

NICHOLAS KLUTE

Senior Controls, Embedded & Backend Software Engineer · Critical Infrastructure & Data Center Energy Systems

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CORE COMPETENCIES

Senior engineer with 12+ years of experience designing production-grade controls, embedded/edge automation, backend tooling, and cloud-enabled critical-infrastructure systems for manufacturing, robotics, and hyperscale data centers. Combines hands-on electrical/controls depth with software-development practices including Python/BASH/C++ automation, CI/CD infrastructure, reusable libraries, structured rules documentation, skills-based workflows, and AI-assisted engineering delivery.

PROFESSIONAL EXPERIENCE

Amazon Web Services (AWS) · 10/2024 – Present

Systems Development Engineer II (L5) — Data Center Engineering, Center for Infrastructure & Controls

Led development of software-driven HV/MV switchgear automation for global AWS data center fleets, combining electrical controls, backend automation logic, standards-informed design, and production deployment methods to support safe, compliant energy distribution.

- ▶ Designed Modbus-based data-acquisition and communication architectures connecting EPMS platforms, protective relays, switchgear, and power-monitoring devices into a scalable software layer for real-time visibility and automated control.
- ▶ Engineered backend automation logic on top of Modbus-integrated EPMS/relay data to perform scheduling, demand response, load flexibility, and contingency reactions across mission-critical electrical infrastructure.
- ▶ Supported automation and control strategies for electrical loads in excess of 100+ MW, requiring reliability, deterministic behavior, operational safety, controlled failure-mode handling, and clear operator interaction expectations.
- ▶ Served as a developer on a globally deployed automation platform integrating on-premises load controls, utility constraints, and cloud-based deployment workflows for automated scheduling and demand-response execution.
- ▶ Helped deliver a platform deployed across AWS data centers driving $\approx$ \$250K in quarterly cost savings per site ($\sim$ \$1M annually, >200% two-year ROI) for lower-load DCs above $\sim$ 40 MW.
- ▶ Applied standards-informed architecture and documentation practices across controls, electrical, and OT systems: IEC 61131-3, ISA-style alarm/sequence docs, UL/NFPA-informed panel & machine-safety considerations, ISA/IEC 62443-aware cybersecurity discussions.
- ▶ Designed, managed, and deployed OpenADR-aligned automation strategies in compliance with ISO/RTO requirements (MISO, EirGrid, S.E.A.), translating grid constraints into executable controls and software requirements.
- ▶ Developed CI/CD infrastructure, AWS pipelines, cloud-based tooling, and deployment frameworks to scale energy-management and critical-infrastructure automation

SKILLS &

RELEVANT EXPERIENCE

BACKEND · CLOUD · AI · DEVOPS

- Python, BASH, C++
- AWS infrastructure & CI/CD pipelines
- Deployment tooling & reusable libraries
- Agentic AI workflows
- Custom MCPs & rules-document frameworks
- Reusable skills-based workflows
- Automated validation frameworks
- SaaS / HaaS patterns

EMBEDDED · OT · CONTROLS

- Rockwell (Logix Designer) & Siemens PLCs
- Rockwell SDK development
- IEC 61131-3 (LD · FBD · ST · SFC)
- SCADA + HMI development
- Protective-relay & switchgear integration
- Modbus RTU/TCP · BACnet · OPC UA
- EPMS / BMS / BAS integration
- Edge-control architectures
- AI-assisted controls software

VISION & ROBOTICS

- Cognex · Keyence · FANUC · Basler · DataMan
- FANUC / ABB — 6-axis · 5-axis · Gantry

ENERGY · POWER · LOAD MGMT.

- HV / MV switchgear automation
- 100+ MW load management
- Power-monitoring data acquisition
- OpenADR demand-response schemas
- Utility & ISO/RTO coordination

STANDARDS

- NFPA 70 (NEC) · NFPA 70E · NFPA 79
- UL 508A · IEC 60204-1
- IEC 61131-3 · IEC 61508 / 61511
- ISO 13849 · IEC 62061
- ISA-5.1 · ISA-18.2 · ISA-88 · ISA-95 · ISA-101

across a global portfolio.

- ▶ Evaluated and integrated embedded/edge devices and Modbus/BACnet-capable technologies for regional requirements, balancing field reliability, protocol compatibility, cybersecurity-aware architecture, and long-term resilience.
- ▶ Partnered with internal engineering, vendor, software, and utility stakeholders to define scope, acceptance criteria, interfaces, and FAT/SAT requirements for scalable critical-infrastructure platforms.

Amazon Services, LLC · 10/2023 – 10/2024

Systems Development Engineer II (L5) — SI, Amazon Robotics

Designed and delivered production-ready robotics automation and process-control software for global fulfillment / sort centers, blending PLC control, backend tooling, cloud infrastructure, commissioning automation, and deployment standards.

