

## PART 1

### INTRODUCTION

#### General

1. The VC10 C Mk 1 is a strategic transport aircraft powered by four Conway Mk 301 engines each developing a nominal thrust of 22,500 lb. The aircraft can be equipped for the following roles:

TROOP TRANSPORT  
FREIGHTER  
AERO-MEDICAL EVACUATION.

#### Crew Complement

2. The following crew members are stationed on the flight deck: 1st pilot, co-pilot, navigator and engineer. An additional seat is fitted for a supernumerary crew member.
3. ALM and medical personnel are accommodated in the passenger cabin.

#### Structure

4. The VC10 C Mk 1 is an all-metal low-wing monoplane with a pressurised fuselage. It has a tricycle undercarriage and a tailplane mounted on a single fin. The wing has a uniform sweep of 32.5° at the quarter chord; there is approximately 25° sweep in the trailing edge of the outer section of wing. Slats are fitted on the leading edge, spoilers on the wing and flaps at the trailing edge.

#### Fuselage

5. The structure of the fuselage will accept a differential pressure of 9.5 PSI. The doors are of the plug type with self-inflating and/or solid rubber seals. A large freight door is fitted above the floor in the forward passenger cabin area left side; the forward and aft freight holds and doors are below the floor. Four emergency exits, two either side of the mid-fuselage, are provided. A hatch in the cabin floor, adjacent to the forward service door, gives access to the radio and electrical bay; a hinged door at the rear end of the bay connects with the forward freight hold.

#### Accommodation and Facilities

- ◀ 6. In the troop carrying role, 146 rearward-facing seats are installed. In the aeromedical role a maximum of 66 stretchers can be carried, plus a medical team of 6 and 2 ALM. ▶
7. Four flushing toilets and one urinal, with wash-room facilities are installed.
8. There are two galleys, one at the front of the passenger cabin and one at the rear. Each galley consists of two units. They are numbered, from the front, No 1, 2, 3 and 4 galley units.

#### Air Conditioning and Pressurisation

9. The whole of the fuselage is pressurised, with the exception of the radome, nose undercarriage bay, the area surrounding the centre section and the main undercarriage bays.
10. Four engine-driven compressors, one on each engine, provide air for conditioning and pressurisation, each pair of compressors on each side forming a separate system (left and right) having its output controlled by a mass-flow control system. Any pair of compressors will maintain normal cabin pressure but with air conditioning at a reduced standard should an engine or compressor fail. A refrigeration pack at the root of each wing forms part of each air conditioning system.
11. The fuselage is pressurised to a normal maximum differential pressure of approximately 9 PSI; at an altitude of 40,000 feet, the cabin can be maintained at a pressure equivalent to 6000 feet. The pressure control equipment is electro-pneumatically controlled and is automatic in operation.

#### Communications

12. The communication equipment consists of the following:
- VHF (incorporating Selcal (selective calling))
  - UHF
  - Intercom
  - HF incorporating Selcal
  - Passenger address system

#### Electrics

13. AC power rated at 40 kVA is generated at 200 volts 3-phase (115 volts single-phase) by four generators, one on each engine. The generators are regulated at a frequency of 400 Hz by constant-speed drive units.
14. Generators 1 and 3 operate in parallel (System A) and generators 2 and 4 also operate in parallel (System B) during normal flight conditions, thus providing two independent AC systems. Failure of a generator results in automatic interconnection of both systems.
15. Two independent 28-volt DC systems, each having a 24-volt 25 ampere hour battery, are supplied by two TRU. A standby TRU can be selected to either system.
16. An emergency 10 kW AC supply from a 115/200-volt, 3-phase, 400 Hz ram air turbine-driven generator (Elrat) can be used to provide power for

essential services in an emergency. The Elrat can also be used to supply power to the standby TRU to maintain essential DC services.

17. An APU is fitted in the tail cone of the fuselage to provide LP air for engine starting and for driving a 40 kVA generator to provide additional electrical power when the aircraft is on the ground only.

### Engines

18. The four Conway Mk 301 engines are installed in pairs on either side of the rear fuselage. Each engine is an axial-flow bypass turbo-jet, incorporating a twin-spool compressor driven by turbines, and has a tubo-annular combustion chamber.

◀ 19. Engine starting is by a low pressure air starter motor, turning the HP compressor; air is provided from either an external source or the APU. Ignition is by high energy igniter plugs. ▶

20. Throttle levers at the pilots' and engineer's stations control the engines. A reverse-thrust facility is provided on the outboard engine on each side.

### Fire Protection

21. Each engine installation contains a continuous fire-wire type detector warning circuit and is protected by a two-shot extinguisher system. Each system is controlled from a fire control handle, the extinguishant being discharged through a spray ring at the front of the engine. Use of a fire control handle isolates the LP fuel and hydraulic supplies to/from the selected engine respectively and shuts off the airframe ice protection supplies from both engines on that side.

22. Spring-loaded double doors, under the front of each nacelle and on the right side of the APU, are provided to facilitate the insertion of ground fire-fighting equipment.

23. An automatically-operated fire detection and extinguisher system with provision for manual operation is provided for the APU.

24. A smoke detection system is fitted in the aircraft.

25. Portable fire extinguishers, smoke goggles, two portable breathing sets, asbestos gloves, axes, a periscope for rear freight hold inspection and portable oxygen sets are carried in the aircraft.

### Flight Controls

26. The control surfaces are power-operated. Movement about the pitch, roll and yaw axes is controlled by dual control columns and rudder bars. The control columns are interconnected and each is surmounted by a handwheel. The rudder bars are interconnected,

each having control pedals with toe pedals for the wheelbrakes.

