

The Living Library

Medical devices that recognise themselves, guide the work, and compose any ward — not a catalog of parts, but a colleague that knows the fleet.

50

EQUIPMENT CLASSES

350

SUBCOMPONENTS

GMDN

UMDNS · ISO 15225

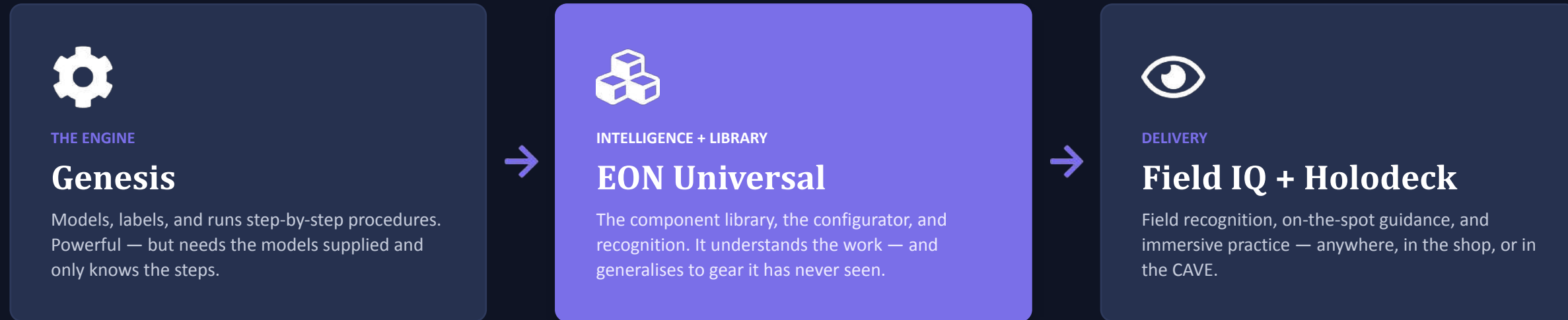
1st

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 Field IQ 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 device 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 devices 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.

	3D / 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 ten device families, seven Level-2 subcomponents each — mapped to GMDN / UMDNS (ISO 15225), the medical-device nomenclatures clinical engineers already use.

Infusion & Fluid Delivery

INF

5

Respiratory & Anesthesia

VEN ANE OXY PAP SUC

5

Patient Monitoring & Diagnostics

MON SPO NBP ECG CTG CAP EEG

7

Cardiac & Resuscitation

DEF AED TEL IAB

4

Diagnostic Imaging

IMG USG CT MRI MAM FLU

7

Renal & Dialysis

DIA RO PD

3

Surgical & OR

ESU TBL LGT MIC INS

5

Sterilization & Reprocessing

AUT WSH LTS USC

4

Laboratory & Analyzers

ANA CHM BGA CEN INC

5

Support & Facility Biomed

REF WRM NCS GAS EXL

5

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

~18

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 3D building blocks.

Subcomponents by family

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

INFUSION & FLUID DELIVERY · 5

Volumetric Infusion Pump

peristaltic pumping mechanism, door & tubing channel, air-in-line ultrasonic sensor, upstream/downstream pressure sensors, keypad & display, drop/flow sensor interface, battery & power board

Syringe Infusion Pump

syringe barrel clamp, plunger drive head & screw, leadscrew & stepper motor, syringe size sensor, force/occlusion sensor, control display & keypad, internal battery

Patient-Controlled Analgesia Pump

locked drug reservoir/cassette, peristaltic or syringe drive, patient demand bolus button, occlusion pressure sensor, air-in-line sensor, secured keypad & lock, event log memory & battery

Enteral Feeding Pump

rotary peristaltic rotor, feeding set cassette seat, flow/rotation sensor, occlusion detector, control display & keys, rechargeable battery, pole/clamp mount

Blood & Fluid Warmer

heating plate/element, disposable warming cassette channel, temperature sensors (RTD/thermistor), over-temperature cutoff, control board & display, air detector, mounting clamp

RESPIRATORY & ANESTHESIA · 5

ICU Mechanical Ventilator

inspiratory & expiratory valves, flow sensors, oxygen blender/mixer, internal turbine or gas inlets, breathing circuit & humidifier port, graphics display & UI, backup battery & power supply

Anesthesia Workstation

gas flowmeters, vaporizer, ventilator/bellows assembly, CO2 absorber canister, breathing circuit & valves, oxygen flush & APL valve, integrated patient monitor

Oxygen Concentrator

air compressor, zeolite sieve beds, solenoid switching valves, product oxygen tank/reservoir, intake & particulate filters, flow regulator & meter, control board

CPAP/BiPAP Therapy Device

blower/turbine, pressure & flow sensors, humidifier chamber, heated tubing connector, intake filter, control display board, SD card/data module

Medical Suction/Aspiration Pump

vacuum pump/motor, collection canister & lid, vacuum regulator, bacterial/overflow filter, vacuum gauge, tubing & connectors, power switch & cord

PATIENT MONITORING & DIAGNOSTICS · 7

Multiparameter Patient Monitor

ECG/parameter acquisition board, SpO2 module, NIBP pump & valve module, temperature input, color display & touchscreen, alarm/speaker board, network & battery module

