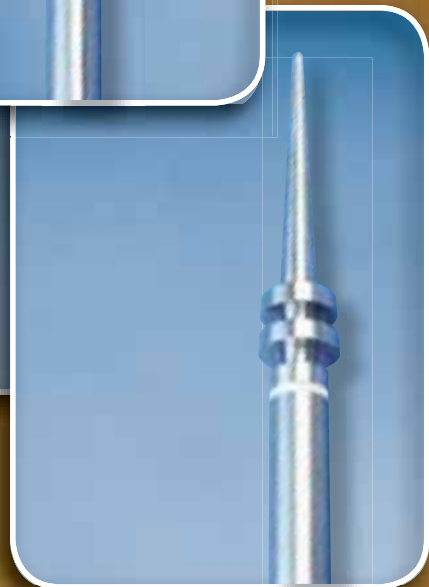
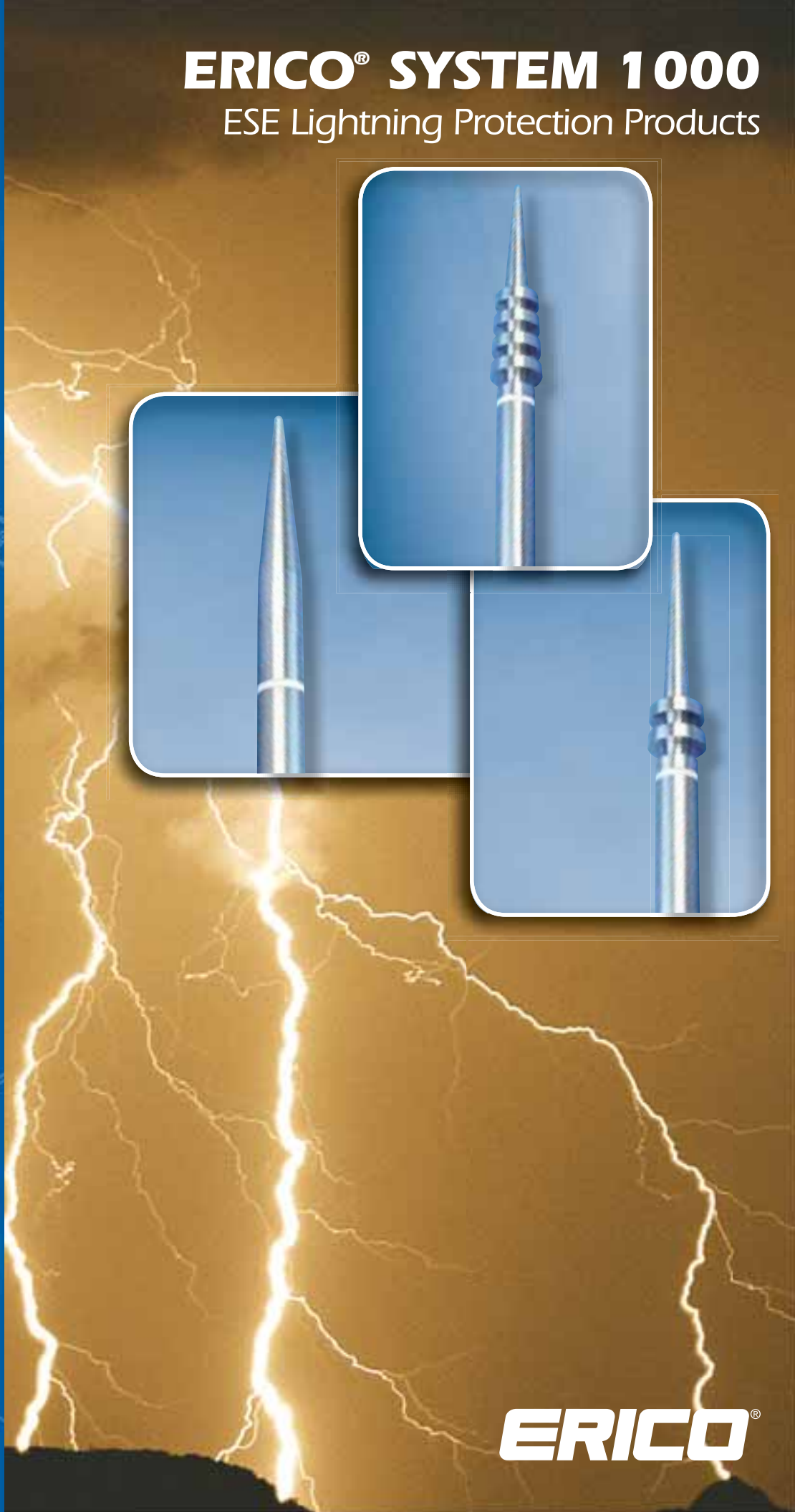


# ERICO® SYSTEM 1000

ESE Lightning Protection Products



**ERICO®**

# Active Protection

ERICO is a trusted world leader for providing high-quality grounding solutions, lightning protection and surge protection technologies. By recognizing the importance of an integrated lightning protection strategy, ERICO has incorporated several major concepts into a Six Point Plan of Protection:

1. Capture the lightning strike
2. Convey this energy to ground
3. Dissipate energy into the grounding system
4. Bond all ground points together
5. Protect incoming AC power feeders
6. Protect low voltage data/ telecommunications circuits

ERICO operates in every region of the world and supports the global market with an extensive distribution network, helping to ensure that ERICO products and expertise are available for any project, regardless of size or location. Dedicated consulting teams assess the requirements of any project and provide guidance for optimal lightning protection solutions.

