Marine and Oil Well Parts Manufacturing

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- Valve Components
- Flanges & Pipe Fittings
- Subsea Connectors
- Drilling Tools
- Subsea Sensor Housings
- Drilling Fluid Nozzles
- Turbine Blades
- Pipeline Flanges
- Navigation & Positioning Systems
- Bearing Seats
- Pump Housings & Valves
- Pressure-Resistant Cabin Assemblies

Advantages of choosing Jupaicnc for Oilfield and Marine components

Jupaicnc passed ISO9001, Marine oil field machining components rely on five-axis linkage ultra-precision machining technology, combined with Inconel/Ti-6Al-4V and other special alloy materials, the precision of key components up to ±0.005mm, nano-coating and deep nitriding treatment, corrosion resistance increased by 60%, Can withstand 1000℃ high temperature and 180MPa high pressure environment. JUPAI extends component life up to 120,000 hours through four-stage gas seal testing and stress/temperature/wear/vibration suppression technology.

JupaiCNC provides technology support for the Oilfield and Marine industries

Reliability in extreme working conditions

Using Inconel718 and other corrosion resistant alloys and five-axis linkage processing technology, the precision of key components is up to ±0.005mm45, and the giant has passed ISO 9001

Environmental adaptation

Oilfield equipment: Modular structure compatible with API 6A standards, three-dimensional detection of full size

Increase full cycle efficiency

Cutting parameters are optimized through edge computing, material utilization is increased by 25%, and delivery time is reduced by 40% compared with traditional processes。

Common materials and properties of offshore oil well equipment parts

1

Titanium alloy Ti-6Al-4V

Lightweight (density 4.5g/cm³), tensile strength ≥900MPa, Cl^- ion corrosion resistance, suitable for drilling pipe, pump valve and other high-pressure components, fatigue life is 3 times higher than steel

2

Inconel718 nickel-based alloy

High temperature (200℃) and high pressure (80MPa), sulfide stress cracking resistance, five-axis processing accuracy of ±0.005mm, for deep well valve sets and LNG ship cryogenic pump body.

3

254SMO Super austenitic stainless steel

PREN value ≥43 (Cr+3.3Mo+16N), resistance to pitting corrosion and seawater uniform corrosion, yield strength ≥550MPa, suitable for high-pressure pipelines and tree sealing parts

4

Marine Zinc 10036 bolt alloy

Surface galvanized treatment, salt spray life of more than 3000 hours, tensile strength ≥1000MPa, suitable for API standard anchor chain and deep sea mooring system fasteners

5

Fluorine rubber (FKM)

Sea water corrosion resistance and −20~200℃ temperature difference, tensile strength ≥15MPa, used for underwater tree seal ring, can withstand 1500 meters deep sea pressure

6

EH690 high strength ship plate steel

Yield strength 690MPa, Marine salt spray corrosion resistance, elongation ≥14%, suitable for drilling platform structural parts, submarine pipelines, impact toughness KV2≥31J

JUPAICNC processes surface treatment of Marine oil well parts

Nanometer AlCrN coating

Hardness HV2200, salt spray life of more than 5000 hours, for valve stem, pump shaft, friction coefficient reduced by 40%.

Laser cladding WC-Co

Repair sealing surface, the coating compressive strength of 1.5GPa, withstand 80MPa high pressure fluid impact。

Electrochemical polishing

316L stainless steel surface roughness Ra≤0.2μm, eliminate CNC tool marks, flow resistance reduced by 18%.

Low temperature ion sulfurizing

5-8μm vulcanization layer is generated on the surface, friction coefficient ≤0.03, suitable for gear meshing surface, wear rate decreased by 70%.

Micro arc oxidation

50μm ceramic film is formed on the surface of aluminum alloy, breakdown voltage > 3000V, Cl^- corrosion resistance, suitable for sensor shell.

JUPAICNC is a processing part type for the offshore oil well industry

Tree sealing flange : 316L stainless steel, laser cladding WC-Co coating to improve the compressive strength of the sealing surface

Deep sea manifold connector : titanium alloy Ti-6Al-4V, salt spray life of more than 5000 hours

Hydraulic control block : 40CrNiMoA alloy steel, nano AlCrN coating reduces friction coefficient by 40%

Guide base bushing : surface micro arc oxidation treatment to form 50μm ceramic layer

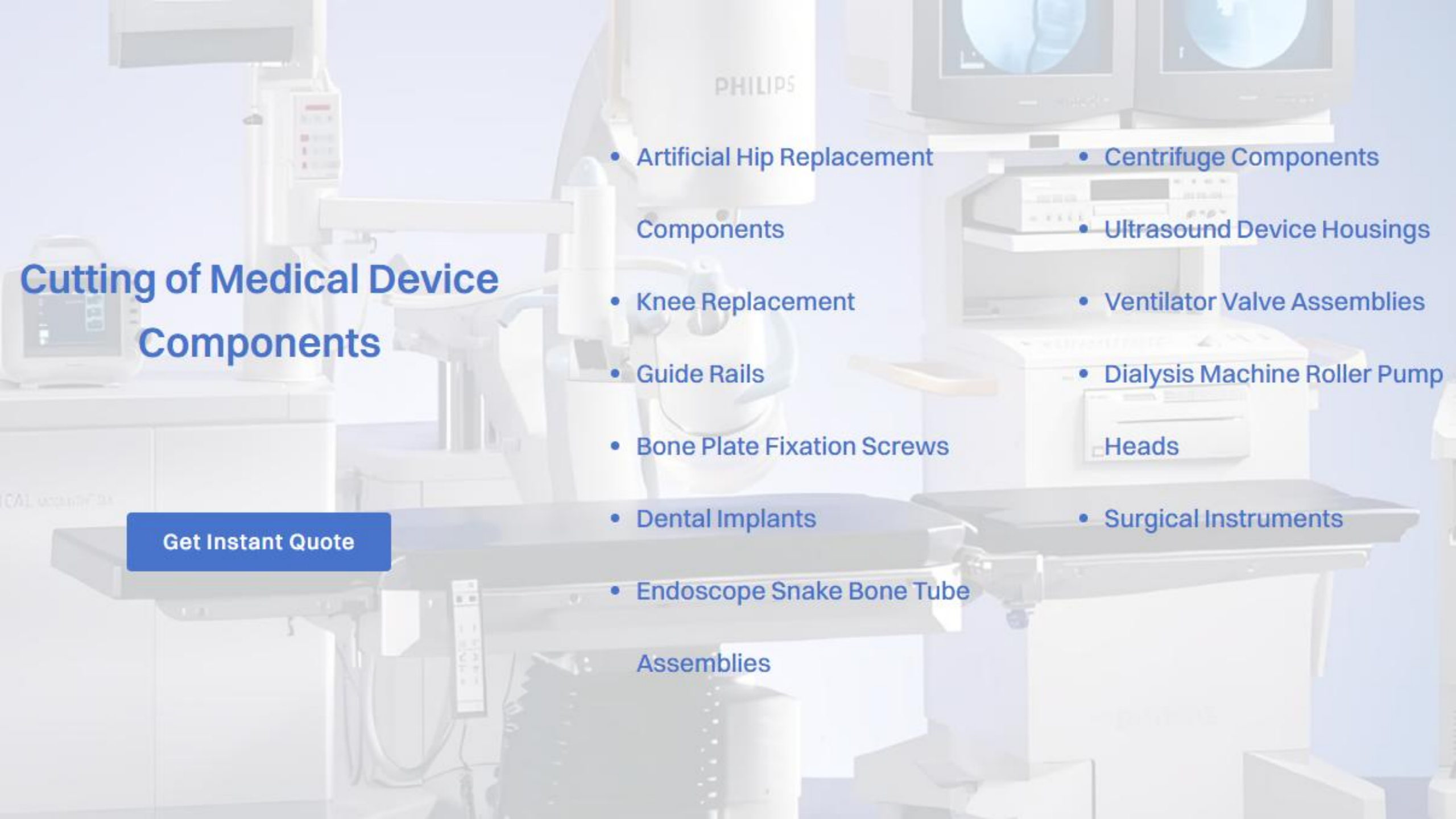
Anchor chain connection pin : 42CrMo4 high strength steel, deep nitriding treatment to make the surface hardness ≥HRC60

