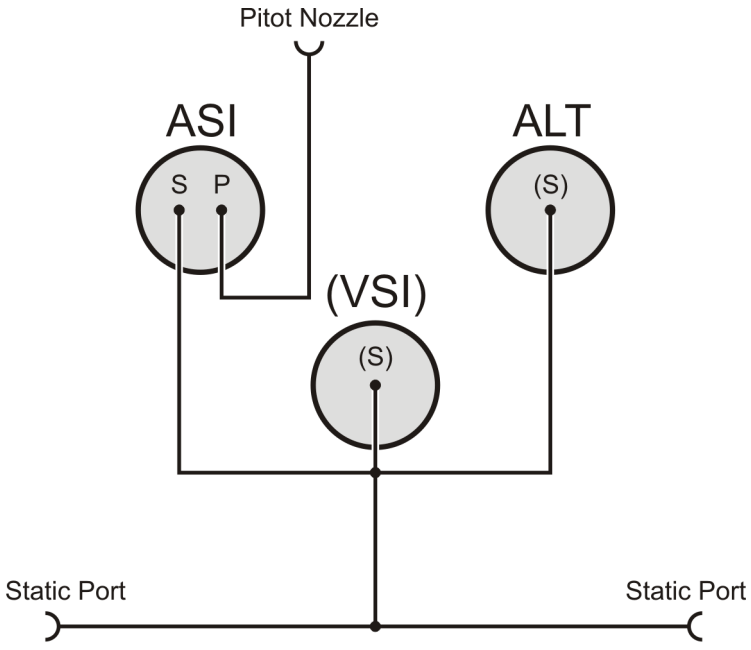


Fig. 1 - Static ports (2 x) and pitot port



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!

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

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

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

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

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

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
		Compessor	L1	24-00-00-M-20977	
		dryer kit	L1	24-00-00-S-30358	

ILLUSTRATIONS

Fig. 1 - Centre panel

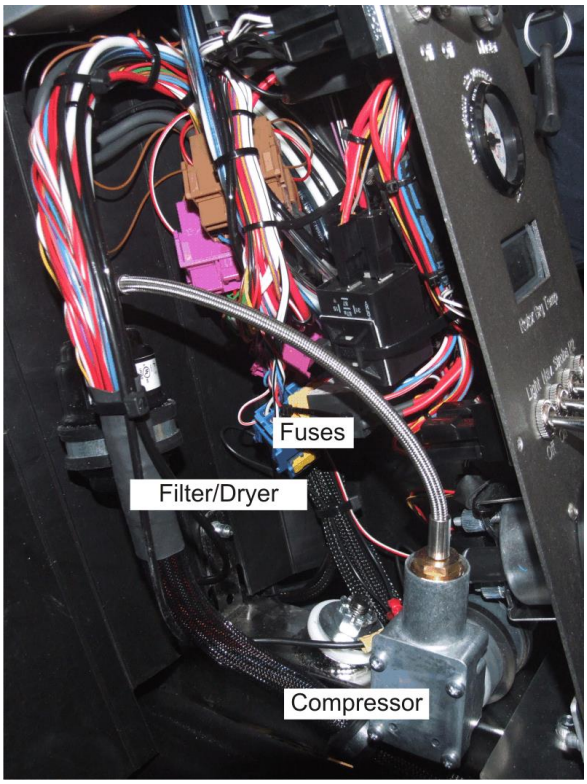


Fig. 2 - Access to compressor, filter/dryer, fuses and cabling (LH cover bent away)

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

Access to compressor, filter/dryer, fuses and cabling (Fig. 1 / 2)

1 Remove 3 x bolts as shown in Fig. 1.

2 Carefully bend away plastic cover.

3 Perform work as required. Consider to remove instrument panel completely, if required.

4 When finished, bring plastic cover in position so that bores and threaded inserts align.

NOTE: Bottom bolt(s) connect instrument panel, plastic cover and support bracket

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

Instrument panel - Removal (Fig. 3)

6 Remove rotor system or secure.

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

8 Unscrew and remove panel bolts (13 x).

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

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

Instrument panel - Installation

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

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

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

ILLUSTRATIONS

Fig. 1 - Centre Panel and Components

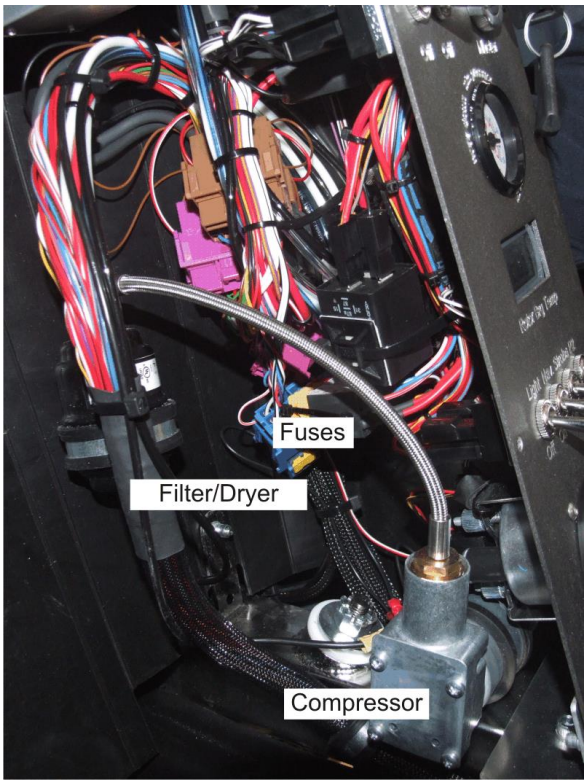


Fig. 2 - Access to compressor, filter/dryer, fuses and cabling (LH cover bent away)

Fig. 3 - Instrument Panel with attachment bolts

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 (88-00-00-S-30483)

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 set, painted	L2	53-00-00-M-30587	
1	2	Propeller attachment kit	L1	61-00-00-M-30064	incl. 3
1	6	HTC CCW-3B-172-CG Propeller 914	L1	61-00-00-S-31628	incl. 4, 5, 7
1	6	HTC CCW-3B-172-CG Propeller 912	L1	61-00-00-M-30398	incl. 4, 5, 7
1	8	atachment kit spinner HTC	L2	71-00-00-M-31116	incl. 9, 10

ILLUSTRATIONS

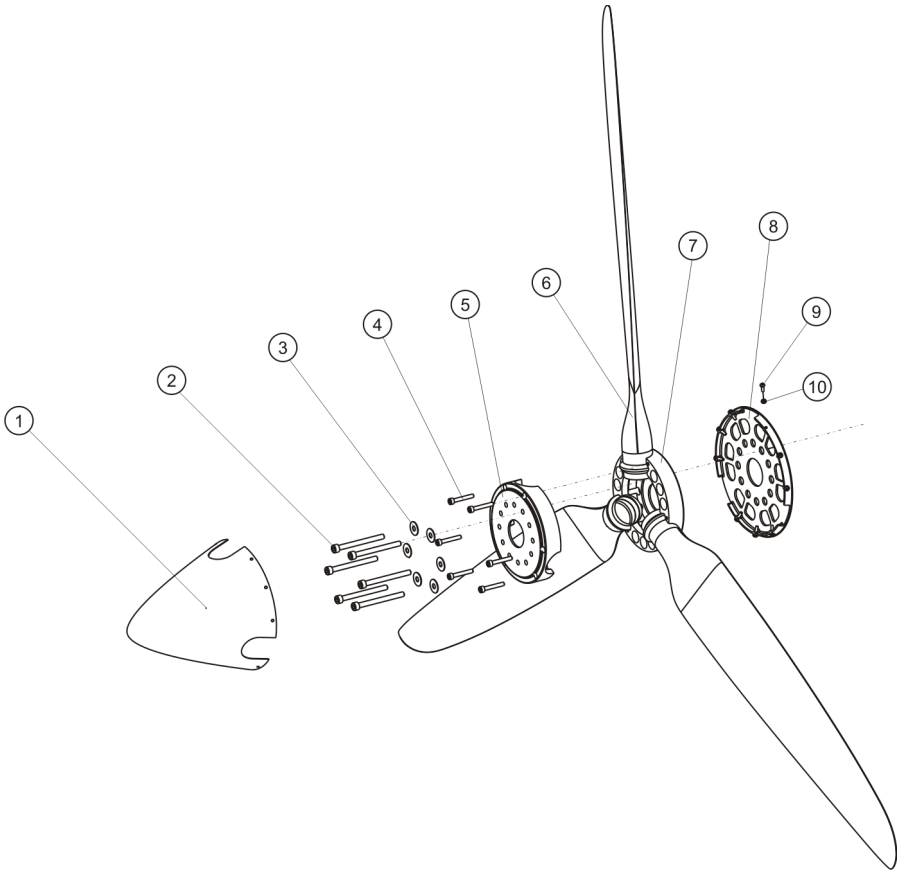


Fig. 1 - Propeller HTC

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 set, painted	L2	53-00-00-M-30587	
1	2	Propeller attachment kit	L1	61-00-00-M-30064	incl. 3
1	6	HTC CCW-3B-172-CG Propeller 912	L1	61-00-00-S-31628	incl. 4, 5, 7
1	6	HTC CCW-3B-172-CG Propeller 914	L1	61-00-00-M-30398	incl. 4, 5, 7
1	8	atachment kit spinner HTC	L2	71-00-00-M-31116	incl. 9, 10

ILLUSTRATIONS

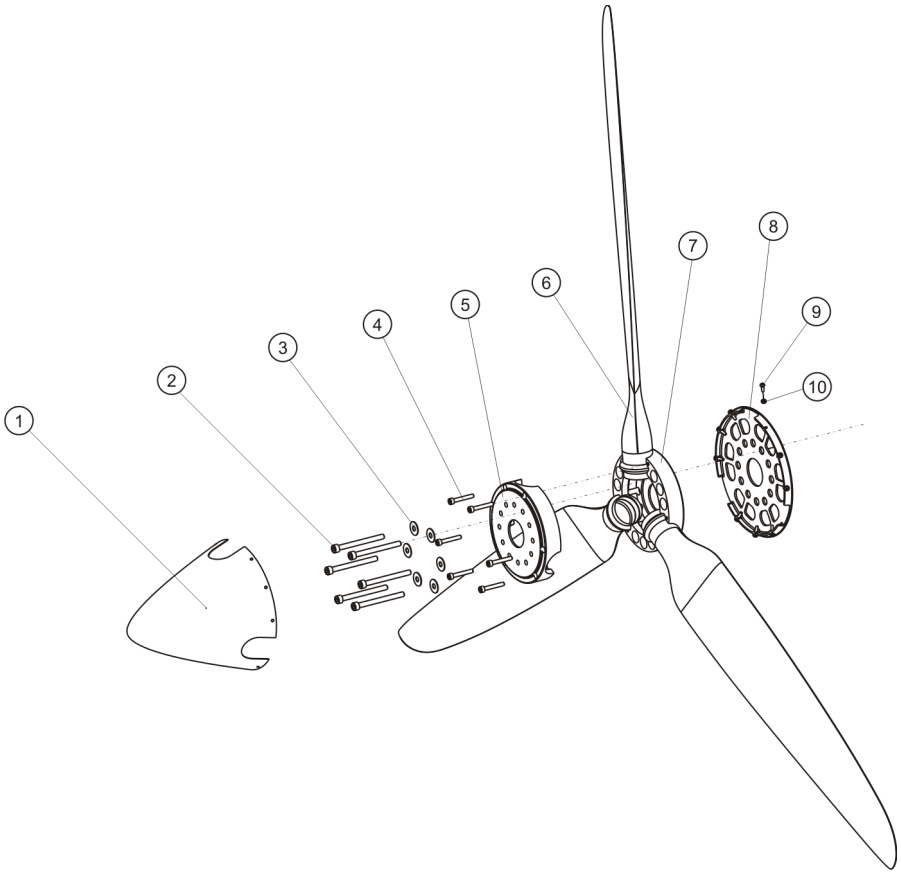


Fig. 1 - Propeller HTC

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

85-00-00-S-30492 Propeller Pitch Adjustment Tool (MT)

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 set, painted	L2	53-00-00-M-30587	
1	2	Propeller attachment kit	L1	61-00-00-M-30064	incl. 3
1	6	HTC CCW-3B-172-CG Propeller 914	L1	61-00-00-S-31628	incl. 4, 5, 7
1	6	HTC CCW-3B-172-CG Propeller 912	L1	61-00-00-M-30398	incl. 4, 5, 7
1	8	atachment kit spinner HTC	L2	71-00-00-M-31116	incl. 9, 10