Pulse Oximeter

finger/sensor probe, red & infrared LEDs, photodetector, signal processing board, display screen, control buttons, battery

Non-Invasive Blood Pressure Monitor

air pump/compressor, solenoid deflate valve, pressure transducer, inflatable cuff & hose, overpressure relief valve, control board & display, battery

Subcomponents by family

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

Electrocardiograph (ECG Machine)

patient lead cable & electrodes, signal acquisition front-end, isolation/protection circuit, display screen, thermal printer, keypad, battery & power supply

Fetal/Maternal Monitor (Cardiotocograph)

ultrasound Doppler transducer, toco (contraction) transducer, signal processing board, display screen, thermal printer, transducer belts & connectors, control panel

Capnograph (EtCO2 Monitor)

infrared CO2 sensor bench, sampling pump (sidestream), water trap/filter, airway adapter, display board, flow control, battery

Electroencephalograph (EEG Machine)

electrode headbox/amplifier, scalp electrodes & cap, isolation/input board, acquisition computer interface, display, photic stimulator, power supply

CARDIAC & RESUSCITATION · 4

Defibrillator/Monitor

high-voltage capacitor, charging circuit, paddles/therapy electrodes, ECG acquisition board, energy control & relay, display & controls, battery

Automated External Defibrillator

high-voltage capacitor, rhythm analysis processor, adhesive electrode pads, voice prompt/speaker, shock button & indicators, self-test board, long-life battery

Cardiac Telemetry Transmitter

ECG lead wires & electrodes, analog front-end amplifier, RF/wireless transmitter module, microcontroller, antenna, status LEDs, battery compartment

Intra-Aortic Balloon Pump

helium gas drive/compressor, balloon catheter interface, ECG/pressure trigger module, safety disk/solenoid valves, helium tank, display console, battery

DIAGNOSTIC IMAGING · 7

Diagnostic X-Ray Unit

X-ray tube, high-voltage generator, collimator, flat-panel detector, tube stand/column & table, control console, cooling system

Mobile/Portable X-Ray Unit

X-ray tube head, battery & capacitor bank, high-voltage generator, collimator, articulating arm/column, drive motor & wheels, control panel

Diagnostic Ultrasound Scanner

transducer probes, beamformer board, signal/image processing board, control panel & touchscreen, display monitor, power supply, cart & probe holders

Computed Tomography Scanner

X-ray tube, detector array, rotating gantry & slip rings, high-voltage generator, patient table, cooling system, reconstruction computer

Magnetic Resonance Imaging Scanner

superconducting magnet, gradient coils, RF transmit/receive coils, cryogen/cooling system, patient table, RF amplifier & spectrometer, gradient amplifiers

Mammography Unit

X-ray tube (molybdenum/tungsten), compression paddle, flat-panel detector, C-arm gantry, automatic exposure control, collimator, control console

Subcomponents by family

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

Mobile C-Arm Fluoroscopy Unit

X-ray tube, image intensifier or flat detector, C-arm yoke, high-voltage generator, monitor workstation cart, collimator, control panel

RENAL & DIALYSIS · 3

Hemodialysis Machine

blood pump (peristaltic), dialysate proportioning system, dialyzer holder, air detector & venous chamber, conductivity & temperature sensors, heparin pump, ultrafiltration control

Dialysis Water Treatment (RO) System

RO membrane modules, high-pressure feed pump, prefilters & carbon filters, conductivity/quality sensors, storage/distribution loop, control panel, reject/drain valves

Peritoneal Dialysis Cycler

fluid pump/cassette, heater plate for dialysate, load cells/weight scale, cassette manifold & valves, temperature sensors, control display, occlusion/air sensors

SURGICAL & OR · 5

Electrosurgical Generator (ESU)

RF power output board, cut/coag waveform generator, return electrode monitor, active & return electrode connectors, control panel & display, footswitch/handpiece ports, cooling fan & power supply

Surgical Operating Table

hydraulic lift column, articulating table sections, motor/pump assembly, control pendant, base & casters/floor lock, mattress pads, battery & charger

Surgical Light (Operating Lamp)

LED light array, reflector/optics, sterilizable center handle, articulating suspension arm, power supply/driver, intensity control, ceiling mount

Surgical Microscope

binocular eyepieces/optics, objective lens, zoom/magnification changer, coaxial light source, fiber-optic illumination, balanced suspension arm, foot control & motorized focus

Laparoscopic Insufflator

CO2 gas inlet & regulator, pressure transducer, flow control valve, gas heater (optional), display & controls, tubing/filter connector, safety overpressure valve

STERILIZATION & REPROCESSING · 4

Steam Sterilizer (Autoclave)

sterilization chamber, steam generator/jacket, door & gasket seal, vacuum pump, steam & drain valves, temperature/pressure sensors, control system

Washer-Disinfector

wash chamber & spray arms, circulation pump, heating element, detergent dosing pumps, door & gasket, temperature sensors, control board

