

50A \pm 12V Pulse Plating Rectifier

1.Specifications:

Input feature:

Rated input voltage: Single-phase AC220V \pm 10% 50Hz,in line with the national power quality standards;

Rated input current: AC 3.5A;

Rated input power: 0.78kVA;

Rated input power factor: COS Φ \geq 0.95.

Output feature:

Output voltage: Peak 0 \sim \pm 12V;

Output current: Peak 0 \sim 50A;

Rated stabilized current precision: \leq 1% (the rated current \geq 20%) ;

Rated voltage precision: \leq 1%;

Display precision: 0.01A, 0.01V;

Rated output efficiency: \geq 90%.

2.Product Description

The Pulse Plating Rectifier enables precise pulse current modulation to optimize metal deposition, serving as a critical tool in modern electroplating. This technology forms uniform metal/alloy coatings (e.g., copper, nickel, chromium) via electrolysis, enhancing substrate properties such as wear resistance and conductivity. Key components include adjustable pulse waveform generators, cathodic workpieces, and ion-rich electrolytes, widely applied in automotive components, ABS engineering plastics, and PCB interconnects.

In automotive manufacturing, pulse plating strengthens wear-resistant coatings on engine parts while achieving mirror-finish chrome layers for decorative trims. For ABS materials, it overcomes traditional material

limitations by bonding metal coatings to plastics without compromising lightweight advantages. In PCB fabrication, duty cycle adjustments ensure $\pm 2\mu\text{m}$ thickness control for blind-via copper layers, critical for high-frequency signal integrity in 5G devices.

Integrated with High-Frequency Switching Power Supplies, pulse plating systems achieve over 97% energy conversion efficiency, reducing power consumption by 30% compared to conventional DC methods. For aerospace applications, microsecond-level pulse control forms nickel-tungsten coatings with $<0.5\%$ porosity on titanium alloys, enhancing oxidation resistance at 800°C . These advancements drive precision manufacturing in medical implants and microelectronics, where submicron coating uniformity defines product reliability.

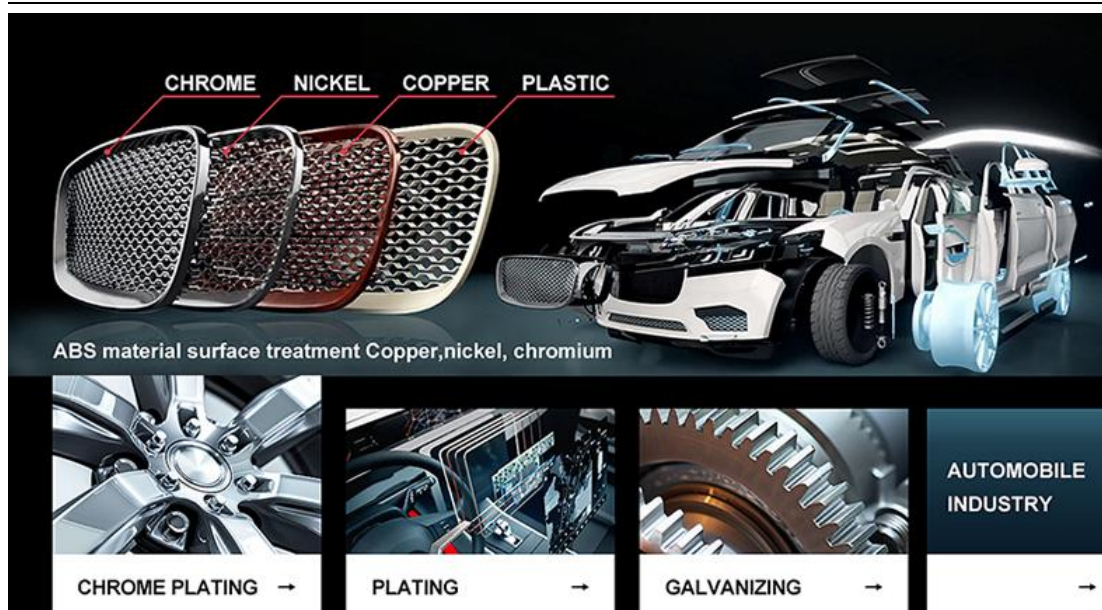
3.Product Applications

Plating rectifiers support surface treatments like PCB electroplating, hard chrome coating, and metal plating (Cu, Ni, Zn, Au, Ag).

