3.0 EMERGENCY PROCEDURES

3.1. INTRODUCTION

Chapter 3 of this Flight Manual deals with emergency procedures and contains check-lists and descriptions how to operate the aircraft in emergency situations.

3.2. AIRSPEEDS DURING EMERGENCY PROCEDURES

	IAS		
	kts	mph	km/h
Engine failure after take-off with flaps in T/O position	60	68	110
Manoeuvering Speed	104	120	193
Airspeed for best glide angle			
Wing Flaps in T/O Position 1653 lbs (750kg)	73	84	135
Wing Flaps in T/O-Position 1322 lbs (600kg)	66	76	121
Precautionary Landing (with power and Wing Flaps in LDG position)	57	66	106
Emergency Landing (with engine off and Wing Flaps in T/O or LDG position)	57	66	106
Emergency Landing (with engine off and Wing Flaps UP)	65	75	120

3.3. EMERGENCY PROCEDURES - CHECKLISTS

3.3.1 ENGINE FAILURES

a) Engine Failure during Take-off Run

1.	Throttle	IDLE
2.	Brakes	as required

b) Engine Failure after Take-off

I. INSUFFICIENT ENGINE POWER

1.	Airspeed (V_{IAS})	60 kts / 68 mph / 110 km/h
2.	Throttle	FULL
3.	Carburetor Heat	ON
4.	Choke	OFF
5.	Fuel Shut-off Valve	OPEN
6.	Ignition Switch	BOTH
7.	Electric Fuel Pump	ON
8.	Propeller Speed Control Lever	max. RPM

! WARNING:

If adequate engine performance cannot be restored immediately, prepare for an emergency landing. If possible, land straight ahead, avoiding obstacles.

Shortly before landing:

9.	Fuel Shut-off Valve	CLOSED
10.	Ignition Switch	OFF
11.	Master Switch (Battery)	OFF

II. ENGINE INOPERATIVE

Perform emergency landing according to paragraph 3.3.2.

b) Engine Failure during Flight

I. ENGINE RUNNING ROUGHLY

1.	Carburetor Heat	ON
2.	Electric Fuel Pump	ON
3.	Choke	check OFF
4.	Fuel Shut-off Valve	check OPEN
5.	Ignition Switch	cycle L - BOTH - R - BOTH
6.	Throttle	at present position
7.	No Improvement	reduce throttle to minimum required power, land as soon as possible.

II. LOSS OF OIL PRESSURE

1.	Oil Temperature	check
2.	If Oil Pressure drops below Green Arc but Oil Temperature is normal	land at nearest airfield
	If Oil Pressure drops below Green Arc and Oil Temperature is rising	reduce throttle to minimum required power; land as soon as possible. Be prepared for engine failure and emergency landing

II. LOSS OF FUEL PRESSURE

1.	Electric Fuel Pump	ON, and land at nearest suitable airport
2.	If Fuel Pressure Warning Light does not extinguish	Land at nearest suitable airport. Be prepared for engine failure and emergency landing.

IV. RESTARTING THE ENGINE WITH PROPELLER WINDMILLING

As long as the airspeed (V_{IAS}) is at least 54 kts / 62 mph / 100 km/h, the propeller will continue to windmill.

1.	Airspeed (V_{IAS})	70 kts / 81 mph / 130 km/h
2.	Wing Flaps	T/O Position
3.	Propeller Speed Control Lever	max. RPM
4.	Fuel Shut-off Valve	OPEN
5.	Ignition Switch	BOTH
6.	Electric Fuel Pump	ON
7.	Throttle	3/4 in (2 cm) forward

If the engine does not start within 10 seconds: Cold Start

8.	Throttle	IDLE
9.	Choke	ON (Pulled)
10.	Ignition Switch	START

V. RESTARTING THE ENGINE WITH PROPELLER AT FULL STOP

1.	Electrically Powered Equipment		OFF
2.	Master Switch (Battery)		ON
3.	Propeller Speed Control Lever		max. RPM
4.	Fuel Shut-off Valve		OPEN
5.	Electric Fuel Pump		ON
6.	Throttle	Cold Start:	IDLE
		Warm Start:	3/4 in (2 cm) forward
7.	Choke	Cold Start:	ON (pulled)
		Warm Start:	OFF
8.	Ignition Switch		START

NOTE:
The engine may also be re-started by increasing the airspeed by pushing the airplane into a descent and accelerating to approx. (V_{IAS}) 120 kts / 138 mph / 222 km/h. A loss of 1000 ft / 300 m altitude must be taken into account.

