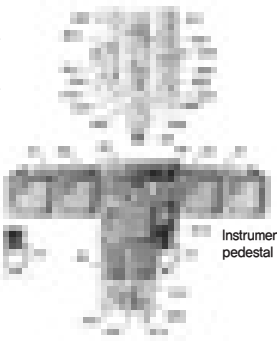
Structure and general

The main key refers to the MV-22 (US Marine Corps) aircraft. Items specific to the CV-22(US Air Force) are identified accordingly.

Typically the pilot sits on the right in the MV-22 and on the left in the CV-22.

1 Nose cone-composite
2 "Anti-plow"bulkhead-composite
3 Windscreen enclosure frame-titanium
4 Side console-both sides
5 Cockpit side window/emergency escape hatch with pyrotechnic jettison-co-pilot's side window removed for clarity
6 Standby magnetic compass
7 Instrument panel and shroud
8 Look-down window
9 Rear view mirror
10 Co-pilot's fully adjustable crashworthy stroking seat-armoured composite
11 Canted cockpit bulkhead-with seat mount
12 Seat occupant weight selector
13 Port side forward avionics bays
14 Skin panels-graphite-epoxy solid laminate with wire mesh lightning discharge membrane
15 Forward fuselage/centre fuselage interface
16 Upper fuselage strake-aluminium alloy with frangible leading edge
17 Crew chief location (aft of centre console)-MV-22
18 Starboard (stbd) side avionics bay
19 Cockpit roll-over protection beams
20 Two-part crew door-up-and-over section and lower fold-down section with integral steps
21 Upper door tracks
22 Cockpit door with troop commander's crashworthy stroking seat-facing into cabin
23 Upper deck avionics rack and support frames
24 Hand hold
25 Wing stow upper deck-composite
26 Wing stow fairing locators
27 Deck drain
28 Cavin compass
29 Life raft stowage-two rafts
30 Cabin underfloor side beam
31 Sponson-graphite-epoxy solid laminate with wire mesh lightning discharge membrane
32 Tie-down shackle
33 Sponson/main landing gear forward bulkhead-machined aluminium alloy
34 Tie-down net stowage
35 Foldaway crashworthy trop seats-during evacuation seats located below escape hatches are removed via a pyrotechnic actuator
36 Wing stow/fuselage frame-aluminium alloy
37 Fixed cabin floor panels with cargo tie-downs-access to cargo hooks is via two hinged panels
38 Cargo handling roller conveyors-removable
39 Cabin escape hatch-three off
40 Cabin 1.82×1.82×7.31m-capable of accommodating 24 combat loaded marines (fast ropes and parachute static lines are provided), 12 litters or 9,000kg (20,000lb) of internal cargo. External cargo is carried by single and dual cargo hooks-4,500kg (10,000lb) and 6,800kg (15,000lb)capabiliby located beneath the cabin floor
41 Overwing fairing panel-composite
42 Conversion actuator forward wing panel
43 Wingtip/spindle rib-aluminium alloy
44 Air intake/proprotor gearbox fairing
45 Spinner avionics shelf
46 Nacelle upper conversion joint fairing
47 Trailing edge cove support structure-composite
48 Flaperon hinge mount-aluminium alloy
49 One piece upper and lower wing skins with bonded stringers-composite
50 Leading edge vortex generators
51 Wing/flex ring rear mount and lifting point
52 Centre wing vortex generators
53 Upper wing skin fairings
54 Auxiliary power unit "A"frame mount
55 Mid-wing gearbox support beam
56 Upper deck avionics rack attachment points
57 Wing/flex ring forward mount and lifting point
58 Centre wing dry bay
59 Mid-wing gearbox central mount
60 Controlled wing failure zone-designed to separate from cabin in the event of a crash
61 Mid-wing gearbox diagonal mount
62 Lower wing skin inspection panels
63 Wing rib-built-up composite
64 Wing forward and rear spars-composite
65 CV-22 wing fuel cell locations-plumbing fitted as standard on all models
66 Main landing gear support beam-machined aluminium alloy
67 Sponson strake
68 Spindle inboard rib-machined aluminium alloy
69 Nacelle maintenance platforms
70 Nacelle lower access panel
71 Nacelle primary structure-mixed construction of titanium,aluminium alloy and composite
72 Primary fire wall-titanium
73 Oil cooler intake
74 Wing fence
75 Maintenance step
76 Sponson/main landing gear rear bulkhead-machined aluminium alloy
77 Overwing aft fairing
78 Mid-wing gearbox access door
79 Cabin insulation blankets-fire proof
80 Sponson aft bulkhead-machined aluminium alloy
81 Cargo loading ramp-multi-position
82 Fold out ramp extensions
83 Ramp actuator fitting
84 Centre fuselage/rear fuselage interface
85 Rear fuselage overhead escape hatch
86 Rear fuselage frames-composite
87 Fipper door upper clearance panels-pneumatic
88 Fipper door
89 Ramp longeron and fairing-composite
90 Rear fuselage torque box-both sides
91 Rear fuselage/tail attachment interface-aluminium alloy
92 Empennage forward attachment points
93 Empennage leading edge-composite
94 Two spar single piece tail plane-mixed construction
95 Elevator actuator access panel
96 Fin attachment points
97 Two spar single piece fin-composite
98 Fin leading edge-detachable
99 Handhold/fire extinguisher nozzle access
100 Windscreen washer bottle