An unparalleled level of engineering support and experience is involved in the development of grounding, lightning protection and surge protection products. ERICO has developed specialized design software to integrate all aspects affecting system performance, including local conditions, to help ensure that requirements of relevant standards are met or exceeded.

ERICO's products are manufactured to ISO® 9001:2008 and are subjected to rigorous field and laboratory testing and computer modeling during product development. The products are supported by test reports, technical papers, literature and installation instructions.



ERICO offers three versions of the ERICO® INTERCEPTOR ESE i-Series air terminals:

- SI25i with a triggering advance of 25  $\mu$ s
- SI40i with a triggering advance of 40  $\mu$ s
- SI60i with a triggering advance of 60  $\mu$ s

These early streamer emission air terminals (ESEAT) are in accordance with the 2011 edition of NF C 17-102. The design requirements, protection level calculations and protection radius are obtained from this standard.

Due to the internal control circuit, the ERICO INTERCEPTOR ESE i-Series enables the early launching of an upward leader compared to other passive components.

1. Strike tip
2. Insulator ring
3. High voltage control section

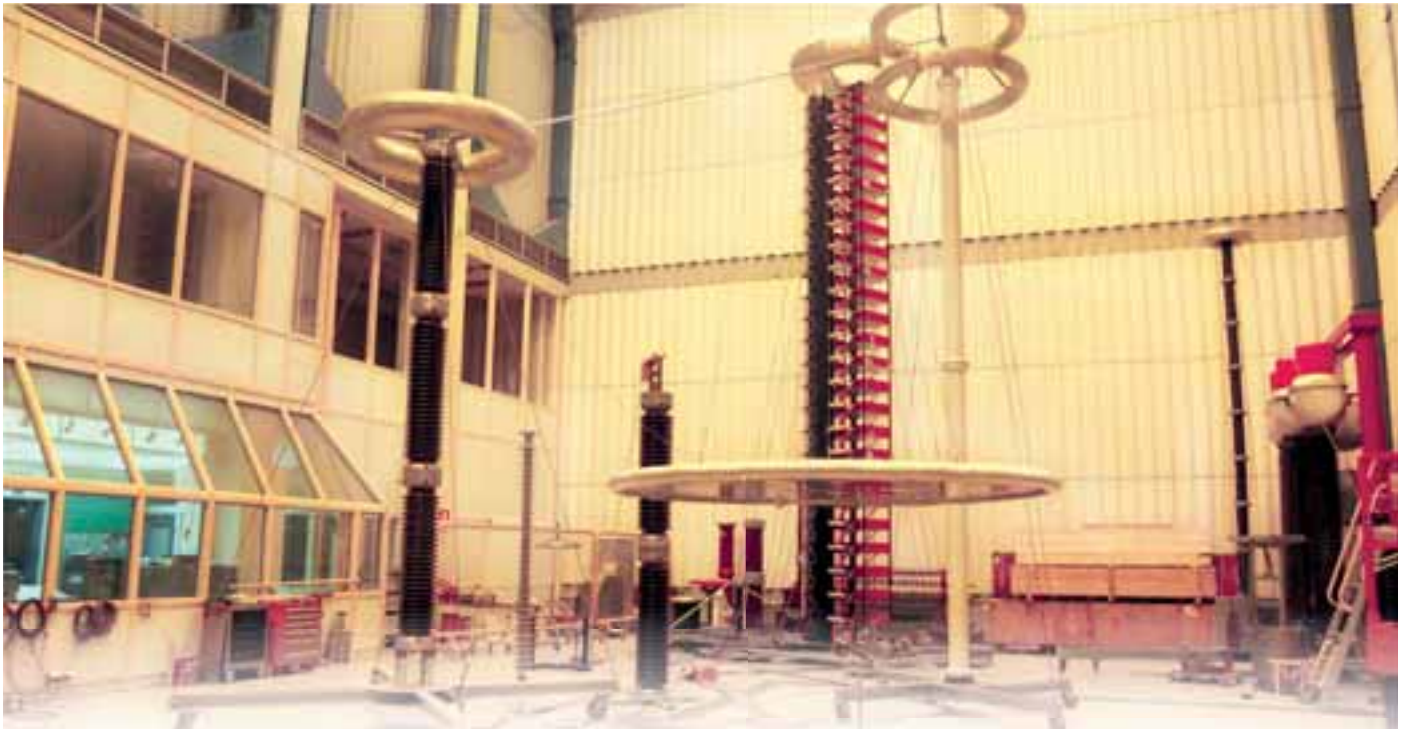


SI60i





# Testing and Working Principles



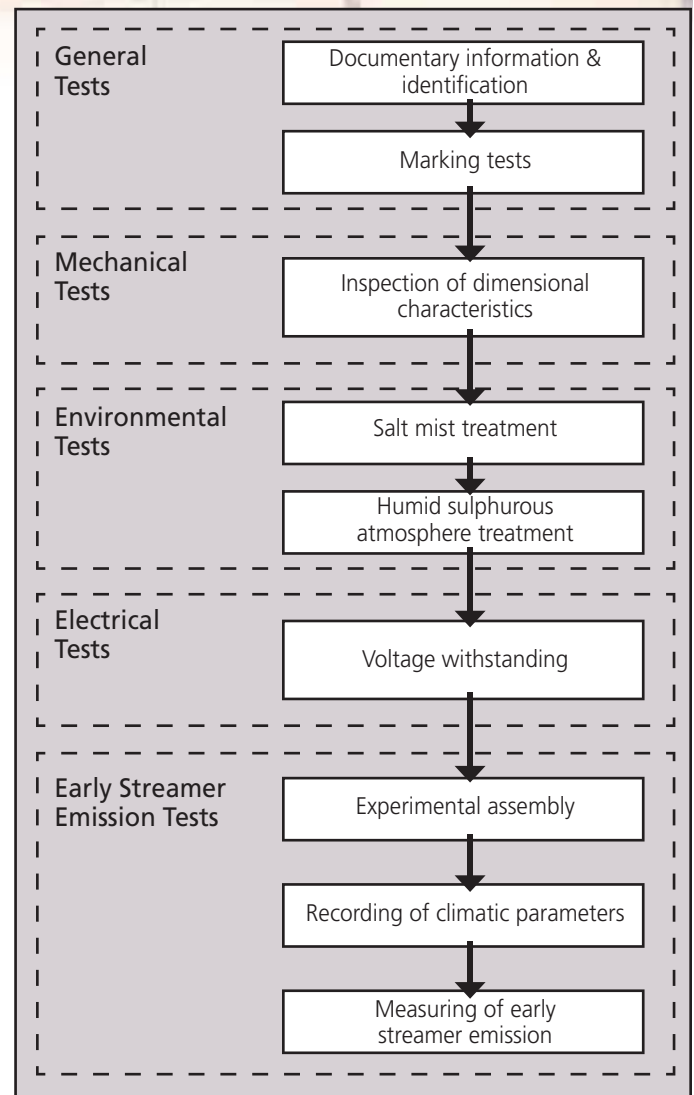
## Testing

The ERICO® INTERCEPTOR ESE i-Series has been extensively tested at an independent high-voltage laboratory\* in accordance with the revised 2011 requirements of French NF C 17-102. The testing, as defined in the standard, was designed to simulate naturally occurring conditions and allow comparison of the performance between differing types of lightning protection systems.

The test simulates natural field conditions where a field impulse (from the downward leader approaching ground, simulated by a Marx Generator with a long front time) is superimposed onto a permanent field (from the charge between cloud and ground, simulated in the laboratory by a DC generator).

