

**INTERIOR INSPECTION**

CB Panel	1. ALL CB SWITCHES	OFF
	2. BATTERY/АККУМ. SWITCH	ON
	3. EXTERNAL GROUND POWER	ORDER ATTACHED (If required)
Left Console	1. EXTERNAL POWER INDICATOR	ILLUMINATES (If attached)
	2. FLIGHT SUIT VENTILATION/ ВЕНТИЛЯЦИЯ КОСТЮМА	AS REQUIRED
	3. OXYGEN SUPPLY/КИСЛОРОД	OPEN (CCW)
	4. OXYGEN CONTROLS - DILUTER DEMAND SWITCH - EMERGENCY/АВАРИЯ SWITCH	NORM/СМЕСЬ OFF/ВЫКЛ
	5. HELMET VENTILATION/ ВЕНТИЛЯЦИЯ ШЛЕМА	AS REQUIRED
	6. FUEL SHUT-OFF LEVER/ ПОЖАРНЫЙ КРАН ТОПЛИВА	FORWARD AND GUARDED
	7. PITOT HEAT/ОБОГРЕВ ПВД BUTTONS	OFF
	8. FDR/РЕГИСТРАТОР SWITCH	OFF
L-39ZA Only	9. INSTRUMENT LIGHTS CONTROL/ ОСВЕЩЕНИЕ ПРИБОРОВ	WHITE Set intensity
	10. MISSILE SEEKER HEATING/ОБОГРЕВ	OFF
	11. MISSILE SEEKER GLOWING/НАКАЛ	OFF
	12. GSH-23 ARM-SAFE/ПУШКА ГШ	OFF (SAFE)
Left Console	13. RADIO SET CONTROL BOX	SET
	14. AUDIO PANEL	SET
	15. ICS CONTROL BOX	SET
	16. THROTTLE	FULL AND FREE MOVEMENT
	17. PITOT TUBE SELECTOR	MAIN/РАБОТА
	18. HELMET VISOR/ОБОГРЕВ Г.Ш PANEL	AS REQUIRED
	19. PARKING BRAKE/ТОРМОЗ LEVER	PARK/СТОП
	20. ENGINE/FUEL CONTROL SWITCHES	OFF AND GUARDED
	21. START REGIME/РЕЖИМ ЗАПУСКА SWITCH	STARTING/ЗАПУК AND GUARDED
	22. TURBO/ТУРБО AND ENGINE/ДВ-ЛЬ BUTTONS	COVERS CLOSED
L-39C Only	23. INSTRUMENT LIGHTS CONTROL/ ОСВЕЩЕНИЕ ПРИБОРОВ	WHITE Set intensity

**INTERIOR INSPECTION**

Left Console	<b>24. LANDING-TAXI/РУЛЕЖ.-ПОСАД. LIGHT SWITCH</b>	<b>OFF/ФАРА</b>
	<b>25. OXYGEN PRESSURE INDICATOR</b>	<b>150 kg/cm<sup>2</sup></b>
<b>NOTE</b> When temperature is below zero degrees of Celsius, the pressure can drop down to 130 kg/cm <sup>2</sup> .		
Left Armament Panel (L-39ZA Only)	<b>1. SS/CC, LIVE/ВЗРЫВ, EMERGENCY/АВАРИЙНО, ПКЗ+GS/ПКЗ+ГШ BREAKERS</b>	<b>OFF AND GUARDED</b>
	<b>2. WEAPON CARRIER/ВЫБОР ДЕРЖАТЕЛЕЙ BUTTONS</b>	<b>OFF</b>
	<b>3. BOMBS/БОМБЫ SWITCH</b>	<b>SALVO/ЗАЛП</b>
	<b>4. A-A/CC SWITCH</b>	<b>PORT./ЛЕВАЯ</b>
	<b>5. MISS. TRAIN/СЕРИЯ SWITCH</b>	<b>POSITION 4</b>
	<b>6. INNER AND OUTER EXPL. CHARGE/ВНЕЖН AND ВНУТРН ЗАРЯД SWITCHES</b>	<b>OFF</b>
	<b>7. PYRO/ПИРО SWITCH</b>	<b>POSITION I</b>
Instrument Panel	<b>1. L/G CONTROL LEVER</b>	<b>DOWN</b>
	<b>NOTE</b> The L/G Lever in the aft cockpit must be in neutral (centre) position.	
	<b>2. ACCELEROMETER</b>	<b>RESET</b> Check "+1G"
	<b>3. GUN SIGHT - GYRO UNIT ARRESTMENT LEVER</b>	<b>FIXED/НЕПОД</b>
	<b>4. AIRSPEED/MACH INDICATOR</b>	<b>CHECK</b>
	<b>5. ALTIMETER</b>	<b>SET</b>
	<b>6. RADAR ALTIMETER</b>	<b>CHECK INDICATION</b> Set Dangerous Height
	<b>7. ADI</b>	<b>CHECK</b> Illuminating red
	<b>8. RMI</b>	<b>CHECK</b>
	<b>9. RANGE INDICATOR</b>	<b>CHECK</b>
	<b>10. VERTICAL VELOCITY INDICATOR</b>	<b>ZERO</b>
	<b>11. ADF INDICATOR</b>	<b>CHECK</b>
	<b>12. CLOCK</b>	<b>SET</b>
<b>13. CABIN PRESSURE/ALTIMETER ELEVATION / ПЕРЕПАД. ДАВЛЕН.</b>	<b>CHECK FIELD ALTITUDE</b> Difference Zero	

