Pigler Proven Process

Kickoff & Design

During the proposal process, our team collaborates with your team to define goals for your investment in process automation projects. A conceptual system architecture provides information regarding benefits and potential risks so all stakeholders can make informed decisions.

Before we begin work, we sit down with you to review the documentation and put together a comprehensive plan of action.

Typical controls documentation to define the control system functionality can include:

- P&ID's
- I/O List
- Control Narratives
- Alarm List
- Cause and Effect (C&E) Matrices

Pigler Automation can provide support in development of the controls system documentation.

Project schedule and execution are clearly outlined to provide transparency into our process. Critical paths and milestones are identified and clearly communicated to the team.

As a result of the Design Phase, we can develop Functional Design Specification (FDS) for Hardware and Software that will guide the implementation of the project. Aspects of a control system defined in a specification documentation can include faceplates, alarm philosophy, redundancy, cybersecurity, control panel design, and control elements.

Implementation

After the design phase is completed, the project transitions into the implementation phase. The implementation phase can be broken into two parts; Hardware Implementation and Software Implementation.

Hardware Controls Panels

Our hardware engineering experts will expand on the design documents required to build the cabinets and remote I/O panels following UL standards. Documentation include:

- Loop-Drawings
- Terminal Strip Allocations
- Power Distributions
- I/O Module Wire Schematics
- Networking Communications
- Power Calculations
- Estimated Heat Loads
- BOM Generation

For projects with multiple control panels, we review our initial designs for the first control cabinet with your team to establish guidelines to be implemented for the remaining cabinets. This critical feedback loop allows you to provide input into the hardware panel drawings and Pigler Automation to execute efficiently.

We work with trusted local partners to build our in-house designed panels for the project. Our engineers oversee the build process and pre-FAT to ensure the panels meet all design criteria.

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Software

The software implementation is based on standards established during the Design Phase of the project. For the control system, each aspect of the software implementation will go through a progress review for you to provide input to desired functionality and look and feel on the HMI. After the input is received from your team, we utilize our bulk engineering tools to implement the remaining control program sections.

For testing in-house and to improve the quality of the control code, we utilize simulation software as the digital twin to simulate field response. In addition, this program can serve as the baseline for initial operator training as the project is being executed to gain familiarity with the look and feel of the system prior to equipment being on-site.

Factory Acceptance Testing (FAT)

Before we install any hardware or software at your site, we go through an extensive FAT. We prepare detailed hardware and software FAT procedures, based on approved design specification and control system documentation. To minimize possible deviations during FAT, we go through an in-house pre-FAT. The FAT can be separated into two sections; HW-FAT and SW-FAT

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Hardware FAT

The HW-FAT can be executed at the selected panel builder's location. The purpose of the hardware FAT is to verify the panel build, internal wiring and correct functionality of hardware components in the control panels. The HW-FAT does not include any software testing; however, it does include a 100% signal test from the software to the terminal block and back.

The HW-FAT can include:

- Verifying HW panel layout against approved HW drawings and BOM
- Power up of control cabinets
- Testing of 100% I/O, including spares
- Confirming power distribution and redundancy
- Establishing network communications
- Diagnostic functionality and alarming for PLC equipment components with HMI
- Checkout of wiring and labels

During the HW-FAT Pigler Automation will create and maintain a punch list of identified deviations. Pigler Automation will resolve all punch list items before the final shipment of panels to site.

Software FAT

The purpose of the software FAT is to verify the proper functionality of the control logic based on the design documentation. We encourage collaboration between engineers, operations and stakeholders to be included on the software FAT team. For the software FAT, we utilize simulation software as the digital twin. This allows us to simulate field responses for a more accurate and thorough testing of the control logic and will reduce the time needed for FAT.

The software FAT can include a review and testing of:

- HMI Screen layout
- Trips and interlocks
- Display of process indicators
- Status indicators
- Alarm annunciation
- Custom control logic

During the SW-FAT, Pigler Automation will create and maintain a punch list of identified deviations. Pigler Automation will resolve all punch list items prior to the commissioning and start-up phase of the project

Commissioning & Startup

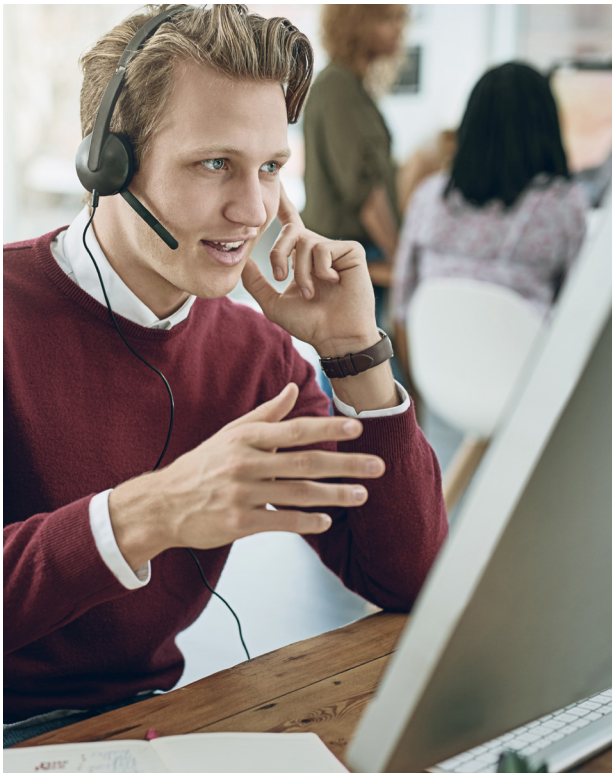
Our engineers work closely with all plan personnel on-site to support the installation and startup. Our engineers are experts in working on live systems and will help guide the customer confidently during the entire commissioning process. An outage task list is developed to track completion of all assigned control tasks. All items tested during FAT will be retested as part of the commissioning procedure. Any observed deficiencies will be documented on a punch list and resolved prior to the Pigler Automation engineer leaving the site.

After successful startup of you plant, Pigler automation will create final documentation. Final documentation can include:

- Copy of the commissioning punch list
- Copy of the software programs and backups
- As-built HW drawings as PDF and original editable file formats

Training & Support

Our services go beyond just designing, setting up, and installing your system. We offer comprehensive and customizable training exclusive to your system. We utilize virtual simulations, allowing your operators and engineers to train in a variety of real-world scenarios before they support or work on a live system. You can be confident that when the project is finished, you and your team will have everything you need to operate your new system successfully.



In addition to offering training opportunities for you and your operators, we also offer pre-paid service retainers for access to our service engineering tea,.

Our support retainer services includes:

- 24/7 hot-line phone number
- Email exchange for smaller files
- Secure file enhance with customer specific credentials for larger files
- Web conferences
- Remote support at customer site

Since 2005, Pigler Automation has inspired confidence and growth with our system integration and industrial automation solutions. Our Pigler Proven Process helps guide our team to consistently accomplish this to the highest standards expected in the industries we serve.