The corona at the tip of the rod is measured by a photo-multiplier that enables the determination of the triggering time of both the simple rod air terminal (SRAT) and the ESEAT. The average value is then determined for both a simple rod and the ESEAT.  $T(SRAT)$  is then subtracted from  $T(ESEAT)$  to achieve the  $\Delta T$  advantage for the ERICO INTERCEPTOR ESE i-Series.

The 2011 revision of the standard has defined more rigorous environmental and performance criteria during terminal testing and has created a higher standard for early streamer emission terminals. The requirements became effective September 2012.

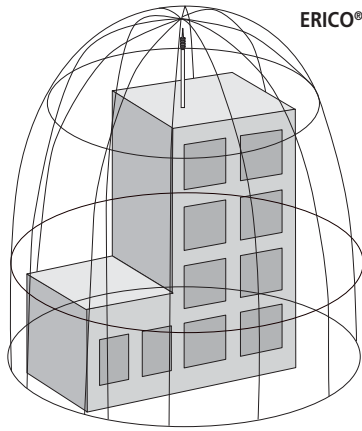


\* Test reports available upon request.

# Testing and Working Principles

## Working Principles

During thunderstorm conditions when the lightning down leader is approaching ground level, an upward leader may be created by any surface. In the case of a passive lightning rod, the upward leader propagates only after a long period of charge reorganization. In the case of the ERICO® INTERCEPTOR ESE i-Series, the initiation time of an upward leader is greatly reduced. The ERICO INTERCEPTOR ESE i-Series generates controlled magnitude and frequency pulses at the tip of the terminal during high static fields prior to a lightning discharge. This enables the creation of an upward leader from the terminal that propagates toward the downward leader coming from the thundercloud.



**ERICO® INTERCEPTOR i-series ESE**  
Early Streamer Emission  
Lightning Terminal

According to  
the NF C 17-102  
and similar  
ESE standards

SI60i

SI40i

SI25i

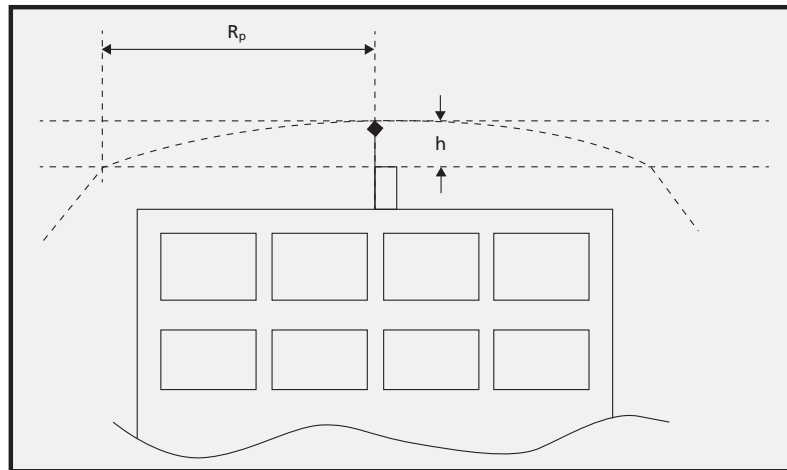
## Features

- Designed and tested to NF C 17-102 and similar standards
- 304 stainless steel design suitable for most environments
- Available in three models to suit specific site requirements
- Suitable for use with a variety of downconductor systems, including tape, cable, smooth-weave, Isolated Downconductor (ISODC) and ERICO® ERICORE conductor



# Protecting Areas

According to NF C 17-102:2011, the standard protection radius ( $R_p$ ) of the ERICO® INTERCEPTOR ESE i-Series is linked to  $\Delta T$  (below), the protection levels I, II, III or IV (as calculated in EN 62305-2) and the height ( $h$ ) of the ERICO INTERCEPTOR ESE i-Series above the structure or feature to be protected (defined by NF C 17-102 as a minimum 2 m).



