

M C P S E R V E R

N O C O D E

C L O U D H O S T E D

Cathodic Protection Design MCP

Automate electrochemical system design and NACE compliance checks.

Cathodic Protection Design MCP provides specialized engineering tools for designing electrochemical protection systems. You can calculate electrical current requirements, design sacrificial anode configurations, size impressed current systems for large-scale infrastructure, and evaluate compliance with NACE safety standards through your AI client.

A+ Quality Score 100/100

nace

pipeline

corrosion

electrochemical

engineering



The connectivity layer between AI and the world's software.

Vinkius sits between AI and every application. All communication passes through Vinkius Cloud via the Model Context Protocol (MCP) — with governance, observability, and security at every layer.

Your AI Connections Run Through Vinkius Cloud

The world's largest
managed MCP catalog

Vinkius is the connectivity layer where AI connects to the software your business already runs. We handle the hosting, the security, the credentials, the uptime — you get agents that actually do things.

We operate the world's largest managed MCP catalog. Major SaaS platforms, CRMs, databases, and cloud providers — running, monitored, production-ready. This MCP server is hosted and maintained by the Vinkius Cloud for AI Agents.

The agent doesn't manage credentials, doesn't manage uptime, doesn't manage security. Vinkius does.

— Architecture principle

Four Pillars of the Vinkius Runtime

01 — Security by design

Credentials stay encrypted at rest via AES-256. The AI agent never touches raw keys — they're injected into a sandboxed V8 isolate at runtime. Actions are logged, and connections have an emergency kill switch.

03 — Deterministic observability

Eight immutable metrics per endpoint: request volume, p95 latency, error rate, active connections, cost attribution. A live payload feed logs every tool call with mutation detection.

02 — Built on MCP Fusion

This MCP server was built with **MCP Fusion**, the open-source framework (Apache 2.0) that powers the entire Vinkius catalog. Schema-as-firewall strips undeclared fields, compiled PII redaction runs at zero overhead, and cryptographic lockfiles produce git-diffable audit trails.

04 — Autonomous operations

Servers are deployed, monitored, and patched autonomously. New capabilities and security patches ship weekly. Zero-downtime deployments ensure continuous availability across all managed MCP servers.

AES-256

Encryption at rest

Ed25519

PKI vault signatures

24h TTL

Ephemeral session keys

V8 Isolate

Sandboxed execution

One Token. Instant Access.

Every MCP server on Vinkius is accessed through a **Connection Token**. Tokens are generated in the cloud dashboard and produce a unique MCP endpoint URL. Paste this URL into any MCP-compatible client — no SDK required.

A single token can serve **multiple AI clients simultaneously**, or you can issue separate tokens per client for granular access control. Each token tracks its own request count, last activity timestamp, and can be individually enabled or revoked.

MCP ENDPOINT`https://edge.vinkius.com/{token}/mcp`

Claude



Cursor



VS Code



Windsurf



Grok



Gemini

Security Is the Architecture

Security in Vinkius is not a feature — it's the foundation of the runtime. The gateway enforces multiple independent protection layers between AI agents and third-party APIs.

01 — Ed25519 PKI Vault

Every workspace has an Ed25519 Master Key. Session keys are generated ephemerally (24h TTL) and signed by the Master Key. Credentials never leave the vault boundary.

02 — V8 Isolate Sandboxing

Tool code runs inside isolated-vm V8 isolates with 64 MB memory caps and per-request timeouts. No filesystem access, no network access except through the SSRF-guarded fetch bridge.

03 — SSRF Guard

All outbound HTTP requests are DNS-resolved and validated before execution. Private IP ranges (10.x, 172.16-31.x, 192.168.x, AWS metadata 169.254.x) are blocked at the network layer.

05 — Cryptographic Audit Trail

Every request is signed into a SHA-256 hash chain with Ed25519 signatures. Events form a tamper-proof, SIEM-exportable forensic record.

04 — DLP & PII Redaction

A ResponseGuard pipeline intercepts every tool response. Configurable redaction patterns strip sensitive fields (emails, SSNs, card numbers) before data reaches the AI agent.

06 — Honeypot Trap System

Phantom credentials are injected into isolated environments. If a honeypot is used outside Vinkius infrastructure, the server is quarantined instantly.

Emergency Kill Switch

EU AI Act Art. 14(1)
Compliant

The kill switch is an **emergency halt** mechanism — not a simple toggle. When triggered, it executes three actions atomically:

01 — Server deactivated

The MCP server is immediately taken offline across the entire cluster.

