

- Control Panel Layouts: Motor Control Panel, Operator Control Panel, Control Stations, etc.. showing all components installed, identified and laid out to reflect the “as-built” condition of the panels.
- Parts Lists: An itemized listing of all control components and their interface hardware. The parts list are detailed to show the part number, quantity used, description, schematic designation and manufacturers name, as well as any additional information required by our client.
- Operator Manual: A selection of various text, pictures, and drawings which describe or illustrate the functions required to be performed by the operator. All system status and alarm messages are further described along with the functions required to be performed by the operator in order to recover or restart the system after a cycle interruption.
- Maintenance Manual: A selection of various text, pictures, and drawings which describe or illustrate the functions required to be performed by the maintenance technician(s). Also included will be copies of manufacturers supplied literature for all system control components.

System Start-Up and Debug

Once the installation phase of a project is complete we inspect the installed system and check/correct any problems with the wiring or mounting of the control devices. Upon completion of these preliminary checks we ensure that all safety procedures are in place prior to applying power.

Once we are satisfied with the electrical installation, we then apply the required power to the system and commence our start-up debugging of the wiring. All I/O are checked for proper functionality and adjustment prior to the implementation of the program.

Once the system is checked out and verified that it is assembled, wired and adjusted in accordance with the latest revision of the electrical schematics, the program is downloaded into the PLC and associated control devices.

The system is then run and the program debugged to achieve full functionality in accordance with the approved sequence of operation.

Inspection and Testing

Upon completion of the start-up/debug phase, the system is put through an endurance check. The system is run and checked for full compliance with the design specifications established for the project.

We are able to assist our clients in participating in the performance of acceptance testing and inspection, either by their personnel or the personnel of their customer.

Product Support and Maintenance

Once a system has been accepted and turned over to the end user, we continue to support our systems by providing troubleshooting assistance either over telephone, remote-connection via modem, or by traveling to the site. In most cases problems are able to be resolved either by telephone or by remote-connection via modem.

As a result of the network of suppliers that we have available to us, we are able to provide replacement parts on a short turn-around basis and at competitive prices.

If a client does not have the necessary technical staff to perform the functions required to maintain the system, R-Squared Systems would be pleased to review each case to determine the best solution for the client.

If the client is local to us, we are able to provide the qualified man-power to perform all the necessary maintenance functions required by the system. For those cases where the client is not located near us, we assist our clients by reviewing the qualifications of the more local companies which are logistically better situated to respond to these needs.

If a local company is not available, or does not possess the necessary qualifications to perform the maintenance functions, we are able to schedule and travel to the customer’s site in order to perform the required maintenance tasks.

If you have any questions, or if you have a control system application that you would like to review, please contact us at any of the telephone numbers, or emails, listed on the front of this brochure. If you have an immediate need, please feel free to contact me directly:

**Richard J. Reyes, Managing Member
R-Squared Systems LLC
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R-Squared Systems LLC *Specializing in Electrical Control Systems for Industrial Automation*

Primary Services:

- Control System Concept
- Engineering/Design
- Programming
- Full Documentation
- Machine Wiring
- System Start-up and Debug
- On-Site System Support
- Certified System Integrator for Machine Vision and Inspection

Additional Services:

- Specification Development
- Project Management
- Inspection and Testing
- Troubleshooting Support
- Maintenance
- Operator Training
- Maintenance Training

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Since the inception of R-Squared Systems LLC (RSQ) on March 1st of 1990, our objective has been to provide our clients with a complete line of services used for the development of electrical control systems for their automated process or material handling equipment.

Over the past 25 years, we have been fortunate enough to have succeeded at assisting clients in all phases of system development: starting from the conceptualization of their application all the way through to the turn-key start-up of their system.

The focus of our efforts are companies which require the use of electrical control systems in their product, the development of their product or in the daily operation of their facilities. We offer our services for new equipment designs as well as modifications and/or service support on existing equipment.

We offer our services on an “à-la-carte” basis so that companies can select only those services that they do not currently possess in-house.

Use us as your complete Electrical Department, your Electrical Engineering/Design personnel, or as your supporting controls staff and/or installation crew. In all cases you are able to minimize the effect to your budget by not having to maintain an in-house full-time staff for those services.

As a result of our many years of experience in this field, we offer the ability to perform each task in a time efficient and cost saving manner. This in turn allows us the ability to offer our services at a reasonable cost and on a schedule tailored to meet the needs of our clients.

Engineering/Design

We offer complete services in industrial controls engineering and design. We are experienced in developing controls for electro-mechanical, electro-hydraulic, electro-pneumatic powered equipment as well as for equipment that is all electrical (control and power).

Once a control system concept is complete and the sequence of operation is understood, RSQ is able to proceed in selecting the necessary control components and interface hardware required to provide the desired equipment functionality.

Our designs have utilized, but are not limited to, the following devices or systems:

- * Programmable Logic Controllers (PLC's)
 - Allen-Bradley: All Models
 - General Electric: All Models
 - Texas Instruments: 500 and 505 Series
 - Square-D: 50, 500 and 700 Series
 - Siemens: S5 and S7 Series
 - Mitsubishi: All Models
 - Modicon: Compact and Micro Controllers
 - Others: Koyo, Idec, Omron, etc...
- * Vision Inspection Systems (Keyence, Cognex, DVT etc.)
- * Supervisory Control Systems
- * Operator Interface Systems
- * Variable Frequency Motor Controllers
- * DC Drive Systems
- * Motor Control Centers
- * Stepper Motors and Controls
- * Weighing / Scale Systems
- * Position Controls (Encoders, Resolvers, etc.)
- * Diagnostic Message Centers
- * Infrared and Power Line Data Communication
- * Standard Industrial Control Switching Components (Relays, Motor Starters, Solenoids, Photo-eyes, Proximity Switches, Ultrasonic Switches, etc...)

Programming

We offer the ability to program all PLC's and associated control system components. Our senior programming staff have more than thirty years of experience in integrating control system components requiring knowledge in the use of specialized programming software and familiarity with computer programming.

Our familiarity with the instruction sets of most PLC's enables us to maximize the control system components in order to provide the most efficient functionality of the equipment being controlled.

During the course of developing our programs, we are fully aware of the benefits of properly organizing and documenting the program. As a result, we think through the organization of our programs prior to writing a single element of code. We document our code with clear and concise language which are representative of the associated control function.

We understand that the best program for an application does not necessarily mean the most complex use of the PLC instruction set. To us, the best program is one that performs the desired functionality and can be easily read and understood not just by the programmer, but by those individuals who will be responsible for supporting and maintaining the system for the years to come.



Documentation

We offer a variety of support documentation services which enhance the customer's understanding and appreciation of the equipment and control system. Some highlights are:

- Overall System Description: Describes the sequence of equipment events that occur immediately after an operator interaction or signal interfaces with other automated systems.
- PLC Program Documentation: Ladder diagram showing program elements. Additional program cross reference, status, usage reports maximizing the capabilities of the PLC programming software.
- Electrical Schematics: Representing the “as-built” condition of the system control components and their interface wiring.
- Equipment Layouts: Various views of the overall system and/or selected views of specific control areas identifying the locations of all control devices in the system.