**INTERIOR INSPECTION**

Instrument Panel	<b>14. VOLTAMETER</b>	<b>EXTERNAL POWER VOLTAGE</b>
	<b>15. ENGINE INSTRUMENTS</b>	<b>CHECK</b>
	<b>16. DIFFUSER AND SUIT TEMPERATURE CONTROL</b>	<b>AUT./ABTOMAT</b>
	<b>17. DIFFUSER</b>	<b>SET DIRECTION</b> Close
Centre Console	<b>1. SIGNAL FLARE BUTTONS</b>	<b>CHECK BASIC POSITION</b>
	<b>2. ARMAMENT PANEL</b>	<b>CHECK STORES</b>
	<b>IN L-39C:</b> Switch ARMS/ОПУЖЕНИЕ CB on. Store lights should turn on for stations in use. A-A MISSILE/CC lights should illuminate if missiles are carried. Switch UB-16/УБ-16 CB on. PUS0/ПУС-8 light should illuminate if rockets are carried.	
	<b>IN L-39ZA:</b> Switch ARMS/ОПУЖЕНИЕ CB on in the CB panel. Switch on LAUNCH/ПУСК CB on the Centre Console. The external stores indicator should show square lights for all stations in use and round lights for stations with bomb racks, missiles, or armed PK-3 gun pods. Switch MISSILE/ПАКЕТ CB on. OUTER and INNER MISSILE/ВНЕШН and ВНУТРН ПАКЕТЫ lights should illuminate corresponding to carried stores. Then switch ARMS/ОПУЖЕНИЕ CBs off.	
	<b>3. ARMAMENT PANEL CIRCUIT BREAKERS</b>	<b>ALL OFF</b>
Centre Console (L-39C Only)	<b>4. LIVE/ВЗРЫВ AND EMERG. JETTIS./АВАР. СБРОС CIRCUIT BREAKER</b>	<b>OFF AND GUARDED</b>
	<b>5. ROCKET MODE SELECTOR</b>	<b>AUT./ABT.</b>
	<b>6. MISSILE/BOMB RELEASE SELECTOR</b>	<b>LEFT/ЛЕВ</b>
Centre Console	<b>7. MAIN BRAKE PRESSURE INDICATOR</b>	<b>ZERO</b>
	<b>8. EMERGENCY BRAKE PRESSURE INDICATOR</b>	<b>CONDITION</b>
	<b>9. BALANCE/ТРИММЕРЫ INDICATOR</b>	<b>TRIM CONDITION</b>
	<b>10. FIRE SIG TEST SWITCH</b>	<b>I AND II</b> Fire light illuminates
Right Console	<b>1. PRESSURISATION/ECS HANDLE / КЛИМТИЗАЦИЯ ГЕРМЕТ</b>	<b>OFF</b> Aft position
	<b>2. AUXILIARY SWITCH PANEL</b> – SEAT UNBLOCKING/ РАЗБЛ. КРЕСЛА SWITCH – CABIN HEATING/ОТОЛЕНИЕ КАБИНЫ – ENGINE INDICAT. EMERGENCY/ АВАР. ПИТ. ПРИБ. ДВИГАТЕЛЯ – ANTI ICING/АНТИОБЛЕД. – NAVIGATION LIGHTS – SDU/СДУ – RSBV/ИСКРА	<b>GUARDED</b>  <b>AUTOMATIC/АВТОМАТ</b> <b>OFF</b>  <b>OFF/ВИЛ.</b> <b>AS REQUIRED</b> <b>OFF</b> <b>NAVIGATION/</b> <b>НАВИГАЦ.</b>

**INTERIOR INSPECTION**

Right Console	<b>3. FOUR HYDRAULIC EMERGENCY LEVERS</b>	<b>FORWARD AND WIRED</b>
	<b>4. A&amp;W LIGHTS INTENSITY CONTROL</b> - CHECK - BRIGHTNESS	<b>LIGHTS ILLUMINATED ADJUST</b>
	<b>5. HYDRAULIC GAUGE</b>	<b>CONDITION</b>
	<b>6. GMK CONTROL BOX</b> - MODE SWITCH - HEMISPHERE SWITCH - LATITUDE SELECTOR	<b>MC/MK SET SET</b>
	<b>7. JPT-REG TEST/КОНТРОЛЬ PT-12</b>	<b>I AND II</b> Lights illuminating
	<b>8. IFF CONTROL BOX</b>	<b>SET CODE</b>
<b>END</b>		

**BEFORE START CHECKS**

CB Panel	1. <b>BATTERY/АККУМ. SWITCH</b>	<b>ON</b>
	2. <b>RDO/РТЛ SWITCH</b>	<b>ON</b>
	3. <b>SIGNAL LIGHTS</b> – AIRCONDIT OFF/КОНБИЦ. ЗАПРЫТО – CANOPY UNLOCKED/ФОНАР НЕЗАКРЫТ – HYD. SYST. FAIL/ ПАД. ДАВЛ. ГИДРОСИСТ. – GENERATOR/ГЕНЕРАТОР – EMERGENCY GENERATOR/ ЗАПАСНЫЙ ГЕНЕРАТОР – ENG. MIN. OIL PRESS/ МИН. ДАВЛ. МАСЛА. – DON'T START/НЕЗАПУК – INV. 3X36 V FAIL/ПРЕОБРАЗ. 3X36B – INV. 115 V FAIL/ПРЕОБРАЗ 115B	<b>FLASHING</b> <b>ILLUMINATING</b> <b>FLASHING</b>  <b>FLASHING</b> <b>FLASHING</b>  <b>FLASHING</b>  <b>FLASHING</b> <b>FLASHING</b> <b>FLASHING</b>
	4. <b>ENGINE/ДВ-ЛЬ SWITCH</b>	<b>ON</b> Don't Start/Незаяук and Inv. 3x36 V Fail/Преобраз 3x36B lights out within 5 seconds
<b>NOTE</b> The ENGINE/ДВ-ЛЬ switch activates a fuel boost pump. If the boost pump fails to operate and DON'T START/НЕЗАПУК light does not go off within 5 seconds, do not start the engine.		
	5. <b>INVERTOR I &amp; II/ПРЕОБРАЗ. I &amp; II</b>	<b>ON</b> Inv. 115 V Fail/ Преобраз 115B lights out
	6. <b>WING TANKS/КРЫЛ. БАКИ</b>	<b>AS REQUIRED</b> Wing Tanks/Баки signal light illuminates
Left Console	1. <b>THROTTLE</b>	<b>STOP/СТОП</b>
	2. <b>FDR SWITCH</b>	<b>ON</b> Green light illuminates
Instrument Panel	1. <b>FUEL INDICATOR</b>	<b>CHECK</b>
	2. <b>VOLTAMMETER</b>	<b>CHECK</b> 22 V minimum
<b>NOTE</b> Do not attempt an engine battery start if battery voltage is less than 22 V.		
Aft Cockpit	<b>▲ WARNING</b> Failure to comply the next step could result in damage to equipment or injury to pilot in aft cockpit.	
	1. <b>AFT CANOPY</b>	<b>CLOSE</b>
	2. <b>AFT CANOPY UNLOCKED LIGHT</b>	<b>COMES OFF</b>
<b>END</b>		

