



cavalon

Aircraft Maintenance Manual
Cavalon | Rotax 915 IS



**Aircraft Maintenance Manual
for Gyroplane Cavalon 915 iS**

0 – PREFACE

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1 – INTRODUCTION

This manual provides accepted and recommended maintenance procedures applicable for the Cavalon gyroplane fitted with the Rotax 915 iS engine, 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.

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

Revision Service

This manual must always be maintained in current, up-to-date status. The latest version status is available at www.auto-gyro.com. Note that the manual is subdivided into 6 parts which will be revised individually. As an example, the revision index for the aircraft maintenance manual (AMM), Cavalon 915 iS (CV_915iS), Part B could be ‘AMM-CV_915iS-B_2019-09’. Note that the date code is ‘yyyy-mm’ so files will sort chronologically.

For the purpose of current status this manual will not be published in paper format.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

Record of Revisions

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

Section	Revision	Comment
Part A – Introduction and Declarations	2019-09	First issue
Part B – Master Servicing Manual (Ch. 00 – 20)	2019-09	First issue
12-30-31 Servicing: Lithium LiFePO5 Earth X Battery	2022-06	First issue
Part C – System Description Section (Ch. 21 – 90)	2019-09	First issue
21-00-00 Ventilation / Heating	2022-06	updated
CHAPTER 22 – Autopilot	2022-06	First issue
31-11-00 Right Panel II	2022-06	First issue
Part D – Diagrams and Charts	2019-09	First issue
Part E – Task descriptions	As below	
07-00-00 2-1 LIFTING OF THE GYROPLANE	2019-09	First issue
07-00-00 2-2 JACKING OF THE GYROPLANE	2019-09	First issue
07-00-00 2-3 SHORING OF THE GYROPLANE	2019-09	First issue
08-20-00 2-1 LEVELING OF THE GYROPLANE	2019-09	First issue
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25-60-00 0-1 DESCRIPTION: EMERGENCY LOCATOR TRANSMITTER (ELT)	2019-09	First issue
26-00-00 0-1 DESCRIPTION: FIRE INDICATING SYSTEM	2019-09	First issue
27-10-00 5-1 CHECK-ADJUSTMENT: ROLL CONTROL TRAVEL LIMITATION	2019-09	First issue
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28-20-00 6-1 INSPECTION: FUEL FILTER	2019-09	First issue
28-20-00 8-1 REPLACEMENT: FUEL FILTER	2019-09	First issue
28-20-00 8-2 REPLACEMENT: ELECTRICAL FUEL PUMPS	2019-09	First issue
32-20-00 8-1 REPLACEMENT: NOSE GEAR RUBBER DAMPER	2019-09	First issue
32-40-00 4-1 REMOVAL-INSTALLATION: WHEELS	2019-09	First issue
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32-40-00 8-3 REPLACEMENT: WHEEL BEARING	2019-09	First issue
34-10-00 5-1 TEST: PITOT STATIC SYSTEM INTEGRITY	2019-09	First issue
34-10-00 7-1 CLEANING: PITOT STATIC SYSTEM	2019-09	First issue
36-21-00 8-1 REPLACEMENT: FILTER/DRYER	2019-09	First issue
52-00-00 4-1 REMOVAL-INSTALLATION: COWLINGS	2019-09	First issue
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56-00-00 8-1 REPAIR: CRACKS IN ACRYLIC GLASS	2019-09	First issue
61-10-00 4-1 REMOVAL-INSTALLATION: PROPELLER- HTC	2019-09	First issue
61-10-00 4-2 DISASSEMBLY-ASSEMBLY: PROPELLER - HTC	2019-09	First issue
61-10-00 5-1 ADJUSTMENT: PROPELLER PITCH - HTC	2019-09	First issue
61-20-00 1-1 TROUBLE-SHOOTING: HTC PROPELLER	2019-09	First issue

Section	Revision	Comment
62-11-00 4-1 REMOVAL: ROTOR - TEETERING PARTS	2019-09	First issue
62-11-00 4-2 DISASSEMBLY: ROTOR - TEETERING PARTS	2019-09	First issue
62-11-00 4-3 ASSEMBLY: ROTOR - TEETERING PARTS	2019-09	First issue
62-11-00 4-4 INSTALLATION: ROTOR - TEETERING PARTS	2019-09	First issue
62-11-00 5-1 CHECK-ADJUSTMENT: ROTOR SYSTEM ALIGNMENT	2019-09	First issue
62-11-00 6-1 INSPECTION: ROTOR - TEETERING PARTS	2019-09	First issue
62-11-00 6-2 INSPECTION: ROTOR BLADES	2019-09	First issue
62-11-00 6-3 INSPECTION: ROTOR HUB BOLTS	2019-09	First issue
62-11-00 6-4 TEETER ANGLE CHECK	2022-06	First issue
62-11-00 8-1 REPLACEMENT: TEETER BUSHINGS	2019-09	First issue
62-20-00 8-1 REPLACEMENT: DRIVE GEAR	2019-09	First issue

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Maintenance Concept and Eligibility

The maintenance concept of the Cavalon gyroplane is structured into 3 qualification levels:

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

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

63-11-10 6-1 INSPECTION: PRE-ROTATOR CLUTCH

LNE

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'	Aircraft Maint. Manual (AMM) Job Cards 'LNE'	All tasks to perform a 100 hrs inspection
SPC	AutoGyro special courses and org. approval 'Specialized'	AMM Job Cards 'SPC' and manufacturer instructions	Main frame overhaul, major mod., repair

Warnings, Caution and Notes

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

The meaning of each call-out is defined below:

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

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

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

Organization and Handling of the Manual

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

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

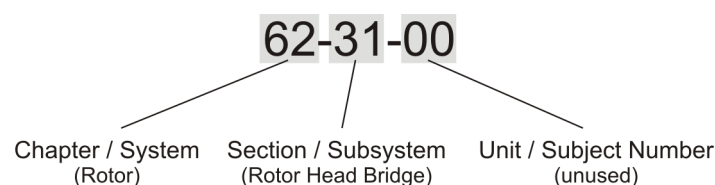
Part	Designation / Content
A	Introduction and Declarations This section. Explains the basic concept, handling of this manual, its structure according to the ATA100 numbering system, abbreviations and acronyms.
B	Master Servicing Manual (ATA Chapters 00 to 20) General description of the aircraft, basic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

Chapter Code Page Block Code Sub-Index

62-11-00 4-3

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.

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.

ACL	Anti-Collision Light
AD	Airworthiness Directive
AGL	Above Ground Level
AMM	Aircraft Maintenance Manual
ATA	Air Transport Association
ATC	Air Traffic Control
BCAR	British Civil Airworthiness Requirements
BUT	Bauvorschriften für Ultraleichte Tragschrauber – German design specification for microlight gyroplanes
CAS	Calibrated Airspeed – indicated speed corrected for installation errors
CHT	Cylinder Head Temperature
Ccw	Counter Clock Wise
CG	Centre of Gravity
CP	Critical Part
CRP	Carbon Reinforced Plastic
CSP	Constant Speed Propeller
CT	Coolant Temperature
DA	Density Altitude
DOM	Date of Manufacture
DULV	Deutsche UltraLeichtflugVerband e.V.
ELT	Emergency Locator Transmitter
Empty Wt	Empty Weight of the gyroplane including oil, cooling liquid and unusable fuel
FOD	Foreign Object Damage (Debris)
FPS	Feet Per Second
Ft	Foot
G / g	G-loading as a factor of gravity
Gal	Gallon
Gal/hr	Gallons Per Hour
GEN	Generator
GPS	Global Positioning System
GRP	Glass Reinforced Plastic
HP	Horsepower
Hrs	Hours
H/V	Hight-Velocity
IAS	Indicated Air Speed – airspeed values in this manual refer to indicated airspeed
ICAO	International Civil Aviation Organization
i.f.d.	in flight direction
In Hg	(Manifold) Pressure, corresponding to inch mercury
ISA	International Standard Atmosphere
JNP	Jahresnachprüfung (annual inspection, annual airworthiness review)
KIAS	Knots Indicated Airspeed
Kg	Kilogram
Km/h	Kilometers per Hour
Kt	Knot
kW	Kilowatt
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, ...)
LOEP	List of Affected Pages

LTA	Lufttüchtigkeitsanweisung (AD, issued by the Airworthiness Authority)
Ltr	Litre
Ltr/hr	Litre per Hour
m	Meters
MAP	Manifold Absolute Pressure
max	Maximum
MCP	Maximum Continuous Power
MPD	Mandatory Permit Directive (issued by UK CAA)
min	Minimum
MLL	Manufacturer Life Limit
m/s	Meters per Second
mph	Miles per Hour
MTOM	Maximum Take-Off Mass
MTOW	Maximum Take-Off Weight
N/A	not applicable
NPI	non procurable item
OAT	Outside Air Temperature
PA	Pressure Altitude
PC	Procurement Code
PFD	Primary Flight Display
PIO	Pilot Induced Oscillation
PIT	procure item through
POH	Pilot's Operating Handbook
Qty.	Quantity
rcv	receive
rec.	recommended
RH	right hand
RFM	Rotorcraft Flight Manual
RON	Research Octane Number
RPM	Revolutions Per Minute
SAC	Statement of Aircraft Conformity
SB	Service Bulletin
Sec	Second
SIL	Service Information Letter
SoC	Statement of Compliance
sqm	square metre(s)
STP	Stückprüfung (C of A, i.e. conformity of airworthiness)
TADS	Type Approval Data Sheet (dt.: Geräte-Kennblatt)
TAS	True AirSpeed - calibrated airspeed corrected for air density
TBO	Time Between Overhaul
TCDS	Type Certificate Data Sheet
TCU	Turbo Control Unit
TOC	Table of Contents
TOP	Take-Off Power
V_A	Design manoeuvring speed
V_B	Design speed for maximum gust intensity
VFR	Visual Flight Rules
V_H	Maximum level-flight speed at maximum continuous power
V_{Hmin}	Minimum level-flight speed
V_{NE}	Never Exceed Speed – maximum speed that must never be exceeded
VOX	Voice Operated eXchange, means: voice activation (level)



VPP	Variable Pitch Propeller
VSI	Vertical Speed Indicator
V_x	Speed for best angle of climb
V_y	Speed for best rate of climb and maximum endurance
W&B	Weight and Balance
xmt	transmit
yrs	year(s)

Service Bulletin (SB) and Airworthiness Directives (AD)

Service Bulletin (SB), (formerly Herstellerinformation or Manufacturer Instructions (MI)) or Airworthiness Directives (AD), issued by the Authority, will be incorporated into the Maintenance Manual with the next revision.

Depending on the market, SB's may be issued by AutoGyro or by AutoGyro Certification Ltd (formally RotorSport UK Ltd)

AutoGyro Certification Ltd (formally RotorSport UK Ltd) is a sister company to AutoGyro GmbH, and responsible for the global approval of AutoGyro products.

In the UK and US Primary Category markets (and some others) the AutoGyro documentation is released via AutoGyro Certification Ltd (formally RotorSport UK Ltd).

Ensure that the correct documentation is used!

The following list covers the Service Bulletins applicable to the Cavalon 915iS. The statement "No Effect" means that the service bulletin has been reviewed to the revision number stated and is considered to have no effect on the text or the illustrations of the manual.

At publishing date, no Service Bulletins have been issued for the Cavalon 915 iS.

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CHAPTER 00 - INTRODUCTION / AIRCRAFT GENERAL

General

The Cavalon 915 iS is a 'new generation' gyroplane with either a 4-bladed push propeller or constant speed hydraulic propeller and a 2-blade aluminium main rotor system with swivelling rotor head and split mast with integrated rotor vibration damping. It features monocoque cabin with glazed canopy, stainless steel mast, engine support and keel tube. Cabin, cowlings, covers and stabilizer with rudder are made from glass fibre reinforced (GRP) plastic.

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

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



CHAPTER 01 - GENERAL

01-11-00 Definitions, Terms and Standard Procedures

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

adjust	To put in specified position or condition, usually using tools or devices Example: Adjust the clearance to 1 mm
Check (noun)	A set of check items to be performed. Example: pre-flight check
check (verb)	To make sure that the item is present and/or a given requirement is fulfilled. No tools are required. Example: Warning Lights...Check NONE
Critical Part (CP)	"Critical Parts" are those parts whose failure during ground or flight operation could have a disastrous effect on the gyroplane.
dent	Depression in a surface having area and depth with no sharp edges (see also 'nick')
discard	Put away in order to exclude inadvertent or intentional re-use of the item. Comply with FOD procedures.
dispose of	Discard item or substance while employing strict procedures, such as environmental or legal requirements.
hand-tighten	Use the bare hand without any tools, gloves or extra efforts
inspect / examine	To look carefully at an item and compare with its standard or specification. Tools or devices may be needed. The condition may be explicitly specified (example: no corrosion). Generally, or if not otherwise stated, inspect/examine means: <div style="margin-left: 40px;"> Make sure that the item <ul style="list-style-type: none"> - is complete - is correctly attached - has no loose parts - shows no signs of leaks - is not cracked or damaged - is not worn </div> <div style="margin-left: 40px;"> Make sure that <ul style="list-style-type: none"> - the surface protection is not damaged - all locking devices are installed correctly </div> <div style="margin-left: 40px;"> Make sure that items such as pipes, hoses and cables <ul style="list-style-type: none"> - look serviceable - do not rub against other items </div> <div style="margin-left: 40px;"> For log books and other technical records: <ul style="list-style-type: none"> - find pending faults - make sure they are up-to-date and correctly maintained </div>
Inspection	Maintenance procedure to be performed as described in this manual. Example: 100 hrs / Annual Inspection
maintenance	Any one or combination of overhaul, repair, inspection, replacement, modification or defect rectification of an aircraft or component, with the exception of pre-flight inspection

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

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

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

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

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

M6 0.8Nm, M8, 0.8Nm, M10 1.0Nm, 12 1.2N

01-12-00 Standard Bolt Torques

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

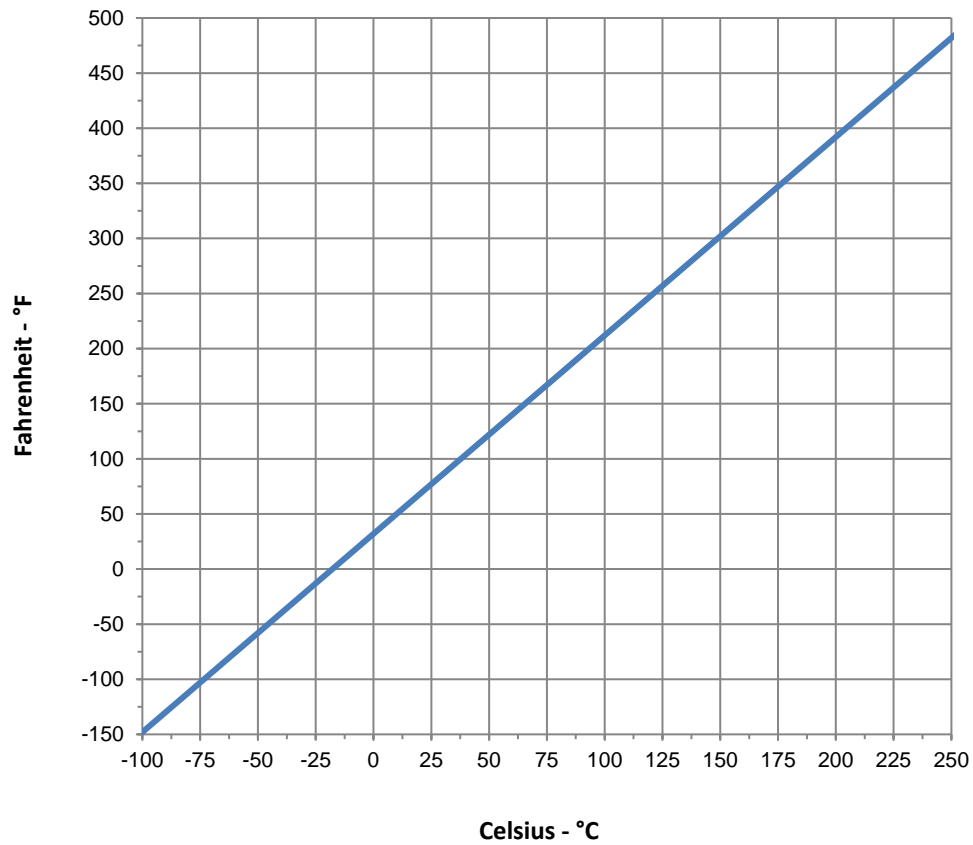
01-21-00 Standard Commercial Tools

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

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

01-91-00 Conversion Tables

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



Celsius-Fahrenheit Conversion Chart

CHAPTER 02 - TOOLS, SPARES AND CONSUMABLE MATERIALS

02-51-00 Consumable Materials

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

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

The following consumable materials are referenced in the Maintenance Manual:

CM-Item	Material / Description	AutoGyro Order Codes
AG-BAS-01	Loctite 221 red	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 Öl 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	Anti-Seize Spray	88-00-00-S-31590
AG-LUB-03	HHS 2000	88-00-00-S-30476
AG-OIL-01	Aeroshell Sport Plus 4	88-00-00-S-43082

CHAPTER 03 - MINIMUM EQUIPMENT REQUIREMENT

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

- Air speed indicator
- Altimeter
- Compass
- Side Slip Indicator
- Rotor RPM indicator
- Engine instruments (oil pressure, oil temperature, RPM, CHT)
- HOBBS meter
- Pre-rotator

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

Equipment / System	Condition	Limitation/Restriction
Compass	Defective	Local flights within the traffic pattern and with ground reference.
Rotor RPM indicator	Defective	Flight to a maintenance facility.
Pre-rotator	Defective / No function R-RPM indicator working	Flight to a maintenance facility under the following conditions: <ul style="list-style-type: none"> • Experienced pilot as sole occupant • Concrete/asphalt runway with a minimum of 5 times the normal required take-off roll distance available • Second briefed person 'handpropping' the rotor while engine/propeller is off • Steady, laminar headwind
Pre-rotator	Malfunction, R-RPM > 120 R-RPM indicator working	Flight to a maintenance facility under the following conditions: <ul style="list-style-type: none"> • Experienced pilot • Concrete/asphalt runway with a minimum of 3 times the normal required take-off roll distance available • Steady, laminar headwind

CHAPTER 04 – MANUFACTURER LIFE LIMITATIONS

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

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

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

Note that the Rotor main bearing is only supplied pre-assembled into the teeter tower. Trained partners with the correct tooling are permitted to change the bearing.

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

Primary and Secondary structure determination:

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

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

Because of the simplicity of the aircraft structure some parts have a dual role – such as the composite body. As an example, the cell of the aircraft is primary structure, yet it carries attachment point for items not flight critical.

The primary structural elements are considered to be:
Monocoque Structure

Connection assemblies joining the rotor head to the mast.

The rotor assembly and rotor head

The tail and rudder assembly

The rudder and rotor control system

The main undercarriage and nose gear

Whilst other items may have an effect on flight safety, they are considered secondary to the above. The undercarriage is included, as whilst it does not contribute to safe flight, it is difficult to make a safe landing without it – inevitably an aircraft rollover would result, probably destroying the aircraft.

Critical parts.

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

Item & pt No.	Reason/comment
Assemblies	
Rotor Head Upper Assembly	Correct assembly of pitch, roll, main bearing and teeter bolts/nuts and splits pins is essential for safe operation
Monocoque Structure	Must be inspected carefully for damage, cracks and delamination
Rotor Assy RSII TOPP 8.4 and 8.6m	Correct assembly of the rotor system is essential for safe operation Life limited and serialised assembly

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

CHAPTER 05 - TIME LIMITS, INSPECTIONS & CHECKS

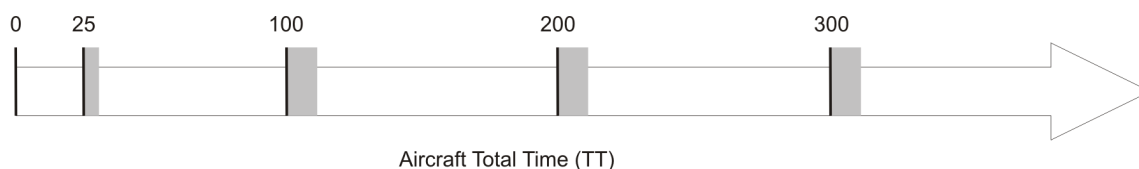
For safe operation and continued airworthiness over the specified lifecycle of the aircraft the following inspection schedule shall apply. Note that specified tolerances must NOT be accumulated!

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

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

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

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



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

05-10-00 Time Limits

In addition to time limits for inspection items and checks the following time limits for inspection or overhaul of respective components or replacement of liquids and fluids apply. Please refer also to the engine manufacturer's manual and time limits specified herein, as well as [CHAPTER 04 - Airworthiness Limitations](#)!

Components

ATA/Ref.	Equipment / System	Time Limit
53-00-00	Monocoque structure (incl. keel tube support), keel tube	on condition

Liquids and Fluids

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

Refer to [CHAPTER 12](#) concerning replenishing/replacement procedures and types of liquids and fluids.

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

05-20-00 Scheduled Inspections & Checks

Daily / Pre-Flight Check

All daily or pre-flight check list items consist of visual checks and do not replace professional mechanical inspection and maintenance. The **Daily / Pre-Flight Checklist** for the standard Cavalon 915 iS gyroplane is provided in the current Pilot's Operating Handbook.

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

Complementary / Servicing Tasks

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

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

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

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

100 hrs / Annual Inspection

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

05-21-00 Temporary Scheduled Inspections & Checks

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

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

05-30-00 **Unscheduled Inspections**

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

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

If in doubt contact AutoGyro customer support.

05-50-00 **Conditional Inspections**

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

05-51-00 **Inspections - Special Operational Conditions**

Condition	Action / Reference
Operation in sand or dust	see below
AVGAS	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 Ethylene Glycol anti-freeze and distilled water, which gives freezing protection down to -20°C. Using a hydrometer, check protection temperature of the coolant and add anti-freeze, if necessary. If temperatures are expected to fall below protection temperature, drain the coolant, and if required for service, refill with pure antifreeze (see 12-30-40 *Servicing: Engine Coolant*).

CAUTION

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

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

05-55-00 Inspections - Special Operational Incident

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

Suspected hard landing

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

- Inspect nose gear, attachment, fork, linkage and wheel bearing
- Inspect main gear axles and attachment
- Examine possible rotor / propeller strike → see 'Rotor / propeller contact with obstacle'
- CRITICAL: Inspect main gear suspension bow (body attachment and both axle attachments ok, no cracks)
- CRITICAL: Inspect monocoque fuselage and attachment points 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. If there is no visible damage, then perform tap test on propeller blades to assess for invisible damage. Replace damaged parts.

Birdstrike

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

Lightning strike

A lightning 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-Generic) is available for download.

05-70-00 Functional Test Flight

The maintenance protocol of the Functional Test Flight (Vorlage04-002cRev4a FTR Cavalon) is available for download.

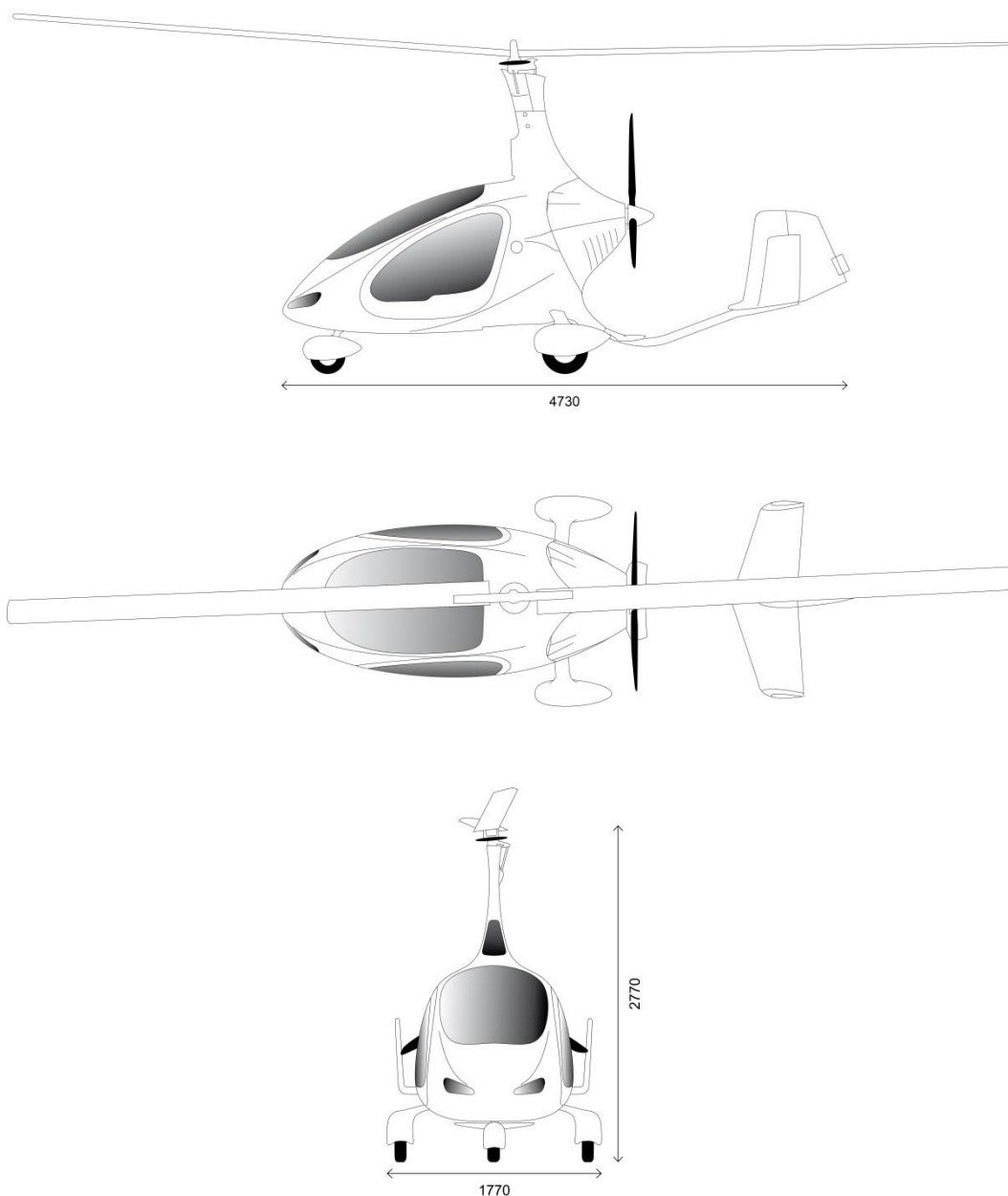
05-90-00 Maintenance Records & Aircraft Logs

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

Forms are available for download.

A 'Life Limited Items Log' (LLI) is delivered with the aircraft by AutoGyro and shall be kept current by the maintenance facility. An empty form (AG-F-LLI) is provided for download.

CHAPTER 06 - DIMENSIONS & AREAS



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

CHAPTER 07 - LIFTING / JACKING / SHORING

See Job Card [07-00-00 2-1](#) in Part 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-CV 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

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

Long-term Storage

Contact AutoGyro

Return to Service

Perform a 100 hrs Inspection.

CHAPTER 11 - PLACARDS & MARKINGS

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

Placards may be market specific by language and or units of measure. Check in the respective handbook

CHAPTER 12 - SERVICING

12-10-00 **Cleaning**

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

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

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

12-20-00 **Lubrication**

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

See [CHAPTER 05](#) for respective time limits.

Lubrication: Teeter hinge

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

Lubrication: Pre-rotator drive coupling sleeve

Apply a thin layer of lubricant AG-LUB-03 on coupling sleeve when in extended position in regular intervals, at latest when the sliding surface feels dry or after flight through rain. Mast cover must be removed!

12-30-10 **Servicing: Engine Air Filter**

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

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

Main wheels	1.8 – 2.3 bar
-------------	---------------

Nose wheel	2.0 – 2.4 bar
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NOTE: *Green valve caps are used when the tire is filled with nitrogen.*

12-30-30 **Servicing: Battery**

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

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

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

12-30-31 **Servicing: Lithium LiFePO5 Earth X Battery**

The Lithium battery is a maintenance free battery. EarthX lithium battery has over discharge protection via an internal Battery Management System (BMS) to disconnect the battery from the active load (your vehicle) to protect the cells from damage when it is 95-98% drained.

Inspection or testing is not needed for 24 months after purchase, and thereafter the following is recommended annually:

- Visually inspect the battery for signs of damage; plastic case is warped or swollen.
- Test the fault indicator: to test, touch the fault wire output of the battery to ground – the internal battery LED should come on
- Ensure the terminal screws are tight (properly torqued)

Charge the battery only with a charging device which is suitable for Lithium 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. Minimum fluid level is stated (engraved) on the fuel dipstick.

If no fluid is visible on the dipstick, a technical defect is most probable. Have engine inspected before next flight.

If temperatures are expected to fall below protection temperature, refer to [05-51-00 Winter operation](#).

Note! The coolant system contains a complex pathway of hoses to each cylinder head. Take care to ensure the system is properly vented during refilling.

With the Rotax header tank cap removed (and only with a cold engine), adequate venting may be ensured by sharply squeezing the radiator hoses until no air bubbles exit through the tank.

Refit the cap after venting.

12-40-00 **Replenishing/Replacement of Fluids**

Liquid / Fluid	Max. Filling Qty.	Type / Code
Engine coolant (50/50 distilled water and EthyleneGlycol antifreeze suitable for aluminium engines)	3.8 ltr	as documented
Engine coolant with cabin heating (option) installed (50/50 distilled water and EthyleneGlycol antifreeze suitable for aluminium engines)	4.2 ltr	as documented
Engine Oil	3.4 ltr	as documented

See [CHAPTER 05](#) for respective time limits.



CHAPTER 13-17 – UNASSIGNED / N/A

CHAPTER 18 - VIBRATION & NOISE ANALYSIS

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

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

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

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

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

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

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

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

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

CHAPTER 19–20 – UNASSIGNED / N/A

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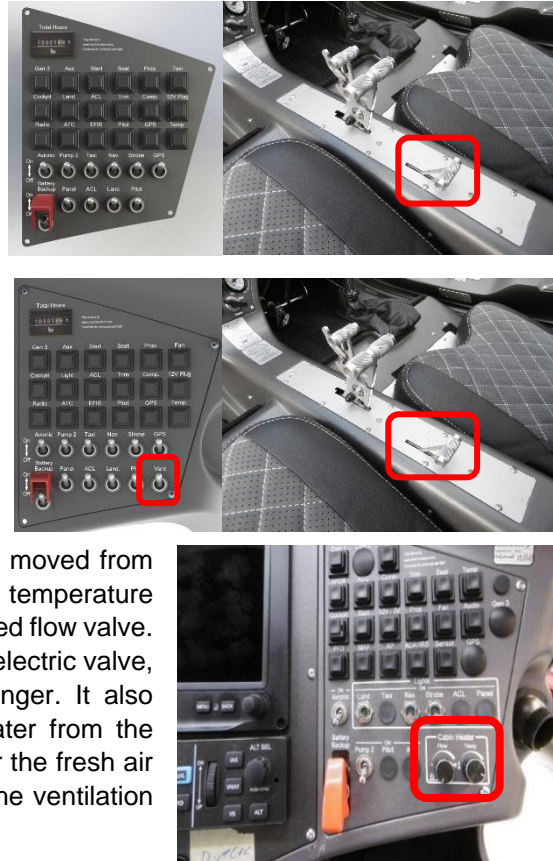
CHAPTER 21 - VENTILATION / HEATING

21-00-00 Ventilation / Heating

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

There are 3 Systems for the Cabin heating (if installed):

1. System is controlled by a labelled lever in the centre console. In order to switch cabin heating on, the lever must be moved to the front which will activate the cabin heat blower fan by means of a micro switch. Heat output / temperature can be controlled corresponding to the position of the lever.
2. System is controlled by a labelled lever in the centre console. In order to switch cabin heating on, the lever must be moved to the front. Heat output / temperature can be controlled corresponding to the position of the lever. The cabin heat blower fan will be activated via a switch in the right-hand panel.
3. System The temperature adjustment has been moved from the centre console to the right-hand panel. The temperature is no longer adjusted manually by a lever actuated flow valve. The panel mounted potentiometer actuates an electric valve, opening the flow of water to the heat exchanger. It also regulates a pump that pushes the heated water from the engine through the heat exchanger. The fan for the fresh air supply to the heat exchanger is regulated by the ventilation control on the right panel.



The blower fan can suck from within the cabin, or from externally when the supply is opened via the cockpit panel knob. Warm air escapes through outlets at the dashboard below the front window, at two adjustable nozzles, and is redirected to the leg room.

Concerning heating control, see [76-10-00 Power Control](#) for reference.

CHAPTER 22 – Autopilot

22-00-10 System / Equipment Descriptions

22-00-11 GMC 507 Autopilot Mode Controller

The GMC 507 Autopilot mode controller is shown in Figure 22-1. The switches on the front panel of the GMC 507 provide inputs to the G5 and G3x instruments and GSA 28 servos for flight director computations. The GMC 507 also contains some of the system monitoring and audio functions for the system.

Refer to the G5 Electronic Flight Instrument Pilot's Guide for Certified Aircraft, 190-01112-12 or to the G3X Touch Pilot's Guide for Certified Aircraft, 190-02472-00 for operational characteristics of the system.



Figure 22-1 – GMC 507

22-00-12 GSA 28 Servo

The GSA 28 is a smart servo. The autopilot, trim and ESP algorithms are performed by the servo. The motor in the GSA 28 servo is a brushless DC motor. This brushless DC motor has an inherent safety feature in that it cannot drive by itself and requires software commutation to run. The brushless DC motor also has a lower backdrive friction than brushed motor or steppers motors. The GSA 28 is limited to a maximum of 60 in-lbs of torque.

GFC 500 Autopilot systems has three servos (pitch, roll, and yaw).

22-00-13 Audio Output

The GMC 507 provides an analog audio output to an audio panel, plus an active low output to drive an external aural alert device (e.g. sonalert). The analog audio can be interfaced to any audio panel that has an unswitched and unmuted analog audio input. In this installation an audio alert is output to the pilots via the radio headset.

22-00-20 GFC 500 Interface Summary

The following figure provides a high-level summary of the GFC 500 autopilot system. Either the G5 or a G3X system is required to be installed.. To avoid difficulties in the stability of the attitude indication the magnetometer GMU11 is always installed, the electric compass has shown a better functionality



Figure 22-2 – GFC 500 System Overview

22-00-30 Power Requirements

Table 22-1 below summarizes the power requirements for the GFC 500 LRUs.

Table 22-1 – Power Requirements

LRU	Characteristics	Specifications
GMC 507	Average Current Draw @ 14 VDC	0.11 A
	Max Current Draw @ 14 VDC	0.20 A
	Average Current Draw @ 28 VDC	0.06 A
	Max Current Draw @ 28 VDC	0.11 A
GSA 28	Average Current Draw @ 14 VDC	0.36 A
	Max Current Draw @ 14 VDC	1.80 A
	Average Current Draw @ 28 VDC	0.20 A
	Max Current Draw @ 28 VDC	0.90 A

22-00-40 Electrical Bonding (Advisory material)

For the purposes of this installation, aircraft ground reference definitions vary according to airframe type as defined in Table 22-2. Refer to the periodic test and reconditioned resistance values corresponding to these ground reference definitions when performing the equipment bonding tests in 22-05-10 Electrical Bonding Test.

The periodic test value is the value allowed during the bonding checks specified in 22-05-10 Electrical Bonding Test. The reconditioned value is the value allowed on initial installation or if the bond must be reworked if the periodic test value is exceeded.

Refer to SAE ARP 1870 Section 5 when surface preparation is required to achieve electrical bond.

Table 22-2 – Electrical Bonding

Aircraft Type	Ground Reference	Maximum Resistance Between GFC 500 Equipment Chassis and Ground Reference (mΩ)	
		Periodic Test	Reconditioned
Metallic Airframe	Nearby metal structure for servos or Instrument panel for GMC 507	10.0	2.5

22-00-41 Consideration for Untreated or Bare Dissimilar Metals – Advisory material

The correct material finish is important when mating untreated or bare dissimilar metals. Materials should be galvanically compatible. When corrosion protection is removed to make an electrical bond any exposed area after the bond is completed should be protected again.

Additional guidance can be found in SAE ARP 1870 Section 5. Typical electrical bonding preparation examples are shown in Figure 22-3, Figure 22-4, and Figure 22-5.

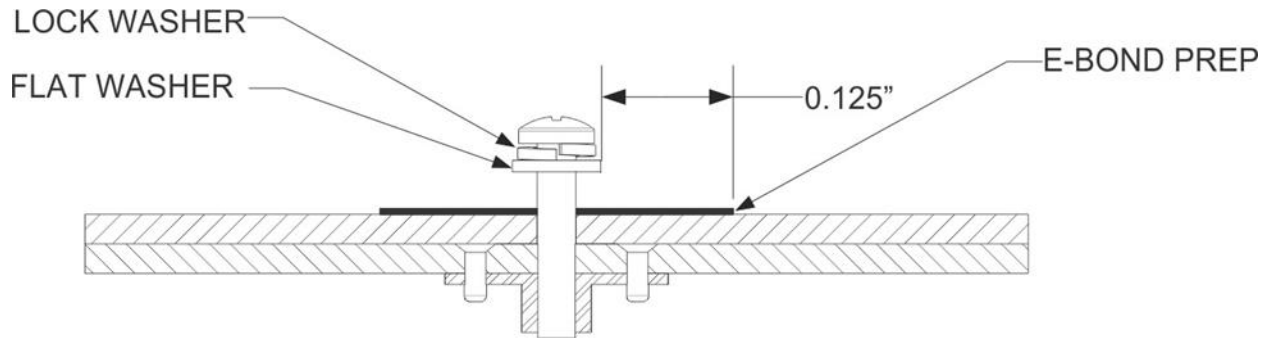


Figure 22-3 – Electrical Bonding Preparation – Nut Plate

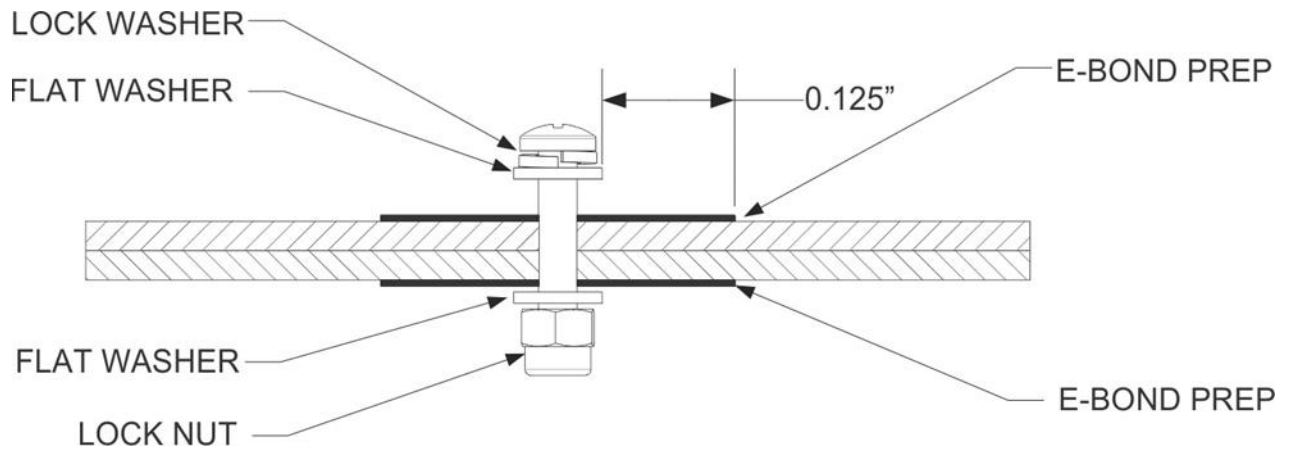


Figure 22-4 – Electrical Bonding Preparation – Bolt/Nut Joint

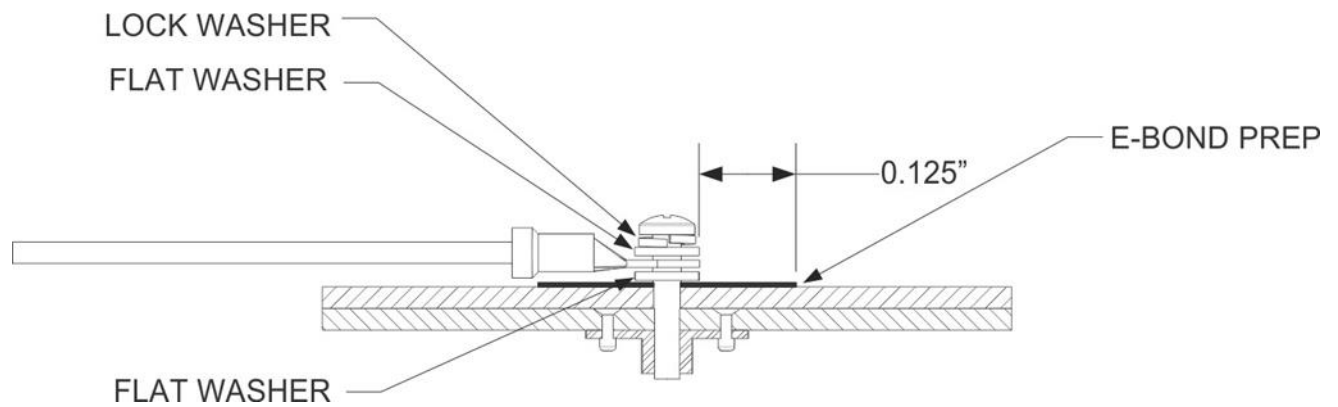


Figure 22-5 – Electrical Bonding Preparation – Terminal Lug

22-00-42 Preparation of Aluminium Surfaces

The following general procedure is recommended to prepare an aluminium surface for proper electrical bonding.

1. Clean grounding location with solvent.
2. Remove non-conductive films or coatings from the grounding location.
3. Apply a chemical conversion coat such as Alodine 1200 to the bare metal.
4. Once the chemical conversion coat is dry, clean the area.
5. Install bonding equipment at grounding location.
6. After bond is complete, if any films or coatings were removed from the surface, reapply a suitable film or coating to the surrounding area within 24 hours.

After satisfactory electrical bond is achieved, when it has been necessary to remove any high-resistance protective coating, the area from which the coating has been removed should be refinished with the same finish as is on the rest of the part within 24 hours. In cases where the parts come in with certain areas spot-faced, or if there is no finish on the part (bare metal), apply conformal coating over the bond joint and hardware per MIL-I-46058 or clear lacquer per TT-L-20A in order to facilitate future inspection. Refer to the model specific Aircraft Maintenance Manual or Standard Practices Manual for surface protection requirements applicable to affected areas. The correct material finish is important when mating untreated or bare dissimilar metals. They should be galvanically compatible. When corrosion protection is removed to make an electrical bond, any exposed area after the bond is completed should be protected again.

Additional guidance can be found in SAE ARP 1870 Section 5.

For a more detailed procedure, refer to SAE ARP 1870 Sections 5.1 and 5.5.

22-00-30 Control and Operation**22-00-31 GMC 507**

The GMC 507 provides GFC 500 Autopilot mode selections and annunciations. Refer to the Garmin G5 Electronic Flight Instrument Pilot's Guide for Certified Aircraft, 190-01112-12, or to the G3X Touch Pilot's Guide for Certified Aircraft, 190-02472-00 for operational characteristics of the system.

22-00-32 Autopilot Disconnect/Trim Interrupt Switch

A Trim interrupt switch is not implemented in the Aircraft. An AP DISC switch is provided on both pilot's stick grips to allow for manual disconnect of the autopilot system and to interrupt the pneumatic pitch trim. The AutoGyro installation with the GFC 500 Autopilot does not include a pitch trim servo. The pneumatic system is controlled via a pitch servo signal. When the Autopilot is disconnected the pneumatic trim system will be disconnected, too.

22-00-33 Trim Switch

The Trim switch will not disengage the autopilot

22-00-34 Go Around (GA) Switch

A GO AROUND switch is not implemented in the Aircraft.

22-01-10 Troubleshooting

This section provides information to assist with troubleshooting if problems occur. See the GFC 500 Autopilot Configuration Log retained in the aircraft permanent records for a list of the system configuration data. When troubleshooting the GFC 500 Autopilot, refer to the interconnect diagrams retained with the aircraft permanent records. Before troubleshooting the GFC 500 Autopilot, ensure that system configuration settings match those recorded in the completed GFC 500 Autopilot Configuration Log that is retained in the aircraft permanent records.

NOTE: For error message troubleshooting specific to the G5/GAD 29()/GMU 11 installation, refer to the Garmin G5 Electronic Flight Instrument Part 23 AML STC Maintenance Manual including ICA, p/n 190-01112-11.

NOTE: For error message troubleshooting specific to the G3X system installation, refer to the Garmin G3X Touch Electronic Flight Instrument Part 23 AML STC Maintenance Manual including ICA, p/n 190-02472-02.

22-01-11 GFC 500 Failure Messages

During operation of the GFC 500 Autopilot, the G5 may annunciate a failure or fault that is specific to the GFC 500 Autopilot. Contact Garmin Technical Support for assistance in troubleshooting the problem.

22-01-20 General Troubleshooting

22-01-21 General GFC 500 Troubleshooting

22-01-22 GFC 500 Will Not Engage

If the GFC 500 will not engage, the following troubleshooting steps may be used to help identify the cause.

1. A common error, during the engine start is that the avionics switch is left 'ON'. The servos will get undervoltage signal, and if one of the three has an error, this will prevent the autopilot from starting. In this case the avionics switch has to be switched off and switched on again after 10s.
2. Verify that the circuit breakers are engaged, and that the stick disconnect buttons are not stuck down.
3. Verify that there are no red-X indications present on the G5 or G3X. Correct any red-X indications that may be present. Refer to the G5 STC Maintenance Manual, Garmin p/n 190-01112-11 or the G3X STC Maintenance Manual, Garmin p/n 190-02472-02 for further details.
4. Check for loose terminals on the circuit breaker connections on the power wire(s) causing intermittent power connections. Also, check for intermittent circuit breakers.
5. Check that all connectors are fully seated, and that the jack screw connectors are fully tightened on both sides of all connectors.
6. Check the security of wiring harness attachments. If the harness is able to move around during flight, the wires could pull on or vibrate the connector, causing intermittent connections.
7. Ensure that the GMC 507 is securely fastened to the panel or rack.
8. Check the wiring harness for faults, defects, or shorts to ground.
9. Disconnect the connectors on the GMC 507 and/or GSA 28s and check for any bent pins or evidence of corrosion.
10. Check the AP Disc switch to verify it is not shorted.
 - a. For G5 systems perform the following:
 - i. Restart the G5 ADI in configuration mode.

- ii. Navigate to the Flight Controls page group.
 - iii. Navigate to the "Autopilot Roll", "Autopilot Pitch", "Yaw Damper" and "Mode Control Panel" pages.
 - iv. On each of the above pages, scroll down to the line item labeled AP Disc Input. With the AP DISC switch not depressed, the line should read "Open/High" for the GMC and "Open" for the servos. With the AP DISC switch depressed, the line should read "LOW". If it does not, troubleshoot the wiring.
- b. For G3X systems perform the following:
- i. Restart the G3X in configuration mode.
 - ii. Navigate to the System Information page.
 - iii. Navigate to the "ROLL", "PITCH", "PTRIM" (if installed), "YD" (if installed), and "GMC" pages.
 - iv. On each of the above pages, locate the line item labeled AP Disc Input. With the AP DISC switch not depressed, the line should read "Open/High" for the GMC, and "Open" for the servos. With the AP DISC switch depressed, the line should read "LOW". If it does not, troubleshoot the wiring.

22-01-23 GFC 500 Will Not Pass Pre-Flight Test (PFT)

If the GFC 500 will not pass Pre-Flight Test (PFT), the following troubleshooting steps may be used to help identify the cause.

1. any red-X indications that may be present. Refer to the G5 STC Maintenance Manual, Garmin p/n 190-01112-11 or the G3X STC Maintenance Manual, Garmin p/n 190-02472-02 for further details.
2. For G5 Systems, verify that the Pitch/Roll Offset procedure has been completed.
 - a. Restart the G5 ADI in configuration mode.
 - b. Navigate to the Mode Control Panel page group
 - c. Navigate to the "Attitude Calibration" line item.
 - d. Verify that there is not a red "X" or "Invalid" shown on the line. Refer to Figure 22-6 below for a representative example.
 - e. If there is a red "X" or "Invalid" shown, repeat the Yaw Offset (if required) and Pitch/Roll Offset Calibration as described in 22-08-31 Yaw Offset and Pitch/Roll Offset Calibration.

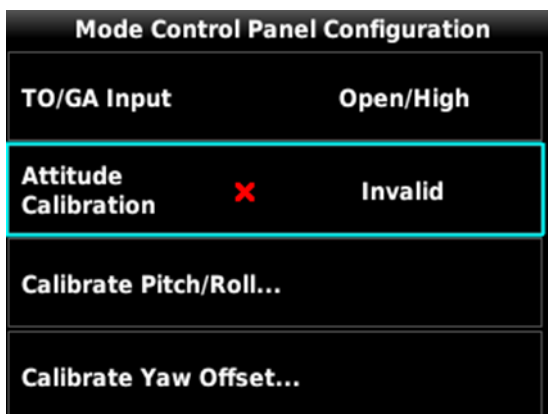


Figure 22-6 – Attitude Calibration Invalid

3. For G3X systems, verify that the Pitch/Roll Offset procedure has been completed.
 - a. Restart the G3X PFD in configuration mode.

- b. Navigate to the System Information page group.
- c. Select the GMC from the Device List.
- d. Verify that there is not a Red "X" or "Invalid" shown in the Autopilot ControllerInfo section.
- e. If there is a red "X" or "Invalid" shown, repeat the Yaw Offset (if required) and Pitch/Roll Offset Calibration as described in 22-08-31 Yaw Offset and Pitch/Roll Offset Calibration.

22-01-24 GFC 500 CAN Bus Errors

If there are CAN Bus errors, refer to the G5 Electronic Flight Instrument Part 23 AML STC Maintenance Manual, Garmin p/n 190-01112-11 or the G3X STC Maintenance Manual, Garmin p/n 190-02472-02 for troubleshooting.

22-01-30 GFC 500 Interconnect Drawings

For GFC 500 interconnect drawings reference Garmin document AMM_CV_915_EN_2022-05.

22-01-40 Connector Layout

For GFC 500 LRU connector layout reference Garmin document AMM_CV_915_EN_2022-05.

22-02-10 Maintenance Intervals

Table 4-1 shows systems and items which must undergo tests or checks at specific intervals. If the interval is shown to be in flight time as well as calendar months, the first interval reached should be used as the limit.

Those inspections that are based on flight time or calendar elapsed time or cycles shall have specific intervals stated in Table 22-3.

Table 22-3 – Maintenance Intervals

Item	Description/Procedure	Manual Section No.	Interval
Equipment electrical Bonding Test	Verify bonding of GMC 507 rack (if installed), GMC 507 (if installed without rack), GSA 28 mounting brackets, and any associated bonding components	22-05-10 Electrical Bonding Test	Following removal and replacement of the racks or brackets AND Every 2000 flight hours or ten years, whichever is first
Equipment Bonding Visual Inspection – suspected lightning strike	Inspection of bonding Components	Table 22-5	At any suspected or actual lightning strike
GFC 500 Equipment Visual Inspection	Visual inspection of GFC 500 components	22-06-10 Visual Inspection	At every annual inspection
Disconnect Tone and Sonalert Test	Functional test of Audio output and/or Sonalert	22-05-20 Disconnect Tone and Sonalert Test	At every annual inspection
GSA 28 Servos	Removal and Replacement	22-04-12 GSA 28 Servos	On Condition
GMC 507 Autopilot Mode Controller	Removal and Replacement	22-04-11 GMC 507	On Condition

Servos, Servo Control Cables and associated hardware	Visual Inspection	Table 22-4	With aircraft manufacturer's required primary control cable checks
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22-03-10 Servicing Information

Servicing of the GFC 500 Autopilot equipment is 'on condition'. In the event of system failure, troubleshoot the GFC 500 Autopilot in accordance with 22-01-10 Troubleshooting.

22-03-11 On Condition Servicing

'On Condition' replacement and/or servicing should occur when an item exhibits conditions, symptoms, and/or abnormalities defined in Section 5 of this manual. Replacement and/or servicing should be made only after the technician troubleshoots the system to the extent determined necessary by using the guidance in this manual along with common avionics maintenance practices.

The remainder of this document is organized in the following fashion:

- 22-02-10 Maintenance Intervals lists maintenance requirements related to the GFC 500 Autopilot.
- 22-04-10 Equipment Removal & Installation gives instructions regarding the removal and replacement of GFC 500 equipment and parts.
- 22-08-10 GFC 500 LRU Replacement/Configuration & Testing gives configuration and testing instructions to be accomplished if GFC 500 equipment or parts are removed or replaced.
- 22-08-20 GFC 500 Software Load and Configuration Procedures specifies system return-to-service procedures.

22-03-12 Required Tools

The following tools are needed to perform maintenance tasks on GFC 500 Autopilot equipment:

- Calibrated Milliohm meter with Kelvin probes, OR
 - Ammeter capable of measuring 1.5 Amps of current with a minimum resolution of 0.1A.
 - Voltmeter capable of measuring millivolts with a minimum resolution of 0.1mV.
 - Variable DC Power Supply capable of providing 1 amp current
- 3/32" Hex tool
- Calibrated VHF NAV/COM/ILS ramp tester or equivalent
- Calibrated pitot/static ramp tester
- Outdoor line-of-site to GPS satellite signals or GPS indoor repeater
- Headset/microphone
- Ground Power Unit
- Calibrated Flight Control Cable Tension Meter or equivalent
- Calibrated torque wrench capable of measuring 0 – 70 in/lbs (0 - 8 Nm).
- Standard sockets & wrenches

22-03-13 Special Tools

There are no special tools required to perform maintenance on the GFC 500 Autopilot.

22-04-10 Equipment Removal & Installation

This section describes how to remove and replace equipment associated with installation. After removal and replacement, the system must be configured and tested as described in 22-08-10 GFC 500 LRU Replacement/Configuration & Testing. Refer to the model-specific Installation Manual Addendums for unit locations and details. Refer to the **22-08-A1 General Master Installation List** for the applicable addendum part number.

CAUTION:

When removing and/or replacing any GFC 500 component, always ensure that aircraft power is off. Unplug any auxiliary power supplies.

NOTE:

Self-locking nuts are normally one time use only and must be replaced if residual torque values are below the minimum. Cotter (split) pins are for one time use only and must be replaced if removed.

22-04-11 GMC 507

Removal:

1. De-energize the GFC 500 system by pushing the AUTOPILOT circuit breaker.
2. Insert a 3/32" hex drive tool into the left and right access holes.
3. Turn the hex drive tool counter clockwise until the tool stops.
4. Pull the unit from the rack.
5. Disconnect the electrical connector (P5071) from the GMC 507.

Reinstallation:

NOTE:

Ensure the position of the GMC 507 retention mechanism is correct by inserting a 3/32" hex drive tool into the access hole at the bottom of the face of the unit and turning the tool counter clockwise until it fully stops.

1. Visually inspect the connector and pins for signs of damage. Repair any damage.
2. Connect the electrical connector (P5071) to the GMC 507.
3. Insert a 3/32" hex drive tool into the left and right access holes.
4. Slide unit into the rack or panel cutout until it stops.
5. Gently push on the GMC 507 bezel while turning the tool clockwise until the unit is securely seated in the rack. Do not exceed 20 in-lbs (2.25Nm). of torque.
6. Perform a functional check of the GMC 507 as required per Section 7.1.

