FLIGHT REFERENCE CARDS

BULLDOG SERIES 120

NORMAL DRILLS

Prepared by Royal Air Force Handling Squadron
Amended by FlyLogical for G-BZFN - Aug 2012
www.flylogical.com

BY COMMAND OF THE DEFENCE COUNCIL
Intentionally Blank
INITIAL CHECKS

On approaching the aircraft check:

<table>
<thead>
<tr>
<th>General position</th>
<th>Clear of other aircraft</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No fuel or oil leaks</td>
</tr>
<tr>
<td>Ground Fire extinguisher</td>
<td>Available</td>
</tr>
<tr>
<td>Chocks</td>
<td>Available</td>
</tr>
<tr>
<td></td>
<td>In position</td>
</tr>
</tbody>
</table>

Before commencing the external checks carry out the following checks in the cockpit:

<table>
<thead>
<tr>
<th>Ignition</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turn needle</td>
<td>OFF flag displayed</td>
</tr>
<tr>
<td>Battery master switch</td>
<td>OFF</td>
</tr>
<tr>
<td>Throttle</td>
<td>CLOSED</td>
</tr>
<tr>
<td>Mixture</td>
<td>CUT-OFF</td>
</tr>
<tr>
<td>Canopy jettison handle</td>
<td>Indicators aligned</td>
</tr>
</tbody>
</table>
EXTERNAL CHECKS

Carry out a systematic check of the aircraft for obvious signs of damage, leaks, loses panels or fairings. Do not move the control surfaces by hand. In particular, check:

- Canopy: Condition and operation
- Cockpit transparencies: Condition

Left Landing Gear

- Fairings: Condition, secure
- Brake lead: Secure
- Tyre: Examine for cuts, creep and pressure
**External Checks – continued**

**Left Mainplane**

<table>
<thead>
<tr>
<th>Part</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flap</td>
<td>Up. Linkage secure</td>
</tr>
<tr>
<td>Aileron</td>
<td>Linkage secure</td>
</tr>
<tr>
<td>Navigation light</td>
<td>Condition of cover</td>
</tr>
<tr>
<td>Pitot head</td>
<td>Cover removed, free of obstruction</td>
</tr>
<tr>
<td>Fuel tank filler cap</td>
<td>Access panel flush and secure</td>
</tr>
</tbody>
</table>

**Engine**

<table>
<thead>
<tr>
<th>Part</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cowling</td>
<td>Fasteners secure</td>
</tr>
<tr>
<td>Intakes and ducts</td>
<td>Clear</td>
</tr>
<tr>
<td>Spinner</td>
<td>Condition, secure</td>
</tr>
<tr>
<td>Propeller</td>
<td>Condition</td>
</tr>
<tr>
<td>Exhaust pipes</td>
<td>Secure</td>
</tr>
</tbody>
</table>

**Nose Landing Gear**

<table>
<thead>
<tr>
<th>Part</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nosewheel straight</td>
<td>Connected</td>
</tr>
<tr>
<td>Steering torque link</td>
<td></td>
</tr>
<tr>
<td>Tyre</td>
<td>Examine for cuts, creep and pressure</td>
</tr>
</tbody>
</table>

**Right Mainplane**

As for left Mainplane except pitot head.

**Right Landing Gear**

As for left landing gear

**Tail Unit**

<table>
<thead>
<tr>
<th>Part</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevator</td>
<td>Linkage secure</td>
</tr>
<tr>
<td>Rudder</td>
<td>Secure, trim tab secure, linkage secure</td>
</tr>
<tr>
<td>Tail bumper</td>
<td>Undamaged</td>
</tr>
</tbody>
</table>
COCKPIT CHECKS

Before entering the cockpit, check:
Chocks & Towbar ... Removed

On entering the cockpit, check:
First aid kit/baggage/
  fire extinguisher ... Stowed and secure
Seats ... ... ... Backs adjusted, locking pins fully home, seat restraint
  straps tight
Harnesses ... ... Condition and security
  Right harness connected and tightened if flying solo
Parachute(s) ... ... Condition and serviceability
Flying control locks ... Remove and stowed
Loose articles ... ... None

Enter cockpit, adjust and lock the rudder pedals evenly, strap in and check or select:

