VC 10

C Mk. 1

FLIGHT REFERENCE CARDS

EMERGENCY DRILLS

TEMPERATURE CONTROL FAILURES

High duct temperatures

If duct temperatures rise and an overheat condition is likely :

1. Select recirc. fan(s) to contain the temperature.
2. Manually adjust the system(s) to reduce the temperature.

Cooler modulation valve failure

Indication

No movement of cooler modulation valve.

If an overheat occurs, overheat light on and spill valve open.

Action

If the cabin temperature is too high :

1. Select MOD ISOLATE.
2. If the 75°c overheat light is on, select the recirc. fans ON and operate the overheat/reset switch.
3. If the light remains on, select the spill valve to SPILL.

If cabin temperature is too low :

1. Select MOD ISOLATE.
2. Select spill valve to SPILL.
3. Select recirc. fans ON.

Choke valve failure

Indication

No movement of choke valve.

Action

1. Select CHOKE OVERRIDE
2. If the cabin temperature falls too low, select the recirc. fans ON.

Refrigeration pack failure

Indication

Fail light on.

Temperature control failures *(continued)*

Action

Prior to take-off

1. Select frig. master switch to ISOL.
2. Select recirc. fan of failed system OFF.
3. Set spill valve of failed system to SPILL. (Reset NORMAL at about 5,000 feet).

During flight

1. Select frig. master switch to ISOL.
2. After descending to 1,500 ft. set spill valve to SPILL.

If the other refrigerator fails

1. Select frig. master switch to ISOL.
2. During descent, set cabin altitude selector 2,000 ft.
3. At 1,500 feet select both spill valves to SPILL and the louvre fan ON.

Temperature control failure

Indication

Variation from preset temperature.

Action

1. Select the temperature control switch of the faulty system to INC or DEC to maintain the temperature the same as that of the other system.
2. The selections should be kept to a minimum to prevent hunting of the serviceable system.

Louvre fan failure

Indication

No air from louvres.

Action

1. Remove fuse F49 on panel z while the temperature control is in the frig. range.
2. Whenever the right refrigerator is used, the right recirc. fan should be switched on.
3. Just before landing, select the right frig. master switch to ISOL.
4. The right refrigerator must not be switched on after landing until the fuse is replaced.

PRESSURE CONTROL FAILURES

Cabin compressor failure

Indication

1. No slide valve movement or slow drift to decrease.
2. Compressor NRV light on.
3. Possibility of smoke in cabin.

Action

1. Set the MFC switch of the failed compressor to DEC.
2. Leave the MFC switch of the paired compressor at AUTO.
3. Select CHOKE OVERRIDE on the faulty system.

Slide valve linvar drive failure

Indication

1. Limited slide valve travel.
2. Slide valve position different to that of paired compressor.

Action

1. Select the MFC switch alternately to INC and DEC.
2. If limited slide valve movement is available, reselect AUTO.
3. If there is no slide movement, set MFC switch to DEC and select CHOKE OVERRIDE on the faulty system.

Mass-flow control sensing unit failure

Indication

1. AUTO OFF warning light(s) on.
2. AUTO selected, no slide movement with changes of height or RPM.
3. Full slide movement with manual selections.

Action

1. Check position of all slide valves.
2. Use the MFC switches of the faulty system to make their slide valves agree with those of the other system.
3. Set the MFC switch(es) to HOLD.

Mass-flow control sensing unit failure (*continued*)

4. Adjust the slide positions, as necessary, every 5,000 feet during climb or descent and every 30 minutes during cruise.
5. If the slides require frequent adjustment when HOLD is selected, select DEC.
6. Select CHOKE OVERRIDE on the faulty system.

Pressure control failure

Indication

1. Discharge valve indicators unbalanced.
2. Change of cabin differential pressure.

Action

1. If one discharge valve fails shut, set its selector switch to SHUT.
2. Set the corresponding thrust augmenter OPEN.
3. If both discharge valves fail shut during:
   (*a*) *Climb*
      (i) Select the spill valves to NORM in turn.
      (ii) At the same time, control the rate-of-change of cabin altitude with the dump valve.
   (*b*) *Cruise*
      (i) Select aft thrust augmenter fully OPEN.
      (ii) Control the cabin altitude with the dump valve.
   (*c*) *Descent*
      (i) Select aft thrust augmenter fully OPEN.
      (ii) Control the change of cabin altitude with the dump valve.
      (iii) When the dump valve is $\frac{3}{4}$ open, continue to control the rate-of-change by progressively opening the forward thrust augmenter.

Pressure control failures (*continued*)

(iv) When the forward thrust augmenter is fully open, maintain control by progressively opening the spill valve.

NOTE: Should the pressure control amplifier give a false open signal, the emergency controller maintains a cabin altitude of 9,000 feet.

Duct failure

(a) **Duct fails upstream of flow control venturi**

Indication

1. Cabin NRV light on.
2. Compressor NRV light on if failure upstream of compressor NRV.
3. At low altitudes, slide valves of the faulty system move towards full delivery.

