Part IV

Chapter 2—Airframe Emergency Procedures

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NOTE: The following emergency drills are contained in the aircraft check lists (Flight Reference Cards)

Cabin pressure failures
Oxygen failures
Hydraulic malfunction drills
Double alternator failure

1 Escape hatch jettisoning

(*a*) Automatic jettisoning occurs when the associated ejection seat face screen or seat pan handle is pulled.

(*b*) To jettison manually, pull up the associated ditching handle.

2 Underwing tank jettisoning

(*a*) Full or empty drop tanks may be jettisoned, in straight and level flight only, at all speeds up to 350 knots.

(*b*) Flaps must be fully raised otherwise serious damage may be caused to them by the tanks on jettison.

(*c*) If one tank fails to jettison, speed must not exceed 0·9M and gentle manoeuvres only are to be carried out.

3 Electrical system failures

Failure	*Indication*	*Immediate action*	*Subsequent action*
LOAD SHARING MALFUNCTION	Load between two alternators differs by more than 8 KW/KVAR with each alternator supplying some load	1 Isolate the alternators 2 Check individual voltages and frequencies 3 Check CSDU oil temperature	1 If one alternator outside its limits, reconnect the other alternator to the sync. busbar 2 Switch off the faulty alternator and appropriate frequency changer 3 If both alternators within limits, re-synchronise if neither is overloaded Restart the frequency changer
SINGLE ALTERNATOR FAILURE (a) Electrical	1 Power failure warning light 2 'A' breaker opens	1 Select appropriate RAT open 2 Switch alternator to RESET for not more than 5 secs., then OFF 3 Stop any frequency changer supplied by it	1 Check voltage and frequency outputs and CSDU oil temperature 2 If normal select alternator ON and re-synchronise 3 If out of limits leave alternator OFF 4 Reduce loads as necessary 5 Select RAT closed when failure investigated
(b) Drive failure	1 Complete out-of-balance of KW load sharing if synchronised 2 Deviation of busbar frequency from 400 c/s 3 Power failure warning light may come on	1 Select appropriate RAT open 2 Stop any frequency changer affected	1 If PFW light comes on switch alternator OFF, check alternator voltage and frequency and check loading of serviceable alternator and CSDU oil temperature 2 If no PFW light, check frequency of sync. busbar If normal or low switch off alternator with zero KW load If high switch off alternator with all the KW load 3 Check loading of serviceable alternator and reduce loads if necessary 4 Select RAT closed when failure investigated
DOUBLE ALTERNATOR FAILURE (a) Electrical	1 Both PFW lights come on 2 RAT scoop opens automatically 3 PFCU's on affected side fail	1 Select opposite RAT open	1 Check LV battery output on affected side 2 If normal, parallel the LV busbars 3 (a) If the port alternators fail check the frequency changer load transfer switch to No. 2 (b) If the starboard alternators fail switch the frequency changer load transfer switch to No. 1 4 Switch failed alternators to RESET then OFF and check individual output 5 If outputs normal shed all switchable MV loads and switch on again. Do not re-synchronise. *(continued)*

Failure	*Indication*	*Immediate action*	*Subsequent action*
DOUBLE ALTERNATOR FAILURE (a) Electrical—*contd.*			6 If one alternator retrip switch OFF. Do not connect serviceable alternator to sync. busbar 7 Reload serviceable alternator 8 If both alternators are faulty leave OFF, descend to AAPP light-up altitude, start AAPP ▶◀ and connect it to busbars as required 9 Select RAT's closed
(b) Engine flame-out	1 Engine RPM decelerate 2 RAT opens below 52% RPM 3 PFCU's remain operating on RAT 4 PFW lights come on	1 Select RAT manually (precautionary measure)	1 Switch off all switchable MV loads 2 Switch off alternators when PFW lights come on 3 If failure on Starboard side check output of stbd. LV battery. Parallel LV busbar 4 Switch frequency changer load transfer switch to No. 1 5 If the failure is on the port side check Frequency Changer Load Transfer switch to No. 2 6 If any engine subsequently relit switch on appropriate alternator, reload and deparallel LV busbar. Close RAT 7 If neither engine relit descend to AAPP light-up altitude, start AAPP ▶◀ and connect to busbars as required
FOUR ENGINE FLAME-OUT	1 Alternators come off line in underspeed ▶◀	1 Select both RATS open 2 Check RAT running lights come on 3 Check RAT voltages and frequencies normal 4 Select standby yaw damper on, main yaw damper to standby	1 Shed all non-essential loads 2 As the PFW lights come on, check RAT load lights come on and, outputs normal 3 Switch off alternators 4 If no immediate relight check load shedding is complete 5 If engines relit above AAPP light up altitude: Switch on appropriate alternators When output normal, check RAT load lights go out Switch on MV and LV loads Close RATS as required

(continued)

