General

General

本QRHはDCS FW 190 D-9 Dora Flight Manual をもとに、Normal Procedures並びにEmergency Proceduresをフライト中に参照しやすいように、まとめなおしたものである。当該Flight Manualを熟読していることを前提としている。さらに重要項目についてはChecklist化し、それを用いることにより効率的に動作状況や重要情報の確認、点検を行うことができる。その他、参考情報等を追記している。

大きく分けてProcedureとChecklistに分かれている。Normal Procedureは原則としてMemoryで操作を行うが、実行前にReviewしてもよい。ChecklistはProcedure実施後に、機体が望ましい状況下になっているか確認するために行う。Emergency Procedureは状況に応じ、Memoryで行っても参照しながら行ってもよい。

表記については、機器の名称は原則英語とする。また動作を表すものは英語で一文字目のみ大文字、Switch自体に名称が書かれているものはドイツ語のまますべて大文字で記載することを基本とした。(例「Landing Gear … Checked, AUS」「Flaps … START」)

Procedureの見出しは太文字斜体、**CHECKLIST**の見出しは太文字アンダーラインで表記してある。

構成

本QRHは以下の内容で構成されている。
・Normal Procedures: 各ProcedureとChecklistで構成
・Emergency Procedure
・Data Cards：各PhaseでのPower Setting、Oil Entry Temperature並びにCoolant Oil TemperatureのLimitation、速度のLimitation、英独単語対応表からなる
・その他、Flight ManualからAirbase Data、Fuel System Diagram、Electrical System Diagramを入れた。

注釈

・AUX fuel Tank; Auxiliary fuselage fuel tank
・OET: Oil Entry Temperature
・CET: Coolant Exit Temperature
・CB: Circuit Breaker.
・Fuel Pumps: E14, E13, E85, E96を指す
・All CBs: forward panel のCB並びに、Additional PanelのCBすべてを指す

NORMAL PROCEDURES & CHECKLISTS

Preflight Procedure

Seat ……..……Adjust
Altimeter ..……..……..…Set,QFE
Oxygen Flow Valve……...…Open
Landing Gear…….....Checked, AUS
Forward CBs…….. ……..……All, In
Fuel Quantity ……..Checked
Magnetos ……..…Set, M1+2
MBG Emergency Mode
Handle…….Checked, Pushed
Fuel Tank Selector ……..AUF
Navigation Light(C1) ……On
Fuel Tank Pumps(E14/E13/E85/E96)
……As required
MW-50/B4 Selector …… As required
Canopy ……..……Closed
Throttle Lever……..……...ANLASSEN
Trim ……...Set
Flaps ……START

NOTE: For fuel pumps setting, Refer *Fuel Management Procedures*

PREFLIGHT

Altimeter ……Set
Oxygen Flow Valve ……...Open
Landing Gear ……..AUS
FWD CBs ……All In
Navigation Light(C1).....On
Fuel Tank Pumps ……Set
MW-50/B4 Selector .....Set
Throttle Lever ……....ANLASSEN
Trim ……..…Set
Flaps ……START

Engine Start Procedure

Press starter switch ……15~20 sec
Pull up starter switch

Engine Warmup Procedure

Cooling Flaps…..……Closed
Run Engine ……...1,000~1,200RPM

When OET > 40 ℃
Run Engine ……1,800RPM
CET ……60-70℃

Before Taxi Procedure

ATC Clearance ……..Received
Cooling Flaps ……Full Open

BEFORE TAXI

ATC Clearance ……..……Received
Run up ……Completed
Cooling Flaps ……Full Open

Taxi Procedure

Brakes ……Alternatively Checked
Run Engine ……>1,000 RPM

Before Take-Off Procedure

Controls ……Checked
Trims ……Set, 0
Altimeter……...Set, QFE
Heading ……....Set
Artificial Horizon ……..…..Checked
Fuel Tank Selector ……..…AUF
Fuel Pumps ….……Checked, as desired
Flaps ……..……START,
Check Yellow Light & Indicator

if humid and temp < 0℃;
Pitot Heat(D1) ……On

NOTE: Windshield Heating seems not to installed in the simulator

NOTE: When AUX Tank is used, Turning on E96 CB is not necessarily needed, because fuel is fed by compressed air from the super charger.

