

Composite FX

Mosquito Helicopter

OPERATING / FLIGHT MANUAL



COMPOSITE FX

COMPACT
RADIAL
ENGINES

INSTRUCTION AND MAINTENANCE MANUAL



MZ 202

We recommend reading this manual before installing or using the engine

Compact Radial Engines Inc.
43-8471 12th Street
Surrey, B.C.
Canada V3W 4G4

Composite FX

Mosquito Helicopter

ASSEMBLY AND OPERATING MANUAL



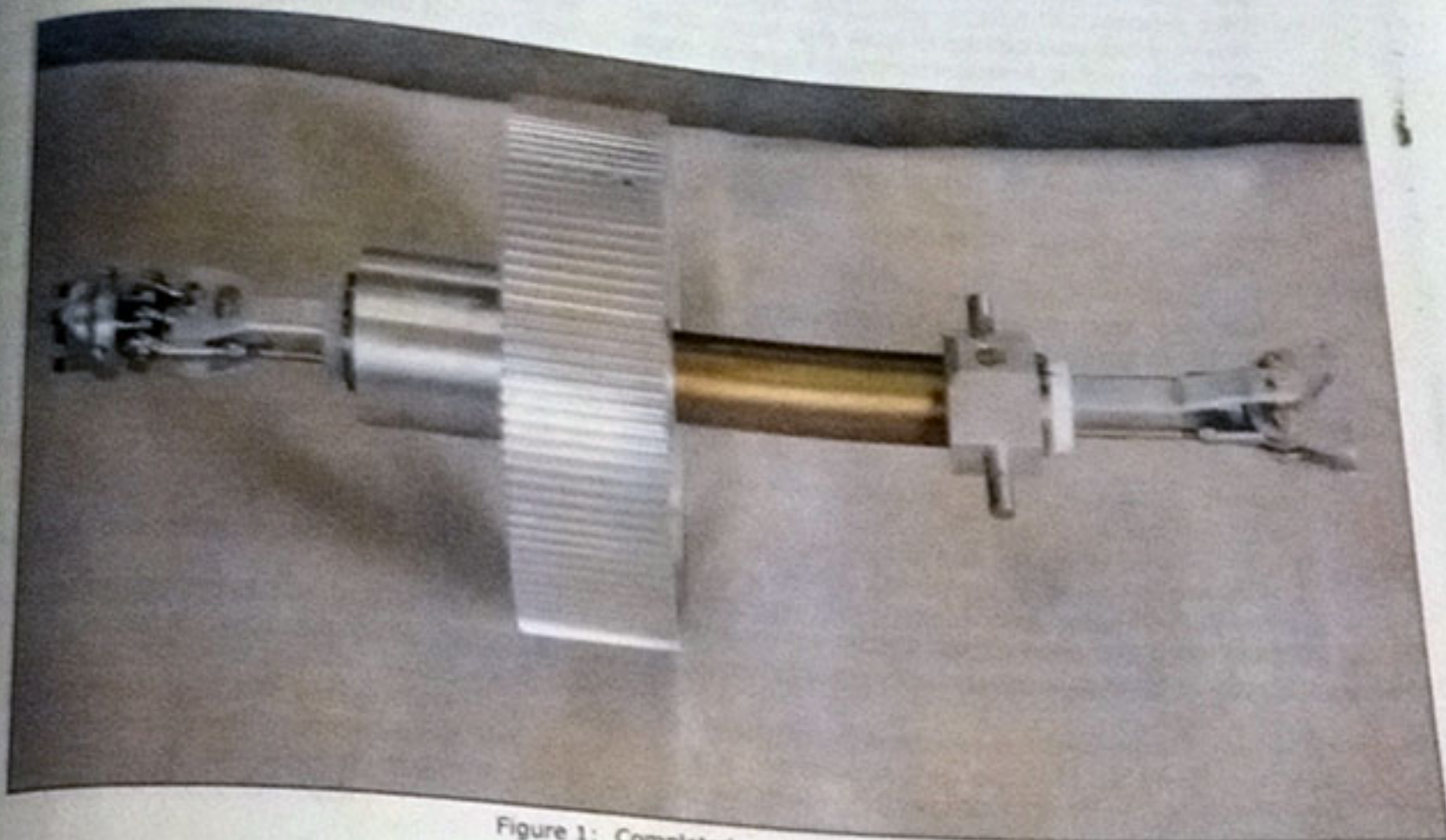


Figure 1: Completed rotor mast assembly.

