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CODE: 026-00-24C

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APPROVED
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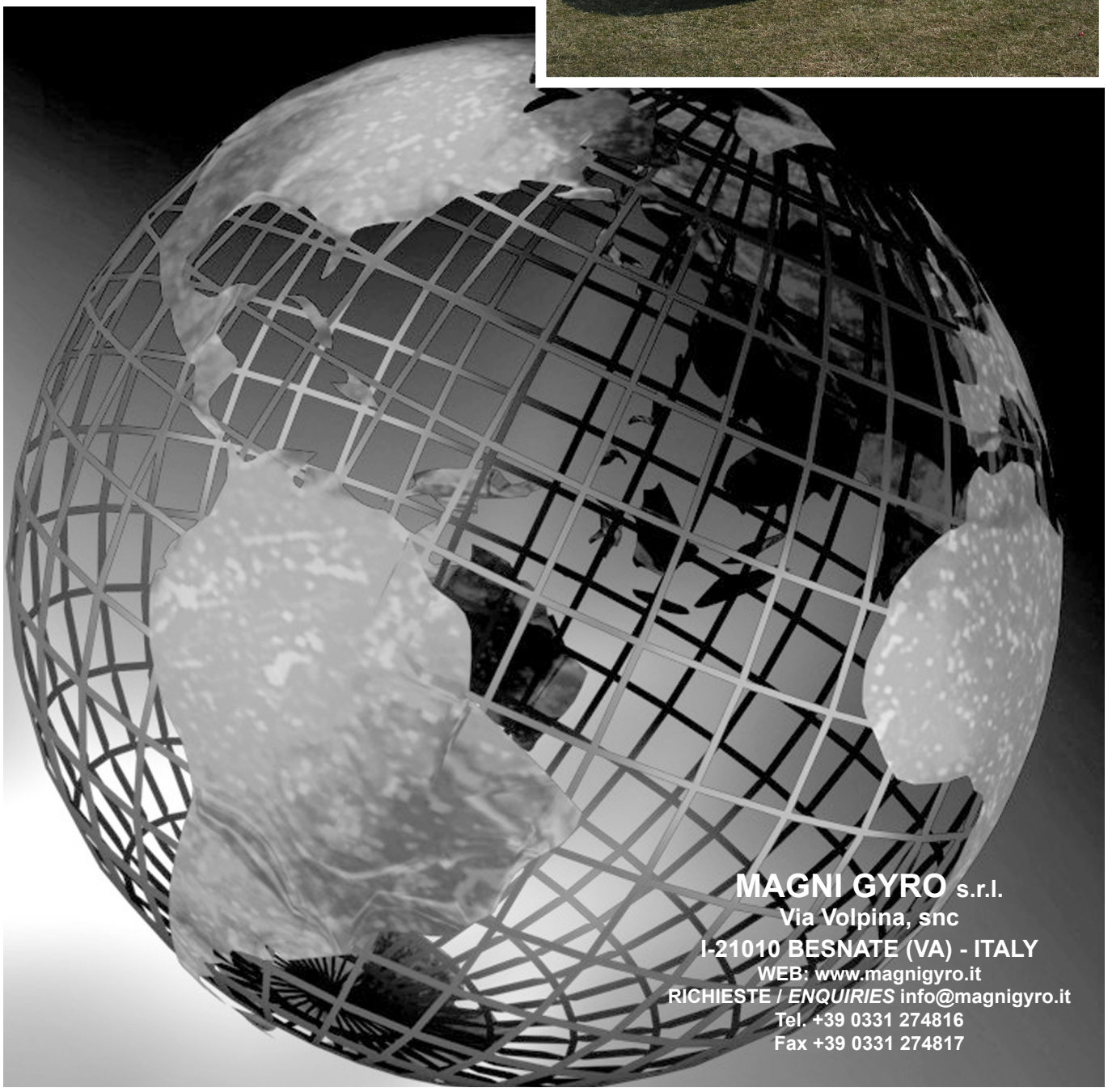
ORDINARY MAINTENANCE MANUAL MAGNI M-24C GYROPLANE 026-00-24C Issue B



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MAINTENANCE MANUAL FOR THE MAGNI GYRO M24C

Registration marks: _____

Constructors serial number: _____

Engine serial number: _____

Aircraft designed and constructed by: Magni Gyro Srl

GENERAL

This Maintenance Manual applies only to the aircraft detailed on page 0-4.
It is the responsibility of the pilot to be familiar with the content of this handbook, including any amendments.

Units of measure
The following units are used in this Handbook and where appropriate on the instruments and placards.

Weight ..... Kilograms [kg]
Length (aircraft geometry) ..... Millimeters [mm]
Distance (aircraft performance) ..... Feet [ft] or Meters [m]
Altitude..... Feet [ft]
Airspeed ..... Mph [mph]
Moments..... Kilogram meters [kgm]
Pressures ..... Bars [bar]
Temperatures..... Degrees Celsius [C°]
Liquid Quantities..... Litres [l]

RECORD OF AMENDMENTS

This page (0-6) and subsequent amendment page (0-6-1 etc), will be reissued as necessary with each amendment list.
A copy of each Amendment List will be sent to the Registered Owner of each Aircraft.
It is the responsability of the registered owner to insure that the amendments are incorporated in the Maintenance manual, that the superseded pages are removed and that the receipt form, enclosed with the Amendment List is signed and returned to Magni Gyro Srl.

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SECTION 1
INTRODUCTION

1.1 GENERAL INSTRUCTIONS

NOTE:

Instructions for engine maintenance and servicing are not included in this manual. Please remember that maintenance and servicing of the engine must be undertaken by suitably trained technicians , in accordance with t h e current i s s u e o f the Rotax Maintenance Manual; this is to ensure that the correct engine maintenance is undertaken and to satisfy safety requirements for this gyroplane.

This Ordinary Maintenance Manual is intended to give to all operators the information and the procedures needed for correct maintenance of the Magni M24 "Orion" gyroplane's systems, equipment, controls, fuselage and control surfaces. Please note that all described operations must be carried out only by operators authorized by Magni Gyro srl and holding an adequate authorisation issued by the appropriate airworthiness authority of the country of registration.
If for whatever reason there is doubt or lack of understanding, please contact the manufacturer.

A Spare Parts Manual is supplied as an attachment to this Maintenance Manual to improve the ease of understanding of all the described procedures. The Spare Parts Manual is illustrated with drawings of all assemblies and systems and lists all codes and descriptions. For each described maintenance procedure, this manual lists all the required references (page or drawing number) so as to allow the best visualization of the parts and an easy understanding of the maintenance operation.
For a better explanation of the more complex operations, pictures have been added to the description of the maintenance operations.

For a general description of the gyroplane and information on the operation and control of the gyroplane, reference should be made to Magni Gyro M24C Orion Pilot's Handbook.

1.1.1 WARNING SIGNS

All the safety rules indicated in this manual that imply danger are highlighted with the following symbols:

WARNING DANGER:
Warns of the presence of serious danger. If the necessary precautions are not taken, it is likely that the operator or a third party will risk serious accidents or death.

WARNING:
Warns that the vehicle's integrity is in danger. If the necessary precautions are not taken, it is likely that the vehicle be damaged, which in turn could cause an accident.

CAUTION:
Information on the operation in progress.

NOTE:
Draws the attention on important information that the personnel in charge must know and bear in mind for a correct operation of the vehicle.

1.2 APPLICABILITY

This manual is applicable to the following type of gyroplane:

Magni Gyro M24C Orion fitted with Rotax 914 UL engine

1.3 OWNER / OPERATOR RESPONSIBILITIES

The owner and/or operator are responsible for completion of the maintenance prescribed in the schedule.

Maintenance must be carried out by qualified staff only. Each operation must be recorded in the aircraft logbook.

If the gyroplane does not fly for a total time of 100 hours within a period of 12 months, the 100-hour inspection should be performed as an annual inspection.
Engine maintenance and servicing should be carried out by appropriately trained and qualified staff.
This manual does not include engine maintenance procedures. See the Rotax engine manual for more information and general maintenance and handling, or contact a Rotax authorized technician.

1.4 PERIODIC MAINTENANCE

Certain parts require scheduled maintenance regardless of flying hours. This maintenance must be performed in addition to the flight hour related maintenance.

1.5 CERTIFICATION OF MAINTENANCE

The gyroplane and engine logbooks should be present at all inspections. The number of flying hours, flights and modifications carried out since the last inspection should be correct and up to date. The engine logbook must show that the engine has been maintained in accordance with the manufacturer's instructions.

All periods in the schedule quoted in flying hours are to be calculated on the basis of the hours recorded by the Flydat instrument.

1.6 READING OF SERIAL AND PART NUMBERS OF COMPONENTS

For correct understanding of the manual and to ease communication with the manufacturer, it is essential to understand the meaning of the serial numbers (s/n) of the gyroplane and part numbers (pn) of its components.

1.6.1 READING OF GYROPLANE s/n (SERIAL NUMBER)

All Magni Gyro gyroplanes are identified with a serial number. This identification is helpful to define all the characteristics of a specific gyroplane, its assembly procedures, production date and, by consequence, the version. We can say that with a serial number it is possible to know the history of a gyroplane, that is its assembly, testing, user and modifications or updates. Furthermore, the serial number is the only reliable reference for the customer to ask for spare parts or information and be sure of a correct assistance from the manufacturer.

Maintenance staff can use the serial number to obtain primary information as to model, production year, progressive production number (and by consequence version) and initially fitted engine.

On Magni gyroplanes, a data plate pn014 located at the bottom of the instrument panel frame (right side).

This data plate lists the following manufacturing data:
- o gyroplane model;
- o serial number;
- o engine initially fitted;
- o production date (year).

The following notes explain how to read a serial number:
serial numbers are composed of 8 digits, the meaning
of which is as follows:

XX - XX - XXX - X
XX the first two digits indicate the model of the gyroplane.
XX the second two digits indicate the year of production.
XXX the next three digits indicate the progressive production number.
X the last digit indicate the engine originally fitted, according to the following

table:

0…….. unassigned
1…….. ROTAX 582
2…….. ROTAX 912
3…….. ROTAX 912 S
4…….. ROTAX 914

Example of serial number reading s/n 16032514

This serial number refers to an M-16 gyroplane, produced in 2003, progressive production number 251, initially powered with a Rotax 914 engine.

1.6.2 READING OF SPARE PARTS pn (PART NUMBER)

All the components of a Magni Gyro gyroplane are identified with a part number. Users and maintenance staff can use this part number as a reference when requiring information or spare parts. These pn are also used in the handbooks when describing procedures or controls. They are listed in the Spare Parts Catalogues supplied with each gyroplane.

The following notes explain how to read a part number:
part numbers are composed of 7 digits, the meaning of which is as follows:

XXX-XX-XX

XXX the first 3 digits are the progressive number given by the Company to the part.
This number is then combined with two other groups of numbers:

XX indicates the number of the page where the part is described in the Spare Parts Catalogue.

XX indicates the model of the gyroplane where the part is installed, and by consequence the Spare Parts Catalogue it refers to.

NOTE:
The same part number XXX may be associated with several page numbers or model identifiers, which is due to the repeated use of the same part in different groups and models.
In this manual the parts are identified only through the first 3 digits of the pn, the other 4 digits are complementary.

Example of part number reading
pn267-09-16

This identifies part number 267, appearing in page 09 of the spare parts catalogue of the M-16 gyroplane model.

1.6.3 REQUEST FOR INTERVENTION TECHNICAL ASSISTANCE

NOTE:
All maintenance, repair, etc. must be carried out only by SPECIALIZED PERSONNEL; otherwise, call our TECHNICAL ASSISTANCE DEPARTMENT.

MAGNI GYRO has set up for its customers the TECHNICAL ASSISTANCE DEPARTMENT so as to solve any problem connected to the machine's operation and maintenance.

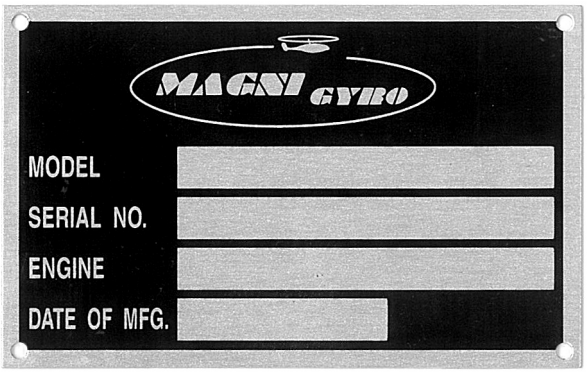
EXCEPTION
MAGNI GYRO does not guarantee repair work and does not answer for the ensuing damages when the above-mentioned repairs have not been performed by its own personnel.

Assistance must be requested after a detailed analysis of the problems and of their causes.

The requests must always be in writing and the following information must be specified in the message:
- Machine model
- Serial number
- Detailed description of the detected defects
- Checks performed
- Adjustments carried out and their effect
- Any other information deemed useful.

Address the requests to:
Magni Gyro – I-21020 Besnate (VA) Italy, via Volpina, snc
tel. +39 0331 274816, **fax** +39 0331 274817
web: www.magnigyro.it, **e-mail:** info@magnigyro.it

Serial number:



When asking for technical assistance or for spare parts, always quote the machine model, SERIAL NUMBER and year of production.

Obtain the data from the machine's data plate, which is fixed to the bottom of the instrument panel frame (right side).

NOTE:
The machine's data plate is the only identification reference. It is therefore important to keep it in a good condition. Do not modify it or remove any data. The Customer is responsible for any tampering.

1.7 GENERAL FASTENING REQUIREMENTS

Use only indicated products and strictly follow the requested methods:

1.7.1 MANUFACTURER'S REQUIREMENTS

1. Metric Series, 8.8 type - fastening of fittings and components.
2. PAN Series - fastening of torsion rods and blade flapping axis bolt.
3. AN Series- fastening of control rods and rotor head assembly.
4. NAS Series - fastening of rotor head joints.
   Each fastening element must have specific anti-corrosion and resistance to oxidation characteristics.

1.7.2 FASTENING AND METHODS REQUIRED FOR ALL THREADED CONNECTIONS

1. Fiberlock / Nyloc nuts:
   - Never use more than once.
   - Do not use them if they do not lock as required.
   - After tightening there must be at least 1 - 1,5 thread clear of the nut.
2. Lock washers (spring lock washers):
   - Always place between nut and plain washer, never directly on surfaces.
3. Threadlocker (Locktite):
   - Light locking purple Locktite 222;
   - Medium locking blue Locktite 243;
   - Strong locking Locktite 272;
4. Castle nuts:
   - Always use in conjunction with safety pins or cotter pins.
5. Plain washers:
   - Use on all painted surfaces.
6. Large plain washers:
   - When possible use on all aluminum surfaces.
   - Always use on surfaces of GRP.
7. Tightening method:
   - Tighten all the nuts by turning the nut, but never turn the bolt.

1.7.3 GENERAL SPECIFICATIONS FOR TORSIONAL TIGHTENING

1. If there is no other specific indication, use the following torques for all threaded fastening elements:
   - M4: 4-4,2 Nm
   - M5: 5,5-6 Nm
   - M6: 9,5-10 Nm
   - M8: 23-26 Nm
   - M10: 34-36,5 Nm
   - AN4: 10-11 Nm
   - AN5: 18-20 Nm
   - AN8: 50-70 Nm
2. Never use high torques on fiberglass reinforced plastic (GRP) surfaces.

1.7.4 LUBRICATION AND ANTICORROSION PRODUCTS SPECIFICATIONS

Rotor head control axis bolts
- Amber-colored grease SHELL DARINA R2 or equivalent

Flap bearings
- Amber-colored grease SHELL DARINA R2 or equivalent

Rotor head notched gear
- Water-repellent protective grease CASTROL GRAPHITE GREASE or equivalent

Prerotation Bendix gear
- Lithium graphite grease CASTROL MOLY GREASE or equivalent

Prerotation flexible shaft
- Lithium graphite grease CASTROL MOLY GREASE or equivalent

Rudder pedals bolt bushes
- Amber-colored grease SHELL DARINA R2 or equivalent

Outer bearing surfaces
- Water-repellent protective grease CASTROL GRAPHITE GREASE or equivalent

Rear wheel axle
- Water-repellent protective grease CASTROL GRAPHITE GREASE or equivalent

Inside of control cable sheaths
- Spray grease CASTROL CHAIN LUBE RACING or equivalent

Rotor hub bar floating bush
- Spray grease CASTROL CHAIN LUBE RACING or equivalent

Rudder upper bush
- Lithium graphite grease CASTROL MOLY GREASE or equivalent

Engine internal lubrication
- in accordance with the latest issue of the engine maintenance manual

1.7.5 CARE AND CLEANING PRODUCT SPECIFICATIONS

Fiberglass reinforced plastic (GRP) Surfaces

Rotor and propeller blades
- Avioclean P47 Special Propeller Cleaner

Transparent surfaces
- Avioclean S23 Canopy Scratch Remover
- Avioclean C32 Aircraft Canopy Cleaner

Inner surfaces and upholstery
- Silicon-free instrument panel spray polisher

Instrument panel
- Silicon-free instrument panel spray polisher

Engine outer surfaces
- ACF 50 corrosion protector

Non-anodized aluminum surfaces
- ACF 50 corrosion protector

Control rod ends
-ACF 50 corrosion protector

WARNING:
To ease maintenance operations, facsimiles of inspection sheets are enclosed with this manual. The inspection sheets indicate the procedures to be carried out, as well as their frequency (hours, years).

1.8 SPECIFICATIONS

WEIGHT

Empty weight 297kg
Maximum take-off weight 500kg

PERFORMANCE

Vne 100mph
Cruising speed 85mph
Service ceiling 10000ft
Take-off distance to 50ft 1250ft
Landing distance from 50ft 430ft
Rate of climb 625ft/min
Tank capacity 82lt

DIMENSIONS

Rotor diameter ..... 8535 mm
Propeller diameter ..... 1700 mm
Width ..... 1800 mm
Length ..... 4400 mm
Height ..... 2760 mm

The Maximum Take-Off Weight may be limited according to the provisions of the local rules.

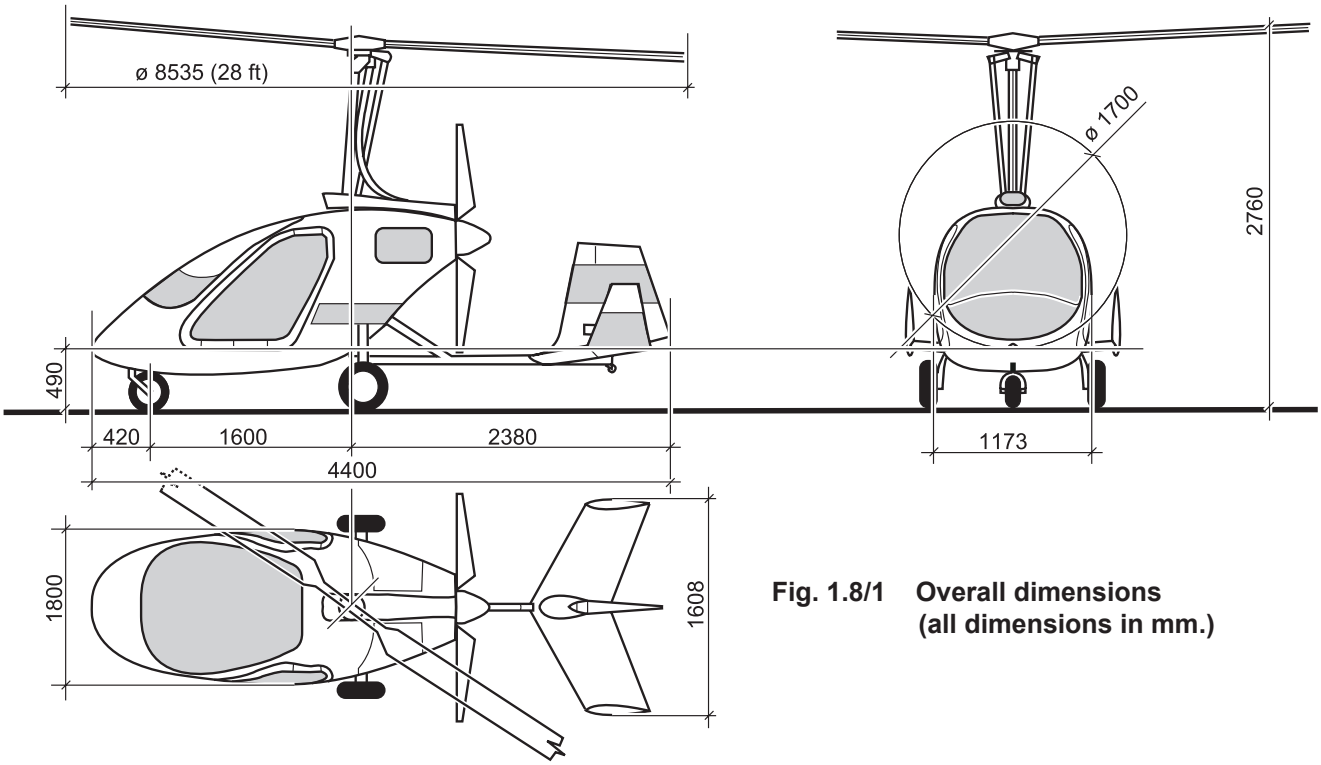
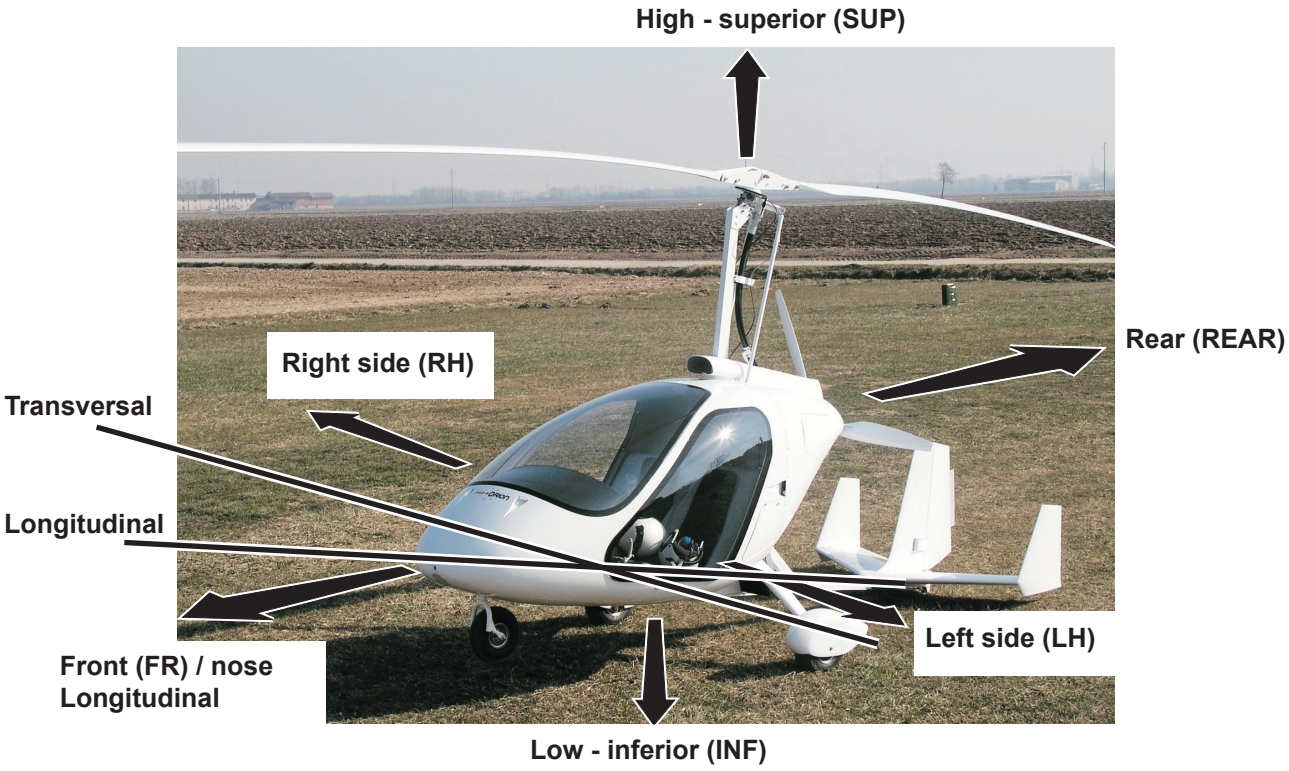


Fig. 1.8/1 Overall dimensions (all dimensions in mm.)



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SECTION 2
DESCRIPTION OF GYROPLANE AND GENERAL MAINTENANCE REQUIREMENTS

2.1 MAIN STRUCTURE

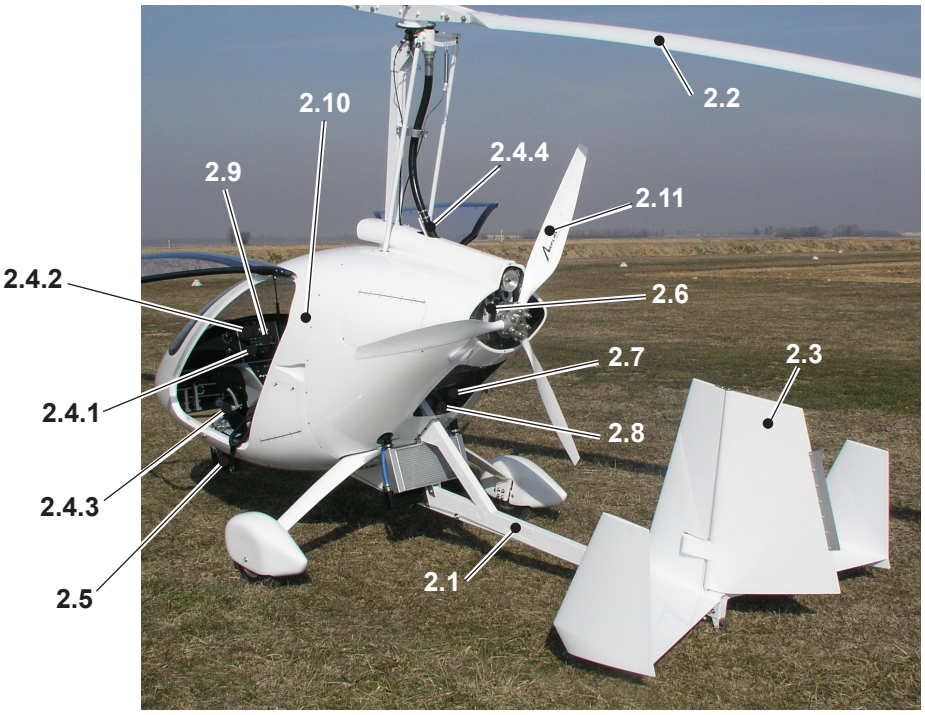
The main structure of the gyroplane is constructed from TIG welded steel box section (4130 type). This structure forms the basis of the gyroplane; all the other systems are mounted on or to it.
The structure is a single piece unit with no user replaceable parts or components.
The structure is constructed to exacting standards in the Magni Gyro factory using templates and jigs with aerospace qualified welders and equipment.
Owing to the flight loads placed on the airframe and the essential role it plays, MAGNI GYRO can not allow or approve any privately made repair and/or modification to the structure.

WARNING DANGER:

THE MANUFACTURER MUST BE CONTACTED IN ALL INSTANCES OF THE STRUCTURE NEEDING ANY REPAIR OR MODIFICATION. FAILURE TO DO SO COULD LEAD TO A HAZARDOUS SITUATION WITH POTENTIAL FOR INJURY OR EVEN DEATH, FREEING MAGNI GYRO OF ANY RESPONSIBILITY.

2.2 ROTOR BLADES

The rotor blades are manufactured by Magni Gyro to a very high standard and have proven to give excellent flying characteristics.



Prior to shipping, the blades are matched and balanced; thus they must always remain paired.
Should one blade be damaged and require replacing, it must be returned with the undamaged blade to Magni Gyro for repair (if repair is possible).
Any non-approved repair of the blades is forbidden.
In all cases of rotor blade damage, either a set repaired by the manufacturer or a new set must be installed.
Even a thin coat of paint can unbalance the blades and prove difficult to correct.
The blades are made of composite material with a composite spar and an aluminum root. There are no user replaceable components on the blades and great skills in composite repair techniques are required to obtain a satisfactory repair.

Rotor blades must be returned to the factory for replacement after 2500 flying hours.

⚠ WARNING DANGER:
THE MANUFACTURER MUST BE CONTACTED IN ALL INSTANCES OF THE ROTOR BLADES NEEDING ANY REPAIR OR MODIFICATION. FAILURE TO DO SO CAN LEAD TO A HAZARDOUS SITUATION WITH POTENTIAL FOR INJURY OR EVEN DEATH, FREEING MAGNI GYRO OF ANY RESPONSIBILITY.

2.3 FUSELAGE AND TAIL (CONTROL SURFACES)

The fuselage of the gyroplane consist of 3 main parts:

- the cockpit , where pilots are seated and where the windscreen, the doors and the door opening systems are connected; and
- 2 engine fairings (left and right) with hinged maintenance access openings.

The entire fuselage is made of carbon fibre and can usually be repaired using standard composite repair techniques.

Any damage must be analyzed first and then repaired to maintain the integrity of the fuselage.
The surface finish must be restored to keep the design and maintain aerodynamic efficiency.
Should the customer wish to modify the fuselage, please refer to Magni Gyro and ask for advice.
The tail assembly is manufactured in composite fibreglass and the surface is finished with a gel coat.
A suitably qualified engineer or technician should assess any crack or debonding of the components.

If the damage is nonstructural, then repairs using standard composite repair techniques can be done.

In all instances, the surface finish must be restored to prevent the infiltration of moisture or contaminants and to guarantee aerodynamic performance.
If the damage to the parts is deemed to be structural, then the components must be returned to the manufacturer for rework or replacement.
Unauthorized structural repair is not allowed.

Any worn or damaged part of the rudder system must be replaced with Magni Gyro original parts.

2.4 MAIN STRUCTURE AND FLYING CONTROLS

The main structure of the gyroplane is also the anchoring point and reaction base for the flying controls.
Correct adjustment and functioning of the controls is essential for safe flight of the gyroplane.
All the pivots and joints of the control system use a combination of bearings and rod end bearings.
During inspection, any bearings or rod end bearings found to be worn or corroded must be replaced.
All components are available from Magni Gyro; this will ensure the use of correctly specified parts.

WARNING:
Some bearings available on the market may look the same as those removed from the gyroplane but, unless they match the designer's specifications, they must not be used to replace the original parts.

Adjustment of the controls, including setting of the stops, may be required after replacement of these parts.
This procedure must be carried out by a Magni Gyro approved engineer or inspector to ensure safety.
It is strongly recommended that Magni Gyro is contacted prior to adjusting the flying controls.
After replacing rod end bearings, check the inserted thread length and make sure it exceeds the minimum specified insertion length to ensure safety.
Lock nuts are to be secured and paint marks applied.

2.4.1 ROLL AND PITCH CONTROL SYSTEM

The gyroplane is controlled for roll and pitch through the control sticks.
The sticks (with their ergonomic handle) are pivoted to a fork; the fork houses the bearings on which the movements along the longitudinal axis of the torsion rods are articulated.
Connection between control fork and torsion rods is made using AN3 aeronautical grade bolts and nuts. Movement of the control stick generates longitudinal movement of the upper torsion rod in relation to the lower torsion rod.
Lateral movements are transmitted via the lower torsion rod, pivoted to the structure with two uniball bearings.

A 4130 steel TIG welded fork connected to the torsion rods via bearings conveys the movements of the torsion rods to the control rods.
The vertical control rods transmit the movements from the lower fork to the rotor head.
This vertical control rod system consists of two pairs of rods fabricated from 4130 steel with TIG welded threaded ends. Rod ends with threaded stems are fitted to the end of the control rods.
Control movements are geared down through two pairs of aluminum arms mounted mid-way down the mast; the arms are mounted on bearings using aeronautical grade bolts and nuts. Movement of the control rods provides control of the rotor head. Movement of the rotor head in the roll axis takes place via bolt pnNAS 628-52 and the fork pn051 which is bolted to the main structure using 4 bolts pnAN5-24 A. Movement in the pitch takes place via bolt pnNAS 628-30 and the fork pn052.
All the bolts and nuts used in the control line are of aeronautical grade and all the movements occur on bearings, with the exception of movement of the rotor head on via fork pn052 and of the square pin pn056 which are fitted with bushes to support the high loads involved.

Control system stops
Pitch and roll stops are fitted along the torsion rods.

2.4.2 SECONDARY CONTROLS

“Secondary controls” are the controls which do not control the aircarft in the pitch, roll or yaw axes and which do not provide control of engine power.
The secondary controls are listed below:

3.9.1 - choke control line;
3.9.2 - rotor brake control line;
3.9.3 - brake system cables line;
3.9.4 - prerotation control line;
5.1 - trim control line;

The secondary controls are operated via 1,5 mm diameter stainless steel cables (2 mm diameter for the trim line) that run in metallic sheaths, with a plastic film on the outside and Teflon covering on the inside.

WARNING:

If periodic maintenance of these cables is not undertaken, the cables might break causing a failure of the system. In the worst of cases, the broken cable might be impossible to extract from the sheathing, and the replacement of both the cable and its sheathing become necessary.
To avoid these problems, it is strongly recommended to undertake the maintenance described in the schedule.

2.4.3 RUDDER PEDAL SYSTEM

Control in the yaw axis is provided by the rudder pedal system used by the pilot to yaw the gyroplane during flight and to direct it in ground manoeuvering such as taxiing and parking.

Pilot and co-pilot pedal units are bolted to the floor of the cockpit by means of 3 screws fixed into aluminium threaded inserts.
The pedal units consist of pedal block pn514 where pedals pn519 are hinged; pedals are connected to the T-link pn515 (pilot position)or pn517 (co-pilot position) by means of rigid rods and rod end bearings.
From the T-links the pedals are connected to the front fork with rigid rods by means of the central link pn527.

Two steel keys pn526 attach the link to the front fork pn619 and to the main pulley pn525; these keysalso allow rotation of the link.

When the pilot pushes one of the pedals, it makes the front wheel turn to the same side (right foot-right turn).

All the movements of the pedal system are via ball bearings and all the rigid rods uses rod end bearings.

The rudder cable is fastened to the main pulley pn525 ; this cable is then routed through pulleys up to the rudder pivot pn086.

The movement of the pivot pn086 is supported by two thrust bearings pn6002 zz mounted in a special housing in the main structure.
Pressure exerted on the pedals moves the rudder (fixed to the pivot pn086) providing yaw control of the gyroplane's in flight.

The rudder cable turnbuckle is located under the fuselage, on right hand side of the structure.

2.4.4 PREROTATION SYSTEM

The function of the prerotation system is to provide to the rotor unit the initial acceleration necessary for take-off.

The prerotation control line is routed along the gyroplane's structure, starting at the lever mounted on the control stick and reaching the transmission unit through a sheathed steel cable. When the pilot operates the control lever, the movement is carried to the belt-tensioning unit on the pre-rotator drive system mounted adjacent to the propeller, tightening the pre-rotator drive belts and causing them to engage on the drive pulleys.

Once the belts are tightened, the drive from the propeller hub is geared down by the belt and pulley system before being transmitted through the flexible steel shaft to the Bendix gear. This gear, once started, engages the rotor head's ring gear which is attached to the rotor head..

The tension exerted on the belts is released when the prerotation lever is released, thus stopping the transmission, flexible shaft and gear. The bendix drops down and disengages from the ring gear, thus freeing the rotor so that it can rotate.

2.5 SUSPENSION, WHEELS AND BRAKES

The suspension of the gyroplane is provided by a composite suspension bow.
The manufacturer does not authorize any repair of the suspension bow.
Any crack or damage to the suspension bow must be be referred to Magni Gyro.
Minor surface abrasions and scratches can be repaired using standard composite repair techniques.

If any of the wheel or brake components are found to be damaged, then replacement with new or repaired parts is the only option.
Magni Gyro's policy is to recommend replacement of any worn or damaged parts rather than repair.
In the long run the cost of a new wheel axle will probably be less than trying to repair a bent or damaged one and ensures greater flight safety.

If the front fork is found to be bent or distorted, then this unit should be replaced.
Unauthorized repair can lead to a unit that is much weaker as the original one and could fail in service **(for inspection procedures see the specific paragraph).**

2.6 POWER PLANT

This gyroplane is designed to be fitted with a pusher configuration powerplant. The powerplant is located behind the crew area, behind a flame-resistant bulkhead. The engine is installed inside a three-part cowling comprising two upper sections incorporating inspection hatches and a lower section.

Any repair or overhaul of the engine must be carried out by personnel trained and qualified in the maintenance of ROTAX engines, in strict accordance with the latest issue of the maintenance and operator's manuals applicable to the engine.
Details of any work carried out must be entered in the relevant engine logbook.
This logbook must be kept up to date and accurate and be available for presentation when work is carried out and at permit to fly renewal.

For more information, see the relevant section.

2.7 FUEL SYSTEM

The gyroplane's fuel system has been designed to meet the requirements of BCAR Section T (CAP 643).

Any modification or substitution of non-original components may cause the system to no longer meet compliance standards and is strictly forbidden.
Whenever replacing a component, it is vitally important to replace it with an identical one.
A fuel flow availability check must be carried out after any work has been carried out on the fuel system.

Each fuel pump and each filter must be capable of individually delivering at least 125% of the maximum fuel consumption of the engine.
Fuel consumption data is available in ROTAX operator's manual applicable to the installed engine.
The fuel tank is manufactured in composite. Before installation, it is subjected to a pressure test and to leak check.

Minor repairs may be carried out using standard composite repair techniques, but they must be tested to make sure it still satisfies the requirements of BCAR Section T.
If contamination of the fuel system is suspected, then the entire system must first be emptied and then filled with clean fuel. In addition the fuel filter must be replaced.

Please see figure 2.7/1 for schematic diagrams of the fuel system.

