PILOT'S NOTES

IL2 Sturmovik Great Battles

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Unit conversion charts

Speed

MPH → Km/h	
80	129
90	145
100	161
110	177
120	193
130	209
140	225
150	241
160	257
170	274
180	290
190	306
200	322
210	338
220	354
230	370
240	386
250	402
260	418
270	435
280	451
290	467
300	483
310	499
320	515
330	531
340	547
350	563
360	579
370	595
380	612
390	628
400	644
410	660
420	676

Km/h → MPH	
140	87
160	99
180	112
200	124
220	137
240	149
260	162
280	174
300	186
320	199
340	211
360	224
380	236
400	249
420	261
440	273
460	286
480	298
500	311
520	323
540	336
560	348
580	360
600	373
620	385
640	398
660	410
680	423
700	435

Altitude

Meters → Feet	
500	1,640
1,000	3,281
1,500	4,921
2,000	6,562
2,500	8,202
3,000	9,843
3,500	11,483
4,000	13,123
4,500	14,764
5,000	16,404
5,500	18,045
6,000	19,685
6,500	21,325
7,000	22,966
7,500	24,606
8,000	26,247
8,500	27,887
9,000	29,528
9,500	31,168
10,000	32,808

Feet → Meters	
1000	305
2,000	610
3,000	914
4,000	1,219
5,000	1,524
6,000	1,829
7,000	2,134
8,000	2,438
9,000	2,743
10,000	3,048
11,000	3,353
12,000	3,658
13,000	3,962
14,000	4,267
15,000	4,572
16,000	4,877
17,000	5,182
18,000	5,486
19,000	5,791
20,000	6,096
21,000	6,401
22,000	6,706
23,000	7,010
24,000	7,315
25,000	7,620
26,000	7,925
27,000	8,230
28,000	8,534
29,000	8,839
30,000	9,144

Germany

Messerschmitt Bf 109 E7

Engine: DB-601A

	Time limit	RPM	ATA
Nominal	-	2,200	1.15
Combat	30 min	2,300	1.23
Emergency	5 min	2,400	1.30
Boosted	1 min	2,400	1.40

Temperatures

	Rated	Max
Water	94 C	100 C
Oil	95 C	105 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (14.3°)	Stall	Dive
140-170	180-190	130-140	152-159	850

Operation features

- To reduce swinging during taxiing due to prop-wash the propeller pitch control should be switched to manual mode (R Shift+P) and pitch should be reduced to minimum.
- Water and oil radiator shutters are controlled manually.
- Airplane has a manually controlled horizontal stabilizer. It should be set to +1° before takeoff and to -4°...-5° before landing. Also, it may be used to trim the flight stick during the flight. In a deep dive the stabilizer should be set so that the pilot must push the flight stick forward to maintain the dive angle.
- The design of the cockpit canopy does not allow it to be opened during flight. The canopy should be closed before takeoff to prevent damage. The canopy has an emergency release system for bailouts.

Messerschmitt Bf 109 F2

Engine: DB-601N

	Time limit	RPM	ATA
Nominal	-	2,300	1.15
Combat	30 min	2,400	1.25
Emergency	3 min	2,600	1.35
Boosted	1 min	2,800	1.42

Temperatures

	Rated	Max
Water	100 C	110 C
Oil	70 C	85 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (14.8°)	Stall	Dive
145-175	185-195	135-145	151-168	850

Operation features

- In addition to full-automatic mode there is a special emergency mode for the radiator shutters, which can be used in specific situations. In this mode, the shutters are forced to be fully opened.
- To reduce swinging during taxiing due to prop-wash the propeller pitch control should be switched to manual (R Shift+P) mode and pitch should be reduced to minimum.
- Airplane has a manually controlled horizontal stabilizer. It should be set to +1° before takeoff and to -4°...-5° before landing. Also, it may be used to trim the flight stick during the flight. In a deep dive the stabilizer should be set so that the pilot must push the flight stick forward to maintain the dive angle.

Messerschmitt Bf 109 F4

Engine: DB-601E

	Time limit	RPM	ATA
Nominal	-	2,300	1.15
Combat	30 min	2,500	1.30
Emergency	1 min	2,700	1.42

Temperatures

	Rated	Max
Water	100-102 C	115 C
Oil	70-80 C	85 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (14.8°)	Stall	Dive
150-180	190-200	145-155	154-171	850

Operation features

- To reduce swinging during taxiing due to prop-wash the propeller pitch control should be switched to manual (R Shift+P) mode and pitch should be reduced to minimum.
- Airplane has a manually controlled horizontal stabilizer. It should be set to +1° before takeoff and to -4°...-5° before landing. Also, it may be used to trim the flight stick during the flight. In a deep dive the stabilizer should be set so that the pilot must push the flight stick forward to maintain the dive angle.
- The control system for the bomb rack only allows for dropping bombs one by one.

Messerschmitt Bf 109 G2

Engine: DB-605A

	Time limit	RPM	ATA
Nominal	-	2,300	1.15
Combat	30 min	2,600	1.30

Temperatures

	Rated	Max
Water	100-102 C	115 C
Oil	70-80 C	85 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (14.8°)	Stall	Dive
155-180	195-205	150-155	158-174	850

Operation features

- To reduce swinging during taxiing due to prop-wash the propeller pitch control should be switched to manual mode (R Shift+P) and pitch should be reduced to minimum.
- Airplane has a manually controlled horizontal stabilizer. It should be set to +1° before takeoff and to -4°...-5° before landing. Also, it may be used to trim the flight stick during the flight. In a deep dive the stabilizer should be set so that the pilot must push the flight stick forward to maintain the dive angle.

Messerschmitt Bf 109 G4, G6, G6 late

Engine: DB-605A

	Time limit	RPM	ATA
Nominal	-	2,300	1.15
Combat	30 min	2,600	1.30
Emergency	1 min	2,800	1.42
Emergency (MW-50 for G6 late)	10 min	2,800	1.70

Temperatures

	Rated	Max
Water	100-102 C	115 C
Oil	70-80 C	85 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (13.7 °)	Stall	Dive
155-180	195-205	150-155	161-179	850

Operation features

- For G6 late: MW-50 water-methanol mixture injection system that prevents the engine detonation in the emergency power mode (modification). It engages automatically when the throttle is set to maximum, there is enough mixture for 25-30 minutes. However, the engine can work up to 10 minutes at this mode, wait for another 10 minutes at the combat mode before engaging the emergency mode again. Attention: running the engine at the emergency mode without the water-methanol mixture or at altitudes higher than 6 km is forbidden! A pilot can check the system using the injection pressure indicator on the left: its normal pressure is 0.6...0.7 atm, stop using it if the pressure is lower than 0.4 atm and switch the engine to combat mode.
- To reduce swinging during taxiing due to prop-wash the propeller pitch control should be switched to manual mode (R Shift+P) and pitch should be reduced to minimum.
- Airplane has a manually controlled horizontal stabilizer. It should be set to +1° before takeoff and to -4°...-5° before landing. Also, it may be used to trim the flight stick during the flight. In a deep dive the stabilizer should be set so that the pilot must push the flight stick forward to maintain the dive angle.

Messerschmitt Bf 109 G14

Engine: DB-605AM

	Time limit	RPM	ATA
Nominal	-	2,300	1.15
Combat	30 min	2,600	1.30
Emergency	10 min	2,800	1.7

Temperatures

	Rated	Max
Water	100-102 C	115 C
Oil	70-80 C	85 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (13.7°)	Stall	Dive
155-180	195-205	150-155	164-181	850

Operation features

- The aircraft is equipped with MW-50 water-methanol mixture injection system that prevents the engine detonation in the emergency power mode. It engages automatically when the throttle is set to maximum. There is enough mixture for 25-30 minutes. However, the engine can work up to 10 minutes at this mode, wait for another 10 min. at combat mode before engaging the emergency mode again. Attention: Running the engine at the emergency mode without the water-methanol mixture, or altitudes above 6km is forbidden!
- Normal levels of pressure for the injection system is 0.6-0.7 atm, as shown by the gauge on your left, near the canopy latch. If the pressure dips below 0.4 atm stop using the injection system and switch to combat mode.
- To reduce swinging during taxiing due to prop-wash the propeller pitch control should be switched to manual mode (R Shift+P) and pitch should be reduced to minimum.
- Airplane has a manually controlled horizontal stabilizer. It should be set to +1° before takeoff and to -4°...-5° before landing. Also, it may be used to trim the flight stick during the flight. In a deep dive the stabilizer should be set so that the pilot must push the flight stick forward to maintain the dive angle.

Messerschmitt Bf 109 K4 “Kurfurst”

Engine: DB-605DB or DB-605DC

	Time limit	RPM	ATA
Nominal	-	2,400	1.35
Combat	30 min	2,600	1.45
Emergency (DB)	10 min	2,800	1.7
Emergency (DC)	10 min	2,800	1.98

Temperatures

	Rated	Max
Water	100-102 C	115 C
Oil	70-80 C	95 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (12.5°)	Stall	Dive
160-190	200-215	155-160	167-190	850

Operation features

- The aircraft is equipped with MW-50 water-methanol mixture injection system that prevents the engine detonation in the emergency power mode. It engages automatically when the throttle is set to maximum. There is enough mixture for 25-30 minutes. However, the engine can work up to 10 minutes at this mode, wait for another 10 min. at combat mode before engaging the emergency mode again. Attention: Running the engine at the emergency mode without the water-methanol mixture, or altitudes above 6km is forbidden!
- Normal levels of pressure for the injection system is 0.6-0.7 atm, as shown by the gauge on your left, near the canopy latch. If the pressure dips below 0.4 atm stop using the injection system and switch to combat mode.
- To reduce swinging during taxiing due to prop-wash the propeller pitch control should be switched to manual mode (R Shift+P) and pitch should be reduced to minimum.
- Airplane has a manually controlled horizontal stabilizer. It should be set to +1° before takeoff and to -4°...-5° before landing. Also, it may be used to trim the flight stick during the flight. In a deep dive the stabilizer should be set so that the pilot must push the flight stick forward to maintain the dive angle.

