

# Mi-8 - Normal Procedures

Based on the TM 1-1520-Mi-17-10 Operator's Manual  
Step numbers corresponds to the ones on that Manual.

In blue those items that can be omitted when on a hurry.

## Cold Start:

### 8.13 Pre-Start Checks:

- If at night, press [**Lalt + L**] to use a Flashlight.

- 1. Enable Circuit Breakers –  
Enable banks 4, 5, 6, 7, 8 and 9,  
with [**Right Ctrl + Right Shift +**  
**4, 5, 6, 7, 8 and 9**].

Turn the five Anti-Icing breakers  
OFF, on bank 9, if you don't  
anticipate icing conditions for this  
mission (Ambient T° over 0 °C).



- 3. Check that the AChS-1 Clock is set to correct Mission time (on Copilot Console):

To set the TOD, stop the clock by  
rotating Counter-clockwise (with the  
mouse wheel) its right silver knob.  
Then, Right click its Red knob and  
then use the mouse wheel, to set the  
desired time. Start the clock by  
rotating the right silver knob  
Clockwise.



Clicking the Red knob activates the  
Mission Time on the small top dial. Inside is a colored status  
indicator:

- Red: Flight Time is running.
- Red-White: Flight Time is stopped.
- White: Flight Time is reset (standby).

The status is controlled by clicking on the Red knob.

The Stopwatch is shown on the small lower dial, to a maximum  
lapse of 1 hour. It's controlled with the  
right knob on the same way as the  
Flight Time.

The clock is equipped with a Heater,  
controlled with the CLOCK HEAT  
switch, on the Right Overhead  
Console.



- 5. Overhead fuel shutoff levers – Check they are in the Closed (back) position (STOP ENGINE LEFT HAND & RIGHT HAND). They control the fuel valve in the Fuel Control Unit of each engine. When closed, the fuel diverts to the drain line.



- 6. MAIN and AUX Hydraulic switches – Confirm they are ON (Up). For redundancy, the Mi-8 has two independent hydraulic systems: MAIN and BACKUP. They power the Flight Controls of the Collective. The Backup system activates automatically if Main system pressure drops below 30 Kg/cm<sup>2</sup>



- 7. Fuel CROSS FEED switch - Confirm it's set to ON (Up), on the FUEL SYSTEM Panel. Allows cross-feed of fuel on the external tanks, it would be set to OFF only if one of the external tanks was not mounted or suffers battle damage.



- 8. Fuel BYPASS switch - Check that it is set to OFF (Down). Allows connection of one or two auxiliary tanks. Not Simulated.

- 9. Battery 1 & 2 – Switch to ON (up), to connect the Batteries to the DC Battery Bus. The following lights illuminate: IFF Transponder, RI-65 Audio Warning, Fire Detector Mode, and Fuel Shut-Off Valves annunciators.



- 10. DC Check Selector – Set to BATT BUS. Make sure that the STBY GEN switch is OFF. Check the Battery Bus voltage on the DC Voltmeter, which should read 24V minimum.



- 11. Annunciator switch - Set to Day/Night, as needed.
- 12. Set the Ri-65 Audio Warning System AUDIO WARN switch ON (Up), to enable the nagging Natasha. The TURN ON RI-65 annunciator goes off. At this point it will warn about low Hydraulic pressure and fuel Pumps not operative, which is normal.



## Cockpit Equipment Checks:

- 1. Battery Condition Check:
  - a. Check DC EXT PWR switch is OFF.
  - b. Turn DC Check Selector knob to BATT 1.
  - c. Set BATT 2 switch to OFF, to check the Battery 1 alone.
  - d. Start any Fuel Pump, to place a load on the circuit, and check the DC voltmeter, which should be not less than 24V.
  - e. Turn DC Check Selector knob to BATT 2.
  - f. Set BATT 2 to ON.
  - g. Set BATT 1 switch to OFF, to check the Battery 2 alone.
  - h. Check the DC Voltmeter, should be not less than 24V.
  - i. Switch OFF the Fuel Pump.
  - j. Set BATT 1 switch to ON.
  - k. Turn DC Selector knob to BATT BUS.
  
- 2. Fire Extinguisher System Check:

The Mi-8 Fire Extinguisher System protects four areas: Left Engine, Right Engine, Main Rotor Transmission bay, and KO-50 Fuel Heater. For each area, there are two extinguisher bottles: I (1<sup>st</sup> Discharge) and II (2<sup>nd</sup> Discharge).

The System has six redundant detection Circuits. Circuits 1, 2 and 3 cover the Left Engine, Right Engine and Transmission. Circuit 4 covers the Transmission. Circuits 5 and 6 cover the Fuel Heater.



Bottle I should operate automatically when a Circuit detects a Fire, but it can be fired manually by pressing one of the four round 1ST DISCH buttons of the Fire Extinguisher Control Panel. Bottle II only operates manually, with 2ND DISCH.



- a. Switch off the command radio Circuit Breaker, on CB Bank 7. This is necessary because the System is programmed to send a radio alarm message on a preset frequency whenever it detects a Fire.

- b. Confirm the FIRE EXTINGUISHING DISCH circuit breakers are OFF, on CB Bank 8, to prevent accidental trigger of the Dischargers during the test.



- c. Alternately set the Bottle selector switch to I (badly translated to PYRO CARTR) and II, to make sure both sets of extinguisher bottles igniters are OK (if the amber lights, on the fire extinguishers discharge indication panel, illuminate then the Bottle is faulty).
- d. Set the Extinguishers Mode Selector switch to DETECTOR TEST and observe the red DETECTOR TEST light to come on.



- e. Alternately, set the Monitoring selector knob to all six channels. With the selector switch set to 1 and 2 the FIRE LFT ENG, FIRE RGT ENG, FIRE KO-50 (Fuel Heater) and FIRE XMSN/APU lights should illuminate. The FIRE light on the Pilot Console should also lit.
- f. Upon setting of the selector knob to 3, the FIRE KO-50 light should go out.
- g. With the selector knob set to 4, 5 and then to 6, the FIRE XMSN/APU (Transmission & APU) should illuminate and the other lights should go out.
- h. Set the Monitoring selector knob to OFF.
- i. Set the Extinguishers Mode Selector switch to EXTINGUISH and the red DETECTOR TEST light goes off.
- j. Switch ON the FIRE EXTINGUISHING SYSTEM circuit breakers. The System is now ready to use.