02 — All tokens revoked

Every connection token is invalidated. Total lockout — reconnection blocked until new tokens are issued.

03 — WebSocket connections killed

Active connections terminated via Redis pubsub broadcast. Propagates to every runtime node in the cluster.

Full Visibility. Zero Guesswork.

The Vinkius cloud dashboard includes a full MCP Governance suite — real-time analytics and security controls for production AI operations.

Control Plane

KPI dashboard with request volume, latency, success rate, token consumption, and AI-generated operational briefings.

FinOps

Cost tracking per tool, payload compression savings, budget optimization signals, and consumption trends.

Firewall & DLP

PII redaction activity, sensitive data protection counters, and security event timeline.

Agent Activity

Which AI clients are connecting, how often, and what they're doing — real-time session tracking.

Tool Health

Slowest and most error-prone tools, with actionable root-cause insights and performance baselines.

Incident Log

Error trends, failure rates, status-code breakdowns, and forensic audit trail access.

Get started at cloud.vinkius.com — connect your AI agent in under 60 seconds.

Cathodic Protection Design MCP

4 tools available

Cloud-hosted on Vinkius

This MCP handles the heavy lifting for electrochemical protection design. Instead of manually running formulas for current density or anode mass, you give your agent the structure specs and let it handle the math. You can design sacrificial anode setups for smaller assets or size up full impressed current systems for major pipeline networks. It also acts as a compliance checker, comparing your measured potentials against NACE thresholds to ensure your design actually meets industry safety requirements. It's built to turn raw engineering parameters into actionable system configurations.

Core Capabilities

01 — Current Demand Calculation

Your agent calculates the total electrical load required for specific structure dimensions and coating efficiencies.

02 — Anode Configuration

The MCP generates specific mass, count, and spacing requirements for sacrificial anode systems.

03 — Impressed Current Sizing

Your agent sizes powered systems for large-scale infrastructure projects.

04 — NACE Compliance Verification

The tool compares measured electrochemical potentials against NACE safety thresholds.

One Click on Vinkius — From Prompt to Execution

Available at vinkius.com/en/ai-agent-connect/cathodic-protection-design — connect your AI agent in three steps.

- 01
- Connect the MCP to Claude, Cursor, or Windsurf via Vinkius.
- 02
- Provide your structure specs, such as surface area or coating efficiency, to your agent.
- 03
- Ask the agent to run specific design or compliance tools.
- 04
- Receive calculated configurations or compliance results immediately.

You connect the MCP to your AI client and start providing engineering parameters.

Built For

This MCP is built for engineers managing corrosion control and infrastructure integrity.

Corrosion Engineers

They use the MCP to generate precise anode configurations and current requirements.

Pipeline Integrity Specialists

They use the tool to verify that protection levels meet NACE standards.

Infrastructure Project Managers

They use the sizing tools to estimate material needs for large-scale CP systems.

What Changes When You Connect

- 01
- Reduces manual calculation errors in electrochemical math.
- 02
- Standardizes compliance checks against NACE thresholds.
- 03
- Speeds up the design phase for both sacrificial and impressed current systems.

- 04 Provides immediate feedback on whether measured potentials meet safety requirements.
-

Real-World Applications

Pipeline Protection Design

Calculate the exact current needed for a new pipeline based on coating efficiency and surface area.

Sacrificial Anode Planning

Determine the number and mass of anodes required for a specific soil resistivity and current demand.

Compliance Auditing

Check field-measured potentials against NACE standards to ensure the structure is fully protected.

Large-Scale Infrastructure Sizing

Design powered impressed current systems for massive industrial assets.

Patterns to Avoid

Guessing current needs

❌ AVOID

You try to estimate the electrical load for a new pipeline by eyeballing the surface area and coating quality.

✓ INSTEAD

Input your specific surface area and coating efficiency into ``calculate_current_requirements`` to get an exact electrical load.

Manual NACE auditing

❌ AVOID

You spend hours comparing field-measured potentials against NACE tables using a spreadsheet.

✓ INSTEAD

Feed your measured potentials directly into ``assess_protection_compliance`` to instantly verify if your design meets industry safety standards.

Underestimating anode mass

❌ AVOID

You pick a standard anode count without considering the specific soil resistivity of the site.

✓ INSTEAD

Use `design\_sacrificial\_anode\_system` to generate the correct mass, count, and spacing based on your actual soil conditions.

