DCS GUIDE

FW190-A8 ANTON

By Chuck

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Special thanks to Paul "Goldwolf" Whittingham for creating the guide icons.

The **Focke-Wulf Fw190** *Würger* (English: Shrike) is a German single-seat, single-engine fighter aircraft designed by Kurt Tank in the late 1930s and widely used during World War II. Along with its well-known counterpart, the Messerschmitt Bf 109, the Fw190 became the backbone of the Luftwaffe's Jagdwaffe (Fighter Force). The twin-row BMW 801 radial engine that powered most operational versions enabled the Fw190 to lift larger loads than the Bf 109, allowing its use as a day fighter, fighter-bomber, ground-attack aircraft and, to a lesser degree, night fighter.

The Fw190A series' performance decreased at high altitudes (usually 6,000 m (20,000 ft) and above), which reduced its effectiveness as a high-altitude interceptor. From the Fw190's inception, there had been ongoing efforts to address this with a turbosupercharged BMW 801 in the B model, the much longer-nosed C model with efforts to also turbocharge its chosen Daimler-Benz DB 603 inverted V12 powerplant, and the similarly long-nosed D model with the Junkers Jumo 213. Problems with the turbocharger installations on the -B and -C subtypes meant only the D model would see service, entering service in September 1944. While these "long nose" versions gave them parity with Allied opponents, it arrived far too late in the war to have any real effect. The D-9 series was rarely used against heavy-bomber raids, as the circumstances of the war in late 1944 meant that fighter-versus-fighter combat and ground attack missions took priority. This model was the basis for the follow-on Focke-Wulf Ta 152 aircraft. The Fw190 was well-liked by its pilots. Some of the Luftwaffe's most successful fighter aces claimed a great many of their kills while flying it, including Otto Kittel, Walter Nowotny and Erich Rudorffer.

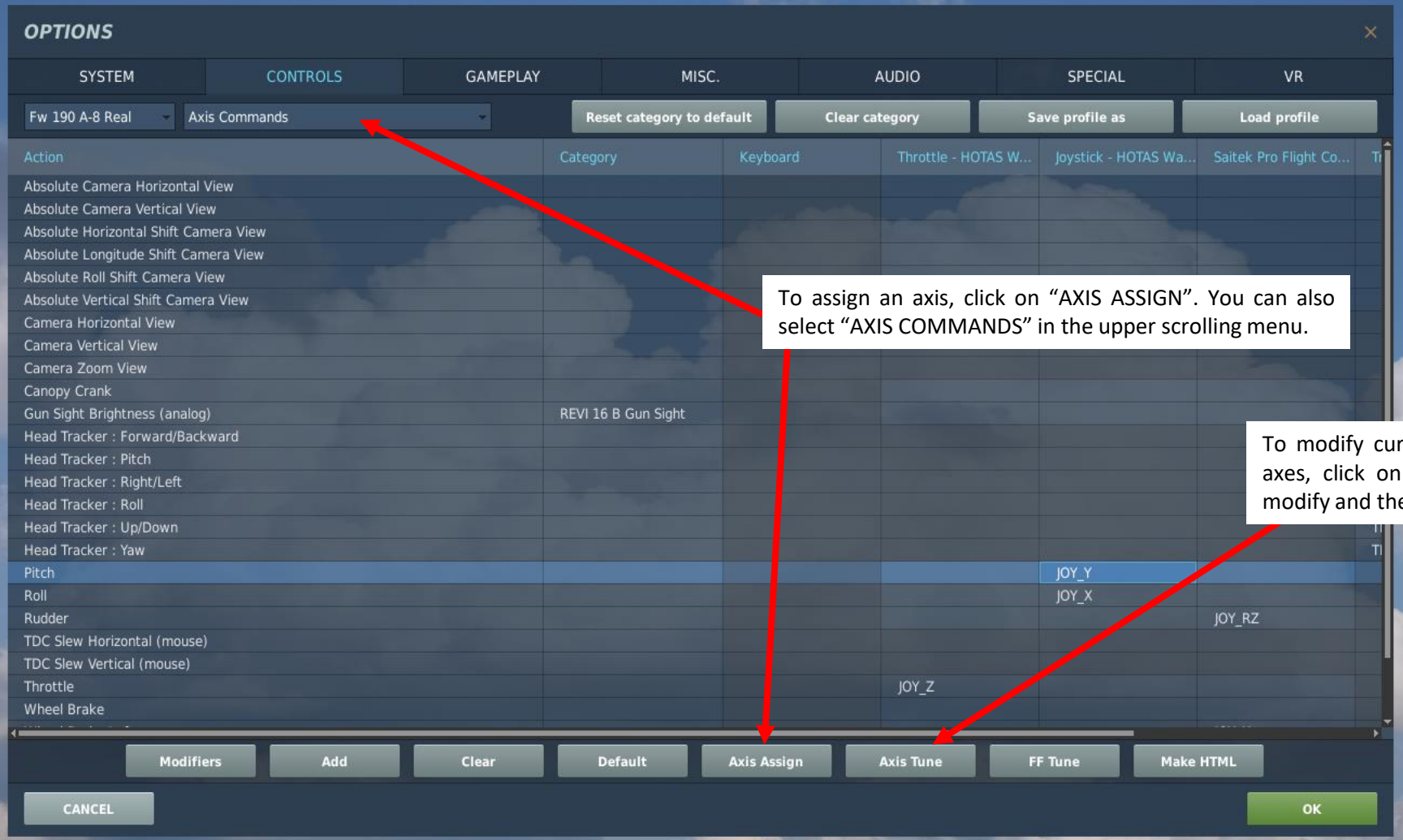
Kurt Tank
(1898-1983)

Kurt Tank wanted something more than an aircraft only built for speed. He outlined his design philosophy as: "*The Messerschmitt 109 [sic] and the British Spitfire, the two fastest fighters in world at the time we began work on the Fw 190, could both be summed up as a very large engine on the front of the smallest possible airframe; in each case armament had been added almost as an afterthought. These designs, both of which admittedly proved successful, could be likened to racehorses: given the right amount of pampering and easy course, they could outrun anything. But the moment the going became tough they were liable to falter. During World War I, I served in the cavalry and in the infantry. I had seen the harsh conditions under which military equipment had to work in wartime. I felt sure that a quite different breed of fighter would also have a place in any future conflict: one that could operate from ill-prepared front-line airfields; one that could be flown and maintained by men who had received only short training; and one that could absorb a reasonable amount of battle damage and still get back. This was the background thinking behind the Focke-Wulf 190; it was not to be a racehorse but a Dienstpferd, a cavalry horse.*"

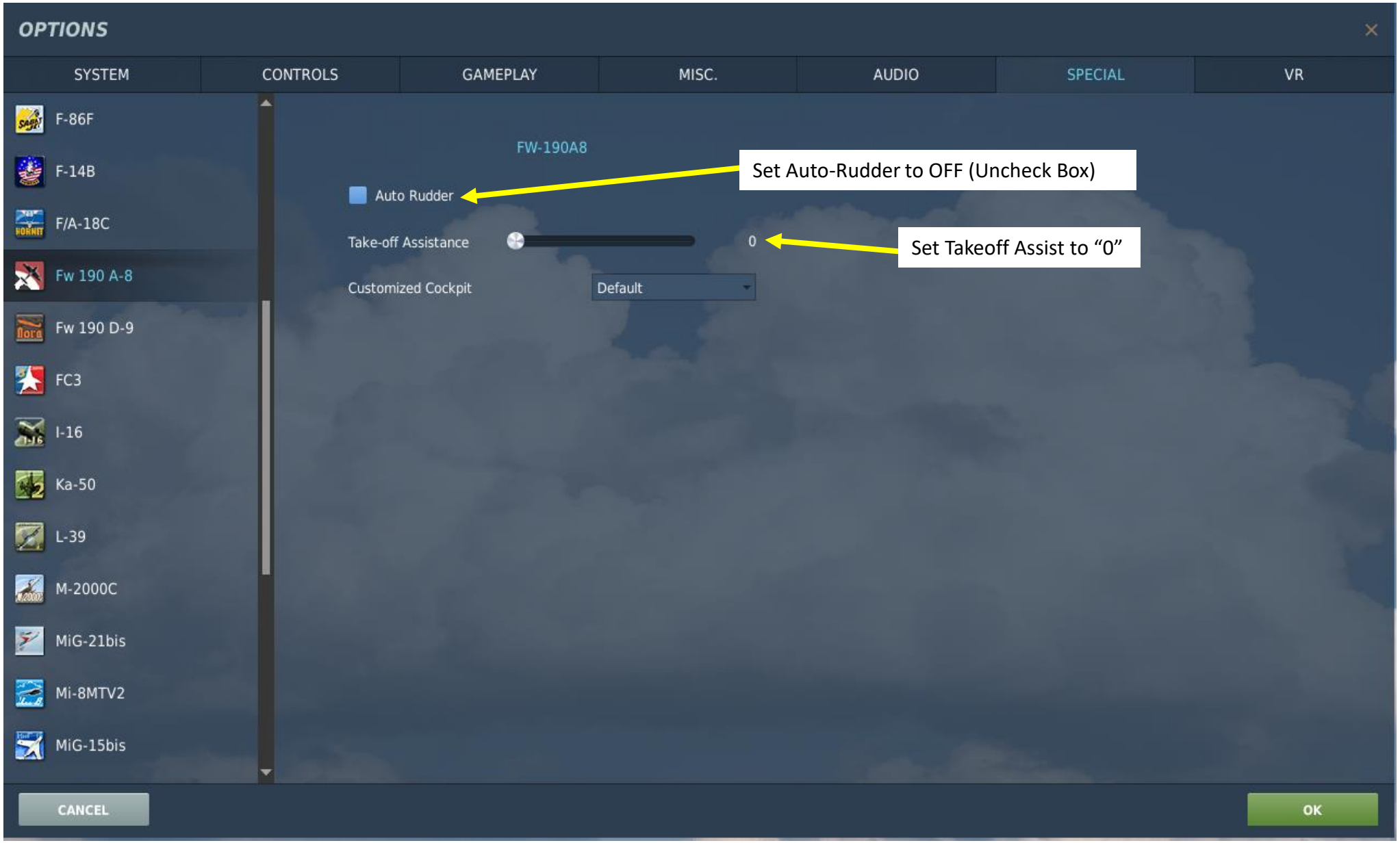
In DCS, I realized after a couple of sorties in the FW190 that Kurt was indeed quite right: the ergonomic cockpit layout is a refreshing change from the cluttered interior of the 109 and you can clearly see that the Anton was built as a functional, high-powered war machine. You inevitably feel like you are sitting in a flying tank. And this feeling is pretty awesome.

CONTROL	FUNCTION
COMM – Push to Talk	Allows you to use radio menu while flying
Engine RPM Decrease/Increase (PageDown/PageUp)	Provides manual propeller pitch control (Drehzahl Switch) if Manual Mode is selected
Toggle Flaps Down	Deploys your flaps
Toggle Flaps Up	Retracts your flaps
Fire Machineguns - A Button (Space)	Fires both your 13 mm MG 131 Machineguns and your 20 mm MG 151/20E Inner Wing Cannons
Fire Cannons - B1 Button (RAlt+Space)	Fires your 20 mm MG 151/20E Outer Wing Cannons
Bomb/Rocket Release - B2 Button (RShift+Space)	Drops Bombs / Fires Rocket
Trigger Safety (LShift+Space)	Flips B2 Button Safety Cover
Landing Gear Up/Down	Raises or Deploys your landing gear
Radiator Flaps Open	These radiator controls are useful in situations where you will need to cool your engine quickly.
Radiator Flaps Close	
Starter Power (Home)	Starter Switch. Map it to something you can hold or toggle.
Trim Elevator Down/Up	Elevator (Horizontal Stabilizer) Trim Control
Zoom In Slow	Allows you to Zoom In
Zoom Out Slow	Allows you to Zoom Out

PART 2 – CONTROLS SETUP



In the “Special” menu in Options, select the FW190 A-8 menu. Make sure to have Takeoff Assist set to “0” (turned off). By default it is set to 100 (ON). This will cause you to crash and burn inexplicably during takeoff. Also uncheck the Auto-Rudder box.

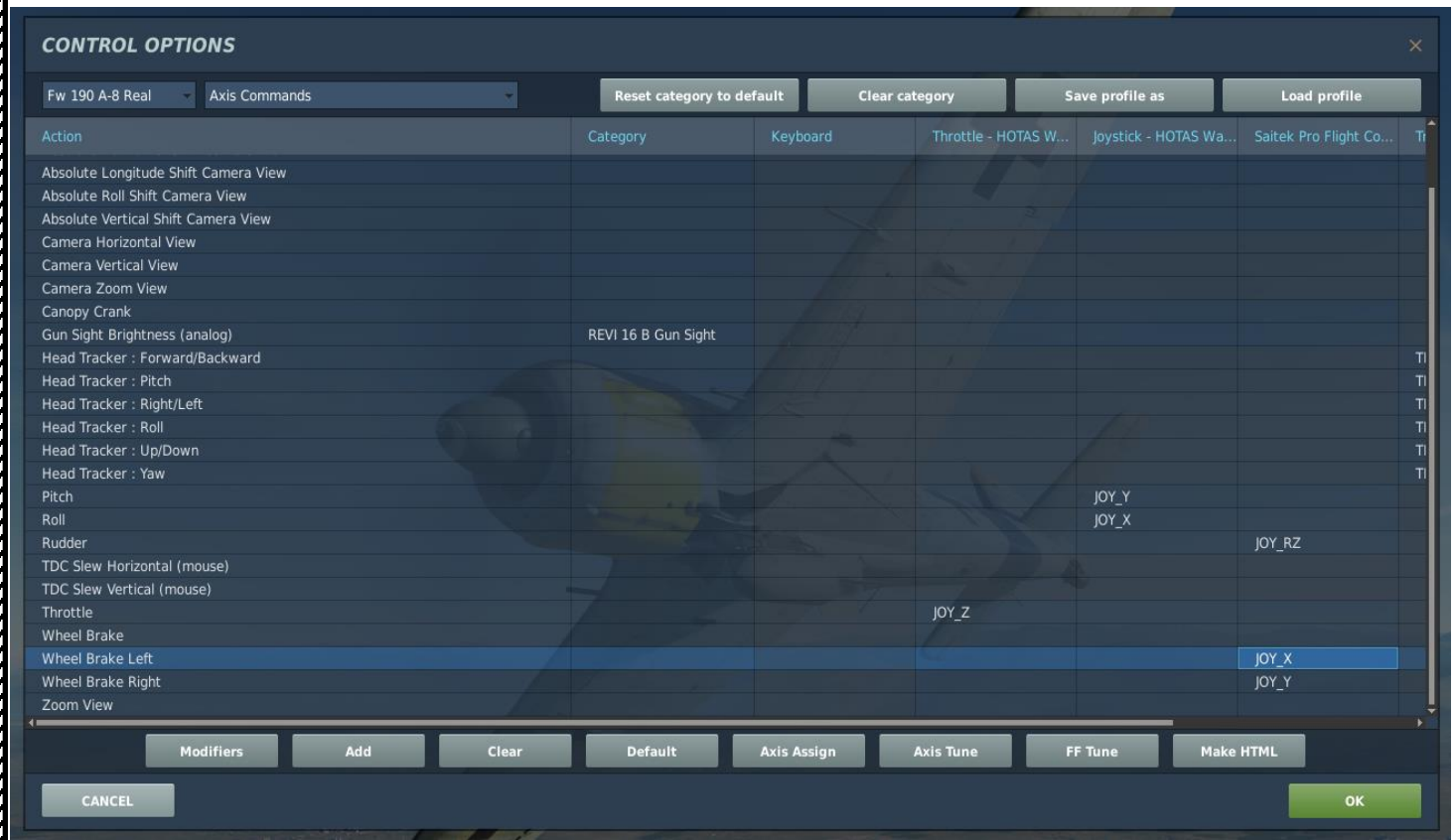


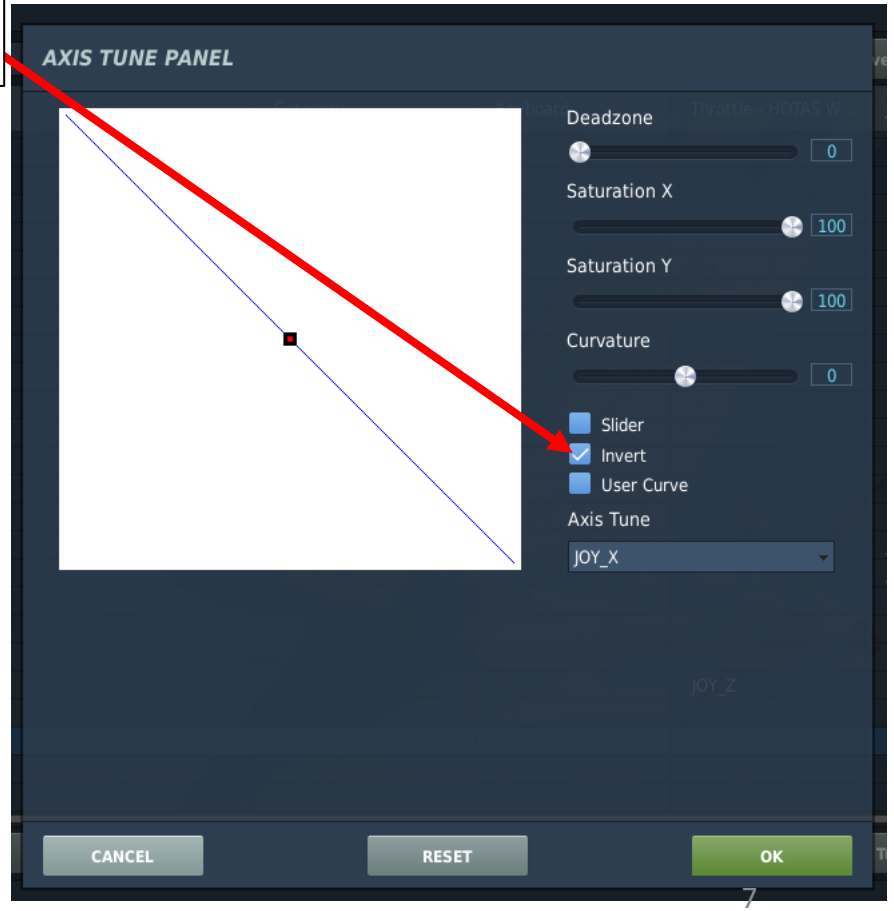
PART 2 – CONTROLS SETUP

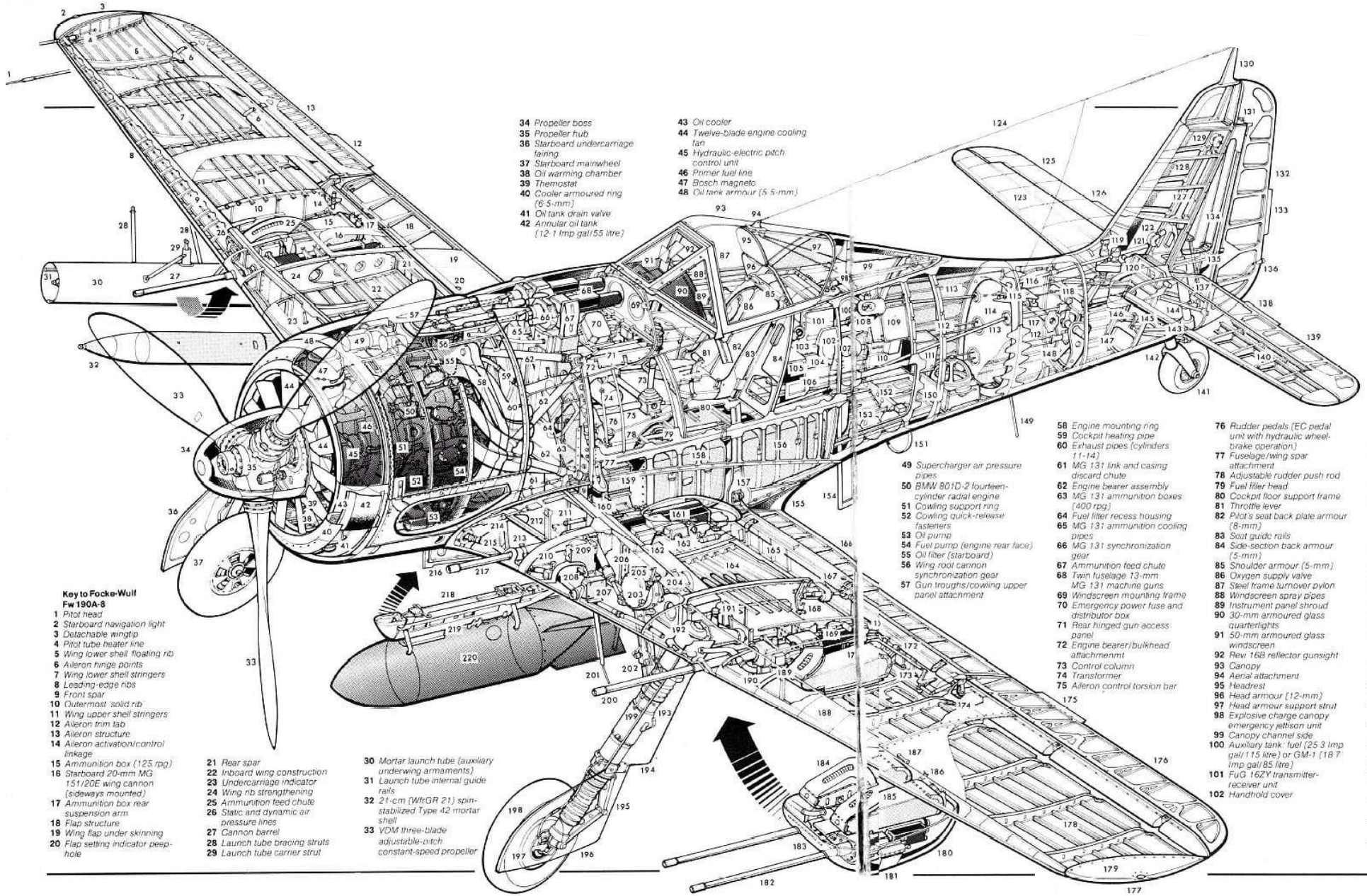
Bind the following axes:

- PITCH, ROLL, RUDDER (DEADZONE AT 0, SATURATION X AT 100, SATURATION Y AT 100, CURVATURE AT 0)
- THROTTLE – CONTROLS ATA/ MANIFOLD PRESSURE / BOOST
- WHEEL BRAKE LEFT
- WHEEL BRAKE RIGHT

When setting wheel brake axis, the axis is not set to “Invert” by default. You need to click on “Invert” in the “Axis Tune” menu” for each wheel brake.



