N413AJ Checklist Version 6/10/11

PREFLIGHT INSPECTION

1. CABIN ITEMS
Control Lock – BELT REMOVE
Ignition Switch – OFF
Breakers – ALL PUSHED IN
Fuel Pump Switch – OFF
Gear Lever – DOWN
Battery Master – ON
Flaps – DOWN
Voltmeter – PITOT HEAT ON; OBSERVE VOLTAGE CHANGE
Gear Position Lights (Panel) – 3 GREEN ON
Lights – CHECK for Night Operations
Engine Page (Pilot Side) – CHELTON DISPLAY
Fuel Quantity Indicators – CHECK QUANTITY
Battery Master – OFF
Fuel Selector Valve – FULLEST TANK
Door Seal – CHECK CONDITION

2. EMPENNAGE/TAIL SECTION
Baggage Door – CLOSED and Secure
Static Ports – CLEAR, NO OCCLUSION
Access Panels – SCREWS TIGHT
Tail Tie Down – DISCONNECT, CONFIRM
Control Surfaces – FREE MOVEMENT

3. RIGHT WING (COPILOT SIDE) TRAILING EDGE
Main Landing Gear Doors – SECURE CLOSED
Copilot Flap – CHECK MOVEMENT <1/2”
Aileron – FREE MOVEMENT
Fuel Tank Vent (Wingtip) – NO OBSTRUCTIONS
Position Lights – INTACT, UNDAMAGED

4. RIGHT WING LEADING EDGE
Fuel Quantity – VISUAL CHECK, CONFIRM LEVEL
Fuel Filler Cap – SECURE TIGHT, CONFIRM
Speed Brakes – INSPECT CONDITION
Main Gear and Tire – INFLATION 55 PSI, DISCS, HOSES
Gascolator (Inside Cowling) – DRAIN FUEL SAMPLE
Wing Tie Down – DISCONNECT, REMOVE, CONFRIM
Nose Gear Doors – SECURE, SIDE MOVEMENT<3/4”
Nose Gear Wheel Well – INSPECT FOR LEAKS

Make sure batteries are OFF, Ignition key is REMOVED, and no one in or near the cockpit will activate engine or power supply.

5. NOSE – COWLING – FRONT OF AIRPLANE
Prop & Spinner – CHECK FOR NICKS, DAMAGE, LEAKS
Cowl Air Intakes – REMOVE INSERTS, NO OBSTRUCTIONS
Landing and Taxi Light (Left Cowling Intake) – INSPECT
Nose Gear and Tire – INFLATE 40 PSI, OLEO HGT 3.5”
Oil – CHECK QNTY **9-11QT**, TIGHTEN CAP, **DOUBLE CHECK**
Cowling Oil Door – CLOSE, SECURE; CONFIRM LATCH

6. LEFT WING (PILOT SIDE) LEADING EDGE
Nose Gear Doors – SECURE, SIDE MOVEMENT<3/4”
Main Gear and Tire – INFLATION **55**, DISCS, HOSES
Wing Tie Down – DISCONNECT, REMOVE, CONFRIM
Speed Brakes – INSPECT CONDITION
Fuel Quantity – VISUAL CHECK, CONFIRM LEVEL
Fuel Filler Cap – SECURE TIGHT, CONFIRM
Landing Lights (Wingtip) – INTACT, UNDAMAGED
AOA Ports – OPEN AND CLEAR
Pitot Tube – CHECK CONDITION; FEEL for WARMTH (IFR)

7. LEFT WING TRAILING EDGE
Fuel Tank Vent (Wingtip) – NO OBSTRUCTIONS
Position Lights – INTACT, UNDAMAGED
Aileron – FREE MOVEMENT
Pilot Tube – OPEN AND CLEAR
Main Landing Gear Doors – SECURE CLOSED

BEFORE STARTING

Preflight Inspection – COMPLETE

Gear Lever – DOWN
Flying Carpet – STOW
Door – CLOSED, LOCKED, PRESSURIZED
Battery Master – SWITCH ON
Enunciator Panel – TEST LIGHTS
Pressurization -- SET
Seats, Belts, Shoulder Straps – ADJUST and SECURE
Fuel Selector Valve – FULLEST TANK (Right for Left Traffic)
Avionics SWITCH -- ON
Chelton MFD Pilot Screen – PROGRAM, ENGINE PAGE
Radios – SET FREQS, ROUTING, OBTAIN CLEARENCES
Brakes – TEST and HOLD
Cabin Door – CLOSED, ALL LATCHES ENGAGED, SECURED
Oil Door -- PULL CLOSED
Autopilot Master Switch -- OFF

