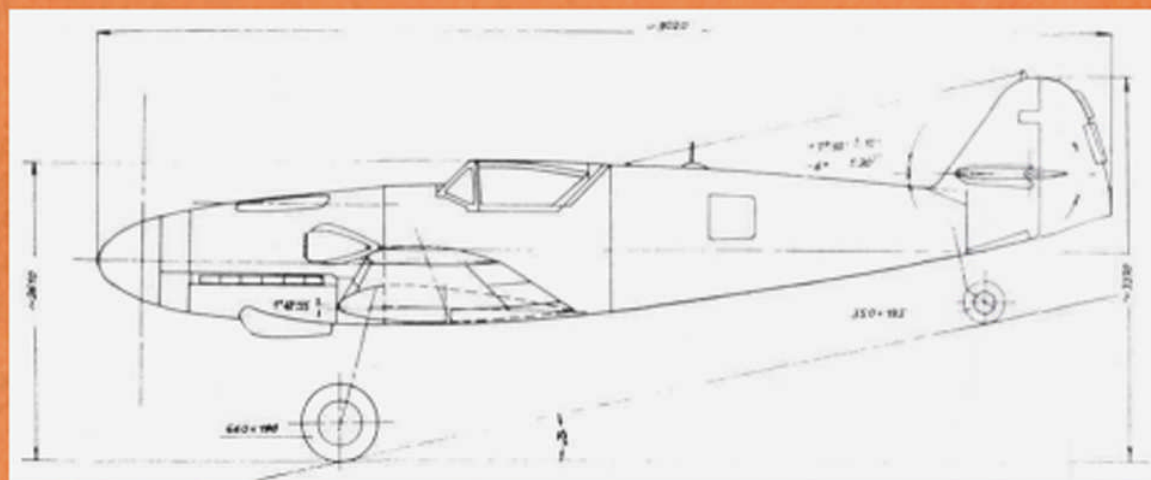


Authorized Use Only!

# Bf 109K-4

## Pilot Handbook



October 1944

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**For use with Microsoft Flight Simulator FSX**

**Warning: This Manual and FSX model must not  
be used for real flight training purposes.**

## Notes about this manual:

The **first part** of this Manual is a translated representation of a real Bf-109 pilot's manual. This is what a real 109 pilot would have received when being introduced to the aircraft.

**This must be followed for your basic aircraft familiarization and operations.**

As such, a few areas, such as operation of the real-life radios, are not applicable to this FSX version, but have been left in order to provide a more complete idea of what a 109 pilot had to know.

The **second part** (page 25 on) contains simulator info specifically required to use the FSX aircraft successfully, where not covered by the real aircraft manual, or where additional explanation is needed (e.g. starting).

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## Introduction:

Thank you for purchasing this FSX aircraft. Its aim is to give you a precise and detailed visual feeling for this amazing aircraft, the last and most powerful in the line of the Messerschmitt Bf-109 series.

The Bf-109 was the most produced fighter aircraft in history, with a total of 33,984 units produced from 1936 up to April 1945.

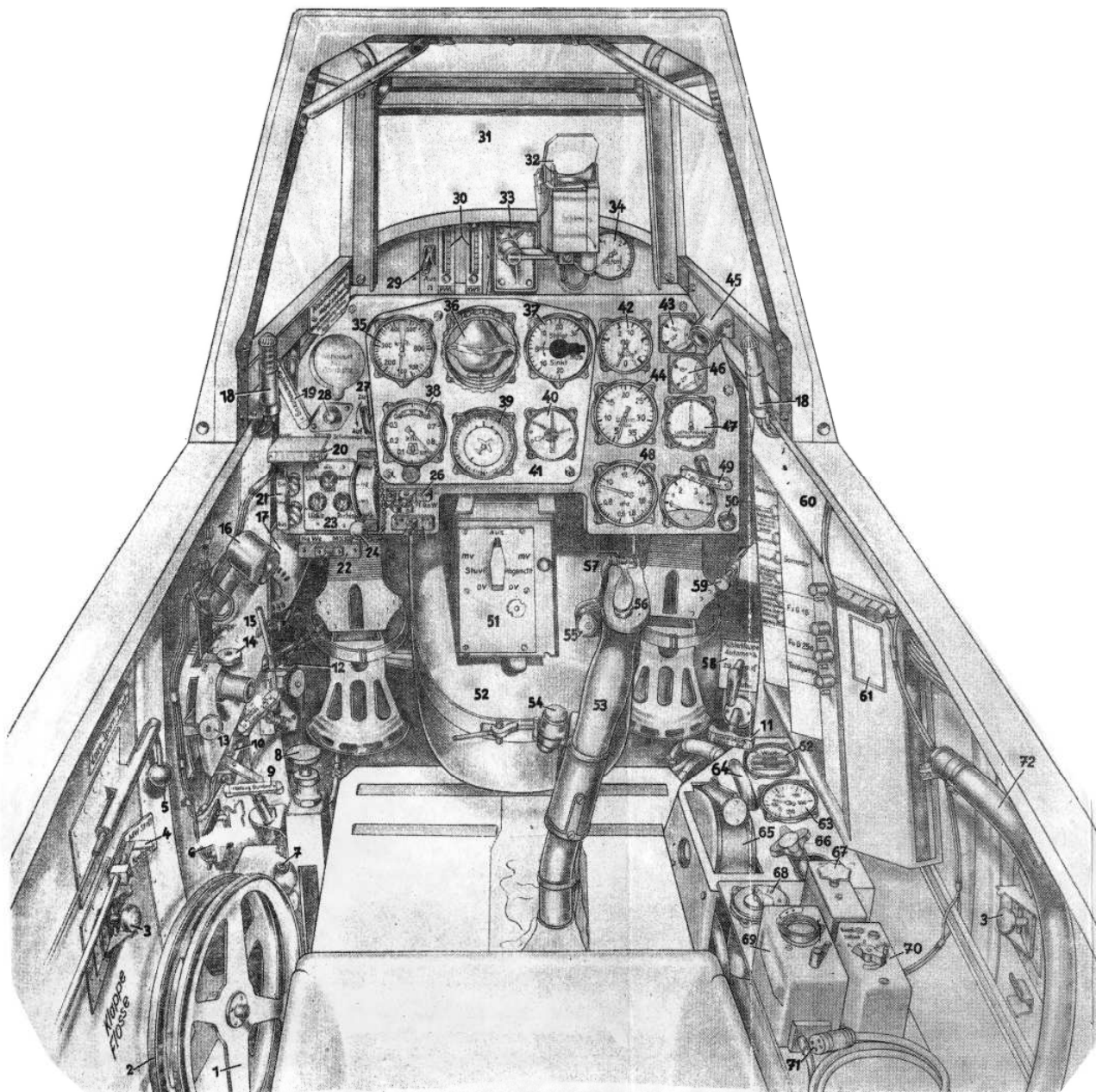
The final production version of the Bf-109 was the K series, or "Kurfürst", introduced in the autumn of 1944, powered by the DB 605D engine with up to 2,000 PS (1,973 HP). Though externally similar to the late production Bf 109G series, a large number of internal changes and aerodynamic improvements were incorporated that improved its effectiveness and remedied existing flaws, keeping it competitive with the latest Allied and Soviet fighters. The Bf 109's outstanding rate of climb was superior to all Allied adversaries including the P-51D Mustang, Spitfire Mk. XIV and Hawker Tempest Mk. V.

