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E-MAIL

Control Panel #1

This is the third system that I built that uses this new P.L.C. by Automation Direct.com Its the DL06 PLC. This panel controls a process that has 4 Temperature control zones and 4 analog sensors. Plus connection to the plant Ethernet.

The temperature in is accomplished by using the F0-04THM Thermocouple input option card. This card can be used in the DL05 P.L.C. as well.

The analog in is 4-20ma type option card. The F0-04AD-1 it too can be used in the DL05.

The Ethernet connection is done by using the H0-ECOM module

This is also the first panel that I've built that incorporates Automation Direct's new line of 24 Volt D.C. Din rail mount Power supplies.

Supply list

Automation Direct.
P.L.C.
.5KVA Transformer
Motor Starter
Touchscreen (Not Shown)
All Terminal Blocks, Fuse Blocks and Din Rail.
Din Rail mounted 24VDC Supply.
LCD Display on P.L.C.
Wire Ferrules and lugs
Back Panel (White panel everythings on)
Enclosure (Not shown which is Stainless Steel)

Allied Electronics.
Circuit Breakers (Now available at Automation Direct)
EMI Filter
110V Relay and Base
Wire way and covers.(Now available at Automation Direct)
Wire and Wire markers
Fuses

About this System

This control system was first electrically designed by me to get the basic electrical systems required.
I then drew up the first electrical prints using Autocad 2000i. After that I laid out the panel, again using

Autocad, with 1:1 scale drawings of the parts. This allows me to move things around and find the best fit
and logical layout before any parts are even ordered.

After the layout drawings are completed to my satisfaction I order the parts from my suppliers.
So What does it do?

This controls a 2 temperature dependant process via the thermocouple card. The P.L.C. uses its P.I.D. control
to control these 2 temperatures. The resulting temperature control switches on and off the 2, 50A **S**olid **S**tate
Relays on the panel (2 Light blue devices center left). These **SSR**'s feed 240 Volts to 2 heater bands.
The other 2 temperature inputs monitor a process chamber and cooling water temperatures.

The 4, 4-20ma analog inputs monitor 3 process pressures. These Pressures are converted by pressure to 4-20ma
transmitters with ranges from 0-100PSI to 0-500PSI. The 4th input is unused.

The P.L.C. Is connected to an EZ-TOUCH color touch screen.
This screen lets the operator key in operating parameters and displays the running status of the machine.
It includes all Start and Stop "Switches", except power on and off and E-Stop.

The P.L.C. controls a water pump via its outputs which are connected to a din-rail mounted, I/O family solid state relay
by Continental, that incorporates its own replaceable fuse. This provides isolation from the control power A.C. and
provides circuit protection via its 3amp fuse. This isolation increases the stability and durability of the process by
protecting the P.L.C. from switching spikes and power fluctuations. The SSR in turn turns on and off a Cutler Hammer
Motor starter purchased from Automation Direct as well.

Motion of the process is done using a Nema 23 sized servo motor from Animatics. The SM2340 Smartmotor is controlled
by the P.L.C. by serial communication. The Smartmotor's program is little more than a configuration file that sets up the
operational parameters of the motor. The speed, direction, start and stop are "printed" out of the P.L.C.'s communication
port. This simplifies the control system of the Servo motor to a 3 wire communication cable. Power is supplied by a 48 Volt
10Amp D.C. power supply (Lower left, Large silver box). This is manufactured by Mean Well and has an automatic cooling
fan that comes on only when the power supply needs it to. The Power supplies main power is fed by a relay tied to the
E-stop which kills power to the 48VDC supply as well as all outputs. The P.L.C. stays operational to control the logic
and prepare the machine for operational status when the E-Stop is reset.

The P.L.C. has a LCD Display,the D0-06LCD, that is supplied by Automation direct that gives you the ability to have a small
HMI to troubleshoot the process in the event of a loss of the Touch screen. I have it programmed to display maintenance
information and statistics, which are also viewable on the touchscreen. These allow a maintenance person to look at
information without disturbing the operator. The P.L.C. has a EMI filter to protect the unit from spikes and surges (Can
to the left of P.L.C.).

All operational parameters and realtime run data can be monitored at a remote location by using the H0-ECOM module
that is plugged into the P.L.C. This also allows easy software updates and diagnostics right over the network, No need
to haul the Laptop down to the machine. Realtime monitoring and collection is done by using Lookout Direct or
DS Data Server supplied by Automation Direct.

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