



025-00-24C M24C FLIGHT MANUAL, Issue E  
18 MAY 2011

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## 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 responsibility of the registered owner to insure that the amendments are incorporated in the Pilot Operating Handbook, that the superseded pages are removed and that the receipt form, enclosed with the Amendment List is signed and returned to Magni Gyro UK Ltd.

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**18) Main fuel pump breaker (5A) button**

In case of failure of the main fuel pump electrical system, the magneto thermic switch activates and its push button pops out .  
To re-arm the breaker push in the button.

**19) Main fuel pump switch**

Push the lever of the switch upward to ON position to turn the main fuel pump on.  
This switch must be ON during all flight operations.

**20) Auxiliary fuel pump switch**

Push the lever of the switch upward to ON position to turn the auxiliary fuel pump on.  
This switch must be ON during all flight operations.

**21) Auxiliary fuel pump breaker (5A) button**

In case of failure of the auxiliary pump electrical system, the magneto thermic switch activates and its push button pops out .  
To re-arm the breaker push in the button.

**22) Engine start push button**

The MASTER switch ON enables the engine start push button.

**23) Ignition key**

The key allows to open the engine's ignition circuits. It permits to select four positions:

**OFF** = ignitions not on - extraction and insertion position of the key

**R** = ignition A on

**L** = ignition B on

**BOTH** = both ignitions activated

**WARNING:**

In flight the key must always be in the 'BOTH' position, except when completing the ignition test during the pre-takeoff checks.

**24) MASTER switch**

Push the lever of the switch upward to ON position to power all electrical utilities.

**25) Rotor tachometer (r.p.m.)**

When the rotor is turning this digital tachometer indicates the rotor rpm.

**26) Fuel pressure indicator**

Fuel pressure is measured by means of a reduced diameter tube inserted in the carburettor fuel feed line.

The range of this instrument is from 0 to 1 bar.

**27) Digital engine monitoring system - FLYDAT (Fig. 8)**

All the engine's instruments are grouped in the FLYDAT digital instrument supplied by ROTAX.

**28) RED light**

When illuminated during normal flight it indicates a fault in the fire protection system. If the light is blinking with a regular beat it indicates that one of the sensors in the engine bay has detected temperatures above 120 degrees and therefore the possible presence of fire.

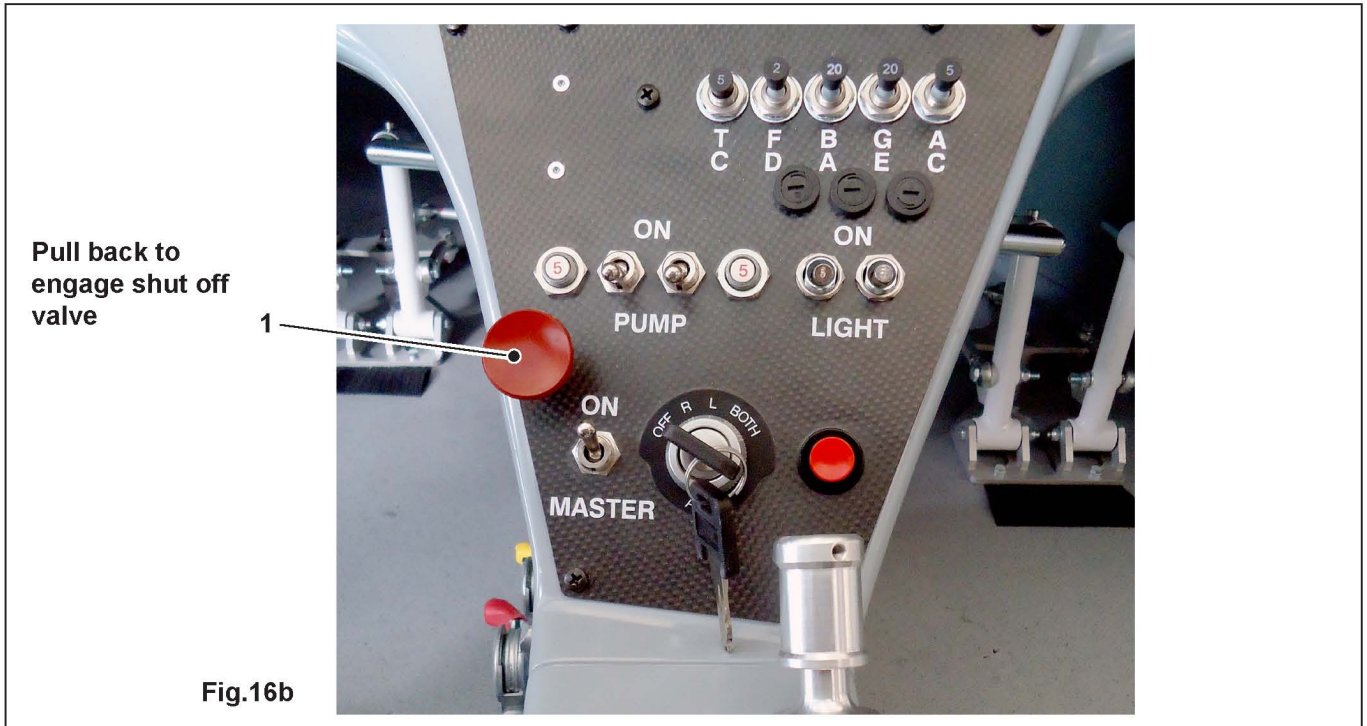
For the procedure to be adopted in this case, refer to Chapter 5.