After successful re-start:

9.	Oil Pressure	check
10.	Choke	OFF
11.	Electrically Powered Equipment	ON if required
12.	Oil Temperature	check

3.3.2 EMERGENCY LANDINGS

a) Emergency Landing Approach with Engine off

1.	Airspeed (V_{IAS}) Flaps in T/O or LDG position Flaps UP	 57 kts / 66 mph / 106 km/h 65 kts / 75 mph / 120 km/h
2.	Fuel Shut-off Valve	CLOSED
3.	Ignition Switch	OFF
4.	Safety Belts	secured
5.	Radio	Transmit, giving location and intentions
6.	Master Switch (Battery)	OFF

b) Precautionary Landing with Engine Power Available

> **NOTE:**
> A precautionary landing would be required if continuing the flight would endanger the aircraft or its occupants. Such circumstances could include mechanical defects, low fuel quantity or deteriorating weather conditions.

1.	Search for a suitable place to land. Special attention must be given to wind direction and obstacles in the approach path	
2.	Safety Belts	secured
3.	Initiate Descent	
4.	Throttle	as required
5.	Trim	as required
6.	Wing Flaps (observe permissible speed)	as required

7. Overfly selected landing area (not below 500 ft / 150 m above ground) to confirm suitability and that approach route is free of obstacles

8. Climb up to 1000 ft AGL (if possible)

9. Low pass over flight (around 100 feet) to observe any possible obstacles, such as cables, fences, ditches

10. Climb up to 1000 ft AGL (if possible)

11. Radio — Transmit, giving location and intentions

12. Final Approach

Throttle	as required
Propeller Speed Control Lever	max. RPM
Carburetor Heat	ON
Electric Fuel Pump	ON
Wing Flaps	LDG
Airspeed (V_{IAS})	57 kts / 66 mph / 106 km/h

13. Touch-down is to be made with minimum airspeed, nose wheel should be kept above ground as long as possible

14. After Touch-down:

Brake	as required
Fuel Shut-off Valve	CLOSED
Ignition Switch	OFF
Master Switch (Battery)	OFF

NOTE:
If no suitable level landing area can be found, an up-hill landing should be performed, if possible.

3.3.3 FIRE

a) Engine Fire during Engine-Start-Up on the Ground

1.	Fuel Shut-off Valve	CLOSED
2.	Throttle	FULL
3.	Master Switch (Battery)	OFF
4.	Ignition Switch	OFF
5.	Evacuate Airplane immediately	

b) Engine Fire during Flight

1.	Fuel Shut-off Valve	CLOSED
2.	Airspeed (V_{IAS})	70 kts / 81 mph / 130 km/h
3.	Flaps	T/O
4.	Throttle	FULL
5.	Electric Fuel Pump	OFF
6.	Cabin Heat	CLOSED
7.	Perform emergency landing with engine off according to paragraph 3.3.2	

c) Electrical Fire including Smoke during Flight

1.	Master Switch (Battery)	OFF
2.	Cabin Air	OPEN
3.	Fire Extinguisher	use only if smoke development continues.

CAUTION:
If fire extinguisher is used, the cabin must be aerated.