• 3. Caution/Warning Lights Test:



- a. WARN LTS Switch to WARN LTS (forward), on the Engineer Console.
- b. Check that all Warning lights illuminate:

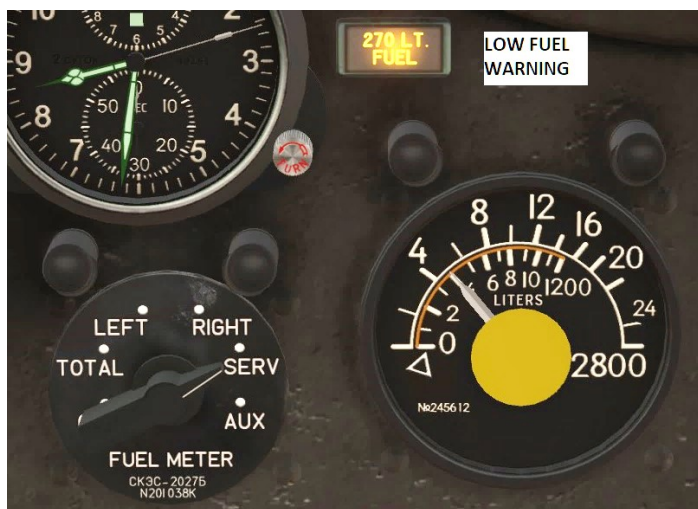
LFT ENG TEMP REG and RGT ENG TEMP REG FLT RCDR HOOK OPEN TURN ON RI-65 ANTI-ICE SYS ON LFT ENG ANTI-ICE and RGT ENG ANTI-ICE L DUST PROT FWD and R DUST PROT FWD L DUST PROT AFT and R DUST PROT AFT SECTION 1, 2, 3 and 4 1ST DISCH (x4) and 2ND DISCH (x4) MAIN SYS ON (hydraulics) DETECTOR TEST AUTO IGNITION and OIL PRES NORMAL (APU) RPM NORMAL and RPM OVERSPEED (APU) AUTO IGNITION and STARTER ON (ENGINE STARTING) LFT and RGT VALVE CLOSED (Fuel Shutoff Valves) CROSSFEED CLOSED	SERVICE PUMP ON, LFT PUMP ON and RGT PUMP ON PREHEAT, IGNITION and KO-50 WORKING (KO-50 Heater) L DUST PROT ON and R DUST PROT ON TURN ON RECT 1, 2 and 3 EQUIP TEST EXT PWR ON and PO-500 ON (AC panel) DOPPLER FAIL (Copilot panel) BATTERY IN USE (Pilot Panel) LOW OIL P LFT ENG and LOW OIL P RGT ENG GOV OFF LFT ENG and GOV OFF RGT ENG HIGH N2 LFT ENG and HIGH N2 RGT ENG EMER PWR LFT ENG and EMER PWR RGT ENG FUEL FILTER LFT ENG and FUEL FILTER RGT ENG HIGH VIB LFT ENG and HIGH VIB RGT ENG CHIP LFT ENG and CHIP RGT ENG CHIP MAIN GEARBOX, CHIP INT GEARBOX and CHIP TAIL GEARBOX
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- c. Lamp Test switch – Move to FLASH position.
- d. Set FLASHER switch – ON (on the right overhead console).
- e. Check that the following lights are flashing:

ICING FIRE LFT ENG, FIRE RGT ENG and FIRE KO-50 FIRE XMSN/APU BACKUP SYS ON Light (hydraulics)	GEN 1 FAIL and GEN 2 FAIL FIRE (on Pilot's Console) SHUT OFF LFT ENG and SHUT OFF RGT ENG 270 LT. FUEL (on Copilot Console)
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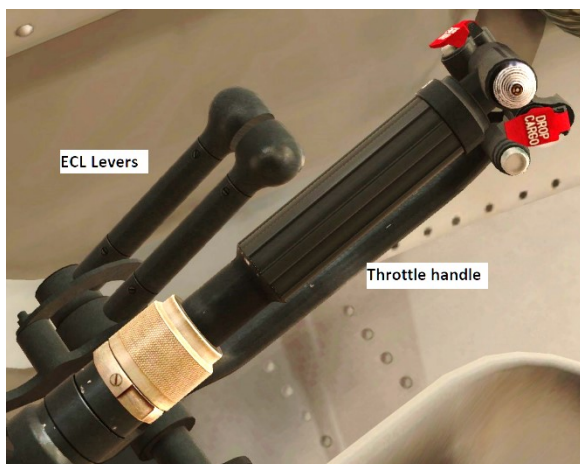
- f. Flasher switch – OFF (down).
- g. Lamp Test switch – OFF (centered).

- 4. Check Fuel. Check that helicopter has enough fuel, using fuel quantity gauge and selector.



- Rotate FUEL METER Selector to each position.
- Check quantity of each tank, using the inner scale of the gauge.
- Compare the total of all tanks to the TOTAL (which is indicated on the outer scale).
- The AUXiliary tanks are not normally used, they go inside the cargo compartment.
- After check procedure, leave the switch on the SERVICE (Feed Tank) position.

- 5. Engine Condition Levers (ECL) – Confirm they are centered in their middle detent. Control with **[RAIt + PgDn]** and **[RAIt + PgUp]** for the Left Lever and **[RShft + PgDn]** and **[RShft + PgUp]** for the right one.



- 6. Throttle, on Collective lever – Check that it is set to minimum (left most) with **[Page Down]** or HOTAS Axis.

- 14. Connect External Power: (Optional).

Ground Power allows the pilot to operate all electric devices of the Helicopter, like the Command Radio, before having the engine generators active. It is very useful on cold weather, at  $-5^{\circ}\text{C}$  or lower, as it will allow the pilot to activate the Battery Heaters.

Contact Ground Crew and ask to connect Ground Power.

- On the AC POWER panel, the EXT PWR ON light will illuminate, indicating that the crew has connected the AC power cable.  
On the DC POWER panel the EXT PWR ON light will also illuminate, because on DCS both AC and DC cables are connected simultaneously. On the real aircraft they are separately connected.
- Check each phase of the AC power: Turn the AC Selector knob alternately to positions EXT PWR I-II, II-III, III-I. The AC Voltmeter should measure 204-208 V in each phase.
- AC EXT PWR switch – Set to ON (Up), to connect the AC bus.





- d. On the DC POWER Panel, set RECTIFIERS 1, 2 and 3 switches to ON.



