SKY MASTER MAINTENANCE AND TROUBLE SHOOTING

AIRFRAME=

AVIONICS COMPARTMENT =

-if not sealed properly with some good industrial ;silicon seals ;may cause significant damage to avionics ,the silicon seal condition should be checked every 25- 30 hrs ,specially when aircraft is not hangered all the time,

FUEL CAPS =

-AD-79-10-14-R1 fuel caps replacement,

-Fuel cap STC ,highly recommended, STC NR 728NW &SA3318NW ,held by Davis Haward Venting Engineering Washington.

-Another STC of fuel caps is held by Mr Charles, Flight Bonus Inc.Texas

FUEL CAPS AND WATER DRAINAGE LINE,

-Periodically replace the seals around the base of these fuel caps ,make sure drain tube 1/8 inch. Of size Which passes thru the tank before exiting over board is clear and ;NOT BLOCKED ;must be checked at every annual and should be cleared with some pipe cleaner tool .

BOOTS TREATMENT =

3 parts Good Rich, solution age master+ shine master+ Ices treatment for aging boots is good.

-Janitrol Heater, C &D associates in Benton Harbour Michigan for heater repairs

-Eddy current inspection on Boom attachment to the wings, can be performed to the aging aircraft

-Serial Nr 1852 And Onward wings were Beefed up ,so spar inspection is at 10000 hrs(not required under Part 91)

-PROPS should be dynamically balanced every year, will lessen wear and tear on engine mount, rubbers, exhausts etc

-FIRE EXTINGUISHERS- Pacific Scientific holds STC nr SA 660WE, kit nr 301 800 20

PRESSURISATION LEAKS=

One of the culprit can be, cone shaped aluminium tube on right side of rear engine top, its held by 4 screws, it some times; CRACKS; and will cause lose of cabin pressure, its called; SONIC VENTURI; its connected to the Induction System via short Rubber hose, check the condition of this Rubber hose too.

CABIN FLOOR SEALENTS=

Do not use; Pro seal or RTO, recommended is; Sky Flex by GORE or CS 5310NL two-part sealant made by Aviation products Inc. MIL -S-29574

Sound Proofing =

Soundex is good material with POLIBOND glue

-ANTI CORROSION -Beo shield from Chief aircraft, or Corrosion X

-FLAPS CABLES- advised to be inspected at annual, under; critical fatigue area

-OLD RUBBERS ON ENGINE MOUNT=

-if engine mount rubbers have given up and are too old, engine will be lower than specifications and exhausts pipe might touch mounts, or other parts, which will cause wear and tear of the exhausts pipes, and damaged pipes may cause fire

-Concord Batteries are one of the best

TRIM TAB ACTUATROS=

when lastly they were overhauled? Have good inspection of them.

FUEL SELECTOR VALVES-=

If they have friction or sticky, the balls can be cleaned and relubed inspect the cable friction ,cork gaskets , better to overhaul the valves. If they were never overhauled.

FUEL STRAINERS=

-Check condition on every annual

-BRAKE LINE LEAKAGE-

Some times this can be fixed ,just replacing O-RINGS

COWL FLAP MOTORS=

Some time malfunction might be due to the damage cable of the motor, at the point where the cable exit the motor housing, put some Red RTO tape to protect the cable

-Clean the motor brushes with some electrical cleaner ,get them rewind ,clean lubricate the gears and they might be good to go.

FUEL RESTRICTOR =

should be installed, wrong fuel has caused some accidents in the past.

-Air- Oil filter is good thing to have, can be obtained from M2 OR www.airwolf.com.

-ALL HOSES =

- carrying fluids should be fire sleeved , just good airmanship, good source is www.aircraftose.com

-ELEVATOR HINGE BOLT =

-needs bit more Torque than factory setting, should be inspected at each annual

-FIRE EXTINGUISHER-

Halon Fire suppersion type should be used.

FUEL INKECTION LINES =

should be inspected at every annual, broken lines have resulted in engine failure during take off

-BUNRING SMELL INTO THE CABIN DURING FLGIHT-

one reason might be , if every thing else is ok, Turbos are working hard , they have oil which may leak, which is then fed into the cabin with pressurization.

