ATTACHMENT 7

OPERATIONS GROUP CHAIRMAN'S FACTUAL REPORT

CEN14FA046

PILOT'S HANDWRITTEN NOTES DURING TRAINING
(30 pages)

Fuel Flow TKO	60 gph	
Crosswind	50 gph	
Downwind	40 gph	gear dn, flaps 20°, ~120-130 KCAS
Base	varies	
Final	35 gph	geardown, flaps 20°, ~120-130

to stop climb ↓30 gph
to stop descent ↑60 gph

* all notes, subtract 1 gph for each 1000 ft above sea level
for single engine, add 10 gph to each speed

For engine out, center ball

Touch down 120 kts, No Beta until 90 kts.

Land @ power ~35 gph
Once runway & mode (400 ft AGL), ↓ power by 2 gph

Payload 220 lbs - hot shelf
206 lbs - pressurized
154 lbs - non-pres.

Certified ceiling 35,000

AP 665 | 724
SHP ESHP

Prop RPM 2000 | 1920 (96%)

Icing training
Flight review } every year

not on ship { Autopilot disconnect
Trim Wheel Alerter

V_{mc} = 99 kts @ 5° flaps
V_{mc} = 90 kts @ 20° flaps

* 120 kts - Never go below X' @ takeoff
@ landing assured.

V_{SSE} = 135 kts

Boost Pump Fail annunciates if fuel pressure < 3.2 psi
then have 9g unusable fuel instead of 3 gal.

If Fuel filter bypass light comes on → land right now.

Tip tanks pressurized to 6.0 psi

"AIC lies, DC dies"
↑ main tank gauge ↑ main tank float

If engine driven fuel pump <30 gph, then "L fuel press low"

"Fuel filter bypass" light → land immediately.
If either fuel boost pump fails the unusable fuel in main is 9g

Landing Gear

Horn cutoff button only works at 0°, 5° flaps

Nose Tire 5 x 4 ply - 55 psi Main Tires: 8.5 x 10 8 ply 10 ply 60 psi average

Max towing speed 5 mph

Max tire speed 139 kts.

Landing Gear safety squat switch ⓨ main gear strut.

Lndg Gear Squat Switch

1. Prevents gear retraction on ground
2. Activates door seal valve
3. Allows stall warning test (stick shaker) on ground
4. Activates Hobbs meter, Data Clock
5. Deactivates starter in flight

Door open Switch - open - pull breakers, incl. gear (3) breakers
(4) wheel well key out
tape APU door shut.

Lndg gear take 17 second to complete
(red mark left)
Door motor → gear motor → door motor
1 sec 15 sec 1 sec

Elect'c gear motor is right fwd side of belly.

Exceeding tow limits = torque link connected.
21° (L) / 25° (R)

① Damage Hinge Pin
② Damage Shear pin that connects piston rod to Elevator
③ Stretch rudder control cables
④ Damage Rudder Travel Stops or Aft gudiat

Signs that Live bug towel & torque link connected!
① Bent Hinge pin

Gear up warning horn is triggered by power lever position.

* When 5° flaps are selected, the power required may prevent the power levers from being retarded enough to sound the horn.

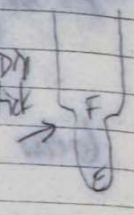
The horn cannot be silenced & flaps > 5° by advancing the power levers.

Emergency Gear Extension

If no gear down:
① reject breakers to try to reset
② slow airplane to 130 KTS.
③ 5° flaps
④ pull 3 circuit breakers — leave position indicator breaker alone
⑤ pull handle up
at 15° door release & flaps open.
— get red unsafe light
⑥ If handle has no resistance, push button to mesh gear teeth together
⑦ ~180 pulls
⑧ never retract gear after emergency extension

Brakes

reservoir in avionics bay (@) in nose
red hydraulic oil (5606)



style disc, multi-pot brake system

V_{LE} 160 kts

V_{LO} 160 kts.

After gear retracts, if red unsafe light lit, may extend
After gear extension, if red unsafe light lit, may not retract

** Abbreviated Lndg Check

Starts 160 kts gear down, prop sync off, flaps 5°
3 trims nose up, tip tanks off, check 3 green, red light off
20% torque or more, condition levers THR/LND, flaps 20°
3 trims nose down, adjust power to 90 kts

Flight Controls

Wing 178 sq ft Wing loading 50-65 lbs/sq ft

Roll 1° Spoilers
2° Aileron trim tabs.