Protection Level	Protection Level I (99%, D = 20 m)			Protection Level II (97%, D = 30 m)			Protection Level III (91%, D = 45 m)			Protection Level IV (84%, D = 60 m)		
	Model	SI25i	SI40i	SI60i	SI25i	SI40i	SI60i	SI25i	SI40i	SI60i	SI25i	SI40i
$\Delta T$ ( $\mu s$ )	25	40	60	25	40	60	25	40	60	25	40	60
$h$ (m)	Rp (m) Protection Radius											
2	17	23	32	19	26	34	23	30	40	26	34	44
3	25	35	48	26	39	52	34	45	59	39	50	65
4	34	46	64	39	52	68	46	60	78	52	67	87
5	42	58	79	49	65	86	57	75	97	65	83	107
6	43	59	79	49	66	86	58	76	97	66	84	107
7	44	59	79	50	66	87	59	76	98	67	85	108
8	44	59	79	51	67	87	60	77	99	68	86	108

Where  $h \geq 5$  m, then  $R_p$  can be calculated from

$$R_p(h) = \sqrt{2rh - h^2 + \Delta(2r + \Delta)}$$

Where  $2 \text{ m} \leq h \leq 5 \text{ m}$ , then  $R_p$  can be calculated from

$$R_p = h \times R_p(5) / 5$$

$R_p(h)$  (m) is the protection radius at a given height  $h$

$h$  (m) is the height of the ESEAT tip over the horizontal plane through the furthest point of the object to be protected

$r$  (m)  
 20 m for protection level I  
 30 m for protection level II  
 45 m for protection level III  
 60 m for protection level IV

$\Delta$  (m)  $\Delta = \Delta T \times 106$   
 Field experience has proved that  $\Delta$  is equal to the efficiency obtained during the ESEAT evaluation tests

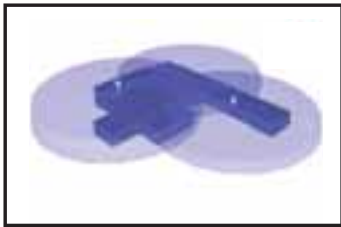




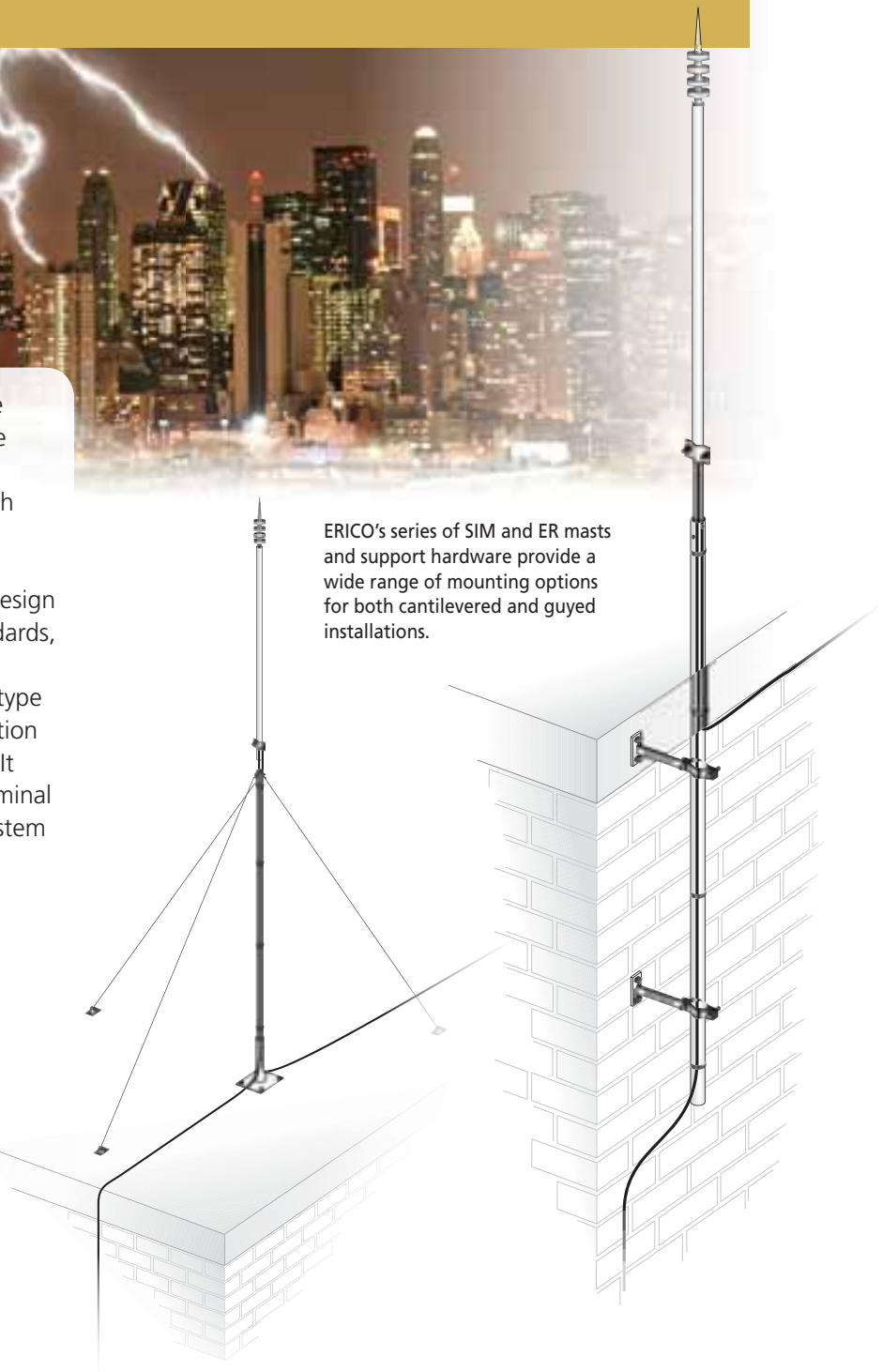
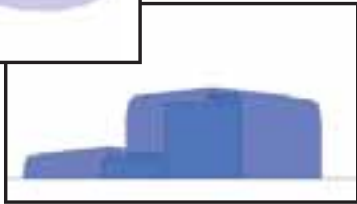
# Design