Messerschmitt Bf 110 E2

Engine: DB-601A

	Time limit	RPM	ATA
Nominal	-	2,200	1.15
Combat	30 min	2,300	1.23
Emergency	5 min	2,400	1.30
Boosted	1 min	2,400	1.40

Temperatures

	Rated	Max
Water	94 C	100 C
Oil	95 C	105 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (10.6°)	Stall	Dive
180-220	200-220	140-160	148-182	740

Operation features

- Water and oil radiator shutters are controlled manually. The oil radiator control has five fixed positions. The water radiator control has nine fixed positions.
- Propellers have a feathering system which should be activated in case of engine damage to reduce drag of the propeller in auto-rotation.
- To reduce swinging during taxiing due to prop-wash it is necessary to use asymmetrical engines thrust. It is recommended to give the left engine 20% more power. Also, the propeller pitch control should be switched to manual mode and pitch should be reduced to minimum.
- Landing flaps have a hydraulic actuator and they can be extended to any angle up to 50°.
- Airplane tail wheel rotates freely and does not have a lock. For this reason, it is necessary to operate the rudder pedals confidently and accurately during the takeoff and landing.
- The design of the cockpit canopy does not allow it to be opened during flight. The canopy should be closed before takeoff to prevent damage. The canopy has an emergency release system for bailouts.
- Airplane is equipped with an automatic bomb salvo controller, it allows you to choose which bomb-racks to be released (central belly, left and right wing) and to switch the bomb salvo (single release or release all bombs).
- Reloading of both MG-FF guns (forward and rearward) must be performed by the rear gunner. The forward firing MGFF must be reloaded at the pilot's command.

Messerschmitt Bf 110 G2

Engine: DB-605B

	Time limit	RPM	ATA
Nominal	-	2,300	1.15
Combat	30 min	2,600	1.30
Emergency	1 min	2,800	1.42

Temperatures

	Rated	Max
Water	100-102 C	115 C
Oil	70 - 80 C	85 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (10.7°)	Stall	Dive
190-230	210-230	150-170	160-190	740

Operation features

- Water and oil radiator shutters are controlled manually. The oil radiator control has five fixed positions. The water radiator control has nine fixed positions.
- Propellers have a feathering system which should be activated in case of engine damage to reduce drag of the propeller in auto-rotation.
- To reduce swinging during taxiing due to prop-wash it is necessary to use asymmetrical engines thrust. It is recommended to give the left engine 20% more power. Also, the propeller pitch control should be switched to manual mode and pitch should be reduced to minimum.
- Airplane tail wheel rotates freely and does not have a lock. For this reason, it is necessary to operate the rudder pedals confidently and accurately during the takeoff and landing.
- Airplane is equipped with an automatic bomb salvo controller, it allows you to choose which bomb-racks to be released (central belly, left and right wing) and to switch the bomb salvo (single release or release all bombs).
- Reloading of BK37 gun is performed by the rear gunner at the pilot's command.

Junkers Ju-88 A4

Engine: Jumo-211J

	Time limit	RPM	ATA
Nominal	-	2,250	1.15
Climb	30 min	2,400	1.25
Take-off	1 min	2,600	1.42

Temperatures

	Rated	Max
Water	80 C	110 C
Oil	100 C	130 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (9°)	Stall	Dive
170-210	210-220	150-160	188-205	670

Operation features

- Each engine has a two-stage mechanical supercharger with an automatic switch system that switches gears depending altitude and engine revolutions. It can also be manually switched to first gear.
- Engine mixture control is automatic.
- Engine RPM has an automatic governor and it is maintained at the required RPM corresponding to the governor control lever position. The governor automatically controls the propeller pitch to maintain the required RPM.
- Propellers have a feathering system which should be activated in case of engine damage to reduce drag of the propeller in auto-rotation.
- Water and oil radiators shutters are joint with engine cowl outlet shutters and manually operated.
- Airplane has hydraulic-actuated landing flaps with three fixed positions: retracted, takeoff (25°) and landing (50°). Flap indicator lights are located on left panel.
- Airplane tail wheel rotates freely and does not have a lock. For this reason, it is necessary to operate the rudder pedals confidently and accurately during the takeoff and landing.
- Airplane has dedicated fuel gauges for left and right fuel tank groups and there is a switch between the internal and external fuel tank group indicator. In game the fuel indicator switch changes by itself during horizontal flight every 10 seconds. Also, the airplane has low fuel warning lights (180 liters) for the internal tanks.
- Airplane is equipped with an automatic bomb salvo controller. It allows the pilot to switch between the bomb racks to be released (internal or external) and to switch between different salvo quantities. There is also a controller for a drop delay between each bomb in the salvo.
- Airplane has fence-type airbrakes which are located under the wing and used to slow the descent during steep dive bombing. When the dive system is engaged, the plane enters a dive when the air brakes are extended or when the dive button (LCtrl + D by default) is pressed. The plane will recover from the dive either by pressing the bomb drop button or by pressing the dive button (LCtrl + D by default). The dive system will return to the neutral position

of the elevator trim, while the full range of trimmer travel from the pilot's input is preserved. Therefore the pilot input and dive system input of the trimmers are independent, and when the dive system is in operation, there is no indication of a trimmer position change in the technochat. Also, the elevator trim is automatically shifted when the stabilizer is moved to the landing position (when flaps are released to the landing position). This also shifts the trim back to the neutral position.

- Contact altimeters are installed. The RShift + K and RCtrl + K commands (by default) set the bomb release (contact) altitude. When the dive system is engaged, the buzzer will sound 250 m above the contact altitude. Buzzer turns off when the contact altitude is reached or when the dive system is disengaged. The pressure setting is adjusted by the same command as on the main altimeter (with a short pause after setting the pressure on the main altimeter). The contact altimeter is not connected with the dive system, it is a separate device that just gives an audio signal at a contact height.

Junkers Ju-87 D3

Engine: Jumo-211J

	Time limit	RPM	ATA
Nominal	-	2,250	1.15
Climb	30 min	2,400	1.25
Take-off	1 min	2,600	1.42

Temperatures

	Rated	Max
Water	80 C	110 C
Oil	90 C	105 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (11°)	Stall	Dive
140-170	180-195	125-145	137-176	650

Operation features

- Water and oil radiators shutters control is manual.
- Airplane has fence-type airbrakes which are located under the wing and used to slow the descent during steep dive bombing.
- Airplane has hydraulic-actuated landing flaps with three fixed positions: retracted, takeoff (25°) and landing (40°). Flap indicator lights are located on left panel near the throttle.
- Airplane has a manual tail wheel lock. Wheel should be locked when taxiing straight for a long distance and before takeoff and landing.
- It is impossible to open or close canopy at high speed due to strong airflow. When the canopy is open, it is impossible to use rear gun because it is linked to canopy. The canopy has an emergency release system for bailouts.
- Airplane has a window in the cockpit floor which can be opened by the bomb bay door command.
- Airplane is equipped with a salvo controller, it allows the pilot to choose which bomb racks to use (central, left, and right wing) and to switch the bomb salvo (single drop or all bombs on the rack).
- When the dive system is engaged, the plane enters a dive when the air brakes are extended and will recover from the dive either by pressing the bomb drop button or when the air brakes are retracted. The dive system controls are separate: the trimmer tab on the right elevator is controlled by the dive system while the pilot controls the trimmer tab on the left elevator. Therefore the pilot input and dive system input of the trimmers are independent, and when the dive system is in operation, there is no indication of a trimmer position change in the technochat.
- Contact altimeters are installed. The RShift + K and RCtrl + K commands (by default) set the bomb release (contact) altitude. When the dive system is engaged, the buzzer will sound 250 m above the contact altitude. Buzzer turns off when the contact altitude is reached or when the dive system is disengaged. The pressure setting is adjusted by the same command as on the main altimeter (with a short pause after setting the pressure on the main altimeter).

The contact altimeter is not connected with the dive system, it is a separate device that just gives an audio signal at a contact height.