ILLUSTRATIONS

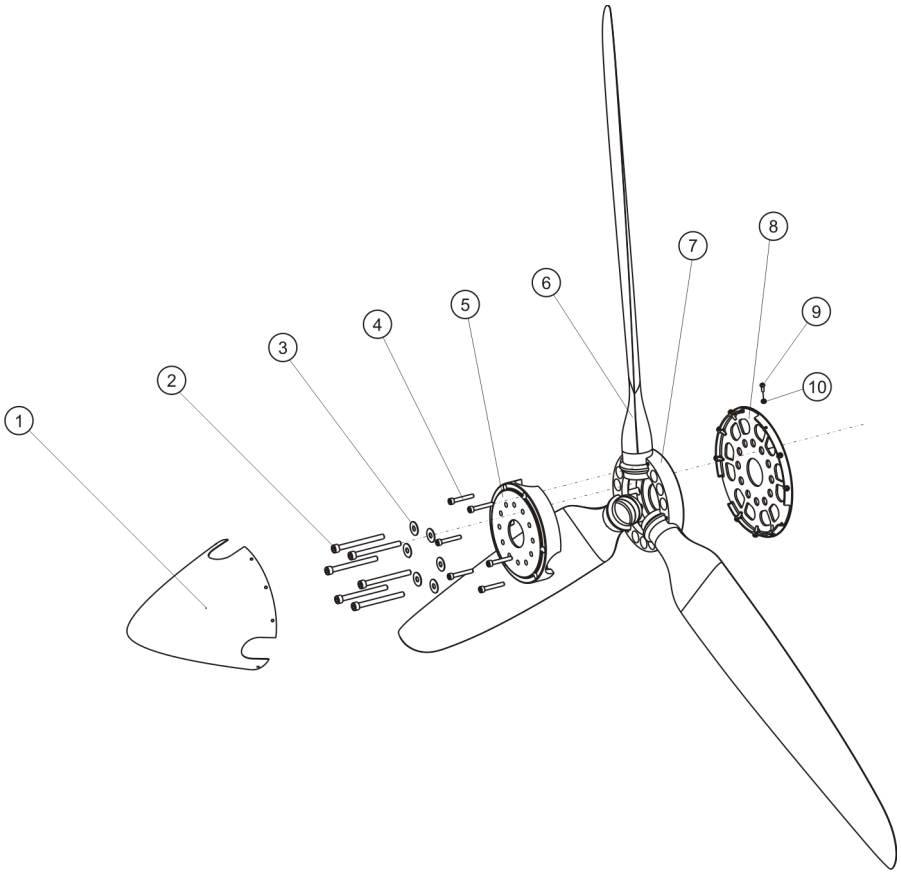


Fig. 1 - Propeller HTC

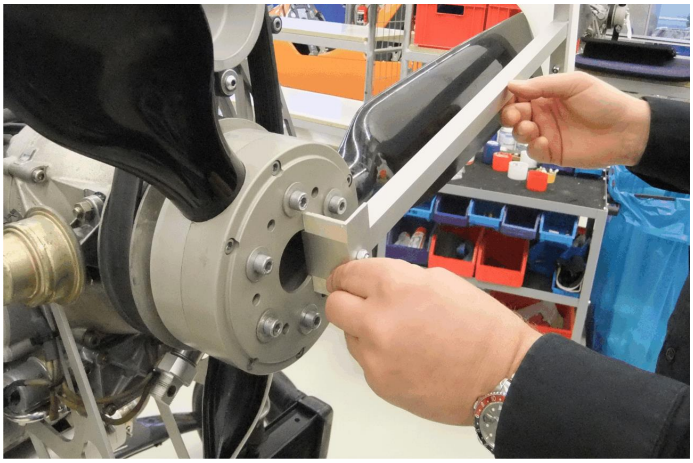


Fig. 2 - Propeller pitch adjustment and tool

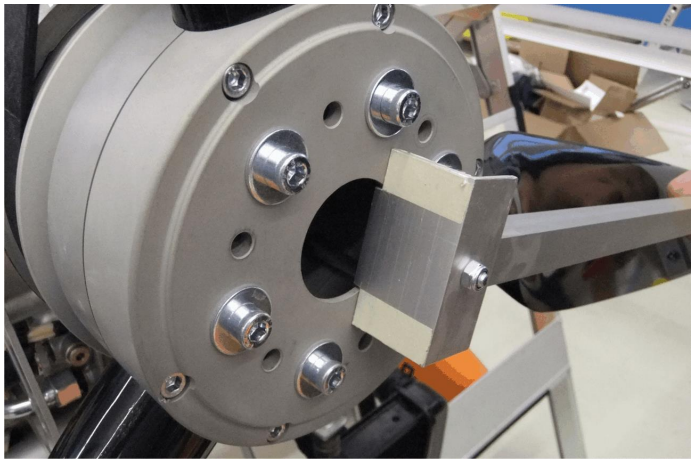


Fig. 3 - Detail hub

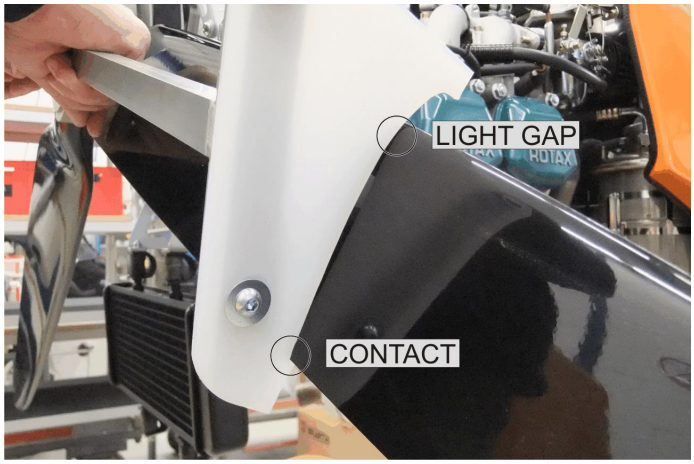


Fig. 4 - Detail blade

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

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):
- red
- orange
- green
- black
- orange/white
- green/white

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. Sqeeze 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 holesInsert LEDs without mounting ring and fastening nut.

6 Fixate LED with mounting ring and nut from behind (see Fig. 6)
Insert LEDs in mount (use pliers, if needed). LED with cable color green goes in upper position, orange in bottom position.

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

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

8 Connect control board to rocker switch (Fig. 7):
- Switch/position '1a' (front): orange/white
- Switch/position '1' (middle): black
- Switch/position '1b' (aft): green/white

9 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’ position
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

ILLUSTRATIONS

Fig. 1 - Contents of the Kit

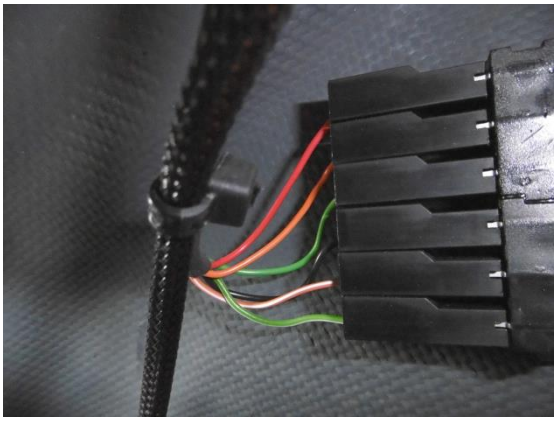


Fig. 2 - Pin assignment of wiring harness

Fig. 3 - Rocker Switch - seen from below

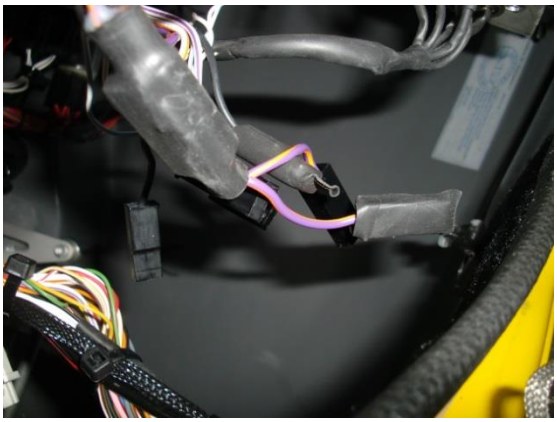


Fig. 4 - Isolation of cable end

Fig. 5 - LEDs mounting position

Fig. 6 - LEDs seen from behind

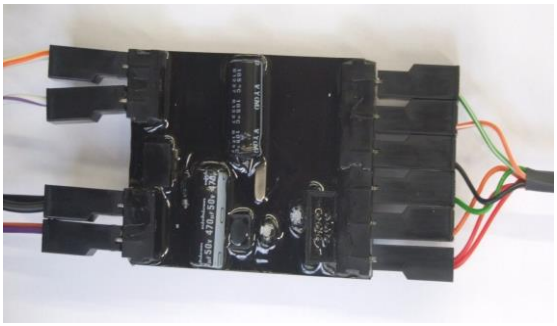


Fig. 7 - Control Board

Fig. 8 - Connected rocker switch from below

Fig. 9 - Rocker switch

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

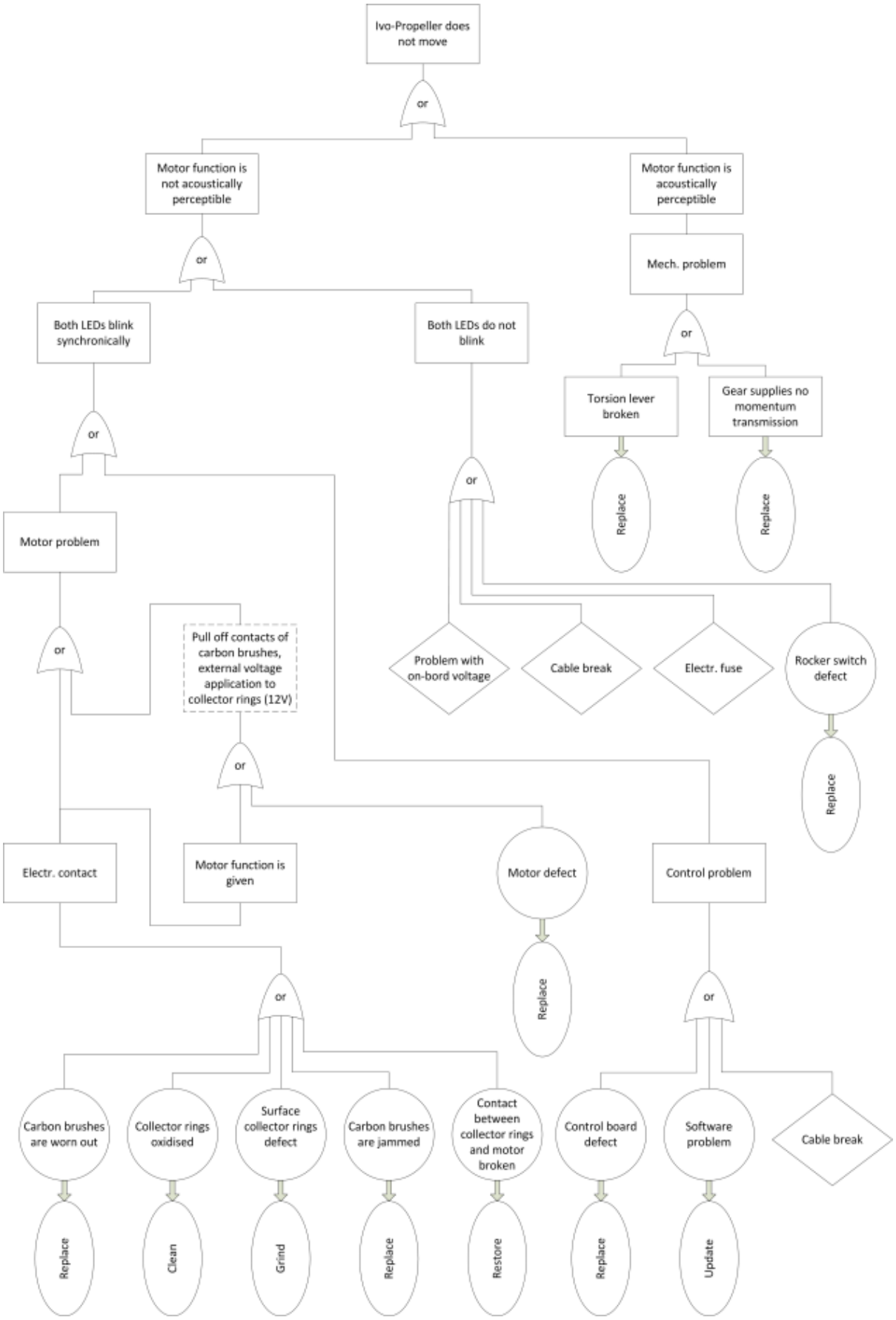


Fig. 1 – Fault Tree IVO Variable Pitch Propeller

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 (88-00-00-S-30487)
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	27-30-00-S-30256	RS II
1	2	Chimm washer 3,5	L0	62-00-00-S-31706	RS II
1	3	U13	L0	27-30-00-S-30256	RS II
1	4	M12 castle nut	L0	27-30-00-S-30256	RS II
1	5	Split pin 3.2x40	L0	27-30-00-S-30256	RS II
1	6	Rotor head II compl.	L2	27-30-00-M-31879	RS II

