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Senior Instrumentation & Automation Engineer

Engineering reliable automation systems through innovation, technical leadership, and practical problem-solving.
Engineering Portfolio — project case studies, innovations and troubleshooting records

ENGINEERING PHILOSOPHY

“Every engineering challenge has a solution. If I don't know the answer immediately, I learn, collaborate when necessary, and stay committed until the problem is solved. My objective is not only to repair equipment but to eliminate recurring problems through engineering improvements.”

AUTOMATION INFRASTRUCTURE MANAGED

- Approximately 350 PLC-controlled systems across production, utilities and support blocks.
- 11 PLC / DCS stations and approximately 50 operator stations.
- Server room with standby historians and engineering stations.
- Managed industrial Ethernet switches with segmented control networks and remote I/O panels.

PROJECT CASE STUDIES

Replacement of ~90 breach isolators with N2 interlock modification | 60 days

Planned and executed isolator replacement with a nitrogen interlock modification strengthening containment safety, delivered without disrupting the production schedule.

Installation of 25 new reactors | 20 days

Coordinated instrumentation, control wiring, loop checking and commissioning for 25 multi-purpose reactors through parallel work-front sequencing.

Relocation of ~80 acid tanks with overflow interlocks | 20 days

Complete field wiring and overflow interlock implementation, raising safety integrity of the storage area on a compressed schedule.

Safety purge panels for ~270 weighing balances | 60 days

Installed and modified purge panels across Mettler-Toledo, Sartorius and Precia Molen platforms, standardising the safety approach across vendors.

Siemens & Allen-Bradley integration into PI System | Plant-wide

Control platform upgrades, PI system installation and unified historian integration, with extended operator stations and long-term process data visibility.

Warehouse & QC block instrumentation into DCS | Multi-block

New and existing block instrumentation connected to DCS with critical-parameter alarms annunciated at the security gate and new safety systems.

ENGINEERING INNOVATIONS

Permanent VFD network optimisation

A block ran 26 VFDs on one RS-485 network where a single fault could stop the block. Split the drives into three networks by criticality, replaced RS-485 terminal blocks and separated electrical earthing from drive earthing.

Universal reactor bottom valve feedback

Designed a feedback solution working consistently across different valve manufacturers; one standard design, stable in service for years.

Plant-wide pH sensor protection

Traced recurring glass electrode breakage to sensor positioning; repositioning plant-wide sharply reduced damage and consumable spend.

PLC asset optimisation

Mapped and used existing spare I/O in installed Rockwell PLCs for QC, warehouse and production block additions instead of purchasing new PLCs.

Instrument recovery & reuse programme

In-house repair of instruments, motherboards, PLC boards, on/off valves, control valves and switches, with removed instruments preserved for controlled reuse.

CRITICAL TROUBLESHOOTING

Autoclave PLC hardware failure

A door control failure stopped the line. Diagnosed the fault to PLC hardware and executed an emergency board-level repair on site; production restored without vendor lead time.

Breach isolator rotary vapour drive

A damaged drive board threatened a critical batch with no spare available. Identified failed board potentiometers and substituted a locally sourced equivalent; the batch completed on schedule.

Obsolete warehouse safety system

Three safety system motherboards failed with no vendor service or spares. Repaired all three at component level, maintaining safety coverage until replacement systems were procured.

Recurring reactor transmitter failures

Investigated repeated temperature transmitter failures and found RTDs were mechanically damaged during bottom valve wheel operation; the root cause was eliminated by design change.

Plant fire incident response

Reached site within an hour, safely shut down automation systems, isolated burnt cabling and restarted plant automation smoothly with controlled, documented recovery.

VALIDATION & COMPLIANCE

- Qualification lifecycle: IQ, OQ, PQ, FAT and SAT execution and documentation.
- Frameworks: cGMP, 21 CFR Part 11, GAMP 5, ALCOA+, RCA, CAPA, deviation management and change control.

LEADERSHIP & COST OPTIMISATION

- Led day-to-day automation activities, 5 shift technicians and 2 contract labourers.
- One of only 3 plant automation administrators across 11 automation stations.
- In-house board and instrument repair, spare I/O utilisation and instrument reuse reduced capital and consumable spend.

FUTURE VISION

- Smart, data-driven plants where historian analytics drive predictive decisions.
- Reliability by design: converting recurring failure modes into permanent engineering improvements.
- Resilient, segmented control networks where no single fault can take a block offline.