SPORT COPTER SCII
PILOT'S OPERATING HANDBOOK

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Aircraft Serial Number _____

Aircraft Registration Number _____

Owner _____

_____

_____

WARNING!

This operating manual is only valid for use with the gyroplane indentified on the face page. Any revisions must be inserted where appropriate.

CONTENTS

SECTION 1 — GENERAL www.sportcopter.com

1.1 Introduction

It is our aim at Sport Copter to ensure that you get the most from your SCII gyroplane. This manual has been prepared to provide you with information about your gyroplane's equipment, operating procedures performance, and suggested care.

This is the approved Pilot's Operating Handbook (POH), and is part of the equipment that must be on-board during gyroplane operation.

This manual is not a substitute for: adequate, competent flight training, knowledge of current Safety Alerts, Advisory Circulars, Service Bulletins, Maintenance Manuals, and/or Notifications affecting the gyroplane or applicable aviation regulations.

Pilots of this aircraft must hold a proper license including the class rating "gyroplane", corresponding to the aircraft's registration. The pilot is responsible for determining whether the gyroplane is safe for flight. He/she is also responsible for determining that the gyroplane is safe for flight, and to operate the aircraft with respect to the procedures and limitations provided in this POH, along with the regulations of their country.

While it is not intended that this POH be used in flight, it must be studied regularly. The pilot must be familiar with all limitations, performance data, procedures and operational handling characteristics of the gyroplane prior to operating it. It is also the owner/operator's responsibility to register and insure the gyroplane, according to country specific regulations.

Whenever revisions are issued, they must be inserted in the appropriate place in the manual. The owner is reminded that it is his/her responsibility to ensure that Sport Copter has the appropriate contact information so that flight safety and other important information can be communicated in a timely manner.

1.2 Warnings, Cautions, Attentions, and Notes

WARNINGS, **CAUTIONS, ATTENTIONS**, and **ENVIRONMENTAL NOTES** are used to emphasize important information, used as below:

WARNING!

An operating procedure, practice, or a condition which, if not correctly followed or remedied, could result in serious bodily injury or loss of life.

CAUTION!

An operating procedure, practice, or a condition which, if not strictly observed or corrected, could result in destruction of or damage to equipment.

ATTENTION

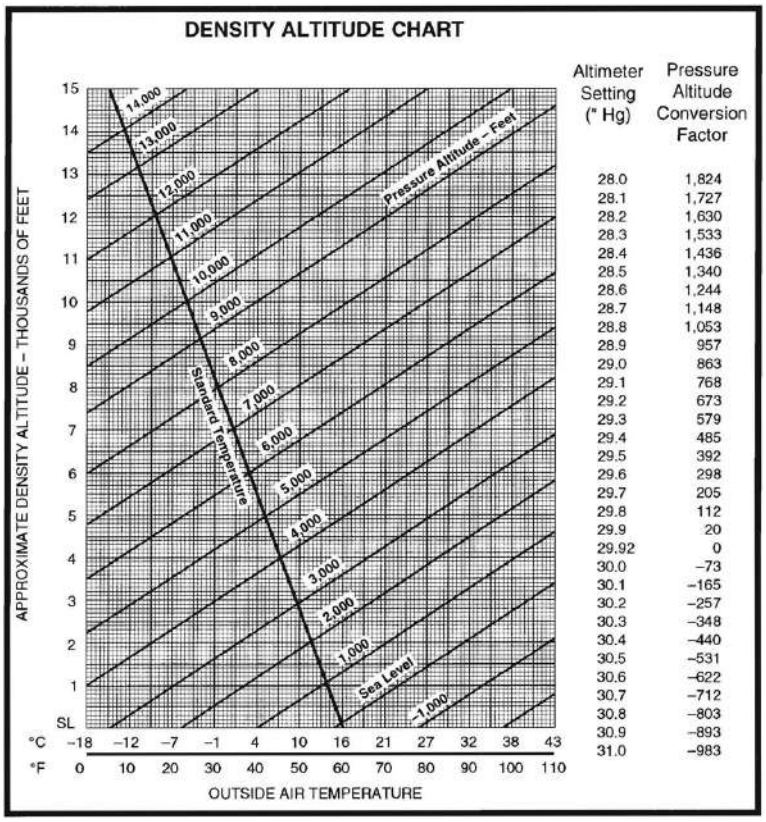
An operating procedure, practice, or condition which is important to emphasize.

ENVIRONMENTAL NOTE

A helpful tip to protect the environment.

1.3 SUMMARY OF PERFORMANCE SPECIFICATIONS
(assumes Standard Day 29.92 in/Hg at 15°C • 59°F)

Empty Weight .....1000-1120 lbs
Maximum Allowable Take-off weight.....1750 lbs
Never Exceed Speed (V_{NE}).....120 mph • 104 kts
Cruise Speed (V_C) - solo.....100 mph • 87 kts
dual.....90 mph • 78 kts
Rate of Climb.....1000 fpm
Range.....300+ miles
Fuel Capacity (total).....33.0 gallons
Fuel Capacity (usable).....32.8 gallons (0.2 gal unusable)
Approved Fuel Grades.....100LL AV gas only
Maximum Engine Rpm.....2700 rpm
Oil Capacity (max).....8.0 qts (but not optimal)
Oil Level (to avoid excess blow-off).....6.0-6.5 qts



1.4 Rotor Blades

General

Type.....2 bladed, ground pitch adj., free to teeter
Material.....6061-T6 Aluminum (aerospace epoxy bonded)
Blade Profile.....Sport Copter, Inc.

Standard

Rotor Diameter.....31 feet
Rotor Chord.....9 inch
Rotor Disc Area.....754.77 sq ft
Rotor Disc Load Maximum.....2.2523 lbs per sq ft
(max. GW & max pilot weight (300 lbs) with proper cheek plates for CG)

Rotorhead

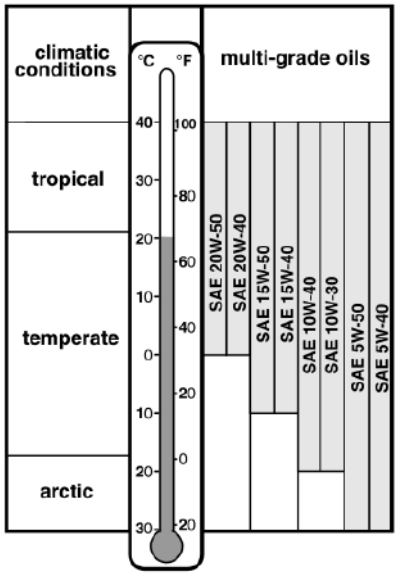
Manufacturer.....Sport Copter, Inc.
Material.....6061-T6 Aluminum, 4130 Steel
Prerotator.....Mechanical flex-shaft

1.5 Engine (by Ly-Con)

Lycoming IO-360

Displacement, cubic inch.....361
Horsepower.....180-250 hp
Compression ratio.....10:1
Cylinders.....4 Cylinder (4-stroke)
Fuel.....**100LL Avgas only!**
Cooling.....Air
Fuel Consumption.....9.5 gph (depending on conditions)
Oil.....SAE20W50*

* First 50 hours use aviation-grade W100 Mineral Oil



1.6 Propeller

MT-Propeller

Constant Speed
Model.....MTV-12-B/LD188-119a
Number of Blades.....3
Diameter.....74 inch
In-Flight Pitch Adjustment.....Yes

1.7 Unit Conversion

Multiply	By	To obtain
kts (knots)	1.852	Km/h
Km/h (kilometers per hour)	0.54	kts
Mph (miles per hour)	1.61	Km/h
Km/h (kilometers per hour)	0.62	mph
Ft (feet)	0.305	m
M (meters)	3.28	Ft

1.8 Abbreviations and Terminology

Velocities:

IAS Indicated Airspeed (All data in this Manual refers to IAS and does not consider instrument fluctuations.)

CAS Calibrated Airspeed (Indicated airspeed corrected to the value of variation related to the construction.)

TAS True Airspeed (True speed of the gyroplane in smooth air and corrected for air density.)

V_{S0} Minimum horizontal-flight-speed, IAS

V_X Speed for steepest angle of ascent (best ascent angle)

V_Y Speed for best ascent (best ascent rate)

V_A Maximum maneuvering speed

V_{cruise} Maximum cruising speed

V_{NE} Never Exceed (Highest permissible IAS, which must never be exceeded.)

Atmosphere:

ISA	International Standard Atmosphere
OAT	Outside Air Temperature
PA	Pressure Altitude
DA	Density Altitude

Weight and Center of Gravity:

MTOW	Maximum take-off weight
Empty Wt.	Empty weight • weight of the empty gyroplane with full oil container, unusable fuel and coolant
CG	Center of Gravity
CGRP	Center of Gravity Reference Point (datum)

SECTION 2 — LIMITATIONS

2.1 General

This section provides approved operating limitations, instrument markings, color-coding, and basic placards for operation of the SCII.

COMPLIANCE WITH THIS SECTION IS MANDATORY

2.2 Minimum Flight Crew — Max. Passenger Seating

The minimum required flight crew is one pilot in the left seat. This does not preclude a qualified flight instructor giving dual instruction from the right passenger seat. The aircraft is approved to carry one passenger, seated to the right of the pilot, if equipped.

2.3 Environmental Limitations

Maximum Tailwind.....15 mph • 13 kts
Maximum Crosswind.....20 mph • 17 kts
Maximum Wind Normal Operations.....50 mph • 43 kts

2.4 Airspeed Limitations

Rough field Take off. .....25 mph • 22 kts
Normal Takeoff .....46 mph • 40 kts
Angle of Climb (V_X).....50 mph • 43 kts
Rate of Climb (V_Y).....60 mph • 52 kts
Best Glide (V_G).....55 mph • 48 kts
V_{MO} (Yellow Line).....86 mph • 75 kts
Cruise (V_{CRUISE}) – Single.....100 mph • 87 kts
Dual.....90 mph • 72 kts
59°F standard day 2400 rpm, 24" (dual).....88 mph • 76 kts
59°F standard day 2400 rpm, 25" (dual).....93 mph • 81 kts
Never Exceed Speed (V_{NE}) (red line).....120 mph • 104 kts
Do not exceed this speed in any operation.

2.5 Rotor Speed Limitations (9" x 31')

Minimum pre-rotation speed.....100 RPM
Minimum Rotor RPM taxiing.....100 RPM
Rough Field.....110+ RPM
Maximum pre-rotation speed.....300 RPM
Rotor speed caution range Minimum.....275-299 RPM
Continuous rotor speed.....300-379 RPM
Rotor speed caution range Max.....380-499 RPM
Rotor speed limit (max).....500 RPM
Minimum sustained load factor.....1G Positive
Maximum sustained load factor.....3G Positive

CAUTION!

Attempting takeoff with initial rotor speed less than the above values could lead to blade flapping. In this condition the rotor could contact the rudders and/or the propeller.

CAUTION!