**ENGINE START**

CB Panel	1. <b>ATC</b>	<b>REQUEST STARTUP</b>
	2. <b>GROUND CREW</b>	<b>REQUEST CHOCKS</b>
	3. <b>INVERTOR I/ПРЕОБРАЗ. I, INVERTOR II, ПРЕОБРАЗ. II AND RDO/ПТЛ SWITCHES</b>	<b>OFF</b>
Left Console	<p><b>⚠ CAUTION</b></p> <p>The engine throttle finger-lift, for retarding the-throttle from IDLE to STOP is available in the forward cockpit only. It is therefore crucial that the forward pilot be aware and prepared to retard the throttle to STOP in case of an engine hot start or at any other time the engine must be shut down.</p>	
	1. <b>TURBO START/ТУРБО BUTTON</b>	<b>DEPRESS</b> For 2 seconds
	2. <b>TURBINE STARTER/ТУРБО СТАРТЕР LIGHT</b>	<b>ON</b> Within 25 sec. max
	3. <b>ENGINE START/ДВ-ЛЬ BUTTON</b>	<b>DEPRESS</b> For 2 seconds
	4. <b>THROTTLE</b>	<b>IDLE/МГ</b> Within 3-6 sec. from step 3
Instrument Panel	1. <b>RPM/ОБОРОТЫ, TRIPLE ENGINE, EGT INDICATORS</b>	<b>CHECK VALUES</b>
	<p><b>⚠ CAUTION</b></p> <p>If the APU starter is not disconnected within 45 sec., abort start and switch APU to STOP (TURBO STOP/СТОП ТУРБО switch). If the EGT rises rapidly and approaches the high limit, abort start immediately. Strong tail wind can cause an EGT temperature increase and aggravate fire condition.</p>	
	<p><b>NOTE</b></p> <p>If any of the following conditions is not met, abort start sequence by retarding the throttle to STOP/СТОП.</p> <ul style="list-style-type: none"> <li>- HPC (n<sub>1</sub>) RPM rise with 8 sec; HPC RPM rising continuously; minium 20% HPC RPM within 15 sec.</li> <li>- EGT rise within 25 sec; max EGT 685°C</li> <li>- When HPC RPM 30 %, LPC (n<sub>2</sub>) RPM start to increase</li> <li>- At 41.5 - 44.5 % HPC RPM, TURBINE STARTER/ТУРБО СТАРТЕР light goes out</li> <li>- Idle RPM within 50 sec.</li> <li>- Oil pressure at idle, 2 kp/cm<sup>2</sup> minimum</li> </ul>	
	<p><b>NOTE</b></p> <p>After any aborted start, perform a cold engine rotation.</p>	
	2. <b>ENGINE AT IDLE RPM/ОБОРОТЫ</b>	<b>56±1%</b>
3. <b>OBSERVE THE FOLLOWING:</b> - <b>OIL PRESSURE</b> - <b>CAUTION AND WARNING LIGHTS</b>	<b>2 kp/cm<sup>2</sup> MINIMUM FOLLOWING OUT:</b> Hyd. Sys. Fail/Пад. Давл. Гидросист Eng Min. Oil Press/Мин. Давл. Масла.	
<b>END</b>		

**AFTER START CHECKS**

Cockpit	1. <b>CANOPY</b>	<b>CLOSE AND LOCK</b> Canopy Unlocked/Фонар Незакрѳт light out
	2. <b>PRESSURIZATION AND ECS/ КЛИМАТИЗЦИЯ–ГЕРМЕТ LEVER</b>	<b>FULLY FORWARD</b> Aircondit. Off/Кондиц. Закрѳту light out
CB Panel	1. <b>MAIN GENERATOR/ГЕНЕРАТОР ОСНОВ. AND EMERGENCY GENERATOR/ГЕНЕРАТОР ЗАПАС.</b>	<b>ON</b> Generator/Генератор and Emergency Generator/ Запасный Генератор lights out
	2. <b>INVERTOR I &amp; II/ПРЕОБРАЗ. I &amp; II</b>	<b>ON</b> Inv. 3x36 V Fail/Преобраз 3x36В and Inv. 115 V Fail/ Преобраз 115В lights out
	3. <b>RDO/РТЛ, MRP-RV/МРП-РВ, AGD-GМК/АГД-ГМК, RSBN/ИСКРА, DE-ICING SIGNAL/РИУ, SDU/СДУ</b>	<b>ON</b>
	4. <b>WING TANKS/КРЫЛ. БАКИ</b>	<b>AS REQUIRED</b>
	5. <b>EXTERNAL POWER</b>	<b>DISCONNECT</b> (If used) Check voltage
Right Console	<b>⚠ CAUTION</b> Should an icing sensor not be in the air stream on the ground, it does not indicate icing conditions. If the engine is started at icing conditions with ambient temperature below 5°C, position the anti-ice mode switch to MANUAL and leave it there the whole time the engine is running on the ground.	
	1. <b>ANTI-ICE MODE/АНТИОБЛЕД. SWITCH</b>	<b>AUTOMATIC OR MANUAL</b>
	2. <b>ADF CONTROL BOX</b>	<b>SET</b>
	On ICS control box position the switch to ADF/PK, ADF beacon switch to О/Д position (outer beacon). On ADF control box select ANT/AHT position, volume control to maximum, mode switch to TLF/ТЛГ, tune the station and fine tune to maximum indicator's deflection. The station signal shall be audible and ADF indicator shall indicate relative bearing to the station after selection of AUT/K ABT position on ADF control box. Ensure a positive signal lock by deflecting the needle on the ADF gauge/Радиокомпас with the Л/Л–Р/П switch and watch the needle return to its previous position. Set ADF beacon switch to I/Б and repeat the same procedure for inner beacon. Select required ADF mode. On ICS control box position the switch to OFF (right).	
	3. <b>RSBN/ИСКРА CONTROL BOX</b>	<b>SET</b> (Where available)
	4. <b>RSNB/ИСКРА FIELD ELEVATION</b>	<b>SET</b>
	5. <b>SDU/СДУ</b>	<b>ON</b>
	6. <b>AIR DIFFUSOR</b>	<b>AS REQUIRED</b>
7. <b>IFF</b>	<b>ON</b>	