Failure	*Indication*	*Immediate action*	*Subsequent action*
FOUR ENGINE FLAME-OUT —*contd.*			6 If engines not relit above AAPP light up altitude start AAPP and connect to stbd. bus-bar. Check stbd. RAT load light goes out when AAPP m.i. is horizontal Switch on 2 TRU, booster pumps as required, and No. 2 hydraulic pump 7 If main engines subsequently relit: Switch on appropriate alternators Check MV bus-bar deparalleled Synchronise alternators Switch on MV and LV loads Retract RAT scoops Select standby yaw damper to standby and main yaw damper on
3-PHASE TRANSFORMER FAILURE	Failure of associated equipment	None in the case of 1 and 4 transformers *No. 2 Transformer* Select 1st Pilot MFS change-over switch to EMERGENCY *No. 3 Transformer* Transfer to No. 2 by selecting No. 1 frequency changer (No. 1 FC must be running)	If No. 1 fails, switch off Green Satin
FREQUENCY CHANGER FAILURE	Neon light goes out	Check other FC is running, otherwise start it	Select LOAD TRANSFER Switch to serviceable FC
TRU FAILURE	LV busbar volts fall to below 24V Battery shows discharge. TRU m.i. vertical or horizontal	1 Switch off TRU, check LV loads and parallel LV busbar (Check fuse K1/CD in case of No. 1 TRU)	1 If MI was horizontal change TRU fuse and switch on. If MI remains horizontal switch OFF and leave OFF. If MI returns to vertical deparallel ▶◀ and check output normal 2 If MI was vertical no further action should be taken

Failure	*Indication*	*Immediate action*	*Subsequent action*
SPECIAL FEEDER FAILURE	Some indicators on BF show striped Special feeder indicator shows OFF LV volts and current meters read zero Appropriate RAT indicator striped. RAT scoop extends	Check circuit breaker If tripped switch off appropriate LV battery and TRU Switch off NBS, STR18 and VHF	1 Reset circuit breaker 2 If it stays closed, indicators revert to normal, switch on the battery and TRU and reselect services required Select RAT closed 3 If 1P.8 CB retrips parallel LV supplies and switch loads as required (paralleling inoperative if 2P.8 retrips). Two PFW lights and fire warning lights will be inoperative 4 If the CB was not tripped reduce loads and set control switch to EMERGENCY. Check appropriate battery (a) If indicator vertical and voltage low, switch off battery and TRU and close RAT. ◀ *DO NOT* parallel LV busbars nor start AAPP ▶ (b) If battery indicator horizontal and voltage normal switch off battery and close RAT
LV BATTERY FAULT	Magnetic indicator horizontal	Special feeder to EMERGENCY Switch off failed battery	Change fuse and switch on battery. If MI shows vertical return special feeder to NORMAL, otherwise switch off battery and leave off

4 Fuel system failures

Failure	*Indication*	*Immediate action*	*Subsequent action*
BOOSTER PUMP FAILURE	None for duplicated pumps in tanks 1, 5, 6, 7, 8, 11 and 12 Tanks 3 and 4: contents gauge reading stays constant	None	If unbalance occurs due to failure of 3 and 4 tank pumps, switch off the appropriate pump in the opposite wing If tank 10B pump fails, fuel available for AAPP only
PROPORTIONER FAILURE (a) Fuselage prop. when fus. group only in operation	LP warning lights of all four engines	Select all wing pumps ON	Select fuselage proportioner to BYPASS. Select wing proportioners to PROPORTION. Check that the fuselage group is feeding, select wing groups to BYPASS, pumps OFF and manually balance fuselage fuel
(b) Wing prop. When wing groups only in operation (no cross-feed)	LP warning lights of two affected engines	Select all fuselage pumps ON	Select failed proportioner to BYPASS. Check fuel control panel selections. Select fuselage group to PROPORTION. Check that affected wing group is feeding, select the fuselage group to BYPASS, pumps OFF and manually balance wing fuel
(c) Any one prop. when all groups in use	Lack of flow from tanks in affected group	Select affected prop. to BYPASS	Maintain individual tank contents in approximate proportion
BACKING PUMP FAILURE	LP warning light of affected engine Fluctuating or reducing RPM	Throttle engine until warning light goes out	If light fails to go out before throttle fully closed, check for accidental closure of LP cock
ENGINE FAILURE	Various	If wing groups in use, open both cross-feed cocks	Check wing contents balance and adjust if necessary

Failure	*Indication*	*Immediate action*	*Subsequent action*
LEAKING TANK	Continuous and disproportionate decrease in fuel level relative to other tanks in same group Confirm by switching off pumps in that tank, with proportioner at PROPn and note if contents still decrease	Select appropiate group to PROPORTION Switch ON all fuel pumps Select leaking tank IN USE/NOT IN USE switch to NOT IN USE	When leaking tank is empty switch OFF fuel pump Leave IN USE/NOT IN USE switch at NOT IN USE