Action

1. Select MFC switches of faulty system to DEC.
2. Switch recirc. fans ON.
3. Check ducting in rear fuselage compartment for leaks.

If the failure affects one compressor only:

1. Select its MFC switch to DEC.
2. Leave the MFC switch of the paired compressor at AUTO.
3. Select CHOKE OVERRIDE on faulty system.

(b) **Duct fails between flow control venturi and stop valve**

Indication

Cabin NRV light on.

Action

1. Select MFC switches of the faulty system to DEC.
2. Check ducting in rear fuselage compartment for leaks.

EMERGENCY DESCENT

Crew oxygen	100%
Throttles	Idle
Speed brakes	Out
Speed	M_{MO}/V_{MO}
Passenger oxygen	On when instructed
Cabin signs	ON

DOOR WARNINGS

In pressurised flight

Entrance or service door or access panel light on

1. Maintain a minimum cabin differential pressure of 1·0 PSI.
2. Check the anti-G lock, if appropriate, as soon as possible.
3. *Do not touch the door handle.*

Cabin freight door light on, pre-Mod. 253 or,

Cabin freight door light and positive lock light on, post-Mod. 253

1. Descend slowly to 16,000 ft. Do not use speed-brakes.
2. Maintain a maximum cabin differential pressure of 1·0 PSI.

Cabin freight door light on, post-Mod. 253

1. Check on the freight door locks test panel.
2. The descent drill above must be carried out if:
   (a) Two hooks are not engaged, or
   (b) Forward shoot bolts not engaged and No. 1 hook not locked, or
   (c) Aft shoot bolts not engaged and No. 7 hook not locked.
3. No action need be taken if:
   (a) Either the forward or aft shoot bolts are not engaged, or
   (b) One hook is not locked, or
   (c) Any one of 2, 3, 4, 5 or 6 hooks are not locked and both the forward and aft shoot bolts not not engaged, or
   (d) the forward shoot bolts not engaged and No. 7 hook unlocked, or

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Door warnings (*continued*)

(e) The aft shoot bolts not engaged and No. 1 hook unlocked.

In unpressurised flight

Entrance or service door light on

1. Check the anti-G lock.
2. If the lock is not in position, *do not touch the door handle;* initiate a cabin minimum differential pressure of 1·0 PSI.

Cabin freight door light on or, post-Mod. 253 positive lock light on

Do not exceed a cabin differential pressure of 1·0 PSI.

CABIN WINDOW FAILURE

1. Reduce cabin differential pressure to 5·5 PSI max.
2. Move passengers away from adjacent seats.
3. On descent—when differential pressure is less than 1·0 PSI, passengers may return to seats ; seat belts fastened.

LOSS OF PRESSURISATION

Thrust augmenters . .	SHUT
Manual dump valve . .	SHUT
UPVV	SHUT
Radio cooling valve . .	Shut
Discharge valves . .	Check indicators. Shut valves as required. Control altitude with dump valve
Spill valves . . .	SHUT
6″ NRV lights . . .	Out
Cabin compressors . .	Check indicator position
4″ NRV lights . .	Out

AIRFRAME ANTI-ICING SYSTEM FAILURES

Two HP stop valves close

1. Select the affected HP stop valve switches to SHUT.
2. Check and restore electrical supplies.
3. Operate the reset switch on panel EA.
4. Select the HP stop valve switches to NORMAL individually after throttling appropriate engine.

Four HP stop valves close

1. Select all four HP stop valve switches to SHUT.
2. Operate both reset switches on panel EA.
3. Establish which PRV is faulty.
4. Select the PRV and HP stop valve switches on the faulty side to SHUT.
5. If both PRV's are faulty, select both PRV and all HP stop valve switches to SHUT.

NOTE: Airframe anti-icing is inoperative for remainder of flight.

Nacelle stub overheat

If either stub O/HEAT light comes on:

1. Select both PRV and all HP stop valves SHUT.
2. If icing conditions cannot be avoided close Nos. 2 and 3 throttles, open the PRV's and then open Nos. 2 and 3 HP stop valves.
3. Slowly open Nos. 2 and 3 throttles as required while monitoring the main, left and right duct temperatures.

Duct failure

If the duct fail light comes on :

1. Wait 15 seconds and cancel the warning; if the light remains out take no further action.
2. If the light comes on again, carry out the drill for Nacelle Stub Overheat above.

Duct overheat

If a duct O/heat warning light is on for more than 60 seconds or the duct temperature stabilises above 235°C:

1. Select the tail anti-icing switch to SHUT.
2. Use the duct temp. switch to establish which side is causing the overheat.

Duct overheat (*continued*)

3. Select both HP stop valve switches to SHUT on the affected side.
4. When the warning light goes out or the duct temperature falls to 235°C, select the tail anti-icing switch to No. 1 OPEN or No. 2 OPEN.
5. Monitor the duct temperature.