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**2.6.i Fuel shut off valve control (Fig. 16b)**

The fuel shut off valve control is located on the left side of the switch panel. This control is protected by a guard. In case of fire in engine compartment (fire detection lamp BLINKING) the fuel supply can be shut off: :

- Push the guard to the side
- Pull out the fuel shut off control.



**2.7. SAFETY BELTS (Fig. 17)**

The safety belts (1) for both seats are 4-point “lap and shoulder belt” type with quick release metal buckle.



**7. COCKPIT AND FUSELAGE, RIGHT HAND SIDE**

Check the state of the external surface of the fuselage and remove any foreign object or dirt. Ensure it is clean.

Check that the windscreen is not damaged. Check the windscreen is clean and visibility is not impeded.

Check the state and security of the fuel cap. Check correct fixing of all engine cowlings and check all screws are in place and tightened.

**8. UNDERCARRIAGE, RIGHT HAND SIDE (Fig. 3)**

Check the state and safety of the leaf spring (1) and mounting bolts.

Check there are no cracks, damages or impact marks.

**9. WHEEL AND WHEEL PANT , RIGHT HAND SIDE (Fig. 3)**

Check the state and security of the wheel attachment (2), hub, axle and wheel spat (3).

Check the whole tyre and make sure the inflation pressure is correct. Check the state, possible damage and rubbing marks.

Either roll the gyroplane forward or remove the wheel spat to check the whole tyre.

Ensure any dirt and debris have been removed from inside the wheel spat.

Examine as far as possible the state of the braking system.

Ensure the components of this system show no leaks or damage.

Check the brake lines and make sure there is no evidence of bending or chafing.



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**27. FUEL LEVEL (Fig. 15)**

Open the lower left cowl (1) and check fuel level.

**WARNING:**

This operation must be done using the tank (2) transparency. Keep the gyroplane on all three wheels (nose down) so as to be able to correctly evaluate the quantity of fuel in the tank.



When refuelling it is imperative that the passenger door is fully open. In the event of a fuel spillage on the passenger door window, damage may occur to the transparency. Any fuel spillage on the cowling should be wiped off with a cloth.

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- 3 - CONTROL STICK - in forward position with retainer applied
- 4 - BREAKERS - switched ON
- 5 - WHEEL BRAKE – ON and LOCKED
  
- 6 - THROTTLE LEVER - in “minimum” position (idle)
  
- 7 - CHOKE - ON, lever in raised position (only if engine is cold)
- 8 - MASTER - switch ON
- 9 - KEYS - in BOTH position (3 clicks)
  
- 10 - AUX. PUMP TEST - ON / check “fuel press” >0,25 bar / OFF.
- 11 - MAIN PUMP - ON / check “fuel press” indication >0,25 bar.
- 12 - PROPELLER - clear

Fig.20





**WARNING DANGER:**  
Shout "CLEAR PROP".

13 - STARTING - push start button



**WARNING:**

Should starting be difficult, keep the starter push button pressed for several seconds. In order not to damage the starting system, it is recommended to press the button for not more than 10 seconds at a time and then to wait at least 1 minute before pressing again.

14 - OIL PRESSURE - check the pressure on the FLYDAT instrument (14) and make sure the pressure rises to within the specified operating range (from 1,5 up to 5,0 bar).



**WARNING:**

Should the pressure not reach the minimum specified level within 10 seconds, stop the engine and look for the defect.

15 - THROTTLE LEVER (6) - Set to reach a speed of 1.800 ÷ 2.000 r.p.m.

16 - AUXILIARY PUMP - ON. Check pressure parameters fuel pressure >0,25 bar.

#### 4.7.3 STARTING FAILED

Should starting fail, repeat the procedure from point 5 onward, moving the throttle lever slightly forward.

**IF THE EXTERNAL TEMPERATURES ARE LOW: CHOKE - ON / lift the choke lever (7).**

Repeat the complete starting procedure.

