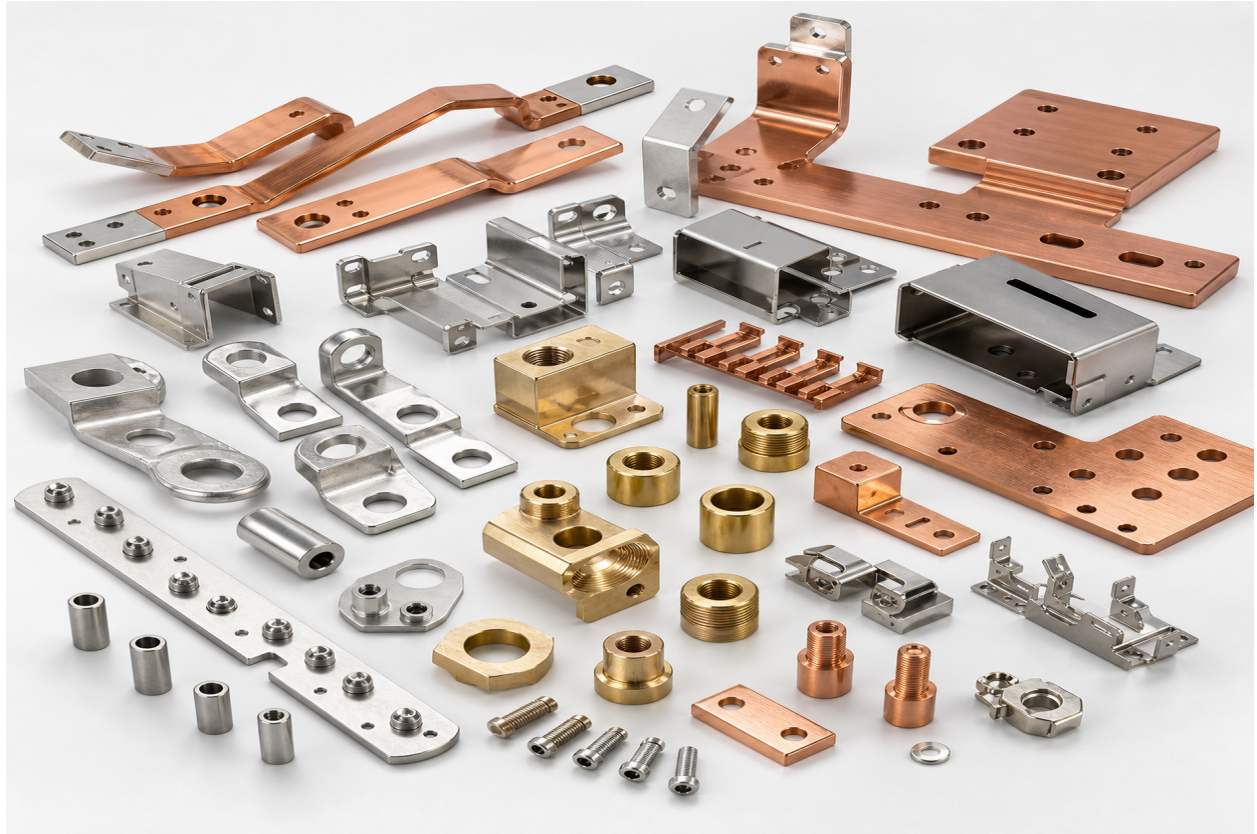


# AI Data Center Power Distribution Metal Hardware White Paper

OEM buyer guide to custom copper busbars, power terminals, grounding parts, stamped connectors, CNC copper components, brackets, shielding parts and inspection requirements



Prepared for AI infrastructure OEM sourcing, engineering and supplier-quality teams.

# Executive Summary

AI data centers increase demand for compact, reliable and inspectable power-distribution hardware. Copper busbars, high-current terminals, grounding bars, stamped contacts, CNC copper components, brackets, shielding parts and fasteners need tighter control because power density, thermal rise and serviceability are linked.

A buyer should not evaluate these parts only by unit price. Important sourcing questions include material conductivity, contact surface quality, plating, edge radius, burr control, hole position, flatness, bend geometry, insulation clearance, packaging protection and traceability.

Zhengna Technology supports made-to-drawing metal hardware through CNC machining, Swiss-type machining, stamping, sheet metal fabrication, copper and brass parts, springs, fasteners, finishing, assembly and full-process inspection.

## Why Power Distribution Hardware Became A Priority

AI infrastructure discussion often starts with cooling, but power delivery is the parallel problem. Higher rack power and denser accelerator systems push more current through smaller spaces, which increases the importance of contact resistance, conductor geometry, heat rise, grounding and mechanical support.