Load factors of less than 1G cause a decay in rotor rpm, and if sustained could lead to blade flapping. Pushover maneuvers lasting 1+ seconds must be avoided by relying on the pilot's sensory cure of lightness in the seat to detect a low G condition.

2.6 Powerplant Limitations

Lycoming IO-360 Engine Speed

Normal Engine Idle.....850 RPM
Maximum Continuous.....2750 RPM

Lycoming IO-360 Engine Oil Pressure

Start and Warm up Oil Pressure.....115 psi
at operating temperature:
Minimum Idling Oil Pressure.....25 psi
Normal Operating Range.....60-90 psi
Maximum Oil Pressure.....100 psi

Lycoming IO-360 Engine Oil Temperature

Minimum Oil Temperature.....165°F • 74°C
Maximum Continuous Oil Temperature.....200°F • 93°C
Maximum Oil Temperature.....245°F • 118°C

ATTENTION

Operating the engine below 194°F • 90°C may form condensation in the lubrication system.

To evaporate possibly accumulated condensation, oil temperature must daily reach 212°F • 100°C.

Lycoming IO-360 Engine Temperatures (CHT & EGT)

Maximum Continuous CHT.....400°F • 204°C
Maximum Cylinder Head Temperature.....450°F • 232°C
Maximum Exhaust Gas Temperature.....1600°F • 871°C

Volts

Maximum Voltmeter reading.....14.4 volts

2.7 Weight and Balance (and see Section 6.2)

Minimum Pilot weight.....175 lbs • 80 kg
Maximum Pilot weight.....275 lbs • 125 kg
Maximum take-off weight (MTOW)..... 1750 lbs • 795 kg

2.8 Fuel

Delivery System.....Mechanical & Elec. pumps
Fuel Quantity Indicating System.....panel elec. gauge
Approved Fuel.....**Avgas 100LL only**

For operational constraints and maintenance aspects, refer to the Engine manufacturer's manual.

Allowable Fuel Loading.....33.0 US gallons total capacity
32.8 US gallons total usable
0.2 US gallons unusable

2.9 SMOKING IS PROHIBITED IN THE AIRCRAFT

2.10 Types of Operation

This aircraft is limited to flight by day in VFR.
For operations into registered or certified aerodromes, strobe lights must be operating.

2.11 Placards

1. Experimental (USA)
2. V_{NE}
3. This aircraft is amateur built and does not comply with federal safety regulations for standard aircraft. (USA)

2.12 Types of Surfaces

The aircraft may be operated from paved and unpaved runways.

SECTION 3 — EMERGENCY PROCEDURES

3.1 General

This section provides the recommended procedures that should be followed during an emergency or a critical situation. It is divided into two parts. The first contains emergency procedure checklists. The second part amplifies the items listed in the checklists and includes information that is not readily adaptable to a checklist format or which the pilot could not be expected to refer to in an emergency situation. This information should be reviewed regularly.

Pilots must familiarize themselves with the procedures in this section and must be prepared to take appropriate action should an emergency arise.

This gyroplane, like most recreational aircrafts, is fitted with a non-certified engine, thus there may be a higher risk of engine failure than with certified engines, with the associated risks of damage or injury as the result of an unplanned landing. Therefore strict compliance with the engine manufacturer's maintenance schedules, operational procedures and any additional instructions is essential. The aircraft must always be flown with the risk of engine failure in mind, and must not be flown over any areas where a forced landing cannot be safely executed.

It is stressed that the procedures outlined in this section are recommendations only. They are not a substitute for sound judgment and common sense and may have to be adjusted, depending on the circumstances prevailing at the time of the emergency. It is important that the pilot be thoroughly familiar with the aircraft. The pilot must review and practice as many of these procedures as are safe to perform as part of his training.

Above all, in any emergency situation, MAINTAIN CONTROL OF THE AIRCRAFT. KEEP FLYING, FIRST, ALWAYS!

AVIATE! NAVIGATE! COMMUNICATE!

3.2 Engine Failure

In case of an engine failure the following action is recommended:

Engine failure prior to lift-off

Maintain directional control
Throttle.....Pull back fully, Idle
Brakes.....Apply as necessary
Electronic Ignition Switch.....Off

Engine Failure after lift-off

Airspeed (establish Best Glide, V_G).....55 mph • 48 kts
Landing Area.....Identify, head towards
Trouble Shooting.....Accomplish, if time

Engine Failure at or above 150 feet AGL

1. Consider wind speed and direction
2. Select a suitable landing site
3. If time allows, attempt "Air restart procedure" below.
4. Perform landing into wind and/or upslope if possible.

WARNING!

Always plan your route to remain within safe gliding distance to areas where a safe forced landing can be performed in case of an engine failure.

A landing in urban congestion, high trees, or open waters may end fatally.

3.3 In Air Restart Procedure

Fuel Valve (if installed).....Open
Fuel Pump(s). .....ON
Throttle.....Slightly Open
Main Switch/Starter Key.....OFF, then START

- If possible, warm-up engine and oil before full power

If Engine fails to start...

Mayday Call.....Transmit, if time
Engine Ignition Switch.....OFF
Emergency Landing.....Accomplish

3.4 Landing into trees or high vegetation

- Assume the surface of the treetops or vegetation as level
- Plan touch-down and flare with minimum ground speed and minimum rate of descent
- As soon as the wheels contact the vegetation bring rotor to level attitude to avoid blade tip contact with vegetation
- Tall trees, maintain airspeed, fly between trees, flare, land

3.5 Degradation of Engine Power

3.5.1 Alternator Failure

Alternator output failure may be indicated by the low voltage annunciator illuminating. The alternator circuit breaker may trip. Output failure may be the result of a mechanical failure of the alternator or breaking of the alternator belt.

Master Switch.....OFF
Circuit Breakers.....Check, In

If alternator drive-belt failure is NOT obvious, and NO circuit breakers are out:

Master Switch.....ON

If the drive belt failure is obvious or the circuit breaker is out, or electrical power is NOT restored, determine what electrical equipment is essential to continue the flight and:

Master Switch.....ON
Non-Essential Electrical Equipment.....OFF
Terminate Flight as soon as safely possible

CAUTION!

If the alternator has an internal failure, it may need to be manually disconnected by pulling the circuit breaker. It is unlikely you will be able to recover any alternator use until alternator is replaced.

WARNING!

The engine requires electrical power to energize the ignition system. Should the alternator not be producing sufficient power and the main and ignition backup batteries become depleted, the engine will stop running.

CAUTION!

Engine run time will run on battery power alone will depend on the state of the battery and load. Without the alternator, the battery will drain totally within 30 minutes. Land within 20 minutes if safe.

3.5.2 Under Voltage

If the under voltage annunciator illuminates:

If equipped with ammeter.....CHECK OUTPUT
Engine RPM.....INCREASE

If problem persists:

Non-Essential Electrical Equipment.....OFF

If alternator power still not sufficient for flight:

Engine Operation.....MONITOR for roughness and Performance

At first indication of loss of power:

Ignition Backup Battery (if equipped).....EMERGENCY Land as soon as it's safe!

3.5.3 Loss of Oil Pressure

More often than not, a loss of oil pressure will be gradual. If it is accompanied by an increase in oil temperature, it is a sign that there is a problem with the engine's oil system and the aircraft should be landed as soon as practical, as the engine may stop suddenly. At reduced power maintain altitude and proceed to the nearest suitable landing site. Be prepared for a power-off, forced landing. Check that oil cooler control louver is open.

Low oil pressure can be the result of a faulty gauge or sending unit or a malfunction in the oil pressure regulating system. In any case, land as soon as practical and have the problem investigated.

3.5.4 High Oil Temperature

Abnormally high oil temperature indications may be caused by a variety of reasons, among them:

1. Low oil level
2. Obstruction in the air flow reaching the oil cooler
3. Defective Gauge
4. Check that oil cooler louver control is open, down position

A rapid rise in oil temperature must be treated seriously. Monitor the oil pressure gauge. Reduce power, enrich the mixture, and if practical, maintain a high airspeed to ram cooling air through the oil cooler.

Land as soon as practical and investigate the cause, but be prepared for a power-off forced landing.

3.6 Evacuating Aircraft

In normal circumstances the pilot should never leave the aircraft while the propeller or the rotor blades are turning. If abandoning the aircraft in an emergency, the pilot should turn the master switch to "OFF" if this can be done without endangering themselves.

If abandoning the aircraft with either the propeller and/or the rotor blades turning, the pilot should follow a path in line with the nose of the aircraft, to minimize the risk of being struck by either the propeller or the rotor.

Pilot should review the emergency evacuation procedures prior to flight, including:

1. Actions to be taken in the event of a forced landing
2. Operation of the seat harness
3. Disconnection of intercom or other connections to gyro
4. How to safely exit and move away from the aircraft

3.7 Engine Fire

In case of fire, the following is recommended:

Fire prior to take-off, during start

Master Switch.....OFF
Engine Ignition Switch.....Crank Engine*

* If the engine starts, and fire goes out within a few seconds, run at 1700 rpm for a few minutes.

If Fire Extinguishes:

Engine Ignition Switch.....OFF

If Fire Persists:

Engine Ignition Switch.....OFF
Evacuation.....ORDER
Fight Fire with Ground Equipment

WARNING!

If a fire is on the ground, under the gyroplane, due to over-priming, and the engine has started, taxi away from the fire as quickly as possible. If a fire is on the ground but engine has not started, abandon the gyroplane immediately.

Fire in Flight
Immediately initiate an emergency landing
Master Switch.....OFF
Engine Ignition Switch.....OFF

3.8 Electrical Fire and Malfunctions

Electrical Fire In-Flight
Individual Circuits.....Isolate

If Fire Persists:
Master Switch.....OFF
Engine Ignition Switch.....OFF
Emergency Landing.....Accomplish

IF FIRE PERSISTS, ABANDON GYROPLANE AND SUMMON HELP

Electrical Malfunctions
Excessive Battery Volts:
Non-Essential Circuits.....Isolate
Land as soon as possible

Low Battery Volts:
Non-Essential Circuits.....Isolate
Land as soon as possible, but within 20 minutes

3.9 Off Field Landing

A precautionary landing at a non-prepared site may be performed at pilot's discretion in order to avoid unexpected weather, in case of sever illness of the pilot, or if technical defects are suspected, for example sudden and severe rotor vibrations.

1. Select a suitable landing site from safe altitude, considering slope, wind speed and direction
2. Fly a reconnaissance pattern to check for obstacles, such as power lines/wires/cables in approach and go-around paths
3. Overfly landing site to check for obstructions such as fences, ditches, rocks, height of vegetation. Select most suitable touch-down zone.
4. Perform a normal approach and touch-down into wind with minimal ground speed.

3.10 Flight Control Malfunction

In case of a flight control failure the gyroplane can be controlled with the remaining primary controls, including power, trim, and rudder.

