

Battery, Starter, Generator Limits				Engine Oil QTY Limits	
Battery Limits		Starter Limits		Oil Capacity	
Min Bat Start Voltage		Limited to four ___ sec cycles		Check Oil Lvl After:	
Min Bat External PWR		Cooling period after 1 st		Service Oil Lvl Within:	
Generator Limits		Cooling period after 2 nd		Normal Oil Level Between:	
Inflight(Amps)		Cooling period after 3 rd			
Grnd/Flt(Volts)		Cooling period after 4 th		NATOPS Date: 01 December 2017	

Engine operating limits						
Power Setting	Torque %	ITT °C	N ₁ % ⁽¹⁾	N _p % ⁽⁴⁾	Oil Pressure psi	Oil Temp °C
Start	---	___ - ___ (___ sec)	---	---	___ Max	___ Min
Idle	___ - ___ ⁽⁹⁾ (Ground)	___ Max	___ to ___ (Ground) ___ (Min Flight)	___ - ___ (Ground)	___ Min	___ - ___ (Grnd) ___ - ___ (Flight) ⁽⁷⁾
Takeoff/Max	___ Max	___ Max	___ Max	___ Max ⁽²⁾	___ - ___ ⁽⁶⁾	___ - ___
Transient	___ Max (___ sec) ⁽⁸⁾	___ - ___ (___ sec)	___ Max	___ Max (___ sec) ⁽³⁾	___ - ___ ⁽⁵⁾	___ - ___ (___ min)

- NOTES
- N₁ values presented for PMU ON. With PMU OFF, N₁ may vary from these values.
 - With PMU OFF, permissible maximum N_p is ____%.
 - Permissible at any power setting for completion of in-flight emergency.
 - Avoid stabilized ground operation from ___ to ___ % N_p.
 - Operation in this range permitted only during aerobatics or spins, and ___ to ___ psi for ___ seconds with PCL at ___.
 - Normal oil pressure during steady state conditions is ___ to ___ psi. Operation at oil pressure less than 90 psi at flight idle or above is indicative of oil system malfunction.
 - Acceptable for ground operation at and below ___ % torque.
 - Torque at ___ % is a materials limit above which damage to the engine may occur. Torque above ___ % is indicative of a system malfunction.
 - Allowable torque range with N_p stabilized and PCL at ___.

Airspeed Limits		Flight Maneuver Limits		Acceleration Limits		
Max Operating Speed V _{MO}	___ KIAS up to ___ MSL	Zero G	___ sec	Symmetric		
Max Operating Mach # M _{MO}	___ above ___ MSL	Neg G(Inverted)	___ sec	Clean	___ to ___	
Maneuvering Speed V _O	___ KIAS	-2.5 to -3.5G	___ sec	Dirty	___ to ___	
Full Rudder Deflection	___ KIAS	Min pos G recovery	___ sec	Asymmetric(Rolling Gs)		
Flaps V _{FE} & Gear V _{LE}	___ KIAS	Landing Limits		Clean	___ to ___	
Turbulence Penetration		VSI _(FT/MIN)	Gs	Main tires psi	Dirty	___ to ___
Max V _G	___ KIAS	___	___	___	For uncoordinated rolling maneuvers	
Recommended	___ KIAS	___	___	___	initiated at ___ G, the maximum bank	

Canopy Wind Limit	Tailwind Takeoff Limit	Crosswind Limits		angle change is ___ degrees.
___ Knots	___ Knots	Dry Runway	___ Knots	Ice Limits

Prohibited Maneuvers		Wet Runway	___ Knots	Approved only for transit
1.	2.	Icy Runway	___ knots	through ___ ft of ___ Ice
3.		Maneuvers w/ ice are limited to ___ ° bank & ___ to ___ Gs		
4.		Landing w/ ice accumulation increase approach speed by ___ KIAS		
5.		Sustained operation in icing conditions:		
6.		Aerobatics with ice on the aircraft:		
7.		Center of Gravity Limits		
8.		<i>Weight and balance shall be checked when the following are exceeded</i>		
9.		Pilots	Combined	Overwing Fuel
10.		___ lbs	___ lbs	___ lbs
11.		Forward CG limit up to 5850lbs		___ % MAC (___" aft of datum)
		Forward CG limit up to 6900lbs		___ % MAC (___" aft of datum)

Fuel Limits		Aft CG limit all weights		___ % MAC (___" aft of datum)
Aerobatics with less than ___ lbs in each wing is prohibited		The reference datum is ___" forward of the prop spinner		
Maximum imbalance is ___ lbs		Ground Operating Temp Limit		___ to ___ °C

Weight limits		Cockpit pressurization limit		___ psi ± ___ psi
Max Ramp	___ lbs	Cockpit PX warning		___ psi to ___ psi
Max Takeoff	___ lbs	Cockpit DP turns red, over pressurization valve opens		≥ ___ psi
Max Landing	___ lbs	Max Zero Fuel	___ lbs	Baggage
				___ lbs

Battery, Starter, Generator Limits				Engine Oil QTY Limits	
Battery Limits		Starter Limits		Oil Capacity	18.5 Qts
Min Bat Start Voltage	23.5V	Limited to four 20 sec cycles		Check Oil Lvl After:	15 - 20 min
Min Bat External PWR	22.0V	Cooling period after 1 st	30 sec	Service Oil Lvl Within:	30 min
Generator Limits		Cooling period after 2 nd	2 min	Normal Oil Level Between:	
Inflight(Amps)	-2.0A - 50A	Cooling period after 3 rd	5 min	ADD & MAX HOT	
Grnd/Flt(Volts)	28.0V - 28.5V	Cooling period after 4 th	30 min	NATOPS Date: 01 December 2017	