2.8 COOLING SYSTEM

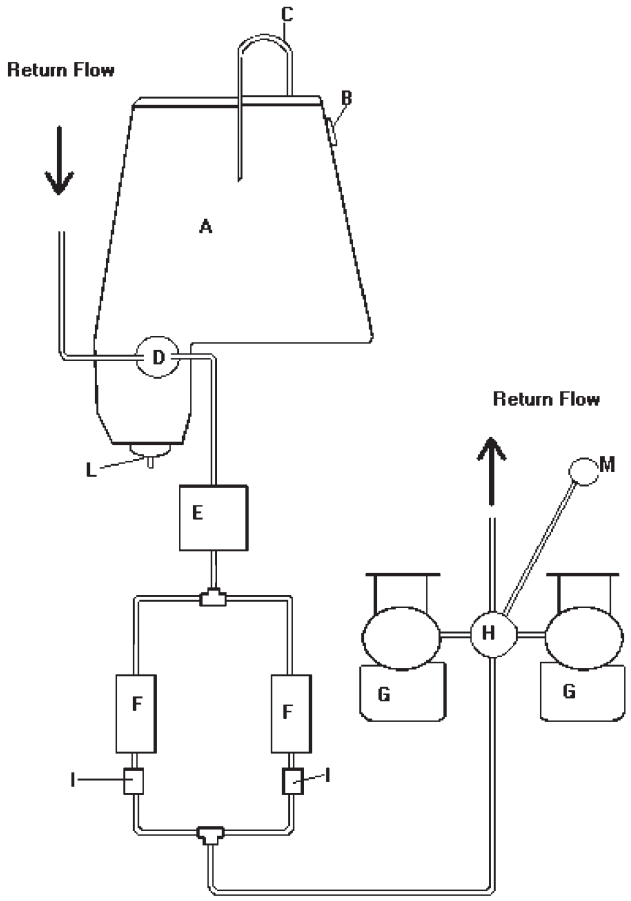
The cooling system can be split as follows:

- water cooling
- oil cooling

Both systems are fitted with thermostatic valves and radiators (1 for the water cooling system, 2 for the oil cooling system); radiators are located below the fuselage.

Maintenance of the cooling system must follow the maintenance schedule as detailed in the Ordinary Maintenance Schedule, or each time there are problems, overheating or loss of coolant.

Fig. 2.7/1 FUEL SYSTEM SCHEMATIC DIAGRAM ROTAX 914



A) - Fuel tank
B) - Fuel tank filler cap
C) - Fuel tank vent pipe
D) - Tank outlet and contents sender
E) - Fuel filter
F) - Fuel pump
G) - Carburetors
H) - Fuel pressure regulator
I) - Non return valves
L) - Sample and drain point
M) - Fuel presure gauge

2.9 INSTRUMENTATION

The instrumentation is located on the dashboard con- sisting in 4 instrument panels:
1) Switch panel
2) Engine instruments/radio panel
3) Pilot panel
4) Co-pilot panel

All maintenance other than permitted pilot maintenance must be carried out by an authorized maintainer.

Any instrument that gives readings that are suspected to be wrong should be replaced and a functional check of the system must be carried out.
Limit and range markings are to be clear and legible; they must be replaced when they no longer comply with a satisfactory standard.
Limits and ranges of each engine instrument can be found in the relevant sections of the ROTAX engine manual.

2.9.1 SWITCH PANEL

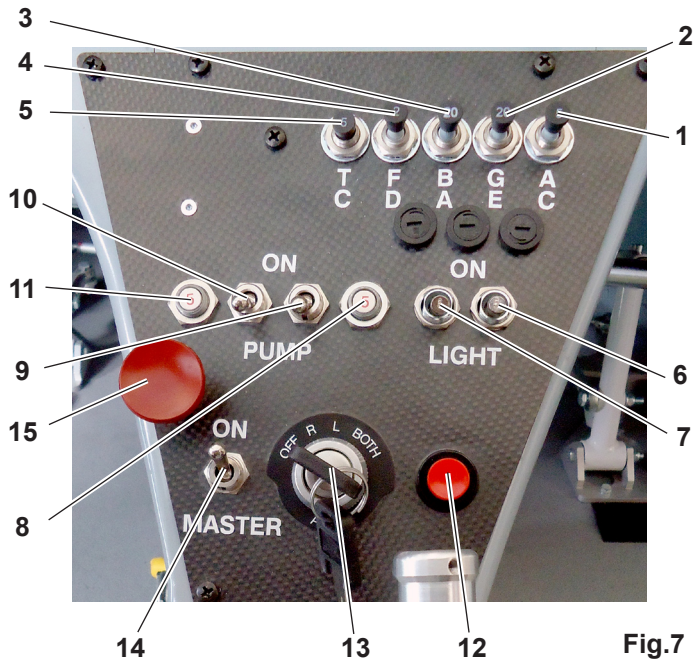
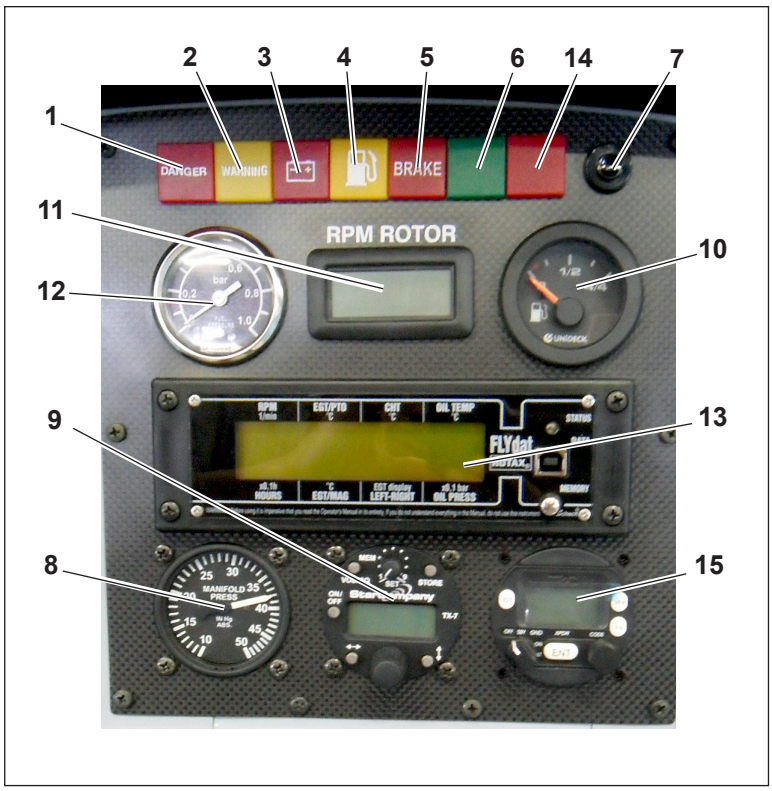


Fig.7

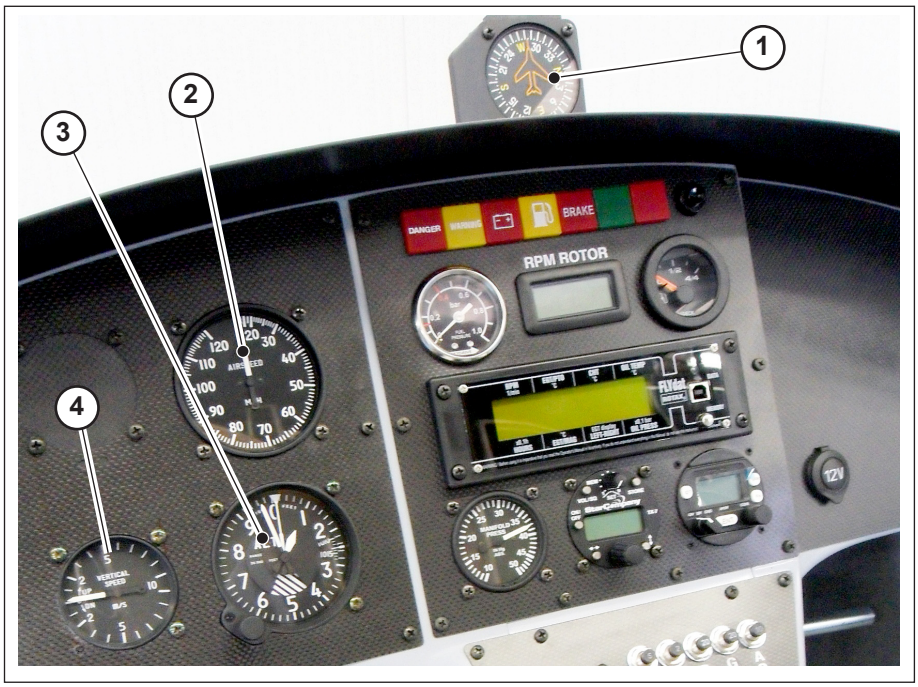
1	ACC Circuit breaker 10 A
2	GEN Circuit breaker 20A, generator
3	BATT Circuit breaker 20A, battery
4	FD Circuit breaker 2A, FLYDAT
5	TCU Circuit breaker 5A, TCU
6	Stroboscopic lights switch (Optional)
7	Landing Light switch
8	BREAKER 5A push button - main pump
9	Main pump switch
10	Auxiliary pump switch
11	BREAKER 5A push button - auxiliary pump
12	Start push button - STARTER
13	Ignition key
14	MASTER switch
15	Fuel shut off valve control

2.9.2 ENGINE INSTRUMENTS/RADIO PANEL



1	Red - DANGER of turbo overpressure
2	Yellow - engine caution or WARNING
3	Red - BATTERY, generator not working
4	Yellow - RESERVE, low fuel level
5	Red - BRAKE, rotor brake (ON when engaged)
6	Green - TRIM in end position
7	Reserve warning light test push button
8	MAP - manifold pressure
9	Radio (Optional)
10	Fuel level gauge
11	RPM ROTOR - rotor revolution counter
12	Fuel pressure indicator
13	FLYDAT engine monitor
14	Red - fire detection warning light
15	Transponder

2.9.3 PILOT PANEL



1	Compass
2	Air-Speed indicators (ASI)
3	Altimeter (ALT)
4	Vertical speed indicator (VSI) (Optional

For further information refer to the POH.

2.10 COCKPIT

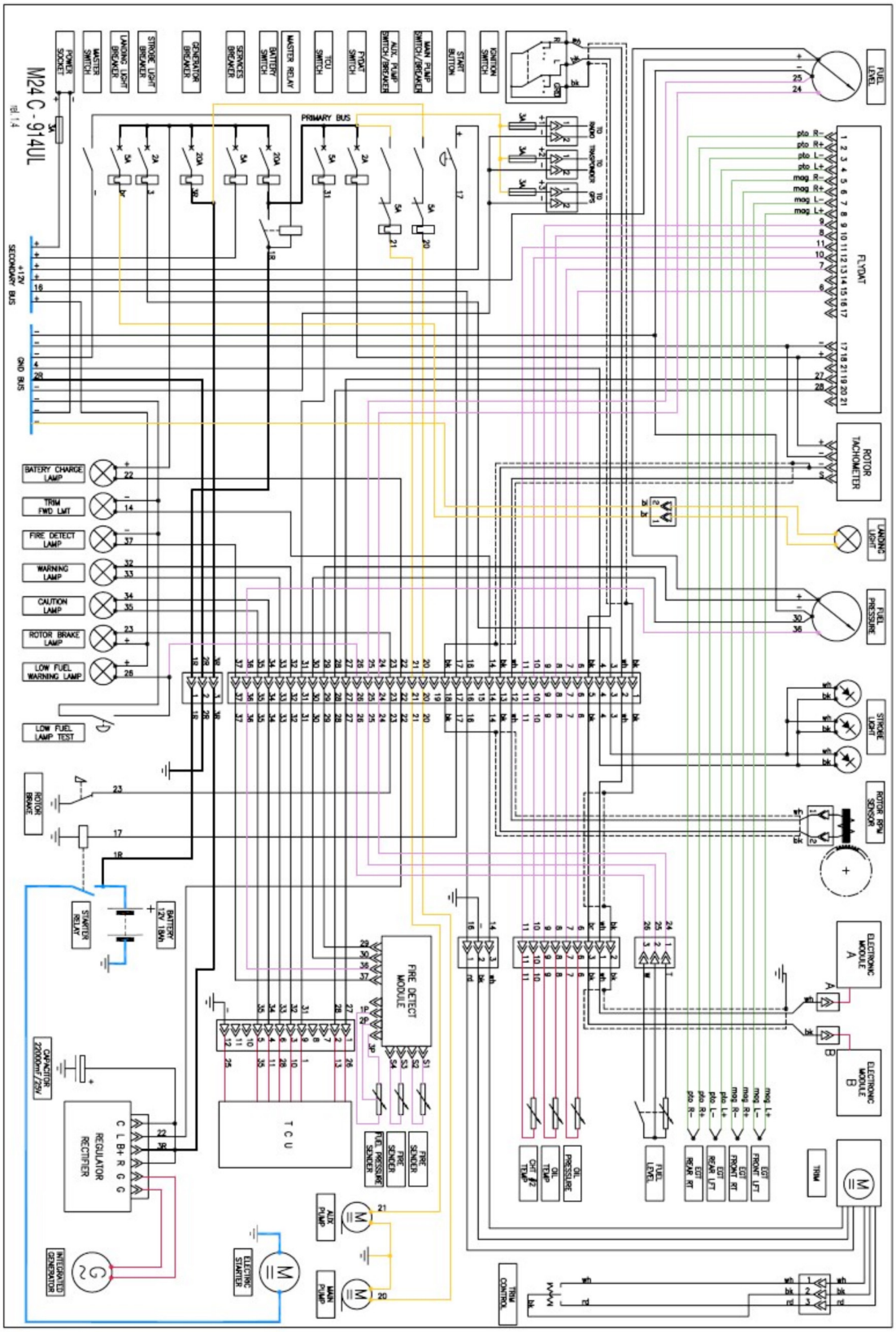
The pilots are seated in a cockpit in a side by side configuration. The co-pilot seat (right side) is not aligned up with the pilot's (left hand) seat, it is fit slightly further back in order to increase the the amount of space available. Access to the cockpit is via the two upward-opening side doors. Each door has a strut to support it when open. The door is locked by a lever which when pushed down engages the door on two pins. Underneath the co-pilot seat there is a small baggage compartment .
Internal maintenance of the cockpit is basically limited to cleaning, general check of the free movement of the controls and inspection of the locking system of the doors.

2.11 PROPELLER

The propeller fitted to the M24 Orion is an ARPLAST GL3 ECOProp manufactured by Arplast-Helice srl.

The propeller comprises composite blades of epoxy resin, reinforced with carbon and glass. The reinforcement extends along the blade and through the alumini- um collar at the blade foot. The hub, which takes three blades, is an aluminium casting, machined to accept the blades and fixing bolts.

2.12 ELECTRIC SYSTEM - WIRING DIAGRAM



Wiring schematic diagram included here for reference.
For improved clarity version see **Appendix A.**

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SECTION 3
ORDINARY MAINTENANCE PROCEDURES (Inspections - Checks - Adjustments - Replacements)

3.1 CHECK AND REPLACEMENT OF FLEXIBLE SHAFT (see fig. 3.1/1 - 3.1/5)

The flexible power transmission unit (1) used during the prerotation phase needs periodic inspection and greasing so as to prevent system failures.

The life of this system is dictated by the way the pre-rotator is used, by the average speed reached during prerotation and by to how smoothly the pre-rotator is engaged.

WARNING:
To avoid unexpected failures, we suggest an inspection of the flexible shaft pn118 every 100 flight hours.

Please remember that the flexible shaft pn118 is heavily greased before installation. The use of latex gloves is recommended before starting the inspection procedure to avoid skin-grease direct contact.

3.1.1 REMOVAL OF FLEXIBLE SHAFT (see fig. 3.1/1 - 3.1/5)

1. Before starting, verify that the ignition contact is in OFF position and that all the breakers are switched OFF.

2. Place the control stick (2) in its forward limit stop position.

3. Unscrew all of the M4x12 screwsthat fix the engine fairings.

4. Remove engine fairings.

5. Loosen the clamps pn4B-25-45 and release the flexible shaft from the support pn193.

6. Remove the clamping bolts M6x16 that fix the flexible outer case pn119 to the prerotation assembly pn117; take care not to lose the spacer washers (3).

7. Extract the flexible outer case pn119 from the prerotation assembly; be very careful the flexible shaft pn118 can slide down and out of the sheathing, thus damaging or dirtying other components.

8. Vertically stretch the sheathing to help the controlled removal of the flexible shaft pn118; it is recommended to mark the upper and lower ends differently to ensure correct orientation on reinstallation.

9. Lay the flexible shaft on a bench, or hold it in a vice (very gently tightened), so as to be able to proceed with the inspection and evaluation of wear.

3.1.2 INSPECTION OF FLEXIBLE SHAFT pn118 (see fig. 3.1/1 - 3.1/5)

There are various factors in evaluating the wear of the flexible shaft pn118:

1. **Integrity of the coils;** damaged or broken coils weaken the flexible shaft. The flexible shaft must be replaced if broken or damaged coils are found.

2. **Torsional deformations** are variations of the shaft's diameter. To feel for deformations simply run two fingers along the shaft as shown in the picture. If these deformations happen, it is more likely that they will be located closer to the connections to the pre-rotation assembly pn117 or to the Bendix gear unit pn- GR03 where the torsional stress is higher. If deformations are perceived then the shaft should be measured (using Vernier calipers or a micrometer) and if the deformation is minimal (less than 3 mm diameter), the flexible shaft may be re-installed but a further inspection after the first 50 hours of use is strongly recommended. If this occurs an entry in the aircraft's logbook should be made indicating the need for a further future inspection of the pre-rotator shaft and the required specific flight hours time.

   In the case of larger deformations, the shaft needs to be replaced.

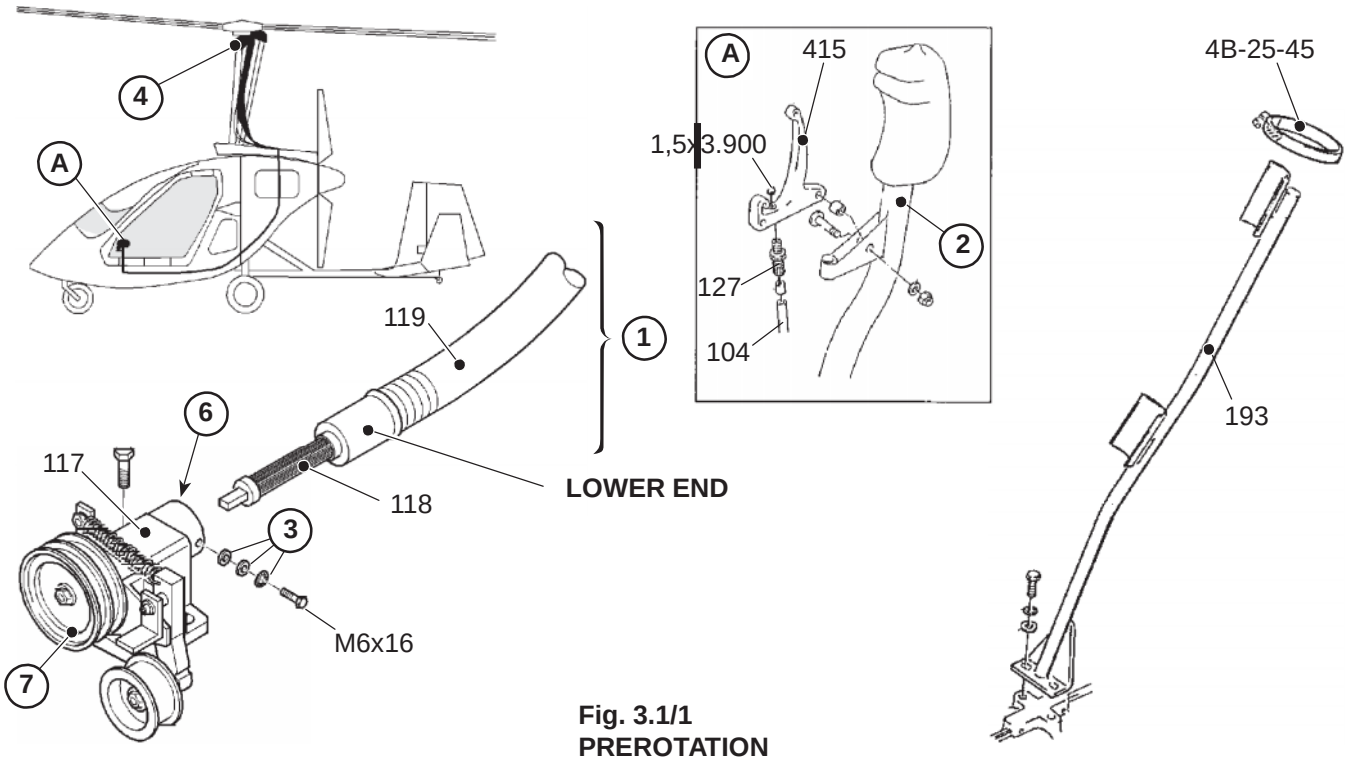
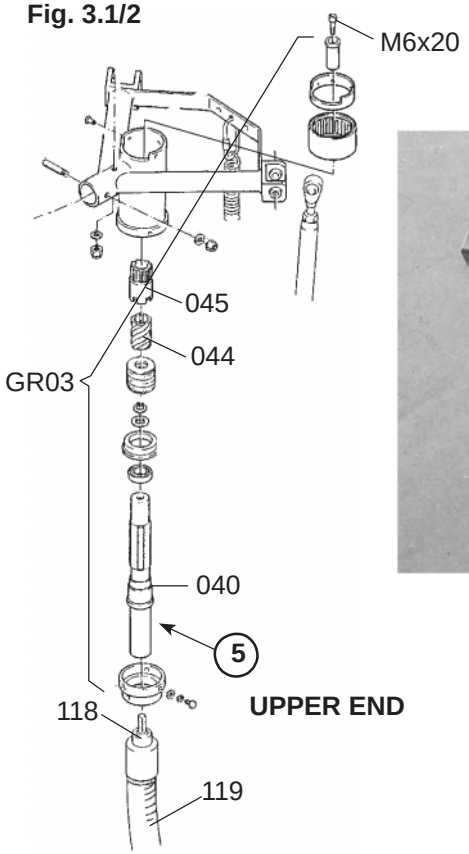


Fig. 3.1/1
PREROTATION

3. **Longitudinal deformation;** the flexible shaft pn118 should be immediately replaced if it shows permanent and discontinuous deformation along its length.

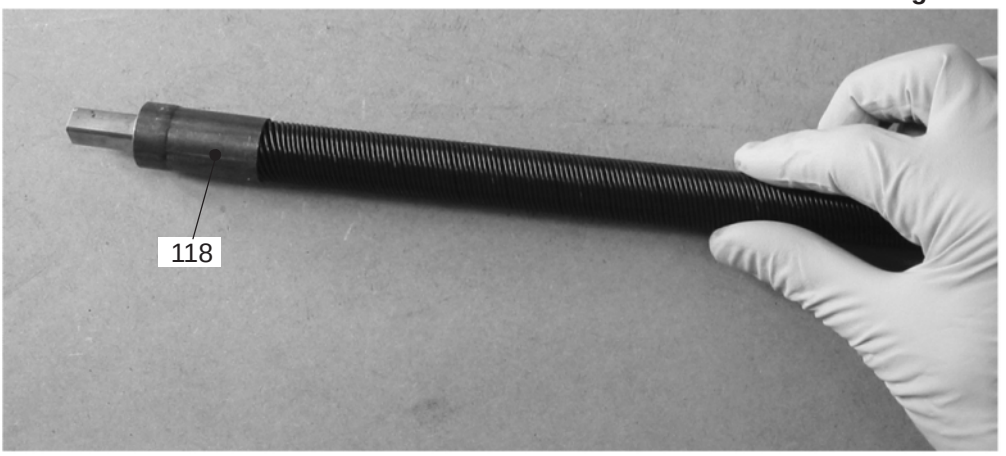
4. **Coils sheen;** if the coils appear to be very polished, this means that they have rubbed against the inner walls of the sheath pn119 for a long time and that the friction caused during rotation has worn them. This situation may be exacerbated by insufficient lubrication. If the flexible shaft pn118 with polished coils has no deformation (similar to the ones described above), it may be re-installed after being thoroughly greased.

Fig. 3.1/2



Inspection of torsional deformation of prerotation flexible shaft

Fig. 3.1/3



Pass two fingers along the flexible shaft to perceive any possible variation of diameter

3.1.3 GREASING OF FLEXIBLE SHAFT pn118 (see fig. 3.1/1 - 3.1/5)

1. Use latex gloves to avoid direct contact with the grease during this operation.
2. Secure the flexible shaft pn118 in a bench vice. Tighten the vice very gently and take care not to damage the coils.

3. Apply plenty of grease along the entire shaft (Castrol Moly Grease or equivalent)
4. Manually spread the grease evenly over the complete shaft surface.

3.1.4 INSTALLATION OF FLEXIBLE SHAFT pn118 (see fig. 3.1/1 - 3.1/5)

1. Before starting, verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Hang the outer case pn119, which is still fixed to the rotor head (4), vertically.
3. Insert at least one third of the flexible shaft pn118 in the sheath, starting from the bottom towards the top.

4. Collect the excess of grease that does not enter the sheath.
5. Extract the shaft pn118 from the sheath and grease it again with the collected excess grease.

6. Repeat the operations indicated in points 2., 3. and 4. three or four times, inserting the shaft pn118 into its outer case pn119 for a longer length each time so as to guarantee a correct greasing of the upper part of the flexible shaft pn118 too.

7. When the flexible shaft pn118 is completely inserted in the sheath pn119, carry this sheath to the prerotator unit and insert the first part of the flexible shaft pn118 into the square hole of the unit pn117.
8. Climb a ladder so as to reach the upper part of the Bendix gear unit pnGR03.

9. Using a key, rotate the socket head screw M6x20 clockwise so as to facilitate the insertion of the square ends of the shaft pn118 in their respective seats (upper (5) and lower (6)).
10. If the rotation of the Bendix gear pnGR03 done with the 6 mm key corresponds to one rotation of the pulley (7) of the prerotation assembly, this means that the shaft pn118 is correctly fitted in its seats (5 and 6).

11. Insert the sheath pn119 in the prerotation assembly.

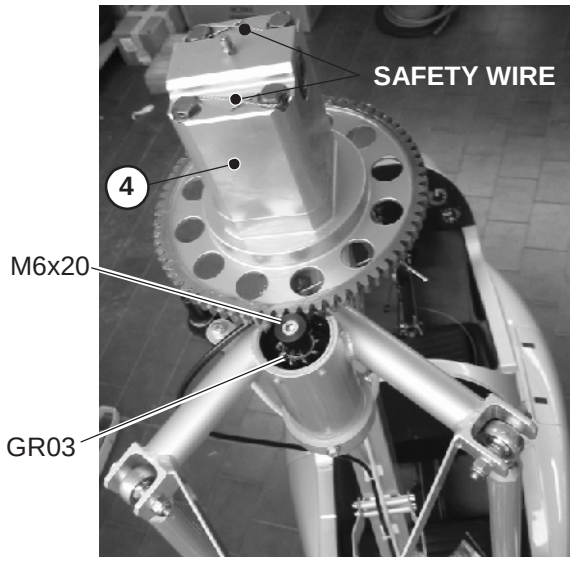
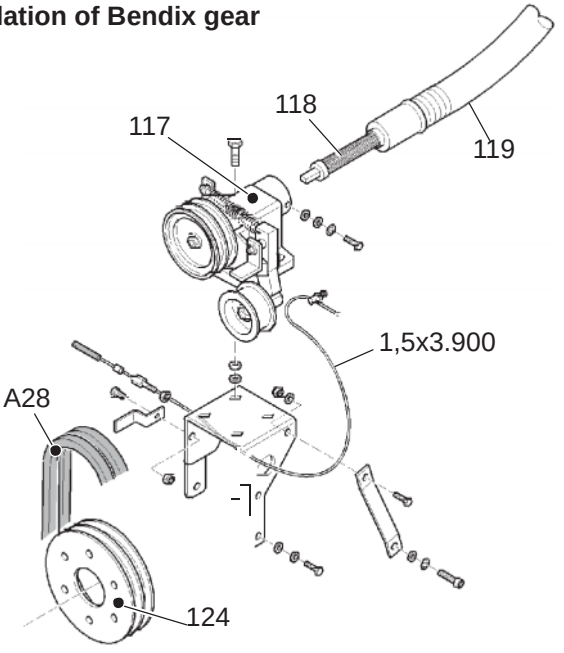


Fig. 3.1/4 Clockwise rotation for flexible shaft coupling

Fig. 3.1/5 Installation of Bendix gear



12. Fasten the sheath pn119 to the prerotation assembly pn117, tightening the M6x16 bolts and paying attention to the spacer washers (3).

13. Block the control stick (2) in the fully-forward position.

14. Position the sheath pn119 on the support pn193.
15. Fit and tighten the clamps pn4B-25-45;

16. If the prerotation pulleys or V-belts are dirty with grease, carefully clean them with gasoline or solvent.
17. Position engine fairings and fix them tightening the M4x12 screws.

3.1.5 RECOMMENDED TYPE OF LUBRICANT (see fig. 3.1/3)

Flexible shaft pn118. ……Castrol Moly Grease or equivalent

3.2 ADJUSTING OF PREROTATION UNIT (see fig. 3.2/1 - 3.2/5)

To maintain the efficiency of the prerotation system and achieve safe and satisfactory take-off performance, it is strongly recommended to periodically check and/or adjust the prerotation unit pn117 as described below.

Reduction of performance is mainly due to settling of the V-belts pnA28 caused by their wear and progressive wear of the pulley pn124. With time, belts tend to stretch, get longer and loose adherence on the pulleys pn124, thus reducing the efficiency of the power transmission to the rotor. This is something that does not happen suddenly, but appears after many hours of use and does not endanger the gyroplane's efficiency, except over a long-term.

Depending on the condition of the V-belts, and on available tools and equipment, it is possible to correct this problem in various ways.
When the operator detects a reduction in performance of the prerotator, he can adjust the adjuster pn127 of the cable housing pn104 of the prerotation cable (1,5 x 3.900).

Unscrewing the adjuster pn127 allows the belt tightening lever pn415 of the prerotator pn117 to further stretch the belts pn428, thus recovering part of their play and re-gaining the lost performance.

WARNING:
This is a temporary solution, the kind of action to be done at the airfield when other types of operation are not possible or when the problem is still small.

Fig. 3.2/1
Prerotation control cable adjuster

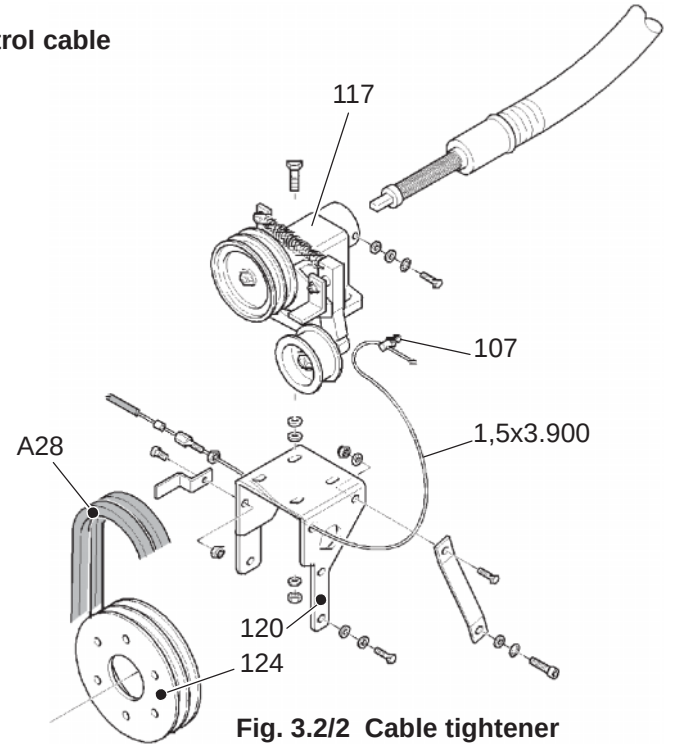


Fig. 3.2/2 Cable tightener

WARNING:
Please note that this type of adjustment might not always be sufficient to solve the problem, espcially after the first hours of flight due to the settling that occurs during running in.
In such a case, the operator may adjust the prerotation cable, as described here below.

3.2.1 CABLE STRETCHING PROCEDURE (see fig. 3.2/1 - 3.2/5)

1. Before starting this operation, verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Completely screw the adjuster pn127 of the sheath pn104 of the prerotator cable pn1,5 x 3.900.
3. Unscrew all the screws M4x12 that fix the engine fairings.
4. Remove engine fairings.
5. Loosen the cable retainer pn107 that fastens the cable to the lever of the belt tensioner.
6. Pull the prerotation control cable pn1,5 x 3.900 and tighten the cable retainer pn107. This will modify the position of the belt tensioner, further stretching the belts A28.
7. Verify that the brake shoe of the belts A28 makes good contact with the belts when the prerotation activating lever pn415 is released. If this is not the case, loosen the bolt M5x40, then re-position the brake shoe (3) as indicated in the figure and tighten the bolt M5x40 again.

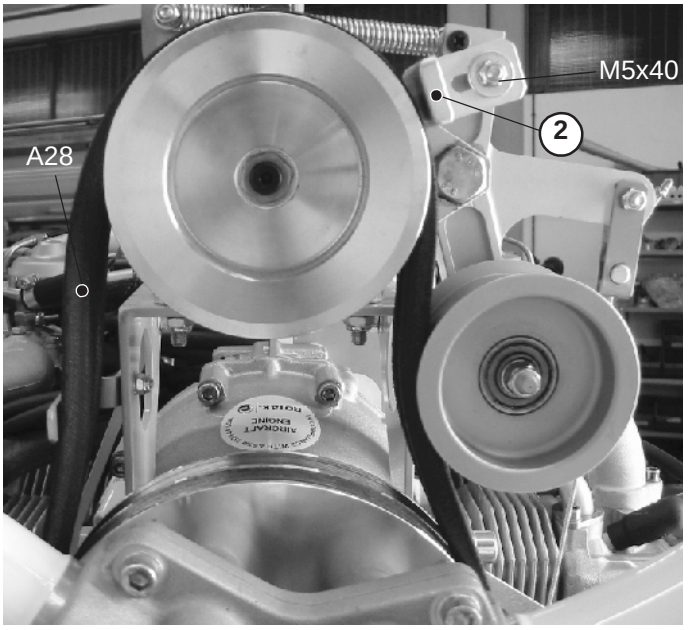


Fig. 3.2/3 Shoe (2) not in contact with the belts (wrong position)

Fig. 3.2/4 Shoe (2) in contact with the belts (correct position)

Shimming of the prerotation assembly pn117 will be required if the above described procedure generates an interference between the lever (1) of the belt tensioner and the support pn120, or if the play between the belts A28 and pulley pn124 is still too big to allow to reach the parameters indicated in the efficiency test diagram. The operator will have to shim the prerotation unit pn117 so as to tighten the belts and remove the play.

Otherwise, position engine fairings and fix them tightening the M4x12 screws.

3.2.2 SHIMMING PROCEDURE OF PREROTATION ASSEMBLY (see fig. 3.2/1 - 3.2/5)

NOTE:
When shimming, it is strongly recommended to follow the instructions given below or to have the operation done by qualified technician so as to avoid mistakes or malfunction that can jeopardize flight safety.

1. Before starting this operation, verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.

2. Completely screw in the adjuster pn127 of the prerotation cable sheath 1,5 x 3.900.

3. Unscrew all the screws M4x12 that fix the engine fairings.

4. Remove engine fairings.

5. To have a better and easier access to the prerotation assembly pn117, unscrew the clamping bolts pn284 and remove the propeller unit pn125.
6. Remove the pulley pn124 from the flange of the propeller as well as the belts pnA28.
7. Unscrew and remove the 4 nuts M6 that fix the prerotation assembly pn117 to the support pn120.
8. Lift the prerotation assembly to have access to the space washers 6x18.
9. Add a washer to each locking bolt M6x30.

NOTE:
Make sure the washers are all of the same thickness.

10. Reposition the prerotation assembly pn117 on the support pn120 and insert the locking bolts M6x30.
11. Tighten the nuts M6 to the bolts so as to reduce the movement of the prerotation assembly on the support pn120.
12. Reposition the pulley pn124 on the flange of the propeller; verify that it rests on the entire surface of the flange.
13. Use a ruler (1), as shown in the figure below to check the alignment between the pulley pn124 and the pulley of the prerotation assembly pn117.
14. Tighten the locking bolts M6x30 completely, checking that the nylock nuts pnM6 are placed correctly. If this condition is not achieved, replace the nuts M6 with thinner ones or replace bolts M6x30 with longerones.
15. Reposition the belts pnA28.
16. Verify that the brake shoe (2) of the belts pnA28 makes good contact with the belts. If this is not the case, set it correctly (see paragraph 3.2.1, point 5).

17. Verify that there is play (at least a small amount) between the belts pnA28 and the pulleys pn124. The belts should be able to be deflected, when pushed mid-way between the two pulleys, at least 2mm laterally.
18. Reposition the propeller and tighten the locking bolts.
19. Position engine fairings and fix them tightening the M4x12 screws.