An immediate reduction of power, respectively speed may be necessary to avoid pitch oscillations or other effects affecting dynamic or static stability. Navigate to a suitable landing site with wide and shallow turns and approach against the wind.

3.11 Parameters Out of Limits

PARAMETER	EXCURSION	CORRECTIVE ACTION
Engine Oil Temperature	Upper **limit** or **yellow arc**	Reduce Power and increase air speed. If condition cannot be corrected, land as soon as practicable.
	Lower **limit**	Allow engine to warm-up on ground
	Within lower **yellow arc**	Increase power setting, if possible. If condition prevails in normal flight, have maintenance action performed
Cyl. Head Temperature	Upper **limit**	Reduce power and increase air speed. If condition cannot be corrected, land as soon as practicable.
Engine Oil Pressure	Upper **limit** or **yellow arc**	Reduce power. If condition cannot be corrected, have maintenance action performed prior to next flight.
	Lower **limit**	If combined with other indications, such as rising oil temp or unusual engine behavior, shut-down engine and perform a power-off landing as per Emergency procedure "Engine Failure". Otherwise, monitor engine instruments carefully and land as soon as practicable. Have maintenance action performed.

3.12 Recovery System/Rotor System

This gyroplane is not equipped with a ballistic recovery system. However, its rotor system which is in permanent autorotation serves as such a system. Therefore, the entire rotor system including its rotorhead with blade attachments and the corresponding components of the flight controls must be carefully inspected and maintained.

If any undue vibration or unusual behavior is experienced, a precautionary landing should be considered.

3.13 Rotor Icing

A more than normal or constantly increasing power demand may be caused by an iced-up rotor system. This could ultimately result in a condition where altitude cannot be maintained, even at maximum power. An iced-up rotor system can also cause sever vibration. **If any of the signs for rotor icing is evident, carry out a precautionary landing.**

3.14 Landing With a Deflated Tire

Plan to land directly into the wind with minimum rate of descent at touch-down, if possible on a grass runway. Maintain directional control with adequate pedal input. Consider the use of some propeller thrust to increase rudder effectiveness. Lower nose gently with the nosewheel pointing straight.

Alternatively, if landing on asphalt is unavoidable, approach normally, with the intent of a zero-speed touch-down directly into wind.

Only if possible to recover the aircraft from the landing area it should be ground maneuvered under its own power, as this could further damage the tire and wheel rim.

SECTION 4 — NORMAL PROCEDURES

4.1 Introduction

This section describes Sport Copter's recommended procedures for the pilot to follow during normal operations of the SCII. It contains checklist items, instructions, procedures, and rules of thumb. However, such does not replace the pilot's appreciation of the individual situation, nor make any allowance for varying degrees of pilot proficiency or mechanical deterioration of the aircraft.

Rules of thumb aren't meant to replace performance charts or good judgment. However, these excellent additions to a pilot's mental flight bag can highlight the influences of different performance factors on their aircraft, which should augment safety. The most important Rule of Thumb for all flying is:

"If you're not SURE it's safe, then don't do it."

4.2 Airspeeds for Safe Operations

The speeds* in this section are based on a maximum gross weight of 1750 lbs • 795 kg under standard sea-level conditions.

Normal Climb	38-60 mph • 33-52 kts
Best angle of Climb (V_X)	50 mph • 43 kts
Best rate of Climb (V_Y)	60 mph • 52 kts
En route Climb	57 mph • 50 kts
Normal Cruise (V_A) Solo	100 mph • 87 kts
Dual	90 mph • 78 kts
Never Exceed (V_{NE})	**120 mph • 104 kts**
En route Descent	50-100 mph • 43-87 kts
Best Glide (V_G)	55 mph • 48 kts
Normal Approach	46 mph • 40 kts
Engine Off Approach	55 mph • 48 kts
Powered Approach	60 mph • 52 kts

* Depending on Rotor pitch

4.3 Normal Procedures Checklist

4.3.1 Preflight

The Pilot shall be familiar with the aircraft limitations detailed in this manual and shall have performed proper flight planning considering required legal aspects, as well as "Weight and Balance" and "Performance" of this manual. The use of the checklists as provided in this manual is mandatory for a safe operation.

All daily and per-flight checklists items consist of visual checks, and do not replace professional mechanical inspection and maintenance. The following checklist applies for the SCII gyroplane. Note that depending on the optional equipment installed the necessary checks may include additional items. It is advisable for the owner/operator to compile his own checklist suitable to his particular configuration.

EXTERIOR INSPECTION

ATTENTION

Both magnetos must be in OFF position and the aircraft must be secured against rolling during the inspection.

Commence this inspection from left hand side, adjacent to the seat. A step ladder is required for access to the upper mast and the rotorhead.

Chocks.....Removed
Brakes and Lines.....Checked
Left-hand Strobe Light.....Secure
Pitt Tube.....Secure and clear
Radio Antenna.....Secure

Nosewheel.....25 psi, spins freely
Windshield.....Clean, no cracks
Right-hand Strobe Light.....Secure
Rotorhead.....No cracks, damage, bolts secure, lock pins in place
Prerotator Ring Gear.....Checked
Prerotator Bendix.....Secure, Safety Cable present and secure
Rotator Sender Unit.Secure, Electrical connections Intact
Rotor brake.....Condition and Operation
Right-Hand Control Rods.....Checked
(rod ends free, lock nuts secure, lock pins in place)
Fuel Cap.....Secure
Engine.....No oil leaks
Electrical Cables secure
Engine Oil Quantity.....Checked, dipstick Secure
Engine Oil Filler.....Cap installed and secure
Cooling Fan Belt.....Checked, no cracks, and tight
Gearbox.....No oil leak, level checked
Temp sender checked
Engine Mounts.....Checked, no cracks
Landing Gear Struts & Shocks.....Secure
Fuel Pump and lines .....Secure, electrical cables intact, Fuel lines checked, water drain, Completed
Main Wheel.....29 psi, spat secure
Propeller and Spinner.....Clean, no damage
Rudder Cables.....Checked, no fraying
Tail Wheel.....Checked, spins freely
Right-Hand turnbuckle and lock wire.....Checked
Right-Hand Stabilizer.....Secure, no damage
Rudder.....Secure, moves freely
Rotor blades (Both). .....Clean, no damage, aligned
Left-hand turnbuckle and lock wire.....Checked
Left-Hand Stabilizer. .....Secure, no damage

Rotorhead.....No cracks or damage, bolts secure, lock pins in place
Left-hand Control Rods.....Checked, rods free,
(rod ends free, lock nuts secure, lock pins in place)
Prerotator.....Belt no cracks or damage
Alternator.....Secure, belt tension
Battery.....Secure, lock wire intact, Electrical cables secure

COCKPIT

Master Switch.....ON
Battery Volts.....Checked
Fuel Qty Indication. .....Checked
Mixture.....Idle cut-off
Ignition Switch off.....OFF
Electrical Switches. .....OFF
Rotor tach and engine tach.....ZERO
Radio.....Checked
Strobe and Landing Lights.....ON, Checked, OFF
Master Switch.....OFF
Seat Belt.....Condition, no frays
Seat Cover.....Secured
Documentation.....On Board
Baggage and Cargo.....Secure
Doors.....Closed and Locked

WARNING!

Stowing hard and/or sharp-edged luggage in the compartment is not permitted. Doing so may cause damage to the gyroplane and could lead to a crash during turbulence.

4.3.2 START UP AND TAXI

4.3.2.1 Before Starting Engine

I.M.S.A.F.E......All Good
Preflight Inspection.....Completed
Teeter Bolt Pin (rotorhead).....**Checked**
Loose Objects.....Removed or Secured
Document Bag.....Closed
Seat Belts.....Fastened
Passenger Briefing. .....Complete
Helmet.....Secured
Flight Suit • Jackets. .....All pockets Closed
Flight Instruments. .....Checked and Set
Switches.....OFF
Circuit Breakers.....Checked
Controls.....Free & Correct
Propeller Area.....Clear

ATTENTION

If passenger seat will be unoccupied, secure seat harness to prevent it from interfering with the flight controls or the pilot during flight.

4.3.2.2 Starting Engine

Prerotator.....Disengaged
Oil Cooler • Fan Box .....As Required
Mixture.....Full Rich
Primer.....Apply*
Master Switch.....ON
Avionics Master Switch.....ON
Strobe Light Switch. .....ON
Engine Ignition Switch.....ON

Fuel Quantity.....Checked
Fuel Pressure.....Checked
Battery Volts.....Checked
Throttle.....Open ½"
Propeller.....CLEAR
Engine Start.....Accomplish
Cooling Fan Pressure.....Checked

** Normal procedure three times, if engine is hot, omit this step.*

WARNING!

Never attempt to start engine until area around propeller is completely clear of any persons or objects. Do not start engine while standing beside aircraft as a brake failure or an operating error may result in prop strike.

CAUTION!

Engage starter for a continuous maximum of 10 seconds only, followed by a cooling period of 2 minutes.

4.3.2.3 Starting Engine When Flooded

Mixture.....Idle cut-off
Throttle.....full open
Starter.....Engage

When Engine Fires:

Mixture.....Rich
Throttle.....Retard to 1200 RPM
Ignition Switch.....Both
Oil Pressure.....Check

After engine has started:

Throttle.....Minimum Idle
Oil Pressure.....Checked
Battery Volts.....Checked
Avionics Master Switch.....ON
Lights.....As required
Nosewheel Steering Switch.....Taxi

4.3.2.4 Warm Up*

Throttle.....2000-2500 RPM

* Airbox vent open in cold weather, adjust to temp.

4.3.2.5 Taxiing

Brakes.....Checked
Nosewheel Steering .....Checked, pressure on
Rotorbrake.....OFF
Prerotator.....Maintain 100-150 RRPM

4.3.2.6 IMPORTANT NOTES ON PREROTATOR RE-ENGAGEMENT

The Engine RPM:Prerotator RRPM ratio is fixed (about 7:1). Here are approximate Engine RPMs and their peak RRPMs you will see:

850 Engine RPM = 120 Rotor RPM (this is at Engine idle)
1400 Engine RPM = 200 Rotor RPM (to start normal take-off roll)
1800 Engine RPM = 260 Rotor RPM (for short-field take-off)

Delivering 200+hp, your Ly-Con IO-360 has more torque than other gyros (including McCulloch J-2 and Air & Space 18A), and even many 2-place helicopters (Robinson R22). Therefore, to achieve increasing belt tension, employment of the SCII prerotator must be judicious until Rotor RPM has reached its peak for that particular Engine RPM.

From an idling Engine 850 RPM and Rotor 0 RPM, the Rotor has the potential of about 120 RRPM (i.e., 850/7 = 120). But, this must be achieved gradually with gentle progression of the prerotator control. **The lower the RRPM is from its potential, the more gradual you must be on the prerotator** to increase belt tension while the RRPM catch up to their relative max value for that Engine RPM.

