

The Living Library

Aircraft components that recognise themselves, guide the work, and compose any tail — not a catalog of parts, but a colleague that knows the aircraft.

50

EQUIPMENT CLASSES

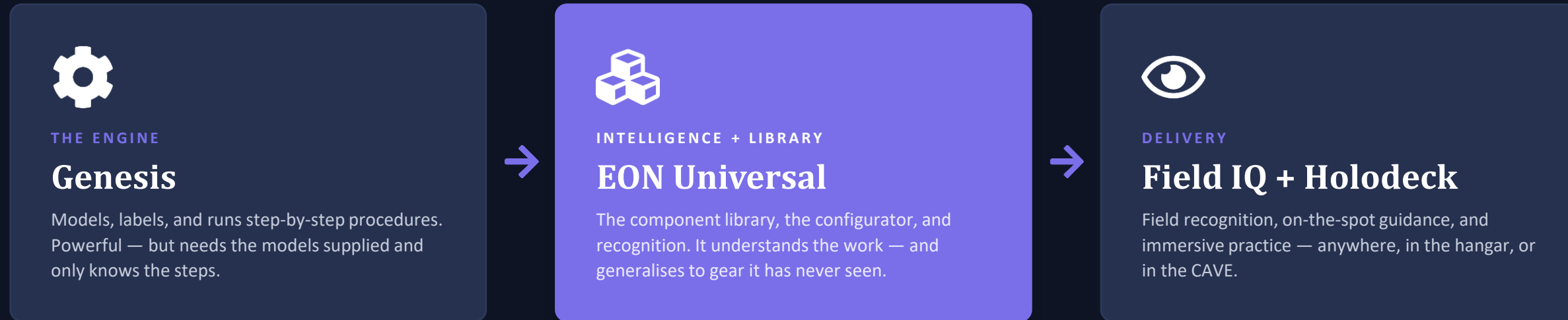
350

SUBCOMPONENTS

ATA 2200ATA iSpec
CHAPTERS**1st**OF A FAMILY OF
LIBRARIES

Where the library fits

EON Universal is a three-part platform. The library is its heart — the bounded vocabulary every facility is composed from.



This deck is the heart of it — the Work Intelligence Library: the finite vocabulary of understood components that Genesis runs, Universal composes, and FieldIQ delivers in the field.

Genesis shows the steps. EON Universal understands the work.

WHAT MAKES IT DIFFERENT

A library that's alive

Other libraries store things. This one does the work — it recognises equipment, tells you what to do, and builds facilities from a vocabulary it understands.



Recognise

Names every component on sight and links the real system to its digital twin. The green worker points; the library identifies.



Guide

Composes the correct procedure step by step — conditional SOPs that branch on live conditions, with safety gates that stop the line.



Build

Drags understood parts onto a canvas to compose any facility — unlimited, engineering-valid systems from one bounded library.

...and Escalate — when the library is unsure, it stops and hands off to a human. The worker is green; the guidance is not.

UNDER EVERY OBJECT — THE SIX-LAYER COMPETENCE RECORD

1 Identity **2** Geometry **3** Anatomy **4** Function **5** Behavior **6** Procedure

Recognition keys on layers 1–2. Guidance composes from layers 3–6. The knowledge is authored and owned — independent of any single AI model.

THE COMPARISON

Why the Universal Living Library is different

Shape, courseware, dynamics — every existing library stops short of the work.

	3-D / CAD library	LMS courseware	Process simulator	EON Work Intelligence Library
What it stores	A 3-D mesh or file	A course / SCORM module	A tuned plant model	A self-describing object: knowledge + 3-D twin
Knows how it works & fails	X	≈ generic theory	≈ dynamics only	✓ six authored layers
Understands isolation & relationships	X	X	≈ implicit	✓ explicit, per component
Tells you what to do — live	X	≈ passive content	X	✓ branching SOPs
Recognises real equipment on sight	X	X	X	✓ feeds FieldIQ + AR
Builds new facilities from it	X	X	X	✓ generative, valid
You own it — and it compounds	X vendor file	X vendor content	X one plant	✓ yours; better every job

Only the Work Intelligence Library binds understood work to the component, recognises it in the field, and lets you own it — the step nobody else has taken, not even a simulator.

ONE METHOD, EVERY HEAVY INDUSTRY

The first of a family

Because it understands components rather than memorising facilities, the same engine transfers to any industry built from a finite parts vocabulary. Learn the parts once; help every site built from them.



BUILT NOW

Petrochemical / Oil & Gas

ISO 14224 · 50 classes · 350 subcomponents



NEXT

Mining & Heavy Equipment

~40–60 core classes · same bounded method



ON THE MAP

Aerospace & MRO

High-regulation, high-value part taxonomy



ON THE MAP

Healthcare

Devices & equipment · same composition logic

***Petrochemical is the proven, built library.** Adjacent verticals are illustrative of the roadmap — each follows the same bounded-vocabulary method, so every new industry compounds on the last.*

What's in the library

Fifty Level-1 classes in twelve system families, seven Level-2 subcomponents each — organised by ATA iSpec 2200 chapters, aviation's own maintenance taxonomy.