The aim of lightning protection design is to mitigate all the factors that can impact the lightning risk. The requirements of EN62305-2 provide guidance on calculation and selection of protection levels for each specific application.

ERICO's unique computer-aided program provides design support for a variety of design techniques and standards, including NF C 17-102. Based on individual site parameters, such as structure dimensions, terminal type and protection requirements, each Lightning Protection System Design (LPSD) is customized for the project. It provides elevation, 3-D and plan views enabling terminal location, downconductor routing and grounding system requirements to be optimized for your facility.



LPSD Design Software



ERICO's series of SIM and ER masts and support hardware provide a wide range of mounting options for both cantilevered and guyed installations.

## System Requirements:

The design and installation of the terminals should be completed in compliance with the requirements of the French Standard NF C 17-102. In addition to terminal placement requirements, the standard requires a minimum of two paths to ground per terminal for non-isolated conductor systems. A downconductor cross-sectional area of  $\geq 50 \text{ mm}^2$  is specified. The downconductors are to be secured at three points per meter with equipotential bonding made to nearby metallic items.

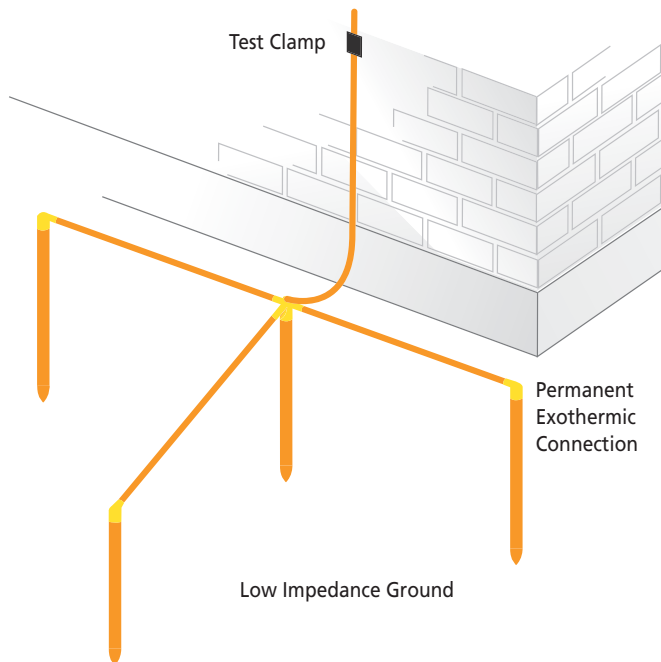
Each downconductor requires a test clamp and dedicated earth system of 10 ohms or less. The lightning protection ground should be connected to the main building ground and any nearby buried metallic items. The NF C 17-102 and similar ESE standards requirements for inspection and testing range from each year to every four years dependent upon location and protection level selected. Refer to your ERICO representative or the ERICO® SYSTEM 1000 installation manual for additional information.