ILLUSTRATIONS

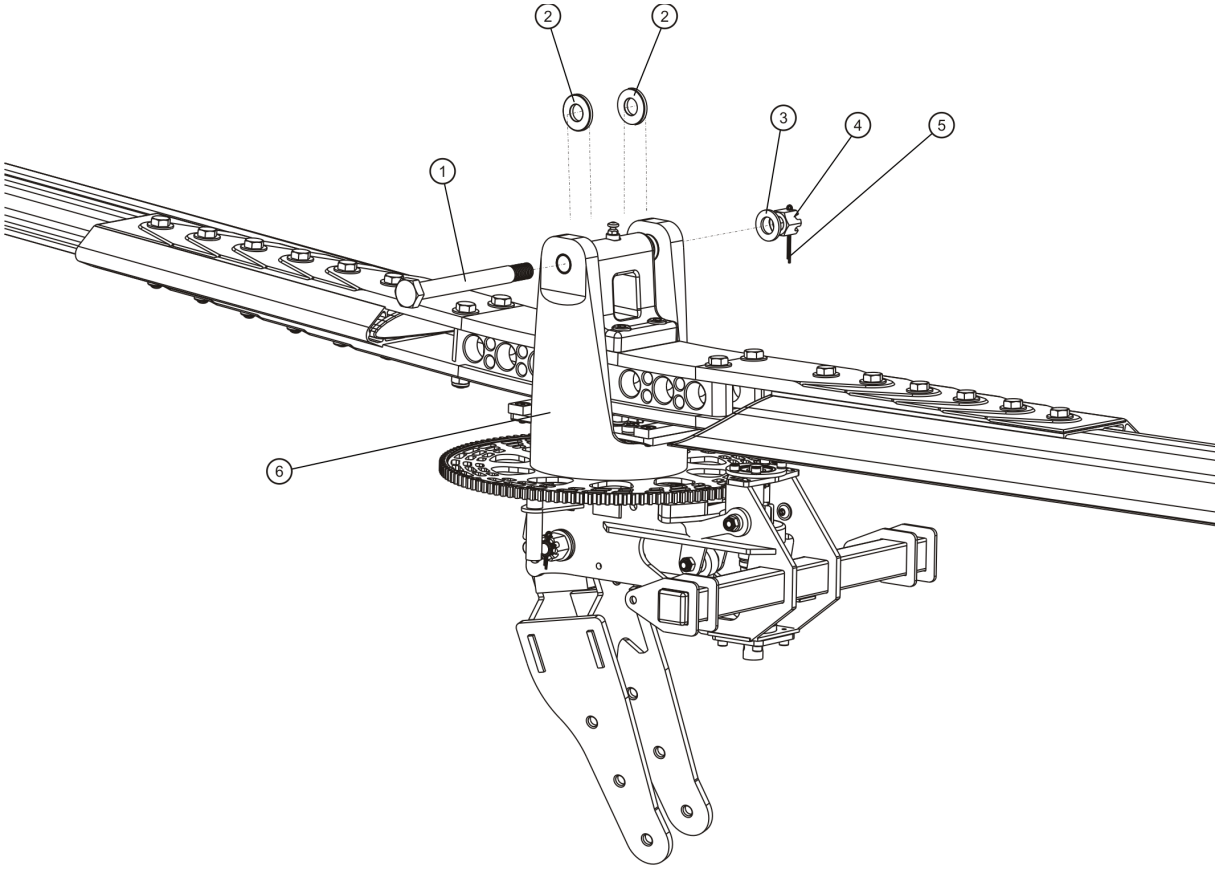


Fig. 1 - Removal rotor - teetering parts (Effectivity: RS II)

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

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

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

5 Repeat step 2 to 4 on second rotor blade.

IMPORTANT NOTE: Do not disassemble the rotor hub!

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

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

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
1	1	shoulder bolt M8 37/12	L0	62-00-00-S-33324	RS II
1	1-5	M8x60 Rotor blade bolt 8.8 DIN 610	L0	62-00-00-M-20661	RS I
1	2	shoulder bolt M8 40/12	L0	62-00-00-S-33324	RS II
1	3	shoulder bolt M8 43/12	L0	62-00-00-S-33324	RS II
1	4	shoulder bolt M8 46/12	L0	62-00-00-S-33324	RS II
1	5	M8x60 Rotor blade bolt 8.8 DIN 610	L0	62-00-00-M-20661	RS II
1	6	U9/20	L0	62-00-00-S-33324	RS II
1	7	Rotorhub II	L1	01-00-00-V-31793	
1	8	U8	L0	62-00-00-S-33324	RS II
1	9	M8 Si	L0	62-00-00-S-33324	RS II
1	10	Clamping profile blade	L1	01-00-00-V-31793	

ILLUSTRATIONS

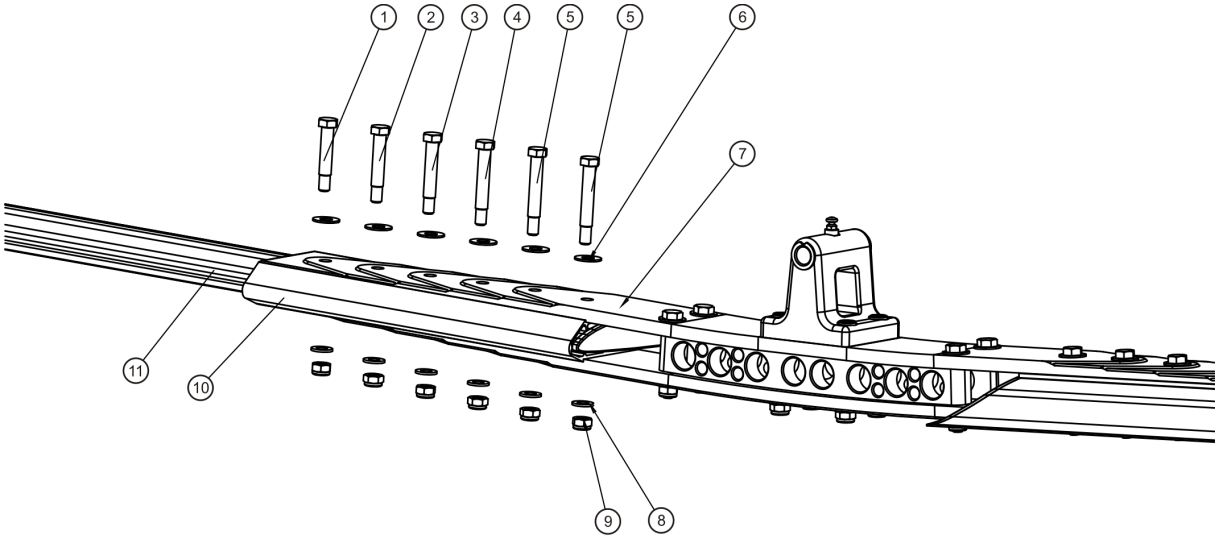


Fig. 1 - Disassembly rotor - teetering parts (Effectivity: RS II)

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	62-00-00-S-33324	RS II
1	1-5	M8x60 Rotor blade bolt 8.8 DIN 610	L0	62-00-00-M-20661	RS I
1	2	shoulder bolt M8 40/12	L0	62-00-00-S-33324	RS II
1	3	shoulder bolt M8 43/12	L0	62-00-00-S-33324	RS II
1	4	shoulder bolt M8 46/12	L0	62-00-00-S-33324	RS II
1	5	M8x60 Rotor blade bolt 8.8 DIN 610	L0	62-00-00-M-20661	RS II
1	6	U9/20	L0	62-00-00-S-33324	RS II
1	7	Rotorhub II	L1	01-00-00-V-31793	
1	8	U8	L0	62-00-00-S-33324	RS II
1	9	M8 Si	L0	62-00-00-S-33324	RS II
1	10	Clamping profile blade	L1	01-00-00-V-31793	

ILLUSTRATIONS

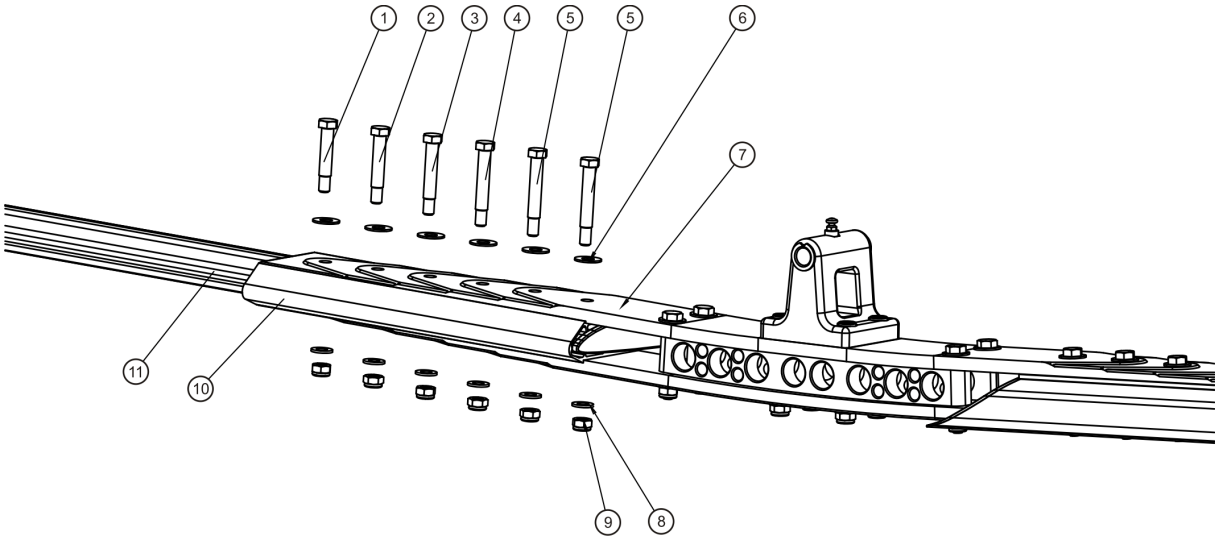


Fig. 1 - Assembly rotor - teetering parts (Effectivity: RS II)

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 (88-00-00-S-30477)
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 (using a lint-free cloth).

7 Insert teeter bolt by hand in the same orientation as it was before (bolt head should be at that side of the teeter block which is marked with one dot) while matching the shim washers with the corresponding installation positions. Insert teeter bolt by hand in the same orientation as it was before (bolt head should be at that side of the teeter block which is marked with one dot) while matching the shim washers with the corresponding installation positions.

8 Check direction of assembly and shim washers: rotor hub, teeter tower and shim washers are marked on each side either with one or two engraved dots.

9 If the teeter bolt cannot be inserted, tilt the rotor blade along the teeter axis with the free hand.

10 Install washer and castellated nut. Hand-tighten only and secure with a new split pin. Use split pins only once. Make sure that the teeter bolt can be turned easily by hand.

11 Grease nipple in teeter block.

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
1	1	Teeterbolt	L0	27-30-00-S-30256	RS II
1	2	Chimm washer 3,5	L0	62-00-00-S-31706	RS II
1	3	U13	L0	27-30-00-S-30256	RS II
1	4	M12 castle nut	L0	27-30-00-S-30256	RS II
1	5	Split pin 3.2x40	L0	27-30-00-S-30256	RS II
1	6	Rotor head II compl.	L2	27-30-00-M-31879	RS II