3.1 Push Tube Assembly

Required Parts And Supplies:

- 1 Rotor Shaft [A-03] (Dwg 25)
- 2 Rotor Shaft End Plugs [50-05]
- 1 Collective Push Tube [50-01]
- 4 6-32 X 1/2" Socket Head Cap Screws
- 4 6-32 X 3/8" Socket Head Cap Screws
- 2 Control Rods [49-02]
- 1 Rotor Pin [25-05]

Fabricated Parts:

- 1 Push Tube Assembly
- 1 Rotor Shaft Assembly

Notes:

- This assembly takes control inputs from the swash plate and presents them to the main rotor butterfly bellcrank.
- The top of the push tube [50-01] is the forked end.

- The teeter block is the octagonal block with two threaded shafts perpendicular to two holes on the top of the rotor shaft assembly [A-03].
- One end of the rotor pin [25-05] is chamfered.

Procedure:

A) In preparation, use a 6-32 tap to clear the threads of the four radial holes at each end of the rotor shaft [A-03] tube. Use a light lubricant and be very careful to apply only light torque to avoid snapping off the tap in the hole.

B) Slide one of the rotor shaft end plugs [50-05] over the push tube [50-01] with the larger diameter of the plug toward the top (forked) end of the push tube (Dwgs 44, A1). The 1/4" holes in the plug must be adjacent to the non-slotted side of the push tube.

Sample page

The air cooled engine is different from the liquid cooled engines in that the CHT temperature will fluctuate so it is very important to monitor the CHT temperature at all times.

ADJUSTING THE CARBURETOR

Choke and idle adjustment.

1- Choke adjustment.

Before adjusting the idle, ensure that the choke screw is adjusted correctly. This must be done on a warm engine; the screw is located to the left of the idling mixture adjusting screw in the main body of the carburetor.

- Switch off the engine and twist the air screw all the way (without applying excess force) then loosen by turning out the screw (1½) Turns.
- Start the engine, adjust the idler screw so the engine is running at the same speed or faster and adjust accordingly.
- To do so, turn the air screw slowly in the appropriate direction; this operation should only be attempted with the engine mounted on a test stand or by trial and error with the engine switched off, due to the proximity of the propeller.
- It may be necessary to give the screw a ½ turn more or less than the prescribed amount.

2- Idle adjustment.

The minimum number of revs is 1500 rpm. If the idle is not adjusted correctly, the engine will run irregularly. To adjust, turn the large, external screw in or out accordingly.

Throttle cable

- Once the throttle cable has been fitted, adjust the freeplay between the carburetor and the throttle lever by acting on the tensioning device.
- Set the throttle lever to minimum.
- Check that the carburetor slide is free to move and that the cable sheath has less than 1 mm of freeplay (check by pulling the sheath). If necessary, adjust the cable adjusting nuts to achieve the proper end play.
- Check that the two carburetors open at the same time. **It is advisable at this time to syero-nize your carburetor use an appropriate carb sye tool.**

Choke cable,

The choke cable should have 2-3 mm of freeplay so that the slide is completely free when the choke is not in use. Adjust by acting on the relative tensioning device.

Safety, Operational Limits & Inspections

1.8 Preflight Inspection - XE & XEL

Always start at the front left (port side) of the aircraft and finish at the front right (starboard side), progressively circling the aircraft

Port Side:

Skids/bows - verify: support cables secure, rivets secure, skid brackets and hardware secure and free of nicks, cracks, fractures, holes, or other anomalies.