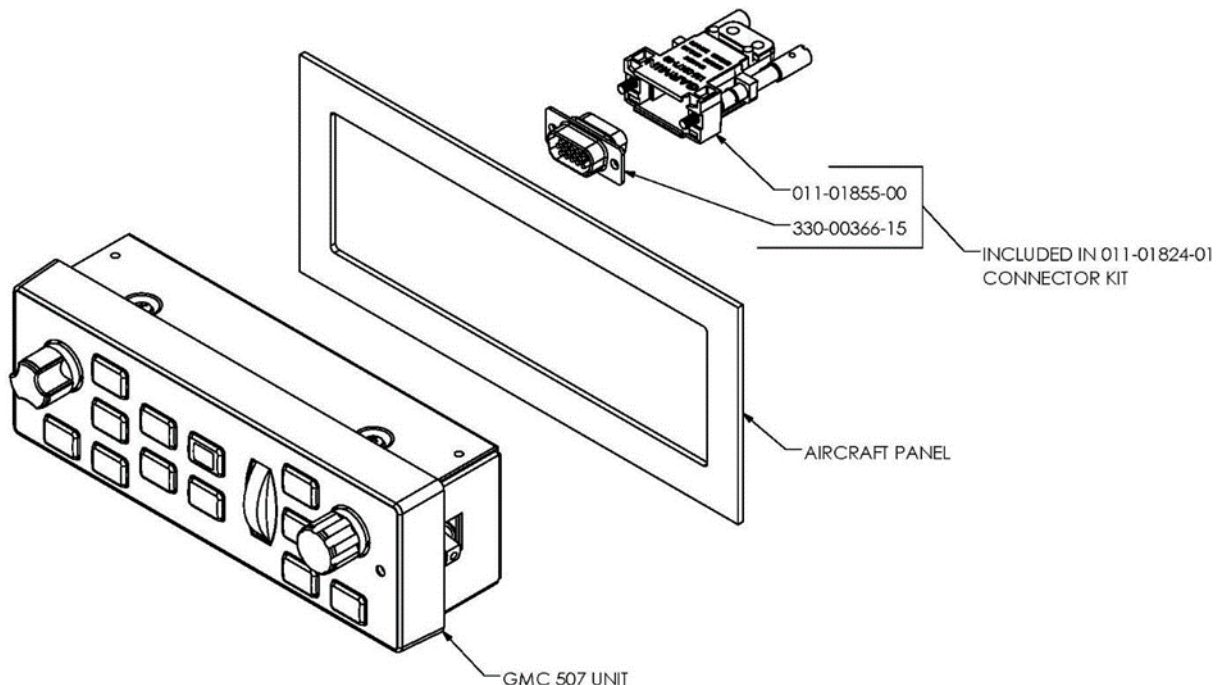


Figure 22-8 – GMC 507 Installation without rack

22-04-12 GSA 28 Servos

Removal:

1. Ensure that there is no electrical power to GSA 28 servos by pulling the AUTOPILOT circuit breaker

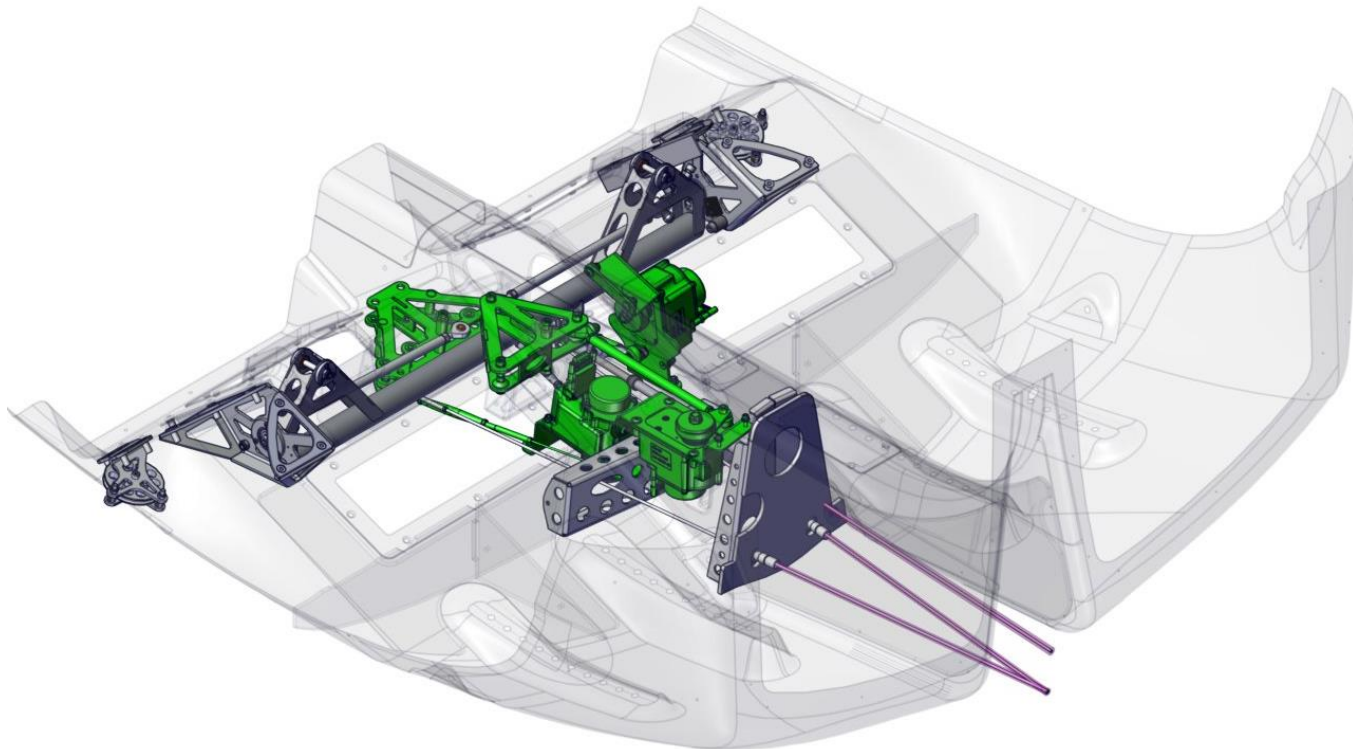
2. Disconnect the electrical connector from the mating connector on the servo as necessary (1P281 Roll, 2P281 Pitch, 4P281 Yaw).
3. Disconnect the servo cables and remove the servo using the data provided in the appropriate model-specific installation manual addendum. Refer to the **22-08-A1 General Master Installation List** and information later in this section.

Reinstallation:

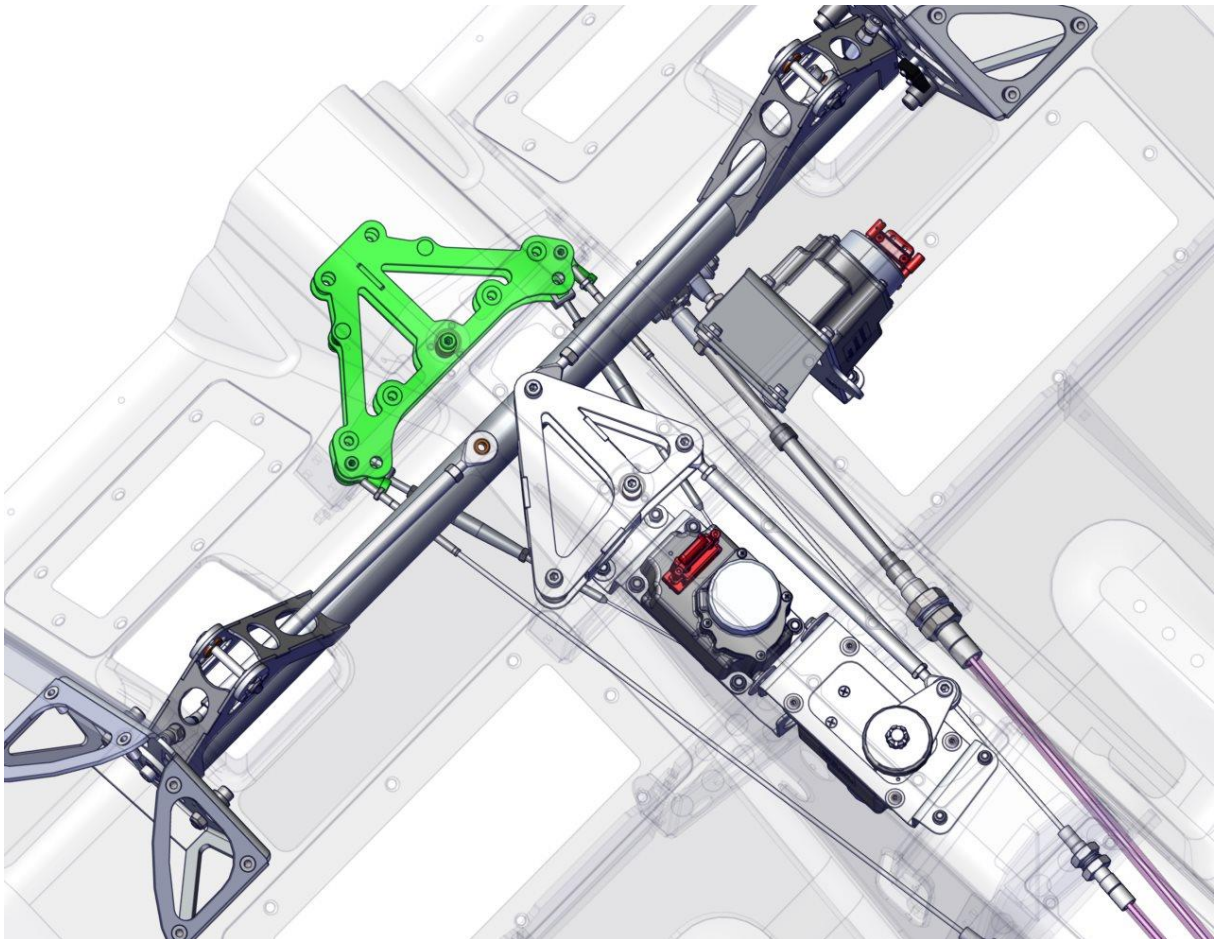
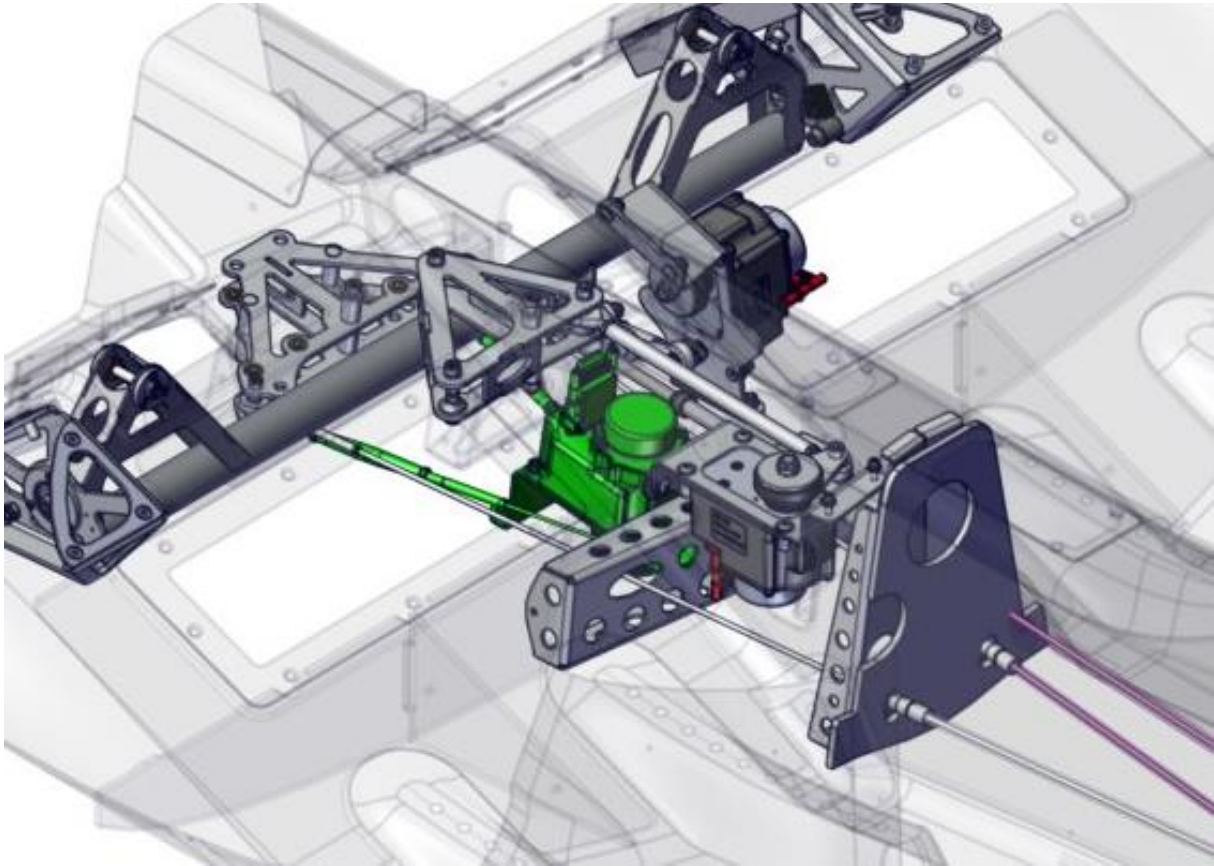
1. Visually inspect the connectors to ensure there are no bent or damaged pins. Repair any damage.
2. Reinstall the servo and servo cables using the data provided in the appropriate model-specific installation manual addendum. Refer to the **22-08-A1 General Master Installation List** and information later in this section.
3. Reconnect the electrical connector (1P281 for Roll, 2P281 for Pitch, or 4P281 for Yaw, as applicable) to the mating connector on the servo.
4. Perform a functional check of the GSA 28 per 22-08-12 GSA 28 Servo

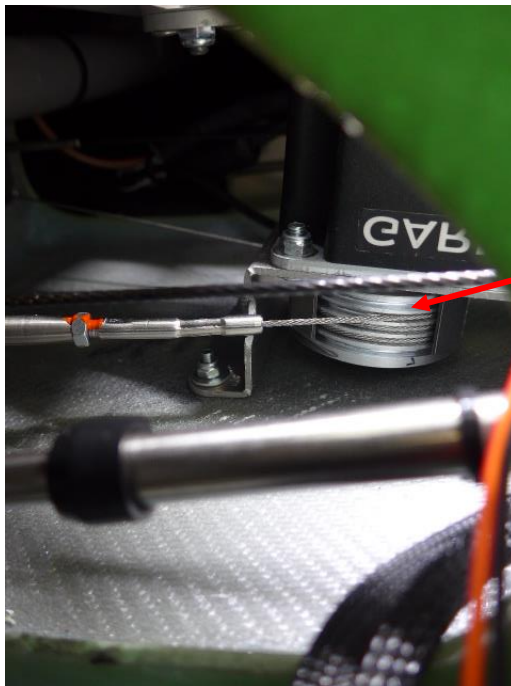
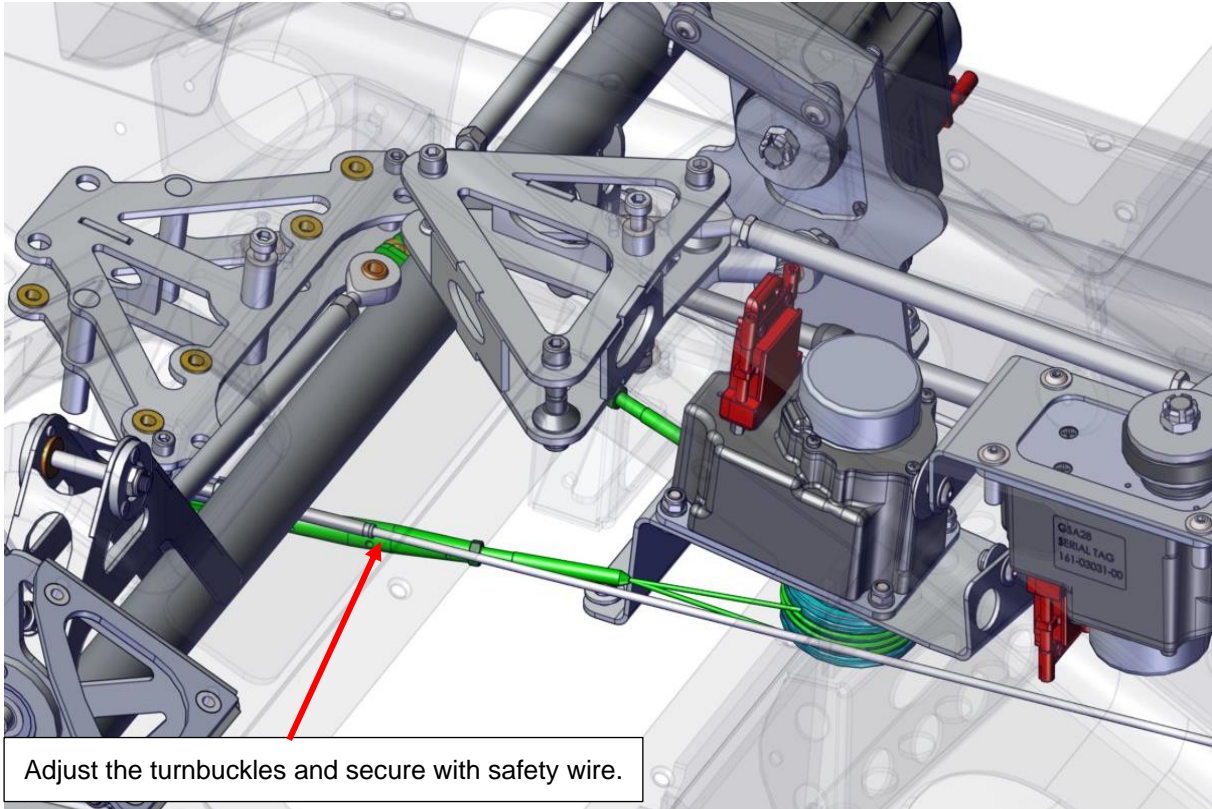
22-04-20 Autopilot components installation

22-04-21 Overview:



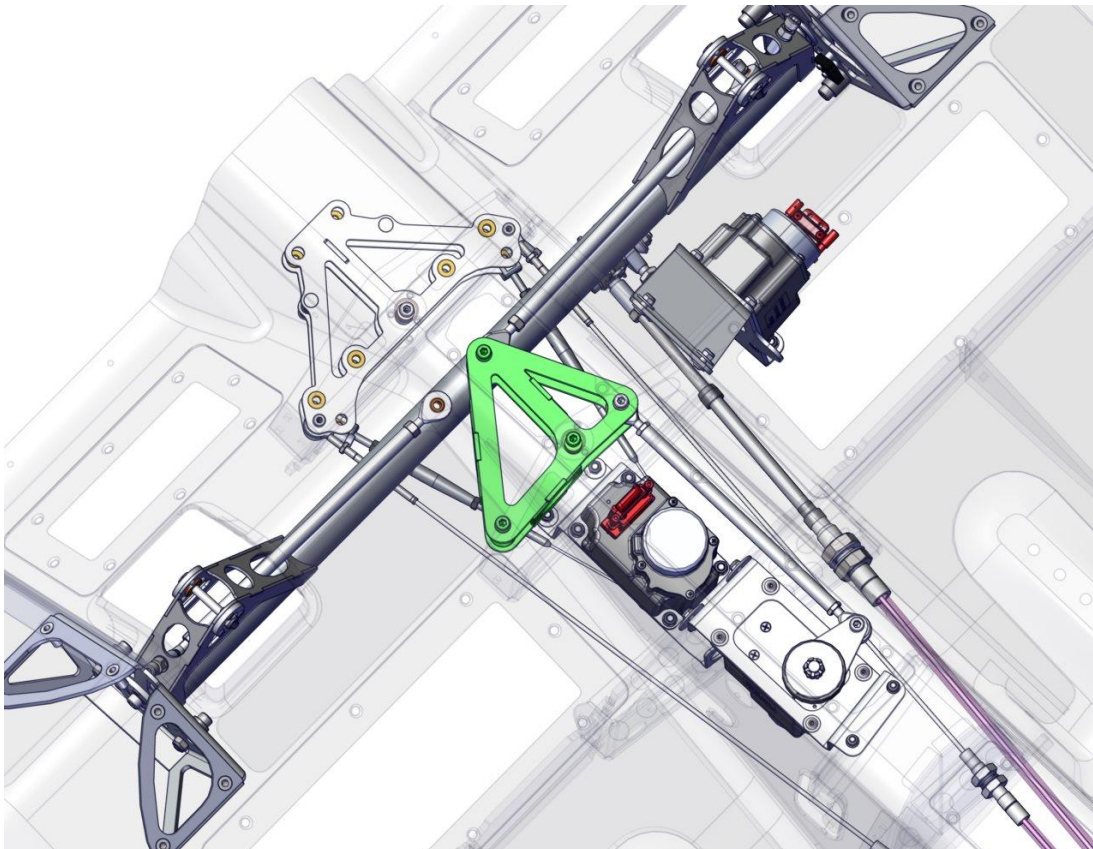
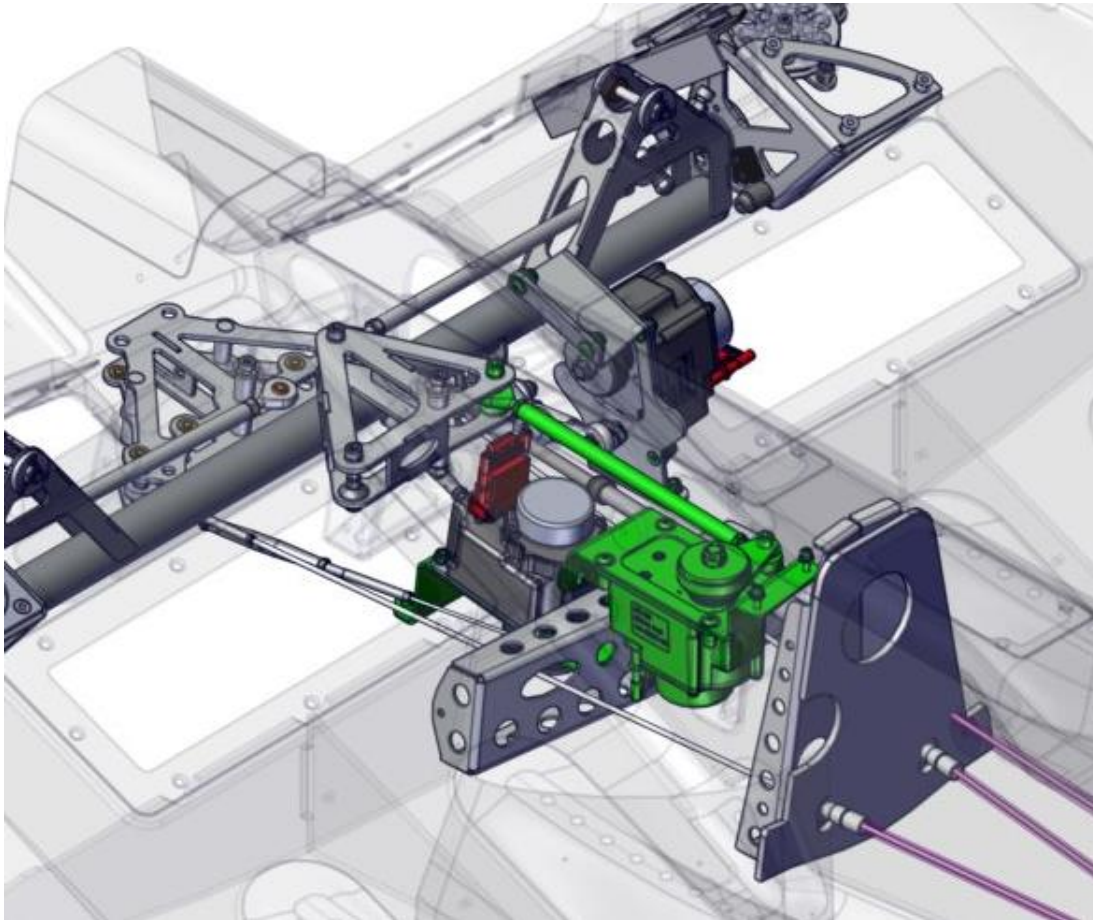
22-04-22 Yaw Components

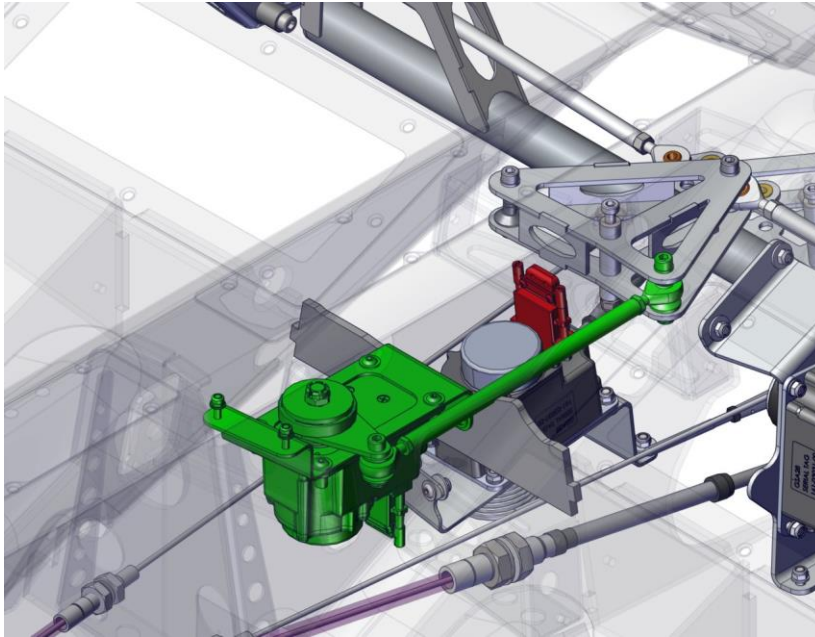




2,5 times windings at the pulley of the Yaw servo are required. Ensure that the windings in the neutral position is the same as shown in the picture.

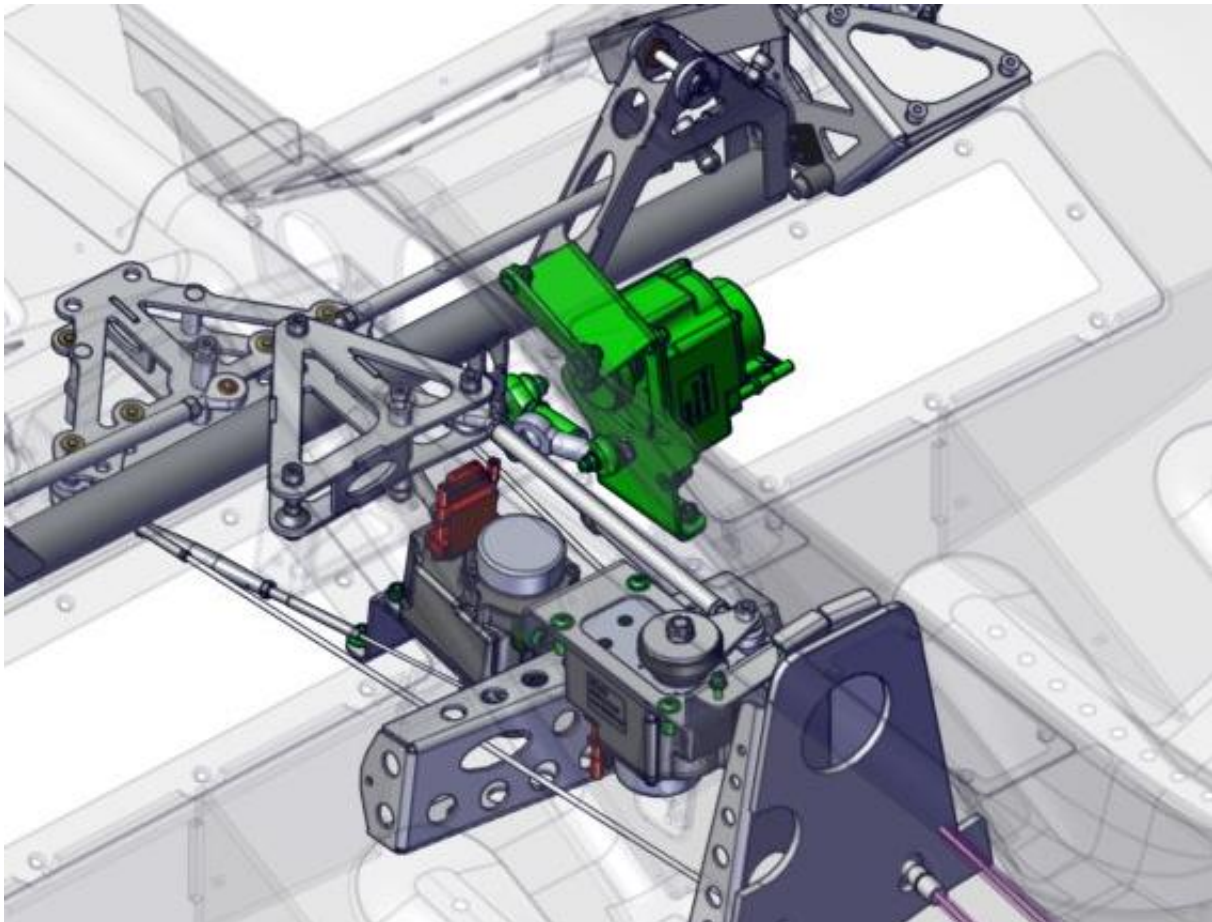
22-04-23 Roll Components

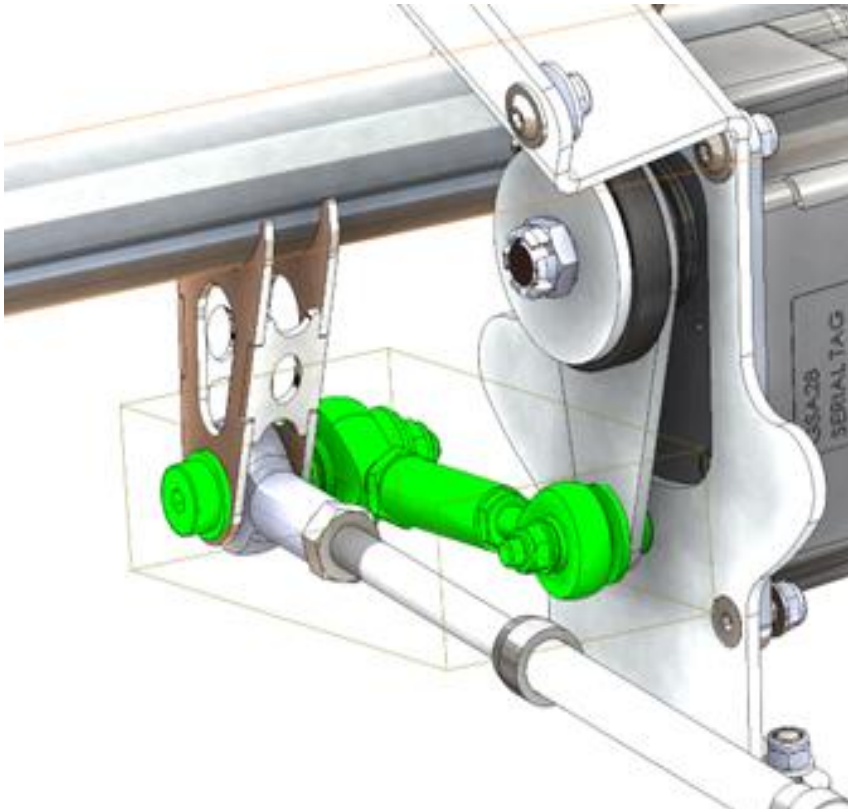




The arm of the Roll control lever and the arm of the Roll servo need to be parallel. If not, the push pull rod needs to be adjusted and secured again with locking paint.

22-04-24 Pitch Components





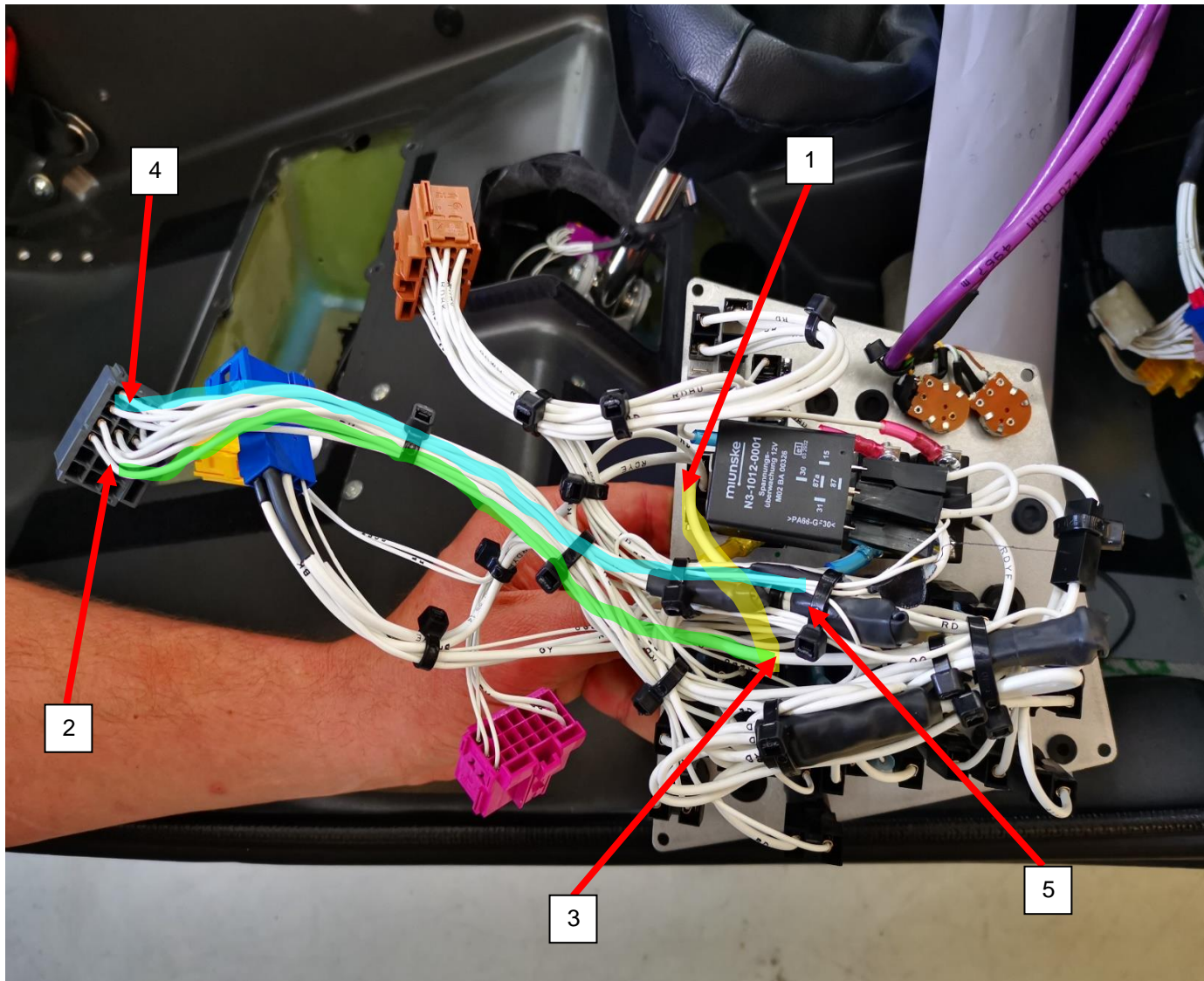
The arm of the Pitch control base tube and the arm of the Pitch servo need to be parallel. If not, the push pull rod needs to be adjusted and secured again with locking paint.

22-04-27 Cable installation

The cables are marked and need to be plugged into the right servos.
Ensure that the Cable routing do not collide with turning and or moving parts

22-04-28 additional power Cable installation

Power supply Installation



1. Wire: highlighted in yellow

Point 1 to point 3: Avionic switch to the fuse of the AP Circuit braker

2. Wire: highlighted in green

Point 2 to point 3: Pin 7 of the white (here in grey) 12 pin socket to the fuse of the AP Circuit braker

3. Wire: highlighted in blue:

Point 4 to point 5: Pin 9 of the white (here in grey) 12 pin socket to the ground point.

The 48112 Garmin GMC 507 Installation kit is then connected to the white (here in grey) socket.

22-04-30 Autopilot disconnect button and prerotator button change

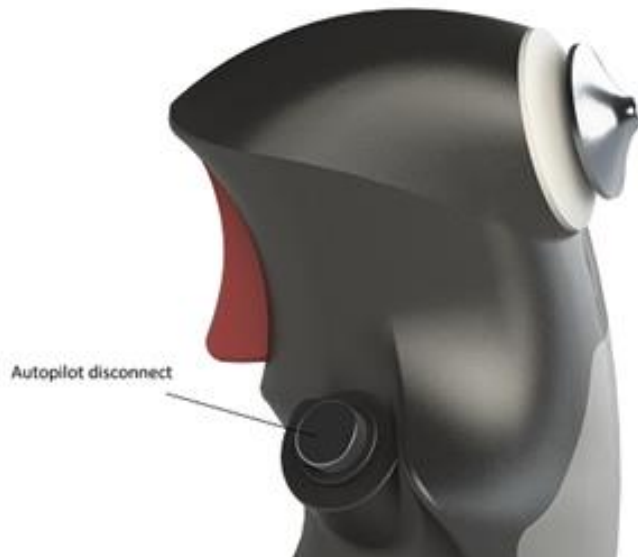
22-04-31 Prerotator button

The new prerotator button position is now integrated in the throttle lever. This button must be placarded.



22-04-32 Autopilot disconnect button

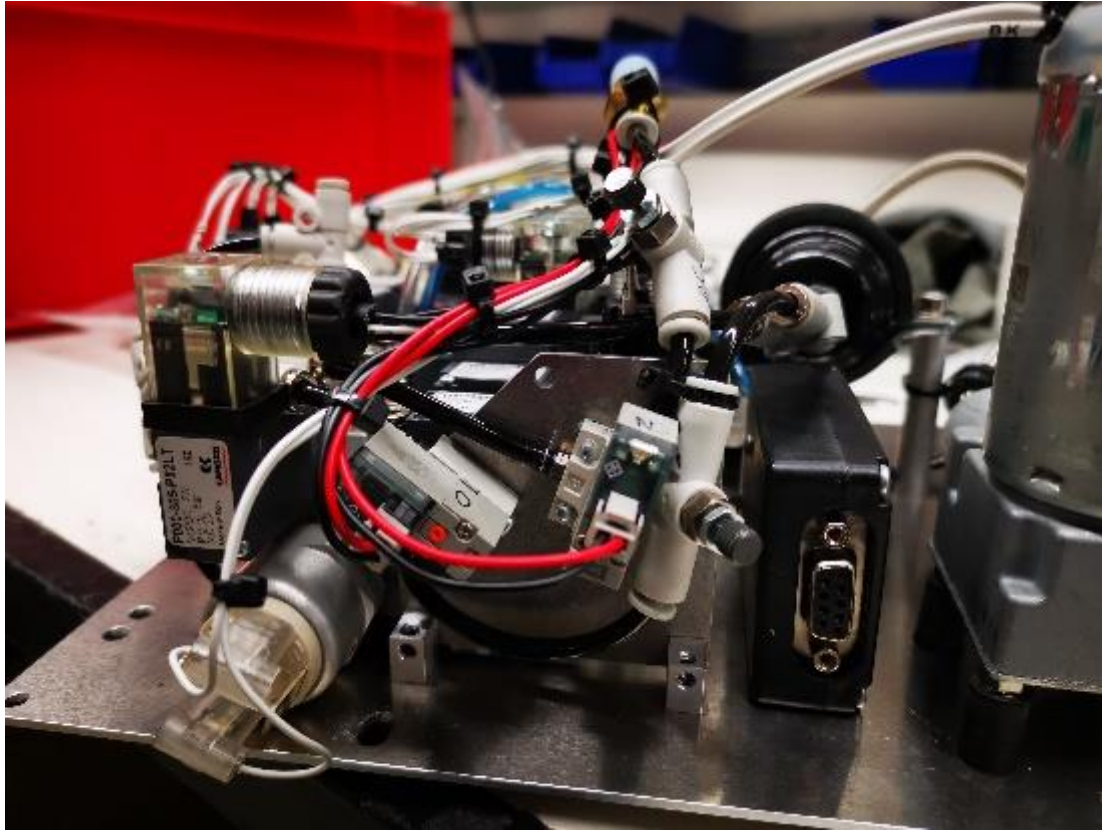
On the stick (pilot and copilot) is now the Autopilot Disconnect button. This button must be placarded



22-04-40 Pneumatic system

New: 48377 Pneumatic System Comfort AP

The AP is able to adjust the Pitch movement via the Pneumatic system, therefore a parallel system for the Pitch trim is added into the pneumatic system for the AP



22-05-10 Electrical Bonding Test

The following bonding tests are provided for aircraft that have a GFC 500 Autopilot installed as a requirement beyond any that may be given in the aircraft maintenance manual.

22-05-11 Requirements

All GFC 500 equipment must be installed. For the GMC 507, the tests are performed with the connectors connected. For the GSA 28, tests are conducted with the connector disconnected. Gain access for the procedure listed below in 22-05-13 Electrical Bonding Procedure as required and in accordance with the aircraft maintenance manual. It is recommended that these tests are conducted after visual inspection of the zone to minimize access requirements.

22-05-12 Test Equipment

A milliohm meter and Kelvin probes are recommended for this test. However, an alternate method may be used to provide equivalent results by using the following procedure and a standard voltmeter, power supply with adjustable current limit, and ammeter. The test set up for this alternate method is described below.

All test equipment used for the bond checks must be calibrated.

1. Connect the positive lead of the power supply to airframe ground. Connect/touch the positive lead of the voltmeter to the same point.

NOTE

Ensure that the voltmeter and power supply probes do not touch, so as not to induce contact resistance.

2. Touch negative lead of power supply to each of the test points listed while performing Step 3. At each required point, configure the power supply to produce 1 amp before measuring voltage. (Use an ammeter to ensure current is within minimum of 1 amp ± 100 milliamp at each point). Do not allow the reference current to exceed 1.5 amps for safety.
3. With the current set to 1A, the voltage reading will be the value of the bonding resistance. Set the voltmeter to measure millivolts and null the reading. Measure the voltage from airframe ground (step 1) to each required test points and record the voltage. (Perform Step 2 at each required point and ensure that minimum of 1 amp ± 100 milliamp is present when measuring the voltage.)

TIP: When a 1A current is used all the millivolt readings are the same as m Ω , and required no further calculation of bond resistance. If 1 amp reference current cannot be maintained and is higher divide the measured voltage by current to get the resistance value.

22-05-13 Electrical Bonding Procedure

Using one of the two measurement methods in 22-05-12 Test Equipment record the bonding measurement for the following equipment. Some equipment in the list is optional and may not be installed.

Ensure that the measurements do not exceed the values shown in Table 22-2. If the values exceed those listed, perform the reconditioning procedure in 22-00-40 Electrical Bonding.

- | | |
|--------------------------------|------------|
| • GMC 507 case: | m Ω |
| • GSA 28 (Roll) chassis: | m Ω |
| • GSA 28 (Pitch) chassis: | m Ω |
| • GSA 28 (Yaw Damper) chassis: | m Ω |

22-05-20 Disconnect Tone and Sonalert Test

Perform the Disconnect Tone and Sonalert (where fitted) Functional Test at the intervals specified in Table 22-3.

1. Apply external electrical power to the aircraft and avionics systems.
2. Ensure that the GFC 500 Autopilot passes PFT.
3. Engage the autopilot by pressing the AP button on the GMC 507.
4. Disengage the autopilot by pressing the AP DISC switch on the pilot's flight controls.
5. Verify that the normal autopilot disconnect tone plays.
 - a. If an audio panel is connected, verify that the autopilot disconnect tone plays through the speaker and headphones. **NOTE:** The normal autopilot disconnect tone is three high-low tones approximately three seconds in duration.
 - b. If a sonalert is connected, verify that the autopilot disconnect tone plays through the sonalert. **NOTE:** The normal autopilot disconnect sonalert tone is a continuous 2000 Hz tone that plays for approximately 3 seconds.

22-05-30 Pitch and Roll clamp Check

A clamp check needs to be made after:

- The production of an Aircraft with Autopilot
- Installing the Autopilot into an already existing Aircraft (aftermarket Solution)
- Incorrect function of the Autopilot in flight.
- 200h inspection

The following values should be used as a comparison.

[N]	at the rotor heat			at the stick		
	with spring	end of spring	without spring	with spring	end of spring	without spring
Front	62	180	49	18	30	11
Left	60		67	13		10
Right	74		65	11		9

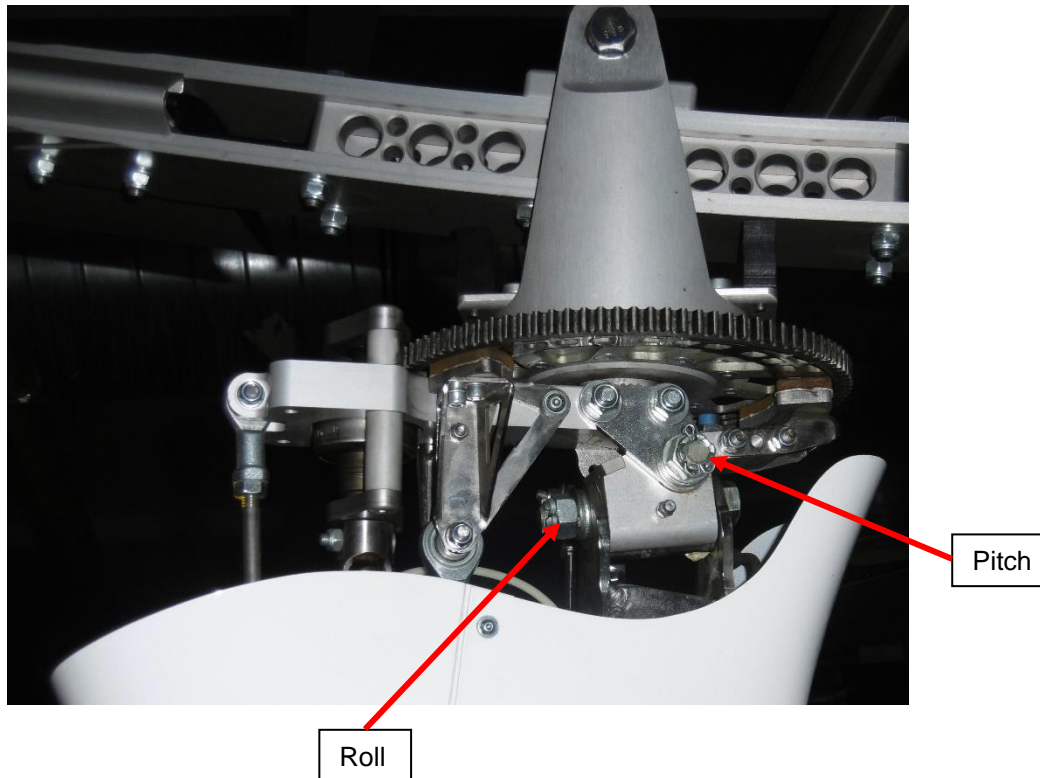
Pre-Setting before measure the system:

- Brake trim pressure off
- Roll trim pressure off

Attachement points were to measure



This Bolts need to be loose or tighten if the clamp force need to be adjusted.



22-06-10 Visual Inspection

Perform a visual inspection in accordance with requirements in Table 22-4. Check for corrosion, damage, or other defects of the GMC 507 and the GSA 28s. Replace any damaged parts as required. Inspection may require the temporary removal of a unit or units to gain access to connectors. Follow guidance in Section 6 for equipment removal and replacement. Refer to the aircraft manufacturer service or maintenance manual for instructions on access panel locations.

Table 22-4 – Visual Inspection Procedure

Item	Description/Procedure	Initials
GFC 500 Equipment Visual Inspections	<p>a) Conduct a visual inspection of the GMC 507 and GSA 28 equipment installations in accordance with 14 CFR Part 43, Appendix D. If the equipment does not pass the visual inspection, complete the following procedure:</p> <ul style="list-style-type: none"> i. Correct improper installations and ensure that all install racks, brackets, and fasteners are secure. Correct improper wire routing and ensure that the wire harness is securely mounted. Replace install racks, brackets, wiring and associated electrical bonding or shielding components with obvious defects ii. Complete the equipment electrical bonding test as described in 22-05-10 Electrical Bonding Test for any components that are replaced. iii. Equipment shield terminations shall be free of corrosion and secure to the backshell or aircraft ground. <p>b) Inspect all exposed wire harness for chafing, damage, proper routing of wire bundles and security of attachment in accordance with AutoGyro standards.</p>	

Servos, Servo Control Cables, and associated hardware	<ul style="list-style-type: none"> a) Using a flashlight, inspect the GSA 28 servos, connectors, support structure, and control cables to ensure that no corrosion, chafing, cracks, or other defects exist. b) Have an assistant manually move the control surfaces from stop to stop and visually observe the servo and control cabling. Ensure there is no binding in the control cabling, that the capstan/sprocket rotates freely, and that there is no rough turning or noise from the servo bearings. c) Check the servo control cables in accordance with AG installations standards to ensure no fraying, corrosion, or other damage exists. If the condition of any cable is questionable, replace it with a new one. Additionally, where servo cables wrap around capstans and pulleys, measure the cable diameter with cable tension applied. If the cable has lost 30% or more of its nominal diameter, replace the servo cable. d) Lubricate any aircraft cables in accordance with the service manual applicable to the aircraft model. e) Check the tension on the servo control cables. Refer to the appropriate Install Manual Addendum for the aircraft type for cable tension specifications: f) Ensure that each cable is correctly attached to the existing flight control system as shown in the appropriate Install Manual Addendum. g) Visually inspect the condition of lock nuts, cable guard support plate, cable guard posts, self-locking castle nuts, cotter pin, split lock washer, flat washer and the output shaft to ensure no corrosion, cracks, or other defects exist. h) For continuous travel servos only, visually inspect the condition of the idler pulley, shaft, washer, and E-ring, to ensure no corrosion, chafing, cracks, or other defects exist. 	
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Table 22-5 – Lightning Strike Inspection Procedure

Item	Description/Procedure	Initials
GMC 507, GSA 28	In the event of a suspected or actual lightning strike to the aircraft, the bonding components for the GFC 500 Autopilot (bonding straps, mounting hardware etc.) must be inspected. If any damage is found, damaged components must be replaced in accordance with specifications and procedures shown in Section 6. If any bonding components are replaced, measure the resistance between the replaced component and aircraft ground. Verify the resistance is less than or equal to 2.5mΩ.	

22-08-10 GFC 500 LRU Replacement/Configuration & Testing

This section provides procedures to be followed after any GFC 500 LRU is replaced. At the beginning of each LRU section, instructions are given to guide the technician for various removal/replacement scenarios. These instructions define necessary procedures to be followed for situations where original equipment was reinstalled as well as for situations where new equipment (new serial number) is installed.

22-08-11 GMC 507

Original GMC 507 Reinstalled

If the removed GMC 507 is reinstalled, no software loading is required. This does not include units that were returned for repair as their software is deleted during the repair testing process. Continue to GMC 507 Test Procedure, 22- 08-32 G5 Systems and 22-08-60 GFC 500 Functional Checks

New Repair or Exchange GMC 507 Installed

If a new, repaired or exchanged GMC 507 is installed, the correct software must be loaded to the unit. Refer to 22-08-21 GMC 507 and GSA 28 Software Loading for software loading procedures. Continue to the GMC 507 Test Procedure, Sections 22-08-31 Yaw Offset and Pitch/Roll Offset Calibration, 22-08-32 G5 Systems and 22-08-60 GFC 500 Functional Checks.

22-08-12 GSA 28 Servo

Original GSA 28 Reinstalled

No software loading is required if the removed GSA 28 is re-installed. This does not include units that were returned for repair as their software is deleted during the repair testing process. Continue to the applicable GSA 28 Test Procedure for the servo that was replaced:

22- 08-32 G5 Systems and 22-08-52 Roll Servo Functional Check for Roll Servo

22- 08-32 G5 Systems and 22-08-53 Pitch Servo Functional Check for Pitch Servo

22- 08-32 G5 Systems and 22-08-54 Yaw Damper Functional Check for Yaw Damper Servo

New, Repaired or Exchange GSA 28 Installed

If a new, repaired or exchanged GSA 28 is installed, the correct software must be loaded to the unit. Refer to Section 8.1 for software loading procedures. Continue to the applicable GSA 28 Test Procedure for the servo that was replaced:

22- 08-32 G5 Systems and 22-08-52 Roll Servo Functional Check for Roll Servo

22- 08-32 G5 Systems and 22-08-53 Pitch Servo Functional Check for Pitch Servo

22- 08-32 G5 Systems and 22-08-54 Yaw Damper Functional Check for Yaw Damper Servo

22-08-20 GFC 500 Software Load and Configuration Procedures

22-08-21 GMC 507 and GSA 28 Software Loading

1. Apply power to the G5/GFC 500 system.
2. On power-up, the GMC 507 and GSA 28 software versions are checked by the system. If there is a mismatch (due to a replaced unit), the correct software is automatically loaded to the unit(s) from the G5 or G3X. Refer to the Garmin G5 Electronic Flight Instrument Part 23 AML STC Maintenance Manual including ICA, p/n 190-01112-11 if the G5 was replaced or to the Garmin G3X Touch Electronic Flight Instrument System Part 23 AML STC Maintenance Manual including ICA, p/n 190-02472-02 if the G3X PFD was replaced.

22-08-22 GFC 500 System Configuration

For configuration items not related to the GFC 500 Automatic Flight Control System, refer to the Garmin G5 Electronic Flight Instrument Part 23 AML STC Maintenance Manual including ICA, p/n 190-01112-11 or the Garmin G3X Touch Electronic Flight Instrument System Part 23 AML STC Maintenance Manual including ICA, p/n 190-02472-02.

NOTE: The G5 must be configured in accordance with the Garmin G5 Electronic Instrument Part 23 AML STC Installation Manual **prior** to configuring the GFC 500 Autopilot.

NOTE: The G3X must be configured in accordance with the Garmin G3X AML STC IM **prior** to configuring the GFC 500 Autopilot

NOTE: To start the G5 in configuration mode, hold down the knob while powering on the G5. Configuration selections are made by rotating and pressing the knob on the face of the G5 as necessary to select the correct configurations. Each configuration item is saved as it is made.

NOTE: To start the G3X in configuration mode, hold down the MENU button while powering on the G3X. Configuration selections are made through the G3X as necessary to select the correct configurations. Each configuration item is saved as it is made.

Configure the GFC 500 Autopilot as shown on the aircraft-specific installation manual addendum (AMM_CV_915_EN_2022-05). Refer to the **22-08-A1 General Master Installation List** for the correct installation manual addendum part number.

22-08-30 GFC 500 Return to Service Procedure

The following sections will verify the proper operation of the GFC 500 Autopilot after maintenance has been performed on the system. Operational information regarding the GFC 500 Autopilot can be found in the G5 Electronic Flight Instrument Pilot's Guide for Certified Aircraft, p/n 190-01112-12 or the G3X Touch Pilot's Guide for Certified Aircraft, p/n 190-02472-00.

22-08-31 Yaw Offset and Pitch/Roll Offset Calibration

Perform the following procedures if the GMC 507 is replaced or when the GMC 507 rack is removed or loosened.

NOTE: If the G5 ADI has been replaced, perform the G5 pitch/roll offset procedures outlined in Garmin G5 Electronic Flight Instrument Part 23 AML STC Maintenance Manual including ICA, p/n 190-01112-11 before completing this section.

NOTE: If the G3X system ADAHRS has been replaced, perform the pitch/roll offset procedures outlined in Garmin G3X Touch Electronic Flight Instrument System Part 23 AML STC Maintenance Manual including ICA, p/n 190-02472-02 before completing this section.

22-08-32 G5 Systems

1. Start the G5 ADI in configuration mode by pressing and holding the knob while applying power to the system.
2. If the GMC 507 is installed in a panel that is perpendicular to the aircraft forward motion, skip to step 6. If the GMC 507 is installed in a panel which is not perpendicular to the aircraft forward motion (i.e. in a canted panel), Navigate to the Flight Controls -> Mode Control Panel -> Calibrate Yaw Offset page and press the knob.
3. Scroll through the yaw offset calibration pages, following the instructions on each page to ensure that the system is ready for calibration.
4. Select the appropriate value of yaw offset and press the knob.
5. When the test is complete, select Done to return to the Flight Controls -> Mode Control Panel page.
6. Navigate to the Flight Controls -> Mode Control Panel -> Calibrate Pitch/Roll page and press the knob.
7. Scroll through the pitch/roll calibration pages, following the instructions on each page to ensure that the system is ready for calibration.
8. Select Calibrate to start the calibration process.
9. When the test is complete, select Done to return to the Flight Controls -> Mode Control Panel page.

22-08-33 G3X Systems

1. Start the G3X PFD in configuration mode by pressing and holding the MENU button while applying power to the system.

2. If the GMC 507 is installed in a panel that is perpendicular to the aircraft forward motion, skip to step 6. If the GMC 507 is installed in a panel which is not perpendicular to the aircraft forward motion (i.e. in a canted panel), Navigate to the Autopilot page group, General tab and touch the value on the Mode Control Panel Yaw Offset row.
3. Follow the on-screen instructions.
4. Select the appropriate value of yaw offset.
5. When the value is entered, select Save to return to the Autopilot page group, General Tab.
6. Touch the "Calibrate" button on the Mode Control Panel Pitch/Roll row.
7. Select Calibrate to start the calibration process.
8. When the process is complete, select Done to return to the Autopilot page group, General Tab.
9. Restart the G3X System in normal mode.

22-08-40 Pre-Flight Test (PFT)

Pre-Flight Test (PFT) is accomplished automatically by the GFC 500 Autopilot after the system is powered up in normal mode.

1. Apply electrical power to the aircraft.
2. Verify that the G5 or G3X PFD displays PFT on the display during PFT.
3. Verify that at the conclusion of PFT, the PFT annunciation is removed from the G5 or G3X PFD.
4. Disable any GPS navigator or antenna providing signal to the G5 or G3X by pulling its circuit breaker or by ensuring that the antenna is not receiving any GPS signal.
5. Using an air data test set, apply 35-40 knots of airspeed.
6. Verify that the ESP roll indices are displayed at the appropriate left and right roll attitude on the G5 or the G3X PFD. Refer to the appropriate model-specific installation manual addendum for model specific information on the placement of the roll indices.
7. Return the air data test set to ambient pressure.
8. Enable the GPS providing signal to the G5 and/or G3X.

22-08-50 Normal Mode Tests

The tests in the following sections are performed with the system in normal mode.

NOTE: Throughout the following sections:

1. A normal autopilot disconnect will be accompanied by a normal disconnect aural alert (three high-low tones approximately three seconds in duration) through the cockpit speaker(s) and headphones and a continuous tone from the sonalert for approximately three seconds (if installed).
2. An abnormal disconnect will be accompanied by an abnormal disconnect aural alert (continuous high-low tones) through the cockpit speaker(s) and headphones and a continuous tone from the sonalert (if installed). The abnormal disconnect tones can be cancelled by pressing the AP button on the GMC 507, the knob on the G5 (if installed), the AP DISC switch on the pilot's flight controls, or by touching the Autopilot Status bar on the G3X PFD (if installed).
3. If the aircraft is not equipped with a pitch trim servo, disregard the steps for pitch trim servos.
4. Depending on the aircraft and the control system, the pitch trim may run automatically at any time while the autopilot is engaged. If it gets to the end of its travel, an amber TRIM annunciation may appear.
5. If the aircraft is not equipped with a yaw damper servo, disregard the steps for yaw damper servos.
6. If the aircraft is configured for miles per hour (mph) instead of knots (kts), utilize mph as the unit in any step that references kts. Conversion of value is not required.

22-08-51 Servo Tests

If a servo has been removed and reinstalled (or replaced), perform the following steps.

1. Load software as shown 22-08-21 GMC 507 and GSA 28 Software Loading.

2. Power the GFC 500 in normal mode.
3. Complete Pre-Flight Test (PFT) as shown in 22-08-40 Pre-Flight Test (PFT).
4. Proceed to the sub-section below as appropriate for the servo that has been replaced.

