

Industrial Mechanic (Millwright)

Maintenance Edits – Errata Sheet 2026

Revisions are organized by **module**, **page**, **change type** and **change made** for quick reference.

These modules were selected for targeted revision because they required the most significant updates.

Notice: All reasonable efforts have been made to ensure that this document is accurate, reliable, and free from error; however, there may be instances where information contained herein is not error-free.

Program	Industrial Mechanic (Millwright) - Period 4	Jump to Period: → Period 4 Change Details
Guide Alignment	Apprenticeship and Industry Training (AIT)	
Total Changes	71 changes across 5 modules	
Change Date	July 20, 2026	

Change Overview

Module (Click modules below to jump to details)	Changes	Focus of Changes
→ 160404c – Advanced Alignment	12	Corrected alignment and thermal-growth content; clarified graphing and benchmark references; and updated figures and Self-Test content.
→ 160405aA – Electricity Principles	13	Updated electrical theory, resistance, calculations, and assessment content; added a glossary and formula appendix.
→ 160405aB – Practical Electricity	21	Expanded electrical safety and maintenance guidance; corrected conductor-loss calculations; and updated figures and assessment.
→ 160405aC – Industrial Controls and Programmable Logic Controllers	14	Expanded control-input, switch, relay, troubleshooting, and safety content; updated figures and the Industrial Controls Activity.
→ 160405aD – Programmable Logic Controllers	11	Expanded PLC memory, ladder-logic, and bit-instruction content; added Logical NOT guidance; and updated figures and assessments.

Change Type Legend

Change Type	Meaning
Assessment	A self-test item, question, answer key, or related term was corrected.
Calculation Correction	A numeric conversion or calculation was corrected.
Compliance	Content was revised to better reflect applicable standards or industry practice.
Content Clarification	Wording or explanation was revised for accuracy, clarity, or consistency.
Figure Update	An image or figure was updated for clarity or relevance.
Formatting	Content formatting was revised for accuracy or consistency.
Scope	Content was added, removed, or adjusted to better fit trade training.
Terminology	A term was replaced, clarified, or made consistent.

Period 4 Change Details

160404c – Advanced Alignment		
Page(s)	Change Type	Changes Made
1	Content Clarification	Revised the rationale to correct “affect” to “effect” and clarify the advanced alignment skills covered in the module.
Throughout	Formatting	Revised section, activity, and answer headings to identify Objectives One through Four.
Throughout	Terminology	Corrected minor grammar and standardized terminology, spelling, and units throughout, including consistent use of “mil,” “tooling balls,” and “movable.”
5–6	Calculation Correction	Clarified that bar sag is added to both rim-rim dial readings. Corrected the shim adjustments to add 1 mil at S2 and remove 4.5 mil at S1, and updated Figure 4.
7–10	Calculation Correction	Corrected the face-face alignment example, including the foot labels, dial reading, rear-foot positions, and shim adjustments. Updated Figure 6 and related references.
12	Calculation Correction	Corrected the Celsius equivalent of a 50°F temperature change to 28°C, not 10°C.
17	Content Clarification	Added Figure 9A through 9D references for the weld-on, threaded, masonry, and covered benchmark examples.
29	Calculation Correction	Corrected the S2 average temperature to 92.5°F and the S4 growth result to –0.003 inches, showing a 3 mil downward movement.
35–41	Content Clarification	Expanded the thermal-growth alignment example with step-by-step graphing instructions and guidance for rounding shim adjustments.
35–41	Calculation Correction	Corrected the cold-offset shim adjustments to remove 2.6 mil at S1 and add 1.5 mil at S2. Corrected the predicted dial readings to –1.75 mil on Dial A and –0.25 mil on Dial B.
36–68	Figure Update	Added three graphs to the thermal-growth alignment example and updated the numbering and references for subsequent figures.
67–70	Assessment	Revised Self-Test questions 12, 13, and 15, updated Figure 43, and corrected the related answer key. Corrected the figure reference to Figure 43, not Figure 40.

160405aA – Electricity Principles		
Page(s)	Change Type	Changes Made
1	Terminology	Updated the module title from <i>Mechanical Systems and Electrical Control Components: Electricity Principles</i> to <i>Electricity Principles</i> .
1	Formatting	Reformatted the <i>Objectives in This Booklet</i> section as a table linking the booklet sections to the applicable AIT objectives.
Throughout	Formatting	Revised section and activity headings to align more closely with the AIT objectives, including changing <i>Electrical Principles</i> to <i>Principles of Electricity, Magnetism, and Electromagnetism</i> and <i>Electrical Calculations</i> to <i>Ohm’s Law Calculations</i> .
Throughout	Terminology	Corrected minor grammar and standardized electrical terminology and units throughout, including consistent use of AC, DC, and Hz.
9	Figure Update	Updated Figure 7 with a clearer illustration of magnetic pole attraction and repulsion.
11-12	Content Clarification	Clarified how the direction of current flow affects compass needle deflection in Figures 9 and 10.