NOTE: The warning light remains on unless the temperature falls at least 15°C.

ENGINE ANTI-ICING SYSTEM FAILURES

Regulating valve failure

After switching the engine anti-icing on, when the pressure is outside the range of 40-60 PSI:

1. Decrease the RPM of the affected engine until the pressure is within the required range.
2. Monitor the engine anti-ice gauge and adjust the RPM as required for the rest of the flight.
3. When the pressure cannot be reduced below 60 PSI, switch off the anti-icing of the affected engine.

WINDSCREEN PANEL/HEATER FAILURES

Restrictions following windscreen failures are as follows:

	Front Windscreen			*Side Windscreen*
	Outer	*Middle*	*Heating*	*Middle*
Symptom	*Crazing Busbars Visible*	*Crazing Busbars Obscured*	*Screen Cold*	*Crazing Insert Obscured*
Max. altitude or IOAT °C	25,000 feet —30°C	18,000 feet	—30°C	18,000 feet
Max. diff pressure	5½ PSI	3½ PSI	—	3½ PSI
Max. speed below 8,000 feet	200	190 knots	200	Normal

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CSD—LOW OIL PRESSURE

Indication—1

Oil LP warning, generator fail and alert lights on.

Action—1

Disconnect the drive.

Indication—2

Oil LP warning and alert lights on.

Action—2

1. Trip GCB.
2. If frequency is erratic or below 350 CPS—Disconnect the drive.
3. If frequency is above 350 CPS and the temperature is:
   (*a*) Above 160°C—Disconnect drive.
   (*b*) Below 160°C—Monitor and use as standby.

CSD—HIGH OIL TEMPERATURE

Indication

The oil temperature of one CSD is 15°C higher than the average of the others.

Action

1. Check loading.
2. Temperature above 110°C—Trip GCB. Monitor temperature and use as standby.
3. Temperature 160°C—Disconnect drive.

GENERATOR STATOR OVERHEAT

Indication

The temperature of one generator is 15°C higher than the average of the others.

Action

1. Trip GCB.
2. Check frequency and voltage.
3. If the frequency is low and erratic—Disconnect drive.

(*continued*)

Electrical failures (*continued*)

4. If frequency is normal—Monitor and use as standby.
5. If temperature continues to rise—Trip GCR.
6. Temperature 160°c—Disconnect drive.

GENERATOR FAILURE LIGHT ON

Indication

Generator failure and alert lights on.

Action

1. Trip GCB.
2. Frequency low and erratic—Disconnect drive.
3. If frequency normal—Select SSB to MANUAL SPLIT and GCB to CLOSE.
4. If generator will not parallel or voltage is low—Take no further action.

BUSBAR FAILURE

Indication

Engineer's and Pilot's GEN BUS FAIL lights on.

Action

1. Check BTB.
2. If frequency is normal—Select GCB to CLOSE.
3. If generator will not parallel or if voltage is low—Take no further action.
4. Check services lost.

GENERATOR FAILURES

General

(*a*) An overload of 48 KW is permitted on any generator for a period not exceeding 5 minutes.

(*b*) Before any attempt is made to diagnose a fault or to re-establish a generator, the SSB must be selected to MANUAL SPLIT.

(*c*) If 1, 2 or 3 generators fail during take-off, the SSB must not be selected to AUTO unless the aircraft is at a safe height.

(*d*) If 1 or 2 generators fail during an approach or landing, take no action; if 3 or 4 generators fail, lower Elrat.

Generator failures (*continued*)

Failure of 1 or 2 generators

1. Select SSB to MANUAL SPLIT.
2. Check loading.
3. Establish the type of fault and take appropriate action.
4. Select SSB to AUTO (when at a safe height).
5. If the generators cannot be re-established, the SSB should remain at AUTO for landing.

Failure of 3 generators

1. Check the loading of the remaining generator and reduce below 36 KW.
2. Select the SSB to MANUAL SPLIT.
3. Establish the type of fault and take appropriate action.
4. Select SSB to AUTO (when at a safe height).
5. If the generators cannot be re-established, maintain the loading below 36 KW and leave SSB at AUTO for landing.
6. Lower Elrat at the top of the descent.

Complete generator failure

1. Lower Elrat.
2. Check Elrat is supplying emergency and auxiliary busbars.
3. Check five PCU and No. 2 feel unit failure lights go out
4. Select standby TRU to BUS 1 and BUS 2 alternately for 15 minutes.
5. Check the appropriate MAIN DC SUPPLY FAIL light is out.
6. Attempt to re-establish the generators.

ELRAT

Operation

1. Maintain at least 170 knots during and after lower ing Elrat.

Elrat operation (*continued*)

2. Within 30 minutes, descend below 35,000 feet and reduce speed (within the buffet boundaries) to reduce frequency below 460 CPS.
3. Maintain at least 140 knots during approach until down to 400 feet and in visual contact with runway.
4. Return the ELRAT selector lever to the forward position after shutting down the engines, before switching off the batteries.
5. The auto-pilot must not be used.

