

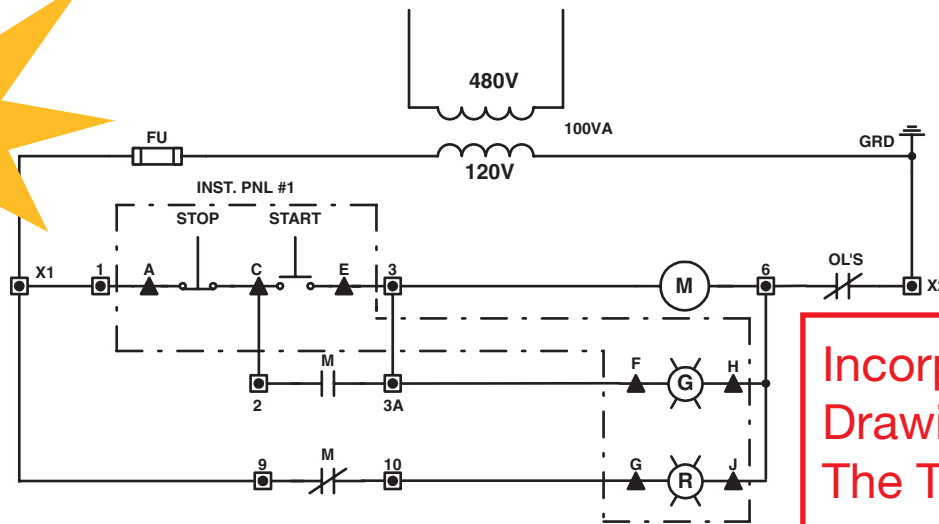
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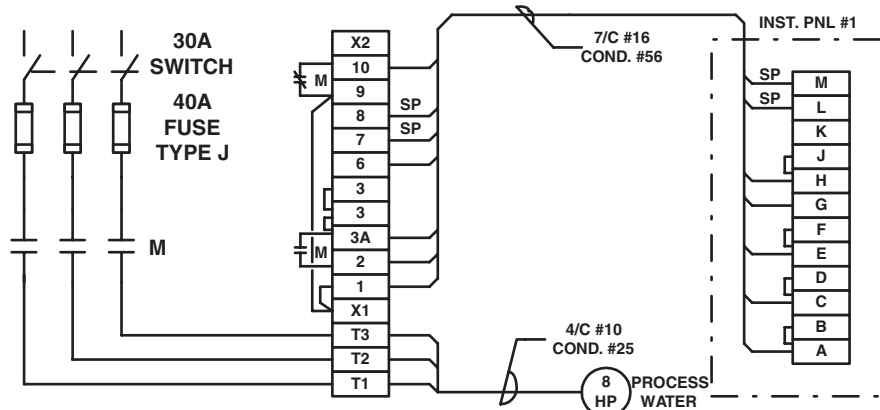
READING ELECTRICAL & PLC I/O DRAWINGS

Learn to Effectively Use Your Drawings To Troubleshoot!

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Reading Electrical & PLC I/O Drawings

“Very informative and worthwhile.”

- Eric Roysdon, MICRO METALS INC.

Drawing Standards Used Throughout Course

- US – ANSI/IEEE, NEMA, CSA
- European, Pacific Rim – IEC

Commonly Used Components:

Operation & Symbols (US & IEC)

- **Contacts:** Normally Open, Normally Closed, Interlock, Permissive, Hold, Run, On-Delay, Off-Delay, Auxiliary
- **Switches:** Pushbuttons, Selector, Limit, Pressure, Flow, Temperature, Vacuum, Proximity, Foot, Float, Photo
- **Loads:** Coils, Solenoids, Lights, Etc.
- **Motor Starters/Contactors:** Coils, Overload Relay, Main Contacts
- **Relays:** Industrial Control, Plug-In, Latching, Time-Delay, Solid-State
- **PLC Modules:** Discreet Inputs/Outputs, Analog Inputs/Outputs

Non-Standard Symbols – US & IEC

- PLC Boards
- Variable Frequency Drives
- Power Supplies
- Other Devices

PLCs & Ladder Logic

- Learn Basic Instructions
- Demonstrate How to Read PLC Ladder Logic
- Compare PLC Logic to Relay Ladder Logic
- Locate Power Supply, CPU, I/O Boards in Racks

Three-Phase Power Drawings

- Learn the Symbols For: Disconnects, Fuses, Circuit Breakers, Main Contacts, Overloads
- Understand Three-Phase Motor Circuits
- Check Voltage Applied To 3-Phase Motors

“Excellent value & great learning experience.”

-Barry Smith, SOUTHERN COMPANY SERVICES

Learn to Read/Trace/Use Electrical Control Circuit Drawings

- Understand What Your Drawings Are Showing You
- Read Electrical Drawings Like Sentences
- Learn to Use: Rails, Rungs, Line-Numbers, Cross-References
- Trace-Through Commonly Used Control Circuits
- Understand/Use As-Built Drawings
- Explain the Role of Normally Open And Normally Closed Contacts

Types of Drawings

- Three-Phase Motor Circuits
- Hardwired Control Circuits Horizontal/Vertical Representations
- Wiring Diagrams
- PLC Discreet I/O Interface
- PLC 4-to-20mA Analog I/O Interface
- PLC Ladder Logic

Troubleshooting Hardwired Logic

Using Your Drawings

- Identify Symptoms & Find Controlling Rung
- Identify Conditions That Must Be Satisfied
- Trace Paths of Electric Continuity
- Properly Connect a Voltmeter
- Interpret Meter Readings Correctly

Troubleshooting PLC - I/O

Using Your Drawings

- Locate Symptoms and Find Controlling Rung
- Identify Instructions That Must Be Satisfied
- Trace Paths of Logical Continuity
- Learn Multiple-Rung Troubleshooting
- Properly Connect a Voltmeter to Check PLC Discrete Inputs/Outputs
- Checking 4-to-20mA I/O With a Voltmeter

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