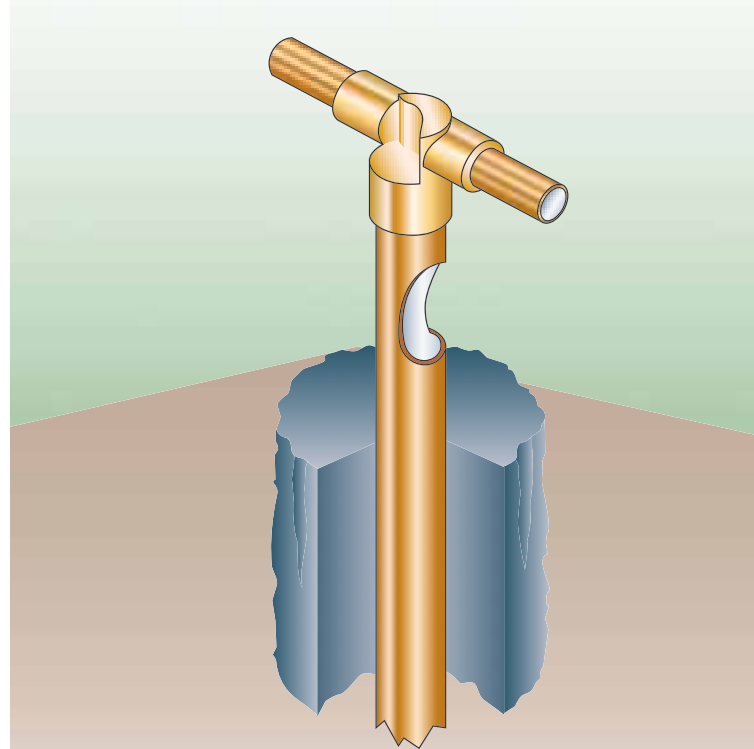
# Importance of Grounding

The transient nature of lightning with its associated fast rise times and large magnitude currents mean that special consideration needs to be given to grounding for lightning protection to be effective. A poorly grounded system increases the likelihood of the strike flashing over to the structure and/or finding a non-preferred path within the structure. Many factors, such as soil resistivity variations, installation accessibility, layout and existing physical features are all site-specific and tend to affect decisions on grounding methods employed. The primary requirements of a direct strike grounding system are to:

- Efficiently dissipate lightning energy into the ground
- Help protect equipment and personnel
- Provide good corrosion resistance/long life



The ground electrode system should be corrosion resistant and bonded to the structural ground system. Copper and copper-bonded steel are the most common materials used for grounding conductors. Mechanical coupling can be used to join ground conductors, but suffers from corrosion effects when dissimilar metals are involved. In addition to mechanical strength, ERICO® CADWELD® connections provide excellent, low-impedance and long-life electrical connections with excellent corrosion resistance.



ERICO also recommends the use of Ground Enhancement Material (GEM) to ensure an optimal ground. GEM is a low-resistance, non-corrosive, carbon dust-based material that helps improve grounding effectiveness, especially in areas of poor conductivity. GEM contains cement, which hardens when set to provide a permanent, maintenance-free, low-resistant grounding system that never leaches or washes away. GEM does not adversely affect soil and will not leach ions or contaminate ground water. GEM conforms to IEC 62561-7 Standard, and is identified in NF C 17-102 as an option for reducing soil resistivity.



ERICO recommends an annual inspection and maintenance program to verify the long-term effectiveness of the lightning protection and grounding system.

# Ordering Information

## Air Terminals



### ERICO® INTERCEPTOR SI

SI25i	25 μs	1.53 kg
SI40i	40 μs	1.53 kg
SI60i	60 μs	1.53 kg

## Masts Accessories



### Guy Kit

GUYKIT4MGRIP	(701305)	4 m	0.4 kg
GUYKIT7MGRIP	(701315)	7 m	0.7 kg

Guy kits for 4 m and 7 m vertical guy heights.



### Cable Tie

CABTIESS	(701420)	0.05 kg
----------	----------	---------

520 mm stainless steel cable tie for strapping downconductor to lower mast sections.



### Mast Bracket

ALOF1GS	(702175)	1.5 kg
---------	----------	--------

280 mm galvanized steel bracket for masts 28 to 68 mm diameter.

## Lightning Event Counter



### Digital Lightning Event Counter

LECV	0.3 kg
------	--------

Digitally records quantity, hour and date of lightning strikes for retrieval during inspections.



### Mechanical Lightning Event Counter

LECIV	(702050)	0.685 kg
-------	----------	----------


Installed on downconductor to record number of lightning strikes.





# Ordering Information for Europe and Asia


## Masts and Bases

Masts and Bases			
	SIM28A2	Upper section, 2 m	2.3 kg
	SIM33B2	Mid section, 2 m	3.5 kg
	SIM33B3	Mid section, 3 m	5.3 kg
	SIM40C2	Lower section, 2 m	4.0 kg
	SIM40C3	Lower section, 3 m	6.1 kg
	SIMBASE2840	Base	1.2 kg
	SIM28XX	Mast diameter	28 mm
	SIM33XX	Mast diameter	33 mm
	SIM40XX	Mast diameter	40 mm


## Adapters


	<b>Mast Adapter</b> INTCPTMI16AT	0.1 kg
	SIM28 to 16 mm air terminal.	


	<b>Mast Adapter</b> INTCPTSIERICOR	0.1 kg
	ERICO® ERICORE to Sli terminal.	

	<b>Mast Butt Adapter</b> INTCPTADBUTTSII	0.05 kg
	Required to mount the ERICO® INTERCEPTOR Air Terminal into the FRP mast. For use with INTCPTSIERICOR.	

## Accessories

	<b>Mast Clamp</b> TMC-SS	(702165)	0.2 kg
	Clamp for connecting 25x3, 30x2 or 8 mm diameter conductor to SIM masts.		

	<b>Mast Bracket</b> ACF-2-GS	(103100)	2.1 kg
	Parallel pipe clamp for masts 30 to 50 mm diameter. Supplied as set of two brackets.		

	<b>Waterproof Cone</b> WPC	(702230)	0.07 kg
--	-------------------------------	----------	---------

Guyed Masts:						
Mast Height (m)	2	4	5	6	7	8
SIM28A2	X	X	X	X	X	X
SIM33B2		X		X		
SIM33B3			X		X	X
SIM40C2				X	X	
SIM40C3						X
SIMBASE2840	X	X	X	X	X	X
GUYKIT4M/GRIP		X	X	X	X	X
GUYKIT7M/GRIP					X	X
CABTIESS	4	8	10	12	14	16
BASEADAPTER40		X	X			

Cantilevered Masts:			
Mast Height (m)	4	5	7
Height above roof plane (m)	3	4	5
SIM28A2	X	X	X
SIM33B2	X		
SIM33B3		X	X
SIM40C2			X
CABTIESS	8	10	14
ALOF1GS	2	2	3