**END**

**BEFORE TAXI CHECKS**

Center Console	1. <b>AILERON TRIM</b>	<b>TRIM</b>
	2. <b>ELEVATOR TRIM</b>	<b>2 MARKS AFT</b>
<p><b>NOTE</b> When flight without external stores, elevator trim to neutral.</p>		
External view	1. <b>FLIGHT CONTROLS</b>	<b>CHECK FOR FREE MOVEMENT AND CORRECT RESPONSE OF ELEVATORS, AILERONS AND RUDDERS</b>
	2. <b>FLAPS</b>	<b>CHECK LANDING AND UP POSITIONS SET TO TAKE-OFF</b> Check indicators
Instrument Panel	1. <b>OIL TEMPERATURE</b>	<b>-5°C MINIMUM</b>
	<p><b>NOTE</b> Before first flight of the day, perform following engine warming-up and engine run-up test:</p> <ul style="list-style-type: none"> <li>When oil temperature is less than - 5°C after one minute engine run at idle and one minute at 85%, increase RPM to 95% and terminate engine warming-up when oil temperature reaches -5°C minimum.</li> <li>Check engine surge bleed valves opening during engine warm-up: Shift the throttle slowly; when the valve behind fifth compressor stage closes (LPC RPM sudden decreasing by 3 to 4%), HPC RPM shall indicate 74 to 77%, when the valve behind third compressor stage closes (LPC RPM sudden decreasing by 1 to 2%), HPC RPM shall be 86 to 89%.</li> <li>Acceleration and deceleration check. Record the fuel pressure at engine idle and max. Shift the throttle from IDLE/МГ to TAKE OFF/ ВЗЛ within 1 to 2 seconds, start stop watch simultaneously. Stop the stop watch in that moment, when the fuel pressure indicator shows a value of max. engine rating minus 10%. Acceleration time shall take from 9 to 12 seconds. Run the engine at max from 1s to 20 seconds and reset the stop watch. Retard the throttle from TAKE OFF/ВЗЛ to IDLE/МГ within 1 to 2 seconds, start stop watch simultaneously. Stop the stop watch in that moment, when the fuel pressure indicator shows a value of idle engine rating measured in the beginning of this check. Deceleration time shall take not more than 5 seconds.</li> <li>During acceleration and deceleration checkout, observe fuel pressure, EGT and RPM whether follow limits.</li> <li>After next 20 seconds, check the idle RPM.</li> </ul>	
	<p><b>⊘ CAUTION</b> When engine is running in ice conditions at RPM less than 85%, increase HPC RPM every 5 minutes to 93% for one minute.</p>	
	<p><b>NOTE</b> During engine run-up check, extend speed-brakes every 5 minutes.</p>	
2. <b>VOLTAMMETER</b>	<b>28.5 V</b>	
3. <b>RADIO ALTIMETER</b>	<b>CHECK</b>	
<p>The height indicator pointer moves to right position and back to zero within 1 to 2 minutes from MRP-RV/МПР-PB CB switching on. Push the TEST button on the height indicator: Warning light shall illuminate when DH pointer is set to 15 meters or below.</p>		



**BEFORE TAXI CHECKS**

Right Console	<b>1. HYDRAULIC PRESSURE</b>	<b>135 TO 150 kp/cm<sup>2</sup></b>
	<b>NOTE</b> If the HYDRAULIC EMER indicator reading is below 150 kp/cm <sup>2</sup> , shut down the engine and terminate the preflight inspection.	
	<b>2. RSNB/ИСКРА</b>	<b>CHECK</b>
	Tune RSNB station of known location, within 3 minutes the RMI shall indicate bearing and distance to this station and AZIMUTH CORRECT/АЗИМУТ КОРРЕКЦИЯ light illuminates. Verify the RSNB proper operation by means of TESTING button on the auxiliary switch panel. When the button is depressed, the RSNB system should set distance 291.5 ± 3 km at the range indicator and course 177° ± 2° at the RMI.	
Left Console	<b>3. DE-ICING SENSOR HEATING</b>	<b>CHECK</b>
	ANTI-ICING/АНТИОБЛЕД, switch to AUTOMATIC/АВТОМАТ position and depress the De-ice sensor heating test button/Контроль обогрева рпо. The light beside the button shall come on. After button releasing, reposition the switch to MANUAL/ВРУЧН., DE-ICING ON light shall come on within 30 seconds. Finally reposition the switch to AUTOMATIC/АВТОМАТ.	
	<b>⚠ CAUTION</b> When ANTI-ICING/АНТИОБЛЕД switch in MANUAL/ ВРУЧН. position, and DE-ICING ON light will not illuminate, shutdown the engine.	
	<b>1. INTERCOM</b>	<b>CHECK</b>
Select radio channel, switch off squelch/шумов circuit on audio panel, and position ADF switch to OFF on ICS control box. Adjust volume by rotating RADIO/РАД knob on ICS control box. Depress the ICS transmission button and adjust intercom volume by rotating the INTERCOM/СПУ knob. Aft cockpit transmission overrides the fwd one. Stand-by intercom check: Positioning switch to STAND-BY should provide the ICS transmission.		
<b>2. SPEEDBRAKES</b>	<b>CHECK EXTENDED AND RETRACTED POSITIONS</b> Check indicator	
<b>3. THROTTLE</b>	<b>IDLE/МГ</b>	
<b>4. EXTERNAL POWER INDICATOR</b>	<b>CONFIRM OFF</b> Request disconnect if on	
<b>5. BRAKES</b>	<b>APPLY</b> Check pressure	
<b>6. PARKING BRAKE/TOPMO3 LEVER</b>	<b>NEUTRAL (RELEASE)</b>	
<b>7. TAXI CLEARANCE</b>	<b>REQUEST</b>	
<b>END</b>		

**TAXI**

**⊘ CAUTION**

Taxi must be made with the canopies closed.  
Check that the area behind and to the sides of the aircraft is clear of obstacles, personnel or other aircraft.

**1. WHEEL CHOCKS**

**REQUEST REMOVE**

**2. POWER**

**80-85%**

**⊘ CAUTION**

Taxi at the lowest practical RPM and moderate speed.  
To move away from chocks, avoid the use of excessive power. Once the aircraft has started moving, retard the throttle to IDLE so as to prevent blowing objects which may cause injury to ground crew or damage to ground equipment.

**NOTE**

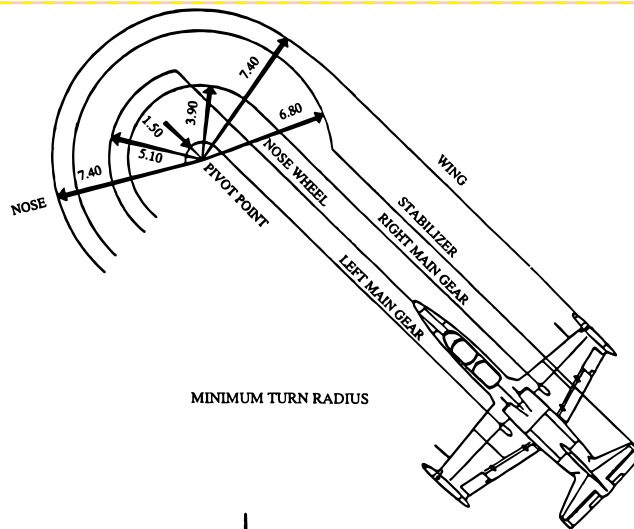
Recommended minimum turning radius of INBD MLG is 1.5 m. When the turning radius is less, the NLG tire will be excessively worn.