Services available

Flight instruments

No. 1 Turn-and-slip
Standby horizon
No. 1 compass system
Captain's CDI
Captain's VOR/RMI card with No. 1 needle only
Co-pilot's VOR/RMI No. 1 needle giving relative bearing only
Captain's ADF/RMI No. 1 needle giving relative bearing only
Co-pilot's ADF/RMI card and No. 1 needle only
Standby altimeter

NOTE: Both precision altimeters will be inoperative.

Radio equipment

UHF
No. 1 VHF
No. 1 VOR
No. 1 ADF
No. 1 ILS/GS
Marker receiver
Intercomm.

Flight controls

Both inner elevator PCU's
Both inner aileron PCU's
Top rudder PCU
Standby yaw damper
No. 2 feel unit

All services supplied by the essential and battery busbars are available.

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FAILURE OF SYSTEM A OR B
(Manual Split)

Equipment available

Equipment	*System* A *inoperative*	*System* B *inoperative*
	Services available	
HDI/CDI	Co-pilot's	Captain's
Precision alts	Co-pilot's	Captain's
Turn and slip	Co-pilot's	Captain's
VOR/RMI card	Co-pilot's	Captain's
ADF/RMI card	Captain's	Co-pilot's
VOR/ADF needles	No. 2	No. 1
Comp/vert gyros	No. 2	No. 1
Auto-pilot	No. 2	No. 1
UHF	Yes	Yes
VHF	No. 2	No. 1
HF	No. 2	No. 1
Doppler	No. 2	No. 1
GPI	—	Available
Ailerons	L Inner R Outer	L Outer R Inner
Elevators	L Inner R Outer	L Outer R Inner
Rudders	Top and bottom	Middle
Yaw dampers	No. 2 & Standby	No. 1
Feel units	No. 1	No. 2
Engine fire warning	2 & 4	1 & 3
TRU's	No. 2	No. 1; Standby
Lighting	Roof panel Console Red Co-pilot's Engine lower	Chart lights Red centre Red Captain's Engine upper

Electrical failures (*continued*)

DC FAILURES

Failure of one TRU

Indication

Appropriate DC supply failure and alert lights on.

Action

1. Isolate the failed TRU.
2. Select standby TRU.
3. Check DC failure light out.

Failure of both TRU's

Indication

Both DC supply failure and alert lights on.

Action

1. Isolate the TRU's.
2. Select standby TRU alternately BUS 1 and BUS 2 at 15 minute intervals.
3. Check appropriate DC failure light out.

BATTERY MALFUNCTION

If the charging rate of a battery exceeds 50 amps, select the appropriate battery switch to BATT ISOL.

In emergency, the battery may be re-connected to the bus-bar and the high charging rate ignored, provided that the voltage is normal.

ENGINE SHUT DOWN
(Failure and Overheat)

Immediate actions

HP cock . . .	E	SHUT

Subsequent actions

Generator . . .	E	Check failure light on and GCB MI cross-line; if not, select TRIP. Check loads
SSB switch . . .	E	AUTO (MI in line)
Hydraulic pump . .	E	Live engine selected
Mass flow control switch	E	DEC; check indicator and NRV light. Select CHOKE OVER-RIDE
HP stop valve . .	E	SHUT; MI cross-line
Alert warning and bell .	P	Reset
Fuel booster-pumps .	E	As required
Engine shut-down drill .	E/N	Complete

RELIGHTING

IMMEDIATE RELIGHT

As soon as the RPM start to fall, a relight may be attempted as follows:

Throttle . . .	E	As set
Start/relight switch .	E	RELIGHT

NORMAL RELIGHT

Preparation

Compressor slide valve .	No flow
Mass flow control switch .	DEC
Booster-pumps . . .	ON
Throttle	IDLE
HP cock	SHUT
HP and LP RPM . . .	Check engine rotating

Normal relight (*continued*)

Relight

Start/relight switch . .	RELIGHT
HP cock	START when RELIGHT selected
Start/relight switch . .	Off when EGT and HP RPM start to rise
HP cock	RUN, check: 1. Temperatures and pressures 2. Generator volts and frequency
GCB	CLOSE; failure light out. (MI in line)
SSB switch	AUTO. Check MI
Mass flow control switch .	Set, then select AUTO
Hydraulic pump . .	Checked and set as required
Booster-pumps . . .	As required
Engine anti-icing . .	As required

Failure to relight

If the EGT and HP-RPM have not started to rise when the START/RELIGHT switch has been at RELIGHT for 20 seconds:

Start/relight switch . .	OFF
HP cock	SHUT

Allow the engine to drain for at least 1 minute before attempting another relight.