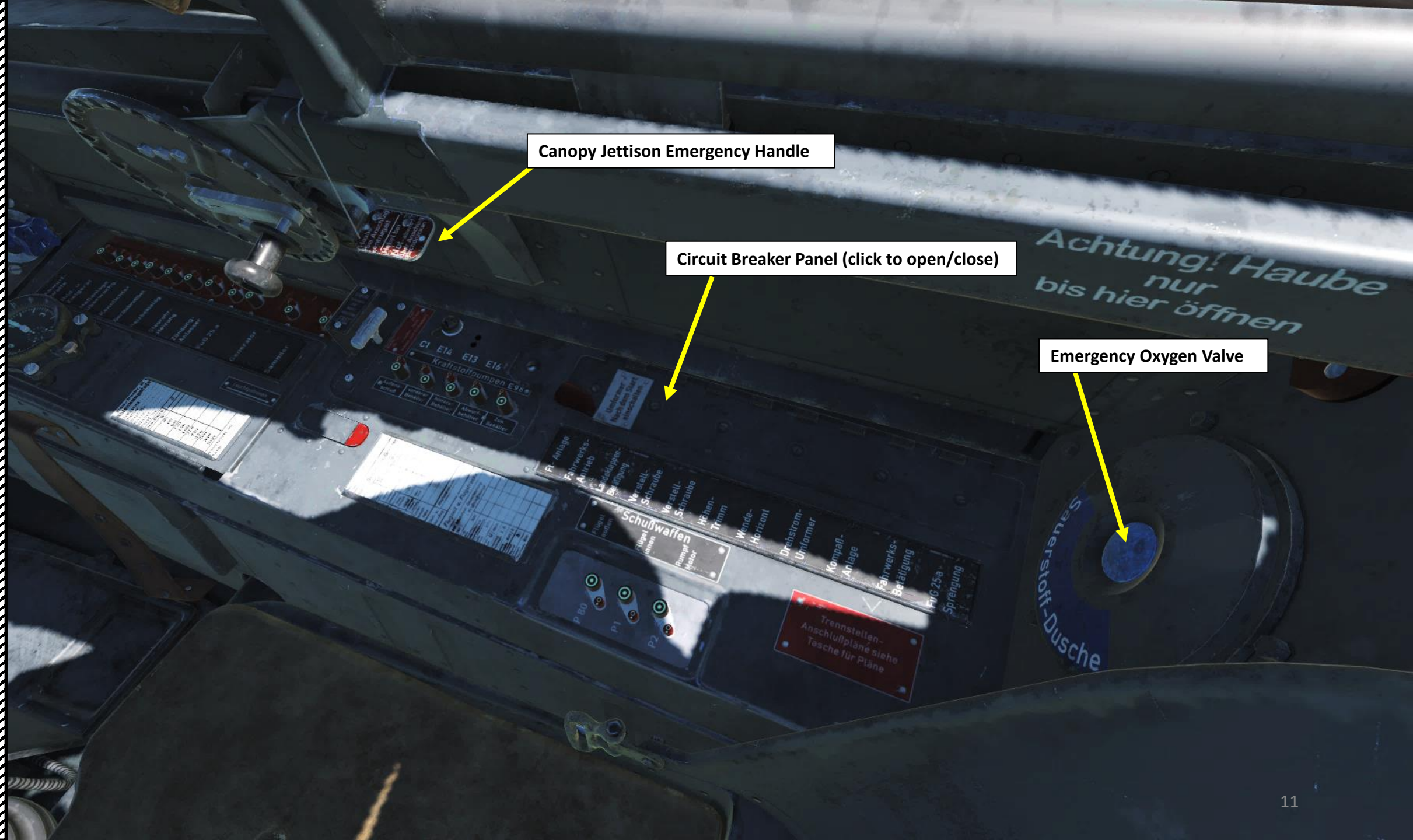


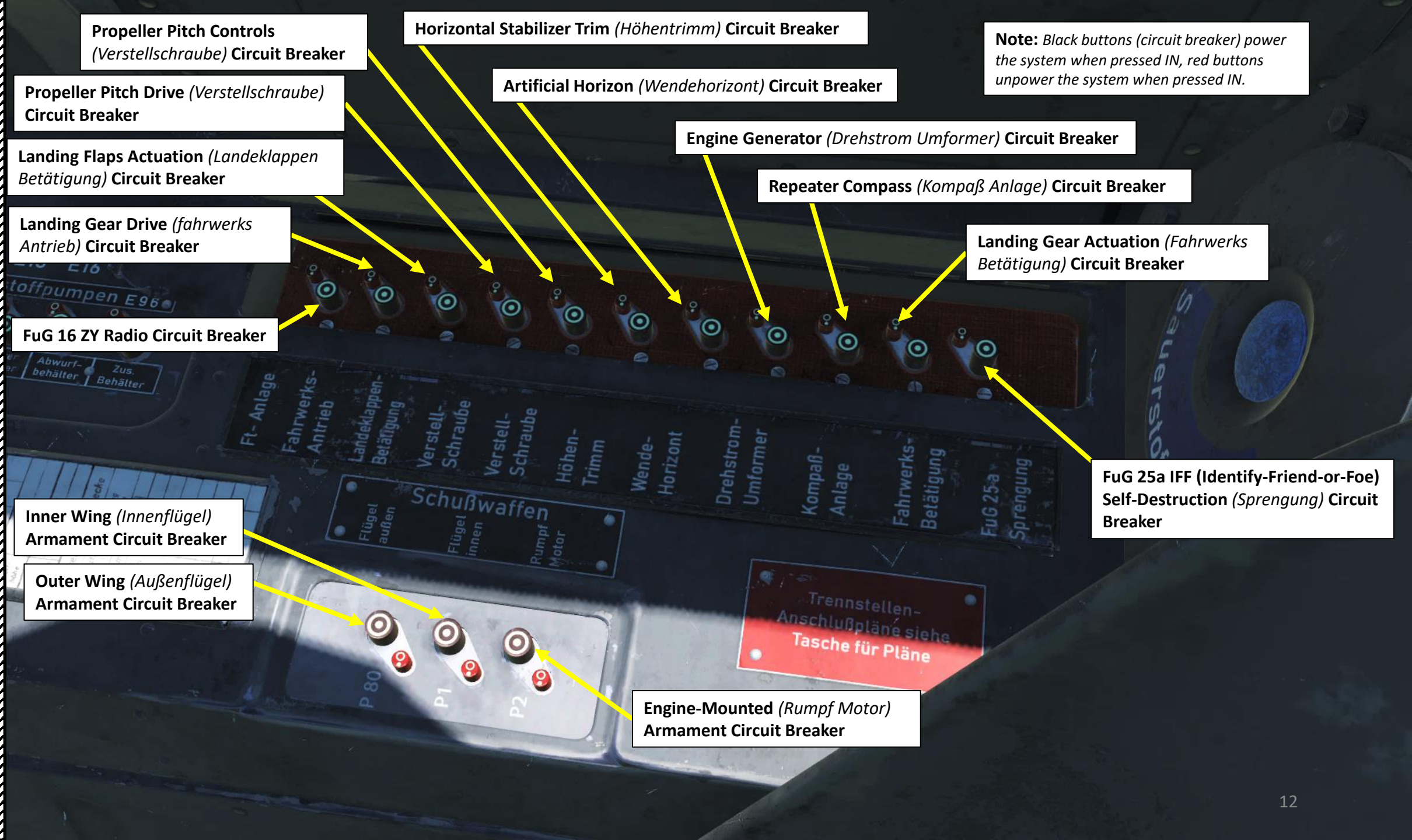


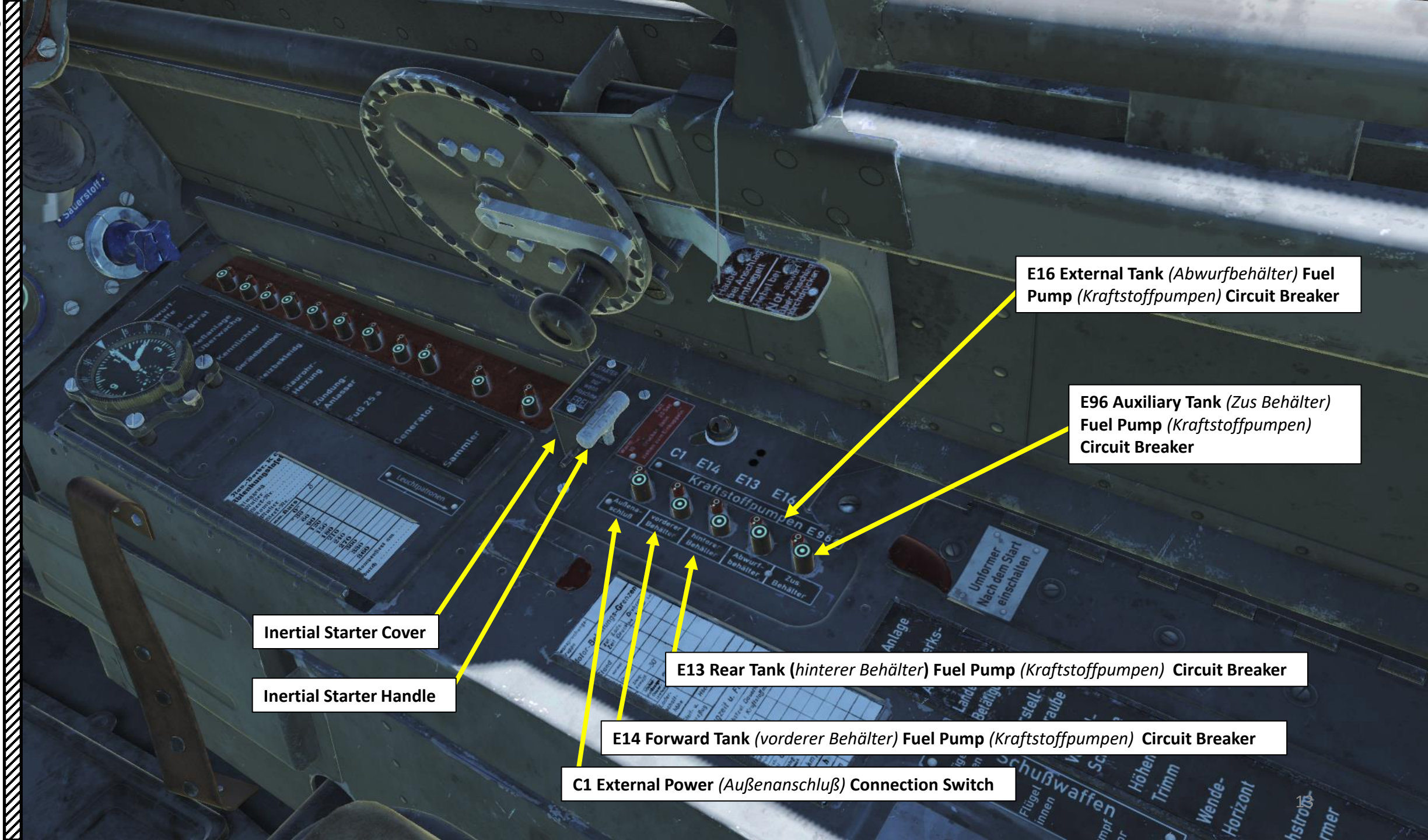
Key to Focke-Wulf Fw 190A-8

1 Pitot head
2 Starboard navigation light
3 Detachable wingtip
4 Pitot tube heater line
5 Wing lower shell floating rib
6 Aileron hinge points
7 Wing lower shell stringers
8 Leading-edge ribs
9 Front spar
10 Outermost solid rib
11 Wing upper shell stringers
12 Aileron trim tab
13 Aileron structure
14 Aileron activation/control linkage
15 Ammunition box (125 rpg)
18 Starboard 20-mm MG 151/20E wing cannon (sideways mounted)
17 Ammunition box rear suspension arm
18 Flap structure
19 Wing flap under skinning
20 Flap setting indicator peep-hole
21 Rear spar
22 Inboard wing construction
23 Undercarriage indicator
24 Wing rib strengthening
25 Ammunition feed chute
26 Static and dynamic air pressure lines
27 Cannon barrel
28 Launch tube bracing struts
29 Launch tube carrier strut
30 Mortar launch tube (auxiliary underwing armaments)
31 Launch tube internal guide rails
32 21-cm (WfrGR 21) spin-stabilized Type 42 mortar shell
33 VDM three-blade adjustable-pitch constant-speed propeller
34 Propeller boss
35 Propeller hub
36 Starboard undercarriage fairing
37 Starboard mainwheel
38 Oil warming chamber
39 Themostat
40 Cooler armoured ring (6·5-mm)
41 Oil tank drain valve
42 Annular oil tank (12·1 Imp gal/55 litre)
43 Oil cooler
44 Twelve-blade engine cooling fan
45 Hydraulic-electric pitch control unit
46 Primer fuel line
47 Bosch magneto
48 Oil tank armour (5·5-mm)
49 Supercharger air pressure pipes
50 BMW 801D-2 fourteen-cylinder radial engine
51 Cowling support ring
52 Cowling quick-release fasteners
53 Oil pump
54 Fuel pump (engine rear face)
55 Oil filter (starboard)
56 Wing root cannon synchronization gear
57 Gun troughs/cowling upper panel attachment
58 Engine mounting ring
59 Cockpit heating pipe
60 Exhaust pipes (cylinders 11-14)
61 MG 131 link and casing discard chute
62 Engine bearer assembly
63 MG 131 ammunition boxes (400 rpg)
64 Fuel filter recess housing
65 MG 131 ammunition cooling pipes
66 MG 131 synchronization gear
67 Ammunition feed chute
68 Twin fuselage 13-mm MG 131 machine guns
69 Windscreen mounting frame
70 Emergency power fuse and distributor box
71 Rear hinged gun access panel
72 Engine bearer/bulkhead attachmenmt
73 Control column
74 Transformer
75 Aileron control torsion bar
76 Rudder pedals (EC pedal unit with hydraulic wheel-brake operation)
77 Fuselage/wing spar attachment
78 Adjustable rudder push rod
79 Fuel filler head
80 Cockpit floor support frame
81 Throttle lever
82 Pilot's seat back plate armour (8-mm)
83 Seat guide rails
84 Side-section back armour (5-mm)
85 Shoulder armour (5-mm)
86 Oxygen supply valve
87 Steel frame turnover pylon
88 Windscreen spray pipes
89 Instrument panel shroud
90 30-mm armoured glass quarterlights
91 50-mm armoured glass windscreen
92 Revi 16B reflector gunsight
93 Canopy
94 Aerial attachment
95 Headrest
96 Head armour (12-mm)
97 Head armour support strut
98 Explosive charge canopy emergency jettison unit
99 Canopy channel side
100 Auxiliary tank: fuel (25·3 Imp gal/115 litre) or GM-1 (18·7 Imp gal/85 litre)
101 FuG 16ZY transmitter-receiver unit
102 Handhold cover
103 Primer fuel filler cap
104 Autopilot steering unit (PKS 12)
105 FuG 16ZY power transformer
106 Entry step cover plate
107 Two tri-spherical oxygen bottles (starboard fuselage wall)
108 Auxiliary fuel tank filler point
109 FuG 25a transponder unit
110 Autopilot position integration unit
111 FuG 16ZY homer bearing converter
112 Elevator control cables
113 Rudder control DUZ-flexible rods
114 Fabric panel (Bulkhead 12)
115 Rudder differential unit
116 Aerial lead-in
117 Rear fuselage lift tube
118 Triangular stress frame
119 Tailplane trim unit
120 Tailplane attachment fitting
121 Tailwheel retraction guide tube
122 Retraction cable lower pulley
123 Starboard tailplane
124 Aerial
125 Starboard elevator
126 Elevator trim tab
127 Tailwheel shock strut guide
128 Fin construction
129 Retraction cable under pulley
130 Aerial attachment stub
131 Rudder upper hinge
132 Rudder structure
133 Rudder trim tab
134 Tailwheel retraction mechanism access panel
135 Rudder attachment/actuation fittings
136 Rear navigation light
137 Extension spring
138 Elevator trim tab
139 Port elevator structure
140 Tailplane construction
141 Semi-retracting tailwheel
142 Forked wheel housing
143 Drag yoke
144 Tailwheel shock strut
145 Tailwheel locking linkage
146 Elevator actuation lever linkage
147 Angled frame spar
148 elevator differential bellcrank
149 FuG 25a ventral antenna
150 Master compass sensing unit
151 FuG 16ZY fixed loop homing antenna
152 Radio compartment access hatch
153 Single tri-spherical oxygen bottle (port fuselage wall)
154 Retractable entry step
155 Wing root fairing
156 Fuselage rear fuel tank (64·5 Imp gal/293 litre)
157 Fuselage/rear spar attachment
158 Fuselage forward fuel tank (51 Imp gal/232 litre)
159 Port wing root cannon ammunition box (250 rpg)
160 Ammunition feed chute
161 Port wing root MG 151/20E cannon
162 Link and casing discard chute
163 Cannon rear mount support bracket
164 Upper and lower wing shell stringers
165 Rear spar
166 Spar construction
167 Flap position indicator scale and peep-hole
168 Flap actuating electric motor
169 Port 20-mm MG 151/20E wing cannon (sideways mounted)
170 Aileron transverse linkage
171 Ammunition box (125 rpg)
172 Ammunition box rear suspension arm
173 Aileron control linkage
174 Aileron control unit
175 Aileron trim tab
176 Port aileron structure
177 Port navigation light
178 Outboard wing stringers
179 Detachable wingtip
180 A-8/R1 variant underwing gun pack (in place of outboard wing cannon)
181 Link and casing discard chute
182 Twin unsynchronized 20-mm MG 151/20E cannon
183 Light metal fairing (gondola)
184 Ammunition feed chutes
185 Ammunition boxes (125 rpg)
186 Carrier frame restraining cord
187 Ammunition box rear suspension arms
188 Leading-edge skining
189 Ammunition feed chute
190 Ammunition warming pipe
191 Aileron bellcrank
192 Mainwheel strut mounting assembly
193 EC-oleo shock strut
194 Mainwheel leg fairing
195 Scissors unit
196 Mainwheel fairing
197 Axle housing
198 Port mainwheel
199 Brake lines
200 Cannon barrel
201 FuG 16ZY Morane antenna
202 Radius rods
203 Rotating drive unit
204 Mainwheel retraction electric motor housing
205 Undercarriage indicator
206 Sealed air-jack
207 BSK 16 gun camera
208 Retraction locking hooks
209 Undercarriage locking unit
210 Armament collimation tube
211 Camera wiring conduits
212 Wheel well
213 Cannon barrel blast tube
214 Wheel cover actuation strut
215 Ammunition hot air
216 Port inboard wheel cover
217 Wing root cannon barrel
218 ETC 501 carrier unit
219 ETC 501 bomb-rack
220 SC 500 bomb load

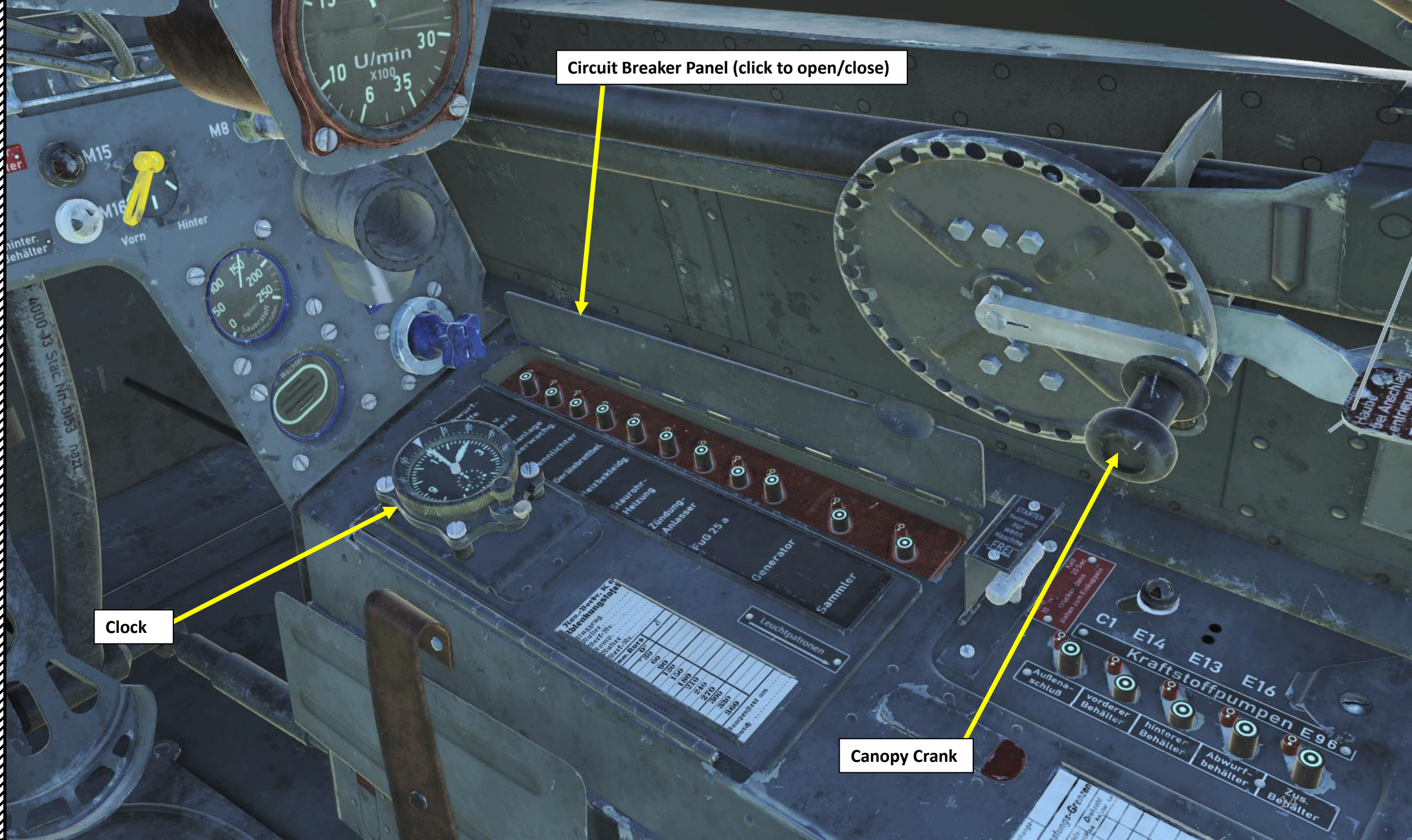
Tip: Pilot body can be toggled ON/OFF with “RSHIFT+P”


Canopy Jettison Emergency Handle
Circuit Breaker Panel (click to open/close)
Emergency Oxygen Valve
Achtung! Haube nur bis hier öffnen
Sauerstoff-Dusche
Schußwaffen
Trennstellen-Anschlußpläne siehe Tasche für Pläne


Propeller Pitch Controls (Verstellschraube) Circuit Breaker
Horizontal Stabilizer Trim (Höhentrimm) Circuit Breaker
Propeller Pitch Drive (Verstellschraube) Circuit Breaker
Artificial Horizon (Wendehorizont) Circuit Breaker
Landing Flaps Actuation (Landeklappen Betätigung) Circuit Breaker
Engine Generator (Drehstrom Umformer) Circuit Breaker
Repeater Compass (Kompaß Anlage) Circuit Breaker
Landing Gear Drive (fahrwerks Antrieb) Circuit Breaker
Landing Gear Actuation (Fahrwerks Betätigung) Circuit Breaker
FuG 16 ZY Radio Circuit Breaker
FuG 25a IFF (Identify-Friend-or-Foe) Self-Destruction (Sprengung) Circuit Breaker
Inner Wing (Innenflügel) Armament Circuit Breaker
Outer Wing (Außenflügel) Armament Circuit Breaker
Engine-Mounted (Rumpf Motor) Armament Circuit Breaker
Note: Black buttons (circuit breaker) power the system when pressed IN, red buttons unpower the system when pressed IN.
Ft- Anlage
Fahrwerks- Antrieb
Landeklappen- Betätigung
Verstell- Schraube
Verstell- Schraube
Höhen- Trimm
Wende- Horizont
Drehstrom- Umformer
Kompaß- Anlage
Fahrwerks- Betätigung
FuG 25a Sprengung
Schußwaffen
Flügel außen
Flügel innen
Rumpf Motor
Trennstellen- Anschlußpläne siehe Tasche für Pläne
P 80
P1
P2


Inertial Starter Cover
Inertial Starter Handle
C1 External Power (Außenanschluß) Connection Switch
E14 Forward Tank (vorderer Behälter) Fuel Pump (Kraftstoffpumpen) Circuit Breaker
E13 Rear Tank (hinterer Behälter) Fuel Pump (Kraftstoffpumpen) Circuit Breaker
E96 Auxiliary Tank (Zus Behälter) Fuel Pump (Kraftstoffpumpen) Circuit Breaker
E16 External Tank (Abwurfbehälter) Fuel Pump (Kraftstoffpumpen) Circuit Breaker

PART 3 – COCKPIT & GAUGES



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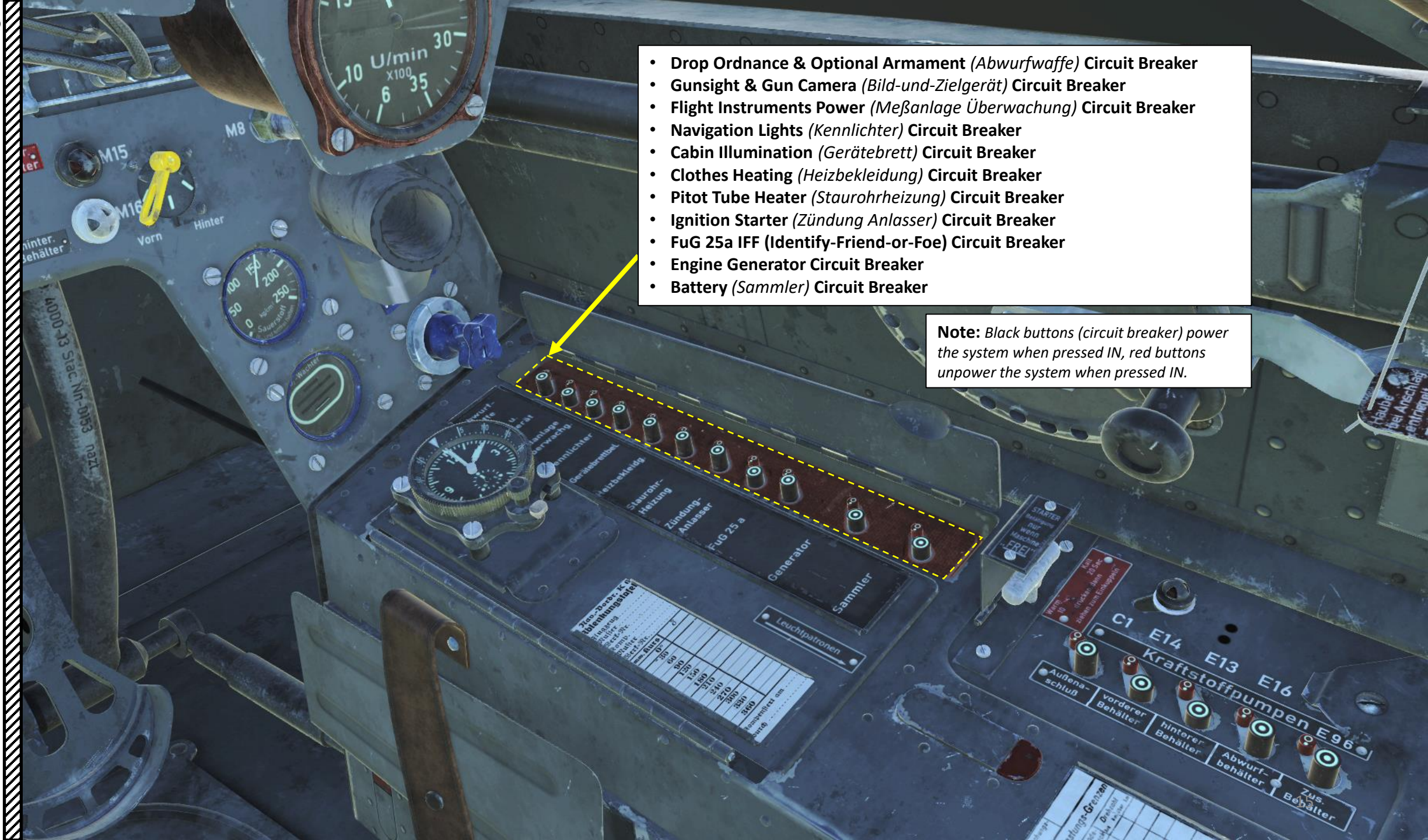
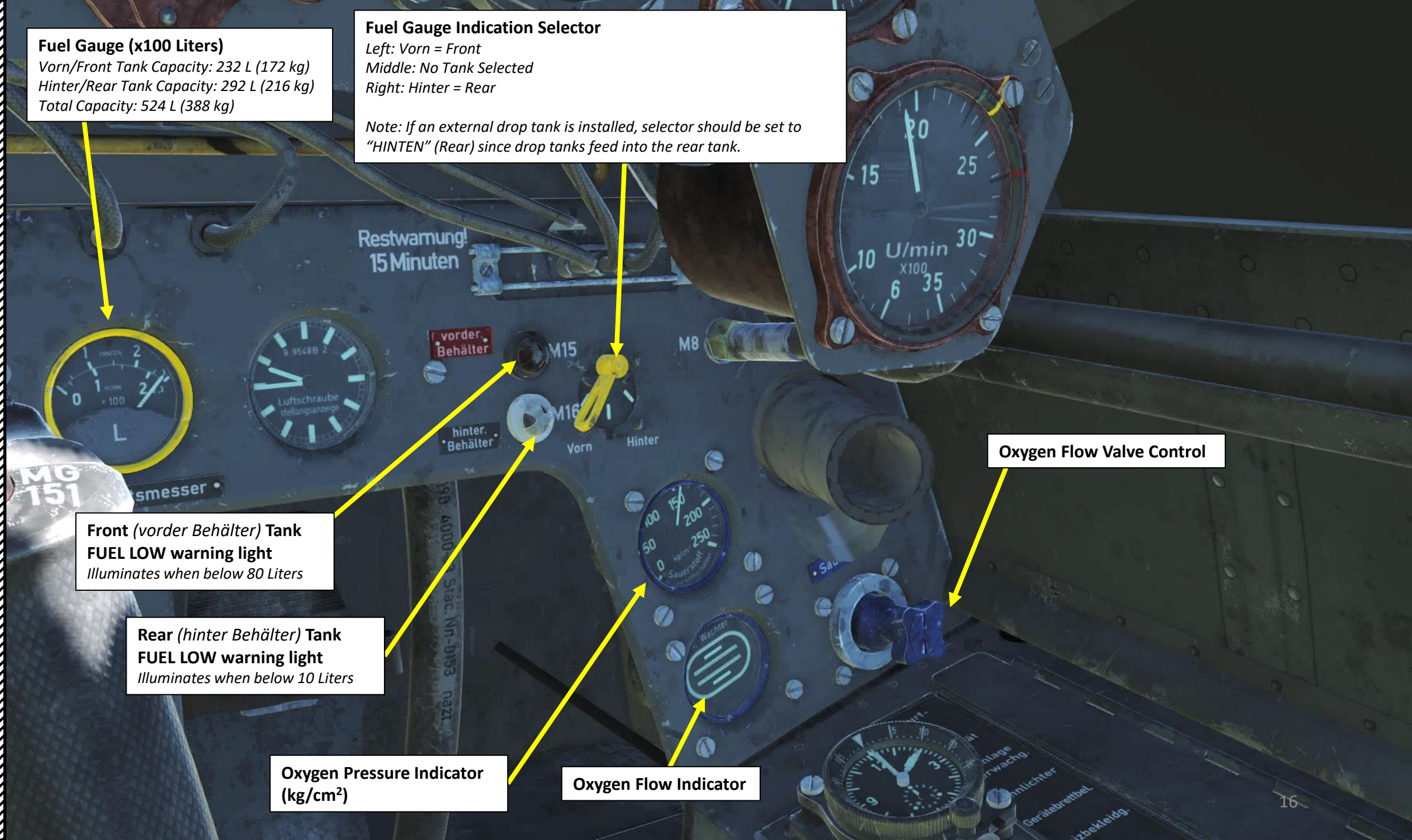




Fuel Gauge (x100 Liters)
Vorn/Front Tank Capacity: 232 L (172 kg)
Hinter/Rear Tank Capacity: 292 L (216 kg)
Total Capacity: 524 L (388 kg)

Fuel Gauge Indication Selector
Left: Vorn = Front
Middle: No Tank Selected
Right: Hinter = Rear

Note: If an external drop tank is installed, selector should be set to "HINTEN" (Rear) since drop tanks feed into the rear tank.

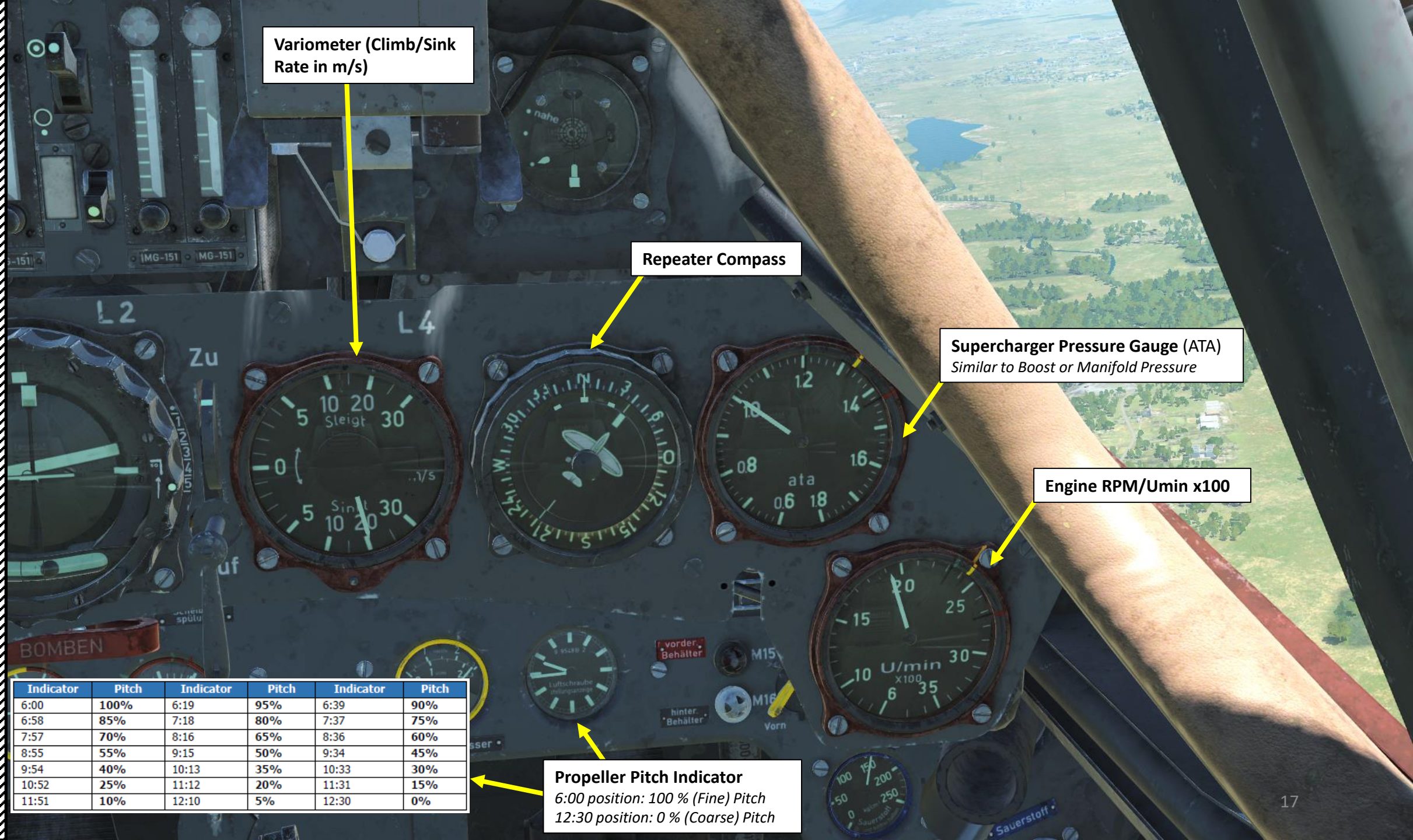
Front *(vorder Behälter)* **Tank FUEL LOW warning light**
Illuminates when below 80 Liters

Rear *(hinter Behälter)* **Tank FUEL LOW warning light**
Illuminates when below 10 Liters

Oxygen Pressure Indicator (kg/cm²)

Oxygen Flow Indicator

Oxygen Flow Valve Control

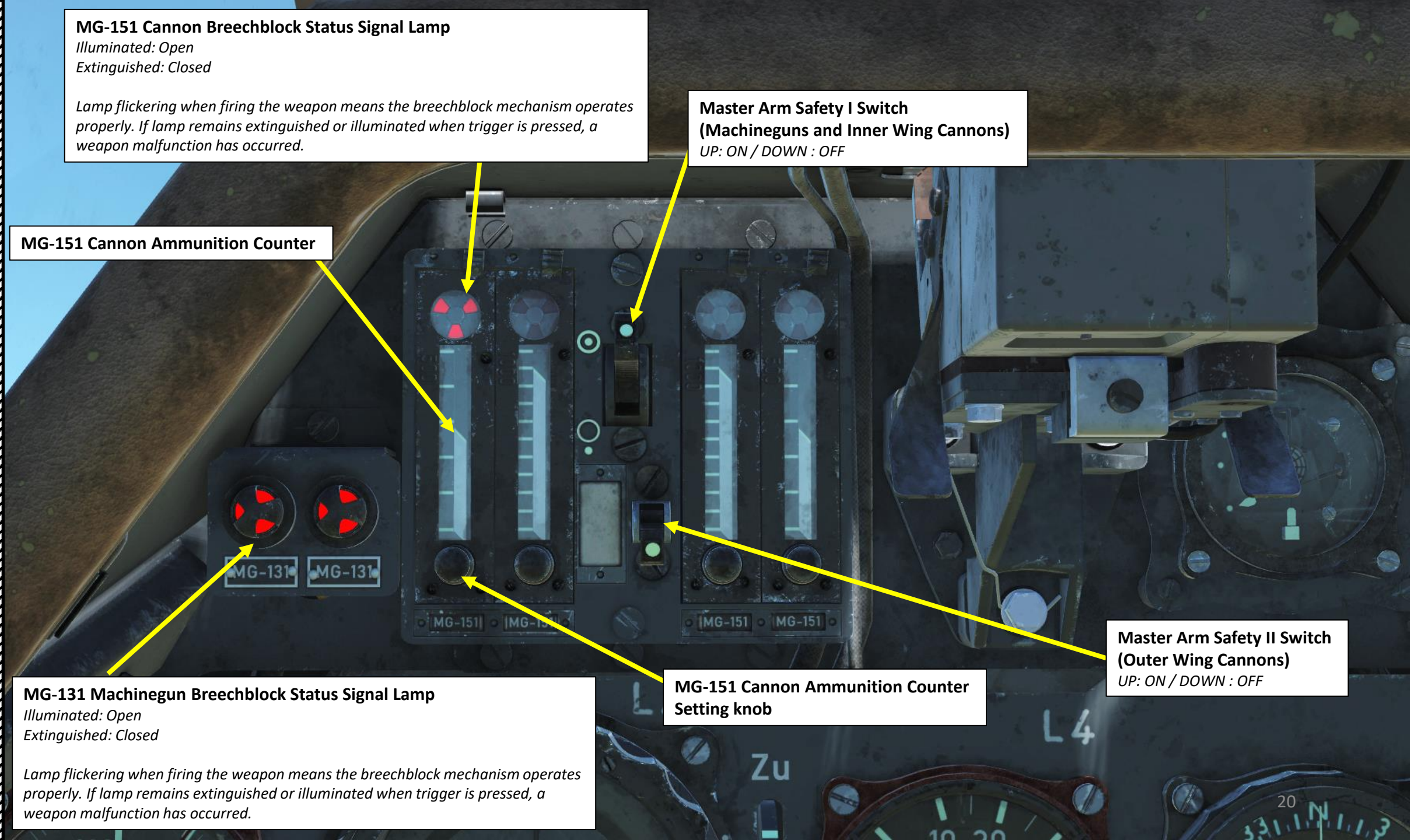


Indicator	Pitch	Indicator	Pitch	Indicator	Pitch
6:00	100%	6:19	95%	6:39	90%
6:58	85%	7:18	80%	7:37	75%
7:57	70%	8:16	65%	8:36	60%
8:55	55%	9:15	50%	9:34	45%
9:54	40%	10:13	35%	10:33	30%
10:52	25%	11:12	20%	11:31	15%
11:51	10%	12:10	5%	12:30	0%

