THOR SYSTEMS, INC.

SURGE APPS SA-003: "CASE STUDY" - MANUFACTURING

(Guidelines and application tools to promote improved Power Quality)

3621 Saunders Avenue
Richmond, VA 23227-4354

Can Your Manufacturing Facility Afford Not to Install Surge Protection Equipment?

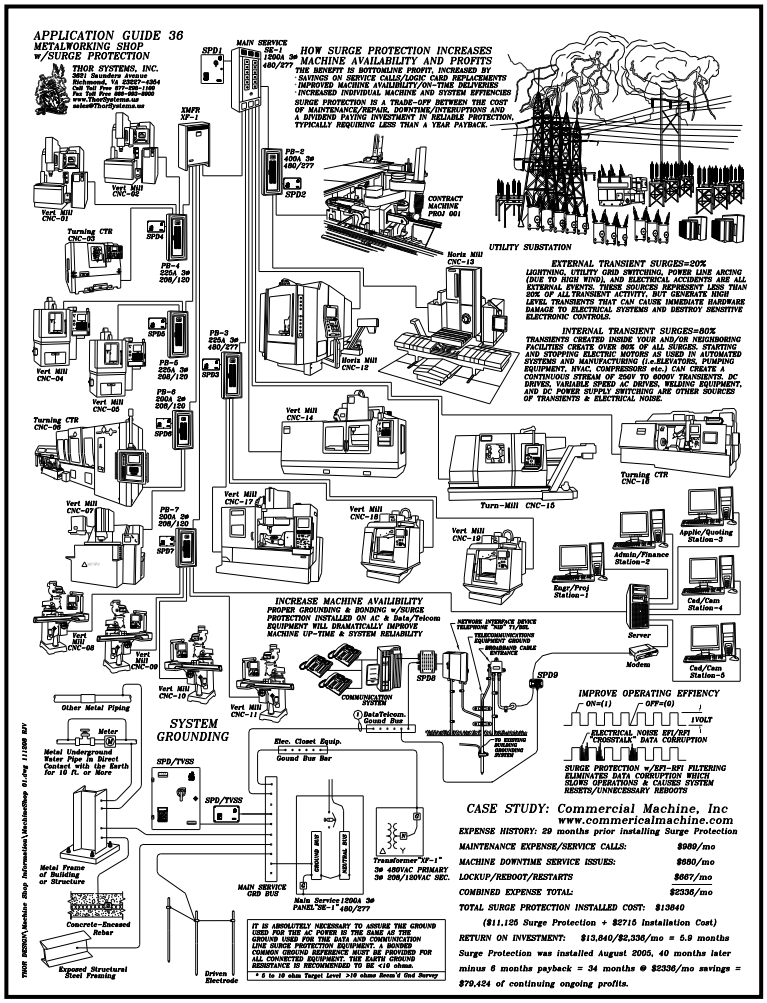
APPLICATION

Commercial Machine, Inc., a Richmond, Virginia metal working facility, was experiencing recurring CNC machine service expenses and increasing lack of machine availability. THOR SYSTEMS was asked to help identify the source of the problem and recommend a solution to improve operating efficiency and machine tool uptime.

Ref. Standards:
- ***UL 1449 4th Ed.***
- ***UL 1283 5th Ed.***
- ***C62.41.1: 2002 IEEE***
- ***C62.41.2: 2002 IEEE***
- ***C62.45: 2002 IEEE***
- ***C62.62: 2010 IEEE***
- ***C62.72: 2007 IEEE***
- ***NEMA***
- ***NEC 2014***
- ***NFPA 70***
- ***FIPS 94***
- ***MIL-STD 220A***

MACHINE TOOL DOWNTIME

- Recurring CNC machine tools having *logic card failures* requiring service visits replacing electronic logic cards (typically two to five days downtime each event).
- Two *mainspindle motors had to be rewound*, at a cost of $5300 and $3700 (both motors had less than six years' service).
- Unnecessary *system upsets, lock-ups, and reboots* caused by transient activity and "crosstalk" (high frequency electrical EFI/RFI noise).



Commercial Machine, Inc. - Facility Layout with SPD Installed

SUSCEPTIBILITY

- Advancements in electronic technology . . . increased integration of complex controls have made logic control much more susceptible to poor power quality.
- Magnitude and frequency of problems worsen with increased utilization of sensitive electronic equipment in the metalworking industry.

THE PROBLEM

- **External Surges/Transients (20% Activity)**
  - Lightning, utility grid switching, power line arcing (due to high winds) and electrical accidents represent a low percentage (less than 20%) of all transient activity but generate high magnitude transients that can destroy sensitive electronic controls found in all CNC machines.
- **Internally Generated Surges/Transients (80% Activity)**
  - Over 80% of all surge/transient activity is created within the facility. Starting and stopping motors (as used in machine tools), cranes, HVAC, compressors, welding equipment, etc. create a continuous stream of transients.

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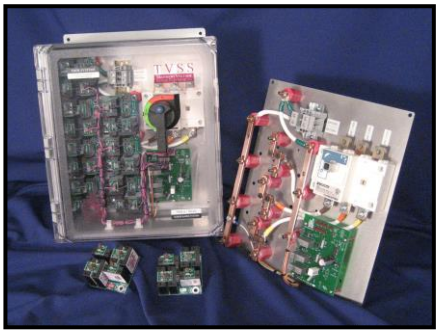
THE SOLUTION

- Installed surge protection at service entry, downstream at panels feeding CNC machine tools, and data/telcom applications, resulting in:
  - Enhanced operating efficiency, equipment reliability/availability, and improved on-time deliveries;
  - Reduction in labor, overtime, and maintenance cost;
  - Reduction in downtime caused by logic/hardware damage.



Modular Surge Protective Device (SPD) With Field Replaceable Modules Located at Electrical Service Entry

Non-modular Surge Protective Device (SPD) Located at Downstream Panels Feeding Machine Tools

THE BOTTOM LINE

- Measurable increase in profitability, machine availability, and minimized production disruptions since installing surge protection.
- Total surge protection and installation cost were $13,840; ROI was 5.92 months.
- Savings 34 months run time since six-month payback of original investment based on 29 months prior expense history was $79,424 of continuing profit.

Thank you for your interest in THOR SYSTEMS, INC. We would like to become an information resource for surge protection applications. THOR SYSTEMS offers products and services that provide protection from the more *obvious external* to the more *frequent internal* transient voltage sources.

Our consistent focus on improved product performance and increased value to the customer is conveyed by our products' transparent cover enclosures, showcasing the TILE Architecture, unique component configurations, and providing per mode status indication.

Should you have any questions, please feel free to contact us (804.355.1100) or visit our Web site, www.ThorSystems.us.

Ref. Documents:

SA-004	*Site Risk Assessment/Sizing SPD*
SA-010	*Hybrid SPDs*
AG-09	*Features/Benefits*
3G TSr	*Product Spec Sheet*
3G TSn	*Product Spec Sheet*
TSt110PB	*Product Spec Sheet*
TSxCoax	*Product Spec Sheet*