Junkers Ju 52/3m g4e

Engine: BMW-132a

	Time limit	RPM
Nominal	-	1,925
Climb	30 min	1,975
Take-off	5 min	2,050

Temperatures

Temps	Rated	Max
Oil	80 C	100 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (11.7°)	Stall
100-120	140-155	95-110	105-117

Operation features

- Engine mixture control is manual; it is necessary to lean the mixture if altitude is more than 1 km for optimal engine operation. Also, leaning the mixture allows a reduction in fuel consumption during flight.
- All three propellers are fixed pitch ones, so thrust can only be controlled by adjusting the engines throttle (from idle at 25% to maximum power at 100%). 0 20% throttle range is used for braking the landing gear wheels. Engine modes can be determined only by watching the engine RPM gauges.
- Airplane has a manually controlled horizontal stabilizer. It should be set to 0° before takeoff, to +2° during flight and to -1.5° for landing. Also, it may be used to trim the flight stick during the flight.
- The mechanical flaps control system can be controlled simultaneously with the horizontal stabilizer, these two systems can be linked or unlinked (by using flaps control buttons). It is important to note that it is possible to render the system inoperable so it would not be able to control either the stabilizer or the flaps by deviating from a standard control procedure described below.
- Before taking off, set the stabilizer to flight position +2°, engage the link and then move the stabilizer to take-off position 0° flaps will be extended to 25°.When airborne, move the stabilizer back to flight position (flaps should also fully retract) and unlink these controls. Before landing, set the stabilizer to flight position +2°, engage the link and then move the stabilizer to landing position -1.5° flaps will be fully extended to 40°.
- Airplane has separate pneumatic wheel brakes. To brake left or right wheels, move their corresponding left or right engine throttle to 20% or less. Setting the central engine throttle to 20% or less will brake both wheels. Maximum braking efficiency can be achieved by moving the throttle all the way down. In the sim, you can also use the brake buttons to move left and right engine throttles to braking position.
- Airplane is equipped with two mechanical fuel float level gauges for left and right fuel tank groups, located on the left and right engine nacelles outside the cabin.
- The left passenger door must be removed before flight for dropping paratroopers or cargo containers. Use the bomb drop button (“B“ by default) to drop them.

Henschel Hs-129 B2

Engine: Gnome-Rhone 14 M

	Time limit	RPM	ATA
Nominal	-	2,350	1.10
Combat	30 min	2,750	1.25
Take-off	1 min	3,030	1.50

Temperatures

Temps	Rated	Max
Oil	60-75 C	125 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (10.6°)	Stall	Dive
145-155	180-200	135-145	143-159	670

Operation features

- Controlling the propellers RPM is possible only in the manual mode (R Shift+P) by changing the propeller pitch. The automatic mode keeps the RPM at 2750.
- The engine control lever allows setting the pressure up to the combat mode (1.25 ATA).
- To switch the engines to the take-off mode, move the boost lever to 1.5 ATA position and set the propellers to 3030 RPM (manually using R Shift+P).
- Engine mixture control is automatic. Leaning the mixture manually reduces the fuel consumption during flight.
- The oil radiator shutters are controlled automatically and don't have a manual mode.
- The propellers have a feathering system which should be activated in case of engine damage to reduce drag of the propeller in auto-rotation.
- The tail wheel rotates freely and does not have a lock. For this reason, it is necessary to operate the rudder pedals confidently and accurately during the takeoff and landing.
- The aircraft fuel gauges are positioned directly on the engine nacelles and show only the amount of fuel remaining in the wing tanks (the fuel remaining in the central fuel tank is not indicated).
- The aircraft isn't equipped with an oxygen supply system, so flying above 4000 meters is forbidden.
- The aircraft is equipped with an electric bomb release controller that allows dropping the bombs only one by one.

Heinkel He-111 (H6 and H16)

Engine: Jumo-211F

	Time limit	RPM	ATA
Nominal	-	2,250	1.15
Climb	30 min	2,400	1.25
Take-off	1 min	2,600	1.42

Temperatures

	Rated	Max
Water	80 C	110 C
Oil	90 C	105 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (9°)	Stall
170-210	180-200	125-150	150-194

Operation features

- Engine mixture control is automatic.
- Supercharger gear shift is automatic.
- Propellers have a feathering system which should be activated in case of engine damage to reduce drag of the propeller in auto-rotation.
- Water and oil radiator shutter controls are manual. The oil radiator control has five fixed positions.
- Airplane tail wheel rotates freely and does not have a lock. For this reason, it is necessary to operate the rudder pedals confidently and accurately during the takeoff and landing.
- Airplane has dedicated fuel gauges for left and right fuel tank groups and there is a switch between the internal and external fuel tank group indicator. In game the fuel indicator switch changes by itself during horizontal flight every 10 seconds. Also, there is dedicated fuel gauge for the fuselage fuel tank. Also, the airplane has low fuel warning lights (200 liters) for left and right fuel tank groups.
- Airplane is equipped with an automatic bomb salvo controller. It allows you to switch between the bomb racks to be released (internal or external) and to switch between different salvo quantities. There is also a controller for a drop delay between each bomb in the salvo.

Focke-Wulf Fw-190 A3

Engine: BMW-801D

	Time limit	RPM	ATA
Nominal	-	2,300	1.20
Combat	30 min	2,400	1.32
Emergency	3 min	2,700	1.42

Temperatures

Temps	Rated	Max
Cylinder head	180 C	220 C
Oil	105 C	120 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (12.5°)	Stall	Dive
170-210	205-215	160-170	166-189	850

Operation features

- Airplane has a wide automatization of the engine systems, in fact, to control speed it is only necessary to use the throttle lever. There is no need to manually set engine revolutions and mixture or supercharger gear in normal flight. The engine supercharger has an automatic switch system which depends on altitude and engine revolutions.
- To reduce swinging during taxiing due to prop-wash the propeller pitch control should be switched to manual mode and pitch should be reduced to minimum.
- When the angle of attack increases to critical levels the wing may stall suddenly and unexpectedly. There is almost no pre-stall buffet before the stalling. To avoid this the pilot must pay additional attention when performing extreme maneuvering.
- Airplane has electrically actuated landing flaps with three fixed positions: retracted, takeoff (13°) and landing (58°). Flaps control buttons and indicator lights are located on left panel near the throttle. The flap angle may also be checked by indicators on the left and right wing outside the cockpit.
- Airplane has a tail wheel lock system which locks the tail wheel if the flight-stick is pulled backward. The tailwheel should be locked when taxiing straight for a long distance before takeoff and after touchdown upon landing.
- The control system for the bomb rack only allows for dropping bombs one by one.

Focke-Wulf Fw-190 A5 and A6

Engine: BMW-801D

	Time limit	RPM	ATA
Nominal	-	2,300	1.20
Combat	30 min	2,400	1.32
Emergency	3 min	2,700	1.42
C3 injection	10 min	2,700	1.65

Temperatures

Temps	Rated	Max
Cylinder head	180 C	220 C
Oil	105 C	120 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (12.5°)	Stall	Dive
170-210	205-215	160-170	170-197	850

Operation features

- Airplane has a wide automatization of the engine systems, in fact, to control speed it is only necessary to use the throttle lever. There is no need to manually set engine revolutions and mixture or supercharger gear in normal flight. The engine supercharger has an automatic switch system which depends on altitude and engine revolutions.
- A5 strike modification and A6 G-3 and G-3/R-5 include C3 additional fuel injection system. When engaged, it increases pressure to 1.65 ATA (10 minutes time limit). This system can be turned on by engine boost command only at 100% throttle, with automatic propeller pitch control enabled and at altitudes lower than 1 km.
- Outlet cowl shutters are operated manually.
- To reduce swinging during taxiing due to prop-wash the propeller pitch control should be switched to manual mode and pitch should be reduced to minimum.
- When the angle of attack increases to critical levels the wing may stall suddenly and unexpectedly. There is almost no pre-stall buffet before the stalling. To avoid this the pilot must pay additional attention when performing extreme maneuvering.
- Airplane has electrically actuated landing flaps with three fixed positions: retracted, takeoff (13°) and landing (58°). Flaps control buttons and indicator lights are located on left panel near the throttle. The flap angle may also be checked by indicators on the left and right wing outside the cockpit.
- Airplane has a tail wheel lock system which locks the tail wheel if the flight-stick is pulled backward. The tailwheel should be locked when taxiing straight for a long distance before takeoff and after touchdown upon landing.
- The control system for the bomb rack only allows for dropping bombs one by one. With A6 G-3 and G-3/R-5 modifications it is possible to select left, right, or both underwing bomb racks, but the centerline bomb rack is always selected, and each push of the bomb release control will drop one of its bombs.

Focke-Wulf Fw-190 A8

Engine: BMW-801D

	Time limit	RPM	ATA
Nominal	-	2,300	1.20
Combat	30 min	2,400	1.32
Emergency	3 min	2,700	1.42
Emergency boost	10 min	2,700	1.58/1.65 (supercharger gears 1/2)

Temperatures

Temps	Rated	Max
Cylinder head	180 C	220 C
Oil	105 C	120 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (12.5°)	Stall	Dive
180-220	215-225	160-180	177-208	850

Operation features

- Airplane has a wide automatization of the engine systems, in fact, to control speed it is only necessary to use the throttle lever. There is no need to manually set engine revolutions and mixture or supercharger gear in normal flight. The engine supercharger has an automatic switch system which depends on altitude and engine revolutions.
- There is an additional emergency engine mode system installed. When it is engaged, the first supercharger gear pressure increases to 1.58 ATA and the second gear pressure to 1.65 ATA, the time limit is 10 minutes. This system is turned on by the engine boost command and works only when the throttle is set to 100%, automatic propeller pitch system is engaged, and the altitude is lower than critical altitude for a given supercharger gear.
- Outlet cowl shutters are operated manually.
- When the angle of attack increases to critical levels the wing may stall suddenly and unexpectedly. There is almost no pre-stall buffet before the stalling. To avoid this the pilot must pay additional attention when performing extreme maneuvering.
- Airplane has electrically actuated landing flaps with three fixed positions: retracted, takeoff (13°) and landing (58°). Flaps control buttons and indicator lights are located on left panel near the throttle. The flap angle may also be checked by indicators on the left and right wing outside the cockpit.
- Airplane has a tail wheel lock system which locks the tail wheel if the flight-stick is pulled backward. The tailwheel should be locked when taxiing straight for a long distance before takeoff and after touchdown upon landing.
- The standard bomb release controller (without modification) allows dropping the bombs only one by one. The strike modification (F-8) bomb release controller allows to choose the bomb release order for underbelly and underwing bombs and the delay between each bomb in the salvo.