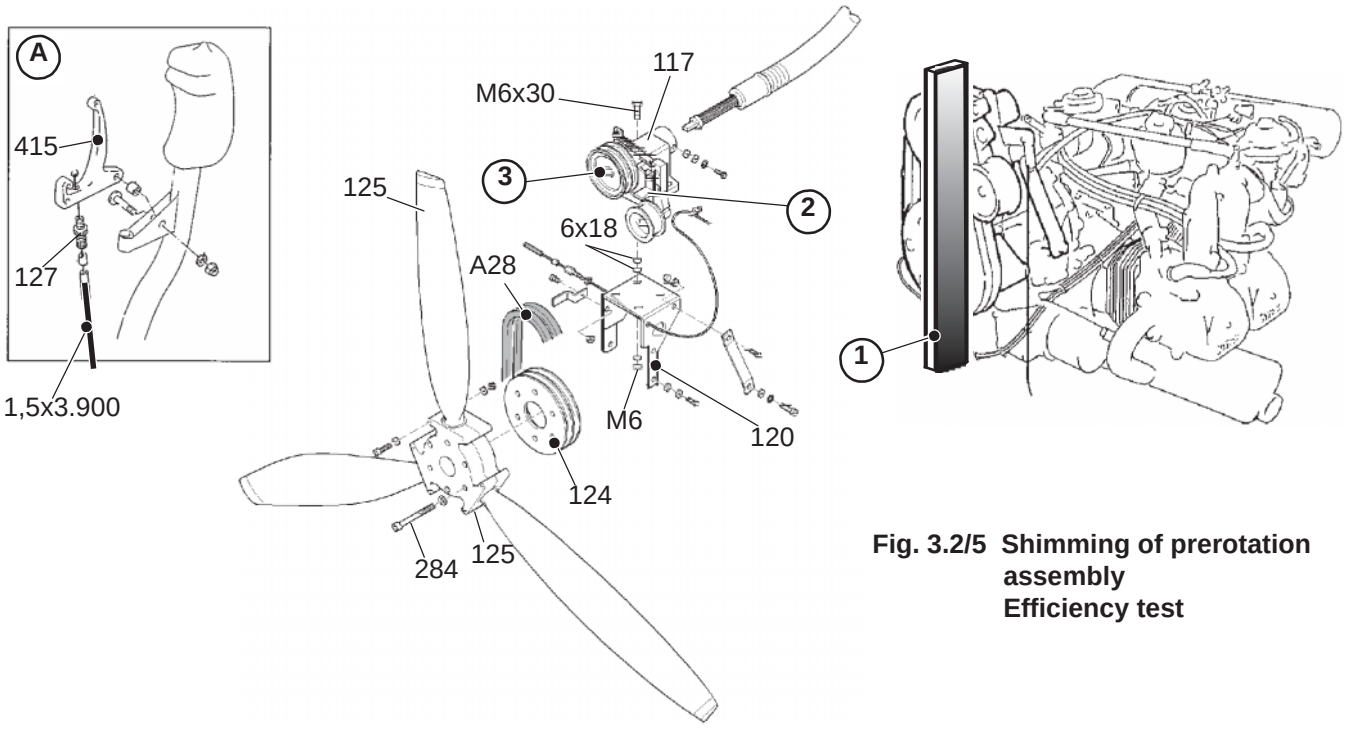


Fig. 3.2/5 Shimming of prerotation assembly
Efficiency test

3.2.3 OPERATIONAL TEST: (see fig. 3.2/1 - 3.2/5)

WARNING DANGER:

An operational test of the system is strongly recommended before starting to fly. Excessive shimming (between the prerotation assembly pn117 and the support pn120) could prevent the disengagement of the power transmission when the prerotation control lever pn415 is released, thus generating hazardous consequences! Two people are needed to execute this test: a qualified gyroplane pilot that knows the prerotation procedures and an outside observer that will always keep outside the rotor range area!

WARNING DANGER:

1. **Before starting the engine make sure that there are no obstacles, people or objects within the rotor range area as too much shimming may result in an immediate rotation of the rotor upon engine start up!**

2. Start the engine, following the standard start procedure.
3. Warm up the engine taking it to minimum operational temperature.

4. Set engine to 1.800 r.p.m.
5. Gently engage the prerotator. Keep in mind that the the pre-rotator will engage earlier than before.

6. Keep the engine setting to 1.800 r.p.m. and gently pull the prerotation control lever pn415 until it reaches the end of its travel. Verify the number of the rotor revolutions achievable with this engine speed. In optimum conditions, it should easily exceed 160 rotor r.p.m.
7. When the number of rotor revolutions stops increasing, gently increase the engine revolutions till 200 rotor r.p.m. are reached (approx 2.200-2.400 engine r.p.m.).
8. Release the prerotation control lever pn415.

9. The outside observer will now have to verify that the belts pnA28 remain still on the pulleys pn124 (3) and are not dragged by these pulleys. If this condition is satisfied, go to the next step. Other- wise proceed to point 11.
10. Increase the engine r.p.m. to a value between 3.500 and 4.000. The outside observer will have to verify that the belts still remain on the pulleys and are not dragged by them. If this condition is satisfied, go to point 12. Otherwise proceed to point 11.

11. Wait till the rotor r.p.m. is less than 50 and repeat points 4, 5, 6, 7, 8 and 9.
12. A flight test may be undertaken if the prerotation parameters are similar to the indications of the fol lowing diagram.

3.2.4 PREROTATION PARAMETERS SUMMARY TABLE

Engine r.p.m.	Rotor r.p.m.
1800	>160
2200-2400	200

Reaching the parameters indicated in the above table guarantees the efficiency of the prerotation system.

3.3 REPLACEMENT OF PULLEYS AND BELTS (see fig. 3.3/1)

The belts pnA28 and the pulleys pn124 are subject to continuous wear in all the operations, except during prerotation.
The pulley pn124 (and the propeller) is fixed with six bolts pn284 to the engine flange; thus its rotation is identical to the number of revolutions of the engine.

The belts pnA28 are braked whenever they are not tightened through the prerotation system.

So, an interference and a continuous slipping are created between the belts and pulleys, which modify the profile of the pulleys' grooves.
Wear of the pulleys causes a reduction in the performance of the prerotation system, which can be overcome by following the procedures described in section 3.2.
Because the adjustments described above will no longer be sufficient to bring the system back to full efficiency, replacement of belts and pulleys is recommended every 500 hours as indicated in the "Ordinary Maintenance Schedule".

WARNING:
Always use belts and pulleys supplied by Magni Gyro itself, as these parts are run-in by the Manufacturer so as to guarantee a soft and progressive engagement, even during the first prerotations.
Take care to note the position of the belts on the pulley when they are supplied by the Manufacturer or Dealer and do not swap them (as each pair of belts is run-in on its own pulley, each belt impresses its own groove on that pulley).

3.3.1 REPLACEMENT PROCEDURE

1. Before starting this operation, verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Release the 6 bolts pn284 that fix the propeller pn125 to the flange of the engine and remove the propeller

3. Unscrew all the screws M4x12 that fix the engine fairings.
4. Remove engine fairings.

5. Remove the pulley pn124 by unthreading it from the bushes of the engine flange.
6. Remove the belts pnA28 from the pulley of the prerotation assembly pn117.

7. If there are more than 2 space washers 6x18 (used to shim the prerotation assembly pn117) under each bolt (M6x30), these need to be removed so as to allow enough slack between the belts and pulleys and avoid unwanted engagement; otherwise proceed as described in points 10-13 and following ones.

8. Loosen the 4 bolts M6x30 that fix the prerotation assembly pn117 to the support pn120.
9. Lift the prerotation assembly pn117 and remove any excess 6x18 spacer washers.
10. Reposition the prerotation assembly pn117 on the support pn120 and insert the locking bolts M6x30.

11. Tighten the nuts M6 to the bolts so as to friction the movements of the prerotation assembly on the support.
12. Position the new pulley pn124 on the flange of the propeller and verify that it rests on the entire surface of the flange.

13. Using a ruler (see fig. 3.2.5, point 1), verify the alignment between the pulley pn124 and the pulley of the prerotation assembly pn117.
14. Tighten the locking bolts M6x30 completely and make sure that the nylock nuts M6 work correctly. It is recommended to change the M6 nyloc nuts so as to guarantee a correct locking effect

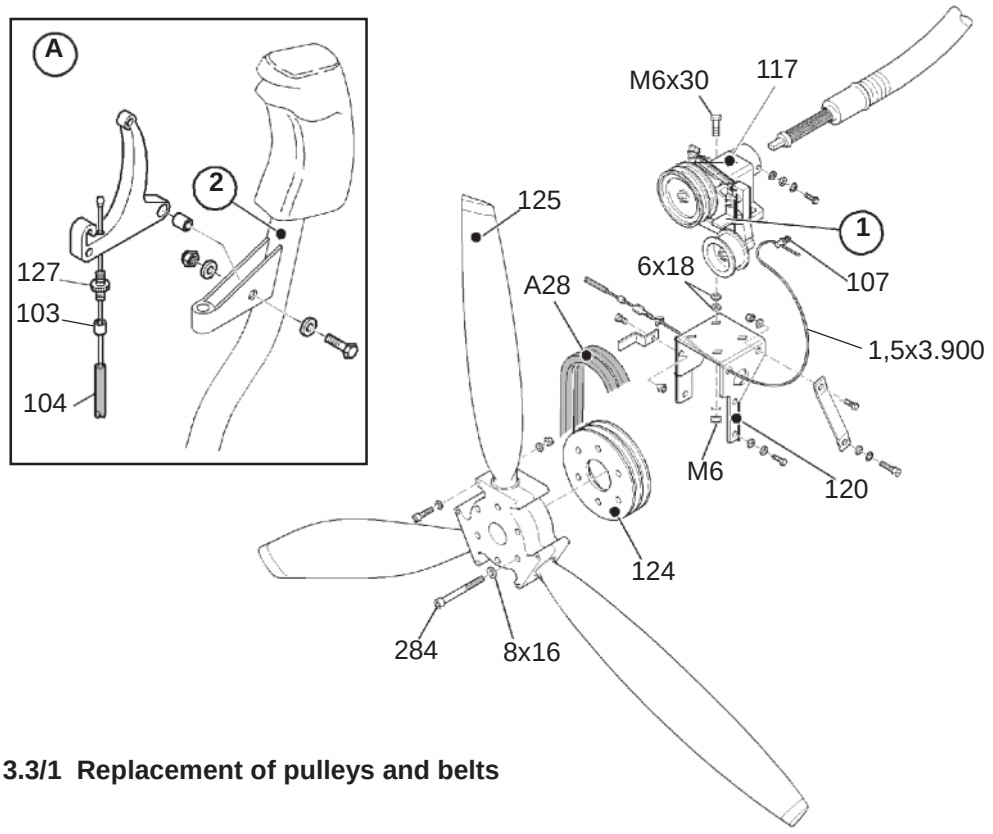


Fig. 3.3/1 Replacement of pulleys and belts

15. Fit the new belts pnA28. Take care not to swap them, as each belt is run in on its pulley so that it impresses its own mark in the groove of the pul ley.

16. Completely screw in the adjuster pn127 of the prerotation cable's sheath pn104.
17. Reposition the brake shoe (1) of the belts pnA28 by loosening the bolt M5x40 and placing it on the mid point of the slot.
18. Verify that the brake shoe (1) makes good contact with the belt pnA28. If this is not the case, set it correctly.

19. Verify that there is play between belts and pulleys, even if it is one.
20. Reposition the propeller pn125 and tighten the locking bolts pn284.
21. Position engine fairings and fix them tightening the M4x12 screws.
22. At the end of this operation (see section 3.2.3.), proceed with an operational test.

3.4 ROTOR HEAD INSPECTION (see fig. 3.4/1)

The rotor head is of essential importance for the gyroplane.
Correct and careful maintenance can avoid troubles and problems that can interfere with flight operations and by consequence reduce safety.

WARNING:
Due to the importance of the rotor head assembly, its maintenance must be done only by authorized personnel, with the following exceptions: visual checks, standard greasing, frictioning of the controls and rotor installation.

3.4.1 VISUAL CHECKS (see fig. 3.4/1)

WARNING:
Visual checks must be done according to the check-list, both before every flight and before scheduled maintenance. There are many items that the maintainer must pay attention to, so as to be able to understand the general condition of the rotor head assembly, the type of operation required and the conditions of operation.

The following factors must be taken into account when evaluating the state of the rotor head assembly:

a) General condition of the paint of the ring gear pn061.

b) Absence of abrasions and/or parts where paint has been removed.
c) Corrosion of bolts and nuts.
d) Lubrication of the ring gear pn061.
e) Presence of safety pins pnAN 416-1.

f) Correct locking (1) of the bolts AN5-40 fastening the aluminum rotor head pn066, the head of the screws must be wired and have paint marks (see also fig. 3.1.3).
g) Freedom of movement of the rotor brake lever pn201. h) State of the teeter bearings pnNKXR 15 Z (only if rotor is not installed).

Presence of anomalies:

a) Burning or blackening of the paint of the notched gear are due to the use of the system with rotor brake pn201 engaged during flight, the friction caused by the braking action of the brake linings pn208 generates the overheating of the notched gear pn061 that burns the paint.

b) Abrasions and/or parts where paint has been removed can reveal rubbing or wear, as well as anomalous deformations. It is essential to recognize and understand the reason that has generated this state before flying again.

c) Corrosion of bolts and nuts can reveal the operating conditions of the gyroplane (high humidity level or use in salty environment);

d) A correct lubrication of the notched gear pn061 teeth avoids corrosion and reduces wear.

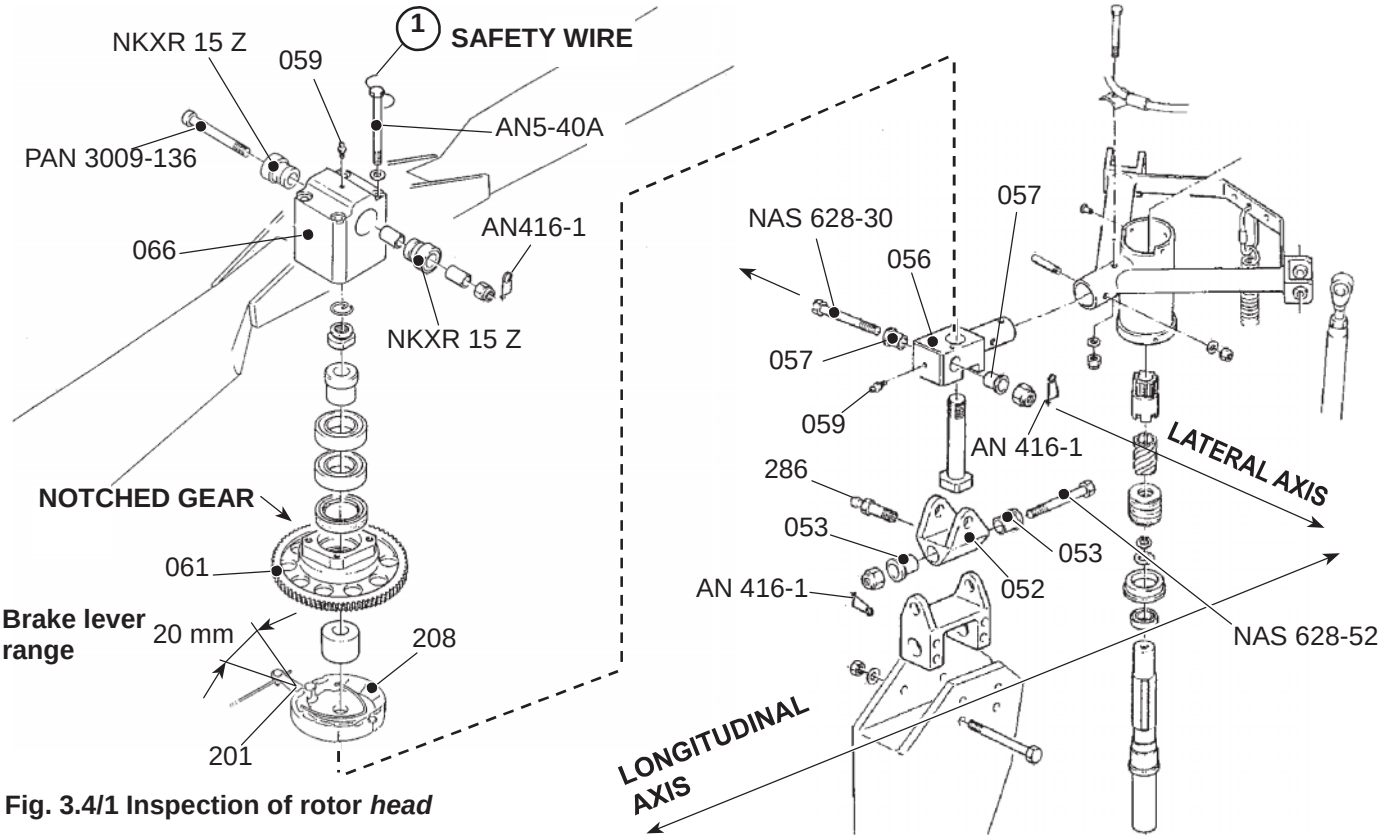


Fig. 3.4/1 Inspection of rotor *head*

e) All the components which need to always be kept tight (longitudinal bolts pnNAS 628-52 and traverse bolts pnNAS 628-30 and PAN 3009-136, on which the rotor head movements are articulated) must be equipped with safety pins pnAN 416-1.

f) The bolts AN5x40 must be fitted with safety wire and the paint stripes must be present. This should allow to check that there has been neither tampering nor unauthorized maintenance.

g) The freedom of movement of the lever pn201 shows the correct functioning of the rotor brake system. If the movement is too large, then wear of the brake linings is excessive.

h) Visual inspection of the teeter bearings pnNKXR 15Z is recommended if the rotor is not installed. In particular, make sure there are no radial cracks on the external ring of the bearing case. Such cracks indicate that the driving torque of the bolt pnPAN 3009-136 that fixes the rotor to the aluminum head pn066 is too high.

3.4.2 LUBRICATION OPERATIONS (see fig. 3.4/1)

The rotor head needs to be greased regularly, as per the maintenance schedule, to avoid an abnormal wear of the teeter bearings pnNKXR 15Z, bolts pnNAS 628-52 and pnNAS 628-30, bushings pn057 and pn053 on which the control movements are articulated and of the notched gear pn061.

There are three lubrication points (pn059 (short) and pn286 (long)) on the rotor head.
During lubrication, movement of the controls or of the teeter bolt allows easier and correct spreading of the grease.
First clean the notched gear pn061, then lubricate it with a humidity-proof grease and apply a protective film on the teeth.

If the forks pn051 and pn052 on the square block pn056 are burnished (black color), the same type of lubrication is required there too.

3.4.3 SUGGESTED TYPES OF LUBRICANT

Bearings and NAS bolts
AMBER-COLORED GREASE SHELL DARINA R2 or equivalent
Notched gear and forks
Castrol Graphited Grease or equivalent

3.5 ROTOR HEAD OVERHAUL (see fig. 3.5/1 - 3.5/2)

WARNING:
Overhaul of the rotor head may only be done by the Manufacturer or at Facilities authorized by the Manufacturer.

This overhaul includes specific checks of the wear of all the head components and the replacement of worn parts.
For any overhaul, the complete rotor head assembly (without alterations or tampering), the teeter bolt PAN 3009-136 and the longitudinal bolt NAS 628-52 (see fig. 3-4/1) must be sent (with previous agreement as to time and conditions) to Magni Gyro or to an Authorized Facility.

3.5.1 INSTRUCTIONS FOR DISASSEMBLY OF ROTOR HEAD (see fig. 3.5/1-3.5/2)

WARNING:
The following instructions describe how to remove the rotor head from the gyroplane.

The operator must follow carefully the operations and procedures described and, in case of any doubt or problem, contact the Manufacturer.
Magni Gyro will not be responsible for damages or breakages due to the misinterpretation or to the wrong application of the given instructions.

3.5.2 ROTOR DISASSEMBLY (see fig. 3.5/1 - 3.5/2)

The complete rotor unit must be removed from the gyroplane before disassembly of the rotor head:

1. Before starting verify that engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Remove the safety pin pnAN 416-1.
3. Unscrew and remove the nut pn12 PCR 106 from the central bolt pnPAN 3009-136 (flapping axle).
4. Lift the rotor (with a hoist (1) or crane) so as to unload the central bolt.
5. Extract the bolt pnPAN 3009-136 by hand or with the help of a rubber hammer.

6. Remove the rotor, lifting it from the rotor head, and put it on a flat surface; take care to protect the blade's trailing edge.

3.5.3 ROTOR HEAD DISASSEMBLY (see fig. 3.5/1 - 3.5/2)

WARNING DANGER:
Carefully follow the instructions.
Magni Gyro is not responsible for damages caused by changes and/or modifications that are either unapproved or done with non-original parts.

1. Before starting this operation, verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. To facilitate the disassembly of the rotor head, put the control stick (2) in the fully-forward position.

3. Unscrew and remove the two bolts M6x16 that fix the outer case pn119 of the flexible shaft to the prerotator pn117 (use a 10 mm wrench).
4. Extract the outer case pn119 and the flexible shaft pn118 from the endings on the rotor head pn039 and pn040.

5. Loosen the rotor brake cable pn1,5x3.900 from the cable retainer pn202 of the brake lever pn201 (use a 10 mm wrench).
6. Extract the cable pn1,5x3.900 of the rotor brake from the retainer pn200 of the rotor head.

7. Mark the fastening position of the trim spring pn109.
8. Loosen and remove the spring catch pn110 that fixes the spring pn109 of the trim (use a 7 mm wrench).
9. Disconnect the connector of the sensor pn238 from the wiring pn655.

Fig. 3.5/1 Disassembly of rotor and head

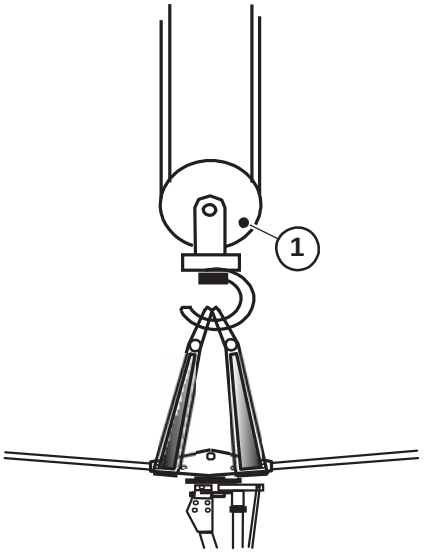
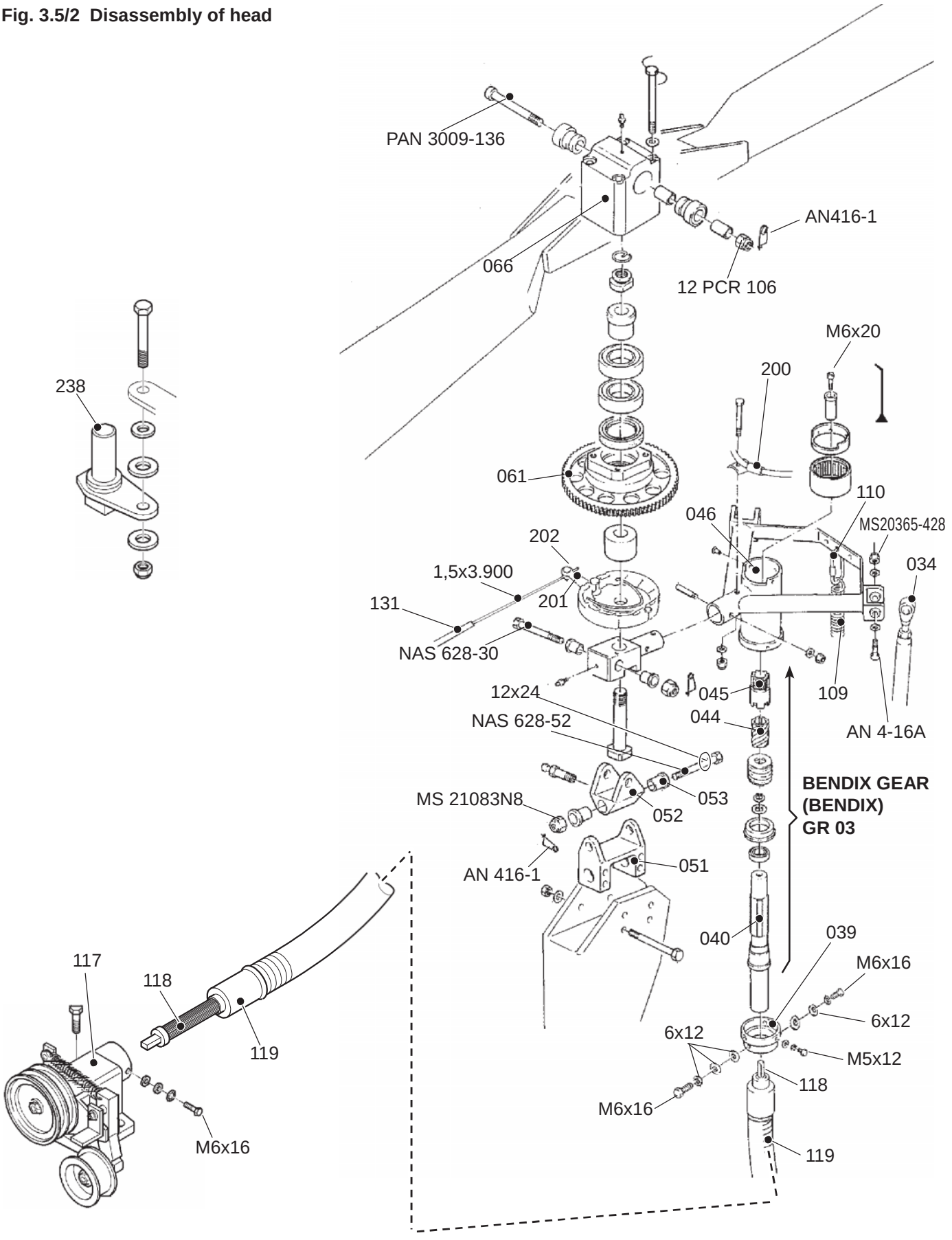


Fig. 3.5/2 Disassembly of head



10. Unscrew and remove the nuts pnMS 20365-428 of the bolts pnAN4x16A that lock the rod ends pn034 of the control rods to the rotor head.
11. Remove the bolts AN14x6A of the rod ends pn034.
    Take care not to scratch or damage the paint of the rods, especially when these get disconnected from the rotor head.
12. Remove the safety pin pnAN 416-1 from the longitudinal bolt pnNAS 628-52.
13. Unscrew and remove the nut pnMS 21083 N8 of the longitudinal bolt pnNAS 628-52 of the head.
14. Holding the rotor head by the fork pn046 to which the trim spring pn109 is fixed, extract the bolt NAS 628-52.
15. Remove the rotor head from the fork pn051.

3.5.4 ROTOR HEAD INSTALLATION (see fig. 3.5/1 - 3.5/2)

1. Before starting this operation, verify that the engine's ignition key and starter button are in OFF position and that all the breakers are switched OFF.
2. To facilitate the assembly of the rotor head, put the control stick in the fully-forward position.
3. Before installing the rotor head, abundantly grease (with amber-colored grease SHELL DARINA R2 or equivalent) the bushings pn053 in which the longitudinal bolt NAS 628-52 will be inserted.
4. Put the rotor head in correct position by inserting the upper fork pn052 into the lower fork pn051.
5. Insert the washer pn12x24 into the bolt NAS 62852. Pay attention to put the beveled part against the bolt head.
6. Insert the bolt pnNAS 628-52 into the fork pn051 taking care that the direction of the bolt insertion along the longitudinal axis is from rear to front.
7. Take the grease in excess that came out while the NAS 628-52 bolt was inserted and spread it on the notched gear teeth.
8. Tighten the nut pnMS 21083 N8 on the bolt NAS 628-52.
9. Reposition the control rod ends in the dedicated head forks and insert the bolts AN4-16A with their washers.
10. Tighten the bolts AN4-16A with the nuts pnMS20365428, which in any case should be replaced.
11. Connect the wiring cable pn239 (or pn411 for RSA version) with the detector pn238.
12. Insert the spring catch pn110 in the apposite hole along the fork pn046 of the rotor head.
13. Tighten the spring catch pn110.
14. Make sure the rotor brake lever pn199 is in OFF- position (low).
15. Make sure that the sheath pn131 of the rotor brake cable is positioned correctly in the seat of the rotor brake lever pn199.
16. Insert the rotor brake cable pn1,5x3.900 along the sheath retainer pn200.

17. Insert the rotor brake cable pn1,5x3.900 in the clamp pn202 of the brake lever pn201.
18. Tighten the clamp pn202.

WARNING:
The lever pn201 must not travel more than 20 mm.

19. Insert the flexible cable pn118 and the sheath pn119 into the rotor head couplings pn039 and pn040.
20. Screw the two bolts pnM6x16 that fix the sheath pn119 to the connection pn039. Thereby respect the position of the four split washers 6x12 and two plane washers 6x12.

21. Operate the bolt pnM6x20 placed on top of the coupling gear GR03 and turn this gear clockwise, so as to insert the flexible cable pn119 more easily in its seats.
22. Following the instructions of paragraph 3.7 CONTROLS FRICTIONING, either tighten or release the bolts pnNAS 628 52 and NAS 628 30 to check that the frictioning of the controls is correct.
23. Place the safety pin pnAN416-1 on the bolt NAS628 52.

3.6 INSPECTION OF BENDIX GEAR (see fig. 3.6/1 - 3-6/3)

The Bendix coupling gear GR03 together with the ring gear pn061 are the last link of the prerotation chain.
The Bendix gear has its seat in the fork's tube pn046, where it can slide and engage the ring gear pn061 to transmit the movement of the flexible shaft.
A failure of the Bendix unit GR03 can cause poor or no functioning at all of the prerotation system. In this case, the operator can apply to the nearest maintenance center or otherwise execute the following inspections, while strictly following the described procedure.

3.6.1 REMOVAL OF BENDIX GEAR (see fig. 3.6/1 - 3-6/3)

1. Make sure that the master switch is in OFF position and that all the breakers are switched OFF.
2. Remove the two bolts M6x16 that fix the flexible shaft's sheath pn119 to the containment cup pn039.

3. Keeping the control stick (2) in forward position, extract the sheath pn119 and with it the flexible shaft pn118 from its square section ending on the spline shaft pn040.

4. Still keeping the control stick (2) in forward position, remove the three bolts M5x12 that fix the cup pn039 to the fork pn046.
5. Gently beat the Bendix coupling gear pn045 with a rubber hammer, extract the assembly GR03 (Bendix) from the lower part of the tube of the fork pn046.

3.6.2 INSPECTION OF BENDIX GEAR (see fig. 3.6/1 - 3-6/3)

1. Manually check the correct sliding of the gear pn045 along the shaft pn040. The gear must slide along the shaft while rotating, without hindrance.

2. Remove the excess of grease from the Bendix gear pn045 and , clean it with gasoline or solvent.

3. Extract the coupling gear pn045 from the worm screw pn044.
4. Visually inspect the entireness of the thread of the screw pn044.
5. Visually inspect the integrity of the base of the inner thread of the coupling gear pn045.
6. If there are radial cracks at the base of the gear pn045 or damages to the sliding screw of the gear pn044, contact Magni Gyro or the Dealer for replacement part(s).

7. If there is no visible damage, put a little grease on the gears and reinstall the Bendix unit GR03.

3.6.3 INSTALLATION OF BENDIX GEAR (see fig. 3.6/1 - 3-6/3)

1. Insert the complete Bendix gear in the tube of the fork pn046. Fit the fastening seats together with the tube's threaded holes.
2. When placing the cup pn039, take care to correctly align the holes as to the tube of the fork pn046 with the sheath (pn119) fastening holes, which must be in line with the longitudinal axis of the gyroplane.

3. Tighten the three bolts M5x12 that fix the cup pn039.
4. Insert the sheath pn119 in the cup.
5. Use an Allen wrench M6 (1) to turn the Bendix unit GR03 clockwise, thus facilitating the insertion of the flexible shaft pn118.

6. Once the insertion is done, place the sheath pn119 against the cup pn039 and fasten it by tightening the bolts M6x16.

WARNING:

If there is no damage to the Bendix coupling gear unit, cleaning it may solve some operation problems. Grease may reduce the sliding of the gear on the shaft due to aging and emulsifying with water and thus hinder the coupling of the prerotation. This kind of problem can be avoided by cleaning the parts on a periodical basis and especially after permanence in very humid situations or rain.

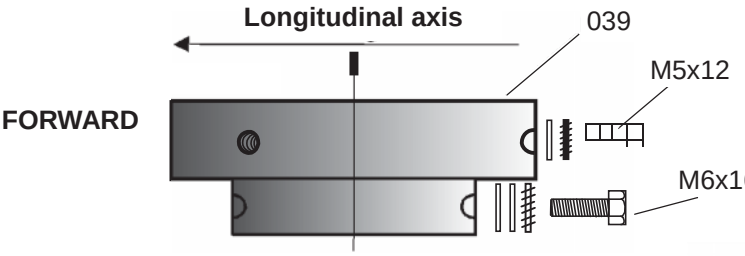


Fig. 3.6/1 Fastening the lower cup

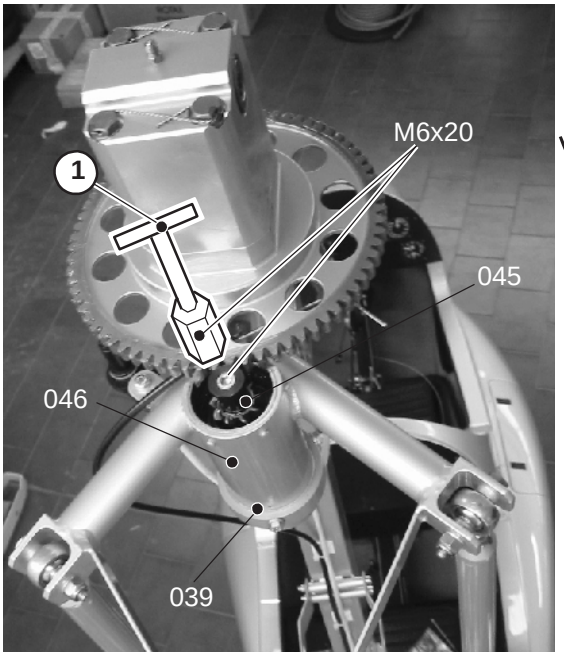


Fig. 3.6/2 Adjustment of coupling

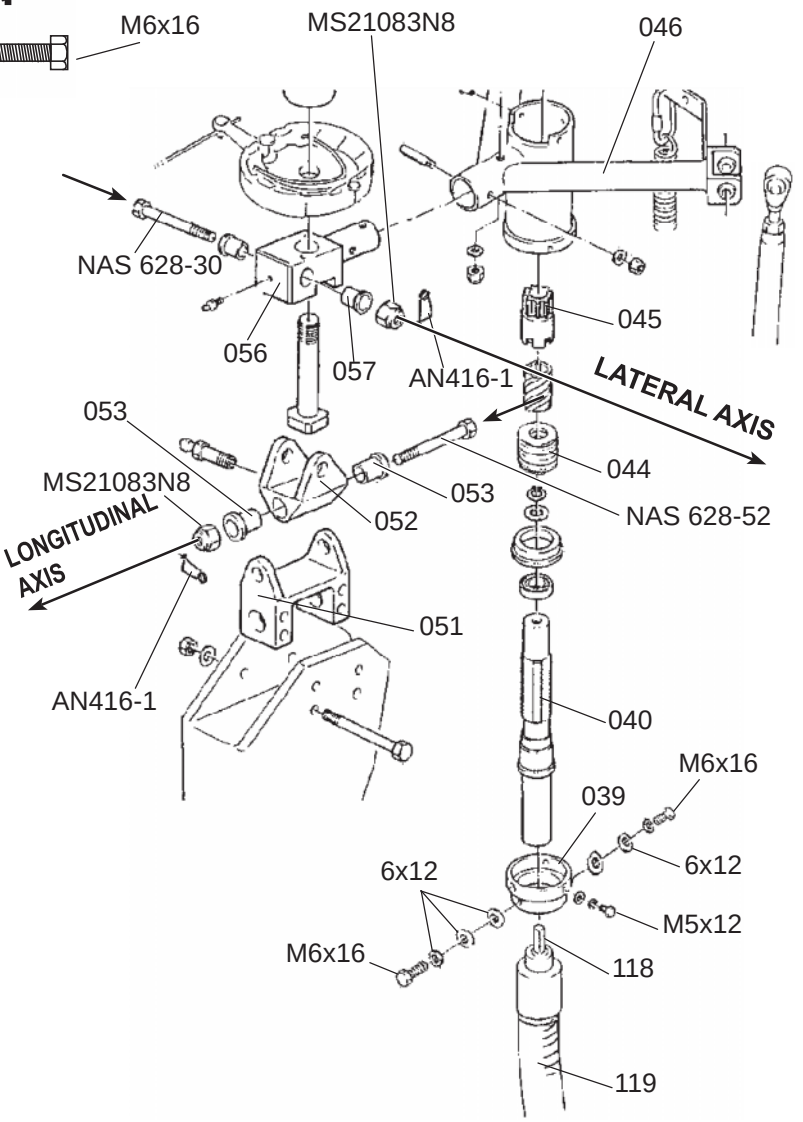


Fig. 3.6/3 Installation of unit GR03 AXIS

3.7 TIGHTENING OF ROLL AND PITCH CONTROLS (see fig. 3.6/1 - 3-6/3)

The controls need to be tightened each time there is an increase in vibration (diverging type of vibration) on these controls, associated with a general slackness and imprecise nature of control movements.
This is due to the wear of the bushes pn057 and pn053, of the square pn056, of the fork pn052, of the safety pin pnAN 416-1 and of the nuts pnMS 21083 N8.

The consequent play along the bolts NAS (pnNAS 62852 and pnNAS 628-30) results in vibration of the controls.

3.7.1 FRICTIONING PROCEDURE (see fig. 3.6/1 - 3-6/3)

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. With the rotor installed, move the control stick (2, fig. 3.3/1) along the longitudinal axis (pitch up and down) to try out the force needed to move it.
3. With a 9/16' ring wrench and a 3/4' wrench (or n°19) slightly tighten the bolt pnNAS 62830.

4. Try again the control movements along the longitudinal axis (pitch up and down).
5. Go on repeating steps 3 and 4 till a good compromise between reduction of forks' play and easiness of flight control is reached.
   The same operation has then to be done for the control along the transversal axis, with tightening of the bolt pnNAS 628-52.
   The picture 3.6/3 shows the axes on which the rotor head movements are articulated.

3.8 MAINTENANCE AND CHECKS OF CONTROL RODS (see fig. 3.8/1 - 3.8/2)

Due to its strength and the high reliability of the materials used, the control rods do not need short term maintenance, just pre-flight checks.

NOTE:
All the bolts of the control line (1) are marked after having been tightened at the factory, so as to highlight incidental and unwished movements of the boltnut coupling.

3.8.1 REPLACEMENT OF CONTROL RODS BALL JOINT ENDS (see fig. 3.8/1 - 3.8/2)

WARNING DANGER:
Replacing the ball joint ends is a very delicate operation which has to be carried out only by MAGNI GYRO authorized operators. This replacement must be done complying with the maintenance schedule diagram.

WARNING:
Each rod must be disassembled and reassembled one by one, according to the following order:

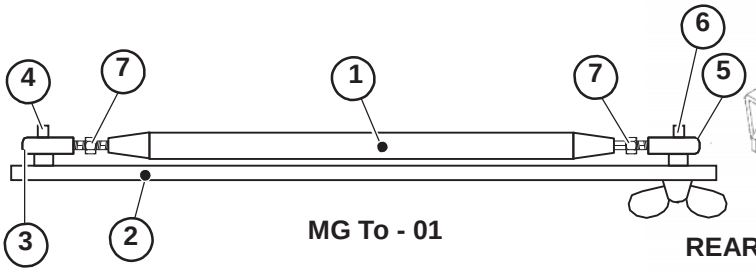
Lower right rod	**pn624 – INF - RH**
Lower left rod	**pn624 – INF - LH**
Upper right rod	**pn038 – SUP - RH**
Upper left rod	**pn038 – SUP - LH**

Whenever replacing ball joint ends, strictly follow the procedure described below, which refers to the lower left rod. Repeat the same procedure for the other rods.