22-08-52 Roll Servo Functional Check

1. Verify that the steps in 22-08-51 Servo Tests have been completed.
2. Center the heading bug on the aircraft heading.
3. Engage the autopilot by pressing the AP button on the GMC 507.
4. Verify that the roll control is restricted from free movement.
5. Press the HDG button to engage roll mode.
6. Rotate the heading bug to the left of the current aircraft heading.
7. Ensure that the command bars indicate a left roll and that the servo drives the flight controls to the left.
8. Rotate the heading bug to the right of the current aircraft heading.
9. Ensure that the command bars indicate a right roll and that the servo drives the flight controls to the right.
10. Firmly grasp the control wheel and press the AP DISC switch on the pilot's flight controls.
11. Verify that the autopilot disconnects and the roll control moves freely.

22-08-53 Pitch Servo Functional Check

1. Verify that the steps in 22-08-51 Servo Tests have been completed.
2. Center the elevator controls approximately mid-travel.
3. Engage the autopilot by pressing the AP button on the GMC 507.
4. Verify that the pitch control is restricted from free movement.
5. Rotate the NOSE UP/DN thumbwheel on the GMC 507 UP three clicks.
6. Ensure that the flight director command bars indicate a pitch up and that the pitch servo drives the controls in a nose up direction. NOTE: In some aircraft, some assistance may be needed to drive the flight controls against any counterweight or springs.
7. Rotate the NOSE UP/DN thumbwheel on the GMC 507 DN three clicks.
8. Apply continuous forward pressure on the pitch control in a nose down direction.
9. Ensure that TRIM UP is displayed on the G5 or G3X PFD.
10. Apply continuous aft pressure to the flight controls in a nose up direction.
11. Ensure that TRIM DN is displayed on the G5 or G3X PFD.
12. Rotate the NOSE UP/DN thumbwheel on the GMC 507 DN three clicks.
13. Ensure that the flight director command bars indicate a pitch down and that the pitch servo drives the controls in a nose down direction.
14. Firmly grasp the control wheel and press the AP DISC switch on the pilot's flight controls.
15. Verify that the autopilot disconnects and the pitch control moves freely.

22-08-54 Yaw Damper Functional Check

1. Verify that the steps in Section 9.3.1 have been completed.
2. Engage the Yaw Damper by pressing the YD button the GMC 507.
3. Verify that resistance is felt in the rudder pedals.

22-08-60 GFC 500 Functional Checks

Perform the following test procedures when the GMC 507 is replaced.

22-08-61 Autopilot Switch Checks

1. Power up the system in normal mode.
2. Complete Pre-Flight Test (PFT) as shown in 22-08-40 Pre-Flight Test (PFT).
3. Actuate the TRIM switch on the pilot's flight controls in the nose down (forward) direction.
4. Verify that the Pitch (Trim) pressure engages and drives the airplane trim system in a Nose Down direction.
5. Release the TRIM Switch.
6. Actuate the TRIM switch on the pilot's flight controls in the nose up (aft) direction.

7. Verify that the Pitch (Trim) Pressure engages and drives the airplane trim system in a Nose Up direction.
8. Release the TRIM switch.
9. Engage the Autopilot by pressing the AP button on the GMC 507.
10. Press the AP DISC switch on the pilot's flight controls.
11. Verify that the autopilot disengages.
12. Engage the Autopilot by pressing the AP Button on the GMC 507.
13. Press the AP button on the GMC 507.
14. Verify that the autopilot disengages but the YD remains engaged.
15. Press the AP DISC switch on the pilot's flight controls
16. Verify the following:
 - f. TO is annunciated for both lateral and vertical modes on the G5 or G3X PFD.
 - g. The flight director command bars are displayed and indicate wings level and pitch up to the angle as shown on the appropriate Install Manual Addendum (AMM_CV_915_EN_2022-05).
17. Press the FD button on the GMC 507.
18. Verify that the flight director command bars are no longer displayed.

22-08-62 Interface Checks

NOTE: Ensure that the flight controls are in a neutral position before performing the following checks.

1. Set the heading bug to the current aircraft heading.
2. Engage the autopilot by pressing the AP button on the GMC 507.
3. Verify that ROL and PIT are displayed on the G5 or G3X PFD.
4. Verify that the flight director command bars are displayed in level pitch and roll attitude.
5. Press the HDG button on the GMC 507 to engage heading mode.
6. Verify that HDG replaces ROL on the G5 or G3X PFD.
7. Adjust the heading bug to the left of the aircraft heading.
8. Verify that the flight director command bars indicate a left turn, and that the flight controls move toward the left.
9. Adjust the heading bug to the right of the aircraft heading.
10. Verify that the flight director command bars indicate a right turn, and that the flight controls move toward the right.
11. Center the heading bug at the aircraft heading.
12. Click the UP/DN thumbwheel on the GMC 507 UP four times.
13. Verify that the command bars indicate a fly up command and that the flight controls drive in the pitch up direction. Note: In some aircraft, it may be necessary to counteract any counterweight or control system springs to assist the servo.
14. Click the UP/DN thumbwheel on the GMC 507 DN eight times.
15. Verify that the command bars indicate a fly down command and that the flight controls drive in the pitch down direction.
16. Press the AP DISC switch to disengage the autopilot.
17. Press the FD button to remove the flight director bars from the G5 or G3X PFD.

22-08-63 VOR Mode Check

1. Set the Course pointer on the CDI 15 degrees to the left of aircraft heading and ensure that the CDI is displaying VOR navigation information.
2. Simulate a VOR signal with a "TO" course equal to the aircraft heading.
3. Engage the autopilot by pressing the AP button on the GMC 507.
4. Verify ROL and PIT are displayed on the G5 or G3X PFD.
5. Press the NAV button on the GMC 507.
6. Verify that VOR is displayed in white with ROL, AP, YD, and PIT in green on the G5 or G3X PFD.
7. Verify that the flight director command bars are displayed in level pitch and roll attitude.
8. Slowly adjust the course pointer on the CDI toward the aircraft heading.
9. When the course pointer is within approximately five degrees of the aircraft heading, verify that that VOR displays green on the G5 or G3X PFD and that ROL is not displayed on the G5 or G3X PFD.
10. Center course pointer on the aircraft heading.

11. Adjust the simulated course 20 degrees to the left of current aircraft heading.
12. Verify that the flight director command bars indicate a left turn and that the flight controls move toward a left turn.
13. Adjust simulated course to aircraft heading.
14. Adjust the simulated course on the nav test set 20 degrees to the right of current aircraft heading.
15. Verify that the flight director command bars indicate a right turn and that the flight controls move toward a right turn.
16. Adjust the simulated course to aircraft heading.
17. Press the NAV button on the GMC 507.
18. Verify ROL and PIT are displayed on the G5 or G3X PFD.
19. Press the AP DISC switch to disengage the autopilot.
20. Press the FD button to remove the flight director bars from the G5 or G3X PFD.

22-08-64 GPS Mode Check

1. On the GPS Navigator, enter a Direct-To flight plan to an airport that is generally in front of the aircraft.
2. Ensure GPS is displayed as the active navigation source on the G5 or G3X PFD.
3. Engage the autopilot by pressing the AP button on the GMC 507.
4. Verify that ROL and PIT are displayed on the G5 or G3X PFD.
5. Press the NAV button on the GMC 507.
6. Verify that GPS replaces ROL on the G5 or G3X PFD.
7. Select OBS mode on the GPS navigator.
8. Adjust the OBS 3 degrees higher than the current DTK (Example: If the DTK is 272 degrees, adjust the OBS to 275 degrees).
9. Verify that the CDI moves to the left.
10. Verify that the flight director command bars indicate a left turn and that the flight controls drive to the left.
11. Adjust the OBS three degrees lower than the current DTK.
12. Verify that the CDI moves to the right.
13. Verify that the flight director command bars indicate a right turn and that the flight controls drive to the right.
14. Press the AP DISC switch to disengage the autopilot.
15. Press the FD button to remove the flight director bars from the G5 or G3X PFD.

22-08-65 IAS Mode Check

An air data test set is required for this section

NOTE: Disable any ADS-B Transmitting equipment for this test to avoid interference with air traffic control.

1. An air data test set is required for this section.
2. Set the air data test set to 3000 ft. altitude and 120 kts airspeed.
3. Engage the autopilot by pressing the AP button on the GMC 507.
4. Verify ROL and PIT are displayed on the GMC 507.
5. Press the IAS button on the GMC 507.
6. Verify that IAS is displayed in green and PIT extinguishes on the G5 or G3X PFD.
7. Verify that 120 KT (+/- 2 KT) is displayed to the right of IAS on the G5 or G3X PFD.
8. Rotate the UP/DN thumbwheel on the GMC 507 UP until 100 KT is displayed to the right of IAS on the G5 or G3X PFD.
9. Verify that the flight director command bars indicate a pitch up command and the flight controls respond in a nose up direction.
10. Rotate the UP/DN thumbwheel on the GMC 507 DN until 140 KT is displayed to the right of IAS on the G5 or G3X PFD.
11. Verify that the flight director command bars indicate a pitch down command and the flight controls respond in a nose down direction.
12. Rotate the UP/DN thumbwheel on the GMC 507 UP until 120 KT is displayed on the G5 or G3X PFD.
13. Verify that the flight director command bars indicate level pitch attitude.
14. Adjust the air data test set for 100 kts airspeed.

15. Verify that the flight director command bars indicate a pitch down command and the flight controls respond in a nose down direction.
16. Adjust the air data test set for 140 kts airspeed.
17. Verify that the flight director command bars indicate a pitch up command and the flight controls respond in a nose up direction.
18. Return the air data test set to 3000 ft. altitude and 120 kts airspeed.
19. Press the IAS button on the GMC 507 to deselect IAS mode.
20. Verify that PIT illuminates in green on the G5 or G3X PFD.
21. Press the AP DISC switch to disengage the autopilot.
22. Press the FD button to remove the flight director bars from the G5 or G3X PFD.

22-08-66 VS Mode Check

NOTE: Disable any ADS-B Transmitting equipment for this test to avoid interference with air traffic control.

1. Set the air data test set to 3000 ft. altitude and 120 kts airspeed, if not already there.
2. Engage the autopilot by pressing the AP button on the GMC 507.
3. Verify ROL and PIT are displayed on the G5 or G3X PFD.
4. Press the VS button on the GMC 507 to engage VS mode
5. Verify VS is displayed in green and PIT extinguishes on the G5 or G3X PFD.
6. Verify that +0 is displayed to the right of VS on the G5 and that the VS bug setting is shown at the bottom right of the G5 or in the autopilot mode annunciation bar on the G3X PFD.
7. Rotate the UP/DN thumbwheel on the GMC 507 UP until +1000 FPM is displayed on the G5 or G3X PFD.
8. Verify that the flight director command bars indicate pitch up and the flight controls respond in the direction of the command bars.
9. Rotate the UP/DN thumbwheel on the GMC 507 DN until -1000 FPM is displayed on the G5 or G3X PFD.
10. Verify that the flight director command bars indicate pitch down and the flight controls respond in the direction of the command bars.
11. Rotate the UP/DN thumbwheel on the GMC 507 UP until 0 FPM is displayed on the G5 or G3X PFD.
12. Verify that the flight director command bars indicate level pitch attitude and the flight controls are centered in pitch and roll.
13. Set the air data test set for 4000 ft. altitude at a vertical speed of 1000 fpm.
14. Verify that the flight director command bars indicate pitch down and the flight controls respond in the direction of the command bars.
15. Set the air data test set for 2000 ft. altitude at a vertical speed of 1000 fpm.
16. Verify that the flight director command bars indicate pitch up and the flight controls respond in the direction of the command bars.
17. Set the air data test set for 3000 ft. altitude and 120 kts airspeed.
18. Press the VS button on the GMC 507 to deselect VS mode.
19. Verify that PIT illuminates in green on the G5 or G3X PFD and that the VS bug is removed from the G5 or G3X PFD.
20. Press the AP DISC switch to disengage the autopilot.
21. Press the FD button to remove the flight director bars from the G5 or G3X PFD.

22-08-67 ALT Mode Check

NOTE: Disable any ADS-B Transmitting equipment for this test to avoid interference with air traffic control.

1. Set the air data test set to 3000 ft. altitude and 120 kts airspeed, if not already there.
2. Press the AP button on the GMC 507 to engage the autopilot.
3. Verify ROL and PIT are displayed on the G5 or G3X PFD.
4. Press the ALT button on the GMC 507 to select ALT mode.
5. Verify ALT is displayed in green and PIT extinguishes on the G5 or G3X PFD.
6. Verify that 3000 (+/- 120) is displayed to the right of ALT on the G5 or G3X PFD.
7. Adjust the air data test set for 3500 ft. altitude.

8. Verify that the flight director command bars indicate a pitch down and the flight controls respond in the direction of the command bars.
9. Adjust the air data test set for 2500 ft. altitude.
10. Verify that the flight director command bars indicate pitch up and the flight controls respond in the direction of the command bars.
11. Return the air data test set to 3000 ft. altitude and 120 kts airspeed.
12. Press the ALT button on the GMC 507 to deselect ALT mode.
13. Verify that PIT illuminates in green on the G5 or G3X PFD.
14. Press the AP DISC switch to disengage the autopilot.
15. Press the FD button to remove the flight director bars from the G5 or G3X PFD.

22-08-68 ALTS Mode Check

NOTE: Disable any ADS-B Transmitting equipment for this test to avoid interference with air traffic control.

1. Set the air data test set to 3000 ft. altitude and 120 kts airspeed, if not already there.
2. Set the selected altitude on the G5 or G3X PFD to 3500 ft.
3. Press the AP button on the GMC 507 to engage the autopilot.
4. Verify green ROL, AP, YD, PIT, and white ALTS are displayed on the G5 or G3X PFD.
5. Adjust the air data test set for 3500 ft. altitude at a vertical speed of 500 fpm.
6. When the altitude reaches 3400 +/- 20 feet, verify that Green ALTS flashes for approximately 3 seconds in place of PIT on the G5 or G3X PFD and then displays steady and that White ALT is displayed to the right of ALTS on the G5 or G3X PFD.
7. When the altitude reaches 3450 +/- 20 feet, verify that Green ALT flashes for approximately 3 seconds in place of ALTS on the G5 or G3X and then displays steady.

NOTE:

The flight director command bars and flight controls may move up or down as the GFC 500 Autopilot is capturing the selected altitude.

8. Adjust the air data test set for 4000 ft. altitude at a vertical speed of 500 fpm.
9. Verify that the flight director command bars indicate a pitch down and the flight controls respond in the direction of the command bars.
10. Adjust the air data test set for 3000 ft. altitude at a vertical speed of 500 fpm.
11. Verify that the flight director command bars indicate a pitch up and the flight controls respond in the direction of the command bars when the altitude goes below 3500 ft.
12. Return the air data test set to 3000 ft. altitude and 120 kts airspeed.
13. Allow the air data test set to stabilize at the target altitude and airspeed.
14. Adjust the selected altitude on the G5 or G3X PFD to 0 FT.
15. Press the ALT button on the GMC 507 to deselect ALT mode.
16. Verify PIT is displayed in place of ALT on the G5 or G3X PFD with ALTS in white to the right of PIT on the G5 or G3X PFD.
17. Press the AP DISC switch to disengage the autopilot.
18. Press the FD button to remove the flight director bars from the G5 or G3X PFD.
19. Return the air data test set to field elevation and 0 kts airspeed.

22-08-69 LVL Mode Check

1. Set the heading bug to the aircraft heading.
2. Press the FD button on the GMC 507 to engage the flight director.
3. Verify ROL and PIT are displayed on the G5 or G3X PFD.
4. Press the HDG button on the GMC 507 to select heading mode.
5. Verify HDG and PIT are illuminated in green and ROL is extinguished on the G5 or G3X PFD.
6. Adjust the heading bug to the left.
7. Verify that the flight director command bars indicate a left turn command.
8. Rotate the UP/DN thumbwheel on the GMC 507 UP four times.
9. Verify that the flight director command bars indicate a pitch up command.
10. Press the LVL button on the GMC 507.
11. Verify that LVL and LVL are displayed in green and HDG and PIT are extinguished on the G5 or G3X PFD.
12. Verify that the flight director command bars show level attitude and that the autopilot engages.

13. Press the AP DISC switch to disengage the autopilot.
14. Press the FD button to remove the flight director bars from the G5 or G3X PFD.

22-08- Appendix A. Installation Specific Information

22-08-A1 General Master Installation List

Part No.	Description	Quantity [EA]
48108	Garmin GSA 28 Servo [pitch,roll,yaw]	3
48111	Garmin GMC 507 - AutoPilot control unit	1
48112	Garmin GMC 507 installation kit	1
48377	&Pneumatic system Comfort AP	1
48327	&Control stick Pilot AP Comfort ETFE	1
48328	&Control stick Copilot AP Comfort ETFE	1
48490	&connection kit autopilot servo [pitch,roll,yaw]	1
48644	Sticker Notice Set AP	1

22-08-A2 Configuration Log (for G5 Equipped Aircraft)

Garmin G5			
Config menu			Value
Main	Level 1	Level 2	
Flight Controls	Garmin Autopilot Servos Yaw Damper Autopilot Roll...		Pitch + Roll Enabled
		Maximum Torque	100%
		Servo Gain	1,20
		Servo Direction	Normal
		Clutch Monitor	Enabled
		Fine Adjust Amount (Expert)	0
	Autopilot Pitch...	Maximum Torque	100%
		Servo Gain	0,80
		Servo Direction	Reverse
		Clutch Monitor	Disabled
		Servo Control Mode (Expert)	Alternate
		Fine Adjust Amount (Expert)	1
		Fine Adjust Time (Expert)	0,20sec
		Minimum Airspeed Limit	85km/h 45,9KIAS 52.5mph
		Maximum Airspeed Limit	185km/h 99,9KIAS 114,7mph
		Vertical Speed Gain	2,00
		Vertical Acceleration Gain	2,80
		Vertical Speed Interital Gain (Expert)	0,00
		Airspeed Gain	0,45
		Airspeed Acceleration Gain (Expert)	0,80
		Airspeed Tracking Gain	0,05
		Airspeed Gain Schedule	0
		Altitude Gain Schedule	0
	Yaw Damper...	Maximum Torque	100%
		Servo Gain	0,80
		Servo Direction	Normal
		Clutch Monitor	Disabled
		Ball Centering Gain (Expert)	1,00
		Yaw Rate Filter Constant (Expert)	0,08
		Yaw Acceleration Filter Constant (Expert)	0,16
	Roll Trim...	Trim Control	Disabled

	Pitch Trim...	Trim Control Trim Motor Voltage Trim Direction Low Airspeed Threshold High Airspeed Threshold Fastest Movement Speed Slowest Movement Speed Slowest Auto Trim Movement Speed (expert) Trim Airspeed Source Maximim Run Time	DC Motor 12V Reverse 85km/h 45,9KIAS 52.5mph 160km/h 86,4KIAS 99.2mph 100% 100% 100% Indicated Airspeed no limits
	Yaw Trim...	Trim Motor Control	Disabled
	Flight Director...	Indicator Type Altitude Controls ALT Mode User Select Action ALT Mode User Up/Down Action TO/GA Takeoff Pitch TO/GA Go-Around Pitch Maximum Bank Angle	Single Cue Normal Normal Normal 5,0° 5,0° 30°
	Mode Control Panel...	Audio Volume Attention Tones Altitude Alert Lighting Bus Voltage Flight Control System Monitors	80% Enabled Enabled 14V Disabled
	Electric Stability Protection...	Roll Attitude Protection	Disabled
	Control Wheel Steering Engage AP Via CWS Input Autopilot Engage Limits AFCS Setup Page	Mode Control Panel Pitch/roll Mode Control Panel Yaw Offset	Disabled Enabled Enabled Calibrated +0,0° Disabled

22-08-A3 Configuration Log (for G3X Equipped Aircraft)

Garmin G3X			
Config menu			Value
Main	Level 1	Level 2	
Autopilot	General	Control Wheel Steering	Disabled
		Engage AP Via CWS Input	Disabled
		Autopilot Engage Limits	Enabled
		Flight Control System Monitors	Enabled
		Mode Control Panel Pitch/roll	Calibrated
		Mode Control Panel Yaw Offset	+0,0°
	Roll	Roll Servo Max Torque	100%
		Roll Servo Gain	1,20
		Roll Servo Direction	Normal
		Roll Servo Clutch Monitor	Enabled
		Roll Fine Adjust Amount (Expert)	0,00
	Pitch	Pitch Servo Max Torque	100%
		Pitch Servo Gain	0,80
		Pitch Servo Direction	Reverse
		Pitch Servo Clutch Monitor	Disabled
		Pitch Servo Control Mode (Expert)	Alternate
		Pitch Fine Adjust Amount (Expert)	1,00
		Pitch Fine Adjust Time (Expert)	0,20
			85km/h
		Min Airspeed Limit	45,9KIAS
			52.5mph
			185km/h
		Max Airspeed Limit	99,9KIAS
			114,7mph
		Vertical Speed Gain	2,00
		Vertical Accel Gain	2,80
		Vertical Speed Inertial Gain	0,00
		Airspeed Gain	0,45
		Airspeed Accel Gain (Expert)	0,80
		Airspeed Track Gain (Expert)	0,05
		Airspeed Gain Schedule (Expert)	0,00
		Altitude Gain Schedule (Expert)	0,00
	Yaw Damper	Yaw Damper Max Torque	100%
		Yaw Damper Servo Gain	0,80
		Yaw Damper Servo Direction	Normal
		Yaw Damper Clutch Monitor	Disabled
		Ball Centering Gain	1,00

		Yaw Rate Filter Constant	0,08
		Yaw Accel Filter Constant	0,16
Trim	Roll Trim	Roll Trim Motor Control	Disabled
	Pitch Trim	Pitch Trim Motor Control	Enabled
		Pitch Trim Motor Direction	Reverse
		Pitch Trim Motor Voltage	12V
		Pitch Trim Airspeed Threshold	85km/h
		Fastest Movement	45,9KIAS
			52.5mph
		Pitch Trim Airspeed Threshold	160km/h
		Slowest Movement	86,4KIAS
			99.2mph
		Pitch Trim Speed Fastest Movement	100%
		Pitch Trim Speed Slowest Movement	100%
		Pitch Auto Trim Minimum Speed (Expert)	100%
		Pitch Trim Airspeed Source	Indicated
		Pitch Trim Max Run Time	Airspeed
			1s
	Yaw Trim	Yaw Trim Motor Control	Disabled
Flight Director	Indicator Type		Single Cue
	Altitude Controls		Normal
	ALT Mode User Select Action		Normal
	ALT Mode User Up/Down Action		Normal
	TO/GA Takeoff Pitch		5,0°
	TO/GA Go-Around Pitch		5,0°
	Maximum Bank Angle		30°
Electric Stability Configuration	Roll Attitude Limiting	Disabled	

Notes:

Note (A) through (D) are used for troubleshooting purposes only.

- (A) AP DISC Input and TO/GA Input are to read the state of the switch. With the switches not depressed, this line should read Open or Open/High. With the switch depressed, the respective line should read Low.
- (B) Trim Input is to read the direction that the switch is being pressed. With the trim switch not pressed, this line will show a single dash "-". With the trim switch depressed in the Nose Down position, this line should read "Nose Down" and with the trim switch depressed in the Nose Up position, this line should read "Nose Up".
- (C) Test Trim Movement is used to verify that the trim moves the correct

direction with the appropriate input. Selecting this line and then selecting Nose Up should cause the trim to move in the nose up direction. Selecting this line and then selecting Nose Down should cause the trim to move in the nose down direction.

- (D) Annunciators is used to test the GMC 507 annunciators as well as the sonalert output. Pushing and holding the knob while this row is highlighted will cause all of the mode annunciators (white arrows above each mode button) on the GMC 507 to illuminate and the sonalert output to be driven low (causing a tone in the sonalert, if installed) for approximately one second.
- (E) This row is utilized when installing a new GMC 507, or if the G5 has been recalibrated in Pitch and Roll. Refer to Section 9.1 for further details.
- (F) This row is utilized when installing a new GMC 507 to calibrate the GMC 507 if it is not installed in a panel which is perpendicular to the direction of flight. Refer to Section 9.1 for instructions.
- (G) To determine if Expert configuration is utilized for the specific airframe, refer to the appropriate Install Manual Addendum (AMM_CV_915_EN_2022-05). If Expert Configuration is required, select the Expert Configuration row and then select OK on the following screen. This will then display (in amber) the additional fields shown below the Expert Configuration row in this table. Enter the appropriate values from the Install Manual Addendum.
- (H) Set this field to "Enabled for dual G5 installations.
Set this field to "Disabled" for G5 ADI-only installations that have an external CDI connected to the navigator.

CHAPTER 23 - COMMUNICATIONS

23-10-00 Speech Communication / Radio

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

At the time of writing, the radio approved by AutoGyro is the Funk ATR833 or Garmin alternatives depending on the market.23-40-00 Interphone / Intercom

The standard intercom system features standard headset sockets (TRS / Tip Ring Sleeve) with additional XLR-3 socket for active headset power supply. Sockets are provided at the aft console between the crew seats. The intercom amplifier and VOX control is integrated in the respective radio. See manufacturer's manual for additional information.

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

CHAPTER 24 - ELECTRICAL POWER

The 12V DC electrical system consists of two engine driven electrical generators, a battery, master switch, indicators, switches, electrical consumers, and cabling. With the ROTAX 915 iS engine an electrical power supply is vital for continued engine operation as this engine variant solely relies on electrically driven fuel pumps and engine ECU. GEN1 is used by the engine only, GEN2 is used to supply the aircraft ancillary systems.

An additional, externally mounted 40A generator (Gen3) is optionally fitted equipped for high electrical load operations.

Turning the master switch to the ON position closes the battery contact and energizes the gyroplane's electrical system. The orange LOW VOLT warning light will illuminate briefly as a functional check. A steady indication warns the pilot that the voltage of the system has dropped below a safe value. In this case a safety circuit (load shedding relay) will automatically disable the unnecessary systems (seat heating, 12V power receptacle, heating fan). It is not unusual for this led to be lit when first turning on the keyswitch, which will depend on the level of battery charge.

The Gen3 (where fitted) amber warning light is installed to indicate that the battery is not being charged by that generator.

BRP-Rotax INSTALLATION MANUAL

VALIDATION OF INSTALLATION

External Power Supply

Is an engine installed in a specific aircraft type for the first time, it is required to measure the voltage on three positions:

- Battery Voltage (separate Voltmeter)
- Voltage on Electric Starter (separate Voltmeter)
- ECU Bus Voltage (displayed in BUDS Aircraft diagnostic tool)

Depending on the location where the engine should be used, this measurement must be done at the lowest reachable temperature. In case the measured voltages drop below 9 V the installation is insufficient. In this case specification of the battery and execution of the wiring needs to be checked.

Separation of EMS and Airframe circuit

Proof the continuity between Fusebox Regulator A and Fusebox Regulator B in static condition (Fusebox will not be supplied with power by an external power source).

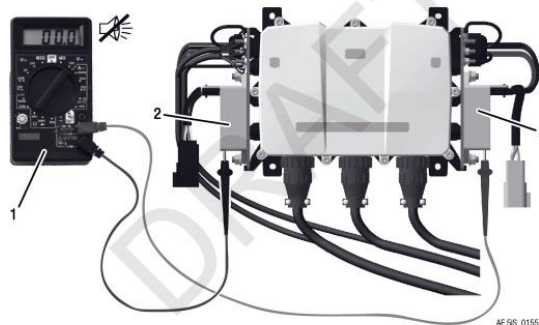


Figure 3.2: Validation of EMS and Airframe Circuit separation

- 1 Multimeter
- 2 Rectifier regulator A (black connector)
- 3 Rectifier regulator B (grey connector)

If continuity of the installation is not sufficient, then the concept of the wiring needs to be revised.

24-30-00 DC Generation and Battery

Direct current is provided by two engine-integrated AC generators with 2 external rectifier-regulators (12V 20 A DC) attached to the engine fuse box. GEN1 is used by the engine only, GEN2 is used to supply the aircraft ancillary systems. The battery is located at the rear wall on the LH side behind the removable fire wall. A dedicated charging receptacle is available at the lower LH side of the fuselage, just before the LH engine cowl.

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 (Gen 2)	(-) 420 W
24-3	External Generator (Gen 3)	(-) 600 W
21-0	Cabin heat blower fan	32 W
23-1	Radio ATR833 (if inst.)	7 W (rcv) / 35 W (xmt)
25-1	Heated seats (if inst.)	100 W
28-2	Electrical fuel pump	41 W
33-4	NAV/Pos Lights (LED)	8 W
33-4	Strobe Lights	46 W
33-4	Landing Light (LED)	36 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-	Pitot heat	19W
85-34	Aspen (if inst.)	70W
85-34	Garmin G3X	?
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

Fuses together with their values and application are listed below:

Fuse / Name	Value	Application
F2 Gen. 3	5 A	Generator 3 (if installed)
F3 Compressor	15 A	Electric Compressor
F5 ECU	2 A	Engine Turbo Control Unit (if inst.)
F6 Cockpit	5 A	
F7 Avionic	10 A	
F8 ACL	10 A	Strobes

F9 Start	5 A	Engine Starter Relay
Line fuse/Taxi light	10 A	
Line fuse/Landing light	10 A	
F12 Prop.	15 A	Propeller Adjustment (if inst.)
F13 Trim.	3 A	Trim and Rotor Brake Control
F14 Sensor	3 A	
F15 Heater pilot	15 A	Seat Heating Front Seat (if inst.)
F16 Heater copilot	15 A	Seat Heating Rear Seat (if inst.)
F17 12 V plug	5 A	12 V Power Outlet
F18 Rear cockpit	10 A	
At the battery		
Regulator	30 A	
Cockpit	50 A	
Aux. generator	50 A	
Starter	125 A	

Note that the electric fuel pumps are supplied and fused via the engine management system. The engine fusebox is located to the rear of the mast, in the engine area. See the Rotax manual for the fuse types and values.

CHAPTER 25 - EQUIPMENT / FURNISHINGS

25-10-00 Flight Compartment

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

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

For each seat an adjustable four point harness is available.

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

25-60-00 Emergency

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

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

CHAPTER 26 - FIRE PROTECTION / FIRE WARNING

Depending on customer's or market configuration the gyroplane may be equipped with a Fire indicator light to alert the pilot that a certain temperature in the engine compartment has been exceeded (the

engine is on fire). The fire indication circuit consists of a cable routed inside the engine compartment. The cable has two integrated wires separated by an insulation layer. At a defined temperature the insulation layer will melt and the embedded wires close contact.

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

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

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

CHAPTER 27 - FLIGHT CONTROLS

27-00-00 Flight Controls

See [CHAPTER 67 – Rotors Flight Control](#).

Note: Stabilizers are described in [CHAPTER 55](#).

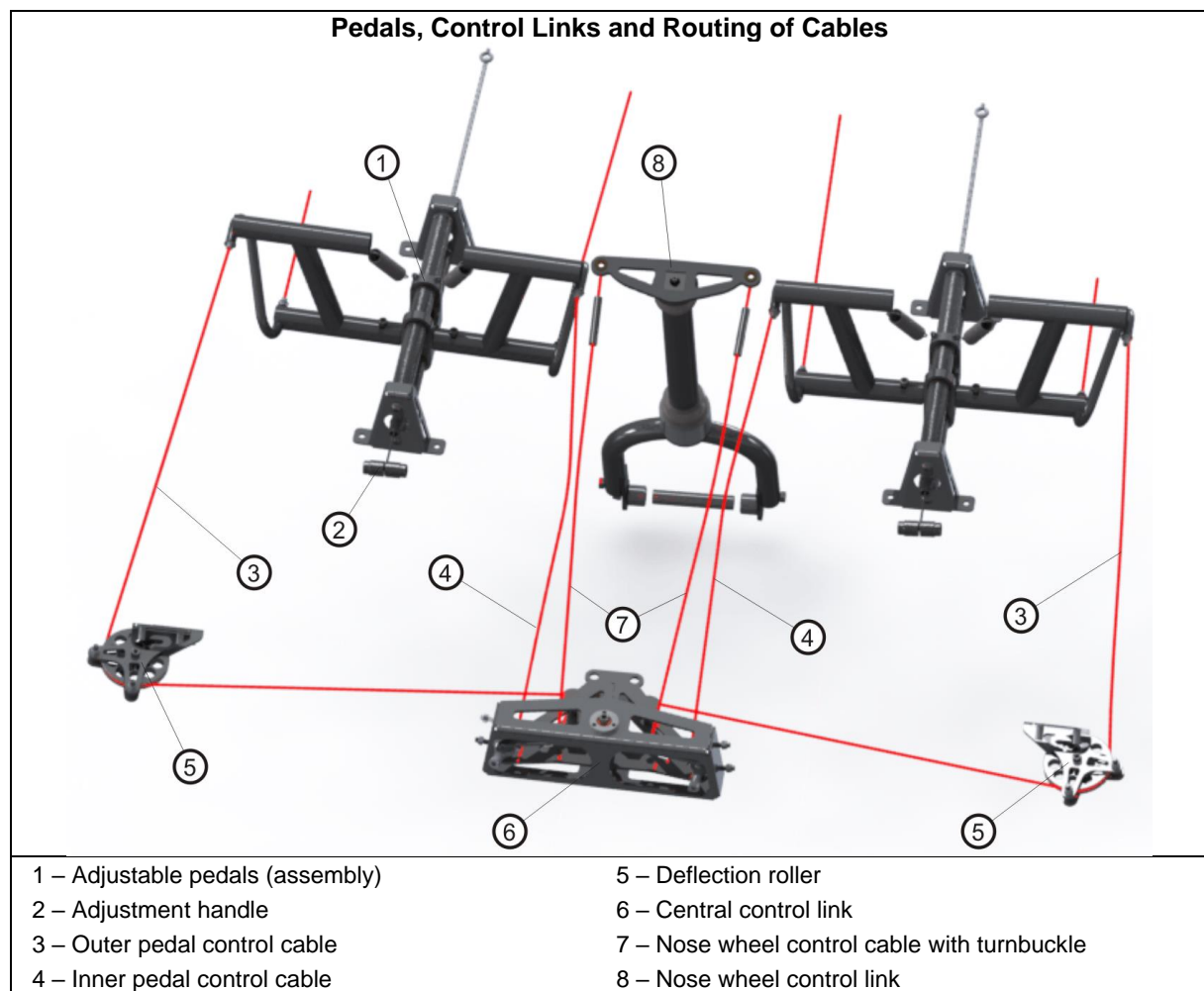
27-20-00 Flight Controls - Rudder

Rudder (Fin) and nose wheel are controlled simultaneously by adjustable foot pedals, control cables, central control link and nose wheel control link. Both pairs of pedals are interconnected and can be adjusted individually to suit different leg lengths. A shorter adjustment is achieved by pulling the handle which moves the pedals closer. Pulling the handle while pushing with both feet gently against the pedals allows longer adjustment.

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

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

The rudder fin is described in [55-40-00 Rudder](#).



CHAPTER 28 - FUEL

28-10-00 Storage

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

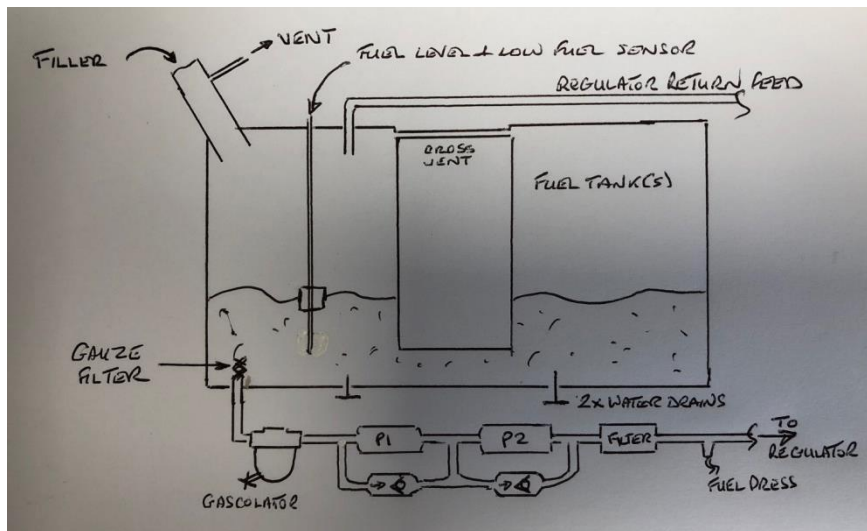
The tanks are installed behind the seats and have a capacity of 100 litres. Fuel level can be checked visually using a dip stick which has to be inserted diagonally from the fuel filler port.

Ventilation is provided by a vent line between the tanks and from the tank filler neck via a hose to the underside of the fuselage, exiting via a port to left of the tank drain access cover.

28-20-00 Distribution

The fuel distribution system comprises fuel hoses, made of fabric-reinforced rubber, PTFE hose with stainless steel braid, a shut-off valve, a filter and two pumps.

Fuel system ROTAX 915 iS:



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



Location of gascolator drain point

28-40-00 Indicating

An electronic fuel level gauge is provided in the cockpit. An independent low fuel sensor can be installed as an option in the right tank. The LOW FUEL warning light is triggered as soon as 7.5 litres or less of usable fuel remain in the tanks. On the ground, fuel level can be checked visually using a dip stick which has to be inserted diagonally from the fuel filler port. Note that in both cases, fuel level is measured from the left hand tank only. Due to the large crossport the filling level of the second tank will be identical.

Additionally, and optionally, a low/high fuel pressure warning LED (FUEL P.) may be fitted to the panel. This lamp indicates solid when the fuel pressure downstream of the fuel pumps is less than 0.15bar. The pressure sensor is located in the fuel supply hose between the fuel filter and the fuel pressure regulators on 915 iS engines.

CHAPTER 29-30 - N/A

CHAPTER 31 – INDICATING SYSTEM

Note: The hour meter / HOBBS meter is described in [CHAPTER 77 - ENGINE INDICATING](#).

31-10-00 Instruments & Control Panels

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

- GPS Layout
- EFIS Layout
- Night VFR

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

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

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

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

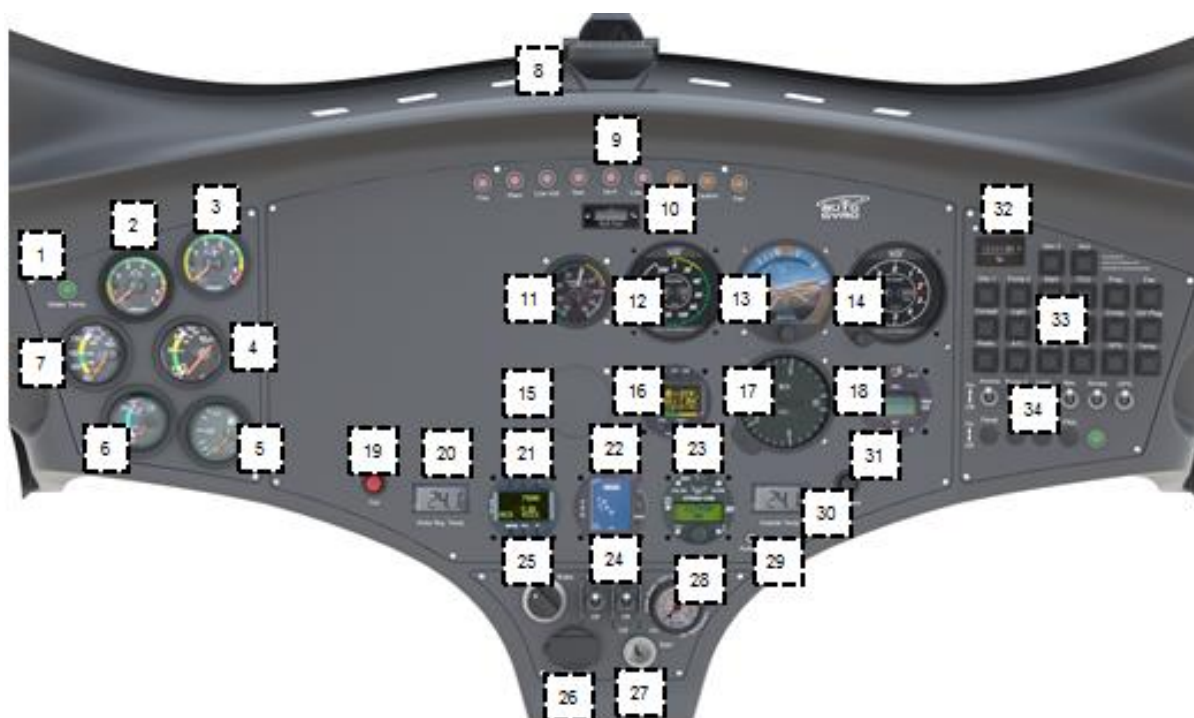
NOTE

The cockpit panel detail layouts may vary from those shown.

Each panel has an additional 'Battery Backup' switch, covered by a red flip-up cover. This is mounted adjacent to the lower switches of the circuit breaker panel on the right side, for emergency use in the event of a full alternator failure.

Where fitted, a blue push-pull knob is provided for the propeller control.

Panel Layout – Standard / Moving Map Portrait



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

31-11-00 Right Panel II

The new right panel II for Cavalon integrates the heater/ventilation controls from the new developed Heater system II (3) and the switchable circuit breaker for the lights (2) into the cockpit.



- 1 – Circuit Breaker Panel
- 2 – Lights switchable circuit breaker
- 3 – Cabin Heater

31-60-00 Integrated Display Systems

The Glass Cockpit layout is tailored to the integrated flight and navigation suite DYNON AVIONICS SkyView. In addition to navigational and moving map functions, the system provides primary flight data and engine/vehicle monitoring. It is of utmost importance to read and understand the operators manual and to become familiar with the system before operation. In case of a system failure, a 2 1/4" (47mm) altimeter, air speed indicator and rotor speed indicator are provided as backup instrumentation.

Panel Layout – Glass Cockpit - Single Display



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

Panel Layout – Glass Cockpit - Dual Display



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

CHAPTER 32 - LANDING GEAR

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

32-10-00 Main Gear

The main gear consists of a GRP suspension bow which is bolted to the underside of the fuselage. The spar is designed to absorb even higher than normal landing loads in case of a hard landing or crash.

32-10-00 Nose Gear

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

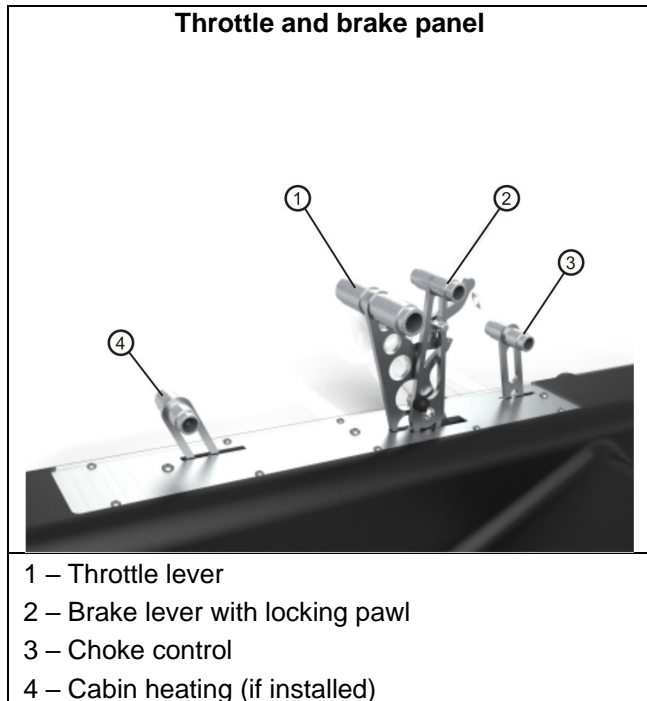
32-40-00 Wheels and Brakes

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

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

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

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



CHAPTER 33 - LIGHTS

33-40-00 Exterior

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

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

Electrical schematics / wiring diagrams are provided in [Part D - Diagrams and Charts](#) of this manual.

Power consumption figures are listed in [24-60-00 DC Electrical Load Distribution](#).

CHAPTER 34 - NAVIGATION

34-10-00 Flight Environment Data

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

34-20-00 Attitude and Direction

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

34-70-00 ATC Transponder

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

CHAPTER 35 - N/A

CHAPTER 36 - PNEUMATIC

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

The pneumatic system controls the following function:

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

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

A schematic drawing of the pneumatic system is provided in [Part D - Diagrams and Charts](#) of this manual.

36-11-00 Generation / Compressor

The electrically driven compressor and filter/dryer is located at the rear wall on the lower RH side behind the removable fire wall. The wiring diagram is provided in [Part D - Diagrams and Charts](#) of this manual.

36-21-00 Distribution

Air distribution comprises of hoses, valves (solenoids), (cockpit) controls and switches, (pressure) sensors, filter/dryer and a pressure compensation vessel. The main pneumatic switching logic is combined in the pneumatic master box (or manifold on later models) which is installed behind the instrument panel in the nose compartment area. See [Part D - Diagrams and Charts](#) for schematics.

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

Example: the brake/trim cylinder is described in [67-05-00 Pitch Trim System / Rotor Brake](#).

CHAPTER 37-50 - UNASSIGNED / N/A

CHAPTER 51 - STANDARD PRACTICES - STRUCTURES

51-00-00 Standard Practices - Structures

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

CHAPTER 52 - DOORS, COVERS AND COWLINGS**52-10-00 Passenger / Crew**

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

In order to close the door, pull the door closed using the provided grip from inside. The lever should snap sideways into its locking detent. Do not pull by reaching through the open sliding window as this will cause the plexiglass to crack. Only use the dedicated grip to close the door.

Note that canopy windows are described in [56-15-00 Windows](#).

52-20-00 Emergency Exit

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

52-40-00 Service Covers and Cowlings

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

CHAPTER 53 - FUSELAGE

The load carrying structure of the gyroplane consists of a composite monocoque occupant enclosure which is connected to the rotor tower and keel tube. The composite structure, composite tower and aft extension (keel tube) carries all loads induced by the crew stations, engine, rotor, undercarriage, stabilizer, and serves as installation platform for additional equipment. Attachment points for the engine installation are provided by a steel tube ring mount bolted to the rear of the monocoque enclosure.

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

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

CHAPTER 54 - N/A**CHAPTER 55 - STABILIZERS**

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

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

55-40-00 Rudder

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

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

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

CHAPTER 56 - WINDOWS

56-10-00 Flight Compartment / Canopy

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

56-15-00 Canopy Windows

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

CHAPTER 57-60 - UNASSIGNED / N/A

CHAPTER 61 - PROPELLER

In standard configuration a 4-bladed, fixed pitch 'HTC' propeller with GRP propeller blades is installed. Depending on customer configuration a spinner may be installed. As an option, the Woodcomp KW30 hydraulic constant speed variable pitch propeller may be fitted. The Woodcomp KW 30 is an EASA certified propeller and should ('MUST' in the case of a certified version of the aircraft) be maintained in accordance with the Woodcomp issued MM.

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. In case, re-adjustment should be necessary on the variable pitch propeller, please refer to the manufacturer's documentation or contact AutoGyro. It is essential that the propeller pitch adjustment does not prevent the aircraft from achieving a minimum climb rate in full coarse of 250fpm at MaxTOW, or allow over-revving in the climb at full fine. Nominal engine rpm at full fine in the climb is 5500, max 5800.

There are 6 (Rotax manufactured) flanged nuts fitted to the gearbox flange, into which the propeller bolts are tightened. These carry the gearbox torque to the propeller hub.

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

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 (Woodcomp KW30) documentation.

For setting the propeller;

The basic propeller is set to achieve a nominal 5950rpm in full fine pitch.

The governor is then set to give a max engine rpm of 5800 in full fine pitch by way of the limit stop.

The governor is also set to give a minimum engine rpm in full coarse of 4600 by way of the coarse limit stop.

CHAPTER 62 - ROTOR

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

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

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

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

62-11-00 Rotor – Teetering Parts

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

IMPORTANT NOTE: Only rotor system 8.4m TOPP, or 8.6m TOPP is released for use with the Cavalon 915iS.

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

The aluminium rotor hub bar is pre-coned to the natural coning angle of the blades and connects the blades firmly to each side using 6 fitting bolts and a clamping profile. In order to compensate for asymmetric air flow in forward flight the blades are free to teeter. The hinge assembly consists of teeter tower, teeter bolt and teeter block.

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

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

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

62-32-00 Rotor Gimbal Head

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

62-41-00 Rotor RPM Monitoring

Rotor RPM monitoring is realized by an inductive pick-up which is installed with a gap of 3-4 mm at the sprocket wheel. The sensor counts the (10) holes in the sprocket disc. Rotor RPM is indicated in the cockpit in an analogue -type instrument which also houses the control electronic. The system requires power supply.

62-51-00 Rotor Vibration Isolation

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

CHAPTER 63 - ROTOR DRIVE**63-11-00 Pre-rotator**

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

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

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

In this case, the pneumatic clutch is activated and engine torque is transmitted through the pre-rotator drive, a 90° gearbox and upper drive to the pinion which is engaged by another small pneumatic actuator into the geared ring / sprocket wheel of the rotor head. The drive pinion is sliding on a helical gear to provide automatic lock-out in case of rotor RPM overrun. In order to allow necessary changes in length the vertical pre-rotator drive shaft features a sliding sleeve coupling.

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

63-11-10 Pre-rotator Lower Engagement

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

For pneumatic control of the clutch refer to [CHAPTER 36 - PNEUMATIC](#).

63-11-20 Pre-rotator Drive

Power flow is realized through a 90-degree gearbox and drive shafts. The 90-degree gearbox is mounted directly to the disc clutch. The pre-rotator drive shaft features a cardan joint right after the 90-

degree gearbox and a sliding shaft coupling in the upper area to allow changes in length due to the tilt of the rotor head.

The cardan joints must be set at the correct relative angles in order to prevent over-stressing and failure

63-11-30 Pre-rotator Upper Engagement

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

63-51-00 Rotor Brake System

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

Due to its main function the pneumatic brake/trim actuator/cylinder itself is allocated to [67-05-00 Pitch Trim](#).

CHAPTER 64-66 - N/A

CHAPTER 67 - ROTOR FLIGHT CONTROL

Rotor flight control comprises of control stick, a control tube running horizontally along the bottom of the fuselage, and push-pull control cables which are routed horizontally along the centre channel, then run vertically up the cabin side of the rear bulkhead to the mast and connected to the rotor head bridge.

Pitch and roll of the gyroplane is controlled by tilting the complete rotor head by means of the control stick. Control input is transferred via torsion tube and linkage running below the seats to the base link and from there to the rotor head via push-pull control cables.

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

67-05-00 Pitch Trim System / Rotor Brake

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

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



67-06-00 Roll Trim System

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

CHAPTER 68-70 - UNASSIGNED / N/A**CHAPTER 71 - POWER PLANT**

Power plant comprises aircraft provisions, installations and systems related to the core engine. The engine itself is allocated to [CHAPTER 72 – 74](#).

71-10-00 Engine Cowling

Concerning engine cowlings see [CHAPTER 52 - DOORS, COVERS AND COWLINGS](#).

71-20-00 Engine Mounts

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

IMPORTANT NOTE: Engine mounting bushings are recommended to be changed at a minimum of every 5 years, or when there is notable sag.

71-30-00 Engine Firewalls

The engine fire wall consists of a fireproof layering adhered to the engine side of the cabin rear bulkhead, and isolates the engine compartment from the passenger cabin.

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 lane switches, if installed), and engine indication. A wiring diagram is provided in Part D of this manual. Also refer to the engine manufacturer's documentation.

71-60-00 Engine Air Intakes

A central engine air intake for cooling and aspiration is provided as ram air inlet in the lower area forward mast cover, just above the cabin. The engine aspirates through a single air filter mounted on the left side of the engine.

71-70-00 Engine Drains

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

CHAPTER 72 TO 74 - ENGINE RELATED

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

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

Engine cowlings are described in [CHAPTER 52](#). For removal and installation see the dedicated Job Card in Part E of this manual.

CHAPTER 75 - AIR / ENGINE COOLING

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

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

A single, large area radiator is mounted below the fuselage in the centre of the rear undercarriage boom. Force cooling is ensured by an electrically driven ducted fan controlled by a thermostatic switch.

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 and related cockpit switches for engine shut-down and test.

76-10-00 Power Control

Engine power / throttle is controlled by a control column installed in the centre console between the crew seats. The unit combines 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. The throttle lever is linked with cable controls to the intake butterfly valve. A mechanical spring applies tension to the control cable and brings the engine 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.

Throttle and brake panel
1 – Throttle lever
2 – Brake lever with locking pawl
4 – Cabin heating (if installed)

76-20-00 Engine Shutdown / Emergency

For normal and emergency shutdown, a pair of LANE switches (LANE 1 + LANE 2) is installed in the cockpit centre panel. These switches are also used for testing the individual ignition circuits. The switches are protected against inadvertent operation by sheet metal safety plates.

CHAPTER 77 - ENGINE INDICATING

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

Canbus note

The engine parameters (Coolant temp, coolant led, oil temp, oil pressure and engine rpm) are provided via the Rotax Canbus system to the gauges, via a digital to analogue Convertor. On start up the gauges initially go to full scale deflection, the normal Road gauge manufacturer's process.

The AutoGyro Convertor then self-checks by displaying the red line indication, dropping to the green line indication.

The Convertor compares the information provided by the two Canbus inputs.

If one input fails the unit will display the information from the other Canbus.

If both fail the indication is zero, but the gauge internal warning light illuminates.

If the information provided shows a significant discrepancy the gauge will go to FSD and the internal warning lamp will illuminate.

In the event of both Canbus input failure, or Convertor failure, no information will be displayed on the gauges.

In this situation provided the Lane A or B lamps are unlit, the engine will run normally.

77-10-00 Power

With a piston engine with fixed pitch propeller, engine power indication normally solely consists of an engine RPM indicator. In this case, regardless of whether a fixed pitch or a variable pitch propeller is installed, a fuel flow rate indicator is provided. This provides the pilot with clear information regarding fuel burn versus engine rpm.

See [CHAPTER 31](#) for different cockpit layouts.

77-20-00 Temperature

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

Oil temperature indication is described in [CHAPTER 79 – OIL SYSTEM](#).

77-40-00 Integrated Engine Instrument Systems

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

CHAPTER 78 - EXHAUST**78-00-00 Exhaust**

The basic exhaust system including manifold and turbo charger with waste gate is part of the core engine. Refer to the engine manufacturer's documentation. The exhaust system vents to the right side of the aircraft and pointing at 45° backwards and up towards the propeller for noise reduction. This configuration meets the noise test requirements of Germany. No aftermuffler is fitted.

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 mounted at the lower right side of the engine compartment and can be accessed by removing the upper engine cowling.. The oil tank is made of stainless steel with oil filler cap. The cap can be unscrewed / tightened by a quarter rotation in order to check the oil level using a dip stick or for replenishing of engine oil.

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

79-20-00 Distribution and Cooling

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

79-21-00 Oil Hoses and Lines

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

79-22-00 Oil Cooler

Two oil coolers are fitted left and right above the engine. Oil flow through the coolers is regulated by a thermostat assembly which opens the cooler circuit at approximately 90 °C.

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

79-30-00 Indicating

Oil temperature is measured direct from the engine sensor via the Canbus.

When the oil temperature reaches 90 °C the thermostat will open, allowing the oil to pass through the oil cooler matrix.

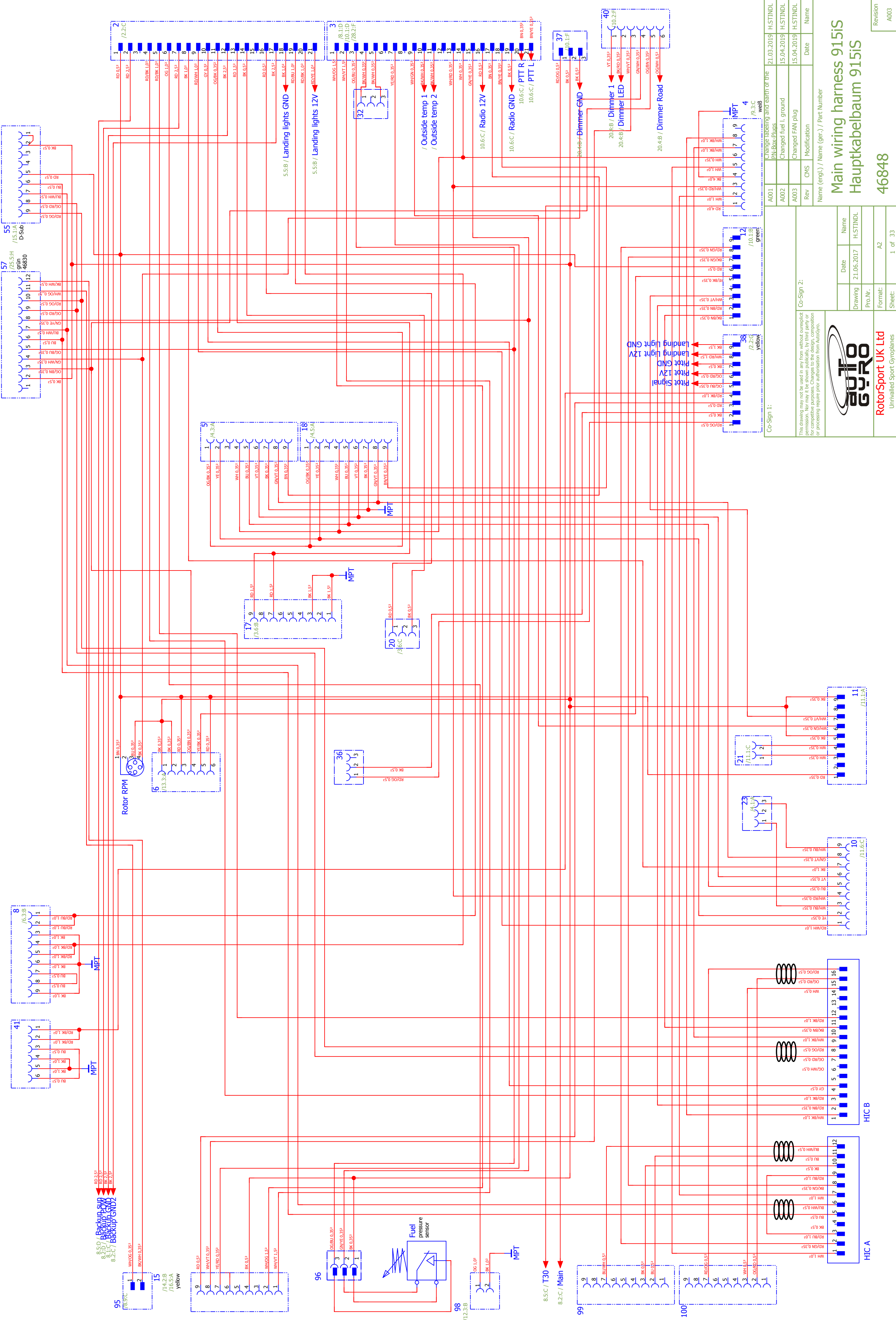
Indicators of Oil Pressure (Oil-P) and Oil Temperature (Oil-T) are provided in the cockpit as analogue-type instruments in standard version. See [CHAPTER 31](#) for different cockpit layouts.