LNG cryogenic pump shaft : Monel K500 nickel-copper alloy, low temperature ion sulfide technology to achieve friction coefficient ≤0.03

Submarine sensor shell : 6061-T6 aluminum alloy, electrochemical polishing roughness Ra≤0.2μm

Pressure balance piston : 17-4PH precipitation hardened steel, composite nickel plating to improve seawater erosion resistance

Underwater robot joint : TC4 titanium alloy, five-axis machining multi-degree of freedom surface, repeated positioning accuracy 0.005mm



Cutting of Medical Device Components

- Artificial Hip Replacement Components
- Knee Replacement
- Guide Rails
- Bone Plate Fixation Screws
- Dental Implants
- Endoscope Snake Bone Tube Assemblies
- Centrifuge Components
- Ultrasound Device Housings
- Ventilator Valve Assemblies
- Dialysis Machine Roller Pump Heads
- Surgical Instruments

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Advantages of choosing JupaiCNC for Medical components

Through ISO 9001 and ISO 13485 certification, relying on five-axis ultra-precision machining technology, combined with medical grade titanium alloy (Ti-6Al-4V ELI), cobalt-chromium alloy and biocompatible materials such as PEEK, the processing accuracy of key implants is up to ±0.005mm, and through nano-level electrolytic polishing and passivation treatment. Surface roughness Ra≤0.1μm, body fluid corrosion resistance increased by 70%, suitable for long-term human implantation environment (temperature resistance -80℃ to 300℃). Through the ISO 10993 biocompatibility test and four-level gas seal verification, stress optimization and microdefect control technology make the component life of more than 15 years, the defect rate < 0.005%.

JupaiCNC provides technology support for Medical

5 axis linkage precision machining

Five-axis CNC technology is used to realize the machining of complex three-dimensional structures such as artificial joints and dental implants. The tolerance control is ±0.005mm27, meeting ASTM F136/F1472 standard 38.

Specialized technology of biological materials

Suitable for medical materials such as titanium alloy (Ti-6Al-4V ELI), cobalt-chromium alloy and PEEK, electrolytic polishing to achieve Ra≤0.1μm ultra-clean surface, biocompatibility in line with ISO 1099368.

The whole process sterilization traceability

Through high pressure steam sterilization and four-level gas seal verification, with laser marking to achieve lifetime traceability of production parameters, in accordance with FDA 21 CFR Part 11 specification 6

Common materials and properties of Medical equipment parts

1

Stainless steel

Martensitic stainless steel (such as 4Cr13) : high hardness, used for surgical scissors, bone forceps and other cutting instruments

2

Polyvinyl chloride (PVC)

Rigid/flexible optional, anti-microbial, used in blood bags, dialysis lines .

3

Polycarbonate (PC)

High transparency, impact resistance, support high temperature sterilization, suitable for transparent instrument housing and observation window

4

Polyether ether ketone (PEEK)

High temperature resistance (250℃), excellent biocompatibility, used for orthopedic implants and cardiovascular stents and other high-end devices

5

ABS plastics

Impact resistant, easy to process, used for equipment shell; Glass fiber reinforced for increased mechanical strength

6

Titanium alloy (e.g. Ti-6Al-4V)

Excellent biocompatibility, corrosion resistance, high strength and low density, widely used in orthopedic implants (artificial joints, spinal screws) and cardiovascular stents

JupaiCNC provides surface treatments for Medical device parts

Anodizing

Titanium alloy surface oxide film (such as heart pacemaker shell), improve corrosion resistance and biocompatibility .

Mechanical/electrolytic polishing

Eliminate burrs and micro-cracks, electrolytic polishing can reduce surface roughness to Ra 0.03μm, reduce the risk of bacterial growth (bone nails, surgical forceps commonly used)

Plasma treatment

To enhance the surface activity and adhesion of materials, suitable for polymer devices (e.g. dialysis lines)

Ultrasonic cleaning

Combined with high temperature sterilization ensures sterility of complex structural instruments such as endoscopes

Degreasing treatment

Remove grease and organic pollutants, improve coating adhesion (a key step in syringe and catheter preparation)

JupaiCNC processes parts types for the Medical

Surgical blade (stainless steel/ceramic) - High hardness cutting edge

Joint prosthesis (titanium alloy/cobalt-chromium alloy) -- orthopedic weight-bearing implant

Bone screw (titanium alloy) - Internal fixation of fracture

Cardiovascular stent (Nitinol /316L stainless steel) -- vascular support to prevent stenosis

Endoscopic tube (stainless steel/polymer coated) - Minimally invasive exploration channel

Hemostatic forceps (martensitic stainless steel) -- Intraoperative vascular clamp

Bone plate (titanium alloy) - External fixation at fracture site

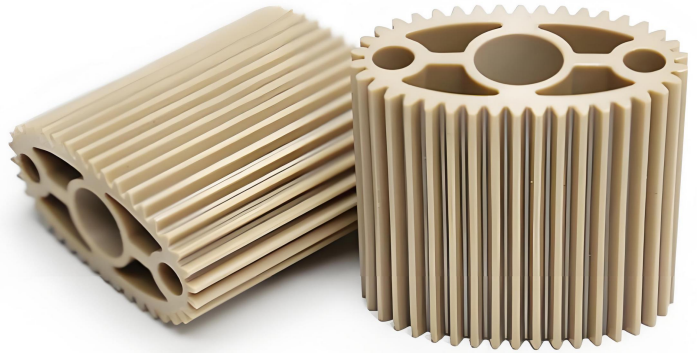
Pacemaker housing (titanium alloy/bioceramic) - Sealing protection for electronic components