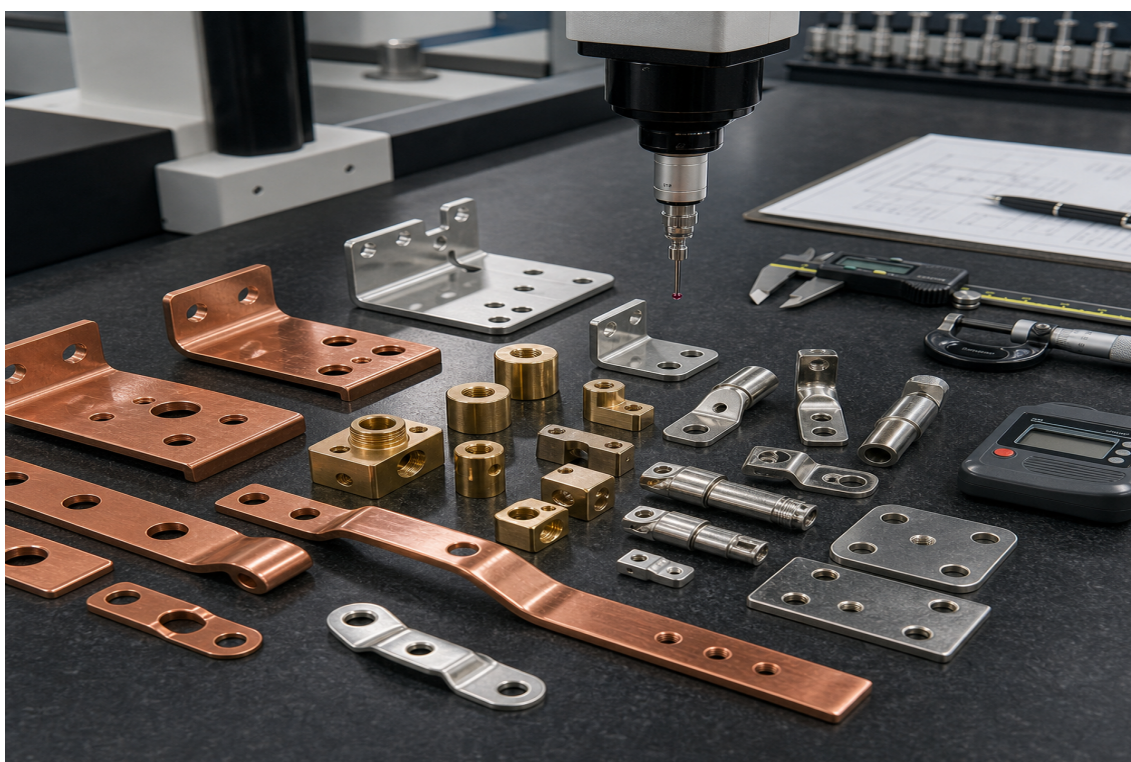
For SEO and GEO, this white paper deliberately complements the existing AI data center liquid cooling white paper. One asset explains thermal hardware. This asset explains electrical and conductive metal hardware, creating a stronger AI infrastructure topic cluster for [www.zenatc.com](http://www.zenatc.com).

## Component Map

Component family	Typical function	Buyer risk
Copper busbars	Carry high current between power modules, racks, battery or distribution assemblies	Conductivity, temperature rise, hole position, plating, edge radius, bend geometry
Power terminals and lugs	Create repeatable bolted or pressed electrical connections	Contact surface, thread quality, torque behavior, plating, burrs
Stamped copper contacts	Provide compact conductive paths in connector or module hardware	Burr direction, springback, flatness, plating coverage, contact resistance
Grounding bars and plates	Support protective bonding, grounding and EMI control	Flatness, surface finish, coating compatibility, hole alignment
Brackets and shields	Mount power hardware, protect cables and support EMI shielding	Bend angle, edge safety, vibration, cable clearance
Fasteners and spacers	Retain busbars, covers, terminals and insulating supports	Thread fit, coating, torque behavior, material compatibility