PRESSURISATION LEAKS=

-One of the culprits may be black heating ducts in the nose , replace them with ;Skeet Ducting;

NOSE GEAR =

Down lock consists of two halves, left and right, they are connected by plastic pin(older models) check the pin, if it broken the two halves will not work properly

-NOSE GEAR DOOR DO NOT CLOSE AND MOTOR KEEP RUNING OR CB POP OUT

-Is possible that rubber Bus Bar cover in the nose well became loose ,inspect and fix.-

-LANDING GEAR HOSES=

for the down lock should be installed/placed ;RELIGIOUSLY; if NOT ,hose can push the lock out of its fully retracted position

POWER PACK OPERATIONAL TIPS =

hoses position, gear set geometry should be as per MM. and thoroughly checked at each annual

-Operation and correct position of all the micro switches should be checked regularly , as they can be out set by air loads ,

-Seals in Perfect condition, fluids quantity as per MM.

-Keep good check of all wiring and connection to the switches.

-Pressure switches should be cleaned off from time to time.

-Solenoids seals clean them up on annual as they tend to gummed up .

-Check up lock rigging ;strictly as per MM.

-Hoses from down locks ;MUST ; be in correct position with no ;TWISTS; other wise this twist will cause trouble.

- Deploying Speeds 110 to 120 kts will create much less air loads and will enhance the life of the system.

-Preferably deploy the gears when in straight and level flight

-Deploying in gusty winds stronger than 18- 20 kts ,cause higher stress on the gears.

-When u cycle the gears up or down , you are getting the light indications, if light indications are there but handle is not fully at neutral position, then culprit might be the Switch on the Power Pac

But if there is no gear lights indications, at all then probably is gear switch, get them check for internal cracks, due to the age of the Skymasters

ORANGE/AMBER LIGHT ON=

If its ;ON it shows that all 3 switches are closed and power if being applied to the landing gear door solenoid, allowing hydraulic pressure to close the doors.

GEARS WON,T RETRACT/DEPLOY=

Might be Dirty solenoids, clean them they are located on located on the pump pedestal ,on each side by Pilots feet pedals

-POWER PAC DEPLOYING CONSIDERTIONS-

Power Pac needs healthy battery and also alternators, , if u have low Power settings, for example during descent, you might run out of deploying power, Good practice is while deploying gears you have MP and RMP 25/25 inches

-Also battery should be load tested on each annual.

-GEAR DOORS COME OPEN DRUING GEAR UP OR DOWN PROCESS=

-To keep the gear doors closed ,power is removed from the door solenoid so any open circuit(interruption of power) will cause the door to come open, so check the power solenoid switch to remedy.

-NOSE GEAR WIRING=

-Nose gear wirings should be placed/located ;Religiously as per factory instructions, if they hang even few Milimeters low ,they can become vulnerable to pinching between the ;Down Lock; and adjacent airframe panel

-GEAR PUMP KEEP RUNNING AFTER GEARS ARE UP=

-The pump will stop running after it achieves approx. 1500 PSI ,If it does not, either its not achieving this pressure value or the pressure switch might the culprit, Inspect and clean the switch, use the pressure gauge and external pressure switch so it ;TIPS ON; at correct pressure value

-Some times gear up ;position switch ; needs adjustment, Pull the CB of the position Switch out for few seconds and then push it in the hydraulic pump motor will stop running.

GEAR WARNING HORN BEEPING=

-Micro switch may have got water, clean it off and seal with good silicon ,Micro switch is located on the front and rear engine.

-Make some shield cover for the wire protection .

POWER PLANT ISSUES=

AD 2016-16-12 =

-Removal of cylinders produced from 2001-2009 , study the AD

VAPOR LOCK

-to prevent ,Insulate the fuel lines from gascolator to fuel pump with material called thermo shield ,can be bought from aircraft spruce.

WASTE GATE =

-lubricate the waste gate at every oil change

HEATED MANIFOLD=

for the pressurised sky masters which fly at high FL ,Ram Aircraft has STC

-TOO HIGH EGT=

-Is indication of ;clogged injectors;

FUEL PUMPS =

should be checked on each annual for right pressure settings, (may cause lose of MP if out of parameters)

-ENGINES DO NOT HOLD PUBLISHED POWER SETTINGS=

-Check ,turbos, fuel pumps settings, waste gate, or Exhaust leaks

-If you have oil type vacuum pumps, put cooling shroud for longer life

ENGINE DROP POWER WITH ALTITUDE=

-the altitude compensation seal in the fuel pump may not be working,

SOME GENERAL TIPS=

-In Line waste gate filter works better than original set up.