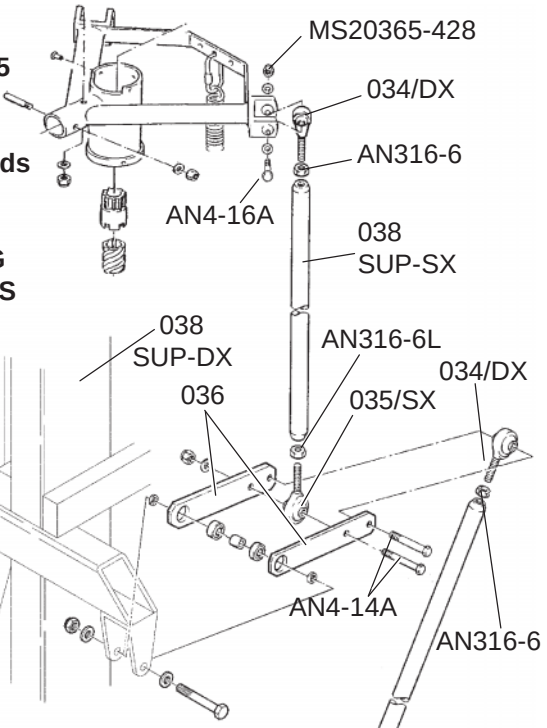
1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Unscrew all the screws M4x12 that fix the engine fairings.
3. Remove engine fairings.
4. Loosen the check nuts pnAN316-6 and pnAN316-6L of the ball joint ends pn033 and pn034 of the lower left rod pn624, taking care not to rotate it as this will vary the rod length.

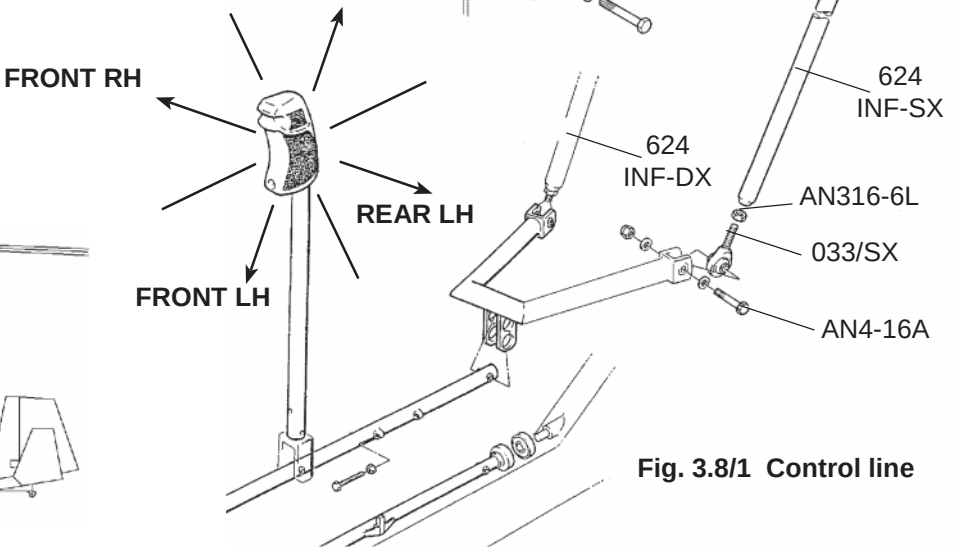
5. Loosen the bolts that fasten the rod.
6. Remove the fastening screws pnAN4-14A and AN4-16A and the rod pn624, taking care not to rotate the rod nor the ball joint ends pn033 and pn034 so as not to vary the rod length.
7. Using the MG To-001 tool, measure the length of the rod pn032.

033-034-035 Ball joint ends
624-038 Rods GREASE BEFORE SCREWING THE JOINTS



MG To - 01





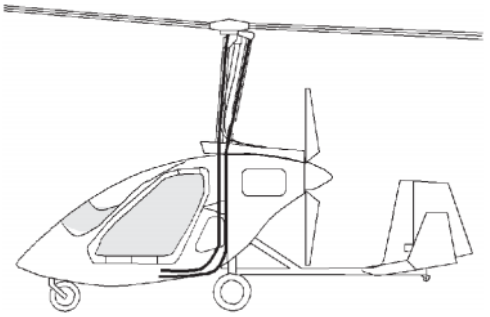


Fig. 3.8/1 Control line

8. Tighten the measuring stop (6) of the MG To-001 (2) tool and remove the rod pn624 from the rod.
9. Remove the ball joint ends pn033 and pn034 from the rod pn624.
10. Slightly grease the threaded end of the rod pn624.

11. Check that the check nuts pnAN316-6 and pnAN316-6L of the ball joint ends are completely screwed in.
12. Completely screw in the ball joint ends to the rod pn624 (as a rule, right thread rod ends pn034 have to be fitted on top, while left thread ones pn035 have to be fitted at the bottom. Wide-movement ball joint ends HXAB-4T pn033, have to be assembled to the lower rods).
13. Put the rod (1) on the tool MG To-001 (2), inserting one of the joints (3) to the fixed pin (4) of the tool.

14. Blocking the rotation of the joint by hand, lengthen the rod (1) until it is possible to insert the second joint (5) in the free pin (6) of the tool.

15. To avoid further rotation of the joints and consequently avoid a modification of the rod length, tighten the check nuts (7) by hand.
16. Remove the rod (1) from the tool (2).
17. Fasten the rod to the control line, keeping the right joint pn034 in upper position, with the bolts pnAN4-16A and pnAN4-14A.

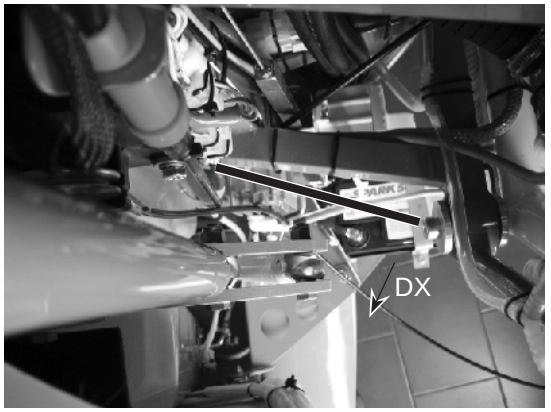
18. Replace the nuts MS 20365-428 for the bolts pnAN4-16A and AN4-14A and tighten them.
19. Tighten the check nuts pnAN316-6 and pnAN316-6L of the control rod pn624.
20. After the check nuts pnAN316-6 and pnAN316-6L have been tightened, make sure the rod can rotate freely in the forks and that these can reach the inner face of the transmissions (see fig. 3.8/2).

21. With the control stick in “end-of-range” positions (RH forward - LH forward - RH backward - LH backward), check that the rods still able (even a limited one) to rotate as regards the bolts pnAN4-16 and pnAN4-14A, so as to guarantee travel!
22. Replace the engine fairings and fix them tightening the M4x12 screws.

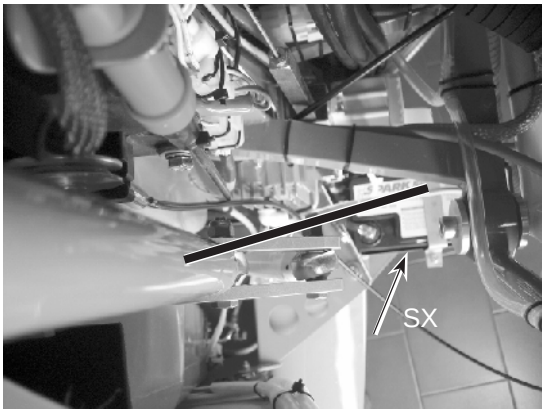
Repeat the same procedure for the other control rods.

WARNING DANGER:

It is strictly forbidden to fly if step 21 has not been satisfied. Flying under such conditions could cause unplanned loads on the ball joint ends which could lead to disastrous consequences!



Inclination to the right



Inclination to the left

Fig. 3.8/2 Complete travel of rod ends

3.9 SECONDARY CONTROLS

3.9.1 CHOKE CONTROL LINE (see fig. 3.9/1)

The choke's control line starts from the lever pn128, placed at the left side of the dashboard, close to the floor.
A cable 1,5x2.500 mm – inserted in its sheath pn 131- is fastened to the control lever by means of a cable retainer pn107. It passes through the vertical wall of the dashboard and, routed beneath the console and the seat, reaches the splitter pn132 located close to the engine mount in the engine compartment.
After the splitter pn132, the movement is transmitted - through two cables 1,2x1.000 mm fastened to the throttles by means of the two cable retainers pn133 - to the choke's throttles (2) located on the carburetors.
Corrosion of the cables in the choke line could result in the choke not returning to the closed position when the pilot moves the control lever.

This results in excessive fouling of the spark plugs and, in the long term, in a possible contamination of the engine oil.

WARNING:
Due to the above mentioned remarks, a careful check of free cable movement inside the sheaths pn131 and the consequent correct closing of the choke throttle valves (2) is strongly recommended.

3.9.1.1 REPLACEMENT OF CHOKE CABLES (see fig. 3.9/1)

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Put the choke lever pn128 in OFF position.

3. Unscrew all the screws M4x12 that fix the engine fairings.
4. Remove engine fairings.
5. Cut the cable 1,2x1.000 and remove the cable terminal protection pn103 located close to the lever of the carburetor (2).
6. Loosen and free the cable 1,5x2500 from the cable retainer pn107 that fastens it to the choke lever pn128.
7. Cut the cable 1,5x2.500 between the sheath pn131 and the deformation (3) caused by the tightening action of the retainer pn107. This deformation could cause some problem when doing step 9.
8. Loosen the cable retainers pn133 and free the cables 1,2x1.000 from the carburetors' throttles.
9. Cut the cables 1,2x1.000 between the sheath pn131/A and the deformation (4) caused by the tightening action of the retainer. This deformation could cause some problem when doing step 9.

10. Open the splitter pn132 and withdraw the lower cap (132/A).
11. Extract the kern (132/B) of the splitter and the three cables (one low and two upper cables).

12. Visually check the cable. If there is no oxidation, the gyroplane has been used in optimal conditions, with low humidity, it has been cleaned accurately, did not fly in the rain and was not parked in a makeshift hangar.

WARNING DANGER:

13. **Before starting to clean the internal part of the sheath, point the upper end of the sheath pn131 downward, far away from people and heat sources.**

14. Starting from the sheath end (5) in the cockpit, spray some releasing agent (WD40 or equivalent) inside the sheath.

15. Always from the sheath end (5) in the cockpit, now spray some spray grease (Castrol Chain Lube Racing, or equivalent) in the sheath.

16. Insert the new cable 1,5x2.500 of the choke, following the sequence: splitter lower cap (132/A), sheath end pn103, sheath pn131, sheath end pn103, control lever pn128.
17. Insert the new cables 1,2x1.000 following the sequence: splitter pn132, sheath end pn103, carburetors 90° adjuster (6), carburetor throttles (2).

18. Anchor the cables to the kern (132/B) of the splitter, taking care not to cross the cables routed to the carburetors.
19. Close the splitter pn132 by pressing the lower cap (132/A) against the body of the splitter.

20. Tension the two cables 1,2x1.000 to the carburetors, so as to pull the kern (132/B) inside the splitter pn132 in high position.

21. Tighten the cables 1,2x1.000 to the carburetors' throttles, using the cable retainers pn133.
22. Cut away the cable in excess, leaving at least 10 mm more than needed.
23. Put the choke control lever pn128 in OFF position.

24. Insert the cable in the retainer pn107.
25. Tighten the retainer pn107 by blocking the cable 1,5x2.500.
26. Cut away the cable in excess, leaving at least 30 mm more than needed.

27. Position the cable terminals on all the cables and clamp them with cutting nippers.
28. Operate the control lever pn128 to check the correct functioning of the system. Make sure that the throttles (2) on the carburetors reach the end positions during their travel.

29. Refit engine fairings and fix them tightening the M4x12 screws.

Fig. 3.9/1 Choke assembly

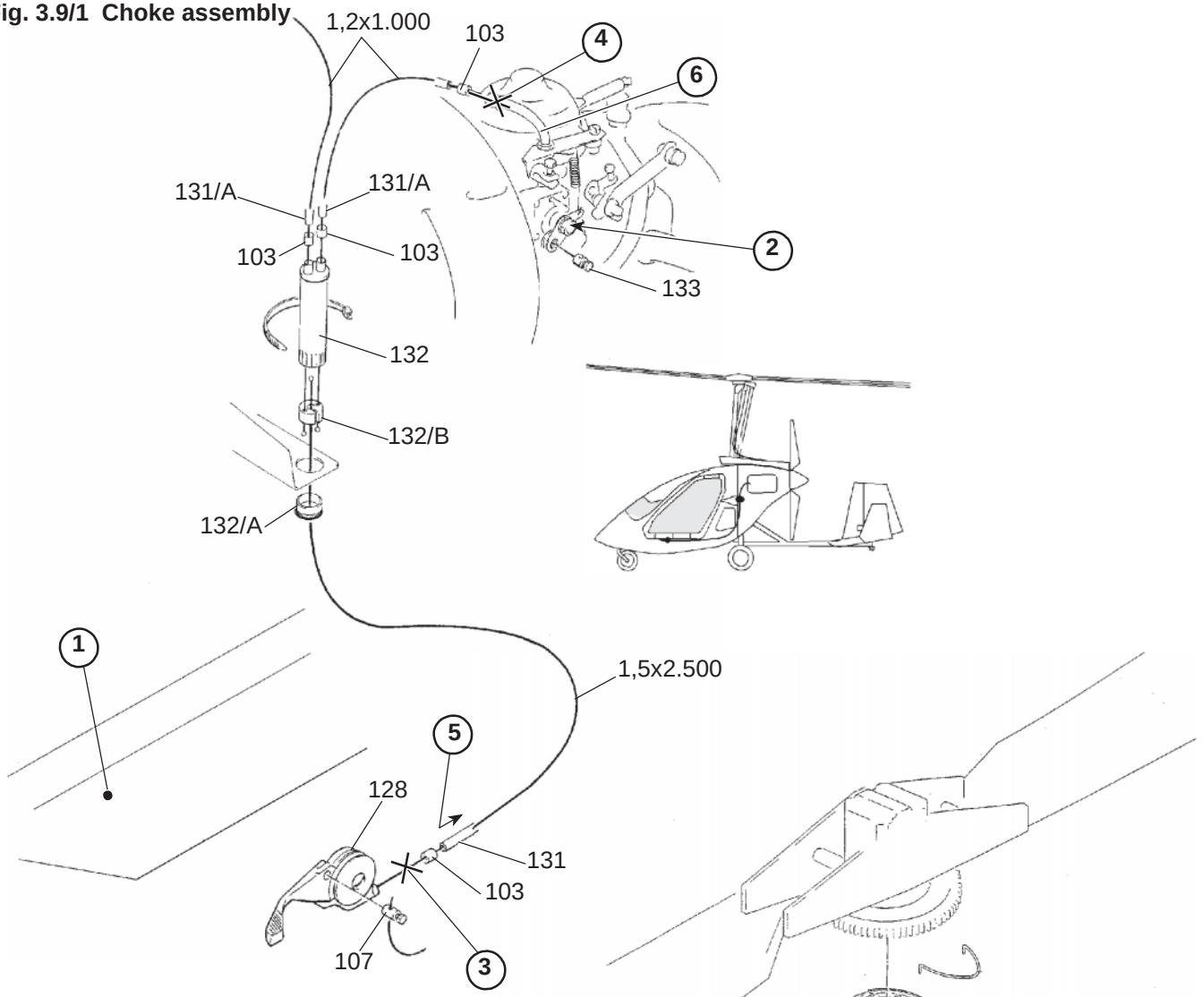
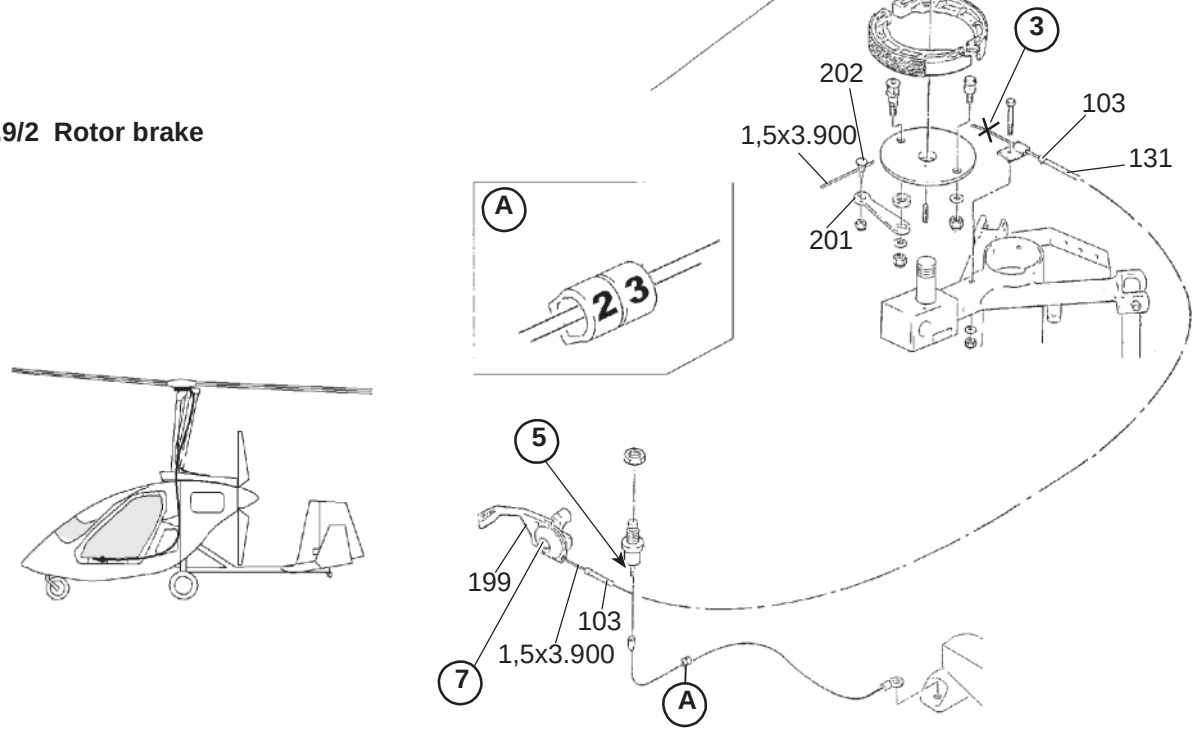


Fig. 3.9/2 Rotor brake



3.9.2 REPLACEMENT OF ROTOR BRAKE CABLE (see fig. 3.9/2)

1. Before starting, verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Put the rotor brake lever pn199 in OFF position.

3. Cut the cable 1,5x3.900 and remove the cable terminal protection pn103 located close to the rotor brake lever pn201 on the rotor head.
4. Using a 10 mm wrench, loosen and free the cable from the retainer pn202 that fastens it to the rotor brake lever pn201.
5. Cut the cable between the sheath and the deformation (3) caused by the tightening action of the retainer pn202. This deformation could cause some problem when doing step 8.
6. Put the rotor brake lever pn199 in ON position.

7. Free the cable kern (7) from the rotor brake control lever pn199.
8. Completely extract the cable 1,5x3.900.
9. Visually check the cable. If there is no oxidation, the gyroplane has been used in optimal conditions, with low humidity, it has been cleaned accurately, did not fly in the rain and was not parked in a makeshift hangar.
10. Before starting to clean the inner part of the sheath, point the upper end of the sheath pn131 downward, far away from people and heat sources.

NOTE:
This operation may be somewhat difficult.

11. Starting from the sheath end (5) in the cockpit, spray some releasing agent (WD40 or equivalent) inside the sheath.
12. Always from the sheath end in the cockpit, spray some spray grease (Castrol Chain Lube Racing, or equivalent) inside the sheath.
13. Insert the new rotor brake cable from the end inside the cockpit and check the correct position of the sheath ends pn103.
14. Hook the cable to the rotor brake lever pn199.

15. Put the rotor brake lever pn199 in OFF position.
16. Put the upper end of the sheath in its seat again, with its sheath end pn103.

17. Insert the cable in the retainer pn202.
18. Tighten the retainer pn202 and fasten the cable.

NOTE:
The movement of the rotor brake control lever must not be more than 20 mm.

19. Cut away the excess of cable 1,5x3.900, leaving at least 30 mm more than needed.
20. Position the cable terminal protection pn103 and tighten it with cutting nippers.

3.9.3 BRAKE SYSTEM CABLE LINE (see fig. 3.9/3)

WARNING:

Position of the cables: The brake system of the M-24C model is duplicated to satisfy the needs of piloting.

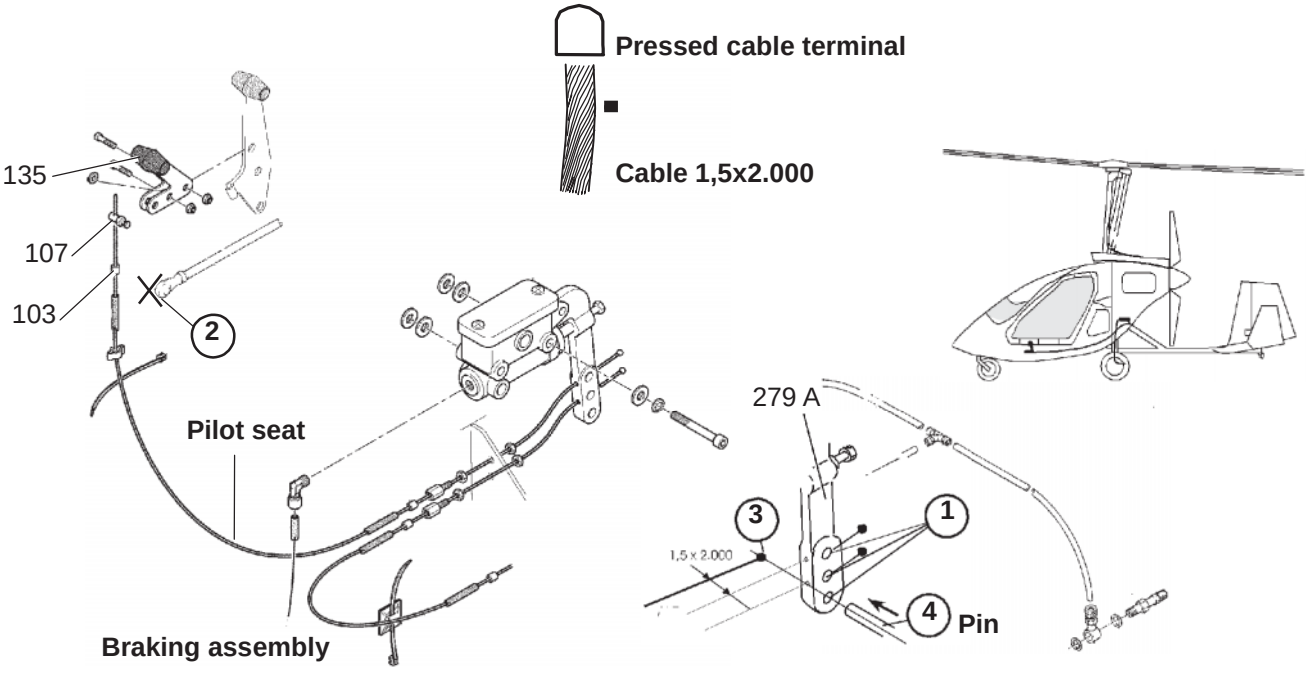
There are two (1) different positions for anchoring the cables on the brake pump pn279. Usually these cables are placed in such a way as to guarantee the most effective braking to the pilot (left seat). It is important to carefully respect the position of the cables so as not to alter the braking efficiency.

3.9.3.1 REPLACEMENT OF BRAKING SYSTEM CABLES (see fig. 3.9/3)

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Cut the cable 1,5x2.000 and remove the cable terminal cap located close to the brake lever pn135.

3. Use a 7 mm wrench to loosen the cable retainer pn107 that fastens the cable 1,5x2.000 to the brake lever pn135.
4. Cut the cable below the deformation (2) caused by the tightening action of the retainer pn107. This deformation could make it difficult to remove the cable from the sheath pn131.

5. Extract the cable kern (3) from the lever pn279/A of the brake pump pn279. Therefore use a pin (4) to apply lateral pressure.
6. Extract the cable from the sheath pn131 and from the lever of the pump pn279.



7. Visually check the cable. If there is no oxidation the cable can be re-installed. If oxidation is found then the cable must be replaced.

8. Before starting to clean the internal part of the sheath, point the upper end of the sheath pn131 downward, far away from people and heat sources.

NOTE:
This operation may be somewhat difficult.

9. Starting from the sheath end in the cockpit, spray some releasing agent (WD40 or equivalent) inside the sheath (5).

10. Always from the sheath end in the cockpit (5), spray some spray grease inside the sheath (Castrol Chain Lube Racing, or equivalent).
11. Insert the new brake cable in the lever of the pump pn279/A and then in the sheath pn131. Check the correct position of the sheath ends pn103.

12. Slightly pull the cable, thereby taking care of getting rid of possible play of the brake lever pn135. Then fasten the cable to the lever, with the retainer pn107.
13. Cut the cable in excess, leaving at least 30 mm more than needed.

14. Position the sheath ends pn103 on all the cable ends and clamp them with the help of cutting nippers.
15. Operate the control lever pn135 to check the correct functioning of the system.

3.9.4 REPLACEMENT OF PREROTATION CABLE (see fig. 3.9/4)

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Cut the cable 1,5x3.900 and remove the cable terminal protection pn344 located close to the belt tightening lever pn415 of the prerotation assembly pn117.

3. Unscrew all the screws M4x12 that fix the engine fairings.
4. Remove engine fairings.
5. Use a 7 mm wrench to loosen the cable retainer pn107 that fastens the cable to the lever of the belt tensioner.

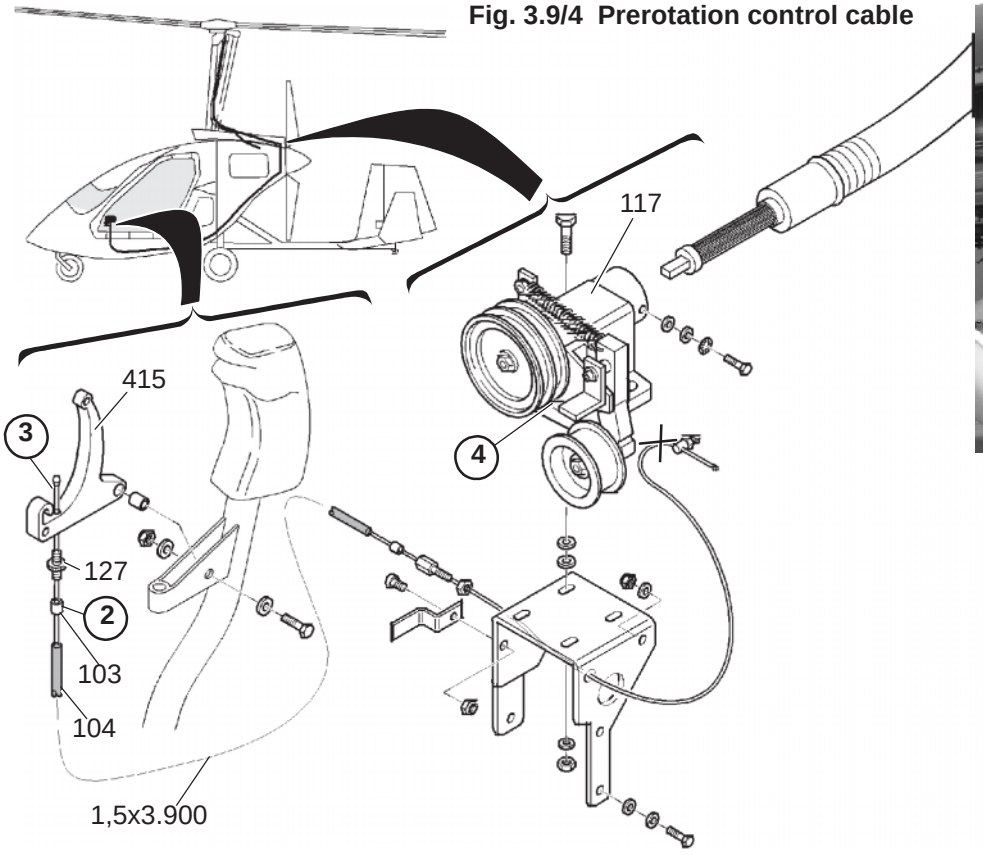
6. Cut the cable between the sheath and the deformation (1) caused by the tightening action of the retainer pn107. This deformation could cause some problem when doing step 8.
7. Put the prerotation control lever pn415 in ON position so as to make it easier to extract the cable 1,5x3.900.

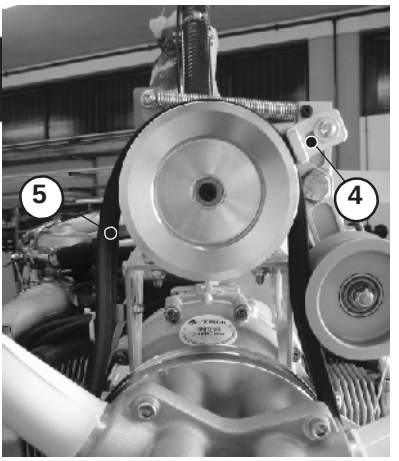
8. Completely extract the cable (3).

9. Visually check the cable. If there is no oxidation the cable can be re-installed. If oxidation is found then the cable must be replaced.

10. Before starting to clean the internal part of the sheath, point the upper end of the sheath pn104 downward, far away from people and heat sources.

Fig. 3.9/4 Prerotation control cable





Correct tightening of the shoe

NOTE:
This operation may be somewhat difficult.

11. Starting from the sheath end (2) in the cockpit, spray some releasing agent inside the sheath.

12. Always from the sheath end in the cockpit (2), spray some grease inside the sheath.
13. Insert the new prerotation control cable in the lever pn415 and then along the adjusters pn127 and in the sheath pn104. Make sure that the position of the cable terminal protections pn103 is correct.
14. Fully screw the adjuster pn127 in its housing.

15. Put the prerotation control lever pn415 in OFF position.
16. Place the upper end of the sheath pn104 back to its seat (support pn122), together with its cable terminal protection pn103.
17. Insert the cable in the retainer pn107 located in the belt pusher pulley lever.
18. Tighten the retainer pn107 and fasten the cable.

WARNING:
When tightening the cable retainer pn107, verify that the brake shoe (4) of the belts (5) makes good contact with the belts (ref. paragraph 3.2 "Prerotation assembly adjustment").

19. Cut the cable in excess, leaving at least 30 mm more than needed.
20. Position the cable terminal protection pn103 and tighten it with cutting nippers.
21. Position engine fairing and fix them tightening the M4x12 screws.

3.10 RUDDER PEDALS LINE (see fig. 3.10/1 - 3.10/2)

3.10.1 GENERAL INSTRUCTIONS

3.10.1.1 Integrity OF CABLES

Rudder cable failure (Ø 3 mm x 49 wires) does not occur suddenly or unexpectedly. It will only happen in the long term, if the correct maintenance of the gyroplane and of the system are neglected. lack of maintenance may allow a chafing of the cable or excessive corrosion. Precautionary checks easily avoid such problems.

3.10.1.2 Chafing

Repeated chafing of the cables over a long period is the only cause of wear.
This wear can only occur where the cables pn3x49 are close to the 6 pulleys and to the rudder pivot pn086.

Excessive wear of the cable causes its flattening and the consequent reduction of its diameter or the breaking of some of the wires which make up the cable.

This may occur near the pulleys, where the cable is continuously in contact with the pulley and there is a movement between both parts. Contact between cable and pulley is absolutely normal and does not compromise the integrity of the cable. Wear can become an issue if the pulley does not turn freely because of excessive tightening or corrosion of the inner bearing pn626-ZZ. In this a case, the friction between pulley and cable will not be rolling anymore; instead there will be rubbing which will damage the cable. Similar problems may arise if the position of the cable guiding fork pn083 is not correct, i.e. if it loses its vertical orientation, thus interfering with the cable.

The inevitable rubbing caused by this may also damage the cable (see detail "A").

3.10.1.3 OXIDATION

In the long term and if operated in very humid conditions, the steel cable pn3x49 may be subject to corrosion, causing some wires to break.

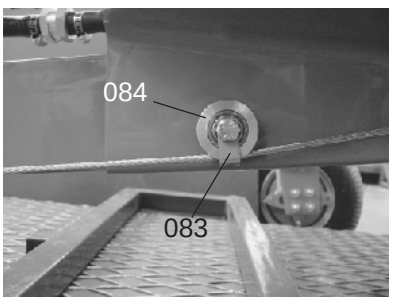
3.10.2 CABLE INSPECTION PROCEDURE (see fig. 3.10/1 - 3.10/2)

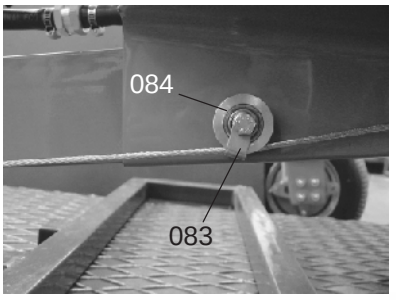
1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.

2. Check the cable guiding forks pn083, making sure they are vertical and that there is no interference with the cables (see detail "A").
3. Initially, proceed with a visual check of the cable pn3x49. Make sure it is not damaged.

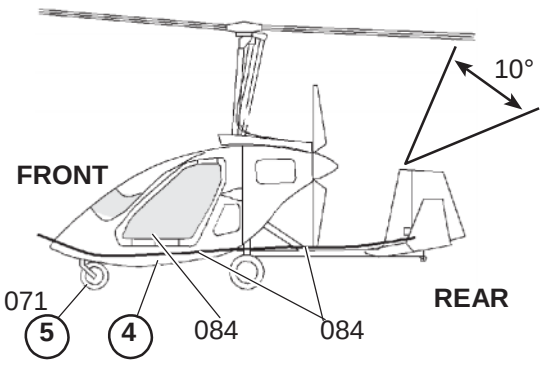
4. To do a more accurate check, pass two fingers all along the cable with a slight pressure.

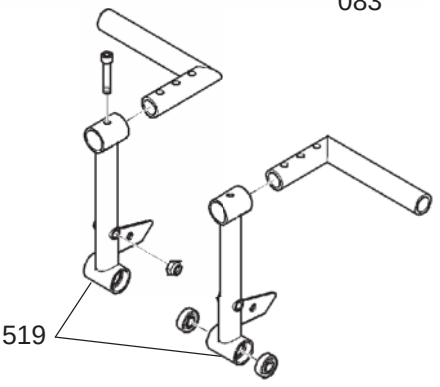
Fig. 3.10/1 Rudder pedals line

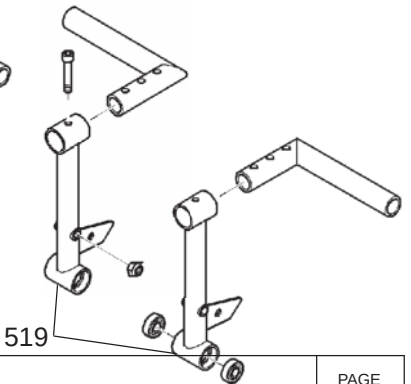




Detail "A"
CORRECT-WRONG placing of the cable retainer (interference with cable)







WARNING:

5. Broken or damaged wires are easy to find, as the fingertips are stung by the damaged wires and can not slide freely.

6. Then check the freedom of movement of the pulleys pn084.
7. If the pulleys are not free to turn, use some release agent WD40 to clean them, facilitate their movement and reduce corrosion.

If the result of steps 3 - 4 - 7 is not satisfactory, the cable or blocked pulley pn084 must be replaced.

3.10.3 CHECK OF CABLE TENSION (see fig. 3.10/1 - 3.10/2 and tab. 3.10.4.4)

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Using the appropriate tool (To-006), check the tension of the cable at approximately the midpoint between the rudder pivot pn086 and the rear pulley pn084 of the rudder pedals line.

3. If the measured tension is lower than the limit values (correct value is between 130 and 170 lbs) remove the safety wiring on the screw coupling pnMS 21251-B3S.
4. Screw in the screw coupling one complete turn.

5. Grab the pedal (pn519) and move it several times along the entire range of the movement, so as to distribute the tension evenly on all the cable.
6. Using the tool To-006, check the tension of the cable again, as per step 2.
7. If the tension is satisfactory, lock and safetywire the screw coupling (1). Otherwise repeat the procedure from step 4 onward.

3.10.4 REPLACEMENT OF RUDDER PEDAL CABLE (see fig. 3.10/1 - 3.10/2)

3.10.4.1 REMOVAL OF DAMAGED CABLE

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.

2. Remove the safety wiring from the screw coupling pnMS21251-B3S.
3. Loosen the screw coupling so as to free the cable ends.
4. Cut the cable (2) close to the thimbles pn082 so as to free the cable eye end pnMS21255-3LS.

5. Free the cable of the front pulley pn525 and retrieve the cable retainer pn085.
6. Extract the damaged cable from the rear of the gyroplane.

7. Free the cable from the rudder pivot pn086 and retrieve the cable retainer pn085.

3.10.4.2 PREPARATION OF NEW CABLE (see fig. 3.10/1 - 3.10/2)

1. Verify that the cable 3x49 is at least 8 meters long.
2. Put the heatshrink sheath (3) on one end of the cable pn3x49.
3. Put the cable retainer pn269 (Nicopress) on the same cable end (see Detail “B”).

4. Run the cable around the thimble pn082 fixed to the cable eye end MS21255-3LS.
5. Leave at least 10 centimeters of cable more than needed and tighten the cable retainer pn269 close to the thimble. Take care not to leave the cable slack (see Detail “C”).