Maximum permissible taxiing speed (the same as for A/C towing) is quoted as follows:

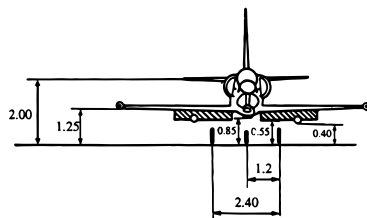
Taxiing	Configuration	Speed limit, concrete runway	Speed limit, grass strip
Straight	all	60 km/h / 32 kts	15 km/h / 8 kts
Turn	without stores	15 km/h / 8 kts	5 km/h / 3 kts
Turn	with stores	10 km/h / 5 kts	5 km/h / 3 kts

**⊘ CAUTION**

After excessive full braking the taxi speed 30 km/h shall be maintained because of possible wheelbrakes overheating.



MINIMUM TURN RADIUS



GROUND CLEARANCES

**END**

**BEFORE TAKE-OFF CHECKS**

1. TRIMS	CONFIRM POSITIONS
2. SPEEDBRAKES	IN
3. FLAPS	TAKEOFF POSITION
4. FUEL QUANTITY & WING TIPS LIGHT	CHECK
5. FLIGHT AND ENGINE INSTRUMENTS	CHECK
6. OXYGEN	CHECK QUANTITY
7. CANOPY	CLOSED AND LOCKED Handle forward, Light out
<b>NOTE</b> If an instrument flying hood is carried, it must be kept at the retracted position throughout the takeoff and landing phases to ensure safe ejection.	
8. HYDRAULIC PRESSURE	CHECK
9. CAUTION AND WARNING LIGHTS	CHECK Lights out
10. FLIGHT CONTROLS	CHECK
11. PRESSURISATION/ECS HANDLE / КЛИМТИЗАЦІЯ ГЕРМЕТ	FULLY FORWARD
12. RUNWAY ENTRY/TAKE-OFF CLEARANCE	REQUEST
END	

**LINE-UP CHECKS**

1. NOSE WHEEL	ALIGNED WITH R/W HEADING
2. COMPASSES	CHECK HEADING
3. ADF, RMI	CHECK
4. GMK	ALIGN
5. ALTIMETER	CHECK
6. PITOT TUBE HEATING	AS REQUIRED
7. LANDING-TAXI/РУЛЕЖ.-ПОСАД. LIGHTS	AS REQUIRED
END	

**TAKE OFF**

Before starting the takeoff roll, mentally go through the "Abort" procedure and relevant take off data.

**1. ENGINE INSTRUMENTS**

**CHECK WITHIN LIMITS**  
RPM, EGT, Oil pressure

**2. CAUTION AND WARNING LIGHTS**

**OUT**

**3. CLOCK**

**START FLIGHT TIME**

**4. THROTTLE**

**TAKE OFF/ВЗЛ**

**5. WHEEL BRAKES**

**RELEASE**

Maintain directional control initially by differential braking and then by rudder. The rudder becomes effective at approximately 60 km/h / 32 kts.  
At 150 km/h / 80 kts IAS, smoothly raise the nose wheel. An aircraft in clean configuration will become airborne at approximately 180–190 km/h / 95–105 kts IAS.

**⊘ CAUTION**

Exceeding Max gear extended speed (330 km/h / 175 kts IAS) may cause damage to the landing gear doors and prevent their subsequent operation.

With positive rate of climb at airspeed 220 km/h / 120 kts IAS and altitude 20 m / 60 ft AGL minimum:

**6. LANDING GEAR LEVER**

**UP**

**7. LANDING GEAR INDICATOR LIGHTS**

**CHECK SEQUENCE**  
Doors Out/Люки Откр. illum.  
Three green extinguish  
Three red come on  
Doors Out/Люки Откр. ext.

**8. MECHANICAL INDICATOR**

**CHECK**

**9. FLAPS**

**UP**

**10. ELECTRICAL AND MECHANICAL INDICAT.**

**CHECK**

**11. TRIM**

**AS REQUIRED**

**NOTE**

Flaps are automatically retracted at airspeed 310 km/h / 167 kts. Overcome this speed with flaps extended can cause an unexpected change of aircraft behavior (unexpected flaps retraction).

**Cross Wind takeoff:** During a cross wind take off, use the same procedures as for normal takeoff. However, since during the takeoff roll, the aircraft nose tends to crab into the wind, be prepared with the opposite rudder. Also as the speed increases the upwind will tend to rise, be prepared with the ailerons into the wind. When airborne, be aware of the cross controls situation and prepare to align controls to gain a coordinated flight.

**Grass Strip Takeoff:** During a grass strip take off, use the same procedures as for normal takeoff. On wet or snow-covered surface, the aircraft can stay on brakes up to 88 to 98% RPM maximum. Aircraft acceleration is slower, maintain directional control initially by differential braking up to 100 km/h / 55 kts IAS. Takeoff roll distance may be longer by 50%. To decrease friction of NLG wheel, perform takeoff roll with a control stick pulled up. At 160–165 km/h / 85–90 kts IAS, raise the nose wheel by pulling the stick fully aft. An aircraft will become airborne at approximately 190–200 km/h / 100–110 kts IAS.

**⊘ CAUTION**

When takeoff is performed by several aircraft at the same moment, distance between aircraft should be kept sufficient not to intake dirt, raised by neighbor aircraft.  
Takeoff on runway fallen to soft through wetness or on thawed snow is not recommended.

**END**

**CLIMB****NOTE**

After retracting flaps, retard the throttle to NORM/HOM (103%) and maintain a nose-up attitude until the initial climb speed of 300 km/h / 160 kts IAS is attained. The first turn out of traffic pattern will be at a minimum of 300 km/h / 160 kts IAS and 100 m / 330 ft AGL (if the airfield rules does not determine otherwise). Maintain climb speed 350 km/h / 190 kts IAS. Trim as required.