We recommend that while slow taxiing (<20 mph) you maintain a minimum 100 RRPM, up to about 150 RRPM (any higher RRPM begins to create lift, which you don't want during slow taxi).

During slow taxi, Engine idle 850 RPM can provide up to 120 RRPM. If during taxi the RRPM drops from 120 RRPM to 100 RRPM, a gentle re-engagement/disengagement will regain 120 RRPM.

RULES FOR ENGAGEMENT & RE-ENGAGEMENT OF PREROTATOR

- Always listen and abort for any prerotator abnormal sound.
- Never begin take-off roll with the prerotator still engaged.
- **During re-engagement**, Stop/Think, and always first adjust throttle to align Engine RPM/7 with current RRPM.
- Always turn/position the gyro underneath a flat spinning rotor.

Scenario A: You're taxiing north to Runway 18. Wind is calm, so your taxi ground speed of (say) 10 mph equals the airspeed of 10 mph. A minimum 100 RRPM can be maintained with sufficient aft stick. Likely no prerotator re-engagement will be necessary.

Scenario B: Now, add wind factor of 180@19 kts. (19 kts = 22 mph) At 10 mph ground speed you are taxiing north with a 12 mph tailwind. I.e., a minimum 100 RRPM cannot be maintained by catching air with aft stick (unless you taxi faster than 22 mph, which is not recommended). This downwind slow taxi scenario will cause RRPM decay, so you finesse prerotation with a series of smooth re-engagements/disengagements. Do not leave engaged during taxi.

Scenario C: You're prerotating on a calm wind Runway 18, have achieved 1600 Engine RPM for 225 RRPM, disengaged the Prerotator to commence your take-off roll, but just before you release brakes you see a flock of birds apparently about to land down the runway. You hold brakes as they fly away. A Cessna announces a 5-mile Final, and you feel pressured to roll. Never be rushed, and check that Rotortach! Your Engine may still be 1600 RPM, but your RRPM has decayed to 150 (which is only 67% of its 225 RRPM current potential).

Your safest action is to immediately remove the time pressure by asking the Cessna to perform a 360° for separation (if he is unresponsive, simply exit the active and let him land). Then reduce throttle to Idle and begin to prerotate normally from about 120 RRPM.

What you do NOT do is succumb to pressure from the Cessna on Final, and mash the Prerotator lever fully forward during an inappropriately high Engine RPM. That will greatly stress (if not fail) the flex-shaft, Prerotator belt, or Bendix drive gear.

Scenario D: You're holding short at a towered runway. If asked to "expedite" departure, reply that you need 30-60 seconds on the runway to prerotate and roll. They'll then properly sequence your clearance. Meanwhile, while holding short, maintain 100-150 RRPM with a series of smooth re-engagements/disengagements (but do not leave engaged). When turning to take the runway, always turn/position your gyro underneath a flat spinning rotor disk.

4.3.3 FLIGHT

4.3.3.1 Run-Up before Take-Off

Controls.....Free and Correct
Throttle.....1800 RPM
Mixture.....Set*
* High altitudes and/or temps, may require leaning for peak RPM.
Ignition Switch.....Both, Left, Both, Right
(≤175 RPM drop; ≤50 diff.)
Prop.....Cycle 2-3x
Engine Instruments. .....Checked
Throttle.....Idle @ 950-1000 RPM
Flight Instruments. .....Checked and Set
Teeter Bolt Pin (rotorhead).....Checked
Switches.....Set
Seatbelts.....Secure
Landing Light.....ON
Rotordisk attitude (trim).....Checked
Rotorbrake.....Checked, Disengaged
Navigation/Position Strobe lights.....As required

4.3.3.2 Prerotation and Take-Off

Wind Direction.....Check, face into wind
Position.....Underneath a flattened disk
Brakes.....Hold
Throttle.....Idle @ 950-1000 RPM
Rotorbrake.....Off
Prerotator.....Slowly full forward
Engine RPM.....Increase slowly
Stick.....150 RRPM, full back slowly
Observe.....Rotor tracking for evenness
RPMs **(Rotor RPMs very important!)**. .1250 Engine — 180 Rotor
RPMs.....1500 Engine — 225 Rotor
RPMs.....1800 Engine — 250 Rotor
Prerotator.....Off
Brakes.....Released
Throttle.....Smoothly increase, full power
Take-off Roll.....Balance on Mains, tap Nose

T/O CAUTIONARY RULES OF THUMB

For each 1.8°F above 59°F
1.0°C above 15°C — Increase distance by 2%
For each 100' above MSL — Increase distance by 2%
For each 1 kt. tailwind — Increase distance by 5%
For each 1° upslope — Increase distance by 10%
Dry grass runway take-off — Increase distance by 10%
Wet grass runway take-off — Increase distance by 20%

For each 1 kt. headwind, take-off distance is 3-5% shorter.

50/70 RULE — By 50% of your available runway you must achieve 70% of your take-off speed, else abort the take-off.

WARNING!

It is dangerous to attempt take-off with forward stick. Before take-off roll, hold stick within 1-2" of its aft stop.

Max. Performance Short Field Take-off:
Prerotate to 230-300 RRPM, gradually pull stick full aft. Disengage prerotator when max rpm is achieved, release brakes, full power. Anticipate nose popping up, stick forward to prevent over-rotation. Climb.

In strong wind: nose may pop up before brakes are released, balance nose in position, disengage prerotator, release brakes.

Take-off distance is 3-5% shorter with each 1 kt. of headwind.

CAUTION!

Pay attention to nose lifting in strong winds, to ensure aircraft does not rock back on its tail.

4.3.3.3 Climb speed

Normal Climb.....38-60 mph • 33-52 kts
Power.....Full
Mixture.....Lean to obtain max rpm
RPM.....2750 no more than 5 minutes

- Perform initial climb at safe climb speed
- Set power to maximum take-off power
- Check engine instruments for max. take-off power time limit
- At safe altitude, the climb may be continued with V_Y
- When approaching desired altitude, level out, reduce power

4.3.3.4 Cruise speed

Normal Cruise.....80-100 mph • 70-87 kts

4.3.3.5 Descent

Airspeed.....57mph • 50 kts

- Reduce power setting and lower nose

4.3.3.6 Approach and Landing

Approach

Altimeter.....SET
Second Fuel Pump Switch.....ON
Fuel Quantity.....Checked
Engine Instruments (normal operating range).....Checked
Wheel Brake.....Unlocked
Approach Speed.....Maintain and trim
Glide Angle.....Control with power

WARNING!

Low fuel level and excessive nose-down attitude in a steep descent can cause fuel starvation.

If landing must be made with low fuel remaining, do so with a raised nose until gliding distance to airport.

Normal Landing

Airspeed.....46mph • 40 kts
Touchdown.....Flare aircraft to full stop
Landing Roll.....Lower nosewheel gently after complete stop, due to Castering nosewheel and Differential braking
Braking.....Minimum required

Short Field Landing (Steep Approach)

Airspeed	50-60 mph • 43-52 kts
Engine Power	Reduce power after obstacle
Touchdown	Flare aircraft to full stop
Landing Roll	Lower nosewheel gently After complete stop due to Castering nosewheel and Differential braking
Braking	Minimum required

4.3.3.7 Go-around (Balked Landing)

Airspeed for Normal Climb	80-100 mph • 70-87 kts
Flight Heading	Maintain
Throttle	Full Power
V_X Best Angle of Climb	50 mph • 43 kts
V_Y Best Rate	60 mph • 52 kts

4.3.3.8 After Landing

Due to castering nosewheel the machine is able to taxi safely at 10-15 mph with Rotor blades parallel to the machine (on smooth surfaces).

Rotorbrake	ON
Control Stick	Full Forward position
Engine Instruments.	Checked
Landing Lights	OFF

Fast Taxi

With Rotor blades turning, stick neutral and tilted into crosswind, you can safely taxi at 15-25 mph. Do so with the nose slightly off the ground or on the ground due to the self-correcting nosewheel, which also helps in crosswinds. PAY ATTENTION TO ABRUPT LIFT OFF.

4.3.3.9 Engine Shut down

Rotor blades.....Aligned fore and aft
Rotorbrake.....ON
Radio Master Switch.....OFF
Engine Ignition Switch.....OFF, key removed
Strobe Light Switch. .....OFF
Master Switch.....OFF
Rotorblades.....Secured

- Leave Beacon on until propeller and rotor blades come to complete stop.
- Do not vacate gyroplane until engine and rotor are at a complete stop.

4.3.3.10 Securing Aircraft

Trim & Stick.....Full Forward
Rotorbrake.....ON
Radios and Electrical.....OFF
Rotor blades.....Tie down
Chocks.....Placed appropriately

SECTION 5 — PERFORMANCE

Introduction

The purpose of this section is to provide information that will assist the pilot with planning a flight in detail with reasonable accuracy.

All data has been corrected to I.C.A.O. standard day conditions. Where appropriate, the data has been expanded analytically for variations in weight, altitude, temperature, etc.

The data has been derived from actual flight tests, taking into account the proficiency of an average pilot. The pilot must use sound judgment when assessing the effect of conditions not found in the charts, such as soft runways and winds aloft. The parameters will be affected by the performance of the engine. Therefore, the pilot must be thoroughly familiar with its operation, including the procedures for adjusting the mixture control.