Instrument panel, overhead panel and centre pedestal detail

Environmental control system(ECS)and anti-ice

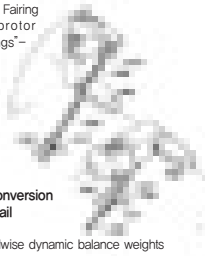
The ECS provides a positive pressure differential up to 0.062 bar (0.9lb/in²)for the cockpit, and 0.048 bar (0.7lb/in²)for the cabin in possible nuclear/biological/chemical(NBC)environments.

A1 Electrically heated windscreen panels
A2 Side window demister ducts
A3 Cockpit pressurisation safety valve
A4 Overhead gaspers
A5 Cockpit heating duct
A6 Avionics bay forward cooling system
A7 Avionics bay aft cooling system
A8 Avionics bay cooling system filter
A9 Cockpit outflow valve
A10 Avionics cooling air inlet duct to A8
A11 Inlet air particle separator exhaust and drain
A12 Avionics cooling air inlet partcle separator
A13 Avionics bay exhaust fan and outlet
A14 Onboard oxygen generating system(OBOGS) and onboard inert gas generating system(OBIGGS) concentrators
A15 Cabin air distribution duct
A16 Cabin air crossover ducting
A17 Compressed air duct from the shaft driven compressor (SDC)
A18 Environmental control unit(ECU)cooling ram air inlet
A19 ECU heat exchanger
A20 ECU exhaust
A21 ECU ground pneumatic supply connector
A22 ECU emergency air vent fan
A23 NBC filter pack
A24 ECS controller
A25 SDC inlet
A26 SDC inlet particle separator
A27 SDC
A28 Leading edge electrically controlled pneumatic actuated de-icing boots (SDC supplied air via the ECU)-three per wing
A29 Proprotor blade spinner and side panel anti-ice system-structural wire mesh electrically heated
A30 Emergency oxygen bottle
A31 De-icing boot air supply
A32 SDC inlet screen
A33 De-ice valves

Flying controls

Flying controls operate on a triple redundant fly by wire system (operating within an automatic fight envelope protection system)-all surfaces are hydraulically controlled

C1 Co-pilot's rudder pedals and toe brakes
C2 C-opilot's side console mounted thrust control lever (the pilot's thrust control lever is located on the centre pedestal)-both incorporate nacelle control and electronic warfare (EW)controls
C3 Co-pilot's cyclic control lever-incorporating trim, communication, multifuncation display (MFD), helmet mounted display (HMD)and cargo release controls
C4 Cyclic control pitch trim actuator
C5 Spindle/blade grip adaptor fork
C6 Spindle
C7 Pendulum damper weight assembly and elastomeric spring
C8 Glass reinforced fibre yoke, elastomeric thrust bearing and beam assembly
C9 Pendulum damper yoke
C10 Constant velocity joint
C11 Proprotor blade grip and pitch horn
C12 Root Fairing
C13 Proprotor blade"tangs"-fold point