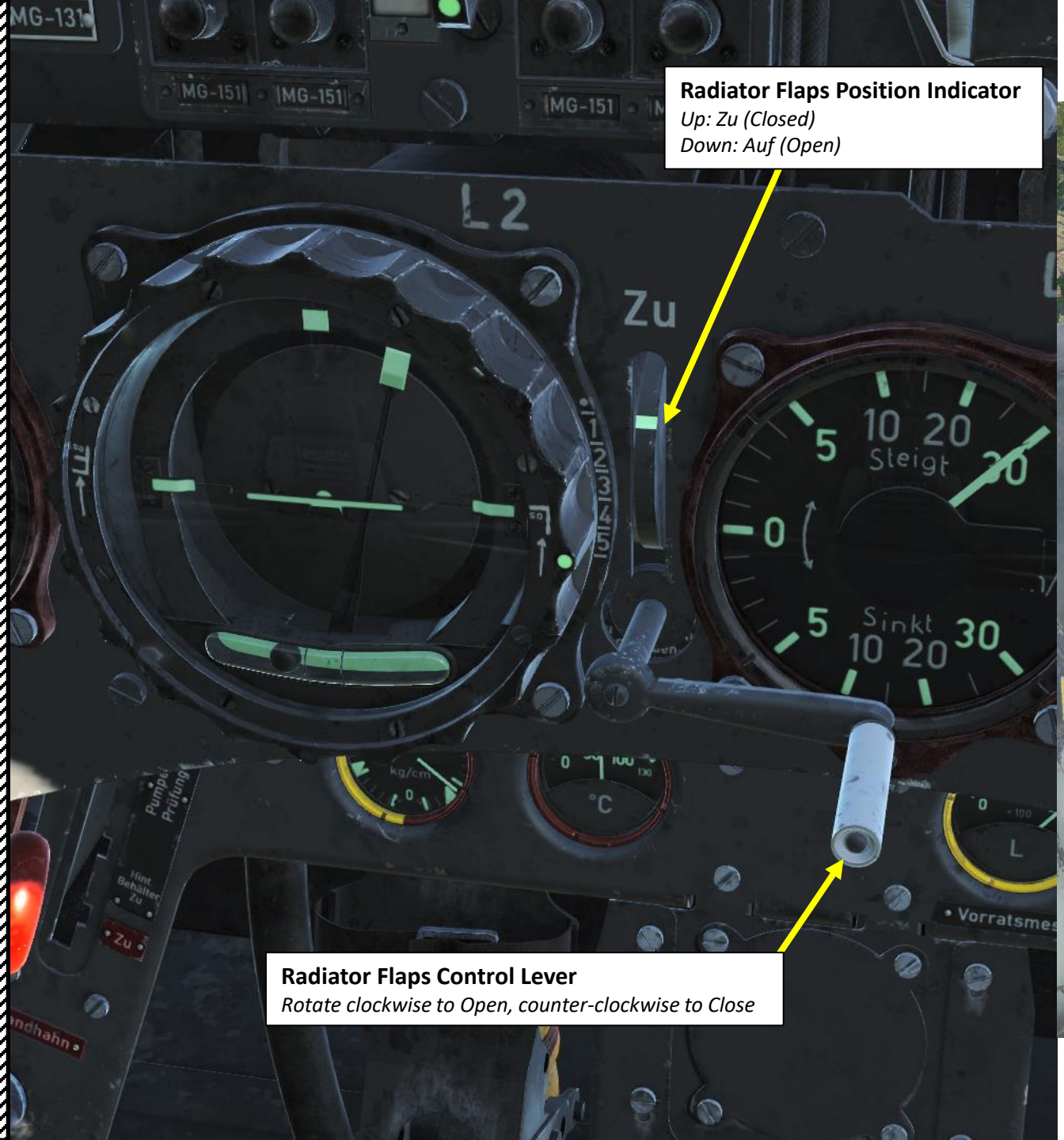
AFN-2 Homing Indicator

Artificial Horizon and
Turn & Bank Indicator

PART 3 – COCKPIT & GAUGES


MG-151 Cannon Breechblock Status Signal Lamp
Illuminated: Open
Extinguished: Closed
Lamp flickering when firing the weapon means the breechblock mechanism operates properly. If lamp remains extinguished or illuminated when trigger is pressed, a weapon malfunction has occurred.
Master Arm Safety I Switch (Machineguns and Inner Wing Cannons)
UP: ON / DOWN : OFF
MG-151 Cannon Ammunition Counter
MG-131
MG-131
MG-151
MG-151
MG-151
MG-151
Master Arm Safety II Switch (Outer Wing Cannons)
UP: ON / DOWN : OFF
MG-131 Machinegun Breechblock Status Signal Lamp
Illuminated: Open
Extinguished: Closed
Lamp flickering when firing the weapon means the breechblock mechanism operates properly. If lamp remains extinguished or illuminated when trigger is pressed, a weapon malfunction has occurred.
MG-151 Cannon Ammunition Counter Setting knob
Zu

PART 3 – COCKPIT & GAUGES



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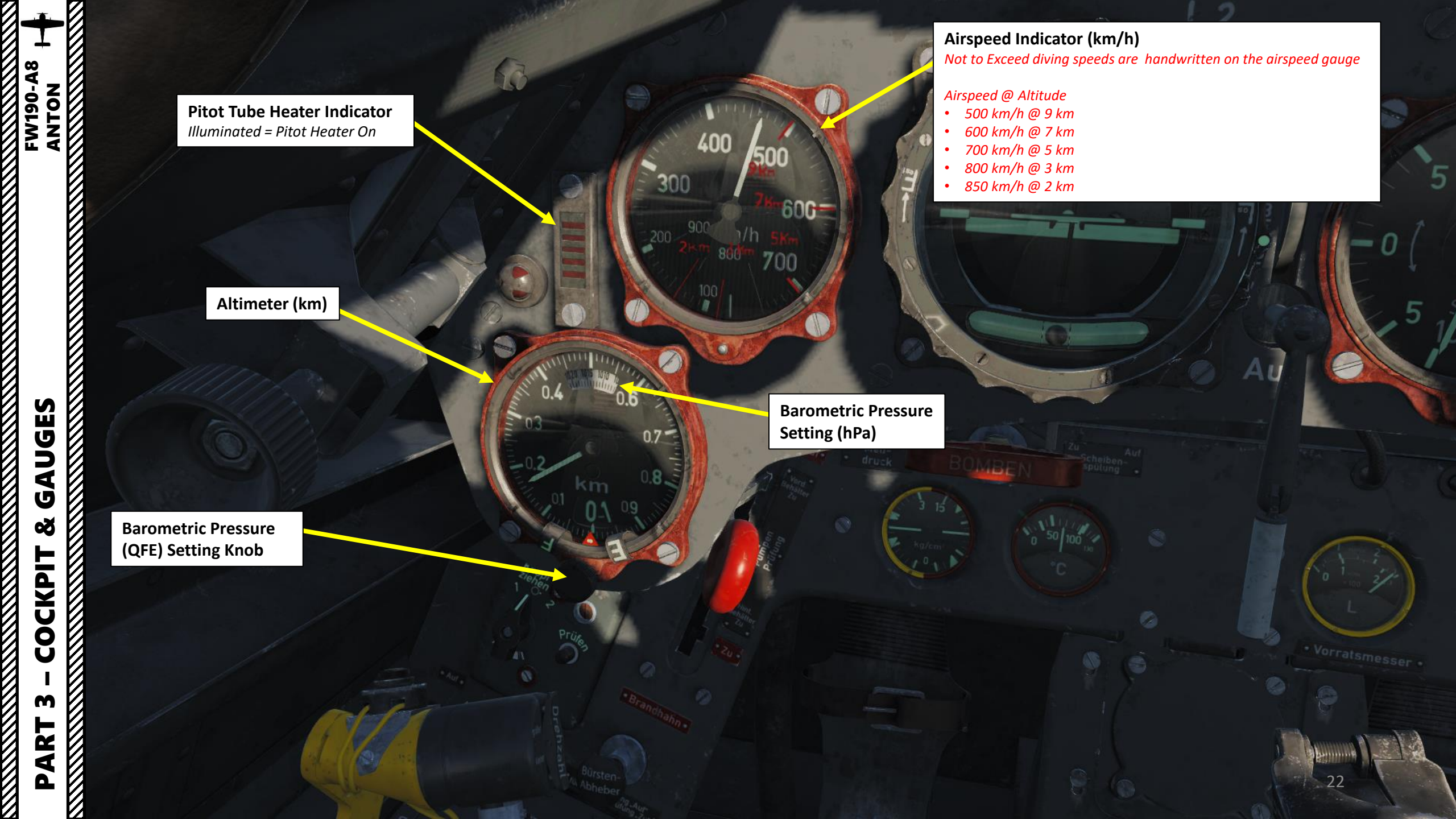
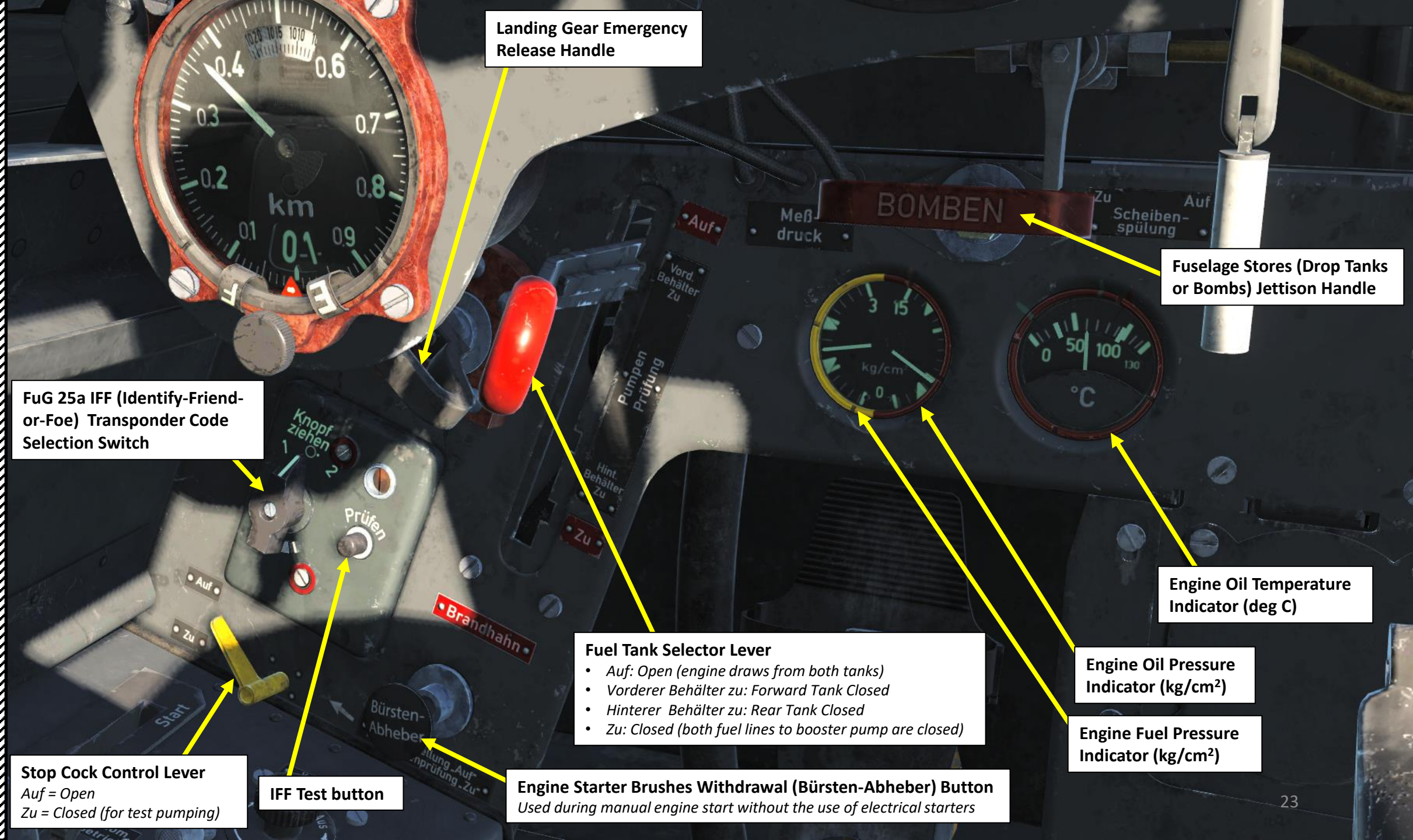
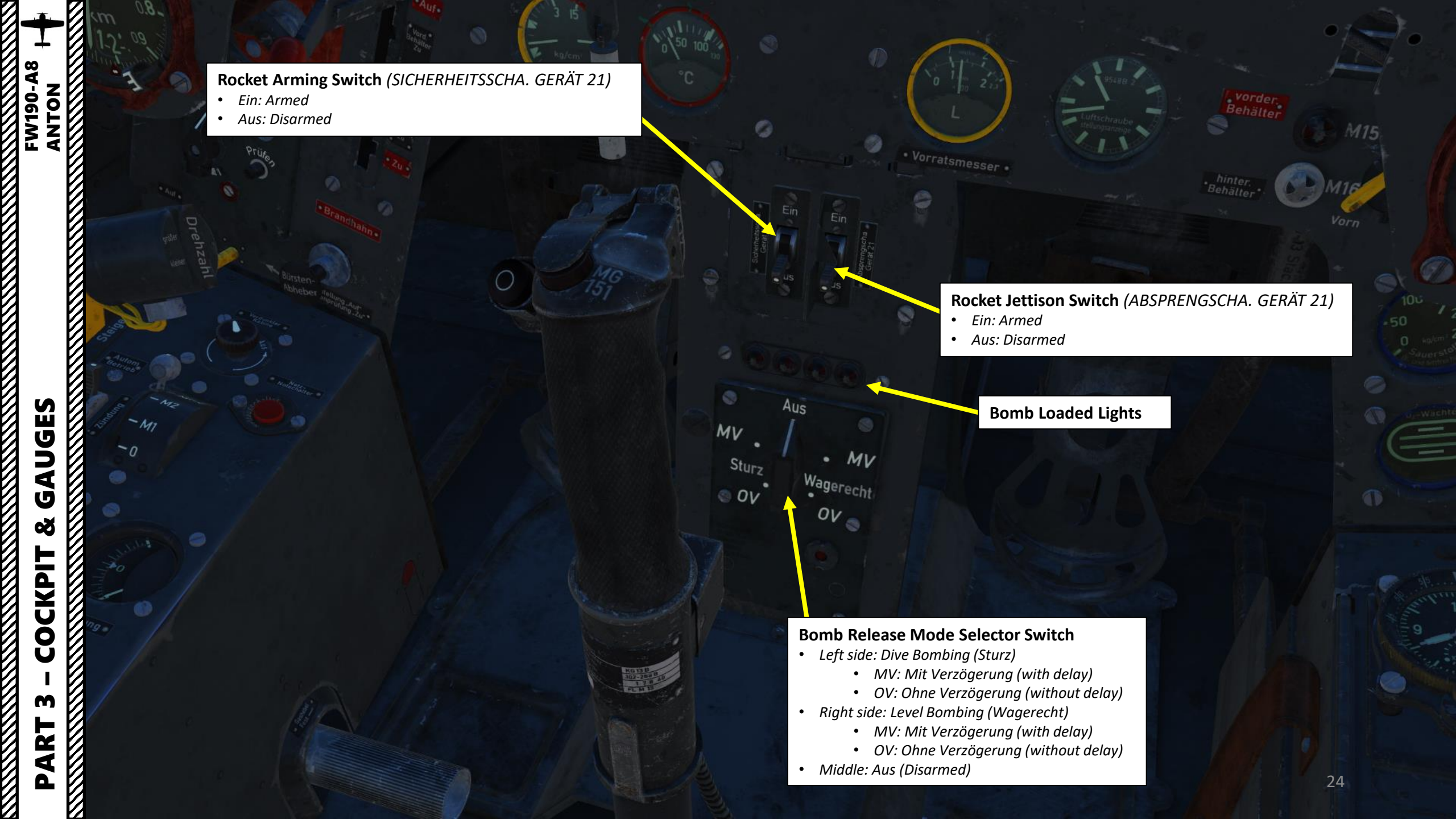



Landing Gear Emergency Release Handle
FuG 25a IFF (Identify-Friend-or-Foe) Transponder Code Selection Switch
Fuselage Stores (Drop Tanks or Bombs) Jettison Handle
Engine Oil Temperature Indicator (deg C)
Engine Oil Pressure Indicator (kg/cm²)
Engine Fuel Pressure Indicator (kg/cm²)
Fuel Tank Selector Lever
• Auf: Open (engine draws from both tanks)
• Vorderer Behälter zu: Forward Tank Closed
• Hinterer Behälter zu: Rear Tank Closed
• Zu: Closed (both fuel lines to booster pump are closed)
Stop Cock Control Lever
Auf = Open
Zu = Closed (for test pumping)
IFF Test button
Engine Starter Brushes Withdrawal (Bürsten-Abheber) Button
Used during manual engine start without the use of electrical starters
BOMBEN
Auf
Zu
Prüfen
Brandhahn
Bürsten-Abheber
Start



Rocket Arming Switch *(SICHERHEITSSCHA. GERÄT 21)*
- *Ein: Armed*
- *Aus: Disarmed*

Rocket Jettison Switch *(ABSPRENGSCHA. GERÄT 21)*
- *Ein: Armed*
- *Aus: Disarmed*

Bomb Loaded Lights

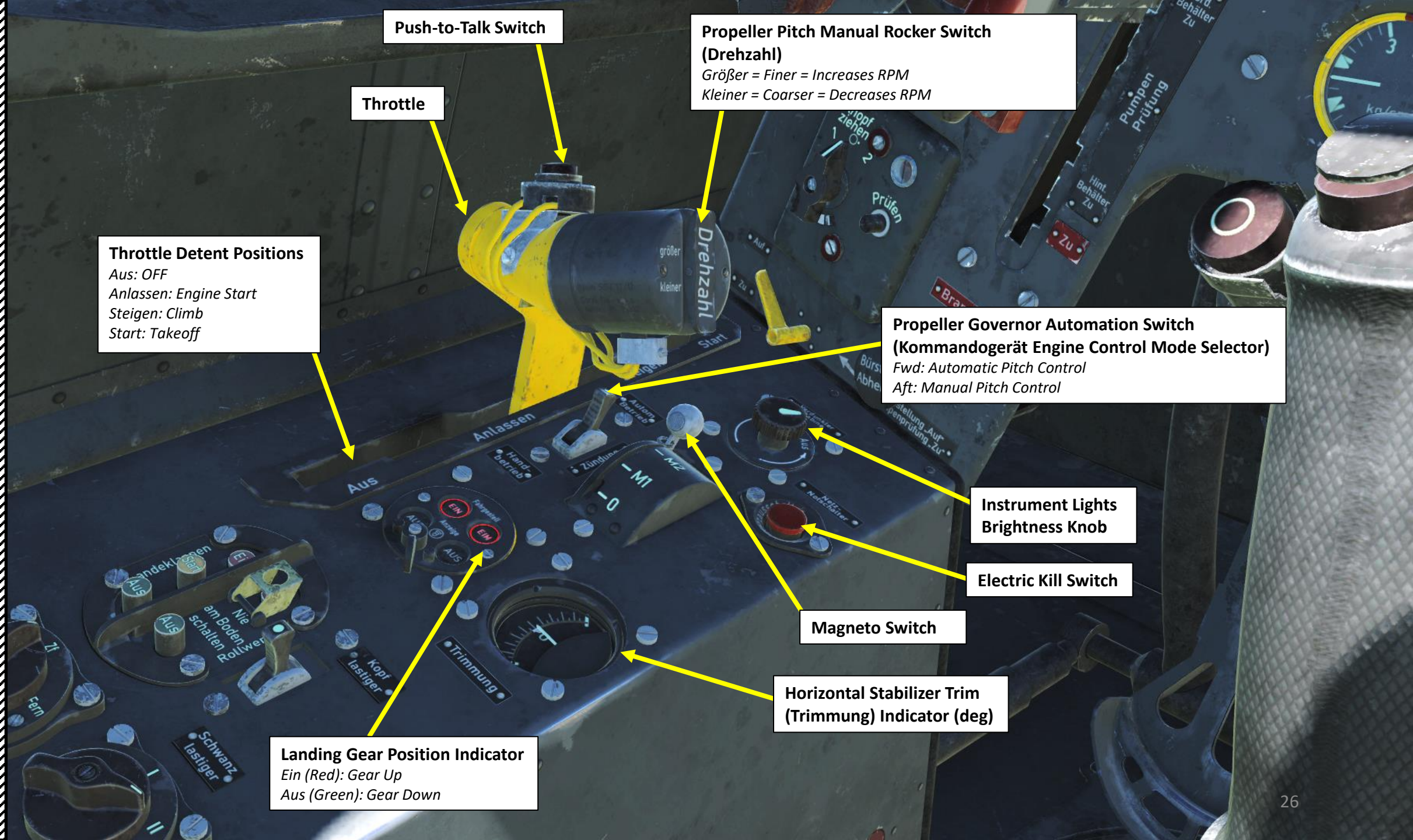
Bomb Release Mode Selector Switch
- *Left side: Dive Bombing (Sturz)*
  - *MV: Mit Verzögerung (with delay)*
  - *OV: Ohne Verzögerung (without delay)*
- *Right side: Level Bombing (Wagerecht)*
  - *MV: Mit Verzögerung (with delay)*
  - *OV: Ohne Verzögerung (without delay)*
- *Middle: Aus (Disarmed)*

B1 Button
Outer Wing MG-151 Cannon Button
- *RALT+SPACE binding*

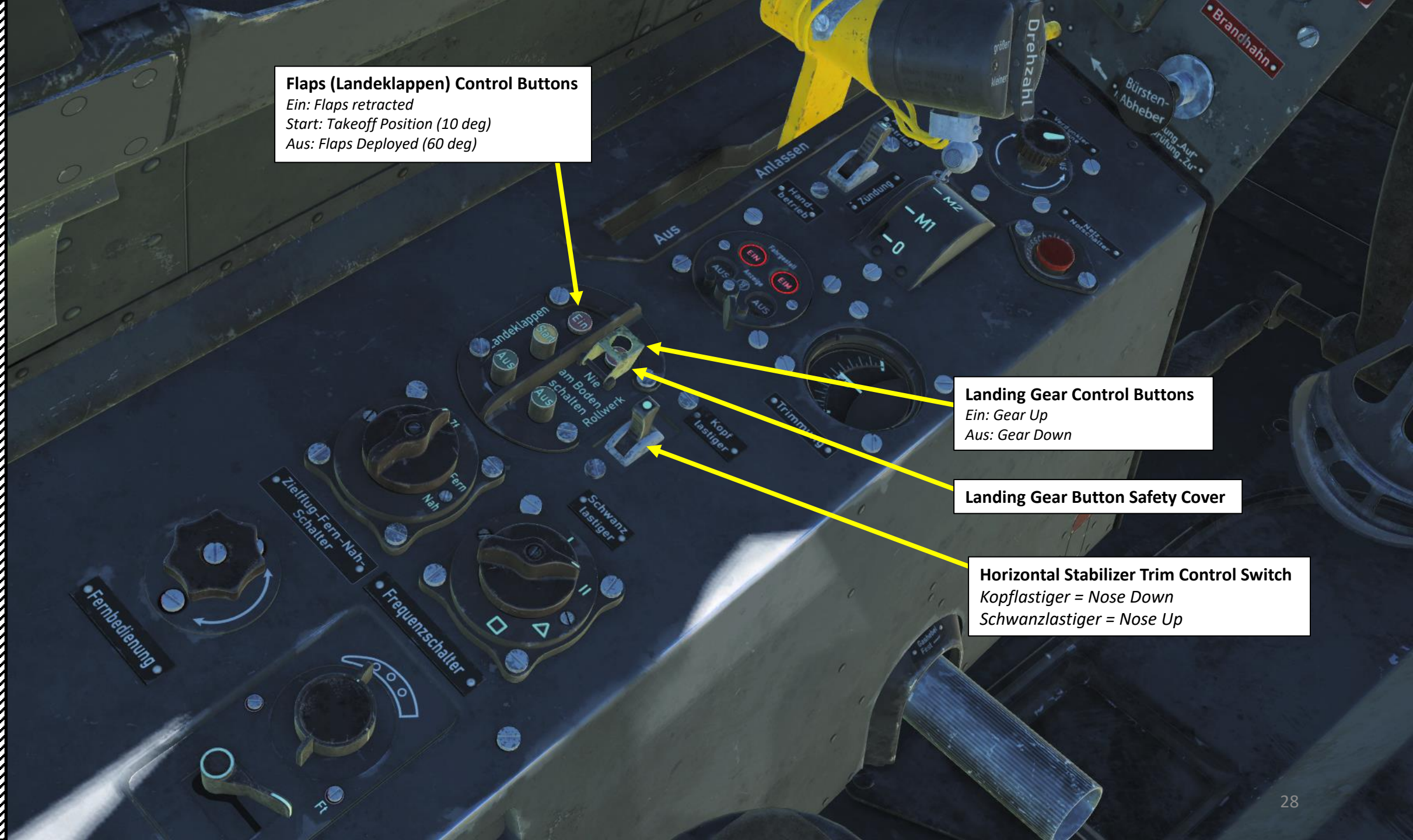
Gun/Cannon Safety Cover
- *LSHIFT+SPACE binding*

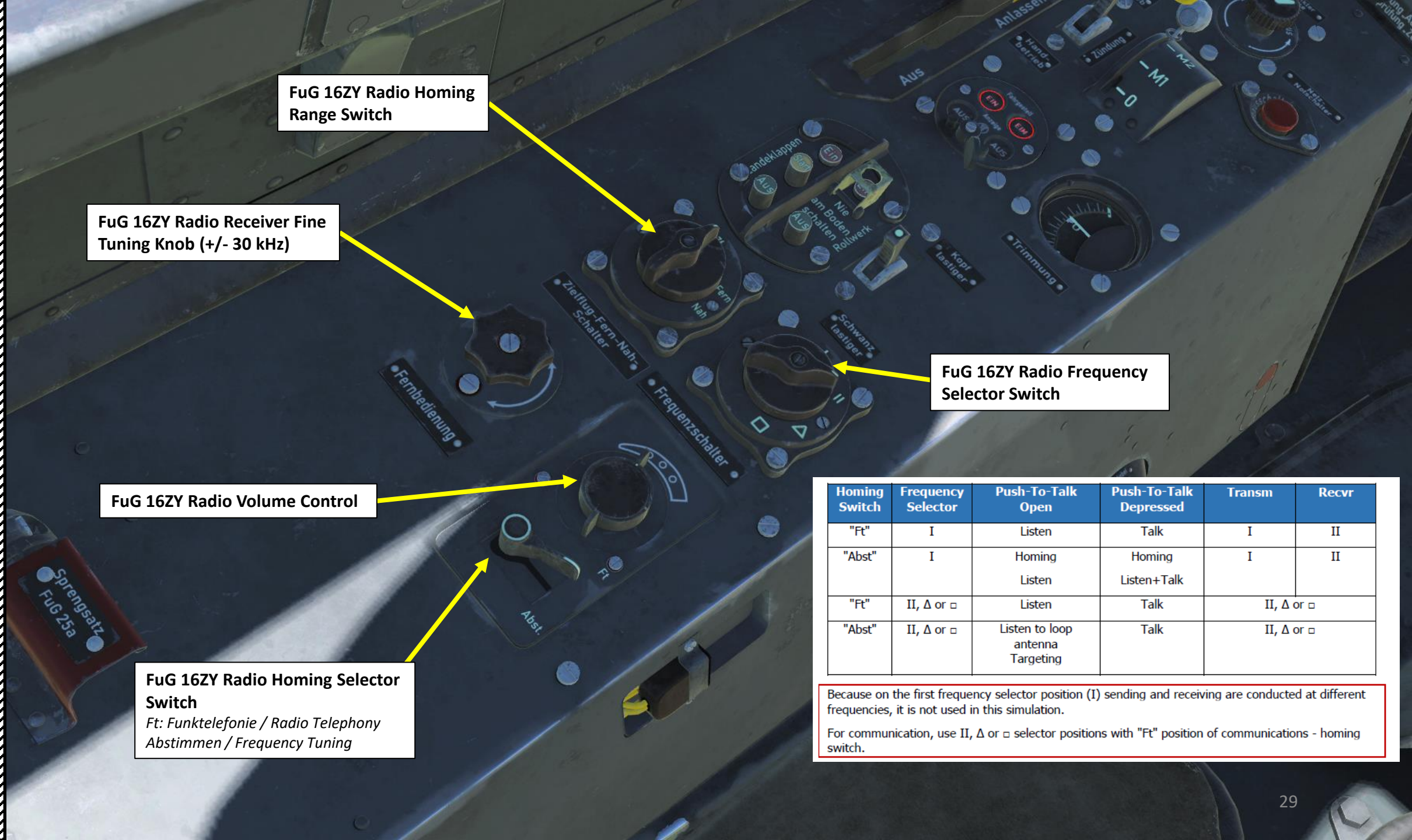
B2 Button
Bomb/Rocket Release Button
- *RSHIFT+SPACE binding*