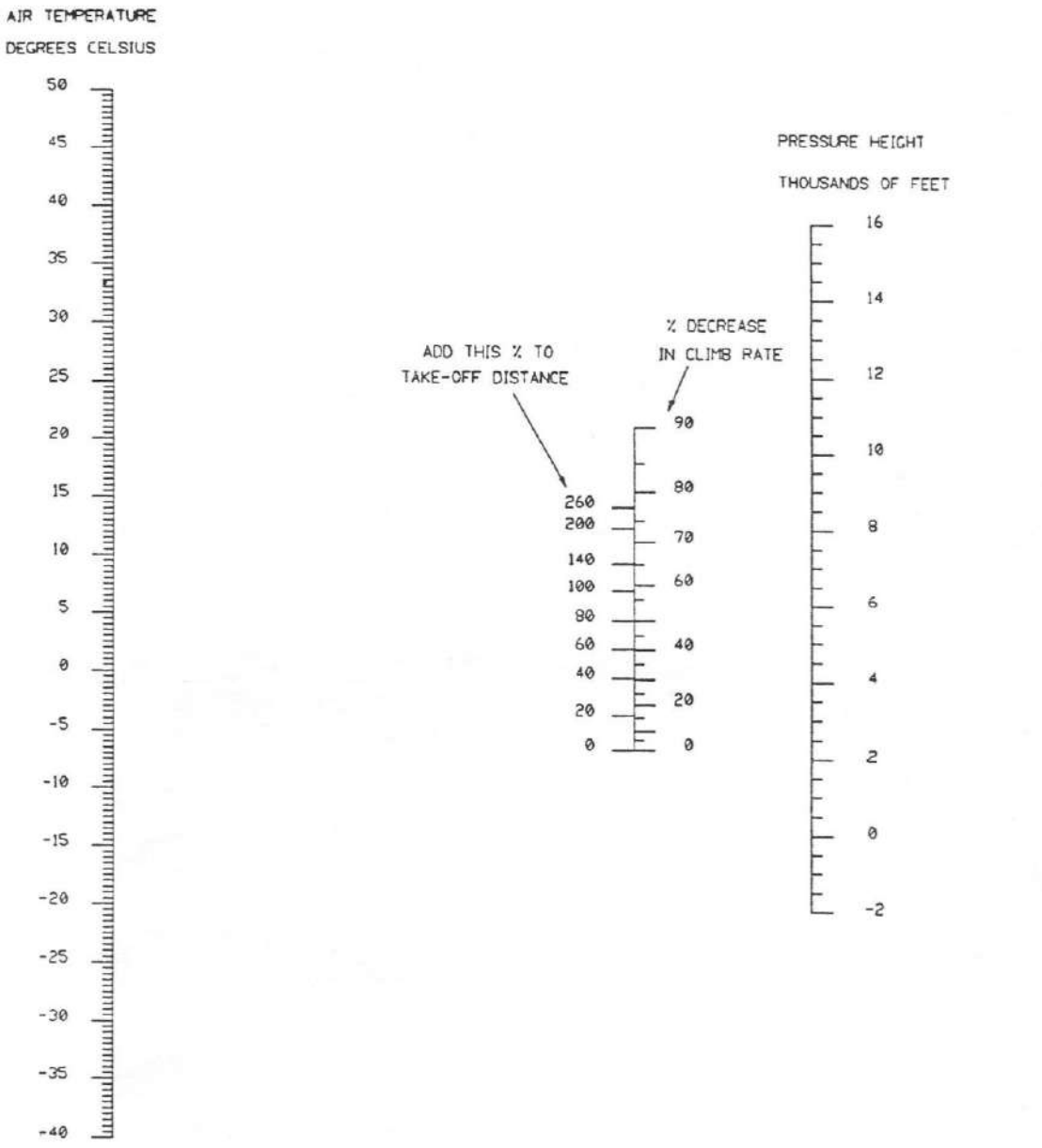
Data should not be extrapolated beyond limits shown on the charts.

All information is presented in the units used on the aircraft's instrumentation.

Airspeeds will be presented in statute miles per hour
Weights in pound
Altitudes in feet
Temperatures in degrees Fahrenheit
Wind speed in nautical miles per hour

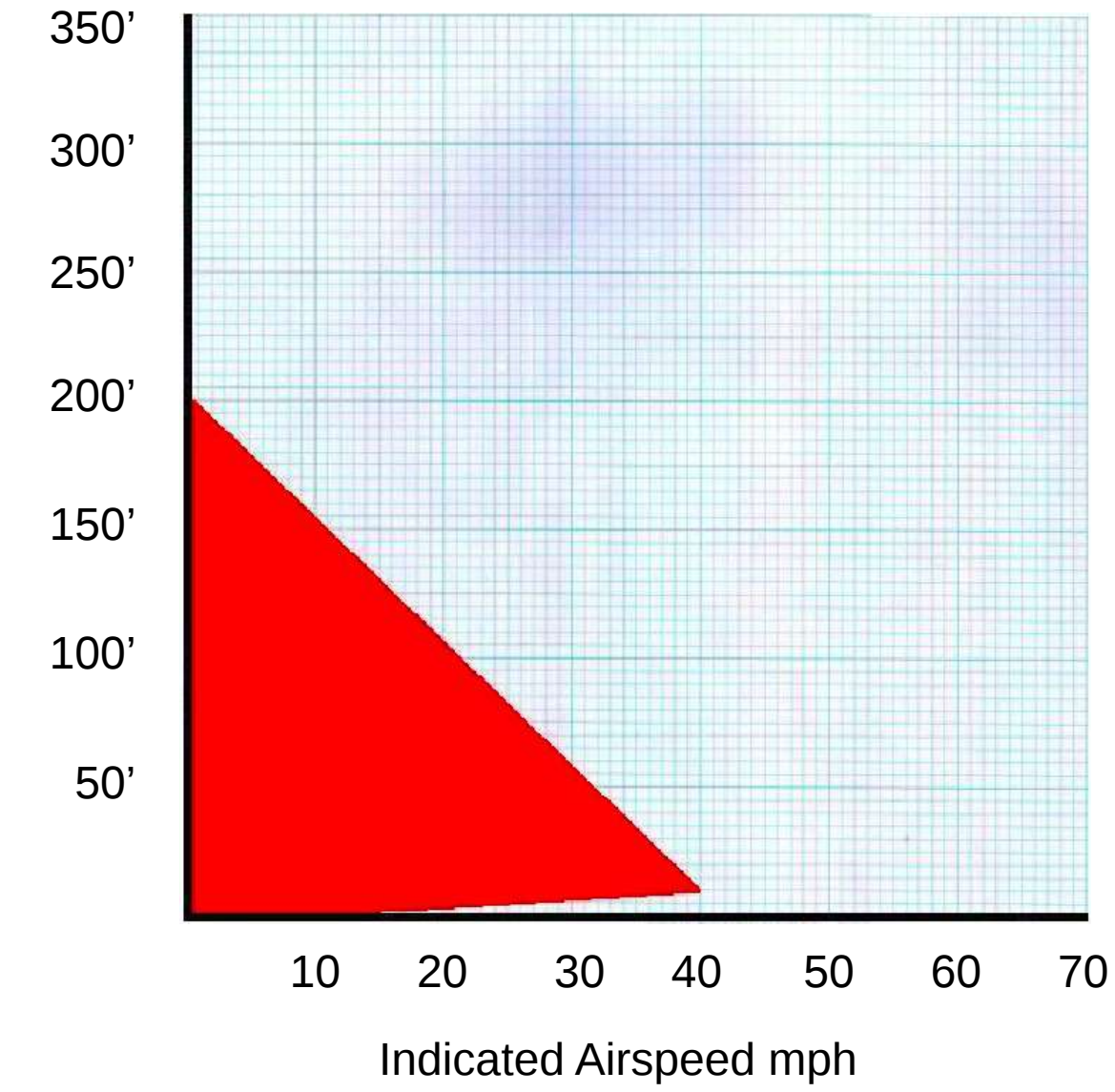
5.1 Airspeed Calibration

The following nomograph may be used to correct to the international standard atmospher conditions (see also page 29 BAK)



5.2 Height-Velocity Diagram

DO NOT OPERATE WITHIN **RED ZONE** HEIGHT/VELOCITY COMBINATION



5.3 Speeds

The speeds listed below are important for flight performance. For other speeds, refer to SECTION 2 — LIMITATIONS of this manual.

Maximum Ground speed for taxiing.....25 mph • 20 kts
Maximum Crosswind.....20 mph • 17 kts
Maximum Tailwind.....15 mph • 13 kts
Maximum Wind Normal Operations.....50 mph • 43 kts
Rough field Take-Off.....35 mph • 22 kts
Short Field Approach.....45 mph • 30 kts
Normal Take-Off.....46 mph • 40 kts
Minimum In-flight Straight and Level.....25 mph • 20 kts
Cruise @ 2400 RPM & 24" MAP.....95 mph • 83 kts
Maximum Cruise.....110 mph • 95 kts
Never Exceed Speed (V_{NE}).....120 mph • 104 kts
Do not exceed this speed in any operation.

5.4 Rate of Climb

Rate of Climb, V_Y.....1000 fpm

5.5 Take-Off and Landing Distances

Take-Off Distance:
Within 150 feet on a standard day, less wind.

Landing Distance:
Landing distances are minimal, usually less than 50 feet (15 meters).

5.6 Glide Ratio

At Best Glide Speed (V_G) 55 mph • 48 kts, the glide ratio is 4:1.
Ideally, the SCII can glide 4,000 ft horizontally per 1,000 ft of descent.
With increased drag of stopped prop, the ratio could be worse, at 3:1.

(NOTE: Confirm your SCII's performance with your own test gliding from a sufficiently safe altitude for pitch recovery and engine restart.)

SECTION 6 — WEIGHT AND BALANCE

6.1 Introduction

This gyroplane is to be operated within the weight and balance limits.

Weight and balance limits are important for two reasons:

- The structure was designed for a certain maximum weight.
- Weight and center of gravity affect both the performance, stability, and control characteristics.

An overloaded gyroplane, will not take-off, climb, or cruise as well as a properly loaded one. The gyroplane will perform as intended when it is properly loaded. It is the pilot's responsibility to ensure the aircraft is flown within the approved flight envelope at all times. Lateral cg imbalance can be offset by baggage distribution, and then applying sufficient compensating roll trim.

6.2 Weight and Balance LImits

Maximum Gross weight.....1750 lbs.
Aircraft Empty weight (incl. engine oil).....1100 lbs.
Full Fuel (33 gallons).....198 lbs.
Maximum Usable Load.....452 lbs.
Max. weight in cockpit (2 seats + 2 compartments).....452 lbs.

Minimum weight in LH pilot seat (no solo from RH seat)...175 lbs.
Max. weight in LH pilot seat (no solo from RH seat).....250 lbs.
Max. weight in LH pilot seat compartment.....25 lbs.
Max. weight in LH pilot seat (incl. its compartment).....275 lbs.

Max. weight in RH passenger seat.....250 lbs.
Max. weight in RH pass. seat compartment.....25 lbs.
Max. weight in RH pass. seat (incl. its compartment).....275 lbs.

The aircraft center of gravity (cg) is considered to be within limits if all weight limits and distributions above are respected.

SECTION 7 — AIRCRAFT AND SYSTEMS

7.1 Introduction

This section gives a description of the operation of the gyroplane systems and standard equipment.

7.2 Airframe

The structure of the airframe consists of a truss made of high-strength chrome-moly 4130 steel tubing that is bolted together with aircraft hardware. The steel mast is joined together using inert gas fusion welding. The steel is powder-coated to protect from corrosion.

The partial body enclosure is made of glass fiber reinforced plastic, and coated for a nice finish. It is mounted to the forward main frame, and is not designed as a load carrying structure. The windshield is made of UV-resistant, break-resistant acrylic plastic. This protects the pilot from the rain, insects, and the wind.

The Rudder and stabilizers are constructed of aircraft grade aluminum with aircraft aluminum ribs. Aircraft hardware and fittings, attach the rudder and stabilizers to the keel.

7.3 Suspension

This gyroplane is equipped with a high-performance Suspension system, which includes a swing-arm nosewheel suspension. The nosewheel swivels 360 degrees and is not linked to the pedal/rudder controls. The landing gear is consists of high strength steel tubing that is powder coated to protect from corrosion. This suspension system was designed to absorb higher loads in the hardest landings and the roughest of terrains.