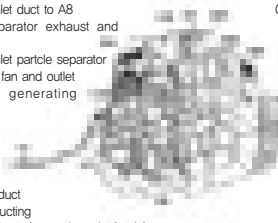


Nacelle conversion detail

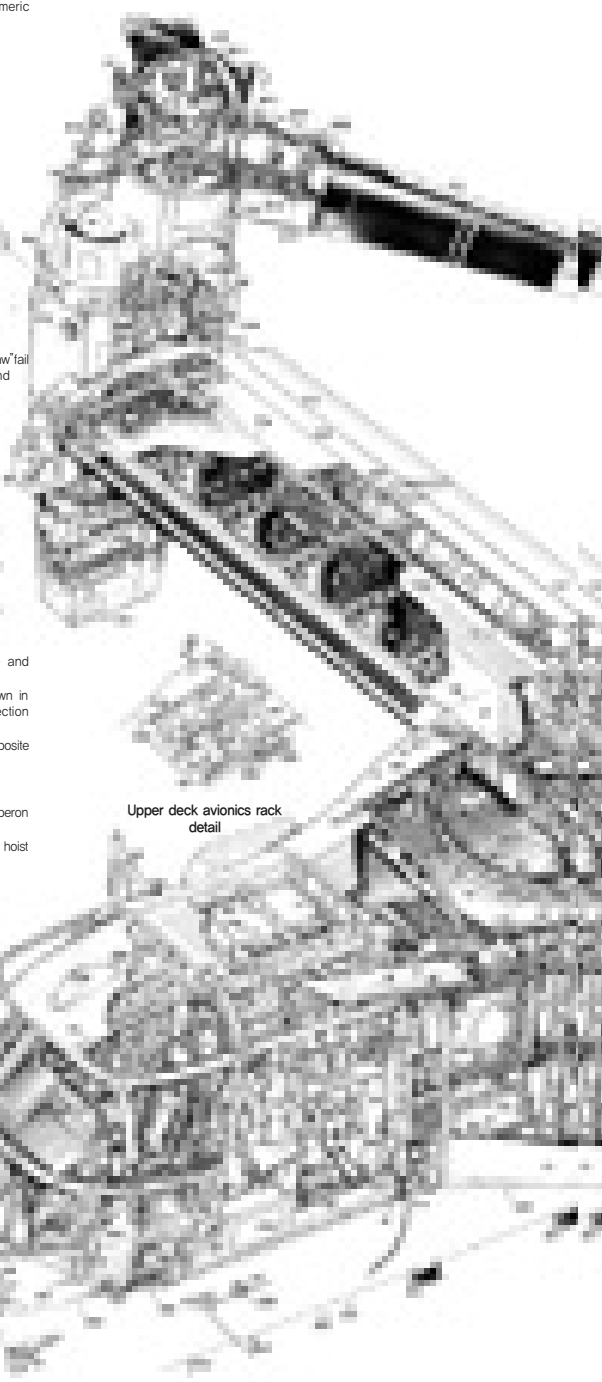
C14 Cordwise dynamic balance weights
C15 Erosion strip
C16 Proprotor blade(designed to "broomstraw"tail upon ground contact)-graphite and glass reinforced fibre spar and skin with honeycob filled after body
C17 Spanwise dynamic balance weights
C18 Nacelle conversion actuator backup drive-hydraulic
C19 Conversion actuator upper section
C20 Nacelle duel primary conversion actuator-hydraulic

Infrared suppressor detail

C21 Primary conversion actuator spindle and bearing
C22 Conversion actuator lower section(shown in lowered position)-upper actuator section retracts into lower section
C23 Single slotted outboard flaperon-composite construction
C24 Flaperon sealing shroud
C25 Shroud cam track and guide
C26 Flaperon hydraulic actuator-two per flaperon
C27 Inboard flaperon
C28 Remote hover control-used from the hoist position
C29 Flaperon uppermost deflection
C30 Flaperon lowermost deflection
C31 Non-rotating swashplate anti-drive assembly