1)Field application diagram:



2)Industry application examples:



Automobile industry, ABS material surface treatment, Copper, nickel, chromium

4. Technology Advantages

- RS485 digital control function
- High power factor and high efficiency
- Reasonable structural design
- Only the radiator is in the air duct
- Effective sealing and isolation
- High protective properties
- Standard wiring and special wiring
- Practical and effective multiple protection system
- Full soft switching technology
- High reliability

5. Role of electroplating

Enhance Wear Resistance, Conductivity & Reflectivity

Electroplating applies durable coatings (e.g., nickel or chromium) to surfaces, reducing wear from friction. This extends the lifespan of industrial tools and

engine parts. For electronics, smoother conductive layers (like copper plating) improve current flow, minimizing energy loss. Metals like silver and chromium also boost reflectivity, ideal for mirrors, solar reflectors, and precision optics.

Improve Corrosion Resistance & Aesthetics

The process shields materials from rust, moisture, and chemicals. For example, zinc-plated bolts resist weathering, while chrome-plated car bumpers stay rust-free for years. Decorative finishes—gold-plated jewelry or matte-black plated gadgets—merge style with protection.

Dual Benefits

Electroplating isn't just functional. It adds value:

Car parts gain sleek chrome finishes.

Circuit boards maintain stable conductivity.

Jewelry combines luxury with tarnish resistance.

Electroplating boosts both performance and visual appeal, making products last longer and look better.

6.Types of electroplating

› Copper Plating

Purpose: Enhances adhesion for subsequent layers and corrosion resistance.

Note: Prone to oxidation (forms non-conductive copper oxide/green patina).

Requires protective coatings.

› Nickel Plating

Purpose: Used as a base layer or decorative finish; improves corrosion/wear resistance. Electroless nickel offers chrome-like durability.

Note: Magnetic properties limit use in electronics (e.g., DIN/N connectors) to avoid signal interference.

› Gold Plating

Purpose: Optimizes conductive contact impedance and signal transmission.

Key: High stability but costly.

› Palladium-Nickel Plating

Purpose: Superior signal transmission and wear resistance vs. gold.

Advantage: Combines palladium's corrosion resistance with nickel's hardness.

› Tin-Lead Plating

Purpose: Improves solderability.

Trend: Phased out due to lead concerns; replaced by bright/matte tin alternatives.

› Silver Plating

Purpose: Best conductivity and signal performance.

Note: Conducts even when oxidized but tarnishes over time. Higher cost.

Selection Criteria

Match plating type to application needs: corrosion/wear resistance, conductivity, cost, and environmental regulations.

7.Elements of Electroplating

› Cathode

The object to be plated (e.g., connector terminals or metal surfaces) where metal ions deposit into a solid coating.

› Anode

Soluble Anode: Made of the plating metal. Dissolves during electrolysis to replenish metal ions in the solution.

Insoluble Anode: Used for precious metals (e.g., white gold, iridium oxide). Does not dissolve but supplies electrons for reduction.

› Plating Solution

Contains ions of the target metal. Composition and concentration determine coating thickness, adhesion, and appearance.

› Plating Tank

Materials: Must resist corrosion and temperature fluctuations (e.g., polypropylene, titanium alloys).

Role: Stores solution and maintains stable plating conditions.

› Rectifier

Converts AC to DC power to drive electrolysis.

Adjust voltage/current to control deposition speed and coating thickness.