The Right Fit

Corrosion engineers and pipeline integrity specialists should connect this MCP to automate electrochemical calculations. Project managers focused on large-scale infrastructure will find it useful for material estimation. If your work doesn't involve NACE compliance or electrochemical protection design, you don't need this.

Cathodic Protection Design: 4 Engineering Tools

These tools automate electrochemical math and NACE compliance checks. They handle everything from small sacrificial setups to massive impressed current systems.

#	TOOL	DESCRIPTION
01	assess_protection_compliance	This tool checks if your current design meets NACE safety and protection standards. It compares electrochemical potentials against required industry thresholds.
02	calculate_current_requirements	This tool determines the total electrical current needed to protect a specific structure. It uses your input parameters like surface area and coating efficiency.
03	design_sacrificial_anode_system	This tool calculates the configuration for sacrificial anode setups. It outputs necessary anode mass, count, and spacing based on soil resistivity and required current.
04	size_impressed_current_system	This tool designs powered impressed current systems for large-scale infrastructure. It handles the sizing for high-demand protection needs.

See It in Action

Real prompts you can use once this MCP is connected to your AI agent through Vinkius Cloud.

- U** Calculate the current needed for a 500 square meter structure with a 0.9 coating efficiency and 50 mA/m² current density.



The total required current is 25 mA, with a bare surface area of 50 square meters.

- U** Design a sacrificial anode system for a requirement of 100A in soil with 500 ohm-cm resistivity, using an anode with 2000 capacity, 5 year life, and 0.5 resistance.



The system requires 50 anodes with a total mass of 250 kg and a spacing of 10 meters.

- U** Is a measured potential of -800mV compliant if the NACE threshold is -850mV?



No, the system is not compliant because the measured potential does not meet the required -850mV threshold.

Frequently Asked Questions

01 What standards does this MCP follow?

The MCP is designed around NACE safety and protection standards for electrochemical systems.

02 Can I use this for both sacrificial and impressed current systems?

Yes, it includes specific tools for designing sacrificial anode configurations and sizing impressed current systems.

03 How does the compliance check work?

The tool evaluates if your measured electrochemical potential meets the specific NACE thresholds you provide.

04 Which AI clients can use this MCP?

You can use this MCP with any compatible client like Claude, Cursor, or Windsurf.

05 Do I need to host the MCP myself?

No, Vinkius hosts and manages the MCP, so you can use it immediately after connecting.

06 What standards does this tool follow?

The tool is designed to align with NACE (National Association of Corrosion Engineers) standards for electrochemical protection.

07 Can I design both sacrificial and impressed current systems?

Yes, you can use ``design_sacrificial_anode_system`` for sacrificial setups and ``size_impressed_current_system`` for powered impressed current systems.

08 How do I check if my system is safe?

You can use the ``assess_protection_compliance`` tool to compare measured electrochemical potential against required NACE thresholds.

Go Live in 60 Seconds

Get your connection token from cloud.vinkius.com, then paste the endpoint URL into any MCP-compatible client.

YOUR MCP ENDPOINT

`https://edge.vinkius.com/[TOKEN]/mcp`

CLIENT	WHERE TO CONFIGURE
 Claude AI	Profile → Customize → Connectors → "+" → Add custom connector → Paste endpoint
 Cursor	Settings → Features → MCP Servers → "+ Add New MCP Server" → Type: SSE → Paste endpoint
 VS Code	Ctrl/Cmd+Shift+P → "MCP: Add Server" → add <code>"cathodic-protection-design": { "url": "..." }</code>
 Windsurf	MCP Settings → <code>mcp_settings.json</code> → Add endpoint URL
 ChatGPT	Settings → Tools & plugins → Add MCP server → Paste endpoint
 Gemini	Extensions → Add MCP Server → Paste endpoint URL

ASK AN AI ABOUT THIS

Let your preferred AI explain this MCP server

-  Ask ChatGPT 
-  Ask Claude 
-  Ask Perplexity 
-  Ask Gemini 
-  Ask Grok 

READY TO CONNECT

Cathodic Protection Design is live on Vinkius Cloud.

Get your connection token, paste it into your AI agent, and
start building. No SDK. No deployment. Just results.

Start at cloud.vinkius.com →

vinkius.com · support@vinkius.com

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DOCUMENT INFORMATION

Generated	September 2026
MCP Server	Cathodic Protection Design MCP
Server ID	01a0914f-4c29-73e0-a12e-d6ac3a1d6ac9
Platform	Vinkius Cloud for AI Agents
Endpoint	https://edge.vinkius.com/{token}/mcp

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