STARTING ENGINE

Battery Master – SWITCH ON (Hydraulics, Starter)
Hydraulic Pump – WILL ACTIVATE ON and PRESSURIZE
Gear Lights – THREE GREENS ON
Mixture -- RICH
Primer – PRIME FUEL SEVEN SECONDS (COLD=LONGER)
Strobe Lights – SWITCH ON
Propeller Area – CLEAR OF PERSON and OBSTRUCTIONS
Engine Page and EAU – ON AND DISPLAYING PARAMETERS
Fuel Pump Switch – CONFIRM **OFF**, PUMP SILENT
Propeller – PUSH IN … HIGH RPM … FLAT PITCH
Throttle – OPEN 1/2 INCH
Ignition Switch – BOTH…START (release starter <30 sec)
Engine Status – OIL PRESSURE GREEN in ONE MINUTE
– OIL TEMP INCREASING to GREEN >100
MFD Map View – CONFIRM/SET
Primary Flight Display – CONFIRM AHRS, NO FLAGS

GROUND WARM-UP

Propeller – Maintain PUSHED IN…HIGH RPM…FLAT PITCH
Warm Up – **1000-1200 RPM** UNTIL GUAGES ALL GREEN
Idle RPM – MINIMUM 850 RPM
Oil Door – MAINTAIN CLOSED UNTIL OIL >100*F
Autopilot Master Switch -- ON
Autopilot Barometer Setting: PRESS AND HOLD [**SEL**] FOR 3 SECONDS TO ENTER ALTIMETER SETTING MODE

BEFORE TAKE OFF “RUN UP”

Cabin Door – CLOSED, LATCHED, SEAL INFLATED
Flight Controls – FREE and CORRECT
Speed Brakes – TEST, VISUALIZED (use flashlight at night)
Trim (Aileron, Rudder, Elevator) -- TAKE OFF SETTINGS
Flight Instruments – SET ALTITUDE, ATTITUDE, CONFIRM
Chelton, Autopilot, Cabin Altimeter, Kollsman Altimeter
Attitude Indicator – CAGE (Pull knob and stabilize)
Turn & Bank, Attitude Indicator – CONFIRM PROPER TAXI
Radios – SET FREQS, ILS, DEPART HEADINGS, TRNSPNDR
Autopilot – TEST ON, then Joystick Switch OFF
Fuel Selector Valve – FULLEST TANK
Throttle – INCREASE TO 1700 RPM
Magnetos - LEFT-RIGHT-BOTH TEST RPM DROP <150
Propeller – CYCLE PULL/PUSH PROP GOVERNOR
Engine Instruments – CHECK ALL GREEN
Ammeter (2) – CONFIRM PITOT HEAT ON/OFF 6.5amps
THERMAWING – BITCHECK > 1200 RPM, THEN OFF
Throttle – RETURN TO IDLE
Flashing Beacon, Nav Lights, Taxi Lights – TURN ON
Transponder – ON/STDBY, SQUAWK CODE LOADED
Throttle Friction Lock – ADJUST TIGHTNESS
Wing Flaps – SET **10** DEGREES
Rudder Trim – ADD RIGHT RUDDER TRIM AS NEEDED
Oil Temp > 100*F prior to take off; OIL DOOR OPEN - Push In
GEAR LEVER – CONFIRM GEAR LEVER DOWN

RUNWAY ITEMS & NORMAL TAKE OFF

Fuel Pump – CONFIRM OFF
Wing Flaps – CONFIRM **10** DEGREES
Transponder – ON/ALT **MODE C**, SQUAWK CODE LOADED
Rudder Trim – CONFIRM RIGHT RUDDER TRIM AS NEEDED
Propeller – PUSHED IN, HIGH RPM SETTING (2700 RPM)

Throttle – 18” CHECK ENGINE, POWER to FULL 38.5” MAP
Elevator Control – LIFT NOSE WHEEL at 65 KIAS
Gear – RAISE GEAR upon +VSI CLIMB, NO RUNWAY AHEAD
Wing Flaps – RETRACT after reaching 100 KIAS
Initial Climb – Vx 110 KIAS (Flaps 10*), Vy 135 KIAS (Flaps Up)
Throttle – Full Manifold Pressure (MAX 38.5”)
Trim – REMOVE RUDDER TRIM AS SPEED INCREASES
GEAR – UP BEFORE **130** KIAS
CLIMB at 160 KIAS

Takeoff:	2700 RPM
	38.5 MP
	42-44 Fuel Flow
Climb:	2700 RPM
	38.5 MP
Cruise:	2450 RPM
	32 MP
Lean:	Lean of Peak TIT
	FF: 17 – 17.7 (17.5 GPH)
TIT:	1625 – 1650 or less
	100 degrees LOP
Oil:	180 – 200 degrees (220 Max)
	Pressure 45-85 (105 Max)
Fuel:	Pressure 10-35 (75 Max)

EGT Caution: 1600
CHT Caution: 400
TIT Caution: 1700

Oil Cooler Door: OPEN (Forward) for Climb. CLOSE (Aft) to increase Oil Temp to 180* or to keep #2 Jug less than 400*. CLOSE DOOR (aft) to maintain 180* (1/3rd out) at altitude.

