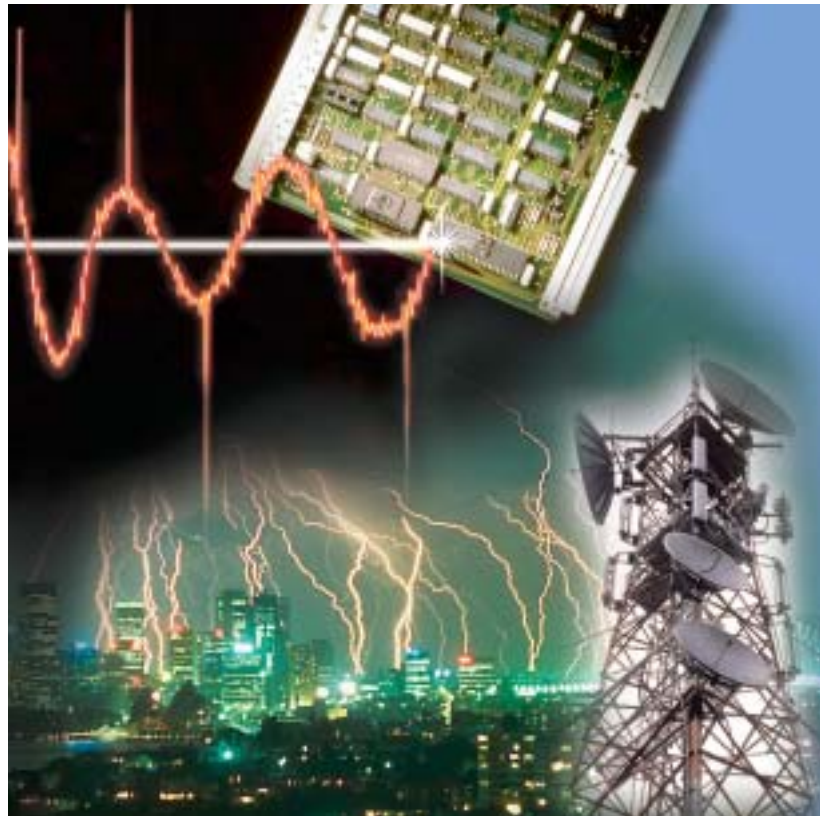


CRITEC®
CADWELD®
ERITECH®

Facility Electrical Protection Solutions

Lightning Protection • Grounding & Bonding
Surge & Transient Protection



ERICO®

100 YEARS YOUNG

1903 - 2003

FACILITY ELECTRICAL PROTECTION

Are you at risk?

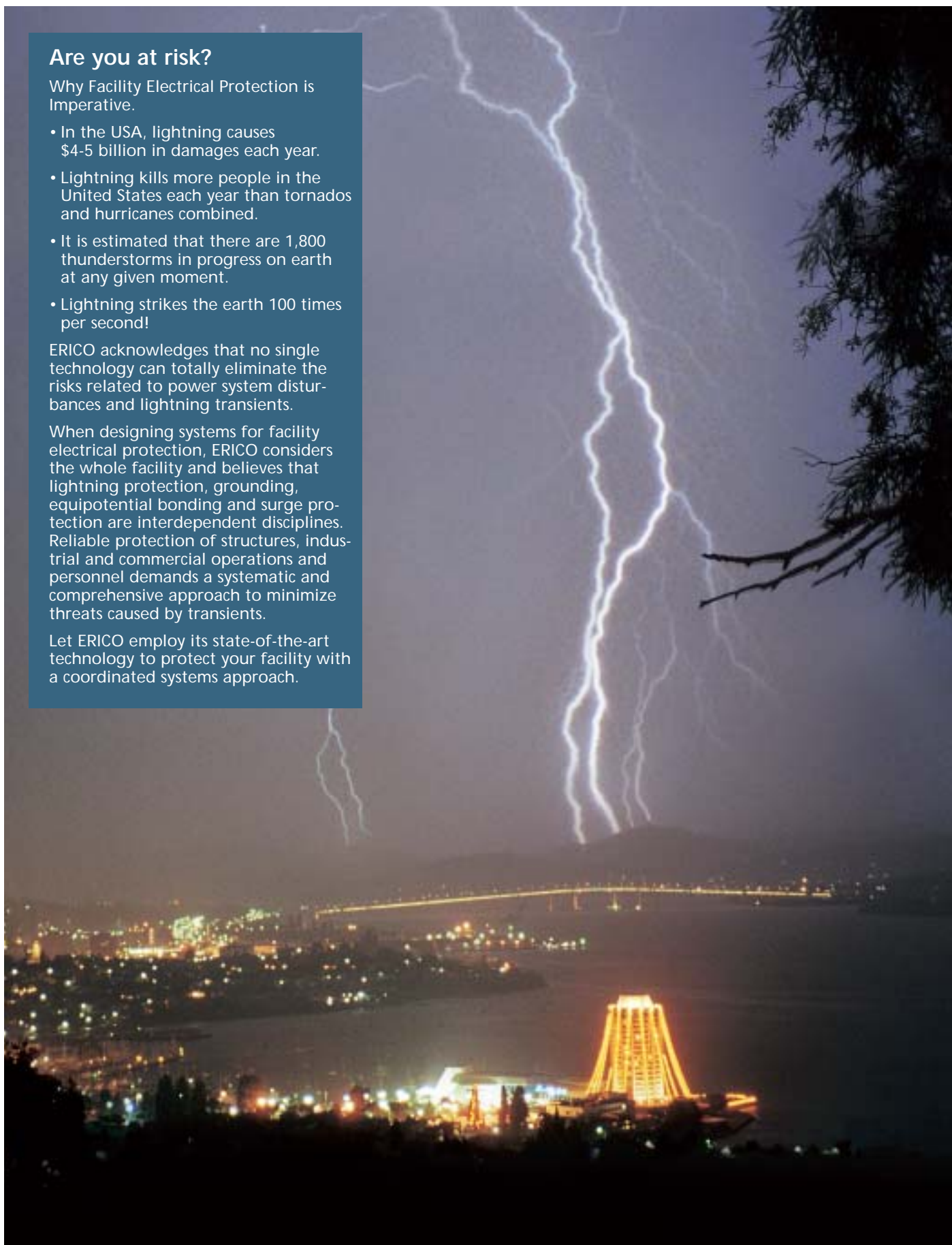
Why Facility Electrical Protection is Imperative.

- In the USA, lightning causes \$4-5 billion in damages each year.
- Lightning kills more people in the United States each year than tornados and hurricanes combined.
- It is estimated that there are 1,800 thunderstorms in progress on earth at any given moment.
- Lightning strikes the earth 100 times per second!

ERICO acknowledges that no single technology can totally eliminate the risks related to power system disturbances and lightning transients.

When designing systems for facility electrical protection, ERICO considers the whole facility and believes that lightning protection, grounding, equipotential bonding and surge protection are interdependent disciplines. Reliable protection of structures, industrial and commercial operations and personnel demands a systematic and comprehensive approach to minimize threats caused by transients.

Let ERICO employ its state-of-the-art technology to protect your facility with a coordinated systems approach.



FACILITY ELECTRICAL PROTECTION

With over 60 years of experience in research, testing and product development, ERICO employs a total engineered systems approach when working with customers on any project – ranging from small installations to multi-billion dollar, turnkey projects anywhere in the world.

Lightning protection, grounding, bonding and surge protection are technical subjects that demand the expertise that only ERICO can provide. ERICO can point facility owners in the right direction with the necessary support needed to implement a complete facility electrical protection system.

Risk Management and System Design

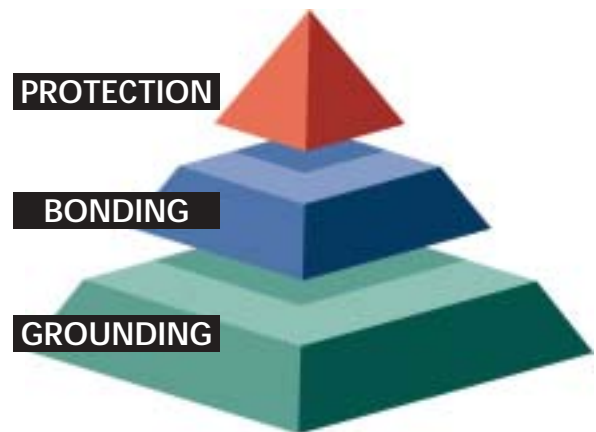
All ERICO projects are designed to meet modern risk management philosophies. Our products are continuously engineered to meet current international standards for lightning, surge and grounding standards.

We develop risk management strategies for projects and assess sites that have been damaged by lightning. This often necessitates designs that go beyond relevant standards.



The mission for Facility Electrical Protection is to protect people and property from lightning damage and transients by providing the best, most cost-effective facility electrical protection system that meets good engineering practices.

A solid foundation is key to any facility electrical protection system. The process begins with proper grounding.



Design Software

In recent years, ERICO has invested heavily in the development of system design software, incorporating a multitude of variables into our designs.

The use of proprietary computer programs ensures the customer receives reliable, customized protection.



			<i>CADWELD® process is introduced into Cathodic Protection applications.</i>		<i>Patented weld metal alloy developed for welding aluminum materials.</i>		<i>CADWELD ONE SHOT developed – a disposable mold for one time use in connecting a copper conductor to a ground rod.</i>		<i>Electrical connections developed for welding to high pressure pipelines.</i>
1903	1930	1938	1949	1951	1954	1956	1959	1960	1973
<i>The Electric Railway Improvement Company was formed to manufacture power bonds, signal bonds and related welding equipment.</i>	<i>Advances in portable welding equipment make possible on-site arc welding for rail bonds.</i>	<i>Dr. Cadwell of the Electric Railway Improvement Company invents the CADWELD process – a copper-based, exothermic process for welding copper conductors to steel rails.</i>		<i>Adapted the CADWELD process for use in grounding connections.</i>		<i>EZ Change Handle Clamp is introduced to the CADWELD process, making it faster and easier to use.</i>		<i>Prefabricated bimetallic wire mesh introduced for grounding mats and antenna reflectors.</i>	

FACILITY ELECTRICAL PROTECTION

Market Leading Products

ERICO's products are designed for long-term reliability and are backed by superior technical support and product warranties.

All ERICO products undergo extensive development processes and performance evaluations to ensure that they remain at the forefront of the electrical protection industry. Many of our products meet worldwide standards and are certified by independent authorities.



Through continued investment in field and laboratory research, ERICO is committed to expanding its already extensive product range in order to meet the changing needs of our customers.



Training, Certification and Commissioning

ERICO provides extensive training for the installation and maintenance of our systems to ensure optimum performance.

We can certify our installations to guarantee that they meet

ERICO's stringent guidelines and the requirements of the appropriate standards or specifications for a particular project. This is essential when the environmental conditions impose higher demands on installations and when minimum levels of protection must be achieved or exceeded. We also commission installations completed by external parties to ensure that uniform standards and quality are maintained.