- e. Turn DC Selector knob to RECT BUSES, to check the Rectifiers voltage. The DC Voltmeter should measure 27-29 V.
- f. Inverters 115V & 36V – Set to AUTO (down, with a left click).
- g. Turn DC Selector knob to EXT PWR, to check the Ground DC voltage before connecting it to the DC bus. The DC Voltmeter should measure 27-29 V.
- h. DC EXT PWR switch – Set to ON (Up).
- i. Set RECTIFIERS 1, 2 and 3 switches to OFF. Their lights will not illuminate as the DC bus is being powered from the Ground Power Unit.

#### On the AC POWER PANEL:

- j. Inverter 115V – Set to MANual (Up). Normally, the 115V Bus is powered from the Generator 2 or 1. When the Generators are not operative, the Bus will draw power from the Battery Bus via the PO-500 Inverter. The “PO-500 ON” lamp illuminates to signal this situation.
- k. Turn AC Selector knob to 115V. The AC Voltmeter should measure 115 Volts.

- 7. Taxi & Searchlights. Check and Set as follows:

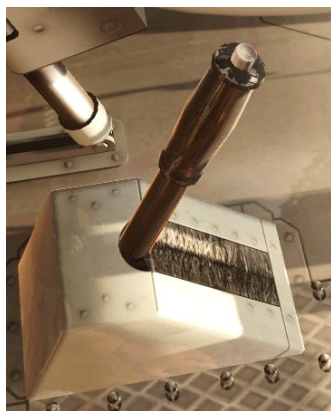
- Searchlight Switch – ON.
- Taxi Light – ON.
- Searchlight and Taxi Light – Extend, retract, and rotate from using Pilot and Copilot collectives' controls.
- Searchlight – Set as Required.
- Taxi Light – OFF.



- 10. Parking Brake. Enable with [**LShift + W**], to prevent the helicopter to move while starting its engines.

Inspect the brake pressure gauge, located on the left side console. It should read 30-36 kg/cm<sup>2</sup> when the brakes are applied.

- 11. Rotor Brake – OFF (bottom most, with right click or [**RCTL + R**]). If the rotor brake is not in the full down position a micro switch will not allow engine start.



- 12. Cockpit & Cabin Lights. Turn ON the red backlight of all the instruments and panels, as follows:

- Backlight Rheostats for the Pilot Console, Left overhead panels and Left Triangle Panel.
- Backlight Rheostats for the Copilot Console, Right overhead panels and Right Triangle Panel.
- Backlight Rheostats for the Flight Engineer Console, Center overhead panels and Radio Panels.
- The backlight of Instruments added after the Mi-8 was modernized to the T model, is controlled by a separate 5.5V system. To turn it on, switch the 5.5V switch to ON (Up), on the Right Triangle Panel. Their rheostat is behind the Copilot Seat.



Not all the lights will work on just battery Power.

- 13. Instruments Transformers Switch (36V). Confirm it is set to MAIN (on Engineer Console). The Single-Phase 36V Bus, which powers the engine and transmission monitoring instruments, draws its power from the 115V Bus through two redundant TR115/36 Transformers, labeled MAIN and STBY.
- 16. DC Voltmeter – Check, should not be below 24V
- 17. Anti-Collision Light – Set to ON. It will always operate, as it is connected to the Battery Bus.
- 18. Navigation, Rotor Tips and position lights – As required.
- Set the SARPP-12DM flight data recorder control panel selector switch to MAN (Up) and wait a bit to check that its FLT RCDR light illuminates, to make sure that the tape drive mechanism operates normally. This system is not actually simulated, but the switch and light are animated.



- 19. Service Fuel Pump – Set to ON (up). This is the pump of the internal 415 liter fuel tank of the Mi-8. A green SERVICE PUMP ON light will illuminate underneath.

Left & Right Fuel Pumps – Set to ON (up). These pumps are for the 1040 liter right and 1130 liter left external fuel tanks. Having all pumps ON is not recommended for Battery Start, but on DCS it doesn't seem to cause problems. Green LFT PUMP ON and RGT PUMP ON lights will illuminate underneath.

- 20. Fuel Shut-Off Valves – Lift their covers and set to OPEN (Up). Their warning lamps underneath will turn off.
- 21. Fire DETECTOR TEST switch – Confirm it is set to EXTINGUISH (Up), to enable the Fire Extinguishing System.



### **Generator Automatic Switchover Test:**

- Turn GENERATOR 1 to ON. Since the engine is not operating yet, its red warning light GEN 1 FAIL will lit and an Aural Warning can be heard.
- Wait 5 seconds, if the switchover circuit is good, the GEN 2 FAIL will lit also, meaning the switchover took place but since both engines are off, the red light for the generator 2 illuminates too.
- Turn GENERATOR 1 to OFF, and now repeat the test for the other Generator.
- Turn GENERATOR 2 to ON. Its red warning light GEN 2 FAIL will lit and an Aural Warning will be heard.
- Wait 5 seconds, if the switchover circuit is good, the GEN 1 FAIL will lit, meaning the switchover took place.
- Make sure that both AC generators switches are set to OFF.

### **Request Starting Permission with ATC:**

- Re-enable the Command Radio Circuit Breaker
- Set CMND RADIO to AM, as on DCS ATC always uses AM rather than FM.
- Set Radio Selector to R-863, for UHF communication.
- Tune Radio to ATC UHF Frequency, on Technician Console, using the frequency dials, or the Presets Selector.
- Contact ATC by pressing the Radio PTT **[RALT + \]**.

## 8.14 APU Starting Procedures:

The AI-9V Auxiliary Power Unit (APU), supplies compressed air to crank the main engine compressor rotors during engine start.

It can also be used to supply 27V DC power to the onboard electrical systems on the ground and in flight if the generators fail.

APU operations are limited to 30 minutes. In STANDBY/GEN Mode, the APU cannot be operated beyond 30 minutes, followed by a 15 minute shutdown/cooling period. Cool down the APU 15 minutes between shutdown and restart. Run the APU a minimum of 1 minute before shutdown.

### APU Abort Criteria:

ABORT APU start, by pressing the APU OFF button for 2 to 3 seconds, if ANY of the following occur after initiating the starting sequence:

- a. Auto ignition light Not illuminated
- b. EGT No indication within 9 sec
- c. EGT Rises above 880°C
- d. Battery/Ext power Drops below 18V voltage
- e. Auto ignition light Illuminated after 30 sec
- f. Max speed light Illuminates
- g. Fire warning light Illuminated

Restart attempts must be three minutes apart. Three attempts can be made. If the unit does not start before the third attempt, a 15 minute shutdown/cooling period must follow before restart is attempted again.