Yaw 1° rudder
2° rudder trim tab

Spoiler up 60°, down 14°
Feeler spring in LH pressurized baggage compartment

Elevator max 30° up
10° down
area = 15 sq ft

Rudder 21° (L)
25° (R) 12.6 sq ft

Trim – rudder 25° (L) or 25° (R)
aileron trim DC power, 20° down, 20° up
elevator trim down 1.5°
up 30°

Aero
Aileron trim failure (both motors go to 1 circuit breaker) use "trim aileron select" switch to select.

if 1 motor inop, deflect is 10° max

Aileron Trim Runaway → don't pull breaker !!
use trim aileron select switch
to find bad motor.

if doesn't work,
① battery key OFF
② Ail trim breaker pull
③ Activate electrical mach switch

Flaps – double slotted Fowler flaps.
28% more wing at 20° flaps
" " lift "

21 sq ft per side = 12 sq ft

flap light only tells what right side flap is doing.
Flap interuptor slows flap deployment

90° flap controversy
When are selected? at 90', when land is assured
adv: slower touchdown 90-100kts
shorter land distance
propellers effective sooner preps to more
better control during land.
assist in engine out.
disadv: unstabilizes approach right before land
Reasons: A. stray crosswind
B. icing
C. minimums

		down	up
flap times	0°-5°	17 sec	21 sec
	5°-20°	10 sec	10 sec
	20°-DD	6 sec	4 sec

V_{FE}	5°	175
	20°	140
	40°	140
V_{FO}	5°	175
	10°	140
	40°	120
V_{MC}	5°	160
	20°	93
V_A		181
V_{NO}		250 kt

* ↓5 kt for each 1000 ft above 24,300 ft

Single engine flight – remain clean configuration until beginning of approach segment.

in approach segment (gear up, flaps 5°) then when landing assured (or previously gear down, 20°

	(5° flaps)	
	V_{SSE}	V_{YSE}
Blue line	130	140
Red line		

Stall Warning.

air · gnd

On grad stall warning to "air" → no response

Minimum Speed (no flaps)

downwind 150 kts
base 140 kts
final 120 kts (book: 115 kts)

Anti-Ice / De-Ice

Conditions that cause ice ① T < 50°F (10°C)
② visible moisture

Everything is anti ice & deice boots

~~Pitot~~ pneumatic boots get air from "A" line bleed air (14-18 psi low pressure)
engine inlet (cowl, throat, PT/TS sensor) in "D" line air (hot)

Pilots: at 1st sign of ice – put boots on "auto"

Auto mode: reinflates every 3 min.

In icing conditions, minimum airspeed 180 kts
(sustained cruise flight)

All overhead rocker switches are circuit breakers
x prop deice, windshield

All boots inflate at same time for 6 sec,
then deflate for 10 sec, then can manually reinflate
for auto mode: 6 sec on, 3 minutes down, 6 sec on, etc.

Anti ice system

- Engine intake - on ≤ 10 sec on ground
"D line" ("D" for "deice")

spike, throat, P_2T_2

* when switch is on - torque ↓'s, EGT ↑'s

Above 50°F (10°C), 1 ham on, 1 ham off

- Propeller deice
each section heats 30-34 sec
① inner, ② outer, ③ inner, ④ outer + 2 minute timer
load meter - look for 0.93-1.2 on load meter & look for equal deflection each 34 sec.

- Windshield Heat
If windshield > 129°F, annunciator "H/W OVERTEMP"

- Window De Fog
"B" line = Big Volume Stuff

For acrylic windshields, AD 74-11-01 requires an inspection daily to check for distortion

If defog air > 200° "defog over temp"
then < 180°, light extinguishes.

Windshield glycol rate is

Auto:
fast mode = spray 4 sec, ½ sec off
slow " = " , 4 sec off

Only 7 minutes duration (2½ g)
bleed air comes from "A line"

60% ethylene glycol, 40% water
pressure regulator = 8 psi

Windshield wipers
V_{WW} = 130 kts (acrylic) 175 kts (glass)

Do not use WW:
① > V_{WW}
② dry windshield
③ cracked windshield

Stall Vane current draw = 0.3 to 0.7
- plate heats up, not for
- ground operation - 10 second limit

Pitot-static System

Pitot-static anti-ice 0.5 - 0.85 amps.

Static port one big (heated), one small

Alternate static source is from nose wheelwell.
when selected, differential indicating portion of cabin altitude diff pressure may not function.