A Button
Inner Wing MG-151 Cannon & MG-131 Machinegun Button
- *Note: If the Cannon Safety Cover is ON, the MG-151/131 Trigger will only fire machineguns when pressed.*


Push-to-Talk Switch
Throttle
Propeller Pitch Manual Rocker Switch (Drehzahl)
Größer = Finer = Increases RPM
Kleiner = Coarser = Decreases RPM
Throttle Detent Positions
Aus: OFF
Anlassen: Engine Start
Steigen: Climb
Start: Takeoff
Propeller Governor Automation Switch (Kommandogerät Engine Control Mode Selector)
Fwd: Automatic Pitch Control
Aft: Manual Pitch Control
Instrument Lights Brightness Knob
Electric Kill Switch
Magneto Switch
Horizontal Stabilizer Trim (Trimmung) Indicator (deg)
Landing Gear Position Indicator
Ein (Red): Gear Up
Aus (Green): Gear Down
Drehzahl
größer
kleiner
Anlassen
Aus
Start
Prüfen
Pumpen Prüfung
Trimmung
Kopf lastiger
Schwanz lastiger


Throttle Lock
Down: Locked
Up: Unlocked

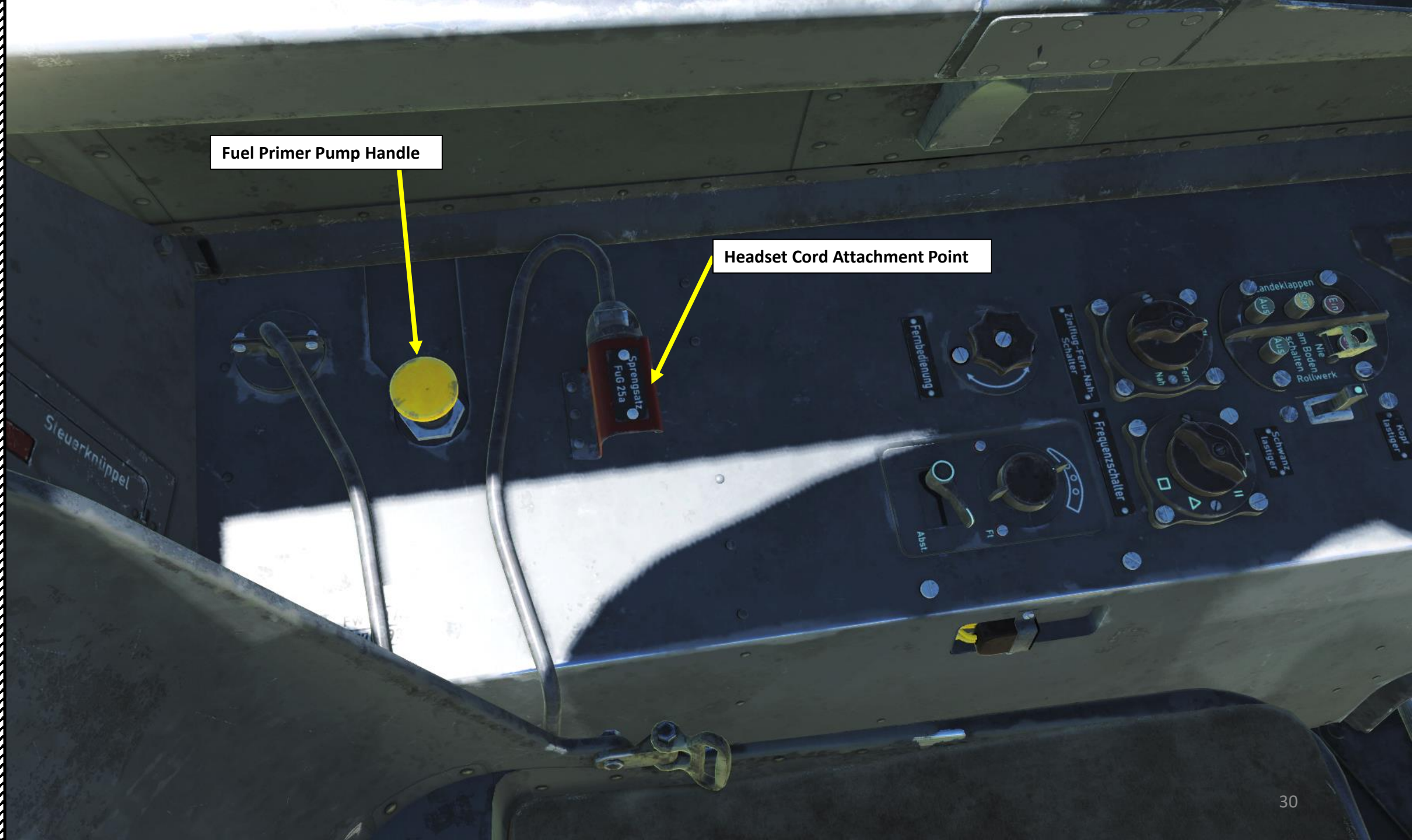

Flaps (Landeklappen) Control Buttons
Ein: Flaps retracted
Start: Takeoff Position (10 deg)
Aus: Flaps Deployed (60 deg)
Landing Gear Control Buttons
Ein: Gear Up
Aus: Gear Down
Landing Gear Button Safety Cover
Horizontal Stabilizer Trim Control Switch
Kopflastiger = Nose Down
Schwanzlastiger = Nose Up
Drehzahl
Anlassen
Aus
Zündung
Handbetrieb
Bürsten-Abheber
Brandhahn
Trimmung
Kopflastiger
Schwanzlastiger
Zielflug-Fern-Nah-Schalter
Frequenzschalter
Fernbedienung
Nie am Boden schalten Rollwerk



Homing Switch	Frequency Selector	Push-To-Talk Open	Push-To-Talk Depressed	Transm	Recvr
"Ft"	I	Listen	Talk	I	II
"Abst"	I	Homing Listen	Homing Listen+Talk	I	II
"Ft"	II, Δ or □	Listen	Talk	II, Δ or □	
"Abst"	II, Δ or □	Listen to loop antenna Targeting	Talk	II, Δ or □	

Because on the first frequency selector position (I) sending and receiving are conducted at different frequencies, it is not used in this simulation.

For communication, use II, Δ or □ selector positions with "Ft" position of communications - homing switch.

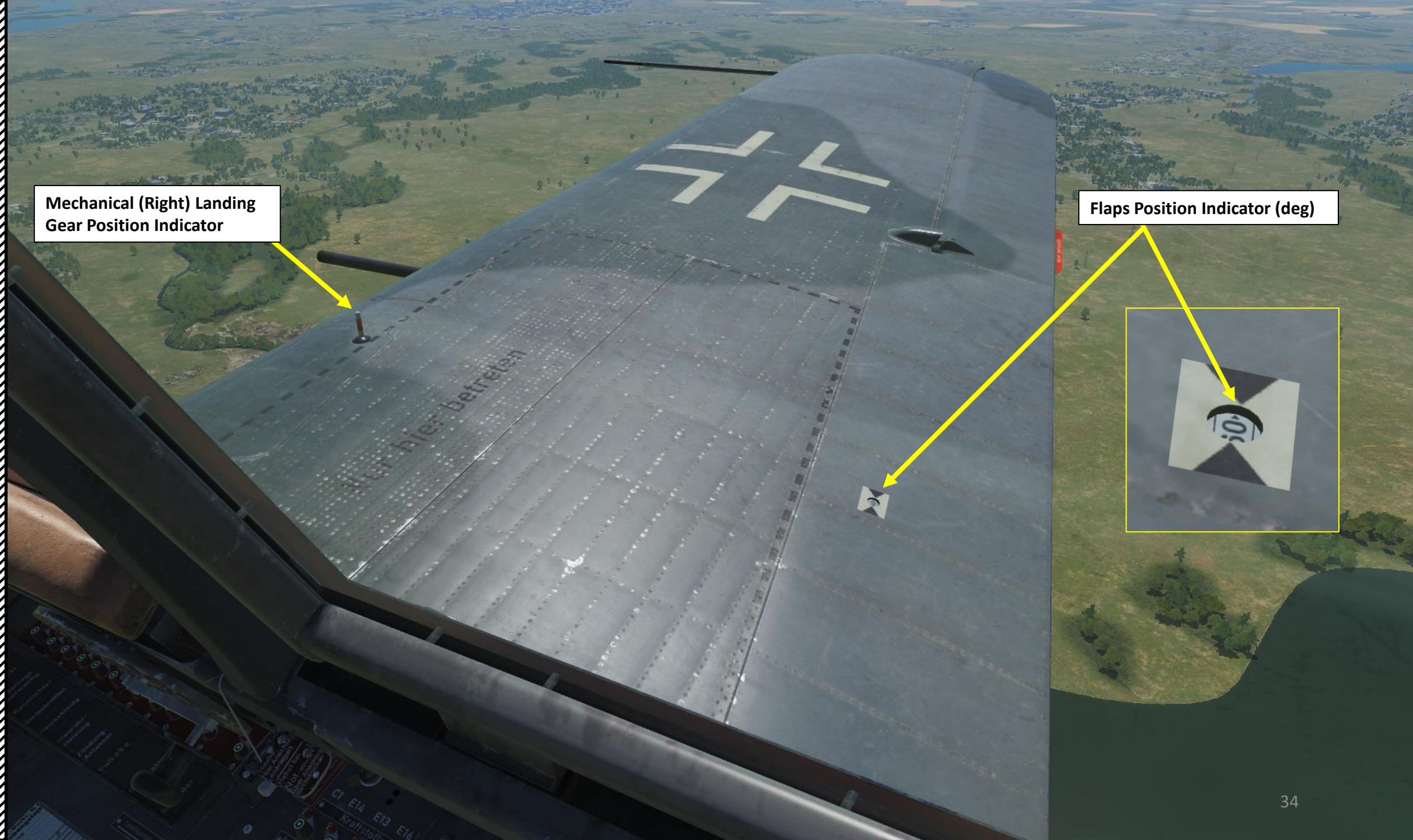

Fuel Primer Pump Handle
Headset Cord Attachment Point
Steuerknüppel
Sprengsatz
FuG 25a
Fernbedienung
Zielflug-Fern-Nah-Schalter
Fern
Nah
Landeklappen
Aus
Ein
Nie am Boden schalten
Rollwerk
Frequenzschalter
Schwanz lastiger
Kopf lastiger
Abst.
Fl


Achtung!
Haubenabwurf
durch Sprengladung
Abwurfhebel nicht berühren. Im Probefall
vorherige Sicherung des Schlagbolzens

PART 3 – COCKPIT & GAUGES


White Navigation Light
Green Navigation Light
Red Navigation Light

PART 3 – COCKPIT & GAUGES

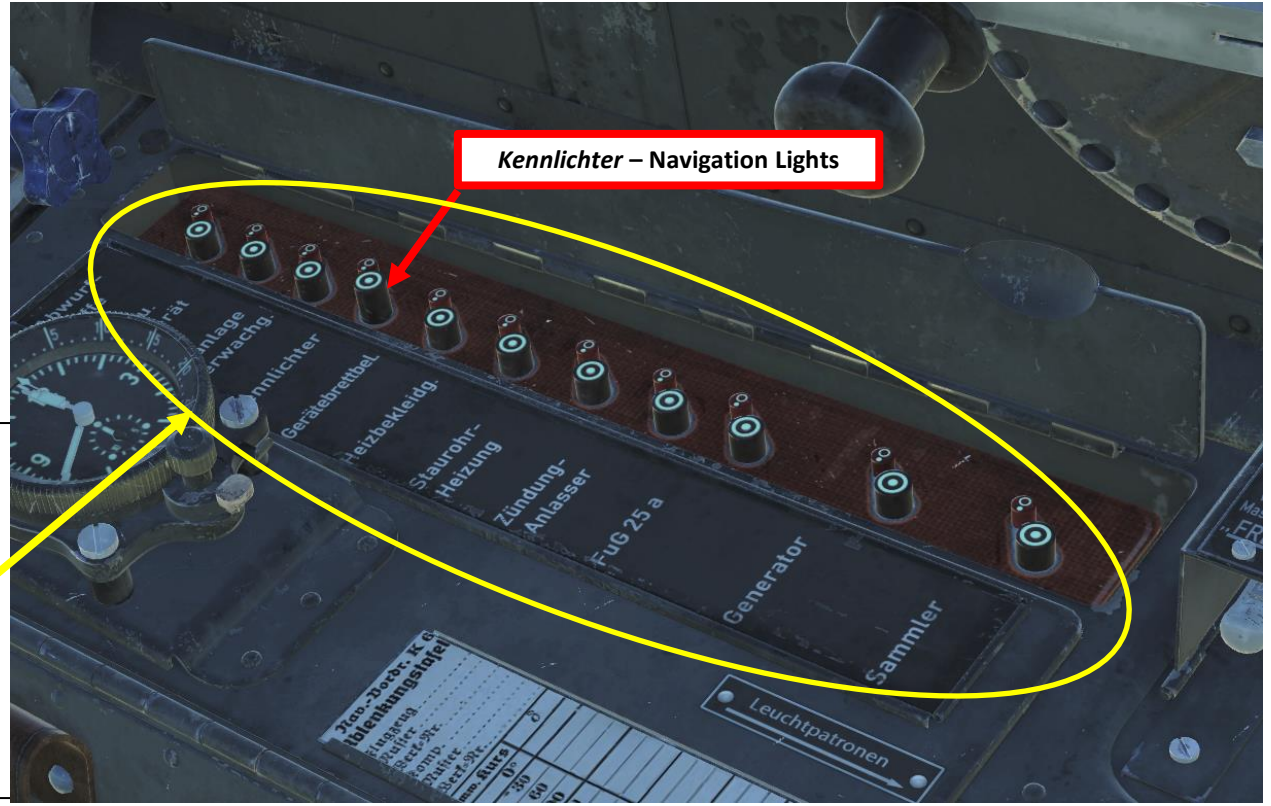


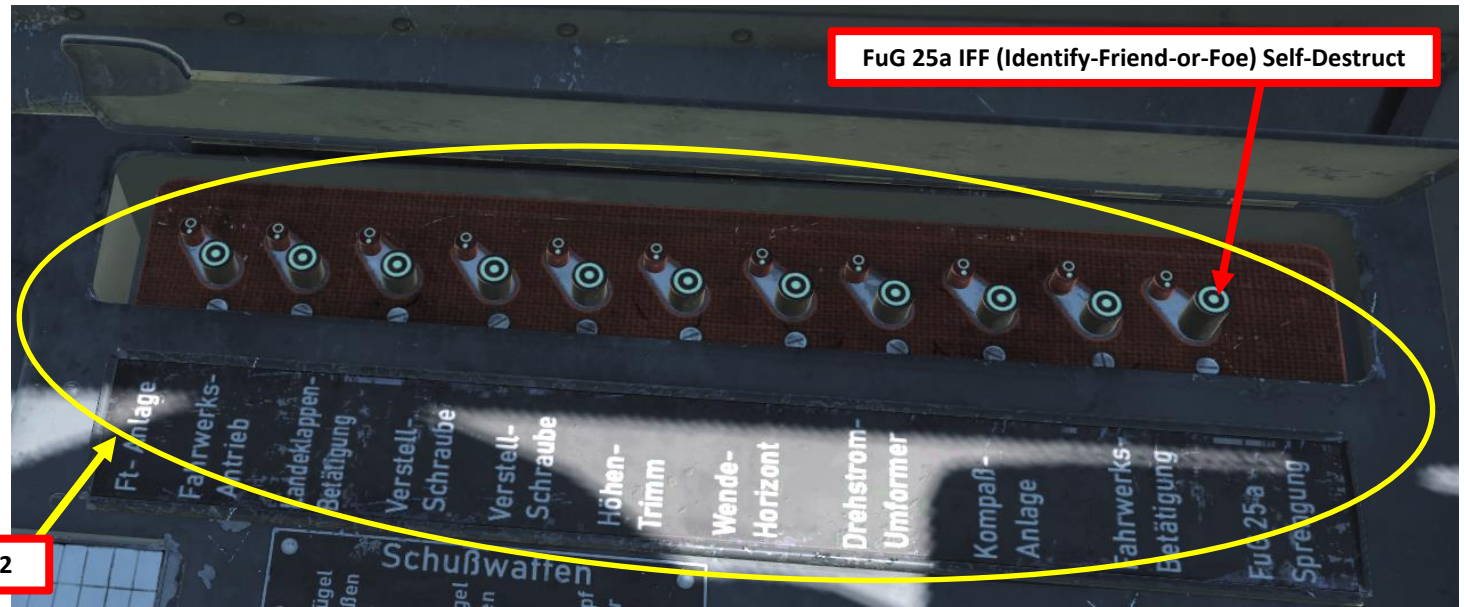
PART 3 – COCKPIT & GAUGES

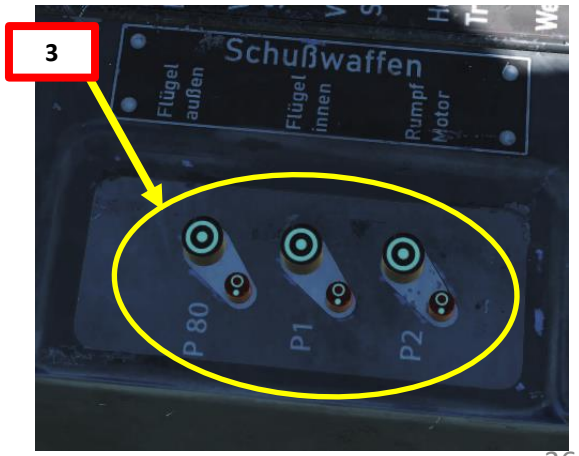
START-UP PROCEDURE

1. Open forward circuit breaker panel and push them all IN (ON). You can set the *Kennlichter* (Navigation Lights) breaker as required since you may not necessarily have your lights on during combat. Close the panel afterwards.
2. Open aft circuit breaker panel and push all of them IN (ON) except the FuG 25a Sprengung (IFF Self-Destruct) circuit breaker. Close the panel afterwards.
3. Set Wing and Fuselage-Mounted Gun Circuit Breakers – IN (ON)

- **Drop Ordnance & Optional Armament** *(Abwurfwaffe)* **Circuit Breaker**
- **Gunsight & Gun Camera** *(Bild-und-Zielgerät)* **Circuit Breaker**
- **Flight Instruments Power** *(Meßanlage Überwachung)* **Circuit Breaker**
- **Navigation Lights** *(Kennlichter)* **Circuit Breaker**
- **Cabin Illumination** *(Gerätebrett)* **Circuit Breaker**
- **Clothes Heating** *(Heizbekleidung)* **Circuit Breaker**
- **Pitot Tube Heater** *(Staurohrheizung)* **Circuit Breaker**
- **Ignition Starter** *(Zündung Anlasser)* **Circuit Breaker**
- **FuG 25a IFF (Identify-Friend-or-Foe) Circuit Breaker**
- **Engine Generator Circuit Breaker**
- **Battery** *(Sammler)* **Circuit Breaker**

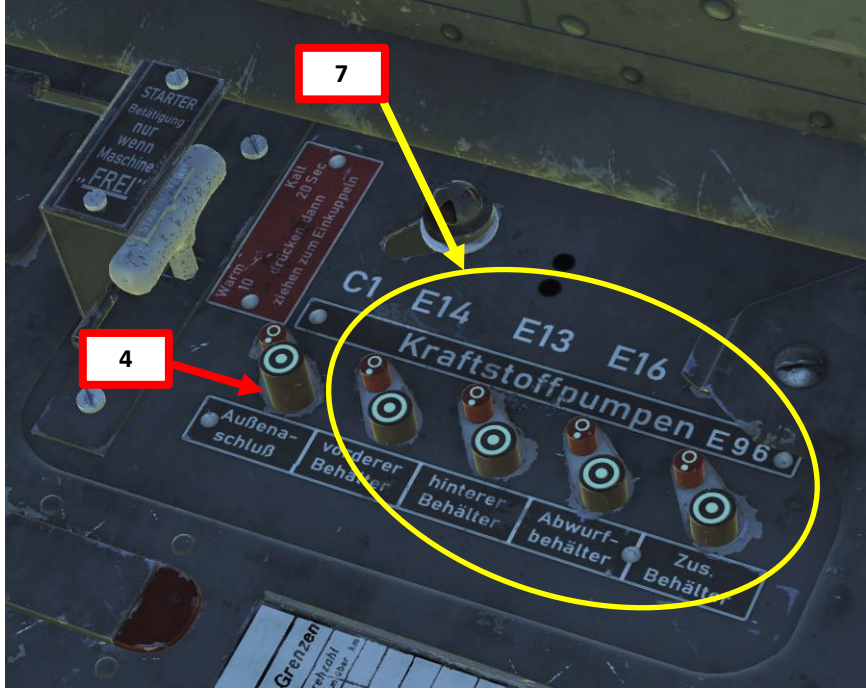






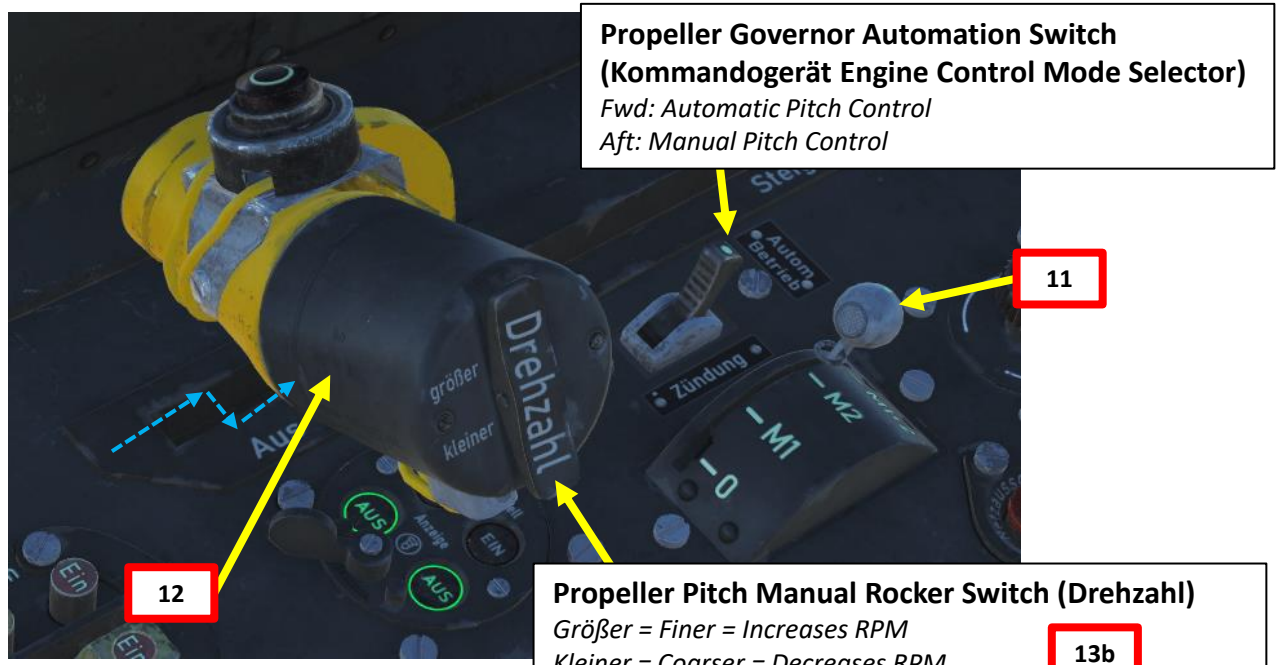
START-UP PROCEDURE

4. *OPTIONAL*: If you want to use External Power, call the ground crew to connect a Ground Power Unit. Then, set the Battery (*Sammler*) Circuit Breaker OUT (OFF), and set the C1 External Power (*Außenanschluß)* Circuit Breaker IN (ON). Otherwise, the engine starter will run on battery power. In this tutorial, we will set the Battery Switch ON and let the engine starter run on battery power alone.
5. Oxygen Valve – Rotate handle clockwise to OPEN. The Oxygen pressure should increase when the valve is fully open.
6. Check fuel in Rear (*Hinter*) and Forward (*Vorn*) tanks using the Fuel Selector switch
7. E14 (Front Tank), E13 (Rear Tank), E16 (Drop Tank, if applicable), E96 (Auxiliary) Fuel Pump (*Kraftstoffpumpen*) power switches – ON



START-UP PROCEDURE

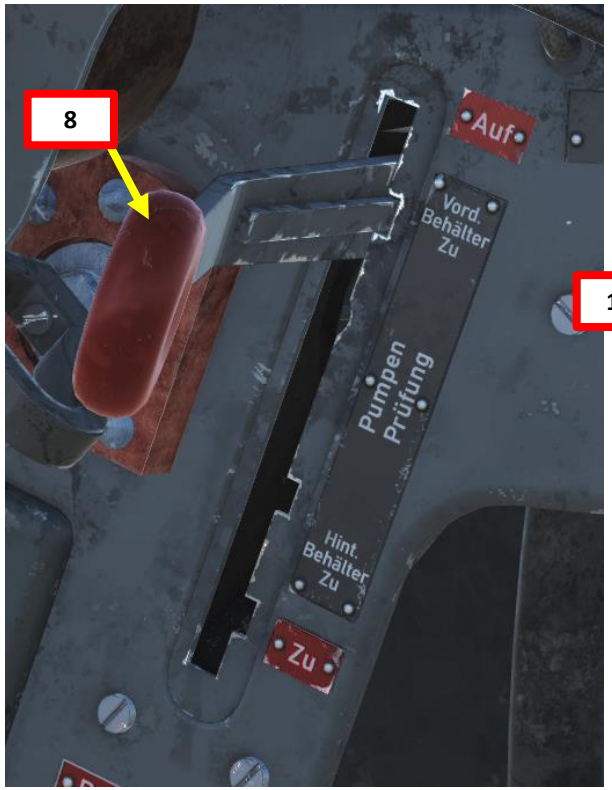
8. Set fuel selector lever to “AUF” (OPEN, FULLY UP) by right-clicking on it three times
9. Actuate the Primer handle to pump fuel into the engines 1 to 15 times depending on the outside air temperature.
10. Confirm that there is sufficient fuel pressure (needle should be between the two white marks)
11. Magnetos (Ignition) Switch – Set to M1+M2
12. Set throttle to *ANLASSEN* (START-IDLE) by pressing RALT+HOME.
13. Set Propeller Governor Automation (Kommandogerät) switch to Manual (AFT), then use the Propeller Pitch Manual Rocker (Drehzahl) to increase Prop Pitch to 12:00 position (Engine RPM Up -> PageUp binding).
14. Set Propeller Governor Automation (Kommandogerät) switch to Automatic (FWD) and confirm that Prop Pitch needle moves to 12:35 position.

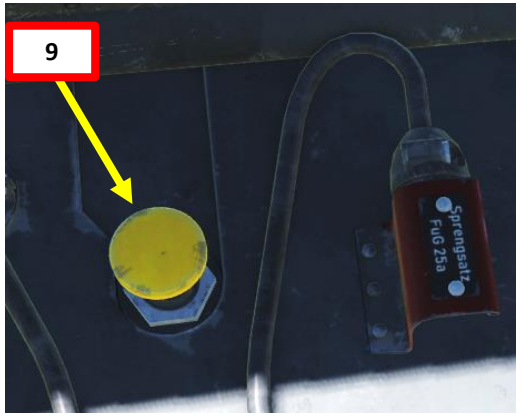


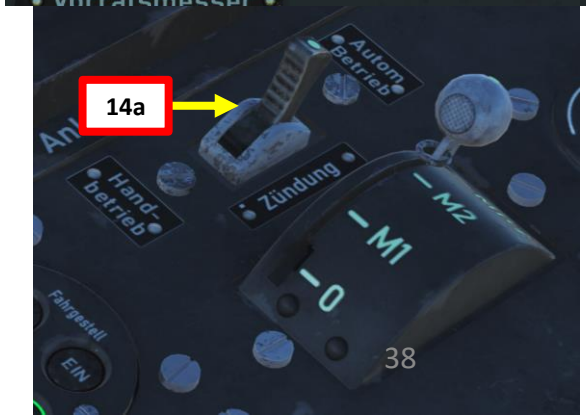
Propeller Governor Automation Switch (Kommandogerät Engine Control Mode Selector)
Fwd: Automatic Pitch Control
Aft: Manual Pitch Control

Propeller Pitch Manual Rocker Switch (Drehzahl)
Größer = Finer = Increases RPM
Kleiner = Coarser = Decreases RPM

13b

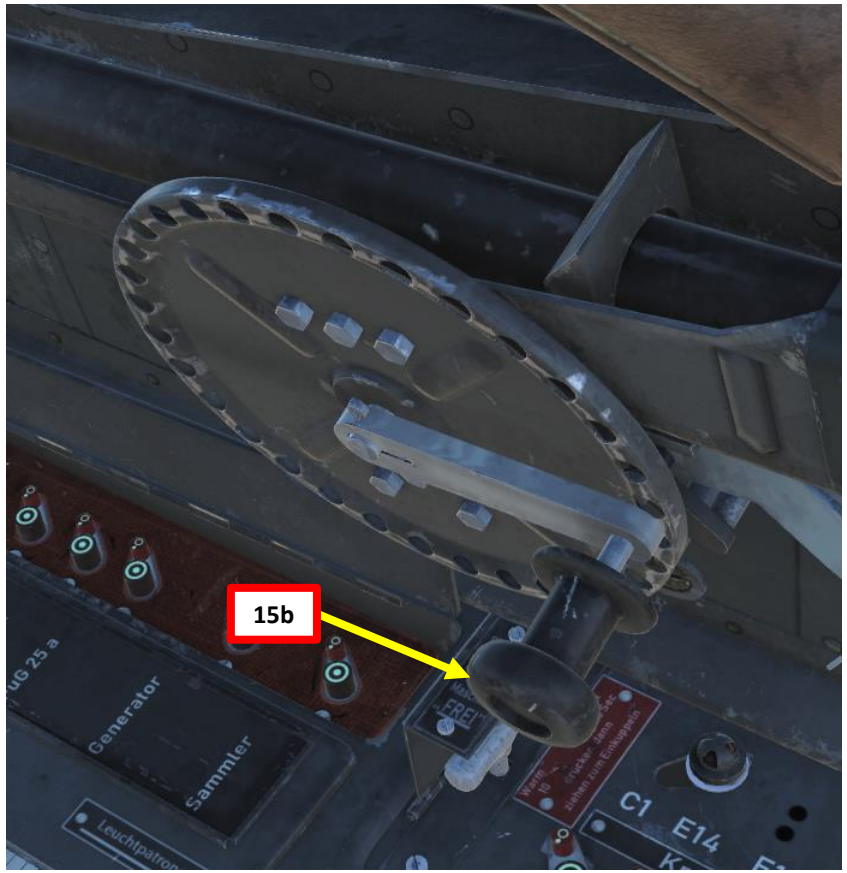


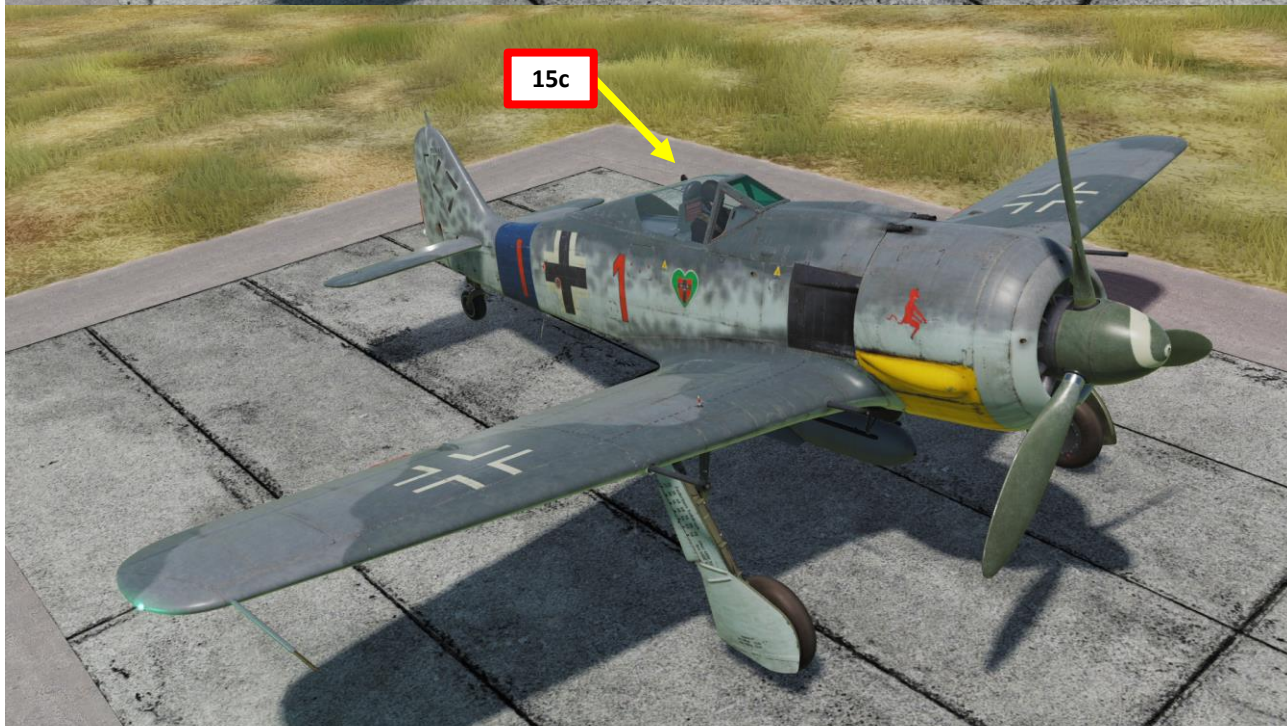




START-UP PROCEDURE

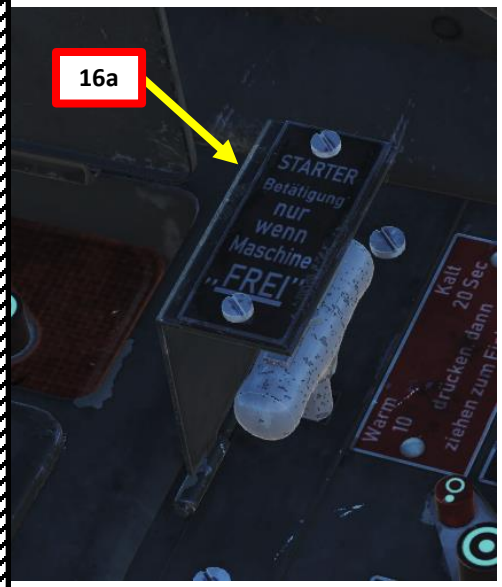
15. Close your canopy (“LCtrl+C” or by using the canopy handle).

