Australian Government

ANSTO
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POSITION DESCRIPTION

Position Title:	Electrical Control Systems Technician / Specialist
Cluster / Business Unit / Division	Nuclear Science and Technology
Section or Unit:	Australian Centre for Neutron Scattering - Operations
Classification:	Band 4 / 5 Linked Role
Job Family:	Engineering and Technical
Position Description Number:	PD-2352
Work Contract Type:	Technical
STEMM/NON-STEMM:	STEMM
STEMM CATEGORY:	Technical

POSITION PURPOSE

The Electrical Control Systems Technician/Specialists are responsible for the safe and reliable operations of Neutron Beam Instruments (NBI) electrical control systems. The role performs designs, programs, deploys and maintains PLC controlled systems including motion control systems and safety interlock systems (SIS). The position also supports NBI electrical systems.

ORGANISATIONAL ENVIRONMENT

ANSTO leverages great science to deliver big outcomes. We partner with scientists and engineers and apply new technologies to provide real-world benefits. Our work improves human health, saves lives, builds our industries, and protects the environment. ANSTO is the home of Australia's most significant landmark and national infrastructure for research. Thousands of scientists from industry and academia benefit from gaining access to state-of-the-art instruments every year.

Nuclear Science & Technology (NST) incorporates ANSTO's research, innovation, landmark research infrastructure and associated platforms and capabilities. NST conducts research and development in relation to nuclear science and technology and connects people, transfers knowledge, and provides nuclear-based products and services for the benefit of Australia.

The Research Infrastructure portfolio consists of scientific infrastructure and capabilities, with a number of them categorised as landmark infrastructure. This includes a range of scientific assets, infrastructure, capability development & delivery for multi-decadal, multi-disciplinary, multi-user platforms for the user community and for internal research and development endeavours

The Australian Centre for Neutron Scattering (ACNS) operates neutron and X-ray scattering instruments with specialised sample environment equipment utilising ANSTO's modern high flux OPAL reactor and its cold neutron source. ACNS conducts structural and functional scientific investigations for industry, health, environment, biotechnology, nanotechnology, energy, advanced materials, engineering, food and heritage / archaeology sectors. ACNS is one of the top neutron facilities worldwide and unique within the Southern Hemisphere with an internationally competitive instrument suite complemented by an extensive suite of sample environments. There is an extensive user program of >500 users (with more than 1400 visits) per year from Australian universities and institutes, international institutions and internal ANSTO researchers. ACNS also services industry needs in engineering, infrastructure, food, automotive and other sectors.

ACCOUNTABILITIES & RESPONSIBILITIES

Key Accountabilities Band 4

- Install and maintain Neutron Beam Instruments (NBI) motion control systems to provide reliable and robust positioning of instruments, samples and other system related to the NBI including moveable shielding.

- Install and maintain Neutron Beam Instruments (NBI) Safety Interlock System (SIS) to ensuring personal safety of ANSTO staff and non-employees
- Maintain all aspects of the motion positioning systems to ensure a high quality and reliability, devising solution for maximising the effective use of the neutron beam instruments including the recommendations for spare parts holdings
- Maintain electrical connectors, cable chains and cabling to ensure effective and efficient systems, reduce faults and minimise NBI outages.
- Provide specialist advice and solutions issues of cabling and cable chaining and the safe and robust routing of cables for new control systems.
- Design, build and wire NBI control cabinet systems to accommodate new axes, hardware and devices to increase flexibility of usage and customisation.
- Maintain all aspects of the motion positioning systems to ensure a high quality and reliability, devising solution for maximising the effective use of the neutron beam instruments including the recommendations for spare parts holdings
- Maintain electrical connectors, cable chains and cabling to ensure effective and efficient systems, reduce faults and minimise NBI outages.
- Maintain ACNS electrical engineering spares including inventory, holdings, and procurement.
- Plan maintenance periods, repairs, and upgrades to synchronise with instrument availability and reactor down time.
- Prepare documentation and draft instrument changes to the as built and original specifications.
- Develop prototype designs for instrument upgrades.
- Install and test instrumentation and systems from engineering documentation and drawings.
- Provide technical advice and contribute to the continuous improvement of the NBI to ensure availability and maintain customer satisfaction.
- Provide knowledge sharing to apprentices, interns and new technical staff on motion control systems.
- Complete electrician tasks when required including isolations, supervision of contractors or apprentices
- Provide C1 (High Risk) supervision to contractors.
- Undertake additional duties as required and during period of leave of other staff.