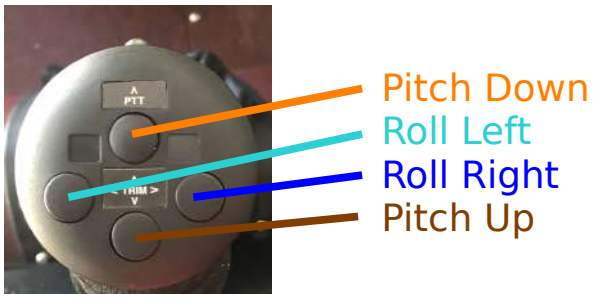
Each main wheel is provided with a set of disc brakes. The left and right systems are independent of each other. The tail is steerable via the rudder pedals.

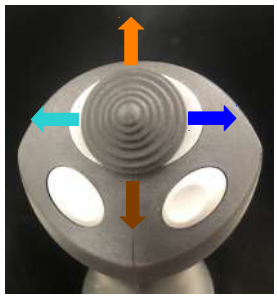
7.4 Flight Controls

The SCII has conventional controls, operated with a control stick and rudder pedals, and actuated with cables.

7.4.1 Air-Trim Controls

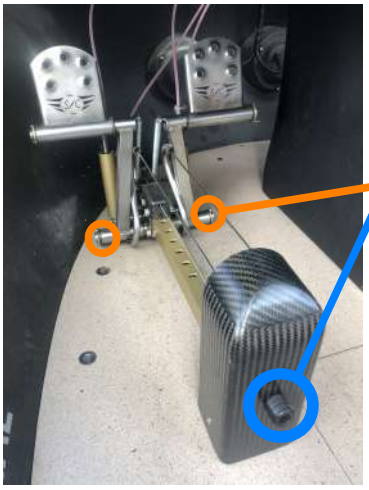
Flight control sticks have air-trim caps (4-buttons, or conical "hat"):





(Be aware of slight time lag between trim control inputs and their movement of rotorhead.) Full Pitch Down trim acts as a rotorhead lock for taxi and parking. During Pre-Start procedure, neutralize trim before testing control stick for free and correct movement.

7.4.2 Rudder Pedals (with Differential Toe Brakes)



Pedals are adjustable for occupants 5'0" to 6'6" tall.

Pull out/hold knob to unlock. Push here to extend pedal pair along their track.

To retract, pull out/hold knob to release lock mechanism, pull pedals toward you.

Pedal adjustment should be made only during Pre-Start, and not during flight operations. Do not start engine unless you have confirmed your ability to freely input rudder pedals and toe brakes.

7.5 Powerplant

This gyroplane is powered by the proven Lycoming IO-360, an air-cooled four cylinder engine capable of 180-250 hp for take-off.

7.5.1 Engine

A throttle controls power to the engine. The throttle is located between the pilot and the passenger in the center of the cockpit.

Full forward = Full Throttle
Full back = Idle

To adjust Throttle Friction, turn the knob at left.
(Do not overtighten in flight to act as "cruise control".)

The air:fuel mixture is adjusted manually with a red knob control in the center of the instrument panel. Press the button to unlock the knob. Pulling the mixture control full back operates a cut-off valve on the carburetor that stops the fuel supply. The mixture control should always be used to stop the engine.

For technical information, please refer to the engine manufacturer's manual.

7.5.2 Engine Mount

The structure of the mount is made of high-strength 4130 chrome-moly steel and the engine is then attached through rubber mounts to help reduce vibration.

7.5.3 Engine Cowling

The engine cowling is made of composite materials. The upper cowl can be removed using Phillips-head fasteners. There is an oil access door located in the upper, left hand portion that allows easy access to the oil fill neck/dip stick, making removal of the cowl unnecessary during preflight inspections.

7.5.4 Exhaust System

The exhaust system is made of stainless steel. It is covered with a shroud that is used as a heat exchanger to draw hot air for the cabin and for the induction system.

7.5.5 Air Induction System

The induction air for the engine enters through a filter on the lower side of the cowling, when the carb is used.

Should the air filter become obstructed, the carburetor air control provides an alternate means of supplying the engine with air for the induction system (Bypass).

It is important that the pilot become knowledgeable about icing when the carb is used.

7.5.6 Oil System

The oil system is an integral part of the engine, except for the cooler that is mounted on the top center of the engine cooling plenum, above the engine. The oil filler is on the right side of the engine.

7.5.7 Propeller

The gyroplane is equipped standard with a 3-bladed, MT adjustable pitch propeller and aluminum hub. The blades are made of a wood-carbon fiber matrix.

Propeller pitch is adjusted manually with a blue knob control on the center of the instrument panel. For technical information, please refer to the propeller manufacturer's manual.

7.5.8 Rotor System

The Sport Rotors system comprises high-strength aluminum rotorblades, a rotorhead assembly and a hub bar with a polyurethane mount and a spherical bearing that allows the rotorblades to pivot and find their own lead, lag, and coning angles. This self-aligning is helpful, especially for the pilot who removes his blades from the hub bar between flights. These are designed for longevity and overall performance. The assembly is done with ease and simplicity.

7.5.9 Fuel System

In the standard SCII, fuel is carried in one welded aluminum tank located behind the seats. Capacity is 33 gallons (32.8 usable). Fuel quantity is determined by an electronic fuel gauge.

7.5.10 Electrical System

The main sources of electrical energy are a 12 volt battery, and an engine driven electrical generator. Turning the master switch ON closes the battery contact and energizes the gyroplane's electrical system. The battery is located low behind the seat, behind the mast.

7.5.11 Lights

This gyroplane is approved for day VFR operation only. Anti-Collision strobe Navigation and position light assemblies are available as optional equipment. The landing light is standard equipment and must be mounted in the partial body enclosure. Please refer to the assembly manual for more installation information.

7.5.12 Pitot-Static System

The pitot system senses dynamic pressure through a tube that is aligned with the flow of air and is located along the upper mast. The pitot-static tube is connected to the instruments by a plastic line. The static pressure is measured through the open ports of the instrumentation, right behind the instrument panel.

7.6 Instrument Panel

The instrument panel contains all flight, navigation and engine instruments that are required for VFR operations. See Manufacturer's instructions regarding operation of equipment installed in the instrument panel.

7.7 Cabin Heat

Hot air for heating the cabin is supplied by a heat exchanger located around the engine exhaust. Hot air enters the cabin through opening in the firewall. To select the heater, the control on the instrument panel (middle between seats) must be pulled aft.

7.8 Indicators and Sensors

Rotor speed is measured by a magnetic pick-up that is located directly at the ring gear of the rotorhead.

Other indicators and sensors have been described in the respective paragraphs. For engine related indicators and sensors see the engine manufacturer's manual.

7.9 Seat and Seatbelt

The Sport Copter cyber seat is made of glass fiber reinforced plastic, and coated for a nice finish. The optional upgrade is made of Carbon glass fiber reinforced plastic. The cushions are made of "Confor" foam. This cushion absorbs hard impacts thus possibly protecting the spine. The seat is also separate from the fuel to protect the pilot. The 4-point restraint harness is a certified aircraft harness made especially for Sport Copter, Inc.

7.10 Music Jack

An optional music jack may be installed in the aircraft.

ATTENTION

When any device is plugged into the music jack, this will disable all GPS Auditory warnings. However, visual warnings will still be displayed on the GPS Screen.

SECTION 8 — HANDLING AND SERVICING

8.1 Introduction

This section contains guidelines for correct handling and servicing of the gyroplane, as well as manufacturer recommendations helping to keep its performance, reliability and value.

8.2 Servicing fuel, oil and other fluids

8.2.1 Oil

Approved Oils (first 50hrs) Phillips 66 Type M 20W50 mineral-based
(after first 50hrs) SAE20W50

Determine oil level by reading dipstick markings. It is recommend that the gyroplane is in level attitude for a more accurate reading.

8.2.2 Fuel

Approved Fuel 100LL Aviation Fuel

Monitor the amount of fuel added by visually watching the amount of fuel rise inside the tank.

8.2.3 Brake Fluid

Approved Brake Fluid Aeroshell Fluid 4 (MIL-H-5606A)

Visually inspect fluid levels. If brake fluid is required, fill with an approved fluid approximately 2/3 full to leave room for the reservoir cap when it is installed.

8.3 Cleaning and Care

Care and regular cleaning of engine, propeller, rotor system and Partial Body enclosure is the basic foundation for airworthiness and reliability. Therefore, the gyroplane should be cleaned prior to first flight or after the last flight of the day, depending on the environmental conditions.

In order to protect the gyroplane against dirt, dust, sunlight, etc, the machine can be covered with a tarp or cloth. The rotor blades can be cleaned with a diluted cleaner wax (such as RotorWash).

Caution: for cleaning cabin glass surfaces, avoid window cleaners with ammonia. Use only mild soap and water with soft cotton cloth. Some pilots use aerosol Pledge® (or generic equivalent).

8.4 Tire Pressures

Nose wheel

5.00-5.....25 psi
Max Inflation.....31 psi
(Tire is rated for 31 psi, but the wheel is NOT — and requires a tube.)
Tube is used in this tire.....4-ply rating

Standard Mains

6.00-6.....29 psi
Max inflation.....29 psi
Tube is used in this tire.....4-ply rating

8.5 Lubrication and Greasing

In between maintenance the owner/operator is responsible to do the following lubrication and greasing:

Rotorhead Lubrication (every 25 hours)

Teeter Needle Bearings

AeroShell 14 (*nothing else!*)

Add grease through Zerk fittings until it comes out past the outer bushings. Wipe off excess. (Grease will naturally soon turn black from air contact.) Rotate bushings ¼ turn every 25 hours. Every 100 hours, check for run-out and 0.001-0.002" max of play.

Ring Gear

Moly-Graph (NAPA has it)

Use a ½" brush to lube the teeth. Wipe off excess from top and bottom plate. Clean RPM sensor gap and rotor brake (inspect for cracks).

Bendix Prerotator

Chevron Ulti-Plex Grease EP

NGLI-1 only. Add grease through Zerk fitting, but not excessively. Stop when grease comes out at top.

If over-greased, the unit will not engage. To remove excess, remove the 4 cap screws at bottom of housing (leave flexshaft attached), and move the Bendix in-out 20+ times. Do not add more grease.

Prerotator Flexshaft

Moly-Graph (NAPA has it)

Wipe clean and then liberally regrease.

Lubricate these particular points of your aircraft:
Please see "Engine Owners Manual".

The below points use: ACF-50 Spray
Control system stick rotor control, all points that pivot and turn, also Rod Ends; Rotorhead pivot points using light amounts only if needed.

Nosewheel pivot arms P/N 010-022 rudder pivot, located TOP rudder cable and pulleys; Axle tube; Trailing Arm; Rod ends; Throttle cable and cable guides. All steel parts and fasteners, lightly lubricate to prevent corrosion. (The Rotorhead DU Bushings located fore and aft, and the teeter bushing, do not require lubrication.)

The below points use: dielectric silicone compound
Nosewheel: Between the dampener disks P/N 010-056 and P/N 010-057. Use a light amount. Assembly of main wheels and O-ring seal.