10,000 FOOT CHECK

Fuel Boost Pump – LOW
Pressurization – CHECK
Lights – AS APPROPRIATE

Visible Moisture & < 0C

Deice – On
Pitot Heat – On
Prop Heat – On
W/S Deice – On

MAXIMUM PERFORMANCE TAKE OFF & CLIMB

Wing Flaps – 20 DEGREES
Transponder – ON/ALT MODE C, SQUAWK CODE LOADED
Rudder Trim – CONFIRM FULL RIGHT RUDDER TRIM
Propeller – PUSHED IN, HIGH RPM SETTING (2750 RPM)
Throttle – SMOOTH POWER to FULL, HOLD BRAKES
Elevator Control – LIFT NOSE WHEEL at 65 KIAS
Gear – RAISE GEAR upon +VSI CLIMB, NO RUNWAY AHEAD
Wing Flaps – RETRACT AFTER REACHING 100 KIAS
Initial Climb – Vx 110 KIAS CLEAR OBSTACLES
Throttle – CHANGE POWER 31.5” CLIMB (MAX 34”)
Trim – REMOVE RUDDER TRIM AS SPEED INCREASES

NORMAL CRUISE CLIMB

Airspeed – 160 KIAS
VSI > 1000 FPM
Power Settings – 38.5” MAP and 2700 RPM
Mixture – Full Rich unless leaned for High Alt S,T,T/O
Fuel Selector Valve – SELECT TANK AS DESIRED
Oil Door – PARTIAL OPEN FOR OIL 160*F-200*F
Fuel Boost Pump – >10,000’ LOW
Mixture – ADJUST FUEL FLOW BACK TO LOP

LEVEL CRUISE

Power – 32” MAP, 2450 RPM (102%) 17.5 GPH
Power – 25” MAP, 2500 RPM (55%) (14.3-14.8 gph)
Power – 29” MAP, 2500 RPM (65%) (16.5-17.0 gph)
Power – 31.5” MAP, 2500 RPM (80%) (18.5-19.0 gph)
Radios – SET FOR NEXT WAYPOINT, AWOS/ATIS
Propeller – CONSIDER REDUCE RPM ABOVE FL200
Elevator and Rudder Trim – ADJUST AS NEEDED
Oil Door – PARTIAL OPEN FOR OIL 180*F-200*F

DESCENT (start reducing power 70 miles out)

Pressurization – SET
Power – Reduce 1 inch MP per Two Minutes
Power – at 20” ADJUST and SET AS DESIRED
Speed Brakes – DEPLOY AS DESIRED (VISUALIZE)
Wing Flaps – INITIAL 10° **BELOW 170 KIAS**

BEFORE LANDING CHECKLIST – **GUMP GUMP**

Pattern Altitude –1500’ AGL
Gear – DOWN **BELOW 150 KIAS** – THREE GREENS (10sec)
Seats, Seatbelts, Shoulder Harness – ADJUST/LOCK
Landing Lights - ON
Fuel Selector – FULLEST TANK

Mixture – FULL IN RICH
(Consider LEFT TRAFFIC = RIGHT FUEL TANK)
Speed Brakes - RETRACT
Power – SET AS DESIRED, SUGGEST 14.5" MAP (12"-16")
Propeller – OPTION PUSHED IN, HIGH RPM 2600 RPM
Airspeed – 120 KIAS DOWNWIND (GEAR DOWN, FLAPS 10*)
Flaps – ADD to 20* WHEN READY to DESCEND (FAF)
Airspeed – DESCEND 120 KIAS BASE to FINAL
Flaps - >20° WHEN RUNWAY DEFINITELY MADE
Airspeed – 110 KIAS SHORT FINAL (1/2 mile)
Power – REDUCE TO 11" MAP (BEST GLIDE 120 KIAS)
Airspeed – 100 KIAS AIRPORT ENVIRONMENT
Airspeed – 90 KIAS OVER THRESHOLD
Trim (Elevator, Rudder) –ADJUST TRIM TO NEUTRAL
Airspeed – FLARE at 85 KIAS
Power – PULL THROTTLE WHEN TOUCHDOWN, BRAKE

BALKED LANDING "GO AROUND"

Power – ADVANCE THROTTLE TO 34" MAP
Prop – OPTIONAL PUSH FOR 2700 RPM
Rudder Trim – FULL RIGHT RUDDER, CONTROL YAW
Flight Attitude – NOSE UP 10° CLIMB
VSI - ESTABLISH POSITIVE RATE CLIMB
Gear – RETRACT UP ONCE CLIMB +VSI POSITIVE
Flaps – RETRACT TO 10°
Airspeed – 110 KIAS (Vx)
Flaps – RETRACT SLOWLY, INCREMENTALLY
Airspeed - >135 KIAS (Vy)