Low-Temperature Sterilizer (H2O2/Plasma)

vacuum chamber, vacuum pump, H2O2 cassette/vaporizer, RF plasma electrode, pressure & H2O2 sensors, door & seal, control system

Ultrasonic Instrument Cleaner

stainless tank, ultrasonic transducers, ultrasonic generator, heating element, lid/cover, drain valve, timer/control panel

Subcomponents by family

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

LABORATORY & ANALYZERS · 5

Hematology Analyzer

sample aspiration probe, sample/reagent dispensing syringes, flow cell & detectors, aperture/impedance counting bath, reagent & waste lines, fluidic pumps & valves, control computer

Clinical Chemistry Analyzer

sample & reagent probes, reaction cuvette wheel/rotor, photometer/optics, incubator (37C) bath, ISE electrode module, syringe pumps & valves, mixing & wash stations

Blood Gas Analyzer

sensor cassette/electrodes, sample inlet port & pump, calibration gas/reagent packs, peristaltic pump & valves, thermal block, display & interface, waste container

Laboratory Centrifuge

rotor, drive motor, lid & latch interlock, imbalance sensor, speed/timer control board, chamber bowl, braking system

Laboratory/Microbiology Incubator

heating elements, temperature controller & sensor, insulated chamber, fan/air circulation, door & gasket, shelves, over-temperature safety cutoff

SUPPORT & FACILITY BIOMED · 5

Medical/Blood Bank Refrigerator

compressor & refrigerant circuit, evaporator & condenser coils, temperature controller & probe, circulation fan, glass door & gasket, temperature alarm & chart recorder, battery backup for alarm

Forced-Air Patient Warming Unit

blower/fan, heating element, air filter (HEPA), temperature sensors, hose/blanket connector, over-temperature cutoff, control board

Nurse Call System Station

patient call button/pillow speaker, room station module, corridor dome light, intercom/audio board, network controller, master/nurse console, power supply

Medical Gas Outlet/Zone Valve

gas-specific outlet/inlet, check valve, quick-connect coupler, zone shutoff valve, pressure gauge, alarm pressure switch, wall rough-in body

Examination/Procedure Light

LED light head, reflector/lens, flexible gooseneck or arm, intensity control, mounting base/clamp, LED driver, power cord & switch

From knowledge to a 3-D 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 volumetric_infusion_pump_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.

INF-01

Volumetric Infusion Pump

INFUSION & FLUID DELIVERY

Infusion & Fluid Delivery Class 1 of 50

WHAT IT IS

Pumps IV fluid at a set rate by squeezing the tubing; alarms on occlusion or air.

SUBCOMPONENTS · LEVEL 2

- peristaltic pumping mechanism
- air-in-line ultrasonic sensor
- keypad & display
- battery & power board
- door & tubing channel
- upstream/downstream pressure sensors
- drop/flow sensor interface

CUTAWAY REVEALS

the rotating peristaltic finger cams, the tubing pressure plate, the air and pressure sensor assemblies, the drive motor and the lithium battery pack



INF-02

Syringe Infusion Pump

INFUSION & FLUID DELIVERY

Infusion & Fluid Delivery Class 2 of 50

WHAT IT IS

Drives a syringe plunger at a precise low rate for small-volume drug delivery.

SUBCOMPONENTS · LEVEL 2

- syringe barrel clamp
- leadscrew & stepper motor
- force/occlusion sensor
- internal battery
- plunger drive head & screw
- syringe size sensor
- control display & keypad

CUTAWAY REVEALS

the leadscrew and stepper motor, the plunger force sensor, the clutch mechanism, the drive carriage and the control PCB



INF-03

Patient-Controlled Analgesia Pump

INFUSION & FLUID DELIVERY

Infusion & Fluid Delivery Class 3 of 50

WHAT IT IS

Lets patients self-dose analgesia within preset limits; logs every demand and lockout.

SUBCOMPONENTS · LEVEL 2

- locked drug reservoir/cassette
- patient demand bolus button
- air-in-line sensor
- event log memory & battery
- peristaltic or syringe drive
- occlusion pressure sensor
- secured keypad & lock

CUTAWAY REVEALS

the pumping mechanism, the locked cassette interface, the pressure and air sensors, the logging memory board and the battery



INF-04

Enteral Feeding Pump

INFUSION & FLUID DELIVERY

Infusion & Fluid Delivery Class 4 of 50

WHAT IT IS

Delivers liquid nutrition into the gut at a controlled rate through a feeding set.

SUBCOMPONENTS · LEVEL 2

- rotary peristaltic rotor
- flow/rotation sensor
- control display & keys
- pole/clamp mount
- feeding set cassette seat
- occlusion detector
- rechargeable battery

CUTAWAY REVEALS

the rotor and roller arms, the set-loading channel, the rotation sensor, the motor gearbox and the battery



INF-05

Blood & Fluid Warmer

INFUSION & FLUID DELIVERY

Infusion & Fluid Delivery Class 5 of 50

WHAT IT IS

Warms IV fluids or blood to body temperature inline to prevent hypothermia during infusion.