ILLUSTRATIONS

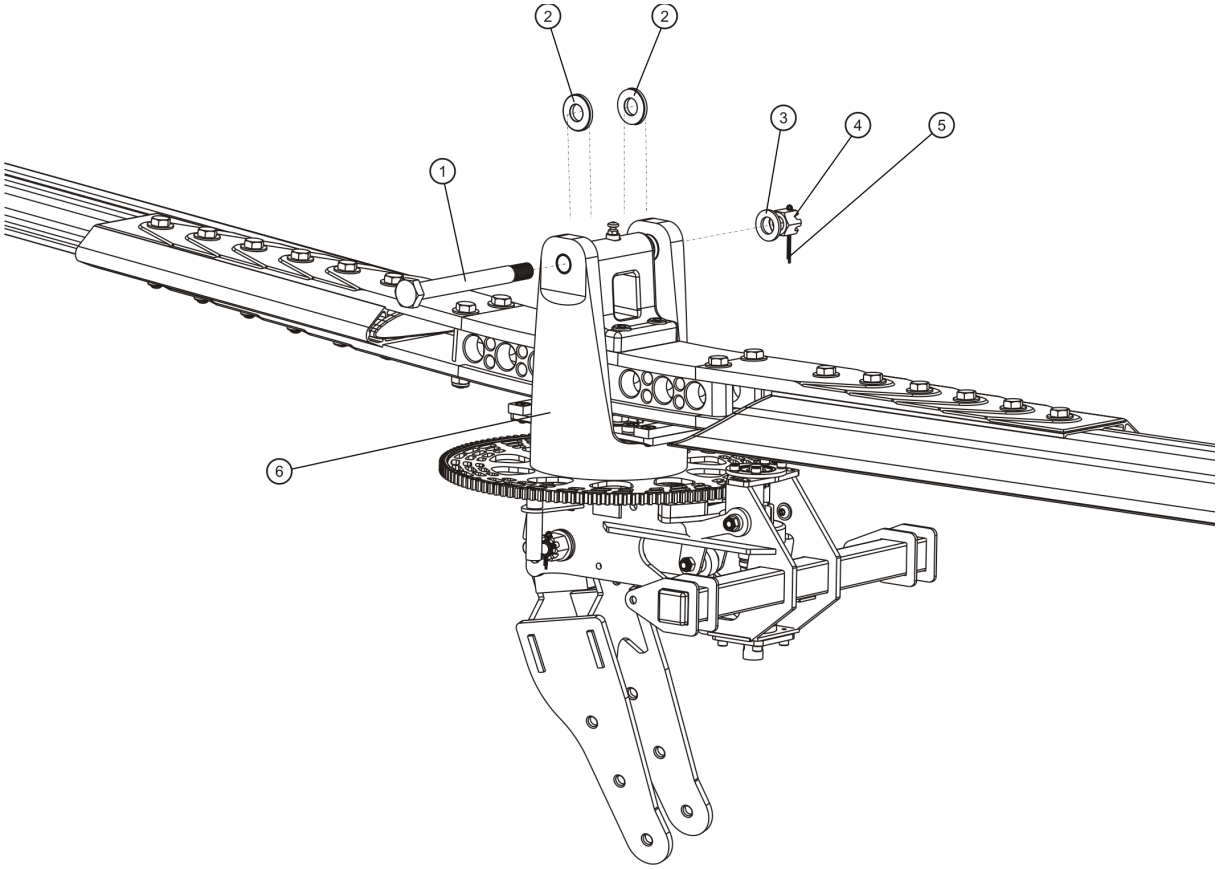


Fig. 1 - Installation rotor - teetering parts (Effectivity: RS II)

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.

IMPORTANT NOTE: In case of any adjustment, a functional test flight must be performed!

ILLUSTRATIONS

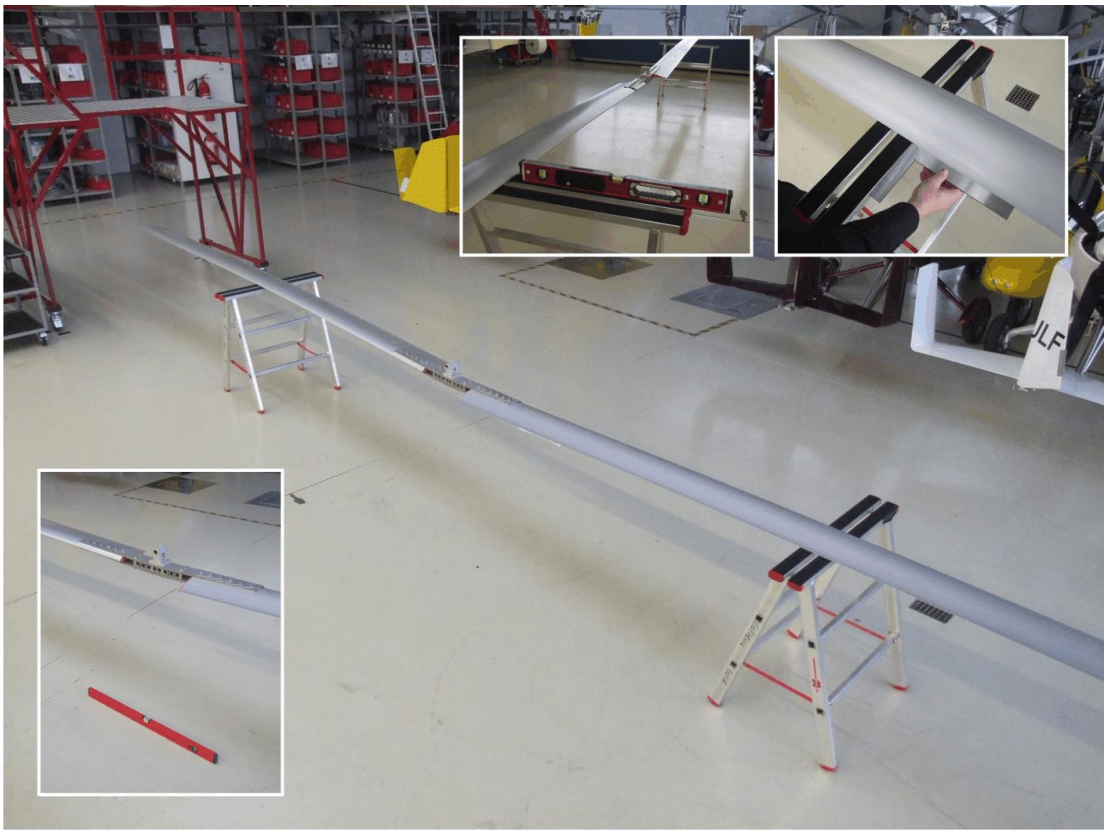


Fig. 1 - Rotor system placed on stands

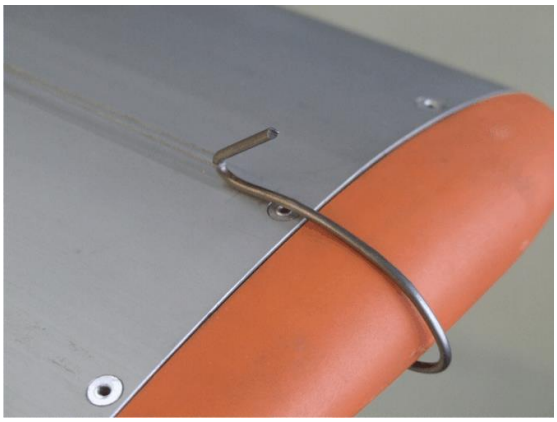


Fig. 2 - Positioning of measuring cord

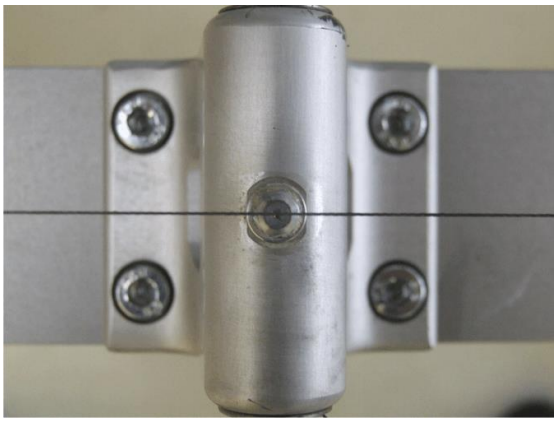


Fig. 3 - Reference point at grease nipple

62-11-00 6-1 INSPECTION: ROTOR - TEETERING PARTS

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to 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 (88-00-00-S-30477)

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 13/15/21x15	L0	27-30-00-M-20677	
1	2	Bushing TEF-MET 13/15/21x15	L2	27-30-00-M-20677	
		Teeterbolt kit	L0	27-30-00-S-30256	