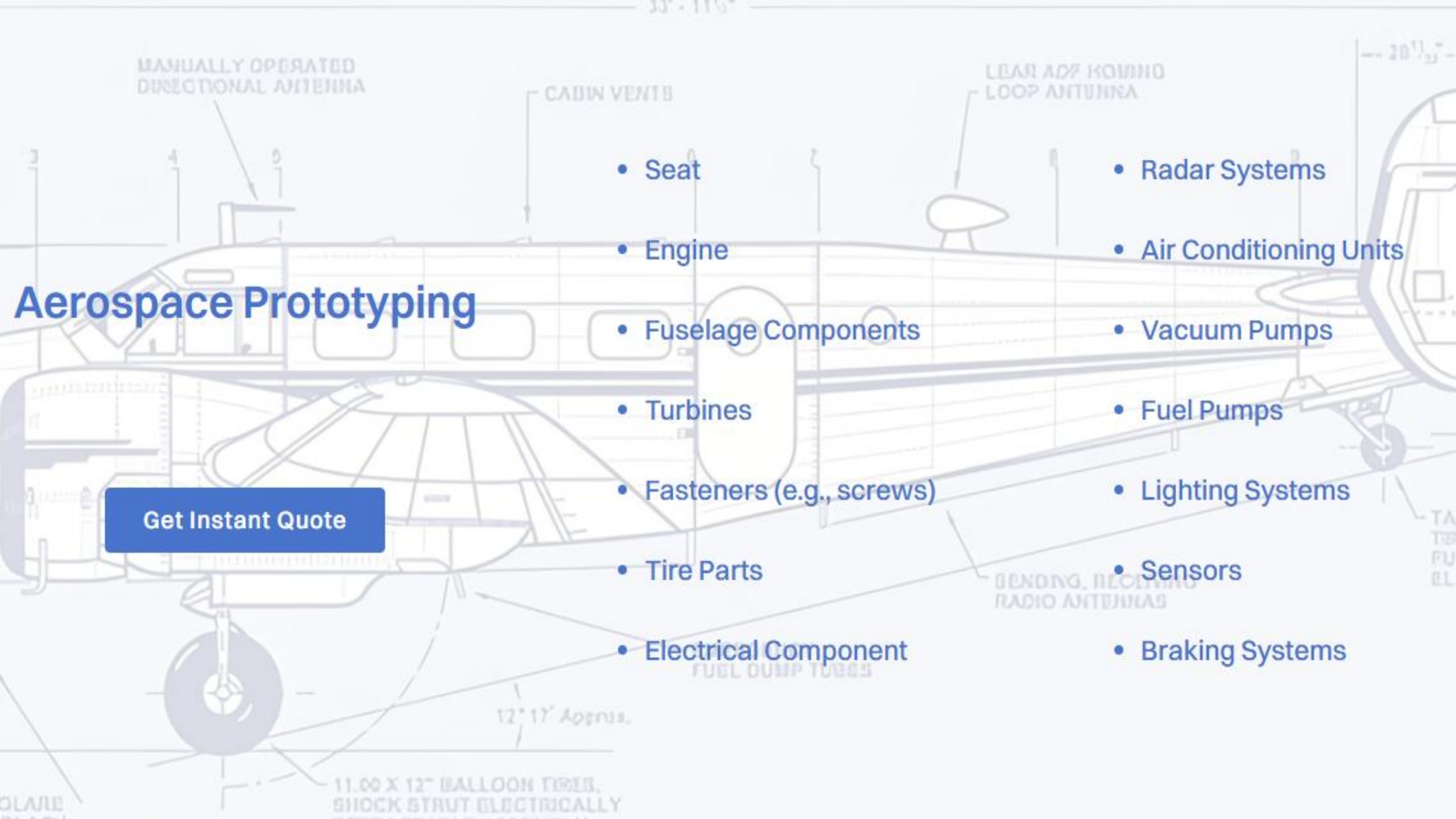
Conduit connector (PEEK/ medical grade plastic) -- Fluid transfer connection

Spinal fixator (titanium alloy) -- Orthopedic and stability reconstruction of the spine

Prosthetic connector (carbon fiber/titanium alloy) -- lightweight mechanical fit

Hemodialyzer housing (medical plastic/stainless steel) - extracorporeal circulation container





Aerospace Prototyping

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- Seat
- Engine
- Fuselage Components
- Turbines
- Fasteners (e.g., screws)
- Tire Parts
- Electrical Component
- Radar Systems
- Air Conditioning Units
- Vacuum Pumps
- Fuel Pumps
- Lighting Systems
- Sensors
- Braking Systems

Choose JupaiCNC for processing aerospace components

Jupaicnc has passed the AS9100D aerospace certification, relying on the five-axis CNC machine tool to achieve ±0.003mm ultra-precision machining, specializing in Inconel718/Ti-6Al-4V and other superalloy materials, and the yield of complex components such as turbine blades is 99.6%. Using micro-arc oxidation and laser cladding technology, the temperature resistance breaks the limit condition of 850℃, and the key parameters are 100% in line with AMS2750E heat treatment standards. The modular process supports 72-hour emergency variant delivery, passes Level 3 warranty certification and ITAR compliance review, and improves the fatigue life of key components to 15,000 cycles with vibration suppression and residual stress relief technology.payload pods and repeatable spacecraft.

JupaiCNC provides technical support to the aerospace

Micron machining

Five-axis CNC technology (accuracy ±0.003mm) supports complex surface processing of titanium alloy and nickel-based superalloy; The intelligent cutting parameter optimization system controls the tool load in real time and reduces the machining loss by 22%.

Space class verification

A total of 500,000 high-precision parts have been delivered, covering precision bases of satellite navigation systems, fuel nozzles of engines, etc., achieving a weight reduction of more than 15% of key components, and passing the AS9100D and ITAR compliance certification

Common materials and properties of aerospace parts

1

Aluminium alloy

High specific strength, corrosion resistance, easy processing, used for fuselage frame, fuel storage tank and other structural parts

2

Titanium alloy (e.g. Ti-6Al-4V)

High specific strength (1.3 times of aluminum alloy), high temperature resistance (450~500℃), corrosion resistance, suitable for engine compressor blades, high temperature cabin

3

Carbon fiber composite

Lightweight (density < 1/4 of steel), tensile strength of more than 3500MPa, used for wings, missile shells and other lightweight high-strength parts

4

Nickel base superalloy

High temperature (> 1000℃), creep resistance, used in engine turbine blades and other extreme high temperature environment

5

Ultra high strength steel

High tensile strength, fatigue resistance, used for bearing, transmission gear and other high-load structural parts

6

Basalt fiber

High strength (2~3 times of carbon fiber), high temperature resistance (1500℃), suitable for high temperature protection materials and lightweight structural parts 8.