Do NOT start the engines with the APU in DC generator mode (APU/GEN switch on right side console ON/Up). Check the STBY GEN selector switch is set to OFF.





- 1. CRANK switch – Set to START (Up)
- 3. Press the APU START button for 2 to 3 sec. – The APU will begin its start cycle. The AUTO IGNITION annunciator will lit.
- 4. Clock – Start, to check Abort criteria.
- 5. Check APU EGT MAX 880 °C
- 6. Restart clock After AUTO ignition light off.
- 7. Monitor the nearby EGT APU temperature gauge and AIR PRESS gauge.

Once they are stable, the AUTO IGNITION light will turn off. The EGT should be less than 720 °C and the Air Pressure should be 1.2 to 2.0 Kg/cm<sup>2</sup>.

The OIL PRESS NORMAL and RPM NORMAL lights should have illuminated once the APU attains its normal speed.



- 8. 115V & 36V Inverter switches. Set to Manual (up)

- 9. Test the Engine Vibration Monitor equipment, by press and hold the VIBR SENSOR button. Check that the HIGH VIB LFT ENG, HIGH VIB RGT ENG, SHUT OFF LFT ENG and SHUT OFF RGT ENG annunciators illuminate on the Pilot Console, and listen to an oral message of LEFT ENGINE VIBRATION and RIGHT ENGINE VIBRATION.



- 10. PTIT Cold test Check (950 -1270 °C). Press and hold the EGT IND COLD test button, check that the PTIT (Power Turbine Inlet Temperature) gauge, on the pilot console, indicates above 950°. The EGT IND HOT test button is used when the engine is operating, the gauge then marking 0°.
- 11. Instrument transformer check:
  - Note APU air pressure
  - Instrument transformer switch – Set to OFF.
  - APU air pressure drops to zero.
  - Instrument transformer switch – Set to STBY
  - APU air pressure returns to previous indications
  - Instrument transformer switch – Set to MAIN
- CAUTION: The APU must run for a minimum of 1 minute before attempting to start the engines.

## 8.15 Starting Engines:

- CAUTION: Never engage the starter with the Fuel Shut-off valve switches turned OFF.
- WARNING: Do not start the engine(s) with the APU in the DC generator mode (ON/UP); APU Gen switch is on the right side console.

### Engine Abort-Start Criteria:

Abort engine start if any of the following occur:

- a. AUTO & STARTER lights - Not illuminated
- b. N1 Not increasing in 3-5 seconds
- c. PTIT Not increasing
- d. Rotor Not engaged by 20% - 25% N1
- e. ENG Oil pressure not increasing ( $>1 \text{ Kg/cm}^2$  by 45% N1)
- f. Batt DC Volts  $< 16\text{V}$
- g. APU EGT  $> 750 \text{ }^{\circ}\text{C}$
- h. ENG PTIT Max  $780 \text{ }^{\circ}\text{C}$
- i. Main Gearbox Oil pressure  $< 0.5 \text{ Kg/cm}^2$
- j. Hyd Press Not increasing
- k. Auto ignition light Remains on beyond 30 sec
- l. Starter light Remains on beyond 60-65% N1
- m. N1 Fails to reach 58% N1 before 60 sec

### Engine Abort-Start Procedure:

- Fuel Shutoff Lever - Closed
- Start Discontinue Button - Press and hold 2-3 sec.

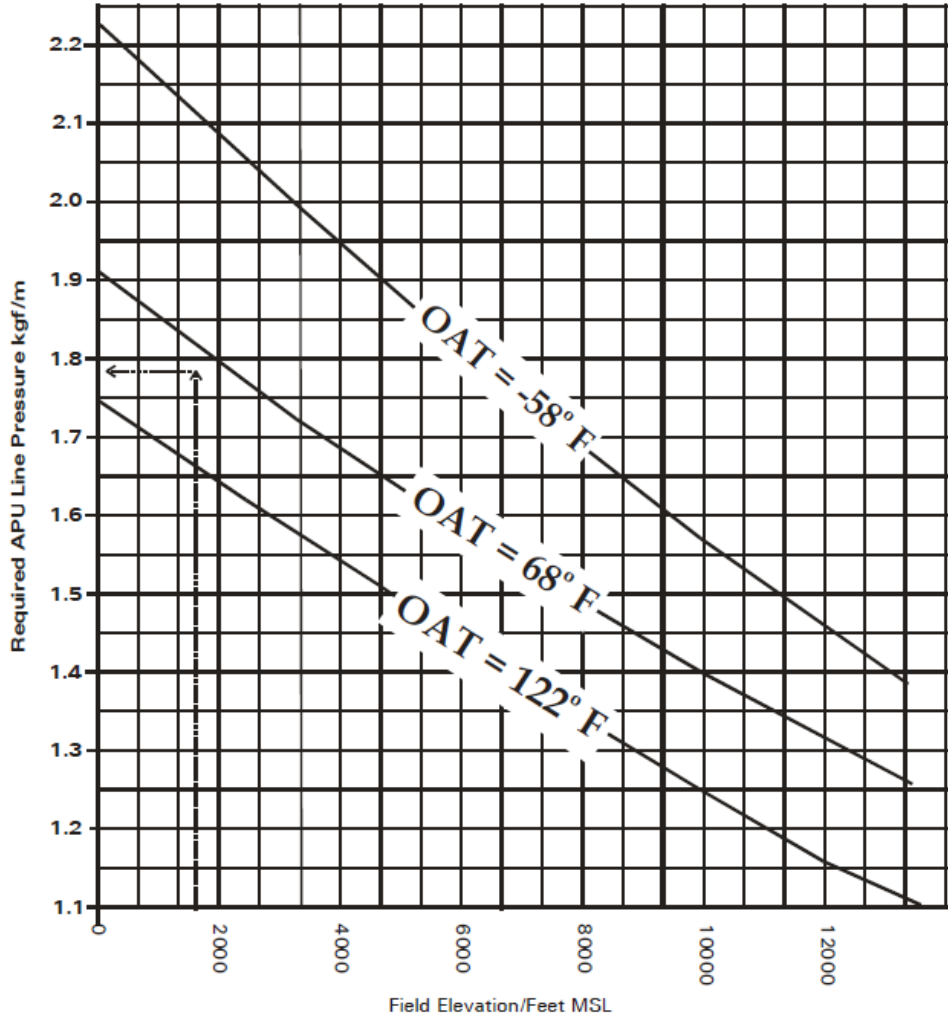
### Engine Cold Crank Procedure:

- Engine cold crank purges any unburned fuel from combustion section.
  - Fuel Fire Shutoff Valves must be ON (open) during cold crank or damage to fuel control may occur
- a. Fuel Shutoff Lever - Closed
  - b. Mode selector switch - Crank
  - c. Starter button - Press and hold for 2-3 sec.
  - d. Engine spool – for a cycle of 51-59 sec
  - e. Start Discontinue Button - Press and hold for 2-3 sec.