...

*Unsolicited comment from Greg "Barfly" Bartos, former USAF pilot / present-day career airline pilot / flight sim enthusiast; T-37, T-38, C-5 and 737 pilot in the real world:*

"The K is an impressive machine - I was able to keep up with then out climb the Mustangs and Thunderbolts up to 31,000ft; keep up with the Mustang at low altitude and dominate the P-47 low. A 47 actually dove on me from high altitude and rapidly closed, but the distance was too great. The K really performed in a comparative sense exactly like it should, in the areas it should, and was weak where it should be - namely endurance and poor high speed maneuvering - perfect! I think it will really impress people with it's performance and accurate character."





- 1 Horizontal Stab. Trim
- 2 Flap Handwheel
- 3 Cabin Vents
- 4 Battery Ventilation
- 5 Tail Wheel Lock
- 6 Glove Heater Plug
- 7 Stabilizer Trim Indicator
- 8 Engine Primer Hand Pump
- 9 Bomb or Drop Tank jettison
- 10 Prop Pitch Auto/Man. Switch
- 11 Man. Coolant Valve Controls \*
- 12 Momentary Limit Switch
- 13 Quick-Stop Handle
- 14 Fuel Selector & Cutoff
- 15 Winter Start Handle
- 16 Throttle with Thumb Switch for Prop Pitch Control
- 17 Motor Generator for Artificial Horizon
- 18 UV Cabin Lights
- 19 Canopy jettison Handle
- 20 Starter Handle
- 21 Landing Gear Push Buttons
- 22 Selector Switch for 21 cm Rockets or MK 108 \*\*
- 23 Landing Gear Indicators
- 24 Magneto Switch
- 25 Switch for MW Installation
- 26 Jettison Switch for 21 cm Rocket Tubes \*\*
- 27 Windscreen Cleaning Valve
- 28 Main Elect. Circuit Breaker
- 29 Master Weapon Switch

- 30 Ammunition Counters & Indicators
- 31 Armor Glass Windscreen
- 32 Gun Sight Revi 16B
- 33 Gun Sight Mount
- 34 Pressure Gauge for MW Installation
- 35 Airspeed Indicator
- 36 Artificial Horizon
- 37 Vertical Speed Indicator
- 38 Altimeter
- 39 Repeater Compass
- 40 AFN2 Instrument Flight Indicator
- 41 Instrument Flight Panel
- 42 Fuel & Oil Pressure Gauge
- 43 Coolant Temperature Gauge
- 44 Tachometer
- 45 Flare Gun Port
- 46 Oil Temperature Gauge
- 47 Prop Pitch Indicator
- 48 Manifold Pressure Gauge
- 49 Emergency Land. Gear Release
- 50 Low Fuel Warning Light
- 51 ZSK 244A Bomb Arming Panel
- 52 Cover for MK 108
- 53 Control Column Grip
- 54 Charging Button For MK 108
- 55 B2 Button for Bomb Release
- 56 B1 Button for MK 108 or Rockets
- 57 A Button for MG 131
- 58 Radiator Flap Control

- 59 Fuel jettison Handle
- 60 Circuit Breaker Panel
- 61 Compass Deviation Card
- 62 Oxygen Monitor
- 63 Oxygen Pressure Gauge
- 64 Drop Tank Fuel Transfer Sight Glass
- 65 Oxygen Regulator
- 66 Main Valve for Oxygen System
- 67 Control for FuG 16ZY Radio
- 68 Frequency Selector for FuG 16ZY Radio
- 69 Headphone Volume Control
- 70 Control for FuG 25a (IFF) Radio
- 71 Headphone Jack
- 72 Oxygen Mask Hose

\* only on initial A/C

\*\* omitted in later A / C

A separate and larger version of this illustration is provided in the Manual folder, for ease of viewing.

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## I. AIRCRAFT SPECIFICATIONS.

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Length of aircraft 9 m, width 10 m. Empty weights: 2800 kg, in full combat readiness: 3500 kg. Wing loading. 220 kg/m. Power-to- weight ratio. 0,4 hp./kg.