**CHOKE - OFF / lower the choke lever (7) within one minute after the engine has started.**

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## 4.9 PRE-TAKEOFF CHECKS (Fig. 23)



### NOTE:

Before entering the runway and while at the holding point, execute the pre-takeoff checks as diligently as possible.

- 1 - CHOKE - OFF lever (1) lowered
- 2 - IGNITION TEST - set engine at 2.500 - 3.000 r.p.m.  
Use key (2) to select the ignition.  
Verify that r.p.m. drop is within 300 r.p.m. and that it does not exceed 150 r.p.m. between one ignition and the next one.
- 3 - Key (2) - in BOTH position
- 4 - Switch (3) lights - ON
- 5 - FUEL RESERVE - press test push button (4) and check functionality of reserve warning light (5).
- 6 - MINIMUM TEMPERATURES - reaching minimum parameters (50° OIL and CHT)
- 7 - ENGINE INSTRUMENTS - check within limits
- 8 - TRIM FULLY FORWARD - move trim switch forward, check that green warning light (7) is ON
- 9 - FLIGHT INSTRUMENTS - check (set altimeter (8))
- 10 - DOORS CORRECTLY CLOSED - Lock lever lowered and doors engaged



### WARNING: DANGER

It is imperative that the security of the door latching is checked prior to take-off as the door may come open on take-off, if incorrectly latched. After engaging the latching lever both the pilot's and passengers doors should be pushed from inside the cabin to ensure both forward and aft catches are secure. Should the door come open in flight it is unlikely to become detached or adversely affect the aircraft's handling. However should a door open in flight it is recommended that the airspeed be limited to around 50-60 MPH and the aircraft landed in an unhurried and controlled fashion as soon as is possible.

- 11 - ROTOR BRAKE - OFF, lever (9) lowered, BRAKE OFF warning light (10)
- 12 - CONTROL LOCK- release and check freedom of control
- 13 - CONTROL STICK - keep at front limit stop
- 14 - AIRPORT TRAFFIC CHECK

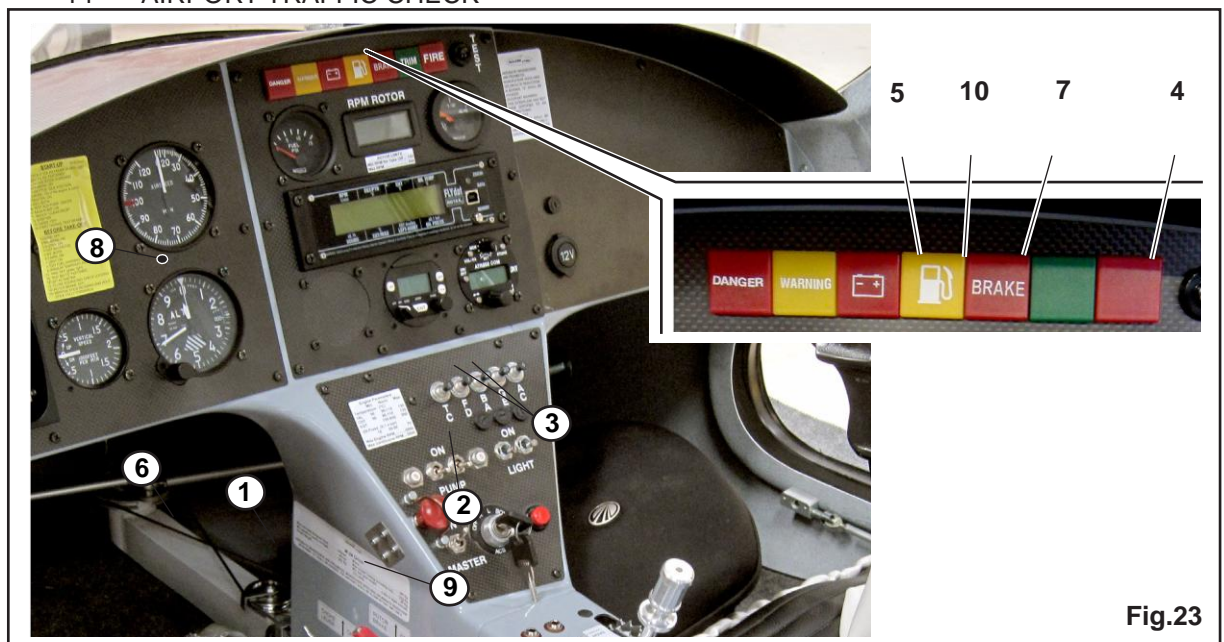


Fig.23

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## 4.10 ROTOR PREROTATION (Fig. 24)



### CAUTION:

Keep the control stick fully forward until reaching 130 r.p.m. rotor speed.

- 1 - ALIGNMENT - runway alignment
- 2 - ENGINE SPEED - set at 1.800 r.p.m.



### CAUTION:

A lower or higher engine speed may worsen the prerotation procedure performances.