**Determine Operating Parameters on the PPC  
(Performance Planning Card)**

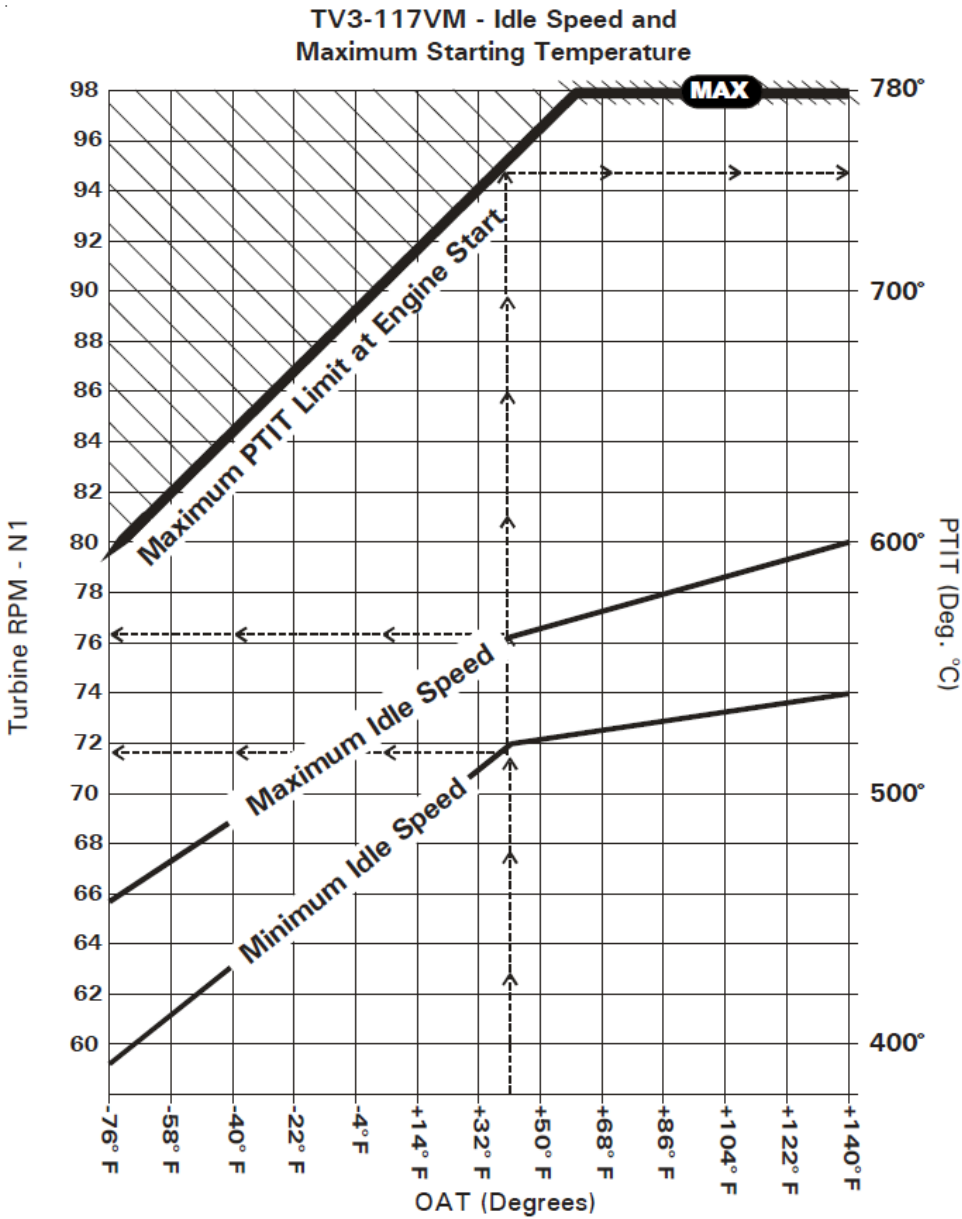
(Performance data for Mi-8 helicopters equipped with TV3-117VM engines)

1. Determine required APU Air Pressure for engine Start.



Enter the graph from the bottom, at the line corresponding to the field elevation. Proceed vertically to the reported temperature. Draw a line left to the required pressure. In the example shown, at a field elevation of 1,640 ft, with an ambient temperature of 81 °F, an APU air pressure of 1.8 Kgf/m will be required for engine starting.

2. Determine N1 rpm speed range, and maximum PTIT:



Enter the graph from the bottom, using the reported ambient temperature. For example: Ambient Temperature: +41 °F, then N1 Minimum = 72%, N1 Maximum = 76%, PTIT Maximum = 745 °C



## Engine Start Procedure:

There are two engines: LEFT (1) and RIGHT (2). Always start the downwind engine first. If the wind is coming from the Left, start the RIGHT engine first and vice versa. This is so that the exhaust gases from the first engine don't interfere with the starting of the other engine.

- 1. Confirm APU has run for 1 Minute
- 2. APU EGT and AIR PRESSURE - Within PPC limits
- 3. CRANK switch – Set to START (Up).
- 4. Select the engine to start with LEFT-RIGHT switch – Set to LEFT or RIGHT depending on wind.
- 5. START button – press and hold for 2-3 sec, to begin the engine start. The AUTO-IGNITION light will lit, followed by the STARTER ON light a few seconds later. If the AUTO IGNITION light doesn't illuminate, then most likely you forgot to release the Rotor Brake.