BEFORE TAKE-OFF

Flaps ……...START
Trims ……..Set, 0
Altimeter ……..…Set
Fuel Pumps ……Set
MW-50/B4 ……..Set
Fuel Tank Selector.....AUF
Tail Wheel …….....Straight

Takeoff Procedure

Pull stick and lock the tailwheel until sufficient speed for udder control is attained

Take- Off Speed ……170-180 km/h
Run Engine ……..…3,250 RPM

After Take-Off Procedure

Brakes ……..…Apply
Landing Gear ……EIN

AFTER RETRACTION

Flaps ……..EIN
Run Engine (within 3 min)
……...reduce to Combat Power

Gear Indications ……Checked, Red
Flap Indications ….……Checked Red

AFTER TAKE-OFF

Landing Gear …..…. EIN, Checked Red
Flap ……..……EIN, Checked Red

CLIMB Procudedure

Throttle …..CLIMB POWER (3250 RPM)
Speed ……..280 - 290 km/h
Radiator ……..Set (~110℃)
Coolant Temperature ……..Checked

After reaching safety altitude ;
Throttle ……3,000RPM
Trim ……AS REQUIRED
All Instruments ……Checked

Caution

Avoid cruising at an altitude of approximately 3,300 +/- 200m

CRUISE

Radiator …….Set(100℃)

Caution

Max Continuous Power ……3,000 RPM
or
above 7,000m;
Max Continuous Power ……3,250 RPM

Landing Procedure

Speed …….. 300km/h
Landing Gear ……..….AUS
Mechanical Indicator Pins …Appear & White Bar is visible
Flap ……AUS(220-300 km/h)
Approach SPD IAS … 200-220 km/h
Touch Down ……..… 170 km/h

If warm weather:
Cooling Flap ……..Full Open

LANDING

Landing Gear…… AUS, Green light
Mechanical Indicator Pins … White Bar
Flap..... AUS, green light
Approach SPD ……. 200 - 220 km/h

After Landing Procedure

Cooling Flap ……...Full Open
Flap ……EIN
Trim ……..…Set, 0
CET……..……..Monitor<130 ℃

NOTE: When Stationary, Run the engine at 1,800 RPM for uniform cooling.

Shutdown Procedure

Engine Cooling:

Run Engine ……..1,200 RPM
Magnetos Check
……..Switching alternately M1 and M2
Coolant Temperature……....< 100℃

Throttle..... AUS
Magnetos ……..0
Fuel Pumps ……Off
Fuel Tank Selector ……ZU
Electrical Powers ……...Off
Oxygen flow valve ……Close

Caution: Stopping the engine above CET > 120℃ can cause coolant fluid loss.

SHUT DOWN

Flap ……EIN
Trim ……Set, 0
Throttle.....AUS
Magnetos ……...0
Fuel Tank Selector ……ZU
All CBs ……Off
Oxygen flow valve ……Close

Fuel Management Procedures

NOTE: AUX tank fuel and drop tank fuel only can be feeded when the quantity of rear tank fuel is less than 240 liters.

<Without a drop tank, additional trank, prior engine start>
Fuel Tank Selector.....AUF
Both Fuel Pumps(E14,E13) …….On
Fuel gauge selector swtich.....HINTEN

<In flight>
Fuel Tank Selector ……..……AUF

When White Lamp illuminates (Rear tank fuel < 10 liters)

Rear Fuel Pump(E13) ……Off
Fuel Tank Selector ….Hinter Behälter Zu
Fuel gauge selector switch ……VORN

<With drop tank>
Fuel Tank Selector ……..……AUF
Rear/Drop Tank Fuel Pumps(E13/E85).....On
Forward Fuel Tank Pump(E14).....Off
Fuel gauge selector switch …….HINTEN

NOTE: At altitudes above 8000m, the forward fuel tank pump may be required.