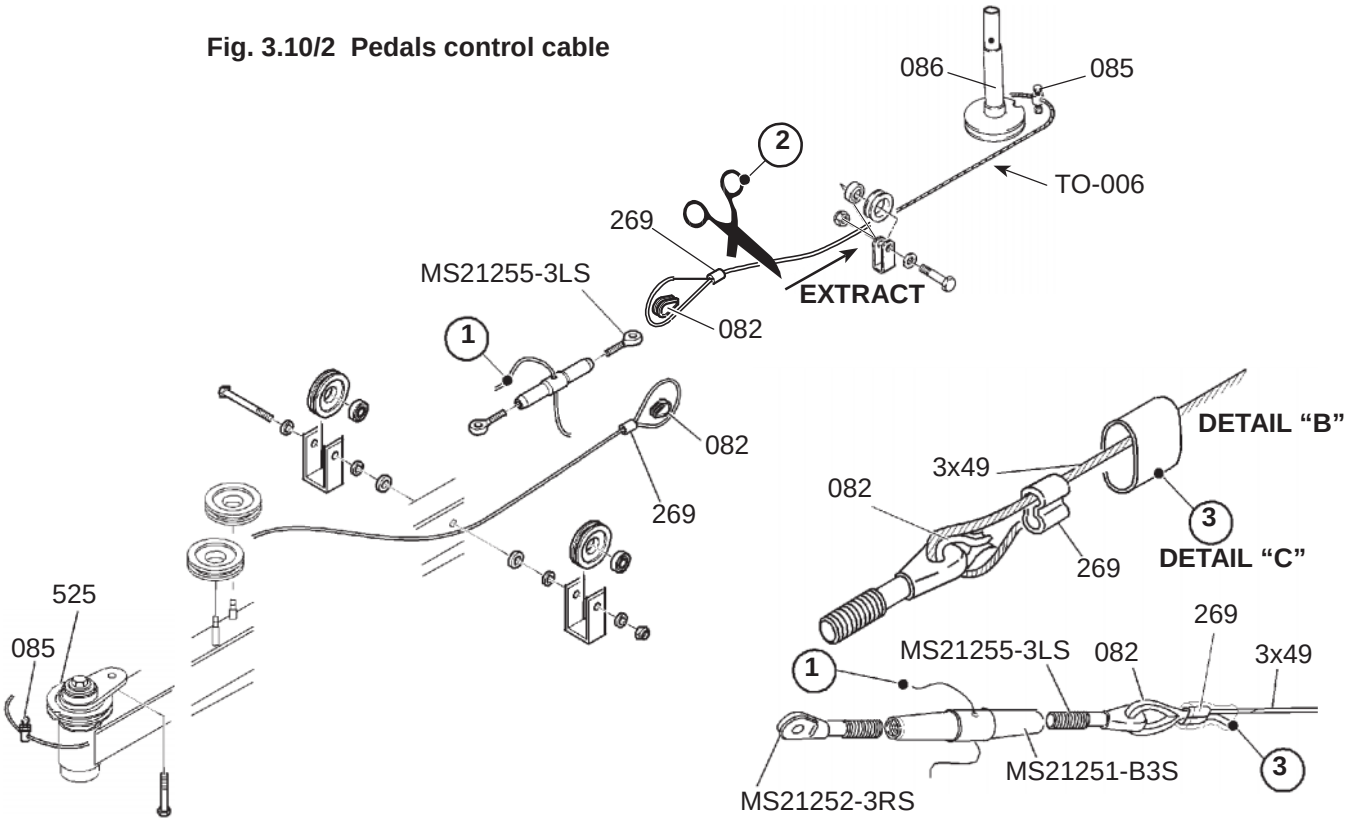
6. Put the heatshrink protection sheath on the crimped cable retainer pn269 and “shrink” it with a heat gun.

3.10.4.3 INSTALLATION OF CABLE (see fig. 3.10/1 - 3.10/3)

1. Before starting verify that the engine’s ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Insert the free end of the cable 3x49 through the front right pulley pn084 of the second pair of pulleys.

3. Subsequently insert the cable in the other pulleys inserting the cable retainer pn085 in the dedicated seat of the fore pulley pn525 and of the rudder pivot pn086.

Fig. 3.10/2 Pedals control cable



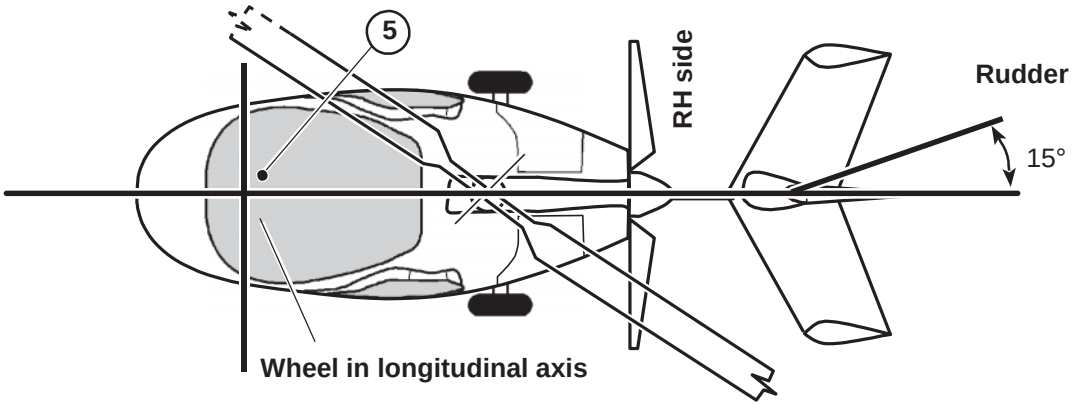
WARNING:
Insert the cable between the pulley pn084 and the cable retainer pn083. Take care to avoid any rubbing of the cable on other components. (see Detail "A").

4. Manually pull the cable's free end so as to give it a slight tension and check its correct positioning along the line.
5. Insert the heat shrink tubing over the cable's free end.

6. Insert the Nicopress fitting pn269 in the cable's free end.
7. Insert the cable in the thimble pn082 of the eyelet end pnMS 21255-3RS of the turnbuckle.

8. Connect the two eyelet ends to the turnbuckle MS2125-3RS.

Fig. 3.10/3 Ground position of the rudder



9. Tighten the Nicopress fitting pn269 close to the thimble. Do not let the cable slack and correctly evaluate the total length of the cable.

10. Screw symmetrically the turnbuckle MS 21251-B3S, thus tightening the cable.
11. Grab the pedals pn519 move it several times along the entire range of the movement, so as to distribute the tension evenly on all the cable.

12. Using the tool To-006, check the tension of the cable according to the indications of paragraph "Check of cable tension".
13. Lock the turnbuckles with the special safety wire (1).
14. Shift the rudder at an angle of approx. 15° to the right, while keeping the nose wheel (5) lined up with the longitudinal axis of the gyroplane.

15. Tighten the cable retainer pn085 so as to block the rudder.
16. Proceed with safety wiring.

3.10.4.4 CABLE TENSION TABLE

Cable specifications: galvanized steel 3,2mm x 49 wires
Cable tension allowance from 578 N (130 lbs) to 667 N (160 lbs)

3.10.5 INSPECTION OF RUDDER PEDALS RODS (see fig. 3.10/5)

The inspection of the pedal rods pn520, pn521 and pn522 is limited to checking the freedom of movement of the joints when they are at the end of their travel, the absence of abrasion or unexpected bending, as well as the correct tightening of the locking bolts.
Incorrect tightening may generate play and vibrations on the pedals and consequently on the nose wheel (buffeting).

3.10.6 INSPECTION OF PEDALS (see fig. 3.10/5)

1. Check the correct movement of the pedals pn519 until they reach the stops.
2. Verify that the pedals have no lateral play.
3. If there is some lateral play, tighten the locking bolts on which the movements of the pedals are articulated.
4. Verify that the safety wiring (1) is still there and check the correct positioning of the turnbuckle pnMS21251-B3S.

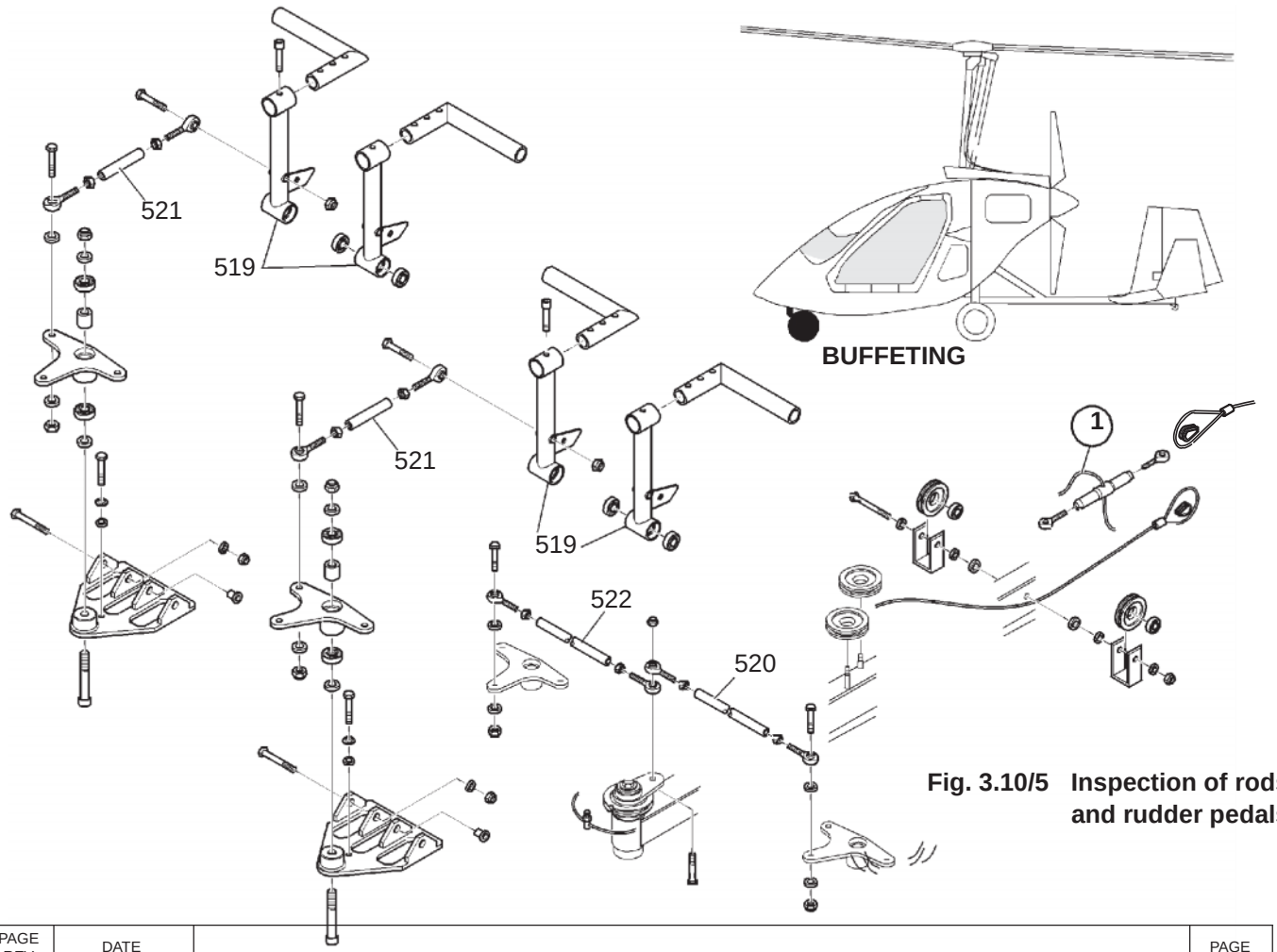


Fig. 3.10/5 Inspection of rods and rudder pedals

3.11 INSPECTION AND REPLACEMENT OF FRONT SUSPENSION (see fig. 3.11/1 - 3.11/3)

3.11.1 INTEGRITY OF TYRE

The tyre must satisfy several basic requirements to avoid punctures or reduction in pressure:

- Tread wear (1) must not be excessive. The maximum allowable thread wear for tires without wear depth indicators is when the tread pattern is worn to the bottom of the tread groove at any spot on the tire. These limits apply regardless of whether the wear is the result of skidding or normal use.
- The tyre must not show abnormal abrasions (2).
- The tyre (3) must not show radial cracks, which are symptoms of ageing.

It is possible to visually check all these requirements. Correct inflation pressure (4) helps in reducing the wear of the tire. Therefore we strongly recommend to check tyre pressure carefully and regularly, at least at the beginning of each new season.
The correct inflating pressure for the nose tire is **1,6 - 1,8 bar.**
Please remember that taxiing on hard surfaces or asphalt increases the wear of tyres. Under such conditions, we recommend to check the tyre and its pressure more often.

3.11.2 FIXING OF NOSE WHEEL AND FORK (see fig. 3.11/3)

The nose wheel (5) and fork (6) are assembled through the connection of the bolt pnM12x160 and the fork pn619 and the spacer pn427 and the wheel (5). Tightening and blocking the wheel is done with a fiberlock nut M12.
The tightening action of the bolt M12x160 must be adequate, so as to avoid compression of the bearings 6201-LU of the wheel hub and allow complete freedom of wheel rotation. At the same time, the wheel must not have any lateral play on the fork, which could cause vibrations to the entire system.

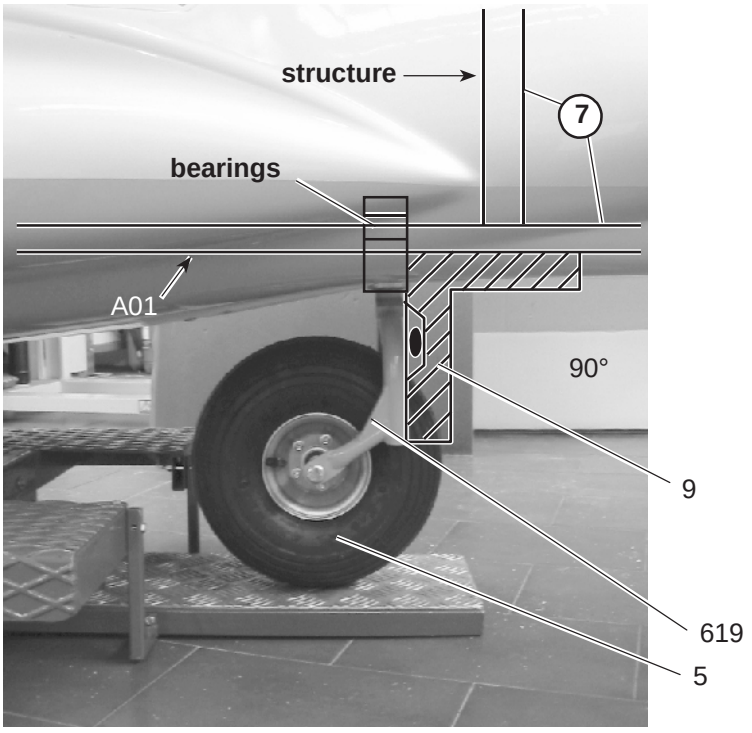
3.11.3 INTEGRITY OF FORK

Fatigue of the front fork pn619 can cause its deformation. Deformation is a symptom of hard landings or of take-off and landing on very rough surfaces. Periodically check the fork so as to prevent excessive deformation or failure of the fork stem.

3.11.4 CHECK PROCEDURE (see fig. 3.11/1)

The fork check parameter consists in having a 90° angle between the main structure's keel, which

Fig. 3.11/1 90° angle between wheel fork and structure

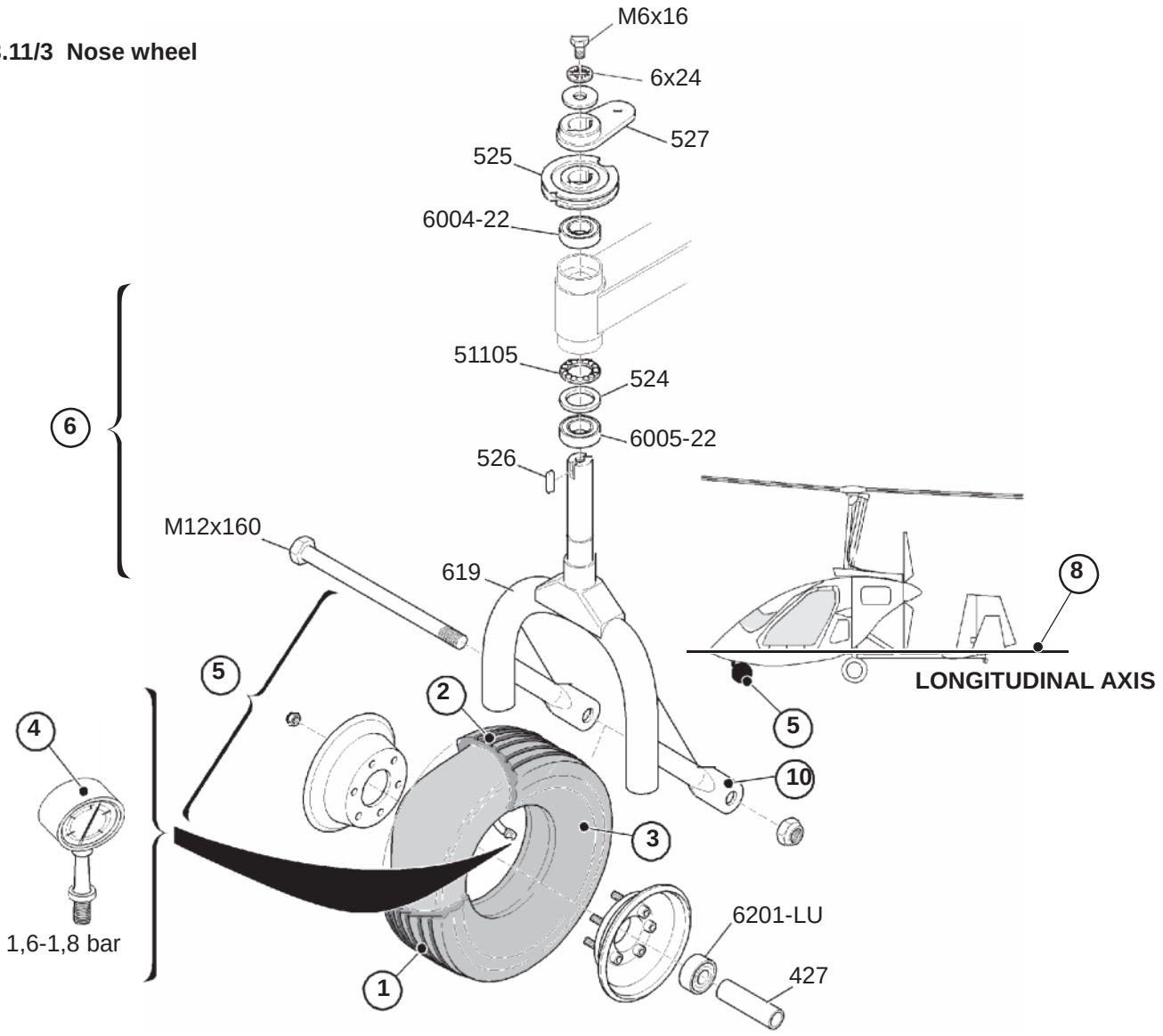


supports the bearings that allow the fork's movement, and the plane created by the fork.

Acceptable tolerances

Structure position A01 - fork	**90°**
Front tolerances	**+5°**
Rear tolerances	**-5°**

Fig. 3.11/3 Nose wheel



1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.

2. Put the pedals (pn519, in fig. 3.10/5) in central position. Visually check that the nose wheel (5) is aligned with the longitudinal axis of the gyroplane (8, fig. 3.11/3).
3. With an inclinometer (9) check the existing angle between the keel spar in A01 position (see fig. 3.11/1) and one of the vertical arms of the fork.

4. If the control parameters are not within the allowed tolerances, the fork pn619 must be replaced.

3.11.5 REPLACEMENT OF FORK pn619 (see fig. 3.11/3)

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF;
2. remove the safety wire from the turnbuckle MS21251-B3S on the pedal cable;
3. completely slacken the turnbuckle MS 21251-B3S so as to remove any tension from the pedal control cable;
4. Using two 10 mm wrenches, loosen and remove the bolt M6x30 that fixes coupling links pn075 on the link rods of the pedals pn520 and pn521 and to the link pn527;
5. Lean the gyroplane with its nose up, so as to be able to work comfortably on the front fork.
   Make sure the aircraft is stable. As the wheel has been removed for replacement, if the nosefalls it will crash on the ground, thus damaging the lower part of the fuselage;

6. Unscrew and extract the screw M12x160 that fix the front wheel to the fork, then remove the wheel;

7. loosen and remove the screw M6x16 that fix the front fork assembly; this screw is located on the top of the stem of the fork;
8. remove the link pn527, the keys pn526 and the pulley pn535 from the stem of the fork pn619;
9. slip off in downwards direction the fork pn619, use a rubber hammer to facilitate the task.

WARNING:
If the deformation of the stem is too severs and it is impossible to extract the indicated bearings, or if this operation could damage them, these bearings must be replaced.

3.11.6 PREPARATION OF REAPLCEMENT FORK

Prior to installation, remove the paint from the bush (10) where the axle M12x160 of the wheel is housed, so as to make its access easier during assembly.

3.11.7 INSTALLATION OF FORK pn619

1. Insert the stem of the fork pn618 in its seat, (the bearings are already in position);
2. place the pulley pn525 on the stem of the fork; pay attention to the correct positioning of the pulley, the seat of the cable retainer pn085 must be on the front side;
3. insert the keys pn526 in their seat located on the stem of the fork pn619 and on the pulley pn525;

4. position pedal control link pn527;
5. tighten the M6x16 screw located on top of the stem of the fork pn619; dio not forget to fit the 6x26 washer and the stop washer;

6. fix the control rods of the two pedal assemblies to the link pn527, this is done by tightening the screw m6x30 (replacement of self locking nuts is strongly recommended);
7. install the nose wheel through the following connection: fork - spacer pn427 - wheel- spacer- fork;

8 tighten the pivot of the wheel as explained in the “assembly of nosewheel and fork” (3.11.2) paragraph;
9. pull pedal cable by means of the turnbuckle (see paragraph “installation of the cable” 3.10.4.3;
10. put safety wiring on the turnbuckle (see fig.3.10/5).

3.12 TYRE CHECK (see fig. 3/12)

WARNING:
The M-24C gyroplane tyres are made of 6-ply tread with inner tube.
The nominal dimensions of the tires are listed in the table at the end of the paragraph.
Tires need to be checked at the beginning of each season, to check the wear and above all the correct inflating pressure.

Please remember that an incorrect inflating pressure will compromise the roadholding and direction-keeping of the gyroplane during taxiing and its overall trim.
Furthermore,unusual wear of the tyre will also increase the risk of punctures.

3.12.1 FRONT WHEEL CONTROL PROCEDURE

1. Before starting verify that the engine’s ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Lean the gyroplane on the tail, so that the nose is up and the access to the front tire is easier.

3. Verify the wear of the tread and check that there are no radial cracks on the rubber.
4. Remove the inflating valve cap.

5. Measure the tire pressure (4, fig. 3.11/3) and correct it according to the inflation pressure table (see paragraph 3.11.1).
6. Close the valve with its cap.

3.12.2 MAIN WHEELS MAINTENANCE PROCEDURE (see fig. 3.12/1)

1. Before starting verify that the engine’s ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Unscrew and remove the wheel spats pn167 outer fixing bolt M8x50. Be careful not to lose the spacers pn168 and the washers (1).

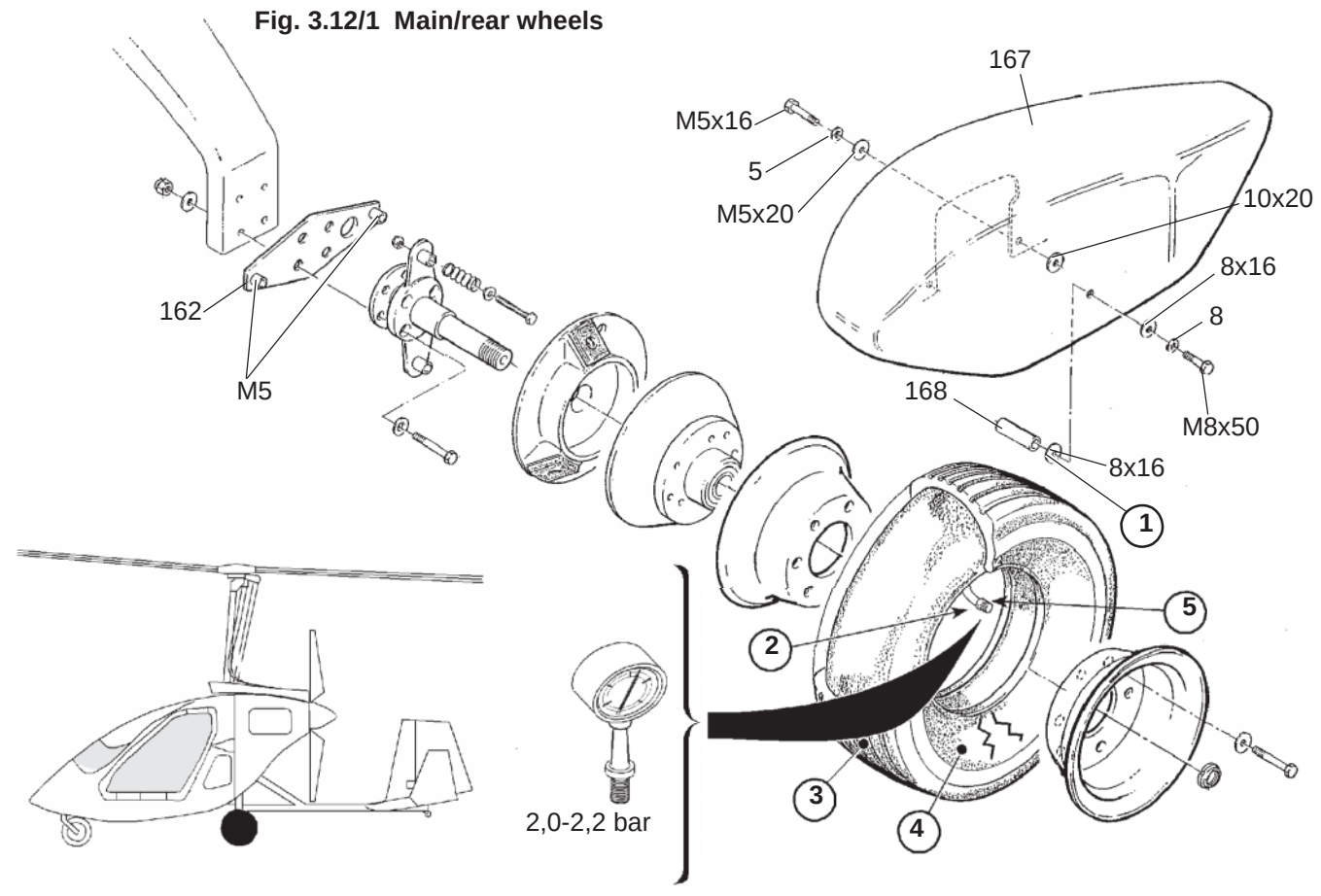
3. Unscrew and remove the wheel spats pn167 inner fixing bolt M5x16. Be careful not to lose the washers.
4. Remove the wheel spats pn167 by pulling them gently upward.
5. Verify the wear of the tread (3) and check that there are no radial cracks on the rubber (4).

6. Remove the inflating valve cap (5).
7. Measure the tire pressure (2) and correct it according to the inflating pressure diagram given below.

8. Close the valve with its cap (5).
9. Insert the wheel spat pn167 on its fixing seat.
10. Tighten the wheel spat pn167 inner fixing bolts M5x16; thereby follow the sequence: bolt (M5x16) - lock washer (5) - washer (5x20) - wheel spat pn167.

11. Position and tighten the outer fixing bolt M8x50, following the sequence: bolt (M8x50) - lock washer (8) - washer (8x16) - wheel spat (pn167) - washer (8x16) - spacer pn168.

Fig. 3.12/1 Main/rear wheels



3.12.3 TIRES INFLATING PRESSURE DIAGRAM

	Ply number		Dimensions	Pressure (bar)
front tyre	6	Trelleborg	4.00 - 4	1,6 - 1,8
main/rear tyres	6	Trelleborg	4.00 - 6	2,0 - 2,2

3.13 COOLING SYSTEM CHECK (see fig. 3.13/0)

3.13.1 PROCEDURE FOR CHECKING COOLING SYSTEM (see fig. 3.13/1 - 3.13/2)

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.

2. Open engine fairing inspection hatches. For a more accurate inspection remove engine fairings loosening all the fixing screws M4x12.
3. Verify that there are no leaks of coolant on the radiant surface (1). These are easy to detect because of the bluewhite stains left by the driedup coolant and damages to the radiator fins.

4. Check the integrity of the hoses in the cooling system. Make sure there are no abrasions or contact points with damaging rubbing.
5. Make sure the level of the coolant is correct, as per parameters of paragraph 3.13.7 "Coolant level".

6. Verify the correct tightening of all the clamps pn441 of the system.

If one or more of the checks identifies an issue, proceed with the following procedures to correct the problem.

3.13.2 INSPECTION OF THERMOSTAT (see fig. 3.13/0 and 3.13/1)

The Magni M24C gyroplanes have been equipped with a threeway thermostat placed in the coolant system upstream the radiator.
This thermostat automatically mainatins the coolan temperature within the normal operation range (green). Inspecting the thermal expansion valve (02, fig. 3.13/0) consists in the following operations:

WARNING:
To carry out this intervention, the engine must be cold.

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Loosen the clamp pn441 that fixes the hose of the cooling line to the connection of the radiator.

3. Have a tray (minimum capacity of 3.5 litres) ready to collect the coolant.

4. Gently remove the hose from the radiator connection and direct the liquid into the tray.

5. Unscrew all the screws M4x12 that fix the engine fairings.
6. Remove engine fairings.
7. Remove the cap of the engine's expansion tank to allow the complete discharge of the coolant from the cooling system.

8. Remove the two locking bolts M6x16 on the thermostat's cover.
9. Gently open the thermostat's cover. Be prepared for the discharge of the coolant still present in the system.

10. Extract the thermostat.
11. Visually inspect the thermostat, remove any deposits and clean it carefully until its original condition is restored.
12. Place the thermostat in its housing. Take care to place the vent on top.

13. Close the thermostat housing. Make sure the seals are placed correctly.
14. Tighten the bolts M6x16 with the proper lock washer.

15. Put the hose of the cooling line on the radiator's lower connection.
16. Tighten the clamp pn441.
17. Fill the cooling system from the engine's expansion tank.

WARNING DANGER:

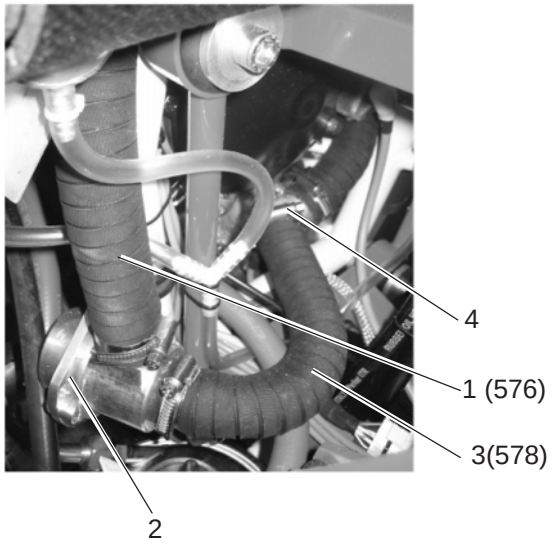
The thermostat remains closed at ambient temperature, hindering the flow of coolant into the radiators. Therefore it is necessary - before starting to fly - that the cylinder heads (CHT) reach a temperature of at least 85° C.

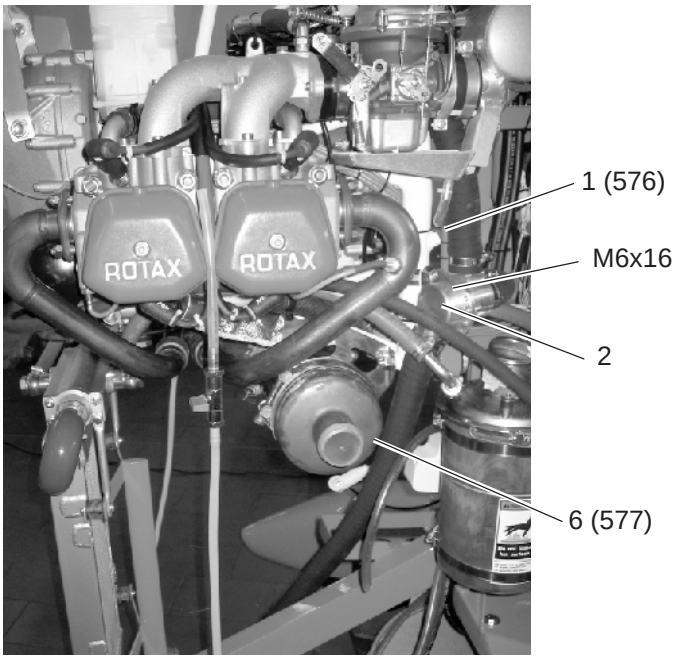
To do this, start the engine. But first, make sure the gyroplane is located outside with plenty of space around, without any hindrance or people. Also make sure the gyroplane is securely braked.
Only qualified personnel seated in the gyroplane are allowed to start and preheat the engine.

Once the temperature necessary for operating the valve (85° C) is reached, stop the engine, let the liquid cool down and fill up with liquid through the expansion tank.
Repeat this operation until the cooling system is completely filled.

18. Position engine fairing and fix them tightening the M4x12 screws.

Fig. 3.13/0 Inspection of thermal expansion valve





1 - Expansion tank hose - Valve L. 300 mm
2 - Thermal expansion valve
3 - Valve - pump connection hose L. 240 mm
4 - Pump connection
6 - Valve - radiator hose L. 870 mm

3.13.3 STAINS OR DAMAGE TO RADIATING SURFACE

Loss of coolant liquid can cause the engine temperature to rise and lead to damage to the engine; in some cases it can also lead to an emergency landing.

WARNING DANGER:
In case of slight dripping (indicated by small stains, no continuous dripping and no damaged radiator surface) and only in case of extreme need, it may be possible for the gyroplane to be allowed to carry out a single positioning flight to a service centre. Magni Gyro must be consulted in such an event before the gyroplane is permitted to conduct the positioning flight.

This is only a temporary solution allowing the gyroplane to fly to a service center. During such a flight, it is necessary to check the leak(s) and levels every 30 minutes of flight.

WARNING DANGER:
In case of large leaks and evident dripping, or if the there is damage to the radiator surface, the radiator must be replaced as soon as possible.

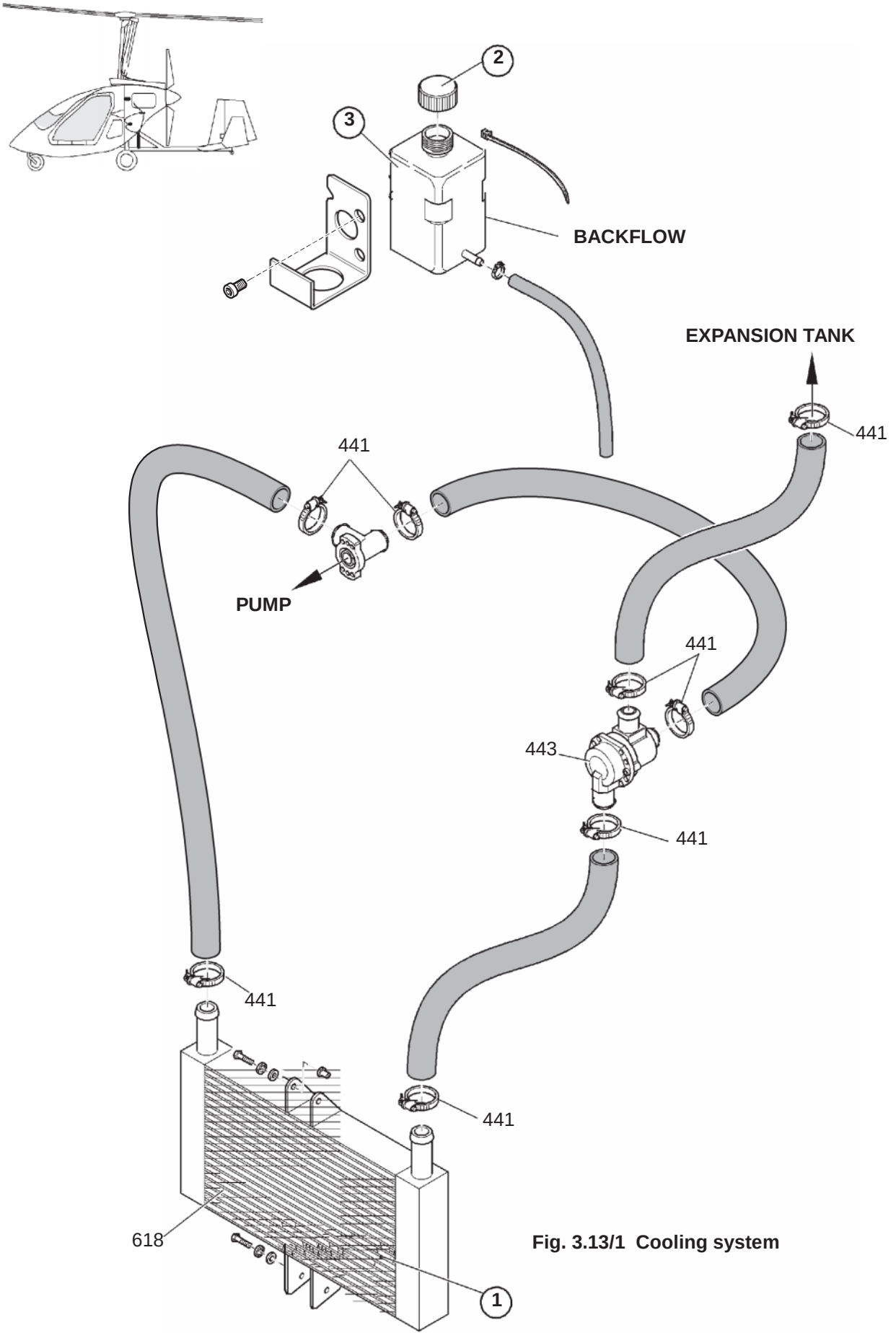


Fig. 3.13/1 Cooling system

3.13.4 REPLACEMENT OF RADIATOR (see fig. 3.13/1 - 3.13/2)

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.