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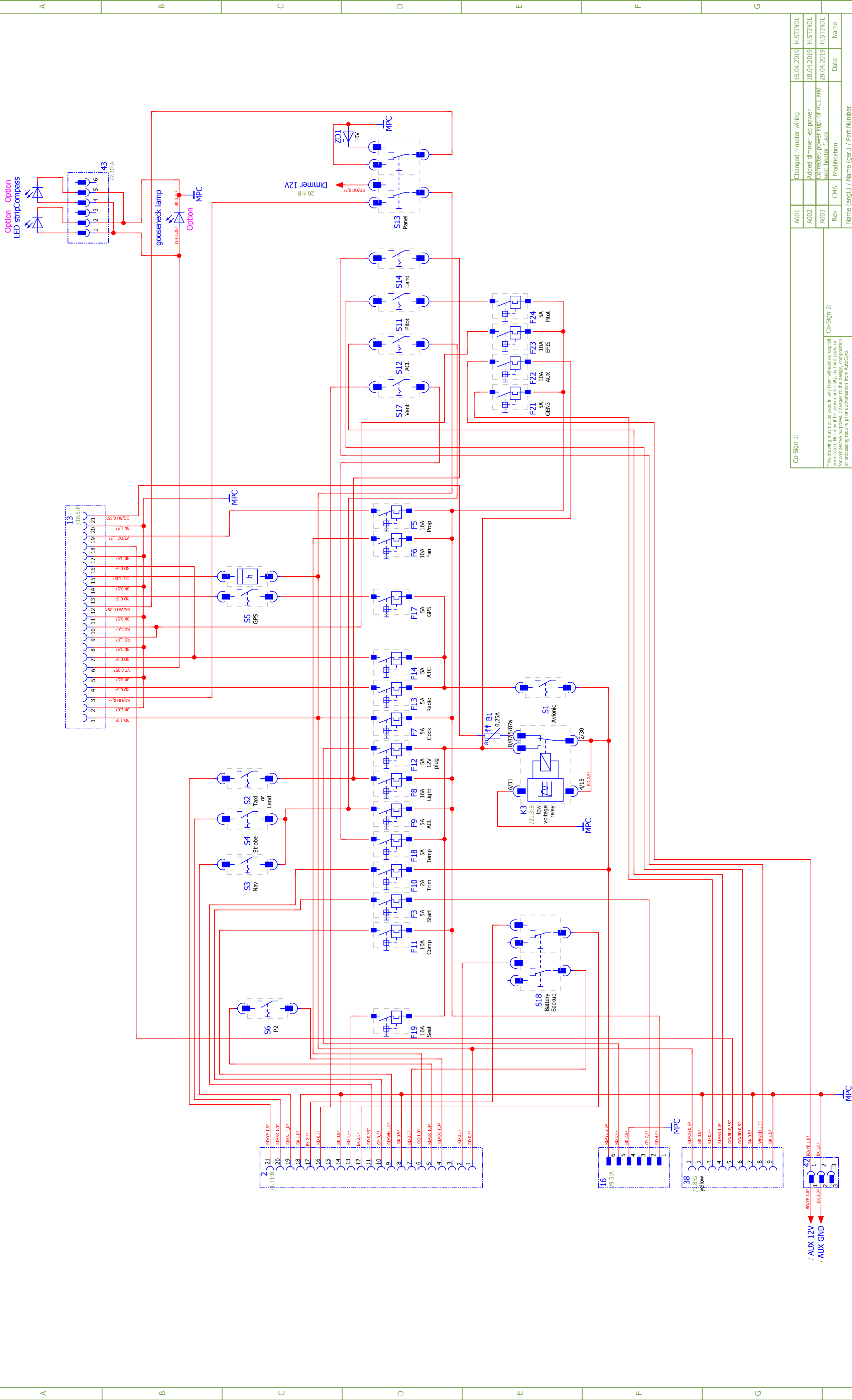
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Wiring Diagram – Aircraft Main Wiring Harness



Wiring Diagram – Cockpit RH (Standard)



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Wiring Diagram – Cockpit RH (EFIS)

X2 - right panel to main wiring harness			
PIN	AWG	Color/Lbl	Function
1	20	RD	Sensor Power
2	12	RD	Battery Backup Power 1
3			
4	18	RD/BK	Pump 2
5	18	RD/BK	Pump 2
6	18	OG	Fan Power
7	12	BK	Battery Backup Power 2
8	20	BK	Ground
9	18	RD/WH	Compressor Power
10	20	GY	Start Relay Power
11	22	OG/BK	Trim Power
12	12	BK	Battery Backup GND 2
13	16	RD	Seat Heater Power
14	20	BK	Ground
15			
16	20	RD	Heating System Power
17	12	BK	Battery Backup GND 1
18	18	BK	Ground
19	18	RD/BU	Nav Light Power
20	18	RD/BK	Strobe Light Power
21	16	RD/YE	Taxi or Land Light Power

X13 - right panel to main panel			
PIN	AWG	Color/Lbl	Function
1	18	RD	Cockpit Power
2	18	BK	Cockpit Ground
3	20	RD/OG	Dimmer LED Power
4	18	RD	COM Power
5	20	BK	COM Ground
6	22	VT	Dimmer lamps
7	20	RD	XPDR Power
8	20	BK	XPDR Ground
9	18	RD	
10	18	RD	G5 Power
11	18	BK	G5 Ground
12	22	BK/WH	Dimmer LED Ground
13	20	RD	GPS Power
14	20	BK	GPS Ground
15	22	OG	Operating hours counter
16	20	RD	ATC Power
17	20	BK	ATC Ground
18	22	OG/NT	Pitot LED Power
19	16	WH/OG	Prop Power
20	20	RD	USB 5V Power
21	22	OG/BU	Low Volt LED Power

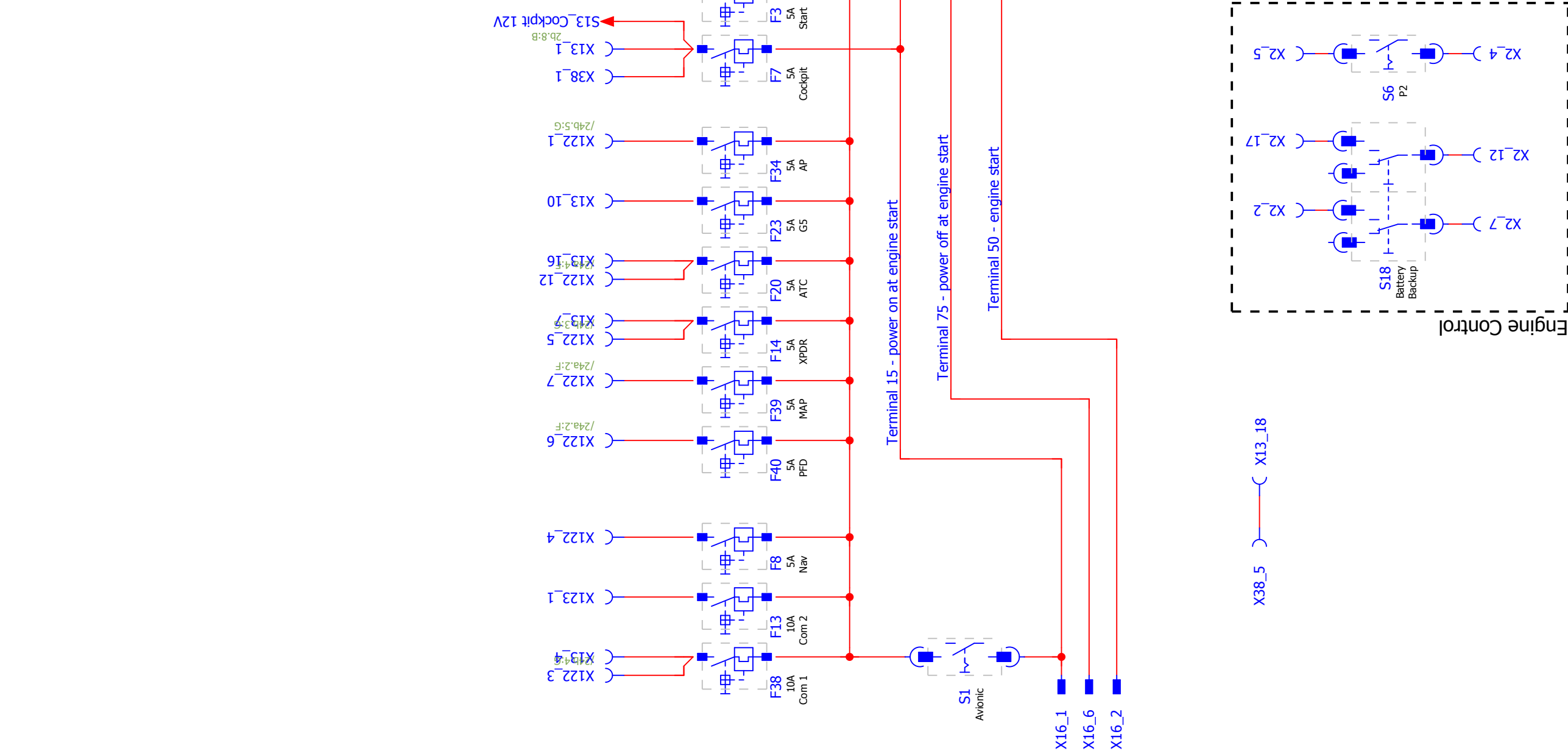
X16 - right panel to center panel (blue)			
PIN	AWG	Color/Lbl	Function
1	10	RD	T15 (on at engine start)
2	12	GY	T50 (engine start)
3	22	OG/BK	Trim Power
4	12	BK	Ground
5	18	RD	12V Plug Power
6	12	RD/YE	T75 (off at engine start)

X38 - right panel to main wiring harness (yellow)			
PIN	AWG	Color/Lbl	Function
1	20	RD/OG	Cockpit Power
2	20	BK	Cockpit Ground
3	20	RD	Generator 3 Power
4	18	RD/BK	ACL Power
5	22	OG/NT	Pitot LED Power
6	12	OG/RD	Pitot Power
7	12	BK	Pitot Ground
8	16	WH/RD	Landing Light Power
9	16	BK	Landing Light Ground

X42 - right panel to AUX Plug (black)			
PIN	AWG	Color/Lbl	Function
1	18	RD/YE	AUX Power
2	18	BK	AUX Ground
3			

X122 - right panel to Garmin Parts (white)			
PIN	AWG	Color/Lbl	Function
1	12	BK	Garmin Ground
2	20	AP_POW	Autopilot Power
3	18	COM_POW	COM Power
4	20	NAV_POW	NAV Power
5	20	XPDR_POW	XPDR Power
6	20	PFD_POW	PFD Power
7	20	MAP_POW	MAP Power
8	20	AUDIO_POW	Audio Power
9	20	MAG_POW	Magnetometer Power
10	20	AHRS_POW	AHRS Power
11	20	GEA_POW	EIS Power (Sensor)
12	20	ATC_POW	ATC Power

X123 - right panel to second COM (black)			
PIN	AWG	Color/Lbl	Function
1	18	RD	COM2 Power
2	18	BK	COM2 Ground



Wiring Diagram – Cockpit RH (Upgrade Interior Heater II)

X2 - right panel to main wiring harness			
PIN	AWG	Color/Lbl	Function
1	20	RD	Sensor Power
2	12	RD	Battery Backup Power 1
3			
4	18	RD/BK	Pump 2
5	18	RD/BK	Pump 2
6	18	OG	Fan Power
7	12	BK	Battery Backup Power 2
8	20	BK	Ground
9	18	RD/WH	Compressor Power
10	20	GY	Start Relay Power
11	22	OG/BK	Trim Power
12	12	BK	Battery Backup GND 2
13	16	RD	Seat Heater Power
14	20	BK	Ground
15			
16	20	RD	Heating System Power
17	12	BK	Battery Backup GND 1
18	18	BK	Ground
19	18	RD/BU	Nav Light Power
20	18	RD/BK	Strobe Light Power
21	16	RD/YE	Taxi or Land Light Power

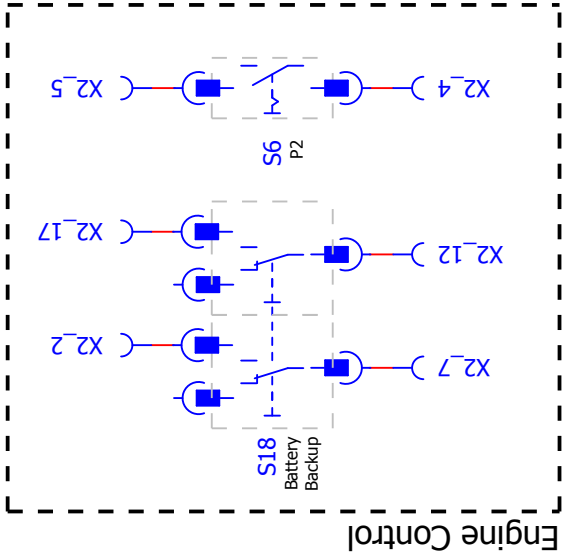
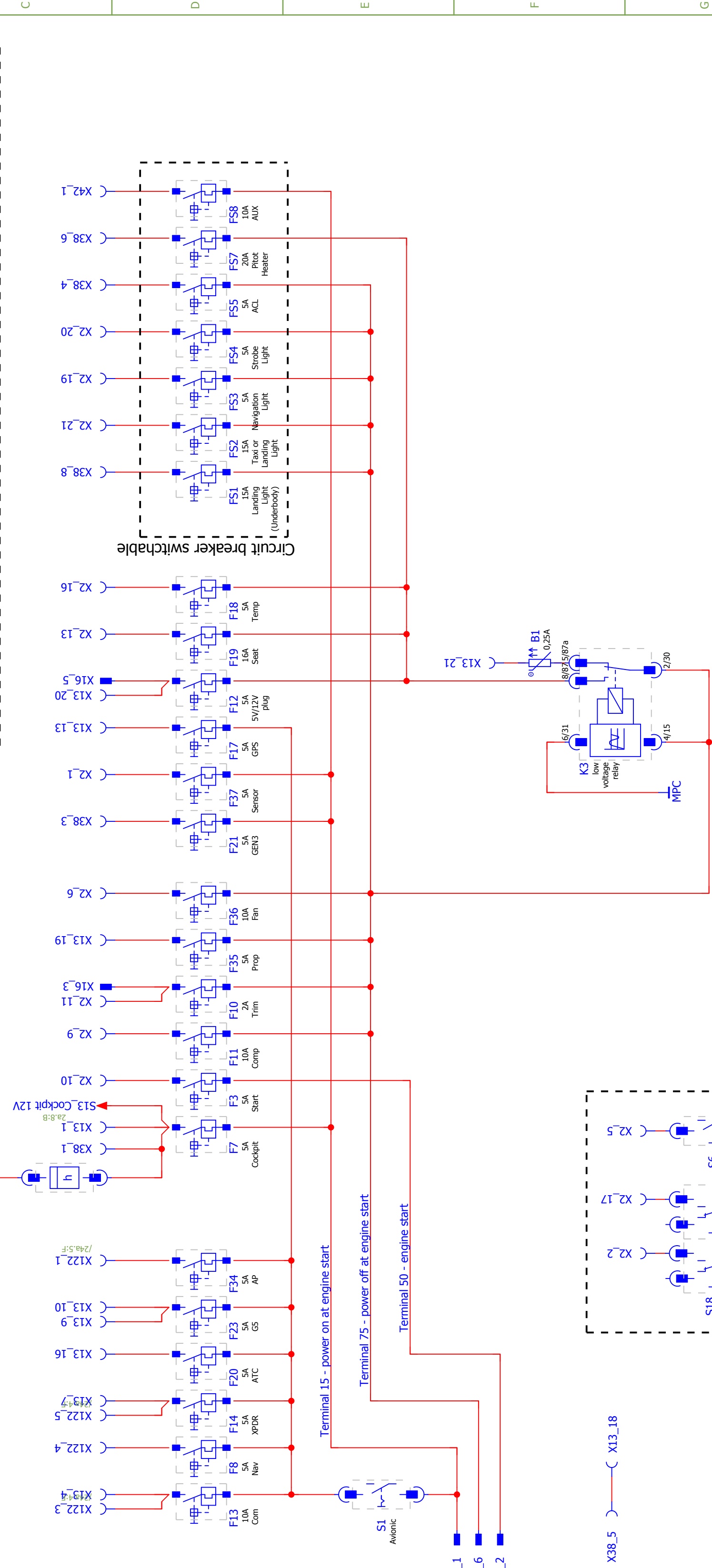
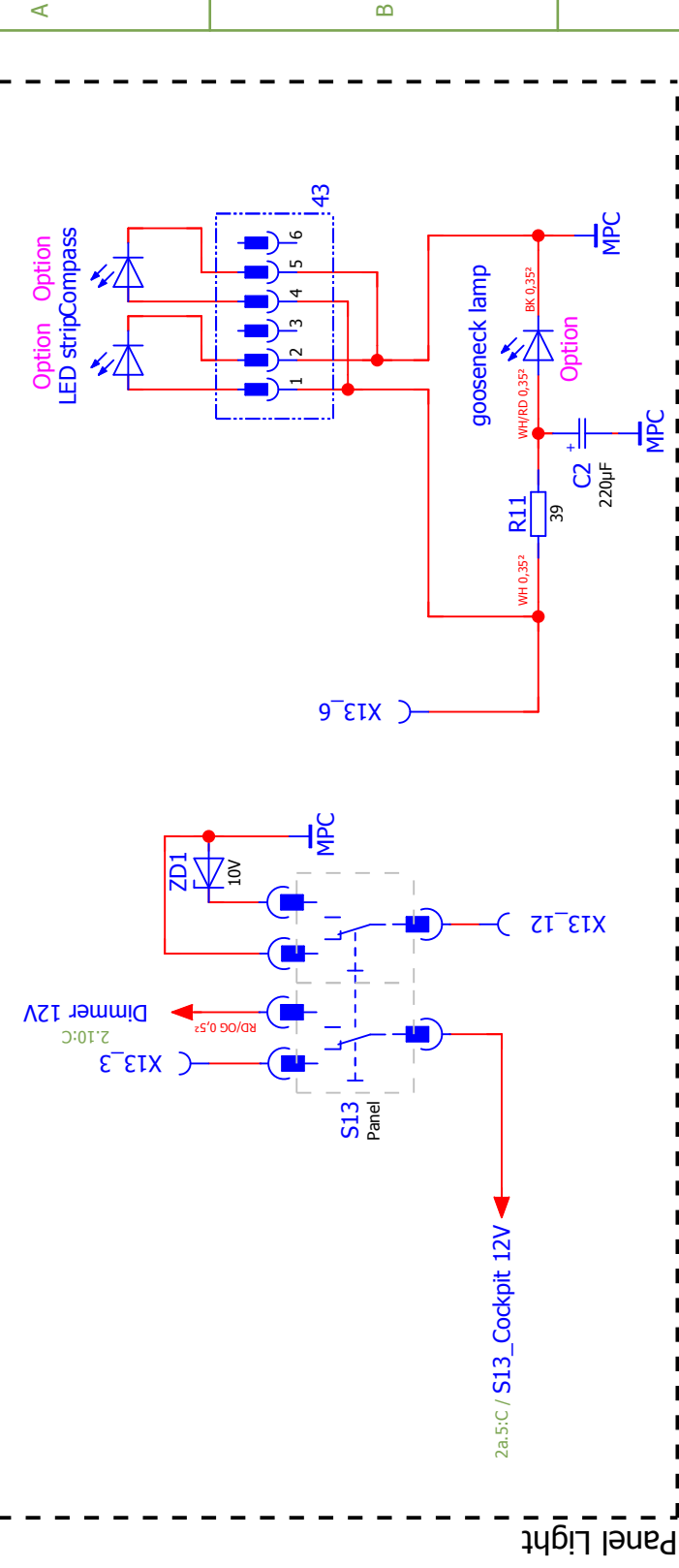
X13 - right panel to main panel			
PIN	AWG	Color/Lbl	Function
1	18	RD	Cockpit Power
2	18	BK	Cockpit Ground
3	20	RD/OG	Dimmer LED Power
4	18	RD	COM Power
5	18	BK	COM Ground
6	22	VT	Dimmer lamps
7	20	RD	XPDR Power
8	20	BK	XPDR Ground
9	18	RD	
10	18	RD	G5 Power
11	20	BK	EFIS Ground
12	22	BK/WH	Dimmer LED Ground
13	20	RD	GPS Power
14	20	BK	GPS Ground
15	22	OG	Operating hours counter
16	20	RD	ATC Power
17	20	BK	ATC Ground
18	22	OG/VT	Pitot LED Power
19	16	WH/OG	Prop Power
20	20	RD	USB 5V Power
21	22	OG/BU	Low Volt LED Power

X16 - right panel to center panel (blue)			
PIN	AWG	Color/Lbl	Function
1	10	RD	T15 (on at engine start)
2	12	GY	T50 (engine start)
3	22	OG/BK	Trim Power
4	12	BK	Ground
5	18	RD	12V Plug Power
6	12	RD/YE	T75 (off at engine start)

X38 - right panel to main wiring harness (yellow)			
PIN	AWG	Color/Lbl	Function
1	20	RD/OG	Cockpit Power
2	20	BK	Cockpit Ground
3	20	RD	Generator 3 Power
4	18	RD/BK	ACL Power
5	22	OG/VT	Pitot LED Power
6	12	OG/RD	Pitot Power
7	12	BK	Pitot Ground
8	16	WH/RD	Landing Light Power
9	16	BK	Landing Light Ground

X42 - right panel to AUX Plug (black)			
PIN	AWG	Color/Lbl	Function
1	18	RD/YE	AUX Power
2	18	BK	AUX Ground
3			

X122 - right panel to Garmin Parts (white)			
PIN	AWG	Color/Lbl	Function
1	12	BK	Garmin Ground
2	20	AP_POW	Autopilot Power
3	18	COM_POW	COM Power
4	20	NAV_POW	NAV Power
5	20	XPDR_POW	XPDR Power
6			
7			
8			
9			
10			
11			
12			



Engine Control

Co-Sign 1:

Co-Sign 2:

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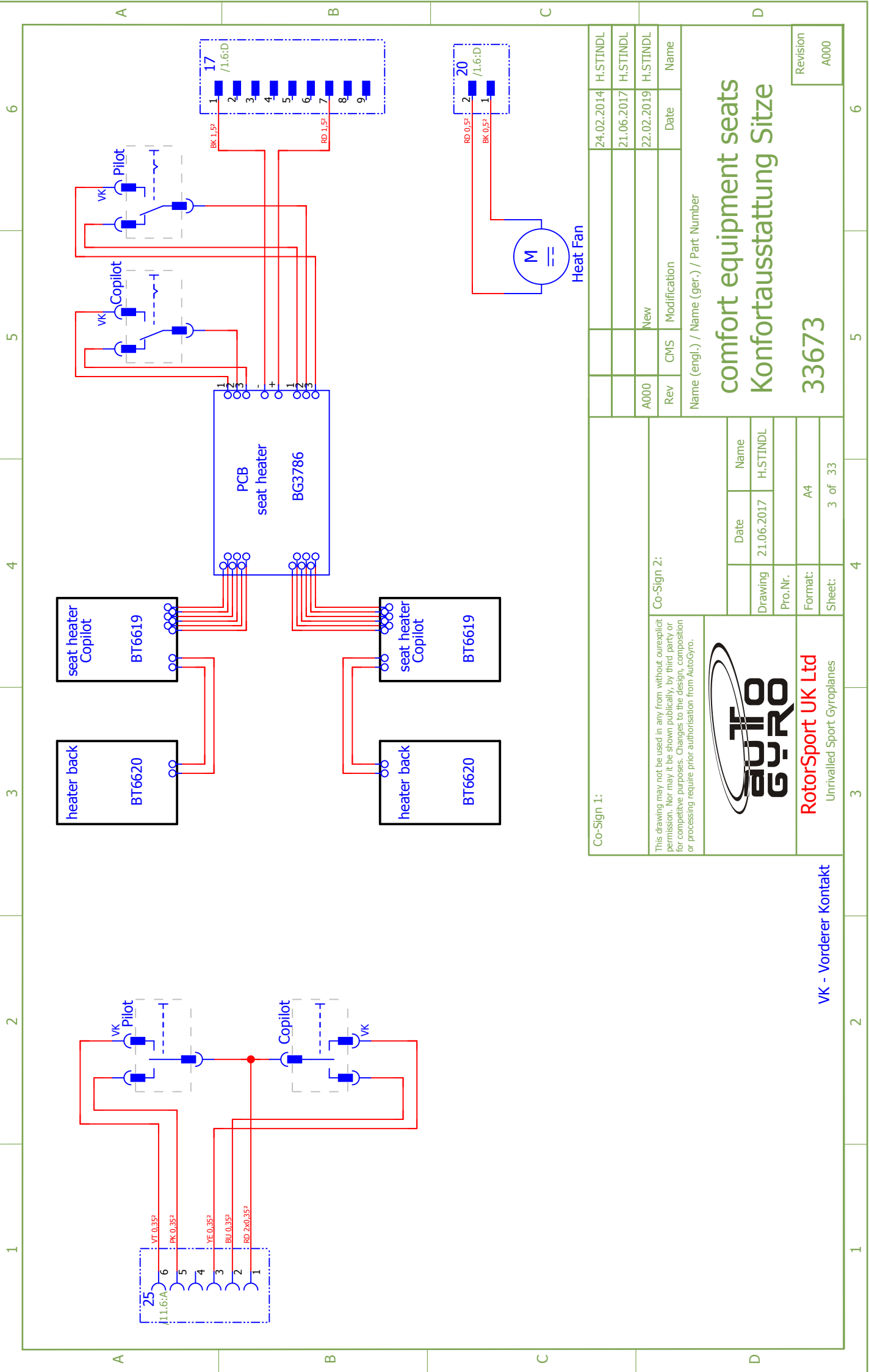
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A000	00760	New	29.03.2022	H.STINDL
A001	00760	Change the value of FAN CB from 5A to 10A	25.05.2022	HARRY
Rev	CMS	Modification	Date	Name

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Drawing	23.03.2022
Pro.Nr.	A2
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Revision	A001
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Wiring Diagram – Optional Comfort Features Seats



Co-Sign 1:

Heat Fan

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Format:	A4
Sheet:	3 of 33

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	21.06.2017	H.STINDL
A000	New	H.STINDL
Rev	CMS	Modification
Name	Date	Name

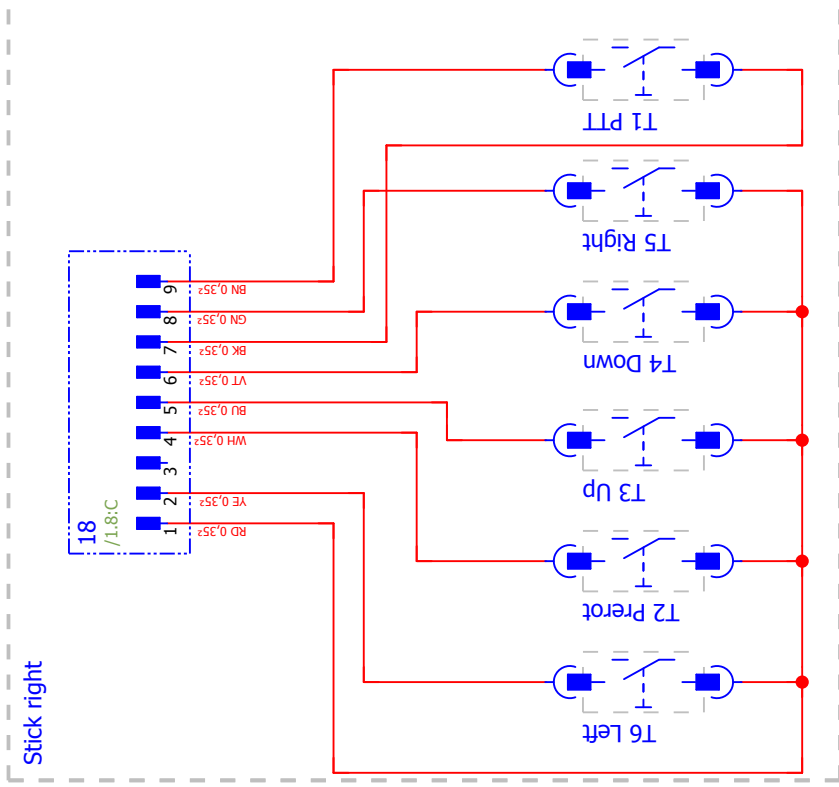
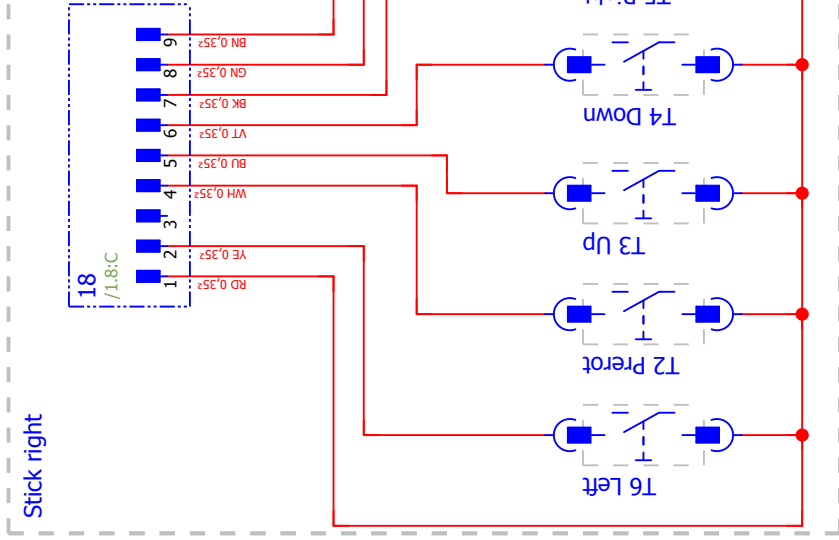
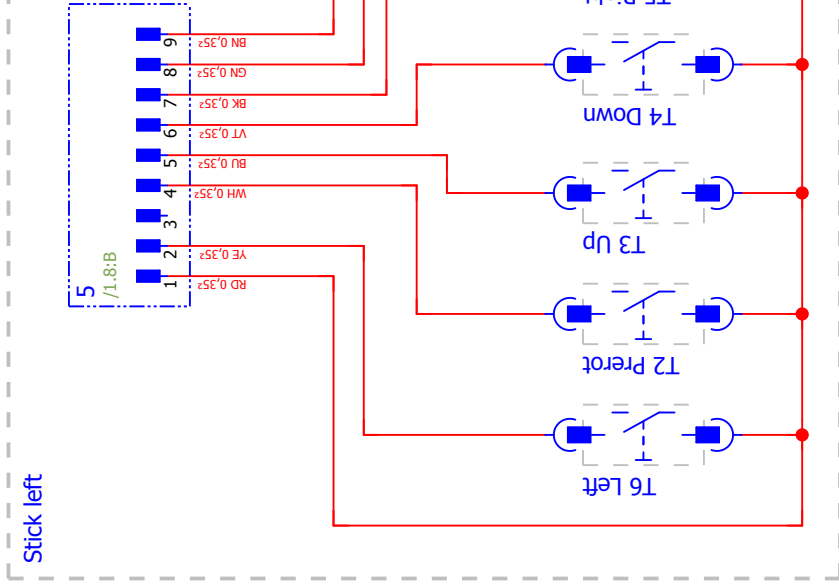
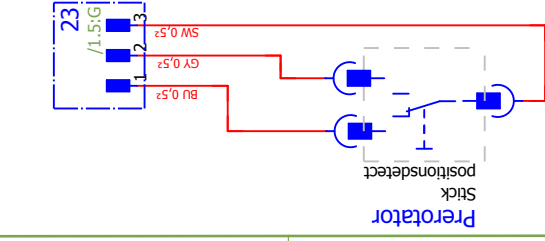
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Konfortausstattung Sitze

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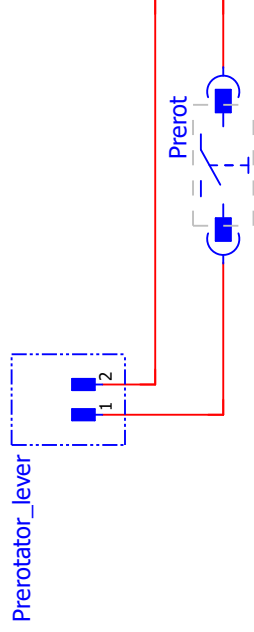
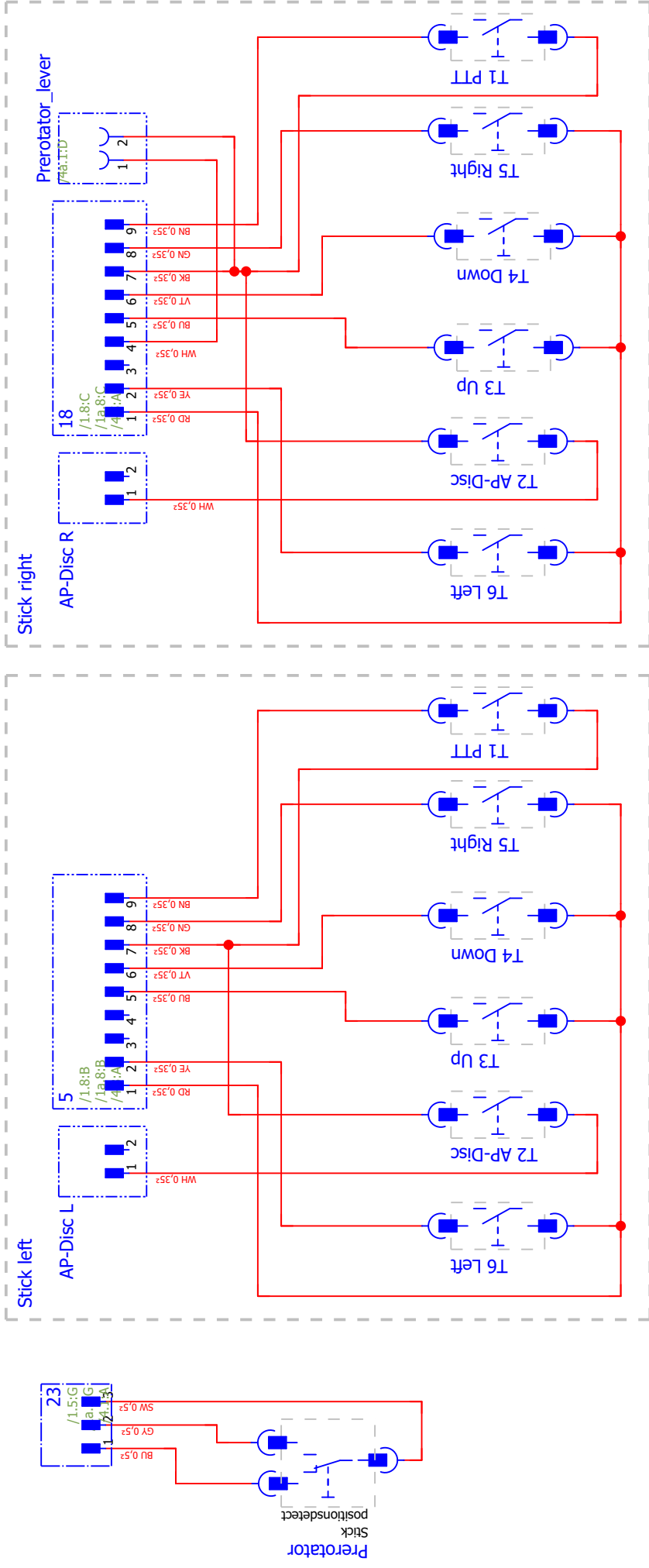
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Wiring Diagram – Flight Control Sticks



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	Sheet:		4 of 33		

Wiring Diagram – Flight Control Sticks with Autopilot



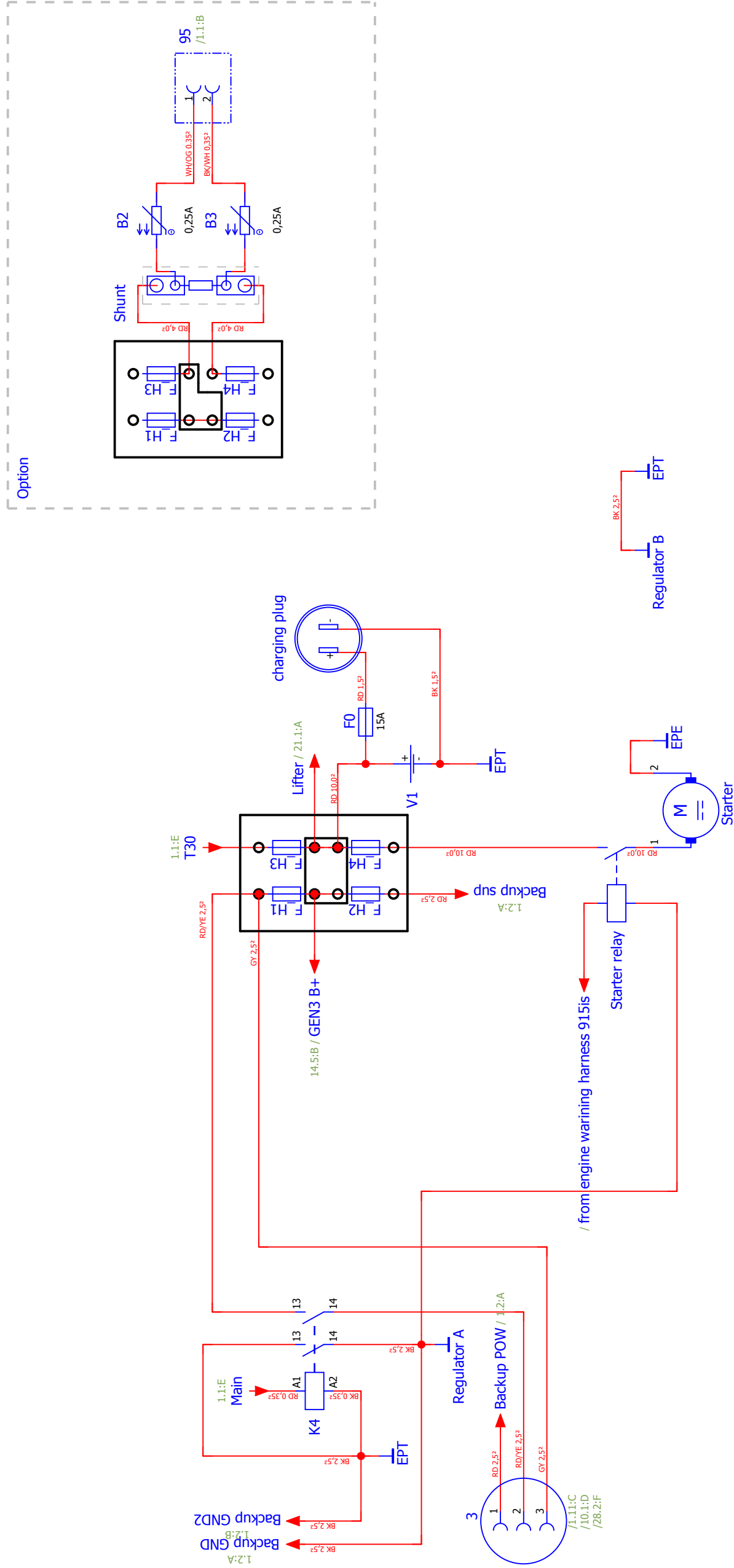
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Wiring Diagram – Landing Lights

Wiring Diagram – NAV / Strobe Lights

Wiring Diagram – Cockpit LH (Standard)

Wiring Diagram – Starter / Battery



13 — 14 / 8.2: C
13 — 14 / 8.3: C

F_H1	30A
F_H2	30A
F_H3	40A
F_H4	125A



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A000		New	22.02.2019	H.STINDL
A001		Corrected the fuse values	1.1.03.2019	H.STINDL
A002		Added shunt	15.04.2019	H.STINDL
Rev	CMS	Modification	Date	Name

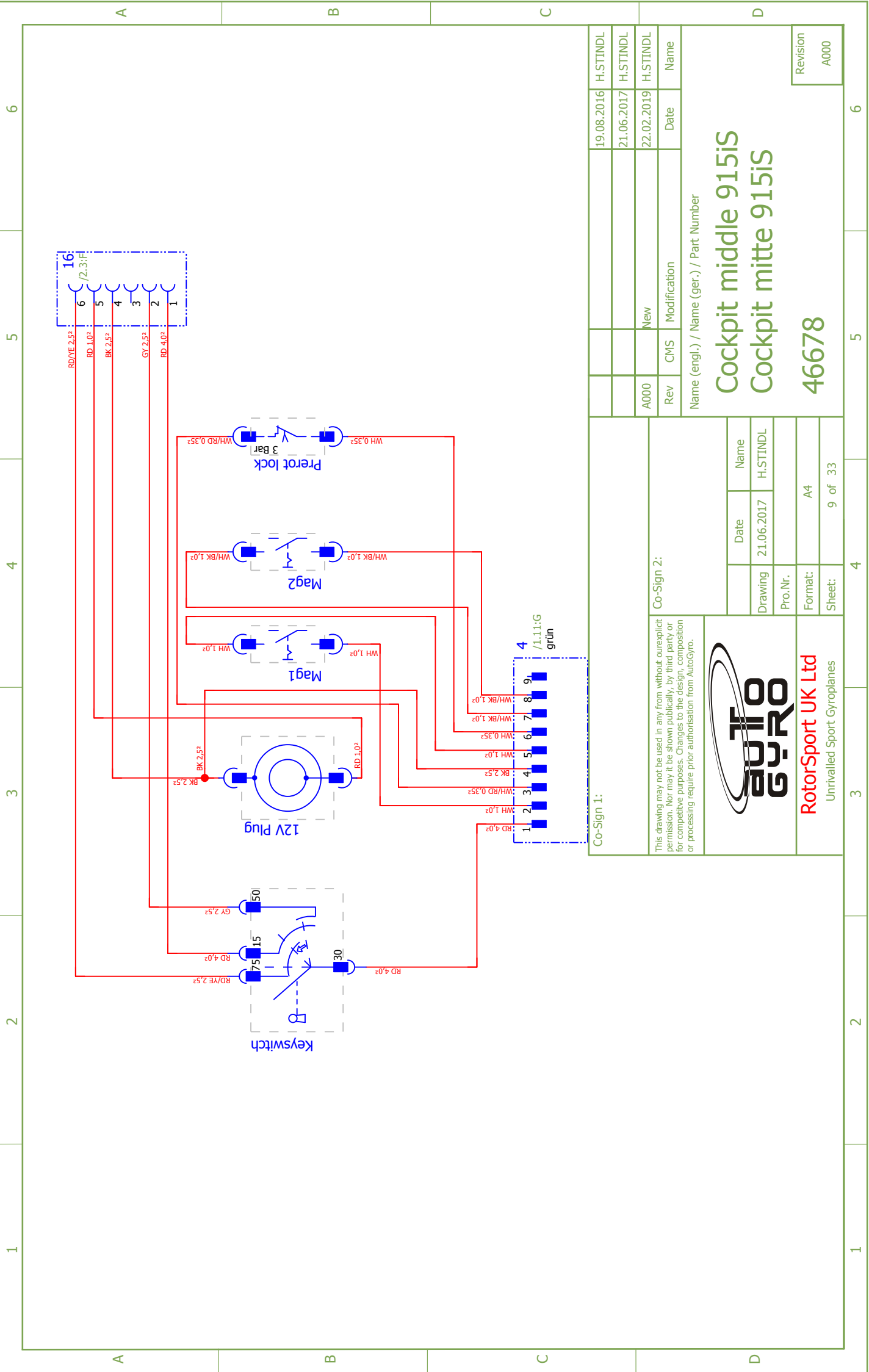
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Starter battery kit 915iS
Anlasserbatteriesatz 915iS

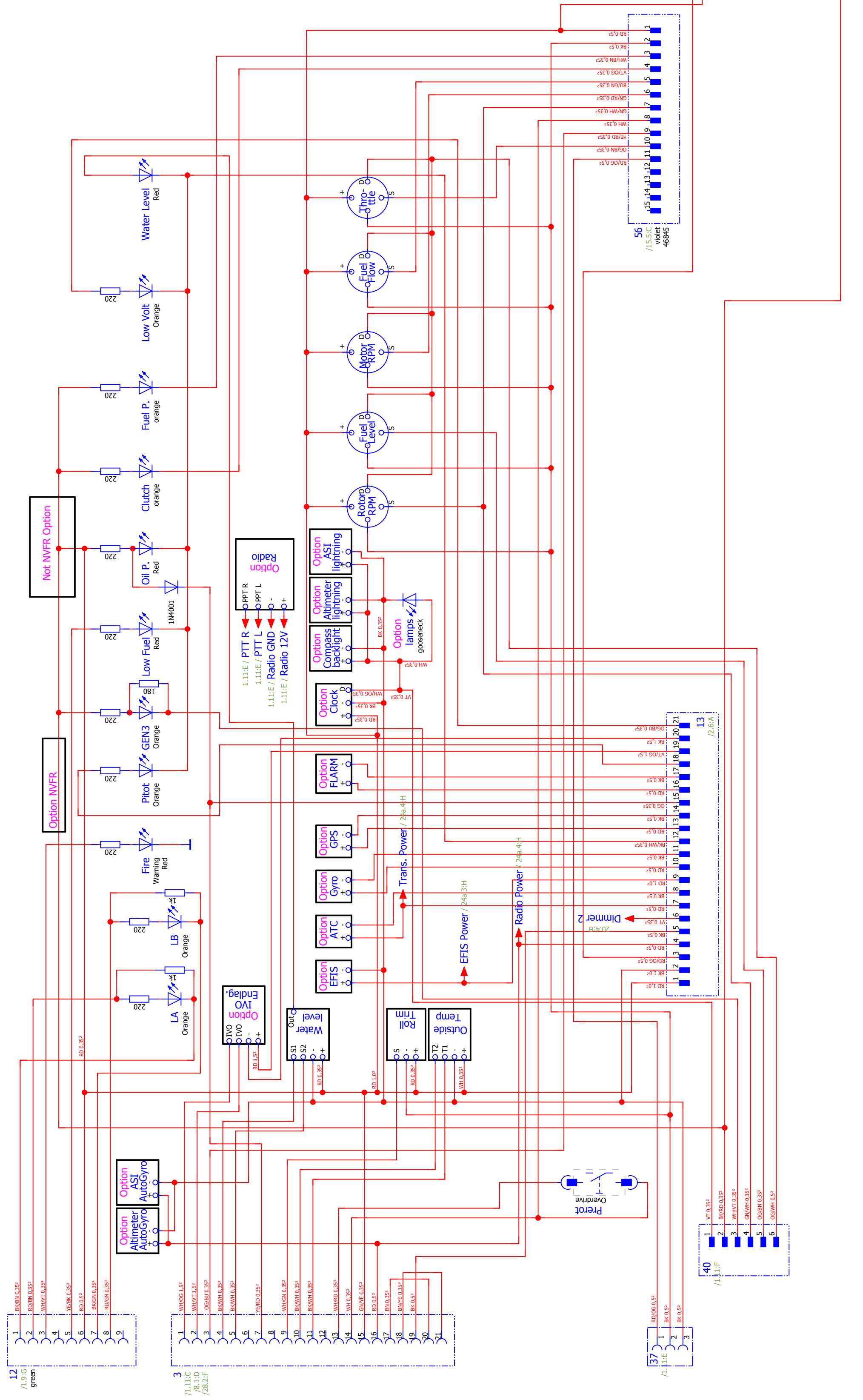
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Revision
A002


Wiring Diagram – Cockpit Centre





Wiring Diagram – Cockpit (General)



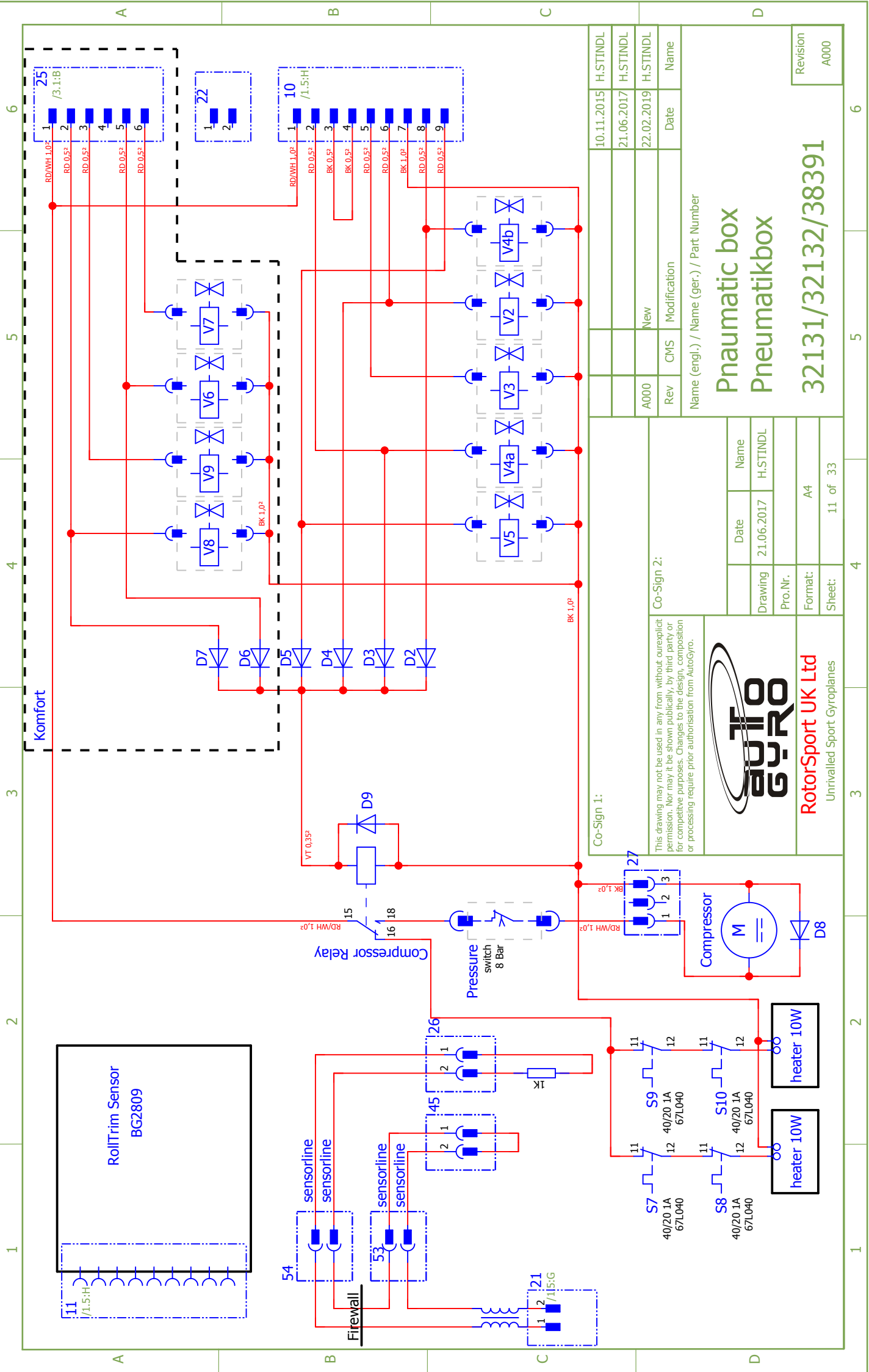
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				A004		Added Dimmer LED		18.04.2019		H-STINDL	
				A005		change ZD2		18.04.2019		H-STINDL	
				Rev		CWS		Modification		Date	
										Name	
										Name (engl.) / Name (ger.) / Part Number	
										Cockpit	
										Cockpit	
										46690	
										Revision	
										A005	

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			A004		Added Dimmer LED		18.04.2019		H-STINDL		
			A005		change ZD2		18.04.2019		H-STINDL		
			Rev		CWS		Modification		Date		
									Name		
										Name (engl.) / Name (ger.) / Part Number	
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										Cockpit	
										46690	
										Revision	
										A005	

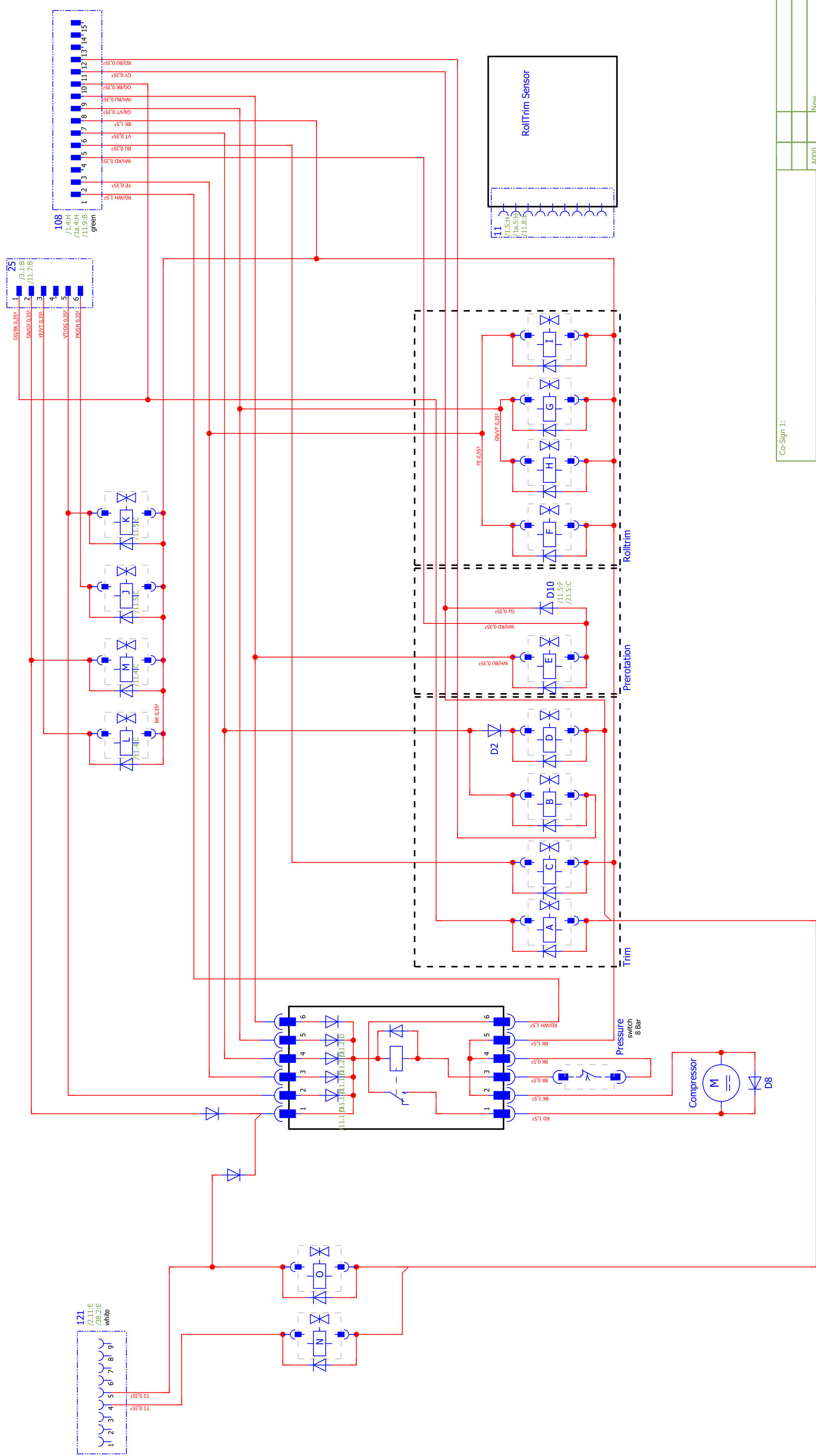
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			A004		Added Dimmer LED		18.04.2019		H-STINDL		
			A005		change ZD2		18.04.2019		H-STINDL		
			Rev		CWS		Modification		Date		
									Name		
										Name (engl.) / Name (ger.) / Part Number	
										Cockpit	
										Cockpit	
										46690	
										Revision	
										A005	


 RotorSport UK Ltd Unvalued Sport Gyroplanes	Co-Sign 2:		A003		Added resistor dimmer		18.04.2019		H-STINDL		
			A004		Added Dimmer LED		18.04.2019		H-STINDL		
			A005		change ZD2		18.04.2019		H-STINDL		
			Rev		CWS		Modification		Date		
									Name		
										Name (engl.) / Name (ger.) / Part Number	
										Cockpit	
										Cockpit	
										46690	
										Revision	
										A005	

Wiring Diagram – Pneumatic System (Standard / Comfort)



Wiring Diagram – Pneumatic System (Auto Pilot)



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			Date	Name	
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	Pro. Nr.				
	Format:	A2			
	Sheet:	11a of 43			
<p>RotorSport UK Ltd Unvalued Sport Gyroplanes</p>			<p>Revision A000</p>		