NORMAL LANDING INSTRUCTIONS

Power – ARRIVE WITH POWER 11" MAP
Touchdown – MAIN WHEELS FIRST
Landing Roll – LOWER NOSE WHEEL SLOWLY
Braking – APPLY AS NEEDED, DIRECTIONAL STEERING

AFTER LANDING CHECKLIST

Flaps – RETRACT UP, RETURN LEVER NEUTRAL
Thermawing – CONFIRM OFF
Transponder – SET TO STANDBY
Strobe – OPTION OFF (AT NIGHT)
Landing Lights – OPTION SWITCH OFF
Taxi Light – MAINTAIN or SWITCH ON
Engine Turbos – FOUR (4) MINUTE COOL DOWN
TIT – LESS THAN 950*
#2 – LESS THAN 265*

SECURING AIRPLANE

Door Seal – DEFLATE
Avionics Switch - OFF
Alternator Power - OFF
Throttle – Idle at 850-1000 RPM
Mixture – PULL to IDLE CUT OFF
Ignition Switch – OFF
Master Switch - OFF
Control Lock – SECURE JOYSTICK
Circuit Breakers – CHECK
Cabin Door – EXIT and LOCK
Baggage Door – EMPTY and LOCK DOOR
Tie Downs – THREE POINT ANCHORS SECURE

ENGINE FAILURE TAKEOFF (NOT AIRBORNE)

Sufficient Runway Remaining

1. Throttle – CLOSED
2. Brakes – APPLY
3. Stop Straight Ahead

Insufficient Runway Remaining

1. Throttle – Closed
2. Brakes – APPLY MAX
3. Fuel Selector – OFF
4. Master Switches – OFF
5. Ignition Key Switch – OFF
6. Door Latch - UNLATCH

Maintain directional control, maneuver to avoid obstacles.

Engine Failure Takeoff (If Airborne)

Sufficient Runway Remaining

1. Airspeed – FLARE TO **85 Kts.**
2. Gear - DOWN
3. Flaps – DOWN
4. Land straight ahead
5. Throttle – CLOSED
6. Brakes – APPLY

Insufficient Runway Remaining

1. Airspeed – **120 Kts** Best Glide
2. Throttle – CLOSED
3. Prop – PULL FEATHER RPM
4. Master Switches – OFF
5. Ignition Key Switch – OFF
6. Gear – AS REQUIRED
7. Flaps – AS REQUIRED
8. Maintain directional control and make only shallow turns to avoid obstacles. **Flare to 85 kts**

Best Glide Configuration

1. Gear – UP
2. Flaps – UP
3. Prop – PULL FEATHER RPM
4. Airspeed – **120 kts.**

Best demonstrated feathered glide is 3 NM per 1000 ft. 120 kts, 700 FPM, glide ratio 19:1

Engine Failure Takeoff (Return to Airport >1000' AGL)

1. Airspeed – **120 kts.**
2. Fuel Selector – FULLEST TANK
3. Throttle – 50% SETTING
4. Ignition Key – CYCLE, BOTH
5. Fuel Pump – BOOST LO, then HI
6. Flaps (Final) – AS REQUIRED
7. Gear – When Airport Assured

Engine Failure (In Flight)

1. Establish Best Glide – **120 kts.**
2. GPS/Chelton – NEAREST
3. Landing Site – BEST SUITABLE
4. Air Start – ATTEMPT RESTART
5. Throttle – FULL IN PROP - IN
6. Fuel Selector – FULLEST TANK
7. Ignition Key – CYCLE, BOTH
8. Fuel Pump – LO/HI BOOST
9. **Mixture – ATTEMPT LEANING**
10. Unable to start – PULL PROP FULL FEATHER (LOW RPM)
11. Radio – 121.5 DECLARE EMERGENCY MAYDAY
12. Transponder – 7700 (7600 is com out)

Off Airport Landing

1. Seat Belts / Harnesses – TIGHT
2. Door Seal– DEFLATE UNLATCH
3. Gear – LEAVE UP RETRACTED
4. Fuel Selector – OFF
5. Ignition Key Switch – OFF
6. Flaps – DOWN when assured
7. Master Switches – OFF
8. Communicate 121.5 - LOCATION
9. Airspeed – DECREASE TO TOUCHDOWN **Flare to 85 kts**

Rough Running Engine

1. Ignition Key – CYCLE, BOTH
2. Fuel Pump – LO BOOST
3. Mixture – RICH, ADJUST
4. Engine EGTs – Which Cylinders?

Engine Fire In Flight Electrical

1. Avionics Master Switches – OFF
2. Master Switches – OFF
3. All Electrical Equipment – OFF
4. **Land immediately and exit the aircraft as soon as possible**
5. **Determine Fire Cause Later**