2. Loosen the clamps pn441 that attaches the hoses of the cooling system to the lower connections of the radiator.
3. Have a tray ready to collect the coolant.

4. Gently remove the hose from the radiator connection and direct the liquid into the tray.

5. Open the right engine fairing inspection hatch.
6. To allow the complete discharge of the coolant from the cooling system, remove the cap (2) of the engine's overflow reservoir (3).

7. Remove the second hose of the cooling line from the radiator.
8. Unscrew the 4 locking bolts M5x16 of the radiator.

9. Remove the locking bolts M5x16 as well as their washers and then the radiator (1).
10. Fit the new radiator and fix it with the bolts M5x16 (replacement of the lock washers is recommended at each removal).

11. Put the hoses on the radiator connection and tighten the clamp pn384.
12. Fill the system from the engine's expansion tank, following the level indications given in paragraph 3.13.7.
13. Close the cap (2) of the engine's expansion tank (3).
14. Verify that there are no leaks in the system.

WARNING DANGER:

The thermostat remains closed at ambient temperature, hindering the flow of coolant into the radiators. Therefore it is necessary - before starting to fly - that the cylinder heads (CHT) reach a temperature of at least 85° C.

To do this, start the engine. But first, make sure the gyroplane is located outside with plenty of space around, without any hindrance or people. Also make sure the gyroplane is braked well on the ground.
Only qualified personnel seated in the gyroplane is allowed to start and preheat the engine.

Once the temperature necessary for operating the valve (85° C) is reached, stop the engine, let the liquid cool down, again verify there are no leaks in the system, and fill up with liquid through the expansion tank.
Repeat this operation until the cooling system is completely filled.

14. Close the right engine fairing inspection hatch.

3.13.5 INTEGRITY OF COOLING SYSTEM HOSES

WARNING:
The flexible hoses of the cooling system have an inner steel spiral to prevent flattening of the inner diameter on bends.

If some part of the hoses rubs against some metal or sharp edge, producing tearing or abrasion of the outer surface of the hose, this hose must be replaced. Furthermore, the rubbing and contact must be reduced.

3.13.6 REPLACEMENT OF COOLING SYSTEM HOSES (see fig. 3.13/1 - 3.13/2)

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Loosen the clamp pn441 that attaches the hoses to the connections of the radiator.
3. Have a tray ready to collect the coolant.

4. Gently remove one of the hoses from the connection and direct the liquid into the tray.
5. Unscrew all the screws M4x12 that fix the engine fairings.
6. Remove engine fairings.
7. To allow the complete discharge of the coolant from the cooling system, remove the cap of the engine's expansion tank.

8. Loosen the clamps that fix the damaged hose to the connections.
9. Remove the damaged hose from the connections.
10. Carefully check the worn part of the hose and find out the point of contact where it has been damaged.

11. If possible, avoid further rubbing with the hose, either using some rubber spacer, antirubbing sheath or removing the sharp contact edges.
12. Replace the hose, taking care to restore the original layout of the cooling system.
13. Fasten the clamps pn441 of the hoses to attach them to their connections.

14. Fill the system from the engine's expansion tank, as per level instruction of paragraph 3.13.7 "Coolant level".
15. Close the cap of the expansion tank.
16. Verify that there are no leaks in the system.

WARNING DANGER:
The thermal expansion valve remains closed at ambient temperature, thus hindering the flow of coolant into the radiators. Therefore it is necessary - before starting to fly - that the heads (CHT) reach a temperature of at least 85° C.

3.13.7 COOLANT LEVEL

Magni Gyro uses the following coolant:

Coolant	**SHELL ANTIFREEZE -26° +122°**
Dilution rate	**40%**

WARNING DANGER:
The coolant level must be checked before each flight. If the engine is hot, be cautious when removing the cap of the expansion tank.

WARNING DANGER:
When the engine is hot, the coolant may be pressurized and careless opening of the cap may generate spurting and spreading of hot liquid.

When the engine is cold, the correct level of the coolant is reached when the ROTAX engine's expansion tank is full and the level inside the recovery reservoir (3) is at its minimum.
If this is not the case, fill up with coolant.

WARNING:
Whenever coolant is replaced during maintenance to the cooling system, always check the levels after the first start-up.

3.13.8 REPLACEMENT OF CLAMPS pn441 (see fig. 3.13/1 and 3.13/2)

The clamps pn441 that fix the hoses to the cooling system need to be replaced whenever they show some kind of corrosion, when they are broken or when they no longer tighten correctly. The tightening action of the clamps should be checked frequently, as rubber hoses may get deformed with time, thus altering the tightening action and seal.

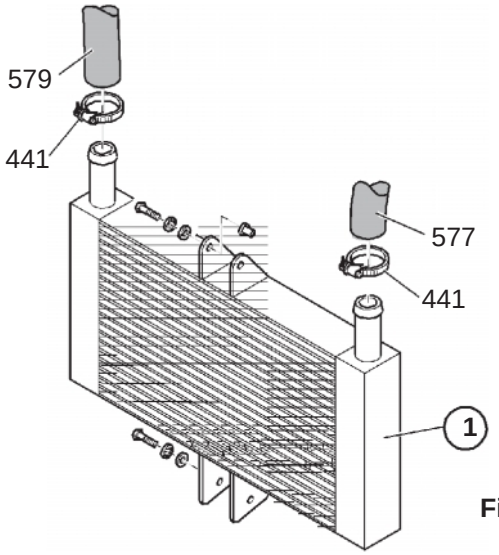


Fig. 3.13/2

3.13.8.1 CHECK PROCEDURE

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Open engine fairing doors. For a more accurate inspection remove engine fairings loosening all the fixing screws M4x12 .

3. Inspect all the clamps pn441 and make sure they are tight.
4. If the clamps do not keep their tightening action (i.e. the screw turns without effort) or if evident corrosion is found, replace them immediately.

5. Close engine inspection hatches.

3.14 REPLACEMENT OF FUEL FILTER (see fig. 3.14/1)

PRECAUTION:
Replace the fuel filter as per Magni Gyro schedule (see Ordinary Maintenance Schedule). Replacement of the fuel filter is also rec ommended whenever you think you have used fuel that is contaminated or has not been filtered correctly.

The following steps indicate the correct procedure for replacing the fuel filter pn274.

PRECAUTION:
If the fuel line is not completely empty, then adequate caps or hose clamping pliers should be prepared before starting the operation. They will be useful to avoid any unwanted discharge of fuel from the hoses when removing the used filter.

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Unscrew all the screws M4x12 that fix the engine fairings.
3. Remove engine fairings.
4. Cut the cable tie pn4,8x300 and free the fuel filter pn274.

5. Loosen the clamps pn176 placed near the filter connections.
6. Place the hose-clamping pliers (4) and (5) on the lines upstream (2) (tank-filter) and downstream (3) (filter-carburetors) of the filter. The pliers apply a restriction in the hose that prevents fuel flowing through the lines.

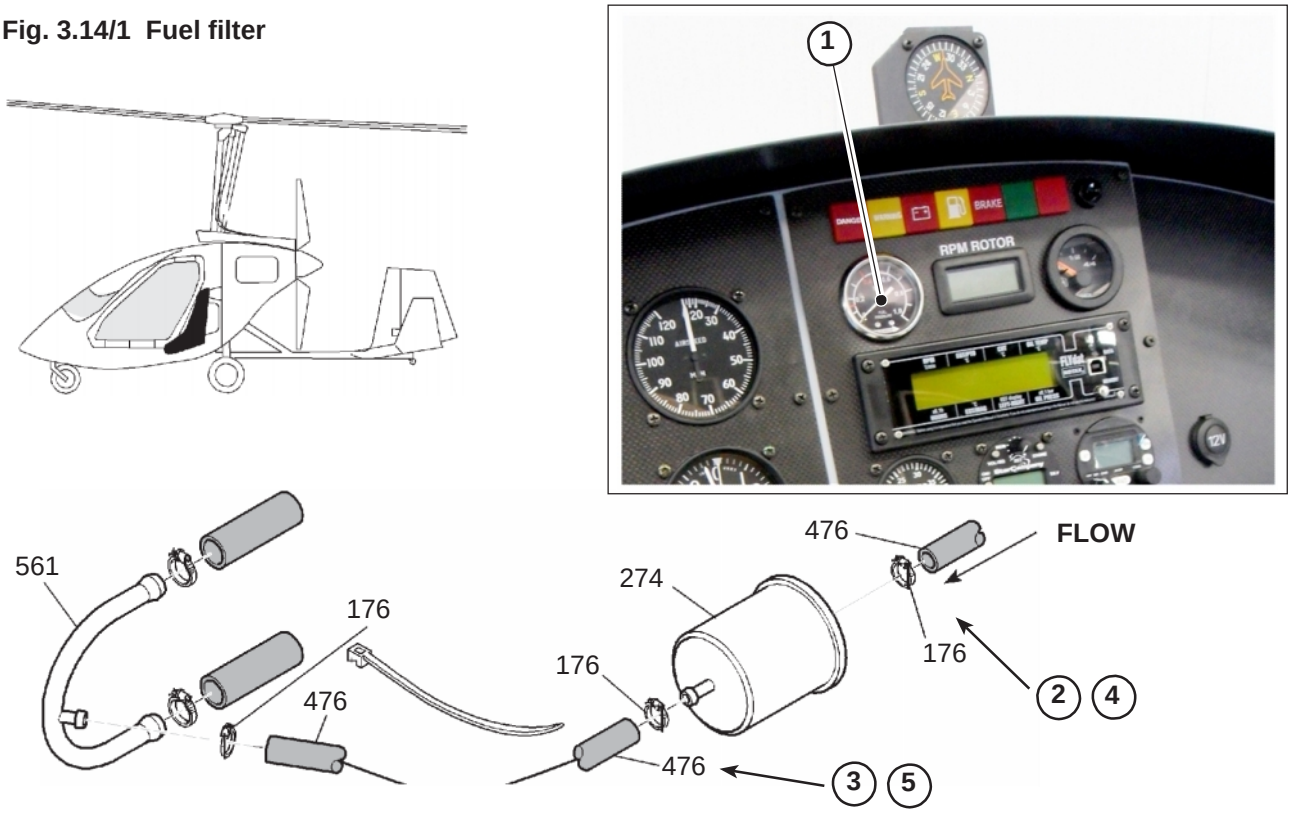
7. Remove the fuel filter pn274 by extracting it from the hoses pn476.
8. Insert the new filter in the upstream (2) part of the line. Take care to respect the correct flow direction, indicated by arrows.

9. Gently loosen the hose clamping pliers (4) located upstream the filter.
10. Check that the new filter gets filled up with fuel and that the fuel flows out the downstream connection.
11. Fit the filter to the downstream hose (3).

12. Remove the pipe clamps (4) and (5).
13. Fit and tighten the clamps pn176.

14. Place the filter on the support pn186 and secure it with a new hose tightening cable tie (ty-rap)
15 Verify there are no leaks in the system..

Fig. 3.14/1 Fuel filter



16. Position engine fairings and fix them tightening the M4x12 screws.

PRECAUTION:
Steps 7 and 8 are very important as they allow to prime the fuel from the main tank and pump it more easily. Carry them out carefully!
Some air in the fuel filter may hinder or reduce the correct flow of fuel in the line.

3.15 REPLACEMENT OF ENGINE MOUNT VIBRATION DAMPERS (see fig. 3.15/1)

Engine mount vibration dampers pn243 are made of silicon-rubber, with a specific mixture which reduces the vibrations transmitted between the engine and the structure.
Aging and wear of the vibration dampers modifies the silicon mixture, resulting in a variation of the angle between thrust axis and longitudinal axis of the gyroplane.
This deformation and its effect reduces the damping capabilities and the distance between the edges of the propeller blades and the keel tube.
Vibration dampers need periodic replacement to avoid the risk of interference between the propeller blade and the keel tube in case of heavy landing.

3.15.1 REPLACEMENT PROCEDURE (see fig. 3.15/1)

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.

WARNING:
Replace the vibration dampers on the right side first and only then the dampers on the left side.

2. Unscrew all the screws M4x12 that fix the engine fairings.
3. Remove engine fairings.
4. Unscrew the 2 bolts M10x100 on the right side of the engine mount.

5. Remove both right side bolts.
6. Using a slotted screwdriver to lever, remove the front vibration damper units (spacer pn242, vibration damper pn243).

7. Apply a constant force (FC) by pushing on the propeller flange along the transversal axis, so as to be able to free the rear vibration dampers from their housing on the engine mount (see picture).

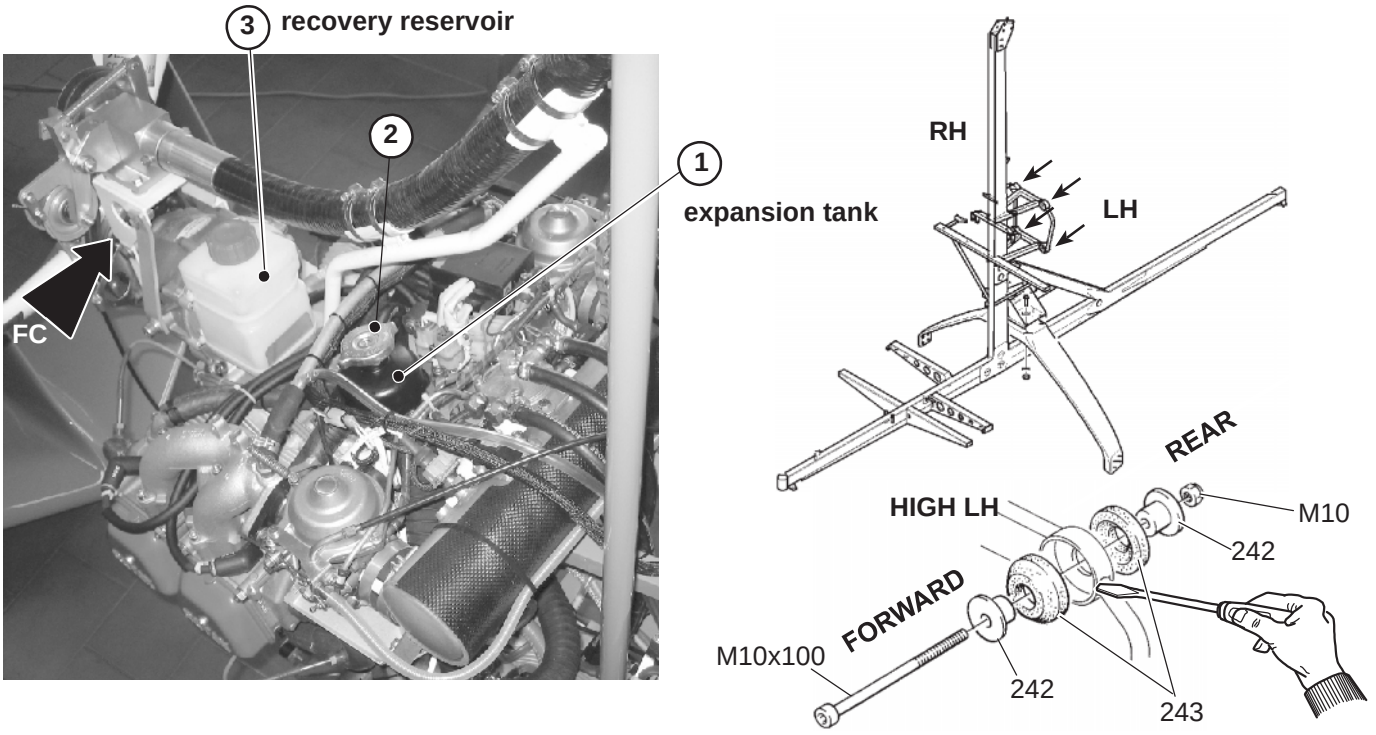


Fig. 3.15/1 Point where to apply a constant side pressure and remove the dampers

8. Fit new vibration dampers pn243 in the engine mount housings; spray some releasing agent (WD40) to make this operation easier.
9. Insert the original spacer pn242 in the vibration dampers pn243; spray some releasing agent (WD40) to make this operation easier.

10. Remove the lateral load applied previously to the propeller flange, so as to place the engine back to its correct position and be able to insert the engine fixation bolts M10x100.
11. Replace the nylock nuts M10 and tighten them.

12. **Repeat steps 2 to 9 for the vibration dampers on the left side.**
13. Position engine fairings and fix them tightening the M4x12 screws.
14. Carry out a trial engine run to verify that there are no excessive vibrations present in the mountings following replacement.

3.16 REPLACEMENT OF FUEL PIPES

WARNING DANGER:
Fuel pipes may only be replaced with Magni Gyro supplied replacement pipes that have been approved as meeting the necessary fire proof requirements.

Pipes must not show abrasions, cuts or wear marks.

Vulnerable points will be close to the clamps where longitudinal cuts of the outer covering may occur because of ageing.

Furthermore, the fuel system must not show any leaking or marks of undue rubbing on the pipes.

If some of the anomalies cited above are found during the visual check, the replacement of the fuel pipes becomes necessary. Follow the procedure described below.

3.16.1 FUEL PIPE REPLACEMENT PROCEDURE (see fig. 3.16/1 and 3.16/2)

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.

2. Examine the complete layout of the fuel pipe and of the fixing systems pn176 along the line being changed.
3. Unscrew all the screws M4x12 that fix the engine fairings.
4. Remove engine fairings.
5. Loosen the fixing clamps pn176 of the pipe that needs replacement.

6. Remove the fuel pipe pn476 from the connections of the various devices, paying attention to possible spilling or loss of fuel, especially if the pipe pn476 is placed lower than the fuel level inside the tank.

7. Replace the damaged fuel pipe pn476 with a new pipe of the same length; respect the original fuel line layout and its fixing systems.
8. Insert the new pipe in the connections of the devices concerned and fix it with the special clamps pn176 (replace these clamps if possible).

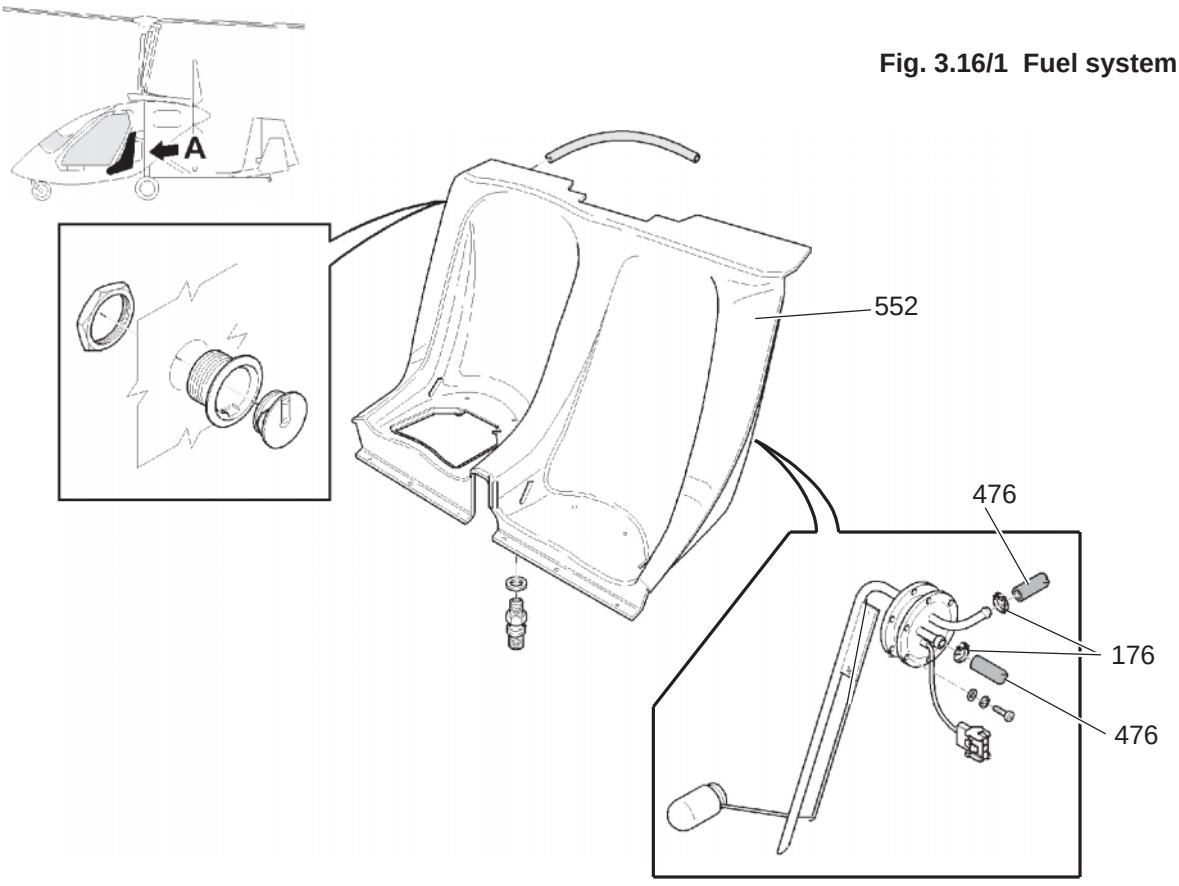
9. If the gyroplane has a ROTAX 914 engine and if some pipe upstream of the fuel filter pn274 (10, fig. 3.16/2) has been replaced, the bleeding of the system is required. Therefore remove the delivery pipe from the pressure regulator (7).
10. Fit a connection with an extension to the delivery pipe (11, fig. 3.16/2) so as to extend the line to an external can.

WARNING DANGER:
11. Check that there are no people or objects close to the power plant.

12. Insert the 10 A Equipment (2) and 20 A Generator (3) breakers.
13. Put the MASTER switch (4) in ON position.

14. Put the fuel electric pumps switches (5) and (6) in ON position and let them function for approx. 10 seconds to allow the cleaning of the pipe inside and the complete bleeding of the system.

Fig. 3.16/1 Fuel system



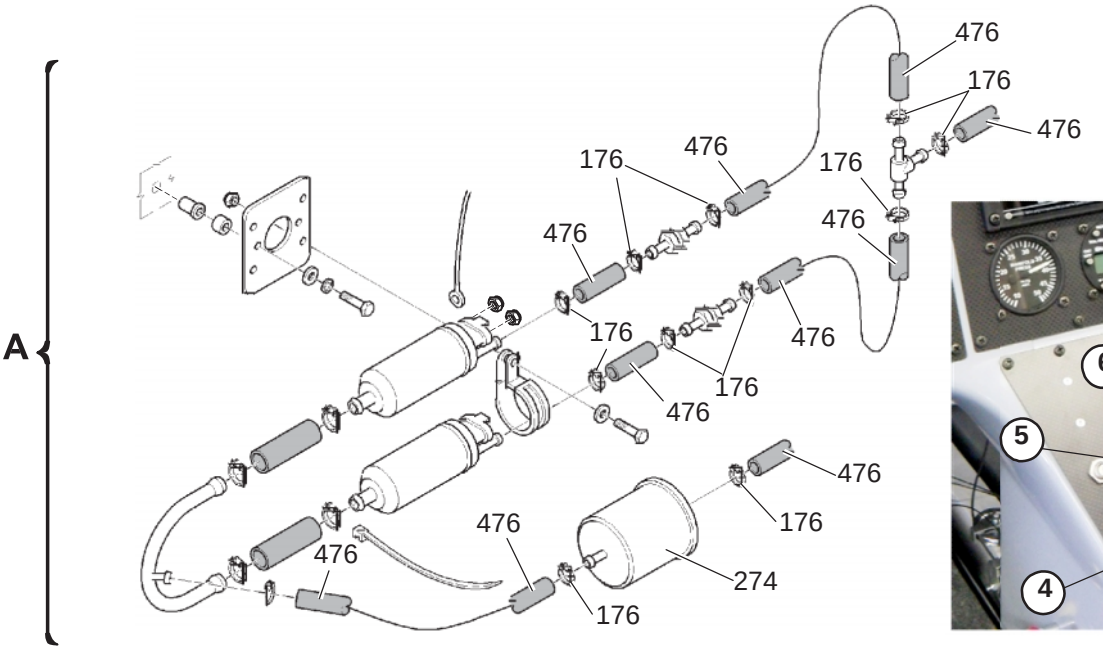
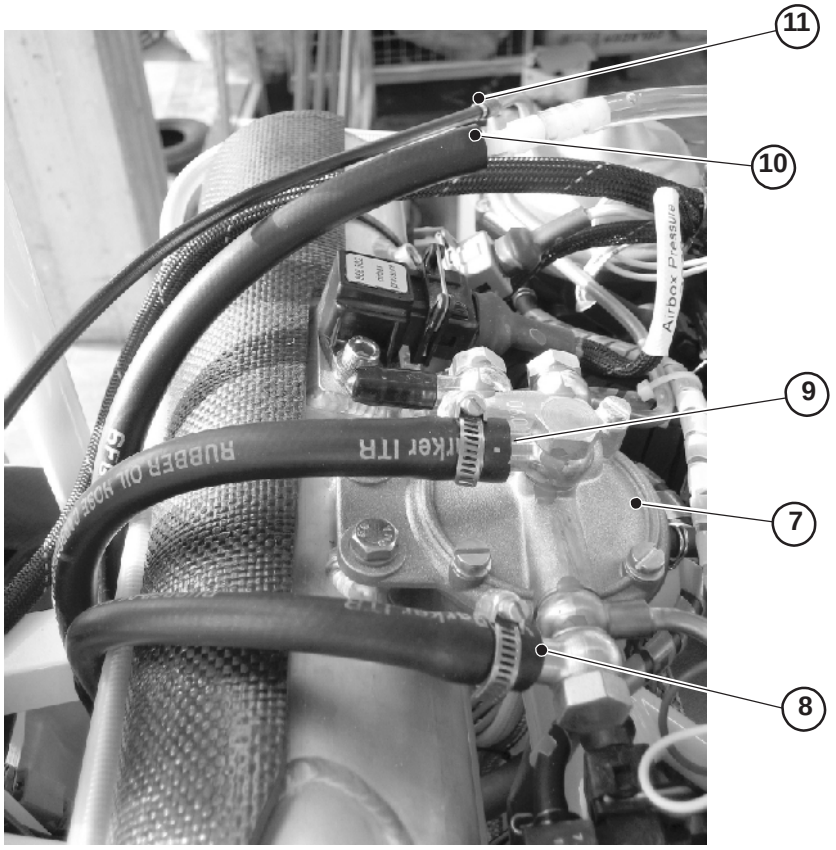


Fig. 3.16/2 Pressure regulator and its tubing



7 - Pressure regulator
8 - Fuel pressure
9 - Backflow to fuel tank
10 - Delivery pipe to carburetors
11 - Backflow to external recovery reservoir

15. Put the MASTER switch (4) in OFF position.
16. Disconnect the connection (1) and the pipe extension.
17. Connect the delivery pipe to the pressure regulator.
18. Tighten the clamp pn176 and fix the fuel pipe pn476.
19. Position engine fairings and fix them tightening the M4x12 screws.
20. Verify there are no leaks in the system.

3.17 AIR FILTER INSPECTION (see fig. 3.17/1)

The air filter pnRU810 must be inspected in accordance with the maintenance schedule.

This inspection must check:
- the cleanliness of the filter;
- the integrity of the filter (ensure there are no deformation, cracks and damages);
- the correct tightening of the filter fixing clamp;
- the presence of the safety wiring

3.17.1 INSPECTION AND CLEANING OF FILTER

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Unscrew all the screws M4x12 that fix the engine fairings.
3. Remove engine fairings.
4. Completely remove the safety wiring (3) of the filter.
5. Loosen the fixing clamp (2) and remove the filter (1).
6. Visually inspect the filter (1) and evaluate its general state.
7. Clean the filter with compressed air (4); blow air from inside towards outside.
8. If possible, apply protective oil (KN Airfilter oil, or equivalent) to the filter RU810 (or RU 800).
9. Restore the safety wiring of the filter (3).

WARNING:

The filters pnRU800 and RU810 installed on the Rotax engines 914 and 912S are not preset for safety wiring. Therefore, pierce the collar of the filter (5) with the safety wire.

10. Place and tighten the filter fixing clamp (2).
11. Finish the safety wiring (3) by anchoring it to the clamp (6).
12. Position engine fairings and fix them tightening the M4x12 screws.

PRECAUTION:

The air filter RU810 is fixed directly to the engine's turbine assembly, which can reach very high temperatures when the engine is running.
Because of these high temperatures, the collar (made of rubber) of the filter (1) gets altered; this in turn can affect the tightening action of the filter clamp (2).
It is strongly recommended to check the correct tightening of the clamp (2) within the first hour of use of the engine after the replacement of the filter.

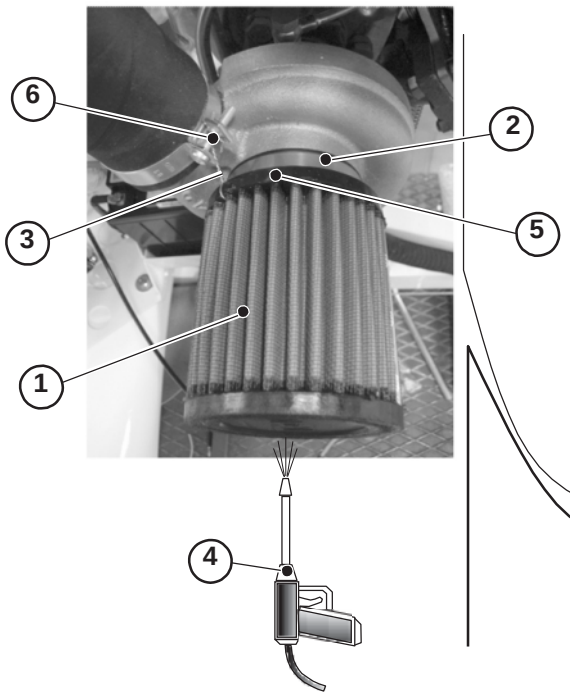
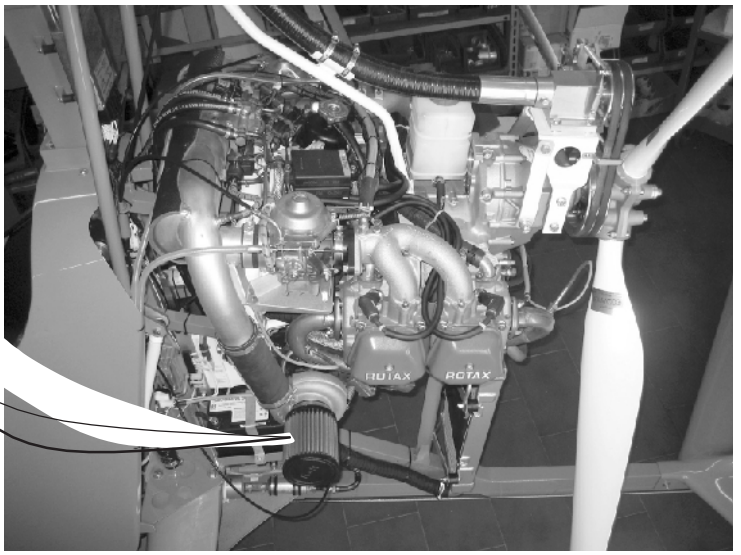


Fig. 3.17/1 Safety wiring for fixation of engine air filter



3.17.2 AIR FILTER REPLACEMENT

WARNING DANGER:
The air filter must be replaced exactly as prescribed in the maintenance schedule.

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Unscrew all the screws M4x12 that fix the engine fairings.
3. Remove engine fairings.
4. Completely remove the safety wiring (3) of the filter.
5. Loosen the fixing clamp (2) and remove the filter.
6. Install a new filter, as per specifications requested in the latest version of the spare parts catalogue.
7. Restore the safety wiring of the filter (3).

NOTE:
As the filters installed on the Rotax 914 engine are not preset for safety wiring, pierce the collar of the filter (1) with the safety wire.

8. Place and tighten the filter fixing clamp (2).
9. Finish the safety wiring of the filter (3), anchoring the filter to the engine.
10. Position engine fairings and fix them tightening the M4x12 screws.

PRECAUTION:
It is strongly recommended to check the tightening of the filter fixation clamp after one hour of use of the engine after having replaced the filter. This to compensate a possible play due to the alteration of the collar of the filter.

3.18 PROPELLER MAINTENANCE

Before each flight the blades must be carefully inspected. The inspection should look for signs of impact, particularly on the leading edges. Evidence of cracks or defects in the blade coating should also be looked for. There should be no signs of play between the blade and hub. A clean finger should be run around the blade root and provide no trace of grey or black dust.

3.18.1.1 CLEANING INSTRUCTIONS

Composite blades can be cleaned using household detergents and water. Polyurethane coated blades may be cleaned using soap or car polish. Regular cleaning and inspection of the blades will keep them at their peak performance.
Each blade is balanced before leaving the factory and any unauthorised repainting will degrade this balancing. Examination of the blade root-ends will reveal a factory sticker containing the factory balancing repair number. The sticker is used to cover a balancing hole which contains small lead balls providing the fine balance to the blades. The lead balls may sometimes move within the hole, this is acceptable. However, if the sticker becomes loose, or detached, the balls may be lost and the propeller balance destroyed. Do not remove the sticker that indicates the Factory's balancing number for repair.

3.18.1.2 LEADING EDGE IMPACT DAMAGE

The extent of repairable damage on the leading edges is less than 4mm in diameter. The damaged area should be filled with epoxy glue (RS Components quick set epoxy adhesive part number 850-940 or equivalent). Once dried the glue should be smoothed to suit the aerodynamic profile of the blade.

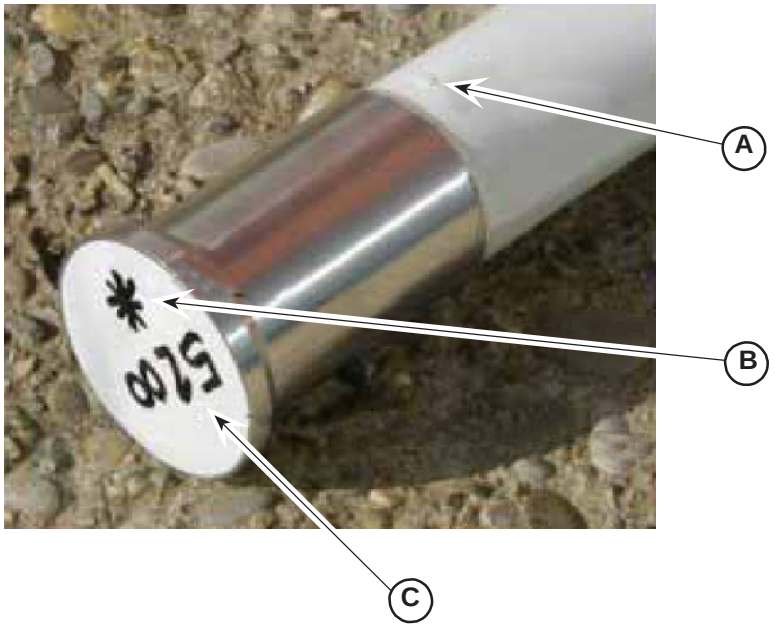
3.18.1.3 CRACKS

The blade should not have any cracks along its length, although minute cracking may appear in the surface gel-coat, or paint, if the blade has been heavily loaded. If small (less than 1/2") cracks are observed then the position and size should be monitored to check that the crack does not grow in size. If elongation of the crack is noted then the blade should be returned immediately to the factory for repair.

3.18.1.4 BLADE ROOT

If any defect is observed in the blade root, or any dust is evident upon wiping with a clean finger, then the blade should be immediately returned to the factory for repair.

The ECOprop range of propellers are highly resistant to the shock loads that the Rotax 914 series of engines, with gear-box produce. Life expectancy of the blades, with correct usage and if correctly maintained, is limited to 3000 hours. Care however should be exercised as excessive loadings may produce damage to the internal structure that is difficult to detect.



A= (0)/(1)/(2) point => mould mark.

B= * correct moment with lead's weight.

C= Balancing blade's number.

3.18.2 REMOVAL AND INSTALLATION OF THE PROPELLER

3.18.2.1 REMOVAL

1. Before starting verify that the engine's ignition key and push-button are in the OFF position and that all the breakers are switched OFF.
2. Remove the spinner (if installed) unscrewing and removing the 6 M4x12 screws and their washers.
3. If balance washers are installed then mark their position on the hub so to be able to put them back during re-installation.
4. Remove safety wires from the propeller fixing screws pn 284.
5. Unscrew and remove the 6 fixing screws pn284. Play attention and support the hub so to avoid it coming off from the engine flange.
6. Remove the hub from the flange of the engine.

3.18.2.2 INSTALLATION

1. Before starting verify that the engine's ignition key and push-button are in the OFF position and that all the breakers are switched OFF.
2. Clean the engine flange and the face of the prerotation pulley pn 124 to allow the correct fixing of the propeller.
3. Fit the propeller to the engine flange.
4. Place and tighten (cross-tightening) the 6 fixing screws pn 284 that mount the propeller. The torque for these screws is 23-26Nm.
5. Install safety wire on the screws pn 284.
6. Re-install the spinner by mean of the 6 M4x12 screws (if this is the case)

3.18.3 PROPELLER STRIKE

In the event of the propeller striking the ground, or any unintended sudden propeller stoppage no further flights are permitted until further inspections are carried out. The engine may have suffered shock loading and should be inspected as defined in the "Special Checks" section of the Rotax maintenance manual. The propeller should be inspected for damage, as defined in section 3.18. Inspection of the gyroplane structure should also be carried out to identify if there has been any damage, twisting, buckling or cracks. Specific attention should be paid to the welded areas of the engine mounting frame and mast structure'

3.19 MAINTENANCE OF THE DOORS

Access to the cockpit is via two upward opening side doors. Two struts (one each door) support the door when open. The door are locked by a lever which engages the door on two pins when pushed downwards. The doors consist of a carbon frame with glued transparent surfaces. The supports for the strut, the locking pins and the fixing for the hinge are bonded to the same frame. The transparent surface is made of moulded Plexiglas that needs to be looked after and cleaned with appropriate products. This will ensure the longevity of the transparency and clearness. The replacement of damaged or broken transparent surfaces is only done at the factory (Magni Gyro Srl).

