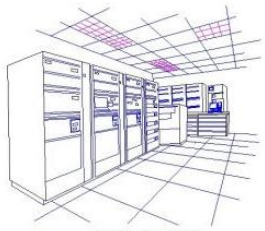
THOR SYSTEMS

Your Power Quality Partner & Source for Surge Protection

identify & realize Profit opportunities

UNDERSTANDING THE PROBLEM… You may ask, "What common problems and related expenses are found in industrial facilities, airports, wastewater treatment plants, office buildings, hotels, hospitals, military installations, Federal and State Government buildings?" *All are subjected to the effects of poor electrical Power Quality (PQ).*



DATA CENTER

Nothing affects profitability as instantly and dramatically as unscheduled **downtime** (intermittent or longer-term), **system failures**, and loss of equipment or process **availability**.

Electric power quality problems cost United States industry over $100 billion annually.

- Cost by sector:
  - 73% commercial (14.9 million small and large businesses)
  - 25% industrial (1.6 million facilities)
- Inexpensive components (circuit cards, chip sets, etc.) cause large financial losses
- Factors which increase susceptibility of equipment/systems:
  - Large capital investments in commercial and industrial automation with embedded, sensitive electronic logic
  - Magnitude/frequency of electrical transients (surges) worsen dramatically with increased use of electrical equipment
  - Increased use of broadband cable, DSL and T1 internet connections requiring the computer to always be connected
  - Large scale integration and miniaturization of electronics in computers, communications and factory automation significantly increase sensitivity to poor PQ

Results of Poor Power Quality

- System upsets, lock-ups, and reboots for no apparent reasons
- Premature equipment, hardware and logic card failures
- Corrupted and lost data
- Motor failures requiring rewinding or replacement
- Interrupted production causing material and capacity losses

Sources of Poor Power Quality

- **Internally generated transients**: 80% of voltage surges and transients are caused by changes in electrical demand (starting and stopping of electrical motors, machine processes, computers, printers, elevators, pumping equipment, HVAC systems, etc.)
- **Externally generated transients**: 20% of electrical problems are caused by external sources (lightning, utility grid switching, high winds causing power line arcing, electrical accidents, etc.)

HOW MUCH IS POOR POWER QUALITY COSTING YOUR COMPANY?

EXPENSE ANALYSIS ~ IDENTIFYING INVESTMENT OPPORTUNITIES… More businesses are in highly competitive markets requiring them to identify opportunities to ensure competitiveness and increase profitability. Successful organizations relentlessly analyze data to understand what drives their expenses and profitability.

Classify expenses which can be converted to future profits. Surge protection is a trade-off between repair costs, equipment downtime and process interruptions.

How to start. Estimate the savings; add the costs from the categories below. Implementing site specific surge protection can yield a *30-70% reduction* of these costs.

Maintenance Expense Categories

- Switchgear/distribution; emergency and mission critical power equipment; motor controls; motor rewinding or replacements
- Building management/lighting controls systems
- Telecommunications equipment
- Office equipment (computers/servers, printers, copiers, etc.)
- Elevators/escalators and HVAC systems
- Security/fire detection and suppression

Miscellaneous Expense Categories

- Lost operating efficiency
- Poor equipment/system availability and longevity
- Unnecessary equipment lock-ups/reboots/restarts
- Material losses generated by production reboots/restarts
- Increased inventory to bridge process interruptions
- Late product deliveries

Business "strategy" addresses long-term guidelines for increased profitability. Improving PQ is a tactic to expand profits through reduced maintenance costs, increased equipment life, and enhanced operational efficiency.

A recent study indicates *the average office building experiences 106 electrical PQ problems in a typical month*. In new construction or renovation, many power disturbances can be eliminated with surge protection.

IMPROVING BUSINESS CONTINUITY CONVERTS OPERATING EXPENSES TO PROFITS

THE SOLUTION ~ AN AFFORDABLE ANNUITY... The application should match the Surge Protective Device (SPD) to the installation parameters and the electrical environment of the facility.

Installation factors to consider:

- Criticality of equipment/process to the business
- Cost and time to repair critical equipment
- SPD locations and appropriate sizing

A **cascaded** installation with SPD units at the Service Entrance and downstream at the protected equipment panelboards is required for effective surge protection. Cascading provides protection from **externally generated transients** and **internally generated transients**.

Susceptibility is often referred to when describing the ability of an installation to be affected by surge events. Susceptibility is defined by geographic location, electrical system size/location, and the electrical configuration.