Avionics bays detail



Upper deck avionics rack detail

C32 Pitch links
C33 Swashplate-rotating
C34 Swashplate-non-rotating
C35 Swashplate hydraulic actuators-three off
C36 Rudder hydraulic actuator
C37 Rudder-composite structure
C38 Single piece elevator-composite structure
C39 Elevator hydraulic actuator-three off
C40 Elevator mounted hinge-five off
C41 Hinge mount
C42 Hinge link
C43 Rotor brake air inlet
C44 Flaperon hinge

Instrument panel

D1 Full colour multifunction primary flight displays
D2 Control display unit(CDU)
D3 Standby flight instrument display
D4 Standby flight instruments
D5 Flight control ppanel-plus(CV-22)multi-mode radar control
D6 Remote frequency indicator
D7 Master alert panel
D8 Magnetic compass
D9 CDU control panels
D10 Landing gear
D11 FLIR multifunction tracking device
D12 Flap controls
D13 Dedicated EW display
D14 Parking brake lever
D15 Nacelle control disable switches
D16 Battery control
D17 Cargo hook/hoist control
D18 Cargo loading ramp
D19 Proprotor blade fold and wing stow control
D20 Lighting controls
D21 APU control
D22 Flight controls
D23 Engine controls-FADEC
D24 Fuel dump control
D25 Power steering controls
D26 Fire Suppression
D27 Display position control
D28 Emergency oxygen
D29 VHF radio
D30 Panel light

