

TRAINING OCCUPATION: INDUSTRIAL MAINTENANCE OPERATIONS	
<b>Competency Unit (CU) 4: AUTOMATION SYSTEM MAINTENANCE</b>	<b>Code : ME-010-3:2012-C04</b>
<b>Work Activity 1: Select automation system to be maintained</b>	<b>Duration : 20 Hour</b>
<p><b><u>Learning Objectives</u></b></p> <p>At the end of learning session the apprentice will be able to:</p> <ol style="list-style-type: none"> <li>1. Define contents of automation system maintenance schedule such as <ol style="list-style-type: none"> <li>1.1. Format of maintenance schedule table (Daily, Weekly, Monthly, Quarterly, Yearly)</li> <li>1.2. Type of maintenance (Corrective, Preventive and Predictive)</li> <li>1.3. Type of machines</li> <li>1.4. Time interval</li> <li>1.5. Duration</li> <li>1.6. Verification (Prepare, Check and Approve)</li> <li>1.7. Location</li> <li>1.8. Etc</li> </ol> </li> <li>2. Explain types and functions of automation system equipments <ol style="list-style-type: none"> <li>2.1. Pneumatic</li> <li>2.2. Hydraulic</li> <li>2.3. PLC/PIC</li> <li>2.4. Etc.</li> </ol> </li> <li>3. Describe job order instructions/ Maintenance checklist <ol style="list-style-type: none"> <li>3.1. List of jobs</li> <li>3.2. Person in charge</li> <li>3.3. Type of job order</li> <li>3.4. Type of maintenance list</li> <li>3.5. Status of work</li> <li>3.6. Department</li> <li>3.7. Date and time start</li> <li>3.8. Date and time completed</li> <li>3.9. Etc</li> </ol> </li> <li>4. Describe automation system safety rules and regulation. <ol style="list-style-type: none"> <li>4.1. Manual Operation</li> <li>4.2. Manual Installation</li> <li>4.3. Standard Operating Procedure (SOP)</li> <li>4.4. Etc.</li> </ol> </li> </ol>	

<b>Work Activity 2 : Select maintenance requirement</b>	<b>Duration : 4 Hours</b>
<p><b><u>Learning Objectives</u></b></p> <p>At the end of learning session the apprentice will be able to:</p> <ol style="list-style-type: none"><li>1. Describe types of maintenance<ol style="list-style-type: none"><li>1.1. Preventive</li><li>1.2. Corrective</li><li>1.3. Predictive</li></ol></li></ol>	

<b>Work Activity 3 : Select automation maintenance system requirement</b>	<b>Duration : 48 Hours</b>
<p><b><u>Learning Objectives</u></b></p> <p>At the end of learning session the apprentice will be able to:</p> <ol style="list-style-type: none"> <li>1. Describe automation system maintenance technical manual <ol style="list-style-type: none"> <li>1.1. Pneumatic/Electro pneumatic</li> <li>1.2. Hydraulic/ Electro hydraulic</li> <li>1.3. PLC/PIC</li> <li>1.4. Etc</li> </ol> </li> <li>2. Describe automation drawing and specifications <ol style="list-style-type: none"> <li>2.1. Pneumatic/Electro pneumatic diagram</li> <li>2.2. Hydraulic/Electro hydraulic diagram</li> <li>2.3. PLC/PIC diagram</li> <li>2.4. Etc</li> </ol> </li> <li>3. Explain automation system maintenance technical manual <ol style="list-style-type: none"> <li>3.1. Installation procedure</li> <li>3.2. Operation procedure</li> <li>3.3. Etc</li> </ol> </li> <li>4. Explain automation tool and parts Input/output device <ol style="list-style-type: none"> <li>4.1. Pneumatic Input/output device</li> <li>4.2. Hydraulic Input/output device</li> <li>4.3. PLC input/output device</li> <li>4.4. PIC input/output device</li> <li>4.5. Etc</li> </ol> </li> <li>5. Identify types of automation maintenance tools <ol style="list-style-type: none"> <li>5.1. Computer/console</li> <li>5.2. Hand tools</li> <li>5.3. Power tools</li> <li>5.4. Viscosity meter</li> <li>5.5. Multimeter</li> <li>5.6. Etc</li> </ol> </li> </ol>	

**Learning Objectives**

At the end of learning session the apprentice will be able to:

1. Explain pneumatic parts maintenance activity
  - 1.1. Power Supply Unit
  - 1.2. Air cleaning section
  - 1.3. Air conditioning section (Air filter regulator, etc.)
  - 1.4. Control Device (Solenoid valve, etc.)
  - 1.5. Final Control Element
  - 1.6. Actuator (Cylinder, etc.)
  - 1.7. Etc.
2. Explain hydraulic parts maintenance activity
  - 2.1. Power pack system (Pump, etc.)
  - 2.2. Filter
  - 2.3. Hoses/piping/fitting
  - 2.4. Oil level/viscosity
  - 2.5. Control Device
  - 2.6. Final Control Element
  - 2.7. Actuator (Cylinder, etc.)
3. Explain PLC/PIC parts maintenance activity
  - 3.1. Power supply
  - 3.2. Air ventilation
  - 3.3. Input/output modul
  - 3.4. Wiring
  - 3.5. Programming
4. Explain Input/output device maintenance activity
  - 4.1. Analogue
  - 4.2. Digital
  - 4.3. Mechanical input/output
  - 4.4. Electrical input/output
  - 4.5. Electronic input/output
  - 4.6. Etc.
5. Describe safety procedures and Standard Operation Procedures.
  - 5.1. Occupation Safety and Health Act (OSHA)
  - 5.2. Manual Operation
  - 5.3. Installation procedure
  - 5.4. Etc.

**Work Activity 5 : Perform automation system functionality test****Duration : 12 Hours****Learning Objectives**

At the end of learning session the apprentice will be able to:

1. Describe safety of machine and safety interlock of equipment
  - 1.1. Occupation Safety and Health Act (OSHA)
  - 1.2. Manual Operation
  - 1.3. Installation procedure
  - 1.4. Etc.
2. Describe functionality of the automation system
  - 2.1. Leakage
  - 2.2. Stability
  - 2.3. Smooth
  - 2.4. Noise
  - 2.5. Accuracy
  - 2.6. Etc.
3. Explain free Test run
  - 3.1. With load
  - 3.2. Without load
  - 3.3. Troubleshoot
  - 3.4. Etc.
4. Explain actual machine test
  - 4.1. With Load
  - 4.2. Without Load
  - 4.3. Troubleshoot
  - 4.4. Etc.

<b>Work Activity 6 : Produce automation maintenance report</b>	<b>Duration : 4 Hours</b>
<p><b><u>Learning Objectives</u></b></p> <p>At the end of learning session the apprentice will be able to:</p> <ol style="list-style-type: none"> <li>1. Identify types of automation maintenance data <ol style="list-style-type: none"> <li>1.1. Technical data</li> <li>1.2. Component</li> </ol> </li> <li>2. Indicate types of Checklist <ol style="list-style-type: none"> <li>2.1. Work checklist</li> <li>2.2. Test checklist</li> </ol> </li> <li>3. Recognise types of report format <ol style="list-style-type: none"> <li>3.1. Manual</li> <li>3.2. Computerize</li> </ol> </li> </ol>	
<b>TOTAL</b>	<b>108 Hours</b>