3.19.1 REPLACEMENT OF THE STRUT

In case the pneumatic strut loses the capability to keep the door open the procedure for replacement is the following:

1. Before starting verify that the master switch is in OFF position;
2. open the door rotating counter-clockwise the outer lever to its end point;
3. keep the door open and unscrew the two M6x16 attachment bolts of the jack;
4. remove the bolts M6x16 so to be able to remove the freed jack;

WARNING:
Removal of the strust means the loss of door support, the door will tend to shut down suddenly

5. place a new strut in the correct position and fix it with the two M6x16 bolts;
6. tighten the M6 self locking nuts of the fixing bolts. The torque must be adequate to avoid play on the fixing points of the strut whilst allowing the full range of movement of the device;
7. verify the functionnality of the door by opening and closing it.

3.19.2 REMOVAL OF THE DOOR

1. Before starting verify that the master switch is in OFF position;
2. open the door;
3. hold the door open and unscrew the M6x16 bolt connecting the strut to the lower support;
4. remove the unscrewed bolt and hold the door open;
5. keep the door open supporting it approx at the c. of g. with the palm of the hand (keep fingers stretched out to maximize the support area);
6. grab the rotation pin of the hinge with the other hand and extract it.

WARNING:
If the extraction of the pin is difficult, gently swing the door to allow the hinge to align correctly and facilitate the sliding out of the pin.
If it is difficult to grab the tip of the pin then carefully use long/extra long nose pliers.

3.19.3 CHECK OF THE LOCKS

The door locks must be checked every 100 hours as per the maintenance schedule.

1. verify the correct closing of the doors on their pins pn548 ; set the length of the pins of the doors if required, this is done screwing or unscrewing them as required;
2. verify that pins pn548 can easily slide in their seats pn549 fixed to the fuselage. If there is too much friction grease the system little with spray grease(Castrol Chain Lube Racing, or equivalent);

3. make sure there are is play in the movement of the outer lever pn634;
4. When locking the door there should be a stiffening of the lock action when in nears the end of its travel and before it is fully closed. This is intended to prevent unintentional opening of the door in flight or whilst taxying.

If this does not happen then:
a. unscrew the M5 bolt that secures the front rod end pn546;
b. unscrew by a couple of turns the rod end pn546 (this will extend the length of the group rod547- rod end pn546 – locking pin pn548);
c. tighten up the rod end;
d. verify again the characteristics of the lock action and make sure they are as per point 4 above;.
e. If the condition isn't satisfied repeat from a.

SECTION 4
CARE AND CLEANING

Care and cleaning of the gyroplane is of great benefit to both the owner and operator. Cleaning involves close contact with all the aspects of the gyroplane and may provide early warning of a potential problem.

The use of solvent or caustic cleaning materials is not necessary.
A mild detergent solution and a soft cloth will remove all the dirt from the gyroplane's fuselage, rotor blades, rudder and propeller.
After washing and drying the surfaces, it is recommended to polish them with a good quality bodywork polish until all dirt is removed.

This will also enhance the aerodynamic properties of the surfaces.
A vacuum cleaner should be used to remove any dirt inside the aircraft.
It is possible to use a jet of water under moderate pressure to clean any mud or dirt from the floor of the gyroplane cockpit. In fact, there are drainage holes in the floor of the cockpit for this purpose.

Magni Gyro recommends the use of Micro-Gloss to clean the windscreens.
Do not use solvent, petrol or caustic cleaning detergents to avoid material hardening, cracking and damage.

The instrument panel should be dusted with a soft clean paintbrush. Any dirty instrument dial should be wiped with a soft dry cloth.

The use of a pressure washer or of strong jets of water is not recommended.
Their use may result in damage to instruments, engine or electrical systems.

There is also a danger that the use of these systems could wash away protective grease from bearings and controls.

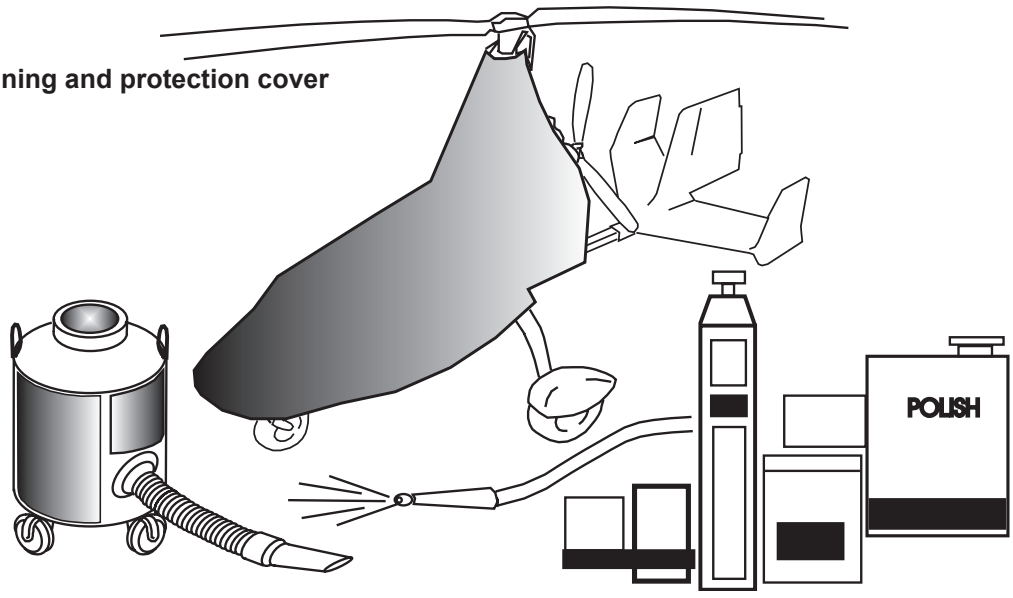


Fig. 4.1/1 Cleaning and protection cover

When stored in a hanger or outside, it is recommended to cover the gyroplane with a close fitting, non marking cover.

The use of an adequate cover supplied by Magni Gyro is strongly recommended. This cover is produced with breathable materials to allow the evaporation of humidity that can occur when the cover touches the gyroplane's surface. Before covering the gyroplane, ensure that all the surfaces are dried well, so as to avoid blistering on painted surfaces.

Blades must be locked longitudinally using the rotor brake.

It is strongly advised not to tie blades, except in case of very strong wind. In this case, use the adequate tip protection so as to avoid undue loads on the blades.

SECTION 5
UNSCHEDULED MAINTENANCE
(See fig. 5.1/1 – 5.1/3)

WARNING:
Should unscheduled maintenance of the gyroplane be necessary, then it is to be carried out and recorded in the gyroplane or engine logbook.

By its very nature, it is very difficult to predict any unscheduled maintenance and how to carry it out. The best solution is to apply standard diagnostic and repair techniques and to seek advice from a suitably qualified engineer or directly from Magni Gyro.

To facilitate unscheduled maintenance, we are listing here some of the problems and/or anomalies of the systems or installations, with their symptoms and the procedures to resolve them.

5.1 TRIM SYSTEM ANOMALY (see fig. 5.1/1 and 5.1/2)

The following are the possible anomalies of the trim system of the M-24C gyroplane and the correct procedures to solve the problems.

5.1.1 DESCRIPTION OF SYSTEM

The trim system consists of an electric linear actuator pn102, placed behind the mast (1), that acts through a sheathed cable 2x1.500 pn104 on the spring pn109, that is fixed to the rotor head fork pn046.
When the actuator is operated, there is a constant force applied to the rotor head. This maintains the angle of incidence and by consequence the gyroplane attitude required by the pilot.
The pilot controls the actuator pn102 via the switch pn112 placed on the handle of the control stick.

The forward and backward movement of the control switch pn112 leads to an attitude variation that is proportional to the period for which the control is operated.

Forward movement of the switch corresponds to nose down attitudes - fast.
Rearward movements of the switch correspond to nose up attitudes - slow.

5.1.2 PROBLEM

The displacement of the trim switch pn112 does not correspond to movements of the actuator pn102.

Solutions:

a. Ensure that the 10 A breaker (Accessories) is switched ON.

b. Check the operation of the actuator pn102.

1. Open engine fairing hatches. For a more accurate inspection remove engine fairings loosening all the fixing screws M4x12 .
2. Remove the cable ties pn2,4x197 that fix the trim control connector pn115.
3. Disconnect the connector pn115.
4. Extract all the breakers (1) of the instrument panel (2), except the 10 A breaker (Accessories).
5. Put the master switch (20 A) in ON position (2).

6. Create a bridge between the contacts (pin) pn102/A of the control connector pn115 on the actuator side in the positions 1-2 and 2-3; verify the functioning of the actuator pn102.

NOTE: results of check:

Positive connection contact pn102A (pin) 1-2:
rack pn271 displacement upward;

connection pin 2-3:
rack pn271 displacement downward;

continue inspection as to steps c, d and e.

Negative no displacement of the rack pn271:
continue inspection as to steps f and g.

c. Verify the complete freedom of movement of the switch pn112.

The trim switch pn112 may accidentally remain stuck inside the handle.
This limits the movement of the switch and by consequence the control of the actuator.

1. Loosen the grub-screw pnM4x6 of the trim switch.

2. Lift the switch pn112 so as to guarantee the control movement.
3. Tighten the grub-screw pnM4x6 again.

d. Inspection of the welding on the trim switch pn112 contacts.

WARNING:
When assembling the switch pn112, take care to place the blue (or grey) wire towards the front.

1. Loosen the grub-screw pnM4x6 of the trim switch.

2. Extract the trim control switch pn112 and check the welding (3) on the switch.
3. Reposition the switch pn112 in its seat, while keeping the blue wire in front.
4. Tighten the grub-screw pnM4x6 again.

e. Verify the continuity of the trim control cable pn113.

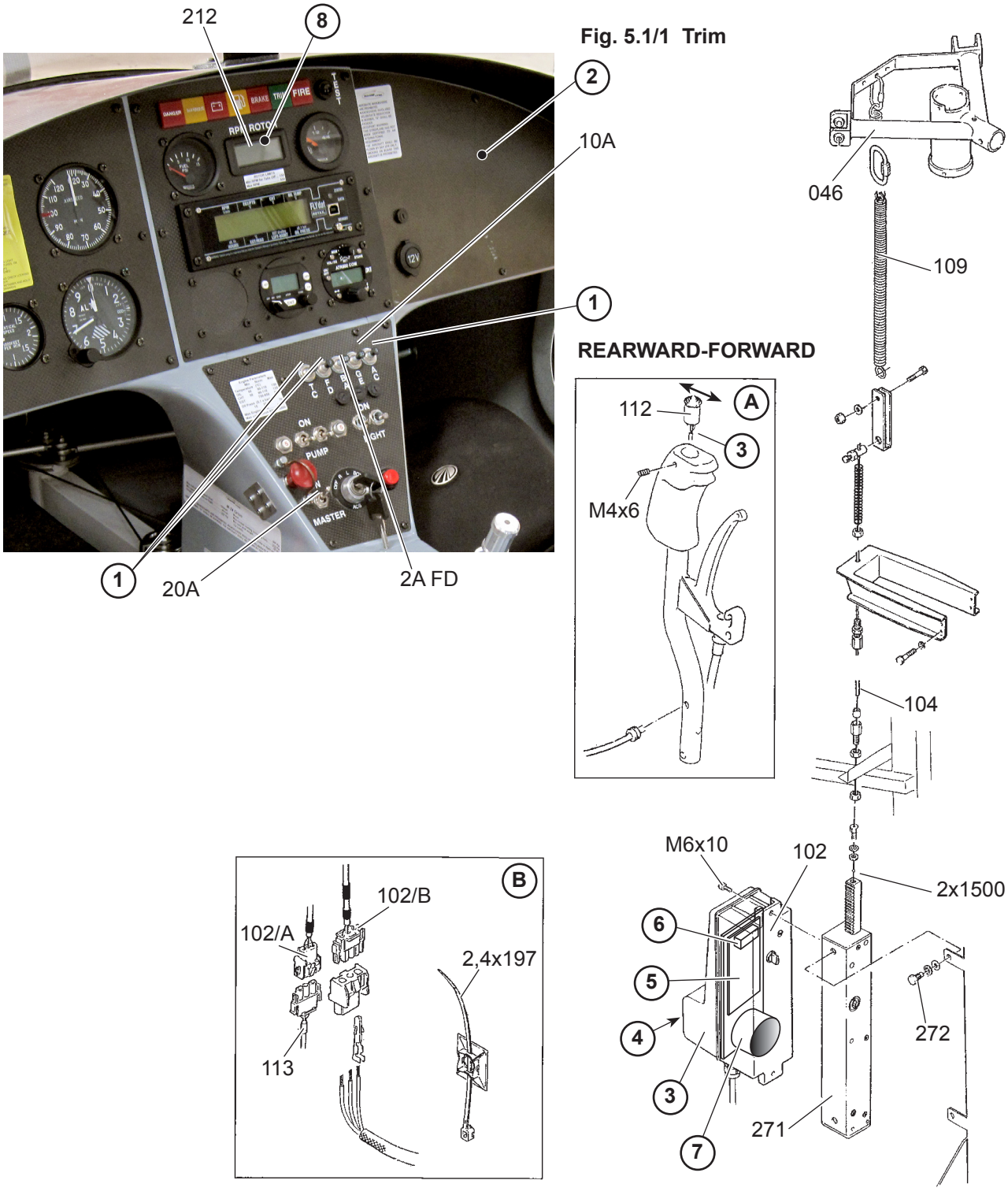


Fig. 5.1/1 Trim

f. Verify the freedom of movement of the rack pn271.

1. Loosen the fixing bolts M5x10 that fix the actuator to the rack pn271 and remove the trim actuator pn102.
2. Verify the freedom of movement of the rack pn271, moving it by hand. If the movement has some hindrance, check that the bolts pn272 that fix the rack pn271 do not interfere with the movement of the rack itself.
3. If the problem is not solved, the rack pn271 will need replacement.

g. Verify the continuity of the wiring of the actuator's power supply connector pn115.

If none of the above mentioned operations solve the problem, replace the actuator pn102 or the unit board. Therefore, proceed as described in paragraph 5.1.3.

5.1.3 REPLACEMENT OF TRIM UNIT BOARD (see fig. 5.1/2)

Before starting, verify that the engine's ignition key and push-button are in OFF position and that all the breakers are pulled.

1. Open engine inspection hatches.
2. Remove the power supply connectors pn102/A and 102/B, and the trim control connectors pn115.

3. Loosen the socket head screws M5x10 and remove the electric actuator pn102.
4. Remove the actuator's cover (3), unscrewing the four socket head screws (4) that fix it.

In this way it is possible to access the trim management unit board (5). Proceed as follows:
1. Gently lift the unit board (5) so to access the terminal board (6) more easily and loosen the terminals so as to extract the cables.

2. Extract the engine power supply connector (7) (black and red wires) so that the unit board is completely free.
3. Reconnect the engine power supply connector (7) to the new unit board supplied by Magni Gyro.

4. Re-insert the six numbered wires in the terminal board, in progressive order as per drawing:

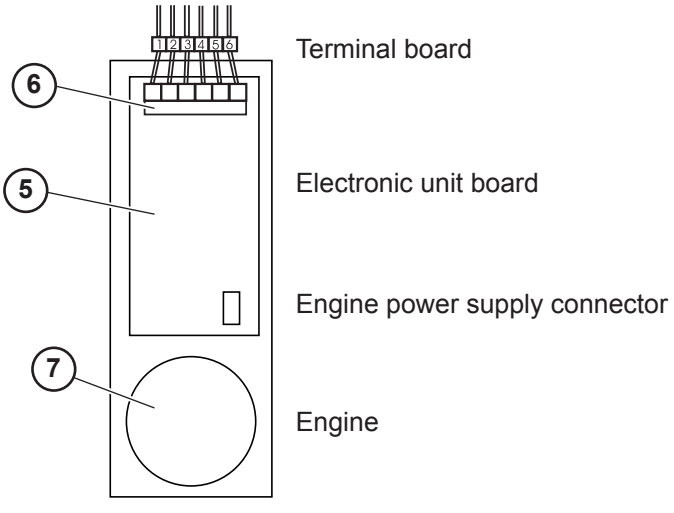


Fig. 5.1/2 Electronic unit board

Complete the operation as follows:
1. Place the unit board (5) in its original position.

2. Put the actuator's pn102 cover (3) back in its original position, taking care not to damage the numbered wires.
3. Tighten the cover fixing screws (4).

4. Reposition the actuator pn102 in its seat and fix it to the rack pn271 with the bolts M6x10.
5. Insert the power supply connectors pn115 and trim control connectors pn113.
6. Close inspection hatches.

5.2 ROTOR TACHOMETER READING ANOMALIES (see fig. 5.1/3)

Reading error of the rotor tachometer pn431.

5.2.1 UNSTEADY READING ANOMALY

Unsteady reading, non progressive and uneven reading of the rotor rpm gauge.
Presence of anomalous points on the display (8, fig.5.1/1).

Actions
Inspect and clean the rotor rpm sensor pn238. Ensure the distance between the sensor pn238 and the notched gear pn061 is within the tolerances (9).
Ensure correct tightening and positioning of the rotor revolutions sensor pn238.

Procedure
The sensor pn238 must always be kept clean.
Grease present on the sensor can noticeably reduce its precision in giving the correct rotor r.p.m. reading.

This kind of problem is likely to happen after the first few hours of use of the gyroplane, if the ring gear pn061 has been over-greased.

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Clean the sensor pn238 using some paper and passing it between the sensor and the notched gear so as to remove residual grease and dirtiness.

3. Verify the distance between the sensor pn238 and the notched gear pn061, which must be within the following range: 1,0 mm +0,4 -0,4. If the distance is out-of-range, remove or insert washers (5mm diameter) so as to take the distance to an acceptable value.

4. Verify the correct position of the sensor versus the teeth of the notched gear. If necessary, position (10) it correctly, following the indications given in the diagram.

5. Check the correct tightening of the bolt that fixes the sensor to the rotor head.
6. Carry out an operational test..

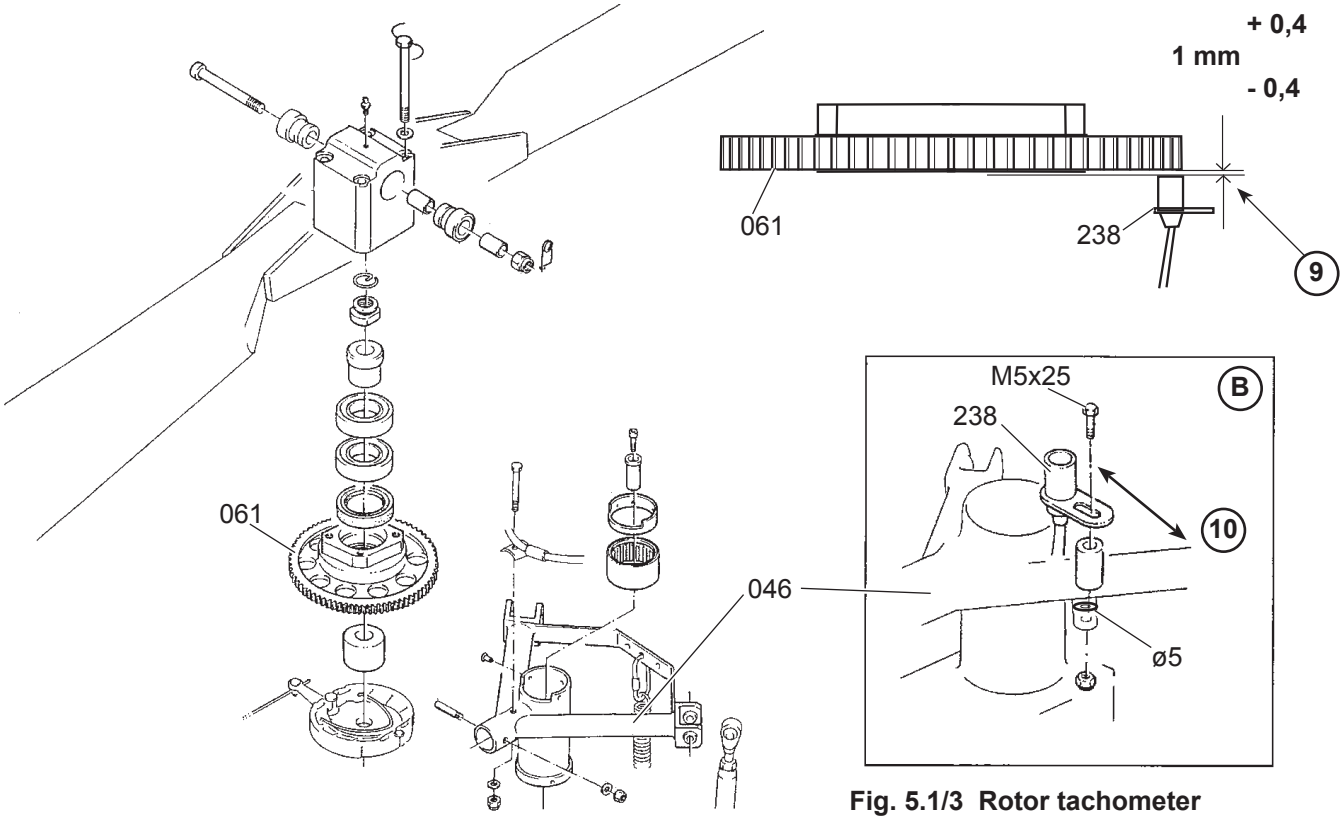


Fig. 5.1/3 Rotor tachometer

If the procedure above does not solve the problem, the next step is to check the tightness of the connectors on the back of the rotor tachometer instrument (8, fig. 5.1/1)

If the above checks do not solve the problem then firstly replace rotor sensor then tachometer.

5.2.2 OPERATION ANOMALY (see fig. 5.1/1)

The display stays black and gives no indication.

Actions
Make sure the MASTER switch (20A) is in the ON position and the breaker 2 A FD is switched ON.
Check the tightness of the connectors on the back of the instrument.
Verify the continuity of the power supply wires of the rotor tachometer instrument.
If the above checks do not solve the problem then replace rotor tachometer.

5.3 ROTOR VIBRATIONS (see fig. 5.3/1)

It is important to keep the rotor vibrations felt via the controls and through the airframe within acceptable limits. This contributes to the maintenance of the gyroplane. The vibration frequencies should remain similar to those found during flight testing and adjustments conducted by the manufacturer.

Each gyroplane can show different types of vibrations, characterized by different amplitude and frequency, according to load, speed and rotor assembly.

The pilot must evaluate the vibration of the controls. (S)he may find that the vibrations are getting worse with time. Prior to any adjustment, the vibrations must be checked, during a scheduled or special inspection, by a pilot approved by the manufacturer.
The first step towards the solution of the problem is to identify the type of vibration so as to define the type of intervention needed and eliminate the problem more easily.

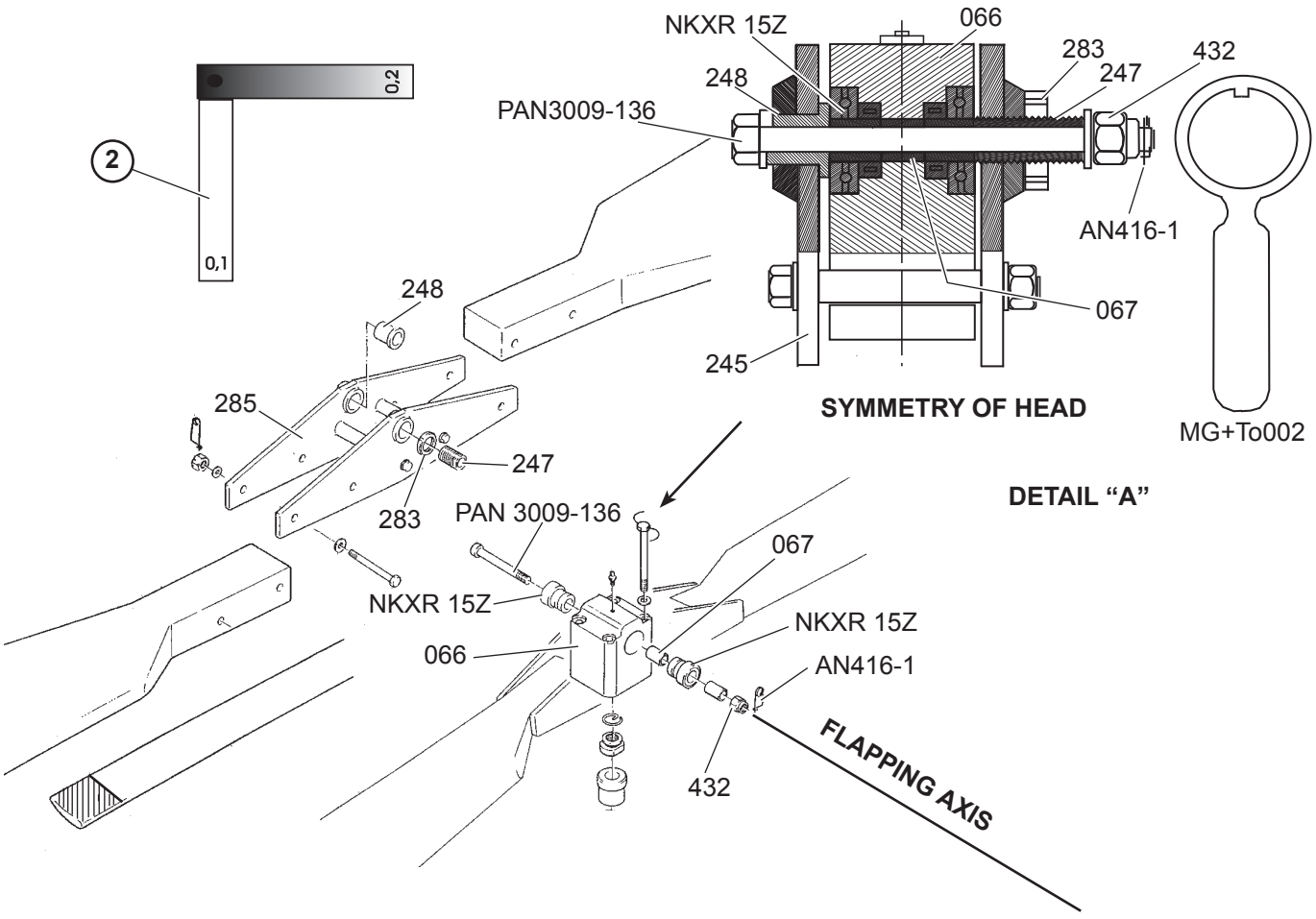
Lateral vibrations
The control stick shakes laterally (left and right).

Longitudinal vibrations
The control stick shakes longitudinally (pitch up and down)
Divergent vibrations

5.3.1 LATERAL VIBRATIONS

Lateral vibrations with constant frequency and amplitude can be smoothened by adjusting the threaded bushing pn247 (loose the lock nut pn283 first to move the threaded bushing pn247). In fact, screwing the threaded bushing in or out makes it possible to offset the hubbar pn245 versus the head pn066 of the rotor head. **But, if the threaded bush has not been tampered or if the lock nut is not loose, it is better to avoid this intervention.**

Fig. 5.3/1 Rotor vibrations



5.3.2 LONGITUDINAL VIBRATIONS

Longitudinal movement of the control stick (nose up and nose down) can be smoothened adjusting the tips of the rotor blades. In particular, it is possible to make the blade tips heavier by laying some tape (1) on the tip along the blade profile. **This should not be done unless the blades have visibly suffered much damage, such as removal of material and consequent alteration of weight and of balance of the set.**

5.3.3 DIVERGENT VIBRATIONS

When flying, it may happen that the pilot feels a non constant and divergent vibration when he lightens his grip on the stick. These vibrations can be considerably smoothened by following the procedure of paragraph 3.7 “Frictioning of controls”.

NOTE:
The above mentioned information has to be considered purely indicative as each rotor may have a different reaction to adjusting procedures.

5.3.4 REDUCTION OF VIBRATIONS

If the pilot feels an increase of vibrations, the following checks are required:
Check the correct tightening of the lock nut pn283 on the threaded bushing pn247.
Check the tightening of the control joint bolts (see paragraph 3.7 “Stiffening of controls”).

5.3.5 CHECK OF CORRECT TIGHTENING OF LOCK NUT pn283 ON THREADED BUSHING pn247

A slight loosening of the lock nut pn283 might cause high amplitude vibrations on the control stick, possibly with vertical vibrations of the gyroplane due to the anomalous misalignment of the hubbar pn245 with the head pn066.

Checking the tightening of the lock nut pn283 must be done using the adequate tool MG TO002 and checking the presence of the marking.
If the tightening of the lock nut pn283 is found to be incorrect, then proceed as follows:

1. Before starting verify that the engine’s ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Tighten or release the threaded bushing pn247 to center the hubbar pn245 with the rotor head (see DETAIL “A”).
3. Tighten the lock nut pn283.
4. Use a feeler gauge (2) to check if the head pn066 is symmetrical with the hubbar pn245.
5. Flight test the gyroplane for an evaluation of the vibrations.

If the rotor is not smooth enough because of an excess of vibrations, then proceed with the adjustment of the flapping axis:

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Loosen the lock nut pn283.
3. Rotate the threaded bushing pn247 a quarter of a turn (90°) clockwise or counter-clockwise.
4. Tighten the lock nut pn283.
5. Flight test the gyroplane for an evaluation of the vibrations.
   Repeat this adjusting of the threaded bushing pn247 several times, turning it clockwise or anticlockwise until reaching the best compromise on vibrations. It is very important to move the threaded bushing pn247 only 90° at a time, for a maximum displacement of one turn and a half (1,5 mm on the pitch 20x1 of the threaded bushing) from central position.

6. Once a satisfying condition has been achieved, mark the position of both the lock nut and threaded bushing with the special marking paint.

5.4 PREROTATION SYSTEM ENGAGING ANOMALY (see fig. 5.4/1)

If the prerotation system does not get engaged, an inspection is required to identify the anomaly generating the problem.
According to the anomaly found, proceed as described below.

5.4.1 ANOMALY: NO POWER TRANSMISSION, NO SYSTEM ENGAGING

Pulling the control lever pn415 during prerotation, the system does not get engaged. No strange noises are heard nor anomalous vibrations are felt.
It is quite likely that there is no power transmission between the propeller pn125 and the belts pnA28. The belts pnA28 are not driven or their movement is not sufficient to engage the system.

a. Verification of the prerotation control line

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Make sure the prerotation control cable pn1,5x3.900 is not damaged.
3. If the cable is broken, replace it as explained in paragraph 3.9.4.

b. Verification of the tension of the prerotation belts

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Pull the prerotation control lever pn415 until it reaches its stop.

3. Once this condition is reached, inspect the tension of the belts pnA28 on the relative pulleys pn124 and (1).

5.4.2 ANOMALY: POWER TRANSMISSION OK, SYSTEM NOT ENGAGING

During prerotation the system does not engage when pulling the control lever pn415. Presence of anomalous vibrations.
The flexible shaft's outer sheath pn119 gets overheated.
In this situation it is very likely that the flexible shaft pn118 is rotating even if the system does not work.

a. Verification of the flexible shaft's entireness

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Move the pulley (1) of the prerotation assembly by hand.
   This movement of the pulley (1) should correspond to the movement of the Bendix gear (2).

If the gear (2) does not move, go to next step.

Otherwise, go to verification b.

3. Inspect the flexible shaft pn118 as explained in paragraph 3.1.2.
4. Replace it the flexible shaft pn118 if it is broken.

b. Verification of the Bendix gear

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Inspect the Bendix gear, as explained in paragraph 3.6.2.

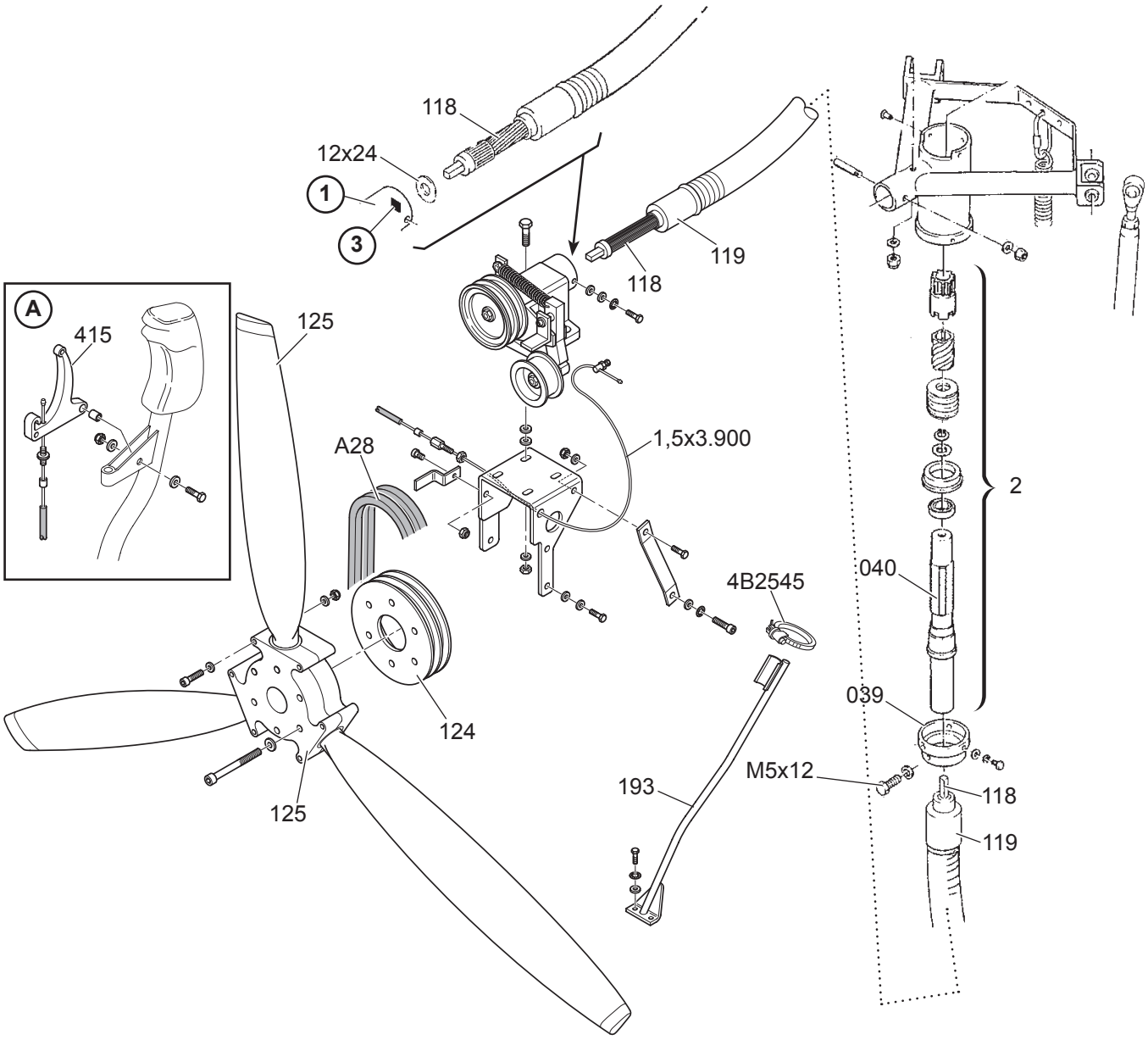
5.4.3 ANOMALY: FLEXIBLE SHAFT NOT ENGAGING, SYSTEM NOT ENGAGING

During prerotation the system does not engage when pulling the control lever pn415. Anomalous metallic noises can be heard at regular intermittency. The flexible shaft's sheath pn119 does not get overheated.
In this case, it is very likely that the flexible shaft pn118 is rotating, but that it does not get engaged in the square section ending of the spline shaft pn040 of the Bendix gear.

a. Verification of the spline shaft pn040

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Loosen and remove the two bolts M6x16 first, then remove the flexible shaft's sheath pn119 from the cup pn039.

Fig. 5.4/1 Prerotation system



3. Extract the flexible shaft pn118 from the seat of the spline shaft pn040.
4. Inspect the shaft pn040 and check the integrity of the square section socket and of the square section ending of the flexible shaft pn118.
5. If the spline shaft pn040 is damaged, replace it as explained in paragraph 3.6.3.

b. Check of the square section ending of the spline shaft pn118

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Remove the flexible shaft's sheath pn119 from the cup pn039, unscrewing and removing the two bolts M6x16.

3. Extract the flexible shaft pn118 from the square seat (3) of the spline shaft pn040.
4. Inspect the square section ending of the flexible shaft pn118 and verify its integrity. If some damage is found, it is possible to shim the flexible shaft pn118 with washers on the lower square ending (3) so as to guarantee an efficient mesh. Proceed with the following steps:

5. Unscrew all the screws M4x12 that fix the engine fairings.
6. Remove engine fairings.
7. Loosen the clamps pn4B-25-45 that fix the sheath of the flexible shaft pn119 to the support pn193.

8. Loosen both bolts M6x16 and remove the sheath of the flexible shaft pn119 from the prerotation assembly.
9. Extract the flexible shaft pn118 from the prerotation assembly (1).
10. Fit two washers12x24 to the square section ending of the flexible shaft pn118. This shimming allows the flexible shaft pn118 to work more on the spline shaft pn040, thus allowing the transmission of power.

11. Insert the flexible shaft pn118 in the square seat (3) of the prerotation assembly (1).
12. Fix the sheath pn119 to the prerotation assembly (1).
13. Insert the flexible shaft pn118 in the seat of the shaft pn040 of the Bowden gear (2).
14. Tighten the two bolts M6x16 to fix the sheath pn119 of the flexible shaft pn118 to the cup pn039.

15. Tighten the clamps pn4B-25-45 that fix the sheath pn119.
16. Position engine fairings and fix them tightening the M4x12 screws.

5.5 CHECK PROCEDURE AFTER SUSPECTED HEAVY LANDING

⚠ WARNING DANGER:

If the gyroplane has been subject to a hard landing or even only suspected of having had a hard landing, then it must not be flown again until it has been inspected and cleared as fit for further flight.
An entry to this effect must be put in the logbook.

When inspecting for damage it must be remembered that the damage may not just show at the point of impact, but may be referred to another point of the gyroplane.

All the controls and components of the gyroplane must be examined for distortion or damage. Particular attention should be paid to the following items:

1. Nosewheel fork – check for straightness and free running
2. Main Landing Gear – Check for damage or fatigue (cracks and deformation) to both the composite bow and the attachment structure.
3. Mainframe – Check for damage, twisting, buckling or cracks, especially at welded areas of the engine mounting frame and mast structure.
4. Fuel Tank – Check attachment points for signs of cracking or deformation.

Any distortion of the airframe, cracked welds, jammed controls, bent rods, bent rod ends, etc. make the gyroplane unfit to fly and must be referred to Magni Gyro for advice and classification of damage.