Processes surface treatment of Aerospace parts

Laser cladding

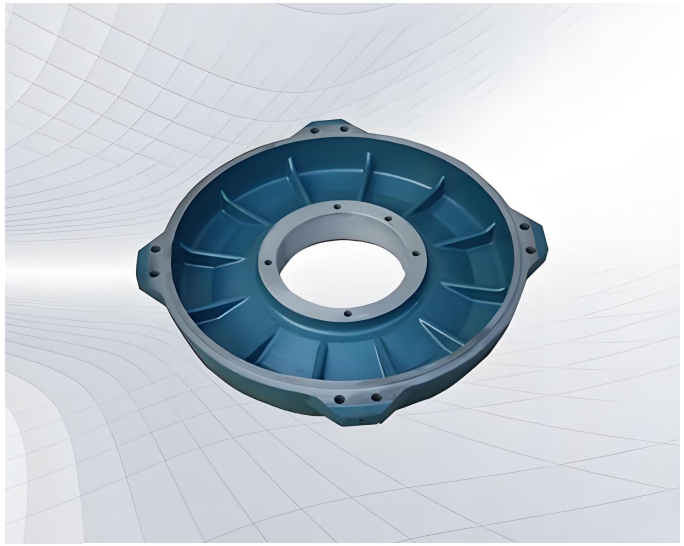
high-energy laser melting metal powder, forming 850℃ high temperature coating on the surface of fuel nozzle, thermal shock resistance improved by 3 times

Micro arc oxidation

1500HV ceramic oxide film is generated on the surface of aluminum alloy by high voltage discharge, and the salt spray corrosion resistance is improved by 60%

Physical Vapor Deposition (PVD)

Vacuum deposition CrN or TiAlN coating, titanium alloy fastener surface hardness ≥2200HV, friction coefficient reduced by 40%



Anodizing

Dense alumina film generated by electrolysis, corrosion resistance up to 1000 hours of neutral salt spray test, suitable for satellite structural parts

Electroless nickel plating

No electrolytic deposition of nickel-phosphorus alloy layer, uniform coverage of complex cavity, hardness 600HV, acid and alkali corrosion resistant

JUPAICNC machined parts for aerospace

Titanium alloy integral blade disc : the core part of engine compressor, five-axis linkage processing, surface accuracy of ±0.005mm.

Aluminum alloy honeycomb structure : 50% weight reduction by high-speed milling, used for wing sandwich structure.

Heat-resistant steel fuel nozzle : deep hole drilling micro-hole (diameter 0.3mm), fuel atomization efficiency increased by 30%.

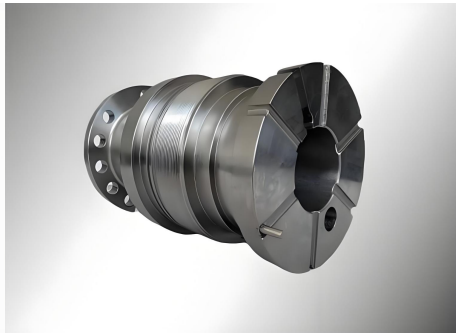
Titanium alloy rocket nozzle : multi-axis turning thread sealing structure, resistant to high pressure and high temperature oxidation environment.

Stainless steel hydraulic spool : nano level turning, with clearance ≤3μm, to ensure zero leakage of hydraulic system.

Composite radome : five-axis curved surface processing, wave transmittability ≥95%, both pneumatic and signal transmission.

Superalloy turbine disk : EDM wire-cut mortise groove (accuracy ±0.01mm), improve engine assembly reliability.

Titanium alloy fasteners : laser marking tracing, shear strength ≥1000MPa, spacecraft structure connection key parts.



Renewable Energy Components Prototype

- Wind Turbine Blades
- Pitch Bearings
- GearBoxPlanetary Rack
- Spindle Flange
- Photovoltaic Support Connection
- Solar Tracker Gears
- Motor Sealing Rings
- Gearbox
- Condenser support Brackets
- Inverter Heat Dissipation Housing
- Pressure Pipe Flange
- Module Cooling Plate
- Hydrogen Tank Connection Flange
- Biomass Boiler Nozzle

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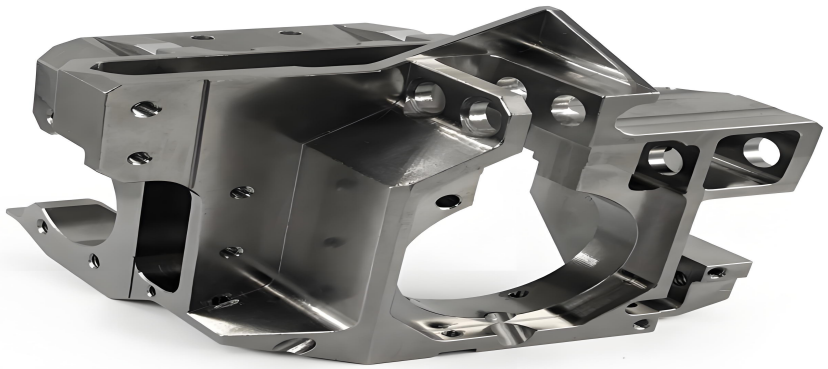
Advantages of Choosing Jupaicnc to Process Energy Components

JUPAICNC's core advantages in the field of energy component processing are reflected in three aspects: technology, efficiency and sustainability. The five-axis linkage CNC system and ultra-precision machining technology can complete high-precision machining of high-end components such as complex surfaces and thin-walled structures (accuracy up to ±0.003mm), meeting the requirements of harsh working conditions such as wind turbine blades and nuclear power seals. Through computer software programming and process optimization, the processing efficiency can be increased by more than 30%, material loss can be reduced by 15%, and the unit cost can be reduced by 20%. The modular equipment design supports rapid changeover and is suitable for flexible production of diversified products such as photovoltaic brackets and energy storage shells. Equipped with a special process database for the energy industry to ensure the processing stability of titanium alloys and composite materials, the product yield rate reaches 99.6%. At the same time, the energy consumption monitoring system is integrated, and the unit energy consumption is reduced by 25% compared with traditional equipment, which is in line with the trend of low-carbon manufacturing.



JUPAICNC Machining Provides Technical Empowerment for Energy Industry

1. High-precision complex component manufacturing

The five-axis linkage machining center breaks through the micron-level machining bottleneck of complex curved surface components such as the pressure-resistant cavity of deep-sea drilling equipment and the sealing ring of nuclear power reactors, ensuring the reliability and life of equipment in extreme environments, and helping to increase oil and gas exploration efficiency by 20%.