ENGINE FIRE (AIR)

Immediate actions

On command from Captain:

HP cock . . .	E	SHUT
Fire control handle .	P/C	Pull
LP cock	E	SHUT
Fire control handle .	P/C	Turn clockwise to fire first shot
HP stop valves . .	E	Both SHUT on affected side
Hydraulic shut-off cock	E	SHUT

If warning persists after 30 seconds:

Fire control handle .	P/C	Turn anti-clockwise to fire second shot

Subsequent actions

Generator . . .	E	Check failure light on, GCB MI cross-line; if not, select TRIP. Check loads
SSB switch . . .	E	AUTO. (MI in line)
Hydraulic pump . .	E	Live engine selected
Mass flow control switch	E	DEC, check indicator and NRV light. Select CHOKE OVERRIDE
Alert warning and bell .	P	Reset
Booster-pumps . .	E	As required
Engine fire drill . .	E/N	Complete

ENGINE FIRE (GROUND)

Immediate actions

As for engine fire in the air.

Inform ATC.

Subsequent actions

Remaining engines .	E	Shut down
Systems . . .	E	Switch off

Complete shut-down check.

SMOKE DETECTOR LIGHT ON

Immediate action

Smoke detector . .	E	RESET
If warning persists:		
SSB switch . . .	E	MANUAL SPLIT
Oxygen . . .	All	ON, 100% selected; goggles on

Subsequent actions

Freight holds

Appropriate thrust augmenter . . .	E	SHUT
Appropriate discharge valve	E	SHUT
Inspect compartment		

NOTE: Fit smoke mask before entering hold.

Discharge valves

Fire	Hydraulic mist
As for freight holds . .	See hydraulic failures (loss of fluid). Discharge valves must remain open

SMOKE

Smoke on flight deck

1. Oxygen . . .	All	ON; 100% selected; goggles on
2. Right spill valve .	E	SPILL
3. Recirc. fans . .	E	OFF
4. Louvre fan . .	E	OFF
5. Flight deck flow .	E	Full INC
6. Right MFC switches .	E	DEC
7. Thrust augmenters .	E	SHUT
8. No smoking signs .	C	On
9. Passenger oxygen .	E	Release when instructed

Smoke in cabin

1.	Oxygen . . .	All	ON; 100% selected; goggles on
2.	Left spill valve .	E	SPILL
3.	Recirc. fans . .	E	OFF
4.	Louvre fan . .	E	OFF
5.	Flight deck flow .	E	Full DEC
6.	Left MFC switches .	E	DEC
7.	Thrust augmenters .	E	SHUT
8.	No smoking signs .	C	On
9.	Passenger oxygen .	E	Release when instructed

ELECTRICAL SYSTEM FIRE

1. If a source of smoke or fire is traced to a particular circuit, isolate the circuit.
2. When the source of smoke or fire is traced to one system, ensure that the SSB switch is at MANUAL SPLIT and then de-energise the two generators feeding that system by setting their GCR switches to TRIP.

Oxygen	All	ON, 100% selected; goggles on
Booster-pumps . .	E	All ON
SSB switch . . .	E	MANUAL SPLIT
Galley load switches .	E	OFF
Engineer's panels . .	E	Check for abnormal indications
Lighting . . .	P/E	Normal and Emergency ON
Auto-pilot . . .	P	Off
No. 2 yaw damper . .	P	On
System A electrics . .	E	GCR's TRIP
No. 1 battery . .	E	OFF

NOTE: If smoke stops, re-instate loads, checking that smoke does not reappear.

Electrical system fire *(continued)*

If smoke persists:

System A electrics . .	E	Normal
No. 1 yaw damper .	E	On
System B electrics . .	E	TRIP GCR's
Pressurisation .	E	Manual operation
No. 2 battery . .	E	OFF

SMOKE REMOVAL

Recirculation fans . E Both OFF

Allow pressurisation system to clear the smoke.

WHEEL BRAKE FIRES

Halt aircraft in an isolated position. Advise ATC. Shut down engines.

Brakes . . . . P Off

Engineer proceeds to wheel unit.

NOTE: 1. Approach fire from forward or aft to minimise risk of injury.

2. Use extinguisher only if fire exists and then from a maximum distance.

3. Risk of tyre explosion exists for at least 15 minutes after the fire is extinguished.

POWER CONTROL FAILURES

Indication

1. Master power control light on.
2. Individual PCU fail light on.
3. No movement of appropriate control surface on control indicator.

Action

1. Press the master power control light to reset.
2. Select appropriate PCU switch to ISOLATE.

FEEL UNIT FAILURES

Failure of one unit

Indication

Feel failure and/or overheat light on.

Action

1. Select appropriate feel motor switch to ISOLATE.
2. Fit trim strut.
3. Select standby yaw damper ON.

Failure of both units

Action

1. Select both feel motor switches to ISOLATE.
2. Disengage auto-pilot.
3. Fit trim strut.
4. Select standby yaw damper ON.
5. When standby yaw damper is functioning, switch off Nos. 1 and 2 yaw dampers.
6. Isolate middle and bottom rudders. If No. 3 yaw damper fails use any other single rudder with a serviceable yaw damper.
7. Operate the stall dump lever to de-activate the stall ident. system.