**1. OXYGEN SYSTEM****ABOVE 2,000m / 6,500ft**Check pressure  
Check blinker**2. FLIGHT AND ENGINE INSTRUMENTS****CHECK****3. FUEL QUANTITY****CHECK****4. HYDRAULIC PRESSURE****CHECK****5. CABIN ALTIMETER****CHECK****6. ALTIMETER****SET****7. LANDING-TAXI/РУЛЕЖ.-ПОСАД. LIGHTS****CHECK OFF/ФАРА****END****CRUISE**

As soon as practical after leveling off, accomplish the following:

**1. FUEL QUANTITY****CHECK****2. OXYGEN****CHECK****3. ENGINE INSTRUMENTS****CHECK****END****INSTRUMENT NAVIGATION****1. ADF TUNED TO STATION****CHECK****2. RSBN/ИСКРА NAVIGATION/НАВИГАЦИЯ CHANNEL  
SELECTED****CHECK**  
If available

If RSBN/ИСКРА is not available for the destination, use the map to determine the desired range and heading. Enter the heading into the RMI using the INITIAL AZIMUTH/АЗИМУТ НАЧАЛЬН. УСТ. switch. Enter the range into the PPD-2 using the INITIAL RANGE/ДАЛЬН НАЧАЛЬН. УСТ. switch.

**NOTE**

RSBN/ИСКРА requires line of sight to function. Even if in range, terrain may obstruct the signal. Use the map to determine if the desired station is out of range and/or if any obstacles may exist, and offset the course or increase altitude to clear the obstruction.

**3. RMI APPROACH COURSE SET****CHECK****4. PPD-2 RANGE INDICATOR****CHECK****5. ADF AND RMI HEADING****ALIGN AS NEEDED****END**

**DESCENT**

<b>1. FUEL QUANTITY</b>	<b>CHECK</b>
<b>2. FLIGHT AND ENGINE INSTRUMENTS</b>	<b>CHECK</b>
<b>3. ALTIMETER</b>	<b>SET AS REQUIRED</b>
<b>4. DE-ICING/АНТИОБЛЕД.</b>	<b>AS REQUIRED</b>

**END****APPROACH CHECK**

<b>1. WARNING AND ADVIS./CAUTION PANELS</b>	<b>CHECK</b>
<b>2. FUEL QUANTITY</b>	<b>CHECK</b>
<b>3. HYDRAULIC PRESSURE</b>	<b>135–150 kp/cm<sup>2</sup></b>
<b>4. LANDING LIGHTS</b>	<b>AS REQUIRED</b>
<b>5. RADIO SET TO TOWER CHANNEL/КАНАЛ</b>	<b>CHECK</b>
<b>6. ATC</b>	<b>DECLARE INBOUND</b>

For an instrument approach, also set the following:

<b>1. ALTIMETER</b>	<b>SET</b>
<b>2. ADF INNER AND OUTER MARKER</b>	<b>CHECK</b>
<b>3. RUNWAY HEADING ON RMI</b>	<b>SET</b> Using Course/3K knob. Remember to take magnetic deviation into account

Aim to arrive at 2000 ft./600 m altitude, 11 nm/20 km away from the airfield, with RMI bearing and course aligned, with ADF inner and outer marker both at 0° azimuth, and flying 200 kts/370 km/h.

**END**

**VFR APPROACH**

Final approach	1. ALTITUDE 2000 ft/600 m DISTANCE 8.1 nm/15 km SPEED 180 kts/300 km/h	EXTEND GEAR
	2. SPEED 150 kts/280 km/h	FLAPS 25°
	3. ALTITUDE 2000 ft/600 m DISTANCE 6.5 nm/12 km	RADIO GLIDESCOPE ENTRY POINT
	4. ALTITUDE 1000 ft/300 m DISTANCE 3.3 nm/6 km SPEED 150 kts/280 km/h	FLAPS 44°
	5. ALTITUDE 600 ft/200 m SPEED 140 kts/260 km/h	FLY OVER OUTER NDB
	6. ALTITUDE 200–250 ft/60–80 m SPEED 125 kts/230 km/h	FLY OVER INNER NDB
	7. TOUCHDOWN	
<b>END</b>		

**INSTRUMENT APPROACH**

RSBN/ИСКРА approach	If using RSBN/ИСКРА navigation and/or descent program channels are available:	
	<b>1. RSBN/ИСКРА FIELD ELEVATION</b>	<b>SET</b>
	<b>2. RSBN/ИСКРА AZIMUTH CORRECTION/АЗИМУТ КОРРЕКЦИЯ AND DISTANCE CORRECTION/ДАЛЪН КОРРЕКЦИЯ LIGHTS</b>	<b>CHECK</b>
	<b>3. SDU/СДУ CIRCUIT BREAKER</b>	<b>ON</b>
	Fly towards air field using ADF and RMI until PPD-2 range indicator is below 130 km	
	<b>4. RSBN/ИСКРА MODE SWITCH</b>	<b>GLIDE PATH/ ПРОБИВ.</b>
	<b>5. RMI DEVIATION POINTERS</b>	<b>ALIGN AND FOLLOW</b>
	<b>6. RMI DIRECTION AND COURSE NEEDLES</b>	<b>ALIGN AND FOLLOW</b> Maintain <200kts/370km/h
	<b>7. END OF DESCENT/ПРОБИВ ОКОНЧЕНО LIGHT</b>	<b>ILLUMINATES</b> Once arrived at 2000ft/600m altitude and 11nm/20km from field
	<b>8. MAINTAIN LEVEL FLIGHT</b>	<b>2000 ft./600 m</b> <b>180 kts/300 km/h</b>
	<b>9. SDU/СДУ SWITCH</b>	<b>ON</b>
	<b>10. RSBN/ИСКРА MODE SWITCH</b>	<b>LANDING/ПОСАДКА</b>
Final approach	<b>11. ADI HEADING AND GLIDESLOPE DEVIATION POINTERS</b>	<b>ALIGN AND FOLLOW</b>
	<b>12. SDU LATERAL AND LONGITUDINAL COMMAND POINTERS</b>	<b>FOLLOW</b>
	<b>1. ALTITUDE 2000 ft/600 m DISTANCE 8.1 nm/15 km SPEED 180 kts/300 km/h</b>	<b>EXTEND GEAR</b>
	<b>2. SPEED 150 kts/280 km/h</b>	<b>FLAPS 25°</b>
	<b>3. ALTITUDE 2000 ft/600 m DISTANCE 6.5 nm/12 km</b>	<b>RADIO GLIDESCOPE ENTRY POINT</b>
	<b>4. ALTITUDE 1000 ft/300 m DISTANCE 3.3 nm/6 km SPEED 150 kts/280 km/h</b>	<b>FLAPS 44°</b>
	<b>5. ALTITUDE 600 ft/200 m SPEED 140 kts/260 km/h</b>	<b>FLY OVER OUTER NDB</b>
<b>6. ALTITUDE 200–250 ft/60–80 m SPEED 125 kts/230 km/h</b>	<b>FLY OVER INNER NDB</b>	
<b>7. TOUCHDOWN</b>		
<b>END</b>		