Engine Fire During Start

1. Starter – CONTINUE CRANKING
2. Throttle – FULL OPEN
3. Master Switch B - OFF
4. Fuel Pump – SHOULD BE OFF
5. Fuel Selector – OFF
6. Starter – CONTINUE CRANKING

Loss of Pressurization >12,500'

1. Oxygen Mask – ON within 5 Sec
2. Aircraft Control – MAINTAIN
3. **Emergency Decent** – INITIATE
4. **Check Door Seal** – Cycle CB

If Cabin door is unsecured:

1. Do not attempt to correct in flight
2. Oxygen masks – ON (everyone)
3. **Emergency Descent** – INITIATE
4. **Pull Knob** DIVERT PRESS AIR
5. Cabin Dump – DEPRESSURIZE
6. Aircraft – LAND IMMEDIATELY

Do not attempt to check door until aircraft is depressurized and on the ground.

Emergency Decent Procedure

1. Throttle – IDLE (Monitor Cabin)
2. Speed Brakes – DEPLOY
3. Propeller – PUSH HIGH RPM
4. Push Nose Down – DESCEND
5. Airspeed – **170 kts – 274 kts**
   Caution do not exceed V_{NE}

Propeller Over Speed

1. Prop Control – PULL (REDUCE)
2. Throttle –PULL (REDUCE)
3. Airspeed – SLOW -- NOSE UP
4. **SLOW AIRSPEED TO REGAIN RPM CONTROL**
5. Oil Pressure – CHECK
6. Oil Quantity - CHECK
7. Prop Control Regained – ADD POWER
8. Airspeed – STAY BELOW WHEN OVERSPEED OCCURRED
9. Engine – MONITER CLOSLY
10. Aircraft – LAND IMMEDIATELY

Speed Brakes Stuck Deployed

CYCLE PANEL ROCKER SWITCH
CYCLE COPILOT JOYSTICK
Circuit Breaker – PULL S.B.
Landing airspeed – **110 kts.**

Emergency Gear Extension

1. Airspeed – **BELOW 120 kts**
2. Gear Motor CB – PULL
3. Gear Handle – DOWN
4. Emergency Hand Pump – PUMP

Pump handle until main gear lights are GREEN and handle is stiff.

Emergency Speed Reduction

1. Throttle – IDLE
2. Aircraft – NOSE UP
3. Speed Brakes – DEPLOY
4. Gear – EXTEND **<150 kts**
5. Flap – EXTEND **<132 kts.**

EGT Shows Low Temp
Presumed Valve or Fuel Injector
Engine Smooth – Failed Probe
Cycle Ignition Key – L/R/BOTH

High Oil Temp
Low Oil Pressure
Oil Pump Failure – Land Immediately
Engine Loss of Oil – Land Immediately
Reduce Throttle – PULL
Reduce RPM - FEATHER PULL
Monitor Engine Parameters

High Oil Pressure
After Engine Warm 99=Sensor Failed

Wide Open Throttle
Throttle Cable Broken
Prop – Pull to Low RPM (NOT Feather)
Ignition Switch – to LEFT or RIGHT
Intermittent Kill Engine – Limp to Airport
Aircraft – Land Immediately
Radio – DECLARE EMERGENCY
Over Airport – FEATHER PROP
ENGINE KILL –LAND ENGINE OUT

Runaway Trim
REMOVE COPILOT GRIP JOYSTICK
CYCLE CHINA HAT – Pilot Side
CYCLE CHINA HAT – Copilot Side
PULL CIRCUIT BREAKER – Landyard

Autopilot Control Failure
Prepare for Significant Control Input
DEPRESS AUTOPILOT DISCONNECT
Autopilot on Panel – TURN OFF
Autopilot Circuit Breaker – PULL

Alternator Failure
Panel Enunciator Light – ON RED
Volt Meter – READING <13.5V
BUSS TIE (Covered Switch)-DEPRESS
Unnecessary Equipment – TURN OFF

ALT Circuit Breaker – PULL
Volt Meter – Monitor >11.5V Needed

Air Intake ICING Detected
Visualize Air Intake – OBSERVE ICE
Pitot Heat - ON
Alternate Air (Under Panel) – PULL
Wings, Prop – DETERMINE THREAT
Altitude – DESCEND or CLIMB
Communicate – ADVISE ATC
Power Settings – ADD THROTTLE PRN

High Key - Low Key
Engine Out Procedure
VFR Landing Position Guide
Trim for Best Glide 120 KIAS
Overfly Runway Cross Field 2500’ AGL
Maintain Clean Configuaration
Turn Downwind Tight in Pattern
Abeam Numbers @ 1500’ AGL
Constant Stable Turn Base-to-Final
Gear DOWN on Final
Flaps as Needed
Power OFF Landing
Good Job