(continued)
Cockpit Checks – continued

Propeller ... ... Clear
Battery Master ... ... On
External power ... ... Off
Intercom ... ... Off
Internal lighting ... ... As required
Parking brake ... ... On
External lights ... ... As required
Pitot head heater ... ... OFF
Circuit breakers ... ... All made (in)
Accelerometer ... ... Reset to +1.0g
Clock ... ... Working, correct
Flap indicator ... ... Correct indication
Volt/amp selector ... ... AMPS
Fuel contents ... ... Sufficient and correct
Magnetic Compass ... ... Condition
Flight instruments ... ... Condition, turn needle OFF flag retracted.
          Altimeter set to zero
Engine instruments ... ... Condition
Vacuum gauge ... ... Condition
VOR/ILS/DME/ADF ... ... OFF
Transponder ... ... OFF
GPS/VHF ... ... OFF
Cabin heat controls ... ... As required
Induction Air ... ... COLD
Fuel Booster pump ... ... OFF
Alternator ... ... On (OFF if on external power)
Alternator warning light ... ... On
Starter warning light ... ... On
Throttle/RPM lock lever ... ... Fully forward
Throttle ... ... Set fully OPEN
RPM control ... ... Exercise, set maximum
Mixture ... ... FULL RICH
Elevator Trim ... ... Full and free movement – Set in TO band
Rudder Trim ... ... Full and free movement – Set to TO
Fuel selector valve ... ... L
Flying controls ... ... Ailerons and elevator – full, free and correct movement
STARTING THE ENGINE

Anti-collision lights ... OFF
Ignition ... ... ... OFF
Fuel booster pump ... (See Note 1) On, check fuel pressure indication then OFF

Mixture ... ... ... CUT OFF
Throttle ... ... ... ¼ inch open (See Note 2)
Give the start up signal... “CLEAR PROP”

When clear, select:

Ignition ... ... ... L
Starter button ... ... Press until engine starts

When engine starts:

Starter button ... ... Release
Mixture ... ... ... FULL RICH
Throttle ... ... ... CLOSED
Ignition ... ... ... BOTH
Starter warning light ... Out
Anti-collision lights ... Red strobes selected
Transponder ... ... SBY
Intercom/GPS/VHF ... ON, T/R, frequencies selected; volumes adjusted

Note 1: If the engine is hot and the aircraft has been standing between 15 and 30 minutes since shutdown, do not carry out fuel booster pump check. If the engine has been shut down for less than 15 minutes, switch the booster pump on momentarily checking for a brief indication on the fuel pressure gauge.

Note 2: When the CHT is 50°C or above or oil temperature is 30°C or above, up to half throttle may be required.

If the starter warning light does not go out the engine must be closed down and the fault investigated.

FAILURE TO START

If the engine fails to start after 10 to 12 seconds, release the starter button. Check the fuel booster pump is OFF, then wait for 5 minutes before making a further attempt to start. If the cause of failure to start is overpriming, make the next attempt to start as for starting a hot engine.

AFTER STARTING

Oil pressure ... ... 25 PSI within 30 seconds
External power ... ... Disconnected
Alternator ... ... On
Set 1200 RPM
Alternator warning light Out
Ammeter ... ... Positive reading; max 10 amps, one minute after starting. (continued)
After Starting – continued

Pitot head heater ... On, ground crew check, then OFF
Vacuum gauge ... Indicating
Horizon and DI ... Erecting, DI aligned with magnetic compass
Ignition ... Check for live and dead magneto
Flap ... Correct operation
Fuel selector valve ... R
VOR/ILS/DME/ADF ... On, frequency set
Transponder ... TST, then as required
GPS/VHF ... Test
Altimeter ... Set QFE
Canopy ... Latched
Taxy lamp ... As required

TESTING THE ENGINE

Aircraft into wind
Parking break ... On
Control column ... Central
Fuel selector valve ... BOTH
Oil temperature ... 30°C minimum
Oil pressure ... 25 PSI minimum
Cylinder head temp ... 100°C minimum

Set 1800 RPM

RPM control (three times for first flight of day) ... Move towards minimum until RPM decrease.
Note: Do not allow RPM to decrease by more than 500 RPM
Return to max.
Check RPM restored

Set 2100 RPM

Magnetos ... Check max drop 175 RPM.
Max drop diff between mags 50 RPM. Check RPM restored at BOTH
Induction Air ... Set HOT – RPM decrease.
Set COLD – RPM restored
Vacuum ... 4½ to 5 inches Hg
CHT ... 125 to 180°C
Throttle ... Close-idling RPM 800±50