ERICO® acquires Knight Metalcraft, a manufacturer of copperbonded ground rods.

ERICO acquires Carolina Galvanizing, a manufacturer of galvanized and copperbonded ground rods.

Signal Reference Grid (SRG) is developed to minimize the effects of transient or electrical noise on sensitive electronic equipment.

First in-house testing capability (5kA surge generator)

1975

1977

1981

1983

1985

1986

1988

1989

1991

Company formed in Hobart, Tasmania, Australia to provide lightning protection.

Surge Reduction Filters and transient barrier concepts developed – Six Point Plan for Facilities Protection first formulated.



Active system Dynasphere Lightning Terminals concept developed.

ERICO introduces CADWELD® EXOLON low emission welding connections.

TLP range of telecommunications protectors released.

ERICO combines Knight Metalcraft and Carolina Galvanizing to form ERITECH®.



FACILITY ELECTRICAL PROTECTION

Responsive Research and Development

ERICO's research and development staff continuously designs new products and better methods that anticipate the requirements of evolving applications. Our goal: find long term problem-solving, cost-effective solutions for customers.

Research is conducted in laboratories and in the field, using in-house and independent facilities. In our constant search for innovative solutions, we have carried out research in high voltage laboratories in Europe, North America and Indonesia, as well as at field stations in Australia and the U.S.

Specialized Training

ERICO conducts training courses and educational seminars around the world to support our customers. These can be tailored to suit your specific requirements.

Topics include:

- Theory of lightning formation
- Air terminal and lightning downconductor technology
- Grounding for substations
- Grounding for electronic equipment including computer and telecommunications facilities
- Power line protection, including shunt and series protection
- Data and communication equipment protection
- Installation procedures
- Lightning safety



1992	1994	1997	1998	1999	2000	2001	2002
<p><i>Release of patented Movtec Surge Divter.</i></p> <p><i>GEM Permanent Ground Enhancement Material is introduced.</i></p>	<p><i>In-house 200kA 8/20μs surge generator developed.</i></p>	<p><i>CRITEC Transient Discriminating (TD) Technology is invented and developed.</i></p> <p><i>ERICO acquires Global Lightning Technologies in Australia.</i></p>	<p><i>ERICO releases TD Technology.</i></p> <p><i>ERICO combines with SUDAFIX a leading Lightning Protection System Provider in the U.K.</i></p>	<p><i>ERICO acquires AC Lightning</i></p>	<p><i>CRITEC® introduces SEP and Integrated Protection Panel ranges.</i></p>	<p><i>ERICO acquires Blackburn ground rod line from T & B</i></p>	<p><i>CRITEC introduces TDX Series Transient Discriminating TVSS</i></p>

FACILITY ELECTRICAL PROTECTION

KEY INDUSTRY GROUPS

Our total facility electrical protection approach can be applied to a number of key industries including oil and gas, telecommunications, aviation, mining, power generation and distribution, industry and process control, and railway and mass rapid transit systems.



Power Generation and Distribution

The power industry is unlike any other in that its product – electricity – can have the same effect on human and capital resources as lightning and therefore requires careful attention in regard to protection strategies.



ERICO's status as one of the worlds largest grounding specialists has resulted in many of our grounding and lightning protection systems being incorporated into power station and substation networks.

Telecommunications facilities are particularly at risk. Tall, slender structures located on high terrain, the tops of tall buildings and structures adjacent to towers are common lightning strike points. Protection for such structures from direct lightning strike is essential.

Similarly, installations fed by long distribution lines are prone to equipment damage from temporary over-voltages caused by switching surges or poorly regulated power supplies. Over-voltage transients and surges are common in this situation, so protection is necessary, as is a grounding system design suitable for the safe dissipation of energy, regardless of local conditions.

Telecommunications

With increasingly complex and miniaturized components and ever increasing importance and scope, telecommunications and broadcast installations are becoming more reliant on effective protection from lightning and over-voltage transients.



Aviation

The complexities of protecting airports and other aviation facilities extend well beyond signal and data systems. Apron lights, ground lights and other navigational aids are susceptible to damage from lightning strikes, which can cause disruption of aircraft movement or have potentially more serious consequences.

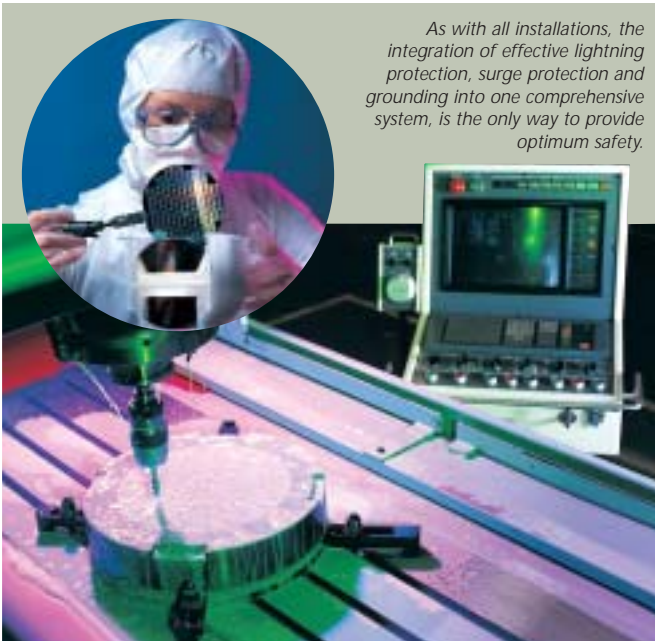
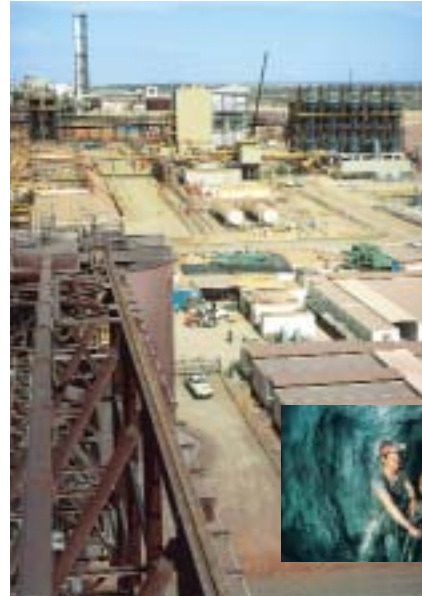


FACILITY ELECTRICAL PROTECTION



Petrochemical Oil and Gas

The severity of lightning strikes in high-risk areas has often been an underestimated component in facility design. Subsequently, conservative lightning protection solutions have been used. The consequences of not providing effective grounding and surge protection when dissipating high magnitude lightning currents in close proximity to volatile materials can be devastating. ERICO's protection strategies are equally applicable to these existing facilities as well as projects in the design stage.



As with all installations, the integration of effective lightning protection, surge protection and grounding into one comprehensive system, is the only way to provide optimum safety.

Mining

Soil resistivity and other environmental considerations present additional challenges, as do the design and purpose of many of the structures requiring protection. This is in addition to the need to protect explosive and fuel storage handling centers where the consequences of a lightning strike can be enormous.



Industry Process and Control

Uncontrolled surges and transients endanger health and safety and can lead to expensive equipment repairs, considerable production downtime and loss of revenue and profits.

Rail and Mass Rapid Transit (MRT) Systems

ERICO is a global provider of a complete, all encompassing protection philosophy. Because of this, we have become increasingly active in the improvement and modernization of established rail networks in developing countries and in assisting with the creation of safe, efficient networks in emerging economies.



Air Terminals

- Conventional Air Terminals
- Enhanced Air Terminals

Downconductor Systems

- Conventional Bare Metal Conductors
- Insulated Low Impedance Conductors

Grounding

- Grounding Enhancement Materials
- Exothermic Welded Connections
- Ground Rods, Connectors and Specialty Ground Electrodes

Bonding

- Signal Reference Grids
- Equipotential Mesh & Safety Mats
- Ground Bars
- Bulkhead Ground Planes
- Connectors
- Bonding Straps
- Pipeline Bonding & Protection
- Flexible Busbars & Braids

Power Protection

- Service Entrance Protectors
- Branch Panel Protection
- Sensitive Electronic Equipment Protection

Data & Signal Line Protection

- Telecommunications Line Protectors
- Transient Barriers
- Industrial Protection
- Coaxial Surge Protectors
- Data Line Protectors
- LAN Protectors

Ancillary Products & Services

- Test Equipment
- Consulting
- Special Designs
- Training Courses
- Site Surveys
- Lightning Warning Systems
- In-house Testing

