

APPLICATION NOTE #4



Application Note 4: Troubleshooting PLC Installments

Entertron PLC's are designed to monitor the processing of the ladder diagram program as well as the unit's power supply. If an Entertron unit detects that a problem exists from either of these sources it will issue a reset to the controller. This reset is seen by the ladder diagram as a complete "power loss" situation. The following guidelines are designed to help you remedy any situations that may contribute to this problem.

- 1) Using devices to remove power from the PLC during your system cycle.

If your application requires that you remove power from the PLC during the system cycle the first place to look for a problem is with these devices. They should be checked for loose wiring and correct operation and replaced if they are suspected of problems.

- 2) Noise on the incoming power line

The incoming power to the PLC is best kept isolated from your other system peripherals. Noise inducing loads such as solenoids, relays and valves, can create electrical noise that will be seen by the PLC as brownout or over voltage conditions. To protect the PLC power supply it is best to keep this power on an isolated line. It is also recommended to place a surge suppressor on the 115 VAC power to the supply transformer. This device can be an MOV, Harris Instruments V150LA20A or equivalent.

An isolation transformer can also reduce the "noise" from your peripheral components. When using an isolation transformer, it is still recommended, to place an MOV on the incoming power to the PLC as well as the incoming power to the isolation transformer.

If your application is strictly DC, and you are again distributing your DC power throughout the entire system, you should use a DC suppression device.

- 3) Brownout conditions on the power line

Brownout conditions on the AC power line can be combated by placing a UPS line conditioner on the 115 VAC lines. This device will provide a constant 120 VAC output for a variety of inputs usually from 87 VAC to 137 VAC. They also provide transient suppression to eliminate damaging spikes to the equipment.

Brownout conditions in a DC system can be effectively treated by placing a large (1000uF or greater) capacitor on the DC line. It is recommended to also use a bypass 0.01 uF capacitor to eliminate transients.

- 4) Excessive "Electrical Noise"

Due to inductive peripherals, in a PLC system, electrical noise can become quite problematic. To diminish the effects of this noise the following steps can be taken:

- a) Inductive devices should be suppressed with MOV's or an equivalent suppressor to reduce the generated "noise" from the

system. The suppression should be placed across the coil of the device as close to the device as physically possible. Suppression for 115 VAC lines is the same as stated above. Larger voltage coils require that the suppression devices be appropriately rated. For DC devices a transorb or diode is acceptable. Don't mistake a low wattage device for a device that does not need to be suppressed, many low wattage devices are very high in inductance.

b) PLC system wiring should be approached with "Noise" in mind. Low voltage, low noise input wires should be kept separate from high voltage, high "noise" output wires. PLC power wires should be kept as far as possible from "noise" producing components, and should NOT be run with any type of output wires. Shielded cable should be used where appropriate to eliminate as much system generated "noise" as possible.

c) The PLC should be shielded from electrical "noise" by containing it in a well grounded metal enclosure.