Powerplant (ATA 70-80)

ATA 71-80

13

APU (ATA 49)

ATA 49

3

Hydraulic Power (ATA 29)

ATA 29

6

Landing Gear (ATA 32)

ATA 32

5

Flight Controls (ATA 27)

ATA 27

5

Engine Fuel & Control (ATA 73)

ATA 73

1

Fuel (ATA 28)

ATA 28

4

Pneumatic & Bleed Air (ATA 36)

ATA 36

2

Air Conditioning & Pressurization (ATA 21)

ATA 21

3

Electrical Power (ATA 24)

ATA 24

4

Avionics & Instruments (ATA 31/34)

ATA 34

3

Ice/Rain, Fire & Oxygen (ATA 26/30/35)

ATA 30

1

The 350 subcomponents

Seven per class. But the same parts keep reappearing — so the library composes a small kit of understood primitives rather than enumerating 350 unique things.

350

7

~21

THE RECURRING PRIMITIVES · how many of the 350 contain each part-type



Composition over enumeration. Understand each primitive once — every assembly that uses it inherits the knowledge. These parts get generated next, the same Tripo way, as reusable 3-D building blocks.

Subcomponents by family

All 350 Level-2 parts, grouped under their parent classes.

POWERPLANT (ATA 70-80) · 13

High-Bypass Turbofan Engine

fan module, low-pressure compressor, high-pressure compressor, combustion chamber, high-pressure turbine, low-pressure turbine, accessory gearbox

Fan Blade

airfoil, dovetail root, leading edge sheath, blade platform, internal cavity, blade tip, midspan shroud

Fuel Nozzle

nozzle tip, primary swirler, secondary swirler, fuel manifold fitting, heat shield, support stem, air shroud

Igniter Plug

center electrode, semiconductor tip, ceramic insulator, outer shell, sealing gasket, threaded body, ignition lead connector

HP Turbine Blade

airfoil, fir-tree root, blade platform, internal cooling passages, film cooling holes, blade tip shroud, thermal barrier coating

Combustion Liner

inner liner wall, outer liner wall, dome, cooling holes, dilution holes, igniter boss, fuel nozzle ferrules

Thrust Reverser Assembly

translating sleeve, blocker doors, cascade vanes, actuators, drive flex shafts, locking mechanism, torque box

Engine Oil Pump

pressure element, scavenge elements, drive shaft, pump housing, relief valve, inlet screen, mounting flange

Engine Oil Filter

filter element, filter bowl/housing, bypass valve, anti-drain valve, sealing o-rings, head/mounting flange, drain plug

FADEC Electronic Engine Control

dual processor channels, power supply module, input signal conditioners, output drivers, circuit card assemblies, electrical connectors, cooling fins/chassis

Engine Speed Sensor (N1/N2)

pole piece, permanent magnet, sensing coil, housing, mounting flange, electrical connector, sealing o-ring

EGT Thermocouple Probe

thermocouple junction, probe sheath, mounting flange, terminal block, compensating leads, support stem, sampling ports

Engine Bleed Air Valve

butterfly disc, valve body, pneumatic actuator, solenoid, position switch, spring, sense lines

APU (ATA 49) · 3

Auxiliary Power Unit (APU)

load compressor, power turbine, combustor, gearbox, starter-generator, fuel control unit, surge control valve

Subcomponents by family

All 350 Level-2 parts, grouped under their parent classes.

APU Fuel Control Unit

fuel metering valve, high-pressure pump element, governor, solenoid valves, filter screen, bypass valve, drive shaft

APU Starter-Generator

armature, field windings, commutator/brushes, drive spline, cooling fan, bearings, terminal block

HYDRAULIC POWER (ATA 29) · 6

Engine-Driven Hydraulic Pump

rotating cylinder block, pistons, swashplate, valve plate, drive shaft, compensator valve, case drain port

Hydraulic Reservoir

tank shell, sight gauge, fill port, pressurization fitting, outlet/standpipe, relief valve, temperature/level sensor

Hydraulic Accumulator

pressure shell, piston or bladder, gas charging valve, fluid port, gas precharge gauge, end caps, seals

Hydraulic Filter Module

filter element, filter bowl, filter head, bypass valve, differential pressure indicator, sealing o-rings, drain valve

Hydraulic Linear Actuator

cylinder barrel, piston, piston rod, rod end bearing, gland/seals, ports, mounting trunnion

Power Transfer Unit (PTU)

hydraulic motor section, hydraulic pump section, common shaft, cylinder blocks, swashplates, valve plates, check valves

LANDING GEAR (ATA 32) · 5

Main Landing Gear Shock Strut

outer cylinder, inner cylinder/piston, torque links, metering pin/orifice, gas charge valve, trunnion, axle

Landing Gear Wheel Assembly

inboard wheel half, outboard wheel half, tie bolts, bearings, heat shields, fusible plugs, tubeless valve

Carbon Brake Assembly

rotor discs, stator discs, pressure plate, torque tube, piston housing, pistons, wear indicator pin

Landing Gear Retract Actuator

cylinder barrel, piston rod, rod end, internal lock, ports, gland seals, mounting eye

Nose Wheel Steering Actuator

rotary or rack actuator, control valve, feedback mechanism, pistons, ports, centering cam, mounting collar

FLIGHT CONTROLS (ATA 27) · 5

Subcomponents by family

All 350 Level-2 parts, grouped under their parent classes.