- 3 - PREROTATION ENGAGING - gently operate the prerotation lever (1).  
Keep engine speed at 1.800 r.p.m.



### CAUTION:

The prerotator must be engaged in a gentle manner, without sudden movements of the lever (1), so as not to stress the system and avoid stopping the engine.

#### At 130 r.p.m. ROTOR

- 4 - CONTROL STICK - Place the control stick (2) in takeoff position (rear limit stop).
- 5 - PREROTATION LEVER - Gently reach the limit stop while keeping a constant engine speed.



### WARNING DANGER:

In windy conditions, or if the payload is light, it is possible that the gyroplane will lift up onto the tail wheel. If this occurs, the prerotator should be released and the stick moved forward to balance the gyroplane on the main wheels, some engine power should be applied to prevent the gyroplane from moving backward. The rotor rpm will continue to increase. When the rotor speed is equal or greater to 200 rpm, proceed as for take off. This should be practiced with an instructor before proceeding in these conditions

#### AT LIMIT STOP OF PREROTATION LEVER

- 6 - ENGINE r.p.m. - Gently increase the engine speed until reaching 200 r.p.m. of the rotor (standard prerotation).



### WARNING DANGER:

The minimum rotor prerotation speed is 150 r.p.m. It is strictly forbidden to proceed with takeoff operations if the rotor r.p.m. is lower than the minimum value.



### NOTE:

Under identical conditions, the length of the takeoff run depends on the rotor r.p.m. reached during prerotation.

The maximum speed of the prerotation system is 280 r.p.m.

The life of the prerotation system and its inspection frequency depend on the average rotor r.p.m. applied during the prerotation operation.

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- 3 - CONTROL STICK (3) - in takeoff position (rear limit stop).  
Once the nose wheel has lifted, move the control stick forward and balance the gyroplane on the main wheels.



**WARNING:**

During the balancing phase, the attitude must be so that neither the nose wheel (pitch down) nor the rear wheel (pitch up) touch the ground. Practicing of "balancing" or taxiing on tarmac runways for more than 30 minutes continuous, without flight, may cause the brakes and the wheels to overheat. This is normal, restrict these exercises to periods of less than 30 minutes continuous.

- 4 - TAKEOFF:  
A) correct the roll induced by the engine torque (stick (3) to the left);  
B) reach and maintain attitude so as to obtain 65 mph (Best rate of climb speed).



**NOTE:**

See the APPENDIX for more information on takeoff.

- 5 - CLIMB: speed for best rate of climb 65 mph
- 6 - THROTTLE - CHECK: (lever (1)) completely open 115% (5.500 r.p.m. at 115%)
- 7 - SPEED - 65 mph (See air-speed (4))



**NOTE:**

See the APPENDIX for more information on speed and rates of climb.

