Vision1040™ and Vision560™ Retrofit and Control Monofilament Extrusion Line

OPA Consulting Services, Inc. of North Carolina is an engineering service provider that focuses their efforts in providing their customers with the latest proven technology in industrial process control. They were recently faced with the challenge of completely automating monofilament extrusion and downstream equipment- all while keeping it flexible and affordable.

OPA's customer had purchased an older German Monofilament Extrusion line from a company that went out of business. OPA was contracted to replace the 40 year old controls with new controls that could efficiently and reliably monitor, control and download recipes to manufacture monofilament yarn. The machine begins the process by taking plastic pellets (or chips) that enter the extruder. The extruder consists of a long screw that is rotated by a large AC motor, and transports the chips through a series of high temperature and compression zones. At the end of the extruder is a spin pump that controls the feed rate of the molten polymer to spinneret. The result? A number of molten monofilament yarns that are very hot and fragile. It then goes through a quench bath, draw stands, and hot air ovens that give this end product its desired physical properties.

Two of Unitronics' Vision1040™'s, and nine Vision560™'s were used for the task. "We needed powerful controllers at very affordable prices, which are what the Vision™ series controllers possessed." Said George Lipovan, System's Engineer for OPA. "We benefited tremendously by using the Unitronics Vision series PLC/HMI right off the bat, just by having the HMI and PLC all in one. Another important factor was the Ethernet (Modbus TCP/IP) communication port capability."

Ultimately, the reliability and flexibility of OPA's extrusion line was the key. If they wanted to replace one machine line element with another, all they would need to do is unplug the power and the Ethernet cable and slide a different one in its place. Therefore, each machine had to have a local PLC and HMI so they could see the current machine conditions and be able to switch from "Remote" to "Local" control. They needed the flexibility to switch from "Remote" to "Local" on not only the Extruder, but also the Quench Bath, Draw Stands, and Hot Air Ovens. This allowed the customer to fine tune the extrusion process to perfection. Once these parameters have been established, they are read back into the recipe file and stored on the server- then back to "Remote" for synchronizes operation.

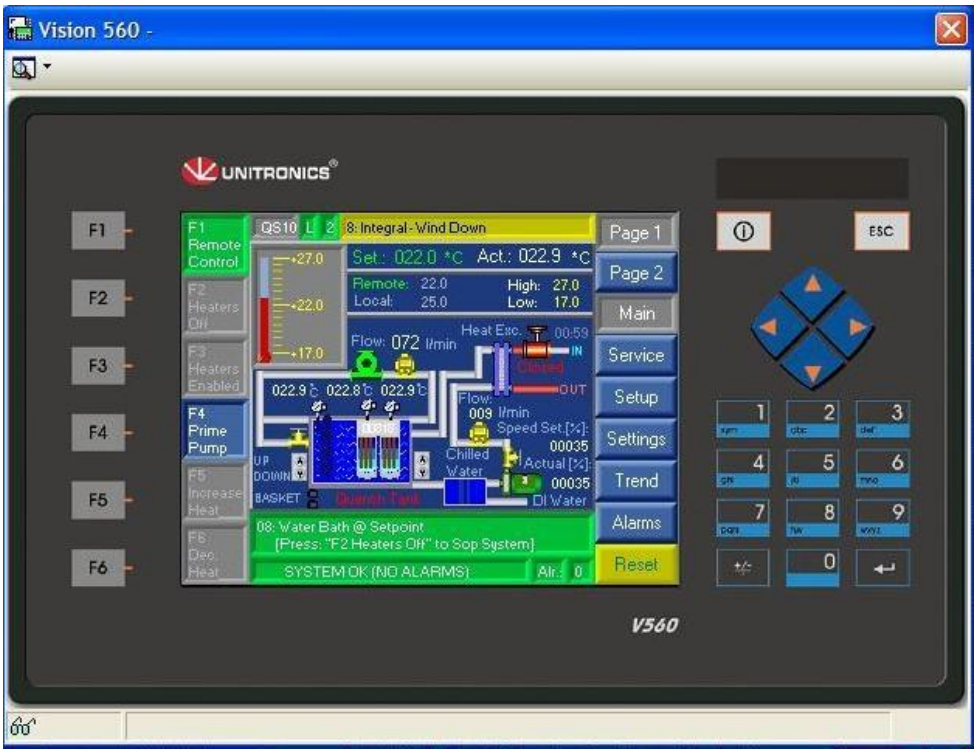
Each machine contains a five port Ethernet switch that has a dual purpose. The first on this Modbus TCP/IP network is to allow the Unitronics Vision™ PLC to communicate with the Variable speed drive for speed controls if applicable. The second, is to link all the machines to SCADA to simultaneously monitor and control each individual machine to perform and process specific tasks. A total of eleven machine elements are on this Modbus TCP/IP network, controlled by a supervisory controller that in turn stores and receives commands from the office network. Essentially, the supervisory controller serves as a bridge between the production equipment and the management (front office) network.