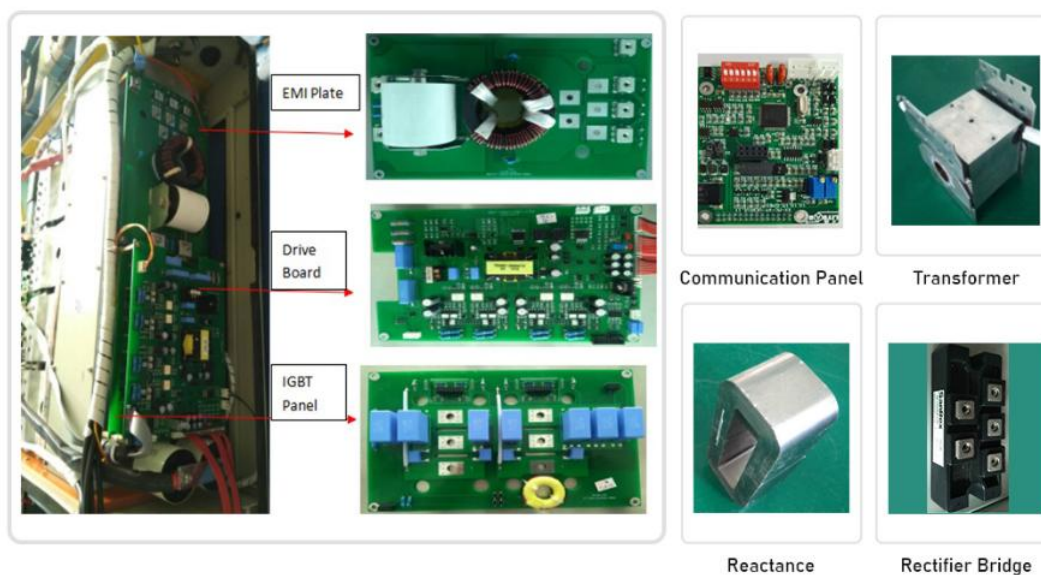
› Auxiliary Equipment

Filters: Remove impurities from the solution.

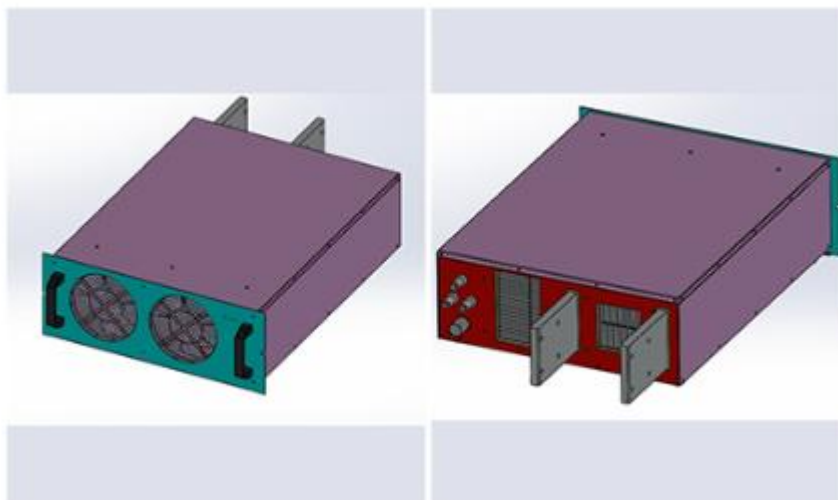
Heaters: Maintain solution temperature.

Stirrers: Ensure uniform mixing.