ILLUSTRATIONS

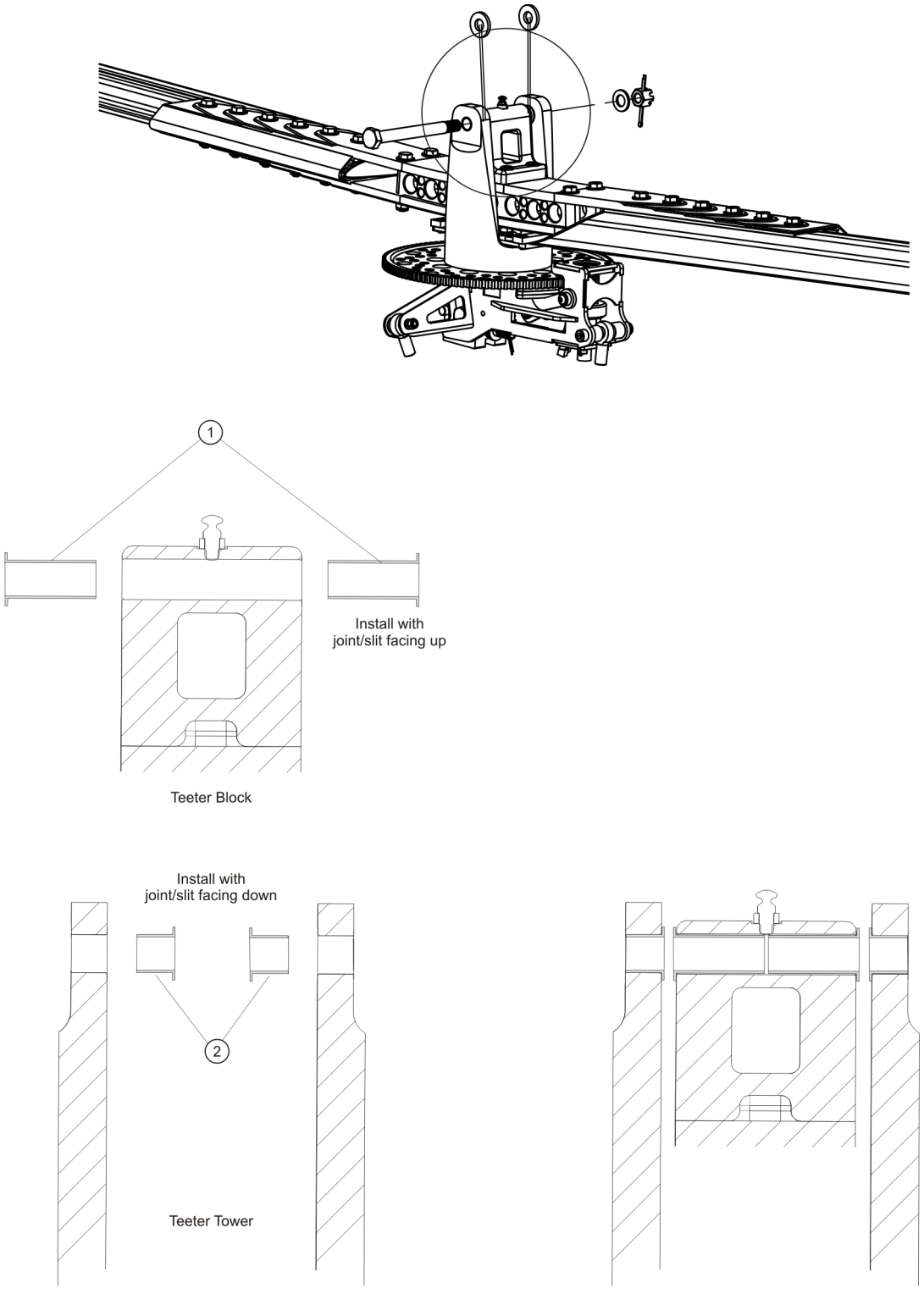


Fig. 1 - Teeter bushings, block and tower - cross section view

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

85-00-00-S-35077 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

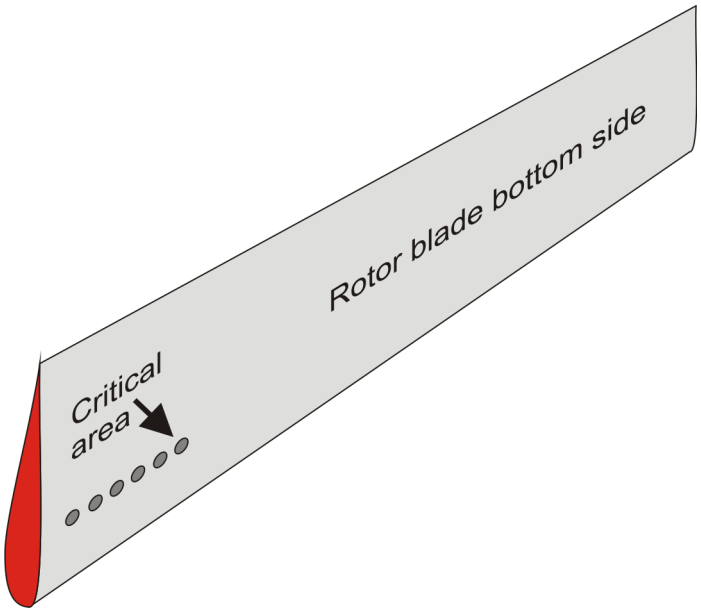


Fig. 1 - Critical blade area

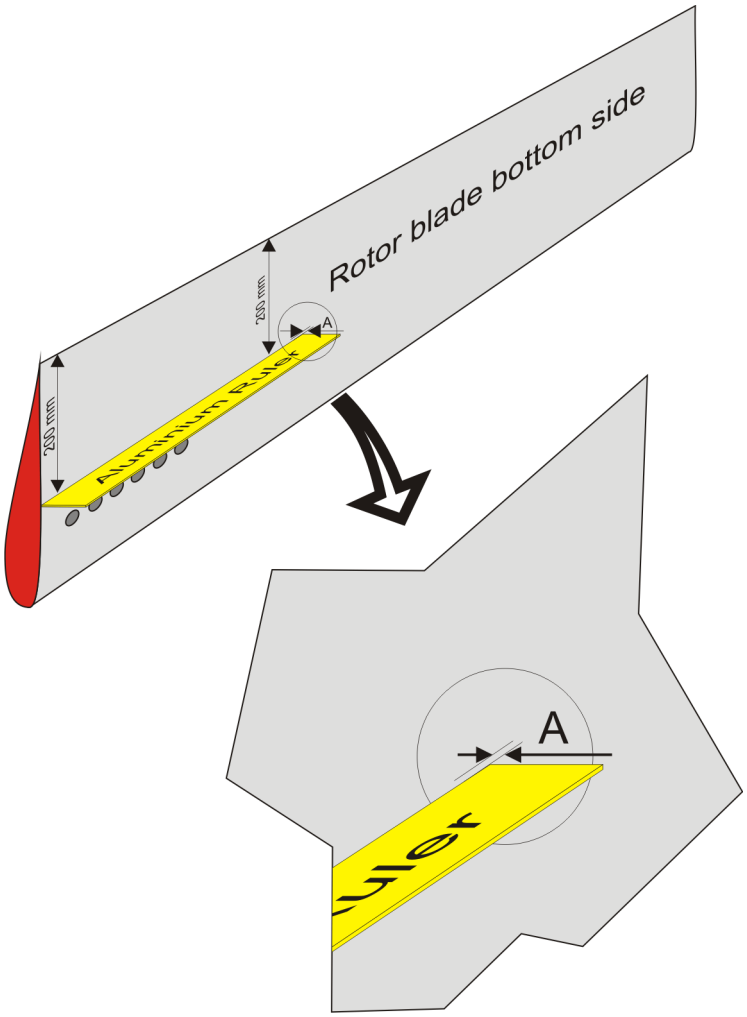


Fig. 2 - Measurement of blade root linearity

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 (88-00-00-S-30477)
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	1-2	Replacement kit rotorhub I bolts	L1	62-00-00-S-33356	(RSI)
1	1-2	Replacement kit rotorhub II bolts	L1	62-00-00-S-33355	

ILLUSTRATIONS

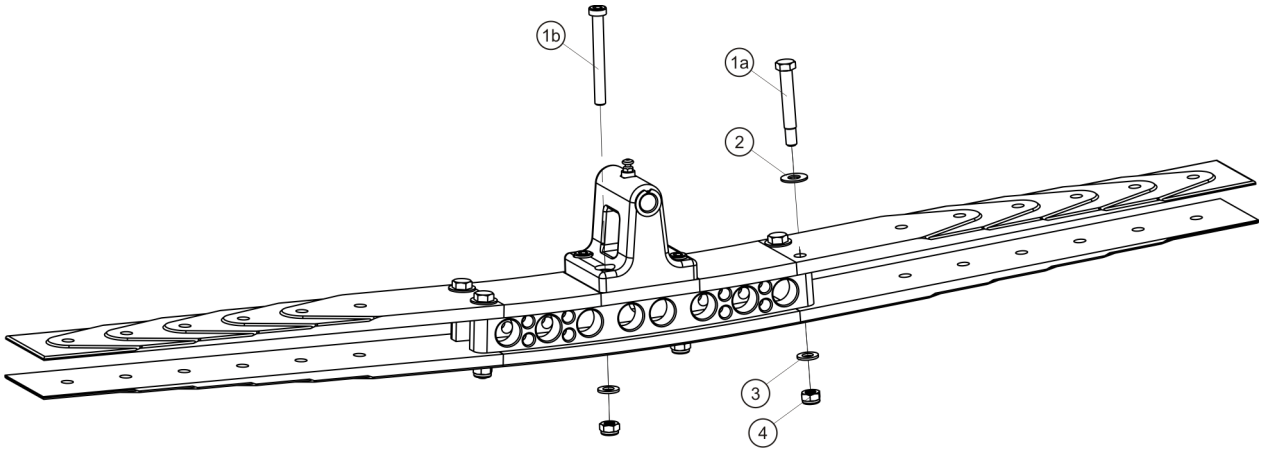


Fig. 1 - Rotor hub

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'!

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, whether the upper bearing shield bendix shaft is welded on inner bottom side to the rotor head side plates; if not contact AutoGyro customer support.

3 Inspect teeter stops (4) for correct attachment and condition.

4 Inspect teeter tower (3) for correct attachment and condition, i.e. no cracks. In case of cracks or unusual condition or appearance contact AutoGyro customer support.

5 Perform torque-check on main bolt nut (2). In order to do so, remove and discard split pin (1) and torque-check castle nut with 120 Nm.

6 If torque-check fails mark component / gyroplane unserviceable and contact AutoGyro customer support.

7 Insert new split pin (1) and secure. Make sure that ends do not contact rotating parts.

WARNING: Do not fly gyroplane in case torque-check failed. Clearly mark as unserviceable and prevent from use until resolved.

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
1	1	Splitpins, 10 pieces	L0	27-30-00-S-30261	
1	2	M20 castle nut flat		NPI	
1	3	Rotorhub upside mounted		NPI	
1	4	Teeter stop II	L1	27-30-00-M-23794	RS II
1	5	rotor head bridge Sport GKS welded	L2	27-30-00-M-31883	
1	6	M20x1_5x73,8		NPI	
1	7	Split pin 3.2x50		NPI	
1	8	M12 castle nut		NPI	
1	9	U13		NPI	
1	10	U13		NPI	
1	11	axial bushing 14		NPI	
1	12	disc spring 12,2X25,0X0,9 drilled 14,5		NPI	
1	13	disc spring 12,2X25,0X0,9 drilled 14,5		NPI	
1	14	U13		NPI	
1	15	ROLL/PITCH BOLT	L2	27-30-00-M-20675	

ILLUSTRATIONS

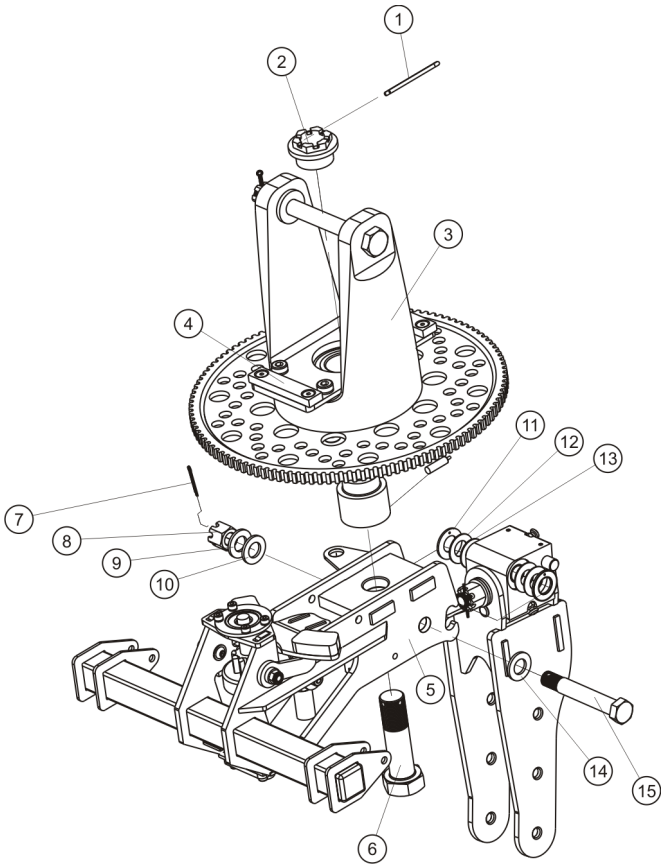


Fig. 1 - Rotor head bridge, bearing and teeter tower

62-32-00 0-1 DESCRIPTION: ROTOR GIMBAL HEAD CONFIGURATIONS 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

None

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

1 If Gimbal Head I version a or Gimbal Head II is installed, no further action is required.

2 In case Gimbal Head I version b or c is installed, modify to Gimbal Head II 62-32-00 8-1.

IMPORTANT NOTE: The conversion to Gimbal Head II is classified as heavy maintenance (HVY)!

ILLUSTRATIONS

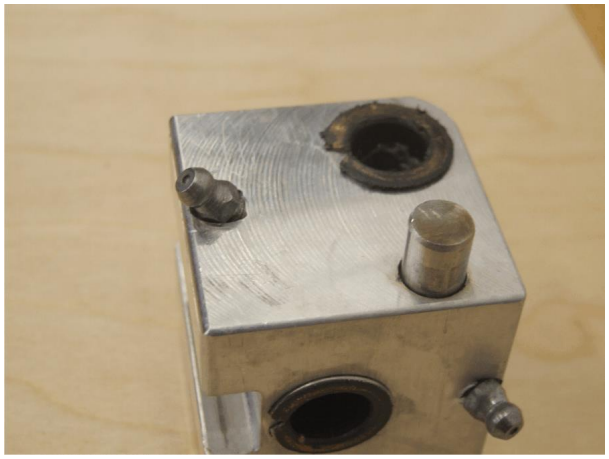


Fig. 1 - Gimbal head I - version a

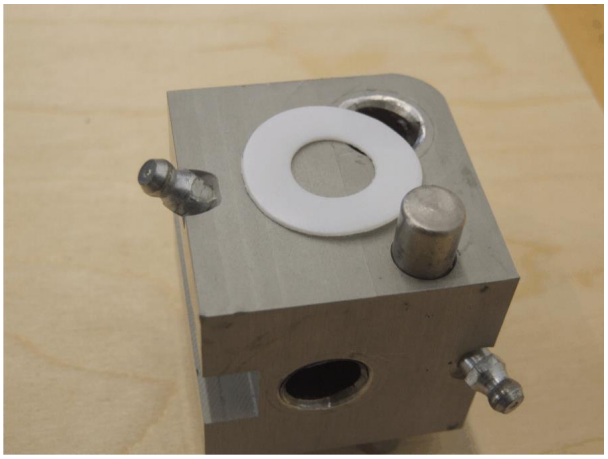


Fig. 2 - Gimbal head I - version b

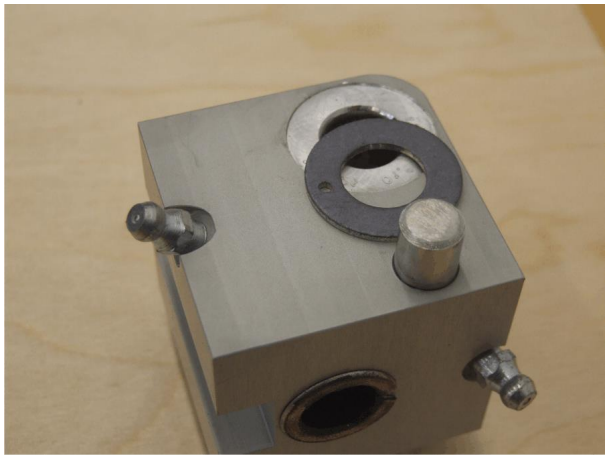


Fig. 3 - Gimbal head I - version c

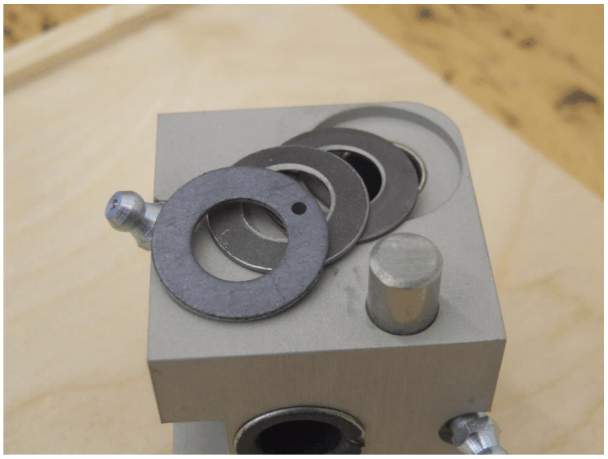


Fig. 3 - Gimbal head II

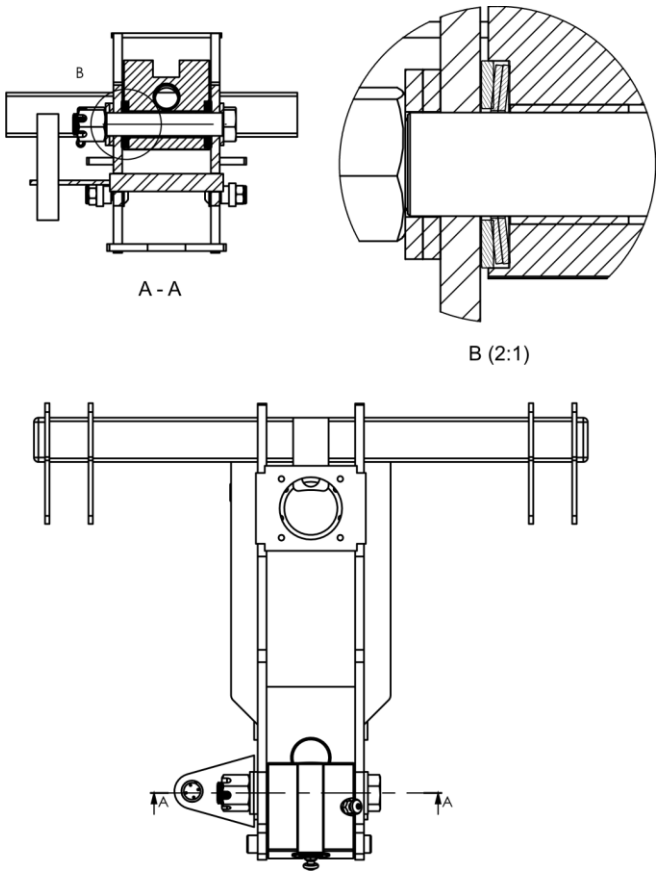


Fig. 5 - Arrangement of spring washers on gimbal head II

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 (88-00-00-S-30477)
85-00-00-S-31438	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 lower mast section vertical.