2. Intelligent process optimization

The adaptive control system based on AI algorithm compensates for machining errors in real time, realizes lightweight blade molds (weight reduction of 15%) and simultaneous optimization of surface accuracy in the wind power field, and shortens the R&D cycle of wind turbines by 40%; combined with thermal error compensation technology, the processing yield of nuclear power precision components is increased to 99.6%.

3. Digital full-chain collaboration

Relying on the industrial Internet platform, a closed-loop system from digital twin simulation to intelligent production line integration is built to achieve dynamic tuning of process parameters in energy storage equipment manufacturing, shortening the delivery cycle by 30% and reducing the overall cost by 18%.

Materials and Performance of Energy Equipment Part

1

Stainless steel

Excellent corrosion resistance and high temperature resistance, suitable for corrosive environment components such as oil and gas pipelines, nuclear power valves, etc.

2

Aluminum alloy

It has remarkable lightweight properties (density is only 1/3 of steel), high strength and corrosion resistance, and is mostly used in wind turbine blade frames and lightweight energy storage housings.

3

Copper alloy

Excellent thermal conductivity (thermal conductivity up to 380 W/m·K), used in thermal management scenarios such as generator radiators and transformer conductive connectors

4

Cast iron

High wear resistance and outstanding vibration absorption performance, suitable for heavy-duty gas turbine bases, hydraulic turbine housings and other load-bearing structural parts

5

Engineering Plastics

Nylon (PA66) has strong fatigue resistance, and PPS has a temperature resistance of up to 240°C. It is used in lightweight scenarios such as insulation parts of electric drive systems and chemical-resistant seals.

6

Composite materials

Carbon fiber reinforced resin-based materials have a specific strength five times higher than steel and are used in extreme working conditions such as pressure-resistant shells of deep-sea drilling equipment and floating wind turbine blades

JUPAICNC Machining Surface Treatment of Energy Industry Parts

Micro-arc oxidation (MAO)

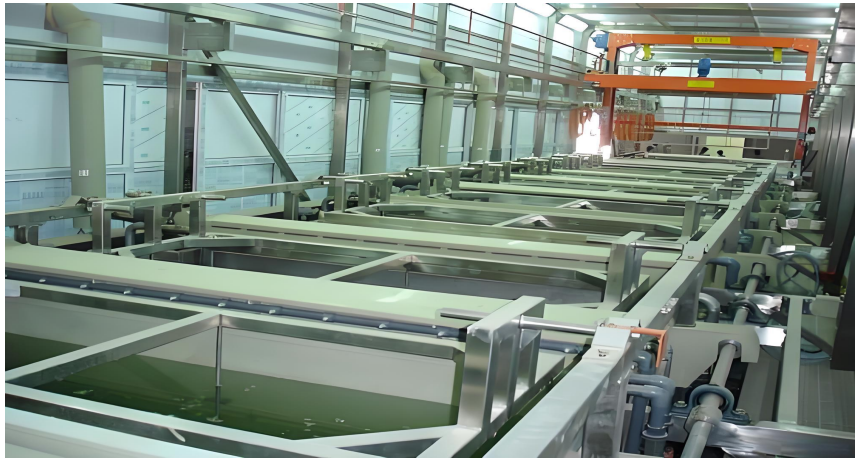
For aluminum alloy components, a 10-100μm ceramic oxide film is generated on the surface through high-voltage electrolysis. The hardness reaches HV1500 and the temperature resistance exceeds 2000℃. It is used for corrosion protection of wind turbine pitch bearings and energy storage boxes, and the salt spray test life is increased by more than 3 times.

Chemical nickel phosphorus alloy

A 50-80μm amorphous coating is deposited on the surface of cast iron valves and pipes, and the H_2S corrosion resistance reaches the highest standard of ISO 15156. It is suitable for shale gas wellhead devices and the service life is extended to 8 years.

Anodizing + Sealing Treatment

The aluminum alloy energy storage battery bracket is hard anodized (film thickness 25μm), and nano-sealing agent is superimposed to fill the micropores. The voltage breakdown strength reaches 35kV/mm, and the insulation performance meets the IEC 61439 standard.



Electroplating nickel-chromium alloy

A multi-layer electroplating process is used to deposit a nickel-chromium composite coating (thickness 50-100μm) on the surface of the stainless steel substrate. The coating hardness reaches HV600-800, and the wear resistance is 60% higher than that of traditional spraying. Applied to gas turbine blades, shale gas valves and other scenarios, the H_2S corrosion resistance meets the ISO 15156 standard.

Laser Cladding

The sealing surface of the nuclear power flange is repaired through 3D printing technology, using Inconel 625 alloy powder. The bonding strength between the cladding layer and the substrate is greater than 400MPa, the high-temperature creep resistance is improved by 60%, and the cost of spare parts replacement is reduced.

JUPAICNC Processes Parts Types For the Energy Industry

Wind turbine hub castings: Ductile iron five-axis machining, bearing strength up to EN-GJS-400 standard, suitable for wind turbines above 5MW.

Nuclear power main pump impeller: Stainless steel 3D printing + laser cladding, high temperature radiation resistance meets ASME III standard.

Solar tracking bracket: 6061-T6 aluminum alloy extrusion molding, dynamic load support > 5kN/m².

Shale gas wellhead valve body: Duplex steel forging CNC machining, hydrogen sulfide corrosion resistance up to NACE MR0175.

Energy storage battery module end plate: 7075 aluminum alloy micro-arc oxidation, insulation breakdown voltage > 30kV

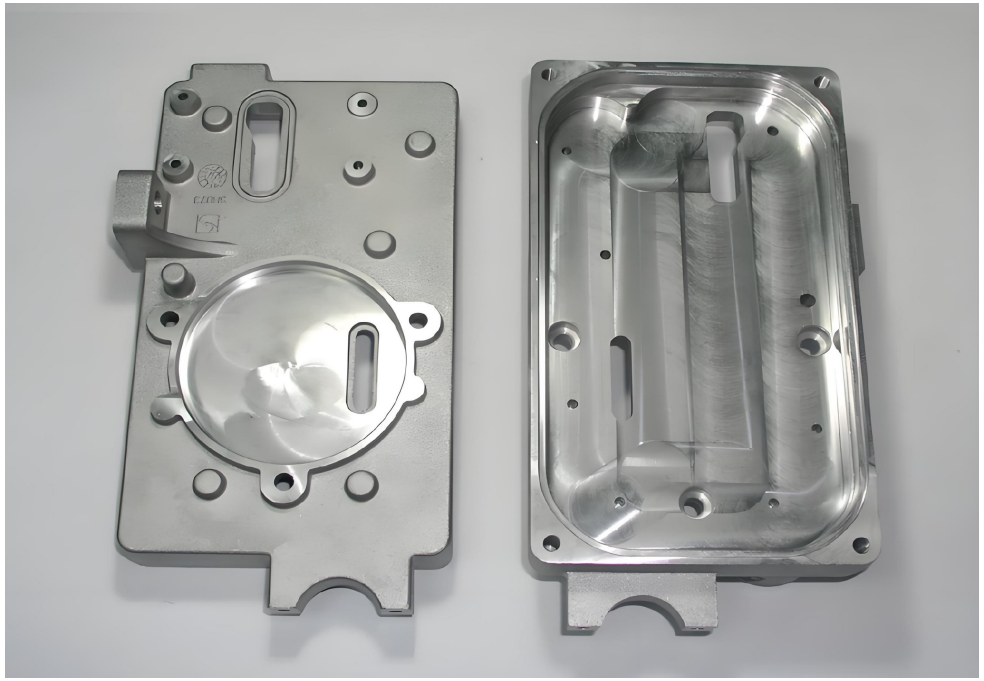
Gas turbine turbine disc: Inconel 718 five-axis milling, high temperature fatigue life exceeds 100,000 times (ISO 12107)