Flight Control Actuator

cylinder/ram, servo valve, piston rod, mode/bypass valve, LVDT position sensor, manifold, mounting lugs

Servo Valve

torque motor, flapper-nozzle stage, spool, feedback wire, filter screen, valve body, electrical connector

Horizontal Stabilizer Trim Actuator

ballscrew/acme screw, primary ball nut, secondary (backup) nut, screw support bearing, upper gimbal attachment, drive gearbox, no-back brake

Flap Drive Actuator

ballscrew or rotary geartrain, ball nut, torque shaft input, no-back brake, gimbal/carriage, position sensor, housing

Flap/Slat Torque Tube & Gearbox

torque tube sections, universal joints, support bearings, right-angle gearboxes, splined couplings, slip clutches, bevel gears

ENGINE FUEL & CONTROL (ATA 73) · 1

Engine Fuel Pump

centrifugal boost stage, gear high-pressure stage, splined drive shaft, relief valve, inlet filter screen, two-stage housing, mounting flange

FUEL (ATA 28) · 4

Fuel Boost Pump

impeller, electric motor, inlet screen, check valve, housing, electrical connector, shaft seal

Fuel Shutoff Valve

valve disc/ball, actuator motor, gear train, position indicator, valve body, manual override, electrical connector

Fuel Quantity Probe

inner tube electrode, outer tube electrode, mounting flange, terminal block, spacers/insulators, compensator element, drain holes

Fuel Flow Transmitter

impeller/turbine rotor, calibrated spring, pickoff coil, flow housing, inlet port, outlet port, electrical connector

PNEUMATIC & BLEED AIR (ATA 36) · 2

Bleed Air Precooler

heat exchanger core, hot air inlet duct, cool air inlet, outlet duct, fins/tube matrix, mounting flanges, drain

Pressure Regulating & Shutoff Valve

butterfly disc, valve body, pneumatic actuator, solenoid, regulator, position switch, filter restrictor

Subcomponents by family

All 350 Level-2 parts, grouped under their parent classes.

AIR CONDITIONING & PRESSURIZATION (ATA 21) · 3

Air Cycle Machine

expansion turbine wheel, compressor wheel, fan wheel, common shaft, air bearings, housing, seals

Cabin Pressurization Outflow Valve

valve gate/doors, actuator motors, gearbox, manual override, position sensor, mounting frame, safety relief

Temperature Control (Trim Air) Valve

butterfly disc, torque motor/actuator, valve body, position sensor, electrical connector, return spring, bearings

ELECTRICAL POWER (ATA 24) · 4

Integrated Drive Generator (IDG)

constant speed drive, generator section, input drive spline, oil pump, governor, disconnect mechanism, cooling oil cooler

Aircraft Battery

cells, intercell links, terminals, vent system, case, temperature sensor, connector

Transformer Rectifier Unit (TRU)

transformer, rectifier diodes, heat sinks, cooling fan, filter capacitors, current sensor, terminal block

Static Inverter

power switching transistors, control board, output transformer, filter inductors/capacitors, heat sink, cooling fan, connectors

AVIONICS & INSTRUMENTS (ATA 31/34) · 3

Attitude & Heading Reference System (AHRS)

MEMS rate gyros, accelerometers, magnetometer interface, processor board, power supply, chassis, electrical connectors

Air Data Computer (ADC)

pressure transducers, processor board, power supply, pneumatic inputs, temperature input, chassis, electrical connectors

Pitot Probe

ram air inlet, pitot pressure chamber, drain holes, heater element, mounting flange, pneumatic fitting, electrical connector

ICE/RAIN, FIRE & OXYGEN (ATA 26/30/35) · 1

Wing Anti-Ice Valve

butterfly disc, pneumatic actuator, solenoid, valve body, position switch, return spring, sense line fitting

From knowledge to a 3D twin



THE PROMPT FORMULA

4 views STYLE + Subject + Camera line + Negative

cutaway CUTAWAY style + internals + Negative

Locked photoreal studio style on a neutral mid-grey background; the object stays identical across all four views — only the camera angle changes.

Filenames `high_bypass_turbofan_engine_front.png ... _cutaway.png`

Lined up for batch upload and the EON Ready agent.

WHERE THE 250 PROMPTS LIVE

- ✓ **On each class slide** — its hero prompt — copy & hand off
- ✓ **In each slide's notes** — the full 5-view set + filenames
- ✓ **In the Build Pack .xlsx** — all 250, copy-paste, batch-ready

50 classes × 5 images = 250 — kept out of the slide body so the deck stays a presentation, not a wall of prompts.

PP-01

High-Bypass Turbofan Engine

POWERPLANT (ATA 70-80)

Powerplant (ATA 70-80) Class 1 of 50

WHAT IT IS

Generates thrust by accelerating a large bypass airflow with a big front fan driven by a turbine core.

SUBCOMPONENTS · LEVEL 2

- fan module
- high-pressure compressor
- high-pressure turbine
- accessory gearbox
- low-pressure compressor
- combustion chamber
- low-pressure turbine

CUTAWAY REVEALS

the fan blades and disk, multi-stage compressor and turbine rotors, annular combustor, central shafts and the accessory gearbox drive



PP-02

Fan Blade

POWERPLANT (ATA 70-80)

Powerplant (ATA 70-80) Class 2 of 50

WHAT IT IS

Wide curved airfoil on the front fan that moves the bulk of the engine's bypass air for thrust.

SUBCOMPONENTS · LEVEL 2

- airfoil
- dovetail root
- leading edge sheath
- blade platform
- internal cavity
- blade tip
- midspan shroud

CUTAWAY REVEALS

the hollow internal cavity with stiffening ribs, the dovetail root profile and the bonded leading-edge sheath



PP-03

Fuel Nozzle

POWERPLANT (ATA 70-80)

Powerplant (ATA 70-80) Class 3 of 50

WHAT IT IS

Atomizes and sprays metered fuel into the combustor for clean, even burning.