4 Rotate rotor head so that rotor blades (removed!) would point exactly fore-aft. Place inclinometer on top of teeter tower and measure RH and LH end stop angle. Make sure that mechanical stops are reached. Record values.

5 Rotate rotor head so that rotor blades (removed!) would point exactly left-right. Place inclinometer on top of teeter tower and measure FORE and AFT end stop angle. Make sure that mechanical stops are reached. Record values.

6 Verify measured angles comply with the values specified in the corresponding type certificate data sheet. If any of the values differs by more than 1° from the specified value mark component unserviceable and contact AutoGyro customer support.

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
1	1	Splitpins, 10 pieces	L0	27-30-00-S-30261	
1	2	M20 castle nut flat		NPI	
1	3	Rotorhub upside mounted		NPI	
1	4	Teeter stop II	L1	27-30-00-M-23794	RS II
1	5	rotor head bridge Sport GKS welded	L2	27-30-00-M-31883	
1	6	M20x1_5x73,8		NPI	
1	7	Split pin 3.2x50		NPI	
1	8	M12 castle nut		NPI	
1	9	U13		NPI	
1	10	U13		NPI	
1	11	axial bushing 14		NPI	
1	12	disc spring 12,2X25,0X0,9 drilled 14,5		NPI	
1	13	disc spring 12,2X25,0X0,9 drilled 14,5		NPI	
1	14	U13		NPI	
1	15	ROLL/PITCH BOLT	L2	27-30-00-M-20675	

ILLUSTRATIONS

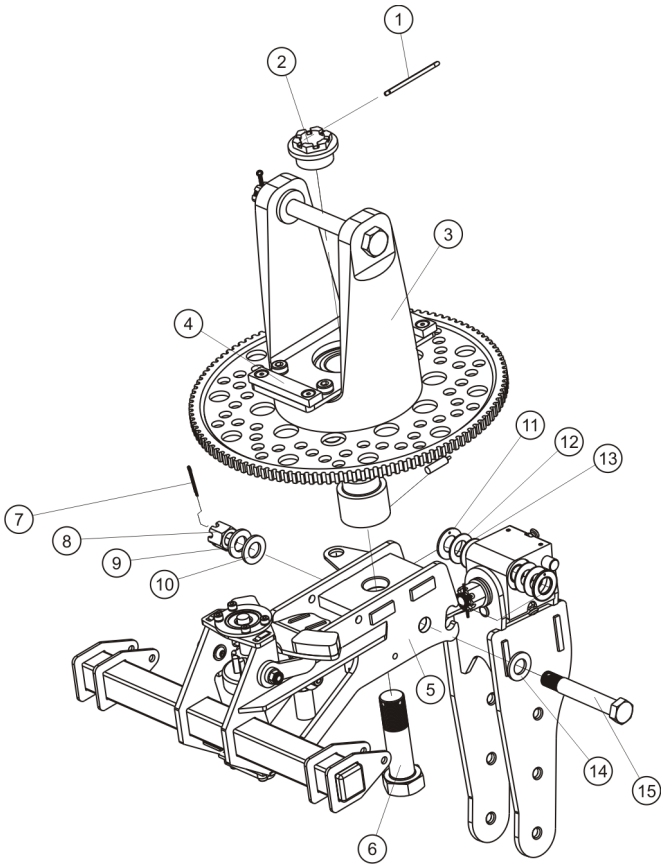


Fig. 1 - Gimbal head assembly

62-51-00 6-1 INSPECTION: MAST BOLTS

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

None

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark

ILLUSTRATIONS

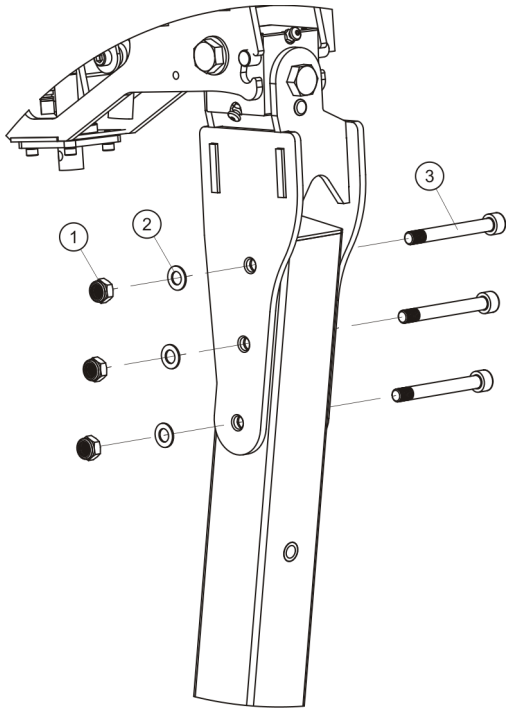


Fig. 1 - Mast bolts

63-11-10 4-2 REMOVAL-INSTALLATION: SMALL PULLEY

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-04 Loctite 638 green (S.VB6013)

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

1 Remove nut (1) and bolt (2).

2 Separate upper pulley (3) from lower drive shaft (4) and pull out upper pulley from inner bearing seating.

NOTE: If correctly installed, the axle stump of the upper pulley is inserted in the inner bearing seating with Loctite 638. If the upper pulley can not be disassembled with normal effort the seating might me intact. In this case, re-consider the need for disassembly.

3 Inspect shaft for abnormal wear in the area of the bearing seating. In case the diameter of the affected area is less than 14.7 mm, the pulley must be discarded and replaced.

4 Apply AG-BAS-04 on axle stump of (new) upper pulley and re-install in reverse order.

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
1	1	driveshaft engine	L2	63-11-00-M-30166	incl. 2, 4
1	3	Pulley small	L2	63-11-00-M-20495	
1	5	spare	L1	63-11-00-S-30181	Set Guide pulley

ILLUSTRATIONS

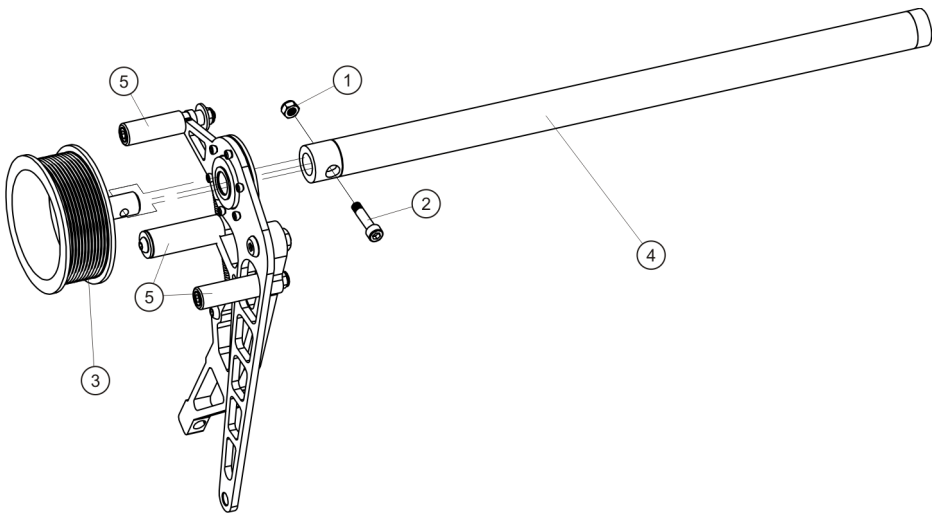


Fig. 1 - Pre-rotator clutch - small pulley, bearing and lower drive shaft

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!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

1 Inspect pre-rotator bracket for cracks, especially in the marked area (Fig. 1).

2 Inspect alignment of upper and lower pulley. Use a ruler at the flanges (Fig. 2).

3 Inspect sufficient slackness of belt. Belt must click when slapped with the palm of your hand against lower pulley from below. Replace belt if necessary.

NOTE: Improper pre-rotation (too high clutch speed, extensive slip) induces heat which may cause the belt to shrink in diameter. As a result the clutch is permanently exposed to friction which causes excessive wear, heat and further shrinking.

4 Check that pneumatic piston is not at its mechanical stop during clutch activation (belt is short enough). In order to do so, activate pre-rotation (engine off) until clutch is fully engaged. Check that pneumatic cylinder is not in its mechanical end stop by manually compressing the cylinder further (Fig. 3).

5 Check that upper pulley / actuation arm can easily return into its neutral position (i.e. sufficient braking action). If actuation arm hesitates to return into neutral position and braking action is low, perform the following work steps 6 to 11.

6 Disconnect ball joint from actuation arm.

7 Check that bearing of actuation arm has no excessive friction. In order to do so, move actuation arm by hand. Adjust if necessary.

8 Move actuator piston by hand and check alignment of ball joint and actuation arm bore. If necessary, adjust (carefully bend) attachment bracket of actuator.

9 Move actuator piston by hand and assess ease of movement. In case of excessive friction, the actuator piston must be replaced.

10 Rotate brake rubber, if necessary (run-in groves).

11 Re-connect ball joint to actuation arm.

ILLUSTRATIONS

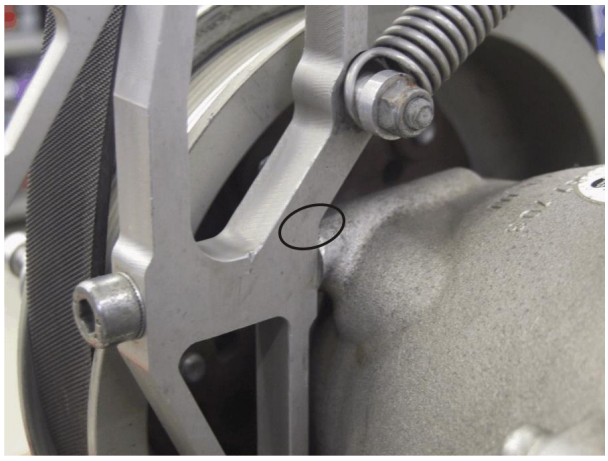


Fig. 1 - Area for accurate crack inspection

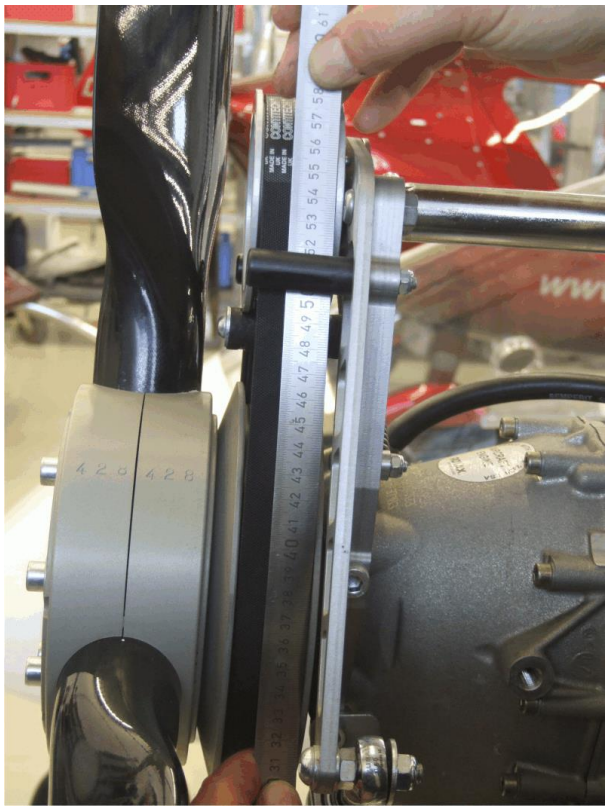


Fig. 2 - Alignment check with ruler

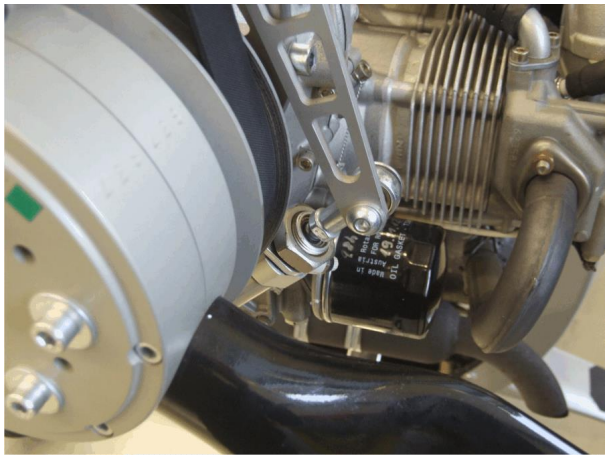


Fig. 3 - Sufficient travel (piston not in mechanical endstop)
when clutch is engaged

63-11-10 8-1 REPLACEMENT: PRE-ROTATOR CLUTCH BELT

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!