SUBCOMPONENTS · LEVEL 2

- heating plate/element
- temperature sensors (RTD/thermistor)
- control board & display
- mounting clamp
- disposable warming cassette channel
- over-temperature cutoff
- air detector

CUTAWAY REVEALS

the dual heating plates, the cassette flow path, the redundant temperature sensors, the safety thermal cutoff and the controller PCB



VEN-06

ICU Mechanical Ventilator

RESPIRATORY & ANESTHESIA

Respiratory & Anesthesia Class 6 of 50

WHAT IT IS

Delivers controlled pressurized breaths and monitors gas flow for critically ill patients.

SUBCOMPONENTS · LEVEL 2

- inspiratory & expiratory valves
- oxygen blender/mixer
- breathing circuit & humidifier port
- backup battery & power supply
- flow sensors
- internal turbine or gas inlets
- graphics display & UI

CUTAWAY REVEALS

the inspiratory and expiratory solenoid valves, the proportional flow valves, the oxygen blender, the flow sensors and the battery module



ANE-07

Anesthesia Workstation

RESPIRATORY & ANESTHESIA

Respiratory & Anesthesia Class 7 of 50

WHAT IT IS

Delivers metered anesthetic gas and oxygen and ventilates the patient during surgery.

SUBCOMPONENTS · LEVEL 2

- gas flowmeters
- ventilator/bellows assembly
- breathing circuit & valves
- integrated patient monitor
- vaporizer
- CO2 absorber canister
- oxygen flush & APL valve

CUTAWAY REVEALS

the vaporizer wicks, the flowmeter needle valves, the bellows and ventilator drive, the CO2 absorbent canister and the unidirectional check valves



OXY-08

Oxygen Concentrator

RESPIRATORY & ANESTHESIA

Respiratory & Anesthesia Class 8 of 50

WHAT IT IS

Concentrates oxygen from room air using molecular sieves and pressure-swing adsorption.

SUBCOMPONENTS · LEVEL 2

- air compressor
- zeolite sieve beds
- solenoid switching valves
- product oxygen tank/reservoir
- intake & particulate filters
- flow regulator & meter
- control board

CUTAWAY REVEALS

the twin zeolite sieve columns, the compressor, the solenoid valve manifold, the product tank and the cooling fan



PAP-09

CPAP/BiPAP Therapy Device

RESPIRATORY & ANESTHESIA

Respiratory & Anesthesia Class 9 of 50

WHAT IT IS

Delivers continuous or bilevel positive airway pressure to keep airways open during sleep.

SUBCOMPONENTS · LEVEL 2

- blower/turbine
- humidifier chamber
- intake filter
- SD card/data module
- pressure & flow sensors
- heated tubing connector
- control display board

CUTAWAY REVEALS

the centrifugal blower turbine, the pressure transducer, the humidifier heater plate, the flow sensor and the control PCB



SUC-10

Medical Suction/Aspiration Pump

RESPIRATORY & ANESTHESIA

Respiratory & Anesthesia Class 10 of 50

WHAT IT IS

Generates vacuum to remove fluids, secretions, or blood from a patient's airway or wound.

SUBCOMPONENTS · LEVEL 2

- vacuum pump/motor
- collection canister & lid
- vacuum regulator
- bacterial/overflow filter
- vacuum gauge
- tubing & connectors
- power switch & cord

CUTAWAY REVEALS

the diaphragm vacuum pump, the motor, the overflow float shutoff, the regulator valve and the hydrophobic filter



WHAT IT IS

Continuously displays vital signs like ECG, SpO₂, NIBP, and temperature at the bedside.

SUBCOMPONENTS · LEVEL 2

- ECG/parameter acquisition board
- SpO₂ module
- NIBP pump & valve module
- temperature input
- color display & touchscreen
- alarm/speaker board
- network & battery module

CUTAWAY REVEALS

the parameter acquisition boards, the NIBP pump and solenoid valves, the SpO₂ module, the main CPU board and the lithium battery



SPO-12

Pulse Oximeter

PATIENT MONITORING & DIAGNOSTICS

Patient Monitoring & Diagnostics Class 12 of 50

WHAT IT IS

Measures blood oxygen saturation and pulse rate using red and infrared light through tissue.

SUBCOMPONENTS · LEVEL 2

- finger/sensor probe
- photodetector
- display screen
- battery
- red & infrared LEDs
- signal processing board
- control buttons

CUTAWAY REVEALS

the LED emitter and photodiode in the probe, the analog front-end, the signal processor and the battery cells



NBP-13

Non-Invasive Blood Pressure Monitor

PATIENT MONITORING & DIAGNOSTICS

Patient Monitoring & Diagnostics Class 13 of 50

WHAT IT IS

Inflates a cuff and reads pressure oscillations to measure blood pressure automatically.

SUBCOMPONENTS · LEVEL 2

- air pump/compressor
- pressure transducer
- overpressure relief valve
- battery
- solenoid deflate valve
- inflatable cuff & hose
- control board & display

CUTAWAY REVEALS

the air pump, the bleed solenoid valve, the pressure sensor, the overpressure relief and the controller PCB



WHAT IT IS

Records the heart's electrical activity through skin electrodes and prints a 12-lead tracing.