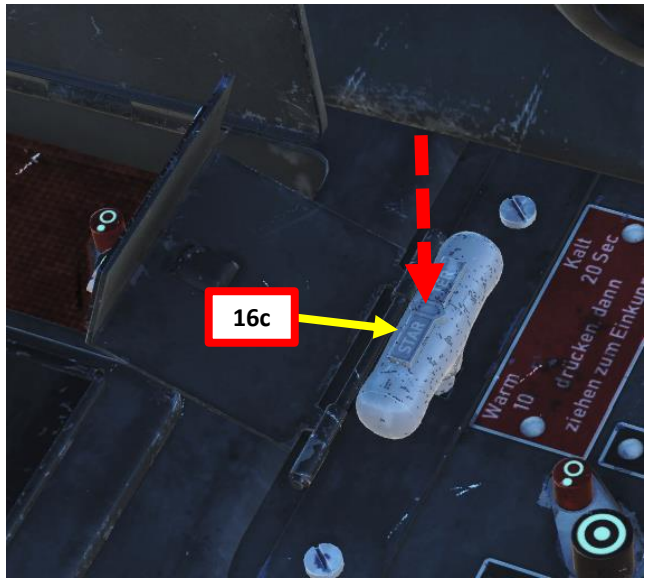


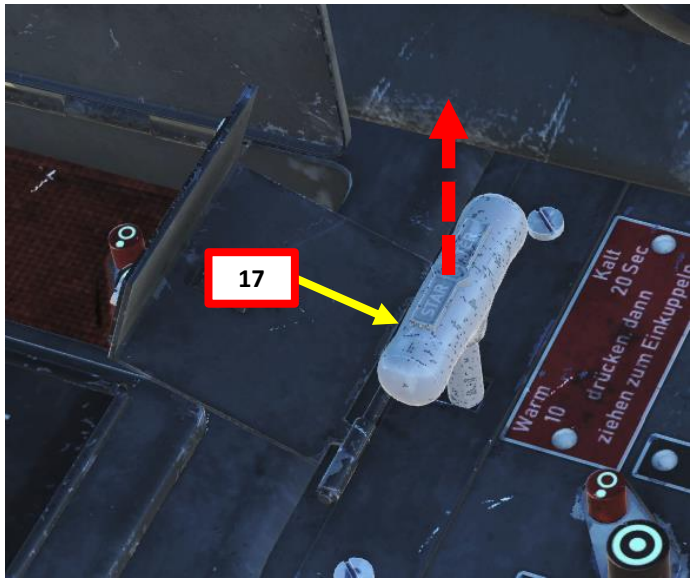


START-UP PROCEDURE

16. Flip starter cover and left click and hold the starter switch (pushed IN) for 25 seconds. The inertial flywheel will crank up.
17. Right click on the Starter Switch and hold it until the engine fires up.
18. After engine startup, keep the engine running at a setting of 500-600 RPM until the oil pressure indicator starts moving, then immediately increase the speed to 1200 rpm. If the arrow of the oil pressure indicator does not move within 15 seconds, stop the engine and call the personnel for repair.
19. *OPTIONAL*: If you have started your engine with ground power, give the signal for the ground personnel to disconnect the aircraft from the airfield power source.







ENGINE WARM-UP

1. Hold pedal brakes and adjust throttle to reach a RPM of about 1200.
2. Let the engine oil warm up to at least 25 deg C. Engine operation at a RPM between 600 and 1100 must be avoided at all costs to prevent vibration damage to the engine impeller.
3. Once oil temperature is at least 25 deg C, increase throttle to 1400-1500 RPM until the oil temperature reaches between 40 and 45 deg C.
4. Open radiator flaps by rotating the Flaps Control Lever clockwise. Open position is AUF. Closed position is ZU.

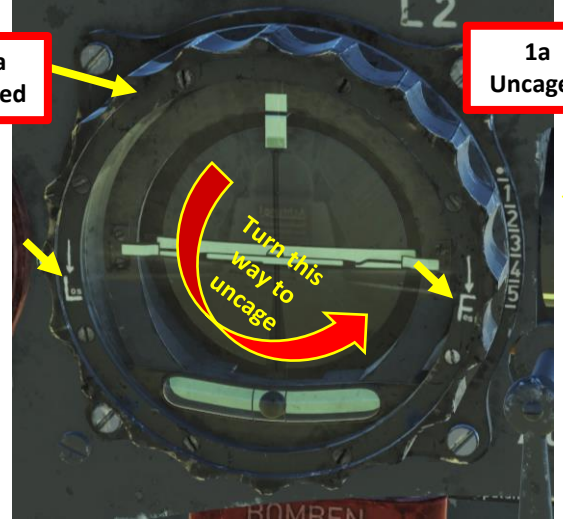
Radiator Flaps Position Indicator
Up: Zu (Closed)
Down: Auf (Open)

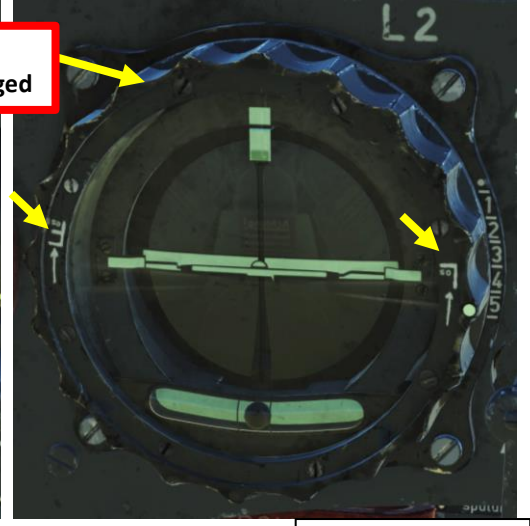
Radiator Flaps Control Lever
Rotate clockwise to Open, counter-clockwise to Close

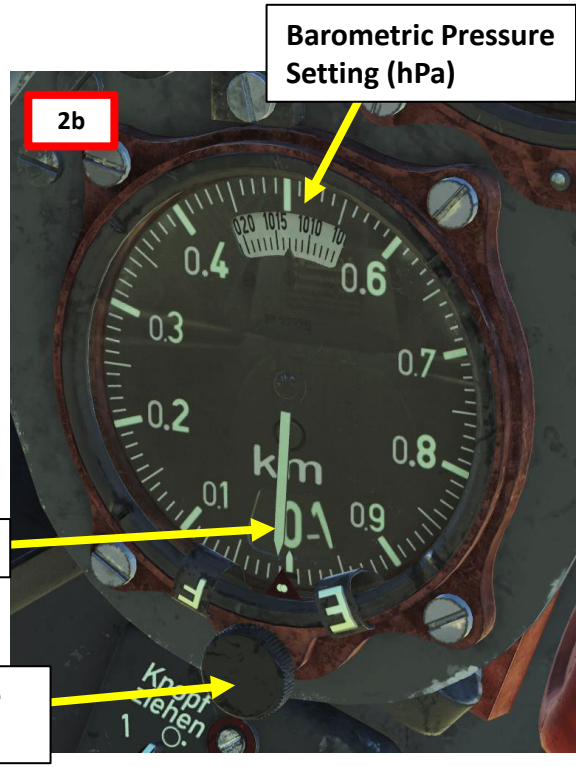
PRE-FLIGHT

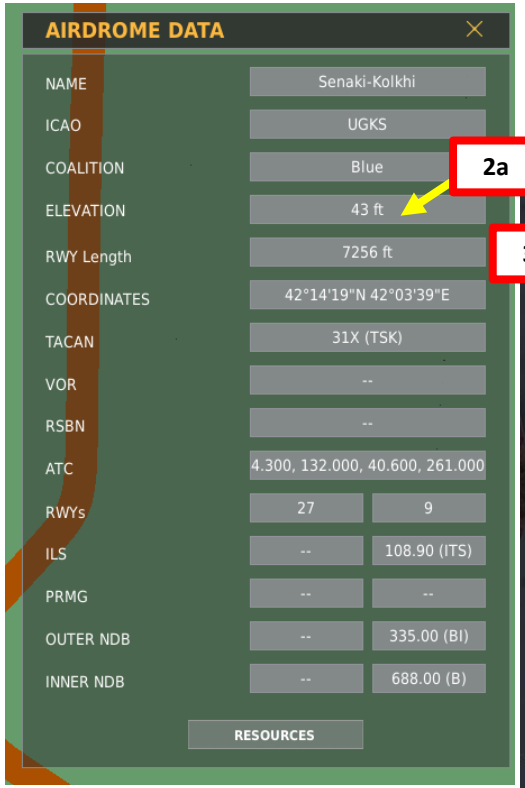
1. Uncage the Artificial Horizon by rotating the outer ring. In UNCAGED position, the F (*Fest*, Caged) and L (*Los*, Uncaged) letters should be upside down.
2. Use F10 key to display your map and airport information. Adjust QFE (Barometric Pressure) Setting to match the altimeter reading to the airport elevation.
   - 42 ft = 13 meters
3. *OPTIONAL*: If desired, adjust your course setting to the departure runway's heading by rotating the outer ring of the Repeater Compass.
4. Start taxiing when engine is warmed up.

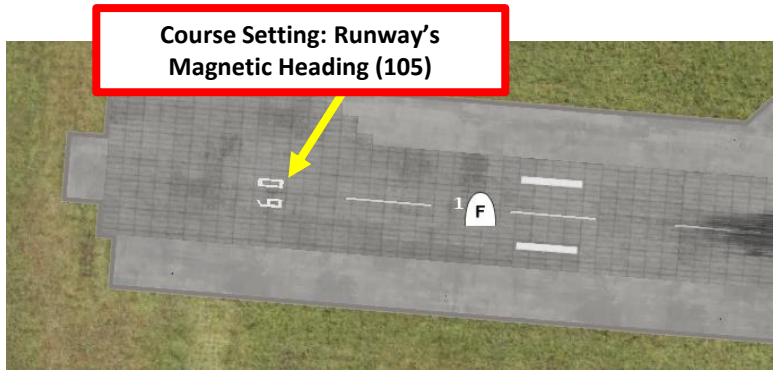
Note: *Attempting a takeoff with low oil temperature can lead to dire consequences. Waiting for proper engine warm-up is often overlooked by virtual pilots and the engine leaves no room for error when engine temperatures are concerned.*

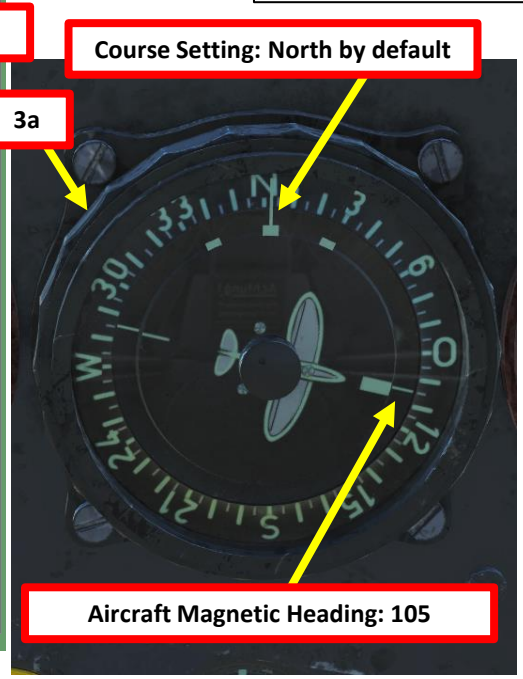


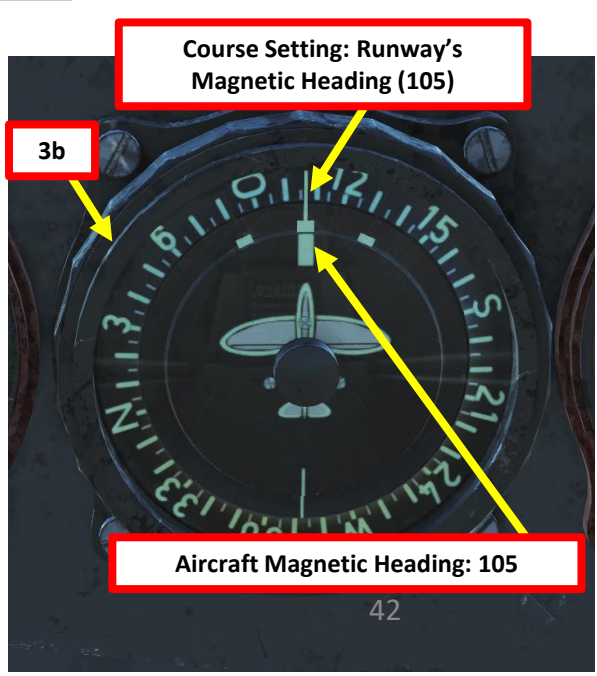






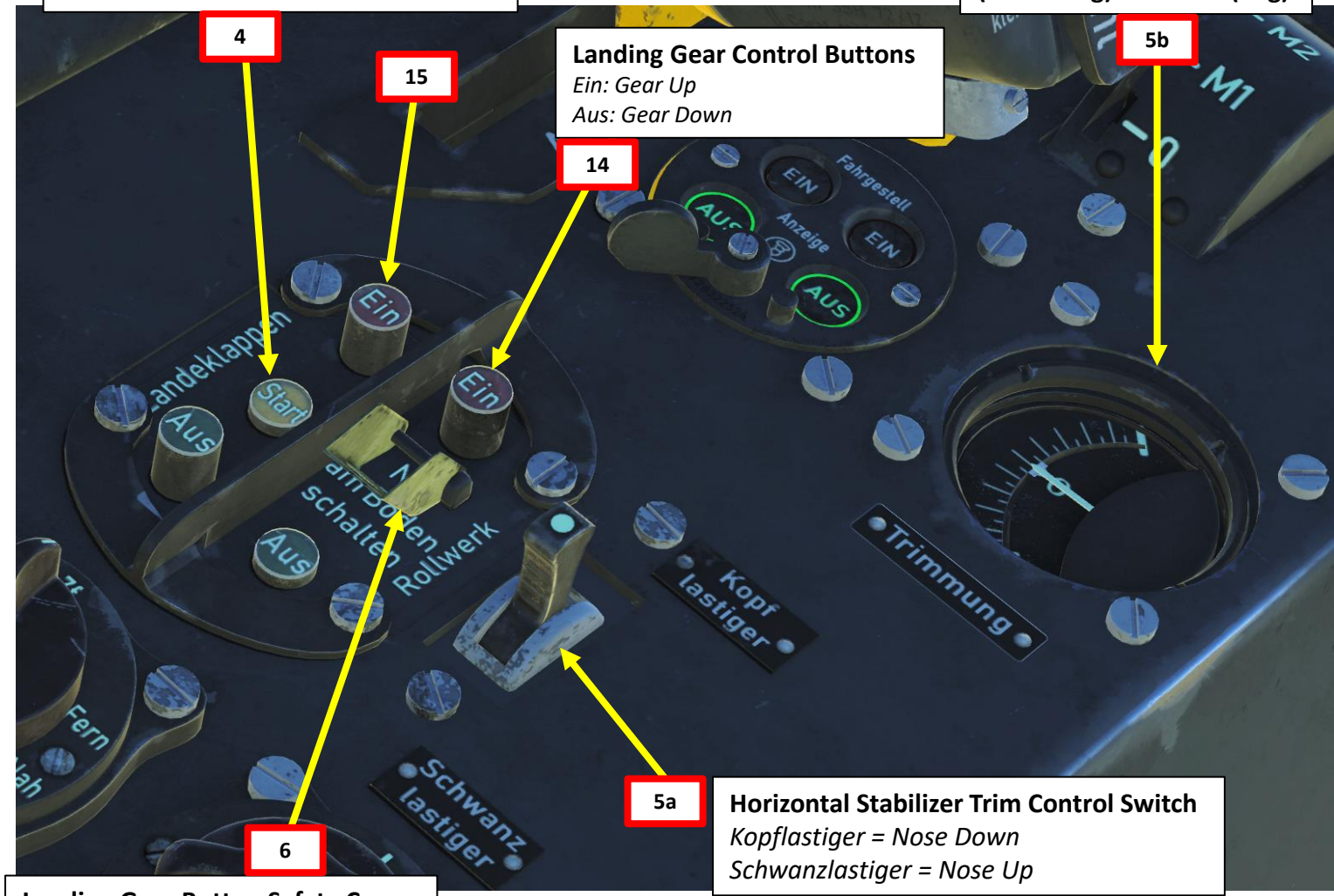






TAKEOFF PROCEDURE

1) Taxi by pulling your stick aft to lock the tailwheel and steering the aircraft by tapping your toe brakes to turn.
2) Once you are lined up with the runway, make sure your tailwheel is straight by moving in a straight line to straighten the wheel.
3) Keep your tailwheel locked on the ground by pulling your stick AFT.
4) Set flaps to TAKEOFF (Start) position by pressing the *Rollwerk* START button IN
5) Set Horizontal Stab trim to 0 deg
6) Flip Landing Gear Safety Cover UP
7) Reminder: Pull your stick fully AFT and hold it there.
8) Hold wheel brakes.
9) Throttle up to 2000 RPM, ensure engine parameters are within safety limits
10) Release brakes, then throttle up to 2700 RPM.
11) Do not use your brakes to steer your aircraft: use your rudder instead to make small adjustments.
12) At 170-180 km/h, center your control stick to allow you to pick up more airspeed. Your tailwheel should begin to rise: make sure that your propeller does not hit the ground.
13) Rotate at 200 km/h.
14) Raise landing gear by pressing the *Rollwerk* EIN button IN before reaching 250 km/h
15) Raise flaps by pressing the *Landeklappen* EIN button IN before reaching 250 km/h
16) Within three minutes after takeoff, reduce power to 2400 RPM (1.4 ATA Manifold Pressure) and start climbing
17) Optimal climb speed is 280-290 km/h with a climb power of 2700 RPM



Flaps (Landeklappen) Control Buttons
Ein: Flaps retracted
Start: Takeoff Position (10 deg)
Aus: Flaps Deployed (60 deg)

Landing Gear Control Buttons
Ein: Gear Up
Aus: Gear Down

Horizontal Stabilizer Trim (Trimmung) Indicator (deg)

Horizontal Stabilizer Trim Control Switch
Kopflastiger = Nose Down
Schwanzlastiger = Nose Up

Landing Gear Button Safety Cover

LANDING PROCEDURE

1. Line up with the runway and make sure to keep the runway centered with your nose.
2. Deploy landing gear and extend flaps in LANDING (*AUS*) position when below 250 km/h.
3. Keep your nose aimed to the end of the runway, not the beginning. You tend to go where you aim.
4. Approach the airfield with a speed of 220 km/h, and a sink rate between 2.5 and 5 m/s.
5. Reach the runway with a speed of approx. 200 km/h and a sink rate of 2.5 m/s.
6. Touchdown with a speed of 160-180 km/h with IDLE throttle. Do not start pulling on the stick to lock your tailwheel down yet: you can still generate enough thrust to bounce, stall and crash at any speed over 170 km/h if you are not careful. Glide your way through the runway… gravity and deceleration will keep you on a straight trajectory.
7. When decelerating to 100 km/h or less, lock your tailwheel by pulling back on your stick.
8. Do not use your brakes to steer the aircraft yet: use small rudder input instead.
9. When you start losing rudder authority (due to the decreasing airspeed), gently tap your brakes to slowly bring the airplane to a full stop.

Reference Data

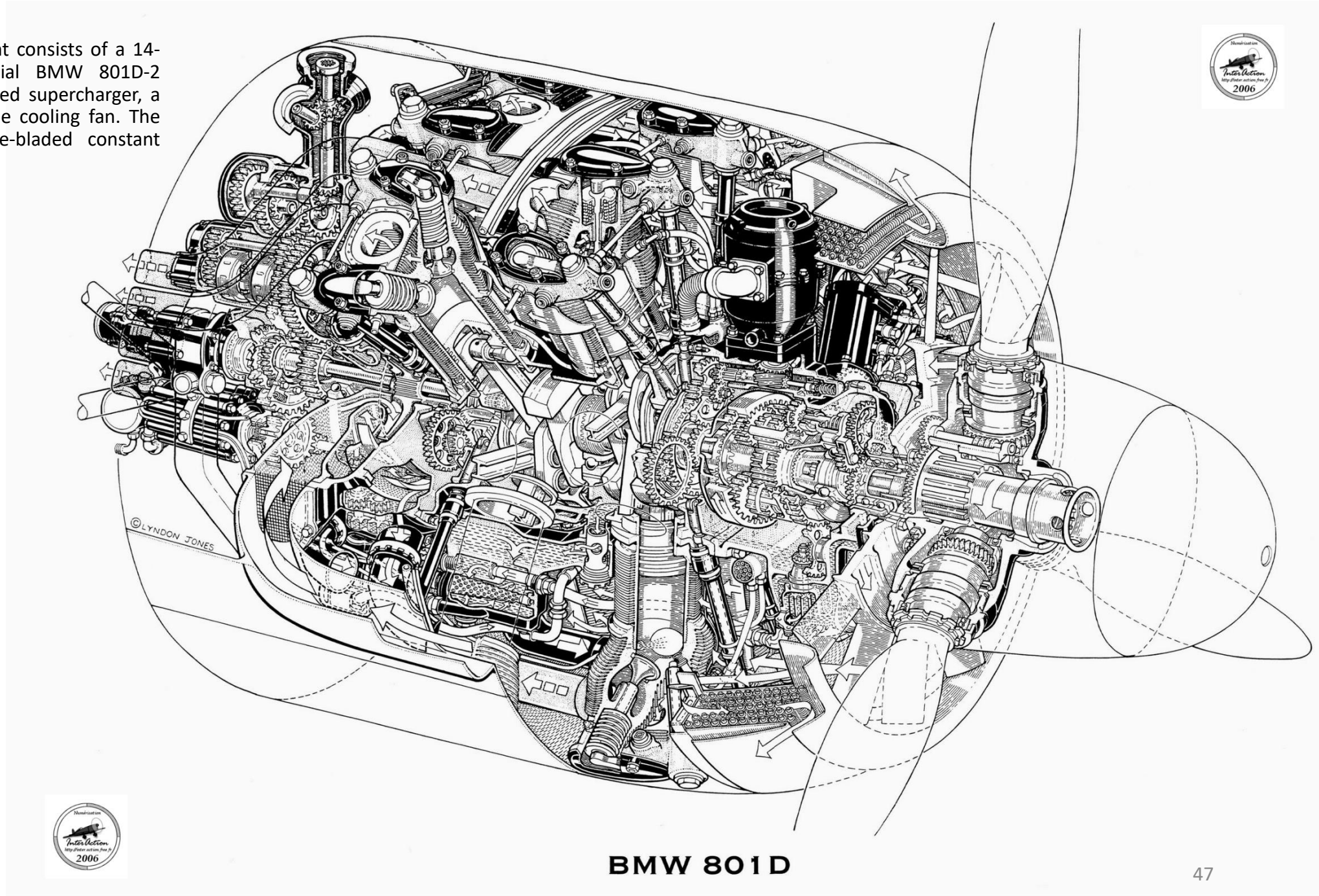
Distances and speeds of takeoff and landing roll depending on aircraft weight and runway surface type:

Weight, kg	Takeoff roll, m		Rate of climb after takeoff, m/s (flaps at 10°)	Landing roll, m		Roll time, seconds	
Runway surface	Concrete	Grass		Concrete	Grass	Concrete	Grass
4000	640	660	11	380	400	14,5	15,5
4500	780	820	9	520	560	18	19,5
5000	960	1110	7	680	730	22	24
5500	1200	1280	5	880	960	26,5	29,5

Landing speed, depending on aircraft weight:

Weight	Speed	Weight	Speed
Kg	Kph	Lbs.	Mph
3500	159	7600	98
3600	161	7800	100
3700	163	8000	101
3800	165	8200	102
3900	167	8400	103
4000	169	8600	105
4100	171	8800	106
4200	173	9000	107
4300	175	9200	108
4400	177	9400	109
4500	179	9600	111
5000	180	9800	112

The Anton's powerplant consists of a 14-cylinder two-row radial BMW 801D-2 engine with a two-speed supercharger, a gearbox and a 12-blade cooling fan. The engine drives a three-bladed constant speed propeller.



RECOMMENDED ENGINE SETTINGS:

TAKEOFF: 2700 RPM
LANDING: 1000 RPM
NORMAL OPERATION: 2300 RPM

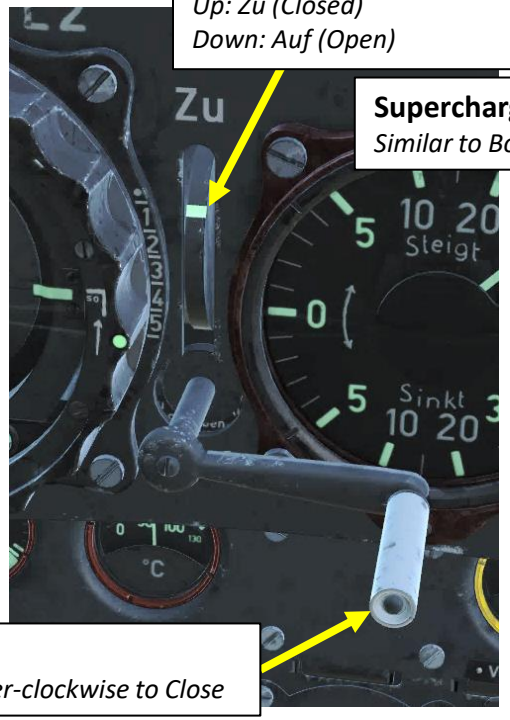
GENERAL RULE FOR OIL TEMPERATURE:
When oil temperature is above 110 deg C, make sure your Radiator Flaps are Open or you risk overheating. When oil temperature is below 110, close it to prevent overcooling.