Foot Pedal Assembly - verify: full and smooth pedal travel, full tail rotor movement, no rod end play, all bolts and rivets tight, cable bolt tight, no bell crank pivot bearing play, pivot bearing retention bolts tight, pivot bolt tight, no axial play of the pitch link rod ends, rod end bolts tight, and overall integrity of the whole assembly

Instrument Panel - verify: instruments secure, wire sockets fully engaged, pitot/static tubing in place, rivets secure, bracket integrity, panel integrity

Body Integrity - verify: no cracks, fractures, holes or other anomalies in cabin, keel, seat support stringers, torque tube, firewall

Windscreen - verify: cleanliness, no cracks, crazing, loose rivets, or other anomalies

Seat - verify: mounting hardware secure; no cracks, fractures, holes, or other anomalies present, overall integrity

Cyclic lever - verify: full and smooth travel in all directions, no pivot bearing play, pivot bolt tight, rod ends secure, support rivets secure, support integrity, push pull tube rivets secure

Collective lever - verify: full and smooth travel, security of the slave lever, torque tube, correlator, all rivets secure, no rod end play, full travel of throttle, throttle cable sleeves secure, no fraying or end play of the throttle cable integrity assembly, and overall lever assembly integrity.

Control Mixer - *lift collective lever, and view under seat* and verify; collective slave lever integrity and smooth travel, no rod end play on any of the rod ends, rod end bolts tight, control tubes secure, no interference through the complete travel motion, and freedom of travel, overall component integrity

Swash plate - verify: bolts tight, no rod end play, no bearing play, no play when moving the anti rotation stationary plate bolt in slot back and forth, push tubes secure, *lift collective full up* to check push tubes and rod ends for proper travel and no interference, overall assembly integrity

Engine mounts - verify: mount and mount brackets secure, integrity of the rubber bushings (*seating and condition*), mount plate integrity, mount bolts tight, and overall integrity of the assembly

Engine - verify: carburetors secure, no cracks or tears in the rubber carburetor couplings, air cleaners secure and clean, throttle cables secure, CDI mounts secure, all wiring (*regulator, instrument senders, plug etc*) secure and in good condition, no oil seepage, fan integrity, fan shroud secure, exhaust and exhaust mounts secure, and overall engine integrity