If fuel indicator < 240 liters, the drop tank is empty

Drop tank fuel pump (E85).....Off

Jettison drop tank (pull emergency handle)

<With AUX tank>
Fuel Tank Selector ……..AUF
Rear Fuel Tank Pump(E13) ……..…...On
Forward Fuel Tank Pump(E14)…….Off
AUX Fuel Tank Pump(E96) ……..On
Fuel gauge selector switch……HINTEN
MW-50/B4 Selector Switch……...B4

When fuel indication < 240 liters, AUX fuel tank is empty

AUX Fuel Tank Pump(E96).....Off

<With drop tank andAUX fuel tank>
Fuel Tank Selector ……..AUF
Drop/ AUX/Rear fuel tank pumps(E85/ E96/E13) ……..On
Forward Fuel Tank Pump(E14).....Off
Fuel gauge selector switch…..HINTEN

when fuel indication < 240 liters, drop/ AUX tank are empty

Drop/AUX fuel tank pump(E85/E96) ……Off

EMERGENCY PROCEDURE

Glide Procedure

Engine ….IDLE(1200 +/-50 RPM)
Advance Throttle Repeatedly (to prevent spark plug fouling)
Coolant Exit Temparature … >60℃
Switching from high to low blower occurs automatically at 3300 +/-300m

Dive Procedure

Speed Limitation

Altitude (km)	IAS(km/h)
9	500
7	600
5	700
3	800
2-0	850

Engine …….<3300RPM

Inverted Flight Procedure

Inverted Flight is not suitable
All aerobatic maneuvers may be performed, even if briefly leading through inverted flight.

Go Around Procedure

Flaps ……Stay extended
Landing Gear..……..……..Retract
Operation as during normal departure

NOTE: Flap START position is allowed only when at sufficient altitude and with sufficient airspeed.

Failure of the Landing Gear Drive

Emergency landing gear…….Release

If gear doesn't extend;
・Push nose down and then recover sharply
・Observe mechanical indicator

If gear doesn't still extend;
・Check if landing gear switch is set to AUS
・If yes, pull manual gear handle once again
・if this is not successful:
・Open CB for landing gear drive(E16) and once again pull manual gear handle
・Make side slip maneuvers to extend landing gear
・Check white marking on landing gear pins is visible

If failed:
・Retract landing gear and carry out belly landing

Note:A single wheel landing is possible. In this case, touch down as for a normal landing but keep the aircraft level as long as possible with aileron input. Usually the propeller and wing tips will receive damage.

Power Plant Failure

Throttle …….. ..... Idle
MBG Emergency Mode Handle …….Pull
Run Engine ……As little as possible

If falling oil pressure indication…….Land

In case fuel vapors enter the cockpit;
・Fuel tank pumps ……Off
・Done oxygen mask
・slightly open canopy

In case of a failed fuel pump;
・Continue flight to the next airfield at low RPM using both fuel pumps

NOTE: In Notzug mode, boost pressure should be less than 1.55 ata, engine rpm should be less than 2,700 RPM.

Emergency Weapons Drop

Operate bomb emergency release handle on the lower front panel. The levers returned to the original position by spring load forces upon release of the handle

Emergency Landing in case of Engine Failure

IAS ……..300km/h
Throttle ……..…AUS
Magnetos……0
Canopy ……Open to the last cog
Landing Gear ….…AUS at airfields only
Flap ..……AUS
Electric systems ……Off

NOTE: Sliding distance on belly landings approximately 150-200 m.

Ditiching

Should be avoided as much as possible. After 2-3 bounces the aircraft will sink over the nose immediately.
Prior to ditching, the canopy has to be always jettisoned.

Flapless Landing

Touchdown speed ……..+ 35 km/h
If possible;
establish the stall speed at high latitude with idle power setting
(should result in speed of about 195 km/h)
+20km/h to determine touch down speed

LDG distance will be from 600 to about 850m

Parachuting

Reduce speed as much as possible
If possible;
Electrical Systems ……..…..Off
Magnetos ……..0
Fuel Tank Selector ……ZU

Canopy Emergency Jettison
Lever…….Push
Seat Belt …… Unfasten
Eject

Data Cards

POWER SETTING

Throttle Position	Power Output	RPM	Permissible Time (min)	Fuel Consumption (L/h)
90°Comand Angle	Emergency power (increased T/O)	3250	3	620 -20
90°	T/O, combat, climb	3250	30	590 +20/-40
75°	Continuous power	3000	constant	530
60°	Economy I	2700	constant	375
47°	Economy II	2400	constant	285
34°	Economy III	2100	constant	215
0°	Idle (In Flight)	app. 1200	-	-
10°	Engine stop position	-	-	-