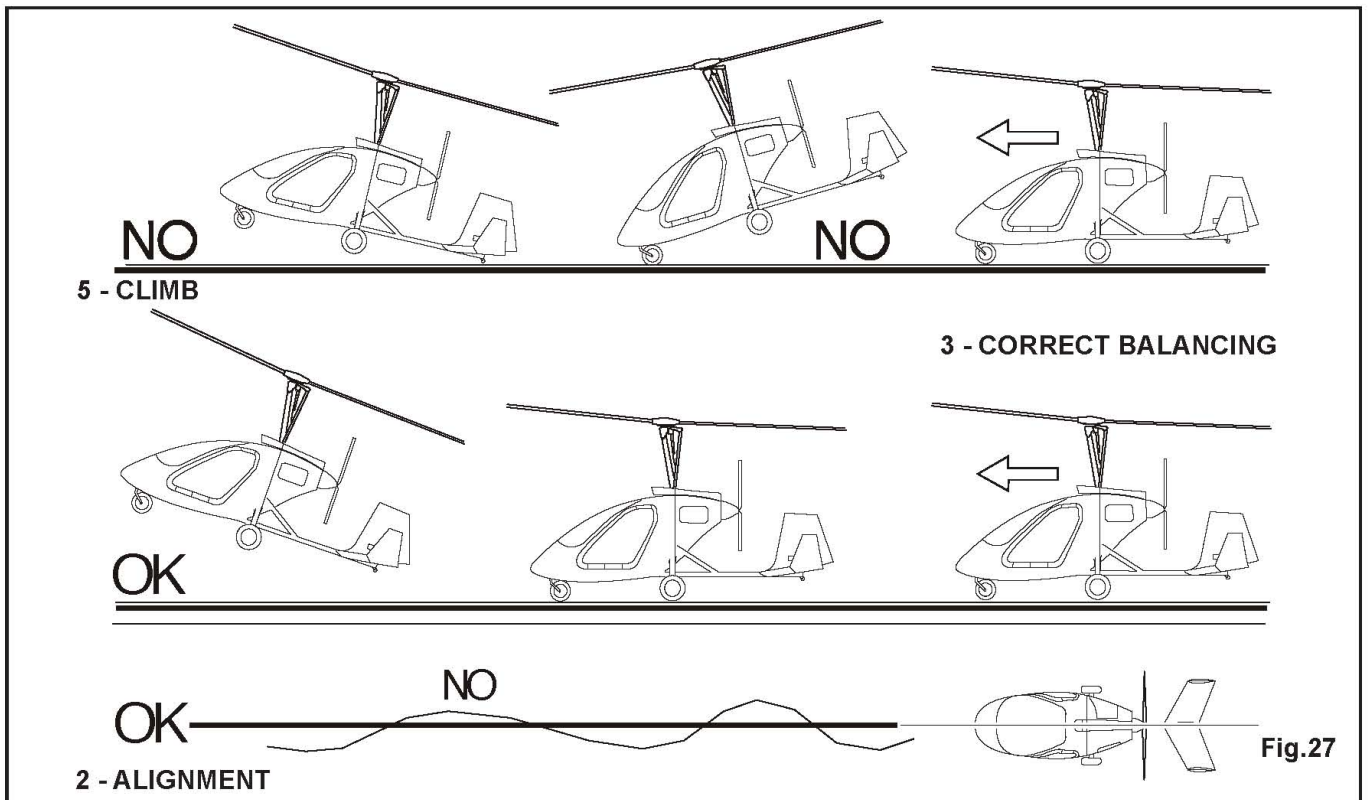


Fig.27

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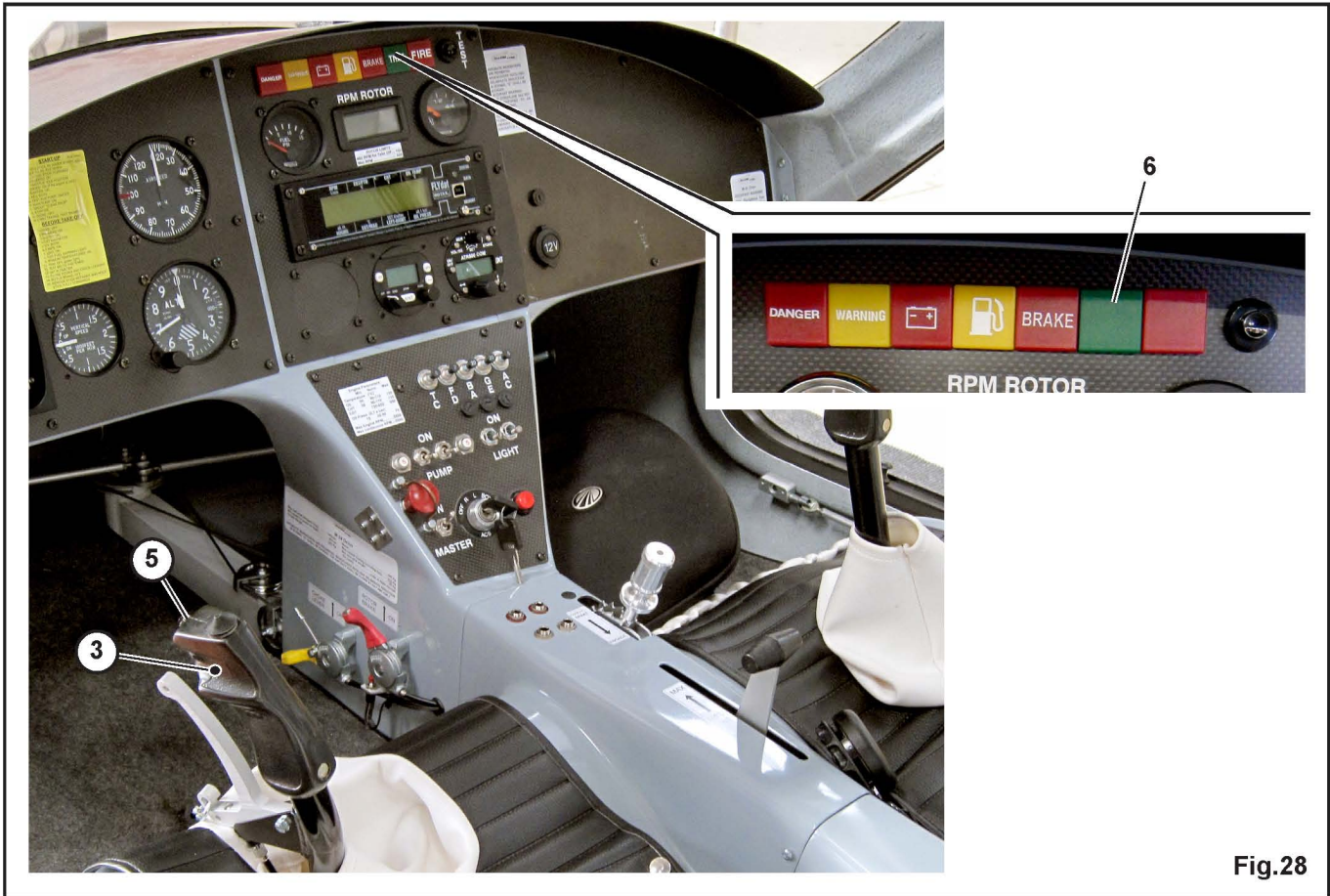