Key Accountabilities Band 5

In addition to accountabilities at Band 4, Band 5 requires:

Band 5 Safety PLC stream

- Lead the design, programming, deployment and maintenance of the Neutron Beam Instruments (NBI) safety interlock systems (SIS) ensuring personal safety of ANSTO staff and non-employees.
- Interpret and apply Australian Standards for Machine Safety and Australian regulatory requirements of the NBI SIS to ensure ongoing compliance
- Project management of operational and capital projects, including conceiving and proposing new projects, according to ACNS plans and objectives, developing the technical case, prepare costing, organising quotes and planning execution.
- Training of staff in the use of the SIS including documentation and preparation of induction and training materials.
- Lead the maintenance of all equipment and associated infrastructure of the SIS including the planning of maintenance periods, repairs and upgrades.
- Prepare documentation and liaise with ANSTO Maintenance & Engineering (AME) section for as built SIS drawings and updates

Band 5 Motion control stream

- Lead the design, programming, deployment and maintenance of the Neutron Beam Instruments (NBI) motion control systems.
- Project management of operational and capital projects, including conceiving and proposing new projects, according to ACNS plans and objectives, developing the technical case, prepare costing, organising quotes and planning execution.
- Training of staff in the use of the motion control including documentation and preparation of induction and training materials
- Lead the maintenance of all equipment and associated infrastructure of the motion control including the planning of maintenance periods, repairs and upgrades.
- Prepare documentation and liaise with ANSTO Maintenance & Engineering (AME) section for as built Motion control system drawings and updates

A selection of accountabilities is required for the higher band transition as indicated in the band transition checklist.

Decision Making

Band 4

- Managing equipment upgrades within complex and diverse systems.
- Carrying out work in a heavily regulated environment and adherence to all external regulations in a changing arena.
- Carrying out work in accordance with operational requirements and tight deadlines to meet customer requirements.
- Maintaining knowledge and expertise with new systems that are custom built.
- Provide support to the NBI and troubleshooting complex systems in short periods of time and under pressure to minimise disruption to internal and external customers.
- Decisions around maintenance, safety, and operational limits must be carried out on sound objective principles involving data gathering and analysis of data to determine operating limits and maintenance procedures.
- The ANSTO values, and organisational corporate plan, business plan, operational excellence program, the (section/unit or higher) strategy and (section/unit) objectives provide the context for the position
- The levels of authority delegated to this position are those approved and issued by the Chief Executive Officer. All delegations will be in line with the ANSTO Delegation Manual AS-1682 (as amended or replaced).

Band 5

Band 5 Safety PLC Stream

- This position provides informed advice to the engineer responsible within the Australian standards framework for solutions related to safety interlock technologies
- The position determines, in agreement with the Electrical Engineering group Leader, and independently documents the commissioning tests required to meet Australian and international standards for the safety interlock systems
- The position is responsible for the planning of upgrades and frequency of commissioning of the NBI safety interlock systems/motion control systems.

Band 5 Motion Control stream

- This position provides informed advice to the engineer responsible within the Australian standards framework for solutions related to motion control and electrical technologies
- The position determines, in agreement with the Electrical Engineering group Leader, and independently documents the commissioning tests required to meet reliability and accuracy standards for the motion control systems
- The position is responsible for the planning of upgrades and frequency of commissioning of the NBI motion control systems.