Focke-Wulf Fw-190 D9

Engine: Junkers Jumo-213 A1

	Time limit	RPM	ATA
Nominal	-	3,000	1.42
Combat	30 min	3,250	1.51
Emergency	3 min	3,250	1.70
Emergency + MW-50	10 min	3,250	1.80

Temperatures

Temps	Rated	Max
Cylinder head	55-100 C	110 C
Oil	40-110 C	120 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (12.5°)	Stall	Dive
180-220	215-225	160-180	174-197	850

Operation features

- Airplane has a wide automatization of the engine systems, in fact, to control speed it is only necessary to use the throttle lever. There is no need to manually set engine revolutions and mixture or supercharger gear in normal flight. The engine supercharger has an automatic switch system which depends on altitude and engine revolutions.
- The aircraft is equipped with MW-50 water-methanol mixture injection system that prevents the engine detonation in the emergency power mode.
- Radiator flaps are controlled automatically, keeping a set coolant temperature. This temperature can be set by the pilot by reading the current temperature of the coolant and then setting the desired temperature accordingly. If the coolant is too cold then the set temperature should be decreased and if it's too hot, increased.
- When the angle of attack increases to critical levels the wing may stall suddenly and unexpectedly. There is almost no pre-stall buffet before the stalling. To avoid this the pilot must pay additional attention when performing extreme maneuvering.
- Airplane has a manually controlled horizontal stabilizer which is electrically actuated. It should be set to +1.5° before takeoff and landing. It may be used to trim the flight stick during flight. In a deep dive it should be set so that the pilot must push the flight stick forward to maintain dive angle.
- Airplane has electrically actuated landing flaps with three fixed positions: retracted, takeoff (13°) and landing (58°). Flaps control buttons and indicator lights are located on left panel near the throttle. The flap angle may also be checked by indicators on the left and right wing outside the cockpit.
- Airplane has a tail wheel lock system which locks the tail wheel if the flight-stick is pulled backward. The tailwheel should be locked when taxiing straight for a long distance before takeoff and after touchdown upon landing.
- Airplane has a fuel gauge which shows the amount of remaining fuel in the front or rear fuel tank depending on switch position. In game the fuel indicator switch changes by itself during horizontal flight every 10 seconds. The airplane has an emergency fuel warning light when it reaches 100 liters.
- The standard bomb release controller allows dropping the bombs only one by one.

Messerschmitt Me-262 A

Engine: Junkers Jumo-004 B-1

	Time limit	RPM
Nominal	-	8,400
Maximal	15 min	8,700

Temperatures

Temps	Rated	Max
Exhaust	600 C	650 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (12.3°)	Stall	Dive (TAS)
200-220	250	165-185	165-200	1000

Startup procedure and taxi

1. Select engine 1 (press 1)
2. Turn on starter motor (press E)
3. When RPM reaches 1000 RPM, **press and hold** the ignition button
4. When turbine reaches 2000 RPM, increase throttle slightly to 3000RPM (look at lever popping out in the throttle).
5. At 3000RPM, release the igniter and throttle back.

- Repeat the same process for engine 2 by deselecting engine 1 and selecting engine 2.
- Slowly increase the RPM to 6500 to start moving the plane and reduce to 6000 RPM during taxi.
- Use right and left brake pedals to turn, make sure the front wheel is not pointing sideways to avoid tight turns.

Operation features

- The airplane is equipped with two turbojet engines. They are controlled automatically by the throttle which sets the turbine rotor RPM.
- The engine is equipped with automatic fuel regulator that engages above 6000 RPM. Below that speed, the regulator is not effective and careless throttle increases could cause excessive fuel intake, resulting in overheating and possible engine fire.
- At high altitudes, it's possible to lean the mixture too much by a sharp throttle decrease, causing a flameout and engine stop. The turbine shouldn't be set below 6,000-8,000 RPM depending on the altitude.
- It is impossible to restart the engines at altitudes higher than 4,000 m.
- The aircraft is equipped with horizontal stabilizer and rudder trim to reduce the load on controls.
- The aircraft is susceptible to Mach tuck when diving at 0.84 M or higher speed.
- Landing flaps have a hydraulic actuator that extends up to 55 degrees. The hydraulic valve controlling the flaps cannot be turned during the landing gear operation (lowering or retracting).

- Landing gear brakes are hydraulic and are engaged by pushing the corresponding pedal. The nose gear orients by itself and has a rotation dampener and dedicated brake handle. The aircraft tends to rotate during a breakaway unless the nose wheel is straightened.
- There are two main (900l each) and two secondary fuel tanks (600l and 170l). The fuel transfer from secondary to main tanks using the electric fuel pump is initiated by the pilot when the fuel level in main tanks drops below 600l.The main tanks have fuel level indicators and emergency fuel lamps (they light up when fuel is below 250l).

Italy

Macchi Aeronautica MC.202 series VIII

Engine: RA.1000 (export DB 601)

	Time limit	RPM	ATA
Nominal	-	2,200	1.23
Combat	5 min	2,400	1.35
Boosted	1 min	2,500	1.45

Temperatures

Temps	Rated	Max
Water	94 C	100 C
Oil	90-100 C	110 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (13.9°)	Stall	Dive
160-190	190-200	140-150	151-166	850

Operation features

- Throttle lever is inverted: backward = full throttle, forward = idle throttle.
- Engine RPM has an automatic governor with two fixed modes: 2200 RPM normal mode, 2400 RPM boosted mode. Also, it is possible to turn off the governor and control the propeller pitch manually by mechanical actuator.
- Water and oil radiator shutter control is manual.
- Airplane has a manually controlled horizontal stabilizer. It should be set to neutral before takeoff and landing. Also, it may be used to trim the flight stick during the flight. In a deep dive the stabilizer should be set so that the pilot must push the flight stick forward to maintain the dive angle.
- Airplane has differential pneumatic wheel brakes with shared control lever. This means that if the brake lever is held and the rudder pedal the opposite wheel brake is gradually released causing the plane to swing to one side or the other.
- The control system of wing-mounted bomb racks only allows the dropping of bombs one by one.

Soviet Union

Polikarpov I-16 Type 24

Engine: Shvetsov M-63

	Time limit	RPM	ATA
Nominal	-	2,200	915 mm
Boosted	5 min	2,300	1065 mm

Temperatures

Temps	Rated	Max
Cylinder head	120-200 C	205 C
Oil	55-90 C	125 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (15.3°)	Stall	Dive
145-175	185-195	135-145	135-145	620

Operation features

- Cockpit has side-doors which should be closed before takeoff to prevent damage.
- Engine has a boost mode. To set boost mode it is necessary to push the boost lever fully forward and increase the engine to 2300 RPM.
- Engine has a two-stage mechanical supercharger which should be manually shifted at 3000m altitude.
- Engine mixture control is automatic when the mixture lever is set to maximum. It is possible to manually lean the mixture by moving the mixture control to less than maximum. This also reduces fuel consumption during flight.
- Engine RPM has an automatic governor and it is maintained at the required RPM corresponding to the governor control lever position. The governor automatically controls the propeller pitch to maintain the required RPM.
- Oil radiator shutter and air cooling intake shutters control is manual.
- Airplane has a tail wheel control mechanism which is linked to rudder pedals. Because of this, it is necessary to avoid of large rudder pedal inputs when moving at high speed on the ground.
- Airplane has independent left and right mechanical wheel brakes. To brake it is necessary to push upper part of the rudder pedal.
- Airplane has a hydrostatic fuel gauge which shows total fuel remaining only when manual sucker lever is pushed in. In game this happens by itself during horizontal flight by every 10 seconds.
- When bombs are installed there is a salvo controller, it has two release modes: single drop or drop two in a salvo.
- When rockets are installed there is a salvo controller, it has three launch modes: single fire, fire two in a salvo or fire by four in a salvo.
- The gunsight has a sliding sun-filter. There is also a back-up folding mechanical sight which can be used if main sight is damaged.

Polikarpov U-2VS

Engine: Shvetsov M-11D

	Time limit	RPM
Nominal	-	1,640 - 1,700
Take-off / Emergency	5 min	1,750 - 1,840

Temperatures

Temps	Rated	Max
Oil	70-80 C	115 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (12°)	Stall
75-85	100	60-70	63-70

Operation features

- There is no engine supercharger.
- Fuel mixture is manual. The mixture should be leaned as the altitude increases for optimal engine functioning and to reduce fuel consumption while flying level.
- The fixed pitch propeller requires controlling the engine RPM manually.
- The tail skid is linked to the rudder (8 degrees maximum tilt).
- There are no wheel brakes.
- Please note that with all modifications and full fuel the total aircraft weight is 1,390 kg, more than its maximum takeoff weight.