-Insulate crankcase ventilation line for better life .

-Turbos should spin freely, if not need overhaul.

--Fuel spider /divider. Check on each annual.

-After start up if you remove the fuel boost pump and engine quits , and needs low boost to stay alive , and needs 3- 5 mints. warming before you can remove the low boost, Check fuel/manifold divider also called ;SPIDER; might have busted and leaking diaphragm.

-Oil leakage from engine, also check gaskets, alternator seal around the alternator shaft.

-Install new FM oil filters than old SCREEN type

-Thermo shield the exhaust pipes covers

-Manifold pressure leaks and split

-Both engine should read same atmospheric pressure when engines are OFF

-Manifold leaks are often due to cracks/leaks into one of the copper lines(front and rear), so check the split NUTS on the manifold pressure coper line, where it is going thru the firewall .

FUEL SPIDER =

-Its central point where fuel comes up to from fuel pumps via valve on the throttle and act as a final fuel filter and distributes the fuel to all injectors

-Its also functions as fuel cut off to the engine, when fuel pressure goes below 3-5 lbs markings ,making engine shut down with out ;Baking

-Due to age the rubber diaphragm gets hard and fails to provide to the engine amount of fuel it needs to run, there is also a small mesh screen inside the spider body ,which should be removed and cleaned on annuals.

-When u Idle cut off and engine does not shut correctly ,fuel prime line should be checked for condition and changed if required.

-Fuel Injectors clogging may result in Excessive fuel flow indications

-Fuel system should be strictly set up as per TCM manual

LOOSING MANIFOLD PRESSURE AT ALTITUDES=

There are can be many causes ,like as follow

, set waste gate as per book, which says ;COMPLETELY CLOSED; very rare A/C have this kind of set up.

-Check the tubes if they are not leaking or other loose fittings, clean waste gate actuators , and check the rubber hose that connects the sections of metal ducting.

-Check there is no Axial play in the shafts of Turbos.

-Check exhaust system for leaks

-Check variable absolute pressure controller

-Checks for leaks in induction system

-Leaking fuel strainer gasket will introduce AIR into the fuel and will cause engine surging and under performing.

ELECTRICAL ISSUES=

-ALTERNATOR GOING OFF LINE OR NOT PRODUCING ENOUGH POWER=

-Make sure the diods and coils are not soldered to the lugs and fuses make good contact.

-Check all connections with OHM meter including field breaker and main fuses

-Check alternator general condition, grounded well and straps from engine.

-All connections clean and tight

-Load test the battery, if there is bad connection or bad internal connection to the plates, the battery will open and overvolt could possibly occur.

-Check overvoltage protection unit.

FLICKERING ALTERNATOR LIGHTS=

-Are caused due to rapid fluctuation in out put voltage of the alternator ,which is caused by high resistance in the field or VR circuits

-Replace the alternator field switch with high quality unit.

-Thee is also very good STC to change the alternator with voltage regulators like in 400 series Cessna,s , and they work in Parallel, as compared to in series (skymasters) and in my opinion are much better solution.

VOLTAGE REGULATOR SET UP=

-Set it at 1700 RPM & at 27.5 volts, Manual says 1200 RPM and at 28.5 volts, but it does not work out.

RED HI;VOLT LIGHT ON=

If it comes on, some equipment will fail, ammeter will be the good clue too

-When u shut down the engine and HI/LO light stays on ,HI/LO Sensor is ;INOP;.

COWL FLAP MOTOR=

-They can have old worn out wires, check wires itself before overhauling the motor, clean the brushes

MORE TIPS=

-Over voltage will trip the alternator off line, if load is above 32 amps.

-Better to have digital read out of bus voltage ,on the panel ,if plane is NOT equipped with modern engine monitor.

-Replace old voltage regulator with new solid state type ,costs around 200 USD.

-Week battery some time will also cause tripping off the alternator,

-Battery discharge light INOP, May be due to loose wire and pin in the harness, that connects to the over/under voltage Box.

-Most of the electrical problems might be/are due to week battery, try to replace the battery first.