SUBCOMPONENTS · LEVEL 2

- nozzle tip
- secondary swirler
- heat shield
- air shroud
- primary swirler
- fuel manifold fitting
- support stem

CUTAWAY REVEALS

the internal primary and secondary fuel passages, the swirl vanes and the metering orifices at the tip



PP-04

Igniter Plug

POWERPLANT (ATA 70-80)

Powerplant (ATA 70-80) Class 4 of 50

WHAT IT IS

High-energy spark plug that ignites the fuel-air mixture during engine start and relight.

SUBCOMPONENTS · LEVEL 2

- center electrode
- ceramic insulator
- semiconductor tip
- outer shell
- sealing gasket
- threaded body
- ignition lead connector

CUTAWAY REVEALS

the center electrode, the ceramic insulator stack, the semiconductor surface gap and the internal connector



PP-05

HP Turbine Blade

POWERPLANT (ATA 70-80)

Powerplant (ATA 70-80) Class 5 of 50

WHAT IT IS

Cooled airfoil that extracts energy from hot combustion gas to drive the high-pressure compressor.

SUBCOMPONENTS · LEVEL 2

- airfoil
- blade platform
- film cooling holes
- thermal barrier coating
- fir-tree root
- internal cooling passages
- blade tip shroud

CUTAWAY REVEALS

the serpentine internal cooling passages, the trailing-edge cooling slots and the fir-tree root profile



WHAT IT IS

Annular metal shell that contains and shapes the flame inside the combustion section.

SUBCOMPONENTS · LEVEL 2

- inner liner wall
- dome
- dilution holes
- fuel nozzle ferrules
- outer liner wall
- cooling holes
- igniter boss

CUTAWAY REVEALS

the dome and swirler mounts, the film-cooling louvers between inner and outer walls and the dilution holes



PP-07

Thrust Reverser Assembly

POWERPLANT (ATA 70-80)

Powerplant (ATA 70-80) Class 7 of 50

WHAT IT IS

Redirects fan airflow forward on landing to help slow the aircraft.

SUBCOMPONENTS · LEVEL 2

- translating sleeve
- cascade vanes
- drive flex shafts
- torque box
- blocker doors
- actuators
- locking mechanism

CUTAWAY REVEALS

the cascade vane boxes, the blocker doors and drag links, the translating sleeve tracks and the actuators



PP-08

Engine Oil Pump

POWERPLANT (ATA 70-80)

Powerplant (ATA 70-80) Class 8 of 50

WHAT IT IS

Gear pump that supplies and scavenges lubricating oil to the engine bearings and gearbox.

SUBCOMPONENTS · LEVEL 2

- pressure element
- drive shaft
- relief valve
- mounting flange
- scavenge elements
- pump housing
- inlet screen

CUTAWAY REVEALS

the meshing pressure and scavenge gear sets, the drive shaft, the relief valve and the internal galleries



PP-09

Engine Oil Filter

POWERPLANT (ATA 70-80)

Powerplant (ATA 70-80) Class 9 of 50

WHAT IT IS

Removes wear particles and debris from circulating engine oil to protect bearings.

SUBCOMPONENTS · LEVEL 2

- filter element
- filter bowl/housing
- bypass valve
- anti-drain valve
- sealing o-rings
- head/mounting flange
- drain plug

CUTAWAY REVEALS

the pleated filter element, the bypass valve, the anti-drain valve and the inlet and outlet passages



PP-10

FADEC Electronic Engine Control

POWERPLANT (ATA 70-80)

Powerplant (ATA 70-80) Class 10 of 50

WHAT IT IS

Digital computer that fully controls engine fuel scheduling, limits and protection.

SUBCOMPONENTS · LEVEL 2

- dual processor channels
- input signal conditioners
- circuit card assemblies
- cooling fins/chassis
- power supply module
- output drivers
- electrical connectors

CUTAWAY REVEALS

the stacked circuit card assemblies, the dual-channel processor boards, the power supply and the connector backplane



PP-11

Engine Speed Sensor (N1/N2)

POWERPLANT (ATA 70-80)

Powerplant (ATA 70-80) Class 11 of 50

WHAT IT IS

Magnetic pickup that senses rotor speed by counting passing gear teeth or phonic-wheel teeth.

SUBCOMPONENTS · LEVEL 2

- pole piece
- permanent magnet
- sensing coil
- housing
- mounting flange
- electrical connector
- sealing o-ring

CUTAWAY REVEALS

the permanent magnet, the wound sensing coil around the pole piece and the connector pins



Powerplant (ATA 70-80) Class 12 of 50

WHAT IT IS

Measures exhaust gas temperature using a hot-junction thermocouple in the gas path.

SUBCOMPONENTS · LEVEL 2

- thermocouple junction
- probe sheath
- mounting flange
- terminal block
- compensating leads
- support stem
- sampling ports

CUTAWAY REVEALS

the hot-junction thermocouple wires inside the sheath, the sampling holes and the terminal posts



WHAT IT IS

Regulates compressor bleed air taken from the engine for pneumatic and anti-ice use.

SUBCOMPONENTS · LEVEL 2

- butterfly disc
- valve body
- pneumatic actuator
- solenoid
- position switch
- spring
- sense lines

CUTAWAY REVEALS

the butterfly disc and shaft, the spring-loaded actuator diaphragm and the solenoid pilot passages



WHAT IT IS

Small gas turbine in the tail that supplies electrical power and bleed air on the ground and in flight.