27. Longitudinal control is by four electro-hydraulically-powered elevators and a hydraulically-powered variable-incidence tailplane. Lateral control is by four electro-hydraulically-powered ailerons supplemented by six hydraulically-operated spoilers. Directional control is by three electro-hydraulically-powered rudders and the aileron/spoiler combination. The spoiler sections normally operate differentially with ailerons, but when used as speedbrakes operate together; when used as speedbrakes selection is limited to 25° at speeds in excess of 345 knots.

28. Hydraulically-operated, electrically-controlled Fowler-type flaps comprising five sections per side are fitted. They normally operate together with the leading edge slats but can be operated independently.

29. A duplicated feel system is provided for all three control surfaces.

◀ 30. An automatic flight control system provides duplicated basic flight instrumentation and automatic control. The system has an in-built self-monitoring capability. ▶

31. A duplicated stall-warning system is fitted, which operates a stick shaker on each control column as a pre-stall warning and, when nearer the stall, sounds a klaxon and pushes the control column forward.

### Fuel System

32. A total of 19,355 Imperial gallons of fuel is carried in eight integral tanks, three in each wing, one in the centre section and one in the fin. The left wing tanks are numbered, from the wing tip, 1A, 1 and 2 and the right wing tanks 4A, 4 and 3.

33. The fuel system supplies fuel to each engine from its own tank, ie No 1, 2, 3 and 4 tanks to No 1, 2, 3 and 4 engines, respectively. Inter-engine and crossfeed facilities are provided so that fuel can be ◀ supplied from any tank to any engine. All tanks are pressurised during flight through flush ram-air intakes. Fuel can be transferred from the centre ▶ tank to the fin tank for trim purposes.

34. Pressure refuelling/defuelling is carried out through two refuel/defuel points, one near the rear inboard edge of each wing. Overwing refuelling can also be carried out. Provision is made for air-to-air refuelling via a refuelling probe in the nose of the aircraft.

35. A proportion of fuel from No 1, 2, 3 and 4 tanks can be jettisoned; all the fuel in the centre and fin tanks can be jettisoned.

### Hydraulics

36. Two separate hydraulic systems (A and B) are provided. They operate from hydraulic pumps, one on each engine, each pair of pumps on the same side forming one system. Each pump is supplied with hydraulic fluid from a hydraulic booster pump, one for each pump, in the associated reservoir. Systems A and B are normally independent, but can be interconnected.

37. The hydraulic system operates the undercarriage, flaps, slats, spoilers/speedbrakes, tailplane incidence, wheelbrakes, nosewheel steering and parking of the windscreen wipers.

### Ice Protection

38. The formation of ice is prevented or dispersed by heating those surfaces where ice formation would be detrimental to the performance of the aircraft. The leading edges of the tailplane, fin, wings and slats, the engine nose fairings, guide vanes and intakes are heated by air bled from the engine compressors. The windcreens are electrically heated.

39. The windcreens are demisted by warm air supplied by an electrically-operated fan.

40. Indication of ice formation is provided by an automatic warning system and by a visual hot-rod system. Floodlights, directed at vulnerable areas, facilitate visual inspection at night.

### Navigation Equipment

41. The navigation equipment consists of the following:

Flight director installation

Compass system  
ADF system  
VOR/ILS system  
Marker system  
Weather radar  
Ground position indicator  
Doppler  
Loran  
IFF/SSR  
DME (Tacan)  
◀ Litton Omega ▶

### Oxygen System

42. The oxygen system supplies gaseous oxygen for the flight deck crew, when required, and an automatic supply to the cabin crew and passengers when the cabin altitude reaches 14,000 feet. Oxygen for therapeutic purposes is available at all times.

43. Six portable oxygen sets and two portable breathing sets are provided.

### Undercarriage and Brakes

44. The aircraft is fitted with a hydraulically-operated tricycle undercarriage; the four main wheel bogies are inward retracting and the twinwheel steerable nosewheel forward retracting. When retracted, the undercarriage is totally enclosed by doors. The undercarriage can be lowered in an emergency by the free-fall method.

45. Hydraulically-operated brakes, operated by toe pedals, are fitted, the normal system operating via anti-skid units which are isolated when the standby system is in use.

## LEADING PARTICULARS AIRFRAME

### *Mainplane*

Dihedral	Wing Station	0 to 89	...	...	0.9495°
"	"	89 to 179	...	...	3.71041°
"	"	179 to 476	...	...	3.02523°
"	"	476 to 760	...	...	3.04202°
Incidence	...	...	...	...	4.0°
Root chord	...	...	...	...	417.0 inches
Tip chord	...	...	...	...	110.0 inches
Mean chord	...	...	...	...	240.2 inches
Aspect ratio	...	...	...	...	7 : 1
Span	...	...	...	...	146 feet 2 inches
Sweep back at .25 chord line	...	...	...	...	32.5°
Track (undercarriage centres)	...	...	...	...	21 feet 5 inches

### *Tailplane*

Span	...	...	...	...	43 feet 10 inches
Incidence range	...	...	...	...	Leading edge plus 3° (nose-down) to minus 14° (nose-up)
Dihedral	...	...	...	...	0°
Height above ground with tailplane and elevator up	...	...	...	...	44 feet 6.8 inches

