



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **MSAPMOPS406A Identify problems in electronic control systems**

**Revision Number: 1**

## **MSAPMOPS406A Identify problems in electronic control systems**

### **Modification History**

Not applicable.

### **Unit Descriptor**

#### **Unit descriptor**

This competency covers the recognition and diagnosis of control system problems in electrical/electronic control systems on process equipment. It includes the implementation of appropriate corrective action. It applies to all sectors of the industry.

This competency is typically performed by technicians working either independently or as part of a work team.

### **Application of the Unit**

#### **Application of this unit**

This competency applies to operators who are required to apply knowledge of electronic control systems and components to the identification and isolation of faults in equipment. The key factors are the diagnosis and the recommendation of action to resolve routine and non-routine faults, in order to return the equipment to production.

The technician will:

- identify and plan scope of equipment checks
- check settings, adjustments and performance of equipment
- identify and isolate faults in equipment
- propose solutions and carry out solutions within scope of authority
- complete logs and reports.
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### **Licensing/Regulatory Information**

Not applicable.

## Pre-Requisites

### Prerequisites

This unit has **no** prerequisites.

## Employability Skills Information

### Employability Skills

This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

## Elements and Performance Criteria

ELEMENT ELEMENT	PERFORMANCE CRITERIA
1. Identify electrical/ electronic control system problems.	<p>Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.</p> <p>1.1 Categorise the types of machine malfunctions due to electrical/electronic faults.</p> <p>1.2 Describe the effects on product quality of electrical/electronic problems.</p> <p>1.3 Isolate possible faulty components from a circuit diagram and knowledge of the function of each component.</p>
2. Implement appropriate corrective action.	<p>2.1 Examine other possible faults.</p> <p>2.2 Short list possible fault causes.</p> <p>2.3 Conduct investigations of machine, products or data to determine most likely fault cause(s).</p> <p>2.4 Take appropriate action to ensure fault is rectified.</p> <p>2.5 Follow up on action to ensure completion in an appropriate time frame.</p> <p>2.6 Recheck after corrective action to ensure fault has been rectified.</p>
3. Identify maintenance requirements.	<p>3.1 Check manufacturer instructions to determine recommended maintenance schedule.</p> <p>3.2 Check fault and maintenance history to determine adequacy of current regime and special requirements.</p> <p>3.3 Determine criticality of machine to production/business.</p> <p>3.4 Develop maintenance schedule/requirements for machine.</p> <p>3.5 Liaise with all relevant stakeholders to ensure schedule is appropriate.</p> <p>3.6 Report outcome to appropriate personnel.</p>
4. Identify electronic control system problems.	<p>4.1 Categorise the types of machine malfunctions due to electronic control system faults.</p> <p>4.2 Describe the effects on product quality of electronic control system problems.</p> <p>4.3 Isolate possible faulty components from a circuit diagram and knowledge of the function of each component.</p>
5. Implement appropriate	5.1 Examine other possible faults.

<b>ELEMENT</b> ELEMENT	<b>PERFORMANCE CRITERIA</b> Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
corrective action.	5.2 Shortlist possible fault causes. 5.3 Conduct investigations of machine, products or data to determine most likely fault cause(s). 5.4 Take appropriate action to ensure fault is rectified. 5.5 Follow up on action to ensure completion in an appropriate time frame. 5.6 Recheck after corrective action to ensure fault has been rectified.

## Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the process and the interaction of process conditions on product quality sufficient to recognise and analyse control system faults.

Knowledge of organisation procedures and policies along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Application of the knowledge of managing risks using the hierarchy of controls applied to the process. Application of approved hazard control, safety procedures, use of PPE in relation to handling materials, equipment operation and clean up.

Knowledge as a basis for solving electronic control system problems, including:

- fundamentals of electricity and electronics
- electronic circuit diagrams
- principles of electronic circuit components
- principles of PLC programming, troubleshooting and diagnosis
- appropriate testing procedures and use of equipment for a range of equipment faults
- urgency and timeliness factors in planning maintenance activities in relation to production requirements
- collection, analysis and reporting of data.

Competence also includes the ability to:

- identify and select testing methods based on cost and time effectiveness
- conduct inspections, checks and tests on equipment as appropriate
- read and interpret circuit diagrams for mechanical, hydraulic, pneumatic and electrical/electronic operating systems
- use technical information and manufacturer information to locate relevant data
- interpret technical specifications and manufacturer instructions
- ensure workplace is safe for testing and maintenance of equipment
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

### Language, literacy and numeracy requirements

This unit requires the ability to read and interpret technical specifications and manufacturer manuals.

Writing is required to the level of writing procedures and schedules. Basic numeracy is also required to allow the interpretation of machine and product data and the comparison of actual with desired readings.

## Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

### Overview of assessment

It is preferred that assessment takes place on industrial equipment in a work environment.

### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

It is essential that competence is demonstrated in the ability to:

- recognise potential situations requiring action and then in implementing appropriate action.

Consistent performance should be demonstrated. For example, look to see that:

- machine reliability is high.

### **Assessment method and context**

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Competence in this unit may be assessed:

- on a processing plant allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing the generation of evidence of the ability to recognise, anticipate and solve problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

### **Specific resources for assessment**

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom.

Additional resources might include the provision of equipment with known faults/problems to allow for assessment of the ability to identify problems.

## **Range Statement**

### **RANGE STATEMENT**

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

**Context**

This competency unit includes all common equipment used in the manufacturing industry and should be able to be applied to all equipment using electrical/ electronic control systems.

This competency applies to all work environments and sectors within the manufacturing industry. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

**Procedures**

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

**Tools and equipment**

This competency includes use of equipment and tools such as:

- application and programming of PLC (programmable logic controls) and ancillaries
- application of solid-state control/switching units
- switches, relays and solenoids
- position and pressure transducers
- temperature controllers.

**Hazards**

Typical hazards include:

- electricity
- temperature from hot surfaces and equipment
- malfunctioning equipment
- test equipment.

**Problems**

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems may include:

- loss of flow, power
- power failure
- component malfunction
- poor maintenance procedures
- regular maintenance
- shutdown
- motor failure effect on cycle time
- short shots
- loss of clamp pressure
- no power
- electronic/electrical faults
- analysis with PLC.

**Variables**

Key variables to be monitored include:

- temperatures
- cleanliness
- poor performance
- safety aspects.



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## **Unit Sector(s)**

Not applicable.