TESTING THE ENGINE

Aircraft into wind
Parking break ... On
Control column ... Central
Fuel selector valve ... BOTH
Oil temperature ... 30°C minimum
Oil pressure ... 25 PSI minimum
Cylinder head temp ... 100°C minimum

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Return to max.
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Max drop diff between mags 50 RPM. Check RPM restored at BOTH
Induction Air ... Set HOT – RPM decrease.
Set COLD – RPM restored
Vacuum ... 4½ to 5 inches Hg
CHT ... 125 to 180°C
Throttle ... Close-idling RPM 800±50
Testing the Engine – continued

Mixture ... ... ... Move control to weak mixture gate. Check RPM rise 5 to 30 RPM. FULL RICH

Booster pump ... ... ... On and audible

TAKE-OFF CHECKS

Trims:
- Elevator ... ... In TO band
- Rudder ... ... TO
- Throttle lock ... ... Off
- RPM control ... ... Maximum
- Mixture ... ... FULL RICH
- Induction air ... ... COLD

Fuel:
- Booster pump ... ... On
- Contents. ... ... Sufficient
- Selector value ... ... BOTH
- Flap ... ... ... INTER

Instruments:
- Pitot head heater ... ... On
- Lights ... ... ... White strobes On/Taxy and Landing light – As required
- Vacuum ... ... ... Indicating
- Flight instruments ... ... Erect, DI synchronised
- Engine instruments ... ... Temperatures and pressures
- Alternator warning light ... ... Out
- Ammeter ... ... ... 2 to 5 amps
- Harnesses ... ... ... Seat and parachute tight
- Canopy ... ... ... Latched
- Flying controls ... ... ... Full and free movement
- Take-off emergencies ... ... Brief complete

Note: The rudder should have been checked for full and free movement during taxying.

CHECKS DURING TAKE-OFF

Oil Pressure ... ... ... 60 to 90 PSI
RPM ... ... ... ... 2650 to 2700
Fuel pressure ... ... ... 7 to 10 PSI

CHECKS AFTER TAKE-OFF

Engine instruments ... ... Checked
Flap ... ... ... ... Up at safe height
Transition Altitude/Airfield Departure:
- Altimeter ... ... ... 1013 mb/RPS set
- Fuel booster pump ... ... At 1000 ft agl OFF
- Mixture ... ... ... Adjust
CHECKS BEFORE
STALLING, SPINNING, AEROBATICS

Height
Sufficient to recover by briefed height

Airframe
Flap ... ... ... UP for spins and aerobatics
Elevator trim ... ... In TO band for spins

Security
Harnesses ... ... Seat and parachute tight
Canopy ... ... Closed and locked
Loose articles ... ... None

Engine
RPM control ... ... 2600 RPM
Mixture ... ... Best power
Induction air ... ... COLD
Fuel booster pump ... ... On
Fuel contents ... ... Satisfactory. Tanks balanced
Fuel selector value ... ... BOTH
Instruments ... ... Indications normal

Location
Clear of controlled airspace, active airfields, built up areas and cloud

Take-off/
In flight

Lookout
6 Clear of other aircraft

Recommended speeds for aerobatics
Roll ... ... ... 130 knots
Barrel Roll ... ... 120 knots
Stall Turn ... ... 120 knots
Loop ... ... ... 140 knots
Half Roll off Loop ... 145 knots

CHECKS AFTER
STALLING, SPINNING, AEROBATICS

Fuel booster pump ... ... OFF
Fuel selector valve ... ... As required for balance
RPM ... ... ... Adjust as required
DI ... ... ... Synchronised
IN-FLIGHT ROUTINE CHECKS

Fuel ... ... ... Contents, balance, booster pump as required
Engine ... ... ... Temperatures, pressures and suction within limits
Electrics ... ... ... Positive rate of charge, alternator warning light out
Location ... ... ... Position and pigeons to base

PRE-DESCENT/RECOVERY CHECKS

Fuel ... ... ... Contents sufficient
Booster pump on below transition level
Instruments ... ... ... Erect and synchronised. Vacuum pressure normal
Radio ... ... ... Frequencies selected
Altimeter ... ... ... Set as required
Demist and screen heat... As required
Induction Air ... ... As required

APPROACH PROCEEDURE

Instrument Approach Settings

<table>
<thead>
<tr>
<th>Configuration</th>
<th>RPM Control</th>
<th>Throttle set to</th>
<th>IAS kt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial decent</td>
<td>Flap UP</td>
<td>2400</td>
<td>2200 RPM</td>
</tr>
<tr>
<td>Glidepath</td>
<td>Flap INTER</td>
<td>Max</td>
<td>As reqd</td>
</tr>
</tbody>
</table>

Fly the instrument pattern at 100 knots, flap UP. When in visual contact with the runway, set FULL flap and reduce to threshold speed +5 knots.