Any damaged part removed from the gyroplane must be either destroyed or returned to Magni Gyro.

WARNING:
Independent inspection of the gyroplane prior to returning it to flight, done by a qualified engineer or inspector, and a statement in the logbook to back it up is recommended policy.

5.6 CHECK PROCEDURE AFTER SUSPECTED DAMAGE CAUSED BY FOREIGN OBJECT

WARNING DANGER:
This damage will predominantly affect the rotating parts of the aircraft, that is either the rotor blades or propeller. In both cases the components must be withdrawn from service until checked and either replaced or certified as fit for return to further use. For engineering advice on the rotor blades the owner should contact Magni Gyro or follow the instructions given in the paragraph " Evaluation of damage to rotor blades". For the propeller, he should contact either Magni Gyro or the manufacturer as per the aircraft documents.

5.7 EVALUATION OF DAMAGE TO ROTOR BLADES (see fig. 5.7/1)

The Magni Gyro rotor blades do not need any scheduled maintenance. Their useful life is approximately 2.500 hours.
However, superficial damage may occur during flight, as the blades may be hit by foreign objects, or while hangaring the gyroplane, etc.
Some simple indications on how to evaluate a damage and how to intervene are given below.

5.7.1 DAMAGE TO TRAILING EDGE

The trailing edge is the most delicate part of the Magni Gyro rotor, because of the reduced thickness which is extremely efficient from an aerodynamic point of view, but at the same time most exposed to damage during garaging, transport and installation.
The following diagram shows the relation existing between the deepness (on the chord) and the length (on the diameter) of the damage on the blade's trailing edge.

Measure the maximum dimensions of the damage and transfer them to the diagram:

1. If the point found is located in the lowest part of the diagram, the gyroplane can continue to fly. Repair can be done during the first inspection of scheduled maintenance.

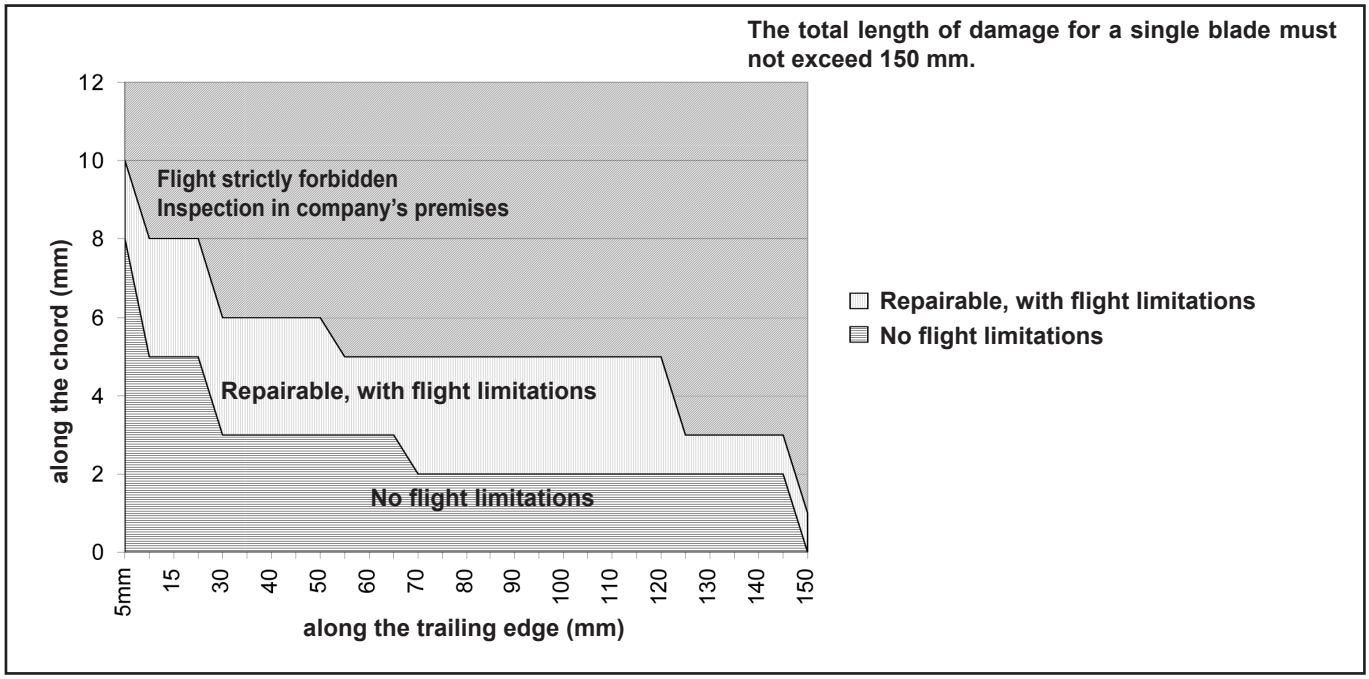
2. If the point found is located in the middle part of the diagram, flying remains possible only if no anomalous vibration occurs. Repair must be done as soon as possible by engineers competent with composite materials, under the supervision of either Magni Gyro personnel or personnel authorized by Magni Gyro.

WARNING DANGER:

3. If the point found is located in the upper part of the diagram, the gyroplane can not fly.

The rotor with its two blades and its hubbar pn245 (for 27 ft) or pn285 (for 28 ft) must be completely removed from the gyroplane, according to the procedure indicated in paragraph 6.3, and sent to Magni Gyro for control, repair or replacement.

Fig. 5.7/1 Repair of rotor edge



5.7.2 DAMAGE TO LEADING EDGE

The leading edge corresponds to the very strong blade spar. It withstands unexpected impacts very well.
The efficacy of the gyroplane can only be limited by debonding of the surface covering along the leading edge or by damage more than 5 mm deep.
In this case, the rotor with its two blades and its hub pn245 (for 27 ft) or pn285 (for 28 ft) must be completely removed from the gyroplane, according to the procedure indicated in paragraph 6.3, and sent to Magni Gyro for inspection, repair or replacement.

5.7.3 DAMAGE ALONG BLADE'S FACE OR BACK

WARNING DANGER:

It is strictly forbidden to use the gyroplane in case of damage along the rotor blade's top and/or bottom, especially if the covering shows signs of abrasion or unraveling on the fiber glass covering or if part of the core is torn.

In this case, the rotor with its two blades and its hub pn245 (for 27 ft) or pn285 (for 28 ft) must be completely removed from the gyroplane, according to the procedure indicated in paragraph 6.3, and sent to Magni Gyro for control, repair or replacement.

WARNING DANGER:

Flight is forbidden in case of debonding of the covering of the blade's face or back, of deformation and anomalous swelling.

Any repainting or repair of the blades must be communicated to Magni Gyro and will only be allowed under the supervision of Magni Gyro authorized engineers.

After this action, the gyroplane rotor blades must be balanced as before it may fly again.

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SECTION 6
TRANSPORTATION AND STORAGE

6.1 ROTOR RIGGING AND DERIGGING (see fig. 6.1/1)

a. Introduction

The rotor assembly of the M24 gyroplane has been designed to offer the best compromise between reliability and ease of handling during fitting of the rotor to the head and removal from it.
Although the operation itself is quite easy, the procedures of rotor installation and removal must be followed very carefully to avoid problems and damage.

Special care must be given to the trailing edge of the rotor blades, being this the more delicate and fragile part of the rotor.

b. Rotor installation procedure

The rotor blades are produced by Magni Gyro according to a very high production standard. They have demonstrated excellent characteristics during flight. Prior to flight tests, the blades (1) are paired and balanced; The blades must remain in the same pair as delivered from the factory.

The pair of blades is then flight tested together with the hubbar pn245 (or pn285 for 28 ft. rotors).
The pairing between blade and hubbar is very important. Each blade (1) is marked with coloured adhesive markings (2) (yellow, blue or red) to allow the correct positioning of each blade on the hubbar. The colour of the marking on the blade obviously matches the side marked with the same colour (see figure).

Fig. 6.1/1 Rotor rigging

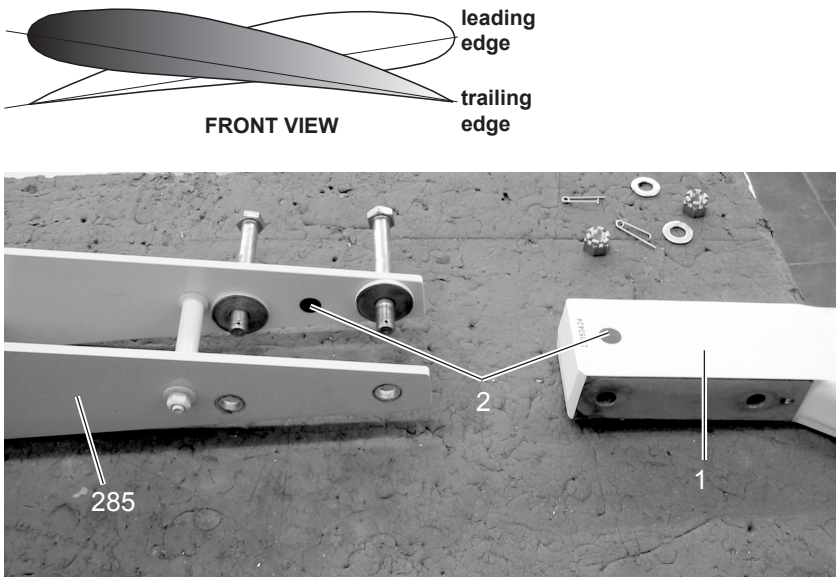
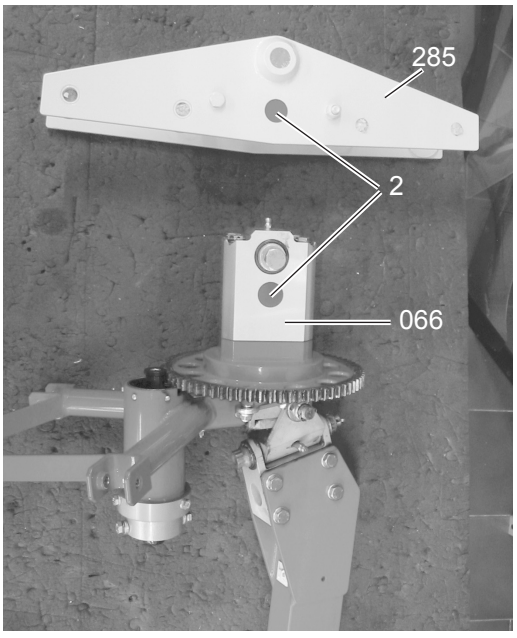


Fig. 6.1/2



c. Rotor rigging
(see fig. 6.1/2)

1. Prepare the hubbar pn245 (or pn285) by laying a thin layer of grease (1) on the unpainted areas of contact between the hubbar and the blade, and on the floating bush pn248.
2. Position the blades on three sturdy supports so that both roots are on the central support and the tips are on the outer supports.

WARNING:
To avoid damage to the blade face or to the trailing edge (2), we strongly recommend covering the supports with a soft or anti-scratch laying.

3. Fit the hub-bar to one blade in accordance with the coloured markings and insert the two bolts AN8-41A; remember to fit the washer pn12x24 under the head of the bolt that have to be on the leading edge side (3) of the blade they fix.

WARNING DANGER:
If the force needed to insert the bolts is more than normal manual force, STOP immediately and find out the cause.
Usually this indicates that something is wrong and needs to be checked prior to carrying on.

4. With the help of another operator fit the second blade to the hubbar, always checking the exact matching of the markings (4).
5. Lift the tip of the blade to help lining up the fixing holes of the blade with those of the hubbar.
6. Insert the bolts AN 8-41A with the washer pn12x24 under the head of the bolt that have to be on the leading edge side of the blade they fix.
7. Rotate the bolts AN 8-41A so that the hole for the safety pin AN416-1 is in vertical position.
8. Tighten the bolts AN 8-41A with the nuts pnAN310-8 (20 ft-lbs); ensure the presence of the washer pn12x24 under the nut.
9. Insert the safety pins pnAN416-1.

Both the hubbar pn245 and the aluminum rotor head pn066 are marked with a red adhesive marking. It is very important to match the markings, so as to avoid anomalous vibrations (see fig. 6.1/1).

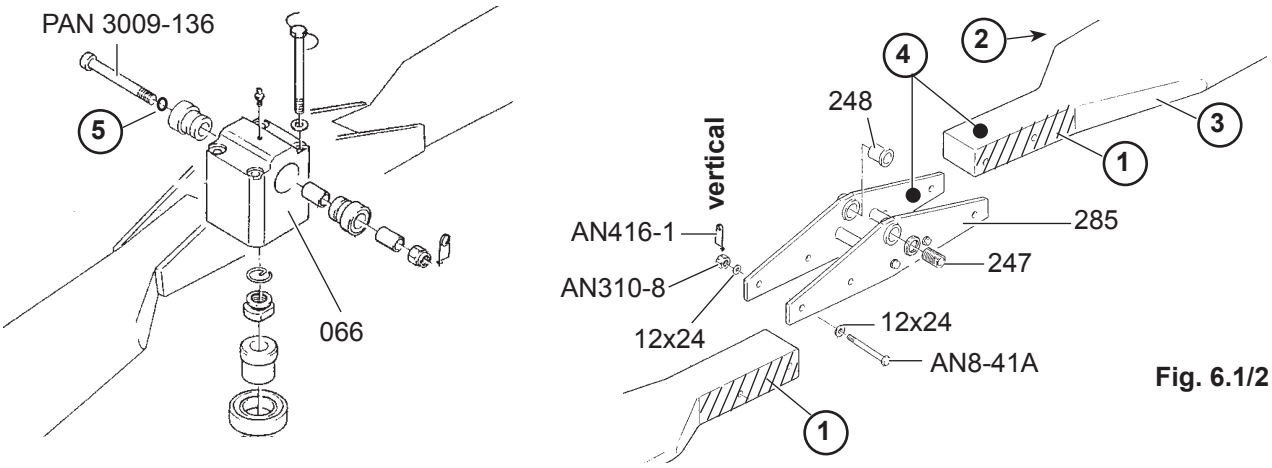


Fig. 6.1/2

10. Lift the rotor with the help of other operators or with a hoist and guide it slowly onto the rotor head, matching the markings.

11. Slowly lower the rotor on the head so as to line up the bushes pn247 and 248 of the hubbar with the flapping bearings.

12. Insert the bolt PAN 3009-136, ensuring the presence of a washer (5) under the head of the bolt, thus making the matching of the rotor with the head easier.
13. Tighten the PAN bolt as per the instructions given below.

6.2 CORRECT TIGHTENING OF BOLT PAN 3009-136 (see fig. 6.1/3)

⚠ WARNING DANGER:

The correct tightening of the bolt PAN 3009-136 is of vital importance for the safety of flight.

It is important that the operator understands the importance of this operation (installation and removal of the bolt PAN 3009-136) and follows carefully the instructions and indications given by Magni Gyro.

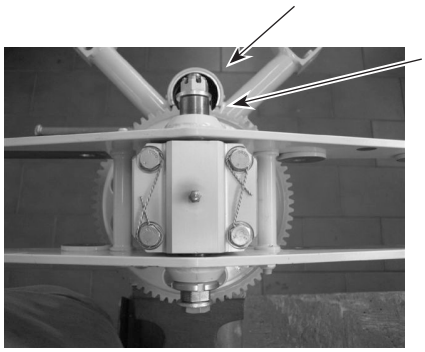
It is impossible to refer to a precise value for the tightening of this bolt due to the low strength required.
The operator must rely on the rotation applied to the nut pn12PCR106, after this nut has put the bushes pn248 and pn247 against the bearings pnNKXR 15Z of the aluminum head pn066.
Follow the procedure described below:

1. Tighten the bolt PAN 3009-136 until the bush pn248 touches the bearings of the head pnNKXR 15Z; stop tightening when the play between the bushes pn248 and 247 and the washers pn12x24 disappears and it becomes **impossible for the washers to rotate on the bolt** pn PAN 3009-136.

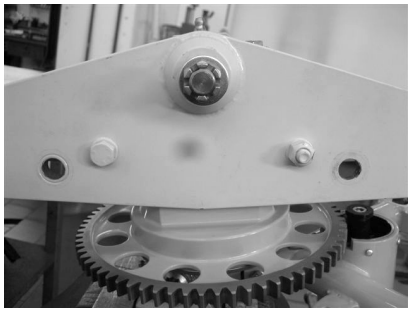
2. Rotate the bolt PAN 3009-136 together with its nut and put the bolt 12 PCR 106 in tightening position as shown in the figure. Note that the superior face (hexagon) of the nut pn12 PCR106 is horizontal and that the violet marking is “anchored” to the rotor hubbar.

3. Tighten the bolt by keeping it in place and turning the nut up to a maximum value of 30°. Simply follow figure 6.1/3: this will permit the operator a correct tightening without needing any dynamometric measurement.

Check rotation of washers

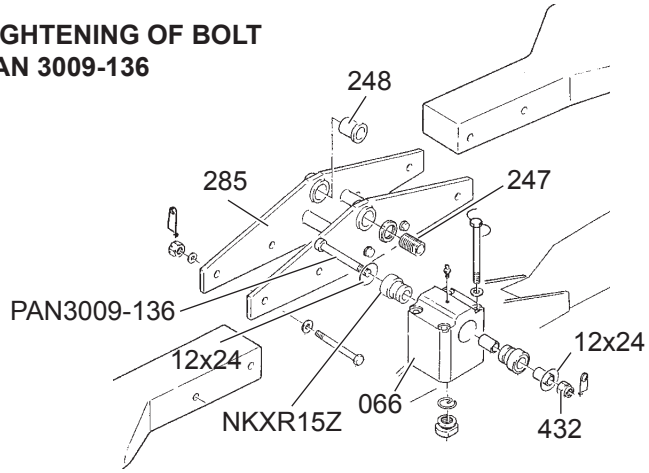


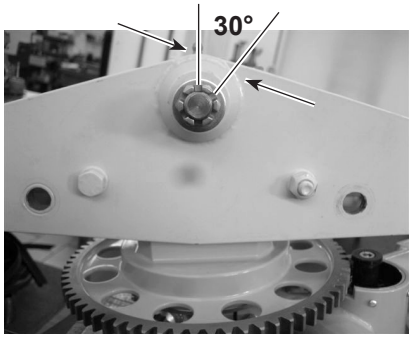
Bush touching the bearingwashers



STARTING POSITION

TIGHTENING OF BOLT PAN 3009-136





MAX. TIGHTENING

Fig. 6.1/3 Check rotation of washers

⚠ WARNING DANGER:

A low tightening may generate some play between the hubbar pn245 and the aluminum head pn066; in flight this play will generate vibrations that will affect the entire control chain. Instead, too much tightening will generate stress on the bearings NKXR15Z supporting the flapping movement, thus leading to the breaking of their outer cage.

Therefore it is very important to remember and fully understand the importance of the correct tightening of the rotor head bolt. The operator must strictly comply with the procedures listed above. If clarification is needed or if there are doubts, contact Magni Gyro or Magni dealers!

6.3 ROTOR DERIGGING (see fig. 6.1/4)

The rotor disassembly consists in a few easy steps.

Notwithstanding the easiness of this operation, it must be done with the greatest care. An adequate area must be prepared to rest the rotor once it has been removed from the gyroplane.
To avoid damages to the blades, it is strongly recommended to use stable platforms on which to disassemble the blades.
Furthermore, it is advisable to use anti-scratch coverings on the surfaces to avoid superficial damage, scratches and abrasion of the blades.

1. Before starting verify that the engine's ignition key and push-button are in OFF position and that all the breakers are switched OFF.
2. Remove the safety pin pnAN 416-1 from the bolt PAN 3009-136 of the flapping axis.

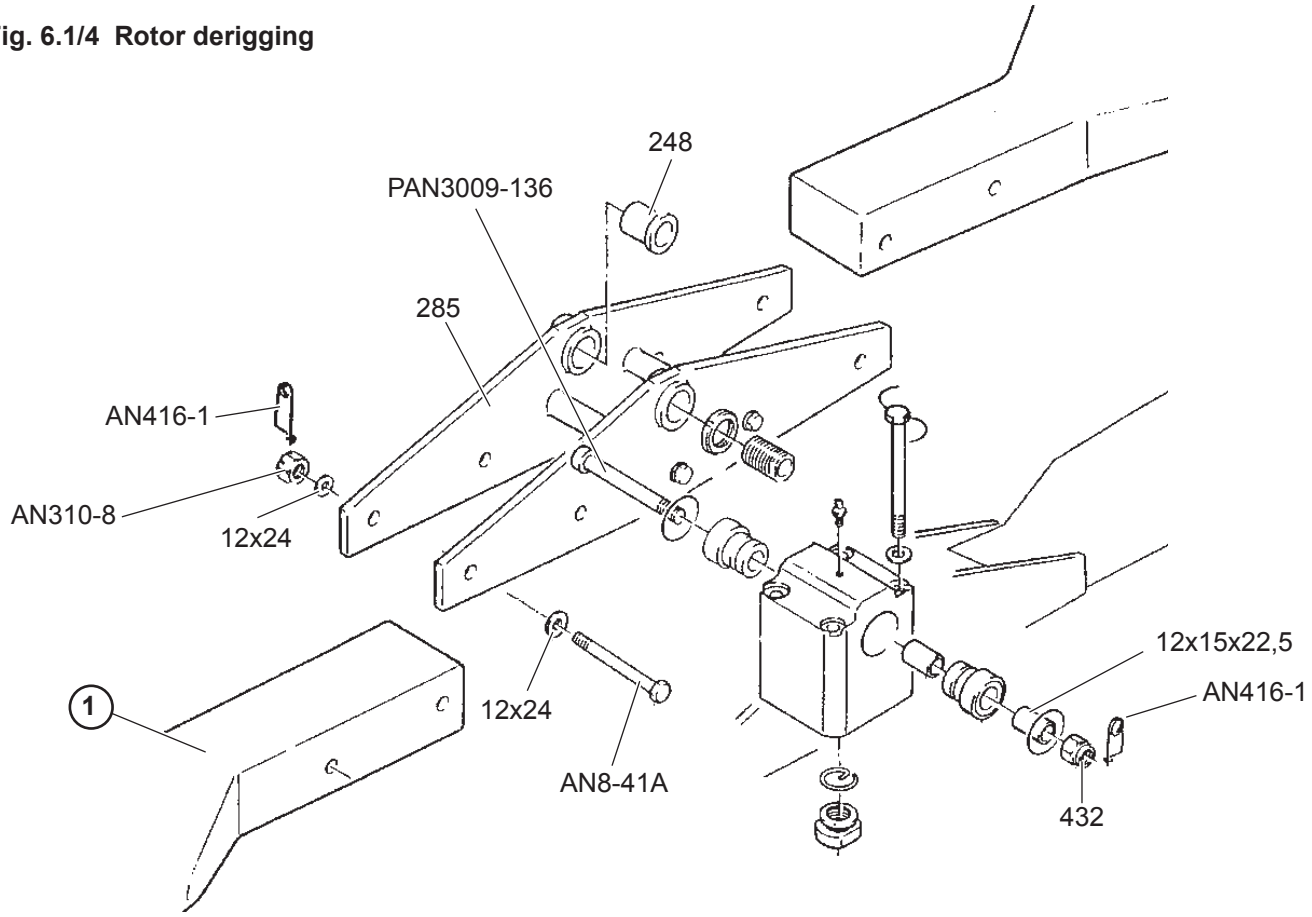
3. Loosen and remove the nut 12PCR106 and its washers.
4. Lift the rotor with the help of other operators or with a hoist (see fig. 3.5/1), so as to lighten the load on the bolt PAN 3009-136 and make its extraction easier.

5. Extract the bolt PAN 3009-136 by hand or, if necessary, use a soft rubber hammer.
6. Remove the rotor from the head and place it on the already prepared stable platforms.
7. Before starting the disassembly of the blades form the hubbar pn245 (or pn285 for 28 ft rotor), check that all the adhesive markings are still there.

8. Remove the safety pins pnAN416-1 from one blade (1).
9. Loosen and remove the two bolts AN310-8 that fix the blade.
10. Carefully lift the blade tip with the help of another operator, so as to reduce the load of the blade (1) on the bolts AN8-41A and make their extraction easier.

11. Extract the bolts AN8-41A by hand or, if necessary, use a soft rubber hammer.

Fig. 6.1/4 Rotor derigging



NOTE:
A gentle vertical oscillation of the blade tip induced by another operator may help the extraction of the bolts AN8-41A.

12. Extract the blade from the hubbar pn245 and carefully place it in a safe and protected area.
13. If packing is needed, insert the bolts pnAN8-41A extracted so far in their seats in the hubbar; thereby position the washers pn12x24, the nuts pnAN310-8 and the safety pins pnAN416-1 correctly.
14. Use a cable tie (ty-rap) to block any movement of the floating bush pn248 in relation with the hubbar pn245.
15. It is recommended to fix the bolt PAN 3009-136 with its nut pn12PRC 106 and safety pin pnAN 416-1 along the flapping axis of the rotor head, so as to avoid a possible loss of the bushes pn12x15x22,5 from the flapping bearings pnNKXR 15Z.

6.4 PROTECTION OF ROTOR BLADES

The rotor blades supplied by Magni Gyro must be handled with care and attention during all the following operations: rigging and derigging, garaging of the gyroplane and possible transportation.

WARNING DANGER:
Due to the importance of the rotor, the operator should keep in mind the following instructions given by Magni Gyro whenever he intends to execute one of the operations listed above.

1. Be sure that you have a stable surface or stable platforms to use as a base during assembly or disassembly of the blades.
2. Be particularly careful when installing the rotor on the gyroplane head not to touch any obstacle with the blades (e.g. walls, doors, gates, etc.), especially along the very fragile trailing edge.

3. Be sure there are enough operators helping you (at least three) or use a hoist (see fig. 3.5/1) to lift the rotor to assemble it on the gyroplane rotor head.
4. When moving the gyroplane to the hangar, move it carefully and pay attention not to damage the blades as noted in point 3.

NOTE:
When hangaring the gyroplane, the rotor brakemust always be ON so as to avoid rotor movements independent from the fuselage of the gyroplane.

5. Never tie the blades when moving the gyroplane to the hangar or keeping it there, either to keep them in horizontal position or to avoid rotation. This could deform the blades in the long term.

6. If you wish to protect the blades while they are assembled on the gyroplane, use only a type of material which lets the air pass through freely (no plastic, nor pluriball (plastic material with bubbles), etc.).
7. Never put any protective material on the blades if these are not perfectly dry!

8. For transportation, wrap the blades with some protective material (the best solution is to use a suitable box, available from Magni Gyro) that prevents rubbing between the blades or against other objects present on the transportation means.

9. For transportation protect the blades with materials that allow free passage of air.
10. Never pack the blades if they are wet or moistened (by rain, dew or after cleaning them without drying them well).

11. Never leave the blades packed for long. Even the condensation that can develop in the packing can slightly damage the blades.
12. It is better to unpack the blades as soon as their destination is reached, especially if the packing has become wet (rain, damp roads or damp conditions) during transportation.

13. If you need to secure packed blades, pay special attention to the trailing edge. If necessary, protect it with cardboard before tightening the ropes or belts.
14. Never leave the blades tied up (on trailers or cars) for long, especially if exposed to high temperatures, (e.g. summer sunny days), as this could deformed the blades permanently.

6.5 TRANSPORTATION (see fig. 6.5/1)

If the gyroplane must be moved by road, then it is necessary to use a suitable trailer (1).
On no account must the aircraft be moved by road with the rotor blades (2) fitted.
The gyroplane is best secured by using ratchet straps or strong ropes (3) around the landing gear leaf spring (4) and anchoring them to the supports (5) on the trailer platform. This will prevent forward and rearward movements on the trailer.

An elevating platform (6) placed below the keel tube (as shown in the figure) or a support strut will prevent any vertical movement of the gyroplane and avoid undue loads on the front wheel.
Secure the rotor blades (7) to the platform (8) and protect them well against any potential damage. Follow the instructions given in paragraph 6.4 “Protection of rotor blades”.
Make sure that the trim is fully back (switch to the rear) so as to have the springs under tension and avoid them bouncing against the control rods.

Last, remove any loose object from inside the aircraft, that could move and/or get lost during transportation.

Before starting your road trip, verify that the trailer is in good working order and that it complies with the regulations in force in the country you are traveling in.

6.6 STORAGE RULES

For any period of inactivity of less than three months, please follow the rules described below to guarantee succesful storage.
Only storage in hangars well protected from rain and other atmospheric agents will keep the gyroplane in good condition.

1. Fill the fuel tank at least at 3/4 of its capacity. This will help avoid condensation.

2. Clean all the surfaces as indicated in SECTION 4 - CARE AND CLEANING.

3. In order to avoid damage to the air speed indicators, only special caps equipped with large breathers are allowed on the dynamic intake.

4. To avoid any intervention of either malicious persons or of curious and inexperienced persons, remove the keys from the control panel switch OFF all the breakers of the flight services.

Fig. 6.5/1 Transportation on trailer

5. Remove all the removable instruments from the instrument panel, including satellite navigators, twoway radios, etc.

6. Protect the gyroplane (at least the cockpit and engine) from dust and humidity with the special ventile cover supplied by Magni Gyro.

WARNING:
Do not put the cover on the gyroplane when the engine is still hot, as this could damage the engine cover and cause burning and scorching.

WARNING:
Any parking outside should only be occasional. Proceed as follows:
1. **Avoid leaving the gyroplane under the sun for lengthy periods.**
2. **If the gyroplane is exposed to the sun, cover the instrument panel with a reflecting cover.**
3. **In case of rain or of an overnight parking, cover the cockpit, engine and rotor head with the special ventile covers supplied by Magni Gyro, so as to protect the gyroplane from humidity.**

6.7 STORAGE RULES

For any extended period of inactivity (greater than 3 months), please follow the rules described below to guarantee a good maintenance of the gyroplane.

1. Disconnect the battery so as to avoid its discharge.
2. Empty the fuel tank completely.
3. Carry out engine storage procedures as per ROTAX manual.

4. Clean and polish all the surfaces well.
5. Coat all the metal parts with a water-repellent product (anticorrosive ACF-50 or equivalent).

6. If necessary, remove the engine and protect the rotor blades as per the indications given in paragraphs 6.3 - ROTOR DERIGGING and 6.4 - PRESERVATION OF ROTOR BLADES.
7. Protect the cockpit, engine and rotor head with the special ventile cover supplied by Magni Gyro.

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SECTION
INSPECTION CHECKLISTS

CL.1 PERMITTED VARIATIONS

1. Permitted variations may not be applied to applicable airworthiness life limitations, airworthiness directives or overhaul and test periods.
2. Permitted variations for tasks controlled by flying hours should not be understood to be a maintenance planning tool, but as an exceptional means to allow the operator to fly for a limited period of time until the required maintenance is performed.
3. Any application of a permitted variation to the maintenance cheek cycle period must be recorded in the appropriate log book(s) together with the reason for the variation by a person who is authorised to sign the log book entry for that particular check. Details of the permitted variation must be made visible to the pilot.
4. Permitted variations are not required to be deducted from the next scheduled check.

Tasks controlled by flying hours

	Maximum variation
25, 100, , 500, , 1000 Hours	10%

Tasks controlled on annual basis

	Maximum variation
Annual, 3 Years	None

CL.2 ENGINE STARTING

The engine must be started in accordance with reference to the latest applicable copy of the relevant Rotax Operators manual.

⚠ WARNING DANGER:

This manual must be read and fully understood before starting the engine. Failure to do so will lead to an extremely hazardous situation with great risk of injury or death.

Refer to the Magni Gyro Gyroplane Pilot Handbook before attempting an engine start sequence.

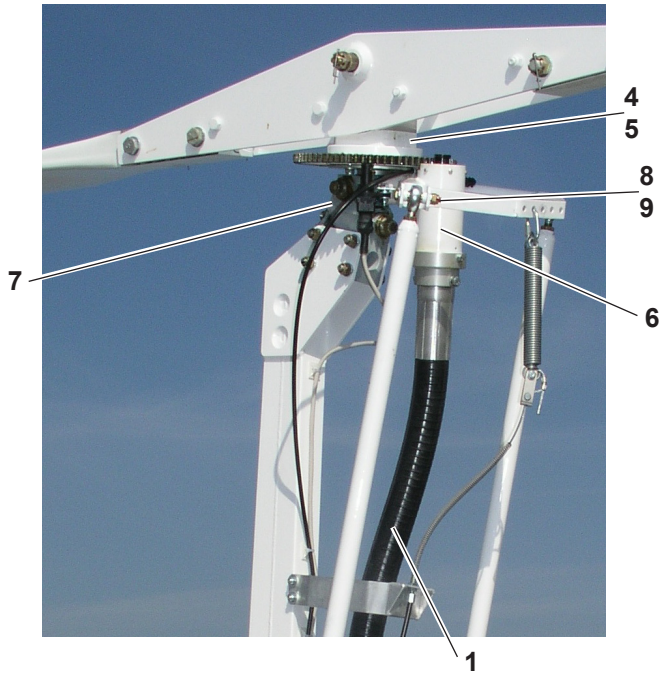
Once the engine is started and warmed up, carry out a full functional check of all the engine indicating and warning systems.and a functional check of the engine operation.

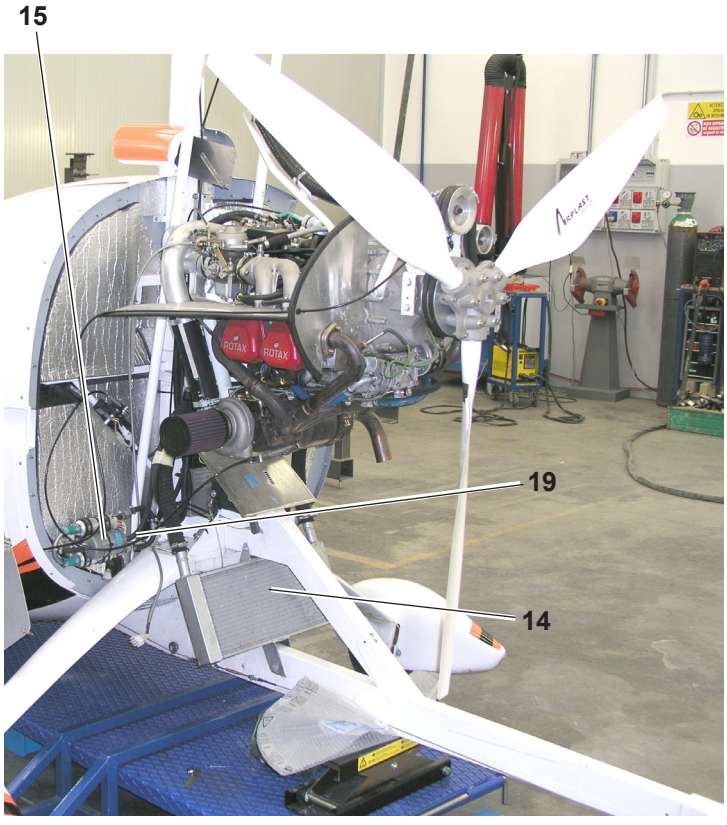
CL.3 ORDINARY MAINTENANCE SCHEDULE

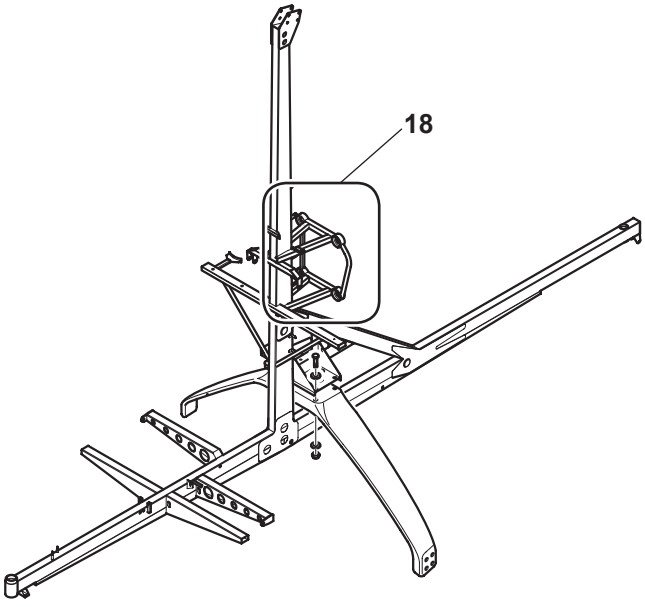
Correct maintenance of the gyroplane avoids problems and issues that can compromise the safety of flight operations. Magni Gyro strongly recommends complying with the published maintenance schedule.

WARNING:

In order to optimize maintenance operations, there are facsimile inspection forms attached to this manual. These forms list the sequence of the operations that need to be done and their frequency (hours/years).





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ROTAX
ROTAX
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FUEL LEVEL
FLYDAT
ROTOR TACHOMETER
LANDING LIGHT
FUEL PRESSURE
STROBE LIGHT
ROTOR RPM SENSOR
ELECTRONIC MODULE A
ELECTRONIC MODULE B
TRIM
EGT FRONT LFT
EGT FRONT RT
EGT REAR LFT
EGT REAR RT
FUEL LEVEL
OIL PRESSURE
OIL TEMP
CHT #2 TEMP
TRIM CONTROL
TO RADIO
TO TRASPONDER
TO GPS
IGNITION SWITCH
START BUTTON
MAIN PUMP SWITCH/BREAKER
AUX. PUMP SWITCH/BREAKER
FYDAT SWITCH
TCU SWITCH
MASTER RELAY
BATTERY SWITCH
SERVICES BREAKER
GENERATOR BREAKER
STROBE LIGHT BREAKER
LANDING LIGHT BREAKER
MASTER SWITCH
POWER SOCKET
PRIMARY BUS
FIRE DETECT MODULE
FIRE SENDER
FIRE SENDER
FUEL PRESSURE SENDER
AUX PUMP
MAIN PUMP
T C U
ELECTRIC STARTER
BATTERY 12V 18Ah
STARTER RELAY
CAPACITOR 22000mF/25V
REGULATOR RECTIFIER
INTEGRATED GENERATOR
ROTOR BRAKE
BATERY CHARGE LAMP
TRIM FWD LMT
FIRE DETECT LAMP
WARNING LAMP
CAUTION LAMP
ROTOR BRAKE LAMP
LOW FUEL WARNING LAMP
LOW FUEL LAMP TEST
+12V SECONDARY BUS
GND BUS

M24 C - 914UL
rel. 1.4

APPENDIX A

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