(airspeed, altimeter, VSI indicator)

Why ice light must work for flight into forecasted known ice conditions:

Minimum climb speed is 150 kts
For icing, add @ 10%

0 - 10k	150
15k	145
20k	140
25k	135

Which instruments use vacuum:
copilots AI, pilots T&B

= Icing video
Textron Aircraft Services website has video
Pat Cannon is there
may request chart for my airplane -
"composite performance chart on video"

Powerplant

"cycle" = engine start, takeoff, land, shut down

RPM = 41,730

Compression at stage 3 is 10-11 x compressed.
Igniter on at 10% & Secondary nozzles at 28% - 30%
Self sustain 40%
at 50% starter ~~&~~ disengages & igniter stops.

* Failed NTS test is a "no go item".

Accessory section: fuel controller, prop governor, bleed valve, pump, pitch control, oil filter, tach generator, starter generator

Starter limitation
30 ~~seconds~~ ON, 1 min OFF
30 " 1 "
30 " 30 min off

~~Fuel Controller~~

Fuel Controller / Fuel Pump - all one unit
"Woodward"

Engine fuel Solenoid Valve - controlled electrically & mechanically

Unfeathering pump - provides oil pressure when engine not on.

EPA Accumulator Can

Fuel flow divider - 2 primary vs. secondary nozzles.
2 fuel manifolds

Oil - Exxon 2380 - Do not mix oils.

-10 engines have an E.G.T. harness

Temperature limitation:

START	770° C	consult chart
TKO	650° C	
Max (cruise continuous)	650° C	

Ignition

run-crank-start ~~run-start~~ switch.

Engine Fuel Solenoid Valve opens electrically at 10%
Igniter box starts ignition at 10%
>50°F 1 hr on 1 hr off
<50°F continuous

Mag shutoff Solenoid = condition lever mechanically

(when condition lever to emergstop, Fuel solenoid valve shutoff & Feather Valve dumps oil / pressure → feather.

Speed Switch
Used during engine start
It gets armed when run-crank-start switch is → run.
at 10% RPM, switch → fuel to engine
→ ignition

Fuel Low Pressure Switch
Fuel low pressure light is on <32psi -
normal to have it on during taxi.

Stagnation during start (cold weather, thick oil)
(~30%)
- may press "fuel enrich button"
→ "press ctl let go"

- Happen "cold soaked engine"
- when temp < 50° F

Nozzles - clean at 200 hrs or within 2 yrs.

EPA Accumulator - stores air from "E" line ("E" for "EPA")
When RUN-CRANK-STOP to stop
air from accumulator blows fuel
out of nozzles, manifolds, lines from fuel flow
divider

* have to have 80% RPM to store air

Run-Crank-Stop switch to "END" does:
1. shut off fuel electrically at engine fuel
shut off valve
2. discharges the EPA accumulator

"RUN"
1. Electrically opens fuel shutoff valve at 10%
2. Activates ignition (& annunciator lights) at 10%
3. Completes electrical circuit for starter
engagement

Fire detection < 350 Ω

Engine Oil System

Oil used for: ① Engine airstart (unfeathering prop)
② Lubricate & cool engine
③ Heat Fuel (exchanger)
④ Prop blade angle
⑤ Tests – prop on locks, ground NTE test

3 scavage pumps

Oil intake Leak
acceptable if < 3cc/min (15 drops)
– common when plane sits > 2wks.

Oil check only accurate if
① within 30 minutes after engine shutdown
② if prop has not been pulled Through

Max consumption is 1 qt per 10 hours
Change every 90-100 hours.

10½ quart system
6 ¾ quarts are in the tank.

Fuel/Oil exchanger is a coil inside oil tank.

Devices:
① Air/Oil separator – has a teflon ribbon (clean, sprayed at rest) that separates oil from air.
② Oil Vent Valve – opens to lessen resistance (suction) from scavage pumps in order to maintain torque for start
③ Oil line to rear bearing (3rd scavage pump)
– ? 3cc/min is acceptable at rear bearing
④ Oil cooling bypass valve – measures oil temp & shunts oil to oil/air "radiator" – keeps temp 130°-160°

Oil Filter
oil filter bypass indicator -

Propeller
3 blades, 90" diameter
Power levers full forward - beta tube allows oil pressure to be dumped faster

Condition lever
65% - 96% is "low RPM" → controls fuel to engine
96% - 100% is "high RPM" → controls constant speed prop.

Propeller blade angle
-13° Reverse
0° Ground Idle "start"
1°-2° Locks
7°-13.5° Flight Idle (Determined by Power level position)
as required Power / flight
85°-90° Full feather

Unfeathering Pump - Electric / Hydraulic pump.
(on engine control circuit breaker)

1. put props on locks (if feathered) before engine start
2. feather valve test
3. needed for ground NTS test
4. prevent prop from windmilling backwards when feathered in flight
5. unfeather prop & assist ngine air start.