LANDING CHECKS

Checks Before Landing

RPM control ... ... Max
Mixture ... ... FULL RICH
Induction air ... ... COLD
Fuel ... ... Booster pump on
      ... ... Contents sufficient
Flap ... ... As required
Harness ... ... Tight
Canopy ... ... Latched
Breaks ... ... Off. Passenger feet clear

Threshold speeds are given on Card 7 (continued)
Landing Checks – continued

Threshold Speeds (knots)

<table>
<thead>
<tr>
<th></th>
<th>FULL flap</th>
<th>Flap UP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powered</td>
<td>65</td>
<td>70</td>
</tr>
<tr>
<td>Glide</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>Short landing</td>
<td>55</td>
<td>-</td>
</tr>
</tbody>
</table>

These speeds are for an AUW of 1066 kg and may be reduced by 1 knot per 20 kg reduction in AUW.

For crosswind and/or turbulent conditions, add 5 knots.

CHECKS AFTER LANDING

Pitot head heater  ...  OFF
Taxy lamp  ...  ...  As required
Anti-collision lights  ...  Red strobes
Transponder  ...  ...  OFF
VOR/ILS/DME/ADF  ...  OFF
Fuel booster pump  ...  OFF
Flaps  ...  ...  UP

SHUTDOWN

Parking break  ...  ...  On
VHF/GPS/Intercom  ...  Off

Set 1100 RPM and allow temperatures and pressures to stabilise. When cylinder head temperature is below 180°C:

Throttle  ...  ...  CLOSED
Ignition  ...  ...  Check for dead magneto, then momentarily select OFF then BOTH (ensure dead cut)
Mixture  ...  ...  CUT OFF
Ignition  ...  ...  OFF (when engine stops)
Fuel selector valve  ...  L or R

Alternator  ...  ...  OFF
Electrical services  ...  Off
Transponder  ...  ...  OFF
Anti-collision lights  ...  OFF
Battery Master  ...  ...  OFF

Portable VHF  ...  ...  OFF
Chocks  ...  ...  In position
| Parking brake | ... | ... | Off |
LIMITATIONS

Note: The following limitations are taken from the RAF Release to Service document and the Bulldog Series 120 Flying Manual No. SH3.3 which should be consulted for the latest release standard.

AIRFRAME

Maximum Speeds (knots)

<table>
<thead>
<tr>
<th>Speed Type</th>
<th>Maximum Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never exceed speed</td>
<td>185</td>
</tr>
<tr>
<td>Normal operating</td>
<td>145</td>
</tr>
<tr>
<td>For full application</td>
<td>140</td>
</tr>
<tr>
<td>Flap: between UP and INTER</td>
<td>135</td>
</tr>
<tr>
<td>Flap: between INTER and FULL</td>
<td>100</td>
</tr>
<tr>
<td>Canopy open (maximum 8 inches)</td>
<td>120</td>
</tr>
</tbody>
</table>

Operating Limitations

<table>
<thead>
<tr>
<th>Limitation</th>
<th>Maximum Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum altitude</td>
<td>10,000 ft</td>
</tr>
<tr>
<td>Maximum OAT (sea level)</td>
<td>+35°C</td>
</tr>
<tr>
<td>Minimum OAT (sea level)</td>
<td>minus 10°C</td>
</tr>
</tbody>
</table>

Aerobatics and spinning prohibited when:

- Flaps are extended, Baggage is carried, Seatbacks installed, Zero fuel weight exceeds 984 kg.

Weight

<table>
<thead>
<tr>
<th>Weight Type</th>
<th>Maximum Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum for take-off and landing</td>
<td>1066 kg</td>
</tr>
<tr>
<td>Maximum load in baggage compartment</td>
<td>100 kg</td>
</tr>
</tbody>
</table>

Airfield Limitations

Aircraft must not be operated when wind speed on the ground is gusting at or in excess of 40 knots.