Rotorhead: P/N 030-010 and 030-060 to assemble with and regular maintenance.

"Never Seize", "Anti Seize" and lubricating compound, protects parts from extreme heat to 1800°F (other points to remember, muffler mount, ball socket and spark plug threads (light amount).

8.6 Engine Air Filter

Approved Air Filter: K&N 33-2070
Visually inspect the air filters. Depending on operating conditions, life of the air filters will vary. Monitor filter and obtain from Sport Copter.

8.7 Propeller

Clean the propeller regularly, as and dirt/grime will decrease its efficiency, which will cause a negative effect on the aircraft performance. Use either clean water, or a mild cleaning agent. Make sure to thoroughly rinse the cleaning agent off, wipe off with a soft cloth. Check the blades, especially the tips and leading edge, for any damage/erosion. If in doubt or if there is obvious damage, please contact the aircraft manufacturer.

8.8 Battery

Please inspect the battery for any leaks, as the corrosive acid could lead to extensive damage when contacting the framework and attachments.

Charge the battery only with a charger suitable for the type of battery equipped on the aircraft.

8.9 Removal, Disassembly, Assembly of Rotor Blades

Removal:

Remove rotor blades from gyroplane before transporting. A second person may be needed to assist in lifting and to help prevent any damage to the gyroplane or the rotor system.

WARNING!

The rotor system must be removed and disassembled for road transport. When handled incorrectly the rotor system can be damaged irreparably. If undetected this may have catastrophic consequences.

1. Make sure the gyroplane is level and secure on the ground, chock the tires. Adjust the rotor system so it is fore and aft, make sure the rotorbrake is locked and secured.

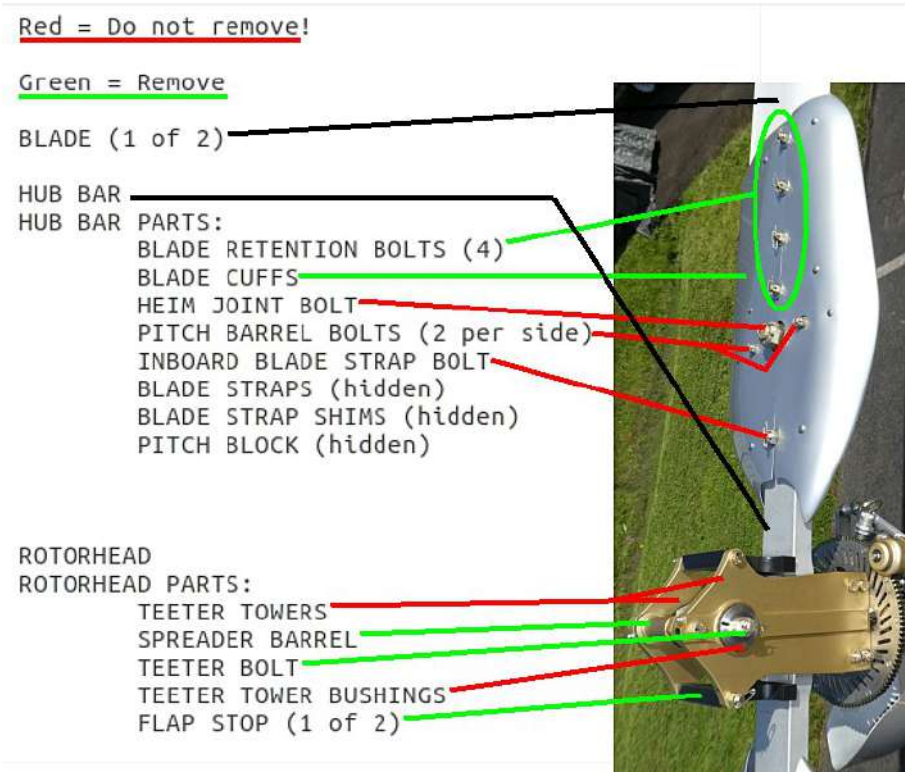
2. Remove and discard cotter or safety pin and tilt the blade and balance lightly on the teeter stop and remove the teeter bolt. This can be done simply by hand — DO NOT USE HAMMER & PUNCH!

3. Have a second person hold an individual blade in the middle while you stand on a ladder and lift the hub bar off the rotorhead. Set the hub bar on top of the ladder, then climb down. Grab the root section of your blade and take off ladder and carry.

4. The rotorblades must not be placed on a dirty or grainy surface, as the blades can scratch and damage easily. The rotor blades should be placed on two stands (one each side, approximately 6' from the hub bar) so they are supported in the middle to prevent them from falling of moving.

SCII rotor blades — removing from hub bar

LEAVE ALONE | LOOSEN | ADJUST | REMOVE | INSPECT



Disassembly:

1. To disassemble the blades, place it upside down onto a clean surface or stand to support the blades.

2. Loosen the locknuts on the first blade by counter holding the corresponding bolt head to prevent it from turning inside the blade holes.

3. Push out all the fitting bolts without any force, but use not more than gentle tapping if necessary.

4. Carefully remove the blade from the retention straps in radial direction.

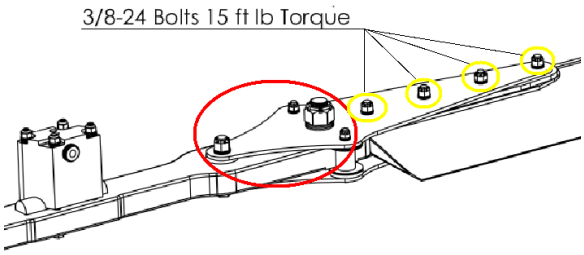
5. Repeat steps 2-4 on second rotor blade.

6. DO NOT DISASSEMBLE THE HUB BAR. Store and transport rotorblades, and hub bar only in the provided crates and foam, to prevent bending or surface damage.

FAQs_____FAQs

Q: *"Must the blade straps be removed? "*

A: All Sport Copter hub bars come with blade straps and (on 8.5" and 9" blades) pitch barrels already installed. **It's neither necessary nor advised to remove the straps** when removing blades from the bar.



Q: *"Why are the hub bar and blade strap bolts 'upside-down'? "*

A: Normally, bolts are installed with head on top, using gravity for emergency retention if the nut comes off. However, we prefer the fastening hardware atop the blade, protecting it from bird strikes.

It is also more aerodynamic to have the bolt heads on the bottom.

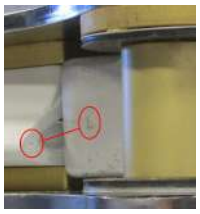
You'll need a small ladder during pre-flight to confirm fastener integrity.

Q: *"Why is the hub bar bead blasted? "*

A: To inhibit micro-crack initiation and propagation. In metal, the tiniest of scratches can act as a stress riser to invite cracking. On a smooth or polished surface, a small crack can easily propagate. However, a bead-blasted surface isolates nicks and scratches so that they cannot easily grow and compromise or fail the part.

Any scratches later should be polished smooth, and then the surface lightly tapped with medium-coarse sandpaper to imprint an approximate of the former bead-blasting.

Q: *"Does it matter if Blade A is attached to Bar Side-A? "*



A: Yes, because the entire rotor length (bar with both blades) is balanced, flown, and tracked with A-A and B-B mounting. Furthermore, always lower the Side-A rotor into Side-A tower (it should be marked with a Sharpie). Reversing such will produce a perplexing imbalance in a previously smooth rotor.

Q: *"Are the cotter pins all in line for looks?"*

A: No, for safety. By pointing the pins toward the centrifugal force, the head will retain the pin if the ends are lost. And, it looks better that way!

SCII rotor blades — attaching to hub bar

LEAVE ALONE | LOOSEN | ADJUST | REMOVE | INSPECT

Although an experienced person can wrangle this procedure alone, having help makes it much easier. Taking the hub bar from its shipping crate, each end will look like the above (marked A and B). Notice the larger nut washers are stood off from the silver plates by a pair of AN-washers. This is to provide clearance for the painted fiberglass cuff halves (as shown at right).

Each hub bar side, **A** and **B**, has a pair of gold anodized blade strap shims. They are marked **Top** and **Bottom** (in relation to their blade in between), and then also **Up** (towards the sky). *I.e.*, do not confuse "Top" with "Up" as they are not synonyms. In the above photo, note the shim marked **B Up Bottom**.

To install the blades within the straps/shims, first set up a line of equal height sawhorses. An inner pair will support the hub bar, and outer sawhorses support each blade at about their mid-point.

Handily arrange all retaining bolts/washers/nuts. (All bolts are of equal length.)

TOOLS NEEDED: long tapered drift pin to line up this five-layer strata of parts
high-quality and recently calibrated torque wrench.

Slide Blade A into the hub bar Side-A. This will be the tightest fit at the inboard hole, so slightly angle the blade up and down to ease it in. *Gently* use the tapered drift pin to wiggle the stack and line up that hole for the bolt. Insert (do not hammer!) the inboard hole bolt, then add its stack of washers (two AN beneath the larger stainless), but do not fully tighten the nut as you will need some parts slack to pivot the shims for lining up the other holes.

Use the drift pin to gently line up the holes inboard-out, inserting bolts and fasteners along the way. The outboard bolt will be last, as the straps have the most "spring" there.

Before tightening the nuts, rotate the bolt so that the cotter pin holes are in line with the blade. Sequentially torque in 60 in/lb (5 ft/lb) increments, inboard-out, to a max of 190 in/lb (15.8 ft/lbs). (Do not loosen from 190 in/lb to line up the castle nut, but torque further to 204-216 in/lb if necessary.) Install the safety clips with the ends pointing toward the blade end.

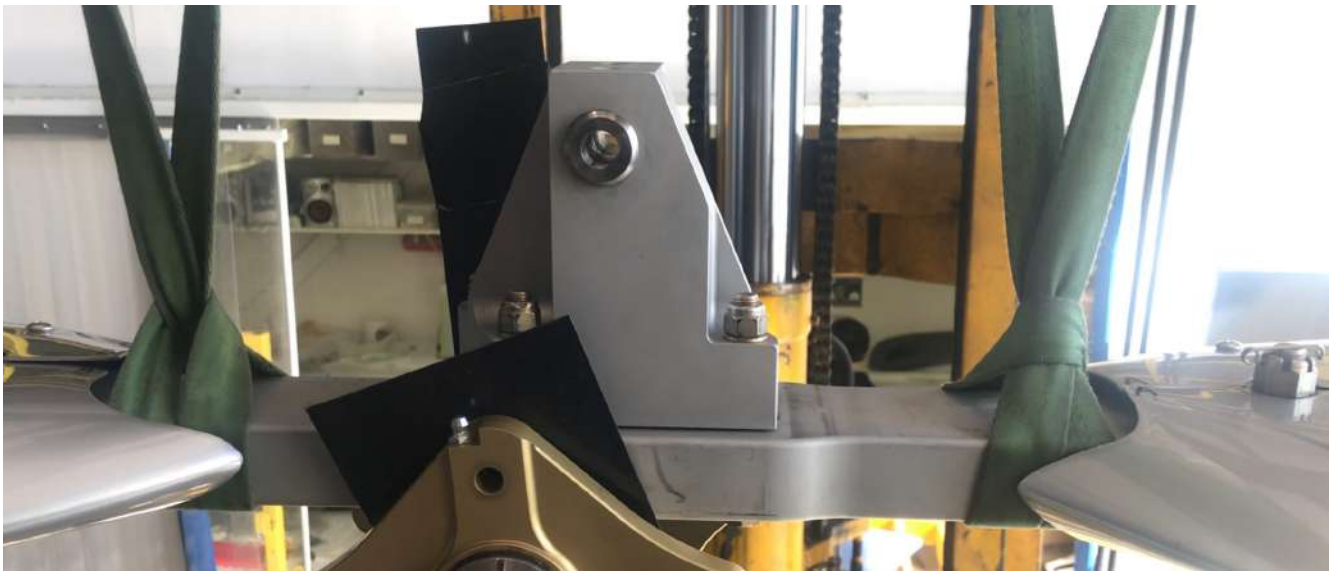
Install Blade B with the above procedure.