ENGINE LIMITS:

Oil Temperature: Min 110 deg C – Max 130 deg C

Oil Pressure: Min 3 kg/cm^2 – Max 13 kg/cm^2

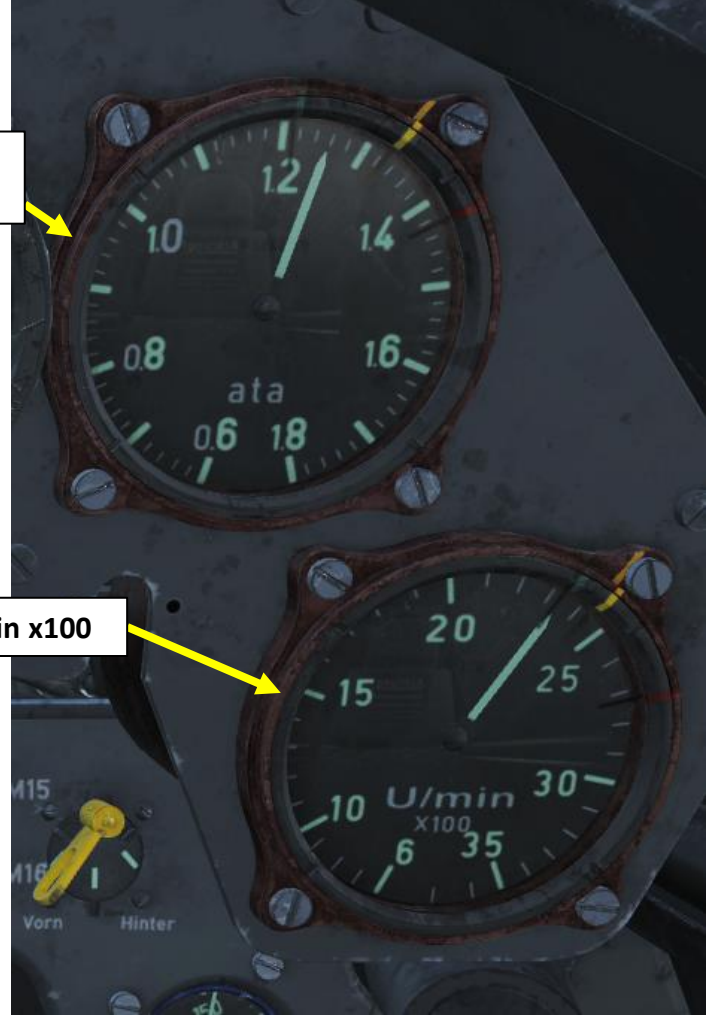
Fuel Pressure: Min 1.3 kg/cm^2 – Max 1.7 kg/cm^2



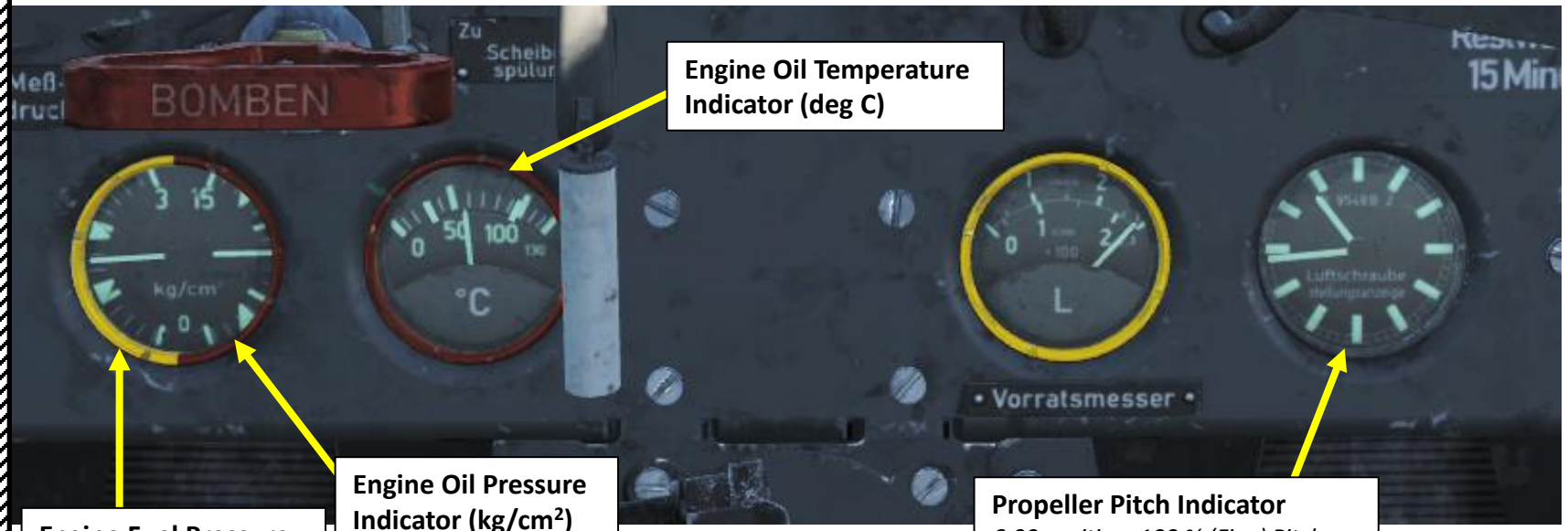
Radiator Flaps Position Indicator
Up: Zu (Closed)
Down: Auf (Open)

Radiator Flaps Control Lever
Rotate clockwise to Open, counter-clockwise to Close

Supercharger Pressure Gauge (ATA)
Similar to Boost or Manifold Pressure



Engine RPM/Umin x100



Engine Oil Temperature Indicator (deg C)

Engine Oil Pressure Indicator (kg/cm^2)

Engine Fuel Pressure Indicator (kg/cm^2)

Propeller Pitch Indicator
6:00 position: 100 % (Fine) Pitch
12:30 position: 0 % (Coarse) Pitch

POWER SETTINGS (SUPERCHARGER IN FIRST STAGE, BELOW 3300 M)

Throttle Position (deg)	Power Output	RPM	Manifold Pressure (ATA)	Permissible Time	Altitude (m)
84-90	Takeoff & Emergency Power	2700	1.4	3 min	600
71	Combat & Climb Power	2400	1.3	30 min	700
66	Max Continuous Power	2300	1.2	Constant	1200
54	Max Economy Power	2100	1.1	Constant	1800

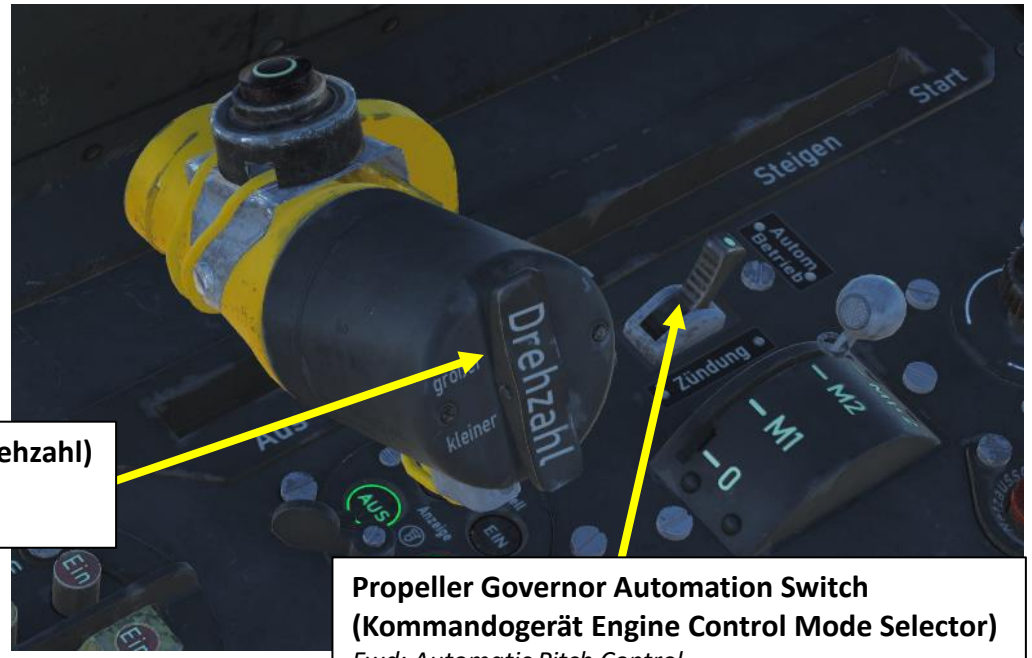
POWER SETTINGS (SUPERCHARGER IN SECOND STAGE, ABOVE 3300 M)

Throttle Position (deg)	Power Output	RPM	Manifold Pressure (ATA)	Permissible Time	Altitude (m)
84-90	Takeoff & Emergency Power	2700	1.4	3 min	5700
71	Combat & Climb Power	2400	1.3	30 min	5300
66	Max Continuous Power	2300	1.2	Constant	5500
54	Max Economy Power	2100	1.1	Constant	5400

KOMMANDOGERÄT ENGINE CONTROL UNIT

The *Kommandogerät* a hydromechanical multifunction integrator that dramatically simplifies engine control. While in most other contemporary aircraft the pilot had to constantly operate a slew of levers to manage throttle level, propeller pitch, fuel mixture, and supercharger stages, the *Kommandogerät* takes the majority of the workload away.

The pilot simply has to move the throttle lever to set the desired manifold pressure. The *Kommandogerät* takes care of the rest, setting all other parameters to allow the engine to properly operate at the desired manifold pressure, given the current flight conditions. The gauge used to monitor desired supercharger pressure is the supercharger pressure gauge to the right of the front dashboard labeled "ATA". If the *Kommandogerät* somehow fails, you can use a manual propeller pitch control.



Propeller Pitch Manual Rocker Switch (Drehzahl)
Größer = Finer = Increases RPM
Kleiner = Coarser = Decreases RPM

Propeller Governor Automation Switch (Kommandogerät Engine Control Mode Selector)
Fwd: Automatic Pitch Control
Aft: Manual Pitch Control

Propeller Pitch Indicator
6:00 position: 100 % (Fine) Pitch
12:30 position: 0 % (Coarse) Pitch

SUPERCHARGER BASICS

A **supercharger is an engine-driven air pump or compressor that provides compressed air to the engine to provide additional pressure to the induction air so the engine can produce additional power.** It increases manifold pressure and forces the fuel/air mixture into the cylinders. The higher the manifold pressure, the more dense the fuel/air mixture, and the more power an engine can produce.

With a normally aspirated engine, it is not possible to have manifold pressure higher than the existing atmospheric pressure. A supercharger is capable of boosting manifold pressure above 1.0 ATA (30 in Hg). For example, at 2500 meters (8000 ft) a typical engine may be able to produce 75 percent of the power it could produce at mean sea level (MSL) because **the air is less dense at the higher altitude**. The supercharger compresses the air to a higher density allowing a supercharged engine to produce the same manifold pressure at higher altitudes as it could produce at sea level.

Thus, an engine at 8,000 feet MSL could still produce 0.85 ATA of manifold pressure whereas without a supercharger it could produce only 0.75 ATA. Superchargers are especially valuable at high altitudes (such as 18,000 feet / 5500 m) where the air density is 50 percent that of sea level. The use of a supercharger in many cases will supply air to the engine at the same density it did at sea level. With a normally aspirated engine, it is not possible to have manifold pressure higher than the existing atmospheric pressure.

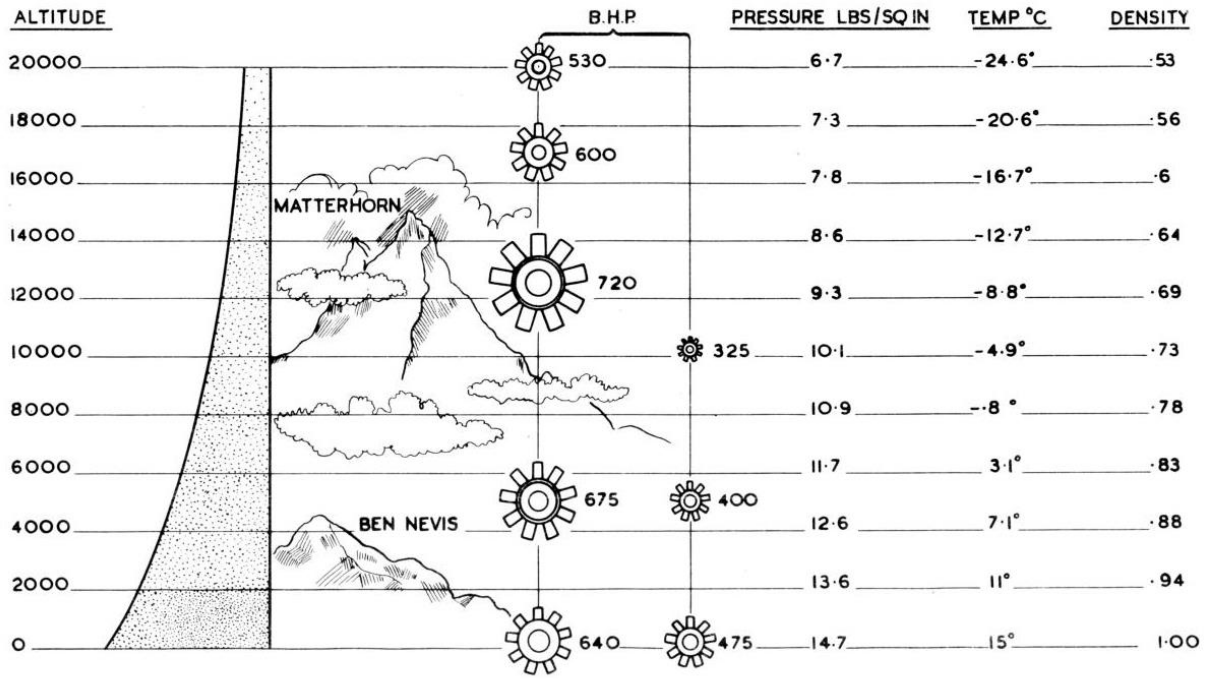
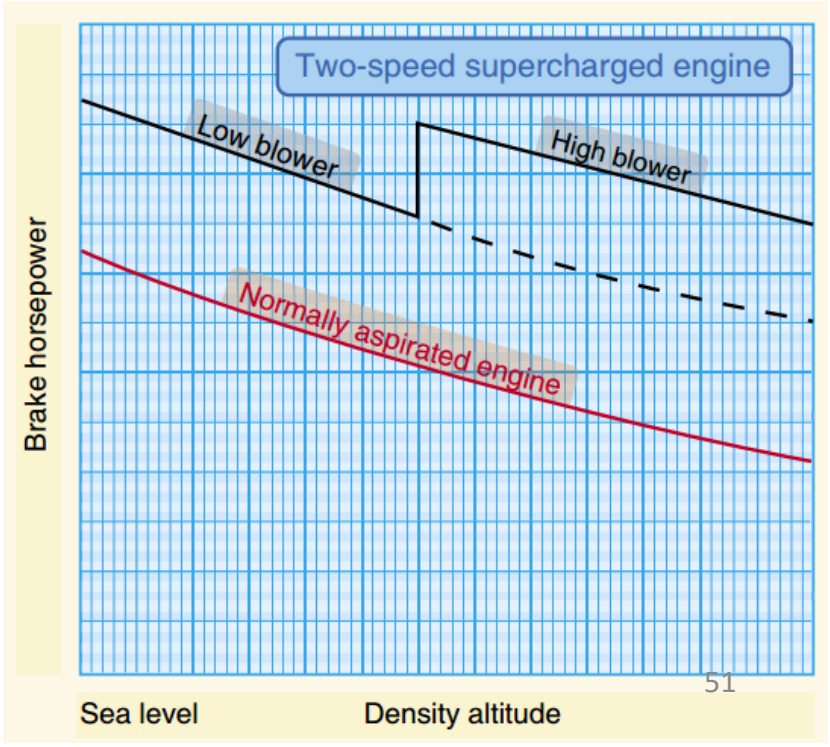


DIAGRAM SHOWING ATMOSPHERIC AND POWER VARIATIONS



SUPERCHARGER OPERATION

The supercharger installed on the BMW 801D-2 engine comes equipped with a two-speed supercharger, a reduction gear, and a 12-blade cooling fan. The fan located in front of the engine supplies the air which enters the filtered air intakes through two channels on both sides of the fuselage fairing. In the 1930's-1940's, the first few aircraft that had a two-speed supercharger had a manual control that had to be set once the aircraft was high enough (air density was low enough to see a noticeable difference once the supercharger is shifted into second gear). In our case, the supercharger shifts gear automatically (managed by the Kommandogerät Control Unit) once a threshold altitude is reached. In practice, you will notice the manifold pressure gauge (ATA) will suddenly increase once the supercharger shifts into high gear.

At an altitude of approximately 3300 +/- 200 meters, the supercharger automatically switches supercharger speed from low to high. Try not to fly or frequently change your altitude within this threshold.

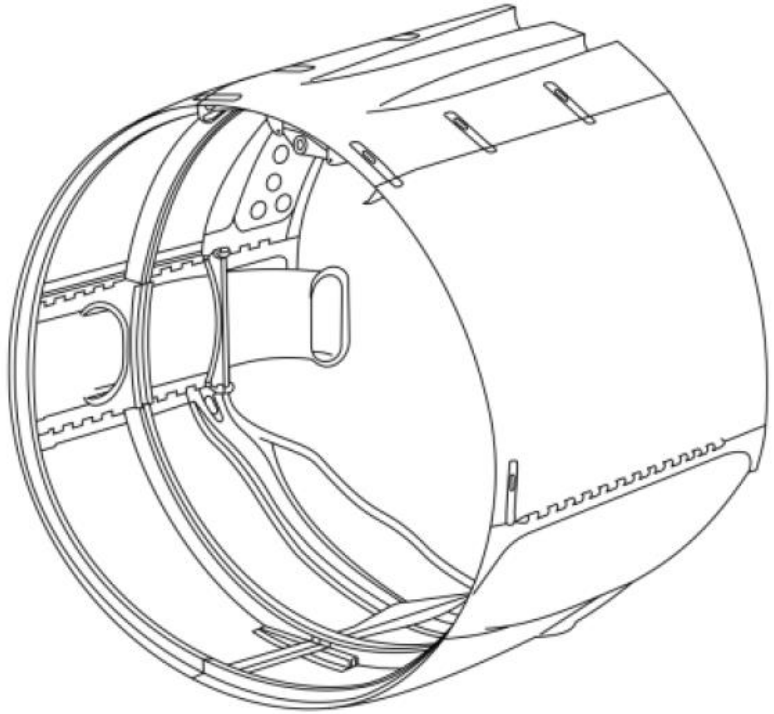
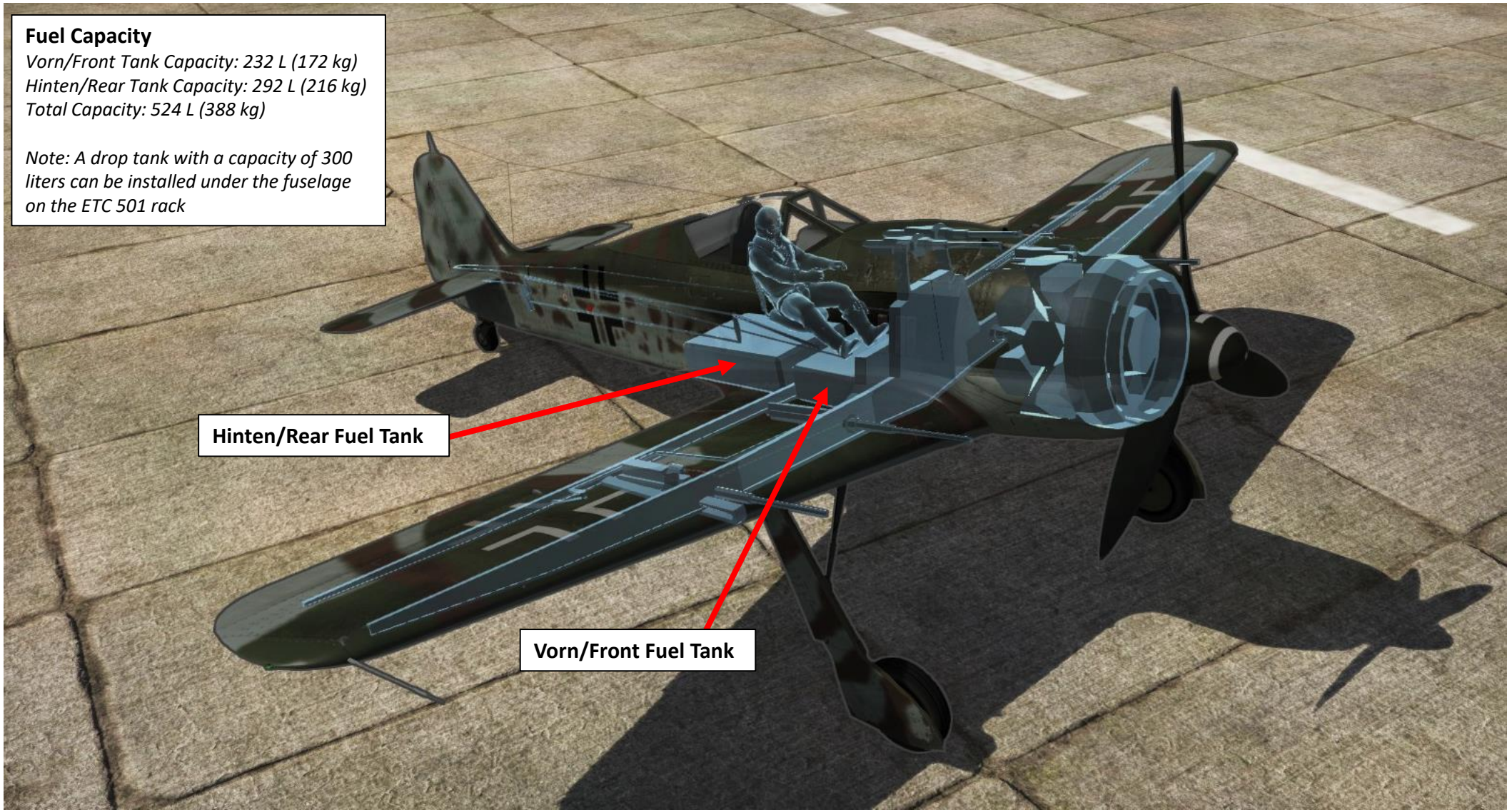


Figure 15: Engine cowling with internal air intake channels

FUEL TANKS

Fuel Capacity
Vorn/Front Tank Capacity: 232 L (172 kg)
Hinten/Rear Tank Capacity: 292 L (216 kg)
Total Capacity: 524 L (388 kg)

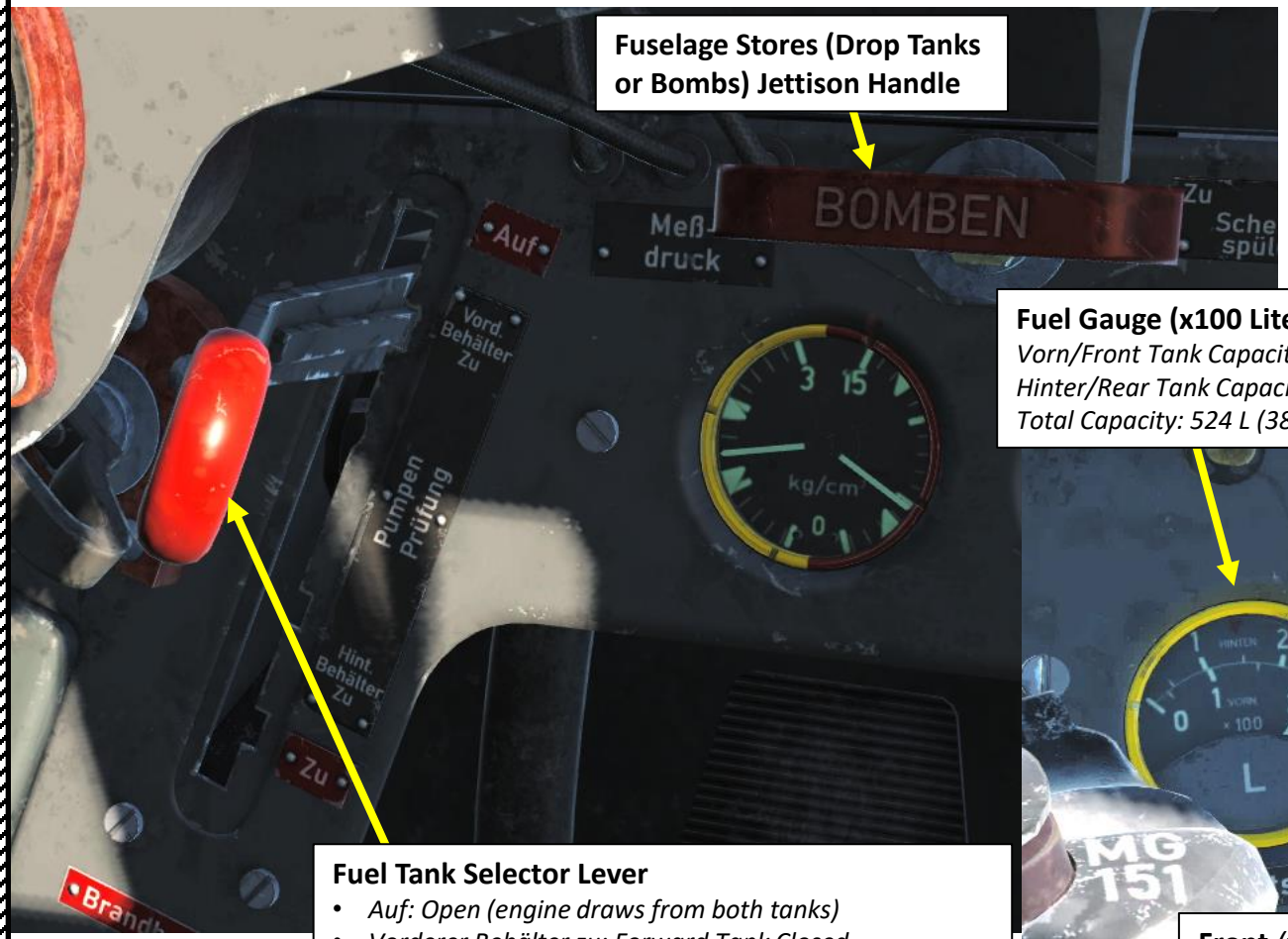
Note: A drop tank with a capacity of 300 liters can be installed under the fuselage on the ETC 501 rack



FUEL MANAGEMENT

Since If there are additional fuel tanks (auxiliary fuselage and/or external drop tank), the fuel from them enters the rear fuel tank via two lines. When the fuel level in the aft tank reaches exactly 240 liters, the restrictor valve opens up the auxiliary line. The additional tanks continue to feed the aft tank until they are fully depleted. The additional tanks are not equipped with any fuel gauge sensors, and so the only way to tell that they have been fully depleted is when the aft tank's fuel level begins to drop below 240 liters.

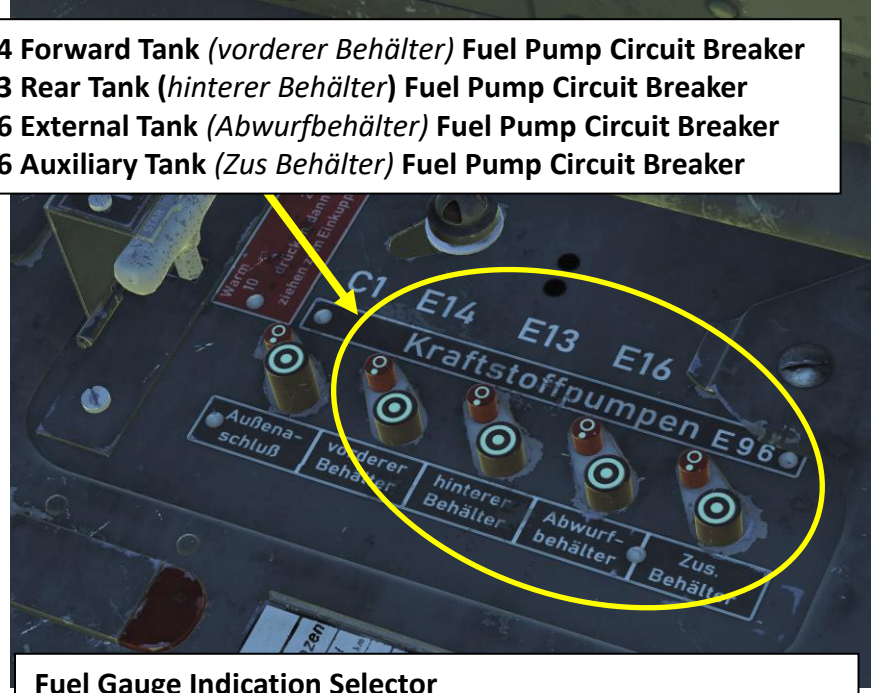
When flying with drop tanks, drop tank fuel should be used first (Set Fuel Tank Selector to "*Vorderer Behälter zu*" to close the forward tank and use fuel from the drop tank, which feeds into the rear tanks). When the fuel inside the drop tank is exhausted, the fuel tank selector lever is set to "Auf" and the external drop tank fuel pump should be turned off.



Fuselage Stores (Drop Tanks or Bombs) Jettison Handle

Fuel Tank Selector Lever

- *Auf: Open (engine draws from both tanks)*
- *Vorderer Behälter zu: Forward Tank Closed*
- *Hinterer Behälter zu: Rear Tank Closed*
- *Zu: Closed (both fuel lines to booster pump are closed)*

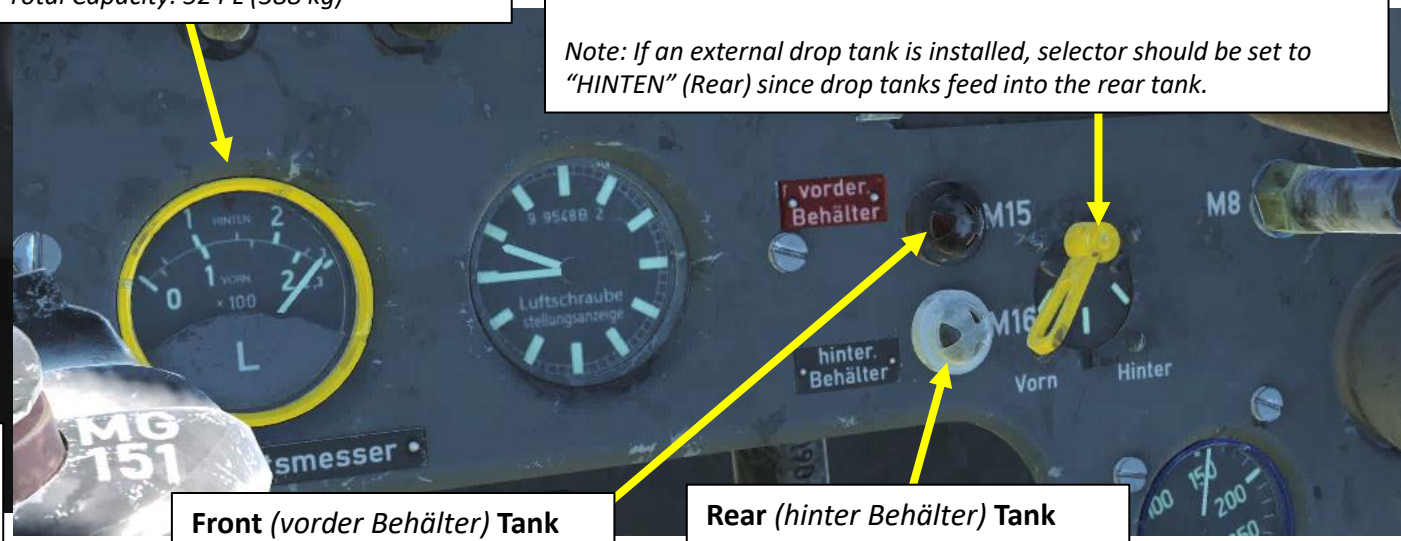


E14 Forward Tank *(vorderer Behälter)* **Fuel Pump Circuit Breaker**
E13 Rear Tank (*hinterer Behälter***) Fuel Pump Circuit Breaker**
E16 External Tank *(Abwurfbehälter)* **Fuel Pump Circuit Breaker**
E96 Auxiliary Tank *(Zus Behälter)* **Fuel Pump Circuit Breaker**

Fuel Gauge (x100 Liters)
Vorn/Front Tank Capacity: 232 L (172 kg)
Hinter/Rear Tank Capacity: 292 L (216 kg)
Total Capacity: 524 L (388 kg)

Fuel Gauge Indication Selector
Left: Vorn = Front
Middle: No Tank Selected
Right: Hinter = Rear

Note: If an external drop tank is installed, selector should be set to "HINTEN" (Rear) since drop tanks feed into the rear tank.