<table>
<thead>
<tr>
<th>Crosswind Component</th>
<th>Maximum Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum crosswind component</td>
<td>30 knots</td>
</tr>
</tbody>
</table>

Arrester Gear Trampling

<table>
<thead>
<tr>
<th>Arrester Type</th>
<th>Trampling Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHAG or PUAG</td>
<td>Erected cable may be crossed at right angles up to 30 knots, no braking applied</td>
</tr>
<tr>
<td>CHAG</td>
<td>Erected cable should be crossed only at walking pace, with marshaller</td>
</tr>
</tbody>
</table>

Negative g

Maximum time for continuous application 15 seconds

Note: A period of rough running may follow the re-application of positive g which may last approximately 15 seconds starting approximately 25 seconds after the original application of negative g.

(continued)
Aircraft Limitations – continued

Normal Acceleration
The normal maximum permitted positive and negative g limits are given below:

Note: Never exceed limits are given in the Flight Manual.

Clean Aircraft
1. Symmetric manoeuvres

<table>
<thead>
<tr>
<th>Aerobatics permitted</th>
<th>Non-aerobatic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ZFW below 984 kg</td>
<td>1. ZFW above 984 kg and/or</td>
</tr>
<tr>
<td>2. No baggage</td>
<td>2. Baggage carried and/or</td>
</tr>
<tr>
<td>3. Flaps up</td>
<td>3. PSP fitted</td>
</tr>
<tr>
<td>Normal g limits</td>
<td>+4.75 to –2.0 (-1.5 above 140 kt)</td>
</tr>
</tbody>
</table>

2. Rolling manoeuvres using any amount of aileron deflection at speeds up to 140 knots

<table>
<thead>
<tr>
<th>Aerobatics permitted</th>
<th>Non-aerobatic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ZFW below 984 kg</td>
<td>1. ZFW above 984 kg and/or</td>
</tr>
<tr>
<td>2. No baggage</td>
<td>2. Baggage carried and/or</td>
</tr>
<tr>
<td>3. Flaps up</td>
<td>3. PSP fitted</td>
</tr>
<tr>
<td>Normal g limits</td>
<td>+3.15 to minus 1.0</td>
</tr>
</tbody>
</table>

Flaps Extended at Any Setting
Maximum normal g limit +2.0g
RPM
Max permissible ... ... ... 2700
Max (oil temp below 30°C) ... ... 1200
Ground idling ... ... ... 800±50
Note: Report extent and duration of all excursions above 2700 RPM.

Maximum Manifold Pressure (in Hg)

<table>
<thead>
<tr>
<th>RPM</th>
<th>1800</th>
<th>1900</th>
<th>2000</th>
<th>2100</th>
<th>2200</th>
<th>2300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea level</td>
<td>25.0</td>
<td>25.6</td>
<td>26.3</td>
<td>26.9</td>
<td>27.5</td>
<td>28.2</td>
</tr>
<tr>
<td>Reducing to at (altitude) (See Note)</td>
<td>23.2</td>
<td>24.1</td>
<td>25.0</td>
<td>26.0</td>
<td>26.9</td>
<td>27.8</td>
</tr>
<tr>
<td>6000</td>
<td>5000</td>
<td>4000</td>
<td>3000</td>
<td>2000</td>
<td>1000</td>
<td></td>
</tr>
</tbody>
</table>

Note: These altitudes correspond to full throttle height for the associated RPM.

Magneto Drop at 2100 RPM
Max each magneto ... ... ... 175
Max between magnetos ... ... 50

Cylinder Head Temperature (°C)
Max at full throttle ... ... ... 246
Max before shutdown (after flight) ... 180
Min before exceeding 1200 RPM (following engine start on ground) ... 100
Min during flight ... ... ... 50

Oil Pressure (PSI)
Min at idling RPM ... ... ... 25
Min (normal operation) ... ... 55
Max (normal operation) ... ... 95
Max during start and warm up ... ... 100
Minimum during a closed throttle descent at 1200 RPM ... ... ... 40
Minimum during inverted flight ... Zero

Oil Temperature (°C)
Maximum ... ... ... ... 118
Min (continuous operation) ... ... 60
Min before exceeding 1200 RPM ... 30