SUBCOMPONENTS · LEVEL 2

- patient lead cable & electrodes
- signal acquisition front-end
- isolation/protection circuit
- display screen
- thermal printer
- keypad
- battery & power supply

CUTAWAY REVEALS

the isolated analog front-end amplifiers, the thermal print head and roller, the acquisition board, the CPU and the battery



CTG-15

Fetal/Maternal Monitor (Cardiotocograph)

PATIENT MONITORING & DIAGNOSTICS

Patient Monitoring & Diagnostics Class 15 of 50

WHAT IT IS

Tracks fetal heart rate and uterine contractions during labor using Doppler and pressure transducers.

SUBCOMPONENTS · LEVEL 2

- ultrasound Doppler transducer
- signal processing board
- thermal printer
- control panel
- toco (contraction) transducer
- display screen
- transducer belts & connectors

CUTAWAY REVEALS

the Doppler ultrasound crystals, the strain-gauge toco sensor, the signal boards, the printer mechanism and the main controller



WHAT IT IS

Measures exhaled carbon dioxide concentration to confirm ventilation and airway placement.

SUBCOMPONENTS · LEVEL 2

- infrared CO₂ sensor bench
- water trap/filter
- display board
- battery
- sampling pump (sidestream)
- airway adapter
- flow control

CUTAWAY REVEALS

the infrared optical bench and detector, the sampling pump, the water trap chamber, the flow sensor and the control board



EEG-17

Electroencephalograph (EEG Machine)

PATIENT MONITORING & DIAGNOSTICS

Patient Monitoring & Diagnostics Class 17 of 50

WHAT IT IS

Records the brain's electrical signals through scalp electrodes for neurological assessment.

SUBCOMPONENTS · LEVEL 2

- electrode headbox/amplifier
- scalp electrodes & cap
- isolation/input board
- acquisition computer interface
- display
- photic stimulator
- power supply

CUTAWAY REVEALS

the high-impedance differential amplifiers, the isolation barrier, the analog-to-digital converter, the multiplexer and the power board



DEF-18

Defibrillator/Monitor

CARDIAC & RESUSCITATION

Cardiac & Resuscitation Class 18 of 50

WHAT IT IS

Delivers a measured electrical shock to restore normal heart rhythm and monitors ECG.

SUBCOMPONENTS · LEVEL 2

- high-voltage capacitor
- charging circuit
- paddles/therapy electrodes
- ECG acquisition board
- energy control & relay
- display & controls
- battery

CUTAWAY REVEALS

the energy-storage capacitor, the high-voltage charging transformer, the discharge relay, the ECG front-end and the battery pack



WHAT IT IS

Analyzes heart rhythm and guides a lay rescuer to deliver a shock if needed.

SUBCOMPONENTS · LEVEL 2

- high-voltage capacitor
- adhesive electrode pads
- shock button & indicators
- long-life battery
- rhythm analysis processor
- voice prompt/speaker
- self-test board

CUTAWAY REVEALS

the energy capacitor, the analysis and charging boards, the relay, the speaker and the lithium battery



TEL-20

Cardiac Telemetry Transmitter

CARDIAC & RESUSCITATION

Cardiac & Resuscitation Class 20 of 50

WHAT IT IS

Wirelessly transmits a patient's ECG to a central monitoring station for ambulatory cardiac surveillance.

SUBCOMPONENTS · LEVEL 2

- ECG lead wires & electrodes
- analog front-end amplifier
- RF/wireless transmitter module
- microcontroller
- antenna
- status LEDs
- battery compartment

CUTAWAY REVEALS

the ECG amplifier front-end, the microcontroller, the RF transmitter module, the antenna and the AA batteries



WHAT IT IS

Inflates a balloon in the aorta in sync with the heartbeat to boost coronary perfusion.

SUBCOMPONENTS · LEVEL 2

- helium gas drive/compressor
- ECG/pressure trigger module
- helium tank
- battery
- balloon catheter interface
- safety disk/solenoid valves
- display console

CUTAWAY REVEALS

the helium pneumatic drive, the safety solenoid valves, the gas reservoir, the trigger electronics and the battery bank



IMG-22

Diagnostic X-Ray Unit

DIAGNOSTIC IMAGING

Diagnostic Imaging Class 22 of 50

WHAT IT IS

Produces X-rays to image bones and tissues onto a detector for radiographic diagnosis.

SUBCOMPONENTS · LEVEL 2

- X-ray tube
- high-voltage generator
- collimator
- flat-panel detector
- tube stand/column & table
- control console
- cooling system

CUTAWAY REVEALS

the rotating anode X-ray tube, the high-voltage transformer in oil, the collimator blades, the detector electronics and the cooling oil pump



WHAT IT IS

A wheeled X-ray machine brought to the bedside for imaging non-transportable patients.

SUBCOMPONENTS · LEVEL 2

- X-ray tube head
- high-voltage generator
- articulating arm/column
- control panel
- battery & capacitor bank
- collimator
- drive motor & wheels

CUTAWAY REVEALS

the X-ray tube, the high-frequency generator, the storage capacitors, the battery pack and the drive motor



USG-24

Diagnostic Ultrasound Scanner

DIAGNOSTIC IMAGING

Diagnostic Imaging Class 24 of 50

WHAT IT IS

Uses high-frequency sound from a transducer to form real-time images of internal organs.