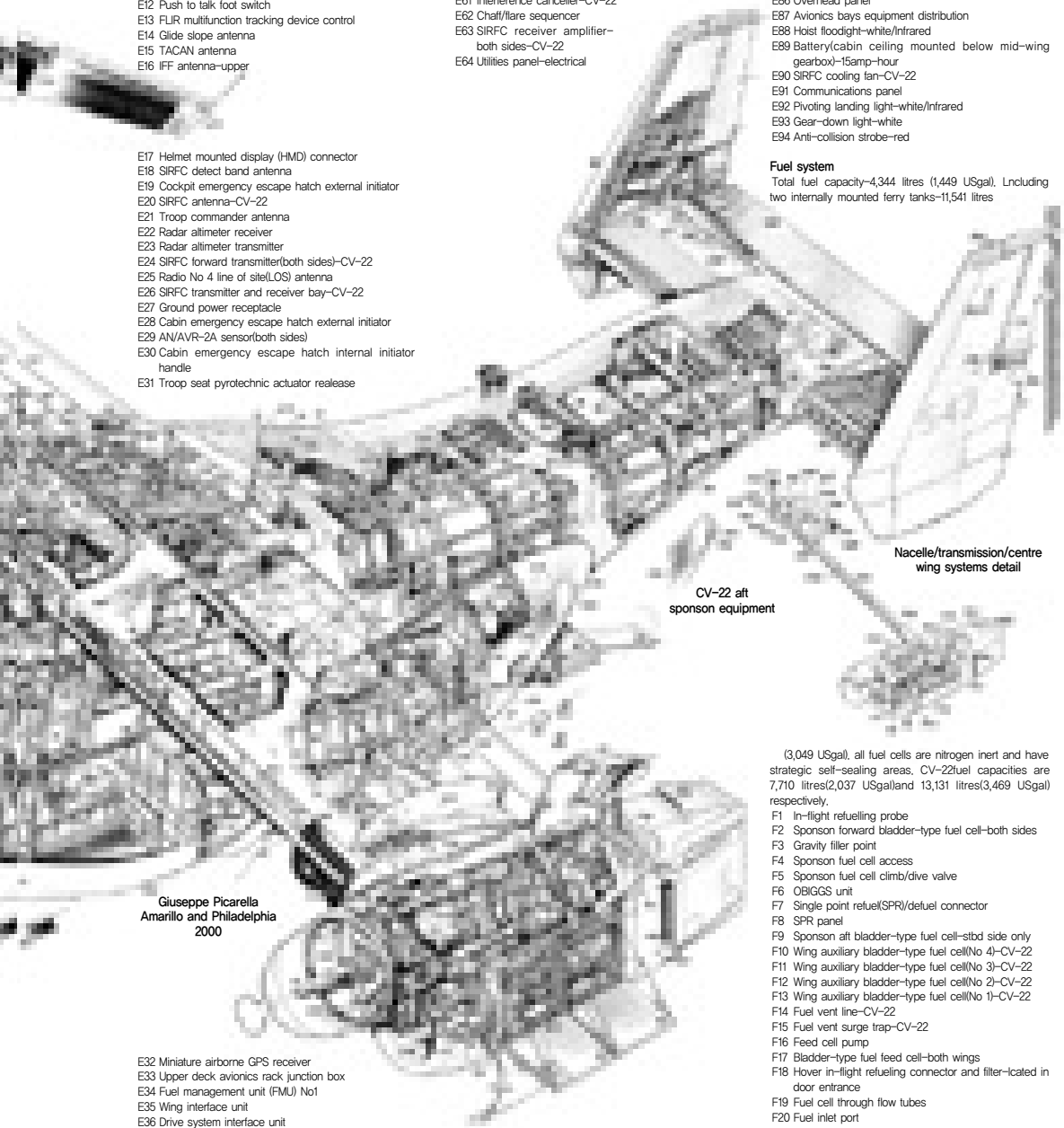
Avionics and electrical

E1 AN/APQ 174D multi-mode radar-CV-22
E2 Radar interface unit-CV-22

BELL BOEING MV-22 OSPREY

E3 In-flight refuelling probe light-white/infrared
E4 Radar warning receivers
E5 Forward looking infrared(FLIR)turret-AN/AAQ-27
E6 Suite of integrated radio frequency counter-measures(SIRFC)forward receiver and fairing (both sides)-CV-22
E7 Missile warning forward optical sensor(both sides)-AAR-47
E8 Radar sensor (both sides)-ARP-39A
E9 Windscreen wipers-two off
E10 Pitot static probes-1 and 3 on port side 2 and 4 on stbd side
E11 Angle of attack vane
E12 Push to talk foot switch
E13 FLIR multifunction tracking device control
E14 Glide slope antenna
E15 TACAN antenna
E16 IFF antenna-upper

E17 Helmet mounted display (HMD) connector
E18 SIRFC detect band antenna
E19 Cockpit emergency escape hatch external initiator
E20 SIRFC antenna-CV-22
E21 Troop commander antenna
E22 Radar altimeter receiver
E23 Radar altimeter transmitter
E24 SIRFC forward transmitter(both sides)-CV-22
E25 Radio No 4 line of site(LOS) antenna
E26 SIRFC transmitter and receiver bay-CV-22
E27 Ground power receptacle
E28 Cabin emergency escape hatch external initiator
E29 AN/AVR-2A sensor(both sides)
E30 Cabin emergency escape hatch internal initiator handle
E31 Troop seat pyrotechnic actuator realease



Giuseppe Picarella
Amarillo and Philadelphia
2000

E32 Miniature airborne GPS receiver
E33 Upper deck avionics rack junction box
E34 Fuel management unit (FMU) No1
E35 Wing interface unit
E36 Drive system interface unit
E37 Auxiliary power unit controller
E38 Fight incident recorder
E39 Wing fire protection controller-(WFPC)
E40 Vibration/structural life and engine diagnostics
E41 FMU No 2
E42 Nacelle interface unit
E43 Low-visibility electro-luminescent formation lights
E44 Variable frequency generator(VFG)No 4-40kVA
E45 Constant frequency generator(CFG)No 1-50/80kVA
E46 Marker beacon antenna
E47 Radio No 2 LOS antenna
E48 Heated nacelle air intake
E49 Wing integrated assembly(WIA) unit
E50 VFG No 3(port side nacelle)-40kVA-CFG No 2(stbd side nacelle) 50/80kVA
E51 Static discharge wick
E52 VOL/LOC antenna-below strake
E53 TACAN antenna-lower
E54 IFF antenna-lower
E55 Chaff/flare dispensers-CV-22
E56 SIRFC missile warning sensor(both sides)-CV-22
E57 SIRFC aft receiver antenna(both sides)-CV-22
E58 Missile warning aft optical sensor(both sides)-AAR-47