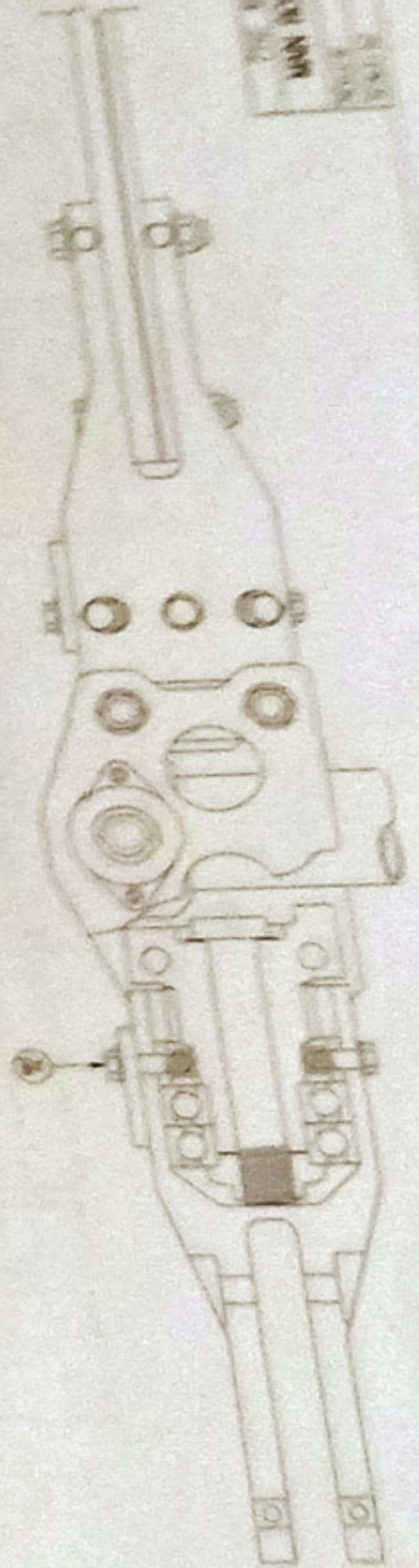
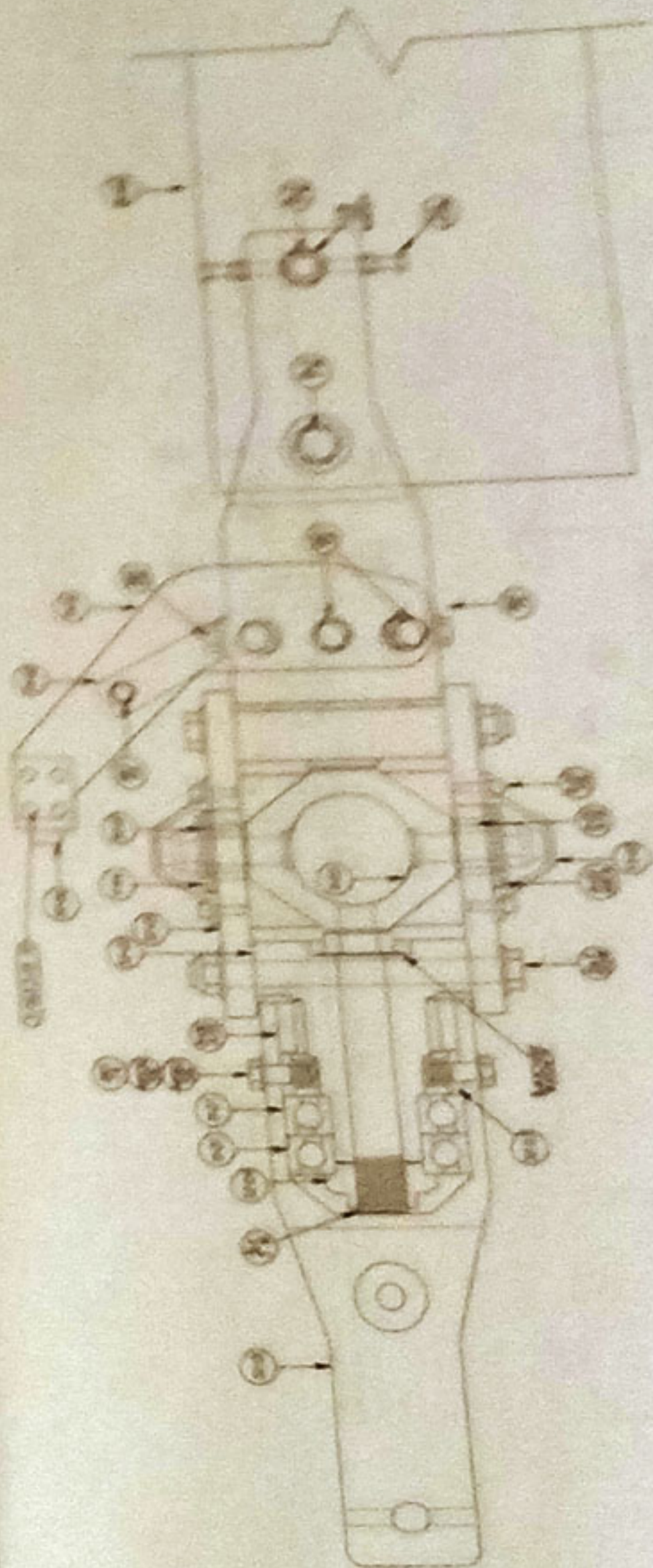
Drain Fuel Sump - verify fuel flow and condition of fuel (condensation, plugged fuel filter, dirt etc.)

Primary reduction - verify: centrifugal clutch secure, sprocket/belt in good condition, proper belt tension and alignment, sprague clutch operation (*spin and engage reduction*), no bearing play (*move sprocket edge up and down*), bolts tight, overall component integrity

Drive shafts - verify: all bolts tight, shafts and flex plates secure and with proper flex plate movement, no flex plate damage, no coupling damage, coupling set screws tight, overall assembly integrity

Tail boom - verify: flange integrity, bolts secure, no control cable chaffing, no delamination, no cracks, fractures, holes, or other anomalies, and overall integrity

Sample page



MAN INCH HEAD
1/2" = 1"

Build record—Sample page

MONDAY, AUGUST 13, 2007

LAYED OUT PITCH ARMS AND ENGINE MOUNTS

TUESDAY, AUGUST 14, 2007

DRILLED AND INSTALLED SS RIVETS IN THE ENDS OF THE CONTROL TUBES

WEDNESDAY, AUGUST 15, 2007

ATTACHED THE ROD ENDS ON THE CONTROL TUBES

THURSDAY, AUGUST 16, 2007

ATTACHED THE CONTROL TUBES TO THE LOWER PITCH ASSY. AND ATTACHED TUBES TO UPPER MAST ASSY.