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

1 Replace clutch belt. Note: length of belt may vary slightly.

2 Perform 63-11-10 6-1 "INSPECTION: PRE-ROTATOR CLUTCH", work steps 3 and 4. Adjust, if necessary.

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
1	2	V-ribbed Belt PJ762/300J	L1	61-00-00-M-30170	

ILLUSTRATIONS

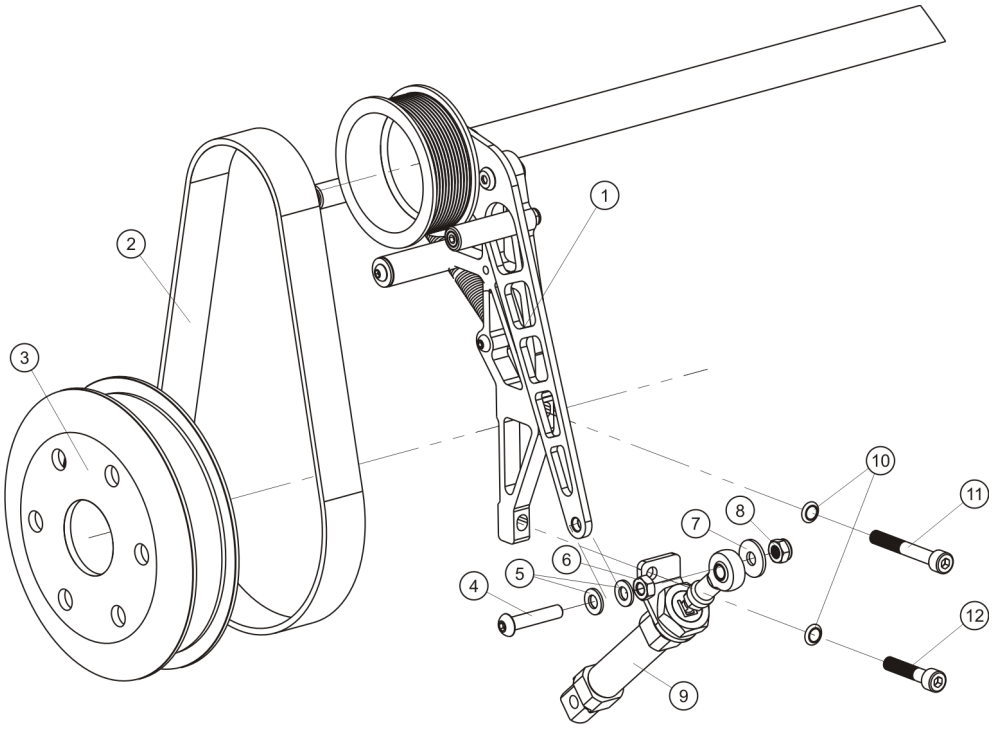


Fig. 1 - Pre-rotator clutch - belt, pulleys and actuation (lower engagement)

63-11-20 0-1 DESCRIPTION: PRE-ROTATOR DRIVE

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

None

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
1	1	Drive Shaft Prerotator long	L1	61-00-00-M-30172	
1	2	driveshaft engine	L2	63-11-00-M-30166	
1	3	Gearbox prerotator B112DG	L1	61-00-00-M-30173	
1	4-5	Attachment kit gearbox	L1	61-00-00-M-30179	
1	6-7	replacement set PreRotator screws	L1	63-11-00-S-33721	

ILLUSTRATIONS

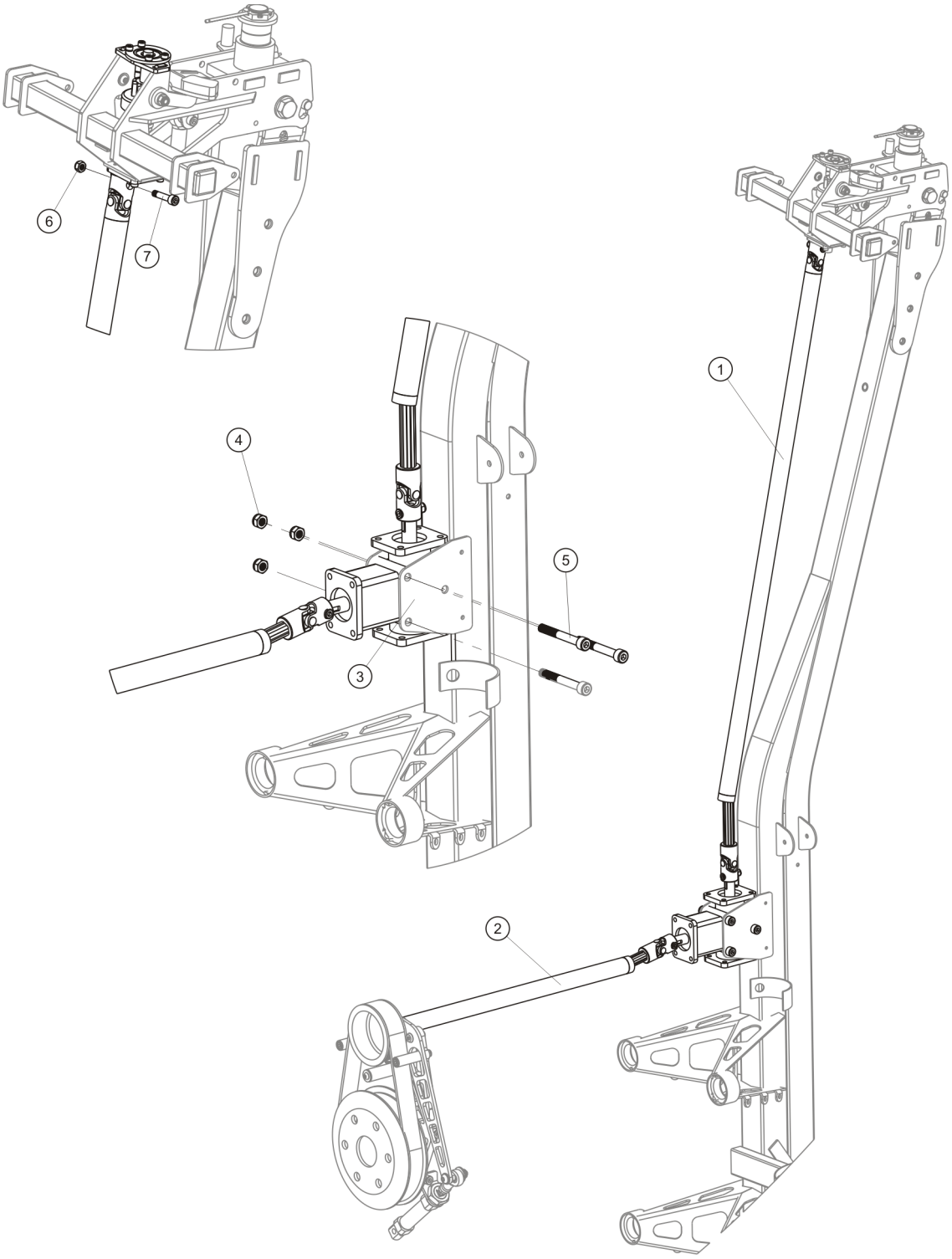


Fig. 1 - Pre-rotator drive

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)

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-GRS-01 Lagermeister WHS 2002 Grease (88-00-00-S-30477)

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

1 Inspect wear pattern and gear mesh of pre-rotator upper engagement. If in doubt, contact AutoGyro customer support.

2 If the wear pattern is uneven (see Fig. 1), e.g. due to dynamic skew, the pre-rotoator 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

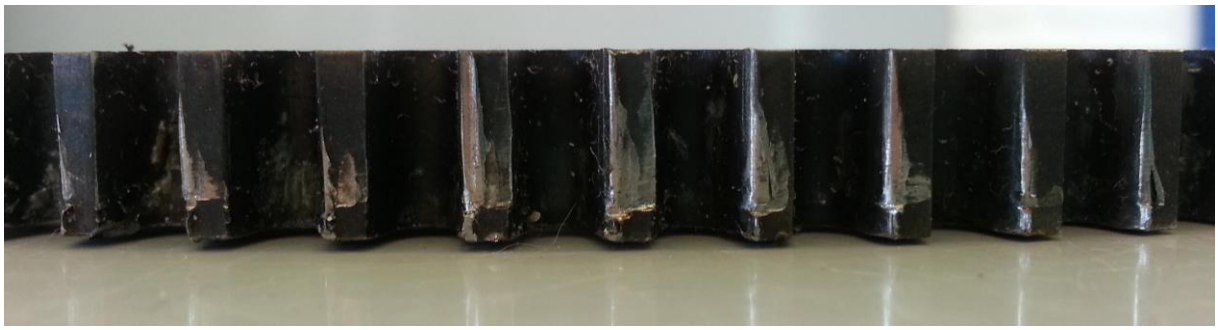


Fig. 1 - Wear Pattern (uneven)

67-00-00 0-1 DESCRIPTION: ROTOR FLIGHT CONTROL OPR

GENERAL, REFERENCES AND REQUIREMENTS

SPECIAL TOOLS AND CONSUMABLE MATERIALS

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

ILLUSTRATIONS

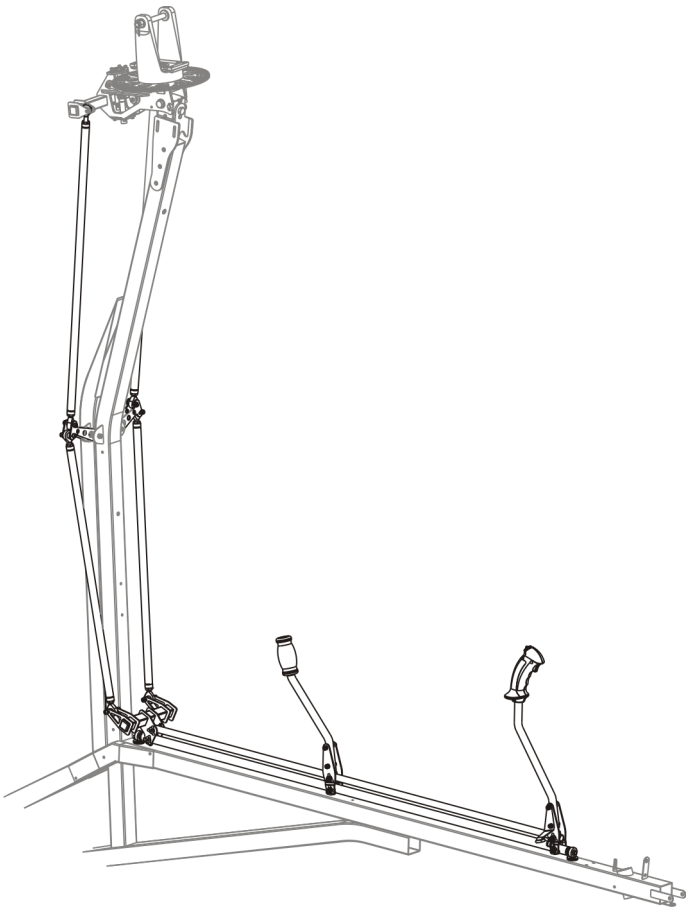


Fig. 1 - Rotor flight control

67-00-00 6-1 INSPECTION: ROTOR FLIGHT CONTROL

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

1 Pump up the rotor brake to its maximum.

2 Carefully move forward flight control stick forward and aft to determine free play. Touch each joint and assess relative motion of joint elements using tactile sense, if necessary with help of a second person.

3 A 5 mm free play, measured at the top end of the control stick, is considered within limits as long as the free play is only a result of equal play in the ball joints.

CAUTION: Control base link and ball bearing must be free of play!

4 If a ball joint exhibits above average play the respective ball joint must be replaced.

5 If control base link or ball bearings exhibit play, or the total play from the ball joints results in play more than 10 mm, measured at the control stick, affected components must be replaced.

6 Move forward and aft flight control stick relative to each other (push one forward while pulling the other one back, and vice versa). No play must be evident. If play ist evident, investigate and replace component(s).