### *Fuselage*

Length with AAR probe	...	...	...	...	166 feet 1.1 inches
Length of cabin	...	...	...	...	87 feet
Maximum width	...	...	...	...	12 feet 4 inches
Maximum floor width	...	...	...	...	11.4 feet
Maximum depth	...	...	...	...	14 feet 1.5 inches
Length of SMC	...	...	...	...	240.2 inches
L/E of SMC	...	...	...	...	872.0 inches aft of fuselage datum
Fuselage and CG datum	...	...	...	...	8.0 inches aft of nose measured along the centre line of the fuselage
Forward passenger door aperture	...	...	...	...	72 inches x 34 inches
Sill height at maximum AUW	...	...	...	...	9 feet 9.3 inches
Aft passenger door aperture	...	...	...	...	72 inches x 34 inches
Sill height at maximum AUW	...	...	...	...	10 feet 8.1 inches
Forward service door aperture	...	...	...	...	66 inches x 24 inches
Sill height at maximum AUW	...	...	...	...	9 feet 11.3 inches
Aft service door aperture	...	...	...	...	66 inches x 24 inches
Sill height at maximum AUW	...	...	...	...	11 feet 10.5 inches
Forward under-floor freight door aperture	...	...	...	...	59 inches x 47.4 inches
Sill height at maximum AUW	...	...	...	...	5 feet 5.3 inches
Aft under-floor freight door aperture	...	...	...	...	54 inches x 38 inches
Sill height at maximum AUW	...	...	...	...	7 feet 1.9 inches
Ventral freight door aperture	...	...	...	...	30 inches x 30 inches
Sill height at maximum AUW	...	...	...	...	11 feet 11.9 inches
Cabin freight door aperture	...	...	...	...	140 inches x 84 inches
Sill height at maximum AUW	...	...	...	...	10 feet 3.7 inches

### *Areas*

Mainplane gross areas	...	...	...	...	2932 sq ft
Mainplane net area	...	...	...	...	2503 sq ft
Flap total area	...	...	...	...	508 sq ft
Aileron total area	...	...	...	...	119 sq ft
Elevator total area	...	...	...	...	144 sq ft
Slat total area	...	...	...	...	132 sq ft
Spoiler total area	...	...	...	...	104 sq ft
Fin gross area	...	...	...	...	476 sq ft
Fin net area	...	...	...	...	364 sq ft
Rudder area	...	...	...	...	100 sq ft

**MAIN UNDERCARRIAGE**

Type ... .. Tricycle retractable  
Track, centre line of undercarriage strut ... .. 21 feet 5 inches  
Wheelbase (maximum AUW) ... .. 65 feet 10.4 inches

*Main Undercarriage Units*

BAC Shock absorber struts ... .. BAC 110050 Sheets 304  
Fluid ... .. DTD 585

*Shock Absorber Strut Extensions*

A/C Weight lb	No 1 valve PSI	Dimensions 'A' (inches)	No 2 valve PSI
150,000	820	12.8	
160,000	873	12.0	
170,000	926	11.15	
180,000	980	10.4	
190,000	1033	9.7	
200,000	1087	9.1	
210,000	1140	8.55	
220,000	1193	8.05	
230,000	1247	7.6	
240,000	1300	7.2	
250,000	1353	6.8	
260,000	1407	6.45	
270,000	1460	6.15	
280,000	1513	5.85	
290,000	1567	5.55	
300,000	1620	5.3	
310,000	1673	5.05	
320,000	1727	4.8	
330,000 (MOS only)	1780	4.55	
340,000 (MOS only)	1830	4.3	

765  
for all  
aircraft  
weights

*Main Wheels*

Type ... .. Dunlop AH 51495  
Tyres ... .. DR 12422T, 12421T  
11766T, 11768T

*Tyre Pressures*

Take-off Weight (lb)	Aircraft fitted with 26 ply rating tyres	
	32% Deflection (PSI)	34.5% Deflection (PSI)
Up to 220,000	93 $\begin{smallmatrix} +7 \\ -5 \end{smallmatrix}$	81 $\begin{smallmatrix} +7 \\ -5 \end{smallmatrix}$
Up to 240,000	102 $\begin{smallmatrix} +10 \\ -0 \end{smallmatrix}$	90 $\begin{smallmatrix} +7 \\ -5 \end{smallmatrix}$
Up to 260,000	113 $\begin{smallmatrix} +10 \\ -0 \end{smallmatrix}$	102 $\begin{smallmatrix} +10 \\ -0 \end{smallmatrix}$
Up to 280,000	123 $\begin{smallmatrix} +10 \\ -0 \end{smallmatrix}$	112 $\begin{smallmatrix} +10 \\ -0 \end{smallmatrix}$
Up to 300,000	132 $\begin{smallmatrix} +10 \\ -0 \end{smallmatrix}$	122 $\begin{smallmatrix} +10 \\ -0 \end{smallmatrix}$
Up to 310,000	137 $\begin{smallmatrix} +10 \\ -0 \end{smallmatrix}$	126 $\begin{smallmatrix} +10 \\ -0 \end{smallmatrix}$
Up to 320,000	141 $\begin{smallmatrix} +10 \\ -0 \end{smallmatrix}$	—
Up to 323,000	143 $\begin{smallmatrix} +10 \\ -0 \end{smallmatrix}$	—
Up to 340,000 (MOS only)	152 $\begin{smallmatrix} +10 \\ -0 \end{smallmatrix}$	—

Note: In cases where the runway load classification group is not critical, a longer tyre life will be achieved by using the pressures quoted for 32% deflection.