- 6. CLOCK – Start.
- 7. Once the RPM of the starting engine rises - Move forward the corresponding ENGINE STOP LEVER overhead, to allow the fuel to reach the engine.
- 8. Restart Clock after start sequence is complete.
- 9. Check idle speed parameters:
  - a. Engine RPM (N1) - Within PPC limits
  - b. PTIT - Within PPC limits
  - c. ENG oil pressure - Greater than 2 Kgf/cm<sup>2</sup>
  - d. Gearbox oil pressure - Greater than 0.5 Kgf/cm<sup>2</sup>
  - e. Rotor RPM - Check 40% -55%

- 10a. Test of flight controls & Main Hydraulic System:
  - a. Cyclic – Move Forward, Aft, Left & Right without depressing the force trim button. The cyclic should return to the original position.
  - b. Cyclic – Move the cyclic, depress the force trim button ([T]), and Release. The cyclic must remain in the position where the trim was released.
  - c. Cyclic – Return to Neutral Position (using Trim Reset [LCtl + T])
  - d. Check Pilot's Pedals – Move pedals fore and aft. Check for smooth operation and return to neutral position.
- 10b. Test of flight controls & Auxiliary Hydraulic System:
  - a. Set the MAIN HYD SYSTEM switch to OFF and make sure that the AUX SYS ON annunciator comes on and the MAIN SYS ON annunciator goes off. The auxiliary hydraulic system pressure rises rapidly as it picks up the load, and varies within the limits of 42 - 73 kgf/cm<sup>2</sup>
  - b. Turn the Main system switch back to the ON position, note that its annunciator remains off, as the active Hydro system is still the Auxiliary one.
  - c. Cyclic – Move Forward, Aft, Left & Right without depressing the force trim button. The cyclic should return to the original position.
  - d. Cyclic – Move the cyclic, depress the force trim button ([T]), and Release. The cyclic must remain in the position where the trim was released.
  - e. Cyclic – Return to Neutral Position (using Trim Reset [LCtl + T])
  - f. Check Pilot's Pedals – Move pedals fore and aft. Check for smooth operation and return to neutral position.
  - g. Collective – Increase collective (1 or 2 degrees pitch angle is sufficient) and check that the blade pitch angle pointer has moved.
  - h. Collective – Full Down.
  - i. Finally, select the main Hydraulic System by depression of the AUX SYS OFF button and keeping it depressed until the MAIN SYS ON annunciator comes on and the AUX SYS ON annunciator goes out.
  - j. When testing the hydraulic systems observe the annunciators to make sure that the PVI-65 information reporting system issues correct voice messages.

- 11. Second Engine Start:
  - a. APU cool down - 1 Minute.
  - b. APU EGT and AIR PRESSURE - Within PPC limits
  - c. Start / Crank switch - Start (up)
  - d. Eng selector switch - Left or right (second engine)
  - e. Start button - Press and hold for 2-3 sec
  - f. Clock - START
  - g. Fuel Shutoff Lever - N1 Increases, move fwd
  
- 12. Check idle speed parameters:
  - a. N1 - Within PPC limits
  - b. PTIT - Within PPC limits
  - c. ENG oil pressure - Greater than 2 Kgf/cm<sup>2</sup>
  - d. Gearbox – Check Temperatures.
  - e. Rotor RPM - Check 55% - 70%

## Engine Run Up:

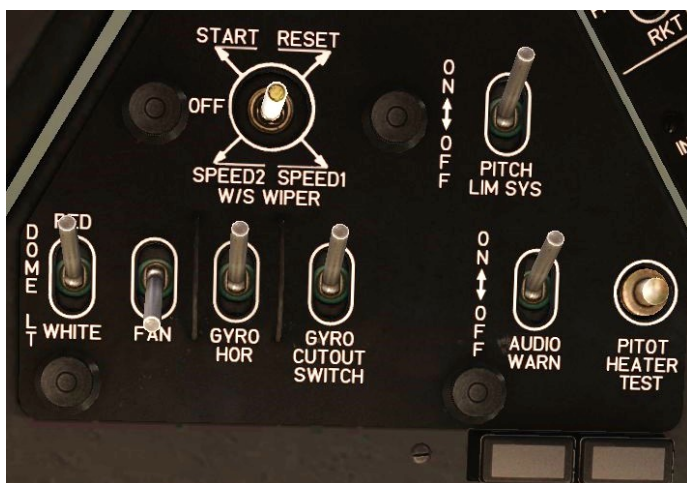
- One minute cool down of APU required after starting second engine and before setting throttle full right.
- Collective lever – Confirm it is set to minimum (Full Down).
- 1. Engines need to run at least 1min in idle and until engine oil temperature exceeds at least 30°, main transmission -15°.
- 2. Throttle, on Collective lever – Set to maximum (right most) with **[Page Up]** key. Engine RPM should go to 85% and the Main Rotor RPM to 93-97%
- 3. Perform Partial Acceleration Test. The partial acceleration check analyzes the engines and dynamic systems for proper response to power demand.
  - a. The throttle is first smoothly advanced from Ground Idle power to Flight Idle power (full right), and the N1 RPM is noted upon stabilization.
  - b. The throttle is returned to Ground Idle power (full Left).
  - c. The throttle is then rapidly advanced (within 1 to 2 seconds), to the Flight Idle power setting and the N1 noted.
  - d. Acceleration to 1 - 1.5 % below noted N1 speed must be reached within 3-6 seconds, PTIT should not exceed PPC limits
- 4. GENERATORS 1 & 2 switches – Set to ON (Up), on the AC Power Panel.

If you are not using Ground Power, the three lights TURN ON RECT will lit on the DC Power Panel, to remind you to turn on the three electric DC rectifiers.

CAUTION: Ensure that Rotor is above 88% prior to turning the Generators on.
- Generator AC Voltmeter Check. Check as Follows:
  - a. AC Voltmeter Selector Dial – #1 generator all three phases for 200 to 205 VAC.
  - b. AC Voltmeter Selector Dial – #2 generator all three phases for 200 to 205 VAC
  - c. Check the 115V inverter for 109-121 VAC
- NOTE: Adjust as necessary by using the voltage control rheostats located on the AC power panel.

- 5. Inverters 115V AC & 36V AC – Set to AUTO (down)
- 6. RECTIFIERS 1, 2 & 3 – Set to ON (Up). Their warning lights will turn off.
- Rectifiers DC Voltmeter Check. Check as Follows:
  - a. DC Voltmeter Selector Dial – RECT (Check 27-29 VDC).
  - b. DC Voltmeter Selector Dial – BATT (Check 27-29 VDC).
- 7. FLASH switch – Sets the annunciator lights to flash or steady.
- 8. If Ground Power was used:
  - a. Contact Ground Crew and tell them to disconnect Ground Power. Wait until the EXT GRND PWR lights turns green.
  - b. EXT PWR switch, on the DC POWER panel – Set to OFF.
  - c. EXT PWR switch, on the AC POWER panel – Set to OFF.
- 10. Enable Gyros:
  - a. GYRO HOR (Pilot) – Set to ON (Up) to power the pilot's Attitude Indicator.
  - b. GYRO HOR (Co-Pilot) – Set to ON (Up) to power the co-pilot's Attitude Indicator.
  - c. GYRO CUTOUT switch – Set to ON (Up), to enable the VK-53 gyro correction system.