Key Challenges

Challenges for the position include:

Band 4

- Develop and maintain control systems for motion control in a changing and continuously evolving environment.
- Ensuring the successful implementation of developed control systems and project completion whilst managing conflicting priorities and deadlines.
- Keeping abreast of recent developments in the field of expertise, ensuring continual improvement and implementation of best practise.
- Ensure control system designs are described, documented, and up to date in the quality assurance system.
- Ensure control system designs are captured in ANSTO drawings and accessible in the ANSTO Engineering Drawing Database
- Ensure spare parts for all developed control systems are in stock and documented minimising downtime of NBI during repairs
- Program the preventative maintenance and ensure that a maintenance plan has been included and performed as part of the SAP master data
- Ensure the on-going quality of the operations of the developed control systems through testing and online monitoring
- Provide advice on costs of works to the ACNS Electrical Engineering Team Leader including Capital and Labour
- Working in a heavily regulated environment adhering to internal and external regulations

Band 5

Band 5 Common requirements

- Carrying out work in accordance with operational requirements and tight deadlines to meet customer requirements
- Remain informed and interpret changing regulations and provide informed advice to stakeholders and to the Electrical Engineer Group Leader

Band 5 Safety PLC stream

- Managing equipment upgrades and maintaining up to date knowledge in the relevant field of expertise across safety interlock systems and motion control systems within a complex and diverse range of systems
- Maintaining relevant and up to date knowledge of motion controls and safety interlock system programming language

Band 5 Motion control stream

- Managing equipment upgrades and maintaining up to date knowledge in the relevant field of expertise across motion control systems within a complex and diverse range of systems
- Maintaining relevant and up to date knowledge of motion controls and PLC programming language

Working in a heavily regulated environment adhering to internal and external regulations

KEY RELATIONSHIPS

Who	Purpose
Internal	
ACNS Electrical Engineering Group Leader	• Receive guidance and direction • Provide expert, authoritative and evidence-based advice • Recommend and gain endorsement for plans and goals and other initiatives
Work area team members	• ACNS Electrical Engineering Team members • Provide expert advice and analysis on a full range of matters relating to motion and PLC control systems and the integration of control systems within a system wide • Contribute to group decision making processes, planning and goals • Collaborate and share accountability • Understand interactions with coupled control systems • Collaborate in the design of Safety interlock Systems (Band 5) • Provide advice on Safety Interlock Systems (Band 5)
Instrument scientists	• Collect and document control system requirements in conjunction with the ACNS Electrical Engineering Team lead • Interpret requirements for the purposes of developing effective control systems
ANSTO AME drafting group	• Communicate new designs for the purposes of drafting control systems • Checking and updating existing drawings and records and general arrangements
ACNS Operations group	• Collaborate and share new axes requirements with software specialists such as configurations and operating details • Develop, document, and maintain interface systems in collaboration with software specialists • Develop documentation for the effective field level operation of control systems • Hand over training of new control systems to stakeholders

	• Direct maintenance technicians in the development and repair of mechatronic systems and motion control plant
External	
Suppliers	• Maintain communications with suppliers of hardware to develop appropriate maintenance plans for PLC and Motion control systems
	•
Work area team members	• ACNS Electrical Engineering Team members • Provide expert advice and analysis on a full range of matters relating to motion and PLC control systems and the integration of control systems within a system wide • Contribute to group decision making processes, planning and goals • Collaborate and share accountability • Understand interactions with coupled control systems • Collaborate in the design of Safety interlock Systems (Band 5) • Provide advice on Safety Interlock Systems (Band 5)
Instrument scientists	• Collect and document control system requirements in conjunction with the ACNS Electrical Engineering Team lead • Interpret requirements for the purposes of developing effective control systems
ANSTO AME drafting group	• Communicate new designs for the purposes of drafting control systems • Checking and updating existing drawings and records and general arrangements
ACNS Operations group	• Collaborate and share new axes requirements with software specialists such as configurations and operating details • Develop, document, and maintain interface systems in collaboration with software specialists • Develop documentation for the effective field level operation of control systems • Hand over training of new control systems to stakeholders • Direct maintenance technicians in the development and repair of mechatronic systems and motion control plant

POSITION DIMENSIONS

Staff Data	
Reporting Line	Reports to the ACNS Electrical Engineering Group Leader
Direct Reports	Nil
Indirect Reports	Nil