Mikoyan-Gurevich MiG-3 series 24

Engine: Mikulin AM-35a

	Time limit	RPM	mm Hg
Nominal	-	2,050	1040
Boosted	10 min	2,050	1240

Temperatures

Temps	Rated	Max
Water	80-110 C	120 C
Oil	115 C	120 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (15°)	Stall	Dive
180-200	195-205	135-145	159-175	750

Operation features

- Engine has a boost mode which is engaged by setting the mixture control lever to maximum.
- Engine has a single-stage mechanical supercharger which does not require manual control.
- Engine mixture control is automatic when the mixture lever is set to the intermediate (50%) position. It is possible to manually lean the mixture by setting the control to less than 50%. This will reduce fuel consumption during flight.
- Landing flaps have a limiter for the maximum angle. The flaps have an extended range from 0° to 50°. The landing flaps have pneumatic actuator. Flaps can only be instantly extended to the angle, which is set by limiter. Gradual extending is impossible. Due to weak force of the actuator the extended landing flaps may retract upward by the airflow when the airspeed is more than 220 km/h. For this reason, it is necessary to remember that flaps will not extend fully in case of high speed. In case of a high-speed landing approach the flaps may extend a few steps right before landing.
- Airplane has a tailwheel control system which is unlocked and made controllable by the rudder if the rudder pedal is pressed more than for 40% of its range. The tailwheel remains locked if pedals are deflected less than 40%. Because of this, it is necessary to avoid large rudder pedal inputs when moving at high speed or be ready to control the airplane with an unlocked tailwheel should large rudder inputs be made.
- It is impossible to open or close the canopy at high speed due to strong airflow. The canopy has no emergency release, so bail out requires the speed drop before it.
- When bombs are installed a salvo controller can be used, it has two release modes: single drop or drop two in a salvo.
- When rockets are installed a salvo controller can be used, it has three launch modes: single fire, fire two in a salvo or fire four in a salvo.

Lavochkin-Gorbunov-Gudkov LaGG-3 series 29

Engine: Klimov M-105PF

	Time limit	RPM	mm Hg
Nominal	-	2,700	1050

Temperatures

Temps	Rated	Max
Water	70-85 C	100 C
Oil	90-100 C	115 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (12.8°)	Stall	Dive
165-200	200-210	140-160	163-189	750

Operation features

- Engine has a two-stage mechanical supercharger which must be manually switched at 2500m altitude.
- Engine mixture control is manual, it is necessary to lean the mixture if altitude is more than 3-4 km for optimal engine operation. Also, leaning the mixture allows a reduction in fuel consumption during flight.
- Airplane tail wheel rotates freely and does not have a lock. Airplane has differential pneumatic wheel brakes with shared control lever. This means that if the brake lever is held and the rudder pedal the opposite wheel brake is gradually released causing the plane to swing to one side or the other.
- Cockpit canopy has a weak lock when in the opened position, for this reason the canopy may spontaneously close in a deep dive. Also, it is impossible to open or close canopy at high speed due to strong airflow. The canopy has no emergency release, so bail out requires the speed drop before it.
- The control system of wing-mounted bomb racks only allows the dropping of bombs one by one.
- When rockets are installed a salvo controller is used, it has three launch modes: single fire, fire two in a salvo or fire four in a salvo.

Yakolev Yak-1 (series 69 and 127)

Engine: Klimov M-105PF

	Time limit	RPM	mm Hg
Nominal	-	2550-2700	1050

Temperatures

Temps	Rated	Max
Water	70-85 C	100 C
Oil	90-100 C	115 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (12°)	Stall	Dive
160-190	195-205	135-145	155-171	720

Operation features

- Engine has a two-stage mechanical supercharger which must be manually switched at 2300m altitude.
- Engine mixture control is manual; it is necessary to lean the mixture if altitude is more than 3-4 km for optimal engine operation. Also, leaning the mixture allows a reduction in fuel consumption during flight.
- Landing flaps have a pneumatic actuator. Flaps can only be fully extended; gradual extending is impossible. Due to the weak force of the actuator the extended landing flaps may be pressed upwards by the airflow if the airspeed is more than 220 km/h. Remember that the flaps will not extend fully in case of high speed. In case of a high-speed landing approach the flaps may extend a few steps further right before landing.
- Airplane has a manual control for the tailwheel lock. The unlocked tailwheel has a 90° turn limit. The tailwheel should be locked when taxiing straight for a long distance and before takeoff and landing.
- Airplane has differential pneumatic wheel brakes with shared control lever. This means that if the brake lever is held and the rudder pedal the opposite wheel brake is gradually released causing the plane to swing to one side or the other.
- Fuel gauges are installed on left and right wing fuel tanks, outside of the cockpit. They show remaining fuel level only when there is less than 80 liters of fuel left in the tank.
- It is impossible to open or close the canopy at high speed due to strong airflow. The canopy has no emergency release, so bail out requires the speed drop before it.
- The control system for the wing-mounted bomb racks only allows releasing of both bombs together.
- When rockets are installed a salvo controller can be used, it has three launch modes: single fire, fire two in a salvo or fire four in a salvo.

Yakolev Yak-7B (series 36)

Engine: Klimov M-105PF

	Time limit	RPM	mm Hg
Nominal	-	2600-2700	1050

Temperatures

Temps	Rated	Max
Water	70-85 C	100 C
Oil	90-100 C	115 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (11.5°)	Stall	Dive
170-175	200	145-165	155-172	740

Operation features

- Engine has a two-stage mechanical supercharger which must be manually switched at 2000 m altitude.
- Engine mixture control is manual; it is necessary to lean the mixture if altitude is more than 3-4 km for optimal engine operation. Also, leaning the mixture allows a reduction in fuel consumption during flight.
- Engine RPM has an automatic governor and it is maintained at the required RPM corresponding to the governor control lever position. The governor automatically controls the propeller pitch to maintain the required RPM.
- Water and oil radiator shutters are controlled manually.
- Airplane has only the pitch flight-control trimmer.
- Landing flaps have a pneumatic actuator. Flaps can only be fully extended; gradual extending is impossible. Due to the weak force of the actuator the extended landing flaps may be pressed upwards by the airflow if the airspeed is more than 250 km/h. Remember that the flaps will not extend fully in case of high speed. In case of a high-speed landing approach the flaps may extend a few steps further right before landing.
- Airplane has a manual control for the tailwheel lock. The unlocked tailwheel has a 90° turn limit. The tailwheel should be locked when taxiing straight for a long distance and before takeoff and landing.
- Airplane has differential pneumatic wheel brakes with shared control lever. This means that if the brake lever is held and the rudder pedal the opposite wheel brake is gradually released causing the plane to swing to one side or the other.
- Fuel gauges are installed on left and right wing fuel tanks, outside of the cockpit. They show remaining fuel level only when there is less than 130 liters of fuel left in the tank.
- It is impossible to open or close the canopy at high speed due to strong airflow. The canopy has no emergency release, so bail out requires the speed drop before it.
- The control system for the wing-mounted bomb racks only allows releasing of both bombs together.

Yakolev Yak-9 and Yak-9T (series 1)

Engine: Klimov M-105PF

	Time limit	RPM	mm Hg
Nominal	-	2550-2700	1050

Temperatures

Temps	Rated	Max
Water	70-85 C	100 C
Oil	90-100 C	115 C

Recommended speeds (km/h)

	Take-off	Glideslope	Landing (12°)	Stall	Dive
Yak-9	160-190	195-205	135-145	152-160	750
Yak-9T	170-200	195-205	140-150	157-165	750

Operation features

- Engine has a two-stage mechanical supercharger which must be manually switched at between 2000m and 2400m altitude.
- Engine mixture control is manual; it is necessary to lean the mixture if altitude is more than 3-4 km for optimal engine operation. Also, leaning the mixture allows a reduction in fuel consumption during flight.
- Engine RPM has an automatic governor and it is maintained at the required RPM corresponding to the governor control lever position. The governor automatically controls the propeller pitch to maintain the required RPM.
- Water and oil radiator shutters are controlled manually.
- Airplane can only be trimmed in the pitch axis.
- Landing flaps have a pneumatic actuator. Flaps can only be fully extended; gradual extending is impossible. Due to the weak force of the actuator the extended landing flaps may be pressed upwards by the airflow if the airspeed is more than 220 km/h. Remember that the flaps will not extend fully in case of high speed. In case of a high-speed landing approach the flaps may extend a few steps further right before landing.
- Airplane has a manual control for the tailwheel lock. The unlocked tailwheel has a 90° turn limit. The tailwheel should be locked when taxiing straight for a long distance and before takeoff and landing.
- Airplane has differential pneumatic wheel brakes with shared control lever. This means that if the brake lever is held and the rudder pedal the opposite wheel brake is gradually released causing the plane to swing to one side or the other.
- Fuel gauges are installed on left and right wing fuel tanks, outside of the cockpit. There is no gauge for the central feeder tank which as a 10 liter capacity.
- The canopy has no emergency release. To bail out, you must slow down to a speed below 550 kph to open the canopy.

Lavochkin La-5 (series 8)

Engine: Shvetsov M-82

	Time limit	RPM	mm Hg
Nominal	-	2,400	950
Boosted	5 min	2,400	1140

Temperatures

Temps	Rated	Max
Cylinder head	140-210 C	215 C
Oil	55-90 C	125 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (13°)	Stall	Dive
170-200	200-210	150-160	165-183	720

Operation features

- Engine has a boost mode. To set boost mode it is necessary to push the boost knob and increase manifold pressure to 1140 mm Hg.
- Engine has a two-stage mechanical supercharger which must be manually switched at 3500m altitude.
- Engine mixture control is automatic when the mixture lever is set to maximum. It is possible to manually lean the mixture by moving the mixture control to less than maximum. This also reduces fuel consumption during flight.
- Air cooling intake shutters should always be open. They should only be closed when there is a possibility of engine overcooling, for example in a dive with idle throttle.
- Airplane has differential pneumatic wheel brakes with shared control lever. This means that if the brake lever is held and the rudder pedal the opposite wheel brake is gradually released causing the plane to swing to one side or the other.
- Cockpit canopy has a weak lock when in the opened position, for this reason the canopy may spontaneously close in a deep dive. Also, it is impossible to open or close canopy at high speed due to strong airflow. The canopy has no emergency release, so bail out requires the speed drop before it.
- The control system of wing-mounted bomb racks only allows the dropping of bombs one by one.