OIL ENTRY TEMPERATURE

Setting	Temperature	Pressure
max continous power	110 ℃	> 4.5 atü,< 13atü
Short Duration	130 ℃	< 13atü

COOLANT OIL TEMPERATURE

Setting	Temperature	Erhard Coolant Regulator Valve
at all altitude	100 ℃	
Climb	110 ℃	2 atü
Takeoff/ Taxi	130 ℃	2 atü
Climb	100 ℃	1.2 atü
Takeoff/ Taxi	120℃	1.2 atü

SPEEDS

Situations	Speed (km/h)
Take-Off	170-180
Landing Gear	<250
Flaps	<300
Approach	220
Tocuhdown	170

English - Deutsch translation

Deutch	English
Ein	On
Aus	Off
Vorn	Forward
Hinten	Rear
Rollwerk	Landing Gear
Start	Start
Zündung	Magneto
Notzug für Bedien Getr	
Auf	Open
Zu	Closed
Kennlichiter	Beacon
Sonder	Special
Anlassen	Cranking
Landeklappen	Flaps

SUPPLEMENTS

Airbase Data

Airbase	Runway	TACAN, channel	ILS	Tower comm frequencies, MHz
UG23 Gudauta - Bambora (Abkhazia)	15-33, 2500m			209.00/130.0/40.20/4.20
UG24 Tbilisi - Soganlug (Georgia)	14-32, 2400m			218.0/139.0/42.0/4.65
UG27 Vaziani (Georgia)	14-32, 2500m	22X (VAS)	108.75	219.0/140.0/42.20/4.70
UG5X Kobuleti (Georgia)	07-25, 2400m	67X (KBL)	07 ILS - 111.5	212.0/133.0/40.80/4.35
UGKO Kutaisi - Kopitnari (Georgia)	08-26, 2500m	44X (KTS)	08 ILS - 109.75	213.0/134.0/41.0/4.40
UGKS Senaki - Kolkhi (Georgia)	09-27, 2400m	31X (TSK)	09 ILS - 108.9	211.0/132.0/40.60/4.30
UGSB Batumi (Georgia)	13-31, 2400m	16X (BTM)	13 ILS - 110.3	210.0/131.0/40.40/4.25
UGSS Sukhumi - Babushara (Abkhazia)	12-30, 2500m			208.0/129.0/40.0/4.15
UGTB Tbilisi - Lochini (Georgia)	13-31, 3000m		13 ILS - 110.3 31 ILS - 108.9	217.0/138.0/41.80/4.60
URKA Anapa - Vityazevo (Russia)	04-22, 2900m			200.0/121.0/38.40/3.75
URKG Gelendzhik (Russia)	04-22, 1800m			205.0/126.0/39.40/4.00
URKH Maykop - Khanskaya (Russia)	04-22, 3200m			204.0/125.0/39.20/3.95
URKI Krasnodar - Center (Russia)	09-27, 2500m			201.0/122.0/38.60/3.80
URKK Krasnodar - Pashkovsky (Russia)	05-23, 3100m			207.0/128.0/39.80/4.10

URKN Novorossiysk (Russia)	04-22, 1780m			202.0/123.0/38.80/3.85
URKW Krymsk (Russia)	04-22, 2600m			203.0/124.0/39.0/3.90
URMM Mineralnye Vody (Russia)	12-30, 3900m		12 ILS - 111.7 30 ILS - 109.3	214.0/135.0/41.20/4.45
URMN Nalchik (Russia)	06-24, 2300m		24 ILS - 110.5	215.0/136.0/41.40/4.50
URMO Beslan (Russia)	10-28, 3000m		10 ILS - 110.5	220.0/141.0/42.40/4.75
URSS Sochi - Adler (Russia)	06-24, 3100m		06 ILS - 111.1	206.0/127.0/39.60/4.05
XRMF Mozdok (Russia)	08-27, 3100m			216.0/137.0/41.60/4.55