LIGHTNING PROTECTION SOLUTIONS

GROUNDING & BONDING SOLUTIONS

SURGE PROTECTION SOLUTIONS

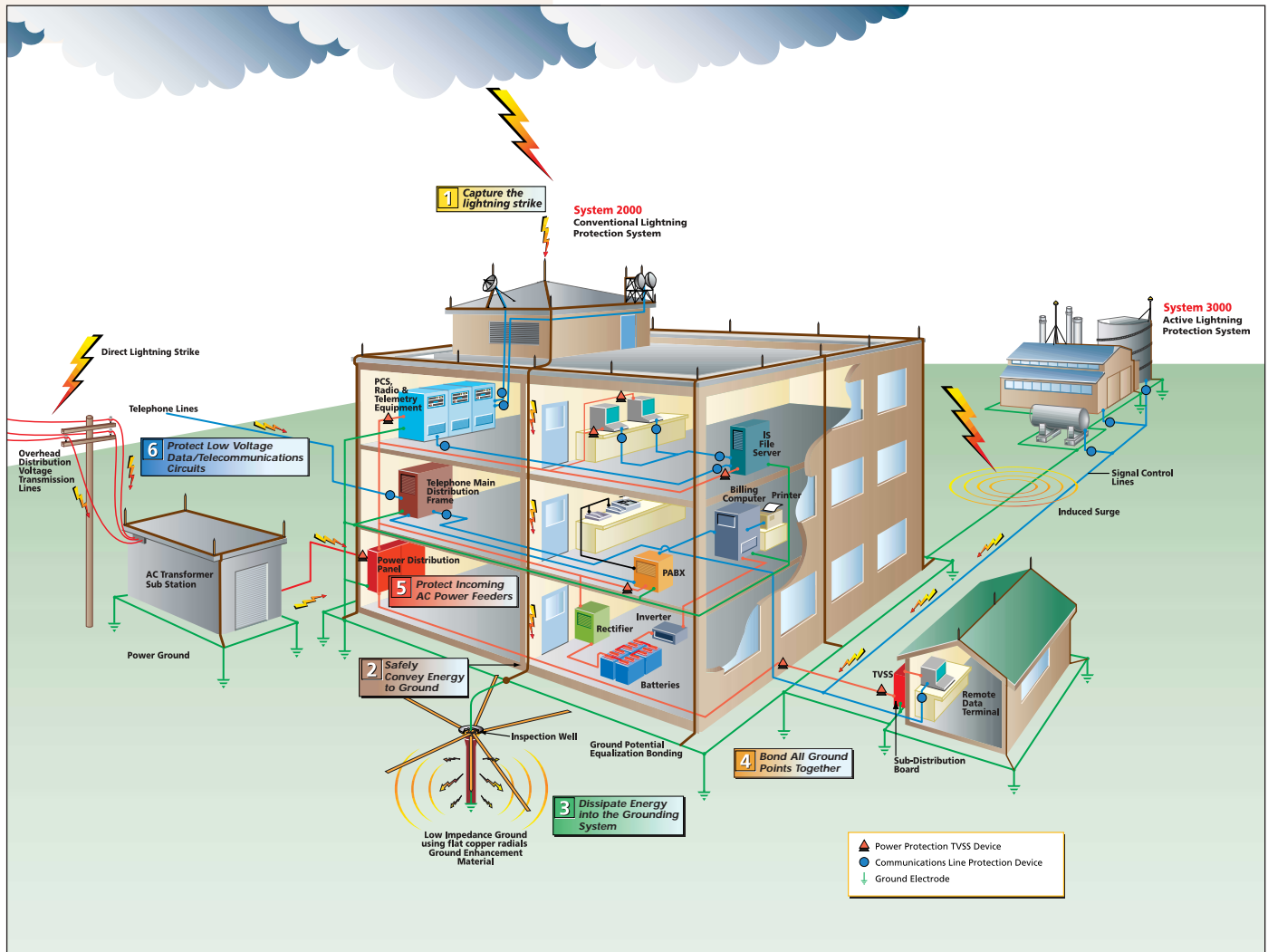
DESIGN SERVICES & SOLUTIONS

FACILITY ELECTRICAL PROTECTION

The ERICO Six Point Plan of Protection provides total facility protection by integrating several concepts. The Plan combines the capture and dissipation of lightning strikes, the elimination of ground loops, and the protection of equipment from surges and transients from multiple sources. ERICO manufactures all of the products and offers the expertise needed to form a plan for any facility.

The ERICO Six Point Plan

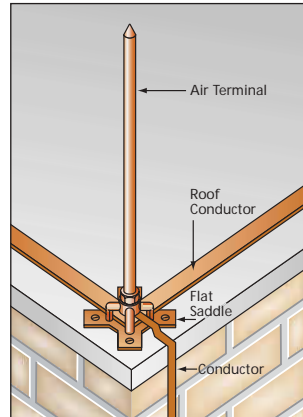
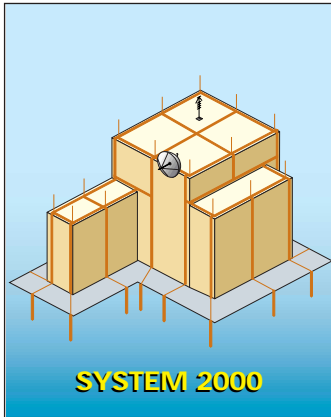
- 1 Capture the lightning strike.**
Capture the lightning strike to a known and preferred attachment point using a purpose-designed air terminal system.
- 2 Safely convey this energy to ground.**
Conduct the energy to the ground safely via a purpose-designed downconductor.
- 3 Dissipate energy into the grounding system.**
Dissipate energy into a low impedance grounding system.
- 4 Bond all ground points together.**
Bond all ground points to eliminate ground loops and create an equipotential plane.
- 5 Protect incoming AC power feeders.**
Protect equipment from surges and transients on incoming power lines to prevent equipment damage and costly operational downtime.
- 6 Protect low voltage data/telecommunications circuits.**
Protect equipment from surges and transients on incoming telecommunications and signal lines to prevent equipment damage and costly operational downtime.



CAPTURE THE LIGHTNING STRIKE

ERITECH Air Terminals

SYSTEM 2000



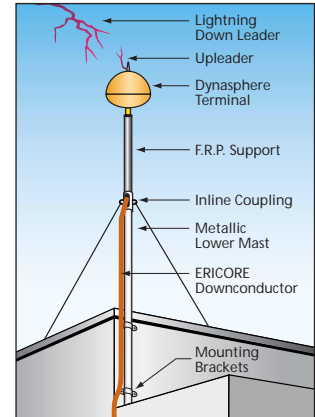
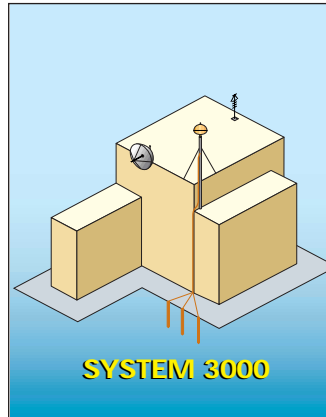
System 2000

- Well known technology of passive rods or air terminals, familiar to installers
- Air terminals available in aluminum or copper
- British Standard component compliance
- Precision manufacturing ensures easy assembly and installation
- BENJI computer-aided design to BS 6651 or NFPA-780

System 2000 Components

- Lightning and bonding conductors
- Air terminals (lightning rods)
- Air terminal base or holder
- Conductors and fittings
- Fasteners and cable holders
- Lightning Event Counter to register strikes
- Low impedance grounding grid including ground enhancement materials for difficult areas
- Grounding or earthing conductors, fittings, and ground electrodes

SYSTEM 3000



System 3000

- Advanced lightning protection system based on latest lightning research and technology
- Enhanced area of protection, fewer air terminals needed
- Economical and easy to install
- Fewer downconductors are needed, which reduces the cost of materials, labor and roof maintenance
- Protects all types of structures and "open areas" such as golf courses, campuses and stadiums

System 3000 Components

- DYNASPHERE dynamic air terminal which acts as a preferred strike point
- Purpose-designed ERICORE downconductor cable to minimize sideflashing, or conventional downconductors
- Lightning Event Counter to register strikes
- Low impedance grounding grid including ground enhancement materials for difficult areas
- Grounding or earthing conductors, fittings and ground electrodes

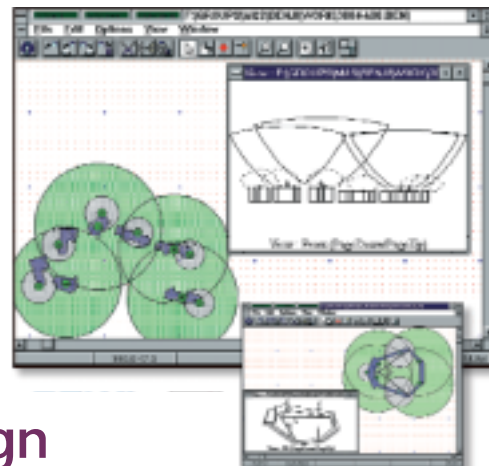
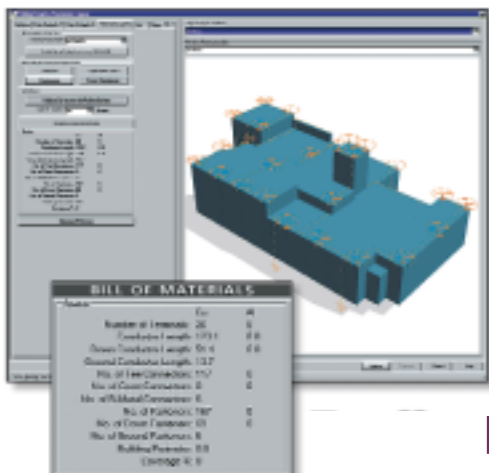
Benji Design Software

The placement of air terminals, whether passive or active in nature, is a critical part of the lightning protection design process. Only if air terminals are placed in the optimum location on a structure, is it possible to achieve an efficient and reliable lightning protection system.

ERICO's unique BENJI computer aided design (CAD) programs provide the highest levels of lightning protection to a variety of

design techniques and standards (BS 6651, NFPA-780, Collection Volume).

Based upon individual site parameters such as structure dimensions, elevation, local thunderday activity and structure usage, each BENJI design is customized for the project and provides elevation, 3D and plan views of the installation with specifications and a "Bill of Materials" including a quotation for components.



Benji Design



SAFELY CONVEY THIS ENERGY TO GROUND

ERITECH Downconductors

Once the lightning has been captured at a preferred point, the discharge current must be conveyed safely to ground. The induction to ancillary conductors, such as nearby coaxial feeder cables connected directly to equipment racks, also must be minimized.

ERICO provides a full range of downconductors, including Smooth Weave, Ropelay, Flat Copper Strip and our ERICORE Series. These conductors convey current to ground safely and effectively.

System 2000

Conventional Conductor

- Flat Copper Strip offers low impedance
- Smooth Weave cable offers flexibility and ease of installation

IMPEDANCE PERFORMANCE OF CONVENTIONAL DOWNCONDUCTOR INSTALLATIONS*

Class 1 & 2 Smooth Weave and Ropelay Cable Copper or Aluminum Diameters vary Zo for largest cable (18mm) = 239W L = 1130nH/m	Flat Copper Strip 1mm x 70mm (.039" x 2.75") Zo = 182W L = 859nH/m
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*All of the figures above are assuming 6 inches (150mm) separation between conventional downconductor and ground plane, or isolated conductor.



System 3000

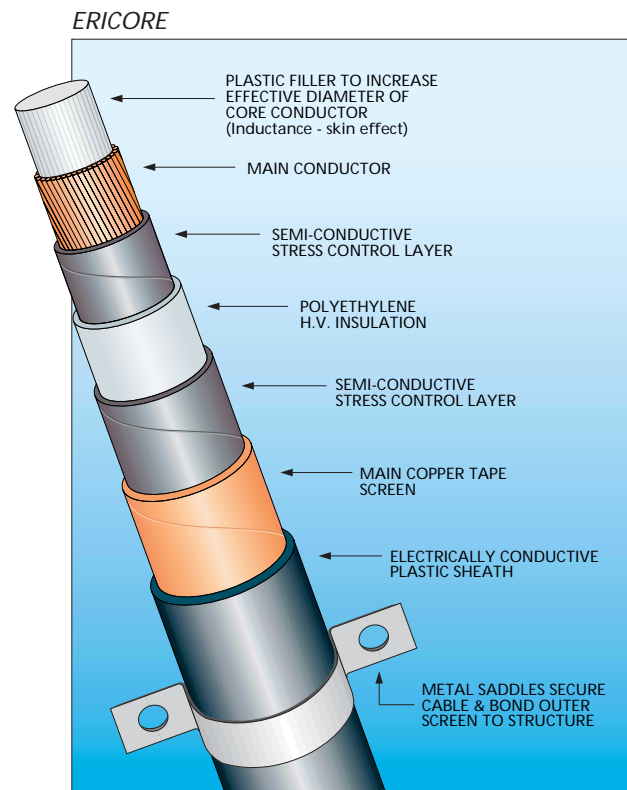
ERICORE Conductor

- Lightning is contained within a 50mm² (Approx. 1/0 AWG) primary conductor
- Lightning is conveyed via a known and preferred path
- Screening properties help reduce radiated fields and consequent induction
- Insulation drastically reduces the risk of side flashing
- Structure carries minimal current
- Easy to retrofit existing structures

IMPEDANCE PERFORMANCE OF ERICORE DOWNCONDUCTOR INSTALLATIONS*

For Structures <65m 24mm (.95") Zo = 6.6W L = 33nH/m	For Structures >65m 36mm (1.42") Zo = 4.4W L = 22nH/m
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*ERICORE figures are unaffected by separation, provided outer sheath is electrostatically bonded to the structure per installation recommendations.