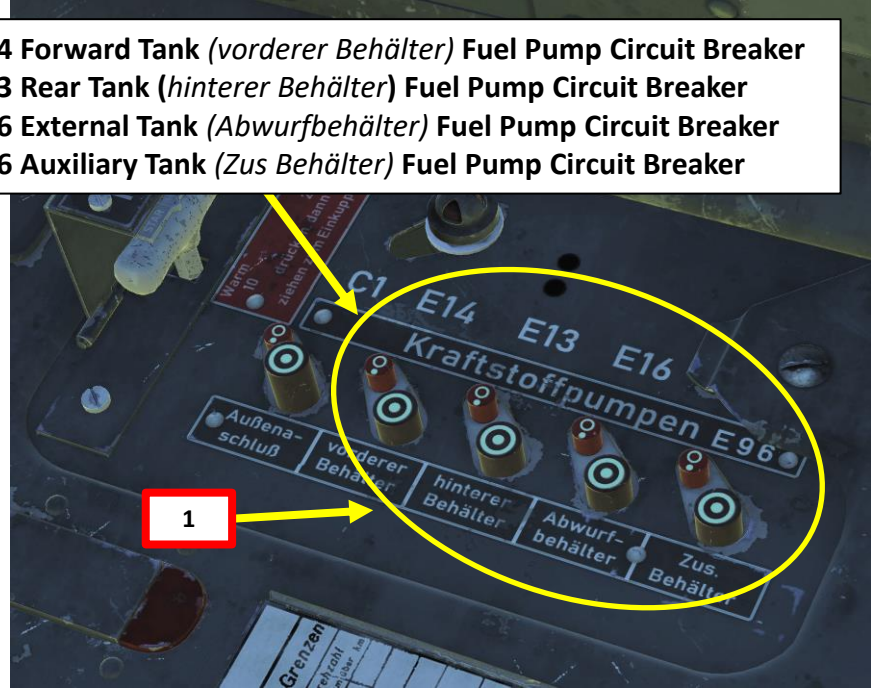
Front *(vorder Behälter)* **Tank FUEL LOW warning light**
Illuminates when below 80 Liters

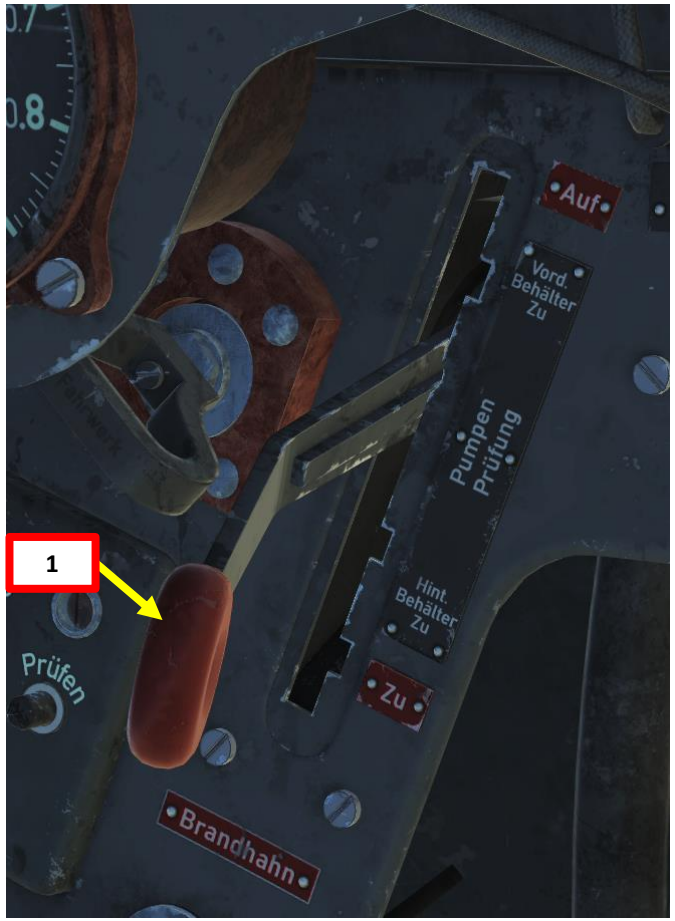
Rear *(hinter Behälter)* **Tank FUEL LOW warning light**
Illuminates when below 10 Liters

FUEL DROP TANK OPERATION

1. Since the drop tank feeds into the rear fuel tank, set fuel tank selector lever to "*VORDERER BEHÄLTER ZU*" (FORWARD TANK CLOSED) and turn on the E96 Fuel Pump Circuit Breaker to consume fuel from the drop tank first.
2. When ready to jettison drop tank, make sure that your fuel tank selector is set to "*AUF*" (OPEN) and turn off the E96 Fuel Pump Circuit Breaker.
3. To jettison fuel drop tank, pull the "*BOMBEN*" (BOMB/DROP TANK JETTISON) handle.

E14 Forward Tank *(vorderer Behälter)* **Fuel Pump Circuit Breaker**
E13 Rear Tank (*hinterer Behälter***) Fuel Pump Circuit Breaker**
E16 External Tank *(Abwurfbehälter)* **Fuel Pump Circuit Breaker**
E96 Auxiliary Tank *(Zus Behälter)* **Fuel Pump Circuit Breaker**





Airspeed Indicator (km/h)

Not to Exceed diving speeds are handwritten on the airspeed gauge

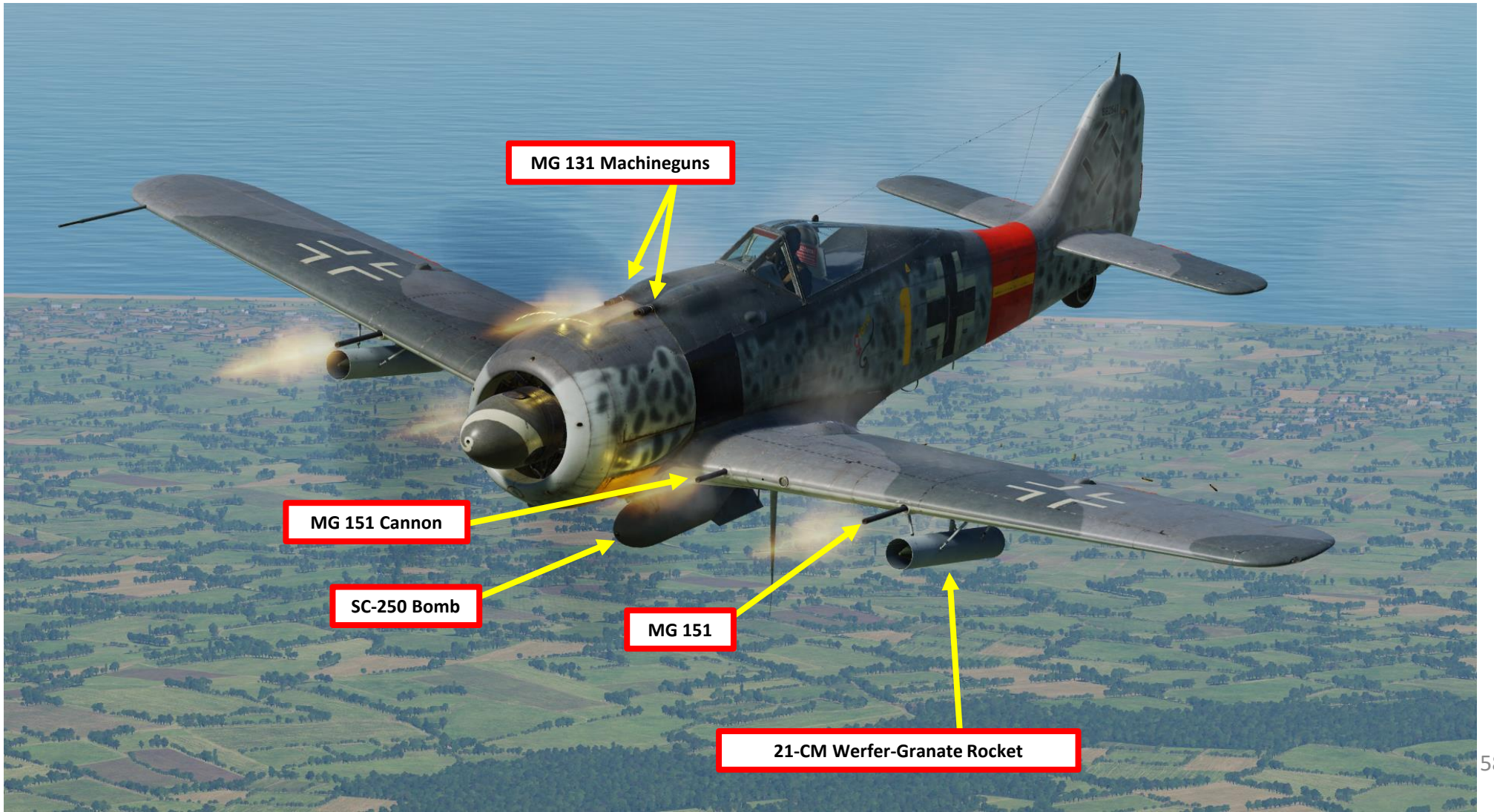
Airspeed @ Altitude

- *500 km/h @ 9 km*
- *600 km/h @ 7 km*
- *700 km/h @ 5 km*
- *800 km/h @ 3 km*
- *850 km/h @ 2 km*

ARMAMENT

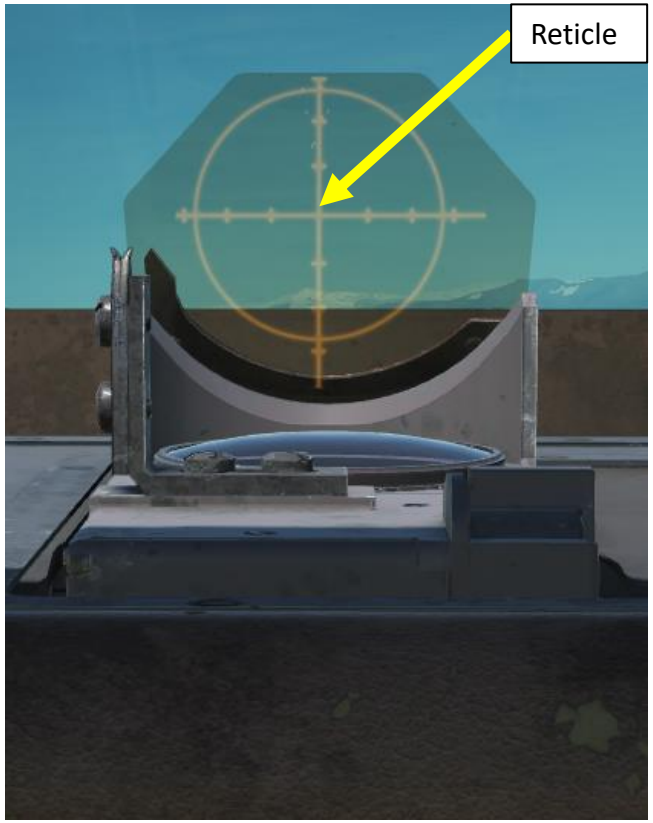
ARMAMENT OVERVIEW

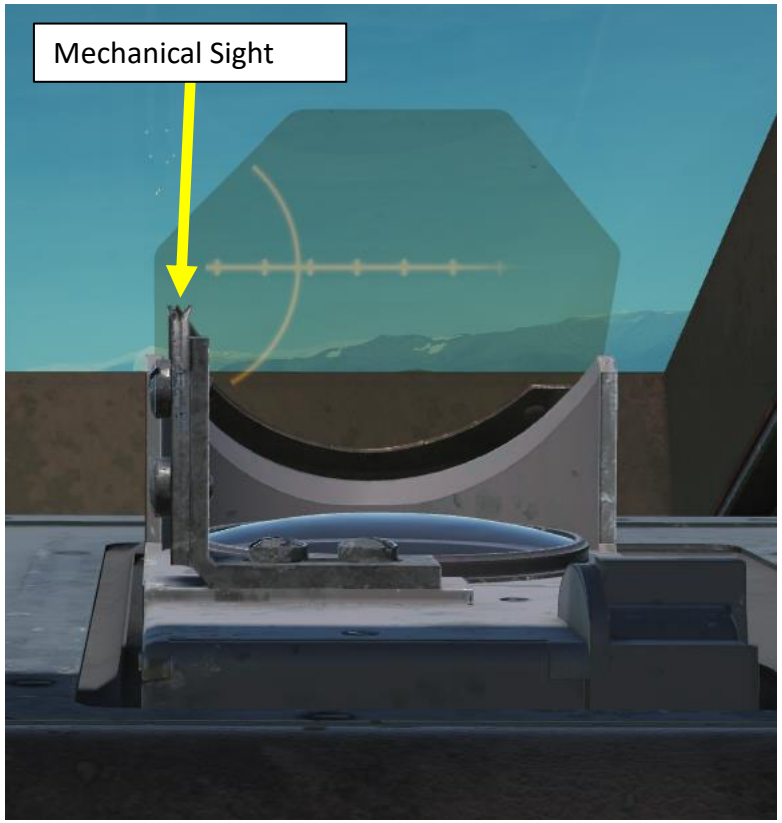
- 4 x Mauser MG151 20 mm Cannons (250 rounds per cannon for inner wing guns, 125 rounds per cannon for outer wing guns)
- 2 x Rheinmetall-Borsig MG131 13 mm Machineguns (475 rounds per gun)
- 4 x SC-50 kg bomb
- 1 x SC-250 kg bomb
- 1 x SC-500 kg bomb
- 2 x Werfer-Granate 21-cm anti-air Rockets



REVI-16B GUNSIGHT

- For weapons targeting, the Fw 190 A-8 came equipped with the standard Revi 16B gunsight that was installed on the vast majority of Luftwaffe combat aircraft.
- The Revi 16B is a sight designed for use with both synchronized and unsynchronized aircraft weaponry and is equipped with both a built-in dimming rheostat for adjusting the crosshair brightness and a night filter.
- Reflector sights work by projecting an image of the targeting reticle onto the reflector glass such that the reticle appears at infinity, providing a fixed aiming point relative to the weapon's line of fire. Alternatively, you can use the Mechanical Sight to aim.
- When using the Revi 16B in combat, the pilot must independently make corrections for the target lead and distance, G-loads, and other parameters necessary for accurate fire.





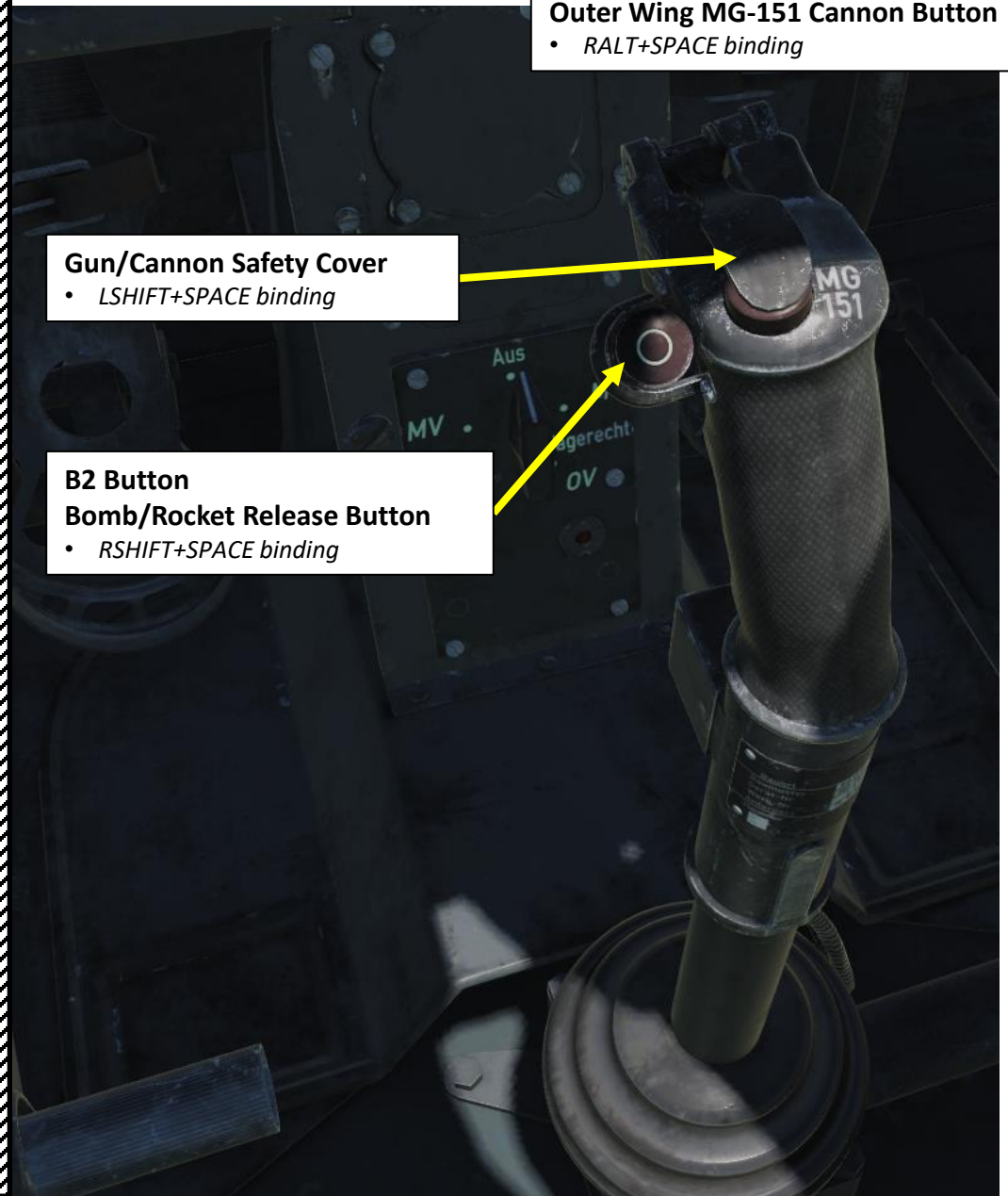
WEAPON CONTROLS

B1 Button
Outer Wing MG-151 Cannon Button
- *RALT+SPACE binding*

A Button
Inner Wing MG-151 Cannon & MG-131 Machinegun Button
- *Note: If the Cannon Safety Cover is ON, the MG-151/131 Trigger will only fire machineguns when pressed.*

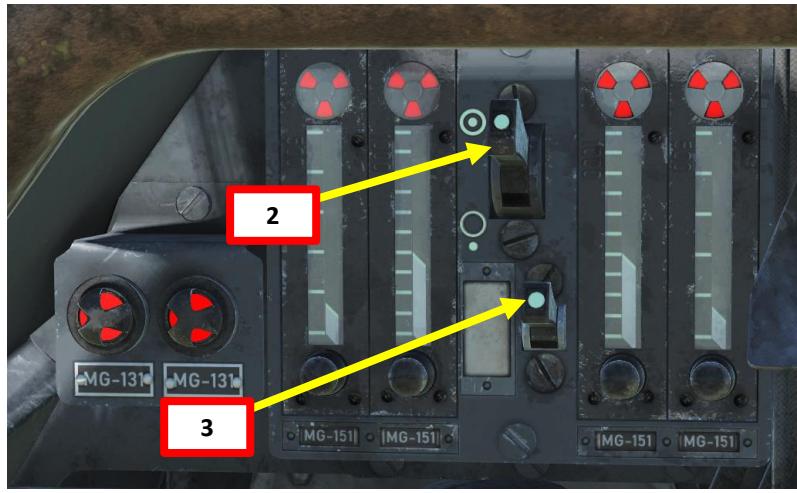
Gun/Cannon Safety Cover
- *LSHIFT+SPACE binding*

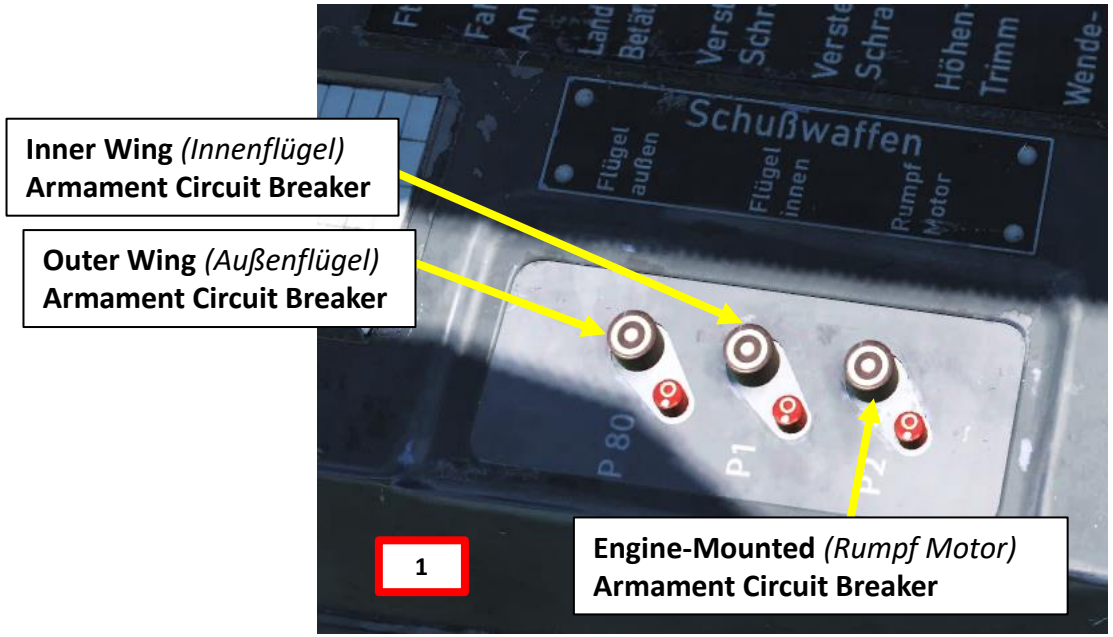
B2 Button
Bomb/Rocket Release Button
- *RSHIFT+SPACE binding*

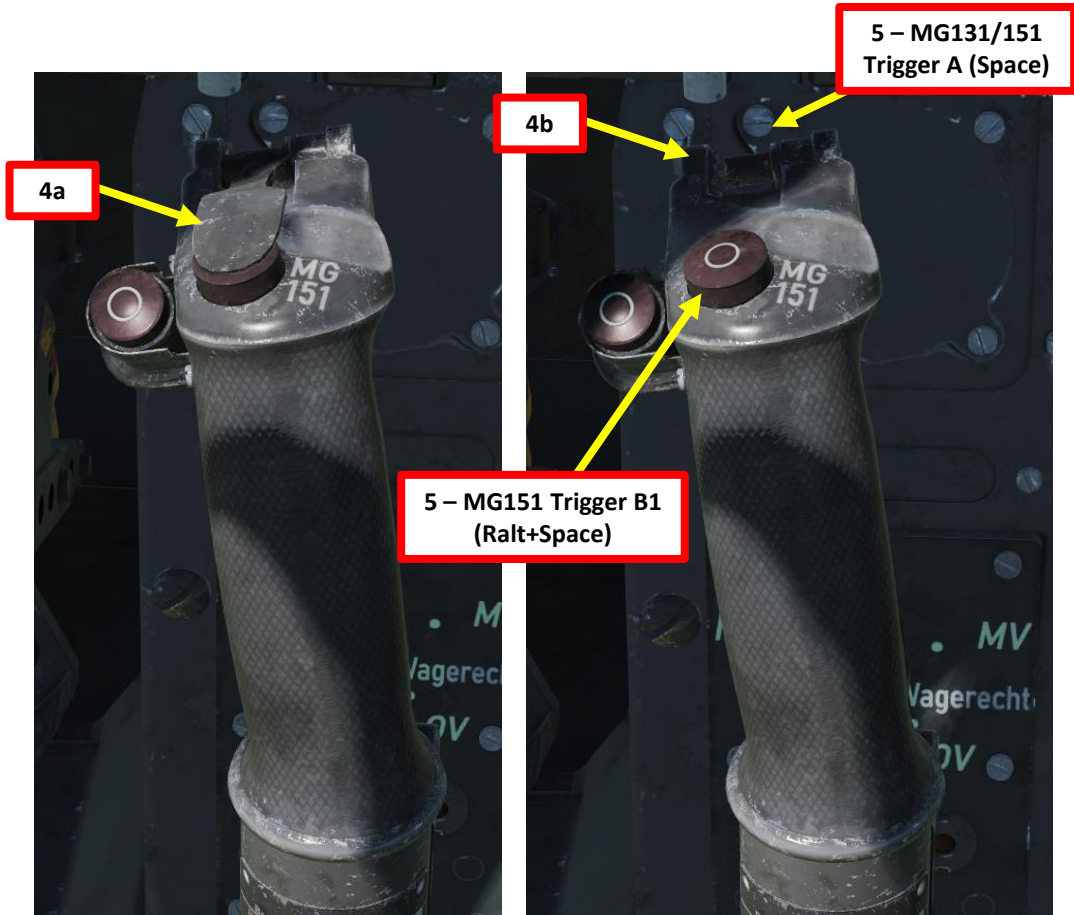


WEAPON EMPLOYMENT (CANNONS + MACHINEGUNS)

1. Verify that the P80 Outer Wing, P1 Inner Wing and P2 Engine-Mounted Armament Circuit Breakers are IN (ON).
2. Arm Machineguns and Inner Wing Cannons by setting the MASTER ARM SAFETY I switch ON (UP)
3. Arm Outer Wing Cannons by setting the MASTER ARM SAFETY II switch ON (UP)
4. Flip the Cannon Safety Cover UP (LSHIFT+SPACE)
5. Press the “MG131/151 Trigger A” button (SPACE) to fire your MG131 Machineguns and Inner Wing MG151 Cannons. Press the “MG151 Trigger B1” button (RALT+SPACE) to fire Outer Wing MG151 Cannons. Hold both triggers at once to fire all machineguns and cannons at once.