Financial Data (2023/2024)	
Revenue / Grants	N/A
Operating Budget	N/A
Staffing Budget	N/A
Capital Budget	N/A
Assets	N/A

Special / Physical Requirements	
Location:	Lucas Heights Working in different areas of designated site/campus as needed
Travel:	May be required travel to ANSTO sites and from time to time
Physical:	Office based physical requirements (sitting, standing, minimal manual handling, movement around office and site, extended hours working at computer) Labour intensive physical requirements (sitting, standing, frequent manual handling) Standing for long periods Frequent movements (climbing, stooping, kneeling, crouching, crawling) Working in a loud environment Public speaking Industrial facility physical requirements (lifting, standing for long periods, operating machinery, equipment and manipulators) Wearing personal protective equipment for the handling of hazardous and/or radioactive materials Working in confined space environment including wearing respiratory equipment
Radiation areas:	May be required to work in radiation areas under tightly regulated conditions Perform duties in an area where radioactive materials are handled under tightly controlled safety conditions Perform duties with and in an area where hazardous chemicals or materials are handled under tightly controlled safety conditions
Hours:	Willingness to work extended and varied hours based on operational requirements May be required to participate on an on-call roster 24x7x365
Clearance requirements:	Satisfy ANSTO Security and Medical clearance requirements Obtain and maintain appropriate federal government clearance
Linked Role:	The Transition from Band 4 to Band 5 is not automatic and requires a full written submission, in addition to the attached checklist, to demonstrate how the employee meets the requirements. Transition will only occur following approvals from the Manager – ACNS Electrical and Control Systems and Operations Manager ACNS

Workplace Health & Safety	
Specific role/s as specified in AP-2362 of the ANSTO WHS Management System	All Workers Other specialised roles identified within the guideline a position holder may be allocated to in the course of their duties

ORGANISATIONAL CHART

Refer to Published Organisational Chart

KNOWLEDGE, SKILLS AND EXPERIENCE

Band 4

- Diploma in Electrical Engineering, Electrical Control Systems, or related discipline and/or equivalent experience in Electrical Control Systems in an industrial environment
- Experience as a licensed Electrician working with an Electrical Engineer in an industrial instrumentation or similar role
- Experience in a PLC environment and programming environment, with specific experience in field device integration such as relays, and control panels
- Experience in a motion control programming environment, with experience in configuration and integration of stepper motors in mechanical assemblies, precision rotary encoding systems, associated interface electronics, mechanical integration, and cabling.
- Experience with fault finding electro-magnetic compatibility and interference and knowledge of practical ways of reducing or eliminating this effect
- Demonstrated ability to read complex and detailed electrical design schematics and must have built electrical control panels from same.
- Demonstrated experience with terminating multi-core cables on Mil spec and Lemo style connectors.
- Ability to manage time efficiently, meet tight deadlines, communicate effectively, and a proven ability to interact within a diverse team environment with multiple specialists from different backgrounds.
- Ability to solve problems independently and pro-actively with a demonstrated high level of self-motivation.
- Experience MS Word, Excel and CAD software for preparing and modifying electrical system schematics.

Band 5

Band 5 Common

- Excellent communication skills, including proven ability to interact within a team environment and provide timely status updates to projects and tasks
- Ability to solve problems independently and pro-actively with a demonstrated high level of self-motivation
- Minimum 5 years demonstrated practical experience in distributed control systems.
- Demonstrated knowledge of project management principles and work experience
- Ability to manage time efficiently and meet tight deadlines
- Supervisor certificate (electrician)

Band 5 Safety PLC stream specific

- Diploma in Electrical Engineering with specialisation in Electrical Controls systems or related discipline and/or equivalent experience in control systems engineering or Safety PLC programming, testing, and commissioning
- 5 years or more experience in Safety PLC programming, testing, and commissioning.
- Machine safety systems expert accreditation

Band 5 Motion control PLC stream specific

- Diploma in Electrical Engineering with specialisation in Electrical Controls systems or related discipline and/or equivalent experience in control systems engineering testing, and commissioning

- Demonstrated experience in a motion control programming environment, with specific experience in configuration and integration of stepper motors in mechanical assemblies.