Attach the painted fiberglass cuff halves to the hub bar brackets, tucking the sides underneath the stainless washers.

SCII rotor system — installing in teeter tower

LEAVE ALONE | LOOSEN | ADJUST | REMOVE | INSPECT

The hub bar (with blades) is now ready to be installed in the teeter tower. If lifting straps are used, it is important to alternate the loops around the hub bar to cancel out each strap's twisting force on the rotor. See photo below. (Otherwise, the hub bar will rotate under load and catch a corner on the bushings.)



Since the cuffs will interfere with laterally sliding the hub bar to center the thinner section, you must shim the thicker section of the bar from the inside of the teeter tower bushings. Plastic shims about 0.020" work well. Once shimmed as above, the bar can be gently lowered through the teeter tower bushings.

Do not allow the teeter bushings to drag on and score the hub bar!

Insert the teeter bolt. Since the rotor weight makes it difficult to line up the holes:

either hoist up slightly to line up bolt (squeeze straps for micro-adjustment), or, tilt the blade back to leverage itself up from the rotorhead bottom plate.

NEVER hammer out or in any rotorhead or blade bolts. There is always a proper way to reduce bolt tension for easier sliding. If unsure how, just call us.

Finger tighten (for now) the teeter bolt nut. Remove the lifting straps.

Install the the two flap stops, with their respective bolt heads facing direction of rotor rotation. Finger tighten (for now) the nuts.

Now torque the teeter bolt nut to 20 ft/lbs and install its safety clip (preferably pointing down).

Insert the spreader barrel and bolt, rotate the barrel until snug inside towers, torque nut to 15 ft/lb.

Finally, the flap stop bolt nuts are tightened to the nearest cotter pin hole, leaving the flaps free to move.

Confirm that the stop plate on the bottom of the hub bar and the teeter stop plate on the rotorhead is what limits teeter travel, instead of interference between the hub bar stop plate and the rotorhead hardware.

8.10 Road Transport

If road transport cannot be avoided, transport with minimal fuel. Furthermore, it is recommended that the rotorblades be packed very carefully, as even the smallest damages may force the replacement of the complete system.

8.11 Repairs

All repairs must be made in strict compliance with the maintenance and repair instructions.

8.13 Maintenance Obligations

REFER TO ENGINE MAINTENANCE MANUAL

25 Hour Inspection:

- Oil and oil filter (Tempest AA-48110-2)
- Air cleaner: service per manufacturers instructions.
- Spark plugs: check color/condition (never torque while warm).
- Radiator: clean. Coolant level: check.
- Prerotator inner flex shaft cable: remove, check condition, grease end, reinstall — check for breaking. (see next page)
- Bendix gear, and ring gear: check for excessive wear, lube
- Rotorhead: lube teeter tower bearings, flex-shaft
- Teeter bolt: check for fretting or unusual wear. Retorque.
- Rivets holding ring gear to ring gear plate: check for security.
- All rod ends in control system: check for side and end play.
- Tires: check for damage and correct pressure.
- Elastomeric rubber mast bushing: check.
- Belts: Alternator • Prerotator: check for condition and tension.
- Rotorbrake cable: check and lubricate.
- Walk-around to detect any fluid leaks: perform.

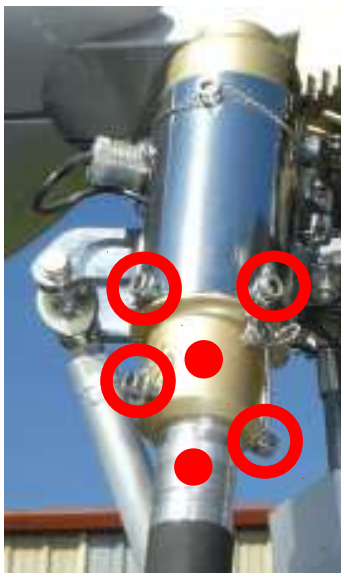
ENVIRONMENTAL NOTE

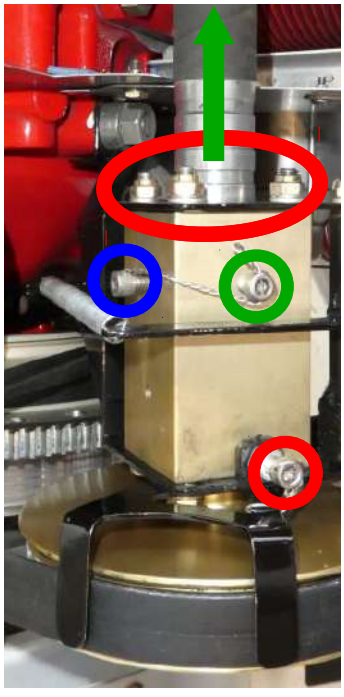
Do not harm the environment by spilling fluids. Work with the utmost care to ensure that no hazardous substances (coolant, oil, fuel) can penetrate into the soil, water, or sewerage system.

Dispose of fluids in an environmentally friendly manner at your regional waste facility.

SCII prerotator — greasing flexshaft

LEAVE ALONE | LOOSEN | ADJUST | REMOVE | INSPECT





The prerotator flexshaft sheath is held within the clutch housing and Bendix by two pairs of cap screws. (**It *may* be possible to leave sheath in the Bendix**, as instructed below, ***but if not*** then **remove** the Bendix bottom pair of cap screws.)

❶ **Remove** the engine cowlings.

❷ **Remove** safety-wires of the two cap screws.

❸ **Loosen** a screw. **Remove** the other in order to later inspect housing groove for reseating.

❹ **Remove** flexshaft sheath from clutch housing. **Remove** cable (it's pressed into the Bendix).

❺ Wipe off old grease, and **inspect** cable.

❻ Liberally regrease cable with Moly-Graph.

❼ *With a light touch*, reinstall cable by pressing square ends fully into both sockets as the clutch sheath end is fully reseated.

❽ Tighten the two retaining screws.

❾ Tug on each housing end to confirm retention. Hand spin pulley to test Bendix engagement.

❿ Safety-wire the two cap screws.

Service Interval: 25-100 hours, depending upon number and intensity of spins. Or, regrease every 50 spins above 230 RRPM.

Hard training: every 25 hours.
Cruise flights: every 100 hours.

50 Hour Inspection:

- 25 hour Inspection: complete.
- Propeller: check for security and condition, re-torque bolts.
- Engine mounts: check for wear and cracks.
- All rod ends in control system: Inspect.
- Rudder cables and horns: check for excessive wear.
- Nosewheel steering: check freedom of movement.
- Pedals: check freedom of movement.
- Wheel bearings: check for smoothness and end play.
- Rudder: check for cracks.
- Main control tube front and rear "L" bracket pivot points: check for excessive play.
- Mast and undercarriage: check for cracks or distortion.
- Belts: inspect all.

100 Hour Inspection:

- 25 and 50 hour Inspections: complete.
- Hub bar: check for cracks with 10X loupe and a dye penetrant.
- Teeter bearings: lubricate (Aeroshell 14, nothing else!).
- Rotorhead bearings: check for runout, rubbing, loss of grease.
- Compression on each cylinder: check.
- Cables: check all for wear.
- Fuel filter: change.
- 3/8" male rod ends in control system: inspect.
- Rotorhead bolts: check for proper torque and unusual wear.
- Engine cowl: remove, clean and check for cracks, distortion, loose or missing fasteners.
- Oil temp sender: check for leaks and security.
- Oil lines and fittings: check for leaks, chafing, dents, cracks.
- Cylinders: check for cracked or broken fins.
- Electrical wiring to engine and accessories:
  inspect, replace any damaged wires and clamps
  inspect terminals for cleanliness and security
- Magnetos: check timing and adjust if needed.

- Inlet line fuel strainer on carburetor: drain and clean.
- Induction air box: inspect for condition.
- Intake seals: inspect for any leaks and clamps for tightness.
- Crankcase: check for cracks, leaks, and security of case bolts.
- Engine mounts, baffle: check for cracks, distortion and security.
- Windows and windshield: clean and check for any cracking, crazing and general condition.
- Upholstery: inspect for any tears, fraying.
- Shocks and springs: check for cracks, threads and weakness. If any oil is visible shock should be replaced. Make sure nuts on top of strut are tight.
- Tires: check for proper pressure, cuts, uneven excessive wear and slippage.
- Wheels: check, remove, clean, and repack bearings.
  Note: Sport Copter offers a conical bearing upgrade package for reduced maintenance and longer service life.
- Fan belt: check every 100 hours.
  use *only* Optibelt Red Power #ARP77
  (Note: We've tried other belts, and they all will slip off.)
- Bare steel shafts (axles, fan): for rust-prevention, apply a thin uniform coating of red & tacky NGLI-2 lithium grease:
  Valvoline  or Lucas 
  Also, check whenever grease may have rubbed off.

200 Hour Inspection:

- 25, 50, and 100 Hour Inspections: complete.
- Roll bushing: relube with #030-061 (SS mounted in Urethane 030-010) with Dielectric grease.
- Torque tube and lateral movement block compound: relube.
- Alternator: remove and inspect brushes and bearings.
- All 3/8" male rod ends in control system: replace.
  (OEM is Aurora, and a pair of them are special order. Call us.)

300 Hour Inspection:

- 25, 50, 100, and 200 hour Inspections: complete.
- Fuel hoses: replace all.
- Throttle shaft: check for excessive wear.

2000 Hour Inspection:

- All previous Inspections: complete.
- Lycoming IO-360 engine: overhaul.
- Rotorhead gimbal AN bolt & nut: replace.
- Pair of rotorhead 7306 bearings: replace.
  use only FAG 7306-B-TVP-UO, or SKF 7306 BEGAP
  (They must be mounted *only* in "back-to-back" orientation!)