The aircraft is generally of full metal construction. The elevator, and ailerons are fabric-covered. The stabiliser, fin and rudder are of wood construction. To protect the pilot, the windshield of the canopy is reinforced with a 60 mm Plexiglas armor, the rear part of the opening canopy is fitted with a 60 mm Plexiglas plus 11 mm steel head protection armor, and the rear wall of the cockpit with 11 mm back armor. To protect the fuel tank there is a two-part light metal armor behind the tank. The fuel tank is entirely made of rubber and has a wall thickness of 8 mm.: the tank wall will self-seal small-caliber bullet holes. Allowed operating time for the fuselage 450h.

### A. Engine:

Mercedes-Benz DB 605 D 12-cylinder, liquid- cooled and equipped with a supercharger for 5.7 km rated altitude. MW-50 injection equipped.

Maximum power at sea level: 1550 hp, with MW-50 2000 hp (1800 hp output at 4.9 km).  
Maximum continuous power: approx. 1080 hp.

The coolant is a mixture of clean water and glycol, top-up volume approx. 75 l.

Lubricant weight: approx. 30 kg.

Fuel: 87 octane aviation gasoline.

Volume of fuselage fuel tank: approx. 420 l, jettisonable auxiliary tank 285 l.

Fuel consumption:

At 1475 hp power: approx. 480 l/h.

At 1355 hp power: approx. 440 l/h.

At 1080 hp power: approx. 320 l/h.

Allowed operating time for engine: 110 h.

### B. Armament:

The fixed fuselage armament consists of a MG-151 20 mm cannon firing through the propeller hub and two 13 mm MG-131 machine guns in the upper part of the fuselage in front of the cockpit, firing synchronized through the propeller disc.

Ammunition for the fuselage cannon: 120-140 rounds

Ammunition for both machine guns: 250 rounds.

Firing speed of the cannon is approx.. 700 rounds/min, muzzle velocity 700 m/s. Firing speed of the machine gun approx. 900 rounds/min, muzzle velocity ca. 700 - 750 m/s.

Tracer colour: blue.

The MG-151 cannon can use the following ammunition:

1.	Practice Round	Weight:	115g	
2.	Armor-Piercing	Weight:	117g	
3.	Armor-Piercing	Weight:	115g	
4.	Explosive	Weight:	115g	1.4sec tracer to approx. 750m
5.	Explosive	Weight:	115g	1.5sec tracer self-igniting at 700m
6.	Explosive	Weight:	115g	3sec tracer to approx. 1200m
7.	Explosive	Weight:	115g	3.3sec tracer to approx. 1300m

The MG-131 cannon can use the following ammunition:

1.	Explosive	Weight:	34g	1.7sec tracer to approx. 760m
2.	Armor-Piercing	Weight:	38.5g	1.6sec tracer to approx. 760m
3.	Armor-Piercing	Weight:	34g	no tracer
4.	Explosive	Weight:	34g	1.7sec tracer to approx. 650m
5.	Explosive	Weight:	38.5g	1.7sec tracer to approx. 750m
6.	Explosive	Weight:	38g	2.5sec tracer to approx. 750m
7.	Explosive	Weight:	34g	1.7sec tracer self-igniting to 760m

The MG-151 cannon is loaded and fired electrically. The system switch on the gun panel supplies current to the operating circuit. After this, by a press of the firing button on the control column, the loading motor loads the cannon and firing takes place immediately as the hammer mechanically ignites the cap.

The MG-131 machine gun is loaded, fired and synchronized electrically. The system switch on the gun panel and the machine gun switch supply current to the operating circuit. After this, by pressing the machine gun trigger on the control column, the loading motor loads the gun, the hammer strikes the cap which acts as an electric switch, and only after the synchronizing pulse closes the circuit the electric cap ignites and fires the gun. The cannon and machine gun belts are assembled from loose links bound together by the round. The belt thus disintegrates when firing.

## C. Radio Equipment:

FuG 16 Z short-wave radio 41.5 mc/s. (7 m).



Range:

Aircraft-to-aircraft, contact at low altitudes starting at max. 30 km distance, with increasing altitude contact up to 200 - 300 km.

Ground station - aircraft at 1000 m certain to contact at approx. 100 km; at 4000 m approx. 200 - 250 km.

Homing device, which includes a fixed loop antenna in the aircraft and a direction indicator in the instrument panel. In emergency suitable also for blind landing.

## D. Instrument flight equipment:

Artificial horizon, turn and bank indicator, airspeed indicator, vertical speed indicator, chronometer, compass and homing device.

## E. Flight Performance:

Take-off run: approx. 400m; landing run without brakes approx. 600m

Ceiling: 11,000m

Climb times:

To 1000m:	approx. 1 min.
To 2000m:	approx. 2 min.
To 3000m:	approx. 3 min.
To 5000m:	approx. 5 min. 15 sec.
To 8000m:	approx. 10 min.
To 11000m:	approx. 17 min.

Climb speed:	approx. 270 km/h.
Cruising speed	approx. 420 km/h.
Landing speed	approx. 160 km/h.

Speed at 0m:	approx. 540 km/h.
Speed at 5000m:	approx. 650 km/h.
Speed at 8000m:	approx. 620 km/h.

Dive speed limit: 750 km/h.

Dive times:

From 9000m to 5000m:	approx. 35 sec.
From 7000m to 2000m:	approx. 40 sec.

From 5000m to 0m: approx. 40 sec.

Turning times:

At 400 km/h: 180 degrees in 13 sec.

At 450 km/h: 100 degrees in 14 sec.

Range at cruise speed: approx. 550 km.

Range at max. speed: approx. 540 km.