Lavochkin La-5FN (series 2)

Engine: Shvetsov M-82FN

	Time limit	RPM	mm Hg
Nominal	-	2,400	1000
Boosted	10 min	2,500	1180

Temperatures

Temps	Rated	Max
Cylinder head	180-215 C	250 C
Oil	65-75 C	85 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (13°)	Stall	Dive
175-195	200-210	150-160	168-185	720

Operation features

- The engine has a boost mode. To engage it, increase the manifold pressure to 1180 mm Hg. Boost only works on 1st supercharger gear.
- Engine has a two-stage mechanical supercharger which must be manually switched at 3500m altitude.
- Engine RPM has an automatic governor and it is maintained at the required RPM corresponding to the governor control lever position. The governor automatically controls the propeller pitch to maintain the required RPM.
- Oil radiator, air cooling intake and outlet shutters are manually controlled.
- Air cooling intake shutters should always be open. They should only be closed when there is a possibility of engine overcooling, for example in a dive with idle throttle.
- Aircraft is equipped with elevator and rudder trimmers.
- Airplane has automatic wing slats. They deploy when the high angle of attack increases which makes pre-stall softer.
- Landing flaps have a hydraulic actuator and they can be extended to any angle up to 60°.
- Airplane tail wheel rotates freely and does not have a lock. For this reason, it is necessary to operate the rudder pedals confidently and accurately during the takeoff and landing.
- Airplane has differential pneumatic wheel brakes with shared control lever. This means that if the brake lever is held and the rudder pedal the opposite wheel brake is gradually released causing the plane to swing to one side or the other.
- Airplane has a fuel gauge which shows total remaining fuel.
- Also, it is impossible to open or close canopy at high speed due to strong airflow. The canopy has no emergency release, so bail out requires the speed drop before it.
- The control system for the bomb rack only allows to drop bombs one by one.

Ilyushin Il-2 (model of 1941 and 1942)

Engine: Mikulin AM-38

	Time limit	RPM	mm Hg
Nominal	-	2,050	1180
Boosted	10 min	2,150	1280

Temperatures

Temps	Rated	Max
Water	80-110 C	120 C
Oil	85 C	120 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (11.7°)	Stall
150-190	185-195	130-140	138-158

Operation features

- Engine has a boost mode which is engaging by setting mixture control lever to maximum position.
- Engine mixture control is automatic when the mixture lever is set to the intermediate (50%) position. It is possible to manually lean the mixture by moving the control lever to less than 50%. This will lower fuel consumption during flight.
- Water and oil radiator shutter control is manual. Airplane has armored oil radiator shutters which should be closed on start of ground attack to reduce possibility of combat damage. After finishing the attack, it is necessary to re-open the shutters to the required position.
- Landing flaps have a pneumatic actuator. Flaps can only be fully extended; gradual extending is impossible. Due to the weak force of the actuator the extended landing flaps may be pressed upwards by the airflow if the airspeed is more than 220 km/h. Remember that the flaps will not extend fully in case of high speed. In case of a high-speed landing approach the flaps may extend a few steps further right before landing.
- Airplane has a fuel gauge which shows the amount of remaining fuel in the front or bottom fuel tank depending on the switch position. In game the fuel indication switch changes by itself during horizontal flight by every 10 seconds. Rear fuel tank level is not indicated.
- Cockpit canopy weight is 50 kg and it has no lock in the open position, for this reason the canopy may to spontaneously close in a deep dive. Also, it is impossible to open or close canopy at high speed due to strong airflow. The canopy has no emergency release, so bail out requires the speed drop before it.
- Airplane is equipped with a joint salvo controller both for bombs and rockets, it has three release/fire modes: single launch, launch two in a salvo or launch four in a salvo.
- The gunsight is installed on a sliding bar which allows the pilot to extend the gunsight towards the pilot allowing for an increase in the field of view through the gunsight.

Ilyushin Il-2 model of 1943

Engine: Mikulin AM-38F

	Time limit	RPM	mm Hg
Nominal	-	2,050	1200
Boosted	5 min	2,350	1360

Temperatures

Temps	Rated	Max
Water	80-110 C	120 C
Oil	85 C	120 C

Recommended speeds (km/h)

Take-off	Glideslope	Landing (11.7°)	Stall
160-200	195-205	145-155	135-152

Operation features

- Engine has a boost mode which is engaged by setting mixture control lever to maximum position.
- Engine mixture control is automatic when the mixture lever is set to the intermediate (50%) position. It is possible to manually lean the mixture by moving the control lever to less than 50%. This will lower fuel consumption during flight.
- Water and oil radiator shutter control is manual. Airplane has armored oil radiator shutters which should be closed at the beginning of ground attack to reduce a possibility of combat damage. After finishing the attack, it is necessary to re-open the shutters to the required position.
- Airplane has differential pneumatic wheel brakes with shared control lever. This means that if the brake lever is held and the rudder pedal the opposite wheel brake is gradually released causing the plane to swing to one side or the other.
- Airplane is equipped with a joint salvo controller both for bombs and rockets, it has three release/fire modes: single launch, launch two in a salvo or launch four in a salvo.
- The mechanical gun sight "Visier Vladimirova" allows aiming rockets and guns at ground and air targets and horizontal bombing at certain speeds and altitudes.

Petlyakov Pe-2 (series 35 and 87)

Engine: Klimov M-105RA and M-105RF

	Time limit	RPM	mm Hg
Nominal (series 35)	-	2,700	910
Nominal (series 87)	-	2,700	1050

Temperatures

Temps	Rated	Max
Water	70-85 C	100 C
Oil	90-100 C	110 -115 C (s87)

Recommended speeds (km/h)

Take-off	Glideslope	Landing (12.5°)	Dive	Stall
160-200	220-240	155-165	790	175-200

Operation features

- Engine has a two-stage mechanical supercharger which must be manually switched at 2700m altitude.
- Engine mixture control is manual; it is necessary to lean the mixture if altitude is more than 3-4 km for optimal engine operation. Also, leaning the mixture allows a reduction in fuel consumption during flight.
- Engine RPM has an automatic governor and it is maintained at the required RPM corresponding to the governor control lever position. The governor automatically controls the propeller pitch to maintain the required RPM. The governor for the series 35 is electrically actuated and takes a long time to reach the required revolutions, up to 45 seconds when going from minimum to maximum.
- Airplane has fence-type airbrakes which are located under the wing and used to slow the descent during steep dive bombing.
- Landing flaps have electro-hydraulic actuator and they can be extended to any angle up to 50°. When landing and the flaps are fully extended the angle of attack for a stall is less than landing pitch angle. For this reason, it is prohibited to extend flaps to more than to 35° (70%) on landing.
- Airplane has automatically controlled horizontal stabilizer. The automatic control system adjusts the stabilizer angle depending on landing flaps extended angle.
- Airplane has three fuel gauges which shows the level in the fuselage fuel tank, left wing tanks and right wing tanks.
- Airplane is equipped with a bomb salvo controller, it has four release modes: drop single, drop two in a salvo, drop four in a salvo, or drop all bombs in salvo. There is also a controller for a drop delay between each bomb in the salvo.
- When rockets are installed a salvo controller can be used, it has three launch modes: single fire, fire two in a salvo or fire four in a salvo. Aircraft has a fire control system that is designed for eight rockets. However, for added punch, ten rockets were typically loaded. In that case, the ninth rocket will fire with the seventh and the tenth will fire with the eighth.

- When the dive system is engaged, the plane enters a dive when the air brakes are extended (pass through the 45° position) and will recover from the dive when you press the bomb drop button or the dive recovery button to exit the dive (LCtrl + D by default). The dive system controls the elevator trim -for correct operation, the trimmer must be in the range between -4.5 ° to + 4.5 ° before turning on the dive system. If the trimmer is outside this range or if the airplane is trimmed manually while the dive system is in operation or if the air brakes are retracted the dive system will disengage.

Great Britain

Supermarine Spitfire Mk.VB

Engine: Rolls Royce Merlin 45 and 46

	Time limit	RPM	Boost
Max cruising	-	2,650	+7
International power	30 min	2,850	+9
Emergency Max All Out	5 min	3,000	+16

Temperatures

Temps	Rated	Max
Water	105-115 C	125 C
Oil	70-85 C	105 C

Recommended speeds

	Take-off	**Glideslope**	**Landing (12.5°)**	**Stall**	**Flaps**
Km/h	160-170	145-160	130-135	137-144	240
Mph	100-105	90-100	80-83	85-90	150

Operation features

- Engine is equipped with the automatic governor of the manifold pressure that works when the throttle is set to 1/3 position or above. It is necessary to turn the automatic governor off to set the boost value to +16.
- Engine is equipped with an automatic fuel mixture control which maintains optimal mixture if mixture lever is set to the forward position. To use automatic mixture leaning to reduce fuel consumption during flight move the mixture lever to backward position.
- The water radiator is operated manually, while the oil radiator is not adjustable.
- Aircraft has a neutral static stability. The elevator effectiveness is high, so the aircraft should be controlled carefully, not giving too much flight stick input.
- Aircraft becomes unstable with extended landing flaps.
- Landing flaps have a pneumatic actuator, so they can be extended to maximum position only. Speed with extended landing flaps is limited to 150 mph.
- Airplane is equipped with a siren that warns a pilot if the throttle is set to low position with landing gear retracted.
- Airplane is equipped with upper and bottom formation lights which can be turned on simultaneously or independently.
- The gunsight is adjustable: both the target distance and target base can be set.
- The gunsight has a sliding sun-filter.