NOTE: When both feel units are inoperative the max. recommended cross-wind for landing is 10 knots.

TPI FAILURES

Operation of fault sensing switch

Indication

1. System in use tail trim overrun light on when selection made.
2. No TPI movement.

Action

Use other trim levers only.

TPI over-run

Indication

Both system tail trim overrun lights on while selection is being made.

Action

1. Press and hold in the re-arm button of the unaffected system.
2. At the same time, make an opposite TPI selection using the unaffected system.

FLAP FAILURES

Flap overtravel

Indication

1. One flap isolation light on and the associated isolation MI cross-line.
2. Flaps fully up or down.

Action

1. Select faulty system isolate switch to ISOLATE.
2. Select flaps as required.

Flap asymmetry

Indication

1. Both flap isolation lights on and both isolation MI's cross-line.
2. Flaps stop moving.

Action

1. Disengage the auto-pilot.
2. Set both isolation switches to ISOLATE and back to NORMAL to check for a transient fault.

Flap failures (*continued*)

3. If the fault does not clear, set both isolation switches to ISOLATE; then check and, where necessary, change the asymmetry control fuses 142, 145 (panel K) and 40, 43 (panel J), in turn.
4. If the fault still does not clear, indicated by the isolation lights remaining on and the isolation MI's remaining cross-line when the isolate switches are set to NORMAL, set the isolate switch to ISOLATE for the remainder of the flight and make no further attempt to operate the flaps.
5. Do not operate the flaps after landing.

MI oscillation

Indication

1. Both selector MI's oscillating when making a selection; one between blank and UP, the other between blank and DOWN.
2. No flap travel.

Action

1. Select the flap isolate switch of the faulty system to ISOLATE. (The faulty system is that in which the MI oscillates between blank and the flap selection made).
2. Make normal flap selections as required.

MI asymmetry

Indication

1. One flap selector MI showing UP, the other DOWN when making a selection.
2. No flap travel.

Action

1. Select the flap isolate switch of the faulty system to ISOLATE (the faulty system is that in which the MI shows the flap selection made).
2. Make normal flap selections as required.

SLAT FAILURES

Slat overtravel

Indication

1. One slat isolation MI cross-line.
2. Slats fully in or out.

Action

Continue to make normal slat selections.

Slat asymmetry

Indication

1. Both slat isolation MI's cross-line.
2. Slats stop moving.

Action

1. Trip CB's 70 and 71.
2. Check asymmetry control fuses 142 and 145 (panel J) and replace if necessary, in turn.
3. If the fault does not clear, indicated by the isolate MI's remaining cross-line, make no further attempt to operate the slats.

AILERON UPSET FAILURES

Failure to upset

1. Select switch of failed system to NORM.
2. Select switch of other system to ARM.

Failure to return to normal

1. Select switch of failed system to NORM.
2. Select switch of other system to ARM, then back to NORM.

BOOSTER PUMP FAILURE

Main tanks

Single pump failure

1. Switch on the other pump ; check LP light out.
2. Switch off failed pump.

Double pump failure

1. Switch off both pumps.
2. Shut the inter-engine and cross-feed valves.
3. Descend to (or below) 32,000 feet.
4. If engine flames out, descend until within relight envelope.
5. Open appropriate inter-engine valve, relight engine, then close inter-engine valve.
6. If required, regain height but do not exceed 32,000 feet.

Centre tank

Single pump failure

1. Switch on the other pump ; check LP MI in-line.
2. Switch off failed pump.

Double pump failure

1. Switch off both pumps. (Centre tank fuel unusable.)
2. Transfer fin tank fuel to main tanks via the fin tank flight refuel valve.
3. Check range with fuel remaining.

FUEL JETTISON PROCEDURE

Preparatory check

1. No smoking signs on, if cabin not pressurised.
2. Check flaps and undercarriage up.
3. Check over open country or sea.
4. Level flight not below 1,000 feet, preferably above 6,000 feet.
5. Inform ATC.
6. Switch off HF.

(continued)

Fuel jettisoning (*continued*)

Jettison procedure

1. Select all transfer and flight refuelling valves SHUT.
2. Switch all booster-pumps and both centre tank transfer pumps on.
3. Select tank jettison valve switches OPEN.
4. Pull jettison gang bar down.
5. Check jettison master MI's OPEN.
6. Check 1A/1 and 4A/4 tank transfer MI's in line.
7. Check reduction of tank contents on gauges.

Fuel may be jettisoned from individual tanks by selective switching of the jettison valves. If fin tank fuel is jettisoned, the tank must be completely emptied except in emergency. When fin tank fuel only is jettisoned, only its jettison valve should be selected.

Switching off

When jettisoning of fuel has automatically stopped or the desired amount has been jettisoned:

1. Select the tank jettison valve switches to NORM.
2. Select the main left and right jettison valve switches to NORM.
3. Select 1A and 4A transfer switches to NORM and check MI's cross-line.
4. Check jettison master valve MI's show SHUT before continuing.
5. Select both negative line switches to NORM.
6. Close jettison panel cover.
7. Revert to normal fuel handling procedure.