Operational range (out and back):

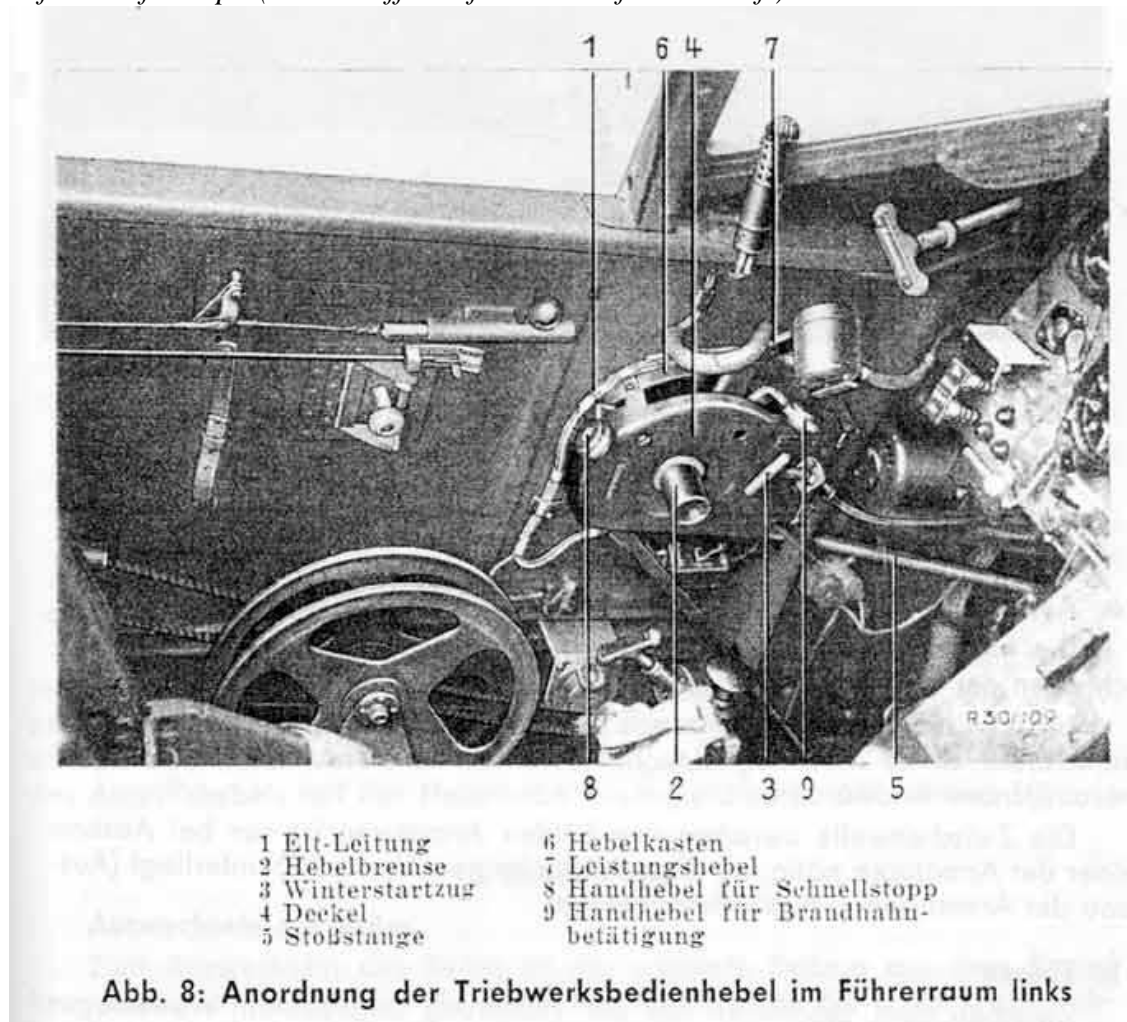
Without drop tank, at cruising speed: approx. 260 km.

Without drop tank, at max speed: approx. 250 km.

With drop tank, at cruising speed: approx. 450 km.

With drop tank, at max. speed: approx. 420 km

*Left side of cockpit (details differed from aircraft to aircraft):*



## II. AIRCRAFT OPERATING INSTRUCTIONS

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### A. Start-up

1. Inquire from mechanic-in-charge whether the aircraft is ready for take-off.
2. Lock canopy in "closed" position.
3. Throttle open approx. 2.5 cm (1 inch) or according to advice from the mechanic.
4. Propellor blade pitch control to automatic.
5. Radiator control to "Open" (Auf) position.
6. Battery switch on.
7. Prime according to advice from mechanic (0-15 times).
8. Electric fuel pump on for approx. 15-30 seconds prior to starting.
9. Magneto switch to M1+2 position, when mechanic gives agreed signal.
10. Wait for inertial starter to be fully wound by mechanics, then pull starter lever strongly with right hand and be prepared to use primer if necessary.
11. If 10-15 sec. after start-up the oil pressure does not indicate 6-8 kg/cm<sup>2</sup> pressure (cold engine), engine must be stopped.
12. Fuel pressure must rise immediately after start, otherwise engine must be stopped.
13. When engine properly started, turn off the fuel pump.

### B. Warm-up and run-up

1. Run the engine briefly at 700-800 rpm, trying to keep oil pressure below 8 kg/cm.
2. Full warm up is then done, at 1000 rpm.

3. Test coolant radiator operation, selecting, in order: "Closed" (Zu), "Open"(Auf), "Automatic" (Kuhlerklappe Automatik) and then "Open"(Auf). Leave selector on "Open"(Auf).
4. When oil temperature has risen by 20 degrees and stays below 8 kg/cm, check the magnetos (**note:** in FSX, ground friction does not allow full run-up, if correct take-off and landing distances are to be used):

- Engine to 2300 rpm; switch to M1 and M2; rpm's must not drop more than 70 rpm.
- Then to 2500 rpm (max 2600 rpm) at 1.30 manifold pressure.