SAFELY CONVEY THIS ENERGY TO GROUND

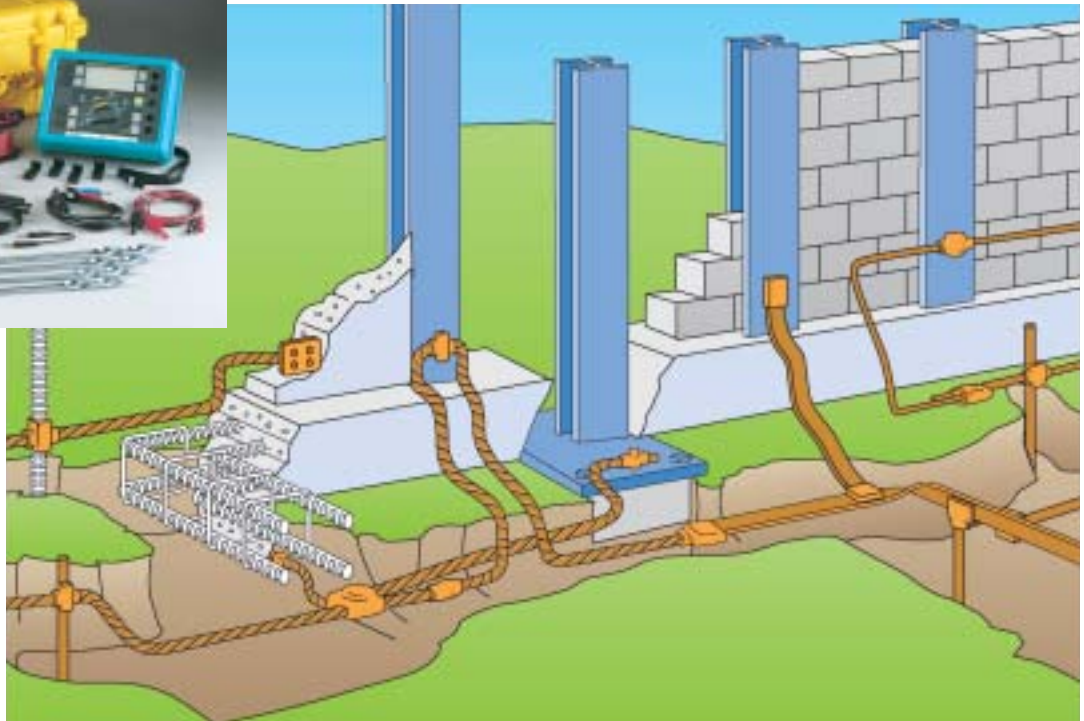
Welded Electrical Connections

Connections are often the weak point of electrical circuits, especially circuits subjected to corrosion and high current. The capacity of a grounding circuit to protect property and personnel depends on the quality of its connections.

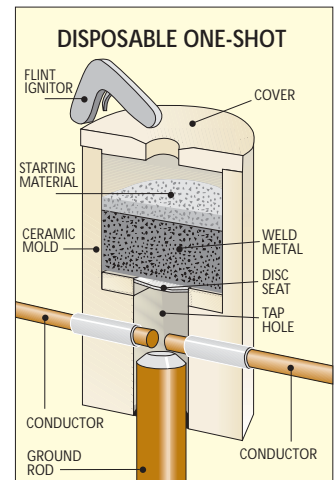
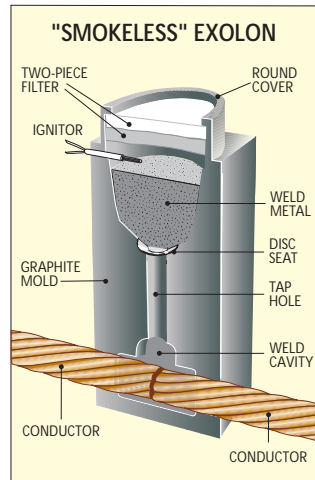
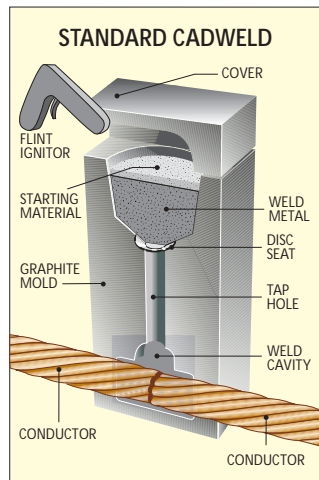
Grounding connection methods, including compression, bolted, brazed and welded, will perform well for the first couple of years. Only the molecular bond provided by the CADWELD exothermic welding system is permanent. The

facility owner is assured peace of mind by knowing his personnel and equipment are safe from electrical hazards for the design life of the facility.

All popular CADWELD welds are UL listed* and perform better than any crimped or bolted connection because the copper-to-copper or copper-to-steel bond is molecular, not just surface pressure. These connections are more conductive, more durable and won't loosen.



CADWELD connections are available for all types of welded electrical connections, including EXOLON "Smokeless" connections for indoor use and ONE-SHOT connections, which are ideal for bonding conductors to ground rods.



* Contact ERICO for information on UL-listed products.

DISSIPATE ENERGY INTO GROUND

Ground Electrodes

ERICO offers a complete range of ground rods, ground rod splicing methods, and ground rod connections for reliable grounding in nearly any application.

Ground Rods

Ground rods serve as the electrode in an electrical protection system, dissipating the surge energy into the earth. ERITECH ground rods, the industry leader, are manufactured to high standards in a variety of platings and styles for a wide range of applications.

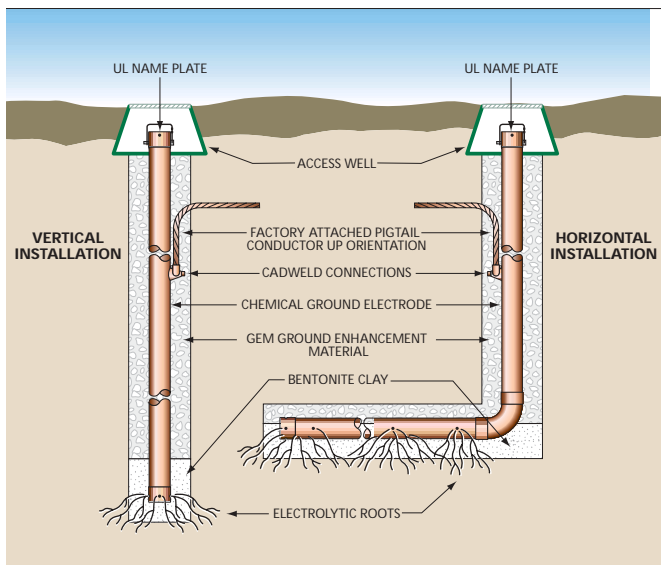


ERITECH Chemical Ground Electrode System

ERITECH chemical ground electrodes provide a low-impedance ground in locations of high soil resistivity. Together with GEM as backfill, the chemical ground electrode system dissipates lightning energy and other dangerous electrical fault currents, even in sandy or rocky soil conditions.

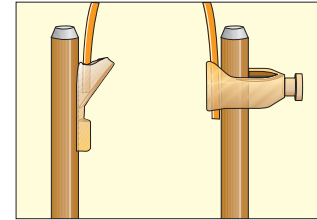
Features

- 54 mm (2-1/8") OD Type K copper pipe contains natural electrolytic salts that permeate into the surrounding soil, lowering resistivity.
- Available up to 610 cm (20 feet) in continuous length and longer rods can be field assembled using 10 foot (305 cm) sections.
- L-Shaped rods are installed horizontally in a trench where it is impractical to auger deep vertical holes.
- Easy connection to conductors using the pigtail. (Up or Down orientation)
- UL & CUL Listed to UL467 and CSA C22.2 No.41 respectively.
- Custom assemblies available.



Ground Rod Connections

CADWELD exothermic welded connections can be used to weld to the top or side of a ground rod for maximum flexibility with the permanence of every CADWELD connection.



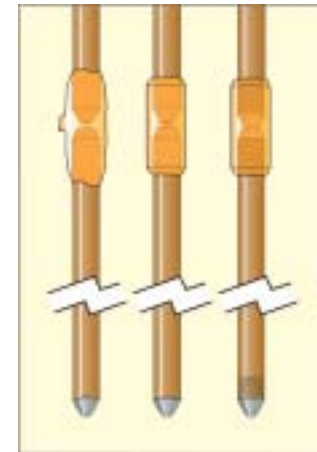
ERITECH mechanical ground rod connectors for copper-bonded and stainless steel ground rods are UL listed and approved for direct burial.

Ground Rod Splicing

For applications where deep-driven ground rods are required, ERICO offers three durable, reliable methods of splicing.

CADWELD connections have the lowest resistance available and will never corrode.

ERITECH compression couplers are easily installed ground rod splices. A compression joint is formed by driving, so the ground rods can be driven quickly and easily without the worry of separation.



ERITECH threaded couplers allow full contact of a rod point with the butt end of the preceding rod. They provide high-strength and corrosion resistance for a low-resistance connection.

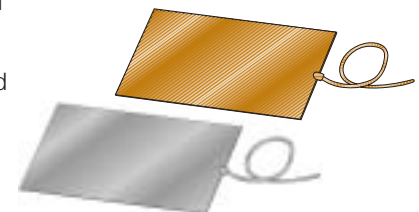
Flat Copper Strips

Flexible Flat Copper Strip is superb for grounding by providing lower inductance and impedance and five times the electrical surface contact than cable. It is easy to connect and can also be used as a downconductor in a lightning protection system. Available bare or tinned copper.



Ground Plate Electrodes

ERICO Ground Plate Electrodes are manufactured from solid copper or galvanized steel and provide excellent conductivity through large area contact with soil. They're available in standard, custom and prefabricated sizes, ready-to-splice or tee directly into your ground grid. Ground Plate Electrodes can also be connected to the ground circuit via CADWELD connections.