### AIR CONDITIONING AND PRESSURISATION

Cabin maximum differential pressure ... ..	Normal 9.0 PSI Safety valves operate at 9.5 PSI
Compressors ... ..	Godfrey 210 Mk.1, 211 Mk 1
Refrigeration units ... ..	Normalair 528260 Right Normalair 528270 Left
Cabin pressure selector ... ..	Normalair 520960
Humidifier ... ..	Normalair 1288 C000

### ICE PROTECTION

Wing leading edges, slats, fin leading edge, tail- plane leading edges	} Hot air
Pressure heads ... ..	
Stall protection incidence probes ... ..	Electrical
Windscreen and side windows ... ..	Electrical
Fuel filters and windscreen de-misting ... ..	Hot air

### FLIGHT SYSTEM

Auto-flight control ... ..	Bendix-Elliot Autopilot (two) Autotrim (two) Autothrottle (two)
Flight director system ... ..	Elliot
Polar path system ... ..	Bendix-Elliot

### OXYGEN SYSTEM

Type ... ..	▶ Gaseous
Contents ... ..	19,200 litres
Pressure ... ..	1850 PSI reduced to 350 PSI
Passenger ring main pressure ... ..	Emergency 85±5 PSI (approximate) Normal 40 PSI
Crew regulators ... ..	Mk 17F
Passenger mask automatic release ... ..	14,000 feet (Cabin altitude)
Portable breathing sets ... ..	Mk 9 (two)
Portable oxygen sets ... ..	Mk 8 (six) 120 litre capacity

### FIRE PROTECTION

Power units dual head ... ..	Graviner A (four)
Flight deck ... ..	BCF hand-operated (one)
Passenger cabin ... ..	BCF hand-operated (five)
Smoke detectors ... ..	Pyrene MSDI

### ELECTRICAL SYSTEM

Voltage (AC) ... ..	115/200 volt, 3-phase 400 Hz
Generators ... ..	40 kVA (four) (36 kW normal maximum) Plessey 503-1-04179-003 Westinghouse 904-J017-3
Voltage (DC) ... ..	28-volt from TRU
Batteries ... ..	24-volt 25 ampere/hour
Emergency supply ... ..	ELRAT DOWTY ROTOL RATE 113. Ram air turbine driving a generator. ROTAX BA2402

## RADIO, RADAR, NAVIGATION AND COMMUNICATION

ARI 23118/1	...	...	...	...	...	...	...	...	ILS/VOR
ARI 23119	...	...	...	...	...	...	...	...	ADF
ARI 18107/13	...	...	...	...	...	...	...	...	TACAN
ARI 23122/3	...	...	...	...	...	...	...	...	DOPPLER
ARI 18124/1	...	...	...	...	...	...	...	...	UHF
ARI 23116/1	...	...	...	...	...	...	...	...	Air search radar
ARI 23288/4	...	...	...	...	...	...	...	...	VHF
ARI 23090/4	...	...	...	...	...	...	...	...	HF SSB or DSB R/T
ARI 23097	...	...	...	...	...	...	...	...	SELCAL
ARI 23134/3	...	...	...	...	...	...	...	...	IFF/SSR
ARI 23152/1 (VA 60 MIL)	...	...	...	...	...	...	...	...	Passenger address equipment
ARI 23180	...	...	...	...	...	...	...	...	Loran ADL 21
ARI 23111/4	...	...	...	...	...	...	...	...	Intercom
◀ ARI 23314/1	...	...	...	...	...	...	...	...	Litton Omega
—	...	...	...	...	...	...	...	...	GPI Mk 7
—	...	...	...	...	...	...	...	...	Periscopic sextant Mk 2A ▶

