PCI
INDUSTRIAL AUTOMATION

NAME OF PROJECT: Modernization and improvement of the capacity of a robotic welding station

FIELD: Robotic welding

LOCATION: Montreal

YEAR OF EXECUTION: 2018-2019

AREA OF EXPERTISE

Robotics

SERVICES PROVIDED

Design

Programming

Machine safety

CONTEXT

With the goal of increasing the number of research projects in robotic welding that the customer could undertake, the contents of the existing robotic welding laboratory were moved to a new room and a second robotic station was added. The move was an opportunity to upgrade the robots and their control systems. It was also an opportunity to review the laboratory's access policies by putting in place a modern machine safety strategy.

MANDATE

PCI's mandate for the modernization of this robotic welding laboratory was to integrate, analyze, design, install and start up the entire system.
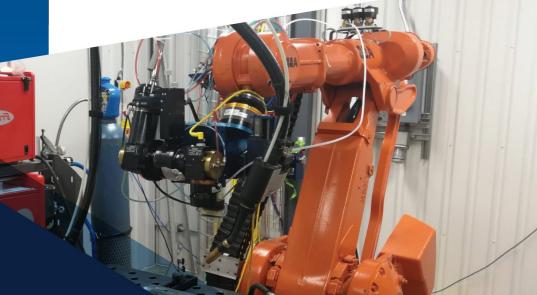
PCI PERFORMED THE FOLLOWING TASKS

- Risk analysis for the machine safety.
- Risk analysis with regards to the welding process (laser, MIG, TIG…).
- Design of the main and remote control panels.
- Design of the machine safety control system.
- Design of the Ethernet network, including the switches, robots and field devices
- Programming of the main PLC and of the machine safety logic.
- Programming of the operator interface.
- Configuration and programming of the two welding robots.
- Electrical installation.
- Commissioning and start-up of the complete solution.
- 24/7 support during the start-up phase.

SOLUTIONS DEPLOYED BY PCI

- Modular control system using Ethernet/IP communication, with the control components strategically positioned throughout the laboratory. This strategy allowed us to reduce the number of cables and conductors that needed to be run, providing us with the ability to react quickly to last-minute changes.
- Machine safety program in the main PLC, using the same I/O adapters as the control I/O in the remote control panels. The I/O adapters communicate with the main PLC over the Ethernet/IP network, which greatly simplifies the electrical wiring work, reduces the number of cables and allows quick changes to the safety logic in the program.
- Machine safety risk analysis, taking into consideration the risks due to the robot (CSA-Z434) and the risks related to the welding process.
- Integration of the many independent welding systems into the machine safety control system, communicating with the main PLC.

TOOLS AND METHODS USED

- Rockwell ControlLogix with a GuardLogix processor and remote Safety Point I/O.
- Allen-Bradley PanelView 5310 operator interface.
- Simulation of the robot's operation using the ABB RobotStudio software.
- Two ABB robots using IRC5 controllers.

1 SIMILAR PROJECT UNDERTAKEN