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
		Rodends for PushRod	L1	27-30-00-S-30138	

67-00-00 6-2 INSPECTION: FLIGHT CONTROL BASE LINK

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

WARNING: Job includes work at critical flight controls. Duplicate inspection must be performed after completion!

PROCEDURES

NOTE: The procedure ensures a minimum clearance of the flight control base link (see picture, dimension 'D', clearance bar to ball joint) when flight control stick is in full aft position.

1 Switch pneumatic mode selector to FLIGHT and allow control stick to move to most aft position.

2 Make sure that gimbal head rests in its aft mechanical stops.

3 Disconnect upper ball joint of lower RH flight control rod from bell crank (see picture). Let gimbal head rest in aft mechanical stops while flight control stick is in full aft position, laterally centred.

NOTE: The bar of the flight control base link now contacts the ball joint of base control unit.

4 The resulting offset must be between 6.5 mm (outer diameter of spacer aligns with bore centre of bell crank) and 9.5 mm (spacer barely visible through bore in bell crank). Adjust and secure control rod, if necessary. Torque-tighten with 25Nm.

5 Re-connect ball joint to bell crank and secure.

6 Perform duplicate inspection and functional check.

7 After completion, switch pneumatic mode selector to BRAKE and apply brake pressure.

ILLUSTRATIONS

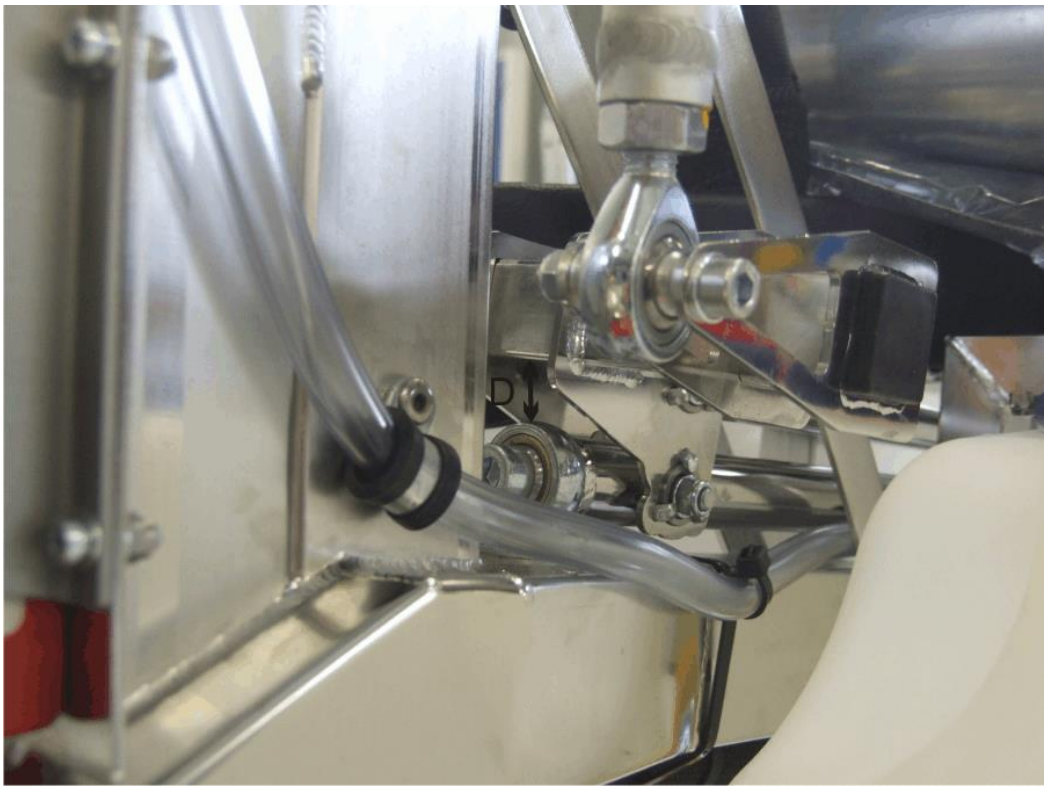


Fig. 1 - Clearance in flight control base link

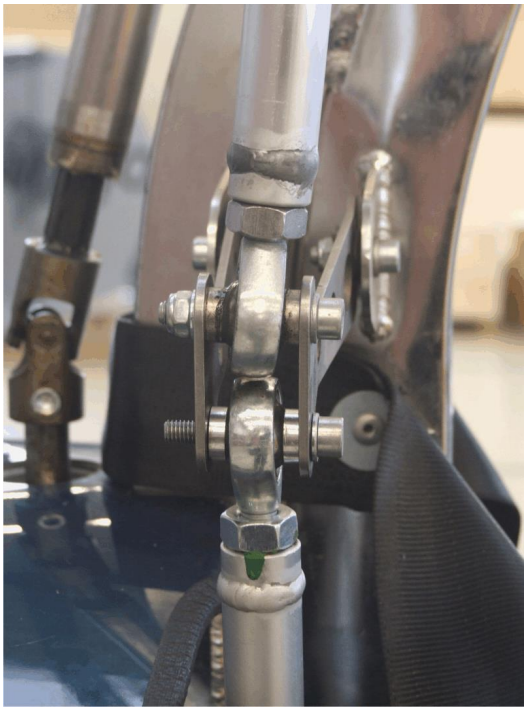


Fig. 2 - Connection of upper ball joint of lower RH flight control rod with bell crank(step3/5)

Fig. 3 - Offset measurement

76-10-00 8-1 REPLACEMENT: THROTTLE CONTROL WITH BRAKE

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark

ILLUSTRATIONS

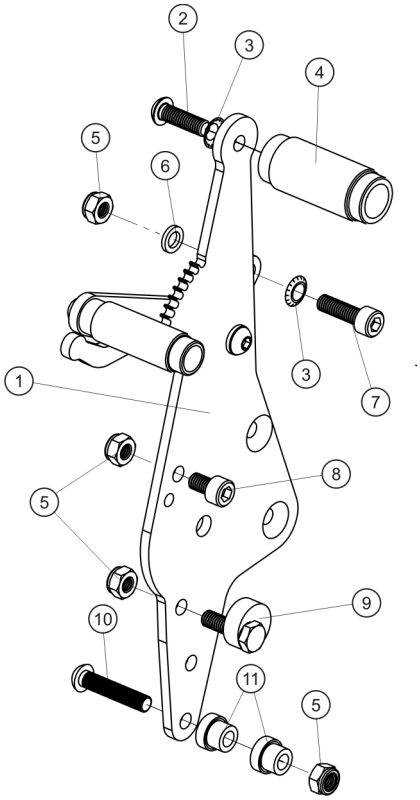


Fig. 1 - Throttle control and brake lever

78-20-00 8-1 REPLACEMENT: WOOL OF MUFFLER TUBE

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

Execute procedure only in cold engine condition!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

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

PRECAUTIONS AND SAFETY MEASURES

WARNING: Risk of severe burns and scalds! Hot engine parts! Always allow engine to cool down to ambient temperature before start any work!

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

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

PROCEDURES

Removal

1 Remove and dispose the locking wire of the hose clamps.

2 Loosen the hinge pin clamp (Fig.1).

3 Before replacing the muffler tube, mark the position so that the muffler tube can be exactly installed in the same location and orientation.

4 Remove the hose clamps and keep them for the installation procedure (Fig.2). Inspect the hose clamps for possible damage.

5 Remove and clamp muffler tube in bench vise carefully.

6 Use appropriate tools to drive out the riveting mandrels.

7 Drill out the rivet pin (Fig.3). Then, use appropriate tool to tap out the pin of the rivet

9 Remove the rivet mandrel and rivet heads from the wool if it is left in place. Make sure any metal swarf is removed.

10 Check the wool. If it is visibly burnt, remove it completely.

11 Install the whole new wool with tension tightly around the pipe (Fig.4).

Installation

Important: Rivet the outer shell to the hot end of the muffler tube.

Effectivity: When the outer shell is riveted to the cold end (Fig.5).

12 When the outer shell is riveted to the cold end, reposition the outer shell so that the outer shell can be riveted to the hot end (Abb.1).

13 Install the outer shell and mark the position of the four rivet holes.

14 Remove the outer shell and drill four holes. Make sure any metal swarf is removed.

Effectivity: END

15 Install the outer shell. Make sure that the rivets holes of muffler tube and the steel tube are perfectly lined up

(Fig.6).

16 Insert the four rivets into the hole and install them with a rivet gun (Fig.6).

17 Set and fix the muffler tube into the correct position with hose clamps and hinge pin clamp, so that the muffler tube remains adjustable (Fig.7).

18 Secure the screws of hose clamps with locking wire (Fig.8).

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
		Replacement kit wool aftersilencer	L1	78-20-00-S-33478	
		Conversion Kit overflow muffler shell	L1	78-20-00-S-42441	

ILLUSTRATIONS

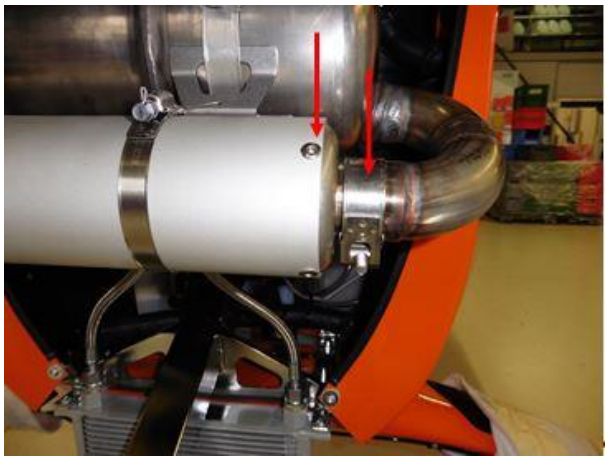


Fig 1 - Rivets at the hot and hinge pin clamp

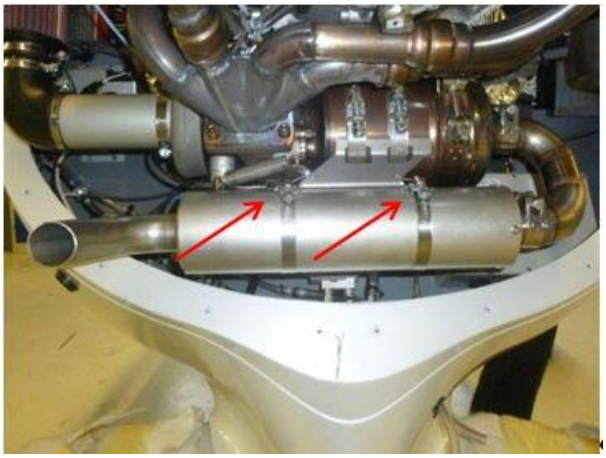


Fig. 2 - Hose clamps

Fig. 3 - Drill out the rivet pin

Fig. 4 - Installation of absorption wool

Fig. 5 - Rivets at the cold end of muffler tube

Fig. 6 - Riveting of the outer shell

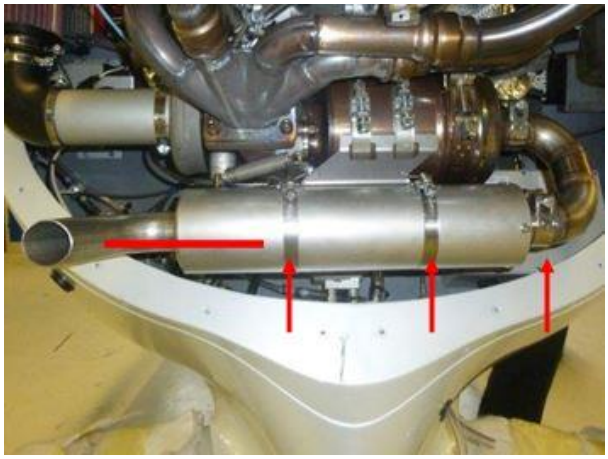


Fig. 7 - Installation of hose clamps and hinge pin clamp

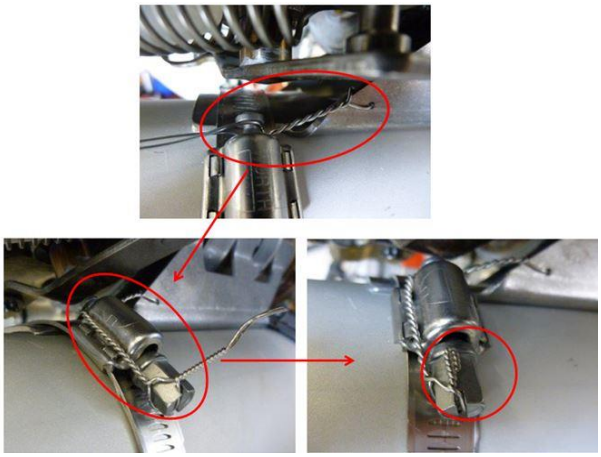


Fig. 8 - Installation of locking wire

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