Get Props a locks.

① battery on
② power lever to full reverse & hold unfeather button until blades are flat pitch
③ let go of unfeathy button & push ~~p~~ push power lever forward.

Battery selector: if <50°F use series.

When condition lever to emergency stop:
① cut off fuel } black knob
② feather valve - dumps oil pressure } red portion

Gauges: Torque - DC power (are at 100% before battery on)
EGT - self generated
Fuel flow - AC power
RPM - self generated
Oil Temperature - DC power.
Prop Sync - DC power

Engine Checks

① Feather valve check - engine off, battery on
- press & hold unfeather pump button - beta light on
- hold button, condition lever to idle stop - beta light off
- hold button, condition lever to taxi - beta light on

(condition lever pulls on feather valve & dumps oil → feather)

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~~before 1st flight of~~
← required at every engine start

(2) NTS ground check - during engine start
before engine start - push on unfeathering button & hold → beta light on
- continue to hold button, press start → beta light off
- beta light back on at or before 40%

(3) Overspeed governor test - engine must be running
- prop must be on locks
- oil temp must be in green arc (starts 55°C)
- condition lever placed to TKOFF/GND
power lever advanced until
RPM stabilizes ≤ 103.5%
- power lever back to GND IDLE
- required 1st flight of day or when airstart is
anticipated or maintenance done.

(4) Supplemental NTS check
- props must be off locks
- condition lever TAXI
- power levers ~~GND IDLE~~ past flight idle each engine
should feel pull from that side

(5)

Engine Start

Power lever ½ inch above START
Air start if safe to ✓ engine
run-crank-stop to RUN
press unfeather button → NTS guard test
guard condition lever ↑ cage ↑ flap (→ shut down

Airborne NTS test

required anytime gear box seal is broken
pilot can do it, but must sign engine log book

① minimum 5000' AGL in Dry VMC
② 160-180 Kts K IAS
③ ④ condition lever 100% RPM
④ ⑤ power lever to zero thrust (~35 g/L) for 1 min
⑤ ⑥ Run/Crank/Stop carefully to CRANK position
⑥ " to STOP & note time
⑦ Time how long it takes RPM to ↓ fr 100% RPM to 35% RPM. cannot exceed 60 seconds.
⑧ By 30% RPM, place condition lever to Emergency Stop
⑨ Complete engine shutdown procedure.

Stopping Engines

Allow engines to cool for 3 min (begins when C.L. is to TH
Then place RCL switch to STOP & hold until 50% RPM
Power levers to full aft reverse
& hold until 70% RPM or less.

Engine Specs

PT-10AU

SHP / ESHP	Prop RPM (96%)	Max ITT / Cruise Temp
605 / 724	2000 / 1922	770°C / consult chart

RPM Limits

TKO power 100%
max cont 100%
cruise 96% minimum.

absolute max 106% (5 sec)
105.5% (20 sec)
101% no limit

Windmilling RPM limits

	0-5%	no limit
	5-10	30 min max
	10-18	5 " "
airborne →	18-28	transient only
	28-100	1 min max

no backwards windmilling

Temp limits (OAT)

~~max temp~~ ISA +30°C

Engine Start

Max temp ISA + 30°C
Min temp minus 40°C (-40F)

Engine Operating

Max temp ISA + 30°C
min temp minus 54°C

Quick Turn

Maximum engine temp to start is 200°C
- RCS in CRANK
- press and hold start button until desired temp, then

Small Problem

- If no oil pressure by 50%, shut down RCS → STOP
- Low oil pressure in flight
  - look at torque gauge - if solid → OK
    if not solid (fluctuate), shut down engine with condition lever (every step)
    , the engine secure.

- If ~~lose~~ lose engine
  - fly airplane
  - engine shut down
    - * no dead foot, dead engine
    - identify dead engine by gauges
    - verify by looking at engine gauges
    - hold condition lever & verify that it is correct lever
    - Then condition lever to ~~flying~~ stop
    - power lever to full forward "beta follow up"
  - add power to good engine by 10 or 4

Then follow engine shutdown procedure.

* RCS switch must remain in RUN (to avoid dischar EPA kit)

* Failure can be too much power

Airstart
* below 15,000ft

questions: ① Why did it fail? do you really want to restart?
② can you fix it?
③ is it safe to do an airstart?