Instrument Approach
Engine Out Procedure
IFR Landing Position Guide

Trim for Best Glide 120 KIAS
There is No “Go Around” Option
Vectors to ILS Outer Marker
Cross LOM at 5000’ AGL
(3000 above listed)
Turn on Localizer (Above Glide Slope)
Maintain Clean Configuration
Expect Descent xxx VSI
Expect GS to Swing @ 200’ AGL
Lower Gear When GS Begins Move
Below DH, Maintain Heading
(Ignore OBS Needles)
Begin Flair to 85 KIAS at 50’ AGL
Hold 85 KIAS below 20’ AGL
Flaps as Needed
Brace for Impact

AIRCRAFT OPERATING +SPEEDS KCAS

V_{NE} – Never Exceed	274
Caution Range	220 - 274
V_A – Maneuvering Speed	170
V_{NO} – Max Structural Cruise	69 - 220
V_{FE} – Flap 0 to 10 Deg.	170
V_{FE} – Flap Extend Full	61 - 132
V_X – Best Angle of Climb	120
V_Y – Best Rate of Climb	135
V_S – Stall Speed Clean	76
V_{SO} – Stall Speed Land Config	65
V_{LO} – Max Gear Extension	150
V_{LO} – Max Gear Operating	120
V_{LE} – Land Gear Extended	165
Vr – Rotation Speed	80
Max X-Wind	25

Empty Weight	2414
Gross Weight	3544
CG	93.04

OIL TEMPERATURE DEG. F.

Maximum	220
Caution Range	200 - 220
Operating Range	180 - 200
Takeoff Minimum	100

OIL PRESSURE PSI.

Maximum	105
Caution Range	10 – 45, 85 – 105
Normal Range	45 - 85
Minimum	25

FUEL PRESSURE PSI.

Maximum	75
Caution Range	<10,>35
Normal Range	10 - 35
Minimum	7

Programmed Ranges and Values

	LOW	Normal	Caution	High
RPM	700	1600	2601	2760
MAP	7	12	36.6	38.6
Fuel Flow (GPH)	4	12	33	54
Fuel Pressure	7	10	35	38
Oil Temp	100	160	220	240
Oil Pressure	15	30	70	100
Volts		24		
Induct Temp				
EGT	800	1100	1600	1700
CHT	220	260	420	460
TIT		1000	1700	1800

Fuel Level		8	16	

TRUETRACK FLIGHT SYSTEMS
SORCERER AUTOPILOT

Initializing the Autopilot:
The autopilot master switch should be in the off position when the engine is started. After start up, turn on the autopilot master switch and hold the aircraft stationary as the internal gyros are initialized. The aircraft must be stationary for the first ten seconds after power is applied to the autopilot. When initialization is complete, **PWR UP** will change to **AP OFF**.

Controls:
Switches labeled **NAV**, **REV**, **SEL**, **VNAV** when depressed enter the respective lateral and vertical mode setup screens.

The **TRK**, **ALT**, **AP**, **GPSS**, **GPSV** buttons do not have setup screens; they enter directly into the respective modes.

Lateral Modes:
Upon being engaged, the autopilot will be in the basic lateral mode, and it will be synchronized to the track being flown at the time. The number following **SEL** (Selected Direction) is underlined meaning that rotation of the encoder will select a new ground track.

When in the **EXT DG** mode, the heading "bug" within the external **DG** or **HIS** will be used to control direction.

GPS Steering/GPS Nav Mode:
Pressing the **GPSS** button will enter either **GPS NAV** or **GPSS** mode depending on which, if either, steering signal is available to the autopilot.

In **GPS NAV** mode, the autopilot follows a flight plan programmed into the **GPS**.

In the **GPSS** mode, the autopilot follows lateral steering or bank commands generated by a navigation system (**EFIS** or **GPS**). If there is a **GPSS** signal present, the autopilot can be engaged with the **GPSS** button, and it will engage in the **GPSS** mode.

NAV/LOC Course Mode:
Pressing the **NAV** button will bring up the **NAV COURSE** or **LOC COURSE** setup screen depending on which is selected by the navigation receiver.

The course numerals are underlined. This means that the VOR/LOC course is to be set by rotating the encoder. As the encoder knob is rotated, knob out equals 5* steps, while knob in equals 1* steps.

With a LOC Course set and glide slope present (ILS), flying below the glide slope in **ALT HOLD** mode will arm the glide slope coupler.

Altitude Hold Mode:
Press **ALT** to select **ALT HOLD** mode. The selected altitude will be to the nearest 100 feet as viewed on the digital altimeter.

Vertical GPS Steering Mode:

Pressing the **GPSV** button will enter vertical GPS steering mode. In the **GPSV** mode the autopilot follows vertical steering commands generated by a navigation system (EFIS or GPS). If there is a vertical steering signal present, the autopilot can also be engaged with **GPSV** button, and it will engage in the **GPSS** and **GPSV** mode.