SUBCOMPONENTS · LEVEL 2

- load compressor
- combustor
- starter-generator
- surge control valve
- power turbine
- gearbox
- fuel control unit

CUTAWAY REVEALS

the centrifugal compressor and turbine wheels, the reverse-flow combustor, the gearbox and the mounted starter-generator



APU-15

APU Fuel Control Unit

APU (ATA 49)

APU (ATA 49) Class 15 of 50

WHAT IT IS

Meters fuel to the APU combustor to control its speed and acceleration.

SUBCOMPONENTS · LEVEL 2

- fuel metering valve
- high-pressure pump element
- governor
- solenoid valves
- filter screen
- bypass valve
- drive shaft

CUTAWAY REVEALS

the gear pump element, the metering valve spool, the governor flyweights and the internal fuel passages



APU-16

APU Starter-Generator

APU (ATA 49)

APU (ATA 49) Class 16 of 50

WHAT IT IS

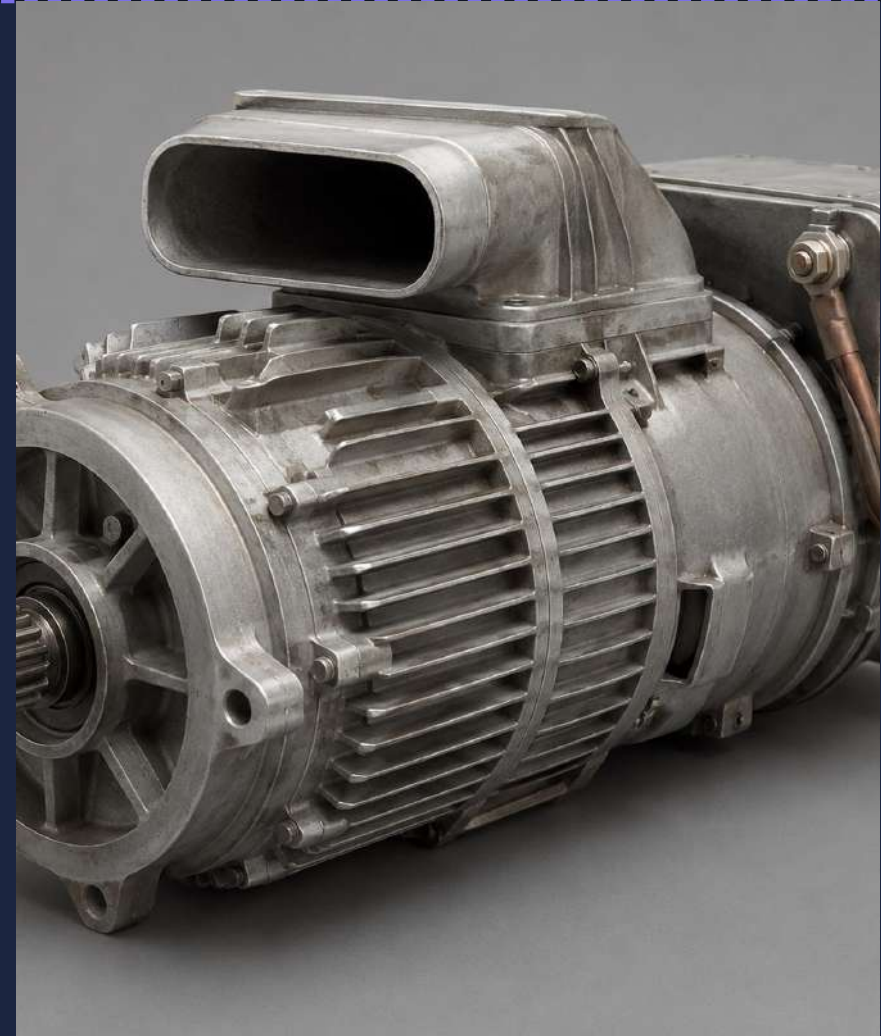
Cranks the APU to start, then turns into a generator to supply electrical power.

SUBCOMPONENTS · LEVEL 2

- armature
- commutator/brushes
- cooling fan
- terminal block
- field windings
- drive spline
- bearings

CUTAWAY REVEALS

the wound armature and field poles, the commutator and brush rigging, the cooling fan and the bearings



HYD-17

Engine-Driven Hydraulic Pump

HYDRAULIC POWER (ATA 29)

Hydraulic Power (ATA 29) Class 17 of 50

WHAT IT IS

Variable-displacement piston pump driven by the engine gearbox to pressurize the hydraulic system.

SUBCOMPONENTS · LEVEL 2

- rotating cylinder block
- pistons
- swashplate
- valve plate
- drive shaft
- compensator valve
- case drain port

CUTAWAY REVEALS

the rotating cylinder block and pistons, the tilted swashplate, the valve plate and the pressure compensator



HYD-18

Hydraulic Reservoir

HYDRAULIC POWER (ATA 29)

Hydraulic Power (ATA 29) Class 18 of 50

WHAT IT IS

Pressurized tank that stores hydraulic fluid and feeds the system pumps.

SUBCOMPONENTS · LEVEL 2

- tank shell
- fill port
- outlet/standpipe
- temperature/level sensor
- sight gauge
- pressurization fitting
- relief valve

CUTAWAY REVEALS

the standpipe outlet, the internal baffles, the level float sensor and the pressurization and relief connections



HYD-19

Hydraulic Accumulator

HYDRAULIC POWER (ATA 29)

Hydraulic Power (ATA 29) Class 19 of 50

WHAT IT IS

Stores pressurized fluid against a gas charge to dampen surges and supply peak demand.