Supermarine Spitfire Mk.IXe

Engine: Rolls Royce Merlin 66 and 70

	Time limit	RPM	Boost
Max cruising	-	2,650	+7
International power	1 hour	2,850	+12
Emergency Max All Out	5 min	3,000	+18
Emergency Max All Out (150 oct.)	5 min	3,000	+25

Temperatures

Temps	Rated	Max
Water	105-115 C	135 C
Oil	90 C	105 C

Recommended speeds

	Take-off	**Glideslope**	**Landing (12.5°)**	**Stall**	**Flaps**
Km/h	160-170	145-160	130-135	143-163	225
Mph	100-105	90-100	80-83	88-101	140

Operation features

- Engine is equipped with the automatic governor of the manifold pressure that works when the throttle is set to 1/3 position or above.
- Engine is equipped with an automatic fuel mixture control which maintains optimal mixture if mixture lever is set to the forward position. To use automatic mixture leaning to reduce fuel consumption during flight move the mixture lever to backward position.
- The water radiator and oil radiator shutters are operated automatically, but there is a special manual mode that forces radiator shutters to open completely.
- When using 150 octane fuel, the supercharger needs to be switched manually.
- Aircraft has a neutral static stability. The elevator effectiveness is high, so the aircraft should be controlled carefully, not giving too much flight stick input.
- Aircraft becomes unstable with extended landing flaps. Landing flaps have a pneumatic actuator, so they can be extended to maximum position only. Speed with extended landing flaps is limited to 140 mph.
- Airplane tail wheel rotates freely and does not have a lock.
- Airplane has differential pneumatic wheel brakes with shared control lever, meaning that if the brake lever needs to be used in conjunction with the rudder pedals to turn when taxiing.
- Airplane is equipped with a siren that warns a pilot if the throttle is set to low position with landing gear retracted.
- Airplane is equipped with a bottom formation light.
- The gunsight is adjustable: both the target distance and target base can be set. The gunsight has a sliding sun-filter.

Hawker Tempest Mk.V ser.2

Engine: Napier Sabre IIA

	Time limit	RPM	Boost
Max cruising	-	3,150	+4.5
Climb power	1 hour	3,700	+7
Combat	5 min	3,700	+9
Combat (+11 boost engine)	5 min	3,700	+11

Temperatures

Temps	Rated	Max
Water	65-125 C	130 C
Oil	60-90 C	95 C

Recommended speeds

	Take-off	**Glideslope**	**Landing (11.6°)**	**Stall**	**Flaps**
Km/h	150-170	170-200	150-155	140-163	257
Mph	100-105	90-100	80-83	88-101	160

Operation features

- The engine is equipped with a two-stage mechanical supercharger that should be manually switched at 2,700m (8,850 ft).
- Engine mixture control is automatic when the lever is set to “Normal” (1/2 position). It should be set to “Start” (forward) position when starting the engine and “Cut-Out” position (back) to stop it.
- The water radiator and oil radiator shutters are operated manually by adjusting the radiator shutters. There are only two settings: fully open or fully closed.
- The landing gear indicator lamp lights up if the throttle is set to low (less than 1/3) position with the landing gear retracted.

Hawker Hurricane Mk.II

Engine: Merlin XX

	Time limit	RPM	Boost (high gear)
Max cruising	-	2,650	+7
Climb power	1 hour	2,850	+9
Combat	5 min	3,000	+12 (+14)
Combat (+14 boost loadout)	5 min	3,000	+14 (+16)

Temperatures

Temps	Rated	Max
Water	65-125 C	135 C
Oil	15-90 C	105 C

Recommended speeds

	Take-off	Glideslope	Landing (10°)	Stall	Dive	Flaps
Km/h	150-180	150-180	115-135	132-155	630	193
Mph	93-111	93-111	71-83	82-96	390	120

Operation features

- The engine is equipped with a two-stage mechanical supercharger that should be manually switched at 13,000ft (4,000 m).
- Engine is equipped with an automatic mixture control that maintains optimal mixture.
- The water radiator and oil radiator shutters are operated manually by adjusting the radiator shutters.
- The landing flaps have hydraulic actuators and can be extended at an angle of 80 degrees. The speed with extended flaps is limited to 120 mph.
- Airplane has differential pneumatic wheel brakes with shared control lever, meaning that if the brake lever needs to be used in conjunction with the rudder pedals to turn when taxiing.
- The airplane is equipped with upper and lower formation lights that can be turned on simultaneously or independently.
- When bombs are installed, there is a salvo controller with two settings: Single or drop two bombs.
- When rockets are installed, there is a salvo controller with three settings: Single, two, and four rockets in a salvo.

United States

Lockheed P-38 J-25 “Lightning”

Engine: Allison V-1710-89(L) and 91(R)

	Time limit	RPM	inch Hg
Cruise	-	2,600	44
Combat	15 min	3,000	54
WEP	5 min	3,000	60
Supercharger	-	24,000	
Supercharger Max	15 min	26,400	

Temperatures

Temps	Rated	Max
Water	85 C	105 C
Oil	105 C	115 C

Recommended speeds

	Take-off	Glideslope	Landing (7°)	Stall	Dive
Km/h	160-175	185-210	150-175	179-220	725
Mph	100-110	115-130	95-110	111-137	450

Operation features

- In addition to the single-stage supercharger, the aircraft is equipped with an automatic turbo-supercharger. The turbo-supercharger is powered by the engine exhaust and is automatically regulated by the pilot throttle by regulating the shutters on the exhaust pipes.
- The turbo-supercharger RPM changes slowly and might take several seconds to rev up/down. For takeoff, it is recommended to keep the brakes pressed for several seconds after moving the throttle forward, so the turbo-supercharger RPM increases enough to reach 54” of pressure.
- Engine is equipped with an automatic fuel mixture control which maintains optimal mixture if mixture lever is set to Auto Rich (70%) position. To use automatic mixture leaning to reduce fuel consumption during flight it is necessary to set mixture lever to Auto Lean (30%) position. In case of malfunction of the automatic mixture control, set it to Full Rich. To stop the engine mixture lever should be set to the Cut Off (0%) position. Full Rich position is used during take-off, in case of emergency or automatic mixture system malfunction.
- The automatic engine governor keeps the set engine RPM by adjusting the pitch using an electric actuator. The propellers can be feathered.
- The landing flaps have a fixed “maneuver” position that can be set by a short flaps-down button press.
- The aircraft is equipped with hydraulic aileron actuators, making their operation and good roll performance at high speeds possible.
- There are signal lamps warning about low fuel warning in the outer wing tanks (main source) and separate indicators for the left and right tank pairs.

Bell P-39 L-1 “Airacobra”

Engine: Allison V-1710-63

	Time limit	RPM	inch Hg	Mixture
Nominal	-	2,600	37.2	-
Military	15 min	3,000	42.0	Auto rich
Take-off	5 min	3,000	51.0	Full rich
Max	2 min	3,000	60.0	Full rich

Temperatures

Temps	Rated	Max
Water	105-115 C	125 C
Oil	70-85 C	90 C

Recommended speeds

	Take-off	Glideslope	Landing (17°)	Stall	Dive
Km/h	150-180	180-210	155-160	160-172	841
Mph	93-112	112-130	100	100-106	522

Operation features

- There is War Emergency power mode. To engage it, move the throttle to max forward position and set the mixture control to Full Rich (move it 90% forward to engage the Take-Off mode).
- Engine has a single stage mechanical supercharger which does not require manual control.
- Engine is equipped with an automatic fuel mixture control which maintains optimal mixture if mixture lever is set to Auto Rich (66%) position. To use automatic mixture leaning to reduce fuel consumption during flight it is necessary to set mixture lever to Auto Lean (33%) position. To stop the engine mixture lever should be set to the Cut Off (0%) position. Full Rich position is used during take-off, in case of emergency or automatic mixture system malfunction.
- Engine RPM has an automatic governor and it is maintained at the required RPM corresponding to the governor control lever position. The governor automatically controls the propeller pitch to maintain the required RPM. Also, it is possible to turn off the governor and control propeller pitch manually.
- Water and oil temperatures are controlled manually by adjusting the outlet engine radiator shutters.
- The nose gear orients by itself, it doesn’t have brakes and can’t be controlled. Its maximum turn angle is 60° left or right.
- Airplane has two fuel gauges which shows the level in each group of fuel tank.
- Although there are two cockpit doors equipped with window lifters, usually only the right one is used. They can’t be opened during flight but can be jettisoned to bail out.
- Airplane is equipped with mechanical releasing system for a single bomb.
- The gunsight has a sliding sun-filter. There is also a back-up mechanical sight which can be used if main sight is damaged.