SUBCOMPONENTS · LEVEL 2

- transducer probes
- beamformer board
- signal/image processing board
- control panel & touchscreen
- display monitor
- power supply
- cart & probe holders

CUTAWAY REVEALS

the piezoelectric crystal array in the probe, the beamformer, the digital signal processing boards, the power supply and the cooling fans



CT-25

Computed Tomography Scanner

DIAGNOSTIC IMAGING

Diagnostic Imaging Class 25 of 50

WHAT IT IS

Rotates an X-ray tube and detectors around the patient to build cross-sectional images.

SUBCOMPONENTS · LEVEL 2

- X-ray tube
- rotating gantry & slip rings
- patient table
- reconstruction computer
- detector array
- high-voltage generator
- cooling system

CUTAWAY REVEALS

the rotating frame carrying the X-ray tube and curved detector array, the slip rings, the generator, the drive belt and the cooling units



WHAT IT IS

Uses a strong magnet and RF pulses to image soft tissue without ionizing radiation.

SUBCOMPONENTS · LEVEL 2

- superconducting magnet
- RF transmit/receive coils
- patient table
- gradient amplifiers
- gradient coils
- cryogen/cooling system
- RF amplifier & spectrometer

CUTAWAY REVEALS

the superconducting magnet windings in liquid helium, the gradient coil layers, the RF body coil, the cryostat and the cold head



MAM-27

Mammography Unit

DIAGNOSTIC IMAGING

Diagnostic Imaging Class 27 of 50

WHAT IT IS

Takes low-dose compressed-breast X-rays to screen for and diagnose breast cancer.

SUBCOMPONENTS · LEVEL 2

- X-ray tube (molybdenum/tungsten)
- flat-panel detector
- automatic exposure control
- control console
- compression paddle
- C-arm gantry
- collimator

CUTAWAY REVEALS

the mammography X-ray tube, the detector electronics, the compression drive motor, the AEC sensor and the gantry rotation mechanism



FLU-28

Mobile C-Arm Fluoroscopy Unit

DIAGNOSTIC IMAGING

Diagnostic Imaging Class 28 of 50

WHAT IT IS

Provides live X-ray imaging during surgery using a C-shaped tube-and-detector arm.

SUBCOMPONENTS · LEVEL 2

- X-ray tube
- image intensifier or flat detector
- C-arm yoke
- high-voltage generator
- monitor workstation cart
- collimator
- control panel

CUTAWAY REVEALS

the X-ray tube, the image intensifier tube and camera, the generator, the C-arm orbital bearings and the drive electronics



WHAT IT IS

Filters waste and excess fluid from blood through a dialyzer for patients with kidney failure.

SUBCOMPONENTS · LEVEL 2

- blood pump (peristaltic)
- dialyzer holder
- conductivity & temperature sensors
- ultrafiltration control
- dialysate proportioning system
- air detector & venous chamber
- heparin pump

CUTAWAY REVEALS

the roller blood pump, the dialysate mixing and heating chamber, the conductivity cells, the ultrafiltration pumps and the air-detector chamber



RO-30

Dialysis Water Treatment (RO) System

RENAL & DIALYSIS

Renal & Dialysis Class 30 of 50

WHAT IT IS

Purifies feed water by reverse osmosis to make safe dialysate water for dialysis.

SUBCOMPONENTS · LEVEL 2

- RO membrane modules
- high-pressure feed pump
- prefilters & carbon filters
- conductivity/quality sensors
- storage/distribution loop
- control panel
- reject/drain valves

CUTAWAY REVEALS

the spiral-wound RO membranes, the high-pressure pump, the carbon and sediment filter cartridges, the conductivity probes and the valves



PD-31

Peritoneal Dialysis Cycler

RENAL & DIALYSIS

Renal & Dialysis Class 31 of 50

WHAT IT IS

Automatically fills and drains dialysate from the abdomen overnight for peritoneal dialysis.

SUBCOMPONENTS · LEVEL 2

- fluid pump/cassette
- heater plate for dialysate
- load cells/weigh scale
- cassette manifold & valves
- temperature sensors
- control display
- occlusion/air sensors

CUTAWAY REVEALS

the pneumatic or pump cassette, the heater plate, the weigh scale load cells, the valve manifold and the controller board



ESU-32

Electrosurgical Generator (ESU)

SURGICAL & OR

Surgical & OR Class 32 of 50

WHAT IT IS

Delivers radiofrequency current to cut and coagulate tissue during surgery.

SUBCOMPONENTS · LEVEL 2

- RF power output board
- return electrode monitor
- control panel & display
- cooling fan & power supply
- cut/coag waveform generator
- active & return electrode connectors
- footswitch/handpiece ports

CUTAWAY REVEALS

the RF power amplifier, the high-frequency transformer, the return-electrode monitoring circuit, the waveform generator and the cooling fan



TBL-33

Surgical Operating Table

SURGICAL & OR

Surgical & OR Class 33 of 50

WHAT IT IS

Positions and supports the patient with motorized tilt and articulation for surgery.