In case the fire is extinguished and electric power is required for continuation of the flight:

4.	Avionics Master Switch	OFF
5.	Electrically Powered Equipment	OFF
6.	Master Switch (Battery)	ON
7.	Avionics Master Switch	ON
8.	Radio	ON
9.	Land as soon as possible.	

d) Electrical Fire including Smoke on the Ground

1.	Master Switch (Battery)	OFF

If engine running:

2.	Throttle	IDLE
3.	Fuel Shut-off Valve	CLOSED
4.	Ignition Switch	OFF
5.	Canopy	open
6.	Fire Extinguisher	deploy as required

e) Cabin Fire during Flight

1.	Master Switch (Battery)	OFF
2.	Cabin Air	OPEN
3.	Cabin Heat	CLOSED
3.	Fire Extinguisher	deploy as required
5.	Land as soon as possible	

CAUTION:
If fire extinguisher is used, the cabin must be aerated.

3.3.4 ICING

Unintentional Flight into Icing Area

1. Leave icing area (through change of altitude or change of flight direction to reach area with higher outside air temp.).
2. Continue to move control surfaces to maintain their moveability.
3. Carburetor Heat ON
4. Increase RPM to avoid icing of propeller blades (observe maximum RPM)
5. Cabin Heat OPEN

CAUTION:
In case of icing on the leading edge of the wing, the stall speed will increase.

CAUTION:
In case of icing on wing leading edge, erroneous indicating of the airspeed, altimeter, rate of climb and stall warning should be expected.

3.3.5 RECOVERY FROM UNINTENTIONAL SPIN

1.	Throttle	IDLE
2.	Rudder	fully applied opposite to direction of spin
3.	Control Stick	ease forward
4.	Rudder	neutral, after rotation has stopped
5.	Wing Flaps	UP
6.	Elevator	pull cautiously

Bring airplane from descent into level flight position. Do not exceed maximum permissible speed (V_{NE})

3.3.6 LANDING WITH DEFECTIVE TIRE ON MAIN LANDING GEAR

1. Final approach with wing flaps in landing position.
2. Land airplane on the side of runway opposite to the side with the defective tire to compensate for change in direction which is to be expected during final rolling.
3. Land with wing slightly tipped in the direction of the non-defective tire. To increase the maneuvrability during rolling, the nose-wheel should be brought to the ground as soon as possible after touch-down.
4. To ease the load on the defective tire, the aileron should be fully applied in the direction of the non-defective tire.

3.3.7 [Intentionally left blank]

3.3.8 GLIDING

1.	Wing Flaps	T/O
2.	Airspeed at 1653 lbs (750 kg) (V_{IAS})	73 kts / 84 mph / 135 km/h
3.	Glide Ratio 14, which means at 1000 ft/305m above ground, and with no wind the distance of glide is 2.3 NM (4.25 km)	

NOTE:
The glide distance from 1000 ft altitude increases for each 10 kts tail wind by 1968 ft (0.6 km).
The glide distance from 1000 ft altitude decreases for each 10 kts head wind by 2296 ft (0.7 km).

3.3.9 ELECTRICAL POWER FAILURE

a) Total Electrical Power Failure (GEN. Annunciator Illuminated)

1.	Battery Circuit Breaker	If tripped, reset
2.	Master Switch (Gen/Battery)	check ON
3.	If unsuccessful	Land at nearest suitable airport

b) Generator Failure

1.	Master Switch (Generator)	Cycle OFF - ON
2.	Gen. Circuit Breaker	If tripped, reset
3.	Gen. Control Circuit Breaker	If tripped, reset
4.	If Gen. can't be brought on-line	Switch OFF all non-flight essential electrical consumers. Monitor Ammeter and Voltmeter. Land at nearest suitable airport.

NOTE:
There are 30 minutes of battery life remaining at a discharge load of 20 amperes.

c) Low Voltage Indication (needle in yellow Arc)

I. LOW VOLTAGE INDICATION (NEEDLE IN YELLOW ARC) WHILE AIRPLANE ON GROUND

1.	Propeller RPM	Increase RPM until needle is in the Green Arc. This should occur before exceeding 1350 RPM.
2.	Non-flight essential electrical consumers	Switch OFF consumers until needle is in the Green Arc.
3.	If needle remains in the yellow arc and the ammeter is indicating to the left of centre (discharge)	Discontinue any planned flight activity

II. LOW VOLTAGE INDICATION (NEEDLE IN YELLOW ARC) DURING FLIGHT

1.	All non-flight essential electrical consumers	Switch OFF
2.	If needle remains in the yellow arc and the ammeter is indicating to the left of centre (discharge)	Generator Failure: Refer to paragraph 3.3.9 (b)

III. LOW VOLTAGE INDICATION (NEEDLE IN YELLOW ARC) DURING LANDING:

1. After landing proceed in accordance with paragraph 3.3.9 (c).

WARNING:

If at any time the Voltmeter needle indicates in the red arc, you should land at the nearest suitable airfield and service the aircraft accordingly before continuing the flight.