### ENGINE CHANGE UNITS

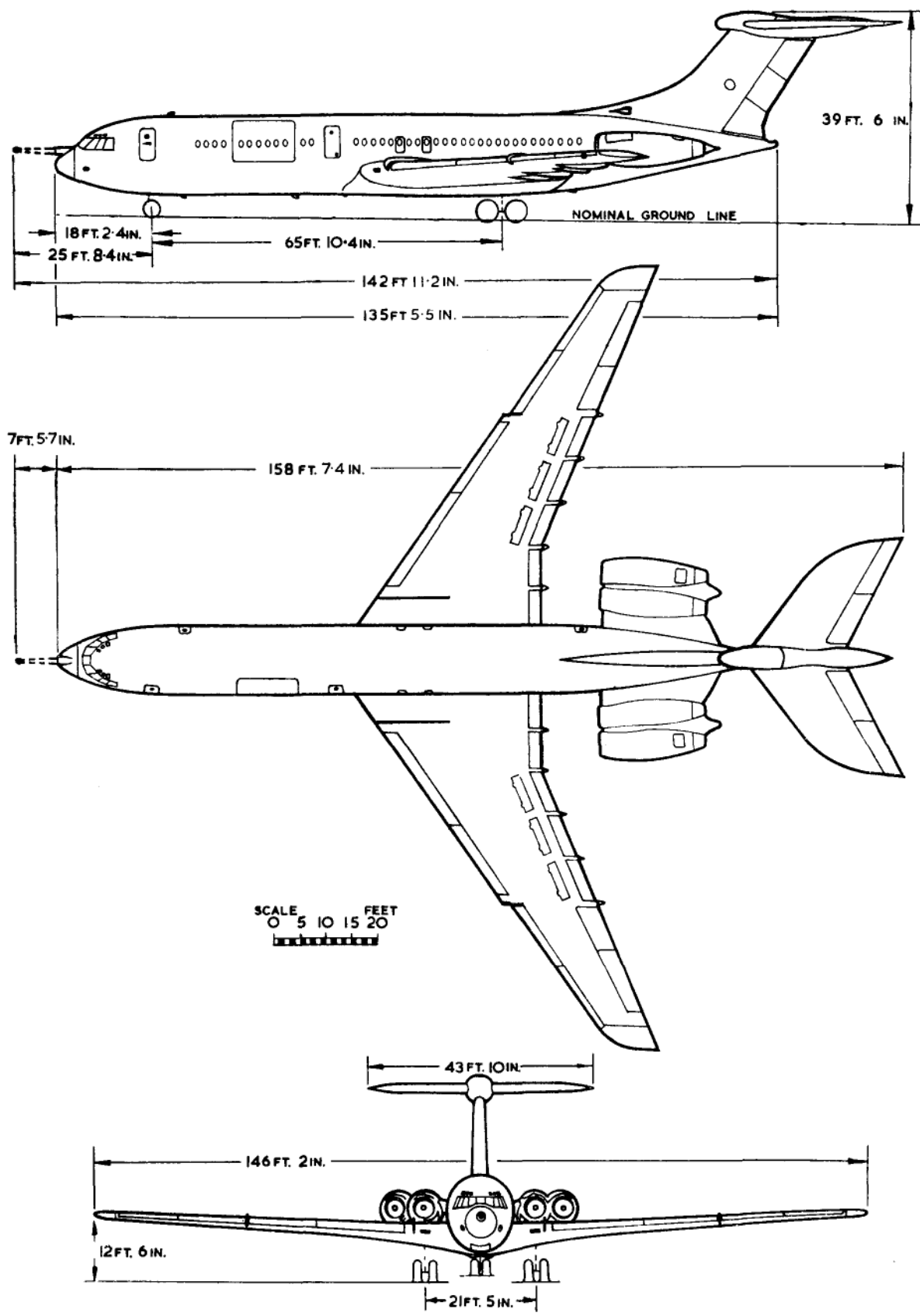
Type	...	...	...	...	...	...	...	...	Conway Mk 30101
Number	...	...	...	...	...	...	...	...	Four
Starting...	...	...	...	...	...	...	...	...	LP air
Starter motors	...	...	...	...	...	...	...	...	Rotax CT 1012
Emergency ignition	...	...	...	...	...	...	...	...	Rotax NB 4013
Constant speed drive	...	...	...	...	...	...	...	...	English Electric AE 8010
<b>Oil</b>									
Specification	...	...	...	...	...	...	...	...	Aero Shell Turbo Oil 390 Castrol 3C Castrol 325
Total capacity	...	...	...	...	...	...	...	...	39 Imperial pints
Total usable	...	...	...	...	...	...	...	...	18 Imperial pints

### AUXILIARY POWER PLANT

Type	...	...	...	...	...	...	...	...	Bristol Siddeley Artouste Mk 121 or Mk 123
Oil	...	...	...	...	...	...	...	...	OX-38 (NATO O-149)
Capacity	...	...	...	...	...	...	...	...	5 pints
Services provided	...	...	...	...	...	...	...	...	LP air for starting main engine; auxiliary electrical power 115/200 volts AC from 40 kVA generator