SUBCOMPONENTS · LEVEL 2

- hydraulic lift column
- motor/pump assembly
- base & casters/floor lock
- battery & charger
- articulating table sections
- control pendant
- mattress pads

CUTAWAY REVEALS

the hydraulic cylinder, the electric pump and motors, the articulation linkages, the control electronics and the battery



LGT-34

Surgical Light (Operating Lamp)

SURGICAL & OR

Surgical & OR Class 34 of 50

WHAT IT IS

Provides shadow-free, color-correct illumination of the surgical field.

SUBCOMPONENTS · LEVEL 2

- LED light array
- sterilizable center handle
- power supply/driver
- ceiling mount
- reflector/optics
- articulating suspension arm
- intensity control

CUTAWAY REVEALS

the LED modules and lenses, the reflector segments, the LED driver board, the handle sterilization contacts and the arm pivot bearings



MIC-35

Surgical Microscope

SURGICAL & OR

Surgical & OR Class 35 of 50

WHAT IT IS

Magnifies and illuminates the operative field for delicate microsurgery.

SUBCOMPONENTS · LEVEL 2

- binocular eyepieces/optics
- zoom/magnification changer
- fiber-optic illumination
- foot control & motorized focus
- objective lens
- coaxial light source
- balanced suspension arm

CUTAWAY REVEALS

the objective and zoom lens groups, the beam-splitter prisms, the illumination fiber bundle, the focus motor and the counterbalance springs



INS-36

Laparoscopic Insufflator

SURGICAL & OR

Surgical & OR Class 36 of 50

WHAT IT IS

Delivers and regulates CO2 gas to inflate the abdomen for minimally invasive surgery.

SUBCOMPONENTS · LEVEL 2

- CO2 gas inlet & regulator
- flow control valve
- display & controls
- safety overpressure valve
- pressure transducer
- gas heater (optional)
- tubing/filter connector

CUTAWAY REVEALS

the pressure regulator, the proportional flow valve, the pressure sensors, the overpressure relief and the control board



AUT-37

Steam Sterilizer (Autoclave)

STERILIZATION & REPROCESSING

Sterilization & Reprocessing Class 37 of 50

WHAT IT IS

Sterilizes instruments with pressurized saturated steam at high temperature.

SUBCOMPONENTS · LEVEL 2

- sterilization chamber
- door & gasket seal
- steam & drain valves
- control system
- steam generator/jacket
- vacuum pump
- temperature/pressure sensors

CUTAWAY REVEALS

the jacketed sterilization chamber, the steam generator, the door gasket, the vacuum pump and the valve manifold with sensors



WSH-38

Washer-Disinfector

STERILIZATION & REPROCESSING

Sterilization & Reprocessing Class 38 of 50

WHAT IT IS

Automatically cleans and thermally disinfects surgical instruments before sterilization.

SUBCOMPONENTS · LEVEL 2

- wash chamber & spray arms
- heating element
- door & gasket
- control board
- circulation pump
- detergent dosing pumps
- temperature sensors

CUTAWAY REVEALS

the rotating spray arms, the circulation pump, the heating element, the dosing pumps and the chamber temperature probes



LTS-39

Low-Temperature Sterilizer (H2O2/Plasma)

STERILIZATION & REPROCESSING

Sterilization & Reprocessing Class 39 of 50

WHAT IT IS

Sterilizes heat-sensitive instruments using vaporized hydrogen peroxide and plasma.

SUBCOMPONENTS · LEVEL 2

- vacuum chamber
- H2O2 cassette/vaporizer
- pressure & H2O2 sensors
- control system
- vacuum pump
- RF plasma electrode
- door & seal

CUTAWAY REVEALS

the vacuum chamber, the hydrogen peroxide vaporizer, the RF plasma electrode, the vacuum pump and the sensor array



USC-40

Ultrasonic Instrument Cleaner

STERILIZATION & REPROCESSING

Sterilization & Reprocessing Class 40 of 50

WHAT IT IS

Removes debris from instruments using high-frequency ultrasonic cavitation in a fluid bath.

SUBCOMPONENTS · LEVEL 2

- stainless tank
- ultrasonic transducers
- ultrasonic generator
- heating element
- lid/cover
- drain valve
- timer/control panel

CUTAWAY REVEALS

the bonded ultrasonic transducers under the tank, the ultrasonic generator, the heating element, the drain valve and the control board



ANA-41

Hematology Analyzer

LABORATORY & ANALYZERS

Laboratory & Analyzers Class 41 of 50

WHAT IT IS

Automatically counts and classifies blood cells from patient samples for a complete blood count.

SUBCOMPONENTS · LEVEL 2

- sample aspiration probe
- sample/reagent dispensing syringes
- flow cell & detectors
- aperture/impedance counting bath
- reagent & waste lines
- fluidic pumps & valves
- control computer

CUTAWAY REVEALS

the aspiration probe and syringes, the flow cell with optical and impedance detectors, the counting apertures, the pumps and the valve manifold



CHM-42

Clinical Chemistry Analyzer

LABORATORY & ANALYZERS

Laboratory & Analyzers Class 42 of 50

WHAT IT IS

Measures chemical constituents in blood or serum via photometric and ion-selective methods.