Floating wind power anchor chain buckle: 42CrMo4 alloy steel supersonic spraying, salt spray resistance > 5000 hours

Hydrogen compressor piston rod: titanium alloy precision honing, surface roughness Ra ≤ 0.2μm

Nuclear waste container sealing cover: silicon carbide ceramic composite processing, radiation aging rate < 0.1% / year

Photovoltaic silicon wafer cutting guide wheel: hard alloy electroplated diamond, cutting line diameter accuracy ± 2μm



Robotics and Automation

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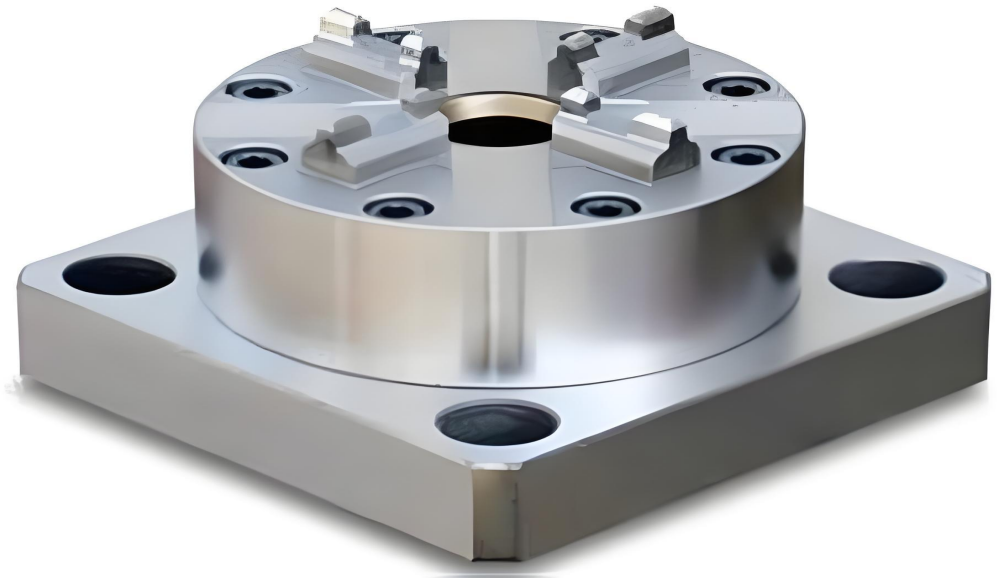
- Frock Clamp
- Harmonic Generators
- Sensor Housings
- Controller Enclosures
- End Effectors
- Joint Modules Speed Reducer
- Lead Screws & Guide Rails
- Servo Motor Components
- RV Reducer Gears
- Harmonic Drive Components
- Grippers
- Connector Housings

Advantages of Choosing Jupaicnc to Process Robots and Automation Components

Jupaicnc has become an ideal partner for robot component manufacturing with its high-precision processing technology and industry experience. We use imported five-axis CNC equipment (accuracy ±0.01mm) and strict quality inspection processes to ensure the durability and dynamic performance of key components such as robot arm joints and reducers. The mature one-stop service covers design optimization, material selection to mass production, supports the processing of special materials such as titanium alloy and carbon fiber, and meets the lightweight requirements of collaborative robots and high load requirements of industrial robots. Through flexible production lines and rapid response teams, we help customers shorten delivery cycles by 50% and reduce overall costs. Backed by 30+ robotics industry project experience, Jupaicnc provides reliable manufacturing support for your innovation.



JUPAICNC Machining Provides Technical Empowerment for Robots and Automation

JUPAICNC focuses on providing high-precision and high-reliability core component processing services for the robotics and automation industries. We have advanced five-axis CNC machining centers, precision testing equipment and mature process systems, which can efficiently process difficult components such as robotic arm joints, servo motor housings, harmonic reducers, etc., with an accuracy of ±0.01mm, ensuring the stable performance of the product under high-speed motion and long-term loads. At the same time, we provide one-stop solutions from design optimization, material selection to batch manufacturing, supporting customization of various materials such as titanium alloys, aluminum alloys, engineering plastics, etc., to meet the diverse needs of collaborative robots, industrial automation equipment and special robots. Choosing JUPAICNC means choosing an efficient, precise and reliable manufacturing partner to empower your robotics and automation technology innovation!

Materials and Performance of Robot and Automation Equipment Parts

1. **Aluminum alloy (such as 6061/7075)**
   Lightweight, high rigidity, corrosion resistance, suitable for mechanical arm structural parts and shells, balancing strength and weight.

2. **Stainless steel (such as 304/316)**
   High strength and corrosion resistance, suitable for food and medical robots, meeting clean environment requirements.

3. **Titanium alloy (such as TC4)**
   Ultra-high strength, high temperature resistance and good biocompatibility, used for key components of aviation and medical robots

4. **Engineering plastics (such as PEEK/nylon)**
   Wear-resistant, self-lubricating, insulating, suitable for light-loaded gears, joint bushings, reducing noise, but limited temperature resistance.

5. **Carbon fiber composite materials**
   Extremely lightweight, high strength, used for drones, bionic robot structural parts.

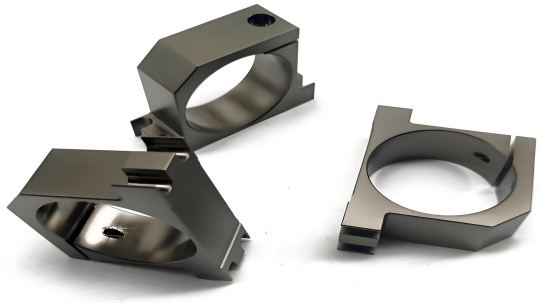
6. **Copper alloy (such as beryllium copper)**
   High electrical and thermal conductivity, suitable for robot motor contacts and heat dissipation components, wear-resistant and fatigue-resistant.