## C. Taxiing

1. Test brakes after beginning to move.
2. Switch on radio.
3. Taxi using brisk S-turns, paying close attention to what is in front of the aircraft.
4. Extend flaps to 20°; stab. Trim to +1.

## D. Take-off

1. Check canopy locked.
2. Check that tailwheel lock is engaged.
3. Check stab. is set to +1.
4. Check flaps are at 20°.
5. Check propellor control is on automatic.
6. Set coolant radiator control to "Automatic"(Kuhlerklappe Automatik)
7. Switch on fuel pump.
8. Immediately after take-off, retract gear.
9. Set engine to 1.15-1.20 manifold pressure and 2300 rpm.
10. When speed exceeds 200 km/h, retract flaps.
11. Switch off fuel pump.
12. Pull landing gear buttons to ensure fully back.

Note! Correct the tendency to swing using the rudder

## E. Cruise

1. Manifold pressure to 1.0, rpm to 2000-2100.

## F. Landing

1. Switch on fuel pump.
2. Open coolant radiator shutters
3. Slow aircraft to 300 km/h.
4. Extend landing gear.
5. During glide, lower flaps to 40°.
6. Stab. To -3, or according to feel.
7. Glide speed: 200-220 km/h
8. At threshold: 180 km/h.

Note! Correct the tendency to swing using rudder at high speeds, then brakes at lower speeds.

## G. Taxiing after landing

1. Unlock tailwheel.
2. Switch off fuel pump.
3. Retract flaps, to 20° or 0°
4. Stab. to 0.
5. After leaving runway, switch off radio.

## H. Stopping the engine

1. Coolant radiator control to "closed"(Auf).
2. Idle-cutoff lever to down position until engine stops.
3. Switch off magnetos.
4. Switch off battery.
5. Undo safety harness.



## III. Forced Landings

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### A. General:

In the following, forced landing means a flight condition in which the engine is not running at all, or is running so badly that the airspeed necessary for controlling the aircraft can be maintained only at the expense of altitude (i.e. by gliding).

1. Forced landing sites in order of suitability: Airfields, fields and meadows with underground drainage, smooth sand beaches, fields with open ditches, swamps and waterways, young, small woods, forests with thick trees, hills and mountains. For the last three sites, success cannot usually be guaranteed, hence in these cases one must bale out.
2. It is best to stick with the site that has been selected for forced landing all the way, even if a seemingly more suitable place were to present itself at a later stage. Making the landing always suffers from switching the site, because then there is usually little time and the landing is made more or less hastily.
3. When the engine stops, one must remember to quickly push the nose down to maintain airspeed. Note! The glide angle is noticeably steeper than normal when the engine is not running.
4. If the engine is running, even badly (e.g. on idle), 200 - 210 km/h. airspeed must be maintained.

#### Turns in a glide:

Altitude:	Change in direction:
100m	10-15°
200m	40-45°
300m	60-70°
400m	90-100°
500m	120-140°

5. If the engine stops completely, 220-230 km/h must be maintained.

#### Turns in a glide:

Altitude:	Change in direction:
100m	5-10°
200m	15-20°
300m	30-40°
400m	50-60°
500m	70-80°

6. When beginning a turn, airspeed must be increased considerably from the aforementioned values, e.g. 250 - 280 km/h.
7. When gliding at best glide speed 200 - 230 km/h. airspeed must be decreased only when close to surface, but even then airspeed must be kept slightly above normal. This is done because if one flies at too low airspeed and the aircraft hits an obstacle, the risk of flipping over is great. In addition, one must try to reach the selected landing spot even if one "overshoots" it. This is better than the aircraft hitting an obstacle before the landing spot.
8. If the engine stops at low altitude, e.g. take-off, large changes of direction must not be made, only steer clear of buildings and other larger obstacles if possible.
9. A forced landing must be made, if possible, close to roads and dwellings, so that help is available quickly if needed, but not in cases where it makes performing the landing and succeeding more difficult. When landing in water, one must land parallel to the shoreline close to the shore.

## **B. Proper forced landing procedure.**

1. Always keep the landing gear retracted, even if landing on an airfield.
2. The propeller pitch control must be switched to manual and set to gliding position (if the engine has completely stopped, set propeller pitch indicator to 6.00 position).
3. When the engine stops, the fuel pump, ignition and battery circuits must be switched off. Even when the engine is running, these must be switched off before coming close to the surface.
4. In aircraft equipped with a turning gunsight, it must be secured to the side, and in aircraft with a fixed gunsight it must be removed using the gunsight forced release.
5. The canopy must be jettisoned. (One must pull the canopy emergency release inside the aircraft, if the canopy does not come off, one must open the locking mechanism of the canopy). When jettisoning canopy, one must bend down forward to avoid being hit in the head by the released canopy.
6. Flaps must be fully extended, but only after it is estimated that the aircraft is certain to glide to the selected landing spot.
7. Safety harness must be tightened, especially the shoulder harness must be pulled very tight.

8. Just when the aircraft is beginning to touch the surface, one must with the hands take a firm grip on the instrument panel e.g. by the gunsight in order to possibly avoid hitting one's head against the panel or something else.

## **C. Forced landings into different terrains.**

### **1. Landing on an airfield:**

Landing on an airfield, when such an opportunity exists, is completely without risk. The aforementioned things must be taken into account. One must try to make the landing into the wind, normally, not stalling the aircraft.

### **2. Landing on ice:**

When landing on ice, one must do it parallel to the shoreline because, to begin with, the surface is hard to make out on snow-covered ice. Otherwise there's nothing different about the landing procedure, except if the ice is thin, one must land either very close to the shore in the shallows or in such a way that the aircraft ends up ashore, in which case the canopy must be jettisoned.

### **3. Landing on a field or meadow with underground drainage:**

If the site is big enough, the landing is without risk. Taking into account the aforementioned things, the landing will succeed with minor damage.