### FUELS—ENGINES AND APU

◀ For fuel specifications see Pilot's Notes—Flying, Part 1, Chapter 3 ▶



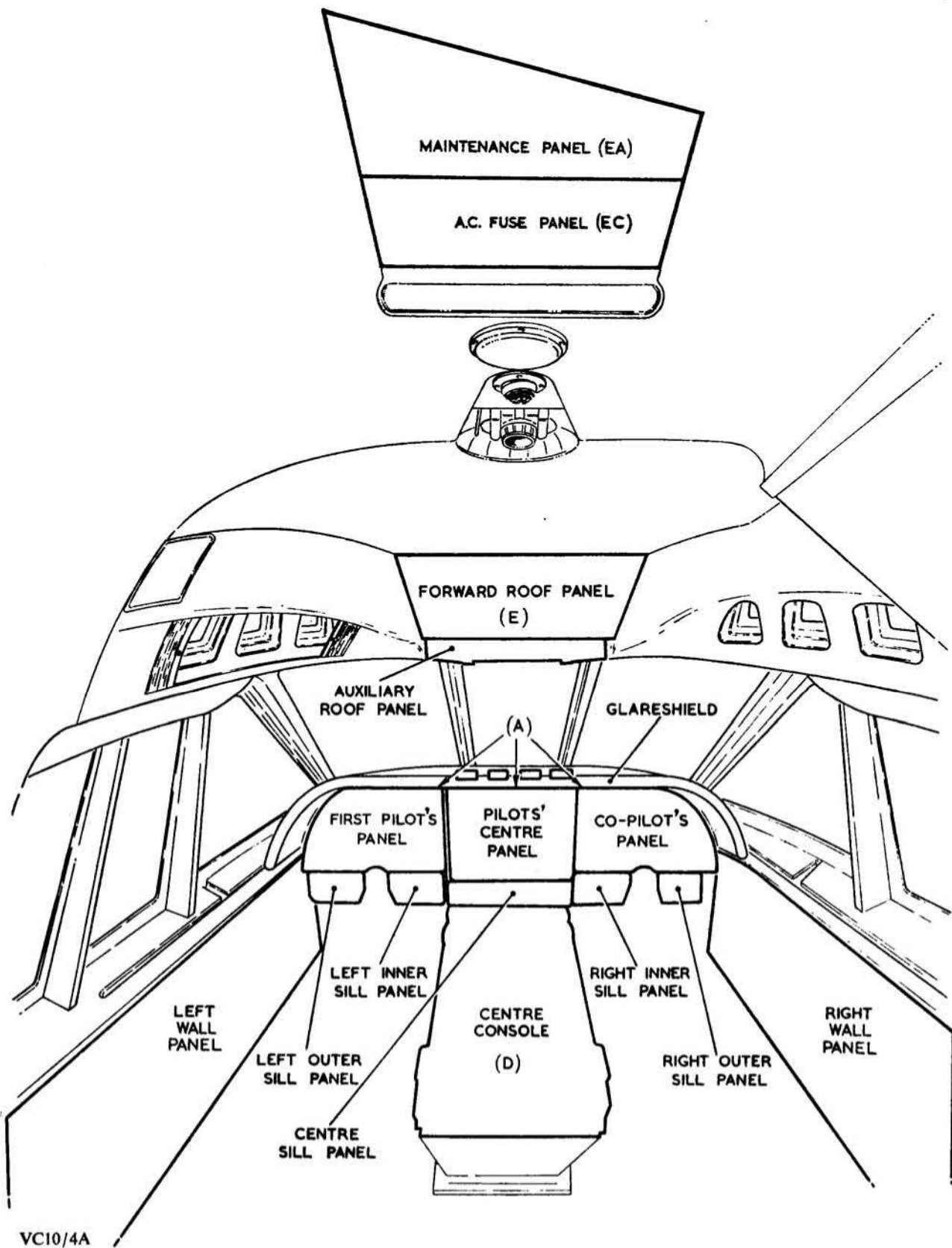
VC10/2A

1.1 Fig. 1. Principal Dimensions

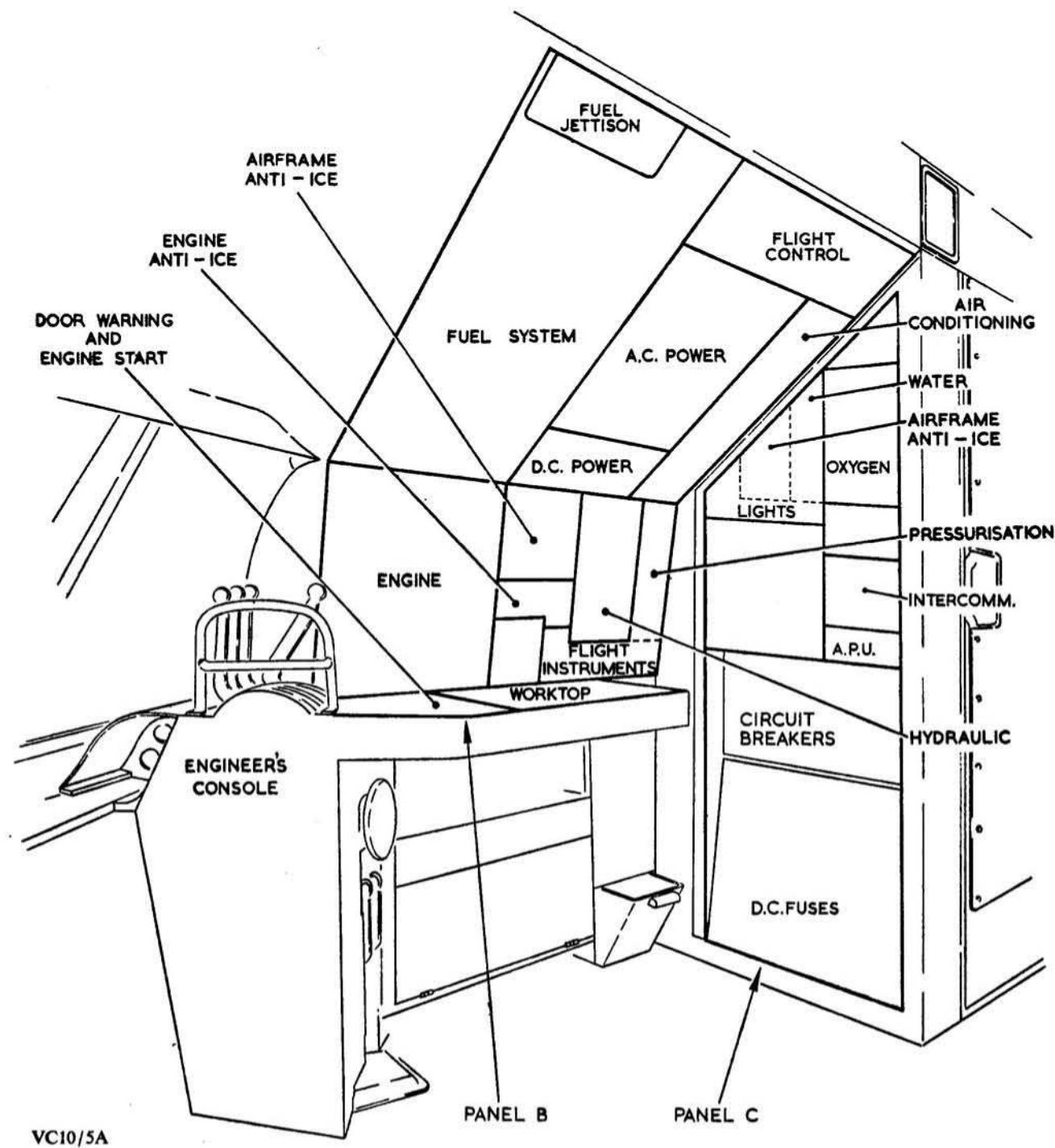
## KEY TO FIG. 2. LOCATION OF PANELS

<i>Description of Zone</i>	<i>Panel</i>	<i>Description of Panel</i>	<i>Fuselage Stn. No.</i>
Flight Deck	A	Pilots' Panels	60
	B	Engineer's Panel	137
	C	Distribution Panel	160
	D	Centre Console	74
	E	Forward Roof Panel	85
	EA	Maintenance Panel	165
	EC	AC Distribution Panel	153
	Y	Fwd. Equipment Panel	30
Forward Vestibule	R	Radio Panel (Navigator)	160
	EB	Roof Equipment Panel	188
Aft Passenger Cabin	L	Forward ALM Panel	276
	LA	Right Aft ALM Panel	1173
	LB	Left Aft ALM Panel	1209
	LG	No. 3 Galley Panel	1154
	LH	No. 3 Galley Unit	1130
	LJ	No. 4 Galley Panel	1190
Aft Fuselage	LK	No. 4 Galley Unit	1202
	S	Left Aft Elect. Panel	1279
Nose Underfloor Equip.	V	Right Aft Elect. Panel	1279
	X	Windscreen Demist/Ice Panel	66
Nosewheel Bay	RF	Radio Rack	100
	SA	Pressure Seal	150
Electrics Bay	XA	Nose Bay Junction Box	146
	G	Left Equipment Panel	235