SUBCOMPONENTS · LEVEL 2

- pressure shell
- gas charging valve
- gas precharge gauge
- seals
- piston or bladder
- fluid port
- end caps

CUTAWAY REVEALS

the internal floating piston or bladder separating the gas precharge from the hydraulic fluid, and the seals



HYD-20

Hydraulic Filter Module

HYDRAULIC POWER (ATA 29)

Hydraulic Power (ATA 29) Class 20 of 50

WHAT IT IS

Filters hydraulic fluid to keep contamination out of valves and actuators.

SUBCOMPONENTS · LEVEL 2

- filter element
- filter bowl
- filter head
- bypass valve
- differential pressure indicator
- sealing o-rings
- drain valve

CUTAWAY REVEALS

the pleated filter element, the bypass valve, the clogging indicator mechanism and the flow passages



HYD-21

Hydraulic Linear Actuator

HYDRAULIC POWER (ATA 29)

Hydraulic Power (ATA 29) Class 21 of 50

WHAT IT IS

Converts hydraulic pressure into straight-line force to move a control surface or mechanism.

SUBCOMPONENTS · LEVEL 2

- cylinder barrel
- piston
- piston rod
- rod end bearing
- gland/seals
- ports
- mounting trunnion

CUTAWAY REVEALS

the piston and rod inside the bore, the dynamic rod and piston seals, the ports and the end-gland



HYD-22

Power Transfer Unit (PTU)

HYDRAULIC POWER (ATA 29)

Hydraulic Power (ATA 29) Class 22 of 50

WHAT IT IS

Links two hydraulic systems by transferring power hydraulically without exchanging fluid.

SUBCOMPONENTS · LEVEL 2

- hydraulic motor section
- hydraulic pump section
- common shaft
- cylinder blocks
- swashplates
- valve plates
- check valves

CUTAWAY REVEALS

the back-to-back cylinder blocks and pistons sharing a common shaft, the swashplates and the valve plates



LG-23

Main Landing Gear Shock Strut

LANDING GEAR (ATA 32)

Landing Gear (ATA 32) Class 23 of 50

WHAT IT IS

Oleo-pneumatic leg that absorbs landing and taxi loads and carries the wheel assembly.

SUBCOMPONENTS · LEVEL 2

- outer cylinder
- inner cylinder/piston
- torque links
- metering pin/orifice
- gas charge valve
- trunnion
- axle

CUTAWAY REVEALS

the oil-and-nitrogen oleo chamber, the metering pin and orifice, the inner piston and the seals



LG-24

Landing Gear Wheel Assembly

LANDING GEAR (ATA 32)

Landing Gear (ATA 32) Class 24 of 50

WHAT IT IS

Split aluminum hub that holds the tire and rides on the axle bearings.

SUBCOMPONENTS · LEVEL 2

- inboard wheel half
- outboard wheel half
- tie bolts
- bearings
- heat shields
- fusible plugs
- tubeless valve

CUTAWAY REVEALS

the two bolted hub halves, the tapered roller bearings, the heat shield pack and the thermal fusible plugs



LG-25

Carbon Brake Assembly

LANDING GEAR (ATA 32)

Landing Gear (ATA 32) Class 25 of 50

WHAT IT IS

Multi-disc carbon brake that converts kinetic energy to heat to stop the wheel.

SUBCOMPONENTS · LEVEL 2

- rotor discs
- stator discs
- pressure plate
- torque tube
- piston housing
- pistons
- wear indicator pin

CUTAWAY REVEALS

the interleaved carbon rotor and stator discs, the torque tube, the pistons and the pressure plate



LG-26

Landing Gear Retract Actuator

LANDING GEAR (ATA 32)

Landing Gear (ATA 32) Class 26 of 50

WHAT IT IS

Hydraulic actuator that raises and lowers the landing gear leg.

SUBCOMPONENTS · LEVEL 2

- cylinder barrel
- rod end
- ports
- mounting eye
- piston rod
- internal lock
- gland seals

CUTAWAY REVEALS

the piston and rod, the internal down-lock mechanism, the seals and the hydraulic ports



LG-27

Nose Wheel Steering Actuator

LANDING GEAR (ATA 32)

Landing Gear (ATA 32) Class 27 of 50

WHAT IT IS

Hydraulic unit that swivels the nose gear to steer the aircraft on the ground.

SUBCOMPONENTS · LEVEL 2

- rotary or rack actuator
- control valve
- feedback mechanism
- pistons
- ports
- centering cam
- mounting collar

CUTAWAY REVEALS

the rack-and-pinion or vane pistons, the control valve spool, the centering cam and the feedback follower



FC-28

Flight Control Actuator

FLIGHT CONTROLS (ATA 27)

Flight Controls (ATA 27) Class 28 of 50

WHAT IT IS

Powered actuator that positions a primary control surface in response to pilot or computer commands.

SUBCOMPONENTS · LEVEL 2

- cylinder/ram
- piston rod
- LVDT position sensor
- mounting lugs
- servo valve
- mode/bypass valve
- manifold

CUTAWAY REVEALS

the piston and ram, the servo valve spool, the bypass/mode valve and the LVDT feedback core



FC-29

Servo Valve

FLIGHT CONTROLS (ATA 27)

Flight Controls (ATA 27) Class 29 of 50

WHAT IT IS

Electrohydraulic valve that meters fluid precisely to position a flight-control actuator.