- See check list

airspeed 150-180 better

Electrical 2 DC batteries
24 Volt, minimum of 36 Amp/hours

#1 is in nose (Ⓡ wheel well)
#2 left wheel well

Hot wired items (#1 batt) baggage lights
cabin, cockpit rm lights

Lead Acid batteries don't have temp limits

Nicad batteries have temp limits

2 starter generators 28 VDC - 200 amps amp limits 200 amps to 25,000
175 amps to 31,000

Inverters 115 V AC / 26 V AC / 400 Hz single phase
located in RH baggage, ① side wall

- each inverter does the same thing.

Circuit breakers
- panel in LH baggage.

If air <38°, then open bypass valve to heat up conditioned air.

Then goes to collator then out.

If conditioned air is >200°F, then ⓛ hot bleed air valve closes.

Mink sock in collator extracts water. It can stink or can get saturated.

Heating & Cooling

Refrigeration valve determines mixing chamber temps.

Coldest = 38° F
Hottest = 200° F

Auto mode: 60° - 90°

Pressurization. Rate knob 50 fpm - 2000 fpm

Manual pressure control dial usually off, - can open to descend >2000 fpm.

A line: De Ice
Tip tek gasket
Door Seal
Vacuum Jet
Outflow Safety Valve
Cabin Pressure
Still work if pressurized

"B" line = "big."

Pressurization
Heating & Cooling
Defogging

"C" line = fuel control unit

2 out flow safety valves, both in front
pneumatic relay adjusts pressure to go to out flow safety valve

Inflatable seal is in door, not airframe.

pneumatic lock in door is powered by bleed air
→ defogs window
→ inflates door seals
→ closes pneumatic door locks.

Emergency Exit window: pull red handle in, top of window comes forward, lift window up.

Oxygen System

Scott Continuous Flow system
↑ O2 at ↑ altitude.
Filled = 1800 psi

both valve on bottle & cabin/cockpit out let valve must be open

11 cu ft. ← 3 people
25,000 ← people - 56 min

All Rocker Switches are C/B ± Windshield Heat & Prop De Ice.

CAUTION LGT test
① → T handles
② → all annunciat lights

Master Switch next to key
used if you don't know what is on fire.
↓
If activated, all elect lost, ~~the~~ ±
① Fire T-handle lights.
② Cabin rm lights

* Before activating Master Switch, turn off both Starter/Generator Switches.

Batteries: parallel vs. series
temp <50°F (10°C) → series (if in series, 2 vs only to start hot)
temp >50°F or APU → parallel

Max APU voltage is 28 V → goes to all systems
needs 800–1000 amps.

Using APU: place battery to "ON" position in case APU fails

Battery isolation switches: use to isolate one battery if ground failure

After 1st engine start, turn on non-started generator first
to absorb in any spike. When below 100 amps
turn off non-started generator

* Never start an engine with a generator turned on.

AC power during engine start provided by DC/AC converter

Environmental

Hamilton Stadard Air Cycle Machine

Intake on ⓒ, exhaust on Ⓟ
Ram air scoop @ top of fuselage

Air Source dial: RAM, OFF, LH, BOTH, RH } bleed air is closed ("BLW")

Air Cycle Machine:
Water collator - pulls water out of air

1 time per month

Fuel preflight
- look for oil filter bypass pin or button
- Drain Sumps

Oxy (cont)
- Don't panic

Emergencies
- aircraft ~~not~~ won't depressurize → use manual control valve

if "cabin pressure low" annunciator light -
- oxygen mask on
- cabin air select switch (→ both)
- pressurization controllers
- descend to alt below 12,000

Air conditioning failure -
737 psi pressure switch bad?
→ try pulling air conditioning ~~pressure switch~~ circuit breaker
* to avoid, choose LH ~~at~~ after takeoff

Manual
check list:
1. cabin air select switch → RH
2. Cabin pressurization → check
3. oxygen
4. Cabin air to RAM (Shows Takes OFF) - take 16 seconds to do
5. Descent to altitude not requiring oxygen

Smoke fume or Fire

① Oxygen mask on
② Clear air
③ If source unknown, activate emergency master switch
④ Open pilot communication door
⑤ Crack open cockpit exit
⑥ Flight attitude descent
⑦ Land soon

High Speed Emerg Descent

① Oxygen
② Power - Flight idle
③ Landing gear - EXTEND
④ 250 kts. max

Airspeed Descent

① O2 on
② Power - Flight idle
③ Landing gear - EXTEND
④ Maintain airspeed to gear airspeed
175 kts - flaps 5°
160 kts - gear down
140 kts - flaps 20°
130 kts - flaps 30°
120 kts - flaps 40°
Trim pitch as 110 kts

Fire extinguisher - check each jet - speed for Fwd
Start And Ign - check

Descent with level off at desired altitude
Max airspeed 130 kts - emergency gear extension
Engine Throttle for warm