# Ordering Information for North America and South America

## Masts and Bases



### Masts and Bases

ER1-1000-SS	(702255)	Upper section, 1 m	3.5 kg
ER1-2000-SS	(702260)	Upper section, 2 m	6.2 kg
ER2-2000-SS	(702265)	Mid section, 2 m	4.9 kg
ER2-3000-SS	(702270)	Mid section, 3 m	7.3 kg
ER3-2000-SS	(702275)	Lower section, 2 m	5.3 kg
ER3-3000-SS	(702280)	Lower section, 3 m	7.9 kg
ER2-BASE-SS	(702290)	Base for ER2 mast	5.2 kg
ER3-BASE-SS	(702295)	Base for ER3 mast	5.6 kg
ER1-xxxx-SS		mast diameter 25 mm	
ER2-xxxx-SS		mast diameter 32 mm	
ER3-xxxx-SS		mast diameter 38 mm	

## Accessories



### Mast Clamp

LPC570	0.2 kg
Clamp for connecting stranded conductor to ER mast.	

## Adapters



### Adapter

INTCPTSIER1	0.1 kg
Sli terminal to ER1 mast.	



### Adapter

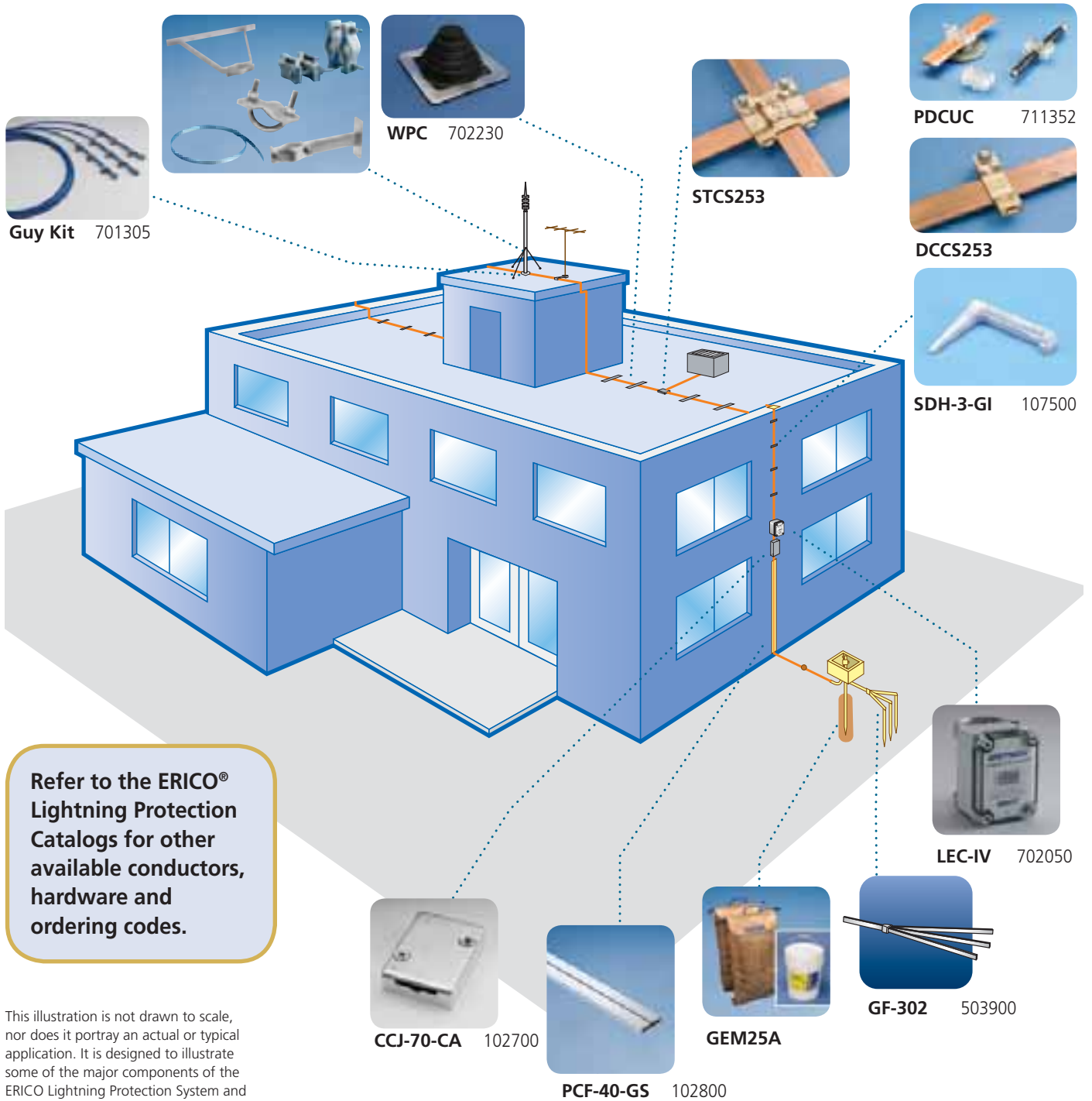
INTCPTSIER2	0.1 kg
Sli terminal to ER2 mast.	