### **4. Landing on a sand beach:**

If the sand beach is smooth and large enough, landing will succeed well with a certain amount of damage. This kind of beach isn't common, and is in practice seldom available.

### **5. Landing on a field with open ditches:**

This is the forced landing site most often encountered in practice. Chances of success are good. When selecting the landing direction, one must note that it is not necessary to land parallel to the plowing direction, if the length and quality of the landing area would be decreased.

#### 6. Landing in water:

Landing in water will succeed well if certain things are taken into account. The canopy must unconditionally be jettisoned and the safety harness opened. The parachute harness must be completely detached from one's back. This is because the aircraft will begin sinking instantly as the speed decreases. If possible, the landing must be made parallel to the shoreline and as close to it as possible, into the wind.

#### 7. Landing in a young wood:

Landing into woods like this still has a fair chance of succeeding, if the trees are small and grow densely. However, this is not very recommendable.

#### 8. Landing in a forest with thick trees:

If there aren't any better places to be reached than a forest with thick trees, it is best to bale out if possible.

The most important thing for a successful forced landing is maintaining airspeed. All decisions must be made with consideration and calmly, yet quickly.

## D. Bailing out of the aircraft.

Bailing out of the aircraft must be considered necessary at least in the following cases:

1. When the aircraft is on fire.
2. When the aircraft has lost its controllability because of damage.
3. When the aircraft has lost its controllability after entering such a state of flight that an accident cannot be avoided.
4. When the engine has stopped and a forced landing site is not available.
5. When the pilot has been wounded in such a way that he loses or is later during the flight at risk of losing his ability to control the aircraft.

The lowest safe bailout altitude must be considered to be **150 m**.

#### **Bail-out procedure:**

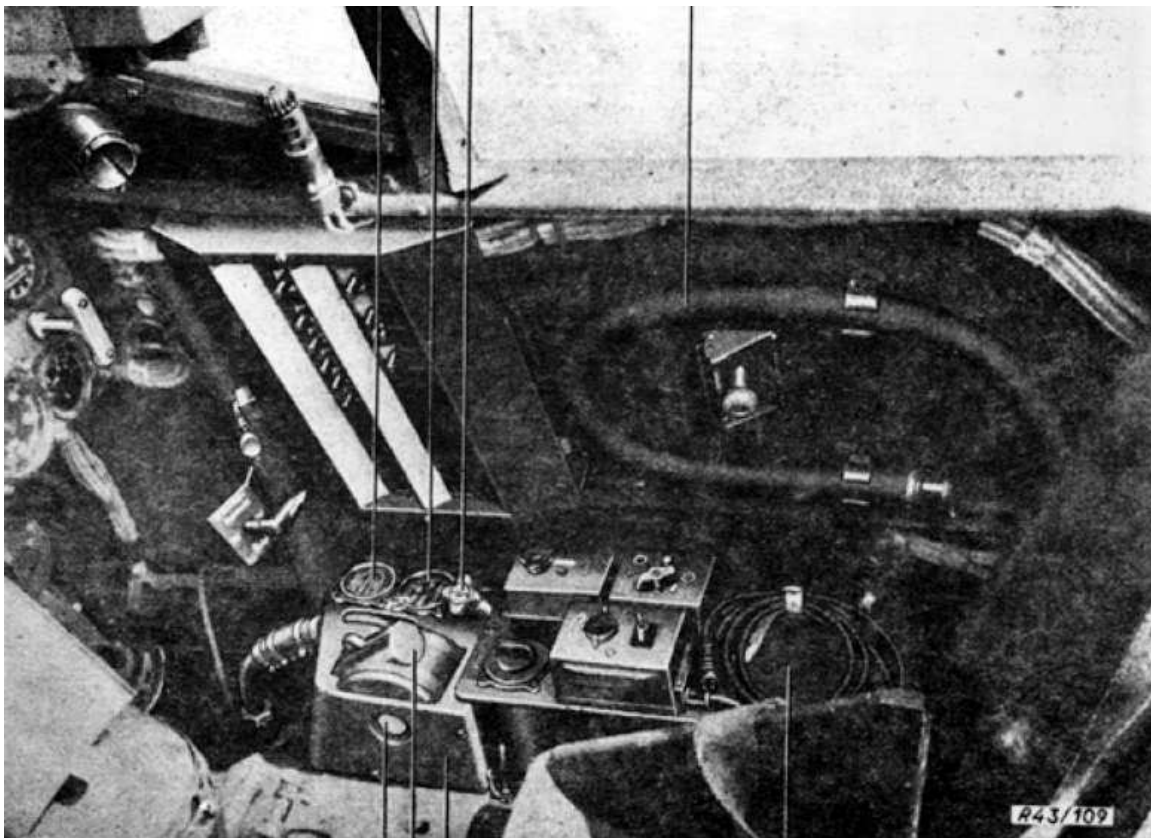
When bailing out, the pilot must open the safety harness, detach the radio cable from its socket, and detach the oxygen mask tube from its connector or the oxygen mask from the headgear. The canopy must be jettisoned either by using the emergency canopy

release located high left forward, or if this doesn't work, by opening the canopy locking lever and helping the canopy open by hand, the airflow will take care of the rest. When the canopy comes off, one must bend down.

If there is time and opportunity, one must try to get the aircraft to climb and lower the airspeed below normal cruising speed before bailing out. Assume a position that poses minimum danger of getting caught in the aircraft by limb or gear and allows making use of leg power in the jump. Jump either down to the side fully exerting the legs, or use the stabiliser to make the aircraft fully nose-heavy, in which case one can jump straight up while pushing the control column strongly forward so that a centrifugal force as strong as possible will help the pilot to get outside the tail surfaces.