This System reduces accumulated error during prolonged unilateral acceleration (like increasing speed, braking, and banked turns). Correction cutout does not occur from abrupt and un-sustained changes in flight conditions.





- 9. For both, Pilot and Copilot Consoles - Uncage Attitude Indicator, by clicking its top right button.
- 11. Set the SPUU-52 Tail Rotor Pitch Limiter to ON, and the corresponding Light on the Center Console illuminates.



The tail rotor normally has a maximum pitch angle of  $23^{\circ}20'$ . At high air density (low altitude, cool day), this amount of pitch actually has a possibility of overloading the drive system.

In order to prevent this, the tail rotor flight controls incorporate a pitch limiting system. This system decreases the amount of pitch available at higher air density. When fully limited, the tail rotor pitch is limited to  $17^{\circ}20'$ .

When the actuator is fully retracted and no limiting is in effect, the white bar indicator will displace to the extreme left. As the actuator extends and pedal travel becomes more limited, the bar will move to the right.

- 11b SPUU-52 Check:

- a. CAUTION: Full deflection of the test indicator bar is required for the system to be considered airworthy.
- b. NOTE: In flight, the vertical bar indicator moves left on low air density conditions. As the bar indicator moves to the right, tail rotor pitch becomes more limited.
- c. Hydraulic System – Check Main pressure normal
- d. Pitch Limit C/B – Check it's ON (overhead C/B panel)
- e. Engine Vibration Button – Check its Released
- f. Pitch Limit Power Switch – Check it's ON (left triangle panel)
- g. Autopilot Solenoid C/B – Check ON (overhead C/B panel)
- h. Pitch Limit Light/Button – PRESS (center console panel).  
Verify Red Light ON
- i. Toggle Test Switch – Set to "P" by left clicking and hold. The indicator bar should deflect until it reaches the left vertical mark.
- j. Toggle Test Switch – RELEASE, by releasing the mouse button.
- k. Toggle Test Switch – Set to "T" by right clicking and hold. The indicator bar should deflect until it reaches the right vertical mark.
- l. Toggle Test Switch – RELEASE, by releasing the mouse button.
- m. Pitch Limit Light/Switch – RELEASE
- n. Pitch Limit Light/Button – PRESS. Scroll the Test knob to the right, until full right needle deflection.
- o. Pitch Limit Power Switch – OFF. The needle will deflect full left
- p. Pitch Limit Power Switch – On
- q. Needle will center based upon ambient conditions
- r. Pitch Limit Light/Button – PRESS and HOLD, center the needle with knob.

- 13. PTIT Hot Test. Check only on first flight of the day.
  - a. Note the temperature of both engine PTIT's
  - b. Depress and hold the Air indicator "HOT" button on the left side console
  - c. Both PTIT indicator gauge needles rotate below 100°C.
  - d. Release the button and the indicators should return to the temperature noted prior to the test
- 14. APU OFF Button – PRESS. Check for a decrease in EGT, decrease in air pressure. The OIL PRESS NORMAL & RPM NORMAL advisory lights will go out after a few seconds.
- 15. Start panel switches – Set to neutral positions (engine start switch, APU start switch, and engine select switch).

## Engine Trim Check:

The engine control system includes a manual adjustment for N2 RPM. The pilot makes these trim changes using the INCR-DECR switch on his collective stick, it's barely visible on the left side of the Collective. Use the keys **[RAIt + Num+]** to Increment and **[RAIt + Num-]** to Decrement.



- a. NOTE: If 96 to 99% Rotor is not obtained when checking the upper Rotor limit, warm up the oil in the main gearbox to between 40 and 60 °C and repeat the check.
- b. Check Pilot's Engine Trim Switch
- c. Throttle – Full Right, Check Rotor 93 – 97%
- d. Main XMSN Oil Temp – Greater than 30°C
- e. Collective pitch – Increase to 3 degrees pitch angle. On the real Mi-8, this check is done with a 3° pitch, but on DCS the parking brake is unable to keep the helicopter still if using more than 2°.
- f. Engine Trim Switch – Decrease to 89 – 93% and stabilize
- g. Engine Trim Switch – Increase to 96 – 99% and stabilize
- h. Engine Trim Switch – Set to 95%
- i. Collective – Full Down
- j. Check Copilot's Engine Trim Switch.
- k. Throttle – Full Right, Check Rotor 93 – 97%
- l. Main XMSN Oil Temp – Greater than 30°C
- m. Collective Pitch – Increase to 3 degrees Pitch
- n. Engine Trim Switch – Decrease to 89 – 93% and Stabilize
- o. Engine Trim Switch – Increase to 96 – 99% and Stabilize
- p. Engine Trim Switch – Set to 95%
- q. Collective – Full Down

- 16. Power Up the Avionics:
  - a. DOPP switch – Set to ON (Up), to enable the DISS-15 Doppler System used for the radar altimeter, the hover indicator and for the Radio navigation.
  - b. COMM RADIO switch – Set to ON (Up), to enable the Jadro 1A HF radio.
  - c. 5.5V LIGHTS switch – Set to ON (Up), to enable the backlight of the Doppler instruments. The actual backlight level is set on the back panel, with the GROUP BACKLIGHT 5.5V knob.
  - d. DO NOT turn on the MIKE switch, as it will mess up the DCS radio communication. In real Life is used for the crew intercom.
  - e. VHF ADF INTERLOCK – Switch to ON to enable ADF navigation.

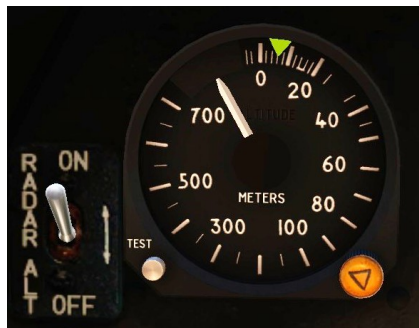


- f. Press the Accelerometer REST button, over the Pilot Console.