Fig.28

8 - TRIMMING - start trimming the aircraft for the desired airspeed.



**NOTE:**

**TRIMMING AFTER TAKEOFF**

Maintain the required attitude in the climb by maintaining rearward pressure on the stick (3).

Operate the trim switch (5) to trim nose up (backward) until the load on the control stick is reduced.



**NOTE:**

If the trimming operation is undertaken after the first takeoff or with the trim fully forward (green light (6)), 15 to 20 seconds of action are necessary before the trim control becomes effective.

Once you feel that the load on the control stick (3) has been reduced as required, reduce the rearward pressure on the control stick and maintain a constant speed.

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**NOTE:****TRIM SWITCH BACKWARD (5)**

= nose up trim = reduced speed

**TRIM SWITCH CONTROL (5)**

= nose down trim = increased speed

Operate the trim switch with small impulses to nose up or nose down until reaching and stabilizing the desired speed.

Carefully release the control stick to check if the speed is maintained correctly.

**NOTE:**

Trimming may start during the climb after the takeoff. Trimming must be stopped and corrected after the leveling off, during straight and level flight.

**NOTE:**

Always wait a few seconds after making an adjustment using the trim switch. This allows correct trimming and avoids too many attitude variations preventing the gyroplane from maintaining a constant attitude and speed.

- 9 - OPERATIONS upon reaching a safe altitude (300-500 ft).
  - A) brakes - momentarily apply them to stop the rotation of the wheels.
  - B) power reduction - if there are no obstacles, reduce the power.
- 10 - LEVELING - reduce the engine power as necessary for level flight 50 ft before reaching the desired altitude; lower the nose to maintain airspeed.
- 11 - CRUISING - Set the engine power necessary to maintain the desired height and speed.  
Adjust the attitude with small corrections of the trim so as to maintain the desired speed.  
Check all the flight parameters and take care not to exceed the specified values.

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#### 4.11.1 TAKEOFF WITH CROSS WIND

During takeoffs with cross wind, pay attention to maintaining alignment with the runway. The takeoff procedure with cross wind is identical to the procedure without wind. It is only necessary to use the rudder pedals and control stick conventionally.



#### NOTE:

Normally, when taking-off with cross wind, as compared to a no-wind condition, the rudder pedals should be used to keep the aircraft straight whilst applying into-wind control stick.

The degree of control inputs will be proportional to the wind's strength and speed and should be appropriate to keep the gyroplane aligned with the runway axis.



#### WARNING DANGER:

Before taking-off with strong cross wind, it is necessary to evaluate its intensity and to operate only if it is possible to respect the limits of that intensity.

Maximum cross-wind component for take-off is 25 knots.  
Inexperienced pilots should consider their own skill level and not attempt to take-off in cross wind conditions which exceed their own capability.

### 4.12 FLIGHT MANEUVERS

#### 4.12.1 CLIMB



#### NOTE:

Best rate of climb speed	65 mph
Best angle of climb speed	55 mph

Purpose	Gain of altitude
Preparation	Level <b>attitude</b> <b>Speed</b> - keep the predetermined speed Predetermined <b>altitude</b> <b>Select</b> reference point
Execution	<b>Increase</b> power (min. 5.000 r.p.m.) <b>Maintain</b> speed Attitude <b>control</b> <b>Maintain</b> reference point



#### NOTE:

Leveling off must be achieved by reducing the engine power until reaching the level flight parameters 50 ft before reaching the desired altitude.



## 4.13 UNUSUAL MANOEUVRES

### 4.13.1 SLOW FLIGHT AND FLIGHT BEHIND THE POWER CURVE

Purpose            **Reduce** speed until reaching flight  
behind the power curve conditions  
65 mph -> 40 mph

Preparation     Constant **heading**  
Head-**wind**  
**Level flight** 400 ft - 65 mph

Execution       **Reduce** engine power  
**Maintain** attitude

**Upon reaching 40 mph:**  
**Increase** power to maintain altitude

**To regain speed:**  
**Change** attitude to increase speed  
**Reduce** power upon reaching 65 mph

### 4.13.2 VERTICAL DESCENT

To descend vertically at zero forward speed, follow these indications:

**1. Preparation:**

- a. head-wind
- b. safe height

**2. Throttle lever:**

Partial reduction compared to level flight values

**3. Attitude management:**

- a. pull the nose up gently
- b. reduce forward speed

**4. Directional control:**

Keep aligned with a reference on the horizon

**5. Reaching zero speed:**

Do not increase the nose-up attitude

**6. Recovery:**

- a. move the control stick forward
- b. gradually increase the power to level flight values
- c. keep aligned with a reference on the horizon



**WARNING DANGER:**

Low speed manoeuvres with a tail wind are forbidden.