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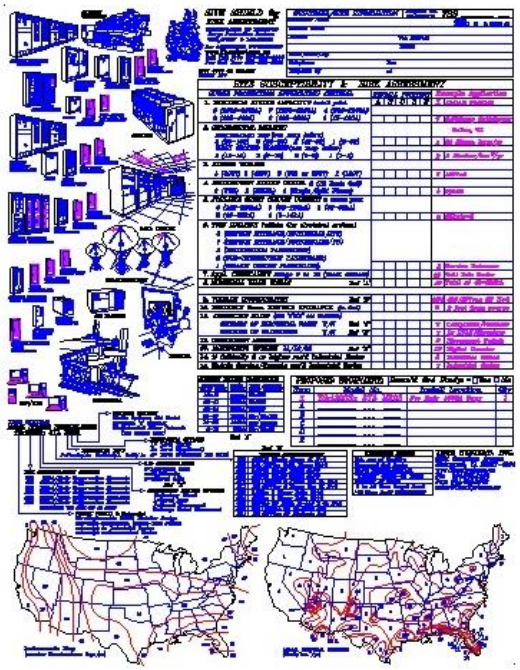
Risk Assessment. THOR SYSTEMS has developed a "**Site Shield 3G Risk Assessment Guide**" to determine the appropriate surge protection for specific applications within a facility.



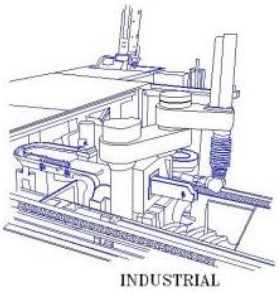
Improved Power Quality Cost. The cost to install surge protection is normally less than 0.25% of the cost of construction with a typical return on investment (**ROI**) of one year and often less than **six months**. After initial payback period, saved expense costs become **profit annuities** year on year.

SURGE PROTECTION IS AN INVESTMENT OPPORTUNITY

IMPLEMENTATION… **Schedule a THOR SYSTEMS site visit/evaluation.** During a site visit we will verify the electrical service/distribution and data/communications systems' ground integrity, review historical maintenance/miscellaneous costs, and record a measurement of the electrical service ground resistance. Following a site visit, we will provide recommended solutions to improve your power quality and enhance your profitability, with a detailed equipment proposal and defined installation guide.

RESULTS… THOR SYSTEMS' power quality solutions will help you achieve your company's objectives by detecting and eliminating power quality problems affecting your business and provide:

- Improvements in **PROFITABILITY**
  - Business continuity/operating efficiency
  - Equipment/system availability and longevity
  - Customer relations by improving on-time deliveries
  - System and equipment connectivity
- Reductions in **EXPENSES**
  - Labor, overtime, and maintenance costs
  - Equipment downtime
  - Equipment repair and replacement
  - Production material losses caused by unnecessary reboots/restarts

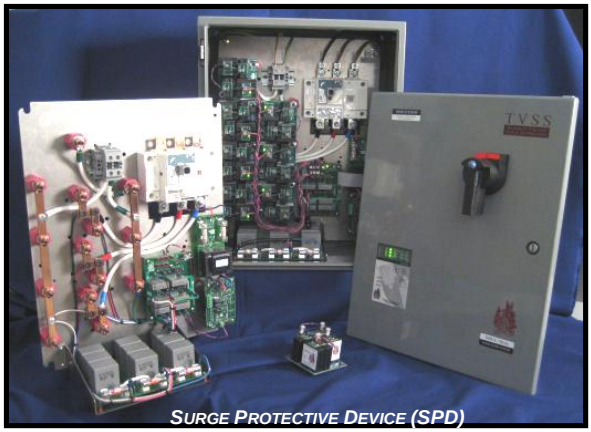


INDUSTRIAL

THOR SYSTEMS' commitment goes beyond the manufacture of the product. We are dedicated to ensuring proper **site evaluation,** sizing/recommending surge protection for **electrical distribution** and **data communications** equipment, as well as implementing and commissioning these products.

Our products are designed to protect an entire facility from the impact of PQ problems.

Product Offerings. THOR SYSTEMS' products range from large facility service entrances to primary and secondary building distribution systems, including computer rooms and data processing centers as well as manufacturing, process control, small business systems and residential equipment.



SURGE PROTECTIVE DEVICE (SPD)

THANK YOU *for your time and interest in THOR SYSTEMS. We look forward to becoming your Power Quality Partner and Source for Surge Protection. We offer products and services that protect you from the* ***more obvious external*** *to the* ***more frequent internal*** *transient voltage sources.*

Feel free to contact Robert Van Sickle (804.355.1100, Ext. 232 or email rjv@ThorSystems.us) or visit our Web site www.ThorSystems.us.

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