	H	Right Equipment Panel	235
	J	Left AC Power Panel	252
	K	Right AC Power Panel	252
	U	Left DC Power Panel	274
	Z	Right DC Power Panel	274
	P	Emergency AC Panel	216
	PA	Fwd. Equipment Panel	216
	RL	Left Radio Rack	348
	RR	Right Radio Rack	348
	GA	Left Equipment Panel	235
	HA	Right Equipment Panel	206
	APU	APU Equipment Panel	268
APU	APU Generator Panel	379	
No. 1 Engine Bay	N1	Engine Break	Nacelle
No. 2 Engine Bay	N2	Engine Break	Nacelle
No. 3 Engine Bay	N3	Engine Break	Nacelle
No. 4 Engine Bay	N4	Engine Break	Nacelle
Left Engine Stub	SF	Pressure Seal	1246
	SN	Pressure Seal	1312
	ST	Pressure Seal	1374
Right Engine Stub	SG	Pressure Seal	1246
	SM	Pressure Seal	1312
	SU	Pressure Seal	1374
Tail Cone	SR	Pressure Seal	1493
	APU	APU Equipment Panel	1546
Fin Lower Half	SH	Pressure Seal	1340
	SK	Pressure Seal	1378
	SJ	Pressure Seal	1472
Left Undercarriage	SD	Pressure Seal	969
	GR	Terminal Panel	969
Right Undercarriage	SE	Pressure Seal	969
Centre Section	SB	Left Pressure Seal	698
	SC	Right Pressure Seal	698
	SL	Pressure Seal	696
	SP	Left Pressure Seal	690
	SQ	Right Pressure Seal	690