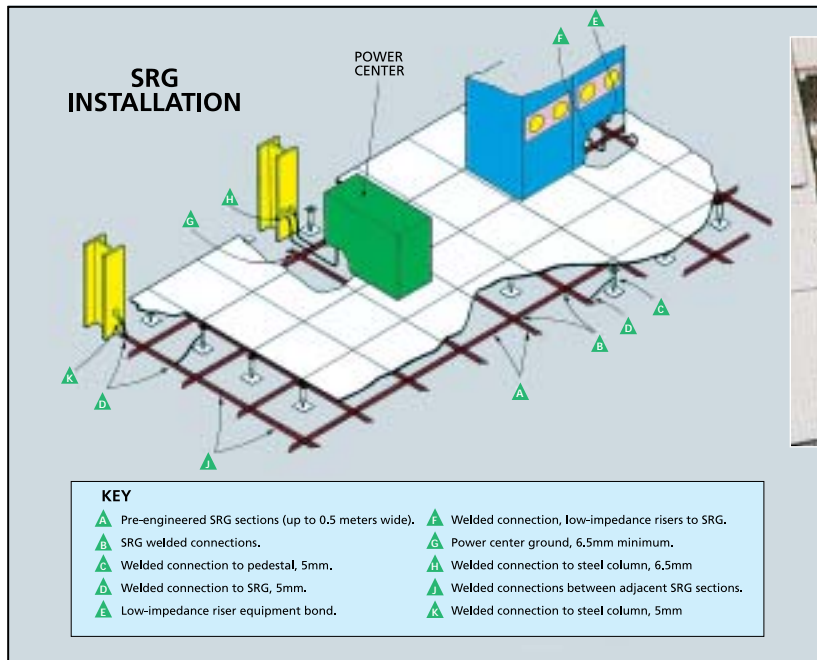


Signal Reference Grid

For proper grounding and bonding of sensitive electronic systems, such as computer and telecommunications installations, all frequencies must be considered, from DC to over 500 MHz.

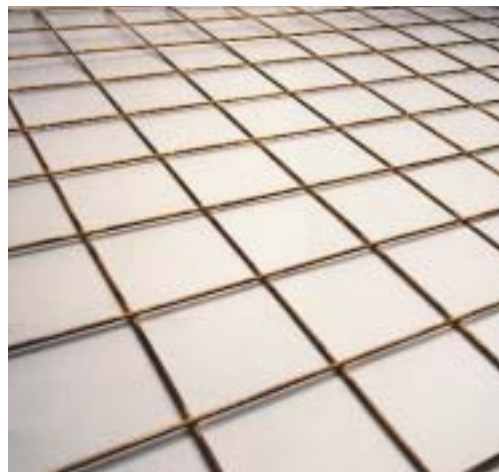
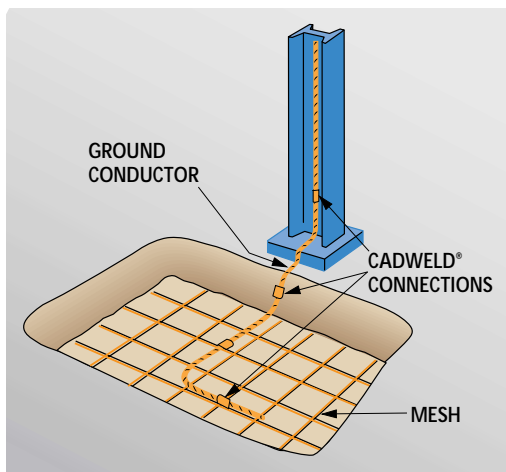
The ERITECH Signal Reference Grid is a low impedance network of conductors which establish an equipotential plane for high frequency, low voltage digital signals.

Because signal voltages are low, their sensitivity to transient noise is very high (typically 1 volt for digital systems). Normal shock and vibrations jar mechanical connections, creating electronic noise which can be coupled into the signal circuits, leading to false data or damage to circuits. The Signal Reference Grid however, uses welded connections, which virtually eliminates this situation.



ERITECH Pre-engineered Wire Mesh and Mats

Pre-engineered wire meshes are a convenient, efficient way to improve grounding in high voltage installations and where large area grounds are required.



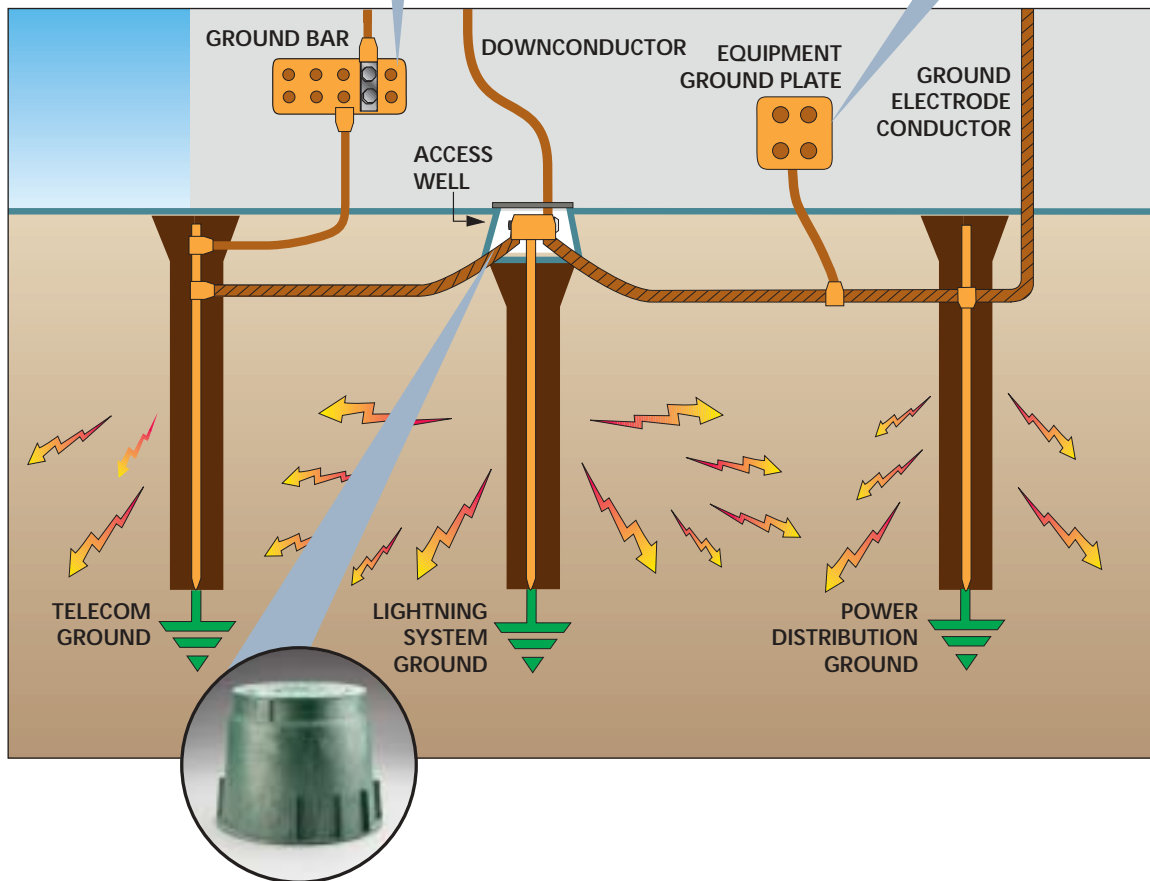
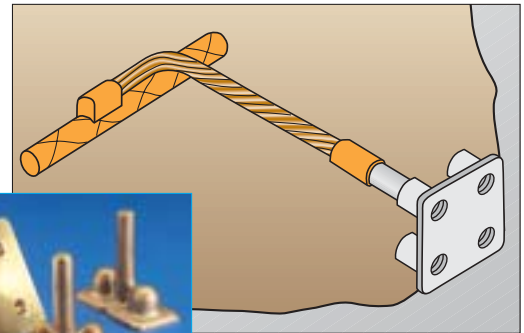
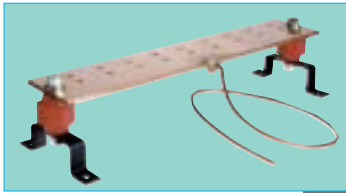
ERITECH Pre-engineered wire mesh.

BOND ALL GROUNDS TOGETHER

Ground Potential Equalization

Creating an equipotential ground plane under transient conditions is essential for the safety of equipment and personnel. When lightning or other transient voltages

occur, however, potential differences between the grounds are inevitable and can be dangerous. ERICO's grounding system experience can help you minimize the threat.



PROTECT INCOMING AC POWER FEEDERS

Surge Protection

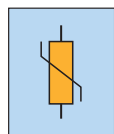
Electrical and electronic equipment in computing, communications and control/alarm installations are highly susceptible to damage from power transients. These impulses may be generated externally to the facility by direct or induced lightning, operation of utility substations or other switching sources. Internally a larger number of smaller impulses are generated by operation of nearby electrical equipment.

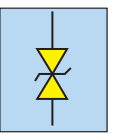
The cost of lightning and surge damage can be very substantial. The cost includes equipment repair/replacement costs, cost of wasted production material, cost of operational downtime and the cost of foregone opportunities. The USA National Safety Institute estimates the cost of lightning damage to exceed \$4-5 billion per year.

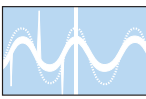
TVSS Core Technology

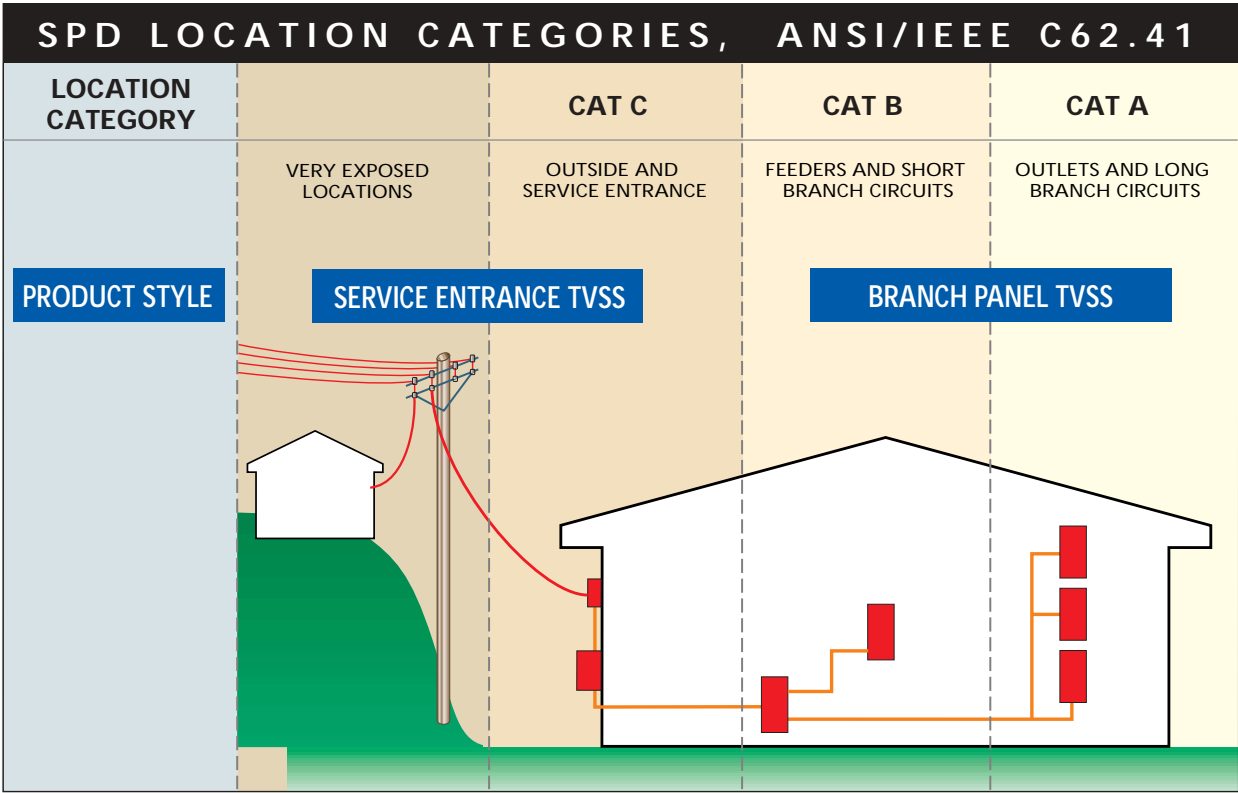
Effective protection is essential if the risk of equipment damage and operational downtime due to overvoltage surge and transient conditions is to be avoided. ERICO has developed a range of Transient Voltage Surge Suppressor (TVSS) products to meet the diversity of operating conditions found in its world market. These include geographical isokeraunic levels, different types of power distribution sys-

tems and local standards requirements. These products employ many different technologies to achieve the desired outcome. Often, a hybrid of more than one technology is used where the advantage of each can be exploited. As an example, such hybrid design may be used to optimize both speed and surge handling capability – parameters seldom found to coexist in a single TVSS technology.