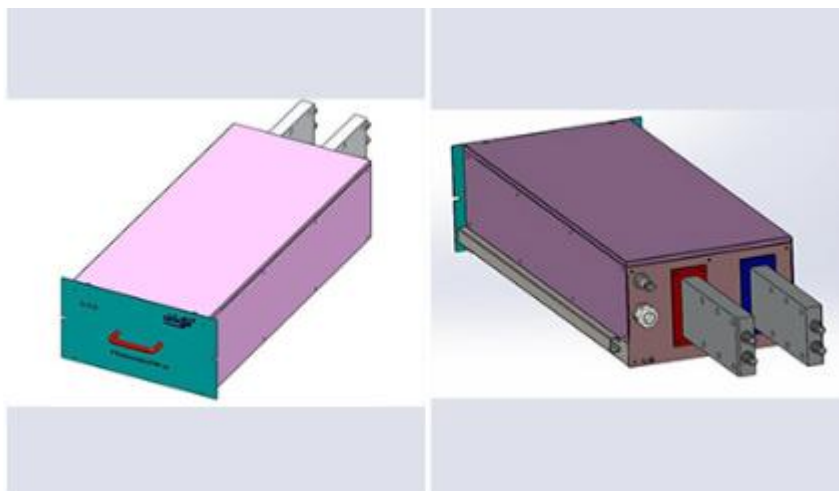
8.Component Part for Electroplating



9. Cooling Type for Electroplating



Air Cooling: Heat dissipation fan + air duct + comb heat sink



Water Cooling: Built-in water circulation line

10. Technical Parameters

Feature Type	Parameter	Technical Requirements
Input feature	Rated input voltage	Single-phase AC220V \pm 10% 50Hz, in line with the national power quality standards
	Rated input current	AC 3.5A
	Rated input power	0.78kVA
	Rated input power factor	COS Φ \geq 0.95
Output feature	Output voltage	Peak 0~ \pm 12V
	Output current	Peak 0~50A
	Rated stabilized current precision	\leq 1% (the rated current \geq 20%)
	Rated voltage precision	\leq 1%
	Display precision	0.01A, 0.01V
	Rated output efficiency	\geq 90%
Insulation feature	Insulation strength	Input-output: AC1000V, 10 mA, 1 min
		Input-shell: AC1000V, 10 mA, 1 min
	Insulation resistance	Input-output: \geq 5M Ω
		Input-shell: \geq 5M Ω
		Output-shell: \geq 5M Ω
	It has self-protection function under abnormal conditions such as overvoltage, overcurrent, overload, short circuit and overheat	
Other features	Noise	\leq 75dB
	Operating status	The product can run full-loaded continuously.
	Load level	Level II
	Insulation grade of the transformer	Grade B
	Weight	About 40KG

11.Solution

Liyuan will keep up with the world's latest technology closely, and uphold the concept of providing customers with high-quality power supplies and professional integrated services.

With advanced design and rich experience in rectifier manufacturing, we will provide the best power solutions as well as the most stable and efficient power supply for users both at home and abroad.

12.Technical Capability

LIYUAN rectifier is the most competitive brand in China

Company relies on strong technology research and development cooperation basis, created a number of advanced technology, in recent 3 years amounted to more than 30 to apply for a patent, which has nearly 10 patents of invention. Equipped with the national electric power transformation and control engineering technology research center (branch), and has set up a loan enterprise academician workstation.

Strict implementation of ISO quality management system, and through the CE safety certification, has been implementing ERP management for many years, to achieve the network, systematic computer control, the formation of a standard, efficient modern management system.

13.Qualification certification

Liyuan adhere to innovation and the continuous improvement of power conversion efficiency and product quality.

The increasing R&D investment every year, and cooperation with China's well-known universities, we has established the research center of national electric power conversion and control engineering technology.

Especially the related core patents of high-power synchronous rectifier power supply, stay ahead of the whole industry in China.

The ISO 9001 quality management system has been fully implemented in Liyuan, including quality inspection of components in warehouse, production process inspection, and final product inspection.

We adopt advanced scientific quality management system and the most stringent testing methods in the whole process to ensure the stability and reliability of products.



14. Service

Packing

- 1) Small size rectifier packing in carton box separately.
- 2) Large size rectifier will be packed in wooden case.
- 3) We guarantee that all the packing is intact when it reaches its destination.

Shipping

- 1) 30-45 Days after payment.
- 2) Transport: DHL, FEDEX, UPS, Air shipping, Boat shipping
- 3) You may choose our shipping partner or your own partner.

Maintenance

We are pleasant to share our theory and experience on equipment maintenance with users.

We are pleasant to interact with users to collect their tips and know-hows on equipment maintenance.

The module “Maintenance” here is intended to help users solve various problems they possibly encounter during equipment maintenance...

If you need other power electroplating rectifiers, we can custom design them according to customer requirements. Please contact us.

Are you looking for 50A \pm 12V Pulse Plating Rectifier? Liyuan Haina Group is one of the professional manufacturers and suppliers in this field. With over 27 years of focus on R&D, design, production, sales, and technical services for industrial rectifiers, we have already exported our products to the United States, Canada, Britain, Italy, Spain, South Africa, Russia, the UAE, Japan, South Korea, Malaysia, and other parts of the world. Equipped with a productive factory, we warmly welcome you to purchase our high-quality, Made-in-China products at competitive prices or try our customized service.