

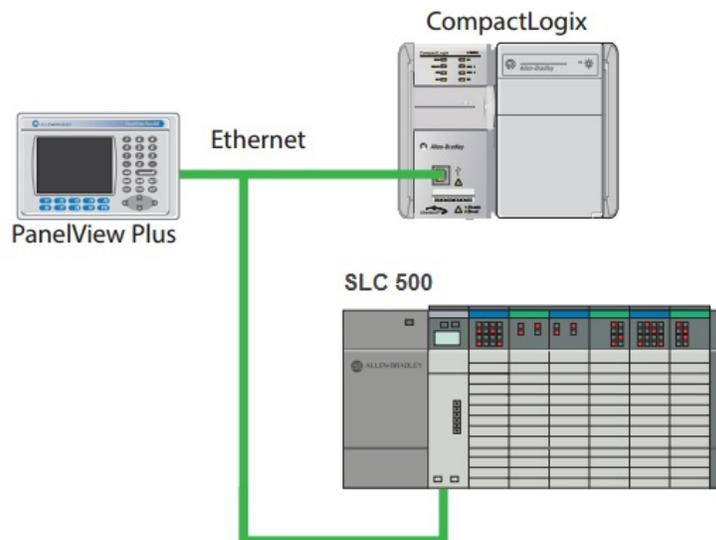
## PLC & HMI Migration

### Piggy Back A Compact Logix PLC Onto Your Existing SLC 500!

#### Add - Enhanced Controls – Increased Functionality – Current Technology

Uniloy is proud to present this month's web posting which features machine controls upgrades available for all Uniloy and Liberty Reciprocating Screw Blow Molding machines currently equipped with Uniloy supplied Allen Bradley SLC 500 PLC's. The controls upgrade consists of:

- Compact Logix PLC
- Ethernet Communication Module
- Panel View Plus (PVP) HMI
- Operator Station with Mounting Materials



The new Compact Logix PLC is linked to the existing SLC 500 rack through the Ethernet communication module which replaces the existing SLC 500 CPU. A new Panel View Plus (PVP) HMI is connected to the new Compact Logix CPU.

New controls features can be added as part of the controls migration while the functionality of the existing SLC 500 rack remains intact. The following options are available:

- Ethernet Connectivity
- Temperature Control
- Analog Inputs
- Parison Programming
- Cooling Bed and Trimmer Control

These 5 options are independent of one another and may be selected individually or in any combination.

### Ethernet Connectivity

Ethernet connection provides Local Area Networking which means you have the ability to link your machine controller to other computers for the purpose of production scheduling, material tracking, or supervisory control. Compact Logix control packages are equipped with this feature. The software required to perform scheduling, tracking, and supervisory tasks, is the customer's responsibility.

### Temperature Control

Temperature Controls can be configured for up to 42 zones using Compact Logix. This is achieved using thermocouple control cards. This system provides closed loop control with temperature set points and actual readings displayed on the graphical interface. Solid state heat contactors may also be provided upon request to replace the old mercury contacts in the existing panel.

The standard Compact Logix package has 16 controlled heat zones. The table below illustrates some typical heat configurations available for Uniloy blow molding machines where three thermocouple cards are used along with one analog output card. This configuration provides the ability to monitor 18 thermocouples, and control 16 zones. The available zones are distributed according to the following rules:

- All 2.5" diameter extruders have three heat zones on the barrel.
- All 3.5" and 4" extruders have 4 zones on the barrel.
- The nozzle accounts for one zone.
- The die block can be wired as one, two, or three zones.
- The feed throats are wired as individual zones when possible or ganged in pairs when necessary.
- The stock temperature uses one monitor only zone.
- The die tips are ganged to use one heat zone.

Temperature Control Zone Distribution - 16 Zone Configuration							
	Barrel	Nozzle	Die Block	Feed Throats	Stock Temp (Monitor only)	Die Tips	Total
250R 4 head	3	1	1	4	1	1	11
350R 4 head	4	1	2	4	1	1	13
350R 6 head	4	1	3	6	1	1	16
350R 10 head	4	1	3	5	1	1	15

### Analog Inputs

Analog inputs are used to provide the controller with information about the machine. There are 7 analog inputs which are available with Compact Logix.

- Screw Position
- Clamp Position
- Swing Arm Position
- Extruder Speed
- Extruder Load
- Melt Pressure
- Hydraulic Temperature

Position sensors are used to measure clamp position, screw position, and swing arm position. These sensors are calibrated for the full range of movement of each of these actuators and provide the controller with a signal

telling it where each of these machine components is at any given time in the machine cycle. The controller will use these signals to trigger other machine functions such as preblow, blow, fingers open and close, and downstream. The position sensors will replace existing limit switches which had to be manually adjusted to make a sequence change. With this option, machine sequence changes can be made from the operator interface.

Extruder Speed and Load are two additional inputs which are included with this option. These inputs would be present on any machine that has an AC/VF drive. The inputs are monitored and have high limit alarms which trip when the drive experiences an over current or over speed condition.

Melt Pressure and Hydraulic Oil Temperature are also available. Melt pressure is measured by a pressure transducer located in the nozzle between the extruder barrel and die block and oil temperature is measured by a thermocouple located in the hydraulic tank. Both of these inputs are monitored with values displayed on the color screen. High limit alarms are assigned to protect the machine from damage caused by operating outside normal machine parameters.

### **Parison Programming**

Parison programming is an option which is available using the Compact Logix controller. Parison programming provides the capability to change the thickness of the parison while it is being extruded. The parison thickness is determined by a profile, programmed into the machine controller. The machine controller uses the profile to drive proportional, or servo, hydraulic valves and cylinders which open and close the gap between the die and mandrel.

Common uses for parison programming include:

- Light-weighting products while maintaining strength
- Profiling to achieve uniform wall thickness in containers with extreme changes in width
- Quick and easy container weight changes

Light-weighting a container can be accomplished by building a profile which places enough material and wall thickness in the top and bottom of the container for strength, while thinning the wall thickness in the body of the container to minimize the overall weight of the container.

Profiling to achieve uniform wall thickness would be useful in containers like a bleach bottle. A bleach bottle has a small neck and diameter at the top of the container which gradually increases in size as you follow the contour downward toward the body. The diameter remains constant from the top of the label panel downward to the bottom of the container. Less material is required in the neck of this container and more material would be required in the larger diameter body. Without a programmable profile this container would have an unnecessarily thick neck which is a waste of material.

Weight changes are made quickly and easily using parison profiling. A straight line profile can be simply shifted by moving two points on the graph. Profiles can be edited on the screen on a single head and tested to verify desired results, then copied to the remaining heads for production.

### **Cooling Bed and Trimmer Control**

Downstream control is accomplished through the use of networking with a flexible I/O wiring system. The downstream control feature moves the cooling bed and impact trimmer controls to the main machine by placing control nodes in the trimmer and cooling bed and linking them back to the machine controller with simple cables.

Controlling downstream equipment from the blow molder's main control system has its benefits including:

- Ergonomic advantages of one control point
- Lower cost of overall control system and components
- One software for the entire system
- Simplified wire connection between equipment

The main disadvantage associated with having the cooling bed and trimmer controlled by the main machine controller is that this limits future flexibility with the equipment. The cooling bed and trimmer are now

dependent on the machine controller and cannot be moved and operated in front of a machine without downstream control capability.

### **Sales and Service**

For more information on this product offering or any other machine upgrade, please contact your local Uniloy Parts Sales Representative. Trained Uniloy Service Representatives are available to assist in the installation of these packages at your facility.