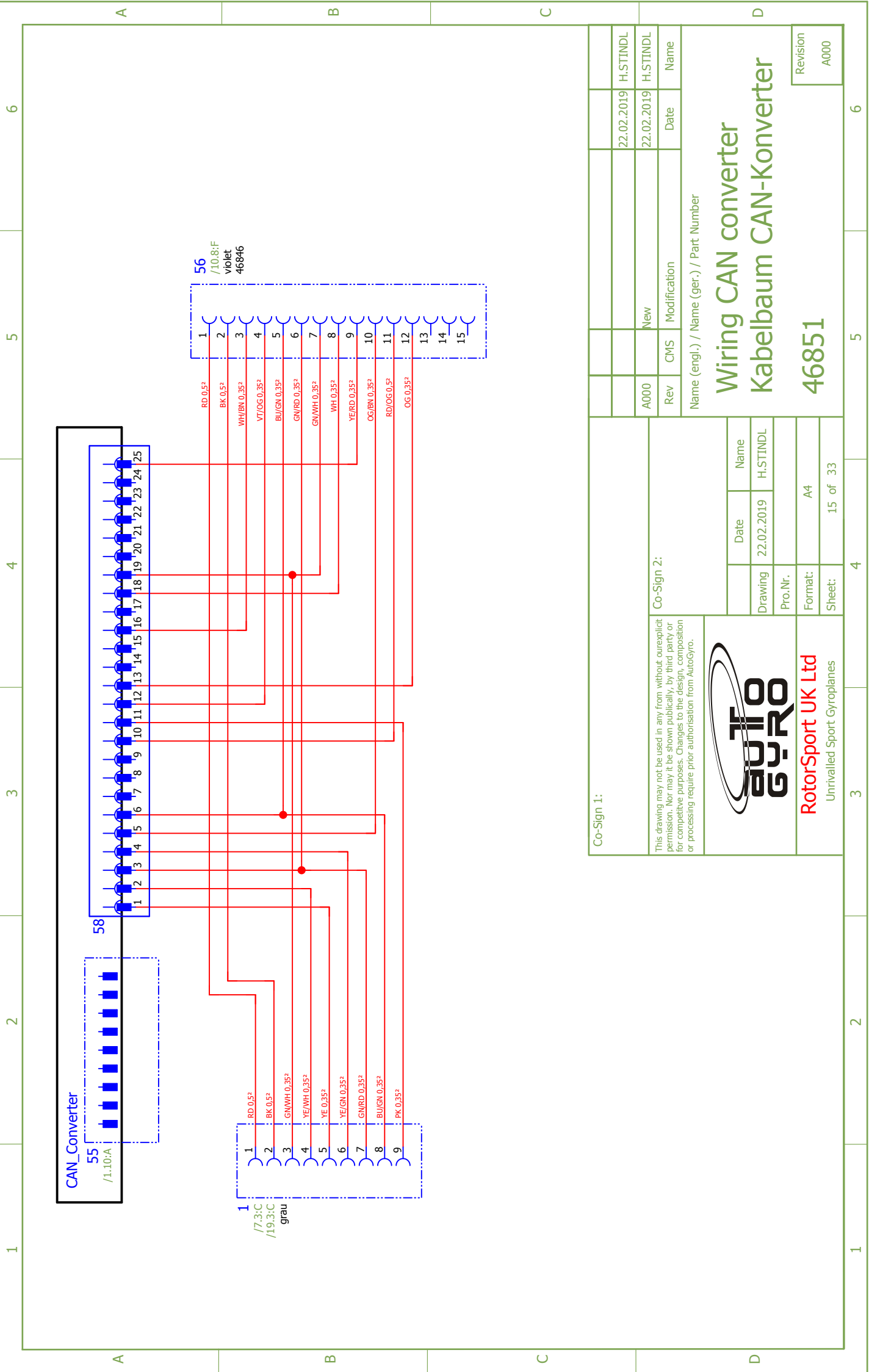
Wiring Diagram – Fan

1		2		3		4		5		6	
A		B		C		D					
<div><div><div><div><div>98</div><div>/1.1:E</div></div><div><div>1</div><div>2</div></div></div><div><div>BU 1.5²</div><div>WH 1.0²</div></div><div><div>Water</div><div>O: 90°C</div><div>C: 95°C</div></div><div><div>BK 1.5²</div><div>FAN</div><div>M</div><div>+</div></div></div></div>											
Co-Sign 1:											
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<div><div><div><div><div><div><div></div><div>AutoGyro</div></div></div><div><div>RotorSport UK Ltd</div><div>Unrivalled Sport Gyroplanes</div></div></div></div></div></div>						Date		Name			
						Drawing		15.04.2019		H.STINDL	
						Pro.Nr.					
						Format:		A4			
Sheet:		12 of 33									
Name (engl.) / Name (ger.) / Part Number						FAN					
						Lüfter					
						46983					
						Revision A000					
1		2		3		4		5		6	

Wiring Diagram – Fuel Level and Low Level Sensors

Wiring Diagram – Engine Wiring Harness

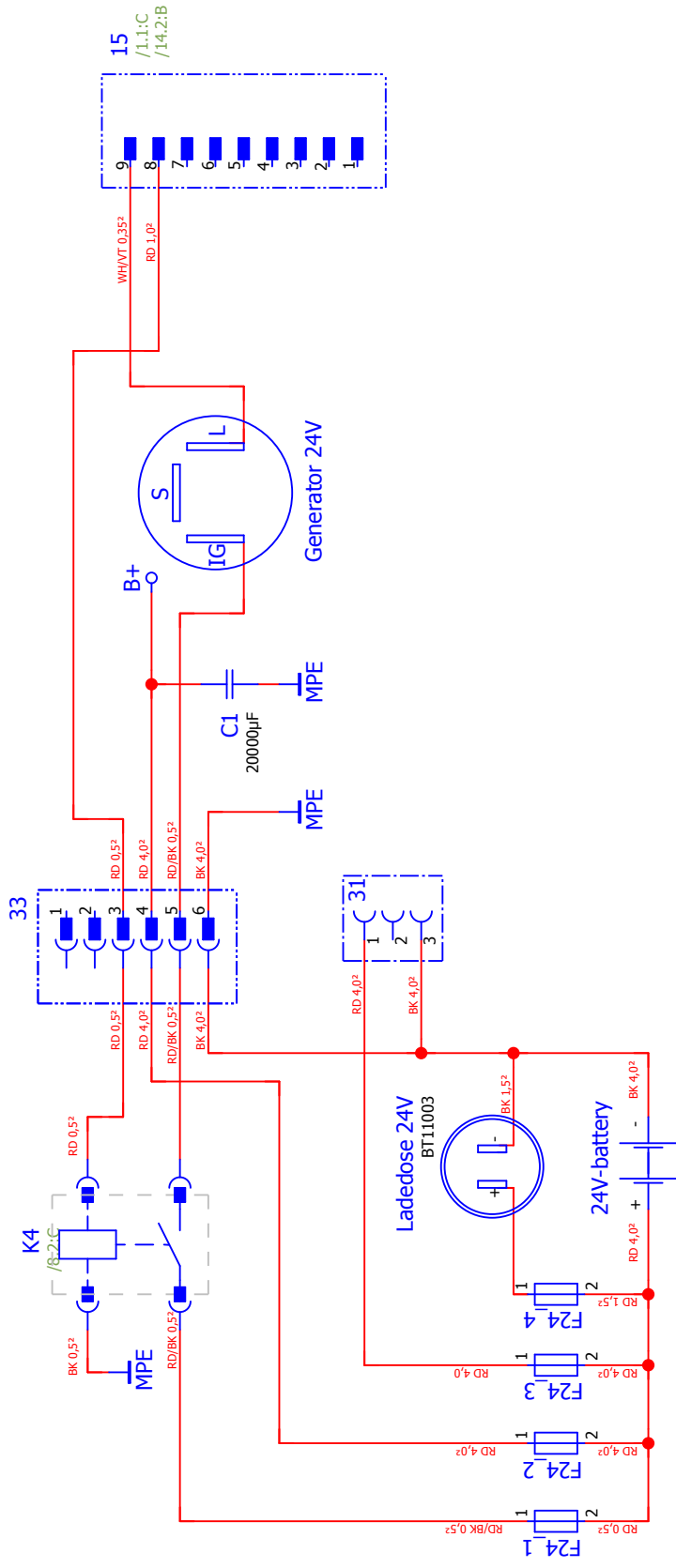
Wiring Diagram – Wiring CAN Convertor




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 RotorSport UK Ltd Unrivalled Sport Gyroplanes		Drawing		Date	Name
		Pro.Nr.		22.02.2019	H.STINDL
		Format:		A4	
		Sheet:		15 of 33	

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Wiring Diagram – 24v option

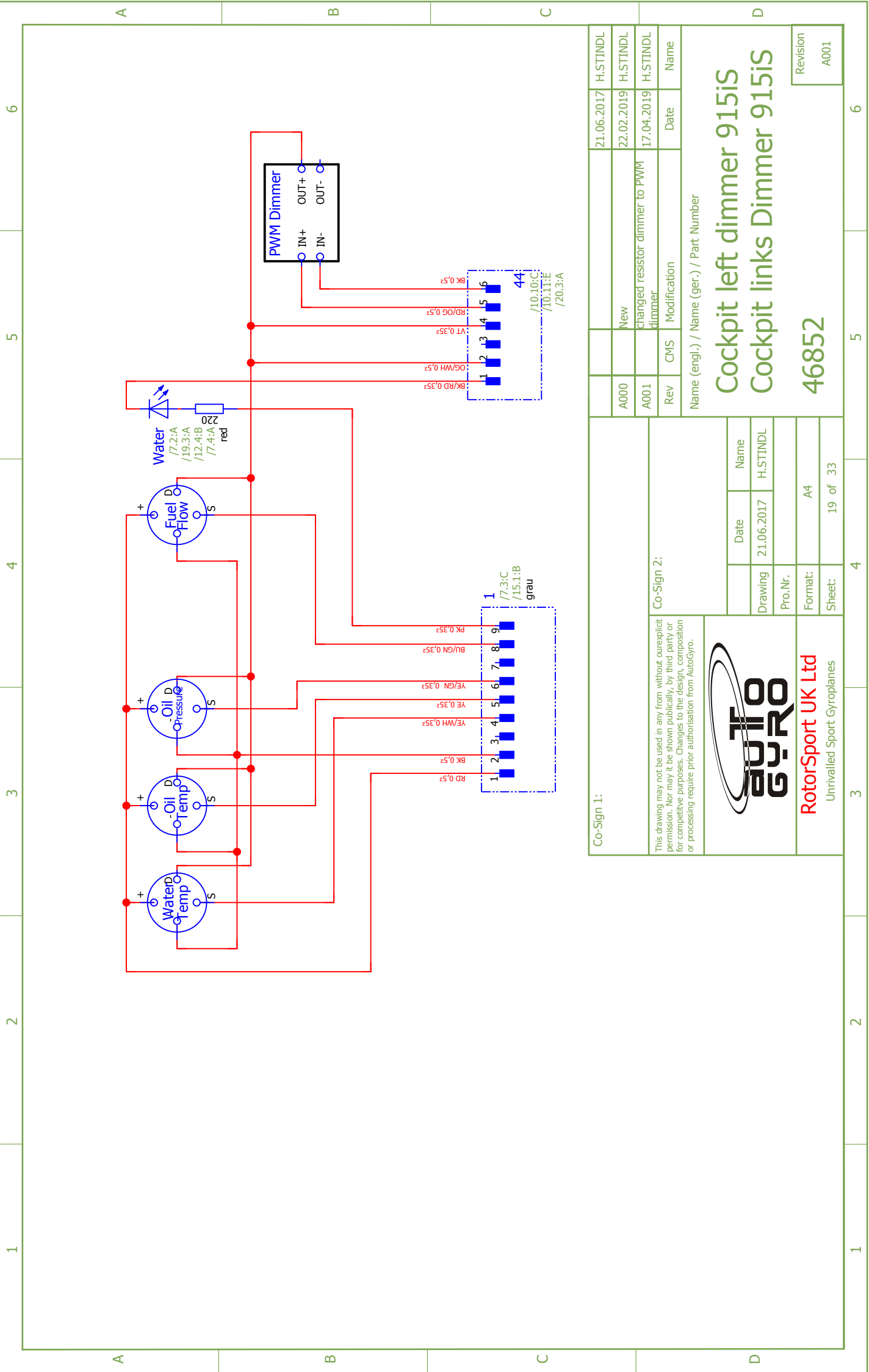


<div>Co-Sign 1:</div>								28.05.2014	H.STINDL
								21.06.2017	H.STINDL
								22.02.2019	H.STINDL
					A000	New			
					Rev	CMS	Modification	Date	Name
Name (engl.) / Name (ger.) / Part Number									
24V option									
24V Option									
36431									
Revision A000									

<div>Co-Sign 1:</div>								
					Co-Sign 2:			
	<div><div></div><div>RotorSport UK Ltd Unrivalled Sport Gyroplanes</div></div>					Date	Name	
					Drawing	21.06.2017	H.STINDL	
					Pro.Nr.			
Format:					A4			
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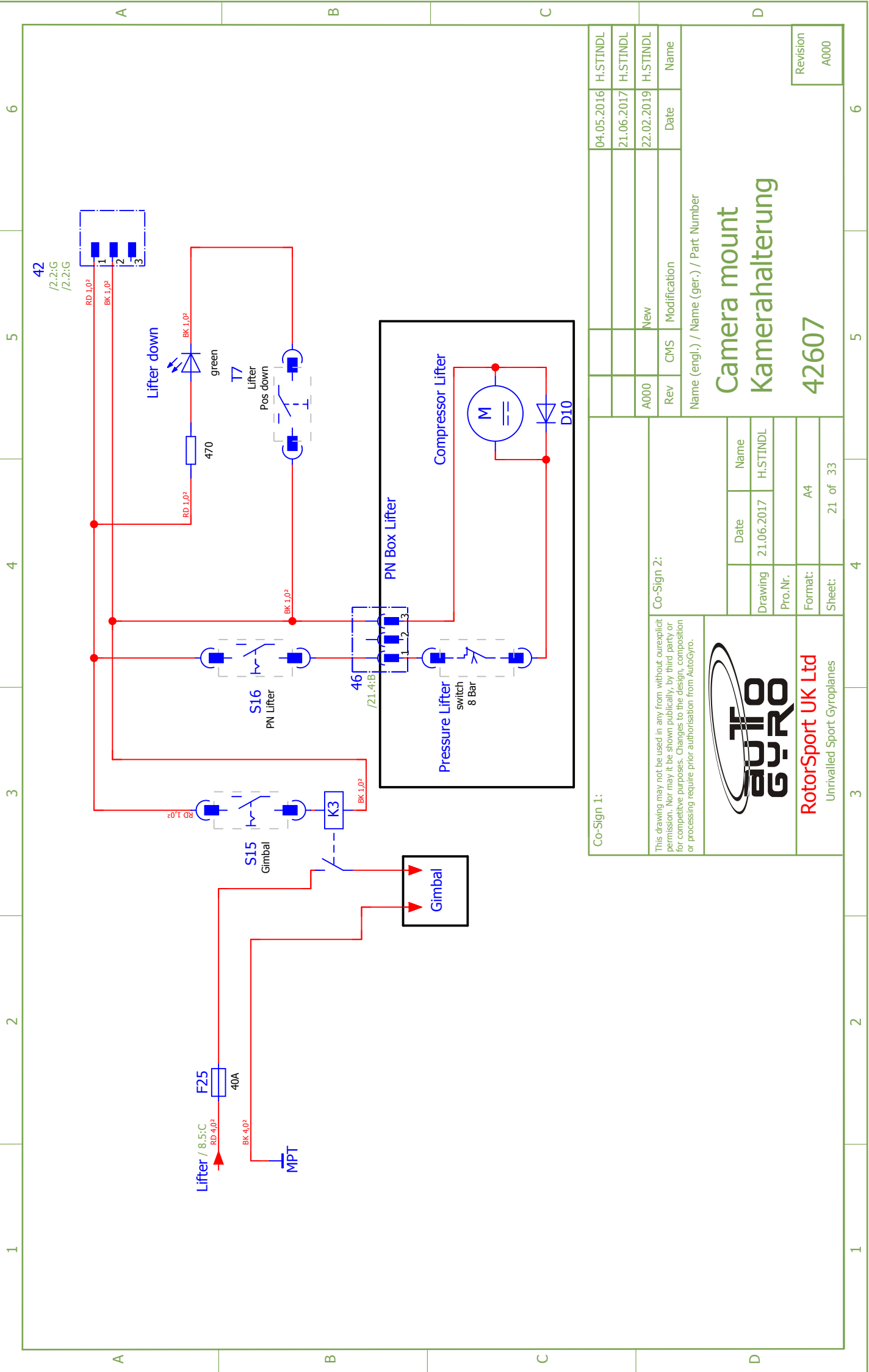
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F24_2	40A
F24_3	40A
F24_4	15A

Wiring Diagram - Cockpit left dimmer



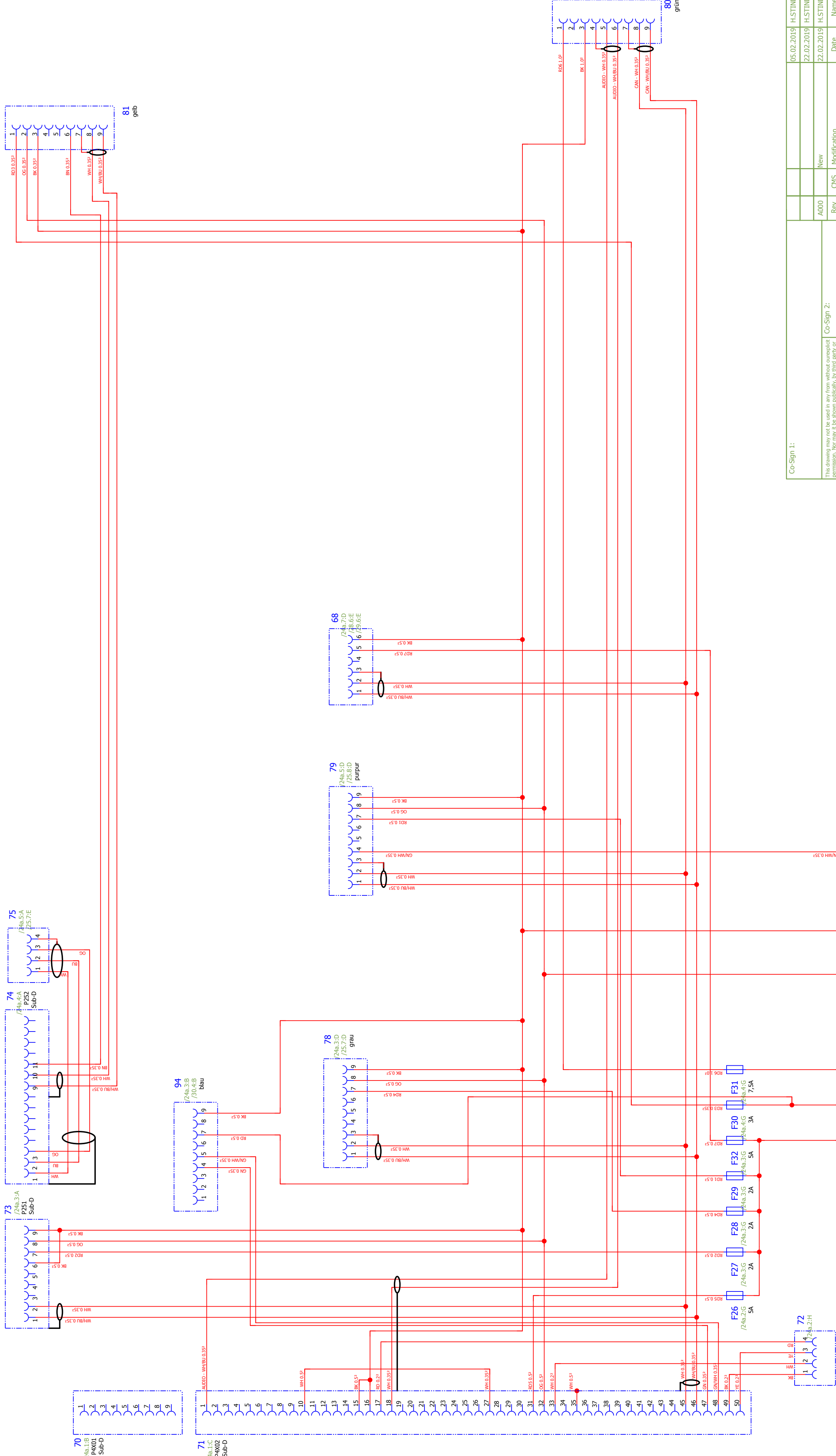
Wiring Diagram - Wiring Dimmer

Wiring Diagram – Camera mount



Wiring Diagram – Garmin G3X cockpit 2 x 7”

Wiring Diagram – Garmin G3X cockpit 1 x 10”



Co-Sign 1:

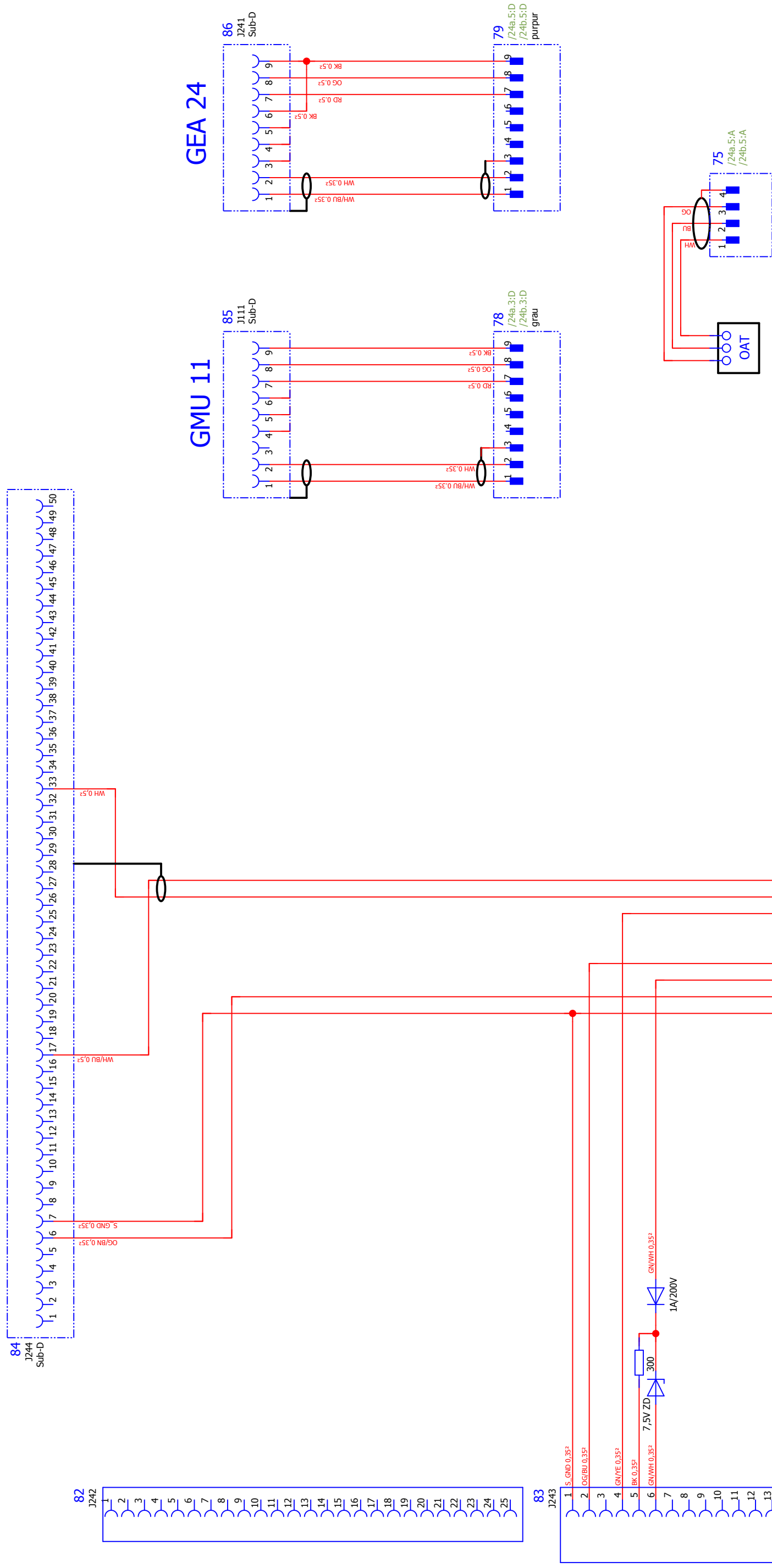
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				22.02.2019	H-STINDL
		A000	New	22.02.2019	H-STINDL

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	RotorSport UK Ltd Unvalled Sport Gyroplanes			Name (orig.) / Part Number	
	Drawing	Date	Name	Garmin G3X cockpit installation 10" 46216	
	Pro.Nr.	22.02.2019	H.STINDL		
	Format:	A2			
	Sheet:	24b of 33			
			Revision A000		

F26	GDU 460	5A
F27	GSU 25	2A
F28	GMU 11	2A
F29	GEA 24	2A
F30	GTX 23	3A
F31	GTR 20	7.5A
F32	GMA 245	5A

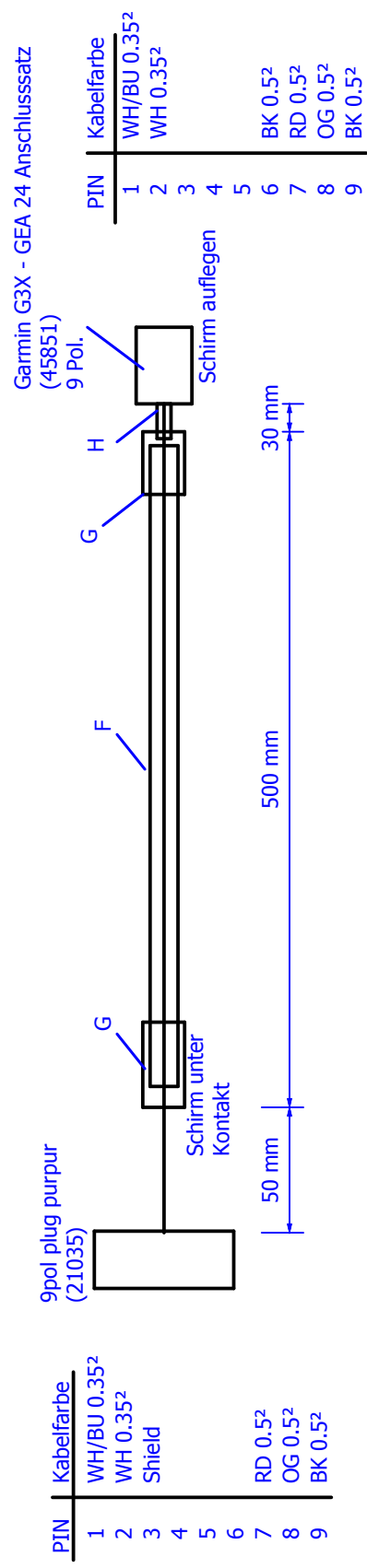
Wiring Diagram G3X installation kit



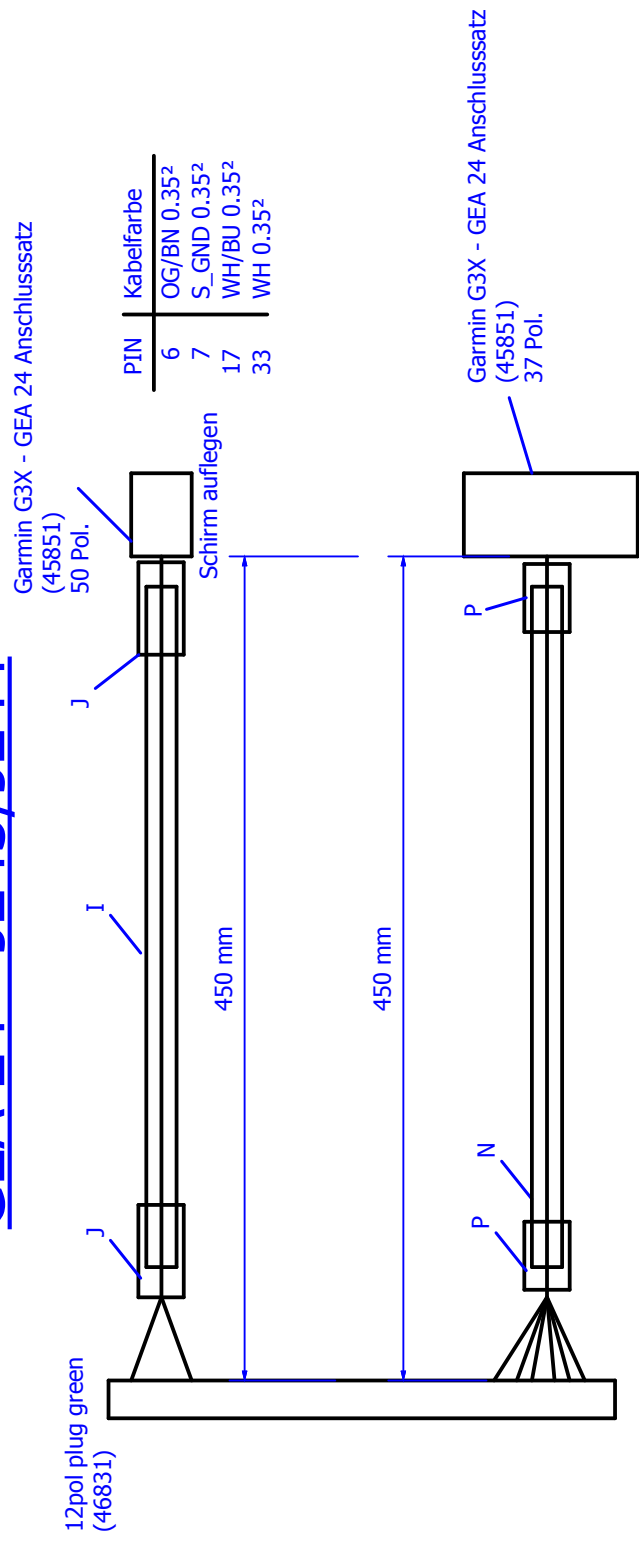
Co-Sign 1:	 RotorSport UK Ltd Unvalled Sport Gyroplanes	Drawing		Date	Name	
		22.02.2019		H.STINDL		
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		Format:		A2		
Sheet:		25 of 33				
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		A000		New	22.02.2019	H.STINDL
		A001		corrected wiring	22.02.2019	H.STINDL
					29.03.2019	H.STINDL
Name (eng.) / Name (ger.) / Part Number						
G3X installation kit 915iS						
G3X Einbausatz 915iS						
46833						
Revision		A001				

Wiring Diagram – G3X installation

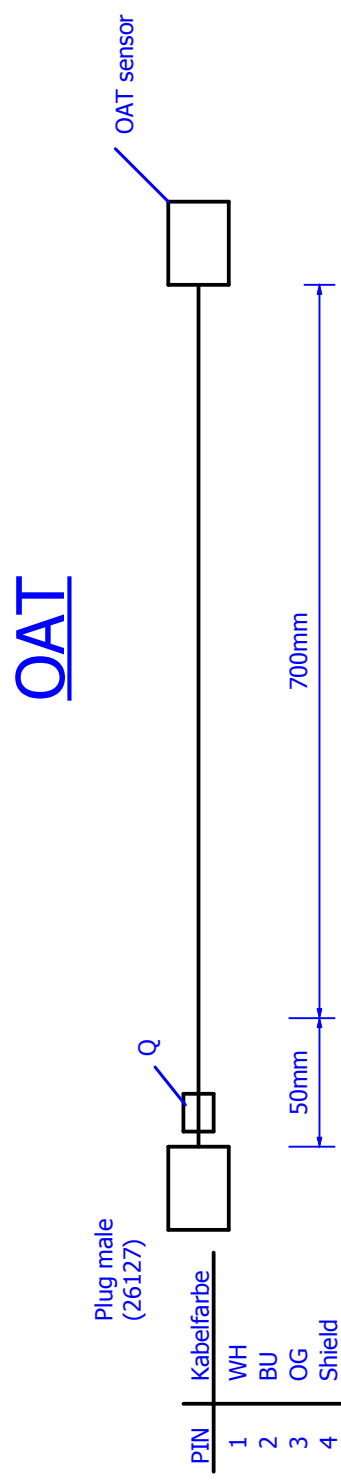
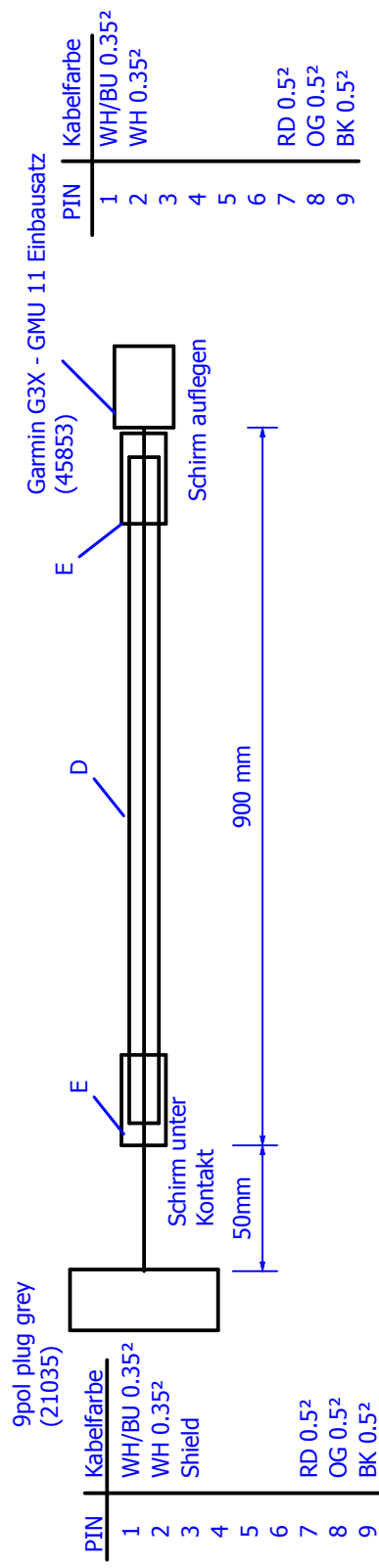
Sensoranalyser wiring harness (GEA 24 - J241)



GEA 24 - J243/J244

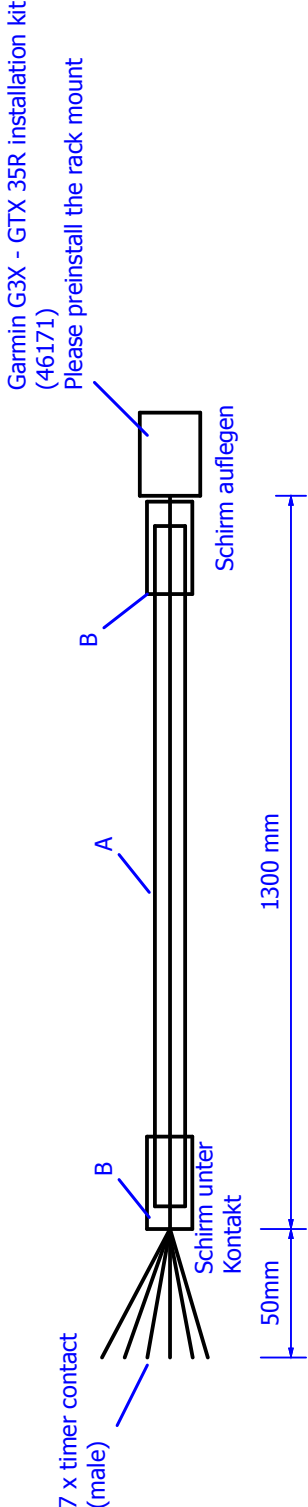


Magnetometer wiring harness (GMU 11)



Wiring Diagram – GTX 35R installation

Wiring Diagram – GTX 35R installation



PIN	Kabelfarbe
9	WH 0.35 ²
20	BK 0.5 ²
21	RD 0.5 ²
31	WH/BU 0.35 ²
38	BK 0.5 ²
41	BK 0.5 ²
42	RD 0.5 ²
52	BN 0.35 ²
59	BK 0.5 ²
61	OG 0.5 ²
62	OG 0.5 ²

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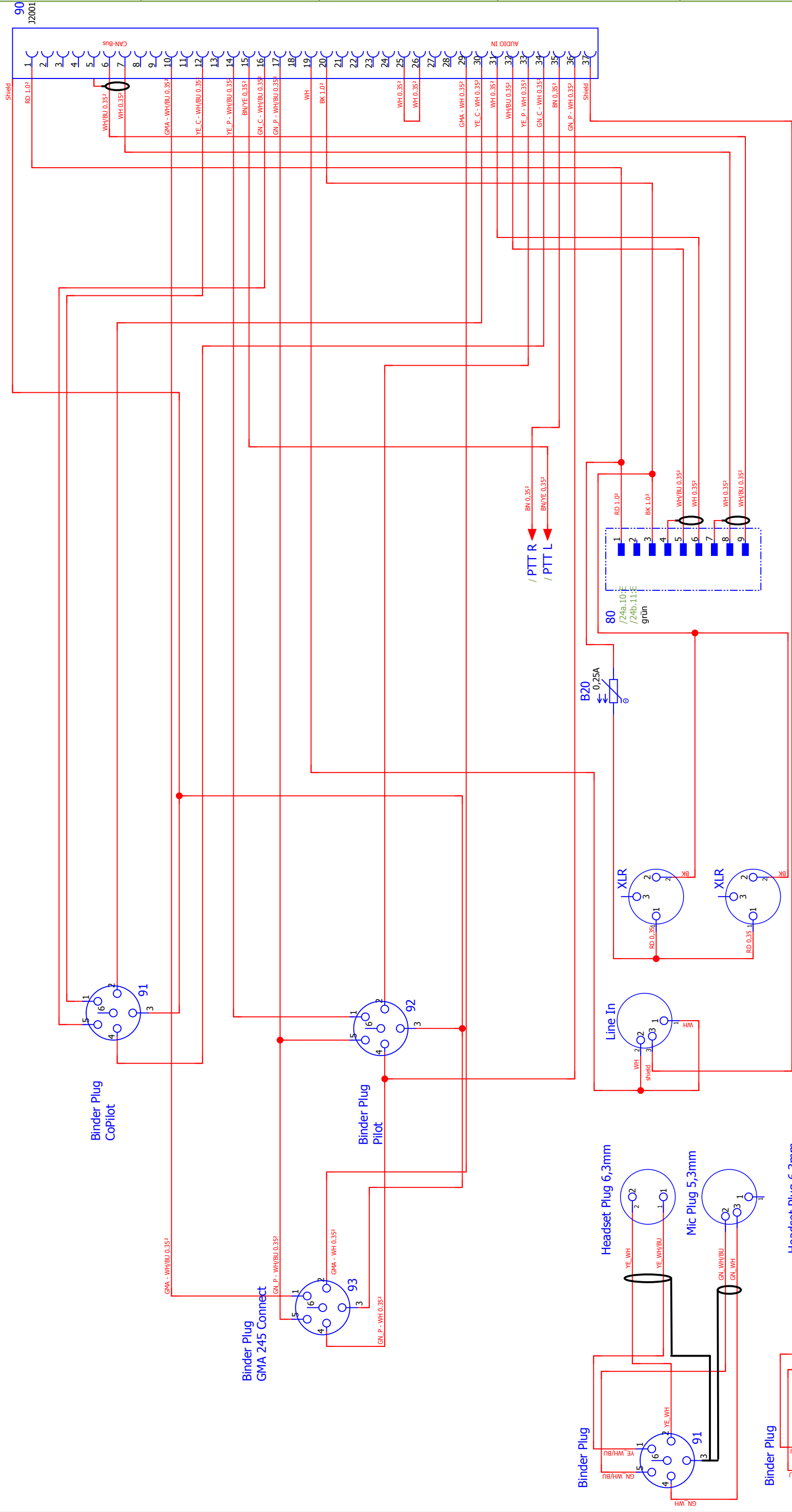
RotorSport UK Ltd
Unrivalled Sport Gyroplanes

Co-Sign 2:

	Date	Name
Drawing	22.02.2019	H.STINDL
Pro.Nr.		
Format:	A4	
Sheet:	26a of 33	

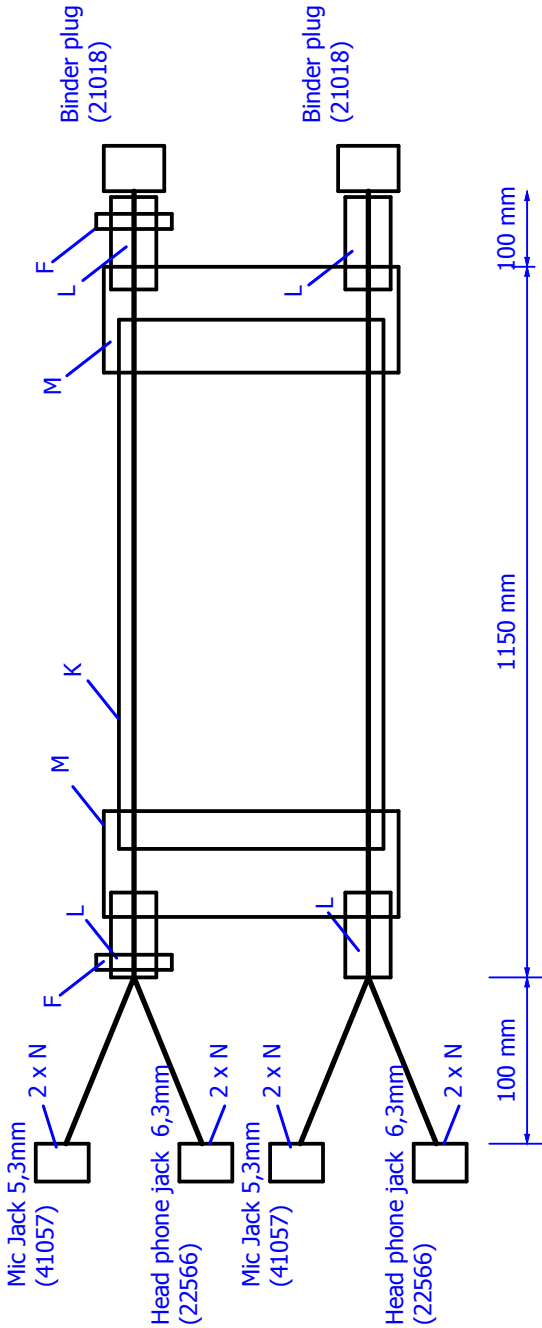
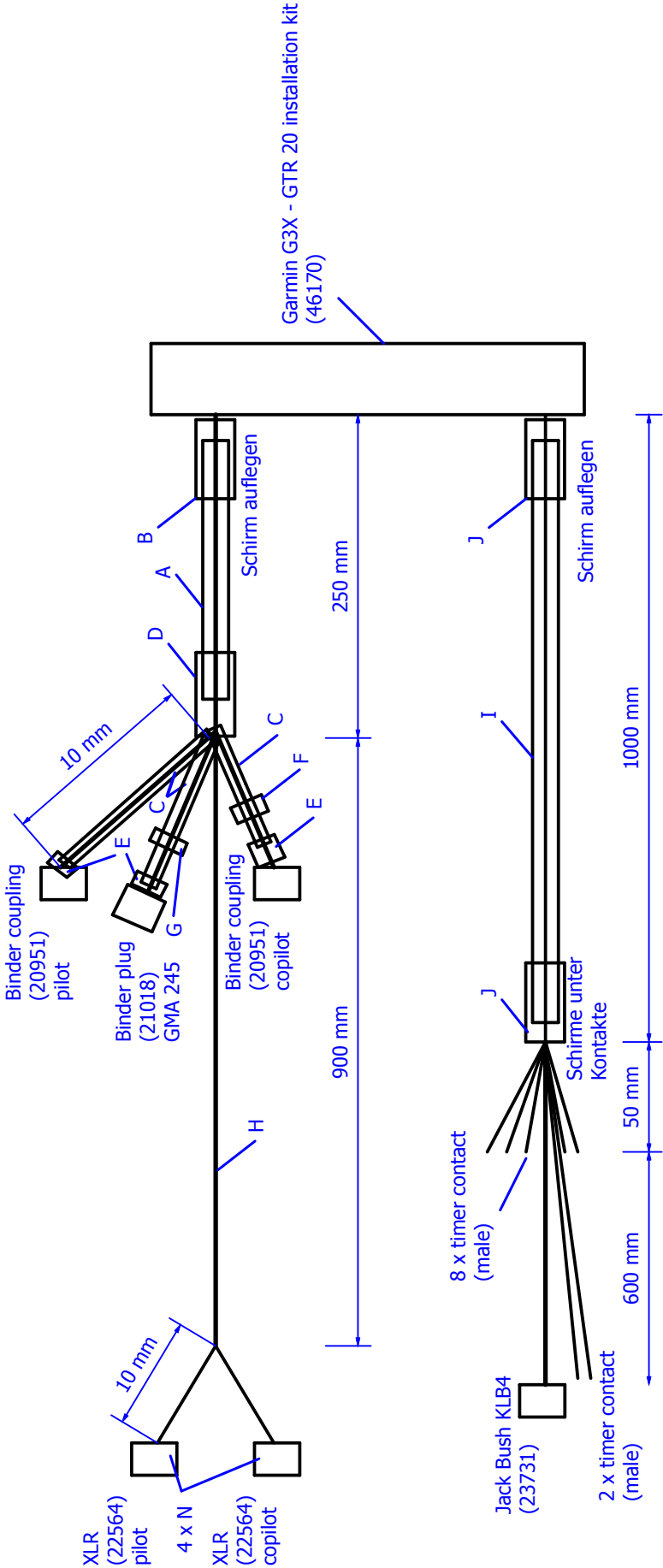
		05.06.2018	H.STINDL
		22.02.2019	H.STINDL
A000	New	22.02.2019	H.STINDL
Rev	CMS	Modification	Date
Name (engl.) / Name (ger.) / Part Number			
Garmin GTX 35R installation kit / Einbausatz			
46111			
Revision A000			


Wiring Diagram – GTR 20 installation



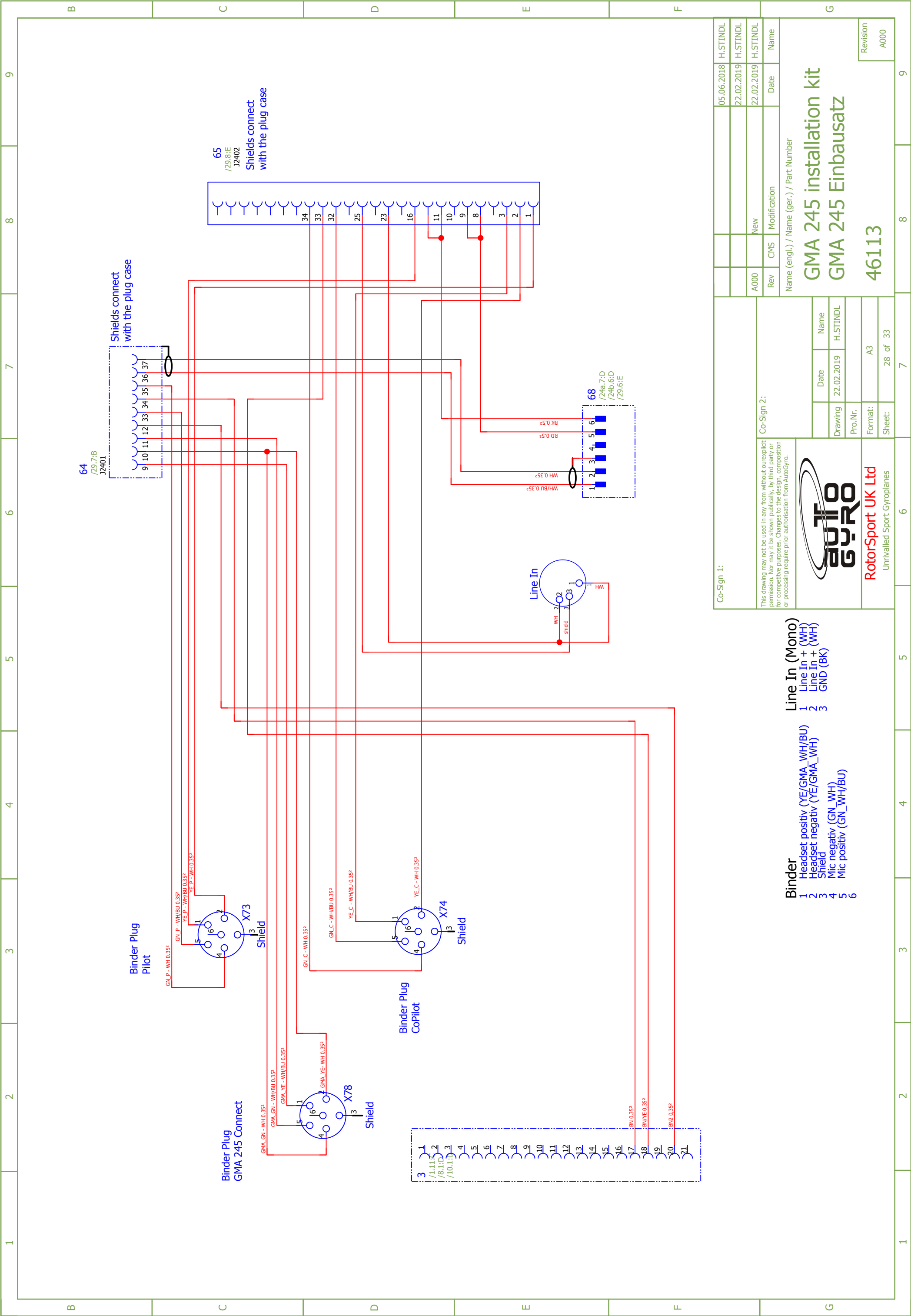
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					Drawing		Date	Name	GTR 20 Einbausatz		
					22.02.2019		H.STINDL				
					Pro.Nr.						
					Format:		A3				
		Sheet:	27 of 33						46112		

Wiring Diagram – GTR 20 installation



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 RotorSport UK Ltd Unrivalled Sport Gyroplanes		Date		Modification		Date	
		22.02.2019		New		22.02.2019	
		Pro.Nr.		A3		H.STINDL	
		Format:		Sheet:		Name	
Garmin GTR 20 installation kit / Einbausatz		27a of 33		Revision		A000	
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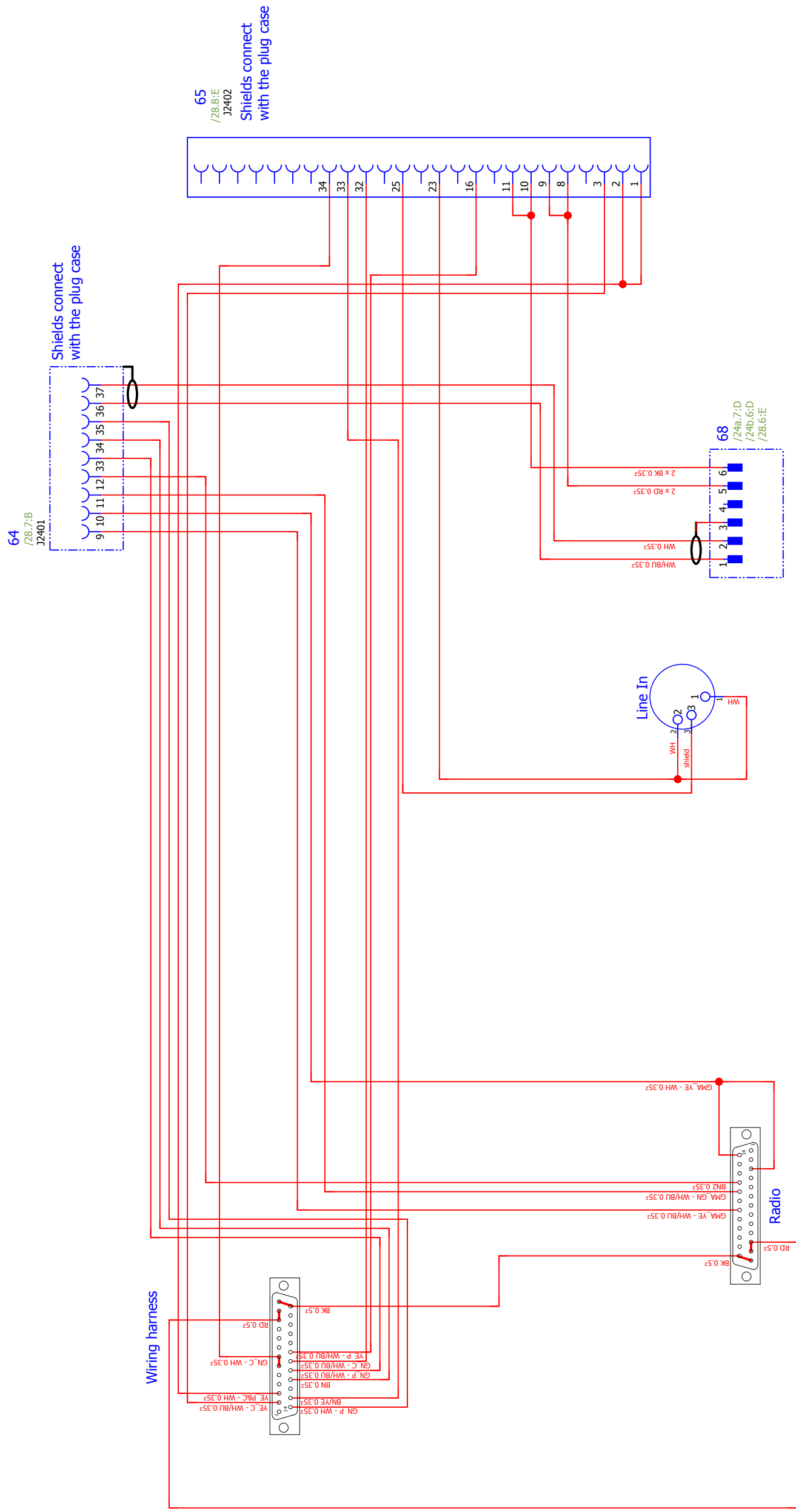
Wiring Diagram – GMA 245 installation




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 RotorSport UK Ltd Unrivalled Sport Gyroplanes		Drawing	22.02.2019	Date					
		Pro.Nr.							
		Format:	A3						
		Sheet:	28 of 33						
Name (engl.) / Name (ger.) / Part Number		Rev	CMS	Modification	Date				
GMA 245 installation kit		A000		New	22.02.2019				
GMA 245 Einbausatz									
46113									
Revision		A000		Revision		A000		Revision	

Wiring Diagram – GMA 245 installation

Wiring Diagram – GMA 245 to ATR833 adaptor



Co-Sign 1:		Co-Sign 2:		Name (engl.) / Name (ger.) / Part Number		Revision	
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				22.02.2019	H.STINDL		
				Pro.Nr.			
		Format:		A3		A000	
		Sheet:		29 of 33			
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				A000		New	22.02.2019
							05.02.2019
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Wiring Diagram – GMA 245 to ATR833 adaptor

SUB-D 25p. plug
(male)
29376

150 mm

SUB-D 25p. plug
(female)
29376

450 mm

6 pol. plug
(female)
22183

Jack Bush KLB4
23731

500 mm

Garmin G3X - GTR 245
(2 D-Sub plugs)

700 mm

Co-Sign 1:

This drawing may not be used in any form without our explicit permission. Nor may it be shown publicly, by third party or for competitive purposes. Changes to the design, composition or processing require prior authorisation from AutoGyro.



RotorSport UK Ltd
Unrivalled Sport Gyroplanes

Co-Sign 2:

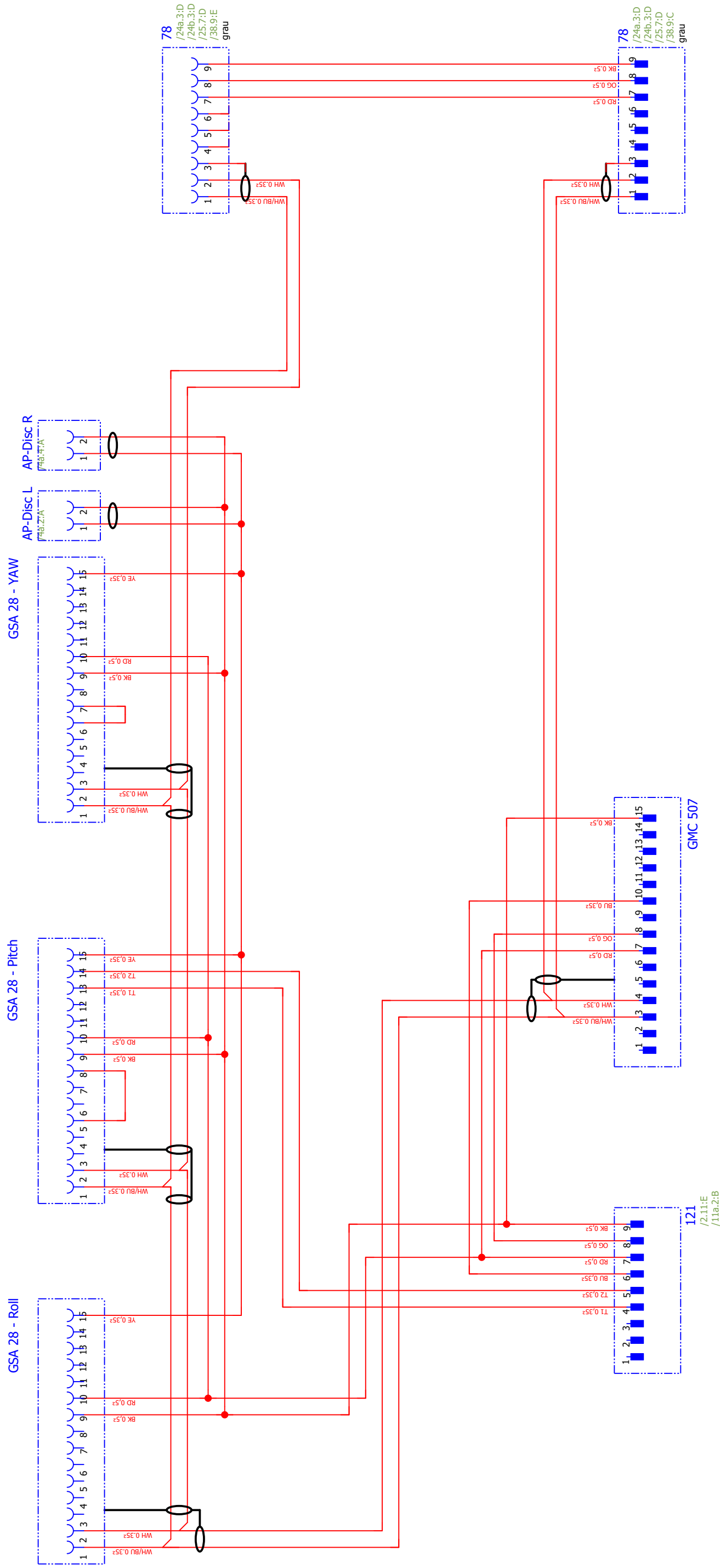
Date	Name
22.02.2019	H.STINDL
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Format:	A4
Sheet:	29a of 33

		10.08.2018	H.STINDL
		22.02.2019	H.STINDL
A000	New	22.02.2019	H.STINDL
Rev	CMS	Modification	Date
Name (engl.) / Name (ger.) / Part Number			Name
Garmin GMA 245 - ATR833 adapter / Einbausatz			
46269			
Revision			A000

Wiring Diagram – GDL 50

Wiring Diagram – GDL 50 data / power cable

Wiring Diagram – for GMC507

[illegible]

Pneumatic Scheme – Standard/Comfort

NOTE! Item 20 6bar pressure limiter
MUST be set fully open (unlimited)
or replaced with a straight coupling
for the 915 aircraft (Rotorhead III)
configuration

Pneumatic Scheme – Auto Pilot



Pneumatic box comfort	48377	Re	A
Pneumatikbox Komfort			

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

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

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

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

PROCEDURES

- 1 Re-install teeter bolt, hand-tighten castellated nut and secure castellated nut adequately.
- 2 Loop a lifting belt around the teeter bolt and carefully lift the gyroplane.