Low speed manoeuvres are only allowed at a minimum height of 600 ft agl and recovery from a vertical descent must commence above 400 ft agl.



**WARNING:**

We recommend the use of gentle and progressive pitch movements in order to avoid excessive nose up pitch attitudes and obtain a more efficient recovery whilst minimising height loss.

#### 4.13.3 LARGE POWER CHANGES



**WARNING:**

In manoeuvres involving sharp increase in power settings from low power to high power (turbo setting) the M24C may exhibit a tendency to roll right as a reaction to the engine torque. We recommend that pilots increase power from low power to 100% before then increasing to 115% to avoid undue roll to the right. It is also recommended that the simultaneous application of control stick to the right whilst applying sharp power increases is avoided.

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#### 4.14.2 LANDING (Fig. 30)

**Power** - idle  
**Speed** - 65 mph

**Maintain alignment** with runway with pedals and control stick.

**At 2-3 metres from ground** - first flare gently to reduce the angle of descent with a slight reduction of speed.

**Close to the ground** - start soft and progressive flare to level-off in ground effect.

**In ground effect**, with a nose-up attitude continue the flare until the main wheels touch the ground.

To stop the gyroplane **upon contact with the ground**, progressively move the control stick to rear limit stop.

**Use the rudder pedals** to control the gyroplane's direction.

#### 4.14.3 LANDING WITH CROSSWIND

**The procedure** for landing with crosswind is identical to that of normal landing.

**Alignment** with the runway must be maintained with the control stick into wind and rudder in the opposite direction.



#### **WARNING DANGER:**

**Maximum cross-wind component for landing is 25 kts. Inexperienced pilots should consider their own skill level and not attempt to land in cross wind conditions which exceed their own capability. It may be more appropriate to land diagonally across the runway in order to limit the crosswind component.**



#### 4.14.4 GO\_AROUND

#### **NOTE:**

**If pilot decides to abandon the landing and go around he should proceed as follows:**

**Throttle** - throttle lever fully forward.

**Pedal** - use right pedal to maintain alignment with the runway.

**Simultaneously** ease the nose up.

**Speed** - reach and maintain 65 mph while climbing.

**Clear** the runway axis and keep to the "dead" side.

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#### 4.14.5 AFTER LANDING

**Gyroplane stopped** - control stick to front limit stop position.

Using the rudder pedals, **vacate the runway** by moving the gyroplane towards the exit.

**Stop the gyroplane** with the brakes.

**TRIM** - fully forward (switch forward) - green light ON.

**Control lock** -connect the control lock. KEEP HOLD OF STICK IN FULLY FORWARD POSITION

**Rotor at 100 r.p.m.** - engage rotor brake, brake warning light ON.



#### **WARNING DANGER:**

In the presence of obstacles or people, or if the available space is not adequate, operate the rotor brake before the rotor reaches 100 r.p.m. This will reduce the rotor's stopping time as much as possible and maximise safety.



#### **WARNING:**

Move towards parking area.

First stop the rotor. When the rotor is stopped then drive slowly towards the appropriate parking area.

#### 4.14.6 ENGINE STOP (Fig. 31)



#### **NOTE:**

To stop the engine, the actions on the instrument panel must be done from right to left.

With gyroplane braked and in parking position.

- 1 - **ROTOR BRAKE** - ON lever (1) up and BRAKE warning light (2) ON
- 2 - **RADIO** and navigation instruments - OFF
- 3 - **STROBE and LIGHTS** - Switches (3) OFF
- 4 - **FUEL PUMPS** - Switches (4) OFF
- 5 - **KEYS** (5) - OFF
- 6 - **MASTER (6) AVIONICS** - OFF

## 5.1 GENERAL

This section contains the procedures to follow in case of emergency. It is extremely important to know these procedures so as to be able to manage any emergency situation and apply the appropriate actions, thus resolving the situation as safely as possible. Multiple emergencies, unfavorable weather conditions and particular conditions require specific adaptations of the following procedures. To address an emergency in the most effective way, the decisions taken by the pilot must be rational and follow common sense logic.