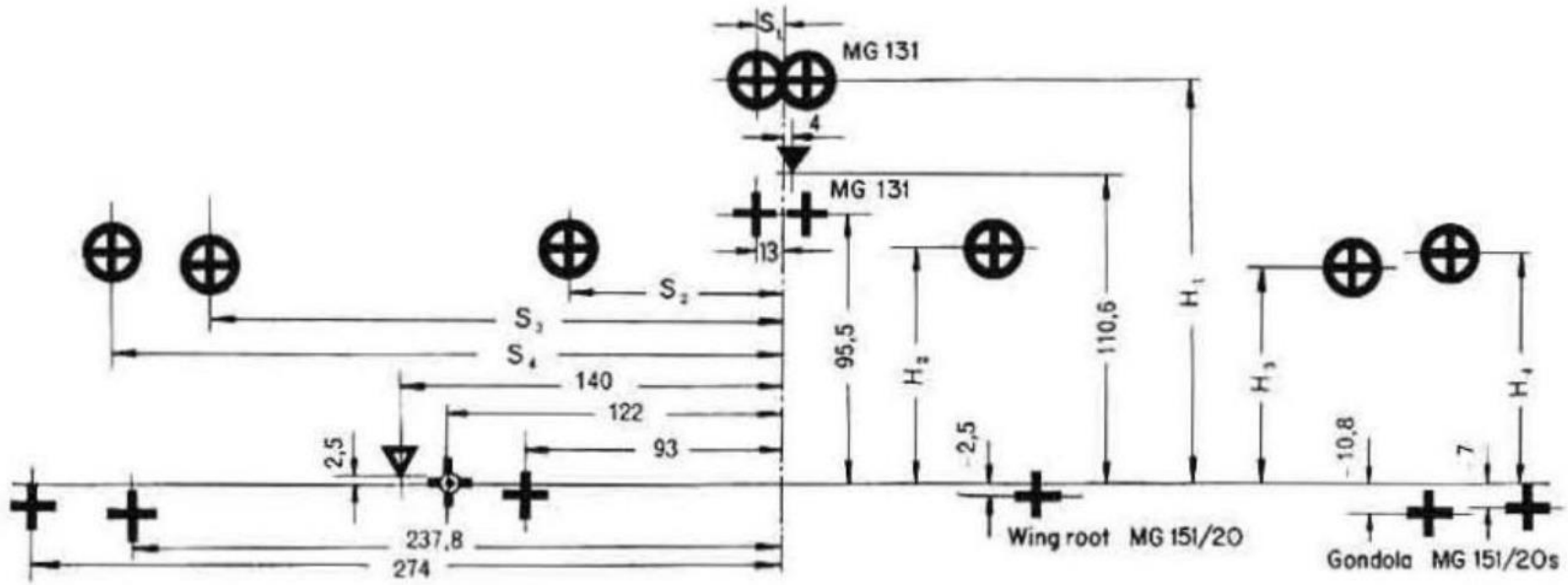


WEAPON EMPLOYMENT (CANNONS + MACHINEGUNS)

ARMAMENT BALLISTICS

Gunfire strike table at 50m and 100m, in cm

Range	Fuselage 2 MG 131		Wing-root 2 MG 151/20		Gond.,inner 2 MG 151/20		Gond.,outer 2 MG 151/20	
	H_1	S_1	H_2	S_2	H_3	S_3	H_4	S_4
0m	95,5	13	-2,5	93	-10,8	237,8	-7	274
50m	121	13	44	85	37	223	41	258
100m	142	13	85	78	78	208	83	244



Weapons:

Fuselage: 2 MG 131
Wing-roots: 2 MG 151/20
Gondola,inner: 2 MG 151/20
Gondola,outer: 2 MG 151/20

Alignment:

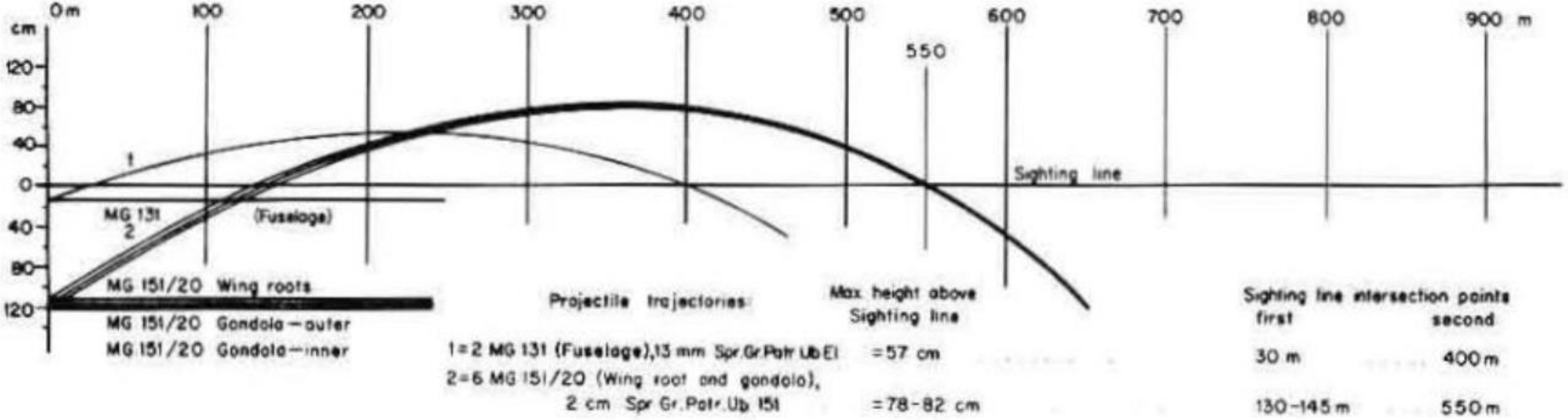
Harmonization 400m, Crossover: parallel
Harmonization 550m, Crossover: 600m
Harmonization 550m, Crossover: 800m
Harmonization 550m, Crossover: 900m

Ammunition:

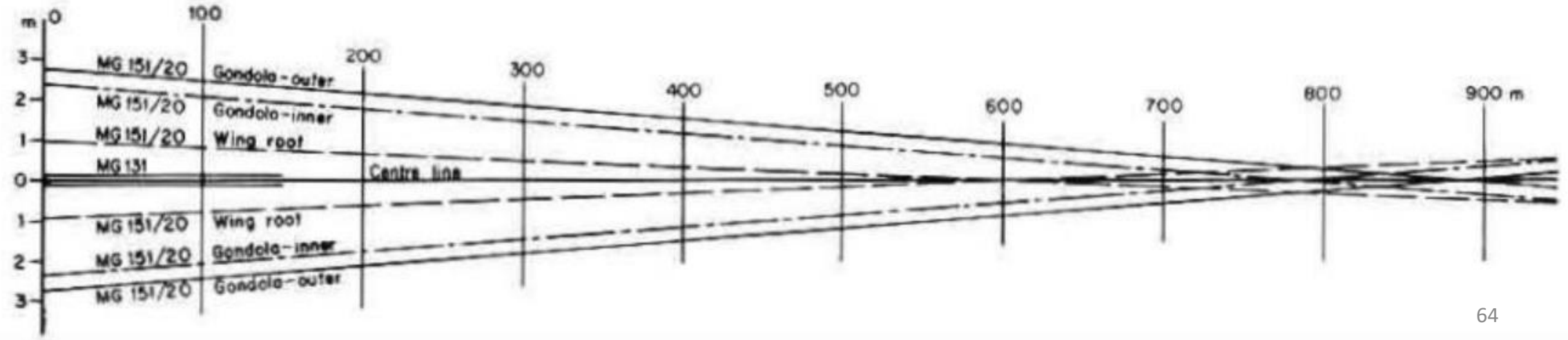
13mm Spr.Gr.Ub.El.
2cm Spr.Gr.Patr.Ub.151
2cm Spr.Gr.Patr.Ub.151
2cm Spr.Gr.Patr.Ub.151

Gunfire strike table at 50m and 100m, in cm

ARMAMENT BALLISTICS

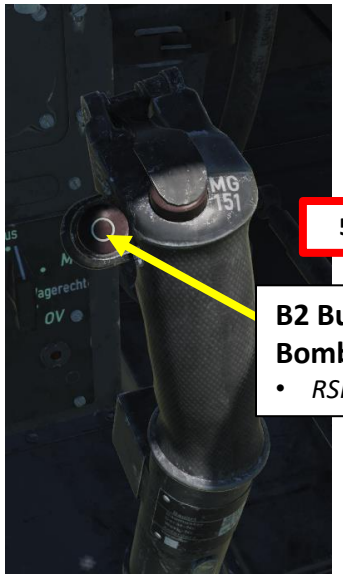


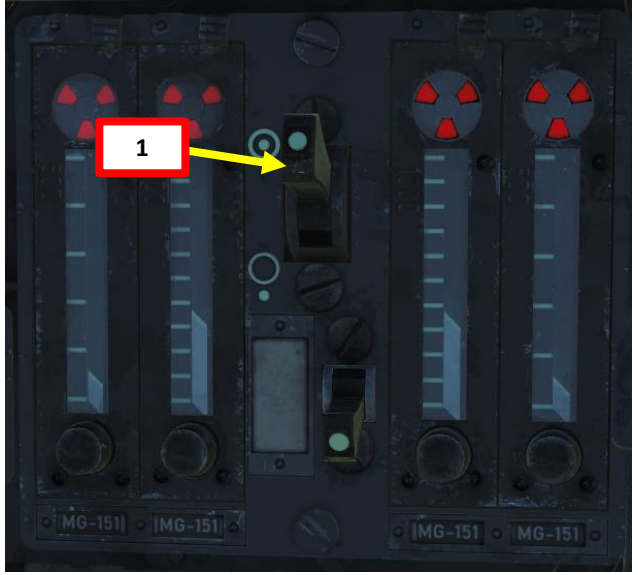
Projectile trajectories:	Max. height above Sighting line	Sighting line intersection points first	second
1 = 2 MG 131 (Fuselage), 13 mm Spr. Gr. Patr. Ub. El.	= 57 cm	30 m	400 m
2 = 6 MG 151/20 (Wing root and gondola), 2 cm Spr. Gr. Patr. Ub. 151	= 78–82 cm	130–145 m	550 m

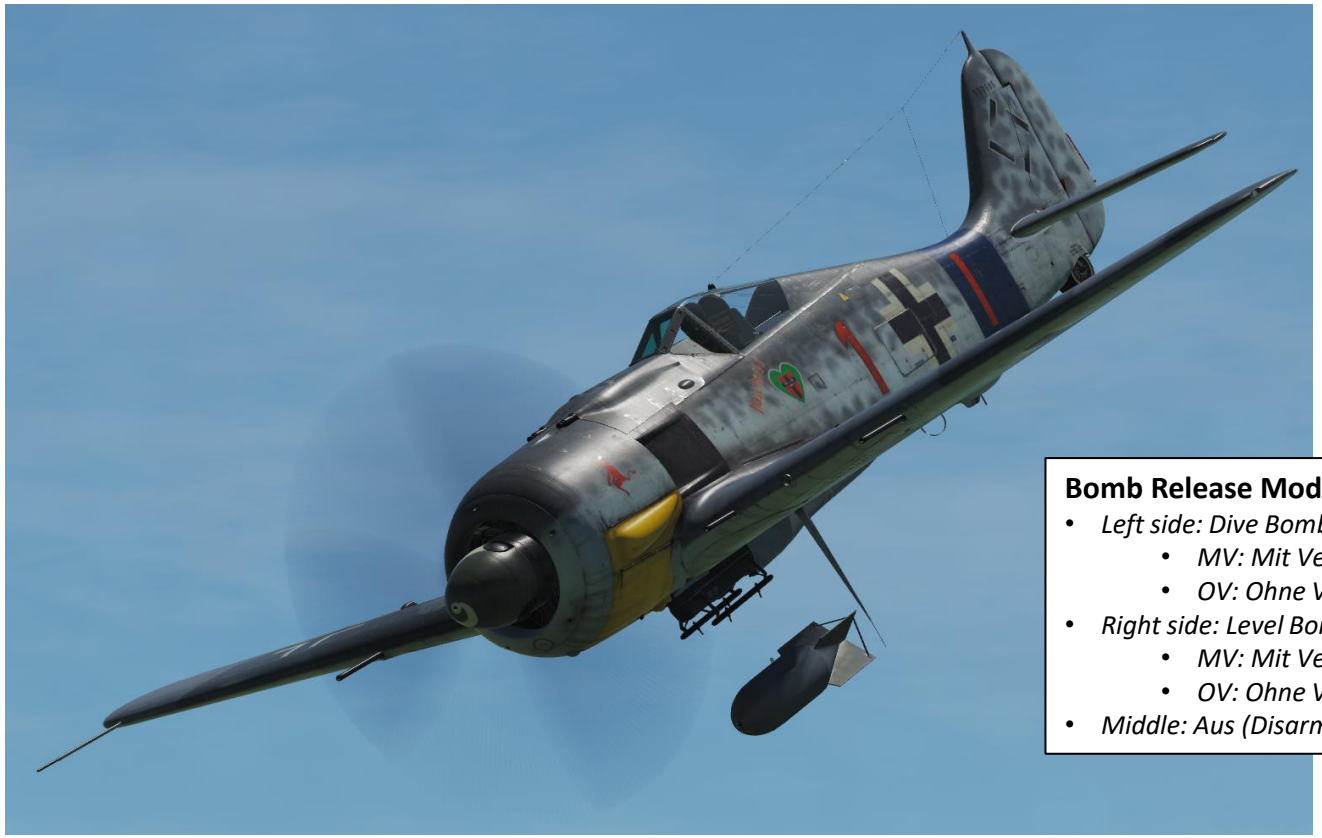


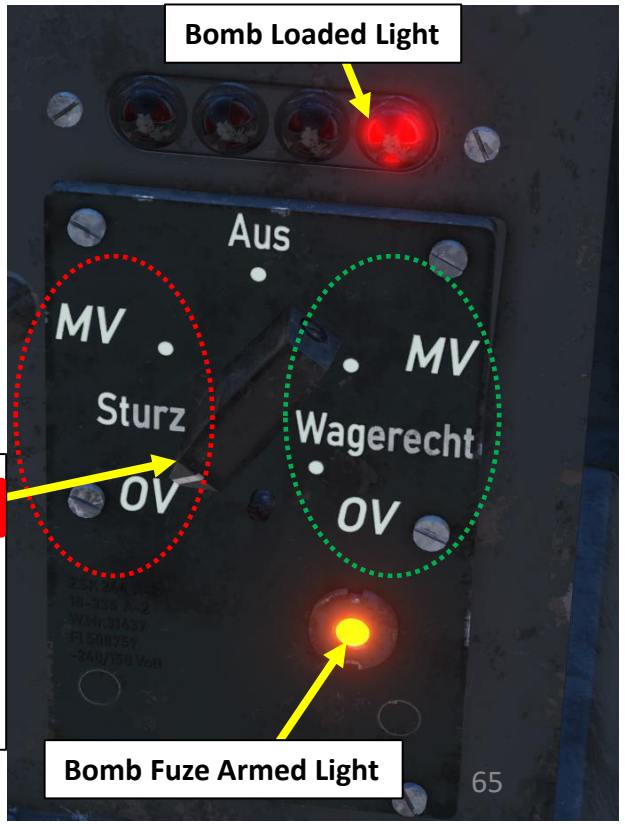
WEAPON EMPLOYMENT (BOMBS)

1. Set Master Arm Safety I Switch – ON (UP)
2. Choose bomb release mode
   - Left Side (Red) = *Sturz* = Dive Bombing
   - Right Side (Green) = *Wagerecht* = Level Bombing
3. Choose desired fuse delay
   - MV = *Mit Verzögerung* = With Delay
   - OV = *Ohne Verzögerung* = Without Delay
4. Select appropriate release mode on console.
   - Example: Sturz OV= Dive Bombing Without Delay
5. Release bomb using the "Bomb Drop B2" button (RSHIFT+SPACE).







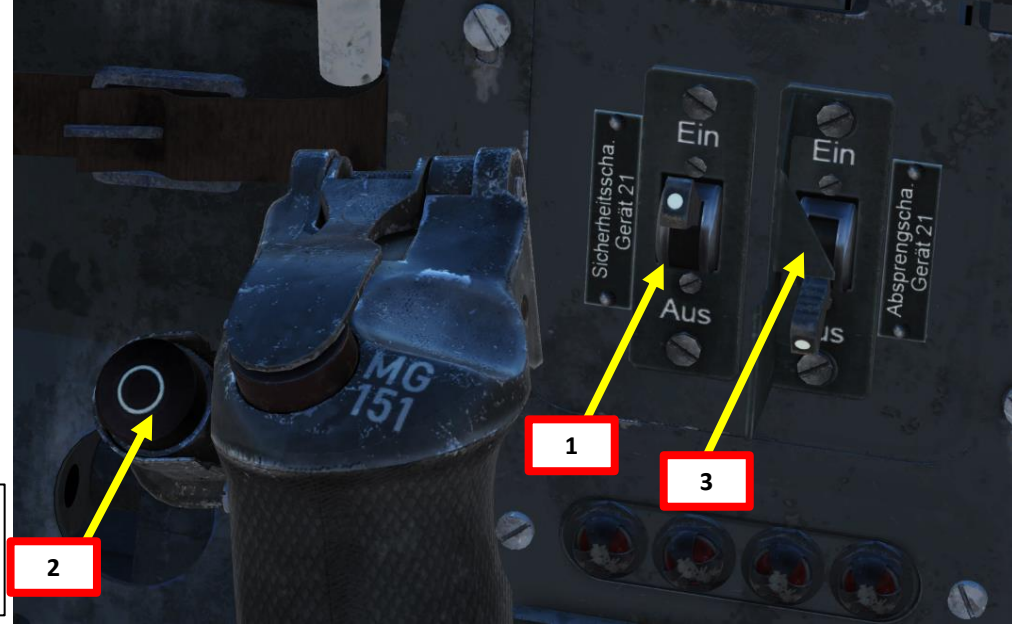


Bomb Release Mode Selector Switch
- *Left side: Dive Bombing (Sturz)*
  - *MV: Mit Verzögerung (with delay)*
  - *OV: Ohne Verzögerung (without delay)*
- *Right side: Level Bombing (Wagerecht)*
  - *MV: Mit Verzögerung (with delay)*
  - *OV: Ohne Verzögerung (without delay)*
- *Middle: Aus (Disarmed)*

WEAPON EMPLOYMENT (ROCKETS)

1. Arm rockets by setting the “SICHERHEITSSCHA. GERÄT 21” switch to EIN (UP).
2. Press the “Bomb Drop B2” button (RSHIFT+SPACE) to fire rocket.
3. To jettison rocket racks, set the “ABSPRENGSCHA. GERÄT 21” switch to EIN (UP) by lifting the safety cover. (Not Currently Implemented)

Note: 21-cm Werfer-Granate Rockets were used as anti-air rockets against the heavy bomber combat boxes.

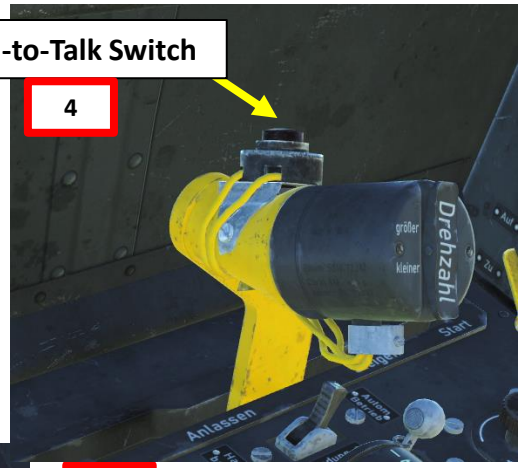


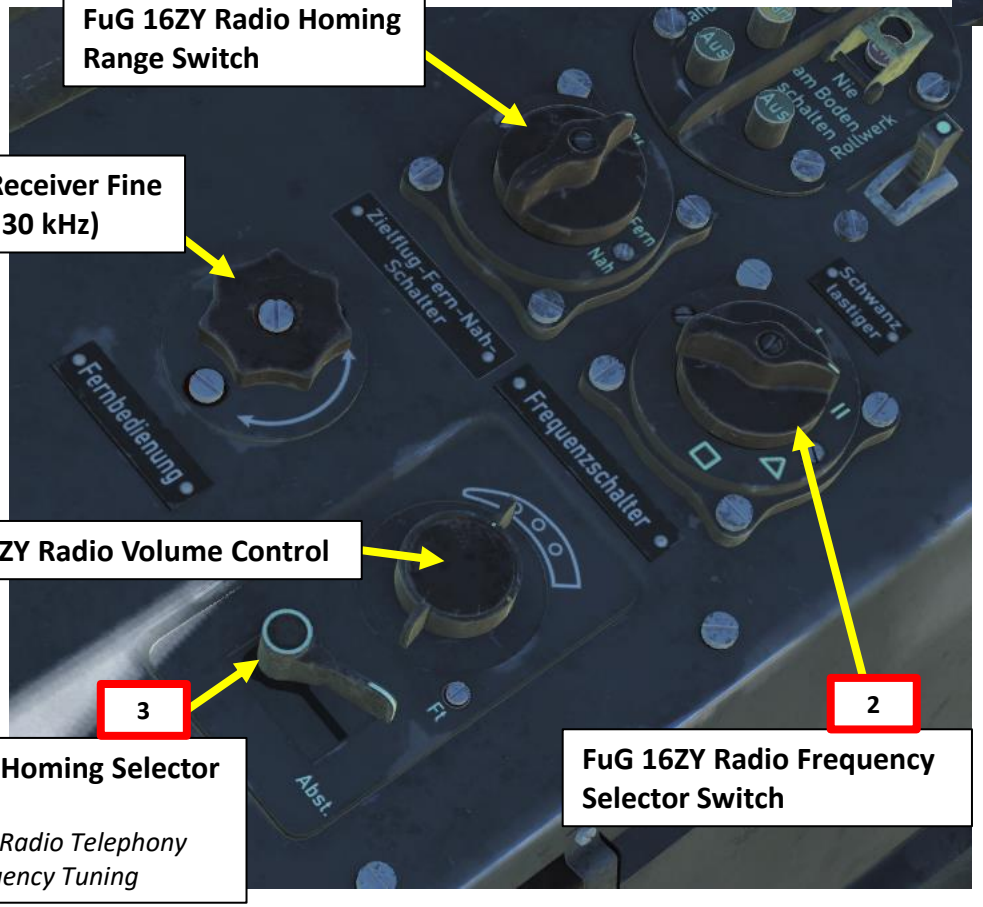
B2 Button
Bomb/Rocket Release Button
- *RSHIFT+SPACE binding*

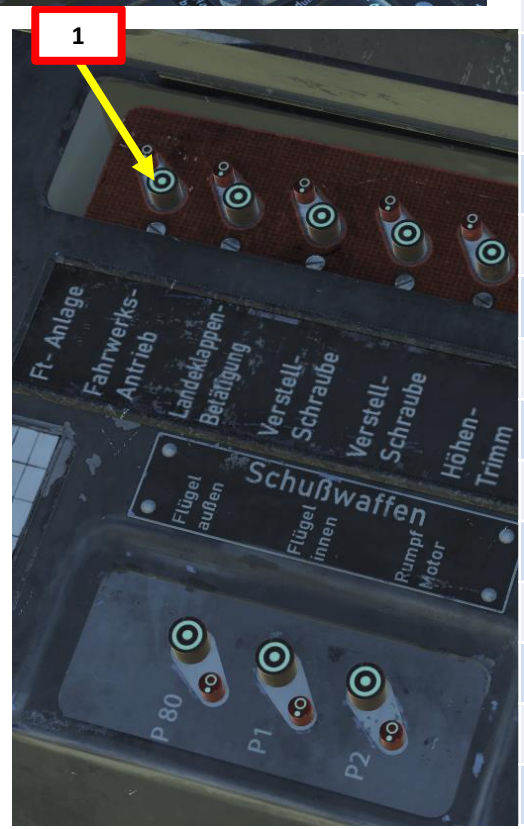
The FW190 is equipped with a FUG 16ZY radio transmitter and receiver. Radio frequencies are preset in the mission editor in 4 different channels and cannot be tuned manually during flight.

1. Set FUG 16ZY Power Switch (FT ANLAGE) ON.
2. Set the radio channel selector to the desired frequency (I, II, Δ or □).
   - See note on next page about the real-life functions of these frequencies.
3. Set radio mode to "FT" (*FUNKTELEFONIE* = RADIO TELEPHONY)
4. Press the PUSH-TO-TALK switch on your throttle to transmit ("COMM PUSH TO TALK" CONTROL, OR "RALT+\")

RADIO FREQUENCY RANGE: 38.4- 42.4 MHz







AIRFIELD	FREQUENCY
Anapa	38.40 MHz
Batumi	40.40 MHz
Beslan	42.40 MHz
Gelendzhik	39.40 MHz
Gudauta	40.20 MHz
Kobuleti	40.80 MHz
Kutaisi	41.00 MHz
Krasnodar-Center	38.60 MHz
Krasnodar-Pashkovsky	39.80 MHz
Krymsk	39.00 MHz
Maykop	39.20 MHz
Mineralnye Vody	41.20 MHz
Mozdok	41.60 MHz
Nalchik	41.40 MHz
Novorossiysk	38.80 MHz
Senaki	40.60 MHz
Sochi	39.60 MHz
Soganlug	42.00 MHz
Sukhumi	40.00 MHz
Tbilisi	41.80 MHz
Vaziani	42.20 MHz

The "I" position is for "*Y-Führungsfrequenz*", or Management frequency, is used for communication within the flight or squadron. A mission maker will typically preset this frequency to the same frequency used by your wingmen of your flight and mention it in the mission briefing.

The "II" position is for "*Gruppenbefehlsfrequenz*", or Group Order frequency, is used to communicate between several flights from different squadrons participating in a single raid. A mission maker will typically preset this frequency to the same frequency used by other flights or friendly units and mention it in the mission briefing.

The "Δ" position is for "*Nah-Flugsicherungsfrequenz*", or the Air Traffic Control frequency. It is used to communicate with the designated Air Traffic Controller. A mission maker will typically preset this frequency to the same frequency used by your departure airfield and mention it in the mission briefing.

The "□" position is for "*Reichsjägerfrequenz*", or Reich Fighter Defense Frequency, and is used to coordinate country-wide air defense efforts in large scale raids.

Homing Switch	Frequency Selector	Push-To-Talk Open	Push-To-Talk Depressed	Transm	Recvr
"Ft"	I	Listen	Talk	I	II
"Abst"	I	Homing Listen	Homing Listen+Talk	I	II
"Ft"	II, Δ or □	Listen	Talk	II, Δ or □	
"Abst"	II, Δ or □	Listen to loop antenna Targeting	Talk	II, Δ or □	

Because on the first frequency selector position (I) sending and receiving are conducted at different frequencies, it is not used in this simulation.

For communication, use II, Δ or □ selector positions with "Ft" position of communications - homing switch.

The Repeater Compass

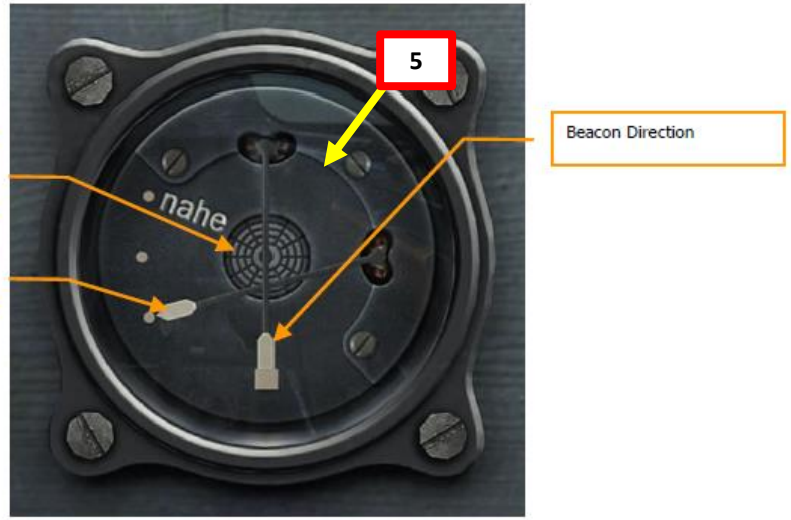
Most of the navigation must be done visually in the FW190. Consult the Repeater Gyrocompass.

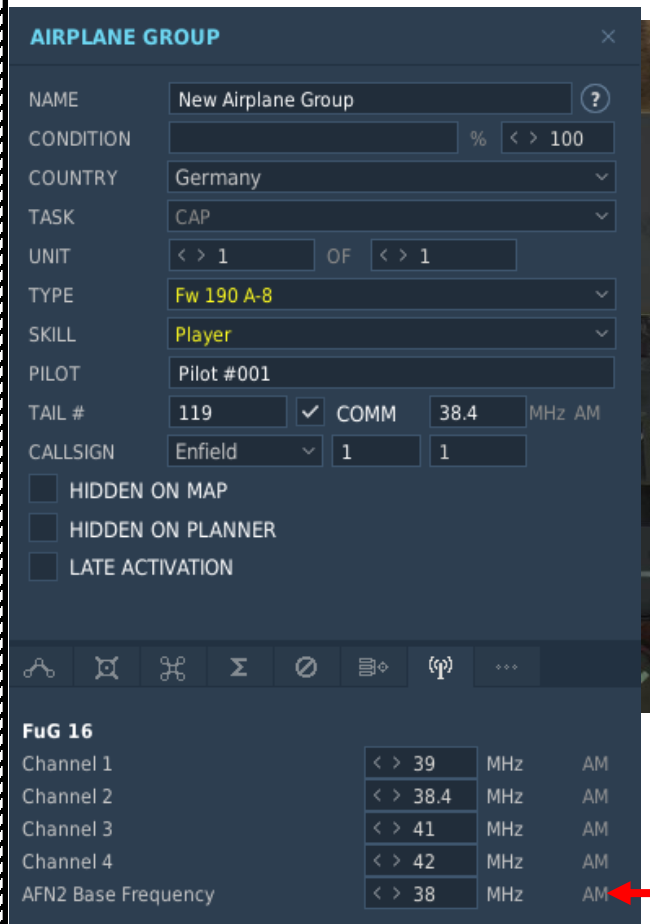
If desired, you can adjust your course setting by rotating the outer ring of the Repeater Compass. You can then steer the aircraft until the Aircraft Magnetic Heading needle (front of the airplane symbol) is lined up with the Course Setting reference mark.

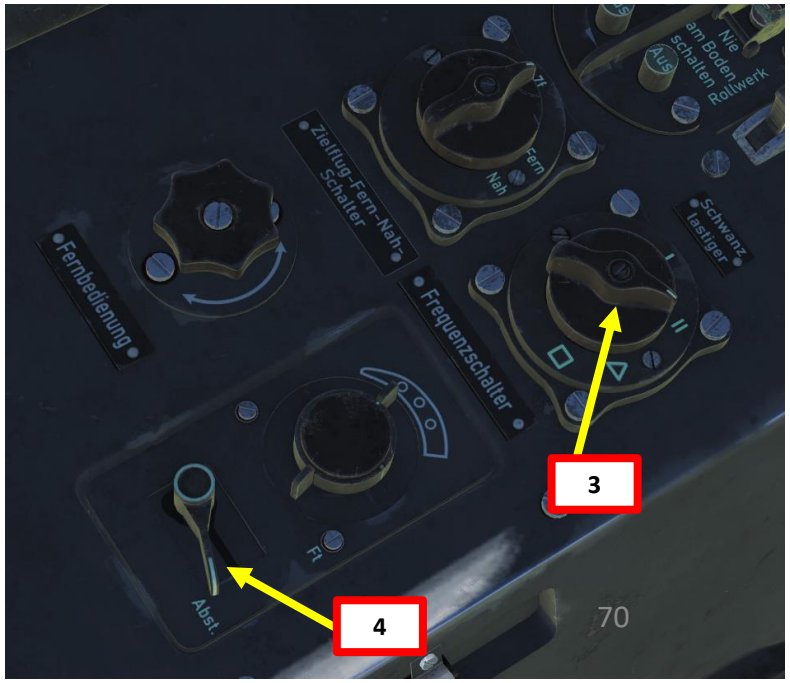
AFN-2 Homing:

1) AFN-2 Frequency must be set via Mission Editor prior to flight
2) Set FuG 16ZY Power Switch (FT ANLAGE) ON.
3) Select Preset Channel II
4) Select "ABST." (*ABSTIMMEN* = Frequency Tuning) Homing Mode
5) Track beacon using the indicator by centering the AFN-2 Indicator's vertical needle (direction of beacon). Your distance to the beacon can be determined by watching the horizontal needle (Signal Intensity/Beacon Distance: Low = FAR, High = NEAR)

The AFN-2 Homing Indicator can be used to track beacons. It is used in conjunction with the FUG 16 radio system and it uses a preset frequency as well that is set with the mission editor. Currently, AFN-2 navigation is not yet modelled in DCS.







The FW.190A-8 variant modelled in DCS is one of the deadliest WWII fighters when flown properly. In comparison to the FW190D-9 “Dora”, the FW190-A8 “Anton” has a much higher firepower and can easily take care of incoming B-17 bombers.

The way to fly a FW.190 is pretty much the same in every simulator: keep your energy state high (meaning that you must keep your airspeed and your altitude up) at all times and avoid turning with an enemy fighter that turns hard to try to make you bleed your energy.

The 190 is first and foremost an energy fighter. In combat, a pilot is faced with a variety of limiting factors. Some limitations are constant such as gravity, drag, and thrust-to-weight-ratio. Other limitations vary with speed and altitude, such as turn radius, turn rate, and the specific energy of the aircraft. The fighter pilot uses BFM (Basic Flight Manoeuvers) to turn these limitations into tactical advantages. A faster, heavier aircraft may not be able to evade a more maneuverable aircraft in a turning battle (like the Spitfire), but can often choose to break off the fight and escape by diving or using its thrust to provide a speed advantage. A lighter, more maneuverable aircraft can not usually choose to escape, but must use its smaller turning radius at higher speeds to evade the attacker's guns, and to try to circle around behind the attacker. This is the principle behind “energy fighting”: use boom and zoom tactics instead of trying to turn with an enemy aircraft that has a smaller turn radius.

The 190 has a high power-to-weight ratio, meaning that it has a good acceleration. It is equally quite manoeuverable, but I would recommend avoiding dogfights above 20,000 ft (6 km) since this is where the Mustang has the advantage.

Taming taildraggers is much more difficult than meets the eye, especially during the takeoff and landing phase. Here is a useful and insightful essay on the art of flying taildraggers wonderfully written by *Chief Instructor*. I highly recommend you give it a read.

Link: https://drive.google.com/open?id=0B-uSpZROuEd3V3Jkd2pfa0xRRW8

TAMING TAILDRAGGERS

Essay by Chief Instructor (CFI)

PART 1

Why taildraggers are tricky and how to overcome it

What do I know about it? Well, I have spent a significant proportion of my professional flying career teaching both experienced and novice pilots how to fly and handle tail-dragging aircraft. This amounts to several thousand hours of tailwheel training alone, though who's counting! These aircraft include among them modern high performance aerobatic aircraft and a variety of more vintage types from DH Tiger Moths, to Harvards. I can't recall off the top of my head exactly how many students I've worked with over the years, but it's well over 200! Best of all, they have all gone on to fly extensive tailwheel ops in a variety of types and to the best of my knowledge, only 2 of them have crashed anything since!

As a significant number of pilots here are expressing difficulties with tailwheel handling,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