FUEL JETTISON FAILURE

If fuel cannot be jettisoned from one of the main tanks:

1. Select the inter-engine and cross-feed valves OPEN.
2. Ensure HP RPM below 96%.

Fuel jettison failure (*continued*)

3. Switch off the forward pumps of the unaffected tanks.
4. If an engine malfunctions, switch on another forward pump.

If fuel cannot be jettisoned from the fin tank:

Open all the fin transfer valves.

HYDRAULIC FAILURES

FLUID OVERHEAT

Yellow warning indication

1. Switch the pump(s) off.
2. Establish which pump is causing the overheating by selective switching.
3. Switch off faulty pump.
4. Continue to use the other pump.
5. If the system overheats when either pump is on, switch off both pumps.

Red warning indication

1. Switch the pump(s) off immediately.
2. When the temperature gauge pointer has returned to the yellow sector, continue as for yellow warning.

LOSS OF FLUID

1. Switch off the pump(s) of the affected system.
2. If the fluid level continues to fall, selectively close the shut-off cocks for periods not exceeding 10 minutes.
3. If the fluid level ceases to fall with one shut-off cock closed, leave the cock closed and use the unaffected pump.
4. If the fluid level ceases to fall (or falls slowly) when both shut-off cocks are closed, the system may be used, if necessary, for approach and landing.

Hydraulic failures (*continued*)

SERVICES AVAILABLE

Loss of system A or B

	System A *inoperative*	*System* B *inoperative*
	Services available	
Tail trim	Captain's normal control	Captain's alternative control
Spoilers	Inner and outer sections	Middle sections
Flaps/slats	Half rate	Half rate
Undercarriage	Normal for right main	Normal for left main and nose
Brakes	Normal system	Standby system
Nosewheel steering	Emergency (select just before landing)	Normal system
Auto-pilot	No. 1	No. 2
Windscreen wipers	—	Parking facility

Loss of both systems

Both brake systems—Accumulator pressure only.

Windscreen wipers—No parking facility.

NOTE: 1. The undercarriage must be lowered by free-fall
2. Nosewheel steering not available.

UNDERCARRIAGE FAILURES

Undercarriage lever cannot be raised

1. Check undercarriage lever solenoid lock CB (panel C-B11) is closed.
2. If CB closed, turn the knob of the undercarriage lever clockwise through 45°.
3. Select the undercarriage lever UP.
4. After landing, trip CB's 9 and 12 (panel C).

Undercarriage fails to retract

1. Check undercarriage main control CB (panel C-B12) is closed.
2. If one hydraulic system has failed, select DOWN on the undercarriage lever ; leave the undercarriage down, *DO NOT USE THE FERRY LINK.*
3. If CB closed and both hydraulic systems serviceable, select standby raise switch to UP.
4. When the undercarriage is locked up, leave undercarriage lever and standby raise switch UP.
5. When lowering the undercarriage before landing, select the standby raise switch to NORMAL before selecting the undercarriage lever DOWN.

Door fails to close

1. Select undercarriage down.
2. If door closes, select undercarriage up.
3. If door fails to close after either selection, leave or select undercarriage down and leave it down. Speed must be kept below 254 knots.

Undercarriage fails to lower or lock down

When an undercarriage leg fails to lower or lock down :

1. Check mechanical indicators showing green/SAFE. Check undercarriage indicator bulbs.
2. No locked down indication, check hydraulic system.
3. Hydraulic system serviceable, recycle the undercarriage ; if unsuccessful leave undercarriage lever UP and carry out free-fall procedure.

Undercarriage failures (*continued*)

4. Hydraulic system u/s; leave undercarriage lever DOWN; carry out free-fall procedure.

Free-fall procedure

1. Establish contact with pilot on I/C.
2. Pull out the disc pin of the appropriate lever.
3. Release the handgrip catch.
4. **Pull the handle downwards to full travel position.**
5. Check appropriate green light comes on.
6. When necessary, select normal undercarriage lever DOWN and check remaining green lights on.

After lowering a main undercarriage leg by free-fall, if a green light is not obtained within 30 seconds:

1. Engage the free-fall lever with the winching mechanism.
2. Rotate the free-fall lever backwards and forwards until a green light is obtained.
3. Check three greens and mechanical indicators show green/SAFE.

If a green light cannot be obtained by winching:

1. Reset the free-fall lever to normal.
2. Select the appropriate spoiler switch to ISOLATE.
3. If the left undercarriage leg is affected operate the nose leg free-fall lever.
4. Increase RPM on the appropriate engines.
5. Recycle the U/C until all legs are locked down.
6. Restore the hydraulic services.

If a main undercarriage fails to lock down after repeated normal and free-fall operations, see Pilot's Notes (Flying) Part 2 chap. 18.

NOTE: 1. No winching facility is provided for the nose leg.
2. After free-fall has been used to lower any leg, the appropriate door remains open and the warning light on.