E59 Radar sensor(both sides)-ARP-39A
E60 AN/ALE-47 Chaff/flare dispenser-MV-22
E61 Interference canceller-CV-22
E62 Chaff/flare sequencer
E63 SIRFC receiver amplifier-both sides-CV-22
E64 Utilities panel-electrical

CV-22 aft sponson equipment

E65 SIRFC receiver processor-CV-22
E66 Overhed light
E67 Rear fuselage overhead emergency escape hatch internal initiator handle
E68 UHF/VHF antenna
E69 Crash position indicator (CPI) antenna-CV-22
E70 CPI-CV-22
E71 Emergency egress lighting system-fitted to all cabin escape exits
E72 WIA panel
E73 SATCOM amplifier
E74 SATCOM antenna
E75 Multi-mission advanced tactical terminal antenna-CV-22
E76 SIRFC modulator receiver-CV-22
E77 SIRFC radio ferauency switch-CV-22
E78 WIA
E79 FM homing antenna
E80 Colling fan and exhaust
E81 ADF antenna
E82 Tail position light-red/infrared
E83 Anti-collision light

E84 Cabin lighting control
E85 No 1 circuit breaker panel-four off throughout aircraft
E86 Overhead panel
E87 Avionics bays equipment distribution
E88 Hoist floodight-white/Infrared
E89 Battery(cabin ceiling mounted below mid-wing gearbox)-15amp-hour
E90 SIRFC cooling fan-CV-22
E91 Communications panel
E92 Pivoting landing light-white/Infrared
E93 Gear-down light-white
E94 Anti-collision strobe-red

Fuel system

Total fuel capacity-4,344 litres (1,449 USgal). Lncluding two internally mounted ferry tanks-11,541 litres

Nacelle/transmission/centre wing systems detail

(3,049 USgal). all fuel cells are nitrogen inert and have strategic self-sealing areas. CV-22fuel capacities are 7,710 litres(2,037 USgal)and 13,131 litres(3,469 USgal) respectively.

F1 In-flight refuelling probe
F2 Sponson forward bladder-type fuel cell-both sides
F3 Gravity filler point
F4 Sponson fuel cell access
F5 Sponson fuel cell climb/dive valve
F6 OBIGGS unit
F7 Single point refuel(SPR)/defuel connector
F8 SPR panel
F9 Sponson aft bladder-type fuel cell-stbd side only
F10 Wing auxiliary bladder-type fuel cell(No 4)-CV-22
F11 Wing auxiliary bladder-type fuel cell(No 3)-CV-22
F12 Wing auxiliary bladder-type fuel cell(No 2)-CV-22
F13 Wing auxiliary bladder-type fuel cell(No 1)-CV-22
F14 Fuel vent line-CV-22
F15 Fuel vent surge trap-CV-22
F16 Feed cell pump
F17 Bladder-type fuel feed cell-both wings
F18 Hover in-flight refueling connector and filter-lcated in door entrance
F19 Fuel cell through flow tubes
F20 Fuel inlet port
F21 Fuel feed line
F22 Fuel feed tank vent and surge traps