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

ILLUSTRATIONS



Lifting belt looped around teeter bolt

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

Unload nose gear

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

Unload main gear

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

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

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

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

OPR

GENERAL, REFERENCES AND REQUIREMENTS

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

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

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

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

PROCEDURES

Shoring, road transport or container transport

WARNING: *The rotor system must be removed, disassembled and carefully packed for road transport.*

CAUTION: *When wrapping the gyroplane make sure that foil or stretch does not cover the painted surface directly. Put a soft layer in between for damage protection and let plastic components breathe. Do not expose wrapped gyroplane or parts to sun radiation or heat in order to avoid paint damage.*

- 1 Restrain main wheels (blocks/chocks). For container transport replace main wheels with wooden blocks to provide safe stand.
- 2 Put a wooden block below the lowest point of the keel tube and lash keel tube against wooden block. The block should be dimensioned so that the main wheels (if installed) are half way unloaded.
- 3 Lash-down both main wheels through the lashing lugs (use rims/axles alternatively) and/or the mast tie-down kit (option).
- 4 Lash-down nose wheel through its axle.
- 5 For container transport or shipping, use the mast tie-down kit (option) and consider folding the mast.

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
		shipping attachment mast		85-00-00-V-33480	

ILLUSTRATIONS

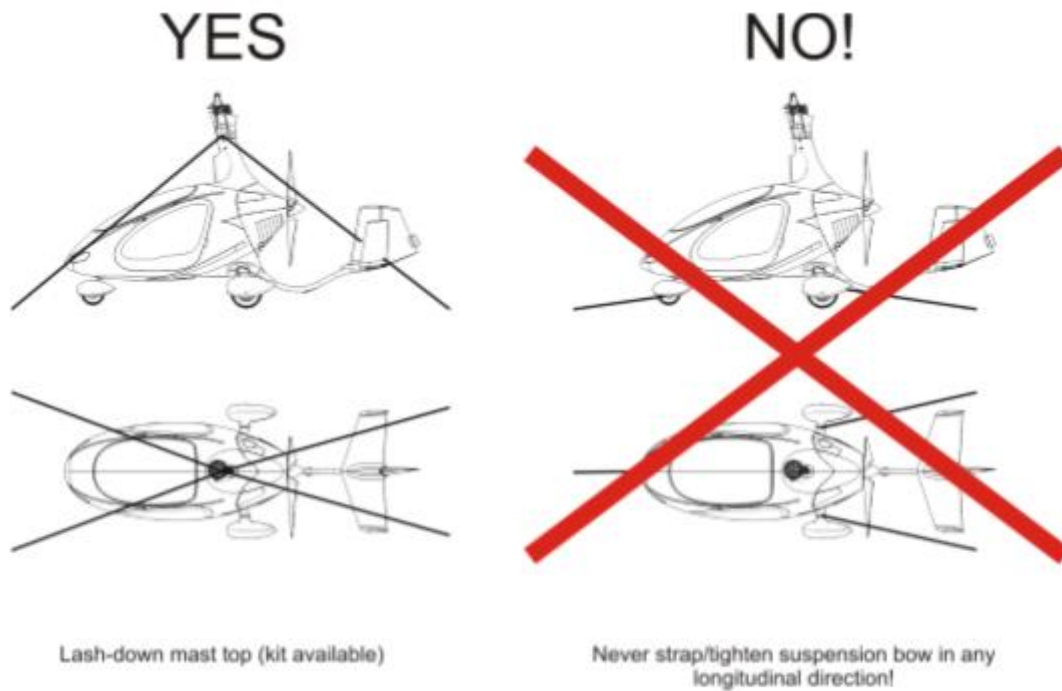


Fig. 1 - Lash-down methods of gyroplane

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 carry out 'Line Maintenance'!

Secure gyroplane against unauthorized or unintended operation!

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

Measurement of Stabilizer Alignment

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

ILLUSTRATIONS



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

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

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

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

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

PRECAUTIONS AND SAFETY MEASURES

WARNING: Electrical shorting of 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

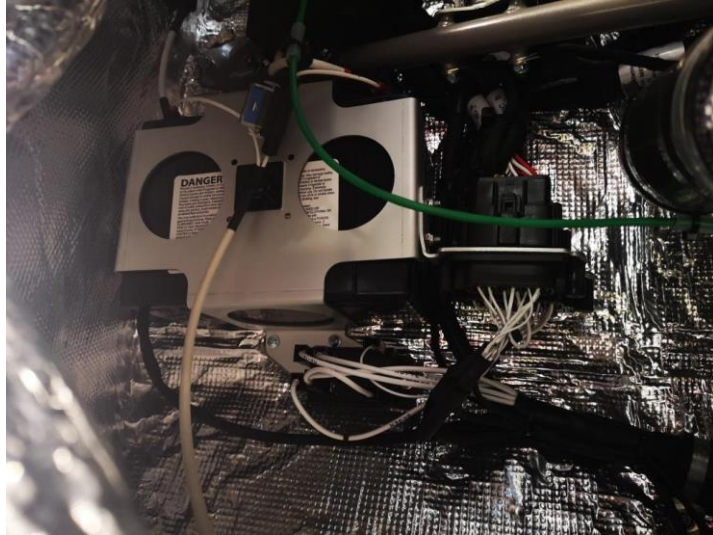


Fig. 1 - Installation Position Battery



25-60-00 0-1 DESCRIPTION: EMERGENCY LOCATOR TRANSMITTER (ELT)

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

CMM Refer to the component/device manufacturer's documentation.

PRECAUTIONS AND SAFETY MEASURES

Refer to the component/device manufacturer's documentation!

PROCEDURES

CAUTION: Device may only be tested with proper testing equipment. Intentional activation for testing without proper testing equipment will lead to false alarms which may initiate an expensive search and rescue alarm chain.

ILLUSTRATIONS



Fig. 1 - Installation Position ELT

26-00-00 0-1 DESCRIPTION: FIRE INDICATING SYSTEM

LNE

GENERAL, REFERENCES AND REQUIREMENTS

SPECIAL TOOLS AND CONSUMABLE MATERIALS

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

ILLUSTRATIONS

Indicator Light	System Status
OFF	Normal Operation (normal resistance)
FLASHING	Fire, abnormal temperature (circuit short-closed)
ON	System Malfunction (circuit open)

Tbl. 1 - Indication Logic

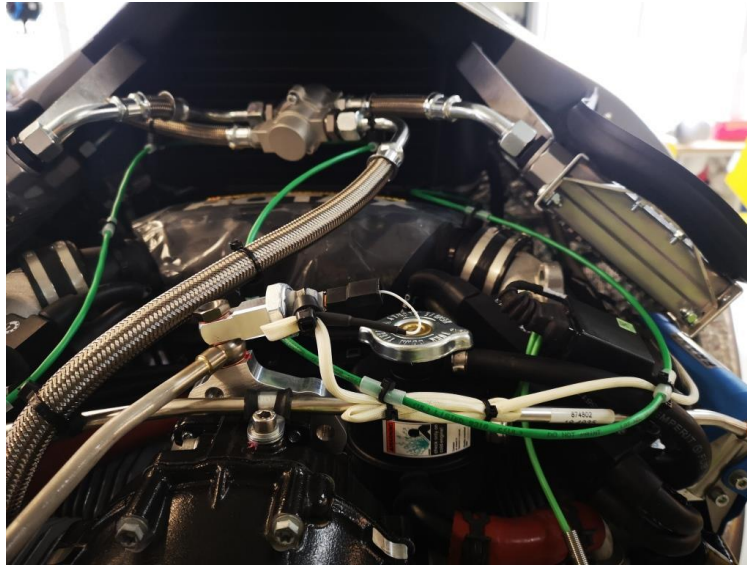


Fig. 2 - Installation - seen from behind



Fig. 3 - Installation - seen from LH side



Fig. 4 - Installation - seen from RH side

27-10-00 5-1 CHECK-ADJUSTMENT: ROLL CONTROL TRAVEL LIMITATION

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

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

Service cover for control linkage must be removed, see [52-40-00 0-1](#).

SPECIAL TOOLS AND CONSUMABLE MATERIALS

88-00-00-S-33588 Screw Securing and Thread-Sealing Varnish yellow

PRECAUTIONS AND SAFETY MEASURES

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

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

PROCEDURES

- 1 Release brake pressure from rotor head by switching the pneumatic mode selector to 'flight'. If necessary switch between 'brake' and 'flight' several times to release brake pressure completely.

NOTE: Procedure will only be successful by checking and adjusting with flight control sticks in neutral pitch position.

Check

- 2 Move and hold control sticks in fully left position so that left gimbal head stop is reached.
- 3 Measure gap at the base control unit between stop screw and ball joint on pilot side (RH), gap must be 2 mm.
- 4 Move and hold control sticks in fully right position so that right gimbal head stop is reached.
- 5 Measure gap at the base control unit between stop screw and ball joint on passenger side (LH), gap must be 2 mm.

Adjustment

- 6 Move and hold control sticks in fully left position so that left gimbal head stop is reached.
- 7 Untighten counter nut of the stop screw at the base control unit on pilot side (RH). Adjust stop screw until gap between stop screw and ball joint is 2 mm.
- 8 Counter-tighten the counter nut to the stop screw to fix the adjustment.
- 9 Apply screw securing varnish to stop screw thread, counter nut and base control link to seal the fixed adjustment.
- 10 Move and hold control sticks in fully right position so that right gimbal head stop is reached. Repeat steps 7 – 9 on the passenger side (LH).

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

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

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

ILLUSTRATIONS

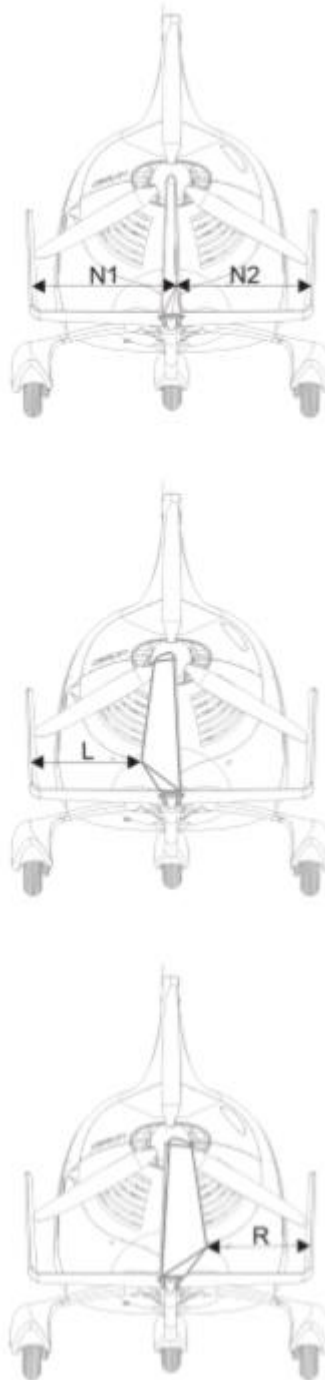


Fig. 1 - Rudder control angle setting



Fig. 2 - Measurement Procedure (example)

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

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

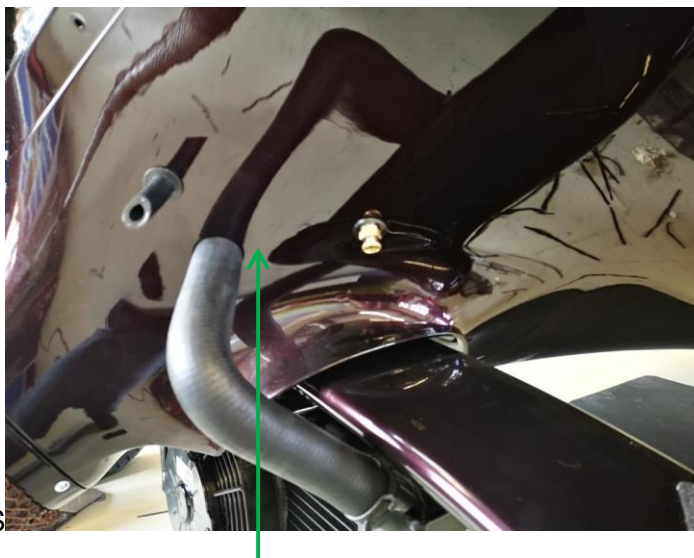
PRECAUTIONS AND SAFETY MEASURES

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

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

PROCEDURES

- 1 Remove and inspect gascolator filter.
- 2 In order to do so, clamp the fuel line to prevent fuel from spilling.
- 3 If contamination is found, clean the filter gauze. Use brake cleaner and compressed air applied
- 4 In case of residual contamination or damage, strainer has to be replaced, see [28-20-00 8-1](#).
- 5 Replace the post-pump filter, see [28-20-00 8-1](#).



ILLUSTRATIONS

Location of gascolator drain point

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

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

PRECAUTIONS AND SAFETY MEASURES

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

PROCEDURES

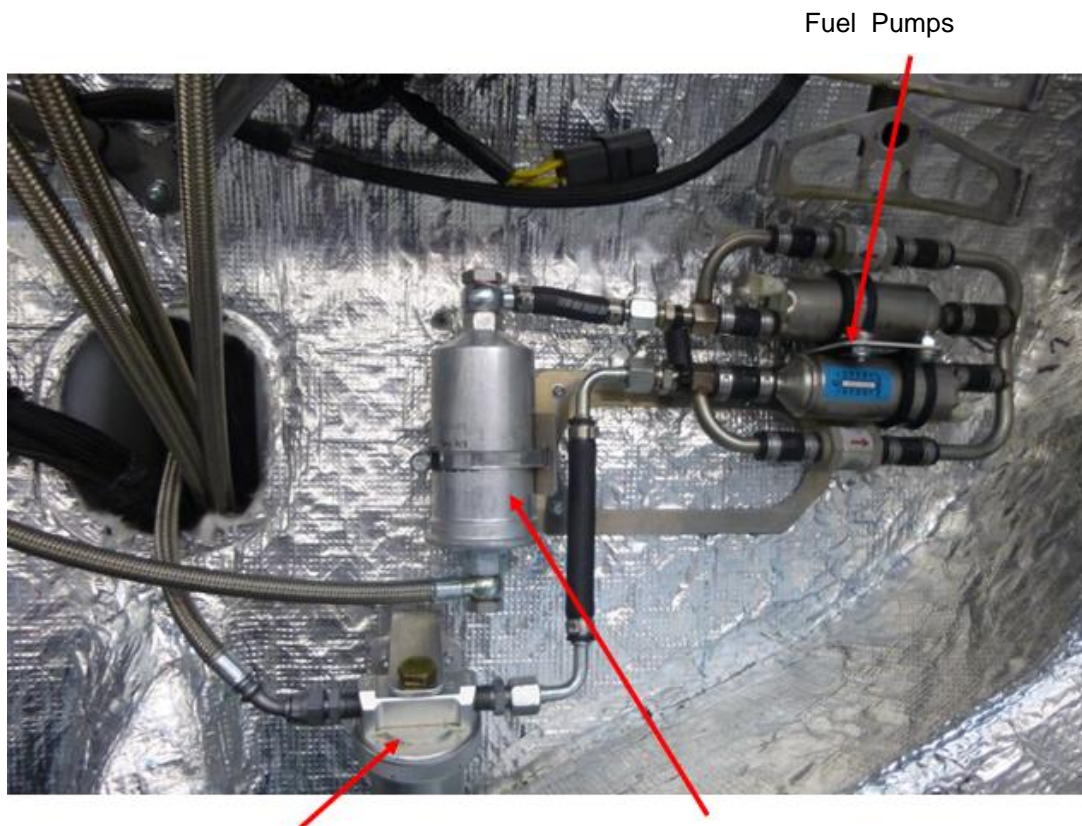
NOTE: Depending on engine variant and optional equipment, number/type of installed fuel filters may differ

- 1 CAUTION: Before disconnecting any fuel lines, clamp respective hoses to prevent fuel spillage.
Applicable to Nylon Filter and KL145
- 2 Disconnect filter and replace with new filter.
- 3 Re-connect hoses to filter and make sure tight fit (no leaks, dry).
- 4 Remove clamps from fuel hoses.

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
1	1	Fuel filter	L1 73-00-00-V-47195	

ILLUSTRATIONS



Fuel Pumps

Gascolator

Fuel Filter

Fig 1

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

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

PRECAUTIONS AND SAFETY MEASURES

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

PROCEDURES

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

- 1 Clamp respective hoses to prevent fuel spillage.
- 2 Unscrew both terminal nuts and disconnect both ring eye cable connectors. Isolate blank connectors to prevent electrical short-cut.
- 3 Disconnect fuel lines from pump.
- 4 Untighten attachment hardware and replace fuel pump.
- 5 Install new fuel pump and tighten attachment hardware.

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

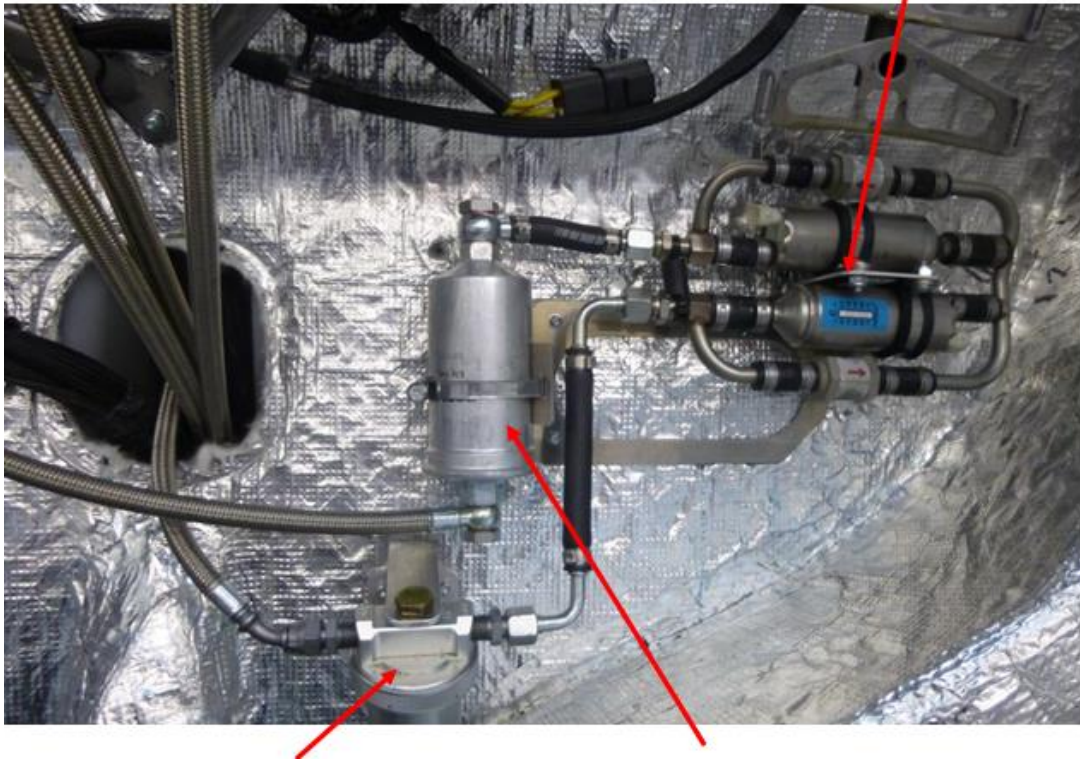
- 6 Re-connect electrical cable connectors and tighten terminal nuts. Secure terminal nuts with securing paint.
- 7 Re-connect hoses to pump and make sure tight fit.
- 8 Remove clamps from fuel hoses.
- 9 Activate respective fuel pump and check function and proper fuel line connection (no leaks, dry).

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
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ILLUSTRATIONS

Fuel Pumps



Gascolator

Fuel Filter

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

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-02 Loctite 243 blue (88-00-00-S-30483)
AG-GRS-01 Lagermeister WHS 2002 Grease (88-00-00-S-30477)

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

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

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
1	1	M10x20	NPI	
1	2	U11x34x3	NPI	
1	3	nose wheel steering	NPI	
1	4	O-Ring 30x5	NPI	
1	5	steering bush	L2 32-00-00-V-22169	
1	6	nosewheel fork long welded	NPI	
1	7	steering bush	L2 32-00-00-V-22169	
1	8	shock absorber 2,5	NPI	
1	9	Nose wheel spat nosewheel painted	L1 53-00-00-V-32070	
1	10	M6x12 round head	NPI	
1	11	U6/18	NPI	
1	12	M10, Si	NPI	
1	13	U10	NPI	
1	14	Nosewheel axle M10x155 DIN 912	NPI	
1	15		32-00-00-V-31914	

ILLUSTRATIONS

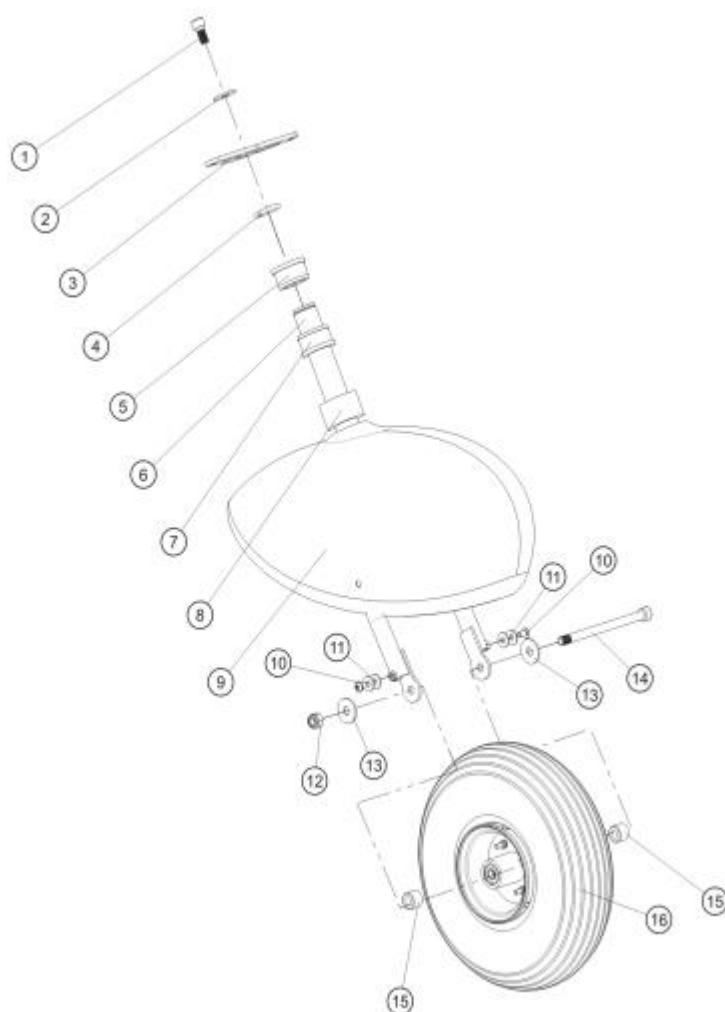


Fig. 1 - Nose gear assembly

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-02 Loctite 243 blue (88-00-00-S-30483)
LR IMPORTANT NOTE: Procedure involves parts with limited reusability. Check parts list below before starting job!

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

Nose wheel - Removal

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

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

Nose wheel - Installation

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

Main wheel - Removal

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

Main wheel - Installation

- 10 Insert main wheel on axle assembly (Fig. 3, 7/9).
- 11 Insert 4 x bolt (Fig. 3, 3) with new serrated washer (Fig. 3, 4) and attach brake disc to main wheel.
- 12 Torque-tighten bolts (Fig. 3, 3) with 10 Nm in crosswise sequence.
- 13 Install castellated nut (Fig. 3, 18) and torque-tighten nut with 35 Nm.
- 14 Install split pin (Fig. 3, 5).
- 15 Check free rotation of wheel, radial run-out and braking action.
- 16 Install wheel spat, if required.

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
1	1	M10x20	NPI	
1	2	U11x34x3	NPI	

1	3	nose wheel steering	NPI
1	4	O-Ring 30x5	NPI
1	5	steering bush	L2 32-00-00-V-22169
1	6	nosewheel fork long welded	NPI
1	7	steering bush	L2 32-00-00-V-22169
1	8	shock absorber 2,5	NPI
1	9	Nose wheel spat nosewheel painted	L1 53-00-00-V-32070
1	10	M6x12 round head	NPI
1	11	U6/18	NPI
1	12	M10, Si	NPI
1	13	U10	NPI
1	14	Nosewheel axle M10x155 DIN 912	NPI
1	15		32-00-00-V-31914
3	1		53-00-00-V-32781
3	2		53-00-00-V-32781
3	3	M6x12 round head	L1 32-40-00-V-30004
3	4	Safety washer M6	L1 32-40-00-V-30004
3	5	Split pin 3.2x40	L1 32-00-00-V-32136
3	6	spacer 26-5/20,2	L1 32-00-00-V-32136
3	7	wheel axis welded	L1 32-00-00-V-32136
3	8	Stop nut M6	L1 32-00-00-V-32136
3	9	brake caliper bracket installed	L1 32-00-00-V-32136
3	10	M6x25 counter sunk	L1 32-00-00-V-32136
3	11	Brake caliber	NPI
3	12	Brake pad outer (small)	L2 32-40-00-V-30512
3	13	Brake Disc	L1 32-40-00-V-30004
3	14	Cylinder bushing 22x10x6	NPI
3	15	Brake pad inner (big)	L2 32-40-00-V-30511
3	16	Safety washer M6	NPI
3	17	M6x40	NPI
3	18	castle nut M18x1	L1 32-00-00-V-32136
3	19	Alu bush Prerotator brake	L1 53-00-00-V-32781
3	20	U6/25 Big washer	L1 53-00-00-V-32781
3	21	M6x60 rounded head	L1 53-00-00-V-32781
4	1	Roller bearing 6204 ZRS	L2 32-00-00-V-20078
4	2	Tube standard	L0 32-00-00-V-26651
4	3	Tyre standard	L0 32-00-00-V-20080
4	4	Rimm installed	L1 32-00-00-V-30595
4	5	Spacer wheel	L1 32-00-00-V-30595
4	6	Roller bearing 6204 ZRS	L2 32-00-00-V-20078

ILLUSTRATIONS

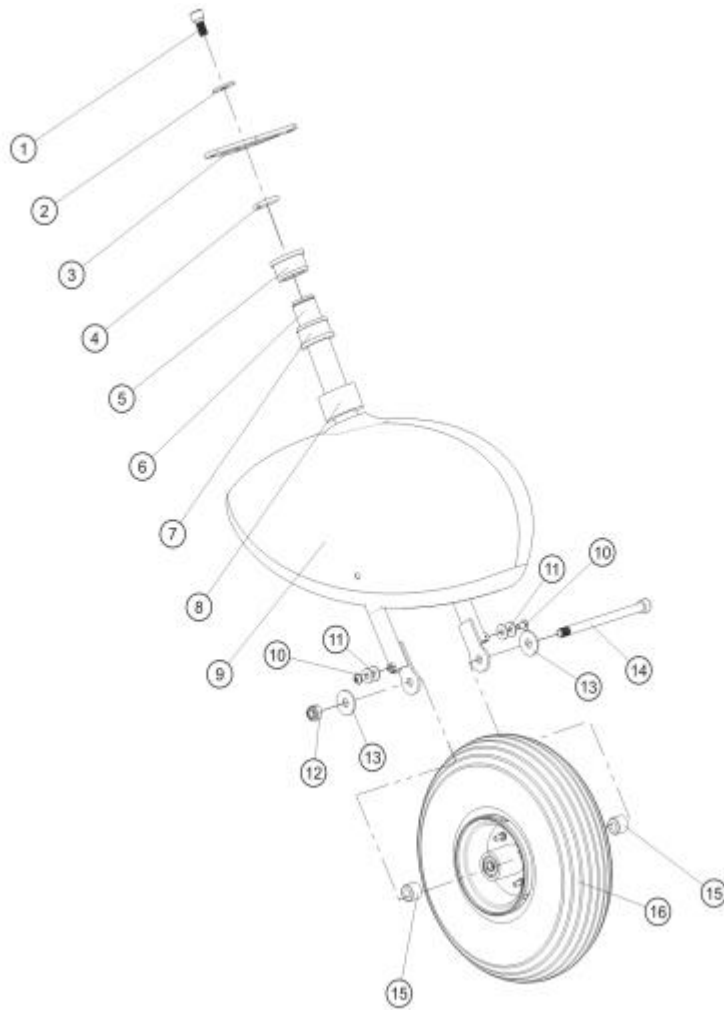


Fig. 1 - Nose gear assembly

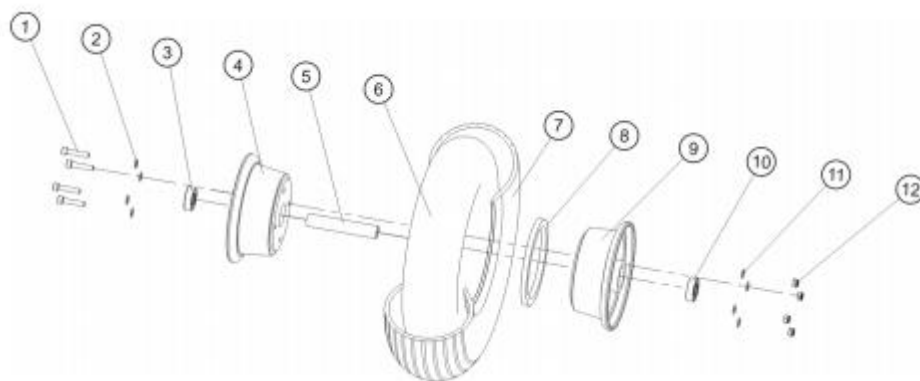


Fig. 2 - Nose wheel

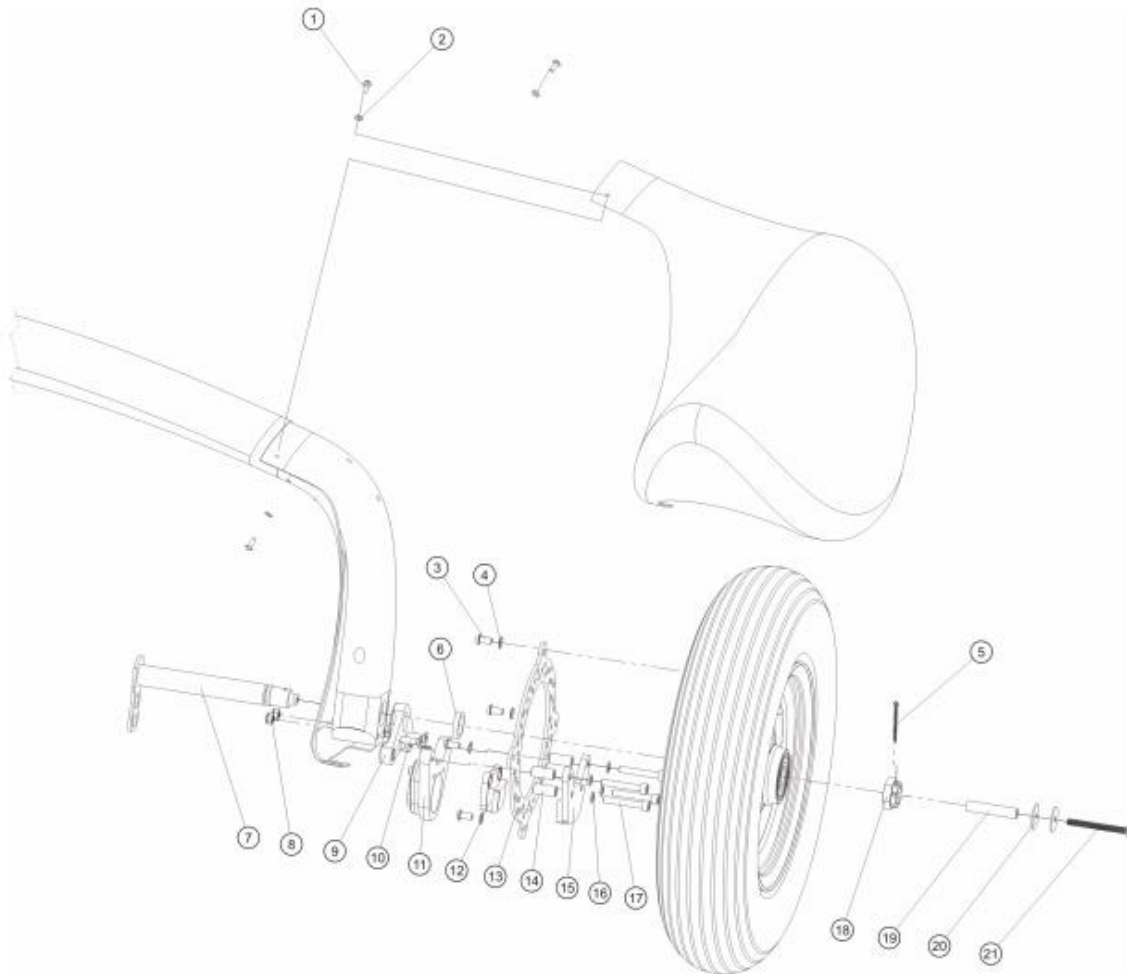


Fig. 3 - Main gear assembly

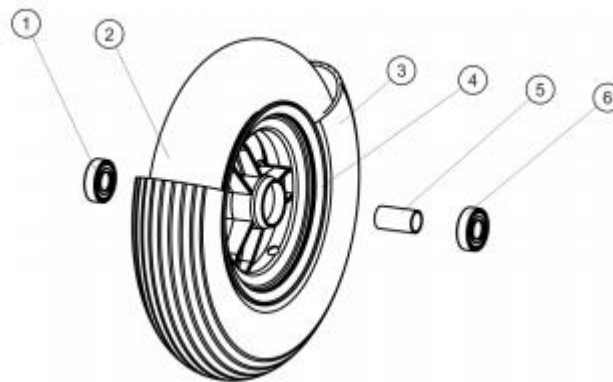


Fig. 4 - Main wheel

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Gyroplane must be jacked, see [07-00-00 2-2](#)

Affected wheel must be removed, see [32-40-00 4-1](#)

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-LUB-04 Silicone Spray (88-00-00-S-30490)

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

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

PRECAUTIONS AND SAFETY MEASURES

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

PROCEDURES

- 1 Pull out brake disc (13) between brake pads.
- 2 Remove 4 x shaft bolt (17) with serrated washer (16).
- 3 Remove brake pad (12) and (15). Dispose of properly!
- 4 Clean 4 x guide sleeves of axle assembly (14) and inspect for damage, scores or run-in grooves.
- 5 Apply a thin layer of silicone spray on guide sleeves of axle assembly.
- 6 Fit new brake pad (12) onto lower guide sleeves.
- 7 Fit new brake pad (15) onto upper guide sleeves.
- 8 Insert 4 x shaft bolt (17) with serrated washers (16) and torque-tighten with 10 Nm. Make sure that brake caliper and pad moves easily about the running sleeve.
- 9 Insert brake disc between brake pads.
- 10 In order to re-install wheel continue with [32-40-00 4-1](#).

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
1	1		53-00-00-V-32781	
1	2		53-00-00-V-32781	
1	3	M6x12 round head	L1 32-40-00-V-30004	
1	4	Safety washer M6	L1 32-40-00-V-30004	
1	5	Split pin 3.2x40	L1 32-00-00-V-32136	
1	6	spacer 26-5/20,2	L1 32-00-00-V-32136	
1	7	wheel axis welded	L1 32-00-00-V-32136	
1	8	Stop nut M6	L1 32-00-00-V-32136	
1	9	brake caliper bracket installed	L1 32-00-00-V-32136	
1	10	M6x25 counter sunk	L1 32-00-00-V-32136	
1	11	Brake caliber	NPI	
1	12	Brake pad outer (small)	L2 32-40-00-V-30512	
1	13	Brake Disc	L1 32-40-00-V-30004	

1	14	Cylinder bushing 22x10x6	NPI
1	15	Brake pad inner (big)	L2 32-40-00-V-30511
1	16	Safety washer M6	NPI
1	17	M6x40	NPI
1	18	castle nut M18x1	L1 32-00-00-V-32136
1	19	Alu bush Prerotator brake	L1 53-00-00-V-32781
1	20	U6/25 Big washer	L1 53-00-00-V-32781
1	21	M6x60 rounded head	L1 53-00-00-V-32781

ILLUSTRATIONS

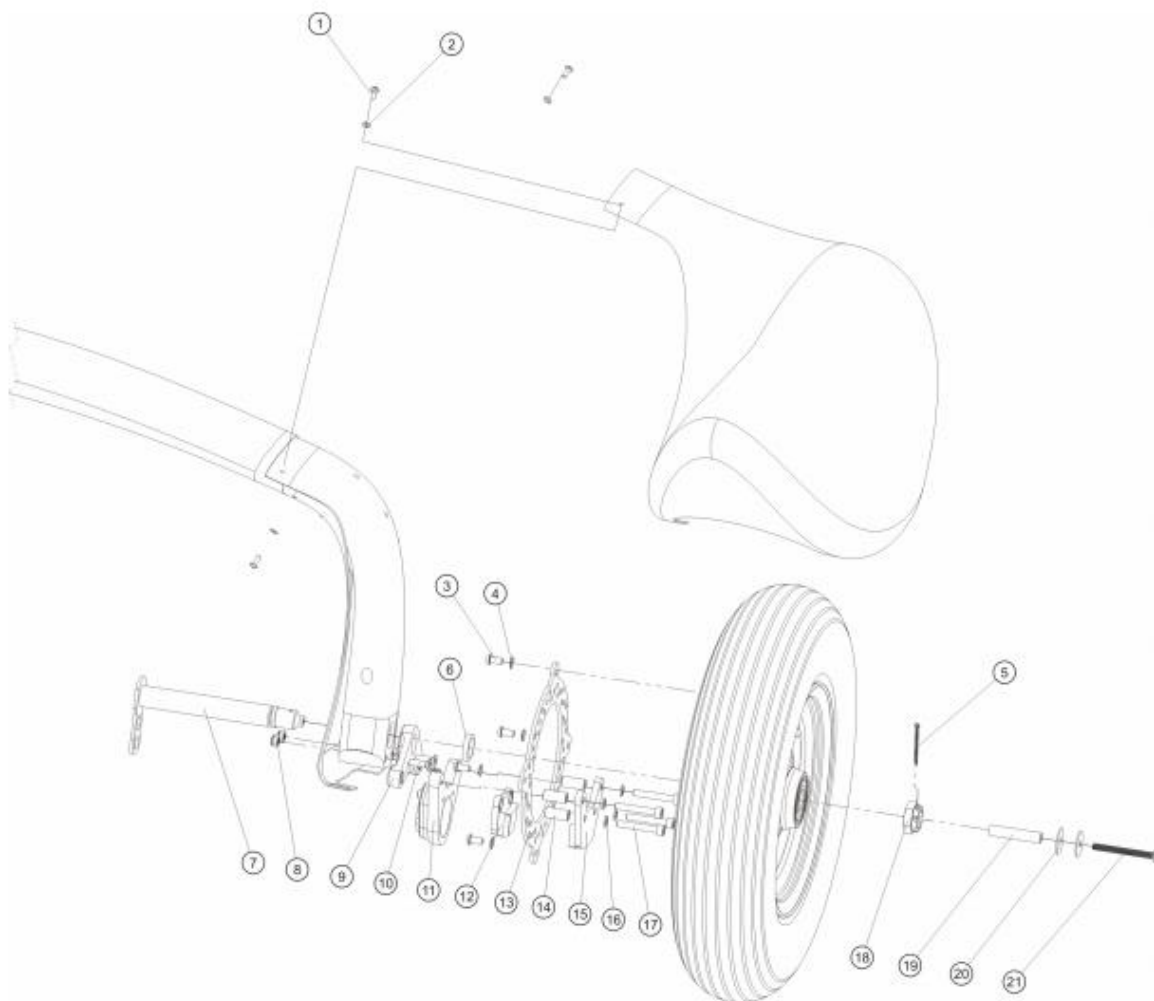


Fig. 1 - Main wheel with brake

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Gyroplane must be jacked, see [07-00-00 2-2](#)

Affected wheel must be removed, see [32-40-00 4-1](#)

SPECIAL TOOLS AND CONSUMABLE MATERIALS

ContactAG For special tools or assistance contact AutoGyro customer support

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

- 1 Perform work according to exploded views.

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
2	1	Roller bearing 6204 ZRS	L2 32-00-00-V-20078	
2	2	Tube standard	L0 32-00-00-V-26651	
2	3	Tyre standard	L0 32-00-00-V-20008	
2	4	Rimm installed	L1 32-00-00-V-30595	
2	5	Spacer wheel	L1 32-00-00-V-30595	
2	6	Roller bearing 6204 ZRS	L2 32-00-00-V-20078	

ILLUSTRATIONS

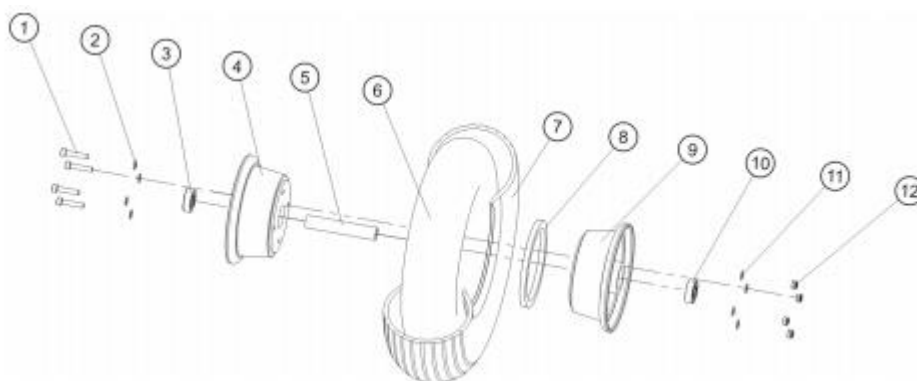


Fig. 1 - Nose wheel

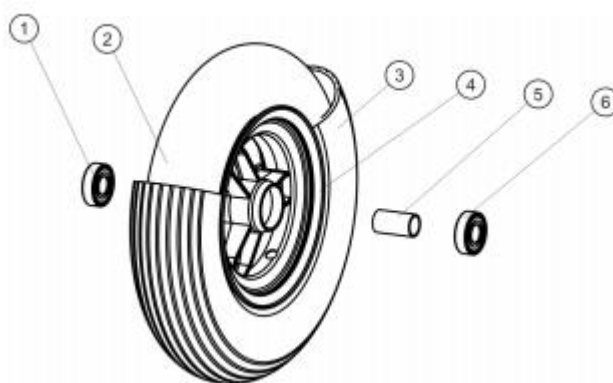


Fig. 2 - Main wheel and bearing

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 carry out '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

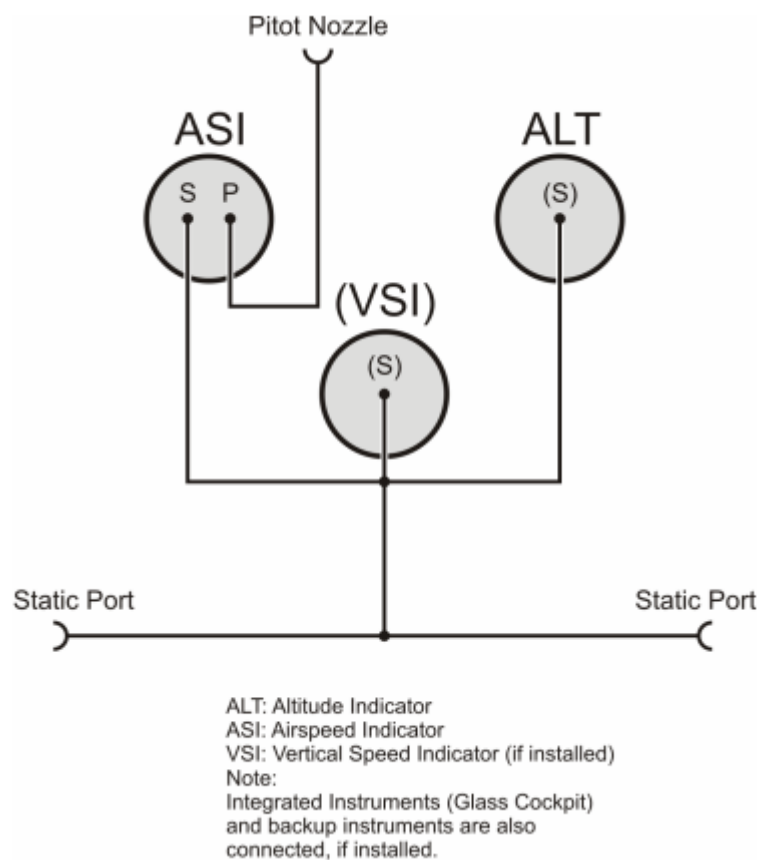


Fig. 2 - Pitot Static Instruments Connecting Diagram

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 carry out '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

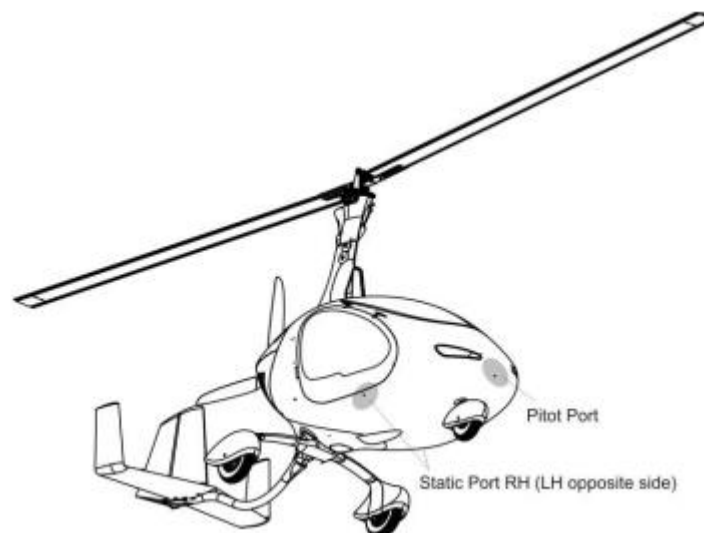


Fig. 1 - Static ports (2 x) and pitot port

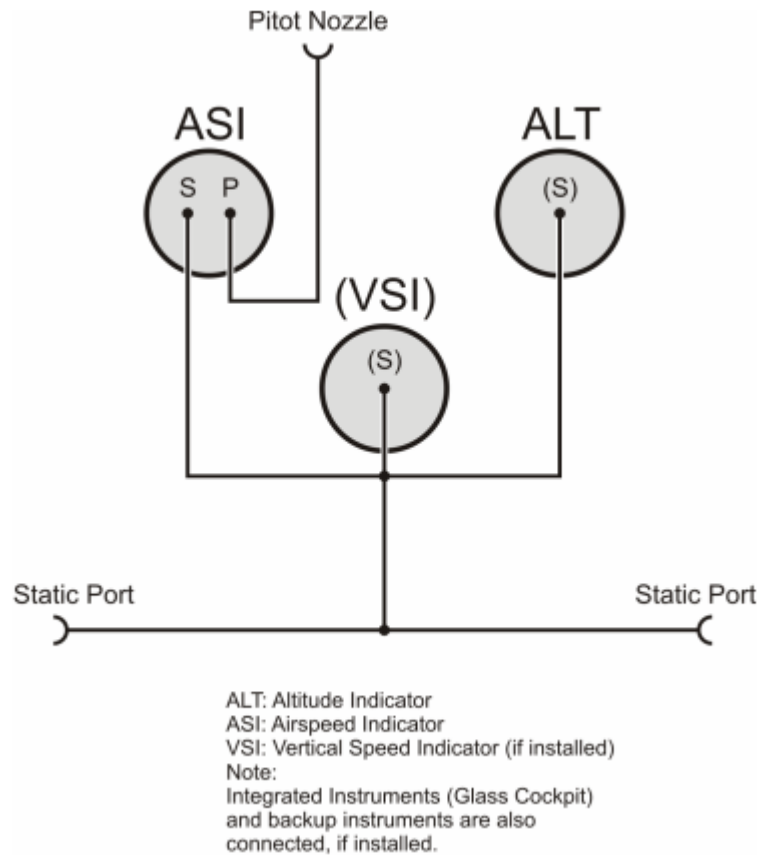


Fig. 2 - Pitot Static Instruments Connecting Diagram

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

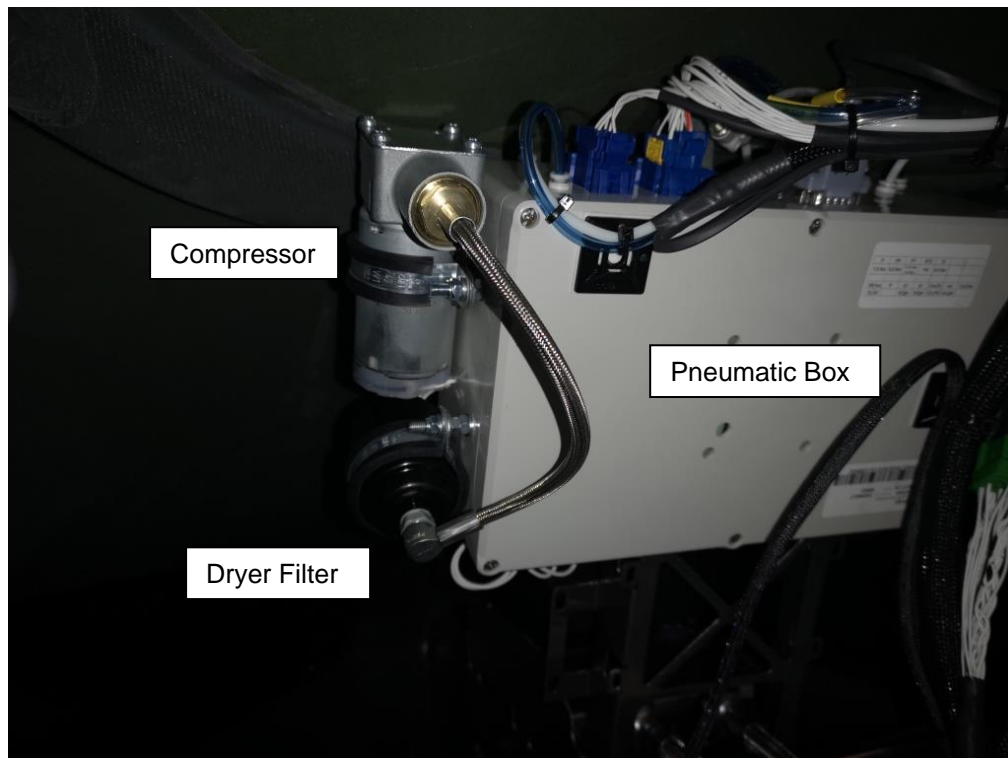
SPECIAL TOOLS AND CONSUMABLE MATERIALS

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

- 1 Gain access to the pneumatic box situated behind the centre cockpit panel.
- 2 Unscrew inlet and outlet connection of the dryer-filter and discard old seal ring (compressor side only).
- 3 Replace filter/dryer with new one and make sure cartridge is tightened safely to rear wall. Install new seal ring.
- 4 Re-connect and tighten inlet and outlet connection with moderate torque.

ILLUSTRATIONS



52-00-00 4-1 REMOVAL-INSTALLATION: COWLINGS**OPR****GENERAL, REFERENCES AND REQUIREMENTS**

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

Secure gyroplane against unauthorized or unintended operation!

SPECIAL TOOLS AND CONSUMABLE MATERIALS**PRECAUTIONS AND SAFETY MEASURES****PROCEDURES****Upper engine cowling (1) - Removal**

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

Upper engine cowling (1) - Installation

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

Lower engine cowling (2) - Removal

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

Lower engine cowling (2) - Installation

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

Mast cover (3) - Removal

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

Mast cover (3) - Installation

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

ILLUSTRATIONS

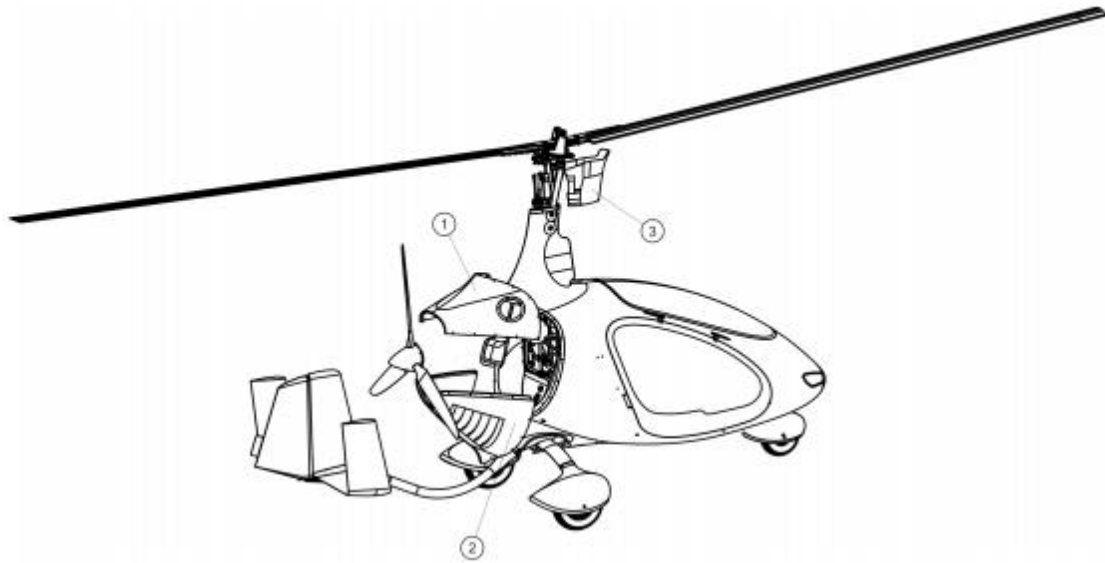


Fig. 1 - Cowling and mast cover

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

SPECIAL TOOLS AND CONSUMABLE MATERIALS

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

ILLUSTRATIONS



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



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

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-01	Loctite 221 red (88-00-00-S-30487)
SP	IMPORTANT NOTE: Procedure involves spare parts. Check parts list below for ordering details of affected components!

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

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

ILLUSTRATIONS

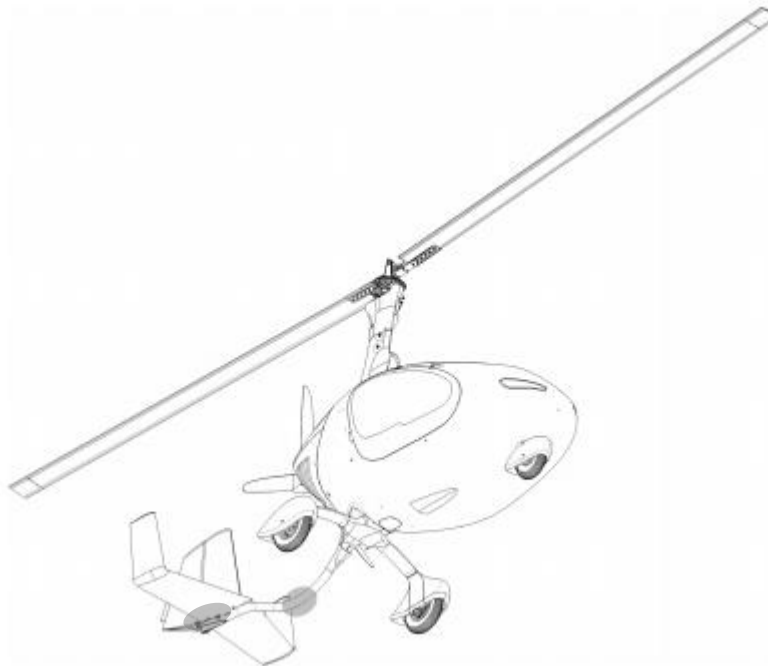


Fig. 1 - Installation position of keel tube protection pads

56-00-00 8-1 REPAIR: CRACKS IN ACRYLIC GLASS

OPR

GENERAL, REFERENCES AND REQUIREMENTS

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

Repair only by a competent person.

Absolute cleanliness at any time during execution of the procedure must be ensured.

The following procedure is only approved for ductile (not brittle) canopies and windows without IR-/UV-protection of AutoGyro aircrafts.

Part must be in removed condition for executing the procedure.

SPECIAL TOOLS AND CONSUMABLE MATERIALS

PRECAUTIONS AND SAFETY MEASURES

WARNING Do not execute procedure in pilot's line of sight!

CAUTION Acrylic glass may not get in contact with thinners, alcohol, fuels etc. Window cleaner contain mostly alcohol. Vapours of thinners in workshops are also damaging.

NOTE The material strength in the area of repair is impaired.

NOTE Only AGOVIT® 1900 is approved.

NOTE Adhesive (AGOVIT® 1900 + KATALYSATOR 20) must be processed as quick as possible.