**AFTER LANDING CHECKS**

1. LANDING/TAXI LIGHTS	AS REQUIRED
2. FLAPS	UP
3. SPEEDBRAKES	IN
4. TRIMS	NEUTRAL
5. ANTI ICING/АНТИОБЛЕД.	OFF/ВИЛ.
6. PITOT HEAT/ОБОГРЕВ ПВД BUTTONS	OFF
END	

**ENGINE SHUT-DOWN**

1. PARKING BRAKE/ТОРМОЗ LEVER	PARK/СТОП
2. THROTTLE	IDLE/МГ
3. ENGINE COOLING	2 MINUTES
4. PRESSURISATION/ECS HANDLE / КЛИМТИЗАЦИЯ ГЕРМЕТ	OFF Aft position
5. FLIGHT SUIT VENTILATION/ ВЕНТИЛЯЦИЯ КОСТЮМА	CLOSE (CW)
6. ELECTRICAL SWITCHES	OFF Except Engine/Дв-Ль, Battery/Аккумуля. and Jpt. Reg./Выкл. РТ-12 (C only)
7. THROTTLE	STOP/СТОП
8. ENGINE RUN-DOWN	CHECK From Idle to 0% RPM: HPC 20s, LPC: 25s
9. ENGINE/ДВ-Ль СВ	OFF
<b>C</b> Only 10. JPT. REG/ВЫКЛ. РТ-12 СВ	UNGUARDED AND OFF
11. FDR/РЕГИСТРАТОР	OFF
12. BATTERY/АККУМ.	OFF
13. CANOPY	OPEN
14. WHEEL CHOCKS	PLACED
15. PARKING BRAKE/ТОРМОЗ LEVER	RELEASED Once chocks in place
16. OXYGEN VALVE/КИСЛОРОД	CLOSE (CW)
END	

**GS-23/ГШ-23 AND PK-3/ПК-3 EMPLOYMENT****NOTE**

When employed against ground targets, guns and gun pods should be fired at dive angles of 20° and 30° under the following conditions:

Parameters	30°	20°
Gunsight reflector deflection angle	1.38°	1.51°
Dive entry altitude at ingress point	3,940'/1,200m	3,940'/1,200m
Dive entry speed at ingress point	216kts/400km/h	216kts/400km/h
Shooting altitude	1,970'/600m	1,640'/500m
Shooting speed	324kts/600km/h	324kts/600km/h
Shooting distance	3,940'/1,200m	4,790'/1,460m

Centre console	1. <b>ASP/АСП CB</b>	<b>ON</b>
	2. <b>GUN INNER WING/ПК-3 ВНУТРИ AND GUN OUTER WING/ПК-3 ВНЕШНИ CBS</b>	<b>ON PER GUN POD LOAD</b>
	3. <b>DEBLOCK GUNS WING-GS/ПК-3+ГШ НА ЗЕМЛЕ BUTTON</b>	<b>PUSH</b> If using GS-23 and/or PK3 against ground targets
Gun sight	1. <b>GUN SIGHT DEFLECTOR ANGLE</b>	<b>AS REQUIRED</b>
	2. <b>FICTITIOUS TARGET BASE</b>	<b>SET</b>
	3. <b>GYRO-FIXED/ГИРО-НЕПОД SWITCH</b>	<b>AS REQUIRED</b>
	4. <b>GUNSIGHT DISTANCE</b>	<b>MINIMUM</b>
Left and Armament panel	1. <b>CANNON GS/ПУШКА ГШ CB</b>	<b>ON</b>
	2. <b>WEAPON CARRIER/ВЫБОР ДЕРЖАТЕЛЕЙ BUTTONS</b>	<b>AS REQUIRED PER GUN POD LOAD</b>
	3. <b>ПК3+GS/ПК3+ГШ CB</b>	<b>UNGUARDED AND ON</b> If both are to be used together
	4. <b>PYRO I-II-III/ПИРО I-II-III SWITCH</b>	<b>I</b>
	5. <b>EXPL. CHARGE GS/ЗАРЯД ГШ BUTTON</b>	<b>PRESS</b> To charge internal gun
	6. <b>EXPL. CHARGE OUTER AND INNER GUNS/ЗАРЯД ПК-3 ВНЕШНИ AND ПК-3 ВНУТРИ</b>	<b>ON PER GUN POD LOAD</b>
CB & centre	1. <b>ARMS/ОРУЖИЕ CB</b>	<b>ON</b>
	2. <b>LAUNCH/ПУСК CB</b>	<b>ON</b>
	1. <b>COMBAT TRIGGER</b>	<b>DOWN</b>
	2. <b>STAND ALERT/ГОТОВ LIGHT</b> Illuminates when IAS exceeds 216kts/400km/h	<b>CHECK ON</b>
	3. <b>“α” (ALPHA) LIGHT</b> Illuminates when angle of attack exceeds allowed limits	<b>CHECK OFF</b>

**END**

## MISSILE DEPLOYMENT

Centre console	1. <b>ASP-FKP/АСП-ФКП CB</b> In ZA, the circuit breaker is labelled ASP/АСП	<b>ON</b>
	2. <b>HEAT SS/ОБОГР СС CB</b>	<b>ON</b>
	3. <b>GLOW SS/НАКАЛ СС CB</b>	<b>ON</b>
	4. <b>VOLUME SS/ГРОМК. СС</b>	<b>MAXIMUM</b>
	5. <b>MISSILE/ПАКЕТЫ CB</b>	<b>ON</b>
Left panel	1. <b>GLOWING/ НАКАЛ CB</b>	<b>ON</b>
	2. <b>HEATING/ОБОГРЕВ CB</b>	<b>ON</b>
	3. <b>VOLUME/ГРОМКОСТЬ</b>	<b>MAXIMUM</b>
Gun sight	1. <b>GUN SIGHT DEFLECTOR ANGLE</b>	<b>0°</b>
	2. <b>FICTITIOUS TARGET BASE</b>	<b>SET</b>
	3. <b>GYRO-FIXED/ГИРО-НЕПОД SWITCH</b>	<b>FIXED/НЕПОД</b>
	4. <b>GUNSIGHT DISTANCE</b>	<b>MAX</b>
Armament panel	1. <b>WEAPON CARRIER/ВЫБОР ДЕРЖАТЕЛЕЙ BUTTONS</b>	<b>PER MISSILE LOAD</b>
	2. <b>A-A PORT.-STARV./СС ЛЕВАЯ-ПРАВАР SWITCH</b>	<b>AS DESIRED</b>
Centre console	1. <b>ARMS/ОРУЖИЕ CB</b> In C, the circuit breaker is on the centre console. In ZA, the circuit breaker is on the CB panel.	<b>ON</b>
	2. <b>LAUNCH/ПУСК CB</b>	<b>ON</b>
	1. <b>COMBAT TRIGGER</b>	<b>DOWN</b>
	2. <b>STAND ALERT/ГОТОВ LIGHT</b> Illuminates when IAS exceeds 167kts/310km/h	<b>CHECK ON</b>
	3. <b>NO LAUNCH/ОПАСНАЯ ПЕРЕГР. LIGHT</b> Illuminates when g-load exceeds 2g.	<b>CHECK OFF</b>