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*Right-hand side of cockpit (details differed from aircraft to aircraft):*





## IV. OPERATING INSTRUCTIONS FOR THE RADIO.

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### A. Radio

1. Connect the headgear to the radio socket in aircraft.
2. Switch on heating (in aircraft equipped with it) and leave it on for approx. 11 sec. before switching on the transformer.
3. Ensure that the selector is set to the frequency in use (In Fl.R 3 presently in use Fu-I 41.5 mc/s).
4. Switch on transformer when starting to taxi. When the engine is running under 1600 - 1800 rev./min. one must avoid using the radio, because this puts a heavy strain on the battery.
5. Check quality of transmission. When speaking, press the tangent on the front side of the control column carefully to avoid transmission cutting off.
6. After taxiing to the starting point for take-off, one must always ask the field duty officer for permission to take off.
7. After take-off, one must check quality of transmission.
8. If the other station is weakly audible, one must turn the volume control up. The volume control is at the low right in front.
9. When reception is bad or not receiving at all (receiver is not tuned correctly) even after the volume control has been turned, one must use the fine tuner, which is located at the low right in front. One must ask the ground station for transmission and turn the fine tuner to one direction or the other, whereupon the station will become audible at some point. Then one must stop turning the tuner immediately and return it to center position (will center itself if in working order).  
  
If reception does not improve, the fine tuner motor has turned beyond the audible band. In this case one must turn the tuner the other way for a very short time, because otherwise it will again turn beyond the audible band.
10. Usually, if even a weak reception is achieved, one must use the fine tuner with caution, especially if lacking experience in operating it, because the result of inexperienced use of the fine tuner often is that reception is lost altogether.

11. The Fern-Nahe selector must be used e.g. when flying in tight formation (must be turned to Nahe (close) position). Usually and always at longer-range connections one must use the Fern (far) position.

## **B. AFN2 homing device.**

1. When commencing a homing flight one must ask the ground station to switch on the homing beacon.

2. Turn the frequency selector to the homing frequency, posit. 2 (42 mc/s.). The homing frequency is the next frequency clockwise from the speech frequency.

3. In the homing indicator, the horizontal indicator displays the signal power of the transmitting station, which can be used to deduce whether we are close by or far away. In addition, when arriving close to the transmitting station, a chirring sound can be heard in the headphones.

4. The downwards-pointing needle of the homing indicator shows the direction of the aircraft with regard to the beacon. One must remember that when flying towards the beacon, the correction must be made in the opposite direction from the one shown by the needle.

So, the indicator works in a “showing” manner, i.e. it shows the direction of the error. When flying away, the indicator works in a “Commanding” manner, i.e. it shows the direction in which the correction must be made.

If it is not known whether one is flying towards or away from the beacon, this is easy to find out by pressing e.g. the left pedal. If the indicator needle “follows”, i.e. swings to the left, one is flying towards the beacon, if it swings to the right, one is flying away from the beacon.

5. After completing the homing flight, the selector must be switched to the operating frequency. It must be noted that during homing flight, the aircraft cannot hear transmissions from the ground station.

6. Notify the ground station that the beacon is no longer needed.

7. After landing, when one has taxied away from the runway, that is the take-off and landing area, one must switch off the transformer (radio), at latest when one has taxied to the parking location.

8. One must report to the radio mechanic possible faults detected during flight, and to the officer who gave the flying mission the quality of radio connections.

## V. INSTRUMENT FLIGHT

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1. Before taking off on an instrument flight one must ensure the following things:

- The homing device on the aircraft is working
- A vertical speed indicator is installed
- There is a chronometer on aircraft or pilot
- The aircraft flies straight
- The altimeter is reset to 0 position.

2. After take-off, the aircraft is trimmed by the stabiliser to level flight.

3. The rim of the artificial horizon is turned from “secured” (Fest) position to the left to “open” (Los) position. Check the indication of the artificial horizon and the turn and bank indicator when the aircraft is in level flight.

4. Pitot heat must be turned on before entering a cloud.

5. In most aircraft, two adjustable pointers are attached to the rim of the altimeter. These can be utilized in the following tasks:

- To indicate the prevailing air pressure (altitude) at the landing field
- To indicate the elevation of obstacles (e.g. mountains) along the route
- To indicate the altitude at which one is planning to fly
- When flying in cloud, the pointer can be adjusted to mark the cloud base and when climbing above the cloud, the other pointer to mark the upper limit of cloud.

With the pointers set like this, one can fly in cloud all the time by staying at an altitude between the pointers.

6. Upon completion of instrument flight, the rim of the artificial horizon is turned right to “secured” (fest) position.

7. The pitot heat is turned off.

## VI. OXYGEN SYSTEM.

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1. Before taking off on a high-altitude flight one must ensure that the pressure gauge of the oxygen tank shows 150 atm. If the amount of oxygen is less than this, one must notify the mechanic, who will fill the tank.
2. The oxygen mask is placed on the face and the tube is connected to the oxygen tube of the aircraft.
3. Test the operation of the oxygen system by opening the valve and breathing while checking the movement of the pressure and flow gauges.
4. When climbing above 4000 m, open the valve. If the flow of oxygen isn't normal (breather window is not synchronized with pilot breathing rate), it can be increased by pressing the button in the middle of the "lung", whereupon the tank will release more oxygen (button inop in FSX).
5. If during flight the pressure gauge drops below 20 atm one must immediately descend below 4000 m.
6. Upon completion of high-altitude flight (preferably right after descending below 4000 m) the oxygen system valve is closed tightly and the button in the middle of the "lung" is pressed so that the pressure gauge drops to 0.