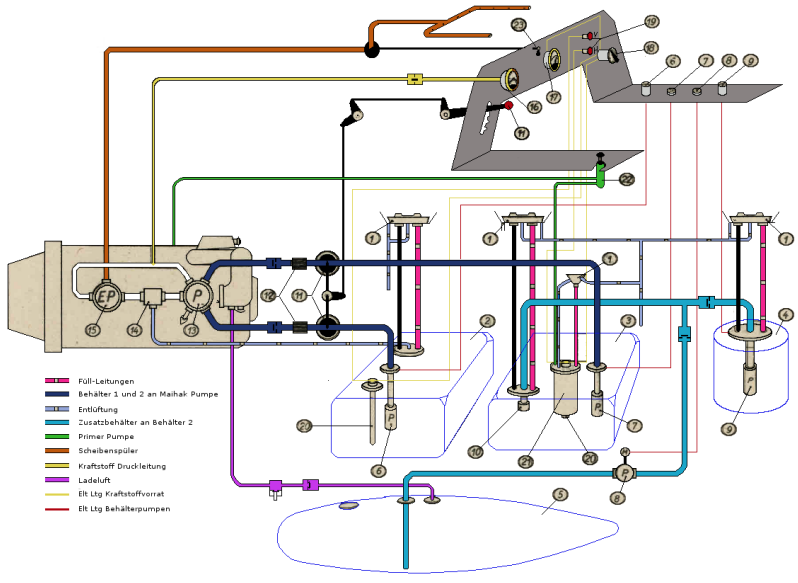

Figure 21: Fuel system diagram

1. Filling port
2. Forward tank (232 l)
3. Aft tank (292 l)
4. Auxiliary fuselage tank (115 l)
5. Auxiliary jettisonable tank
6. Forward tank feeder pump
7. Aft tank feeder pump
8. Auxiliary jettisonable tank feeder pump
9. Auxiliary fuselage tank feeder pump
10. Shutter valve (shuts at 240 l)
11. Fuel selector
12. Fuel filter
13. Booster pump
14. Vapor separator
15. Fuel injection
16. Fuel pressure gauge
17. Fuel content gauge
18. Fuel gauge selector switch
19. Fuel warning lights
20. Fuel level sender
21. Primer fuel canister (3 l)
22. Primer pump
23. Windscreen cleaner

Electrical System

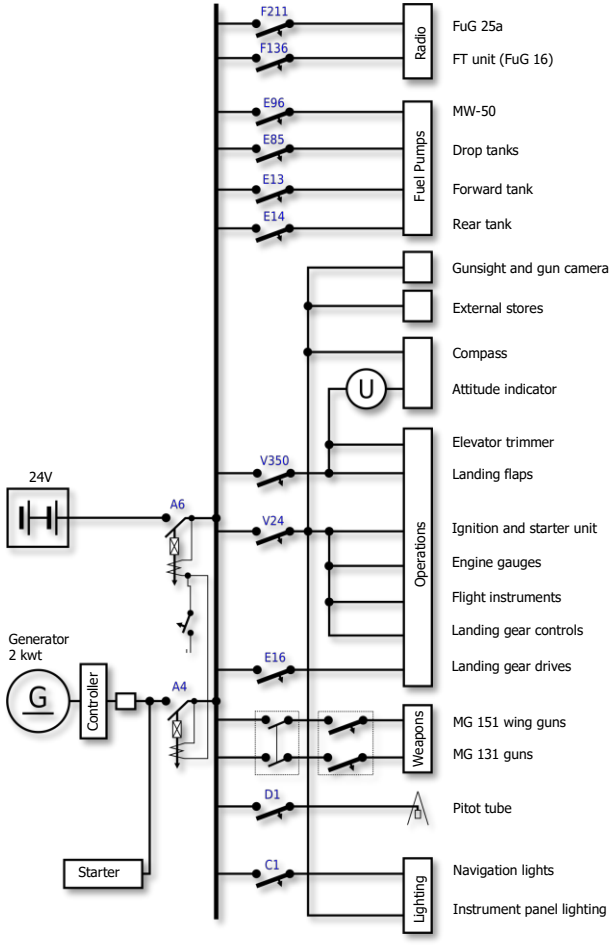

Figure 29: Electrical system diagram