Fuel Pressure (PSI)
Maximum ... ... ... ... 12
## PERFORMANCE

### EN-ROUTE CLIMB-ISA, Maximum take-off weight, Maximum power

<table>
<thead>
<tr>
<th>Altitude (ft)</th>
<th>Time (mins)</th>
<th>Distance (NM)</th>
<th>Fuel Used (UK gal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea level to 2000</td>
<td>2.5</td>
<td>3.5</td>
<td>0.5</td>
</tr>
<tr>
<td>4000</td>
<td>5.0</td>
<td>7.0</td>
<td>1.0</td>
</tr>
<tr>
<td>6000</td>
<td>7.5</td>
<td>11.0</td>
<td>1.5</td>
</tr>
<tr>
<td>8000</td>
<td>10.5</td>
<td>15.0</td>
<td>2.0</td>
</tr>
<tr>
<td>10,000</td>
<td>14.0</td>
<td>20.0</td>
<td>2.6</td>
</tr>
</tbody>
</table>

### CRUISE PERFORMANCE

<table>
<thead>
<tr>
<th>Power %</th>
<th>IAS (knots)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1043 kg AUW</td>
</tr>
<tr>
<td></td>
<td>SL 4000 8000</td>
</tr>
<tr>
<td>95</td>
<td>134</td>
</tr>
<tr>
<td>90</td>
<td>130</td>
</tr>
<tr>
<td>80</td>
<td>123</td>
</tr>
<tr>
<td>70</td>
<td>116</td>
</tr>
<tr>
<td>60</td>
<td>108</td>
</tr>
<tr>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>40</td>
<td>89</td>
</tr>
</tbody>
</table>

(continued)
Performance – continued

FUEL CONSUMPTION – ISA, All altitudes and weights

a. Best Power Mixture

<table>
<thead>
<tr>
<th>Power %</th>
<th>UK Gallons per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2600 RPM</td>
</tr>
<tr>
<td>95</td>
<td>12.5</td>
</tr>
<tr>
<td>90</td>
<td>11.9</td>
</tr>
<tr>
<td>80</td>
<td>10.7</td>
</tr>
<tr>
<td>70</td>
<td>9.7</td>
</tr>
<tr>
<td>60</td>
<td>8.7</td>
</tr>
<tr>
<td>50</td>
<td>7.7</td>
</tr>
<tr>
<td>40</td>
<td>6.8</td>
</tr>
</tbody>
</table>

b. Best Economy Mixture

<table>
<thead>
<tr>
<th>Power %</th>
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## CRUSIE POWER SETTINGS

### BEST POWER MIXTURE

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Performance (contd)

(continued)
Cruise Power Settings – continued

**BEST ECONOMY MIXTURE**

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Note: The fuel given in the table below is the fuel available after an arbitrary allowance of 4 UK gallons has been made for descent, landing and unusable fuel (e.g. full fuel (32 UK gallons) is 28 UK gallons plus 4 UK gallons allowance).

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Performance (contd)

10A
Intentionally Blank
BULLDOG SERIES 120
EMERGENCIES

EMERGENCY ENGINE SHUTDOWN
(Engine Fire or Mechanical Failure/
ENGINE FAILURE IN FLIGHT
(Non-Mechanical)

FORCED LANDING
ENGINE FAILURE AFTER TAKE-OFF/
ENGINE FIRE ON THE GROUND
COCKPIT FIRE
FUMES IN THE COCKPIT

ROUGH RUNNING IN FLIGHT
PROPELLER MALFUNCTIONING/
ELECTRICAL FAILURES

COMMUNICATIONS FAILURE/
ABANDONING
DITCHING
EMERGENCY ENGINE SHUTDOWN
(Engine Fire or Mechanical Failure)

Note: No engine fire extinguisher is fitted.