Engine operating limits						
Power Setting	Torque %	ITT °C	N ₁ % ⁽¹⁾	N _p % ⁽⁴⁾	Oil Pressure psi	Oil Temp °C
Start	---	871-1000(5 sec)	---	---	200 Max	-40 Min
Idle	1 - 10 ⁽⁹⁾ (Ground)	750 Max	60 to 61 _(Ground) 67 _(Min Flight)	46 - 50 (Ground)	90 Min	-40 - 105 _(Grnd) 10 - 105 _(Flight) 106 - 110 ⁽⁷⁾
Takeoff/Max	100 Max	820 Max	104 Max	100 Max ⁽²⁾	90 - 120 ⁽⁶⁾	10 - 105
Transient	132 Max (20 sec) ⁽⁸⁾	821 - 870 (20 sec)	104 Max	110 Max (20 sec) ⁽³⁾	40 - 130 ⁽⁵⁾	106 - 110 (10 min)

- NOTES
- N₁ values presented for PMU ON. With PMU OFF, N₁ may vary from these values.
 - With PMU OFF, permissible maximum N_p is 100±2%.
 - Permissible at any power setting for completion of in-flight emergency.
 - Avoid stabilized ground operation from 62 to 80% N_p.
 - Operation in this range permitted only during aerobatics or spins, and 15 to 40 psi for 5 seconds with PCL at IDLE.
 - Normal oil pressure during steady state conditions is 90 to 120 psi. Operation at oil pressure less than 90 psi at flight idle or above is indicative of oil system malfunction.
 - Acceptable for ground operation at and below 20% torque.
 - Torque at 132% is a materials limit above which damage to the engine may occur. Torque above 102% is indicative of a system malfunction.
 - Allowable torque range with N_p stabilized and PCL at IDLE.

Airspeed Limits		Flight Maneuver Limits			Acceleration Limits	
Max Operating Speed V _{MO}	316 KIAS up to 19,020MSL	Zero G	5 sec	Symmetric		
Max Operating Mach # M _{MO}	0.67 above 19,020MSL	Neg G(Inverted)	60 sec	Clean	7.0 to -3.5	
Maneuvering Speed V _O	227 KIAS	-2.5 to -3.5G	30 sec	Dirty	2.5 to 0.0	
Full Rudder Deflection	150 KIAS	Min pos G recovery	60 sec	Asymmetric(Rolling Gs)		
Flaps V _{FE} & Gear V _{LE}	150 KIAS	Landing Limits			Clean	4.7 to -1.0
Turbulence Penetration		VSI _(FT/MIN)	Gs	Main tires _{psi}	Dirty	2.0 to 0.0
Max V _G	207 KIAS	600	3.7	185±5	For uncoordinated rolling maneuvers	
Recommended	180 KIAS	780	5.1	225±5	initiated at -1G, the maximum bank	
Canopy Wind Limit	Tailwind Takeoff Limit	Crosswind Limits			angle change is 180 degrees.	
40 Knots	10 Knots	Dry Runway	25 Knots	Ice Limits		
Prohibited Maneuvers		Wet Runway	10 Knots	Approved only for transit		
1. Inverted Stalls	2. Inverted Spins	Icy Runway	5 knots	through 5000ft of Rime Ice		
3. Aggravated spins past two turns		Maneuvers w/ ice are limited to 30° bank & 0 to 2 Gs				
4. Spins with PCL above IDLE		Landing w/ ice accumulation increase approach speed by ___ KIAS				
5. Spins with the landing gear, flaps or speed break extended		Sustained operation in icing conditions:			Prohibited	
6. Spins with the PMU off		Aerobatics with ice on the aircraft:			Prohibited	
7. Spins below 10,000 feet pressure altitude		Center of Gravity Limits				
8. Spins above 22,000 feet pressure altitude		<i>Weight and balance shall be checked when the following are exceeded</i>				
9. Abrupt cross-controlled (snap) maneuvers		Pilots	Combined	Overwing Fuel	Bagage	
10. Aerobatic maneuvers, spins, or stalls with a fuel imbalance		260lbs	480lbs	1100lbs	10lbs	
greater than 50 pounds between wings		Forward CG limit up to 5850lbs			18.8% MAC (164.7" aft of datum)	
11. Tail slides		Forward CG limit up to 6900lbs			20.0% MAC (165.5" aft of datum)	
Fuel Limits		Aft CG limit all weights			26.0% MAC (169.3" aft of datum)	
Aerobatics with less than ___ lbs in each wing is prohibited		The reference datum is 16.46" forward of the prop spinner				
Maximum imbalance is ___ lbs		Ground Operating Temp Limit			-23° to 43°C	
Weight limits		Cockpit pressurization limit			3.6 psi ± 0.2 psi	
Max Ramp	6950lbs	Cockpit PX warning			3.9 psi to 4.0 psi	
Max Takeoff	6900lbs	Cockpit DP turns red, over pressurization valve opens			≥ 4.0 psi	
Max Landing	6900lbs	Max Zero Fuel	5850lbs	Baggage	80lbs	