 *The Metal Oxide Varistor (MOV) is an effective surge arrester, which has proven its worth as a robust TVSS technology over many years. Such devices are designed to rapidly limit overvoltage surge conditions and to direct the excess energy safely to ground.*

 *A newer technology involves the use of Silicon Avalanche Diodes (SADs). These devices are known for their extremely fast response time – this translates into a low-residual voltage – but are very poor in their energy handling capabilities and unsuitable as primary point-of-entry protective devices.*

 *The patented CRITEC Transient Discriminating Technology from ERICO not only addresses the danger of TVSS induced fire, but it also provides one of the lowest SVR (Supressed Voltage Rating) of any primary protection product on the market. This makes it an ideal technology base for TVSS development.*

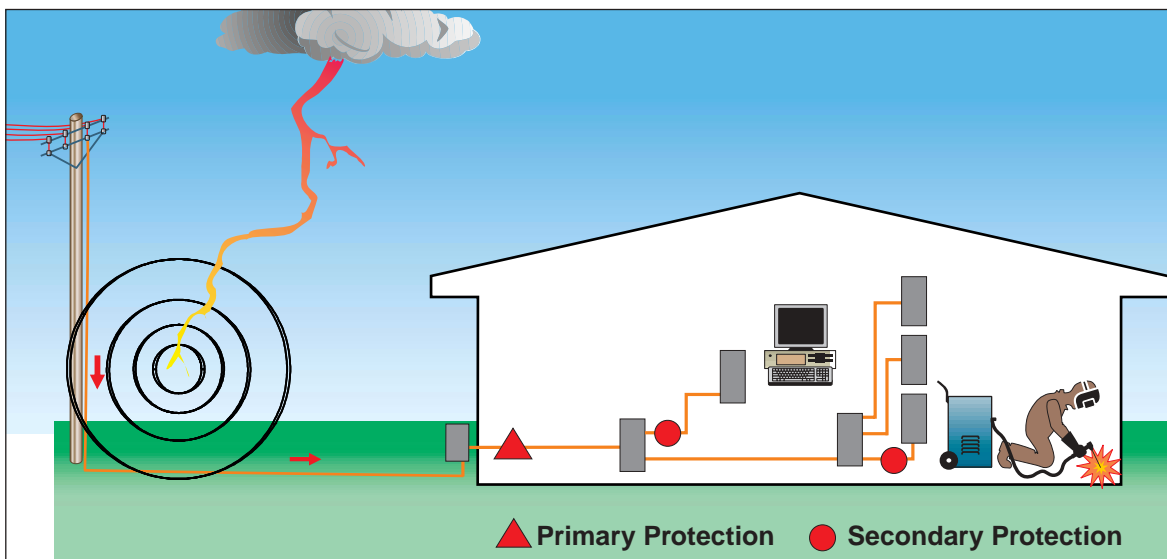


PROTECT INCOMING AC POWER FEEDERS

Primary and Secondary Facility Protection

In practice, there is a need for a wider range of products and technologies to satisfy more than the three ANSI/IEEE C62.41 recommended locations and surge ratings. To provide comprehensive protection for the diverse needs of Commercial & Industrial, Utility, Defense and Cellular & Wireless facilities, ERICO offers a range of surge protection devices and technologies.

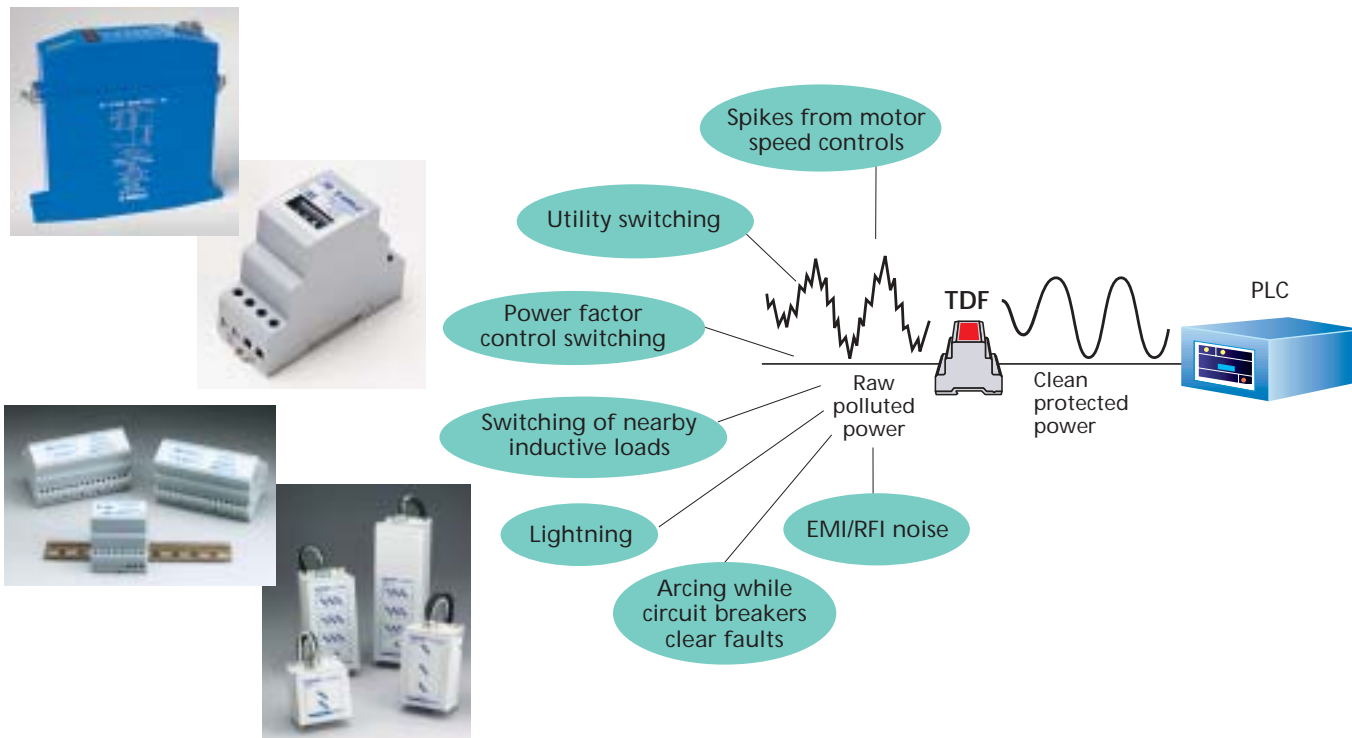
Most facility protection utilizes a high energy primary SPD at the service entrance as the first line of defense. This is followed by lower rated secondary protection devices at selected branch distribution panels. The secondary protection fulfills two roles - lowering the primary protection's residual voltage as well as providing local protection against internally generated transients.



Protection for Process Control and Automation Equipment

Modern industry is highly reliant on electronic automation to increase productivity and safety. Programmable Logic Controllers (PLCs) and SCADA are now common place in most manufacturing facilities, and microprocessors can be found imbedded in many industrial machines, security & fire alarms,

time clocks and inventory tracking tools. However, the power circuits of most industries are severely polluted with electrical disturbances caused by the switching of inductive loads, electrical noise from motor speed controllers and even the occasional induced lightning impulse.