VERIFICATION

This section verifies that the line manager and appropriate senior manager/executive confirm that this is a true and accurate reflection of the position.

Line Manager		**Delegated Authority**	
Name:	Frank Darmann	Name:	Paolo Imperia
Title:	Lead: Electrical and Control Systems	Title:	Operations Manager, ACNS
Signature:		Signature:	
Date:		Date:	

Appendix 1

ANSTO Job Families
Accounting & Finance
Administration
Communications & Marketing
Compliance & Regulation
Engineering and Technical
Human Resources
ICT & Digital Solutions
Information & Knowledge Management
Legal
Manufacturing
Monitoring & Audit
Operations
Organisational Leadership
Project & Program
Research
Science
Security & Intelligence
Senior Executive
Service Delivery
Strategic Policy
Trades & Labour

Electrical Control Systems Technician / Specialist **Linked Role (PD-2352)** **Band 4 to Band 5 Transition Checklist**	
Name:	
Commencement Date:	
Assessment Date:	

Note: Full written submission demonstrating and justifying how the employee meets the requirements must also be attached.

Requirements for transition	Met Criteria
Expert in Australian standards AS3000 as applied to electrical power systems. Evidence of LOTO activities including associated SWMES. Practical field deployed examples of new circuits, RCD testing, Megger testing, Earth loop measurement, and the methodical visual inspection of switchboards.	☐Yes ☐No
Expert in commissioning of motion control systems showing evidence of written test systems and results. Written evidence of detailed commissioning protocols that exhaustively test all ranges and circumstances of a motion control system along with expected results and pass/fail criteria. Detailed step by step visual inspection, electrical testing, and oscilloscope testing of feedback signals. Evidence of documenting issues, following up on failure events to a level where they are not just fixed in the field in a short-term sense, they are repaired for the long term. Evidence of capturing field repairs that can be repaired on the spot to get an instrument going in the short term however a longer-term plan is made to deploy a higher quality solution in a shut down that may need more design time or procurement of items.	☐ Yes ☐ No
Detailed field knowledge of systems at the ACNS. Evidence of integrating new axes into existing control systems, including updates to the SICS configuration, updates to the YAML file, testing employing SICS command lines to simulate the Gumtree control and how the scientist would control their instrument. Understanding the processes including compressed air, chilled water, power supply, UPS system, vacuum control, and the NBI monitoring system,	☐ Yes ☐ No
Expert in version control of code and activities and documents. At least ten examples of updates employing GIT to manage code changes. At least ten examples of detailed electrical control system updates and as-built updates of electrical drawings saved in the project area.	☐ Yes ☐ No
Proven experience integrating a system from concept to commissioning in the field. Evidence will include where appropriate the electrical control system drawings, the general assembly of the control system, field deployment, testing and commissioning in the field. Evidence of completing as-built drawings based on test results will also be required.	☐ Yes ☐ No
Proven experience of delivering tasks and projects on time and to the right quality as directed by the Electrical and Control Systems Engineering Lead (ACNS)	☐ Yes ☐ No
Proven experience in coding control systems from client specification to field functionality. Written evidence of code changes and new code written of control systems to a level of quality that includes comments, GIT updates, and error handling within the code.	☐ Yes ☐ No

Proven experience in fault finding and repairs in the field. Written evidence of documenting root causes, the repair made, and subsequent updates to records including, if applicable, any associated electrical drawing updates, Solidworks model updates, software updates. All software updates to be in GIT, drawing updates to be in the Engineering Data Base. Evidence must also show that root causes and repairs are shared with the team through history dockets and verbally in teams meetings.	☐ Yes ☐ No

Manager Recommendation:
I have reviewed the employee's competence in accordance with Linked Role PD-2352 and certify that the employee meets all requirements for transition and recommend transition from Band 4 to Band 5 be endorsed.

Manager Name:	
Signature:	
Date:	

General Manager Assessment
I have assessed the submission and confirm that the employee meets all requirements for transition from Band 4 to Band 5

General Manager Name:	
Signature:	
Date:	