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## **VII. WEAPONS**

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### **A. Before take-off:**

1. Check that the aircraft has been trimmed to fly straight.
2. Check the gunsight light. The gunsight is located below the cockpit windshield at eye level of the pilot. The gunsight is always grabbed by the right hand and turned to the left, whereupon the sight is in its operating position. After this, using the battery mains, turn on the current. The switch is located at the top of the switchboard at the right side wall of the cockpit.
3. Inquire from armourer staff whether the guns are loaded.
4. Find out which triggers operate the different weapons. In normal use, the MG 131's are fired by the trigger at the upper end of the control column, and the MG 151 by the push button on top of the control column.
5. Ensure that the weapons main switch is in down position to avoid firing accidents. It is located below the cockpit windshield on the left side of the ammunition counter.
6. Check that the ammunition counters are showing correct numbers of rounds.

### **B. Before firing:**

1. Pull the gunsight to its correct position.
2. Switch on the gunsight light.
3. Lift the weapons system switch to up position and check from the loading indicator whether the guns load, and lift the front trigger away from covering the cannon button into firing position. After this, firing may commence.
4. While firing, follow the operation of the weapons from the lights of the ammunition counters below the cockpit windshield.
  - If they show white, the weapon is loaded and ready to fire.
  - If they show black, the weapon is either out of ammunition or has malfunctioned.

If the malfunction is caused by a faulty cartridge, the fault is corrected automatically by letting go of the trigger, whereupon the loading motor will perform a re-load and the



weapon is once again ready to fire.

## C. After firing:

1. Lift the front trigger to cover the cannon button.
2. Weapons current switch to down position.
3. Switch off gunsight light.
4. The gunsight must be set to resting position by pressing the sight with the right hand and turning to the right and pushing in.

## D. After the mission:

Report to the armourer staff possible unused ammunition, malfunctions of the weapons and other things that may have occurred.



## VIII. FSX

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### **Flight dynamics:**

Flight dynamics of the 109K are extremely accurate. As such, some may find aspects such as the torque swing on takeoff hard to control at first. Please use the “Realism” settings in FSX to tone down the p-factor and torque as necessary.

### **Paint Kit:**

The paint kit is in the aircraft folder. Due to the understandably sensitive nature of the fin markings (swastika), these can be turned on or off as desired as a layer. Where sales laws dictate (e.g. Germany), 109K packages purchased there will have no swastika at all.

### **Paint Schemes:**

Due, again, to the understandably sensitive nature of the fin markings (swastika), where laws require this FSX aircraft must be sold without those markings. Where the markings are permitted, optional fuselage textures can be found in the texture folders that will allow a fully accurate fin to be depicted. Cut and paste the desired texture into the main texture folder.

### **Revi 16B Gunsight**

To centre the reticule to your line of sight, use Ctrl-Shft-Enter and Ctrl-Shft-Backspace to move your viewpoint left and right as necessary.

When first turned on, the reticule may be hard to see if your viewpoint is in the central default position, but it should be possible to see a small part to help confirm the Revi is indeed switched on.

### **Slat Sounds**

In flight, if you fly at certain airspeeds and angles of attack, you will hear the wing slats moving in and out: a muffled bang. This is normal, and as per the real aircraft.

## Main Panel Additional Explanations:



1. Adjustable altitude pointers (tooltips will indicate A and B).
2. Revi 16B. Click to fold/unfold.
3. Lever to raise smoked glass
4. Compass. In the FSX, tuning an ADF antenna will cause the 'bird' to point towards that source.
5. Homing gauge. In FSX, acts as localizer and glide slope when nav radio is tuned to an ILS.
6. Starting in FSX (Ctrl-E will only work if Magnetos are at M1+2):
  - Magnetos to M1+2
  - Raise cover. This will signal your mechanics to start turning the inertial starter handle. Wait until it has spooled to top speed; then immediately:
  - Pull starter handle. Engine will start. If handle doesn't automatically spring back in, a click should do it.
  - Close cover.
7. Fuel dump: Press once to start dumping fuel (watch fuel gauge); press again to stop.

## Gun Firing and Switch Panel:



1. Cannon arming switch. When pressed in, MG151 can be fired.
2. Machine gun arming switch. When flipped over, MG131's can be fired.

**Cannon and machine guns can be fired separately or together. In real life, the button hidden under the stick top cover would fire the cannon, but due to needing to use the brake button (on joystick controllers) as the trigger (in flight), the button is inop here.**

3. Switch panel. Because buttons are hard to see when pressed, the tooltip areas have been expanded to allow button to be turned off even if not visible. Running the cursor over the spot will show the tooltip. Some buttons are inop.

### Far row, top to bottom:

- Battery
- AFN2 Homing
- Nav Lights
- Pitot Heat
- Glove Warmer
- Panel Lights

### Near row, top to bottom:

- Revi 16B gunsight
- FuG16
- FuG25a
- Fuel Pump

4. Drop tank fuel flow indicator. Fuel (green) will stop when tank dropped.
5. Oxygen: turn the tap to start system (pilot will put on oxygen mask; breather will work)



## FSX Radio Panel:

(and pilot visibility clickspot location)



Use Shift-1. This layout was chosen in order to permit normal navigation throughout FSX.

- ADF panel is used to get the compass 'bird' to point towards the source.
- Comm 1 is used for standard radio communications. Nav1 is used to tune the homing gauge.
- Transponder is included as is often asked for in FSX navigation.

## Thank you:

- Bernt Stolle: Complete aerodynamics package; beta testing
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- Chuck Jodry: For giving developers a collimated gunsight.
- Rob White For proofreading the Manual
- Chet Two Wolves Beta Testing

- And everyone else for their input and contributions! -

## Support:

[support@flight-replicas.com](mailto:support@flight-replicas.com)

All requests for support must be accompanied by the following information:

1. Place/website where the Bf-109K was purchased;
2. Order number;
3. Name used when purchasing; and
4. Date of purchase.

No support will be available without this information.

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