SUBCOMPONENTS · LEVEL 2

- torque motor
- spool
- filter screen
- electrical connector
- flapper-nozzle stage
- feedback wire
- valve body

CUTAWAY REVEALS

the torque motor coils, the flapper-and-nozzle first stage, the sliding spool and the feedback wire



FC-30

Horizontal Stabilizer Trim Actuator

FLIGHT CONTROLS (ATA 27)

Flight Controls (ATA 27) Class 30 of 50

WHAT IT IS

Jackscrew actuator that tilts the horizontal stabilizer to provide pitch trim.

SUBCOMPONENTS · LEVEL 2

- ballscrew/acme screw
- primary ball nut
- secondary (backup) nut
- screw support bearing
- upper gimbal attachment
- drive gearbox
- no-back brake

CUTAWAY REVEALS

the ballscrew and primary ball nut, the secondary backup nut, the screw support bearing, the no-back brake and the drive gears



FC-31

Flap Drive Actuator

FLIGHT CONTROLS (ATA 27)

Flight Controls (ATA 27) Class 31 of 50

WHAT IT IS

Geared rotary or ballscrew unit that extends and retracts a wing flap panel.

SUBCOMPONENTS · LEVEL 2

- ballscrew or rotary geartrain
- torque shaft input
- gimbal/carriage
- housing
- ball nut
- no-back brake
- position sensor

CUTAWAY REVEALS

the ballscrew and ball nut, the input gearset, the no-back brake and the carriage rollers



WHAT IT IS

Rotating shaft network with angle gearboxes that drives all flap or slat stations together.

SUBCOMPONENTS · LEVEL 2

- torque tube sections
- support bearings
- splined couplings
- bevel gears
- universal joints
- right-angle gearboxes
- slip clutches

CUTAWAY REVEALS

the bevel gears inside the angle gearboxes, the splined couplings and the support bearings



WHAT IT IS

Engine-driven pump that boosts and pressurizes fuel to the high pressure required by the engine fuel control and nozzles.

SUBCOMPONENTS · LEVEL 2

- centrifugal boost stage
- splined drive shaft
- inlet filter screen
- mounting flange
- gear high-pressure stage
- relief valve
- two-stage housing

CUTAWAY REVEALS

the centrifugal boost impeller, the high-pressure gear set, the drive shaft and the relief valve



FU-34

Fuel Boost Pump

FUEL (ATA 28)

Fuel (ATA 28) Class 34 of 50

WHAT IT IS

Submerged electric centrifugal pump that supplies pressurized fuel from the tank to the engines.

SUBCOMPONENTS · LEVEL 2

- impeller
- electric motor
- inlet screen
- check valve
- housing
- electrical connector
- shaft seal

CUTAWAY REVEALS

the centrifugal impeller, the sealed electric motor, the inlet screen and the discharge check valve



FU-35

Fuel Shutoff Valve

FUEL (ATA 28)

Fuel (ATA 28) Class 35 of 50

WHAT IT IS

Motor-driven valve that opens or closes fuel flow to an engine or tank.

SUBCOMPONENTS · LEVEL 2

- valve disc/ball
- gear train
- valve body
- electrical connector
- actuator motor
- position indicator
- manual override

CUTAWAY REVEALS

the ball or gate element, the actuator motor and gear train and the position indicator linkage



FU-36

Fuel Quantity Probe

FUEL (ATA 28)

Fuel (ATA 28) Class 36 of 50

WHAT IT IS

Capacitance tube probe that measures fuel level in a tank for the gauging system.

SUBCOMPONENTS · LEVEL 2

- inner tube electrode
- outer tube electrode
- mounting flange
- terminal block
- spacers/insulators
- compensator element
- drain holes

CUTAWAY REVEALS

the concentric inner and outer electrode tubes, the insulating spacers and the compensator at the base



FU-37

Fuel Flow Transmitter

FUEL (ATA 28)

Fuel (ATA 28) Class 37 of 50

WHAT IT IS

Inline sensor that measures engine fuel flow rate for the cockpit indication.

SUBCOMPONENTS · LEVEL 2

- impeller/turbine rotor
- calibrated spring
- pickoff coil
- flow housing
- inlet port
- outlet port
- electrical connector

CUTAWAY REVEALS

the spring-restrained impeller, the angular-momentum drum, the magnetic pickoff and the flow passage



PN-38

Bleed Air Precooler

PNEUMATIC & BLEED AIR (ATA 36)

Pneumatic & Bleed Air (ATA 36) Class 38 of 50

WHAT IT IS

Air-to-air heat exchanger that cools hot engine bleed air with fan air before distribution.

SUBCOMPONENTS · LEVEL 2

- heat exchanger core
- hot air inlet duct
- cool air inlet
- outlet duct
- fins/tube matrix
- mounting flanges
- drain

CUTAWAY REVEALS

the cross-flow finned core matrix, the hot and cold air passages and the header tanks



PN-39

Pressure Regulating & Shutoff Valve

PNEUMATIC & BLEED AIR (ATA 36)

Pneumatic & Bleed Air (ATA 36) Class 39 of 50

WHAT IT IS

Pneumatic valve that regulates downstream bleed pressure and shuts off the supply on command.

SUBCOMPONENTS · LEVEL 2

- butterfly disc
- valve body
- pneumatic actuator
- solenoid
- regulator
- position switch
- filter restrictor

CUTAWAY REVEALS

the butterfly disc and shaft, the actuator diaphragm and spring, the regulator and the solenoid pilot



AC-40

Air Cycle Machine

AIR CONDITIONING & PRESSURIZATION
(ATA 21)

Air Conditioning & Pressurization (ATA 21) Class 40 of 50

WHAT IT IS

Air-bearing turbine-compressor that cools cabin air by expansion in the air-conditioning pack.