160405aA – Electricity Principles		
Page(s)	Change Type	Changes Made
31–33	Content Clarification	Expanded the resistance explanation to include common uses of resistance, factors affecting motor speed and power, and how resistors are manufactured to achieve a specific nominal resistance.
41, 56	Assessment	Revised <i>Principles of Electricity Activity</i> , questions 6 and 7, as true-or-false questions and updated the answer key accordingly.
44–45	Formatting	Reordered the Finding Voltage and Finding Resistance examples and updated Figures 50 and 51 and their references accordingly.
49	Calculation Correction	Corrected the R1 and R4 values in Figure 54 from 5 Ω to 0.5 Ω so the calculation correctly results in a total resistance of 25 Ω and a total current of 0.48 A.
54	Assessment	Updated Figure 59 to include the 100 V source value required to calculate the total current.
58–61	Scope	Added a glossary defining electrical, control-system, and PLC terminology used across the booklet series.
62	Scope	Added an appendix summarizing formulas for Ohm's law, electrical power, total resistance, and Kirchhoff's laws.
160405aB – Practical Electricity		
Page(s)	Change Type	Changes Made
1	Terminology	Updated the module title from <i>Mechanical Systems and Electrical Control Components: Practical Electricity</i> to <i>Practical Electricity</i> .
1	Formatting	Reformatted the <i>Objectives in This Booklet</i> section as a table linking each section to the applicable AIT objective.
2	Formatting	Corrected the 160405aC corequisite title from <i>Practical Electricity</i> to <i>Industrial Controls and Programmable Logic Controllers</i> .
Throughout	Formatting	Revised section, activity, and answer headings to align more closely with the AIT objectives, including changing <i>Electrical Safety</i> to <i>Hazards Associated with Electricity</i> and <i>Electrical Testing</i> to <i>Electrical Test Meters</i> .
Throughout	Terminology	Corrected minor grammar and standardized electrical terminology and units throughout, including consistent use of VAC and VDC.
5	Compliance	Expanded the electrical dangers section to instruct workers to report hazards they cannot safely correct and to use a Class C extinguisher, never water, on electrical fires.
6	Figure Update	Updated Figure 1 with a clearer image showing unobstructed access to a motor control centre.
7	Compliance	Expanded the opening-disconnect guidance to address safe positioning, hand placement, arc-flash exposure, and the use of insulated operating tools.
8	Figure Update	Replaced Figure 3 with an updated disconnect-panel image and clarified that line-lug locations may vary by equipment and manufacturer.
9	Compliance	Expanded the control-power lockout procedure from six to twelve steps to address all energy sources, personal locks and tags, stored energy, test starts, and zero-energy verification.
10	Figure Update	Replaced Figure 5 and revised the related description and caption to show the three-phase breaker in the ON position rather than the OFF position.

160405aB – Practical Electricity		
Page(s)	Change Type	Changes Made
11–23	Figure Update	Removed the former Figure 7 from the multiple-circuits section and updated the numbering and references for Figures 8 through 18 accordingly.
15	Content Clarification	Expanded the broken-fittings explanation to include contamination and pest-entry hazards and revised the Figure 11 caption from broken bolts to broken hardware.
23–25	Content Clarification	Expanded the fuse section with clearer explanations of fast-acting, time-delay, and current-limiting fuses and added typical voltages, wire sizes, and protected devices for control fuses.
23–24	Figure Update	Added Figure 18 to illustrate assorted fuse types and updated Figure 19 with clearer examples of control fuses.
32–34	Calculation Correction	Revised the 3 HP compressor example to compare the appropriate No. 10 AWG and No. 14 AWG conductors, correcting the line-loss values to 22.8 W at 120 V and 14.4 W at 240 V.
35	Content Clarification	Clarified that the 120/208 VAC three-phase, four-wire system shown uses a wye or star configuration.
36	Figure Update	Updated Figure 32 with a simplified three-phase line-voltage diagram for a 480 or 600 VAC supply.
43–44	Compliance	Expanded the motor-bearing lubrication and reassembly guidance to address thermal expansion, excess-grease removal, vent-plug installation, component reassembly, and securing guards before operation.
65–66	Assessment	Reformatted <i>Electrical Test Meters Activity</i> , question 2, from fill-in-the-blank to true-or-false and updated the answer to False.
66	Assessment	Revised the answers to questions 3 and 4 to clarify that an unknown voltage should be measured by starting at the highest voltage range and that resistance should only be measured on a de-energized circuit.