Powerplant and transmission

P1 Proprotor mast
P2 Oil filter
P3 Proprotor gear box(PRGB)
P4 PRGB integral oil reservoir
P5 Pylon drive shaft interface
P6 Torque housing
P7 Engine air intake
P8 Engine air particle separator (EAPS) splitter vane
P9 EAPS-twin hydraulically powered blowers
P10 EAPS exhaust
P11 Engine fire extinguisher-one per engine
P12 Pylon drive shaft and couplings
P13 Engine starter-hydraulic
P14 Rolls-Royce/Allison T406-AD-400 tuboshaft engine(FADEC controlled)-rated at 4,580 kW(6,150shp)
P15 Tilt axis gearbox(TAGB)
P16 Pylon assembly-complete
P17 Pylon support
P18 Transmissin adapter
P19 TAGB accessories pad and integral oil reservoir-drives oil filters, oil pumps hydaulic pumps(stbd side-hydraulic system No 2 and port side-hydraulic system No 1)and electrical generators
P20 Pylon spindle
P21 Oil cooler
P22 Rear nacelle blower assembly
P23 Ram air inlet-infrared suppressor
P24 Infrared suppressor ram air inlet ducting
P25 Infrared suppressor mixer side plenum panels
P26 Interconnect drive shafts (five per wing) - interconnected via the mid-wing gear box (MWGB) and the TAGB-distribute power to both PRGB's in the event of single engine shutdown
P27 Oil cooler exhaust
P28 Oil cooler blower
P29 Oil cooler
P30 Hamilton Sundstrand T-62T-46-2 auxiliary power unit(APU)-rated at 224KW(300shp)
P31 APU exhaust
P32 Mid-wing gearbox
P33 Rotor phasing unit
P34 Double coupling and support assembly
P35 Engine exhaust transition duct-IR suppressor
P36 IR ram air centre body mixer
P37 Coanda deflector tubes
P38 Emergency PRGB oil lubrication reservoir and pump
P39 Single coupling and support assembly
P40 Fire suppression gas generators-seven in midwing area, three in each wing trailing edge cove, one on each tip rib and one in each wing(located inboard of wing fuel cells)

Undercarriage and hydaulics

The triple redundant hydraulic system typically operates at 345 bar (5,000lb/in2)

U1 Rearward retracting oleo pneumatic nose landing gear(NLG)-electronically controlled, hydraulically actuated and steered-Messier Dowty
U2 NLG doors-composite
U3 Access to foot brake pilot master cylinders-both side
U4 Parking brake transfer valves
U5 Cabin internal cargo loding winch-hydraulically actuated
U6 Ressue hoist-hydraulically actuated
U7 Main landing gear(MLG)tyre door-composite
U8 MLG closing panel-composite
U9 MLG Pivot
U10 MLG drag strut
U11 MLG retraction actuator
U12 Forward retracting oleo pneumatic twin wheel MLG-electronically controlled, hydraulically actuation with dual hydraulic multi-disk carbon braking system-Messier-Dowty
U13 Weight-on-wheel switch
U14 MLG outboard door-composite
U15 MLG oleo upper access door
U16 Hydraulic fluid level monitor
U17 Hydraulic reservoir servicing ports and filters
U18 Cargo loading ramp actuator-two off
U19 emergency pneumatic reservoir and electrical pump(stbd side rear sponson)-landing gear and cargo loading ramp deployment
U20 Hydraulic pump No 3-No 1 the port TSGB pad and No 2 on the stbd TAGB pad
U21 Hydraulics service point
U22 Fipper door actuators-hydraulic
U23 Cargo loading ramp primary locks-hydraulic
U24 Hoist winch control
U25 Hike extend/vents

Wing stowage and blade fold

Fully automated proprotor blade fold and wing stowage is accomplished in 90s in 45KT(85㎞/h) winds

W1 Wing stowage deck supports
W2 Wing locking flag type indicator(black-locked, chequered-unlocked)-one per lockpin actuator
W3 "Flexring"secondary locator fittings/guides with lead running strip lubrication-eight off
W4 Wing stowage a"flexring"-stainless steel
W5 Lockpin primary locators-four off attachment points-four off
W6 "Flexring" to wing integrally machined attachment points-four off
W7 Wing stowage lockpin control module-hydraulic
W8 Lockpin actuator(hydraulic)-four off
W9 Wing stowage capstan drive with parallel action cables
W10 Wing rotation control-hydraulic
W11 Stowage cables-two off
W12 Wing stowage manual drive shaft
W13 Wing stowage "cap stand"-systems rotational interface between the wing and fuselage
W14 Proprotor blade pitch locking pin
W15 Proprotor blade latch and sensor
W16 Porprotor blade fold drive unit incorporating electrical motor,"planetary"gear sets and brake mechanism
W17 Proprotor manual fold drive
W18 Proprotor blade fold control unit - electrical