PROCEDURES

- 1 Clean acrylic glass with dishwashing liquid solution (2-3 drops per 0.2 l lukewarm tap water) and a clean sponge; let air dry or dry with damp chamois leather; for the repair material and adhesive should have a temperature of approx. 20°C.
- 2 Ensure a clean work environment with a temperature of approx. 20°C and good lighting conditions (day light is recommended).
- 3 Recommendation: If possible temper the acrylic glass at 80°C before and after the repair for avoiding stress cracks – material thickness divided by 3 to get the tempering duration in hours.
- 4 Stop drill the crack at the end using a 1.5 mm drill bit.
- 5 Fix crack with adhesive tape on the material bottom side, mill with low revolutions per minute (approx. 3000 min⁻¹) and low pressure a channel into material top side using a small multifunction rotary tool (Fig. 1).
- 6 Remove shavings carefully.
- 7 Position material so the crack is horizontal and mask the surrounding, intact acrylic glass with adhesive tape. Keep a distance to the edge of the channel of approx. 2 mm.
- 8 Stir AGOVIT® 1900 with 3-6 % hardener KATALYSATOR 20 in a PE-cup or glass bubble-free using a glass or metal stirring rod.
- 9 The adhesive must be applied in layers of approx. 2 mm thickness into the channel. The first layer must cover all areas of the channel and must protrude approx. 2 mm over the channel edge (Fig. 2). Any air bubbles or dirt particles can be pushed into the bead of adhesive to the top, as this will later be sanded away again. Next layers will be applied when the last layer is after approximately one hour hardened so far that it is not possible to push a nail or wire in.
- 10 After application of the last layer let adhesive seam harden for two hours at approx. 20°C.
- 11 Turn material upside-down.
- 12 Mill with low revolutions per minute (approx. 3000 min⁻¹) and low pressure a channel into material bottom side using a small multifunction rotary tool (Fig. 3).
- 13 Proceed as in steps 7-10 (Fig. 4).
- 14 Sand adhesive area as follows, begin with the convex outside of the acrylic glass:

- 15 Create dishwashing liquid solution (2-3 drops per 0.2 l lukewarm tap water). Sand with grit 320 wet sandpaper and dishwashing liquid solution to the surface of the tape.
- 16 When the adhesive tape is scratched, remove these and shade the area extensively with a felt pen (Edding blue or red).
- 17 Create new dishwashing liquid solution (2-3 drops per 0.2 l lukewarm tap water). Rinse to be sanded area and aids with dishwashing liquid solution. When carrying on wet sanding with grit 600 and dishwashing liquid solution can now be seen exactly where material is removed.
- 18 Create new dishwashing liquid solution (2-3 drops per 0.2 l lukewarm tap water). Rinse to be sanded area and aids with dishwashing liquid solution. Shade again (Edding blue or red) before reaching the surrounding surface and continue sanding with grit 900 wet sandpaper and dishwashing liquid solution until the shaded area and the adhesive bead are equally abraded.
- 19 Create new dishwashing liquid solution (2-3 drops per 0.2 l lukewarm tap water). Rinse to be sanded area and aids with dishwashing liquid solution. With MicroMesh abrasive cloth grit 3200, a cellular rubber sanding block and dishwashing liquid solution to carry on wet sanding until the surface is uniformly rough.
- 20 Create new dishwashing liquid solution (2-3 drops per 0.2 l lukewarm tap water). Rinse to be sanded area and aids with dishwashing liquid solution. Finish-sand with Micro Mesh abrasive cloth grit 8000, a cellular rubber sanding block and dishwashing liquid solution.
- 21 Create new dishwashing liquid solution (2-3 drops per 0.2 l lukewarm tap water). Clean acrylic glass with dishwashing liquid solution and a clean sponge; let air dry or dry with damp chamois leather.
- 22 Polish with a polishing pad and polishing agent XERAPOL®. Apply a pea-sized mass of polishing agent on the polishing pad. The speed must be selected not higher than approx. 800 min⁻¹. The polishing pad may not be used for too long on one place. Remove at regular intervals used polishing agent with an unused polishing cloth and repeat the process with new polishing agent. The XERAPOL® should result in a closed, silky shimmering layer during polishing. If this is not the case, the amount of polishing agent is too small.

ILLUSTRATIONS

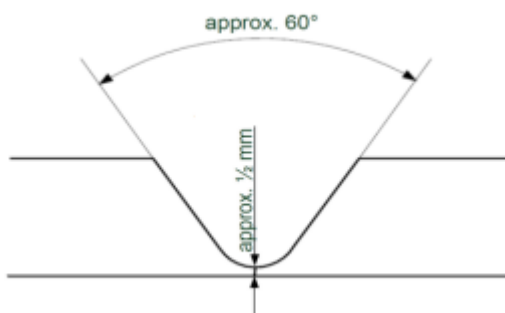


Fig. 1 – Milling of a channel on material top side

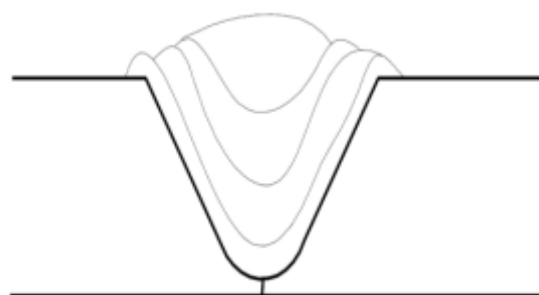


Fig. 2 – Filled channel on material top side

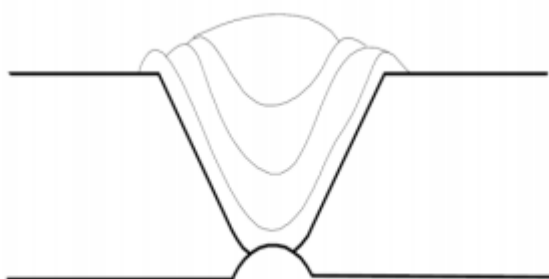


Fig 3. - Channel on material bottom side

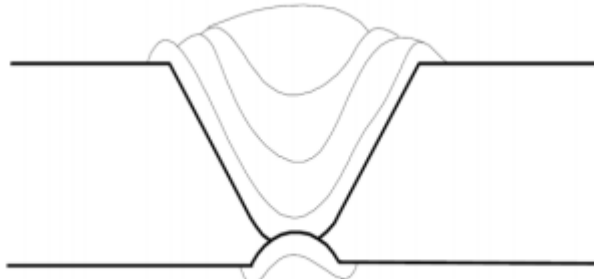


Fig 4. - Filled channels on material top and bottom side

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

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 HTC4B, painted	L2 53-00-00-V-46905	
1	2	M8x110	NPI	
1	3	U8/24	NPI	
1	4	M6x40	NPI	ROTAX 915
1	5	Propeller	L3 61-00-00-V-45479	ROTAX 915
1	5	Propeller	L3 61-00-00-V-45479	ROTAX 915
1	6	Propeller	61-00-00-V-45479	ROTAX 915
1	8	Spinner Plate	61-00-00-V-46906	
1	9		71-00-00-V-31051	
1	10	U4, Poly	NPI	
1	11	torque bush spacer	NPI	
1	12	spacer propeller	NPI	

ILLUSTRATIONS

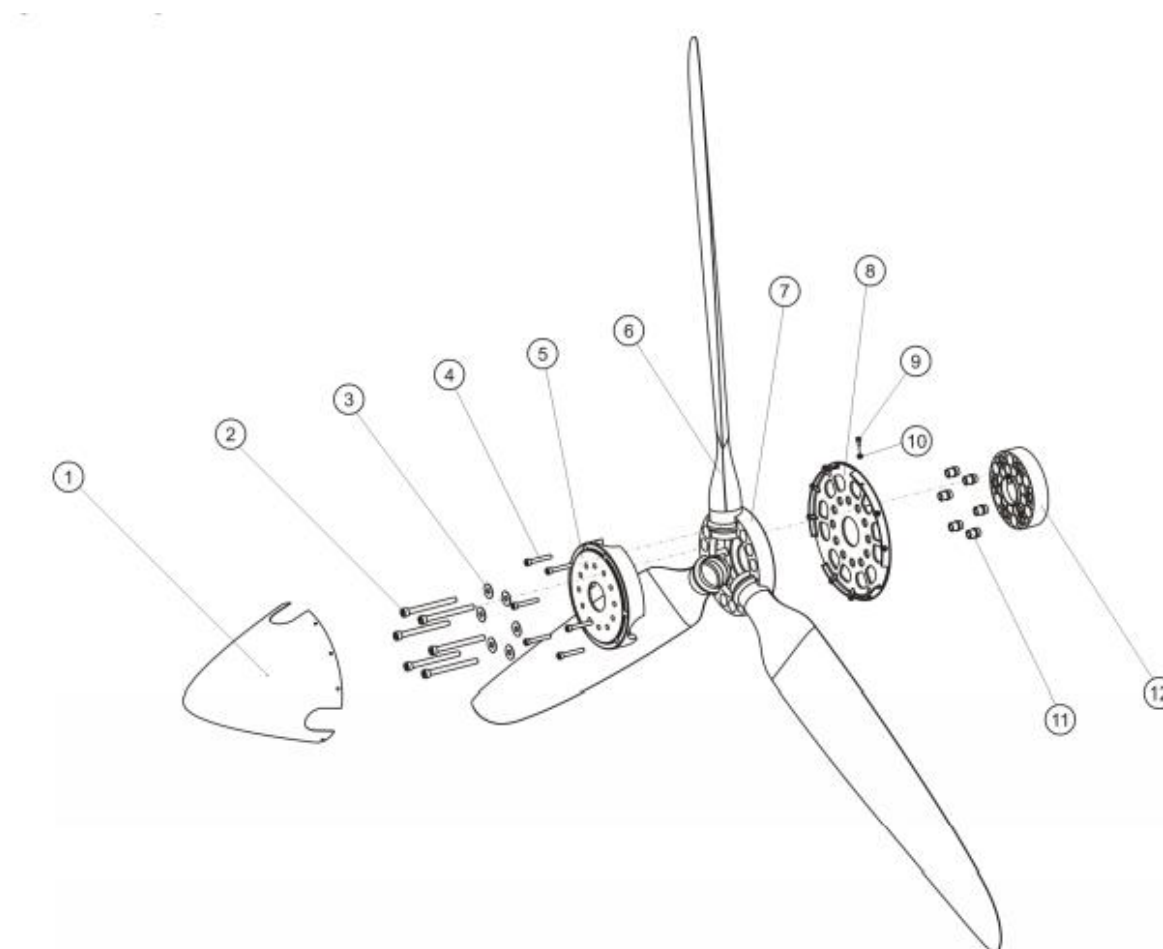


Fig. 1 - Propeller HTC (Note: a 3 bladed propeller is shown, the current HTC propeller for 915iS engines is 4 bladed)

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

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

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

Refere to job card 61-10-00 4-1

Fig.	Pos.	Description	PC PIT	Remark
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ILLUSTRATIONS

FIG. 1 - 1

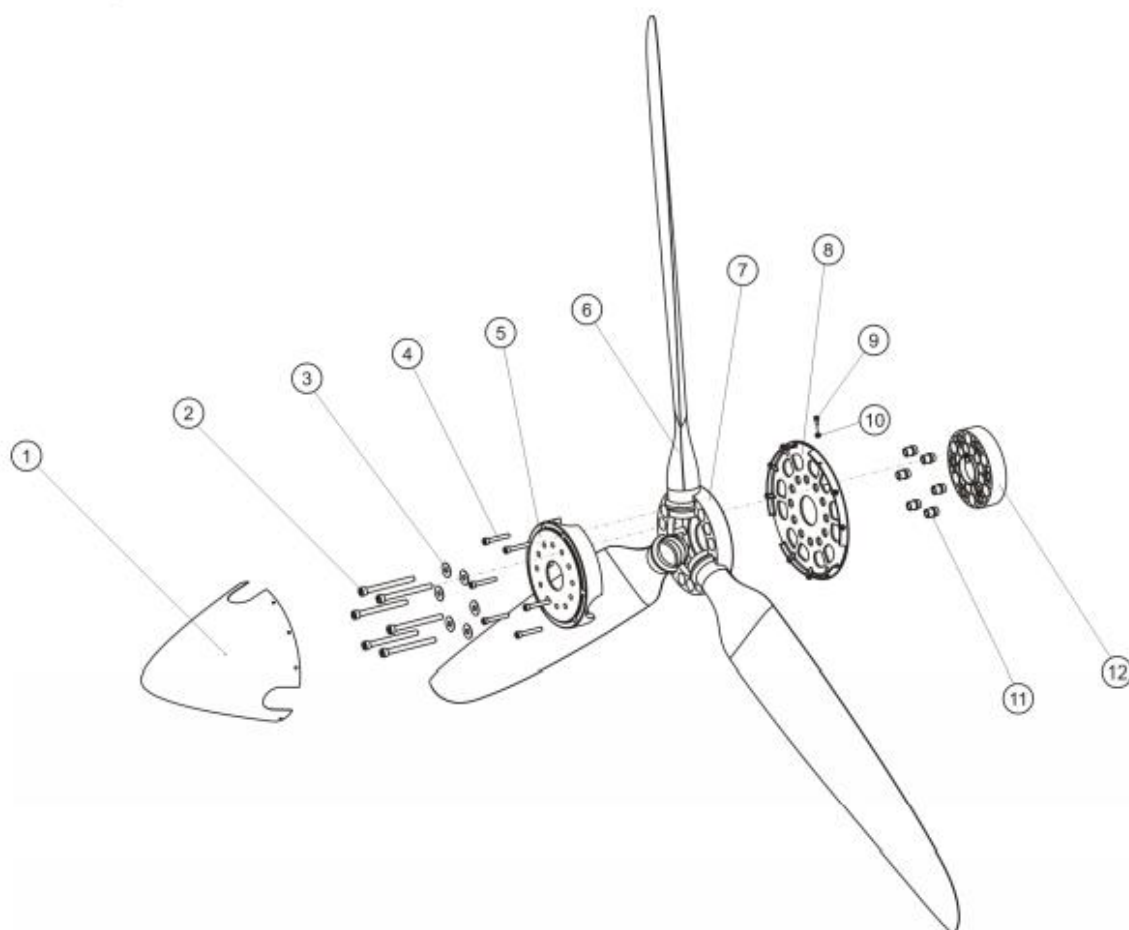


Fig. 1 - Propeller HTC (Note: a 3 bladed propeller is shown, the current HTC propeller for 915iS engines is 4 bladed)

61-10-00 5-1 ADJUSTMENT: PROPELLER PITCH - HTC**LNE****GENERAL, REFERENCES AND REQUIREMENTS**

Task may only be performed by an organization or individual trained and entitled to carry out 'Line Maintenance'!
Spinner (if installed) must be removed, see [61-10-00 4-1](#)

SPECIAL TOOLS AND CONSUMABLE MATERIALS**PRECAUTIONS AND SAFETY MEASURES****PROCEDURES**

- 1 Untighten bolts (Fig. 1, 4) so that bolt heads does not contact outer propeller hub.
- 2 Unscrew bolts (Fig. 1, 2) about 2 revolutions.
- 3 Position propeller pitch adjustment tool with the inner side on outer propeller hub and profiled section on the propeller blade.
- 4 Carefully adjust blade pitch by tapping with a 200 g rubber hammer in the area of the blade's nose section so that blade pitch increases or decreases. Never use hammer on trailing edge as the blade may be damaged that way.
- 5 In order to read the correct setting it is advisable to let the blade's trailing edge rest in (touch) the tool while allowing a small light gap between blade's back and the tool's profiled section.
- 6 Repeat work steps 3 to 5 for the remaining blades.
- 7 Hand-tighten bolts (Fig. 1, 2) and (Fig. 1, 4) and check blade pitch setting for all blades. If necessary, untighten bolts and re-do from step 1.
- 8 Torque-tighten bolts (Fig. 1, 2) with 15 Nm in crosswise sequence.
- 9 Torque-tighten bolts (Fig. 1, 4) with 10 Nm in crosswise sequence.
- 10 Perform torque-check after first flight or ground run.

PARTS LIST

ILLUSTRATIONS (Note: Propellers shown are 3 blade. 915 engines are fitted with a 4 blade HTC propeller, but the same principles apply)

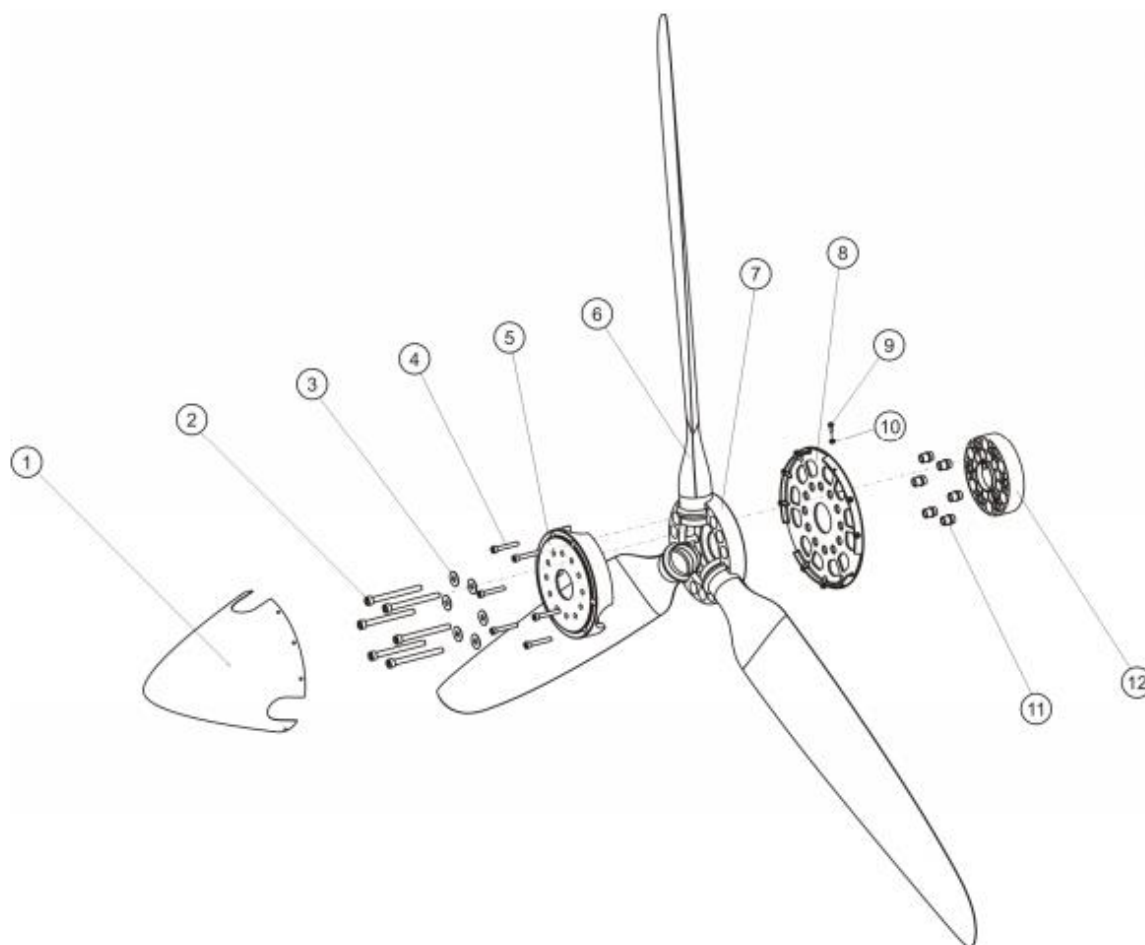


Fig. 1 - Propeller HTC



Fig. 2 - Propeller pitch adjustment and tool

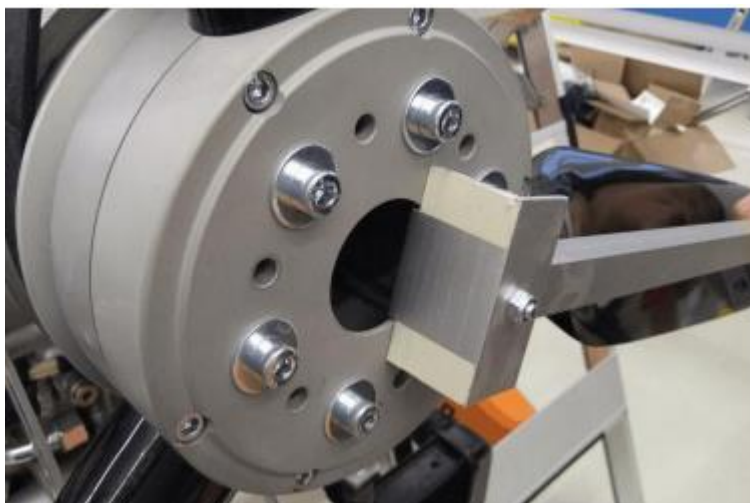


Fig. 3 - Detail hub

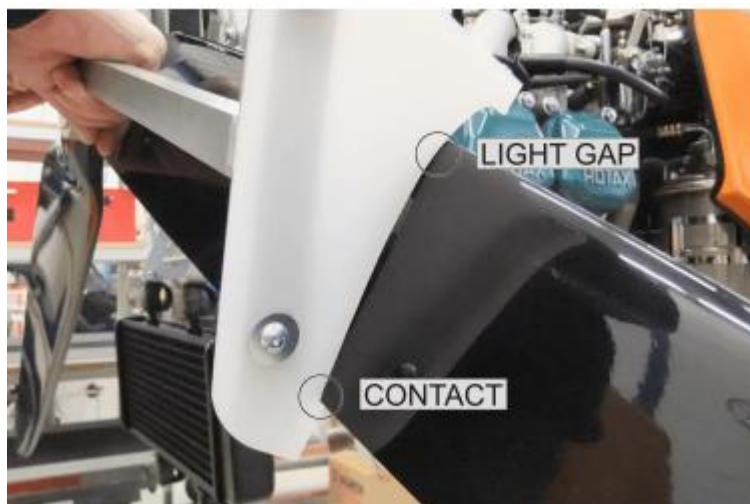


Fig. 4 - Detail blade

61-20-00 1-1 TROUBLE-SHOOTING: HTC Prop**LNE****GENERAL, REFERENCES AND REQUIREMENTS**

Propeller repair.

Surface damage not tearing through the glass or carbon fibre, or splitting through the mould line (middle of the leading edge along the blade), may be repaired using suitable epoxy resin, or superglue and carbon. If the surface is damaged from excess exposure to water (rain) in flight, then use of propeller protection tape fitted to the leading edge may be considered. Fitment will lead to a small performance deterioration. Heat on the tape during fitment will allow easier fitting along the curved edge. If fitted, the integrity of this tape must be examined at each 100hr/Annual inspection. There must be no air-bubbles under the tape, no lifting of any edge, or any deterioration (e.g. splitting) of the tape itself. Should the tape installation be defective it may be replaced (individual blades acceptable). Follow the product fitting instructions.

Propeller balance.

A well balanced propeller will significantly improve the engine and ancillary component service life. The Rotax recommended maximum out of balance force on the propeller shaft is 0.1ips.

SPECIAL TOOLS AND CONSUMABLE MATERIALS

Q-Bond is a suitable material for repairing light leading edge damage.

PRECAUTIONS AND SAFETY MEASURES

Follow the instructions given with the adhesive.

Record the repair in the aircraft documentation

PROCEDURES – Blade repair

The area must be thoroughly cleaned of insect debris and dirt, and abraded to give a good fresh key to bond into. Mix and load the epoxy onto the blade as per the adhesive instructions.

Superglue repairs using materials such as Q-Bond are built up in stages, a small drop of glue followed by a sprinkle of carbon or charcoal (which instantly sets the adhesive). Build up in layers to the thickness required

Once the adhesive is fully cured, flat back to the original blade profile and polish in for best performance

PROCEDURES – Propeller Balancing

Mass balance weights may either be suitably weighted washers fitted under the propeller fitment bolts, or self adhesive aluminium wheel balance weights as used on car wheels, fitted inside the propeller hub to a well cleaned, dry, surface.

If using washers under the prop bolts, use no more than three 2mm washers extra under each standard prop bolt, unless a minimum of 6 full threads of engagement are obtained between the bolt and the flanged nut (measure by checking the depth of the bolt from the flange –nut depth 9mm max).

If more washers are required, and/or there is insufficient thread engagement, fit a longer bolt to suit, and ensure no more than 8mm of thread is protruding beyond the nut flange.

For aircraft where the propeller has been dynamically balanced on the aircraft prior to aircraft release to service do not add more than two washers without understanding the cause of the balance change. Otherwise fit no more than 10 x 2mm thick washers.

Rotor balancing is undertaken using proprietary equipment, and by following the associated instructions.

ILLUSTRATIONS

None

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

ILLUSTRATIONS

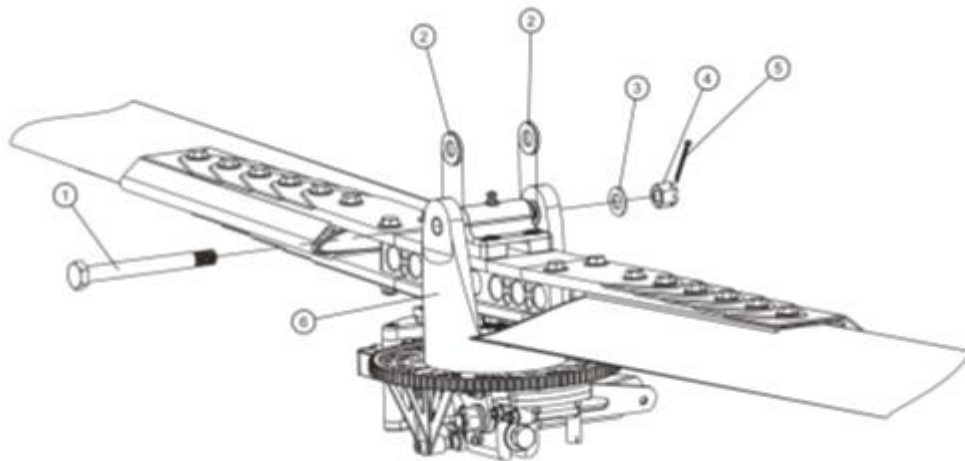


Fig. 1 - Removal rotor - teetering parts

62-11-00 4-2 DISASSEMBLY: ROTOR - TEETERING PARTS**OPR****GENERAL, REFERENCES AND REQUIREMENTS**

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

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

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

PRECAUTIONS AND SAFETY MEASURES

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

CAUTION: The rotor hub must never be disassembled!

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

PROCEDURES

- 1 To disassemble the rotor system, place it upside down onto a clean surface or stands to support the rotor at approximately 2 m from the hub.
- 2 Unscrew and discard self-locking nuts (9) on the first blade by counter-holding the corresponding bolt head to prevent it from turning.
- 3 Push out all shoulder bolts (1 - 5) without any force, but use no more than a gentle tapping if necessary. Tilt the rotor blade up and down to support easy removal of the bolt
- 4 Carefully pull the rotor blade out of the hub (7) in radial direction and take off the clamping profile (10).
- 5 Repeat step 2 to 4 on second rotor blade.

IMPORTANT NOTE: Do not disassemble the rotor hub!

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

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

PARTS LIST

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

ILLUSTRATIONS

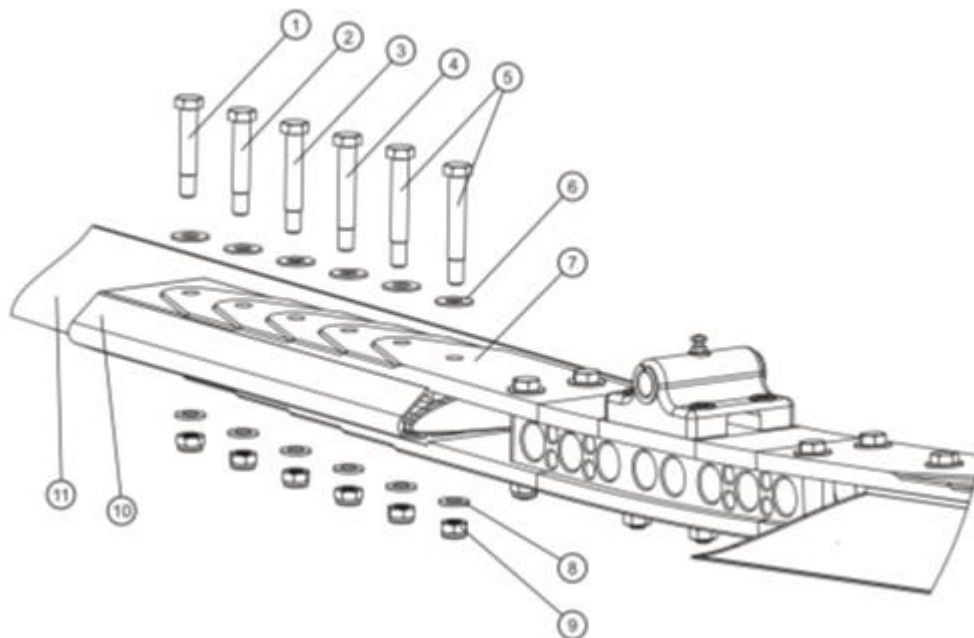


Fig. 1 - Disassembly rotor - teetering parts

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

ILLUSTRATIONS

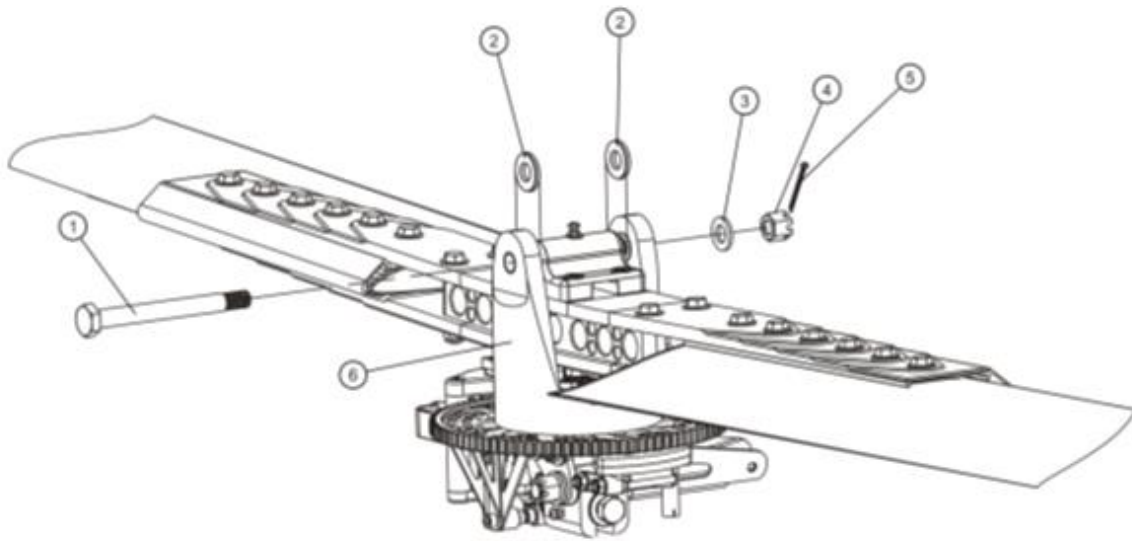


Fig. 1 - Assembly rotor - teetering parts

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.
- 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	
1	2	Chimm washer 3,5	L0 62-00-00-S-31706	
1	3	U13	L0 27-30-00-S-30256	
1	4	M12 castle nut	L0 27-30-00-S-30256	
1	5	Split pin 3.2x40	L0 27-30-00-S-30256	
1	6	Rotor head II compl.	L2 27-30-00-V-33433	

ILLUSTRATIONS

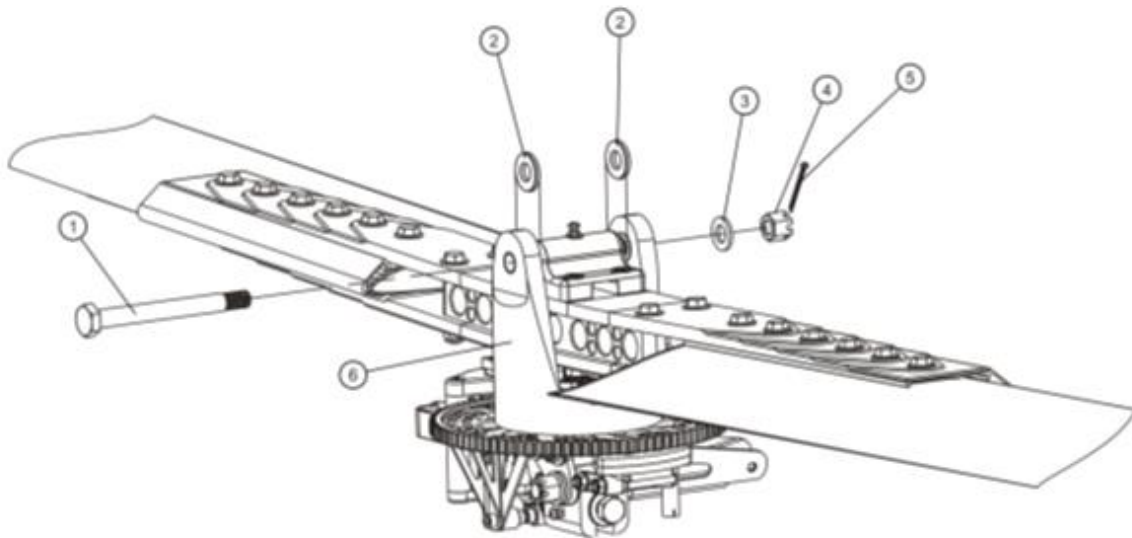


Fig. 1 - Installation rotor - teetering parts

62-11-00 5-1 CHECK-ADJUSTMENT: ROTOR SYSTEM ALIGNMENT

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

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

Rotor system must be placed on suitable supports to avoid scratching of the blades or bending moments at the blade attachment

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

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

WARNING: Do not lift or support the rotor system at its blade tips as the bending moment due to the weight of the hub assembly may overstress the blade roots!

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

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

PROCEDURES

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

ILLUSTRATIONS

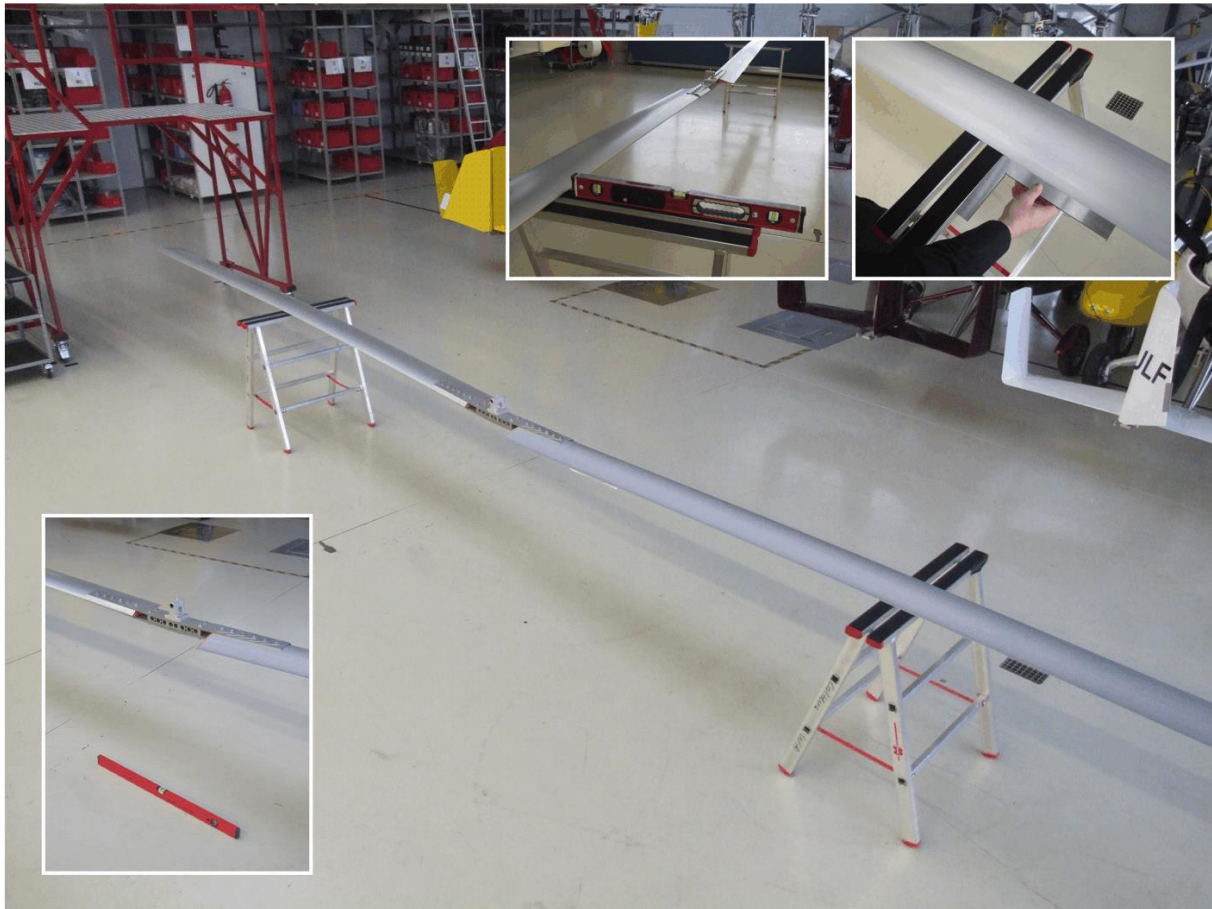


Fig. 1 - Rotor system placed on stands

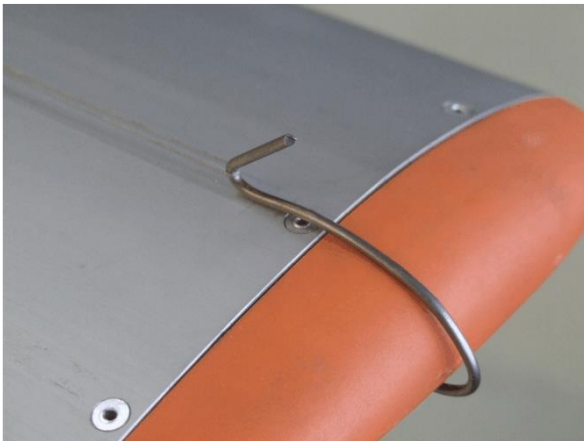


Fig. 2 - Positioning of measuring cord

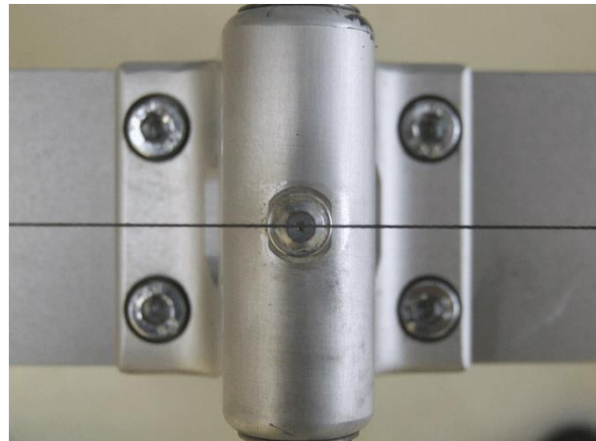


Fig. 3 - Reference point at grease nipple

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

Task may only be performed by an organization or individual trained and entitled to carry out '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-V-20677	
1	2	Bushing TEF-MET 13/15/21x15	L2 27-30-00-V-20677	
		Teeterbolt kit	L0 27-30-00-S-30256	

ILLUSTRATIONS

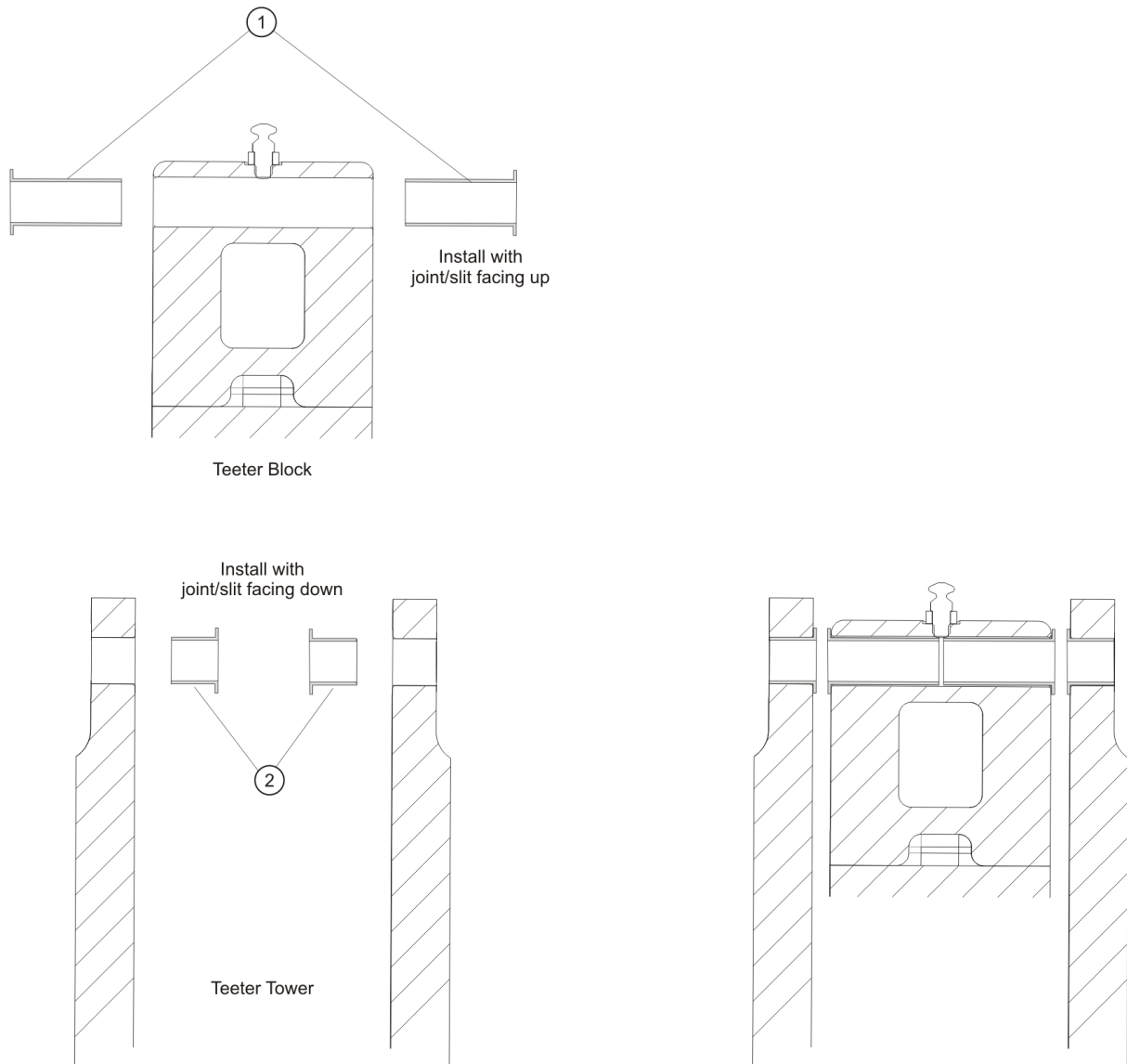


Fig. 1 - Teeter bushings, block and tower - cross section view

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

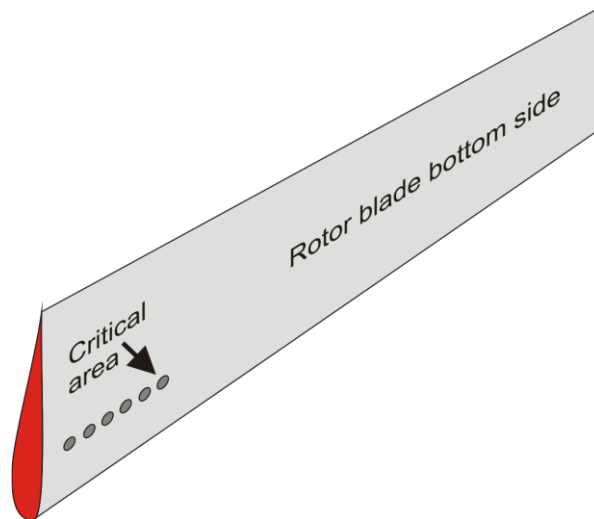


Fig. 1 - Critical blade area

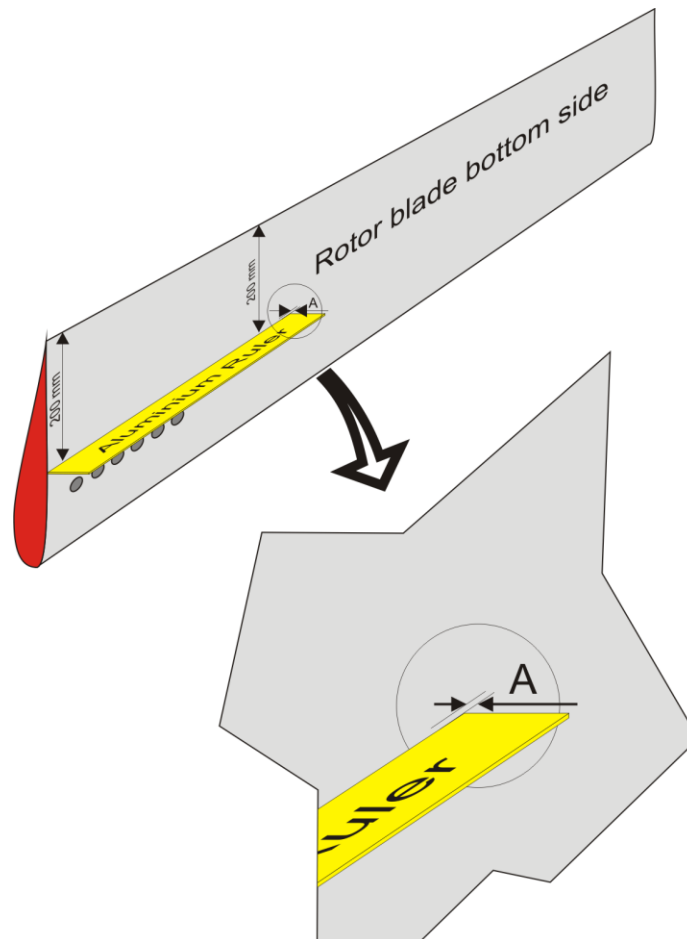


Fig. 2 - Measurement of blade root linearity

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 carry out 'Line Maintenance'!

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

Rotor system must be placed on suitable supports to avoid scratching of the blades or bending moments at the blade attachment

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-GRS-01 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	M8x60 Rotor blade bolt 8.8 DIN 610	L0 62-00-00-V-20661	
1	2	U9/20	L1 62-00-00-S-33355	
1	3	U8	L1 62-00-00-S-33355	
1	4	M8 Si	L1 62-00-00-S-33355	

ILLUSTRATIONS

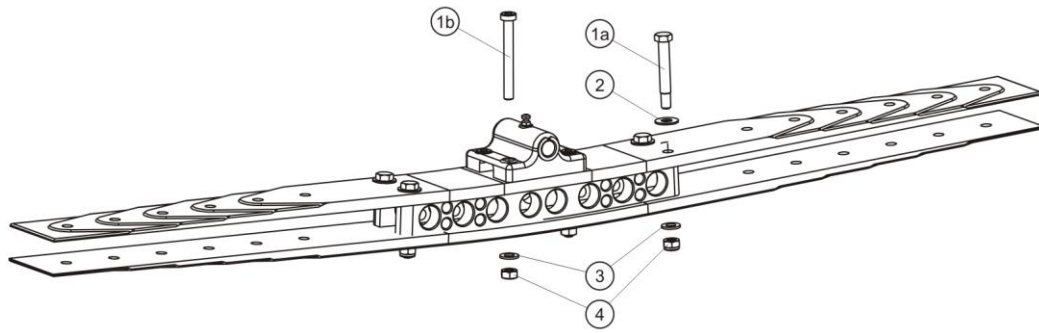


Fig. 1 - Rotor hub

62-11-00 6-4 TEETER ANGLE CHECK

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

31438 Digital level or similar

PRECAUTIONS AND SAFETY MEASURES

CAUTION: *Be careful not to damage the blades while using the digital level. Any scratches or other damages on the blade or the hub may cause a failure!*

PROCEDURES

- 1 Engage the rotor brake.

CAUTION: *Don't remove the rotor bag until rotor brake is engaged to avoid blade flapping.*

- 2 Remove the rotor bag.
- 3 Move the rotor system until it touches the teeter stop. Hold on the digital level and check the angle.
- 4 Move to the other side of the teeter stop and check the angle again. Angle has to be $14^{\circ} \pm 1^{\circ}$.
- 5 If you use the tool which is mentioned above you have to sum up both angles for the blade which points to the flight direction because while moving from the one teeter stop to the other one the horizontal line will be crossed. For this case it is $5.60^{\circ} + 8.90^{\circ} = 14.5^{\circ}$.



- 6 Do it again for the blade which points at the end of the aircraft. This blade is above the horizontal line and the angle is the difference of both measurements.

- 7 If you use a tool which can be put to zero than it will only show the angle movement and there is no need to sum up or check the angle difference. Allowed angle is $14^\circ \pm 1^\circ$.

You can see that the hub is in contact with the forward teeter stop on the left picture. Zero the level and you can check the angle by putting the rotor to the rear teeter stop.



- 8 Is the angle smaller than the tolerance given this could have one reason:
1. External force applied to one or both ends of the teeter stop assembly plate from the underside which has deformed the plate. It must be determined how this has occurred. This cannot happen in an in-flight or taxiing phase or normal aircraft operation.
- 9 If the teeter angle is larger than the tolerance stated, there is one possible reasons:
1. There has been an external force applied to one or both ends of the teeter stop assembly plate from the upper side which has deformed the plate. The general causes on this:
 - Blade flap has occurred and a contact has been made between the hub bar and the teeter stop. SOI checks should be carried out in accordance with chapter 05-55-00 of the respective AMM and rotor alignment check job cards from chapter 62-11.

But in the case of any angle mismatch first things to check are:

- Correct teeter stop installed on both sides?
- Any wear of the teeter stop which can cause the angle mismatch?
- Correct installation of the main bearing cover?

62-11-00 8-1 REPLACEMENT: TEETER BUSHINGS

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-04 Loctite 638 green (88-00-00-S-30485)

85-00-00-S-36039 Puller bushing teeterblock

PRECAUTIONS AND SAFETY MEASURES

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

PROCEDURES

Removal

CAUTION: *It is advisable to heat up the teeter block in an oven. When removing the teeter block marks all parts or use cable ties so that each and every part of the component is re-assembled and installed in exactly the same location and orientation! This is especially important for the shim plates between teeter block and hub bar.*

WARNING: *Affected aluminium parts must not become warmer than 160 °C.*

- 1 Remove bushings from teeter block. In order to do so warm up teeter block to 120 °C, preferably in an oven.
- 2 Use appropriate tools to drive out bushings. Be careful not to damage the surface of bore.
- 3 Remove bushings from pre-heated teeter tower.
- 4 Use appropriate tools to drive out bushings. Be careful not to damage the surface of bore.

Installation

- 5 Clean bushing seatings / bores from bonding residues and de-grease.
- 6 Teeter block: Apply a thin layer of AG-BAS-04 to bore.
- 7 Press in first bushing with joint/slit facing up. Use a bench vise and press carefully until bushing flange is flush.
- 8 Clean off excessive Loctite, if necessary.
- 9 Repeat step 6 to 8 for second bushing.
- 10 Teeter tower: Apply a thin layer of AG-BAS-04 to bore.
- 11 Press in first bushing with joint/slit facing down. Pull in bushing until flange is flush. Use thick washers on both sides to protect teeter tower and bushing flange from damage.
- 12 Clean off excessive Loctite, if necessary.
- 13 Repeat step 10 to 12 for second bushing.
- 14 If necessary rework inner diameter of bushings in teeter tower with a reamer 13H7.

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
1	1	Bushing TEF-MET 13/15/21x15	L0 27-30-00-V-20677	

ILLUSTRATIONS

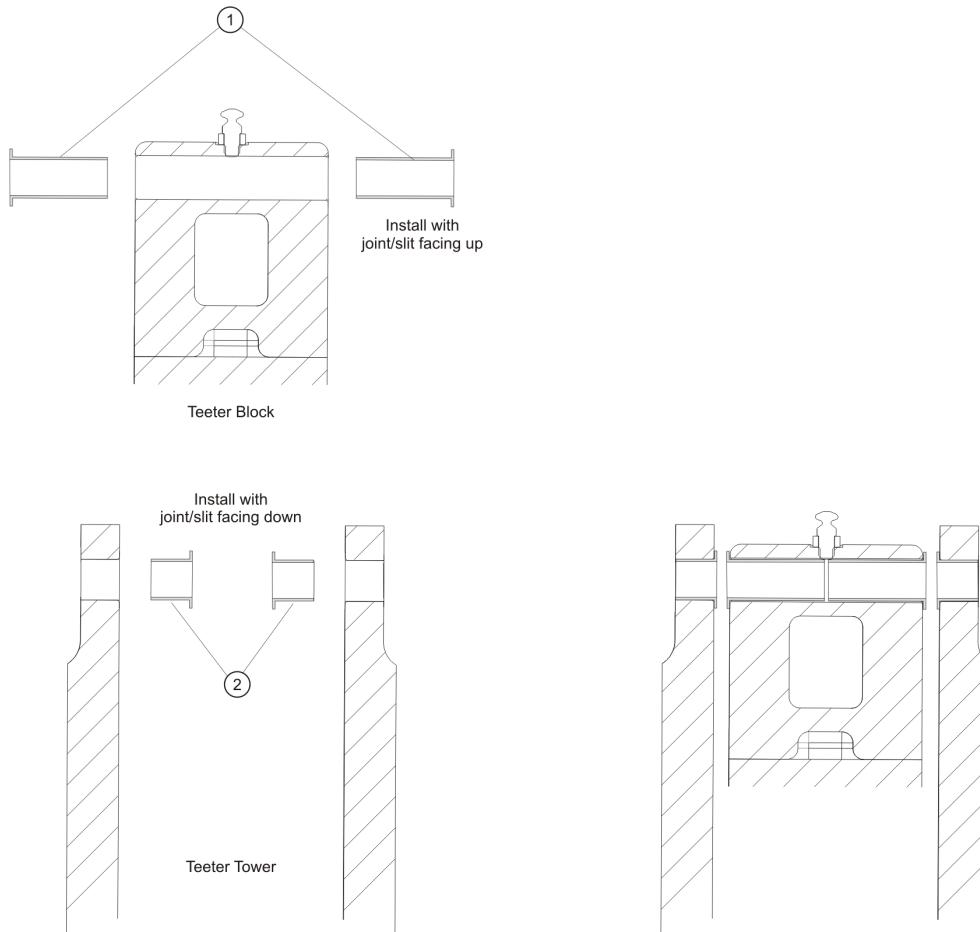


Fig. 1 - Teeter bushings, block and tower - cross section view

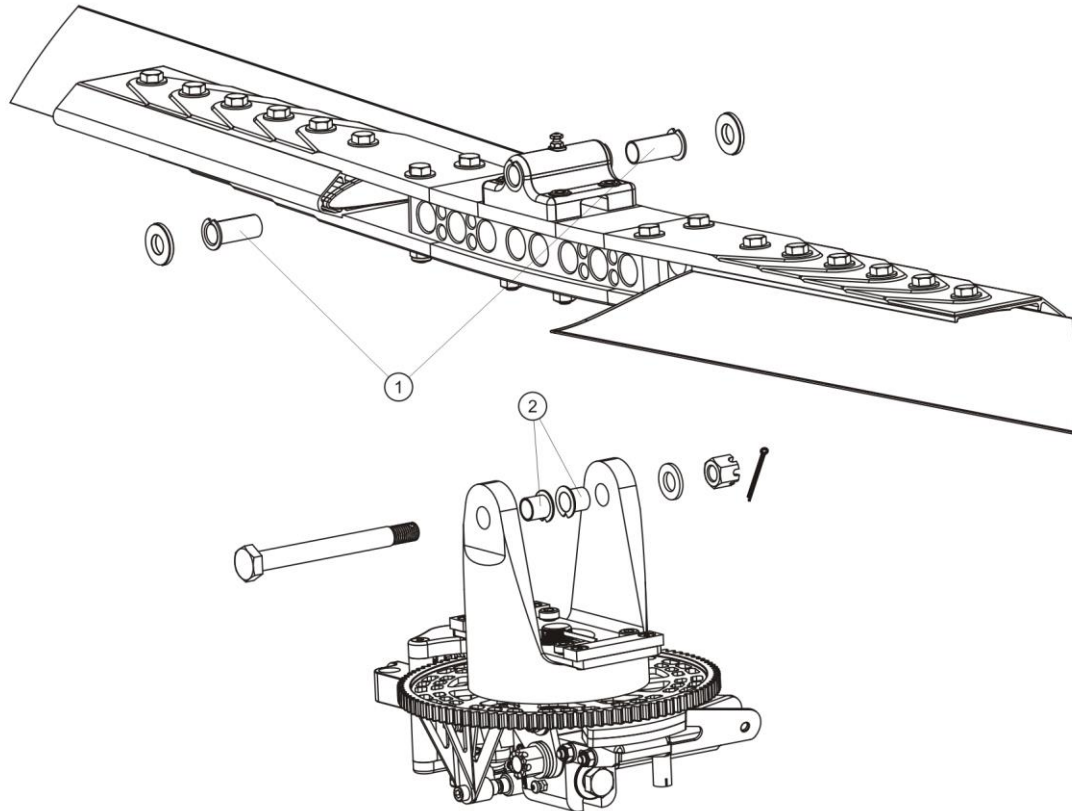


Fig. 2 - Teeter bushings, block and tower - exploded view

62-20-00 8-1 REPLACEMENT: DRIVE GEAR

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

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

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-02 Loctite 243 blue

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

PRECAUTIONS AND SAFETY MEASURES

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

PROCEDURES

- 1 Switch pneumatic mode selector to BRAKE.
- 2 Remove and dispose the split pin (1) (Fig.1 and 2).

WARNING: Wear eye protection when removing attachment hardware!