## 5.2 CRITICAL EMERGENCY PROCEDURES

The emergency procedures may be classified in critical and non-critical ones. **Critical emergencies** are defined as emergency situations which require a rapid and immediate response that must be instinctive, without reference to any checklist and must be learned by the pilot through training.

## 5.3 GROUND EMERGENCY PROCEDURES

### FIRE DURING STARTING

In the event of a fire in the engine compartment the fire detection light (red "FIRE" indicator) will illuminate in a constant blinking manner.

Proceed as follows

SHUT OFF VALVE – ON (Pull backwards)

FUEL PUMPS - OFF

THROTTLE LEVER - OPEN

KEY - upon stopping the engine - OFF

MASTER - OFF

**ABANDON THE GYROPLANE**

CALL EMERGENCY SERVICES

## 5.4 EMERGENCY PROCEDURES DURING TAKE-OFF

If an emergency occurs during takeoff, the pilot must decide whether to continue the takeoff or abort it.

His decision might be influenced by the nature of the malfunction, by the speed, by the point of takeoff when the malfunction was recognized, by the pilot's training to land safely or continue with the takeoff.

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## 5.5 FIRE IN FLIGHT

### IF ENGINE FIRE:

In the event of a fire in the engine compartment the fire detection light (red "FIRE" indicator) will illuminate in a constant blinking manner.

Proceed as follows:

SHUT OFF VALVE – ON (Move guard to one side and pull out fuel shut off control)

FUEL PUMPS - OFF THROTTLE LEVER - OPEN

KEY - upon stopping the engine - OFF MASTER - OFF

MAINTAIN ATTITUDE TO ENSURE ADEQUATE MANOEUVRE SPEED

PROCEED IN LINE WITH PROCEDURES OUTLINED FOR AN EMERGENCY LANDING

AFTER EMERGENCY LANDING:

ROTOR BRAKE ON

### ABANDON THE GYROPLANE

CALL EMERGENCY SERVICES

### IF ELECTRICAL FIRE:

If smoke/fire appears to be originating from instrument panel area, switch off non-essential equipment (and pull circuit breakers) and carry out precautionary landing. If smoke persists carry out actions as for fire in engine bay area above.

## 5.6 ENGINE FAILURE

In case of failure of the engine the following actions are recommended

### Taxing, prior to take-off

Maintain directional control, brake and stop where safe.

### Immediately after take-off

Land immediately ahead.

- a) If higher than 300ft - consider wind speed and direction. Select a forced landing site, in to wind and/or up any slope.

### In flight

If at reasonable altitude

- a) Check magneto switch is set to "both"
- b) Check fuel pumps are on
- c) Check fuel gauge to confirm sufficient fuel
- d) Check choke is off
- e) Attempt engine re-start

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If engine fails to re-start

- f) Turn off engine magneto switches
- g) Flick Master switch to "OFF"
- h) Check Harnesses are tight
- i) Consider wind speed and direction.
- j) Select a forced landing site, in to wind and/or up any slope

## 5.7 ENGINE START IN FLIGHT

### ENGINE START IN FLIGHT:

The engine should not be deliberately stopped in flight except as part of forced landing training under the supervision of a competent instructor.

Where practical, to limit engine damage, leave the engine to idle at 3000 rpm for about 30 sec to cool before turning it off.

The engine can be restarted in flight using the usual starting procedure.



### NOTE:

To restart the engine the key does not have to be turned to off, and then back, to start

## 5.8 ABANDONING THE AIRCRAFT

In normal circumstances occupants should not leave the aircraft while either the propeller or the rotors are turning to prevent risk of the occupants being struck by moving blades.

If abandoning the aircraft in an emergency the pilot should turn the off the engine magneto switches and flick the Master switch to "OFF".

If abandoning the aircraft with either the propeller and/or the rotors turning the occupants should follow a path out of the cockpit straight forward away from the nose of the aircraft, to minimise the risk of injury

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- Because of the incorporated friction clutch, oils with friction modifier additives are unsuitable as this could result in a slipping clutch during normal operation.
- Heavy duty 4-stroke motor cycle oils meet all the requirements. These oils are normally not mineral oils but semi or fully synthetic oils.
- Oils primarily for Diesel engines are generally unsuitable due to **insufficient high temperature properties and additives which cause clutch slipping.**



**WARNING:**

If the engine is mainly run on AVGAS more frequent oil changes will be required.

**Oil consumption:** ..... max 0,06 l/h (0.13 liq pt/h)

**Oil viscosity:**

Use of multi-grade oils is recommended.



**NOTE:**

Multigrade oils are less sensitive to temperature variations than single grade oils. They are suitable for use throughout the seasons, ensure rapid lubrication of all engine components from cold start and become less fluid at higher temperatures.

**Table of lubricants**

Since the temperature range of neighbouring SAE grades overlap, there is no need for change of oil viscosity during short term fluctuations of ambient temperatures.