- 17. COMP SYS switch – Set to ON (Up), to align the Gyro Magnetic Compass.
- 18. Caution/Warning lights – Check.
- 19. Barometric Altimeters - Set the pressure altimeter pointers to zero and check that the barometric pressure display corresponds with the actual aerodrome value  $\pm 1.5$  mm Hg.
- 20. RADAR ALT switch – Set to ON, to activate the Radio Altimeter. It will perform an initialization test during which it will read 800 meters. The test will last 30 seconds and when it finishes the LOW ALTITUDE WARNING light on the yellow knob, will illuminate.



Rotate the Radar Altimeter yellow knob, using the Mouse wheel, until the index reaches 0, the warning light will then extinguish. Now you can set the index to the desired warning altitude, say 5-10 meters, to activate the alarm just before touch down.

- 21. Enable Autopilot - Enable ROLL & PITCH hold, by clicking on the central green light. You can use the mouse wheel over the light knob to adjust its brightness.



- 22. Autopilot Test:

- a. Depress the ON switch-lights of all the channels on the autopilot Console. All the switch-lights should come on, the IILH-4 trim indicator pointers should be centered within their pointer width with the flight controls in neutral position.



- b. Deflect the control stick to make sure that the pointers R and P of the IILH-4 indicator respond to control inputs (the directions of control stick and indicator pointers movements should match).
- c. Check the autopilot channels for disengagement upon depression of the AP OFF button at the cyclic stick, this condition being displayed by going out of all the lights.
- d. Check the altitude channel for engagement upon depression the ALT ON switch-light. Momentarily depress up the TEST selector switch with a Right Click and hold. Observe the indicator pointer A move upward.
- e. Move the collective pitch control lever 1° up from the lower stop, engage the altitude channel again and momentarily depress the TEST selector switch down with a Left Click and hold.
- f. This done, pointer A should move downward. Check the altitude channel for disengagement upon movement of the collective pitch control lever.
- g. Test the autopilot directional channel. With the pedals set neutral and feet removed from the pedals depression of the YAW ON switch-light should come on.
- h. As this takes place pointer Y of the indicator should be centered. Rotation of the YAW dial more than 1.5 turn to the left or to the right should cause a pedal movement in the same direction.
- i. With the pedals set neutral, the pointer Y of the indicator and the YAW dial of the control panel should return to their initial positions.
- j. Depress the YAW OFF button at the control panel and observe the YAW ON switch-light to go out.
- k. Caution. When testing the autopilot on the ground avoid the helicopter breakaway or turning for this purpose move the pedals and control stick smoothly and not more than  $\pm 50$  mm from the neutral position.

## **2. Taxi:**

### **2.1 Pre-taxi Checklist:**

- Gyro compass – align (check against Mag. Compass)
- Pitch limiter – ON
- Auto Pilot – ON

### **2.2 Taxi Checklist:**

- Throttle – Check full right
- Brakes – Check
- Flight Instruments – Check (in a turn, mag compass, turn and slip, RMI and HSI all indicate a turn)

## **3. Take-Off**

### **3.1 Before Take-Off Checks:**

- Nose Wheel – Centered
- Systems – Check indications of the following:
  - a. Rotor RPM
  - b. Engine RPM
  - c. Transmissions
  - d. Master CAUTION panel
- Fuel Quantity Selector Switch – Service.
- Fuel Pump Switches – SERVICE, LEFT and RIGHT ON and all three lights work accordingly.
- Hydraulics – check the Main System ON and light is illuminated, check pressure.
- AFCS system – Engaged.
- Transponder – ON and set as required
- Brakes – As Required
- Hover Power Check – Perform as Required

### 3.2 Hover Check:

- Controllability – control response will be checked in a hover with autopilot off and then on, carefully bring the aircraft to a stabilized 10 ft. hover ensuring all control responses are normal.
- Hover – closely monitor control response and CG hang as the aircraft departs the ground and ensure no unusual vibrations.
- Flight Controls – note position, cyclic nearly centered, normal pedal position.
- Control Response Checks:
  - a. Hovering Turns – 45 degrees in each direction
  - b. Sideward Flight – Cyclic response and rigging in both directions. (5 knots max)
  - c. Forward and Aft Flight – check control response and rigging

## 4. Engine Shutdown:

- 1. Aircraft Position – Into the wind
- 2. Parking Brake – Set, with **[LShift + W]**.
- 3. Wheel Chocks – As required. On DCS you can request the Chocks to the Ground Crew, but they will not be displayed.
- 4. AFCS/Autopilot – OFF, using 3 AUTOPILOT circuit breakers on CB Bank 7.
- 5. Mission equipment – As required.
- 6. Taxi/Search light – As required.
- 7. SPUU-52 T/R Pitch limiter – OFF, on Left Triangle Panel.
- 8. RI-65 Audio Warning system – OFF. Yellow annunciator underneath, illuminates.
- 9. Gyros/Erect Cutout/Compass switches – Set all OFF
- 10. Engine Dust Protectors (PZU) – OFF
- 11. Blinking system flash switch – OFF
- 12. EHSI / Avionics – OFF.
- 13. Rectifiers 1, 2, 3 – OFF (down), their yellow annunciators underneath illuminate.
- 14. AC generators 1, 2 – OFF (down)
- 15. Throttle – Full Left. Allow the engines a 2 minute cool down period in idle power.
- 16. Fuel Cutoff Levers – Closed (Levers Aft)
- 17. Engine Coast Down – 50 seconds min or 40 sec more than 3% NG.
- 18. Rotor brake – Engage, once the Rotor RPM is less than 20%
- 19. Fire EXT system – Set to DETECT (down), its red annunciator illuminates.
- 20. Fuel Fire Shutoff Valves – Set to OFF, once engines fully stopped. Their yellow annunciators illuminate.
- 21. Fuel Boost Pumps – All OFF, their green lights turn off.
- 22. Fuel Indicator Gauge Selector – Set to OFF.
- 23. Instrument transformer switch – OFF

- 24. 115V & 36V Inverters – Set to OFF (center position)
- 25. Anti-collision light – OFF
- 26. Miscellaneous switches – OFF
  - a. Radios/Avionics – OFF.
  - b. SARPP-12DM flight data recorder switch - Set to AUTO (Down).
- 27. Radar Altimeter - OFF
- 28. Parking Brake – Release.
- 29. Cockpit/Instrument lights – OFF
- 30. DC selector knob – OFF
- 31. Batteries 1 and 2 – OFF (down)
  
- Circuit Breakers - Switch all OFF.