Barometer Set:
Press and hold the **SEL** button for three seconds to enter the **BARO SET** screen to enter altimeter setting.

Altitude Select Mode:
Press **SEL** to enter **SEL ALT** mode. Use encoder to set target altitude then press enter.

Both selected altitude and air speed can be modified while in transition. Press and release the encoder knob once and the underlined cursor moves to selected altitude. Pressing a second time moves it to air speed and a third time returns it to direction, or after a short period of time it will return automatically to direction.

VNAV Mode:
Pressing **VNAV** will display the **SEL ALT** set up screen. At this screen the **SEL ALT** numerals are underlined so that rotation of the encoder selects the target altitude. When this is done, press enter.

CHELTON FLIGHT SYSTEMS – FLIGHT LOGIC
Departures / Approaches

Select a DP
You must have an active route to select a DP

1. Press ACTV.
2. Turn control knob to highlighted desired **airport**, push to enter.
3. Turn control knob to highlight **DP**, push to enter.
4. Turn control knob to highlight desired **procedure**, push to enter.
5. Turn control knob to highlight desired **transition**, push to enter.
6. Turn control knob to highlight desired **runway**, push to enter.

NOTE: Only Pilot Nav DP's are available

Select an IFR Approach
You must have an active waypoint with IFR Procedures to activate an IFR Approach.

1. Press **ACTV**
2. Turn control knob to highlight landing **airport**, push enter.
3. Turn control knob to highlight **IFR APPR**, push to enter.
4. Turn control knob to highlight desired **approach**.
5. Turn control knob to highlight desired **transition**, push to enter.
6. Turn control knob to highlight desired **runway**, push to enter.

Missed Approach Arming
1. To arm the missed approach, select the **ARM** menu displayed in the upper left corner upon passage of the final approach fix (FAF). Select this by pressing the **ACTV** button.
2. Enter required climb angle (ft/nm) from chart using **BUGS**, then **VNAV CDA**, then **CLIMB ANG**. Turn control knob to set desired angle, push knob to enter.

Select a VFR Approach
You must have an active waypoint to select a VFR Approach.

1. Press **ACTV**
2. Turn control knob to highlight landing **airport** or user waypoint, push knob to enter.
3. Turn control knob to highlight **VFR APP**, push to enter

4. Turn control knob to highlight desired **runway**, push to enter.

Using Airways

Selecting Victor Airways and Jet Routes

Airways can only be added before or after airway fizes (VORs, intersections)

1. When prompted for a waypoint (flight planning or using **ACTV**), enter a V (for Victor Airways) or J (for Jet Routes). Push knob to step through blank approaches.
2. Turn control knob to select desired airway, push to enter.
3. Turn control knob to select desirec transition fix, push to enter.

Waypoints

Create a User Waypoint (MFD only)

1. Press **FLP**
2. Turn control knob to highlight **CREATE/EDIT**, push to enter
3. Turn control knob to highlight **CREATE USER WPT (Lat-Lon) or RAD-DST)** push to enter.
4. Turn control knob to select waypoint, push to enter.

Edit a User Waypoint (MFD ONLY)

1. Press **FLP**.
2. Turn control knob to highlight **CREATE/EDIT** push to enter.
3. Turn control knob to highlight **EDIT USER WPT**, push to enter.
4. Turn control kinow to highlight waypoint to be edited, push to enter.

Activate a Waypoint Within a Route

1. Press **ACTV**.
2. Turn control Knob to select desired waypoint.
3. Press control knob to activate selected waypoint, or press **DIRECT TO** to go direct to the selected waypoint.

Flight Plans (Stored Routes)

Create New Flight Plan (MFD only)

1. Pres **FPL**
2. Turn control knob to highlight **CREATE-EDIT**, push to enter.
3. Turn control knob to highlight **CREATE NEW FLIGHT PLAN**, push to enter.
4. Using the **ADD**…menu button and control knob, enter the route waypoints from beginning to end. Press **SAVE-EXIT** when finished.
5. Turn the control knob to **EXIT TO EFIS**.

Activate Flight Plan

1. Press **FPL**.
2. Turn control knob to highlight **SELECT**, push to enter.
3. Turn control knob to highlight stored flight plan, push to enter.

Omnibearing Selector Function

Automatic OBS (GPS OBS only)

1. Press **OBS** then select **GPS**
2. Press **AUTO**.

Manual OBS

1. Press **OBS**.
2. Choose desired HIS source (**Nav 1**, **Nav 2**, or **GPS**).
3. Turn control knob to select desired OBS course, push to enter.