3.3.10 FLAP SYSTEM FAILURE

FLAP POSITION INDICATOR FAILURE

- visual check of the flap position
- select airspeed within the range of the white arc marked on the airspeed indicator
- check all positions of the flap toggle switch (flap stops are fail-safe)
- modify approach and landing as follows:

only **UP** available:
- raise approach speed by 5 kts
- throttle as required
- flat approach angle

only **T/O** available:
- normal approach speed
- throttle as required
- flat approach angle

only **LDG** available:
- normal landing

3.3.11 STARTER FAILURE

STARTER DOES NOT DISENGAGE AFTER STARTING THE ENGINE (CONTINUOUS WHINING SOUND AUDIBLE).

1.	Throttle	IDLE
2.	Ignition Switch	OFF
		discontinue any planned flight

3.3.12 AVIONICS SYSTEM FAILURE

TOTAL AVIONIC FAILURE:

1.	Avionic Master Circuit Breaker	If tripped, re-engage and monitor status. If it trips again, land at nearest suitable airport
2.	Avionic Master Switch	Toggle avionic master switch, if avionic system remains off-line, pull avionic master control circuit breaker and land at nearest suitable airport

RADIO SYSTEM OPERATIVE, NO RECEPTION:

1.	Microphone Key	check for stuck Microphone Key on transceiver display
2.	Headphones	check, deactivate SQUELCH for a few moments, if SQUELCH not heard, check headset connection

RADIO SYSTEM OPERATIVE, TRANSMITTING NOT POSSIBLE:

1.	Selected Frequency	check if correct
2.	Microphone	check, if available use different one (headset)

Problem cannot be resolved: switch transponder (if available) to "COMM FAILURE" code if required by the situation and permitted by applicable national regulations.

3.3.13 TRIM SYSTEM FAILURE

STUCK TRIM:

1.	Circuit breaker	check, reset if it is tripped
2.	Rocker switch	depress in both directions, wait 5 minutes, try again

> **NOTE:**
> Full range of travel is available for elevator, but expect forces up to 20 lbs. on control stick.

3. Land at nearest suitable airport

RUNAWAY OF TRIM:

1.	Control Stick	Grip stick and maintain control of airplane
2.	Trim motor circuit breaker	Pull circuit breaker
3.	Rocker Switch	Check if depressed

If reason for runaway condition is obvious and has been resolved, push in (engage) circuit breaker.

> **NOTE:**
> Full travel of the elevator trim system will take approximately 10 seconds.

3.3.14 INSTRUMENT PANEL LIGHTING FAILURE

1.	Rocker Switch, map light	ON
2.	Rocker Switch, I-panel lighting	Cycle OFF - ON
3.	Dimming Control	Turn fully clockwise
4.	Internal Lighting Circuit Breaker	If tripped, reset
5.	If NOT Successful	Use Flashlight

Expect electrical power failure. Ref. 3.3.9

3.3.15 TACHOMETER FAILURE

Operation at T/O (5 minute) power:

1.	Airspeed	Do not exceed 110 KIAS

Operation at maximum continuous power:

1.	Propeller Speed Control Lever	Ensure lever is at least ½ inch (10mm) (measured at slot) aft of full forward position. Engine will now be operating at, or below, maximum continuous power.

NOTE:
With propeller speed control lever at least ½ inch (10mm) aft of full forward position, the Max. Permissible Continuous RPM (2260 RPM) cannot be exceeded at any throttle setting and airspeed. However, maximum engine power may not be available.