160405aC – Industrial Controls and Programmable Logic Controllers		
Page(s)	Change Type	Changes Made
1	Terminology	Updated the module title from <i>Mechanical Systems and Electrical Control Components: Industrial Controls and Programmable Logic Controllers</i> to <i>Industrial Controls and Programmable Logic Controllers</i> .
1	Content Clarification	Revised the rationale to focus on the electrical terminology and component functions required to troubleshoot equipment malfunctions.
1	Scope	Revised the <i>Objectives in This Booklet</i> section to align Industrial Controls with AIT Objectives 5 and 6 and reformatted the information as a table.
Throughout	Formatting	Revised the heading hierarchy and Table of Contents so <i>Control Inputs</i> and <i>Switches</i> appear under <i>Electrical Controls</i> , and <i>Relays</i> and <i>Types of Relays</i> appear under <i>Control Outputs</i> .
Throughout	Terminology	Corrected minor grammar and standardized terminology and electrical units throughout, including consistent use of VAC and VDC.
9–11	Content Clarification	Expanded the analog-input, feedback-signal, and pulse-width-modulation explanations to cover continuous and proportional control, closed-loop feedback, duty cycle, advantages, applications, and examples.
11	Figure Update	Replaced Figure 5 with a diagram showing how pulse-width modulation can control AC voltage and frequency.

160405aC – Industrial Controls and Programmable Logic Controllers

Page(s)	Change Type	Changes Made
13–21	Content Clarification	Revised operator-input and process-sensor descriptions, including joysticks, pressure switches, ultrasonic sensors, and load cells, for clearer classification.
24–26	Scope	Added explanations of single-break, double-break, and three-position selector switches, including schematic examples.
26–60	Figure Update	Added Figure 19 showing three-position switch schematics and renumbered all subsequent figures and references through Figure 42.
29	Content Clarification	Clarified the single-pole, double-throw relay explanation by identifying the movable contact and explaining the A–B and A–C contact relationships.
52	Content Clarification	Corrected relay and latch identifiers, equipment movement, and timer sequencing in the drilling-station relay-logic sequence.
55–56	Compliance	Expanded touch-based troubleshooting safety guidance to address hot components and high-pressure fluid injection.
60–63	Assessment	Revised the <i>Industrial Controls Activity</i> and answer key, including question wording, figure references, response formatting, terminology, and answers.

160405aD – Programmable Logic Controllers

Page(s)	Change Type	Changes Made
1	Terminology	Updated the module title from <i>Mechanical Systems and Electrical Control Components: Programmable Logic Controllers</i> to <i>Programmable Logic Controllers</i> .
1	Content Clarification	Revised the rationale to focus on the electrical terminology and component functions needed to troubleshoot equipment malfunctions.
1	Formatting	Reformatted <i>Objectives in This Booklet</i> as a table aligning the <i>Programmable Logic Controllers</i> section with AIT Objectives 5 and 6.
Throughout	Terminology	Corrected minor grammar and standardized PLC terminology and electrical units, including consistent use of I/O, VAC, VDC, NO, and NC.
7–34	Figure Update	Updated selected PLC and troubleshooting figures; corrected the captions for Figures 12 and 14; and renumbered Figures 20–24 after adding the new Logical NOT diagram as Figure 19.
12	Scope	Expanded the processor-memory content to explain RAM, ROM, flash memory, EEPROM, removable storage, and data retention during power loss.
13	Content Clarification	Revised the typical range of I/O points to explain that modules may provide 2 to 64 points depending on the application and whether they are analog or digital.
20–30	Content Clarification	Revised the ladder-logic and bit-instruction explanations, including XIC, XIO, OTE, OTL, and OTU instructions; NO and NC terminology; and logical AND and OR examples.
27	Scope	Added a Logical NOT explanation, fail-safe control example, truth table, and ladder-logic diagram.
35–37	Assessment	Revised <i>Programmable Logic Controllers Activity</i> , question 6, and Self-Test question 1 for clearer question wording and response formatting.
43–46	Assessment	Updated the activity and Self-Test answer keys with clearer definitions, complete-sentence responses, consistent electrical terminology, and parallel answer formatting.