Guyed Masts							
Mast Height (m)	2	3	4	5	6	7	8
ER11000SS						X	
ER12000SS							X
ER22000SS	X		X	X			
ER23000SS		X			X	X	X
ER32000SS			X				
ER33000SS				X	X	X	X
ER2BASESS	X	X					
ER3BASESS			X	X	X	X	X
GUYKIT4M/GRIP		X	X			X	X
GUYKIT7M/GRIP				X	X	X	X
CABTISS	4	6	8	10	12	14	16
INTCPTSIER1						X	X
INTCPTSIER2	X	X	X	X	X		

Cantilevered Masts:				
Mast Height (m)	3	4	6	7
Height above roof plane (m)	2	3	4	5
ER11000SS				X
ER22000SS		X		
ER23000SS	X		X	X
ER32000SS		X		
ER33000SS			X	X
CABTISS	6	8	10	14
ALOF1GS	2	2	3	3
INTCPTSIER1				X
INTCPTSIER2	X	X	X	



# Other Lightning Protection and Grounding Accessories



**Refer to the ERICO® Lightning Protection Catalogs for other available conductors, hardware and ordering codes.**

This illustration is not drawn to scale, nor does it portray an actual or typical application. It is designed to illustrate some of the major components of the ERICO Lightning Protection System and their relationship with one another.

**WARNING**  
 ERICO products shall be installed and used only as indicated in ERICO's product instruction sheets and training materials. Instruction sheets are available at [www.erico.com](http://www.erico.com) and from your ERICO customer service representative. Improper installation, misuse, misapplication or other failure to completely follow ERICO's instructions and warnings may cause product malfunction, property damage, serious bodily injury and death.

**WARRANTY**  
 ERICO products are warranted to be free from defects in material and workmanship at the time of shipment. NO OTHER WARRANTY, WHETHER EXPRESS OR IMPLIED (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), SHALL EXIST IN CONNECTION WITH THE SALE OR USE OF ANY ERICO PRODUCTS. Claims for errors, shortages, defects or nonconformities ascertainable upon inspection must be made in writing within 5 days after Buyer's receipt of products. All other claims must be made in writing to ERICO within 6 months from the date of shipment or transport. Products claimed to be nonconforming or defective must, upon ERICO's prior written approval in accordance with its standard terms and procedures governing returns, promptly be returned to ERICO for inspection. Claims not made as provided above and within the applicable time period will be barred. ERICO shall in no event be responsible if the products have not been stored or used in accordance with its specifications and recommended procedures. ERICO will, at its option, either repair or replace nonconforming or defective products for which it is responsible or return the purchase price to the Buyer. THE FOREGOING STATES BUYER'S EXCLUSIVE REMEDY FOR ANY BREACH OF ERICO WARRANTY AND FOR ANY CLAIM, WHETHER SOUNDING IN CONTRACT, TORT OR NEGLIGENCE, FOR LOSS OR INJURY CAUSED BY THE SALE OR USE OF ANY PRODUCT.

**LIMITATION OF LIABILITY**  
 ERICO excludes all liability except such liability that is directly attributable to the willful or gross negligence of ERICO's employees. Should ERICO be held liable its liability shall in no event exceed the total purchase price under the contract. ERICO SHALL IN NO EVENT BE RESPONSIBLE FOR ANY LOSS OF BUSINESS OR PROFITS, DOWNTIME OR DELAY, LABOR, REPAIR OR MATERIAL COSTS OR ANY SIMILAR OR DISSIMILAR CONSEQUENTIAL LOSS OR DAMAGE INCURRED BY BUYER.



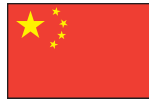
# ERICO®



[www.erico.com](http://www.erico.com)



**AUSTRALIA**  
Phone 1-800-263-508  
Fax 1-800-423-091



**CHINA**  
Phone +86-21-3430-4878  
Fax +86-21-5831-8177



**HUNGARY**  
Phone 06-800-16538  
Fax +39-0244-386-107



**NORWAY**  
Phone 800-100-73  
Fax 800-100-66



**SWITZERLAND**  
Phone 0800-55-86-97  
Fax 0800-55-96-15



**BELGIUM**  
Phone 0800-757-48  
Fax 0800-757-60



**DENMARK**  
Phone 808-89-372  
Fax 808-89-373



**INDONESIA**  
Phone +62-21-575-0941  
Fax +62-21-575-0942



**POLAND**  
Phone +48-71-349-04-60  
Fax +48-71-349-04-61



**THAILAND**  
Phone +66-2-267-5776  
Fax +66-2-636-6988



**BRAZIL**  
Phone +55-11-3623-4333  
Fax +55-11-3621-4066



**FRANCE**  
Phone 0-800-901-793  
Fax 0-800-902-024



**ITALY**  
Phone 800-870-938  
Fax 800-873-935



**SINGAPORE**  
Phone +65-6-268-3433  
Fax +65-6-268-1389



**UNITED ARAB  
EMIRATES**  
Phone +971-4-881-7250  
Fax +971-4-881-7270



**CANADA**  
Phone +1-800-677-9089  
Fax +1-800-677-8131



**GERMANY**  
Phone 0-800-189-0272  
Fax 0-800-189-0274



**MEXICO**  
Phone +52-55-5260-5991  
Fax +52-55-5260-3310



**SPAIN**  
Phone 900-993-154  
Fax 900-807-333



**UNITED KINGDOM**  
Phone 0808-2344-670  
Fax 0808-2344-676



**CHILE**  
Phone +56-2-370-2908  
Fax +56-2-369-5657



**HONG KONG**  
Phone +852-2764-8808  
Fax +852-2764-4486



**NETHERLANDS**  
Phone 0800-0200-135  
Fax 0800-0200-136



**SWEDEN**  
Phone 020-790-908  
Fax 020-798-964



**UNITED STATES**  
Phone 1-800-753-9221  
Fax +1-440-248-0723