ENGINE OPERATING PROCEDURES:

Normal Engine Starts:

1. Battery Master – ON
2. Fuel Selector -- ON
3. Throttle – FULL IN
4. Propeller -- FULL IN
5. Mixture – FULL IN
6. Prime -- SEVEN SECONDS
7. Throttle – OFF, then ½ INCH OPEN

8. Starter – ACTIVATE
9. Oil Pressure – CONFIRM PRESSURE W/IN 30 Seconds

Cold Starts:
Use the same procedure as for normal start. After engine begins running, it may be necessary to operate the primer intermittently for a few seconds in order to prevent the engine from stopping.

Hot Starts:
1. Battery Master – ON
2. Fuel Selector – ON
3. Throttle/Prop/Mixture – Full Forward
4. High Boost – On for 5 Seconds
5. Mixture – Full Aft, Idle cut-off
6. Crank Until Start
7. Mixture -- Full Forward
8. Throttle – Retard to Idle

Ground Warm-Up
1. Head Aircraft into the wind.
2. Operate Prop in “Full Increase” (forward) RPM
3. Avoid Prolonged Idling at Low RPM
4. Leave Mixture in Full Rich
5. Warm Engine at 900 – 1000 RPM

NOTE: For taxi at high ambient temps and or high altitude, mixture may require leaning for smooth engine operation. A FULL RICH MIXTURE MUST BE USED FOR TAKEOFF.

Maintain engine speed at approximately 900 to 1000 RPM for at least one minute in warm weather and as required during cold weather to assure adequate lubrication.

Do not operate the engine at run-up speed unless oil temperature is 100*F minimum and oil pressure is within specified limits of 30-60 PSI.

Pre-Takeoff Check

1. Mixture – FULL RICH
2. Propeller – MAX RPM
3. Throttle -- ADVANCE SLOWLY TO 1200 RPM
4. Throttle – 1700 RPM AFTER 100*F
5. Ignition – MOVE TO R (note RPM)
6. Ignition – Move to Both
7. Ignition – Move to L (note RPM)

The difference between the two magnetos operated individually should not differ more than 50 RPM with a maximum drop for either magneto of 150 RPM. Observe engine for roughness during this check.

8. Propeller – MOVE TO LOW RPM, THEN HIGH (3X)

RPM drop should be a minimum of 400 RPM not to exceed 500 RPM.

Feather Prop Check
Where applicable, move propeller control to “feather” position. Observe for RPM drop below minimum governing RPM. Then return control to “full increase” RPM position in accordance with the airframe manufacturer’s requirements.

Clear Minor Spark Plug Fouling
1. Magnetos – BOTH ON
2. Throttle – 2200 RPM
3. Mixture – MOVE TOWARD IDLE CUTOFF UNTIL RPM PEAKS AND HOLD FOR TEN SECONDS. RETURN MISTURE TO FULL RICH.
4. Magnetos -- RECHECK

Power Control
1. Increasing Power – FIRST INCREASE RPM WITH PROPELLER CONTRON AND THEN INCREASE MANIFOLD PRESSURE WITH THROTTLE.
2. Decreasing Power – THROTTLE BACK TO DESIRED MANIFOLD PRESSURE AND THEN ADJUST TO THE

DESIRED RPM. READJUST MANIFOLD PRESSURE AFTER FINAL RPM SETTING

Landing Power

1. Throttle – BEFORE LOWERING THROTTLE BELOW 15 INCHES OF MANIFOLD PRESSURE, ADVANCE MIXTURE SLOWLY TOWARD “FULL RICH.”
2. LEAVE MIXTURE LEANER IF ENGING RUNS ROUGH

Engine Shutdown

1. Engine – COOL FOR 5 MINUTES
2. Boost Pump – OFF
3. Avionics Master -- OFF
4. Main Alt Field -- OFF
5. Mixture Control – IDLE CUTOFF
6. Battery Master – OFF
7. Magnetos -- OFF

AOA:

[When you're all in the green and it says "018" (for example) you are at cruise and your wing has a 1.8 degree angle of attack. As you pull back the stick and increase the AOA those numbers will increase. Somewhere around 7-8 degrees (070 - 080 on the AOA) you'll probably be getting into the yellow. The transition from green to yellow, BTW, happens at L/D max... in the green you're on the front of the power curve, in the yellow and you're behind it. The AOA when you "spear the donut" (setup for the approach) should be at 1.4 times your stall speed (determined during the instrument calibration), and the numbers at the bottom will probably be somewhere around 100-110 (10.0 to 11.0 AOA), Somewhere around 12-13 degrees AOA (numbers = 120-130) you'll probably be transitioning into the red at which point Bitching Betty should be giving you an "Angle, angle, push" warning, as you're approaching the critical angle which is around 16-17 degrees (160-170 on the numbers) of AOA. Beyond that the wing is stalled... if you see 200 at the bottom it's magic and Harry Potter is flying right seat. <g> I apologize if my recollections of the numbers are a bit off, it's been a long time since I demo'ed them at the airshows. I hope this helps. <Marv>]