-FLASHING ALTERNATOR LIGHTS=

Is usually caused by high resistance point in the field wiring,

-Measure It in every connection in the field circuit and bus circuit ,if volt meter shows voltage change between 26-28 volts ,then check and measure across field alternator switch and CB. They are often source of high resistance.

-After you have verified above, adjust each voltage regulator independently to 27.5 -28.5 volts, which ever will work,

-If flashing do not go away , look for possible defective voltage regulator or problem with one or both alternators.

-Try to replace alternator field fuses Nr214 (center of forward fire wall),

-Another cause may be too old alternator restart batteries.

-Replacement of Master and Ignition switches recommended ,after 5 years or 500 hrs.

-Battery should have load test on each annual.

-If you can not restore the ;Charging system ; common area to look for the trouble shooting will be Bus Bar, CB, Wires ,

-If possible replace 40 + years old wires with Copper ones.

-if possible replace Aluminium bus with copper one.

-Good voltmeter is one of the best tool to trouble shoot the electrical issues and should be equipped with ;built in; continuity checker (tone or Buzzer).

-Also use O-SCOPES for electrical tracings and MAGS checks.

-Get the Battery Minder if u do not fly regularly.

-As wrote above very good solution is C-400 series parallel voltage regulators or Zeftronics solid state voltage regulators.

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ALTERNATOR TRIPPING/OFFLINE

There can be many causes ,

-First check batteries

-Check voltage regulators

-Bad master relay.

-Check voltage across all the system should not be over 28.4 volts

-May be Master alternator switch needs replacement.

-Check the diods in the landing gear system, they might be causing .voltage spike.

-Check condition of over voltage Relay, its located on right side of central pedestal, up high near firewall.

-Check all ;ground; wire installed properly.

-Change the CB on both Alternators,

-Unscrew and clean with good cleaner all 3 contact cylinders(they are on front fire wall on pilot side.)

-Clean the contact on voltage regulator and voltage circuit.

-Also the alternators are too old and too week , before replacing them do the following diagnosis

A)the 20 gauge wire feeding the circuit is protected by 5 amps CB, Skymasters are 40+ years old ,so replace that wire

B)Check the voltage to the input wire of each regulator, Pin 1, with out engine running, just Master/Alternator switch ;ON; It should read same voltage as battery.

-If not then not then check across MASTER/ALTERNATOR Switch ,to see if there Is internal ;contact ;problem causing the voltage drop. Its not uncommon for those switches to be High Resistance point, causing the charging system problems,

-Make sure all wires on these switches are in good shape and as well select the stand by regulator and check the voltage to that regulator too.

-If the voltage reading to the input, to the regulators matches to the battery, reading, then check the field terminal on the alternator, it should be very close to the battery voltage, Reading of couple of tenths of volt less is normal.

-Those checks will confirm the regulator circuits are in good shape.

-Alternator coupling is also very often the culprit, cooling fins of the alternator rotor should have fee movement.

-DIODS acts like check valves and send right current to the system ,very Often diods are old and making problems, new diods can be sourced out from Newark Electronics ,

-Check condition of Capacitors for alternators and replace if needed.

ALTERNATOR VOLTAGE SETTING=

-This setting Is very critical for the system to work properly.

-The front alternator should be set little lower than the Rear, in this way rear alternator is always taking the first loading and once its MAX out , the front will take over(in case of old series type voltage regulator system), and will come ON LINE. And will pick up the loading.

ALTERNATOR RESTART PRECEDURE=

-If voltage regulator drops off line, both alternator will stop charging the battery and depending on condition of battery you will soon have electrical failure.

TO RESTORE=

-MASTER =OFF

-RUN/STBY= STBY

-Now Master =ON

And alternator should start charging the system

-If u can not restore the charging system . common areas to look for troubles will be ,Bus Bar, CB ,Wiring

ALTERNATOR LIGHT COMES IIN IN FLGIHT=

-In flight if front or rear alternator goes off line, check voltage out put of each alternator separately ,it should be 27.5+- 0.2 volts, if they are out of adjustment one will kick other off line, solid state regulators can be bought from www.planepower.com.

WISH YOU ALL SAFE AND TROUBLE FREE FLYING))

DENNIS NAZIR

POLAND

POZNAN

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