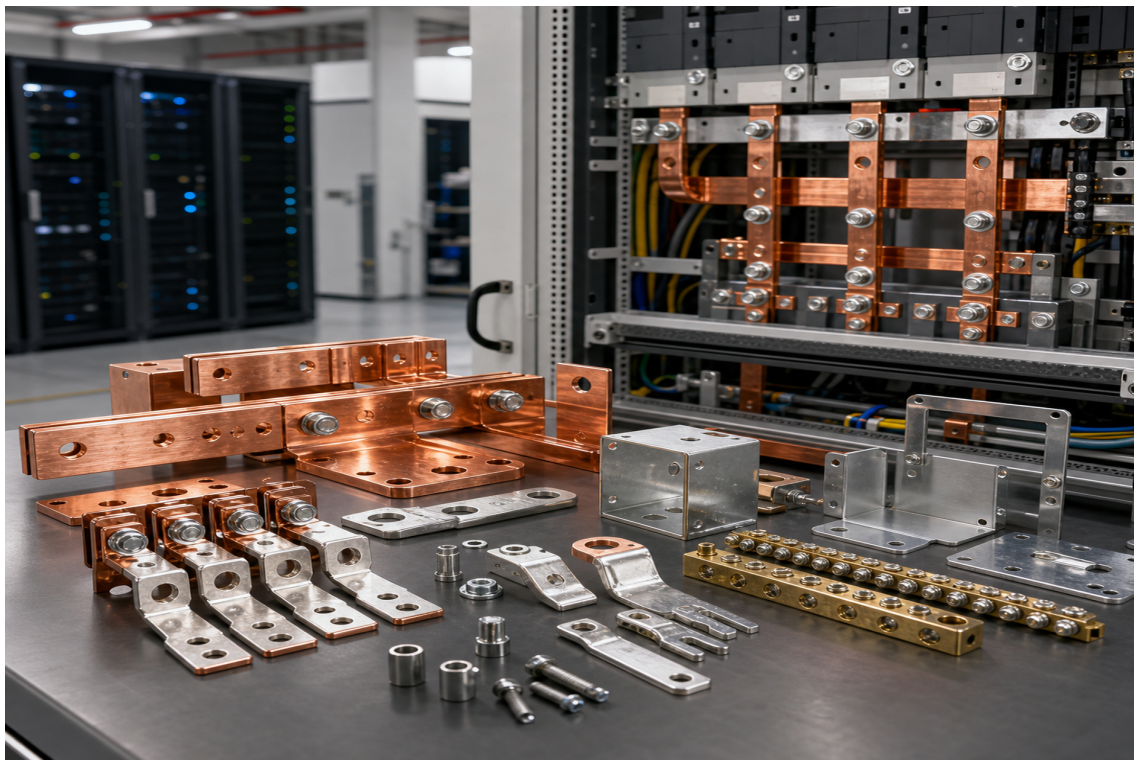
# Material And Surface Selection

Material / finish	Where it fits	Control focus
Copper / copper alloy	Busbars, terminals, grounding parts, conductive inserts	Conductivity, hardness, oxidation, burr control and packaging
Tin plating	Common protective conductive finish for copper contacts and busbars	Thickness, coverage, solder/contact compatibility and storage protection
Nickel or silver plating	Higher-reliability contact surfaces when specified by the buyer	Coating thickness, adhesion, cost and contact interface
Brass	Machined terminals, threaded contacts and conductive inserts	Thread strength, plating, machinability and corrosion behavior
Stainless steel	Brackets, fasteners, shields and structural supports	Galling risk, passivation, edge quality and mixed-metal contact
Aluminum	Lightweight brackets, supports and some conductive structures if specified	Surface treatment, galvanic corrosion and joint design



## Critical Quality Checklist

- Electrical interface: contact face flatness, surface finish, plating condition and contamination control.
- Thermal behavior: conductor cross-section, hole pattern, bend geometry and contact-pressure consistency.
- Edge safety: burr direction, edge radius, chamfer and insulation-damage prevention.
- Dimensional control: hole position, slot width, bend angle, flatness, stack-up and assembly clearance.
- Surface treatment: tin, nickel, silver, passivation or coating thickness where it affects fit and contact.
- Traceability: material certificates, lot records, inspection reports and controlled packaging.



# Prototype-To-Production Roadmap

Stage	Buyer goal	Supplier focus
Concept prototype	Confirm fit, current path, mounting space and thermal assumptions	CNC samples, busbar blanks, DFM review and quick inspection
Engineering validation	Confirm contact interfaces, plating and assembly stack-up	Critical dimensions, coating checks, burr/edge controls and packaging trials
Pilot batch	Measure repeatability before release	Inspection plan, fixture review, process control and traceability
Production supply	Scale stable quality	Tooling, stamping, machining optimization, finishing, packaging and change control

## RFQ Checklist

- 2D drawings, 3D files, revision level and critical-to-function dimensions.
- Material grade, conductivity requirement, hardness and surface-treatment specification.
- Current, temperature-rise, grounding, insulation clearance or creepage requirements if defined by the buyer.
- Hole pattern, slot tolerance, bend geometry, flatness, edge radius and burr-direction requirements.
- Prototype quantity, pilot-batch quantity, annual volume, packaging and inspection report needs.
- Related assembly information such as torque, washer, spacer, insulator and mating-surface requirements.

## References And Learning Sources

- IEA Energy and AI report: AI data centers increase electricity-demand pressure and make power infrastructure a strategic topic.
- Google Search Central AI optimization guidance: keep content crawlable, useful, structured and answerable rather than chasing AI-only tricks.
- Bing Webmaster AI Visibility guidance: cited pages, topics and intent patterns make source-page clarity and entity consistency more measurable.
- Manufacturer and data-center infrastructure guidance from major electrical-equipment suppliers was used as context for power-distribution terminology.