SUBCOMPONENTS · LEVEL 2

- expansion turbine wheel
- compressor wheel
- fan wheel
- common shaft
- air bearings
- housing
- seals

CUTAWAY REVEALS

the turbine, compressor and fan wheels on the common shaft, the air bearings and the labyrinth seals



AC-41

Cabin Pressurization Outflow Valve

AIR CONDITIONING &
PRESSURIZATION (ATA 21)

Air Conditioning & Pressurization (ATA 21) Class 41 of 50

WHAT IT IS

Controls cabin pressure by modulating how much air escapes overboard from the fuselage.

SUBCOMPONENTS · LEVEL 2

- valve gate/doors
- gearbox
- position sensor
- safety relief
- actuator motors
- manual override
- mounting frame

CUTAWAY REVEALS

the gate doors and linkage, the dual actuator motors and gearbox and the position pickoff



AC-42

Temperature Control (Trim Air) Valve

AIR CONDITIONING &
PRESSURIZATION (ATA 21)

Air Conditioning & Pressurization (ATA 21) Class 42 of 50

WHAT IT IS

Mixes hot bleed air into cool pack air to set the temperature of each cabin zone.

SUBCOMPONENTS · LEVEL 2

- butterfly disc
- valve body
- electrical connector
- bearings
- torque motor/actuator
- position sensor
- return spring

CUTAWAY REVEALS

the butterfly disc and shaft, the torque-motor actuator, the return spring and the position sensor



Electrical Power (ATA 24) Class 43 of 50

WHAT IT IS

Engine-driven unit that holds generator speed constant and produces constant-frequency AC power.

SUBCOMPONENTS · LEVEL 2

- constant speed drive
- generator section
- input drive spline
- oil pump
- governor
- disconnect mechanism
- cooling oil cooler

CUTAWAY REVEALS

the hydromechanical constant-speed drive, the generator rotor and stator, the charge oil pump and the disconnect



EL-44

Aircraft Battery

ELECTRICAL POWER (ATA 24)

Electrical Power (ATA 24) Class 44 of 50

WHAT IT IS

Rechargeable battery that powers essential systems for start and emergency electrical loads.

SUBCOMPONENTS · LEVEL 2

- cells
- terminals
- case
- connector
- intercell links
- vent system
- temperature sensor

CUTAWAY REVEALS

the series-connected cells, the intercell connecting straps, the vent manifold and the terminal posts



EL-45

Transformer Rectifier Unit (TRU)

ELECTRICAL POWER (ATA 24)

Electrical Power (ATA 24) Class 45 of 50

WHAT IT IS

Converts aircraft AC power into regulated DC for the DC bus and battery charging.

SUBCOMPONENTS · LEVEL 2

- transformer
- rectifier diodes
- heat sinks
- cooling fan
- filter capacitors
- current sensor
- terminal block

CUTAWAY REVEALS

the laminated transformer core and windings, the diode bridge on heat sinks, the cooling fan and the filter



EL-46

Static Inverter

ELECTRICAL POWER (ATA 24)

Electrical Power (ATA 24) Class 46 of 50

WHAT IT IS

Converts battery DC into AC power to feed essential AC loads when generators are off.

SUBCOMPONENTS · LEVEL 2

- power switching transistors
- control board
- output transformer
- filter inductors/capacitors
- heat sink
- cooling fan
- connectors

CUTAWAY REVEALS

the switching transistor module on a heat sink, the control board, the output transformer and the output filter



WHAT IT IS

Solid-state unit that computes aircraft attitude and heading from gyros and accelerometers.

SUBCOMPONENTS · LEVEL 2

- MEMS rate gyros
- magnetometer interface
- power supply
- electrical connectors
- accelerometers
- processor board
- chassis

CUTAWAY REVEALS

the inertial sensor block of gyros and accelerometers, the processor and power supply boards and the connector backplane



AV-48

Air Data Computer (ADC)

AVIONICS & INSTRUMENTS (ATA 31/34)

Avionics & Instruments (ATA 31/34) Class 48 of 50

WHAT IT IS

Computes airspeed, altitude and temperature from pitot, static and temperature inputs.

SUBCOMPONENTS · LEVEL 2

- pressure transducers
- processor board
- power supply
- pneumatic inputs
- temperature input
- chassis
- electrical connectors

CUTAWAY REVEALS

the static and pitot pressure transducers, the processor and power-supply boards and the pneumatic manifold



WHAT IT IS

Forward-facing probe that senses ram air pressure for airspeed measurement.

SUBCOMPONENTS · LEVEL 2

- ram air inlet
- pitot pressure chamber
- drain holes
- heater element
- mounting flange
- pneumatic fitting
- electrical connector

CUTAWAY REVEALS

the ram-air pressure passage, the internal water-drain traps, the embedded heater element and the pneumatic outlet



IPO-50

Wing Anti-Ice Valve

ICE/RAIN, FIRE & OXYGEN (ATA 26/30/35)

Ice/Rain, Fire & Oxygen (ATA 26/30/35) Class 50 of 50

WHAT IT IS

Controls hot bleed air into the wing leading edge to prevent ice buildup.

SUBCOMPONENTS · LEVEL 2

- butterfly disc
- solenoid
- position switch
- sense line fitting
- pneumatic actuator
- valve body
- return spring

CUTAWAY REVEALS

the butterfly disc and shaft, the actuator diaphragm and spring and the solenoid pilot passages



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