JUPAICNC Machining Surface Treatment of Robots and Automated Industry Parts

Anodizing (aluminum alloy)
Enhance wear resistance and corrosion resistance, provide a variety of color options, suitable for robot arm housing and structural parts, improve aesthetics and functionality.

Hard chrome plating
Ultra-high hardness (HV800+), wear resistance, suitable for high-load guide rails, joint parts, and extend service life.

Electroless nickel plating (ENP)
Uniform coating, corrosion resistance and no risk of hydrogen embrittlement, suitable for precision gears, hydraulic parts, and ensure dimensional stability.



Sandblasting oxidation (matte treatment)
Eliminate reflections, improve surface texture, used for collaborative robot housing, and has both anti-fingerprint and industrial beauty.

PVD coating (titanium/diamond-like carbon)
Ultra-hard, low-friction coating, suitable for high-speed transmission parts, with both decorative and performance improvement.

JUPAICNC Processes Parts Types For the Robotics And Automation industry

Robot arm joint parts: high-precision five-axis machining is adopted to ensure ±0.01mm tolerance, achieve smooth movement and precise positioning.

Harmonic reducer housing: aviation-grade aluminum alloy one-piece molding, lightweight design and high torque transmission stability.

Servo motor end cover: precision heat dissipation gear structure optimization, effective control of temperature rise, and extended motor service life.

Linear guide slider: hard anodized, friction coefficient as low as 0.001, to ensure long-term operation accuracy.

Robot end effector: modular design, support fast replacement of fixtures, adapt to multiple scenarios such as grasping and welding.

Rotary encoder code disc: ultra-thin stainless steel precision etching, resolution of 0.001°, to meet high-precision closed-loop control.

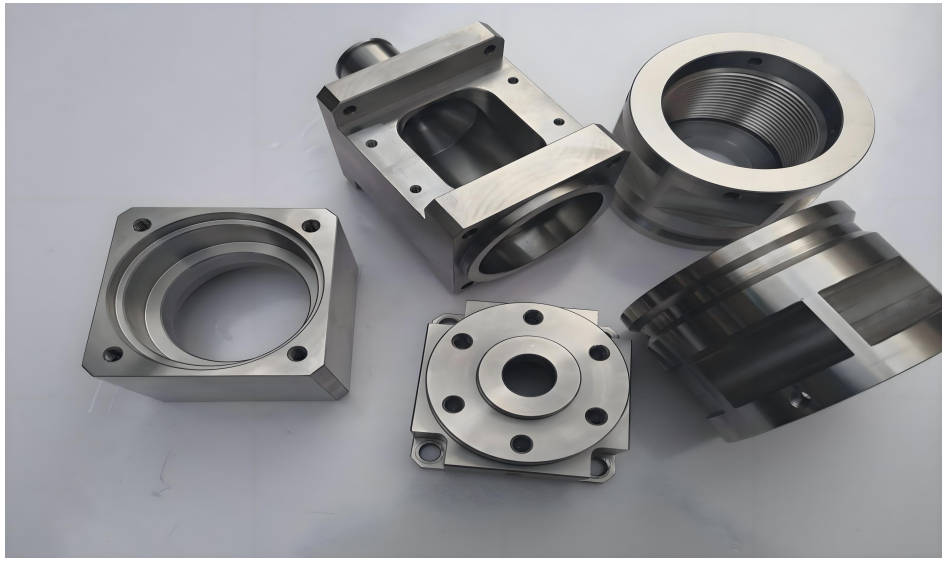
Force sensor housing: magnesium alloy CNC processing, excellent electromagnetic shielding performance, to ensure signal transmission stability.

Collaborative robot carbon fiber arm: T800 grade carbon fiber composite processing, 5 times stronger than steel, 60% lighter.

AGV drive wheel assembly: polyurethane coated wheel hub, silent coefficient <45dB, suitable for more than 100,000 cycles.

Automated sorting mechanical claw: bionic structure design, gripping force 0.1-50N adjustable, response time <0.1s.

Industrial robot base: cast iron stress relief treatment, vibration attenuation rate 90%, to ensure system stability.



Automotive Prototype CNC Manufacturing

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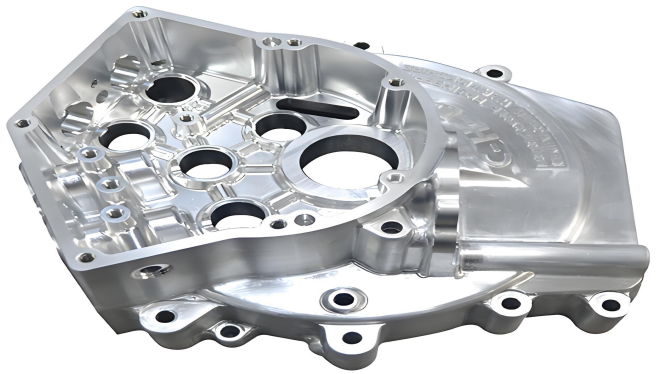
- Engine
- Crankshafts
- Transmission Gears
- Camshafts
- Brake Discs
- Differential Housings
- Steering Gears
- Wheel Hubs
- Drive Shafts
- Turbocharger Impellers
- Battery Enclosures

Advantages of Choosing Jupaicnc to Process Automotive Components

As a professional partner in the field of precision parts processing in the automotive industry, Jupaicnc provides customers with high-precision and high-reliability component solutions with advanced CNC machining technology, intelligent production systems and rich industry experience. The company uses advanced machine tools such as five-axis linkage machining centers and turning and milling equipment, combined with a strict IATF 16949 quality management system to ensure that the dimensional accuracy of various metal parts reaches the micron level, fully meeting the stringent requirements of key parts such as engines and transmission systems; at the same time, through automated production lines and flexible manufacturing systems, efficient mass production and rapid delivery are achieved to help customers optimize supply chain efficiency. Jupaicnc has been deeply involved in automotive parts processing for many years. Driven by technology and based on quality, it helps automakers improve their competitiveness and is a trustworthy precision processing partner.



JUPAICNC Machining Provides Technical Empowerment for Automotive

JUPAICNC provides the automotive industry with full-dimensional precision machining technology empowerment, covering everything from core components to intelligent production systems. With five-axis linkage machining centers and high-precision turning and milling equipment, we can perfectly process key components such as engine blocks and gearbox gears, with a tolerance accuracy of up to ±0.005mm. Through the intelligent MES production management system, digital control of the entire process from raw materials to finished products is achieved to ensure quality traceability and production stability. In response to the lightweight needs of new energy vehicles, we have unique process advantages in the processing of aluminum alloys and carbon fiber composite materials, which can help customers achieve a weight reduction of more than 30%. At the same time, the flexible production line design supports rapid changeover to meet the customized needs of multiple varieties and small batches.