- ▶ Engineered PLC and controls-integration solutions for robotic material-handling and sortation systems while reducing manual commissioning effort through software automation and reusable validation workflows.
- ▶ Led AWS infrastructure development including pipelines, S3-backed tooling, and deployment frameworks to standardize commissioning, validation, and technology-agnostic rollouts across facilities worldwide.
- ▶ Partnered with R&D, manufacturing, and vendor teams on mission-critical projects, defining technical requirements, deliverables, and factory acceptance criteria to align execution with organizational goals.
- ▶ Developed global programming libraries, internal standards, reusable automation patterns, and documentation practices that improved consistency, reliability, and cross-team adoption across diverse geographies and vendors.

Amazon Services, LLC · 07/2021 – 10/2023

Systems Development Engineer I (L4) — SI, Amazon Robotics

Led integration and deployment of large-scale automated systems for Amazon Robotics, building backend applications, PLC/automation solutions, and deployment tooling to optimize commissioning and operational efficiency.

- ▶ Designed technology-agnostic software tools/scripts (Python, BASH, C++) to automate deployment, normalize vendor deliverables, and streamline multi-team commissioning workflows.
- ▶ Collaborated with vendors and cross-functional teams to define testing, validation, and operational standards for robotic material-handling systems.
- ▶ Directed factory acceptance testing, system validation, and process documentation for robotics automation equipment to support long-term operational excellence and adherence to safety and quality standards.

Matthews International · 04/2019 – 04/2021

Senior Controls Engineer

Owned end-to-end delivery of multi-million-dollar automation and control projects (\$50K – \$15M), from concept through commissioning.

- ▶ Partnered with customers to define user requirements and translate them into scalable, reliable system designs supporting complex operational processes.
- ▶ Directed integration of large-scale material-handling and automation systems, ensuring seamless coordination across control software, hardware, data interfaces, safety requirements, and vendor deliverables.
- ▶ Designed source code for shoe sorters, wave sorters, and chute sorters with 100+ diverting locations through the PLC and WMS interface; SawTooth merges up to 6-to-1 lane merges; transfer stations with 4 primary transfer locations.

- ISA/IEC 62443 (OT cybersecurity)

COMMS PROTOCOLS

- MQTT · Ethernet/IP · EtherCAT
- Sercos · ProfiBus · DeviceNET · ControlNET
- Modbus RTU/TCP · BACnet · OPC UA

REGULATORY · UTILITY

- ISO/RTO compliance — MISO · EirGrid · S.E.A.
- OpenADR-aligned demand response
- Federal / state considerations
- OEE and cost modeling

LEADERSHIP & DELIVERY

- \$15M+ project delivery
- Cross-functional & vendor oversight
- Global standards development
- FAT / SAT coordination
- Control narratives & sequence-of-op docs
- Requirements traceability

JTM Provisions · 03/2018 – 04/2019

Controls Engineer

Led design, commissioning, and maintenance of control systems for high-throughput food production facilities supplying critical federal/state programs (military, school, prison).

- ▶ Implemented process improvements and automation solutions that increased OEE and ensured reliable production for government-backed programs.
- ▶ Managed CapEx projects for facility expansion — budgets, vendor relationships, and on-time execution to support strategic growth.
- ▶ Established preventive-maintenance programs, documentation standards, and workforce training to ensure compliance, continuity, and safety.

Toyota TEMA (Aerotek) — VPPE · 09/2017 – 03/2018 (contract)

Systems Engineer

Adapted control and inspection system architectures to meet evolving plant production requirements at Toyota's Vehicle Production Preparation Engineering group.

- ▶ Developed and implemented vision inspection programs to enhance production quality, defect detection, and process efficiency.
- ▶ Ensured compatibility with existing infrastructure, vision software, and quality standards on active production lines.

Mubea Shared Services, LLC — Hose Clamps · 07/2014 – 09/2017

Controls Engineer / EET Apprenticeship

Led design, retrofit, and commissioning of automated control systems for critical manufacturing infrastructure.

- ▶ Implemented a plant-wide SCADA system to centralize operational data, improve real-time monitoring, and support production/maintenance decision-making.
- ▶ Directed multi-system integrations and large-scale retrofits, managing execution from design through commissioning.
- ▶ PLC/HMI programming, drive parameterization, and field-device reliability improvements across Beckhoff CX10xx/CX20xx and Siemens S7 300/400/1200/1500 platforms.

EDUCATION & TRAINING

Apprenticeship: Completed 3-year Federally Recognized Electrical & Controls Apprenticeship

Degrees + Diplomas: Associate of Applied Science — Electrical Technology · Industrial Maintenance · Associate of Science (~172 credit hours total)

Certifications: Certified Journeyman Electrician (KY) · AWS Certified Cloud Practitioner · AWS Architecting (trained) · Project Management Professional (trained)

Credentials: ProfiBus DP/PN · Siemens STEP 7 v5.5 · Siemens TIA Portal v13+ · Beckhoff TwinCat 2 · Industrial Maintenance Mechanic L2 · Industrial Maintenance Electrical Mechanic · MSSC (CPT) Certified · FANUC Basic Handling Tool · Exploratory Machining I · Electrician Trainee Level I