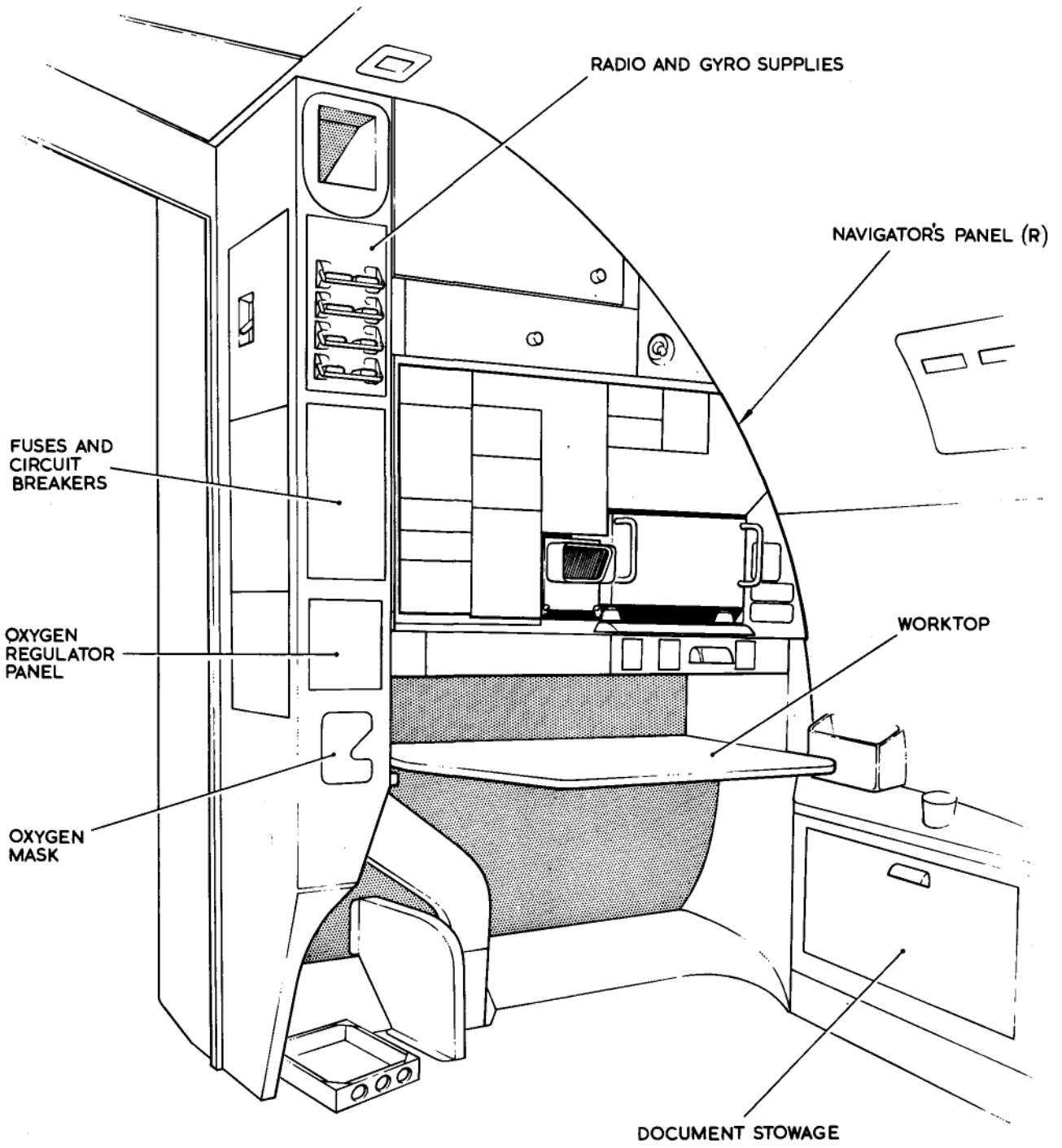




1.1 Fig. 3. Pilots' Panels

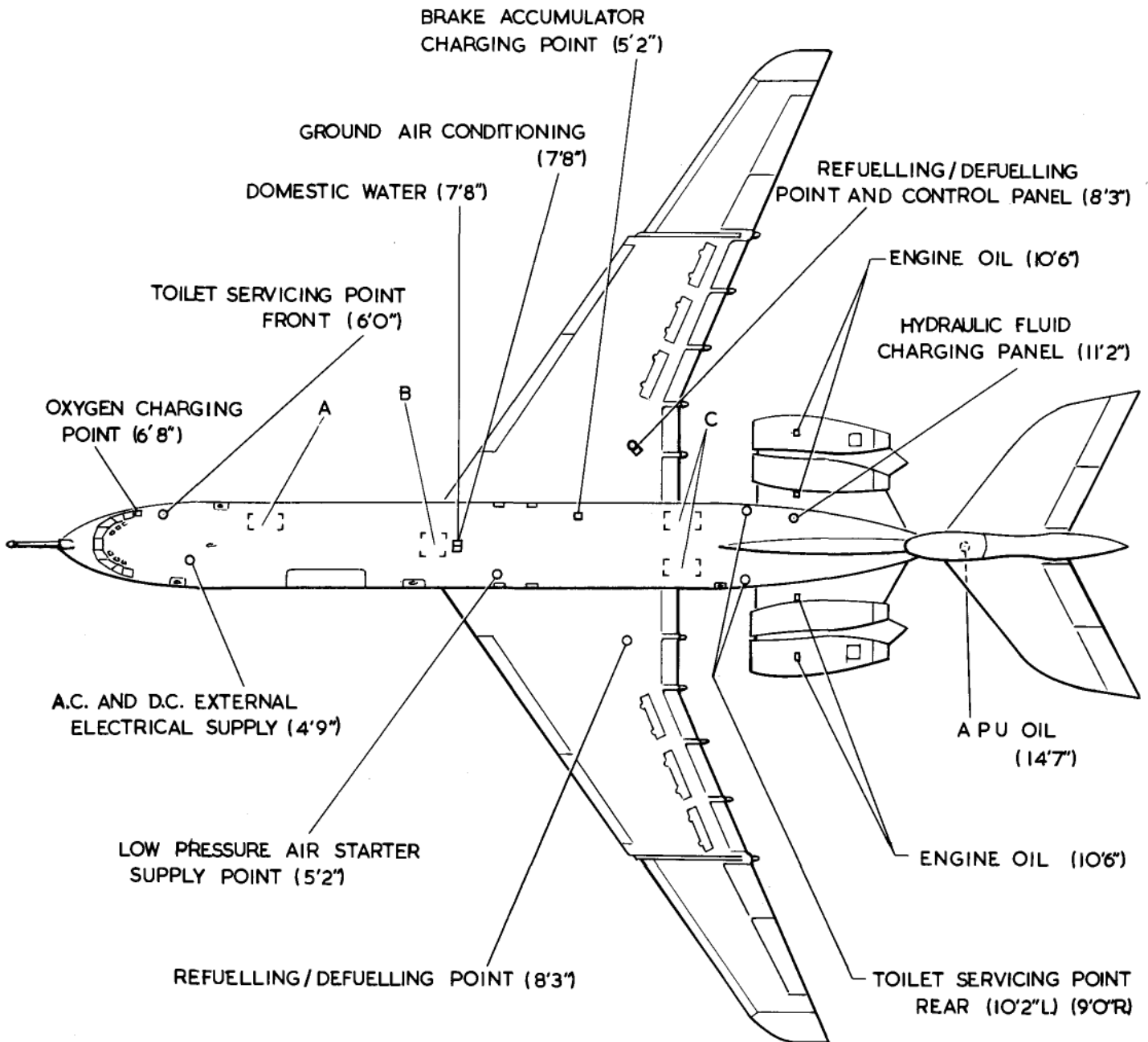


1.1 Fig. 4. Engineer's Panels



VC10/6A

1-1 Fig 5 Navigator's Panels



NOTE:— GROUND CLEARANCES ARE GIVEN ADJACENT TO EACH POINT

BREAK-IN POINTS (A,B,C)  
 BREAK-IN AREAS ARE CORNERED  
 IN RED AND LABELLED  
 "CUT HERE IN EMERGENCY"

VC10/7B

1-1 Fig 6 General Servicing Points  
 ◀ Deletion of Break-In Point ▶

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