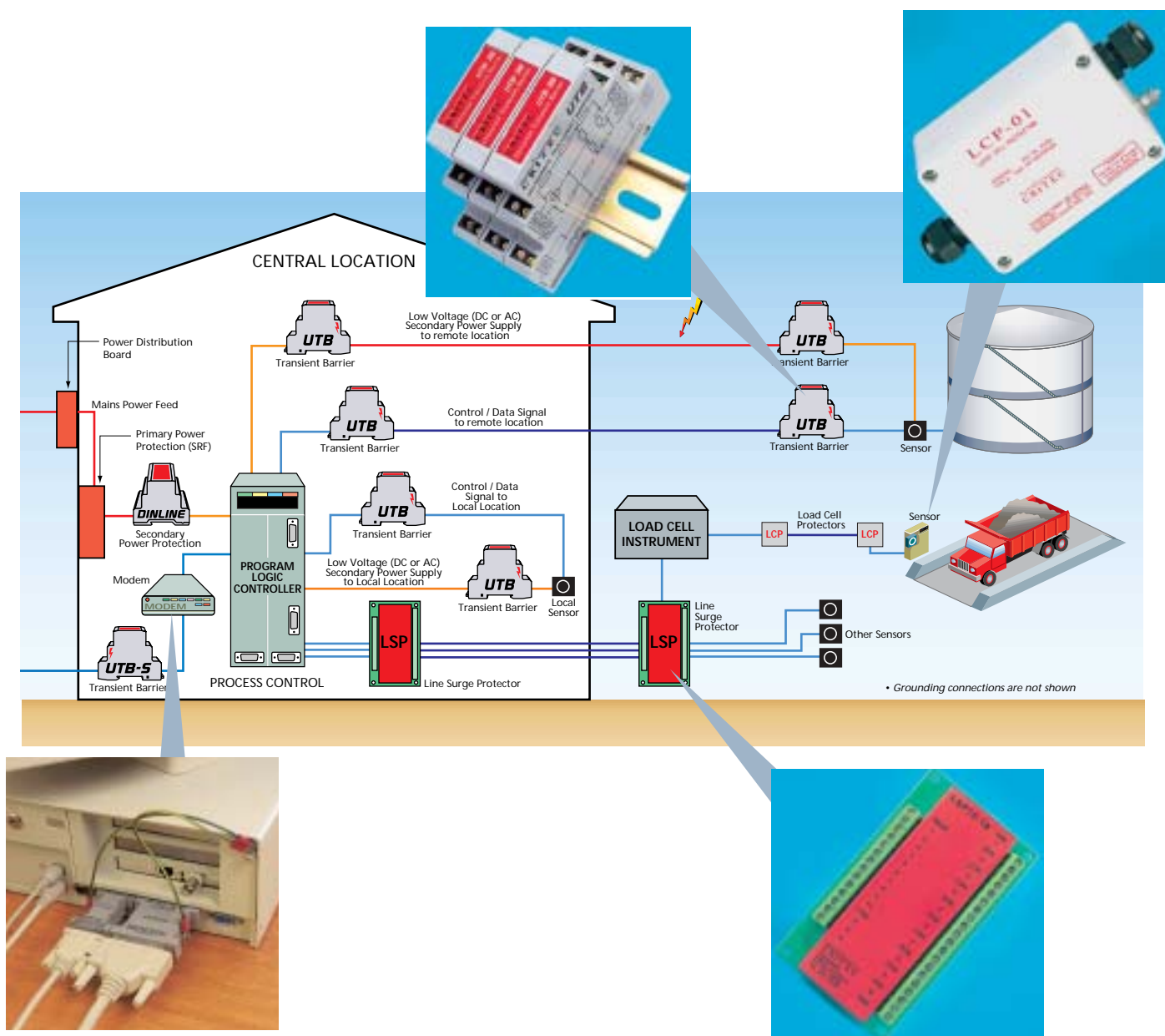
PROTECT LOW VOLTAGE DATA/TELECOMMUNICATIONS CIRCUITS

Data, Control & Signaling Protection

Transients and surges caused by such events as lightning strikes, the switching of inductive loads and even static discharge, can be coupled on to low voltage communication cables. Telephone lines, industrial process control lines, coaxial feeders, and computer networks are all vulnerable to surges, which may be up to 20kA in certain risk environments.

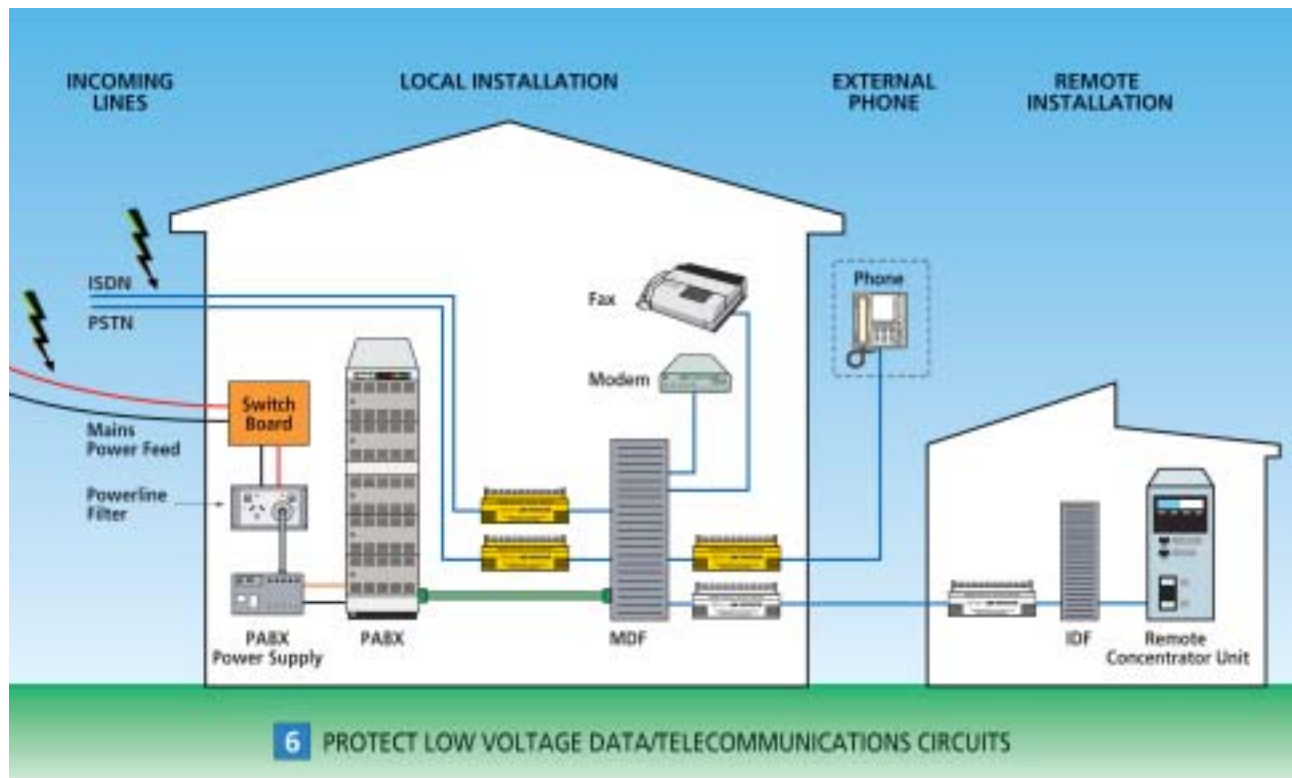
ERICO offers multi-stage hybrid topologies to ensure both an adequate surge handling capability together with a very low residual voltage.

- Primary protection products using gas discharge tubes provide cost effective solutions for less sensitive equipment.
- Premium two-stage technologies, incorporating both gas arresters with secondary solid state clamping components, ensure a higher level of performance with lower residual voltages.
- Robust three-stage protectors, like the Universal Transient Barriers, incorporate gas arresters, metal oxide varistors and solid state clamping components to provide high energy protection for critical environments such as industrial process control.



PROTECT LOW VOLTAGE DATA/TELECOMMUNICATIONS CIRCUITS

Telecommunications Protection



The CRITEC telecommunications equipment protectors provide a range of transient and operating performance characteristics to protect telecommunications terminal and interface equipment from transients on telecommunications lines. The CRITEC line of devices includes models designed to protect analogue voice frequency equipment, and high speed digital circuits, providing optimum protection irrespective of the type of circuit in use.

Telecommunications protection devices provide a clear benefit to the network operator by reducing equipment damage and system down time. Profits can be increased by reducing the costs of system maintenance and economic losses.

The telecommunications protectors should be integrated with Power Filters to provide a more complete protection scheme for PABX, office telephone or for switching centers.



Research and Product Development

ERICO has a high commitment to in-house research and product development in order to better understand the lightning process and electrical phenomena. This research

has led to the development of a number of techniques, with granting of international patents, and numerous, innovative product applications.



- ERICO's constant search for innovative lightning solutions has been undertaken in high voltage laboratories in Europe, North America, Indonesia, Australia and the USA.

- The company has pioneered a 200kV generator capable of producing a computer-controlled, monotonically increasing waveform to simulate the "e-field" of a naturally-occurring "stepped downleader". Electric field rise times for this generator can be up to 1 kV/m/μs.

- High impulse current surge generators are used to test SPD product performance and compliance to various international standards.

- Many products have UL (Underwriters' Laboratories) listing, CE compliance, or have been granted other accredited organization approval for distribution internationally.

The quality of ERICO's engineering team is recognized by engineering institutions and the acceptance of technical papers at premier lightning protection, surge protection and grounding conferences around the world.

The engineers of ERICO have extensive experience on a wide number of International Standards Committees and Organizations including:

- IEC - (International Electrotechnical Commission)
 - IEC TC81 Lightning Protection
 - IEC SC37A Low-voltage surge protective devices
 - IEC SC37B Specific components for surge arresters and surge protection devices
 - IEC TC64 Electrical installations of buildings
- IEEE - (Institution of Electrical and Electronic Engineers)
 - IEEE - Std 80 Working Group - IEEE Guide for safety in substation grounding
 - IEEE - Std 587 Committee - IEEE Guide for surge voltages in low voltage AC power circuits (ANSI C62-41)
 - IEEE - Std 837 Working Group - IEEE Standard for qualifying permanent connections used in substation grounding
 - IEEE - Std 998 Working Group - IEEE Guide for direct lightning stroke shielding of substations
 - IEEE - Std 1100-IEEE Recommended practice for powering and grounding sensitive electronic equipment
- BS6651 - Lightning Protection
- SAA (Standards Australia)
 - EL/24 Lightning Protection
 - EL 7/3/1 Low Voltage Surge Arresters
 - TE 20 Telecommunications Overvoltage Protection
- NFPA - National Fire Protection Association - NFPA-780
- NEMA - 5VS Low Voltage Surge Protection Devices

TOTAL SOLUTIONS AND SERVICES

Applications Engineering Services/Training

ERICO has 100 years experience in design and product development for railway, utility and industrial protection and grounding. Combined with over 20 years experience

in lightning and transient overvoltage protection for facilities, ERICO can assist with providing the solution for all types of problems in any industry sector.



Services provided by ERICO include:

- Technical and Risk-Benefit Analysis
- Specification and advice on application of technologies
- Design and manufacture of product specials
- Computer-assisted installation design (lightning protection and grounding)
- Product supply
- Installation
- Earth System Analysis
- Commissioning
- Testing
- Certification
- Training
- Servicing and Maintenance Reporting Training Courses

To support our customers, training courses and educational seminars are regularly conducted in various locations around the world. These can be tailored to suit your specific requirements.

Topics include:

- Theory of lightning formation
- Air terminal and lightning downconductor technology
- Grounding for substations
- Grounding for electronic equipment including computer and telecommunications facilities
- Power line protection, including shunt and series protection
- Data and Communication equipment protection
- Installation procedures
- Lightning Safety

Cathodic Protection, Bonding & Surge Protection

For pipelines, refineries and water supply infrastructure

Pipelines, refineries and water supply infrastructure facilities are sophisticated and complex networks of metering, control, instrumentation and communications equipment. Unfortunately, these facilities and especially pipelines, act as very efficient collectors of lightning energy. Current from strikes that occur near pipelines will travel many miles because the pipes have been well insulated to minimize corrosion. The conflicting requirements between corrosion protection and surge protection can be resolved with the range of ERICO corrosion protection and surge protection products. In both cases, a high degree of reliability is required for equipment and systems designed to last for decades. ERICO is known worldwide for meeting these requirements.