- 3 Undo the castle nut (2) (Fig.1 and 2).
- 4 Switch pneumatic mode selector to FLIGHT.
- 5 Remove the castle nut (2) (Fig.1 and 2).
- 6 Remove the teeter tower with the drive gear. Fix the teeter tower in a bench vise carefully.
- 7 Remove and dispose the 6 screws and 6 washers of the drive gear. Remove the drive gear.
- 8 Put new drive gear on teeter tower.
- 9 Apply Loctite 243 to the six screws and six washers of the drive gear. Tighten the screws with a torque of 25 Nm.
- 10 Rotate rotor head so that rotor blades (removed!) would point exactly in flight direction.
- 11 Put teeter tower with new drive gear on the rotor head.
- 12 Align the magnet to the 7 o'clock position in flight direction (Fig.4).
- 13 Tighten castle nut (2) with a torque value enough to fix the adjustment and of the main bolt.
- 14 Inspect backlash of pre-rotator upper engagement. Backlash should be as tight as possible, but also wide enough to allow easy engagement of the pinion into the sprocket wheel in any position.
- 15 Torque-tighten castle nut (2) with final torque of 120 Nm and re-check position. Apply further torque until the split pin can be inserted.

- 16 Insert and secure new split pin (1). Make sure that ends do not contact rotating parts (Fig.2).
- 17 Inspect backlash of pre-rotator upper engagement again. Backlash should be as tight as possible, but also wide enough to allow easy engagement of the pinion into the sprocket wheel in any position.
- 18 Install the rotor system, according to [62-11-00 4-4](#).
- 19 Perform jobcard [63-11-30 6-1](#) "INSPECTION: PRE-ROTATOR UPPER ENGAGEMENT".

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
		Splitpins, 10 pieces	L0 27-30-00-S-30261	
		Rotor sprocket mounted	L2 27-30-00-M-36385	
		Kit – Rotor sprocket	L2 27-30-00-S-42957	

ILLUSTRATIONS

Fig.1 - Rotor head

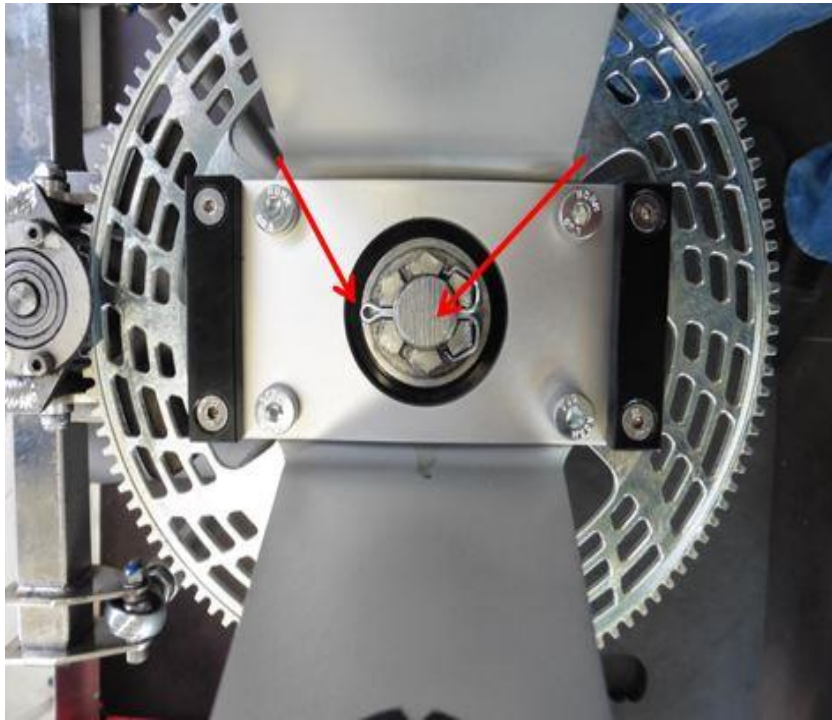


Fig.1 - Split pin and castle nut

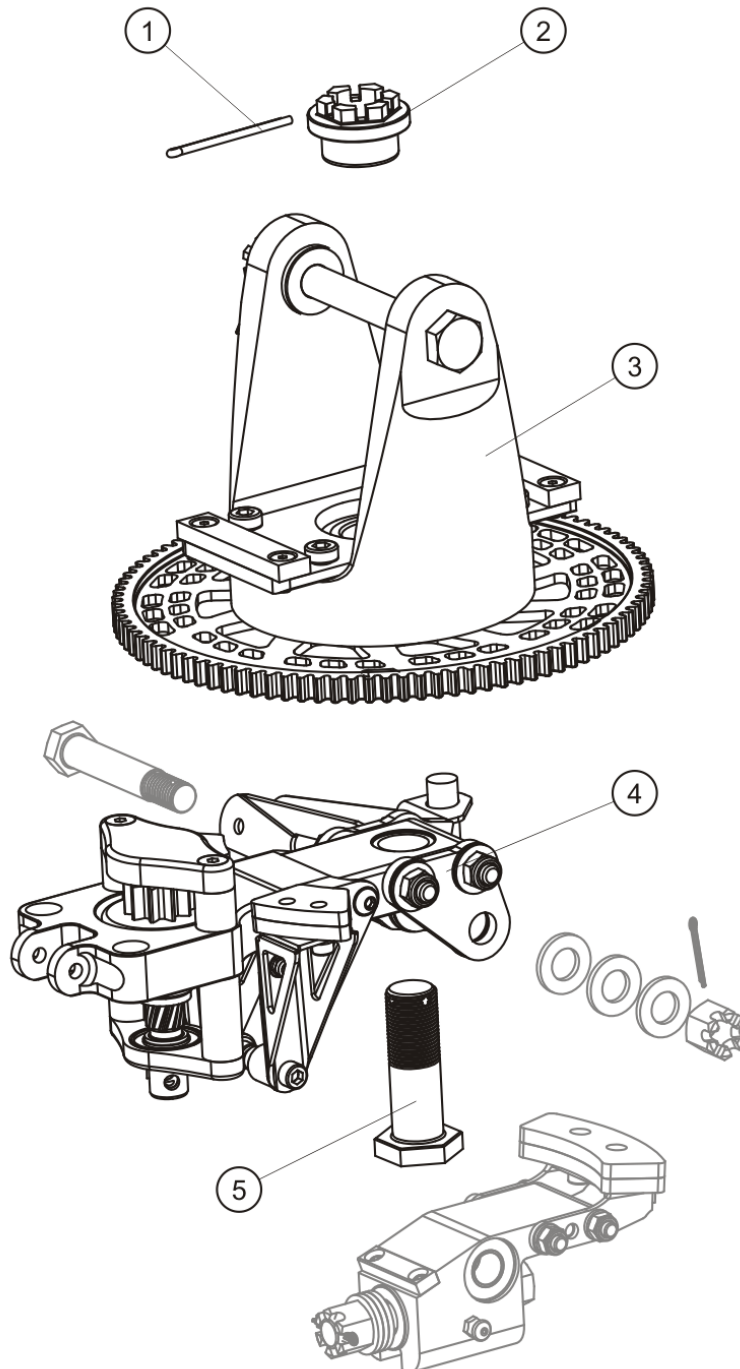


Fig.2 - Rotor head III



62-31-00 6-1 INSPECTION: ROTOR HEAD BRIDGE, BEARING AND TEETER TOWER

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

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

PRECAUTIONS AND SAFETY MEASURES

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

PROCEDURES

- 1 Inspect rotor head bridge (5) function and condition, i.e. no misalignment, dents, nicks, corrosion, or cracks. In case of any of the aforementioned is evident or suspected contact AutoGyro customer support.
- 2 Inspect teeter stops (4) for correct attachment and condition.
- 3 Inspect teeter tower (3) for correct attachment and condition, i.e. no cracks. In case of cracks or unusual condition or appearance contact AutoGyro customer support.
- 4 Perform torque-check on main bolt nut (2). In order to do so, remove and discard split pin (1) and torque-check castle nut with 120 Nm.
- 6 If torque-check fails mark component / gyroplane unserviceable and contact AutoGyro customer support.
- 7 Insert new split pin (1) and secure. Make sure that ends do not contact rotating parts.

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

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
1	1	Splitpins, 10 pieces	L0 27-30-00-S-30261	
1	2	M20 castle nut flat	NPI	
1	3		27-30-00-V-	
1	4		27-30-00-V-	
1	5	Rotorhub bottom mounted	NPI	
1	6	M20x1_5x73,8	NPI	

ILLUSTRATIONS

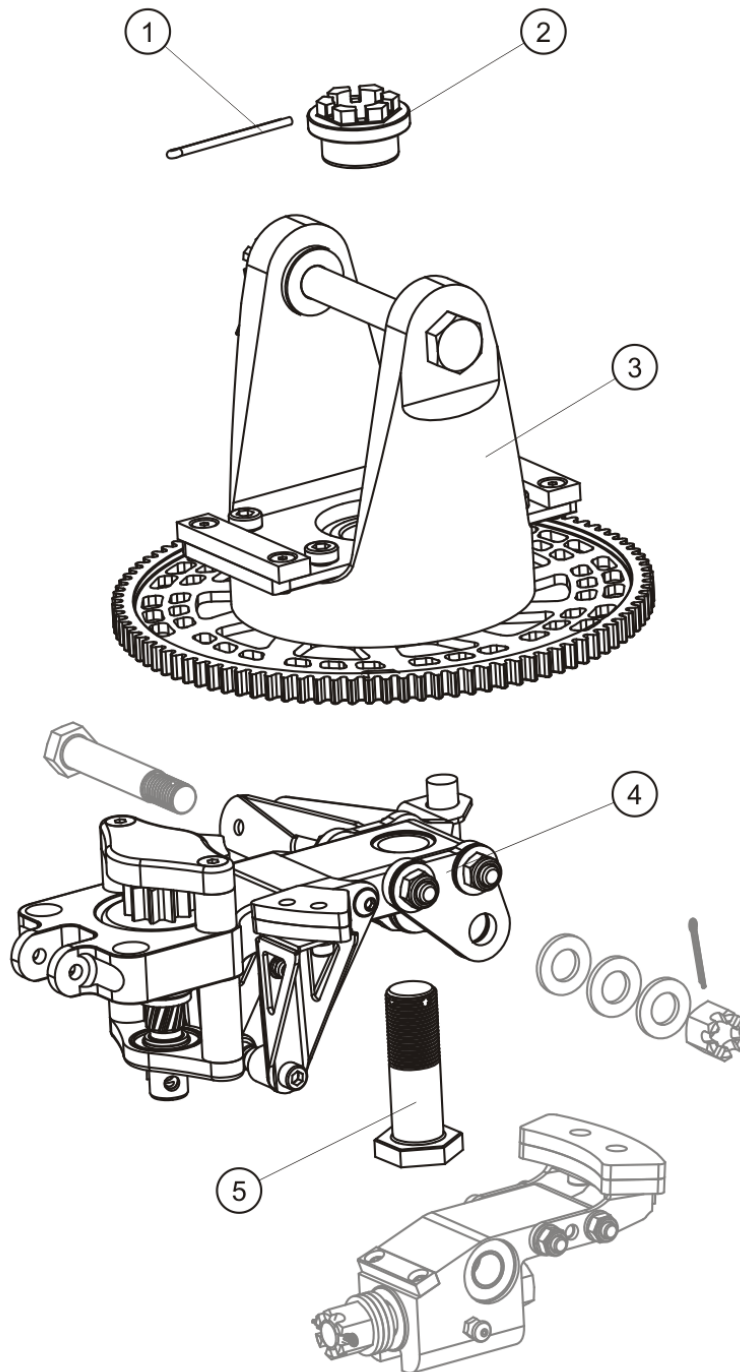


Fig. 1 - Rotor head bridge, bearing and teeter tower

62-32-00 5-1 CHECK-ADJUSTMENT: ROTOR CONTROL FRICTION

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Rotor head bridge / gimbal head configuration state must conform to version II

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

85-00-00-S-34115 Spring balance / Dynamometer

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

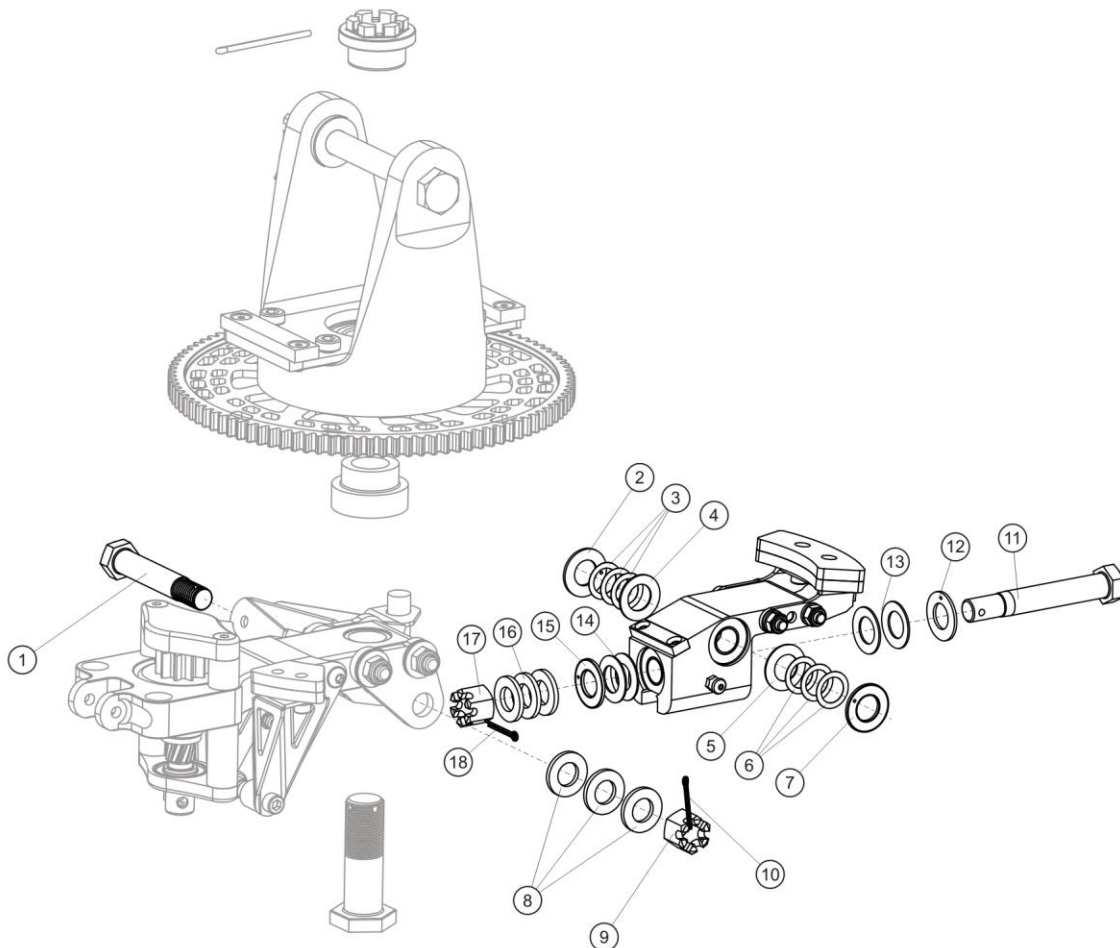
- 1 Switch pneumatic mode selector to flight and release trim pressure completely. If necessary, switch repeatedly!
- 2 Attach spring balance / dynamometer as shown in Fig. 1 and pull carefully until control stick starts to move. Note maximum value (breakout force).

WARNING: Job includes work at critical flight controls. Duplicate inspection must be performed after completion!
- 3 Breakout force can be adjusted by tightening the gimbal head pitch bolt. If the split pin drill of the gimbal head pitch bolt is covered by the castle nut, place shim washers between the washers (Fig. 2, Pos. 10). Note: 0.1 mm shim washer equates approximately 20° nut rotating angle.
- 4 Rotor vibration levels will decrease with higher control friction, but handling qualities will suffer, if control friction is too high. Friction should not exceed 10 N, with an absolute maximum of 15 N!
- 5 After completion, switch pneumatic mode selector to BRAKE, apply brake pressure and secure rotor system.

ILLUSTRATIONS

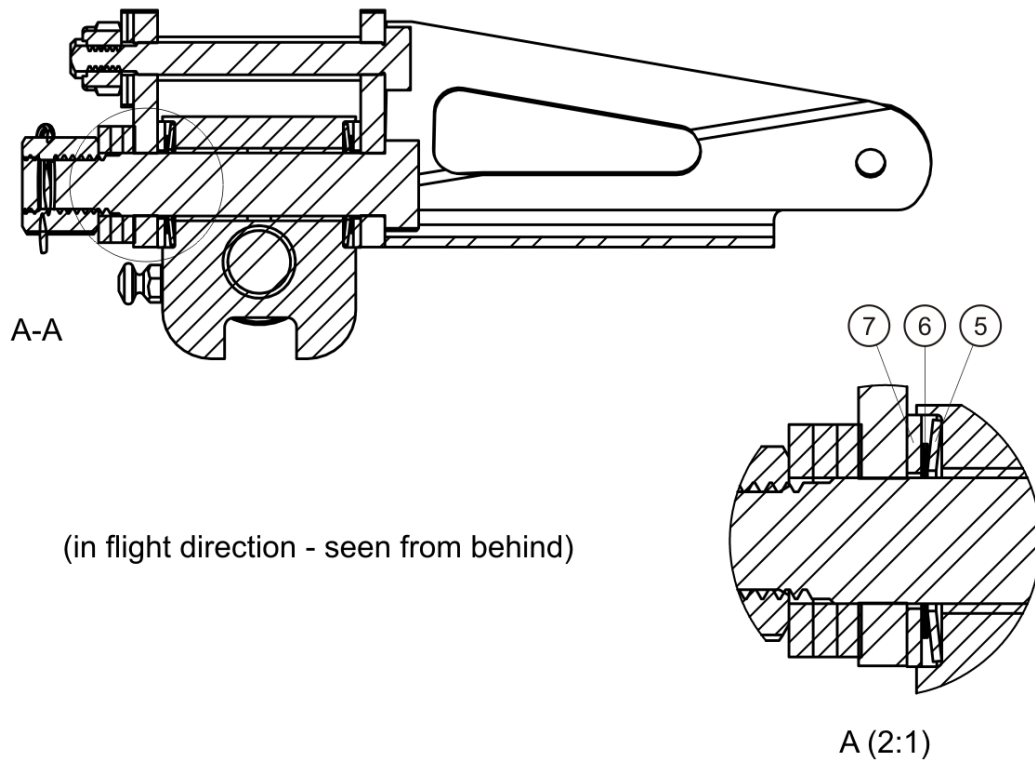


Fig. 1 - Measurement of rotor control friction



6232M17-1

Fig. 2 - Gimbal head assembly, Rotor System II (with spring washers)



6232M17-2_EN

Fig.3 - Arrangement of spring and shim washers on gimbal head - Version III

62-32-00 6-1 INSPECTION: ROTOR GIMBAL HEAD**LNE****GENERAL, REFERENCES AND REQUIREMENTS**

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

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-GRS-01 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 centre console horizontal.
- 4 Rotate rotor head so that rotor blades (removed!) would point exactly fore-aft. Place inclinometer on top of teeter tower and measure RH and LH end stop angle. Make sure that mechanical stops are reached. Record values.
- 5 Rotate rotor head so that rotor blades (removed!) would point exactly left-right. Place inclinometer on top of teeter tower and measure FORE and AFT end stop angle. Make sure that mechanical stops are reached. Record values.
- 6 Verify measured angles comply with the values specified in the corresponding type certificate data sheet. If any of the values differs by more than 1° from the specified value mark component unserviceable and contact AutoGyro customer support.

ILLUSTRATIONS

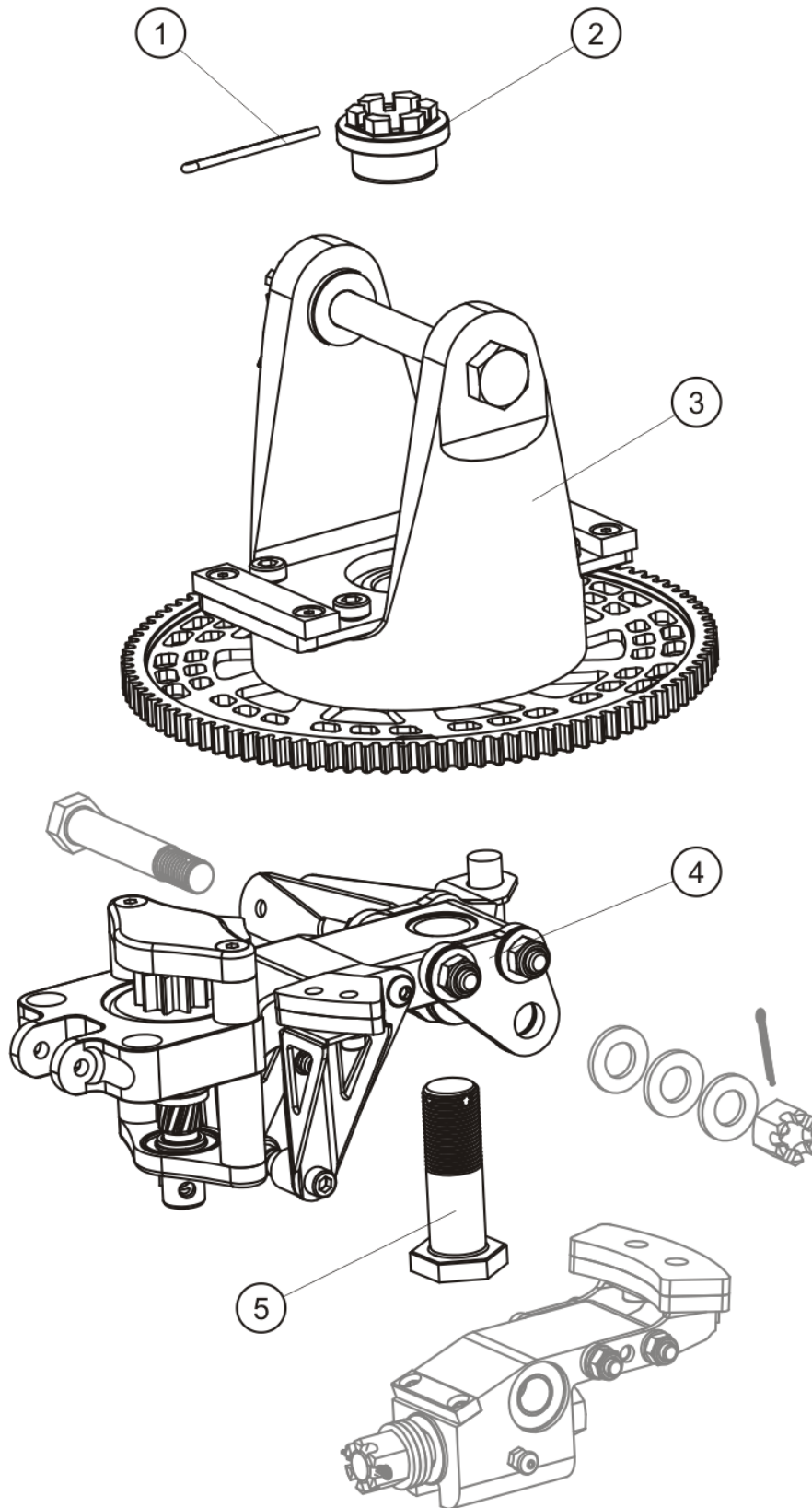


Fig. 1 - Rotor gimbal head - Version III

62-51-00 4-1 REMOVAL-INSTALLATION: TOP MAST

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

A suitable stand should be used if possible!

Self-locking nuts and split pins must only be used once and discarded! Check availability of new hardware before commencing work!

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

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-01	Loctite 221 red (88-00-00-S-30487)
AG-BAS-02	Loctite 243 blue (88-00-00-S-30483)
AG-GRS-01	Lagermeister WHS 2002 Grease (88-00-00-S-30477)
AG-LUB-03	Würth HHS2000 Oil Spray (88-00-00-S-30476)

PRECAUTIONS AND SAFETY MEASURES

WARNING: Safety Critical Part - May have catastrophic consequences when component or part is missing, damaged, or handled incorrectly!

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

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: 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 Disconnect rotor rpm sensor, remove cable ties on top mast
- 2 Disconnect pneumatic hoses from Bendix pneumatic actuator, roll trim actuator and pitch trim actuator (Fig. 1).

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!

- 3 Remove bolt from roll control and roll trim attachments at head. Maintain attachment hardware, discard self-locking nut!

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!

- 4 Remove bolt from pitch control. Maintain attachment hardware, discard self-locking nut!

IMPORTANT NOTE: When disconnecting the push-pull cable bulkhead at the top mast, unscrew only top (outer) attachment nut and leave lower (inner) attachment nut unchanged and mark position.

- 5 Disconnect roll push-pull cable bulkhead. In order to do so, unscrew and remove top (outer) attachment nut (Fig.2).
- 6 Disconnect pitch push-pull cable bulkhead. In order to do so, unscrew and remove top (outer) attachment nut.
- 7 Remove mast bushes (Fig. 3) and free mast bushes from grease residuals.
- 8 Pull top mast equipped with rotor head out of mast bottom. Lead push-pull control cables through attachment consoles and pneumatic hose package through the inside of the pitch console.

Installation

- 9 If applicable remove transport securing devices.
- 10 Insert top mast equipped with rotor head into mast bottom. Lead push-pull control cables through attachment consoles
- 11 Lubricate pre-rotator drive with oil with AG-LUB-03 (spray in top pre rotator drive shaft) and insert lower sliding splined drive shaft into top pre-rotator drive shaft (Fig. 4)
- 12 Equip each threaded mast bush with a washer disc and a screw, grease mast bushes (AG-GRS-01) and push into their designated openings as follows: Short mast bush in the upper opening, long mast bush in lower opening. Equip each mast bush on opposite also with a washer disc and a screw. Apply Loctite 243 (AG-BAS-02) on each screw thread and torque-tighten with standard bolt torque

IMPORTANT NOTE: When re-installing push-pull cable bulkhead make sure that the lower (inner) attachment nut remains in original (marked) position.

- 13 Equip roll push-pull control cable bulkhead with a serrated washer and a counter nut. Torque-tighten counter nut with 25 Nm and apply securing paint
- 14 Equip pitch push-pull control cable bulkhead with a serrated washer and a counter nut. Torque-tighten counter nut with 25 Nm and apply securing paint.
- 15 Re-install pitch control ball joint . In order to do so, insert bolt from left and install
 - 1) spacer
 - 2) ball joint
 - 3) spacer
 Secure with new locking nut and torque-tighten.
- 16 Re-install roll control ball joint and roll trim . In oder to do so, insert bolt from front and install
 - 1) plastic washer
 - 2) ball joint roll control
 - 3) small washer
 - 4) spacer
 - 5) ball joint trim actuator
 - 6) spacer
 - 7) large washer
 Secure with new locking nut and torque-tighten.
- 17 Pull pneumatic hose package through the inside of the pitch console and fix with cable-ties (Fig. 1).
- 18 Apply Loctite 221 (AG-BAS-01) on pneumatic connection threads of roll trim actuator actuator and pitch trim actuator. Connect pneumatic hoses according to Fig. 1. Tighten union nuts of pneumatic hoses slightly with pliers and fix hoses with cable ties. Prevent chafing of pneumatic hoses!
- 19 Connect rotor rpm sensor, lead cable on the right side of the mast. Fix cable according to Fig. 1 with cable ties.
- 20 Move flight control stick carefully to all directions (full deflections) in order to ensure an installation without strain or stresses.
- 21 Inspect rotor gimbal head according to [62-32-00 6-1](#) and check/adjust rotor control angles.

ILLUSTRATIONS



Fig. 1 - Pneumatic hoses



Fig. 2 - Push-pull control cable bulkhead attachment



Fig. 3 - Installation of mast pins



Fig. 4 - Pre-rotator drive

62-51-00 6-1 INSPECTION: MAST MOUNTING BUSHINGS**LNE****GENERAL, REFERENCES AND REQUIREMENTS**

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

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

Secure gyroplane against unauthorized or unintended operation!

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

A suitable stand should be used if possible!

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

85-00-00-S-34115 Spring balance / Dynamometer

PRECAUTIONS AND SAFETY MEASURES**PROCEDURES**

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

ILLUSTRATIONS (Note: Rotor head II is shown, the principle is the same for rotor head III)

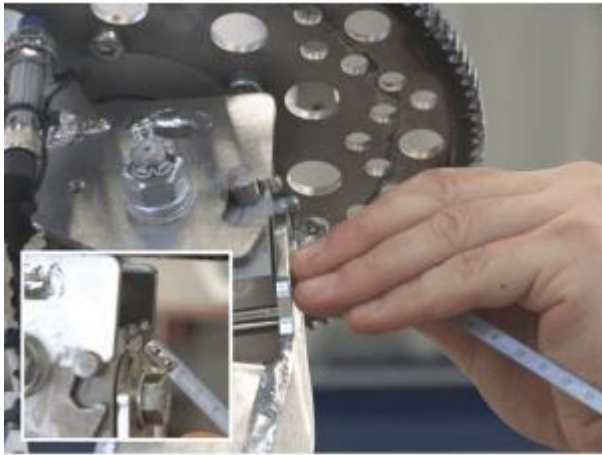


Fig. 1 - Mast reference point



Fig. 2 - Fuselage reference point



Fig. 3 - Force applied against flight direction



Fig. 3 - Force applied in flight direction

62-51-00 8-1 REPLACEMENT: MAST MOUNTING BUSHINGS

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

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

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

A suitable stand should be used if possible!

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-04	Loctite 638 green (88-00-00-S-30485)
AG-GRS-01	Lagermeister WHS 2002 Grease (88-00-00-S-30477)
AG-LUB-03	Würth HHS2000 Oil Spray (88-00-00-S-30476)

PRECAUTIONS AND SAFETY MEASURES

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

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: *Before disconnecting and removing push-pull cables, mark position of (inner) counter nut and ball end in order to avoid re-adjustment (rigging) of flight controls!*

PROCEDURES

- 1 Disconnect rod end of roll control push-pull cable at upper attachment point.
- 2 Disconnect rod end of pitch control push-pull cable at upper attachment point.

NOTE: *When disconnecting the push-pull cable bulkhead at the top mast, unscrew only top (outer) attachment nut and leave lower (inner) attachment nut unchanged.*
- 3 Disconnect roll push-pull cable bulkhead. In order to do so, unscrew and remove top (outer) attachment nut.
- 4 Disconnect pitch push-pull cable bulkhead. In order to do so, unscrew and remove top (outer) attachment nut.
- 5 Disconnect sensor cable from rotor speed sensor, pneumatic hoses from pneumatic cylinders and remove respective cable ties.
- 6 Support the upper mast (using a crane or suitable lifting device) and remove mast attachment hardware.
- 7 Screw-in an 8 x 120 mm bolt and drive out rubber bushing sleeves using a rubber hammer.
- 8 Make sure all support lines, cables and controls are safely disconnected and out of the way. Carefully pull out upper mast
- 9 Heat up seatings of rubber bushings with a heat gun and push out rubber bushings using appropriate tools.
- 10 Clean inner bores from residual Loctite and degrease with brake cleaner.
- 11 Clean outer surface of new bushings. Use abrasive cloth to ensure clean, metallic surface.
- 12 Check that bushings can be inserted tightly into bores. If necessary, rework outer surface of bushing.
- 13 Apply AG-BAS-04 (Loctite 638) on outer surface of bushings and install bushings in upper mast. Bushings shall be centred so that they extend equally to both sides.
- 14 Remove excessive Loctite. Use brake cleaner, if needed.
- 15 Apply AG-LUB-03 to pre-rotator drive coupling sleeve and position upper mast. Make sure that coupling sleeve joins easily.

- 16 Apply AG-GRS-01 on outer surface of bushing sleeves and install bushing sleeves. Use a rubber hammer, if required.
- 17 Install attachment hardware and torque-tighten with 20 Nm. Mark bolt heads with securing paint.
- 18 Re-install push-pull cable bulkhead and rod end for roll control. Mark attachment hardware with securing paint.
- 19 Re-install push-pull cable bulkhead and rod end for pitch control. Mark attachment hardware with securing paint.
- 20 Re-connect support lines and cables. Secure support lines and cables with cable ties.
- 21 Have duplicate inspection performed on correct attachment of flight controls, i.e. push-pull cables and attachments.

WARNING: The ball joint must be installed with at least 8 threads on the rod end of the push-pull control cable .

- 22 Check rotor head control angles [62-32-00 6-1](#) and re-adjust, if necessary.

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
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ILLUSTRATIONS

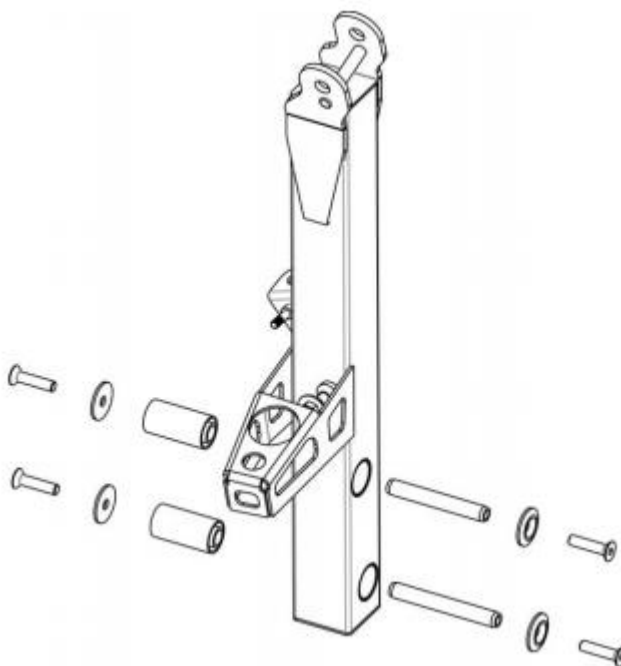


Fig. 1 - Bottom mast with mast mounting bushings

63-11-10 4-1 REMOVAL-INSTALLATION: PRE-ROTATOR CLUTCH

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-02 Loctite 243 blue (88-00-00-S-30483)

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

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

Removal

- 1 Remove hoses from oil reservoir and seal open ends against contamination.
- 2 Remove oil reservoir.
- 3 Loop a lifting belt around the propeller/gearbox shaft and take the load off the engine mounts using appropriate lifting equipment.

NOTE: Both engine mounts in the LH side remain in place.

- 4 Unscrew and remove 2 x attachment hardware of engine mounts on RH side. Discard self-locking nuts.
- 5 With the engine weight unloaded, tilt engine around remaining LH engine mounts as far as necessary (do not overstretch rubber bushings) in order to get access to the pneumatic clutch.
- 6 Disconnect pneumatic hose at quick connect coupling.
- 7 Cut open and discard affected cable ties.
- 8 Unscrew and remove 4 x M6 bolts and remove pneumatic clutch with attach ring.

NOTE: Do not separate attach ring from clutch and let adapter frame remain on engine.

- 9 Remove pneumatic clutch by pulling apart sliding shaft coupling.

Installation

- 10 Insert sliding shaft coupling and position pneumatic clutch with attach ring on adapter frame.
- 11 Apply AG-BAS-02 on threads and torque-tighten 4 x M6 bolts with 10 Nm.
- 12 Check that vertical pre-rotator drive can be easily turned by hand.
- 13 Re-connect pneumatic hose at quick connect coupling. Make sure flow control valve is in place and installed in correct flow direction (blue line to clutch, white line to pneumatic box).
- 14 Perform functional check (engine off) and monitor clutch actuation.

EFFECTIVITY: Pneumatic Clutch III

- 15 Check clutch activation pressure 5 bar +/- 0.1
- 16 Re-install engine mounts. Use new self-locking nuts and torque-tighten.
- 17 Remove lifting belt.
- 18 Install oil reservoir.
- 19 Remove seals and re-connect oil hoses to reservoir.

63-11-10 6-1 INSPECTION: PRE-ROTATOR CLUTCH**LNE****GENERAL, REFERENCES AND REQUIREMENTS**

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

Secure gyroplane against unauthorized or unintended operation!

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES**PROCEDURES**

- 1 Check wear state of clutch lining. Wear mark (groove in the lining) must be recognizable. See Fig. 1, dimension A. Replace clutch if necessary.
- 2 Measure clearance between clutch lining and clutch plate. See Fig. 1, dimension B. Clearance must be between 1.0 - 1.5 mm. In case clearance is less than 1 mm or more than 1.5 mm contact AutoGyro customer support.
- 3 Measure clearance between inner (engine side) drive star disc and outer (clutch side) drive star claws. See Fig. 1, dimension C. Clearance must be between 0.5 - 1.0 mm. In case clearance is less than 0.5 mm or more than 1.0 mm contact AutoGyro customer support.

ILLUSTRATIONS

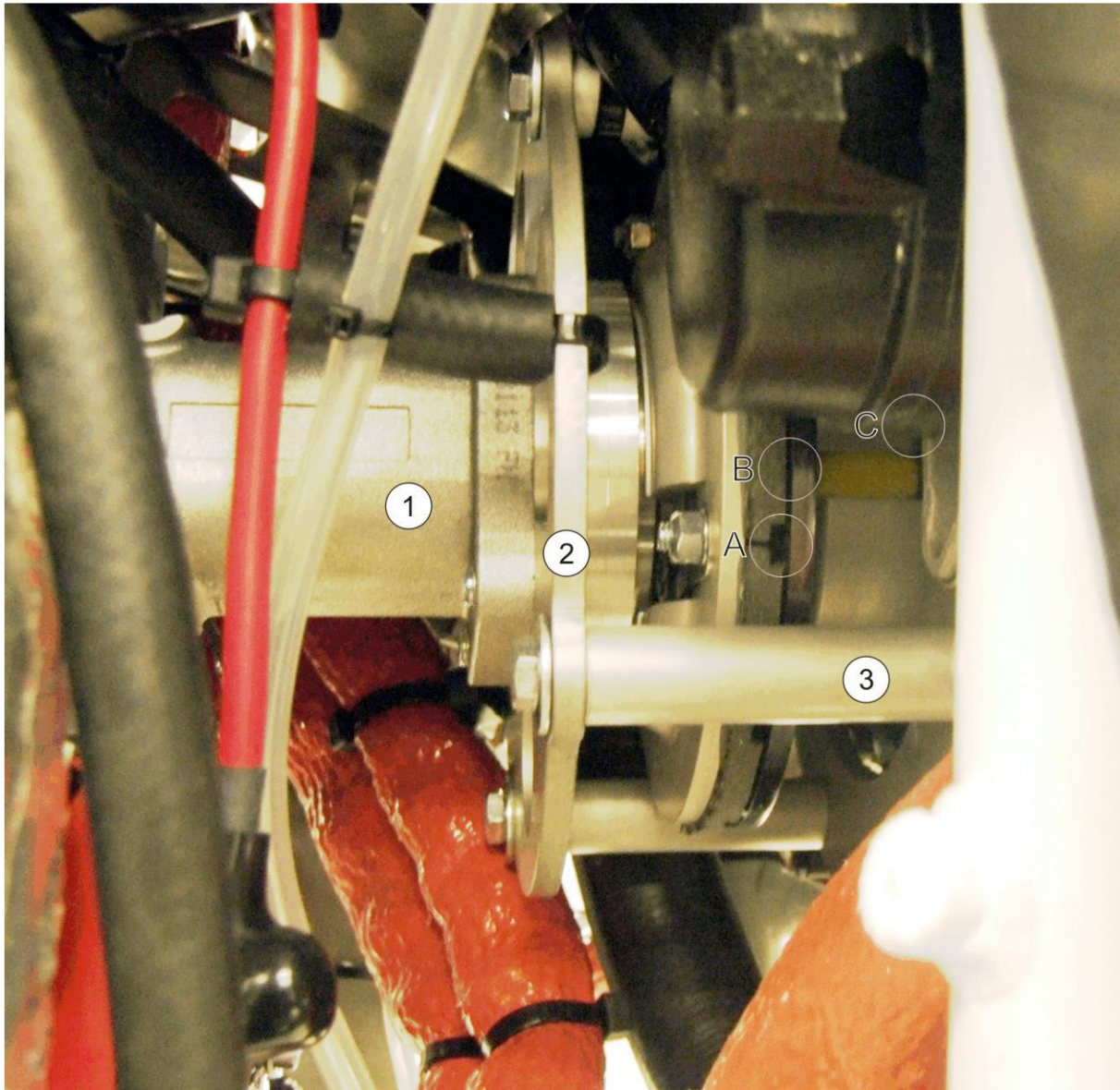


Fig. 1 - Pre-rotator clutch with attach ring

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

88-00-00-S-35915 Loctite 7063 Super Clean

88-00-00-S-31023 Loctite 648

88-00-00-S-35790 Installation Aid Dog Gear

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

- 1 Disconnect battery according to [24-30-00 4-1](#), work steps 1 - 2.
- 2 Remove M8x20 screw plug (Fig. 2) with seal ring from the crankcase. Turn the crankshaft by propeller into top dead centre (TDC) position of cylinder 1 and 2. TDC can be checked with the aid of a lamp through the opening of the removed screw. When the crankshaft is in correct position screw thread pin M8x50 (Fig. 3) so that the crankshaft is blocked.
- 3 Remove pre-rotator clutch according to [63-11-10 4-1](#), work steps 1 - 9

IMPORTANT NOTE: New clutch liners feature an with improved design additional brake pad. Stock items having old design shall be returned to AutoGyro or discarded.
- 4 Replace clutch liner

In order to do so, untighten central screw. Should it not be possible untighten central screw bore out bolt head and remove remaining screw thread with pliers. Pull friction plate off the drive shaft axially. Place spare part and fix it with new central screw.
- 5 Remove clutch dog gear with 'Installation Aid Dog Gear'
- 6 Thoroughly clean the crankshaft and the driver stud with Loctite 7063

CAUTION: For the following work step, use Loctite 648 only! The use of other brands or alternative products will prevent correct functioning.
- 7 Apply Loctite 648 on inner and outer thread in sufficient quantity (Fig.4)

CAUTION: For the following work step, the clutch dog gear must be easily screwable (floating) up to the stop!
- 8 Screw dog clutch gear into the crankshaft and remove excess Loctite
- 9 Tighten dog clutch gear using 'Installation Aid Dog Gear' with a torque of 150 Nm (Fig. 5). Clean driver free of Loctite residues.
- 10 Check with feeler gauge 0.05 mm whether dog clutch gear is contacted with the flywheel. Feeler gauge 0.05 mm must not be able to stick in between dog clutch gear and flywheel
- 11 Remove thread pin M8x50. Mount M8x20 screw plug with new copper seal ring and tighten with a torque of 15 Nm. For checking, turn carefully the propeller by hand.
- 12 Re-connect battery according to [24-30-00 4-1](#), work steps 2 - 1.
- 13 Re-install pre-rotator clutch according to [63-11-10 4-1](#), work steps 10 - 19

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
		Replacement set friction plate PK III / IV	L1 61-00-00-S-	

ILLUSTRATIONS

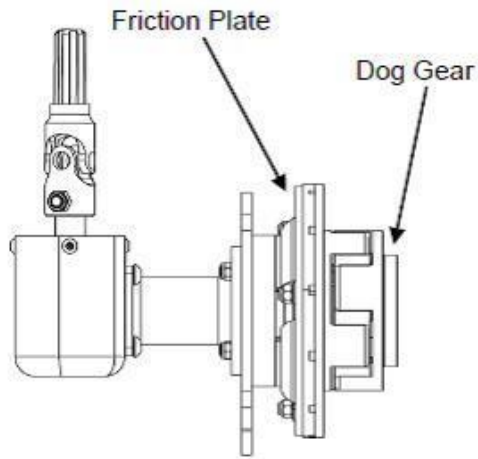


Fig. 1 - Pneumatic Clutch III/IV



Fig. 2 - M8x20 screw plug



Fig. 3 - Thread Pin M8x50

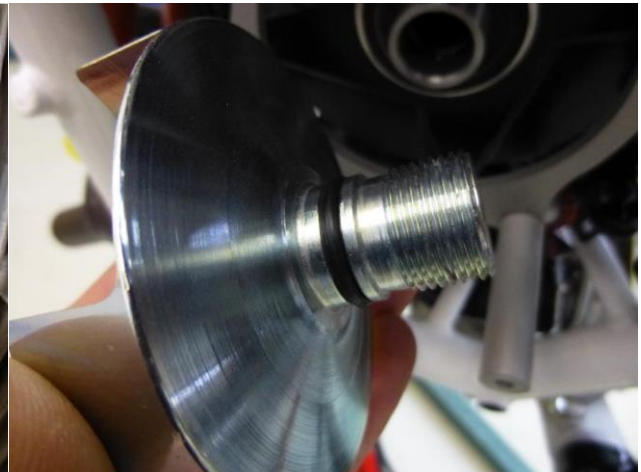


Fig. 4 - Loctite 648 on inner and outer thread



Fig. 5 - Torque dog gear with 150 Nm



Fig. 6 - Correct mounting position

63-11-10 8-2 REPLACEMENT: PRE-ROTATOR CLUTCH DOG GEAR

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

88-00-00-S-35915 Loctite 7063 Super Clean

88-00-00-S-31023 Loctite 648

85-00-00-S-35790 Installation Aid Dog Gear

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

- 1 Disconnect battery according to [24-30-00 4-1](#), work steps 1 - 2.
- 2 Remove M8x20 screw plug (Fig. 1) with seal ring from the crankcase. Turn the crankshaft by propeller into top dead centre (TDC) position of cylinder 1 and 2. TDC can be checked with the aid of a lamp through the opening of the removed screw. When the crankshaft is in correct position screw in thread pin M8x50 (Fig. 2) so that the crankshaft is blocked (for further information see Rotax Maintenance Manual 12-20-00).
- 3 Remove pre-rotator clutch according to [63-11-10 4-1](#), work steps 1 - 9
- 4 Remove clutch dog gear with 'Installation Aid Dog Gear'
- 5 Thoroughly clean the crankshaft and the driver stud with Loctite 7063.
CAUTION: For the following work step, use Loctite 648 only! The use of other brands or alternative products will prevent correct functioning.
- 6 Apply Loctite 648 on inner and outer thread in sufficient quantity (Fig.4)
CAUTION: For the following work step, the clutch dog gear must be easily screwable (floating) up to the stop!
- 7 Screw dog clutch gear onto the thread and remove excess Loctite
- 8 Tighten dog clutch gear using 'Installation Aid Dog Gear' with a torque of 150 Nm (Fig. 5). Clean driver free of Loctite residues.
- 9 Check with feeler gauge 0.05 mm whether dog clutch gear is contacted with the flywheel. Feeler gauge 0.05 mm must not be able to stick in between dog clutch gear and flywheel (Fig. 6).
- 10 Remove thread pin M8x50. Install M8x20 screw plug with new copper seal ring and tighten with a torque of 15 Nm. For checking, carefully turn propeller by hand.
- 11 Re-connect battery according to [24-30-00 4-1](#), work steps 2 - 1
- 12 Re-install pre-rotator clutch according to [63-11-10 4-1](#), work steps 10 - 19.

PARTS LIST

Fig.	Pos.	Description	PC	PIT	Remark
		pressure plate rear	L1	61-00-00-V-33792	

ILLUSTRATIONS

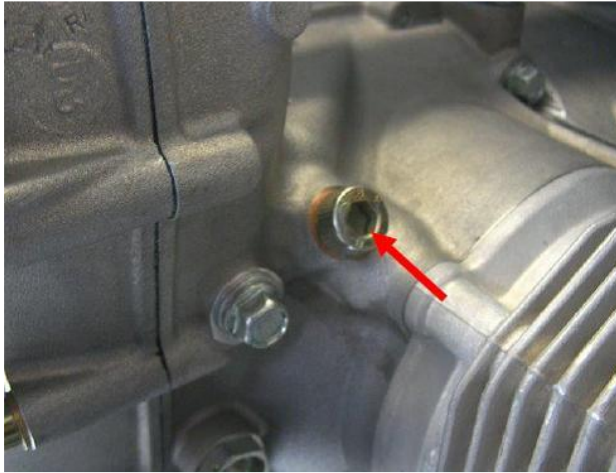


Fig. 1 - M8x20 screw plug



Fig. 2 - Thread Pin M8x50

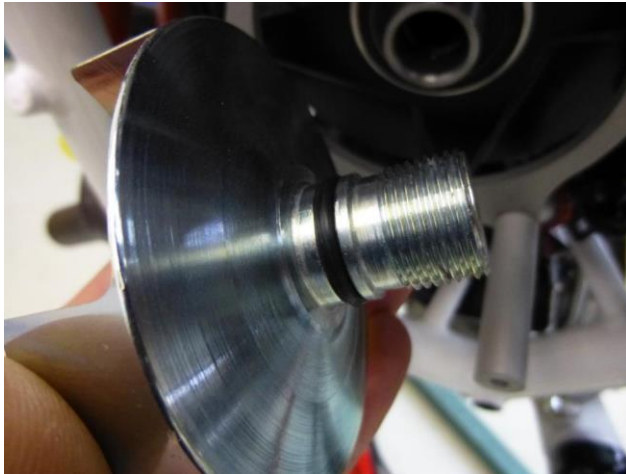


Fig. 3 - Loctite 648 on inner and outer thread



Fig. 4 - Tighten dog gear to 150Nm

63-11-30 6-1 INSPECTION: PRE-ROTATOR UPPER ENGAGEMENT

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

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

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-GRS-01 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-rotator upper engagement / Bendix shaft must be repaired acc. to [63-11-30 8-2](#).
- 3 Inspect backlash of pre-rotator upper engagement. Backlash should be as tight as possible, but also wide enough to allow easy engagement of the pinion into the sprocket in any position.
- 4 If necessary, have backlash adjusted [62-31-00 5-1](#).
- 5 Grease with AG-GRS-01.

ILLUSTRATIONS

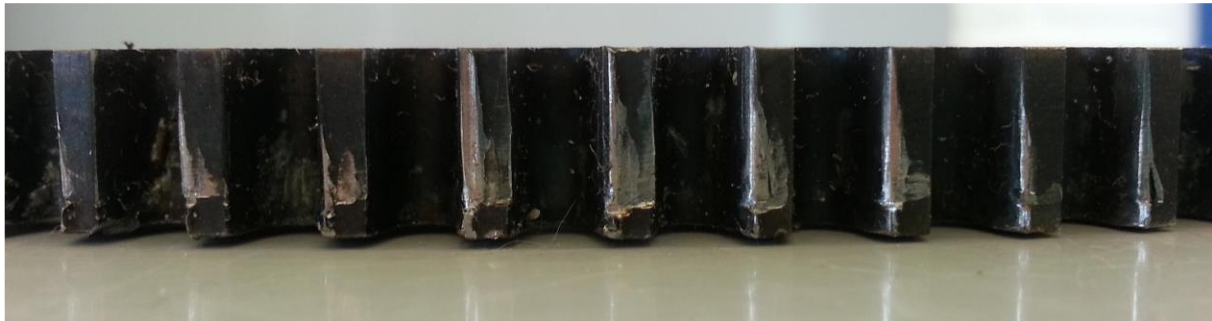


Fig. 1 - Wear Pattern (uneven)

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

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

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-02 Loctite 243 blue (88-00-00-S-30483)

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

PRECAUTIONS AND SAFETY MEASURES

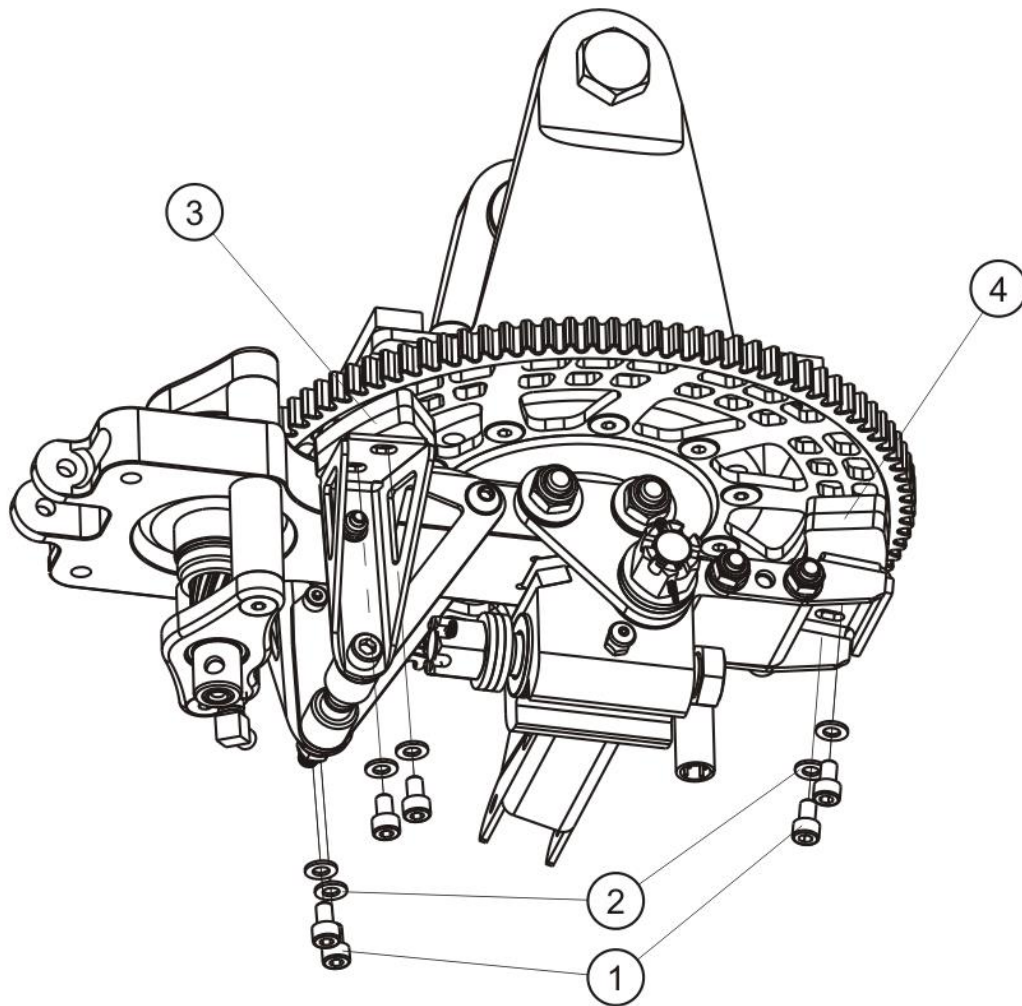
IMPORTANT NOTE: Procedure involves handling and disposal of special materials. For your health and environmental aspects respect all applicable regulations!

PROCEDURES

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

- 1 Unscrew and remove hexagon socket screws (1) with washers (2) of affected brake pad.
- 2 Replace integrated rotor brake pad assembly (3/4) with new component.
- 3 Apply Loctite 243 (blue) on screws, re-install hexagon socket screws (1) with washers (2) and torque-tighten.
- 4 After replacing the front pad, check that the head stops onto the pad before the stick reaches the forward limit stop. Adjust limit stop as required,

ILLUSTRATIONS



6351M17-1

Fig. 1 - Rotor bridge with brake pads

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

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

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

67-05-00 8-1 REPLACEMENT: PITCH TRIM/BRAKE PNEUMATIC SEAL

LNE

GENERAL, REFERENCES AND REQUIREMENTS

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

Secure gyroplane against unauthorized or unintended operation!

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

AG-BAS-02 Loctite 243 blue (88-00-00-S-30483)

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

PRECAUTIONS AND SAFETY MEASURES

PROCEDURES

- 1 Install rotor lash bag to support rotor system.
- 2 Switch pneumatic mode selector to FLIGHT and release trim pressure completely. If necessary, switch repeatedly!
- 3 Disconnect ball joint (rod end) from rotor brake bracket (ground plate).
- 4 Retract cylinder (pneumatic mode selector to FLIGHT and trim aft) and remove ball head from rod end.
- 5 Remove circlip / snap ring with appropriate tool.
- 6 Tilt pneumatic cylinder aft and pull out piston completely. In order to do so, switch pneumatic mode selector to BRAKE and apply brake pressure.
- 7 Remove old seal ring and discard. Install new seal ring using the special grease provided in the package.
- 8 Re-install piston and re-assemble pneumatic cylinder. Re-install circlip / snap ring.
- 9 Apply AG-BAS-02 on threads, install ball head and tighten.
- 10 Re-connect ball joint with rotor brake bracket (ground plate).

PARTS LIST

Fig.	Pos.	Description	PC PIT	Remark
		Pneumatic cylinder brake/trim repair kit	L1 27-30-00-S-32926	

67-10-00 4-1 REMOVAL-INSTALLATION: CENTRE CONSOLE**LNE****GENERAL, REFERENCES AND REQUIREMENTS**

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

SPECIAL TOOLS AND CONSUMABLE MATERIALS

None

PRECAUTIONS AND SAFETY MEASURES**PROCEDURES****Removal**

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

Installation

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

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

ILLUSTRATIONS

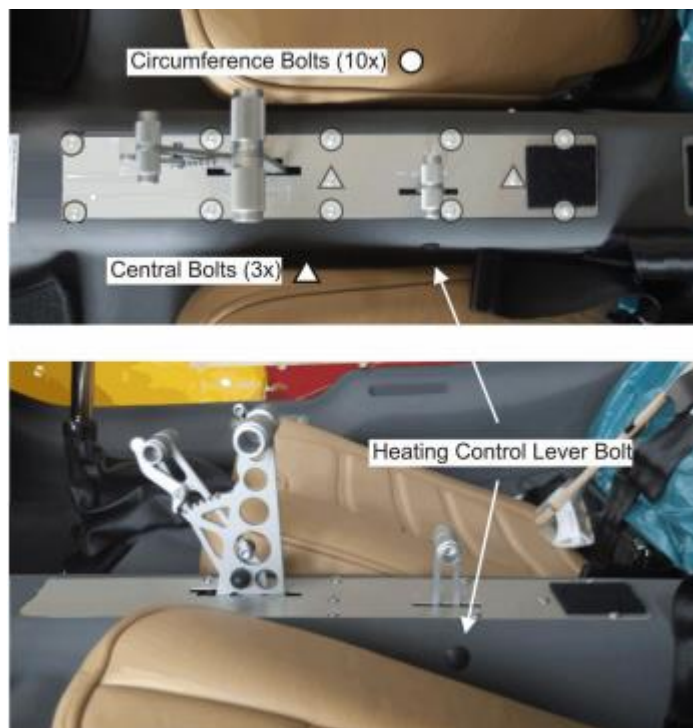


Fig. 1 - Centre Console



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