Curtiss P-40 E-1 “Kittyhawk”

Engine: Allison V-1710-39

	Time limit	RPM	inch Hg
Nominal	-	2,600	37.2
Combat	5 min	3,000	42.0
Take-off	2 min	3,000	45.5
Max (prohibited by manual)	-	3,000	56.0

Temperatures

Temps	Rated	Max
Water	105-115 C	125 C
Oil	70-85 C	90 C

Recommended speeds (km/h)

	Take-off	Glideslope	Landing (13.9°)	Stall	Dive
Km/h	160-190	210-220	140-145	153-176	860
Mph	100-120	230-237	87-90	95-109	534

Operation features

- Engine has no manifold pressure automatic governor. For this reason, manifold pressure not only depends on throttle position, but also from RPM and altitude. This requires additional checking of manifold pressure to not cause engine damage.
- Engine is equipped with an automatic fuel mixture control which maintains optimal mixture if mixture lever is set to Auto Rich (66%) position. To use automatic mixture leaning to reduce fuel consumption during flight it is necessary to set mixture lever to Auto Lean (33%) position. In the case of malfunction of the automatic mixture control the mixture lever should be set to Full Rich (100%) position. To stop the engine mixture lever should be set to the Cut Off (0%) position.
- Water and oil radiators shutters are joint with engine cowl outlet shutters and manually operated.
- Airplane has a very small stability margin in yaw. When angle of side slip is more than 12° plane becomes unstable in yaw and starts to increase the side slip angle by itself. Because of this, it is necessary to accurately operate the rudder pedals and pay attention to the side slip indicator.
- Airplane has a tailwheel control system which is unlocked by the rudder if the rudder pedal is pressed more than half of its range. The tailwheel remains locked if pedals are deflected less than halfway. Because of this, it is necessary to avoid large rudder pedal inputs when moving at high speed.
- Airplane is equipped with a parking brake system.
- Airplane is equipped with mechanical releasing system for a single bomb.
- When rockets are installed a salvo controller can be used, it has three launch modes: single fire, fire two in a salvo or fire four in a salvo.

Douglas A-20B

Engine: Wright R-2600-11

	Time limit	RPM	Boost 1st gear	Boost 2nd gear	Mixture
Cruise	-	1,705	27.5	30.0	Auto lean
Nominal	-	2,300	36.0	40.0	Auto rich
Combat	5 min	2,400	43.0	41.0	Auto rich

Temperatures

Temps	Rated	Max
Cylinder head	140-240 C	260 C
Oil	80-95 C	105 C

Recommended speeds

	Take-off	Glideslope	Landing (3.4°)	Stall	Dive
Km/h	170-195	185-225	150-170	161-193	665
Mph	105-120	115-140	93-105	100-120	412

Operation features

- Engine has no manifold pressure automatic governor. For this reason, manifold pressure not only depends on throttle position, but also from RPM and altitude. This requires additional checking of manifold pressure to not cause engine damage.
- Engine is equipped with an automatic fuel mixture control which maintains optimal mixture if mixture lever is set to Auto Rich (66%) position. To use automatic mixture leaning to reduce fuel consumption during flight it is necessary to set mixture lever to Auto Lean (33%) position. In the case of malfunction of the automatic mixture control the mixture lever should be set to Full Rich (100%) position. To stop the engine mixture lever should be set to the Cut Off (0%) position.
- Engine RPM has an automatic governor and it is maintained at the required RPM corresponding to the governor control lever position. The governor automatically controls the propeller pitch to maintain the required RPM.
- Oil radiators shutters are joint with engine cowl outlet shutters and manually operated.
- Airplane is equipped with a siren that warns a pilot if the throttle is set to low position with landing gear retracted.
- Airplane is equipped with upper formation lights.
- Engine has a two-stage mechanical supercharger which must be manually switched at 2900m (9500 ft) altitude.
- Airplane have a fuel gauge which shows remaining fuel in left and right fuel tanks depending on switch position. In game the fuel indicator switch changes by itself during horizontal flight by every 15 seconds.
- The aircraft is equipped with an electromechanical safety system that blocks the hydraulic landing gear actuator while the aircraft is on the ground.
- The nose gear orients by itself, it doesn't have brakes and can't be controlled.
- It is forbidden to open the upper cowl flaps during flight, so they should be closed before taking off.
- The upper cowl flaps are controlled simultaneously using a shared hydraulic actuator.

- There are white and red signal lamps in the tail: the white one is lit while bomb doors are open and the red one lights up for 5 seconds when bombs are released.
- The upper cockpit door can't be opened during flight, but there is an emergency jettison handle.
- Airplane is equipped with a bomb salvo controller that has four release modes: drop single, drop two in a salvo, drop four in a salvo, or drop all bombs in salvo. There is also a controller for a drop delay between each bomb in the salvo.

Republic P-47D-22 “Thunderbolt”

Engine: Pratt & Whitney R-2800-59

	Time limit	RPM	inch Hg
Cruise	-	2,550	42
Combat	15 min	2,700	52
WEP	5 min	2,700	64
WEP (150 oct)	5 min	2,700	70
Turbocharger	-	20,000	
Turbocharger MAX	15 min	22,000	

Temperatures

Temps	Rated	Max
Oil	60-95 C	100 C

Recommended speeds

	Take-off	Glideslope	Landing (11.9°)	Stall	Dive	Cowl flaps
Km/h	177-210	179-220	175-205	175-212	805	360
Mph	110-130	111-135	110-127	109-131	500	225

Operation features

- The aircraft requires a long takeoff run (650m standard load and 1,500m at max takeoff weight). Lower the flaps to 10-20 degrees to shorten takeoff.
- The aircraft is equipped with one fuel indicator with two needles for the forward and rear tanks.
- In addition to the single stage supercharger, the engine is equipped with a turbocharger.
- The total engine power should be controlled using the joint method by joining all three levers (RPM, Throttle, Turbocharger).
- The aircraft is equipped with a water injection system that boosts the power in emergency mode. When engaged, the mixture becomes leaner and the turbocharger RPM increases automatically. The water supply is good for 15 minutes.
- The engine is equipped with an automatic fuel mixture control which maintains optimal mixture if the mixture lever is set to Auto Rich (85%). Set to Auto Lean (60%) to reduce fuel consumption. In case of malfunction set mixture lever to Full Rich (100%).
- Engine has an automatic governor that maintains RPM at the level corresponding to the governor control lever position.
- The aircraft has trimmer s for all flight controls: Roll, pitch, and yaw.
- M10 rocket launcher tubes can be jettisoned (Shift+D)

Republic P-47D-28 “Thunderbolt”

Engine: Pratt & Whitney R-2800-59

	Time limit	RPM	inch Hg
Cruise	-	2,550	42
Combat	15 min	2,700	52
WEP	5 min	2,700	64
WEP (150 oct)	5 min	2,700	70
Turbocharger	-	20,000	
Turbocharger MAX	15 min	22,000	

Temperatures

Temps	Rated	Max
Oil	60-95 C	100 C

Recommended speeds

	Take-off	**Glideslope**	**Landing (11.9°)**	**Stall**	**Dive**	**Cowl flaps**
Km/h	185-200	185-210	175-195	178-222	805	360
Mph	115-125	115-130	110-120	110-138	500	225

Operation features

- The aircraft requires a long takeoff run (650m standard load and 1,500m at max takeoff weight). Lower the flaps to 10-20 degrees to shorten takeoff.
- The aircraft is equipped with one fuel indicator with two needles for the forward and rear tanks.
- In addition to the single stage supercharger, the engine is equipped with a turbocharger.
- The total engine power should be controlled using the joint method by joining all three levers (RPM, Throttle, Turbocharger).
- The aircraft is equipped with a water injection system that boosts the power in emergency mode. When engaged, the mixture becomes leaner and the turbocharger RPM increases automatically. The water supply is good for 15 minutes.
- The engine is equipped with an automatic fuel mixture control which maintains optimal mixture if the mixture lever is set to Auto Rich (85%). Set to Auto Lean (60%) to reduce fuel consumption. In case of malfunction set mixture lever to Full Rich (100%).
- Engine has an automatic governor that maintains RPM at the level corresponding to the governor control lever position.
- The aircraft has trimmer s for all flight controls: Roll, pitch, and yaw.
- M10 rocket launcher tubes can be jettisoned (Shift+D)

North American P-51D-15 “Mustang”

Engine: Packard V-1650-7

	Time limit	RPM	inch Hg
Cruise	-	2,700	46
Combat	15 min	3,000	61
WEP	5 min	3,000	67
WEP (150 oct)	5 min	3,000	75

Temperatures

Temps	Rated	Max
Water	100-110 C	121 C
Oil	80 C	90 C

Recommended speeds

	Take-off	Glideslope	Landing (12.9°)	Stall	Dive
Km/h	185-200	185-210	175-195	159-196	812
Mph	115-125	115-130	110-120	99-122	505

Operation features

- Combat, Aerobatic maneuvers and Instrument Flying are forbidden at full fuel reserve. The aircraft is unstable with full rear fuel tank. This limit is lifted when there is no more than 20 gallons (~75% fuel) in the rear tank. The tank is fully empty at 68% (in-game fuel %).
- It’s possible to reach dangerously high Mach numbers in a dive: the aircraft starts to shake, and control loss is possible. Reduce throttle and gently return to horizontal flight.
- The engine is equipped with an automatic governor of manifold pressure, that works when throttle is 1/3 position or above.
- Engine has a two-stage mechanical supercharger which does not require manual control. It can be switched to low gear manually.
- The engine is equipped with an automatic fuel mixture control which maintains optimal mixture if the mixture lever is set to RUN position (70%). In case of malfunction set mixture lever to Full Rich (100%). To stop the engine the mixture should be set to CUT OFF position (0%).
- The water and oil shutters are operated automatically but there is a manual control.
- The aircraft has trimmers for all flight controls: pitch, yaw, and roll.
- The aircraft has trimmers for all flight controls: Roll, pitch, and yaw.
- Landing flaps have hydraulic actuator and can be extended to 10°, 20°, 30°, 40° or 50°.
- Each tank has a dedicated fuel level indicator: Wing tanks on the floor, and rear tank behind the seat (left).
- The tail wheel rotates freely but moving the control stick back locks it, so it rotates by the pedals input.