Immediate Actions

Warn crew
Turn towards nearest suitable landing area
Speed  ...  ...  ...  Reduce to 75 kt for the glide
Fuel Booster pump  ...  OFF
Throttle  ...  ...  ...  CLOSED
Mixture  ...  ...  ...  CUT-OFF
Ignition  ...  ...  ...  OFF
Fuel selector valve  ...  OFF
Cabin heat  ...  ...  Off
Alternator  ...  ...  OFF

WARNING: Do not attempt to restart the engine

Subsequent Actions

Above 2000 feet AGL:
Fire not extinguished – carry out the Abandoning checks (Card 15)
Fire extinguished/Mechanical Failure – decide between Forced Landing (Card 12R) or Abandoning (Card 15)

Below 2000 feet AGL:
Harness  ...  ...  ...  Tight
Canopy  ...  ...  ...  Closed and locked
Parking brake  ...  ...  Off
Radio  ...  ...  ...  R/T call
Maintain 75 knots throughout descent until roundout
When final flap selection has been made:
Battery master switch  ...  OFF
ENGINE FAILURE IN FLIGHT
(Non-Mechanical)

Immediate Actions
Warn Crew
Turn towards nearest suitable landing area
Fuel booster pump ... On
Throttle ... ... CLOSED
Speed ... ... Reduce to 75 knots for glide

Subsequent Actions

Below 2000 feet AGL:
Carry out Forced Landing Checks (Card 12R)

Above 2000 feet AGL:
If time permits, set or confirm:
Fuel selector value ... BOTH
Fuel booster pump ... On
Induction air ... ... As required
Ignition ... ... BOTH
Mixture ... ... FULL RICH
RPM ... ... Max
Throttle ... ... Slightly open

If propeller is windmilling:
Throttle ... ... Open
If engine does not pick up:
Throttle ... ... CLOSED
Decided between Forced Landing (Card 12R) or Abandoning (Card 15)

If propeller is stationary:
Starter button ... ... Press until engine fires
Starter warning light ... Out
Throttle ... ... Open
If engine does not pick up:
Decided between Forced Landing (Card 12R) or Abandoning (Card 15)

Note 1: If engine does not turn using starter motor the propeller may be rotated by diving steeply to 140 knots. If still stationary, a firm pull-out assists propeller rotation. Only attempt this if a successful Forced Landing or Abandoning would still be possible if engine fails to start.

Note 2: If engine failure was caused by intake icing, use induction hot air until clear of icing conditions.
FORCED LANDING

The recommended minimum height for abandoning the aircraft is 2000 feet AGL.

Speed ... ... ... 75 knots until roundout
Fuel booster pump ... OFF
Throttle ... ... CLOSED
Mixture ... ... CUT-OFF
Ignition ... ... OFF
Fuel selector value ... OFF
Harness ... ... Tight
Canopy ... ... Closed and locked
Park. Brake ... ... Off
Radio ... ... R/T call
Transponder ... ... ALT, code 7700

When final flap selection has been made:
Battery master ... ... OFF

ENGINE FAILURE AFTER TAKE-OFF

Immediate Actions

Warn crew
Select attitude for gliding speed
Select landing area
Lower flap as necessary

Subsequent Actions

Radio ... ... R/T call
Carry out as many Forced Landing checks (above) as time and circumstances permit
ENGINE FIRE ON THE GROUND

Warn crew
Fuel booster pump ... OFF
Throttle ... ... CLOSED
Mixture ... ... CUT-OFF
Ignition ... ... OFF
Fuel selector valve ... OFF
Battery master switch ... OFF
Parking brake ... Off
Collect the hand fire extinguisher and vacate the aircraft

COCKPIT FIRE

Alternator ... OFF
Battery Master switch ... OFF
Cabin heat. ... OFF
Use hand fire extinguisher

Note: If time is sufficient, make RT distress call before battery master switch OFF.

FUMES IN THE COCKPIT

Cabin heat ... OFF
Air flow lever ... SCREEN
Windscreen demist ... Pulled on
Speed ... ... Below 120 knots
Canopy ... ... Open 2 to 4 notches
Land ASAP

Forced Ldg.
EFATO/
Fire on Grnd,
C’pit, Fumes
ROUGH RUNNING IN FLIGHT

Ensure positive g applied
Turn towards the nearest suitable landing area
Fuel booster pump ... On
Fuel selector valve ... Check setting
Fuel contents ... Check
Engine controls ... Check correctly set (see Note 1)
Induction air ... Change setting if still rough running

If rough running continues, attempt to maintain at least 2000 feet AGL
Mixture ... FULL RICH

If rough running continues (see Note 2):
Throttle ... Set to about half open
Magneto switch ... Select Left (see Note 3)

If rough running continues:
Magneto switch ... Select Right (see Note 3)

If rough running continues:
Magneto switch ... Select BOTH
MAP and RPM ... To give smoothest running

Recover to nearest airfield from a forced landing pattern

Note 1: In the climb above 5000 feet some over-richness may occur resulting in rough running or loss of power. If either symptom occurs, use mixture control to reduce fuel pressure to attempt to remove symptom.