SUNDAY, AUGUST 19, 2007

FABRICATED CYCLIC TORQUE AND ROLL TUBES/ ADJUSTED-ALIGNED CONTROLS OUTSIDE THE HELICOPTER

SUNDAY, AUGUST 26, 2007

WORKED ON THE SECONDARY REDUCTION WITH DAD/ INSTALLED MAST AND TUBES IN THE HELICOPTER

MONDAY, AUGUST 27, 2007

FABED PITCH HORNS / FABED HALL EFFECT SENSOR BRACKET

WEDNESDAY, AUGUST 28, 2007

BENT THE PITCH HORNS WITH MY HARBOR FREIGHT BENDER

THURSDAY, AUGUST 29, 2007

SAFETY WIRED THE BOLTS THAT ATTACH THE UPPER ROD ENDS TO THE SWASH PLATE

SUNDAY, SEPTEMBER 2, 2007

ATTACHED THE MAIN MAST ASSY. TO THE COLLECTIVE-CYCLIC ASSY. IN THE HELICOPTER/ SAFETY WIRED ENGINE MOUNTS TO THE ENGINE BLOCK

MONDAY, SEPTEMBER 3, 2007

ASSEMBLED THE TAIL ROTOR DRIVE SHAFT

SUNDAY, SEPTEMBER 9, 2007

INSTALLED ANTI-TORQUE GUIDE FOR SWASH PLATE/ FABED CYCLIC TUBES PITCH AND ROLL+INSTALLED AND ADJUSTED

MONDAY, SEPTEMBER 10, 2007

SANDED AND FILED THE BULK HEADS IN THE FUSELAGE TO ACCEPT THE CONTROL TUBES

WEDNESDAY, SEPTEMBER 12, 2007

INSTALLED BATTERY, PEDAL PIVOT PLATE AND T.R. CABLE BRACKET (FRONT)/RELOCATED COCKPIT LIGHT/ ATTACHED AIRSPEED INDICATOR TO PANEL

SUNDAY, SEPTEMBER 16, 2007

ORDERED FUEL PUMP FROM AIRWOLF.COM

THURSDAY, SEPTEMBER 20, 2007

INSTALLED PRIMARY REDUCTION MOUNT. SAFETY WIRED REAR BOLTS AND INSTALLED SET SCREWS IN THE FRONT BOLTS TO SECURE THEM

SUNDAY, SEPTEMBER 23, 2007

INSTALLED DRIVE SHAFT AND FRONT GEAR BOX/INSTALLED T.R. CABLE/INSTALLED THROTTLE SPLITTER/INSTALLED AND MADE SUPPORT PIECE FOR FUEL PUMP

MONDAY, SEPTEMBER 24, 2007

ROUTED ENGINE TEMP. WIRES AND INSTALLED SPARK PLUGS

THURSDAY, SEPTEMBER 27, 2007

PRESSED LOWER HOUSING ONTO SPROCKET OF THE PRIMARY REDUCTION/PUT NUTSERTS IN SIDE PIECES/BOLTED BOTTOM TO THE SIDES WITH THE BELT INSIDE

SUNDAY, SEPTEMBER 30, 2007

TEST FIT THE DRIVE SHAFTS RELATIVELY TO THE GEAR BOX AND PRIMARY AND SECONDARY RED. NEED TO MOVE THE GEAR BOX FORWARD 1/8 OF AN INCH AS ALLOWED FOR IN THE INSTRUCTIONS.

MONDAY, OCTOBER 10, 2007

FABED. REAR GEAR BOX SUPPORT PLATE ROUND THING WITH HANS

WEDNESDAY, OCTOBER 12, 2007

FABED. AUX. TANK MOUNTS OUT OF ALUMINUM ANGLE AND S.S. STRAP