END

**BOMB DEPLOYMENT****NOTE**

Bombs should be dropped at a 20°, 30° or 40° dive angle per the following:

Parameters	20°	30°	40°
Gunsight reflector deflection angle	13°	11°	10°
Dive entry altitude at ingress point	3,940'/1,200m	4,920'/1,500m	5,900'/1,800m
Dive entry speed at ingress point	238kts/440km/h	189kts/350km/h	162kts/300km/h
Release altitude	2,400'/730m	2,620'/800m	3,610'/1,100m
Release speed	307kts/570km/h	297kts/550km/h	302kts/560km/h
RPM	97%	92%	МГ%

Centre console	1. <b>ASP-FKP/АСП-ФКП CB</b> In ZA, the circuit breaker is labelled ASP/АСП	<b>ON</b>
	2. <b>BOMB RELEASE MODE PORT-STARBOARD/ЛЕВ-ПРАВ. ОБЕ SWITCH</b>	<b>AS DESIRED</b>
	3. <b>BOMBS/БОМБИ CB</b>	<b>ON</b>
Gun sight	1. <b>GUN SIGHT DEFLECTOR ANGLE</b>	<b>AS NEEDED</b>
	2. <b>FICTITIOUS TARGET BASE</b>	<b>SET</b>
	3. <b>GYRO-FIXED/ГИРО-НЕПОД SWITCH</b>	<b>FIXED/НЕПОД</b>
	4. <b>GUNSIGHT DISTANCE</b>	<b>MINIMUM (REAR)</b>
Armament panel	1. <b>WEAPON CARRIER/ВЫБОР ДЕРЖАТЕЛЕЙ BUTTONS</b>	<b>PER BOMB LOAD</b>
	2. <b>BOMBS TRAIN.-1-SALVO/МБИ СЕРИЯ-1-ЗАЛП SWITCH</b>	<b>AS DESIRED</b>
Centre console	1. <b>ARMS/ОРУЖИЕ CB</b> In C, the circuit breaker is on the centre console. In ZA, the circuit breaker is on the CB panel.	<b>ON</b>
	2. <b>LAUNCH/ПУСК CB</b>	<b>ON</b>
	1. <b>COMBAT TRIGGER</b>	<b>DOWN</b>

**END**

## ROCKET DEPLOYMENT

### NOTE

Unguided rockets should be fired at dive angles of 20° and 30° under the following conditions:

Parameters	30°	20°
Gunsight reflector deflection angle	2.53°	2.30°
Dive entry altitude at ingress point	3,940'/1,200m	3,940'/1,200m
Dive entry speed at ingress point	162kts/300km/h	216kts/400km/h
Shooting altitude	1,970'/600m	1,640'/500m
Shooting speed	297kts/550km/h	302kts/560km/h
Shooting distance	3,940'/1,200m	4,790'/1,460m

Centre console	1. <b>ASP-FKP/АСП-ФКП CB</b> <i>In ZA, the circuit breaker is labelled ASP/АСП</i>	<b>ON</b>
	2. <b>UB-16/УБ-16 CB</b>	<b>ON</b>
	3. <b>2RS-AUT-4RS/2PC-ABT-4PC SHOOTING MODE SWITCH</b>	<b>AS DESIRED</b>
	4. <b>MISSILE/ПАКЕТЫ CB</b>	<b>ON</b>
Gun sight	1. <b>GUN SIGHT DEFLECTOR ANGLE</b>	<b>AS NEEDED</b>
	2. <b>FICTITIOUS TARGET BASE</b>	<b>SET</b>
	3. <b>GYRO-FIXED/ГИРО-НЕПОД SWITCH</b>	<b>FIXED/НЕПОД</b>
	4. <b>GUNSIGHT DISTANCE</b>	<b>MINIMUM</b>
Armament panel	1. <b>WEAPON CARRIER/ВЫБОР ДЕРЖАТЕЛЕЙ BUTTONS</b>	<b>PER ROCKET POD LOAD</b>
	2. <b>MISS. TRAIN.-2-4/СЕРИЯ-2-4 SWITCH</b>	<b>AS DESIRED</b>
Centre console	1. <b>ARMS/ОРУЖИЕ CB</b> <i>In C, the circuit breaker is on the centre console. In ZA, the circuit breaker is on the CB panel.</i>	<b>ON</b>
	2. <b>LAUNCH/ПУСК CB</b>	<b>ON</b>
	1. <b>COMBAT TRIGGER</b>	<b>DOWN</b>

END

**COLD ROTATION**

<b>1. THROTTLE</b>	<b>STOP/СТОП</b>
<b>2. START REGIME/РЕЖИМ ЗАПУСКА</b>	<b>UNGUARDED AND COLD ROTATION/ХОЛОД. ПРОКР.</b>
<b>3. TURBO/ТУРБО BUTTON</b>	<b>PRESS</b> For 2 seconds
Wait until Turbine Starter/Турбо Стартер light goes on	
<b>4. ENGINE/ДВ-ЛЬ BUTTON</b>	<b>PRESS</b> For 2 seconds
Air starter spins up the HPC rotor within 45 seconds, then automatically disables. Turbine starter switches to idle mode.	
<b>5. STOP TURBO/СТОП ТУРБО</b>	<b>UNGUARDED AND UP</b>
Wait until APU has stopped.	
<b>6. STOP TURBO/СТОП ТУРБО</b>	<b>DOWN AND GUARDED</b>
<b>7. START REGIME/РЕЖИМ ЗАПУСКА</b>	<b>STARTING/ЗАПУСК AND GUARDED</b>
<b>8. RESTART THE ENGINE</b>	
<b>END</b>	