Note 2: Switching of magnetos in flight to attempt to isolate a defective magneto is only recommended if a forced landing away from an airfield is inevitable.

Note 3: If engine cuts, close throttle before selecting alternative magneto.

PROPELLER MALFUNCTIONING

RPM Overspeed (Exceed 2700)
Reduce RPM control until RPM are governed
Reduce speed
Use minimum throttle
Land ASAP

RPM underspeed or RPM
Follow Throttle Movement in Constant Speed Range
Throttle back slowly to avoid overboosting
Use minimum throttle
Monitor engine for oil loss
Maintain 2000 feet AGL
Land ASAP from forced landing pattern
ELECTRICAL FAILURES

Alternator Failure

**Indications – 1**
- Alternator failure light ... On
- Ammeter... ... ... Negative reading
- Volts ... ... ... 24 volts or less
- Charge c/b ... ... Tripped

**Actions**
- Non-essential electrics ... Off
- Alternator ... ... OFF

*Do not reset* charge c/b or alternator

**Indications – 2**
As for Indications – 1 but charge c/b *not* tripped

**Indications – 3**
- Ammeter... ... ... Negative reading
- Volts ... ... ... 24 volts or less
- Charge c/b ... ... Tripped

**Actions for Indications 2 and 3**
- Reset drill:
  - Non-essential electrics ... Off
  - Alternator ... ... OFF
  - Charge or field c/b ... Reset if tripped
  - Alternator ... ... On

See Note and considerations below

**Note:** If alternator is regained, check ammeter positive reading reduces to 10 amps within one minute

If alternator *not* regained or charge rate exceeds 10 amps after 1 minute, switch alternator OFF and trip CHARGE c/b

**Considerations**

Reduced services are available from an 80% charged battery for 45 minutes but satisfactory communications are only available for 35 minutes (VHF). For landing, full flap selection and fuel booster pump may not be available.

Flap Actuator Failure

If flap fails to operate when selected, check flap circuit breaker and if tripped make one attempt to reset.

If flap still fails to operate, continue flight with flap in achieved position, observing flap limiting speeds.
COMMUNICATIONS FAILURE

Loss of Transmit and/or Receive Facility
Mic/tel leads ... ... Connected
COM 1 or COM 2 ... Use alternative radio
Transmit switch ... Check, try other switch
If VHF reception available ... ... Use speechless procedure
If complete failure remains ... ... Transponder to ALT, code 7600

Loss of Intercom
Mic/tel leads ... ... Connected
Audio circuit breaker ... If tripped, make one attempt to reset
ABANDONING

The recommended minimum height for abandoning the aircraft is 2000 feet AGL. In a spin the aircraft should be abandoned by transition level plus height of ground AMSL.

Warn Crew
Radio ... ... ... Transmit distress call
Transponder ... ... ... ALT, code 7700
Canopy ... ... ... Jettison
Speed ... ... ... Reduce to safe minimum
Safety harness ... ... ... Release
Parachute harness ... ... ... Tight

Dive head first towards trailing edge of Mainplane
When clear of the aircraft, pull the parachute ripcord handle

To jettison canopy

Pull jettison handle down and aft sharply
Push canopy away if necessary
Note: Above 75 kt it should not be necessary to push the canopy away

DITCHING

If possible, abandon rather than ditch. If ditching is inevitable:

Radio ... ... ... Transmit distress call
Transponder ... ... ... ALT, code 7700
Flap ... ... ... As required
Canopy ... ... ... Jettison
Safety harness ... ... ... Tight

Approach into wind at normal speed with full flap.
If power is available, hold off just clear of water.
Touch down at lowest practicable speed and close throttle.
Land on the crest of a wave if possible or, if the swell is heavy, along the swell.
Aircraft will probably turn on its back.
Release safety harness and leave cockpit; retain parachute harness until clear of cockpit.
### Diversion Data

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<th>Indicated Fuel - Gallons</th>
<th>Range (R) - NM and Time (T) - Minutes</th>
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</table>

The table allows 4 UK gallons of fuel overhead the diversion airfield for descent and landing. Use of BEM increase range by approximately 15%.

Do not climb above Minimum Safe Flight Level unless headwind is less at higher level; use same % power for head or tailwind component.