SUBCOMPONENTS · LEVEL 2

- sample & reagent probes
- photometer/optics
- ISE electrode module
- mixing & wash stations
- reaction cuvette wheel/rotor
- incubator (37C) bath
- syringe pumps & valves

CUTAWAY REVEALS

the rotating reaction cuvette ring, the photometer lamp and detectors, the heated incubation bath, the ISE module and the probe drive arms



BGA-43

Blood Gas Analyzer

LABORATORY & ANALYZERS

Laboratory & Analyzers Class 43 of 50

WHAT IT IS

Measures blood pH, oxygen, carbon dioxide, and electrolytes from a small sample.

SUBCOMPONENTS · LEVEL 2

- sensor cassette/electrodes
- calibration gas/reagent packs
- thermal block
- waste container
- sample inlet port & pump
- peristaltic pump & valves
- display & interface

CUTAWAY REVEALS

the electrochemical sensor cassette, the thermostatted measurement block, the peristaltic pump, the valves and the calibration reagent packs



CEN-44

Laboratory Centrifuge

LABORATORY & ANALYZERS

Laboratory & Analyzers Class 44 of 50

WHAT IT IS

Spins blood tubes at high speed to separate plasma, serum, and cells by density.

SUBCOMPONENTS · LEVEL 2

- rotor
- lid & latch interlock
- speed/timer control board
- braking system
- drive motor
- imbalance sensor
- chamber bowl

CUTAWAY REVEALS

the rotor and tube buckets, the brushless drive motor, the lid interlock, the imbalance detector and the control board



INC-45

Laboratory/Microbiology Incubator

LABORATORY & ANALYZERS

Laboratory & Analyzers Class 45 of 50

WHAT IT IS

Maintains a controlled warm temperature to culture microorganisms or cells.

SUBCOMPONENTS · LEVEL 2

- heating elements
- temperature controller & sensor
- insulated chamber
- fan/air circulation
- door & gasket
- shelves
- over-temperature safety cutoff

CUTAWAY REVEALS

the chamber heating elements, the circulation fan, the temperature probe, the insulation layer and the controller board



REF-46

Medical/Blood Bank Refrigerator

SUPPORT & FACILITY BIOMED

Support & Facility Biomed Class 46 of 50

WHAT IT IS

Stores blood, vaccines, or medications at a tightly controlled cold temperature with alarms.

SUBCOMPONENTS · LEVEL 2

- compressor & refrigerant circuit
- evaporator & condenser coils
- temperature controller & probe
- circulation fan
- glass door & gasket
- temperature alarm & chart recorder
- battery backup for alarm

CUTAWAY REVEALS

the compressor, the evaporator and condenser coils, the circulation fan, the temperature probe and the alarm controller



WRM-47

Forced-Air Patient Warming Unit

SUPPORT & FACILITY BIOMED

Support & Facility Biomed Class 47 of 50

WHAT IT IS

Blows filtered warm air into a disposable blanket to keep patients normothermic.

SUBCOMPONENTS · LEVEL 2

- blower/fan
- air filter (HEPA)
- hose/blanket connector
- control board
- heating element
- temperature sensors
- over-temperature cutoff

CUTAWAY REVEALS

the blower fan, the heating element, the HEPA filter, the temperature sensors and the safety cutoff



NCS-48

Nurse Call System Station

SUPPORT & FACILITY BIOMED

Support & Facility Biomed Class 48 of 50

WHAT IT IS

Lets patients summon staff and routes calls and intercom between rooms and the nurse station.

SUBCOMPONENTS · LEVEL 2

- patient call button/pillow speaker
- room station module
- corridor dome light
- intercom/audio board
- network controller
- master/nurse console
- power supply

CUTAWAY REVEALS

the audio intercom board, the call logic module, the network interface, the dome-light driver and the power supply



GAS-49

Medical Gas Outlet/Zone Valve

SUPPORT & FACILITY BIOMED

Support & Facility Biomed Class 49 of 50

WHAT IT IS

Supplies and isolates piped medical gases like oxygen and vacuum at the point of use.

SUBCOMPONENTS · LEVEL 2

- gas-specific outlet/inlet
- quick-connect coupler
- pressure gauge
- wall rough-in body
- check valve
- zone shutoff valve
- alarm pressure switch

CUTAWAY REVEALS

the gas-specific indexed body, the spring check valve, the primary/secondary seals, the zone ball valve and the pressure switch



EXL-50

Examination/Procedure Light

SUPPORT & FACILITY BIOMED

Support & Facility Biomed Class 50 of 50

WHAT IT IS

Provides focused bright light for patient examination and minor procedures.

SUBCOMPONENTS · LEVEL 2

- LED light head
- flexible gooseneck or arm
- mounting base/clamp
- power cord & switch
- reflector/lens
- intensity control
- LED driver

CUTAWAY REVEALS

the LED array and lens, the reflector, the driver board, the gooseneck flex joints and the wiring channel



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