Nosewheels fully offset (undercarriage down)

1. Leave the undercarriage lever DOWN and operate both main leg free-fall levers.

Undercarriage failures *(continued)*

4. Hydraulic system u/s; leave undercarriage lever DOWN; carry out free-fall procedure.

Free-fall procedure

1. Establish contact with pilot on I/C.
2. Pull out the disc pin of the appropriate lever.
3. Release the handgrip catch.
4. **Pull the handle downwards to full travel position.**
5. Check appropriate green light comes on.
6. When necessary, select normal undercarriage lever DOWN and check remaining green lights on.

After lowering a main undercarriage leg by free-fall, if a green light is not obtained within 30 seconds:

1. Engage the free-fall lever with the winching mechanism.
2. Rotate the free-fall lever backwards and forwards until a green light is obtained.
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If a main undercarriage fails to lock down after repeated normal and free-fall operations, see Pilot's Notes (Flying) Part 2 chap. 18.

NOTE: 1. No winching facility is provided for the nose leg.
2. After free-fall has been used to lower any leg, the appropriate door remains open and the warning light on.

Nosewheels fully offset (undercarriage down)

1. Leave the undercarriage lever DOWN and operate both main leg free-fall levers.

Undercarriage failures (*continued*)

2. Select the undercarriage lever UP.
3. When the steering handles reach centre, operate the nose leg free-fall system. (If the handles do not centralise, still operate free-fall.)
4. Reselect the undercarriage lever DOWN.
5. If the nosewheels are still offset, lower them gently onto the ground after landing.

NOTE: The normal and emergency nosewheel steering systems are inoperative.

SYSTEM PRESSURE FAILURES

Hydraulic system B inoperative

1. Lower the right main undercarriage leg using the free-fall system.
2. Use the normal brake system while accumulator pressure lasts, then select standby system.

Hydraulic system A inoperative

1. Lower left main and nose undercarriage legs using free-fall systems.
2. Use normal brake system for landing.
3. Select EMERGENCY steering just before landing and check for fluid loss.
4. Keep selections of hydraulic services to a minimum while taxying.

Hydraulic systems A and B inoperative

1. Lower all undercarriage legs using the free-fall systems.
2. Use normal brake system while accumulator pressure lasts, then select standby system.
3. Do not taxy; nosewheel steering is not available.

LANDING WITH UNDERCARRIAGE IN ABNORMAL POSITIONS

General

When a landing has to be made with the undercarriage in an abnormal position, i.e. one or more legs locked up or trailing:

Landing with U/C in abnormal positions (*continued*)

1. Jettison excess fuel.
2. Depressurise.
3. Remove and stow the overwing escape hatches.
4. Prepare escape ropes and chutes.
5. Secure all loose articles.

Whenever possible, the runway should be foamed.

Nosewheel unit up

1. Ensure CG between centre and aft positions.
2. Make a normal approach and landing.
3. Immediately after landing, extend the speed brakes, close down Nos. 2 and 3 engines and pull their fire handles.
4. Lower the nose gently onto the runway at 85 knots.
5. Use reverse thrust throughout the landing run keeping the use of wheelbrakes to a minimum.

One main wheel unit up

1. Make a normal approach, positioning the aircraft so that the unsupported wing tip is within the runway width.
2. Keep rate of descent to a minimum at touch-down.
3. After touch-down, close down Nos. 2 and 3 engines and pull their fire handles.
4. Lower the nosewheels onto the runway early in the landing run.
5. Hold the unsupported wing up as long as possible, using the ailerons.
6. After the wing contacts the runway, use wheelbrakes to maintain directional control.
7. If possible, avoid using speedbrakes and reverse thrust during the landing run.

Both main wheel units up

1. During landing, keep the wings level and the nosewheels clear of the runway.
2. After landing, close all HP cocks and pull all the fire handles.

CRASH LANDING AND DITCHING

General

When a crash landing or ditching is inevitable:

1. Transmit distress call.
2. Warn crew and passengers.
3. Jettison excess fuel.
4. Depressurise below 10,000 feet.
5. Remove and stow both forward overwing escape hatches.
6. Set altimeters if possible.
7. Switch on emergency lights.
8. Switch on all external lights.

The detailed procedures and individual crew members' drill are contained in Air Support Command Emergency Drills.

Crash landing

1. If possible, make a normal approach, using flap as required.
2. Close the HP cocks and pull the engine fire handles on touch-down.
3. See also LANDING WITH UNDERCARRIAGE IN ABNORMAL POSITIONS.

Ditching

1. Make a normal approach using slats and full flap with the undercarriage retracted.
2. Aim to touch-down along the swell or into wind if the swell is negligible; close the throttles just before contact.
3. Touch-down in the normal landing attitude at a speed just above the stalling speed; keep the rate of descent to a minimum.

NOTE: Whenever time permits, weight should be reduced as much as possible and the CG moved rearwards before ditching.