Innovative Technology
TVSS Products

Technical Document

Factory Automation (PLC's) And Their Need For Surge Suppression

FACTORY AUTOMATION (PLC'S) AND THEIR NEED FOR SURGE SUPPRESSION

End users often ask us why our surge protection is necessary for protecting process control systems. Most people assume that programmable controls and automation equipment are fully protected from power disturbances. As this technical note explains, PLC manufacturers and service technicians recommend the use of surge suppressors and filters to prevent downtime and equipment damage due to surges and electrical line noise.

A major study on how power disturbances effect process control systems has been conducted by Dranetz Technologies and PowerCet corporation. Results of the study indicate that impulses, surges and electrical noise cause the following equipment problems:

- scrambled memory
- process interruption
- circuit board failure
- ac detection circuits cause false shutdown
- setting calibration drift
- power supply failure
- lock up
- SCR failures
- program loss
- Digital/Analog control malfunction

"Sensitivity to electrical interference varies dramatically from one system to another, depending upon grounding conditions, equipment sensitivity, system design and quantity of electronic equipment in the area."

--Dranetz Field Handbook For Power Quality Analysis, 1991

Facility downtime and repair costs associated with these power quality problems represent a growing concern for engineers and maintenance staff. Power protection is now widely recognized as an important factor in the design of process control systems. Major PLC manufacturers such as Allen Bradley and Siemens provide the following recommendations:

1. Allen Bradley SLC500 Operational Manual 1747-1002, Series A, Sept. 1993:

"Most industrial environments are susceptible to power transients or spikes. To help ensure fault free operation and protection of equipment, we recommend surge suppression devices on power to the equipment in addition to isolation equipment.

"*Lack of surge suppression on inductive loads* may contribute to processor faults and sporadic operation. RAM can be corrupted (lost) and I/O modules may appear to be faulty or reset themselves."

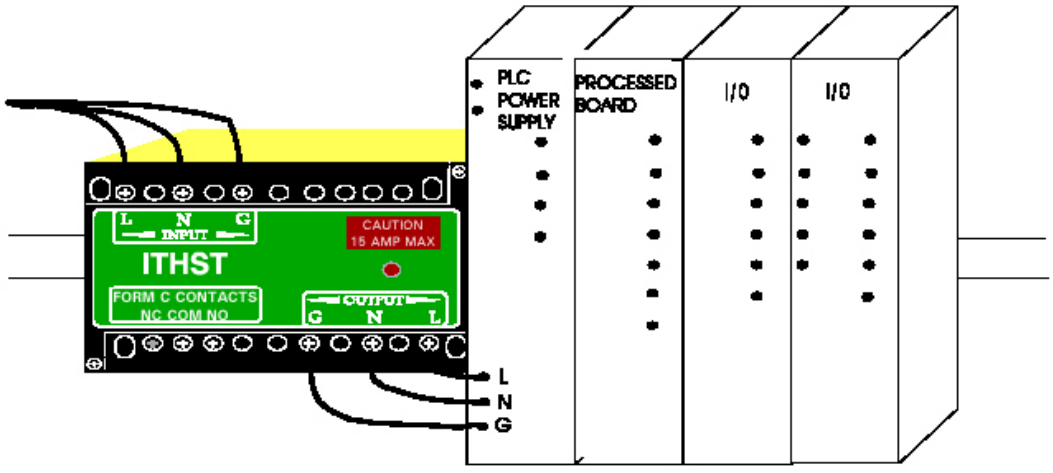
2. Siemens AG. Automation Group EWA 4NEB 811 6130-02

"Measures to suppress interference are frequently only taken when the controller is already in operation and reception of a signal has already been affected. The overhead for such measures (e.g. special contactors) can often be considerably reduced by observing the following points when you install your controller. These points include:

- *Physical arrangements of devices and cables*
- *Grounding of all inactive metal parts*
- *Filtering of power and signal cables*
- *Shielding of devices and cables*
- *Special measures for interference suppression*

3. Allen Bradley publication 1785-6.6.1 July 1992

"Electromagnetic interference (EMI) can be generated whenever inductive loads such as relays, solenoids, motor starters or motors are operated by 'hard con-



tacts' such as push buttons or selector switches. Following the proper wiring and grounding practices guards the processor system against the effects of EMI. However, in some cases you can use suppression networks to suppress EMI at its source."

Regardless of the manufacturer, electronic equipment is susceptibility to power disturbances. This results from two contributing factors:

1. Processors themselves are increasingly complex with higher chip density and lower operating voltages;

2. The growing use of disturbance generating loads such as adjustable frequency drives, capacitor banks, inductive loads and a wide variety of robotic equipment.

Innovative Technology's series HS, HT & ITHST lines of TVSS filters were developed exclusively for the protection of automation equipment used in industrial environments. With up to 85 dB of noise attenuation and outstanding transient suppression, these products are well suited for the protection of sophisticated microprocessor loads. These Products are extremely cost effective and less than one third the cost of a typical service call.

Consider improving your control system and your bottom line reliability.

For more information about Innovative Technology's line of series suppression products and other power quality products, contact your local Innovative Technology Application Engineer, Salesperson, or call the Help-line at 1-800-647-8877.

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