Materials and Performance of Automotive Equipment Parts

1. **High Strength Steel (HSS)**
   Tensile strength 500-1500MPa, used for body structural parts, improving collision safety while achieving lightweight.

2. **Aluminum alloy (such as 6061, 7075)**
   Low density (2.7g/cm³), corrosion resistance, used in engine blocks and body panels, with significant weight reduction effects.

3. **Ductile iron (QT400-18)**
   High strength, good toughness, used for crankshafts and differential housings, balancing cost and performance.

4. **Engineering plastics (such as PA66-GF30)**
   30% glass fiber reinforced, high temperature resistant, low friction, used for intake manifolds and bearing covers, replacing metal to reduce weight.

5. **Carbon fiber composite material (CFRP)**
   Its specific strength is 5 times that of steel and is used in battery boxes and structural parts of new energy vehicles, making it extremely lightweight.

6. **Titanium alloy (such as Ti-6Al-4V)**
   High strength, corrosion resistance, used in high-performance car connecting rods and exhaust systems, but the cost is relatively high.

JUPAICNC Machining Surface Treatment of Automotive Industry Parts

Anodizing (aluminum alloy parts)
A dense oxide layer is formed on the surface of aluminum alloy through electrolysis, which improves corrosion resistance (salt spray test for more than 500h) and enhances surface hardness (HV800+). It is suitable for new energy battery housings, motor end covers and other parts.

Hard oxidation (parts with high wear resistance requirements)
Using low-temperature technology to generate a 50-100μm thick oxide film with a surface hardness of HV1200, it is used in scenarios that require wear resistance, such as transmission valve bodies and hydraulic components.

Zinc-nickel alloy (fasteners/connectors)
The electroplating layer has a thickness of more than 12μm, and the neutral salt spray test is more than 720h without rusting, meeting the long-term anti-corrosion requirements of automotive bolts, clamps and other parts.

PVD coating (decorative functional parts)
Vacuum ion plating of titanium/chrome achieves mirror-grade gloss (Ra≤0.1μm) and scratch resistance. It is used for exterior parts such as door handles and signs, taking into account both beauty and durability.

Powder coating (structural protection)
Epoxy resin powder is sprayed and cured to form a 80-120μm coating that is stone-impact and chemical-resistant, suitable for outdoor exposed parts such as chassis parts and suspension components.

JUPAICNC Processes Parts Types For the Automotive industry

BOP valve body – precision machining of high-strength alloy steel, resistant to high-pressure corrosion, ensuring well control safety.

Christmas tree assembly – high-precision stainless steel forgings, meeting API 6A standards, resistant to deep-sea high pressure.

Drill collar connector – ultra-high-strength steel turning and milling composite machining, tensile strength ≥120ksi.

Subsea production valve block – corrosion-resistant nickel-based alloy machining, integrated multi-channel hydraulic control.

Guide base flange – deep hole machining of large-size carbon steel parts to ensure accurate positioning of subsea equipment.

Mud pump cylinder sleeve – tungsten carbide coated inner wall, wear-resistant and corrosion-resistant, extending service life.

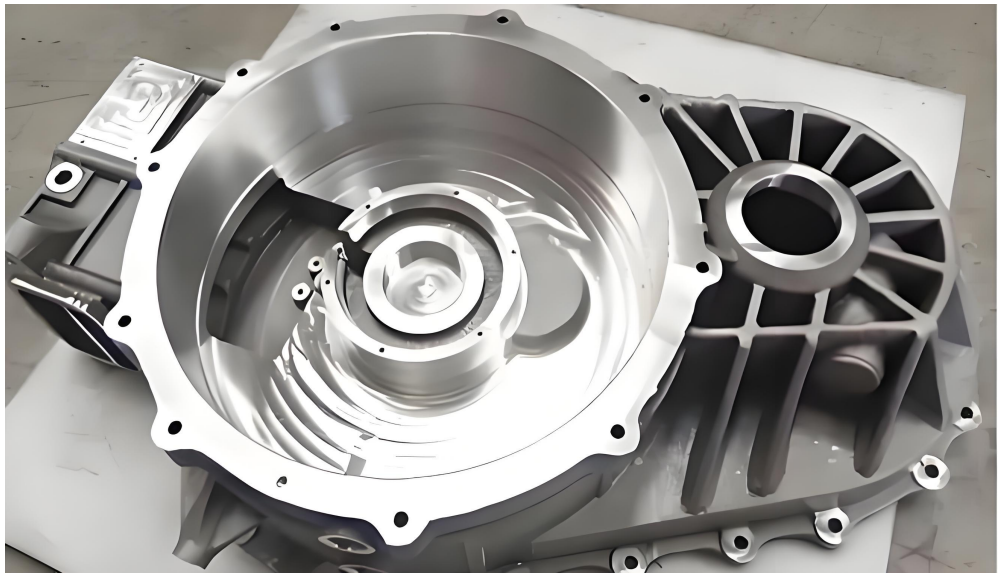
Riser joint – titanium alloy lightweight design, seawater corrosion resistance, reducing deepwater operation load.

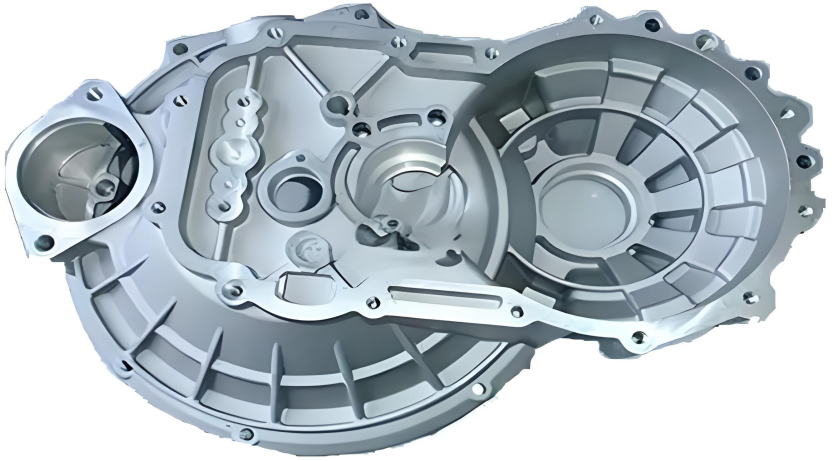
Casing hanger – alloy steel precision thread machining, bearing wellhead weight and sealing pressure.

Underwater robot joints – aluminum alloy/stainless steel combined machining, flexible, pressure-resistant and corrosion-resistant.

Wellhead sealing ring groove – Ultra-precision cutting, sealing surface roughness Ra≤0.8μm.

Hydraulic control module housing – Aluminum alloy integral processing, 30% weight reduction and seawater erosion resistance.





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