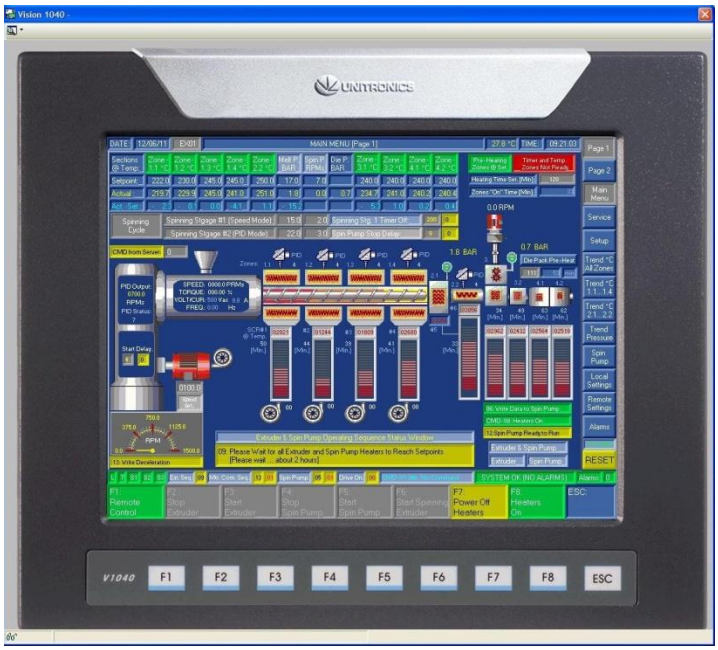
Unitronics is "Not a small fish in the sea!" Says Lipovan. "At first, a few years ago, I really did not pay too much attention to the Vision™ series, but the more I came to understand them, I'd wished I would have used them much earlier!"

To see the machine in action, click the video/links below:

http://www.youtube.com/watch?v=SFdIB6KIIkI&feature=youtu.be

http://www.opaconsultingservices.com/Monofilament_Extruders.html


Vision 560 -
UNITRONICS
F1
F2
F3
F4
F5
F6
F1 Remote Control
F2 Heaters Off
F3 Heaters Enabled
F4 Prime Pump
F5 Increase Heat
F6 Dec. Heat
QS10 L 2 8: Integral - Wind Down
Set: 022.0 °C Act.: 022.9 °C
Remote: 22.0 High: 27.0
Local: 25.0 Low: 17.0
+27.0
+22.0
+17.0
Flow: 072 l/min
Heat Exc. 00:59
IN
Closed
OUT
022.9 022.8 022.9
Flow: 009 l/min
Speed Set.[%]: 00035
Actual [%]: 00035
Chilled Water
DI Water
UP DOWN
BASKET
Quench Tank
08: Water Bath @ Setpoint
(Press: "F2 Heaters Off" to Sop System)
SYSTEM OK (NO ALARMS)
Alr.: 0
Page 1
Page 2
Main
Service
Setup
Settings
Trend
Alarms
Reset
ESC
1 2 3
4 5 6
7 8 9
+/- 0
V560


Vision 1040
UNITRONICS
MAIN MENU [Page 1]
V1040
F1
F2
F3
F4
F5
F6
F7
F8
ESC