Transient current and energy can be very large and must be limited to prevent damage to equipment and the corrosion protection systems. Transient current typically dissipates in less than a few milliseconds. Corrosion protection of pipes, tanks and related equipment requires a steady DC voltage, low in amplitude but on-line for many decades with virtually no interruption. Both surge protection and corrosion protection systems must be and can be designed to work

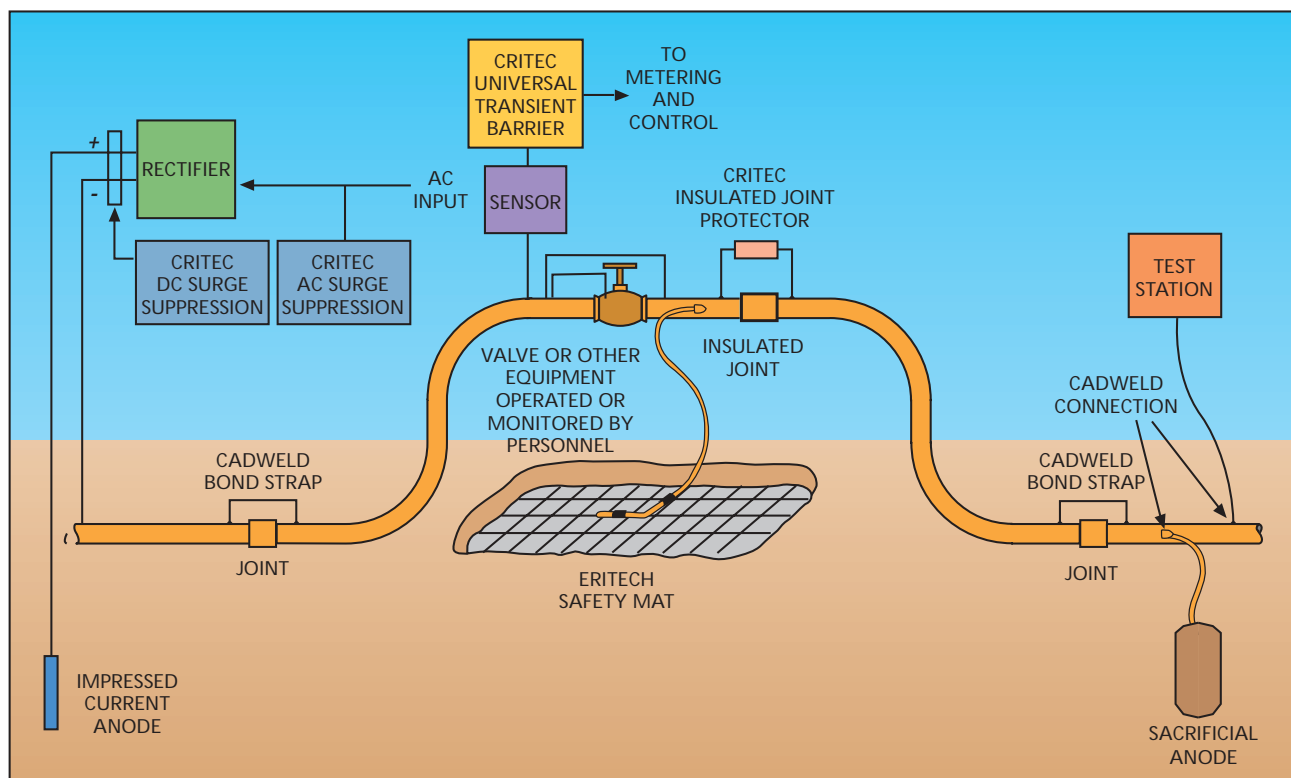
together. One common feature is the requirement that all metal objects sharing the same cathodic protection system must be permanently bonded together. Metal objects on different cathodic protection systems may be isolated from each other but not from earth ground. ERICO can ensure that multiple cathodic protection systems remain separated but work together before and after high voltage transients.

Rectifiers used on impressed current systems are especially vulnerable. Failures due to surges can be virtually eliminated with ERICO surge suppression devices. This protection is available for the AC input and DC output of these rectifiers.

ERICO surge protection devices are available for instrumentation, computing and communication applications.

To protect people in the vicinity of manually operated equipment, ERICO safety mats must be considered. This is especially true if power system transients such as faults can raise the voltage of the equipment.

ERICO also has mechanical connectors for selected cathodic protection applications.



TOTAL SOLUTIONS AND SERVICES



ERICO Website

ERICO has updated its website to offer easier navigation – giving customers the information that they need right at their fingertips.

Now search the site via ERICO's well-known brand names, by ERICO division, alphabetical product listing, or industry. The easy-to-access Literature Library provides pertinent literature in an easy-to-download PDF format. In the News & Events section, customers can find new product updates, new product announcements and lists of helpful seminars.

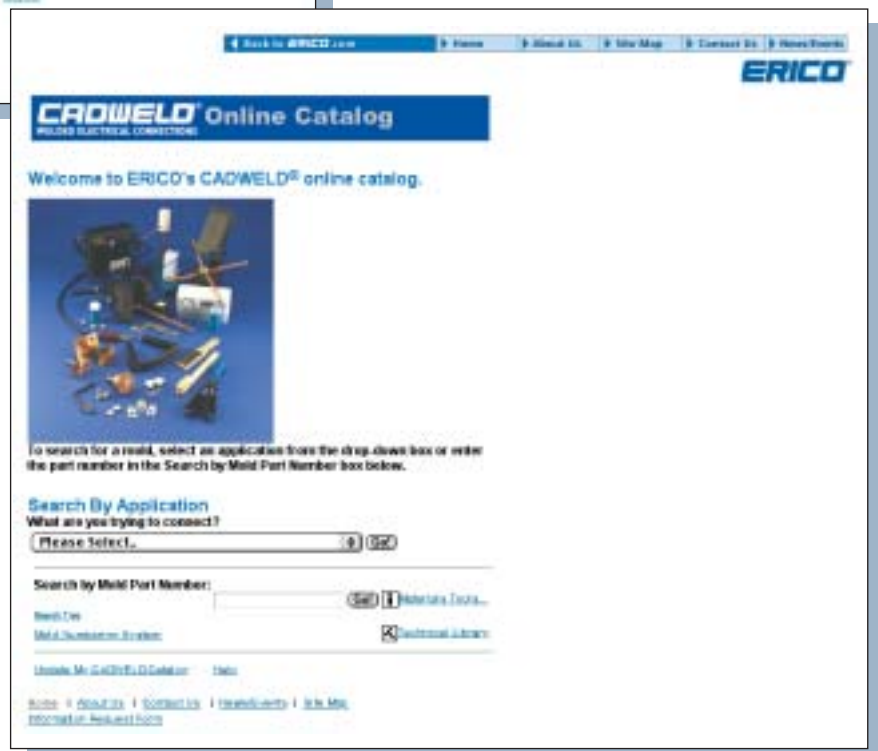
Other features include:

- Faster access to product information through improved navigation
- Product specifications
- A list of upcoming events and industry trade shows
- Locations and contact information for ERICO offices around the world

CADWELD Online Catalog

The CADWELD interactive catalog will help determine the right mold and materials for practically any grounding or bonding application.

This interactive catalog presents all CADWELD mold styles in an easy to understand pictorial format. Begin by choosing a connection type. The easy-to-navigate catalog then allows the user to select a connection family as well as run and tap sizes. The result provides a mold part number, required weld metal size and quantity, and required and recommended parts. If selected, mold families that provide alternatives to making the connection for the specified conductors are also displayed.





www.erico.com



AUSTRALIA

6 Chilvers Road
P.O. Box 148
Thornleigh (Sydney) NSW 2120
Australia
Tel. 61-2-9479-8500
Fax 61-2-9484-9188



HONG KONG

Unit 1, 2nd Floor, Block A
Po Yip Building
62-70 Texaco Road
Tsuen Wan, New Territories
Hong Kong
Tel. 852-2764-8808
Fax 852-2764-4486



SINGAPORE

16 Wan Lee Road
Jurong Industrial Estate
Singapore 627946
Tel. 65-6-268-3433
Fax 65-6-268-1389



BELGIUM

Lambroekstraat 5A
B-1831 Diegem
Belgium
Tel. 32-14-69-96-88
Fax 32-14-69-96-90



HUNGARY

Ceglédi út 1-3
1107 Budapest
Hungary
Tel. 36-1-431-3464
Fax 36-1-431-3471



SPAIN

C/ Provenza 288, Pral.
08008 Barcelona
Spain
Tel. 34-93-467-7726
Fax 34-93-467-7725



BRAZIL

Rua D. Pedro Henrique de Orleans
E Braganca, 276
Vila Jaguara CEP 05117-000
Sao Paulo
Brazil
Tel. 55-11-3621-4111
Fax 55-11-3621-4066



INDONESIA

Wisma Danamon Aetna Life, 19th Floor
Jalan Jend. Sudirman Kav. 45-46
Jakarta 12930
Indonesia
Tel. 62-21-575-0941
Fax 62-21-575-0942



SWEDEN

Carlsgatan 12 A
SE-211 20 Malmö
Sweden
Tel. 46-40-611-1360
Fax 46-40-611-9415



CANADA

34600 Solon Road
Solon, Ohio 44139
U.S.A.
Tel. 1-800-677-9089
Fax 1-800-677-8131



ITALY

Via Pavia 69
15100 Alessandria
Italy
Tel. 39-01-3122-2054
Fax 39-01-3122-2879



SWITZERLAND

Pra Pury 7d
3280 Murten
Switzerland
Tel. 41-26-672-9999
Fax 41-26-672-9998



CHILE

Alcantara 200, piso 6 Of. 17
Las Condes, Santiago
Chile
Tel. 56-2-370-2908
Fax 56-2-370-2914



MEXICO

Melchor Ocampo 193
Torre A piso 13
Col. Veronica Anzures
11300 Mexico D.F.
Mexico
Tel. 52-55-5260-5991
Fax 52-55-5260-3310



THAILAND

Level 23, M. Thai Tower, All Seasons Place
87 Wireless Road
Pathumwan, Bangkok 10330
Thailand
Tel. 66-2-627-9037
Fax 66-2-627-9168



DENMARK

Carlsgatan 12 A
SE-211 20 Malmö
Sweden
Tel. 45-46-19-1941
Fax 45-46-19-1942



NETHERLANDS

Postbus 487
NL - 5000 AL Tilburg
Netherlands
Tel. 31-13-583-5400
Fax 31-13-583-5499



TURKEY

Insaat Malzemeleri, Perpa Ticaret Merkezi
B Blok, 5 Kat, 5. Cadde. No. 297
Istanbul 80270
Turkey
Tel. 90-212-210-0825
Fax 90-212-210-0827



FRANCE

Rue Benoit Fournayron Z.I. Sud
Boite Postale 31
42161 Andrezieux Cedex
France
Tel. 33-4-7736-5656
Fax 33-4-7755-3789



NORWAY

Postboks 148
NO-1325 Lysaker
Norway
Tel. 47-67-53-1200
Fax 47-67-12-4268



UNITED KINGDOM

52 Milford Road
Reading, Berkshire RG1 8LJ
United Kingdom
Tel. 44-118-958-8386
Fax 44-118-959-4856



GERMANY

D-66851 Schwanenmuehle
Germany
Tel. 49-6307-918-10
Fax 49-6307-918-150



POLAND

54-613 Wrocław
ul. Krzemieniecka 17
Poland
Tel. 48-71-357-4827
Fax 48-71-374-4043



UNITED STATES

34600 Solon Road
Solon, Ohio 44139
U.S.A.
Tel. 1-440-248-0100
Fax 1-440-248-0723